



**STATE OF MICHIGAN**  
**CENTRAL PROCUREMENT SERVICES**  
Department of Technology, Management, and Budget  
320 S. WALNUT ST., LANSING, MICHIGAN 48933  
P.O. BOX 30026 LANSING, MICHIGAN 48909

**CONTRACT CHANGE NOTICE**

Change Notice Number **11**  
to  
Contract Number **071B5500115**

<b>CONTRACTOR</b>	DATA TRANSFER SOLUTIONS, LLC	<b>STATE</b>	<b>Program Manager</b>	Various	MDOT
	3680 Avalon Park Blvd , E				
	Orlando, FL 32828				
	Donna Huey		<b>Contract Administrator</b>	Jeremy Lyon	DTMB
	407-382-5222			517-230-2858	
	donna.huey@atkinsglobal.com			lyonj5@michigan.gov	
	CV0001154				

CONTRACT SUMMARY				
ASSET MANAGEMENT SOLUTION				
INITIAL EFFECTIVE DATE	INITIAL EXPIRATION DATE	INITIAL AVAILABLE OPTIONS		EXPIRATION DATE BEFORE
July 13, 2015	July 12, 2022	5 - 1 Year		July 12, 2024
PAYMENT TERMS		DELIVERY TIMEFRAME		
NET 45				
ALTERNATE PAYMENT OPTIONS				EXTENDED PURCHASING
<input type="checkbox"/> P-Card		<input type="checkbox"/> PRC	<input type="checkbox"/> Other	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
MINIMUM DELIVERY REQUIREMENTS				
DESCRIPTION OF CHANGE NOTICE				
OPTION	LENGTH OF OPTION	EXTENSION	LENGTH OF EXTENSION	REVISED EXP. DATE
<input checked="" type="checkbox"/>	2 years	<input type="checkbox"/>		July 12, 2026
CURRENT VALUE	VALUE OF CHANGE NOTICE	ESTIMATED AGGREGATE CONTRACT VALUE		
\$6,027,776.00	\$223,574.00	\$6,251,350.00		
DESCRIPTION				
Effective 5/21/2024, this change is to utilize 2 option years making the revised expiration date 7/12/2026. This change is in the amount of \$223,574 to cover the option years, while also to continue utilizing the capabilities of the VueWorks product and extend the assessment management and maintenance work orders for their traffic signals during this period.				
Period of coverage Amount				
July 13, 2024, to July 12, 2025 - \$110,680.00				
July 13, 2025, to July 12, 2026- \$112,894.00				
Total\$223,574.00				
All other terms, conditions, specifications, and pricing remain the same. Per contractor and agency agreement, DTMB Central				



**Program Managers  
for  
Multi-Agency and Statewide Contracts**

AGENCY	NAME	PHONE	EMAIL
MDOT	Cory Johnson	517-335-2931	johnsonc45@michigan.gov
DTMB	Dave Work	517-241-4604	workd@michigan.gov



**STATE OF MICHIGAN**  
**CENTRAL PROCUREMENT SERVICES**  
Department of Technology, Management, and Budget  
320 S. WALNUT ST., LANSING, MICHIGAN 48933  
P.O. BOX 30026 LANSING, MICHIGAN 48909

**CONTRACT CHANGE NOTICE**

Change Notice Number **10**  
to  
Contract Number **071B5500115**

<b>CONTRACTOR</b>	DATA TRANSFER SOLUTIONS, LLC	<b>STATE</b>	Program Manager	Various	MDOT
	3680 Avalon Park Blvd , E				
	Orlando, FL 32828		Contract Administrator	Christopher Martin	DTMB
	Donna Huey			(517) 643-2833	
	407-382-5222			martinc20@michigan.gov	
	donna.huey@atkinsglobal.com				
	CV0001154				

CONTRACT SUMMARY				
ASSET MANAGEMENT SOLUTION				
INITIAL EFFECTIVE DATE	INITIAL EXPIRATION DATE	INITIAL AVAILABLE OPTIONS	EXPIRATION DATE BEFORE	
July 13, 2015	July 12, 2022	5 - 1 Year	July 12, 2024	
PAYMENT TERMS		DELIVERY TIMEFRAME		
NET 45				
ALTERNATE PAYMENT OPTIONS			EXTENDED PURCHASING	
<input type="checkbox"/> P-Card <input type="checkbox"/> PRC <input type="checkbox"/> Other			<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	
MINIMUM DELIVERY REQUIREMENTS				
DESCRIPTION OF CHANGE NOTICE				
OPTION	LENGTH OF OPTION	EXTENSION	LENGTH OF EXTENSION	REVISED EXP. DATE
<input type="checkbox"/>		<input type="checkbox"/>		July 12, 2024
CURRENT VALUE	VALUE OF CHANGE NOTICE	ESTIMATED AGGREGATE CONTRACT VALUE		
\$5,956,276.00	\$71,500.00	\$6,027,776.00		
DESCRIPTION				
Effective 10/14/2022, the following amendments are incorporated into this Contract per attached the attached SOW and Vendor Proposal. These changes include the following to the SigAM solution:				
<div>• Scope</div> <div>• Schedule</div>				
This Contract is increased by \$71,500.00 for MDOT use.				
All other terms, conditions, specifications and pricing remain the same. Per contractor and agency agreement, and DTMB Central Procurement Services approval.				



**Program Managers  
for  
Multi-Agency and Statewide Contracts**

AGENCY	NAME	PHONE	EMAIL
MDOT	Cory Johnson	517-335-2931	johnsonc45@michigan.gov
DTMB	Dave Work	517-241-4604	workd@michigan.gov



**MICHIGAN DEPARTMENT OF TECHNOLOGY,  
MANAGEMENT AND BUDGET  
IT SERVICES  
STATEMENT OF WORK FOR IT CHANGE NOTICES**

<b>Project Title:</b> Signal Asset Management System – SigAMS	<b>Period of Coverage:</b> October 2022 - April 2023
<b>Requesting Department:</b> MDOT Field Services/Traffic Signals	<b>Date:</b> 10/14/2022
<b>Agency Project Manager:</b> Hilary Owen	<b>Phone:</b> 517-230-7965
<b>DTMB Project Manager:</b> Dave Work	<b>Phone:</b> 517-719-2250

**Brief Description of Services to be provided:**

This Statement of work is based on the existing contract between the State of Michigan (SOM) and Data Transfer Solutions, LLC, (DTS) see Contract #071B5500115, dated July 13, 2015, subject to the terms and conditions thereof.

**BACKGROUND:**

During the Business Analysis Phase, DTS identified and documented VUEWorks functionality that could be enhanced to either fully meet requirements or provide improved user experience within the SigAM workflows

**PROJECT OBJECTIVES**

The objective is to identify and document the necessary changes that have been identified for the MOOT SigAM Implementation. This SOW provides the list of the required SigAM Change Requests. The Change Requests include proposals for development tasks, scope changes, execution approach change including a detailed requirements review and a prototype configuration for each Work Order Workflow phase, schedule extension and budget increase.

**SCOPE OF WORK**

The scope of work includes implementing, configuring, and customizing the COTS (Commercial off the Shelf) solution to meet the requirements attached to this Statement of Work.

- R&H Event - Create CS-Spot/ Device Location and CS-Spot Sequential ID
- Facility - GIS Linking
- WorkOrderVUE Data Link controls for JobNet
- Work Order Detail Form Calculation Controls
- ProjectWise Integration
- Facility Search using GIS
- Facility Asset Status Updates
- Work Order Activity Notifications

**SCOPE REMOVED:**

- MLAP Integration
- CSCS Integration
- Global Interface
- Cost Agreements

**SCOPE AND SCHEDULE CHANGE:**

- Event Snapping Tool (Remove Request)
- Project Schedule (Change)
- Esri Event Editor Configuration by DTMB CSS and MOOT (Change)
- VUEWorks Event Editing Tools Configuration (Change)

**TASKS:**

1. Provide SigAM application with the required Linear Reference System (LRS) data (such as PR, CS, PR mile point) functionality and automate the entry of other defined fields.
2. Automate and update the Sequential CS-Spot numbering for the CS-Spot Location point feature.
3. Provide the functionality to highlight the GIS selected set and zoom on a map from the Facility query.
4. Integrate with JobNet and auto populate the Job level information in Work Order form based on the Linking ID.
5. Include calculation control on work order detail form.
6. Integrate with MOOT ProjectWise Document repository via REST API as recommended
7. Provide manual data import or entry of MLAP into SigAM
8. Provide functionality to select a GIS asset and have the linked facility assets available for selection within a user interface.
9. Provide functionality to update the status for all assets on a manual work order through an automated batch update process.
10. Provide work Order Activity Notification functionality to allow for configurable and automated region notifications at the Work Order Activity level.
11. Include Cost Participation to the Work Order Detail Form as a manual entry.

Review of the attached documents will provide a detailed view of the requirements, workflow, and reporting.

**DELIVERABLES**

Follow Statement of Work in Contract Change Notice Number 7

**ACCEPTANCE CRITERIA:**

Deliverables will not be considered complete until the Agency and DTMB Project Manager have formally accepted them.

**PROJECT CONTROL AND REPORTS:**

Follow Statement of Work in Contract Change Notice Number 7

**SPECIFIC DEPARTMENT STANDARDS:**

Follow Statement of Work in Contract Change Notice Number 7

**PAYMENT SCHEDULE:**

Payment will be made based on the satisfactory acceptance of each Milestone. DTMB will pay CONTRACTOR upon receipt of properly completed invoice(s) which shall be submitted to the billing address on the State issued purchase order not more often than monthly. DTMB Accounts Payable area will coordinate obtaining Agency and DTMB Project Manager approvals. All invoices should reflect actual work completed by payment date and must be approved by the Agency and DTMB Project Manager prior to payment. The invoices shall describe and document to the State's satisfaction a description of the work performed, the progress of the project, and fees. When expenses are invoiced, receipts will need to be provided along with a detailed breakdown of each type of expense. All invoices must include the purchase order number.

Payment shall be considered timely if made by the DTMB within forty-five (45) days after receipt of properly completed invoices.

**EXPENSES:**

The State will NOT pay for any travel expenses, including hotel, mileage, meals, parking, etc.

#### **PROJECT CONTACTS:**

The designated Agency Project Manager is:

**Name** Hilary Owen  
**Department:** Michigan Department of Transportation (MOOT)  
**Area:** MOOT - Signals Operations Unit  
**Building/Floor:** Construction & Technology Building  
**Address:** 8885 Ricks Rd.  
**City/State/Zip:** Lansing, MI 48917  
**Phone Number:** 517-230-7965  
**Email Address:** owenh2@michigan.gov

The designated DTMB Project Manager is:

**Name:** Dave Work  
**Department:** Department of Technology, Management and Budget (DTMB)  
**Area:** Enterprise Portfolio Management Office (EPMO)  
**Building/Floor:** Murray D. Van Wagoner Building, 3<sup>rd</sup> Floor  
**Address:** 425 W. Ottawa Street  
**City/State/Zip:** Lansing, MI 48909  
**Phone Number:** 517-719-2250  
**Email Address:** workd@michigan.gov

#### **AGENCY RESPONSIBILITIES:**

Technical support tasks that require assistance, include, but are not limited to the following tasks:

1. DTMB/MDOT staff will be made available, as needed, throughout the duration of this implementation.
2. DTMB will provide network access and network security access to the consultants as needed to accomplish the tasks outlined in this document.
3. DTMB will be responsible for any 3<sup>rd</sup> party licensing of all software per their user licensing agreements.

#### **LOCATION OF WHERE THE WORK IS TO BE PERFORMED:**

Consultants will work at Data Transfer Solutions, LLC, 3680 Avalon Park Blvd. E, Orlando, FL 32828-9373 or onsite at State of Michigan, 425 W. Ottawa Street, Lansing, MI 48933.

#### **EXPECTED CONTRACTOR WORK HOURS AND CONDITIONS:**

Work hours are not to exceed eight (8) hours a day, forty (40) hours a week. Normal working hours of 8:00 am to 5:00 pm are to be observed unless otherwise agreed to in writing.

No overtime will be permitted.

\*1: JobNet, DTMB ArcGIS Server, LAPS (Local Agency Payment System), AASHTOware (WEBTRANSPORT), MIDB (Michigan Informational Database), MFIVE (Fleet Management System), CSCS (Central Signal Control System) systems.

# **MDOT SigAM Implementation**

Proposal and Change Request

09/01/2022

# Notice

This document and its contents have been prepared and are intended solely MDOT's information and use in relation to SigAM Implementation Project.

DTS assumes no responsibility to any other party in respect of or arising out of or in connection with this document and/or its contents.

## Document history

Revision	Purpose description	Originated	Reviewed	Date
Rev .01	Merging of CR, ProjectWise SOW and Dev SOW	SS		07/22/2022
Rev .02	Updates	Kh	SR	07/29/2022
Rev .03	Updates and formatting	ED		08/02/2022
Rev .04	Update and Accept MDOT changes	KH		8/3/2022
Rev. 05	Update for final review and formatting	ED		8/15/2022
Rev .06	Accepted MDOT updates and provided feedback	KH		8/29/2022

## Client signoff

Client	State of Michigan Department of Transportation		
Project	SigAM Implementation		
Document title	SigAM Implementation Proposal and Change Request		
Approval	Signature:		Date:

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# Introduction

This document contains the Scope of Work for development of SigAM, ProjectWise integration as well as the proposed change requests being submitted by DTS. The Scope of Work identifies development tasks associated with SigAM requirements. During the Business Analysis Phase, DTS identified and documented VUEWorks functionality that could be enhanced to either fully meet requirements or provide improved user experience within the SigAM workflows. The purpose of this document is to provide details to Change Requests listed in the Change Log. The Change Log is documented within the Requirements Traceability Matrix which also identifies requirements affected by development tasks. Implementation tasks are also noted where needed to meet the requirements.

## Change Request Summary

The following Change Requests have been identified for the MDOT SigAM Implementation. This proposal provides the details of the SigAM Change Requests. The Change Requests include proposals for development tasks, scope changes, execution approach including a detailed requirements review and a prototype configuration for each Work Order Workflow phase, schedule extension and budget increase.

The development tasks have been identified for the MDOT SigAM implementation. Some of these development tasks are not tied directly to requirements but have been identified as improving user experience or efficiencies in the SigAM workflows. The Requirements Traceability Matrix references the SigAM Change Log. Each of the Development tasks are listed in the Change Log. Development Tasks defined in this document will be developed in VUEWorks base code.



## Scope Added

Scope Added				
Change Request #	Change Request	Hours	Value	Impact on Budget
1-2	R&H Event - Create CS-Spot/ Device Location and CS-Spot Sequential ID (Add)	105	\$17,900.00	\$0.00
3	Facility - GIS Linking (Add)	17	\$2,950.00	\$0.00
4	WorkOrderVUE Data Link controls for JobNet (Add)	14	\$2,400.00	\$0.00
5	Work Order Detail Form Calculation Controls (Add)	126	\$20,225.00	\$0.00
6	ProjectWise Integration (Add)	337	\$59,350.00	\$0.00
10	Facility Search using GIS (Add)	42	\$7,200.00	\$0.00
11	Facility Asset Status Updates (Add)	7	\$1,250.00	\$0.00
12	Work Order Activity Notifications (Add)	63	\$10,175.00	\$0.00
	<b>Total</b>	<b>711</b>	<b>\$121,450.00</b>	<b>\$00.00</b>

## Scope Removed

Scope Removed				
Change Request #	Change Request	Hours	Value	Impact on Budget
7	MLAP Integration (Remove Scope)	3	\$500.00	\$0.00
13	CSCS Integration (Remove Scope)	8	\$1,450.00	\$0.00
14	Global Interface (Remove Scope)	0	\$0.00	\$0.00
15	Cost Agreements (Remove Scope)	17	\$3,125.00	\$0.00
	<b>Total</b>	<b>28</b>	<b>\$5,075.00</b>	<b>\$0.00</b>

## Scope and Schedule Change

Changes				
Change Request #	Change Request	Hours	Value	Impact on Budget
8	Event Snapping Tool (Remove Request)	0	\$0.00	\$0.00
16	Project Schedule (Change)	0	\$0.00	\$0.00
17	Esri Event Editor Configuration by DTMB CSS and MDOT (Change)	164	\$17,040.00	DTMB and MDOT Project Budget only
18	VUEWorks Event Editing Tools Configuration (Change)	8	\$1,450.00	0.00
	<b>Total</b>	<b>172</b>	<b>\$18,490.00</b>	<b>\$0.00</b>

## Budget Increase

Budget Increase				
Change Request #	Change Request	Hours	Value	Impact on Budget
9	DTS Resources - Budget Increase Request	310	\$71,500.00	\$71,500.00
	<b>Total</b>	<b>310</b>	<b>\$71,500.00</b>	<b>\$71,500.00</b>

# 1. R&H Event Layer - Create CS-Spot/CS-Spot Device Locations

During the Business Analysis Phase, the DTS Team reviewed, documented and provided recommendations for creating and managing GIS data within SigAM. The SigAM spatial data required for managing workflows are CS-Spot Locations and Signal Device Locations.

MDOT TAMS is currently using Web Map Services (WMS) Roads and Highways (R&H) Events to represent Work Orders spatially based on MDOT LRS Routes and Mileposts. Since the SigAM CS-Spot location information will rely on the MDOT LRS, the DTS Team recommended expanding the current TAMS Work Order R&H tool functionality to be used in SigAM for the creation and editing of CS-Spot Locations and CS-Spot Device Location. This functionality will provide the SigAM application with the required Linear Reference System (LRS) data (such as PR, CS, PR mile point) and automate the entry of other defined fields.

This Change Request was added to provide efficient tools to meet the MDOT requirements to update the Signal GIS data. This requirement was documented and approved in the GIS Data Design Document on 3/10/22 and Development Scope of Work approved on 4/12/2022. While the development tasks will not be used for SigAM implementation at this time, MDOT is still interested in keeping this Change Request functionality. In the future MDOT will have an ability to switch to utilizing the VUEWorks event editing options when the VUEWorks Conflict Prevention becomes supported, at that time DTS can provide required configuration and support to implement the GIS Data Design solutions as originally planned and approved in the GIS Data Design Document (3/10/22).

## 1.1. Development Tasks

Extend the MDOT TAMS Work Order Event Tools for SigAM.

- Modify and enhance Event Tool user interfaces specific to SigAM data requirements for CS-Spot Locations and CS-Spot Signal Devices.
  - Add the functionality to add CS-SPOT Locations or Signal Device Location Events
  - Update the Event layers with the appropriate attributes
  - Auto populate the appropriate attributes at event creation
- Provide VUEWorks functionality to edit the Event layers created through the Event Tools.

## 1.2. Change Request Reason

During Business Analysis Review and GIS Data Design (see Appendix A), DTS recommended the use of Events to create the Signal GIS data and capture the LRS information. DTS proposed the enhancements of the existing MDOT TAMS WMS Event functionality to create a streamlined process to create events, and auto-populate fields while providing MDOT the ability to edit certain attributes. The GIS data design (Appendix c) was approved on 3/12/2022. DTS Development work was completed.

While the development task will not be used for SigAM Implementation, MDOT is still interested in keeping this Change Request functionality. In the future MDOT will have an ability to switch

to utilizing the VUEWorks event editing options when the VUEWorks Conflict Prevention becomes supported, at that time DTS can provide required configuration and support to implement the GIS Data Design solutions as originally planned and approved in the GIS Data Design Document (3/10/22).

### 1.3. Impact on project scope

Activities to complete GIS Data creation has been revised.

### 1.4. Impact on team resources

This task utilized DTS Development resources as part of the original request. It was completed and delivered with VUEWorks release 2022.1. MDOT and DTMB resources will now perform tasks to create events and edit event attributes for the CS-Spot Locations and the Signal Device Locations using Esri Event Editor for SigAM Implementation.

### 1.5. Project Budget Impact

<b>Change to Project Budget</b>	Effort to complete (hours)	0
	Cost of Change Request (\$)	\$0.00
	Change to Project Budget	\$0.00
<b>Value of Change Request</b>	Effort to complete (hours)	105
	Value of Change Request (\$)	\$17,900.00

### 1.6. Risk associated with change request

Increased project costs due to unplanned Development Team resources. Change Request development task was completed per MDOT approval but will not be used within SigAM Implementation project.

### 1.7. Alternatives and Recommendations

The MDOT R&H Event Editor will handle the creation of events and editing of event attributes for the CS-Spot Locations and the Signal Device Locations for SigAM Implementation.

If this Change Request development task is kept, in the long-term MDOT would have an option to create events and edit event attributes for the CS-Spot Locations and the Signal Device Locations as was documented and approved in the GIS Data Design Document (3/10/22), when the VUEWorks conflict prevention is supported.

## 2. CS-Spot Sequential ID

Sequential CS-Spot numbering will be automated and updated for the CS-Spot Location point feature. The sequential number will be programmatically assigned when the user uses the Event tool to create a CS-Spot Location. Sequential numbering for the Spot Number will be created based on the highest value previously used for the CS. There are gaps in Spot Numbers in the current SAFESTAT database. These gaps served as placeholders for future Spot Numbers within each CS. Those gap numbers will be ignored in the auto-generated process and only the highest value will be used to generate the next Spot Number. This process will prevent duplication of CS-Spot numbers. Refer to the GIS Data Design document (3/10/22) for further details.

The format of the sequential numbering will be:

- CS (5 characters) + "-" + Spot Number (3 characters)
  - a. 12345-001
  - b. 12345-002
  - c. 22345-001
  - d. 22345-002

This was enhancement documented in the SigAM Development Scope of Work document and approved by MDOT (4/12/22). This request was originally done to create and automate the sequential number of the CS-Spot IDs to meet the mandatory minimum requirement.

### 2.1. Change Request Reason

Request to keep the change even though MDOT will be handling the event creation and event attribute updates through MDOT R&H Event Editor for SigAM Implementation.

In the long-term MDOT would like to keep an option to create events and edit event attributes for the CS-Spot Locations and the Signal Device Locations as was documented and approved in the GIS Data Design Document (3/10/22). While the development task will not be used for SigAM Implementation, MDOT is still interested in keeping this Change Request functionality. In the future MDOT will have an ability to switch to utilizing the VUEWorks event editing options when the VUEWorks Conflict Prevention becomes supported, at that time DTS can provide required configuration and support to implement the GIS Data Design solutions as originally planned and approved in the GIS Data Design Document (3/10/22).

### 2.2. Impact on project scope

Activities to complete GIS Data creation has been revised.

### 2.3. Impact on team resources

This task utilized DTS Development resources as part of the original request. It was completed and delivered with VUEWorks release 2022.1. MDOT and DTMB resources will now perform these tasks.

### 2.4. Value of change request

This work was completed per approval from MDOT.

	Effort to complete (hours)	0
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<b>Change to Project Budget</b>	Cost of Change Request (\$)	\$0.00
	Change to Project Budget	\$0.00
<b>Value of Change Request</b>	Effort to complete (hours)	Included in CR # 1 Estimates
	Value of Change Request (\$)	Included in CR # 1 Value

## 2.5. Risk associated with change request

Increased project costs due to unplanned Development Team resources. Change Request development task was completed per MDOT approval but will not be used for SigAM Implementation.

## 2.6. Alternatives and recommendations

The MDOT R&H Event Editor will handle the creation of events and sequential numbering.

# 3. Facility – GIS Linking

Current functionality in VUEWorks allows the linking of facility (non-spatial) assets to GIS features (assets). The Facility Manager provides filters and search tools to select facility assets using a variety of criteria.

As part of the SigAM requirements the SigAM Team would like to query and select facility assets (non-spatial) and have the linked/associated GIS features highlighted on the Map. The functionality to highlight the GIS selected set on a map from the Facility query will be an enhancement to SigAM. Enhancements to the VUEWorks software will be required to deliver this functionality to meet the business requirements.

DTS Development Tasks:

- Develop a table view to create GIS selection sets from linked assets.
- GIS selection set will be highlighted on the map.
- Provide 'Zoom To' tool for zooming to the GIS selection

MDOT requests to add and enhance functionality to view facility assets and create a GIS selection set from linked assets. The functionality will highlight and zoom to selected GIS assets on the map.

This is documented in the SigAM Development Scope of Work and approved by MDOT (4/12/22).

## 3.1. Change Request Reason

Provide an efficient way to view all the linked GIS assets on a map from the Facility Manager.

### 3.2. Impact on project scope

Scope changed to enhance existing functionality and to meet the business requirements.

### 3.3. Impact on team resources

DTS Development Team Task with Implementation hours to configure.

### 3.4. Value of change request

<b>Change to Project Budget</b>	Effort to complete (hours)	
	Cost of Change Request (\$)	\$0.00
	Change to Project Budget	\$0.00
<b>Value of Change Request</b>	Effort to complete (hours)	17
	Value of Change Request (\$)	\$2,950.00

### 3.5. Risk associated with change request

Increased project costs due to unplanned Development Team resources.

### 3.6. Alternatives and recommendations

Alternative is to utilize existing search and zoom functionality within VUEWorks.

Recommendation is to add the product enhancement to improve usability and efficiency for SigAM's workflow and thus increase the likelihood of user adoption of the tool.

## 4. WorkOrderVUE Data Link controls for JobNet Integration

DTS identified this task as a requirement to meet the JobNet Integration and provide JobNet information within WorkOrderVUE mobile application.

JobNet integration is required to provide Job Number information within the SigAM workflow phases. The Job Number data from JobNet will need to be populated within Work Order Detail forms. Data linking involves establishing a data connection to another data source and displaying the data within VUEWorks. This functionality is supported with MS Excel, MS Access, MS SQL Server and Oracle 10g database tables and views. VUEWorks creates a link to the data source with a linking ID on the asset.

The current functionality of VUEWorks allows for datalinks controls on Work Order forms. The linking ID on the Work Order will populate the associated JobNet fields on the Work Order form. Each time a Work Order is opened the JobNet data will be refreshed on the Work Order Detail form.

The WorkOrderVUE mobile application currently does not fully support datalink fields on the Work Order Detail form. The Development Team will enhance these forms to support datalinks and update JobNet data within Work Order tables.

### 4.1. Development Tasks

- VUEWorks (desktop) - Address any VUEWorks key field support to populate associated JobNet fields.
  - Develop configurable options to update/refresh work order form controls using a datalink from JobNet SQL views.
  - Work Order Detail form controls will refresh JobNet associated fields with the creating a new Work Order or opening a work order. The controls will be configurable to allow MDOT to auto-refresh when a work order is opened or control the refresh of data.
  - The Work Order form JobNet attributes will be saved to the VUEWorks Work Order tables.
- WorkOrderVUE Mobile application - Extend Work Order datalink support to WorkOrderVUE mobile application for display only. Refresh options will not be available to the mobile users due to how data is cached; direct database access is not available. Data will display the last saved values for the Work Order when the User synchronizes their mobile device with VUEWorks.

### 4.2. Change Request Reason

Requested by the DTS Development Team to fully meet JobNet Integration requirements within the WorkOrderVUE mobile app. This is documented in the SigAM Development Scope of Work and approved by MDOT (4/12/22).



### 4.3. Impact on project scope

Enhanced Detail Form control functionality in WorkOrderVUE.

### 4.4. Impact on team resources

DTS Development Team Task with Implementation hours to configure.

### 4.5. Project Budget Impact

<b>Change to Project Budget</b>	Effort to complete (hours)	NA
	Cost of Change Request (\$)	\$0.00
	Change to Project Budget	\$0.00
<b>Value of Change Request</b>	Effort to complete (hours)	14
	Value of Change Request (\$)	\$2,400.00

### 4.6. Risk associated with change request

Increased project costs due to unplanned Development Team resources.

### 4.7. Alternatives and recommendations

Alternative is to utilize VUEWorks on laptop in the field.

Recommendation is to add the product enhancement to improve usability and efficiency for WorkOrderVUE users and thus increase the likelihood of user adoption of the tool.

## 5. Work Order Detail Form Calculation Controls

VUEWorks provides the functionality to develop custom forms within Work Orders for users to collect and store specific information and data related to each Work Order Activity. The Custom Detail forms allow for a variety of controls. As part of the Business Process Review, DTS documented forms from SafeStat that contain calculated fields. VUEWorks Work Order form controls do not include calculation functions. The alternative solution for providing calculated fields is to produce reports from the digital work order forms. The DTS Implementation Team requested the VUEWorks Development Team enhance the Work Order forms to include calculation controls. This request for development will streamline the workflow of updating forms and returning calculated values in the forms.

This is documented in the SigAM Development Scope of Work and approved by MDOT (4/12/22).

### 5.1. Development Tasks

- Develop Calculation functions within the Work Order Detail Forms
  - Include logical operators: If Then, Else
  - Detail fields will act as operands
  - Basic Arithmetic functions: Add, subtract, multiply, Divide, Parenthesis
  - Other Mathematical functions:
    - ABS, MIN, MAX, HIGH, LOW
    - EXP - raise to a power EXP(Radius,2) where Radius is the name of a numeric field = Radius squared
    - SQRT
  - Control Types: Text inputs, numeric inputs, attribute and datalink
  - Support default values for inputs that cannot be converted to numeric
  - Data formats: decimal precision, percentage and currency
- Example calculation provided by MDOT:
  - **Engineer Estimate**  
Look-up cost per item name - If (item = "Steel Strain Pole, 30 ft")  
{unit\_cost="\$10,000"}  
Calculate total cost of item total\_item\_cost = qty \* unit\_cost

### 5.2. Change Request Reason

Provide the ability to perform calculations on the Work Order Detail form to streamline efficiency and reduce user calculation or input errors. Engineers Cost Estimate required calculations on forms. This is documented in the SigAM Development Scope of Work and approved by MDOT (4/12/22).

### 5.3. Impact on project scope

Enhancements required for WO Custom Detail Form. Configuration modifications to detail forms.

## 5.4. Impact on schedule

The schedule was adjusted to allow configurations to occur in phases that addressed configuration tasks not dependent on development activities and those dependent on the release of VUEWorks with enhancements. Multiple testing phases will be completed to test each phase.

## 5.5. Impact on quality

The inclusion of calculated field will streamline efficiency and reduce user calculation or input errors.

## 5.6. Impact on team resources

This task will utilize DTS Development and Implementation resources.

## 5.7. Value of change request

<b>Change to Project Budget</b>	Effort to complete (hours)	0
	Cost of Change Request (\$)	\$0.00
	Change to Project Budget	\$0.00
<b>Value of Change Request</b>	Effort to complete (hours)	126
	Value of Change Request (\$)	\$20,225.00

## 5.8. Risk associated with change request

Increased project costs due to unplanned Development Team resources.

## 6. ProjectWise Integration

The ProjectWise Integration Scope of Work (Appendix A) provides the detailed development tasks. This change request modifies solutions and required level of effort to meet the scope of all requirements including those designated as *Optional* in the Requirement Matrix to provide integration to MDOT ProjectWise document repository. The solutions documented in the ProjectWise Scope of Work has been reviewed and approved by MDOT and are being completed by DTS at no additional cost or project budget increase.

### 6.1. Change Request Reason

Development tasks required to fully meet MDOT requirements.

### 6.2. Impact on project scope

Scope of Work is defined in VUEWorks-ProjectWise Integration Scope of Work (Appendix A).

### 6.3. Impact on schedule

Schedule for the delivery of ProjectWise Interface configurations will be delayed until after development work is completed. The schedule was adjusted to allow Work Order Workflow configurations to occur in phases that address configuration tasks not dependent on ProjectWise development activities.

Full review of Interface and ProjectWise API technical requirements has been completed. ProjectWise Scope of Work development and approvals extended the schedule for this deliverable. Functionality to be part of VUEWorks Release 2022.3 or 2022.4

### 6.4. Impact on team resources

This task will utilize DTS Development resources.

### 6.5. Value of change request

DTS will provide VUEWorks enhancements defined in the VUEWorks- ProjectWise Integration Scope of Work (Appendix A) at no additional project costs.

<b>Change to Project Budget</b>	Effort to complete (hours)	0
	Cost of Change Request (\$)/	\$0.00
	Change to Project Budget	\$0.00
	Effort to complete (hours)	337

<b>Value of Change Request</b>	Value of Change Request (\$)	\$59,350.00
	DTS will provide VUEWorks enhancements defined in the VUEWorks-ProjectWise Enhancement document at no additional project costs.	

## 6.6. Risk associated with change request

SigAM documents will not be accessible within the application if these development tasks are not completed. Workflow and business process for SigAM are at risk if integration is not available.

## 7. MLAP Integration

MDOT MLAP Implementation project (LAPS Replacement) is in process and not ready for integration with SigAM/VUEWorks. The interface with MLAP to send data from SigAM to MLAP is being removed from the project scope. Manual data import or entry from MLAP to SigAM will still be done for SigAM Implementation. The SigAM Integration Plan includes documentation regarding the integration.

### 7.1. Change Request Reason

MLAP system is not ready to support the SigAM/VUEWorks automated Inbound and Outbound integration with MLAP.

### 7.2. Impact on project scope

Requirement is removed from the project scope.

### 7.3. Impact on team resources

Remove the DTS Implementation Team task.

### 7.4. Value of change request

<b>Change to Project Budget</b>	Effort to complete (hours)	0
	Cost of Change Request (\$)	\$0.00
	Change to Project Budget	\$0.00
<b>Value of Change Request</b>	Effort to complete (hours)	3
	Value of Change Request (\$)	\$500.00
	The hours included creating a file export of the Work Order data.	

### 7.5. Alternatives and recommendations

Manual exports of data from VUEWorks can be created on-demand as needed.

Manual import or entry of data exported from MLAP to SigAM/VUEWorks is recommended for SigAM Implementation.

## 8. Event Snapping Tool

MDOT requested the ability to use Esri geometry editing tool to snap a point to an intersection and route. This request was not a part of the SigAM requirement, however the VUEWorks Development Team can provide this tool to use for the creation of CS-Spot Locations and CS-Spot Signal Device event layers.

DTS Development Tasks:

- Include Esri Snapping tools within the VUEWorks Event Tool to allow the user to snap point to geometry.

This change request is documented in the Development Scope of Work and was approved by MDOT on 4/12/2022.

### 8.1. Change Request Reason

This request is a modification to remove this Change Request. This request is no longer needed since MDOT will be utilizing Esri Event Editor. Built in Esri snapping tools are available.

### 8.2. Impact on project scope

This was not a requirement but added to Scope to improve processes and efficiencies. Change request to add snapping functionality is being cancelled as MDOT is planning to use built-in Esri snapping tools functionality.

### 8.3. Impact on quality

Originally requested to assist in data accuracy, alternate tools will now be used which will also assist with data accuracy.

### 8.4. Impact on team resources

No impact on DTS resources or MDOT resources.

### 8.5. Value of change request

<b>Change to Project Budget</b>	Effort to complete (hours)	
	Cost of Change Request (\$)	\$0.00
	Change to Project Budget	\$0.00
<b>Value of Change Request</b>	Effort to complete (hours)	0
	Value of Change Request (\$)	\$0.00

	Work was not initiated by DTS. Work is not transferred to MDOT since the functionality is included in R&H Event Editor.
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## **8.6. Risk associated with change request**

No Risk to DTS, development work has not been initiated.

## **8.7. Alternatives and recommendations**

The MDOT Esri Event Editor will handle snapping for SigAM Implementation. MDOT can request this change if needed for the long-term solution, since MDOT would like to keep an option to create events and edit event attributes for the CS-Spot Locations and the Signal Device Locations as was documented and approved in the GIS Data Design Document (3/10/22).



## 9. DTS Resources - Budget Increase Request

### 9.1. Change Request Reason

The SigAM project schedule has been extended by 6 months due to delays in Facility Design and GIS Data Design. These major milestones were delayed due to MDOT revisions to designs. Additionally, the change in the execution approach including detailed requirements review and a prototype configuration for each Work Order Workflow phase was needed to meet the project objectives, which resulted in extending the project schedule. The revised scheduled completion date has moved from October 2022 to April 2023.

DTS is requesting additional project funds to cover the extended schedule. The request is for:

- 210 Project Manager hours
- 80 Implementation Specialist hours

The request increase in the DTS Project Staff budget assumes the project schedule will not slip beyond 4/17/2023.

### 9.2. Impact on schedule

Project extended to April 2023. Project Management resources will be needed beyond the original project completion of October 2022.

### 9.3. Impact on team resources

DTS Project Manager resource will be extended by 6 months.

### 9.4. Value of change request

<b>Change to Project Budget</b>	Effort to complete (hours)	310
	Cost of Change Request (\$)	\$71,500.00
	Change to Project Budget	
<b>Value of Change Request</b>	Effort to complete (hours)	310
	Value of Change Request (\$)	\$71,500.00
	This is a request for MDOT to authorize additional funds for the \$71,500.00	

### **9.5. Risk associated with change request**

This request mitigates the risk of a reduction in DTS project management at the end of the project when coordination of training, deployment, and go-live is critical.

### **9.6. Alternatives and recommendations**

None

# 10. Facility Search using GIS

MDOT requested an enhancement to the current VUEWorks functionality to select Facility assets for a Work Order. SigAM Team would like to select a GIS asset and have the linked facility assets available for selection within a user interface. Current functionality exists in VUEWorks to select the Facility assets but requires additional steps to select the Facility assets.

DTS has provided mock-ups of enhancements and have been approved by MDOT. The Development Team will deliver with Release 2022.2.

## 10.1. Change Request Reason

Current functionality does not provide the efficiencies that MDOT business users expected within this business process.

## 10.2. Impact on project scope

An enhancement added to the project scope to meet the business requirements.

## 10.3. Impact on project schedule

The schedule was adjusted to allow configurations to occur in phases that addressed configuration tasks not dependent on development activities and those dependent on the release of VUEWorks with enhancements. Multiple testing phases will be completed to test each phase.

## 10.4. Impact on quality

MDOT Team believe this will improve the business process and data integrity.

## 10.5. Impact on team resources

DTS Development Team is responsible for this task.

## 10.6. Value of change request

<b>Change to Project Budget</b>	Effort to complete (hours)	0
	Cost of Change Request (\$)	\$0.00
	Change to Project Budget	\$0.00
<b>Value of Change Request</b>	Effort to complete (hours)	42
	Value of Change Request (\$)	\$7,200.00

### **10.7. Risk associated with change request**

Increased project costs due to unplanned Development Team resources.

### **10.8. Alternatives and recommendations**

Alternative is to use the existing VUEWorks functionality.

# 11. Facility Asset Status updates

MDOT requested an enhancement to the current VUEWorks functionality to be able to update the status for all assets on a work order through an automated batch update process in the workflow. Current functionality exists in VUEWorks to select the Facility assets but requires additional steps to select each asset and update the status.

DTS has provided mock-ups of enhancements for approval. Development Tasks are completed and will be in 2022.2 release

## 11.1. Change Request Reason

Current functionality does not provide the efficiencies that MDOT expected within this business process.

## 11.2. Impact on project scope

An enhancement added to the project scope to meet the business requirements.

## 11.3. Impact on schedule

The schedule was adjusted to allow configurations to occur in phases that addressed configuration tasks not dependent on development activities and those dependent on the release of VUEWorks with enhancements. Multiple testing phases will be completed to test each phase.

## 11.4. Impact on quality

MDOT Team believes this will improve the business process and data integrity.

## 11.5. Impact on team resources

DTS Development Team task with Implementation hours to configure.

## 11.6. Value of change request

<b>Change to Project Budget</b>	Effort to complete (hours)	0
	Cost of Change Request (\$)	\$0.00
	Change to Project Budget	\$0.00
<b>Value of Change Request</b>	Effort to complete (hours)	7
	Value of Change Request (\$)	\$1250.00

### **11.7. Risk associated with change request**

Increased project costs due to unplanned Development Team resources.

### **11.8. Alternatives and recommendations**

Alternative is to use the existing VUEWorks functionality.

## 12. Work Order Activity Notifications

MDOT requested an enhancement to the current VUEWorks Work Order Activity Notification functionality to allow for configurable and automated region notifications at the Work Order Activity level.

Current functionality does not allow for configurable and automated notifications at the Activity Level to accommodate the regional notifications.

### 12.1. Impact on project scope

An enhancement added to the project scope to meet the business requirements.

### 12.2. Impact on schedule

The schedule was adjusted to allow configurations to occur in phases that addressed configuration tasks not dependent on development activities and those dependent on the release of VUEWorks with enhancements. Multiple testing phases will be completed to test each phase.

### 12.3. Impact on quality

Improved process will streamline the notification process.

### 12.4. Impact on team resources

DTS Development Team task with Implementation hours to configure.

### 12.5. Value of change request

<b>Change to Project Budget</b>	Effort to complete (hours)	0
	Cost of Change Request (\$)	\$0.00
	Change to Project Budget	\$0.00
<b>Value of Change Request</b>	Effort to complete (hours)	63
	Value of Change Request (\$)	\$10,175.00

## **12.6. Risk associated with change request**

Increased project costs due to unplanned Development Team resources.

## **12.7. Alternatives and recommendations**

Manual processes currently exist to notify the user at a regional role.



## 13. CSCS Integration

CSCS integration for accessing Existing Permits stored in CSCS is an optional requirement and MDOT decision was made to remove this integration from the SigAM Implementation scope. The processes to interface with these documents will require to be defined in detail for integration in the future. Requirements for this task include:

- SigAM to pull Timing Permit information from CSCS. The Timing Permit format will be PDF. The Timing Permit PDF will be linked to a Work Order within the Design Phase.
- System establishes a connection to the CSCS to import a Timing Permit PDF.

Since a full requirement review with the MDOT CSCS technical team, DTS assumption is that the current Document Linking functionality within VUEWorks will allow for links to be created to access CSCS PDFs. Permissions and access to the CSCS system will be required to access documents.

### 13.1. Change Request Reason

Request to remove CSCS Integration from scope. Currently the CSCS system does not store all the timing permit information for the SigAM project. The SigAM Design phase would require the use of proposed timing permits, and these are not stored in CSCS. Existing timing permits will be available within ProjectWise.

### 13.2. Impact on project scope

Removed requirements.

### 13.3. Impact on schedule

NA if removed.

### 13.4. Impact on quality

NA if removed.

### 13.5. Impact on team resources

NA if removed. Full research of the level of effort to complete this integration with VUEWorks side was not completed. Further discussions with the MDOT CSCS Technical Team would be required to understand the level of effort and resources required.

### 13.6. Value of change request

<b>Change to Project Budget</b>	Effort to complete (hours)	0
	Cost of Change Request (\$)	\$0.00

	Change to Project Budget	
<b>Value of Change Request</b>	Effort to complete (hours)	8
	Value of Change Request (\$)	\$1,450.00
	The estimated hours for CSCS include the configuration of Document Linking functionality to access PDF documents in CSCS.	

### 13.7. Alternatives and recommendations

ProjectWise can be used to obtain existing Timing Permits for reference. CSCS can be manually accessed to download the permit and attach as a document to the Work Order.

# 14. Global Interface

Global Interface can be removed from the project scope. Region, county and description, district, road, state, TSC information, RPI Region Code can be obtained from R&H map services.

## 14.1. Change Request Reason

Not required since the data can be obtained from Roads and Highways.

## 14.2. Impact on team resources

The removal of this requirement does not affect DTS resources since this would have been an MDOT process to provide Global data within GIS Map Services. MDOT resources not affected since this is part of the map services.

## 14.3. Value of change request

<b>Change to Project Budget</b>	Effort to complete (DTS hours)	0
	Cost of Change Request (\$)	\$0.00
	Change to Project Budget	
<b>Value of Change Request</b>	Effort to complete (hours)	0
	Value of Change Request (\$)	\$0.00

## 14.4. Risk Associated with Change

None.

# 15. Cost Agreements

Cost Agreement requirements were originally requested to allow for MDOT to track maintenance costs for signals. Per discussions during Business Analysis Phase, Cost Agreements are no longer used within their business processes. Instead, Cost Participation will be added to the Work Order Detail Form as a manual entry.

Original solutions for Cost Agreement assumed a datalink to a table or SQL View created by the MDOT Team. The level of effort for DTS configurations were close to the same. The Work Order Detail form was the only configuration affected.

## 15.1. Change Request Reason

Revise the Cost Agreement configuration solutions to manually track Cost Participation %.

## 15.2. Impact on project scope

None, the level of effort to complete does not change scope.

## 15.3. Impact on schedule

None, the level of effort to complete does not change project schedule.

## 15.4. Impact on team resources

None, the level of effort is not impacted.

## 15.5. Value of change request

<b>Change to Project Budget</b>	Effort to complete (hours)	0
	Cost of Change Request (\$)	\$0.00
	Change to Project Budget	
<b>Value of Change Request</b>	Effort to complete (hours)	17
	Value of Change Request (\$)	\$3,625.00
	Assumptions are the original configuration tasks would include a data link to MDOT Cost Agreement data. The revision to move to a data entry field does not impact DTS work since most of this work to compile and deliver tabular data is the responsibility of MDOT.	

## **15.6. Alternatives and recommendations**

The manual data entry of Cost Participation %.

# 16. Project Schedule

The project schedule has been extended to 4/17/2023. The original project completion date of the project was October 2022. The current project schedule is shared within the DTS Sharepoint Shared folder and updated as of 8/11 for this document.

## 16.1. Change Request Reason

The project schedule has been extended to 4/17/2023 to reflect the following changes to the project.

- Adjustments for increased durations to complete Facility Database Design and GIS Data Design
- Detailed requirements review for each phase.
- Implementation and configuration approach changes to implement using a design/build of Prototypes for each phase.
- Adjust schedule to include PTO and holidays.
- Modifications to account for the completion of development tasks.

## 16.2. Impact on schedule

Project extended by 6 months.

## 16.3. Impact on team resources

DTS Team allocations will need to be updated across scheduled projects.

## 16.4. Value of change request

<b>Change to Project Budget</b>	Effort to complete (hours)	0
	Cost of Change Request (\$)	\$0.00
	Change to Project Budget	\$0.00
<b>Value of Change Request</b>	Effort to complete (hours)	0
	Value of Change Request (\$)	\$0.00
	Change Request #9 resolves any DTS Staff/resource budget changes.	

## 16.5. Alternatives and recommendations

None.

# 17. Esri Event Editor Configuration by MDOT (Change)

After MDOT's analysis of the current Esri/VUEWorks integration capabilities and the need for VUEWorks conflict prevention to be supported to proceed with the GIS Data Design V2 (5/5/22) (Appendix B), MDOT decision was made to use Esri Event Editor application to create the events and edit the event attributes for the CS-Spot Locations and the Signal Device Locations for SigAM Implementation. VUEWorks will read the data from the updated Web Map Services (WMS) Roads and Highways (R&H) Events

MDOT and DTMB Center for Shared Solutions (CSS) resources will now perform the required tasks to build the Workflow Manager and complete Esri Event Editor configuration to create events and edit event attributes for the CS-Spot Locations and the Signal Device Locations.

In the future MDOT will have an ability to switch to utilizing the VUEWorks event editing options when the VUEWorks conflict prevention becomes supported. At that time DTS can provide required configuration and support to implement the GIS Data Design solutions as originally planned and approved in the GIS Data Design Document (3/10/22).

## 17.1. Change Request Reason

VUEWorks conflict prevention is currently not supported to proceed with the GIS Data Design (3/10/22) for SigAM Implementation. Therefore, a short-term solution was accepted to use Esri Event Editor to create the events and edit the event attributes for the CS-Spot Locations and the Signal Device Locations.

## 17.2. Impact on schedule

The schedule was revised to include MDOT and DTMB CSS tasks to build the Workflow Manager and complete Esri Event Editor configuration.

## 17.3. Impact on team resources

Increase in DTMB CSS and MDOT resources effort due to this change. Decrease in the DTS resource effort.

## 17.4. Value of change request

<b>Change to Project Budget</b>	Effort to complete (hours)	
	Cost of Change Request (\$)	\$0.00
	Change to Project Budget	\$0.00
<b>Value of Change Request</b>	Effort to complete (hours)	164

	Value of Change Request (\$)	\$17,040.00
	This is MDOT and DTMB CSS effort and cost due to the change.	

## 17.5. Alternatives and recommendations

None.



# 18. VUEWorks Event Editing Tools Configuration – DTS (Change)

## 18.1. Change Request Reason

VUEWorks conflict prevention is currently not supported to proceed with the GIS Data Design (3/10/22) for SigAM Implementation. Therefore, a short-term solution was accepted to use MDOT's Esri Event Editor to create the events and edit the event attributes for the CS-Spot Locations and the Signal Device Locations.

This Change Request documents the future configuration tasks and costs associated with implementation the DTS VUEWorks Event Tools defined in Change Request 1 & 2.

## 18.2. Impact on schedule

The project schedule is not affected. The switch to using the VUEWorks Event Tool will be post-go live and be included as part of SigAM annual support and maintenance.

## 18.3. Impact on team resources

Effort to assist the MDOT VUEWorks Administrative Team to configure map services and tools will be minimal. This can be done under annual support and maintenance.

## 18.4. Value of change request

<b>Change to Project Budget</b>	Effort to complete (hours)	
	Cost of Change Request (\$)	\$0.00
	Change to Project Budget	\$0.00
<b>Value of Change Request</b>	Effort to complete (hours)	8
	Value of Change Request (\$)	\$1,450.00
	This is the DTS effort to configure and test the event map services.	

## 18.5. Alternatives and recommendations

None.

# Appendix A. ProjectWise Integration Scope of Work

## 1. VUEWorks - ProjectWise Interface Overview

During the Business Analysis Review, the project team identified the need to create a direct integration with ProjectWise. SigAM will be configured to use VUEWorks direct linking functionality to access documents stored in ProjectWise. The users within the SigAM application will require proper permissions to access and view the documents stored in ProjectWise.

ProjectWise authentication is available to internal users using Active Directory (AD) authentication. External users can only access ProjectWise files using the ProjectWise API. The State of Michigan utilizes MiLogin for authentication for all users (internal and external). The following scenarios define users and authentication methods.

1. All users use MiLogin:
  - a. External users use MiLogin 3<sup>rd</sup> Party, e.g., local agencies
  - b. Internal users use MiLogin Worker, e.g. MDOT employees
2. Only internal users have the State of MI (SOM) Active Directory (AD) accounts, external users are not given AD accounts.
3. MiLogin and ProjectWise are connected to SOM AD and allow single sign on authentication for Internal users only.
4. All SigAM users, external and internal, will be using MiLogin, 3<sup>rd</sup> Party or Worker, to authenticate and access the VUEWorks application.
  - a. Only internal users, e.g., MDOT Employees, can also use the ProjectWise AD authentication directly to upload and download files in ProjectWise.
  - b. External users can only access ProjectWise files using the ProjectWise API.

Initial ProjectWise Interface planning was to configure ProjectWise datalinks within the SigAM Workflows. VUEWorks-ProjectWise interface can be successfully configured using Active Directory authentication for internal users. However, VUEWorks does not provide API integration with ProjectWise. This prevents external users from accessing ProjectWise files through the SigAM workflows. VUEWorks enhancements will be required to utilize the ProjectWise API and provide external ProjectWise user access.

This Scope of Work provides the updates required to allow internal and external users to access ProjectWise documents using the ProjectWise API.

## 2. Development Tasks

The following requirements and development tasks have been identified to meet the required and optional SigAM ProjectWise requirements.

### **ProjectWise Integration Development Requirements include:**

- Provide ProjectWise API access for internal and external SigAM users to access ProjectWise folders and documents.
- VUEWorks will allow the user to open documents and folders within ProjectWise
  - Document Links – allow direct access to documents for internal and external users. Users will have the ability to view, update, add and replace.
  - Folder Links – When an internal user clicks a folder link within VUEWorks, ProjectWise Explorer opens at the folder level for the user to view and select documents to open. Users will then view, update, add and replace within ProjectWise
- WorkOrderVUE will allow internal and external users read-only access to documents.
- In SigAM application the user can enter the document ID, then the application (SigAM) makes an API call to '/getFile/' to verify the path and store the filename and document ID in SigAM.
  - Lansing users will add the files in ProjectWise, get the document ID (The one that comes after the d and in between {} )
- Uploading/Adding files to ProjectWise through SigAM
  - User uploads document in SigAM application (browse local folder and select document to upload), SigAM application makes API call to '/addFile/' and adds the file in ProjectWise. API returns document ID, which is stored in SigAM.
- Two API methods must be supported: GetFile and AddFile
  - GetFile call gets the document and shows to user. In this requirement user is not redirected to ProjectWise to see files.
  - AddFile call adds the file to ProjectWise through SigAM.

## **2.1 ProjectWise API Connector**

DTS Development Team will develop a connector to interface with the ProjectWise API. The connector will allow both internal and external users access, update, upload ProjectWise documents within VUEWorks. WorkOrderVUE will allow read-only access to documents through datalinks. The permissions to edit those documents will be based on the MDOT user account at ProjectWise Login.

### **DTS Development Tasks:**

- Develop a connector to utilize the ProjectWise VUEWorks account and the rest API authToken to access ProjectWise documents within VUEWorks.
- Add Administrative Settings functionality to define multiple document types associated with documents stored in ProjectWise. The Document Type will be used to identify as a ProjectWise document as well as launch the API authToken.

### **MDOT tasks:**

- Create a ProjectWise API account for VUEWorks application.
- Create a rest API authToken using the VUEWorks account

## **2.2 Access Documents – Folder Link**

SigAM User stores the ProjectWise folder link in SigAM. When a user clicks on the link ProjectWise explorer is opened. The folder link is needed to access each CS-Spot folder in ProjectWise for all 5000 CS-Spots (4000 devices plus 1000 studies).

- The path structure for folder links to launch ProjectWise Explorer is PW:/....
  - ProjectWise Project Explorer User Interface will open
  - User will sign on to Project Explorer

- Project Explorer opens directly to the folder path
- The link will work for internal users with desktop. ProjectWise must be available on the desktop.
- Editing files in VUEWorks must be opened at the folder level through ProjectWise.

## 2.3 Access Files – Direct Link

SigAM users will be able to access files in ProjectWise and then establish a link in SigAM application.

- Lansing users will add the files in ProjectWise, get the document id (The one that comes after the d and in between { } )
  - Study memos (in Memo folder in yellow highlight in screen shot below)
  - Latest signal plan pdf (Lansing Signals folder in yellow)
  - Signal timing permits (in current folder in yellow)
  - Work authorization documents (in TWA#17958)
  - All the files above (except study memos) need to be viewed by others as part of a work authorization (including SigAM users outside State of Michigan)
  - In SigAM application the user enters the document id; SigAM application makes an API call to '/getFile/' to verify the path and store the filename and document ID in SigAM. ProjectWise document id is the global id at the end of the URL/Path.
    - User will then be able to paste in the URL and VUEWorks will parse out the document id (GUID) OR
    - the user can enter the document id.
      - Only Paths to files/documents will be parsed. Paths with 'D'. All others indicate links to folders and will not be parsed.
- Whenever user clicks on that document in SigAM, SigAM application makes again 'getFile' call and gets the document and shows to user.
- In this requirement user is not redirected to ProjectWise (Project Explorer) to see files.

## 2.4 Adding file to ProjectWise from SigAM

SigAM users will be able to add documents to a SigAM ProjectWise upload folder. MDOT will provide constant Folder GUID to link to the SigAM folder.

- User uploads document in SigAM application (browse local folder and select document to upload), SigAM application makes API call to '/addFile/' and adds the file in ProjectWise SigAM folder. API returns document id, which is stored in SigAM.
- Use Case - The 1597 Prescreening form.xls which may be completed and attached to a Request in SigAM.
  - This prescreening form may need to be uploaded by SigAM users outside State of Michigan
  - User views the document though SigAM link.

## 2.5 Assumptions

- ProjectWise API authentication token is constant and will not expire.
- ProjectWise API will be used for authenticating both internal and external SigAM users.
- ProjectWise document permissions will be based on MDOT ProjectWise user authentication.

- All SigAM documents will be stored and managed in ProjectWise. VUEWorks will store and manage the links/paths and document ids to the ProjectWise documents and folders.
- Users will have the software on their computers or devices to open the document based on the types and formats.

### 3. Cost Estimates

The Cost Estimates for developing a VUEWorks connector to ProjectWise API for VUEWorks and WorkOrderUE mobile Application. This effort is being completed by DTS at no additional cost to the project to meet the business requirements.

MDOT SigAM ProjectWise Connector		Hours					Cost					Total Requirement Cost
	Development Task	Project Manager	Sr. Architect/ Developer	Sr. Developer	Test/QA	Total Task Hours	Project Manager	Sr. Architect/ Developer	Sr. Developer	Test/QA	Total Task Cost	
		\$250.00	\$250.00	\$150.00	\$150.00							
<b>Project Wise API - VUEWorks Connector (VUEWorks)</b>												
	Development	20	20	60	8	108	\$5,000.00	\$5,000.00	\$9,000.00	\$1,200.00	\$20,200.00	
	Development QA	4	0	32	16	52	\$1,000.00	\$0.00	\$4,800.00	\$2,400.00	\$8,200.00	
	<i>Total VUEWorks Connector</i>	24	20	92	24	160	\$6,000.00	\$5,000.00	\$13,800.00	\$3,600.00	\$28,400.00	\$28,400.00
<b>Project Wise API - VUEWorks Connector (WorkOrderVUE)</b>												
	Development	8	20	60	8	96	\$2,000.00	\$5,000.00	\$9,000.00	\$1,200.00	\$17,200.00	
	Development QA	4	0	32	8	44	\$1,000.00	\$0.00	\$4,800.00	\$1,200.00	\$7,000.00	
	<i>Total WorkOrderVUE Connector</i>	12	20	92	16	140	\$3,000.00	\$5,000.00	\$13,800.00	\$2,400.00	\$24,200.00	\$24,200.00
<b>Deployment and Client QA</b>												
	Development Testing	8	0	1	16	25	\$2,000.00	\$0.00	\$150.00	\$2,400.00	\$4,550.00	\$4,550.00
<b>Documentation</b>												
	Documentation	4	0	4	4	12	\$1,000.00	\$0.00	\$600.00	\$600.00	\$2,200.00	\$2,200.00
<b>Total Hours</b>		48	40	189	60	337	\$12,000.00	\$10,000.00	\$28,350.00	\$9,000.00	\$59,350.00	\$59,350.00

**Figure - ProjectWise Cost Estimate**

## 19. Appendix B: GIS Data Design

### MDOT GIS Data Design

Last Update: 4/11/2022

(Final revisions on 4/11 to respond to 3/10 comments and changes)

The purpose of this document is to provide information to assist MDOT SigAM Team in making decisions regarding GIS data architecture. DTS has provided recommendations based on documented SigAM workflows and ease of editing and maintaining data. DTS has also identified where GIS updates and data creation occur within the SigAM workflows.

### Pros and Cons for Feature classes and Events

Feature class	
Pros	Cons
<ul style="list-style-type: none"><li>Can create and edit geometry directly in VUEWorks so no need to jump between applications</li></ul>	<ul style="list-style-type: none"><li>Signals becomes dependent on the yearly framework version<ul style="list-style-type: none"><li>Must be migrated every year</li><li>Can only access the active version for that year in order to be in compliance with downstream systems (i.e. v21 until v22 is released in October of 2022)</li></ul></li></ul>
<ul style="list-style-type: none"><li>Can edit geometry in the field using Esri Collector or Field Maps.</li></ul>	<ul style="list-style-type: none"><li>PR Route and PR Mile Post(s) will need to be manually added</li></ul>
<ul style="list-style-type: none"><li>Can edit attributes in the facility module in the field using FacilityVUE mobile application.</li></ul>	<ul style="list-style-type: none"><li>CS Route and CS Mile Post(s) will need to be manually added</li></ul>
<ul style="list-style-type: none"><li>Esri GIS Relationship classes are supported within VUEWorks. Feature class to tables and Feature Class to Feature Class.</li></ul>	<ul style="list-style-type: none"><li>VUEWorks can only fully support the editing of a single Relationship Class. If multiple Relationship Classes exist for the same Feature Class, the editing can only be done on the first related table or Feature Class (determined alphabetically by relationship class name).</li></ul>

Events	
Pros	Cons
<ul style="list-style-type: none"> <li>• Signals is directly/tightly integrated with Roads &amp; Highways, thus doesn't rely on the yearly framework version <ul style="list-style-type: none"> <li>○ Downstream systems can use date filters to pull data for the framework version that is required (e.g. v21)</li> <li>○ No need to migrate data every year</li> <li>○ Event Creation available for CS+Spot Location and Signal Device Location Points.</li> <li>○ Event editing available for the WMS Work Order Events (CS+Spot Location points). Exception is route field will not be editable.</li> </ul> </li> </ul>	
<ul style="list-style-type: none"> <li>• Can edit attributes in the facility module in the field</li> </ul>	<ul style="list-style-type: none"> <li>• Cannot edit geometry in the field</li> </ul>
<ul style="list-style-type: none"> <li>• PR Route and PR Mile Post(s) will be automatically populated upon creation of feature</li> </ul>	<ul style="list-style-type: none"> <li>• CS Route and CS Mile Post(s) will need to be manually added</li> </ul>
<ul style="list-style-type: none"> <li>• Esri GIS Relationship classes are supported within VUEWorks. Feature Class to tables and Feature Class to Feature Class. Kirsten is still testing all functionality in VUEWorks.</li> </ul>	<ul style="list-style-type: none"> <li>• VUEWorks can only fully support the editing of a Single Relationship class. If multiple Relationship Classes exist for the same Feature Class, the editing can only be done on the first related table or Feature Class (determined alphabetically by relationship class name).</li> </ul>

Note: Event editing is NOT available for other assets published in SigAMS other than the CS+Spot Location and CS+Spot Signal Device Location Points created through WMS Work Order Events.

- Other Signal Related assets will use SDE database.

## GIS Data Format Recommendations

DTS recommends the use of R&H Events to represent CS+Spot Locations and Signal Devices Locations. The WMS Work Order Event Tool was originally built for MDOT TAMS to create Work Order Events with the PR LRS route and measures. DTS recommends further updating this tool to create specific SigAM CS+Spot Location and Signal Device Location events. The use of this tool in VUEWorks will allow the auto-population of LRS values and streamline the process of creating these points.

DTS recommends the SigAM implementation use 3 GIS datasets to represent data:



- CS+Spot Locations represented by Roads and Highways Events. The event layer a single point to represent a general location of the CS+Spot.
- Signal Device Location represented by R&H Events. The event layer will represent the multiple locations for each device location.
- Assets, which are the specific devices or components will be represented as a feature class. This data does not currently exist and will be implemented as data is collected.

MDOT provided various depictions of assets and their interactions in a PowerPoint on January 13, 2022. The recommendations below will work for all scenarios provided to DTS. The image below shows a representative configuration. The CS+Spot Locations show as the peach-colored rectangle in the image above. In subsequent slides it's noted that the CS+Spot location does not need to be as precise and that a separate point layer would be considered for this feature. The CS+Spot Location layer is not intended to interface with JobNet.

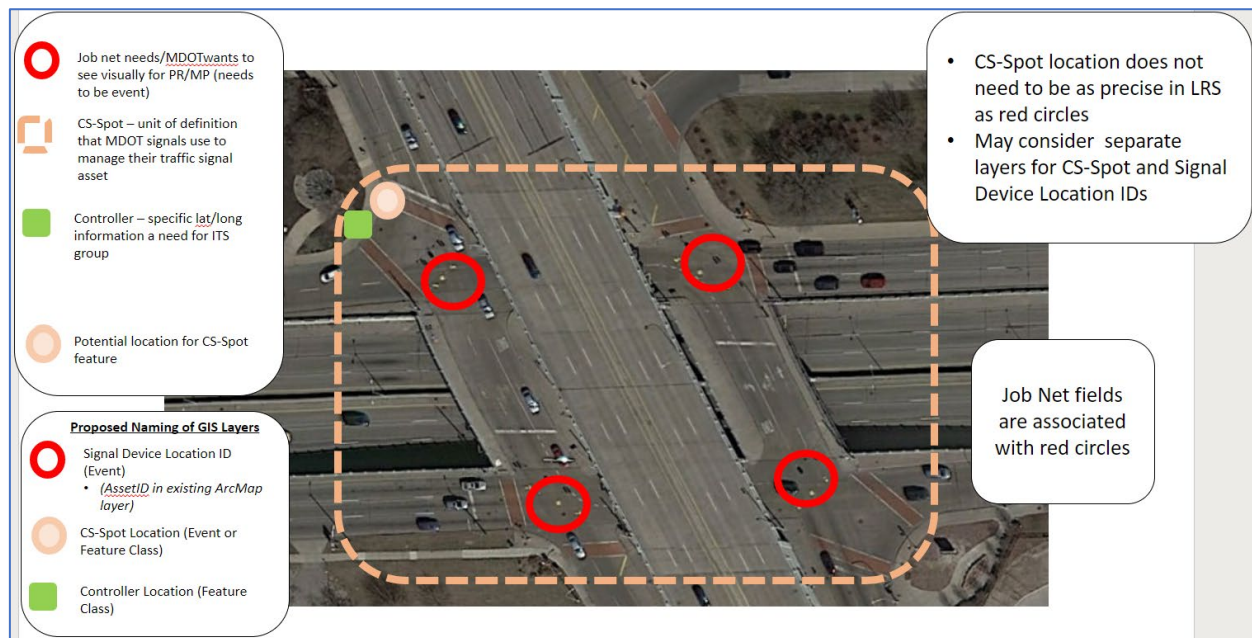


Figure 1: MDOT CS+Spot representation

## CS+Spot Location

DTS recommends the use of R&H Events to represent CS+Spot Locations. The use of the Event Tools in VUEWorks will allow the auto-population of LRS values and streamline the process of creating these points. The CS+Spot Locations show as the peach-colored rectangle in the image above. The CS+Spot Location layer is not intended to interface with JobNet.

### Requirements and solutions:

CS-Spot	4	<p>System allows user to click on the map to start the process of creating a new CS-Spot. Based on location chosen on the map, system:</p> <ol style="list-style-type: none"> <li>1. Identifies Control Sections within a buffer distance of the point on the map based on MDOT GIS Control Section layer and displays in a selectable list</li> <li>2. Allows user to select a Control Section from the list</li> <li>3. (a). displays all existing CS-Spot numbers in the selected Control Section (b). suggests and displays a new CS-Spot number (based on the next available sequential Spot number). and allows to choose a CS-Spot number from (a) or (b) above.</li> <li>4. When the new, suggested CS-Spot number(b) is selected, allows the user to edit the number.</li> <li>5. Then validates and alerts for duplicate CS-Spot numbers.</li> <li>6. If not a duplicate number, then allows to create the new CS-Spot.</li> <li>7. When an existing CS-Spot is selected, allows to edit CS-Spot details.</li> </ol> <p>Supplemental Information to the above requirement:</p> <p>The interface portion of this requirement includes displaying read-only views of existing MDOT ArcGIS layers such as Control Section.</p>	Mandatory Minimum (Interface)	X
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**Figure 2: Requirements Traceability Matrix**

### The following VUEWorks functionality and solutions address CS+Spot Requirement # 4

Requirement #4 is the process that the MDOT Signals Team currently use in SafeStat to select Control Sections, determine sequencing for next CS+Spot IDs and create CS+Spots with unique IDs. The recommendations presented in this document are to use the VUEWorks Event Tool for the tasks in this requirement. Each Requirement Task is addressed below:

1. VUEWorks provides buffer tools to allow the user to select other assets based on a distance from a selected point. While buffer tools are available they will not be needed as part of the Event Tool solution for the creation of a CS+Spot event.
2. Filter and search tools are available to select by any attribute stored in GIS or Facility database. The filter, query and reporting tools in VUEWorks can be used as a QA process when the user chooses to edit the CS+Spot Number.
- 3a. User can display CS+Spot #s within both GIS and the Facility database. CS+Spot GIS data can be queried and viewed via mapping tools or attribute list display. The query and display of the data on a map and tabular can assist with the QA process if the user chooses to edit the CS+Spot Number.
- 3b. CS+Spot numbering:
  - The VUEWorks Event Tool will provide auto-generated sequential CS+Spot numbering for CS+Spot point created within the CS+Spot Study Location event layer. Sequential

numbering for the Spot Number will be created based on the highest value previously used for the CS Number. There are gaps in Spot Numbers in current SAFESTAT database. These gaps served as placeholders for future Spot Numbers within each CS. Those gap numbers will be ignored in the auto-generated process and only the highest value will be used to generate the next Spot Number. The user will not be presented an optional CS+Spot # to use since this is auto-assigned at creation. The Event Tool will not allow duplicates to be created.

- MDOT will need to review CS+Spot Numbers to determine if any clean-up will be needed prior to migration and go-live.
- The format of the sequential numbering will be:
  - CS (5 characters) + "-" + Spot Number (3 characters)
    - a. 12345-001
    - b. 12345-002
    - c. 22345-001
    - d. 22345-002

4. CS+Spot Number Editing – MDOT would like to be able to edit the CS+Spot number after the initial value is auto generated. CS+Spot number will not be used as the VUEWorks unique id. Instead a VUEWorks Global ID will be used as the unique id. CS+-Spot will then be editable by select MDOT users.

The workflow described in Requirement #4 is based on a manual process currently being used in SafeStat. The Event Tool sequencing is being implemented to move away from this manual process. If there is a business case where MDOT will need to perform edits on this field, MDOT will need to create a business process to ensure numbers are not duplicated.

- The user will have the ability to edit the CS+Spot Number value with any number they choose. It is the user's responsibility to run queries and validate prior to updating.
- The Event Tool auto-sequencing of the new number will always be based on the highest existing value of the CS+Spot # in the event layer.
  - If CS+Spot 4567-001 and 4567-002 are created through the Event Tool and the second point is manually edited to 4567-101, then the 2 CS+Spots will be 4567-001 and 4567-101.
  - If another CS+Spot number (Signal Location is added to the CS) using the Event Tool then it will create a point with CS-Location ID of 4567-102.
    - The Event tool will always look for the highest existing value and increment by one.

5. The Event Tool will create the CS+Spot Number based on the highest value of the CS Number previously used. No duplicates will be generated. This occurs with the creation of the event within the CS+Spot Location using the VUEWorks Event Tool. See explanation in Task 4.

6. The Event Tool will create the CS+Spot Number based on the highest value of the CS Number previously used. No duplicates will be generated. This occurs with the creation of the event within the CS+Spot Location using the VUEWorks Event Tool. See explanation in Task 4.

7. Event editing will be available for CS+SPOT Locations and Signal Device Locations. The editing will allow for the user to update the 'User Populated' fields defined below. If auto-populated fields

are edited, MDOT will need to create a business process to edit and QA those fields. See Task 4 explanation of editing.

### CS+Spot Location Attributes:

The following attributes will be defined for CS+Spot Location and auto populated:

- Global ID – Auto generated by Roads and Highway standard process and used as VUEWorks unique id.
- CS+Spot # - Auto generated by VueWorks process with the CS and next sequence. This will not be designated as the VUEWorks unique id since it will need to be editable.
- PR Route – Auto populated when the event is created
- PR Mile Post – Auto populated when the event is created
- CS Route – Auto populated when the event is created
- CS Mile Post – Auto populated when the event is created
- Status – Auto populated with default status (Value TBD, Example: Pending)
- CS+Spot Type – Auto populated with a default status. Value “study-type”.
- CS+Spot Description – User populated

## Signal Device Location

DTS recommends the use of R&H Events to represent an intersection or location along a roadway where traffic signal or other electronic traffic control devices (e.g., School Crosswalk Sign Beacon, Warning Sign Beacon, Pedestrian Hybrid Beacon (HAWK)) are installed in the field. The use of the Event Tools in VUEWorks will allow the auto-population of LRS values and streamline the process of creating these points. The Signal Device Location is shown as the red circle in the image above. This Event Layer will be used with the JobNet Interface.

- Signal Device Location will be created using VUEWorks desktop to utilize the Event Tools functionality. Please refer to Appendix for listing of attributes available in the MDOT\_PRMP Roads & Highways Route Event Layer (VUEWorks Development). If data is available within this event layer, those fields can be auto populated in the Signal Device Location Event Layer. Exceptions are the geometry fields (Route and Mile Post); they are not included in the VUEWorks attribute list screenshot however this geometry data is available. Attributes included in the Signal Device Location Event Layer:
  - Global ID – Auto generated by Roads and Highway standard process and used as VUEWorks unique id.
  - CS+Spot Location number – User populated. This is based on the CS+Spot Location values. These will be user populated by copying from the CS+Spot Location layer.
  - CS+Spot # - User populated as above
  - PR Route – Auto populated when the event is created
  - PR Mile Post – Auto populated when the event is created
  - CS Route – Auto populated when the event is created (using Roads and Highways API, these attributes are not stored in the PRMP Route Layer)

- CS Mile Post – Auto populated when the event is created (using Roads and Highways API, these attributes are not stored in the PRMP Route Layer)
- Signal Device Location ID – Auto populated when the event is created. The Signal Device Location ID will use the existing SafeStat format (integer). The ID will be auto-generated using VUEWorks Asset ID Seed functionality. The initial value will be loaded at go-live and the Signal Device Location ID will be incremented at creation. This will be the VUEWorks unique id.

**Edit Layer Settings**

**MDOT\_Signals**

Layer Group: Transportation

Tab Group: \_Default

Asset ID Field: Asset ID Number

Selectable: ☒

Attribute Edit: ☐

Spatial Edit: ☐

Address Abutter: ☐

Picture:

Hyperlink:

Modified By:

Modified Date:

Change Code:

Asset ID Prefix:

Asset ID Suffix:

Asset ID Seed: 1

Transparency (%): 0

Used In Modules: Work Orders

Navigation: Previous, Next, Save, Close

**Figure 3: Signal Device asset id - auto increment**

- SignalDeviceLocationIDDescription (text, 255) – User populated after event is created
- DeviceDescription (text, 255) - User populated after the event is created
- RS Establish Date – If the editor fields are enabled for the layer it will be populated by Esri when the event is created. They are enabled in the VUEWorks Development environment. See Appendix.
- RS Retire Date – If the editor fields are enabled for the layer it will be populated by Esri when the event is created. They are enabled in the VUEWorks Development environment. See Appendix.

## Assets

DTS recommends using Feature Classes to represent any additional assets that are components of the CS+SPOT Location, an example asset would be Controllers. Feature classes will provide the best options for creating and editing data within SigAM workflows. SigAM GIS assets can be easily edited in VUEWorks, Esri Field Maps and Collector and ArcMap/ArcPro. The Assets are shown as green squared in the image above (Figure 1: MDOT CS+Spot representation). In the image this asset is a controller, however, there have been other discussions that in the future there may be a desire to add additional assets, e.g. Poles, etc. and these would also be handled as assets.

## Relationship Classes

Esri relationship classes can be created to create links between CS+Spot Assets and their Devices that have spatial representation. They also provide the ability to link Feature Classes to tabular data. Multiple relationship classes to the same Feature Class are not fully supported in VUEWorks for editing. Example: If there is a CS+Spot location linked to multiple Feature Classes that represent Poles, Signals, etc., then only 1 of those related tables can be edited (the first alphabetically).

### Considerations

- Relationship classes can provide the spatial hierarchy and provide the ability to spatially select and display on a map. Alternatively, if relationship classes are not used then attribute queries can be used to select the CS+Spot Asset and its associated devices across 2 Feature Classes.
- Relationship class functionality for Events within VUEWorks needs to be fully vetted yet.
- Symbology for Feature Classes using relationship classes is created based on the primary Feature Class.
- Relationship classes are only recommended for SigAM if MDOT wants to associate 2 Feature Classes to link CS+Spot Asset to Devices. Linking of any tabular data should be done through the VUEWorks Facility DB configurations.

**Esri relationship classes will not be used for SigAM. There will not be relationship classes tied to the events.**

## VUEWorks – Linking non-spatial data to GIS Data

VUEWorks provides the functionality to link non-spatial (Facility database) to GIS Feature Class. The links provide a 'relationship' between the GIS data and the non-spatial facility data. Facility assets can be linked to any GIS feature or event. This is a standard VUEWorks functionality and is recommended for SigAMs GIS and non-spatial data linking.

- Facility Link to GIS functionality – Within the Manage Facilities, the Link to GIS feature allows user to link a non-spatial asset to a GIS feature or event.

Primary View View 1 View 2 View 3

A Attributes GIS: Not Linked **Link to GIS** Save Cancel

Field Name	Value
Asset ID	254
Service Status	In Service
Status	E
Louver Count	0

- Administration Tools allow the user to select the GIS Layers the facility assets can be linked.

Facility Templates CS-SPOT Location

Views Primary View 1 View 2 View 3

CS-SPOT Location Locations Powers Devices

Select Layers

Select Layers this Facility Type can be linked to

Layer	Link	Create/Delete Facilities
BikeLanes	<input type="checkbox"/>	Create
Bridge Mounted Sign Structure	<input type="checkbox"/>	Create
Cable Barrier	<input type="checkbox"/>	Create
Cantilever Sign Structure	<input type="checkbox"/>	Create
County	<input type="checkbox"/>	Create
CSSPOT	<input type="checkbox"/>	Create
Culvert	<input type="checkbox"/>	Create
Lane	<input type="checkbox"/>	Create
LaneFunction	<input type="checkbox"/>	Create
Maintenance Responsibility	<input type="checkbox"/>	Create
MDOT Region	<input type="checkbox"/>	Create
MDOT TSC	<input type="checkbox"/>	Create

Ok Cancel

## Data Collection and Editing

Data Collection outside of the SigAM workflows should be completed using Esri Collector or Field Maps.

As part of the SigAM workflow the following GIS editing, and data creation scenarios have been documented.

- Request Phase:**
  - If CS+Spot Location exists, attach to the Work Order and revise the Status as needed. If Event is used, then the point is created with the attributes documented above for CS+Spot Location.
- Study Phase :**
  - CS+Spot location is created in the Study Phase. If Event is used, then the point is created with the attributes documented above for the CS+Spot Signal Device.
- Scoping:**
  - CS+Spot Location may be updated to Pending Status.
  - CS+Spot Location may be created. See Study Phase for attributes to be updated when the location(s) are created
  - Signal Device Location may be created
  - Signal Device Location may be updated to Pending Status

- **Construction**
  - **Construction completed** – Facility data is set to existing status
    - Future: Add/Update Device Feature Class.
 Update status for devices in Facility after construction completed.
- **Maintenance:**
  - Future: Update Device Feature Class.
  - Update Facility Device attributes.

Business Requirement Module	Business Requirement No.	Detailed Business Requirement Description	Priority	Current Capability	Requires Configuration	Requires Customization	Future Enhancement	Not Available	Technical Assumption(s), Configuration Solution.
Asset Inventory	182	System sets the status of an asset inventory item based on a certain criterion (see Supplemental Information for criteria).  Supplemental Information to the above requirement:  Inventory item statuses: P (Pending) E (Existing) R (Retired)  System criterion to set inventory status on an inventory item:  The 'Pending' status would typically be set during design phase (but could be set during M/WA initiated by electrician). The 'Pending' status would be associated with an open status of design, maintenance, or construction phase. Additional criteria/business rules will be provided later during implementation phase of the project.	Required	X					An attribute pick list field will be created to define the current status of the asset. Users with appropriate permissions will be able to edit/update the asset status.
Asset Inventory	183	System sets the status of an asset inventory item to 'Pending' when it is first added on a 'Work Authorization or on a Design.	Required	X					Additional information may be required.  Current functionality doesn't exist for the system to assign a status when a record is created.  When the inventory item is created the user will set the appropriate status.
Asset Inventory	186	System updates inventory status from 'Pending' to either 'Existing' or 'Retired' when 'Work Authorization or Design phase's status is 'Closed-Completed'.  Supplemental Information to the above requirement:  Pending -> Existing: When a new asset is installed Existing -> Retired: When an existing asset is removed	Required	X					Functionality does not currently exist.  With permissions, the user will be able to change the status of an asset or Work Order.

## Event Creation Process

The CS+Spot Locations and CS+Spot Signal Device Locations are created in Event layers.

MDOT TAMS utilizes LRS Tools developed by DTS within VUEWorks to create Work Order Points based on MDOT's LRS. MDOT's Roads and Highways network is used to populate routes and measures. DTS recommends providing this same tool with enhanced functionality to create CS+Spot Locations and CS+Spot Device Locations. This tool will allow the user to select which type of point/asset they would like to create. The user has the option of selecting a point on the map or keying the route/milepost.



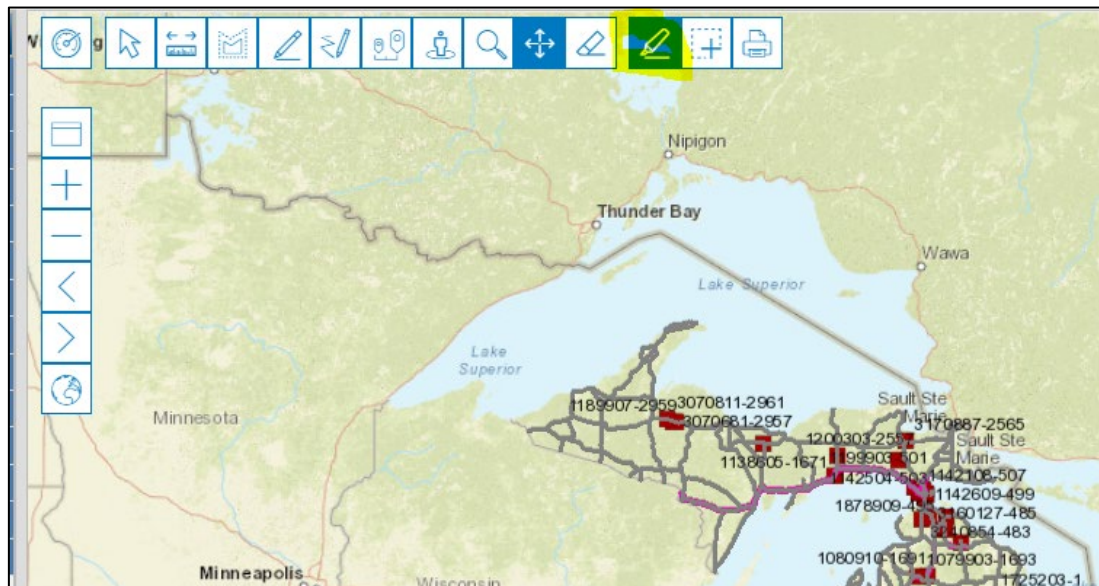


Figure 4: LRS Tools in MDOT TAMS

The user will first create the Work Order within Workflow process, and then select attach assets.

Figure 5: Create Work Order

Within the Work Order, the user will select the *Asset Tab* to add the locations(points) of the CS+Spot Location or the Signal Device Location. The User will use the *By Route* selection

Form View Table View Filter Reports Assets

ID DEV-020322-002 Logged By MDOT Test 02/03/2022 04:06 PM

Type Inspection

Work Category SigAM

Activity Maintenance

Method Maintenance Work 1531

Location Culvert Inspection1126005 Lat/Long 44.390440, -85.747162

Description

Assigned To MDOT User 02/03/2022 4:06 PM

Project Group: Project:

Associate with...

Status Open Priority 1

Begin Date: 02/03/2022 Time: 8:00 AM

End Date: 02/03/2022 Time: 9:00 AM

Due Date: Time:

Send Email to Notification List on Save

Set Recurring

Form: MDOT Maint 1531 Electrical Devices Installation

Details Workflow Costs Tasks Labor Equipment Inventory **Assets** Documents Work Orders Comments

Add Assets to Work Order

By Selecting on Map From Current Selection From Facility From Equipment **By Route** Clear Route

Work Order Assets

To Selection Remove From Clear Selection

Show Fields	Asset ID	Layer or Facility	GIS Location	Name	Quantity	Completed	Completion Date
-------------	----------	-------------------	--------------	------	----------	-----------	-----------------

Figure 6: Work Order with Asset Tab

The *By Route* selection will open the LRS Tool User Interface. The tool will allow the user to select a point on the map and have the PR route and measure populated. The user can optionally enter the route and measure if known. Snapping tool will be developed to allow the user to snap to the intersection.

Network (LRM)

WGIS\_LRM

Route ID

SPICSR00056\*\*C

Point Linear

From Measure

0.9840692879160 Miles

To Measure

10.819164630229 Miles

Add Cancel

Feature

CSSPOT Location

Signal Device Location

Route ID

SUNISR00161\*\*C

Point

Location

17.300512481677 Miles

Add Cancel

Current

Enhanced

State Route 3

Darbyville

Figure 7: LRS Tool to create events

After the user clicks Add, the event is created within the CS+Spot Location or the Device Signal Location event layer. Additional attributes will be populated and available for user input. Below is a sample of the Data Viewer showing attributes. The final list of attributes will need to be defined.

CSSPOT Location: 12345-001



A Attributes

Save

Cancel

OBJECTID	808
Event ID*	500000
From Date	
To Date	
Route ID	SUNISR00161**C
Measure	17.7245
VUEWorks ID	2
Activity	Fill
WorkType	1
Location Error	NO ERROR
CSSPOT#	12345-001
PR Route	Uplands Dr SE
PR Mile Post	0208909
CS Route	E Fulton St
CS Mile Post	41843
Status	Pending
Description	user populated
CSSPOT Type	"asset-type"

Figure 8: CS+Spot Location attributes

Signal Device Location: 12345001



**A Attributes**

Save Cancel

OBJECTID	808
Event ID*	500000
From Date	
To Date	
Route ID	SUNISR00161**C
Measure	17.7245
VUEWorks ID	2
Activity	Fill
WorkType	1
Location Error	NO ERROR

CSSPOT Location Numbe	12345001
CSSPOT#	12345-001
PR Route	Uplands Dr SE
PR Mile Post	0208909
CS Route	E Fulton St
CS Mile Post	41843
Asset ID	user populated

Figure 9: CS+Spot Signal Location attributes.

## Appendix: MDOT\_PRMP - Roads & Highways Event Layer

MDOT\_PRMP Roads & Highways Event Layer (Development Environment) attributes available within VUEWorks are shown in screen shots below. Geometry data (route and milepost) are not stored as attributes within the Event Layer but the data is available for auto population.

The following image shows the populated fields within MDOT\_PRMP (Development). This dataset will be the source used to auto populate the Sig AM event layers:

PR-MP: 0992210

A Attributes

Save Cancel

PR*	0992210
RH Establish Date	07/09/2020
RH Retire Date	
System Create Date	01/01/2017
System Modified Date	07/09/2020 06:23 PM
User Create	MDOT
User Modified	ALLENP
Shape.STLength()	6978.49364923418

Figure 108: PRMP (Development) Route attributes.

# Appendix C: GIS Data Design (V2)

MDOT GIS Data Design  
Last Update: 5/5/2022  
(Changes accepted and updated: 8/1/2022)

The purpose of this document is to provide information to assist MDOT SigAM Team in making decisions regarding GIS data architecture. The original document MDOT SigAM GIS Data Design Version 1 provided solutions for creating Esri Events using tools within VUEWorks. Since Conflict Prevention is not supported within VUEWorks, the MDOT Team would like to re-design the processes to update and manage the GIS data for SigAMs. This document addresses those changes.

## Pros and Cons for Feature classes and Events

It was established that MDOT will proceed with Events in the implementation of SigAM project. The information below states the Pros and Cons that assisted in finalizing the spatial data formats used in the project.

Feature class	
Pros	Cons
<ul style="list-style-type: none"><li>• Can create and edit geometry directly in VUEWorks so no need to jump between applications</li></ul>	<ul style="list-style-type: none"><li>• Signals becomes dependent on the yearly framework version<ul style="list-style-type: none"><li>◦ Must be migrated every year</li><li>◦ Can only access the active version for that year in order to be in compliance with downstream systems (i.e. v21 until v22 is released in October of 2022)</li></ul></li></ul>
<ul style="list-style-type: none"><li>• Can edit geometry in the field using Esri Collector or Field Maps.</li></ul>	<ul style="list-style-type: none"><li>• PR Route and PR Mile Post(s) will need to be manually added</li></ul>
<ul style="list-style-type: none"><li>• Can edit attributes in the facility module in the field using FacilityVUE mobile application.</li></ul>	<ul style="list-style-type: none"><li>• CS Route and CS Mile Post(s) will need to be manually added</li></ul>
<ul style="list-style-type: none"><li>• Esri GIS Relationship classes are supported within VUEWorks. Feature class to tables and Feature Class to Feature Class.</li></ul>	<ul style="list-style-type: none"><li>• VUEWorks can only fully support the editing of a single Relationship Class. If multiple Relationship Classes exist for the same Feature Class, the editing can only be done on the first related table or Feature Class (determined alphabetically by relationship class name).</li></ul>

<b>Events created within VUEWorks Event Editor Tools</b>	
<b>Pros</b>	<b>Cons</b>
<ul style="list-style-type: none"> <li>• Signals is directly/tightly integrated with Roads &amp; Highways, thus doesn't rely on the yearly framework version               <ul style="list-style-type: none"> <li>◦ Downstream systems can use date filters to pull data for the framework version that is required (e.g. v21)</li> <li>◦ No need to migrate data every year</li> <li>◦ Event Creation available for CS+Spot Location and Signal Device Location Points.</li> <li>◦ Event editing available for the WMS Work Order Events (CS+Spot Location points). Exception is route field will not be editable.</li> </ul> </li> </ul>	
<ul style="list-style-type: none"> <li>• Can edit attributes in the facility module in the field</li> </ul>	<ul style="list-style-type: none"> <li>• Cannot edit geometry in the field</li> </ul>
<ul style="list-style-type: none"> <li>• PR Route and PR Mile Post(s) will be automatically populated upon creation of feature</li> </ul>	<ul style="list-style-type: none"> <li>• CS Route and CS Mile Post(s) will need to be manually added</li> </ul>
<ul style="list-style-type: none"> <li>• Esri GIS Relationship classes are supported within VUEWorks. Feature Class to tables and Feature Class to Feature Class. Kirsten is still testing all functionality in VUEWorks.</li> </ul>	<ul style="list-style-type: none"> <li>• VUEWorks can only fully support the editing of a Single Relationship class. If multiple Relationship Classes exist for the same Feature Class, the editing can only be done on the first related table or Feature Class (determined alphabetically by relationship class name).</li> </ul>

Note: Event editing is NOT available for other assets published in SigAMS other than the CS+Spot Location and CS+Spot Signal Device Location Points created through WMS Work Order Events.

- Other Signal Related assets will use SDE database.



## GIS Data Format Recommendations

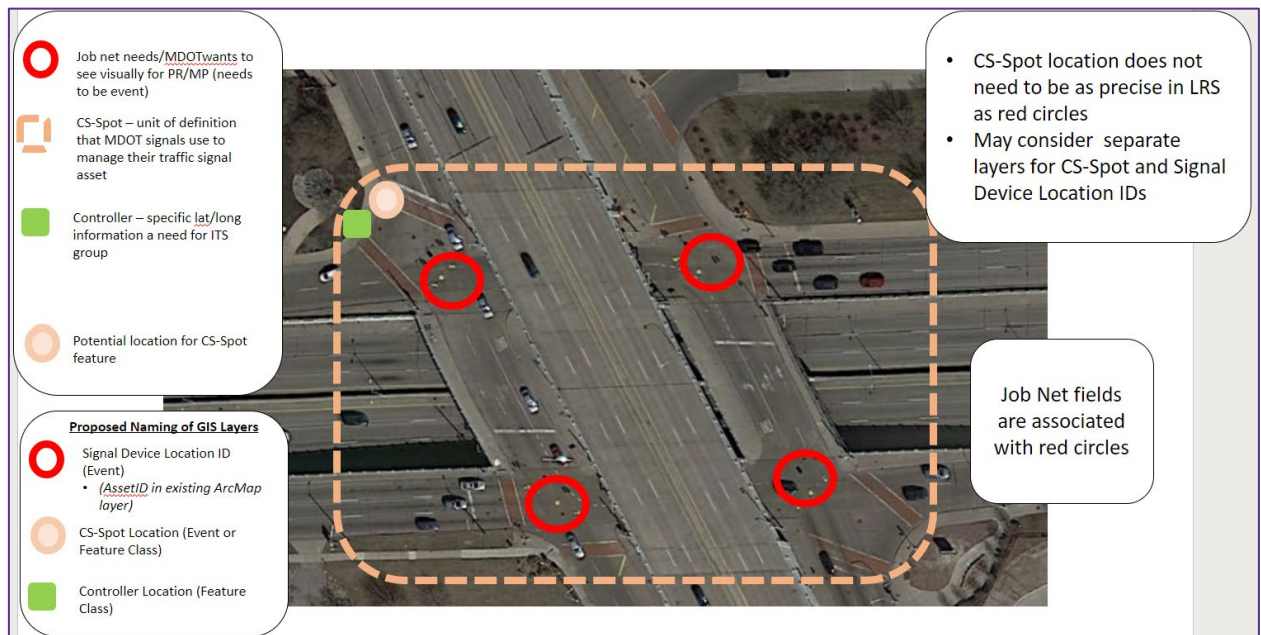
DTS recommends the use of R&H Events to represent CS+Spot Locations and Signal Devices Locations. The WMS Work Order Event Tool was originally built for MDOT TAMS to create Work Order Events with the PR LRS route and measures. DTS recommended updating this tool to create specific SigAM CS+Spot Location and Signal Device Location events. The use of this tool in VUEWorks will allow the auto-population of LRS values and streamline the process of creating these points.

Instead MDOT will utilize MDOT R&H Event Editor and custom scripts to complete requirements below. MDOT will provide these events within a published Map Service to be used within VUEWorks. The configuration will be part of standard Esri Integration.

DTS recommends the SigAM implementation use 3 GIS datasets to represent data:

- CS+Spot Locations represented by Roads and Highways Events. The event layer a single point to represent a general location of the CS+Spot.
- Signal Device Location represented by R&H Events. The event layer will represent the multiple locations for each device location.
- Assets, which are the specific devices or components will be represented as a feature class. This data does not currently exist and will be implemented as data is collected.

MDOT provided various depictions of assets and their interactions in a PowerPoint on January 13, 2022. The recommendations below will work for all scenarios provided to DTS. The image below shows a representative configuration. The CS+Spot Locations show as the peach-colored rectangle in the image above. In subsequent slides it's noted that the CS+Spot location does not need to be as precise and that a separate point layer would be considered for this feature. The CS+Spot Location layer is not intended to interface with JobNet.



**Figure 11: MDOT CS+Spot representation**



## CS+Spot Location

DTS recommends the use of R&H Events to represent CS+Spot Locations. The use of the MDOT Roads & Highways Tools will handle the creation of events and will allow the auto-population of LRS values and streamline the process of creating these points. The CS+Spot Locations show as the peach-colored rectangle in the image above. The CS+Spot Location layer is not intended to interface with JobNet.

## Requirements and solutions:

CS-Spot	4	<p>System allows user to click on the map to start the process of creating a new CS-Spot. Based on location chosen on the map, system:</p> <ol style="list-style-type: none"> <li>1. Identifies Control Sections within a buffer distance of the point on the map based on MDOT GIS Control Section layer and displays in a selectable list</li> <li>2. Allows user to select a Control Section from the list</li> <li>3. (a). displays all existing CS-Spot numbers in the selected Control Section (b). suggests and displays a new CS-Spot number (based on the next available sequential Spot number). and allows to choose a CS-Spot number from (a) or (b) above.</li> <li>4. When the new, suggested CS-Spot number(b) is selected, allows the user to edit the number.</li> <li>5. Then validates and alerts for duplicate CS-Spot numbers.</li> <li>6. If not a duplicate number, then allows to create the new CS-Spot.</li> <li>7. When an existing CS-Spot is selected, allows to edit CS-Spot details.</li> </ol> <p>Supplemental Information to the above requirement:</p> <p>The interface portion of this requirement includes displaying read-only views of existing MDOT ArcGIS layers such as Control Section.</p>	Mandatory Minimum (Interface)	X
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**Figure 12: Requirements Traceability Matrix**

### The following VUEWorks functionality and solutions address CS+Spot Requirement # 4

Requirement #4 is the process that the MDOT Signals Team currently use in SafeStat to select Control Sections, determine sequencing for next CS+Spot IDs and create CS+Spots with unique IDs. The recommendations presented in this document are to use the MDOT R & H Event Editor Tool for the tasks in this requirement. Each Requirement Task is addressed below:

1. VUEWorks provides buffer tools to allow the user to select other assets based on a distance from a selected point. While buffer tools are available they will not be needed as part of the Event Tool solution for the creation of a CS+Spot event.
2. Filter and search tools are available to select by any attribute stored in GIS or Facility database. The filter, query and reporting tools in VUEWorks can be used as a QA process when the user chooses to edit the CS+Spot Number.
- 3a. User can display CS+Spot #s within both GIS and the Facility database. CS+Spot GIS data can be queried and viewed via mapping tools or attribute list display. The query and display of the data on a map and tabular can assist with the QA process if the user chooses to edit the CS+Spot Number.
- 3b. CS+Spot numbering:

- The MDOT R&H Tools and custom scripts (developed by MDOT) will provide auto-generated sequential CS+Spot numbering for CS+Spot point created within the CS+Spot Study Location event layer. Sequential numbering for the Spot Number will be created based on the highest value previously used for the CS Number. There are gaps in Spot Numbers in current SAFESTAT database. These gaps served as placeholders for future Spot Numbers within each CS. Those gap numbers will be ignored in the auto-generated process and only the highest value will be used to generate the next Spot Number. The user will not be presented an optional CS+Spot # to use since this is auto assigned at creation. The MDOT Tool will not allow duplicates to be created.
  - MDOT will need to review CS+Spot Numbers to determine if any clean-up will be needed prior to migration and go-live.
- The format of the sequential numbering will be:
  - CS (5 characters) + "-" + Spot Number (3 characters)
    - e. 12345-001
    - f. 12345-002
    - g. 22345-001
    - h. 22345-002

4. CS+Spot Number Editing – MDOT would like to be able to edit the CS+Spot number after the initial value is auto generated. CS+Spot number will not be used as the VUEWorks unique id. Instead a Global ID will be used as the unique id. CS+-Spot will then be editable by select MDOT users when permissions are granted in VUEWorks.

The workflow described in Requirement #4 is based on a manual process currently being used in SafeStat. The MDOT Event Editor Tool sequencing is being implemented to move away from this manual process. If there is a business case where MDOT will need to perform edits on this field, MDOT will need to create a business process to ensure numbers are not duplicated.

- The user will have the ability to edit the CS+Spot Number value with any number they choose. It is the user's responsibility to run queries and validate prior to updating.
- The Event Tool auto-sequencing of the new number will always be based on the highest existing value of the CS+Spot # in the event layer.
  - If CS+Spot 4567-001 and 4567-002 are created through the MDOT Event Tool and the second point is manually edited to 4567-101, then the 2 CS+Spots will be 4567-001 and 4567-101.
  - If another CS+Spot number (Signal Location is added to the CS) using the Event Tool then it will create a point with CS-Location ID of 4567-102.
    - The MDOT Event tool will always look for the highest existing value and increment by one.

5. The MDOT Event Tool will create the CS+Spot Number based on the highest value of the CS Number previously used. No duplicates will be generated. This occurs with the creation of the event within the CS+Spot Location using the MDOT Tools. See explanation in Task 4.

6. Event editing will be available for CS+SPOT Locations and Signal Device Locations. The editing will allow for the user to update the 'User Populated' fields defined below. If auto-populated fields are edited, MDOT will need to create a business process to edit and QA those fields. See Task 4 explanation of editing.

## CS+Spot Location Attributes:

The following attributes will be defined for CS+Spot Location and auto populated using MDOT's R&H Event Editor Tools and scripts to populate sequential ids

- Global ID – Populated through the R & H Event Editor Tools.
- CS+Spot # - Auto generated using MDOT Tools with the CS and next sequence. This will not be designated as the VUEWorks unique id since it will need to be editable.
- PR Route – Auto populated when the event is created.
- PR Mile Post – Auto populated when the event is created.
- CS Route – Auto populated when the event is created.
- CS Mile Post – Auto populated when the event is created.
- The following attributes may be populated using VUEWorks editing tools after the record has been created through MDOT's R&H Event Editing tools:
  - Status – Auto populated with default status (Value TBD, Example: Pending)
  - CS+Spot Type – Auto populated with a default status. Value "study-type".
  - CS+Spot Description – User populated

## Signal Device Location

DTS recommends the use of R&H Events to represent an intersection or location along a roadway where traffic signal or other electronic traffic control devices (e.g., School Crosswalk Sign Beacon, Warning Sign Beacon, Pedestrian Hybrid Beacon (HAWK)) are installed in the field. The use of the Event Tools in VUEWorks will allow the auto-population of LRS values and streamline the process of creating these points. The Signal Device Location is shown as the red circle in the image above. This Event Layer will be used with the JobNet Interface.

- Signal Device Location will be created using MDOT R&H Tools and scripts. Please refer to Appendix for listing of attributes available in the MDOT\_PRMP Roads & Highways Route Event Layer (VUEWorks Development). If data is available within this event layer, those fields can be auto populated in the Signal Device Location Event Layer. Exceptions are the geometry fields (Route and Mile Post); they are not included in the VUEWorks attribute list screenshot however this geometry data is available. Attributes to be updated by R & H Event Editor tools and MDOT script included in the Signal Device Location Event Layer:
  - Global ID – Populated through the R & H Event Editor Tools.
  - CS+Spot Location number – User populated. This is based on the CS+Spot Location values. These will be user populated by copying from the CS+Spot Location layer. Optionally MDOT may auto-populate through scripts.
  - CS+Spot # - User populated as above or through MDOT Scripts
  - PR Route – Auto populated when the event is created through R&H Event Editor.
  - PR Mile Post – Auto populated when the event is created through R&H Event Editor.
  - CS Route – Auto populated when the event is created through R&H Event Editor .
  - CS Mile Post – Auto populated when the event is created through R&H Event Editor.
  - Signal Device Location ID – Auto populated when the event is created using MDOT Tools and scripts. The Signal Device Location ID will use the existing SafeStat format (integer). The ID will be auto-generated using MDOT Tools. The initial value will be loaded at go-live and the Signal Device Location ID will be incremented at creation.

1.

**Edit Layer Settings**

**MDOT\_Signals**

Layer Group: Transportation

Tab Group: \_Default

Asset ID Field: Asset ID Number

Selectable: ☒

Attribute Edit: ☐

Spatial Edit: ☐

Address Abutter: ☐

Picture:

Hyperlink:

Modified By:

Modified Date:

Change Code:

Asset ID Prefix:

Asset ID Suffix:

Asset ID Seed: 1

Transparency (%): 0

Used In Modules: Work Orders

Navigation: [Back] [Forward] [Save] [Close]

2.

**Figure 13: Signal Device asset id - auto increment**

- SignalDeviceLocationIDDescription (text, 255) – User populated after event is created. Optionally editable in VUEWorks if permissions are granted.
- DeviceDescription (text, 255) - User populated after the event is created. Editable in VUEWorks if editing permissions granted.
- RS Establish Date – If the editor fields are enabled in R&H for the layer it will be populated by Esri when the event is created. They are enabled in the VUEWorks Development environment. See Appendix.
- RS Retire Date – If the editor fields are enabled in R&H for the layer it will be populated by Esri when the event is created. They are enabled in the VUEWorks Development environment. See Appendix.

3.

## Assets

DTS recommends using Feature Classes to represent any additional assets that are components of the CS+SPOT Location, an example asset would be Controllers. Feature classes will provide the best options for creating and editing data within SigAM workflows. SigAM GIS assets can be easily edited in VUEWorks, Esri Field Maps and Collector and ArcMap/ArcPro. The Assets are shown as green squared in the image above (Figure 1: MDOT CS+Spot representation). In the image this asset is a controller, however, there have been

other discussions that in the future there may be a desire to add additional assets, e.g. Poles, etc. and these would also be handled as assets.

## VUEWorks – Linking non-spatial data to GIS Data

VUEWorks provides the functionality to link non-spatial (Facility database) to GIS Feature Class. The links provide a 'relationship' between the GIS data and the non-spatial facility data. Facility assets can be linked to any GIS feature or event. This is a standard VUEWorks functionality and is recommended for SigAMs GIS and non-spatial data linking.

- Facility Link to GIS functionality – Within the Manage Facilities, the Link to GIS feature allows user to link an non-spatial asset to a GIS feature or event.

4.

The screenshot shows the 'Manage Facilities' interface. On the left, a tree view shows a facility hierarchy: 59032-115 > M91 @ FRED MEIJER HEARTLAND TRAI > Solar > Warning Sign Beacon > Signal Head. The main panel is titled 'Attributes' and shows a table of facility data. A yellow box highlights the 'Link to GIS' button in the top right corner of the main panel.

Field Name	Value
Asset ID	254
Service Status	In Service
Status	E
Louver Count	0

- Administration Tools allow the user to select the GIS Layers the facility assets can be linked.

The screenshot shows the 'Select Layers' dialog box. It has a title bar 'Select Layers' and a close button. The main area is titled 'Select Layers this Facility Type can be linked to'. It contains a table with columns 'Layer', 'Link', and 'Create/Delete Facilities'. The 'Link' column has checkboxes for each layer. The 'Create/Delete Facilities' column has 'Create' buttons for each layer. The 'Layer' column lists various GIS features like BikeLanes, Bridge Mounted Sign Structure, Cable Barrier, etc.

Layer	Link	Create/Delete Facilities
BikeLanes	<input type="checkbox"/>	Create
Bridge Mounted Sign Structure	<input type="checkbox"/>	Create
Cable Barrier	<input type="checkbox"/>	Create
Cantilever Sign Structure	<input type="checkbox"/>	Create
County	<input type="checkbox"/>	Create
CSSPOT	<input type="checkbox"/>	Create
Culvert	<input type="checkbox"/>	Create
Lane	<input type="checkbox"/>	Create
LaneFunction	<input type="checkbox"/>	Create
Maintenance Responsibility	<input type="checkbox"/>	Create
MDOT Region	<input type="checkbox"/>	Create
MDOT TSC	<input type="checkbox"/>	Create

## Data Collection and Editing

Data Collection outside of the SigAM workflows should be completed using Esri Collector or Field Maps.

As part of the SigAM workflow the following GIS editing, and data creation scenarios have been documented.

- **Request Phase:**
  - If CS+Spot Location exists, attach to the Work Order and revise the Status as needed. If Event is used, then the point is created with the attributes documented above for CS+Spot Location.
- **Study Phase :**
  - CS+Spot location is created in the Study Phase. If Event is used, then the point is created with the attributes documented above for the CS+Spot Signal Device.
- **Scoping:**
  - CS+Spot Location may be updated to Pending Status.
  - CS+Spot Location may be created. See Study Phase for attributes to be updated when the location(s) are created
  - Signal Device Location may be created
  - Signal Device Location may be updated to Pending Status
- **Construction**
  - **Construction completed** – Facility data is set to existing status
    - Future: Add/Update Device Feature Class.
 Update status for devices in Facility after construction completed.
- **Maintenance:**
  - Future: Update Device Feature Class.
  - Update Facility Device attributes.

Business Req. Module	Business Req. No.	Detailed Business Requirement Description	Priority	Current Capability	Requires Configuration	Requires Customization	Future Enhancement	Not Available	Technical Assumption(s), Configuration Solution.
Asset Inventory	182	System sets the status of an asset inventory item based on a certain criterion (see Supplemental Information for criteria).  Supplemental Information to the above requirement:  Inventory item statuses: P (Pending) E (Existing) R (Retired)  System criterion to set inventory status on an inventory item:  The 'Pending' status would typically be set during design phase (but could be set during Mv/A initiated by electrician). The 'Pending' status would be associated with an open status of design, maintenance, or construction phase. Additional criteria/business rules will be provided later during implementation phase of the project.	Required	X					An attribute pick list field will be created to define the current status of the asset. Users with appropriate permissions will be able to edit/update the asset status.
Asset Inventory	183	System sets the status of an asset inventory item to 'Pending' when it is first added on a Work Authorization or on a Design.	Required	X					Additional information may be required.  Current functionality doesn't exist for the system to assign a status when a record is created.  When the inventory item is created the user will set the appropriate status.
Asset Inventory	186	System updates inventory status from 'Pending' to either 'Existing' or 'Retired' when 'Work Authorization or Design phase's status is 'Closed-Completed'.  Supplemental Information to the above requirement:  Pending -> Existing: When a new asset is installed Existing -> Retired: When an existing asset is removed	Required	X					Functionality does not currently exist.  With permissions, the user will be able to change the status of an asset or Work Order.

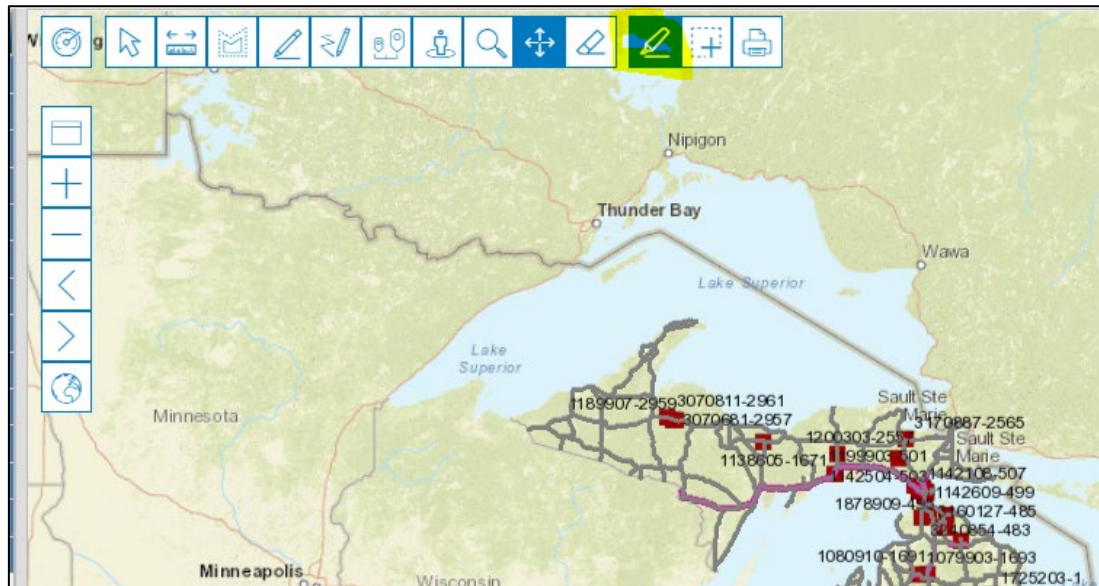
## Event Creation Process

The process described below will be developed for MDOT. Change Request 1 & 2 describe the development tasks that will provide this functionality. These tools will be available to MDOT but

will not be implemented as part of the SigAM project. In the future when Conflict Prevention is supported within VUEWorks, MDOT may choose to use these tools.

The CS+Spot Locations and CS+Spot Signal Device Locations are created in Event layers.

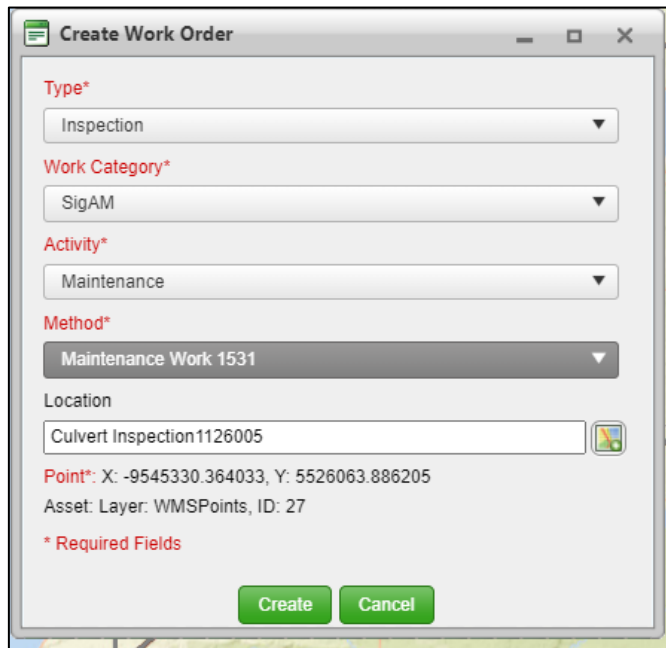
MDOT TAMS utilizes LRS Tools developed by DTS within VUEWorks to create Work Order Points based on MDOT's LRS. MDOT's Roads and Highways network is used to populate routes and measures. DTS recommends providing this same tool with enhanced functionality to create CS+Spot Locations and CS+Spot Device Locations. This tool will allow the user to select which type of point/asset they would like to create. The user has the option of selecting a point on the map or keying the route/milepost.



**Figure 14: LRS Tools in MDOT TAMS**

The user will first create the Work Order within Workflow process, and then select attach assets.





**Create Work Order**

Type\*  
Inspection

Work Category\*  
SigAM

Activity\*  
Maintenance

Method\*  
Maintenance Work 1531

Location  
Culvert Inspection1126005

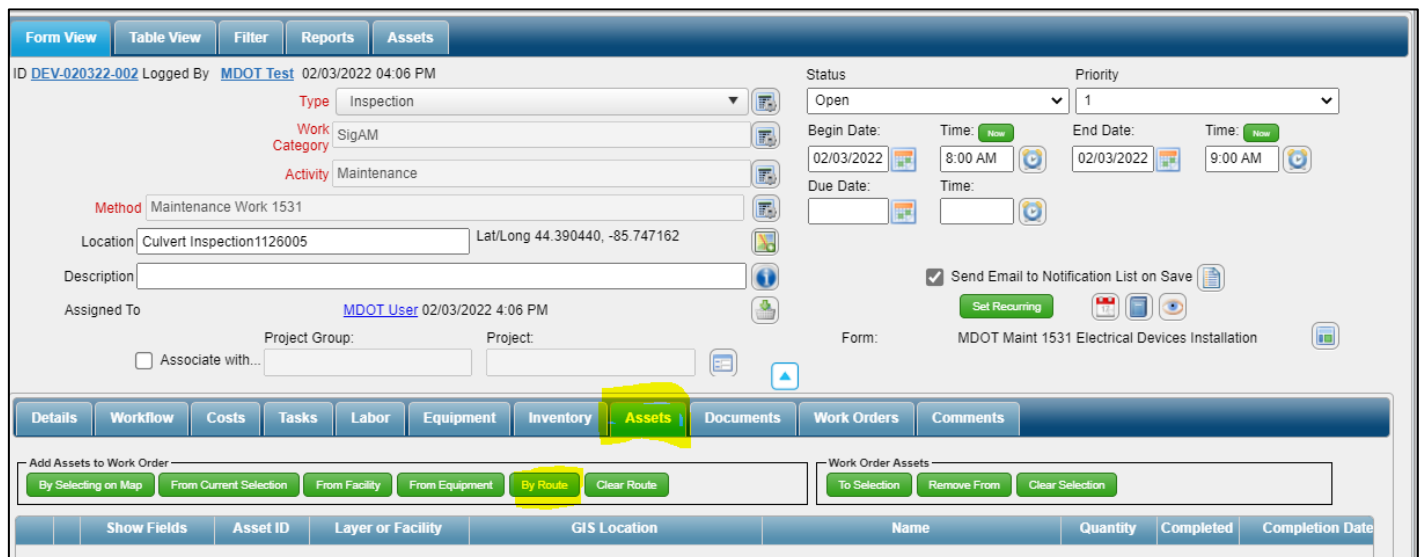
Point\*: X: -9545330.364033, Y: 5526063.886205  
Asset: Layer: WMSPoints, ID: 27

\* Required Fields

Create Cancel

**Figure 15: Create Work Order**

Within the Work Order, the user will select the *Asset Tab* to add the locations(points) of the CS+Spot Location or the Signal Device Location. The User will use the *By Route* selection



Form View Table View Filter Reports Assets

ID DEV-020322-002 Logged By MDOT Test 02/03/2022 04:06 PM

Type Inspection  
Work Category SigAM  
Activity Maintenance  
Method Maintenance Work 1531  
Location Culvert Inspection1126005 Lat/Long 44.390440, -85.747162  
Description  
Assigned To MDOT User 02/03/2022 4:06 PM  
☐ Associate with... Project Group: Project:

Status Open Priority 1  
Begin Date: 02/03/2022 Time: 8:00 AM  
End Date: 02/03/2022 Time: 9:00 AM  
Due Date: Time:

☒ Send Email to Notification List on Save  
Set Recurring  
Form: MDOT Maint 1531 Electrical Devices Installation

Details Workflow Costs Tasks Labor Equipment Inventory **Assets** Documents Work Orders Comments

Add Assets to Work Order  
By Selecting on Map From Current Selection From Facility From Equipment **By Route** Clear Route

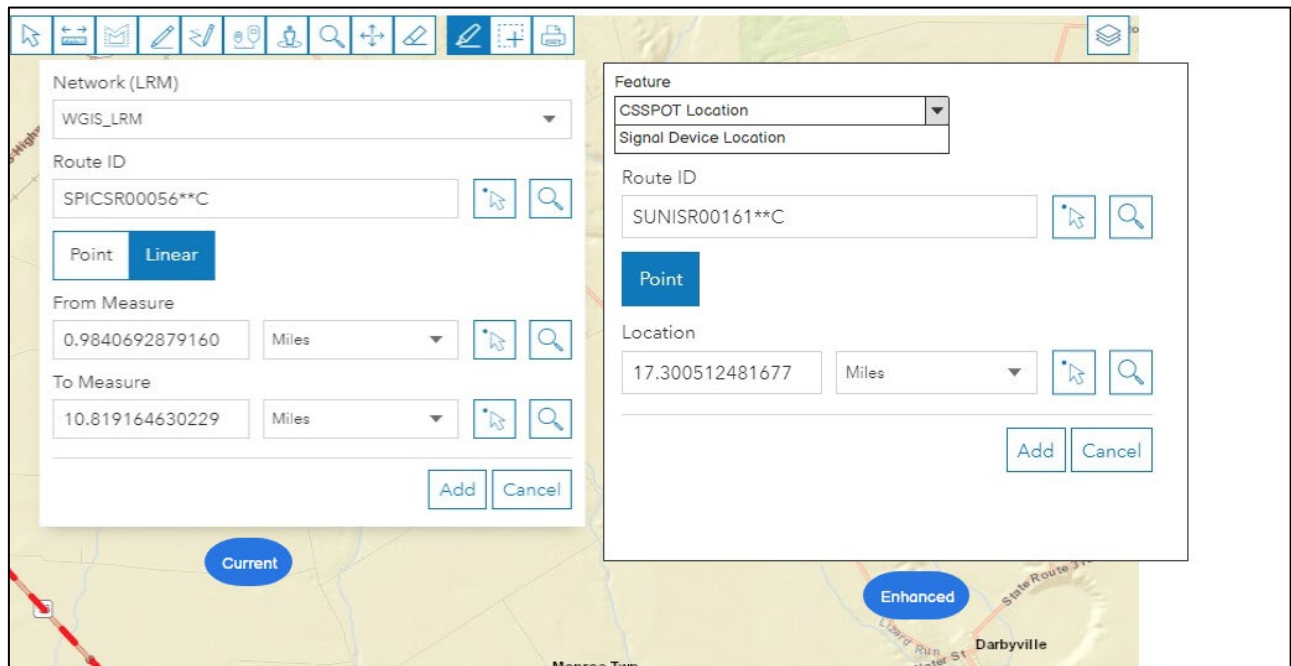
Work Order Assets  
To Selection Remove From Clear Selection

Show Fields	Asset ID	Layer or Facility	GIS Location	Name	Quantity	Completed	Completion Date
-------------	----------	-------------------	--------------	------	----------	-----------	-----------------

**Figure 16: Work Order with Asset Tab**

The *By Route* selection will open the LRS Tool User Interface. The tool will allow the user to select a point on the map and have the PR route and measure populated. The user can optionally enter the route and measure if known. Snapping tool will be developed to allow the user to snap to the intersection.





**Figure 17: LRS Tool to create events**

After the user clicks Add, the event is created within the CS+Spot Location or the Device Signal Location event layer. Additional attributes will be populated and available for user input. Below is a sample of the Data Viewer showing attributes. The final list of attributes will need to be defined.

CSSPOT Location: 12345-001

A Attributes

Save

Cancel

OBJECTID	808
Event ID*	500000
From Date	
To Date	
Route ID	SUNISR00161**C
Measure	17.7245
VUEWorks ID	2
Activity	Fill
WorkType	1
Location Error	NO ERROR
CSSPOT#	12345-001
PR Route	Uplands Dr SE
PR Mile Post	0208909
CS Route	E Fulton St
CS Mile Post	41843
Status	Pending
Description	user populated
CSSPOT Type	"asset-type"

**Figure 18: CS+Spot Location attributes**

Signal Device Location: 12345001

A Attributes

Save Cancel

OBJECTID	808
Event ID*	500000
From Date	
To Date	
Route ID	SUNISR00161**C
Measure	17.7245
VUEWorks ID	2
Activity	Fill
WorkType	1
Location Error	NO ERROR

CSSPOT Location Numbe	12345001
CSSPOT#	12345-001
PR Route	Uplands Dr SE
PR Mile Post	0208909
CS Route	E Fulton St
CS Mile Post	41843
Asset ID	user populated

**Figure 19: CS+Spot Signal Location attributes.**

## Appendix: MDOT\_PRMP - Roads & Highways Event Layer

MDOT\_PRMP Roads & Highways Event Layer (Development Environment) attributes available within VUEWorks are shown in screen shots below. Geometry data (route and milepost) are not stored as attributes within the Event Layer but the data is available for auto population.

The following image shows the populated fields within MDOT\_PRMP (Development). This dataset will be the source used to auto populate the Sig AM event layers:

PR-MP: 0992210

A Attributes

Save Cancel

PR*	0992210
RH Establish Date	07/09/2020
RH Retire Date	
System Create Date	01/01/2017
System Modified Date	07/09/2020 06:23 PM
User Create	MDOT
User Modified	ALLENP
Shape.STLength()	6978.49364923418

**Figure 208: PRMP (Development) Route attributes.**







**STATE OF MICHIGAN**  
**CENTRAL PROCUREMENT SERVICES**  
Department of Technology, Management, and Budget  
320 S. WALNUT ST., LANSING, MICHIGAN 48933  
P.O. BOX 30026 LANSING, MICHIGAN 48909

**CONTRACT CHANGE NOTICE**

Change Notice Number **9**

to

Contract Number **071B5500115**

<b>CONTRACTOR</b>	DATA TRANSFER SOLUTIONS, LLC	<b>STATE</b>	<b>Program Manager</b>	Various	MULTI
	3680 Avalon Park Blvd , E				
	Orlando, FL 32828				
	Donna Huey		<b>Contract Administrator</b>	Christopher Martin	DTMB
	407-382-5222			(517) 643-2833	
	donna.huey@atkinsglobal.com			martinc20@michigan.gov	
	CV0001154				

CONTRACT SUMMARY				
ASSET MANAGEMENT SOLUTION				
INITIAL EFFECTIVE DATE	INITIAL EXPIRATION DATE	INITIAL AVAILABLE OPTIONS		EXPIRATION DATE BEFORE
July 13, 2015	July 12, 2022	5 - 1 Year		July 12, 2022
PAYMENT TERMS		DELIVERY TIMEFRAME		
NET 45				
ALTERNATE PAYMENT OPTIONS				EXTENDED PURCHASING
<input type="checkbox"/> P-Card <input type="checkbox"/> PRC <input type="checkbox"/> Other				<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
MINIMUM DELIVERY REQUIREMENTS				
DESCRIPTION OF CHANGE NOTICE				
OPTION	LENGTH OF OPTION	EXTENSION	LENGTH OF EXTENSION	REVISED EXP. DATE
<input checked="" type="checkbox"/>	2 years	<input checked="" type="checkbox"/>		July 12, 2024
CURRENT VALUE	VALUE OF CHANGE NOTICE		ESTIMATED AGGREGATE CONTRACT VALUE	
\$5,462,156.00	\$494,120.00		\$5,956,276.00	
DESCRIPTION				
Effective 6/28/2022, this Contract is exercising the 1st and 2nd option years and is increased by \$394,120.00 for licencing and maintenance fees and \$100,000.00 for enhancements, improvements, and customizations to be performed on a time and material basis per the attached rate card. This Contract is increased by a total of \$494,120.00 for MDOT use. The following amendments are incorporated into this Contract per attached proposal.				
1. Maintenance and Licensing Fees for Option Year 1 and 2 2. Revised Rate Cards Ancillary Services for Option Year 1 and 2				
The revised contract expiration date is 7/12/2024.				
All other terms, conditions, specifications, and pricing remain the same. Per contractor and agency agreement, DTMB Central Procurement Services approval, and State Administrative Board approval on 6/28/2022.				

**Program Managers  
for  
Multi-Agency and Statewide Contracts**

AGENCY	NAME	PHONE	EMAIL
MDOT	Cory Johnson	517-335-2931	johnsonc45@michigan.gov
DTMB	Dave Work	517-241-4604	workd@michigan.gov



> Multiple assets. Single solution.



## Transportation Asset Management System (TAMS)

### Maintenance and Support

Prepared for: Michigan Department of Transportation

Prepared on: 5/5/2022



## Introduction

Data Transfer Solutions, LLC is pleased to have the continued opportunity to support the Transportation Asset Management System (TAMS) program for the Michigan Department of Transportation (MDOT).

The original contract period for Contract No. 071B5500115 is set to expire on July 12, 2022. The current contract has five, 1-year options available. At MDOT's request, DTS is providing this scope of work for two of the 1-year options with a date range of 7/13/2022 - 7/12/2024.

## COTS Software License Cost by Module

DTS and Rizing will continue to provide Annual Maintenance and Support as defined within Contract No. 071B5500115. Below is a table of costs for each COTS tool per year.

<b>COTS Software License Cost by Module</b>				
<b>Commercial Off the Shelf (COTS)</b>		<b>Option Year 1</b>	<b>Option Year 2</b>	<b>Total</b>
Asset Inventory Management Annual Maintenance	Enterprise	\$61,250	\$63,087	\$124,337
Maintenance Management Annual Maintenance	Enterprise	\$44,100	\$45,423	\$89,523
Straight Line Diagram	Enterprise	\$13,000	\$13,390	\$26,390
Video Log Interface	Enterprise	\$7,000	\$7,210	\$14,210
Roads and Highways Productivity Tools	Enterprise	\$12,000	\$12,360	\$24,360
<b>Total COTS Software License Cost</b>				<b>\$278,820</b>

## DTS Hourly Rate Card

The table below lists the DTS hourly rates per year. These rates apply to additional services that may be requested by MDOT in support of TAMS.

<b>Title</b>	<b>Rate: Option Year 1</b>	<b>Rate: Option Year 2</b>
Customer Support Agent	\$ 150.00	\$ 155.00
IT Systems Analyst	\$ 170.00	\$ 175.00
Sr Developer / Architect	\$ 250.00	\$ 260.00
Developer	\$ 150.00	\$ 155.00
Trainer	\$ 150.00	\$ 155.00
Implementation Specialist	\$ 175.00	\$ 180.00
Sr. Implementation Specialist	\$ 225.00	\$ 230.00
Project Manager	\$ 250.00	\$ 260.00
Project Director	\$ 290.00	\$ 300.00

## Item #1 – Product Maintenance for Years 6 and 7

Cost Categories	Product Name	Year 6 4/1/2023 – 3/31/2024	Year 7 4/1/2024 – 3/31/2025
Straight Line Diagram	Road Analyzer	\$13,000 *	\$13,390 *
Video Log Interface	Road Video Viewer	\$7,000 *	\$7,210 *
R&H Productivity Tools	R&H Productivity Tools	\$12,000 *	\$12,360 *

\* This pricing information is included in the pricing table above

## Item #2 – Video Log Processing

Video Log Processing Year	Est Cost
2023 VideoLog Processing	\$57,650.00*
2024 VideoLog Processing	\$57,650.00*

\* Assumes image metadata format will not change, size of the source imagery is under 5 TB, and the VideoLog imagery matches the LRS of the current year.

## Item #3 – Rate Card for July 2022 – July 2024

Role	Rate
Sr. Project Manager	\$250.00
Project Manager	\$220.00
Solution Architect	\$230.00
Data Architect	\$210.00
Sr. Data Analyst	\$190.00
Data Analyst	\$170.00
GIS Consultant	\$160.00
Sr. GIS Analyst	\$140.00
GIS Analyst	\$120.00
Sr. Application Developer	\$180.00
Application Developer	\$150.00
Jr Application Developer	\$100.00
Sr. GIS Analyst	\$160.00
Sr. Business Analyst	\$180.00
Business Analyst	\$150.00
IT System Administrator	\$170.00
Application Tester	\$85.00



Data Transfer Solutions, LLC  
3680 Avalon Park E Blvd., Suite 200  
Orlando, FL 32828  
Phone: 407-382-5222

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**STATE OF MICHIGAN**  
**CENTRAL PROCUREMENT SERVICES**  
 Department of Technology, Management, and Budget  
 525 W. ALLEGAN ST., LANSING, MICHIGAN 48913  
 P.O. BOX 30026 LANSING, MICHIGAN 48909

**CONTRACT CHANGE NOTICE**

Change Notice Number **8**

to

Contract Number **071B5500115**

<b>CONTRACTOR</b>	DATA TRANSFER SOLUTIONS, LLC
	3680 Avalon Park Blvd , E
	Orlando, FL 32828
	Donna Huey
	407-382-5222
	donna.huey@atkinsglobal.com
	CV0001154

<b>STATE</b>	<b>Program Manager</b>	Various	MDOT
	<b>Contract Administrator</b>	Christopher Martin	DTMB
		(517) 643-2833 martinc20@michigan.gov	

**CONTRACT SUMMARY**

**ASSET MANAGEMENT SOLUTION**

INITIAL EFFECTIVE DATE	INITIAL EXPIRATION DATE	INITIAL AVAILABLE OPTIONS	EXPIRATION DATE BEFORE
July 13, 2015	July 12, 2022	5 - 1 Year	July 12, 2022
PAYMENT TERMS		DELIVERY TIMEFRAME	
NET 45			
ALTERNATE PAYMENT OPTIONS			EXTENDED PURCHASING
<input type="checkbox"/> P-Card <input type="checkbox"/> PRC <input type="checkbox"/> Other			<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No

**MINIMUM DELIVERY REQUIREMENTS**

**DESCRIPTION OF CHANGE NOTICE**

OPTION	LENGTH OF OPTION	EXTENSION	LENGTH OF EXTENSION	REVISED EXP. DATE
<input type="checkbox"/>		<input type="checkbox"/>		July 12, 2022
CURRENT VALUE	VALUE OF CHANGE NOTICE	ESTIMATED AGGREGATE CONTRACT VALUE		
\$5,392,156.00	\$70,000.00	\$5,462,156.00		

**DESCRIPTION**

Effective 1/21/2022, the following amendments are incorporated into this Contract per attached proposal and Statement of Work. This Contract is increased by \$70,000 for MDOT use. This change includes the following:

1. Hardware Maintenance and Support Services - \$3,750.00
2. Planning Meetings - \$4,948.00
3. Prepare Environment for Image Processing - \$23,266.00
4. 2021 VideoLog Image Processing - \$18,150.00
5. RVV Product Enhancements - \$12,244.00
6. As needed Road Analyzer Enhancements, Scripting Enhancements, and Support - billed on a time and material basis per the rates for 2022 included in Contractor's proposal.

All other terms, conditions, specifications and pricing remain the same. Per contractor and agency agreement, and DTMB Central Procurement Services approval.

**Program Managers  
for  
Multi-Agency and Statewide Contracts**

AGENCY	NAME	PHONE	EMAIL
MDOT	Cory Johnson	517-335-2931	johnsonc45@michigan.gov
DTMB	Dave Work	517-241-4604	workd@michigan.gov



**MICHIGAN DEPARTMENT OF TECHNOLOGY,  
MANAGEMENT AND BUDGET  
IT SERVICES  
STATEMENT OF WORK**

<b>Project Title:</b> Transportation Asset Management System (TAMS) - Rizing Transcend Tools Support	<b>Period of Coverage:</b> January 2022 - January 2023
<b>Requesting Department:</b> Michigan Department of Transportation (MDOT)	<b>Date:</b> 01/03/2022
<b>Agency Project Manager:</b> Cory Johnson	<b>Phone:</b> (517) 331-4508
<b>DTMB Project Manager:</b> David Work	<b>Phone:</b> (517) 719-2250

**Brief Description of Services to be provided:**

**BACKGROUND:**

This Statement of Work is based on the existing contract between the State of Michigan (SOM) and Data Transfer Solutions (DTS), LLC, see Contract #071B5500115. Rizing Geospatial (formerly Transcend Spatial Solutions LLC) is a subcontractor to DTS and will be performing this work to modify products that they have developed and solely support.

**PROJECT OBJECTIVE:**

- Meet with MDOT to define and document the issues and scope of work to be conducted under this contract modification.
- Provide and maintain the system infrastructure required to process the 2021 VideoLog dataset.
- Prepare the environment for processing the 2021 VideoLog image dataset. The VideoLog capture vendor is Pathway Services for the 2021 dataset.
- Update Road Video Viewer Information Toll and implement Label Customization to meet MDOT business needs.
- Provide as needed enhancement and support for Road Analyzer, and potential scripting changes.

**TASKS:**

**Task 1 – Monthly Hardware Maintenance and Support Services (Fixed Price)**

Transcend will provide and maintain the system infrastructure required to process the 2021 VideoLog dataset. This will include establishing adequate disk space and networking access/capability, monitoring and tuning system performance, and data backup services on Transcend servers. Based on the size of 2021 dataset (5 TB) and an estimated processing rate of seven minutes per GB, Transcend expects three months will be needed to process, upload, and QC the data.

**Task 2 – Planning Meetings (Fixed Price)**

Transcend will hold meetings with MDOT and DTS to define, plan and document the issues and final scope of work to be conducted under this agreement to process the 2021 VideoLog images.

**Task 3 – Prepare Environment for Image Processing (Fixed Price)**

Transcend will complete six subtasks as part of preparing the environment for processing the 2021 VideoLog image dataset.

In order to locate the VideoLog imagery on MDOT's current ALRS, Transcend will require a backup of MDOT's most recent transactional Roads and Highways database. Transcend will use the same software versions as MDOT in our technical environment to process the image data – ESRI 10.7.1 and SQL Server 2019.



**Subtask 1** – Establish VM for an image processing workspace. Configure TIM updating all relevant packages.

**Subtask 2** – Upgrade Transcend development environment to Esri 10.7.1 and Microsoft SQL Server 2019 to match MDOT's current environment.

**Subtask 3** – Restore MDOT's SQL Server backup of the LRS network data to Transcend's environment.

**Subtask 4** – Verify the Roads and Highways ALRS to ensure that the structure will support image processing and that the network edits made by MDOT have not introduced data anomalies that would result in processing errors. If data issues are found, Transcend's project manager will notify the named MDOT contact to discuss the issues and resolution options.

**Subtask 5** – Copy MDOT's 2021 VideoLog images from the external drive to Transcend's network storage. Transcend will use the same rigor in protecting MDOT's data as it does its own systems and data; including, but not limited to:

- Virus protection
- Internet/network security (Router and Firewall)
- Server security (Windows)

**Subtask 6** – Update TIM processing scripts to handle new Pathways image metadata format.

**Subtask 7** – Project management activities such as communications, personnel coordination, and issue resolution for the environment preparation task.

#### **Task 4 – 2021 VideoLog Image Processing (Fixed Price)**

Transcend will complete four subtasks as part of processing the 2021 VideoLog image dataset.

**Subtask 1** – Initiate and monitor the 2021 image processing. The assigned Sr. Developer will be responsible for using the TIM application to process the data, monitor the status of processes, and work with Transcend's GIS analyst and project manager to resolve any issues.

Data processing includes extracting the metadata from the Pathway images, locating the images to MDOT's LRS, and optimizing the images for display over the web. It is estimated this will require approximately 10 hours of Sr. Developer time per week of processing. If data issues are encountered, the project manager will notify the named contact at MDOT to discuss the issues and the approach to resolve the issues.

A Sr. GIS Analyst will be available two hours per week to provide additional processing support, data analysis, and QC. Based on the estimated processing rate of seven minutes per gigabyte and the 5 TB size of the 2021 dataset, Transcend estimates image processing to take six weeks.

**Subtask 2** – Copy the processed 2021 imagery to the AWS S3 bucket using MDOT-provided credentials.

**Subtask 3** – Work with the MDOT contact to configure the new 2021 seed file for MDOT's Transportation Data Server (TDS) environment for proper use of the images within Road Video Viewer and support MDOT in review of the imagery. This includes providing a GIS Analyst for four hours per week for a four-week period to support MDOT's review of the processed 2021 VideoLog images. The GIS Analyst would be available to answer questions and investigate issues reported by MDOT.

**Subtask 4** - Project management activities such as communications, personnel coordination, and issue resolution for the image processing task.

#### **Task 5 – RVV Product Enhancements (Fixed Price)**

**Subtask 1** – Enable the Information Tool within RVV to support configurable fields and labels. The Information button currently displays the following static information for an image: Point ID, Profile ID, PR Number, Measure, X, Y, and Direction.

This enhancement will allow MDOT to select the fields to be extracted from the image metadata, set the desired order, and customize the labels for those fields. This enhancement will allow MDOT to do the following:

1. Remove both "Point ID" and "Profile ID"
2. Rename "Measure" as "Milepoint"
3. Rename "Direction" as "PR Direction"
4. Add "Route" from the Comments area
5. Add "Collection Date" from the Comments area
6. On the 'Milepoint' label, show the value as three decimal places, and this would be a rounding operation instead of simply truncating or hiding the remaining four decimal places.

Transcend will develop the enhancement, support MDOT's installation and testing in development and QA environments for two weeks and deployment to production.

**Subtask 2** – Enable Label Customization in RVV. As “Route” has a specific meaning to MDOT, they would like the ability to change the references to “Route” in the labels on the RVV main screen as follows:

1. Change “Select Route” to “Select PR Number”
2. Change “Select a Route (start typing)” to “Select a PR Number (start typing)”
3. Change “VIEW ROUTE” to “VIEW PR NUMBER”

Transcend will develop the enhancement, support MDOT's installation and testing in development and QA environments for two weeks and deployment to production.

#### **Task 6 – Road Analyzer Enhancements, Scripting Enhancements, and Support (Hourly)**

Road Analyzer Enhancements may include but are not limited to requests related to signs, guardrail, or culvert updates. Scripting Enhancements may include but are not limited to requests related to ESRI software upgrades, or other utility requests. An updated Rate Card will be provided by Transcend. Support and enhancement requests will be submitted by MDOT to the Transcend Project Manager via email. Transcend will then provide a cost estimate for the scope of work. Approval must be received from DTMB & MDOT PMs prior to commencement of work.

#### **DELIVERABLES:**

Deliverables for this project include documentation to support completion of the following milestones:

1. **Hardware Maintenance and Support Services**
2. **Planning Meetings**
3. **Prepare Environment for Image Processing**
4. **2021 VideoLog Image Processing**
5. **RVV Product Enhancements**
6. **As needed Road Analyzer Enhancements, Scripting Enhancements, and Support**

Deliverables will not be considered complete until the Agency Project Manager has formally accepted them.

#### **ACCEPTANCE CRITERIA:**

1. Successful installation and testing of processed images from 2021 VideoLog into MDOT's production hosting environment.
2. Successful installation and testing of Road Video Viewer enhancements in MDOT's dev, QA, and production hosting environments.

#### **PROJECT CONTROL AND REPORTS:**

A bi-weekly progress report must be submitted to the Agency and DTMB Project Managers throughout the life of this project. This report may be submitted with the billing invoice. Each bi-weekly progress report must contain the following:

1. **Hours:** Indicate the number of hours expended during the past two weeks, and the cumulative total to date for the project. Also state whether the remaining hours are sufficient to complete the project.
2. **Accomplishments:** Indicate what was worked on and what was completed during the current reporting period.
3. **Funds:** Indicate the amount of funds expended during the current reporting period, and the cumulative total to date for the project.

#### **SPECIFIC DEPARTMENT STANDARDS:**

Agency standards, if any, in addition to DTMB standards.

**PAYMENT SCHEDULE:**

Payment will be made on ***acceptance of each Milestone or an Hourly basis*** as indicated. DTMB will pay CONTRACTOR upon receipt of properly completed invoice(s) which shall be submitted to the billing address on the State issued purchase order not more often than monthly. DTMB Accounts Payable area will coordinate obtaining Agency and DTMB Project Manager approvals. All invoices should reflect actual work completed by payment date and must be approved by the Agency and DTMB Project Manager prior to payment. The invoices shall describe and document to the State's satisfaction a description of the work performed, the progress of the project, and fees. When expenses are invoiced, receipts will need to be provided along with a detailed breakdown of each type of expense.

Payment shall be considered timely if made by the DTMB within forty-five (45) days after receipt of properly completed invoices.

**EXPENSES:**

The State will NOT pay for any travel expenses, including hotel, mileage, meals, parking, etc.

**PROJECT CONTACTS:**

The designated Agency Project Manager is:

Cory Johnson  
Michigan Department of Transportation  
Data Oversight & Geospatial Management Section  
Murray D. Van Wagoner Building 3rd Floor  
425 W. Ottawa Street  
Lansing, Michigan 48909  
(517) 331-4508

JohnsonC45@michigan.gov

The designated DTMB Project Manager is:

David Work  
Department of Technology, Management and Budget  
Agency Services MDOT – Public Services and Field Operations Section  
Murray D. Van Wagoner Building 3rd Floor  
425 W. Ottawa Street  
Lansing, Michigan 48909  
(517) 719-2250

WorkD@michigan.gov

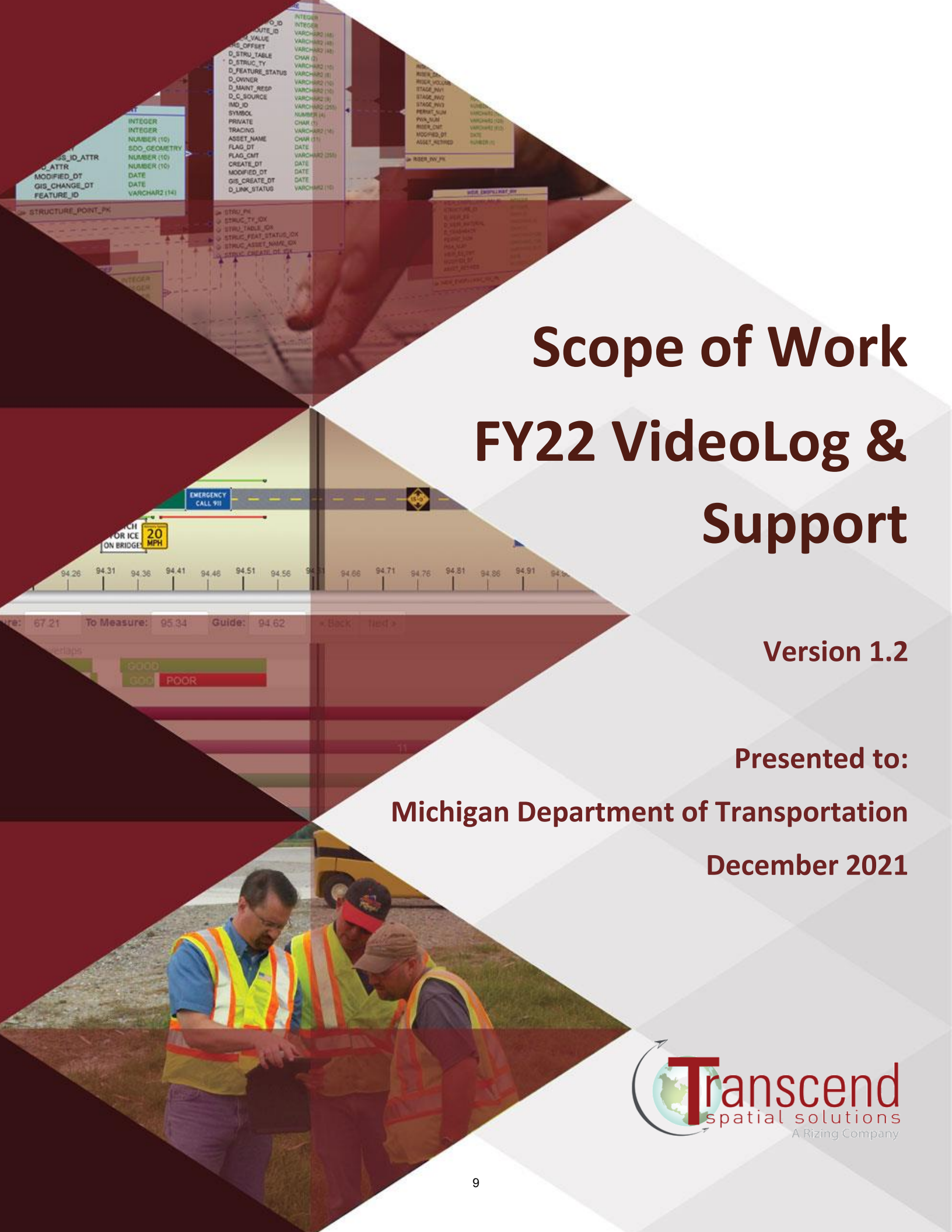
**AGENCY RESPONSIBILITIES:****LOCATION OF WHERE THE WORK IS TO BE PERFORMED:**

Consultants will work at Rizing Geospatial – 300 First Stamford Place Stamford, CT 06902

**EXPECTED CONTRACTOR WORK HOURS AND CONDITIONS:**

Work hours are not to exceed eight (8) hours a day, forty (40) hours a week. Normal working hours of 8:00 am to 5:00 pm are to be observed unless otherwise agreed to in writing.

No overtime will be permitted.



# Scope of Work FY22 VideoLog & Support

Version 1.2

Presented to:  
Michigan Department of Transportation

December 2021





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## Document Version Information

Version	Date	Description	Author
1.0	09/08/2021	Original document creation	Transcend
1.1	10/14/2021	Added RVV Product enhancements	Transcend
1.2	12/17/2021	Software upgrades, upload images to AWS, round route Milepoint to three decimal places.	Transcend

## Introduction

Transcend Spatial Solutions, LLC (Transcend) is pleased to have the opportunity to support the Michigan Department of Transportation (MDOT) once again by processing the 2021 VideoLog dataset for use in Transcend's Road Video Viewer (RVV) application and implement requested changes to Transcend's Road Video Viewer. MDOT also requested Transcend's hourly rates for support and enhancements to Transcend's products and the TAMS custom geoprocessing scripts.

## Services Provided

### Task 1 – Monthly Hardware Maintenance and Support Services (Fixed Price)

Transcend will provide and maintain the system infrastructure required to process the 2021 VideoLog dataset. This will include establishing adequate disk space and networking access/capability, monitoring and tuning system performance, and data backup services on Transcend servers. Based on the size of 2021 dataset (5 TB) and an estimated processing rate of seven minutes per GB, Transcend expects three months will be needed to process, upload, and QC the data.

### Task 2 – Planning (Fixed Price)

Transcend will hold meetings with MDOT and DTS to define, plan and document the issues and final scope of work to be conducted under this agreement to process the 2021 VideoLog images.

### Task 3 – Prepare Environment for Image Processing (Fixed Price)

Transcend will complete seven subtasks as part of preparing the environment for processing the 2021 VideoLog image dataset.

In order to locate the VideoLog imagery on MDOT's current ALRS, Transcend will require a backup of MDOT's most recent transactional Roads and Highways database. Transcend will use the same software versions as MDOT in our technical environment to process the image data – ESRI 10.7.1 and SQL Server 2019.



**Subtask 1** – Establish VM for an image processing workspace. Configure TIM updating all relevant packages.

**Subtask 2** – Upgrade Transcend development environment to Esri 10.7.1 and Microsoft SQL Server 2019 to match MDOT’s current environment.

**Subtask 3** – Restore MDOT’s SQL Server backup of the LRS network data to Transcend’s environment.

**Subtask 4** – Verify the Roads and Highways ALRS to ensure that the structure will support image processing and that the network edits made by MDOT have not introduced data anomalies that would result in processing errors. If data issues are found, Transcend’s project manager will notify the named MDOT contact to discuss the issues and resolution options.

**Subtask 5** – Copy MDOT’s 2021 VideoLog images from the external drive to Transcend’s network storage. Transcend will use the same rigor in protecting MDOT’s data as it does its own systems and data; including, but not limited to:

- Virus protection
- Internet/network security (Router and Firewall)
- Server security (Windows)

**Subtask 6** – Update TIM processing scripts to handle new Pathways image metadata format.

**Subtask 7** – Project management activities such as communications, personnel coordination, and issue resolution for the environment preparation task.

#### **Task 4 – 2021 VideoLog Image Processing (Fixed Price)**

Transcend will complete four subtasks as part of processing the 2021 VideoLog image dataset.

**Subtask 1** – Initiate and monitor the 2021 image processing. The assigned Sr. Developer will be responsible for using the TIM application to process the data, monitor the status of processes, and work with Transcend’s GIS analyst and project manager to resolve any issues.

Data processing includes extracting the metadata from the Pathway images, locating the images to MDOT’s LRS, and optimizing the images for display over the web. It is estimated this will require approximately 10 hours of Sr. Developer time per week of processing. If data issues are encountered, the project manager will notify the named contact at MDOT to discuss the issues and the approach to resolve the issues.

A Sr. GIS Analyst will be available two hours per week to provide additional processing support, data analysis, and QC. Based on the estimated processing rate of seven minutes per gigabyte and the 5 TB size of the 2021 dataset, Transcend estimates image processing to take six weeks.

**Subtask 2** – Copy the processed 2021 imagery to the AWS S3 bucket using MDOT-provided credentials.

**Subtask 3** – Work with the MDOT contact to configure the new 2021 seed file for MDOT’s Transportation Data Server (TDS) environment for proper use of the images within Road Video Viewer





and support MDOT in review of the imagery. This includes providing a GIS Analyst for four hours per week for a four-week period to support MDOT's review of the processed 2021 VideoLog images. The GIS Analyst would be available to answer questions and investigate issues reported by MDOT.

**Subtask 4** - Project management activities such as communications, personnel coordination, and issue resolution for the image processing task.

### **Task 5 – RVV Product Enhancements (Fixed Price)**

Transcend will complete two subtasks as part of product enhancements with this scope of work.

**Subtask 1** – Enable the Information Tool within RVV to support configurable fields and labels. The Information button currently displays the following static information for an image:



This enhancement will allow MDOT to select the fields to be extracted from the image metadata, set the desired order, and customize the labels for those fields. This enhancement will allow MDOT to do the following:

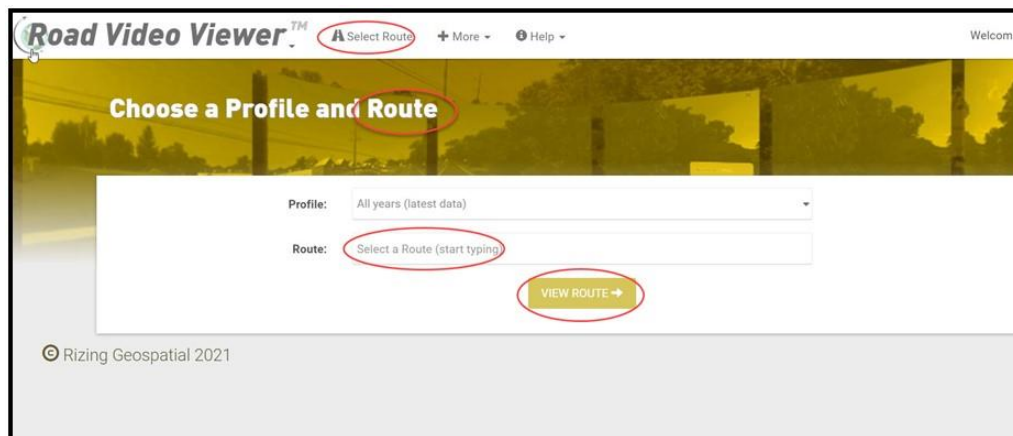
1. Remove both "Point ID" and "Profile ID"
2. Rename "Measure" as "Milepoint"
3. Rename "Direction" as "PR Direction"
4. Add "Route" from the Comments area
5. Add "Collection Date" from the Comments area
6. On the 'Milepoint' label, show the value as three decimal places, and this would be a rounding operation instead of simply truncating or hiding the remaining four decimal places.

Transcend will develop the enhancement, support MDOT's installation and testing in development and QA environments for two weeks and deployment to production.

**Subtask 2** – Enable Label Customization in RVV. As "Route" has a specific meaning to MDOT, they would like the ability to change the references to "Route" in the labels on the RVV main screen as follows:

1. Change "Select Route" to "Select PR Number"
2. Change "Select a Route (start typing)" to "Select a PR Number (start typing)"
3. Change "VIEW ROUTE" to "VIEW PR NUMBER"





Transcend will develop the enhancement, support MDOT’s installation and testing in development and QA environments for two weeks and deployment to production.

### Product Enhancements and Support (Hourly)

This may include but is not limited to requests related to signs, guardrail, or culvert updates. Rates are provided below in *Table 2 - FY22 Rate Card*. Support and enhancement requests will be submitted by MDOT to the Transcend Project Manager via email. Transcend will then provide a cost estimate for the scope of work. Approval must be received from DTMB & MDOT PMs prior to commencement of work.

### Scripting Enhancements and Support (Hourly)

This may include, but is not limited to, requests related to changes in established automated scripts due to ESRI software upgrades, or other utility requests. Rates are provided below in *Table 2 - FY22 Rate Card*. Support and enhancement requests will be submitted by MDOT to the Transcend Project Manager via email. Transcend will then provide a cost estimate for the scope of work. Approval must be received from DTMB & MDOT PMs prior to commencement of work.



