WVDOT

Fleet And Equipment Management System
Technical Proposal

RFP # CRFP 0803 DOT22*1

Manufacturing Automation & Software Systems, Inc.

6280 S. Valley View Blvd., Suite 230
Las Vegas, NV 89118
Tel: 818-709-1255 / Fax: 818-709-1468
Primary Contact: Gamal Balady
Email: govbids@massgroup.com

Signature:	Gamal Balady	Date:	9/21/2021

TRANSMITTAL LETTER

MANUFACTURING AUTOMATION & SOFTWARE SYSTEMS, INC.
6280 S. Valley View Blvd., Suite 230
Las Vegas, NV 89118
(818) 709-1255 phone

September 21, 2021

Ms./Mrs. Lyle:

MASS Group, Inc. ("MASS Group"), is pleased to submit its response to your request for proposal on Fleet and Equipment Management System (the "System") for WVDOT ("WVDOT"). Our commercial off the shelf ("COTS") Traceability Made Easy® Software Suite ("TME®) has been sold to and successfully installed at hundreds of Customers to meet their asset and inventory management needs. We are confident that MASS Group can provide the requirements sought by WVDOT. At a minimum, the TME® System will provide the following:

- **Comprehensive Asset Record** –A full and complete record of each Asset containing attributes like ID/Description/Type/Serial #/Barcode #/Condition/Location/Acquisition Date, etc., along with status tracking.
- **Genealogy/History** – Ability to track all inventory transactions by Lot/Batch/Serial Numbers to Assets and/or Work Orders along with real-time Quantity updates.
- **Work Orders and PMs/Calibrations** – Maintenance of Assets whether unscheduled or scheduled along with calibration records and inspections.
- **Location Management** – Hierarchal location information down to 5 levels, if desired.
- **Notifications** – Alert configuration for warranty expirations, replacements, and upgrades.
- **Reports** – Robust Reporting capabilities including requirements for state and/or Federal compliance mandates.
- **Barcode/RFID Capabilities** – Integration with mobile barcode and RFID.

In selecting TME®, WVDOT will have 24 x 7, real time traceability of their assets and inventory across the entire supply chain from cradle to grave. Given TME's flexible architecture, the System can be deployed on an on-site server, web-hosted onsite, or web-hosted offsite location. Additionally, a well-defined and proven implementation process will minimize organizational disruption and resources consumed. Further, built-in-configuration tools within TME® will reduce the need for extensive custom programming and scripting which can be costly.

RFP Conditions

1. We have reviewed WVDOT's solicitation in its entirety and understand the requirements, terms and conditions, and other information contained herein. MASS Group, Inc. recognizes that this bid, offer or proposal constitutes an offer to the State that cannot be unilaterally withdrawn that the product or service proposed meets the mandatory requirements contained in the Solicitation for that product or service, unless otherwise stated herein; that MASS Group accepts the terms and conditions contained in the Solicitation, unless otherwise stated herein; that I am submitting this bid, offer or proposal for review and consideration; that I am authorized by MASS Group, Inc. to execute and submit this bid, offer, or proposal, or any documents related thereto on MASS Group's behalf; that I am authorized to bind MASS Group in a contractual relationship; and that to the best of my knowledge, MASS Group has properly registered with any State agency that may require registration.

2. This proposal and the pricing information contained therein is binding upon MASS Group, Inc. in all respects for a period of 180 days from the receipt of the BAFO (Best and Final Offer), or from submission if no BAFO is requested.

3. MASS Group, Inc. is the primary contractor for the WVDOT Contract.

4. Proposed Subcontractor:
   AETOS, LLC.
   5310 Statice Hunt
   San Antonio, TX 78253
   TX Hub (state): 1320599180800
   DIBE ESBE HABE MBE SBE VBE certification: 221081374

5. MASS Group, Inc. is the original equipment manufacturer of TME®.

6. Neither MASS Group, Inc. nor AETOS, LLC. presently have no interest, direct or indirect which would conflict with the performance of services under this Contract and shall not employ, in the performance of this Contract, any person having a conflict.

7. All staff members of the proposed project team shall follow all WVDOT and State of West Virginia administrative policies, procedures, requirements, specifications, and standards.

Thank you for considering MASS Group, and we look forward to responding to the RFP when issued. Should you have any questions, please don't hesitate to contact me.

Very truly yours,

Gamal Balady
President & CEO
Ph: 818-709-1255 | Email: gbalady@massgroup.com

Table of Contents

Table of Figures

TAB 1 – EXECUTIVE SUMMARY

TME® Overview

Figure 1 TME® Is Cloud Based

TME® is a 100% web/cloud based (Internet/Intranet), cost effective, highly scalable, and easily implemented asset management solution that can seamlessly support and improve the visibility, accountability, and management of WVDOT's assets. TME®'s all-encompassing suite of capabilities will allow WVDOT to manage and control all of its assets with a single System, provide linkages to the company's other information management systems (should that be desired at a later phase), and serve as a foundation to support future growth.

Further, TME®'s robust library of data analytics and Reporting tools will enable concurrent users in a hosted environment to have full visibility to the whereabouts of WVDOT's underlying assets and their associated details anytime, anywhere, anyhow.

Figure 2 TME® Is Multi-Tenant Based

Figure 3 TME® Is Multi-Instance

Additionally, TME® can easily support hundreds if not thousands of concurrent users requiring simultaneous access across multiple locations. WVDOT needs only to purchase additional hardware and Users to expand beyond the first set of locations.

The impact of installing TME® should facilitate WVDOT having optimized tracking and accountability of its assets, improved planning and purchasing, and the ability to know where all assets are always to minimize disruption to the learning environment. Below are some of the benefits of the TME® System:

Simple

TME® is a simple, intuitive system that is designed for the non-technical person. Unlike many competitor products which are overly complex, cumbersome, and costly, TME® is easy to use, implement and maintain, allowing you to quickly achieve your organization's goals.

Flexible and Easily Configurable

TME® is a flexible system that enables users to define parameters and new fields; customize Reports, purchase and requisitions orders; and track inventory and assets across multiple locations or sites. In addition, it is easily configurable without having to take on the burden of excessive costs and effort levels to support specialized and/or unique applications where customization is required. Given that its underlying architecture was constructed to run in the Cloud, this allows for greater flexibility to provide end users with a more integrated solution with other management information systems.

Automated

TME® easily integrates the latest technologies, enabling end users to have a seamless flow of data from hardware to software. Data collection is fast, easy, and accurate, and the ability to view critical data parameters is as easy as 1,2,3 given the simplicity of how TME® allows you to create customized dashboards and Reports. TME® gives you real-time visibility into your inventory, assets, equipment, facilities, and other data so that you can maintain optimal operational performance, supply levels, reduce equipment loss, and increase cost savings.

Scalable

TME is a highly scalable and easily configurable product. It provides the specific features that will address WVDOT's fixed asset management and ability to manage its items over their lifecycle include the following:

Figure 4 Traceability Made Easy® (TME®) Features

- Asset Tracking
  - Maintain complete database of all assets
  - Track by serial number, barcode
- Location Tracking
  - Multi-tier, hierarchical location tracking
- Tool Tracking (Check In/Check Out)
  - Track date, time, length of time an asset was checked out by a user
  - Set due date and create "overdue" Report
- Inventory Tracking
  - Receive inventory by vendor, size, quantity, description
  - Create, print, email purchase orders, requisition orders
  - Track by serial number, lot, batch ID
  - Track consumption, supply levels, expiration, any user-defined attribute
  - Capture transaction history (e.g., Consume, Scrap, Transfer, Put, Take, Return)
- Work Order Management
  - Create work orders and assign to employees

- Track real-time work order status through to completion
- Prioritize tasks, assign tasks to personnel
- Email notification for new, complete, past due, rejected work orders

- Preventive Maintenance Scheduling
  - Schedule PM by Time (e.g., weekly, monthly), or Metrics (e.g., hours, MTBF), or other scheduled work
  - Define PM procedures for staff
  - Schedule PM reminders
  - Track all PMs on web-based calendar
  - Record all maintenance history
  - Log Hours
- Statistical Reports
  - 150+ standard Reports
  - Customizable Reports without programming skills
  - Report Subscriptions
  - Key Performance Indicator (KPI), Failure Analysis, Labor Cost, Reliability Availability Maintainability (RAM), Overall Equipment Effectiveness (OEE) Reports
- Email Notifications
  - Receive email/text alerts for low inventory quantity, work orders, PMs, or any user-defined trigger
- Barcode Technology
  - Create and print barcode labels directly from TME®
- Mobility
  - Submit work orders directly from any smartphone or mobile device
  - Integrate with barcode scanners, printers, Windows-based mobile computers, Pocket PCs, PDAs, etc.
- Document Manager
  - Upload any document type (e.g. .pdf, .doc, video, images, AutoCAD, Visio) and link to any asset
  - Access all documents online and ensure compliance to all operational, repair and safety procedures.
- Contact Manager
  - Access all contact/vendor information online
  - Set up email alerts to vendors/suppliers

Since TME® is built on a simple to use GUI that consists of a selection of controls that provide different viewpoints of information from the System, if needed, controls can be custom built to display what the organization needs. Controls can be set up in different configurations to allow Users to choose which series of controls to display. Built in configuration tools that MASS Group has incorporated into the core of the System will allow for customization, if desired by the Customer.

TAB 2 – VENDOR COMPANY PROFILE

Brief History of MASS Group

Manufacturing Automation & Software Systems Group, Inc. (MASS Group), is a privately held software company established by the Company's Founder and current President back in 1998. For over 23 years, MASS Group has been providing Customers an innovative, 100% cloud-based asset management and inventory control software solution to track, manage, and control anything from tools to facilities to weapons to keys to computer/IT equipment to vehicles. The Company's flagship software product called TME® (Traceability Made Easy) has been sold to and used by tens of thousands of end users across a host of very complex and demanding segments including government & public sector; aerospace & defense; automotive; electronics and semiconductor; energy; entertainment; and food & beverage. Customers range from small to medium-sized businesses to large enterprises such as Applied Materials, Tulsa International Airport, Melbourne Police Department, Arizona Dept. of Corrections, Colorado Community College System, Disney Digital Studios, Photronics, and Agilent Technologies. For many of our commercial Customers, TME® is used at multiple facilities across multiple geographic locations throughout the world.

Figure 5 Partial Customer List

Common organizational challenges that TME® is used to resolve include (i) providing tracking and visibility to improve inventory and asset management; (ii) managing all facets of maintenance operations including preventative maintenance scheduling, work order requests, tool calibration, etc.; (iii) enabling clients to more easily meet regulatory compliance and financial Reporting requirements; and (iv) facilitating more informed fact-based decision-making using data analytics to improve forecasting and budgeting, and (v) increasing productivity by automating manual processes and utilizing barcode and/or RFID technology.

To ensure success for those Customers who decide to use TME®, MASS Group provides a full range of services that complement our software. From the Company's head office located in Los Angeles, California, MASS Group provides consulting, sales, implementation, training, technical support, and administrative services. From MASS Group's other office located in Las Vegas, Nevada, the Company provides program management, software development, quality assurance and testing. In addition, MASS Group has a network of certified partners and resellers located in key strategic markets throughout the world that the Company uses to support its global accounts and provide local support.

Due to its ongoing commitment and operating philosophy of making sure that we continue to remain partners with our Customers after the System has been installed to ensure ongoing success, MASS Group has enjoyed an extremely high retention rate of 99% with loss only to Customers who have either closed operations or shutdown a facility. Additionally, given the Company's commitment to its Customers, MASS Group has benefitted with incremental business from over 50% of its installed base. In some cases, the Company has been selected to be the global standard and system of choice. In other instances, the Customers have expanded the number of users from a handful to thousands as well as deployed our System at other locations and/or with other departments.

The Company has been a GSA vendor since 2012, with the distinction of being awarded both top secret facility and personnel clearance due to the work MASS Group and its Team have completed with various U.S. intelligence agencies as a prime contractor. Additionally, MASS Group is a certified small business that has been self-funded since its formation in 1998, and not dependent on 3rd parties for its continued financial sustainability.

Highlights

- MASS Group is a prime contractor for the U.S. Intelligence Community and its products are certified by the Department of Defense (DoD) to be 100% Made in the USA with no foreign sources
- MASS Group has received the necessary personnel clearances by the DoD to engage in classified negotiations
- MASS Group is a software and hardware provider of automation technologies. We can provide barcode and RFID technologies that integrate with our software, and enhance traceability and asset management capabilities

Certifications

- CA State Small Business #62438
- CMAS (California Multiple Award Schedule) Vendor #3-19-70-3693A
- U.S. General Service Administration Information Technology Vendor (GSA Certified) GS-35F-0145Y
- DUNS# 02-652-0416
- Microsoft Partner
- Alien RFID Partner and Zebra RFID Partner
- Cognex Partner

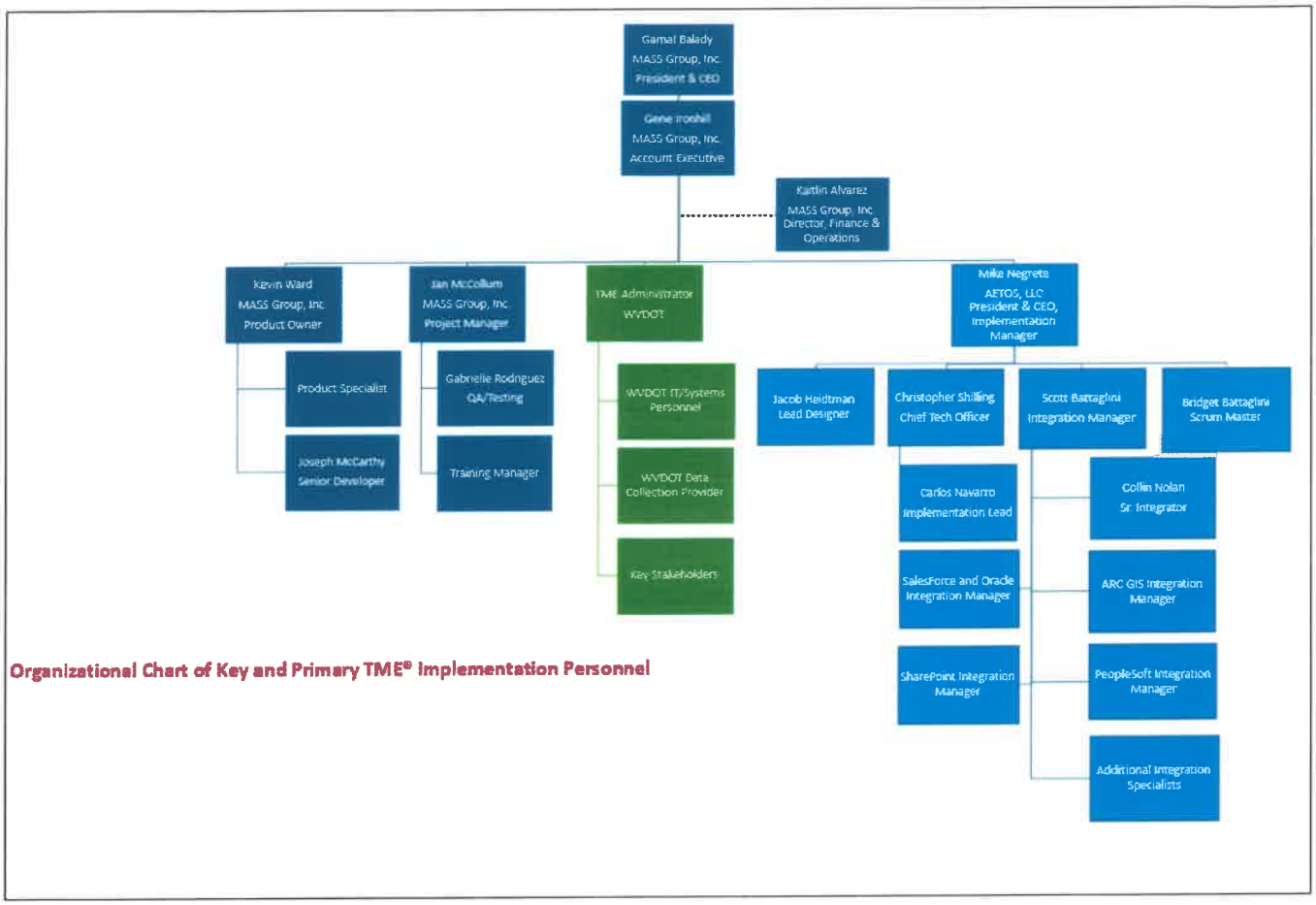
VENDOR INFORMATION

Company Name	Manufacturing Automation & Software Systems, Inc. dba. MASS Group, Inc.	
Date Established	3/20/1998	
Location of Incorporation	California	
Number of Employees	< 100	
Office Location(s)	**Chatsworth Office** 21601 Devonshire Street Suite 108 Chatsworth, CA 91311 Tel: 818-709-1255 Fax: 818-709-1468	**Las Vegas Office** 6280 S. Valley View Blvd. Suite 230 Las Vegas, NV 89118 Tel: 818-709-1255 Fax: 818-709-1468
Years in business	23	
Summary of financial strength/position	MASS Group, Inc. is a privately held company; we do not share financial information.	

OFFSITE ACTIVITY

Any software development work will be conducted by the MASS Group development team in Las Vegas, NV, and integration work may be conducted by Aetos in San Antonio, TX. Many of the project management meeting may be conducted virtually with team members (Project Manager will be onsite as required).

Organizational Chart



Organizational Chart of Key and Primary TME® Implementation Personnel

Conflicts of Interest

MASS Group, Inc. has no potential conflicts of interest with WVDOT.

Bankruptcy Filing

Neither MASS Group, Inc., nor any of its officers in their individual or professional capacity or associated with another company have filed (or had filed against it) any bankruptcy or insolvency proceeding, whether voluntary or involuntary or undergone the appointment of a receiver, trustee, or assignee for the benefit of creditors

MASS Group, Inc., is a privately held company. We do not share financial information.

SEC Filings

There are no SEC Filings involving MASS Group, Inc. MASS Group, Inc. is a privately held company. We do not share financial information.

Pending Litigation

MASS Group, Inc., is not involved in any pending litigation.

Terminations

MASS Group, Inc., has not had any public sector Fleet and Equipment Management System related contract terminations in the last five (5) years.

Civil and Criminal Disclosure

MASS Group, Inc., does not have any pending civil or criminal actions against it.

Statement of Financial Stability

MASS Group, Inc., is a privately held company. We do not share financial information.

TAB 3 – SUBCONTRACTOR COMPANY PROFILES

Company Name	AETOS, LLC.
Date Established	2010 (dba. Argus) 2019 (dba. Aetos, LLC.)
Location of Incorporation	Texas
Number of Employees	16
Office Location(s)	5310 Statice Hunt San Antonio, TX 78253
Years in business	13 Years as Aetos/Argus 3 years as Aetos, LLC.
Summary of financial strength/position	AETOS, LLC. is a privately held company. Aetos, LLC. does not share financial information.

TAB 4 – LICENSED PRODUCT INFORMATION

4.3.10.1. Business Applications

In this section, the Vendor shall provide a detailed product summary chart that lists:

- **Each Software Provider (please list the primary Fleet and Equipment Management Software Provider first);**
- **The different product sets to be provided by each Software Provider;**
- **The modules/functions within those product sets;**
- **The release level of the products to be used;**
- **The next release/version level to be released; and**
- **The planned release date of the next release/version.**

Software Provider	Product Set(s)	Modules/Functions	Release Level	Next Release Version	Release Date
MASS Group, Inc.	Traceability Made Easy® (TME®)	• TME® Asset Management: ○ Asset Performance Tracking ○ Hierarchical Location Management ○ Reconciliation ○ Data Collection/SPC/QC ○ Equipment Check In/Out ○ Utilization ○ Document Management ○ Image Upload ○ User Certification Tracking ○ Customizable Dashboards ○ Status Tracking/Notifications • TME® Inventory Management: ○ Purchase Order creation ○ Receiving Inventory ○ Warehouse and On-Hand Parts Notifications ○ TME® Reorder by Location Report ○ User Defined Fields and Managed Drop-Down Lists ○ Hierarchical Location Management ○ Parts Check-in/Out ○ Document Management ○ Image Upload ○ User Certification Tracking ○ Customizable Dashboards	7.0.9.1	7.0.10.X	TME is updated continuously. Updates are released every two (2) to three (3) months

Software Provider	Product Set(s)	Modules/Functions	Release Level	Next Release Version	Release Date
		• TME® Mobile ○ Access to TME via mobile device ○ Mobile Phone ○ Laptop ○ Available on any mobile device with a web browser, including iOS and Android ○ Web Based ○ Real-time Asset and Inventory management ○ Notifications ○ Ability to submit Work Orders • TME® Work Tracking: ○ Work Order Management ○ Service/Repair Order Generation ○ Preventive/Predictive Maintenance ○ Work Order Cost Tracking • TME® Reports ○ 300 + out-of-the-box-reports ○ Customizable reports ○ Configurable report templates ○ Ability to export reports in several formats			

4.3.10.2. Technology Products

The Vendor shall take the following into account when addressing the technology components of their proposal:

- **The Vendor shall provide the WVDOT with network, desktop, and server requirements for all software.**
- **The Vendor shall specify the requirements for all required cache servers, web servers, application servers, and database servers for installation per the Vendor's specifications.**

TME® is based on standard Microsoft technologies for extreme flexibility when integrating into existing automation systems. Since the System is web-based, it requires minimal resources on the client reducing total cost of ownership (TCO). TME is available to install on a local server or virtual server environment. TME can be installed on your private cloud, public cloud (Amazon, etc.) or MASS Group's secure data center. MASS Group even provides an option to ship a fully configured server running TME.