## Cost and Schedule Proposal Assumptions

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### Data Assumptions

- The VideoLog imagery will be in Pathways format located to MDOT PR network.
- The size of the imagery is under 5 TB
- The VideoLog imagery matches the LRS of the current year.
- MDOT's network will be provided in ESRI 10.7.1/SQL Server 2019 format.

### Time Estimates

Minutes/GB TIM Processing:	7
Processing Time (Weeks):	6
Additional Manual Processing (Weeks):	2
Upload Processed Images to drive (Weeks):	2
Support MDOT VideoLog Testing (Weeks):	4
Sr. Developer Hours/Week:	10
Sr. GIS Analyst Hours/Week:	2

*Table 1 - Time Estimates*

### Rates

This table lists the rates for Michigan's 2022 fiscal year. These rates apply to both the fixed price tasks and hourly support work.

System Admin Rate:	\$ 150.00
Database Admin Rate:	\$ 174.00
Sr. Developer Rate:	\$ 197.00
Developer Rate:	\$ 130.00
Sr. GIS Analyst Rate:	\$ 130.00
Project Manager Rate:	\$ 212.00
Project Director Rate:	\$ 274.00

*Table 2 - FY22 Rate Card*



## Cost Proposal

This table lists tasks and costs for the FY22 TAMS Support. Invoices will be submitted upon completion of Task 4 and Task 5 and then monthly for hourly support.

Task Description	Resource	Unit Costs	Units	Total Cost
<b>Task 1 - Monthly Hardware Maintenance and Support Services</b>		<b>\$ 1,250.00</b>	<b>3</b>	<b>\$ 3,750.00</b>
<b>Task 2 - Planning</b>			<b>24</b>	<b>\$ 4,948.00</b>
2.1 Meetings and planning prior to beginning work	Project Manager	\$ 212.00	12	\$ 2,544.00
	Project Director	\$ 274.00	4	\$ 1,096.00
	Sr. GIS Analyst	\$ 130.00	4	\$ 520.00
	Sr. Developer	\$ 197.00	4	\$ 788.00
<b>Task 3 - Prepare Environment for Image Processing</b>			<b>137</b>	<b>\$ 23,266.00</b>
3.1 VM Setup, Configure and Update TIM	Sr. Developer	\$ 197.00	8	\$ 1,576.00
	System Admin	\$ 150.00	4	\$ 600.00
3.2 Upgrade Environment to Esri 10.7.1 and SQL Server 2019	Database Admin	\$ 174.00	4	\$ 696.00
	System Admin	\$ 150.00	4	\$ 600.00
	Sr. GIS Analyst	\$ 130.00	6	\$ 780.00
3.3 Restore MDOT SQL Server database with updated network	Database Admin	\$ 174.00	6	\$ 1,044.00
	Sr. GIS Analyst	\$ 130.00	1	\$ 130.00
3.4 Verify ALRS configuration	Sr. GIS Analyst	\$ 130.00	4	\$ 520.00
3.5 Download 2021 VideoLog images for processing	System Admin	\$ 150.00	4	\$ 600.00
3.6 Changes to TIM to support updated process for Pathways dataset	Sr. Developer	\$ 197.00	40	\$ 7,880.00
	Developer	\$ 130.00	40	\$ 5,200.00
3.7 Project Management	Project Manager	\$ 212.00	12	\$ 2,544.00
	Project Director	\$ 274.00	4	\$ 1,096.00



Task Description	Resource	Unit Costs	Units	Total Cost
<b>Task 4 - VideoLog Image Processing</b>			<b>120</b>	<b>\$ 18,150.00</b>
4.1 Process 2021 VideoLog Images	Sr. GIS Analyst	\$ 130.00	60	\$ 7,800.00
	Sr. Developer	\$ 197.00	6	\$ 1,182.00
4.2 Upload 2021 VideoLog images to AWS	System Admin	\$ 150.00	16	\$ 2,400.00
	Sr. GIS Analyst	\$ 130.00	2	\$ 260.00
4.3 Configure seed file, support MDOT during validation of image processing	Sr. GIS Analyst	\$ 130.00	16	\$ 2,080.00
	Sr. Developer	\$ 197.00	4	\$ 788.00
4.4 Project Management	Project Manager	\$ 212.00	12	\$ 2,544.00
	Project Director	\$ 274.00	4	\$ 1,096.00
<b>Task 5 - Product Enhancements</b>			<b>88</b>	<b>\$ 12,244.00</b>
5.1 Road Video Viewer Information Tool	Sr. Developer	\$ 197.00	8	\$ 1,576.00
	Developer	\$ 130.00	44	\$ 5,720.00
	Sr. GIS Analyst	\$ 130.00	8	\$ 1,040.00
5.2 Road Video Viewer Label Customization	Sr. Developer	\$ 197.00	4	\$ 788.00
	Developer	\$ 130.00	20	\$ 2,600.00
	Sr. GIS Analyst	\$ 130.00	4	\$ 520.00
<b>Grand Total</b>				<b>\$ 62,358.00</b>



**STATE OF MICHIGAN**  
**CENTRAL PROCUREMENT SERVICES**  
 Department of Technology, Management, and Budget  
 525 W. ALLEGAN ST., LANSING, MICHIGAN 48913  
 P.O. BOX 30026 LANSING, MICHIGAN 48909

**CONTRACT CHANGE NOTICE**

Change Notice Number 7  
 to  
 Contract Number 071B5500115

<b>CONTRACTOR</b>	DATA TRANSFER SOLUTIONS, LLC	<b>STATE</b>	Program Manager	Various	MDOT
	3680 Avalon Park Blvd , E				
	Orlando, FL 32828		Contract Administrator	Christopher Martin	DTMB
	Donna Huey			(517) 643-2833	
	407-382-5222			martinc20@michigan.gov	
	donna.huey@atkinsglobal.com				
	CV0001154				

CONTRACT SUMMARY					
ASSET MANAGEMENT SOLUTION					
INITIAL EFFECTIVE DATE	INITIAL EXPIRATION DATE		INITIAL AVAILABLE OPTIONS	EXPIRATION DATE BEFORE	
July 13, 2015	July 12, 2022		5 - 1 Year	July 12, 2022	
PAYMENT TERMS			DELIVERY TIMEFRAME		
NET 45					
ALTERNATE PAYMENT OPTIONS				EXTENDED PURCHASING	
<input type="checkbox"/> P-Card		<input type="checkbox"/> PRC	<input type="checkbox"/> Other	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	
MINIMUM DELIVERY REQUIREMENTS					
DESCRIPTION OF CHANGE NOTICE					
OPTION	LENGTH OF OPTION		EXTENSION	LENGTH OF EXTENSION	REVISED EXP. DATE
<input type="checkbox"/>			<input type="checkbox"/>		July 12, 2022
CURRENT VALUE		VALUE OF CHANGE NOTICE		ESTIMATED AGGREGATE CONTRACT VALUE	
\$4,914,656.00		\$477,500.00		\$5,392,156.00	
DESCRIPTION					
Effective 5/25/2021, the following amendment for the Signal Asset Management System (SigAMS) is incorporated into this Contract per the attached documents. This Contract is increased by \$477,500.00 for MDOT use.					
All other terms, conditions, specifications, and pricing remain the same. Per contractor and agency agreement, DTMB Central Procurement Services approval, and State Administrative Board approval on 5/25/2021.					

**Program Managers  
for  
Multi-Agency and Statewide Contracts**

AGENCY	NAME	PHONE	EMAIL
MDOT	Cory Johnson	517-335-2931	johnsonc45@michigan.gov
DTMB	Dave Work	517-241-4604	workd@michigan.gov



**MICHIGAN DEPARTMENT OF TECHNOLOGY,  
MANAGEMENT AND BUDGET  
IT SERVICES  
STATEMENT OF WORK**

<b>Project Title:</b> Signal Asset Management System - SigAMS	<b>Period of Coverage:</b> March 2021 – December 2021
<b>Requesting Department:</b> MDOT Field Services/Traffic Signals	<b>Date:</b> 11/13/2020
<b>Agency Project Manager:</b> Hilary Owen	<b>Phone:</b> 517-230-7965
<b>DTMB Project Manager:</b> Pam Chappell	<b>Phone:</b> 517-525-4226

**BRIEF DESCRIPTION OF SERVICES TO BE PROVIDED:**

To replace and modernize needed SAFESTAT functionalities with a new Signal Asset Management System.

**BACKGROUND:**

SAFESTAT is the existing database for signal asset inventory and the primary tool for workflow from study through design, construction, and final inspection. SAFESTAT is not geographic or map-based and has become so outdated that we are using other programs for major functionalities including signal timing permits, studies, and drawing archival. A geographic database of signal assets has been developed within ArcMap, and we are currently updating both SAFESTAT and the ArcMap database. Because of these inefficiencies, a lean process improvement was conducted during the summer of 2018. One of the conclusions was to implement a new signal asset management system.

**PROJECT OBJECTIVES:**

The objective of this project is to streamline and modernize the Michigan Department of Transportation (MDOT)'s traffic signal asset management approach by implementing a new traffic signal asset management system that both replaces the functionality currently provided by the SAFESTAT application (See BACKGROUND above) and adds new functionality to make the process more efficient. An overarching objective is to spend less time managing traffic signal assets and have a more reliable, up to date asset database. The new web-based system must have a user-friendly map interface and must be able to be accessed remotely by field staff within or outside of the SOM network. Ideally the new system would provide seamless workflows from requests, operational and planning studies through funding, scoping, design, construction, inspection, and ongoing maintenance and billing. Ideally the new system would be capable of interfacing with many other software systems from these workflow areas, serving as an integrated solution for all stages of signal asset management.

**SCOPE OF WORK:**

The scope of work includes implementing, configuring, and customizing the COTS (Commercial off the Shelf) solution to meet the requirements attached to this Statement of Work.

The resulting COTS solution should allow MDOT Signals Unit to manage the full lifecycle of electronic control devices (e.g., traffic signal, flashing beacon, etc.) which includes requests for new devices, operational and planning studies, funding, scoping, design, construction, inspection, and ongoing maintenance and billing. This includes automating the process of Transport Work Authorization (TWA) (including the capability to track and reflect maintenance work & costs) and Inspection Work Authorization (IWA).

The solution should provide a map-based and robust ability to manage traffic signal CS-Spots (i.e., "sites") and relate assets and devices to a CS-Spot. The system should interface with other State of Michigan (SOM) data sources to display

read-only views of existing MDOT ArcGIS layers such as Control Section and allow the user to click on the map to start the process of creating a new CS-Spot.

The solution should seamlessly integrate, with the capability to send and receive data, with internal and external systems including JobNet, DTMB ArcGIS Server, AASHTOWARE, Michigan Informational Database (MIDB), Fleet Management System, and the State of Michigan approved Electronic Document Management System (currently ProjectWise for document storage).

The solution should provide remote access (accessible to internal or external users out of SOM network without a SOM VPN) and provide a responsive interface through which users, especially field workers, can update work authorizations and asset inventory.

The solution:

- Supports create and edit functionality of CS-Spot, Study, Scoping, Design, and work authorization records.
- Provides links to design files in DGN format stored in ProjectWise.
- Allows users to upload and store design PDFs (e.g., as-built documentation) in the system.
- Allows users to add (attach) and manage asset inventory on work authorizations.
- Provides GUI for electronic logbook entries so that electricians can enter costs incurred on work (authorizations).

The solution should provide the ability to create new and edit existing asset inventory items.

The solution should also provide a Dashboard showing real-time metrics on work authorizations, user configurable reports and system reports - some of which are used for financial reporting of the system. The system should also provide admin functionality (i.e., GUI to manage maintenance tables).

The vendor shall migrate only data from any source that is corresponding to functionality supported in the new system which includes migrating an existing ArcMap layer to associate a geographic location to each CS-Spot and device.

#### **TASKS:**

- Provide a new traffic signal asset management solution that fulfills mandatory minimum and required items and identifies if, how, and at what cost optional requirements can be met.
- Provide a new traffic signal asset management solution that both replaces the functionality currently provided by the SAFESTAT application and adds new functionality to make the process more efficient.
- Integrate with MILogin for DEV, QA and PROD environments Provide a map-based and robust ability to manage traffic signal CS-Spots (i.e., "sites"); and the ability to relate assets and devices to a CS-Spot.
- Provide remote access to the system (accessible to internal or external users out of SOM network without a SOM VPN).
- Provide a responsive design interface through which users, especially field workers, can update work authorizations and asset inventory.
- Import converted required data from SAFESTAT and ProjectWise systems and migrate to the new Signals system in an agreed upon format (including asset inventory from latest modernization design).
- Implement data interfaces between the Signals solution and JobNet, ArcGIS, LAPS, AASHTOware, MIDB, Fleet Management System, CSCS systems.
- Create requirements traceability matrix, design, develop, test, and implement the new SigAMS system utilizing a development, UAT and production environment.
- Allow for full retirement of old PowerBuilder system.
- Coordinate Security Application Development Lifecycle Scan on new code module, review findings with DTMB, and provide corrections within agreed upon timeframe.

Review of the attached documents will provide a detailed view of the requirements, workflow, and reporting.

- Attachment 1: SigAMS SOW Requirements
- Attachment 2: Interface Summary Table
- Attachment 3: Data Migration Summary Table
- Attachment 4: SAFESTAT Forms (Current system)



- Attachment 5: Transport Work Authorization (TWA) - Sample
- Attachment 6: Inspection Work Authorization (IWA) - Sample
- Attachment 7: SAMS Workflow v3
- Attachment 8: Signal Asset Management Glossary V2
- Attachment 9: Data Collection Guide V4

#### **DELIVERABLES:**

The following documents will be required to be completed and approved.

Package builds should be submitted and accepted by DTMB. Package installation instructions and support are required for each of MDOT's environments (DEV, QA, PROD).

Provide MDOT with a test plan that includes test cases to verify the system workflow and enhancements. MDOT will conduct testing after the software is deployed in the QA environment. Once MDOT determines these test cases and their own test cases are successful then testing will be deemed a success if there are no defects or issues detected.

Design Acceptance Criteria:

- SEM-0501 Functional Design approval
- SEM-0604 System Design Document approval
- SEM-0401 Requirements Traceability Matrix Milestone Acceptance
- SEM-0701 Training Plan approval
- SEM-0189 Design Stage Exit approval
- Design Milestone Acceptance Signoff

Construction Acceptance Criteria:

- SEM-0600 Test Strategy approval
- SEM-0603 Detailed Test Plan approval
- SEM-0606 Test Case approval
- Vendor System Acceptance Testing Results/Metrics Report
- SEM-0189 Construction Stage Exit approval
- Construction Milestone Acceptance Sign-off

UAT Acceptance Criteria:

- SEM-0607 Test Closure Report approval
- SEM-0189 UAT Stage Exit approval
- UAT Defect Tracking Log
- UAT Milestone Acceptance Signoff

Implementation and Warranty:

- Training Milestone
- 90-day warranty Milestone Acceptance Sign-off

#### **ACCEPTANCE CRITERIA:**

Deliverables will not be considered complete until the Agency and DTMB Project Manager have formally accepted them.

#### **PROJECT CONTROL AND REPORTS:**

- Provide an updated project schedule bi-weekly with status of task/work completed, in progress and tasks coming due, throughout the lifecycle of the project. Identify if task completion is at risk of not completing within original timeframe.
- Facilitate weekly project status meetings and minutes with State of Michigan team and distribute to DTMB PM for review within 24 hours of meeting.
- Identify risks and issues, indicating if there is an impact to the project schedule or budget in timely manner.
- Indicate what work was completed during current reporting period and indicate the amount of funds expended, with a cumulative total to date for the project.
- Coordinate with DTMB PM to schedule and facilitate design/other meetings, as necessary.

- Provide functional and logical design documentation for review and acceptance per schedule.
- Throughout construction, provide beta version reviews of deliverables, for feedback, early and often.
- Provide Requirements Traceability Matrix (RTM) and user test cases based on RTM for approval and acceptance.
- Provide design documentation for review and acceptance.
- Develop test cases and work closely with business on User Acceptance Testing.
- Provide UAT defect tracking log and reporting using a tool which allows all team members to see defects, status, and resolution.
- Schedule and support UAT sessions with business users.
- Assist with production deployment, onsite if requested, during configuration and deployment.
- Provide user training in the office and field, with supporting written documentation and online help.

#### **SPECIFIC DEPARTMENT STANDARDS:**

Agency standards, if any, in addition to DTMB standards.

- MDOT Correspondence Manual  
See Attached
- SOM Web Application Standards  
<https://www.michigan.gov/som/0,4669,7-192-86761---,00.html>
- ADA Compliance Standards  
<https://www.michigan.gov/som/0,4669,7-192-86761---,00.html>

#### **PAYMENT SCHEDULE:**

Payment will be made based on the satisfactory acceptance of each Milestone. DTMB will pay CONTRACTOR upon receipt of properly completed invoice(s) which shall be submitted to the billing address on the State issued purchase order not more often than monthly. DTMB Accounts Payable area will coordinate obtaining Agency and DTMB Project Manager approvals. All invoices should reflect actual work completed by payment date and must be approved by the Agency and DTMB Project Manager prior to payment. The invoices shall describe and document to the State's satisfaction a description of the work performed, the progress of the project, and fees. When expenses are invoiced, receipts will need to be provided along with a detailed breakdown of each type of expense. All invoices must include the purchase order number.

Payment shall be considered timely if made by the DTMB within forty-five (45) days after receipt of properly completed invoices.

Payment Schedule Milestones:

- Requirements Traceability Matrix Milestone Acceptance
- Design Milestone Acceptance Signoff
- Construction Milestone Acceptance Sign-off
- UAT Milestone Acceptance Signoff
- Training Milestone
- 90-day warranty Milestone Acceptance Sign-off

#### **EXPENSES:**

The State will NOT pay for any travel expenses, including hotel, mileage, meals, parking, etc.

#### **PROJECT CONTACTS:**

The designated MDOT Business Owner:

**Name:** Hilary Owen  
**Department:** Michigan Department of Transportation (MDOT)  
**Area:** Intelligent Transportation Systems (ITS) Program  
**Building/Floor:** Construction & Technology Building  
**Address:** 8885 Ricks Road  
**City/State/Zip:** Lansing, MI 48917  
**Phone Number:** 517-636-4821  
**Fax Number:** n/a  
**Email Address:** [owenh2@michigan.gov](mailto:owenh2@michigan.gov)

The designated DTMB Project Manager:

**Name:** Pam Chappell  
**Department:** Department of Technology, Management and Budget (DTMB)  
**Area:** Enterprise Portfolio Management Office (EPMO)  
**Building/Floor:** Murray D. Van Wagoner Building, 3<sup>rd</sup> Floor  
**Address:** 425 W. Ottawa Street  
**City/State/Zip:** Lansing, MI 48933  
**Phone Number:** 517-525-4226  
**Fax Number:** n/a  
**Email Address:** [chappellp3@michigan.gov](mailto:chappellp3@michigan.gov)

The designated DTMB Agency Program Manager:

**Name:** Dave Work  
**Department:** Department of Technology, Management and Budget (DTMB)  
**Area:** Agency Services MDOT – Public Services and Field Operations Section  
**Building/Floor:** Murray D. Van Wagoner Building, 3<sup>rd</sup> Floor  
**Address:** 425 W. Ottawa Street  
**City/State/Zip:** Lansing, MI 48933  
**Phone Number:** 517-719-2250  
**Fax Number:** n/a  
**Email Address:** [workd@michigan.gov](mailto:workd@michigan.gov)

**AGENCY RESPONSIBILITIES:**

Technical support tasks that require assistance, include, but are not limited to the following tasks:

- DTMB/MDOT staff will be made available, as needed, throughout the duration of this implementation.
- DTMB will provide network access and network security access to the consultants as needed to accomplish the tasks outlined in this document.
- DTMB will be responsible for any 3<sup>rd</sup> party licensing of all software per their user licensing agreements.

**LOCATION OF WHERE THE WORK IS TO BE PERFORMED:**

Work performed on this project should occur onsite at State of Michigan, 425 W. Ottawa Street, Lansing, MI, or at Contractor offices, or as mutually agreed.

**EXPECTED CONTRACTOR WORK HOURS AND CONDITIONS:**

Work hours are not to exceed eight (8) hours per day, forty (40) hours per week. Normal working hours of 8:00 am to 5:00 pm are to be observed unless otherwise agreed to in writing.

No overtime will be permitted.

**STATEMENT OF WORK GLOSSARY:**

See Attached

## DTS Response to Michigan DOT Statement of Work for Signal Asset Management System - SigAMS



EASY SOLUTIONS FOR  
A COMPLEX WORLD.

**VUEWorks®**

Leading Performance-based  
Asset Management

*Prepared by:*

**Data Transfer Solutions, LLC**  
**3680 Avalon Park Blvd. E., Suite 200**  
**Orlando, FL 32828**  
**[www.dtsgis.com](http://www.dtsgis.com)**

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## Executive Summary

On behalf of Data Transfer Solutions (DTS), LLC, we would like to thank the Michigan Department of Transportation for the opportunity to provide a response to the MDOT Solicitation for Signal Asset Management System - SigAMS. DTS is pleased to provide our enclosed response purposing our Commercial-off-the-shelf (COTS) VUEWorks® software, which is currently the MDOT Enterprise Asset Management System. VUEWorks is a user friendly, 100% web-based, mobile capable, GIS, maintenance management system that will allow MDOT Field Services/Traffic Signals Department personnel to configuration VUEWorks to accommodate the agency's needs. Our system overview beginning on page 8 outlines how VUEWorks will meet those needs as it is currently meeting signals management needs for MassDOT and other clients.

Data Transfer Solutions, LLC (DTS), a Florida-based limited liability company, has been in business since 2006. DTS offers comprehensive experience and subject matter expertise in the fields of asset management, transportation planning, GIS and application development. DTS is a business unit within Atkins North America, itself a subsidiary of SNL-Lavalin Group, Inc. which has approximately 50,000 employees. DTS also invests highly in R&D activities to keep our proposed VUEWorks asset management software current with the latest trends in asset management.

Since inception, DTS has been involved in many asset management projects for organizations such as Michigan DOT, Rhode Island DOT, Massachusetts DOT, Ohio DOT, Wisconsin DOT, Colorado DOT, Arizona DOT, Delaware DOT, Virginia DOT, Maryland DOT and New Hampshire DOT. DTS is unique in that we provide the full life-cycle of asset management services and software in-house. Our knowledge, expertise and experience cover the gamut from data collection and analysis through maintenance and Capital Improvements Planning. DTS has a broad perspective and depth of understanding from our experience providing the full complement of asset management services. We continually look to upgrade our software and have recently released additional mobile products and flexibility in dashboards, advanced inventory, facilities management and reporting. A significant advantage of the VUEWorks platform is its ability to integrate virtually any business or SCADA system into the core software to support analysis, reporting and dashboarding.

DTS was also involved in the FHWA pooled fund study for **ARNOLD** (All Roads Network of Linear Referenced Data). In 2012, FHWA announced that Highway System Performance Monitoring (**HPMS**) data collection would be expanded in 2014 to include all public roads required under 23 CFR 460. This requirement was later entitled the "All Roads Network of Linear Referenced Data" or ARNOLD. The study funded nine states: California, Colorado, Florida, Georgia, Kansas, Minnesota, New Mexico, Pennsylvania and Utah. This work also included delivery of data models for several states for meeting **MIRE** (Model Inventory or Roadway Elements) and **TAMP** (Transportation Asset Management Plan) requirements.

To meet the functional requirement needs addressed by MDOT in both the DTMB Scope of Work and SigAMS SOW Requirements Matrix, DTS is proposing the use of VUEWorks as a comprehensive, yet simple and user friendly, web-based GIS-integrated enterprise asset management system that provides the functionality without the need for customization. VUEWorks is highly configurable and does not maintain any custom streams of code. If a client requires a feature that is not available in VUEWorks, our team



works with the client to get those users stories into our agile development cycle. Once development is finished the new feature becomes part of a build release and is available to all VUEWorks users. DTS has provided a detailed narrative in this response, detailing how VUEWorks will meet the requirements outline in the Scope of Work.

VUEWorks has been a full-service asset and work management software since 2002 with the purpose to provide users with software that is an affordable, web-enabled integrated GIS, enterprise asset management solution utilized in tracking the condition, minimizing failure risk and optimizing expenditures and service delivery of physical assets. VUEWorks specializes in state, county and city software system implementation, integration and training. Over 200 current implementations of VUEWorks are active in the United States and Canada. We provide services directly to our customers for all elements of system implementation, training and data conversion. VUEWorks is the only Enterprise Asset Management system built specifically to be **Risk-based, meeting Map 21 and FAST Act requirements.**

The principles of an effective, efficient and sustainable comprehensive maintenance and asset management program are: Collection, sustainment and measurement of an asset inventory; Collection, sustainment and measurement of asset management activities; Integration of asset data across multiple business units and systems; Analysis of alternative project, maintenance, preservation and operational activities on asset value, condition, effectiveness and life and Reporting on asset value, condition, effectiveness and life over time.

These 5 principles represent a collective set of functionalities that needs to be met by an asset management program. Any DOT seeking a comprehensive asset management program needs these capabilities across a wide variety of asset information including signals, pavement, bridges, signs, guardrails, rumble strips, ITS infrastructure, roadway characteristics, traffic volumes, freight capacities, travel speeds, travel patterns, safety and others. Therefore, it is critical that the maintenance and asset management system be able to integrate a multitude of data formats, systems, and platforms.

<i>MDOT SigAMS System Requirements VUEWorks Module Crosswalk</i>	Core	Facilities	Service Request	Work Order	Resource Manager	Condition	Risk	Valuation	Budget Forecasting	Projects	Mobile App Suite
CS-Spot	●	●	●	●							●
Request	●	●	●	●	●	●	●	●	●	●	●
Study	●	●	●	●	●	●	●	●	●	●	●
Scoping	●	●	●	●	●	●	●	●	●	●	●
Design	●	●	●	●	●	●	●	●	●	●	●
Asset Inventory	●	●									●
Maintenance Work Authorization	●	●	●	●	●	●	●	●	●	●	●
IWA (Construction Phase)	●	●	●	●	●	●	●	●	●	●	●
Reports	●	●	●	●	●	●	●	●	●	●	●
Administration	●	●	●	●	●	●	●	●	●	●	●
Migration	●	●	●	●	●	●					

## Proposed Solution

### Understanding of Scope of Services

The DTS team is proposing VUEWorks® asset management software to meet the needs of the Michigan Department of Transportation (MDOT) addressed in the Statement of Work document “Michigan Department of Technology, Management and Budget IT Services Statement of Work”, for Signal Asset Management System – SigAMS.

VUEWorks is a comprehensive, yet simple and user friendly, web-based asset management system that provides the functionality needed by MDOT without considerable customization. VUEWorks software is an affordable, web-enabled GIS-integrated enterprise asset management solution licensed by concurrent user. VUEWorks is designed for use by departments of transportation, airports, state and local governments, utilities, corporations, theme parks and other organizations that need to track the condition, minimize failure risk and optimize expenditures and service delivery of their physical assets. VUEWorks integrates directly with GIS data, allowing users to share geospatial and non-geospatial data on any physical asset within any infrastructure domain.

VUEWorks software employs an all assets model that is based on asset types and asset classes, and therefore does not require users to purchase separate modules for individual assets.

VUEWorks will enable MDOT to track and manage service requests, work orders, asset inspections, asset/inventory life-cycles and condition and publicly reported concerns. VUEWorks is GIS-centric software that will leverage MDOT’s current Esri GIS environment and allow for future infrastructure modeling. Our asset management system will enable the Department to signal assets. VUEWorks is the solution MDOT can utilize to provide users an effective tool that will allow them to easily create and manage service requests, inspections and corrective/preventative maintenance work orders as well as to maintain an inventory database of parts and equipment. Detailed module overviews are provided later in this document.

The following is a listing of some of the advantages of our approach and solution:

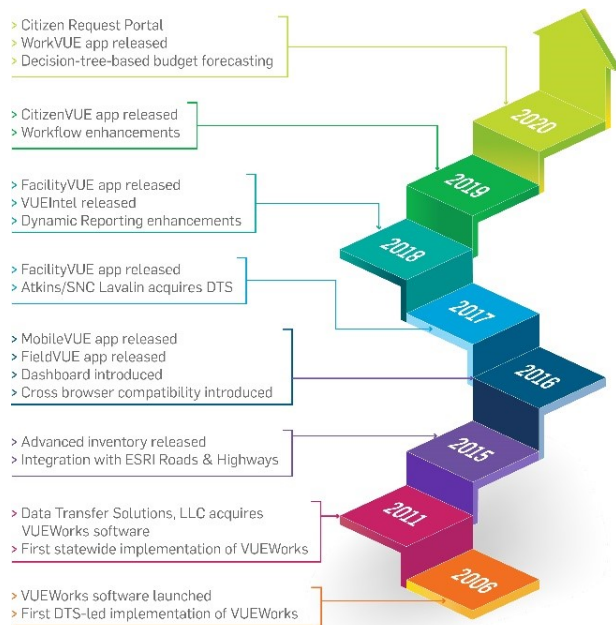
- VUEWorks uses the International Infrastructure Management Manual’s approved and accredited “all assets” approach to infrastructure asset management - which eliminates the need for MDOT to purchase specific modules for different workflows or asset types and allows uniformity in MDOT’s asset management program.
- VUEWorks is a 100% web-based application coded in .NET – it uses a service-oriented architecture allowing it to interface with nearly any external database or application, and it is 100% mobile.
- Utilizing the power of VUEWorks and GIS, an organization can develop the criteria and data to develop different investment scenario models to analyze and understand impacts the Performance Gap Analysis, Life-Cycle Cost Analysis and Risk Assessment Analysis may have on existing and potential funding sources and dollar amounts.
- VUEWorks allows for comparison reporting on existing asset conditions and capacity versus performance targets to determine where gaps may be present.
- The VUEWorks Budget Forecasting module allows for the establishment of performance targets and processes to minimize life-cycle costs of assets by allowing an organization to select from user-defined risk and failure probability criteria to define how treatments will be prioritized and assigned based on



failure modes such as capacity or condition in order to pre-determine the impact of a treatment on the life-cycle cost of an asset.

- The VUEWorks Risk module will aid in monitoring, measuring and reporting on high-priority risks to the performance of an asset or network in order to determine the consequences of failure by analyzing failure modes and probabilities as part of an ongoing risk assessment of infrastructure.

VUEWorks modules build off of one another starting with VUEWorks Core that allows for map and data sharing, linking to 3<sup>rd</sup> party systems and attribute and feature reporting and editing. Work management tools integrate with the VUEWorks Core by creating relationships between asset features and the resources used to maintain them such as labor, equipment and fleet. Organizations that incorporate strategic asset management consider their assets from a long-term perspective looking sometimes decades into the future making connections between how assets are managed today and the long-term outcomes the organization is committed to achieving. These strategic modules can be configured at inception or added years after the VUEWorks work and maintenance tools are deployed. As illustrated to the right, VUEWorks has been a full-service asset and computerized maintenance management software since 2002 continuously enhancing functionality for clients. The application is an affordable, web-enabled integrated GIS, enterprise asset management solution utilized in tracking the condition, minimizing failure risk, and optimizing expenditures and service delivery of physical assets. Today, over 200 current implementations of VUEWorks are active in the United States and Canada.



VUEWorks is highly configurable and does not maintain any custom streams of code. If a client requires a feature that is not available in VUEWorks, our team works with the client to get those users stories into our agile development cycle. Once development is finished the new feature becomes part of a build release and is available to all VUEWorks users. The VUEWorks user does not have to apply the new feature if they do not wish as they are handled through a series of checkboxes. At MDOT, customizations of VUEWorks would really be “configurations” of MDOT workflows and contain any number of business processes, reports and dashboards as needed per Department or business function.

**VUEWorks releases builds regularly throughout the year that include new functionality as well as maintenance updates which may be applied by the client when they wish (e.g. quarterly, bi-annually or annually). Releases include substantial new features and functionality (for instance as can be seen in the timeline graphic above, VUEWorks will release 3 new products at a minimum). VUEWorks is an Esri business partner and is recognized by Esri as a best in class work and asset management solution. VUEWorks is architected such that all system configurations, setups and software customizations persist across builds and upgrades with no impact to the client.**

VUEWorks’ application database is SQL Server-based and will integrate with any ODBC-compliant database or set of databases (SQL, Oracle, Access, Excel), coded in C#. The Data Linking functionality that

is native to the system was designed for integration between the Core application and any third-party system to ensure that other IT investments can be leveraged. The VUEWorks application also runs within a virtualized server environment.

**VUEWorks is also fully compliant with open standards for asset management such as ISO 55000, PAS 55, PAS 1192-3 and others, as well as accepted best practices found in the International Infrastructure Management Manual (IIMM), the Institute for Asset Management (IAM) guidelines and the Global Forum on Maintenance and Asset Management (GFMAM).** These standards, and the accompanying best practices for how to implement them, form a core part of the VUEWorks product design and functional capabilities as well as guide ongoing product development and our implementation process.

ISO 55000 states, “Asset management involves the balancing of costs, opportunities, and risks against the desired performance of assets to achieve the organizational objectives.” VUEWorks enables users to optimize both operations and maintenance (tactical) and capital renewal planning (strategic) objectives to ensure assets are meeting the desired service level at an optimal cost and within acceptable levels of risk.

This is done through the seamless interaction of VUEWorks’ asset management modules (Condition, Risk, Budget Forecasting and Valuation) with VUEWorks’ operations and maintenance modules (Service Request, Work Order, Facilities and Core). Using different ‘what if’ scenarios, VUEWorks allows users to combine different funding amounts, risk tolerances and asset failure modalities (condition, capacity, fit for purpose, regulatory, obsolescence, etc.) into asset renewal and maintenance strategies. This enables users to understand how assets perform over time and whether they will meet the required levels of service the organization seeks to provide to its constituents.

Asset management maturity varies widely from organization to organization, and within an organization will mature over time. VUEWorks provides a scalable asset management platform that meets the requirements of asset management standards for organizations of all maturity levels, as shown in the Asset Management Maturity Scale (Figure 1 below) published by the IAM.



The effective implementation of asset management standards requires the organization to have a stated objective it seeks to achieve. Asset management is the management system (or process) the organization employs to ensure it uses its assets as effectively as possible in pursuit of its objectives. VUEWorks is an asset management platform that enables senior management to define organizational objectives and service level targets and connects this vision with the tactical day-to-day operations and maintenance

activities that must be carried out against the asset portfolio in order to reach the objectives; within budget constraints and tolerance for risk.

Performance-based asset management breaks the asset management life-cycle down into five primary categories:

- Core assets
- Work management
- Resource management
- Risk-based asset management
- Plan management

Each of these categories are equally important in assessing, evaluating, planning and maintaining alignment between organizational goals and the efficient, cost-effective utilization of limited resources. This is critical in order to effectively maintain an organization's infrastructure and assets in a sustainable state of good repair. Following is a deeper dive into the five primary categories.

**Core Assets** is the GIS-centric listing of all the individual infrastructure assets that make up an asset, system or network that requires periodic reactive or routine maintenance to keep it in a state of good repair. Core Assets consists of a real-time integration with Esri's ArcGIS Server REST end-point services to allow your registry of assets mapped in GIS to be used as your asset inventory against which Service Requests and Work Orders, Resources, Risk-based Asset Management and Budget Forecasting can be applied. For non-spatial assets and information that also requires management, the VUEWorks Facilities module can be tailored to manage information related to assets such as assets within a building or fleet.

**Work Management** is the timely coordination and efficient execution of activities that are in alignment with organizational goals for maintaining infrastructure in a state of good repair. Work management consists of Service Requests and Work Orders. Service Requests encompass requests made upon an organization for information or for action, typically in way of a defined work activity. Requests can be internal or external. They can come from departments internal to the organization or from citizens and stakeholders' external to the organization. Work Orders encompass reactive, proactive, capital and preventative maintenance work orders to organize and execute work. Work Management is integrated with or may be used separately from Resource Management.

**Resource Management** allows you to efficiently manage work activities by managing the limited resources required to execute those activities. These resources include detailed information about labor, equipment and material inventory as well as contracted labor, equipment and/or inventory provided by vendors. Log resources against a Work Order for tracking and Activity Based Costing. Track stock materials, quantities on hand, locations and trigger re-ordering.

**Risk-Based Asset Management** is the process of maintaining infrastructure in a sustainable state of good repair based on how a particular asset performs or deteriorates over time. Risk-based asset management includes the routine inspection and condition assessment of assets within an infrastructure network in order to compare a single asset's performance against the general performance of all like assets. In risk-based asset management, each asset is also assessed for risk related to the likelihood and consequence of failure of that specific asset. These risk factors are used in prioritization when creating work plans and budgets. Other considerations in risk-based asset management are the valuation of an asset and "cost of ownership" through an asset's life-cycle, as well as replacement costs.

**Plan Management** brings together budgets and plans for annual programs, capital improvement plans and master plans. This allows organizations to analyze the impacts of annual programs to determine what

the next set of projects and budgets should be to align master plans and organizational goals. An important step within Plan Management is the analysis of different routines, capital and long-term programs and plans using “what-if” scenarios. Organizations can create, for instance, capital improvement plans that model out both “budget” and “impact on asset condition” and include additional useful life of the asset based on plan scenarios. The capability to run multiple plan scenarios to get the right mix of “budget” and “impact” to maintain infrastructure networks in a state of good repair is a critical function.

## Performance-Based Asset Management

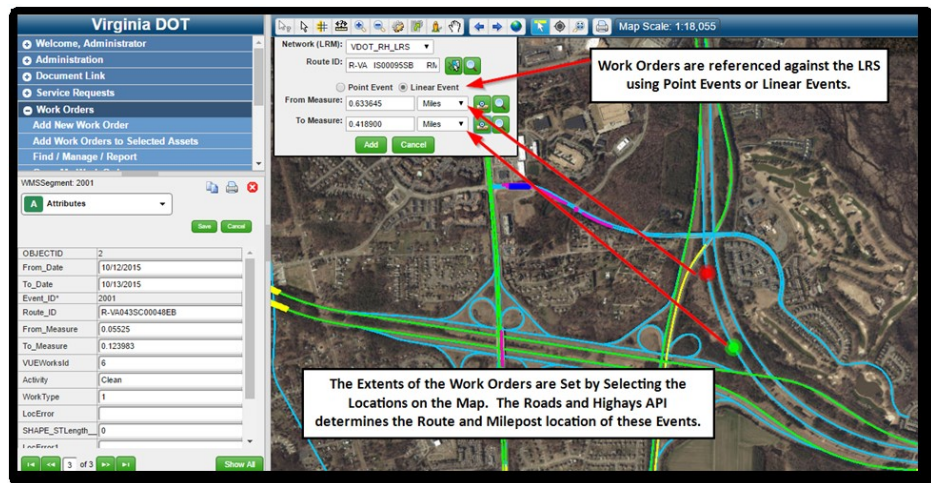
### Handling the life-cycle of assets



**ABOVE: VUEWorks modules and how they relate to the five primary areas of performance-based asset management. Complete module descriptions are provided later in this document.**

### VUEWorks Seamless Esri Roads & Highways Integration

VUEWorks is designed to seamlessly integrate with Esri’s Roads and Highways in real time. Combining VUEWorks with Roads and Highways offers MDOT significant benefits and security ensuring data will be kept current and reliable at all times. A recent value analysis study commissioned by the American Association of State Highway Transportation Officials (AASHTO) regarding the implementation of a modernized LRS showed that simply implementing a modernized LRS editing environment only produced a 1.8 to 1 benefit to cost ratio. However, by adding other functionality to the LRS environment such as business system synchronization and increased integration capabilities, the benefit to cost ratio was increased dramatically to 21.4 to 1. Esri Roads and Highways (R&H) and VUEWorks provides not only all of the additional





functionality mentioned in the report to increase the benefit to cost ratio, but also includes substantially more functionality. The result of implementing R&H and VUEWorks should exceed the 21.4 to 1 ratio of benefit to cost ratio.

DTS has extensive experience working and integrating VUEWorks with multiple LRSs; in fact, DTS has a working knowledge of the integrations points within the MDOT Roads and Highways implementation. Our team implemented MDOT's Esri Roads and Highways and VUEWorks AMS simultaneously. For the Virginia DOT Implementation, our team leveraged the most recent LRS publication data as the primary source for linear reference data. As the RNS data services become available data was migrated from the publication data resource to the data services resource. During the Wisconsin DOT implementation, our team integrated with WisDOT Local Roads Database (WISLR) to be more inclusive and geometrically more accurate. Links to this database were from several of the legacy systems (Metamanager, HAMS, etc.) The main part of the LRS application utilizes GIS data (both linear and non-linear) and enterprise database information (associated to linear features through WisDOT's several LRS processes). Since VUEWorks is a true GIS-centric application it can be linked to any current or legacy LRS system.

### SigAMS Product Offering

VUEWorks® software is an affordable, web-enabled GIS-integrated enterprise asset management solution. VUEWorks is designed for use by state and local governments, utilities, corporations, schools, theme parks and other organizations that need to track the condition, minimize failure risk and optimize expenditures and service delivery of their physical assets. VUEWorks integrates directly with GIS data, allowing users to share geospatial and non-geospatial data on any physical asset within any infrastructure domain. Typical domains include transportation, utilities, facilities, fleet, power (generation, transmission and distribution), oil and gas pipelines, airports, seaports and commercial property management.

VUEWorks software employs an all assets model that is based on asset types and asset classes, and therefore does not require users to purchase separate modules for individual assets.



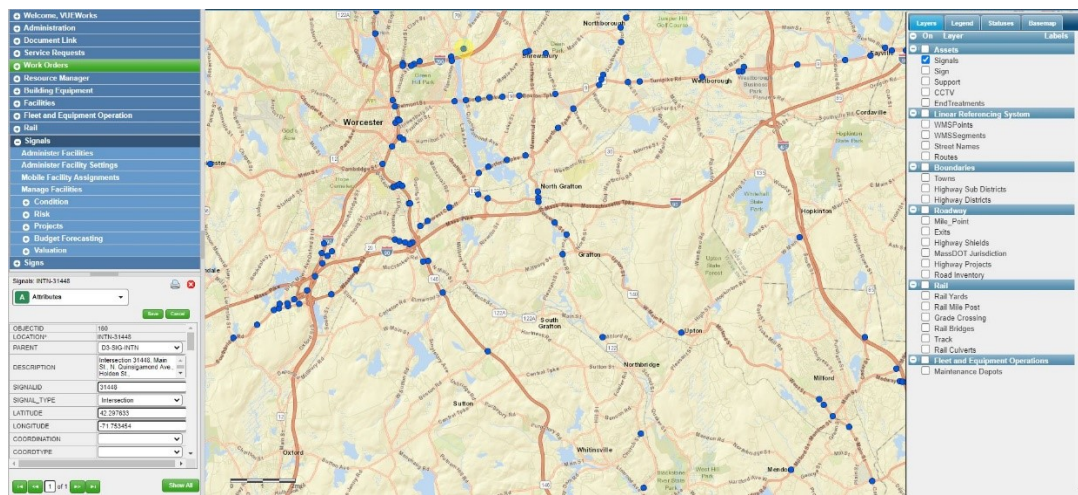
VUEWorks and its modules can be thought of as building upon each other. The base (red) allows for map and data sharing. Work management tools (steel gray) integrate with the core module of the system by creating relationships between asset features and the resources used to maintain them – this integration provides much greater functionality for organizations to use as they perform standard daily, weekly, monthly and as-needed tasks to maintain assets. Organizations that incorporate strategic asset management (gold) consider their assets from a long-term perspective that (depending upon the asset type) may look decades into the future.



## VUEWorks® Core – Signals

Web-based access to all your GIS and asset management data — anytime, anywhere

VUEWorks® Core is the foundation for all other VUEWorks modules, connecting your existing GIS data to the VUEWorks strategic asset and work management system. You can link documents and databases to specific assets, conduct multi-level searches, buffer queries, measure distances and create reports. Best of all, it is very configurable and easy to navigate and use. As a web-based application, VUEWorks can be accessed with Microsoft Internet Explorer via the Internet/intranet, Wi-Fi and wireless communication cards. This gives users the added flexibility to access VUEWorks from the office, the field or home using a traditional desktop computer, notebook or tablet.



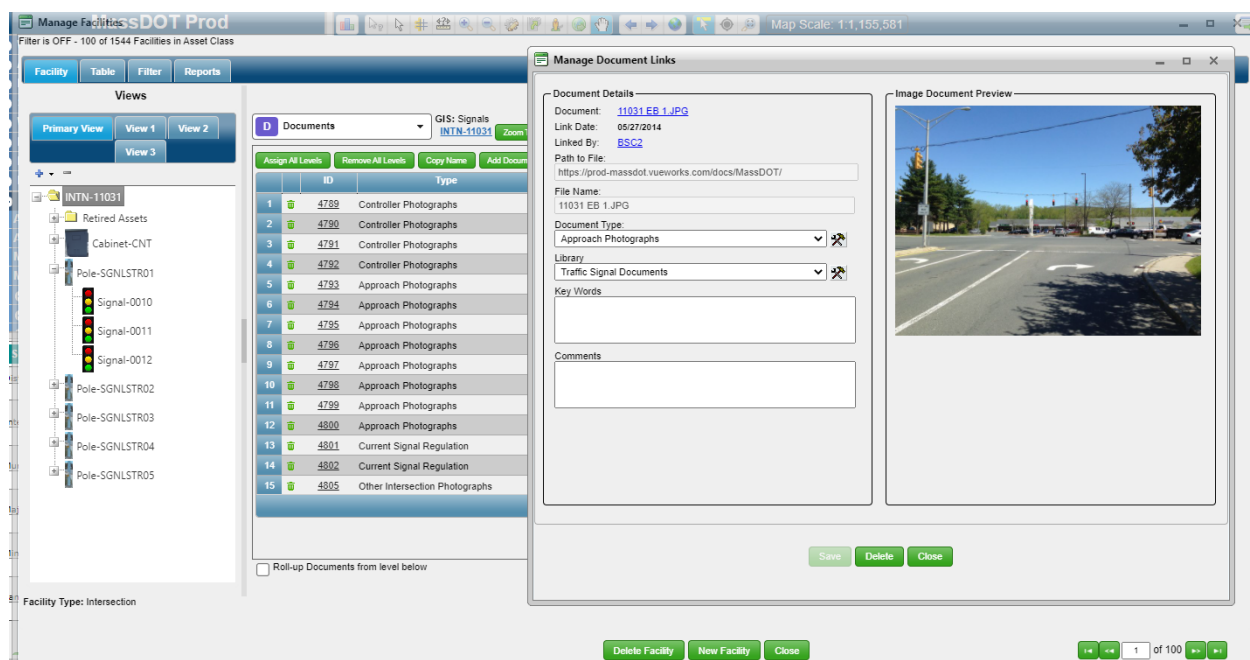
### Features & Benefits

- Integrated with Esri ArcGIS Server
- Manage read/write/edit permissions by department, role and user
- User defined dashboards to graphically display statistical data for service requests and work orders
- Easily link documents such as image files, PDFs, videos and many other formats to any asset for quick viewing anytime, anywhere
- Use Data Link to seamlessly link external databases in Access, Excel, SQL Server, Oracle or any ODBC-compliant database

## Facilities – Signals

### For signal boxes, buildings & vehicle fleet

The VUEWorks® Facilities module provides access to physical assets not found in a GIS but which still need historical service/work records, data links, condition assessment, valuation, preventative maintenance scheduling and access to key operational documentation. The types of facilities that can be managed are virtually limitless including fleet and building components. The Multi-view feature allows assets to be organized in different categories (e.g., location/floor level, department or manufacturer). The VUEWorks Facilities data linking features combined with the Work Order module allow automatic work orders to be issued based on user defined triggers from a SCADA or ITS database.



### Features & Benefits

- Manage non-GIS assets like building components and internal equipment
- Create and organize assets in a hierarchical structure for easy reference
- Inventory fleet and mobile equipment in the Resource Manager module for use with work orders
- Structure your asset hierarchy to include work orders, condition, valuation and more.
- Manage facilities with trigger work orders based on equipment run-time or other data (e.g., SCADA systems)



## Request Portal – Signals

### For citizens and customers to place requests online

The VUEWorks® Request Portal module delivers convenient online access for citizens and customers to place their requests using the Web. No customization or third party database is required. The Request Portal interfaces directly to the Service Request module. And the Request Portal status is kept up-to-date when a service request is closed. At any time, a citizen or customer can review the status of their request by entering the portal and viewing “My Requests” or by searching for a Service Request ID.

### Features & Benefits

- Allows citizens and customers to issue requests directly, reducing the burden on your call takers or front office staff
- Minimizes errors by directly populating the Service Request module
- Complete integration between the Request Portal and the Service Request and Work Order modules
- Request Portal status is kept in sync with work orders that have linked service requests
- Allows your agency to receive and share request status after hours, 24/7, 365 days a year
- The Request Portal can be accessed via smartphones and other mobile devices

## Service Request – Signals

### For managing service requests from any source

The VUEWorks® Service Request module enables you to record and track requests from those you serve. This configurable module allows you to attach requests to assets in the GIS or in the Facilities module. Request takers can quickly fill out the information for the request and, if the Work Order module is in use, create a work order directly from the service request.

**Manage Service Requests**

Filter is OFF - Current list contains 73 out of 73 Service Requests

-- Select Field --

Apply Filter

**Form View** | Table View | Filter | Reports | Assets

ID: 0127211 Logged By: VUEWorks Support 01/27/2021 02:50 PM

Type \* General

Department \* Highway District Offices

Group Traffic

Issue \* Traffic Signal - damage or knockdown

Location: WORCESTER - Route 70 (Lincoln Street) at Beverly Road

Assigned To: D3 Operations 01/27/2021 2:52 PM

Status Open Date / Time Occurred 01/27/2021 2:50 PM

Date / Time Responded To

Now

☒ Send Email to Notification List on Save

**Details** | Linked Calls | Documents | Work Orders | Assets | Comments

Description:

Response:

Caller Information Copy from

Name of Caller:

Address of Caller:

Relation to Owner:

Phone: Primary

Email

Auto Send

Business

Road MARSH AVENUE

Route L128767 NB

City/Town WORCESTER

District 3

Sub-District 3C

Severity

\* Required Fields

Service request saved

Save Delete New Print... Close

1 of 73

### Features & Benefits

- Service request forms can be easily filled out while talking with the requester
- Record and track requests from both internal and external customers
- Can be used for maintenance activities
- Allows for calculating resolved time between the request and the time the request is closed
- Identify and track duplicate requests to avoid creating multiple work orders for the same incident

## Work Order – Signals

### For work activities, preventative maintenance, tracking progress & costs and notifications & reporting

The VUEWorks® Work Order module combines the power of computerized maintenance management systems (CMMS) with geographic information systems (GIS) to manage and plan work activities. Work orders can be configured to match your existing work order forms to maintain the look and feel of your existing workflow, right down to the activity level. Easily create preventative maintenance schedules linked to a calendar to view activities by day, week or month. Trigger work orders based on data measurements or events from SCADA systems or other data links. The Work Order module can be integrated with other VUEWorks modules.

### Features & Benefits

- Work order forms can be user defined to fit your “look & feel” and existing work process
- Attach work orders to any physical asset on the map or non-GIS asset in the Facilities module for easy reference
- Robust reporting features include pre-defined report templates and wizards
- Automated email notices can be sent to any email program
- Work orders can be logged from the field in a fully disconnected mode.

## Resource Manager – Signals

**For quick cost calculations on labor, equipment and inventory used (parts & materials)**

The VUEWorks® Resource Manager module is tightly integrated with the Work Order module so that associated time and costs for personnel, crews, contractors, vendors, equipment and other items pulled from inventory can be tracked. Time for labor and equipment can be accounted for independently with the Time Recorder feature, then passed on to external accounting systems. Multiple billing rates can be assigned for different labor roles and activities. Set up personnel so that employees can be placed on a work order based on job classification, availability and cost. Personnel managers can be set up to search for an employee job classification, availability and cost in an easy-to-use calendar interface.

**Manage Equipment**

Filter is OFF - Current list contains 79 out of 79 Equipment

Equipment Form | Equipment Table | Filter | Issue / Return | Reports

Number: 12345 | Name: CCTV Truck | Permission Group: Default | Type: Backhoe - 5014

Year: 2005 | Make: CCTV | Model: Truck | Mfr Serial Number:

Category: Field Equipment | Manufacturer: Dodge | Mfr Number:

Sub Category: CCTV Vehicle | Supplier: Grainger Industrial Supply | Supplier Number:

Available: ☐ | In Service Date: 12/10/2013 | Description:

Facility Item in: (none) | Issued To: (no one)

Details | Transactions | Rates | Work Orders | Documents

Linked Documents: 57659 Photograph ford\_13f250xltc

Save | Delete | New Copy | New | Print... | Close

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### Features & Benefits

- Personnel, equipment and inventory items/costs can be added and tracked in work orders
- Assign multiple labor rates to special field activities to get quick cost estimates
- Get real-time inventory tracking with alerts for low inventory
- Use the calendar interface to track availability of employees and equipment
- Automatic notification of employees and supervisors when assigned to a work order
- Import/export personnel, equipment and inventory to accounting systems

## Advanced Inventory – Signals

### For quick cost calculations and advanced inventory management on inventory (parts & materials)

The VUEWorks Advanced Inventory module is a transaction-based inventory model where all transactions are recorded in the system such that a complete financial audit trail can be kept for all transactions relating to inventory.

Manage Inventory

Filter is OFF - Current list contains 153 out of 162 Inventory

Form Table Filter Receiving Issue / Transfer Transactions Reconcile Reports

Number 1234 Name Air Conditioner Filter Permission Group Default

Type Facility Manufacturer N/A Aisle 234

Category Facilities Supplier Home Depot Bin 12

Sub Category Parts and Accessories Description

Purchase Cost 16 Cost Type Average

Units EACH Stocking 300 Threshold 15 Untracked

Overall Quantities  
On Hand: 155  
Reserved: 3  
Backordered: 0  
Counted: 0

Logged By Jason Amadori 09/01/2015 04:29 PM  
Update By VUEWorks 10/30/2015 02:15 PM

Details Locations Transactions Receiving Rate Types Documents

Transaction Type... Between and All Warehouses... Apply Clear

Transaction Type	Adjustment Type	Reference	Warehouse	Aisle	Shelf	Bin	Lot	Quantity
Issued		010616-001	Warehouse 1	123	12	1	62	2.00
Reserved		112015-001	Warehouse 1	123	12	1		2.00

Columns Save Layout Restore Layout Export To Excel

Save Delete New Copy New Print... Close

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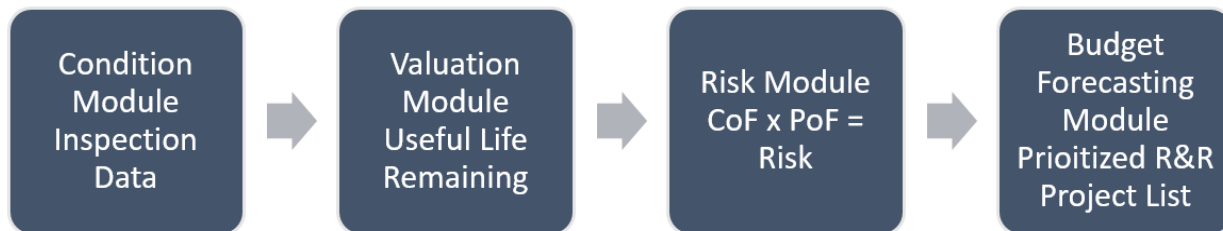
### Features & Benefits

- Transaction-based inventory model
- Ability to organize inventory into user defined categories and subcategories
- Manage unlimited number of warehouses with inventory items
- Assign inventory to various locations within a warehouse and organize into aisles, shelves and bins
- Transfer inventory items between warehouses
- Receive inventory items either manually or through Purchase Orders
- Issue inventory items to work orders or manage a return of an inventory item
- Ability to reconcile a physical count of an inventory item with the count in the system
- Manage transaction types for inventory items
- Grouping of inventory items as “Kits” for common maintenance activities
- Manage suppliers and manufacturers
- Automate purchase order related processes based on inventory stocking and threshold levels
- Link documents such as maintenance instructions to inventory items
- Equipment can be issued and returned similar to inventory items

## VUEWorks Strategic Asset Management Modules

### For maintaining infrastructure in a sustainable state of good repair

VUEWorks strategic asset management modules can be used to provide cost effective life-cycle planning to prioritize WHERE and WHEN signal work needs to be programmed. The powerful Budget Forecasting module allows you to forecast near and long-term budgetary needs using deterioration curves and data from external databases and also the Risk, Valuation and Condition modules. Combined, these tools offer unmatched life-cycle management capabilities that help the Department provide the consistent level of service that stakeholders and customers expect.



VUEWorks robust data linking functionality allows for external databases to be integrated and utilized to populate Condition and Risk records. These records are then used within the Budget Forecasting module to forecast treatment and budgetary needs.

The VUEWorks Condition module is highly configurable, allowing the Department to collect, summarize, analyze, rate and report on the condition of the assets. VUEWorks provides configurable tools that allow for the configuration of rating criteria and tracks the condition history and how signal condition has changed over time. Asset attribute data such as size is stored in the GIS as part of the VUEWorks Core. VUEWorks Core is the foundation for all other VUEWorks modules, connecting your existing GIS data to the VUEWorks strategic asset and work management system.

Current list contains 63 out of 84418 Records

Condition Form | Condition Table | Filter | Reports | Calculations

Record | Documents

Asset Class: Sewer Layer: Sewer Mains Pipeline Condition: 3  
 Asset Type: Main Asset ID: 218826  
 Form: Pipeline Condition

☐ By Inspection ☒ Assigned ☐ Override  
 Record Date: 12/12/2016 9:25 AM  
 Recorded By: Jason Amadori  
 Created: 12/16/2016 9:25 AM By:  
 Modified: 12/16/2016 9:26 AM By:

Notes: Notes 2: Comment(s) for:

Infiltration/Inflow Failure Mode Minimal I/I risk 2	Capacity Failure Mode Minimal capacity limitation risk 2	Structural Condition Failure Mode Acceptable structural condition 1
Maintenance Failure Mode Maintenance failure unlikely in near f 3	Corrosion Failure Mode Minimal corrosion risk 2	Remaining Useful Life 13-24 yrs 3

Save Delete New Print... Close

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The VUEWorks Valuation module removes the labor and expense of meeting the Government Accounting Standards Board (GASB) Statement No. 34 requirements for maintaining and reporting value and depreciation of infrastructure assets, Valuation can calculate historical costs back to the time of construction.

**Valuation History**

**Valuation History For Sewer Mains 61557 (as of 5/16/2018)**

Remaining Life (years):	37.6	Present Value:	\$237
Age:	12.4	Historical Cost:	\$316
Year of Construction:	2005	Value Added By Maintenance:	\$0
Years Added By Maintenance:	0	Accumulated Depreciation:	\$78
Original Life Expectancy:	50	Salvage Value:	\$0
Expected Replacement Year:	2055	Present Replacement Cost:	\$445

Depreciation calculated from the beginning of the year following the year the asset was placed in service

Year	Value Added or Removed	Years Added or Removed	Remaining Life at End of Year	Depreciation Expense	Total Change in Value	Value at End of Year
2015	\$0	0.0	40.0	\$0	-\$0	\$237
2016	\$0	0.0	39.0	\$6	-\$6	\$246
2017	\$0	0.0	38.0	\$6	-\$6	\$240
2018	\$0	0.0	37.0	\$6	-\$6	\$233
2019	\$0	0.0	36.0	\$6	-\$6	\$227
2020	\$0	0.0	35.0	\$6	-\$6	\$221
2021	\$0	0.0	34.0	\$6	-\$6	\$215
2022	\$0	0.0	33.0	\$6	-\$6	\$208

Refresh Print Close

VUEWorks Risk-Based Asset Management can provide a process of maintaining the Department's asset infrastructure in a sustainable state of good repair based on how a signal asset performs or deteriorates over time. Risk-based asset management includes the routine inspection and condition assessment of assets within an infrastructure network (either from an external database or from internally configured condition inspection form) in order to compare a single asset's performance against the general performance of all like assets. In risk-based asset management, each asset is also assessed for risk related to the likelihood and consequence of failure of that specific asset. These risk factors are used in prioritization when creating work plans and budgets. Other considerations in risk-based asset management are the valuation of an asset and "cost of ownership" through an asset's life-cycle, as well as replacement costs.

Storm Mains: 186

**Risk**

**Risk Information**

Asset Class: Environmental Services  
Asset Type: Mains  
Location: 186 - RCP - 36  
Risk Factor (1-10): 1.00  
Consequence Factor (1-10): 6.00  
Criticality Factor (1-10): 3.00  
Failure Probability: 31%  
Overall Confidence: 100%  
Consequence Factor Confidence: 100%  
Failure Probability Confidence: 100%

**Consequences**

Consequence	Rating	Score
Environmental Impact*	None	0.00
Loss of Service*	Low	3.00
Local Flooding*	Moderate	6.00

**Failure Probabilities**

Failure Mode	Value	Units	Failure Probability
Age	67		31 %
Structural Defects	68		30 %
OSM Defects	72		27 %

Show All

The VUEWorks Risk module can allow the Department to capture stakeholder concerns in a risk model to strategically prioritize limited resources and work activities. Determining the consequences of failure by analyzing failure modes and failure probabilities for asset classes and types. Risk priorities are configured by assigning weight factors. Once the risk model has been configured and calculated, VUEWorks Risk makes it easy to quickly look at every aspect of the risk model by highlighting assets on a map and illustrating findings to stakeholders to justify work priorities. Failure history data and pipe hydraulic data can be linked and utilized in the analysis.

The VUEWorks Plan Management tools brings together budgets and plans for annual programs, capital improvement plans and master plans. This could allow the Department to analyze the impacts of annual signals program to determine what the next set of projects and budgets should be to align master plans and organizational goals. An important step within Plan Management is the analysis of different routines, capital and long-term programs and plans using "what-if" scenarios. The Department can create, for



instance, capital improvement plans that model out both “budget” and “impact on asset condition” and include additional useful life of the asset based on plan scenarios. The capability to run multiple plan scenarios to get the right mix of “budget” and “impact” to maintain infrastructure networks in a state of good repair is a critical function of a performance-based asset management system.

**Budget Scenario Manager**  
Filter is OFF - Current list contains 1 out of 3 Scenarios

Form View | Table View | Filter | Reports

Scenario Name: **Sewer Rehabilitation Scenario**  
Asset Class(es): **Sewer**  
Asset Type(s): **Sewer Gravity Pipe**

Scenario Type: **Automatic**  
Analysis Period: **5 Years (2022)**

Created By: [Administrator](#) 06/06/2017  
Modified By: [Administrator](#) 05/08/2018

Notes | **Summary** | Job Details | Audit | Budget | Documents

Scenario Time Span (years): **2018 - 2022**

Year	Base Line			Forecast			Budget	
	Avg Deterioration	Avg Age	Avg % Life Used	Avg Deterioration	Avg Age	Avg % Life Used	Budget Required	Budget Cap
2018	57.72	25.0	54.10%	62.46	19.3	48.80%	\$3,499,984.87	\$3,500,000.00
2019	54.86	26.0	56.72%	65.41	17.8	45.33%	\$3,604,854.50	\$3,605,000.00
2020	51.89	27.0	59.33%	68.83	16.3	41.62%	\$3,713,016.85	\$3,713,150.00
2021	48.81	28.0	61.95%	72.90	14.6	37.51%	\$3,824,500.42	\$3,824,544.50
2022	45.83	29.0	64.44%	77.00	13.0	33.66%	\$3,939,171.71	\$3,939,280.84
							<b>\$18,581,528.35</b>	<b>\$18,581,975.34</b>

Export To Excel

Save | Wizard | Delete | New | New Copy | Print... | Close

1 of 1

The VUEWorks Budget Forecasting module delivers configurable, multi-year capital improvement planning capabilities to help determine long-term budget needs based on deterioration curves. The Department can use one of the supplied deterioration curves or configure their own as a basis for forecasting and then identify at what point on the deterioration curve an asset should be rehabilitated or replaced based on risk and condition. “What-if” budget scenarios can be created by adjusting budgets, project types and prioritization criteria – then run forecasting models to see if your budget will meet service level goals.

The VUEWorks Work Management tools provide timely coordination and efficient execution of activities that are in alignment with organizational goals for maintaining infrastructure in a state of good repair. Work management consists of Service Requests and Work Orders. Service Requests encompass requests made upon an organization for information or for action, typically in way of a defined work activity. Requests can be internal or external. They can come from bureaus internal to the organization or from citizens and stakeholders’ external to the organization. Work Orders encompass reactive, proactive, capital and preventative maintenance work orders to organize and execute work. Work Management is integrated with or may be used separately from Resource Management. Furthermore, VUEWorks is capable of linking directly into spreadsheets, Microsoft Access, SQL, Oracle and any ODBC-compliant database.



## Valuation (GASB 34) – Signals

### For calculating the value and depreciation for all physical assets

The VUEWorks® Valuation module removes the drudgery and expense of meeting the Government Accounting Standards Board (GASB) Statement No. 34 requirements for maintaining and reporting value and depreciation of infrastructure assets. With reporting under your control, you can leverage depreciation and related financial information to help plan budgets and projects. Missing historical cost data? No problem – Valuation will calculate historical costs back to the time of construction. You can also enter historical costs directly or enter unit costs and let VUEWorks calculate the total value.

Sewer Manholes: 14

**V** Valuation

☐ Exclude Values as of 1/18/2016

[View History](#) [Save](#) [Calculate](#)

Remaining Life (years)

Age (years):

Year of Construction:

Original Life Expectancy (years):

Years Added By Maintenance:

Expected Replacement Year:

Present Value: \$

Accumulated Depreciation:

Value Added By Maintenance:

Historical Cost: \$

Replacement Cost: \$

Salvage Value:

**VALUE OVERRIDES**

Note: red values are overrides.  
Edit overrides below.

Original Life Expectancy (years):

Historical Cost: \$

Replacement Cost: \$

Salvage Value: \$

Decommission Date:

**View Valuation**

Current list contains 87681 out of 87681 Valuation records

[Summary](#) [Filter](#) [Asset List](#) [Exclusion List](#) [View Report](#) [Calculate](#)

Layer	Period Ending	Historical Cost	Accumulated Depreciation	Present Year Depreciation	Current Value	Replacement Cost
Centerlines	12/31/2012	\$63,353,538	\$13,167,888	\$1,885,543	\$50,185,650	\$73,1
Parks Polygon	12/31/2014	\$21,745,432	\$1,957,089	\$217,454	\$19,788,343	\$26,2
Sewer Lift Stations	06/30/2015	\$4,964,000	\$942,752	\$49,232	\$4,021,248	\$6,1
Sewer Mains	12/31/2012	\$48,499	\$6,793	\$973	\$41,706	\$
Sewer Manholes	12/31/2012	\$29,054,292	\$4,069,193	\$582,678	\$24,985,099	\$33,5
Signal Point	12/31/2014	\$5,703	\$2,053	\$228	\$3,650	
Storm Mains	12/31/2012	\$24,947,893	\$5,823,453	\$833,875	\$19,124,439	\$28,8
Traffic Signs	12/31/2013	\$3,028,579	\$2,422,863	\$302,858	\$605,716	\$3,5
Trails_arc	12/31/2012	\$3,787,695	\$2,652,424	\$379,807	\$1,135,271	\$4,3
Water Mains	12/31/2012	\$123,757,442	\$17,332,823	\$2,481,930	\$106,424,619	\$142,9
Water Manholes	12/31/2014	\$537,767	\$96,798	\$10,755	\$440,969	\$6
Water Valves	12/31/2012	\$41,163,970	\$5,765,211	\$825,535	\$35,398,759	\$47,5
<b>Totals</b>		<b>\$316,394,810</b>	<b>\$54,239,341</b>	<b>\$7,570,868</b>	<b>\$262,155,469</b>	<b>\$367,1</b>

[Print](#) [Close](#)

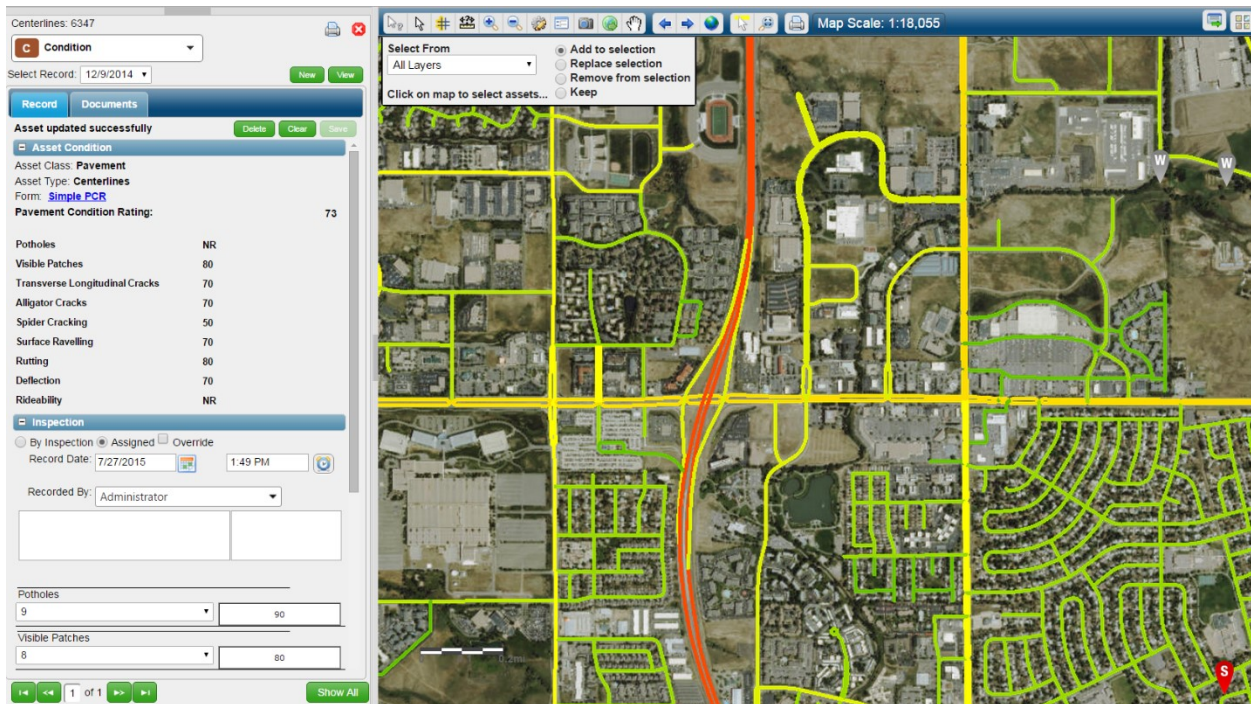
### Features & Benefits

- Integrates seamlessly with the VUEWorks Facilities module & your GIS
- Determine and report historical and replacement costs
- Calculate value and depreciation for all infrastructure assets including buildings and equipment
- Take control of depreciation parameters to realize the full value of your assets
- Account for maintenance through work orders that add value and extend asset life
- Powerful search and filter capabilities allow users to report by location or other criteria

## Condition – Signals

### For condition tracking and reporting on any physical asset

The VUEWorks® Condition module is highly configurable, allowing you to collect, summarize, analyze, rate and report on the condition of any asset. Develop your own condition inspection criteria or use condition data collected with the use of other software. Either way, VUEWorks provides configurable tools that allow you to build your own rating criteria as simple or as detailed as required. History features show how condition has changed over time for each asset or the entire system. The Report Designer lets you design just about any style of report with data from all sources including GIS data and linked databases that contain condition assessment details.



### Features & Benefits

- Supports condition ratings using the following methods: Simplified, Itemized and Defect
- Link to external condition data to summarize, analyze, rate and report
- Integrates with GIS to visualize color-coded conditions for viewing on a map
- Using the VUEWorks Work Order module, capture condition data directly on work order forms
- Condition inspections can be performed in the field in a connected or disconnected mode

## Risk – Signals

### For strategic planning and prioritization of work activities

The VUEWorks® Risk module allows you to capture stakeholder concerns in a risk model to strategically prioritize limited resources and work activities. Determine the consequences of failure by analyzing failure modes and failure probabilities for asset classes and types. Configure priorities by assigning weight factors. Once you have the risk model configured and calculated, VUEWorks Risk makes it easy to quickly look at every aspect of the risk model by highlighting assets on a map and illustrating findings to stakeholders to justify work priorities. Avoid costly failures before they occur!

Summary Filter

Statement Filter

Asset Type:

All

All Assets

Selected Assets

Apply

When a value is picked:

Add to Selection Set

Replace Selection Set

Overall Factors	0.00 - 0.99	1.00 - 1.99	2.00 - 2.99	3.00 - 3.99	4.00 - 4.99	5.00 - 5.99	6.00 - 6.99	7.00 - 7.99	8.00 - 8.99	9.00 - 9.99	10.00	Not Rated	Total Rated	Total Assets
Risk Factor		8491	1511	124	1	2		38	1	1		12	10169	10181
Criticality Factor						8615	2	3	500		1049	12	10169	10181
Consequence Factor						8614			4		1551	12	10169	10181
Failure Probabilities	0.0% - 9.9%	10.0% - 19.9%	20.0% - 29.9%	30.0% - 39.9%	40.0% - 49.9%	50.0% - 59.9%	60.0% - 69.9%	70.0% - 79.9%	80.0% - 89.9%	90.0% - 99.9%	100%	Not Rated	Total Rated	Total Assets
Overall Failure Probability			10000	2	1	3		161	1	1		12	10169	10181
Age			10007					161	1	1		11	10170	10181
Distresses	3	3	4	3		1						10167	14	10181
Drainage	5	1	4	2		1						10168	13	10181
Striping/Marking	8	1	2		1	1						10168	13	10181
Work Orders												10181		10181
Consequence Scores	0.0 - 0.99	1.0 - 1.99	2.0 - 2.99	3.0 - 3.99	4.0 - 4.99	5.0 - 5.99	6.0 - 6.99	7.0 - 7.99	8.0 - 8.99	9.0 - 9.99	10.00	Not Rated	Total Rated	Total Assets
Public Perception						8618			2		1549	12	10169	10181
Safety						8618			501		1050	12	10169	10181
Vehicle Damage			1			8614			504		1050	12	10169	10181

Export To Excel

Probability of Failure Ratings				Failure Modes and Failure Probabilities						
Consequence	Rating	Weight	Score	Age	Distresses	Drainage	Striping/M	Work Orders	High Scores	
				22%						
Public Perception*	High		1.000	10.00	2.18					2.18
Vehicle Damage*	High		1.000	10.00	2.18					2.18
Safety*	High		1.000	10.00	2.18					2.18
				22%						2.18

### Features & Benefits

- Use GIS data with the VUEWorks Multi-edit and Buffer tools to quickly assign consequence of failure values to assets in the GIS
- Utilize the consequence of failure values as a measure of criticality when comparing assets
- Configure up to ten consequence and failure modes for each asset type
- Use data from the Work Order module (e.g., number of work orders as a variable) or any external database such as a capacity analysis to keep risk models current
- Use risk data to forecast budgets for asset maintenance and replacement

## Budget Forecasting – Signals

### For multi-year capital improvement budget forecasts

The VUEWorks® Budget Forecasting module delivers configurable, multi-year capital improvement planning capabilities to help determine long-term budget needs based on deterioration curves. Use one of the supplied deterioration curves or one of your own as a basis for forecasting and then identify at what point on the deterioration curve an asset should be rehabilitated or replaced based on risk and condition. “What-if” budget scenarios can be created by adjusting budgets, project types and prioritization criteria – then run forecasting models to see if your budget will meet service level goals. For pavement, PCI values can be used to determine the work activities and cost to maintain a roadway pavement surface condition that supports the needs of the user.

VUEWorks cost-benefit analysis capability takes into consideration not only direct life-cycle costs of projects, but also social and environmental costs. These features allow transportation agencies to incorporate the costs of factors such as lost travel time, accident rates and fuel consumption when planning projects.

**Budget Scenario Manager**

Filter is OFF - Current list contains 3 out of 3 Scenarios

Form View Table View Filter Reports

Scenario Name: Roads Replacement Project  
 Asset Class(es): Roads  
 Asset Type(s): Centerlines

Scenario Type: Automatic  
 Analysis Period: 10 Years (2024)

Created By: Brian Sovik 11/02/2015  
 Modified By: 12/07/2015

Notes Summary Job Details Audit Budget Documents

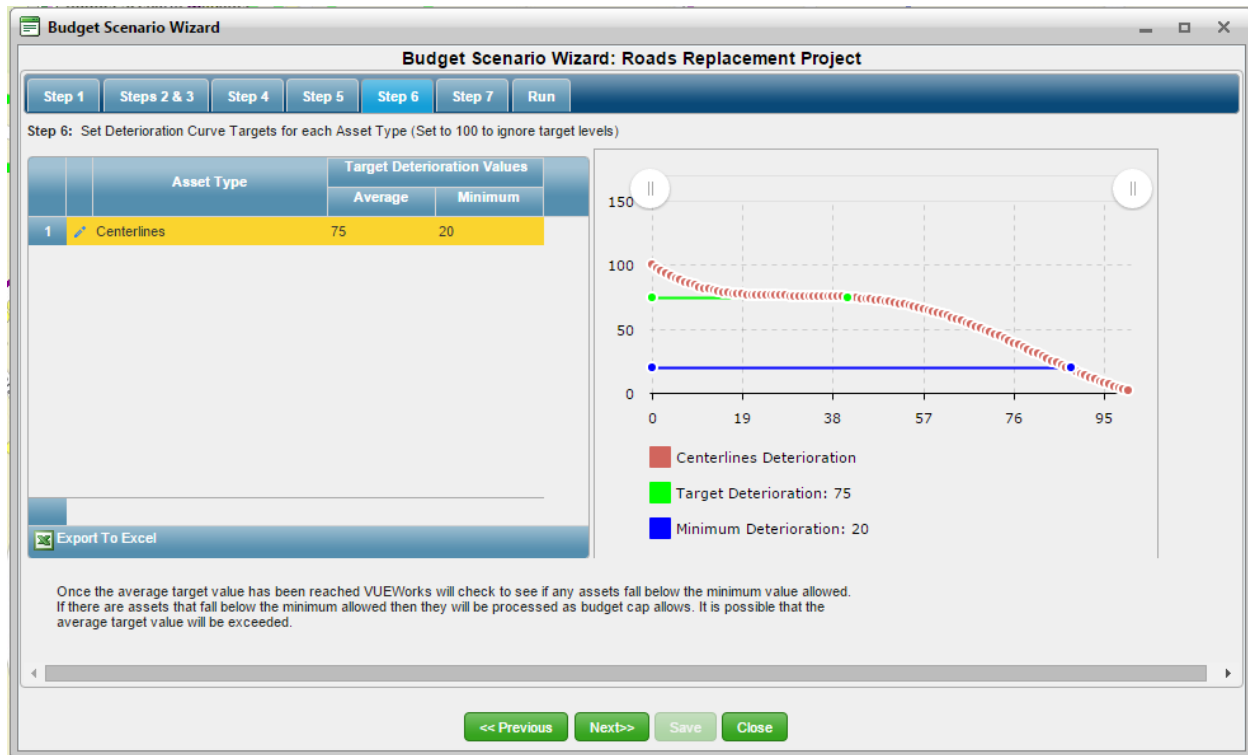
Scenario Time Span (years): 2015 - 2024

Year	Base Line			Forecast			Budget		Capital Improvements	
	Avg Deterioration	Avg Age	Avg % Life Used	Avg Deterioration	Avg Age	Avg % Life Used	Budget Required	Budget Cap	Budget Required	Budget Cap
2015	2.36	10.0	99.94%	2.38	35.7	99.92%	\$35,546.52	\$2,000		
2016	2.36	11.0	99.94%	2.37	36.7	99.93%	\$0.00	\$2,060		
2017	2.35	12.0	99.95%	2.37	37.7	99.93%	\$0.00	\$2,121		
2018	2.35	13.0	99.95%	2.36	38.7	99.93%	\$0.00	\$2,185		
2019	2.35	14.0	99.95%	2.36	39.7	99.94%	\$0.00	\$2,251		
2020	2.35	15.0	99.95%	2.36	40.7	99.94%	\$0.00	\$2,318		
2021	2.34	16.0	99.96%	2.35	41.7	99.95%	\$0.00	\$2,388		
2022	2.34	17.0	99.96%	2.35	42.7	99.95%	\$0.00	\$2,459		
2023	2.34	18.0	99.96%	2.35	43.7	99.96%	\$0.00	\$2,533		
							\$35,546.52	\$22,927,758.62	\$35,546.52	

Export To Excel

Save Wizard Delete New New Copy Print... Close

3 of 3



**Budget Scenario Manager**

Filter is OFF - Current list contains 3 out of 3 Scenarios

Form View Table View Filter Reports

Scenario Name: Roads Replacement Project  
 Asset Class(es): Roads  
 Asset Type(s): Centerlines

Scenario Type: Automatic  
 Analysis Period: 10 Years (2024)

Created By: Brian Sovik 11/02/2015  
 Modified By: 12/07/2015

Notes Summary Job Details Audit Budget Documents

Scenario Time Span (years): 2015 - 2024  
 Filter by: All years All Assets Apply Filter

Year	Asset Type	Asset ID	Location	Label	Failure Type	Failure Probability	Job	Funding Source	D-Curve Before	D-Curve After	% Life Used Before	% Life A
1	2015 Centerlines	10460	152ND AVE - 7075	152ND AVE - 7075	Age	95.00%	Resurface	Capital Improvements	2.30	95.08	100.00%	
2	2015 Centerlines	10642	HOLLY ST - 5122	HOLLY ST - 5122	Age	85.83%	Milling	Capital Improvements	2.30	81.15	100.00%	
3	2015 Centerlines	1490	HURON ST - 7131	HURON ST - 7131	Distresses	57.00%	Resurface	Capital Improvements	2.30	100.00	100.00%	

Columns Save Layout Restore Layout Export To Excel Add To Selection Clear Selection

Save Wizard Delete New New Copy Print... Close

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### Features & Benefits

- View how different budget scenarios impact the overall condition of any asset class
- Select from risk and failure probability criteria to define how rehabilitation will be prioritized
- Automate the assignment of rehabilitation jobs based on failure modes such as capacity and condition
- Pre-determine the impact of rehabilitation jobs on the life-cycle of the asset.

## Projects – Signals

### For construction cost estimation and budget analysis

The VUEWorks® Projects module delivers capabilities to define projects, calculate estimated costs, group them for budgeting purposes and compare estimated costs with actual costs through integration with the VUEWorks Work Order module. Features allow you to assign job costs for an entire asset, a portion of it or multiple point repairs along it. The Projects module allows you to group and summarize projects hierarchically by asset classes, asset types and jobs through a simple interface. Once you have one or more jobs defined, simply select the assets involved in the project, assign the jobs and let VUEWorks perform all the calculations and generate summaries.

**Project Manager**  
Filter is OFF - Current list contains 8 out of 8 Projects

**Form View** | Table View | Filter | Reports | Assets

\*Project Title: Road Rehabilitation Program      Status: Open

\*Project Group: CIP

Location:

Estimated Cost: \$1,184,491.88      Actual Cost: \$57,823.00      Cost Overrun: (\$1,126,668.88)

Estimated Start Date      Actual Start Date

Estimated End Date      Actual End Date

Estimated Duration:      Actual Duration:

**Estimated Costs** | Actual Costs | Details | Documents

	Activity Description	Work Order ID	Department	Group	Amount
1	Call Out Inspection	<a href="#">011416-001</a>	Water	Water Call Out	\$100.00
2	Slurry Sealing	<a href="#">121114-1</a>	Pavement	Operations & Maintenance	\$5,000.00
3	Slurry Sealing	<a href="#">061914-002</a>	Pavement	Operations & Maintenance	\$7,500.00
4	Slurry Sealing	<a href="#">051414-002</a>	Pavement	Operations & Maintenance	\$15,000.00
5	Slurry Sealing	<a href="#">051414-001</a>	Pavement	Operations & Maintenance	\$14,000.00
6	Pothole Filling	<a href="#">021914-001</a>	Pavement	Operations & Maintenance	\$8,000.00
7	Pothole Filling	<a href="#">020514-008</a>	Pavement	Operations & Maintenance	\$8,222.86
					<b>\$57,823.00</b>

Export To Excel

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### Features & Benefits

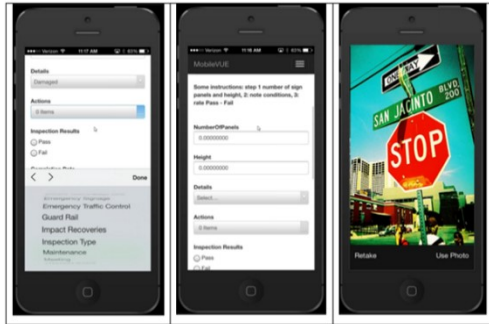
- Include any asset classes and types within the same project – great for corridor projects involving multiple asset classes
- Create a library of comprehensive and point repair job types
- Configure your own status terms to display such as Pending, On Hold, In Progress, Completed, Backlogged, etc.
- Allows adjustment of a project cost by forecasting inflation rates
- Run projects through the Budget Forecasting module to analyze the best cost–benefit ratio, extending asset life



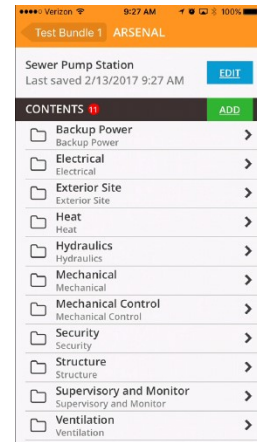
## VUEWorks Mobile Suite of Apps – Signals

For asset management, work management, tracking progress & costs and notifications in the field

The VUEWorks mobile app collection includes **MobileVUE**, **WorkVUE**, **FacilityVUE**, **FieldVUE**, **CitizenVUE** and **Sidewalk Apps**. MobileVUE is built on



Esri's ArcGIS Server platform and is used to execute work orders in the field from any Android or iOS-based device (iPad, iPhone or iPad Mini). MobileVUE allows the VUEWorks user to increase field productivity in a connected or disconnected environment. FacilityVUE allows VUEWorks users to execute work orders in the field from any Android

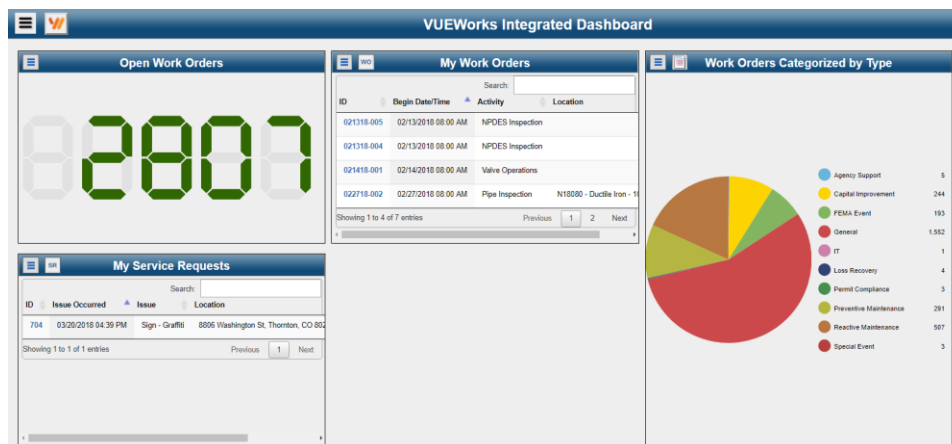


or iOS-based device. FacilityVUE allows the VUEWorks user to increase field productivity in a connected or disconnected environment. FieldVUE allows workers in the field to take photographs of damaged assets and submit the photos as Service Requests. The SidewalkApp allows users in the field to perform condition inspections on sidewalks for ADA compliance. Both the FieldVUE and SidewalkApp operate in a connected or disconnected environment.

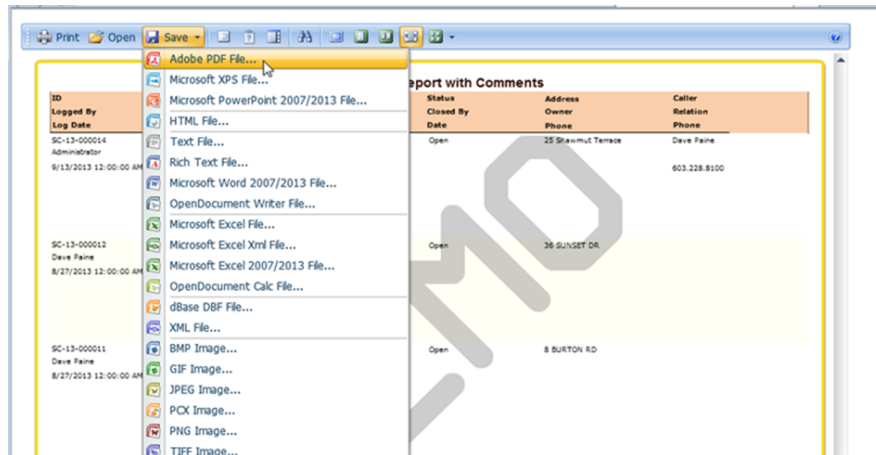
Because MobileVUE is built on Esri's ArcGIS Server platform, users can take the map and all the GIS data into the field while maintaining the relationship to a Work Order Activity. **Features & Benefits:** Syncs with VUEWorks for simple "grab and go" field device use, Work with your GIS data in a fully disconnected state, perform asset condition inspections, asset attribute updates and capture new assets and Designed for tablet form factors and touch input.

### Dashboards and Reporting

VUEWorks is capable of visualizing charts, reports and graphs of various reports available through its user-configured dashboards. These dashboards are data-driven, so the user can specify each data source (GIS, Condition module, Risk module or linked data) and then render a report based on the user's needs. Dashboards are an excellent way to provide visibility into the user's data to support high-level decision-making.

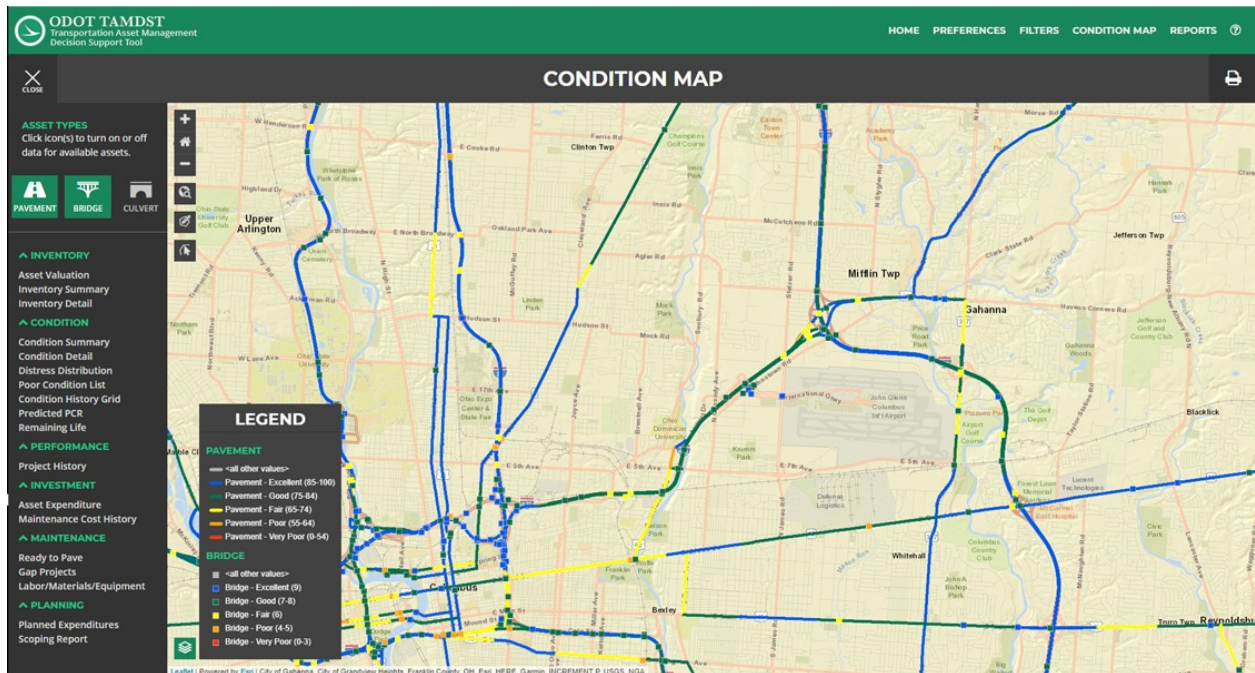


VUEWorks includes its own native reporting engine and query/report user interface for all modules. VUEWorks supports full reporting Standard and Dynamoc Reporting against all data fields in all user interfaces, as well as full reporting against linked data and the GIS database. Report data can be exported into many file formats including but not limited to excel, dbase, csv, work, PDF to name a few. VUEWorks is also able to integrate with Crystal Reports and BI tools.



## Business Intelligence

At DTS, we focus on intelligent asset management. Therefore, it makes sense that we are helping our DOT clients integrate their assets and GIS data with these business intelligence tools. We have developed TAMS data warehouses, star schemas, data lakes and data cubes to support analytical analyses for multiple asset types from planning/scoping through asset expenditures, condition and maintenance reporting in a dynamic way. An example implementation for Ohio DOT is provided below.

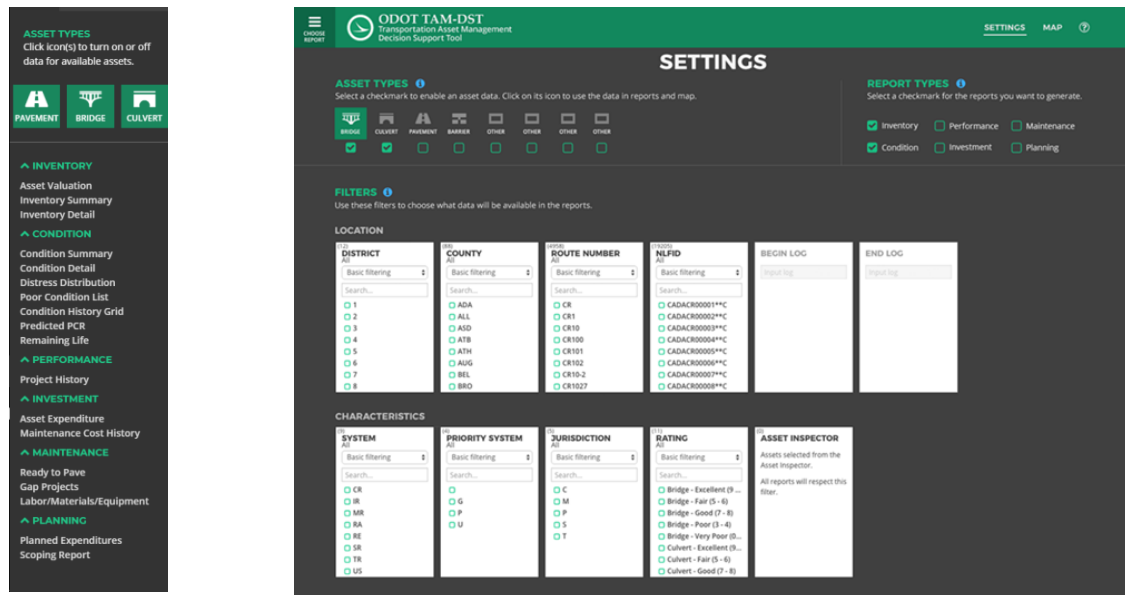


Single Mapping interface Providing Access to all Asset Data



## DTS SOW Response for MDOT Signal Asset Management System (SigAMS)

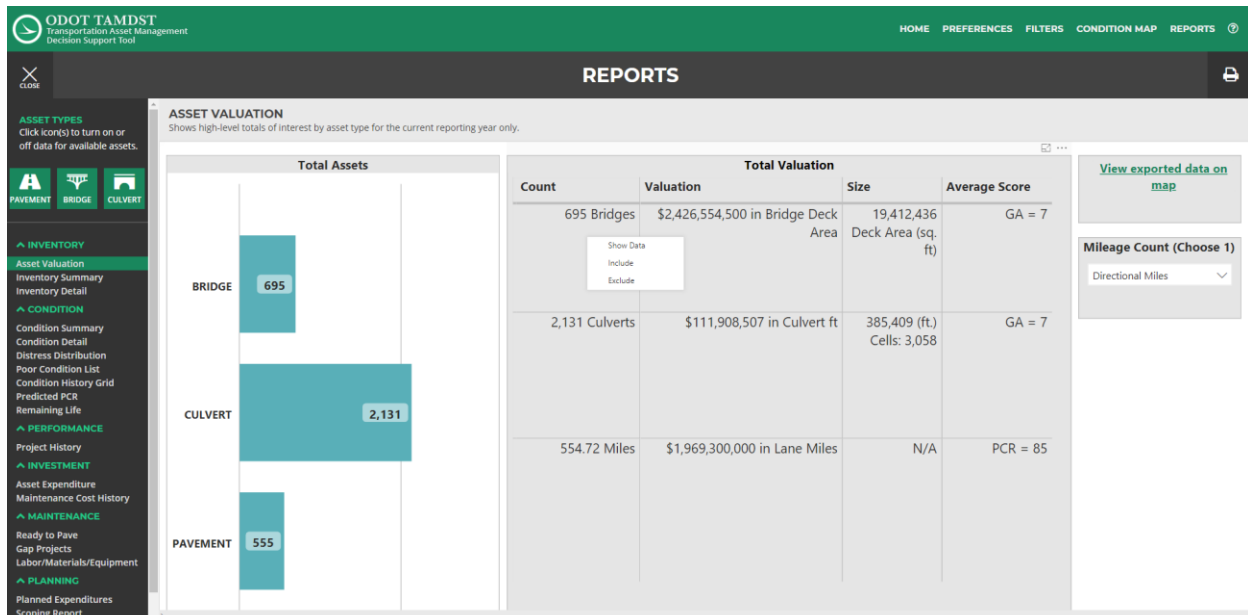
Our DTS developers can embed dashboards and reports in desktop and web applications. This functionality allows organizations to provide access to big data and powerful analytical tools in custom applications.



Asset Data Navigation

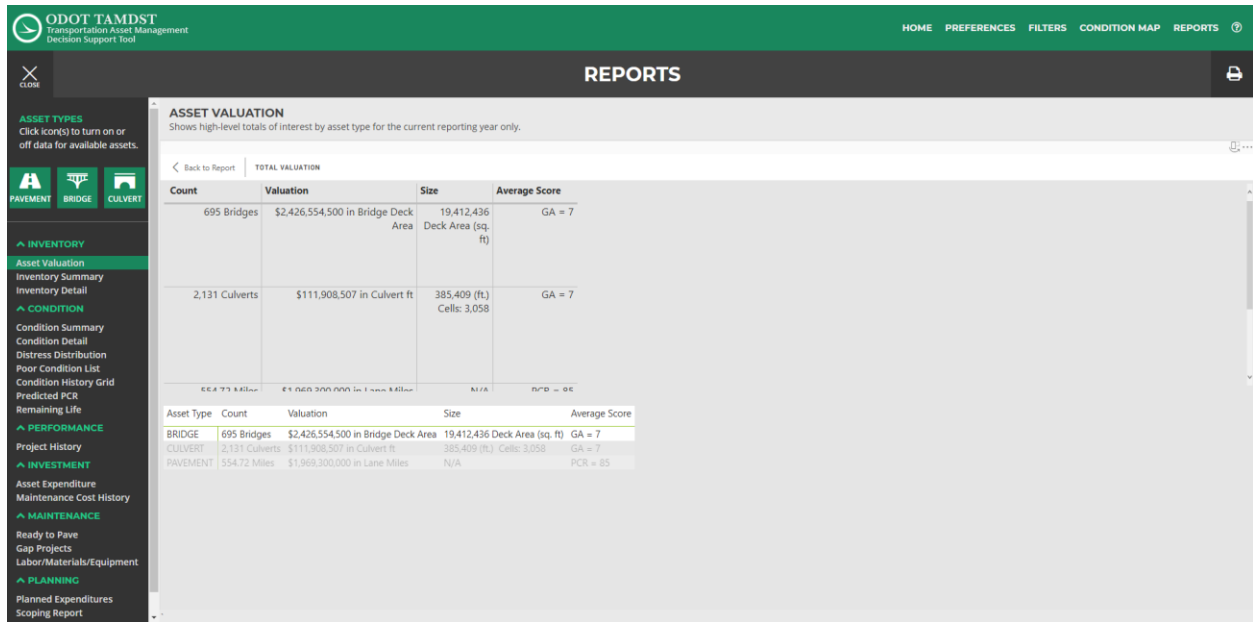
User Defined Filtering and Query Tools

The dynamic reports we build have significant drill through capabilities to view and report on data at its most granular level.



Interactive Dashboards with Drilldown Capabilities

## DTS SOW Response for MDOT Signal Asset Management System (SigAMS)



**ASSET VALUATION**  
Shows high-level totals of interest by asset type for the current reporting year only.

Count	Valuation	Size	Average Score
695 Bridges	\$2,426,554,500 in Bridge Deck Area	19,412,436 Deck Area (sq. ft)	GA = 7
2,131 Culverts	\$111,908,507 in Culvert ft	385,409 (ft.) Cells: 3,058	GA = 7
554.72 Miles	\$1,969,300,000 in Lane Miles	N/A	PCR = 85

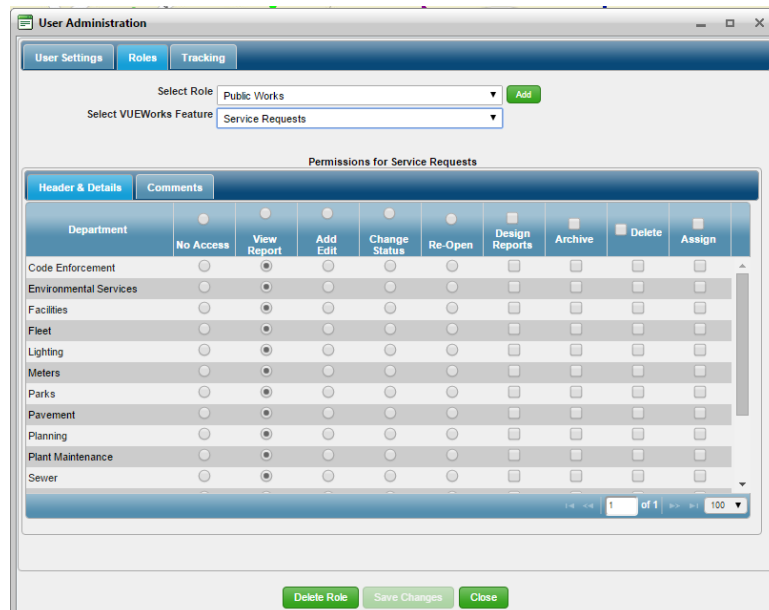
**Asset Type** | **Count** | **Valuation** | **Size** | **Average Score**

BRIDGE	695 Bridges	\$2,426,554,500 in Bridge Deck Area	19,412,436 Deck Area (sq. ft)	GA = 7
CULVERT	2,131 Culverts	\$111,908,507 in Culvert ft	385,409 (ft.) Cells: 3,058	GA = 7
PAVEMENT	554.72 Miles	\$1,969,300,000 in Lane Miles	N/A	PCR = 85

View of Additional Drilldown Data

## Security

VUEWorks contains a fully featured security console. All modules can be controlled for user access. The extent to which access is granted (read only, read and edit, read and edit and delete, read and edit and delete and modify, etc.). VUEWorks can use Windows Active Directory and Single Sign On.



**User Administration**

Select Role: Public Works [Add]

Select VUEWorks Feature: Service Requests

**Permissions for Service Requests**

Department	No Access	View Report	Add Edit	Change Status	Re-Open	Design Reports	Archive	Delete	Assign
Code Enforcement	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Environmental Services	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Facilities	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Fleet	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Lighting	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Meters	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Parks	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Pavement	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Planning	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Plant Maintenance	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Sewer	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

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Delete Role Save Changes Close

## VUEWorks Authentication

This is the most basic form of authentication. A user will create a login to the VUEWorks application itself. This requires the user to maintain separate credentials.

### **Active Directory Authentication**

This form of authentication uses the current users' windows session to sign into VUEWorks. The credentials are the same as the users' Windows Credentials

### **Single Sign On (OAuth2 with OpenID Connect, Windows IdentityServer3)**

This is a form of authentication where the VUEWorks Server will redirect the user to an authentication server to log in. The user will be required to enter in their credentials; once the user has successfully logged in, they will be redirected to the VUEWorks application. The purpose of Single Sign On is to promote the use of an Identity Server, which is in essence a single location for user credentials. This also allows users to not be required to have username/password combinations for numerous locations.

### **Supported Authentication Methods**

VUEWorks Supports the following implementations:

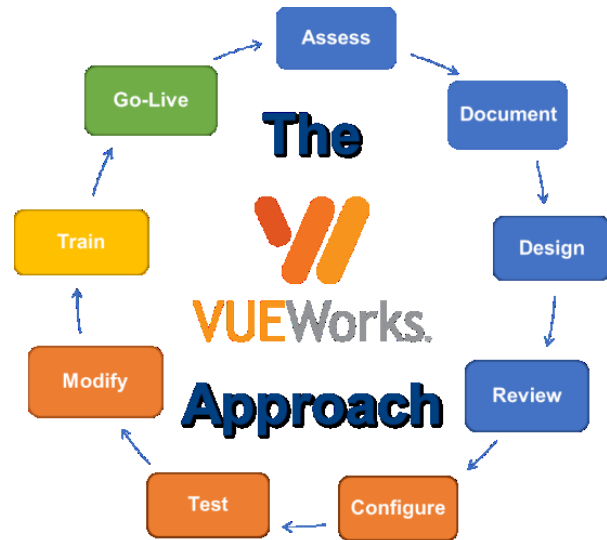
- 1) IdentityServer3
  - a. OAuth with OpenID Connect
  - b. WS-Federation
  - c. SAML2
- 2) Active Directory
- 3) NetIQ/EDirectory
- 4) Built-In

## Project Management Approach

While no two implementation projects are identical, DTS follows a standard delivery approach that has produced successful projects resulting in the adoption and long-term productive use of VUEWorks.

### Planning and Design

During the planning and design phase of the project, DTS works in collaboration with the project team to assess and document the needs of the maintenance teams that will implement, support or use the system through a series of interviews and workshops. Understanding the various goals and priorities, desired business processes and state of existing data are key to establishing the foundation of the software design. During the assessment sessions, DTS uses the opportunity to educate participants on the standard tools and functionality of the software and may provide software demonstrations to help the team visualize options. The MDOT team will be asked to gather data and make decisions during this phase. The DTS Project Manager ensures that any requests for information is provided with advanced notice to give the project team adequate time to gather required information. A commitment to timelines from the MDOT is crucial to ensuring the project remains on track.



#### Highlights of the Planning and Design Phase

- Understand the various goals, priorities, and desired business processes
- Evaluate state of existing data
- Provide early education on software functionality
- Gather required information
- Finalize the configuration, integration, and conversion plans
- Initiation of VUEWorks base installation

A configuration design plan will be prepared and presented to the project team for review and input. The intent for the plan is to formalize the discussed design and obtain input and feedback from the project team. Major adjustments that are easily incorporated during the design phase introduce project risk if introduced during the configuration phase. The configuration design plan provides a recipe for the configuration phase and ensures all project participants can validate that the configuration meets the intended design.

The integration planning and design will occur in parallel with the configuration design sessions. Working sessions will be held with the application administrator, business users and supporting IT professionals to identify the business need for the desired integrations, assess the viability and identify the tasks needed to accomplish the integration. A system integration plan will document the outcome of the assessment. Each desired integration will be classified using the following:

- Possible with COTS built-in tools
- Possible with COTS provided APIs
- Requires custom development

- Handled through a manual process
- No longer needed

Upon review and approval of the integration plan, integration tasks and timelines will be incorporated into the overall project schedule.

For the MDOT SigAMS, DTS will prepare a Data Conversion Plan that outlines the data conversion method (linking or import), existing data sources and fields, data modifications (if any) and future VUEWorks data locations. The plan will include the specific steps required to migrate the data, including constraints and responsibilities. This plan will include both those datasets for which MDOT has defined via knowledgeable DOT staff as well as those datasets identified for vendor link or import so that expectations for completion and accuracy of data converted can be met per the overall implementation goals.

For the on-premise implementation, the VUEWorks software installation process will run concurrently with the planning phase in order to mitigate against project schedule impacts should a delay in hardware/software requisition or processing network access paperwork occur. The installation of the VUEWorks software will be scheduled with the VUEWorks product support team and MDOT IT professionals. Installation sets up the framework from which all configuration activities occur. As part of the installation process, VUEWorks will integrate with MDOT's enterprise GIS services and email server. MDOT will be provided with a pre-installation checklist, platform requirements and GIS integration documentation in advance.

#### *Configuration and Validation*

Utilizing the planning documents as our recipe book, the DTS team will configure the VUEWorks software platform. This work includes tasks such as establishing global system settings, form creation, module-based configuration, set-up of mobile app connectors, report template creation and establishment of role-based permissions. As the DTS team completes a reviewable component, the technical lead will present a software demonstration of the functionality to the project team. The incremental review process ensures gaps or misunderstandings are captured as early as possible so a resolution can be discussed. The demonstration also serves as an opportunity for informal training on usage of the system.

As the components are configured and finalized, the system will be ready for data linking, import and/or keying as defined in the MDOT RFP conversion requirements. DTS will provide the data formatting requirements and templates to MDOT. DTS will review the provided data and identify any concerns over field type conflicts or potential data integrity issues. MDOT will have an opportunity to address data quality issues prior to import. DTS believes that migration to a new system is the ideal time to assess and clean-up existing data so the new system begins with high quality and accurate information. Data modification is often easier performed outside of the

#### Highlights of the Configuration and Validation Phase

- Establish global system settings, form creation, module-based configuration, set-up of mobile app connectors, report template creation and establishment of role-based permissions
- Conduct incremental software reviews to confirm configuration progress
- Complete required data linking, import or keying
- Publish testing environment to users and conduct testing

system with a tool that business units are familiar with like Microsoft Excel, rather than attempting to correct individual records once loaded into the new system. DTS understands the data imported during this phase may need to be refreshed during final system cut-over. Final data migration steps will be incorporated in the production deployment planning.

With the components configured and data loaded, the integration tasks will be completed to wrap up the configuration. DTS will provide a detailed demonstration of the site's configuration, highlighting integration points and imported data. MDOT users will be provided a testable environment for the validation process to commence.

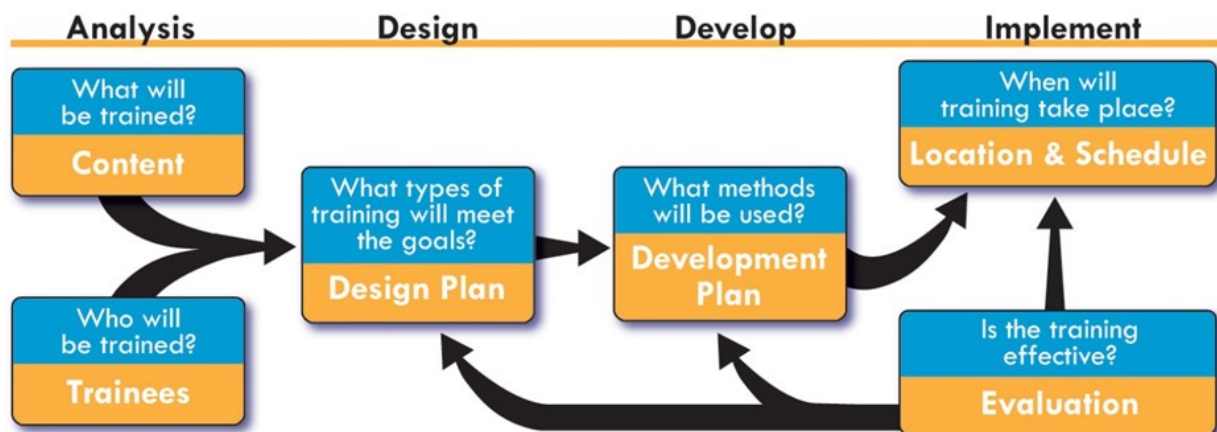
During the validation process, MDOT will test the configuration, and MDOT testers will be provided with Microsoft Excel test cases consisting of business scenarios and integration tasks to validate the configuration meets the configuration design plan and system integration plan. At the conclusion of the testing period, the MDOT's consolidated comments will be assessed and classified by DTS as:

- Working as designed – address through training
- Configuration adjustment
- Defect - report to product maintenance team

Each item will be assessed by the Project Manager and prioritized according to MDOT project goals. DTS will modify the configuration as agreed between the DTS and MDOT Project Managers and subject the modified configuration to the testing process described above to confirm all agreed modifications have been validated.

### Training

The DTS philosophy is to train early and often throughout the implementation process. DTS' training team is experienced in providing tailored training courses for organizations of all sizes, industries and regions. In fact, DTS received an award from the American Planning Association and FHWA for its development of the Sociocultural Effects Evaluation training program, which was delivered throughout the State of Florida.



### Highlights of the Training Phase

- Develop a training plan
- Conduct instructor led and remote sessions per plan
- Provide VUEWorks training material and quick guide templates at each phase.
- Conduct knowledge transfer sessions with application and business administrators with system user guides and administration manuals

DTS recognizes that training and support is one of the most critical of the project phases. DTS will work with the project team to develop a training plan that defines training format, curriculum, number of on-site and remote sessions and anticipated scheduled that is best suited for MDOT. The best approach to balance cost versus effectiveness will be discussed with MDOT and documented in the training plan. Details regarding training location, equipment needs and attendee lists will also be coordinated.

DTS trainers employ strategies to assist with user adoption of the software including partnering with a MDOT business unit lead during the training session.

The business lead can vocalize the importance of the training, show support for the program and address any fears or operational specific questions that arise during training.

Instructor-led training sessions will be supplemented with standard VUEWorks training materials, including report view definitions, provided in electronic format to attendees. Templates for quick guides can be provided to MDOT if customized training materials are desired. The DTS team is dedicated to our client's long-term success in using our VUEWorks solution. In addition to our end-user training offerings, we perform knowledge transfer with the team of VUEWorks application and business administrators that will be responsible for managing the system. This usually equates to a few focused web sessions following the roll-out support period.

DTS has an extensive background in training curriculum development. We understand that not every user learns a system in the same way. Additional training types/delivery methods, shown in the training catalog graphic below, can be discussed as an alternative or as supplemental services to the proposed training approach.





## Data Migration Approach

VUEWorks is capable of linking directly into spreadsheets, Microsoft Access, SQL, Oracle and any ODBC-compliant database. Linked data can be used to auto-populate dropdown lists, auto-populate information in modules. Linked data can also be associated with GIS features, allowing spatial queries to be performed on data that is external to VUEWorks such as JobNet, LAPS, AASHTOware, MIDB, Fleet Management System, CSCS systems, custom MDOT databases or other data sources. External databases can have any type of data in their columns. Because VUEWorks is a 100% web-based application, as soon as the new data is collected from the web form it is immediately available for display, reporting and other uses.

Data Link can link to an unlimited number of external databases and tables, to views of tables and directly to Excel spreadsheets. Tables can contain links that launch third party applications – to include AutoCAD, PDF, video files, applications and more.

DTS has extensive experience in the migration of data from the multiple systems into the VUEWorks solution. The next section contains a sample migration task list (assets) that could be used for this project. DTS has prior experience conducting these migrations as a team for other clients with success.

DTS will assist MDOT with the following:

1. Document the functional requirements for the asset data by asset type.
2. Investigate exiting asset systems operational features and database structure for asset data.
3. Provide the MDOT system administrator(s) with an overview of the VUEWorks table structure, data views and configuration options.
4. Prepare a detailed work plan that covers all aspects of the migration with assistance from MDOT. Sections of the work plan will be created as required to meet the functional requirements of MDOT. The following aspects of the migration will be covered in the work plan:
  - a. Functional requirements for the asset data by asset type.
  - b. Identification of asset types and fields that will be migrated to GIS feature classes for use by VUEWorks.
  - c. Identification of asset types and fields that will be migrated to the VUEWorks modules.
  - d. Identification of the asset hierarchy that will be replicated in the VUEWorks modules.
  - e. Identification and migration of dropdown field data that will be transferred. The functional aspects of the dropdown fields will be migrated to GIS domains or VUEWorks dropdowns as appropriate.
  - f. Define data structure and templates required in the GIS or VUEWorks modules.
  - g. Identification of any special considerations for the migration. (For instance, numerical data should be migrated to a numerical field even if numerical data is currently stored in a text field).
  - h. Identification of any data that will not be transferred (obsolete data or data that has no value to the MDOT).
  - i. Document data integrity issues discovered during the process. Data integrity issues consist mostly of misspellings and/or inconsistent terminology. While it may be possible to address some data integrity issues, DTS will be limited to documenting any issues discovered that may be addressed in the future by MDOT.



- j. Plan to accommodate final migration of data immediately prior to the Go-Live date.
- 5. MDOT will review the work plan with DTS for approval. The review requires DTS to attend at least one on-site meeting. Additional meeting time can be arranged as needed using telephone and/or screen sharing technology.
- 6. DTS will execute the work plan collaboratively. DTS will be responsible for tasks that require DTS' expertise with SQL Server Oracle and the VUEWorks database.

## Requirement Responses - Completed Business Specification Worksheet

The completed Business Specification Worksheet begins on the next page. Please note that DTS has also provided the spreadsheet as an Excel file.

## High-level System Architecture and Design Plan

### VUEWorks Technical Requirements

VUEWorks requires Standard or Enterprise versions of Windows Server 2016 32-bit or 64-bit or newer. Optimal is 64-bit.

When installed for ArcGIS Server, VUEWorks can be installed on the same server as ArcGIS Server. Use the same hardware recommended for your GIS environment by Esri.

The most resource intensive operations implemented by VUEWorks occur on the server that hosts SQL Server. At a minimum this server should have 4GB of RAM and a dual core processor running at 2.4GHz. Simply put, VUEWorks will perform faster with fast multi-core CPUs, more memory and with few other applications competing for the same resources on the SQL Server machine.

### VUEWorks is supported on VMware, Citrix and Hyper-V.

#### Optimal server configuration:

- VUEWorks co-installed with ArcGIS Server, **server is 64-bit, quad core processor, 16GB RAM**
- Configured for remote access over the Internet using Remote Desktop Services or other remote access software (for VUEWorks support)

#### Minimum server requirements:

- MS Windows Server Standard 2016 (32-bit or 64-bit), 4GB RAM or newer
- Configured for remote access over the Internet using Remote Desktop Services or other remote access software (for VUEWorks support)

#### Optimal Database Requirements

- Any version of MS SQL Server 2016 or newer
- Installed on separate server from VUEWorks and ArcGIS Server, which is 64-bit, quad core, 16GB ram
- Configured for remote access over the Internet using Remote Desktop Services or other remote access software (for VUEWorks support)

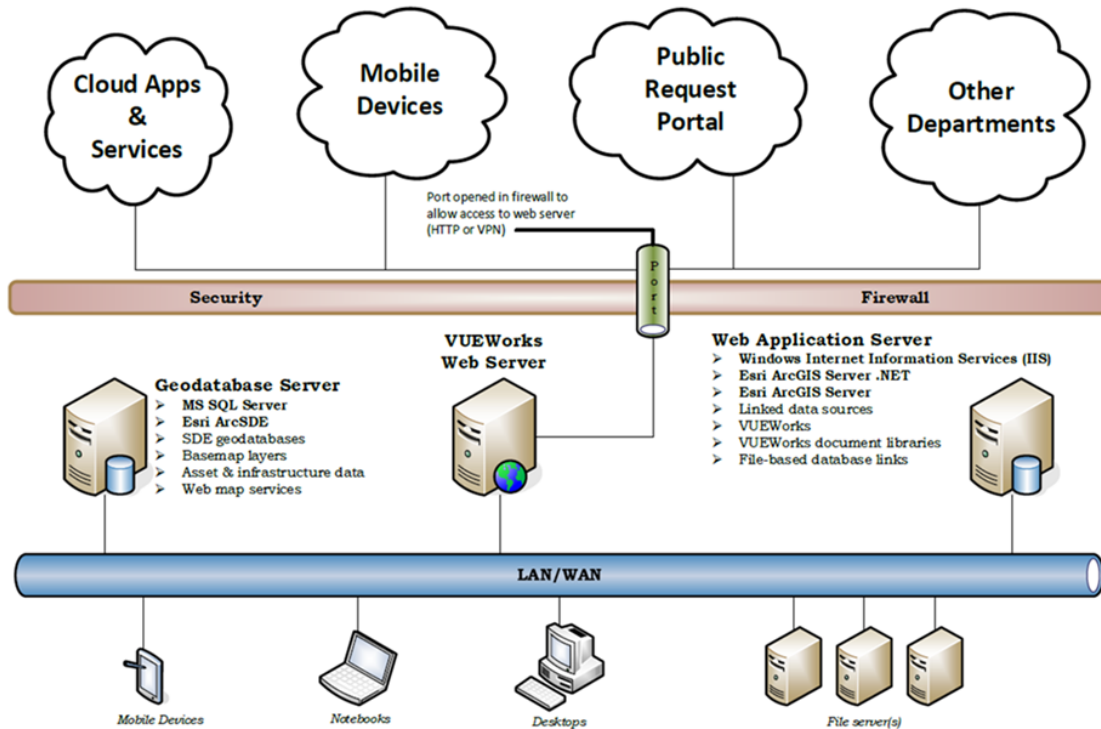
#### Minimum database requirements:

- Any version of MS SQL Server 2016 or newer, server is 32-bit or 64-bit, 4GB RAM
- Installed on same server as VUEWorks and ArcGIS Server
- Configured for remote access over the Internet using Remote Desktop Services or other remote access software (for VUEWorks support)

#### Optimal Desktop (Client) Requirements

Any client capable of running Internet Explorer, Chrome or Firefox. This include desktops, tablets and mobile devices. VUEWorks runs on iPads and Macs using Chrome or Firefox.

## Conceptual VUEWorks® System Architecture



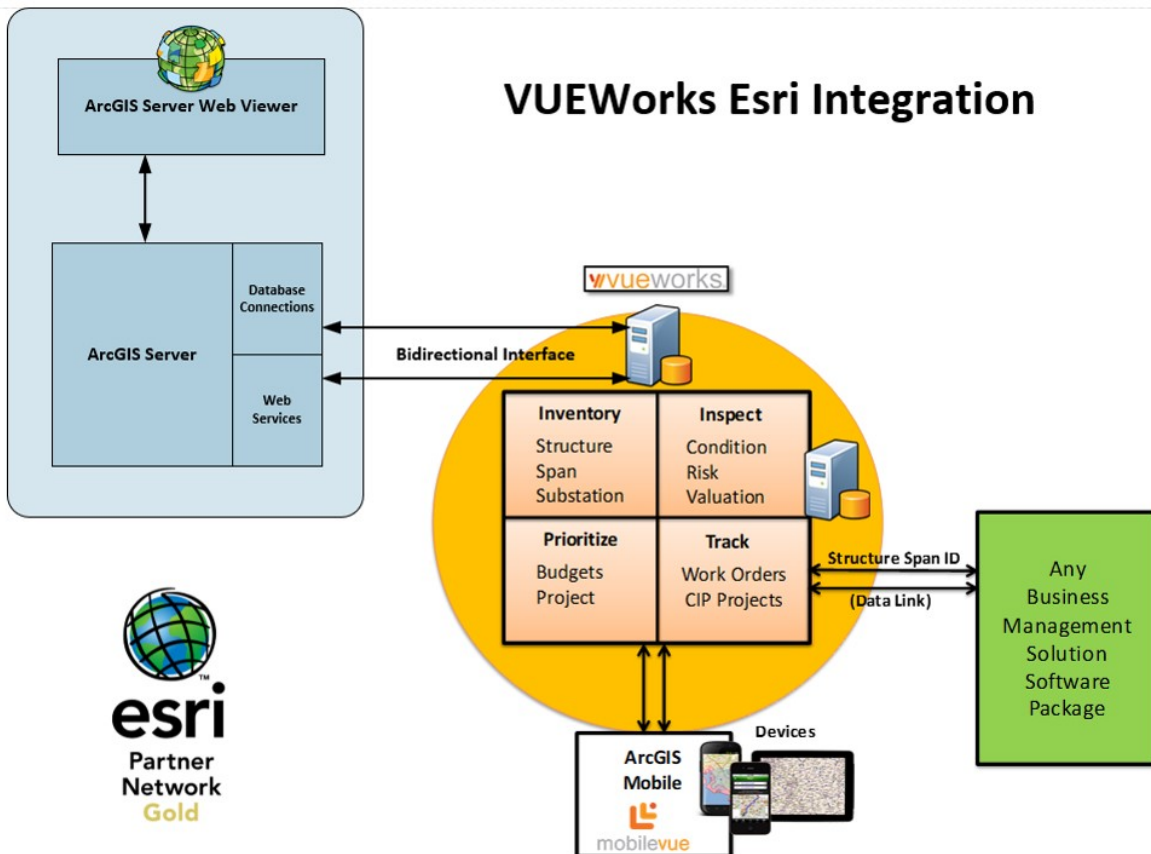
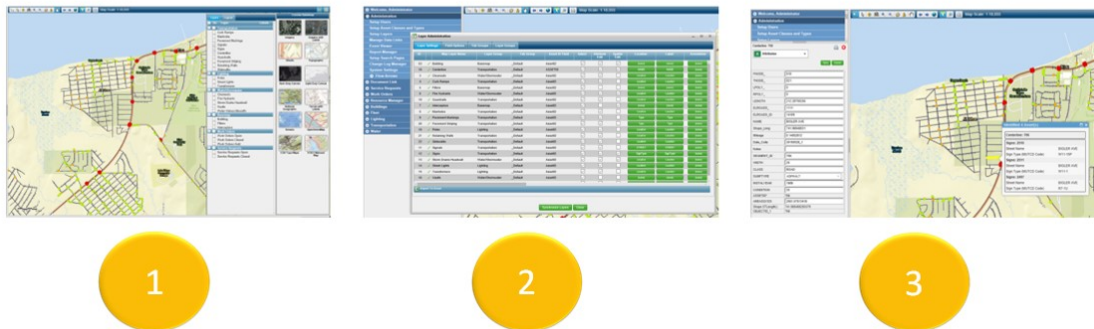
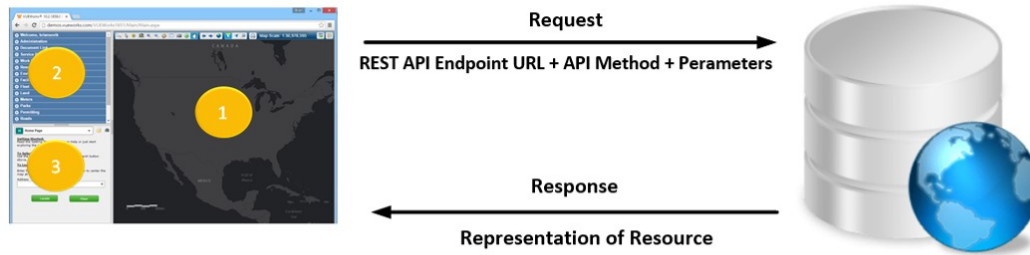
This document is provided to illustrate a conceptual model of the VUEWorks installation and coexistence within typical computing and network environments. The final system architecture is usually determined after a detailed discovery process is performed and system capacity and network security protocols are evaluated.

**DTSCloud Infrastructure:** The VUEWorks solution is hosted on Microsoft Windows Server 2016 virtual machines with IIS 10 and Microsoft SQL Server 2016. Our virtualization platform is VMware vSphere 6.7 running on Dell/EMC PowerEdge hardware.

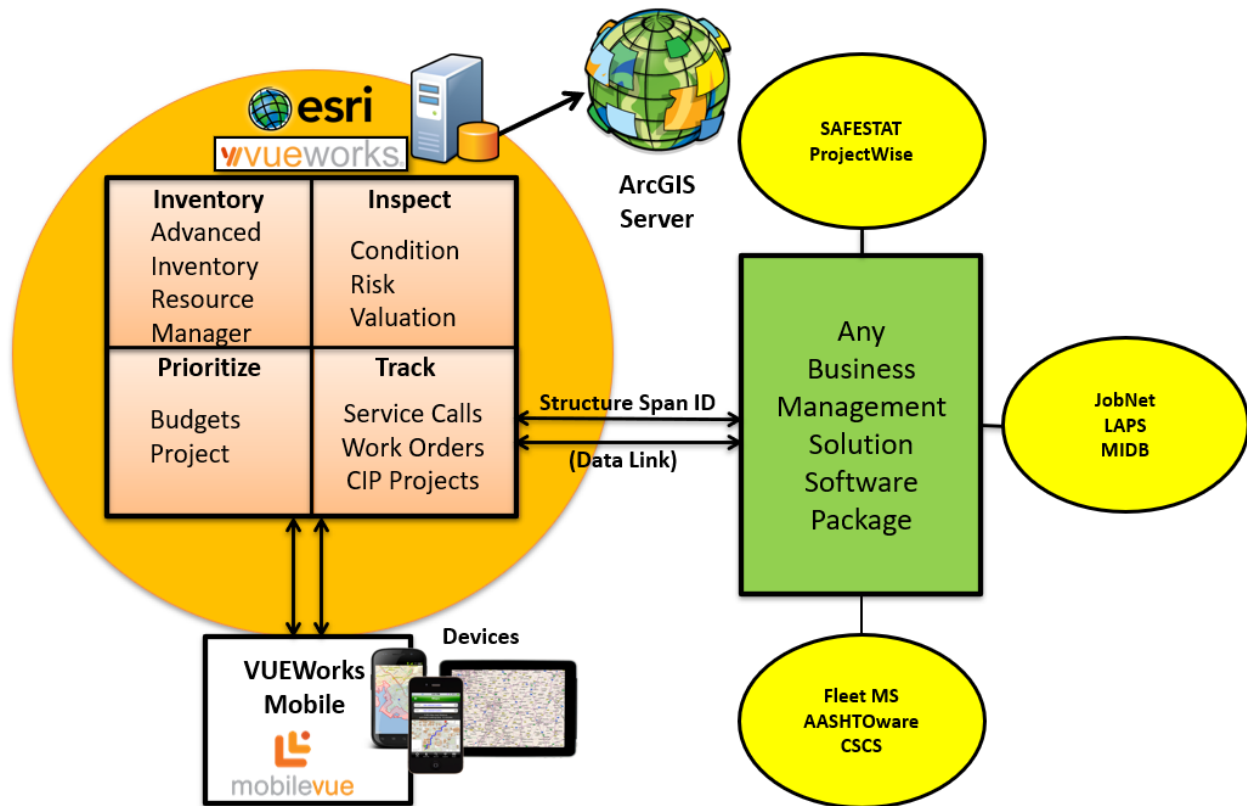
The primary VUEWorks hosting facility is a Tier 4 datacenter based in Orlando, Florida. The facility is SOC1 Type II certified, HIPAA and PCI DSS compliant. Wide area network connectivity to the primary VUEWorks hosting environment utilizes a BGP configuration consisting of fiber circuits from three Tier 1 carriers. Each circuit is 1 Gbps symmetrical.

The secondary VUEWorks hosting facility is a Tier 4 datacenter based in Dallas, Texas. The facility is also SOC1 Type II certified. Wide area network connectivity to the primary VUEWorks hosting environment utilizes a BGP configuration consisting of fiber circuits from multiple Tier 1 carriers. Each circuit is 10 Gbps symmetrical.

## VUEWorks Esri ArcGIS Server REST API Integration



# MDOT SigAMS Solution Overview



## High-level Implementation Plan

The high-level project schedule of initial project activities as well as subsequent program area implementations is shown below. A more detailed project schedule will be developed as part of the Overall SIGAMS Implementation Plan.

### Project Schedule

Task Name	Start	Finish
<b>Project Kickoff Meeting (Gate 1)</b>	Mon 4/5/21	Fri 4/9/21
<b>Develop System Integration Plans (Gate2)</b>	<b>Mon 4/12/21</b>	<b>Fri 4/30/21</b>
System Implementation Plan	Mon 4/12/21	Fri 4/16/21
System Implementation Schedule	Mon 4/19/21	Fri 4/23/21
Data Security Plan	Mon 4/26/21	Fri 4/30/21
Master Test Plan	Mon 4/26/21	Fri 4/30/21
Project Management Plan	Mon 4/26/21	Fri 4/30/21
Change Management Procedure	Mon 4/26/21	Fri 4/30/21
Create Requirements Matrix	Mon 4/26/21	Fri 4/30/21
Training/Education Plan	Mon 4/26/21	Fri 4/30/21
<b>Data, Document and Process Review (Gate 3)</b>	<b>Mon 5/3/21</b>	<b>Fri 6/18/21</b>
System Integration Plans - Review	Mon 5/3/21	Fri 5/21/21
Review Existing Process Documentation	Mon 5/24/21	Fri 6/4/21
Tabular Data	Mon 5/3/21	Fri 5/14/21
Evaluate Data and Plan Data Migration	Mon 5/3/21	Fri 5/14/21
Data Retention and Archiving Plan	Mon 6/7/21	Fri 6/18/21
Review Hardware and Software Requirements	Mon 6/7/21	Fri 6/18/21
Software Installation & Setup	Mon 6/21/21	Fri 7/2/21
<b>Configuration and Integration (Gate 4)</b>	<b>Mon 7/5/21</b>	<b>Fri 4/22/22</b>
<b>Module Level Configuration by Department</b>	<b>Mon 7/5/21</b>	<b>Fri 4/22/22</b>
<b>Phase 1 CS-Spot &amp; Asset Inventory (Gate 4a)</b>	<b>Mon 7/5/21</b>	<b>Fri 11/5/21</b>
Configuration	Mon 7/5/21	Fri 9/24/21
Data Migration/Integration	Mon 7/5/21	Fri 9/24/21
Acceptance Testing	Mon 9/27/21	Fri 10/8/21
Formal Acceptance	Mon 10/11/21	Fri 10/15/21
Training Materials Development - PH1	Mon 9/27/21	Fri 10/1/21
User Training - PH1	Mon 10/4/21	Fri 10/15/21
Business Owner Training - PH1	Mon 10/18/21	Fri 10/29/21
Go Live	Mon 11/1/21	Fri 11/5/21
<b>Phase 2 Study, Scoping &amp; Design (Gate 4b)</b>	<b>Mon 9/27/21</b>	<b>Fri 1/28/22</b>
Configuration	Mon 9/27/21	Fri 12/17/21
Data Migration/Integration	Mon 9/27/21	Fri 12/17/21
Acceptance Testing	Mon 12/20/21	Fri 12/31/21

Task Name	Start	Finish
Formal Acceptance	Mon 1/3/22	Fri 1/7/22
Training Materials Development - PH2	Mon 12/20/21	Fri 12/24/21
User Training - PH2	Mon 12/27/21	Fri 1/7/22
Business Owner Training - PH2	Mon 1/10/22	Fri 1/21/22
Go Live	Mon 1/24/22	Fri 1/28/22
<b>Phase 3 MWA &amp; IWA (Gate 4c)</b>	<b>Mon 12/20/21</b>	<b>Fri 4/22/22</b>
Configuration	Mon 12/20/21	Fri 3/11/22
Data Migration/Integration	Mon 12/20/21	Fri 3/11/22
Acceptance Testing	Mon 3/14/22	Fri 3/25/22
Formal Acceptance	Mon 3/28/22	Fri 4/1/22
Training Materials Development - PH1	Mon 3/14/22	Fri 3/18/22
User Training - PH1	Mon 3/21/22	Fri 4/1/22
Business Owner Training - PH1	Mon 4/4/22	Fri 4/15/22
Go Live	Mon 4/18/22	Fri 4/22/22
<b>Training/Education Plan (Gate 5)</b>	Mon 3/14/22	<b>Fri 4/22/22</b>
<b>Manuals &amp; Documentation Development</b>	Mon 3/14/22	<b>Fri 4/8/22</b>
Finalize Resource ToolKit	Mon 3/14/22	Fri 4/8/22
<b>Training</b>	<b>Mon 4/11/22</b>	<b>Fri 4/22/22</b>
Administrator Training	Mon 4/11/22	Fri 4/22/22
<b>Project Closeout</b>	<b>Mon 4/25/22</b>	<b>Wed 4/27/22</b>
Review and Acceptance	Mon 4/25/22	Wed 4/27/22



### Plan to Cost-effectively Include as Many Optional Requirements as Possible

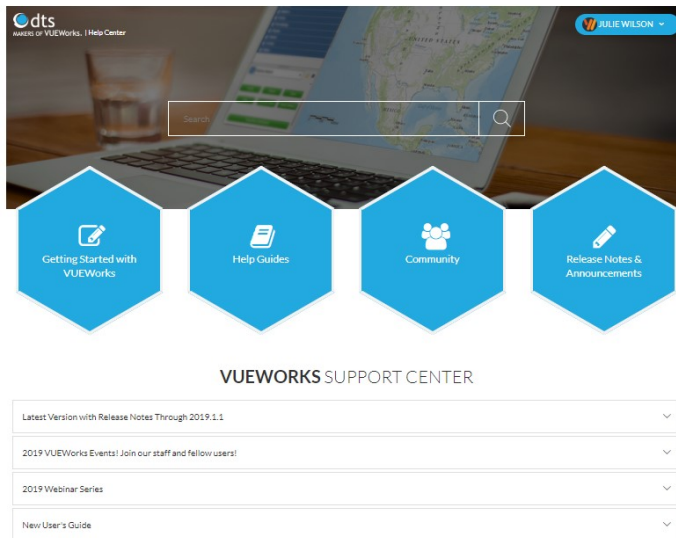
DTS can meets this requirement since nearly all of the optional requirements do not require any special configuration or customization. Please see the matrix above for optional requirements that are proposed as part of the DTS solution.

Any Assumptions Used in the Preparation of the SOW Response, if Applicable

DTS assumes that MDOT 3<sup>RD</sup> Party vendors will provide access to their APIs for VUEWorks integration with their software.

## Ongoing Support and Maintenance Approach

In preparation for software roll-out to users, DTS will promote all site configurations and integrations to the final Production environment. DTS will work with MDOT to ensure all users are loaded and final data is imported. The DTS PM will coordinate with the MDOT PM to confirm a Go-Live date.



DTS understands the challenges that System Administrators face when transitioning staff to a new software. To ease with the transition, the DTS project team will provide roll-out support for the MDOT during the first 30 days. Roll-out support includes weekly pre-set call in time for System Administrators to ask questions or discuss issues that users have reported during the week. The VUEWORKS Support team will continue to provide support to administrators beyond the initial roll-out period. DTS will introduce the MDOT administrators to the Support Manager and explain the customer support process as

well as the product resources available through the VUEWORKS Customer Support Portal. All users will have access to the **Customer Support Portal** to access the knowledge base, past webinars and community forum.

Also, we provide the following opportunities to remain engaged with our customers, share knowledge, and encourage networking among VUEWORKS users.

- **Annual Meeting** - Facilitated regional user group meetings are held in specific regions annually. In addition, DTS hosts an annual national conference. For 2021, these may be virtual.
- **Online Forum** - VUEWORKS has an internal client only online forum for users to collaborate.
- **Resource Documents** - Resource and training documents are available online and can be accessed and downloaded by any user.
- **Online Webinars** - Online webinars are offered monthly and focus on specific software modules or best practices. These are recorded and made available to users online as well.

### Highlights of the Production Deployment and Support Transition Phase

- Promote all site configurations and integrations to the final Production environment
- Schedule roll-out support sessions
- Introduce the MDOT administrators to the Support Manager and explain the customer support process
- Confirm user access to the Customer Support Portal

## QA/QC Approach

Planning for testing begins during Gate 2 with the development of several key planning documents including the Quality Management Plan, the Business Specification Worksheet and the Testing and Acceptance Management Plan. These plans will lay out the approach to ensuring quality assurance measures are introduced early in the project and clear metrics for testing acceptance are defined. During the development of these plans, an assessment of the planning life-cycle will be performed to develop a testing approach that will ensure testing coverage and validation that handles multiple cycles within the planning period. The Quality Assurance Lead will work closely with the Functional Lead and Technical Lead throughout each phase to maintain the Business Specification Worksheet as this will be the basis for the creation of testing scenarios and test scripts. In addition, several other design level documents prepared during the phase will be leveraged when preparing the Test Plan for the phase/iteration.

The Testing and Acceptance Management Plan will also include testing requirements and approach that extend to the system infrastructure including load testing, penetration testing, annual backup and recovery testing, annual disaster recovery plan testing and upgrade testing.

The Quality Assurance Lead is the key resource for all testing activities including the creation of the Test Plan (test scripts), execution of all testing, facilitation of user acceptance testing, maintenance of the defect log and obtaining acceptance. The Quality Assurance Lead will be involved in the entirety of the project from initial Gate 2 planning through the Final Acceptance Period providing continuity and developing comprehensive project knowledge that will contribute to better testing of requirements and earlier identification and resolution of issues.

### Testing Approach

The SigAMS project methodology includes a phased approach to configuration. In addition to phases, testing will follow an iteration testing cycle on a specific feature or business process and users are requested to confirm the feature or process meets the requirement. Performing testing in this way should identify issues and defects early in the process leading to early correction and fewer unknown issues during intermediate phase testing or final system acceptance phase. The testing cycle will include:

1. Quality Testing of Each Iteration (Quality Assurance Lead)
2. Iteration Demonstration Review and Tester Preparation (Functional Lead)
3. State Testing of Each Iteration (MDOT testers)
4. Regression Testing, as needed (Quality Assurance Lead)
5. Iteration acceptance

The DTS team recommends testing areas as listed in the table below which includes iteration testing, data quality / migration, system integrations, report/dashboard validation and system validation testing.

Test	Description
<b>Iteration Testing</b>	The testing performed by the DTS team followed by MDOT during each of the iterations. During this testing, DTS and MDOT testers will be testing for the following:
<ul style="list-style-type: none"> <li><i>Usability</i></li> </ul>	Ability for users to complete their tasks successfully using the configured functionality defined in the configuration design and Business Specification Worksheet. Usability specific to built-in COTS system components (e.g. module layout design) will not be modified as a result of this testing.
<ul style="list-style-type: none"> <li><i>Processes</i></li> </ul>	Workflow determined through review of MDOT requirements and details defined in the configuration design, business process flow diagrams and Business Specification Worksheet.
<ul style="list-style-type: none"> <li><i>System Features</i></li> </ul>	Ensure that system features are functional (e.g. button responds when clicked, map pans and zooms, layers turn on/off).
<ul style="list-style-type: none"> <li><i>Content</i></li> </ul>	Formatting, spelling and grammar specific items.
<b>System Integration Testing</b>	The testing performed by DTS and MDOT to test the integration of the COTS software with other systems as identified in the Integration Plan. The Integration Plan will document the data-level requirements, integration methods, common linking key and testing protocol. During this testing, DTS and MDOT testers will be testing for requirements specific to system integration as identified in the Business Specification Worksheet and Integration Plan.
<b>Data Quality / Migration</b>	The testing performed by DTS and MDOT to test the quality of the data and a specific migration process. The Data Migration Plan will document the data-level requirements, mapping, process and testing protocol. During this testing, DTS and MDOT testers will be testing for requirements specific to data migration and data quality as identified in the requirements traceability matrix, Data Quality Management Plan/Issue Log and Data Migration Plan.
<b>Report / Dashboard Validation</b>	The testing performed by MDOT to test the report/dashboard output meets expected results by replicating real-world examples. The Business Specification Worksheet and reporting requirements will be leveraged during testing.
<b>System Validation Testing</b>	The testing performed by DTS followed by MDOT at the completion of all configuration, integration and migration to validate the SigAMS solution meets MDOT requirements. During this testing, DTS and MDOT testers will be testing for the following:
<ul style="list-style-type: none"> <li><i>Usability</i></li> </ul>	Ability for users to complete their tasks successfully using the configured functionality. Usability specific to built-in system components (e.g. module layout design) will not be modified as a result of this testing.

Test	Description
<ul style="list-style-type: none"> <li><i>Processes</i></li> </ul>	Workflow determined through review of MDOT requirements and details defined in the configuration design, business process flow diagrams, Integration Plan, Data Migration, Business Specification Worksheet and reporting requirements.
<ul style="list-style-type: none"> <li><i>Role based Access</i></li> </ul>	SigAMS Role-based access testing to review MDOT requirements defined for specific user roles within the system.
<ul style="list-style-type: none"> <li><i>System Features</i></li> </ul>	Ensure that system features are functional (e.g. button responds when clicked, map pans and zooms, layers turn on/off).
<ul style="list-style-type: none"> <li><i>Content</i></li> </ul>	Formatting, spelling and grammar specific items.

#### Defect Reporting and Tracking

A defect log will be used to record defects and configuration changes detected during the testing cycle. The Quality Assurance Lead will review any defects/changes reported during testing to ensure that all defects are well defined, reproducible and in line with the requirements and will work with the team to prioritize the defects based on SigAMS priorities. A Defect Log and Test Summary Report will be prepared and made available to the project team. The Quality Assurance Lead will follow a testing cycle to ensure that every defect is tested thoroughly before it comes back for review by MDOT.

#### Intermediate Acceptance

Acceptance will be requested and documented at the end of each iteration. User acceptance testing occurring during the system validation testing of the phase will be performed to ensure all components are well integrated, meet the requirements, and no new defects are identified.

The DTS team understands the Final Acceptance Period requirement for the SigAMS project. The Quality Assurance Lead will work within the defined process to research and develop a plan to correct and oversee correction of the source of the failure should issues be identified during the Final Acceptance Period.

The DTS team believes that the key to obtaining Final Acceptance within the contract period lies in consistent collaboration with MDOT to develop clear requirements and design, define agreed upon acceptance criteria and engage users in incremental review and testing.

## Resume Templates for Key Personnel

The resumes for DTS Key Personnel begin on the next page.

The Key Personnel for this project are:

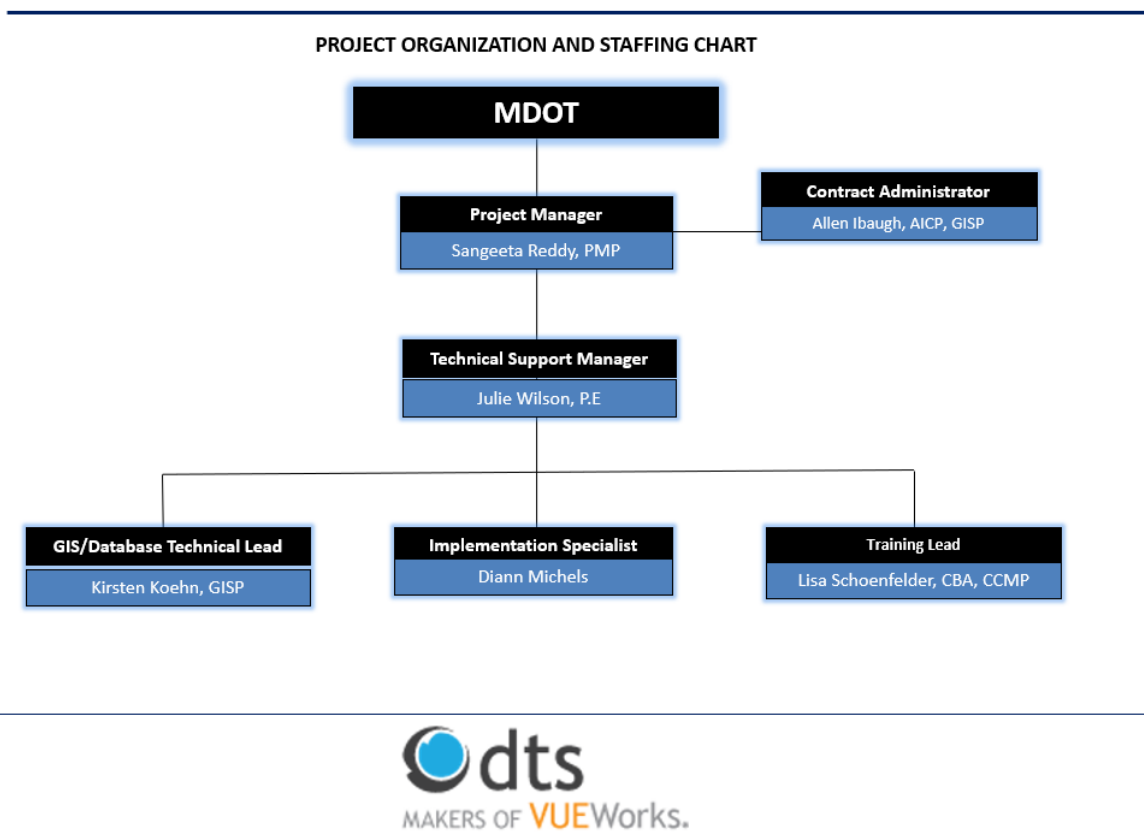
- Allen Ibaugh, AICP, GISP – Contract Administrator
- Sangeeta Reddy, PMP – Contractor Project Manager
- Julie Wilson, P.E. – Contractor Technical Support Manager
- Kirsten Koehn, GISP – Contractor GIS/Database Technical Lead
- Diann Michels – Implementation Specialist
- Lisa Schoenfelder, CBA, CCMP – Training Lead

## Company and Team Qualification

The team proposed to this contract, as shown in the organization chart, is structured to be responsive to the needs of MDOT by providing the resources necessary to address all the work assignments associated with this project. DTS believes that MDOT and DTS team members must become a single unified team with common goals in order to deliver a successful and sustainable enterprise maintenance management and asset system. Although several VUEWorks implementation projects are underway involving the proposed staff, they will have the needed availability to ensure the MDOT schedule is maintained.

Our team has the resources, knowledge, skills, and abilities to support the MDOT and the implementation of the SIGAMS. The DTS team is comprised of certified professionals and ISO 55000 asset management subject-matter experts to assist in all phases of planning, implementation, configuration, integration, data conversion, testing, training, change management and documentation.

## Organizational Chart



As the Makers of VUEWorks, DTS will be a one-stop shop for MDOT in the implementation of this project. No suppliers, subcontractors or other third-parties will be needed to carry out the project.



## Detailed List of Accomplishments

### Detailed List of Accomplishments

The following project examples illustrate the diverse assets for which VUEWorks is being used by transportation agencies. Massachusetts DOT, Virginia DOT and Rhode Island DOT use VUEWorks in a setting similar to the MDOT project. The Ohio DOT Transportation Asset Management Decision Support Tool (TAMDST) exploits vast amounts of asset and maintenance data and gives ODOT staff and decision makers information to help with planning, programming and maintaining infrastructure using VUEWorks BI and Reporting Tools. Michigan DOT uses VUEWorks as a cost-effective means of ensuring that the assets they are responsible for maintaining will continue to meet the required standards and regulatory compliance.

#### **Traffic Signal, Sign Management and Reporting System (VUEWorks ELA), Massachusetts DOT**

The Massachusetts Department of Transportation contracted with five engineering firms to collect the location of State-owned signals and the components of those signals. DTS was selected to implement VUEWorks asset management software for signalized intersections throughout the State. Each signalized intersection was populated in VUEWorks by DTS, and as the engineering firms complete their analysis of each signal, they populate the components of the signal in the VUEWorks database. The components being populated include approach, BBS cabinets, streetlights, pedestrian pull boxes, signals, ped heads, cameras, blankout signs, advanced warning signals, controllers and MMU/CMs.

VUEWorks allows MassDOT to view the data in a centralized location as soon as the engineering firms complete each inspection. The development of custom editing forms ensures all five engineering firms are collecting the same data for signal components in the same manner.

#### **Statewide Highway Maintenance Management System (VUEWorks ELA), Virginia DOT**

Project components included implementation of the commercial off-the-shelf (COTS) VUEWorks software, integration with additional asset management inventory and VDOT's linear referencing system (the Roadway Network System – RNS), conversion and loading of prior asset management data and performance models as well as services to support the implementation to include solution design, integration, testing, training and ongoing support and maintenance.

The business requirements that the system addressed are asset and inventory management, maintenance planning, budgeting, expenditure tracking, work order management, resource planning and scheduling, work planning and budgeting, staff management, time recording, mobile environment support and analysis and reporting for pavement, traffic ancillary structures, fixed bridges and culverts, roadway and roadside maintenance and tunnels and moveable bridges.

#### **Enterprise Asset Management System and MIRE Collection (VUEWorks ELA), Rhode Island DOT**

The Rhode Island Department of Transportation (RIDOT) adopted the VUEWorks Enterprise Asset Management solution as the agency's work management system. RIDOT is composed of 7 regional facilities and district facilities, making it increasingly difficult to manage without a centralized system. The Department was in need of an asset management system that could effectively track the work management process of various assets including drainage (catch basins, retention ponds), safety

(attenuators), traffic (signals, signs), structure (bridges), facilities (maintenance facilities, parks) and most recently, traffic management centers.

A major concern was the lack of a centralized customer service system that could address issues from the public regarding assets and distribute them to the various districts within the Department. VUEWorks maintenance management has enabled the agency to track work completed by these facilities and districts including their online traffic management center which is open 24 hours, 7 days a week for citizens to report situations of immediate concern. Information reported from citizens can then be tracked through the VUEWorks Service Request and Work Order modules.

#### **Transportation Asset Management Decision Support Tool (VUEBI), Ohio DOT**

The Ohio Department of Transportation (ODOT) selected Data Transfer Solutions to develop the Transportation Asset Management Decision Support Tool (TAMDST). TAMDST exploits vast amounts of asset and maintenance data and gives ODOT staff and decision makers information to help with planning, programming and maintaining infrastructure. DTS began by obtaining information from a wide variety of stakeholders including ODOT executives, ODOT District personnel and representatives of Construction Management, Engineering, Operations, Planning, Jobs and Commerce, Facilities, Innovative Delivery, Finance and Communications. The objective of TAMDST is to provide these users with a one-stop web-based solution that organizes data into information to meet stakeholders' business needs. The next step DTS took was to take information from stakeholder interviews in order to build wireframes, workflows and mockups for the custom solution.

The final on-premises implementation of the new tool is complete, and regression testing was conducted using a ticket tracking system to allow multiple agents to test each functional aspect of the system. Additional testing included the testing of multiple devices such as tablets and laptops with varying resolutions.

#### **Transportation Asset Management System (TAMS) Solution (VUEWorks ELA), Michigan DOT**

Data Transfer Solutions and the firm's VUEWorks asset management software were selected by the Michigan Department of Transportation (MDOT) in its competitively bid request for its new Transportation Asset Management System (TAMS) solution.

The project included implementation of the commercial off-the-shelf (COTS) VUEWorks software, data conversion and migration, integration with other MDOT systems, training and long-term maintenance and support.

Initial components included Road Network Management (including multiple Linear Referencing Methods and straightline diagramming), Asset Inventory Management (with a beginning focus on lanes, signs, culverts and guardrails) and Maintenance Management (including integration with a number of existing MDOT maintenance-related systems).

All VUEWorks modules are being made available to MDOT for future use in other TAMS phases or by other divisions of the Department and other state agencies. Other integrations include MDOT's Transportation Management System (TMS), the Michigan Information Database (MIDB), the Michigan Bridge Management System (MIBridge) and data from e-Construction as-built files.

## Price Proposal

The DTS price proposal is as follows. Note there will be no additional licensing charge to the State for this project.

<b>Implementation Services</b>	<b>Fee</b>
Project Kickoff Meeting (Gate 1)	\$7,500
Develop System Integration Plans (Gate2)	\$25,000
Data, Document and Process Review (Gate 3)	\$40,000
Configuration and Integration (Gate 4)	
Phase 1 CS-Spot & Asset Inventory (Gate 4a)	\$125,000
Phase 2 Study, Scoping & Design (Gate 4b)	\$125,000
Phase 3 MWA & IWA (Gate 4c)	\$125,000
Training/Education Plan (Gate 5)	\$30,000
<b>Total</b>	<b>\$477,500</b>

Business Req. Module	Business Req. No.	Detailed Business Requirement Description	Priority	Current Capability	Requires Configuration	Requires Customization	Future Enhancement	Not Available	Bidder to explain how they will deliver the Business Specification. Explain the details of any configuration/customization, associated costs, and the impacted risk that may be caused if configured or customized to meet the business specification.
CS-Spot	1	System allows the user to enter criteria, search for existing CS-Spots.  Supplemental Information to the above requirement:  Search criteria – Location (CS, CS-Spot, PR), Area (Region, TSC, County, District), Route Name, any text within CS-Spot Description.	Mandatory Minimum	X					VUEWorks Core (Data Pane) provides canned and configurable search tools. All VUEWorks modules provide robust query tools.
CS-Spot	2	System displays results of CS-Spot search on a map interface within the System.	Mandatory Minimum	X					VUEWorks Core (Map Pane) provides standard Esri query tools.
CS-Spot	3	System displays results of CS-Spot search in a list view.	Mandatory Minimum	X					All VUEWorks modules provide robust query tools.
CS-Spot	4	System allows user to click on the map to start the process of creating a new CS-Spot. Based on location chosen on the map, system:  1. Identifies Control Sections within a buffer distance of the point on the map based on MDOT GIS Control Section layer and displays in a selectable list 2. Allows user to select a Control Section from the list 3. (a). displays all existing CS-Spot numbers in the selected Control Section (b). suggests and displays a new CS-Spot number (based on the next available sequential Spot number). and allows to choose a CS-Spot number from (a) or (b) above. 4. When the new, suggested CS-Spot number(b) is selected, allows the user to edit the number. 5. Then validates and alerts for duplicate CS-Spot numbers. 6. If not a duplicate number, then allows to create the new CS-Spot. 7. When an existing CS-Spot is selected, allows to edit CS-Spot details.  Supplemental Information to the above requirement:  The interface portion of this requirement includes displaying read-only views of existing MDOT ArcGIS layers such as Control Section.	Mandatory Minimum (Interface)	X					VUEWorks Core (Map Pane) provides standard Esri map tools.

CS-Spot	5	<p>Changes made in the system that affect the fields stored in the existing MDOT Signals Layer (create new feature, delete feature, or edit attributes of an existing feature) will be made available immediately in a feature service that can be read by JobNet which may be created either by the DTMB ArcGIS Server or directly by the system. Note: System users are expected to make these changes in the System before creating a Job in JobNet. After a job has been created, critical JobNet attributes will not be changed unless a JobNet Change Request is submitted.</p> <p>Supplemental Information to the above requirement:</p> <p>Currently, DTMB ArcGIS Server serves a Signals feature service layer that is used to interface with other MDOT, DTMB, and SOM systems. The Signals layer has attributes that may be edited within the System. Whenever those changes are made in the System, the changes must be synchronized with the Signals layer served through DTMB ArcGIS Server. Examples of these changes include but are not limited to:</p> <p>(1) Create/update new CS-Spot (2) Revising attributes for an existing CS-Spot/Device (3) Adding new device (4) Changing device type.</p> <p>Note: The specifics on this requirement are dependent on system architecture. Existing system stores geospatial in a spatial database engine (SDE) database that is connected to DTMB ArcGIS Server. However, there are other potential architectures. If a vendor chooses to pursue a different architecture, it will need to be further vetted by MDOT and DTMB technical teams.</p>	Mandatory Minimum	X					VUEWorks provides a bi-directional integration with ArcGIS Server. This is a live link through the use of REST services. Since VUEWorks is permissions-based, users with appropriate permissions can create/update new CS-Spot, revise attributes for an existing CS-Spot/Device, add new device and change device type.
Scoping	6	<p>Changes made in the system that affect the fields stored in the existing MDOT Signals Layer (create new feature, delete feature, or edit attributes of an existing feature, change CS-Spot type) will be made available immediately in a feature service that can be read by JobNet (created by the DTMB ArcGIS Server or directly by the System). This includes revising attributes for an existing asset, adding new device or changing device type.</p> <p>Note: System users are expected to make these changes in the System before creating a Job in JobNet. After a job has been created, critical JobNet attributes will not be changed unless a JobNet Change Request is submitted.</p> <p>Supplemental Information to the above requirement:</p> <p>(a) Signal layer affecting changes made to 'For Device Type CS-Spot' are -</p> <p>(1) Revising attributes of an existing asset (2) Adding new device (3) Changing device type of an existing device.</p> <p>(b) JobNet system then pulls Scoping (CS-Device-Spot) details from ArcGIS server to update Jobs in JobNet. (c) Some of Scoping Phase details updated in JobNet are- Location ID Number/Asset ID Number, Device Type, Device Type Description, Sub-Device Type, Description, PR, PRMP, CS, CSMP</p>	Mandatory Minimum (Interface ArcGIS Server)	X					VUEWorks provides a bi-directional integration with ArcGIS Server. This is a live link through the use of REST services. Since VUEWorks is permissions-based, users with appropriate permissions can create/update new CS-Spot, revise attributes for an existing CS-Spot/Device, add new device and change device type.
Design	7	System allows the user to access 'Generate Work Order' function independent of workflow phases such as Design, Scoping, Study, Request (allows user to generate Work Order with or without prior phases existing).	Mandatory Minimum	X					This functionality is part of the VUEWorks Work Order module.

Asset Inventory	8	<p>System allows the user to enter criteria and search for asset inventory items.</p> <p>Supplemental Information to the above requirement:</p> <p>Asset inventory should be searchable by any attribute associated with the asset or the CS-Spot/Device that the asset is associated with.</p> <p>Some examples of search criteria: CS-Spot, Route, CS, Region, Device Type, Inventory Item ID, Inventory status, controller type, detection type, etc. Additional search criteria will be provided later during implementation phase of the project.</p>	Mandatory Minimum	X						
Asset Inventory	9	System allows the user to create a new asset inventory item.	Mandatory Minimum	X						
Asset Inventory	10	System allows the user to edit attributes of an asset inventory item.	Mandatory Minimum	X						
Undefined	11	<p>The new, web-based system automates the complete process of Transport Work Authorization (TWA) including the capability to track and reflect maintenance work &amp; costs, Inspection Work Authorization (IWA) and the Signal Asset Management processes to support all work authorizations.</p> <p>Supplemental Information to the above requirement:</p> <p>The legacy/old application (SAFESTAT) is a system with PowerBuilder front-end and database with an Oracle back-end.</p>	Required		X					Some of these capabilities will be part of a database linking activity, and others can be configured directly using VUEWorks workflow tools.
Undefined	12	Users internal to MDOT have access to the system based on their role.	Required	X						
Undefined	13	External users have access to the system based on their role.	Required	X						External user accounts can be in their own role and permission groups
Undefined	14	<p>System supports remote access. (System is accessible to internal or external users out of SOM network without a SOM VPN.</p> <p>Supplemental Information to the above requirement:</p> <p>Local agency maintaining electricians must be able to modify inventory, complete IWAs &amp; TWAs, initiate and close out MWAs. Local Agency Finance may have to run reports. Allow for consultant to have same access as MDOT operations engineers, TSC traffic &amp; safety engineers, and local maintaining agencies, power companies, Contractors need access to the system.</p>	Required	X						VUEWorks is web-based, and user accounts can be created for both internal and external users.
Undefined	15	<p>The system stores event, date/time stamp of event, and user credentials pertaining to data for all adds/changes/deletes.</p> <p>Supplemental Information to the above requirement:</p> <p>This information will be stored for audit purposes.</p>	Required	X						All actions in VUEWorks are time and date stamped, and administrators have GUI-based audit tools available to them.
Undefined	16	<p>System provides role-based access to each functional area.</p> <p>Supplemental Information to the above requirement:</p> <p>There are approximately 10 roles.</p> <p>Some of the roles are- Requestor, Operations (Study &amp; Scoping), Design, Construction/Maintenance, Administrator, System Manager, Read Only.</p> <p>Complete Role functionality matrix will be provided during the implementation phase of the project.</p>	Required	X						VUEWorks provides a robust roles-based management GUI. Administrators can create an unlimited amount of roles for both individual users and groups.

Undefined	17	The system is available 24x7.  Supplemental Information to the above requirement:  Business can tolerate up to 8 hours of unplanned downtime due to unforeseen issues during work hours.	Required	X					VUEWorks is available 24/7. Furthermore, system patches and updates can be performed without the need to take the system offline.
Undefined	18	Responsive design is needed. All of system's functionality can be accessed using a tablet or a laptop and the functionality is same on both devices.	Required	X					All VUEWorks mobile tools are designed using responsive design.
Undefined	19	Responsive design is needed. All of system's functionality can be accessed using a mobile phone and the functionality is same as it is on other devices.  Supplemental Information to the above requirement:  <a href="https://www.michigan.gov/som/0,4669,7-192-86761---,00.html">https://www.michigan.gov/som/0,4669,7-192-86761---,00.html</a>	Optional	X					All VUEWorks mobile tools are designed using responsive design.
Undefined	20	Responsive design and the application development to follow SOM standards.  Supplemental Information to the above requirement:  <a href="https://www.michigan.gov/som/0,4669,7-192-86761---,00.html">https://www.michigan.gov/som/0,4669,7-192-86761---,00.html</a>	Required	X					All VUEWorks mobile tools are designed using responsive design.
Undefined	21	The system provides an application that is ADA compliant.  Supplemental Information to the above requirement:  Specific links to SOM ADA standards can be found on this site - <a href="https://www.michigan.gov/som/0,4669,7-192-86761---,00.html">https://www.michigan.gov/som/0,4669,7-192-86761---,00.html</a>	Required	X					VUEWorks has the same ADA compliance capabilities as Esri products.
Undefined	22	System provides User Guides and access to training manuals.	Required	X					All users have access to the VUEWorks Customer Portal from within VUEWorks Core. VUEWorks Core contains user guides, a knowledge base, training materials, videos, templates, access to customer support and much more.
		<b>Request:</b> <b>System includes a module (referred to as Request phase) through which users can submit a request to have a signal operations engineer investigate a traffic operations issue (i.e., study), create a description of work to be completed (i.e., scope of work), or dispatch a maintenance worker.</b> <b>Requirements below provide more details about the Request phase needs.</b>							
Request	23	System allows the user to enter criteria and search for existing Requests.  Supplemental Information to the above requirement:  Search criteria – Study Request ID, Location (CS-Spot, PR), Area (Region, TSC, County, District), Requested Unit, Request Type, Phase/Disposition, Route Name	Optional	X					Existing functionality of the VUEWorks Service Request module
Request	24	System allows the user to view details of a Request record from the search results.	Optional	X					Existing functionality of the VUEWorks Service Request module
Request	25	System allows the user to create a new Request and assigns it a unique ID.  Supplemental Information to the above requirement:  Request ID is an auto generated unique identifier which remains constant through any or all Phase changes (and all Status changes within each Phase).  Request detail fields- Request ID, Request Date, Assign Request To. Fields in addition to listed above, will be provided later during implementation phase of the project.	Optional	X					Existing functionality of the VUEWorks Service Request module
Request	26	When a new Request is created, system saves Request in the database in such a way that it can be saved as a historical record, queried, and details viewed.	Optional	X					Existing functionality of the VUEWorks Service Request module

Request	27	System allows user to click/drop a pin on the map to associate a location with the request.  Supplemental Information to the above requirement:  This requirement is in addition to associating Request with an existing CS-Spot.	Optional	X					Existing functionality of the VUEWorks Service Request module
Request	28	System sets the Status of a Request as 'Open' when it is created.	Optional	X					Existing functionality of the VUEWorks Service Request module
Request	29	System allows the user to enter Request Type for the Request.  Supplemental Information to the above requirement:  Types of Requests include – Device Removal, New Phasing, New Device, Scoping, Signal Timing, Corridor Timing, Other	Optional	X					Existing functionality of the VUEWorks Service Request module
Request	30	System allows the user to enter Signal Study Screening information when the Request Type is 'Device Removal', 'New Phasing', 'New Device' or 'Other'.  Supplemental Information to the above requirement:  The Signal Study Screening fields (form -1597) are – Location, Junction, CS-SPOT#, PR#, City/Village/Township, County, Region/TSC, Request Type, Requestor's Name, Agency/Citizen, Phone#, Date of Most Recent Study, Major Road Posted Speed Limit, Minor Road Posted Speed Limit, Urban Low Speed, Rural/Urban High Speed. Fields specific to New Traffic Signal or Flashing Beacon Study, Left Turn Phasing Study. New Pedestrian Device Study (crossing, pedestrian data during peak pedestrian hours). Fields to capture the person making the decision to order complete study or not, name of the person and date when decision taken.  See Supplemental Information to the above requirement: – Forms document for a screenshot of the current form.	Optional	X					Existing functionality of the VUEWorks Service Request module
Request	31	System provides the user an option to select 'Work Type' and enter other scoping related details on the Request.  Supplemental Information to the above requirement:  Work Type selection determines 'Scoping' Phase details. List of 'Work Types will be provided later during implementation phase of the project. Other scoping details are- delivery type, job number, permit number.	Optional	X					Existing functionality of the VUEWorks Service Request module
Request	32	When user enters a job number, the System brings in related data from JobNet system (if a Job has already been created in JobNet) and makes the same available to the user on Request details. Changes made in System will not be transmitted to JobNet.  Supplemental Information to the above requirement:  Job Number, Let Date, Contractor and some other Job details are brought from JobNet.  Note: System users are expected to make any changes to CS-Spot in the System before creating a Job in JobNet. After a job has been created, critical JobNet attributes will not be changed unless a JobNet Change Request is submitted. (Change Request will be submitted outside the System).	Optional (JobNet Interface)	X					Existing functionality of the VUEWorks Service Request module
Request	33	System allows the user to edit Request details.	Optional	X					Existing functionality of the VUEWorks Service Request module
Request	34	System allows the user to Save changes made to a Request.	Optional	X					Existing functionality of the VUEWorks Service Request module
Request	35	System allows the user to switch between Statuses within Request Phase.  Supplemental Information to the above requirement:  A Request has three statuses- Open, Closed – Completed, Closed – No Action.	Optional	X					Existing functionality of the VUEWorks Service Request and Work Order modules



Request	36	System sends out workflow notifications to all parties involved and the requestor for all status changes within Request phase.	Optional	X			X		Partial existing functionality of the VUEWorks Service Request and Work Order modules. Additionally, enhanced workflow is in development.
Request	37	System allows user to manage notifications (i.e., who gets an email) for Status changes with the Request phase.  Supplemental Information to the above requirement:  Notifications should be based on role; must include ability for the user who submitted the request to be included in notifications by default.	Optional	X					Existing functionality of the VUEWorks Service Request and Work Order modules
Request	38	System allows the user to enter a comment when changing the status on a Request.	Optional	X					Existing functionality of the VUEWorks Service Request module
Request	39	System allows the user to change the Phase to next level in workflow when the Status of a Request is 'Closed – Completed'.  Supplemental Information to the above requirement:  Phases in workflow are – Request, Study, Scoping, Design, Construction, Maintenance.	Optional	X					Existing functionality of the VUEWorks Service Request and Work Order modules
Request	40	System doesn't allow the user to edit Request details once the status is 'Closed-Completed'.	Optional	X					Existing functionality of the VUEWorks Service Request and Work Order modules
Request	41	System allows the user with administrative rights alone to re-open Request Phase once it is completed and moved to next Phase in workflow. Once reopened, any user with Request editing rights may edit.	Optional	X					Existing functionality of the VUEWorks Service Request and Work Order modules
Request	42	System sends out workflow notifications to all parties involved and the requestor when Request is changed to the next phase (i.e., Study or Scoping).	Optional	X			X		Partial existing functionality of the VUEWorks Service Request, Work Order and Projects modules. Additionally, enhanced workflow is in development.
Request	43	System allows the user to enter a comment when changing the Phase of a Request.	Optional	X					
		<b>CS-Spot:</b> <b>System includes CS-Spot module through which users can manage CS-Spots, including editing details of existing CS-Spots and creating new CS-Spots. ('CS-Spot' is not a workflow phase, it is only a separate module).</b>  <b>A CS-Spot is the combination of a control section (CS) number and a sequential spot number (spot). It is a unique identifier. A more general term for CS-Spot is "site".</b>  <b>Requirements below provide more details about CS-Spot module.</b>							
CS-Spot	44	System allows the user to click on a CS-Spot in the list view and display the details of a CS-Spot in a tabular format.	Required	X					Existing functionality of VUEWorks Core and the Facilities module
CS-Spot	45	System allows the user to create a CS-Spot without any prior workflow phases being created or completed.	Required	X					Existing functionality of VUEWorks Core and the Facilities module
CS-Spot	46	System allows user to click on a CS-Spot on the map and display the CS-Spot details in a new window while still viewing the map (i.e., pop-up, dockable side panel, etc.).	Required	X					Existing functionality of VUEWorks Core and the Facilities module
CS-Spot	47	System automatically populates some CS-Spot associated details based on its selection made on the GIS CS layer.  Supplemental Information to the above requirement:  CS, CS-Spot#, PR, PR Mile Point, Road names, Trunk Line/Route(s), City/Township/County.	Required	X					Existing functionality of VUEWorks Core and the Facilities module
CS-Spot	48	System allows user to enter remaining CS-Spot details and edit details that were auto-populated based on the Control Section GIS layer.  Supplemental Information to the above requirement:  CS-Spot Description, CS Mile Point, Site Reference Number, Intersection ID, City/Township FIPS code, Customer Codes/Names, Control Section, and mile point of each approach		X					Existing functionality of VUEWorks Core and the Facilities module

CS-Spot	49	System allows the user to choose CS-Spot type.  Supplemental Information to the above requirement:  Types of CS-Spot- 1. Study type CS-Spot: To conduct a Study (and then ends up with no Device added to it). 2. Device type CS-Spot: To conduct a Study and then add a Device during Scoping Phase.	Required	X					Existing functionality of VUEWorks Core and the Facilities module
CS-Spot	50	System includes an application screen through which users can configure details of each leg of an intersection.  Supplemental Information to the above requirement: Details include but are not limited to – Cost Participation, Approach Name, CS, Jurisdiction, Route, Road Name	Required	X					Existing functionality of VUEWorks Core and the Facilities module
CS-Spot	51	System automatically populates intersection leg information based on the underlying MDOT CS GIS layer.	Required	X					Customization of ArcGIS Server to create a new feature API
CS-Spot	52	System allows the user to enter Cost Participation details on CS-Spot details.  Supplemental Information to the above requirement:  Cost Participation details are - Entity having jurisdiction and which leg(s) of the intersection the entity has jurisdiction over and related details.	Required	X					Existing functionality of VUEWorks Core and the Facilities module
CS-Spot	53	System provides the user a list of private entities to choose from to enter the Cost Participation/Sharing information on CS-Spot details.  Supplemental Information to the above requirement:  Private entities such as Meijers. This list will be populated from a look-up table.	Required (Migration)	X					Creation of a look-up table in the Facilities module
CS-Spot	54	System presents a list of Location Codes and allows the user to select from the list on CS-Spot details screen.  Supplemental Information to the above requirement:  Location Code information entered (and saved) on CS-Spot details assists electrician during his/her time entry in SIGMA.	Required	X					Existing functionality of VUEWorks Core and the Facilities module
CS-Spot	55	System provides the user a list of maintaining local agencies, maintenance levels to select from and to enter the Cost Participation/Sharing information on CS-Spot details.  Supplemental Information to the above requirement:  This list will be populated from a look-up table. Look-up table will be initially populated based on migrated information from legacy SAFESTAT application.	Required (Migration)		X				Configuration of GIS data attribution for the CS-Spots
CS-Spot	56	System calculates Cost Participation percentage for each entity having jurisdiction to a leg(s) at the intersection based on cost participation data entered on CS-Spot details.  Supplemental Information to the above requirement:  The percentages can change without owner/jurisdictional changes (for example, a T-intersection adding a pedestrian crossing).	Required			X			This would require a more thorough analysis of the requirements on where to develop this feature. Potentially this could be a dynamic report developed using CS-Spot GIS attribution (or dynamic segmentation) and VUEWorks CS-Spot detail attribution.

CS-Spot	57	System allows the user to enter multiple Location ID Numbers and Location ID Descriptions for a CS-Spot.  Supplemental Information to the above requirement:  Location ID and Location Description may be used when a CS-Spot has multiple distinct locations. For example, a boulevard may have four distinct locations.  MDOT does not have a definitive data model for CS-Spot/Location/Device/Asset. However, the flexibility that this requirement provides is needed for future expansion.	Optional	X					VUEWorks manages this on the MassDOT project using clustering.
CS-Spot	58	System allows the user to enter one or more Devices for each Location ID Number or Location ID Description.  Supplemental Information to the above requirement:  For example, a traffic signal and flashing beacon (i.e., devices) may be assigned to the same Location. MDOT does not have a definitive data model for CS-Spot/Location/Device/Asset. However, the flexibility that this requirement provides is needed for future expansion.	Required	X					This can be managed in VUEWorks out of the box. As an example the support structure is an asset and that structure has assets linked to it, i.e. a traffic signal and a flashing beacon.
CS-Spot	59	System allows the user to enter more than one Device at a CS-Spot.  Supplemental Information to the above requirement:  One or more Devices can be associated with each CS-Spot. One or more Location ID and Location Description can be associated with each Device.	Required	X					CS-Spot would be managed as a vertical asset with the Facilities module.
CS-Spot	60	System allows the user to edit CS-Spot details.	Required	X					CS-Spot would be managed as a vertical asset with the Facilities module.
CS-Spot	61	System allows the user to Save changes made to a CS-Spot.	Required	X					CS-Spot would be managed as a vertical asset with the Facilities module.
		<b>Study:</b>  <b>System includes a module (referred to as Study phase) through which users can track the process of performing a traffic study (needed to investigate a traffic operations issue), gaining approval(s), and storing the results of the study.</b>  <b>Requirements below provide more details about Study phase needs.</b>							
Study	62	System allows the user to enter(paste) the file path/hyperlink to the location in Document Management System (ProjectWise) where the pdf study files are stored.	Required	X					VUEWorks document linking
Study	63	System allows the user to enter criteria, search for existing studies, and, click on and view details of a Study record from search results.  Supplemental Information to the above requirement:  The search criteria – [values: ID (Study, Request), Location (CS, CS-Spot, PR), Area (Region, TSC, County, District), Study (Unit, Type, Disposition) Mile Point, Date Range, any text within CS-Spot Description]	Optional	X					This functionality can be configured using the VUEWorks Projects and Work Order modules.
Study	64	System allows the user to create Study phase without any prior phases being created or completed.	Optional	X					This functionality can be configured using the VUEWorks Projects and Work Order modules.

Study	65	<p>System allows the user to create a new Study and automatically assigns it a unique ID.</p> <p>Supplemental Information to the above requirement:</p> <p>Study ID is an auto generated unique identifier which remains constant through any or all Phase changes (and Status changes within each Phase).</p> <p>If Study originated as a Request then Study ID will be the same as Request ID.</p> <p>Some study detail fields include –</p> <p>Study Type [values: Device Removal, Corridor Timing, Signal Timing, New Device, New Phasing, Other]</p> <p>Status, Comments, Study ID, Location Information, Assigned To, Date Assigned, CS-Spot, Person Responsible for Study. Complete field list will be provided later during implementation phase of the project.</p>	Optional	X					This functionality can be configured using the VUEWorks Projects and Work Order modules.
Study	66	System sets the Status of the Study as ‘Open’ when it is newly created.	Optional	X					This functionality can be configured using the VUEWorks Projects and Work Order modules.
Study	67	<p>System allows user to click/drop a pin on the map to associate a location with the Study.</p> <p>Supplemental Information to the above requirement:</p> <p>This requirement is in addition to associating Study with a CS-Spot.</p>	Optional	X					This functionality can be configured using the VUEWorks Projects and Work Order modules.
Study	68	<p>System allows the user to choose between ‘full study’ or ‘not a full study’.</p> <p>Supplemental Information to the above requirement:</p> <p>‘Full study’ will have different approval requirements than ‘not a full study’ which will be managed by changing the status within the Study workflow phase.</p>	Optional	X					This functionality can be configured using the VUEWorks Projects and Work Order modules.
Study	69	<p>System allows the user to enter Traffic Survey Request information when a full study needed.</p> <p>Supplemental Information to the above requirement:</p> <p>Traffic Survey Request (form- 1776) fields: Date submitted, Due Date, Date Request Received, Study Number, Control Section, CS Mile Point, PR # LRSID, PR Mile Point, Latitude, Longitude24 Hour vehicle volume, 48 hour vehicle volume, 8 hour manual vehicle turning movements, 8 hour manual pedestrian movements Requestor name, email, Gap Study Date, Delay Study Date, Program, Phase, Activity, Name, Email of the person notified when study is completed.</p> <p>See Supplemental Information–Forms document for a screenshot of the current form.</p>	Optional	X					This functionality can be configured using the VUEWorks Projects and Work Order modules.
Study	70	<p>System reads Timing Permit information from Central Signal Control System (CSCS) and links it to Study ID.</p> <p>Supplemental Information to the above requirement:</p> <p>If Timing Permit information can be read and imported from CSCS to System, the information should also be transferred to Design Phase to link to a Work Order.</p> <p>See Supplemental Information to the above requirement: – Forms document for a screenshot of the current form.</p>	Optional (CSCS Interface)	X					This functionality can be configured using the VUEWorks Projects and Work Order modules.
Study	71	System allows the user to edit Study details.	Optional	X					This functionality can be configured using the VUEWorks Projects and Work Order modules.
Study	72	System allows the user to save any changes made to a Study.	Optional	X					This functionality can be configured using the VUEWorks Projects and Work Order modules.

Study	73	System allows the user to switch between statuses within Study Phase.  Supplemental Information to the above requirement:  A Study has following Statuses- [values: Open, Open-Unassigned, Open-Traffic Survey Requested, Open-Traffic Survey Received, Open-Waiting for Approvals, Open-Waiting for Safety Programs, Open-Approved, Open-Denied, Open-Draft Response, Open-Final Response, Closed-No Action Recommended, Closed - Completed]. Note: may need to add more approval specific statuses- details to be given later during implementation phase of the project.	Optional	X					This functionality can be configured using the VUEWorks Projects and Work Order modules.
Study	74	System sends out workflow notifications to all parties involved and the requestor for all status changes.	Optional	X					This functionality can be configured using the VUEWorks Projects and Work Order modules.
Study	75	System allows the user to manage automatic notifications (i.e., who gets an email) for Status changes with the Study phase.  Supplemental Information to the above requirement:  Notifications should be based on role; must include ability for the user who submitted the request to be included in notifications by default.	Optional	X					This functionality can be configured using the VUEWorks Projects and Work Order modules.
Study	76	System allows the user to enter a comment when changing the status on Study.	Optional	X					This functionality can be configured using the VUEWorks Projects and Work Order modules.
Study	77	System allows the user to upload a study conclusion memo pdf and save in the system, when the Status of the Study is 'Open – Approved'/'Open – Denied'.  Supplemental Information to the above requirement:  Study conclusion memo pdfs are distributed to concerned parties.	Optional	X					This functionality can be configured using the VUEWorks Projects and Work Order modules.
Study	78	System allows the user to generate a study Response pdf as appropriate, based on Study details entered and saved in the system, when the Status of the Study is 'Open – final Response'.	Optional	X					This functionality can be configured using the VUEWorks Projects and Work Order modules.
Study	79	System allows the user to preview and save the generated Study conclusion memo (or) Study response pdf in designated Document Management System location.  Supplemental Information to the above requirement:  ProjectWise is the current Document Management System in use where all/ most of saved Studies and Designs are stored.	Optional	X					This functionality can be configured using the VUEWorks Projects and Work Order modules.
Study	80	System has access to read and retrieve stored Study conclusion memo(or) the Study response pdfs from the Document Management System.	Optional	X					This functionality can be configured using the VUEWorks Projects and Work Order modules.
Study	81	System provides user a hyperlink to the location where stored Study conclusion memo or Study response pdf is stored in the Document Management System.	Optional	X					This functionality can be configured using the VUEWorks Projects and Work Order modules.
Study	82	System allows the user to view study conclusion memo(or) the Study Response pdf on the application when the Status of the Study is 'Open – Approved'/'Open-Denied' (or) Open-final Response.  Supplemental Information to the above requirement:  Permission to view the conclusion memo or Study response based on user role and security permissions.	Optional	X					This functionality can be configured using the VUEWorks Projects and Work Order modules.
Study	83	System allows the user to change the Phase to the next phase in workflow when the Status of a Study is 'Closed–Completed'.  Supplemental Information to the above requirement:  Phases in workflow are – Request, Study, Scoping, Design Construction, Maintenance.	Optional	X					This functionality can be configured using the VUEWorks Projects and Work Order modules.

Study	84	System locks the study conclusion pdf/Study response pdf to prevent any further changes to it when the status of the Study is Closed-Completed'.  Supplemental Information to the above requirement:  The conclusion memo pdf documents the approval or denial of the Study.	Optional	X					This functionality can be configured using the VUEWorks Projects and Work Order modules.
Study	85	System unlocks the memo pdf when re-opening Study Phase.  Supplemental Information to the above requirement:  Study gets re-opened when moving backward in workflow from any level after Study Phase.	Optional	X					This functionality can be configured using the VUEWorks Projects and Work Order modules.
Study	86	System doesn't allow the user to update Study details once the status is 'Closed-Completed'.	Optional	X					This functionality can be configured using the VUEWorks Projects and Work Order modules.
Study	87	System allows the user with administrative rights alone to re-open Study Phase once it is completed and moved to next Phase in workflow.	Optional	X					This functionality can be configured using the VUEWorks Projects and Work Order modules.
Study	88	System sends out workflow notifications to all parties involved and the requestor for all Study Phase changes.	Optional	X					This functionality can be configured using the VUEWorks Projects and Work Order modules.
Study	89	System allows the user to enter a comment when changing the Phase from Study to next level in workflow.	Optional	X					This functionality can be configured using the VUEWorks Projects and Work Order modules.
		<b>Scoping:</b>  <b>System includes a module (referred to as Scoping phase) through which users can enter information about the work to be completed and identify devices that need to be installed. Scoping phase is based on completing the fields included on MDOT's existing Layout Request Form.</b>  <b>Requirements below provide more details about the Scoping phase needs.</b>							
Scoping	90	System allows the user to enter criteria and search for existing Scoping Phases.  Supplemental Information to the above requirement:  Search criteria – will be provided later during implementation phase of the project.	Required	X					This functionality can be configured using the VUEWorks Projects and Work Order modules.
Scoping	91	System allows the user to click on and view details of a Scoping Phase record from the search results.	Required	X					This functionality can be configured using the VUEWorks Projects and Work Order modules.
Scoping	92	System allows the user to create Scoping phase without any prior phases being created or completed.	Required	X					This functionality can be configured using the VUEWorks Projects and Work Order modules.
Scoping	93	System allows the user to create Scoping Phase (Scope of Work) and automatically assigns it a unique ID.  Supplemental Information to the above requirement:  Scoping ID is an auto generated unique identifier which remains constant through any or all Phase changes (and Status changes within each Phase). If Scoping originated as a Request or Study, then Scoping ID will be the same as Request or Study ID.  Scoping Detail fields- Layout Request (Scoping Detail) Date, Location, File Number, City/Township, Fips Code, Control Section, Mile Point, County, Approved per, Approved From & To, Memo Date, Operational Analysis By, Initial Request Date, PR#, Work Status, Layout Request Date, Prepare Layout details, Traffic Signal details - Controller Type, Operation, Detection, Signal Indications, Pedestrian Indications, Countdown Indications, Phasing/Operation, Other Electrical Devices. Location ID Number/Asset ID Number, Device Type, Device Type Description, Sub-Device Type, Sub-Device Type Description, PR, PRMP, CS, CSMP, Job Number, Work Type, Delivery Type.	Required	X					This functionality can be configured using the VUEWorks Projects and Work Order modules.

Scoping	94	<p>System allows the user to create a new Scoping phase based on an existing Scoping phase (i.e., use a previous scoping phase as a template).</p> <p>Supplemental Information to the above requirement:</p> <p>Intention of this requirement is to speed up data entry when scoping several devices with a similar scope of work (e.g., modernization)</p> <p>One way this functionality could be implemented is:</p> <ol style="list-style-type: none"> <li>1. Click on previous Scoping (ScopingID=123)</li> <li>2. Choose "Create new Scoping" button with previous Scoping</li> <li>3. Pop-up says, "Are you sure you want to create a new Scoping based on ScopingID=123?" Click "Yes". New ScopingID=456 is created with Status of 'Open', populated with all relevant information from ScopingID=123, and is editable.</li> </ol>	Optional	X					This functionality can be configured using the VUEWorks Projects and Work Order modules.
Scoping	95	System sets the Status of the Scoping Phase as 'Open' when it is created.	Required	X					This functionality can be configured using the VUEWorks Projects and Work Order modules.
Scoping	96	<p>System pre-populates Scoping detail fields with any relevant data previously entered on Request or Study Phase.</p> <p>Supplemental Information to the above requirement:</p> <p>When the Status of a Study or a Request is 'Closed - Completed', if user decides scoping is required for the work, it is assigned to Scoping Phase in workflow and then Scoping details are entered.</p> <p>(1). Phases prior to Scoping are 'Request', and 'Study', however sometimes work can start with Scoping Phase. In that case no previous Phase exists.</p> <p>(2). Some pre-populated Scoping Phase fields - Location, File Number, City/Township, Fips Code, Control Section, Mile Point, County, Approved per, Approved From &amp; To, Memo Date, Operational Analysis By, Initial Request Date, PR#, Work Status, Scoping Request Date, Prepare Layout details, Job Number.</p>	Required	X					This functionality can be configured using the VUEWorks Projects and Work Order modules.
Scoping	97	<p>System provides the user an option to select 'Work Type' for Scoping on Study details.</p> <p>Supplemental Information to the above requirement:</p> <p>Work Type selection determines 'Scoping' Phase details.</p> <p>Following is the list of proposed signal work types:</p> <ul style="list-style-type: none"> <li>4 to 3 Lane Conversion</li> <li>Road Resurfacing</li> <li>Road Reconstruct</li> <li>Typical Temporary Signal</li> <li>Non-Typical Temporary Signal</li> <li>Construction Staging</li> <li>Central System Integration</li> <li>Operational</li> <li>Other Intersection Improvement</li> <li>Modernization</li> <li>New Phasing</li> <li>New Device</li> <li>Device Removal</li> <li>Corridor Timing</li> <li>Signal Timing</li> </ul>	Required	X					This functionality can be configured using the VUEWorks Projects and Work Order modules.

Scoping	98	<p>System allows the user to change CS-Spot type during Scoping Phase.</p> <p>Supplemental Information to the above requirement:</p> <p>Ability to change CS-Spot type should not be restricted at any time during any Phase, assuming user has security permissions that allow CS-Spot change. However, the requirement is listed here because it is the most common time to make the type change.</p> <p>Types of CS-Spot- (1)CS-Spot – for Study’ To conduct a Study (and then ends up with no Device added to it). ‘CS-Spot- for Device’ To conduct a Study and then add a Device during Scoping Phase.</p> <p>Note: System users are expected to make these changes to CS-Spot in the System before creating a Job in JobNet. After a job has been created, critical JobNet attributes will not be changed unless a JobNet Change Request is submitted.</p>	Required	X					This functionality can be configured using the VUEWorks Projects and Work Order modules.
Scoping	99	System allows the user to add one or more Devices on Scoping Detail when CS-Spot is Device type.	Required	X					This functionality can be configured using the VUEWorks Projects and Work Order modules.
Scoping	100	<p>System allows the user to change Device Type of an existing Device on Scoping Detail when CS-Spot is Device type.</p> <p>Supplemental Information to the above requirement:</p> <p>The other type of CS-Spot is Study type.</p>	Required	X					This functionality can be configured using the VUEWorks Projects and Work Order modules.
Scoping	101	<p>System allows the user to create one Scoping Phase per one CS-Device-Spot.</p> <p>Supplemental Information to the above requirement:</p> <p>There can be multiple devices per each CS-Device-Spot.</p>	Required	X					This functionality can be configured using the VUEWorks Projects and Work Order modules.
Scoping	102	<p>System brings in Job numbers and other related data from JobNet system and make the same available to the user on Scoping details. Changes made in System will not be transmitted to JobNet.</p> <p>Supplemental Information to the above requirement:</p> <p>Job Number, Let Date, Contractor, Project Number, Fin Sys, Phase (Fin Sys may be different per phase), Template, Scheduled Let Date, Scheduled Obligation Date, Asset IDs (Location IDs), Work (Detailed) details are brought from JobNet.</p>	Optional (Interface JobNet)	X					This functionality can be configured using the VUEWorks Projects and Work Order modules.
Scoping	103	System allows the user to edit Scoping Phase details.	Required	X					This functionality can be configured using the VUEWorks Projects and Work Order modules.
Scoping	104	System allows the user to save changes made to Scoping details.	Required	X					This functionality can be configured using the VUEWorks Projects and Work Order modules.
Scoping	105	<p>System allows the user to switch between Statuses within Scoping Phase.</p> <p>Supplemental Information to the above requirement:</p> <p>Scoping Phase Statuses are – Open – Unassigned, Open – Assigned, Closed - Completed Closed - No Action.</p>	Required	X					This functionality can be configured using the VUEWorks Projects and Work Order modules.
Scoping	106	System sends out automatic workflow notifications to concerned parties and the initiator for all Scoping Phase Status changes.	Required	X					This functionality can be configured using the VUEWorks Projects and Work Order modules.



Scoping	107	System allows user to manage automatic notifications (i.e., who gets an email) for Status changes with the Scoping phase.  Supplemental Information to the above requirement:  Notifications should be based on role; must include ability for the user who submitted the request to be included in notifications by default.	Required	X					This functionality can be configured using the VUEWorks Projects and Work Order modules.
Scoping	108	System allows the user to enter a comment when changing the status on Scoping Phase.	Required	X					This functionality can be configured using the VUEWorks Projects and Work Order modules.
Scoping	109	System allows the user to change the Phase from Scoping to next Phase when the Scoping Phase Status is 'Closed-Completed'.  Supplemental Information to the above requirement:  Phases after Scoping can be- Design/ Construction/ Maintenance	Required	X					This functionality can be configured using the VUEWorks Projects and Work Order modules.
Scoping	110	System doesn't allow the user to update Scoping Phase details once the status is 'Closed-Completed'.	Required	X					This functionality can be configured using the VUEWorks Projects and Work Order modules.
Scoping	111	System allows the user with administrative rights alone to re-open Scoping Phase once it is completed and moved to next Phase in workflow.	Required	X					This functionality can be configured using the VUEWorks Projects and Work Order modules.
Scoping	112	System sends out automatic workflow notifications to all parties involved and the initiator for all Scoping Phase changes.	Required	X					This functionality can be configured using the VUEWorks Projects and Work Order modules.
Scoping	113	System allows the user to enter a comment when changing the Phase from Scoping.	Optional	X					This functionality can be configured using the VUEWorks Projects and Work Order modules.
		<b>Design Module:</b>  <b>System includes a module (referred to as Design phase) through which users can enter information related to the final design of the traffic operations device.</b>  <b>Design information includes:</b> <b>1. Construction cost estimate</b> <b>2. Utility (Power Service) request tracking</b> <b>3. Listing of asset inventory to be installed</b> <b>4. Funding/financial information</b> <b>5. Local agency/Private entity cost agreement tracking</b>  <b>Requirements below provide more details about the Design phase needs.</b>							
Design	114	System allows the user to enter criteria and search for existing Designs.  Supplemental Information to the above requirement:  Search criteria includes - Design ID, CS-CS-Spot, Location, Area, Design type, Delivery type, Program category, and disposition, any text within CS-Spot Description.	Required	X					The Design functionality can be implemented using VUEWorks Core and the Facilities, Work Order, Valuation, Condition, Risk, Budget Forecasting and Projects modules.
Design	115	System allows the user to view details of a Design record from the search results.	Required	X					The Design functionality can be implemented using VUEWorks Core and the Facilities, Work Order, Valuation, Condition, Risk, Budget Forecasting and Projects modules.
Design	116	System allows the user to create Design phase without any prior phases being created or completed.	Required	X					The Design functionality can be implemented using VUEWorks Core and the Facilities, Work Order, Valuation, Condition, Risk, Budget Forecasting and Projects modules.

Design	117	<p>System allows the user to create a new Design and assigns it a unique Design ID.</p> <p>Supplemental Information to the above requirement:</p> <p>Like other Phases, Design ID is an auto generated unique identifier which remains constant through any or all Phase changes (and Status changes within each Phase). If Design originated as a Request/Study/Scoping, then Design ID will be the same as or easily translatable to Request/Study/Scoping ID.</p> <p>Some of the Design detail fields are entered by user and some fields need to be pre-populated from Request, CS-Spot, Study, Scoping details.</p>	Required	X					The Design functionality can be implemented using VUEWorks Core and the Facilities, Work Order, Valuation, Condition, Risk, Budget Forecasting and Projects modules.
Design	118	<p>System sets the Status of the Design as ‘Open’ when it is newly created.</p> <p>Supplemental Information to the above requirement:</p> <p>Design Phase statuses: Open Closed – Completed Closed – No Action</p>	Required	X					The Design functionality can be implemented using VUEWorks Core and the Facilities, Work Order, Valuation, Condition, Risk, Budget Forecasting and Projects modules.
Design	119	<p>System populates ‘Delivery Type’ field on Design details based on data entered on prior workflow Phases and/or CS-Spot details.</p> <p>Supplemental Information to the above requirement:</p> <p>‘Delivery Type’ options - Contract Inspection Work Authorization (CIWA), Signal Work Authorization (SWA), Permit Inspection Work Authorization (PIWA), Maintenance Work Authorization (MWA)</p> <p>Workflow Phases prior to Design are – Request/ Study/ Scoping and on CS-Spot details.</p>	Required	X					The Design functionality can be implemented using VUEWorks Core and the Facilities, Work Order, Valuation, Condition, Risk, Budget Forecasting and Projects modules.
Design	120	System allows the user to enter/select ‘Delivery Type’ on Design details if it is not pre-populated or if user wants to overwrite the pre-populated value.	Required	X					The Design functionality can be implemented using VUEWorks Core and the Facilities, Work Order, Valuation, Condition, Risk, Budget Forecasting and Projects modules.
Design	121	System populates Job number on Design details screen from prior workflow Phase, ‘Scoping’.	Required	X					The Design functionality can be implemented using VUEWorks Core and the Facilities, Work Order, Valuation, Condition, Risk, Budget Forecasting and Projects modules.
Design	122	<p>System brings in other Job-related information from JobNet system to populate the same on Design details. User can change any of pre-populated values. Changes to pre-populated values will be displayed/stored in SigAMS but not transmitted to JobNet.</p> <p>Supplemental Information to the above requirement:</p> <p>Job related information needed from JobNet – Project Number, Fin Sys, Phase (Fin Sys may be different per phase), Template, Scheduled Let Date, Scheduled Obligation Date, Asset IDs (Location IDs), Work (Detailed), Location (Detailed)</p> <p>‘Fin Sys’ field is currently called as ‘Fund Type’ ‘Fin Sys’ options are- M, ST, STG, NHG, CM, CMG</p> <p>Note: MDOT’s long-term data strategy is to read/update the primary/definitive data source whenever possible. If any of the data elements listed as being pulled from JobNet have primary/definitive residence in another database, may need to have additional interfaces with the databases.</p>	Optional (JobNet Interface)	X					The Design functionality can be implemented using VUEWorks Core and the Facilities, Work Order, Valuation, Condition, Risk, Budget Forecasting and Projects modules.

Design	123	System brings in Contractor information, Bid Prices from AASHTOWare system and populates on Design details (for SWAs).	Required (AASHTOWare Interface)	X					The Design functionality can be implemented using VUEWorks Core and the Facilities, Work Order, Valuation, Condition, Risk, Budget Forecasting and Projects modules.
Design	124	System allows the user to enter(paste) the file path/hyperlink to the location in Document Management System (ProjectWise) where the CAD design file(.dgn) is stored.  Supplemental Information to the above requirement:  The location link is saved as the CAD design field value in the database of the system and can be retrieved along with other Design details when viewing a Design record.	Required	X					The Design functionality can be implemented using VUEWorks Core and the Facilities, Work Order, Valuation, Condition, Risk, Budget Forecasting and Projects modules.
Design	125	System allows the user to upload a PDF design plan document for the Design and save it in the system.	Required	X					The Design functionality can be implemented using VUEWorks Core and the Facilities, Work Order, Valuation, Condition, Risk, Budget Forecasting and Projects modules.
Design	126	System displays previously saved, most current PDF design plan document and allows the user to view along with other Design details without needing the user to connect to VPN or open another application.  Supplemental Information to the above requirement:  The intention of this requirement is to have a current PDF design plan available to users within the System without the need to go to ProjectWise or login to a VPN. Some of the use cases for functionality include:  1. Signal electrician views PDF before visiting the intersection to prepare for maintenance activities 2. Signal engineers export and provide to a design team as an as built for a modernization project.  The intention is that a user will upload a PDF to the System whenever changes are made to intersection.  The designs are currently stored in ProjectWise. Microstation DGN files are typically archived in specific folders in ProjectWise but PDFs are not.	Required	X					The Design functionality can be implemented using VUEWorks Core and the Facilities, Work Order, Valuation, Condition, Risk, Budget Forecasting and Projects modules.
Design	127	A preferred extension of above requirement is to establish an automated connection with ProjectWise through which the PDF would be saved to ProjectWise and automatically synchronized to the System.	Optional (Interface Projectwise)	X					The Design functionality can be implemented using VUEWorks Core and the Facilities, Work Order, Valuation, Condition, Risk, Budget Forecasting and Projects modules.
Design	128	System provides an editable comment/remarks text field on Design details and populates the same with location details/CS-Spot description from Scoping Phase.	Required	X					The Design functionality can be implemented using VUEWorks Core and the Facilities, Work Order, Valuation, Condition, Risk, Budget Forecasting and Projects modules.
Design	129	System allows the user to enter Power Service Request (Electricity Application) information on Design details, assigns it a unique ID and links the same to the Design ID.  Supplemental Information to the above requirement:  Example Fields – Elect Appn ID, Location details, Power Company name and contact details, Agency [Billing, Maintaining, Contractor/Vendor Account Number, Service Request Number, Power consumption details (Wattage), Estimation details.	Required	X					The Design functionality can be implemented using VUEWorks Core and the Facilities, Work Order, Valuation, Condition, Risk, Budget Forecasting and Projects modules.
Design	130	System allows the user to generate ‘Application for Electric Energy Services and Installation/Removal’ printable PDF form based on Power Service Request information entered and saved on Design details.  Supplemental Information to the above requirement:  See Supplemental Information to the above requirement: – Forms document for a screenshot of the current form.	Required	X					The Design functionality can be implemented using VUEWorks Core and the Facilities, Work Order, Valuation, Condition, Risk, Budget Forecasting and Projects modules.
Design	131	System allows the user to email ‘Application for Electric Energy Services and Installation/Removal’ to power/utility company. (To receive updated electrical usage/wattage).	Required	X					The Design functionality can be implemented using VUEWorks Core and the Facilities, Work Order, Valuation, Condition, Risk, Budget Forecasting and Projects modules.

Design	132	System allows the user to enter Power Service Request number on Design details and update electrical usage (Wattage) when the application is received back from the power company	Required	X					The Design functionality can be implemented using VUEWorks Core and the Facilities, Work Order, Valuation, Condition, Risk, Budget Forecasting and Projects modules.
Design	133	System provides a field on Design details screen for the user to enter if wireless data request information exists for the design or not.	Required	X					The Design functionality can be implemented using VUEWorks Core and the Facilities, Work Order, Valuation, Condition, Risk, Budget Forecasting and Projects modules.
Design	134	System allows the user to enter Wireless Data Request information on Design details if wireless data request exists for the Design.  Supplemental Information to the above requirement:  Fields- Location, Monthly data plan, Monthly data rate. Rest of the fields to be given later during implementation phase of the project. Current form #2152.	Required	X					The Design functionality can be implemented using VUEWorks Core and the Facilities, Work Order, Valuation, Condition, Risk, Budget Forecasting and Projects modules.
Design	135	System allows the user to generate ‘Wireless Data Request for Communications’ PDF form based on Wireless Data Request information entered on Design details.  Supplemental Information to the above requirement:  See Supplemental Information to the above requirement: – Forms document for a screenshot of the current form.	Optional	X					The Design functionality can be implemented using VUEWorks Core and the Facilities, Work Order, Valuation, Condition, Risk, Budget Forecasting and Projects modules.
Design	136	System allows the user to create a new Cost Agreement for the Design, assigns it a unique ID and links the same to the Design ID.  Supplemental Information to the above requirement:  Fields on Cost Agreement- Cost Agreement ID, Design ID, Location details Origin[Region, TSC, County, District, Lansing], Status Dates [Request Date, Received Date, Maintenance Agency Notify], Agreement Signed[Yes, No, Refused, Not Needed], FHWA Installation, , Estimated Annual Maintenance Cost, Agreement Signed by participating agency, Agreement signed by maintaining agency, maintaining agency, maintaining level (type A, B, C, D).	Required	X					The Design functionality can be implemented using VUEWorks Core and the Facilities, Work Order, Valuation, Condition, Risk, Budget Forecasting and Projects modules.
Design	137	System provides a list of maintenance costs per signal and allows the user to choose maintenance cost \$ amount from the list, on Cost Agreement details.  Supplemental Information to the above requirement:  Currently, there is no look-up table for these costs so, a requirement to provide the maintenance costs table has been added to ‘Admin’ requirements.	Required	X					The Design functionality can be implemented using VUEWorks Core and the Facilities, Work Order, Valuation, Condition, Risk, Budget Forecasting and Projects modules.
Design	138	System populates a list of maintenance costs per signal based on actual maintenance cost information entered in System in Maintenance phase. After sufficient data has been collected (i.e., a year or so), this list will replace the maintenance cost look-up table referenced in previous requirement.  Supplemental Information to the above requirement:  Goal is for the System to calculate the average annual maintenance cost per individual CS-Spot based on maintenance costs internal to the new system.	Required	X					The Design functionality can be implemented using VUEWorks Core and the Facilities, Work Order, Valuation, Condition, Risk, Budget Forecasting and Projects modules.

Design	139	System populates cost participation details for the Cost Agreement based on cost participation percentages saved on CS-Spot.  Supplemental Information to the above requirement:  Participation fields- Agency FIPS, Agency Name (system to provide list of local agencies to choose from, Customer Code, Customer Name. Installation costs share%, Maintenance cost share%, Maintenance Type, Energy Billing, worker.	Required	X					The Design functionality can be implemented using VUEWorks Core and the Facilities, Work Order, Valuation, Condition, Risk, Budget Forecasting and Projects modules.
Design	140	System allows the user to generate Cost Agreement PDF based on entered Cost Agreement details for the Design.  Supplemental Information to the above requirement:  PDF needs to be formatted to look the same as current Cost Agreement form.	Required	X					The Design functionality can be implemented using VUEWorks Core and the Facilities, Work Order, Valuation, Condition, Risk, Budget Forecasting and Projects modules.
Design	141	System calculates cost participation \$ amounts for Local Agency /private entities by multiplying the cost share percentages by estimated costs (wattage or maintenance costs) to generate Cost Agreement PDF.	Required	X					The Design functionality can be implemented using VUEWorks Core and the Facilities, Work Order, Valuation, Condition, Risk, Budget Forecasting and Projects modules.
Design	142	System populates Location related fields on Design details (or on any form generated on Design details such as Cost Agreement etc..) from data saved on prior workflow Phases such as Study or CS-Spot	Required	X					The Design functionality can be implemented using VUEWorks Core and the Facilities, Work Order, Valuation, Condition, Risk, Budget Forecasting and Projects modules.
Design	143	System allows the user to select e-mail recipient(s) and email Cost Agreement PDF.	Required	X					The Design functionality can be implemented using VUEWorks Core and the Facilities, Work Order, Valuation, Condition, Risk, Budget Forecasting and Projects modules.
Design	144	System allows the user to upload a PDF version of proposed timing permit document for the Design.	Required	X					The Design functionality can be implemented using VUEWorks Core and the Facilities, Work Order, Valuation, Condition, Risk, Budget Forecasting and Projects modules.
Design	145	System establishes a connection to the CSCS to import a PDF version of the proposed timings from CSCS to System.	Optional (Interface CSCS)	X					The Design functionality can be implemented using VUEWorks Core and the Facilities, Work Order, Valuation, Condition, Risk, Budget Forecasting and Projects modules.
Design	146	System allows user to provide a ProjectWise hyperlink to the location of proposed timing permit.	Required	X					The Design functionality can be implemented using VUEWorks Core and the Facilities, Work Order, Valuation, Condition, Risk, Budget Forecasting and Projects modules.
Design	147	System allows users to develop and save two types of cost estimates.  Supplemental Information to the above requirement:  Cost Estimate Types: 1. Engineer's Estimate - Estimates cost for private contractor to construct based on MDOT historical average bid prices. 2. Cost Estimate – Estimates cost for MDOT/Local Agency to construct based on actual materials costs, labor rates, overhead rates, and equipment costs.	Required	X					The Design functionality can be implemented using VUEWorks Core and the Facilities, Work Order, Valuation, Condition, Risk, Budget Forecasting and Projects modules.
Design	148	System determines the requirement for the user to fill in Estimate (Engineer's Estimate and Cost Estimate) details based on Delivery Type of the Design.  Supplemental Information to the above requirement:  If the Delivery Type is - Signal Work Authorization (SWA) – both Estimate types are required.  For CIWA, PIWA, MWA construction cost information is not needed.	Required	X					The Design functionality can be implemented using VUEWorks Core and the Facilities, Work Order, Valuation, Condition, Risk, Budget Forecasting and Projects modules.

Design	149	System allows the user to enter non-material costs manually or attach a csv file to fill Cost Estimate for the Design when Delivery Type is ‘Signal Work Authorization’ and link the file to the Design ID.  Supplemental Information to the above requirement:  Cost Estimate is entered manually, or a csv is attached for non-material costs when the work is done by MDOT/Local Agency.  Following fields are entered for Estimate Information-  Material related cost percentages, labor hour/ costs, equipment costs, Power company construction costs, Telephone company construction costs, participation FHWA cost participation.	Required	X					The Design functionality can be implemented using VUEWorks Core and the Facilities, Work Order, Valuation, Condition, Risk, Budget Forecasting and Projects modules.
Design	150	System reads wage/hourly rates for MDOT employees from MIDB system (for HRMN wage rates) and provides a list of rates to choose from to fill in Labor Costs estimate on <b>Cost Estimate</b> .	Required (Interface HRMN/MIDB)	X					The Design functionality can be implemented using VUEWorks Core and the Facilities, Work Order, Valuation, Condition, Risk, Budget Forecasting and Projects modules.
Design	151	System reads equipment rental rates from MFIVE system and provides a list of rates to choose from to fill in Equipment Costs estimate on <b>Cost Estimate</b> .	Required (Interface MFIVE)	X					The Design functionality can be implemented using VUEWorks Core and the Facilities, Work Order, Valuation, Condition, Risk, Budget Forecasting and Projects modules.
Design	152	System presents a list of material costs to select from while the user is entering Cost Estimate for the Design.  Supplemental Information to the above requirement:  Cost Estimate (for material) projects the cost of material incurred when MDOT/Local Agency does the work. These costs are the material costs maintained in the system.  The material cost look-up presents these fields- Item Number, Item Description, Units, Price of Material.	Required	X					The Design functionality can be implemented using VUEWorks Core and the Facilities, Work Order, Valuation, Condition, Risk, Budget Forecasting and Projects modules.
Design	153	System allows the user to attach a file (e.g., PDF) and manually enter the total cost for the Cost Estimate for the Design when the Delivery Type is – CIWA or PIWA.  Supplemental Information to the above requirement:  Estimates are obtained from local maintaining agencies for IWAs. They should be able to attach a pdf of their estimate to the IWA assigned to them.	Required	X					The Design functionality can be implemented using VUEWorks Core and the Facilities, Work Order, Valuation, Condition, Risk, Budget Forecasting and Projects modules.
Design	154	System allows the user to save the <b>Cost Estimate</b> (material costs) for the Design and links the same to the Design ID.	Required	X					The Design functionality can be implemented using VUEWorks Core and the Facilities, Work Order, Valuation, Condition, Risk, Budget Forecasting and Projects modules.
Design	155	System reads weighted average bid price of MDOT pay items from AASHTOWare pre-construction for Engineer's Estimate for the Design.  Supplemental Information to the above requirement:  Engineer's Estimate is an estimate of the cost incurred when a contractor does the work. Engineer's Estimate consists of a list of standard pay items. Each pay item is inclusive of the cost of materials, labor, equipment, and contractor markup; the component parts of the pay item (material, labor, equipment, markup) are not listed separately.	Required (Interface AASHTOWare )	X					The Design functionality can be implemented using VUEWorks Core and the Facilities, Work Order, Valuation, Condition, Risk, Budget Forecasting and Projects modules.
Design	156	System presents the average unit price list to select from while the user is entering <b>Engineer's Estimate</b> (of construction costs) for the Design.	Required	X					The Design functionality can be implemented using VUEWorks Core and the Facilities, Work Order, Valuation, Condition, Risk, Budget Forecasting and Projects modules.
Design	157	System allows the user to save the Engineer's <b>Estimate</b> (of construction costs) for the Design and links the same to the Design ID.	Required	X					The Design functionality can be implemented using VUEWorks Core and the Facilities, Work Order, Valuation, Condition, Risk, Budget Forecasting and Projects modules.

Design	158	System provides the user an option to attach a csv file to fill in all costs for either <b>Cost Estimate</b> or <b>Engineers Estimate</b> on Design details (in addition to allowing to enter costs manually).	Required	X					The Design functionality can be implemented using VUEWorks Core and the Facilities, Work Order, Valuation, Condition, Risk, Budget Forecasting and Projects modules.
Design	159	System allows users to either develop cost estimates within the system or to attach a PDF estimate and manually enter the cost estimate totals.  Supplemental Information to the above requirement:  This functionality is called Override in SAFESTAT.  Intention of this requirement is to provide flexibility to create cost estimates in a different tool outside of the System. For example, if a Consultant provides an Engineer’s estimate to the signal design unit, the MDOT signal design engineer can directly enter the total to the System rather than entering each line item.	Required	X					The Design functionality can be implemented using VUEWorks Core and the Facilities, Work Order, Valuation, Condition, Risk, Budget Forecasting and Projects modules.
Design	160	System allows the user to generate a PDF to view the total cost estimate once Cost Estimate details are entered and saved.  Supplemental Information to the above requirement:  System sums Cost Estimates to calculate total cost estimate.  PDF format will be provided later during implementation phase of the project.	Required	X					The Design functionality can be implemented using VUEWorks Core and the Facilities, Work Order, Valuation, Condition, Risk, Budget Forecasting and Projects modules.
Design	161	System allows the user to enter Cost Agreement signed date on Design details.	Required	X					The Design functionality can be implemented using VUEWorks Core and the Facilities, Work Order, Valuation, Condition, Risk, Budget Forecasting and Projects modules.
Design	162	System allows the user to upload the signed Cost Agreement to be stored in the database.	Required	X					The Design functionality can be implemented using VUEWorks Core and the Facilities, Work Order, Valuation, Condition, Risk, Budget Forecasting and Projects modules.
Design	163	System allows the user to upload the signed Power Service Application to be stored in the database.	Required	X					The Design functionality can be implemented using VUEWorks Core and the Facilities, Work Order, Valuation, Condition, Risk, Budget Forecasting and Projects modules.
Design	164	System allows the user to attach a pdf of LA estimated inspection costs for the IWA assigned to them.  Supplemental Information to the above requirement:  Note: This is separate from the Cost Estimate and Engineer’s Estimate. This refers to the cost to inspect, rather than the cost to construct.	Required	X					The Design functionality can be implemented using VUEWorks Core and the Facilities, Work Order, Valuation, Condition, Risk, Budget Forecasting and Projects modules.
Design	165	System provides the function/ability to ‘Generate a Work Order’ (Work Authorization) while on Design details screen based on the Delivery Type of the Design and assigns it a unique ID.	Required	X					The Design functionality can be implemented using VUEWorks Core and the Facilities, Work Order, Valuation, Condition, Risk, Budget Forecasting and Projects modules.
Design	166	System links the Work Order/Work Authorization ID generated on Design details to Design ID.		X					The Design functionality can be implemented using VUEWorks Core and the Facilities, Work Order, Valuation, Condition, Risk, Budget Forecasting and Projects modules.
Design	167	System allows the user to generate a PDF checklist of documents to be completed for a Work order/Work authorization and print the same.	Required	X					The Design functionality can be implemented using VUEWorks Core and the Facilities, Work Order, Valuation, Condition, Risk, Budget Forecasting and Projects modules.

Design	168	<p>System allows the user to email the Work Order and all documents linked to it (to all parties involved based on the Work Order Type.</p> <p>Supplemental Information to the above requirement:</p> <p>MWA to - Region Operations Engineer, Local Agency Supervisor, Electrician. IWA to – Lead Signal Inspector, Local Agency Supervisor, Electrician</p> <p>Email addresses for most of the recipients will be saved in the System as part of a lookup table but would also like the ability to enter an email address directly on the Work Order.</p>	Required	X					The Design functionality can be implemented using VUEWorks Core and the Facilities, Work Order, Valuation, Condition, Risk, Budget Forecasting and Projects modules.
Design	169	<p>System allows the user to generate a unique Fiscal Control Number for the Work Order and links the same to the Work Order and the Design ID when the work is done by LA.</p> <p>Supplemental Information to the above requirement:</p> <p>Work Order (Work Authorization) types – 1. Transportation Work Authorization (TWA) for signal (SWA- Signal Work Authorization) or maintenance (MWA- Maintenance Work Authorization)  2. Inspection Work Authorization (IWA) for Contract (CIWA- Contract Inspection Work Authorization) or Permit work (PIWA- Permit Inspection Work Authorization)</p>	Required	X					The Design functionality can be implemented using VUEWorks Core and the Facilities, Work Order, Valuation, Condition, Risk, Budget Forecasting and Projects modules.
Design	170	<p>System allows user to export a report containing fields that need to be input in Local Agency Payments System (LAPS). Partial list of fields includes Fiscal Control Number, Work Order/SWA Number.</p> <p>Supplemental Information to the above requirement:</p> <p>Some of the other fields to include in the export are - Region, TSC, LA, Control Section, CS-Spot (signal number), Type of Work, Description. Complete list of fields to be provided later during implementation phase of the project.</p>	Required	X					The Design functionality can be implemented using VUEWorks Core and the Facilities, Work Order, Valuation, Condition, Risk, Budget Forecasting and Projects modules.
Design	171	<p>System provides an interface with Local Agency Payments System (LAPS) to send Fiscal Control Number, Work Order/SWA Number.</p> <p>Supplemental Information to the above requirement:</p> <p>Some of the other fields to include in the export are - Region, TSC, LA. Complete list of fields to be provided later during implementation phase of the project.</p>	Optional (LAPS Interface)	X					The Design functionality can be implemented using VUEWorks Core and the Facilities, Work Order, Valuation, Condition, Risk, Budget Forecasting and Projects modules.
Design	172	System allows the user to edit Design details.	Required	X					The Design functionality can be implemented using VUEWorks Core and the Facilities, Work Order, Valuation, Condition, Risk, Budget Forecasting and Projects modules.
Design	173	System allows the user to save any changes made to a Design record.	Required	X					The Design functionality can be implemented using VUEWorks Core and the Facilities, Work Order, Valuation, Condition, Risk, Budget Forecasting and Projects modules.
Design	174	System allows the user to change workflow Phase from Design to either Maintenance /Construction when status of the Design Phase is ‘Closed-Completed’.	Required	X					The Design functionality can be implemented using VUEWorks Core and the Facilities, Work Order, Valuation, Condition, Risk, Budget Forecasting and Projects modules.
Design	175	System locks Design details for any updates when the status of the Design is ‘Closed-No Action’ or ‘Closed – Completed’. System only allows user with administrative rights to re-open a closed Design phase.	Required	X					The Design functionality can be implemented using VUEWorks Core and the Facilities, Work Order, Valuation, Condition, Risk, Budget Forecasting and Projects modules.
Design	176	System sends out workflow notifications to all parties involved when the Design is assigned to next Phase in Workflow.	Required	X					The Design functionality can be implemented using VUEWorks Core and the Facilities, Work Order, Valuation, Condition, Risk, Budget Forecasting and Projects modules.



Design	177	System allows the recipients of Phase change workflow notification to access and print the Work Order and all documents linked to it.	Required	X					The Design functionality can be implemented using VUEWorks Core and the Facilities, Work Order, Valuation, Condition, Risk, Budget Forecasting and Projects modules.
Design	178	System allows the user to enter a comment when changing the Phase.	Required	X					The Design functionality can be implemented using VUEWorks Core and the Facilities, Work Order, Valuation, Condition, Risk, Budget Forecasting and Projects modules.
		<b>Asset Inventory:</b>  <b>System includes Asset Inventory module through which users can manage asset inventory (Asset inventory is not a workflow phase). Electronic traffic control assets include signal controllers, signal heads, poles, detection etc used for a work authorization.</b>  <b>Requirements below provide more details about Asset Inventory module.</b>							
Asset Inventory	179	System allows the user to manage signal asset inventory (search, create, edit attributes of asset inventory items) independently or from any Work Order/Work Authorization screen.  Supplemental Information to the above requirement:  Asset inventory fields are TBD until data migration takes place.	Required	X					The Design functionality can be implemented using VUEWorks Core and the Facilities module.
Asset Inventory	180	System allows the user to view details of a search result asset inventory item.  Supplemental Information to the above requirement:  All attributes of an asset in the inventory must be viewable and exportable in one row of a table.	Required	X					The Design functionality can be implemented using VUEWorks Core and the Facilities module.
Asset Inventory	181	System allows the user to save any changes made to asset inventory items.	Required	X					The Design functionality can be implemented using VUEWorks Core and the Facilities module.
Asset Inventory	182	System sets the status of an asset inventory item based on a certain criterion (see Supplemental Information for criteria).  Supplemental Information to the above requirement:  Inventory item statuses: P (Pending) E (Existing) R (Retired)  System criterion to set inventory status on an inventory item:  The 'Pending' status would typically be set during design phase (but could be set during MWA initiated by electrician). The 'Pending' status would be associated with an open status of design, maintenance, or construction phase. Additional criteria/business rules will be provided later during implementation phase of the project.	Required	X					The Design functionality can be implemented using VUEWorks Core and the Facilities module.
Asset Inventory	183	System sets the status of an asset inventory item to 'Pending' when it is first added on a Work Authorization or on a Design.	Required	X					The Design functionality can be implemented using VUEWorks Core and the Facilities module.
Asset Inventory	184	System allows user to assign a unique QR code to an asset inventory item.	Optional	X					The Design functionality can be implemented using VUEWorks Core and the Facilities module.
Asset Inventory	185	System allows the user to scan an Inventory item's QR code to add it on a Work Authorization or on a Design (as an alternative to searching and adding inventory items on the application).	Optional	X					The Design functionality can be implemented using VUEWorks Core and the Facilities module.

Asset Inventory	186	System updates inventory status from 'Pending' to either 'Existing' or Retired' when Work Authorization or Design phase's status is 'Closed-Completed'.  Supplemental Information to the above requirement:  Pending -> Existing: When a new asset is installed Existing -> Retired: When an existing asset is removed	Required	X					The Design functionality can be implemented using VUEWorks Core and the Facilities module.
Asset Inventory	187	System disables add/update/delete Inventory item(s) functionality on a Work Authorization or on Design when Work Authorization phase's status is 'Closed-Completed'.  Supplemental Information to the above requirement:  With exception to MWA	Required	X					The Design functionality can be implemented using VUEWorks Core and the Facilities module.
		<b>MWA:</b>  <b>System includes a module (referred to as Maintenance phase/MWA) through which users can create work authorization (i.e., work order) and assign the work to an electrician.</b> <b>This module is intended to track work activities completed by MDOT or a local maintaining agency.</b>  <b>Requirements below provide more details for MWA phase.</b>							
MWA	188	System allows the user to enter criteria and search for existing Maintenance Phase records/MWAs (Maintenance Work Authorization).  Supplemental Information to the above requirement:  MWA: A set of forms/GUI screens on the application to capture the automated process of maintenance work that is performed by either MDOT or by the LA.  'Maintenance Phase' and 'MWA' are used interchangeably and can be read as same throughout this requirements document.	Required	X					The MWA functionality can be implemented using the VUEWorks Work Order module.
MWA	189	System allows the user to view details of a search result MWA record.	Required	X					The MWA functionality can be implemented using the VUEWorks Work Order module.
MWA	190	System allows the user to create new Maintenance Phase/MWA and assigns it a unique ID when Design Phase (or any other prior phases) doesn't exist for an MWA.  (OR)  System considers the Work Order/Work Authorization ID (MWA ID) generated on Design details as the Maintenance Phase ID and links Design ID to the MWA when Design Phase exists for an MWA	Required	X					The MWA functionality can be implemented using the VUEWorks Work Order and Projects modules.
MWA	191	System sets the Status of the MWA as 'Open-Unassigned' when it is created.  Supplemental Information to the above requirement:  Maintenance Phase Statuses: Open – Unassigned Open – Assigned Closed – Completed Closed – No Action Closed - Approved	Required	X					The MWA functionality can be implemented using the VUEWorks Work Order module.

MWA	192	System presents a map and allows the user to click on it to populate CS-Spot, device type, location and Inventory details on MWA.  Supplemental Information to the above requirement:  User – electrician Intention of this requirement is for when an electrician needs to self-report their work (e.g., knockdown overnight when a Design was not created).	Required	X					The MWA functionality can be implemented using VUEWorks Core and the Work Order module.
MWA	193	System presents a list of Traffic Control method options (options are hyperlinks to a PDF of each method) and allows the user to select one on MWA screen.  Supplemental Information to the above requirement:  List of Traffic control methods-  1. <del>INT</del> -LD-CLT-MID 2. <del>INT</del> -LD-LANE 3. <del>INT</del> -LD-MID 4. <del>INT</del> -LD-OUT 5. <del>INT</del> -SD-MID  When user clicks on the traffic control method, system will open/preview the PDF. Then, user selects the appropriate choice from the list.	Required		X				The MWA functionality can be configured using the VUEWorks Facilities module.
MWA	194	System allows the user to preview, open and download a Traffic Control method PDF while selecting the option.	Required	X					The MWA functionality can be implemented using the VUEWorks Facilities module.
MWA	195	System allows the user to change Status of MWA to ‘Open-Assigned’  Supplemental Information to the above requirement:  User - Supervisor	Required	X					The MWA functionality can be implemented using the VUEWorks Work Order module.
MWA	196	System sends out workflow notifications to all parties involved and the requestor for all status changes.	Required	X					The MWA functionality can be implemented using the VUEWorks Work Order module.
MWA	197	System reads maintaining agency name from CS-Spot details and populates the same on MWA. When CS-Spot details do not exist for the MWA, system allows the user to enter maintaining agency.	Required		X				This would require a configuration of the API place work order pin tool.
SCAS MWA	198	System provides electronic logbook screen allowing the user to enter Time Report (labor hours, equipment hours) and materials for the MWA. See Supplemental Information for fields detail.  Supplemental Information to the above requirement:  Electronic Logbook requirement  Time report fields - labor & equipment hours, dates, CS-Spot, MWA#, IWA#, Job Number, and relevant coding from MWA/IWA, LDPR profile, County name based on CS-Spot location.  For all Time Report fields see form 0499(include additional fields for material cost). See Supplemental Information to the above requirement: – Forms document for a screenshot of the current form.	Required	X					The MWA functionality can be implemented using the VUEWorks Time Recorder sub-module.
SCAS MWA	199	System provides user the option to choose wage rate from a list of MDOT wages or local maintaining agency.	Required	X					The MWA functionality can be implemented using the VUEWorks Resource Manager module.
SCAS MWA	200	System provides an interface to the Michigan Informational Database (MIDB) to provide HRMN wage rates for MDOT employees within the System.	Required (Interface MIDB)	X					The MWA functionality can be implemented using VUEWorks data link feature to the VUEWorks Resource Manager module.
SCAS MWA	201	System provides a lookup table of local maintaining agency wage rates that can be updated/maintained by a System admin.	Required	X					The MWA functionality can be implemented using VUEWorks data link feature to the VUEWorks Resource Manager module.

SCAS MWA	202	System provides an interface with LAPS (for local maintaining agency) to automatically import wage rates for local maintaining agencies.	Optional (Interface LAPS)	X					The MWA functionality can be implemented using VUEWorks data link feature to the VUEWorks Resource Manager module.
SCAS MWA	203	System reads Labor Rate, Fringe Percent, Material Handling Percent, Overhead rate from LAPS system to multiply them by respective number of hours entered by maintaining LA electrician on Time Report and calculates LA maintenance costs for the MWA.  Supplemental Information to the above requirement:  Electronic Logbook requirement  Labor Rate (read weekly), Fringe Percent, Material Handling Percent, Overhead (read annually).	Optional (Interface LAPS)	X					The MWA functionality can be implemented using VUEWorks data link feature to the VUEWorks Resource Manager module.
SCAS MWA	204	System reads wage rates from MIDB (for HRMN wage rates) system to multiply them by the number of hours entered by the MDOT electrician on Time Report and calculates maintenance costs for the MWA.  Supplemental Information to the above requirement:  Electronic Logbook requirement	Required (Interface HRMN/MIDB)	X					The MWA functionality can be implemented using VUEWorks data link feature to the VUEWorks Resource Manager module.
SCAS MWA	205	System reads equipment rental rates in real-time from MFIVE Fleet Management System (to multiply them by the number of equipment hours entered by the electrician on Time Report) and calculates equipment costs for the MWA.  Supplemental Information to the above requirement:  Electronic Logbook requirement	Required (MFIVE Interface)	X					The MWA functionality can be implemented using VUEWorks data link feature to the VUEWorks Resource Manager module.
SCAS MWA	206	System presents the list of material costs maintained in the system and allows the user to select to enter material costs on Electronic Logbook for the MWA.  Supplemental Information to the above requirement:  Electronic Logbook requirement	Required	X					The MWA functionality can be implemented using VUEWorks data link feature to the VUEWorks Resource Manager module.
SCAS MWA	207	System provides a comments field on Time Report screen for the MWA and allows the user to enter comments/notes.  Supplemental Information to the above requirement:  Electronic Logbook requirement	Required	X					The MWA functionality can be implemented using VUEWorks data link feature to the VUEWorks Resource Manager module.
SCAS MWA	208	System automates the current form and allows the user to enter signal force account Daily Field Record on MWA. See form 1101A for field details.  Supplemental Information to the above requirement:  Electronic Logbook requirement  See Supplemental Information to the above requirement: – Forms document for a screenshot of the current form.	Required		X				The MWA functionality can be configured using VUEWorks data link feature to the VUEWorks Resource Manager and Work Order modules.
MWA	209	System allows the user to attach copies of invoices for equipment purchased if any, for the Job Number/Work Order and save the same to link to MWA ID.	Required	X					The MWA functionality can be implemented using the VUEWorks Work Order module.

MWA	210	System automates the current form and allows the user to enter Completion Card details on MWA and generate a PDF form. See form 1531 for field details.  Supplemental Information to the above requirement:  See Supplemental Information to the above requirement: – Forms document for a screenshot of the current form.	Required		X					The MWA functionality can be configured using the VUEWorks Work Order module reports.
MWA	211	System automates the current form and allows the user to upload PDF of Catalog Cuts on MWA.	Optional	X						VUEWorks document linking
MWA	212	System automates the current form and allows the user to enter Traffic Signal Timing Record on MWA. See form 1577 for field details.  Supplemental Information to the above requirement:  See Supplemental Information– Forms document for a screenshot of the current form.	Required	X						The MWA functionality can be implemented using the VUEWorks Work Order module.
MWA	213	System automates the current form and allows the user to enter Property Damage Report on MWA. See form 0443 for field details.  Supplemental Information to the above requirement:  See Supplemental Information– Forms document for a screenshot of the current form.	Required	X						The MWA functionality can be implemented using the VUEWorks Work Order module.
MWA	214	System allows the user to access and update inventory items on MWA (add/subtract one or multiple items used on the field) from the field, being within/out of SOM network.  Supplemental Information to the above requirement:  Inventory detail fields- Installation: [Inventory ID, Timing Permit Number, If Removed, Inventory Status, Location details, Power Company.] Detailed Inventory requirements are written under ‘Inventory’ module.	Required	X						The MWA functionality can be implemented using the VUEWorks Mobile Suite of apps.
MWA	215	System provides an interface with LAPS system to transmit maintenance costs, fiscal control number, project coding, Job Number (when funding available) and Construction Phase/MWA number, CS from system to LAPS.  Supplemental Information to the above requirement:  Exporting these costs supports LAPS invoice review.  Complete list of fields to be included for this interface will be provided later during implementation phase of the project.	Optional (LAPS Interface)	X						
MWA	216	System allows the user to enter comments/justification for inventory updates.  Supplemental Information to the above requirement:  Intent is to capture comments based on changes made in the field. For example, if the Design called for replacing controller only but the detection also needed to be replaced.	Required	X						
MWA	217	System allows the user to edit MWA details.	Required	X						The MWA functionality can be implemented using the VUEWorks Work Order module.
MWA	218	System allow the user to save any changes made to an MWA	Required	X						The MWA functionality can be implemented using the VUEWorks Work Order module.
MWA	219	System allows the user to change workflow Status of MWA to ‘Closed-Completed or ‘Closed-No Action’.	Required	X						The MWA functionality can be implemented using the VUEWorks Work Order module.
MWA	220	System allows the user to enter a comment when changing the Status within Maintenance Phase.	Required	X						The MWA functionality can be implemented using the VUEWorks Work Order module.
MWA	221	System sends out workflow notifications to all parties involved and the requestor for all status changes within Maintenance Phase.	Required	X						The MWA functionality can be implemented using the VUEWorks Work Order module.

MWA	222	System also sends out email notifications to PDRP (when form 0443 filled on MWA) and/or Finance (when form 0838 filled on MWA) when the MWA Status is 'Closed - Completed'.  Supplemental Information to the above requirement:  See Supplemental Information to the above requirement: – Forms document for a screenshot of the current form.	Required					X		The MWA functionality will be available with the release of advanced workflow functions.
MWA	223	System sends out workflow notification to the Asset Manager to check the inventory update against the Design plan and approve Inventory updates when MWA Phase status is 'Closed-Completed'.	Required					X		The MWA functionality will be available with the release of advanced workflow functions.
MWA	224	System allows the user to change MWA Phase status to 'Closed- Approved' when the user approves Inventory updates on MWA.  Supplemental Information to the above requirement:  The user – Asset Manager	Required	X						The MWA functionality can be implemented using the VUEWorks Work Order module.
MWA	225	System locks the MWA for any updates when the status is 'Closed-Approved'.	Required	X						The MWA functionality can be implemented using the VUEWorks Work Order module.
SCAS MWA	226	System allows user to export a PDF containing all the fields included on form 0489.  Supplemental Information to the above requirement:  Historically, form 0489 has been used by an Admin for data entry into SCAS. See Supplemental Information to the above requirement: – Forms document for a screenshot of the current form.	Required	X						The MWA functionality can be implemented using the VUEWorks Work Order module.
		<b>IWA (Construction Phase):</b>  <b>System includes a module (referred to as Construction phase/IWA) through which users can create work authorization (i.e., work order) and assign the work to an electrician/inspector.</b>  <b>This module is intended to track work activities completed by a private contractor where MDOT or a local maintaining agency serves in an inspection role.</b>  <b>Requirements below provide more details for IWA phase.</b>								
IWA	227	System allows the user to enter criteria and search for existing Construction Phase records/IWAs (Inspection Work Authorization).  Supplemental Information to the above requirement:  IWA: A set of forms/GUI screens on the application to capture the automated process of inspection performed by either MDOT or by the LA for the work performed by a contractor. There are two types of IWAs – CIWA, PIWA  'Construction Phase' and 'IWA' are used interchangeably and can be read as same throughout these requirements.	Required	X						VUEWorks Projects and Work Order modules
IWA	228	System allows the user to view details of a search result IWA record.	Required	X						VUEWorks Projects and Work Order modules
IWA	229	System considers the Work Order/Work Authorization (IWA) ID generated on Design details as Inspection Phase ID and links it to the Design ID.	Required	X						VUEWorks Projects and Work Order modules

IWA	230	System sets the Status of the Construction Phase as 'Open' when it is created.  Supplemental Information to the above requirement:  Construction Phase Statuses: Open Closed – Completed Closed – No Action Closed - Approved	Required	X					VUEWorks Projects and Work Order modules
IWA	231	System brings in Contractor details from AASHTOWare, populates the same on IWA screen and allows the user to overwrite, if need be.  Supplemental Information to the above requirement:  Contractor, Sub-contractor name.	Required	X					VUEWorks Resource Manager data link
IWA	232	System allows the user to enter Electronic Logbook details related to time, equipment, and materials.  Supplemental Information to the above requirement: The user – MDOT Inspector/LA Inspector  Detailed Electronic Logbook requirements and related interface details can be found under 'MWA' module.	Required	X					VUEWorks Resource Manager data link
IWA	233	System imports financial information (via LAPS interface) specific to maintaining agency such as labor, fringe, and overhead rates to allow the inspector to use while entering electronic logbook entries for IWA	Optional (LAPS Interface)				X		Middleware will need to be developed to write to LAPS.
IWA	234	System provides an interface with LAPS system to export estimated cost of inspection, fiscal control number, project coding, Job Number (when funding available), and Construction Phase/IWA number, CS.  Supplemental Information to the above requirement:  Exporting these costs supports LAPS invoice review.  Complete list of fields to be included for this interface will be provided later during implementation phase of the project.	Optional (LAPS Interface)	X					VUEWorks Resource Manager data link
IWA	235	System allows the user to enter contractor costs or attach a csv file received from the contractor (with details of materials, serial number, and make/model) on the TWA.  Supplemental Information to the above requirement:  The user –Contractor/ Inspector  Contractor enters information on the TWA or emails a csv which, the inspector attaches to the TWA.	Required	X					VUEWorks document linking
IWA	236	System provides a comments field for the user to enter text/notes on IWA.	Required	X					Available in all VUEWorks modules

IWA	237	System allows the user to access and update inventory items on IWA (add/subtract one or multiple items used on the field) from the field, being within/out of SOM network.  Supplemental Information to the above requirement:  User – Inspector on the field (from field within/out of SOM network)  Inventory detail fields- Installation: [Inventory ID, Timing Permit Number, If Removed, Inventory Status, Location details, Power Company.]  Detailed Inventory requirements can be found under ‘Inventory’ module.	Required	X					VUEWorks Work Order, Resource Manager and Inventory modules
IWA	238	System automates the current form allows the user to enter Inventory Field Checklist details on IWA.  Supplemental Information to the above requirement:  See Supplemental Information to the above requirement: – Forms document for a screenshot of the current form.	Required	X					VUEWorks Form Designer GUI
IWA	239	System allows the user to enter comments/justification for inventory updates on IWA.	Required	X					VUEWorks Projects and Work Order modules
IWA	240	System allows the user to edit Inspection Phase/IWA details.	Required	X					VUEWorks Projects and Work Order modules
IWA	241	System allow the user to save any changes made to the Construction Phase/ IWA.	Required	X					VUEWorks Projects and Work Order modules
IWA	242	System allows the user to change workflow Status of IWA to ‘Closed-Completed or ‘Closed-No Action’’.  Supplemental Information to the above requirement:  User – Inspecting electrician of Local maintaining agency or MDOT.	Required	X					VUEWorks Projects and Work Order modules
IWA	243	System allows the user to enter a comment when changing the Status within Construction Phase.	Required	X					VUEWorks Projects and Work Order modules
IWA	244	System sends out workflow notifications to all parties involved and the requestor for all status changes within Construction Phase.	Required	X					VUEWorks Work Order module
IWA	245	System sends out workflow notification to the Asset Manager for the approval of Inventory updates when IWA Phase status is ‘Closed-Completed’.	Required	X					VUEWorks Advanced Inventory module
IWA	246	System allows the user to change IWA Phase status to ‘Closed- Approved’ when the user approves Inventory updates on IWA.  Supplemental Information to the above requirement:  The user – Asset Manager	Required	X					The MWA functionality will be available with the release of advanced workflow functions.
IWA	247	System locks the IWA for any updates when the status is ‘Closed - Approved’.	Required	X					VUEWorks Work Order module
		<b>Reports:</b>  <b>Some of the data categories to display and update in real-time per criteria/filter changes on the dashboard are-</b>  <b>Total Assets, Open Requests, Open Studies, Open Scoping, Open Design, Open Maintenance Phases, Open Construction Phases, Closed Maintenance Phases (past 30 days).</b>							



Reports	248	<p>System provides a Dashboard for the user to view real-time workflow phase details based on default (pre-defined) report criteria. -</p> <p>Supplemental Information to the above requirement:</p> <p>Some of the data categories to display and update in real-time per criteria/filter changes on the dashboard are-</p> <p>Total Assets, Open Requests, Open Studies, Open Scoping, Open Design, Open Maintenance Phases, Open Construction Phases, Closed Maintenance Phases (past 30 days).</p>	Required	X					Functionality available using VUEWorks Standard and Dynamic Reporting
Reports	249	System allows the user to view the Dashboard along with a map (shown as a separate view on the dashboard window and can be minimized).	Required	X					Functionality available using VUEWorks Standard and Dynamic Reporting
Reports	250	System allows the user to export/download the Dashboard in PDF, XLSX, and PNG formats.	Optional	X					Functionality available using VUEWorks Standard and Dynamic Reporting
Reports	251	<p>System then allows the user to change report criteria/filters on the dashboard.</p> <p>Supplemental Information to the above requirement:</p> <p>Report Criteria/Filter: CS, Spot, Region, Jurisdiction, Date Range</p>	Required	X					Functionality available using VUEWorks Standard and Dynamic Reporting
Reports	252	<p>System regenerates the dashboard view in real-time when the user changes report criteria/filter.</p> <p>Supplemental Information to the above requirement:</p> <p>A sample Dashboard –</p>	Required	X					Functionality available using VUEWorks Standard and Dynamic Reporting
Reports	253	<p>System provides functionality to create User Reports which allows users to build/configure their own reports to query the database.</p> <p>Supplemental Information to the above requirement:</p> <p>User Report menu will include a list of asset attribute fields. A sample User Report menu-</p>	Required	X					Functionality available using VUEWorks Standard and Dynamic Reporting

Reports	254	<p>System allows the user to configure each User Report (select report Category, Criteria/Filter, - Columns to include in the report). See Supplemental Information for Categories and Criteria.</p> <p>Supplemental Information to the above requirement:</p> <p>Category: CS-Spot Criteria/Filter, - Columns to include in the report: CS, Region, CS-Spot, - Location, Area, Route Name, Location Description Text Output: All CS-Spots records that meet criteria/ filters</p> <p>Category: Request Criteria/Filter, - Columns to include in the report: CS, Region, CS-Spot, - Date Created, Created By (user), Type, Linked phase instances, JN, Status, Status Date Output: All instances/records of Request Phase that meet criteria/filters.</p> <p>In addition to above, there are 'Categories' such as-</p> <p>Study Scoping Design Maintenance Construction Inventory Maintenance Cost Contract (Party) Report</p> <p>Note: For a complete list of 10 reports's 'Criteria/Filter, - Columns to include in the report:' &amp; 'Output' details of above 'Criteria', refer to 'Reports List' supplemental information document attached in the Statement of Work.</p>	Required	X					Functionality available using VUEWorks Standard and Dynamic Reporting
Reports	255	<p>System provides the user the ability to select assets from the map and use that selection set of assets to create a User Report.</p> <p>Supplemental Information to the above requirement:</p> <p>The intention of this requirement is to draw a polygon/rectangle/etc on the map to select a subset of points. (e.g., a point refers to an asset). Then, create a User Report (i.e., export subset of asset attributes) based on the selected points.</p> <p>Examples of Assets: Traffic Signal Controller Detection</p>	Optional	X					Functionality available using VUEWorks Standard and Dynamic Reporting
Reports	256	<p>System allows the user to select and configure a Map Filter to adjust the assets displayed on the map.</p> <p>Supplemental Information to the above requirement:</p> <p>Examples of Map Filters: Detection Type Controller Type Controller Firmware</p> <p>Map Filter should provide several filter criteria. Criteria in addition to above will be provided later during implementation phase of the project.</p>	Optional	X					Functionality available using VUEWorks Standard and Dynamic Reporting

Reports	257	System allows the user to select which attributes to use to symbolize the assets displaying on the map (e.g., by controller type, detection type, controller firmware, date installed).	Required	X					Functionality available using VUEWorks Standard and Dynamic Reporting
Reports	258	System allows the user to save User Report configuration.	Required	X					Functionality available using VUEWorks Standard and Dynamic Reporting
Reports	259	System allows the user to select report accessibility restrictions.  Supplemental Information to the above requirement:  A user report can be saved as public or user specific.	Required	X					Functionality available using VUEWorks Standard and Dynamic Reporting
Reports	260	System allows the user to run a report based on user role assignment and report accessibility restrictions.	Required	X					Functionality available using VUEWorks Standard and Dynamic Reporting
Reports	261	System builds report based on User Report configuration and displays per standard output format specifications.  Supplemental Information to the above requirement:  Standard template details for the output will be provided later during implementation phase of the project.	Required	X					Functionality available using VUEWorks Standard and Dynamic Reporting
Reports	262	System also displays report output on the map (in addition to the standard format output).  Supplemental Information to the above requirement:  Report output on the map displays only features/attributes that are available on the map (not all columns included in the standard format report output).	Optional	X					Functionality available using VUEWorks Standard and Dynamic Reporting
Reports	263	System allows the user to export/download any User Report in PDF or CSV formats.	Required	X					Functionality available using VUEWorks Standard and Dynamic Reporting
Reports	264	System allows the user to print a User Report.	Required	X					Functionality available using VUEWorks Standard and Dynamic Reporting
Reports	265	System allows the user to print any User Report in a custom formatted print template.  Supplemental Information to the above requirement:  System reports have custom, formatted print templates assigned to them - custom formats (for example MDOT logo) will be provided later during implementation phase of the project.	Optional	X					Functionality available using VUEWorks Standard and Dynamic Reporting
Reports	266	System allows the user to print a User Report with map.	Optional	X					Functionality available using VUEWorks Standard and Dynamic Reporting
Reports	267	System provides a pre-configured System Report for maintenance cost analytics.  Supplemental Information to the above requirement:  Information this report contains – Costs by MWA, Sum and average maintenance costs per Region, CS, Jurisdiction, Maintaining Agency, CS-Spot or maintenance costs incurred per knockdowns.  More reports details will be provided later during implementation phase of the project.	Required	X					Functionality available using VUEWorks Standard and Dynamic Reporting
Reports	268	System provides a pre-configured System Report for inspection cost analytics.  Supplemental Information to the above requirement:  Costs by IWA/date range/Local maintaining agency/CS-Spot.	Required	X					Functionality available using VUEWorks Standard and Dynamic Reporting

Reports	269	System provides a pre-configured Historical Studies Report.  Supplemental Information to the above requirement:  Information this report contains- Study Type, CS-Spot, Study Open Date, Phase-Status (previously called disposition), StudyID. Note: Studies from SAFESTAT or PW will not be migrated into new system	Optional	X					Functionality available using VUEWorks Standard and Dynamic Reporting
Reports	270	System provides a pre-configured System Report for Scope of Work (Scoping Phase) for one or more CS-Spots.	Required	X					Functionality available using VUEWorks Standard and Dynamic Reporting
SCAS Reports	271	System provides a pre-configured System Report for Electrical Devices Trouble Call.  Supplemental Information to the above requirement:  This report includes all fields from forms 0499, 0489 and material fields. Typical usage of this report will include export (send) to Finance for a input into the SCAS system.  Report criteria/filters: date range/Local maintaining agency/CS-Spot.	Required	X					Functionality available using VUEWorks Standard and Dynamic Reporting
SCAS/PDRP Reports	272	System provides a pre-configured System Report for Department Property Damage.  Supplemental Information to the above requirement:  Form 0443 Query costs based on criteria. Criteria/filters: Date range/Local maintaining agency/CS-Spot  This report is needed for property damage analytics and to see how much has been spent on knockdowns.	Required	X					Functionality available using VUEWorks Standard and Dynamic Reporting
SCAS Reports	273	System provides a pre-configured System Report for Memorandum Job – Accounts Receivable.  Supplemental Information to the above requirement:  This report queries cost share \$ amounts so, it is needed to invoice private entities. When Maintenance Phase is completed the report is sent to Finance. For fields to display and criteria/filters for this report refer form #838.	Required	X					Functionality available using VUEWorks Standard and Dynamic Reporting
SCAS Reports	274	System provides a pre-configured System Report to display summary (e.g, weekly/bi-weekly) of electrician's timecard entries.  Supplemental Information to the above requirement:  This report summarizes an electrician's work for a time period and is referenced while time is input by him/her into the SIGMA application. This is not a proposed interface with SIGMA. Rather, it is a report stating number of hours per day for each financial charge code. Electrician exports/downloads this report and compares to his/her timecard in SIGMA to ensure that charges are being accurately reflected in SIGMA.  Report criteria/filters: Weekly/bi-weekly time report, Criteria/filters: Across multiple Work Authorizations, CS-Spot. Report for timecard entry includes time, financial coding, and equipment hours.	Required	X					Functionality available using VUEWorks Standard and Dynamic Reporting
SCAS Reports	275	System provides a pre-configured System Report to show a list of the most recent signed Cost Agreements for one or more CS-Spots.	Required	X					Functionality available using VUEWorks Standard and Dynamic Reporting

Reports	276	System allows the user to batch export /download the most recent PDF version of signed Cost Agreement at multiple locations.  Supplemental Information to the above requirement:  Report criteria/filters: CS, CS-Spot, region, Maintaining Agency, Jurisdiction.	Required	X					Functionality available using VUEWorks Standard and Dynamic Reporting
Reports	277	System provides a pre-configured System Report to show the list of open (yet to be signed) Cost Agreements.  Supplemental Information to the above requirement:  This report displays all unsigned cost agreements saved in the system within a date range. Fields to display and criteria in addition to date range will be provided in future.	Required	X					Functionality available using VUEWorks Standard and Dynamic Reporting
Reports	278	System allows the user to export/download any System Report in PDF or CSV formats.	Required	X					Functionality available using VUEWorks Standard and Dynamic Reporting
Reports	279	System allows any user to view Dashboard and run System Reports unless access is specifically restricted.	Required	X					Functionality available using VUEWorks Standard/Dynamic Reporting, Dashboards and BI
		<b>Administration/Maintenance:</b>  <b>Table maintenance: Tables containing values that are populated throughout the application (e.g., a list of device types) are maintained by Admin. The purpose of this maintenance function is to make the application more configurable for MDOT and require fewer software customizations.</b>  <b>The list of maintenance tables provided below is based on the requirements (under different modules) written for the proposed system in Statement of Work (SOW). The vendor should indicate which maintenance tables will be included based on the other requirements that their System meets.</b>  <b>Requirements below provide more details for Administration/Maintenance module (is not a phase).</b>							
Admin	280	System provides the user (Admin) a GUI screen for each maintenance table. The preliminary list of tables (and fields) to be maintained is provided in the Supplemental Information.  Supplemental Information to the above requirement:  Maintenance Table Name: Material-Cost Estimate Maintenance Table Fields: Short description, Unit of Measure, MDOT Cost, Other Cost, Eng Estimate Item Number, Material Inventory Type.  (Note: A requirement specific to this table has been mentioned below the list of maintenance tables **) Note: This table is used for a lookup table on the application. The source of costs is the maintenance contract (renewed every 2 to 5 years).  Note: There are 33 total number of maintenance tables (including mentioned above). For a complete list of table names and fields, refer to the 'Maintenance Tables' supplemental information document attached in the Statement of Work.	Required	X					Functionality available using VUEWorks data linking
Admin	281	** System allows the user to upload a CSV file to create/add new entries into Material Cost Estimate table.	Required	X					Functionality available using VUEWorks data linking
Admin	282	System allows the user to add a new record to a maintenance table.	Required	X					
Admin	283	System allows the user to update an existing record of a maintenance table.	Required	X					
Admin	284	System allows the user to delete a record of a maintenance table.	Required	X					Functionality available using VUEWorks data linking
Admin	285	System displays all records of a maintenance table in a default sort order.  Supplemental Information to the above requirement:  Most recent record created at the top of the list is the default order.	Required	X					Functionality available using VUEWorks data linking

Admin	286	System allows the user to change sort order of displayed records.	Required	X					Functionality available using VUEWorks data linking
Admin	287	System allows the user to enter filter criteria and filter displayed records.	Required	X					Functionality available using VUEWorks data linking
Admin	288	System allows the user to preview and print a grid of a table (records) in pdf format.	Required	X					Functionality available using VUEWorks data linking
		<b>Data Migration</b>							
Migration	289	Vendor is responsible for migrating historical data (involving around 100 source tables/more than 100,000 records) from multiple existing data sources to the proposed asset management system.  Supplemental Information to the above requirement:  Some of the data sources: SAFESTAT database exports, ArcMap shapefile, and Microsoft Excel spreadsheets.	Required	X					During the Document and Data Review Phase of the project, DTS will determine the best approach for data migration/integration. Regardless of the approach all data will be available for use within VUEWorks.
Migration	290	Vendor is responsible to migrate only data from any source that is corresponding to functionality supported in the proposed asset management system.  Supplemental Information to the above requirement:  Any data that is specific to source system and won't support functionality in the proposed system do not need to be migrated.	Required	X					During the Document and Data Review Phase of the project DTS will determine the best approach for data migration/integration. Regardless of the approach, all data will be available for use within VUEWorks.
Migration	291	Vendor migrates spot maintenance information for all CS-Spots with Description field populated in SAFESTAT.  Supplemental Information to the above requirement:  From SAFESTAT - CS-Spot (called 'Spot' in SAFESTAT)	Required	X					During the Document and Data Review Phase of the project DTS will determine the best approach for data migration / integration. Regardless of the approach all data will be available for use within VUEWorks.
Migration	292	Vendor to identify which CS-Spots have assets and which only have studies.  Supplemental Information to the above requirement:  Will need to cross-reference between ArcMap and SAFESTAT to classify the CS-Spot as 1) study-only or 2) with assets.	Required	X					During the Document and Data Review Phase of the project DTS will determine the best approach for data migration / integration. Regardless of the approach all data will be available for use within VUEWorks.
Migration	293	Vendor migrates current asset inventory of each device based on the latest modernization design.  Supplemental Information to the above requirement:  Asset inventory include items such as controller information, interconnect means, and signal head information as an example. MDOT will provide further guidance on how to determine inventory items are included in the latest design.	Required	X					During the Document and Data Review Phase of the project DTS will determine the best approach for data migration / integration. Regardless of the approach all data will be available for use within VUEWorks.
Migration	294	Vendor migrates any work authorizations' designs performed in the past 10 years.  Supplemental Information to the above requirement:  From SAFESTAT	Required	X					During the Document and Data Review Phase of the project DTS will determine the best approach for data migration / integration. Regardless of the approach all data will be available for use within VUEWorks.
Migration	295	Vendor migrates the PDF of the most recent signed cost agreement for each CS-Spot.  Supplemental Information to the above requirement:  Currently located in physical red binders at the signal shop or in ProjectWise	Required	X					VUEWorks document linking

Migration	296	<p>Vendor migrates all of the information from the most recent signed cost agreement, including the jurisdiction percentage of each leg of each device, maintaining agency, and type of maintenance (A, B, C, D).</p> <p>Supplemental Information to the above requirement:</p> <p>Migrate from SAFESTAT and cross check with ArcMap.</p> <p>Cost Agreement / Jurisdiction / Maintaining Agency CS-Spot/CS-Spot Description</p> <p>ArcMap is most accurate for CS-Spot, CS-Spot Description.</p>	Required	X					During the Document and Data Review Phase of the project DTS will determine the best approach for data migration / integration. Regardless of the approach all data will be available for use within VUEWorks.
Migration	297	<p>Vendor migrates all most recent electrical applications and all the information specific to create the most recent electrical application, including CS-Spot, CS-Spot Description, power company contact information, cyclic wattage, steady wattage, and metered service (Y/N).</p> <p>Supplemental Information to the above requirement:</p> <p>From SAFESTAT –</p> <p>Electrical Application specific fields:</p> <p>Migrate CS-Spot, CS-Spot Description, wattages, power company contact &amp; metered or unmetered</p> <p>Note: Following Electrical Application fields are migrated as part of work authorization/ work order record so no need to migrate specific to (or along with) Electrical Application, see fields below-</p> <p>Rest of the Electrical Application form data is project specific including: Location, JN, Serv. Rqst No., Vendor Acct#, Power Co contact, Contractor, Existing &amp; New cyclic watts, Existing &amp; New steady watts, plan no., plan date, Agency to be billed for energy, agency to be billed for maintaining, authorized agent, title, MDOT approval signature, MDOT approver title, address, phone, &amp; fax are available on work authorization/ work order record.</p>	Required	X					During the Document and Data Review Phase of the project DTS will determine the best approach for data migration / integration. Regardless of the approach all data will be available for use within VUEWorks.
Migration	298	<p>Vendor migrates all Party Maintenance which includes contact information for public and private entities related to traffic signal construction and maintenance, including local agencies, power companies, etc.</p> <p>Supplemental Information to the above requirement:</p> <p>From SAFESTAT -</p> <p>Party Maintenance</p>	Required	X					Functionality available using VUEWorks Standard and Dynamic Reporting
Migration	299	<p>Vendor migrates the existing ArcMap layer to associate a geographic location to each CS-Spot and device. See the Comment column for the initial list of ArcMap Layer attributes that need to be migrated. The final list to be provided after a System has been selected.</p> <p>Supplemental Information to the above requirement:</p> <p>From ArcMap Layer-</p> <p>Sample ArcMap layer attributes need to be migrated include: AssetId, PR, PRMP, CS, CSMP, RegionName, RegionCode, CountyName, CountyCode, PendingInventory Flag, DeviceType, Sub-Device Type, SpotNumber, IntersectionDescription, Controller Installation Year, Metered Service, DeviceDescription, CsSpotNumb, LocationId, Maintaining Agency, ControllerID, and, SignalGroupingID</p>	Required	X					GIS data will be migrated during the implementation.

Migration	300	Vendor to ensure that all sub-devices are converted into stand-alone devices.  Supplemental Information to the above requirement:  Within the existing data sources, certain entities are classified as a sub-device to another device entity. The migration shall create multiple devices for instances such as this.	Required	X					Parent/Child relationships are supported in the Facilities module.
Migration	301	Vendor to search ProjectWise, identify and migrate ProjectWise location link to the folder that contains the design (.dgn) file for each CS-Spot.  Supplemental Information to the above requirement:  From ProjectWise .dgn ProjectWise Location links  Vendor will be provided with naming convention to use in search query.	Optional	X					VUEWorks document linking
Migration	302	MDOT to provide a list of ProjectWise location links for each CS-spot. Vendor to incorporate ProjectWise location link into System.	Required	X					VUEWorks document linking
Migration	303	Vendor to search ProjectWise, identify and migrate two most recent PDF Design files for each CS-Spot.  Supplemental Information to the above requirement:  From ProjectWise 2 most recent Design PDFs for each CS-Spot  Vendor will be provided with naming convention to use in search query.	Optional		X				VUEWorks document linking
Migration	304	MDOT to provide a folder containing up to two PDF design files for each CS-spot. Vendor to upload up to two PDF design files for each CS-Spot into System.	Required	X					This is accomplished through VUEWorks document linking.



Interface Summary Table

Interface	Inbound/ Outbound to the system (SigAMS)	Internal to MDOT/ External System	Fields	Priority, Frequency	Where on Application / System
JobNet	Inbound	MDOT System	Job Number, Let Date, Contractor, Project Number, Fin Sys, Phase (Fin Sys may be different per phase), Template, Scheduled Let Date, Scheduled Obligation Date, Asset IDs (Location IDs), Work (Detailed), rest of the fields TBD	Must-have, Real-time	Request screen, Scoping screen, Design screen  SigAMS reads these values from JobNet and stores in SigAMS database. Users can edit values received from JobNet but those changes are not submitted back to JobNet.
DTMB ArcGIS Server	Inbound & Outbound	SOM system external to MDOT	System must have access to create, update, and delete features (i.e., rows) in the existing Signals ArcGIS layer which resides on the DTMB ArcGIS Server. Any changes made in the System must be synchronized in real-time to the MDOT ArcGIS Server. Similarly, any changes made to signals layer on DTMB ArcGIS	Must-have, Real-time	CS-Spot screen, Scoping screen  This interface is intended to provide a feature layer from which other SOM applications (such as JobNet) can read Signals asset data. This is currently architected

Interface Summary Table

			Server must be synchronized in real-time to the System.		as a feature service created through ArcGIS server but other architecture could be explored.
LAPS	Inbound & Outbound	MDOT System	<p>Fiscal Control Number, Work Order/SWA Number, Region, TSC, LA. estimated cost of inspection, project coding, Job Number, Construction Phase/IWA number, CS.</p> <p>-----</p> <p>Fringe Percent, Material Handling Percent, overhead (read annually).</p>	<p>Must-have, Real-time</p> <p>Annually</p>	Design screen, MWA screen, IWA screen
AASHTOWare (WEBTRANSPORT)	Inbound	MDOT System	Contractor information, weighted average bid price of materials, Sub-contractor name	Nice to have, Real-time	Design screen, IWA screen
MIDB	Inbound	SOM system external to MDOT	HRMN wage rates etc..	Must have, Weekly	<p>Design Phase – Needed to develop cost estimate when construction completed by MDOT forces.</p> <p>Maintenance Phase (MWA) – Needed to track maintenance costs through Electronic Logbook.</p>

Interface Summary Table

					Construction Phase (IWA) – Needed to track costs through Electronic Logbook.
MFIVE Fleet Management System	Inbound	MDOT System	Equipment Unit #, rental Rate	Must have, Real-time	Design Phase, MWA screen.  Needed during design phase for MDOT cost estimate for SWA.  Also needed during Construction and Maintenance Phases for Electronic Logbook.
Central Signal Controls System (CSCS)	Inbound	MDOT System	Timing Permit – fields TBD	Nice to have, Real-time	Study screen, Design screen
ProjectWise	Inbound & Outbound	MDOT System	Study completion memo  Design Pdf files	Optional - System can directly read/write to/from ProjectWise  Required – migrate design PDFs into new system (one-time interface), migrate PW location link where .dgn files is stored	Map Interface (click on signal and PDF is accessible via hyperlink)  Design pdf files to be accessible globally by clicking on device to show most current plan. Migrated existing plans may not be linked to a design phase

Interface Summary Table

				for each CS-Spot.  Required – migrate most recent & signed cost agreements.	ID, but future plans will likely be linked to a design phase ID.
Global	Inbound	MDOT/DT MB System	Region, county and desc, district, road, state, Tsc information, RPI Region Code	Required Real-time  Note: System interface with Global only required if data cannot be obtained from ArcGIS server.	Across multiple screens

Note: This table has summary, supplemental information for some of migration requirements (# Migration-289 to 303) and does not cover every single requirement written under ‘Data Migration’ section of the document. Please read the section for more details.

	<b>Historical records</b>		<b>Future records</b>	
	<b>PDFs in ProjectWise (PW)</b>	<b>Records/data in SAFESTAT tables / fields</b>	<b>PDF in new System</b>	<b>Screen fields on application to capture data</b>
<b>Spot (CS-Spot)</b>	N/A	Migrate spot maintenance information for all CS-Spots with ‘Description’ field populated in SAFESTAT.	N/A	User creates by clicking on the application map interface.
<b>Asset Inventory</b>	N/A	Migrate current asset inventory of each device based on the latest modernization design.	N/A	Ability to add/edit/delete asset inventory on new application.
<b>Work Authorizations</b>	N/A	Vendor migrates any work authorizations’ designs performed in the past 10 years.	N/A	Ability to create/edit/save work authorizations on new application.
<b>Design DGN</b>	PDF – N/A	The DGN file PW location path will be migrated from SAFESTAT into the new system.	PDF – N/A	Screen fields on new application will capture data
<b>Design PDF</b>	Migrate from PW into the new system.	Design record data will be migrated from SAFESTAT into the new system.	Ability to upload pdf is a ‘must have’ on Design screen	N/A
<b>Cost Agreement PDF</b>	Migrate from PW into the new system. Currently located in physical red binders at the signal shop or in ProjectWise	Migrate the PDF of the most recent signed cost agreement for each CS-Spot.	Ability to generate PDF is a ‘must have’.	N/A
<b>Cost Agreement records</b>	No migration needed from PW.	Records/fields in SAFESTAT tables will	N/A	Screen fields on application will capture data

Note: This table has summary, supplemental information for some of migration requirements (# Migration-289 to 303) and does not cover every single requirement written under 'Data Migration' section of the document. Please read the section for more details.

		be migrated into the new system		
<b>Elec.Application</b>	No migration needed from PW.	Records/fields in SAFESTAT tables will be migrated into the new system	Ability to generate PDF is a 'must have'.	Screen fields on application will capture data



## Current SAFESTAT forms

Michigan Department  
of Transportation  
1531 (11/02)

### ELECTRICAL DEVICES INSTALLATION COMPLETION DATE

*Information required by MDOT to complete billing process*

COMPLETE AND RETURN

☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5 ☐ 6 ☐ 7

REGION:

FILE REF.

W.O. NO.

LOCATION

WORK TO BE PERFORMED BY

COMPLETION DATE

CIRCUIT NO.

CABLE NO.

PAIR NO.

WATTAGE CHANGE

☐ Yes ☐ No

UTILITY

☐ Detroit Edition ☐ Consumer Energy ☐ Other

SIGNATURE

TITLE

DATE



# Current SAFESTAT forms

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## SIGNAL STUDY SCREENING

LOCATION	DATE	JN	C.S./SPOT #	PR#
PROVIDE/PASTE LINK TO AERIAL	COUNTY	REGION/TSC	C.S.M.P.	PR M.P.
REQUESTOR'S NAME	AGENCY (IF NONE ENTER "CITIZEN")	PHONE #	DATE OF MOST RECENT STUDY	
MAJOR ROAD POSTED SPEED LIMIT	MINOR ROAD POSTED SPEED LIMIT	ROAD TYPE:		

REQUEST FOR:

REASON(S) FOR REQUEST (include any additional information)

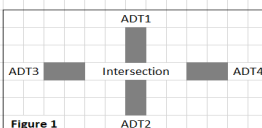
### 1. NEW TRAFFIC SIGNAL STUDY

Intersection Sight Distance in accordance with [Sight Distance Guidelines](#)

	Measured (Ft)		Required (Ft)
	Left	Right	
Northbound			
Southbound			
Eastbound			
Westbound			

**Average Daily Traffic (ADT)**

ADT 1 =	
ADT 2 =	
ADT 3 =	
ADT 4 =	



**Figure 1**

Major ADT =  #DIV/0!

Minor ADT =  0

TIME FRAME OF CRASH DATA (5 Years Typical)

NUMBER OF YEARS	START DATE	END DATE

YES: WILL LIKELY MEET WARRANT 1 ☐

NO: WILL NOT LIKELY MEET WARRANT 1 ☐

TOTAL NUMBER OF CRASHES	NUMBER OF ANGLE CRASHES	NUMBER OF SEVERE ANGLE CRASHES (Types K and A)

PEDESTRIANS CROSSING MAJOR ROAD (Per Hour)	LONGEST BACKUP ON MINOR ROAD (# of vehicles)

TIME FRAME OF CRASH DATA (5 Years Typical)			YES: WILL LIKELY MEET WARRANT 1 <input type="checkbox"/>
NUMBER OF YEARS	START DATE	END DATE	NO: WILL NOT LIKELY MEET WARRANT 1 <input type="checkbox"/>
TOTAL NUMBER OF CRASHES	NUMBER OF ANGLE CRASHES	NUMBER OF SEVERE ANGLE CRASHES (Types K and A)	
PEDESTRIANS CROSSING MAJOR ROAD (Per Hour)	LONGEST BACKUP ON MINOR ROAD (# of vehicles)		

MDOT 1597 (05/20) Page 2 of 4

### 2. LEFT TURN PHASING STUDY

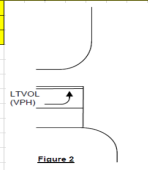
TIME FRAME OF CRASH DATA (5 Years Typical)			DATE OF MOST RECENT TIMING PERMIT (if available)	
NUMBER OF YEARS	START DATE	END DATE		
TOTAL NUMBER OF CRASHES	NUMBER OF HEAD-ON-LEFT-TURN CRASHES	MAX LEFT TURN LANE BACKUP (# of veh)		

SPEED LIMIT OF THRU TRAFFIC OPPOSING THE LEFT TURN LANE

NUMBER OF THROUGH LANES ON THE OPPOSING APPROACH

LEFT TURN VOLUME  OPPOSING VOLUME

LT VOL x OPP VOL =  0



**Figure 2**

OPP VOL (VPH) (includes through AND right turning traffic)

# through lanes on opposing approach (Don't count RT lane)

YES: MEETS LEFT TURN PHASING VOLUME THRESHOLD ☐

NO: DOES NOT MEET LEFT TURN PHASING VOLUME THRESHOLD ☐

### 3. NEW PEDESTRIAN DEVICE

PEDESTRIANS ARE CROSSING AT A MARKED CROSSWALK? (Y or N) <span style="background-color: yellow; display: inline-block; width: 50px; height: 15px;"></span>		IS THERE A CROSSING GUARD? (Y or N) <span style="background-color: yellow; display: inline-block; width: 50px; height: 15px;"></span>	
PEDESTRIANS ARE CROSSING AT A DESIGNATED SCHOOL WALKING ROUTE? (Y or N) <span style="background-color: yellow; display: inline-block; width: 50px; height: 15px;"></span>		CROSSING DISTANCE (FT) <span style="background-color: yellow; display: inline-block; width: 50px; height: 15px;"></span>	
IS THERE A NON-MOTORIZED PLAN FOR THIS COMMUNITY?			
HAS THERE BEEN COMMUNITY INVOLVEMENT WITH THIS CROSSING?			
# OF PEDESTRIANS WITH DISABILITIES, ELDERLY, OR K-12 PERSONS IN PEAK PED HOUR - EXISTING	<span style="background-color: yellow; display: inline-block; width: 50px; height: 15px;"></span>	Subtotal A	
# OF PEDESTRIANS WITH DISABILITIES, ELDERLY, OR K-12 PERSONS IN PEAK PED HOUR - GENERATED	<span style="background-color: yellow; display: inline-block; width: 50px; height: 15px;"></span>	0	
SOURCE OF GENERATED VALUES (ridership, trip gen, population, etc.)			
# OF OTHER ADULT PEDESTRIANS DURING PEAK PEDESTRIAN HOUR - EXISTING	<span style="background-color: yellow; display: inline-block; width: 50px; height: 15px;"></span>	Subtotal B	
# OF OTHER ADULT PEDESTRIANS DURING PEAK PEDESTRIAN HOUR - GENERATED	<span style="background-color: yellow; display: inline-block; width: 50px; height: 15px;"></span>	0	
SOURCE OF GENERATED VALUES (ridership, trip gen, population, etc.)			
AVERAGE DAILY TRAFFIC (ADT) ON ROADWAY <span style="background-color: yellow; display: inline-block; width: 50px; height: 15px;"></span>			
NUMBER OF PEDESTRIAN CRASHES IN THE LAST FIVE YEARS <span style="background-color: yellow; display: inline-block; width: 50px; height: 15px;"></span>			
YES: FURTHER STUDY NEEDED <input type="checkbox"/>			
NO: NO FURTHER STUDY <input type="checkbox"/>			
MAXIMUM NUMBER OF PEDESTRIANS CROSSING IN ONE GROUP <span style="background-color: yellow; display: inline-block; width: 50px; height: 15px;"></span>			
MAXIMUM WAIT FOR PEDESTRIAN TO FIND ACCEPTABLE GAP TO CROSS (SECONDS) <span style="background-color: yellow; display: inline-block; width: 50px; height: 15px;"></span>			
SUMMARIZE THESE PED AND BIKE CRASHES INCLUDING TYPES AND SEVERITIES			
DESCRIBE PREVIOUS TREATMENTS			
OTHER INFORMATION ON HAND THAT MAY BE PERTINENT: (trip generators, land use, bus use, school trips, etc.)			
NAME	DATE	SHOULD A COMPLETE STUDY BE ORDERED?	

MDOT 1597 (05/20)		Page 4 of 4
<b>2. Left Turn Phasing Study:</b>		
-Provide data of most recent timing permit if available		
-Provide crash data (5 years) and longest backup in the left turn lane(s) being requested for phasing. Backup length is measured in number of vehicles.		
-Provide crash reports (UD-10s) for all head on left turn crashes.		
-Obtain the necessary traffic counts (see Figure 2) including:		
-LTVOL=Left turning volume (vehicles per hour, during the peak hour) for the highest volume left turn approach.		
-OPPVOL=Thru volume + right turn volume (vehicles per hour, during the peak hour) on the approach opposing the subject left turn movement.		
-Record the number of thru lanes on the approach opposing the subject left-turn movement (See Figure 2)		
<b>3. New Pedestrian Device:</b>		
-Provide crossing and pedestrian data as requested for the peak pedestrian hour.		
-ADT (Average Daily Traffic) is the average number of vehicles (two-way) in a 24 hour period (vehicles per day). For pedestrian devices the ADT requested is for the roadway that is to be crossed.		
-The minimum one hour volume threshold for further study is 10 children, 10 pedestrians with disabilities, 10 elderly pedestrians, 20 other adult pedestrians, or any equivalent mix of these. This may include both existing and future pedestrian volumes.		
-Provide crash reports (UD-10s) for pedestrian and bicycle crashes.		
<b>Conclusion:</b>		
-Provide name of person filling out this form, date, and whether there is demonstrated cause to order a complete study.		

## Current SAFESTAT forms

### Planning is owner of form 1776

Michigan Department of Transportation 1776 (07/19)		TRAFFIC SURVEY REQUEST		<a href="#">Clear Form</a>		Page 1 of 2	
<b>INSTRUCTIONS:</b> Complete and return Traffic Survey Request form to "Statewide Field Operations Supervisor", Michigan Department of Transportation, Bureau of Transportation Planning, Collection Section, 425 W. Ottawa Street, P.O. Box 30050, Lansing, MI 48909 or by Clicking the "Submit" button at the bottom of the page. All fields outlined in Red must be filled in before the request can be submitted. <b>Please read instructions on Page 2.</b>				DATE SUBMITTED	DUE DATE		
				DATE REQUEST RECEIVED (Office use only)			
				STUDY NUMBER (Office use only) Data			
				CONTROL SECTION	CS MILE POINT		
				PR-NO - LRS ID	PR MILE POINT		
LOCATION (Site map must be submitted with request)				LATITUDE			
				LONGITUDE			
<input type="checkbox"/> 24 hour vehicle volumes on each of the legs				<input type="checkbox"/> Gap Study on _____			
<input type="checkbox"/> 48 hours vehicle volumes on each of the legs							
<input type="checkbox"/> 8 hour manual vehicle turning movements 7 a.m. to 9 a.m. 11 a.m. to 1 p.m. 2 p.m. to 6 p.m.  All TM's will be 3 Bin classified count unless specified.				<input type="checkbox"/> Delay Study on _____  5-Minute Interval Method Note Time and extent of backups			
<input type="checkbox"/> 8 hour manual pedestrian movements <input type="checkbox"/> Separate school children from adult							
<input type="checkbox"/> Notify Region Traffic and Safety Engineer of date survey is to be taken							
FULL NAME OF REQUESTOR							
PHONE NUMBER							
E-MAIL ADDRESS				PROGRAM	PHASE	ACTIVITY	
SPECIAL NOTES							
NAME AND E-MAIL OF PERSON OR PERSONS TO BE NOTIFIED AFTER STUDY IS COMPLETED							
<a href="#">Submit Form</a>							

# Current SAFESTAT forms

This form is internally generated by SAFESTAT



## Traffic Control Devices Layout Request

Layout Request form  
1554 pg. 1 of 1

7/14/2016

Location US2 US41 M35 (LINCOLN) @ 3RD AVE NORTH		File No. 21022-01-008	
City/Twp ESCANABA	Fips Code 26360	Control Section 21022	Mile Pt 0.25
County Delta	Approved Per CONTRACT	From Traffic Signals	To Superior Region
Operational Analysis By ADELMAN, DOUG	Initial Request Date 1/9/2015	Memo Date 01/09/15	PR # 1349006
Work Status Modernization	Layout Request Date 01/14/15		
Prepare Layout	Layout Type Routine	By Date Indicated	Coordinate With <input type="checkbox"/> CS <input checked="" type="checkbox"/> Job
Job/CS Number 125834			

TRAFFIC SIGNAL			
<b>Controller Type</b> Model: MOD 60 Mount: 16 Load Switch Base <input type="checkbox"/> Existing	<b>Operation</b> <input type="checkbox"/> Fixed-Time <input checked="" type="checkbox"/> Semi-Actuated <input type="checkbox"/> Full-Actuated	<b>Detection</b> Type: <input type="text"/> Location: Non-Locking Size:	
<b>Signal Indications</b> <input type="checkbox"/> 8 Inch <input checked="" type="checkbox"/> 12 Inch	<b>Pedestrian Indications</b> <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	<b>Countdown Ped Indications</b> <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No Crossing: All Legs Push-Button Actuated Crossing: All Legs	
<b>Phasing/Operation</b> Left Turn Phasing: Flashing Yellow Arrow <input type="checkbox"/> Fixed-Time Right Turn Green Arrow Facing: <input checked="" type="checkbox"/> Actuated			

Per base plan meeting on 11/9/16:  
 Fully actuate with hemispherical camera.  
 Tether & backplates all around (geometry N/S; sunglare E/W)  
 Potentially move controller to SW quad  
 No audible ped request

<b>Interconnect</b> Type: Broad Band Local Master At: Escanaba US-2 @ Lincoln/Ludington (21022-001)	<b>Timing</b> <input type="checkbox"/> Permit Attached <b>See:</b> <b>Pre-emption Type:</b> <input type="checkbox"/> Computer <input type="checkbox"/> Bridge <input type="checkbox"/> Fire <input type="checkbox"/> Opticom <input type="checkbox"/> Rail <input type="checkbox"/> Manual <input type="checkbox"/> EVAS <input type="checkbox"/> ITS
<b>Other Electrical Devices:</b> <input type="checkbox"/> Overhead Flashing Beacon <input type="checkbox"/> School Flashers <input type="checkbox"/> School Speed Limit <input type="checkbox"/> Advanced Warning Sign Flasher <input type="checkbox"/> Case Sign: <input type="checkbox"/> Other	<input type="checkbox"/> Fire Device <input type="checkbox"/> Keep Right Size Optical Inch

**Remarks**  
 Modernize via signal 125834: FYA's for US-2 and for 3rd Ave. (in conjunction with widening of 3rd Ave.). Tether and backplates for all spans; Keep controller on NW quad. Install (min) 2 new strain poles; Peds & PB's all legs (verify with TSC if audible requested); Install broad band remote and ethernet switch

<input type="checkbox"/> Construction Project	Job No. _____	Letting Date: _____
<input type="checkbox"/> By Work Order	<input type="checkbox"/> By Contract	<input type="checkbox"/> Federal-Aid Funds _____
Layout Prepared By: _____		Date _____

# Current SAFESTAT forms

Michigan Department  
Of Transportation  
1550 (05/12)

## TRAFFIC SIGNAL INSPECTION REPORT FOR SPOT # \_\_\_\_\_

Page 1 of 2

REGION				COUNTY		CITY/TWP	
INTERSECTION							
WORK OR MAINTAINED BY				DATE		W.O.#	
SIGNAL HEAD		QUANTITY SA-SO-BA- PM	NEW/EXISTING OR REMOVED	MATERIAL (Plastic or metal/LED)	SOLAR	ALIGNMENT	HEIGHT
12"	1W-1C						
12"	2W-1C						
12"	3W-1C						
12"	4W-1C						
12"	1W-3C						
12"	2W-3C						
12"	3W-3C						
12"	4W-3C						
FYA	12" 1W-4C						
DOG HOUSE	1W-5C						
RTGA – YA							
LTGA – YA							
12"	L. LEVEL						
PEDS	Count Down Y/N				PED POLE HT		
12" PM	1W-2C						
12" PM	2W-2C						
12"	1W-2C BA						
12"	2W-2CBA						
CONTROLLER TYPE	NEW/EXISTING OR REMOVED	OPERATING SYSTEM	CABINET MODEL #	CONTROLLER ADDRESS	CONTROL CABINET CONDITION	MECH SERIAL #	
EPAC							
EPIC							
MASTER							
FLASHER							
CONFLICT MONITOR	MMU-15LE	SERIAL #	DATE CHECKED	OTHER ITEM			
CASE SIGN		2W	4W	1W 12-27			
QUANTITY							
NEW-EXISTING OR REMOVED							

## Current SAFESTAT forms

MDOT 1550 (05/12)

Page 2 of 2

SIGN TYPE		REFLECTORIZED		FIBER OPTIC		DISAPPEARING LEGEND	
QUANTITY							
NEW/EXISTING							
POLES	QUANTITY	DOWN GUY	PAINT	RUST Y/N	SIZE 30' 40' ETC.	HAND HOLD & COVER Y/N	NEW/EXISTING OR REMOVED
					100'		
DETECTION		QUANTITY		APPROACH		NEW OR EXISTING	
DETECTOR MAKE AND MODEL							
RADIO ADDRESS/HOP PATTERN		PUSH BUTTONS WORKING <input type="checkbox"/> YES <input type="checkbox"/> NO			TIMING PERMIT IN CABINET? <input type="checkbox"/> YES <input type="checkbox"/> NO		
TIMING PERMIT DATED	TIMING CHECKED		PRE-EMPTER FOR		CHECKED		
REMARKS							
INSPECTED/REPORTED BY						DATE	

## Current SAFESTAT forms



Michigan Department of Transportation  
Operations Field Services Division  
Signal Operations Section  
Receiving/Shipping Report

Signal Shop Receiving/Shipping Form  
Pg 1 of 1

RECEIVED FOR: \_\_\_\_\_ DATE: \_\_\_\_\_

INTERSECTION: \_\_\_\_\_

SPOT # \_\_\_\_\_ -01- \_\_\_\_\_ PROJECT # \_\_\_\_\_ WORK ORDER # \_\_\_\_\_

REGION \_\_\_\_\_ CITY \_\_\_\_\_ COUNTY \_\_\_\_\_

DATE DELIVERED FROM C&G \_\_\_\_\_

TESTING START DAT \_\_\_\_\_

DATE READY FOR PICKUP \_\_\_\_\_

CABINET TYPE: EPAC \_\_\_\_\_ MODEL # \_\_\_\_\_

CONTROLLER SERIAL # \_\_\_\_\_ OPERATING SYSTEM: \_\_\_\_\_

EDI MMU EIP Serial # \_\_\_\_\_

<input type="checkbox"/> LOAD SWITCHES	<input type="checkbox"/> FLASHERS
<input type="checkbox"/> POWER SUPPLY	<input type="checkbox"/> FLASH TRANSFERS
<input type="checkbox"/> GPS	<input type="checkbox"/> RSU
<input type="checkbox"/> LOOP DETECTOR (2CH) (4 CH.)	<input type="checkbox"/> PBCU
<input type="checkbox"/> VIDEO DETECTOR (1 CAM) 2CAM)	<input type="checkbox"/> BIU
<input type="checkbox"/> VIDEO MONITOR	<input type="checkbox"/> ENCOM RADIO
<input type="checkbox"/> SENSYS SYSTEM	<input type="checkbox"/> CELL MODEM
<input type="checkbox"/> APS SYSTEM	<input type="checkbox"/> BROADBAND SYSTEM
<input type="checkbox"/> TS SWITCH	<input type="checkbox"/> ITS SWITCH
<input type="checkbox"/> GRIDSMART SYSTEM	<input type="checkbox"/> WAVETRONIX SYSTEM

CONTROLLER TO BE DELIVERED YES/NO \_\_\_\_\_ POLE HARDWARE YES/NO \_\_\_\_\_

REMARKS: \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

RECEIVED BY: \_\_\_\_\_ DATE: \_\_\_\_\_ SHIPPED BY: \_\_\_\_\_

# Current SAFESTAT forms

Signal Shop Controller & Cabinet  
Checklist: Pg 1 of 1



## CONTROLLER CABINET CHECK LIST

JOB NUMBER: \_\_\_\_\_ SPOT NUMBER: \_\_\_\_\_

LOCATION: \_\_\_\_\_

### PAPERWORK:

Timing Permit Dated: \_\_\_\_\_

IP Config \_\_\_\_\_

IP Labels \_\_\_\_\_

### MMU:

All Jumpers in Place and Soldered \_\_\_\_\_

Dual Indications Set \_\_\_\_\_

Red Fails Set \_\_\_\_\_

Y&R Clearance Set \_\_\_\_\_

FYA Set (if needed) \_\_\_\_\_

### CONTROLLER Utilities Data:

Set for TS2 \_\_\_\_\_

Ports Configured \_\_\_\_\_

### CONTROLLER Phase Data:

Vehicle Times \_\_\_\_\_

Pedestrian Times \_\_\_\_\_

Initialization \_\_\_\_\_

Recalls Set for Street \_\_\_\_\_

Phase NL Set \_\_\_\_\_

Phase Omits \_\_\_\_\_

Detector Assignments \_\_\_\_\_

### CONTROLLER Coordination Data:

Operation, Mode, & Correction \_\_\_\_\_

Offsets Correct \_\_\_\_\_

Alt. Seq Set (if needed) \_\_\_\_\_

Times & Modes Set \_\_\_\_\_

Splits Add Up to Cycle Length \_\_\_\_\_

### CONTROLLER System Data:

Check for Errors \_\_\_\_\_

### AUX:

Disappearing Case Sign \_\_\_\_\_

### CONSTRUCTION TIMING:

Initial Final Setup \_\_\_\_\_

Setup for Stage \_\_\_\_\_

What Stage \_\_\_\_\_

Jumper's Added \_\_\_\_\_

Jumper's Removed \_\_\_\_\_

### COMMENTS:

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

CHECKED BY: \_\_\_\_\_ Initials

DATE CHECKED: \_\_\_\_\_

Copy of Paperwork in Cabinet & On Door \_\_\_\_\_

### CABINET:

PBCU Wired In & Tested W/PB \_\_\_\_\_

Terminal Flash Set \_\_\_\_\_

Zone Defender Working \_\_\_\_\_

Power Supply Working \_\_\_\_\_

BIU Working \_\_\_\_\_

All Switches Working \_\_\_\_\_

All Screws/Nuts/Bolts Tight \_\_\_\_\_

Replace MMU connector Screws \_\_\_\_\_

ADD Shelf Ground & DIN Rail Ground \_\_\_\_\_

### CONTROLLER Unit Data:

Remote Flash & ALT.SEQ Set \_\_\_\_\_

Overlap Assignments Set \_\_\_\_\_

Overlap Times Set \_\_\_\_\_

Ring Structure Set \_\_\_\_\_

ALT.SEQ. Set \_\_\_\_\_

BIU Turned On \_\_\_\_\_

### CONTROLLER Time Base Coordinator:

Time & Date Set \_\_\_\_\_

Traffic Events Set \_\_\_\_\_

Time of Year Events Set (if needed) \_\_\_\_\_

Run In & Out of Flash \_\_\_\_\_

### CONTROLLER PREEMTS:

Min. Green Walk Time \_\_\_\_\_

Priority Status \_\_\_\_\_

Interval Times \_\_\_\_\_

Pedestrian Status \_\_\_\_\_

Overlap Status \_\_\_\_\_

Vehicle Status \_\_\_\_\_

ALL UNUSED PREEMPOTS ZEROED OUT \_\_\_\_\_



## Current SAFESTAT forms

IP addresses spreadsheet

IP ADDRESSES

<u>Intersection</u> M-26 @ Green Acres Rd.		<u>IP Address Range:</u> 172.17.3.161- 172.17.3.190		<u>SPOT #</u>		<u>Subnet Mask</u> 255.255.255.224	
<u>Gateway (Cell Modem) IP Address</u> 172.17.3.161		<u>Public IP Address</u> 165.180.11.173	<u>Broadcast IP Address</u> 172.17.3.191		<u>Mobile Phone</u> 517-331-2798		
<u>INT. #</u>	<u>INTERSECTION NAME</u>	<u>DEVICE</u>	<u>IP ADDRESS</u>	<u>SSID</u>	<u>RADIO MODE</u>	<u>NOTES:</u>	<u>Channel</u> <u>ChanMode</u>
1	M-26 @ Green Acres Rd.	CONTROLLER	172.17.3.162				
		MMU	172.17.3.163				
		TS SWITCH	172.17.3.164				
		ITS SWITCH	172.17.3.165				
		RSU	172.17.3.166				

L. M. M. CARD

Michigan Department  
of Transportation  
1577 (10/04)

### TRAFFIC SIGNAL TIMING RECORD

Information required by Act 51 of 1951,  
as documentation for potential litigation.

#### COMPLETE AND RETURN

<u>FILE REF.</u>	<u>LOCATION</u>	
<input type="checkbox"/> Timing installed as authorized by permit dated.		<u>DATE INSTALLED</u>
<input type="checkbox"/> Timing NOT installed as authorized. Copy of corrected permit enclosed. Explanation:		

<u>TIMING PERMIT IN CONTROLLER</u>	<u>INSTALLED BY</u>
------------------------------------	---------------------

## Current SAFESTAT forms

Some electricians input directly to SCAS instead of using this form

Michigan Department  
Of Transportation  
0499 (04/13)

## ELECTRICAL DEVICES TROUBLE REPORT

**PRINT LEGIBLY.** This form does not need to be typewritten.

<b>PRINT LEGIBLY. This form does not need to be typewritten.</b>												
LOCATION										JOB REPORT NO.		
REPORTED BY										REFERENCE NO.		
								TIME CALL RECEIVED <div style="border: 1px solid black; height: 20px; width: 100%;"></div>		DATE <div style="border: 1px solid black; height: 20px; width: 100%;"></div>		
TIME ELECTRICIAN NOTIFIED <div style="border: 1px solid black; height: 20px; width: 100%;"></div> <div style="float: right;"><input type="checkbox"/> AM <input type="checkbox"/> PM</div>		TIME ARRIVED <div style="border: 1px solid black; height: 20px; width: 100%;"></div> <div style="float: right;"><input type="checkbox"/> AM <input type="checkbox"/> PM</div>		TIME COMPLETED <div style="border: 1px solid black; height: 20px; width: 100%;"></div> <div style="float: right;"><input type="checkbox"/> AM <input type="checkbox"/> PM</div>		TOTAL TRAVEL TIME		TRUCK NO.		DATE		
(Type / ✓ One)												
TROUBLE <input type="checkbox"/> SIGNAL <input type="checkbox"/> FLASHER <input type="checkbox"/> KEEP RIGHT <input type="checkbox"/> O'HEAD LUMIN <input type="checkbox"/> OTHER		RED OUT	YELLOW OUT	GREEN OUT	NO COLOR	DON'T WALK OUT	WALK OUT	SIGNAL IN FLASH	POWER FAILURE	TIMING PROBLEM	SIGNAL LOW	OTHER (NOTE IN REMARKS)
REPORTED												
FOUND												
REMARKS												
DESCRIPTION OF WORK PERFORMED												
ELECTRICIAN(S) (SIGNATURE)										DATE		
CALL RECEIVED BY						REPORT APPROVED BY (SIGNATURE)				DATE		

Clear Form

**Note wherever financial coding is entered, we need to explore linking to SIGMA**

120

## Current SAFESTAT forms

4/24/2018

[https://mdotcfmtra.state.mi.us/interchange/scas/jobreport/dsp\\_elect\\_jobprint.cfm](https://mdotcfmtra.state.mi.us/interchange/scas/jobreport/dsp_elect_jobprint.cfm)

04/24/2018  
SAGINAW SIGN SHOP  
Region: Metro  
Location: I94BL (GRATIOT) @ MICHIGAN  
Date Job started: 04/16/2018  
Job Description: REPLACED FAULTY OUTDATED VEHICLE DETECTION(SENSYS); PRINT  
UPDATED SENSYS DATA SHEETS FOR CABINET. - NO TROUBLE REPORT 414G18

### ELECTRICIANS JOB REPORT

Doc #: 507043

Ref #:77031-01-001

County: St. Clair County

Date Job Finished: 04/16/2018

489 input to SCAS yields this output from SCAS

#### Material Costs:

Material	Quantity	Unit Cost	Amount
SENSYS VEHICLE	3	\$ 0.00	\$ 0.00
DETECTION NODE	3	\$ 0.00	\$ 0.00
SENSYS EPOXY			
		Travel Expense:	\$ 0.00
		Material Total:	\$ 0.00

#### Labor Costs:

Employee	Hrs	Object Code	Rate	Amount
GARBER,ROBERT	1.00	REG1	28.21	\$ 28.21
			Fringe Benefit:	\$ 33.01
			Labor+Fringe Total:	\$ 61.22

#### Equipment Costs:

Equipment #	Hrs	Rental Rate	Amount
042055	1.00	21.73	\$ 21.73
		Equip Total:	\$ 21.73
		Grand Total:	\$ 82.95

#### Distribution of Charges:

State Share:	(Total cost * 50%)	\$ 41.47
Local Shares:		
MARYSVILLE	(Total cost * 50%)	\$ 41.47
Overhead: (labor+equip) * 27.4% * share		\$ 6.84
Local Total:		\$ 48.31

#### Financial Coding:

TC	Index	PCA	Object Code	Grant	Phase	Project	Phase	Amount
26	63610	16100	4929	0B1094	77			\$ 41.47

Signature: \_\_\_\_\_

Date: \_\_\_\_\_

# Current SAFESTAT forms

Form 0443 pg 1 of 6

Michigan Department  
Of Transportation  
0443 (01/13)

## REPORT OF DEPARTMENT PROPERTY DAMAGE

Information required by Act 17, P.A. of 1925.  
Failure to supply this information will result in non-payment for service.

DISTRIBUTION:  
REGION MAINT. ENGR.  
YOUR FILES

ACCIDENT/INCIDENT REPORT NUMBER 170011726		OWNER/DRIVER Tamara Renee Bennett		ACCIDENT DATE 6-14-17		
TRUNKLINE NUMBER BL I-69(Griswold) @ 16th St.		JOB/PROJECT NUMBER 77023-01-019		POLICING AGENCY Port Huron PD		
AGENCY MAKING REPAIRS (List all agencies involved) MDOT- Bay Region Signal Shop				CONTACT PERSON Scott Holzhei		
				AGENCY PHONE NO. 989-239-6392		
WORK COMPLETED, CHECK APPROPRIATE BOX						
<input type="checkbox"/> Guardrail <input type="checkbox"/> Attenuator <input type="checkbox"/> Concrete wall <input checked="" type="checkbox"/> Signals <input type="checkbox"/> Sign <input type="checkbox"/> Cable Guardrail <input type="checkbox"/> Bridge <input type="checkbox"/> Lane closure <input type="checkbox"/> Fences <input type="checkbox"/> Other						
CHECK APPROPRIATE BOX: <input checked="" type="checkbox"/> Repair <input type="checkbox"/> Replace <input checked="" type="checkbox"/> Actual costs <input type="checkbox"/> Estimated costs						
Labor	INSTALLER BY SHOP IDENTIFIER NUMBER		DATES WORKED	HOURS	RATE	DIRECT LABOR CHARGES
	Scott Holzhei		6-14-17	5	\$30.04	\$150.20
	Rob Garber		6-14-17	5	\$27.39	\$136.95
	Scott Holzhei		6-14-17	5	\$45.06	\$225.30
	Rob Garber		6-14-17	3	\$41.09	\$123.27
	Pat Andres		6-14-17	5	\$27.39	\$136.95
	Scott Myers		6-14-17	4	\$27.39	\$109.56
	DIRECT LABOR COST TOTAL					
Equipment	NUMBER OR DESCRIPTION		DATES WORKED	HOURS	RATE	DIRECT EQUIP. CHARGES
	03-1216		6-14-17	10	\$7.68	\$76.80
	12-2010		6-14-17	10	\$4.50	\$45.00
	04-2045		6-14-17	5	\$19.79	\$98.95
	04-0394		6-14-17	9	\$13.21	\$118.89
	04-2029		6-14-17	4	\$19.79	\$79.16
	DIRECT EQUIPMENT COST TOTAL					\$418.80
Materials	ITEM DESCRIPTION		UNIT	COST/UNIT		DIRECT MATERIAL CHARGES
	2-1/2" LB body w/ cover & gasket		2	\$132.48		\$264.96
	Misc.conduit fittings - 1-1/4", 1-1/2", 2-1/2"		1	\$20.00		\$20.00
	3M no.33 tape		4	\$4.13		\$16.52
	8 load bay Eagle actuated controller cabinet		1	\$9,887.00		\$9,887.00
	Encom 5100 serial 900mhz radio w/FSK		1	\$2,255.00		\$2,255.00
	Pelco SE-0126 cabinet bracket		2	\$15.90		\$31.80
DIRECT MATERIAL COST TOTAL						
TOTAL DIRECT COSTS						
INDIRECT COSTS						
LABOR ADDITIVE (fringe) %		% x	DIRECT LABOR COST TOTAL		=	
MATERIAL HANDLING %		% x	DIRECT MATERIAL COST TOTAL		=	
OVERHEAD %		% x	TOTAL DIRECT COSTS		=	
TOTAL INDIRECT COSTS						
TOTAL COST (TOTAL DIRECT COSTS + TOTAL INDIRECT COSTS)						\$14,121.87
SIGNATURE Scott Holzhei			TO BE FILLED OUT BY ARU ONLY			
TITLE Electrician E11			LESS DEPRECIATION (On Replacement Cost Only) \$			
DATE 08/16/2017			MAIN OFFICE CHARGE \$			
			GRAND TOTAL \$			

# Current SAFESTAT forms

MDOT 0443 (01/13)

## *Reference Guide for completing Michigan Department of Transportation*

### *Report of Department Property Damage Form 443*

- The calculations are automatic when the form is completed on line.

**ACCIDENT/INCIDENT REPORT NUMBER** - Can be found in the upper right corner of the Traffic Crash Report.

**OWNER/DRIVER** – Can be found in the center of the Traffic Crash Report.

**ACCIDENT DATE** - Can be found in the upper left corner of the Traffic Crash Report.

**TRUNKLINE NUMBER** - Can be found in the center of the Traffic Crash Report.

**JOB/PROJECT NUMBER** – Applies if 3<sup>rd</sup> party contractor does repairs.

**POLICING AGENCY** - Can be found in the top middle of the Traffic Crash Report.

**AGENCY MAKING REPAIRS** - The garage or the County Road Commission making the repairs.

**CONTACT PERSON** - Supervisor overseeing trunkline repairs that can answer any questions regarding the items that were filled out on form 443.

**AGENCY PHONE NUMBER** - The garage phone number or county road commission phone number where the contact person can be reached.

#### **WORK COMPLETED**

- Check appropriate box of what was repaired.

**CHECK APPROPRIATE BOX:** Check only one box.

- Repair: Less than whole item being repaired
- Replacement: The ENTIRE unit has been taken down and replaced with all new material
- Actual Costs: Repairs/replacement to damage caused by the above accident have been completed. The cost is itemized below.
- Estimated Costs: Below is an estimated cost of damage caused by the accident above.



## Current SAFESTAT forms

MDOT 0443 (01/13)

### Labor

**INSTALLER BY SHOP IDENTIFIER** - Employee number, Installers initials, or TMW number as long as the information on the 443 form can be identified to a specific individual. This will reduce the number of harassing phone calls to these individuals.

**DATES WORKED** - These would be all the dates you were at this site.

**HOURS** - This would be the hours you were at the site.

**RATE** - This is the hourly rate.

**DIRECT LABOR CHARGES** - Hours worked multiplied by rate equals direct labor charges.

**DIRECT LABOR COST TOTAL** – Total of all direct labor charges.

### Equipment

**NUMBER OR DESCRIPTION** - Equipment number or description.

**DATES WORKED** - The date the equipment was at the job site.

**HOURS** - Hours worked on site.

**RATE** - Equipment rental rate which is recalculated annually.

**DIRECT EQUIPMENT CHARGE** - Hours multiplied by rate equals direct equipment charges.

**DIRECT EQUIPMENT COST TOTAL** – Total of all direct equipment charges.

### Materials

**ITEM DESCRIPTION** - Description if the item(s) used for the repair or replacement.

**UNIT** - The number of units used on this particular job.

**COST/UNIT** - Cost of one unit.

**DIRECT MATERIAL CHARGES** - Units multiplied by cost per unit equals direct material charges.

**DIRECT MATERIAL COST TOTAL** – Total of all direct material charges.

## Current SAFESTAT forms

Form 0443 pg 6 of 6

MDOT 0443 (01/13)

**TOTAL DIRECT COST**- Add direct labor charges plus direct equipment charges plus direct material charges equals total direct cost.

### Indirect Costs

**LABOR ADDITIVE** - Multiply Labor Additive rate by direct labor charges.

MDOT Current rate can be found at:

<http://inside.michigan.gov/sites/mdot/finance/fod/Rates/Forms/AllItems.aspx>

\* County Road Commission - refer to State Trunkline Maintenance Contract.

**MATERIAL HANDLING** - Multiply material handling charge percentage times total direct material charges to equal the indirect material charges.

\*MDOT repair facilities do not charge a handling fee. Only County Road Commissions have handling charges as established in contract agreement.

**OVERHEAD** – Multiply overhead rate by the direct costs.

\*For County Road Commission, the overhead rate is set by the county according to a formula in the State Trunkline Maintenance Contract.

**TOTAL INDIRECT COST** - Total of indirect labor charges plus indirect material charges plus indirect cost for overhead

**TOTAL COST TO REPAIR/REPLACE** -Total of the direct charges plus the total indirect charges.

\*\*Additional pages can be added to include more space for Labor, Equipment and Materials and a description of articles or service rendered. See additional pages online.

**SIGNATURE** – Individual completing form.

**TITLE** – Job title of individual completing form.



# Current SAFESTAT forms

For planned work not covered by maintenance agreement with a local agency

Michigan Department  
Of Transportation  
0838 (08/14)

## MEMORANDUM JOB REPORT ACCOUNTS RECEIVABLE

Page 1 of 4

PLEASE PRINT ALL INFORMATION. USE REVERSE SIDE FOR ADDITIONAL ITEMS. DO NOT COMPLETE SHADED AREAS

DESCRIPTION OF ARTICLES OR SERVICE RENDERED/LOCATION					JOB NO.	
					PERMIT NO.	
					APPLICATION NO. / CASE NO.	
DIVISION PROVIDING SERVICE		DATE JOB STARTED	DATE JOB COMPLETED	REFERENCE/PROJ. NO.	FEDERAL ID / EMPLOYER ID NO.	
<b>BILL TO</b>	NAME					ATTENTION
	STREET ADDRESS					
	CITY	STATE	ZIP CODE	PHONE NO. ( )		
<b>LABOR</b>	NAME OR IDENTIFIER REFERENCE	DATE(S) WORKED	HOURS	RATE	DIRECT LABOR COST	
Instructions						
						DIRECT LABOR COST TOTAL
<b>EQUIPMENT</b>	NUMBER OR DESCRIPTION	DATE(S) USED	HOURS	RATE	DIRECT EQUIPMENT COST	
Instructions						
						DIRECT EQUIPMENT COST TOTAL
<b>MATERIALS</b>	ITEM DESCRIPTION	UNIT	COST/UNIT		DIRECT MATERIALS COST	
Instructions						
						DIRECT MATERIAL COST TOTAL
						TOTAL DIRECT COSTS
INDIRECT COST TO BE COMPLETED BY FINANCIAL OPERATIONS DIVISION (FOD)						
LABOR ADDITIVE %	% X	DIRECT LABOR COST TOTAL		=	\$0.00	
OVERHEAD %	% X	TOTAL DIRECT COSTS		=	\$0.00	
REGION OFFICE		TOTAL INDIRECT COST			\$0.00	
		TOTAL COST = TOTAL DIRECT COST + MATERIALS + TOTAL INDIRECT COST			\$0.00	
SIGNATURE		TITLE		PHONE NUMBER		
PRINTED NAME		E-MAIL		DATE		

CLEAR FORM

# Current SAFESTAT forms

MDOT 0838 (08/14)

Page 4 of 4

## Reference Guide for completing Michigan Department of Transportation Memorandum Job Report Form 0838.

- The calculations are automatic when the form is completed online.
- Make sure you sign the form and include your Region Office, printed name, title, phone number, e-mail and the date.

**Description of articles or service rendered — Location** — Provide information that can be used as description on invoice to explain charges.

**Job No.** — Complete if applicable.

**Permit No.** — Complete if applicable.

**Application No./Case Number** — Complete if applicable.

**Division Providing Service** — Name of Division providing services for which we are requesting reimbursement.

**Date Job Started and Date Job Completed** — Date job started and completed.

**Reference/Project No.** — Identifying information and if work relates to a project, indicate project and phase numbers.

**Federal ID/Employer ID No.** — Reference number helpful in collection efforts or refunds.

**Bill To** — Name and mail address of responsible party where invoice needs to be mailed.

**Attention** — Provide an individual's name if the invoice needs to be sent to their attention for approval and/or payment.

**Phone No.** — The vendor's phone number to call if there are problems collecting the invoice.

### LABOR

**Name or identifier reference** — Employee's name and Employee Identification Number (EID) as long as the information on Form 0838 can be identified to a specific individual.

**Date(s) worked** — Date(s) worked on this specific job.

**Hours** — Hours worked on this specific job.

**Rate** — The hourly rate for each individual.

**Direct labor cost** — Total of all direct labor costs which automatically calculates if form completed online.

**Direct labor cost total** — Total of all direct labor costs which automatically calculates if form completed online.

### EQUIPMENT

**Number or description** — List the various equipment numbers or description of the equipment used on job.

**Date(s) used** — The date(s) the equipment was used.

**Hours** — Hours the equipment was used.

**Rate** — Schedule C Equipment rental rate which is recalculated annually can be found on the Maintenance Services web page.

**Direct equipment cost** — Hours multiplied by rate equals direct equipment costs which calculates automatically if form completed online.