Client Requirements

- Current versions of Microsoft® Internet Explorer, Firefox, or Chrome
- Android and IOS for TME Mobile on mobile devices (optional)

Web Server Requirements (should WVDOT decide to host onsite)

- Windows® Server 2016 or newer
- Microsoft IIS web server, ASP.NET technology
- .Net Framework 4.7.2 or higher
- Intel Xeon CPU is recommended
- RAM: 16 GB or higher (at least 32GB is recommended if SQL Server and TME are on the same server)
- HARD DISK: Mirrored 500 GB SSD Drives

Data Server Requirements (should WVDOT decide to host onsite)

- Windows® Server 2016 or newer
- Microsoft® SQL Server 2014 or newer (2016 or newer is recommended)
- Intel Xeon CPU is recommended
- RAM: 32 GB or higher
- HARD DISK: Mirrored 500 GB SSD Drives minimum

Client Peripherals / Options

- Barcode Readers with Keyboard Wedge software
- Barcode and Label Printers
- Mobile Computers or Tablet PCs such as Microsoft® Surface
- Mobile Devices supported by IOS and Android

4.3.10.2.1 Ad Hoc Reporting Tools

A reporting solution shall enable business users to create their own reports and explore enterprise data by downloading data or utilizing standard ad hoc reporting tools.

The TME® Report module can be accessed from any Web browser. TME® provides over 150 standard Report templates covering all data collected within TME® including, but not limited to Asset Management, Inventory Tracking, Trending, Work Order, Labor and Performance Reports. Users select from a list of available Report templates and enter Report criteria before generating the Report. They can be opened in formats other than .html and saved to any folder for which the user has access. Reports can be created in multiple formats including .HTML, .XLS, .PDF, .CSV and .DOC.

Authorized Users will also be able to copy and configure Reports to their needs within minutes. TME® Report provides extensive Report customization capability without the need for programming knowledge or skills. In addition to standard TME® Reports, the System can also generate customized Reports based on user-defined parameters such as storage room location versus system wide, category of items, etc.

TME® Reports offers powerful Reporting capabilities, giving you the ability to create Reports on any type of recorded data, including data from other external SQL Server databases. In addition to the standard set of Reports, MASS Group can create any type of Custom Report (including data in SQL but outside of TME®).

WVDOT will be able to report on any Assets that have upcoming inspections or require 5-year maintenance (PMs), failed hydrostatic or any other testing, as well as billing and invoicing of maintenance costs, fuel mileage, usage and work completed. Reports can be color coded to flag areas of concern based on data entry or aging (i.e., past due work orders). They can be localized by site or generated for the entire organization. TME® Administrators will have control over what Users can see by sharing only those Reports necessary with parameters such as Site or Asset Category locked down.

Report Subscriptions

TME® contains a feature called Report Subscriptions. Any Report can be set up and then subscribed to be sent out via email on a pre-defined time interval such as daily, weekly, monthly, bi-monthly, quarterly, yearly etc. These subscriptions are individually set up for recipients, whether a TME® user, email group or an email address entered specifically for the subscription.

4.3.10.2.2. Business Intelligence Tools

It is the WVDOT's intent to take full advantage of the information captured within the new VPS to support Business Intelligence functionality in addition to operational reporting requirements. The expectation for Business Intelligence is to provide the capability for both tactical data analysis associated with program performance and strategic data analysis associated with long-term planning and measurement of operational performance against strategic goals.

TME® provides the ability to send information (asset records, failure history, etc.) to an Asset Performance Management system. TME® can be integrated with external system utilizing 3rd Party Applications Integration.

MASS Group can integrate TME® with an Asset Investment Planning (AIP) system by utilizing 3rd Party Applications Integration. WVDOT will be able to send asset records, failure history, work history/costs, maintenance schedules, etc. to the AIP to develop asset investment plans.

4.3.10.2.3. Product Maintenance

In this section of the proposal, the approach of the Fleet and Equipment Management System Software Provider(s) and the Third-party Software Provider(s) to meet the WVDOT's requirements to provide product maintenance is described.

Each MASS Group System is backed by our network of highly trained service technicians as well as our consulting staff. Support services include:

- Technical Phone Support – Direct Access to MASS Group Engineers who are located onsite from 8am-5pm, and available off hours, weekends, and holidays 24 x 7
- On-line Support – Full access to online resources and unlimited email technical support
- Major Version Releases – Receipt of major version software upgrades of current licenses System components
- Minor Version Releases – Full access to product improvements during the support period which include software updates, patches, and service packs

In support of the above services for email inquiries, MASS Group will respond to the service-related incidents and/or requests submitted by a Customer within the following time frames:

- 0-1 hours (during business hours) for issues classified as High Priority which reflects a "System down" or product inoperative condition impacting a working environment or high-impact condition possible endangering the working environment.
- Within the same work day for issues classified as Medium priority which reflects a situation where most software functions are still useable; however, some circumvention may be required to provide service; and
- Within 24-48 working hours for issues classified as Low priority which reflects a situation where there is a minor problem or question that does not affect the software function.

Remote assistance will be provided in-line with the above timescales dependent on the priority of the support request. Below is the Technical Support Process that MASS Group follows:

- All call or emails will be logged into MASS Group's internal technical support logging system which is shared with our Development and QA/Testing Teams for future product improvements and enhancements
- Incident logged with problem definition, classification, and priority.
- A MASS Group service professional will take the initial call and may assign a more qualified technician depending on the Classification (Application, Data, Network, Communications, Operational, Reporting, Etc.)
- All service calls are logged into the TME® Support System and are assigned a Work Order Service ID (WO) with a status of pending or closed. Each WO is assigned to a MASS Group Service Technician and a Customer Requester.
- The Customer may have to give access to the system remotely. This can be done using a various number of ways from a PKI key and remote login to setting up a remote meeting (Teams, WebEx or GoToMeeting) and giving supervised control to MASS Group.
- All Pending or Open Service calls will have a log stating a wait state (Waiting on Customer, Waiting on MASS Group).
- A Report can be given to Customer at Customer's Request of all service calls. The Daily WO Customer Report gives the last 48 hours of actions on open issues as well as all open/past due items

The ultimate outcome is to have a successful and smooth implementation in as quick a turn-around time as possible. MASS Group is there every step of the way—working with stakeholders to ensure that data is scrubbed and ready for Import into TME®, address specific processes, assist with setting up standard operating procedures (SOPs) and advise on best practices.

Once TME® is live and the authority of record, MASS Group continues to provide user-friendly assistance to troubleshoot issues, provide on-the-spot item specific training, work with IT (if hosted by client) when server/database upgrades are scheduled, as well as assist Users with ideas on configuration options and usage.

MASS Group's goal is to ensure that our clients are completely knowledgeable in how to administer and operate TME® to its fullest potential. Below is other relevant detailed information related to our End User Support.

Premium End User Support Services

If desired, for an additional cost, MASS Group offers Premium End User Support Services which include:

- Onsite Technical Support for emergency incidences
- Issuance of regular Reports summarizing key performance indicators such as total incidences, mean time to response, mean time to resolution, supplier dependent downtime %, customer dependent downtime %, pareto of common failures, pareto of common resolutions, etc.
- Online training related to product improvements, new releases, and development initiatives
- Onsite customized training
- Quarterly check-ins by one of our Account Managers to audit and validate the System
- Assistance with setup of User Group by topic upon request

4.3.10.2.4. Future Direction

The Vendor shall describe the future direction of the technology of the proposed products. Also, include future plans for public sector functionality for the components of the proposed solution. The Vendor should discuss in some detail the strategic product plans for the proposed software products in this response. What have been the significant enhancements to the products in the past few years, and what is expected in the next three (3) years? Describe how the proposed solution provides a stable robust environment for the WVDOT and provides a platform for growth and technological advances for the future.

Significant Enhancements to TME® in the Last Three (3) Years

Inventory Warehouse Management

- Container support was added for inventory with bills of material requirements
- Asset and serialized inventory can be checked in and out to users
- Sales Orders
  - Integration with WIP for build to order
  - Attributes are available at the sales order and line-item level
  - Evaluation of sales order attributes during WIP production is provided for conditional logic
- RMAs for doing returns against the sales order
- Transfer Orders
- Move inventory from one locale to another via picking, shipping and receiving
- Picking
- Sales and transfer orders which commits the inventory scanned to the order
- Shipping
  - One or all committed line items can be shipped
- Multiple statuses available to prepare the shipment and ship it
- Receiving
- Purchase Orders, transfer orders, and RMAs
- Put Away
  - Inventory received to the receiving dock can be transferred to their designated locales

TME Mobile

- Asset Management
  - Asset lookup
  - Asset maintenance
  - Move assets with or without required signatures
  - Asset reconciliation

- Work Tracking
  - Work requests
  - Work order lookup
  - Edit work order
  - Log comments
  - Change asset status
  - Log hours
  - Close work order

MES

- TME now includes a full web based WIP processing system built into TME
  - Full revision control of processes and operations
  - The following Actions are available when processing a work order
    - Process Operation
    - Log Comments
    - Adjust the Quantity in the work order
    - Change the locale

        - Change the main batch
        - Change the process being used
        - Change the product being built
        - Split and Combine work orders
        - Hold and Park
        - Reposition
        - Scrap
        - Put, Take and Return inventory

    - The following Operation/Step types are available to include in processes
        - Messaging – displaying instructions, attribute values, asset statuses, scheduled work requirements
        - Starting and stopping Assets
            - Tracking equipment utilization
            - Allow the user to issue a repair request
            - Show the appropriate recipe based on the product being built
        - Consuming Inventory with or without BOMs
            - BOM rules so that the correct inventory is consumed based on the product being built
        - Changing the locale or the work order
        - Inspection
        - Scrapping or Destroying inventory
        - Conditional logic for process control based on the following events or data
            - Product or process
            - Work order, sales order, product or asset attribute values
            - Asset previously used
            - Timing requirements
        - Sign off of the current user or another designated user class
        - Setting attributes (e.g., runtime counters)
        - Data Collection
- Digital Twin functionality provided
    - Model and test process changes in the digital twin system
    - One button upload of digital twin changes to production

Expected Enhancements for TME® Within the Next Three (3) Years

MASS Group utilizes the Agile development process, and the Scrum framework to develop its software. TME is updated continuously. Updates to TME® are released every two (2) months.

Enhancements requiring modification to Base Code:

- Support use of keyboard data entry only (i.e., allow screen functions to be performed without use of a mouse).
- Support parallel approvals and single-threaded approvals in the same approval path.
- Allow user-defined standard approval timeframes.
- Support multiple levels of approvals for transactions based on profile security and other user-defined criteria.
- Route transactions automatically to a workgroup after a specific time of inaction (based on user-defined criteria).
- Support public key infrastructure (PKI)
- Provide the ability to ensure that if two or more distinct security roles are needed to perform a business function and all needed roles are held by the same user, the user must log on separately under each security role to perform the full business transaction.

  - If a user has approval privileges over a business process, they must also enter data
  - The user shall NOT be able to approve their own work or requests
  - User-generated work or requests must be approved by a different/independent approver, such as a supervisor
- Log incidents of security violations within the System, capturing user ID, IP address with X-Forward IP if a load balancer is involved, system function for which unauthorized access was attempted and date and time of security violation.

Global Features

- Dual authentication and other security updates
- Continue to move to a responsive user interface
- Extend the graphical presentation of data in TME with real-time analytics and dashboards
- Provide enhanced global data sharing
- Make pages configurable for content – Asset maintenance is done as an example
- Improve RFID integration into inventory, asset, and user transactions
- Improve and expand use of containers in TME
- Improve external document handling in TME with integration to platforms like SharePoint
- Enhanced GIS Mapping

Inventory Warehouse Management

- Cycle Counting
  - Allow rich selection criteria for what to count
  - Handle batch scanning barcodes or RFID tags
  - Handle bulk inventory, batched inventory and serialized inventory
  - Handle inventory loaded into containers including allowing the counting of containers and trusting the contents of the container are accurate

CMMS Work Tracking

- Improve ad hoc Job/Tasking Library
- Labor and Resource Scheduling workflow
- Inspection Module separate from Data Collection
- Automated Job Routing and Escalation
- Integration of Asset Data Collection via Work Orders
- Modernize Reservation Calendar

TME® Mobile

- Check in and out of assets and serialized inventory with container integration
- Add Inventory transactions with container integration
  - Adjust, Consume, Destroy, Transfer, Return
  - Load, Unload and Transfer containers
- Shipping
- WIP Transactions
  - Start Equipment
  - Stop Equipment

- Sign Off
- Change Locale
- Collect Data

MES

- Advanced Planning & Scheduling (APS) for the Smart manufacturing 4.0
  - Dynamically optimize machines, manpower and materials as demands and constraints change
  - Define hourly production of each product group at an operation
  - Define setup and breakdown time for assets when changing product
  - Produce production schedule of active WIP work orders
  - Allow changing priority of work orders to change schedule
  - Show work order estimated completion dates versus due dates
  - Show backlogs and equipment bottlenecks

- Extended IOT support on the production floor
  - IOT scanner support
  - IOT sensor support
  - Automated handling of scanned work orders
    - Start equipment
    - Stop equipment
    - Collect Data
    - Move work order thru WIP

- Web services to allow integration with TME® WIP from outside sources
  - Get work order status
  - Log comments
  - Start and stop assets
  - Put work orders on hold
  - Move product to inventory including container support
    - Create container
    - Load container
    - Print container label
    - Move container
  - Set attribute values
  - Set data collection

- Modernization of the OPC interface for WIP
  - Convert to OPC UA
  - Use standard TME web-based configuration
  - Move work orders thru standard TME WIP processes/operations/steps

- Die Handling
  - Define the die mask layout (rows and columns) on wafers in WIP
  - Add inspection at the die level in WIP with the ability to note defects and failures of individual dies
  - Add grading into different product specifications when converting from wafers to dies

TME® High-Level Architecture

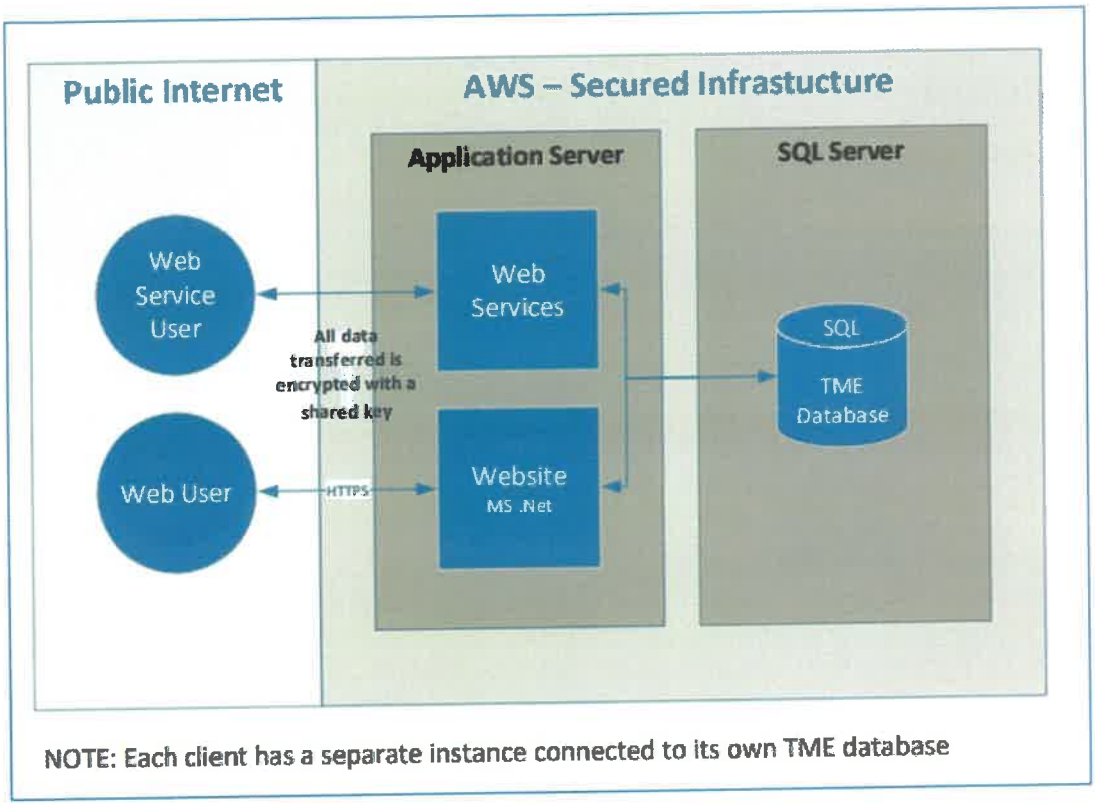


Figure 6 AWS Infrastructure

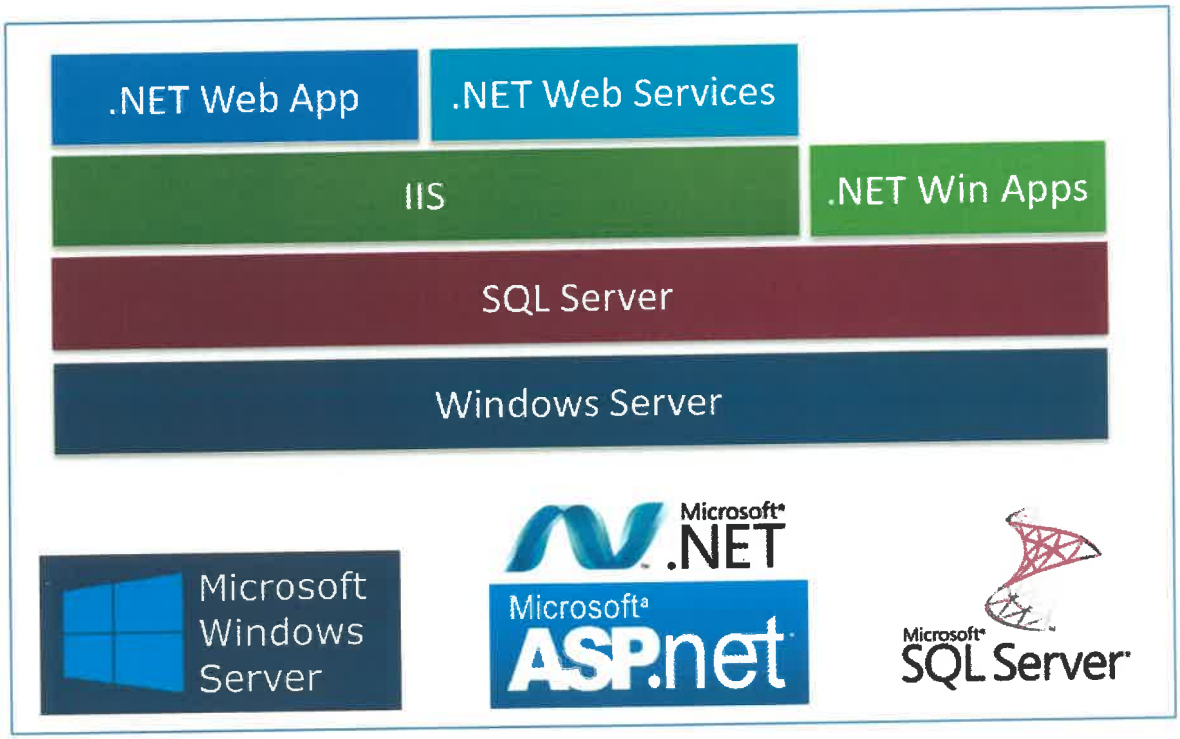


Figure 7 Architecture

Authentication

- Active Directory Authentication
- Single Sign On (SAML)

Integration Options

- Web Services
- SQL
- CSV
- OPC

ERP

- JDE
- SAP
- Sage 100

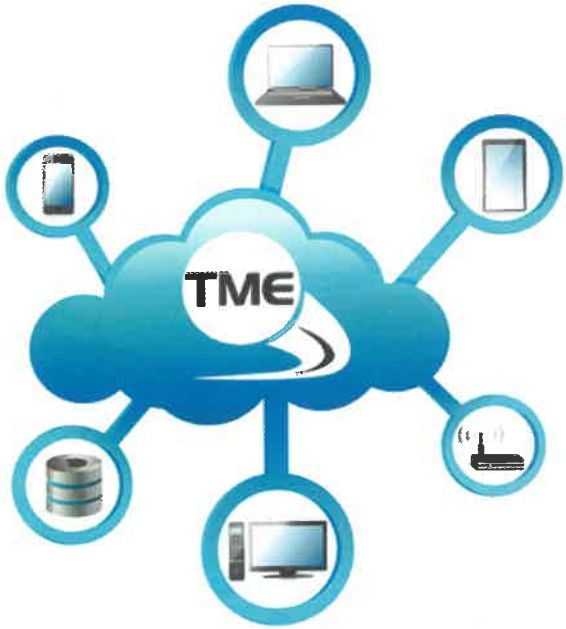


Figure 8 TME® Connectivity

- Agile development process utilizing Scrum framework
- Jira and Confluence as single repository for
  - Feature Requests
  - Improvements
  - Bugs
  - Support Tickets
  - Product Specifications
  - Design documents
  - Meeting Minutes
- 2-Week Sprints Cycles with Daily Scrum
- Highly Engaged Team