**Direct equipment cost total** — Total of all direct equipment costs which calculates automatically if form completed online.

### MATERIALS

**Item description** — Description of the item(s) used for which the customer is to be charged.

**Unit** — The number of units used on this particular job.

**Cost/unit** — Units multiplied by cost per unit equals direct material costs which automatically calculates if completed online.

**Direct material costs total** — Total of all direct material costs which automatically calculates if completed online.

**Total direct costs** — Total of direct labor costs + direct equipment costs + direct materials costs = total direct costs which automatically calculates if completed online.

### INDIRECT COST TO BE COMPLETED BY FINANCIAL OPERATIONS DIVISION (FOD)

**This section is to be completed by FOD.**

**Labor Additive** — Multiply labor additive rate by direct labor cost total, which calculates automatically if completing form online.

**Overhead** — Multiply overhead rate by the total direct costs, which calculates automatically if completing form online.

**Total indirect cost** — Is total direct labor cost after labor additive is added + total direct cost after overhead is added which calculates automatically if completing form online.

**Total cost** — The sum of total direct costs + total indirect costs, which calculates automatically if completing form online.

**Signature** — Individual completing form.

**Title** — Job title of individual completing form.

**Phone No.** — Phone number of individual we can call if we have any questions.

**Printed Name** — Print the name of the person signing the form.

**E-mail** — Email address of person completing the form.

**Date** — Date signing form.

## TRANSPORTATION WORK AUTHORIZATION

TYPE OF WORK NEW FIRE DEVICE		FISCAL CONTROL #	
WORK TO BE PERFORMED BY MDOT - GR RAPIDS SPECIAL CREW & MDOT - LANSING SIGNAL SHOP		DIVISION AUTH # 17592	
IF NOT UNDER TERMS OF TRUNKLINE MAINTENANCE CONTRACT, ENTER CONTRACT NUMBER		CS # 62032	
LOCATION M37/M20 (EVERGREEN) @ WASHINGTON STREET		PR # 711907	
		JOB # 208207	TRUNKLINE # M37, M20
TOWNSHIP, CITY OR VILLAGE WHITE CLOUD	COUNTY NEWAYGO	SIGNAL OR POLE # 62032-08-002	REGION 3
STARTING DATE 03/13/2018	ESTIMATED COMPLETION DATE 11/30/2019	DATE WORK COMPLETED	
		DIVISION TSMO/TRAFFIC SIGNALS UNIT	

## ESTIMATED PROJECT COST

A (1) LABOR	\$3,542
B MATERIALS	\$31,193
C EQUIPMENT	\$1,168
D OVERHEAD *	
E OTHER	
TELEPHONE	
POWER	
DEPT. OF LABOR	
F LESS:	
Salvage Credits	
G Total Est. Cost	\$35,903
ESTIMATED BY	EC
PREPARED BY	EC

## DESCRIPTION OF WORK TO BE PERFORMED

All materials incorporated in the work will be accepted on the basis of a visual inspection by a representative of the performing agency. The Department retains the right to sample and test at its option.

THIS WORK IS TO BE PERFORMED DURING THE PERIOD 06/2019 THROUGH 11/2019 WITH THE CLOSING DATE BEING SEPTEMBER 30.

ANY WORK NOT STARTED BY THIS DATE OR WORK IN PROGRESS BEYOND THIS DATE MUST BE CHARGED TO NEXT YEAR'S PROGRAM USING PROJECT / PHASE NUMBERS.

RETAIN ALL REMAINING CODING INFORMATION IN THIS INSTANCE (FISCAL CONTROL #, DIVISION AUTHORIZATION #, PCA NO., JOB #, ETC.)

PLEASE BE AWARE OF DOCUMENTATION INFORMATION CHANGE REQUIREMENTS FOR TWA PACKAGES:

- PLEASE HAVE THE ELECTRICIAN THAT DID THE WORK FILL OUT THE MIDDLE SECTION OF THE INSPECTION AND COMPLETION REPORT. ANSWER THE TWO QUESTIONS ABOUT MAINTENANCE OF TRAFFIC. AFTER THE MIDDLE SECTION IS FILLED OUT; THE ELECTRICIAN WILL HAVE THEIR SUPERVISOR FILL OUT THE BOTTOM SECTION. ONCE THE ENTIRE DOCUMENT HAS BEEN FILLED OUT, PLEASE SEND IT BACK TO MDOT/PLACED IN PROJECTWISE (ERIK SMALLEY) FOR OUR RECORDS.
- PLEASE FILL OUT THE SIGNAL FORCE ACCOUNT DAILY FIELD RECORD FOR WORK ACTIVITIES COMPLETED IN THE DURATION OF THE PROJECT NEED TO BE SENT BACK TO MDOT/PLACED IN PROJECTWISE.
- COPIES OF TIME SHEETS SHOWING TIME CHARGED AGAINST THIS JN/WORK ORDER NEED TO BE SENT BACK TO MDOT/PLACED IN PROJECTWISE.
- COPIES OF INVOICES FOR PURCHASING ANY EQUIPMENT FOR THIS JN/WORK ORDER NEED TO BE SENT BACK TO MDOT/PLACED IN PROJECTWISE.
- COPIES OF CATALOG CUTS FOR ANY MATERIAL USED IN THE PROJECT NEED TO BE SENT BACK TO MDOT/PLACED IN PROJECTWISE.

**PLEASE NOTE** An overrun of the estimate in excess of 10% (except an overrun less than \$100) must either have prior approval of the authorizing division or must be accompanied by an explanation outlining unforeseeable difficulties encountered while performing the work which resulted in the overcharge.

PERCENT	NAME/ADDRESS OF THOSE PARTICIPATING IN COSTS	FEDERAL PARTICIPATION - ACTION BY FHWA OR
100.00	FHWA	APPROVED BY
* 100.00	MDOT	DATE
		NOT ELIGIBLE
		DATE
		SEE LETTER /PR 1240 DATED 11/01/2001 (Attach copy if available)
		Required only when work is to be performed by direct or contract maintenance forces.
	* NON-PARTICIPATION BY FHWA IN OVERHEAD COSTS	REVIEWED BY (Traffic Signal Design)
		DATE
AUTHORIZED BY:		DATE

LDPR PROFILE	FUND	DEPT	UNIT	APPR UNIT	LOCATION	ACTIVITY	PROGRAM	PHASE	AMOUNT
67200	1116	591	6720	59730	1L02	6700	208207CON		\$35,903
67200	1116	591	5720	59730	1L02	5700	208207CON		\$250

**TRANSPORTATION  
WORK AUTHORIZATION**  
**(Continuation Sheet)**

FISCAL CONTROL #		DIVISION AUTH. #	
		17592	
CS#		PR #	
62032		711907	
JOB #		TRUNKLINE #	
208207		M37, M20	
SIGNAL / POLE #	REGION	DIVISION	
62032-08-002	3	T AND S	

NOTES:

6 PLEASE REFERENCE THE MDOT PLAN NO. 62032 - 08 - 002 DATED 02/05/2018.

7 INSTALL ESTIMATE ITEMS.

- 2 ECH 1W-1C-SO-12 (LED)
- 1 ECH Pushbutton and Sign (R10-3E)
- 32 LFT Wood Post 4"x 6"
- 2 ECH 40'4 Wood Pole
- 40 LFT Conduit, DB, 1, 1 1/2 inch
- 40 LFT 600V. 1-2/C#16 P.J. CABLE SHIELDED
- 1 ECH Antenna, Yagi 10 DB
- 50 SFT Sign, Type IIIB
- 3 ECH Wireless, Intercn, Sign,Solar,Mast/Remt
- 2 ECH Wood Pole, Fit Up, TS Cable
- 2 ECH Sign Mtd Flsh Beacon, Solar Power
- 4 ECH Wood Post Foundation
- 3 ECH Antenna SOP Mounting Kit
- 2 ECH Flsh Beacon, Contr & Cab S.S.

NOTES:

8 THIS WORK REQUEST PER GOLDENROD DATED 08/28/2017 FROM GRAND REGION TO TRAFFIC SIGNALS.

## MATERIAL COSTS

[illegible]**TOTAL MATERIAL COST**

\$31,193

## LABOR COSTS

PERSONNEL	RATE HOUR	EST. HOURS	EST. COST
ELECTRICIANS	\$50	24	\$1,200
TRAVEL TIME	\$50	8	\$400
TRAVEL EXPENSE (\$110.00 PER MAN PER DAY)			\$56
LABOR ADDITIVE 117.86%			\$1,886

**TOTAL LABOR COST**

\$3,542

EQUIPMENT COSTS	RATE HOUR	EST. HOURS	EST. COST
TRUCKS	\$42.00	24	\$1,008
CRANE TRUCK	\$20.00	8	\$160
	\$0.00	0	\$0

TOTAL EQUIPMENT COST

\$1.168

STATE OF MICHIGAN		OTHER COST	0
DEPARTMENT OF TRANSPORTATION		POWER COMPANY COST	0
		TELEPHONE COST	0
		DEPT. OF LABOR COST	0
		<b>SUB TOTAL</b>	<b>\$35,903</b>
		*OVERHEAD 0 %	\$0
		<b>SUB TOTAL</b>	<b>\$35,903</b>
		CREDIT	0
ESTIMATED BY EC	DATE: 02/20/2018	<b>FINAL TOTAL ESTIMATED COST</b>	<b>\$35,903</b>

**\*NON PARTICIPATION BY FHWA**

# TRANSPORTATION WORK AUTHORIZATION INSPECTION AND COMPLETION REPORT

Attach to Performing Agency's Copy of Work Authorization

TYPE OF WORK <div style="display: flex; justify-content: space-between;"><span>NEW</span><span>FIRE DEVICE</span></div>		FISCAL CONTROL #	
WORK TO BE PERFORMED BY <div style="display: flex; justify-content: space-between;"><span>MDOT - GR RAPIDS SPECIAL CREW</span><span>&amp; MDOT - LANSING SIGNAL SHOP</span></div>		DIVISION AUTH # 17592	
IF NOT UNDER TERMS OF TRUNKLINE MAINTENANCE CONTRACT, ENTER CONTRACT NUMBER		CS # 62032	
LOCATION M37/M20 (EVERGREEN) @ WASHINGTON STREET		PR # 711907	
		JOB # 208207	TRUNKLINE # M37, M20
		SIGNAL OR POLE # 62032-08-002	REGION 3
TOWNSHIP, CITY OR VILLAGE WHITE CLOUD	COUNTY NEWAYGO	DIVISION TRAFFIC AND SAFETY/TRAFFIC SIGNALS UNIT	

## WORK COMPLETION AND MATERIALS APPROVAL

The following information is to be supplied by the performing agency upon completion of the work and forwarded to the District/Region office of the originating Division. If any deviation from work description was necessary, explain in detail under Remarks.

All work specified on the Authorization was completed on  (Date)

SIGNATURE	TITLE	DATE

### REMARKS:

Describe the Maintaining Traffic that was used:

Traffic Control was done in accordance with MMUTCD. Yes or No (circle one)

## INSPECTION AND APPROVAL

The following information is to be supplied by the Region/TSC office.

I certify that installation was inspected and approved on  (Date) and that the traffic signal operation was in accordance with the authorized work.

SIGNATURE	TITLE	DATE

### REMARKS:

**PLEASE FORWARD TO TRAFFIC SAFETY DIVISION, TRAFFIC SIGNALS UNIT  
UPON COMPLETION OF INSPECTION AND APPROVAL**

CONTRACTOR				CONTROL SECTION ID	
STREET ADDRESS				JOB NO.	
CITY	STATE	ZIP	FEDERAL NO.		ROUTE
WORK PERFORMED BY (Subcontractor):			WORK ORDER NO.		AUTH. NO.
STREET ADDRESS			WORK AUTH. BY		
CITY	STATE	ZIP	DATE WORK PERFORMED	TYPE OF WORK	

[illegible][illegible]

Brief description of activities and remarks:

The labor, materials and equipment used this date on the specified work operations are correct.

CONTRACTOR		MICHIGAN DEPARTMENT OF TRANSPORTATION	
SIGNATURE	DATE	PREPARED BY	DATE
132			

## SKETCHES, COMPUTATIONS, REMARKS, ETC.



**ELECTRICAL DEVICES INSTALLATION  
COMPLETION DATE**

*Information required by MDOT to complete billing process*

COMPLETE AND RETURN

1 2 3 4 5 6 7

REGION:		FILE REF.		W.O. NO.	
LOCATION					
WORK TO BE PERFORMED BY					
COMPLETION DATE		CIRCUIT NO.			
CABLE NO.		PAIR NO.			
WATTAGE CHANGE Yes No		UTILITY Detroit Edition Consumer Energy Other			
SIGNATURE		TITLE		DATE	

**ELECTRICAL DEVICES INSTALLATION  
COMPLETION DATE**

*Information required by MDOT to complete billing process*

COMPLETE AND RETURN

1 2 3 4 5 6 7

REGION:		FILE REF.		W.O. NO.	
LOCATION					
WORK TO BE PERFORMED BY					
COMPLETION DATE		CIRCUIT NO.			
CABLE NO.		PAIR NO.			
WATTAGE CHANGE Yes No		UTILITY Detroit Edition Consumer Energy Other			
SIGNATURE		TITLE		DATE	

**ELECTRICAL DEVICES INSTALLATION  
COMPLETION DATE**

*Information required by MDOT to complete billing process*

COMPLETE AND RETURN

1 2 3 4 5 6 7

REGION:		FILE REF.		W.O. NO.	
LOCATION					
WORK TO BE PERFORMED BY					
COMPLETION DATE		CIRCUIT NO.			
CABLE NO.		PAIR NO.			
WATTAGE CHANGE Yes No		UTILITY Detroit Edition Consumer Energy Other			
SIGNATURE		TITLE		DATE	

**ELECTRICAL DEVICES INSTALLATION  
COMPLETION DATE**

*Information required by MDOT to complete billing process*

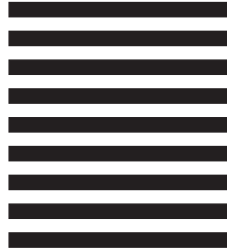
COMPLETE AND RETURN

1 2 3 4 5 6 7

REGION:		FILE REF.		W.O. NO.	
LOCATION					
WORK TO BE PERFORMED BY					
COMPLETION DATE		CIRCUIT NO.			
CABLE NO.		PAIR NO.			
WATTAGE CHANGE Yes No		UTILITY Detroit Edition Consumer Energy Other			
SIGNATURE		TITLE		DATE	



NO POSTAGE  
NECESSARY  
IF MAILED  
IN THE  
UNITED STATES



# BUSINESS REPLY MAIL

FIRST-CLASS MAIL PERMIT NO. 1312 LANSING, MI

POSTAGE WILL BE PAID BY ADDRESSEE

MICHIGAN DEPARTMENT OF TRANSPORTATION  
TRAFFIC & SAFETY DIVISION  
TRAFFIC SIGNALS UNIT  
PO BOX 30050  
LANSING MI 48909-9791



NO POSTAGE  
NECESSARY  
IF MAILED  
IN THE  
UNITED STATES



# BUSINESS REPLY MAIL

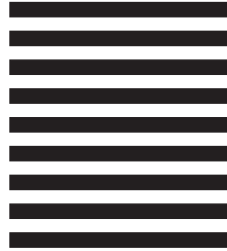
FIRST-CLASS MAIL PERMIT NO. 1312 LANSING, MI

POSTAGE WILL BE PAID BY ADDRESSEE

MICHIGAN DEPARTMENT OF TRANSPORTATION  
TRAFFIC & SAFETY DIVISION  
TRAFFIC SIGNALS UNIT  
PO BOX 30050  
LANSING MI 48909-9791



NO POSTAGE  
NECESSARY  
IF MAILED  
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UNITED STATES



# BUSINESS REPLY MAIL

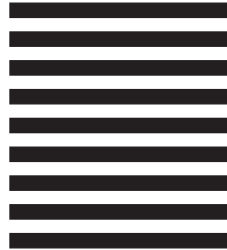
FIRST-CLASS MAIL PERMIT NO. 1312 LANSING, MI

POSTAGE WILL BE PAID BY ADDRESSEE

MICHIGAN DEPARTMENT OF TRANSPORTATION  
TRAFFIC & SAFETY DIVISION  
TRAFFIC SIGNALS UNIT  
PO BOX 30050  
LANSING MI 48909-9791



NO POSTAGE  
NECESSARY  
IF MAILED  
IN THE  
UNITED STATES



# BUSINESS REPLY MAIL

FIRST-CLASS MAIL PERMIT NO. 1312 LANSING, MI

POSTAGE WILL BE PAID BY ADDRESSEE

MICHIGAN DEPARTMENT OF TRANSPORTATION  
TRAFFIC & SAFETY DIVISION  
TRAFFIC SIGNALS UNIT  
PO BOX 30050  
LANSING MI 48909-9791



**Traffic Control Devices  
Layout Request**

8/28/2017

<b>Location</b> M37/M20 (Evergreen) @ Washington Street				<b>File No.</b> 62032-08-002	
<b>City/Twp</b> WHITE CLOUD		<b>Fips Code</b> 86680		<b>Control Section</b> 62032	<b>Mile Pt</b> 0.723
<b>Approved Per</b> GOLDENROD		<b>From</b> Traffic Signals		<b>To</b> Grand Region	
<b>Operational Analysis By</b> Seeger, William				<b>Initial Request Date</b> 8/9/2016	
<b>Work Status</b> New				<b>Memo Date</b> 08/28/17	
				<b>PR #</b> 0711907	
				<b>Layout Request Date</b> 08/28/17	
<b>Prepare Layout</b>		<b>Layout Type</b> Routine	<b>By Date Indicated</b>	<b>Coordinate With</b> <input checked="" type="checkbox"/> CS <input type="checkbox"/> Job	
				<b>Job/CS Number</b> 62032	

**TRAFFIC SIGNAL**

<b><u>Controller Type</u></b>		<b><u>Operation</u></b>		<b><u>Detection</u></b>	
Model: _____		<input type="checkbox"/> Fixed-Time		Type: _____	
Mount: _____		<input type="checkbox"/> Semi-Actuated		Location: _____	
<input type="checkbox"/> Existing		<input type="checkbox"/> Full-Actuated		Size: _____	
<b><u>Signal Indications</u></b>		<b><u>Pedestrian Indications</u></b>		<b><u>Countdown Ped Indications</u></b>	
<input type="checkbox"/> 8 Inch <input checked="" type="checkbox"/> 12 Inch		<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No		<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	
		Crossing: _____			
		Push-Button Actuated Crossing: _____			
<b><u>Phasing/Operation</u></b>					
Left Turn Phasing: _____				<input type="checkbox"/> Fixed-Time	
Right Turn Green Arrow Facing: _____				<input type="checkbox"/> Actuated	

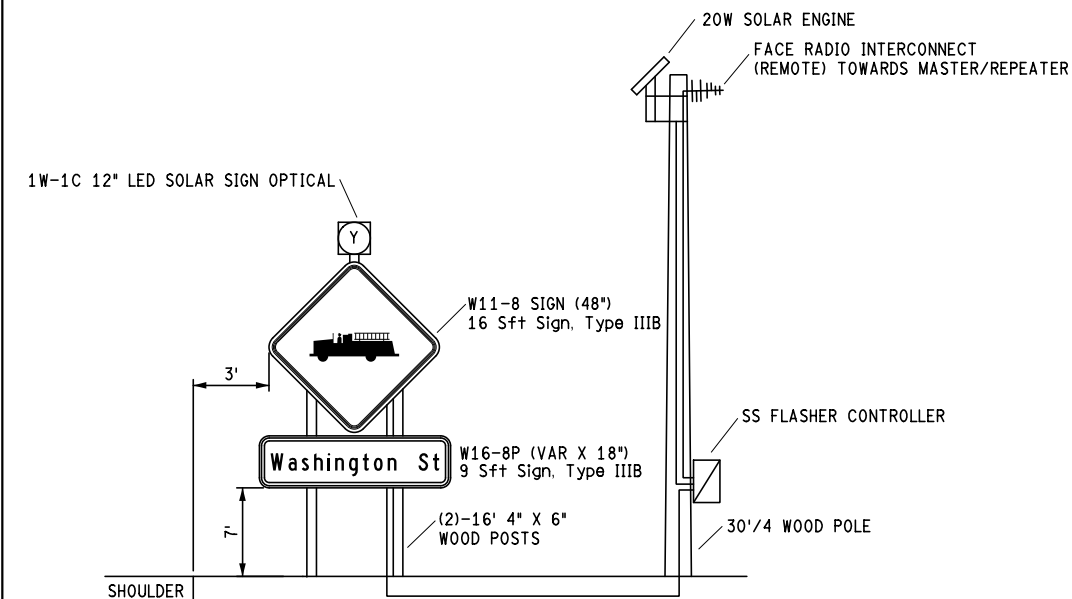
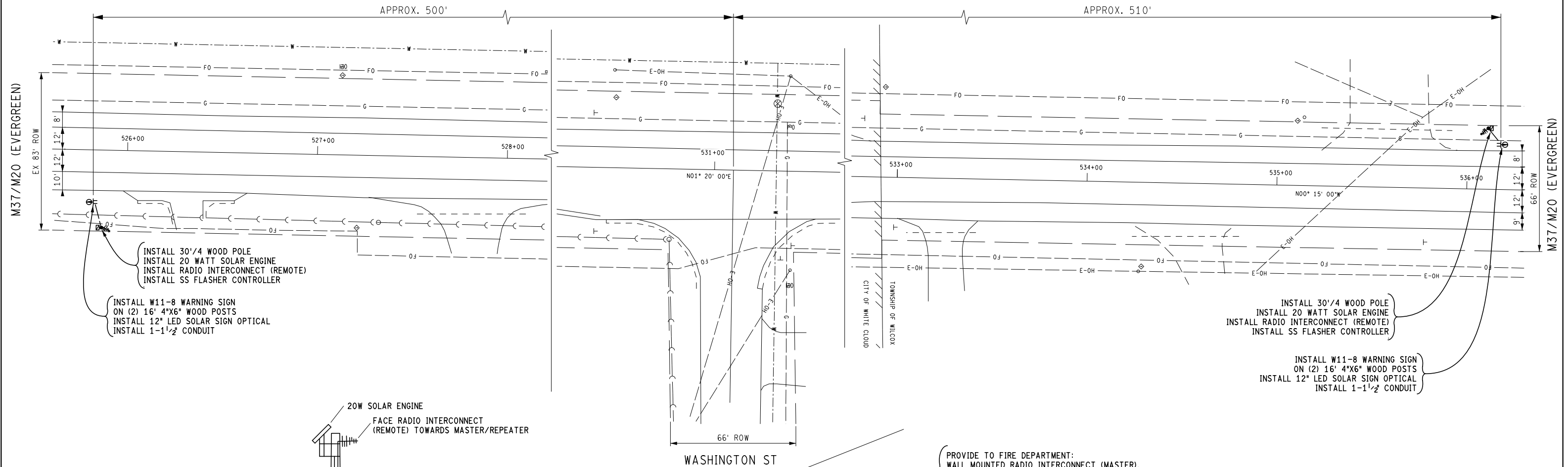
<b><u>Interconnect</u></b>		<b><u>Timing</u></b> <input type="checkbox"/> Permit Attached <b>See:</b>	
Type: _____		Pre-Emption Type: <input type="checkbox"/> Computer <input type="checkbox"/> Bridge <input type="checkbox"/> Fire	
Master At: _____		<input type="checkbox"/> Opticom <input type="checkbox"/> Rail <input type="checkbox"/> Manual	
		<input type="checkbox"/> EVAS <input type="checkbox"/> ITS	
<b>Other Electrical Devices:</b>			
<input type="checkbox"/> Overhead Flashing Beacon	<input type="checkbox"/> School Flashers	<input checked="" type="checkbox"/> Fire Device	<input type="checkbox"/> Keep Right
<input type="checkbox"/> School Speed Limit	<input type="checkbox"/> Advanced Warning Sign Flasher	<b>Size Optical</b> <u>12</u> Inch	
<input type="checkbox"/> Case Sign:	<input type="checkbox"/> Other		

**Remarks**  
08/28/20147 Install advanced warning sign mounted fire beacon via TWA. Radio w/PB in firestation.

<input type="checkbox"/> Construction Project _____	<b>Job No.</b> _____	<b>Letting Date:</b> _____
<input type="checkbox"/> By Work Order	<input type="checkbox"/> By Contract	<input type="checkbox"/> Federal-Aid Funds _____
		<input type="checkbox"/> M\$
<b>Layout Prepared By:</b> _____		<b>Date</b> _____

NOTE:  
REMOVE W11-8 WARNING SIGN & SUPPORTS  
(APPROX. 840' S OF INTERSECTION)

NOTE:  
REMOVE W11-8 WARNING SIGN & SUPPORTS  
(APPROX. 1.150' N OF INTERSECTION)



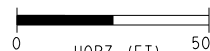
PROVIDE TO FIRE DEPARTMENT:  
WALL MOUNTED RADIO INTERCONNECT (MASTER),  
PUSHBUTTON ACTIVATION WITH CONFIRMATION LIGHT,  
DOUBLE YAGI ANTENNAS WITH 4' RISER & STD BRACKET,,  
150' OF LMR 400 CABLE OR APPROVED EQUAL.

FIRE STATION

SOLAR SIGN OPTICAL &  
RADIO INTERCONNECT

SIGNALS	
OPENINGS:	2
CYCLIC WATTS:	SOLAR
STEADY WATTS:	0
PLAN: 62032-08-002	

FINAL ROW PLAN REVISIONS (SUBMITTAL DATE: )					
NO.	DATE	AUTH	DESCRIPTION	NO.	DATE
137					



	DATE: 2/5/18	CS: 62032	TRAFFIC SIGNAL INSTALL SHEET	DRAWING	SHEET
	DESIGN UNIT: SIGNALS	JN: 208207	M37/M20 (EVERGREEN) AT WASHINGTON STREET		SECT
FILE: 208207_6203208002_CON001.dgn	TSC: CADILLAC	TWA#17592	CITY OF WHITE CLOUD, NEWAYGO COUNTY		

MICHIGAN  
DEPARTMENT OF TRANSPORTATION

SPECIAL PROVISION  
FOR  
**TRAFFIC CONTROL ON  
HIGHWAY PREVENTIVE MAINTENANCE PROJECTS**

CADTSC:DJL

1 of 2

CADTSC:APPR:KM:xx-xx-xxxx  
CS-62032, TWA 17592

**a. Description.** This work consists of maintaining traffic installation of W11-8 signs, LED warning flashers, solar engine, and radio interconnect on M-37/20, for the Fire Station located on Washington Street in White Cloud, Newaygo County. Traffic shall be maintained according to the 2012 Standard Specifications for Construction and as specified herein.

**c. Construction.** All temporary traffic control devices shall be removed from the right-of-way within 72 hours of completion of the work.

1. Construction Influence Area (CIA).

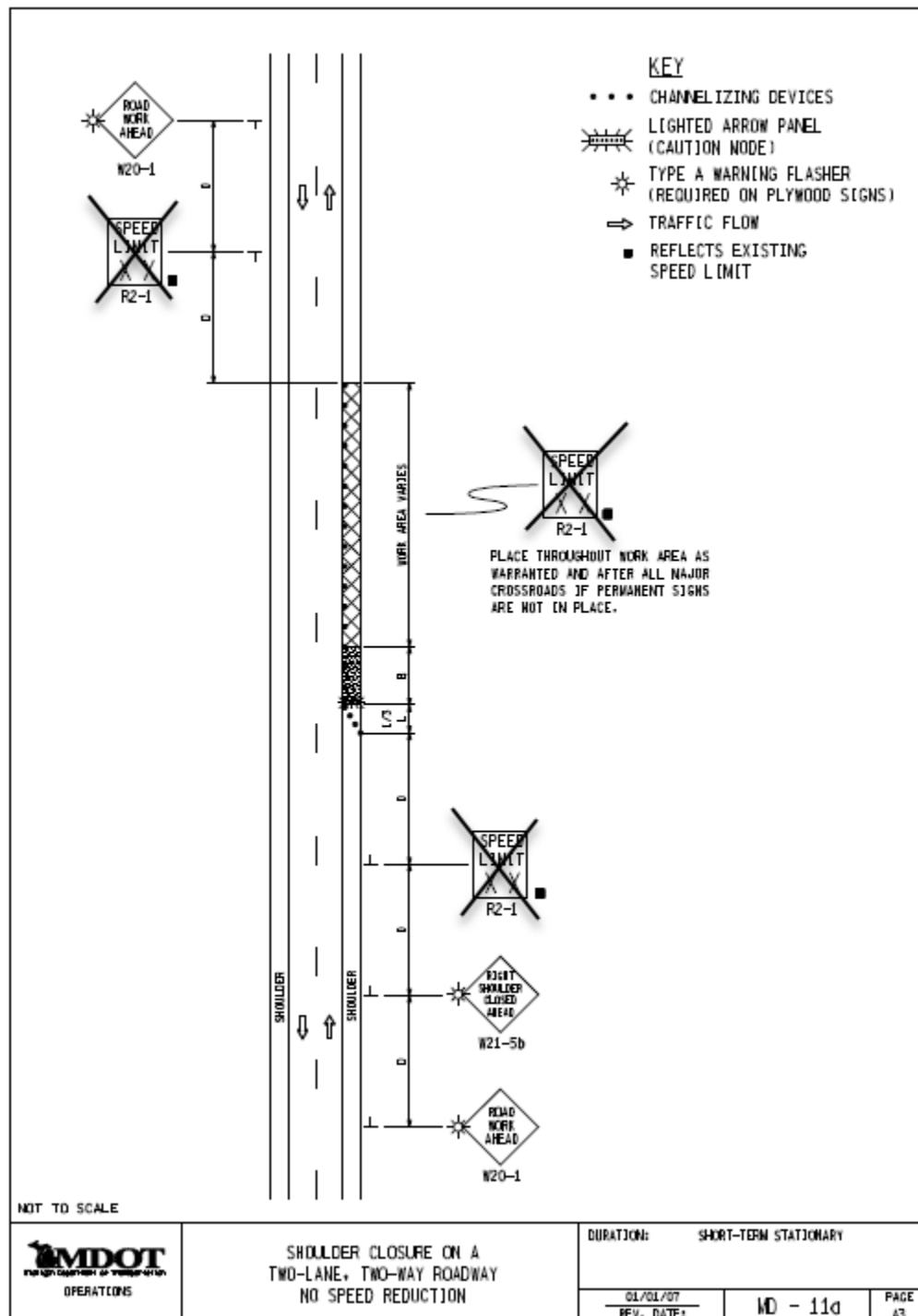
The CIA limits for M-37/20 shall extend from 1500' feet south and north of the intersection of M-37/20 and Washington Street.

2. Traffic Restrictions.

All work and traffic restrictions are confined to daylight hours. Daylight hours are defined as sunrise to sunset as posted by the United States Naval Observatory, Astronomical Applications Department located at:  
[http://aa.usno.navy.mil/data/docs/RS\\_OneYear.php](http://aa.usno.navy.mil/data/docs/RS_OneYear.php) .

No work will be performed or shoulder closures allowed during the following:  
Memorial Day defined as (3:00pm, Thursday, 5/24/18 to 6:00am, Tuesday 5/29/18).  
Labor Day defined as (3:00pm, Thursday, 8/30/18 to 6:00am, Tuesday 9/4/18).  
4<sup>th</sup> of July holiday period commencing 5:00pm Thursday, June 28, 2018 and ending Monday 7:00am July 9, 2018

Traffic shall be maintained with a shoulder closure in accordance with Signing Typical; MD-11a.



**d. Measurement and Payment.** Quantities have been estimated based on the following:  
(2) W20-1, (1) W21-5b,

Sign Type B, Temp, Prismatic, Furn/Oper	Total (Sft):	48
---	--------------	----

TYPE OF WORK			FISCAL CONTROL #	
Traffic Signal		INSPECTION		
WORK TO BE PERFORMED BY			DIVISION AUTH #	
MDOT - LANSING SIGNAL SHOP			17570	
IF NOT UNDER TERMS OF TRUNKLINE MAINTENANCE CONTRACT, ENTER CONTRACT NUMBER			CS #	
			47082	
LOCATION			PR #	
M59 (HIGHLAND) @ LATSON RD			933209	
			JOB #	TRUNKLINE #
			128155	M59
TOWNSHIP, CITY OR VILLAGE		COUNTY	SIGNAL OR POLE #	REGION
OCEOLA TWP		Livingston	47082-1-001	6
STARTING DATE	ESTIMATED COMPLETION DATE	DATE WORK COMPLETED	DIVISION	
08/31/2017			TRAFFIC AND SAFETY/TRAFFIC SIGNALS UNIT	

A (1) LABOR	\$2,000
B MATERIALS	
C EQUIPMENT	
D OVERHEAD	
E OTHER	
TELEPHONE	
POWER	
DEPT. OF LABOR	
F LESS:	
Salvage Credits	
G Total Est. Cost	\$2,000
ESTIMATED BY	EC
PREPARED BY	EC

1 ATTACHED ARE FINAL COPIES OF THE PROJECT PROPOSAL, PLANS AND SPECIFICATIONS.

PERCENT	NAME/ADDRESS OF THOSE PARTICIPATING IN COSTS	FEDERAL PARTICIPATION - ACTION BY FHWA OR	
100	FHWA	APPROVED BY	DATE
		NOT ELIGIBLE	DATE
		SEE LETTER /PR 1240 DATED	(Attach copy if available)
		Required only when work is to be performed by direct or contract maintenance forces.	
		REVIEWED BY (Via <del>301a</del> and <del>301a</del> )	DATE
AUTHORIZED BY:		DATE	

[illegible]

TRANSPORTATION  
WORK AUTHORIZATION

Continuation Sheet

FISCAL CONTROL #		DIVISION AUTH. #	
		17570	
CS #		PR #	
47082		933209	
JOB #		TRUNKLINE #	
128155		M59	
SIGNAL / POLE #	REGION	DIVISION	
47082-1-001	6	T AND S	

- 2 COPIES OF THE FINAL PROJECT PROPOSAL, PLANS AND SPECIFICATIONS TO AGENCY.
- 3 NO CHANGES FROM PLANS IN LOCATION OF SUPPORTING STRUCTURES, SIGNAL HEAD  
PLACEMENT OR TRAFFIC EQUIPMENT WILL BE ALLOWED WITHOUT PRIOR APPROVAL OF THE  
TRAFFIC AND SAFETY DIVISION, TRAFFIC SIGNAL UNIT IN LANSING, MI; PHONE (517) 373-2323.
- 4 PLEASE PROVIDE SIGNAL INSTALLATION COMPLETION DATES FOR EACH LOCATION.
- 5 SEE THE ATTACHED TRAFFIC SIGNAL PERMITS.



CHECK LIST										Michigan Department of Transportation		DOCUMENT CHECKLIST							
D R A W I N G	W O R K	O R D E R	C O S T	S E R V I C E	A P P N	T I M I N G	P E R M I T	TYPE OF WORK <u>Traffic Signal</u> <u>Modernization</u>				PREPARED BY _____ CHECKED BY _____							
										ITEM		REGION <u>University</u> DISTRICT NO. <u>8</u>							
										1	REFERENCE NUMBER	47082-01-001							
										2	REQUEST DATE	12/04/2015							
										3	MILEAGE POINT	Begin: 6.29 End: 6.29							
										4	LOCATION	M59 (HIGHLAND) @ LATSON RD							
										5									
										6	STATUS								
										7	FUND								
										8	JOB NUMBER	128155							
										9	Contract	17570							
										10	DISTRIBUTION DATE								
										11	COMPLETION DATE								
										12	ESTIMATED COST	0							
										13	PARTICIPATING AGENCY								
										14	AGENCY NAME	FIPS CODE	MAINT. PARTICIPATION	M	B	WK	CLASS CD		
										15	MDOT	0	50	D	E	X	MS		
										16	Livingston County	47	50				MC		
										17									
										18									
										19									
										20									
										21	TELEPHONE COMPANY								
										22	CIRCUIT TYPE / NUMBER								
										23									
										24									
										25	POWER COMPANY	DETROIT EDISON COMPANY							
										26	STREET LIGHTS								
										27	CYCLIC WATTAGE	504							
										28	STEADY WATTAGE	0							
										29	SERVICE TYPE								
										30	NUMBER OF PHASES	TIMING PERMIT DATE 08/31/2017							
										31	REMOTE FEATURES								
										32	COMPUTERIZED	X							
										33	TURN PROHIBITION L								
										34	R								
										35	NTOR								
										36	DIMENSIONS								
										37	SPAN DIMENSIONS								
										38	ONE-WAY LABELING								
										39	CENTERLINES								
										40	LANELINE								
										41	CONTROLLER/INTERCONNECT	FA							
										42	DIMMER CIRCUIT								
										43	INTERCONNECTION								
										44	DETECTORS								
										45	SIGNALS								
										46	CASE SIGNS								
										47	SIGN LEGENDS								
										48	POLE SIZE								
										49	GUYING								
										50	PEDESTALS								
										51	HOURS OF OPERATION								
										52	RESPONSIBLE PERSON								
										53	REMOVE "STOP" & FLASH								
										54	LEASE LINE RATE								
										55	CODING								
										56	AUTHORIZATION DATE								
										57	RESOLUTION DATE								

# **Letting of April 27, 2016**

Item No: 1604 201  
 Project: 84926-128155  
 Location: M-59 (Highland) @ Latson Rd, Oceola Twp, Livingston County  
 Description: Signal Modernization COST ESTIMATE

JN128155

Low Bid/Lowest Adjustment Factor Submitted: 1.19

Pct Over/Under Estimate: 19.00%

Total Number of Bidders: 2

Other Adjustment Factors Submitted: 1.4

IWA#17570

Line #	Item Number	Pay Item	Pay Unit	Estimated Unit Price	Low Bidder (1.19) Adjusted Unit Price	Quantity	Adjusted Total Price
77	8120140	Lighted Arrow, Type C, Furn	Each	\$416.33	\$495.43	4	\$1,981.73
78	8120141	Lighted Arrow, Type C, Oper	Each	\$38.59	\$45.92	4	\$183.69
81	8120250	Plastic Drum, High Intensity, Furn	Each	\$15.18	\$18.06	65	\$1,174.17
82	8120251	Plastic Drum, High Intensity, Oper	Each	\$0.43	\$0.51	65	\$33.26
85	8120310	Sign Cover	Each	\$21.10	\$25.11	5	\$125.55
86	8120340	Sign, Type A, Temp, Prismatic, Furn	Square Foot	\$4.40	\$5.24	20	\$104.72
87	8120341	Sign, Type A, Temp, Prismatic, Oper	Square Foot	\$0.26	\$0.31	20	\$6.19
88	8120350	Sign, Type B, Temp, Prismatic, Furn	Square Foot	\$3.51	\$4.18	626	\$2,614.74
89	8120351	Sign, Type B, Temp, Prismatic, Oper	Square Foot	\$0.29	\$0.35	626	\$216.03
103	8190027	Conduit, DB, 1, 1 1/2 inch	Foot	\$17.00	\$20.23	16	\$323.68
108	8190035	Conduit, DB, 3, 3 inch	Foot	\$24.00	\$28.56	8	\$228.48
110	8190038	Conduit, DB, 4, 3 inch	Foot	\$33.48	\$39.84	8	\$318.73
113	8190254	Hh, Rem	Each	\$200.00	\$238.00	6	\$1,428.00
114	8190259	Hh, Round, 3 foot Dia.	Each	\$2,188.73	\$2,604.59	1	\$2,604.59
124	8190399	Cable, Sec, 600V, 1, 3/C#6	Foot	\$4.00	\$4.76	25	\$119.00
163	8200020	Case Sign, Rem	Each	\$91.72	\$109.15	1	\$109.15
169	8200030	Controller and Cabinet, Rem	Each	\$137.33	\$163.42	1	\$163.42
170	8200031	Controller and Cabinet, Digital Type	Each	\$18,904.48	\$22,496.33	1	\$22,496.33
175	8200045	Controller Fdn, Base Mount	Each	\$1,466.17	\$1,744.74	1	\$1,744.74
191	8200088	TS, Managed Field Ethernet Switch, Layer 2, Copper	Each	\$1,000.00	\$1,190.00	1	\$1,190.00
210	8200135	Serv Disconnect	Each	\$917.95	\$1,092.36	1	\$1,092.36
211	8200136	Serv Disconnect, Rem	Each	\$101.26	\$120.50	1	\$120.50
213	8200140	Span Wire	Each	\$704.49	\$838.34	4	\$3,353.37
214	8200141	Span Wire, Rem	Each	\$128.65	\$153.09	1	\$153.09
228	8200182	TS, Span Wire Mtd, Rem	Each	\$97.83	\$116.42	5	\$582.09
242	8200313	TS, One Way Span Wire Mtd (LED)	Each	\$850.00	\$1,011.50	6	\$6,069.00
243	8200314	TS, One Way Span Wire Mtd, FYA (LED)	Each	\$1,000.00	\$1,190.00	4	\$4,760.00
244	8200315	TS, One Way Span Wire Mtd, Five Sect (LED)	Each	\$1,375.00	\$1,636.25	2	\$3,272.50
273	8200378	Bracket, Truss, With 18 Foot Arm	Each	\$761.93	\$906.70	1	\$906.70
310	8200461	Strain Pole, Steel, 6 Bolt, 36 foot	Each	\$6,971.72	\$8,296.35	1	\$8,296.35
312	8200470	Strain Pole Fdn, 6 Bolt	Foot	\$429.12	\$510.65	15	\$7,659.79
313	8200480	Casing	Foot	\$119.90	\$142.68	12	\$1,712.17
322	8200498	Cellular Modem, TS, 4G	Each	\$1,000.00	\$1,190.00	1	\$1,190.00
	82507051	Power Co. (Est. Cost to Contractor)	Dlr	\$11,198.00	\$11,198.00	1	\$11,198.00
						Sub Total =	\$87,532.12
		<b>*Items to be negotiated</b>					
		Hemispherical Video Detection Camera*	Ea	\$4,000.00	\$4,760.00	1	\$4,760.00
		Hemispherical Video Detection System*	Ea	\$12,000.00	\$14,280.00	1	\$14,280.00
		Managed Field Ethernet Switch, Layer 2 *	Ea	\$1,000.00	\$1,190.00	1	\$1,190.00
		Road Side Unit*	Ea	\$2,000.00	\$2,380.00	1	\$2,380.00
		System Integration and Testing*	LSUM	\$ 8,379.51	\$9,971.62	1	\$9,971.62
		Sign, Portable Changeable Message, Furn*	Ea	\$ 1,500.00	\$1,785.00	4	\$7,140.00
		Sign, Portable Changeable Message, Oper*	Ea	\$ 48.00	\$57.12	4	\$228.48
		Mobile Attenuator*	Ea	\$ 1,500.00	\$1,785.00	1	\$1,785.00
						Grand Total	\$129,267.22

\*Listed Negotiated Unit Prices are based on 2015 average unit prices from Trans-port. Actual costs will need to be negotiated with the contractor.



Q1510(R 9/94)

**APPLICATION FOR ELECTRIC ENERGY SERVICES  
AND  
INSTALLATION / REMOVAL**

DATE 08/31/2017	OCEOLA TWP	Livingston	JOB NUMBER 128155
Location M59 (HIGHLAND) @ LATSON RD			SERV. RQST NO. VENDOR ACCT#

Mark Cetnor  
DETROIT EDISON COMPANY  
37849 Interchange Dr.  
Farmington Hills, MI 48335  
(248) 427-2902

COST TO CONTRACTOR \$11198.

CONTRACTOR: RAUHORN ELECTRIC, INC.  
Tel: 810-739-8400

17171 23 MILE ROAD

FAX: 810-739-8223  
MACOMB, MI 480424100

**POWER CONSUMPTION:**

	EXISTING		NEW
Attention: <b>Mark Setner</b>	5400	CYCLIC WATTS	504
	400	STEADY WATTS	0

Please supply, install and maintain electrical service and/or supporting structures in accordance with attached Michigan Department of Transportation Plan No. 47082-01-001, dated 08/31/2017 for Barricade Lighting, Traffic Signals or Street Lights. An annual permit by the Department or an individual permit issued by the appropriate District Office is required to install and maintain facilities necessary to provide electric service connections and/or supporting structures on state right-of-way for span type traffic signals. Power consumption, in watts, to be used as shown on Plan.

The Department of Transportation or one of its authorized contract agencies will supply, install and maintain service wiring overhead or underground to the utilities point of service connection and also the signals and signs complete with their wiring and controllers.

The Michigan Department of Transportation will underwrite the cost of this work, estimated at . This approval is granted with the understanding that this office will be notified in writing as to why the above estimate was exceeded. List labor, materials and equipment in detail on your company Invoice Voucher and send to the Department of Transportation, Traffic and Safety Division. Any charges and the applicable tariffs as approved by the Michigan Public Service Commission are subject to review by the Michigan Department of Transportation.

Construction to begin as soon as possible. Notify the undersigned when construction is completed.

AGENCY TO BE BILLED FOR ENERGY MDOT
AGENCY TO BE BILLED FOR MAINTAINING MDOT
AUTHORIZED AGENT
TITLE
COST AGREEMENT SIGNED BY MAINTAINING AGENCY DATE

**APPROVED**

\_\_\_\_\_  
Signed  
Manager - Traffic Signals Unit  
\_\_\_\_\_  
Title  
MICHIGAN DEPARTMENT OF TRANSPORTATION  
6333 Old Lansing Road, Lansing MI 48917  
\_\_\_\_\_  
Address  
Phone: (517)-322-3360 Fax: (517) 636-5266

**DISTRIBUTION:**

Original and 1 copy - Power Company  
Copy - District Traffic and Safety Engineer  
Copy - District Utility Permit Engineer  
Copy - Maintaining Agency  
Copy - Financial Services Division  
Copy - Financial Operations Division-Payment Section  
Copy - File

**Maintaining traffic shall be in  
accordance with the provisions of  
the Michigan Manual of Uniform  
Traffic Control Devices**

# TRAFFIC SIGNAL TIMING PERMIT

APPROACH	PHASE	1	2	3	4	5	6	7	8				TIMING INSTALLED																																																																																																																																																																																																																																																																																																																																																																																																																																			
		EB Lefts	WB Thrus	NB Lefts	SB Thrus	WB Lefts	EB Thrus	SB Lefts	NB Thrus																																																																																																																																																																																																																																																																																																																																																																																																																																							
MINIMUM GREEN		7	10	7	7	7	10	7	7				REMARKS  Traffic Signal Modernization in conjunction with Job Number 128155 A. 16-Load-Switch, Base-Mounted, Epac-Type Controller with an Intelligent Transportation Systems (ITS) Combination Cabinet.																																																																																																																																																																																																																																																																																																																																																																																																																																			
PASSAGE		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0																																																																																																																																																																																																																																																																																																																																																																																																																																							
MAXIMUM NO. 1		25	70	25	65	25	70	40	65																																																																																																																																																																																																																																																																																																																																																																																																																																							
MAXIMUM NO. 2		25	70	25	65	25	70	40	65																																																																																																																																																																																																																																																																																																																																																																																																																																							
YELLOW CHANGE		5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0																																																																																																																																																																																																																																																																																																																																																																																																																																							
RED CLEARANCE		1.7	1.7	1.7	1.7	1.7	1.7	1.7	1.7																																																																																																																																																																																																																																																																																																																																																																																																																																							
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REST IN WALK		0	0	0	0	0	0	0	0																																																																																																																																																																																																																																																																																																																																																																																																																																							
INITIALIZATION		1	4	1	1	1	4	1	1				All left turns operate on a lagging, permissive-protected basis via utilizing flashing-yellow-arrow signal head displays. Utilizes a fully-actuated operation and equipped with a HEMISPHERICAL camera.																																																																																																																																																																																																																																																																																																																																																																																																																																			
NON-ACT RESPONSE		0	0	0	0	0	0	0	0																																																																																																																																																																																																																																																																																																																																																																																																																																							
VEHICLE RECALL		0	4	0	0	0	4	0	0																																																																																																																																																																																																																																																																																																																																																																																																																																							
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NON-LOCK MEMORY		1	0	1	0	1	0	1	0																																																																																																																																																																																																																																																																																																																																																																																																																																							
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DIAL 1 SPLIT 1		100	15	43	15	27	15	43	15	27	1																																																																																																																																																																																																																																																																																																																																																																																																																																					
DIAL 2 SPLIT 1		120	15	63	15	27	15	63	18	24	1																																																																																																																																																																																																																																																																																																																																																																																																																																					
DIAL 3 SPLIT 1		150	19	66	15	50	19	66	36	29	1																																																																																																																																																																																																																																																																																																																																																																																																																																					
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PHASE		D1/S1/O1: Normal D2/S1/O1: 06:00 - 08:00 Monday - Friday D3/S1/O1: 14:00 - 19:00 Monday - Friday D4/S1/O1: 07:00 - 10:00 Monday - Friday (School Peak) D4/S2/O1: 19:00 - 00:01 Special Event Dial D4/S3/O1: 08:45 - 09:15 Monday - Friday The M-59 (Highland Road) thru movements have been placed on SOFT recall.																																																																																																																																																																																																																																																																																																																																																																																																																																														
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## ADVANCED TIMING PARAMETERS FORM

SYSTEM INFORMATION	LEFT-TURN PHASING										RING AND BARRIER STRUCTURE																	
	Phase # / Description		Permissive-Protected		Protected-Only			R1	B1			B2			B3			B4										
			Lead	Lag	Split	Lead	Lag		2	1		4	3															
	<b>Controller Type:</b> <input checked="" type="checkbox"/> EPAC <input type="checkbox"/> Other:	# 1 / EB M-59 (Highland Road) Lefts		<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	R2	6	5			8	7													
# 3 / NB Latson Road Lefts		<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	R3																					
# 5 / WB M-59 (Highland Road) Lefts		<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	R4																					
# 7 / SB Latson Road Lefts		<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>																						
<b>VEHICULAR AND PEDESTRIAN DETECTION</b>																				<b>DISAPPEARING LEGEND CASE SIGNS</b>								
<b>System Type:</b> <input type="checkbox"/> Closed Loop <input type="checkbox"/> Stand By <input type="checkbox"/> Group 1 <input type="checkbox"/> Group 2 Address: <input type="checkbox"/> TBC <input type="checkbox"/> TBC/GPS <input checked="" type="checkbox"/> None <input type="checkbox"/> Other:	Approach		Vehicular Detection				Pedestrian Detection																					
			Movements and Call Delay (s)				Type													Push-Button Crossing Locations								
			Left	Thru	Right	Loop	Video	Other																				
	EB M-59 (Highland Road)	<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>	10	<input type="checkbox"/>	<input checked="" type="checkbox"/>											<input type="checkbox"/>								
	WB M-59 (Highland Road)	<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>		<input type="checkbox"/>		<input type="checkbox"/>	<input checked="" type="checkbox"/>											<input type="checkbox"/>								
	NB Latson Road	<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>	10	<input type="checkbox"/>	<input checked="" type="checkbox"/>											<input type="checkbox"/>								
	SB Latson Road	<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>		<input type="checkbox"/>		<input type="checkbox"/>	<input checked="" type="checkbox"/>											<input type="checkbox"/>								
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		<input type="checkbox"/>		<input type="checkbox"/>		<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>											<input type="checkbox"/>								
	<b>ADDITIONAL DIAL SPLIT DATA</b>																			<b>COORDINATION DATA</b>								
PHASE			1	2	3	4	5	6	7	8	O1	O2	O3	Operation Mode		1												
DIAL	SPLIT	CYCLE													Coordination Mode		0											
DIAL	SPLIT	CYCLE													Maximum Mode		0											
DIAL	SPLIT	CYCLE													Correction Mode		2											
DIAL	SPLIT	CYCLE													Offset Mode		0											
DIAL	SPLIT	CYCLE													Force Mode		0											
DIAL	SPLIT	CYCLE													Max Dwell		0											
DIAL	SPLIT	CYCLE													Yield Period		0											
<b>REMARKS:</b>  Wire Overlap "E" to the Phase # 3 Yellow and Red. Wire Overlap "F" to the Phase # 5 Yellow and Red.  Place a 10-second delay in the following approach lanes:  1. The Eastbound M-59 (Highland Road) Right-Turn Approach Lane.  2. The Northbound Latson Road Right-Turn Approach Lane.														<b>ADDITIONAL OVERLAP DATA</b>														
														Overlap Phase	Load Bays	Phases Overlapped	T.G. (s)	Y (s)	R (s)	-G/Y	+GRN							
														E = EB M-59 (Highland Rd.) RTGA		3	0.0	5.0	1.7									
														F = NB Latson Road RTGA		5	0.0	5.0	1.7									
														=														
PREPARED BY: HHH      DATE: 08/31/17														LOCATION: M-59 (Highland Road) at Latson Road														
<input checked="" type="checkbox"/> MDOT <input type="checkbox"/> County <input type="checkbox"/> City <input type="checkbox"/> Consultant														CONTROL SECTION-SPOT # 47082-01-001														

CLEAR PAGE 2

# TRANSPORTATION WORK AUTHORIZATION INSPECTION AND COMPLETION REPORT

Attach to Performing Agency's Copy of Work Authorization

TYPE OF WORK Traffic Signal INSPECTION		FISCAL CONTROL #	
WORK TO BE PERFORMED BY MDOT - LANSING SIGNAL SHOP		DIVISION AUTH # 17570	
IF NOT UNDER TERMS OF TRUNKLINE MAINTENANCE CONTRACT, ENTER CONTRACT NUMBER		CS # 47082	
LOCATION M59 (HIGHLAND) @ LATSON RD		PR # 933209	
		JOB # 128155	TRUNKLINE # M59
		SIGNAL OR POLE # 47082-1-001	REGION 6
		DIVISION TRAFFIC AND SAFETY/TRAFFIC SIGNALS UNIT	
TOWNSHIP, CITY OR VILLAGE OCEOLA TWP	COUNTY Livingston		

## WORK COMPLETION AND MATERIALS APPROVAL

The following information is to be supplied by the performing agency upon completion of the work and forwarded to the District/Region office of the originating Division. If any deviation from work description was necessary, explain in detail under Remarks.

All work specified on the Authorization was completed on \_\_\_\_\_ (Date)

SIGNATURE	TITLE	DATE

REMARKS:

## INSPECTION AND APPROVAL

The following information is to be supplied by the Region/TSC office.

I certify that installation was inspected and approved on \_\_\_\_\_ (Date) and that the traffic signal operation was in accordance with the authorized work.

SIGNATURE	TITLE	DATE

REMARKS:

**PLEASE FORWARD TO TRAFFIC SAFETY DIVISION, TRAFFIC SIGNALS UNIT  
UPON COMPLETION OF INSPECTION AND APPROVAL**

# MICHIGAN DEPARTMENT OF TRANSPORTATION

## INVENTORY FIELD CHECKLIST

REFERENCE NUMBER: 47082-01-001      ROUTE: M59      LOCATION: M59 (HIGHLAND) @ LATSON RD  
 CHECKED BY: \_\_\_\_\_      DATE CHECKED: \_\_\_\_\_      REGION: University

Job Number: 128155A      Contract Number: 17570      Completed Date: \_\_\_\_\_      Completion Status: New (System)

CURRENT and PENDING INVENTORY						
Inv Status	Installed Date	Action Code	Item Description		X	Notes
E	02/25/98	R	<b>Controller Information-</b> Status: N			
			Telephone Company:			
			Power Company:      DETROIT EDISON COMPANY			
			Street Lights:			
			Cyclic Wattage:      5400			
			Steady Wattage:      420			
			Service Type:			
			Number of Phases:      4      Timing Permit Date:05/06/1999			
			Turn Prohibition L:			
			R:			
			NTOR:			
			All Red:			
			On ADS:      N			
			Master System:			
			Interconnect Type:      Local			
			Controller- Type: Semi-Actuated Si Make: E      Model: EPAC			
			Remote Features:			
			Sub Device Type:			
P	08/31/17	A	<b>Controller Information-</b> Status: N			
			Telephone Company:			
			Power Company:      DETROIT EDISON COMPANY			
			Street Lights:			
			Cyclic Wattage:      504			
			Steady Wattage:      0			
			Service Type:			
			Number of Phases:      Timing Permit Date:08/31/2017			
			Turn Prohibition L:			
			R:			
			NTOR:			
			All Red:			
			On ADS:      N			
			Master System:			
			Interconnect Type:			
			Controller- Type: Fully-Actuated Si Make: E      Model: MOD6			
			Remote Features:			
			Sub Device Type:			
P			<b>Interconnect Means:</b>	<b>Sub Device Type</b>		
	09/01/17	A	RSU for Connected Vehicle (DSRC)			
	09/01/17	A	Cell Modem, 4G			
			<b>Loop Information-</b>	<b>Count</b>	<b>Type</b>	<b>Approach</b>
						<b>Sub Device Type</b>
E	10/24/13	R		2	Traffic Loop	LATSON RD NB
E	10/24/13	R		2	Traffic Loop	LATSON RD SB
E	10/24/13	R		2	Traffic Loop	M59 NEB
E	10/24/13	R		2	Traffic Loop	M59 WB
P	08/29/17	A		1	Hemispherical C	M59 WB

			Support Structures-	Count	Type	Length	Class	Sub Device Type			
P	08/29/17	A		1	36' ANCHOR BASE	36					
P	08/29/17	A		3	WOOD POLE	40	4				
E	12/18/08	R		2	WOOD POLE	50	4				
			Signal Head-	Count	Faces	Color	Lens	Sppt	Istl Yr	Sub Device Type	
E	02/25/98	R	P Eagle	1	4	3	12	SA	1999		
E	02/25/98	R	P Eagle	4	2	3	12	SA	1999		
P	08/29/17	A	P Eagle	2	1	5	12	SA	2017		
P	08/29/17	A	P Eagle	4	1	4	12	SA	2017		
P	08/29/17	A	P Eagle	6	1	3	12	SA	2017		
			Pedestrian-	Count	Faces		Lens		Istl Yr	Sub Device Type	
			Case Sign-	Count	Case Sign					Sub Device Type	
E	02/25/98	R		1	Four Way Case Sign- Mercury Vapor						
			Turn Arrow-	Count	Arrow Info.					Sub Device Type	
P	08/29/17	A		4	Left Turn Green						
P	08/29/17	A		4	Right Turn Yellow						
P	08/29/17	A		4	Right Turn Green						
P	08/29/17	A		8	Left Turn Yellow						
P	08/29/17	A		4	Left Turn Red						

**LEGEND:** Inv Status - E (Existing) P (Pending) I (In Process - a copy of Existing which can be changed or removed)

Action Code - I (Installed via current design) R (Removed) C (Changed via current design) A (Added via current design)



**Traffic Control Devices  
Layout Request**

7/24/2017

<b>Location</b> M59 (HIGHLAND) @ LATSON RD			<b>File No.</b> 47082-01-001	
<b>City/Twp</b> OCEOLA TWP	<b>Fips Code</b> 60120	<b>Control Section</b> 47082	<b>Mile Pt</b> 6.29	<b>County</b> Livingston
<b>Approved Per</b> GOLDENROD		<b>From</b> Traffic Signals	<b>To</b> University Region	<b>Memo Date</b> 12/04/15
<b>Operational Analysis By</b> Hamilton, Hieronymous			<b>Initial Request Date</b> 12/4/2015	<b>PR #</b> 0933209
<b>Work Status</b> Modernization				<b>Layout Request Date</b> 07/24/17
<b>Prepare Layout</b>		<b>Layout Type</b> Routine	<b>By Date Indicated</b>	<b>Coordinate With</b> <input type="checkbox"/> CS <input checked="" type="checkbox"/> Job
				<b>Job/CS Number</b> 128155

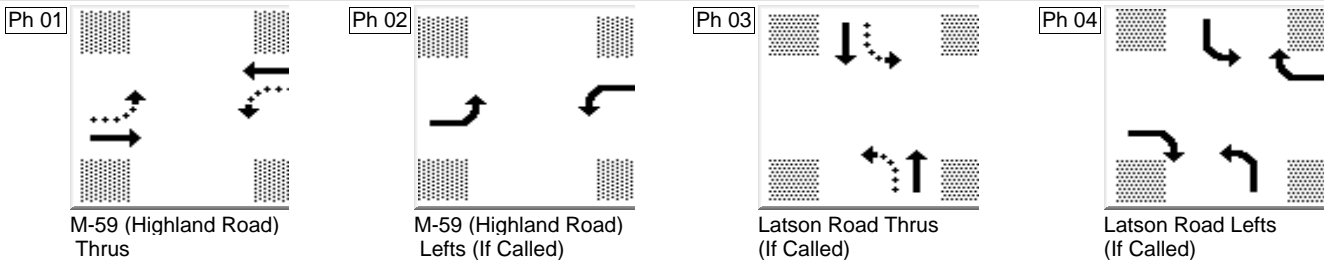
**TRAFFIC SIGNAL**

<b>Controller Type</b>		<b>Operation</b>		<b>Detection</b>	
Model: MOD 60		<input type="checkbox"/> Fixed-Time		Type: Hemispherical Camera	
Mount: 16 Load Switch Base		<input type="checkbox"/> Semi-Actuated		Location: for detecting vehicles in ALL approach lanes	
<input type="checkbox"/> Existing		<input checked="" type="checkbox"/> Full-Actuated		Size: _____	
<b>Signal Indications</b>		<b>Pedestrian Indications</b>		<b>Countdown Ped Indications</b>	
<input type="checkbox"/> 8 Inch <input checked="" type="checkbox"/> 12 Inch		<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No		<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	
		Crossing: _____			
		Push-Button Actuated Crossing: _____			

**Phasing/Operation**

Left Turn Phasing: Flashing Yellow Arrow ☐ Fixed-Time

Right Turn Green Arrow Facing: E and W on Latson Rd ☒ Actuated



<b>Interconnect</b>	<b>Timing</b> <input type="checkbox"/> Permit Attached	<b>See:</b> <u>H. Hamilton-Holmes</u>
Type: _____	<b>Pre-emption Type:</b>	<input type="checkbox"/> Computer <input type="checkbox"/> Bridge <input type="checkbox"/> Fire
Master At: _____		<input type="checkbox"/> Opticom <input type="checkbox"/> Rail <input type="checkbox"/> Manual
		<input type="checkbox"/> EVAS <input type="checkbox"/> ITS

**Other Electrical Devices:**

<input type="checkbox"/> Overhead Flashing Beacon	<input type="checkbox"/> School Flashers	<input type="checkbox"/> Fire Device	<input type="checkbox"/> Keep Right
<input type="checkbox"/> School Speed Limit	<input type="checkbox"/> Advanced Warning Sign Flasher	<b>Size Optical</b> _____ Inch	
<input type="checkbox"/> Case Sign:	<input type="checkbox"/> Other		

**Remarks**

Traffic Signal Modernization via Job Order Contract (JN 128155 A). Install a 16-Ld-Sw, Mod 60, Epac-Type Controller with 12-inch signal heads. Install Flashing-Yellow-Arrow Signal Head Displays facing ALL directions. Install 5-section Right-Turn Green Arrows facing EAST and WEST on Latson Road. Install an ITS Combo Cabinet. Connected Vehicle Equipment per Collin Castle. Supersedes LRF dated 12/4/2015.

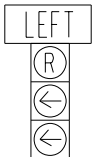
☐ Construction Project \_\_\_\_\_ **Job No.** \_\_\_\_\_ **Letting Date:** \_\_\_\_\_

☐ By Work Order ☐ By Contract ☐ Federal-Aid Funds \_\_\_\_\_ ☐ M\$

**Layout Prepared By:** \_\_\_\_\_ **Date** \_\_\_\_\_

4-WAY, 12" X 27"  
ILLUMINATED CASE SIGN

REM CS #1



4W-3C-SA (12")

REM TS #3

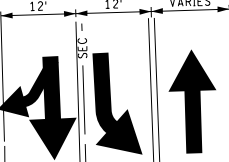
2W-3C-SA (12")



REM TS #1, TS #2, TS #4, TS #5

LATSON RD

SPEED  
LIMIT  
55



REMOVE WOOD POLE & DOWN GUY (BY DTE ENERGY)  
REMOVE SECONDARY ELEC SERVICE (BY DTE ENERGY)  
REMOVE SERVICE DISCONNECT ①  
REMOVE POLE MTD CABINET & CONTROLLER ②  
ABANDON CONDUIT

N

### LIST OF MATERIAL

NO.	ITEM	QUANTITIES
①	Serv Disconnect, Rem	1 Ea
②	Controller and Cabinet, Rem	1 Ea
③	Hh, Rem	6 Ea
④	Span Wire, Rem	1 Ea
⑤	TS, Span Wire Mtd, Rem	5 Ea
⑥	Case Sign, Rem	1 Ea

ABANDON TRAFFIC LOOPS

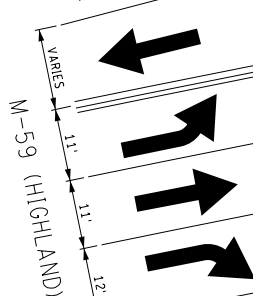
REMOVE WOOD POLE (BY DTE ENERGY)  
REMOVE STREET LIGHT LUMINAIRE FOR SALVAGE (BY DTE ENERGY)

CAUTION - CRITICAL  
UTILITY

ABANDON TRAFFIC LOOPS

SPEED  
LIMIT  
55

GRAVEL SHOULDER  
HMA SHOULDER



⑤ REM TS #4  
⑤ REM TS #5  
REM TS #1 ⑤  
REM TS #2 ⑤  
REM TS #3 ⑤  
REM CS #1 ⑥

REMOVE SPAN ④

REMOVE HH ③

REMOVE HH ③

REMOVE HH ③

SPEED  
LIMIT  
55

M-59 (HIGHLAND)  
VARIES

CAUTION - CRITICAL  
UTILITY

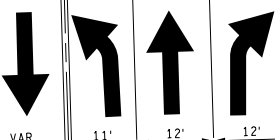
ABANDON TRAFFIC LOOPS

REMOVE WOOD POLE & DOWN GUY (BY DTE ENERGY)  
ABANDON CONDUIT

ALL ROW EXTENDS BEYOND LIMITS OF  
THIS DRAWING SHEET

LATSON RD

SPEED  
LIMIT  
55



ABANDON TRAFFIC LOOPS

ABANDON TRAFFIC LOOPS

REM HH

REM WOOD POLE

REM HH

REM HH

REM TS#1

REM TS#2

REM TS#3

REM CS#1

REM TS#4

REM TS#5

REM SERV DISCONNECT

REM ELECTRIC SERV

REM WOOD POLE

REM HH

ABANDON TRAFFIC LOOPS

REM HH

REM HH

REMOVAL CABLING DIAGRAM

NOT TO SCALE

### SIGNALS

OPENINGS:	40
CYCLIC WATTS: 5400	
STEADY WATTS: 400	
PLAN: 47082-01-001	

FINAL ROW PLAN REVISIONS (SUBMITTAL DATE: )					
NO.	DATE	AUTH	DESCRIPTION	NO.	DATE
151					



0 30  
HORZ. (FT)

FILE: 128155\_4708201001\_REM001.dgn

DATE: 8/31/17

DESIGN UNIT: SIGNALS

TSC: BRIGHTON

CS: 47082

JN: 128155

TRAFFIC SIGNAL REMOVAL SHEET

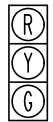
M-59 (HIGHLAND) @ LATSON RD

OCEOLA TWP, LIVINGSTON COUNTY

DRAWING SHEET

SIGNAL REM

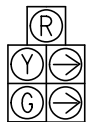
001 SECT 1



TS#2  
TS#5  
TS#8  
TS#9  
TS#11  
TS#12



TS#1  
TS#4  
TS#7  
TS#10



TS#3  
TS#6

SPEED  
LIMIT  
55

LATSON RD

INSTALL 36" 6 BOLT STRAIN POLE (3)  
INSTALL 42" DIA 15' 6 BOLT FDN (4)  
INSTALL 11.5' CASING (5)  
INSTALL SECONDARY ELEC SERVICE (BY DTE ENERGY)  
INSTALL SERVICE DISCONNECT (1)(2)  
INSTALL HEMISPHERICAL VIDEO DETECTION CAMERA & (11)  
RSU MOUNTED ON 18' BRACKET TRUSS ARM (12)(14)  
INSTALL CELLULAR MODEM ANTENNA AT 15'

INSTALL BASE MTD ITS COMBO CABINET & MOD 60 CONTROLLER (6)(7)  
INSTALL CONTROLLER FDN  
INSTALL 3' HH & CONDUIT (15)(20)(21)(22)  
INSTALL HEMISPHERICAL VEHICLE DETECTION SYSTEM (10)  
INSTALL CELLULAR MODEM (9)  
INSTALL ETHERNET SWITCHES (8)(13)

INSTALL 40' 1/4 WOOD POLE & DOWN GUYS (BY DTE ENERGY)  
INSTALL STREET LIGHT LUMINAIRE FROM SALVAGE (BY DTE ENERGY)

SPEED  
LIMIT  
55

SPEED  
LIMIT  
55

CONTACT: MARK CETNOR OF DTE ENERGY AT  
(248) 427-2901 FOR ELECTRIC SERVICE  
DISCONNECT AND RECONNECT. REMOVE (3) WOOD  
POLES & DOWN GUYS. INSTALL (3) WOOD POLES  
& (6) DOWN GUYS.  
COST TO CONTRACTOR: \$11,198.42

FOR ELECTRICAL SERVICE INSPECTION CONTACT  
THE MICHIGAN DEPARTMENT OF LICENSING AND  
REGULATORY AFFAIRS AT 517-315-7344  
COST TO CONTRACTOR WILL BE INCIDENTAL.

INSTALL 40' 1/4 WOOD POLE & DOWN GUYS (BY DTE ENERGY)

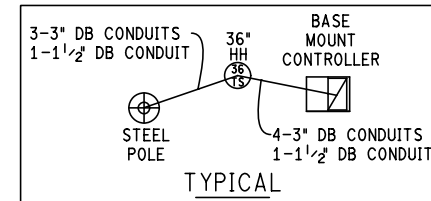
INSTALL 40' 1/4 WOOD POLE & DOWN GUYS (BY DTE ENERGY)

GAS STATION

UTILIZE EXISTING CONDUIT & HANDHOLES  
WHERE POSSIBLE. OTHERWISE INSTALL  
NEW AS DIRECTED BY ENGINEER.

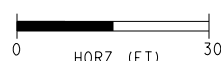
INSTALL RSU ABOVE TRAFFIC SIGNALS SO  
NOT TO INTERFERE WITH THE SIGNAL  
DISPLAY VISIBILITY.

SIGNAL INSPECTOR TO VERIFY MOUNTING HEIGHT  
OF CELLULAR MODEM ANTENNA (15' MIN) FOR  
OPTIMAL SIGNAL STRENGTH. CONTACT JIM  
KWAPISZEWSKI AT 517-242-1486.  
GIVE 5 WORKING DAYS NOTICE.



ALL ROW EXTENDS BEYOND LIMITS OF  
THIS DRAWING SHEET

FINAL ROW PLAN REVISIONS (SUBMITTAL DATE: )					
NO.	DATE	AUTH	DESCRIPTION	NO.	DATE



FILE: 128155\_4708201001\_CON001.dgn

DATE: 8/31/17

DESIGN UNIT: SIGNALS

TSC: BRIGHTON

CS: 47082

JN: 128155

TRAFFIC SIGNAL INSTALL SHEET

M-59 (HIGHLAND) @ LATSON RD

OCEOLA TWP, LIVINGSTON COUNTY

SIGNALS	
OPENINGS:	44
CYCLIC WATTS:	504
STEADY WATTS:	0
PLAN:	47082-01-001

DRAWING	SHEET
SIGNAL CON 001	SECT 1



MICHIGAN  
DEPARTMENT OF TRANSPORTATION

SPECIAL PROVISION  
FOR  
**MAINTAINING TRAFFIC**

BRI:WFR

1 of 6

UNIV:APPR:BRI:WFR:09-01-17

- a. Description.** This work consists of all labor, materials and equipment required to maintain traffic in accordance with this special provision for installation of traffic signal devices at M-59 and Latson Road in Oceola Township, Livingston County.
- b. General.** Maintain traffic according to Subsection 104.11 and Sections 812 and 922 of the 2012 Standard Specifications for Construction, including any Supplemental Specifications, the 2011 Michigan Manual on Uniform Traffic Control Devices (MMUTCD), and as specified herein. Any changes and/or adjustments to the maintaining traffic plans and standards require approval by the Engineer.
1. Notify the Engineer a minimum of 7 calendar days prior to the implementation of any lane closures, traffic shifts or detours.
  2. MDOT maintenance crews and/or contract maintenance agencies may perform maintenance work within or adjacent to the Construction Influence Area (CIA). The Maintenance Division of MDOT and/or contract maintenance agency will coordinate their operations with the Delivery Engineer to minimize the interference. No additional payment will be made to the Contractor for joint use of the traffic control items.
  3. Any damage done to M-59 or any local road pavement due to the Contractor's operations must be repaired at the Contractor's expense.
- c. Construction Influence Area (CIA).** The CIA includes the right-of-way of the following roadways, within the approximate limits described below:
1. M-59 (Washtenaw Avenue) from approximately 4000 feet east of Latson Road to approximately 4000 feet west of Latson Road.
  2. Include in the CIA the rights-of-way of any intersecting roads adjacent to the work zone as far as the advanced construction signing.
- d. Traffic Restrictions.**
1. Remove lane closures and cease work in the following areas during the following special events and additional holiday period:
    - A. Labor Day (3:00 p.m. Friday, September 1, 2017 to 6:00 a.m. Tuesday, September 5, 2017) and Thanksgiving (3:00 p.m. Wednesday, November 22, 2017 to 6:00 a.m. Monday November 27, 2017).
    - B. M-59 and Latson Road during the Legend of Sleepy Howell event (after 2 PM on October 28, 2017) and the Election Day (November 7, 2017) if project limits near a

polling station. The contractor is responsible for verifying the locations of the polling stations.

2. Single lane closures utilizing traffic regulation on M-59 and Latson Road will be permitted from 9 am to 3 pm, weekdays. Weekend work may be permitted as approved by the Engineer.
3. Closure of the left lane on M-59 and Latson Road will only be permitted between the hours 10:00 am and 2:00 pm, weekdays. Weekend work may be permitted as approved by the Engineer.
4. Traffic regulators must be used as directed by the Engineer for cross street traffic while installing the signal at intersections and driveways. Additional traffic regulators used at the intersections and driveways, as directed by the Engineer, must be included with the Traffic Regulator Control, pay item. Additional traffic regulators should be used at M-59 and Latson and other intersections as directed by the Engineer.
5. No speed reduction signs shall be placed in advance of the traffic regulator. The speed limit reduction signs shall be placed 100 feet beyond the end of the traffic regulator taper.
6. Cover (or remove) existing regulatory, warning and construction signs that are not applicable during construction.
7. Access for construction vehicles between the travel lanes and work areas will be restricted to specific locations (this includes the workman's private vehicles). The number of access points and their locations will require the prior approval of the Engineer. The Contractor will be required to submit a "Work Area Access Plan" to the Engineer for review and acceptance a minimum of 14 calendar days prior to the start of work. The Engineer will have 7 calendar days to review the plan for acceptance or provide comments for revisions required to obtain acceptance. At a minimum, the plan must include the proposed ingress/egress locations for construction equipment and vehicles, traffic control devices that will be utilized to warn the motoring public of ingress/egress locations, and measures that will be taken to ensure compliance with the plan. No work will be allowed to begin prior to acceptance of the "Work Area Access Plan". Additional time required to obtain an accepted "Work Area Access Plan" will not be considered cause for delay or impact claims. All costs associated with obtaining an acceptable plan, providing and executing all parts of the accepted plan including required traffic control devices, or resolving an incomplete or unacceptable plan will be borne by the Contractor.
8. The Contractor must complete and submit the "Lane/shoulder Closure Notification/Request Form" to the Engineer for approval prior to the actual closure date. **The lane closure request must be submitted 7 calendar days in advance of the lane closure/detours for approval.** This includes all shifts/shoulder/lane closures and detours as stated per the Proposal or any new lane closure requests submitted by the Contractor. The Engineer will have four (4) calendar days to review the lane closure request for acceptance or provide comments for revisions required to obtain acceptance. **The Contractor must not implement a lane closure/detour prior to approval by the Engineer.** In addition, the Contractor must notify the Engineer when the lane closure is removed. See Lane Closure Notification/Request Form contained in the Proposal.

9. The Contractor will obtain all necessary local permits including Washtenaw County Road Commission for work within areas of local jurisdiction (Latson Road). Payment for acquiring the permits is considered included in Minor Traf Devices.
10. During non-working hours, remove workers' vehicles, and obtain the Engineer's approval to store idle construction equipment and materials that cannot be removed from the project as follows:
  - A. At least 30 feet from the traffic lanes, if topography and right of way allows.
  - B. Less than 30 feet from the traffic lanes if delineated by signs, lights, barricades, or concrete barriers. MDOT will not make additional payment for devices used to delineate store equipment and material.
11. A "full width roadway" closure will not be permitted at any time.
12. Open all lanes to normal traffic operations during non-working hours, and when the Contractor is not working on the site.
13. Maintain access for emergency vehicles at all times without exception. The Engineer will be responsible for notifying emergency services, transit agencies, law enforcement and schools (including bus garages) one week prior to any lane closures, detours or major traffic shifts. **The Contractor will be responsible for notifying the Engineer a minimum of 7 calendar days prior to any lane closures, detours or major traffic shifts.** In addition, the Contractor will be responsible for working with and complying with any coordination that is necessary with the Department and emergency services, transit agencies, law enforcement and schools. All costs associated with these coordination efforts will be considered included in the pay item "Minor Traf Devices".
14. During construction, maintain access to all commercial and residential drives at all times.

**e. Traffic Control Devices.**

1. General.
  - A. Conform all traffic control devices and their usage to Part 6 of the 2011 Michigan Manual of Uniform Traffic Control Devices (MMUTCD). This document can be found at the following website:  
  
<http://mdotcf.state.mi.us/public/tands/plans.cfm>
  - B. During non-working periods, any work site with uncompleted work must have advance warning signs ("Road Work Ahead" or other applicable signing) and plastic drums with high intensity sheeting/42 inch channelization devices at specified locations as directed by the Engineer, at no additional cost to the Department.
  - C. The Contractor must review, adjust and maintain all traffic control devices on a daily basis, or as directed by the Engineer as specified in the standard specifications.
2. Temporary Signs.

- A. Place temporary sign spacing and taper lengths as shown on attached Typical M0020a.
- B. All signs must be approved by the Engineer prior to use.
- C. Place signing for traffic regulation (Lane closure) as shown on attached Typical M0150a.
- D. Place signing for a single lane closure as shown on attached Typical M0250a, M0370a and M2804a as applicable.
- E. Include the G20-2 (End Road Work) signing with all maintenance of traffic typicals.
- F. Include W20-1 (ROAD WORK AHEAD) signs in the quantities, to place on intersecting roads in advance of construction areas as the Engineer directs.
- G. W20-15a (PREPARE FOR BACKUPS") signs are included in the quantities to be placed on M-59. **Recommend sign placement a minimum of 1 mile in advance of the first Road Work Ahead (W20-1).** The location of the W20-15a signs may need to be field adjusted if the traffic backups are longer than anticipated during the lane closures as directed by the Engineer.
- H. Mount all temporary signs at a five-foot minimum bottom height in uncurbed areas and seven-foot minimum bottom height in curbed or pedestrian areas.
- I. Consider distances shown between construction warning, regulatory and guide signs shown on the typicals as approximate. Signs may require field adjustment, as directed by the Engineer.
- J. All construction warning signs used on this Project must be fabricated with **prismatic retro-reflective sheeting**.
- K. Fabricate all temporary signs with legends and symbols flush to the signs face and do not extend beyond the sign borders or edges.
- L. Mount all temporary signs that will be in place for more than 14 days on driven posts.
- M. When a portable construction sign is no longer applicable, remove it or lay the sign down with legs pointed in the same direction as traffic flow and with its feet off and laid flat.
- N. Four (4) Portable Changeable Message Sign (PCMS) must be used. The PCMS are intended to be used to warn traffic of upcoming work and changing traffic control during the life of the project. They will be installed and operational a minimum of fourteen (14) calendar days prior to the start of work. The PCMS locations and messages must have the approval of the Engineer prior to displaying the message to the motoring public. Multiple messages and locations may be required throughout the length of the project. Submit the locations and messages to the Engineer for approval a minimum of seven (7) calendar days prior to displaying the message. Locations for PCM sign will be



determined prior to construction. PCM signs must be locked at all times.

Sample PCMS messages include and as directed by Engineer:

M-59 SIGNAL WORK	BEGIN (DATE)
LANE CLOSURES AHEAD	EXPECT TRAFFIC BACKUPS
ONE LN ROAD AHEAD	EXPECT TRAFFIC BACKUPS

- O. The Federal Highway Administration (FHWA) requires all signs to be NCHRP 350 crashworthy. For design and configuration refer to their website:

[http://safety.fhwa.dog.gov/roadway\\_dept.polity\\_guide/road\\_hardware/](http://safety.fhwa.dog.gov/roadway_dept.polity_guide/road_hardware/)

### 3. Channelizing Devices.

- A. Use plastic drums with high intensity sheeting for channelizing devices during the lane/shoulder and ramp closures.
- B. All plastic drums used on this project will have sufficient ballast to prevent the barrel from moving or tipping. If moving or tipping of plastic drums occurs as the result of wind generated by traffic or occurring naturally, the Contractor will be required to place additional ballast on the plastic drum at no additional cost to the Department, as directed by the Engineer. It is the Contractors responsibility to ensure all drums and delineators remain clean and maintained in good working order.

### 4. Temporary Pavement Markings.

Pavt Mrkg, Wet Reflective, Type R, Tape, 4 inch, White, Temp

Pavt Mrkg, Wet Reflective, Type R, Tape, 4 inch, Yellow, Temp

- A. Use temporary pavement marking – wet reflective Type R (Tape) when temporary pavement markings must be placed on finished pavements (skip lines) and are not in the exact location as future permanent markings or at the discretion of the Engineer.
- B. Removal of pavement markings on surfaces that will not be resurfaced must be done by non-destructive, abrasive methods as approved by the Engineer.

C. If needed place the temporary stop bars using 4 inch white R pavement markings,

5. Permanent Pavement Markings

A. All permanent pavement markings that are removed for traffic control purposed or obliterated outside the project limits during construction operations must be replaced with Waterborne pavement markings for longitudinal markings and Overlay Cold Plastic for Special Markings.

B. Permanent pavement markings must consist of the following:

- Pavt Mrkg, Waterborne, 4 inch, White
- Pavt Mrkg, Waterborne, 2<sup>nd</sup> Application, 4 inch, White
- Pavt Mrkg, Waterborne, 4 inch, Yellow
- Pavt Mrkg, Waterborne, 2<sup>nd</sup> Application, 4 inch, Yellow
- Pavt Mrkg, Waterborne, 6 inch, White
- Pavt Mrkg, Waterborne, 2<sup>nd</sup> Application, 6 inch, White
- Pavt Mrkg, Overlay Cold Plastic, 24 inch, Stop Bar
- Pavt Mrkg, Overlay Cold Plastic, Left/Right Arrow Symbol

C. Final pavement markings must be installed once the roadway is open to traffic.

**f. Measurement and Payment.**

1. Estimated quantities for maintaining traffic on this project is based on the suggested sequence of operations contained in the staging plans and described in this special provision. Payments for these devices are in accordance with Section 812.04 of the 2012 Standard Specifications for Construction unless otherwise specified.
2. Any additional signing or maintaining traffic devices required to expedite the construction will be at the Contractor's expense.



## NOTES

- 1H. D = DISTANCE BETWEEN TRAFFIC CONTROL DEVICES AND LENGTH OF LONGITUDINAL BUFFERS  
SEE **M0020a** FOR "D" VALUES.
2. ALL NON-APPLICABLE SIGNING WITHIN THE CIA SHALL BE MODIFIED TO FIT CONDITIONS, COVERED OR REMOVED.
3. DISTANCES BETWEEN SIGNS, THE VALUES FOR WHICH ARE SHOWN IN TABLE D, ARE APPROXIMATE AND MAY NEED ADJUSTING AS DIRECTED BY THE ENGINEER.
- 3A. THE "WORK ZONE BEGINS" (R5-18c) SIGN SHALL BE USED ONLY IN THE INITIAL SIGNING SEQUENCE IN THE WORK ZONE. SUBSEQUENT SEQUENCES IN THE SAME WORK ZONE SHALL OMIT THIS SIGN AND THE QUANTITIES SHALL BE ADJUSTED APPROPRIATELY.
- 4A. THE MAXIMUM RECOMMENDED DISTANCE(S) BETWEEN CHANNELIZING DEVICES IN THE TAPER AREA(S) SHOULD BE 15 FEET AND SHOULD BE EQUAL IN FEET TO TWICE THE POSTED SPEED IN MILES PER HOUR IN THE PARALLEL AREA(S).
5. FOR OVERNIGHT CLOSURES, TYPE III BARRICADES SHALL BE LIGHTED.
6. WHEN CALLED FOR IN THE FHWA ACCEPTANCE LETTER FOR THE SIGN SYSTEM SELECTED, THE TYPE A WARNING FLASHER, SHOWN ON THE WARNING SIGNS, SHALL BE POSITIONED ON THE SIDE OF THE SIGN NEAREST THE ROADWAY.
7. ALL TEMPORARY SIGNS, TYPE III BARRICADES, THEIR SUPPORT SYSTEMS AND LIGHTING REQUIREMENTS SHALL MEET NCHRP 350 CRASHWORTHLY REQUIREMENTS STIPULATED IN THE CURRENT EDITION OF THE MICHIGAN MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES, THE CURRENT EDITION OF THE STANDARD SPECIFICATIONS FOR CONSTRUCTION, THE STANDARD PLANS AND APPLICABLE SPECIAL PROVISIONS. ONLY DESIGNS AND MATERIALS APPROVED BY MDOT WILL BE ALLOWED.
9. ALL TRAFFIC REGULATORS SHALL BE PROPERLY TRAINED AND SUPERVISED.
- 9A. IN ANY OPERATION INVOLVING MORE THAN ONE TRAFFIC REGULATOR, ONE PERSON SHOULD BE DESIGNATED AS HEAD TRAFFIC REGULATOR.
10. ALL TRAFFIC REGULATORS' CONDUCT, THEIR EQUIPMENT, AND TRAFFIC REGULATING PROCEDURES SHALL CONFORM TO THE CURRENT EDITION OF THE MICHIGAN MANUAL OF UNIFORM TRAFFIC CONTROL DEVICES (MMUTCD) AND THE CURRENT EDITION OF THE MDOT HANDBOOK ENTITLED "TRAFFIC REGULATORS INSTRUCTION MANUAL."
11. WHEN TRAFFIC REGULATING IS ALLOWED DURING THE HOURS OF DARKNESS, APPROPRIATE LIGHTING SHALL BE PROVIDED TO SUFFICIENTLY ILLUMINATE THE TRAFFIC REGULATOR'S STATIONS.
- 12E. THE MAXIMUM DISTANCE BETWEEN THE TRAFFIC REGULATORS SHALL BE NO MORE THAN 2 MILES IN LENGTH UNLESS RESTRICTED FURTHER IN THE SPECIAL PROVISIONS FOR MAINTAINING TRAFFIC. ALL SEQUENCES OF MORE THAN 2 MILES IN LENGTH WILL REQUIRE WRITTEN PERMISSION FROM THE ENGINEER BEFORE PROCEEDING.
13. WHEN INTERSECTING ROADS OR SIGNIFICANT TRAFFIC GENERATORS (SHOPPING CENTERS, MOBILE HOME PARKS, ETC.) OCCUR WITHIN THE ONE-LANE TWO-WAY OPERATION, INTERMEDIATE TRAFFIC REGULATORS AND APPROPRIATE SIGNING SHALL BE PLACED AT THESE LOCATIONS.
14. ADDITIONAL SIGNING AND/OR ELONGATED SIGNING SEQUENCES SHOULD BE USED WHEN TRAFFIC VOLUMES ARE SIGNIFICANT ENOUGH TO CREATE BACKUPS BEYOND THE W3-4 SIGNS.
15. THE HAND HELD (PADDLE) SIGNS REQUIRED BY THE MMUTCD TO CONTROL TRAFFIC WILL BE PAID FOR AS PART OF FLAG CONTROL.
- 16A. ADDITIONAL SPEED LIMIT SIGNS REFLECTING THE REDUCED SPEED SHALL BE PLACED AFTER EACH MAJOR CROSSROAD THAT INTERSECTS THE WORK AREA WHERE THE REDUCED SPEED IS IN EFFECT, AND AT INTERVALS ALONG THE ROADWAY SUCH THAT NO SPEED LIMIT SIGNS REFLECTING THE REDUCED SPEED ARE MORE THAN TWO MILES APART.
- 16B. WHEN REDUCED SPEED LIMITS ARE UTILIZED IN THE WORK AREA, ADDITIONAL SPEED LIMIT SIGNS RETURNING TRAFFIC TO ITS NORMAL SPEED SHALL BE PLACED BEYOND THE LIMITS OF THE REDUCED SPEED AS INDICATED.
- 16E. WHEN EXISTING SPEED LIMITS ARE REDUCED MORE THAN 10 MPH, THE SPEED LIMIT SHALL BE STEPPED DOWN IN NO MORE THAN 10 MPH INCREMENTS.
- 28E. THE TRAFFIC REGULATORS SHOULD BE POSITIONED AT OR NEAR THE SIDE OF THE ROAD SO THAT THEY ARE SEEN CLEARLY AT A MINIMUM DISTANCE OF 500 FEET. THIS MAY REQUIRE EXTENDING THE BEGINNING OF THE LANE CLOSURE TO OVERCOME VIEWING PROBLEMS CAUSED BY HILLS AND CURVES.

## SIGN SIZES

DIAMOND WARNING            - 48" x 48"  
 RECTANGULAR REGULATORY - 48" x 60"  
 R5-18c REGULATORY        - 48" x 48"

161

NOT TO SCALE



DRAWN BY: CON:AE:djf  
 CHECKED BY: BMM:CRB

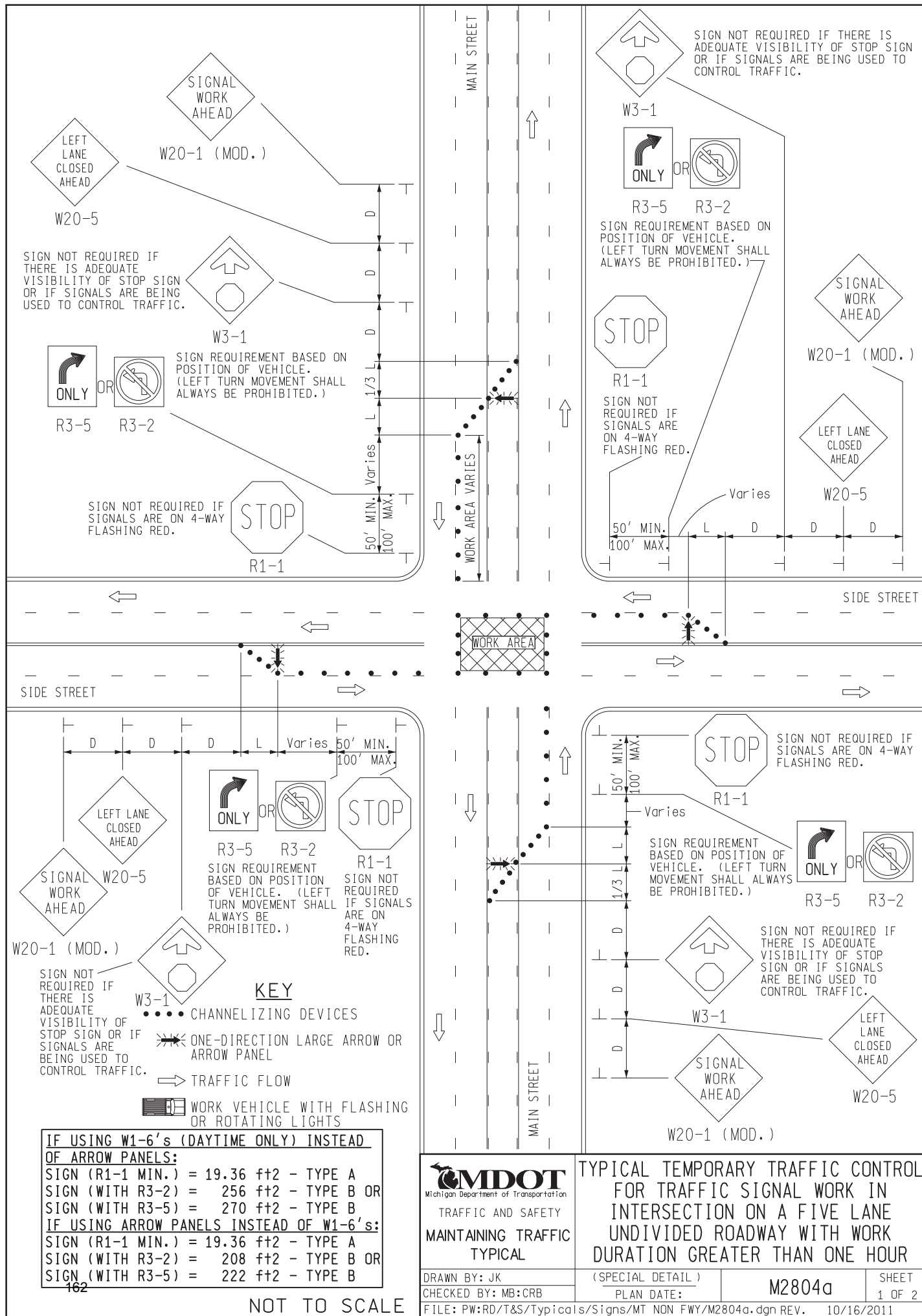
TYPICAL TEMPORARY TRAFFIC CONTROL FOR  
 A TWO-LANE TWO-WAY ROADWAY WHERE ONE  
 LANE IS CLOSED UTILIZING TRAFFIC  
 REGULATORS AND USING A SINGLE STEP  
 DOWN IN SPEED LIMIT

OCTOBER 2011  
 PLAN DATE:

M0150a

SHEET  
 2 OF 2

FILE: PW RD/TS/Typicals/Signs/MT NON FWY/M0150a.dgn REV. 10/04/2011




NOT TO SCALE

## NOTES:

- 1G. D = DISTANCE BETWEEN TRAFFIC CONTROL DEVICES AND LENGTH OF LONGITUDINAL BUFFERS 1/3 L = MINIMUM LENGTH OF TAPER SEE M0020a FOR "D" AND "L" VALUES
2. ALL NON-APPLICABLE SIGNING WITHIN THE CONSTRUCTION INFLUENCE AREA (CIA) SHALL BE MODIFIED TO FIT CONDITIONS, COVERED OR REMOVED.
3. DISTANCES BETWEEN SIGNS, THE VALUES FOR WHICH ARE SHOWN IN TABLE D, ARE APPROXIMATE AND MAY NEED ADJUSTING AS DIRECTED BY THE ENGINEER.
- 4C. THE MAXIMUM RECOMMENDED DISTANCE(S) BETWEEN CHANNELIZING DEVICES IN THE TAPER AREA(S) SHOULD BE 15 FEET.
7. ALL TEMPORARY SIGNS, TYPE III BARRICADES, THEIR SUPPORT SYSTEMS AND LIGHTING REQUIREMENTS SHALL MEET NCHRP 350 CRASH WORTHY REQUIREMENTS STIPULATED IN THE CURRENT EDITION OF THE MICHIGAN MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES, THE CURRENT EDITION OF THE STANDARD SPECIFICATIONS FOR CONSTRUCTION, THE STANDARD PLANS AND APPLICABLE SPECIAL PROVISIONS. ONLY DESIGNS AND MATERIALS APPROVED BY MDOT WILL BE ALLOWED.
26. THE ARROW PANEL SHALL BE LOCATED AT THE BEGINNING OF THE TAPER AS SHOWN. WHEN PHYSICAL LIMITATIONS RESTRICT ITS PLACEMENT AS INDICATED, THEN IT SHALL BE PLACED AS CLOSE TO THE BEGINNING OF THE TAPER AS POSSIBLE.
32. THESE SIGNS SHALL BE LEFT IN PLACE AT THEIR PRESCRIBED LOCATIONS AND UNTIL ALL TEMPORARY TRAFFIC CONTROL HAS BEEN REMOVED.
35. THESE SIGNS ARE INTENDED TO BE USED WITHIN THE LIMITS OF THE TEMPORARY SEQUENCE SIGNING AS IS SHOWN ON 1 OF 2. THESE SIGNS ARE NOT TO BE INTERMINGLED WITH ANY OTHER TEMPORARY SEQUENCE SIGNING EXCEPT AS SHOWN.
- EXISTING SIGNAL SHALL BE EITHER 4-WAY FLASHING RED, BAGGED, OR TURNED OFF.
- WORK AREA AND TAPERS DELINEATED BY 28" CONES (DAYTIME) OR GRABBER CONES (NIGHTTIME).
- TARGET ARROW W1-6 (DAYTIME) OR ARROW BOARD (NIGHTTIME).
- IF THE AERIAL BUCKET IS LOCATED OVER ACTIVE TRAVEL LANE(S), THE CONTRACTOR MUST HAVE A DESIGNATED PERSON "SPOTTER" ENSURING THAT THE LOWEST POINT OF THE BUCKET DOESN'T TRAVEL BELOW THE MINIMUM 14 FOOT VERTICAL CLEARANCE REQUIREMENTS, THE SPOTTER SHOULD KNOW THE ACTUAL HEIGHT OF THE SIGNAL TO DETERMINE THE MINIMUM WORKING HEIGHT.
- SUFFICIENT VERTICAL DISTANCE FROM ACTIVE TRAFFIC MUST BE MAINTAINED AT ALL TIMES. IF THE WORK OPERATION REQUIRES THE MINIMUM 14 FOOT WORKING HEIGHT TO BE COMPROMISED, THE CONTRACTOR SHALL EITHER UTILIZE AN ALTERNATE SET UP OR PLACE THE INTERSECTION IN A 4 WAY STOP USING APPROPRIATE SIGNING AND USE A TRAFFIC REGULATOR TO CONTROL TRAFFIC THROUGH THE INTERSECTION.
- ALL SIGNS SHOULD BE CONTAINED WITHIN THE SIGNAL INFLUENCE AREA.

### SIGN SIZES

DIAMOND WARNING	- 48" x 48"
MANDATORY MOVEMENT (R3-5)	- 30" x 36"
ONE-DIRECTION LARGE ARROW (W1-6)	- 48" x 24"
STOP (R1-1)	- 36" x 36" MIN.
TURN PROHIBITION (R3-2)	- 24" x 24"

 Michigan Department of Transportation  TRAFFIC AND SAFETY  MAINTAINING TRAFFIC TYPICAL		TYPICAL TEMPORARY TRAFFIC CONTROL FOR TRAFFIC SIGNAL WORK IN INTERSECTION ON A FIVE LANE UNDIVIDED ROADWAY WITH WORK DURATION GREATER THAN ONE HOUR		
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# MDOT Signals Asset Management (SigAMS) Proposed Workflow

This document includes MDOT signals unit’s proposed asset management workflow for traffic signal and electronic traffic control devices.

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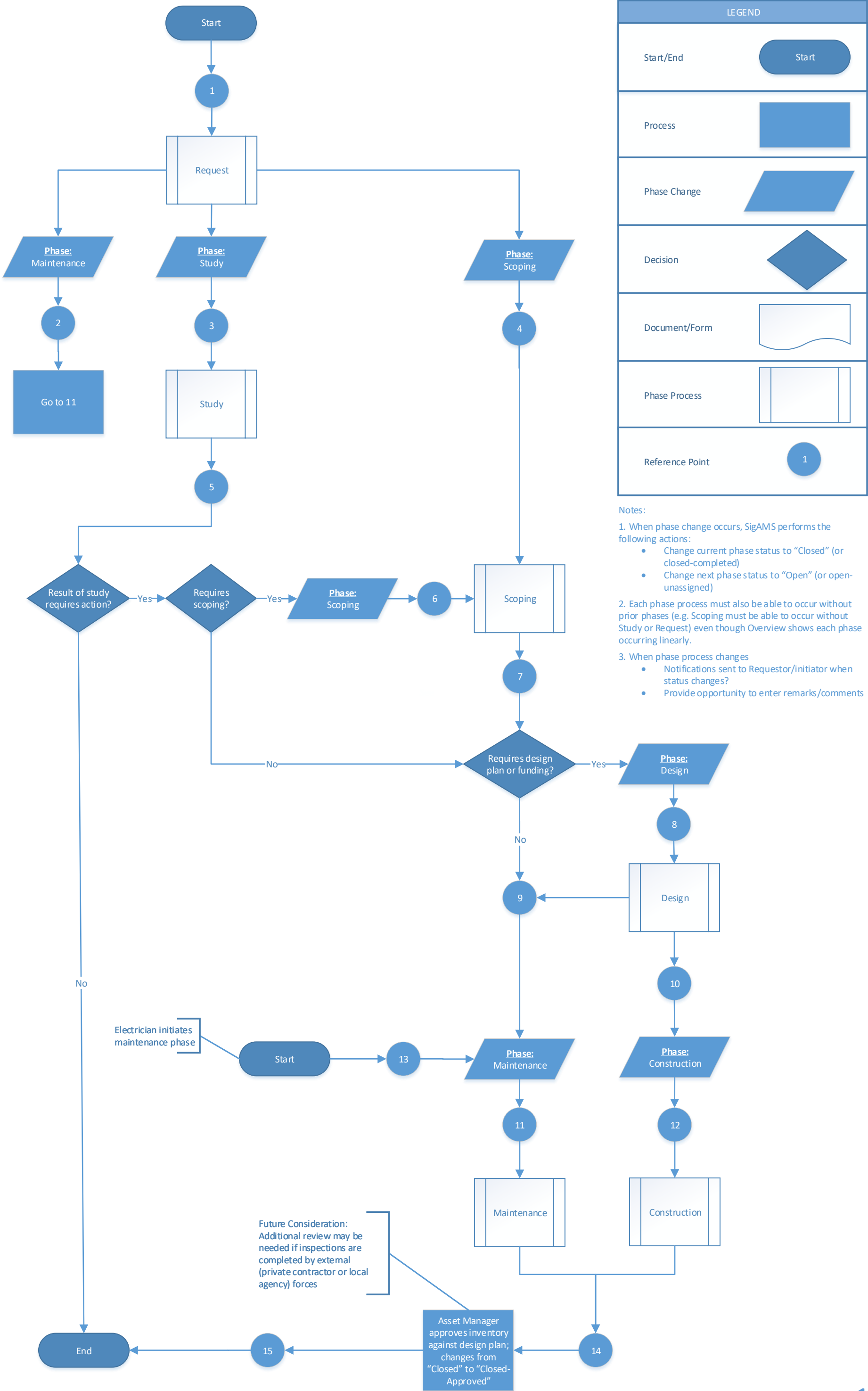
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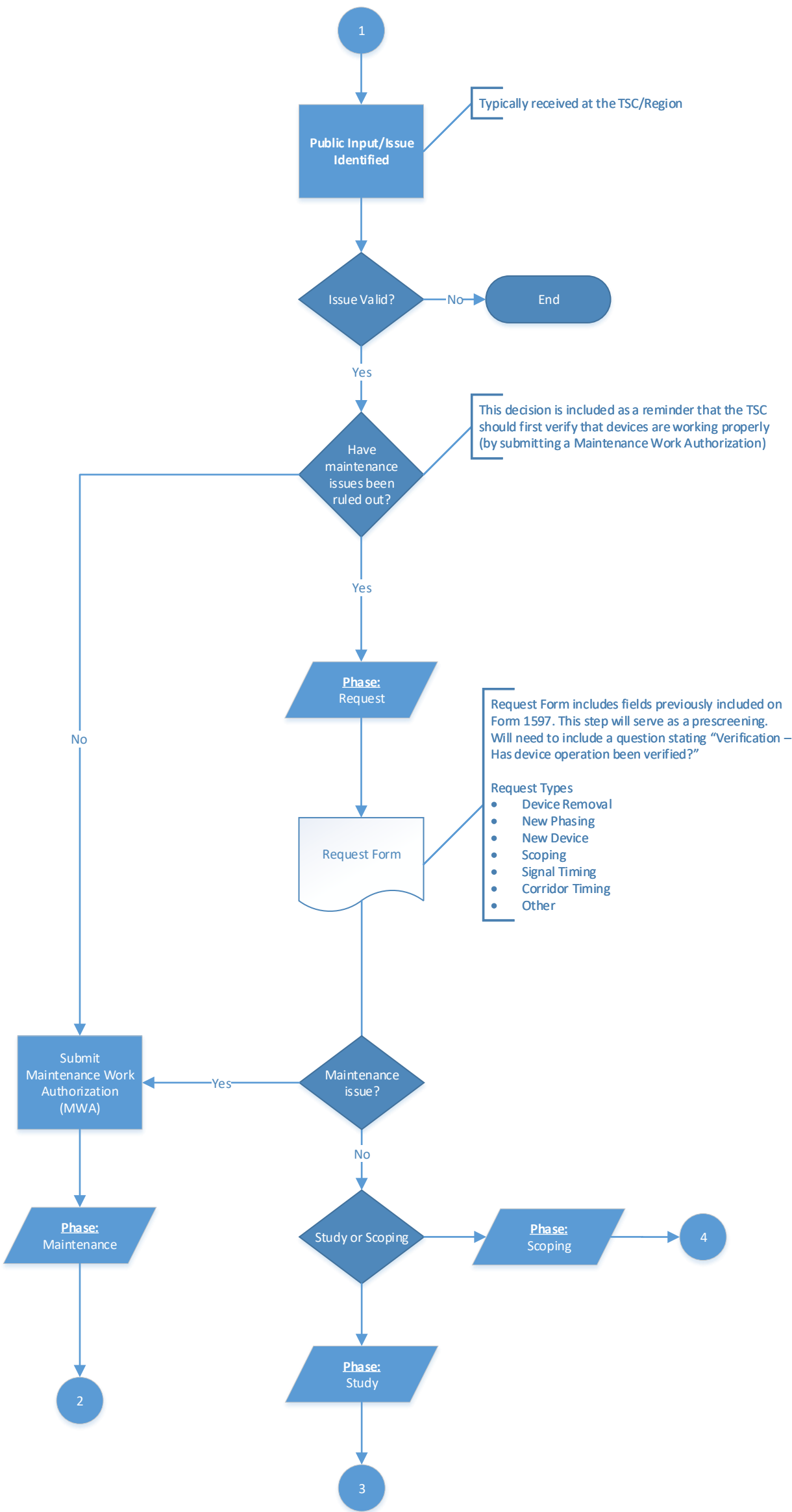


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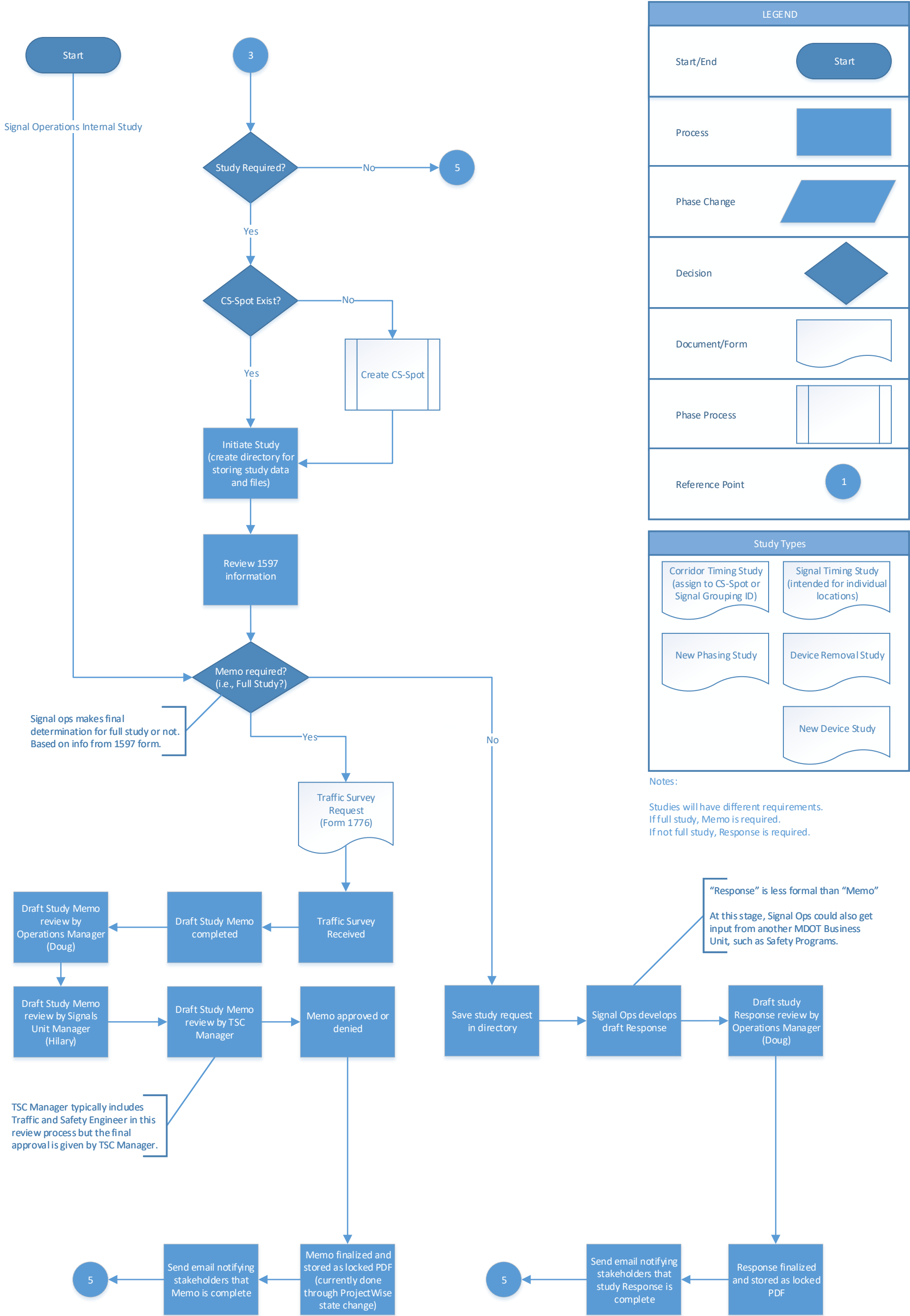


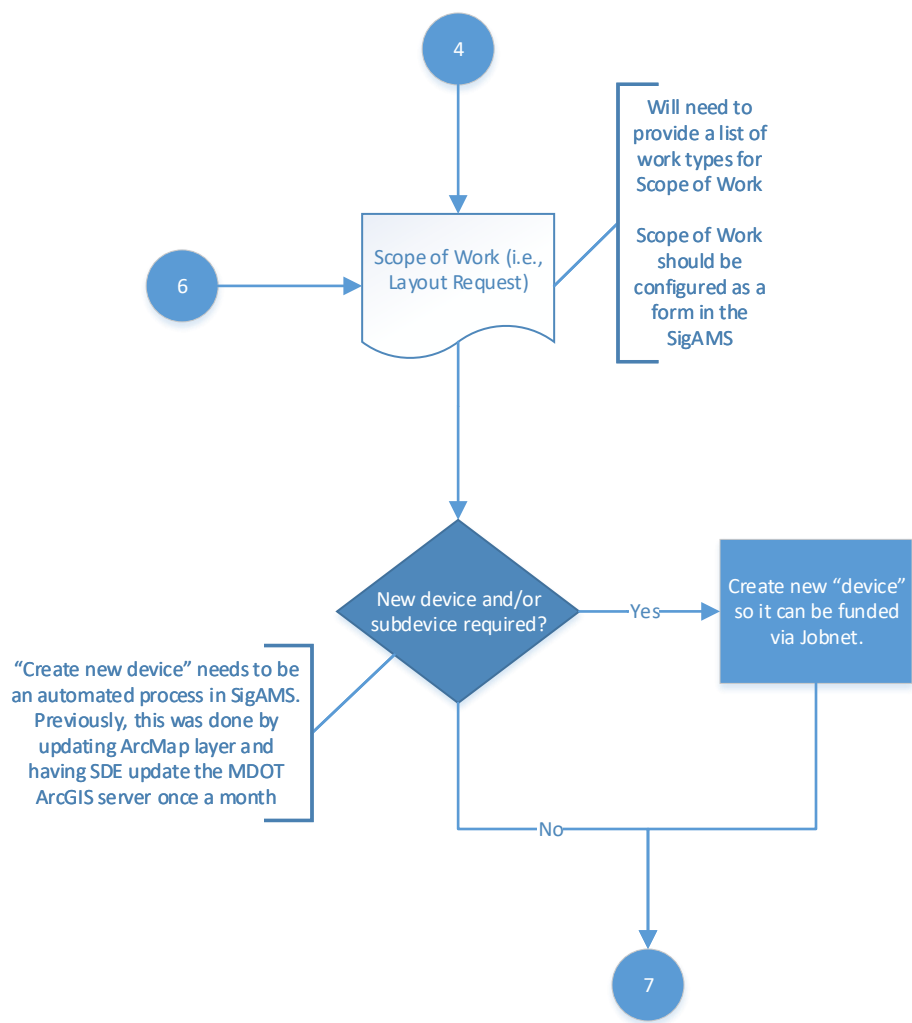






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Decision	
Document/Form	
Phase Process	
Reference Point	1

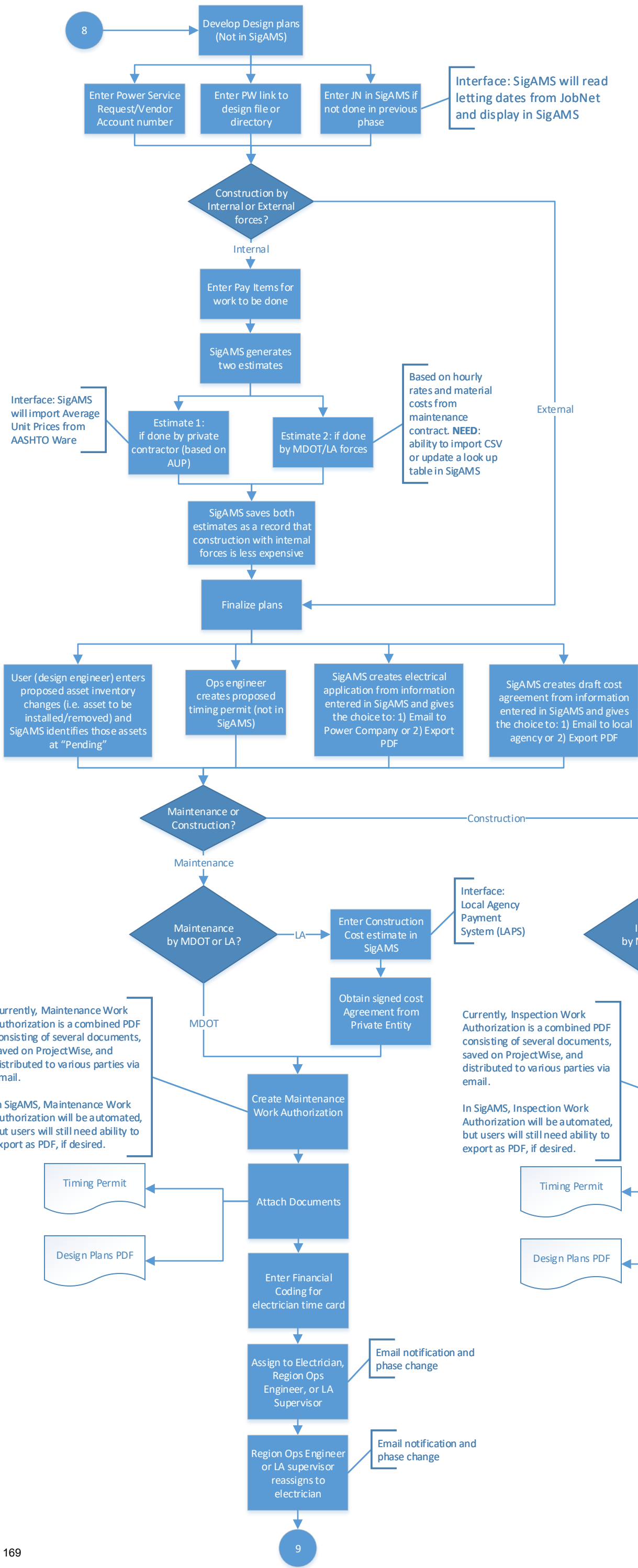




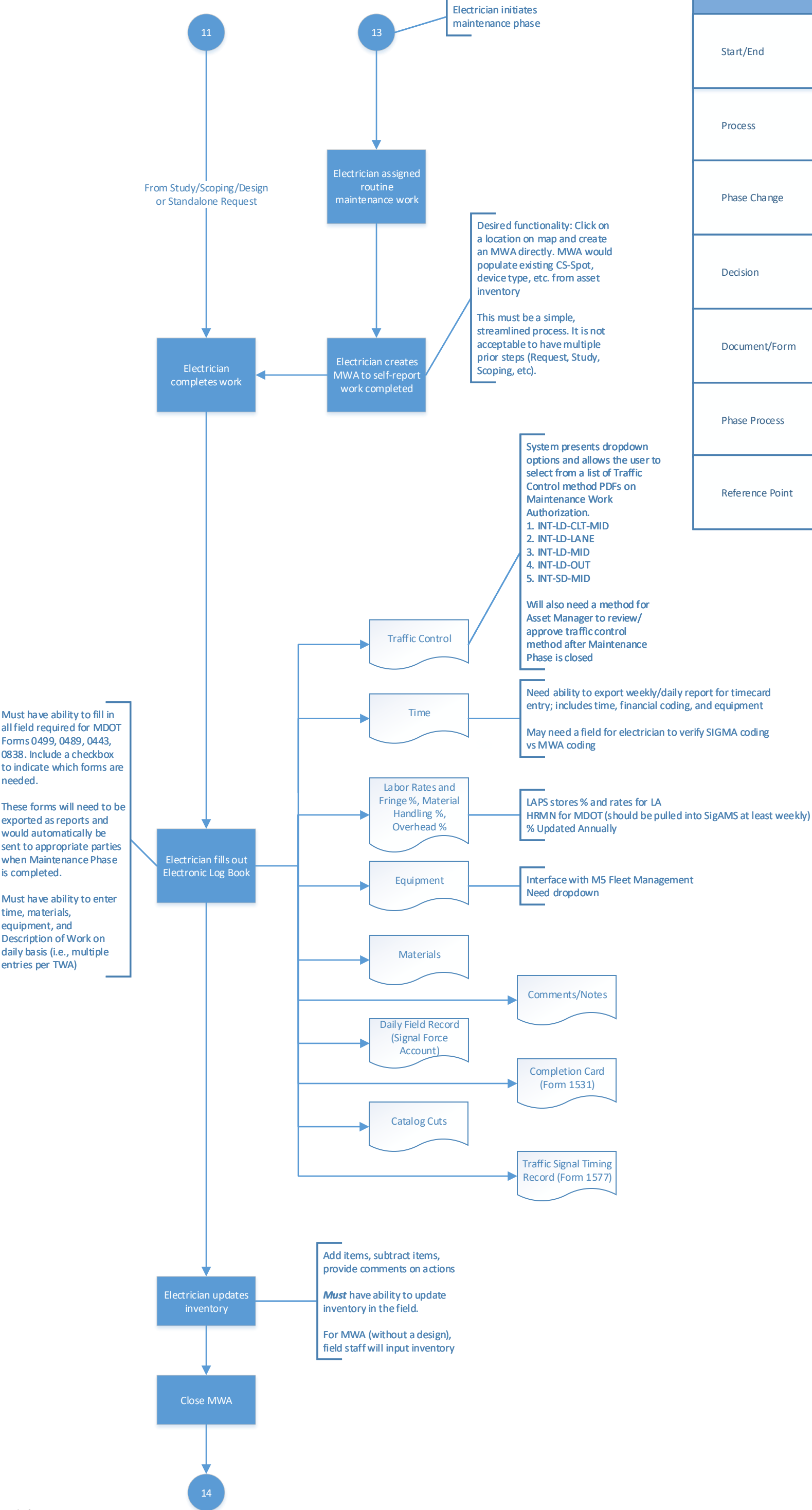
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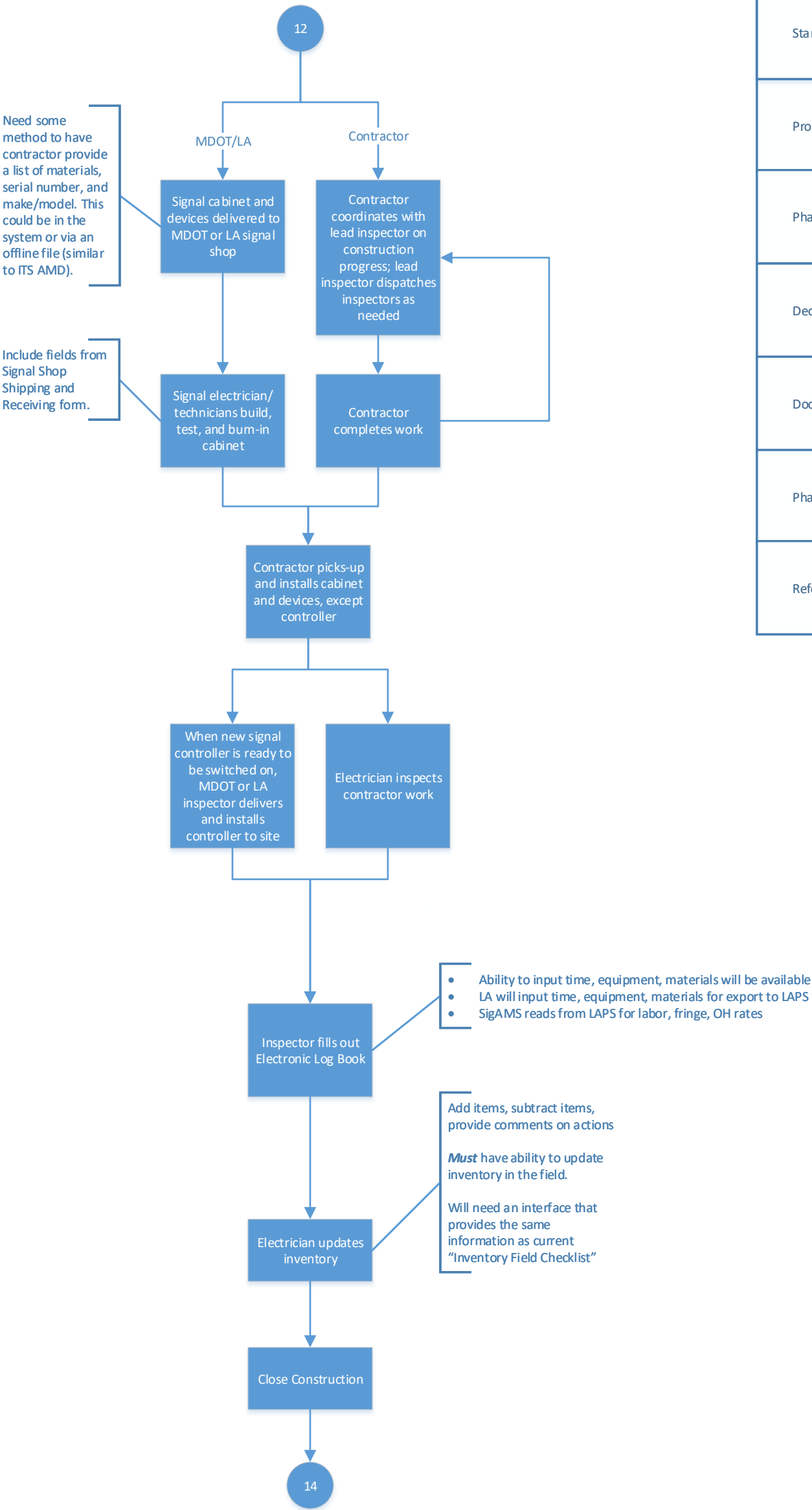
LEGEND	
Start/End	Start
Process	
Phase Change	
Decision	
Document/Form	
Phase Process	
Reference Point	1

- Cost Agreement is based on % cost share multiplied by an average cost
- Average cost and % share and is based on “# of openings”
- Moving forward, SigAMS will use signal-specific maintenance costs, rather than average cost based on “# of openings”
- Initially, signal-specific maintenance costs would need to be pulled from a static lookup list
- After sufficient maintenance cost history has been established in SigAMS, it would need to dynamically pull this from maintenance costs entered into SigAMS



LEGEND	
Start/End	Start
Process	
Phase Change	
Decision	
Document/Form	
Phase Process	
Reference Point	1





LEGEND	
Start/End	Start
Process	
Phase Change	
Decision	
Document/Form	
Phase Process	
Reference Point	1

## SigAMS COTS Requirements Glossary:

Some terms used within the requirements may not be familiar to individuals new to the business process. These terms are defined here to assist with the understanding of the requirements.

Term/Acronym	Description
AASHTOWare	AASHTOWare is an infrastructure construction software designed to assist project managers with different types of work, such as highway or bridge design. AASHTOWare is created and updated by the American Association of State Highway and Transportation Officials.
Approach	One of the segments at the intersection of two roadways. Same as leg, but typically using a different naming convention (northbound approach, southbound approach, eastbound approach, westbound approach).
ArcGIS / GIS	Geographic Information System Tool
Asset attributes	Features and qualities specific to each individual asset. For example, the installation date of a signal controller is an attribute of that asset.
Asset Inventory/Signal Assets	A system of components/assets (e.g., controller, signal head, pole) that serves a traffic operations purpose. Examples: traffic signal, intersection control beacon, curve warning system. There is a list of approximately 30 device types in SAFESTAT.
Asset Manager	A person responsible for keeping track of devices and assets that are in use throughout the traffic signal inventory. This person is responsible for monitoring the new asset management system to ensure its proper use including final approval of all completed construction and maintenance phase activities.
CAD Design File (DGN file)	Computer-Aided Design files are generated by CAD software programs and used to generate a traffic signal design. Bentley Microstation is a CAD software that creates CAD files in DGN format.
Catalog Cuts	Catalog cuts include standard drawings, diagrams, illustrations, schedules, performance charts, and other items, submitted by a contractor to illustrate some portion of work done on a specific project.

CIWA	Construction Inspection Work Authorization (CIWA) – Work authorization for the inspection of construction projects.
Completion Card	Completion Card refers to MDOT form 1531.
Contractor	The organization, typically a private entity, responsible for construction of an electronic traffic control device project.
Control Section	A Control Section, or CS, is a five-digit number assigned to a segment of an MDOT roadway. The first two digits are the county number. The remaining digits are typically unique for each route number within that county. Control Section numbers are only assigned to MDOT roadways. Non-MDOT roadways are not assigned Control Section numbers.
Cost Share Agreement	A document that specifies how the maintenance and power costs of a traffic signal are shared between MDOT and a local agency.
CS	A Control Section, or CS, is a five-digit number assigned to a segment of an MDOT roadway. The first two digits are the county number. The remaining digits are typically unique for each route number within that county. Control Section numbers are only assigned to MDOT roadways. Non-MDOT roadways are not assigned Control Section numbers.
CSCS	Central Signal Control System
CS-Spot	CS-Spot is the combination of a control section (CS) number and a sequential spot number (spot). In SAFESTAT, the CS-Spot combination was used as the unique identifier for an electronic traffic control device.
Default Sort order	Order the table records can be displayed – Ascending/Descending/Alphabetical.
Delivery Type	Method by which work is to be completed including CIWA, PIWA, SWA, & MWA.
Design	System includes a module (referred to as Design phase) through which users can enter information related to the final design of the traffic operations device. Design information includes:
	1. Construction cost estimate
	2. Utility (Power Service) request tracking
	3. Listing of asset inventory to be installed
	4. Funding/financial information
	Local agency/Private entity cost agreement tracking.
Device type CS-Spot	A type of CS-Spot with at least one associated electronic traffic control device and asset inventory.



Device	A system of components/assets (e.g., controller, signal head, pole) that serves a traffic operations purpose. Examples: traffic signal, intersection control beacon, curve warning system. There is a list of approximately 30 device types in SAFESTAT.
Electronic Logbook	A term used to describe System functionality to allow electricians who maintain MDOT traffic signals to keep a record of activities electronically in the System. This includes a description of work, time/labor, equipment, and materials.
Equipment Costs	Costs associated with equipment used to complete a work authorization. Examples of equipment costs include bucket truck, crane, van, etc.
Fiscal Control Number	The Fiscal Control Number connects the work authorization data in the system to the payment and other work authorization details in the local agency payments system (LAPS).
Fleet Management System (M5)	A web-based software application used to administer and manage an organizational (such as MDOT) fleet of vehicles.
Geographical/Geospatial	Geographical data is based on or derived from the physical features of an area. Geospatial data is data that has a geographical component.
GIS / ArcGIS	Geographic Information System
GIS CS Layer	A polygon layer in a GIS map that displays the location of each Control Section throughout the roadway network.
GUI	Graphical User Interface
HRMN	Human Resources Management Network
Intersection (Leg)	One of the segments at the intersection of two roadways. Same as approach, but typically using a different naming convention (north leg, south leg, east leg, west leg).
Inventory/Signal Inventory	A complete list of electronic traffic control assets, such as signal controllers, signal heads, poles, detection, etc.
IWA	An Inspection Work Authorization (IWA) is a work authorization (i.e., work order) assigned to an electrical inspector for the inspection of a construction project. Construction is typically completed by a private contractor.
Job Number	A number assigned to a certain task or project which is used for funding, recordkeeping, and job tracking.
JobNet	A software application internal to the State of Michigan that is used for funding projects.
LA	Local Agency (LA) is the governmental agency within whose legal boundaries certain devices reside.

LAPS	Local Agency Payment System: Software system that processes payments to local agencies. Several local agencies are paid to maintain MDOT owned electronic traffic control devices.
Location	The geographical location at which a certain device is located.
LPI	Lean Process Improvement
M5 Fleet Management System (M5)	A web-based software application used to administer and manage an organizational (such as MDOT) fleet of vehicles.
Maintaining Agency	A public agency, such as county road commission, responsible for maintaining an electronic traffic control device, such as a traffic signal.
Maintenance Costs	Costs associated with maintenance and upkeep of devices and other assets, including time, materials, and equipment. For example, the time and materials needed to repair a defective signal head would be a maintenance cost.
Maintenance Table	A table that can be maintained (add, update, save, delete records) using a GUI or the application screen on the system.
Material Costs	The cost of material, including an asset such as signal controller, signal head, electrical cable.
MDOT	Michigan Department of Transportation
Memo	Documentation of study conclusion.
MIDB	Michigan Information Database
MILogin	MILogin is State of Michigan's Identity, Credential and Access Management solution. The MILogin solution provides enhanced single sign-on capabilities in addition to meeting many other business requirements, security, and compliance needs.
Modernization (term from data migration requirements)	Modernization refers to the updating of some components (partial modernization) or all components (full modernization) of an electronic traffic control device.
MWA	A Maintenance Work Authorization (MWA) is a work authorization consisting of work requiring no special funding or design (electrician would charge to maintenance funding).
PDRP	The Property Damage Reclamation Process is used to track crashes that cause damage to state property such as traffic signals.
PIWA	A Permit Inspection Work Authorization (PIWA) is a work authorization for the inspection of a construction permit project. Construction is typically completed by a private contractor.

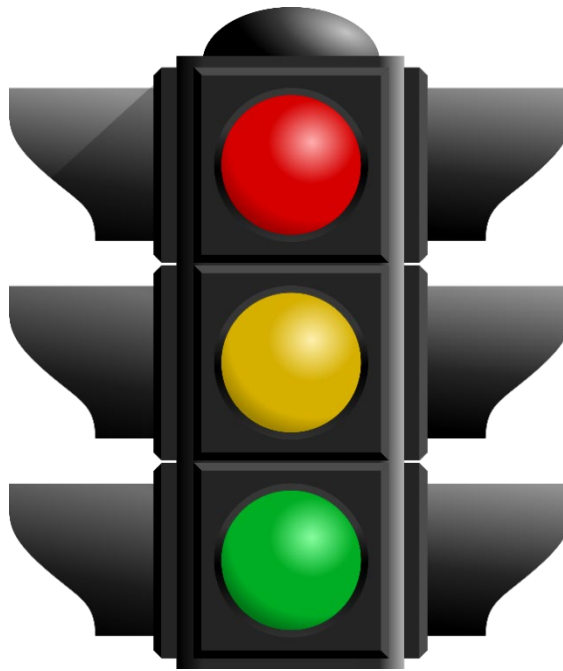
Phase	<p>System Phases include Request, Study, Scoping, Design, Construction, &amp; Maintenance. System Phase identifies stage of activity and generally represents distinct work areas responsible for that specific stage of activity.</p> <p>Phase is also used to refer to coding for job numbers used in billing and time keeping systems. Examples include CON (construction), PE (preliminary engineering).</p>
Power Service Request	A request submitted to a power company to install a new power service at a new or reconstructed signal.
PR	A Physical Reference Number (PR) is a number assigned to a specific segment of roadway. PR numbers are assigned to all roadway segments in Michigan including both MDOT and non-MDOT roadways.
PR Mile Point	Physical Road Mile Points are distances along the PR at which signal assets are located.
Private Entities	Typically refers to companies that enter into a cost sharing agreement if they own a driveway that constitutes an approach to a signalized intersection.
ProjectWise	Document repository for MDOT traffic signal documentation, including design DGN, previous IWA/TWA, and studies.
QR Code	A Quick Response (QR) Code is a type of matrix barcode that can be scanned by an imaging device, such as a camera on a smartphone, that then redirects the user to a certain application, such as a website.
Request	A System phase used to initiate the investigation of traffic signal operating conditions, signal maintenance, new device, new phasing, or other traffic operation adjustment at an existing CS-Spot or new location.
SAFESTAT	Current/legacy Signal Asset Management system
SAM	Security Access Manager (MDOT's security role management system).
Scoping	A phase module in which the work to be completed and devices to be installed are identified. Scoping phase is based on completing MDOT's existing Layout Request Form.
SigAMS	Proposed name for the new Signal Asset Management System.
SIGMA	Statewide Integrated Governmental Management Application - Is state government's enterprise wide financial system (has time entry system integrated in it).

Signal Assets/Asset Inventory	A system of components/assets (e.g., controller, signal head, pole) that serves a traffic operations purpose. Examples: traffic signal, intersection control beacon, curve warning system. There is a list of approximately 30 device types in SAFESTAT.
Signal Layer	A point layer in a GIS map that displays the location of each traffic signal on the roadway network. The existing 'Signal Layer' includes other electronic traffic control devices in addition to traffic signals.
Signal Study Screening form - 1597	Existing document currently in excel format which has many data fields to be supplied by requestor.
SOM	State of Michigan
Study type CS-Spot	A type of CS-Spot only associated with traffic studies (i.e., memos), no associated electronic traffic control devices or asset inventory.
Study	A system phase in which a study may be conducted to determine if a new device is warranted, or if a change in the operation of an existing device is warranted.
Sub-device	In SAFESTAT, a sub-device was defined as the second device at a CS-Spot. Sub-device will not be a classification in the new System. Existing sub-devices will be converted to devices in the new System.
SWA	A Signal Work Authorization (SWA) is a work authorization consisting of more complex work that requires a funding source and typically requires a design.
System Internal Users	MDOT Employees.
Template	Pre-composed or drafted letter or form with placeholders for other necessary data.
Timing Permit	A form that contains all pertinent information as to how a signal controller operates at a specific intersection. This information includes green, yellow, and red times, hours during which the controller flashes, and the order of the various movements through the intersection. Timing permit is in a standard PDF format.
TSC	Transportation Service Center
TWA	A Transportation Work Authorization (TWA) is more of a generic reference to either an IWA, or an SWA, or an MWA.
VPN	Virtual Private Network

Wattage	A measure of electrical power expressed in watts. Traffic signal electrical costs are calculated by estimating the number of steady and cyclical watts a signal will use, and then sending that estimate to the relevant power company. The power company then bills MDOT based on the estimated wattage.
Wireless Data Request	Refers to MDOT form 2152.
Workflow	System's workflow consists of Phases called – Request, Study, Scoping, Design, Maintenance, and Construction. Any work performed, based on the type of work, goes through one or more Phases of the workflow. Each Phase has statuses defined. When created, a Phase is assigned a unique ID, by which Phases can be searched. System sends a notification for each Status change and for each Phase change. Once closed, a Phase can only be re-opened by the Admin.

# Signal Asset Management System (SigAMS)

## Data Collection Guide



*October 2020* | *Version 4*

Prepared for:



Prepared by:



## Document Control

Document Control Panel				
Version No	Author	Reviewer	Date	Modifications
1.0	Matthew Boelkins/Tim Brandstetter, PE, PTOE	Michael Lodes, PE	7/13/2020	Draft
2.0	Matthew Boelkins/Tim Brandstetter, PE, PTOE	Michael Lodes, PE	7/21/2020	Additional asset examples and addressed MDOT signals unit comments
3.0	Matthew Boelkins	Tim Brandstetter, PE	9/23/2020	Completed asset examples; addressed comments from MDOT regions and MDOT ITS
4.0	Tim Brandstetter, PE	Michael Lodes, PE	10/5/2020	Addressed MDOT comments

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## KEY TERMS

Term/Acronym	Description
<b>SOM</b>	State of Michigan
<b>MDOT</b>	Michigan Department of Transportation
<b>TSC</b>	Transportation Service Center
<b>CSCS</b>	Central Signals Control System
<b>LPI</b>	Lean Process Improvements
<b>SigAMS</b>	Signal Asset Management System
<b>GIS</b>	Geographic Information System
<b>ProjectWise</b>	Central repository of all MDOT production specs and documents for all projects
<b>PR</b>	Physical Reference
<b>PRMP</b>	Physical Reference Mile Point
<b>CSS</b>	Control Section Spot Number
<b>CS MP</b>	Control Section Mile Point
<b>EPIC</b>	Eagle Programmable Interval Console
<b>EPAC</b>	Eight Phase Actuated Controller
<b>RSU</b>	Roadside Unit
<b>MMU</b>	Malfunction Management Unit
<b>TWA</b>	Transportation Work Authorization
<b>IWA</b>	Inspection Work Authorization
<b>SWA</b>	Signal Work Authorization
<b>MWA</b>	Maintenance Work Authorization

## 1 INTRODUCTION

A comprehensive asset management system encompasses the entire life cycle of assets from capital planning, construction management and commissioning, monitoring operational performance, managing the maintenance of assets, and tracking asset and infrastructure condition for renewal and replacement decision making. Through a systematic approach, the agency can act on an enterprise-wide basis to:

- Prioritize projects to determine how best to spend current budgets.
- Plan successfully for capital development and maintenance impact on operations.
- Extend life cycles through increased focus on preventative maintenance and promote the long-term sustainability of civil infrastructure and related assets
- Improve capital planning by anticipating and budgeting for future repairs and replacements.

The Michigan Department of Transportation's (MDOT) Signals Unit has been using an existing signal database (SAFESTAT) for the purposes of asset management. SAFESTAT was selected for a lean process improvement (LPI) in 2018. The LPI recommendation was to develop a new signal asset management system that ties together design, construction, finance, maintenance, and planning and operations by using existing data. Unless otherwise noted, the remainder of this document will use the term 'signal' to indicate all electronic traffic control devices. MDOT has decided to act upon the recommendation and is pursuing a new signal asset management system (SigAMS).

This document describes the assets that will be tracked in the SigAMS and provides a preliminary investigation of the data migration process from SAFESTAT to SigAMS. Specifically, it includes a description of the following:

- Devices and assets to be tracked
- Attributes to be collected for each asset
- Where applicable, the list of dropdown/data validation options for each attribute
- Existing data to be incorporated into SigAMS
- Data elements desired in the SigAMS but do not currently exist in an existing, suitable dataset

### 1.1 Project Background

SAFESTAT is the current database for the existing signals system. Currently, MDOT's Signals Unit utilizes the SAFESTAT application to manage traffic signal planning, design, construction, finance, maintenance, and operations. SAFESTAT does not allow MDOT to meet its objectives of achieving management efficiency, providing better accountability for work performed, and yielding more effective management of maintenance and operations and capital improvement costs.

As recognized during the LPI, SAFESTAT lacks critical functionality which limits its utility for MDOT staff. SAFESTAT suffers from several deficiencies with regards to its data organization, primarily by being unable to interface with other applications and databases. Furthermore, signal locations in

SAFESTAT are not properly geolocated and disconnected from enterprise GIS layers. Therefore, asset location data in SAFESTAT cannot be accurately triangulated and connected to other MDOT applications, slowing down inventory tracking, maintenance reporting, and overall ease of data analysis. Because of these technological inefficiencies, SAFESTAT is being phased out in favor of a new system that will migrate all relevant signal asset data as discussed in this document.

In 2013, the Michigan Department of Transportation (MDOT) signals unit began to create a signals layer in ArcMap including all electronic devices for a more user-friendly experience to track signals. In 2017, the signals layer was made available in JobNet for funding purposes. The ArcMap signals layer must be populated with newly proposed signals before funding can be available in JobNet. This requires the updating of both the ArcMap signals layer and the SAFESTAT database to fund, design, and construct new devices. The goal of the new system is to incorporate features of both systems into one.

## 2 DATA OVERVIEW

In order to create a comprehensive system, the data migrated and included in the SigAMS needs to be identified, clarified and defined. The proposed data for inclusion has been discussed and verified amongst stakeholders. The gaps in data between existing sources and proposed needs has been defined through analysis. The various sources of existing data and the proposed data needs are discussed below. Furthermore, this document will outline what data needs to be collected prior to system launch and what data can be collected over time.

### 2.1 Existing Data Source Overview

Currently, MDOT tracks signal equipment and assets via several methods. As discussed, SAFESTAT and the signals unit ArcMap layer are the two primary sources of existing data. However, several other sources of data exist that will be incorporated into the SigAMS, such as Excel spreadsheets and links to MDOT's ProjectWise system.

#### 2.1.1 SAFESTAT

The current asset inventory database, SAFESTAT, provides data relevant to signals throughout the State of Michigan (SOM) roadway network. The SAFESTAT database contains each asset included in the Signals jurisdiction, such as signal heads, controllers, signal supports and pedestrian heads. It is anticipated that this will be the main data source used to populate the SigAMS. However, it is important to note that SAFESTAT data accuracy is a significant concern. Specifically, many assets have been installed but are still marked "pending". This data accuracy issue should be mitigated during migration to ensure that the SigAMS is trustworthy (see subsequent sections for more detail).

### **2.1.2 ArcMap**

As stated earlier, the ArcMap signals layer was created in 2013. All electronic devices are stored within this GIS database. The ArcMap signals layer has been substantially verified as correct by physical reference (PR) number and mile point (MP) and will be the primary source of the geographical information about the device inventory for the SigAMS.

### **2.1.3 Additional Sources**

Multiple MDOT groups (e.g., maintenance electricians) have created signal asset tracking spreadsheets to meet needs that SAFESTAT could not. In many cases the information contained in these spreadsheets will be used to supplement the information tracked in other data sources (e.g., SAFESTAT, ArcMap layer). The following spreadsheets contain information that is intended to be integrated into the SigAMS:

- Signal Cabinet spreadsheet
- Detector Tracking spreadsheet
- LED module Tracking spreadsheet

### **2.1.4 ProjectWise**

ProjectWise is MDOT's electronic document management system used by both internal MDOT staff and external partners to store and manage documentation for all aspects of traffic signal asset lifecycle, including study, design, construction, and maintenance. Many of the documents (e.g., traffic studies, design DGN, etc) stored in ProjectWise were originally stored/managed in SAFESTAT. Over time and due to SAFESTAT limitations, MDOT signals unit has started saving most documents in ProjectWise rather than SAFESTAT. Certain items, such as pdfs of design plans and cost agreements, will be incorporated into the SigAMS from ProjectWise, either directly or via a link.

## **2.2 Proposed Data Structure Overview**

The proposed data structure is being design with flexibility to meet the following needs:

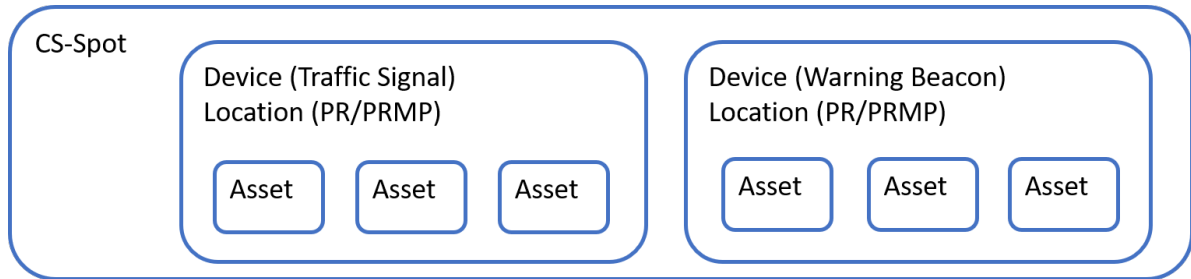
1. Answer planning level queries from signals unit staff
2. Serve the field technicians for maintenance efforts
3. Interface with other SOM systems
4. Facilitate data migration by aligning with the existing asset inventory.

In order to meet these needs, the proposed data structure is hierarchical and based on devices having associated assets. A device is considered a system of components (i.e., assets) that serves a traffic operations goal. For example, a traffic signal or intersection control beacon is considered a device. Each device is currently geospatially referenced by physical reference number and mile point. An asset is considered the items or components associated with the main device operation. Examples of assets include controllers, cabinets, poles, etc.

An overarching principle of the data is that all devices, and their accompanying assets, must be associated with a CS-Spot. A CS-Spot is a numerical combination of a Control Section and Spot

number that relates to a section of state trunkline, a referencing system utilized throughout MDOT. This allows for all devices and assets to be searchable based upon CS-Spot number.

It should be noted that due to the nature of the CS-Spot and definition of devices, multiple devices may be associated with a specific CS-Spot number. For example, a warning beacon and traffic signal may have the same associated CS-Spot number. This results in a data structure as defined in **Figure 2-1**.



**Figure 2-1: Proposed Data Structure**

There is significant concern regarding data accuracy in the existing SAFESTAT database and its subsequent migration into SigAMS. For example, the SAFESTAT database contains the following errors (note that these examples do not constitute an exhaustive list):

- Inventory status continues to appear as ‘pending’ even after it has been installed
- Devices and assets that have been retired still appear in the inventory database
- Duplicate assets, such as support poles, appear in the database
- Asset attribute (e.g., controller make and model) information is not properly up to date

## 2.3 Proposed Device List

The starting point for the proposed device list is the existing SAFESTAT device list shown in the leftmost column in **Table 2-1**. The existing list contains all the needed device types, but also includes multiple irrelevant devices, making the list cumbersome to use. As such, the proposed devices for the SigAMS have been streamlined as shown in **Table 2-1**. Several devices, such as traffic signals, will maintain the same device name in the proposed data structure while other devices, such as stop sign border lights, will be combined with similar devices into one category (Sign Border Lights). Irrelevant devices have been removed from the proposed device list and can be identified from a blank cell in the Proposed Device column. It is important to note that the proposed SigAMS will allow for future flexibility. This requirement will allow for adjustments to be made, as needed, as future device needs change.



Table 2-1: Existing and Proposed Devices

<b>Existing Device List</b>	<b>Migration Status</b>	<b>Proposed Device List</b>
Emergency Traffic Signal	No change	Emergency Traffic Signal
Traffic Signal	No change	Traffic Signal
Flashing Beacon	Rename	Intersection Control Beacon
Keep Right Sign	No change	Keep Right Sign
School Speed Limit Sign	No change	School Speed Limit Sign
School Crosswalk Sign Beacon	No change	School Crosswalk Sign Beacon
Street Lighting	Removed – no longer tracking	
Internally Illuminated Sign	Removed – no longer tracking	
Illuminated Crosswalk Sign	No Change	Illuminated Crosswalk Sign
Emergency Vehicle Sign Beacon	No change	Emergency Vehicle Sign Beacon
Miscellaneous	Removed	
Stop Sign Beacon	No change	Stop Sign Beacon
Warning Sign Beacon	No change	Warning Sign Beacon
Weigh Station	No change	Weigh Station
Illumination Sign (Flood Light)	Removed – no longer tracking	
Rural Intersection Warning System	No change	Rural Intersection Warning System
Pedestrian Hybrid Beacon (HAWK)	No change	Pedestrian Hybrid Beacon (HAWK)
School Speed Limit Sign (Border Lights)	Combined	Sign Border Lights
School Crosswalk Sign (Border Lights)	Combined	Sign Border Lights
Emergency Vehicle Sign (Border Lights)	Combined	Sign Border Lights
Warning Sign (Border Lights)	Combined	Sign Border Lights
Stop Sign (Border Lights)	Combined	Sign Border Lights
ITS	Removed – no longer tracking	
Movable Gate	No change	Movable Gate
Rectangular Rapid Flashing Beacon	No change	Rectangular Rapid Flashing Beacon
Environmental Sensor Station	Removed – no longer tracking	
Interconnect	No change	Interconnect
Crosswalk Overhead Flashing Beacon	No change	Crosswalk Overhead Flashing Beacon
Wrong Way Warning System	No change	Wrong Way Warning System
Curve Warning System	No change	Curve Warning System

## 2.4 Proposed Asset List

Assets are components associated with certain devices. In similar fashion to the device list, the proposed assets for the SigAMS have been streamlined and are listed in **Table 2-2**. The list of proposed assets was developed based on balancing the needs of field technicians, the needs for planning efforts, and the state of the currently available data sources. The goal is to be simple but useful for all parties. The attributes associated with each asset are described in detail in subsequent chapters of this document.

**Table 2-2: Proposed Assets**

<b><i>Proposed Asset</i></b>
Cabinet
Detection
Controller
Signal Heads
Pedestrian Heads
Support Structure
Case Sign

## 2.5 Traffic Operations Studies

In addition to physical assets, the SigAMS must also track the geographic locations and history of traffic operations studies. These will be tracked by CS-Spot numbers, in similar fashion to devices. The developed workflows for the SigAMS contain further details and system requirements for the tracking of traffic studies. The SigAMS will easily differentiate between CS-Spots with devices and those with only studies.

## 3 DEVICE ATTRIBUTES

The device attributes are the fields/data elements that will be collected and associated with each device. The majority of device attributes are consistent across the various device types. As a way to organize, the attributes have been separated into three categories: location, power, and administrative.

- Location: information needed to geolocate the device and ease of identification for each individual asset
- Power: wattage outputted by each individual device, which can be used to vet and verify power bills charged to MDOT
- Administrative: other relevant information, such as the device's maintaining agency and device status

The attribute fields have been developed to balance the need to query and track devices within the system with the desire to keep a simplified data set. Adding attribute fields increase the level of effort to keep the data contained in the system current and useful over its lifecycle. The device attribute fields have been designed to answer questions related to both planning and field/maintenance, including the following:

- How many traffic signals (or other device type such as flashing beacon) does MDOT operate?
- How many devices are located within a specific MDOT region, county, or control section?
- How many traffic signals utilize diagonal span vs. box span configuration?
- How many devices exist within a local jurisdiction (city, township, etc.), as determined by geospatial analysis (i.e., using an existing GIS layer to determine rather than needing a person to input the information)?
- How many devices are powered by a specific power company?
- How many devices have metered vs. un-metered (i.e., estimated wattage) power service?

### 3.1 Location Fields

Location data will include the CS and CS-Spot values for the device as well as the PR and PRMP, which can be used to geolocate the specific device. The location information will primarily be migrated from ArcMap.

**Table 3-1: Device Location Fields**

<b>Field</b>	<b>Field Description</b>	<b>Data Entry Options</b>	<b>Proposed Source</b>
CS	CS Number	#	ArcMap
CSS	Spot Number	#	ArcMap
DEVICE TYPE	Type of Device	See Table 2-1 for list of options	ArcMap
CS MP	Control Section Mile Point	#	ArcMap
PR	Physical Reference	#	ArcMap
PRMP	Physical Reference Mile Point	#	ArcMap
LOCATION DESC	Description of Location	Free text	ArcMap
LATITUDE	Latitude coordinate of the device	# (Decimal degrees)	ArcMap
LONGITUDE	Longitude coordinate of the device	# (Decimal degrees)	ArcMap
REGION	MDOT region device is located within	Drop-down list of MDOT regions	ArcMap

<b>Field</b>	<b>Field Description</b>	<b>Data Entry Options</b>	<b>Proposed Source</b>
COUNTY	County device is located within	Drop-down list of MI counties	ArcMap

### 3.2 Power Fields

Power data will be migrated to provide relevant information about each device, as well as allow MDOT to verify power bills. Power information will primarily be migrated from SAFESTAT.

**Table 3-2: Device Power Fields**

<b>Field</b>	<b>Field Description</b>	<b>Data Entry Options</b>	<b>Proposed Source</b>
POWER COMPANY	Power Service Provider	Drop-down list of options, solar included as option	SAFESTAT
CYCLIC WATTAGE	Estimated Cyclic Wattage	#	SAFESTAT
STEADY WATTAGE	Estimated Steady Wattage	#	SAFESTAT
METER SERVICE	Does a meter serve this location?	Yes, No	ArcMap
DISCONNECT	Is a disconnect present for this device?	Yes, No	New data source

### 3.3 Administrative Fields

Administrative data includes ancillary information not directly associated with the location or power categories including device status, maintaining agency, and installation method.