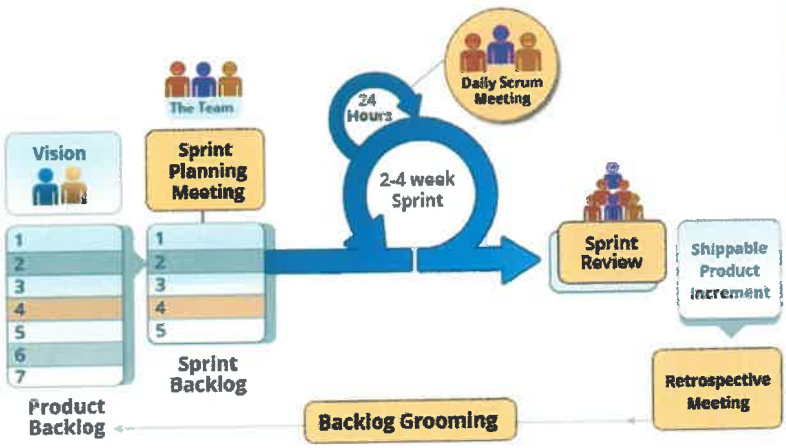


Figure 9 Agile for Development and QA

TAB 5 – REFERENCES

Company	Tulsa Airports Improvement Trust (TAIT)
Address	7777 E Apache St, Tulsa, OK 74115
Contact Name	Eric Kien / Michael Shelton
Title	Support Services Supervisor / Application Development Analyst
Phone	(918) 838-5161 / (918) 838-5452
Email	EricKien@tulsaairports.com / MichaelShelton@tulsaairports.com
Description of Company	Tulsa Airports Improvement Trust administers, manages and operates Tulsa International Airport and R.L. Jones, Jr. Airport. TAIT's mission is to provide a safe, efficient, self-supporting airport system for the citizens of the Tulsa metropolitan area and surrounding region.
Challenge	TAIT needed a replacement airport facilities enterprise maintenance management system for reporting and managing assets and maintenance incidents at facilities and sub facilities covering 4,360 acres and three paved runways.
Solution	Tulsa International Airport uses TME® Asset Management and CMMS for its airport facilities enterprise maintenance management system for reporting and managing maintenance incidents at facilities and sub facilities. They track all labor and inventory/spares consumed to work orders to charge back to the customers (Airlines, Restaurants, Vendors, etc.) who lease space in the facility.
# of Inventory/Assets	3600+
# of Users	35
Start/End Date	3/1/2015 to present
Cost of Project	$25,968.76
Project Manager	Gene Ironhill
Product	TME

Company	Arizona Department of Corrections (ADC)
Address	1645 W. Jefferson, M/C 601 Phoenix, AZ 85007
Contact Info Name	Kevin Tynan
Title	Construction Manager
Phone	602-364-4296
Email	ktynan@azcorrections.gov
Description of Company	The Arizona Department of Corrections is the statutory responsible for the incarceration of inmates in 10 prisons in the U.S. state of Arizona. As of December 2015, the ADC manages over 42,643 imprisoned inmates and over 5,466 inmates who have been paroled or that are statutorily released. ADC is also in involved in recruitment and training of Correctional Officers at the Correctional Officer Training Academy (COTA). It has its headquarters in Downtown Phoenix.
Challenge	ADC needed a centralized web-based system for requesting and processing work orders to better maintain their facilities and equipment across the state. It needed to have a simple request interface for administrative personnel and a comprehensive work order processing and PM management capability for the technicians. Specifically, it needed to ensure that Security Devices were kept at optimal performance.

Solution	ADC uses TME® Asset Management and CMMS for its enterprise maintenance management system for reporting and managing maintenance work orders at Complexes and Units across the state. This is to ensure that Security Devices and equipment are properly maintained on schedule, facilities are kept in good condition for the personnel and inmates, and that the ADC sustains compliance with all State and Federal mandates.
# of Inventory/Assets	4300+
# of Users	850+
Start/End Date	3/15/2016 - Present
Original Cost of Project	$77,330
Project Manager	Gene Ironhill

Company	**Melbourne Police Dept.**
Address	900 E. Strawbridge Ave, Melbourne, FL 32901
Contact Name	Eric Sack
Title	Systems Analyst
Phone	(321) 608-7700
Email	Eric.Sack@mlbfl.org
Project	The City Police Department needed Asset and Inventory Tracking Software that incorporated RFID and barcode technology. It was to be used for the issuing of weapons, ammunition, uniforms, radios, vehicles, etc. In addition, the Department needed a way to check out/in vehicles to officers on a temporary basis as assigned vehicles were being maintained/repaired.
Solution	Police Inventory Asset Management Solution
# of Inventory/Assets	2000+ Assets and 250+ unique Inventory Items
# of Users	20
Start/End Date	2/1/2016 to present
Project Manager	Gene Ironhill
Product	TME

TAB 6 – PROPOSED PROJECT STAFF AND ORGANIZATION

4.3.12.1. PROJECT ORGANIZATION

Vendors shall describe their project staffing strategy to coincide with their recommended implementation approach, including any proposed phasing. As part of this project staffing strategy, the Vendor shall recommend when WVDOT participation is expected, how the WVDOT's employees are going to be integrated into the Project Team, where the project team is primarily located and what methods are going to be used to ensure skills and knowledge transfer.

For information on project staffing strategy, please see section 4.3.13.2. System Development Methodology Overview.

4.3.12.2. PERSONNEL SUMMARY TABLE

The MASS Group team for Inventory Management Workflow Solution will be led by Account Executive Gene Ironhill and will include staff for Project Management and Software Development. Key personnel:

Proposed Role(s)	Consultant Name	Experience Summary
Account Executive	Gene Ironhill	Account Executive designated to oversee the implementation and ongoing support of the TME® Software System has extensive experience in working with government agencies and the public sector. Gene has been a MASS Group employee for more than 13 years and has extensive technical knowledge of TME®, having worked in implementation, technical support and training during her tenure at MASS Group.
Project Manager	Jan McCollum	Project Manager in the integration services division at MASS Group. He is experienced in managing the diverse needs of all the players in the corporate environment to ensure high satisfaction levels and corporate growth. Adept at learning new systems, crisis management, and consensus building while encouraging problem solving in the whole team. Exemplary skills at interfacing with end users for requirements planning and support. Well-rounded IT background with experience programming, managing projects, training and supporting end users.
Product Owner, CSPO, CSM	Kevin Ward	Product Owner in the Integration Services/Software Development division of MASS Group located in Las Vegas. He is responsible for managing the Agile/Scrum processes and all database architecture standards. His main tasks include leading the TME® Development team, adding additional functionality to existing services, creating and updating the Master Report set along with custom client reports and improving SQL efficiency when needed.

Proposed Role(s)	Consultant Name	Experience Summary
Lead Subcontractor, President & CEO of AETOS, LLC.	Mike Negrete	Service-Disabled Veteran and highly entrepreneurial-spirited technologist with 15+ years of executive-level experience identifying, qualifying, building consensus for, and implementing enabling technologies and enterprise systems that facilitate business processes and strategic objectives. Broad expertise in IT, network, full stack development, information architecture, cyber security, architecture/infrastructure design, change management, full project life cycle management, business process improvement, and financial/operational management.

4.3.12.3. RESUMES

GENE K. IRONHILL

Summary of Experience

Gene K. Ironhill is an Account Executive in the TME division of MASS Group. She is responsible for business development and provides expertise, training and support to all TME customers. Gene is an innovative and analytical problem solver dedicated to work process improvement and efficiency. A highly skilled communicator with a service-oriented approach, Gene is proactive in meeting the client's changing needs.

Software and Computer Skills

Microsoft 2010 Word, Excel, PowerPoint, Outlook, Visio, and Expressions (FrontPage); SQL Server and Visual Studio 2008R2/12; Familiar with Microsoft Project and Adobe Acrobat.

Professional Experience

2007 – Present
MASS Group, Inc.; Project Specialist, Implementation Manager, Account Executive as of 2017

Responsibilities: Provides remote and on-site support to customers, customer teams, and affiliates; Develops, organizes, and conducts onsite and web-based product training; Interacts and serves as an internal resource for all departments in facilitating the sales process; Develops documentation for the end-user and administrators for developed web applications.

July 2005 - November 2006, KB Home Inc., Purchasing Agent
February 2005 – July 2005, D.R. Horton, Inc., Contracts Administrator
Purchasing Agent, Land Development

Responsibilities: Managed budget revisions for multi-million dollar projects; Supervised Accounts Payable Administrator; Reduced the turnaround time for contracts, change orders, tracking and payments by over 75% by streamlining systems, paperwork and processes and regularly following up with clients; Assisted Land Development Manager with the bidding process: preparing bid letters, accumulating plans to go with the bid letter, and inputting bids into spreadsheets; Worked on projects delegated by the Land Development Manager; Accounts Payable related duties (code billing, reconcile budgets, budget revision requests, JDE input); Prepared vendor contracts and change/extra work orders and coordinated office paperwork.

May 2004 – February 2005
Amgen, Inc.; Administrative Coordinator II, Field Training & Development

Responsibilities: Provided administrative support to the Associate Director and staff; Coordinated logistics, communications, supplies, and facilities for sales new hire orientation and training.

July 2000-May 2004
Sony Pictures Entertainment; Training Coordinator, Management & Organizational Development

Responsibilities: Organized and facilitated full day New Hire Orientation program, incorporating team building activities, group discussions and several multi-media presentations; Designed and formatted high quality course materials; Negotiated discount pricing with outside and in-house vendors and cultivated outstanding relationships with internal and external personnel resulting in increased department efficiency; Coordinated the facilities, equipment, supplies, vendors, enrollments, pre-work and chargebacks.

Education

University of Florida, B.A. Political Science 1993

21601 Devonshire Street, Suite 108, Chatsworth, CA 91311 | Tel: 818-709-1255 | www.massgroup.com

JAN MARSHEL MCCOLLUM

Summary of Experience

Jan McCollum is a project manager in the integration services division at MASS Group. He is experienced in managing the diverse needs of all the players in the corporate environment to ensure high satisfaction levels and corporate growth. Adept at learning new systems, crisis management, and consensus building while encouraging problem solving in the whole team. Exemplary skills at interfacing with end users for requirements planning and support. Thorough understanding of manufacturing and retail and wholesale distribution best practices. Well-rounded IT background with experience programming, managing projects, training and supporting end users.

Software and Computer Skills

Microsoft SQL Server 2012/14/16, Microsoft Visual Studio for Reporting Services 2010/13, Microsoft Server 2012R2/16, Microsoft Windows 7, Microsoft Office 2013 including Word, Excel, PowerPoint, Visio, and Microsoft Project.

Professional Experience

2008 – Current

MASS Group, Inc. - Project Manager

- Manage customer accounts from developing specifications through installation, training, and technical support.
- Manage a programming team that writes software modules for our software suite, then installs and supports that software.
- Develop program specifications with the customer.
- Do schema, query and script development in Microsoft SQL Server.
- Create reports using Microsoft SQL Reporting Services.
- Write sales proposals for prospective customers.

2001 – 2007
VIP Distributing - IT Manager

- Managed the migration to Windows SQL distribution software.
- Managed the development of program and reporting customizations.
- Managed all computer and network resources.
- Provided technical expertise to help warehouse management do Inventory Control on 22,000 SKUs utilizing EOQ and Min/Max that provided over a quarter million dollars in savings.

1984 – 2001
TPS, Inc. - Program Manager / Owner

- Managed all programmers and projects.
- Developed retail point of sale and wholesale distribution applications including touch screen Point of Sale applications.
- Developed a management package for 7-11 and other convenience stores and gas stations that was installed in over 1500 locations nationwide.
- Helped develop the NTN Buzztime multiplayer play-along TV games for restaurants and sports bars.

1980 – 1984
Atari / Warner Communications - Programmer

- Wrote and managed the inventory control system for Warner Home Video.
- Wrote billing software for over the air delivery of video games.
- Wrote ranking software for the Men's Association of Tennis Professionals.
- Wrote Multi-lingual guest activity tracking software for Club Med.

Education

California State University at Northridge, Philosophy

21601 Devonshire Street, Suite 108, Chatsworth, CA 91311 | Tel: 818-709-1255 | www.massgroup.com

KEVIN WARD, CSM

Summary of Experience

Kevin Ward is the Database Architect in the Integration Services/Software Development division of MASS Group located in Las Vegas. He is responsible for managing the Agile/Scrum processes and all database architecture standards. His main tasks include adding additional functionality to existing services, creating and updating the Master Report set along with custom client reports and improving SQL efficiency when needed.

Software and Computer Skills

Technologies: SQL Server 2008r2, SQL Server 2012, SQL Server 2014, SQL Server 2016, T-SQL, TFS Build, Visual Studio 2015, Visual Studio Database projects, SSDT, SSRS Reports, TFS 2015, SSMSBoost, Jira, SQL Sentry Plan Explorer

Professional Experience

June 2016 – Present
MASS Group, Inc.
Database Architect

- Created and maintain SQL Standards Document
- Automated complex build processes on build server using Team Foundation Server Build
- Manage T-SQL Import Processes
- Review and optimize views and created Indexes as needed
- Designed efficient Table Functions for checking access permissions against large data sets
- Develop complex reports and matrices for clients
- Profile, identify and fix SQL inefficiencies
- Fully implemented Scrum in the organization

November 2015 – June 2016
Preferred Mortgage Services (PMSI)
SQL/.Net Developer

- Improved reliability, consistency and traceability of ETL product
- Created utility stored procedures for importing and exporting files in multiple formats
- Migrated ETL workflows from outdated process to MSBuild workflow orchestration
- Created table driven structure for automatically generating complex MSbuild ETL workflows in T-SQL, including testing scripts (in 1 second)
- Set standards for detailed testing on all ETL workflows, trained SDET
- Documented evolution of product, major milestones and presented to company

September 2015 – November 2015
HealthDataInsights, Inc.
Programmer Analyst II

- T-SQL development, extension and troubleshooting of complex workflows
- Created templates for SSIS projects
- Created utility stored procedures
- Assisted with daily standups and process improvement
- Trained replacement and encouraged knowledge transfer in the team

21601 Devonshire Street, Suite 108, Chatsworth, CA 91311 | Tel: 818-709-1255 | www.massgroup.com

KEVIN WARD, CSM, cont.

November 2013 – September 2015
MASS Group, Inc.
SQL/.Net Developer

- Reduced running time for some imports from days to seconds
- Created database framework for importing and exporting massive amounts of data from SQL to SAP
- Created database framework for restricting sync data on a windows mobile device
- Upgraded source control process
- Coordinated with offshore teams in Abu Dhabi and Dubai in an agile fashion greatly improving the communication and allowing us to complete the phase

Education

LV93, LV105, LV112, LV1118, 2009-2012 at Choice Center Leadership University
Certification: Certified Scrum Master – Scrum Alliance, 2015

Jose M. Negrete

[redacted]

SUMMARY: Service-Dissbled Veteran and highly Entrepreneurisl-spirited technologist with 20+ years of executive-level experience identifying, qualifying, building consensus for, and implementing enabling technologies and enterprise systems that facilitate business processes and strategic objectives. Powerful blend of technology vision and business acumen results in consistent development of powerful business strategies supported by cost-effective, high-performance IT infrastructures and applications. Broad expertise in IT, network, full stack development, test development, cyber security, architecture/infrastructure design, full project life cycle management, client/vendor relationship management, and financial/operationsl management.

- Results -focused Lead with extensive knowledge of Agile (SAFE), Waterfall, XP, Lean, Scrum, SDLC, test driven development (TDD) and other Project Management methodologies with proven track record managing and completing strategic and complex projects -on time, within budget.
- Strong problem solving and decision-making skills with ability to develop and implement effective action plans aligned to strategic direction.
- Goal oriented leader and team player with skills to manage relationships with internal and external customers, partners, peers, and other management.
- Experience in federal government contracting and commercial program management, contract and vendor management, business development, strategic planning, contact proposal lifecycle, and operations management in fast-paced, high technology environments.
- Experience Solution Architect developing customer solutions across multiple platforms utilizing Service-Oriented Architecture (SOA), and DOD Enterprise Architecture (EA).
- Expert in Data Modeling and Software Systems Analysis and Design in both government Healthcare and Finance and private financial sectors.

EXPERIENCE:

Aetos LLC, May 2017 to present – Program Manager / Data Architect (Dept of Veterans Affairs)

- Serve as the Program Lead managing all aspects of the project lifecycle from scope of work through provision of deliverables, follow-up, and relationship management for large-scale, long-term projects. Lead operations and strategic business planning; strategic finance; corporate strategy, development and financing; organizational design; operational and financial turnaround; and market strategy and research.
- Created development, quality assurance, implementation methodologies, processes and best practices to support demanding customer base and highly aggressive business goals. Responsible for Strategy Development, Solution Design, Execution, Integration and Risk Management. Operated as the principal bridge for senior leadership, development team and customers.
- Serves as a Lead Data Architect for Dept of Veterans Affairs oversees several enterprise data migration/ data integrations for the Office of Rural Health (ORH) and Caregiver Record Management Application (CARMA) to support the VA Mission Act extending care and services to Veterans VA Salesforce cloud environment. Developed complex ETL processes in UNIX shell scripts, Informatica PowerCenter and Oracle SQL to meet business requirements. Successfully migrated over 8 million object records, cases, contacts and attachments completed on scheduled with 100% compliancy. Monitored and worked to resolve any issues related to the hundreds of daily EDW extracts and loads.
- Providing Database Architecture and QA/Test Development support for the VA's Enterprise Data Warehouse (VBA EDW). The EDW consists of approximately 50 schemas (Transactional Snapshots and Star Schemas), 3,700 tables and 60,000 columns which are updated on a daily, weekly, and monthly basis as required to meet the business community requirements:
  - Managed a team of Mid to Jr level QA Testers, Database Developers & Administrators.
  - Lead QA activities for all software development testing activities for developing ETL test automation scripts and test documentation to monitored, test and worked to resolve any issues related to the hundreds of daily EDW extracts and loads.

- Oversaw the creation of test plans and execution of test cases and the collection of bug/issue creation and tracking.
- Served as the liaison between development team & stakeholders and key contributors on determining the level of acceptance for deliverables of data.
- Developed test automation frameworks, wrote test specifications, created test cases/plans and performed testing levels that included at a minimum functional, unit, integration, regression, stress and acceptance testing.
- Developed and executed multiple scenarios for performance testing and capacity planning using LoadRunner and Tabjolt tools.

Bestica, May 2018 to April 2019 – Chief Technology Officer
Supervisor LTC(Retired) Jeffrey Dibiasi 770-743-98110, Jeffrey@bestica.com

- Provide executive leadership as head of all IT initiatives. Responsible for overall technology vision, product development, IT Proposal development and IT solution delivery for 200+ person company servicing large number of clients in the DOD, Federal and Commercial sectors. Lead all aspects of architecture, software and product development, including all make vs. buy analysis, investment rationalization, and delivery schedule for high transaction applications. Manage and delivered multiple large-scale projects & IT proposals on time and within budget. Responsible for budgeting, design and support of all IT technology initiatives.

- Chief technical executive responsible for advising DOD, Federal and Commercial clients regarding the application of commercial industry best practices for Information Technology and Systems Engineering. Responsibilities include development of corporate technical strategy, business development, direct Systems Engineering consulting for clients, staff development, training, and acting as Senior Technical Advisor for IT Technologies projects.

- Led strategic development and delivery of enterprise systems and process improvement initiatives including corporate administration, human resources, finance, operational fulfillment, and business intelligence. Reduced operating budget by 30% while implementing IT solutions to realize greater value at the corporate level and service level improvements in the business units.

Defense Health Agency (DHA) / MEDCOM G8 Budget Integration, November 2013 to June 2018 – IT Program Manager / Lead Architect Supervisor MAJ Philip Kaberline (210) 295-3812, philip.s.kaberline.mil@mail.mil

- Serve as the Chief of the Budget Integration Financial System Branch managing a team of 12 consisting of database administrators, software developers, business & system analyst and architects. Responsible for software development, delivery and sustainment of DHA/MEDCOM IT Financial Enterprise applications.

- Serve as the Lead Architect leading 6 enterprise software development efforts including the design, development, delivery and sustainment of the agency's enterprise Financial Management platform and the migration of over 5 million object records, cases, contacts and attachments from the multiple legacy correspondence application, to the new financial management platform.

- Provide System Architecture and technical expertise into design, policy and planning initiatives including develop of short and long-range goals and future planning in support of Enterprise IT systems infrastructures.

- Serve as the Portfolio Manager representing the MEDCOM in all IT related procurement activities to include overseeing Cost, Schedule and Performance of IT programs, Defense Business Certification of funds, Contracts development and management and Software/Hardware/Infrastructure Procurement. Provide leadership and oversight to ensure successful execution of spend plans. Assess cost and schedule baseline variance and oversee resource reallocation in response to project Cost, Schedule, and Quality of deliverables changes.

- Provided Program Manager focused support to convert frequently ill-defined requirements into successful but necessarily highly complex projects that include parallel task management with multiple dependencies and interfaces. Ensure all IT project initiatives were completed on time, within budget and aligned with corporate strategic objectives. Provide oversight of customer and stakeholder requirement definition to ensure plans and schedules were developed and followed throughout project lifecycles. Promote continuous quality improvement by adjusting project management processes as necessary based on project outcome assessments.

US Army MEDCOM G8 Budget Integration, December 2010 to November 2013 –Lead Financial Systems Analyst
Supervisor: LTC Sean Casperson (915) 742-2968, sean.a.casperson.mil@mail.mil

- Served as a database developer managing multiple Enterprise wide databases. Developed, sustained, integrated, and modified relational databases (SQL / Oracle), dictionaries, Queries, Views, and Stored Procedures. Defined data policies supporting the management, storage, protection, access, navigation, movement, and transformation of data. Developed and sustained ETL processes to consolidated data from multiple ERP/SAP data sources and legacy systems into one centralized location, which eliminated labor intensive manual processes and reduced the need for multiple IT systems.
- Served as a Test Developer responsible for all software development testing activities using Microsoft Test Manager (MTM) to develop test automation for the continuous testing of code. Developed test automation frameworks, wrote test specifications, created test cases/plans and performed testing levels that included at a minimum functional, unit, integration, regression, stress and acceptance testing.
- Served as a SharePoint Developer managing the Army Medicine SharePoint FARM for MOSS 2007, SharePoint 2010 and SharePoint 2013. Oversaw the planning, design, deployment and sustainment of the SharePoint Farm to include development of sites and sites collections, security & updates to application, implementation and maintenance of the search engine, development of enhanced features such as custom site templates, web parts, libraries, workflows, Performance-point Services, creation of custom branding, and upgrade from MOSS 2007, 2010 and to 2013.

US Army MEDCOM G8 Finance & Accounting, June 2009 to December 2010 –IT Specialist
Supervisor: LTC Sean Casperson (915) 742-2968, sean.a.casperson.mil@mail.mil

- Served as an Application System Owner. Designed, planned, installed, configured, maintained, and upgraded enterprise software across multiple IT applications/systems and various platforms. Planned, tested and released with minimal impact to customer or existing IT infrastructures, application/software enhancements/upgraded, legacy application retirement protocols, system patches, and security improvements.
- Developed and implemented an enterprise IT Configuration Management strategy in support of MEDCOM objectives that ensured CMDB accuracy. Developed, documented, executed and implemented a CMDB repository to track all IT assets across the Enterprise. Created and managed process documentation, policies and training manuals.

USAA, November 2007 to June 2009 – Software/System Engineer II
Supervisor: Dan Wolberg 210-913-1641, daniel.wolberg@usaa.com

- Served as the Lead Developer and Program Manager for Enterprise Financial Information & Fraud Systems (Choice Point). Managed application development process/methodologies spanning the entire SDLC from planning and analysis to design, coding, testing, and documentation. Also managed program cost, schedule and performance, contract development and management, Software/Hardware/Infrastructure, and project management support.
- Served as a developer for the USAA.COM FAST ESP Search Engine. Configured and deployed search engine capability and refactored search engine to improved user experience and search capability. Worked intensively with key stakeholders and consultants to deliver expected to search engine performance.
- Served as a Test Developer responsible for all software development testing activities. Developed test automation frameworks, wrote test specifications, created test cases/plans and performed testing levels that included at a minimum functional, unit, integration, regression, stress and acceptance testing.

Citibank, April 2005- Nov 2007 – IT Programmer Analyst
Supervisor: Kevin Hafferty 210-677-7304, kevin.hafferty@citibank.com

- Served as a database administrator maintaining several relational database systems such as MS Access, SQL Server 2005 and Oracle 9i. Refactored legacy databases by eliminating excess tables, queries, and resource intensive Stored Procedures and other database related processes that optimized performance and supported future growth & enhancements. Optimized data loading process by taking labor intensive manual processes and automating to be loaded systematically.
- Sustained Enterprise web sites using Macromedia studio 2004 and Dreamweaver 2008. Utilized programming languages such as .NET, HTML, Jscript to sustain website and improve user experience.
- Served as an application developer. Developed, sustained and upgraded IT hardware/software applications. Resolved work order/trouble ticket issues with applications and systems. Performed systems maintenance, updates and patches on existing software applications and portable electronic devices. Installed and setup video and audio equipment for presentations and conferences.

TECHNICAL SKILLS:

- Office Applications: Word, Excel, Access, PowerPoint, Visio, OneNote, Project.
- SharePoint: All versions (2010-2016 & 365), Central Admin, Forms, Designer, PowerApps.

- Programming Languages: C#, PL-SQL, T-SQL, JAVA, Angular, ASP.NET, ColdFusion, JavaScript, jQuery, HTML5, ReactJS.
- Scripting: AWK/GAWK, Perl, PHP, PowerShell, Bash and Python.
- Frameworks: NET framework, Entity Framework.
- Virtual Technologies: VMWare, vSAN, ESXi,
- Network services: DNS, DHCP, NTP, HTTP, Log Servers, and User Authentication
- Cloud: AWS, Azure, GovCloud, MilCloud.
- Operating Systems – Windows, Windows Server, UNIX, Linux, Mac OS.
- Databases: IBM Informix, Oracle (all versions), SQL Server (all versions), MongoDB, SQLite.
- Methodologies: Agile, Waterfall, Extreme Programming (XP), Lean, Scrum, SDLC, test driven development (TDD), Agile Model-Driven Development (AMDD).
- Web Services & APIs: REST, SOAP, JSON, XML and AJAX.
- Software/Misc.: MVC 4/5, SQL Management Studio, Informatica PowerCenter, Pentaho Data Integrator, Toad, Salesforce DL, Visual Studio, Team Foundation Server (TFS) Microsoft Test Manager (MTM), Git, Apache Subversion (SVN), Adobe Creative Suite (CS5 & CS6), System Center Configuration Manager (SCCM), SharePoint Central Admin, SharePoint Designer, SAP ECC & BI, ERP systems. (GFEBS,Stanfins, Business Objects, PeopleSoft).

EDUCATION & TRAINING:

- Master of Science in Computer Information Systems from University of Phoenix, completed Jan 2009
- Bachelor of Science in Information Technology from University of Phoenix, completed Aug 2007
- Certificate Program in Project Management Professional (PMP) Prep Certification
- Certificate Program in Project Management Institute Agile Certified Practitioner (PMI-ACP)
- Active Intern Top Secret Clearance
- Service-Disabled Veteran (US Army) Honorable Discharge

PROJECT MANAGER—COLLIN NOLAN

Qualifications and Experience Collin Nolan has 19 years of experience in the information technology industry. During that time, he has worked as a database designer, developer and administrator for various government agencies supporting environments based on Oracle, DB2 and SQL Server on both Unix and Windows platforms. In addition to working with database technologies, Mr. Nolan has designed and managed complex custom software applications that incorporate a variety of tools, such as Informatica, Cognos, ESRI ArcGIS, Websphere and Java. For the last five years Mr. Nolan has successfully leveraged his knowledge of information technology and software development to prvide technical and project management skills to various software projects. Mr. Nolan is ITIL certified and has taken extensive project management training. He is a trained scrum master in AGILE software development and has successfully led several software and system development projects as both a technical lead and project manager.

Education
- B.A. Environmental Studies, 1996
- M.S. Information and Telecommunications Systems, Johns Hopkins University, 2003

Clearance
- DoD Top Secret (Inactive)

Certifications
- CSM
- ITIL v3f
- Security +

Relevant Experience

Aetos llc — *2019–PRESENT*

Aetos LLC, Partner — **April 2019 – Present**

Project: VECMS – CARMA (VA) — **April 2019 – Present**

- Team Lead for Collaboration Contract at Defense Contract Management Agency (DCMA).
- COO management and tasks for Aetos working in conjunction with rest of partners and direction from CEO
- Business development
- Technical staff recruitment
- Creation and maintaining IT budgets

Argus Solutions — *2011–2019*

Project Manager. Mr. Nolan manages a team of IT professionals responsible for maintaining and improving a series of mission critical systems for the Defense Contract Management Agency (DCMA). This includes the creation and management of various processes and protocols that streamline the efforts of his team and the interactions between several other IT groups within the agency. One of Mr. Nolan's main tasks include managing the Integrated Master Schedule (IMS) that connects the efforts between the client and various other technical teams and tasks throughout the agency. This requires intimate understanding of which groups manages the different technology stacks that comprise the DCMA IT Enterprise.

He acted as Project Team Lead for the transition from Sharepoint 2010 to Sharepoint 2016 Enterprise. Responsibilities entailed creating the process from beginning to end that facilitate the interaction with stakeholders, as well as:

1

- Identification of requirements;
- creation of content migration process;
- design of agency Sharepoint site collection taxonomy;
- communication between various technical groups; and
- interfacing with client to update status.

He managed the effort of transitioning the agency from a file share document storage environment to a collaborative document management environment, facilitated by Sharepoint. This work entailed the identification and aggregation of the various types of documentation. It also required the creation of a standardized system for tagging and storing common documents. This work consisted of working with stakeholders from the various functional disciplines within DCMA to identify a standard metadata taxonomy for tagging documentation in an effort to efficiently store documents in a way that makes it easy to find, sort, manage, and share consistently across the agency.

Mr. Nolan worked as Project Manager for the SharePoint 2010 rollout to the Defense Contract Management Agency (DCMA) enterprise. Responsibilities entailed coordinating the efforts of multiple teams to include training, communications, development, legacy migration and support services. In addition, he was the Product Manager/Functional Analyst for the DCMA eTools enterprise wide suite of tools. Mr. Nolan managed the schedule and deliverables for development efforts for various projects by supporting the software development team throughout the entire software development life cycle. This work entailed organizing the communication between various vendors and government stakeholders, creating and managing schedules and applying Agile principles to the software development lifecycle.

Mr. Nolan was also the Subject Matter Expert/Developer, working with a team of developers designing and developing a prototype application in a COTS Business Process Management tool, called Appian. He served as expert on existing DCMA eTools suite of tools and data store. Mr. Nolan developed database objects for BPM tool to leverage in Oracle 11i environment.

Argus Solutions *2006–2010*

Technical Lead/Project Manager. Mr. Nolan was the Technical Team Lead for the code maintenance team in charge of developing, testing and deploying enhancements, bug fixes or code changes to the Electronic System for the Early Notification of Community-based Epidemics (ESSENCE) application. This included any changes to the database, ETL data migration scripts, reports, front end code as well as any system updates or security patches. Technology included DB2, Oracle, Informatica, Cognos, Java, ARCGIS, and Websphere. He designed and developed data migration mappings and reports for millions of military medical records daily to be used by military decision makers regarding epidemic response policy for the US armed forces.

He was also Technical Lead of the team of IT specialists that managed and maintained mission critical database driven systems built on Oracle 10g/11g and DB2 9.7. The main application was the Electronic System for the Early Notification of Community-based Epidemics (ESSENCE) project. This required monitoring the system on a daily basis, addressing any issues that arose, ensuring the security of the application and its data by maintaining an up to date STIG security posture as well as recent database backups, in addition to introducing any new code or enhancements requested by the client. A mission essential task was the management of the intake of millions of rows of data, collected from military medical treatment facilities around the world, on a

daily basis using the Informatica ETL tool, UNIX shell scripts, and cronjobs. Other tasks included ensuring backups and recovery, performance monitoring and tuning and maintaining upgrades and patch releases. Our team also worked closely with The DISA infrastructure group to maintain security accreditation through the application of STIG checklists as well as vendor specific security best practices.

Bearing Point *2004–2006*

DBA Team Lead. Mr. Nolan was the Team Lead for the DCMA eTools enterprise wide operational data store. The team was responsible for interfacing with functional team to determine data points for new development projects, modeling those data points into existing enterprise-wide data models, developing database objects to support the data model enhancements and supporting the software development team throughout the entire software development life cycle. This work often entailed designing the components to migrate disparate sources of data into the enterprise data store. Migration was handled with native PL/SQL scripts that accounted for the transformation of migration of data as needed by the end user.

Booz Allen Hamilton *1999–2004*

Oracle DBA/PLSQL. Mr. Nolan worked as an Oracle DBA/PLSQL Developer for the IRSS project, United States Air Force. He created and developed an Oracle 9i and 10g environment supporting the USAF development team working on a proprietary knowledge management tool. Mr. Nolan created and maintained approximately 15 development and production databases to support the IRSS development effort. He wrote PLSQL scripts to facilitate data filtering and loading within the IRSS application, as well as for reports that the application generated. He designed and maintained changes to the data model and wrote and tuned SQL used to query the databases that held millions of rows of various types of data for the USAF IRSS project resulting in results sets being returned in seconds as opposed to minutes.

As Senior Data Analyst for the U.S. Army, DIMHRS Integration project, Mr. Nolan supported the Army in integration of DIMHRS military health system. He managed the efforts of a team of six analysts that decomposed requirements to identify the data points needed to be captured by the DIMHRS system. He also mapped and modeled those data points into the enterprise-wide logical data model being created for the DIMHRS system. The results of this work allowed the DIMHRS team to move on to the next steps of creating an enterprise-wide physical data model for the integrated health system effort.

3

Christopher A Shilling

5500 Ashleigh Road. · Fairfax· VA · 22030 · 703.338.0098 · cshilling@aetosllc.com

PROFILE

Aetos LLC Partner and Chief Technology Officer with over 20 years of hands-on implementation and design enabling client and corporate initiatives by developing and delivering effective, lasting solutions.

CORE COMPETENCIES

Data Migration, Management, Integration & Design | Systems Engineering & Architecture | Cloud Migrations | Systems Integration | Network & System Security | Disaster Recovery Planning | Server Provisioning

TECHNICAL SKILLS

Salesforce Cloud	Information Power Center	Oracle OEM Cloud Control 13c	Oracle OBIEE 12c
Windows Server 2016	Oracle 12c Database	Toad	IBM IDA
Solaris 10, 11	Exchange Server	Symantec Pure Disk	Rational CM Tools
Linux Red Hat	MS SharePoint Server	HP Quality Center	NetApp
VMware vSphere	Quest Migration Manager	HP Quick Test Pro / Load Runner	SAN Fabric Design
Hyper-V Server 2012	Tableau Server 10	Pentaho Data Integrator	

EXPERIENCE

Aetos, LLC., San Antonio, TX — **May 2019 – present**

Chief Technology Officer and partner of Aetos LLC. Oversee all technical aspects of the company. Work with Executive Management to grow the company through the use of technological resources. Using an active and practical approach, direct all employees in IT and IO departments to attain the company's strategic goals established in the company's strategic plan.

Argus Solutions, LLC., Vienna, VA — **Dec 2007 – May 2019**

U.S. Department of Veterans Affairs – Office of Information Technology – VIEWS & VECMS Salesforce Data Migration Program Manager

Program manager and lead for multiple data migration project teams which to date has successfully migrated over 5 million object records, cases, contacts and attachments from the legacy correspondence application, VAIQ, to the VA Salesforce cloud environment. The migration was completed on schedule with 100% of records being validated and accounted for. The full data migration for the legacy White House Hotline application, ExecVA, was completed on schedule with 100% of records being successfully migration in alignment with the functionality rollout. Data migrations for GAO and the OGC's legacy application GCLAWS are also underway and estimated to add an additional 3 million records to the VA Salesforce environment. VECMS projects include the data migrations for the Office of Rural Health (ORH) and Caregiver Record Management Application (CARMA) to support the VA Mission Act extending care and services to Veterans.

U.S. Department of Veterans Affairs – Veterans Benefits Administration – Deputy O&M Project Manager

Deputy Operations and Maintenance manager for the Veterans Benefits Administration's Enterprise Data Warehouse (VBA EDW). The EDW consists of approximately 50 schemas (Transactional Snapshots and Star Schemas), 3,700 tables and 60,000 columns which are updated on a daily, weekly, and monthly basis as required to meet the business community requirements

- Managed a team of database administrators and architects
- Monitored and worked to resolve any issues related to the hundreds of daily EDW extracts and loads.
- Analyzed ETL runtime statistics to optimize performance.
- Developed complex ETL processes in UNIX shell scripts, Informatica PowerCenter and Oracle SQL to meet business requirements.
- Architect and implementer of the VBA PA&I Tableau Server Environment
- Designed and configured multi-node cluster for VBA to handle 1,000's of users
- Developed and executed multiple scenarios for performance testing and capacity planning using LoadRunner and Tabjolt tools
- Designed VBA EDW Source control plans and procedures using Rational CM Source Control.

U.S. Department of Commerce – Enterprise Architect

Lead architect for the Department of Commerce Active Directory and Email Consolidation initiative.

- Designed and implemented a single root Windows 2008 R2 Active Directory forest to accommodate over 5,000 users.
- Built systems according to DISA Security Technical Implementation Guides (STIG) to ensure system security.
- Designed an Exchange Server 2010 Enterprise email system to consolidate 9 DOC Bureaus into a single environment.
- Created business cases for consolidation to include true total cost of ownership and alternative analysis.

Mobile: 703.338.0098 · E-mail: cshilling@argus-vs.com

- Performed project management duties including creating processes to manage all technical artifacts and deliverables, create weekly status reports, perform regular senior management and CIO briefings, manage project and staff schedules.

ECS Limited, Inc., - Systems Architect

Senior Consultant for ECS Limited to engineer solutions that meet enterprise-wide initiatives.

Key Contributions

- Engineered and installed a central Enterprise Exchange Server messaging system, **consolidating 37 Exchange Servers into a single clustered environment** with EMC SAN back-end storage and load balanced front-end architecture. **Reduced license maintenance, administration and hardware costs by over 81%.**
- Implemented a centralized, enterprise-wide backup solution for 35 remote offices around the country, **backing up over 15 TB across the WAN.**
- Designed and installed an EMC SAN infrastructure with VMware ESXi to **consolidate the number of servers within the data center by over 60%.**
- Created new processes and mechanisms to support disaster recovery and continuity of operations initiatives by implementing SAN data replication, redundant failover sites and DR procedures for vital services.
- **Implemented Symantec Enterprise Vault solution** to archive enterprise-wide file systems and email.
- Assisted in the redesign and consolidation of an Enterprise Active directory schema for over 5,000 users and objects.

U.S. Department of Homeland Security - Customs & Border Protection - SBInet Program Project Engineer

Systems Engineering & Integration Project Engineer for the Department of Homeland Security / Customs and Border Protection Secure Border Initiative Program (SBInet).

Key Contributions

- **Oversaw all technical engineering designs and requirement deliverables** for the deployment of the "Virtual Fence" in Tucson, AZ.
- **Maintained the project schedule** for planning and design phases of over 20 resources in 4 teams.
- Led and mediated technical design meetings between engineering teams to include Active Directory design, network infrastructure, hardware and application development.
- Engineered and deployed a secure Microsoft Office SharePoint Server 2007 site to manage classified project data and document workflow.

TRIOH CONSULTING GROUP, INC., BETHESDA, MD — **January 2006 – December 2007**

DoD Military System, JMIS DT&E - Automated Test Manager

Established and led the automated testing team for The Joint Medical Information Systems Development Test & Evaluation office (JMIS DT&E).

Key Contributions:

- Established core foundation and framework for the JMIS DT&E automated testing effort.
- Applied the products; HP Mercury QuickTest Pro, Mercury Quality Center, BMC Black Box and McCabe IQ to create an integrated testing environment and process.
- **Developed automated regression testing scripts for AHLTA, the Department of Defense's $4 billion electronic health record system with over 5 million lines of source code**
- Authored and conducted training sessions for more than 50 testers and managers to the deployment and use of BMC Appsight. Published a custom website to provide additional support for Appsight users within JMIS DT&E.

DoD Military Health Systems, EI/DS - Technical Tester

Technical tester providing technical consulting and Independent Verification and Validation services for Military Health Systems Executive Information / Decision Support Program Office.

Key Contributions:

- **Conducted load / stress tests** on Military Health Systems (MHS) applications using Mercury LoadRunner to validate performance **up to 10,000 users.**
- Provided analysis and recommendations for client systems to improve performance, availability and reduce total cost of ownership.
- Managed MHS EI/DS Quality Center projects and assisted in the development of processes and design.

BEARINGPOINT INC., SPRINGFIELD, VIRGINIA — **March 2005 – January 2006**

Defense Contract Management Agency - System Engineer / Integrator

Sr. Consultant for the Defense Contract Management Agency (DCMA). Worked closely with database and application teams to support tasks and system related needs. Supported and maintained client servers in a development environment and frequently configured and introduced new servers and systems.