**Table 3-3: Device Administrative Fields**

<b>Field</b>	<b>Field Description</b>	<b>Data Entry Options</b>	<b>Proposed Source</b>
MAINTAINING AGENCY	Agency that maintains the device; table of agency level will be incorporated	Drop-down list of options	SAFESTAT
COST AGREEMENT ID	Number of most recent signed cost agreement, (note: system requirements include further detail)	#	SAFESTAT
INTERNALLY ILLUMINATED STREET SIGN AGREEMENTS	Link to PDF of agreement	#	ProjectWise
DESIGN ID	Identifying number of design (note: system	#	SAFESTAT

<b>Field</b>	<b>Field Description</b>	<b>Data Entry Options</b>	<b>Proposed Source</b>
	requirements include further detail)		
INSTALLED VIA	Method of device installation	TWA, IWA, SWA, MWA	SAFESTAT
STATUS	Status of asset	Pending, Existing, Retired	SAFESTAT
SIGNAL HEAD SUPPORT	Type of Signal Head support	See Table 3-4 for options	SAFESTAT
ITS DEVICE PRESENT	Do any ITS devices associate with the signal device (i.e. RSU in cabinet, ESS on pole, etc.)	Yes, No	ITS Asset Management System

ITS DEVICE PRESENT field will be initially populated based on an export from ITS Asset Management System. It will enable users of the SigAMS to be aware of ITS devices co-located with signal devices. At this point, an interface with the ITS Asset Management System is not required or planned. A new workflow will need be developed to keep this field up to date after the initial data export.

**Table 3-4** displays Signal Head support type options. Since most devices in the inventory system will be signal heads, support type options are included in the device fields. In addition, this option will allow MDOT to easily filter signal heads by support type. Note that these options will be user-customizable for future modification.

**Table 3-4: Signal Head Support Type Options**

<b>Signal Head Support Type Options</b>
Diagonal Span
Box Span
Mast Arm
Other Span Wire
Other Non-Span Wire
N/A

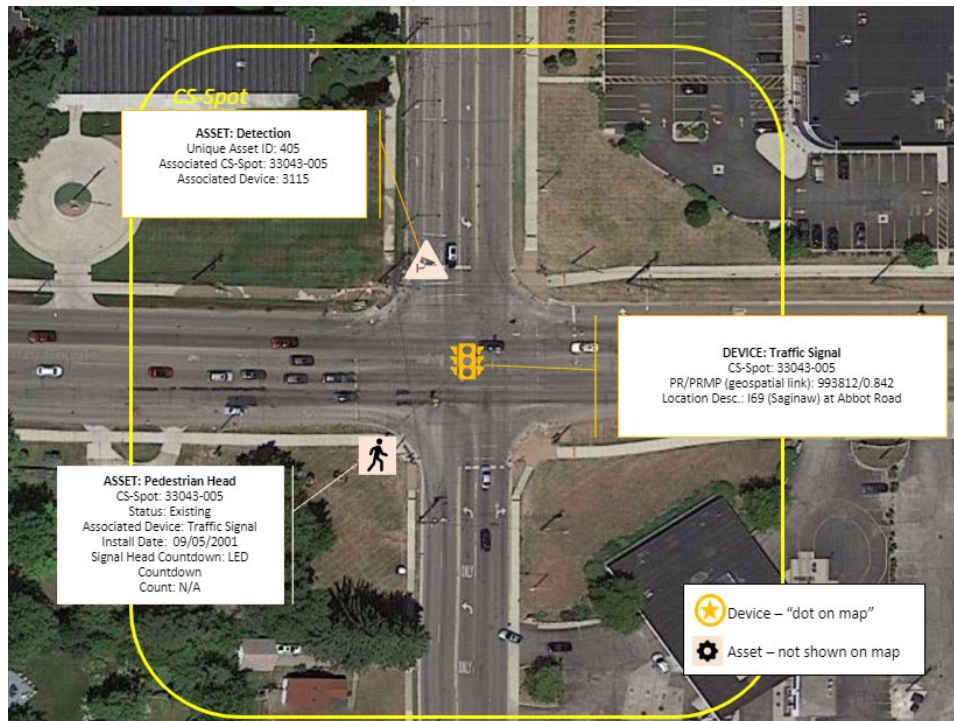
Per initial analysis of the SAFESTAT database, the STATUS field is not completely accurate. The most common error is that asset/devices items listed as “Pending” are currently installed and operating in the field. Before migrating device data from SAFESTAT to SigAMS, the STATUS attribute should be verified. One potential method of STATUS verification is to update asset inventory based on review of open IWAs and TWAs.

In addition, it should be noted that STATUS data within the SigAMS is being revamped from the current SAFESTAT processes. The device STATUS in SigAMS will include the following categories:

- Pending
- Existing
- Retired

### 3.4 Location Example

To illustrate how device inventory data will be structured and viewable on a map, **Figure 3-1** displays an example based on the traffic signal at the intersection of I-69 BL (Saginaw Hwy) at Abbot Road in East Lansing. This example location will be used throughout the document. Note that within the SigAMS system, the device location will be graphically displayed on a map and the attributes will be accessible in a table format. The figures in this report are intended to describe the proposed structure of the data, and not to describe the graphical user interface (GUI) requirements of the SigAMS. An example of the location display is included below in **Figure 3-1**.



**Figure 3-1: Device Location**

An example of the device table fully populated with attribute information for the example location is shown in **Table 3-5**. Note that all assets related to the CS-Spot where the example device is located will be searchable within SigAMS.

Table 3-5: Example Location Device Table

<i>Field</i>	<i>Device: Traffic Signal</i>
CS	33043
CSS	33043-005
DEVICE TYPE	Traffic Signal
CS MP	1.180
PR	9938124
PRMP	9938124/0.842
LOCATION DESC	I-69 BL (Saginaw) @ Abbot Rd
LATITUDE	42.746833
LONGITUDE	-84.483722
REGION	University
COUNTY	Ingham
POWER COMPANY	Lansing Board of Water and Light
CYCLIC WATTAGE	7,900
STEADY WATTAGE	200
METER SERVICE	No
DISCONNECT	No
MAINTAINING AGENCY	MDOT
COST AGREEMENT ID	Link to PDF
INTERNALLY ILLUMINATED STREET SIGN AGREEMENTS	Link to PDF
DESIGN ID	Link to as-build design PDF
INSTALLED VIA	SWA
STATUS	Existing
SIGNAL HEAD SUPPORT	Diagonal Span
ITS DEVICE PRESENT	No

## 4 CONTROLLER ASSET ATTRIBUTES

The asset attributes are the fields/data elements that will be collected and associated with each controller asset. Controller asset attribute data can be grouped into three distinct categories: location and administrative, controller attributes, and connection data.

- Location and Administrative: information needed to geolocate the device and ease of identification and notation for each individual asset Controller Attributes: CS number, spot number, device type, make, model, and ID
- Connection Data: integration into CSCS, signal grouping, master system, and communication method

The asset attribute fields have been developed to balance the need to query and track assets within the system with the desire to keep a simplified data set. For controllers, the attribute fields have been designed to answer some of the following use cases:

- How many EPIC controllers are still in operation?
- What is the average lifecycle of Cobalt controllers (i.e., how long does a Cobalt controller remain operational in the field)?
- Assets can be identified via serial number for tracking or recall purposes
- Which intersections are part of a closed-loop master system?
- What is the controller's communication method at a specific location?
- How many controllers communicate via cell modem vs. broadband radios?

### 4.1 Location and Administration Fields

Location data will include the CS and CS-Spot values for the controller, which can be used to geolocate the specific asset. Administrative data will include general attributes of the asset, including a notes field for user supplied information. Data is primarily expected to be migrated from SAFESTAT.



**Table 4-1: Controller Location and Administration Fields**

<i>Field</i>	<i>Field Description</i>	<i>Data Entry Options</i>	<i>Proposed Source</i>
CS	CS Number	#	SAFESTAT
CSS	Spot Number	#	SAFESTAT
STATUS	Status of asset	Pending, Existing, Retired	SAFESTAT
DEVICE TYPE	Associated device type	i.e. Traffic Signal, HAWK, Beacon, etc.	SAFESTAT
LOCATION DESC	Description of Location; to be used per region preference	Free text	For Future Use
LATITUDE	Latitude coordinate of the controller, to be used at region's discretion	# (Decimal degrees)	ArcMap
LONGITUDE	Longitude coordinate of the controller, to be used at region's discretion	# (Decimal degrees)	ArcMap
INSTALL DATE	Date of installation	Date	SAFESTAT
NOTES	Any items needing further detail	Free text	N/A

## 4.2 Attributes Fields

The asset attributes fields contain the basic information about the specific asset, including make, model, serial number, and controller ID.

**Table 4-2: Controller Attribute Fields**

<i>Field</i>	<i>Field Description</i>	<i>Data Entry Options</i>	<i>Proposed Source</i>
MAKE	Make of controller	See Table 4-3 for options	SAFESTAT
MODEL	Controller model	See Table 4-4 for options	SAFESTAT
SERIAL NUMBER	Controller serial number	#	New data source
FIRMWARE VERSION	Controller firmware; to be used at region discretion until full CSCS roll-out	Free text	New data source
CONTROLLER ID	Controller ID from ArcMap fields	#	ArcMap

**Table 4-3** lists controller make options, which is a key identifier for each controller asset, and will populate the drop-down list for data entry. Note these will be user-customizable for future modifications as needed.

**Table 4-3: Controller Make Options**

<b><i>Controller Make Options</i></b>
Carmanah
Eagle
Econolite
Siemens
TAPCO

**Table 4-4** lists controller model options, which is also a key identifier for each controller asset and will populate the drop-down list for data entry. Note these will be user-customizable for future modifications as needed.

**Table 4-4: Controller Model Options**

<b><i>Controller Model Options</i></b>	
S/S Flasher Controller	MOD 50(EPAC)
2070	<i>MOD 50(EPIC)</i>
COBALT	<i>EF 140</i>
EPAC	<i>Electro Mechanical</i>
EPIC	<i>NEMA, ATC Type</i>
MOD 60	<i>R247C</i>

It should be noted that the italicized controller model options are all older equipment entries within SAFESTAT and possibly no longer in operation. The below actions are recommended to validate the data records.

- MOD 50 (EPIC) (20 records): verify if still in operation
- EF 140 (39 records): verify if still in operation
- Electro Mechanical (1 record): verify if still in operation
- NEMA, ATC Type (15 records): investigate to shift into more accurate classification
- R247C (7 records): investigate to determine if solar is a better classification

### 4.3 Connection Fields

The connection fields provide information about how the controller asset relates to the rest of the signal system. This includes information about CSCS integration, signal groupings, master controllers, and the communication method. From discussions with stakeholders, the communication method was left at a high level for the SigAMS because the further details about the communications network enlist other partners and departments beyond the scope of this effort. The goal is to provide a snapshot into how the controller is operating within the larger signal system.

**Table 4-5: Controller Connection Fields**

<b>Field</b>	<b>Field Description</b>	<b>Data Entry Options</b>	<b>Proposed Source</b>
CSCS CONNECTION	Is the signal connected to the CSCS system?	Yes, No	CSCS System
SIGNAL GROUP ID	Signal group ID for operational purposes	#	ArcMap
MASTER CONTROLLER	Is this the master controller?	Yes, No	SAFESTAT
MASTER SYSTEM	What master system is this controller a part of?	Drop-down from MDOT master list	SAFESTAT
SPECIAL OPERATIONS	Are any special operations controlling this location?	See list in Table 4-6	SAFESTAT
COMM METHOD	How are communications operating at this location?	See list in Table 4-7	SAFESTAT

**Table 4-6: Special Operations**

<b>Special Operations Method</b>
SCATS
SCOOT
IN-SYNC
SPM
N/A

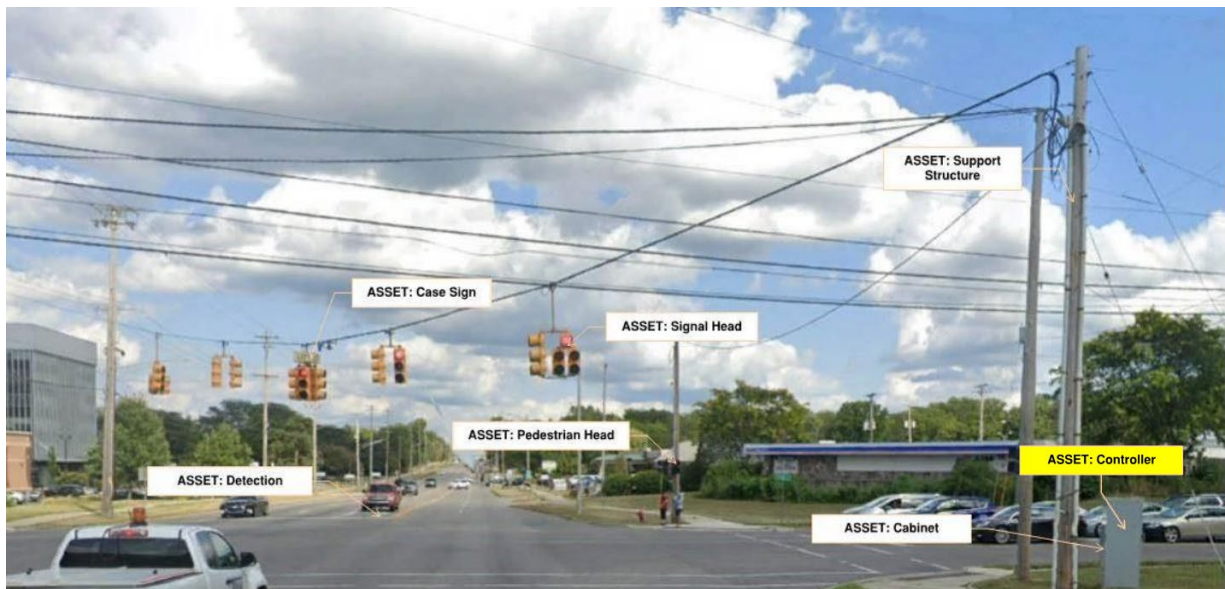
**Table 4-7: Communication Methods**

<b>Communication Method Options</b>
GPS

<i>Communication Method Options</i>
Cell Modem
Cable Modem
Radio
Fiber
Hardwire

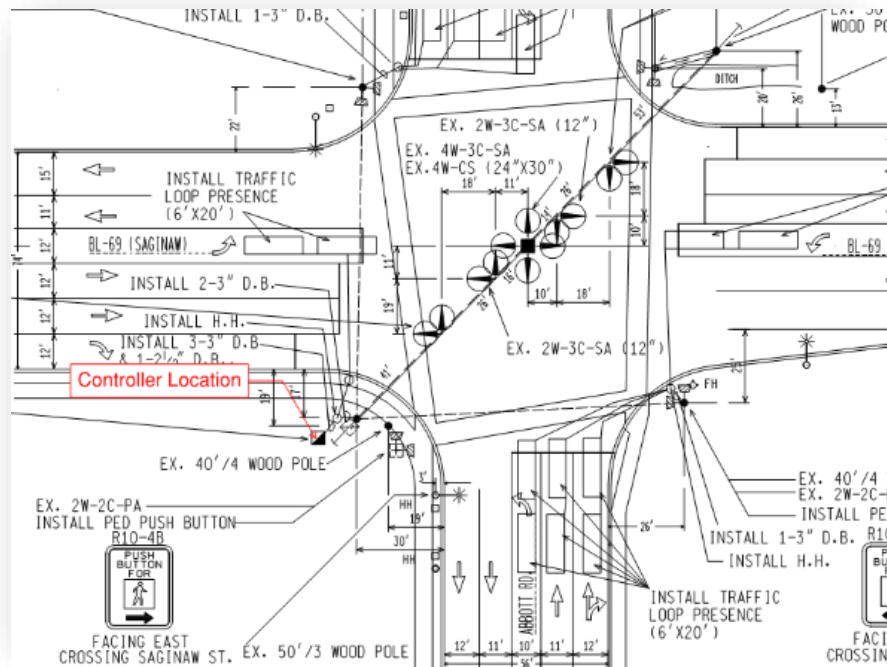
#### 4.4 Location Example

As an example of how certain assets, such as a controller, comprise their associated device, the example intersection and its relevant assets can be found in **Figure 4-1**. The device in question is the traffic signal at the intersection of I-69 BL (Saginaw Hwy) at Abbot Road, as introduced in Section 3.4. This section gives an example of how asset inventory data is structured and captured within the SigAMS.



**Figure 4-1: Controller at the Example Intersection**

In addition to attributes collected for each controller, a PDF of the latest as-built design plan will be available via the SigAMS, as shown in **Figure 4-2**. Including a design plan PDF will allow users to get additional information when needed (e.g., for maintenance or when planning a modernization) while minimizing the data input requirements for each controller.



**Figure 4-2: Example Controller Location**

**Table 4-7** is populated with the controller asset attributes for the example location. The associated device type for the example CS-Spot is displayed, allowing the associated controller to be searchable within the SigAMS.

**Table 4-7: Example Location Controller Asset Table**

Field	Example Entry 1
CS	33043
CSS	33043-005
STATUS	Existing
DEVICE TYPE	Traffic Signal
LOCATION DESC	I-69 BL (Saginaw) @ Abbot Road
LATITUDE	42.746833
LONGITUDE	-84.483722
INSTALL DATE	09/05/2001
NOTES	-

<b>Field</b>	<b>Example Entry 1</b>
MAKE	Eagle
MODEL	EPAC
SERIAL NUMBER	123456
FIRMWARE VERSION	3.35a
CONTROLLER ID	150
CSCS CONNECTION	No
SIGNAL GROUP ID	23-2
MASTER CONTROLLER	No
MASTER SYSTEM	Frandon Point Closed Loop
SPECIAL OPERATIONS	N/A
COMM METHOD	Hardwire

## 5 CABINET ASSET ATTRIBUTES

The asset attributes are the fields/data elements that will be collected and associated with each cabinet asset. Controller asset attribute data can be grouped into three distinct categories: location and administrative, cabinet attributes, and preemption types.

- Location and Administrative: information needed to geolocate the device and ease of identification and notation for each individual asset
- Cabinet Attributes: type, load switches, UPS, RSU and MMU information
- Preempt Types: type of preempt, communication preempt method

The attribute fields have been developed to balance the need to query and track assets within the system with the desire to keep a simplified data set. For cabinets, the attribute fields have been designed to answer some of the following use cases:

- How many pole mounted cabinets exist within a region?
- How many load switches does a single cabinet have? Or, how many cabinets on a corridor have 8 vs 16 load switches? Intent is to quickly develop estimates for potential modifications
- MMUs can be identified via serial number for tracking or recall purposes
- What percent of MDOT signals are equipped with emergency preemption?

### 5.1 Location and Administrative Fields

Location data will include the CS and CS-Spot values for the cabinets, which can be used to geolocate the specific asset. Administrative data will include general attributes of the asset, including a notes field. Data is primarily expected to be migrated from SAFESTAT.

**Table 5-1: Cabinet Location and Administrative Fields**

<i>Field</i>	<i>Field Description</i>	<i>Data Entry Options</i>	<i>Proposed Source</i>
CS	CS Number	#	SAFESTAT
CSS	Spot Number	#	SAFESTAT
STATUS	Status of asset	Pending, Existing, Retired	SAFESTAT
DEVICE TYPE	Associated device type	i.e. traffic signal, HAWK, beacon, etc.	SAFESTAT
LOCATION DESC	Description of Location; to be used per region preference	Free text	For Future Use
LATITUDE	Latitude coordinate of the cabinet, to be used at region's discretion	# (Decimal degrees)	ArcMap

<b>Field</b>	<b>Field Description</b>	<b>Data Entry Options</b>	<b>Proposed Source</b>
LONGITUDE	Longitude coordinate of the cabinet, to be used at region's discretion	# (Decimal degrees)	ArcMap
INSTALL DATE	Date of installation	Date	SAFESTAT
NOTES	Any items needing further detail	Free text	N/A

## 5.2 Cabinet Attribute Fields

The cabinet attribute fields contain relevant information about each asset, such as the cabinet type and MMU serial number. This data will be migrated from SAFESTAT or other tracking sources kept by MDOT. Note that it is anticipated that front and back panel photos of the cabinet will be included within SigAMS, possibly rendering the Number of Load Switches field superfluous.

**Table 5-2: Cabinet Attribute Fields**

<b>Field</b>	<b>Field Description</b>	<b>Data Entry Options</b>	<b>Proposed Source</b>
CABINET TYPE	Type of Cabinet	See Table 5-3 for drop-down options	TBD
NUMBER OF LOAD SWITCHES	Number of load switches in the cabinet	#	TBD
UPS SYSTEM	Is a UPS system present?	Yes, No	TBD
RSU	Is an RSU present at the device?	Yes, No	TBD
MMU SERIAL	Serial number for MMU	#	TBD

**Table 5-3** displays cabinet type options, a key identifier for each cabinet asset. These will be user-customizable for future modifications.

**Table 5-3: Cabinet Type Options**

<b>Cabinet Type Options</b>
Base Mounted
Base Mounted Combo
Pole Mounted
Pole Mounted Combo



## 5.4 Preemption Type Fields

Preemption data is used to identify preemption types present at the cabinet and the method each preemption type uses. This ability will simplify the work of the maintaining electrician, as well as identify important features of each cabinet. Each preemption field will allow user data entry from a pre-defined list, which can be found in **Table 5-5**.

**Table 5-4: Cabinet Preemption Fields**

<i>Field</i>	<i>Field Description</i>	<i>Data Entry Options</i>	<i>Proposed Source</i>
BRIDGE PREEMPT	Is bridge preemption present and method used to communicate?	See Table 5-5 for drop-down options	SAFESTAT
RAIL PREEMPT	Is rail preemption present and method used to communicate?	See Table 5-5 for drop-down options	SAFESTAT
EMERGENCY PREEMPT	Is emergency preemption present and method used to communicate?	See Table 5-5 for drop-down options	SAFESTAT
TRANSIT PREEMPT	Is transit preemption/priority present and method used to communicate?	See Table 5-5 for drop-down options	SAFESTAT
PREEMPT NOTES	Additional notes to supplement details of preempt	Free text	N/A

**Table 5-5** displays cabinet preemption types for all five categories of preemption, which will populate the drop-down list for user entry. Note these will be user-customizable for future modifications as needed.

**Table 5-5: Cabinet Preemption Types**

<i>Cabinet Preemption Type Options</i>
Yes - Infrared
Yes - GPS
Yes - Hardwire
Yes - Wireless
Yes - Other
No

## 5.5 Location Example

To provide an example of how cabinet asset information will be structured, a full table has been populated using the example location, I-69 BL (Saginaw Hwy) at Abbot Road. The placement of the cabinet in relation to the entire location intersection is provided in **Figure 5-1**. Certain cabinet information that is seen in the intersection image, such as its base-mounted configuration, can be found in the asset table.



**Figure 5-1: Cabinet at the Example Intersection**

**Table 5-6** displays the cabinet asset attributes. The associated device type for the example CS-Spot is displayed, allowing this associated cabinet to be searchable within the SigAMS.

Table 5-6: Example Location Cabinet Asset Table

<b>Field</b>	<b>Example Entry 1</b>
CS	33043
CSS	33043-005
STATUS	Existing
DEVICE TYPE	Traffic Signal
LOCATION DESC	I-69 BL (Saginaw) @ Abbot Road
LATITUDE	42.746833
LONGITUDE	-84.483722
INSTALL DATE	09/05/2001
NOTES	-
CABINET TYPE	Base Mounted
NUMBER OF LOAD SWITCHES	4
UPS SYSTEM	No
RSU	No
MMU SERIAL	1234.1234
BRIDGE PREEMPT	No
RAIL PREEMPT	No
EMERGENCY PREEMPT	No
TRANSIT PREEMPT	No
PREEMPT NOTES	-

## 6 DETECTION ASSET ATTRIBUTES

The asset attributes are the fields/data elements that will be collected and associated with each detection asset. Detection asset attribute data can be grouped into two distinct categories: location and administrative, and detection attributes.

- Location and Administrative: information needed to geolocate the device and ease of identification and notation for each individual asset
- Detection Attributes: type and count of detection

The attribute fields have been developed to balance the need to query and track assets within the system with the desire to keep a simplified data set. For detection, the attribute fields have been designed to answer some of the following use cases:

- When does the warranty expire on detection assets?
- By comparing status of devices, retired vs. existing, the lifecycle of detection devices can be determined
- On a given corridor, how many locations have side street detection only vs. full detection on both main and side streets? This could inform level of effort to install signal performance measures along the corridor
- By reviewing the design plans (included in SigAMS as attached PDF), the precise detection layout can be easily accessible by field staff

### 6.1 Location and Administrative Fields

Location data will include the CS and CS-Spot values for the detection, which can be used to geolocate the detection asset. Administrative data will include general attributes of the asset, including a notes field for user supplied information. Furthermore, warranty dates will be included for tracking purposes. Any unique aspects, such as software versions, can be captured within the notes field to minimize data entry for a standard intersection. Data is primarily expected to be migrated from SAFESTAT.

**Table 6-1: Detection Location and Administrative Fields**

<b>Field</b>	<b>Field Description</b>	<b>Data Entry Options</b>	<b>Proposed Source</b>
CS	CS Number	#	SAFESTAT
CSS	Spot Number	#	SAFESTAT
STATUS	Status of asset	Pending, Existing, Retired	SAFESTAT
DEVICE TYPE	Associated device type	i.e. traffic signal, HAWK, beacon, etc.	SAFESTAT

<b>Field</b>	<b>Field Description</b>	<b>Data Entry Options</b>	<b>Proposed Source</b>
LOCATION DESC	Description of Location; to be used per region preference	Free text	For Future Use
LATITUDE	Latitude coordinate of the detector, to be used at region's discretion	# (Decimal degrees)	ArcMap
LONGITUDE	Longitude coordinate of the detector, to be used at region's discretion	# (Decimal degrees)	ArcMap
INSTALL DATE	Date of installation	Date	SAFESTAT
REMOVAL DATE	Date of removal	Date	SAFESTAT
WARRANTY DATE	Date of warranty expiration	Date	TBD
NOTES	Any items needing further detail	Free text	N/A

## 6.2 Attribute Fields

The detection attribute fields contain relevant information about each asset, such as the detection type and count. Detection type options can be found in **Table 6-3**. Approaches are explicitly not tracked in order to help achieve database simplification. Notes and work order history will allow the user to track any issues by approach. This data is expected to be migrated from SAFESTAT.

**Table 6-2: Detection Attribute Fields**

<b>Field</b>	<b>Field Description</b>	<b>Data Entry Options</b>	<b>Proposed Source</b>
TYPE	Type of detection	See Table 6-3 for drop-down options	SAFESTAT
COUNT	Quantity of that asset type	#	SAFESTAT
DETECTION LOCATION	General overview of detection location	Main, Side, Both	TBD

**Table 6-3** displays detection type options, which allows each asset to be easily distinguished and will populate the drop-down list for user entry. Note these will be user-customizable for future modifications as needed.

**Table 6-3: Detection Type Options**

<i>Detection Type Options</i>	
Camera	Thermal
System Loop	Microwave
Traffic Loop	Hemispherical Camera
Push Button	Radar
Push Button (Audible)	Dilemma Zone Detection, Camera
Wireless Loops	Dilemma Zone Detection, Radar

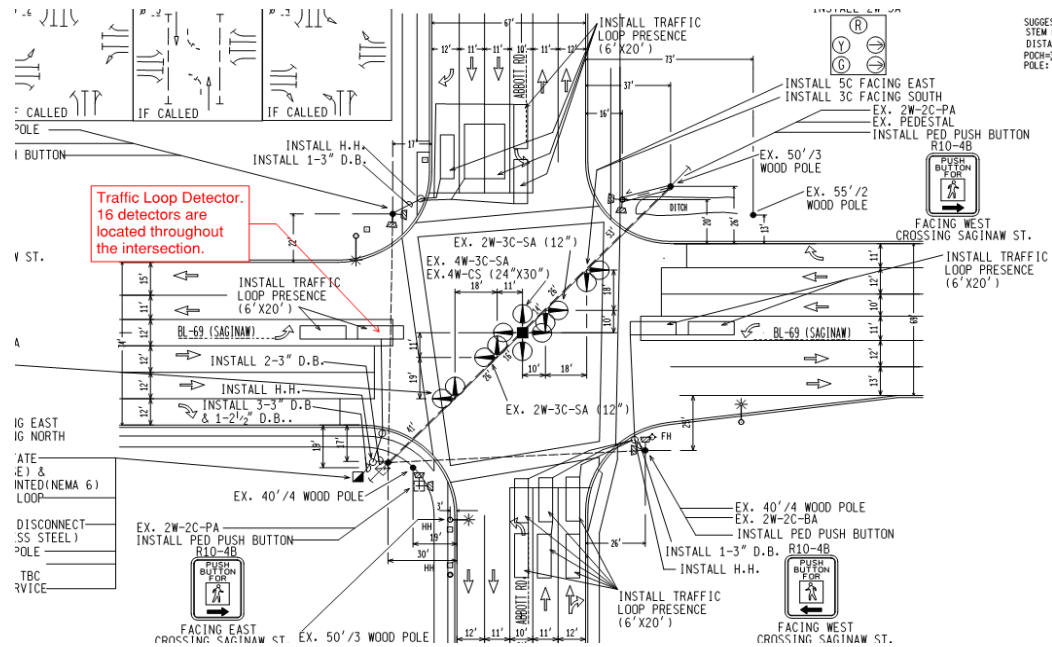
### 6.3 Location Example

To provide an example of how detection asset information will be structured, a full table has been populated using the example location, I-69 BL (Saginaw Hwy) at Abbot Road. The location of a detector in relation to the entire location intersection is provided in **Figure 6-1**.



**Figure 6-1: Detection at the Example Intersection**

Furthermore, the layout of the traffic loop detectors is shown in **Figure 6-2** to provide context to the example.



**Figure 6-2: Detector Locations**

**Table 6-4** displays the detection asset attributes. The associated device type for the example CS-Spot is displayed, allowing these associated detectors to be searchable within the SigAMS.

**Table 6-4: Example Location Detection Asset Table**

Field	Example Entry 1	Example Entry 2
CS	33043	33043
CSS	33043-005	33043-005
STATUS	Existing	Existing
DEVICE TYPE	Traffic Signal	Traffic Signal
LOCATION DESC	I-69 BL (Saginaw) @ Abbot Road	I-69 BL (Saginaw) @ Abbot Road
LATITUDE	42.746833	42.746833
LONGITUDE	-84.483722	-84.483722
INSTALL DATE	09/05/2001	09/05/2001
REMOVAL DATE	-	-



<i>Field</i>	<i>Example Entry 1</i>	<i>Example Entry 2</i>
WARRANTY DATE	09/05/2021	09/05/2021
NOTES	-	-
TYPE	Traffic Loop	Push Button
COUNT	16	4
DETECTION LOCATION	Both	Both

## 6.4 Lifecycle Example

As stated in Section 6.1, the data collection is structured in such a way that the SigAMS can track the lifecycle of assets including detection. As an example of how that will look and feel, **Table 6-5** has been populated with information regarding vehicle puck detectors present at I-94 and Conner Street in Port Huron. Detection assets will be tracked by Install Date, which refers to the date the detector was installed, as well as Removal Date, which displays the date the detector was removed, provided the detector has been retired. In addition, the asset status will also indicate whether or not a detector is still in operation or has been retired. Below, one can clearly see that 10 initial pucks were installed in 2013, and 3 of those initial pucks were replaced in 2017.

**Table 6-5: Detection Lifecycle**

<i>CS</i>	<i>CSS</i>	<i>Status</i>	<i>Device Type</i>	<i>Install Date</i>	<i>Removal Date</i>	<i>Warranty Date</i>	<i>Notes</i>	<i>Type</i>	<i>Count</i>
77032	77032-010	Existing	Traffic Signal	07/09/2013	-	7/2/2023	Sensor IDs: B08A, AC44, B1F2, CS64, AA77, B746, AC0D	Wireless	7
77032	77032-010	Retired	Traffic Signal	07/09/2013	01/18/2017	7/9/2023	Sensor IDs: B1S1, B1F0, B152	Wireless	3
77032	77032-010	Existing	Traffic Signal	01/18/2017	-	1/18/2027	Sensor IDs: 086E, 871D, 06F1	Wireless	3



## 7 SIGNAL HEAD ASSET ATTRIBUTES

The asset attributes are the fields/data elements that will be collected and associated with each signal head asset. Signal head asset attribute data can be grouped into two distinct categories: location and administrative, and signal head attributes.

- Location and Administrative: information needed to geolocate the device and ease of identification and notation for each individual asset.
- Signal Head Attributes: type and count of signal heads

The attribute fields have been developed to balance the need to query and track assets within the system with the desire to keep a simplified data set. For signal heads, the attribute fields have been designed to answer some of the following use cases:

- How many MDOT intersections have flashing red ball operations?
- By reviewing the design plans, the signal head layout can be ascertained
- What percentage of MDOT signals do not include backplates?

### 7.1 Location and Administrative Fields

Location data will include the CS and CS-Spot values for the traffic signal heads, which can be used to geolocate the specific asset. Administrative data will come primarily from SAFESTAT and include general attributes of the asset, including a notes field for user supplied information.

**Table 7-1: Signal Head Location and Administrative Fields**

<b>Field</b>	<b>Field Description</b>	<b>Data Entry Options</b>	<b>Proposed Source</b>
CS	CS Number	#	SAFESTAT
CSS	Spot Number	#	SAFESTAT
STATUS	Status of asset	Pending, Existing, Retired	SAFESTAT
DEVICE TYPE	Associated device type	i.e. traffic signal, HAWK, beacon, etc.	SAFESTAT
LOCATION DESC	Description of Location; to be used per region preference	Free text	For Future Use
LATITUDE	Latitude coordinate of the signal heads, to be used at region's discretion	# (Decimal degrees)	ArcMap
LONGITUDE	Longitude coordinate of the signal heads, to be used at region's discretion	# (Decimal degrees)	ArcMap
INSTALL DATE	Date of installation	Date	SAFESTAT

<b>Field</b>	<b>Field Description</b>	<b>Data Entry Options</b>	<b>Proposed Source</b>
NOTES	Any items needing further detail	Free text	N/A

## 7.2 Attribute Fields

Signal heads are grouped by quantity and type, not by individual signal heads. This organization allows for a simplistic overview of the existing signal heads at each intersection. It will be adequate for evaluating planning level analysis such as left turn treatments across the state.

From discussions with stakeholders, tracking each individual signal head or approach was deemed unnecessary. The effort to create such detailed information did not warrant the value derived from the projected results. This approach was driven by the fact that electricians typically view the intersection as-built drawing first to understand the signal head layout.

**Table 7-2: Signal Head Attribute Fields**

<b>Field</b>	<b>Field Description</b>	<b>Data Entry Options</b>	<b>Proposed Source</b>
SIGNAL HEAD TYPE	Type of signal head	See Table 7-3 for drop-down options	SAFESTAT
COUNT	Number of that signal head type	#	SAFESTAT
LOUVER QTY	How many signal heads contain louvers?	#	SAFESTAT
PROGRAMMABLE	Are the signal heads programmable?	Yes, No	SAFESTAT
BACKPLATE	Are backplates included on the signals?	Yes, No	SAFESTAT

Signal head type options are listed below in **Table 7-3**, which will help identify types of signal heads as well as left-turn treatments. These options will populate a user selected drop-down list.

**Table 7-3: Signal Head Type Options**

<b>Signal Head Type Options</b>	
3 Section	Single RTGA
LT 3 Section Protected	Single Thru Arrow
LT 5 Section	Single LGTA
LT Flashing Red Ball	Single Yellow
LT 4th Level	Single Red
LT FYA	Transit

<i>Signal Head Type Options</i>	
RT 3 Section Protected	HAWK
RT 5 Section	Other

### 7.3 Location Example

To provide an example of how signal head asset information will be structured, a full table has been populated using the example location, I-69 BL (Saginaw Hwy) at Abbot Road in. The location of the signal heads in relation to the entire location intersection is provided in **Figure 7-1**. There are three types of signal heads present at the intersection: Right Turn (RT) 5 Section, 3 Section, and Left Turn (LT) 3 Section Protected. See **Table 7-4** to view an example of how those assets are translated to an inventory table.



**Figure 7-1: Signal Head at the Example Intersection**

Each different type of signal head is shown in **Table 7-4**.

Table 7-4: Example Location Signal Head Asset Table

<b>Field</b>	<b>Example Entry 1</b>	<b>Example Entry 2</b>	<b>Example Entry 3</b>
CS	33043	33043	33043
CSS	33043-005	33043-005	33043-005
STATUS	Existing	Existing	Existing
DEVICE TYPE	Traffic Signal	Traffic Signal	Traffic Signal
LOCATION DESC	I-69 BL (Saginaw) @ Abbot Road	I-69 BL (Saginaw) @ Abbot Road	I-69 BL (Saginaw) @ Abbot Road
LATITUDE	42.746833	42.746833	42.746833
LONGITUDE	-84.483722	-84.483722	-84.483722
INSTALL DATE	09/05/2001	09/05/2001	09/05/2001
NOTES	-	-	-
SIGNAL HEAD TYPE	RT 5 Section	LT 3 Section Protected	3 Section
COUNT	3	4	5
LOUVER QTY	0	0	0
PROGRAMMABLE	No	No	No
BACKPLATE	No	No	No

## 8 PEDESTRIAN HEAD ASSET ATTRIBUTES

The asset attributes are the fields/data elements that will be collected and associated with each pedestrian head asset. Pedestrian head asset attribute data can be grouped into two distinct categories: location and administrative, and signal head attributes.

- Location and Administrative: information needed to geolocate the device and ease of identification and notation for each individual asset.
- Pedestrian Head Attributes: type and count of pedestrian heads

The attribute fields have been developed to balance the need to query and track assets within the system with the desire to keep a simplified data set. For pedestrian heads, the attribute fields have been designed to answer some of the following use cases:

- How many pedestrian heads have incandescent vs. LED illumination?
- By comparing status of devices, retired vs. existing, the lifecycle of pedestrian head assets can be determined
- By reviewing the design plans, the pedestrian head layout can be easily accessible by field staff

### 8.1 Location and Administrative Fields

Location data will include the CS and CS-Spot values for the pedestrian heads, which can be used to geolocate the specific asset. Administrative data will include general attributes of the asset, including a notes field for user supplied information. Data is primarily expected to be migrated from SAFESTAT.

**Table 8-1: Pedestrian Head Location and Administrative Fields**

<b>Field</b>	<b>Field Description</b>	<b>Data Entry Options</b>	<b>Proposed Source</b>
CS	CS Number	#	SAFESTAT
CSS	Spot Number	#	SAFESTAT
STATUS	Status of asset	Pending, Existing, Retired	SAFESTAT
DEVICE TYPE	Associated device type	i.e. traffic signal, HAWK, beacon, etc.	SAFESTAT
LOCATION DESC	Description of Location; to be used per region preference	Free text	For Future Use
LATITUDE	Latitude coordinate of the pedestrian heads, to be used at region's discretion	# (Decimal degrees)	ArcMap

<b>Field</b>	<b>Field Description</b>	<b>Data Entry Options</b>	<b>Proposed Source</b>
LONGITUDE	Longitude coordinate of the pedestrian heads, to be used at region's discretion	# (Decimal degrees)	ArcMap
INSTALL DATE	Date of installation	Date	SAFESTAT
NOTES	Any items needing further detail	Free text	N/A

## 8.2 Attribute Fields

The attribute fields are organized by the count of pedestrian signal heads and the signal head type at the intersection, creating a straight-forward dataset. Approach and layout information were specifically excluded because a PDF of the as-built design plans will be included in the SigAMS.

**Table 8-2: Pedestrian Head Attribute Fields**

<b>Field</b>	<b>Field Description</b>	<b>Data Entry Options</b>	<b>Proposed Source</b>
SIGNAL HEAD TYPE	Signal head type	LED, LED Countdown, Incandescent	SAFESTAT
COUNT	Quantity of that asset type	#	SAFESTAT

## 8.3 Location Example

To provide an example of how pedestrian head asset information will be structured, a full table has been populated using the example location, I-69 BL (Saginaw Hwy) at Abbot Road. The location of a detector in relation to the entire location intersection is provided in **Figure 8-1**.



**Figure 8-1: Pedestrian Head at the Example Intersection**

Furthermore, **Figure 8-2** is a closer image of two pedestrian heads present at the example intersection to provide context. There are eight pedestrian heads located at the intersection, which can be seen in the fully populated example table.



**Figure 8-2: Pedestrian Head Example**

**Table 8-3** displays the pedestrian head asset attributes. The associated device type for the example CS-Spot is displayed, allowing these associated pedestrian heads to be searchable within the SigAMS.

**Table 8-3: Example Location Pedestrian Head Asset Table**

<i><b>Field</b></i>	<i><b>Example Entry 1</b></i>
CS	33043
CSS	33043-005
STATUS	Existing
DEVICE TYPE	Traffic Signal
LOCATION DESC	I-69 BL (Saginaw) @ Abbot Road
LATITUDE	42.746833
LONGITUDE	-84.483722
INSTALL DATE	09/05/2001
NOTES	-
SIGNAL HEAD TYPE	Incandescent
COUNT	8



## 9 SUPPORT STRUCTURE ASSET ATTRIBUTES

The asset attributes are the fields/data elements that will be collected and associated with each structure asset. Structure asset attribute data can be grouped into two distinct categories: location and administrative, and structure type attributes.

- Location and Administrative: information needed to geolocate the device and ease of identification and notation for each individual asset.
- Structure Type Attributes: type, foundation diameter, bolt count, count, and manufacturer

The attribute fields have been developed to balance the need to query and track assets within the system with the desire to keep a simplified data set. For support structures, the attribute fields have been designed to answer some of the following use cases:

- How many mast arms are in operation that follow the 1993 standards?
- How many support structures are owned by a specific power company?
- By reviewing the design plans, the support structure layout is be easily accessible by field staff
- How many 4-bolt poles are in operation?
- If a certain manufacturer was found to have failing poles, where are other poles installed from that manufacturer over a similar time period in order to identify an inspection list

### 9.1 Location and Administrative Fields

These fields will encompass the CS-Spot number and general attributes of the support structure, including a notes field for user supplied information. It will also include an Owned By field that indicates the owner of the respective support. Data is primarily expected to be migrated from SAFESTAT.

**Table 9-1: Support Structure Location and Administrative Fields**

<b>Field</b>	<b>Field Description</b>	<b>Data Entry Options</b>	<b>Proposed Source</b>
CS	CS Number	#	SAFESTAT
CSS	Spot Number	#	SAFESTAT
STATUS	Status of asset	Pending, Existing, Retired	SAFESTAT
DEVICE TYPE	Associated device type	i.e. traffic signal, HAWK, beacon, etc.	SAFESTAT
LOCATION DESC	Description of Location; to be used per region preference	Free text	For Future Use



<b>Field</b>	<b>Field Description</b>	<b>Data Entry Options</b>	<b>Proposed Source</b>
LATITUDE	Latitude coordinate of the support structure, to be used at region's discretion	(Decimal degrees)	ArcMap
LONGITUDE	Longitude coordinate of the support structure, to be used at region's discretion	# (Decimal degrees)	ArcMap
INSTALL DATE	Date of installation	Date	SAFESTAT
OWNED BY	Agency that owns support	MDOT, Power Company, Other	SAFESTAT
NOTES	Any items needing further detail	Free text	N/A

## 9.2 Structure Type Fields

Support structure type fields will include the pertinent data about the type of structure support. While a PDF of the design plans will be included at the device level, critical fields have been detailed to allow for various queries to be completed within the system. Several of the fields, namely the foundation diameter and bolt count, are not readily available within an existing data source and will require further investigation from as-builts to populate these fields. Furthermore, tracking the manufacturer is recommended moving forward for material life cycle purposes.

**Table 9-2: Support Structure Type Fields**

<b>Field</b>	<b>Field Description</b>	<b>Data Entry Options</b>	<b>Proposed Source</b>
TYPE	Type of support	See Table 9-3 for drop-down options	SAFESTAT
FOUNDATION DIAMETER	Diameter of foundation	30, 36, 42	To be populated
BOLT COUNT	Number of bolts in foundation	4, 6, n/a	To be populated
COUNT	Quantity of that support type	#	SAFESTAT
LENGTH	Length of support structure	#	SAFESTAT
MANUFACTURER	Pole manufacturer	Free text	To be populated

Table 9-3 displays a list of support type options, which are key identifiers for each support structure and will populate the drop-down list for user entry. Pedestals and posts, which were previously tracked within SAFESTAT, are not proposed to be tracked in the new system based upon stakeholder discussions. No use cases were identified which provided value to tracking these items individually, especially considering the design plans will be accessible within the new system. Note these will be user-customizable for future modifications as needed.

Table 9-3: Support Structure Type Options

<i>Support Structure Type Options</i>
Mast Arm Cat I
Mast Arm Cat II
Mast Arm Cat III
Mast Arm Standard (1993)
Anchor Base Steel
Embedded Steel
Wood Pole

### 9.3 Location Example

To provide an example of how support structure asset information will be structured, a full table has been populated using the example location, I-69 BL (Saginaw Hwy) at Abbot Road. The location of a support structure in relation to the entire location intersection and other assets is provided in **Figure 9-1**.



Figure 9-1: Support Structure at the Example Intersection

Furthermore, **Figure 9-2** is an image of the example support structure, added to provide context. The support structure supports a diagonal span wire on which the signal heads are suspended.



**Figure 9-2: Support Structure Example**

Table 9-4 displays the associated support structure attributes. The associated device type for the example CS-Spot is displayed, allowing this associated support structure to be searchable within the SigAMS.

**Table 9-4: Example Location Support Structure Asset Table**

<b>Field</b>	<b>Example Entry 1</b>
CS	33043
CSS	33043-005
STATUS	Existing
DEVICE TYPE	Traffic Signal
LOCATION DESC	I-69 BL (Saginaw) @ Abbot Road
LATITUDE	42.746833
LONGITUDE	-84.483722
INSTALL DATE	09/05/2001
OWNED BY	Power
NOTES	-
TYPE	Wood Pole
FOUNDATION DIAMETER	-
BOLT COUNT	-
COUNT	2
LENGTH	50
MANUFACTURER	-

## 10 CONTROLLER OPERATED CASE SIGN ASSET ATTRIBUTES

The asset attributes are the fields/data elements that will be collected and associated with each asset.

Internally illuminated street signs are not tracked because the maintenance of these signs is not in the jurisdiction of MDOT Signals. Local responsibility for both installation and maintenance is typically outlined in a local agency agreement which is generated as part of a construction project and stored as part of the project documents. MDOT maintenance has requested ongoing and direct access to these agreements to settle future questions of maintenance responsibility. Due to the MDOT maintenance request, a link to the PDF agreement is a requirement of SigAMS and included in the data collection guide.

The attribute fields have been developed to balance the need to query and track assets within the system with the desire to keep a simplified data set. For case signs, only controller-operated signs have been deemed worth to track, differing from SAFESTAT. Examples of a controller-operated signs include blank out signage or changeable speed limit signs. The attribute fields have been designed to answer some of the following use cases:

- By comparing status of assets, retired vs. existing, the lifecycle of case signs can be determined
- The notes field can be utilized as needed to describe any unique information for that specific asset

### 10.1 Location, Administrative, and Attribute Fields

These fields will encompass the CS-Spot number and general attributes of the case sign, including a notes field for user supplied information. Data is primarily expected to be migrated from SAFESTAT.

**Table 10-1: Case Sign Location, Administrative, and Attribute Fields**

<b>Field</b>	<b>Field Description</b>	<b>Data Entry Options</b>	<b>Proposed Source</b>
CS	CS Number	#	SAFESTAT
CSS	CS Spot Number	#	SAFESTAT
STATUS	Status of asset	Pending, Existing, Retired	SAFESTAT
DEVICE TYPE	Associated device type	i.e. traffic signal, HAWK, beacon, etc.	SAFESTAT
LOCATION DESC	Description of Location; to be used per region preference	Free text	For Future Use

<b>Field</b>	<b>Field Description</b>	<b>Data Entry Options</b>	<b>Proposed Source</b>
LATITUDE	Latitude coordinate of the case sign, to be used at region's discretion	# (Decimal degrees)	ArcMap
LONGITUDE	Longitude coordinate of the case sign, to be used at region's discretion	# (Decimal degrees)	ArcMap
INSTALL DATE	Date of Installation	Date	SAFESTAT
NOTES	Any items needing further detail	Free text	SAFESTAT
CASE SIGN TYPE	Type/Operation of sign	Free text	SAFESTAT

## 11 EXAMPLE LOCATION

To understand how the asset inventory data will be structured, an example location has been displayed for the Pedestrian Hybrid Beacon (HAWK) and Flashing Warning Beacon installed along US-31 near Hall Street in Traverse City. This example will walk through how the devices and their various attributes will be captured within the SigAMS. Note that within the GUI of the SigAMS system, the two device locations will be graphically displayed on a map, while the various asset attributes will be accessible in table format. It is also important to note that this example provides information for devices other than traffic signals and their corresponding assets, differing from the examples provided earlier. A snapshot of this example is included below in **Figure 11-1** and highlights the following items:

- Warning Sign Beacon device attributes
- Pedestrian Hybrid Beacon (HAWK) device attributes
- Pedestrian Signal Head attributes associated with the HAWK signal
- Controller attributes associated with the HAWK signal



**Figure 11-1: Device and Asset Example**

### 11.1 Device Information Table

A full device table has been populated from the example above and is shown in **Table 11-1**. Note that both devices have the same CS-Spot number, allowing all devices and assets related to this CS-Spot to be searchable.



Table 11-1: Device Information Table Example

<b>Field</b>	<b>Device: Pedestrian Hybrid Beacon)</b>	<b>Device: Warning Sign Beacon</b>
CS	28013	28013
CSS	28013-30	28013-30
DEVICE TYPE	Pedestrian Hybrid Beacon (HAWK)	Warning Sign Beacon
CS MP	0.389	0.319
PR	3281171	9933209
PRMP	3281171/0.965	993209/0.903
LOCATION DESC	US-31, M-72 (Grandview Parkway) @ 90' West of Hall Street	US-31, M-72 (Grandview Parkway) @ 450' West of Hall Street
LATITUDE	44.766250	44.766250
LONGITUDE	-85.627139	-85.627139
REGION	North	North
COUNTY	Grand Traverse	Grand Traverse
POWER COMPANY	Traverse City Light and Power Dept.	Solar
CYCLIC WATTAGE	0	0
STEADY WATTAGE	0	0
METER SERVICE	No	No
DISCONNECT	Yes	No
MAINTAINING AGENCY	MDOT	MDOT
COST AGREEMENT ID	Link to PDF	Link to PDF
INTERNALLY ILLUMINATED STREET SIGN AGREEMENTS	Link to PDF	Link to PDF
DESIGN ID	Link to as-build design PDF	Link to as-build design PDF
INSTALLED VIA	TWA	TWA
STATUS	Existing	Existing
SIGNAL HEAD SUPPORT	Other Span Wire	Other Span Wire
ITS DEVICE PRESENT	No	No

## 11.2 Asset Information Tables

The associated asset tables have been populated for the Pedestrian Hybrid Beacon and are shown in **Figure 11-2** below. Note that the assets all have the same CS-Spot number, allowing all devices and assets related to this CS-Spot to be searchable. Also note that each asset is related to an associated device, allowing all the assets associated with a specific device to be searchable.



Figure 11-2: Asset Display



### 11.2.1 Controller Asset Table

The below table demonstrates the controller asset attributes.

**Table 11-2: Controller Asset Table Example**

<b>Field</b>	<b>Example Entry 1</b>
CS	28013
CSS	28013-30
STATUS	Existing
DEVICE TYPE	Pedestrian Hybrid Beacon
LOCATION DESC	US-31, M-72 (Grandview Parkway) @ 90' West of Hall Street
LATITUDE	44.766250
LONGITUDE	-85.627139
INSTALL DATE	8/15/2019
NOTES	-
MAKE	Econolite
MODEL	Cobalt
FIRMWARE VERSION	ASC/3-LX
SERIAL NUMBER	123456
CONTROLLER ID	100
CSCS CONNECTION	Yes
SIGNAL GROUP ID	24-1
MASTER CONTROLLER	No
MASTER SYSTEM	Traverse City Closed Loop
SPECIAL OPERATIONS	N/A
COMM METHOD	Fiber

### 11.2.2 Cabinet Asset Table

The below table demonstrates the cabinet asset attributes.

**Table 11-3: Cabinet Asset Table Example**

<b>Field</b>	<b>Example Entry 1</b>
CS	28013
CSS	28013-30
STATUS	Existing
DEVICE TYPE	Pedestrian Hybrid Beacon
LOCATION DESC	US-31, M-72 (Grandview Parkway) @ 90' West of Hall Street
LATITUDE	44.766250
LONGITUDE	-85.627139
INSTALL DATE	8/15/2019
NOTES	-
CABINET TYPE	Pole Mounted
NUMBER OF LOAD SWITCHES	4
UPS SYSTEM	No
RSU	No
MMU SERIAL	1234.1234
BRIDGE PREEMPT	No
RAIL PREEMPT	No
EMERGENCY PREEMPT	No
TRANSIT PREEMPT	No
PREEMPT NOTES	No

### 11.2.3 Detection Asset Table

The below table demonstrates the detection asset attributes.

**Table 11-4: Detection Asset Table Example**

<b>Field</b>	<b>Example Entry 1</b>
CS	28013
CSS	28013-30
STATUS	Existing
DEVICE TYPE	Pedestrian Hybrid Beacon
LOCATION DESC	US-31, M-72 (Grandview Parkway) @ 90' West of Hall Street
LATITUDE	44.766250
LONGITUDE	-85.627139
INSTALL DATE	8/15/2019
REMOVAL DATE	-
WARRANTY DATE	8/15/2029
NOTES	-
TYPE	Push Button (Audible)
COUNT	2
DETECTION LOCATION	Main

### 11.2.4 Signal Head Asset Table

The below table demonstrates the signal head asset attributes.

**Table 11-5: Signal Head Asset Table Example**

<b>Field</b>	<b>Example Entry 1</b>
CS	28013
CSS	28013-30
STATUS	Existing
DEVICE TYPE	Pedestrian Hybrid Beacon
LOCATION DESC	US-31, M-72 (Grandview Parkway) @ 90' West of Hall Street

<b>Field</b>	<b>Example Entry 1</b>
LATITUDE	44.766250
LONGITUDE	-85.627139
INSTALL DATE	8/15/2019
NOTES	-
SIGNAL HEAD TYPE	HAWK
COUNT	4
LOUVER QTY	0
PROGRAMMABLE	No
BACKPLATE	No

### 11.2.5 Pedestrian Asset Table

The below table demonstrates the pedestrian head asset attributes.

**Table 11-6: Pedestrian Head Asset Table Example**

<b>Field</b>	<b>Example Entry 1</b>
CS	28013
CSS	28013-30
STATUS	Existing
DEVICE TYPE	Pedestrian Hybrid Beacon
LOCATION DESC	US-31, M-72 (Grandview Parkway) @ 90' West of Hall Street
LATITUDE	44.766250
LONGITUDE	-85.627139
INSTALL DATE	8/15/2019
NOTES	-
SIGNAL HEAD TYPE	LED Countdown
COUNT	2

### 11.2.6 Support Structure Asset Table

The below table demonstrates the support structure asset attributes.

**Table 11-7: Support Structure Table Example**

<i>Field</i>	<i>Example Entry 1</i>
CS	28013
CSS	28013-30
STATUS	Existing
DEVICE TYPE	Pedestrian Hybrid Beacon
LOCATION DESC	US-31, M-72 (Grandview Parkway) @ 90' West of Hall Street
LATITUDE	44.766250
LONGITUDE	-85.627139
INSTALL DATE	8/15/2019
OWNED BY	Power
NOTES	-
TYPE	Wood Pole
FOUNDATION DIA.	-
BOLT COUNT	-
COUNT	2
LENGTH	30
MANUFACTURER	-

### 11.2.7 Case Sign Asset Table

The below table demonstrates the case sign asset attributes. (Note: Figure 11-2 shows a static sign. For the purposes of this example it assumed to be a right turn blank out sign).

**Table 11-8: Case Sign Asset Table Example**

<b>Field</b>	<b>Example Entry 1</b>
CS	28013
CSS	28013-30
STATUS	Existing
DEVICE TYPE	Pedestrian Hybrid Beacon
LOCATION DESC	US-31, M-72 (Grandview Parkway) @ 90' West of Hall Street
LATITUDE	44.766250
LONGITUDE	-85.627139
INSTALL DATE	8/15/2019
NOTES	-
CASE SIGN TYPE	Right Turn Blank Out



**STATE OF MICHIGAN**  
**CENTRAL PROCUREMENT SERVICES**  
 Department of Technology, Management, and Budget  
 525 W. ALLEGAN ST., LANSING, MICHIGAN 48913  
 P.O. BOX 30026 LANSING, MICHIGAN 48909

**CONTRACT CHANGE NOTICE**

Change Notice Number **6**  
 to  
 Contract Number **071B5500115**

<b>CONTRACTOR</b>	DATA TRANSFER SOLUTIONS, LLC	<b>STATE</b>	Program Manager	Various	MDOT
	3680 Avalon Park Blvd , E				
	Orlando, FL 32828				
	Allen Ibaugh		Contract Administrator	Christopher Martin	DTMB
	407-382-5222			(517) 643-2833	
	aibaugh@dtsgis.com			martinc20@michigan.gov	
	CV0001154				

CONTRACT SUMMARY				
ASSET MANAGEMENT SOLUTION				
INITIAL EFFECTIVE DATE	INITIAL EXPIRATION DATE	INITIAL AVAILABLE OPTIONS	EXPIRATION DATE BEFORE	
July 13, 2015	July 12, 2022	5 - 1 Year	July 12, 2022	
PAYMENT TERMS		DELIVERY TIMEFRAME		
Net 45				
ALTERNATE PAYMENT OPTIONS			EXTENDED PURCHASING	
<input type="checkbox"/> P-Card	<input type="checkbox"/> PRC	<input type="checkbox"/> Other	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No
MINIMUM DELIVERY REQUIREMENTS				
DESCRIPTION OF CHANGE NOTICE				
OPTION	LENGTH OF OPTION	EXTENSION	LENGTH OF EXTENSION	REVISED EXP. DATE
<input type="checkbox"/>		<input type="checkbox"/>		July 12, 2022
CURRENT VALUE	VALUE OF CHANGE NOTICE	ESTIMATED AGGREGATE CONTRACT VALUE		
\$4,844,656.00	\$70,000.00	\$4,914,656.00		
DESCRIPTION				
Effective 6/5/2020, the following amendments are incorporated into this Contract per the attached SOW and vendor proposal and increased by \$70,000.00. These changes include the following: Task 1 – Monthly Hardware Maintenance and Support Services - \$3,750.00 Task 2 – Planning Meetings - \$4,908.00 Task 3 – Prepare Environment for Image Processing - \$18,964.00 Task 4 – 2019 VideoLog Image Processing - \$15,504.00 Task 5 – Update TSS Tools to Support VUEWorks 2019.3.3 and later versions such as 2020 Q1 release - \$13,824.00 Task 6 – Road Analyzer Enhancements, Scripting Enhancements, and Support as needed. (Hourly - per rate card)				
All other terms, conditions, specifications and pricing remain the same. Per contractor and agency agreement, and DTMB Central Procurement Services approval.				

**Program Managers  
for  
Multi-Agency and Statewide Contracts**

AGENCY	NAME	PHONE	EMAIL
MDOT	Cory Johnson	517-335-2931	johnsonc45@michigan.gov
DTMB	Dave Work	517-241-4604	workd@michigan.gov





**MICHIGAN DEPARTMENT OF TECHNOLOGY,  
MANAGEMENT AND BUDGET  
IT SERVICES  
STATEMENT OF WORK**

<b>Project Title:</b> Transportation Asset Management System (TAMS) Transcend Support	<b>Period of Coverage:</b> May 2020 - September 2020
<b>Requesting Department:</b> Michigan Department of Transportation (MDOT)	<b>Date:</b> 04/17/2020
<b>Agency Project Manager:</b> Cory Johnson	<b>Phone:</b> (517) 331-4508
<b>DTMB Project Manager:</b> David Work	<b>Phone:</b> (517) 719-2250

**Brief Description of Services to be provided:**

**BACKGROUND:**

This Statement of Work is based on the existing contract between the State of Michigan (SOM) and Data Transfer Solutions (DTS), LLC, see Contract #071B5500115. Transcend Spatial Solutions LLC is a subcontractor to DTS and will be performing this work to modify products that they have developed and solely support.

**PROJECT OBJECTIVE:**

- Meet with MDOT in order to define and document the issues and scope of work to be conducted under this contract.
- Provide and maintain the system infrastructure required to process the 2019 VideoLog dataset.
- Prepare the environment for processing the 2019 VideoLog image dataset. The VideoLog capture vendor remains Mandli for the 2019 dataset.
- Update TSS tools to pass Oracle tokens via cookie instead of string; required to support VUEWorks 2019.3.3 and future versions.
- Provide as needed enhancement and support for Road Analyzer and potential scripting changes.

**TASKS:**

**Task 1 – Monthly Hardware Maintenance and Support Services (Fixed Price)**

Transcend will provide and maintain the system infrastructure required to process the 2019 VideoLog dataset. This will include establishing adequate disk space and networking access/capability, monitoring and tuning system performance, and data backup services on Transcend servers. Based on the size of 2019 dataset (2 TB) and an estimated processing rate of seven minutes per GB, Transcend expects three months will be needed to process, upload, and QC the data.

**Task 2 – Planning Meetings (Fixed Price)**

Transcend will hold meetings with MDOT and DTS in order to define and document the issues and scope of work to be conducted under this agreement. This includes both the 2019 VideoLog image processing and the TSS tool updates to support VUEWorks 2019.2.3 and future versions including the 2020 Q1 release.

**Task 3 – Prepare Environment for Image Processing (Fixed Price)**

Transcend will complete five subtasks as part of preparing the environment for processing the 2019 VideoLog image dataset.

In order to locate the VideoLog imagery on MDOT's current ALRS, Transcend will require a backup of MDOT's most recent transactional database. Transcend will use the same software versions as MDOT in our technical environment to process the image data – ESRI 10.6.1 and SQL Server 2014.

**Subtask 1** - restore MDOT's SQL Server backup to Transcend's environment.

**Subtask 2** - verify the Roads and Highways ALRS to ensure that the structure will support image processing and that the network edits made by MDOT have not introduced data anomalies that would result in processing errors. If data issues are found, Transcend's project manager will notify the named MDOT contact to discuss the issues and resolution options.

**Subtask 3** - copy MDOT's 2019 VideoLog images from the AWS S3 bucket to Transcend's network storage. Transcend will use the same rigor in protecting MDOT's data as it does its own systems and data; including, but not limited to:

- Virus protection
- Internet/network security (Router and Firewall)
- Server security (Windows)

**Subtask 4** - The Transcend Image Manager (TIM) currently locates images based on the latitude and longitude from the image metadata by snapping that location to the closest route. In cases where that point is closer to an intersecting route, the potential exists that the point would be associated with the incorrect route. Transcend worked with MDOT to understand the information provided in an Excel spreadsheet that when used along with the images' metadata would accurately locate all the images. Subtask 4 implements the changes to TIM specific to MDOT that would incorporate the information from the spreadsheet into the image processing.

#### **Task 4 – 2019 VideoLog Image Processing (Fixed Price)**

Transcend will complete five subtasks as part of processing the 2019 VideoLog image dataset.

**Subtask 1** – during the processing of the 2018 images, the external drive containing the images was damaged in shipping from MDOT to AWS. Instead of shipping another drive, Transcend uploaded the images directly to AWS. This process is expected to be followed for 2019 images.

**Subtask 2** - initiate and monitor the 2019 image processing. The assigned GIS Analyst will be responsible for using the TIM application to process the data, monitor the status of processes, and work with Transcend's developers and project manager to resolve any issues. It is estimated this will require approximately 10 hours of GIS Analyst time per week of processing. If data issues are encountered, the project manager will notify the named contact at MDOT to discuss the issues and the approach to resolve the issues. A Senior Developer will be available one hour per week to provide technical support and oversight to the GIS Analyst.

Based on the estimated processing rate of seven minutes per gigabyte and the 2.0 TB size of the 2019 dataset, Transcend estimates image processing to take four weeks.

**Subtask 3** - upload the processed 2019 imagery back to the AWS S3 bucket. This task also includes working with the MDOT contact to configure the new 2019 seed file for MDOT's Transportation Data Server (TDS) environment for proper use of the images within Road Video Viewer.

**Subtask 4** - support MDOT in review of the imagery. This includes providing a GIS Analyst for four hours per week for a four-week period to support MDOT's review of the processed 2019 VideoLog images. The GIS Analyst would be available to answer questions and investigate issues reported by MDOT.

**Subtask 5** - project management activities such as communications, personnel coordination, and issue resolution for the image processing task.

#### **Task 5 – Update TSS Tools to Support VUEWorks 2019.3.3 and later versions such as 2020 Q1 release (Fixed Price)**

**Subtask 1** – The new IDP with VUEWorks 2019 utilizes a separate database. The client needs to send a cookie containing the Project Name. Transcend will add an option to the current Security Token Service (STS) configuration in TDS to allow setting fixed cookie values that will be passed via the request made to DTS' Identity Server instance for the login request.

**Subtask 2** - support MDOT in review the application changes. This includes providing a Sr. Developer for 16 hours per week for a two-week period to support MDOT's testing. The developer would be available to answer questions and investigate issues reported by MDOT.

#### **Task 6 – Road Analyzer Enhancements, Scripting Enhancements, and Support (Hourly)**

Road Analyzer Enhancements may include but are not limited to requests related to signs, guardrail, or culvert updates. Scripting Enhancements may include but are not limited to requests related to ESRI software upgrades, or other utility requests. An updated Rate Card will be provided by Transcend. Support and enhancement requests will be submitted by MDOT to the Transcend Project Manager via email. Transcend will then provide a cost estimate for the scope of work. Approval must be received from DTMB & MDOT PMs prior to commencement of work. Rates for resources per the rate card in the attached proposal.

#### **DELIVERABLES:**

Deliverables for this project include documentation to support completion of the following milestones:

1. **Hardware Maintenance and Support Services**
2. **Planning Meetings**
3. **Prepare Environment for Image Processing**
4. **2019 VideoLog Image Processing**
5. **Update TSS Tools to Support VUEWorks IDP**
6. **As needed Road Analyzer Enhancements, Scripting Enhancements, and Support**

Deliverables will not be considered complete until the Agency Project Manager has formally accepted them.

#### **ACCEPTANCE CRITERIA:**

1. Successful installation of processed images from 2019 VideoLog into MDOT's production hosting environment.
2. Successful testing of VueWorks IDP integration in MDOT's production hosting environment.

#### **PROJECT CONTROL AND REPORTS:**

A bi-weekly progress report must be submitted to the Agency and DTMB Project Managers throughout the life of this project. This report may be submitted with the billing invoice. Each bi-weekly progress report must contain the following:

1. **Hours:** Indicate the number of hours expended during the past two weeks, and the cumulative total to date for the project. Also state whether the remaining hours are sufficient to complete the project.
2. **Accomplishments:** Indicate what was worked on and what was completed during the current reporting period.
3. **Funds:** Indicate the amount of funds expended during the current reporting period, and the cumulative total to date for the project.

#### **SPECIFIC DEPARTMENT STANDARDS:**

Agency standards, if any, in addition to DTMB standards.

#### **PAYMENT SCHEDULE:**

Payment will be made on a **Satisfactory acceptance of each Milestone or an Hourly** basis. DTMB will pay CONTRACTOR upon receipt of properly completed invoice(s) which shall be submitted to the billing address on the State issued purchase order not more often than monthly. DTMB Accounts Payable area will coordinate obtaining Agency and DTMB Project Manager approvals. All invoices should reflect actual work completed by payment date and must be approved by the Agency and DTMB Project Manager prior to payment. The invoices shall describe and document to the State's satisfaction a description of the work performed, the progress of the project, and fees. When expenses are invoiced, receipts will need to be provided along with a detailed breakdown of each type of expense.

Payment shall be considered timely if made by the DTMB within forty-five (45) days after receipt of properly completed invoices.

**EXPENSES:**

The State will NOT pay for any travel expenses, including hotel, mileage, meals, parking, etc.

**PROJECT CONTACTS:**

The designated Agency Project Manager is:

Name Cory Johnson  
Department Michigan Department of Transportation  
Area Data Oversight & Geospatial Management Section  
Building/Floor Murray D. Van Wagoner Building 3<sup>rd</sup> Floor  
Address 425 W. Ottawa Street  
City/State/Zip Lansing, Michigan 48909  
Phone Number (517) 331-4508  
Fax Number  
Email Address JohnsonC45@michigan.gov

The designated DTMB Project Manager is:

Name David Work  
Department Department of Technology, Management and Budget  
Area Agency Services MDOT – Public Services and Field Operations Section  
Building/Floor Murray D. Van Wagoner Building 3<sup>rd</sup> Floor  
Address 425 W. Ottawa Street  
City/State/Zip Lansing, Michigan 48909  
Phone Number (517) 719-2250  
Fax Number  
Email Address WorkD@michigan.gov

**AGENCY RESPONSIBILITIES:****LOCATION OF WHERE THE WORK IS TO BE PERFORMED:**

Consultants will work at Transcend Spatial Solutions LLC 2970 University Parkway, Suite 201 Sarasota, FL 34243-2401

**EXPECTED CONTRACTOR WORK HOURS AND CONDITIONS:**

Work hours are not to exceed eight (8) hours a day, forty (40) hours a week. Normal working hours of 8:00 am to 5:00 pm are to be observed unless otherwise agreed to in writing.

No overtime will be permitted.

# Scope of Work 2020 TAMS Support

Version 1.0

Presented to:

Michigan Department of Transportation

March 2020





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## Document Version Information

Version	Date	Description	Author
1.0	03/02/2020	Original document creation	Transcend

## Introduction

Transcend Spatial Solutions, LLC (Transcend) is pleased to have the opportunity to once again support the Michigan Department of Transportation (MDOT) by processing the 2019 VideoLog dataset for use in Transcend's Road Video Viewer application and implement changes to Transcend's applications to support VUEWorks 2019.2.3. MDOT also requested Transcend's hourly rates for support and enhancements to Road Analyzer and the TAMS custom geoprocessing scripts.

## Services Provided

### Task 1 – Monthly Hardware Maintenance and Support Services (Fixed Price)

Transcend will provide and maintain the system infrastructure required to process the 2019 VideoLog dataset. This will include establishing adequate disk space and networking access/capability, monitoring and tuning system performance, and data backup services on Transcend servers. Based on the size of 2019 dataset (2 TB) and an estimated processing rate of seven minutes per GB, Transcend expects three months will be needed to process, upload, and QC the data.

### Task 2 – Planning (Fixed Price)

Transcend will hold meetings with MDOT and DTS in order to define and document the issues and scope of work to be conducted under this agreement. This includes both the 2019 VideoLog image processing and the TSS tool updates to support VUEWorks 2019.2.3.

### Task 3 – Prepare Environment for Image Processing (Fixed Price)

Transcend will complete five subtasks as part of preparing the environment for processing the 2019 VideoLog image dataset.

In order to locate the VideoLog imagery on MDOT's current ALRS, Transcend will require a backup of MDOT's most recent transactional database. Transcend will use the same software versions as MDOT in our technical environment to process the image data – ESRI 10.6.1 and SQL Server 2014.

**Subtask 1** - restore MDOT's SQL Server backup to Transcend's environment.



**Subtask 2** - verify the Roads and Highways ALRS to ensure that the structure will support image processing and that the network edits made by MDOT have not introduced data anomalies that would result in processing errors. If data issues are found, Transcend's project manager will notify the named MDOT contact to discuss the issues and resolution options.

**Subtask 3** - copy MDOT's 2019 VideoLog images from the AWS S3 bucket to Transcend's network storage. Transcend will use the same rigor in protecting MDOT's data as it does its own systems and data; including, but not limited to:

- Virus protection
- Internet/network security (Router and Firewall)
- Server security (Windows)

**Subtask 4** – The Transcend Image Manager (TIM) currently locates images based on the latitude and longitude from the image metadata by snapping that location to the closest route. In cases where that point is closer to an intersecting route, the potential exists that the point would be associated with the incorrect route. On January 7<sup>th</sup>, we worked with MDOT to understand the information provided in an Excel spreadsheet that when used along with the images' metadata would accurately locate all the images. Subtask 4 implements the changes to TIM specific to MDOT that would incorporate the information from the spreadsheet into the image processing.

**Subtask 5** - project management activities such as communications, personnel coordination, and issue resolution for the environment preparation task.

#### **Task 4 – 2019 VideoLog Image Processing (Fixed Price)**

Transcend will complete five subtasks as part of processing the 2019 VideoLog image dataset.

**Subtask 1** – during the processing of the 2018 images, the external drive containing the images was damaged in shipping from MDOT to AWS. Instead of shipping another drive, Transcend uploaded the images directly to AWS. This subtask partially covers that cost.

**Subtask 2** – initiate and monitor the 2019 image processing. The assigned GIS Analyst will be responsible for using the TIM application to process the data, monitor the status of processes, and work with Transcend's developers and project manager to resolve any issues. It is estimated this will require approximately 10 hours of GIS Analyst time per week of processing. If data issues are encountered, the project manager will notify the named contact at MDOT to discuss the issues and the approach to resolve the issues. A Senior Developer will be available one hour per week to provide technical support and oversight to the GIS Analyst.

Based on the estimated processing rate of seven minutes per gigabyte and the 2.0 TB size of the 2019 dataset, Transcend estimates image processing to take four weeks.

**Subtask 3** - upload the processed 2019 imagery back to the AWS S3 bucket. This task also includes working with the MDOT contact to configure the new 2019 seed file for MDOT's Transportation Data Server (TDS) environment for proper use of the images within Road Video Viewer.





**Subtask 4** - support MDOT in review of the imagery. This includes providing a GIS Analyst for four hours per week for a four-week period to support MDOT's review of the processed 2019 VideoLog images. The GIS Analyst would be available to answer questions and investigate issues reported by MDOT.

**Subtask 5** - project management activities such as communications, personnel coordination, and issue resolution for the image processing task.

### **Task 5 – Update TSS Tools to Support VUEWorks 2019.2.3 (Fixed Price)**

**Subtask 1** – The new IDP with VUEWorks 2019 utilizes a separate database. The client needs to send a cookie containing the Project Name. Transcend will add an option to the current Security Token Service (STS) configuration in TDS to allow setting fixed *cookie* values that will be passed via the request made to DTS' Identity Server instance for the login request.

**Subtask 2** - support MDOT in review the application changes. This includes providing a Sr. Developer for 16 hours per week for a two-week period to support MDOT's testing. The developer would be available to answer questions and investigate issues reported by MDOT.

### **Road Analyzer Enhancements and Support (Hourly)**

This may include but is not limited to requests related to signs, guardrail, or culvert updates. Rates are provided below in *Table 2 - 2020 Rate Card*. Support and enhancement requests will be submitted by MDOT to the Transcend Project Manager via email. Transcend will then provide a cost estimate for the scope of work. Approval must be received from DTMB & MDOT PMs prior to commencement of work.

### **Scripting Enhancements and Support (Hourly)**

This may include but is not limited to requests related to ESRI software upgrades, or other utility requests. Rates are provided below in *Table 2 - 2020 Rate Card*. Support and enhancement requests will be submitted by MDOT to the Transcend Project Manager via email. Transcend will then provide a cost estimate for the scope of work. Approval must be received from DTMB & MDOT PMs prior to commencement of work.

## **Cost and Schedule Proposal Assumptions**

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### **Data Assumptions**

- The VideoLog imagery will be in same Mandli format as MDOT's 2018 dataset. If the format is found to be different, Transcend will contact MDOT before any work on the imagery progresses in order to determine the mitigation strategy.
- The VideoLog imagery matches the LRS of the current year, and MDOT will provide Transcend with a copy of that network in Esri 10.6.1/SQL Server 2014 format.
- The size of the 2019 dataset will be 2 TB or less.



### Time Estimates

Minutes/GB TIM Processing:	7
Processing Time (Weeks):	4
Additional Manual Processing (Weeks):	2
Upload Processed Images to AWS (Weeks):	2
Support MDOT VideoLog Testing (Weeks):	4
Support MDOT App Testing (Weeks):	2
Tech Manager Hours/Week:	1
GIS Analyst Hours/Week:	10

*Table 1 - Time Estimates*

### Rates

This table lists the rates for the 2020 calendar year. These rates apply to both the fixed price tasks and hourly support work.

System Admin Rate:	\$ 150.00
Database Admin Rate:	\$ 174.00
Sr. Developer Rate:	\$ 197.00
Developer Rate:	\$ 130.00
Sr. GIS Analyst Rate	\$ 120.00
Project Manager Rate:	\$ 212.00
Project Director Rate:	\$ 274.00

*Table 2 - 2020 Rate Card*



## Cost Proposal

This table lists tasks and costs for the 2020 TAMS Support. Invoices will be submitted upon completion of Task 4 and Task 5.

Task Description	Resource	Unit Costs	Units	Total Cost
<b>Task 1 - Monthly Hardware Maintenance and Support Services</b>		<b>\$ 1,250.00</b>	<b>3</b>	<b>\$ 3,750.00</b>
<b>Task 2 - Planning</b>			<b>24</b>	<b>\$ 4,908.00</b>
2.1 Meetings and planning prior to beginning work	Project Manager	\$ 212.00	12	\$ 2,544.00
	Project Director	\$ 274.00	4	\$ 1,096.00
	Sr. GIS Analyst	\$ 120.00	4	\$ 480.00
	Sr. Developer	\$ 197.00	4	\$ 788.00
<b>Task 3 - Prepare Environment for Image Processing</b>			<b>111</b>	<b>\$ 18,964.00</b>
3.1 Restore MDOT SQL Server database with updated network	Database Admin	\$ 174.00	6	\$ 1,044.00
	Sr. GIS Analyst	\$ 120.00	1	\$ 120.00
3.2 Verify ALRS configuration	Sr. GIS Analyst	\$ 120.00	4	\$ 480.00
3.3 Download 2019 VideoLog images for processing	System Admin	\$ 150.00	4	\$ 600.00
3.4 Changes to TIM to support MDOT spreadsheet	Sr. Developer	\$ 197.00	40	\$ 7,880.00
	Developer	\$ 130.00	40	\$ 5,200.00
4.5 Project Management	Project Manager	\$ 212.00	12	\$ 2,544.00
	Project Director	\$ 274.00	4	\$ 1,096.00



**2020 TAMS Support**  
Michigan Department of Transportation

<b>Task 4 - VideoLog Image Processing</b>			<b>90</b>	<b>\$ 15,504.00</b>
4.1 Additional Processing Costs from 2018 Image Processing		\$ 2,564.00	1	\$ 2,564.00
4.2 Process 2019 VideoLog Images	Sr. GIS Analyst	\$ 120.00	40	\$ 4,800.00
	Sr. Developer	\$ 197.00	4	\$ 788.00
4.3 Upload 2019 VideoLog images to AWS and configure seed file	System Admin	\$ 150.00	16	\$ 2,400.00
	Sr. GIS Analyst	\$ 120.00	2	\$ 240.00
4.4 Provide support to MDOT during validation of image processing	Sr. GIS Analyst	\$ 120.00	16	\$ 1,920.00
4.5 Project Management	Project Manager	\$ 212.00	8	\$ 1,696.00
	Project Director	\$ 274.00	4	\$ 1,096.00
<b>Task 5 - Update TSS Tools to Support VUEWorks 2019.2.3</b>			<b>68</b>	<b>\$ 13,824.00</b>
5.1 TSS Applications changes to Support VUEWorks 2019.2.3	Sr. Developer	\$ 197.00	24	\$ 4,728.00
5.2 Provide support to MDOT during application testing	Sr. Developer	\$ 197.00	32	\$ 6,304.00
5.4 Project Management	Project Manager	\$ 212.00	8	\$ 1,696.00
	Project Director	\$ 274.00	4	\$ 1,096.00
<b>Grand Total</b>				<b>\$ 56,950.00</b>

**STATE OF MICHIGAN**  
**CENTRAL PROCUREMENT SERVICES**  
 Department of Technology, Management, and Budget  
 525 W. ALLEGAN ST., LANSING, MICHIGAN 48913  
 P.O. BOX 30026 LANSING, MICHIGAN 48909



**CONTRACT CHANGE NOTICE**

Change Notice Number **5**

to

Contract Number **071B5500115**

<b>CONTRACTOR</b>	DATA TRANSFER SOLUTIONS, LLC
	3680 Avalon Park Blvd , E
	Orlando, FL 32828
	Allen Ibaugh
	407-382-5222
	aibaugh@dtsgis.com
	CV0001154

<b>STATE</b>	<b>Program Manager</b>	MULTI	MULTI
		MULTI	
		MULTI	
	<b>Contract Administrator</b>	Christopher Martin	DTMB
		517-643-2833	
		martinc20@michigan.gov	

CONTRACT SUMMARY				
ASSET MANAGEMENT SOLUTION				
INITIAL EFFECTIVE DATE	INITIAL EXPIRATION DATE	INITIAL AVAILABLE OPTIONS	EXPIRATION DATE BEFORE	
July 13, 2015	July 12, 2022	5 - 1 Year	July 12, 2022	
PAYMENT TERMS		DELIVERY TIMEFRAME		
ALTERNATE PAYMENT OPTIONS			EXTENDED PURCHASING	
<input type="checkbox"/> P-Card <input type="checkbox"/> PRC <input type="checkbox"/> Other			<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	
MINIMUM DELIVERY REQUIREMENTS				
DESCRIPTION OF CHANGE NOTICE				
OPTION	LENGTH OF OPTION	EXTENSION	LENGTH OF EXTENSION	REVISED EXP. DATE
<input type="checkbox"/>		<input type="checkbox"/>		July 12, 2022
CURRENT VALUE	VALUE OF CHANGE NOTICE	ESTIMATED AGGREGATE CONTRACT VALUE		
\$4,810,956.00	\$33,700.00	\$4,844,656.00		
DESCRIPTION				
Effective 5/1/2019, the following amendments are incorporated into this Contract per the attached SOW. This change includes the Transcend modifications and those listed below. The not to exceed price for these modifications is \$33,700.00.				
Please note the Contract Administrator has been changed to Christopher Martin. Please note the Program Manager has been changed to Cory Johnson for MDOT and Dave Work for DTMB.				
All other terms, conditions, specifications and pricing remain the same. Per contractor and agency agreement, and DTMB Central Procurement Services approval.				

**Program Managers  
for  
Multi-Agency and Statewide Contracts**

AGENCY	NAME	PHONE	EMAIL
MDOT	Cory Johnson	517-335-2931	johnsonc45@michigan.gov
DTMB	Dave Work	517-241-4604	workd@michigan.gov



**MICHIGAN DEPARTMENT OF TECHNOLOGY,  
MANAGEMENT AND BUDGET  
IT SERVICES  
STATEMENT OF WORK**

<b>Project Title:</b> Transportation Asset Management System (TAMS) Transcend Support	<b>Period of Coverage:</b> April 2019 - September 2019
<b>Requesting Department:</b> Michigan Department of Transportation (MDOT)	<b>Date:</b> 03/18/2019
<b>Agency Project Manager:</b> Cory Johnson	<b>Phone:</b> (517) 335-2931
<b>DTMB Project Manager:</b> David Work	<b>Phone:</b> (517) 241-4604

**Brief Description of Services to be provided:**

**BACKGROUND:**

This Statement of Work is based on the existing contract between the State of Michigan (SOM) and Data Transfer Solutions (DTS), LLC, see Contract #071B5500115. Transcend Spatial Solutions LLC is a subcontractor to DTS and will be performing this work to modify products that they have developed and solely support.

**PROJECT OBJECTIVE:**

- Meet with MDOT in order to define and document the issues and scope of work to be conducted under this contract.
- Provide and maintain the system infrastructure required to process the 2018 VideoLog dataset.
- Prepare the environment for processing the 2018 VideoLog image dataset. The VideoLog capture vendor has changed from Fugro Roadware to Mandli for the 2018 dataset.
- Update custom geoprocessing scripts so they work properly in MDOT's ESRI 10.6.1 environment.

**TASKS:**

**Task 1 – Hardware Maintenance and Support Services**

Transcend will provide and maintain the system infrastructure required to process the 2018 VideoLog dataset. This will include establishing adequate disk space and networking access/capability, monitoring and tuning system performance, and data backup services on Transcend servers. Based on the size of 2018 dataset and an estimated processing rate of seven minutes per GB, Transcend expects one month will be required to process the dataset.

**Task 2 – Planning Meetings**

Transcend will hold meetings with MDOT in order to define and document the issues and scope of work to be conducted under this contract.

**Task 3 – Prepare Environment for Image Processing**

Transcend will complete four subtasks as part of preparing the environment for processing the 2018 VideoLog image dataset.

In order to locate the VideoLog imagery on MDOT's current ALRS, Transcend will require a backup of MDOT's most recent transactional database. Over the course of the past year, MDOT has upgraded their technical environment to SQL Server 2014 and ESRI 10.6.1. Transcend will use the same software versions in our technical environment to process the image data.

**Subtask 1** - restore MDOT's SQL Server backup to Transcend's environment.

**Subtask 2** - verify the Roads and Highways ALRS to ensure that the structure will support image processing and that the network edits made by MDOT have not introduced data issues that would result in processing errors. If data issues are found, the project manager will notify the named MDOT contact to discuss the issues and resolution options.

**Subtask 3** - copy MDOT's 2018 VideoLog images from the provided external hard-drive(s) to Transcend's network storage as was performed with previous datasets. Transcend will use the same rigor in protecting MDOT's data as it does its own systems and data; including, but not limited to:

- Virus protection
- Internet/network security (Router and Firewall)
- Server security (Windows)

In addition to the technology changes, MDOT also changed VideoLog vendors from Fugro Roadware to Mandli to capture the 2018 images. Changes may be required to the Transcend Imager Manager (TIM) and/or Roadway Video Viewer (RVV) to support the Mandli data.

**Subtask 4** - process a sample set of images (a few routes agreed upon between MDOT and Transcend) prior to processing the full set of images to ensure compatibility with the applications. Any changes required to the applications to support the Mandli dataset will be made to support the existing application functionality. No additional enhancements or product changes will be addressed under this Scope of Work.

#### **Task 4 – 2018 VideoLog Image Processing**

Transcend will complete four subtasks as part of processing the 2018 VideoLog image dataset.

**Subtask 1** – initiate and monitor the 2018 image processing. The assigned Transcend GIS Analyst will be responsible for using the TIM application to process the data, monitor the status of processes, and work with Transcend's developers and project manager to resolve any issues. It is estimated this will require approximately 10 hours of GIS Analyst time per week of processing. If data issues are encountered, the project manager will notify the named contact at MDOT to discuss the issues and the approach to resolve the issues. A Senior Developer will be available one hour per week to provide technical support and oversight to the GIS Analyst.

Based on the estimated processing rate of seven minutes per gigabyte and the 2.0 TB size of the 2018 dataset, Transcend estimates image processing to take four weeks.

**Subtask 2** - copy the processed 2018 imagery back to the external hard-drive(s) and send the drive(s) to the named contact at MDOT or another designee. This task also includes working with the MDOT contact to configure the new 2018 seed file for MDOT's Transportation Data Server (TDS) environment for proper use of the images.

**Subtask 3** - support MDOT in review of the imagery. This includes providing a GIS Analyst for four hours per week for a three-week period to support MDOT's review of the processed 2018 VideoLog images after the seed file is configured. The GIS Analyst would be available to answer questions and investigate issues reported by MDOT.

**Subtask 4** - project management activities such as communications, personnel coordination, and issue resolution for the image processing task.

#### **Task 5 – Custom Geoprocessing Script Updates**

Transcend will complete four subtasks as part of the update to the custom geoprocessing scripts. Only the two issues mentioned here will be addressed. No additional enhancements or changes will be addressed under this Scope of Work.

**Subtask 1** - investigate, diagnose, and correct the issue with the CS/Route Milepoint Update geoprocessing script. The following scenario was provided by Doug VanderHulst:

*I tested trying to get the 94/96 interchange to show updated CS and Route mile points using the script/toolbox provided by TSS. I initially ran the tool using the system modified date of 10/10/2018 so it found changes after that date, and it only found part of the interchange. After this modified date failed, I tried using 11/1/2018 as the modified date and it filled in a few more pieces of the interchange. I tried using a date of 12/1/2018 as the modified date for a third attempt and did not fill in anymore pieces of the interchange. I then changed the System Modified Date field to Established date and set it to be 12/1/2018 and ran the tool and it filled out the whole interchange. After looking at a few other locations that we edited I noticed that the 5-point roundabout was not updated fully. I tried the tool a few more times trying to get that area to update, but was unable to get it to work, and during one of the attempts to get the tool to work on the 5-point roundabout it reset the some of the updates made to the 94/96 Interchange.*

Transcend will provide a solution that works properly in MDOT's ESRI 10.6.1 environment.

**Subtask 2** - investigate, diagnose, and correct the issue with the Update Publication Data geoprocessing script. The following error was reported by Kyle Clem after upgrading to ESRI 10.6.1:



*Executing: Select D:\PyScripts\sde\_conns\MdotRH.sde\MdotRH.RH.LrsnCSMP  
D:\PyScripts\sde\_conns\temp.gdb\z\_LrsnCSMP\_current "(RHEstablishDate IS NULL OR RHEstablishDate <=  
'02/01/19') AND (RHRetireDate IS NULL OR RHRetireDate > '02/01/19')"*Failed to execute. Parameters are not valid.

*ERROR 000732: Input Features: Dataset D:\PyScripts\sde\_conns\MdotRH.sde\MdotRH.RH.LrsnCSMP does not exist or is not supported*

*Failed to execute (Select).*

Transcend will provide a solution that works properly in MDOT's ESRI 10.6.1 environment.

**Subtask 3** - GIS Analyst support for four hours per week for a two-week period to support MDOT's review of the updated geoprocessing scripts. The analyst would be available to answer questions and investigate issues reported by MDOT.

**Subtask 4** - project management activities such as communications, personnel coordination, and issue resolution for the image processing task.

## **DELIVERABLES:**

Deliverables for this project include documentation to support completion of the following milestones:

1. **Hardware Maintenance and Support Services**
2. **Planning Meetings**
3. **Prepare Environment for Image Processing**
4. **2018 VideoLog Image Processing**
5. **Custom Geoprocessing Script Updates**

Deliverables will not be considered complete until the Agency Project Manager has formally accepted them.

## **ACCEPTANCE CRITERIA:**

1. Successful installation of processed images from 2018 VideoLog into MDOT hosting environment.
2. Successful testing of custom geoprocessing scripts in conjunction with MDOT's 10.6.1 ESRI environment.

## **PROJECT CONTROL AND REPORTS:**

A bi-weekly progress report must be submitted to the Agency and DTMB Project Managers throughout the life of this project. This report may be submitted with the billing invoice. Each bi-weekly progress report must contain the following:

1. **Hours:** Indicate the number of hours expended during the past two weeks, and the cumulative total to date for the project. Also state whether the remaining hours are sufficient to complete the project.
2. **Accomplishments:** Indicate what was worked on and what was completed during the current reporting period.
3. **Funds:** Indicate the amount of funds expended during the current reporting period, and the cumulative total to date for the project.

## **SPECIFIC DEPARTMENT STANDARDS:**

Agency standards, if any, in addition to DTMB standards.

## **PAYMENT SCHEDULE:**

Payment will be made on a **Satisfactory acceptance of each Milestone** basis. DTMB will pay CONTRACTOR upon receipt of properly completed invoice(s) which shall be submitted to the billing address on the State issued

purchase order not more often than monthly. DTMB Accounts Payable area will coordinate obtaining Agency and DTMB Project Manager approvals. All invoices should reflect actual work completed by payment date and must be approved by the Agency and DTMB Project Manager prior to payment. The invoices shall describe and document to the State's satisfaction a description of the work performed, the progress of the project, and fees. When expenses are invoiced, receipts will need to be provided along with a detailed breakdown of each type of expense.

Payment shall be considered timely if made by the DTMB within forty-five (45) days after receipt of properly completed invoices.

**EXPENSES:**

The State will NOT pay for any travel expenses, including hotel, mileage, meals, parking, etc.

**PROJECT CONTACTS:**

The designated Agency Project Manager is:

Name Cory Johnson  
Department Michigan Department of Transportation  
Area Data Oversight & Geospatial Management Section  
Building/Floor Murray D. Van Wagoner Building 3<sup>rd</sup> Floor  
Address 425 W. Ottawa Street  
City/State/Zip Lansing, Michigan 48909  
Phone Number (517) 335-2931  
Fax Number  
Email Address JohnsonC45@michigan.gov

The designated DTMB Project Manager is:

Name David Work  
Department Department of Technology, Management and Budget  
Area Agency Services MDOT – Public Services and Field Operations Section  
Building/Floor Murray D. Van Wagoner Building 3<sup>rd</sup> Floor  
Address 425 W. Ottawa Street  
City/State/Zip Lansing, Michigan 48909  
Phone Number (517) 241-4604  
Fax Number  
Email Address WorkD@michigan.gov

**AGENCY RESPONSIBILITIES:**

**LOCATION OF WHERE THE WORK IS TO BE PERFORMED:**

Consultants will work at Transcend Spatial Solutions LLC 2970 University Parkway, Suite 201 Sarasota, FL 34243-2401

**EXPECTED CONTRACTOR WORK HOURS AND CONDITIONS:**

Work hours are not to exceed eight (8) hours a day, forty (40) hours a week. Normal working hours of 8:00 am to 5:00 pm are to be observed unless otherwise agreed to in writing.

No overtime will be permitted.



**STATE OF MICHIGAN**  
**ENTERPRISE PROCUREMENT**  
 Department of Technology, Management, and Budget  
 525 W. ALLEGAN ST., LANSING, MICHIGAN 48913  
 P.O. BOX 30026 LANSING, MICHIGAN 48909

**CONTRACT CHANGE NOTICE**

Change Notice Number **4**  
 to  
 Contract Number **071B5500115**

<b>CONTRACTOR</b>	Data Transfer Solutions, LLC
	3680 Avalon Park Blvd
	Orlando, FL 32828
	Allen Ibaugh
	407-382-5222
	aibaugh@dtsgis.com
	CV0001154

<b>STATE</b>	<b>Program Manager</b>	John Kalanquin	MDOT
		517-241-0177	
		kalanquinj@michigan.gov	
	<b>Contract Administrator</b>	Sean Regan	DTMB
		(517) 284-6993	
		regans@michigan.gov	

CONTRACT SUMMARY				
ENTERPRISE ASSET MGMT. SOLUTION FOR MDOT				
INITIAL EFFECTIVE DATE	INITIAL EXPIRATION DATE	INITIAL AVAILABLE OPTIONS	EXPIRATION DATE BEFORE CHANGE(S) NOTED BELOW	
July 13, 2015	July 12, 2022	5 - 1 Year	July 12, 2022	
PAYMENT TERMS		DELIVERY TIMEFRAME		
ALTERNATE PAYMENT OPTIONS			EXTENDED PURCHASING	
<input type="checkbox"/> P-Card <input type="checkbox"/> Direct Voucher (DV) <input type="checkbox"/> Other			<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	
MINIMUM DELIVERY REQUIREMENTS				
DESCRIPTION OF CHANGE NOTICE				
OPTION	LENGTH OF OPTION	EXTENSION	LENGTH OF EXTENSION	REVISED EXP. DATE
<input type="checkbox"/>		<input type="checkbox"/>		July 12, 2022
CURRENT VALUE	VALUE OF CHANGE NOTICE	ESTIMATED AGGREGATE CONTRACT VALUE		
\$4,637,174.00	\$173,782.00	\$4,810,956.00		
DESCRIPTION				
Effective 4/24/2018, this Contract is increased by \$173,728.00 per the two attached Statement of Work documents. Please note, the Contract Administrator has been changed to Sean Regan. All other terms, conditions, specifications, and pricing remain the same. Per Contractor and Agency agreement, DTMB Procurement approval, and State Administrative Board approval on 4/24/2018.				

# **Proposal**

## **TAMS Project Support and Maintenance**

**Presented to:**  
**Michigan Department of Transportation**

**January 29<sup>th</sup>, 2018**

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January 2, 2018

Cory Johnson  
Manager Data Oversight & Geospatial Management Section  
Data Inventory & Integration Division  
Michigan Department of Transportation  
425 W. Ottawa St  
PO Box 30050  
Lansing, MI 48909

Dear Mr. Johnson:

RE: TAMS Project Support and Maintenance Proposal

Data Transfer Solutions, LLC is pleased to submit this proposal for continuing our support of Michigan Department of Transportation's (MDOT's) Roads and Highways (R&H) environment by providing on-going support and maintenance of its Transportation Asset Management System (TAMS) on behalf of our subconsultant, Transcend Spatial Solutions (Transcend).

Transcend is currently working with 14 transportation agencies delivering successful geospatial IT projects. We specialize in geospatial systems strategic and implementation planning; developing solutions for data collection and analysis processes; data integration and reporting; linear referencing systems; and spatial (map) data design and visualization. Transcend has experience integrating and effectively reporting roadway characteristic, environmental, HPMS, traffic, crash, pavement, safety, bridge, planning, project, and financial data.

We look forward to the opportunity to continue to work with you and MDOT staff on this important project. If you need additional information, please contact Sangeeta Reddy at 214-566-2857 or via email [sreddy@dtsgis.com](mailto:sreddy@dtsgis.com) or Bill Schuman at 515-509-6282 (cell) or via email at [bschuman@tssgis.com](mailto:bschuman@tssgis.com).

## Introduction

---

Transcend Spatial Solutions (Transcend) is pleased to have the opportunity to continue to support Michigan Department of Transportation (MDOT) with its development and implementation of TAMS. This proposal outlines our approach and costs associated with implementing the defined tasks to be completed under this support and maintenance proposal.

## Project Scope

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### Task 1 – R&H 10.5.1 Upgrade Support

To address architecture issues and stay current with Esri's most recent software versions, MDOT has opted to upgrade to version 10.5.1 of ArcGIS Server, Desktop, and Roads and Highways.

This effort will include the following deliverables:

- Transcend maintains a dedicated development environment for the MDOT TAMS project. Transcend will upgrade their ArcGIS and database servers to version 10.5.1 of the Esri software to both test the custom geoprocessing scripts and keep Transcend's environment consistent with MDOT's environment through MDOT's rollout to production.
- After the 10.5.1 development environment is established, Transcend will develop four (4) test scripts to support testing the custom geoprocessing scripts developed for MDOT LRM and Publication processes. Transcend will submit the test scripts for approval by MDOT and then execute the test scripts on the Transcend environment to ensure the planned configuration works at MDOT. The completed test scripts and test results will be provided to MDOT as the formal deliverable for this effort.
- Transcend will update the four custom geoprocessing scripts and supporting documentation to ensure it is compatible with R&H 10.5.1.
- After the software upgrade and configuration is complete, Transcend will commence deployment on MDOT's R&H 10.5.1 instance and the updated custom scripts on the GIS staging/testing environment. Transcend will support MDOT in re-executing the four (4) test cases developed in the first portion of this scope of work, and the results will be submitted to MDOT as the formal deliverable for this effort.
- Transcend will support MDOT in resolving issues that may be revealed during the UAT of the MDOT custom scripts.

### Task 2 – Rename InterchangeNumber to CountyCode in Route-MP Network Feature Class

When Transcend created the RouteID for the Route-MP LRM, the first two digits of the Interchange Number were extracted to a column named InterchangeNumber. According to Patrick Allen, these two characters represent the County Number, and the column should have been named CountyCode instead of InterchangeNumber.

This effort will include the following deliverables:

- Transcend will execute the column name change in Transcend's development environment by creating the new LrsnRouteMP feature class with the updated column name, County Code, replacing the new feature class with the existing feature class, updating the ALRS Network settings to use the CountyCode column in the RouteID definition, re-registering the Dominance event to the Route-MP network, generating and replacing the Route Milepoint event with the updated column, repeating the process for the publication database, and generating and replacing the new translated Route Milepoint feature classes in the publication database.
- The CS and Route Milepoint custom geoprocessing scripts will be updated to use the new column name.
- QA/QC will be performed by testing Roads and Highways edits and testing the Route Milepoint custom geoprocessing script.
- Map services will be republished for the transactional and publication database.
- Changes will be documented, and Transcend will provide the documentation to MDOT.
- Transcend will provide technical support as MDOT executes the steps outlined in the change documentation.

### Task 3 – User Acceptance Testing

Although User Acceptance Testing (UAT) is covered under the original agreement, MDOT has expanded the activities beyond what was originally planned.

This effort will also include the following deliverables:

- Transcend will prepare for and conduct a one-day remote training session on the following Transcend Applications:
  - Road Analyzer (RA)
  - Road Video Viewer (RVV)
  - Segment Analyzer (SA)
  - Validation Assistant (VA)
  - Report Engine (RE)

### Task 4 – MDOT Specific Roads and Highways Training

Although MDOT specific Roads & Highways user training is covered under the original agreement, MDOT has expanded the activities beyond the original plan.

This effort will also include the following deliverables:

- Additional training materials will be developed covering the following topics:
  - An Overview session has been added to kick-off the training and allow Transcend to review the training agenda and goals.
  - Road Analyzer training will be separated into two sessions – an introductory session covering basic display and analysis, and an advanced session aimed at administrative users. The advanced sessions will cover profile creation, default styling, MUTCD sign image configuration, integration management, relationships, intersections, and divided highways.
  - Best practices for map service creation is added under Event Editor.



- The Event Editor section has been expanded to view changes in ArcGIS Desktop to provide MDOT with an understanding of how Event Editor applies updates to the database.
- The on-site training will be extended from four to five days to cover the extra material.

### Task 5 – Migrate Environment to Production

All planned activities under this task are covered under the original agreement.

### Task 6 – On-going Project Support

Facing design, development, and implementation challenges, the project schedule has been extended beyond the original plan. The two sub-tasks under this task provide on-going technical and project management support for the MDOT TAMS project through May 18, 2018.

This task will fund hours for the following resources:

Resource Category	Rate 2017/2018	Hrs.	Cost
Project Director (PD)	\$ 222.00 / \$ 225.00	20	\$ 4,497.27
Project Manager (PM)	\$ 192.00 / \$ 202.00	180	\$ 36,278.18
GIS Analyst (GA)	\$ 89.00 / \$ 107.00	400	\$ 42,636.36
Technical Architect (TA)	\$ 175.00 / \$ 188.00	60	\$ 11,244.55
Database Administrator (DBA)	\$ 141.00 / \$ 148.00	20	\$ 2,953.64
<b>Totals</b>		<b>680</b>	<b>\$ 97,610.00</b>

\*Hours may be transferred among resources with MDOT's approval and the total budget is not exceeded.

## Project Resources

Resources to be assigned to the MDOT Support and Maintenance project include:

- Project Director – William Schuman
- Project Manager – Doug Argall
- GIS Analyst – Lauren Anderson
- Technical Architect – Rusty Green
- Database Administrator – Star Wu
- IT Manager – Greg Carson

Resumes can be made available if requested.

## Cost/Schedule Proposal

Task Name	Start	Finish	Work	Resource Initials	Fixed Cost	Cost
<b>External Dependencies</b>	<b>Fri 12/29/17</b>	<b>Fri 12/29/17</b>	<b>0 hrs</b>		<b>\$0.00</b>	<b>\$0.00</b>
Change Order Approval	Fri 12/29/17	Fri 12/29/17	0 hrs		\$0.00	\$0.00
<b>MDOT Support and Maintenance</b>	<b>Mon 12/18/17</b>	<b>Fri 5/18/18</b>	<b>1,209 hrs</b>		<b>\$0.00</b>	<b>\$133,782.00</b>
<b>Task 1 - R&amp;H 10.5.1 Upgrade</b>	<b>Mon 1/1/18</b>	<b>Tue 2/6/18</b>	<b>193 hrs</b>		<b>\$0.00</b>	<b>\$22,803.00</b>
Upgrade dedicated MDOT development environment	Mon 1/1/18	Tue 1/2/18	18 hrs	DBA,GA,ITM	\$0.00	\$2,178.00
Develop test scripts to test custom GP scripts	Wed 1/3/18	Thu 1/11/18	45 hrs	GA	\$0.00	\$4,815.00
Update custom GP scripts and documentation	Fri 1/12/18	Tue 1/23/18	50 hrs	GA	\$0.00	\$5,350.00
Deploy updated custom GP scripts to MDOT environment and support MDOT acceptance testing	Wed 1/24/18	Tue 1/30/18	30 hrs	GA	\$0.00	\$3,210.00
Resolve issues found during UAT of the custom GP scripts	Wed 1/31/18	Tue 2/6/18	30 hrs	GA	\$0.00	\$3,210.00
Project Management	Mon 1/1/18	Tue 2/6/18	20 hrs	PM	\$0.00	\$4,040.00
<i>Task 1 Complete</i>	Tue 2/6/18	Tue 2/6/18	0 hrs		\$0.00	\$0.00
<b>Task 2 - Rename InterchangeNumber to CountyNumber in Route-MP Network Feature Class</b>	<b>Wed 2/7/18</b>	<b>Tue 2/20/18</b>	<b>67 hrs</b>		<b>\$0.00</b>	<b>\$7,929.00</b>
Execute column name change in Transcend environment	Wed 2/7/18	Mon 2/12/18	25 hrs	GA	\$0.00	\$2,675.00
Update CS and Route Milepoint custom script to use new column name	Tue 2/13/18	Tue 2/13/18	2 hrs	GA	\$0.00	\$214.00
Confirm configuration (test R&H edit, test Route Milepoint custom script)	Tue 2/13/18	Tue 2/13/18	5 hrs	GA	\$0.00	\$535.00
Republish map services from transactional and publication databases	Wed 2/14/18	Wed 2/14/18	2 hrs	GA	\$0.00	\$214.00
Document steps for MDOT to execute in MDOT environment	Wed 2/14/18	Fri 2/16/18	15 hrs	GA	\$0.00	\$1,605.00
Support MDOT during update	Mon 2/19/18	Tue 2/20/18	10 hrs	GA	\$0.00	\$1,070.00
Project Management	Wed 2/7/18	Tue 2/20/18	8 hrs	PM	\$0.00	\$1,616.00
<i>Task 2 Complete</i>	Tue 2/20/18	Tue 2/20/18	0 hrs		\$0.00	\$0.00
<b>Task 3 User Acceptance Testing</b>	<b>Wed 2/21/18</b>	<b>Fri 3/16/18</b>	<b>138 hrs</b>		<b>\$0.00</b>	<b>\$1,688.00</b>
Prepare 1-day TSS application training	Wed 2/21/18	Wed 2/21/18	5 hrs	GA,PM	\$0.00	\$630.00
Conduct 1-day training remotely on TSS applications	Thu 2/22/18	Thu 2/22/18	9 hrs	GA,PM	\$0.00	\$1,058.00

Task Name	Start	Finish	Work	Resource Initials	Fixed Cost	Cost
On-site R&H Acceptance Testing with Acceptance Team	Tue 2/27/18	Fri 3/2/18	80 hrs	GA,PM	\$0.00	\$0.00
Adjust R&H Environment/Data and Repeat Acceptance Tests (Iteratively)	Mon 3/5/18	Fri 3/16/18	44 hrs	GA,PM	\$0.00	\$0.00
<i>Task 3 Complete</i>	Fri 3/16/18	Fri 3/16/18	0 hrs		\$0.00	\$0.00
<b>Task 4 - MDOT Specific R&amp;H User Training</b>	<b>Mon 3/5/18</b>	<b>Fri 4/6/18</b>	<b>103 hrs</b>		<b>\$0.00</b>	<b>\$3,752.00</b>
Develop training materials for additional/expanded topics	Mon 3/5/18	Fri 3/9/18	20 hrs	GA	\$0.00	\$2,140.00
Conduct on-site MDOT Specific User Training	Mon 3/19/18	Thu 3/22/18	32 hrs	GA	\$0.00	\$0.00
Conduct on-site training on additional/expanded topics	Fri 3/23/18	Fri 3/23/18	8 hrs	GA	\$150.00	\$1,006.00
Remote support/training via GoToMeeting	Mon 3/26/18	Fri 4/6/18	40 hrs	GA	\$0.00	\$0.00
Project Management	Mon 3/5/18	Fri 4/6/18	3 hrs	PM	\$0.00	\$606.00
<i>Task 4 Complete</i>	Fri 4/6/18	Fri 4/6/18	0 hrs		\$0.00	\$0.00
<b>Task 5 - Migrate Environment to Production</b>	<b>Mon 3/26/18</b>	<b>Fri 4/6/18</b>	<b>28 hrs</b>		<b>\$0.00</b>	<b>\$0.00</b>
Remote Support Migration of Accepted Test Environment to Production Environment	Mon 3/26/18	Fri 3/30/18	12 hrs	GA,TA	\$0.00	\$0.00
Final Acceptance Testing on Production Environment	Mon 4/2/18	Fri 4/6/18	12 hrs	GA	\$0.00	\$0.00
Project Management	Mon 3/26/18	Fri 4/6/18	4 hrs	PM	\$0.00	\$0.00
<i>Task 5 Complete</i>	Fri 4/6/18	Fri 4/6/18	0 hrs		\$0.00	\$0.00
<b>Task 6 - On-going Project Support (Sep '17 - May '18)</b>	<b>Mon 12/18/17</b>	<b>Fri 5/18/18</b>	<b>680 hrs</b>		<b>\$0.00</b>	<b>\$97,610.00</b>
Technical Support	Mon 12/18/17	Fri 5/18/18	480 hrs	GA,TA,DBA	\$0.00	\$56,834.55
Project Management	Mon 12/18/17	Fri 5/18/18	200 hrs	PD,PM	\$0.00	\$40,775.45
<i>Task 6 Complete</i>	Fri 5/18/18	Fri 5/18/18	0 hrs		\$0.00	\$0.00

**Green** – On-site with MDOT personnel

**Orange** – MDOT Review/Implementation Tasks

**State of Michigan  
Transportation Asset Management System (TAMS)  
Scope of Work for Change Request #4**



**Feb 13<sup>th</sup>, 2018**

## Transportation Asset Management System (TAMS)

### Scope of Work for Change Request

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#### Change No. 1 Service Request Portal – Integration with MiLogin (Updated scope of work)

##### Change Request Definition

Initial Reason for Change – Service request portal needs to be integrated with MiLogin to meet MDOT's single sign on (SSO) requirement.

Reason for Updated Change Request - MDOT communicated on 2/7/2018 that integration of service request portal with MiLogin is not a requirement any more. MDOT decided to implement the service request portal "as is" where it's publicly accessible. This CR has been updated to reflect the cost incurred by DTS until 2/7.

##### Description – Describe the proposed change.

DTS team worked on planning and design activities associated with the integration of the service request portal with MiLogin. Based on the direction from MDOT on 2/7, DTS team has stopped activities associated with this change request.

##### Schedule

Task Name	Duration	Start	Finish
<b>Service Request Portal Enhancement</b>	<b>88 days</b>	<b>Mon 1/1/18</b>	<b>Wed 5/2/18</b>
DTS to create mockups	21 days	Mon 1/1/18	Mon 1/29/18
DTS to provide mockups for MDOT's review	2 days	Tue 1/30/18	Wed 1/31/18

**Total Cost – \$10,000**

#### Change No. 2 Extend Project Schedule for Production Server Procurement - Support

##### Change Request Definition

The project end date per the current schedule and scope of work is June 30, 2018. MDOT requested for additional time for procurement activities specific to production servers. The purpose of this change request is to provide project management support activities from June 30<sup>th</sup> through Sep 30<sup>th</sup>.

##### Description – Describe the proposed change.

DTS and TSS project management team will participate in project related weekly calls and respond to technical questions specific to production setup and installation. This change request doesn't include any changes to TAMS data or schema, workflows, processes, reports, configuration and functional changes, including any previously delivered items specific to TAMS project.

##### Schedule – June 30<sup>th</sup> to Sep 30<sup>th</sup>

**Total Cost – \$30,000**





**STATE OF MICHIGAN**  
**ENTERPRISE PROCUREMENT**  
Department of Technology, Management, and Budget  
525 W. ALLEGAN ST., LANSING, MICHIGAN 48913  
P.O. BOX 30026 LANSING, MICHIGAN 48909

**CONTRACT CHANGE NOTICE**

Change Notice Number **3**

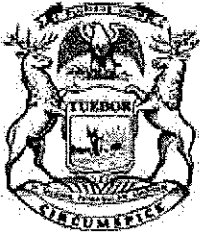
to

Contract Number **071B5500115**

<b>CONTRACTOR</b>	Data Transfer Solutions, LLC
	3680 Avalon Park Blvd
	Orlando, FL 32828
	Allen Ibaugh
	407-382-5222
	aibaugh@dtsgis.com
	*****7100

<b>STATE</b>	<b>Program Manager</b>	John Kalanquin	DTMB-IT
		517-241-0177	
		kalanquinj@michigan.gov	
	<b>Contract Administrator</b>	Kim Harris	DTMB
		(517) 284-7016	
		harrisk16@michigan.gov	

CONTRACT SUMMARY							
ENTERPRISE ASSET MGMT SOLUTION FOR MDOT							
INITIAL EFFECTIVE DATE	INITIAL EXPIRATION DATE	INITIAL AVAILABLE OPTIONS	EXPIRATION DATE BEFORE CHANGE(S) NOTED BELOW				
July 13, 2015	July 12, 2022	5 - 1 Year	July 12, 2022				
PAYMENT TERMS		DELIVERY TIMEFRAME					
ALTERNATE PAYMENT OPTIONS			EXTENDED PURCHASING				
<input type="checkbox"/> P-Card	<input type="checkbox"/> Direct Voucher (DV)	<input type="checkbox"/> Other	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No			
MINIMUM DELIVERY REQUIREMENTS							
DESCRIPTION OF CHANGE NOTICE							
OPTION	LENGTH OF OPTION	EXTENSION	LENGTH OF EXTENSION	REVISED EXP. DATE			
<input type="checkbox"/>		<input type="checkbox"/>		July 12, 2022			
CURRENT VALUE	VALUE OF CHANGE NOTICE	ESTIMATED AGGREGATE CONTRACT VALUE					
\$4,613,759.00	\$23,415.00	\$4,637,174.00					
DESCRIPTION							
Effective August 29, 2017 this contract is hereby increased by \$23,415.00 for contractor to process the 2016 and 2017 videolog images per attached statement of work. All other terms, conditions, specifications, and pricing remain the same. Per DTMB, contractor, and agency approval.							



# STATE OF MICHIGAN ENTERPRISE PROCUREMENT

Department of Technology, Management, and Budget

525 W. ALLEGAN ST., LANSING, MICHIGAN 48913

P.O. BOX 30026 LANSING, MICHIGAN 48909

## CONTRACT CHANGE NOTICE

Change Notice Number **2**

to

Contract Number **071B5500115**

<b>CONTRACTOR</b>	Data Transfer Solutions, LLC
	3680 Avalon Park Blvd
	Orlando, FL 32828
	Allen Ibaugh
	407-382-5222
	aibaugh@dtsgis.com
	*****7100

<b>STATE</b>	John Kalanquin	DTMB-IT
	517-241-0177	
	kalanquinj@michigan.gov	
	James Topping	DTMB
	(517) 284-7000	
	toppingj@michigan.gov	

### CONTRACT SUMMARY

#### ENTERPRISE ASSET MGMT SOLUTION FOR MDOT

INITIAL EFFECTIVE DATE	INITIAL EXPIRATION DATE	INITIAL AVAILABLE OPTIONS	EXPIRATION DATE BEFORE CHANGE(S) NOTED BELOW
July 13, 2015	July 12, 2022	5 - 1 Year	July 12, 2022
PAYMENT TERMS		DELIVERY TIMEFRAME	
ALTERNATE PAYMENT OPTIONS			EXTENDED PURCHASING
<input type="checkbox"/> P-Card	<input type="checkbox"/> Direct Voucher (DV)	<input type="checkbox"/> Other	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
MINIMUM DELIVERY REQUIREMENTS			

### DESCRIPTION OF CHANGE NOTICE

OPTION	LENGTH OF OPTION	EXTENSION	LENGTH OF EXTENSION	REVISED EXP. DATE
<input type="checkbox"/>		<input type="checkbox"/>		July 12, 2022
CURRENT VALUE	VALUE OF CHANGE NOTICE	ESTIMATED AGGREGATE CONTRACT VALUE		
\$4,242,893.00	\$370,866.00	\$4,613,759.00		

### DESCRIPTION

Effective May 5, 2015 the following changes are hereby incorporated into the contract:

Michigan Geographic Framework Proposal: Create two specific legacy data products on an annual basis. Esri has developed a firm, fixed-price proposal that will provide documented procedures for how DTS's end client can create these two required legacy data products during the planned period while the MGF is in an upgrade transition- Firm Fixed \$66,700

Michigan Geographic Framework change 01: This will accomplish the following: All route data must be broken into intersection to intersection segments. The data needs to represent the entire PR network including all unchanged data as well as changed records. - Firm Fixed \$25,000

TAMS Tool and Data Structure Changes:

- Convert Measures to Geographic Length - \$38,088.00
- Bridge and Polygon Intersections - \$7,344



- HPMS Event Processing - \$7,344
- Esri Route Dominance - \$1,836
- Esri Intersection Configuration - \$2,154 Total Firm Fixed-\$56,766

Highway Performance Monitoring System Implementation: Esri to assist MDOT in using HPMS tools and implement Highway Performance Monitoring System workflows in production. Specifically, Esri will provide consulting services to lead a HPMS Data Preparation Concept of Operations (CONOPS) Workshop and Coaching for MDOT staff, under the direction of DTS. After the workshop, Esri will provide remote consulting support to MDOT on the use of tools and processes used in the HPMS Data Preparation concept of operations- Firm Fixed- \$42,400

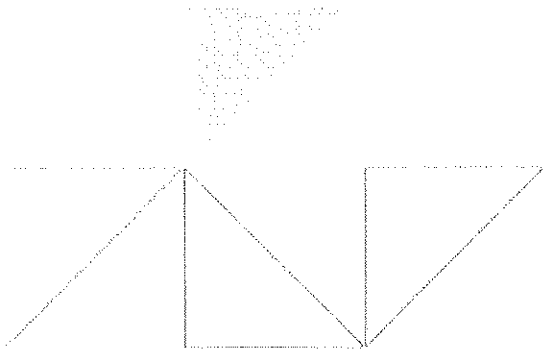
Pump Station Implementation Configure VUEWorks and train state staff to support Pump Station Assets. Firm Fixed- \$50,000

Changes to Support Roles, Oauth and Routing for MiLogin: Update Transcend and DTS software to be compatible with MiLogin. Specific updates include an authentication mechanism and UI to support authorizing users via external system but authenticate via internal role checks and an update to MobileVUE software to support Oauth protocol. - Firm Fixed- \$70,000

Signs Customization for Signs Library: Develop feature to allow business users to manage the sign library with MUTCD codes and provide them with the ability to link to the sign library to populate attribute data. The values in the attribute drop down will be filtered based on the values allowed per the sign library. Firm Fixed-\$60,000

Changes to Original Milestone and Payment Updates

Total of all Changes: 370,866



# Proposal for MGF Transitional Workflows

## Prepared for:

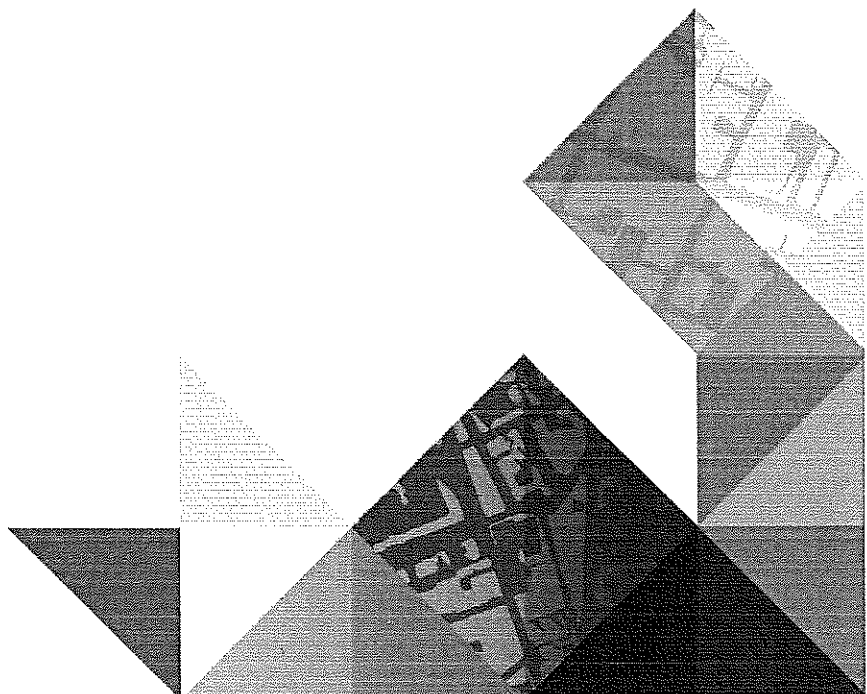
Mr. Allen Ibaugh, Chief Executive Officer  
Data Transfer Solutions LLC  
3680 Avalon Park Blvd Ste 200  
Orlando, Florida 32828  
(407) 382-5222  
[aibaugh@dtsgis.com](mailto:aibaugh@dtsgis.com)

November 29, 2016

Esri Proposal # P16-18010



380 New York Street  
Redlands, California 92373-8100 USA  
T 909 793 2853



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## **1.0 Introduction**

The Center for Shared Solutions (CSS) is currently soliciting bids to implement new COTS technology to upgrade the Michigan Geographic Framework (MGF) enterprise Geographic Information System (GIS) data model and system design including data validation and workflow management processes.

During the interim between the old MGF system and when the new MGF upgrade is available, CSS and Michigan Department of Transportation (MDOT) need to create two specific legacy data products on an annual basis. Esri has developed a firm, fixed-price proposal that will provide documented procedures for how DTS's end client can create these two required legacy data products during the planned period while the MGF is in an upgrade transition.

## **2.0 Scope of Work**

### **2.1 Introduction**

The goal of this scope of work is to support CSS and MDOT, during this transitional interim period before MGF is replaced by a new solution, with procedural workflows that CSS/MDOT can use to create the two legacy data products from the transitional MGF environment at CSS and the new Roads and Highways solution at MDOT.

### **2.2 Work Plan**

Please refer to Appendix A of this proposal for general assumptions, DTS responsibilities, and the Deliverable review and acceptance process that apply to this Scope of Work.

#### **Task 1 Procedural workflow for creating a LRS centerline data product**

Esri will develop a multiple-step procedural workflow for creating the LRS centerline data product described in item 1 of the 'MGF Deliverable Requirements for TAMS project 082616.docx' document (see Appendix B).


The outcome of this task will be a document that describes a procedural process for creating the desired LRS centerline data product on an annual basis, including screen shots, description of the procedural steps that need to be performed, and choices that need to be made by the operator. The methodology will rely on an operator running COTS ArcGIS desktop tools and functions. Esri does not intend to perform work to create custom programming code, scripts, or geoprocessing models for this Task.

Esri will develop the procedural methodology based on a representative copy of the MDOT Advanced Linear Reference System (ALRS) source data. DTS will deliver the source ALRS data to Esri before work starts on this activity. Esri will develop the procedural process on a representative subset of MDOT's ALRS. Esri will test the procedural process on the full source ALRS data provided. Esri assumes that all source data items required to create the LRS centerline data product will reside in either LRS Networks or LRS Events that are registered to the ALRS.

Esri will prepare a draft document of the procedural process and submit it to DTS along with a webcast that will review the procedures. DTS will work with their end client to review the draft and provide Esri with consolidated written comments within five business days. Esri will conduct a webcast to review the consolidated written comments with DTS and their end client. Esri will perform up to two rounds of mutually agreed rework to create a final document to DTS for acceptance.

### ***Esri Deliverables***

#### **1. LRS Centerline Data Product Procedures document**

	<ul style="list-style-type: none"> <li>• DTS will provide Esri with a copy of the MDOT ALRS source data to be used for development of the procedures</li> <li>• DTS will select a representative subset of the data for the development and documentation of the procedures</li> <li>• Esri cannot create procedures to translate data fields or values that are not present in the source data ALRS as either LRS Networks or LRS Events</li> <li>• Esri will not develop procedures to create data from data items, marked in the MGF Deliverable Requirements for TAMS project 082616' document, as "No longer required drop", "No longer needed", or "MDOT may no longer maintain this field"</li> <li>• Esri will develop and test the procedural process on a representative subset of MDOT's ALRS</li> <li>• The process to create the LRS centerline data product will be run once a year</li> </ul>
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## **Task 2 Procedural workflow for creating a Fasttrans MDOT Legacy migration table**

Esri will develop a multiple-step procedural workflow for creating a 'Fasttrans' format MDOT Legacy migration table data product described in item 2 of the 'MGF Deliverable Requirements for TAMS project 082616' document (see Appendix B). The workflow will include adding a

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field for indicating routes that have been reversed. The methodology will rely on using COTS ArcGIS desktop tools without the need for custom programming.


The outcome of this task will be a document that describes a procedural process for creating the desired 'Fasttrans' format MDOT Legacy migration table on an annual basis, including screen shots, description of the procedural steps that need to be performed, and choices that need to be made by the operator. The methodology will rely on an operator running COTS ArcGIS desktop tools and functions. Esri does not intend to perform work to create custom programming code, scripts, or geoprocessing models for this Task.

Esri will develop the procedural methodology based on a copy of the MDOT Advanced Linear Reference System (ALRS) source data. DTS will deliver the source ALRS data to Esri before work starts on this activity. Esri will develop and test the procedural process on a representative subset of MDOT's ALRS. DTS's end client will select the representative data subset. Esri assumes that all source data items required to create the 'Fasttrans' format MDOT Legacy migration table will reside in either LRS Networks or LRS Events that are registered to the ALRS.

Esri will prepare a draft document of the procedural process and submit it to DTS along with a webcast that will review the procedures. DTS will work with their end client to review the draft and provide Esri with consolidated written comments within five business days. Esri will conduct a webcast to review the consolidated written comments with DTS and their end client. Esri will perform up to two rounds of mutually agreed rework to create a final document to DTS for acceptance.

### ***Esri Deliverables***

#### **2. Fasttrans Data Product Procedures Document**

	<ul style="list-style-type: none"><li>• DTS will provide Esri with a copy of the MDOT ALRS source data to be used for development of the procedures</li><li>• DTS will select a representative subset of the data for the development and documentation of the procedures</li><li>• Esri cannot create procedures to translate data fields or values that are not present in the source data ALRS</li><li>• Esri will develop and test the procedural process on a representative subset of MDOT's ALRS</li><li>• The process to create the 'Fasttrans' format MDOT Legacy migration table will be run once a year</li></ul>
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## 2.3 Project Deliverables

Table 1. Summary of Project Deliverables

Deliverable No.	Deliverable Name	Deliverable Type
1	LRS Centerline Data Product Procedures document	Document
2	Fasttrans Data Product Procedures Document	Document

## 3.0 Schedule

Esri anticipates a 3-month schedule for completing the project during the 2017 calendar year.

## 4.0 Pricing

Esri is pleased to provide the following pricing to DTS to provide the Geographic Information Systems services stated above. The required staff, computer and travel expenses for this statement of work have been estimated based on prior experience with work of a similar nature. Esri proposes a firm-fixed-price of **\$66,700** to complete the project as defined in this proposal.

Payment on completion of State of Michigan acceptance of all deliverables in this statement of work.

## Appendix A Responsibilities, Assumptions, and Deliverable Review and Acceptance

### A.1. General DTS Responsibilities

- Coordinate and ensure the participation of appropriate DTS and end-client staff in all project-related activities. Activities include, but are not limited to:
  - Meetings.
  - Webcasts.
  - Provide Esri with access to the following items during the project, as needed:
    - Background materials.
    - ~~Source documents.~~

- 
- Data.
  - Meeting facilities.
  - Review and provide Esri with written acceptance to all project Deliverables according to the review and acceptance process outlined in Section A.4 of this Appendix.
  - Provide access to and facilitate interactions between Esri and DTS end clients and/or stakeholders.

#### **General DTS Responsibilities T&M**

- Lead all project activities.
- Communicate project needs and priorities to the Esri project manager.

#### **Additional Responsibilities for Primes**

- Ensure that all end client Responsibilities required for this project are met.
- Coordinate and lead all meetings with end client.
- Be responsible for the operations and maintenance of the entire system, unless otherwise stated in the Scope of Work.
- Provide overall project and contract management.

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## **A.3. General Assumptions**

### **General**

- This proposal is based on the requirements outlined in the following document(s):
- Appendix B of this proposal
- Unless otherwise stated in the Scope of Work, work will be performed remotely from an Esri office.
- Unless otherwise stated in the Scope of Work, remote work will be provided via telephone, email, and/or webcast and only during normal Esri business hours, Monday–Friday, 8:00 a.m. to 5:00 p.m. Pacific time, excluding Esri holidays.
- On-site work will take place at Lansing, MI, unless otherwise stated in the Scope of Work.
- Days at DTS or end client site are not to exceed 8 hours of work per day.
- References to days in the Scope of Work refer to consecutive business days.
- DTS will provide Esri with a minimum of two weeks' advanced notice before on-site travel is scheduled.
- All work will be accomplished using ArcGIS COTS Software functionality. No custom development will be performed for this project Scope of Work.

### **Software**

- All work will be performed on the latest version of Esri products, unless otherwise specified in the Scope of Work.
- Documentation for ArcGIS COTS is available in ArcGIS help online, and is not included in any project-specific documentation; nor is documentation for third-party software or Hardware.
- Unless otherwise specified in the price section, this proposal does not include the costs of any Esri COTS software, third-party software, or hardware.

### **Data**

- Data to be migrated will be provided by DTS in an Esri-compatible or Esri-convertible format.
- Unless otherwise specified in this proposal, Esri will not be responsible for cleansing data.
- Existing errors in the source data will not be corrected by Esri as part of any data upload.



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## A.4. Deliverable Review and Acceptance

Timely review and acceptance of Deliverables will be critical to maintaining the project schedule.

The Scope of Work assumes the following acceptance process and review cycles for each Deliverable type specified in the matrix below and DTS is responsible for providing Esri with written acceptance for each Deliverable specified in Table 1 of the Scope of Work in accordance with this matrix.

Esri can provide a sample acceptance letter for review at the beginning of the project.

Deliverable Type	Acceptance Process
Document	<ul style="list-style-type: none"><li>• Esri and DTS agree on the document template and table of contents.</li><li>• Esri submits a draft document to DTS for review.</li><li>• DTS review period is five days.</li><li>• DTS compiles comments from reviewers, de-conflicts comments, removes comments that are out of scope, and submits a single set of comments to Esri.</li><li>• Esri and DTS discuss comments and agree on changes, if any, that will be made.<ul style="list-style-type: none"><li>• Esri submits a final document to DTS and DTS provides written acceptance to Esri within two days of receipt.</li></ul></li></ul>

## Appendix B Requirements for Transitional Workflows for MGF Deliverables

The Center for Shared Solutions and Michigan Department of Transportation will be working together to develop a transitional deliverable for the Michigan Geographic Framework after version 17. Based on the Roads and Highways and MGFE integration options that were evaluated at the beginning of the TAMS project, it was deemed that it would be more effective to manage the road network LRS and specific events within Roads and Highways rather than migrate edits from the Roads and Highways LRS to the MGFE LRS. This change however leads to the need of creating a transitional process to create the MGF version deliverables from data within both Roads and Highways LRS and Events as well as the MGF. To meet these MGF deliverables, the following requirements would be needed:

- 1) Develop a LRS centerline (Feature Class) version with the following as attributes (Fields) on the centerline:

Current MGF Field Name	Source	ESRI Feature Class Name	Field Name	Description	Comments
PR	MDOTRH ALRS	Lrsn_PRMP	PR	Physical Road ID number	LRM for allroads
BMP	MDOTRH ALRS	Lrsn_PRMP	Lrsn measures	Beginning PR (Physical Road) segment Mile Point for linear referencing system	
EMP	MDOTRH ALRS	Lrsn_PRMP	Lrsn measures	Ending PR (Physical Road) segment Mile Point for linear referencing system	
CS	MDOTRH ALRS	Lrsn_CSMP	CS	LRM for MDOT state trunkline highways	Part of the CS LRM key. ArcGIS 10.4 needed for this requirement.
ACUBL	MDOTRH polygon feature class or LRSE	Acub LrseAcub	AcubCode Acub	Adjusted Census Urban Area Boundary Left	Do not need both ACUBL and ACUBR fields; a single ACUB value

ACUBR	MDOTRH polygon feature class or LRSE	Acub LrseAcub	AcubCode Acub	Adjusted Census Urban Area Boundary Right	Do not need both ACUBL and ACUBR fields; a single ACUB value
CSALIGN	DROP			Control Section Alignment (+ or -) in relation to PR direction	Drop no longer a requirement
CSBMP	MDOTRH ALRS	Lrsn_CSMP	Lrsn measures	Control Section segment Beginning Mile Point	
CSBRANCH	MDOTRH ALRS	Lrsn_CSMP	CSBranch	Michigan Department of Transportation (MDOT) Control Section Branch  **(See below for Branch information)  County based breakdown of trunk lines into chunks	Part of the CS LRM key. ArcGIS 10.4 needed for this requirement.
CSEMP	MDOTRH ALRS	Lrsn_CSMP	Lrsn measures	Control Section segment Ending Mile Point	
CSPATH	MDOTRH ALRS	Lrsn_CSMP	CsBranch	Control Section Path 1 = Main line forward direction 2 = Main line reverse direction 3 = Forward side on collector distributors and service drives 4 = Reverse side on collector distributors and service drives 5 = Ramps and other Trunkline features	Derived value from CSBranch in the MDOT ALRS. ArcGIS 10.4 needed for this operation.
FT	MDOTRH Lrse	LrseFacilityType	FacilityType	HPMS Data Item	

LEGALSYSTEM	MDOTRH LRSE	LrseLegalSystem	LegalSystem	Indicates ownership of the road: 0 – Non Act 51 Certified 1 – State Trunkline 2 – County Primary 3 – County Local 4 – City Major 5 – City Minor 7 – Other Public Entity (road is uncertified, non-trunkline, public)	The legal system indicates the type of Michigan Act 51 agency that has jurisdiction of the road.
MDOTEXP	MDOTRH LRSE	LrseExceptionCode	MdotExceptionCode	MDOT Exception Field	Validation exception code
NFC	MDOTRH LRSE	LrseFSystem	FunctionalSystem	MDOT National Functional Classification (NFC) code  FHWA F system values	
NHS	MDOTRH LRSE	LrseNhs	Nhs	National Highway System  FHWA NHS values	
NUMLANES	MDOTRH LRSE	LrseLane	LaneNumber	Number of Lanes	RAI data
OWP	MDOTRH LRSE	LrseOneWayPair	OneWayPair	One Way Pair 1= "Forward Side" of pair  2= "Reverse Side" of pair	Indicates state trunkline highway one way pair facilities
PC_CITY_L	MDOTRH LRSE	LrseJurisdictionCity	JurisdictionCity	Place Code City Left	Value indicates which city has jurisdiction of the road. A value for both PC_CITY_L AND PC_CITY_R is

					no longer needed. Only one city jurisdiction field will be coded on a road segment.
PC_CITY_R	MDOTRH LRSE	LrseJurisdictionCity	JurisdictionCity	Place Code City Right	Value indicates which city has jurisdiction of the road. A value for both PC_CITY_L AND PC_CITY_R is no longer needed. Only one city jurisdiction field will be coded on a road segment
PC_COL	MDOT RH LRSE	LrseJurisdictionCounty	JurisdictionCounty	Place Code County Left The County codes run alphabetically from 1-83 (Using St., not Saint for St Clair (77) and St Joseph (78))	Value indicates which county has jurisdiction of the road. A value for both PC_COL AND PC_COR is no longer needed. Only one county jurisdiction field will be coded on a road segment.
PC_COR	MDOTRH LRSE	LrseJurisdictionCounty	JurisdictionCounty	Place Code County Right The County codes run alphabetically from 1-83 (Using St., not Saint for St Clair (77) and St Joseph (78))	Value indicates which county has jurisdiction of the road. A value for both PC_COL AND PC_COR is no longer needed. Only one county jurisdiction field will be coded on a road segment.
RAMPID	MDOTRH LRSE	LrseRamp	MaliRampId	MDOT Michigan Accident Location Index (MALI) Ramp Identification Number	MDOT ramp identifier for ramps within a county
RDBRANCH	MDOTRH LRSE	LrseLocalRoadBranch	RoadBranch	County based breakdown of the	

				local road network into chunks.	
ROUNDID	MDOT RH LRSE	Lrsn_Roundabout	RoundaboutId	Unique Identifier for Roundabout intersection segments	
RT1	MDOT RH ALRS	Lrsn_RouteMP	RouteDesignation RouteNumber RouteBRBLBS	Lead Route	Part of the MDOT RH ALRS route LRM key. ArcGIS 10.4 required.
RT1ALIGN	DROP			Route 1 alignment (+ or -) in relation to PR direction	No longer required drop
RT1BMP	MDOT RH ALRS	Lrsn_RouteMP	Lrsn measures	Lead Route segment Beginning Mile Point	
RT1BRANCH	MDOT RH ALRS	Lrsn_RouteMP	RouteBranch	Lead Route Branch	Part of the MDOT RH ALRS route LRM key. ArcGIS 10.4 required.
RT1EMP	MDOT RH ALRS	Lrsn_RouteMP	Lrsn measures	Lead Route segment Ending Mile Point	
RT1SIGN	MGF needs to be added to MDOT RH LRSE	TBD	TBD	Signed Route Direction for Lead Route	N – North S – South E – East W- West
RT2	MDOT RH ALRS	Lrsn_RouteMP	RouteDesignation RouteNumber RouteBRBLBS	Dual Route	Part of the MDOT RH ALRS route LRM key. ArcGIS 10.4 required.
RT2ALIGN	DROP			Route 2 alignment (+ or -) in relation to PR direction	No longer required drop
RT2BMP	MDOT RH ALRS	Lrsn_RouteMP	Lrsn measures	Dual Route segment Beginning Mile Point	

RT2BRANCH	MDOT RH ALRS	Lrsn_RouteMP	RouteBranch	Dual Route Branch	Part of the MDOT RH ALRS route LRM key. ArcGIS 10.4 required.
RT2EMP	MDOT RH ALRS	Lrsn_RouteMP	Lrsn measures	Dual route segment Ending Mile Point	
RT2SIGN	MGF needs to be added to MDOT RH LRSE	TBD	TBD	Signed Route Direction for dual route	N – North S – South E – East W- West
RT3	MDOT RH ALRS	Lrsn_RouteMP	RouteDesignation RouteNumber RouteBRBLBS	Dual route	Part of the MDOT RH ALRS route LRM key. ArcGIS 10.4 required
RT3ALIGN	DROP			Route 3 alignment (+ or -) in relation to PR direction	No longer required drop
RT3BMP	MDOT RH ALRS	Lrsn_RouteMP	Lrsn measures	Dual Route segment Beginning Mile Point	
RT3BRANCH	MDOT RH ALRS	Lrsn_RouteMP	RouteBranch	Dual Route Branch	Part of the MDOT RH ALRS route LRM key. ArcGIS 10.4 required.
RT3EMP	MDOT RH ALRS	Lrsn_RouteMP	Lrsn measures	Dual Route segment Ending Mile Point	
RT3SIGN	MGF needs to be added to MDOT RH LRSE	TBD	TBD	Signed Route Direction for dual route	N – North S – South E – East W- West
RU_L	MDOT RH LRSE	LrseRuralUrban	RuralUrban	Code Description 1 Rural Area 2 Small Urban Area (5,000 to 49,999)	RU_L and RU_R no longer needed. A single value will be coded per road segment.

				3 Small Urbanized Area (Population 50,000 to 199,999) 4 Large Urbanized Area (Population 200,000 or More)	
RU_R	MDOT RH LRSE	LrseRuralUrban	RuralUrban	Code Description 1 Rural Area 2 Small Urban Area (5,000 to 49,999) 3 Small Urbanized Area (Population 50,000 to 199,999) 4 Large Urbanized Area (Population 200,000 or More)	RU_L and RU_R no longer needed. A single value will be coded per road segment.
SDIR	MDOT RH LRSE	LrseRouteDirection	RouteDirection	Lead Route Direction	Route direction for lead route
SYNCBMP	Drop			Synchronized Beginning Mile Point value	No longer needed. If needed a new LRM may be needed
SYNCEMP	Drop			Synchronized Ending Mile Point value	No longer needed. If needed a new LRM may be needed
SYNCPR	MDOT LRSE	LrseDividedRoadCS LrseDividedRoadPR	SyncPR	Synchronize PR Number (CS and PR)	MDOT may no longer maintain this field.
SYNCPR1	MDOT LRSE	LrseDividedRoadRT	SyncPR	Synchronized PR for Lead Route	MDOT may no longer maintain this field
SYNCPR2	MDOT LRSE	LrseDividedRoadRT	SyncPR	Synchronized PR for Dual Route	MDOT may no longer maintain this field
SYNCPR3	MDOT RH LRSE	LrseDividedRoadRT	SyncPR	Synchronized PR for Dual Route	MDOT may no longer maintain this field
GSF	MDOT RH LRSE	LrseInterchange	GradeSeparationFrom	Grade (Spatial) Separation From 0 = at grade Intersection 1 = Underpass 2 = Overpass	



				3 = 2 <sup>nd</sup> overpass	
GST	MDOT RH LRSE	LrseInterchange	GradeSeparationTo	Grade Separation To 0 = at grade Intersection 1 = Underpass 2 = Overpass 3 = 2 <sup>nd</sup> overpass	
ICN	MDOT RH LRSE	LrseInterchange	InterchangeNumber	MDOT Interchange Identifier	Currently coded on all facility arcs within an interchange area
TRAFALIGN	MDOT RH LRSE	LrseTrafficAlignment	TrafficAlignment	Traffic Alignment indicates vehicle travel direction in relation to PR direction	
US_BK_RT	MDOT RH LRSE	LrseUSBikeRoute	USBikeRoute	Approved United States Bicycle Route Code	

2) Develop a process to create the MDOT Legacy migration table in Fasttrans format with reverse column added from the MDOT Roads and Highways LRS. Column headers = OPR, OBMP, OEMP, OLEN, NPR, NBMP, NEMP, NLEN. See Appendix A for example of Fasttrans table and Appendix B for an example of the reverse column that should be included as a field in the new version the Fasttrans table to be developed. The migration table process will allow the user to specify a date range for the migration records requests.

## **Esri-DTS Task Order No. 03, Change Order No. 01**

### **Background**

The Michigan project team working with Esri on MGF transition workflows communicated new data requirements for the Fastrans data product to Esri's attention on Mar 22, 2017. Esri was not aware of these data requirements at the time of proposing the work for Task Order No. 3.

The new Fastrans data product requirements are:

- All route data must be broken into intersection to intersection segments
- The data needs to represent the entire PR network including all unchanged data as well as changed records

The Michigan project team has requested Esri to incorporate these newly identified data product requirements into the next iteration of deliverables for the work on Fastrans export procedures. This change order will impact the scope, schedule, and budget for Task Order No. 3.

### **1.0 Scope of Work**

Esri will enhance the procedures and documentation for the procedural process for creating the desired 'Fasttrans' format MDOT Legacy migration table to include the following output data requirements:

- All route data must be broken into intersection to intersection segments
- The data needs to represent the entire PR network including all unchanged data as well as changed records

Esri will develop the additional changes to the Fastrans procedures, perform internal testing, document the procedures, provide a webcast presentation of deliverables, and provide time for review and rework. The work will be performed as a supplement to the deliverables contracted for Task 2 of Task Order No. 3.

#### ***Esri Responsibilities***

- Provide additional work so that the deliverables of Task 2, Task Order No. 3, for Fastrans data product procedures will comply with the additional two requirements described above

### **2.0 Schedule Impact**

The new scope of work covered by this change order is expected to add three weeks to the expected deliverables for Task 2 of Task Order No. 3.

### **3.0 Pricing Impact**

Esri proposes a firm-fixed-price of \$25,000 additional budget needed to complete the change order scope as defined in this document.

Payment on completion of State of Michigan acceptance of all deliverables in this statement of work.

---

**Tool and Data Structure Change Email from vendor PM. Change description in bold.**

Payment on completion of State of Michigan acceptance of all deliverables in this statement of work.

**From:** Sangeeta Reddy [mailto:sreddy@dtsgis.com]

**Sent:** Thursday, November 10, 2016 3:45 PM

**To:** Lenahan, James (DTMB-Contractor) <LenahanJ@michigan.gov>; Kalanquin, John (DTMB) <KalanquinJ@michigan.gov>

**Cc:** Allen Ibaugh <aibaugh@dtsgis.com>; Swieringa, Charles (DTMB) <SwieringaC@michigan.gov>; Doug Argall <dargall@transcendspatial.com>; Kirsten Koehn <kkoehn@dtsgis.com>

**Subject:** TAMS - Schedule for Remaining Work and Change Request

**Importance:** High

Jim/John,

Please see attached schedule for TAMS related tasks to be completed between now and end of April. TSS activities specific to R&H will be wrapped up towards end of April. I know we had talked about a go live of March 1. Couple of options on going live....We can go live with VUEWorks off the UAT environment on March 1st and then switch to production environment on 4/24 when TSS activities specific to R&H implementation have been completed or we can go live with both VUEWorks and R&H towards end of April.

In order for us to deliver per the attached schedule, it's important that MDOT provides us with required data as listed in tasks 3 through 12 per the scheduled date.

Also, please see below the fee information for the changes requested by MDOT. Let me know if you need me to put this in formal CR document. Listed below are the only changes we have planned for in our schedule. If this is not a complete list of changes that MDOT is expecting then please let me know.

- **Convert Measures to Geographic Length (tasks 40-46 and 49-61 and 103) - \$38,088.00**
- **Bridge and Polygon Intersections (tasks 67 and 80) - \$7,344**
- **HPMS Event Processing (task 62) - \$7,344**
- **Esri Route Dominance (task 86) - \$1,836**
- **Esri Intersection Configuration (task 90) - \$2,154**

Please note that HPMS Event were created by ESRI as part of their scope of work. However, TSS is now reprocessing it in support of the change request to convert measures to geographic length.

Please let me know if you have any questions.

Thanks,

Sangeeta Reddy, PMP

Director of Program Management

Data Transfer Solutions, LLC

6412 Academy Lane,

---

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# Proposal for MDOT HPMS Implementation Consulting

## Prepared for:

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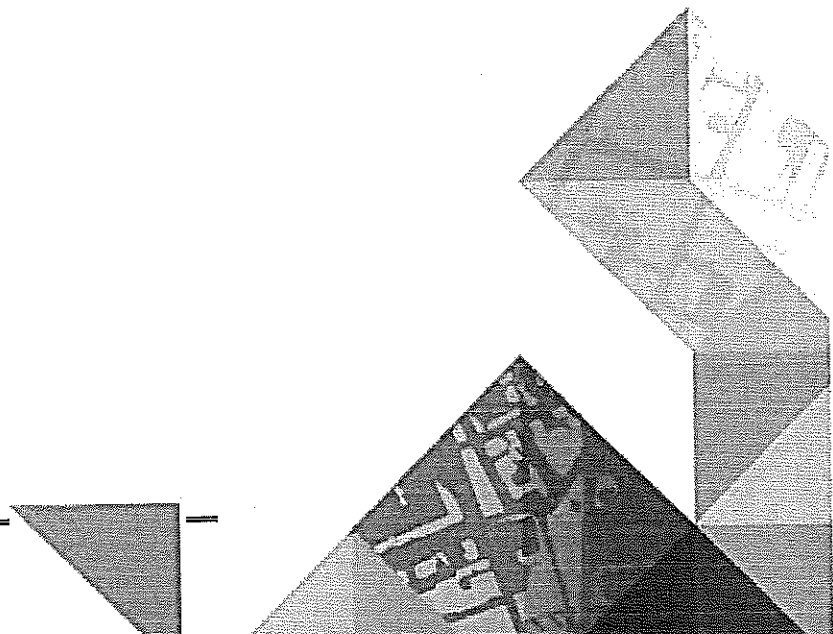
**December 8, 2016**

**Esri Proposal # P16w18518**

The Esri logo consists of the word "esri" in a bold, lowercase, sans-serif font. A small registered trademark symbol (®) is located to the upper right of the letter "i".

**esri**

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## 1.0 Introduction

Environmental Systems Research Institute, Inc. (Esri) is proposing this follow on work in response to lessons learned from the HPMS prototyping effort that was performed for Data Transfer Solutions, LLC (DTS) and its end client Michigan Department of Transportation (MDOT). The focus of this proposal is for Esri to assist MDOT in using HPMS tools and implement Highway Performance Monitoring System (HPMS) workflows in production. Specifically, Esri will provide consulting services to lead a HPMS Data Preparation Concept of Operations (CONOPS) Workshop and Coaching for MDOT staff, under the direction of DTS. After the workshop, Esri will provide remote consulting support to MDOT on the use of tools and processes used in the HPMS Data Preparation concept of operations.

## 2.0 Solution Overview

### 2.1 Introduction

Under contract to DTS, Esri provided consulting services to DTS and MDOT for prototyping an HPMS support solution that leverages the Esri Roads and Highways solution that is currently in the process of deployment at MDOT.

The work resulted in the following deliverables:

1. Logical Roads and Highways event data model for HPMS.
2. Prototype dataset of MDOT-provided data loaded into the HPMS event data model.
3. Custom ArcGIS tools developed to run HPMS validation checks and output results.
4. Knowledge transfer on the use of HPMS validation tools, HPMS data export tools, and Esri Roads and Highways Roadway Reporter web application.

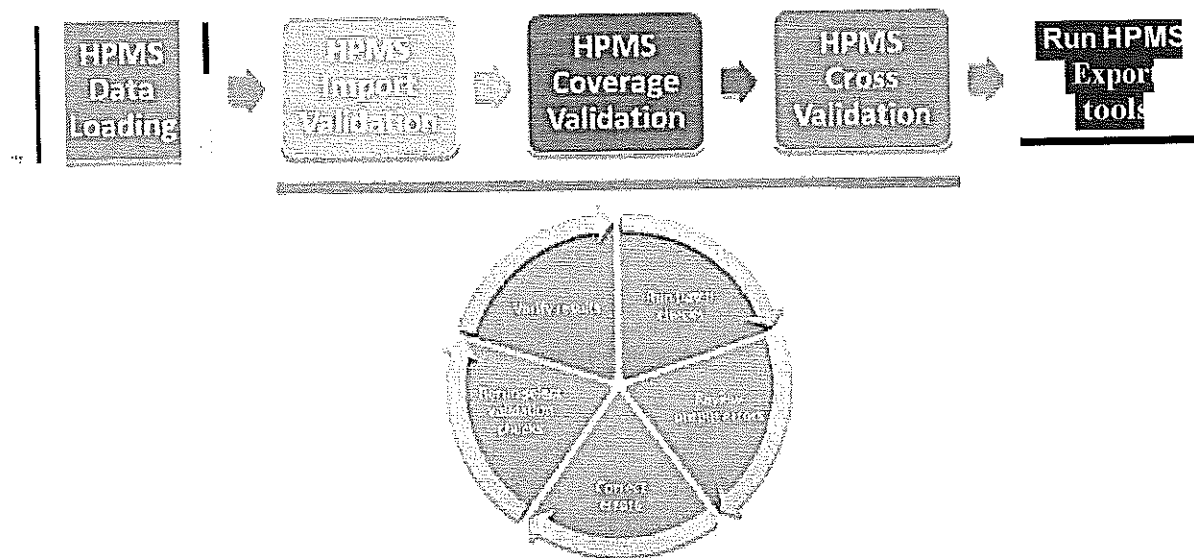
After the knowledge transfer workshop, Esri further refined the HPMS validation tools based on direct user feedback and enhancement requests from MDOT. Based on feedback to date, no gaps have been identified after exercising the prototype data model and tools. Therefore, for moving to production, Esri recommended the following to MDOT and DTS:

- Task MDOT's Roads and Highways implementer with deploying the HPMS event data model in a production environment, and provide event editing rights to staff involved with HPMS data evaluation and submission.

- Follow the CONOPS described in this document for preparing HPMS data for submission to Federal Highways Administration (FHWA). The CONOPS should be refined with use.
- Task Esri to provide consulting services to lead a HPMS Data Preparation CONOPS Workshop and Coaching for MDOT staff.

## 2.2 CONOPS for HPMS Submission Preparation

Based on the HPMS prototyping work performed for DTS and end client MDOT, Esri recommended a concept of operations to MDOT for preparing data for HPMS submission.



### HPMS Data Loading

The first step in the process is for MDOT to use built-in Roads and Highways capabilities to load HPMS data from MDOT business data owners into the HPMS event model in MDOT's production Roads and Highways Advanced Linear Referencing System. MDOT should seek to leverage the "Append Events" geoprocessing tool as the primary data loading tool. Source data should be transformed if necessary into a table or feature layer format that contains all the necessary field information required of the target HPMS event.

ArcGIS Tool Reference: <http://desktop.arcgis.com/en/arcmap/latest/tools/roads-and-highways-toolbox/append-events.htm>

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The next step is for MDOT to perform the HPMS validation checks using the custom ArcGIS toolset developed by Esri for MDOT.

### HPMS Import Validation

MDOT runs the HPMS Import Validation tool check following the tool documentation for how to use the tool. In an initial run, Esri recommends MDOT runs all the Import Validations in a single batch process. After the tool runs, the output files should be inspected for errors. MDOT should then develop a corrective action plan to fix any errors {or document those errors that MDOT feels should be exceptions for FHWA). After implementing the corrective action plan, MDOT should rerun selected Import Validation checks that need to be rerun. Again, output files should be inspected and the process of corrective action and rerunning validation checks should be iterated until all checks pass to MDOT's satisfaction.

### HPMS Coverage Validation

MDOT runs the HPMS Coverage Validation tool check following the tool documentation for how to use the tool. In an initial run, Esri recommends MDOT runs all the Coverage Validations in a single batch process. After the tool runs, the output files should be inspected for errors. MDOT should then develop a corrective action plan to fix any errors {or document those errors that MDOT feels should be exceptions for FHWA). After implementing the corrective action plan, MDOT should rerun selected Coverage Validation checks that need to be rerun. Again, output files should be inspected and the process of corrective action and rerunning validation checks should be iterated until all checks pass to MDOT's satisfaction.

### HPMS Cross Validation

MDOT runs the HPMS Cross Validation tool check following the tool documentation for how to use the tool. In an initial run, Esri recommends MDOT runs all the Cross Validations in a single batch process. After the tool runs, the output files should be inspected for errors. MDOT should then develop a corrective action plan to fix any errors {or document those errors that MDOT feels should be exceptions for FHWA). After implementing the corrective action plan, MDOT should rerun selected Cross Validation checks that need to be rerun. Again, output files should be inspected and the process of corrective action and rerunning validation checks should be iterated until all checks pass to MDOT's satisfaction.

### Run HPMS Export tools

MDOT runs the HPMS geoprocessing models and tools to produce the HPMS submittal data products required by FHWA. MDOT has been trained on using the models. The models are configurable, and can be run against MDOT's data model to produce the HPMS outputs.

#### HPMS Export Tools link:

<http://www.arcgis.com/home/item.html?id=c29c965cb9c54d3f83a864a4a94f9at'2>

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## 3.0 Scope of Work

### 3.1 Introduction

As a subcontractor to DTS, Esri will provide consulting services to MDOT to lead a HPMS Data Preparation CONOPS Workshop and Coaching for MDOT staff.

### 3.2 Work Plan

Please refer to Appendix A of this proposal for general assumptions, DTS responsibilities, and the Deliverable review and acceptance process that apply to this Scope of Work.

#### Task 1 HPMS Data Preparation CONOPS Workshop

Esri will prepare custom training materials consisting of slides and user exercises that will be used for the HPMS Data Preparation CONOPS workshop. The user exercises will leverage the prototype HPMS ALRS data and will cover the processes involved in the HPMS CONOPS.

Esri will conduct a four day HPMS Data Preparation CONOPS workshop at MDOT facilities in Lansing, Michigan supporting up to 12 participants. The workshop will cover the following topics:

- Review and knowledge transfer on loading HPMS data from business sources into the HPMS events
- Review and knowledge transfer on running the HPMS validation tools (Import Validation, Coverage Validation, Cross Validation)
- Review and knowledge transfer on running HPMS Export tools
- Additional onsite time to discuss/whiteboard HPMS workflows
- Additional onsite time coaching MDOT staff on the use of HPMS tools to get MDOT started on HPMS data validation and correction

The purpose of the workshop is to familiarize MDOT on how to accomplish the HPMS Data Preparation CONOPS workflows and provide hands-on coaching and support on the use of the HPMS tools.

In preparation for the workshop, Esri will lead a one-hour webcast with MDOT at least two weeks before the workshop to discuss the workshop agenda and workshop prerequisites that MDOT needs to arrange.



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## Esri Deliverables

### 1. Four-day HPMS Data Preparation CONOPS workshop

- i**
- MDOT must implement the HPMS event data model in a production environment, and provide event editing rights to staff involved with HPMS data evaluation and submission, prior to the start of this task.
  - MDOT is responsible for loading data into the HPMS event data model prior to the start of this task.
  - MDOT's Roads and Highways solution will be at ArcGIS version 10.4.1 or greater.
  - MDOT will identify and schedule the appropriate MDOT staff to attend the workshop.
  - MDOT will ensure that attendees have general ArcGIS Roads and Highways editing knowledge and a basic understanding of MDOT workflows.
  - Ensure that attendees have access to MDOT computers that can access ArcGIS for Desktop software, Esri Roads and Highways, MDOT's Roadways Characteristics Editor, and a geodatabase training version of MDOT Roads and Highways ALRS.
  - Esri will create knowledge transfer exercises based on the HPMS prototype data model and work performed to-date.

## Task 2 HPMS Data Preparation Remote Consulting Support

Following the workshop, Esri will provide 20 hours of remote consulting support to MDOT under the direction of DTS over the six months following completion of Task 1 on the use of tools and processes used in the HPMS Data Preparation concept of operations.

Under the direction of DTS, Esri will coordinate with MDOT on biweekly basis on HPMS status and remote consulting needs and at MDOT.

### Esri Deliverables

#### 2. 20 hours of remote consulting services

## 3.3 Project Deliverables

Table 1. Summary of Project Deliverables

Deliverable No.	Deliverable Name	Deliverable Type
1	Four-day HPMS Data Preparation CONOPS workshop	Custom Training
2	20 hours of remote consulting services	Remote Support

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## 4.0 Schedule

Esri anticipates a 3-month schedule for completing the project during the 2017 calendar year.

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## 5.0 Pricing

Esri is pleased to provide the following pricing to DTS to provide the Geographic Information Systems services stated above. The price for this proposed work has been estimated based upon an anticipated award of a firm-fixed-price (FFP) task order. The required staff, computer and travel expenses for this statement of work have been estimated based on prior experience with work of a similar nature. Esri proposes a firm-fixed-price of **\$42,400** to complete the project as defined in this proposal.

Payment on completion of State of Michigan acceptance of all deliverables in this statement of work.

### **Contact:**

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Project Manager / Consultant  
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## **Appendix A Responsibilities, Assumptions, and Deliverable Review and Acceptance**

### **A.1. General DTS Responsibilities**

Coordinate and ensure the participation of appropriate DTS end client staff in all project-related activities. Activities include, but are not limited to:

Meetings.

Webcasts.

Training.

Provide Esri with access to the following items during the project, as needed:

Background materials.

Source documents.

Data.

Meeting facilities.

Hardware and software environments (directly, or via VPN).

- Review and provide Esri with written acceptance to all project Deliverables according to the review and acceptance process outlined in Section A.3 of this Appendix.
- Provide access to and facilitate interactions between Esri and any DTS customers and/or stakeholders.
- Communicate project needs and priorities to the Esri project manager.
- Ensure that all end client Responsibilities required for this project are met.
- Coordinate and lead all meetings with end client.
- Be responsible for the operations and maintenance of the entire system, unless otherwise stated in the Scope of Work.
- Provide overall project and contract management.

### **A.2. General Assumptions**

This proposal is based on the requirements outlined in the following document(s):

- HPMS Implementation Plan for Michigan Department of Transportation document prepared for DTS and end client MDOT dated November 2016 (filename: HPMS Implementation Recommendations.docx)

- 
- Unless otherwise stated in the Scope of Work, work will be performed remotely from an Esri office.
  - Unless otherwise stated in the Scope of Work, remote work will be provided via telephone, email, and/or webcast and only during normal Esri business hours, Monday– Friday, 8:00a.m. to 5:00p.m. Pacific time, excluding Esri holidays.
  - On-site work will take place at Lansing, MI, unless otherwise stated in the Scope of Work.
  - Days at DTS end client site are not to exceed 8 hours of work per day.
  - References to days in the Scope of Work refer to consecutive business days.
  - DTS will provide Esri with a minimum of two weeks' advanced notice before on-site travel is scheduled.
  - DTS end client end users are already knowledgeable in the use of ArcGIS software, or will complete the training classes recommended by Esri, if included in this proposal.

#### Hardware / Software

- All work will be performed on the latest version of Esri products, unless otherwise specified in the Scope of Work.
- Bugs found in Esri COTS Software will be handled by DTS and/or end client under the terms of its software licenses.
- Documentation for ArcGIS COTS is available in ArcGIS help online, and is not included in any project-specific documentation; nor is documentation for third-party software or Hardware.
- Unless otherwise specified in the price section, this proposal does not include the costs of any Esri COTS software, third-party software, or hardware.

### **A.3. Deliverable Review and Acceptance**

Timely review and acceptance of Deliverables will be critical to maintaining the project schedule.

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## Michigan Department of Transportation

### VUEWorks™ Proposed Scope of Services

The following proposed Scope of Services are a combination of remote and onsite consultation, configuration and training services designed to meet the needs as defined in the *TAMS Pump Station Technical Requirements, 1/18/2017*. The scope is designed to provide enough services to properly configure VUEWorks and train state staff to ensure successful use of VUEWorks in meeting the Department's operational needs and goals.

The Scope of Services will be used to implement VUEWorks with a mix of the following service categories:

- Project management
- Consultation
- Documentation
- Configuration
- Training
- Onsite Support Services

~~Each service category, with the exception of Onsite Support Services, can be conducted remotely or onsite. In order to balance cost against adequate service hours, DTS recommends most services be conducted remotely with onsite face-to-face meetings and services periodically occurring throughout the life of the implementation project.~~

The implementation of Pump Stations will consist of the following tasks:

1. Project Management
2. Project Initiation (1 week)
  - a. Project kick-off
  - b. Task and resource scheduling for next steps
  - c. Data, document and process review
3. System Configuration (10 weeks) – (1) GIS, Facilities, Condition (4 weeks), (2) Service Request, Work Order, Preventative Scheduler (3 weeks), (3) Valuation, Projects, Budget Forecasting (3 weeks) (NOTE: all 5 tasks below apply to each module configuration)
  - a. Form and data field configuration
  - b. Data loads and data linking
  - c. PM/System Admin initial training
  - d. System testing
  - e. Configuration adjustments
4. Production use and maintenance (2 weeks)
  - a. End-user training
  - b. System go-live
  - c. Technical Support  
& Annual  
Maintenances

The implementation services will focus on the implementation of 166 pump stations for use with the following VUEWorks application modules: Service Request, Work Order, Facilities, Condition, Valuation, Projects, and Budget Forecasting.

## **Software & Professional Service Fees:**

DTS is pleased to present the following proposal to the Michigan Department of Transportation for professional services to satisfy the *TAMS Pump Station Technical Requirements*. DTS believes this proposal is prudent and equitable in extending the use of TAMS for pump stations. The overall proposed fees to satisfy the requirements is:

	Cost
Software Fees	
Professional Services	\$50,000.00
<b>Project Total</b>	<b>\$50,000.00</b>

### Software Fees

The Michigan Department of Transportation has an existing VUEWorks software license. There is no additional software licensing fee for the implementation of pump stations as defined in this document.

### Professional Services

The pricing for the professional services is based on the effort required to implement the Proposed Scope of Services, including an estimate of 3 onsite days.

## Schedule:

DTS estimates an approximate 3 month schedule based on the modules to be configured as detailed above. We anticipate beginning the project in April and completing in June/July of 2017.

## Terms & Conditions

### Invoicing & Payment Terms

Payment on completion of State of Michigan acceptance of all deliverables in this statement of work.

### Additional Expenses

All travel and out-of-pocket expenses associated with delivery of the consulting and customer education services are included in the proposed fees and are not billed at actual.

### Additional Service Fees

In the event it becomes apparent to Data Transfer Solutions, LLC, that estimated fees will be exceeded due to unforeseen issues or complications or due to any changes in the scope of the project requiring a



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change in the Scope of Services, DTS will notify the client of the additional need and require authorization to proceed.

## **Additional Considerations**

Most of the requirements listed in Attachment A can be achieved through configuration of VUEWorks off the shelf. A few requirements will require a bit of a modified approach that is listed here:

1. Pump stations elemental facility asset costs to be rolled up as a GIS asset in order to support budget forecasting activities.
2. Import of pump station condition will require the identification of a unique ID as well as determination of an index (0-100) value (words such as good, fair, poor) can be used, but the index is needed.
3. Relative weight formula for condition is fine.
4. Condition Requirement 2.10 is possible, but requires a manual process currently to complete to create a new inspection unless thresholds are determined and can be setup as preventative maintenance triggers on Work Orders.
5. Service Request Requirement 3.2 will be handled through a buffer operation until a boundary layer (management area) can be developed and integrated in GIS.

## Attachment A: Asset Configuration Requirements

## State of Michigan TAMS Pump Station Technical Requirements

### General Information

Project ID / Acronym:	
Organizational Titles:	MDOT – Michigan Department of Transportation DTMB –Department of Technology, Management and Budget
Document Creation Date:	January 18, 2017

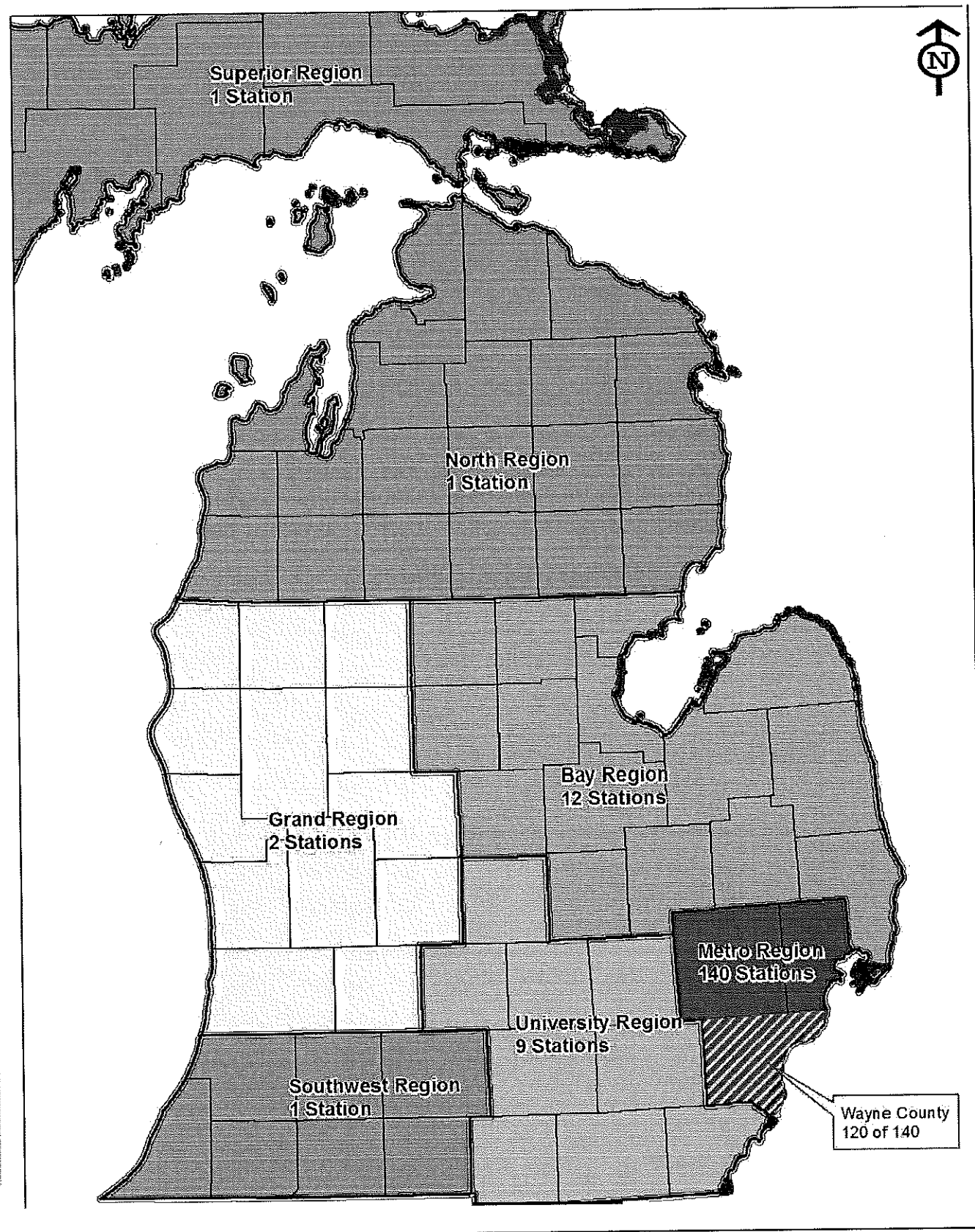
### Change Control

Revision Date	Author	Section(s)	Summary
	Joseph Bartus		Initial creation.

### Overview

The Michigan Department of Transportation (MDOT) and the Department of Technology, Management and Budget (DTMB) are working collaboratively on a project to migrate pump station maintenance management into the TAMS platform. Pump stations are not currently managed in any asset management system at MDOT.

MDOT maintains a total of 166 pump station throughout the state. Of that 166, maintenance responsibility is divided into three separate service providers. Wayne County Roads Division, through contract, maintains 120 pump stations within the geographic border of Wayne County. The MDOT Auburn Hills Special Crews maintains 20 pump station in Oakland and Macomb counties. The remaining 26 stations are located throughout the rest of state and maintained by Statewide Electrical Crews.



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## Scope

The scope of this project includes the following:

- Must meet all the Minimum Mandatory Requirements from the MDOT Attachment A-Solution Requirements Enterprise Asset Management System
- Add all MDOT pump stations as assets along with corresponding child, grandchild, etc. assets as structured in the VueWorks Water Pump Station Facility Module. These include Backup Power, Electrical, Exterior Site, Heat, Hydraulics, Mechanical, Mechanical Control, Security, Structure, Supervisory and Monitor and Ventilation.
- Include Condition module for all MDOT pump stations
- Include Projects module for all MDOT pump stations
- Include Budget Forecasting module for all MDOT pump stations
- Include Valuation module for all MDOT pump stations
- Include pump station assets in Service Request module
- Include pump station assets in Work Order module
- Include Preventative Maintenance Scheduler

MDOT would like to utilize the Water Pump Station Facility Module that DTS has available within the VueWorks software. The technical requirements listed in this document may overlap some of that modules features already and are not intended to be exclusive or overwrite any of those features. The intent of listing the technical requirements here is to cover items that may need customization within the existing module.

## Out of Scope

Changes other than those listed above are not included in this project. Future consideration will be given for integration of SCADA, Wayne County CityWorks and energy invoicing.

## MDOT Stakeholders

Name/Title	Title
Justin Droste	
James Lenahan	
Gary Mayes	
Mia Silver	
Joe Bartus	
Kevin McKnight	
Mike Gorman	

## Pump Station Assets

1. Pump Station Attributes	
	Requirement Description
1.1	Basic Information
1.1.1	Structure number
1.1.2	Control Section
1.1.3	PR number
1.1.4	Wayne County ID/State ID
1.1.5	Region (pull down)
1.1.6	TSC (pull down)
1.1.7	Maintaining Agency (from pull down)
1.1.8	Energy Provider
1.1.9	Energy Provider Account Number
1.1.10	SCADA (Yes/No)
1.1.11	Attachments: Flow, Wiring Diagram, As Built attachments.
1.1.12	Service Address
1.1.13	Common Name
1.1.14	Allow a single photo of station to be visible
1.1.15	Include MDOT standard coding block per station
1.2	Mechanical System
	Pump Attributes
1.2.1	Pump type (pull down)
1.2.2	Pump capacity
1.2.3	Pump horse power
1.2.4	Year Installed
1.2.5	Manufacturer/Model Number
1.2.6	Number of discharge tubes
1.2.7	Generator hook up type and location
1.2.8	Heater present (Y/N) and type
1.2.9	Ventilation present (Y/N) and type
1.3	Electrical Systems
1.3.1	Back up battery for primary
1.3.2	Incoming service voltage
1.3.3	Back up battery for Multismart
1.4	Level Control System
1.4.1	Type of level control system (Pull down-Electrodes, Floats, Multismart, Aggressive, MDIs)
1.5	Facility Information
1.5.1	Stairs
1.5.2	Fence
1.5.3	Slopes
1.5.4	Parking
1.6	Pump Station Access
1.6.1	Access directions to station
1.6.2	Pit clean out access

## Condition Module

2. Condition Data		
		Requirement Description
2.1		The system must include condition assessment for entry and have the ability to be in a form format.
2.2		There must be 5 tabs to enter the information in; General, Mechanical, Electrical, Structure and Site. See sample Inspection Report for all required fields in this module. Attachment A.
2.3		The system shall allow pull down menus for each element that is rated with number.
2.4		Batch upload existing condition data. This will be provided to the vendor at a later date.
Condition Reporting		
2.5		The system must allow the full condition report to be printed for each pump station.
2.6		The system must calculate the subsystem condition value for Mechanical, Electrical, Structure and Site.
2.7		The system must calculate the overall pump station rating value based on formulas.
2.8		The system must have the ability to provide map views based on all condition values, overall and subsystem.
2.9		The system must recalculate the overall condition value and subsystem value based on completed/closed Work Orders (see Work Order section for entering requirements).
2.10		The system must prompt a re-assessment of an asset if a Work Order is closed and tied to a ratable asset in the condition assessment module.

## Service Request Module

3. Service Requests (SR)		
		Requirement Description
3.1		Have the ability to tie flooding complaints to a pump station.
3.2		Have the ability to auto locate the nearest 2 pump stations, when a flooding location SR is pinned to the road network.
3.3		When a SR is tagged to a pump station, it must auto pull certain fields from asset attributes (from Section 1) and include a name and contact phone number based on the pump station maintenance service provider. This list will be provided at a later date and based on the Pump Station Attributes.

## Work Order Module

4. Work Orders		
		Requirement Description
4.1		The system will allow the entering of a Work Order to the Pump Station.
4.2		The system will allow the entering of a new condition value when a Work Order changes the value of an existing attribute that has a condition value. The system will recalculate the condition assessment values.
4.3		The system will show when a pump station is under the control of a contractor because of a programmed job. The job number will be referenced in a new field.
4.4		The system will allow a Work Order to contain more than one Pump Station as an asset.
4.5		Have the ability to create emergency Work Orders that have a red flag/high priority designation.
4.6		When a WO is tagged to a pump station, it must auto pull certain fields from attributes (from Section 1).



## Preventative Maintenance Scheduler

5. Preventive Maintenance Scheduler		
		Requirement Description
5.1		The system must be able to provide preventive maintenance checklists items in 'click off' format, and capture the date and user. A list of various routine and preventive maintenance tasks is provided in Attachment B.
5.2		The system must be able to account for weekly, monthly, semi-annual an annual PM checklists and schedule. The system should also allow 'bumping' of a PM and correspond to the resulting schedule changes.
5.3		The system must be able to link pump stations based on Pump Run. Pump Run lists are provided in Attachment C. Please note that this only apply to assets maintained by Wayne County Department of Roads.

## Projects Module

Reserve for future use of this module.

6. Projects Module		
		Requirement Description

## Budget Forecasting Module

Reserve for future use of this module.

7. Budget Forecasting Module		
		Requirement Description

## Valuation Module

Reserve for future use of this module.

8. Valuation Module		
		Requirement Description

**PUMP STATION INSPECTION  
CONDITION RATING CRITERIA**

**MECHANICAL**

**PUMP**

7 TO 10 (GOOD)	UNDER 20 YEARS OLD OR RECENTLY REFURBISHED, IN WORKING ORDER
4 TO 6 (FAIR)	20 TO 30 YEARS OLD, IN WORKING ORDER
0 TO 3 (POOR)	OVER 30 YEARS OLD, BROKEN, MISSING, DISCONNECTED

**DISCHARGE TUBE**

7 TO 10 (GOOD)	NO TO MINOR VISIBLE RUST, PAINTED OR GALVANIZED IN GOOD CONDITION
4 TO 6 (FAIR)	NO COATING, MAY BE RUSTED, NO HOLES WITH SOLID JOINTS
0 TO 3 (POOR)	NO COATING, SIGNIFICANT RUST, HOLES, COMPROMISED JOINTS OR MISSING

**VENTILATION**

7 TO 10 (GOOD)	NEW FORCED AIR (BELOW GRADE) OR NON MECHANICAL VENTILATION (ABOVE GRADE) SECURE TO OUTSIDE & WEATHER TIGHT
4 TO 6 (FAIR)	OLDER FORCED AIR SYSTEM, STILL IN WORKING ORDER, WEATHER TIGHT
0 TO 3 (POOR)	BROKEN OR NO VENTILATION PROVIDED, NOT WEATHER TIGHT, POSSIBLE SECURITY ISSUE

**HEATER**

7 TO 10 (GOOD)	NEW HEATER IN GOOD WORKING ORDER
4 TO 6 (FAIR)	OLDER HEATER, STILL IN WORKING ORDER
0 TO 3 (POOR)	NO HEATER OR BROKEN HEATER.
N/A	IF NO HEATING SYSTEM IS PROVIDED AND THERE IS NO EVIDENCE/ HISTORY OF CONDENSATION WITHIN THE MACHINE ROOM, HEATING IS NOT NECESSARY

PUMP STATION INSPECTION REPORT					
DATE:		LOCATION:		INSPECTOR:	
STRUCTURE NO:		WAYNE CO ID:			
REGION:		LATITUDE:		LONGITUDE:	
TYPE:					
RATING SYSTEM		7 TO 10 = GOOD		4 TO 6 = FAIR	
		0 TO 3 = POOR			
MECHANICAL SYSTEM					
NO. OF PUMPS:		HORSE POWER (PER PUMP)		TYPE:	
YEAR INSTALLED		GPM RATING (PER PUMP)		TUBE DIA:	
MANUFACTURER / MODEL NO.					
ITEM	CONDITION (1 TO 10)	COMMENTS:			
PUMP 1					
PUMP 2					
PUMP 3					
PUMP 4					
PUMP 5					
PUMP 6					
DISCHARGE TUBES					
VENTILATION					
HEATER					
OVERALL:	#DIV/0!				
ELECTRICAL SYSTEM					
POWER CO:					
ITEM	CONDITION (1 TO 10)	COMMENTS:			
SERVICE					
CT CABINET					
METER					
CONTROL PANEL					
LEVEL CONTROL					
LIGHTING					
OVERALL:	#DIV/0!				
STRUCTURE					
TYPE:					
ITEM	CONDITION (1 TO 10)	COMMENTS:			
ROOF					
HATCHES					
DRAINAGE					
RAILS					
MACHINE RM					
WET WELL					
CONC SURF COAT					
DOORS					
LADDERS/STAIRS					
OVERALL:	#DIV/0!				
SITE					
ITEM	CONDITION (1 TO 10)	COMMENTS:			
FENCE					
SLOPES					
PARKING					
OVERALL:	#DIV/0!				
OVERALL PUMP STATION CONDITION RATING:		#DIV/0!			

## **ELECTRICAL**

### **SERVICE**

7 TO 10 (GOOD)	NEW SERVICE, 480 VOLT (MIN)
4 TO 6 (FAIR)	480 VOLT (MIN), HISTORY OF PHASE LOSS
OTO 3 (POOR)	LESS THAN 480 VOLT OR HISTORY OF NUMEROUS PHASE / POWER OUTAGE

### **CTCABINET**

7 TO 10 (GOOD)	NEW CABINET, NO RUST, LOCK MECHANISM IN GOOD ORDER, MT SWITCH, GENERATOR LUGS
4 TO 6 (FAIR)	OLDER CABINET, SOME RUST, SECURE AND WEATHER TIGHT, NO MT SWITCH OR GENERATOR LUGS
OT03 (POOR)	NOT WEATHER TIGHT, LOCKING MECHANISM COMPROMISED, RUSTY

### **METER**

7 TO 10 (GOOD)	NEW METER, WORKING, SECURE ENLOSURE
4 TO 6 (FAIR)	WORKING METER, NO ENCLOSURE
OT03 (POOR)	BROKEN OR NO METER

### **CONTROL PANEL**

7 TO 10 (GOOD)	NEW PANEL, NO RUST, CONTROLS IN GOOD ORDER
4 TO 6 (FAIR)	OLDER PANEL, CONTROLS IN GOOD ORDER, REPLACEMENT PARTS AVAILABLE IF NEEDED
0 TO 3 (POOR)	OLD PANEL, REPLACEMENT PARTS NOT AVAILABLE

### **LEVEL CONTROL**

7 TO 10 (GOOD)	PIEZO CONTROL UNIT WITH MULTITRODE SYSTEM IN WORKING CONDITION
4 TO 6 (FAIR)	PIEZO CONTROL IN WORKING CONDITION, NO MULTITRODE
OTO 3 (POOR)	MECHANICAL FLOAT SYSTEM OR PIEZO SYSTEM NOT WORKING

### **LIGHTING**

7 TO 10 (GOOD)	IN WORKING CONDITION, PROVIDES ADEQUATE ILLUMINATION FOR MAINTENANCE ACTIVITIES
4 TO 6 (FAIR)	IN WORKING CONDITION, ILLUMINATION LESS THAN NEEDED NOT
OT03 (POOR)	WORKING, ILLUMINATION INADEQUATE FOR MAINTENANCE

## STRUCTURAL

### ROOF

#### HATCHES

7 TO 10 (GOOD)	NO RUST, WEATHER TIGHT, LOCKING MECHANISM IN GOOD WORKING ORDER
4 TO 6 (FAIR)	RUSTY, SOME LEAKS, LOCKING MECHANISM IN GOOD WORKING ORDER
OTO3 (POOR)	NOT WEATHER TIGHT, CONCRETE WITH BITUMEN SEAL, NOT SECURE

#### DRAINAGE

7 TO 10 (GOOD)	POSITIVE DRAINAGE
4 TO 6 (FAIR)	MINIMAL DRAINAGE, SOME PONDING
0 TO 3 (POOR)	NOT WEATHER TIGHT

#### RAILS

7 TO 10 (GOOD)	RAILS SOLID IN PROPER LOCATIONS
4 TO 6 (FAIR)	RAILS LOOSE.
OTO 3 (POOR)	RAILS MISSING

### MACHINE ROOM

7 TO 10	ISOLATED FROM WET WELL
4 TO 6	NOT ISOLATED, NO HISTORY OF CONFINED SPACE ATMOSPHERE ISSUES
0 TO 3 (POOR)	NOT ISOLATED, HISTORY OF CONFINED SPACE ATMOSPHERE ISSUES

### WET WELL

7 TO 10 (GOOD)	TRASH RACKS WITH NO GAPS, INSTALLED CORRECTLY NO RUST
4 TO 6 (FAIR)	TRASH RACKS SOME RUST, SOME BROKEN SLATS
OTO3 (POOR)	TRASH RACKS LARGE GAPS, MISSING SECTIONS

### CONC SURF COAT

7 TO 10 (GOOD)	SURFACE COATING ON EXTERIOR & INTERIOR SURFACES WITH NO TO MINIMAL SPALLING
4 TO 6 (FAIR)	SURFACE COATING IN WET WELL ONLY OR WITH LARGE AREAS (>10%) PEELING
0 TO 3 (POOR)	NO SURFACE COATING OR PEELING >25%

### DOORS

7 TO 10 (GOOD)	NO RUST, SOLID FRAME, WEATHER TIGHT, LOCKING MECHANISM IN GOOD WORKING ORDER
4 TO 6 (FAIR)	RUSTY, SOLID FRAME, SOME LEAKS, LOCKING MECHANISM IN GOOD WORKING ORDER
OTO 3 (POOR)	NOT WEATHER TIGHT, RUSTY, NOT SECURE, HARD TO OPERATE

### LADDERS & STAIRS

7 TO 10 (GOOD)	NO RUST, SOLID FRAME, GALVINIZED OR PAINTED
4 TO 6 (FAIR)	RUSTY, SOLID FRAME
0 TO 3 (POOR)	RUSTED, NOT SECURE. MISSING RUNGS OR HAND RAILS

## **SITE**

### **FENCE**

7 TO 10 (GOOD)

SECURE, NO GAPS, NO RUST, GATE WORKING

4 TO 6 (FAIR)

SECURE, RUSTY, GATE WORKING

OTOJ (POOR)

GAPS, MISSING, RUSTED, NOT SECURE, GATE MISSING

### **SLOPES**

7 TO 10 (GOOD)

VEGETATED, NO EROSION

4 TO 6 (FAIR)

< 10% BARE, NO TO MINIMAL EROSION

OTOJ (POOR)

> 10% BARE, MINIMAL TO SIGNIFICANT EROSION, SEEPAGE

### **PARKING**

7 TO 10 (GOOD)

ADEQUATE, PAVED, IN GOOD CONDITION

4 TO 6 (FAIR)

ADEQUATE, UNPAVED OR PAVEMENT DETERIORATED

OTOJ (POOR)

MINIMAL, DETERIORATED OR NO PAVEMENT / CURB CUT

## PUMPHOUSE MAINTENANCE

### ROUTINE MECHANICAL - ELECTRICAL PUMP RUN

1. Change sequential switch.
2. Start all motors by turning Healy Ruff rototrol, shorting out electrodes, or raising float.
3. Start all motors with test buttons.
4. Check overloads; whenever an overload is out, take ampere reading all three phases and record readings on daily sheet.
5. Maintain all electrical equipment clean of dust and cobwebs. Sweep floor when necessary.
6. Check sump lights. Replace when burned out.
7. Grease all pump fittings. Fill and test all oilers.
8. Check trash rack and clean as required.
9. Check sump monthly for sediment and cleaning.
10. Clean pumps, outside of motors and floors.
11. Maintain pump house site orderly, including trash pickup and grass cutting.
12. Change chart in pump houses with a Bristol Recorder.
13. Batteries & battery charger.
14. Wipe off pier panels & lights at grade separations.
15. Check US-10 escape ladders.
16. Sign in when leaving pump house.
17. Read and Record Utility Meter
18. Pick up pump house sign in sheets when completed and file in electricians office file cabinets in order by date on the sign in sheets
19. Check all chatter box & verbatim phone lines by calling in

### Pump Station Electrical Checklist

- 1). Check operations of leveling system. Floats, Transducers, Electrodes or Mercury Switches. Monthly
- 2). Open all electrical panels and in a de-energized state check all terminations including the Motor Control Center. Semi-Annually
- 3). Check condition of all Motor Starter Contacts. Order and replace kits as needed. Annually
- 4). Check condition of control transformers for each pump. Look for loose contacts and signs of overheating. Order and replace as needed. Semi-Annually
- 5). Check lighting and lighting transformer. Monthly
- 6). Inspect main circuit breaker for the pump station. Annually
- 7). Inspect the circuit breaker for each pump motor as well as the control circuit breaker for each pump. Annually
- 8). Meg each motor. Annually
- 9). If available, simulate pump operations and check sequencer. Monthly
- 10). Check incoming voltage phase to phase and phase to ground. Monthly
- 11). Test light switches and receptacles inside the station. Monthly

Inform Maintenance Mechanics of any electrical hazards found and write problems found in the book at the station for future reference. Sign and date it.



#### Weekly Preventative Maintenance for Pump House Mechanics

- 1). Operate pumps by automatically starting devices such as floats and electrodes or transducers.
- 2). Lubricate pumps as required.
- 3). Change sequence as necessary.
- 4). Check trash racks for debris, clean when necessary.
- 5). Clean electrodes once a month.
- 6). Clean catch basins on road as needed.
- 7). Check and fill oil on electric motors.
- 8). Adjust and repair all doors and locks at first sign of rubbing, binding or sticking, including pit and trash rack doors.
- 9). Clean pump house, re-stock rags, grease and light bulbs.
- 10). Keep grass, weeds and brush cut around pump house.
- 11). Remove snow during winter to provide access.
- 12). Enter all work performed in log book,
- 13). Make sure pumps are in auto position.
- 14). Turn off lights and lock doors.
- 15). Report problems to supervisor.

#### Projects

- 1). Paint pump houses as needed.
- 2). Clean pits yearly,
- 3). Have pumps rebuilt as needed.

**Pump Run #1**

PH 1007	1-75@ 1-94 (just east of Freeway Yard)
PH 1027	1-375 (Chrysler Freeway)@ Ferry Street (DTE regulator house)
PH 1017	1-375 (Chrysler Freeway south Service Drive)@ Watson (DTE regulator house)
PH 1020	1-375 (Chrysler Freeway north Service Drive)@ Canfield
PH1012	1-375 (Chrysler Freeway south)@ 1-75 Interchange (Gratiot exit ramp)
PH 1005	1-375 (Chrysler Freeway south) @ Monroe Street Exit (Greektown Casino)
PH 785	1-94 (east) @Seneca (1-375/1-75 north to 1-94 east to the Van Dyke exit)
PH 789	1-94 (east)@ Cadillac (DTE regulator house)
PH 793	1-94 (east) @Connors (DTE regulator house/WCCC campus)
PH 797	1-94 (east)@ Dickerson(Detroit Public Library)
PH 1704	1-94 (east) @East Outer Drive (DTE regulator house)
PH 1711	1-94 (east)@ Whittier (Audubon Street)
PH 1714	1-94 (east) @Cadieux (Harvard Street)
PH 1810	1-94 (west)@ Hollywood (south of 8 mile)
PH 1807	1-94 (west) @Country Club
PH 1803	1-94 (west) @ Woodcrest
PH 1716	1-94 (west) @ Marseilles

Pump Run #2

PH 714	Telegraph (north)@ 1-94 (east ramp) PHONE
PH 710	1-94 (east) to Southfield Freeway (north)(on ramp to Southfield)
PH 726	1-94@ Schaefer (Butler and Schaefer)
PH 704	1-94 (west)@ Rotunda (Prospect Drive behind commercial buildings)
GS 147	Miller Rd. north of Michigan Ave@ CSXRR Pier lights
PH 727	1-94 (east)@ Michigan Ave PHONE
GS 581	Wyoming south of Michigan Ave@ Southern (Check meter, sidewalk lights and pier lights)
PH 731	1-94 (east)@ Wyoming (behind hotel)
PH 737	1-94 (east)@ Central (between Casper and Central)
PH 740	1-94 (east) @ Martin (service drive to Parkinson right, left on Horatio, left on Martin)
PH 742	1-94 (east)@ Wesson (Martin south to Horatio left, cross Livernois, go over RR tracks, left on Howell)
PH 743	1-94 (east) @Junction
PH 744	1-94 (east)@ 28'h(Herbert to 30'h left, right at service drive)
PH 754	1-94 (east)@ 14'h(service drive to Warren right, left on 14'h)
PH 579	1-94 (east)@ Hecla
PH 760	1-94 (east) @the Lodge (south) PHONE
PH 875	Lodge (south) @ Forrest
PH 879	Lodge (south) @Grand River(Motor City Casino)
PH 877	Lodge (north) @Selden

Pump Run 113

PH 1481	Pleasant Street under 1-75 (high level bridge)
PH 106	Schaefer @ NSRR (Marathon Oil)
GS 106	<b>Pier Lights</b>
GS 107	<b>Pier Lights</b>
PH 113	Dix Ave@ Conrail (North of Dix Bridge)
GS 113	<b>Pier lights, roadway lights and side walk lights</b>
PH 132	Fort Street@ Conrail (north of Fort Street Bridge)
PH 1319	1-75 (north)@ Wheelock
PH 1320	1-75 (north)@ Waterman
PH 1350	I-75 (north)@ Dragoon
PH 1322	1-75 (north)@ Junction
PH 1323	1-75 (north)@ Clark
PH 978	Michigan Ave.@ Scotten (Clark)
PH 885	Lodge@ Larned (Congress between 2" and 3")
PH 1339	1-75 (north)@ (Grand River Ave. across from Cass Tech)
PH 881	Lodge@ Bagley (behind MGM Casino)
PH 880	Lodge@ I-75 interchange (Lodge south to I-75 north) (DTE regulator house)
PH 1341	Ambassador Bridge (West Grand Boulevard @ West Jefferson)

Pump Run #4

CMY	Central Maintenance Yard
PH 195	Middlebelt@ 1-94
GS 195	Pier lights
PH 160	Telegraph (north) @ NSRR (Ecorse Road)
PH 711	Pelham @ 1-94
PH 708	Oakwood @ 1-94
PH 101	Allen Road @ Outer Drive
GS 101	Pier lights, sidewalk lights, and roadway lights/ Key switch
PH 154	Outer Drive @ GTWRR
GS 154	Pier Lights
PH 709	Outer Drive @ 1-94
PH 124	Southfield (south) @ GTWRR (Roosevelt)
GS 124	Pier lights, sidewalk lights, roadway lights
PH 110	Dix-Toledo@ GTWRR (south of Pennsylvania)
PH 158	Telegraph (south)@ GTWRR (south of Vreeland)
GS 158	Pier lights, sidewalk lights, roadway lights
PH 167	West Road @ GTWRR
PH 355	Jefferson Road @ Monguagon Creek (Grosse lie Pay Bridge)
PH 716	Ecorse Road @ 1-94

Pump Run #5

PH 596	Merriman @ NSRR (Back 40) PHONE
PH 721	Wayne Road (north)@ 1-94
GS 165	Wayne Road@ Conrail (south of Michigan Ave.) Pier lights and sidewalk lights
PH 104	Bellville Road @ Conrail
PH 2211	1-94 (east)@ 1-275 (south) ramp PHONE
PH 127	Eureka@ Conrail (west of 1-75)
PH 126	Eureka @ GTW RR (west of Allen Rd)
GS1306	1-75@ Allen Rd Pier lights
GS 1307	1-75 @ Northline Pier lights
PH 182	Goddard @Conrail (Across from Goddard Yard)
PH 1309	1-75 (north)@ London-Moore
PH 1310	1-75 (north)@ Dix-Toledo
PH 1311	1-75 (north)@ Champaign (Lincoln Park High School)
GS 114	Southfield @Conrail and GTWRR Pier lights
PH 1312	Southfield (north)@ 1-75 (north)
PH 1313	1-75 (north)@ Cicotte
PH 108	Dix-Toledo@ NSRR
GS 108	Pier lights, roadway lights
PH 112	Greenfield @ GTW RR
GS 112	Pier lights
GS 706	Greenfield @ 1-94 Pier lights
PH 244	Sheldon @ M-14
PH 103	Ann Arbor Rd (west) west of Haggerty (RR tracks)

Pump Run #16

AP1	Middlebelt@ Goddard checkpoint 12 (Access meter from outside gate)
AP2	East of AP 1, near runway
AP3	Goddard@ Vining past AP maintenance buildings (Fed-Ex)
AP6	Middlebelt between Northline and Eureka Phone
AP6A	Middlebelt between AP6 and Eureka Phone
AP6B	Middlebelt between AP6 and Eureka Phone
AP9	Above South Tunnel, north bound lane (through check point 34) Phone
AP10/13	Across Taxiway Fox from fire hall (building 803) Phone
AP11	Access from Eureka Road (through check point 34) SW corner of airport property Phone
AP12	Access from Eureka Road (turn left before going through check point 34) Phone
AP14	Follow signs for International Arrivals just north of parking garage and AP terminals

Pump Run #7

PH904	Southfield Freeway (north)@ Outer Drive	
PH987	Southfield Freeway (south)@ Fern (between Outer Drive and Oakwood)	
PH905	Southfield Freeway (north) @Oakwood (meter on SE corner across from pump house)	
PH928	Rotunda X mile east of Southfield Freeway (enter through Rotunda Park gate)	
PH906	Southfield Freeway (south) @ Rotunda	
PH988	Southfield Freeway (north) @Village (Greenfield Village/Henry Ford Museum entrance)	
PH315	Southfield Freeway (north)@ Michigan Ave(just south)	
PH923	Southfield Freeway (north)@ Hubbard	
PH920	Southfield Freeway (north)@ Paul	
PH908	Southfield Freeway (north)@ Warren	
PH910	Southfield Freeway (south) @Joy PHONE	
PH909	Southfield Freeway (south)@ Tireman	
GS 163	Warren east of Greenfield	Pier lights
GS 169	Warren east of Wyoming	Pier lights
GS 130	Ford east of Oakman	Pier lights
PH 129	Ford (west)@ Oakman	
GS 129	Pier lights	
PH 1628	Greenfield (south)@ Ford Rd	
PH 1629	Greenfield (south) @Michigan Ave	
PH 111	Greenfield (north) south of Michigan Ave (U.S. Post Office)	
GS 111	Pier lights	
PH 1630	Greenfield (south)@ Rotunda	
GS 1630	Pier lights	
PH 175	Rotunda (east)@ Schaefer	
GS 152	Oakwood south of Michigan Ave (Westborn Market)(Photocell on top of wall next toRR tracks, pier lights, sidewalk lights, roadway lights)	
GS 186	Inkster south of Michigan Ave (meter next toRR tracks, sidewalk lights)	



Pump Run #8

PH921	Southfield Freeway (north)@ West Chicago (north of RR tracks)
PH911	Southfield Freeway (north)@ Plymouth (SE corner)
PH918	Southfield Freeway (north)@ Grand River/Fenkell
PH991	Southfield Freeway (north)@ Puritan
PH924	Southfield Freeway (north)@ 8 Mile
PH925	Southfield Freeway (south)@ 9 Mile (follow 9 Mile Rd signs from 8 Mile)
PH993	Southfield Freeway (south)@ Pembroke (between 7 Mile and 8 Mile)
PH916	Southfield Freeway (south)@ 7 Mile (DTE Regulator House)
PH914	Southfield Freeway (south)@ 6 Mile
PH990	Southfield Freeway (south) @ Lyndon (1/2 mile south of Grand River)
PH912	Southfield Freeway (south) @ Schoolcraft
PH 162	Telegraph (north) between 1-96 and Plymouth (RR tracks)
PH 1994	1-96 (east) between Rouge River and Telegraph (Seminary)
PH 1995	1-96 (east)@ Dolphin (DTE regulator house)
PH 501	Beech Daly (north) between Schoolcraft and Plymouth (RR tracks)
PH 194	Middlebelt (south) between Schoolcraft and Plymouth (RR tracks)
GS 194	Pier lights
PH 193	Merriman (north) between Schoolcraft and Plymouth (RR tracks)
GS 193	Pier lights
PH 180	Farmington (south) between Schoolcraft and Plymouth (RR tracks@ Awrey's Bakery)
GS 180	Pier lights
PH 163	Hines Dr @ Warren

Pump Station Run #9

PH 869	Lodge (north)@ Milwaukee
PH 867	Lodge (north) @ Bethune
PH 864	Lodge (north) @ Euclid
PH 859	Lodge (north)@ Calvert (turn on to Glynn from Hamilton)
PH 860	Lodge (south)@ Chicago (west on Calvert to Woodrow Wilson south to Chicago)
PH 861	Lodge (south) @ Edison (DTE regulator house)
PH 280	Davison (east) @ Hamilton
PH 282	Davison (west) @ 2 <sup>nd</sup>
PH 853	Davison (west) just west of Lodge Phone
PH 852	Lodge@ Oakman (Rosa Parks@ Oakman)
PH 849	Lodge (north) @Linwood (DTE regulator house)
PH 847	Lodge (north)@ Holmur
PH 846	Lodge (north)@ Santa Rosa
PH 844	Lodge (north) @ Woodingham (DTE Regulator house)
Ladders	6 Mile (northbound and southbound)
Ladders	Outer Dr (northbound and southbound)
Ladder	Schaefer (northbound and southbound)
Ladder	Pembroke (northbound and southbound)
PH 830	Lodge (north) @ 8 Mile (north of 8 Mile)
PH 834	Lodge (south)@ Hubbell (day-care)
PH 837	Lodge (south) @Schaefer (party store/DTE Regulator house)
PH 841	Lodge (south)@ Puritan (south of 6 Mile) Phone
PH 842	Lodge (south)@ Kentucky (south of Wyoming)

Pump Station Run #9

PH 1044      1-75 (south)@ Holbrook

PH 1040      1-75 (south)@ East Grand Blvd

PH598      Ring Road @Conrail (east on E. Grand Blvd to  
Hamtramck Dr)

GS587      Joseph Campau@ RR Bridge      (Pier lights)

GS520      Conant@ RR Bridge (Pier lights, sidewalk lights, controls east of RR bridge)

PH 1050      1-75 (north)@ Carpenter

PH 1052      1-75 (north)@ Davison

PH1066      Davison (east)@  
Joseph Campau

PH283      Davison (east)@  
Woodward

PH286      Davison (east)@  
Oakland

PH524      Woodward (north) north of Davison@ RR tracks

PH554      1-75 (south)@ 6 Mile

PH1058      1-75 (north)@ Nevada

PH1060      1-75 (north)@ 7 Mile

PH1063      1-75 (north)@ State Fair

PH1064A      1-75 (north)@ 8 Mile

PH1064B      1-75 (south)@ 8 Mile

PH121      8 Mile (west) west of John R@ GTW RR

GS121      Sidewalk lights, roadway lights (photo cell by-pass on east bound side of  
8 Mile}

PH976      8 Mile (west) @Woodward (south}



**State of Michigan  
Transportation Asset Management System (TAMS)  
Scope of Work for Change Request**

**April 14<sup>th</sup>, 2017**

## Change No. 1 MiLogin Integration

### Change Request Definition

Reason for Change – MiLogin Integration work was started in June 2016 with the understanding that TAMS Identity Server can connect to MiLogin. In Feb 2017, the team discovered that MiLogin cannot distinguish between DTS and TSS applications. As part of this change request, TSS and DTS will be making changes to their products to work around the limitations of MiLogin and meet MDOT's integration requirements per the discussion between MDOT, MiLogin vendor, DTS and TSS on 2/23 and 3/15, and as described in this change request.

Description – Describe the proposed change.

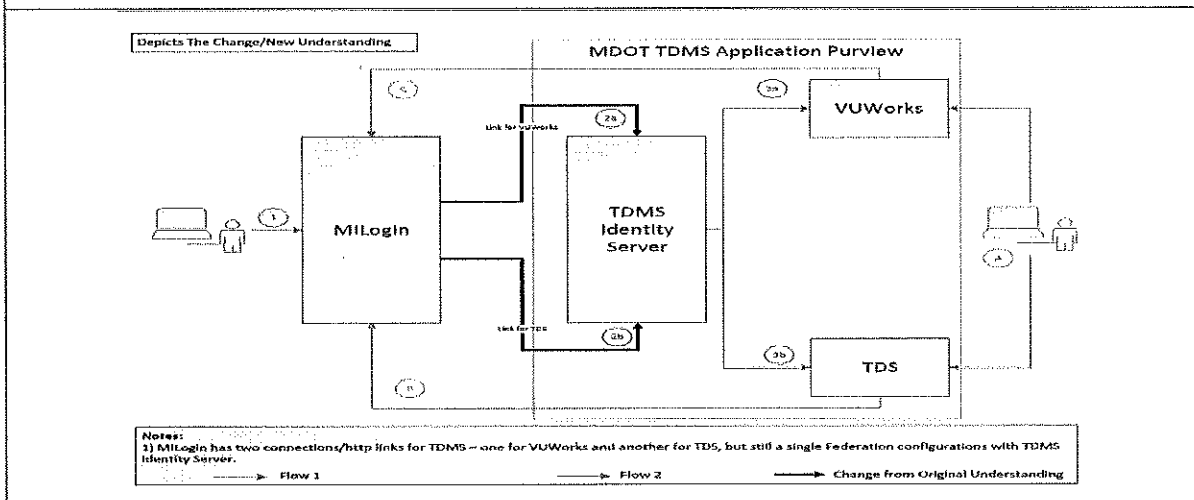
### Scope of Work:

#### TSS Tasks

- Requirements gathering and task knowledge transfer.
- Setup development environment and prep repositories.
- Library search and research topic.
- Work with DTS to configure Identity Server 3.
- Develop UI to search manage external users and assign to internal roles.
- Develop services to support external user search and management.
- Build authentication mechanism to support authorizing users via external system but authenticate via internal role checks.
- Build UI to manage configuring claims semantics (mapping custom claims).
- Update server side code to handle using configured claims mapping.
- Point internal TDS to use identity server instance with custom claims.
- UAT Testing Support.

#### DTS Tasks

- Implement the new Identity Provider.
- Research and execute a proof of concept (POC) to determine if Identity Server has built-in capability to receive the token and application location information passed on by MiLogin application. Assumption – MiLogin vendor will implement IP-STs to RP-STs federation to be able to communicate directly with the Identity Server and provide security token and application location information.
- If the POC is successful then DTS will continue with development efforts
- If the POC is not successful then DTS will have to brainstorm next steps and find an alternate solution.
- Implement administrative panel to manage configuration.
- Update MobileVUE to support OAuth.
- Testing and acceptance – Testing may involve direct connection to MiLogin test environment from the development environment at DTS.
- Support with implementation in QA environment.



#### Change No. 1 MiLogin Integration

##### Change Request Definition

MDOT, MiLogin vendor, DTS and TSS discussed about sending the target application information from MiLogin to TAMS Identity Server. TAMS Identity Server will then redirect traffic to the target application. MiLogin vendor will have to make adjustments to MiLogin code to allow it to connect to TAMS Identity Server. DTS and TSS with MiLogin vendor's support will test the workflow of passing target application information and security token from MiLogin to Identity Server and then redirecting the user to the target application as part of the POC. It is critical that this POC is successful in order for the proposed workflow to be implemented as part of the overall solution for MiLogin integration.

##### Schedule

POC period – 4 weeks (starting on April 24<sup>th</sup> and ending on May 19<sup>th</sup>)  
Testing and Implementation – Completed by June 16<sup>th</sup>

Cost – \$70,000 (Note: If the POC is not successful then MDOT, MiLogin Vendor, DTS and TSS will have to explore other options and assess the impact on scope, schedule and cost.) Payment on completion of State of Michigan acceptance of all deliverables in this statement of work.

#### Change No. 2 Sign Library Enhancement

##### Change Request Definition

Reason for Change – Enhancement request to address requirements communicated for Sign Library

Description – Describe the proposed change.

##### Scope of Work

Develop feature to allow business users to manage the sign library with MUTCD codes and provide them with the ability to link to the sign library to populate attribute data. The values in the attribute drop down will be filtered based on the values allowed per the sign library.

- Create mock-ups and review with business users
- Development effort to allow users to create the template for sign types/codes
- Build a user interface to allow users to manage templates
- Update attribute editor to allow users to edit attribute data specific to sign types.
- Allow user to add a related asset to a sign post
- UAT Testing and acceptance

##### Schedule

Development – 6 weeks (starting on June 1<sup>st</sup> and ending on July 10<sup>th</sup>)  
Testing and Implementation – Completed by July 31<sup>st</sup>

Cost – \$60,000 Payment on completion of State of Michigan acceptance of all deliverables in this statement of work.

### Milestone and Payment Updates

Milestone	Description	Associated Contract Items (Attachment B)	Estimated Acceptance Date	Payment
1	<p>Upon successful delivery of the agreed Software licenses, executable code and set-up and installation scripts, and instructions to the State on agreed upon media.</p> <p>Upon successful completion of the following activities and deliverables as described within Article 1.104 Work and Deliverables:</p> <ul style="list-style-type: none"> <li>Project Initiation Services</li> </ul>	<p>Table 1 Item A – COTS Software Acquisition</p> <p>Table 1 Item B – Project Initiation Services</p>	7/15/15	\$593,395.00
2	<p>Upon successful completion of the following activities and deliverables as described within Article 1.104 Work and Deliverables:</p> <ul style="list-style-type: none"> <li>Installation and Configuration Services for DEV environment.</li> </ul>	Table 1 Item D – Installation and Configuration Services	8/15/15 2/17/2016	\$88,889.00
3	<p>Upon successful completion of the following activities and deliverables as described within Article 1.104 Work and Deliverables:</p> <ul style="list-style-type: none"> <li>Requirements and Solution Architecture Validation Services.</li> </ul>	Table 1 Item C – Requirements and Solution Architecture Validation Services	10/1/2015	\$258,054.00
4a	<p>Upon successful completion of the following activities and deliverables for <b>COTS System Focused Configurations – Lane Inventory, Signs, and Guardrails</b> as described within Article 1, Section 1.104 Work and Deliverables:</p> <ul style="list-style-type: none"> <li>Installation and Configuration Services, and</li> </ul>	Table 5 Item D and E.1, E.4, E.5 (payments for these are divided across Milestone 4, 5, 7, 8, and 10).	12/1/2015	\$111,360
4b	<ul style="list-style-type: none"> <li>Implementation Services – Data Conversion / Migration, and</li> <li>Testing; and</li> <li>Production Go-live.</li> <li>MDOT will verify production readiness in QA</li> </ul>		4/26/2016 9/13/2017	\$111,355

Milestone	Description	Associated Contract Items (Attachment B)	Estimated Acceptance Date	Payment
5a	<p>Upon successful completion of the following activities and deliverables for <b>COTS System Focused Configurations – Culverts; and SLD Design &amp; Implementation</b> as described within Article 1, Section 1.104 Work and Deliverables:</p> <ul style="list-style-type: none"> <li>Installation and Configuration Services, and</li> </ul>	Table 5 Item D and E.1, E.4, E.5 (payments for these are divided across Milestone 4, 5, 7, 8, and 10).	2/1/2016	\$111,360
5b	<ul style="list-style-type: none"> <li>Implementation Services – Data Conversion / Migration, and</li> <li>Testing; and</li> <li><del>Production Go-live.</del></li> <li><i>MDOT will verify production readiness in QA</i></li> </ul>		5/3/2016	\$111,355
6	<p>Upon successful completion of the following activities and deliverables as described within Article 1.104 Work and Deliverables:</p> <ul style="list-style-type: none"> <li>Implementation Services – Interfaces / Integration.</li> <li><i>MDOT will verify production readiness in QA.</i></li> </ul>	Table 5 Item E Row E.2 – Total Interfaces / Integration	4/1/2016 5/10/2016	\$317,344.00
7	<p>Upon successful completion of the following activities and deliverables for <b>FINAL: Module Level Configuration</b> as described within Article 1, Section 1.104 Work and Deliverables:</p> <ul style="list-style-type: none"> <li>Installation and Configuration Services, and</li> <li>Implementation Services – Data Conversion / Migration, and</li> <li>Testing; and</li> <li><del>Production Go-live.</del></li> <li><i>MDOT will verify production readiness in QA.</i></li> </ul>	Table 5 Item D and E.1, E.4, E.5 (payments for these are divided across Milestone 4, 5, 7, 8, and 10).	6/1/2016 6/28/2016 10/31/2017	\$222,715.00



Milestone	Description	Associated Contract Items (Attachment B)	Estimated Acceptance Date	Payment
8	<p>Upon successful completion of the following activities and deliverables for <b>ArcGIS Server/ArcSDE and Roads &amp; Highways</b> as described within Article 1, Section 1.104 Work and Deliverables:</p> <ul style="list-style-type: none"> <li>• Installation and Configuration Services, and</li> <li>• Implementation Services – Data Conversion / Migration, and</li> <li>• Testing; and</li> <li>• <del>Production Go-live.</del></li> <li>• <i>MDOT will verify production readiness in QA</i></li> </ul>	Table 5 Item D and E.1, E.4, E.5 (payments for these are divided across Milestone 4, 5, 7, 8, and 10).	<del>8/1/2016</del> 7/14/2016	\$222,715.00
9	<p>Upon successful completion of the following activities and deliverables as described within Article 1.104 Work and Deliverables:</p> <ul style="list-style-type: none"> <li>• Training.</li> </ul>	Table 1 Item F – Training	<del>9/1/2016</del> 10/4/2017	\$141,382.00
10	<p>Upon successful completion of the following activities and deliverables for <b>ESRI Roads &amp; Highways Design and Implementation</b> as described within Article 1, Section 1.104 Work and Deliverables:</p> <ul style="list-style-type: none"> <li>• Installation and Configuration Services, and</li> <li>• Implementation Services – Data Conversion / Migration, and</li> <li>• Testing; and <del>Production Go-live.</del></li> <li>• <i>MDOT will verify production readiness in QA</i></li> </ul>	Table 5 Item D and E.1, E.4, E.5 (payments for these are divided across Milestone 4, 5, 7, 8, and 10).	<del>9/1/2016</del> <del>8/11/2016</del> 8/18/2017	\$222,715.00
11	<p>Upon successful completion of the following activities and deliverables as described within Article 1.104 Work and Deliverables:</p> <ul style="list-style-type: none"> <li>• Implementation Services – Pilot Projects.</li> </ul>	Table 3 Item E Row E.3 – Pilot Projects	10/1/2016	\$98,032.00
12	<p>Upon successful completion of the following activities and deliverables as described within Article 1.104 Work and Deliverables:</p> <ul style="list-style-type: none"> <li>• Knowledge Transfer / Transition; and</li> <li>• Documentation.</li> </ul>	Table 1 Item I – Knowledge Transfer / Transition Table 1 Item G – Documentation	<del>12/1/2016</del> <del>11/3/2016</del> 7/14/2017	\$28,488.00
13	<p>Upon successful completion of the following activities and deliverables as described within Article 1.104 Work and Deliverables:</p> <ul style="list-style-type: none"> <li>• Performance Warranty Period</li> </ul>	Table 3 Item E Row E.5 – Performance Warranty Period	<del>4/1/2017</del> 12/12/2017	\$829,798.00

Milestone	Description	Associated Contract Items (Attachment B)	Estimated Acceptance Date	Payment
	Holdback (20%) – see Article 1, Section 1.602.	All of the above		

**STATE OF MICHIGAN**  
**DEPARTMENT OF TECHNOLOGY, MANAGEMENT & BUDGET**  
**PROCUREMENT**

525 W. ALLEGAN STREET  
 LANSING, MI 48933

P.O. BOX 30026  
 LANSING, MI 48909

CHANGE NOTICE NO. 1  
 to  
 CONTRACT NO. 071B5500115  
 between  
 THE STATE OF MICHIGAN  
 and

NAME & ADDRESS OF CONTRACTOR	PRIMARY CONTACT	EMAIL
Data Transfer Solutions, LLC	Allen Ibaugh	aibaugh@dtsgis.com
3680 Avalon Park Blvd	PHONE	CONTRACTOR'S TAX ID NO. (LAST FOUR DIGITS ONLY)
Orlando FL, 32828	407-382-5222	*****7100

STATE CONTACTS	AGENCY	NAME	PHONE	EMAIL
PROGRAM MANAGER / CCI	DTMB	John Kalanquin	517-241-0177	kalanquinj@Michigan.gov
CONTRACT ADMINISTRATOR	DTMB	David Hatch	517 284-7044	hatchd@michigan.gov

CONTRACT SUMMARY			
<b>DESCRIPTION:</b> Enterprise Asset Management Solution for MDOT			
INITIAL EFFECTIVE DATE	INITIAL EXPIRATION DATE	INITIAL AVAILABLE OPTIONS	EXPIRATION DATE BEFORE CHANGE(S) NOTED BELOW
July 13, 2015	July 12, 2022	5 - 1 Year	July 12, 2022
PAYMENT TERMS		DELIVERY TIMEFRAME	
ALTERNATE PAYMENT OPTIONS			EXTENDED PURCHASING
<input type="checkbox"/> P-card <input type="checkbox"/> Direct Voucher (DV) <input type="checkbox"/> Other			<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
MINIMUM DELIVERY REQUIREMENTS			

DESCRIPTION OF CHANGE NOTICE				
EXERCISE OPTION?	LENGTH OF OPTION	EXERCISE EXTENSION?	LENGTH OF EXTENSION	REVISED EXP. DATE
<input type="checkbox"/>		<input type="checkbox"/>		
CURRENT VALUE		VALUE OF CHANGE NOTICE	ESTIMATED AGGREGATE CONTRACT VALUE	
\$4,242,893.00		\$ 0.00	\$4,242,893.00	
DESCRIPTION: Effective date March 01, 2016 Section 1.601 has been updated. The milestone payments have been updated to ensure project remains on schedule. \$0 price change.				
All other terms, conditions, specifications and pricing remain the same. Per contractor and agency agreement and DTMB Procurement approval.				

TAMS Milestone Updates 2/9/2016

Milestone	Description	Associated Contract Items (Attachment B)	Estimated Acceptance Date	Payment	Status
1	<p>Upon successful delivery of the agreed Software licenses, executable code and set-up and installation scripts, and instructions to the State on agreed upon media.</p> <p>Upon successful completion of the following activities and deliverables as described within Article 1.104 Work and Deliverables:</p> <ul style="list-style-type: none"> <li>Project Initiation Services</li> </ul>	<p>Table 1 Item A – COTS Software Acquisition</p> <p>Table 1 Item B – Project Initiation Services</p>	7/15/15	\$593,395.00	Complete
2	<p>Upon successful completion of the following activities and deliverables as described within Article 1.104 Work and Deliverables:</p> <ul style="list-style-type: none"> <li>Installation and Configuration Services for DEV environment.</li> </ul>	Table 1 Item D – Installation and Configuration Services	2/17/2016	\$88,889.00	Pending
3	<p>Upon successful completion of the following activities and deliverables as described within Article 1.104 Work and Deliverables:</p> <ul style="list-style-type: none"> <li>Requirements and Solution Architecture Validation Services.</li> </ul>	Table 1 Item C – Requirements and Solution Architecture Validation Services	10/1/2015	\$258,054.00	Complete
4a	<p>Upon successful completion of the following activities and deliverables for COTS System Focused Configurations – Lane Inventory, Signs, and Guardrails as described within Article 1, Section 1.104 Work and Deliverables:</p> <ul style="list-style-type: none"> <li>Installation and Configuration Services; and</li> </ul>	Table 5 Item D and E.1, E.4, E.5 (payments for these are divided across Milestone 4, 5, 7, 8, and 10).	12/1/2015	\$111,360	Complete
4b	<ul style="list-style-type: none"> <li>Implementation Services – Data Conversion / Migration, and</li> <li>Testing; and</li> <li>MDOT will verify production readiness in QA</li> </ul>		4/26/2016	\$111,355	Pending

TAMS Milestone Updates 2/9/2016

Milestone	Description	Associated Contract Items (Attachment B)	Estimated Acceptance Date	Payment	Status
5a	Upon successful completion of the following activities and deliverables for COTS System Focused Configurations – Culverts; and SLD Design & Implementation as described within Article 1, Section 1.104 Work and Deliverables: <ul style="list-style-type: none"> <li>Installation and Configuration Services</li> </ul>	Table 5 Item D and E.1, E.4, E.5 (payments for these are divided across Milestone 4, 5, 7, 8, and 10).	2/1/2016	\$111,360	Complete
5b	<ul style="list-style-type: none"> <li>Implementation Services – Data Conversion / Migration, and</li> <li>Testing; and</li> <li>MDOT will verify production readiness in QA</li> </ul>		5/3/2016	\$111,355	Pending
6	Upon successful completion of the following activities and deliverables as described within Article 1.104 Work and Deliverables: <ul style="list-style-type: none"> <li>Implementation Services – Interfaces / Integration.</li> <li>MDOT will verify production readiness in QA.</li> </ul>	Table 5 Item E Row E.2 – Total Interfaces / Integration	5/10/2016	\$317,344.00	Pending
7	Upon successful completion of the following activities and deliverables for FINAL: Module Level Configuration as described within Article 1, Section 1.104 Work and Deliverables: <ul style="list-style-type: none"> <li>Installation and Configuration Services, and</li> <li>Implementation Services – Data Conversion / Migration, and</li> <li>Testing; and</li> <li>MDOT will verify production readiness in QA.</li> </ul>	Table 5 Item D and E.1, E.4, E.5 (payments for these are divided across Milestone 4, 5, 7, 8, and 10).	6/28/2016	\$222,715.00	Pending

TAMS Milestone Updates 2/9/2016

Milestone	Description	Associated Contract Items (Attachment B)	Estimated Acceptance Date	Payment	Status
8	<p>Upon successful completion of the following activities and deliverables for ArcGIS Server/ArcSDE and Roads &amp; Highways as described within Article 1, Section 1.104 Work and Deliverables:</p> <ul style="list-style-type: none"> <li>• Installation and Configuration Services, and</li> <li>• Implementation Services – Data Conversion / Migration, and</li> <li>• Testing; and</li> <li>• MDOT will verify production readiness in QA</li> </ul>	Table 5 Item D and E.1, E.4, E.5 (payments for these are divided across Milestone 4, 5, 7, 8, and 10).	7/14/2016	\$222,715.00	Pending
9	<p>Upon successful completion of the following activities and deliverables as described within Article 1.104 Work and Deliverables:</p> <ul style="list-style-type: none"> <li>• Training.</li> </ul>	Table 1 Item F – Training	9/1/2016	\$141,382.00	Pending
10	<p>Upon successful completion of the following activities and deliverables for ESRI Roads &amp; Highways Design and Implementation as described within Article 1, Section 1.104 Work and Deliverables:</p> <ul style="list-style-type: none"> <li>• Installation and Configuration Services, and</li> <li>• Implementation Services – Data Conversion / Migration, and</li> <li>• Testing;</li> <li>• MDOT will verify production readiness in QA</li> </ul>	Table 5 Item D and E.1, E.4, E.5 (payments for these are divided across Milestone 4, 5, 7, 8, and 10).	8/11/2016	\$222,715.00	Pending
11	<p>Upon successful completion of the following activities and deliverables as described within Article 1.104 Work and Deliverables:</p> <ul style="list-style-type: none"> <li>• Implementation Services – Pilot Projects.</li> </ul>	Table 3 Item E Row E.3 – Pilot Projects	10/1/2016	\$98,032.00	Pending

TAMS Milestone Updates 2/9/2016

Milestone	Description	Associated Contract Items (Attachment B)	Estimated Acceptance Date	Payment	Status
12	Upon successful completion of the following activities and deliverables as described within Article 1.104 Work and Deliverables: <ul style="list-style-type: none"> <li>Knowledge Transfer / Transition; and</li> <li>Documentation.</li> </ul>	Table 1 Item I – Knowledge Transfer / Transition  Table 1 Item G – Documentation	11/3/2016	\$28,488.00	Pending
13	Upon successful completion of the following activities and deliverables as described within Article 1.104 Work and Deliverables: <ul style="list-style-type: none"> <li>Performance Warranty Period</li> </ul> Holdback (20%) – see Article 1, Section 1.602.	Table 3 Item E Row E.5 – Performance Warranty Period  All of the above	1/1/2017	\$829,798.00	Pending

Allen Ibaugh DTS CEO

seen for 2/24/16

PL 10/6 - 3/2/2016  
John Kalanguin SAM 15

STATE OF MICHIGAN  
DEPARTMENT OF TECHNOLOGY,  
MANAGEMENT AND BUDGET PROCUREMENT  
P.O. BOX 30026,  
LANSING, MI 48909  
OR  
525 W. ALLEGAN, LANSING, MI 48933

**NOTICE OF CONTRACT NO. 071B5500115**

between

**THE STATE OF MICHIGAN**

and

NAME & ADDRESS OF CONTRACTOR	PRIMARY CONTACT	EMAIL
Data Transfer Solutions, LLC  3680 Avalon Park Blvd. E.  Orlando, FL 32828-9373	Allen Ibaugh	aibaugh@dtsgis.com
	PHONE	VENDOR TAX ID # (LAST FOUR DIGITS ONLY)
	(407) 382-5222	-7100

STATE CONTACTS	AGENCY	NAME	PHONE	EMAIL
PROGRAM MANAGER	DTMB	John Kalanquin	(517) 241-0177	KalanquinJ@michigan.gov
CONTRACT ADMINISTRATOR	DTMB - Purchasing	David Hatch	(517) 284-7044	HatchD@michigan.gov

CONTRACT SUMMARY			
<b>DESCRIPTION: Enterprise Asset Management Solution for MDOT.</b>			
INITIAL TERM	EFFECTIVE DATE	INITIAL EXPIRATION	AVAILABLE OPTIONS
7 Years	July 13, 2015	July 12, 2022	5, One Year
PAYMENT TERMS	F.O.B.	SHIPPED TO	
Net 45	NA	NA	
ALTERNATE PAYMENT OPTIONS			EXTENDED PURCHASING
P-card <input type="checkbox"/> Direct Voucher (DV) <input type="checkbox"/> Other			<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
<b>MINIMUM DELIVERY REQUIREMENTS:</b>			
Delivery of the implemented and integrated Transportation Asset Management System for MDOT per the Statement of Work.			
<b>MISCELLANEOUS INFORMATION:</b>			
Contract is available for use by other MDOT subdivisions and other State agencies.			
<b>ESTIMATED CONTRACT VALUE AT TIME OF EXECUTION:</b>		<b>\$4,242,893.00</b>	



Notice of Contract #: 071B5500115

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**For the Contractor:**

\_\_\_\_\_  
[Redacted]

**Contract Administrator**

\_\_\_\_\_  
[Redacted] **Date**

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**For the State:**

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**State of Michigan**

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Attachment H: Preliminary EA Solution Assessment Worksheet



## Article 1 – Statement of Work (SOW)

### 1.000 Project Identification

#### **1.001 PROJECT REQUEST**

The State of Michigan (“**State**”), through the Department of Technology, Management & Budget (“**DTMB**”), and Department of Transportation (“**MDOT**”)(collectively “**Client**”), has issued this Contract (“**Contract**”) for an Enterprise Asset Management System (“**EAMS**”) or as used by MDOT a Transportation Asset Management System (“**TAMS**”) Solution. Solution will improve the business processes and enabling information systems that support the management of MDOT’s assets. This project includes the implementation of a Commercial Off-The-Shelf (“**COTS**” or “**Solution**”) solution, data conversion and migration, training, and maintenance and support as detailed in Section 1.101. This contract is available for use by other MDOT divisions and State agencies.

#### **1.002 BACKGROUND**

MDOT’s stated mission is to “**Provide the highest quality integrated transportation services for economic benefit and improved quality of life.**” One of the goals within the strategic plan supporting this mission is to provide cost-effective, integrated and sustainable transportation solutions. The two objectives underlying this goal are directly related to the TAMS initiative:

- Apply asset management principles to prioritize and implement the most cost-effective transportation investment strategies.
- Optimize the value of transportation investments by employing sustainable solutions that reduce congestion, energy use, emissions and life cycle costs that support job creation and improved quality of life.

Client seeks to implement a TAMS that will improve the business processes and supporting information systems that will enable management of transportation assets across all levels of the Department’s organization, locations, and facilities. An effective TAMS will help MDOT maximize value of its physical assets, improve utilization and performance, reduce capital and operating costs, and extend asset life. The implemented TAMS will allow the whole-life optimal management of the MDOT’s assets, both physical (e.g. buildings, equipment, infrastructure, etc.) and non-physical (e.g. accounting systems, design, right-of-way, planning), to maximize value. This will also support the Department in adopting a performance-based operational system (“**PBOS**”) to deliver the Department’s core highway maintenance services.

The initial benefits of implementing TAMS include:

- Improved transparency in decision making on the basis of sound data and robust processes;
- Improved understanding and optimization of Life-Cycle Costs;
- Defined Levels of Service to focus investment, rather than just fixing what is broken;
- Ability to track performance of assets and activities at all levels of the organization;
- Ability to link desired outcomes to resource and budgetary needs;
- Optimized maintenance expenditures through the development of work programs that achieve the highest Level of Service within available funding;
- Demonstrated asset custodianship to highway users;
- Better communication as a result of greater access to information and longer term planning; and
- Fewer surprises going forward – resulting in a more efficient and effective organization.

The TAMS implementation is being done incrementally. The initial phase of the project is intended to focus on high priority functionality with additional modules to be added over time. Specifically, the following initial functionality is required of the system being procured through this Contract:

- *Road Network Management* – manage the location of highway assets, integrate roadway data from multiple referencing system (including coordinates and Linear Referencing Systems – “**LRS**”) networks, visualize / analyze road network assets, and ensure the TAMS is built in accordance with MDOT’s existing LRS;



- *Asset Inventory Management* – record, centrally store and manage multiple asset types through a geo-referenced database with the ability to record physical description, location, historical data, value, performance, etc. with initial focus on a) Lanes, b) Signs, c) Culverts and d) Guardrails;
- *Highway Maintenance Management* – capture and report maintenance activities, quantities, location, costs, performance-based planning / budgeting, resource needs, annual work program, work order scheduling-tracking, performance monitoring and customer-service delivery; and
- *Application Integration* - enable future integration with other existing and planned application systems to be incorporated within the TAMS environment (for example: bridge management, pavement management, safety management), and integrate data from mobile field data collection systems and e-Construction as-built files.

Contractor will work on-site with Client's TAMS implementation team at MDOT's Central Office in Lansing. No other State agencies or MDOT contractors are involved with this initial procurement, although it is envisioned that TAMS functionality may be provided to MDOT partner agencies and MDOT contractors in the future.

### **1.100 Scope of Work and Deliverables**

#### **1.101 IN SCOPE**

This project consists of the following scope:

- COTS Software Acquisition
- Project Initiation
  - Project Kick-off Meetings
  - Implementation Plan development
  - COTS software orientation
  - TAMS software requirements validation and solution configuration specifications
- Implementation
  - Configuration (COTS)
  - Data Migration
  - Interfaces/Integration
  - Pilot Projects
  - Testing
  - Production Go-live
- Training
  - Network Manager
  - Asset Manager
  - Maintenance Manager
  - System Administrator
  - End user inquiry / reporting: desktop / web clients
  - Systems Integration
- Documentation
- Maintenance and Support
  - Help Desk
  - Onsite Technical Support
  - Solution Release Management Support
- Knowledge Transfer/Transition
- Other
  - Contingency Services – to address scope changes





A more detailed description of the software, services (work) and deliverables sought for this project is provided in Article 1, Section 1.104, Work and Deliverables.

#### Longer Term Potential TAMS Functionality

Client may expand the TAMS functionality in subsequent project phases. These expansions may be added through submission of Statements of Work for review and Contract amendment; or Client may go out to bid for these expansions. This additional functionality may include:

- Incorporating additional Highway Asset Classes
- Integration with other Existing and planned Corporate Systems
- Strategic Investment Planning
- Multiple Asset Optimization Programming
- Risk Management Programming
- Organizational Change

#### Additional Use by MDOT Divisions or Other State Agencies

The COTS software and associated services available through this contract may be used by other departments, divisions, or bureaus of MDOT. Additionally other State agencies and their subdivisions may use this contract for all software and services provided by Contractor under this contract.

#### Expansion of Use

Contractor is making available all modules of its software for future use in other TAMS phases or by other divisions of MDOT and other State agencies. Requests for use by MDOT divisions or other agencies will be presented to the vendor for proposed pricing and licensing; and processed through the standard change management process as governed by DTMB Procurement.

Additional pricing and licensing will be adjusted based on tiered levels tied to agency usage and number of concurrent users; to ensure appropriate security and access agencies cannot just add on licenses to TAMS project. Licenses are to be added through the change notice process and separate agreements for number of concurrent users is to be processed through the change management process for this contract. If inadvertent use of licenses happen, a true-up to manage licensing use and pricing will be conducted by the vendor annually, at their discretion per Article 1, Section 1.603. Payment adjustments will be prorated based on use prior to and considering future use after the true-up review is completed.

VUEWorks software licenses and DTS services are available through this Agreement to other departments and divisions of the Michigan Department of Transportation. Such licenses and services shall be defined in detail through a scope of service with accompanying fee provision for license and/or implementation service. Any changes shall be mutually agreed to by both parties in writing through the change management process. Such licenses and services shall include but not be limited to extension of VUEWorks licenses and configuration services to other departments for work flows, forms, reporting, system configuration, etc.

### **1.102 OUT OF SCOPE**

The following products / services are out of scope for this Contract:

- Hardware
- Custom development (unless included within the agreed COTS configuration scope or requested in a new Statement of Work under this contract as part of COTS configuration scope)

### **1.103 ENVIRONMENT**

The links below provide information on the State's Enterprise information technology ("IT") policies, standards and procedures which includes security policy and procedures, IT strategic plan, eMichigan web development and the State Unified Information Technology Environment ("SUITE").



All services and products provided as a result of this Contract must comply with all applicable State IT policies and standards.

**Enterprise IT Policies, Standards and Procedures:**

<http://www.michigan.gov/dmb/0,1607,7-150-56355-107739--,00.html>

All software and hardware items provided by Contractor must run on and be compatible with the DTMB Standard Information Technology Environment. Additionally, the State must be able to maintain software and other items produced as the result of Contract. Therefore, non-standard development tools may not be used unless approved by DTMB. Contractor must request, in writing, approval to use non-standard software development tools, providing justification for the requested change and all costs associated with any change. The DTMB Project Manager must approve any tools, in writing, before use on any information technology project.

It is recognized that technology changes rapidly. Contractor may request, in writing, a change in the standard environment, providing justification for the requested change and all costs associated with any change. The State's Project Manager must approve any changes, in writing, and DTMB, before work may proceed based on the changed environment.

**Enterprise IT Security Policy and Procedures:**

[http://www.michigan.gov/documents/dmb/1310\\_183772\\_7.pdf](http://www.michigan.gov/documents/dmb/1310_183772_7.pdf)

[http://www.michigan.gov/documents/dmb/1310.02\\_183775\\_7.pdf](http://www.michigan.gov/documents/dmb/1310.02_183775_7.pdf)

[http://www.michigan.gov/documents/dmb/1325\\_193160\\_7.pdf](http://www.michigan.gov/documents/dmb/1325_193160_7.pdf)

[http://www.michigan.gov/documents/dmb/1335\\_193161\\_7.pdf](http://www.michigan.gov/documents/dmb/1335_193161_7.pdf)

[http://www.michigan.gov/documents/dmb/1340\\_193162\\_7.pdf](http://www.michigan.gov/documents/dmb/1340_193162_7.pdf)

[http://www.michigan.gov/documents/dmb/1350.10\\_184594\\_7.pdf](http://www.michigan.gov/documents/dmb/1350.10_184594_7.pdf)

**The State's security environment includes:**

- DTMB Single Login
- Secured Socket Layers
- SecureID (State security standard for external network access and high risk web systems)

DTMB requires that its single - login security environment be used for all new client-server software development. Where software is being converted from an existing package, or a client-server application is being purchased, DTMB recommends the use of its single – login security environment if feasible. At a minimum, an authentication tool is required. Contractor's proposed security mechanism must be approved in writing by the State's Project Manager and DTMB Office of Enterprise Security.

**IT Strategic Plan:**

<http://www.michigan.gov/itstrategicplan>

**IT eMichigan Web Development Standard Tools:**

[http://www.michigan.gov/documents/som/Look\\_and\\_Feel\\_Standards\\_302051\\_7.pdf](http://www.michigan.gov/documents/som/Look_and_Feel_Standards_302051_7.pdf)

**The State Unified Information Technology Environment (SUITE):**

Includes standards for project management, systems engineering, and associated forms and templates – must be followed: <http://www.michigan.gov/suite>



### **Support for Mobile Technologies**

It is envisioned that THE completed TAMS solutions will include mobile field data collection tools as a component of the overall Solution. Contractor is advised that the State has developed mobile application development standards. These are included for reference as Attachment G.

### **Agency Specific Technical Environment**

TAMS will be implemented within MDOT's current business application architecture. In order to maximize the potential for TAMS integration as described within Section 1.104 C Implementation Services - Interfaces / Integration below, Solution will provide support for this architecture.

The DTMB/MDOT Standard Information Technology Environment consists of the Desktop Environment, Project Management Tools, the Business System Development Environment, the Web / Intranet Site and Application Development Environment, the Security Environment, and the Network Environment. These environments include but are not limited to the following identified IT tools:

#### *Desktop Environment*

Windows 7 and Windows XP  
 Microsoft Office 365  
 Microsoft Internet Explorer 8.0  
 Mozilla Firefox 17.x +  
 Oracle Net Services 10g +  
 Adobe Standard X

#### *Development Languages, Tools*

JDK 6  
 JEE 6  
 Spring Framework 3.x  
 JQuery 1.x  
 JPA 2.0  
 Hibernate 3.x  
 Apache CXF  
     Apache Maven  
     Nexus (Maven Repository Manager)  
 JBoss BRMS 5.x  
 JBoss ESB 4.x

JavaScript, JQuery  
 PowerBuilder 9.x, 10.x, 11.x  
 XML  
 HTML  
 CSS  
 AJAX  
 Microsoft .NET 2.x, 3.x, 4.x  
 C#  
 ASP.NET  
 ColdFusion 7.x, 8.x

JBoss Developer Studio

Microsoft Visual Studio 2008

Eclipse, CFEclipse

TOAD Data Modeler  
 Toad for Oracle 11

Enterprise application Studio (PowerBuilder 9.x PowerJ 3.x, PowerSite)  
 - Sybase Powerbuilder Enterprise

*Web/Application Servers*

Apache 2.x

JBoss SOA Platform 5.x

Microsoft Internet Information Server 6, 7

Cold Fusion, 8

Enterprise Application Server 3.x (Jaguar CTS 3.x, PowerDynamo)

*Database Server*

Oracle 11g (with spatial)

SQL Server

*Spatial*

ArcGIS Server 10

ArcSDE

*Content Management*

Serena Dimensions CM

Serena Dimensions RM

Serena Business Manager

Serena Prototype Composer

*Document Management*

IBM FileNET

Bentley ProjectWise

Adobe Acrobat version 6.0 +

*Electronic Forms*

Presentation: Adobe Acrobat version 6.0 +

FileNET eForms for document management

*Testing Environment*

JUnit 4.x

HP LoadRunner 11.5

SoapUI 4.x

Quick Test Professional 11

*Security Environment*

Java J2EE Security

IBM Tivoli Single Sign On

SSL

SecureID (State Security Standard for external network access and high risk Web systems)

Spring Security

*Operating Systems*

Windows Server 2003, 2008

Sun Solaris 10

RedHat Enterprise Linux 5

*Network Environment/Hardware*

Cisco Routers

Dell, Sun, HP, Redhat servers

Citrix ICA Client

Citrix Metaframe

*Reporting*

Crystal Reports 2011

Business Objects XI 3.1



## 1.104 WORK AND DELIVERABLES

### I. Services and Deliverables

The State is implementing a COTS Transportation Asset Management System (TAMS) Solution. The proposed Solution will be hosted on the State's network. This project includes the implementation of a COTS TAMS solution, data conversion and migration, training, and maintenance and support as detailed in Section 1.101. The system will be installed, configured, tested and in operation by October 1, 2016.

### A. COTS Software Acquisition

Contractor to provide COTS software licenses in sufficient quantities to meet TAMS functional requirements as summarized below and specified in detail within Attachment A - Solution Requirements.

#### Road Network Management

The Road Network Management component of Solution will provide the following high level functionality:

- Manage the location of highway assets throughout the asset life cycle (support temporal data management);
- Integrate roadway data from multiple linear referencing system (LRS) networks into the Michigan Geographic Framework ("MGF") Physical Road ("PR") segment based LRS network;
- Translate asset location references amongst the various MDOT business Linear Referencing Methods ("LRMs") and the MGF PR LRM, and between LRMs and other geospatial referencing methods (coordinates, indirect referencing);
- Visualize / analyze / map / report road network assets, including the capability to produce customized Straightline Diagrams ("SLDs");
- Coordinate / synchronize road network updates with DTMB's Michigan Geographic Framework (MGF) spatial database; and
- Support MDOT and DTMB standards for location metadata fields.

It is presently envisioned that the initial TAMS will operate independently of the DTMB MGF edit environment and must update the LRS data with each MGF release. It is a future objective of Client to investigate the capability of the TAMS solution to be able to integrate with the MGF edit environment, which has recently migrated to an Oracle Spatial and Intergraph Advanced Data Editing ("ADE") environment.

#### Asset Inventory Management

The Asset Inventory Management component of Solution will provide the following high level functionality:

- Record, store and manage multiple user-defined asset types through a geo-referenced database that is integrated with other TAMS modules to enable enterprise wide asset management, with initial focus on a) Lanes, b) Signs, c) Culverts and d) Guardrails;
- Provide the capability to record user defined data attribute fields such as physical description, historical data, value, performance, etc.;
- Support Client standards for asset inventory metadata fields;
- Integrate with the TAMS Road Network Management module for asset location management, geospatial analysis and reporting;
- Integrate with the TAMS Highway Maintenance Management module to support asset maintenance management;
- Provide flexible data loaders with robust Q/A functionality to migrate legacy data (for example: existing sign inventory) and also to support future mobile data collection technologies; and
- Integrate with the DTMB MGF environment for sharing of MDOT business data (where applicable).

#### Maintenance Management

The Maintenance Management component of Solution will provide the following high level functionality:

- Capture and report maintenance activities, quantities, location, costs, performance-based planning / budgeting, resource needs, annual work program, work order scheduling-tracking, performance



monitoring of defined service levels, and customer-service delivery for both MDOT direct forces and contracted maintenance service providers;

- Integrate with the TAMS Road Network Management module for location management of maintenance activities, work orders and work programs;
- Integrate with the TAMS Asset Inventory Management module to support asset maintenance management, geospatial analysis and reporting;
- Integrate with a number of existing MDOT maintenance related systems;; and
- Provide web based Maintenance reporting functionality to replace that currently available in WebFANCY.

#### Future Integration Capability

The TAMS Solution includes functionality to permit future integration with other existing and planned application systems to be incorporated within the TAMS environment, such as TMS, MIDB, MIBridge, and integrating data from e-Construction as-built files. The State is also currently investigating the implementation of an Enterprise Resource Planning (“ERP”) solution within the next several years.

Solution will support future integration initiatives through published Application Program Interfaces (“APIs”), access to foreign tables and other linkage mechanisms.

#### **Deliverable(s)**

- Procurement of COTS software on suitable media – delivery format to be agreed with DTMB. Two (2) copies to be provided.
- *Detailed installation manuals / instructions in support of the above, in electronic PDF format.*
- Any other deliverable Contractor deems appropriate

#### **Acceptance Criteria**

High-level acceptance criteria for Document Deliverables and Software Deliverables are listed in Section 1.501.

#### **Contractor Agreement & Approach in regards to Section 1.104, A. COTS Software Acquisition**

<b>x</b>	I have reviewed the above section and agree with no exception.
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#### **Executive Summary/Solutions Overview**

The DTS team is proposing a solution that will meet MDOT needs for an TAMS that is web-based, user friendly, affordable and GIS-centric to support Work, Asset, and Inventory Management as well as provide a seamless platform that supports Enterprise Resource Planning (ERP) commercial off-the-shelf (COTS) integration in future phases of the overall vision for the MDOT TAMS.

During The TAMS Phase 1, this proposed solution will provide:

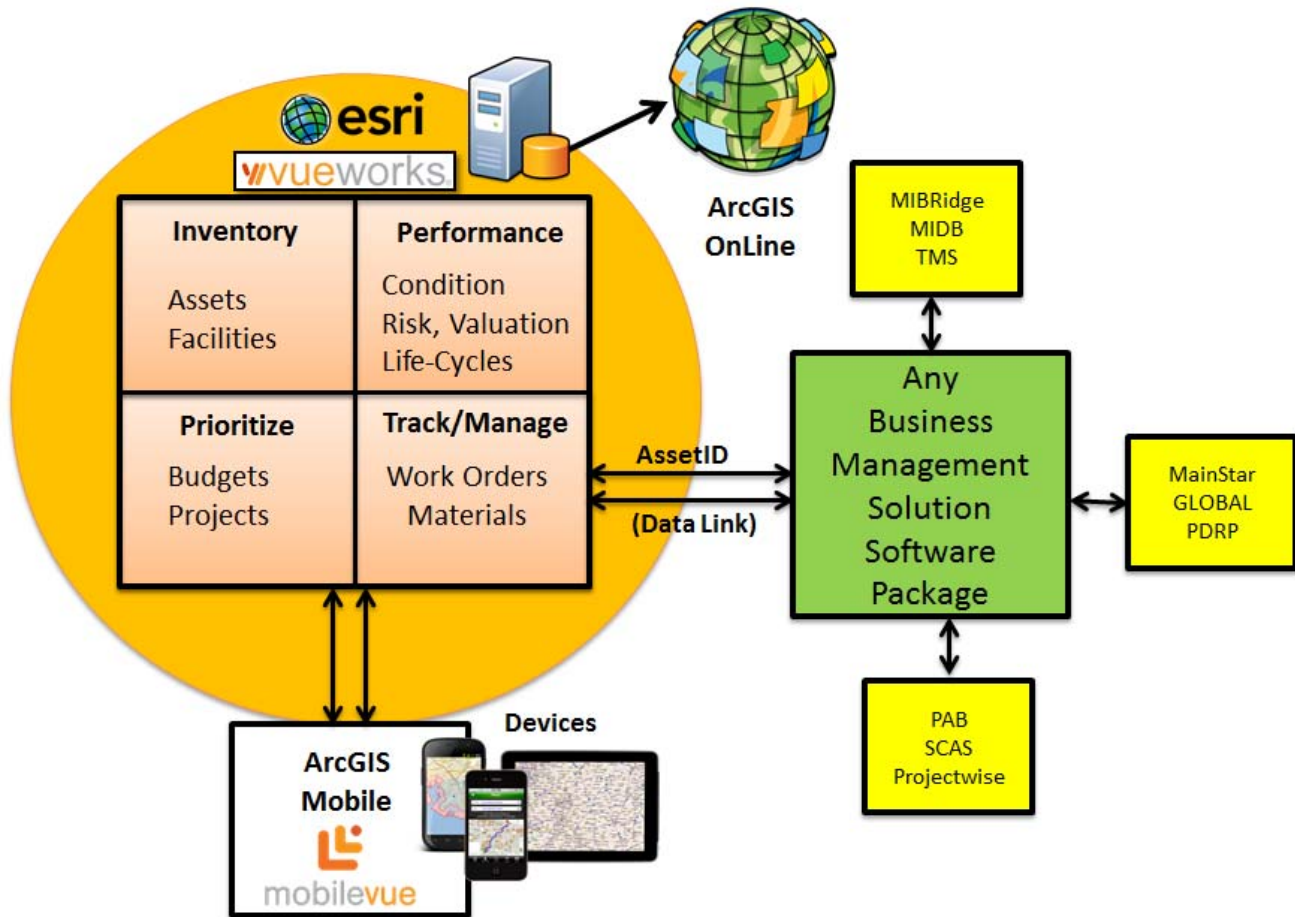
- **Road Network Management** – managing the location of highway assets, integrating roadway data from multiple linear referencing methods (LRMs), visualizing / analyzing road network assets and coordinating / synchronizing road network updates with the Michigan Department of Management and Budget (DTMB);
- **Asset Inventory Management** – providing the ability to record, store and manage physical description, historical value, performance and other attributes of multiple asset types through a geo-referenced database with the ability to record physical description, historical value, performance, and more with an initial focus on a) Lanes, b) Signs, c) Culverts and d) Guardrails;
- **Highway Maintenance Management** – allowing MDOT to capture and report maintenance activities, quantities, location, costs, performance-based planning / budgeting, resource needs, annual work program, work order scheduling-tracking, performance monitoring and customer-service delivery and





- **Application Integration** - ensuring that future integration capability is adequately tested and confirmed within the scope of the initial TAMS project (for example: bridge management, pavement management and safety management) with integrated data from mobile field data collection systems as well as e-Construction as-built files.

## Michigan DOT Solution Overview



The diagram above provides a high-level overview of **DTS's flagship Asset and Maintenance Management System: VUEWorks** which is fully integrated with the **Esri Roads and Highways Linear Referencing System Framework** as well as **Transcend Spatial Solutions' Straightline Diagramming Application** and **VUEWorks Mobile Solutions**. In addition, the diagram represents the strong data linking and integration modules that can be utilized to build one or bi-directional relationships with any business management solution. Each application component is discussed in more detail below.

DTS's Asset and Maintenance Management Software, **VUEWorks**, is a full service, web-based, GIS-centric, asset and work management software and services solution.

**DTS's VUEWorks** software is a web-based, geospatially-enabled, enterprise-level asset and work management system that provides government agencies with the ability to manage, analyze, integrate and share valuable asset and work management information.

VUEWorks can manage infrastructure capital assets to minimize the total cost of owning and operating them, while delivering the service levels the State desires. Our objective is to provide the State of Michigan with a comprehensive and scalable system built on our web-based technology that will not



only address the points that were outlined in Contract, but will also be capable of fully leveraging the State's current and future geospatial data infrastructure, ERP and TAMS resources.

**The following is a listing of some of the advantages of our approach and solution:**

- VUEWorks uses the International Infrastructure Management Manual's approved and accredited "all assets" approach to infrastructure asset management, eliminating the need for the State to purchase specific modules for different workflows or asset types and allowing uniformity in the State's DOT asset management program.
- VUEWorks is a 100% web-based application coded in .NET that uses a service-oriented architecture allowing it to interface with nearly any external database or application, and it is 100% mobile.
- The VUEWorks solution provides seamless integration with Esri's ArcGIS Server and Roads & Highways LRS/M platform and standard relational databases.

**ESRI**

Esri's will provide a GIS-based, complete Linear Referencing System (LRS) solution combined with COTS configurable and embeddable technologies. **The Roads and Highways LRS solution will provide a seamless path to Transportation Asset management implementation statewide.**

**Transcend Spatial Solutions (Transcend) – Transcend will provide the following Services :**

- **Linear Referencing Systems (LRS) Design and Implementation** – As the foundation for data integration, LRS is a vital component in DOT operations. Transcend's knowledge of the latest solutions such as Esri Roads & Highways (R&H) is substantial. As federal reporting requirements become more stringent in terms of the amount of data as well as the roads to be included, many DOTs are embarking on initiatives to revamp their LRS. Transcend is a recognized leader in assisting DOTs with LRS implementation projects.
- **Federal Reporting Support** – Transcend keeps current with the Federal Highway Administration (FHWA) reporting requirements for DOTs. Their professionals have experience in delivering tools to facilitate delivery of the Highway Performance Monitoring System (HPMS) submittal, addressing Moving Ahead for Progress in the 21st Century Act (MAP-21) reporting requirements, generating Model Inventory of Roadway Elements (MIRE) and the Fundamental Data Element (FDE) data structures and integrating other reporting functions related to the National Bridge Inventory (NBI), safety reporting and rail crossing reporting.
- **Data Visualization and Decision Support** – Visualization tools support effective decision-making by providing easy access to a wide variety of enterprise business data. These tools mine, analyze, map and report the data stored in data warehouses and repositories and managed by LRS. These tools provide basic mapping functions, but also more advanced capabilities such as sophisticated spatial analysis, **straight-line diagramming displays and business intelligence (BI) integration.**

**eVision Partners, Inc.** – eVision Partners is a management consulting firm dedicated to assisting public sector clients to plan and execute significant business and technology change projects. eVision Partners specializes in providing consulting support to transportation agencies that will ensure the successful planning and implementation of transportation asset management and associated core information systems.

**Contractor /Sub-contractor Team Will Provide:**

- An Asset and Maintenance Management Solution that is web-based, GIS-centric, natively integrated with Esri Roads & Highways and provides fully-functional, risk-based asset, maintenance and performance management enabling asset valuation and budget forecasting to support program and project level lifecycle transportation infrastructure asset management.





- A mobile asset and maintenance management solution that can be utilized on any platform (Toughbook, tablet, smartphone) in both connected and disconnected modes.
- A team of proven system integrators (DTS, Esri and Transcend) and system integration planners (eVision Partners) that not only are skilled in the requirements of the TAMS program to support Phase 1, but have the necessary skillset to provide insight, planning and implementation for future phases of the program.
- A senior level management team of professionals with proven track records who are also owners of their companies where a project of this magnitude is of upmost importance to both our and MDOT's success.
- COTS and configurable products where ongoing support and portions of the implementation can be performed by the State's technical resources if desired. The team of DTS, Esri, Transcend and eVision Partners will offer unique opportunities for end user support, implementation and sustainment.
- Given the number of initial users identified in Contract, MDOT will be provided an enterprise site license for all components of the TAMS solution. We understand the goals of the Phase 1 Program are limited to a few asset classes; however, having access to the site license from the outset of the project will provide configuration benefits across assets as well as enable potential work bundling activities that will maximize cost savings and return on investment.



## Product Descriptions

### VUEWorks® Software Description

VUEWorks software is a, web-enabled GIS-integrated Transportation Asset management solution.



VUEWorks is designed for use to track the condition, minimize failure risk and optimize expenditures and service delivery of physical assets. VUEWorks integrates directly with GIS data, allowing users to share geospatial and non-geospatial data on any physical asset within any infrastructure domain.

VUEWorks software employs an all assets model that is based on asset types and asset classes, and therefore does not require users to purchase separate modules for individual assets.

VUEWorks and its modules can be thought of as building upon each other. The base (red) allows for map and data sharing. Work management tools (steel gray) integrate with the core module of the system by creating relationships between asset features and the resources used to maintain them – this integration provides much greater functionality when used to perform standard daily, weekly, monthly and as-needed tasks to maintain assets. Strategic asset management (gold) from a long-term perspective (depending upon the asset type) may look decades into the future.

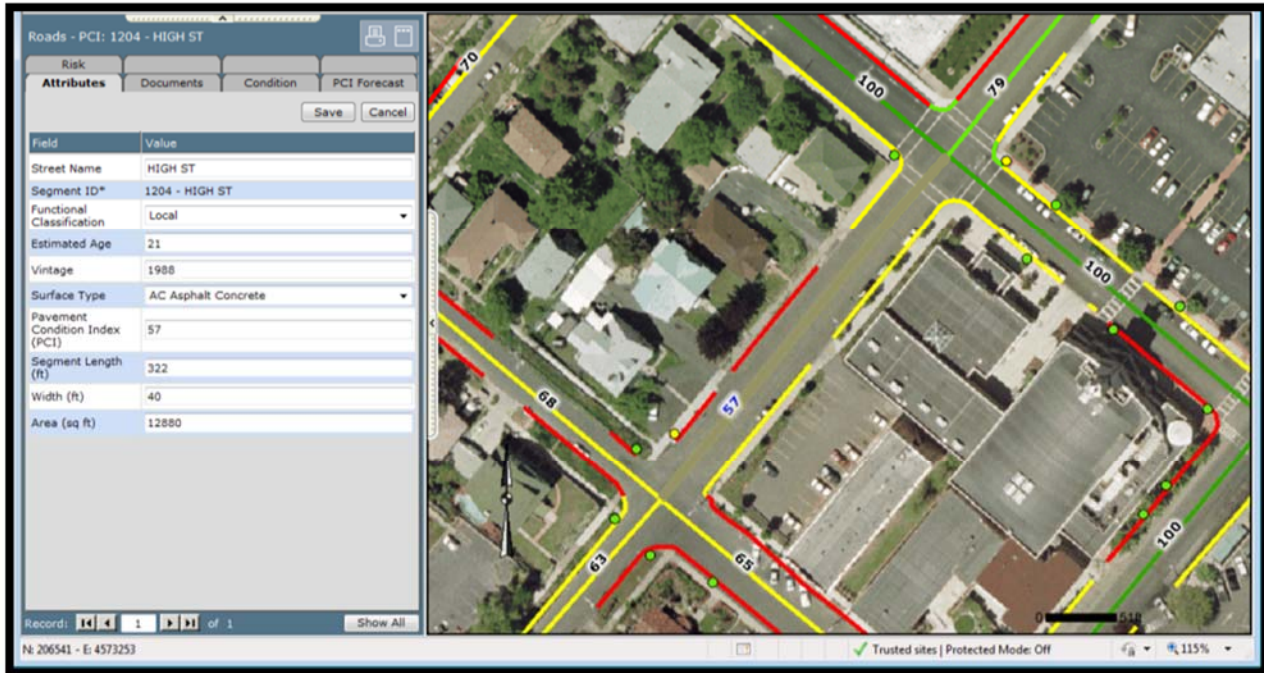
### VUEWorks® Core

#### Web-based access to all your GIS and asset management data

VUEWorks Core is the foundation for all other VUEWorks modules, connects existing GIS data to the VUEWorks strategic asset and work management system. Link documents and databases to specific



assets, conduct multi-level searches, buffer queries, measure distances and create reports. It is very configurable and easy to navigate and use. As a web-based application, VUEWorks can be accessed with Microsoft Internet Explorer via the Internet/intranet, Wi-Fi and wireless communication cards. Users can access VUEWorks from the office, the field or home using a traditional desktop computer, notebook or tablet.



### Features & Benefits

- Integrated with Esri ArcGIS Server and Roads & Highways
- Manage read/write/edit permissions by department, role and user
- User defined dashboards to graphically display statistical data for service requests and work orders
- Easily link documents such as image files, PDFs, videos and many other formats to any asset for quick viewing anytime, anywhere
- Use Data Link to seamlessly link external databases in Access, Excel, SQL Server, Oracle or any ODBC-compliant database

### Request Portal

#### For internal and external customers to place requests online

The VUEWorks Request Portal module delivers online access for citizens and customers to place their requests using the Web. No customization or third party database is required. The Request Portal interfaces directly to the Service Request module. And the Request Portal status is kept up-to-date when a service request is closed. At any time, a citizen or customer can review the status of their request by entering the portal and viewing "My Requests" or by searching for a Service Request ID.



## Features & Benefits

- Allows citizens and customers (both internal and external) to issue requests directly, reducing the burden on your call takers or front office staff
- Minimizes errors by directly populating the Service Request module
- Complete integration between the Request Portal and the Service Request and Work Order modules
- Request Portal status is kept in sync with work orders that have linked service requests
- Allows your agency to receive and share request status after hours, 24/7, 365 days a year
- The Request Portal can be accessed via smart phone mobile devices

## Service Request

### For managing service requests from any source

The VUEWorks Service Request module enables you to record and track requests. This configurable module allows you to attach requests to assets in the GIS or in the Facilities module. Request takers can quickly fill out the information for the request and, if the Work Order module is in use, create a work order directly from the service request.



## Features & Benefits

- ## Work Order

**For work activities, preventative maintenance, tracking progress & costs and notifications & reporting**

26



**Manage Work Orders**

Filter is OFF - Current list contains 9 out of 9 Work Orders - Select Field - Apply Filter

**Form View** | Table View | Filter | Reports | Assets

ID: 011211002 Logged By: Administrator 01/12/2011 10:34 AM

Type\* Routine

Department\* Operations and Maintenance

Activity Description\* Group\* Installation

Visual Nighttime Inspection

Location:

**Status**

Open Priority: 1

Begin Date / Time: 01/12/2011 8:00 AM

End Date / Time: 01/12/2011 9:00 AM

Notify Set Recurring Calendar History

**Details** | Costs | Tasks | Labor | Equipment | Inventory

Project Group: -- Select Project Group -- Project: Open Project

☐ Associate this Work Order with:

**Estimated Costs (In Activity Year Dollars)**

Item	Cost	Rollup Cost
Labor	\$240.00	\$240.00
Inventory		\$0.00
Equipment	\$1,000.00	\$1,000.00
Vendor		\$0.00
Other		\$0.00
<b>Total</b>	<b>\$1,240.00</b>	<b>\$1,240.00</b>

Cost Description:

**Actual Costs (In Activity Year Dollars)**

Item	Cost	Rollup Cost
Labor	\$240.00	\$240.00
Inventory		\$0.00
Equipment	\$1,000.00	\$1,000.00
Vendor		\$0.00
Other		\$0.00
<b>Total</b>	<b>\$1,240.00</b>	<b>\$1,240.00</b>

Cost Description:

\*Required Fields

Save Delete New Copy New Print... Close Rec 3 of 9

## Features & Benefits

- Work order forms can be user defined to fit your “look & feel” and existing work process
- Attach work orders to any physical asset on the map or non-GIS asset in the Facilities module for easy reference
- Robust reporting features include pre-defined report templates and wizards
- Automated email notices can be sent to any email program
- Work orders can be logged from the field in a fully disconnected mode.

## Resource Manager

### For quick cost calculations on labor, equipment and inventory used (parts & materials)

The VUEWorks Resource Manager module is tightly integrated with the Work Order module so that associated time and costs for personnel, crews, Contractor, vendors, equipment and other items pulled from inventory can be tracked. Time for labor and equipment can be accounted for independently with the Time Recorder feature, then passed on to external accounting systems. Multiple billing rates can be assigned for different labor roles and activities. Set up personnel so that employees can be placed on a work order based on job classification, availability and cost. Personnel managers can be set up to search for an employee job classification, availability and cost in an easy-to-use calendar interface.



## Features & Benefits

- Personnel, equipment and inventory items/costs can be added and tracked in work orders
- Assign multiple labor rates to special field activities to get quick cost estimates
- Get real-time inventory tracking with alerts for low inventory
- Use the calendar interface to track availability of employees and equipment
- Automatic notification of employees and supervisors when assigned to a work order
- Import/export personnel, equipment and inventory to accounting systems

## Condition

### For condition tracking and reporting on any physical asset

The VUEWorks Condition module is highly configurable, allowing you to collect, summarize, analyze, rate and report on the condition of any asset (whether signs, culverts, guardrails, street lights, pipes, roads, power lines, playground equipment, trees or something else). Develop your own condition inspection criteria or use condition data collected with the use of other software. Either way, VUEWorks provides configurable tools that allow you to build your own rating criteria as simple or as detailed as required. History features show how condition has changed over time for each asset or the entire system. The Report Designer lets you design just about any style of report with data from all sources including GIS data and linked databases that contain condition assessment details.



**VUEWorks** 2010.0.124.0 Project: VUEWorks2010 Host: vuedemo4 User: Chip

**Manage Work Orders**

**Form View** Assets

ID: WO-092310-002 Logged By: Kenneth Spalding 09/23/2010 01:45 PM

Ref: SC-072810-2 Type: Scheduled Repair/Replace

Department: Highway Group: Signs

Activity Description: Existing installation

Location:

**Status** Closed Priority: 1

Begin Date / Time: 07/29/2010 8:00 AM

End Date / Time: 07/29/2010 9:00 AM

Closed By: Kenneth Spalding 2/9/2011 2:17 PM

Notify Set Recurring Calendar History

**Details** Costs Tasks Labor Equipment Inventory

MUTCD Sign Number(s): D-3 AND R1-1 Street Position: NORTHBOUND Street Location: PROSPECT ST ON MT VERNON ST

MUTCD Post Number: B-2 Post Type: SQUARE Post Material: Steel Multiple Signs: Yes

Sign 1 Description: D3-1 Mt Vernon St Sign 1 Retroreflectivity OK: Yes Sign 1 Notes:

Sign 2 Description: D3-1 Prospect St Sign 2 Retroreflectivity OK: No Sign 2 Notes: Faded from south facing direction.

Sign 3 Description: R1-1 Stop Sign 3 Retroreflectivity OK: Yes Sign 3 Notes: Replaced because of graffiti.

**Attributes** Documents Service

Field	Value
ASSET_ID*	90
TYPE	
POST	SQUARE
POST_POS	B-2
DESCRIPT	D-3 AND R1-1
DESIGNAT	PROSPECT ST ON M
ROAD_POS	NORTHBOUND
COMMENT	

Record: 1 of 1 Show

N: 278720 - E: 1195767

R1-1

## Features & Benefits

- Supports condition ratings using the following methods: Simplified, Itemized and Defect
- Link to external condition data to summarize, analyze, rate and report
- Integrates with GIS to visualize color-coded conditions for viewing on a map
- Using the VUEWorks Work Order module, capture condition data directly on work order forms
- Integrated ASTM templates measure pavement condition for asphalt and concrete
- Condition inspections can be performed in the field in a connected or disconnected mode.

## Risk

### For strategic planning and prioritization of work activities

The VUEWorks Risk module allows you to capture stakeholder concerns in a risk model to strategically prioritize limited resources and work activities. Determine the consequences of failure by analyzing failure modes and failure probabilities for asset classes and types. Configure priorities by assigning weight factors. Once you have the risk model configured and calculated, VUEWorks Risk makes it easy to quickly look at every aspect of the risk model by highlighting assets on a map and illustrating findings to stakeholders to justify work priorities. Avoid costly failures before they occur.





http://vueworks.edats.com/?AssetClassID=7 - Risk Manager - Windows Internet Explorer

Filter is OFF - Current list contains 1660 out of 1660 Assets

Form View Table View **Filter** Reports Calculations

Summary Filter Statement Filter Asset Class: Pavement

Asset Type: All ☒ All Assets ☐ Selected Assets Apply

When a value is picked: ☒ Add to Selection Set ☐ Replace Selection Set

Risk Factor	0.00 - 0.99	1.00 - 1.99	2.00 - 2.99	3.00 - 3.99	4.00 - 4.99	5.00 - 5.99	6.00 - 6.99	7.00 - 7.99	8.00 - 8.99	9.00 - 9.99	10.00	Not Rated	Total Rated	Total Assets
Overall Risk Factor	587	382	275	182	83	62	44	22	5	7		3	1649	1660
Failure Probabilities	0.0% - 9.9%	10.0% - 19.9%	20.0% - 29.9%	30.0% - 39.9%	40.0% - 49.9%	50.0% - 59.9%	60.0% - 69.9%	70.0% - 79.9%	80.0% - 89.9%	90.0% - 99.9%	100 %	Not Rated	Total Rated	Total Assets
Overall Failure Probability	442	188	237	202	203	144	125	64	33	18		3	1656	1660
% Life Left	3	4	1		1	3	2	3	4	8		1631	29	1660

Failure Modes Consequences Terms

Consequence Settings For: Pavement - Asphalt (Asset Type)

Consequences Ratings

	Consequence Name	Weight	Use for Criticality	% Life Left	Surface Condition
1	Safety	3	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
2	Travel Delay	1	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
3	Vehicle Damage	2	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>

### Features & Benefits

- Use GIS data with the VUEWorks Multi-edit and Buffer tools to quickly assign consequence of failure values to assets in the GIS
- Utilize the consequence of failure values as a measure of criticality when comparing assets
- Configure up to ten consequence and failure modes for each asset type
- Use data from the Work Order module (e.g., number of work orders as a variable) or any external database such as a capacity analysis to keep risk models current
- Use risk data to forecast budgets for asset maintenance and replacement

### Valuation (GASB 34)

#### For calculating the value and depreciation for all physical assets

The VUEWorks Valuation module removes the drudgery and expense of meeting the Government Accounting Standards Board (GASB) Statement No. 34 or Canadian PSAB 3150 requirements for maintaining and reporting value and depreciation of infrastructure assets. With reporting under your control, you can leverage depreciation and related financial information to help plan budgets and projects. Missing historical cost data? No problem – Valuation will calculate historical costs back to the time of construction. You can also enter historical costs directly or enter unit costs and let VUEWorks calculate the total value.





Attributes Documents Condition Risk

Value Picture

Save Cancel

View History

☐ Exclude

Values as of 3/2/2011

**Remaining Life (years):** 0.0

Age (years): 11.2

Year of Construction: 2000

Original Life Expectancy (years): 10

Years Added By Maintenance: 0

Expected Replacement Year: 2009

**Present Value:** \$0

Accumulated Depreciation: \$105

Value Added By Maintenance: \$0

Historical Cost: \$105

Replacement Cost: \$150

Salvage Value: \$0

Note: red values are overrides.  
Edit overrides below.

**VALUE OVERRIDES**

Original Life Expectancy (years):

Record: 14 of 4

Calculate Summary Filter Asset List Exclusion List View Report

Report type: Pdf Download Report

**Valuation Report For Period Ending 12/31/2010**

Asset_ID	Layer Sub-Asset Type 1 Sub-Asset Type 2	Street Function	Construction Year Replace Year Remaining Life	Current Deprec Accum Deprec	Historical Cost Replace Cost	Present Value Salvage Value
66	Alt_Signs R2-1 R2-1	Manaul Blvd NE	2001 2010 0.0 years	\$11 \$112	\$112 \$150	\$0
44	Alt_Signs R2-1 R2-1	Sunset Rd SW	2009 2018 8.0 years	\$15 \$30	\$150 \$150	\$120
1	Alt_Signs R1-1 R1-1	Kimmick Dr NW	2000 2009 0.0 years	\$0 \$110	\$110 \$150	\$0
2	Alt_Signs D3 D3	Kimmick Dr NW	2002 2011 1.0 years	\$12 \$104	\$115 \$150	\$12
3	Alt_Signs W1-SL W1-SL	Kimmick Dr NW	2006 2015 5.0 years	\$13 \$67	\$134 \$150	\$67
<b>Total Assets</b>				<b>Accum Deprec</b>	<b>Historical Cost</b>	<b>Present Value</b>
				\$51	\$621	\$199

## Features & Benefits

- Integrates seamlessly with the VUEWorks Facilities module & your GIS
- Determine and report historical and replacement costs
- Calculate value and depreciation for all infrastructure assets including buildings, streets, bridges, pipes and equipment
- Take control of depreciation parameters to realize the full value of your assets
- Account for maintenance through work orders that add value and extend asset life
- Powerful search and filter capabilities allow users to report by location or other criteria

## Budget Forecasting

### For multi-year capital improvement budget forecasts

The VUEWorks Budget Forecasting module delivers configurable, multi-year capital improvement planning capabilities to help determine long-term budget needs based on deterioration curves. Use one of the supplied deterioration curves or one of your own as a basis for forecasting and then identify at what point on the deterioration curve an asset should be rehabilitated or replaced based on risk and condition. "What-if" budget scenarios can be created by adjusting budgets, project types and prioritization criteria – then run forecasting models to see if your budget will meet service level goals. For pavement, PCI values can be used to determine the work activities and cost to maintain a roadway pavement surface condition that supports the needs of the user.

VUEWorks cost-benefit analysis capability takes into consideration not only direct life-cycle costs of projects, but also social and environmental costs. These features allow transportation agencies to incorporate the costs of factors such as lost travel time, accident rates and fuel consumption when planning projects.



http://vueworks.edats.com/?AssetClassID=7 - Budget Scenario Manager - Windows Internet Explorer

Filter is OFF - Current list contains 9 out of 9 Scenarios

Form View Table View Filter Reports

Scenario Name: Asphalt Concrete - 70 by VUEWorks  
 Asset Class: Pavement  
 Asset Type(s): Pavement - Asphalt

Created By: Roderick Lovely 05/27/2010  
 Modified By: Mark Willrett 07/29/2010

Details Summary Results Audit Budget Documents

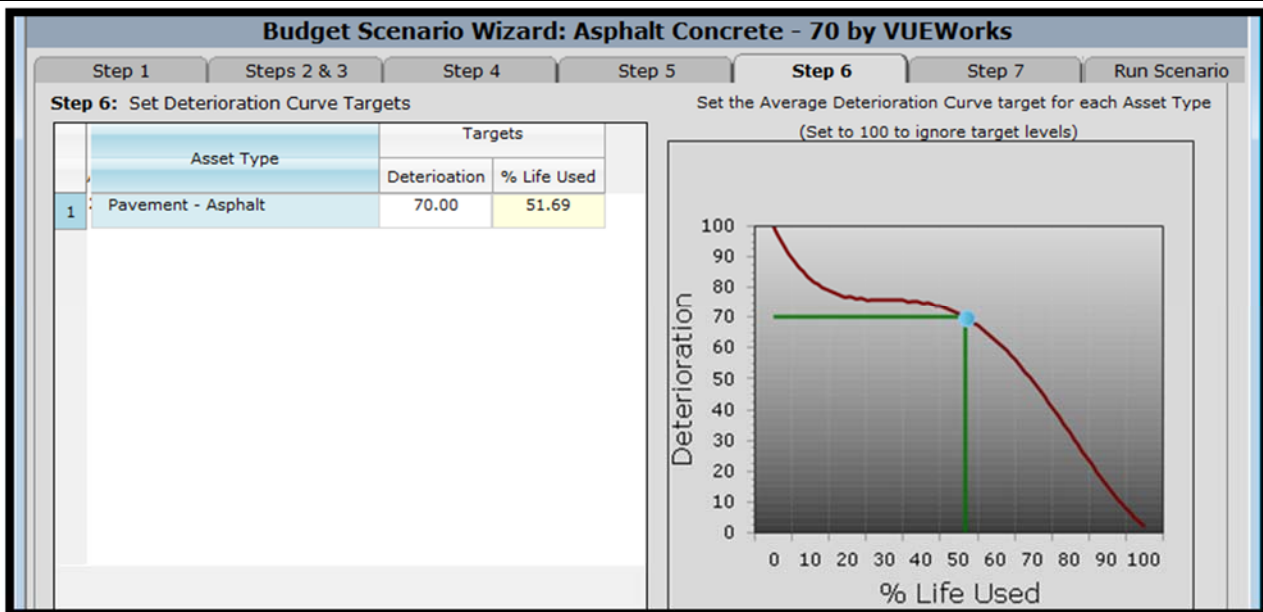
Scenario Time Span (years): 2010 - 2029

Year	Baseline			Forecast			Budget Used	Budget
	Avg Deterioration	Avg Age	Avg % Life Used	Avg Deterioration	Avg Age	Avg % Life Used		
2010	58.92	16.0	48.08 %	58.92	16.0	48.08 %	\$0	\$0
2011	55.62	17.0	50.66 %	57.77	16.0	48.44 %	\$1,499,976	\$1,500,000
2012	52.51	18.0	53.22 %	58.36	17.0	47.64 %	\$1,499,976	\$1,500,000
2013	49.60	19.0	55.76 %	58.11	17.0	47.37 %	\$1,499,988	\$1,500,000
2014	46.91	20.0	58.23 %	57.64	17.0	47.30 %	\$1,499,974	\$1,500,000
2015	44.43	21.0	60.62 %	56.33	18.0	47.12 %	\$1,499,688	\$1,500,000
2016	42.18	22.0	62.91 %	55.47	19.0	47.43 %	\$1,499,278	\$1,500,000
2017	40.13	23.0	65.12 %	56.06	20.0	47.85 %	\$1,498,288	\$1,500,000
2018	38.32	24.0	67.20 %	55.47	21.0	48.79 %	\$1,499,648	\$1,500,000
2019	36.71	25.0	69.16 %	55.32	22.0	49.43 %	\$1,498,524	\$1,500,000
2020	35.32	26.0	70.99 %	56.24	23.0	48.48 %	\$1,497,902	\$1,500,000
2021	34.14	27.0	72.66 %	57.26	24.0	47.81 %	\$1,498,587	\$1,500,000
2022	33.15	28.0	74.18 %	57.81	25.0	46.73 %	\$1,497,162	\$1,500,000
2023	32.32	29.0	75.51 %	58.47	27.0	45.67 %	\$1,497,047	\$1,500,000
Total							\$28,473,992.41	\$28,500,000.00

Edit Delete New New Copy Print... Close

Rec 1 of 9

Done Trusted sites | Protected Mode: Off 115%



Asset Type(s): Pavement - Asphalt

Details   Summary   **Results**   Audit   Budget   Documents

Scenario Time Span (years): 2010 - 2029   Current list contains 2526 out of 2526 Jobs

	Year	Asset Type	Asset ID	Failure Type	Failure Probability	Job	D-Curve Before	D-Curve After	% Life Used Before	% Life Used After	Cost
1	2011	Pavement - Asphalt	<a href="#">40 - MAIN ST</a>	Surface Condition	73.3953	Re-Construct	2.30	100.00	100.00 %	0.00 %	\$47,345
2	2011	Pavement - Asphalt	<a href="#">1406 - N 5TH ST</a>	Surface Condition	63.9729	2" Grind and Inlay	5.76	90.00	96.67 %	4.79 %	\$15,844
3	2011	Pavement - Asphalt	<a href="#">47 - KLAMATH AVE</a>	Surface Condition	57.5649	Skin Patching	15.13	60.00	90.00 %	61.36 %	\$11,533
4	2011	Pavement - Asphalt	<a href="#">672 - N 6TH ST</a>	Surface Condition	46.0328	2" Overlay	32.24	85.00	80.00 %	8.41 %	\$9,002
5	2011	Pavement - Asphalt	<a href="#">1707 - WASHBURN WAY</a>	Surface Condition	93.2108	Re-Construct	25.21	100.00	84.00 %	0.00 %	\$16,927
6	2011	Pavement - Asphalt	<a href="#">1541 - BIEHN ST</a>	Surface Condition	90.8299	Re-Construct	2.30	100.00	100.00 %	0.00 %	\$2,231
7	2011	Pavement - Asphalt	<a href="#">1728 - WASHBURN WAY</a>	Surface Condition	89.4016	Re-Construct	2.30	100.00	100.00 %	0.00 %	\$62,406
8	2011	Pavement - Asphalt	<a href="#">115 - S 6TH ST</a>	Surface Condition	88.7999	Re-Construct	2.30	100.00	100.00 %	0.00 %	\$30,888
9	2011	Pavement - Asphalt	<a href="#">1729 - WASHBURN WAY</a>	Surface Condition	87.2919	Re-Construct	2.30	100.00	100.00 %	0.00 %	\$128,593
10	2011	Pavement - Asphalt	<a href="#">488 - MAIN ST</a>	Surface Condition	85.0515	Re-Construct	2.30	100.00	100.00 %	0.00 %	\$38,712
11	2011	Pavement - Asphalt	<a href="#">601 - WASHBURN WAY</a>	Surface Condition	83.7484	Re-Construct	2.30	100.00	100.00 %	0.00 %	\$229,871
12	2011	Pavement - Asphalt	<a href="#">1401 - S 11TH ST</a>	Surface Condition	79.7798	Re-Construct	2.30	100.00	100.00 %	0.00 %	\$9,075

## Features & Benefits

- View how different budget scenarios impact the overall condition of any asset class
- Select from risk and failure probability criteria to define how rehabilitation will be prioritized
- Automate the assignment of rehabilitation jobs based on failure modes such as capacity and condition
- Pre-determine the impact of rehabilitation jobs on the life-cycle of the asset.

## Projects

### For construction cost estimation and budget analysis

The VUEWorks Projects module delivers capabilities to define projects, calculate estimated costs, group them for budgeting purposes and compare estimated costs with actual costs through integration with the VUEWorks Work Order module. Features allow you to assign job costs for an entire asset, a portion of it or multiple point repairs along it. The Projects module allows you to group and summarize projects hierarchically by asset classes, asset types and jobs through a simple interface. Once you have one or more jobs defined, simply select the assets involved in the project, assign the jobs and let VUEWorks perform all the calculations and generate summaries.



http://vvieworks.edats.com/?AssetClassID=7 - Project Manager - Windows Internet Explorer

Filter is OFF - Current list contains 7 out of 7 Projects

Form View Table View Filter Reports Assets

\*Project Title: Fix All Roads with Today's Doi Status: Open

\*Project Group: FY 2010

Estimated Start Date: 01/27/2010 Actual Start Date: 01/27/2010

Estimated End Date: 01/27/2010 Actual End Date: 01/27/2010

Estimated Duration: Actual Duration:

Location:

Estimated Cost: \$143,045,087.13 Actual Cost: \$0.00 Cost Overrun:

Estimated Costs Actual Costs Details

Group By: AssetClass, Asset Type, Asset, Job

Cost Source	Asset Type	Cost
	Pavement - Asphalt	\$143,045,087.13

Location	Cost Class 1	Cost Class 2	Cost
1 LIBERTY AVE	Local	Local	\$247,007.07
2 RECLAMATION AVE	Local	Local	\$154,722.96
3 MODOC ST	Local	Local	\$73,993.50
4 CLEVELAND AVE	Local	Local	\$120,387.06
5 EMERALD ST	Local	Local	\$62,708.58
6 BALSAM DR	Local	Local	\$54,332.37
7 BALSAM DR	Local	Local	\$86,619.78
8 BALSAM DR	Local	Local	\$64,560.24
9 GRANITE ST	Local	Local	\$29,779.65
10 BALSAM DR	Local	Local	\$64,297.80
11 6 TH CT	Arterial	Arterial	\$786,778.70

Add Save Layout

Save Delete New New Copy Print... Close

Rec 14 4 of 7

Done Trusted sites | Protected Mode: Off 115%

## Features & Benefits

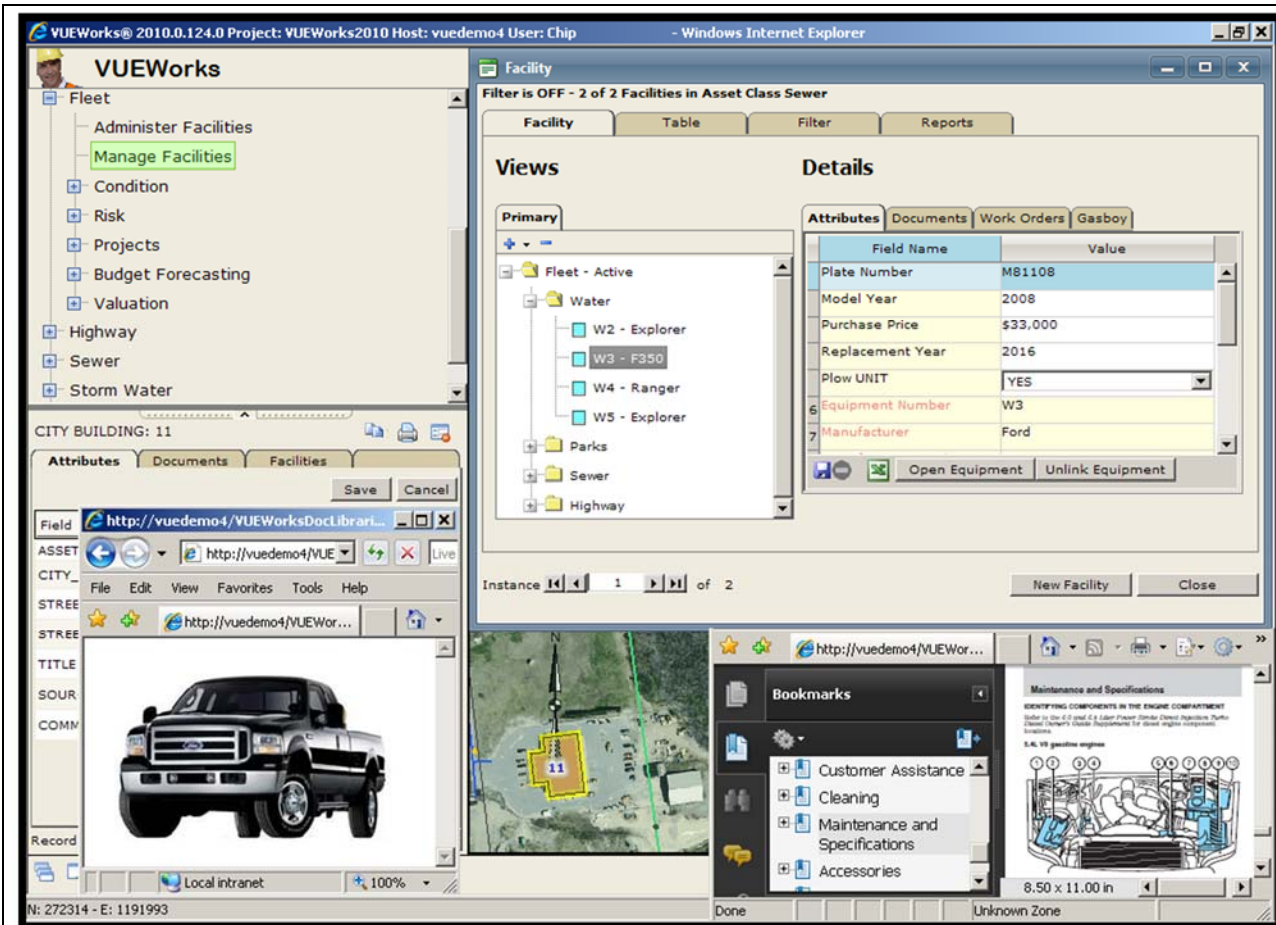
- Include any asset classes and types within the same project – great for corridor projects involving multiple asset classes
- Create a library of comprehensive and point repair job types
- Configure your own status terms to display such as Pending, On Hold, In Progress, Completed, Backlogged, etc.
- Allows adjustment of a project cost by forecasting inflation rates
- Run projects through the Budget Forecasting module to analyze the best cost–benefit ratio, extending asset life

## Facilities

### For buildings, pump stations, treatment plants & vehicle fleet

The VUEWorks Facilities module provides access to physical assets not found in a GIS but which still need historical service/work records, data links, condition assessment, valuation, preventative maintenance scheduling and access to key operational documentation. The types of facilities that can be managed are virtually limitless including pumps, motors, fleet and building components. The Multi-view feature allows assets to be organized in different categories (e.g., location/floor level, department or manufacturer). The VUEWorks Facilities data linking features combined with the Work Order module allow automatic work orders to be issued based on user defined triggers from a 3<sup>rd</sup> Party Database.





## Features & Benefits

- Manage non-GIS assets like building components and internal equipment
- Create and organize assets in a hierarchical structure for easy reference
- Inventory fleet and mobile equipment in the Resource Manager module for use with work orders
- Structure your asset hierarchy to include work orders, condition, valuation and more. Manage facilities with trigger work orders based on equipment run-time or other data

## VUEWorks for Mobile Field Asset Management

VUEWorks functions in both disconnected and connected environments. The application is built on Esri's ArcGIS Mobile platform. This allows the VUEWorks user to take the application into the field.

Since it is built on Esri ArcGIS Mobile, a user can take the map and all the GIS and asset data with them regardless of location. Perform asset condition inspections, manage work orders, collect new assets and interact with your GIS from a tablet or other mobile device.

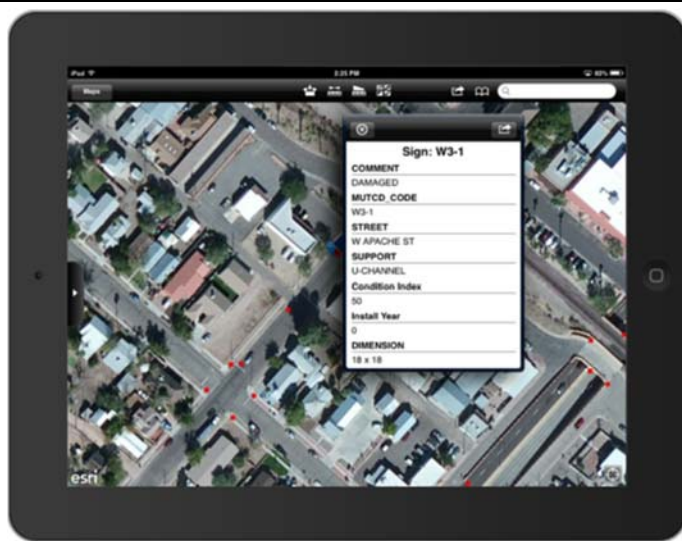


VUEWorks allows for the creation and editing of geospatial GIS data. For field inspection data, the Condition Records tools can be used for recording data for individual assets from laptops, tablets and other small devices to record new data and modification of existing values. Furthermore, VUEWorks allows the passenger

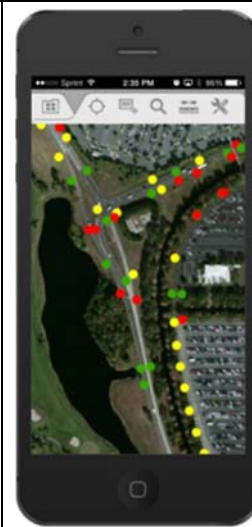


in a moving vehicle to perform asset assessment tasks, via touch screen interface on a standard tablet computer. VUEWorks recommends use on a rugged tablet computer with the following minimum specifications: 9.7" screen, touch interface and a built-in camera.

VUEWorks integrates seamlessly with the Collector for ArcGIS and improves the efficiency of your field work force and the accuracy of your GIS. Devices are used to collect and update information in the field, whether connected or disconnected, from service requests, work orders and damage reports, allowing end users to create the data that matters most to your organization.



**VUEWorks with ArcGIS showing Attribute editing in the field**



**Collector for ArcGIS**

### Features and benefits:

- Geocode locations, plan routes and get directions.
- Improve your data quality with map-driven forms.
- Captured multiple photos and videos.
- Configurable to fit your organization's workflow.

The asset data file is editable by either assessment buttons or editing the feature attribute data table directly. Time/date stamp and user information is logged.

The "feature" attribute table includes the ability to sort the data in ascending or descending order based on the column heading and ability to select which attribute fields are to be displayed for assessment.

The application can automatically connect via Wi-Fi and 3g/4g with a repository (master) asset database to extract a copy of the asset database used within VUEWorks. The connection serves as the



synchronization of completed and newly assigned service requests and work orders from the database to MobileVUE and vice versa.

With VUEWorks, field crews can add or verify data inputs, apply time and track and assign materials and costs for each asset. This allows field crews to go significantly deeper into the management of assets while away from the office.

### **Features & Benefits**

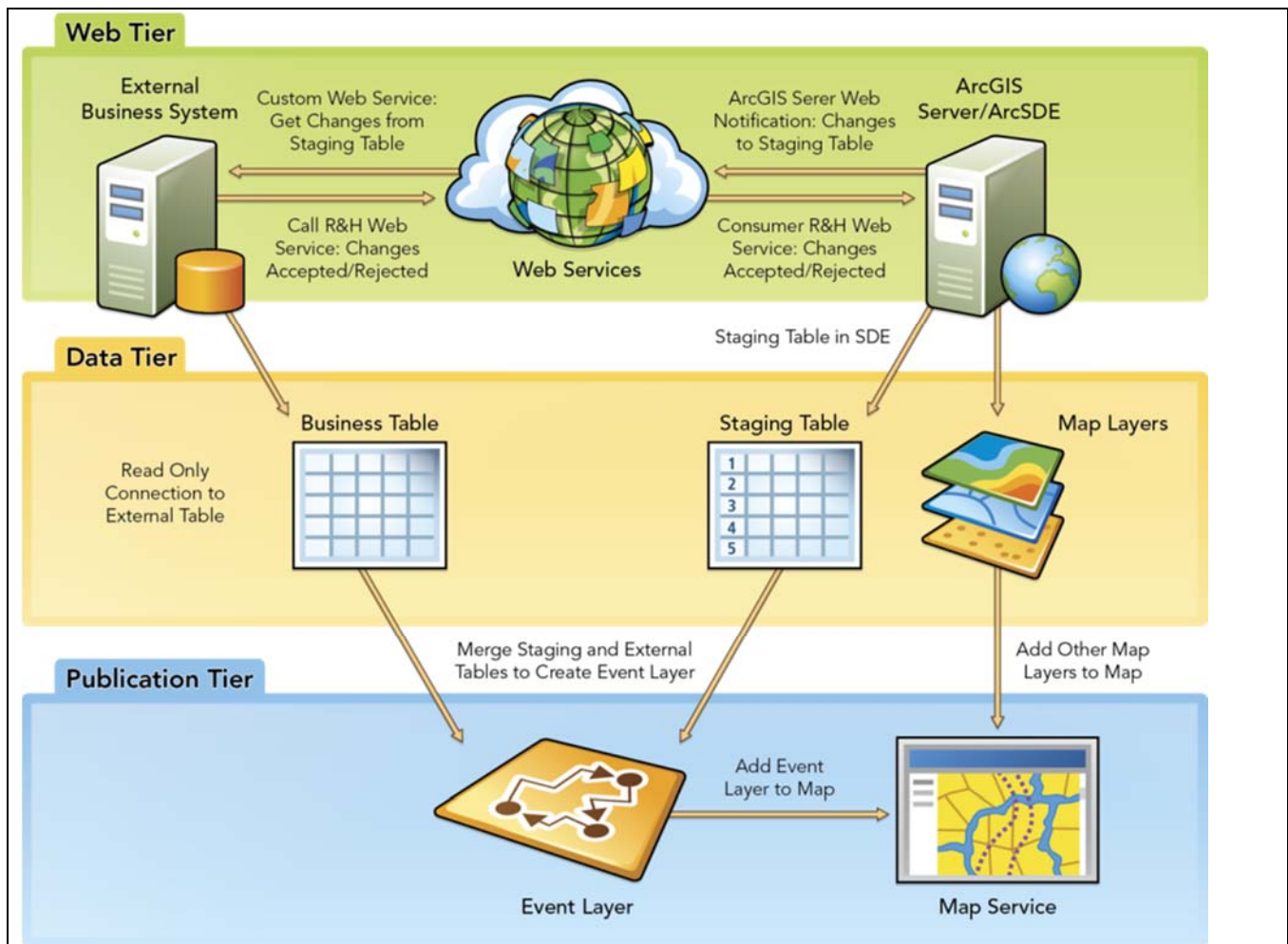
- Syncs with VUEWorks for simple “grab and go” field device use
- Work with your GIS data in a fully connected or disconnected state
- Perform asset condition inspections, asset attribute updates and capture new assets
- Designed for tablet form factors and touch input

### **Esri Roads and Highways**

The Esri Roads and Highways solution enables integration with authoritative business systems for display of related data on GIS maps, in tables and within reports. Business systems interface with Esri Roads and Highways through two distinct data exchange paths. A read-only path from external business systems to Esri Roads and Highways solution via REST-based web services enables LRS Users and GIS Users to view and report on information contained in those external business systems as it relates to LRS tabular and map based data managed by Esri Roads and Highways solution. A create/update/retire path allows external systems to connect to Esri Roads and Highways solution and inspect the LRS as well as ingest changes to the physical network or measures on the network.

When changes are made to the LRS Network using Esri Roads and Highways (realign route, retire route and extend a route), the solution automatically analyzes the impact these changes have on registered event layers from an external system. Any impacted events are read from their native system and compared with registered events within the Esri Roads and Highways GIS environment with measure and/or route reference modifications, as appropriate according to the preconfigured event behavior rules. When the change is committed to the database, a web service call notifies the external system that event records have been impacted. This change notification can happen when the change is published, during a scheduled synchronization process or when synchronization is triggered by a user.

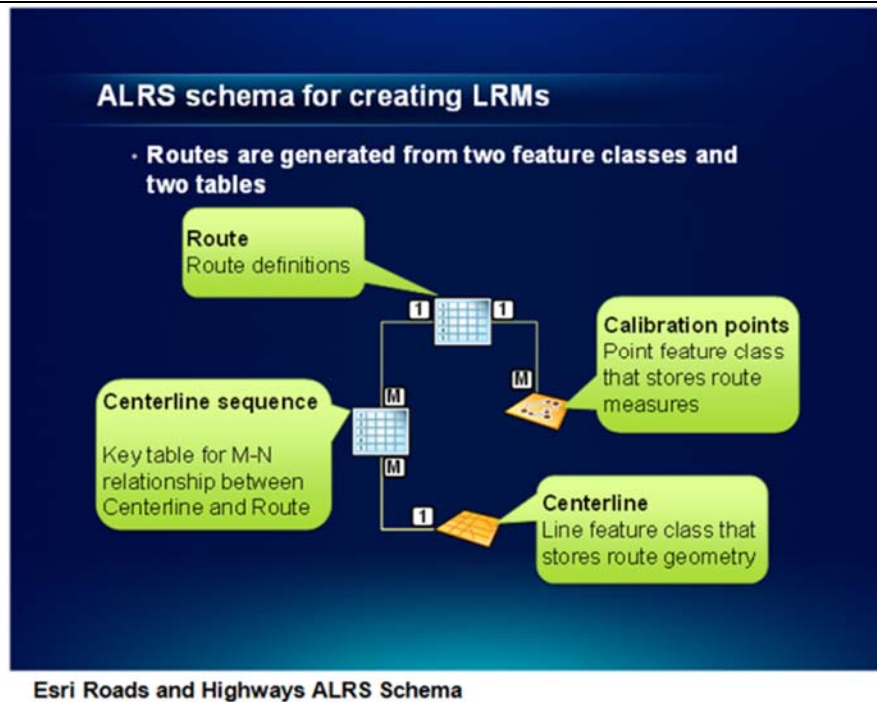
Change records that have been rejected will be dealt with by the LRS maintenance TAMS within MDOT. Change records that have been accepted and incorporated into the target system will be reflected in Esri Roads and Highways when the event records are refreshed by redrawing a map or otherwise querying the database. The figure illustrates the integration process concepts.



### Esri Roads and Highways External System Integration Framework

The Esri Roads and Highways schema is designed to manage multiple LRMs and support a wide variety of business systems leveraging a common centerline geometry within a single advanced linear referencing system (ALRS).





The above figure illustrates the Roads and Highways ALRS schema. Route geometry is stored as a single Centerline feature class within the geodatabase. This feature class stores only the geometry, not the route definitions or measures. Route definitions are stored in the Route table. The Route table contains definitions for all identified routes in all LRMs. Between the Centerline feature class and the Route table resides a cross reference table called CenterlineSequence. CenterlineSequence supports the many-to-many relationship between centerlines and routes. When routes are constructed from centerlines, CenterlineSequence provides the keys that indicate to Roads and Highways which routes are made up of what centerlines.

In this manner, centerline features are reused to create multiple routes across multiple LRMs. This allows Roads and Highways to represent multiple routes leveraging a common set of geometry for all. It also supports concurrent or overlapping routes within the same LRM as well as gapped or discontinuous routes. Finally, measure values are stored in the Calibration Point feature class. By supporting measures separate from centerline geometry, Roads and Highways avoids error prone translations between LRMs by allowing the system to read across all LRMs simultaneously. It is not necessary to transform event measures from one LRM to another in order to perform overlay analysis across multiple LRMs.

These four ALRS schema elements are managed automatically and maintained through the Roads and Highways Desktop tools. When routes are updated using the Roads and Highways tools, Centerline, CenterlineSequence, Route and Calibration Point are automatically updated as well and synchronized to the new highway alignment.

**Transcend Solutions**



**Road Analyzer™** – Road Analyzer is Transcend's configurable straightline diagramming environment. It provides access to roadway business data in a stacked bar display format and is especially useful when many types of data elements need to be visualized at a single location on a transportation network. Road Analyzer can be integrated with Transcend's Map Analyzer (described below), Transcend's custom Videolog viewer or several commercially-available videolog viewing tools.



For clients that have Esri's Roads and Highways (R&H) Solution, Road Analyzer has been integrated with this toolset. Road Analyzer can be launched from within the Roadway Characteristics Editor (RCE) module of R&H and can be used in conjunction with RCE for editing business data.



**Map Analyzer™** – Map Analyzer is Transcend's geospatial web portal. It builds upon Esri's tools providing streamlined functionality specifically for the transportation industry. In addition to basic mapping functions, Map Analyzer provides sophisticated thematic mapping, redlining, temporal and advanced querying capabilities. Together with Road Analyzer, Map Analyzer provides users with a full range of data access, editing, analysis and reporting capabilities. Map Analyzer can be integrated and used in conjunction with Road Analyzer or it can be configured as a separate solution.

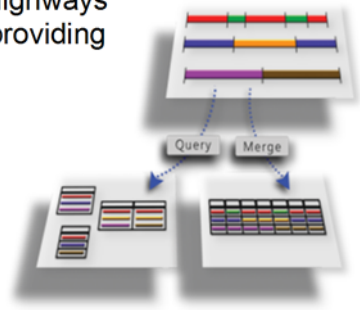


**MAVRIC™** – Mobile Asset Verification and Roadway Inventory Collection (MAVRIC) is Transcend's geospatially-enabled, tablet-based mobile field data collection tool. MAVRIC provides easy to use GPS-enabled data collection that integrates with an agency's LRS and mapping environment. Data is stored on an enterprise server and synced to the MAVRIC environment to provide local access to data while in the field. MAVRIC allows users to view roadway data through wireless networks (where available) or in disconnected mode via easy-to-use touch/stylus tools that include maps (native or commercial formats), straightline views of infrastructure and data elements and videologs. MAVRIC is fully integrated with Road Analyzer, Map Analyzer and Esri's R&H

Solution.

**Roads and Highways Productivity Tools** – The Roads and Highways Productivity Tools augment the Esri Roads and Highways solution by providing efficient tools for managing and analyzing your transportation data.

- Segment Analyzer – Advanced dynamic segmentation tools
- Intersection Manager – Automated intersection attribution creation for MIRE
- HPMS Assistant – Streamlined HPMS validation and submittal tools
- Report Engine – Customizable report formatting and generation
- LRM Converter – Batch and on-the-fly LRM-to-LRM transformation tools





## B. Project Initiation Services

Contractor will work with the State to initiate and provide planning resources and services to ensure Solution is ready for go-live production by the target date listed above. This includes all the services detailed in 1.300 Project Plan and 1.400 Project Management in addition to the activities specified below.

### Project Kick-off Meetings

Contractor will work with Client to arrange official project kick-off meetings as follows:

- *Orientation Meeting* – as further defined within Article 1, Section 1.301;
- *Project Initiation Meeting* – a joint presentation by Contractor to the Project Steering Committee and Working Group outlining the proposed approach to the TAMS Phase 1 implementation, including but not limited to the following: an overview of the proposed COTS software, project plan, Contractor resources, costs, Critical Success Factors (“CSFs”) and risk mitigation plan.

### COTS Software Orientation Workshop

Contractor will prepare and deliver a COTS Software Orientation Workshop for Client’s Project Working Group to demonstrate in detail the functionality contained within the proposed TAMS solution. This workshop will also cover the technical environment requirements for the proposed Solution and required Client staff support resources.

### **Deliverable(s)**

- Project Kick-off Meetings and Presentations
- COTS software orientation workshop
- Project Plan as per Article 1.300
- Project Management as per Article 1.400
- Any other deliverable Contractor deems appropriate

### **Acceptance Criteria**

- High-level acceptance criteria for Document Deliverables and Software Deliverables are listed in Section 1.501.
- Project Plan in conformance with specifications detailed within Article 1.300
- Proposed Project Management services in conformance with specifications detailed within Article 1.400

### **Contractor Agreement & Approach in regards to Section 1.104, B. Project Initiation Services**

☒ I have reviewed the above section and agree with no exception.

#### **Project Kick-off Meetings**

The DTS team will work with the State to arrange official project kick-off meetings as follows:

#### **Orientation Meeting**

Within 10 calendar days from execution of Contract, the DTS team will attend an orientation meeting to discuss the content and procedures of Contract. This meeting will be held in Lansing, Michigan at a date and time mutually acceptable to the State and the DTS team. The DTS team understands that the State will bear no cost for the time and travel of the DTS team for attendance at the meeting.

#### **Project Initiation Meeting**

The DTS team will provide a joint presentation to both the Project Steering Committee and Working Group. During this meeting the DTS team will outline the proposed approach to satisfy the requirements for the TAMS Phase 1 implementation. Items included as part of this meeting will be but not limited to the following: an overview of the proposed COTS software, project plan, Contractor resources, costs, Critical Success Factors and risk mitigation plan.

**VUEWorks, Roads & Highways and Road Analyzer Software Orientation Workshop**

The DTS team will prepare and deliver a COTS Software Orientation Workshop for the State's Project Working Group to demonstrate in detail the functionality contained within the proposed TAMS solution. This workshop will also cover the technical environment requirements for the proposed Solution and required State staff support resources.

**Project Plan Information**

The DTS team believes a solid Project Plan must include several key elements, including, but not limited to, the following:

1. Identification of stakeholders (internal, external, project team, departmental, etc.)
2. Identification and documentation of stakeholder needs and project goals
3. Identification of needed resources, budget and schedule
4. Identification of potential risks and risk mitigation strategies
5. Listing of tasks, duties, responsibilities and timeframes
6. Quality/performance metrics in order to establish task completeness
7. Additional complementary plans such as communication, issues, configuration, change and risk management plans

Our Project Plan/Schedule is included in Attachment C and below we describe our approach to project management, implementation and key guidance documents that we use throughout a project's lifecycle. In addition, the plan and schedule combined define the roles and responsibilities of both the DTS and MDOT teams in relationship to requirements building, configuration, implementation, testing and reviews.

**Project Management and Implementation Approach****The Agile Process – DTS Approach to Project Management and Implementation**

The agile process is based on collaboration and the ability of the implementation team and the stakeholder organization to work together openly and collaboratively. It relies on the constant inspection and adaptation of the process itself and the backlog of requirements. As such, it is a communications-intensive approach to software implementation. The collective group of agile practices DTS actively employs on software implementation projects is known as Scrum. It is a set of guidelines and practices that encourages frequent communication and collaboration and intensely focused requirements gathering, COTS software configuration and deployment effort throughout the life of a project. It is an iterative approach and is described in detail below.

**Backlog Development**

DTS will work closely with the State to develop a backlog of requirements and critical issues for the workflow definition, software configuration and deployment phases of this project. The backlog will initially be developed at a high level. After creating the backlog, DTS will work with the State to prioritize the user stories (i.e. requirements) within the backlog to ensure that the most valuable software modules are configured first.

**Iteration Planning**

The DTS software implementation teams work in two-week iterations. At the start of each iteration, the implementation team and the State will conduct an iteration planning meeting. Upon selection of the backlog items to be addressed during the iteration, the State and DTS will collaboratively discuss the user stories selected in detail. This discussion will allow everyone involved to adequately define the requirements and conditions of satisfaction so that DTS can provide high quality deliverables at the conclusion of the iteration. Following this discussion, the DTS team will internally decompose the user stories into detailed tasks to be accomplished during the upcoming iteration. Time estimates are placed against the tasks and DTS team members select the tasks they will work on during the iteration. An



example of an iteration may include the development and testing of the Work Order Module specific to particular maintenance activities (e.g., inspection of sign condition, or culvert compliance).

### The Iteration

Following the Iteration Planning Meeting, the implementation team will immediately begin working on the functionality, to be configured during the iteration. Our implementation team is completely dedicated to the user stories in the iteration without disturbance from external influences or other project work. They will work closely with the State during the iteration to ensure that what is being produced is precisely what the State requires.

The work of the iteration typically includes configuring, testing and documenting VUEWorks, Roads & Highways or systems integration functionality, but frequently will include workflow diagrams, software configuration mockups and any other work products configured during the iteration.