Mobile: 703.338.0098 · E-mail: cshilling@argus-inc.com

Key Contributions:

- Installed and supported Cognos Business Intelligence applications.
- Developed PL/SQL code to interact with backend database as determined by business processes.
- Built a Linux RedHat server provisioning environment using Cassatt Collage for client pilot project.

BOOZ ALLEN HAMILTON INC., MCLEAN, VIRGINIA 1999 – 2005

System Engineer / Administrator

Consultant for the Defense Systems Team clients serving clients throughout The Department of Defense. Administered over 150 production and development servers in a mixed platform environment, managed resources and access policies for over 200 users. Responsible for performing regular backups and system maintenance. Maintained network infrastructure and access policies on Cisco PIX firewalls, provided technical specifications of hardware and software to meet client requirements and ensured appropriate security measures were in place to protect information and assets.

Key Contributions:

- Designed Active Directory domain to manage resources for over 200 users and objects. Created and maintain access policies for users and systems.
- Configured and maintained Oracle databases in UNIX and Windows environments.
- Assisted the United States Army Corps of Engineers achieve DITSCAP accreditation for their Deployable Tactical Operation System (DTOS) by implementing security policies and installing perimeter devices to protect satellite communications.
- Contributed to the disaster relief effort in Alabama and Florida from the four hurricanes in the summer of 2004 by operating and supporting satellite communications for the US Army Corps of Engineers' DTOS.
- Developed and implemented a secure systems architect to provide high-level encryption for communications using PKI and IPSec to ensure confidentiality of sensitive data for an application used for Base Realignment and Closures (BRAC)

EDUCATION & CREDENTIALS

Bachelor of Science Degree in Information Technology Engineering
GEORGE MASON UNIVERSITY– Fairfax, Virginia
Professional Training and Certifications
Certified Tableau Server Administrator v10
CISSP - Certified Information Systems Security Professional
Security Clearance
Department of Veterans Affairs - MBI

Mobile: 703 338.0088 · E-mail: cshilling@argus-va.com

BRIDGET BATTAGLINI

EMAIL: bbattaglini@aetosllc.com PHONE: [redacted]

AREAS OF EXPERTISE

Project Management and Team Leadership
System Implementation and Integration
Technical Writing and Documentation
Advanced Technical Skills in Microsoft Project and Office Suite

- ***Project Management Professional (PMP) Certification***
- ***Professional Website: www.bridgetbattaglini.com***

EDUCATION & CERTIFICATIONS

Indiana University of Pennsylvania, Indiana, Pennsylvania
Bachelor of Science in Education

University of Maryland, Baltimore, Maryland
Post Bachelor in Adult Education and Instructional Design, 2000 – 2003

BPMInstitute
Business Process Management Certification

Broadsword Solutions Corporation
Agile Scrum Workshop, 2020
Scrum Master Certification
Coursework in Agile Capability Maturity Model Integration (CMMI), 2019

- ***Member of the Project Management Institute (PMI), DC Chapter of PMI and the Scrum Alliance***

PROFESSIONAL EXPERIENCE

Aetos LLC, IT Project Lead
December 2019 – Present

- Coordinate project deliverables, schedule and day-to-day operations.
- Utilize excellent organizational, communication and detail skills.
- Create and analyze project reports and make schedule updates as required.
- Utilize my Project Management Professional (PMP) certification to complete project planning, execution, monitoring and control and closing.
- Plan and lead meetings, training and system demonstrations.
- Provide subject matter expertise in Agile Scrum project management and development.
- Provide subject matter expertise to the Agile Capability Maturity Model Integration (CMMI) initiative.
- Assist in business development initiatives and during the contracting bid and proposal process.
- Provide consulting services and recommendations to support process improvement.

DELTA Resources, Senior Business and Technical Analyst; Project Manager
May 2007 – December 2019

Supported the Defense Information System Agency (DISA) Development and Business Center Directorate

- Held a Secret security clearance with the Department of Defense.
- Provided direct and remote support to the Defense Information System Agency (DISA) Development and Business Center Directorate. Focused on work within the program office for acquisitions and program management.
- Coordinated project deliverables and requirements with contractor and government stakeholders.

BRIDGET BATTAGLINI

EMAIL: bbattaglini@aetosllc.com PHONE: [redacted]

- Led development and implementation of a Government off-the-shelf (GOTS) project controls software product.
- Designed and utilized SharePoint sites to organize and centrally collect and store project and system information.
- Built rapport with stakeholders to elicit, analyze and validate requirements and business processes.
- Subject matter expertise evolved over time and it was applied to the system which supported acquisition, program management and DoD Financial Management processes.
- Researched, prepared and edited complex technical documents.
- Created and tracked a Microsoft Project schedule for information system development.

Supported the Army Environmental Information Technology Management (EITM) Program System certification.

- System certification and accreditation support.
- Led the Risk Management Framework (RMF) certification and accreditation processes for the system.

DELTA Resources, Inc.

- Provided subject matter expertise to the Agile Capability Maturity Model Integration (CMMI) initiative to reach Maturity Level 3.
- Served as the Program Manager, Process Implementation Lead and Special Interest Group (SIG) Lead.
- Assisted in business development initiatives and during the contracting bid and proposal process.

Milestone Group an Anteon Corporation, Business Analyst and Project Lead
March 2003 – May 2007

Supported the Defense Information System Agency (DISA) Development and Business Center

- Provided direct and remote support to the Defense Information System Agency (DISA) Development and Business Center Directorate. Focused on work within the program office for acquisitions and program management.
- Designed and utilized SharePoint sites to organize and centrally collect and store project and system information.
- Coordinated project deliverables and requirements with contractor and government stakeholders.
- Researched, prepared and edited complex technical documents.
- Created and tracked a Microsoft Project schedule for information system development.

ADDITIONAL EXPERIENCE

University of Maryland, Lead Training and Instructional Design Coordinator

- Managed Special IT Projects within the Division of Administrative Affairs and the Office of Information Technology. Set up and managed a training center for staff. Created, deployed and maintained courseware storyboards, instructor-led and online learning experiences.
- **Office of National Drug Control Policy, Training Manager**
- Set up and managed a training center for law enforcement and treatment personnel. Created instructional materials for 2 proprietary systems and Microsoft Office products. Deliver training to diverse audiences.

State of Maryland Department of Education, Content Coordinator

- Collaborated with subject matter experts (SME) across the organization to develop documentation and learning experiences. Developed and published web content. Analyzed business processes; identified opportunities for improvement. Developed detailed work plans, schedules, project estimates, resource plans and status reports.

AETOS

Candidate
Scott Battaglini

Summary of Experience

Aetos Partner and Chief Information Officer with over 25 years of systems development and maintenance experience, to include end to end BI Solutions, ETL development, systems analysis, problem solving and database administration to include upgrades, tuning, and backup/recovery.

U.S. Citizen

- *6+ years JasperSoft Reports and Server*
- *12+ years Informatica Products*
- *15+ years Data Mart & Data Warehouse*
- *17+ years System Infrastructure & Integration*
- *20+ years Data Modeling & Design*
- *9+ years SalesForce & Integration*
- *22+ years RDBMS (Oracle, MSSQL, DB2)*
- *7 years Business Objects*
- *7 years Cognos Reports*
- *25+ years leading teams.*
- *17 years backup and recovery*
- *25+ years meeting deadlines/schedules, problem solving, and deploying/maintaining solutions.*
- *25+ years testing, training and documentation*
- *5+ years DOD STIG and DIACAP process*

Experience

Aetos LLC — ***April 2019 – Present***

Project: VECMS - United States Department of Veterans Affairs — ***April 2019 – Present***

- ***Role: Data Architect***
- *Data architect and deputy lead for multiple data migration project teams which to date has successfully migrated over 5 million object records, cases, contacts and attachments from the legacy correspondence application, VAIQ, to the VA Salesforce cloud environment.*
- *VECMS projects include the data migrations for the Office of Rural Health (ORH) and Caregiver Record Management Application (CARMA) to support the VA Mission Act extending care and services to Veterans.*

Argus Solutions, LLC — ***October 2010 – May 2019***

Project: United States Department of Veterans Affairs — ***February 2018 – May 2019***
VIEWS & VECMS Salesforce Data Migration
Role: Data Architect / Lead ETL

- ***Role: Data Architect***
- *The migration was completed on schedule with 100% of records being validated and accounted for.*
- *The full data migration for the legacy White House Hotline application, ExecVA, was completed on schedule with 100% of records being successfully migration in alignment with the functionality rollout.*
- *Data migrations for GAO and the OGC's legacy application GCLAWS are also underway and estimated to add an additional 3 million records to the VA Salesforce environment.*

Project: Energy Information Administration (EIA) — ***April 2012 – January 2018***
Role: Team Lead

- *Team Lead for Modernization Development effort for surveys.*
- *Team Lead for EIA-930 Public Beta development and deployment.*
- *Infrastructure & Systems engineer on team for Modernization design & deployment.*
- *Data Architecture and Integration team member for Modernization system for the three authoritative databases (Transactional, Warehouse, & Reporting).*
- *Performed capacity planning for the Modernization databases from initial load from sources, as well as growth over time from continuous feed processes.*
- *Informatica PowerCenter Developer for variety of data integration projects for various energy surveys*
- *JasperSoft Report Developer for variety of business intelligence projects for various energy surveys*

AETOS

- *Informatica Data Exchange for EIA-930.*
- *Assisted in ATO efforts for the Energy Survey Platform (ESP) which included interview sessions, mitigations for POAM's, and port configurations.*
- *Installation and configuration of the ESP for JasperSoft, BitVise, and Informatica products.*

Project: DHSS (rollover from Matrix Solutions) ***October 2010 – 2012***
Role: Developer

- *Informatica Developer for variety of ad-hoc data request tasking's from clinical research teams that due to data volumes or complexity were outside of the BI tool-set for end-users. Gathered requirements, designed solution, created mappings/workflows, deployed solution to production. Developed Data-Request Template after seeing number of requests increasing and becoming an ongoing effort and also was able to design Informatica code for re-usability thus reducing the overall time to production by several hours to several days.*
- *Designed and developed the Informatica PowerCenter portion for an Auditing solution for the Reporting tool (BOXI) that captured the actual SQL Query used by end-users for their ad-hoc reports. The mapping and workflows sourced to two separate Oracle Databases based on certain conditions and loaded data into central auditing repository.*
- *Using Informatica PowerCenter and specifically the Transaction Control transformation created a solution that was required for the end of life of DHSS product that created a target text files for National Archives and Records Administration (NARA). The solution when completed read over 500,000 records from a several joined Oracle tables and outputted over 19,000 text files in less than 2 minutes per execution.*
- *Daily responsible for the maintaining and monitoring two production and 3 development/test Informatica PowerCenter environments, this consisted of moving code through the Software Development LifeCycle, backup/recovery of repository/domain databases, applying upgrades/HotFixes, and providing proper security privileges on objects for team members either via native or LDAP authentication configured access.*
- *Team lead for migration of the CDM application and database from one DISA-DECC to another. The migration entailed moving 500 GB database, changing from HP-UX Unix OS to AIX Unix OS and upgrading Informatica PowerCenter from v6.2 to 8.6.1 this was all done over a period of time that required keeping data synchronized in two locations with final cutover occurring successfully over a 1 weekend with zero down-time realized by end-users and zero data loss.*
- *Provided Oracle Relational Database Management Support (RDBMS) support for the CDM product for DHSS that involves tuning for performance, stability, and quarterly Critical Patch Updates (CPU) for security with no unscheduled downtime being directly caused by the database. Performed testing for Oracle upgrades and CDM application bug fixes following the DHSS CM process and mitigated STIG findings during the development or test cycle. Environment contained 3 instances in production and 4 instances in Dev/Test, production database was over 3 TB.*
- *For the CDM product was deeply involved in the Authorization to Operate (ATO) effort and renewal effort. Included running and mitigating database (Oracle) Security Readiness Review (SRR) scripts/checklists and application checklists, and providing technical assistance in mitigating Operating System (OS) open findings. In completing this effort, the CDM applications support team was able to meet tasked deadlines for an aggressive ATO schedule and not slip on standard daily/weekly/monthly tasks.*
- *Has in-depth knowledge of commercial off-the-shelf (COTS) applications (Oracle & PowerCenter), database design, and ETL processes from the Clinical Data Repository (CDR) extract, Feed Node process from Defense Information Systems Agency (DISA) Enterprise Computing Center (DECC) to DECC, and load into CDM while working with a variety of vendors/teams on different contracts, DISA, and Information Assurance (IA)/Security.*
- *For ESSENCE, DMHRSi, and CDM, developed a process to change non-Category Assignments List (CAL) compliant ports within the Informatica PowerCenter and the configuration for usage of Lightweight Directory Access Protocol (LDAP) for authentication purposes to close a Category I finding for passwords. This effort leveraged knowledge and skill sets across multiple DHSS products and shortened the overall effort required to complete successfully.*

AETOS

- *For the CDM product for DHSS through maintenance tasks such as extract log pruning, COTS applications upgrades, and configuration and tuning, presented statistics showing that the current Extract, Transformation, and Load (ETL) cycle could be performed within a 24-hour window from a 44 hour window.*

Matrix Solutions **February 2005 – October 2010**
Project: Department of Defense Military Health System
Role: Senior Systems Analyst

- Technical lead for a DoD initiative for analysis, development of specifications, creation of reporting data marts and reporting applications, data models, creation of test plans and test packages, programming of reports and systems, and implementing products.
- Developed multiple reporting packages for metric-based Web sites using the Cognos suite of software products and ad-hoc reporting system using Business Objects, Oracle RDBMS, and Informatica PowerCenter
- Managed multiple development teams and projects to complete database and reporting applications.
- Managed and supported SQL Server 2005 database and Reporting Services for Crisis Response System.
- Training of staff on administrator and user functions of reporting packages.

Micros Systems **November 1996 – February 2005**
Project: Commercial Systems
Role: Technical Lead

- Technical lead and product expert in various database/software installations for IHG, Four Seasons Hotels, Starwoods Hotels, and variety of independent hotels throughout the Americas, Europe, and Asia-Pacific regions.
- Team lead on a variety of database import/migration/export projects, custom reports, and deployment implementations.
- Developed sales tools, support models, and plans to sell services and products across corporate departments.
- Served as senior business analyst to kickoff various enterprise implementations, training programs, and maintenance programs.
- Created documentation and Web-based training material to support implementations.
- Served on Tier III+ Escalation Team for help desk issues, such as Oracle database recovery, tuning, complex product issues.

Education, Training and Certifications

Education: Indiana University of Pennsylvania, Bachelor of Science in Business Management

Professional Training and Certifications:

- Informatica PowerCenter Developer
- ITIL v3
- PowerCenter Administrator
- Oracle DBA Advanced, Oracle OBIEE

Security Clearance: Public Trust MBI currently from the United States Department of Veterans Affairs.

Page 3 of 3

Jacob Heidtman
Creative Designer
www.jacobheidtman.com
jheidtman@aetosllc.com

Skills

UI
Visual Design
Prototyping
Design Language Systems
Responsive Design
Custom Illustration
HTML/CSS

UX
Interaction Design
User Flows
Wireframes
Usability Testing
UX Research
Human Centered Design

Programs
Adobe CC
Sketch
InVision/Studio
Axure
Asana

Experience

Aetos LLC
Lead Designer
May 2019 – Present

- Facilitate meeting with clients to evolve customer ideas into sketches/wireframes.
- Lead efforts creating brand identities as well as brand redesigns
- Employ human centered design methodologies i.e. user research, competitive analysis, prototyping and user testing.
- Collaborate with development team to implement code and updates to design.

Bestica
UX/UI Freelance Designer
March 2019 – May 2019

- Refreshed brand identity with updated logo and brand colors.
- Created wireframes for buy in with leadership, mockups based on different color schemes.
- InVision prototype created in Sketch.
- Collaboration and implementation with development team to get site into production.

USAA
Creative Designer I – UI/UX
July 2016 – March 2019

- Designed, tested, and implemented storefront web pages for real estate, investments, and bank digital teams under the Chief Design Office (CDO - which acts as USAA's authority on digital brand standards).

- Promoted to role on a team of 6 peers within Chief Design Office that focused on created end to end experiences for prospective members and suspect members to join USAA.
  - Daily team level collaboration/workshopping/critique
  - Competitive analysis
  - Formative user testing
  - Requirements sprints with stakeholders
  - Affinity mapping (user utterances)
  - Insight writing to provoke decision makers to think differently
  - Prototyping with InVision, Sketch and Axure
  - concept testing

- Modeling and implementation with development teams.

SaveUp
Lead Designer – UI/UX
January 2016 – May 2016

• Designed mockups, prototypes, aided in development of digital models of website and SaveUp app.
• Worked in tandem with offshore dev team in Guadalajara. GitHub repository used for collaboration between design and development teams.

AbbVie
Graphic Design Specialist – Short Term Contract
October 2015 – November 2015

• Aided in creation of marketing collateral for new talent acquisition team.
• Print design for Veterans Days "Refer a Veteran" Campaign
- Postcards,
- Table-tents. These designs were later translated to web banners, video screens, pop-up banners and email templates.

Internal to HR Dept. - Designed November e-blast in Avature. Sharepoint internal site support for AbbVie Way Ambassadors, web page layout for AbbVie Culture Community along with banners and icons.

USAA
Creative Designer I (Contractor) - UI/UX
May 2013 – January 2015

• Managed relationship with Experience Design partners for dynamic marketing on the USAA storefront.
• Contributed to efforts such as the Veterans Day, 'How Do You Picture a Hero', and 2013 and 2014 Report to Members Digital Experiences.
• Later focused on advice, insurance and bank digital storefront pages where I lead some projects including the USAA Travel Hub and Real Estate Hub, both taking place during a brand design re-fresh, where USAA digital design was moving from Legacy standards to New Brand standards and patterns.

Dazed INC.
Graphics/Web Designer
September 2011 – February 2013

• Produced print and digital ads for publication in San Antonio's, The Current Magazine.
• Collaboration with Boss Creative for creation of www.lazydazeco.com, (e-commerce site launched in early 2011).
• Acted as in-house photographer created digital assets from company inventory to be used in print, marketing and advertising.
• Responsible for creating franchise marketing and collateral.

U.S.C.G
Firemen E-3
July 2008 – August 2010

• E3 Fireman for USCG Station South Padre Island. Crewmember qualified on SPC-LE and UTB.
• Qualified Marksman and Sharpshooter. Honorably discharged in 2010 to pursue college education.

Education

Bachelor of Fine Art in Web Design and Interactive Media
The Art Institute of Houston at San Antonio
May 2011 - January 2013

Carlos Navarro

Full Stack Web Developer

ADDRESS [redacted]

PHONE [redacted]

EMAIL

Profile

I'm an enthusiastic software developer with leadership skills looking for creative ways to solve real-world issues. With a track record of successful launches, such as Whataburger Web-based Online Order System, IBC Bank Customer Portal, and Military Applications, I'm eager to join a company that is looking to transition to a new platform or enhance their day to day applications.

As a Full Stack Web developer, I have extensive experience in Angular 2+, Node, React, .Net, C#, Vue, and Databases including MongoDB, MySQL, and MSSQL.