The DTS team will provide a web-based Project Management and Implementation task tracking, defect reporting, configuration management and testing tool free of charge. This agile software tool provides a transparent approach to project management and implementation where MDOT is able to review the backlog, progress, testing and completion of a particular COTS software configuration and/or systems integration component. An example is provided below:

The screenshot displays the Rally Enterprise web application interface. The top navigation bar includes links for File, Edit, View, History, Bookmarks, Tools, and Help. The main content area shows the 'Iteration Task Status' for the project 'CDOT GeoMap 2.0'. The interface includes a sidebar with navigation links, a top navigation bar, and a main content area displaying a list of tasks with columns for Rank, ID, Name, State, Plan Est, Task Est, To Do, and Owner. A progress bar at the top indicates 92% completion.

Rank	ID	Name	State	Plan Est	Task Est	To Do	Owner
US563		Update image sets	D P C A	2.0	8.0	0.0	Charley Cartee
TA861		Document how to add a new image set	D P C	4.0	0.0		Charley Cartee
TA908		Move the database/image set connection information to a config file	D P C	4.0	0.0		Charley Cartee
US562		Data Display	D P C A	3.0	4.0	0.0	Charley Cartee
US559		Nav Tools: Play	D P C A	2.0	6.0	0.0	Charley Cartee
TA860		Change the default play speed to 3 seconds per image, and determine the usable play speed range.	D P C	2.0	0.0		Charley Cartee
TA862		Make the play controls more responsive	D P C	4.0	0.0		Charley Cartee
US556		Query Tool	D P C A	8.0	23.0	0.0	Charley Cartee
TA850		Implement an additional query interface.	D P C	4.0	0.0		Charley Cartee
TA851		Allow the user to add items to the where clause of a query	D P C	1.0	0.0		Charley Cartee
TA853		Allow the user to specify some default fields.	D P C	2.0	0.0		Charley Cartee
TA854		Populate the main video logger viewer with the results from this query.	D P C	4.0	0.0		Charley Cartee
TA902		Figure out how to deal with large numbers of responses.	D P C	8.0	0.0		Charley Cartee
TA900		Research how to deal with SQL injection	D P C	4.0	0.0		Charley Cartee
US555		Geographic Selection (Prep for map viewer)	D P C A	8.0	6.0	0.0	Charley Cartee
US554		Drop down Selection	D P C A	5.0	6.0	0.0	Charley Cartee
US553		Pavement View	D P C A	8.0	16.0	0.0	Charley Cartee

**DTS will initially prepare a project plan for approval by MDOT**, and as the project progresses will have an installation test plan prior to installing the system on the State's servers. DTS implementers can use load and performance testing software/tools if requested by MDOT. Load and performance testing and capacity evaluation can be conducted once the application is installed in the test environment. Test results can be tracked and reported as the test deliverables.





Also, as part of our Project Initiation activities, we will work with MDOT to establish guidance documents that will be used to manage the project throughout. These documents will address Issues, Risk and Change Management and some of their expected content is highlighted below:

### **Issue Management Plan**

The purpose of the issue management plan is to specify the processes used to identify and manage project issues. The issue management plan addresses both internal and external issues on the project. Using specific project management tools to enter, track and report issue activity. Both the issue management plan and the issue log will be reviewed regularly throughout the project to monitor existing issues and to identify new ones.

DTS will maintain an issue log for issues relating to the provision of services under this Contract. This issue management log will be communicated to the State's Project Manager on an agreed upon schedule, with email notifications and updates. The issue log must be updated and must contain the following minimum elements: description of issue, issue identification date, responsibility for resolving issue, priority for issue resolution (mutually agreed upon by the State and DTS), resources assigned responsibility for resolution, resolution date and resolution description.

Issues will be escalated for resolution from level 1 through level 3, as defined below:

- Level 1 – Subject Matter Experts (SMEs) / Business leads
- Level 2 – Project Managers / Business Owner
- Level 3 – Executive Sponsor

### **Identification/Communication of Issues**

Issues will be identified during the draft review period for project deliverables. DTS will provide access its online issue tracking tool highlighted above. The State's team will have complete access to the tool to track issues. The State will either enter issues into the tool or communicate all issues to the DTS team in an Excel format prior to the end of the review period.

### **Process/Tool for Issue Tracking**

DTS will use a web-based tool to track and manage issues identified in each of the gates specific to the **TAMS** project. User accounts for the following user groups will be created by DTS in the tool.

1. State's Management Team
2. DTS Management and Development Team
3. Esri Management and Development Team
4. TSS Management and Development Team

Users will have the ability to create/update issues, track status and generate issue tracking report. Specifically, the users will have the ability to track the following:

1. Status: New, Assigned, Resolved, In QA or Closed
2. Priority: Low, Normal, High or Immediate
3. Assignee: Name of the person assigned to the issue
4. Target version: Development version
5. Verified: Yes or No
6. Start date: Start date for when the issue needs to be worked on
7. Due date: Date the issue needs to be addressed by
8. % Done: Percent complete
9. Subject: Subject of the issue
10. Description: Description of the issue
11. Attachments: Upload any documents specific to the issue

### **Relationships among Issues, Risks and Change Requests**



Issues are events that are occurring now or have already occurred. An issue is not an event or item that may occur at a time in the future. If something is definitely going to happen or it has already happened, then it is an issue. If it is something that might happen - whether it is very likely or very unlikely - then it is a risk. An issue can turn into a risk and a risk may result from an issue. An issue can be associated to a risk. Prompt issue resolution can minimize project changes.

### **Risk Management Plan**

A formal risk management plan format will be submitted to the State for approval within twenty (20) business days after the effective date of Contract. DTS has reviewed the State's PMM Methodology document and will submit a risk management plan for the initial planning phase of TAMS project, in accordance with the State's PMM methodology. DTS understands that once both parties have agreed to the format of the plan, it will become the standard to follow for the duration of Contract. This plan will be updated bi-weekly, unless another timeframe is agreed upon.

The purpose of the risk management plan is to specify the processes used to identify and manage risk. The risk management plan addresses both internal and external project risks associated with the project, and is drafted prior to completion of the project planning phase. Both the risk, management plan and the risk log will be regularly reviewed throughout the project to monitor existing risks and to identify new ones.

The project manager is responsible for facilitating sessions with project stakeholders to identify risks. A risk owner is assigned to each risk, with responsibility for developing, documenting and executing risk action plans. The project manager is responsible for monitoring the status of all project risks and escalating as appropriate.

DTS can provide the tools to track risks and will work with State to allow for their input into the prioritization of risks.

DTS understands it is responsible for identification of risks for each phase of the project and that mitigating and/or eliminating assigned risks will be the responsibility of the DTS team. Furthermore, DTS understands that the State will assume the same responsibility for risks assigned to them. Project risks can be identified by using one or more of the following techniques:

<b>Technique</b>	<b>Description</b>
Interviews	Interview relevant project stakeholders to identify their concerns, which may provide insight into real project risks.
Risk brainstorming workshops	Conduct risk brainstorming workshops with relevant project stakeholders to identify risks, including key risk influencers, risk levels and possible impacts.
SWOT analysis	Conduct a strengths, weaknesses, opportunities and threats (SWOT) analysis to gain a holistic view of the project with respect to risk. Threats are project risks Opportunities represent lost potential benefits if not pursued Weaknesses, if not properly mitigated, can negatively impact a project Strengths should be leveraged to help the project mitigate the identified project threats
Process reviews	Identify process-related risks by reviewing the various project management processes, tools and techniques described in the Quality Management Plan.
Previous project reviews	Identify risks from previous projects of similar size and complexity, using available project data and lessons learned.

### **MDOT Example Risk Management Plan**



## Introduction

The purpose of the Risk Management Plan is to define the plan for managing risks and provide a process for identifying, analyzing, prioritizing and controlling risks during all gates associated with the TAMS project. Project risks will be collaboratively identified early on during the planning gate and will be updated during the remainder of the gates. This Risk Management Plan serve as a guide for managing project risks throughout the life of the project and will be updated on a weekly basis or when there is a change in the risk status.

## Risk Identification

Project risks identified will be entered into the Risk Register (separate Excel spreadsheet delivered along with the Risk Management Plan). The Risk Register will be updated on a weekly basis by DTS and will be submitted to MDOT along with the weekly project status reports.

The Risk Register will include the following information:

1. Risk Statement: a clear and concise explanation of the context of the risk. The risk statement includes the:
  - a. Risk (Event) Description: explanation of the risk event or the occurrence that has caused the risk (e.g., customer submits changes to requirements after requirements are baselined)
  - b. Risk Consequence: potential effect or outcome of the risk (e.g., changes could extend project delivery completion date)
2. Risk Trigger/Causes: act or event that serves as a stimulus and initiates or precipitates the risk
3. Assessment: a value (e.g., Low=1, Medium=2, High=3) that represents the result of identifying, classifying, analyzing and prioritizing risk
  - a. Impact: result of determining the nature of possible effects of the risk
  - b. Probability: degree of likelihood or chance that the risk will occur
  - c. Level of Control: extent to which the project team lacks control over the risk being realized
  - d. Total: sum of the Impact, Probability and Level of Control values
4. Risk Response Strategy: one or more options to address the risk
5. Actions Required to Implement Response Strategy: activities that will be carried out in order to accomplish the risk response strategy (e.g., revising the Project Plan to include additional activities, defining various alternatives to address the risk)
6. Risk Owner: name of the individual(s) or party(s) responsible for managing the risk
7. Completion Date: date mm/dd/yy the risk response actions were completed

## Risk Status

The Risk Status Report as shown below will be updated on a weekly basis by DTS and will be submitted to MDOT along with the weekly project status reports.

### Risk Status Report

Agency/Organization Name		Version Number	
Project Name		Revision Date	





Rank	Risk Statement		Rank This Time	Rank Last Time	# Times on List	Risk Response Progress
	Condition	Consequence				

### Change Management Plan

The purpose of the change management plan is to describe the process involved with identifying, escalating and managing project changes. A project change is defined as something that is outside the documented and approved project scope or is a change to project requirements, project schedule or project cost (including resource effort). A project change requires approval for additional resources, funding or modifications to the project schedule. The change management process defines how to handle project changes that present either a negative or positive impact on deliverables, schedule, budget and/or resources. DTS will utilize project management tools as the repository for all project changes.

- **Change Management Roles and Responsibilities**

- **Project Sponsor** The project sponsor does not directly participate in change management activities, but serves as a point of escalation as required. The project sponsor has sole decision making authority to approve changes to the total project budget.
- **Project Manager** The project manager is responsible for bringing change requests to the Change Control Board (CCB) for its review and decision making. Upon approval of a change request, the project manager is responsible for overseeing the change and making appropriate modifications to appropriate project documents.
- **Change Control Board** The CCB meets on a regular basis to review, approve or reject proposed project changes. The project manager may convene a special session for the purpose of reviewing a specific change request(s) as required. The makeup and formality of the CCB will depend on the size and complexity of the project.
- **Project Team Members** Project team members are empowered to initiate change requests. Members serve as subject matter experts and are responsible for analyzing, documenting and estimating impacts of change requests on schedule, budget, resources, scope and quality.



DTS understands that if a proposed contract change is approved by the State, Contract Administrator will submit a request for change to the Department of Technology, Management and Budget, Procurement Buyer, who will make recommendations to the Director of DTMB-Procurement regarding ultimate approval/disapproval of change request. Furthermore DTS recognizes that if the DTMB Procurement Director agrees with the proposed modification and all required approvals are obtained (including State Administrative Board), the DTMB-Procurement Buyer will issue an addendum to Contract, via a Contract Change Notice. DTS understands that provided products or services prior to the issuance of a Contract Change Notice by DTMB-Procurement, risk non-payment for the out-of-scope/pricing products and/or services.

#### **Out of Scope Process Description**

Out of Scope project changes will be proposed in the form of a change request that has been captured in project management tools. The change requests are started by a Change Request Initiator who provides as much information as possible to document and initiate the request. The change requests will contain information such as brief description, impact, alternatives, detailed description, final recommendation and other pertinent information.

#### **Out of Scope Change Request Tasks:**

<b>Task</b>	<b>Action</b>	<b>Responsibility / Agent</b>
1.	Identify and document change requests	Change Request Initiator
2.	Assign Change Request Person Responsible	Project Manager
3.	Collect and document project impacts, including changes to costs and schedule	Change Request Person Responsible
4.	Validate change requests in the Enterprise PPM	Project Manager
5.	Review change request details for feasibility	Project Manager
6.	Facilitate CCB review / make decision	Project Manager/CCB Members
7.	Communicate decision and closure	Project Manager
8.	Update appropriate schedules and documents	Project Manager
9.	Update status and close change request	Project Manager

DTS will employ the change control methodologies to justify changes in the processing environment, and to ensure those changes will not adversely affect performance or availability.

### **C. Requirements and Solution Architecture Validation Services**

#### **TAMS Software Requirements Validation and Solution Configuration Specifications**

Contractor is responsible to meet with State staff to review the specified requirements (see Article 1, Section 1.103 above and Attachment A) to ensure that Solution can be implemented successfully within the State IT environment. Contractor will identify any functional or technical issues that need to be addressed for successful implementation and propose resolutions to be undertaken as part of both the initial software installation and Section E - Implementation Services.

As a result, Contractor will provide a Solution Configuration Plan to detail how Solution will be set up to provide the State's requested functionality. Contractor will provide a Screen Configuration Plan to portray data to the State's satisfaction. At the State's request, Contractor will provide Solution and Network Architecture information relevant to DTMB submitting and approving an Enterprise Architecture Solution Assessment (see Attachment H) and an IT Security Assessment.

#### **Deliverable(s)**

- TAMS Solution Configuration Plan
- TAMS Screen Configuration Plan
- TAMS Solution and Network Architecture information
- Any other deliverable Contractor deems appropriate



### Acceptance Criteria

- High-level acceptance criteria for Document Deliverables and Software Deliverables are listed in Section 1.501.
- TAMS Solution Configuration Plan and Screen Configuration Plan must comply with State specifications for these document deliverables.
- TAMS Solution and Network Architecture information provided must be sufficient in detail to support State assessment requirements.
- Any other deliverable Contractor deems appropriate

### Contractor's Agreement & Approach in regards to Section 1.104, C. Requirements and solution Architecture Services

☒ I have reviewed the above section and agree with no exception.

#### Solution Configuration Plan Overview

##### Purpose


The purpose of this Configuration Management (CM) Plan is to provide an overview of the organization, activities, overall tasks and objectives of Configuration Management for the Michigan Department of Transportation (MDOT) Transportation Asset Management System (TAMS) project. It addresses configuration item (CI) identification, change control and configuration audits at a high level. Additional details regarding CM activities, techniques and tools are provided in the CM-related procedures.

##### Configuration Management Plan Scope

The MDOT TAMS project has established several levels of baseline, with appropriate levels of control for each, as summarized in the following table:

Baseline	Contents	Control Level
Requirements	<ul style="list-style-type: none"> <li>• System requirements</li> <li>• Allocated requirements</li> <li>• Detailed requirements</li> </ul>	MDOT IT Team
Production	Operational software and hardware	Change Control Board (CCB)
Process	Documented processes, plans and procedures	Project Management Team
Test	<ul style="list-style-type: none"> <li>• System Test</li> <li>• User Acceptance Test (UAT)</li> <li>• Deployment Test environment</li> </ul>	QA/QC Team CCB
Development	Local development environment	Local development team management

#### References

Document	Description
Concept of Operations (ConOps) Report.pdf as provided in original RFP.   Concept of Operations (ConOps)	System Requirements and Design Requirements
TAMS As-Is and To-Be Process Flowcharts and Documentation.pdf as provided in original RFP.	Business Requirements



EAMS As-Is and  
To-Be Process Flowchart

Attachment H - SOM Enterprise  
Architecture Solution Assessment  
Worksheet.doc

SOM Information Resources Architecture

SOM\_PMM\_Manual\_456390\_7.pdf

Project Management Methodology

### Key Terms

Key Term	Description
CCB	Configuration Control Board
CCR	Configuration Change Request
CM	Configuration Management
IA	Impact Analysis
TAMS	Transportation Asset Management System
MDOT	Michigan Department of Transportation

### Configuration Management Activities

#### Configuration Control Procedures

#### Non-Code Configuration Item

Document Item	Description
Test Item Transmittal Report	Test plan, procedure and reporting document
Release notes	Contains details of project/phase/sprint release information
Implementation Plan	Lists detailed implementation requirements and how/when against each of the requirements
Miscellaneous MS Office documents	Word, Excel files (Microsoft Office 2007)
Miscellaneous PDF documents	Adobe Acrobat files
Project schedule documents	Microsoft Project Standard 2003
Visio documents	Microsoft Visio 2007

#### Software Configuration Item

Software Item	Description
Web application tier source code files/binary files/installation files	Visual Studio 2008 environment
Database files (DB design and program files)	SQL Server
Version management of all software items	Subversion
Spatial Data Repository	ArcSDE on SQL Server
GIS files (shapefiles, maps, etc.)	ArcGIS

**Status Accounting, Reviews and Reporting**

Configuration status accounting will include recording and reporting of the change process. The goal of configuration status accounting is to maintain a status record of all items in the configuration baseline, thus providing traceability of all changes to the TAMS. Configuration status accounting will answer the following questions:

- What changes have been made to the system and when were they made?
- What components were affected by this change?

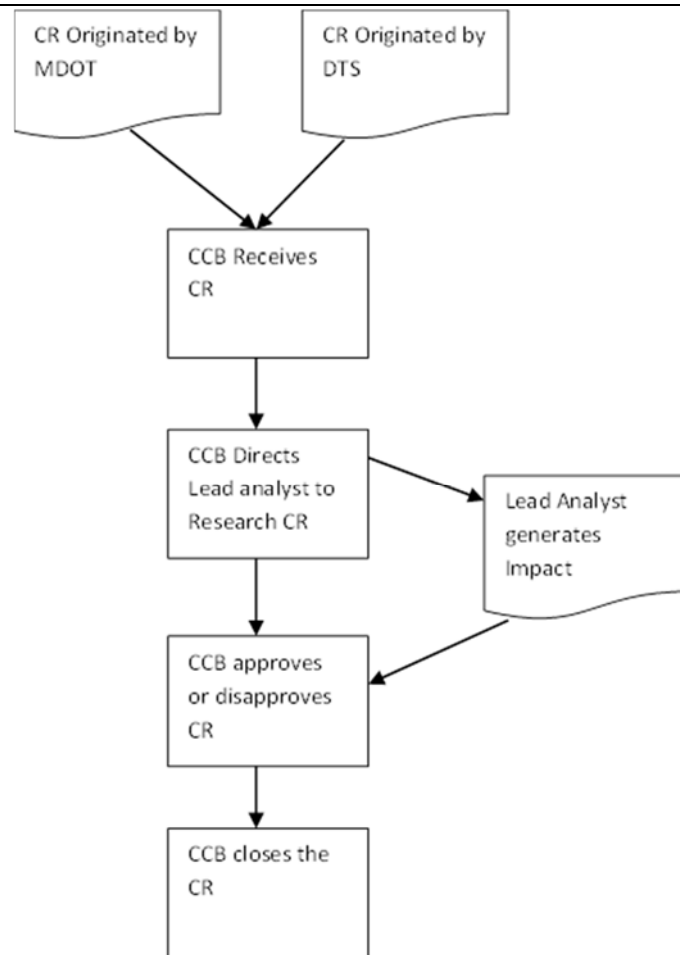
The major activities of configuration status accounting include:

- Identifying the configuration status information to be recorded
- Maintaining a record of configuration changes upon release of the code
- Reporting the status of TAMS system configuration management

At the TAMS architecture level, only the CCB will have the authority to approve and make changes to the components of the TAMS architecture baseline. Before considering any change, the potential change must be documented using a TAMS Change Request (CR) form as provided under Appendix A. This form describes the desired change, the justification for the change, the impact of implementing the change and the eventual CCB decision regarding the proposed change. CRs normally document code changes originating from the Lead Analyst, but a CR may be submitted by any of the project stakeholders.

The CR will be submitted to the Chair of the CCB who will route the CR to each Lead Analyst. Each Lead Analyst will fill in the Impact Assessment (IA) section in the CR documenting the impact of the change upon the phase/component. If a phase/component will be affected by the change, the IA will be returned with notations or comments documenting the Lead Analyst's technical analysis; the impact on the phase/component schedule, cost and labor resources and any suggested alternatives to the proposed change. If a phase/component will not be affected by the change, the IA will be returned indicating "no impact".

The CCB will meet either in person or by teleconference to discuss proposed changes. The CCB will use the IAs and the meeting discussion to decide whether to approve or disapprove a proposed change. The CCB meeting minutes will clearly document its decisions and the rationale supporting its decisions. These CCB minutes will be distributed to all project stakeholders. The figure below represents the Change Management process:



### CM Process

The following sections present the configuration status accounting activities for the TAMS.

#### Identify Status Tracking Information

The following configuration status information will be regularly tracked on the TAMS-project level:

- Current architecture document
- Associated components
- Open Change Requests
- Closed Change Requests
- Components affected by Change Requests

At the component level, the CRs will provide configuration status information for each individual TAMS component.

#### Maintain Status Tracking

Project level configuration status information will be recorded and maintained in a centralized repository that using Subversion. This repository will contain the current architecture as well as any proposed and implemented changes to the project. Component configuration status information will be recorded and maintained in respective component folders.



Since the configuration status information is crucial to ensuring the integrity of the baseline, its components and the CM process, only authorized personnel should update this data. The CCB will identify the specific personnel authorized to update the status information changes and the specific changes that each person is authorized to make.

### Report Status Tracking

Regular monitoring of the configuration status information will enable the Architecture Group and the Deployment Group to identify trends and potential trouble spots in the TAMS. Each of the two groups and the CCB in collaboration with MDOT's IT will determine the reports required for performing this analysis.

### Management of Data Conversion/Migration

Asset Inventory Dataset	Migration Approach	Details
Lane Inventory	Geodatabase Feature Class	<ul style="list-style-type: none"> <li>Based on MGF</li> </ul>
Signs	Application Data	<ul style="list-style-type: none"> <li>Functional requirements and an existing application may increase the complexity of the migration</li> </ul>
Guardrail	Geodatabase Layer	<ul style="list-style-type: none"> <li>Currently not in a system</li> <li>No legacy issues</li> </ul>
Culverts	Events and Geodatabase Layer	<ul style="list-style-type: none"> <li>Currently not in a system</li> <li>No legacy issues</li> </ul>

### Management of Interfaces to Other Systems

Application	Description	Database Type	Integration
MAIN	The MAIN (Michigan Administrative Information Network) vendor/payee file is the State of Michigan's centralized database maintained by the Michigan Department of Management and Budget (DMB) for all individuals and entities receiving payments from the State.	ORACLE	VUEWorks Database Link (Through MIDB)
DCDS	Data Collection Distribution System – Time sheet collection and payroll Distribution	ORACLE	VUEWorks Database Link (Through MIDB)
LAPS	Local Agency Payments System - Streamlines the payment process for local agency maintenance contracts. It is a cross- functional information system consisting of five modules to track and process billing information. The system is primarily vouchers for payment and maintaining and forecasting budgets. It is responsible for collecting routine and non-routine bills submitted by local contract agencies, validating billing transactions against MDOT data, assisting in review and approval of bills and audit bills.	ORACLE	VUEWorks Database Link (Through MIDB)
LARS	Local Agency Reimbursement System	ORACLE	VUEWorks Database Link (Through MIDB)



MIDB	Management Information Database – A data warehouse consisting of data from the State of Michigan's accounting, purchasing and human resources systems.	ORACLE	VUEWorks Database Link
TMS	The Transportation Management System (TMS) is an integrated and automated decision-support tool. Within the context of asset management, TMS provides the capability to identify and monitor infrastructure condition, analyze usage patterns and determine deficiencies. The system was developed to integrate multiple systems that use a consistent, collaborative decision- making process that supports planning, program development and implementation. Included Modules: Bridge,	ORACLE	These Event Tables will be registered as foreign event tables for access within TAMS. Road and Highway database integration strategy is based upon MGF
MaintStar	MaintStar is the Fleet Management Program that MDOT uses to track the inventory and services of all MDOT owned vehicles and equipment. MaintStar is also used to create work orders for needed equipment services and repairs and calculates the cost of maintaining the equipment fleet.	ORACLE	VUEWorks Database Link
Global Database	This database is the central repository for information that will be shared by many systems supporting MDOT. It holds location-based (spatial) and other data that is considered to be at the enterprise level. Ownership of the contents will cross MDOT organizational boundaries with DTMB staff acting as data custodians. The current methods for data delivery are direct database access, spatial data access through ArcServer / ArcSDE and/or services within an SOA Architecture.	ORACLE	VUEWorks Database Link
MiBridge	MIBridge is a new web- based application designed to replace the current MBRS system as of January 2014. It will allow users to securely and conveniently view and/or export bridge data from the PONTIS database. This database is large and is being updated continually.	ORACLE	VUEWorks Database Link
MGDR (MDOT Geospatial Data Repository)	This database contains MDOT's current SDE asset inventory. All absolute location (x, y, z) data is stored in the MGDR. The MGF road centerline network layer and other MGF basemap layers are also stored here. It is used by a number of MDOT users / applications to gain access to spatial data through ArcGIS for Server / ArcSDE.	MS SQL Sever	ArcGIS for Server / ArcSDE
PDRP	Property Damage Reclamation Process is the process used by MDOT to recover moneys spent on road repair due to damage created by traffic accidents.	ORACLE	VUEWorks Database Link
PAB	Project Accounting and Billing - Used by Financial and Project Accountants (FOD staff) for viewing project accounting details at the lowest level	ORACLE	VUEWorks Database Link





M5 Fleet Focus	Vendor: AssetWorks FleetFocus M5 Fleet Management System is a comprehensive application that provides fleet asset management and operations data and functionality	ORACLE	VUEWorks Database Link
SCAS	Signal Cost Accounting System - Web app used for entering Electricians Job Reports. Finance uses this application for creating the Invoice Report for the local agencies.	ORACLE	VUEWorks Database Link
Project Wise	Document Management System used to store drawings, documents and other content.	N/A	Link to VUEWorks

## Staffing – Roles and Skills

### CM Entities

The CCB will provide cross-phase CM control and coordination.

### Change Control Board

The CCB will be established as a formal approval authority for changes. It primarily exists to control changes to the EMAS architecture; however, any TAMS issue with significant cross-component impact should involve the CCB. Written Change Requests (CRs), Impact Analyses (part of CRs) and meeting minutes will document the CCB's consideration of an issue. Appendix A represents the Project Change Request template.

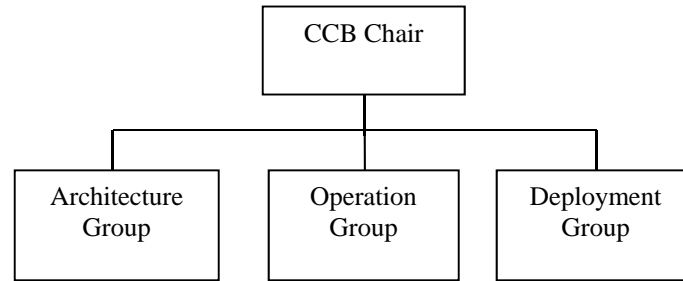
A Change Request (CR) form will initiate CCB consideration of a change. Any project stakeholder will have the ability to submit a CR to the CCB. The Architecture Group will generate most configuration specific CRs. Upon receipt of a CR, the CCB will request each member to research the incident and record its analysis on an IA. These IAs will document the data upon which the CCB will have based its decision. The CCB will identify the appropriate change resolution activities and will authorize the affected phase/component to be modified. The CCB will be notified immediately when the actual change has been completed and the configuration status information will be updated accordingly. The decision of the CCB and its rationale will be recorded on the CR. The CR will be closed and copies distributed to each member organization.

The CCB will be comprised of representatives from the following IT organizations:

- Architecture Group
- Operation Group
- Deployment Group

One representative from each of these groups must be identified as group head and have the authority to commit to his or her group. Any changes that are within the group's scope and do not affect the other groups will be authorized by the respective group head. Since the CCB will consider and resolve cross-component issues, its Chair should be a person with the authority to mandate actions across the organization and its groups. In addition, since final responsibility resides with the CCB Chair, this person will have the authority to mandate or override decisions made by the CCB.

Figure 3-1 graphically presents the organization of the CCB.



### Change Control Board

#### Configuration Management Plan Maintenance Process

A configuration baseline is the foundation of configuration management. The initial baseline is outlined in the scope of this document. Each baseline captures an approved snapshot of the TAMS and its components at a given point in time. The conventional configuration management model constructs a system baseline from the top-down. In this model, a baseline is comprised of a specific release of each component and any change to any component must be considered and approved by the CCB. The following information will be recorded for each CCB Meeting:

- Meeting date, time and duration
- List of attendees and their organizations
- Items discussed
- Existing action items
- New action items
- Decisions made

#### Version Control

##### Naming Convention

All document type files will have the following naming format: {Prefix}\_{ShortDescription}\_{Version}.{doc type}

Below are the list of document type and their prefix:

Document	Prefix
Project Plan	PP
High level design	HLD
Low level design	LLD
Database model	DDD
Software Requirement specification	SRS
Software Functional specification	SFS
Workflow diagram	WF
Test Plan	TP
Test result	TC
Configuration files	CONF
Meeting Minutes	MM
Change Request	CR
Trouble Report	TR
Release package file	RL



{ShortDescription} – indicates the subject area of a document

{Version} – indicates the release that a document is associated with

{doc type} – indicates the application that a document is associated with. For example: Microsoft Word documents will be named \*.doc, Microsoft Project plan documents will be named \*.mpp, etc.

### **Document Version Control**

Documents will be maintained and versioned using Subversion. Version control allows for the ability to revert a page to a previous revision, which is critical for allowing authors to track each other's edits and to correct mistakes.

### **Release Management**

#### **Release Notes**

The release notes document will be a text file with .txt extension.

The release notes filename will be "ReleaseNotes.txt".

Release notes will have the following sections:

#### **Release version**

This section contains the version of current release. This section also identifies major updates done from the previous release.

#### **Installation**

This section briefly outlines important pre-installation steps to be performed, if any, to ensure proper installation of the current release.

#### **Manifest**

This section lists out the contents of the release package.

#### **Minimum System Requirements**

This section provides the information on minimum system requirements.

- System Processor:
- System Memory:
- Free Disk Space:
- Operating System:
- Networking:
- Existing Software:

#### **Version Compatibility**

This section explains the compatibility with previous releases. This section may also explain steps to be performed to make some of the functions from the previous version work with this release version.

#### **Release Matrix**

#### **Release Types**



<b>Sprint Release</b>	Contains the most up-to-date code for the entire system. The focus for testing/review of a sprint release is the code/documentation developed during the sprint.
<b>Phase Release</b>	Contains all components/documents related to the specific phase being released. The focus for testing/review of a phase release is all the code/documentation developed during the phase.
<b>Project Release</b>	Contains all components/documents up to and inclusive of the most recent version of all sprints and phases. Testing/review is done on all code/documentation for the project.

### Revision History

Name	Date	Reason for Changes	Version
Initial		Initial draft	1.0 draft 1

### Screen Configuration Plan

Since the agile process is based on collaboration and the ability of the implementation team and the stakeholder organization to work together openly and collaboratively, the screen configurations the State will use for the UAT testing process are configured as part of each iteration and iteration review process. The State will have constant involvement in the configuration of the screens and will sign off on both the mockups and working prototypes prior to the implementation team proceeding to the next stage in the process. Furthermore the workflow tools and API's within VUEWorks will aid in the process since the team can utilize these tools during the workflow workshops meetings conducted with the State.

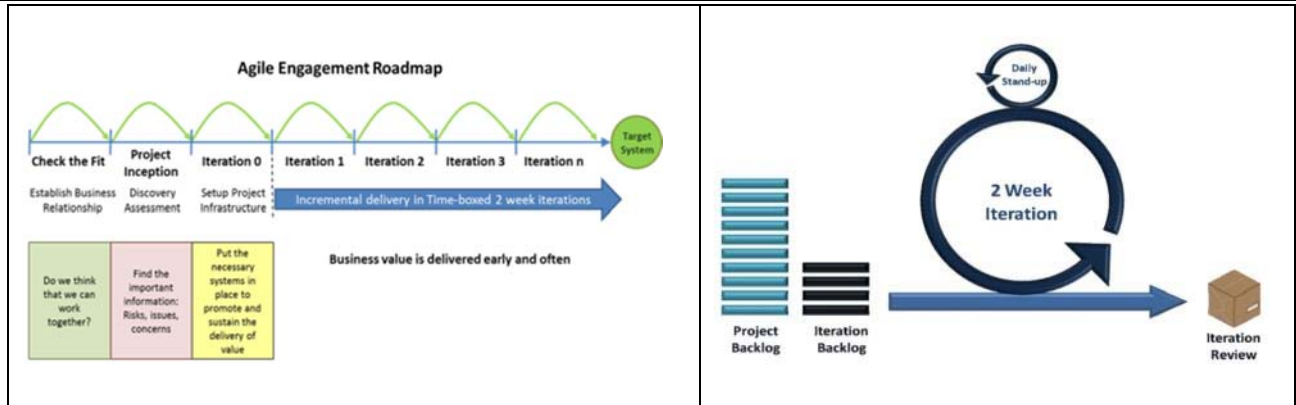
### The Iteration

Following the Iteration Planning Meeting, the implementation team will immediately begin working on the functionality, to be configured during the iteration. Our implementation team is completely dedicated to the user stories in the iteration without disturbance from external influences or other project work. They will work closely with the State during the iteration to ensure that what is being produced is precisely what the State requires.

### Iteration/Release Review

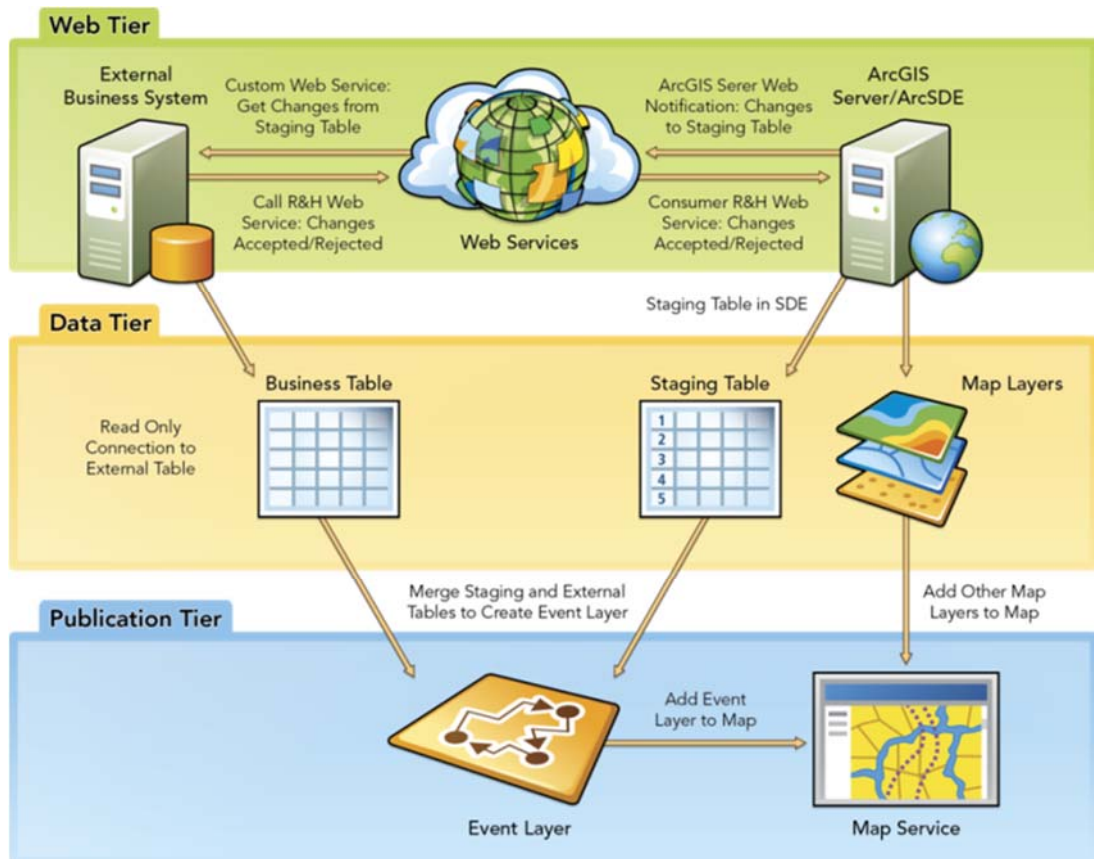
At the conclusion of each iteration, the DTS implementation team will conduct a review meeting in which the functionality configured during the previous iteration will be demonstrated live. The team will review the user stories that were included in the iteration and demonstrate and software functionality configured that correlates to each user story for the initiative.

At this time, the DTS team will solicit feedback from the State on the functionality configured in Roads and Highways, VUEWorks or the systems integration components depending on where we are in terms of the Project Plan. These review meetings provide a very high level of visibility into the TAMS project process and allows for an effective feedback mechanism for the implementation team.



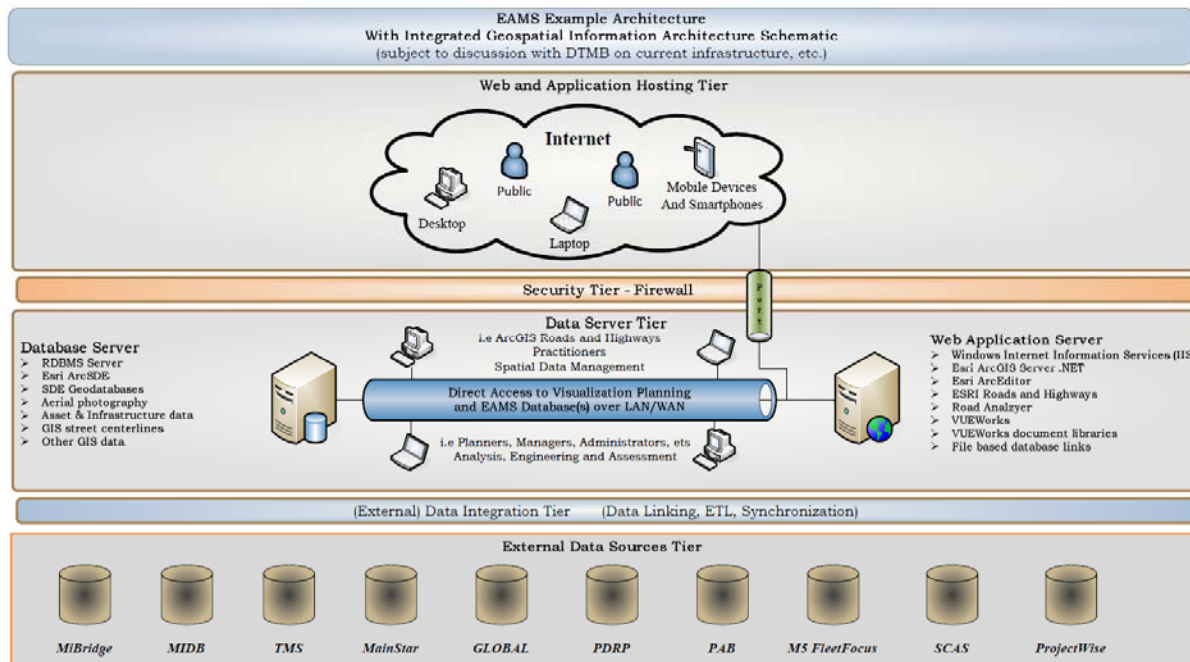
The following diagrams highlight the TAMS solution and Network Architecture information. The architectures below are recommended, but can be modified based on direction from MDOT and IT requirements of the State.

### Solution and Network Architecture Esri Roads and Highways

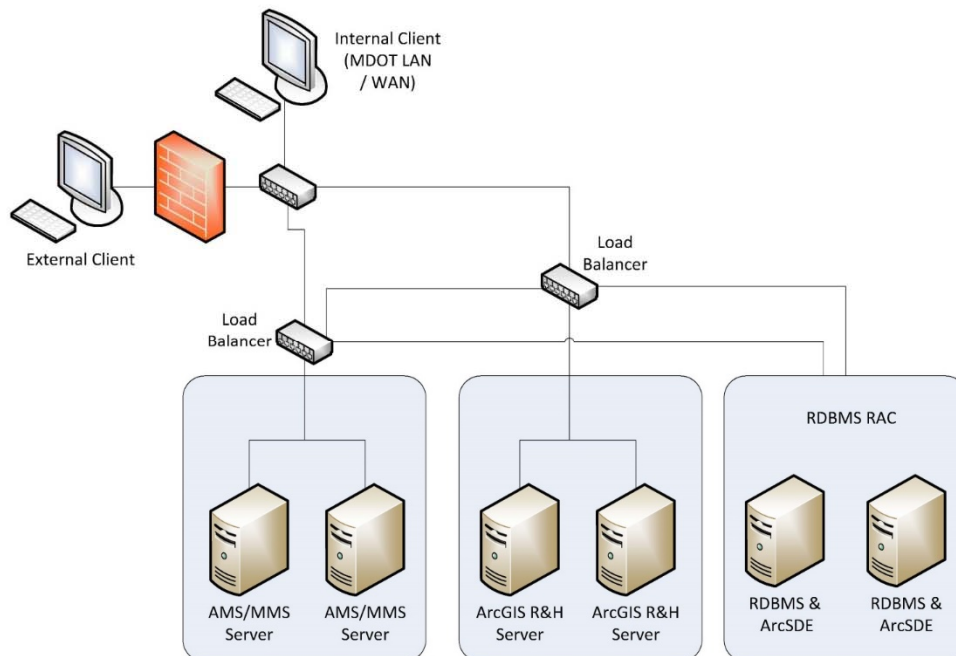


### VUEWorks TAMS Solution

The diagrams below represent a conceptual system architecture for the TAMS as both the minimum needs to be viable as well as a high availability architecture with load balancing for an optimal representation based on numbers of users and future growth.



**EAMS Example Architecture**  
**High Availability Configuration**  
(subject to discussion with DTMB on current infrastructure, etc.)



Contractor completed, and the following documents are now attached to Contract.

x	Attachment A – Solution Requirements
x	Attachment H – Proposed Enterprise Architecture Solution Assessment





#### D. Installation and Configuration Services

Contractor is responsible to install and configure the TAMS COTS working in cooperation with State IT and MDOT business user staff. This will include possible onsite troubleshooting to rectify TAMS COTS configuration and installation within the MDOT IT development, QA and production architecture environments. Specific service activities are described below.

##### TAMS Software Installation

Contractor is responsible to work with DTMB / MDOT IT staff to install the specified TAMS COTS software modules within the MDOT IT architecture environment specified in Article 1.103 above. Contractor will verify the successful operation of the installed “out of the box” COTS functionality within the MDOT IT environment using Contractor supplied test data and use cases sufficient to confirm that the software performs without malfunction within this environment.

##### Configuration (COTS)

Contractor will work with State IT staff to install and verify the TAMS Solution software within the specified MDOT application Development (“**DEV**”) environment. Verification of software functionality will be conducted using Contractor supplied test data and test scripts in the presence of State IT staff that will be responsible to confirm the successful completion of the verification scripts. Contractor will configure the TAMS Solution to meet MDOT requirements in accordance with the approved TAMS Solution Configuration Plan and Screen Configuration Plan detailed above.

##### **Deliverable(s)**

- TAMS COTS installation within the MDOT IT environment
- Configured TAMS solution
- Any other deliverable Contractor deems appropriate

##### **Acceptance Criteria**

- High-level acceptance criteria for Document Deliverables and Software Deliverables are listed in Section 1.501.
- TAMS COTS software modules are installed and functional within the MDOT IT environment to the satisfaction of MDOT IT staff and Business Leads
- Configured TAMS Solution in conformance with agreed TAMS Solution Configuration Plan and Screen Configuration Plan

<b>Contractor’s Agreement &amp; Approach in regards to Section 1.104, D. Installation and Configuration Services</b>	
<b>x</b>	I have reviewed the above section and agree with no exception.
	<p><b>Installation and Configuration Services</b></p> <p>The project will begin with a series of planning and configuration validation activities. The objectives are for the DTS and MDOT project teams to first finalize the implementation plan and to review and validate solution architecture and configuration specifications for all TAMS components. The final outcome is an accepted configuration specification which will be a key acceptance milestone for the project. Once the configuration specification has been accepted, our team will continue with a database design, test data migration and <b>configuration of the MDOT R&amp;H implementation, VUEWorks software and systems integration components</b> based on the configuration items defined during planning. Our team will use a phased-delivery approach for the deployment and is planning to configure the implementation in three iterations that will successively build on each other. Each implementation component is discussed below:</p>



## ESRI's Roads and Highways LRS Solution

This task will start with project initiation and planning:

- **Project Initiation and Planning:**
  - A review of MDOT's existing linear referencing items.
  - A review of MDOT's business processes mapped to Esri's Roads and Highways solution.
  - On-site workshop to define configuration of Esri's Roads and Highways solution, including the identification of MDOT data and workflows to be implemented.
- **Prototype Implementations, COTS Experience:** Esri will establish a staging system to support rapid availability of the Roads and Highways COTS Solution. Simultaneously it is recommended that MDOT and DTS prepare / stand up their own internal systems. A solution architecture review (webcast) led-by Esri will be phased in early on the project to guide MDOT and DTS with respect to readying their systems. Technical resources at Esri will review MDOT's and DTS's current (and proposed) systems and provide recommendations based on institutional knowledge from similar prior engagements and from the documentation MDOT and DTS provides with respect to specific workflows and potential number of users.

The Esri controlled cloud-based staging system will be used for the following three iterations / activities:

1. Prototype 1. Provides Roads and Highways configured with a mutually agreed upon, representative migrated subset of MDOT's data. MDOT and DTS team members can log into and utilize the Prototype version of the planned implementation. This approach enables MDOT and DTS project members the ability to better understand the intended solution as well as be able to envision how they will adapt MDOT business processes to best accommodate the Roads and Highways solution. The staging system will also facilitate feedback from MDOT and DTS team members to Esri.

It is recommended that MDOT prepare to provide an internal environment for getting experience with the Roads and Highways applications during the first prototype.

2. Prototype 2: Provides Roads and Highways configured with MDOT data maintenance workflows using Esri Workflow Manager (WMX). This iteration will allow MDOT and DTS project members to experience the engineered workflows in the context of the Roads and Highways framework using a subset data. The iteration will also facilitate feedback from MDOT and DTS team members to Esri.

It is recommended that MDOT also stand up an internal environment with the same applications and datasets. The purpose of the MDOT internal environment is to let the users get acquainted with the applications and to be able to start testing system integrations inside the firewall.

3. Prototype 3: Provides Roads and Highways configured with migrated Statewide LRS data (full migration performed by DTS or MDOT) and an agreed upon subset of engineered WMX workflows. Esri will provide WMX training to MDOT staff so any remaining workflows required to complete LRS management data maintenance business processes can be configured by MDOT staff. This final configuration will be coordinated with the Statewide MDOT LRS Data Cleansing and Migration.
- **Validate Configuration in QA Environment:** Installation and configuration on the MDOT Test/Dev environment for the full set of migrated data. This environment will be used for complete series of configuration validation checks.
  - **Rollout:** Support (onsite and remote consulting as needed) to the MDOT and DTS team to assist on deploying the system into production mode.





Esri will demonstrate the results of each prototype deployment through an iterative “gate” process. The objective for this process is to reach initial acceptance of each configuration stage before proceeding to the next step. System rollout and training will occur once quality assurance implementation has been completed and the system has been accepted into the MDOT infrastructure.

### **Install and Configure Roads and Highways**

Esri will install the COTS Esri Roads and Highways solution on an Esri-controlled hosted configuration environment. Esri will use this site to configure Roads and Highways based on MDOT configuration items as documented in the Configuration Specification.

The key subtasks to be accomplished under this task include:

- **Configuration environment setup** - Includes the setup of Esri internal environment including servers and the installation of test database environment.
- **Prototype (Iteration) Configuration** - Includes the configuration of the Esri COTS Roads and Highways solution per the specifications in the Roads and Highways Configuration Report document. Functional testing will only be performed to confirm that the MDOT data is accessible within the Esri COTS Roads and Highways solution.
- **Software Demonstrations** - At the conclusion of each iteration, Esri will provide a webcast demonstration of the configuration to demonstrate the capabilities that have been accomplished and to communicate project status with key DTS and MDOT project stakeholders. Following each demonstration, the demonstration site will be made web accessible for users from DTS and MDOT for a two-week period to allow for additional review time.

The subtasks below provide more detailed information on the work that will be performed under the Roads and Highways configuration task. It should be noted that with the exception of the environment setup the configuration activities associated with the overall implementation project are actually running in concurrency to the geodatabase modeling and loading tasks.

### **Roads and Highways Configuration Environment Setup**

Esri will setup Roads and Highways Configuration environment using cloud-based infrastructure controlled by Esri. This environment will support COTS software release management, regularly scheduled service packs and internal functional testing and validation using the Roads and Highways Configuration Report as a guide. This includes:

#### **ALRS configuration**

- Creating the ALRS and LRS Networks (LRMs) during data load
- Creating ALRS event layers and establishing event behavior
- Creating Intersection layers

#### **RCE configuration**

- Esri will support MDOT in the creation of map services for roadway characteristics editing
- Esri to host Attribute Sets white boarding session to determine how to configure attribute sets
- RCE user authentication (COTS .NET authentication)

#### **Workflow Manager Configuration**

- Tying R&H COTS workflow to MDOT business processes
- Establishing a versioning strategy managed by WMX
- Creating an end-to-end workflow that supports web-based redlining, desktop LRS edits, QC, and web-based event creation and editing

#### **Roads and Highways Web Services**

- Publish R&H web services through ArcGIS Server
- Configure R&H REST API Samples



The purpose of the Roads and Highways Configuration environment is to provide Esri's implementation team with the ability to implement the required COTS functionality in an integrated and systematic manner and to manage new software releases and any configuration work based on the planned project schedule. Additionally, the configuration environment will allow the Roads and Highways solution to be configured and deployed within an environment that closely aligns to the intended usage.

After the Roads and Highways solution has been deployed to the MDOT QA environment, Esri will remain onsite for an additional two days in order to conduct a Roads and Highways data and configuration validation. The validation will include:

1. Software installation checklist – was all the software properly installed?
2. Data installation checklist – was the database loaded correctly into the SDE instance and is it accessible by the appropriate staff?
3. RCE deployment checklist – are all the required RCE deployments set up, accessible to the appropriate staff, have the correct layers in the web maps and have the correct attribute sets created?
4. Desktop Roads and Highways functionality checklist – run a series of common desktop editing tasks and verify they complete correctly.
5. Web functionality checklist – run a series of common RCE editing tasks and verify they complete correctly.
6. VUEWorks Integration – run a series of asset and work order location tasks to determine proper placement of assets against the LRS. This part of the validation will be executed by DTS.

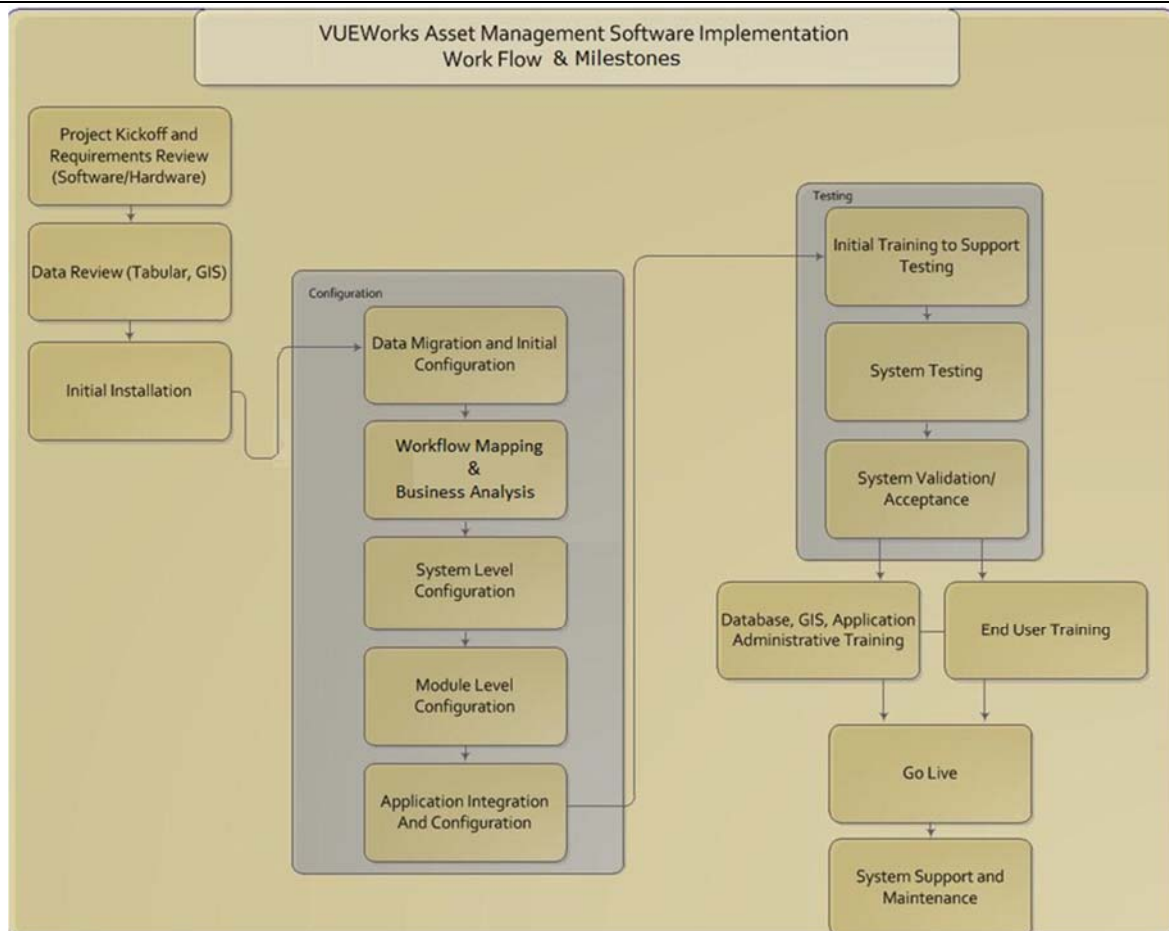
#### **VUEWorks MDOT TAMS Implementation**

The VUEWorks system is fully configured as a turnkey system ready for use by the entire organization.

Tier 2 Implementations contains the following as part of the scope of work:

- Exhaustive workflow and business process mapping,
- Work order and service call user interface configuration specifications,
- Creation of work order, condition and service call forms,
- Creation of reports and dashboards,
- GIS data development,
- Integration of Esri Roads & Highways components,
- Linking to external databases and migrating data from external systems into the VUEWorks database (as directed by MDOT if it is preferred to migrate data from particular systems to be integrated, or to simply link the data in one direction, or bidirectional),
- Integration with 3rd party software systems such as financial systems (e.g. for payroll, purchase order or inventory integration),
- Training all levels of system users, to include managers, VUEWorks administrators, non-technical field staff and mid-level management.

The Tier 2 implementation can be scaled to include myriad services as mentioned above, or it can be tightly focused on a single business process.



**The Tier 2 Implementation:** In what we call a *focused Tier 2 implementation*, we focus on a small number of very well understood and documented work management activities. The State is also prepared to take ownership of the configuration and subsequent administration of VUEWorks during the course of the focused Tier 2 implementation. This deepens the customer's participation in the implementation and training process, typically resulting in significant progress being made in the State becoming self-sufficient in implementing additional work and asset management activities without DTS professional services.

The implementation will occur in a stepwise process moving from one department to the next over a period of time. Implementation and training will focus on the State's first selected asset class and specifically addressing these assets and related workflows.

#### **Phase 1 VUEWorks Kickoff Meeting**

The goal of this meeting is to clearly identify the subject matter experts, VUEWorks Administrator(s) and other points of contact between DTS and the State. The meeting will establish dates and overall initial project timeline.

#### **Workflow Definition Workshop**

Implementing the work and maintenance management modules of VUEWorks requires careful identification of the work activities to be managed in the system and the relevant data to be recorded at the work activity level. Work activities are the most granular level of work management and form the basis for asset specific work and preventive maintenance management, reporting and analysis.

Prior to the first implementation workshop, State staff will identify 2 to 4 well understood asset specific work activities and 2 to 4 service requests issues related to their asset types as the work activities. Any supporting documents such as paper-based work orders, inspection forms, service request



documentation, etc. is typically provided to DTS. DTS will review the information prior to the workshop to step through the work activities and service request issues.

The goal of this first workshop is to begin defining how VUEWorks will be configured before the second workshop. The process of defining work activities in a work order system can be complex initially. This stems from the fact that any given work activity is composed of several parts: work planning, work assignment, doing the actual work and closing out the task or work order correctly. The challenge in implementing any work management system is that the above steps are often not completely understood by a single individual; in fact, it is more common for these steps to be handled in a sequential fashion with different State staff largely confined one or two parts of the sequence.

In addition, when the State works with DTS to define these steps it is common for changes to be introduced to the workflow process now that it's being completely reviewed. Finally, VUEWorks can bring a great deal of flexibility to the entire workflow. Collectively, these factors create a time period during the implementation where the workflow surrounding a work order is somewhat fluid. Therefore, the initial meeting is designed to get the State thinking about all these moving parts so the actual implementation workshops can be as productive as possible.

Prior to the first implementation workshop, the State will identify the subject-matter expert(s) (SME) for each of the work activities, as well as the overall VUEWorks Administrator. The SME(s) needs to understand the entire workflow for any given activity that will be managed via work orders but they do not necessarily need to be the employee(s) who perform the work. The purpose of the SME(s) is to break down each of the work activities into a step-by-step series of events, where at each step key information to be collected is identified, and the actions necessary to move to the next step are defined.

The VUEWorks Administrator is the lead person(s) responsible for administering the application. The VUEWorks Administrator is responsible for taking ownership of the system and will expand it over time. As such, they will need to understand the workflows, how to use the various configuration user interfaces to build new workflows, master the report designer and more.

### **Asset and Maintenance Management Workflow Workshops**

The first workflow workshop has two goals:

1. Finalize and sign off on the work order activities, service request issues and the associated workflows. DTS will spend a half day on each workflow with significant input from the workflow SME(s). The VUEWorks Administrator must attend.
2. Expose the SME(s) and VUEWorks Administrator to the actual work management modules in VUEWorks to begin designing actual work order forms, service request issues, reports and dashboard gadgets. Furthermore, data entry requirements for employee names, pay rates, rate types (e.g. standard, overtime, etc.) and similar information for equipment and inventory will be identified. Populating VUEWorks with this data will be tasked to the VUEWorks Administrator.

### **Workshops for Work Order Specification**

The actual content of the work order form in VUEWorks is highly configurable. The contents of the work order has two drivers: 1) the flow of the work activity and 2) data to be captured in the course of performing the work activity. This workshop will be scheduled for each work activity being configured in VUEWorks. Based on the completed workflow exercise, the DTS implementation team will have a draft work order specification already built for each work activity, and a concomitant work order form set up in the software for live interaction during the workshop.

The goals of the work order specification workshops are:

1. Sign off on draft work order forms and service request issues for use in VUEWorks, which will be finalized during the second workshop,
2. Have live work order forms in the system for the VUEWorks Administrator to begin interacting with prior to the second workshop and



3. Have draft reports set up in VUEWorks for the VUEWorks Administrator to begin interacting with prior to the second workshop.

### **Workflow Workshop**

This second workshop marks a turning point in the implementation process. Final changes will be made to the work order specification documents as well as the actual work order forms in VUEWorks. DTS will update the specification documents during the workshop; however the VUEWorks Administrator will perform updates to the actual work order forms in VUEWorks, condition inspection forms as well as service request issues. The SME(s) and the VUEWorks Administrator will step through the workflow process in a role playing exercise to test drive the configuration. We will step through the reporting capabilities of the system, and the VUEWorks Administrator (and others in attendance as appropriate) will run reports and learn how to create their own reports.

The goals of these workshops are:

1. Sign off on the work order specification, condition inspection and service request issues,
2. Final configuration of the work order and condition forms in VUEWorks,
3. VUEWorks Administrator is now responsible for existing work order and condition configuration (both the workflow and the content of the actual work order forms),
4. VUEWorks Administrator is now responsible for creating reports.

### **Road Analyzer (Straightline Diagramming - SLD) TAMS Implementation**

**Kick-Off Meeting** - The SLD kick-off meeting will include final discussions of project expectations, risks, goals, scope clarification and definition discussions and project management procedures before starting the project. During this meeting, the project team and MDOT will document the project core team(s) and the groups that must be consulted for requirements, testing and training. A final baseline work plan, project repository and other project management documentation will be the results of this effort.

#### **Deliverables:**

- **Kick-off Meeting Notes and Baseline Work Plan** – Following the kick-off meeting, notes including any decisions made will be delivered to MDOT. In addition, a final baseline work plan will be submitted with the notes.

**Project Requirements** – The project team will conduct requirements workshops and interviews with the various stakeholders and document the detailed needs of the SLD application. Transcend will begin the requirements sessions with an overview of Road Analyzer. Changes and enhancements will then be documented in a Requirements Matrix. The project team will conduct meetings onsite on the day immediately following the kick-off meeting.

Deliverable:

- **Requirements Matrix** – The requirements matrix will be a Microsoft Excel spreadsheet that lists a requirement number, priority, level of effort, any known prerequisites and any necessary comments so that the entire team has a thorough understanding of the functionality to be included in the final SLD application.

**Version 1 Design** - A High-Level Design will be developed to incorporate the MDOT specific components to the existing SLD tool foundation. This design will be the guide for the development cycles as Road Analyzer is implemented and customized to meet MDOT needs. At this time, the Test Plan containing test scripts that match the workflows and use cases outlined in the design will be created.

#### **Deliverables:**

- **High-Level Design** - The High-Level Design will document what components are available in Road Analyzer, what will need to be configured, what needs to be customized and the interactions and communication between the different components of the system.





- **Test Plan** – The Test Plan will include test scripts as well as procedures for logging errors or requests for enhancements into the Tracking Database.

**Version 1 Development and Testing** - At the completion of the high level design phase, the application will be developed using the Requirements Matrix and High-Level Design to guide the development team. The application will be developed in two iterations. The first iteration will focus on the core modules that are available in Road Analyzer. Although this is a product, the application will need to be configured to use MDOT's data and to meet the unique requirements of how MDOT would like to access and display data.

This phase will not include any formal deliverables, but the core modules will be made available to a small group of users on a Transcend server at the end of the first iteration. At some point during this phase, the project will conduct an onsite visit to review progress and to make any necessary adjustments to the work being completed.

**Version 1 Deployment** - Near completion of the first iteration of development, the project will initiate Implementation Planning. The first step will be to create the Implementation Plan. Transcend's standard Road Analyzer documentation will also be updated to reflect MDOT workflows, data, and customization. The project team will then be onsite to assist MDOT with reviewing/testing the application (on Transcend's servers), logging any found defects and documenting requested enhancements.

**Deliverables:**

- **Implementation Plan** – The Implementation Plan will document the details and timeline for each of the tasks in the implementation phase. It will establish responsibilities for each task including those of MDOT personnel.
- **User and Technical Documentation** – Two electronic documents will be customized as a part of this project – a User Guide and a Technical Guide.
  - **User Guide** – The User Guide will include an explanation of the data available in the stick diagram and through the data bars as well as the associated attributes available for display. A definition of any code values will be included. The User Guide will also include example workflows that describe how to use the functionality available in the SLD from an end-user perspective. It will be provided in PDF format as well as through online help.
  - **Technical Guide** – The Technical Guide will include a data dictionary, a description of the technical architecture, an explanation of the configuration capabilities of the SLD and other information needed by the technical team to describe the administrative components of Road Analyzer.

**Requirements Update** - Based on the results of the UAT and other project documentation requesting changes or enhancements, the Requirements Matrix from the first iteration will be updated.

**Deliverable:**

- **Updated Requirements Matrix** – The requirements matrix will be a Microsoft Excel spreadsheet that lists a requirement number, priority, level of effort, any known prerequisites and any necessary comments so that the entire team has a thorough understanding of the functionality to be included in the final SLD application.

**Version 2 Design** - The High-Level Design from the first iteration will be updated to reflect the custom components to be addressed during Iteration 2.

**Version 2 Development and Testing** - The second iteration will build upon the core modules and will be used to develop the custom modules that are not currently a portion of the Road Analyzer core product. At the end of the second iteration, the custom functionality will be made available on a Transcend server.



- **Updated High-Level Design** - The High-Level Design will document what components are available in Road Analyzer, what will need to be configured, what needs to be customized and the interactions and communication between the different components of the system.
- **Updated Test Plan** - The Test Plan will also be updated to reflect additions (customized modules) for the MDOT implementation.

**Version 2 Deployment** - Using the Implementation Plan as a guide, the final steps of the SLD portion of the project will be to conduct onsite deployment of the application in MDOT's environment, conduct a more thorough UAT and to provide one day of training.

- **Updated Implementation Plan** – This document will be updated to reflect any needed changes based on the outcome of Iteration 1.
- **UAT** – Transcend will be onsite with MDOT as they thoroughly test the application using MDOT test scripts.
- **Training Plan** – The training plan will document the approach for training MDOT personnel on the SLD application. The training will meet the needs of end-users and more technical staff and will be designed to train 10 end-users and 2 technical staff.
- **User Training** – The project team will provide an onsite one-day training course for up to 12 participants.
- **UAT-Tested SLD Tool** – Following UAT and any necessary bug fixes, Transcend will provide the Road Analyzer/SLD executable as well as the source code for the custom modules.

## E. Implementation Services

Contractor is responsible to work with State staff to implement the TAMS Solution within the State IT environment described within Article 1, Section 1.103 above. Specific implementation service activities are described below.

### Data Conversion / Migration

Contractor will work with MDOT staff to perform data conversion / migration of business data from existing sources for use with the TAMS Solution Development environment as follows:

- MGF road network and other base map layers (to be determined as part of Project Initiation and Planning Services)
- Construction of the MDOT LRS linear datum and definition of the PR-MP, Route-MP and Control Section-MP Linear Referencing Methods (LRM) based upon MGF road network feature attributes
- Lane Mile Inventory
- Sign Inventory
- Culvert Inventory
- Guardrail Inventory
- Other business data as determined as part of Project Initiation and Planning Services

Contractor will work with State IT staff to migrate TAMS data from the Development environment to the Quality Assurance ("QA") and Production environments to support further project services and deliverables as specified below.

### **Contractor's Agreement & Approach in regards to Section 1.104, E. Implementation Services – Data Conversion / Migration**

X	I have reviewed the above section and agree with no exception.
	The DTS team will work with MDOT staff to perform data conversion / migration of business data from existing sources for use with the TAMS Solution Development environment as follows:



- MGF road network and other base map layers (to be determined as part of Project Initiation and Planning Services)
- Construction of the MDOT LRS linear datum and definition of the PR-MP, Route-MP and Control Section-MP Linear Referencing Methods (LRM) based upon MGF road network feature attributes
- Lane Mile Inventory
- Sign Inventory
- Culvert Inventory
- Guardrail Inventory
- External Business Systems

#### **Four Stages of Data Migration Process**

- Planning and Design – This entails mapping all of the attributes to their appropriate fields in the TAMS application database, preparing scripts / automation for import and setting a migration schedule around the implementation schedule for TAMS;
- Initial Load for Testing and System Integration – loading the information into the development and testing instances for use by the integration specialists and testers. This tests the loading of the data as well;
- Final Load for Production – Once TAMS is ready for production a final data load takes place and the old system to maintain the asset inventory is frozen and
- Operation and Maintenance – If the TAMS is used for network adjustments, it can be used to update event locations. If the MGF is used, then each year, event data needs to be adjusted through back-end database scripts.

#### **MGF and Lane Mile Inventory**

During the implementation of the statewide data cleansing, migration and loading process, it is anticipated that the data cleansing and migration process will be performed by DTS and MDOT and will follow the steps documented in the Data Migration document prepared by DTS. Esri will provide support during this effort, including high level review of the results of the migration based on the data migration and QA plans.

**Data Migration Planning** – Migration of route and event data to the roads and highways environment requires a review of the existing route and event data to determine whether incompatibilities exist between the current LRS and Roads and Highways. This review will also determine if manual steps are required to migrate the data. Key elements for review include:

- Route ID structure
- Route calibration methods
- Route gaps and concurrencies
- Event data structures

**Create Migration Scripts and Tools** – Depending on the results of the data migration planning, portions of the data migration can be automated. A set of scripts will be created to aid in the initial and periodic migrations of data. This will reduce the overall effort and increase the quality of the migrated data. Some manual effort will be needed to maintain the centerline and calibration point data, modify any new data that requires edits to fit the new model and perform QA/QC tasks. The scripts will assist in the following tasks:

- Build Advanced Linear Referencing System (ALRS) networks from existing routes
- Calibrate the new route networks
- Create source to table mappings for event data





- Migrate event data to new formats, if necessary
- Register event tables with the ALRS networks
- Identify potential migration errors

Esri will provide COTS documentation of the R&H external business systems integration patterns and specifications. Esri will communicate and demonstrate integration patterns with external business systems owners and technical staff.

### **Sign, Culvert and Guardrail**

#### **Data Conversion and Migration Methodology**

DTS has extensive experience in the migration of data from the multiple systems into the VUEWorks and Esri solutions. The next section contains a sample migration task list (assets) that is being used for this project. DTS has prior experience conducting these migrations as a team for other clients with success.

DTS will assist MDOT with the following:

1. Document the functional requirements for the asset data by asset type
2. Investigate exiting asset systems operational features and database structure for asset data
3. Provide MDOT system administrator(s) with an overview of VUEWorks table structure, data views and configuration options
4. DTS will prepare a detailed work plan that covers all aspects of the migration with assistance from MDOT. Sections of the work plan will be created as required to meet the functional requirements of the State. The following aspects of the migration will be covered in the work plan:
  - a. Functional requirements for the asset data by asset type.
  - b. Identification of asset types and fields that will be migrated to GIS feature classes for use by VUEWorks.
  - c. Identification of asset types and fields that will be migrated to the VUEWorks modules.
  - d. Identification of the asset hierarchy that will be replicated in the VUEWorks modules.
  - e. Identification and migration of dropdown field data that will be transferred. The functional aspects of the dropdown fields will be migrated to GIS domains or VUEWorks dropdowns as appropriate.
  - f. Define data structure and templates required in the GIS or VUEWorks modules.
  - g. Identification of any special considerations for the migration. (For instance, numerical data should be migrated to a numerical field even if numerical data is currently stored in a text field).
  - h. Identification of any data that will not be transferred (obsolete data or data that has no value to the State).
  - i. Document data integrity issues discovered during the process. Data integrity issues consist mostly of misspellings and/or inconsistent terminology. While it may be possible to address some data integrity issues, DTS will be limited to documenting any issues discovered that may be addressed in the future by the State.
  - j. Plan to accommodate final migration of data immediately prior to the Go Live date.
5. MDOT will review the work plan with DTS for approval. The review requires DTS to attend one on-site meeting. Additional meeting time can be arranged as needed using telephone and/or screen sharing technology.
6. DTS will execute the work plan collaboratively. DTS will be responsible for tasks that require DTS' expertise with SQL Server, Oracle and the VUEWorks database.



### Interfaces / Integration

Contractor must provide appropriate system interfaces / integration to the following MDOT applications:

1. Name of application: Michigan Bridge Management System ("**MIBridge**")  
Details of interface:
  - Definition of Bridge Structure feature class within the TAMS GIS database environment
  - Management of Bridge Structure LRS location references within TAMS
  - TAMS access to Bridge Structure data:
    - Inventory data
    - Maintenance requirements
  - MIBridge access to TAMS functionality:
    - Creation and deletion of TAMS Bridge Structure features from within the MIBridge application environment
  - MIBridge access to TAMS data:
    - Maintenance work
    - Capital work
    - Inspection data
2. Name of application: Michigan Information Database ("**MIDB**")  
Details of interface:
  - TAMS access to MIDB data:
    - Vendor / Payee data
    - Budgets
    - Local Agency Work Order data (agency, accomplishments, costs)
  - MIDB access to TAMS data:
    - Timesheet data
    - Asset inventory / accounting data
    - Project cost data
3. Name of application: Transportation Management System ("**TMS**")  
Details of interface:
  - TAMS access to TMS LRS event classes
4. Name of application: Michigan Fleet Management System ("**MainStar**")  
Details of interface:
  - TAMS access to MainStar materials issued data
  - MainStar access to TAMS data:
    - Materials issue requests
    - Costs
    - Work Orders
5. Name of application: MDOT Global Database (GLOBAL)  
Details of interface:
  - TAMS access to Oracle tables: code tables, name / address tables, etc.
6. Name of application: Property Damage Reclamation Process System ("**PDRP**")  
Details of interface:
  - TAMS access to PDRP data:
    - Damaged asset location
    - Crash event ID
  - PDRP access to TAMS data:
    - Crash event costs
    - Work orders
    - Accomplishments
7. Name of application: M5 FleetFocus  
Details of interface:
  - TAMS access to FleetFocus data:
    - Vehicle rates



- Preventative maintenance queues
- FleetFocus access to TAMS data:
  - Vehicle usage data
- 8. Name of application: Signal Cost Accounting System (“SCAS”)
 

Details of interface:

  - TAMS access to SCAS data:
    - Electrician job reports
    - Accomplishments
    - Costs (labour, equipment, materials, Contractor)
- 9. Name of application: ArcGIS Server / ArcSDE
 

Details of interface:

  - TAMS access to MDOT spatial data layers existing in MDOT spatial data repository
- 10. Name of application: Local Agency Payment System (LAPS)
 

Details of interface:

  - TAMS access to local agency payments.

Contractor may at MDOT’s option be asked to provide appropriate system interfaces / integration to the following MDOT applications (cost, project schedule, resources to be agreed upon by MDOT and Contractor through a SOW and the change management process). These interfaces / integrations may be built in a future phase at MDOT’s options as well:

1. Name of application: Project Accounting and Billing System (“PAB”)
 

Details of interface:

  - PAB access to TAMS data:
    - Projects
    - Accomplishments
    - Costs (labour, equipment, materials, Contractor)
2. Name of application: ProjectWise
 

Details of interface:

  - TAMS access to ProjectWise documents

For each of the above application interfaces / integration, Contractor to specify details regarding:

- The manner through which TAMS gains access to the MDOT business application data, and whether this will be achieved through TAMS configuration or custom software programming
- The manner through which the MDOT business application gains access to TAMS functionality (for example: API) and the extent of custom programming required
- Support for custom software developed in future TAMS product releases

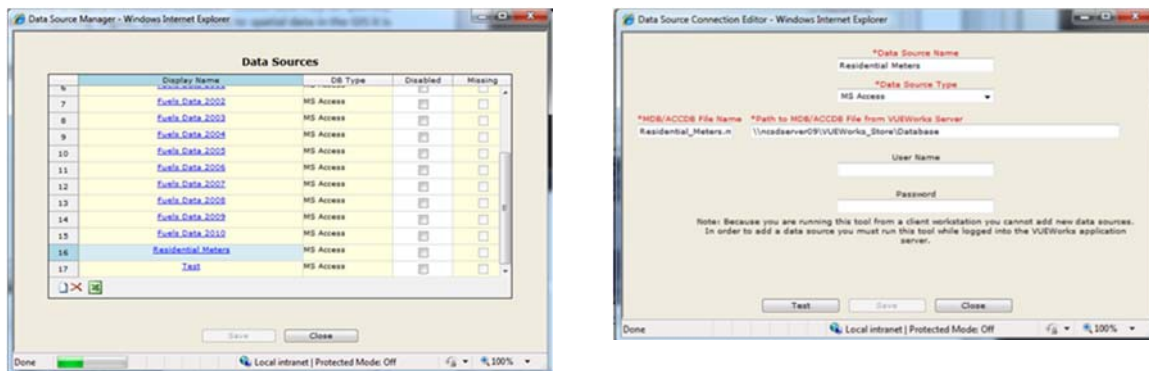
Contractor to work with State IT staff to achieve knowledge transfer regarding skills required to integrate MDOT business applications with TAMS.

Contractor’s Approach in regards to Section 1.104, E. Implementation Services – Interfaces / Integration	
X	I have reviewed the above section and agree with no exception.
	<p><b>Data Management</b></p> <p>VUEWorks is capable of linking directly into spreadsheets, MS Access, SQL, Oracle and any ODBC compliant database. These linkages can be one direction or bi-directional based on the openness of the 3<sup>rd</sup> party system being integrated with. Linked data can be used to autopopulate dropdown lists, populate specific modules (such as asset condition like pavement PCI or PACP ratings, or ownership information for Service Calls), trigger work orders and be available for reporting. This is a great way to maintain visibility into legacy databases without the cost or complexity of migrating the data into VUEWorks (yet this can be accommodated as well based on MDOT’s desires). Linked data can also be associated with GIS features, allowing spatial queries to be performed on data that is external to VUEWorks.</p>

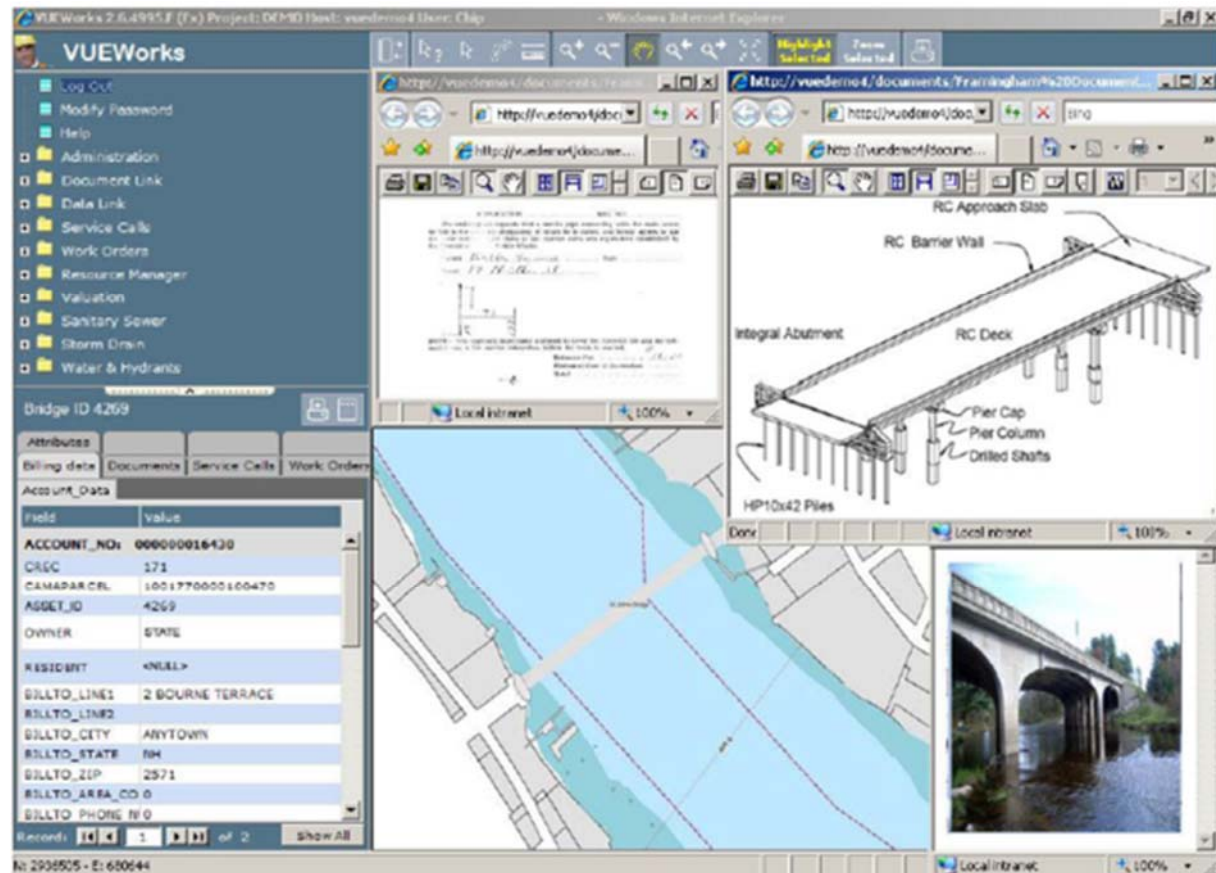


External databases can have any type of data in their columns, and can even provide hyperlink data a web form that opens, allowing users greater access into the external database. Because VUEWorks is a 100% web-based application, as soon as the new data is collected from the web form it is immediately available for display, reporting and other uses. Data Link can link to an unlimited number of external databases and tables, to views of tables and directly to Excel spreadsheets. Tables can contain links that launch 3<sup>rd</sup> party applications.

VUEWorks also has the capability to migrate legacy data directly into VUEWorks forms. A common example of this is to create a VUEWorks work order for every historic legacy work order. We have done this for clients that desire to have a full work order history pulled from their legacy system into VUEWorks. This requires separate data migration services, but is typically very simple.



In the screenshot shown below is a legacy MS Access database for bridge condition inspections that has been linked into VUEWorks and associated with the GIS and other flat file documents.



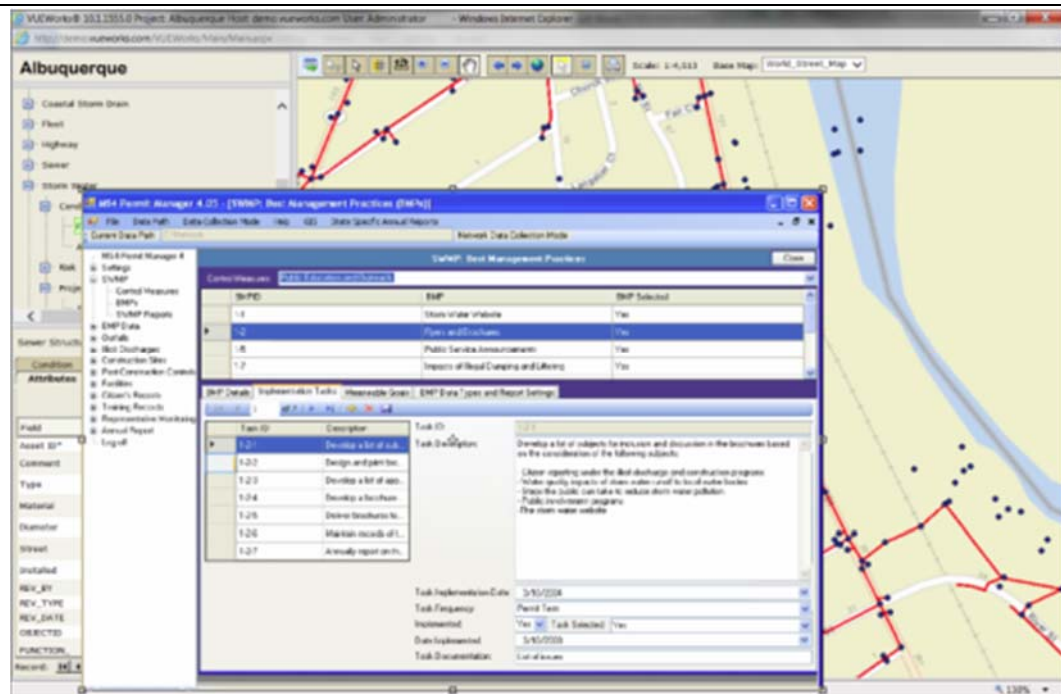


The screenshot displays the NCS D VW10 software interface. On the left, a list of fields for a permit record is shown, including ID, BP\_Master\_ID, BP\_BP\_Link, Effective\_Date, Application\_No, Permit\_No, Permit\_No\_Prefix, Permit\_No\_Count, Permit\_Status, Permit\_Setup\_Cor, Application\_Date, Date\_Issued, Completion\_Date, Expiration\_Date, Date\_Printed, Temp\_CO\_Expirat, Lot\_No, Cust\_No, General\_Contract, Description, Permission\_Type, Notification, Project\_Cost, Balance, and various Misc\_Char fields. The central map shows a street layout with a yellow highlighted parcel labeled '110-090-002'. On the right, a detailed permit record for a 'Deck Permit' is displayed, including fields for Permit\_Status, Permit\_No, Permit\_No\_Prefix, Permit\_No\_Count, Permit\_Status, Permit\_Setup\_Cor, Application\_Date, Date\_Issued, Completion\_Date, Expiration\_Date, Date\_Printed, Temp\_CO\_Expirat, Lot\_No, Cust\_No, General\_Contract, Description, Permission\_Type, Notification, Project\_Cost, Balance, and various Misc\_Char fields. The bottom of the interface shows a record summary: 'Record: 11 of 1' and 'Show All'.

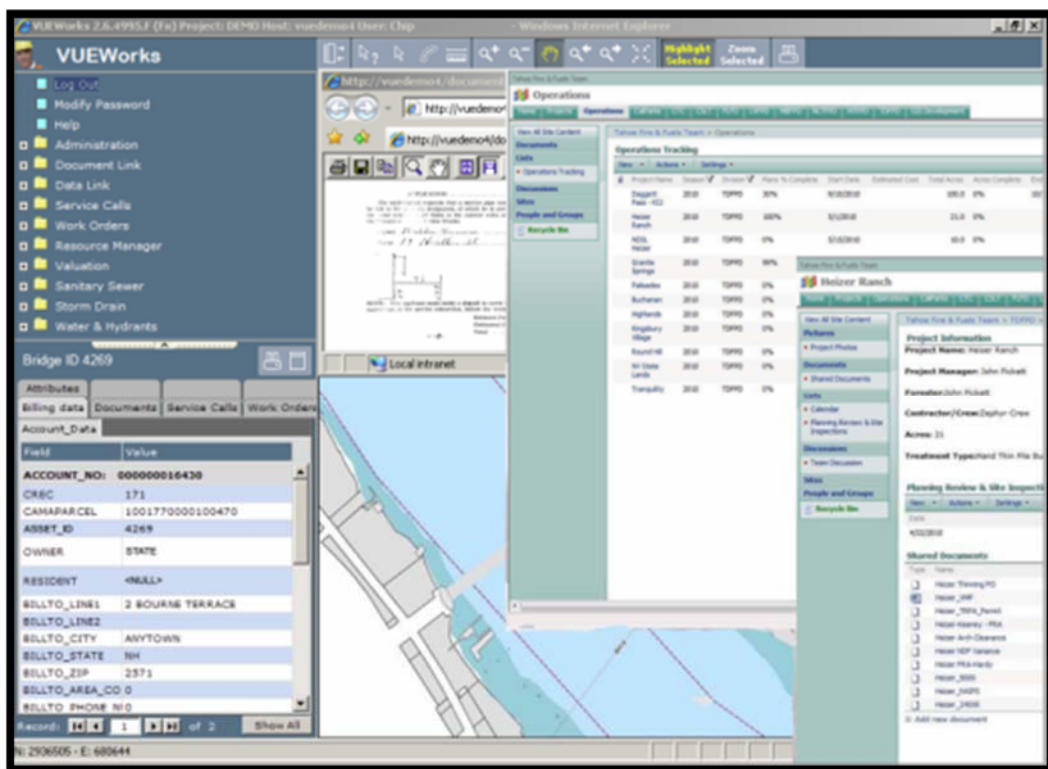
Above are Billing, Permits, Licensing and other modules from a leading Finance/ERP system linked into VUEWorks. This inherently makes the external Financial & Permitting data geospatially enabled – supporting such operations as mapping all accounts more than 30 days past due, or showing all parcels with open permits that need an inspection (for routing purposes), etc. Not only can VUEWorks read and expose data from these modules, via the hyperlink shown, the module can be launched and opens directly to the record. External data can be exposed through VUEWorks geospatially via the GIS or non-spatially.

For another example using the Data Linking functionality, VUEWorks links associated documents directly and can interface with the EPA Permit Manager. Below is an example of a VUEWorks data link to environmental data.



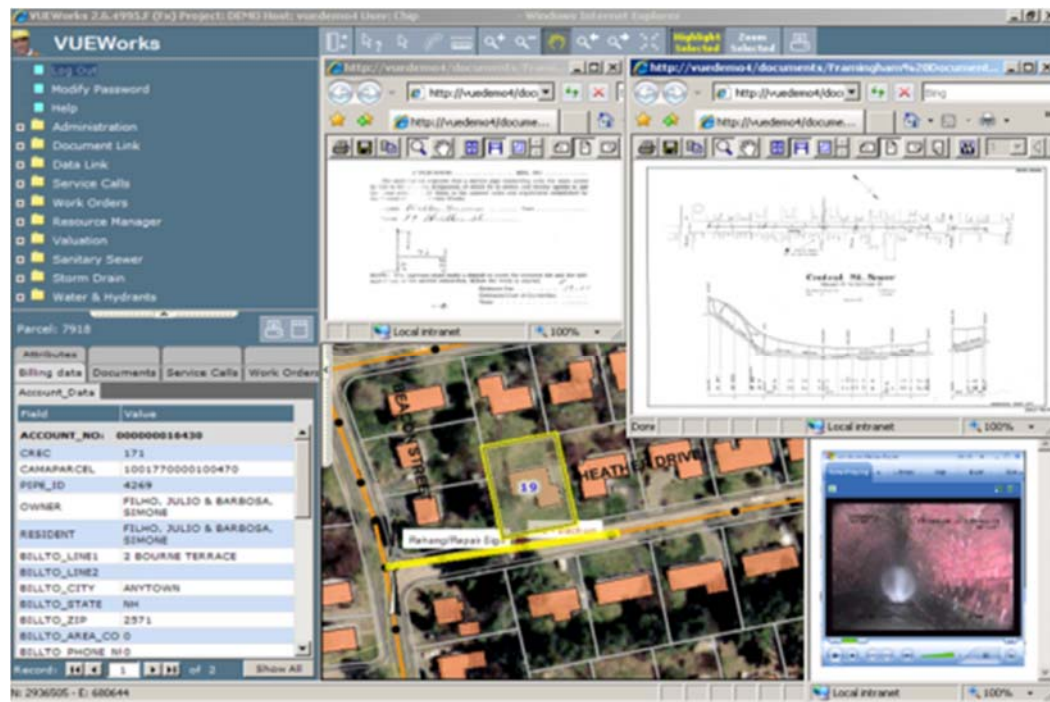


Using the Data Linking functionality VUEWorks links associated documents directly and can interface with a document management system, SharePoint. Below is an example of a VUEWorks linkages to the Tahoe Integrated Information Management System (TIIMS) SharePoint site. TIIMS utilizes the document version control native to SharePoint to maintain the documents; these updates are immediately available within VUEWorks via the data linking functionality.





Using the Data Linking functionality in VUEWorks, links associated to AutoCAD documents can be performed directly and interface with video documents for pipe and culvert inspections. Below is an example of a VUEWorks linked to a video system along with the corresponding CAD as-built drawings:



For the MDOT systems, the DTS team foresees utilizing this functionality for a basis of integration as well as the inherent VUEWorks, Roads and Highways LRS solution for any spatial data that MDOT prefers to be located along an LRS. To be clear though, VUEWorks can ingest any MDOT spatial data and 3<sup>rd</sup> party data whether it is located along an LRS or not.

### Pilot Projects

Contractor is responsible to work with State and County / Municipal agency staff to conduct limited scope pilot projects as described below.

1. *County and Municipality Pilot Testing* – to confirm TAMS functionality to integrate / support external agency requirements by inclusion of three County agencies and one large municipality.
2. *Mobile Data Collection Pilot Testing* – to confirm TAMS functionality to improve business processes associated with the reporting of inspection results and maintenance accomplishments within one MDOT Region.

Contractor will be responsible to work with State and County / Municipal agency to conduct limited testing of the use of mobile field data collection technologies as a means of improving business processes associated with the reporting of inspection results and maintenance accomplishments. This testing would be conducted early in the TAMS implementation schedule within selected MDOT maintenance garages in one Region enabling field staff to begin collecting inventory, condition and maintenance activity data in order to align with the requirements and implementation schedule of the associated PBOS project. It is expected that this information would be stored in an interim database for eventual uploading to the TAMS once it is fully implemented. The timing for mobile data collection pilot testing is 2015.


**Contractor's Agreement & Approach in regards to Section 1.104, E. Implementation Services – Pilot Projects**

<b>x</b>	I have reviewed the above section and agree with no exception.
	<p><b>County and Municipality Pilot Testing</b>            During TAMS Phase 1 implementation DTS will conduct testing of the VUEWorks TAMS within Iosco, Kent and Bay counties and if needed one large sized city, allowing the State assess both the functional capabilities of the software to integrate external agencies. This pilot testing will provide the State with the ability to discover related security, performance and IT infrastructure issues. The pilot will include all parts of the TAMS implementation including Esri Roads and Highways LRS solution, VUEWorks Asset and Maintenance Management solution, systems integration components and other software integrations such as Road Analyzer.</p> <p><b>Mobile Data Collection Pilot Testing</b>            Furthermore the pilot testing will provide testing for mobile data collection. This includes testing the use of mobile field data collection technologies as a means of improving business processes associated with the reporting of inspection results and maintenance accomplishments. For this phase of the project, DTS can provide the State with the ability to examine connected and disconnected work management mobile data collection, as well as mobile collection from various hardware platforms. The DTS team will conduct this early in the TAMS implementation schedule within selected MDOT maintenance garages in one Region and will enable field staff to begin collecting inventory, condition and maintenance activity data in order to align with the requirements and implementation schedule of the associated PBOS project. A testing environment will be created so this information can be stored in an interim database for eventual uploading to the TAMS once it is fully implemented.</p>

**Testing**

Contractor is responsible to work with State staff to conduct TAMS Solution testing, including:

- System Testing; and
- User Acceptance Testing (“UAT”).

Contractor responsibilities with respect to the above testing activities are as follows:

- Assist State staff in the development of the test plans;
- Assist State staff in the establishment and verification of the TAMS Test environment;
- Assist State staff in the migration of TAMS data from the Development environment to the Test environment;
- Participate in on-site test activities as requested by the State Project Manager;
- Verify and remedy software defects encountered during testing activities; and
- Obtain official sign-off from the State upon successful completion of testing activities.

**Contractor's Agreement & Approach in regards to Section 1.104, E. Implementation Services – Testing**

<b>x</b>	I have reviewed the above section and agree with no exception.
	<p>The DTS team understands our responsibilities with respect System Testing and User Acceptance Testing and will provide the following services to the State::</p> <p>Development environment</p> <ul style="list-style-type: none"> <li>• Assist State staff in the development of the test plans;</li> <li>• Assist State staff in the establishment and verification of the TAMS Test environment;</li> <li>• Assist State staff in the migration of TAMS data from the to the Test environment;</li> </ul>





- Participate in on-site test activities as requested by the State Project Manager;
- Verify and remedy software defects encountered during testing activities; and
- Obtain official sign-off from the State upon successful completion of testing activities.

DTS has also provided the State with a sample testing plan to illustrate our testing methodology.

## Sample TAMS Testing Plan

### Section 1. Overview

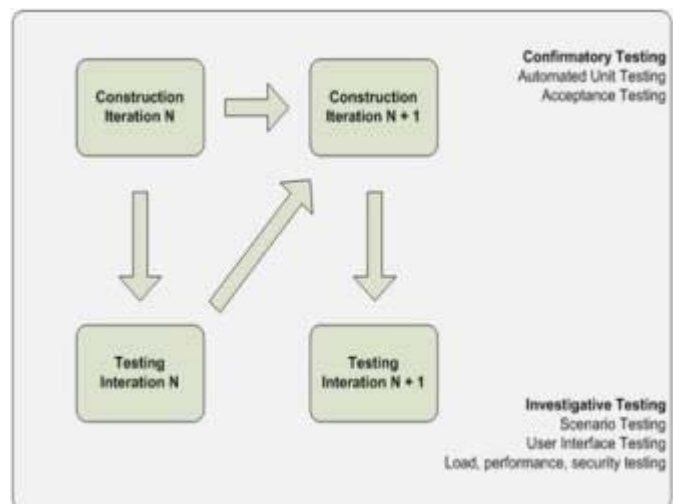
#### 1.1 Introduction

The purpose of the Test Management and Acceptance Plan is to define the deliverables, acceptance criteria, acceptance schedule, problem resolution and testing approach associated with the MDOT TAMS Project. The methodology for the acceptance process will ensure that each deliverable has undergone State of Michigan review, problem identification and resolution and acceptance. This document details the overall strategy to be adopted, the activities to be completed, the resources required and the methods and processes to be used to complete the testing of the Commercial Off-the-Shelf (COTS) software based on the VUEWorks asset and maintenance management system solution. The testing process identified within this plan will ensure a better quality product overall which will meet MDOT TAMS Project requirements as specified by the State of Michigan.

### Section 2. Test Management

The overall approach that the DTS team will employ to conduct effective testing of the VUEWorks asset and maintenance management system is to start by reviewing the requirements compliance matrix developed for the project.

The testing strategies that the DTS team will undertake can broadly be subdivided into confirmatory and investigative testing categories. Confirmatory testing is pursued through an agile approach where a certain feature is implemented and users are requested to confirm if the feature meets their requirements. Investigative testing regimes are traditionally defined in consultation with the client but may include exploratory or scenario-based testing along with some component of user testing of the system components as well. Investigative testing will be conducted during the data migration phase where the State of Michigan will review and verify the migrated data.



All defects will be recorded in web-based agile project management software available for MDOT's review at any time. This tool will be used to record defects and configuration changes detected during testing.

#### 2.1 Staffing

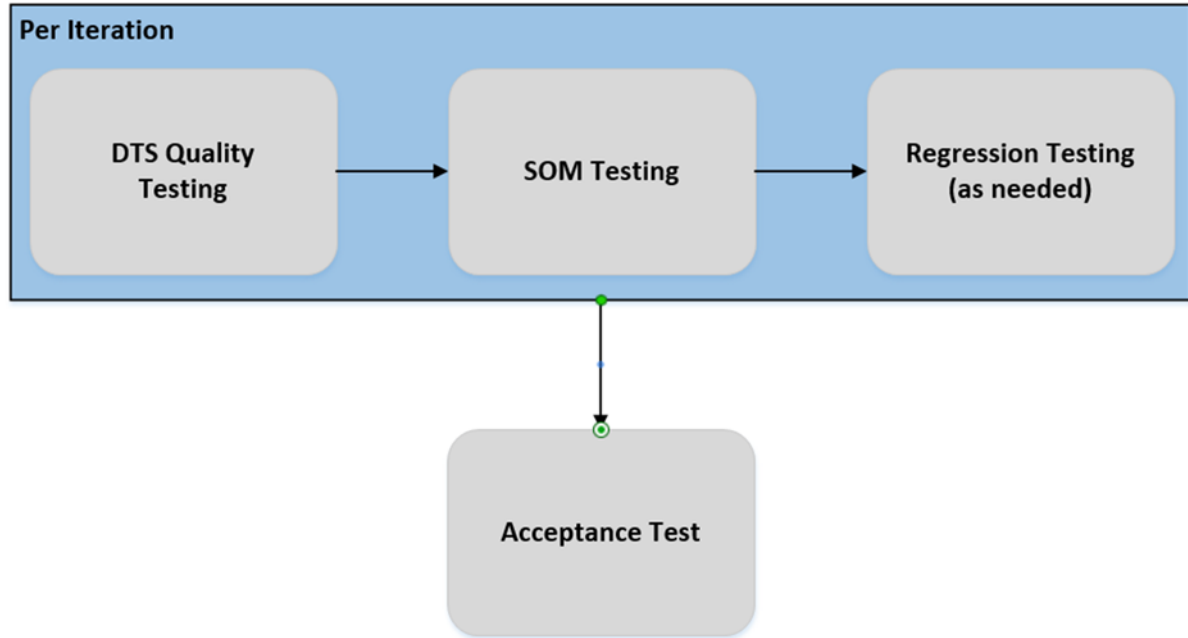
Testing is a collaborative effort between the State of Michigan and DTS staff. Below is a table that identifies the key roles and responsibilities for the testing team.



Name	Role	Responsibility
DTS Team	Test Manager (DTS)	Responsible for developing and following the Test Management and Acceptance Plan, managing the DTS testing team and coordinating with the SOM Test Manager. The DTS Test Manager ensures that SOM feedback is reviewed, prioritized and assigned for resolution.
DTS Team	Quality Assurance Manager (DTS)	Responsible for overseeing that the quality control measures are followed. Performs quality assurance testing to ensure the workflows and requirements are met. Responsible for overseeing that all features are tested and ensuring that the team delivers a quality product.
To Be Identified by SOM	Test Manager (SOM)	Responsible for identifying testers, securing testing locations and coordinating the SOM testing team. The SOM Test Manager is responsible for ensuring the test team follows the test plan and utilizes the agile defect tracking software. The SOM Test Manager will coordinate with the DTS Test Manager to prioritize defects/changes and follow the Issue Management Plan for any identified issues.
SOM Testing Team	Testers (SOM)	Responsible for performing testing of each iteration to validate that workflows and requirements have been configured correctly in the system. Testers will also perform acceptance testing to ensure the solution works for the user. Testers are responsible for following the test plans and documenting any defects/changes into the agile defect tracking software.

## 2.2 Testing Strategy

There are several testing strategies that can be adopted for successful implementations of large scale systems. DTS recommends the following testing of each iteration for the implementation of the MDOT TAMS project.



### 2.2.1 Quality Testing of Each Iteration

#### Responsibility

The DTS testing team is responsible for conducting testing for each iteration as defined in the WBS, Schedule and Resource Allocation Management Plan.

#### Dependency to Begin Test

For the testing to begin on each iteration, the initial workflow analysis, configuration, data migration and data linking and reporting must be complete with successful results for that iteration.

#### Description

The goal of the testing for each iteration is to ensure that the system is meeting the specifications as detailed in the workflow and requirements documents. The testing team will work with the project requirements lead to ensure that the system is ready for SOM testing.

#### Test Document

There will be no physical document created at this time. Our agile web-based software application will be used as the primary tool to record any misconfigurations, missed requirements, etc. during the quality testing of each iteration.

#### Test Environment

This type of testing is conducted by the testing team on a DTS test site. There is no automated method of testing whether or not the system meets the required specifications, except through human interaction with the system.

#### Desired Test Output

The quality iteration testing will be conducted by the DTS testing team and any changes identified will be tracked using the agile tool.

### 2.2.2 SOM Testing of Each Iteration

**Responsibility**

The State of Michigan testing team is responsible for conducting testing for each iteration as defined in the WBS, Schedule and Resource Allocation Management Plan.

**Dependency to Begin Test**

For the testing to begin on each iteration, the initial workflow analysis, configuration, data migration, data linking and reporting and DTS quality testing must be complete for that iteration.

**Description**

The goal of the testing for each iteration is to validate documented workflows and identify misconfigurations. Performing testing of each iteration ensures that misconfigurations or inaccurate processes are identified and resolved early and do not propagate elsewhere in the system. In addition, testers will gain crucial experience interacting with the system.

**Test Data**

DTS will provide sample test data required to perform testing of each iteration. As DTS and State of Michigan testers perform iteration testing on the system, the test data will accumulate to establish a greater data set.

**Test Plans**

DTS will provide test plans to the SOM testers for each iteration. The test plan will document the functions to test, the steps to perform the function and the expected outcome.

**Test Document**

There will be no physical document created at this time. Redmine (our web-based agile software tool) will be used as the primary tool to record any misconfigurations, missed requirements, etc. during the iteration tests.

**Test Environment**

This type of testing is conducted by the SOM testers on a DTS test site.

**Desired Test Output**

The testing of each iteration will be conducted by the SOM testing team and any changes identified will be tracked using Redmine.

**DTS Review of Test Results**

The DTS Test Manager will review any defects/changes reported during iteration testing to ensure that all defects/changes are well defined, reproducible and in line with the SOM requirements. The DTS Test Manager will work with the implementation team to prioritize the defects/changes based on SOM priorities.

**2.2.3 Regression Testing (as needed)****Responsibility**

The DTS implementation team along with the testing team will be responsible for ensuring that any configuration changes are completely tested across inter-related components of the TAMS.

**Dependency to Begin Test**

Before regression tests begin, the implementation team needs to complete and then test the configuration changes.

**Description**

The goal of regression testing is to uncover any defects created by a change to the configuration of a function. Regression testing is a continuous process and the State of Michigan testing team may need to spot test related features.

**2.2.4 Acceptance Testing****Responsibility**

The SOM testing team is responsible for conducting acceptance testing.

**Dependency to Begin Test**

For the acceptance testing process to begin, all configuration, data migration, data linking and reporting and iteration testing, as described above, must be complete with successful results.

**Description**

The goal of acceptance testing is to ensure that the system meets the specifications as detailed in the requirements compliance matrix and that the interactions between the functions tested during iteration testing meets requirements as defined by the SOM.

**Test Data**

DTS will provide sample test data required to perform acceptance testing. The test data set will include the test data created during DTS and the SOM iteration testing.

**Test Plans**

DTS will provide test plans to the State of Michigan testers for acceptance testing. The test plans will document the functions to test, the steps to perform the function and the expected outcome.

**Test Document**

There will be no physical document created at this time. Redmine will be used as the primary tool to record any misconfigurations, missed requirements, etc. during the acceptance tests.

**Test Environment**

This type of testing is conducted by the SOM testers on a DTS test site.

**Desired Test Output**

The testing of each iteration will be conducted by the SOM testing team and any changes identified will be tracked using Redmine. During acceptance testing, the State of Michigan testing team may document future enhancements and suggestions for improvement. The outcome of the acceptance testing is final acceptance and sign-off of the MDOT TAMS Project.

**2.3 Defect Reporting and Tracking**

Redmine project management software will be used to record defects and configuration changes detected during iteration testing and acceptance testing. The DTS Test Manager will review any defects/changes reported during testing to ensure that all defects/changes are well defined, reproducible and in line with the SOM requirements and will work with the implementation team to prioritize the defects/changes based on State of Michigan priorities. The SOM will be provided with access to the Redmine system as users to enter in defects/changes and to track the status. Redmine users may opt to receive email notifications when a reported defect status changes. DTS will provide weekly reports in PDF format with a listing of the defects/changes and the status of each.



When reporting a defect, the following details will be captured to provide the implementation team a good description of the defect/change:

- Module Name, Title or File Name
- Description of steps leading to the error
- Priority (Immediate, High, Low)
- Type (defect, configuration change)
- Error message, if applicable
- Any associated screenshots (preferred but optional)

DTS will follow a testing cycle to ensure that every defect is tested thoroughly before it comes back for State of Michigan review.

1. Defect identification
2. Defect resolution by implementation team
3. Defect testing by QC test team
4. Acceptance testing by the SOM

This defect resolution testing cycle is utilized to ensure that resolution of a defect was accomplished without an impact to the implementation of other features.

## **2.4 Testing Schedule**

The testing schedule will follow the schedule as documented in the WBS, Schedule and Resource Allocation Management Plan. DTS will work with the State of Michigan to identify individual testers prior to testing.

## **Section 3. Acceptance Management**

### **3.1 Process**

DTS deliverables will follow a strict acceptance process of (1) checking, (2) concurrence with comments, (3) change incorporation into the document/product and (4) verification that the change was completed prior to being delivered to MDC. The acceptance process will follow a milestone or a gated approach where the following will apply.

1. Gate decision points that precede every phase. Until specific deliverables are accepted by SOM, the project shall not move forward into the next phase.
2. Gate sessions will be attended by the DTS project management team and the State of Michigan's Core Team. Conditional approval of the deliverables will occur as the deliverables are submitted; however, acceptance of the deliverables will occur at the milestone sessions.
3. At each Gate, the SOM and the DTS team shall review the accepted deliverables in the previous phase to determine whether the project is on target.

### **3.2 Project Deliverables**

The project schedule shows project acceptance review gates specific to the MDOT TAMS project. Each milestone will include delivery of several documents or items.

### **3.3 Project Acceptance Criteria**

Upon the completion of all project work, as defined by the project schedule and list of deliverables, DTS will notify the SOM Project Manager and Project Sponsor in writing and submit the final invoice in accordance with the invoicing schedule. The SOM Project Manager and Project Sponsor will review, approve and formally accept or reject the components of the project work in accordance with the review time outlined in the project schedule. Formal acceptance of the project work constitutes complete implementation of the TAMS project and the commencement of the Warranty Period.



### Production Go-live

Contractor is responsible to work with State staff to migrate the TAMS application from the QA environment into the Production environment following the successful completion of UAT activities. Contractor responsibilities with respect to the above testing activities are as follows:

- Assist State staff in the establishment and verification of the TAMS Production environment;
- Assist State staff in the migration of TAMS data from the Test environment to the Production environment;
- Participate in on-site Go-live activities as requested by the State Project Manager; and
- Obtain official sign-off from the State upon successful completion of Go-live activities.

### **Contractor's Agreement & Approach in regards to Section 1.104, E. Implementation Services – Production Go-live**

x	I have reviewed the above section and agree with no exception.
	<p><b>Production Go-Live/Stabilization Plan</b></p> <p>The overall strategy that DTS will employ to conduct effective testing of the TAMS is to start with creating well-defined user stories, from reviewing the requirements matrix developed for the project, created during the Implementation Plans task. A user story (a requirement or a part of a requirement) is a feature oriented task that covers who, what, and why about the task. A well-defined user story is very closely lined up with a unit test specification for a component. Thus, a good user story leads to a good unit test which ensures that a component is accurately completing the task at hand. Additional testing phases ensure that the component appropriately integrates with the rest of the system.</p> <p>The testing strategies that DTS will undertake can broadly be sub-divided into confirmatory and investigative testing categories. Confirmatory testing is pursued through a combination of test driven development (TDD) and Agile Acceptance Testing while investigative testing regimes are traditionally defined in consultation with the client but may include exploratory or scenario based testing along with some component of user testing of the system components as well.</p> <p><b>Unit Test</b></p> <p>Unit testing or programmer testing is the first level of testing which ensures that a component in the TAMS meets a user story specification. This has to be completed by the developer of the component, and is the foundation of all other types of testing on a component. When addressing requirements of a system, DTS implementers typically use the Test Driven Development (TDD) methodology and first create test methods or unit tests that define requirements and configuration behavior before implementing the configuration for a functional application unit itself.</p> <p><b>Integration Test</b></p> <p>Integration testing can be internal or external to the TAMS. During the TAMS internal integration testing, TAMS will ensure that application components produced by two separate teams working independently "work and play well together". Once the specific components are integrated, automated unit tests will be run to ensure that the integration pieces are sound and do not have any immediate issues. This is also typically when peer review testing is conducted, by a person who is in the development team, but someone other than the program author.</p> <p>During the TAMS external integration testing, DTS will ensure that the TAMS integrates well with external systems listed in Contract.</p>



**System Test**

The goal of system testing is to ensure that the application is meeting the specifics as detailed in the requirements matrix, created during the Implementation Plans task. The testing team will work with the project requirements lead team to ensure that unit tests and integration tests have been written for all components as per the specification, and the system is now ready for user acceptance testing.

**Load Test**

DTS will perform load testing wherever applicable on custom components of the system, to examine how they perform under load. This process determines whether positive test outcomes are dependent upon system loads and whether refactoring is necessary to increase performance.

**Security Test**

Security testing ensures that test users are created for every functional area in the system and have the proper access levels for the tools they would work with.

**Usability Test**

The goal of usability testing is to determine user flow, user interface, and basic usability issues with the application. It involves the user testing every page/function of the TAMS or parts of the TAMS, and documenting any comments, issues or difficulties encountered on the TAMS.

**User Acceptance Test**

This testing phase is open to a selected testing group from the client side, and typically is a prerequisite to the Beta testing phase. The goal of this type of testing is to ensure that the testing team can review the components configured and make sure it meets the specifications outlined in the requirements matrix, this document is created during the Implementation Plans task.

Typically the 2 main goals of this type of testing are requirements validation and usability testing from the client end.

**Regression Test**

The goal of regression testing is to uncover any configuration or software errors by the "fix" of a part of the program to solve an issue. Although this can be done manually, by having a group of testing (typically part of the quality assurance team) test all inter-related functions which could have been affected by this bug fix, it is becoming increasingly popular to write tests for user-defined test cases that can be automated in such a situation.

**Operational Readiness Test**

DTS's philosophy to operational readiness testing is to eliminate any surprises with respect to the TAMS implementation early on. As part of the agile software methodology approach that the DTS team will follow, DTS will conduct automated deployments of configurations into the hosting environment on a periodic basis.

During the initial iterations of the project, the development team will work at setting up a test environment for initial and incremental deployments of the project. This environment will be the future deployment environment, or will very closely mimic the final deployment environment.

During operational readiness testing, the testing team will use the "Beta Testing Checklist" and review all the functionality in the system, on the "production/stage environment". This will ensure that any "system or configuration" issues are addressed in the deployed environment, before Beta testing is conducted in detail.





### **Beta Testing**

Once the system has been deployed into the hosted environment during operational readiness testing, the testing team will perform detailed testing of all user stories completed in the last iteration cycle in the hosted environment (stage) and thereafter prepare to hand over the system to the project team for the final user testing.

At the end of each iteration, the testing team will review the specifications for the components configured, to ensure that the component is meeting the user specifications outlined, and also test the functionality for each user story to ensure that it is working as intended.

A preliminary user manual or user interface mock-ups, detailing all the components which have completed configuration, along with a list of functions/tasks to be tested in specific roles will be handed to the project team before Beta testing.

### **Final Sign-off**

We will complete the steps below as part of our overall process to support sign-off and go-live activities:

- Assist State staff in the establishment and verification of the TAMS Production environment;
- Assist State staff in the migration of TAMS data from the Test environment to the Production environment;
- Participate in on-site Go-live activities as requested by the State Project Manager; and
- Obtain official sign-off from the State upon successful completion of Go-live activities.

### Performance Warranty Period

Contractor will provide a 90-day Performance Warranty for Solution in production, per Section 2.311 of Article 2.

### **Contractor's Agreement & Approach in regards to Section 1.104, E. Implementation Services – Performance Warranty Period**

<b>x</b>	I have reviewed the above section and agree with no exception.
	<p>The DTS team represents and warrants that Deliverables, after Final Acceptance, will perform and operate in compliance with the requirements and other standards of performance contained in this Contract (including all descriptions, specifications and drawings made a part of Contract) for a period of (90) ninety days. In the event of a breach of this warranty, the DTS team will promptly correct the affected Deliverable(s) at no charge to the State.</p> <p>The following items are included in the 90 day Performance Warranty Period:</p> <ul style="list-style-type: none"> <li>• LRS linear datum and associated LRMs</li> <li>• Lane Mile, Sign, Culvert and Guardrail Inventory event layers and attributes</li> <li>• Interface to the MDOT MIBridge system</li> <li>• Successful completion of pilot projects</li> <li>• TAMS UAT plan</li> <li>• Accepted Production TAMS Solution</li> <li>• Warranty services as required</li> </ul>

**Deliverable(s)**

- LRS linear datum and associated LRMs
- Lane Mile, Sign, Culvert and Guardrail Inventory event layers and attributes
- Interface to the MDOT MIBridge system
- Successful completion of pilot projects
- TAMS UAT plan
- Accepted Production TAMS Solution
- Warranty services as required
- Any other deliverable Contractor deems appropriate

**Acceptance Criteria**

- High-level acceptance criteria for Document Deliverables and Software Deliverables are listed in Section 1.501.
- Successful completion of the Performance Warranty shall be the criterion for final acceptance of the TAMS Solution.

<b>Contractor's Agreement in regards to Section 1.104, E. Implementation Services</b>	
<b>x</b>	I have reviewed the above section and agree with no exception.

**F. Training**

Contractor will provide a Train-the-Trainer solution for State administrative staff at a State facility in Lansing, MI for up to 20 staff members, who will provide training for all other State staff to use and administer Solution. Contractor shall conduct a minimum of two separate Train-the-Trainer sessions to ensure that all participants have an opportunity to attend the training. Each Train-the-Trainer session should be designed for minimum of 8 to 16 hours (i.e., 1 to 2 day of training). Training will include:

- Technical training for State individuals who will be working with the services contractor to configure the applications including but not limited to establishing databases and interfaces, data conversion, customization, and upgrading the customized software;
- System administration training for State personnel who will be responsible for ongoing maintenance and administration of the system, including security;
- End-User Training for designated State personnel responsible for entering changes to the MGF road network database and associated LRMs (Road Network Editor);
- End-User Training for designated State personnel responsible for entering new assets, modifying existing assets, and deleting assets (Asset Editor);
- End-User Training for designated State personnel responsible for entering work requests, work orders and other information associated with maintenance management activities (Maintenance Editor); and
- End-User Training for designated State personnel responsible for inquiry, reporting and analysis against TAMS data (Inquiry User).

Additionally, Contractor will provide online / web-based access to End-User Training, so that users can access the training as desired and when needed.

Contractor will provide training at no additional cost for all upgrades and new versions to the system that affect end-users.

**Deliverable(s)**

- Train-the-Trainer training and associated documentation
- Online / web-based access to End-User Training
- Additional training ((e.g. classroom or online / web-based training, training flier, release features, etc.) at no additional cost for all upgrades and new versions to the system that affect end-user functionality



Training is provided in a variety of formats for product installation, use, and administration for a variety of levels (e.g. basic, advanced, refresher, etc.)

All training manuals, training plans and other documentation provided become the property of the State.

#### Acceptance Criteria

- High-level acceptance criteria for Document Deliverables and Software Deliverables are listed in Section 1.501. Any additional or more specific criteria should be identified here.

#### Contractor's Agreement & Approach in regards to Section 1.104, F. Training

x	I have reviewed the above section and agree with no exception.
	<p><b>Training</b></p> <p>DTS has a wealth of training-related experience. In fact, DTS received an award from the American Planning Association and Federal Highway Administration for its development of the Sociocultural Effects Evaluation training program, delivered throughout the State of Florida. Moreover our training staff has conducted training for clients throughout the United States. Specific to TAMS implementations, training and support is one of the most critical of the project phases. To this end, DTS has extensive help documentation as well as routinely creates implementation-specific materials.</p> <div> </div> <div> </div> <p>We have Instructional Systems Designers (ISD) on-staff who are dedicated to developing training curriculum, resource toolkits, digital tooltips and user manuals. Additionally, we have full service multimedia capabilities to support HD video capture and production, interactive training media and 3-D animation. Our company is able to provide under one roof a combination of experience and services that spans from transportation planning professionals, to GIS and asset management technologies, to website design, programming and database development, to training development and the multimedia production capabilities to provide graphics, animations and video to support all of our disciplines.</p> <p>DTS personnel have delivered numerous training courses for clients including online courses, computer-based training courses, interactive training media, video and video simulation, tabletop exercises and stand-up training courses. <b>In addition, we typically deliver web-based "Resource Toolkits" that are customized to each type of TAMS user and administrator that is a job aid configured specifically to his/her business function. We have found this particularly useful when the user is focused on one particular area of interest and does not want to search through a large manual or complex help files.</b></p> <p>Our personnel have an extensive background in training for a variety of types of delivery. Our personnel have not only written the courseware content, but have also designed and developed the technology format in which it is delivered.</p> <p>Our unique combination of video production and web designers and programmers makes it convenient for our clients to use us on a variety of projects. Our references, project history and client list demonstrate the consistency of production and client satisfaction.</p> <p>The DTS will provide the State with a Train-the-Trainer solution for State administrative staff at a State facility in Lansing for up to 20 staff members. Once trained these State staff members will then have the required skill sets to provide training for all other State staff to use and administer the solution. DTS will conduct a minimum of two separate Train-the-Trainer sessions to ensure that all participants have an opportunity to attend the training. Each of these Train-the-Trainer sessions will be designed for minimum of 8 to 16 hours. The training will include:</p>



- Technical training for State individuals who will be working with the services contractor to configure the applications including but not limited to establishing databases and interfaces, data conversion, customization and upgrading the customized software;
- System administration training for State personnel who will be responsible for ongoing maintenance and administration of the system, including security;
- End-User Training for designated State personnel responsible for entering changes to the MGF road network database and associated LRMs (Road Network Editor);
- End-User Training for designated State personnel responsible for entering new assets, modifying existing assets, and deleting assets (Asset Editor);
- End-User Training for designated State personnel responsible for entering work requests, work orders and other information associated with maintenance management activities (Maintenance Editor); and
- End-User Training for designated State personnel responsible for inquiry, reporting and analysis against TAMS data (Inquiry User).

Here is an example of what is available as potential delivery mechanisms:

#### **Train the Trainer**

DTS realizes that train the trainer courses important for the sustainability of systematic, ongoing training. These sessions are a very effective way to train the system administrator responsible for understanding the total system as well as individual users or groups of users. Under this training model, the State's administrator(s) and other managers (as desired) can be trained either the training team or the actual DTS implementation team.

For a single department this is a highly effective method. It creates an in-house expert in the use of the system that keeps external training needs to an absolute minimum.

Under this training model, basic training manuals as well as context sensitive focus can be incorporated where desired.

#### **The model training curriculum is as follows:**

**Phase 1:** Identify customer staff that will be trained and subsequently become in-house trainers.

**Phase 2:** Develop any context sensitive focus desired (can be done at a later date as well).

**Phase 3:** Train the trainers.

This is done in a hands-on immersive setting, typically in a one-on-one setting. Training is heavily focused on making the student(s) subject-matter experts in the system, and then focusing on how the organization's business processes have been implemented. By understanding the underlying system architecture it becomes much simpler to train other users to use the system. This greatly facilitates the State's ability to configure and expand the system without any further assistance.

We find that one-on-one training for a minimum of two 4 to 6 hour sessions is optimal. After the initial one-on-one sessions, remote training is highly effective (e.g. GoToMeeting or WebEx). The duration of training is a function of the number of modules in use more than the number of user groups/roles. As with the enterprise training options, all training is done on an exact copy of the production system.

#### **Enterprise Training with Context Sensitive Focus**

This training option is the most thorough and comprehensive. The trainers begin developing the training curriculum early in the system's implementation. The training staff works closely with the implementation staff during the business process analysis phases of the project. This allows the training staff to perfectly understand the agency's workflows within the system on a user group by user group (e.g. "role") basis. The training team develops comprehensive training programs for each role – where field users will be trained in the use of the system as it specifically relates to how they need to get their jobs done, and where supervisors all the way up to senior managers are each trained to use the system specifically for their roles within the organization. An administrative role is included – where the customer always has a person(s) trained in the use of the system across \*all\* roles.



This training option includes “context sensitive” training materials. Our training staff will develop customized online materials, popups, manuals, resource toolkits, job aids, etc. that are specific to the agency’s business processes and user roles.

**The model training curriculum is as follows:**

**Phase 1:** Define all agency user roles and related business processes to be supported by the implemented system. This is done in tandem with the implementation team.

**Phase 2:** Develop training storyboards with the agency’s administrative user(s). The administrative user(s) will be the customer side PM to work with our training team to approve training course content.

**Phase 3:** For each role, create context sensitive media/materials that are embedded into the application, help files and training manual(s) in hardcopy and digital form.

**Phase 4:** Training a number of groups to train is driven by the number of roles in the organization. The size of a group is determined by the agency’s timeline for training, facility size available and complexity of the role being trained. Duration of training is driven by the complexity of the role being trained:

- We prefer to limit training to 3 hours maximum in a given day to maintain optimal focus in the students, and to allow normal work duties to continue as best as possible.
- Depending on the customer’s ability to commit staff to training in lieu of performing their normal work activities, the number of training sessions and the duration of the sessions may be affected.

Training is done on an exact copy of the production version of the agency’s final TAMS implementation.

**End User Training**

DTS steps through the use of the system with actual end users in a classroom setting. The VUEWorks Administrator and the SME(s) will attend and will play a dual role: receiving training as well as assisting with the training. The format is informal, where DTS staff will take the new system users through an overview of the application and then proceed to walk through activities correctly. It is critical that the VUEWorks Administrator and the SME(s) understand that their role throughout the implementation process is to correctly define and articulate the workflow process, with signoff at key steps along the way.

The VUEWorks Administrator will be expected to have already taken ownership of the VUEWorks configuration prior to the end user training, and will be fully capable of modifying the system as necessary to refine processes, workflows and configurations for the agency. Training should occur in an agency room/facility where trainees can sit at a computer that has access to the TAMS application. Doubling up or sharing a computer is often beneficial. A projector and screen is useful so students can follow along with the instructor.

**Other Training Tools Available:**

**Training Workshops**

Training workshops will be an important part of the development and implementation of this training. The workshops will be geared specifically to roll out the course and will include training workshops for:

- internal users (a variety of types of users will be trained)
- external users
- training the trainers

**Online or Web-based Training**

Web-based or online training is the most effective and most contemporary training methodology for software system training. The training can be modified and changes can be implemented immediately, as opposed to printed and published handbooks that can be outdated a month after publication. Decisions will need to be address to determine which types of users and courses will be developed to meet specific needs:

- Employing or not employing an LMS (learning Management System)
- Graded or non-graded structure/design
- Simple confirmation of a trainee finishing the course (non-graded)
- Certificate awards for finishing the course
- Training that is available at the individual’s own pace
- Online training available during certain time frames





### Manuals (Handbook) and Documentation

User manuals will be user-friendly with an inviting style and an easy-to-use reference format, including SMART Tips and practical information. These will be available online, in PDF format with users notified when updates are available.

### Resource Toolkit

The Resource Toolkit is a collection of resources, developed and targeted for users. For instance, an external user of the does not need to have all of the training information that a system operator or staff person needs. So resource toolkits will for the end user. These will be a combination of quick helps, handouts and references. They will also include:

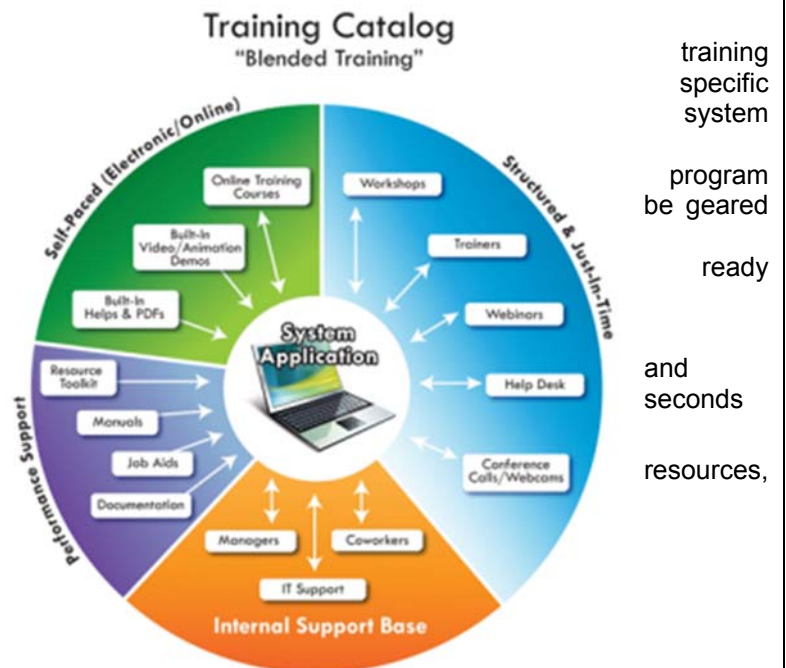
- Flash video “how to” demonstrations (audio narration screen captures that are a few to a few minutes long)
- Interactive training media with maps, job aids, videos and animations as required
- Printed guides for specific users

### Built-In Tool Tips

The software application will have built-in helps and prompts for users.

### Webinars

Training webinars are a very advantageous form of training because the training can be made available as needed to address specific training needs. These courses can be flexible and customized for large groups of users or for select, small groups.



## G. Documentation

Contractor is responsible to provide a complete set of Solution documentation to the State including but not limited to the deliverables specified below.

### Deliverable(s)

- User manuals
- Technical manuals
  1. Copies of the following documentation in electronic PDF format will be provided:
    - a. User and Technical Manuals - On-line and Hard Copy
    - b. Data Element Dictionary
    - c. Operations Manual
    - d. All updates of documentation during the term of Contract, software license and maintenance agreement
  2. The following documentation is provided for all modules and program development:
    - a. System-wide documentation and specifications
    - b. Baseline End-User training manuals to be used as a basis for “User Manuals” and online / web-based help
    - c. Installation procedure



- d. Module configuration documents sufficient for configuration maintenance purposes
- e. Testing scripts
- f. Specification documentation
- g. Production migration
3. The documentation of components, features, and use of the hardware/software shall be detailed such that resolution of most problems can be determined from the documentation, and most questions can be answered.
4. All system, operational, user, change, and issue documentation must: be available in electronic format; published to an intranet website accessible to State users; updated regularly; include unique numerical identifiers for each section, and: be consistent with the most current version of the application(s) and three (3) previous versions.
5. All system, operations, user, change and issue documentation is to be organized in a format approved by the State and that facilitates updating and allows for revisions to the documentation to be clearly identified including the three (3) previous versions.
6. Contractor must develop and submit for State approval complete, accurate, and timely system, operations, and user documentation.
7. Contractor must notify the State of any discrepancies or errors outlined in the system, operations, and user documentation.

#### Acceptance Criteria

- High-level acceptance criteria for Document Deliverables and Software Deliverables are listed in Section 1.501. Media format(s) for documentation are subject to approval by the State.

Contractor's Agreement & Approach in regards to Section 1.104, G. Documentation	
x	I have reviewed the above section and agree with no exception.
	<p>User manuals and technical documents will be user-friendly with an inviting style, easy-to-use reference format, and with Tool Tips and practical information. These will also be available in on-line, PDF formats, which also makes updating page changes less costly (instead of re-printing and publishing, the on-line PDF is updated and users are notified).</p> <p>DTS will provide the training and required documentation as outlined below. In addition, DTS is willing to work with the State to determine other training types/delivery methods as we understand that not every user learns a system in the same way.</p> <p>DTS will provide training materials to train MDOT personnel in the use and maintenance of the system. The DTS team will initiate development of the VUEWorks, Roads and Highways and SLD Tool Training Materials once DTS has provided written acceptance of the Final Training Plan document. Training documentation will augment the TAMS online help documentation and will be relevant to the MDOT deployment.</p> <p>Materials will be developed to support training MDOT personnel to perform the basic workflows of the of Roads and Highways solution. This will include training in the use of the TAMS desktop and web-based components. Training materials will also address training of the GIS group on how to add other events and add more users (i.e. from other business units).</p> <p>Training Materials will be a combination of Microsoft PowerPoint presentations and Microsoft Word exercises. The class materials and exercises will be scenario based, incorporating MDOT's workflows known from this project and the TAMS operational procedures as defined during the configuration and design tasks of the project.</p> <p><b>Resource Toolkit</b> The Resource Toolkit is a collection of training resources for specific users. These can be developed and targeted to the user. For instance, an external user of the system does not need to have all of the training information that a systems operator or program staff person needs. So resource toolkits will be geared for the end user. These will be a combination of quick helps, handouts and ready references. They will also include:</p>



- Flash Video “How To” demonstrations (audio narration and screen captures that are a few seconds to a few minutes long)
- Interactive training with resources, maps, job aids, videos and animations as required
- Printed Guides for Specific Users

DTS will provide a complete set of solution documentation to the State as listed in deliverables above.

## H. Maintenance and Support

Contractor is responsible for providing ongoing maintenance and support of the TAMS Solution to the State including but not limited to the deliverables specified below. Contractor is requested to specify any additional maintenance and support features provided in addition to those specified under Deliverables below. The resulting contract will integrate the attached schedule, Schedule A – Maintenance and Support, with this section (Section H – Maintenance and Support). Schedule A includes response and resolution times.

- Help Desk
- Onsite Technical Support
- Solution Release Management Support

### Deliverable(s)

- Maintenance of TAMS Solution software:
  - Maintenance is available on an annually renewable contract.
  - Maintenance programs commence at the end of the 90-day warranty period.
  - The software maintenance program includes all future software updates and system enhancements applicable to system modules licensed without further charge to all licensed users maintaining an annually renewable software support contract.
- Support
  - Help Desk
    - Help desk support is available from 6 am – 6 pm Eastern Time Monday through Friday inclusive, with escalation as necessary to senior technical/engineering staff, and then to higher management and/or senior management.
    - A Web-enabled help desk interface is provided at no additional cost.
  - Technical
    - Remote diagnostic capabilities are provided.
    - Onsite support capabilities as needed (referred to as Second Line Support in Schedule A).
    - Support service options are provided including service from 6 am – 6 pm Eastern Time Monday through Friday inclusive, including onsite service (next day after remote support is determined unable to resolve).
    - Emergency assistance is available from 6 am – 6 pm Eastern Time Monday through Friday inclusive, at no additional cost to the State.
    - The State will be provided with information on software problems encountered at other locations, along with the solution to those problems, when such information is relevant to State software.
    - Support is provided for superseded releases and back releases still in use by the State.
    - For the first year and all subsequent Contract years, the following services are provided for the current version and one previous version of any Software provided with the deliverables, commencing upon installation of the deliverables or delivery of the Software:





1. **Error Correction.** Upon notice by State of a problem with the Software (which problem can be verified), reasonable efforts to correct or provide a working solution for the problem.
2. **Material Defects.** The State will be notified of any material errors or defects in the deliverables known, or made known to Contractor from any source during Contract term that could cause the production of inaccurate, or otherwise materially incorrect results; Contractor shall initiate actions as may be commercially necessary or proper to effect corrections of any such errors or defects.
3. **Updates.** All new releases and bug fixes (collectively referred to as “Changes”) for any software deliverable developed or published by Contractor and made generally available to its other customers at no additional charge will be provided to the State at no additional charge.

#### Acceptance Criteria

- High-level acceptance criteria for Document Deliverables and Software Deliverables are listed in Section 1.501. Contractor agrees to the terms and conditions specified under Deliverables above.

#### Contractor’s Agreement & Approach in regards to Section 1.104, H. Maintenance and Support and Schedule A – Maintenance and Support

<b>x</b>	I have reviewed the above section and agree with no exception.
	<p><b>Technical Support and Help Desk</b></p> <p>DTS will provide an account manager assigned to the state agency, to assist with set-up, state agency administrator and principle administrator training and ongoing support. The account manager will be our Project Manager.</p> <p>DTS will provide the agency a contact phone number that the state agency can use to report technical system problems. DTS currently provides a toll free line for its clients as well as direct contact to the VUEWorks support structure. In fact, depending on the issue, our clients have access to development/implementation resources to talk directly and work through issues on a case-by-case basis.</p> <p>DTS will provide technical/help desk support Monday through Friday that overlap with the normal state agency operating hours of 6:00 a.m. to 6:00 p.m. EST. In fact, VUEWorks support is currently provided from 6:00 a.m. to 8:00 p.m. Eastern time for our customers.</p> <p>DTS support staff will keep a log of all maintenance/technical support calls made to the help desk/technical support personnel, and document the complaints and problems reported to the help desk system by State agency staff utilizing the websites. This log will be made available to the State upon request. A Customer Relationship Management System is used that includes a complete reporting and web-based visualization tool to view any problems including the details listed below.</p> <p>The log will contain the following information:</p> <ul style="list-style-type: none"> <li>• Time of call</li> <li>• Name of caller</li> <li>• Caller’s telephone number and/or email address</li> <li>• Description of reported problem/complaint</li> <li>• Indication of whether the problem/complaint was resolved at time of call</li> <li>• Description of any follow-up investigation/resolution plans</li> <li>• Assigned case number if resolution not provided during call</li> <li>• Date of and description of final resolution</li> </ul>



DTS will make electronic support available to the State upon award of Contract. We understand that electronic support should include the ability to report problems to our support staff on-line, the ability to browse a database containing problems, technical questions and the ability to fix problems electronically. A web-based troubleshooting report application is maintained that can be used to review ongoing tasks and support issues as well as estimates to complete and client acceptance of fixes.

### System Maintenance

DTS will provide system maintenance that includes but is not limited to upgrades, enhancements, new releases and technical support for all products/services provided including ongoing unlimited telephone technical support problem determination and resolution. We understand that this is contingent on the State paying the maintenance/purchase/subscription fees as specified within Schedule A. DTS will provide to the State all generally publicly available improvements and additions to the functionality, as well as new functions, of the licensed system and provide the maintenance services as specified herein. At least one new major VUEWorks release is provided each year as well as service packs to go with 3<sup>rd</sup> party vendor updates (Esri, Microsoft, Oracle, etc.).

DTS will maintain the licensed system so that it operates in conformity with all descriptions and specifications stated herein and as applicable in Contract Exhibits/Attachments including specifications for the performance of all improved or modified versions that the state agency has been licensed to use. We understand that any system components upgrades must accommodate and maintain the state agency baseline configurations required to fulfill the mandatory specifications in Contract.

DTS understands maintenance services shall include, at a minimum, the detection and correction of system errors according to the specifications described herein, in the applicable Exhibits/Attachment and in our team's documentation of the system and the implementation of all program changes, system configuration, new releases/updates, upgrades, enhancements, new versions and implementation of additional programs provided under this contract. We agree to respond to the State's inquiries regarding the use and functionality of the solution as issues are encountered by system users.

For the first year and all subsequent Contract years, the following services are provided for the current version and one previous version of any software provided with the deliverables, commencing upon installation of the deliverables or delivery of the Software:

1. **Error Correction.** Upon notice by State of a problem with the Software (which problem can be verified), reasonable efforts to correct or provide a working solution for the problem.
2. **Material Defects.** The State will be notified of any material errors or defects in the deliverables known, or made known to Contractor from any source during Contract term that could cause the production of inaccurate, or otherwise materially incorrect results; Contractor shall initiate actions as may be commercially necessary or proper to effect corrections of any such errors or defects.
3. **Updates.** All new releases and bug fixes (collectively referred to as "Changes") for any software deliverable developed or published by DTS and made generally available to its other customers at no additional charge will be provided to the State at no additional charge.

## I. Knowledge Transfer/Transition

Contractor is responsible to liaise with State technical staff identified by Client to ensure that ample opportunity is provided for knowledge transfer during the performance of TAMS Solution installation, configuration, application integration, data migration and other implementation service activities. Contractor will work with State IT technical staff to prepare a Solution Transition Plan that will describe how the transfer of responsibility for TAMS Solution support will occur as part of the Go-live activity.

### Deliverable(s)

- Knowledge transfer to State Staff
- Solution Transition Plan



### Acceptance Criteria

- High-level acceptance criteria for Document Deliverables and Software Deliverables are listed in Section 1.501.
- Contractor proposed approach to knowledge transfer will be monitored for effectiveness during Solution Implementation activities and may require adjustments. Solution Transition Plan requires State approval.

#### Contractor's Agreement in regards to Section 1.104, I. Knowledge Transfer/Transition

x	I have reviewed the above section and agree with no exception.
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### J. Reserve Bank of Hours / Other Services

Contractor agrees to provide additional services as required to meet requirements stated within this section.

#### Contingency Services

The State intends to establish a contingency reserve of resource hours that may be used to address scope changes encountered during the project. Contractor is responsible to ensure that technical resources are available to address this requirement at agreed upon all inclusive fixed rates.

#### Release Management Services

The State may request technical support services to install, configure, test and migrate new TAMS Solution software releases to Production. Contractor is responsible to provide estimates of required support hours and associated expenses upon request by the State, and to ensure that technical resources are available to address this requirement at agreed upon fixed rates.

### Deliverable(s)

- Contingency services to meet new requirements (1,500 hours)
- Release management services – upon request

### Acceptance Criteria

Contractor agrees to provide additional services upon request from the State. Firm hourly rates for these services are to be provided for a five (5) year period commencing with the project start date as outlined in Table 9 and Table 10 in the Attachment B Cost Tables.

#### Contractor's Agreement in regards to Section 1.104, J. Other Services

x	I have reviewed the above section and agree with no exception.
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## II. Requirements

This section defines requirements for the TAMS Solution. Contractor is responsible to ensure that a response is provided where indicated below to address these requirements.

### A. Technical System Requirements

TAMS Solution technical/general system requirements identify what Solution or product must run on or integrate with, including any standards that must be met, security requirements, service levels and interfaces. Technical/general system requirements will also identify the general framework in which the system or product must work, such as: capacity requirements (number of users, concurrent users, number of transactions to be handled, peak usage), documentation, audit, backup and recovery. These requirements are defined in detail within the attachment specified below.



## B. Functional Requirements

TAMS Solution functional requirements identify what the product or system must do to enable performance of work tasks and any applicable service levels. These requirements are defined in detail within the attachment specified below.

**Contractor has completed Attachment A Solution Requirements and it is attached to Contract.**

x	Attachment A – Solution Requirements
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### 1.200 Roles and Responsibilities

#### 1.201 CONTRACTOR STAFF, ROLES, AND RESPONSIBILITIES

##### A. Contractor Staff

Contractor has identified a Single Point of Contact (“**SPOC**”). The SPOC is:

Allen Ibaugh  
CEO  
Data Transfer Solutions, LLC

The duties of the SPOC shall include, but not be limited to:

- Supporting the management of Contract,
- Facilitating dispute resolution, and
- Advising the State of performance under the terms and conditions of Contract.

The State reserves the right to require a change in the current SPOC if the assigned SPOC is not, in the opinion of the State, adequately serving the needs of the State.

Contractor must submit a letter of commitment for Key Personnel, signed by the identified resource, stating their commitment to work for Contractor/subcontractor on this project contingent on award of Contract. If the identified personnel are currently assigned to a State project Contractor must provide a letter signed by the State Project Manager releasing the individual from the project upon execution of Contract.

Contractor will provide, and update when changed, an organizational chart indicating lines of authority for personnel involved in performance of this Contract and relationships of this staff to other programs or functions of the firm. This chart must also show lines of authority to the next senior level of management and indicate who within the firm will have prime responsibility and final authority for the work.

All Key Personnel may be subject to the State’s interview and approval process. Any key staff substitution must have the prior approval of the State. The State has identified the following as key personnel for this project:

- *Project Manager*
- *Solution Architect*
- *Solution Trainer*

#### Contractor’s Key Personnel

Project Manager – Sangeeta Reddy, DTS, 100% of time dedicated to TAMS.

Solution Architect – Kristen Koehn, DTS, 55% of time dedicated to TAMS.

Solution Trainer – Charles Brown, DTS, 25% of time dedicated to TAMS.



**Contractor will provide a Project Manager** to interact with the designated personnel from the State to insure a smooth transition to the new system. To facilitate project communication and scheduling, a project manager with PMP certification is requested. The project manager will coordinate all of the activities of Contractor personnel assigned to the project and create all reports required by State. Contractor's project manager responsibilities include, at a minimum:

- Manage all defined Contractor responsibilities in this Scope of Services.
- Manage Contractor's sub-contractor if any
- Develop the project plan and schedule, and update as needed
- Serve as the point person for all project issues
- Coordinate and oversee the day-to-day project activities of the project team
- Assess and report project feedback and status
- Escalate project issues, project risks, and other concerns
- Review all project deliverables and provide feedback
- Proactively propose/suggest options and alternatives for consideration
- Utilize change control procedures
- Prepare project documents and materials
- Manage and report on the project's budget

**Contractor will provide a System Architect** to design, configure, and implement the proposed TAMS solution. The System Architect should be a skilled, experienced individual that will accept responsibility for leading the design and implementation of the proposed solution in the MDOT environment.

**Contractor will provide a Trainer** to be responsible for delivering training in the use of the proposed solution within the MDOT environment. Experience in effective delivery of training and in depth knowledge of Contractor's solution is required.

Contractor will provide sufficient qualified staffing to satisfy the deliverables of this Statement of Work.

## **B. On Site Work Requirements**

### **1. Location of Work**

As necessary and as determined by the State, the work is to be performed, completed, and managed in the greater Lansing, Michigan area. Where appropriate, Contractor may perform work at their location.

### **2. Hours of Operation:**

- a. Normal State working hours are 8:00 a.m. to 5:00 p.m. EST, Monday through Friday, with work performed as necessary after those hours to meet project deadlines. No overtime will be authorized or paid.
- b. The State is not obligated to provide State management of assigned work outside of normal State working hours. The State reserves the right to modify the work hours in the best interest of the project.
- c. Contractor shall observe the same standard holidays as State employees. The State does not compensate for holiday pay.

### **3. Travel:**

- a. No travel or expenses will be reimbursed. This includes travel costs related to training provided to the State by Contractor.
- b. Travel time will not be reimbursed.

### **4. Additional Security and Background Check Requirements:**

Contractor must present certifications evidencing satisfactory Michigan State Police Background checks, ICHAT, and drug tests for all staff identified for assignment to this project.

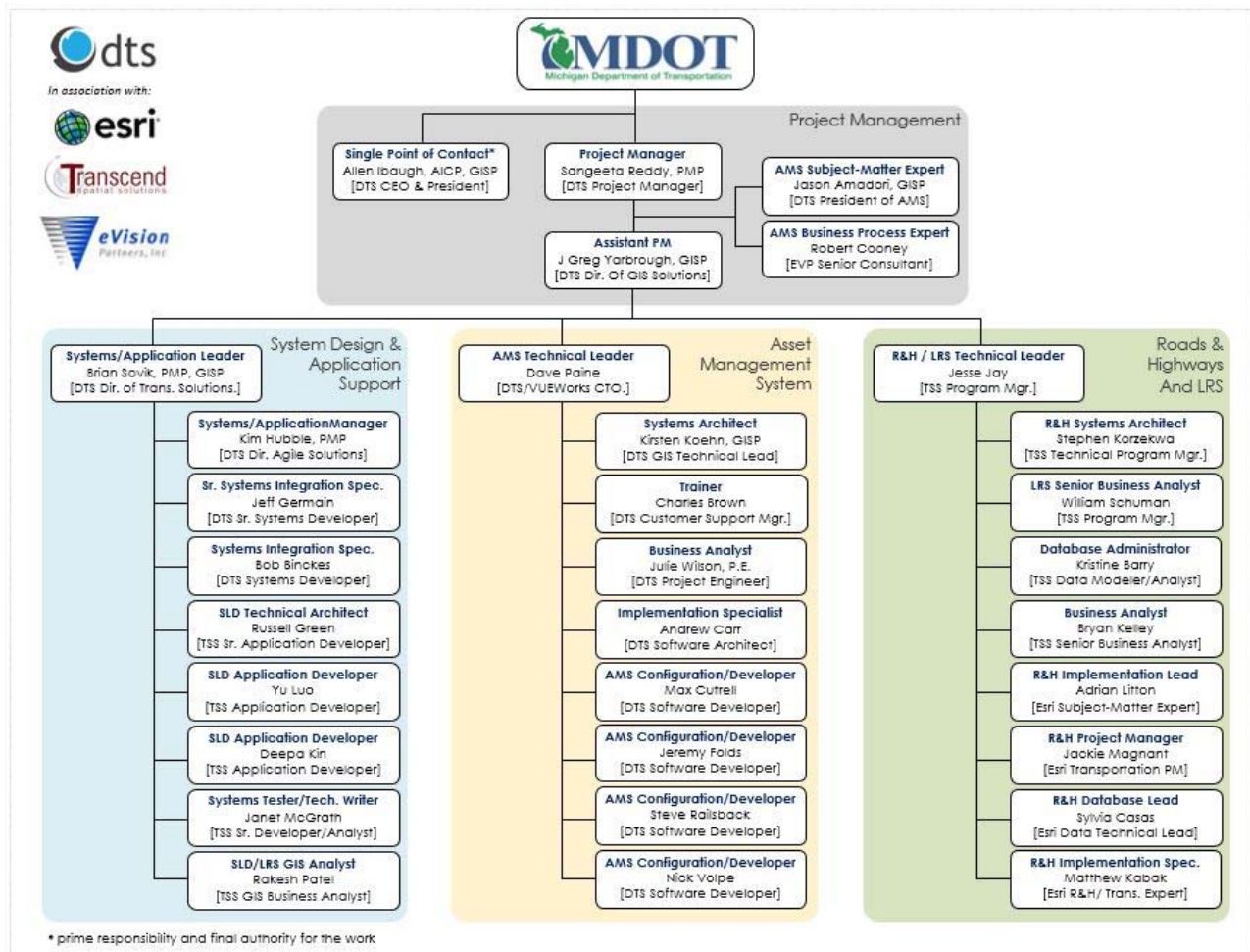


In addition, proposed Contractor personnel will be required to complete and submit an RI-8 Fingerprint Card for the National Crime Information Center (“NCIC”) Finger Prints, if required by project.

Contractor will pay for all costs associated with ensuring their staff meets all requirements.

### Contractor’s Agreement & Approach in regards to Section 1.201, Contractor Staff Roles & Responsibilities

x I have reviewed the above section and agree with no exception.



### 1.202 STATE STAFF, ROLES, AND RESPONSIBILITIES

Agency should specify State personnel dedicated to project, and identify their associated roles and responsibilities.

The State will provide the following resources for Contractor’s use on this project:

- Work space
- Minimal clerical support
- Desk
- Access to copiers and fax machine





The State project team will consist of Executive Subject Matter Experts (“**SMEs**”), project support, and a DTMB and Agency project manager:

#### **Executive Subject Matter Experts**

The Executive Subject Matter Experts representing the business units involved will provide the vision for the business design and how the application shall provide for that vision. They shall be available on an as needed basis. The Executive SMEs will be empowered to:

- Resolve project issues in a timely manner
- Review project plan, status, and issues
- Resolve deviations from project plan
- Provide acceptance sign-off
- Utilize change control procedures
- Ensure timely availability of State resources
- Make key implementation decisions, as identified by Contractor’s project manager, within 48-hours of their expected decision date.

The State will identify SMEs as needed over the course of this project.

#### **State Project Manager- (DTMB and Agency)**

DTMB will provide a Project Manager who will be responsible for the State’s infrastructure and coordinate with Contractor in determining the system configuration.

The State’s Project Manager will provide the following services:

- Provide State facilities, as needed
- Coordinate the State resources necessary for the project
- Facilitate coordination between various external Contractors.
- Facilitate communication between different State departments/divisions
- Provide acceptance and sign-off of deliverable/milestone
- Review and sign-off of timesheets and invoices
- Resolve project issues
- Escalate outstanding/high priority issues
- Utilize change control procedures
- Conduct regular and ongoing review of the project to confirm that it meets original objectives and requirements
- Document and archive all important project decisions
- Arrange, schedule and facilitate State staff attendance at all project meetings.

The State will identify a Project Manager as needed over the course of this project.

DTMB shall provide a Contract Administrator whose duties shall include, but not be limited to, supporting the management of Contract. The State will identify a Contract Administrator as needed over the course of this project. DTMB will name a Contract Administrator upon execution of Contract.

#### **Contractor’s Response in regards to Section 1.202, State Staff, Roles & Responsibilities**

x	I have reviewed the above section and agree with no exception.
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## 1.203 RESERVED

### 1.300 Project Plan

#### 1.301 PROJECT PLAN MANAGEMENT

##### **Preliminary Project Plan**

Contractor will provide a Preliminary Project Plan with the proposal for evaluation purposes, including necessary time frames and deliverables for the various stages of the project and the responsibilities and obligations of both Contractor and the State.

1. In particular, the Preliminary Project Plan will include a MS Project plan or equivalent:
  - a. A description of the deliverables to be provided under this contract.
  - b. Target dates and critical paths for the deliverables.
  - c. Identification of roles and responsibilities, including the organization responsible. Contractor is to provide a roles and responsibility matrix.
  - d. The labor, hardware, materials and supplies required to be provided by the State in meeting the target dates established in the Preliminary Project Plan.
  - e. Internal milestones
  - f. Task durations
2. The Preliminary Project Plan shall include the following deliverable/milestones for which payment shall be made.
  - a. Payment to Contractor will be made upon the completion and acceptance of the deliverable or milestone, not to exceed contractual costs of the phase. A milestone is defined as complete when all of the deliverables within the milestone have been completed.
  - b. Failure to provide deliverable/milestone by the identified date may be subject to liquidated damages as identified in Article 2.

Note: A Final Project Plan will be required as stated in Article 1, Section 1.301 Project Control.

##### **Orientation Meeting**

Within 10 calendar days from execution of Contract, Contractor will be required to attend an orientation meeting to discuss the content and procedures of Contract. The meeting will be held in Lansing, Michigan, at a date and time mutually acceptable to the State and Contractor. The State shall bear no cost for the time and travel of Contractor for attendance at the meeting.

##### **Performance Review Meetings**

The State will require Contractor to attend monthly meetings, at a minimum, to review Contractor's performance under Contract. The meetings will be held in Lansing, Michigan, or by teleconference, as mutually agreed by the State and Contractor. The State shall bear no cost for the time and travel of Contractor for attendance at the meeting.