Employment History

Jun 2019 — Present
SAN ANTONIO, TX

Lead Software Engineer
Aetos LLC

- React, Angular 8, Node, Express.js, Gatsby, Redux, Hooks.
- .NET Core, Apache Kafka, Jenkins CI/CD
- Material UI, Semantic UI, Bootstraps

Jun 2018 — Feb 2020

Web Developer
Whataburger

- Angular 5 Developer
- React & Node Application
- Gatsby.js & Netlify CMS
- Ruby on Rails
- Developing new components to improve user experience and performance
- .Net Core API C# for Identity Server Development and API
- Developing new features to enhance administration workflow while maintaining security requirements

2014 — Jun 2018

Software Developer
USA ARMY

Migrate legacy application from:

- Classic ASP to ASP.NET MVC4 using Entity Framework
- ASP.NET MVC 4 using Entity Framework with Telerik Controls
- Maintained web services communication using SOAP.
- Migrated (as needed) to Rest Web Services using MVC 4.0
- Integrate Telerik Kendo UI Controls

- VB6 WinForms to Windows Presentation Foundation (WPF)
- Maintain classic asp core applications
- Create, Update MSSQL 2012 Stored Procedures, Triggers as needed.
- Integrate authentication
- Integrated session based authentication-using GROAT (SessionFarm).
- Monitor requests to maintain performance and security.
- Test automation - (Microsoft Unit Tests | Coded UI Tests)
- Automated deployment and TFS integration

2013 — 2016

Adjunct Instructor
Sanford-Brown College San Antonio

Nov 2012 — Jul 2014

Software Developer
InfoTouch Corp

Lead Developer

- Vue, Laravel, MySQL, PostgreSQL, Nuxt
- Create Custom Modules for Touch Application using C#.
- Develop Web Services for online shopping cart using ASP.NET and Shopify API.
- Extend online customer registration portal (ASP.NET MVC 4) Web Services.
- Extend existing code in C and VB6
- Design MSSQL Database Schema.
- Develop T-SQL Scripts for data transfer between systems.
- Integrate Credit Card Transactions
- Authentication Security Integration

Jun 2010 — Dec 2012

Computer Programmer and Systems Analyst
LonestarBadge&Sign INC

- Develop PHP, PERL Web pages.
- Improve intranet site using JQuery, PHP, and PERL.
- Administer sites through CPANEL.
- Administer MySQL Database backups and restore.
- Design automated CRON jobs using (Bash, Perl).
- Improved network infrastructure.
- Redesigned Companywide Firewall, Proxy, and failover Dual WAN Router.
- Design graphics using Adobe Products.
- Migrated physical servers to VMWARE ESXi running RAID

Education

Nov 2006 – Nov 2010 — Texas State University-San Marcos
BA

Skills

React.js	SASS/SCSS
Angular	C++
Node.js	C#
Express.js	C# .NET
Vue	ASP.NET
Laravel	ASP.NET Core
Redux	ASP.NET MVC
Hooks	MongoDB
Next.js	MySQL
Gatsby.js	PostgreSQL
Ruby on Rails	Firebase
Python	AWS
PHP	Docker
TypeScript	Git
jQuery	Web Service
JavaScript	System Analysis
HTML & CSS	Troubleshooting
Bootstrap	Microsoft SQL Server

Licenses & Certifications

Feb 2015 – Present — Security Plus SY0-401
COMPTIA

May 2015 – Present — ITIL Foundation
EXIN

Dec 2014 – Present — MS: Programming in HTML5 with JavaScript and CSS3 Specialist
MICROSOFT

Dec 2014 – Present — MCPS: Microsoft Certified Professional
MICROSOFT

AETOS

Candidate

Jacob Nguyen

Summary of Experience

Jacob is a talented, self-motived professional with an immense understanding of database and business intelligence technologies and principles. His capabilities cover the full spectrum from advanced SQL skills, optimal data design, complex ETL development to BI report development and analytics. He is always eager to enhance his knowledge and expertise through self-taught and formal training. There has never been a challenge Jacob has turned away from or has not been able overcome.

U.S. Citizen

- CRM: Salesforce Certified Administrator, Salesforce Certified Data Architect
- Business Intelligence Tools: OBIEE 12c
- ETL: Oracle Warehouse Builder (OWB), Informatica Power Center, Talend Open Studio, Pentaho DI, MuleSoft Anypoint, TOAD
- Software: MS Project, MSOffice Suite, MS Visio.
- Languages: SQL, PL/SQL, HTML
- Functional Skills: Systems Development Life Cycle (SDLC), Software Architecture, Object Oriented Programming/Design (OOP/OOD)
- Database: Oracle 12c, MSSQL

Experience

Aetos, LLC **August 2020 – Present**
Project: Department of Veterans Affairs – VECMS Salesforce Data Migration
Role: Data Developer

- ETL Developer and Data Analyst for multiple VECMS data migrations for legacy VA applications to the VA Salesforce cloud.
- Developed custom data validation scripts to validate migration completeness and accuracy.
- Responsible for successful data ingestion, cleansing, transformation, loading from legacy systems/sources to Salesforce.
- Developed workflows and transformations in MuleSoft Anypoint as a proof of concept for a large-scale data migration.
- Setting up data migration, transformation, and validation environments
- Development of a Data Migration plan per project which must include a mapping between the source data to the destination objects/fields and detail all data transformations required.

Argus Solutions, LLC **2014 – Present**
Project: United States Department of Veterans Affairs – Office of Information Technology – VECMS Salesforce Data Migration
Role: ETL and OBIEE Developer / QA Analyst

- ETL Developer and Data Analyst for multiple VECMS and VIEWS data migrations for legacy VA applications to the VA Salesforce cloud.
- **VIEWS**
  - Case and Correspondence Management CCM
  - White House Hotline
  - GCMatters – legal case management for the Office of General Council
- **VECMS**
  - ORH NOMAD – Office or Rural Health
  - CARMA – Caregiver Record Management Application
  - IEWeb - National Center for Ethics in Health Care (NCEHC)

Page 1 of 3

AETOS

Academic Detailing 2.0
MPI-E - Veteran Master Person Index
CARMA - Regulatory

- Developed custom data validation scripts to validate migration completeness and accuracy.
- Responsible for successful data ingestion, cleansing, transformation, loading from legacy systems/sources to Salesforce.
- Developed workflows and transformations in MuleSoft Anypoint as a proof of concept for a large-scale data migration.
- Setting up data migration, transformation, and validation environments.
- Development of a Data Migration plan per project which must include a mapping between the source data to the destination objects/fields and detail all data transformations required.
- Support numerous connections including but not limited to Salesforce, other Cloud technologies as well as files, File Transfer Protocol (FTP), Open Database Connectivity (ODBC), web services, Microsoft Office products, standard databases, and data warehouse connectors.
- Cross-functional developer for the Veterans Benefits Administration's Enterprise Data Warehouse (VBA EDW) Business Intelligence (BI) team under the Office of Performance, Analysis, & Integrity (PA&I) – Data & Information Services (D&IS).
- Developed complex, high-volume, ETL workflows in Informatica Power Center within a large data warehouse environment.
- Developed metadata repository using OBIEE Administration tool in Physical, Business Model and Mapping, and Presentation Layer.
- Designed and developed various Interactive Dashboards and reports with drilldowns, guided navigation, filters, and prompts.
- Created new logical columns, dimensional hierarchy, calculated measures, and aggregate mappings in the BMM layer as per the business requirements.
- Developed Sessions, Workflows, Mappings, Mapplets using various available transformations in Informatica, including Router, Aggregator, and Lookup.
- Created mapping documents to outline data flow from sources to targets.
- Modified existing mappings for enhancements of new business requirements.

Appsential, LLC **2012 – 2013**
Role: Junior ETL Developer

- Ensured accuracy & integrity of data & applications through analysis, coding, writing clear documentation & problem resolution.
- Performed regression testing for system change requests and updates in Development and QA environments.
- Created and modified test scripts by analyzing & translating functional specifications & change requests into technical solutions.
- Developed, tested & implemented program logic.

Global Transportation Systems **October 2010 – October 2012**
Role: Intern

- Assisted Staff in day to day operations.
- Transferred data from Excel workbooks into Access Databases.
- Performed research and gathered requirements for new system implementation.
- Created PowerPoint presentations for potential clients.

Washington Capital Lending **2003 – 2008**

AETOS

Role: Loan Processor

- Worked with loan officer to determine client needs.
- Maintained consistent communication with loan officer, borrower, escrow and realtor.
- Retrieved outstanding loan conditions; reviewed and submitted promptly to underwriting department.
- Upon final approval, drew loan documents and submitted them to proper escrow company to ensure closing deadlines were met.

Education, Training and Clearance Information

Education: James Madison University, Bachelor of BA in Computer Information Systems

- **Security Clearance:** Public Trust MBI currently from United States Department of Veterans Affairs.
- **Language:** Fluent in Vietnamese

AETOS

Candidate

Helen Tulu

Summary of Experience

Senior level consultant with experience in Mule ESB, Mule connectors including: JDBC, HTTP, HTTPS, FTP, FILE, SFTP, JMS, Salesforce and SAP. Experienced in all phases of API lifecycle including: API Specification (design -first approach) using RAML in Design Center that are used as foundation for API-Led Connectivity. Excellent analytical and programming, written and verbal communication to work with individuals at all levels. Experienced in designing, developing, and deploying complex applications. Expert knowledge of full project life cycles, Extensive knowledge of Agile, Waterfall, XP, Lean, Scrum, SDLC, test driven development and other Project Management methodologies. Equipped with strong technical, multi-tasking, problem-solving, and interpersonal skills. Adapt quickly to new and emerging technologies.

U.S. Citizen

- Mule: AnyPoint Studio, Mule 3.x, 4.x, RAML, Dataweave, CloudHub
- Frameworks: JSP, Spring and Hibernate
- Databases: Oracle, Mongo DB, MySQL, IBM DB2, MS SQL Server.
- IDE: Eclipse, Net Beans, Any-Point Studio.
- Programming Languages: Java, MEL, Python, PL/SQL, SQLC++
- Version Control Tools: CVS, Git Hub, SVN, Bitbucket
- XML Technologies: XML, DTD, XSD, XSLT, XPAH, JAXP, JAXB
- Web Services & APIs: API, SOAP - API, JSON, HTTP, XML, REST, JERSEY, WS-Security.
- Build Tools: Ant, Maven, and Jenkins Office Applications: Word, Excel, Access, PowerPoint, Visio, OneNote, Project.
- Operating Systems – Windows XP/7/8, Linux, Ubuntu, Mac

Experience

CIGNA, Senior Mulesoft Developer **April 2020 – Present**

- Participate in requirement gathering, design discussions and sprint planning.
- Create an Integration Component with third party application using Mule ESB.
- Create Maven Archetypes for generating fully functional REST web service supporting both XML and JSON Message transformation.
- Create SOAP and REST web services in Mule, Consumption of REST and SOAP web services for downstream systems.
- Configure Mule service flows with various exception handling strategies such as Global Exception, Custom Exception and Choice Exception Strategies that notifies the user with custom and simple error descriptions.
- Coordinate with testing, back-end teams and the client during the smoke tests and aggression tests at Sprint.
- Implement interfaces between SAP, Salesforce and REST web-services.
- Configure Mule ESB projects for the services with synchronous and asynchronous Mule flows.
- Used Mule ESB connectors- SFDC, Message Transformer, Choice Exception Strategies, Batch processing, etc. in designing the application as a middleware between the third-party system and the customer side system.
- Create MUnit test cases to validate the Mule flows.
- Coordinate with program managers to explain what tasks were possible for the system to achieve their desired output.
- Design and implement exception handling, logging, JSON Schema Validation as common reusable components across multiple message flows.
- Participate in 24X7 production support effort after application go-live.

AETOS

Kroger, Mulesoft Developer **May 2017 – March 2020**

- Participated in Agile – Sprint methodologies to do requirements gathering, analysis and planning.
- Performed Low & High-Level application design documents by Sequence Diagrams, Class Diagrams using Microsoft Visio tool.
- Created mule flows, subflow and transformation logic using Dataweave and configure MULE configurations files.
- Implemented data transformation using XPATH, XSLT, Dataweave, custom java classes.
- Used Mule components that include File, SMTP, FTP, SFTP, JDBC Connector and Transaction Manager.
- Used Database Connector to connect with MySQL and Oracle using Mule ESB.
- Used ActiveMQ for messaging service in the applications.
- Coded SQL, PL/SQL for backend processing and retrieval logic.
- Used MEL (Mule Expression Language), an expression language that provides a consistent, standardized way to work with a Mule message's payload, and properties.
- Leveraged different components of AnyPoint platform, Runtime Manger, Exchange, Design Center and API Manager.
- Coded, performed Unit, Functional and Regression Testing of the systems.
- Created contract document using RAML and Swagger.
- Worked on bug fixing and Production Support.

Iberia Bank, IBM WebSphere Developer **September 2015 – April 2017**

- Created message flows and Message sets for handling Copy book messages.
- Designed and developed Integration solutions based on IBM Message Broker and MQ technologies.
- Used spring core for object wiring, spring restful and Spring MVC, implemented resource classes, business classes, marshaling and un-marshaling and highly involved in restful web service development.
- Participated in business meeting and responsible for the design and delivery of technical design documents.
- Designed and developed Web services using SOAP and HTTP Nodes
- Performed end-to-end testing, resolved problems and validated the test results.
- Implemented API in DataPower using XSLT, configured XML firewall and multiprotocol gateway.
- Implemented Transaction logging for Message broker flows.
- Analyzed existing Message flow applications and suggested performance improvements
- Participated in the capacity planning and setup of MQ and Message Broker infrastructure.
- Participated in the administration of MQ and Message Broker and on- call Support.
- Created Message Broker applications using Java Compute Node (JCN).
- Used hibernate 2.0 to map Java object to database record and vice versa..

People's United Financial, Java Developer **April 2012 – August 2015**

- Analyzed business/technical requirements and design/develop/execute test plans/test cases to support the platform software development.
- Participated in designing phase and create Sequence diagrams, State Diagrams, Class Diagrams.
- Created presentation Layer using MVC Struts Framework and also used Tiles Layout for View Transactions and User Activity Monitoring module.
- Used Spring Framework for Dependency Injection and integrated Spring with Struts.
- Created UI components using JSP/JSF, HTML, CSS.
- Used Log4J for logging the user actions and exceptions to find out causes of system malfunctioning and keep user action logs.
- Leveraged ORM framework, Hibernate/JPA for Object/Relational Mapping purposes for transparent persistence onto the Oracle 10g database for fetching transactions and User Search Module.
- Created Remote interfaces using web services for accessing the services third party applications using JAX-WS.

- Created Shell scripts for various Batch functionalities and automation purpose.
- Automated build and deployment process using Maven, Jenkins, Git and Nexus.
- Managed deployment plans, tracked test results from DEV to Pre-Prod to Production.

Education, Certification and Clearance Information

Education: Bachelor's in Applied Science

- **Certifications:** MuleSoft Certified Developer Version 4

Aaron D. Salinas

[redacted]

Education

Baylor University, Waco, TX — *Dec. 2016*
Bachelor of Science in Computer Science
w/ Software Engineering Concentration

Experience

United States Automobile Association (USAA) — San Antonio, TX
Data Engineer I — *Aug. 2020 - Current*

- Designed and implemented data-pipeline to migrate on-prem enterprise data warehouses and relational databases to the cloud in Snowflake using Data Building Tool (DBT) and DataStage connectors.
- Led efforts in upgrading enterprise-wide IBM DataStage projects from 11.5 to 11.7 and updated DataStage frameworks to utilize Git for code management, UCD for code deployment, and GitLab CICD pipelines for automated testing, validation, and evidencing.
- Integrated Jira, qTest and GitLab CICD to perform automated test execution and evidencing via CICD pipelines.

Software Developer & Integrator II — *Dec. 2018 - Aug. 2020*

- Implemented DataStage batch jobs to perform source preps from a variety of data sources such as CSV, delimited flat files, databases, JSON, data sets, etc.
- Implemented DataStage batch jobs to perform column and value transformations on data sets based upon business needs and specifications.
- Implemented DataStage batch jobs to perform data loads to a variety of target systems such as Netezza, IBM DB2, data warehouses, API endpoints, Hadoop, flat files, FTP, etc.
- Designed and implemented batch to near-real time data-migration infrastructure to send DataStage DataSet object data to JSON accepting API endpoints utilising Java, IBM DataStage API framework and CyberArk.
- Streamlined data movement efforts to vendors via B2B by enhancing outdated infrastructure and dead code in Java APIs and DataStage ETL jobs.
- Performed operations, maintenance and monitoring on production ETL-batch jobs and API traffic by utilizing tools such as Kibana, Control-m, OpenShift web UI, and Splunk.

Software Developer & Integrator III — *Jan. 2017 - Dec. 2018*

- Designed and implemented ETL process to track active and inactive members with associated demographic information by utilizing enterprise-wide and single CoSA Data Warehouses.
- Implemented and maintained configurable Java Batch B2B data migration processes that proxied legacy ETL jobs to vendor import APIs.
- Streamlined B2B Data Migration process by implementing API microservices to integrate with vendor data import APIs.
- Scripted light-weight data file job to retrieve ETL flat files to be utilized in ad-hoc and streamlined processes via command-line and Control-M.

AETOS, LLC — San Antonio, TX
Data Developer, Contractor (Remote) — *Jun. 2020 - Current*

- Designed and developed APIs for integrating business and data layers for front-end applications as it related to customer business processes.
- Maintained and performed administrative duties on various relational databases as it related to customer needs.

LiftAI — Austin, TX
Data Developer, Contractor (Remote) — *Mar. 2019 - Jun. 2019*

- Developed PostgreSQL scripts and stored procedures for querying motion-event information from IoT Raspberry PIs rigged to elevators and escalators.
- Developed PostgreSQL scripts and stored procedures for aggregating different views based on device ownership, location, and behavior.

GeneWeaver Project, Baylor University — Waco, TX
Undergraduate Senior Capstone — *Aug. 2016 – Dec. 2016*

- Redesigned and implemented algorithm for anchored biclique analysis across biomolecular datasets using PostgreSQL and Python.
- Increased anchored biclique analysis tool's efficiency by a 50:1 ratio.
- Developed UI widget for analysis tool using Flask micro-framework and Bootstrap.

Rackspace, Inc. — San Antonio, TX
Hybrid Intern I — *May 2016 – Aug. 2016*

- Created RESTful API backend using Ruby and Sinatra Framework.
- Designed and implemented Unit and Functional Test for backend and UI layers using the RACK::TEST framework.
- Developed UI for API backend using internal AngularJS-based UI framework.
- Worked effectively as a part of a remote development team.

Center for Spatial Research, Baylor University — Waco, TX
Undergraduate Research Assistant — *May 2015 - Dec. 2015*

- Designed schema for environmental sensor reading data using MySQL.
- Performed routine MySQL database maintenance and updates.
- Designed UI for database interaction and administration using HTML with PHP controller.
- Scripted data quality assurance parsing methods for sensor data in MATLAB.

Skills

Languages:
- Java
- Python
- Shell Scripting
- SQL
- ETL
- C++
- C
- Ruby
- JavaScript
- HTML/CSS
- Groovy

Database:
- MySQL
- PostgreSQL
- IBM DB2
- Snowflake
- MongoDB
- Couchbase
- Oracle
- SQLServer

Management | Deployment:
- Git
- Docker
- OpenShift
- Rational Team Client
- UrbanCode Deploy
- CyberArk

Frameworks:
- JSR 352
- Jersey
- JUnit
- Flask
- Bootstrap

Test | Monitoring:
- qTest
- GitLabCI
- Control-M
- Splunk
- Kibana
- Postman
- ReadyAPI

TAB 7 – VENDOR'S PROPOSED PLAN FOR PROVIDING REQUESTED SERVICES

4.3.13.1. Timeline and Implementation Phasing Plan

Typically, TME® can be deployed in less than 50% of the time of comparable systems due to built-in configuration tools within the System. This eliminates the need for any scripting and/or need to do any customized programming. In turn, this allow for WVDOT's System to be more easily supported and maintained and reduce the overall cost of ownership to the WVDOT over its lifetime.

When rolling out a new system, MASS Group utilizes detailed processes to define the requirements and potential challenges of a project. Our Team has proven experience in leading successful projects, and is well-equipped to manage complex resources, timelines, and process requirements. Well defined and documented processes will be used for the deployment of the WVDOT's System. The tools have been proven to be highly successful in hundreds of prior implementations with Customers that had similar needs. Based on the scope laid out in this RFP and information provided to date, MASS Group doesn't foresee the need to create any unique processes for the successful deployment of the WVDOT's System.

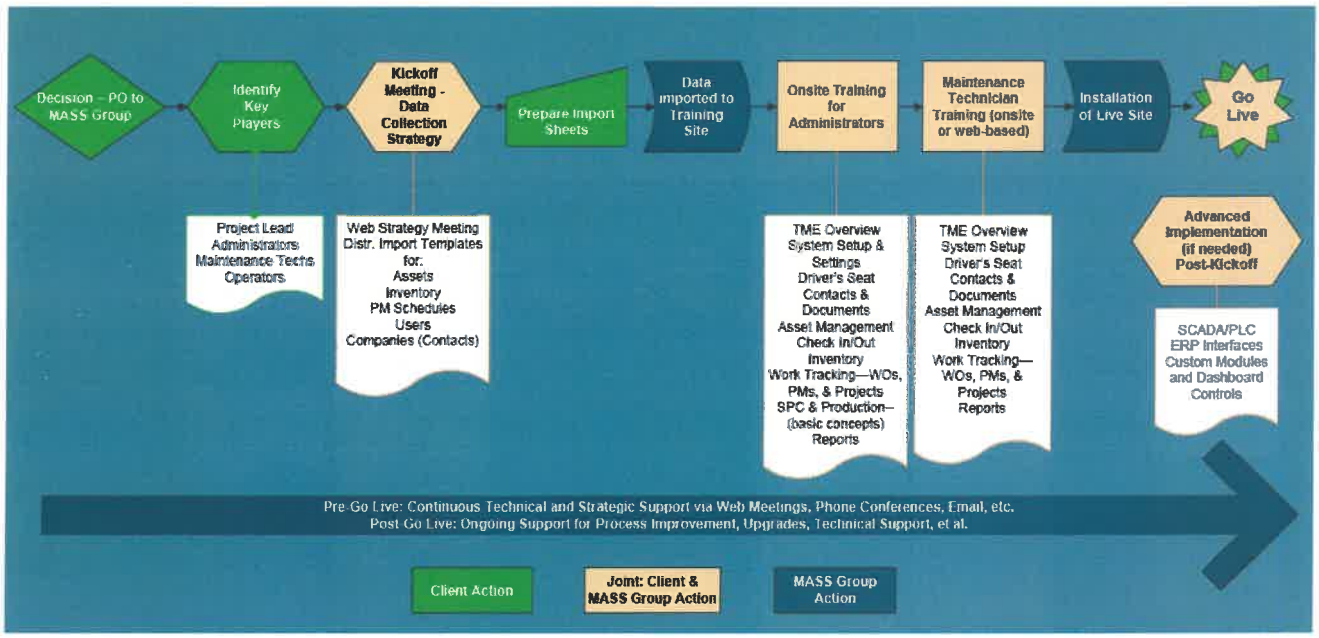


Figure 10 Approach to Implementation

For WVDOT, MASS Group will adhere to a defined and measurable methodology for all parts of the System rollout. We will be using a well-defined and documented phased approach that will ensure clarity in purpose, and successful execution in completing the required tasks needed to ensure success.

Outline of Expected Responsibilities

Key stakeholders for WVDOT for which resources will be needed include the following:

- **Role of WVDOT TME® Administrator(s)**: decision maker on how system overall will be configured and setup; point of contact for MASS Group; coordinator amongst personnel for meetings and trainings. Hours expected: 5-10 hrs./week during implementation.
- **Role of WVDOT Data Collection Provider**: personnel who will gather data for initial Import. Will work with MASS Group to provide the data via an Excel template or alternate agreed upon format.
- **Role of WVDOT 3rd Party System SME**: subject matter experts for the systems to which TME will be integrating. Will work with MASS Group to provide information, access and configuration to those systems.

The bulk of the implementation will reside with MASS Group personnel who will work with WVDOT on the data Import, install the software, etc. Timing is highly contingent on the completion of the asset inventory and compilation of data.

The ultimate outcome is to have a successful and smooth implementation in as quick a turn-around time as possible. MASS Group is there every step of the way—working with stakeholders to ensure that data is scrubbed and ready for Import into TME®, address specific processes, assist with setting up standard operating procedures (SOPs) and advise on best practices. Once TME® is live and the authority of record, MASS Group continues to provide user-friendly assistance to troubleshoot issues, provide on-the-spot item specific training, work with IT (if hosted by client) when server/database upgrades are scheduled, as well as assist Users with ideas on configuration options and usage. MASS Group's goal is to ensure that our clients are completely knowledgeable in how to administer and operate TME® to its fullest potential.

Data Conversion Plan

TME® data conversion can be completed within 30-60 days from start of data assembly to import (oftentimes less) depending on the readiness of WVDOT and the availability of the data as compiled by WVDOT. Should the data harvesting and collection effort take longer, the time frame will be extended. With the use of Excel spreadsheet templates, standardized Import tools, no scripting, immersive onsite training and highly experienced personnel, MASS Group will have WVDOT utilizing the System and extracting much needed data to improve its day-to-day operations.

Steps for data Import:

A. MASS Group trains and provides best practices to WVDOT on setting up the data on Excel template spreadsheets
B. WVDOT scrubs available data, pastes it onto the templates
C. MASS Group reviews the data and checks for standard items (i.e., duplicate category names due to misspelling, locale strings (Campus, Building, Floor, Room, and Location) not entered from left to right, letters entered into a date or number field, etc.)
D. MASS Group Imports the data into the TME® Test site set up specifically for WVDOT to review and use during training; MASS Group checks the data validity with specific spot checks throughout the system
E. End User training takes place which provides an opportunity for WVDOT to see the data in use within the System
F. WVDOT / MASS Group revises the data, if necessary, based on discoveries made during training
G. MASS Group reviews and Imports into the live TME® site

Sample Timeline:

Deliverable	*Estimated Business Days*	*Est. Start*	*Est. Complete*
Development of Project Work Plan	5	11/01/2021	11/05/2021
Kick-Off Meeting with WVDOT Stakeholders to review existing data sets, discuss data to be collected along with naming conventions, integration requirements and assess Reporting needs	1	11/08/2021	11/08/2021
Development of Project Management, Quality Management Plans, Knowledge Transfer, Interface and Stakeholder Engagement Plans (concurrent)	12	11/09/2021	11/24/2021
Installation of TME® Test site designated for WVDOT at MASS Group data center on AWS for initial Import, testing and training	1	11/09/2021	11/09/2021
Installation of TME® production site at on AWS	1	11/09/2021	11/09/2021
Assembly of data onto Import templates by WVDOT and MASS Group	10	11/29/2021	12/10/2021
Development of Organizational Change Management, Master Test, Data Conversion and Training Plan (concurrent)	10	11/29/2021	12/10/2021

Configuration of Software and Custom Objects per Attachment B – Cost Price Proposal	48	11/29/2021	02/04/2022
Review of Import templates by MASS Group; revisions by WVDOT as needed	5	12/13/2021	12/17/2021
Development of Go-Live Deployment, Go-Live, SDDD, and Security Plans as well as Requirements Traceability Matrix	9	12/13/2021	12/23/2021
Mock Data Conversion 1 including review	9	12/20/2021	01/14/2022
Mock Data Conversion 2 including review	9	01/18/2022	01/28/2022
System Test Report	10	02/07/2022	02/18/2022
Development of Training Materials	14	02/07/2022	02/25/2022
Integration Test Report	9	02/14/2022	02/25/2022
Security Test, Performance and User Acceptance Reports	10	02/28/2022	03/11/2022
Onsite Training Course Pilot (pre User Acceptance Test)	5	03/14/2022	03/18/2022
Onsite End-user Training	5	03/21/2022	03/25/2022
Enterprise Readiness Plan and OCM Support/Materials per approved Plan	5	03/28/2022	04/1/2022
Cut-over to Production	2	4/4/2028	04/05/2022
Acceptance	12	04/06/2022	04/22/2022
Timeframe	**192**	**11/01/2021**	**04/22/2022**

Notes: Schedule based on award made by November 1, 2021. Can start earlier should contract be awarded earlier. Estimated days are manpower days and may overlap on the calendar; implementation can be drastically shortened or lengthened per schedule negotiated between WVDOT and MASS Group. Estimated labor days excludes weekends and national holidays. Development of plans, customizations and configurations may be intertwined throughout the schedule. **Calendar Days: 173**

4.3.13.2. System Development Methodology Overview

The MASS Group team's execution approach to this implementation will be to conduct meetings, interviews, discussions, and data review with key County stakeholders. Using a gap analysis approach, the team will develop a high-level overview of the current strengths and weaknesses in the organization related to inventory management. With a summary of these findings, the team will help determine the alignment between County goals and the Inventory Management System capabilities and recommend an approach to a sustainable, and strategic System.

After this recommendation is reviewed and approved by County staff, the MASS Group team will provide a technical document detailing the System roadmap. The roadmap will define the Inventory Management System for WVDOT, determine inventory classes, and define metrics for the System. It will also include a draft Inventory Management Policy for presentation to, and approval by WVDOT. The roadmap will provide level of effort and role of staff and consultants, assess risk, provide a budget and schedule, and detailed Inventory Management steps and initiatives.

Additional project management techniques will be incorporated due to the inclusion of integration:

- Work Breakdown Structure (WBS) – division of tasking among stakeholders and project team
- Gantt Chart – schedule tasking
- Critical Path Method – project model of all tasks and milestones to establish shortest and longest time to completion based on dependencies and circumstances
- Agile – utilization of Scrum practices for continual improvement of the product and new features

Outline of MASS Group Responsibilities

The MASS Group team will have three basic divisions of staff: Software, Field, and Project Administration Personnel.

- **Software division** will be responsible for ensuring the Inventory Management solution is compatible with WVDOT's system, has all of the functionality WVDOT requires—general, location, work orders, work flow, key performance indicator (KPI) and dashboard functionality— is optimized for mobile applications so that field maintenance technicians can perform work in an easy and intelligent way, meets all technical requirements and WVDOT project manager's approval, and is ready to be delivered on schedule.
- **Field division** will initiate the discovery phase of data and information gathering, prepare for the installation of software, system integration, and verify hardware compatibility, and will be the hands-on-team of installation and testing technicians responsible for integration of systems, testing, and training as required. The Field division will also undergo training from the Software division and provide training to County staff.
- **Project Administration** division will be responsible for developing and monitoring the test plan and quality plan, the schedule (refer to the Implementation Schedule below), any cost estimating, project management, meetings, progress reports, a corrective action plan if needed, and safety.

Outline of Expected Responsibilities

Key stakeholders for WVDOT for which resources will be needed including the following:

- **Project Manager/TME Administrator(s)**: decision maker on how system overall will be configured and setup; point of contact for MASS Group; coordinator amongst personnel for meetings and trainings. Hours expected: 2 - 5 hrs. on average per week during implementation.
- **County Data Collection Provider**: personnel who will gather data for initial import. Will work with MASS Group to provide the data via an Excel template or alternate agreed upon format.
- **IT/Systems Personnel**: will need to be available to supply the initial files and workflow samples for development and testing as well as provide detail on field definitions so that mapping is set up correctly. Time spent on those field definitions is dependent on the knowledge of the personnel and the current naming convention of the fields. MASS Group will handle the project management, development of the interface and testing. Remote access will be required to the network and servers during implementation. If this is not possible, County personnel will need to be available to provide the access via web meetings. It is not necessary for MASS Group to be onsite for the development and implementation.

4.3.13.3. Project Management Methodology and Approach

MASS Group staff will meet with WVDOT project manager and staff at an initial kick-off meeting and meet regularly thereafter to obtain information, review plans and site conditions, and confirm field installations and site visits as necessary. MASS Group will produce a checklist, monitor questions and responses, and tabulate requests, actions, deliverables, and necessary approvals.

The team's project manager will work with MASS Group staff to develop and update a detailed project management plan that the team will follow for tasks associated with system integration, software installation and testing, and training.

The MASS Group team will provide an Inventory Management solution and all related services, including licensing, data migration, configuration, implementation, training, maintenance requests for end customers, work order issuance and tracking, inventory control, and other related maintenance services in accordance with the requirements detailed in the RFP. In addition, the proposed solution will be configurable but not be based on custom-built solutions. It will integrate with WVDOT's existing systems and be cloud-based.

It is vital to ensure the equipment that an organization owns, or has in their custody, is being used as intended. It is also important to know the exact location of that equipment. Accurate inventory listings are also important for government reporting requirements and disaster preparedness. As such, an option to the pricing detail includes a physical field inventory

for items based on the current Item Register. This would be conducted to ensure accuracy of data and that all Items are properly tagged.

MASS Group assures quality control by having in place project controls: development and monitoring of a schedule, a budget and cost estimates as needed, and a document-control system which maintains accurate records of all transactions, changes, and revisions with sign-offs at the appropriate level.

4.3.13.4. Detailed Description of Services/Deliverables to Provided

4.2.2.1 Single Vendor to Execute the Contract

MASS Group, Inc. will provide WVDOT with the services and personnel to implement WVDOT's Fleet and Equipment Management solution. To ensure success for those Customers who decide to use TME®, MASS Group provides a full range of services that complement the software. From the Company's main office located in Chatsworth, California (northern Los Angeles County), MASS Group provides consulting, sales, implementation, training, technical support and administrative services. From MASS Group's other office located in Las Vegas, Nevada, the Company provides program management, development, quality assurance and testing. In addition, MASS Group has a network of certified partners located throughout the world in key strategic markets that the Company uses to support its global accounts.

The team at AETOS, LLC. provides information technology solutions focused on building a business that is customer-centered and performance-oriented. At Aetos, they specialize in developing IT solutions to optimize functionality and efficiencies for government and commercial clients to meet their business needs. As MASS Group's partner, AETOS provides several services, including:

IT Operations

- Asset & Inventory Management

Enterprise Data Solutions

- Data Management
- Data Design
- ETL
- Business Intelligence
- Data Architecture
- Data analytics
- Data Migration

IT Infrastructure & Cloud

- Network Monitoring and Log Management
- System/Server Administration & Sustainment
- Incident Response & Management
- Database Architecture Implementation & Administration
- Server and Application virtualization
- Server Hardware refresh, consolidation, and migration
- Disaster Recovery & Backup
- Storage Area Network (SAN) administration
- Managed Cloud Services

Company Capability Brief

MANUFACTURING AUTOMATION & SOFTWARE SYSTEMS, INC.

Corporate Capabilities

Company Overview

MASS Group, Inc., designs and develops COTS Manufacturing Automation software to manage and collect data on inventory, assets, equipment, production, and processes. We configure and adapt our software and hardware solutions for customers in verticals ranging from aerospace to agriculture. With a proven 20-year history, MASS Group delivers solutions on-budget, on-spec, and on-time.

The core of MASS Group is our TME® software suite, a robust set of configurable data collection, data processing and data reporting programs. TME® automates, controls, and simplifies the production processes of raw materials to finished goods and collects data ranging from para-metric readings to asset status, availability, and inventory levels.

MASS Group software is affordable, easy to implement and simple to use. Our software is installed onsite or as a Cloud solution. MASS Group software provides full implementation, training and commissioning with time efficient methodology enabling our client to realize project ROI.

- Increasing efficiencies
- Decreasing costs
- Reducing defects
- Complying with corporate and/or government mandates
- Increasing reporting capabilities
- Reducing and controlling inventory levels
- Increasing utilization of assets
- Accessing real-time data
- Compiling genealogy & traceability data
- Integrating with existing systems

Corporate Designations

Corporate Status: Small Business

CLEARANCE STATUS: TOP SECRET

CA State Small Business Certification: 62438

Cage Code: 1LFX6

DUNS #: 026520416

GSA Schedule: GS35F0145Y

Primary NAICS Codes

511210	Software Publishers
518210	Data Processing, Hosting, and Related Services
541511	Custom Computer Programming Services
541512	Computer Systems Design Services
541519	Other Computer Related Services
541614	Process, Physical Distribution, Manufacturing, and Logistics Consulting Services

Contact Information

MASS Group, Inc.
21601 Devonshire Street, Suite 108
Chatsworth, CA 91311

818-709-1255 phone
800-842-2790 toll free
818-709-1468 fax
sales@massgroup.com
www.massgroup.com

The TME® Suite: Software Solutions for Peak Performance

From traceability and genealogy to asset management and inventory, TME® integrated suite of software applications deliver a single database to manage, track, and communicate the activities of an operation. TME® software solutions provide a robust set of reports that provide a real-time view into critical business processes.

- Manage Supply Levels, Consumption, and Reorder Parts Lists
- Track Supply Costs associated with Equipment
- Barcode, Scan and Track Inventory (Label, DPM, RFID)
- Check-In / Check-Out Mobile Assets
- Cycle Counting
- Cross-reference Inventory Parts to Assets
- Purchase Orders and Requisitions
- Database of Suppliers
- Spare Parts Inventory
- Incoming Quality Validation
- Asset Performance Management (APM)
- Preventive Maintenance (PM) and Calibration Scheduling & Tracking
- Work Order Management
- Asset Management
- Reliability, Availability, Maintenance (RAM) and Utilization Tracking
- Statistical Process Control (SPC)
- Equipment Performance Analysis
- Overall Equipment Effectiveness (OEE)
- Return Material Authorization (RMA)
- Complete Product Genealogy & Traceability
- Serialization, Lot IDs, Batch Codes
- Work in Process (WIP) Tracking
- Production Visibility and Routing
- Bill of Materials (BOM)
- Quality, Defects, SPC/SQC
- Raw Materials & Component Tracking
- Scrap Management
- Boxing/Palletizing
- Shipping/Bill of Lading
- Comprehensive KPIs & Dynamic Reporting

www.massgroup.com 1-800-842-2790

MANUFACTURING AUTOMATION & SOFTWARE SYSTEMS, INC.

Case Studies

Situation: Needed to upgrade from legacy DOS-based software for better traceability & genealogy in both the research lab and production facilities
Solution: MASS Group installed TME® software for FAB management to track their Work in Process (WIP), traceability, genealogy, yield management and scrap management; increasing efficiencies and saving time and budget.

Situation: Needed a clear understanding of the availability and reliability of billions of dollars in production assets and equipment to increase total uptime.
Solution: Leverage MASS Group software to manage visibility of existing assets, increase uptime and track the performance, maintenance, and behavior of equipment to improve equipment utilization (OEE).

Situation: Needed inventory control of sensitive and secure media assets.
Solution: TME® Inventory & Asset Management software was put in place to track and inventory the Navy's high value media assets and correlate and group all media associated with a single event for easy recall. The Check In/Check Out module was provided as so that the Navy could track these mobile assets to individuals. Better management and tracking save critical time.

Situation: Required traceability and genealogy of materials used to make high ballistic helmets for war fighters and first responders.
Solution: MASS Group TME® MES provides complete traceability, genealogy, WIP, yield and performance tracking, resulting in increased compliance and quality.

Situation: The R&D labs needed to closely track the data generated in the development of display technologies and move the developed products into production.
Solution: MASS Group's software captures the parametric data on the product variations and test results and delivers detailed report analysis allowing users to successfully develop the intellectual property required to launch new and revolutionary products.

Situation: The Laboratory needed to track information on equipment maintenance and cleaning to comply with regulations and ISO audits.
Solution: MASS Group's TME® software captures, manages and reports on the equipment upkeep data to drive audit efficiencies and streamline the tracking of production equipment maintenance, cleaning, and calibrations.

Situation: Two separate producers of food products needed to track the precise quantity and origin of every ingredient that goes into batch and lot products to maintain a record of the exact recipe for public health and safety mandates.
Solution: TME® captures and references a complete forward and backward genealogy record of products, including complete multi-level detail, and enables immediate electronic data recall of product, process, re-source and asset information.

A Few More of Our Customers

Engineering Services

- Design and Integration
- Systems Planning
- Consultation
- Site Surveys
- Software Installation and Configuration
- Ongoing Support
- Maintenance
- Software Hosting

www.massgroup.com

1-800-842-2790

4.2.2.2. Project Location and On-site Work

On-site Work

MASS Group, Inc. intends to subcontract with AETOS, LLC for integration and implementation of the System. In addition, Aetos, LLC will provide On-Site Work at both the WVDOT Headquarters in Charleston, the WVDOH Equipment Division Headquarters in Buchanan, the State Rail Authority (SRA) in Mooresville, and various WVDOH offices and locations in West Virginia as needed.

Training

MASS Group, Inc. will conduct end-user technical training and provide knowledge transfer to WVDOT's key personnel. MASS Group's certified trainers will perform standard training on all software components, hardware devices, system administration, and hard and soft copies of training materials. MASS Group offers cost-effective methods of training such as web-based training and train-the-trainer approaches. Training will be done on a demo system using WVDOT's data (if provided in advance). Exercises will be performed and reviewed throughout the training.

Over the course of five days (40 hours), System Administrators (Days 1 and 2) and Primary Users (Days 3 – 5 in split sessions) will be trained thoroughly on TME® application software administration, software configuration, performance optimization, and application programming interfaces/scripts, Reports, etc. In addition to the formal training, we will provide continuance web based live training on demand to ensure that personnel are using the System in the most efficient way. Additionally, MASS Group can provide on-site training and assistance regarding tag placement, handheld barcode reader usage and basic operations and maintenance of the TME® software application.

Sample Training Agenda – Administrators

Day 1-Morning
- TME® Overview
- System Set Up and Settings
- Driver's Seat – Messages and Dashboard: Operations, Asset Scheduling, Time Clock
- Contacts and Documents

Day 1-Afternoon
- Asset Management
- Check In/Out
- Inventory

Day 2-Morning
- Purchasing— Requisitions and Purchase Orders
- Work Tracking – Work Orders, Scheduled Work, and Projects

Day 2-Afternoon
- Reports (creating, editing and viewing)—bring in additional participants who need to be able to create Reports, but are attending the training on Day 3 for non-Administrators

Upon completion, Administrators will have the knowledge and skills to set up the system as necessary to comply with corporate processes as well as the ability to complete tasks and functions of the maintenance technicians and operators. Though as with all learning curves, continued use and practice over time will provide fluency and the ability to streamline.

Course Objectives for Administrators

After completing this course, they will be able to:

- Have Insight on how TME® works and how it will help you do your job more successfully

- Explain the benefits of TME®
- Understand the purpose and function of each Module

- Have knowledge of how to best set up and manage the System based on your corporate policies and Reporting needs
  - Set up Users / Access Groups / Email Groups and Permissions in the system
  - Enter the prerequisites to adding Assets
  - Set up and manage Inventory Items used to complete Work Orders
  - How to use the Projects Sub-Modules for work outside the scope of Maintenance
  - Manage the Requisition and Purchase Orders process

- Collect single-instance and multi-instance data on objects throughout TME®
  - Set up variables into Groups that in turn are associated as Attributes to objects or grouped into Data Collections that are then associated to objects
  - Collect and Report on the data
- Create, process and complete Work Orders using the Operations Control and Maintenance Module
  - Set up Processes and Operations templates tailored to the Assets and work environment
  - Log change/s within the Major and Minor Status of an Asset
  - Create a Non-Equipment Related Maintenance Request (NERMR)
  - Send an Equipment Related Maintenance Request
  - Set up Scheduled Work Orders
  - Use the Real-Time Status and Asset Downtime tools
  - Close a Work Order—consume inventory, log hours and enter comments
  - Reserve an Asset for repair/maintenance through the Reservation Calendar

- Communicate quickly and automatically to the appropriate stakeholders and provide extensive information using Messages, Documents and Contacts Modules as well the Runtime Engine
  - View / Send / Delete messages through Driver's Seat
  - Manage Contacts—individuals and companies
  - Maintain an online filing system for documentation, invoices, safety instructions, maintenance procedures, etc.
  - Monitor how the Runtime Engine automatically generates emails on Work Orders and Asset Performance/SEMI E-10 Reports

- Understand how accurate Equipment Utilization Reporting along with proactive Maintenance Management provides you with the ability to analyze and positively affect Overall Equipment Effectiveness (OEE)
  - Set up Assets with detailed Categories / SubCategories with Modules, Failures and Corrective Actions
  - Set up and collect data for statistical analysis and OEE calculations
  - Be consistent and accurate when updating Equipment Status and handling/completing Work Orders
  - Build / Edit / Send Reports to enable oversight of Assets, Personnel, and time frames

An additional five days (40 hours) of training will take place post Go-Live to enhance the initial learning and cover additional TME® features and functionality that WVDOT decides to include.