##### **Project Control**

1. Contractor will carry out this project under the direction and control of DTMB and MDOT.
2. Within 30 working days of the execution of Contract, Contractor will submit to the State project manager(s) for final approval of the project plan. This project plan must be in agreement with Article 1, Section 1.104 Work and Deliverables, and must include the following:
  - *Contractor's project organizational structure.*
  - *Contractor's staffing table with names and title of personnel assigned to the project. This must be in agreement with staffing of accepted proposal. Necessary substitutions due to change of*





*employment status and other unforeseen circumstances may only be made with prior approval of the State.*

- *The project work breakdown structure (“WBS”) showing sub-projects, activities and tasks, and resources required and allocated to each.*
  - *The time-phased plan in the form of a graphic display, showing each event, task, and decision point in the WBS.*
3. Contractor will manage the project in accordance with the State Unified Information Technology Environment (SUITE) methodology, which includes standards for project management, systems engineering, and associated forms and templates which is available at <http://www.michigan.gov/suite>
- a. Contractor will use an automated tool for planning, monitoring, and tracking Contract’s progress and the level of effort of any Contractor personnel spent performing Services under Contract. The tool shall have the capability to produce:
- Staffing tables with names of personnel assigned to Contract tasks.
  - Project plans showing tasks, subtasks, deliverables, and the resources required and allocated to each (including proposed Services to be performed within the next two (2) weeks updated bi-weekly).
  - Graphs showing critical events, dependencies and decision points during the course of Contract.
- b. Any tool(s) used by Contractor for such purposes must produce information of a type and in a manner and format that will support reporting in compliance with the State standards.

**Contractor’s Agreement in regards to Section 1.301, Project Plan Management**

<b>x</b>	I have reviewed the above section and agree with no exception.
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### 1.302 REPORTS

Reporting formats must be submitted to the State’s Project Manager for approval within five (5) business days after the execution of Contract resulting from this Contract. Once both parties have agreed to the format of the report, it shall become the standard to follow for the duration of Contract.

Contractor will provide a bi-weekly Project Update Report on the overall status to implement Solution, which will include:

- Updated project plan
- Deliverable status
- Schedule status
- Issues

**Contractor’s Agreement in regards to Section 1.302, Reports**

<b>x</b>	I have reviewed the above section and agree with no exception.
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### **1.400 Project Management**

#### 1.401 ISSUE MANAGEMENT

An issue is an identified event that if not addressed may affect schedule, scope, quality, or budget.

Contractor shall maintain an issue log for issues relating to the provision of services under this Contract. The issue management log must be communicated to the State’s Project Manager on an agreed upon schedule, with email notifications and updates. The issue log must be updated and must contain the following minimum elements:



- Description of issue
- Issue identification date
- Responsibility for resolving issue.
- Priority for issue resolution (to be mutually agreed upon by the State and Contractor)
- Resources assigned responsibility for resolution
- Resolution date
- Resolution description

Issues shall be escalated for resolution from level 1 through level 3, as defined below:

Level 1 – Subject Matter Experts (SMEs) / Business leads

Level 2 – Project Managers / Business Owner

Level 3 – Executive Sponsor

#### Contractor Agreement to Section 1.401 Issue Management

Contractor must check one of the boxes below:

☒ Can comply with State standards referenced in this section, without exception

### 1.402 RISK MANAGEMENT

Contractor is responsible for establishing a risk management plan and process, including the identification and recording of risk items, prioritization of risks, definition of mitigation strategies, monitoring of risk items, and periodic risk assessment reviews with the State.

A risk management plan format shall be submitted to the State for approval within twenty (20) business days after the effective date of Contract resulting from the upcoming Contract. The risk management plan will be developed during the initial planning phase of the project, and be in accordance with the State's PMM methodology. Once both parties have agreed to the format of the plan, it shall become the standard to follow for the duration of Contract. The plan must be updated bi-weekly, or as agreed upon.

Contractor shall provide the tool to track risks. Contractor will work with the State and allow input into the prioritization of risks.

Contractor is responsible for identification of risks for each phase of the project. Mitigating and/or eliminating assigned risks will be the responsibility of Contractor. The State will assume the same responsibility for risks assigned to them.

#### Contractor Agreement to Section 1.402 Risk Management

Contractor must check one of the boxes below:

☒ Can comply with State standards referenced in this section, without exception

### 1.403 CHANGE MANAGEMENT

Change management is defined as the process to communicate, assess, monitor, and control all changes to system resources and processes. The State also employs change management in its administration of Contract.

If a proposed contract change is approved by the Agency, Contract Administrator will submit a request for change to the Department of Technology, Management and Budget, Procurement Buyer, who will make recommendations to the Director of DTMB-Procurement regarding ultimate approval/disapproval of change request. If the DTMB Procurement Director agrees with the proposed modification, and all required approvals



are obtained (including State Administrative Board), the DTMB-Procurement Buyer will issue an addendum to Contract, via a Contract Change Notice. **Contractors who provide products or services prior to the issuance of a Contract Change Notice by DTMB-Procurement, risk non-payment for the out-of-scope/pricing products and/or services.**

Contractor must employ change management procedures to handle such things as “out-of-scope” requests or changing business needs of the State while the migration is underway.

Contractor will employ the change control methodologies to justify changes in the processing environment, and to ensure those changes will not adversely affect performance or availability.

Contractor Agreement to Section 1.403 Change Management	
Contractor must check one of the boxes below:	
<input checked="" type="checkbox"/>	Can comply with State standards referenced in this section, without exception

### **1.500 Acceptance**

#### **1.501 CRITERIA**

##### **Document Deliverables**

1. Documents are dated and in electronic format, compatible with State of Michigan software in accordance with Article 1.302.
2. Requirements documents are reviewed and updated throughout the design/configuration/implementation process to assure requirements are delivered in the final product.
3. Draft documents are not accepted as final deliverables.
4. The documents will be reviewed and accepted in accordance with the requirements of Contract and Attachments.
5. DTMB will review documents within the timeframes detailed in section 2.250 Approval of Deliverables.
  - a. Approvals will be written and signed by DTMB Project Manager.
  - b. Issues will be documented and submitted to Contractor.
  - c. After issues are resolved or waived, Contractor will resubmit documents for approval within 30 days of receipt.

#### **1.502 FINAL ACCEPTANCE**

*Final acceptance is expressly conditioned upon completion of ALL deliverables/milestones, completion of ALL tasks in the project plan as approved, completion of ALL applicable inspection and/or testing procedures, and the certification by the State that Contractor has met the defined requirements. For purposes of this Contract, please refer to Section 1.104 Work and Deliverable, Subsection D, implementation, regarding the Performance Warranty, which must be successfully completed prior to final acceptance.*

### **1.600 Compensation and Payment**

#### **1.601 COMPENSATION AND PAYMENT**

##### **Method of Payment**

1. Project Payments



Payments to Contractor will be made on a defined milestone basis upon the completion and acceptance of the deliverable or milestone, not to exceed 90% of contractual costs of the associated Contract items as defined in Attachment B Cost Tables. A milestone is defined as complete when all of the deliverables within the milestone have been completed. Failure to provide deliverable/milestone by the identified date may be subject to liquidated damages as identified in Article 2, Section 2.073.

Payment milestones are specified within the table below along with the associated payments per Contract items.

Milestone	Description	Associated Contract Items (Attachment B)	Estimated Acceptance Date	Payment
1	<p>Upon successful delivery of the agreed Software licenses, executable code and set-up and installation scripts, and instructions to the State on agreed upon media.</p> <p>Upon successful completion of the following activities and deliverables as described within Article 1.104 Work and Deliverables:</p> <ul style="list-style-type: none"> <li>Project Initiation Services</li> </ul>	<p>Table 1 Item A – COTS Software Acquisition</p> <p>Table 1 Item B – Project Initiation Services</p>	7/15/15	\$593,395.00
2	<p>Upon successful completion of the following activities and deliverables as described within Article 1.104 Work and Deliverables:</p> <ul style="list-style-type: none"> <li>Installation and Configuration Services.</li> </ul>	Table 1 Item D – Installation and Configuration Services	8/15/15	\$88,889.00
3	<p>Upon successful completion of the following activities and deliverables as described within Article 1.104 Work and Deliverables:</p> <ul style="list-style-type: none"> <li>Requirements and Solution Architecture Validation Services.</li> </ul>	Table 1 Item C – Requirements and Solution Architecture Validation Services	10/1/2015	\$258,054.00
4	<p>Upon successful completion of the following activities and deliverables for <b>COTS System Focused Configurations – Lane Inventory, Signs, and Guardrails</b> as described within Article 1, Section 1.104 Work and Deliverables:</p> <ul style="list-style-type: none"> <li>Installation and Configuration Services, and</li> <li>Implementation Services – Data Conversion / Migration, and</li> <li>Testing; and</li> <li>Production Go-live.</li> </ul>	Table 5 Item D and E.1, E.4, E.5 (payments for these are divided across Milestone 4, 5, 7, 8, and 10).	12/1/2015	\$222,715.00
5	<p>Upon successful completion of the following activities and deliverables for <b>COTS System Focused Configurations – Culverts; and SLD Design &amp; Implementation</b> as described within Article 1, Section 1.104 Work and Deliverables:</p> <ul style="list-style-type: none"> <li>Installation and Configuration Services, and</li> <li>Implementation Services – Data Conversion / Migration, and</li> <li>Testing; and</li> <li>Production Go-live.</li> </ul>	Table 5 Item D and E.1, E.4, E.5 (payments for these are divided across Milestone 4, 5, 7, 8, and 10).	2/1/2016	\$222,715.00



Milestone	Description	Associated Contract Items (Attachment B)	Estimated Acceptance Date	Payment
6	<p>Upon successful completion of the following activities and deliverables as described within Article 1.104 Work and Deliverables:</p> <ul style="list-style-type: none"> <li>Implementation Services – Interfaces / Integration.</li> </ul>	Table 5 Item E Row E.2 – Total Interfaces / Integration	4/1/2016	\$317,344.00
7	<p>Upon successful completion of the following activities and deliverables for <b>FINAL: Module Level Configuration</b> as described within Article 1, Section 1.104 Work and Deliverables:</p> <ul style="list-style-type: none"> <li>Installation and Configuration Services, and</li> <li>Implementation Services – Data Conversion / Migration, and</li> <li>Testing; and</li> <li>Production Go-live.</li> </ul>	Table 5 Item D and E.1, E.4, E.5 (payments for these are divided across Milestone 4, 5, 7, 8, and 10).	6/1/2016	\$222,715.00
8	<p>Upon successful completion of the following activities and deliverables for <b>ArcGIS Server/ArcSDE and Roads &amp; Highways</b> as described within Article 1, Section 1.104 Work and Deliverables:</p> <ul style="list-style-type: none"> <li>Installation and Configuration Services, and</li> <li>Implementation Services – Data Conversion / Migration, and</li> <li>Testing; and</li> <li>Production Go-live.</li> </ul>	Table 5 Item D and E.1, E.4, E.5 (payments for these are divided across Milestone 4, 5, 7, 8, and 10).	8/1/2016	\$222,715.00
9	<p>Upon successful completion of the following activities and deliverables as described within Article 1.104 Work and Deliverables:</p> <ul style="list-style-type: none"> <li>Training.</li> </ul>	Table 1 Item F – Training	9/1/2016	\$141,382.00
10	<p>Upon successful completion of the following activities and deliverables for <b>ESRI Roads &amp; Highways Design and Implementation</b> as described within Article 1, Section 1.104 Work and Deliverables:</p> <ul style="list-style-type: none"> <li>Installation and Configuration Services, and</li> <li>Implementation Services – Data Conversion / Migration, and</li> <li>Testing; and Production Go-live.</li> </ul>	Table 5 Item D and E.1, E.4, E.5 (payments for these are divided across Milestone 4, 5, 7, 8, and 10).	9/1/2016	\$222,715.00
11	<p>Upon successful completion of the following activities and deliverables as described within Article 1.104 Work and Deliverables:</p> <ul style="list-style-type: none"> <li>Implementation Services – Pilot Projects.</li> </ul>	Table 3 Item E Row E.3 – Pilot Projects	10/1/2016	\$98,032.00



Milestone	Description	Associated Contract Items (Attachment B)	Estimated Acceptance Date	Payment
12	Upon successful completion of the following activities and deliverables as described within Article 1.104 Work and Deliverables: <ul style="list-style-type: none"> <li>Knowledge Transfer / Transition; and</li> <li>Documentation.</li> </ul>	Table 1 Item I – Knowledge Transfer / Transition  Table 1 Item G – Documentation	12/1/2016	\$28,488.00
13	Upon successful completion of the following activities and deliverables as described within Article 1.104 Work and Deliverables: <ul style="list-style-type: none"> <li>Performance Warranty Period</li> </ul> Holdback (20%) – see Article 1, Section 1.602.	Table 3 Item E Row E.5 – Performance Warranty Period  All of the above	1/1/2017	\$829,798.00

## 2. Maintenance and Support Payments

Payments to Contractor will commence on Solution's Production Go-live date, and will be made on an annual basis for the ongoing services, not to exceed the rates established in Contract per Table 7 as noted in the Exhibit 2 and as summarized below.

Cost Categories	Proposed Licenses	Annual Cost (\$)					Total Cost (\$)
		Year 1	Year 2	Year 3	Year 4	Year 5	
<b>Total COTS Software License Cost</b>		\$0	\$141,609	\$141,609	\$141,609	\$141,609	<b>\$566,436.00</b>

## 3. Operational Services

Payments to Contractor for operation services (for example: contingency services, release management services) that are authorized under a specific SOW will be made upon the completion and acceptance of the deliverable or milestone as stipulated within the SOW. Failure to provide deliverable/milestone by the identified date may be subject to liquidated damages as identified in Article 2, Section 2.073.

### Cost Table

Please refer to Attachment B: Cost Tables for all detailed costs relating to services under this Contract.

### Administrative Fee

Contractor is required to submit an Administrative Fee (see Article 2, Section 2.031) on all payments remitted under Contract.

### Extended Purchasing Program

Extended purchasing program (see Article 2, section 2.281) volume requirements are included, unless stated otherwise.



### Travel

The State will not pay for any travel expenses, including hotel, mileage, meals, parking, etc. Travel time will not be reimbursed. Any out of pocket costs to be included within Contract price. Rates provided for Contractor staff are to be fully loaded rates including travel, lodging, meals and miscellaneous costs.

If Contractor reduces its prices for any of the software or services during the term of this Contract, the State shall have the immediate benefit of such lower prices for new purchases. Contractor shall send notice to the State's DTMB Contract Administrator with the reduced prices within thirty (30) Business Days [or other appropriate time period] of the reduction taking effect.

### Statements of Work and Issuance of Purchase Orders

- Unless otherwise agreed by the parties, each Statement of Work will include:
  1. Background
  2. Project Objective
  3. Scope of Work
  4. Deliverables
  5. Acceptance Criteria
  6. Project Control and Reports (including detailed project schedule with staff, hours, etc.)
  7. Specific Department Standards
  8. Payment Schedule
  9. Travel and Expenses
  10. Project Contacts
  11. Agency Responsibilities and Assumptions
  12. Location of Where the Work is to be performed
  13. Expected Contractor Work Hours and Conditions
  14. Cost Estimate (Detailed including staff hours, rates, etc.)
- The parties agree that the Services/Deliverables to be rendered by Contractor pursuant to this Contract (and any future amendments of it) will be defined and described in detail in Statements of Work or Purchase Orders ("PO") executed under this Contract. Contractor shall not be obliged or authorized to commence any work to implement a Statement of Work until authorized via a PO issued against this Contract. Contractor shall perform in accordance with this Contract, including the Statements of Work/Purchase Orders executed under it.

### Invoicing

Contractor will submit properly itemized invoices to

DTMB – Financial Services

Accounts Payable

P.O. Box 30026

Lansing, MI 48909

or

[DTMB-Accounts-Payable@michigan.gov](mailto:DTMB-Accounts-Payable@michigan.gov)

- Invoices must provide and itemize, as applicable:
  - Contract number;
  - Purchase Order number
  - Contractor name, address, phone number, and Federal Tax Identification Number;
  - Description of any commodities/hardware, including quantity ordered;





- Date(s) of delivery and/or date(s) of installation and set up;
- Price for each item, or Contractor's list price for each item and applicable discounts;
- Maintenance charges;
- Net invoice price for each item;
- Other applicable charges;
- Total invoice price; and
- Payment terms, including any available prompt payment discount.

The State may pay maintenance and support charges on a monthly basis, in arrears. Payment of maintenance service/support of less than one (1) month's duration shall be prorated at 1/30th of the basic monthly maintenance charges for each calendar day.

Incorrect or incomplete invoices will be returned to Contractor for correction and reissue.

#### **1.602 HOLDBACK**

The State shall have the right to hold back an amount equal to ten percent (10%) of all Milestone payment amounts invoiced by Contractor for Services/Deliverables. The amounts held back shall be released to Contractor after the State has granted Final Acceptance of the project.

#### **1.603 TRUE-UP**

Additional pricing and licensing will be adjusted based on tiered levels tied to agency usage and number of concurrent users; to ensure appropriate security and access agencies cannot just add on licenses to TAMS project. Licenses are to be added through the change notice process and separate agreements for number of concurrent users is to be processed through the change management process for this contract. If inadvertent use of licenses happen, a true-up to manage licensing use and pricing will be conducted by the vendor annually, at their discretion. Payment adjustments will be prorated based on use prior to and considering future use after the true-up review is completed.

The parties agree upon the following bundles for annual true-ups:

1. 0-49 users added - \$1,500.00 per user
2. 50-99 users added - \$1,250.00 per user
3. 100+ users added - \$1,000.00 per user

Annual support and maintenance will also increase at a rate of 20% annually per true-up user added.





## **Article 2, Terms and Conditions**

### **2.000 Contract Structure and Term**

#### **2.001 CONTRACT TERM**

This Contract is for a period of 7 years beginning at Contract Start Date. All outstanding Purchase Orders must also expire upon the termination for any of the reasons listed in **Section 2.150** of Contract, unless otherwise extended under Contract. Absent an early termination for any reason, Purchase Orders issued but not expired, by the end of Contract's stated term, shall remain in effect for the balance of the fiscal year for which they were issued. This contract is available to all State agencies.

#### **2.002 OPTIONS TO RENEW**

This Contract may be renewed in writing by mutual agreement of the parties not less than 30 days before its expiration. Contract may be renewed for up to 5 additional 1 year periods. The State reserves the right to exercise one or more renewal options at one time; or, to exercise only a part of an option year.

#### **2.003 LEGAL EFFECT**

Contractor accepts this Contract by signing two copies of Contract and returning them to the DTMB-Procurement. Contractor shall not proceed with the performance of the work to be done under Contract, including the purchase of necessary materials, until both parties have signed Contract to show acceptance of its terms, and Contractor receives a contract release/purchase order that authorizes and defines specific performance requirements.

Except as otherwise agreed in writing by the parties, the State shall not be liable for costs incurred by Contractor or payment under this Contract, until Contractor is notified in writing that this Contract or Change Order has been approved by the State Administrative Board (if required), signed by all the parties and a Purchase Order against Contract has been issued.

#### **2.004 ATTACHMENTS & EXHIBITS**

All Attachments and Exhibits affixed to any and all Statement(s) of Work, or appended to or referencing this Contract, are incorporated in their entirety and form part of this Contract.

#### **2.005 ORDERING**

The State must issue an approved written Purchase Order, Blanket Purchase Order, Direct Voucher or Procurement Card Order to order any Services/Deliverables under this Contract. All orders are subject to the terms and conditions of this Contract. No additional terms and conditions contained on either a Purchase Order or Blanket Purchase Order apply unless they are specifically contained in that Purchase Order or Blanket Purchase Order's accompanying Statement of Work. Exact quantities to be purchased are unknown; however, Contractor will be required to furnish all such materials and services as may be ordered during Contract period. Quantities specified, if any, are estimates based on prior purchases, and the State is not obligated to purchase in these or any other quantities.

#### **2.006 ORDER OF PRECEDENCE**

Contract, including any Statements of Work and Exhibits, to the extent not contrary to Contract, each of which is incorporated for all purposes, constitutes the entire agreement between the parties with respect to the subject matter and supersedes all prior agreements, whether written or oral, with respect to the subject matter and as additional terms and conditions on the purchase order must apply as limited by **Section 2.005**.

In the event of any inconsistency between the terms of Contract and a Statement of Work, the terms of the Statement of Work shall take precedence (as to that Statement of Work only), provided, however, that a Statement of Work may not modify or amend the terms of Contract. Contract may be modified or amended only by a formal Contract amendment.



## **2.007 HEADINGS**

Captions and headings used in Contract are for information and organization purposes. Captions and headings, including inaccurate references, do not, in any way, define or limit the requirements or terms and conditions of Contract.

## **2.008 FORM, FUNCTION & UTILITY**

If Contract is for use of more than one State agency and if the Deliverable/Service does not meet the form, function, and utility required by that State agency, that agency may, subject to State purchasing policies, procure the Deliverable/Service from another source.

## **2.009 REFORMATION AND SEVERABILITY**

Each provision of Contract is severable from all other provisions of Contract and, if one or more of the provisions of Contract is declared invalid, the remaining provisions of Contract remain in full force and effect.

### **2.010 Consents and Approvals**

Except as expressly provided otherwise in Contract, if either party requires the consent or approval of the other party for the taking of any action under Contract, the consent or approval must be in writing and must not be unreasonably withheld or delayed.

## **2.011 NO WAIVER OF DEFAULT**

If a party fails to insist upon strict adherence to any term of Contract then the party has not waived the right to later insist upon strict adherence to that term, or any other term, of Contract.

## **2.012 SURVIVAL**

Any provisions of Contract that impose continuing obligations on the parties, including without limitation the parties' respective warranty, indemnity and confidentiality obligations, survive the expiration or termination of Contract for any reason. Specific references to survival in Contract are solely for identification purposes and not meant to limit or prevent the survival of any other section

### **2.020 Contract Administration**

## **2.021 ISSUING OFFICE**

This Contract is issued by the Department of Technology, Management & Budget, Procurement and the Michigan Department of Transportation (collectively, including all other relevant State of Michigan departments and agencies, the "State"). DTMB-Procurement is the sole point of contact in the State with regard to all procurement and contractual matters relating to Contract. The DTMB-Procurement Contract Administrator for this Contract is:

David Hatch, IT Buyer  
Procurement  
Department of Technology, Management & Budget  
Constitution Hall, First Floor  
PO Box 30026  
Lansing, MI 48909  
hatchd@michigan.gov  
517-284-7044

## **2.022 CONTRACT COMPLIANCE INSPECTOR**

The Director of DTMB-Procurement directs the person named below, or his or her designee, to monitor and coordinate the activities for Contract on a day-to-day basis during its term. **Monitoring Contract activities does not imply the authority to change, modify, clarify, amend, or otherwise alter the prices, terms, conditions and specifications of Contract. DTMB-Procurement is the only State office authorized to**



**change, modify, amend, alter or clarify the prices, specifications, terms and conditions of this Contract.** Contract Compliance Inspector for this Contract is:

John Kalanquin, IT Manager  
DTMB  
Email - KalanquinJ@michigan.gov  
Phone – (517) 241-0177

## **2.023 PROJECT MANAGER**

The following individual will oversee the project:

Jim Lenahan, Senior Project Manager  
DTMB-EPMO  
Email - LenahanJ@michigan.gov  
Phone - (517) 373-7639

## **2.024 CHANGE REQUESTS**

The State reserves the right to request from time to time any changes to the requirements and specifications of Contract and the work to be performed by Contractor under Contract. During the course of ordinary business, it may become necessary for the State to discontinue certain business practices or create Additional Services/Deliverables. At a minimum, to the extent applicable, Contractor shall provide a detailed outline of all work to be done, including tasks necessary to accomplish the Additional Services/Deliverables, timeframes, listing of key personnel assigned, estimated hours for each individual per task, and a complete and detailed cost justification.

If the State requests or directs Contractor to perform any Services/Deliverables that are outside the scope of Contractor's responsibilities under Contract ("New Work"), Contractor must notify the State promptly before commencing performance of the requested activities it believes are New Work. If Contractor fails to notify the State before commencing performance of the requested activities, any such activities performed before Contractor gives notice shall be conclusively considered to be in-scope Services/Deliverables and not New Work.

If the State requests or directs Contractor to perform any services or provide deliverables that are consistent with and similar to the Services/Deliverables being provided by Contractor under Contract, but which Contractor reasonably and in good faith believes are not included within the Statements of Work, then before performing such Services or providing such Deliverables, Contractor shall notify the State in writing that it considers the Services or Deliverables to be an Additional Service/Deliverable for which Contractor should receive additional compensation. If Contractor does not so notify the State, Contractor shall have no right to claim thereafter that it is entitled to additional compensation for performing that Service or providing that Deliverable. If Contractor does so notify the State, then such a Service or Deliverable shall be governed by the Change Request procedure in this Section.

In the event prices or service levels are not acceptable to the State, the Additional Services or New Work shall be subject to competitive bidding based upon the specifications.

### **(1) Change Request at State Request**

If the State requires Contractor to perform New Work, Additional Services or make changes to the Services that would affect Contract completion schedule or the amount of compensation due Contractor (a "Change"), the State shall submit a written request for Contractor to furnish a proposal for carrying out the requested Change (a "Change Request").

### **(2) Contractor Recommendation for Change Requests:**

Contractor shall be entitled to propose a Change to the State, on its own initiative, should Contractor believe the proposed Change would benefit Contract.



- (3) Upon receipt of a Change Request or on its own initiative, Contractor shall examine the implications of the requested Change on the technical specifications, Contract schedule and price of the Deliverables and Services and shall submit to the State without undue delay a written proposal for carrying out the Change. Contractor's proposal shall include any associated changes in the technical specifications, Contract schedule and price and method of pricing of the Services. If the Change is to be performed on a time and materials basis, the Amendment Labor Rates shall apply to the provision of such Services. If Contractor provides a written proposal and should Contractor be of the opinion that a requested Change is not to be recommended, it shall communicate its opinion to the State but shall nevertheless carry out the Change as specified in the written proposal if the State directs it to do so.
- (4) By giving Contractor written notice within a reasonable time, the State shall be entitled to accept a Contractor proposal for Change, to reject it, or to reach another agreement with Contractor. Should the parties agree on carrying out a Change, a written Contract Change Notice must be prepared and issued under this Contract, describing the Change and its effects on the Services and any affected components of this Contract (a "Contract Change Notice").
- (5) No proposed Change shall be performed until the proposed Change has been specified in a duly executed Contract Change Notice issued by the Department of Technology, Management & Budget, Procurement.
- (6) If the State requests or directs Contractor to perform any activities that Contractor believes constitute a Change, Contractor must notify the State that it believes the requested activities are a Change before beginning to work on the requested activities. If Contractor fails to notify the State before beginning to work on the requested activities, then Contractor waives any right to assert any claim for additional compensation or time for performing the requested activities. If Contractor commences performing work outside the scope of this Contract and then ceases performing that work, Contractor must, at the request of the State, retract any out-of-scope work that would adversely affect Contract.

## **2.025 NOTICES**

Any notice given to a party under Contract must be deemed effective, if addressed to the party as addressed below, upon: (i) delivery, if hand delivered; (ii) receipt of a confirmed transmission by facsimile if a copy of the notice is sent by another means specified in this Section; (iii) the third Business Day after being sent by U.S. mail, postage pre-paid, return receipt requested; or (iv) the next Business Day after being sent by a nationally recognized overnight express courier with a reliable tracking system.

State:

State of Michigan  
DTMB-Procurement  
PO Box 30026  
Lansing, Michigan 48909

Contractor:

Data Transfer Solutions, LLC  
3680 Avalon Park Blvd. E.  
Orlando, FL 32828-9373

Either party may change its address where notices are to be sent by giving notice according to this Section.

## **2.026 BINDING COMMITMENTS**

Representatives of Contractor must have the authority to make binding commitments on Contractor's behalf within the bounds set forth in Contract. Contractor may change the representatives from time to time upon giving written notice.

## **2.027 RELATIONSHIP OF THE PARTIES**

The relationship between the State and Contractor is that of client and independent contractor. No agent, employee, or servant of Contractor or any of its Subcontractors shall be deemed to be an employee, agent or servant of the State for any reason. Contractor shall be solely and entirely responsible for its acts and the acts of its agents, employees, servants and Subcontractors during the performance of Contract.

**2.028 COVENANT OF GOOD FAITH**

Each party shall act reasonably and in good faith. Unless stated otherwise in Contract, the parties shall not unreasonably delay, condition or withhold the giving of any consent, decision or approval that is either requested or reasonably required of them in order for the other party to perform its responsibilities under Contract.

**2.029 ASSIGNMENTS**

Neither party may assign Contract, or assign or delegate any of its duties or obligations under Contract, to any other party (whether by operation of law or otherwise), without the prior written consent of the other party; provided, however, that the State may assign Contract to any other State agency, department, division or department without the prior consent of Contractor and Contractor may assign Contract to an affiliate so long as the affiliate is adequately capitalized and can provide adequate assurances that the affiliate can perform Contract. The State may withhold consent from proposed assignments, subcontracts, or novations when the transfer of responsibility would operate to decrease the State's likelihood of receiving performance on Contract or the State's ability to recover damages.

Contractor may not, without the prior written approval of the State, assign its right to receive payments due under Contract. If the State permits an assignment, Contractor is not relieved of its responsibility to perform any of its contractual duties and the requirement under Contract that all payments must be made to one entity continues.

If Contractor intends to assign Contract or any of Contractor's rights or duties under Contract, Contractor must notify the State in writing at least 90 days before the assignment. Contractor also must provide the State with adequate information about the assignee within a reasonable amount of time before the assignment for the State to determine whether to approve the assignment.

**2.030 General Provisions****2.031 ADMINISTRATIVE FEE AND REPORTING**

Contractor must remit an administrative fee of 1% on all payments remitted to Contractor under Contract including transactions with the State (including its departments, divisions, agencies, offices, and commissions), MiDEAL members, and other states (including governmental subdivisions and authorized entities). Contractor must submit an itemized purchasing activity report, which includes at a minimum, the name of the purchasing entity and the total dollar volume in sales.

Itemized purchasing activity reports should be mailed to DTMB-Procurement and the administrative fee payments shall be made by check payable to the State of Michigan and mailed to:

The Department of Technology, Management & Budget  
Financial Services – Cashier Unit  
Lewis Cass Building  
320 South Walnut St.  
P.O. Box 30681  
Lansing, MI 48909

The administrative fee and purchasing activity report are due within 30 calendar days from the last day of each quarter.

**2.032 MEDIA RELEASES**

News releases (including promotional literature and commercial advertisements) pertaining to the RFP and Contract or project to which it relates shall not be made without prior written State approval, and then only in accordance with the explicit written instructions from the State. No results of the activities associated with the RFP and Contract are to be released without prior written approval of the State and then only to persons designated.

**2.033 CONTRACT DISTRIBUTION**

DTMB-Procurement retains the sole right of Contract distribution to all State agencies and local units of government unless other arrangements are authorized by DTMB-Procurement.

**2.034 PERMITS**

Contractor must obtain and pay any associated costs for all required governmental permits, licenses and approvals for the delivery, installation and performance of the Services. The State shall pay for all costs and expenses incurred in obtaining and maintaining any necessary easements or right of way.

**2.035 WEBSITE INCORPORATION**

The State is not bound by any content on Contractor's website, even if Contractor's documentation specifically referenced that content and attempts to incorporate it into any other communication, unless the State has actual knowledge of the content and has expressly agreed to be bound by it in a writing that has been manually signed by an authorized representative of the State.

**2.036 FUTURE BIDDING PRECLUSION**

Contractor acknowledges that, to the extent this Contract involves the creation, research, investigation or generation of a future RFP; it may be precluded from bidding on the subsequent RFP. The State reserves the right to disqualify any Bidder if the State determines that the Bidder has used its position (whether as an incumbent Contractor, or as a Contractor hired to assist with the RFP development, or as a Vendor offering free assistance) to gain a competitive advantage on the RFP.

**2.037 FREEDOM OF INFORMATION**

All information in any proposal submitted to the State by Contractor and this Contract is subject to the provisions of the Michigan Freedom of Information Act, 1976 Public Act No. 442, as amended, MCL 15.231, et seq (the "FOIA").

**2.038 DISASTER RECOVERY**

Contractor and the State recognize that the State provides essential services in times of natural or man-made disasters. Therefore, except as so mandated by Federal disaster response requirements, Contractor personnel dedicated to providing Services/Deliverables under this Contract shall provide the State with priority service for repair and work around in the event of a natural or man-made disaster.

**2.040 Financial Provisions****2.041 FIXED PRICES FOR SERVICES/DELIVERABLES**

Each Statement of Work or Purchase Order issued under this Contract shall specify (or indicate by reference to the appropriate Contract Exhibit) the firm, fixed prices for all Services/Deliverables, and the associated payment milestones and payment amounts.

**2.042 ADJUSTMENTS FOR REDUCTIONS IN SCOPE OF SERVICES/DELIVERABLES**

If the scope of the Services/Deliverables under any Statement of Work issued under this Contract is subsequently reduced by the State, the parties shall negotiate an equitable reduction in Contractor's charges under such Statement of Work commensurate with the reduction in scope.

**2.043 SERVICES/DELIVERABLES COVERED**

The State shall not be obligated to pay any amounts in addition to the charges specified in this Contract for all Services/Deliverables to be provided by Contractor and its Subcontractors, if any, under this Contract,.





## 2.044 INVOICING AND PAYMENT – IN GENERAL

- (a) Each Statement of Work issued under this Contract shall list (or indicate by reference to the appropriate Contract Exhibit) the prices for all Services/Deliverables, equipment and commodities to be provided, and the associated payment milestones and payment amounts.
- (b) Each Contractor invoice shall show details as to charges by Service/Deliverable component and location at a level of detail reasonably necessary to satisfy the State's accounting and charge-back requirements. Invoices for Services performed on a time and materials basis shall show, for each individual, the number of hours of Services performed during the billing period, the billable skill/labor category for such person and the applicable hourly billing rate. Prompt payment by the State is contingent on Contractor's invoices showing the amount owed by the State minus any holdback amount to be retained by the State in accordance with **Section 1.600**.
- (c) Correct invoices shall be due and payable by the State, in accordance with the State's standard payment procedure as specified in 1984 Public Act No. 279, MCL 17.51 et seq., within 45 days after receipt, provided the State determines that the invoice was properly rendered.
- (d) Contract Payment Schedule
  - 1. *Contractor request for performance-based payment.*  
Contractor may submit requests for payment of performance-based payments upon completion and acceptance of the milestones in a form and manner acceptable to Contract Administrator. Unless otherwise authorized by Contract Administrator, all performance-based payments in any period for which payment is being requested shall be included in a single request, appropriately itemized and totaled.
  - 2. *Approval and payment of requests.*  
Contractor shall not be entitled to payment of a request for performance-based payment prior to successful accomplishment of the event or performance criterion for which payment is requested. Contract Administrator shall determine whether the event or performance criterion for which payment is requested has been successfully accomplished in accordance with the terms of Contract. Contract Administrator may, at any time, require Contractor to substantiate the successful performance of any event or performance criterion, which has been or is represented as being payable.

The approval by Contract Administrator of a request for performance-based payment does not constitute an acceptance by the State and does not excuse Contractor from performance of obligations under this Contract.

## 2.045 PRO-RATION

To the extent there are Services that are to be paid for on a monthly basis, the cost of such Services shall be pro-rated for any partial month.

## 2.046 ANTITRUST ASSIGNMENT

Contractor assigns to the State any claim for overcharges resulting from antitrust violations to the extent that those violations concern materials or services supplied by third parties to Contractor, toward fulfillment of this Contract.

## 2.047 FINAL PAYMENT

The making of final payment by the State to Contractor does not constitute a waiver by either party of any rights or other claims as to the other party's continuing obligations under Contract, nor shall it constitute a waiver of any claims by one party against the other arising from unsettled claims or failure by a party to comply with this Contract, including claims for Services and Deliverables not reasonably known until after acceptance to be defective or substandard. Contractor's acceptance of final payment by the State under this Contract shall constitute a waiver of all claims by Contractor against the State for payment under this Contract, other than those claims previously filed in writing on a timely basis and still unsettled.



## **2.048 ELECTRONIC PAYMENT REQUIREMENT**

Electronic transfer of funds is required for payments on State Contracts. Contractors are required to register with the State electronically at <http://www.cpexpress.state.mi.us>. As stated in Public Act 431 of 1984, all contracts that the State enters into for the purchase of goods and services shall provide that payment shall be made by electronic fund transfer (“EFT”).

### **2.050 Taxes**

#### **2.051 EMPLOYMENT TAXES**

Contractor shall collect and pay all applicable federal, state, and local employment taxes, including the taxes.

#### **2.052 SALES AND USE TAXES**

Contractor shall register and remit sales and use taxes on taxable sales of tangible personal property or services delivered into the State. Contractors that lack sufficient presence in Michigan to be required to register and pay tax must do so as a volunteer. This requirement extends to: (1) all members of any controlled group as defined in § 1563(a) of the Internal Revenue Code and applicable regulations of which the company is a member, and (2) all organizations under common control as defined in § 414(c) of the Internal Revenue Code and applicable regulations of which the company is a member that make sales at retail for delivery into the State are registered with the State for the collection and remittance of sales and use taxes. In applying treasury regulations defining “two or more trades or businesses under common control” the term “organization” means sole proprietorship, a partnership (as defined in § 701(a) (2) of the Internal Revenue Code), a trust, an estate, a corporation, or a limited liability company.

### **2.060 Contract Management**

#### **2.061 CONTRACTOR PERSONNEL QUALIFICATIONS**

All persons assigned by Contractor to the performance of Services under this Contract must be employees of Contractor or its majority-owned (directly or indirectly, at any tier) subsidiaries (or a State-approved Subcontractor) and must be fully qualified to perform the work assigned to them. Contractor must include a similar provision in any subcontract entered into with a Subcontractor. For the purposes of this Contract, independent contractors engaged by Contractor solely in a staff augmentation role must be treated by the State as if they were employees of Contractor for this Contract only; however, the State understands that the relationship between Contractor and Subcontractor is an independent contractor relationship.

#### **2.062 CONTRACTOR KEY PERSONNEL**

- (a) Contractor must provide Contract Compliance Inspector with the names of the Key Personnel.
- (b) Key Personnel must be dedicated as defined in the Statement of Work to the Project for its duration in the applicable Statement of Work with respect to other individuals designated as Key Personnel for that Statement of Work.
- (c) The State shall have the right to recommend and approve in writing the initial assignment, as well as any proposed reassignment or replacement, of any Key Personnel. Before assigning an individual to any Key Personnel position, Contractor shall notify the State of the proposed assignment, shall introduce the individual to the appropriate State representatives, and shall provide the State with a resume and any other information about the individual reasonably requested by the State. The State reserves the right to interview the individual before granting written approval. In the event the State finds a proposed individual unacceptable, the State shall provide a written explanation including reasonable detail outlining the reasons for the rejection.
- (d) Contractor must not remove any Key Personnel from their assigned roles on Contract without the prior written consent of the State. Contractor’s removal of Key Personnel without the prior written consent of the State is an unauthorized removal (“**Unauthorized Removal**”). Unauthorized Removals does not include replacing Key Personnel for reasons beyond the reasonable control of Contractor, including illness, disability, leave of absence, personal emergency circumstances, resignation, or for cause termination of the Key Personnel’s employment. Unauthorized Removals does not include replacing Key





Personnel because of promotions or other job movements allowed by Contractor personnel policies or Collective Bargaining Agreement(s) as long as the State receives prior written notice before shadowing occurs and Contractor provides 30 days of shadowing unless parties agree to a different time period. Contractor with the State must review any Key Personnel replacements, and appropriate transition planning will be established. Any Unauthorized Removal may be considered by the State to be a material breach of Contract, in respect of which the State may elect to exercise its termination and cancellation rights.

- (e) Contractor must notify Contract Compliance Inspector and Contract Administrator at least 10 business days before redeploying non-Key Personnel, who are dedicated to primarily to the Project, to other projects. If the State does not object to the redeployment by its scheduled date, Contractor may then redeploy the non-Key Personnel.

## **2.063 RE-ASSIGNMENT OF PERSONNEL AT THE STATE'S REQUEST**

The State reserves the right to require the removal from the Project of Contractor personnel found, in the judgment of the State, to be unacceptable. The State's request must be written with reasonable detail outlining the reasons for the removal request. Additionally, the State's request must be based on legitimate, good faith reasons. Replacement personnel for the removed person must be fully qualified for the position. If the State exercises this right, and Contractor cannot immediately replace the removed personnel, the State agrees to an equitable adjustment in schedule or other terms that may be affected by the State's required removal. If any incident with removed personnel results in delay not reasonably anticipatable under the circumstances and which is attributable to the State, the applicable SLAs for the affected Service shall not be counted for a time as agreed to by the parties.

## **2.064 CONTRACTOR PERSONNEL LOCATION**

All staff assigned by Contractor to work on Contract shall perform their duties either primarily at Contractor's offices and facilities or at State facilities. Without limiting the generality of the foregoing, Key Personnel shall, at a minimum, spend at least the amount of time on-site at State facilities as indicated in the applicable Statement of Work. Subject to availability, selected Contractor personnel may be assigned office space to be shared with State personnel.

## **2.065 CONTRACTOR IDENTIFICATION**

Contractor employees must be clearly identifiable while on State property by wearing a State-issued badge, as required. Contractor employees are required to clearly identify themselves and the company they work for whenever making contact with State personnel by telephone or other means.

## **2.066 COOPERATION WITH THIRD PARTIES**

Contractor agrees to cause its personnel and the personnel of any Subcontractors to cooperate with the State and its agents and other contractors including the State's Quality Assurance personnel. As reasonably requested by the State in writing, Contractor shall provide to the State's agents and other contractors reasonable access to Contractor's Project personnel, systems and facilities to the extent the access relates to activities specifically associated with this Contract and shall not interfere or jeopardize the safety or operation of the systems or facilities. The State acknowledges that Contractor's time schedule for Contract is very specific and agrees not to unnecessarily or unreasonably interfere with, delay or otherwise impeded Contractor's performance under this Contract with the requests for access.

## **2.067 CONTRACT MANAGEMENT RESPONSIBILITIES**

Contractor shall be responsible for all acts and omissions of its employees, as well as the acts and omissions of any other personnel furnished by Contractor to perform the Services. Contractor shall have overall responsibility for managing and successfully performing and completing the Services/Deliverables, subject to the overall direction and supervision of the State and with the participation and support of the State as specified in this Contract. Contractor's duties shall include monitoring and reporting the State's performance of its participation and support responsibilities (as well as Contractor's own responsibilities) and providing timely notice to the State in Contractor's reasonable opinion if the State's failure to perform its responsibilities in



accordance with the Project Plan is likely to delay the timely achievement of any Contract tasks. Notwithstanding the foregoing, Contractor shall not be liable for any liability arising out of its performance of any instruction or requirement given or made by the State or otherwise included in the Product Plan except to the extent that such liability arises out of Contractor's negligence or wilful misconduct. To the extent that the State makes or gives any instruction or requirement that Contractor identifies as a potential risk, Contractor will notify the State in writing, and wait for the State's response, not to exceed 10 business days, prior to performing such instruction or requirement.

Contractor shall provide the Services/Deliverables directly or through its affiliates, subsidiaries, subcontractors or resellers. Regardless of the entity providing the Service/Deliverable, Contractor shall act as a single point of contact coordinating these entities to meet the State's need for Services/Deliverables. Nothing in this Contract, however, shall be construed to authorize or require any party to violate any applicable law or regulation in its performance of this Contract.

## **2.068 CONTRACTOR RETURN OF STATE EQUIPMENT/RESOURCES**

Contractor shall return to the State any State-furnished equipment, facilities and other resources when no longer required for Contract in the same condition as when provided by the State, reasonable wear and tear excepted.

### **2.070 Subcontracting by Contractor**

## **2.071 CONTRACTOR FULL RESPONSIBILITY**

Contractor shall have full responsibility for the successful performance and completion of all of the Services and Deliverables. The State shall consider Contractor to be the sole point of contact with regard to all contractual matters under this Contract, including payment of any and all charges for Services and Deliverables.

## **2.072 STATE CONSENT TO DELEGATION**

Contractor shall not delegate any duties under this Contract to a Subcontractor unless the Department of Technology, Management & Budget, Procurement has given written consent to such delegation. The State shall have the right of prior written approval of all Subcontractors and to require Contractor to replace any Subcontractors found, in the reasonable judgment of the State, to be unacceptable. The State's request shall be written with reasonable detail outlining the reasons for the removal request. Additionally, the State's request shall be based on legitimate, good faith reasons. Replacement Subcontractor(s) for the removed Subcontractor shall be fully qualified for the position. If the State exercises this right, and Contractor cannot immediately replace the removed Subcontractor, the State shall agree to an equitable adjustment in schedule or other terms that may be affected by the State's required removal. If any such incident with a removed Subcontractor results in delay not reasonable anticipatable under the circumstances and which is attributable to the State, the applicable SLA for the affected Work shall not be counted for a time agreed upon by the parties.

## **2.073 SUBCONTRACTOR BOUND TO CONTRACT**

In any subcontracts entered into by Contractor for the performance of the Services, Contractor shall require the Subcontractor, to the extent of the Services to be performed by the Subcontractor, to be bound to Contractor by the terms of this Contract and to assume toward Contractor all of the obligations and responsibilities that Contractor, by this Contract, assumes toward the State. The State reserves the right to receive copies of and review all subcontracts, although Contractor may delete or mask any proprietary information, including pricing, contained in such contracts before providing them to the State. The management of any Subcontractor shall be the responsibility of Contractor, and Contractor shall remain responsible for the performance of its Subcontractors to the same extent as if Contractor had not subcontracted such performance. Contractor shall make all payments to Subcontractors or suppliers of Contractor. Except as otherwise agreed in writing by the State and Contractor, the State shall not be obligated to direct payments for the Services other than to Contractor. The State's written approval of any Subcontractor engaged by Contractor to perform any obligation under this Contract shall not relieve Contractor of any obligations or performance required under this



Contract. A list of the Subcontractors, if any, approved by the State as of the execution of this Contract, together with a copy of the applicable subcontract is attached.

#### **2.074 FLOW DOWN**

Except where specifically approved in writing by the State on a case-by-case basis, Contractor shall flow down the obligations in **Sections 2.031, 2.060, 2.100, 2.110, 2.120, 2.130, and 2.200** in all of its agreements with any Subcontractors.

#### **2.075 COMPETITIVE SELECTION**

Contractor shall select subcontractors (including suppliers) on a competitive basis to the maximum practical extent consistent with the objectives and requirements of Contract.

#### **2.080 State Responsibilities**

##### **2.081 EQUIPMENT**

The State shall provide only the equipment and resources identified in the Statement of Work and other Contract Exhibits.

##### **2.082 FACILITIES**

The State must designate space as long as it is available and as provided in the Statement of Work, to house Contractor's personnel whom the parties agree will perform the Services/Deliverables at State facilities (collectively, the "State Facilities"). Contractor shall have reasonable access to, and unless agreed otherwise by the parties in writing must observe and comply with all rules and regulations relating to each of the State Facilities (including hours of operation) used by Contractor in the course of providing the Services. Contractor agrees that it shall not, without the prior written consent of the State, use any State Facilities or access any State information systems provided for Contractor's use, or to which Contractor otherwise gains access in the course of performing the Services, for any purpose other than providing the Services to the State.

#### **2.090 Security**

##### **2.091 BACKGROUND CHECKS**

On a case-by-case basis, the State may investigate Contractor's personnel before they may have access to State facilities and systems. The scope of the background check is at the discretion of the State and the results shall be used to determine Contractor personnel eligibility for working within State facilities and systems. The investigations shall include Michigan State Police Background checks (ICHAT) and may include the National Crime Information Center (NCIC) Finger Prints. Proposed Contractor personnel may be required to complete and submit an RI-8 Fingerprint Card for the NCIC Finger Print Check. Any request for background checks shall be initiated by the State and shall be reasonably related to the type of work requested.

#### **2.100 Confidentiality**

##### **2.101 CONFIDENTIALITY**

Contractor and the State each acknowledge that the other possesses and shall continue to possess confidential information that has been developed or received by it. As used in this Section, "Confidential Information" of Contractor must mean all non-public proprietary information of Contractor (other than Confidential Information of the State as defined below), which is marked confidential, restricted, proprietary, or with a similar designation. "Confidential Information" of the State must mean any information which is retained in confidence by the State (or otherwise required to be held in confidence by the State under applicable federal, state and local laws and regulations) or which, in the case of tangible materials provided to Contractor by the State under its performance under this Contract, is marked as confidential, proprietary or with a similar designation by the State. "Confidential Information" excludes any information (including this Contract) that is publicly available under the Michigan FOIA.



## **2.102 PROTECTION AND DESTRUCTION OF CONFIDENTIAL INFORMATION**

The State and Contractor shall each use at least the same degree of care to prevent disclosing to third parties the Confidential Information of the other as it employs to avoid unauthorized disclosure, publication or dissemination of its own confidential information of like character, but in no event less than reasonable care. Neither Contractor nor the State shall (i) make any use of the Confidential Information of the other except as contemplated by this Contract, (ii) acquire any right in or assert any lien against the Confidential Information of the other, or (iii) if requested to do so, refuse for any reason to promptly return the other party's Confidential Information to the other party. Each party shall limit disclosure of the other party's Confidential Information to employees and Subcontractors who must have access to fulfill the purposes of this Contract. Disclosure to, and use by, a Subcontractor is permissible where (A) use of a Subcontractor is authorized under this Contract, (B) the disclosure is necessary or otherwise naturally occurs in connection with work that is within the Subcontractor's scope of responsibility, and (C) Contractor obligates the Subcontractor in a written Contract to maintain the State's Confidential Information in confidence. At the State's request, any employee of Contractor and of any Subcontractor having access or continued access to the State's Confidential Information may be required to execute an acknowledgment that the employee has been advised of Contractor's and the Subcontractor's obligations under this Section and of the employee's obligation to Contractor or Subcontractor, as the case may be, to protect the Confidential Information from unauthorized use or disclosure.

Promptly upon termination or cancellation of Contract for any reason, Contractor must certify to the State that Contractor has destroyed all State Confidential Information.

## **2.103 PCI DATA SECURITY STANDARD**

(a) Contractors that process, transmit, or store credit/debit cardholder data, must adhere to the Payment Card Industry (PCI) Data Security Standards. Contractor is responsible for the security of cardholder data in its possession. The data may only be used to assist the State or for other uses specifically authorized by law.

(b) Contractor must notify the CCI (within 72 hours of discovery) of any breaches in security where cardholder data has been compromised. In that event, Contractor must provide full cooperation to the Visa, MasterCard, Discover and state Acquirer representative(s), and/or a PCI approved third party to conduct a thorough security review. Contractor must make the forensic report available within two weeks of completion. The review must validate compliance with the current PCI Data Security Standards for protecting cardholder data.

(c) Contractor must properly dispose of cardholder data, in compliance with DTMB policy, when it is no longer needed. Contractor must continue to treat cardholder data as confidential upon contract termination.

(d) Contractor must provide the CCI with an annual Attestation of Compliance (AOC) or a Report on Compliance (ROC) showing Contractor is in compliance with the PCI Data Security Standards. Contractor must notify the CCI of all failures to comply with the PCI Data Security Standard.

## **2.104 EXCLUSIONS**

Notwithstanding the foregoing, the provisions in this Section shall not apply to any particular information which the State or Contractor can demonstrate (i) was, at the time of disclosure to it, in the public domain; (ii) after disclosure to it, is published or otherwise becomes part of the public domain through no fault of the receiving party; (iii) was in the possession of the receiving party at the time of disclosure to it without an obligation of confidentiality; (iv) was received after disclosure to it from a third party who had a lawful right to disclose the information to it without any obligation to restrict its further disclosure; or (v) was independently developed by the receiving party without reference to Confidential Information of the furnishing party. Further, the provisions of this Section shall not apply to any particular Confidential Information to the extent the receiving party is required by law to disclose the Confidential Information, provided that the receiving party (i) promptly provides the furnishing party with notice of the legal request, and (ii) assists the furnishing party in resisting or limiting the scope of the disclosure as reasonably requested by the furnishing party.



## **2.105 NO IMPLIED RIGHTS**

Nothing contained in this Section must be construed as obligating a party to disclose any particular Confidential Information to the other party, or as granting to or conferring on a party, expressly or impliedly, any right or license to the Confidential Information of the other party.

## **2.106 SECURITY BREACH NOTIFICATION**

If Contractor breaches this Section, Contractor must (i) promptly cure any deficiencies and (ii) comply with any applicable federal and state laws and regulations pertaining to unauthorized disclosures. Contractor and the State shall cooperate to mitigate, to the extent practicable, the effects of any breach, intrusion, or unauthorized use or disclosure. Contractor must report to the State in writing any use or disclosure of Confidential Information, whether suspected or actual, other than as provided for by Contract within 72 hours of becoming aware of the use or disclosure or the shorter time period as is reasonable under the circumstances.

## **2.107 RESPECTIVE OBLIGATIONS**

The parties' respective obligations under this Section must survive the termination or expiration of this Contract for any reason.

### **2.110 Records and Inspections**

## **2.111 INSPECTION OF WORK PERFORMED**

The State's authorized representatives, at reasonable times and with 10 days prior notice, have the right to enter Contractor's premises or any other places where work is being performed in relation to this Contract. The representatives may inspect, monitor, or evaluate the work being performed, to the extent the access will not reasonably interfere with or jeopardize the safety or operation of Contractor's systems or facilities. Contractor must provide reasonable assistance for the State's representatives during inspections.

## **2.112 RETENTION OF RECORDS**

(a) Contractor must retain all financial and accounting records related to this Contract for a period of 7 years after Contractor performs any work under this Contract (Audit Period).

(b) If an audit, litigation, or other action involving Contractor's records is initiated before the end of the Audit Period, Contractor must retain the records until all issues arising out of the audit, litigation, or other action are resolved or until the end of the Audit Period, whichever is later.

## **2.113 EXAMINATION OF RECORDS**

(a) The State, upon 10 day notice to Contractor, may examine and copy any of Contractor's records that relate to this Contract any time during the Audit Period. The State does not have the right to review any information deemed confidential by Contractor if access would require the information to become publicly available. This requirement also applies to the records of any parent, affiliate, or subsidiary organization of Contractor, or any Subcontractor that performs services in connection with this Contract

(b) In addition to the rights conferred upon the State in paragraph (a) of this section and in accordance with MCL 18.1470, DTMB or its designee may audit Contractor to verify compliance with Contract. The financial and accounting records associated with Contract shall be made available to DTMB or its designee and the auditor general, upon request, during the term of Contract and any extension of Contract and for 3 years after the later of the expiration date or final payment under Contract.

## **2.114 AUDIT RESOLUTION**

If necessary, Contractor and the State will meet to review any audit report promptly after its issuance. Contractor must respond to each report in writing within 30 days after receiving the report, unless the report specifies a shorter response time. Contractor and the State must develop, agree upon, and monitor an action plan to promptly address and resolve any deficiencies, concerns, or recommendations in the report.





## 2.115 ERRORS

- (a) If an audit reveals any financial errors in the records provided to the State, the amount in error must be reflected as a credit or debit on the next invoice and subsequent invoices until the amount is paid or refunded in full. However, a credit or debit may not be carried forward for more than four invoices or beyond the termination of Contract. If a balance remains after four invoices, the remaining amount will be due as a payment or refund within 45 days of the last invoice on which the balance appeared or upon termination of Contract, whichever is earlier.
- (b) In addition to other available remedies, if the difference between the State's actual payment and the correct invoice amount, as determined by an audit, is greater than 10%, Contractor must pay all reasonable audit costs.

## **2.120 Warranties**

### 2.121 WARRANTIES AND REPRESENTATIONS

Contractor represents and warrants:

- (a) It is capable in all respects of fulfilling and must fulfill all of its obligations under this Contract. The performance of all obligations under this Contract must be provided in a timely, professional, and workman-like manner and must meet the performance and operational standards required under this Contract.
- (b) Contract Appendices, Attachments and Exhibits identify the equipment and software and services necessary for the Deliverable(s) to perform and Services to operate in compliance with Contract's requirements and other standards of performance.
- (c) It is the lawful owner or licensee of any Deliverable licensed or sold to the State by Contractor or developed by Contractor under this Contract, and Contractor has all of the rights necessary to convey to the State the ownership rights or licensed use, as applicable, of any and all Deliverables. None of the Deliverables provided by Contractor to the State under neither this Contract, nor their use by the State shall infringe the patent, copyright, trade secret, or other proprietary rights of any third party.
- (d) If, under this Contract, Contractor procures any equipment, software or other Deliverable for the State (including equipment, software and other Deliverables manufactured, re-marketed or otherwise sold by Contractor under Contractor's name), then in addition to Contractor's other responsibilities with respect to the items in this Contract, Contractor must assign or otherwise transfer to the State or its designees, or afford the State the benefits of, any manufacturer's warranty for the Deliverable.
- (e) Contract signatory has the power and authority, including any necessary corporate authorizations, necessary to enter into this Contract, on behalf of Contractor.
- (f) It is qualified and registered to transact business in all locations where required.
- (g) Neither Contractor nor any Affiliates, nor any employee of either, has, must have, or must acquire, any contractual, financial, business, or other interest, direct or indirect, that would conflict in any manner or degree with Contractor's performance of its duties and responsibilities to the State under this Contract or otherwise create an appearance of impropriety with respect to the award or performance of this Agreement. Contractor must notify the State about the nature of the conflict or appearance of impropriety within two days of learning about it.
- (h) Neither Contractor nor any Affiliates, nor any employee of either has accepted or must accept anything of value based on an understanding that the actions of Contractor or Affiliates or employee on behalf of the State would be influenced. Contractor must not attempt to influence any State employee by the direct or indirect offer of anything of value.
- (i) Neither Contractor nor any Affiliates, nor any employee of either has paid or agreed to pay any person, other than bona fide employees and consultants working solely for Contractor or the Affiliate, any fee, commission, percentage, brokerage fee, gift, or any other consideration, contingent upon or resulting from the award or making of this Contract.
- (j) The prices proposed by Contractor were arrived at independently, without consultation, communication, or agreement with any other Bidder for the purpose of restricting competition; the prices quoted were not knowingly disclosed by Contractor to any other Bidder; and no attempt was made by Contractor to induce any other person to submit or not submit a proposal for the purpose of restricting competition.



- (k) All financial statements, reports, and other information furnished by Contractor to the State as part of its response to the RFP or otherwise in connection with the award of this Contract fairly and accurately represent the business, properties, financial condition, and results of operations of Contractor as of the respective dates, or for the respective periods, covered by the financial statements, reports, other information. Since the respective dates or periods covered by the financial statements, reports, or other information, there have been no material adverse changes in the business, properties, financial condition, or results of operations of Contractor.
- (l) All written information furnished to the State by or for Contractor in connection with this Contract, including its bid, is true, accurate, and complete, and contains no untrue statement of material fact or omits any material fact necessary to make the information not misleading.
- (m) It is not in material default or breach of any other contract or agreement that it may have with the State or any of its departments, commissions, boards, or agencies. Contractor further represents and warrants that it has not been a party to any contract with the State or any of its departments that was terminated by the State or the department within the previous five years for the reason that Contractor failed to perform or otherwise breached an obligation of Contract.
- (n) If any of the certifications, representations, or disclosures made in Contractor's original bid response change after contract award, Contractor is required to report those changes immediately to the Department of Technology, Management & Budget, Procurement.

## **2.122 WARRANTY OF MERCHANTABILITY**

Goods provided by Contractor under this agreement shall be merchantable. All goods provided under this Contract shall be of good quality within the description given by the State, shall be fit for their ordinary purpose, shall be adequately contained and packaged within the description given by the State, shall conform to the agreed upon specifications, and shall conform to the affirmations of fact made by Contractor or on the container or label.

## **2.123 INTENTIONALLY OMITTED**

## **2.124 WARRANTY OF TITLE**

Contractor shall, in providing goods to the State, convey good title in those goods, whose transfer is right and lawful. All goods provided by Contractor shall be delivered free from any security interest, lien, or encumbrance of which the State, at the time of contracting, has no knowledge. Goods provided by Contractor, under this Contract, shall be delivered free of any rightful claim of any third person by of infringement or the like.

## **2.125 EQUIPMENT WARRANTY**

To the extent Contractor is responsible under this Contract for maintaining equipment/system(s), Contractor represents and warrants that it shall maintain the equipment/system(s) in good operating condition and shall undertake all repairs and preventive maintenance according to the applicable manufacturer's recommendations for the period specified in this Contract.

Contractor represents and warrants that the equipment/system(s) are in good operating condition and operates and performs to the requirements and other standards of performance contained in this Contract, when installed, at the time of Final Acceptance by the State, and for a period of (1) one year commencing upon the first day following Final Acceptance.

Within 30 business days of notification from the State, Contractor must adjust, repair or replace all equipment that is defective or not performing in compliance with Contract. Contractor must assume all costs for replacing parts or units and their installation including transportation and delivery fees, if any.

Contractor must provide a toll-free telephone number to allow the State to report equipment failures and problems to be remedied by Contractor.



Contractor agrees that all warranty service it provides under this Contract must be performed by Original Equipment Manufacturer (OEM) trained, certified and authorized technicians.

Contractor is the sole point of contact for warranty service. Contractor warrants that it shall pass through to the State any warranties obtained or available from the original equipment manufacturer, including any replacement, upgraded, or additional equipment warranties.

## **2.126 EQUIPMENT TO BE NEW**

If applicable, all equipment provided under this Contract by Contractor shall be new where Contractor has knowledge regarding whether the equipment is new or assembled from new or serviceable used parts that are like new in performance or has the option of selecting one or the other. Equipment that is assembled from new or serviceable used parts that are like new in performance is acceptable where Contractor does not have knowledge or the ability to select one or other, unless specifically agreed otherwise in writing by the State.

## **2.127 PROHIBITED PRODUCTS**

The State will not accept salvage, distressed, outdated or discontinued merchandise. Shipping of such merchandise to any State agency, as a result of an order placed against Contract, shall be considered default by Contractor of the terms and conditions of Contract and may result in cancellation of Contract by the State. The brand and product number offered for all items shall remain consistent for the term of Contract, unless DTMB-Procurement has approved a change order pursuant to **Section 2.024**.

## **2.128 CONSEQUENCES FOR BREACH**

In addition to any remedies available in law, if Contractor breaches any of the warranties contained in this section, the breach may be considered as a default in the performance of a material obligation of this Contract.

### **2.130 Insurance**

#### **2.13.1 LIABILITY INSURANCE**

For the purpose of this Section, "State" includes its departments, divisions, agencies, offices, commissions, officers, employees, and agents.

(a) Contractor must provide proof that it has obtained the minimum levels of insurance coverage indicated or required by law, whichever is greater. The insurance must protect the State from claims that may arise out of, or result from, or are alleged to arise out of, or result from, Contractor's or a Subcontractor's performance, including any person directly or indirectly employed by Contractor or a Subcontractor, or any person for whose acts Contractor or a Subcontractor may be liable.

(b) Contractor waives all rights against the State for the recovery of damages that are covered by the insurance policies Contractor is required to maintain under this Section. Contractor's failure to obtain and maintain the required insurance will not limit this waiver.

(c) All insurance coverage provided relative to this Contract is primary and non-contributing to any comparable liability insurance (including self-insurance) carried by the State.

(d) The State, in its sole discretion, may approve the use of a fully-funded self-insurance program in place of any specified insurance identified in this Section.

(e) Unless the State approves otherwise, any insurer must have an A.M. Best rating of "A" or better and a financial size of VII or better, or if those ratings are not available, a comparable rating from an insurance rating agency approved by the State. All policies of insurance must be issued by companies that have been approved to do business in the State.

(f) Where specific coverage limits are listed in this Section, they represent the minimum acceptable limits. If Contractor's policy contains higher limits, the State is entitled to coverage to the extent of the higher limits.

(g) Contractor must maintain all required insurance coverage throughout the term of this Contract and any extensions. However, in the case of claims-made Commercial General Liability policies, Contractor must secure tail coverage for at least three (3) years following the termination of this Contract.





(h) Contractor must provide, within five (5) business days, written notice to the Director of DTMB-Procurement if any policy required under this section is cancelled. The notice must include the applicable Contract or Purchase Order number.

(i) The minimum limits of coverage specified are not intended, and may not be construed, to limit any liability or indemnity of Contractor to any indemnified party or other persons.

(j) Contractor is responsible for the payment of all deductibles.

(k) If Contractor fails to pay any premium for a required insurance policy, or if any insurer cancels or significantly reduces any required insurance without the State's approval, the State may, after giving Contractor at least 30 days' notice, pay the premium or procure similar insurance coverage from another company or companies. The State may deduct any part of the cost from any payment due Contractor, or require Contractor to pay that cost upon demand.

(l) In the event the State approves the representation of the State by the insurer's attorney, the attorney may be required to be designated as a Special Assistant Attorney General by the Michigan Attorney General.

(m) Contractor is required to pay for and provide the type and amount of insurance checked ☒ below:

☒ **(i) Commercial General Liability**

Minimal Limits:

\$2,000,000 General Aggregate Limit other than Products/Completed Operations  
 \$2,000,000 Products/Completed Operations Aggregate Limit  
 \$1,000,000 Personal & Advertising Injury Limit, and  
 \$1,000,000 Each Occurrence Limit.

Deductible maximum:

\$50,000 Each Occurrence

Additional Requirements:

Contractor must list the State of Michigan, its departments, divisions, agencies, offices, commissions, officers, employees, and agents as additional insureds on the Commercial General Liability certificate. Contractor also agrees to provide evidence that the insurance policy contains a waiver of subrogation by the insurance company.

The Products/Completed Operations sublimit requirement may be satisfied by evidence of the manufacturer's Commercial General Liability Insurance. The manufacturer must list the State of Michigan, its departments, divisions, agencies, offices, commissions, officers, employees, and agents as additional insureds on the Commercial General Liability certificate and must provide evidence that the policy contains a waiver of subrogation by the insurance company.

☒ **(iii) Motor Vehicle**

Minimal Limits:

If a motor vehicle is used in relation to Contractor's performance, Contractor must have vehicle liability insurance on the motor vehicle for bodily injury and property damage as required by law.

☒ **(v) Workers' Compensation**

Minimal Limits:

Contractor must provide Workers' Compensation coverage according to applicable laws governing work activities in the state of Contractor's domicile. If the applicable coverage is provided by a self-insurer, Contractor must provide proof of an approved self-insured authority by the jurisdiction of domicile.

For employees working outside of the state of Contractor's domicile, Contractor must provide certificates of insurance proving mandated coverage levels for the jurisdictions where the employees' activities occur.



Additional Requirements:

Contractor must provide the applicable certificates of insurance and a list of states where the coverage is applicable. Contractor must provide proof that the Workers' Compensation insurance policies contain a waiver of subrogation by the insurance company, except where such a provision is prohibited or limited by the laws of the jurisdiction in which the work is to be performed.

☒ **(vi) Employers Liability**

Minimal Limits:

\$100,000 Each Incident  
\$100,000 Each Employee by Disease  
\$500,000 Aggregate Disease

Additional Requirements:

Contractor must list the State of Michigan, its departments, divisions, agencies, offices, commissions, officers, employees, and agents as additional insureds on the certificate.

☒ **(viii) Professional Liability (Errors and Omissions)**

Minimal Limits:

\$3,000,000 Each Occurrence  
\$3,000,000 Annual Aggregate

Deductible Maximum:

\$50,000 Per Loss

☒ **(ix) Cyber Liability**

Minimal Limits:

\$1,000,000 Each Occurrence  
\$1,000,000 Annual Aggregate

Additional Requirements:

Insurance should cover (a) unauthorized acquisition, access, use, physical taking, identity theft, mysterious disappearance, release, distribution or disclosures of personal and corporate information; (b) transmitting or receiving malicious code via the insured's computer system; (c) denial of service attacks or the inability to access websites or computer systems.

Contractor must list the State of Michigan, its departments, divisions, agencies, offices, commissions, officers, employees, and agents as additional insureds on the certificate.

## **2.13.2 SUBCONTRACTOR INSURANCE COVERAGE**

Except where the State has approved a subcontract with other insurance provisions, Contractor must require any Subcontractor to purchase and maintain the insurance coverage required in Section 2.13.1, Liability Insurance. Alternatively, Contractor may include a Subcontractor under Contractor's insurance on the coverage required in that Section. The failure of a Subcontractor to comply with insurance requirements does not limit Contractor's liability or responsibility.

## **2.13.3 CERTIFICATES OF INSURANCE**

Before Contract is signed, and not less than 20 days before the insurance expiration date every year thereafter, Contractor must provide evidence that the State of Michigan, its departments, divisions, agencies, offices, commissions, officers, employees, and agents are listed as additional insureds as required. Contractor must provide DTMB-Procurement with all applicable certificates of insurance verifying insurance coverage or providing, if approved, satisfactory evidence of self-insurance as required in Section 2.13.1, Liability Insurance.



Each certificate must be on the standard "Accord" form or equivalent and MUST IDENTIFY THE APPLICABLE Contract OR PURCHASE ORDER NUMBER.

## **2.140 Indemnification**

### **2.141 GENERAL INDEMNIFICATION**

To the extent permitted by law, Contractor must indemnify, defend and hold harmless the State from liability, including all claims and losses, and all related costs and expenses (including reasonable attorneys' fees and costs of investigation, litigation, settlement, judgments, interest and penalties), accruing or resulting to any person, firm or corporation that may be injured or damaged by Contractor in the performance of this Contract and that are attributable to the negligence or tortious acts of Contractor or any of its subcontractors, or by anyone else for whose acts any of them may be liable.

### **2.142 CODE INDEMNIFICATION**

To the extent permitted by law, Contractor shall indemnify, defend and hold harmless the State from any claim, loss, or expense arising from Contractor's breach of the No Surreptitious Code Warranty.

### **2.143 EMPLOYEE INDEMNIFICATION**

In any claims against the State of Michigan, its departments, divisions, agencies, sections, commissions, officers, employees and agents, by any employee of Contractor or any of its subcontractors, the indemnification obligation under Contract must not be limited in any way by the amount or type of damages, compensation or benefits payable by or for Contractor or any of its subcontractors under worker's disability compensation acts, disability benefit acts or other employee benefit acts. This indemnification clause is intended to be comprehensive. Any overlap in provisions, or the fact that greater specificity is provided as to some categories of risk, is not intended to limit the scope of indemnification under any other provisions.

### **2.144 PATENT/COPYRIGHT INFRINGEMENT INDEMNIFICATION**

To the extent permitted by law, Contractor must indemnify, defend and hold harmless the State from and against all losses, liabilities, damages (including taxes), and all related costs and expenses (including reasonable attorneys' fees and costs of investigation, litigation, settlement, judgments, interest and penalties) incurred in connection with any action or proceeding threatened or brought against the State to the extent that the action or proceeding is based on a claim that any piece of equipment, software, commodity or service supplied by Contractor or its subcontractors, or the operation of the equipment, software, commodity or service, or the use or reproduction of any documentation provided with the equipment, software, commodity or service infringes any United States patent, copyright, trademark or trade secret of any person or entity, which is enforceable under the laws of the United States.

In addition, should the equipment, software, commodity, or service, or its operation, become or in the State's or Contractor's opinion be likely to become the subject of a claim of infringement, Contractor must at Contractor's sole expense (i) procure for the State the right to continue using the equipment, software, commodity or service or, if the option is not reasonably available to Contractor, (ii) replace or modify to the State's satisfaction the same with equipment, software, commodity or service of equivalent function and performance so that it becomes non-infringing, or, if the option is not reasonably available to Contractor, (iii) accept its return by the State with appropriate credits to the State against Contractor's charges and reimburse the State for any losses or costs incurred as a consequence of the State ceasing its use and returning it.

Notwithstanding the foregoing, Contractor has no obligation to indemnify or defend the State for, or to pay any costs, damages or attorneys' fees related to, any claim based upon (i) equipment developed based on written specifications of the State; (ii) use of the equipment in a configuration other than implemented or approved in writing by Contractor, including, but not limited to, any modification of the equipment by the State; or (iii) the combination, operation, or use of the equipment with equipment or software not supplied by Contractor under this Contract.



## **2.145 CONTINUATION OF INDEMNIFICATION OBLIGATIONS**

Contractor's duty to indemnify under this Section continues in full force and effect, notwithstanding the expiration or early cancellation of Contract, with respect to any claims based on facts or conditions that occurred before expiration or cancellation.

## **2.146 INDEMNIFICATION PROCEDURES**

The procedures set forth below must apply to all indemnity obligations under this Contract.

- (a) After the State receives notice of the action or proceeding involving a claim for which it shall seek indemnification, the State must promptly notify Contractor of the claim in writing and take or assist Contractor in taking, as the case may be, any reasonable action to avoid the imposition of a default judgment against Contractor. No failure to notify Contractor relieves Contractor of its indemnification obligations except to the extent that Contractor can prove damages attributable to the failure. Within 10 days following receipt of written notice from the State relating to any claim, Contractor must notify the State in writing whether Contractor agrees to assume control of the defense and settlement of that claim (a "Notice of Election"). After notifying Contractor of a claim and before the State receiving Contractor's Notice of Election, the State is entitled to defend against the claim, at Contractor's expense, and Contractor will be responsible for any reasonable costs incurred by the State in defending against the claim during that period.
- (b) If Contractor delivers a Notice of Election relating to any claim: (i) the State is entitled to participate in the defense of the claim and to employ counsel at its own expense to assist in the handling of the claim and to monitor and advise the State about the status and progress of the defense; (ii) Contractor must, at the request of the State, demonstrate to the reasonable satisfaction of the State, Contractor's financial ability to carry out its defense and indemnity obligations under this Contract; (iii) Contractor must periodically advise the State about the status and progress of the defense and must obtain the prior written approval of the State before entering into any settlement of the claim or ceasing to defend against the claim; and (iv) to the extent that any principles of Michigan governmental or public law may be involved or challenged, the State has the right, at its own expense, to control the defense of that portion of the claim involving the principles of Michigan governmental or public law. But the State may retain control of the defense and settlement of a claim by notifying Contractor in writing within 10 days after the State's receipt of Contractor's information requested by the State under clause (ii) of this paragraph if the State determines that Contractor has failed to demonstrate to the reasonable satisfaction of the State Contractor's financial ability to carry out its defense and indemnity obligations under this Section. Any litigation activity on behalf of the State, or any of its subdivisions under this Section, must be coordinated with the Department of Attorney General. In the event the insurer's attorney represents the State under this Section, the insurer's attorney may be required to be designated as a Special Assistant Attorney General by the Attorney General of the State of Michigan.
- (c) If Contractor does not deliver a Notice of Election relating to any claim of which it is notified by the State as provided above, the State may defend the claim in the manner as it may deem appropriate, at the cost and expense of Contractor. If it is determined that the claim was one against which Contractor was required to indemnify the State, upon request of the State, Contractor must promptly reimburse the State for all the reasonable costs and expenses.

## **2.150 Termination/Cancellation**

## **2.151 NOTICE AND RIGHT TO CURE**

If Contractor breaches Contract, and the State in its sole discretion determines that the breach is curable, then the State shall provide Contractor with written notice of the breach and a time period (not less than 30 days) to cure the Breach. The notice of breach and opportunity to cure is inapplicable for successive or repeated breaches or if the State determines in its sole discretion that the breach poses a serious and imminent threat to the health or safety of any person or the imminent loss, damage, or destruction of any real or tangible personal property.

**2.152 TERMINATION FOR CAUSE**

- (a) The State may terminate this contract, for cause, by notifying Contractor in writing, if Contractor (i) breaches any of its material duties or obligations under this Contract (including a Chronic Failure to meet any particular SLA), or (ii) fails to cure a breach within the time period specified in the written notice of breach provided by the State
- (b) If this Contract is terminated for cause, Contractor must pay all costs incurred by the State in terminating this Contract, including but not limited to, State administrative costs, reasonable attorneys' fees and court costs, and any reasonable additional costs the State may incur to procure the Services/Deliverables required by this Contract from other sources. Re-procurement costs are not consequential, indirect or incidental damages, and cannot be excluded by any other terms otherwise included in this Contract, provided the costs are not in excess of 50% more than the prices for the Service/Deliverables provided under this Contract.
- (c) If the State chooses to partially terminate this Contract for cause, charges payable under this Contract shall be equitably adjusted to reflect those Services/Deliverables that are terminated and the State must pay for all Services/Deliverables for which Final Acceptance has been granted provided up to the termination date. Services and related provisions of this Contract that are terminated for cause must cease on the effective date of the termination.
- (d) If the State terminates this Contract for cause under this Section, and it is determined, for any reason, that Contractor was not in breach of contract under the provisions of this section, that termination for cause must be deemed to have been a termination for convenience, effective as of the same date, and the rights and obligations of the parties must be limited to that otherwise provided in this Contract for a termination for convenience.

**2.153 TERMINATION FOR CONVENIENCE**

The State may terminate this Contract for its convenience, in whole or part, if the State determines that a termination is in the State's best interest. Reasons for the termination must be left to the sole discretion of the State and may include, but not necessarily be limited to (a) the State no longer needs the Services or products specified in Contract, (b) relocation of office, program changes, changes in laws, rules, or regulations make implementation of the Services no longer practical or feasible, (c) unacceptable prices for Additional Services or New Work requested by the State, or (d) falsification or misrepresentation, by inclusion or non-inclusion, of information material to a response to any RFP issued by the State. The State may terminate this Contract for its convenience, in whole or in part, by giving Contractor written notice at least 30 days before the date of termination. If the State chooses to terminate this Contract in part, the charges payable under this Contract must be equitably adjusted to reflect those Services/Deliverables that are terminated. Services and related provisions of this Contract that are terminated for convenience must cease on the effective date of the termination.

**2.154 TERMINATION FOR NON-APPROPRIATION**

- (a) Contractor acknowledges that, if this Contract extends for several fiscal years, continuation of this Contract is subject to appropriation or availability of funds for this Contract. If funds to enable the State to effect continued payment under this Contract are not appropriated or otherwise made available, the State must terminate this Contract and all affected Statements of Work, in whole or in part, at the end of the last period for which funds have been appropriated or otherwise made available by giving written notice of termination to Contractor. The State must give Contractor at least 30 days advance written notice of termination for non-appropriation or unavailability (or the time as is available if the State receives notice of the final decision less than 30 days before the funding cutoff).
- (b) If funding for Contract is reduced by law, or funds to pay Contractor for the agreed-to level of the Services or production of Deliverables to be provided by Contractor are not appropriated or otherwise unavailable, the State may, upon 30 days written notice to Contractor, reduce the level of the Services or change the production of Deliverables in the manner and for the periods of time as the State may elect. The charges payable under this Contract shall be equitably adjusted to reflect any equipment, services or commodities not provided by reason of the reduction.
- (c) If the State terminates this Contract, eliminates certain Deliverables, or reduces the level of Services to be provided by Contractor under this Section, the State must pay Contractor for all Work-in-Process





performed through the effective date of the termination or reduction in level, as the case may be and as determined by the State, to the extent funds are available. This Section shall not preclude Contractor from reducing or stopping Services/Deliverables or raising against the State in a court of competent jurisdiction, any claim for a shortfall in payment for Services performed or Deliverables finally accepted before the effective date of termination.

## **2.155 TERMINATION FOR CRIMINAL CONVICTION**

The State may terminate this Contract immediately and without further liability or penalty in the event Contractor, an officer of Contractor, or an owner of a 25% or greater share of Contractor is convicted of a criminal offense related to a State, public or private Contract or subcontract.

## **2.156 TERMINATION FOR APPROVALS RESCINDED**

The State may terminate this Contract if any final administrative or judicial decision or adjudication disapproves a previously approved request for purchase of personal services under Constitution 1963, Article 11, § 5, and Civil Service Rule 7-1. In that case, the State shall pay Contractor for only the work completed to that point under Contract. Termination may be in whole or in part and may be immediate as of the date of the written notice to Contractor or may be effective as of the date stated in the written notice.

## **2.157 RIGHTS AND OBLIGATIONS UPON TERMINATION**

- (a) If the State terminates this Contract for any reason, Contractor must, at no charge to the State, (a) stop all work as specified in the notice of termination, (b) return all materials and property provided directly or indirectly to Contractor by any entity, agent or employee of the State, (c) deliver to, the State, unless otherwise directed, all work flows, business process documents, and State owned data relating to this agreement at the termination of Contract and which are resulting from Contract, and (d) take any action to mitigate and limit any potential damages, or requests for Contractor adjustment or termination settlement costs, to the maximum practical extent, including terminating or limiting as otherwise applicable those subcontracts and outstanding orders for material and supplies resulting from the terminated Contract. For the avoidance of doubt, nothing herein shall be deemed to convey any ownership interest in any Contractor software to the State.
- (b) If the State terminates this Contract before its expiration for its own convenience, the State must pay Contractor for all charges due for Services provided before the date of termination and, if applicable, as a separate item of payment under this Contract, for Work In Process, on a percentage of completion basis at the level of completion determined by the State. All completed or partially completed Deliverables prepared by Contractor under this Contract, at the option of the State, becomes the State's property, and Contractor is entitled to receive equitable fair compensation for the Deliverables. Regardless of the basis for the termination, the State is not obligated to pay, or otherwise compensate, Contractor for any lost expected future profits, costs or expenses incurred with respect to Services not actually performed for the State.
- (c) Upon a good faith termination, the State may assume, at its option, any subcontracts and agreements for services and deliverables provided under this Contract, and may further pursue completion of the Services/Deliverables under this Contract by replacement contract or otherwise as the State may in its sole judgment deem expedient.

## **2.158 RESERVATION OF RIGHTS**

Any termination of this Contract or any Statement of Work issued under it by a party must be with full reservation of, and without prejudice to, any rights or remedies otherwise available to the party with respect to any claims arising before or as a result of the termination.

### **2.160 Termination by Contractor**

## **2.161 TERMINATION BY CONTRACTOR**

If the State breaches Contract, and Contractor in its sole discretion determines that the breach is curable, then Contractor will provide the State with written notice of the breach and a time period (not less than 30 days) to



cure the breach. The Notice of Breach and opportunity to cure is inapplicable for successive and repeated breaches.

Contractor may terminate this Contract if the State (i) materially breaches its obligation to pay Contractor undisputed amounts due and owing under this Contract, (ii) breaches its other obligations under this Contract to an extent that makes it impossible or commercially impractical for Contractor to perform the Services, or (iii) does not cure the breach within the time period specified in a written notice of breach. But Contractor must discharge its obligations under **Section 2.170** before it terminates Contract.

### **2.170 Transition Responsibilities**

#### **2.171 CONTRACTOR TRANSITION RESPONSIBILITIES**

If the State terminates this contract, for convenience or cause, or if Contract is otherwise dissolved, voided, rescinded, nullified, expires or rendered unenforceable, Contractor shall comply with direction provided by the State to assist in the orderly transition of equipment, services, software, leases, etc. to the State or a third party designated by the State. If this Contract expires or terminates, Contractor agrees to make all reasonable efforts to effect an orderly transition of services within a reasonable period of time that in no event will exceed 90 days. These efforts must include, but are not limited to, those listed in **Section 2.150**.

#### **2.172 CONTRACTOR PERSONNEL TRANSITION**

Contractor shall work with the State, or a specified third party, to develop a transition plan setting forth the specific tasks and schedule to be accomplished by the parties, to effect an orderly transition. Contractor must allow as many personnel as practicable to remain on the job to help the State, or a specified third party, maintain the continuity and consistency of the services required by this Contract. In addition, during or following the transition period, in the event the State requires the Services of Contractor's subcontractors or vendors, as necessary to meet its needs, Contractor agrees to reasonably, and with good-faith, work with the State to use the Services of Contractor's subcontractors or vendors. Contractor will notify all of Contractor's subcontractors of procedures to be followed during transition.

#### **2.173 CONTRACTOR INFORMATION TRANSITION**

Contractor shall provide reasonable detailed specifications for all Services/Deliverables needed by the State, or specified third party, to properly provide the Services/Deliverables required under this Contract. Contractor will provide the State with asset management data generated from the inception of this Contract through the date on which this Contractor is terminated in a comma-delineated format unless otherwise requested by the State. Contractor will deliver to the State any remaining owed reports and documentation still in Contractor's possession subject to appropriate payment by the State.

#### **2.174 CONTRACTOR SOFTWARE TRANSITION**

Contractor shall reasonably assist the State in the acquisition of any Contractor software required to perform the Services/use the Deliverables under this Contract. This must include any documentation being used by Contractor to perform the Services under this Contract. If the State transfers any software licenses to Contractor, those licenses must, upon expiration of Contract, transfer back to the State at their current revision level. Upon notification by the State, Contractor may be required to freeze all non-critical changes to Deliverables/Services.

#### **2.175 TRANSITION PAYMENTS**

If the transition results from a termination for any reason, the termination provisions of this Contract must govern reimbursement. If the transition results from expiration, Contractor will be reimbursed for all reasonable transition costs (i.e. costs incurred within the agreed period after contract expiration that result from transition operations) at the rates agreed upon by the State. Contractor will prepare an accurate accounting from which the State and Contractor may reconcile all outstanding accounts.



## **2.176 STATE TRANSITION RESPONSIBILITIES**

In the event that this Contract is terminated, dissolved, voided, rescinded, nullified, or otherwise rendered unenforceable, the State agrees to reconcile all accounts between the State and Contractor, complete any pending post-project reviews and perform any others obligations upon which the State and Contractor agree.

- (a) Reconciling all accounts between the State and Contractor;
- (b) Completing any pending post-project reviews.

### **2.180 Stop Work**

#### **2.181 STOP WORK ORDERS**

The State may, at any time, by written Stop Work Order to Contractor, require that Contractor stop all, or any part, of the work called for by Contract for a period of up to 90 calendar days after the Stop Work Order is delivered to Contractor, and for any further period to which the parties may agree. The Stop Work Order must be identified as a Stop Work Order and must indicate that it is issued under this **Section**. Upon receipt of the stop work order, Contractor must immediately comply with its terms and take all reasonable steps to minimize incurring costs allocable to the work covered by the Stop Work Order during the period of work stoppage. Within the period of the stop work order, the State must either: (a) cancel the stop work order; or (b) terminate the work covered by the Stop Work Order as provided in **Section 2.182**.

#### **2.182 CANCELLATION OR EXPIRATION OF STOP WORK ORDER**

Contractor shall resume work if the State cancels a Stop Work Order or if it expires. The parties shall agree upon an equitable adjustment in the delivery schedule, Contract price, or both, and Contract shall be modified, in writing, accordingly, if: (a) the Stop Work Order results in an increase in the time required for, or in Contractor's costs properly allocable to, the performance of any part of Contract; and (b) Contractor asserts its right to an equitable adjustment within 30 calendar days after the end of the period of work stoppage; provided that, if the State decides the facts justify the action, the State may receive and act upon a Contractor proposal submitted at any time before final payment under Contract. Any adjustment will conform to the requirements of **Section 2.024**.

#### **2.183 ALLOWANCE OF CONTRACTOR COSTS**

If the Stop Work Order is not canceled and the work covered by the Stop Work Order is terminated for reasons other than material breach, the termination shall be deemed to be a termination for convenience under **Section 2.153**, and the State shall pay reasonable costs resulting from the Stop Work Order in arriving at the termination settlement. For the avoidance of doubt, the State shall not be liable to Contractor for loss of profits because of a Stop Work Order issued under this Section.

### **2.190 Dispute Resolution**

#### **2.191 IN GENERAL**

Any claim, counterclaim, or dispute between the State and Contractor arising out of or relating to Contract or any Statement of Work must be resolved as follows. For all Contractor claims seeking an increase in the amounts payable to Contractor under Contract, or the time for Contractor's performance, Contractor must submit a letter, together with all data supporting the claims, executed by Contractor's Contract Administrator or Contract Administrator's designee certifying that (a) the claim is made in good faith, (b) the amount claimed accurately reflects the adjustments in the amounts payable to Contractor or the time for Contractor's performance for which Contractor believes the State is liable and covers all costs of every type to which Contractor is entitled from the occurrence of the claimed event, and (c) the claim and the supporting data are current and complete to Contractor's best knowledge and belief.

#### **2.192 INFORMAL DISPUTE RESOLUTION**

- (a) All disputes between the parties shall be resolved under Contract Management procedures in this Contract. If the parties are unable to resolve any dispute after compliance with the processes, the parties must





meet with the Director of Procurement, DTMB, or designee, to resolve the dispute without the need for formal legal proceedings, as follows:

- (1) The representatives of Contractor and the State must meet as often as the parties reasonably deem necessary to gather and furnish to each other all information with respect to the matter at issue which the parties believe to be appropriate and germane in connection with its resolution. The representatives shall discuss the problem and negotiate in good faith in an effort to resolve the dispute without the necessity of any formal proceeding.
  - (2) During the course of negotiations, all reasonable requests made by one party to another for non-privileged information reasonably related to Contract shall be honored in order that each of the parties may be fully advised of the other's position.
  - (3) The specific format for the discussions shall be left to the discretion of the designated State and Contractor representatives, but may include the preparation of agreed upon statements of fact or written statements of position.
  - (4) Following the completion of this process within 60 calendar days, the Director of Procurement, DTMB, or designee, shall issue a written opinion regarding the issue(s) in dispute within 30 calendar days. The opinion regarding the dispute must be considered the State's final action and the exhaustion of administrative remedies.
- (b) This Section shall not be construed to prevent either party from instituting, and a party is authorized to institute, formal proceedings earlier to avoid the expiration of any applicable limitations period, to preserve a superior position with respect to other creditors, or under Section 2.193.
- (c) The State shall not mediate disputes between Contractor and any other entity, except state agencies, concerning responsibility for performance of work under Contract.

### **2.193 INJUNCTIVE RELIEF**

A claim between the State and Contractor is not subject to the provisions of Section 2.192, Informal Dispute Resolution, where a party makes a good faith determination that a breach of Contract by the other party will result in damages so immediate, so large or severe, and so incapable of adequate redress that a temporary restraining order or other injunctive relief is the only adequate remedy.

### **2.194 CONTINUED PERFORMANCE**

Each party agrees to continue performing its obligations under Contract while a dispute is being resolved except to the extent the issue in dispute precludes performance (dispute over payment must not be deemed to preclude performance) and without limiting either party's right to terminate Contract as provided in **Section 2.150**, as the case may be.

## **2.200 Federal and State Contract Requirements**

### **2.201 NONDISCRIMINATION**

In the performance of Contract, Contractor agrees not to discriminate against any employee or applicant for employment, with respect to his or her hire, tenure, terms, conditions or privileges of employment, or any matter directly or indirectly related to employment, because of race, color, religion, national origin, ancestry, age, sex, height, weight, and marital status, physical or mental disability. Contractor further agrees that every subcontract entered into for the performance of this Contract or any purchase order resulting from this Contract will contain a provision requiring non-discrimination in employment, as specified here, binding upon each Subcontractor. This covenant is required under the Elliot Larsen Civil Rights Act, 1976 PA 453, MCL 37.2101, et seq., and the Persons with Disabilities Civil Rights Act, 1976 PA 220, MCL 37.1101, et seq., and any breach of this provision may be regarded as a material breach of Contract.

### **2.202 UNFAIR LABOR PRACTICES**

Under 1980 PA 278, MCL 423.321, et seq., the State shall not award a Contract or subcontract to an employer whose name appears in the current register of employers failing to correct an unfair labor practice compiled under section 2 of the Act. This information is compiled by the United States National Labor Relations Board. A Contractor of the State, in relation to Contract, shall not enter into a contract with a Subcontractor, manufacturer, or supplier whose name appears in this register. Under section 4 of 1980 PA 278, MCL



423.324, the State may void any Contract if, after award of Contract, the name of Contractor as an employer or the name of the Subcontractor, manufacturer or supplier of Contractor appears in the register.

### **2.203 WORKPLACE SAFETY AND DISCRIMINATORY HARASSMENT**

In performing Services for the State, Contractor shall comply with the Department of Civil Services Rule 2-20 regarding Workplace Safety and Rule 1-8.3 regarding Discriminatory Harassment. In addition, Contractor shall comply with Civil Service regulations and any applicable agency rules provided to Contractor. For Civil Service Rules, see <http://www.mi.gov/mdcs/0,1607,7-147-6877---,00.html>.

### **2.204 PREVAILING WAGE**

Wages rates and fringe benefits to be paid each class of individuals employed by Contractor, its subcontractors, their subcontractors, and all persons involved with the performance of this Contract in privity of contract with Contractor shall not be less than the wage rates and fringe benefits established by the Michigan Department of Licensing and Regulatory Affairs, Wage and Hour Division, schedule of occupational classification and wage rates and fringe benefits for the local where the work is to be performed. The term Contractor shall include all general contractors, prime contractors, project managers, trade contractors, and all of their contractors or subcontractors and persons in privity of contract with them.

Contractor, its subcontractors, their subcontractors and all persons involved with the performance of this contract in privity of contract with Contractor shall keep posted on the work site, in a conspicuous place, a copy of all wage rates and fringe benefits as prescribed in Contract. Contractor shall also post, in a conspicuous place, the address and telephone number of the Michigan Department of Licensing and Regulatory Affairs, the agency responsible for enforcement of the wage rates and fringe benefits. Contractor shall keep an accurate record showing the name and occupation of the actual wage and benefits paid to each individual employed in connection with this contract. This record shall be available to the State upon request for reasonable inspection.

If any trade is omitted from the list of wage rates and fringe benefits to be paid to each class of individuals by Contractor, it is understood that the trades omitted shall also be paid not less than the wage rate and fringe benefits prevailing in the local where the work is to be performed.

### **2.210 Governing Law**

#### **2.211 GOVERNING LAW**

Contract shall in all respects be governed by, and construed according to, the substantive laws of the State of Michigan without regard to any Michigan choice of law rules that would apply the substantive law of any other jurisdiction to the extent not inconsistent with, or pre-empted by federal law.

#### **2.212 COMPLIANCE WITH LAWS**

Contractor shall comply with all applicable state, federal and local laws and ordinances in providing the Services/Deliverables.

#### **2.213 JURISDICTION**

Any dispute arising from Contract shall be resolved in the State of Michigan. With respect to any claim between the parties, Contractor consents to venue in Ingham County, Michigan, and irrevocably waives any objections it may have to the jurisdiction on the grounds of lack of personal jurisdiction of the court or the laying of venue of the court or on the basis of forum non conveniens or otherwise. Contractor agrees to appoint agents in the State of Michigan to receive service of process.

### **2.220 Limitation of Liability**



## **2.221 LIMITATION OF LIABILITY**

Neither Contractor nor the State is liable to each other, regardless of the form of action, for consequential, incidental, indirect, or special damages. This limitation of liability does not apply to claims for infringement of United States patent, copyright, trademark or trade secrets; to claims for personal injury or damage to property caused by the gross negligence or willful misconduct of Contractor; to claims covered by other specific provisions of this Contract calling for liquidated damages; or to court costs or attorneys' fees awarded by a court in addition to damages after litigation based on this Contract.

## **2.230 Disclosure Responsibilities**

## **2.231 DISCLOSURE OF LITIGATION**

Contractor shall disclose any material criminal litigation, investigations or proceedings involving Contractor (and each Subcontractor) or any of its officers or directors or any litigation, investigations or proceedings under the Sarbanes-Oxley Act. In addition, each Contractor (and each Subcontractor) shall notify the State of any material civil litigation, arbitration or proceeding which arises during the term of Contract and extensions, to which Contractor (or, to the extent Contractor is aware, any Subcontractor) is a party, and which involves: (i) disputes that might reasonably be expected to adversely affect the viability or financial stability of Contractor or any Subcontractor; or (ii) a claim or written allegation of fraud against Contractor or, to the extent Contractor is aware, any Subcontractor by a governmental or public entity arising out of their business dealings with governmental or public entities. Contractor shall disclose in writing to Contract Administrator any litigation, investigation, arbitration or other proceeding (collectively, "Proceeding") within 30 days of its occurrence. Details of settlements that are prevented from disclosure by the terms of the settlement may be annotated. Information provided to the State from Contractor's publicly filed documents referencing its material litigation shall be deemed to satisfy the requirements of this Section.

If any Proceeding disclosed to the State under this Section, or of which the State otherwise becomes aware, during the term of this Contract would cause a reasonable party to be concerned about:

- (a) the ability of Contractor (or a Subcontractor) to continue to perform this Contract according to its terms and conditions, or
- (b) whether Contractor (or a Subcontractor) in performing Services for the State is engaged in conduct which is similar in nature to conduct alleged in the Proceeding, which conduct would constitute a breach of this Contract or a violation of Michigan law, regulations or public policy, then Contractor must provide the State all reasonable assurances requested by the State to demonstrate that:
  - (1) Contractor and its Subcontractors will be able to continue to perform this Contract and any Statements of Work according to its terms and conditions, and
  - (2) Contractor and its Subcontractors have not and will not engage in conduct in performing the Services which is similar in nature to the conduct alleged in the Proceeding.
- (c) Contractor shall make the following notifications in writing:
  - (1) Within 30 days of Contractor becoming aware that a change in its ownership or officers has occurred, or is certain to occur, or a change that could result in changes in the valuation of its capitalized assets in the accounting records, Contractor must notify DTMB-Procurement.
  - (2) Contractor shall also notify DTMB Procurement within 30 days whenever changes to asset valuations or any other cost changes have occurred or are certain to occur as a result of a change in ownership or officers.
  - (3) Contractor shall also notify DTMB-Procurement within 30 days whenever changes to company affiliations occur.

## **2.232 CALL CENTER DISCLOSURE**

Contractor and/or all subcontractors involved in the performance of this Contract providing call or contact center services to the State shall disclose the location of its call or contact center services to inbound callers. Failure to disclose this information is a material breach of this Contract.



## 2.233 BANKRUPTCY

The State may, without prejudice to any other right or remedy, terminate this Contract, in whole or in part, and, at its option, may take possession of the "Work in Process" and finish the Works in Process by whatever appropriate method the State may deem expedient if:

- (a) Contractor files for protection under the bankruptcy laws;
- (b) an involuntary petition is filed against Contractor and not removed within 30 days;
- (c) Contractor becomes insolvent or if a receiver is appointed due to Contractor's insolvency;
- (d) Contractor makes a general assignment for the benefit of creditors; or
- (e) Contractor or its affiliates are unable to provide reasonable assurances that Contractor or its affiliates can deliver the services under this Contract.

Contractor will fix appropriate notices or labels on the Work in Process to indicate ownership by the State. To the extent reasonably possible, materials and Work in Process shall be stored separately from other stock and marked conspicuously with labels indicating ownership by the State.

## 2.240 Performance

### 2.241 TIME OF PERFORMANCE

- (a) Contractor shall use commercially reasonable efforts to provide the resources necessary to complete all Services and Deliverables according to the time schedules contained in the Statements of Work and other Exhibits governing the work, and with professional quality.
- (b) Without limiting the generality of **Section 2.241**, Contractor shall notify the State in a timely manner upon becoming aware of any circumstances that may reasonably be expected to jeopardize the timely and successful completion of any Deliverables/Services on the scheduled due dates in the latest State-approved delivery schedule and must inform the State of the projected actual delivery date.
- (c) If Contractor believes that a delay in performance by the State has caused or will cause Contractor to be unable to perform its obligations according to specified Contract time periods, Contractor must notify the State in a timely manner and must use commercially reasonable efforts to perform its obligations according to Contract time periods notwithstanding the State's failure. Contractor will not be in default for a delay in performance to the extent the delay is caused by the State.

### 2.242 SERVICE LEVEL AGREEMENT (SLA)

- (a) SLAs will be completed with the following operational considerations:
  - (1) SLAs will not be calculated for individual Incidents where any event of Excusable Failure has been determined; Incident means any interruption in Services.
  - (2) SLAs will not be calculated for individual Incidents where loss of service is planned and where the State has received prior notification or coordination.
  - (3) SLAs will not apply if the applicable Incident could have been prevented through planning proposed by Contractor and not implemented at the request of the State. To invoke this consideration, complete documentation relevant to the denied planning proposal must be presented to substantiate the proposal.
  - (4) Time period measurements will be based on the time Incidents are received by Contractor and the time that the State receives notification of resolution based on 24x7x365 time period, except that the time period measurement will be suspended based on the following:
    - (i) Time period(s) will not apply where Contractor does not have access to a physical State Location and where access to the State Location is necessary for problem identification and resolution.
    - (ii) Time period(s) will not apply where Contractor needs to obtain timely and accurate information or appropriate feedback and is unable to obtain timely and accurate information or appropriate feedback from the State.
- (b) Chronic Failure for any Service(s) will be defined as three unscheduled outage(s) or interruption(s) on any individual Service for the same reason or cause or if the same reason or cause was reasonably discoverable in the first instance over a rolling 30 day period. Chronic Failure will result in the State's



option to terminate the effected individual Service(s) and procure them from a different vendor for the chronic location(s) with Contractor to pay the difference in charges for up to three additional months. The termination of the Service will not affect any tiered pricing levels.

- (c) Root Cause Analysis will be performed on any Business Critical outage(s) or outage(s) on Services when requested by Contract Administrator. Contractor will provide its analysis within two weeks of outage(s) and provide a recommendation for resolution.
- (d) All decimals must be rounded to two decimal places with five and greater rounding up and four and less rounding down unless otherwise specified.

### 2.243 LIQUIDATED DAMAGES

#### Unauthorized Removal of any Key Personnel

It is acknowledged that an Unauthorized Removal will interfere with the timely and proper completion of Contract, to the loss and damage of the State, and that it would be impracticable and extremely difficult to fix the actual damage sustained by the State as a result of any Unauthorized Removal. Therefore, Contractor and the State agree that in the case of any Unauthorized Removal in respect of which the State does not elect to exercise its rights under **Section 2.152**, the State may assess liquidated damages against Contractor as specified below.

For the Unauthorized Removal of any Key Personnel designated in the applicable Statement of Work, the liquidated damages amount is \$25,000.00 per individual if Contractor identifies a replacement approved by the State under **Section 2.060** and assigns the replacement to the Project to shadow the Key Personnel who is leaving for a period of at least 30 days before the Key Personnel's removal.

If Contractor fails to assign a replacement to shadow the removed Key Personnel for at least 30 days, in addition to the \$25,000.00 liquidated damages for an Unauthorized Removal, Contractor must pay the amount of \$833.33 per day for each day of the 30 day shadow period that the replacement Key Personnel does not shadow the removed Key Personnel, up to \$25,000.00 maximum per individual. The total liquidated damages that may be assessed per Unauthorized Removal and failure to provide 30 days of shadowing must not exceed \$50,000.00 per individual.

### 2.244 EXCUSABLE FAILURE

Neither party will be liable for any default, damage or delay in the performance of its obligations under Contract to the extent the default, damage or delay is caused by government regulations or requirements (executive, legislative, judicial, military or otherwise), power failure, electrical surges or current fluctuations, lightning, earthquake, war, water or other forces of nature or acts of God, delays or failures of transportation, equipment shortages, suppliers' failures, or acts or omissions of common carriers, fire; riots, civil disorders; strikes or other labor disputes, embargoes; injunctions (provided the injunction was not issued as a result of any fault or negligence of the party seeking to have its default or delay excused); or any other cause beyond the reasonable control of a party; provided the non-performing party and its Subcontractors are without fault in causing the default or delay, and the default or delay could not have been prevented by reasonable precautions and cannot reasonably be circumvented by the non-performing party through the use of alternate sources, workaround plans or other means, including disaster recovery plans.

If a party does not perform its contractual obligations for any of the reasons listed above, the non-performing party will be excused from any further performance of its affected obligation(s) for as long as the circumstances prevail. But the party must use commercially reasonable efforts to recommence performance whenever and to whatever extent possible without delay. A party must promptly notify the other party in writing immediately after the excusable failure occurs, and also when it abates or ends.

If any of the above-enumerated circumstances substantially prevent, hinder, or delay Contractor's performance of the Services/provision of Deliverables for more than 10 Business Days, and the State determines that performance is not likely to be resumed within a period of time that is satisfactory to the State in its reasonable discretion, then at the State's option: (a) the State may procure the affected Services/Deliverables from an alternate source, and the State is not be liable for payment for the unperformed Services/ Deliverables not





provided under Contract for so long as the delay in performance continues; (b) the State may terminate any portion of Contract so affected and the charges payable will be equitably adjusted to reflect those Services/Deliverables terminated; or (c) the State may terminate the affected Statement of Work without liability to Contractor as of a date specified by the State in a written notice of termination to Contractor, except to the extent that the State must pay for Services/Deliverables provided through the date of termination.

Contractor will not have the right to any additional payments from the State as a result of any Excusable Failure occurrence or to payments for Services not rendered/Deliverables not provided as a result of the Excusable Failure condition. Defaults or delays in performance by Contractor which are caused by acts or omissions of its Subcontractors will not relieve Contractor of its obligations under Contract except to the extent that a Subcontractor is itself subject to an Excusable Failure condition described above and Contractor cannot reasonably circumvent the effect of the Subcontractor's default or delay in performance through the use of alternate sources, workaround plans or other means.

## **2.250 Approval of Deliverables**

### **2.251 DELIVERY OF DELIVERABLES**

Before delivering a Deliverable to the State, Contractor shall certify to the State that (1) it has performed quality assurance activities, (2) it has performed any necessary pre-testing, (3) it has corrected all material deficiencies discovered during such quality assurance activities and pre-testing, (4) the Deliverable is in a suitable state of readiness for the State's review and approval, and (5) the Deliverable has all critical security patches/updates applied.

### **2.252 APPROVAL OF DELIVERABLES, IN GENERAL**

All Deliverables require formal written approval by the State, in accordance with the following procedures. Formal approval by the State requires that the Deliverable be confirmed in writing by the State to meet its specifications, which, in the case of the COTS Solution and Enhancements, will include the successful completion of State User Acceptance Testing, to be led by the State with the support and assistance of Contractor.

The State's obligation to comply with any State Review Period is conditioned on the timely delivery of Deliverables being reviewed. If Contractor fails to provide a Deliverable to the State in a timely manner, the State will nevertheless use commercially reasonable efforts to complete its review or testing within the applicable State Review Period.

Before commencement of its review or testing of a Deliverable, the State may inspect the Deliverable to confirm that all components of the Deliverable (e.g., software, associated documentation, and other materials) have been delivered. If the State determines that the Deliverable is incomplete, the State may refuse delivery of the Deliverable without performing any further inspection or testing of the Deliverable. Otherwise, the review period will be deemed to have started on the day the State receives the Deliverable and the applicable certification by Contractor in accordance with Section 2.251.

The State will approve in writing a Deliverable upon confirming that it conforms to and, in the case of the COTS Solution and Enhancements, performs in accordance with, its specifications without material deficiency. The State may, but shall not be required to, conditionally approve in writing a Deliverable that contains material deficiencies if the State elects to permit Contractor to rectify them post-approval. In any case, Contractor will be responsible for working diligently to correct within a reasonable time at Contractor's expense all deficiencies in the Deliverable that remain outstanding at the time of State approval.

If, after three (3) opportunities (the original and two repeat efforts), Contractor is unable to correct all deficiencies preventing State approval of a Deliverable, the State may: (i) demand that Contractor cure the failure and give Contractor additional time to cure the failure at the sole expense of Contractor; or (ii) keep this Contract in force and do, either itself or through other parties, whatever Contractor has failed to do, in which event Contractor shall bear any excess expenditure incurred by the State in so doing beyond Contract price for



such Deliverable and will pay the State an additional sum equal to ten percent (10%) of such excess expenditure to cover the State's general expenses without the need to furnish proof in substantiation of such general expenses; or (iii) terminate this Contract for default, either in whole or in part by notice to Contractor (and without the need to afford Contractor any further opportunity to cure).

The State, at any time and in its own discretion, may halt the UAT or approval process if such process reveals deficiencies in or problems with a Deliverable in a sufficient quantity or of a sufficient severity as to make the continuation of such process unproductive or unworkable. In such case, the State may return the applicable Deliverable to Contractor for correction and re-delivery prior to resuming the review or UAT process and, in that event, Contractor will correct the deficiencies in such Deliverable in accordance with Contract, as the case may be.

Approval in writing of a Deliverable by the State shall be provisional; that is, such approval shall not preclude the State from later identifying deficiencies in, and declining to accept, a subsequent Deliverable based on or which incorporates or inter-operates with an approved Deliverable, to the extent that the results of subsequent review or testing indicate the existence of deficiencies in the subsequent Deliverable.

## **2.254 PROCESS FOR APPROVAL OF WRITTEN DELIVERABLES**

The State Review Period for written Deliverables will be the number of days set forth in the applicable Statement of Work following delivery of the final version of the written Deliverable (failing which the State Review Period, by default, shall be five (5) Business Days for written Deliverables of one hundred (100) pages or less and ten (10) Business Days for written Deliverables of more than one hundred (100) pages). The duration of the State Review Periods will be doubled if the State has not had an opportunity to review an interim draft of the Written Deliverable prior to its submission to the State. The State agrees to notify Contractor in writing by the end of the State Review Period either stating that the written Deliverable is approved in the form delivered by Contractor or describing any deficiencies that shall be corrected prior to approval of the written Deliverable (or at the State's election, subsequent to approval of the written Deliverable). If the State delivers to Contractor a notice of deficiencies, Contractor will correct the described deficiencies and within five (5) Business Days resubmit the Deliverable in a form that shows all revisions made to the original version delivered to the State. Contractor's correction efforts will be made at no additional charge. Upon receipt of a corrected written Deliverable from Contractor, the State will have a reasonable additional period of time, not to exceed the length of the original State Review Period, to review the corrected written Deliverable to confirm that the identified deficiencies have been corrected.

## **2.255 PROCESS FOR APPROVAL OF COTS SOLUTION AND ENHANCEMENTS**

The State will conduct UAT of each software Deliverable (including but not limited to the COTS Solution and any Enhancements) in accordance with the following procedures to determine whether it meets the criteria for State approval – i.e., whether it conforms to and performs in accordance with its specifications without material deficiencies.

Within thirty (30) days (or such other number of days as the parties may agree to in writing) prior to Contractor's delivery of any software Deliverable to the State for approval, Contractor shall provide to the State a set of proposed test plans, including test cases, scripts, data and expected outcomes, for the State's use (which the State may supplement in its own discretion) in conducting UAT of the software Deliverable. Contractor, upon request by the State, shall provide the State with reasonable assistance and support during the UAT process.

For each software Deliverable, the State Review Period for conducting UAT will be as indicated in the Statement of Work. The State Review Period for each software Deliverable will begin when Contractor has delivered the software Deliverable to the State accompanied by the certification required by Section 2.251 and the State's inspection of the Deliverable has confirmed that all components of it have been delivered.

The State's UAT will consist of executing test scripts from the proposed testing submitted by Contractor, but may also include any additional testing deemed appropriate by the State. If the State determines during the UAT that the software Deliverable contains any deficiencies, the State will notify Contractor of the deficiency by



making an entry in an incident reporting system available to both Contractor and the State. Contractor will modify promptly the software Deliverable to correct the reported deficiencies, conduct appropriate testing to confirm the proper correction of the deficiencies and re-deliver the corrected version to the State for re-testing in UAT. Contractor will coordinate the re-delivery of corrected versions of software Deliverables with the State so as not to disrupt the State's UAT process. The State will promptly re-test the corrected version of the software Deliverable after receiving it from Contractor.

Within three (3) business days after the end of the State Review Period, the State will give Contractor a written notice indicating the State's approval or rejection of the software Deliverable according to the criteria and process set out in this **Section**.

## **2.256 FINAL ACCEPTANCE**

"**Final Acceptance**" shall be considered to occur when the software Deliverable to be delivered has been approved by the State in writing and has been operating in production without any material deficiency for fourteen (14) consecutive days. If the State elects to defer putting a software into live production for its own reasons, not based on concerns about outstanding material deficiencies in the Deliverable, the State shall nevertheless grant Final Acceptance of the Project.

### **2.260 Ownership**

#### **2.261 OWNERSHIP OF WORK PRODUCT BY STATE**

Contractor owns all Enhancements and all United States and international copyrights, trademarks, patents or other proprietary rights in the Enhancements.

#### **2.262 INTENTIONALLY OMITTED**

#### **2.263 RIGHTS IN DATA**

The State is the owner of all data made available by the State to Contractor or its agents, Subcontractors or representatives under Contract. Contractor will not use the State's data for any purpose other than providing the Services, nor will any part of the State's data be disclosed, sold, assigned, leased or otherwise disposed of to the general public or to specific third parties or commercially exploited by or on behalf of Contractor. No employees of Contractor, other than those on a strictly need-to-know basis, have access to the State's data. Contractor will not possess or assert any lien or other right against the State's data. Without limiting the generality of this Section, Contractor must only use personally identifiable information as strictly necessary to provide the Services and must disclose the information only to its employees who have a strict need-to-know the information. Contractor must comply at all times with all laws and regulations applicable to the personally identifiable information. Within five days of termination or expiration of Contract, Contractor must, at no charge to the State, return to the State all State owned data.

#### **2.264 OWNERSHIP OF MATERIALS**

The State and Contractor will continue to own their respective proprietary technologies developed before entering into Contract. Any hardware bought through Contractor by the State, and paid for by the State, will be owned by the State. Any software licensed through Contractor and sold to the State, will be licensed directly to the State.

### **2.270 State Standards**

#### **2.271 EXISTING TECHNOLOGY STANDARDS**

Contractor must adhere to all existing standards as described within the comprehensive listing of the State's existing technology standards at <http://www.michigan.gov/dmb/0,4568,7-150-56355-108233--,00.html>.





## **2.272 ACCEPTABLE USE POLICY**

To the extent that Contractor has access to the State computer system, Contractor must comply with the State's Acceptable Use Policy, see [http://michigan.gov/cybersecurity/0,1607,7-217-34395\\_34476---,00.html](http://michigan.gov/cybersecurity/0,1607,7-217-34395_34476---,00.html). All Contractor employees must be required, in writing, to agree to the State's Acceptable Use Policy before accessing the State system. The State reserves the right to terminate Contractor's access to the State system if a violation occurs.

## **2.273 SYSTEMS CHANGES**

Contractor is not responsible for and not authorized to make changes to any State systems without written authorization from the Project Manager. Any changes Contractor makes to State systems with the State's approval must be done according to applicable State procedures, including security, access and configuration management procedures.

## **2.274 ELECTRONIC RECEIPT PROCESSING STANDARD**

All electronic commerce applications that allow for electronic receipt of credit/debit card and electronic check (ACH) transactions must be processed via the Centralized Electronic Payment Authorization System (CEPAS).

### **2.280 Extended Purchasing Program**

#### **2.281 EXTENDED PURCHASING PROGRAM**

Contract will be extended to MiDEAL members. MiDEAL members include local units of government, school districts, universities, community colleges, and non-profit hospitals. A current list of MiDEAL members is available at [www.michigan.gov/mideal](http://www.michigan.gov/mideal). Upon mutual written agreement between the State of Michigan and Contractor, this Contract may be extended to (a) State of Michigan employees, or (b) other states (including governmental subdivisions and authorized entities).

If extended, Contractor must supply all goods and services at the established Agreement prices and terms. The State reserves the right to negotiate additional discounts based on any increased volume generated by such extensions.

Contractor must submit invoices to, and receive payment from, extended purchasing program members on a direct and individual basis.

### **2.290 Environmental Provision**

#### **2.291 ENVIRONMENTAL PROVISION**

**Energy Efficiency Purchasing Policy:** The State seeks wherever possible to purchase energy efficient products. This includes giving preference to U.S. Environmental Protection Agency (EPA) certified 'Energy Star' products for any category of products for which EPA has established Energy Star certification. For other purchases, the State may include energy efficiency as one of the priority factors to consider when choosing among comparable products.

**Environmental Purchasing Policy:** The State of Michigan is committed to encouraging the use of products and services that impact the environment less than competing products. The State is accomplishing this by including environmental considerations in purchasing decisions, while remaining fiscally responsible, to promote practices that improve worker health, conserve natural resources, and prevent pollution. Environmental components that are to be considered include recycled content and recyclables; energy efficiency; and the presence of undesirable materials in the products, especially those toxic chemicals which are persistent and bioaccumulative. Contractor should be able to supply products containing recycled and environmentally preferable materials that meet performance requirements and is encouraged to offer such products throughout the duration of this Contract. Information on any relevant third party certification (such as Green Seal, Energy Star, etc.) should also be provided.



**Hazardous Materials:** For the purposes of this Section, “Hazardous Materials” is a generic term used to describe asbestos, ACBMs, PCBs, petroleum products, construction materials including paint thinners, solvents, gasoline, oil, and any other material the manufacture, use, treatment, storage, transportation or disposal of which is regulated by the federal, state or local laws governing the protection of the public health, natural resources or the environment. This includes, but is not limited to, materials the as batteries and circuit packs, and other materials that are regulated as (1) “Hazardous Materials” under the Hazardous Materials Transportation Act, (2) “chemical hazards” under the Occupational Safety and Health Administration standards, (3) “chemical substances or mixtures” under the Toxic Substances Control Act, (4) “pesticides” under the Federal Insecticide Fungicide and Rodenticide Act, and (5) “hazardous wastes” as defined or listed under the Resource Conservation and Recovery Act.

- (a) Contractor shall use, handle, store, dispose of, process, transport and transfer any material considered a Hazardous Material according to all federal, State and local laws. The State shall provide a safe and suitable environment for performance of Contractor’s Work. Before the commencement of Work, the State shall advise Contractor of the presence at the work site of any Hazardous Material to the extent that the State is aware of the Hazardous Material. If Contractor encounters material reasonably believed to be a Hazardous Material and which may present a substantial danger, Contractor shall immediately stop all affected Work, notify the State in writing about the conditions encountered, and take appropriate health and safety precautions.
- (b) Upon receipt of a written notice, the State will investigate the conditions. If (a) the material is a Hazardous Material that may present a substantial danger, and (b) the Hazardous Material was not brought to the site by Contractor, or does not result in whole or in part from any violation by Contractor of any laws covering the use, handling, storage, disposal of, processing, transport and transfer of Hazardous Materials, the State shall order a suspension of Work in writing. The State shall proceed to have the Hazardous Material removed or rendered harmless. In the alternative, the State shall terminate the affected Work for the State’s convenience.
- (c) Once the Hazardous Material has been removed or rendered harmless by the State, Contractor shall resume Work as directed in writing by the State. Any determination by the Michigan Department of Community Health or the Michigan Department of Environmental Quality that the Hazardous Material has either been removed or rendered harmless is binding upon the State and Contractor for the purposes of resuming the Work. If any incident with Hazardous Material results in delay not reasonable anticipatable under the circumstances and which is attributable to the State, the applicable SLAs for the affected Work will not be counted in a time as mutually agreed by the parties.
- (d) If the Hazardous Material was brought to the site by Contractor, or results in whole or in part from any violation by Contractor of any laws covering the use, handling, storage, disposal of, processing, transport and transfer of Hazardous Material, or from any other act or omission within the control of Contractor, Contractor shall bear its proportionate share of the delay and costs involved in cleaning up the site and removing and rendering harmless the Hazardous Material according to Applicable Laws to the condition approved by applicable regulatory agency(ies).

**Labeling:** Michigan has a Consumer Products Rule pertaining to labeling of certain products containing volatile organic compounds. For specific details visit [http://www.michigan.gov/deq/0,1607,7-135-3310\\_4108-173523--,00.html](http://www.michigan.gov/deq/0,1607,7-135-3310_4108-173523--,00.html)

**Refrigeration and Air Conditioning:** Contractor shall comply with the applicable requirements of Sections 608 and 609 of the Clean Air Act (42 U.S.C. 7671g and 7671h) as each or both apply to this contract.

**Environmental Performance:** Waste Reduction Program - Contractor shall establish a program to promote cost-effective waste reduction in all operations and facilities covered by this contract. Contractor's programs shall comply with applicable Federal, State, and local requirements, specifically including Section 6002 of the Resource Conservation and Recovery Act (42 U.S.C. 6962, et seq.).



## **2.300 Deliverables**

### **2.301 SOFTWARE**

A list of the items of software the State is required to purchase for executing Contract is attached. The list includes all software required to complete Contract and make the Deliverables operable. If any additional software is required in order for the Deliverables to meet the requirements of this Contract, such software shall be provided to the State by Contractor at no additional charge (except where agreed upon and specified in a Statement of Work or Contract Change Notice). The attachment also identifies certain items of software to be provided by the State.

### **2.302 HARDWARE**

A list of the items of hardware the State is required to purchase for executing Contract is attached. The list includes all hardware required to complete Contract and make the Deliverables operable. If any additional hardware is required in order for the Deliverables to meet the requirements of this Contract, such hardware shall be provided to the State by Contractor at no additional charge (except where agreed upon and specified in a Contract Change Notice). The attachment also identifies certain items of hardware to be provided by the State.

## **2.310 Software Warranties**

### **2.311 PERFORMANCE WARRANTY**

Contractor represents and warrants that Deliverables, after Final Acceptance, will perform and operate in compliance with the requirements and other standards of performance contained in this Contract (including all descriptions, specifications and drawings made a part of Contract) for a period of (90) ninety days. In the event of a breach of this warranty, Contractor will promptly correct the affected Deliverable(s) at no charge to the State.

### **2.312 NO SURREPTITIOUS CODE WARRANTY**

Contractor represents and warrants that the COTS Solution and any Enhancements provided to the State do not contain or will not contain any Self-Help Code or any Unauthorized Code as defined below. This warranty is referred to in this Contract as the "No Surreptitious Code Warranty."

As used in this Contract, ("**Self-Help Code**") means any back door, time bomb, drop dead device, or other software routine designed to disable a computer program automatically with the passage of time or under the positive control of a person other than the licensee of the software. Self-Help Code does not include Software routines in a computer program, if any, designed to permit an owner of the computer program (or other person acting by authority of the owner) to obtain access to a licensee's computer system(s) (e.g. remote access via modem) for purposes of maintenance or technical support.

As used in this Contract, ("**Unauthorized Code**") means any virus, Trojan horse, spyware, worm or other Software routines or components designed to permit unauthorized access to disable, erase, or otherwise harm software, equipment, or data; or to perform any other such actions. The term Unauthorized Code does not include Self-Help Code. Unauthorized Code does not include software routines in a computer program, if any, designed to permit an owner of the computer program (or other person acting by authority of the owner) to obtain access to a licensee's computer system(s) (e.g. remote access via modem) for purposes of maintenance or technical support.

In addition, Contractor will use up-to-date commercial virus detection software to detect and remove any viruses from any software prior to delivering it to the State.

### **2.313 THIRD-PARTY MATERIALS WARRANTY**

**CONTRACTOR WARRANTS THAT IT WILL NOT INCLUDE IN THE COTS SOLUTION OR ENHANCEMENTS, AND OPERATION OF THE COTS SOLUTION AND ENHANCEMENTS WILL NOT REQUIRE, ANY THIRD-PARTY MATERIALS, UNLESS SPECIFICALLY APPROVED IN WRITING BY THE STATE.**



## 2.314 OPEN SOURCE COMPONENT WARRANTY

Contractor warrants that it will not include in the COTS Solution or Enhancements, and operation of the COTS Solution and Enhancements will not require, any Open Source Components, unless specifically approved in writing by the State.

## 2.315 PHYSICAL MEDIA WARRANTY

Contractor represents and warrants that each licensed copy of the COTS Solution provided by Contractor is free from physical defects in the media that tangibly embodies the copy. If Contractor breaches this warranty, then the State shall be entitled to replacement of the non-compliant copy by Contractor, at Contractor's expense (including shipping and handling).

### **2.320 Software Licensing**

#### **2.321 LICENSE GRANT**

**2.321.1 License Grant.** Contractor hereby grants to the State the right and license to use the COTS Solution and Documentation throughout the universe for the Permitted Use in accordance with the terms and conditions of this Contract. The rights and licenses hereby granted are non-exclusive, fully paid up, royalty-free, perpetual, and irrevocable. For purposes of this Section, ("**Permitted Use**") means use of the COTS Solution and Documentation by the State for the purposes set forth in Article 1 of this Contract.

**2.321.2 Licensed Access and Use.** Pursuant to the license granted under Section 2.321.1 and in accordance with the terms and conditions thereof, the State has the right and license to do each of the following for or in connection with the Permitted Use:

- (a) install, execute and run copies of the COTS Solution on the State's computer network for use by authorized end users in accordance with Article 1;
- (b) have authorized end users access and use the COTS Solution by any means whatsoever, including via the internet or any WAN, LAN or VPN, from any other device;
- (c) generate print, copy, download and store all State Data and other data, information and content, including all GUI, audio, visual or digital and other displays and output, as may result from any execution or other use of the COTS Solution;
- (d) use the COTS Solution in object code form, except that the licensed uses of the COTS Solution hereunder shall include use in both Source Code and object code form:
  - (i) if and to the extent access to and use of Source Code may be necessary, in the State's reasonable judgment, for interoperability purposes; and
  - (ii) for any Open Source Components, in accordance with the license therefor;
- (e) prepare and use a reasonable number of copies of the COTS Solution and Documentation for the Permitted Use, including for purposes of:
  - (i) operation with other software or systems;
  - (ii) hardware or system maintenance or repair;
  - (iii) software, hardware or system testing;
  - (iv) disaster recovery; and
  - (v) backup and archiving;
- (f) train end users in any and all uses of the COTS Solution and Documentation permitted hereunder; and
- (g) perform, and have end users perform, any other act, including the provision of any service, that is reasonably incidental to the operation of the COTS Solution for the Permitted Use in accordance with terms and conditions of this Contract.

**2.321.3 Use Restrictions.** Except as and to the extent expressly permitted, or as reasonably necessary to make any use of the COTS Solution permitted by Section 2.321.2 or elsewhere in this Contract, the State shall not, and shall not permit others to:

- 2.1** Reverse engineer, disassemble, decompile, decode or adapt the COTS Solution, or otherwise attempt to derive or gain access to the Source Code of the COTS Solution, in whole or in part, except as and only to the extent: (a) such action is taken for purposes of creating Enhancements to the COTS



Solution (b) such action is taken for purposes of ensuring or assessing interoperability or; (c) with respect to Open-Source Components included in the COTS Solution, these acts are permitted under the applicable open-source license.

2.2 Rent, lease, lend, sell, sublicense, distribute, publish, transfer or otherwise make the COTS Solution available to any third party.

### **2.330 Source Code Escrow**

#### **2.331 DEFINITION**

“Source Code Escrow Package” shall mean:

- (a) A complete copy in machine-readable form of the source code and executable code of the Licensed Software, including any updates or new releases of the product;
- (b) A complete copy of any existing design documentation and user documentation, including any updates or revisions; and/or
- (c) Complete instructions for compiling and linking every part of the source code into executable code for purposes of enabling verification of the completeness of the source code as provided below. Such instructions shall include precise identification of all compilers, library packages, and linkers used to generate executable code.

#### **2.332 DELIVERY OF SOURCE CODE INTO ESCROW**

Contractor shall deliver a Source Code Escrow Package to the Escrow Agent, pursuant to the Escrow Contract, which shall be entered into on commercially reasonable terms subject to the provisions of this Contract within (30) thirty days of the execution of this Contract.

#### **2.333 DELIVERY OF NEW SOURCE CODE INTO ESCROW**

If at any time during the term of this Contract, Contractor provides a maintenance release or upgrade version of the Licensed Software, Contractor shall within ten (10) days deposit with the Escrow Agent, in accordance with the Escrow Contract, a Source Code Escrow Package for the maintenance release or upgrade version, and provide the State with notice of the delivery.

#### **2.334 VERIFICATION**

The State reserves the right at any time, but not more than once a year, either itself or through a third party contractor, upon thirty (30) days written notice, to seek verification of the Source Code Escrow Package.

#### **2.335 ESCROW FEES**

Contractor will pay all fees and expenses charged by the Escrow Agent.

#### **2.336 RELEASE EVENTS**

The Source Code Escrow Package may be released from escrow to the State, temporarily or permanently, upon the occurrence of one or more of the following:

- (a) Contractor becomes insolvent, makes a general assignment for the benefit of creditors, files a voluntary petition of bankruptcy, suffers or permits the appointment of a receiver for its business or assets, becomes subject to any proceeding under bankruptcy or insolvency law, whether domestic or foreign;
- (b) Contractor has wound up or liquidated its business voluntarily or otherwise and the State has reason to believe that such events will cause Contractor to fail to meet its warranties and maintenance obligations in the foreseeable future;
- (c) Contractor voluntarily or otherwise discontinues support of the provided products or fails to support the products in accordance with its maintenance obligations and warranties.

#### **2.337 RELEASE EVENT PROCEDURES**

If the State desires to obtain the Source Code Escrow Package from the Escrow Agent upon the occurrence of an Event in this **Section**, then:

- (a) The State shall comply with all procedures in the Escrow Contract;



- (b) The State shall maintain all materials and information comprising the Source Code Escrow Package in confidence in accordance with this Contract;
- (c) If the release is a temporary one, then the State shall promptly return all released materials to Contractor when the circumstances leading to the release are no longer in effect.

### **2.338 LICENSE**

Upon release from the Escrow Agent pursuant to an event described in this **Section**, Contractor automatically grants the State a non-exclusive, irrevocable license to use, reproduce, modify, maintain, support, update, have made, and create Derivative Works. Further, the State shall have the right to use the Source Code Escrow Package in order to maintain and support the Licensed Software so that it can be used by the State as set forth in this Contract.

### **2.339 DERIVATIVE WORKS**

Any Derivative Works to the source code released from escrow that are made by or on behalf of the State shall be the sole property of the State. The State acknowledges that its ownership rights are limited solely to the Derivative Works and do not include any ownership rights in the underlying source code.



**Article 3 – Reserved**





## Article 4 – Required Contractor Information

### 4.010 Contractor Information

#### **4.011 AUTHORIZED CONTRACT SIGNATORY**

Person named will be sole contact for your company to receive Contract. Include the name and telephone number of person(s) in your company authorized to expedite any proposed contract with the State.

<b>Name:</b>	Allen Ibaugh, AICP, GISP	<b>Title:</b>	Chief Executive Officer	<b>Phone:</b>	(407) 382-5222
<b>Name:</b>	Trey Fragala, AICP, PMP	<b>Title:</b>	Chief Operating Officer	<b>Phone:</b>	(407) 382-5222

#### **4.012 – 4.014 RESERVED**

#### **4.015 STAFFING**

Below is a list of all Sub-contractors who will work on this contract – including firm name, address, contact person, and a complete description of the work to be contracted.

#### **4.015 SUB-CONTRACTORS**

1. Contractor must provide the required Subcontractor information outlined in 4.015 for each subcontractor they are proposing:

<b>Contractor Response:</b>	<p>Subcontractors for this proposal are:</p> <p><b>ESRI</b>  380 New York Street  Redlands, CA 92373-8100  Eric Floss</p> <p>Esri will support the DTS team with a focus on implementing a modern linear referencing system. MDOT desires a single, authoritative GIS-based LRS system that will be leveraged as a “springboard” for unlocking the potential value of enterprise GIS-based business solutions across many MDOT departments. Serving as a centralized integration point, implementation of the enterprise LRS solution will enable MDOT to:</p> <ul style="list-style-type: none"> <li>• Largely impact time savings in decision making processes.</li> <li>• Streamline manual and disjointed workflows among business units.</li> <li>• Simplify route management.</li> <li>• Provide a framework for safety and performance management.</li> <li>• Enable the department to use advanced geospatial analysis to guide project prioritization and planning, which could ultimately equate to putting pavement into the ground more efficiently.</li> </ul> <p>Esri Roads and Highways has the capability to manage the existing MDOT linear referencing methods (LRMs) and also an ability to expand support for other LRMs which could include GPS Coordinate and Referent Offset.</p> <p>Esri's Roads and Highways offers MDOT the security of a highly configurable, COTS product that is fully integrated with core ArcGIS technology.</p> <p>Engaging Esri to support MDOT's configuration and deployment project will provide the agency many advantages that cannot be delivered by any other contractor or team. These advantages include:</p> <ul style="list-style-type: none"> <li>• As the developer of the Esri Roads and Highways solution product, Esri is the only company that will have access to the research and development programming staff responsible for creating and implementing the next iteration of advances to the Esri Roads and Highways solution product.</li> </ul>
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- In developing the Esri Roads and Highways solution product over the last 4 years, Esri has consulted with many state DOT's, including MDOT. As a result, Esri has acquired critical knowledge of MDOT's data sources, requirements and needs within the organization, staff and GIS. We have demonstrated through this effort that we have the resources and experience to meet the LRS needs of MDOT in accordance with this scope of services document.
- Esri is the sole domestic provider of software maintenance for the Esri Roads and Highways solution product (technical support plus Esri software updates/upgrades).
- Esri is also the sole source of certain proprietary training courses, including any future Esri Roads and Highways training courses.
- Only Esri can provide the required technology capabilities in a single unified platform.
- Esri will make available subject-matter experts who specialize in many key aspects of transportation GIS and LRS, including the Esri Roads and Highways solution product.
- Members of the Esri Transportation Services and Database Services teams were key contributors to Designing Databases for Transportation (Esri Press, 2008), which the Esri Roads and Highways information model is based upon.

COTS Software Name	Usage	Comments
Esri's Roads and Highways Desktop	Implementation of an Advanced Linear Reference System (ALRS) accessible via ArcMap Toolbar	COTS implementation.
Esri's ArcGIS Server with Esri's Roads and Highways Server.	Publish ALRS content for editing / consumption within the Esri's Roads and Highways Characteristic Editor (RCE)	COTS implementation.
Esri's Roads and Highways Roadway Characteristic Editor (RCE)	Web based Roads and Highways redlining and event editor	COTS implementation.
Esri's Workflow Manager (WMX) – Desktop and Server	This software enables organizations to design and configure "workflows" that model their organizational business processes.	COTS implementation.
ArcGIS Data Reviewer – Desktop and Server	This software provides a complete system for automating and simplifying data quality control, which can quickly improve the integrity of your data.	COTS implementation.

#### **Transcend Spatial Solutions LLC**

2970 University Parkway, Suite 201  
Sarasota, FL 34243-2401  
Connie Gurchiek

**TSS** will support the DTS team with the implementation and integration of the Linear Reference System and Straightline Diagram components of the project.

**Data Migration Planning** – Migration of route and event data to the roads and highways environment requires a review of the existing route and event data to determine whether incompatibilities exist between the current LRS and Roads and Highways. This review will also determine if manual steps are required to migrate the data. Key elements for review include:

- Route ID structure



- Route calibration methods
- Route gaps and concurrencies
- Event data structures

**Create Migration Scripts and Tools** – Depending on the results of the data migration planning, portions of the data migration can be automated. A set of scripts will be created to aid in the initial and periodic migrations of data. This will reduce the overall effort and increase the quality of the migrated data. Some manual effort will be needed to maintain the centerline and calibration point data, modify any new data that requires edits to fit the new model and perform QA/QC tasks. The scripts will assist in the following tasks:

- Build Advanced Linear Referencing System (ALRS) networks from existing routes
- Calibrate the new route networks
- Create source to table mappings for event data
- Migrate event data to new formats, if necessary
- Register event tables with the ALRS networks
- Identify potential migration errors

#### **Deploy to MDOT Environment**

**Server Setup** – The project team will assist in the configuration of the R&H servers and the installation of all required software.

**GDB Creation and Migration** – The team will assist in creating the required geodatabases and users to support the R&H schemas, versions and workflows.

**Application Deployment and Configuration** – The project team will assist in the deployment and configuration of the desktop and web components of R&H including:

- Roads and Highways desktop extension
- Workflow manager extensions for desktop and server
- Data Reviewer extensions for desktop and server
- Roadway Characteristics Editor (RCE) web application
- Roads and Highways Productivity Tools
- Road Analyzer

**Documentation and Training** - The project team will provide detailed documentation and training materials for the use of all Roads and Highways tools and workflows. The documentation will include user guides, technical documentation, test cases for user acceptance and deployment documentation.

#### **eVision Partners, Inc.**

9660 Falls of Neuse Road, Suite 138 #256

Robert Cooney

Raleigh, NC 27615-2435

**eVision Partners** will support the DTS team in business requirements definition both short-term as well as long-term in relationship of the TAMS solution and future ERP COTS integration as well as other potential environmental (fiscal and the like) that could occur over the program lifecycle.

#### **4.016 RESERVED**

#### **4.017 PLACE OF PERFORMANCE**

Contractor, in the performance of any resulting contract, must identify the place of performance for work to be done by Contractor and any Subcontractor. The place of performance includes any facility that may be utilized during the term of the proposed Contract. If the place of performance is a State facility, Contractor must list the location of the office responsible for the performance. DUNS numbers may vary by location. Please provide a DUNS number for each place of performance listed below.



Place of Performance – Owner/Operator of facility to be used and full name and address including 9-digit zip code	Description of services to be performed at this location.	Percent (%) of Contract value to be performed at this location	Data Universal Number System (DUNS) #
Data Transfer Solutions 3680 Avalon Park Blvd. E., Suite 200 Orlando, FL 32828-9373	Software enhancement, configuration, implementation & integration for VUEWorks, R & H & SLD. Professional consulting services.	45%	17-003-8595
Data Transfer Solutions 1001 Elm Street, Suite 203 Manchester, NH 03101-1845	Software enhancement, configuration, implementation & integration for VUEWorks, R & H & SLD. Professional consulting services.	19%	01-721-5923
ESRI 380 New York Street Redlands, CA 92373-8100	Software enhancement, configuration, implementation & integration for VUEWorks, R & H & SLD. Professional consulting services.	20%	06-313-4175
Transcend Spatial Solutions LLC 2970 University Parkway, Suite 201 Sarasota, FL 34243-2401	Software enhancement, configuration, implementation & integration for VUEWorks, R & H & SLD. Professional consulting services.	15%	96-621-1927
eVision Partners, Inc. 9660 Falls of Neuse Road, Suite 138 #256 Raleigh, NC 27615-2435	Software enhancement, configuration, implementation & integration for VUEWorks, R & H & SLD. Professional consulting services.	1%	05-294-2994

#### 4.018 - 4.019 RESERVED

#### 4.020 SERVICES NEEDED IN PERFORMANCE – PRINCIPAL PLACE OF BUSINESS

Contractor certifies that any services procured to perform work under a Purchase Order or Contract for this solicitation will be purchased from a business whose principal place of business is in the State of Michigan.

☐ Yes ☒ No If No, complete the table below for those services whose primary location is outside the State of Michigan.

Describe the Service to be purchased	Percent (%) of total contract value to be purchased	Service providers principal place of business (City and State)
VUEWorks®	64%	Orlando, FL, Manchester, NH
Esri Roads & Highways	20%	Redlands, CA
Professional Services	16%	Sarasota, FL, Raleigh, NC

#### 4.021 SUB-CONTRACTOR NEEDED IN PERFORMANCE OF CONTRACT – PRINCIPLE PLACE OF BUSINESS

- a. Contractor certifies that Sub-contractors will be used to assist the company to perform work required under a Purchase Order or Contract for this solicitation.

☐ Yes ☒ No If No, does Contractor certify that Subcontractor used will have their primary location inside the State of Michigan?

☐ Yes ☒ No If No, complete the table below for those services whose primary location is outside the State of Michigan.



Note: Do not complete table if responding Yes to both situations above.

Describe the work to be subcontracted	Percent (%) of total contract value to be subcontracted	Subcontractor name and principal place of business (City)
Roads & Highways (Esri)	20%	Esri – Redlands, CA
LRS/SLD (TSS)	15%	Transcend Spatial Solutions – Sarasota, FL
Professional Services (eVision)	1%	eVision Partners – Raleigh, NC

#### 4.022 RESERVED

#### 4.023 E-VERIFY

If the Michigan Department of Human Services or Michigan Department of Transportation receives goods or services under this Contract and pays for them using funds appropriated under 2012 PA 200, then Contractor must comply with the requirements of §§ 291 and 381 of 2012 PA 200, as applicable, and use the federal E-Verify system to verify that new hire employees of Contractor and its Subcontractor are legally present in the United States, and then certify the verification to the State.

#### 4.025 EXTENDED PURCHASING PROGRAM

Contractor must check one box below:

- X Deliverable(s) will be supplied to the State and **MiDEAL Members** according to the terms and prices quoted, subject to Section 2.22.1, MiDEAL Requirements.
- ☐ Deliverable(s) will not be supplied to **MiDEAL Members**.
- ☐ Deliverable(s) will be supplied to **State of Michigan employees**.
- ☐ Deliverable(s) will not be supplied to **State of Michigan employees**.
- ☐ Deliverable(s) will be supplied to **other states** (including governmental subdivisions and authorized entities).
- ☐ Deliverable(s) will not be supplied to **other states** (including governmental subdivisions and authorized entities).



## Glossary

24x7x365	Means 24 hours a day, seven days a week, and 365 days a year (including the 366th day in a leap year).
Additional Service	Means any Services/Deliverables within the scope of Contract, but not specifically provided under any Statement of Work, that once added will result in the need to provide Contractor with additional consideration.
Addenda or Addendum	Means each amendment to this Contract issued by the Buyer and/or Project Manager as described in this Contract document.
Approved Date	Late start/late finish dates (backward pass). These dates are set as the baseline.
ArcSDE	Spatial Database Engine – software provided by ESRI as part of their overall GIS software product suite. ArcSDE provides the capability to store and manage spatial data and associated information within a Relational Database Management System (RDBMS).
Audit Period	See Section 2.110
Baseline	Original project plan.
Benchmark	Annual snapshot of the entire program that becomes the program “baseline”.
Contract Construction Cost	Contract construction cost changes based on the stage of the job. After the job is awarded, Contract amount is used for Contract construction cost. If this is absent the engineers estimate is used from Web Trns*Port.
Blanket Purchase Order	An alternate term for Contract as used in the States computer system.
Business Critical	Any function identified in any Statement of Work as Business Critical.
Business Day	Whether capitalized or not, shall mean any day other than a Saturday, Sunday or State-recognized legal holiday (as identified in the Collective Bargaining Agreement for State employees) from 8:00am EST through 5:00pm EST unless otherwise stated.
Blanket Purchase Order	An alternate term for Contract as used in the States computer system.
Characteristics	High-level scope information used to generate an initial network.
Chronic Failure	Defined in any applicable Service Level Agreements.
ConOps	Concept of Operations – report provided as an attachment to Contract which describes how TAMS is intended to operate within the MDOT applications environment.
Construction Cost	The construction cost changes based on the stage of the job. Initially the costs are from the concept statement. In the next stage the amount for the job phase is used. Once the job is obligated, the obligated amount is used.
Contract ID	<i>Not referenced in this document.</i> The lowest job number of packaged jobs, concatenated with control section.
COTS Solution	The web-based Commercial-of-the-Shelf software program provided by Contractor under this Contract, and any update, upgrade, release, or other adaptation or modification of the COTS Solution, including any updated Documentation, that Contractor may generally provide to its licensees from time to time, which may contain, among other things, error corrections, enhancements, improvements or other changes to the user interface, functionality, compatibility, capabilities, performance, efficiency or quality of the COTS Solution.
Days	Means calendar days unless otherwise specified.
DCDS	Data Collection Distribution System (State of Michigan time reporting system)
DTMB	Michigan Department of Technology, Management & Budget
Deliverable	The COTS Solution, Enhancements and Documentation, and all other documents, work product and other materials, that Contractor is required to or otherwise does provide to the State under this Contract and otherwise in connection with any Services, including any and all items specifically identified as Deliverables in the Statement of Work.
Documentation	All user manuals, operating manuals, technical manuals and any other instructions, specifications, documents and materials, in any form or media, that describe the functionality, installation, testing, operation, use, maintenance, support and technical and other components, features and requirements of the COTS Solution or Enhancements.
ECO	Environmental Clearance Organizer
EPE	Early Preliminary Engineering Job Phase



Enhancements	All modifications, corrections, repairs, translations, enhancements and other derivative works and improvements of the COTS Solution or Documentation made by Contractor pursuant to this Contract.
Environmentally preferable products	A product or service that has a lesser or reduced effect on human health and the environment when compared with competing products or services that serve the same purpose. Such products or services may include, but are not limited to, those that contain recycled content, minimize waste, conserve energy or water, and reduce the amount of toxics either disposed of or consumed.
Excusable Failure	See Section 2.244.
External Resources	Contractor Employees
Finish Date	A point in time associated with a schedule tasks completion. Usually qualified by one of the following: actual, planned, estimated, scheduled, early, late, baseline, target or current.
FleetFocus	Michigan fleet management system application
Funding Template	A source of funds which aligns funding and work to accomplish approved goals and performance standards.
Hazardous material	Any material defined as hazardous under the latest version of federal Emergency Planning and Community Right-to-Know Act of 1986 (including revisions adopted during the term of Contract).
Incident	Any interruption in Services.
Intellectual Property Rights	All or any of the following, in each case whether registered or unregistered and including all applications for, and renewals or extensions of, such rights, and all similar or equivalent rights or forms of protection in any part of the world: (a) patents, patent disclosures and inventions (whether patentable or not); (b) trademarks, service marks, trade dress, trade names, logos, corporate names and domain names, together with all of the goodwill associated therewith; (c) copyrights and copyrightable works (including computer programs), and rights in data and databases; (d) trade secrets, know-how and other confidential information; and (e) other intellectual property rights.
Internal Resources	MDOT Employees
Job	A work activity after the approval of funds, specifically, a number assigned by MDOT to uniquely identify all of the work activities required to be performed to prepare or maintain a specific transportation system component. See also Project.
Job Group	See Subprogram.
JobNet	JobNet is currently in development and will replace the current MPINS (MAP Project Information System). This system collects and tracks information about projects, from scoping through design, and builds documentation for projects.
Key Dates	Major milestone dates including but not limited to dates for plan completion, letting, ROW certification, and environmental clearance. These are the target dates or basis from which the schedule is generated.
Key Personnel	Any Personnel designated in Article 1 as Key Personnel.
Labor Hours	The time that a resource actually spends 'hands on' with a task, as opposed to duration (i.e. no periods of task inactivity). Project management defines this as work.
MainStar	Michigan fleet management system application
MAP	MDOT Architectural Project Database (Global MDOT database)
MDOT	Michigan Department of Transportation
MIBridge	Michigan Bridge System – a new MDOT application being implemented to replace existing legacy bridge management systems applications.
MFOS	MAP Financial Obligation System
MiDEAL	MiDEAL is an extended purchasing program which allows Michigan local units of government to use state contracts to buy goods and services.
Major Milestone	Plan completion date, let date, omissions error check (OEC), plan review, and plan turn in date.
Milestone	A significant event in the job, usually the completion of a major deliverable.
New Work	Any Services/Deliverables outside the scope of Contract and not specifically provided under any Statement of Work, that once added will result in the need to provide Contractor with additional consideration.
Network	Diagram of a project's tasks and their dependencies, applied in a logical order.
Open Source Components	Any software component that is subject to any open-source copyright license agreement, including any GNU General Public License or GNU Library or Lesser Public License, or





	other license agreement that substantially conforms to the Open Source Definition as prescribed by the Open Source Initiative or otherwise may require disclosure or licensing to any third party of any source code with which such software component is used or compiled.
Ozone-depleting substance	Any substance the Environmental Protection Agency designates in 40 CFR part 82 as: (1) Class I, including, but not limited to, chlorofluorocarbons, halons, carbon tetrachloride, and methyl chloroform; or (2) Class II, including, but not limited to, hydro chlorofluorocarbons
P/PMS	Program/Project Management System
Package	Multiple projects linked together with the same letting date. Ideally when a change is made to one that applies to all of the jobs, that change would be applied to all. For example, if the let date changed for the package, it would be applied to all jobs.
Package ID	Unique identifier for a package of multiple projects linked together with the same letting date.
Performance Indicator	Indicator will be determined by MDOT based on departmental priorities (ex: WIGS). This can include but not be limited to dates and costs
Post-Consumer Waste	Any product generated by a business or consumer which has served its intended end use, and which has been separated or diverted from solid waste for the purpose of recycling into a usable commodity or product, and which does not include post-industrial waste.
Post-Industrial Waste	Industrial by-products that would otherwise go to disposal and wastes generated after completion of a manufacturing process, but do not include internally generated scrap commonly returned to industrial or manufacturing processes.
ProjectWise	MDOT computer application which stores information on Design / Construction projects
Program	Multiple projects as defined by MDOT to be let in a certain fiscal year or group of fiscal years. Could also refer to a roll-up of projects in the program management system.
Project	A related set of tasks performed to achieve a specific goal.
Project Development	Work involved in the plan development and design for the construction of a highway project.
Project ID	<b>Not referenced in document.</b> Unique identifier assigned to a group of jobs with the same environmental clearance and could be let over multiple years. When jobs are combined in this way, they will be given a Project ID.
ProjectWise	Central Repository of all MDOT production specs and documents for all projects
QA	Quality Assurance – used within the context of this Contract to refer to the DTMB IT environment used for the testing of applications prior to migration to Production.
REMIS	Real Estate Management System
Recycling	The series of activities by which materials that are no longer useful to the generator are collected, sorted, processed, and converted into raw materials and used in the production of new products. This definition excludes the use of these materials as a fuel substitute or for energy production.
Region	An artificial geographical division of the state used by MDOT and other departments for conducting state business.
Resource	People (MDOT employees) involved in and required to complete a task, that are assigned hours (hands on time) to work on a particular task. This is the smallest breakdown of the OBS. Also known at MDOT as a Work Unit, Organizational Unit, or DCDS Index Code.
Responsible Unit	Specific resource assigned to a task that is responsible for reporting the actual start and finish dates for that task.
Reuse	Using a product or component of municipal solid waste in its original form more than once.
SUITE	(State Unified Information Technical Environment) DTMB initiative that integrates effective methodologies for project management and systems development across all projects.
SafeStat	Safety Status Program System
Schedule	Network that has start and finish dates for all activities, as applied via the Critical Path method.
Scheduled Date	Early start/early finish dates (forward pass). These dates are allowed to move based on progress.
Services	Any of the services Contractor is required to or otherwise does provide under this Contract or the Statement of Work, as more fully described in this Contract or such Statement of Work.
Snapshot	The state of the program. Taken each Monday and the first day of each month. Consists of the listing of jobs (from which the number of jobs can be derived); job planned, engineer,



	estimated cost, actual cost; approved/scheduled/actual dates for major milestones (planned completion date, omissions and errors check, let date, plan review, plan turn in, base plan).
Source Code	The human readable source code of the COTS Solution to which it relates, in the programming language in which the COTS Solution was written, together with all related flow charts and Documentation, including a description of the procedure for generating object code, all of a level sufficient to enable a programmer reasonably fluent in such programming language to understand, operate, support, maintain and develop modifications, upgrades, updates, enhancements, improvements and new versions of, and to develop computer programs compatible with, such COTS Solution.
Source reduction	Any practice that reduces the amount of any hazardous substance, pollutant, or contaminant entering any waste stream or otherwise released into the environment prior to recycling, energy recovery, treatment, or disposal.
Standard Task	A specific work responsibility performed by one or more resources. Tasks include both resource labor hours and duration commitments.
Start Date	A point in time associated with the beginning of schedule tasks. Usually qualified by one of the following: actual, planned, estimated, scheduled, early, late, baseline, target or current.
State Location	Any physical location where the State performs work. State Location may include state-owned, leased, or rented space.
Subcontractor	A company that Contractor delegates performance of a portion of the Services to, but does not include independent contractor engaged by Contractor solely in a staff augmentation role.
Subprogram	Multiple projects as defined by MDOT to be let in a certain fiscal year or group of fiscal years. Refers to groupings in project management system. A set of jobs, projects and/or packages that have common templates (Road, Bridge, Traffic & Safety, Capital Preventative Maintenance, Increase Capacity).
TSC	Transportation Service Center which is a subdivision of the Region used for closer customer contacts.
Template	Group of tasks, default resources, durations and labor hours tailored for a particular type of work.
Third-Party Materials	Any materials and information, including documents, data, know-how, ideas, methodologies, specifications, software, content and technology, in any form or media, in which any person other than the State or Contractor owns any Intellectual Property Right, but specifically excluding Open-Source Components.
Trunkline	A state highway transportation system handling long-distance through traffic.
UAT	User Acceptance Testing – a formal process for the testing of the configured / customized TAMS solution prior to migration to a production environment. Testing will be conducted within the MDOT QA environment.
Unauthorized Removal	Contractor's removal of Key Personnel without the prior written consent of the State.
Validating Standards	Comparing actual durations and labor hours (gathered over time) versus what the system calculated, for specific scope situations. Significant differences would result in refining the standards to help ensure that the initial schedules generated are closer to real-life.
Waste prevention	Source reduction and reuse, but not recycling.
Waste reduction and Pollution prevention	The practice of minimizing the generation of waste at the source and, when wastes cannot be prevented, utilizing environmentally sound on-site or off-site reuse and recycling. The term includes equipment or technology modifications, process or procedure modifications, product reformulation or redesign, and raw material substitutions. Waste treatment, control, management, and disposal are not considered pollution prevention, per the definitions under Part 143, Waste Minimization, of the Natural Resources and Environmental Protection Act (NREPA), 1994 PA 451, as amended.
WebFANCY	MDOT web-based, intranet Oracle application that is used for reporting budget/expenditure summary data to track all costs charged to a project
Web TRNS*Port	Web-based Transportation Software Management Solution
What-If	Capability that makes it easy to consider the impact of changes to the program/project without affecting program/project schedule.
Wizard	User interface that presents a user with a sequence of dialog boxes, leading the user through a series of well-defined steps to create a network.
Work in Progress	A Deliverable that has been partially prepared, but has not been presented to the State for Approval.





Work Product	Refers to any data compilations, reports, and other media, materials, or other objects or works of authorship created or produced by Contractor as a result of an in furtherance of performing the services required by this Contract.
Work Type	A code representing a recommended work activity. Provides primary classification for a set of work activities required to improve or maintain a specific, actual or proposed transportation component.
Work Unit	People (MDOT employees) involved in and required to complete a task, that are assigned hours (hands on time) to work on a particular task. This is the smallest breakdown of the OBS. Also known at MDOT as a Resource, Organizational Unit, or DCDS Index Code.