Customizations and Enhancements

Much of the customization and configuration will be handled during the implementation training as it is available through the web applications—drop-down list configuration, user defined fields, label changes, saved searches, etc. Any items not covered will be discussed during web meetings as needed.

New features and enhancements are described in release notes with every version release of TME®. MASS Group will set up web meetings for those items that require a large amount of knowledge dispersal and release notes are not enough.

Documentation

MASS Group provides comprehensive on line and print, customer operator manuals and laminated instructions to simplify end-user operations. We will provide Standard Operating Procedures (SOP) for any system functionality. Soft copies of the Administrator manual and User manual to be printed in-house are included with the training, at no additional cost.

There are a variety of references and material available for TME®:

- User Training Manuals available for download
- Job Aids for specific workflows and features
- Online Help Articles and links to chapters of User Training Manual
- Import Data Sheets with notes and instructions included
- Software Implementation Notes
- Integration Specifications and Documentation
- Release Notes with every Upgrade

4.2.2.3. Fleet and Equipment Management Functional Requirements

TME® provides both short-term and long-term maintenance planning for WVDOT including scheduling work orders, projecting resource requirements (labor, material, etc.) as well as labor, parts, and Just-in-Time inventory to prevent shortages as well as excesses of expensive parts and equipment. Because of TME®'s web-based nature, all asset and inventory information is available in real-time. Additionally, notifications are inherent in TME to notify WVDOT or stockroom personnel when supplies are running low. For more information on TME® please refer to TAB 9.

For information on MASS Group's integration experience, please refer to Section 4.2.2.3.5. System Integrations/Interfaces.

4.2.2.3.1. Asset Inventory/Asset Registry

Asset Inventory

TME® provides WVDOT with the ability to uniquely identify and define all its fleet or equipment assets. TME® utilizes Asset IDs for assets entered into the System. Assets are assigned an Asset ID and can have additional information listed, such as asset description, manufacturer, Owner, asset model, group, subgroup, serial numbers, service dates etc. Additionally, Assets can be organized by Category (as defined by the WVDOT), SubCategory, model, vendor, manufacturer, or group, such as a department, building, or campus. The System allows the End User flexibility to determine which asset characteristics are to be included and how the assets are to be organized.

Leasing and Financing

TME® provides WVDOT with the ability to store lease/rental information for any fleet units leased by WVDOT. TME® provides the functionality for objects such as Assets, Inventory Items and Work Orders to be associated with user defined fields for single-instance or multi-instance data collection. WVDOT can add an unlimited number of user-defined fields in the system such as leasing and financing fields for its Assets, equipment, or inventory Items.

Additionally, TME® provides WVDOT the ability to integrate with wvOASIS Advantage Financials accounts payable function by means of 3rd Party Integrations. WVDOT will have the ability to access information in wvOASIS from the new System.

Licenses and Permits

TME® will track certifications for any type of training as defined by WVDOT. This includes setting up schedules for

recertification based on the training, having different due dates for individuals, email notifications set on WVDOT schedule to Users and Managers, etc. Copies of the certificates and waivers can be uploaded to the membership records and/or stored in the TME® Document Manager. Reporting will provide all the data as needed and can be scheduled for delivery on a scheduled basis to the inbox of designated personnel.

Service Call and Incident Tracking

TME® can generate repair and service request work orders. The TME® Work Tracking module tracks all aspects related to work performed on assets, from installing new equipment to issuing response or preventive maintenance work orders. Tracking and managing work requests, labor, planning, and scheduling allows organizations to make the most of their resources while improving productivity. Current, pending, completed and overdue work orders are displayed graphically in the Work Tracking Calendar.

AVL Integration

CAD AVL can be integrated with TME® utilizing 3rd Party Integrations. WVDOT users will be able to view vehicle activity history including operator, activity, location and date and time of activity.

Fuel Management

Fuel is consumed directly to an Asset as a tracked Inventory item in TME®. WVDOT will thus be able to track fuel inventory levels, consumption by each vehicles and the costs. TME® may be integrated with a Fuel Management application by means of 3rd Party Applications Integration.

Work Management Integration

TME provides WVDOT with the ability to obtain vehicle and equipment usage information entered in wvOASIS Advantage Financials. TME® may be integrated with work management functions and the wvOASIS Advantage Financials application by means of 3rd Party Applications Integration.

Tire Management

Tires can be consumed directly to an Asset as a tracked inventory item in TME. WVDOT will be able to track information specific to tires including installation date, model, type, dimensions, and lifecycle tread usage across all installed equipment.

Motor Pool

TME® provides WVDOT with the ability to setup and manage motor pools in the System. TME® Check In/Out tracks the time, date, length of time, and the identity of the person who checked out/in an asset. This feature is particularly useful for tracking mobile assets (e.g., vehicles, keys, tools, etc.) that are used by multiple personnel and moved from location to location for any period of time. Rental costs by the hour or day can be associated to each Asset.

Maintenance History

TME maintains complete work histories for Asset and Inventory Items that require service, maintenance, calibration, etc. WVDOT will have a complete maintenance history for all its vehicles, tools, etc.

Performance Analysis

TME® tracks asset performance for Assets. In TME® all actions taken against a work order are logged with the User ID, date/time stamp and relevant information. Users can consume inventory that have been associated with pricing; log work

hours against a rate code associated with an hour rate; provide comments to update progress (or lack thereof with comments); update the downtime/uptime status of the Asset, etc. As a result, key stakeholders will have a complete picture of equipment performance and the ability to thoroughly analyze total cost of ownership (TCO).

Acquisition, Replacement and Surplus

TME® Asset Management maintains a complete database for all assets including fleet, vehicle equipment, tools, building equipment (valves and fire extinguishers), maintenance equipment, office equipment, IT equipment and any other user defined asset. . Every action taken against a piece of equipment is recorded – whether it's a repair, change in status, check-in/out, reconciliation, move from a location, etc. WVDOT will have the ability to track detailed information on the acquisition and replacement of purchased and constructed assets.

Fleet and Asset Planning

TME® may be integrated with an external Asset Investment Planning (AIP) system by means of 3rd Party Applications Integration.

Costing and Billing

TME® provides the ability to assign the cost of parts to work orders, locations, groups or assets as transactions are conducted. Purchase orders can be created, and expenses assigned to the applicable budget codes in the system.

4.2.2.3.2. Work Management

The Work Management function shall provide a work planning and management solution that will support the identification of potential issues through a work request process and the planning, scheduling, management and tracking of various maintenance management activities performed by WVDOT on the range of fleet and equipment asset classes. Work management capabilities shall include:

- **Problem Reporting: Provide an Intranet based capability for an employee to report issues related to fleet and equipment assets.**

TME® Mobile provides users with the ability to report issues via their mobile devices. Users can also create work orders in the System via TME Mobile. WVDOT employees will be able to report fleet and equipment related issues, in real-time, using their mobile devices.

- **Reporting and Managing Problems, Work Requests: Automatically generate work requests (problem reports/defects) if usage, meter readings, and other condition measurements deviate from pre-defined tolerances for an asset or if a pre-defined event occurs; manually generate work requests from manual sources such as defects found during preventive maintenance, operator vehicle condition reports. Work Orders are created from Work Requests if the request is approved.**

TME® can automatically generate work orders based on performance measurements. Assets that require periodic testing can have the data entered as an SPC collection whereby if any point is out of specification, a work order will trigger automatically. This provides WVDOT a complete cycle of failure and corrective action documentation for regulatory review and audits.

- **Planned/Preventive Maintenance Program Management: Define and maintain a Planned / Preventive Maintenance program for each fleet and equipment asset and/or sub-assets asset types, asset model, class or series using a library of standard preventive maintenance job templates for jobs included in the preventive**

maintenance program with defined intervals for performing each job. If the preventive maintenance is required by external directive, provide indication on the preventive maintenance work order of the originating source (local, state, federal agency). Provide comprehensive and detailed history of asset usage, maintenance, performance and cost to support effective asset management throughout the entire asset life cycle.

TME® provides the ability to set up work order templates for different types of work, assets, processes, etc. Each template can also incorporate specific notifications to designated personnel regarding the status of the work order overall. It also can include steps that further define certain types of work, sets up distinct pieces of data collection (such as an inspection, measurements, etc.), includes documentation separate from the overall work order, and notifies different groups or individuals via email or text the status of the step within the work order. Additionally, TME® logs all actions taken against a work order and/or step with the date/time stamp, user name, action taken, comments made, etc. WVDOT will have all information needed within easy reach for any audit or program review.

- **Major Overhauls, Asset Rehab and Campaigns: Provide the capability to define and track major maintenance programs (e.g., overhauls) consisting of a series of maintenance jobs to be completed for a single asset, or specific asset groupings, models or series, or location performed on user defined scheduling criteria. As with regular maintenance, WVDOT requires complete and detailed tracking of the actual work performed, costs, and resources consumed for each action performed on each asset.**

Major work campaigns can also set up using TME® work order templates. Each step in an Asset rehabilitation can be created as its own work order within the System. The campaign itself can be set up as an overall work order with smaller associated work orders. TME® tracks all transactions against Assets, Inventory Items and Work Orders. WVDOT will be able to create maintenance campaigns and track all related work through the System.

- **Maintenance Standard Job Definition: Define standard maintenance job templates to predefine a specific scope of work for specific asset classes or asset types, including the specification of a job code, labor hours, skills, materials, and equipment needed to perform a job.**

Work order templates in TME® can be set up for a predefined scope of work for any asset class, type, etc. Documents, drawings, instructions and other materials can be associated to a specific work order. WVDOT technicians will have access to all information related to a specific work order before starting the task.

- **Maintenance Resource Definition: Define specific maintenance locations, shops, and facilities and a list of maintenance work to be performed at each facility; indicate the specific assets maintained at each facility and the equipment at the location as well as the labor resources available by labor classification.**

Specific maintenance locations, shops, and facilities and the type of work performed can be setup on a TME Work Template. Work orders of a specific type can be to personnel (individuals or groups) with associated costs tracked and tabulated. Notifications are also sent to individuals or groups responsible for completing the work order. WVDOT will be able to define and work orders to specific groups and individuals automatically whenever a work order for a particular task is generated.

- **Work Order Planning: Define maintenance work and resource requirements, schedule and assign work and resources, monitor work in process, capture information on work activity, and record work results, including time and costs. Manage maintenance resources including WVDOT and contractor personnel, facilities, materials, and tools. Provide the ability to plan, monitor, and forecast annual work quantities and required resources (labor, equipment, material, and budget) for fleet and equipment assets at a program level.**

Work orders in TME® can be scheduled using triggers. Triggers can be set using Time, Metrics or Other Scheduled Work. Additionally, work orders can be set up to be assigned to a specific individual or group based on the scope of work. Scheduled Work, current, pending, completed and overdue work orders are displayed graphically in the Work Tracking Calendar. WVDOT will be able to plan, monitor and forecast annual work and required resources based on the triggers setup for the work orders associated with a particular asset. All transactions against the work order are recorded in the System.

- **Work Order Description: Identify the fleet and equipment asset to which the work applies. Provide the ability to attach/access/retrieve standard asset documentation from the work order, including drawings, maintenance manuals, etc. Identify the reason for the work order, define the work to be done and the labor resources required, etc.**

In TME®, assets are assigned an Asset ID. This means that each fleet and equipment asset will have a unique ID to which other information can be added or associated. Documentation, drawings, manuals, can be associated with a specific asset. The documentation is also associated with any work order created against an asset. WVDOT technicians will have access to all documentation needed to successfully complete the work order.

- **Work Order Creation: Provide the capability to create work orders using several methods - on demand, from templates, from defects found during a preventive maintenance activity, as the result of an incident, from a warranty failure, recall or service bulletin, etc.**

TME® work orders can be generated automatically, on demand, from a work order template, by means of work order triggers and through scheduled preventive maintenance. TME® work orders can also be generated based on failures or due to a recall or service bulletin regarding an Asset.

- **Work Activity Recording: Provide the capability for multiple individuals to work on multiple assets on a single work order and link specific work jobs or steps to a specific asset. Provide a method of allocating labor and material cost accurately to specific assets, with the cost then interfaced back to wvOASIS. Provide the capability to designate a work order as a service/road call, or link a work order to a service/road call/incident event and to record travel time, service information (route, run, operator), road conditions, etc. Provide detailed description, classification, and reporting of asset failures by asset type, component, and system. Allow the ability to match repair codes to the reported failure. Support various maintenance failure analysis methods for developing asset/part modifications/replacements, adjustments to planned maintenance programs, and other actions to support continuous improvement of asset reliability and performance.**

TME provides the capability for multiple individuals and assets to be included on a single work order. Specific jobs can be associated with a specific Asset via work order templates. Work orders can be created as templates for an Asset to include specific job-related documentation and instructions. Material costs may be submitted to wvOASIS by means of 3rd Party Integration with the System. Work order templates can be created to route work to specific group or individual depending on the type of work (e.g., service/road call or incident event. Detailed information can be added to a work order that includes information such as job description, classification, failures, asset type, component, system, etc. WVDOTs repair codes can also be included on a work order template to match the reported failure TME® provides real-time equipment status according to the standard specification for equipment maintenance and includes three major and 14 minor status conditions. WVDOT will have the ability to support various maintenance and failure analysis methods to support continuous improvement of assets.

- **Work Activity Timekeeping: Provide the capability to integrate with wvOASIS Advantage Financials and Human Resource Management (HRM) to capture and track the actual time and associated labor cost attributed to a work order.**

wvOASIS Advantage Financials and Human Resource Management (HRM) may be integrated with the System by utilizing 3rd Party Integrations. WVDOT will have the ability to capture and track actual time along with associated labor costs through the System.

- **Work Order Tracking and Monitoring: Provide real-time monitoring of work order status and provide information required to manage and adjust work as required, including the estimated time remaining on the work order (planned or estimated time less elapsed time). Other information may include but is not limited to percent complete based on the projected time to complete remaining tasks, current task or step being performed and the employee(s) currently assigned, number of tasks completed and percentage, hours accumulated against each task, projected completion date/time, percent ahead or behind schedule based on actual labor versus standard for the job tasks or steps completed, accumulated cost detail, and current work order status.**

Due to TME®'s web-based nature, all information in the System is in real-time. Therefore, WVDOT will have the ability to track all transactions against a work order as they are recorded in the System. Due dates can be set up for work orders when they are generated. The Work Order Viewer provides a list of all pending and past due work orders and can be sorted or filtered by selecting criteria such as work order status and Asset ID. This is particularly useful to show past due work orders. Completed work orders can also be displayed using the search function. TME® also sends notifications to individuals or groups to notify them when a work order is overdue. TME users can also add information to a work order as the work order is being completed. Work orders can be also be put on hold until other work associated with the Asset is completed.

- **Work Order Closeout: Automatically calculate total work order costs and update asset maintenance history upon closing a work order.**

TME Work Order Cost Tracking tracks all aspects of work on an asset. Work Orders such as life safety tasks, mechanic, equipment repairs, maintenance requests, janitorial work, or any work required by WVDOT can be generated with associated costs (in hours or outsourced) tracked and tabulated. TME® automatically records all transactions against an Asset providing a complete maintenance history for an Asset.

- **Component Rebuild Management: Provide support to track components through the entire repair and rebuild cycle and maintain component operating and maintenance history. Provide the capability to manage and track the status, movement, and history of serialized components. Provide the capability to define major components, sub-components, assemblies and sub-assemblies that will be individually tracked by serial number, or another unique ID.**

TME® provides the capability to manage component rebuilds. Each component can be assigned a Serial Number. The Serial Numbers for each component can be associated to the overall work order. As each component is rebuilt, the status of the component can be updated in the work order. All transactions will be based on the Serial Number and logged with the User name and data/time stamp.

- **Handheld/Mobile/Tablet Devices: Provide support for work orders from handheld/mobile devices (create and perform).**

TME® Mobile provides WVDOT with the ability to support work orders from a handheld/mobile-device. WVDOT staff will be able to view and update work orders as they are completed. Staff will also be able to submit work orders via their mobile devices.

- **Management of Contractors: Manage inspection, maintenance, and work contracted out to a vendor or contractor; capture work details and cost. Monitor actual vendor or contractor performance versus service-level targets. Track performed warranty work for reimbursement. Manage repair and return of rebuilt assets, which requires the tracking of serialized components sent for repair (either the return of the same item or a replacement).**

TME® provides the ability to manage work performed via work orders. Contractors can be provided access to the System to update their progress on the work order. The associated cost and labor can be tracked and tabulated in the System. Additionally, all assets and components can be associated to work orders by Asset ID. This will provide WVDOT the ability to track the progress and costs associated with work performed by contractors.

- **Workforce Management: Integrate with the wvOASIS Advantage HRM module to obtain employee information including status, vacations, training and certification information. Store basic information on workforce records, including job title, home location, job function, supervisor/shift, name, address, union affiliation, certifications, skills, all assigned assets including phones, cars, and uniforms, etc. Track training requirements.**
- **Costing and Billing: Integrate with wvOASIS Advantage Financials to obtain the required actual cost data. Accumulate comprehensive maintenance costs by asset, type of work, and other breakdowns for the purpose of providing input to capital and operating budgets, maintenance cost analysis, repair or replace decisions, internal versus external maintenance decisions, etc.**

Training requirements can be tracked through the TME® Certifications module. For more information on the Certifications module please see to section 4.2.2.3.1. Asset Inventory/Asset Registry. TME can integrate with wvOASIS Advantage HRM and wvOASIS Advantage financial by utilizing 3rd Party Integrations. For more information on MASS Group's integration experience, please see Section 4.2.2.3.5. System Integrations/Interfaces.

4.2.2.3.3. Warranty Management

The VPS shall identify asset, component, and parts warranties. The system should define warranty terms and conditions, and vendor or contractor responsibility for warranty service. The VPS should highlight work under warranty, identify and file warranty claims, and track warranty service and reimbursements.

Warranty functionality shall include:

- **Warranty Management: Automatically generate and track warranty claims from the work order system based on user-defined business rules including what are warrantable repairs versus maintenance items and repairs not covered.**

WVDOT will be able to segregate and track warranty claims within the work order system. This includes the ability to track the costs (labor and parts) based on the warranty requirements.

- **Claims: Generate and track warranty claims from the work order system including claim number and date, vehicle/asset/component, original cost (if applicable), RMA, repair cost, claim amount, text descriptions or notes, claim status (user defined categories), claim disposition and date, actual recovery amount or value received by WVDOT, type of disposition (e.g., reimbursement, replacement part, credit toward future purchases, etc.), comments, etc.**

TME® does allow the creation and association of work orders to a warranty to assist in the tracking of warranty claims. TME® also provides the ability to track warranty information for an Asset and have that information available. MASS Group will need to set up the automatic blocking of internal work orders generated against those flagged assets.

- **Payments/Reimbursements: Track warranty work performed by external contractors and vendors and automatically create claims for reimbursement if appropriate. Provide the ability to credit an asset or inventory based on reimbursement or other credit received in response to a warranty claim, to receive a replacement part or component into inventory at no cost, to track a credit against future purchases from the vendor, or to record vendor repairs under warranty for asset history.**

TME® does allow the creation and association of work orders to a warranty to assist in the tracking of warranty claims. Cost for repairs can be recorded for an inventory item or Asset in TME®. This includes labor and parts for the rebuilding or repair of an asset, component, or part. Additionally, TME® provides the ability to receive rebuilt or repaired inventory back into inventory at the rebuilt/repaired cost. The cost can be spread across multiple parts as an average or for the specific part.

4.2.2.3.4. Planning and Budgeting

The VPS shall provide support for capital planning based on asset condition, criticality, performance, or other criteria and plan for and identify funding needs and sources. Planning and budgeting functionality should include:

- **Performance Standards: Create and maintain performance guidelines based on user-defined business rules for all work management activities.**

Business rules can be defined in the workflow for work orders at different levels. This allows WVDOT to control costs and prevents unauthorized modifications to work orders.

- **Operating Budget Development: Generate annual budgetary plans utilizing existing asset data and standard work order templates to project labor and material needs.**
- **Operating and Maintenance History, Performance Analysis, and Costs: Maintain operating and maintenance history detail for all assets including problems posted, fuel/power and fluids consumption and operating costs, maintenance/rebuild work order detail, warranty claims, etc. Record and track the source and category of funds used for acquisition, operations and maintenance of a particular asset.**
- **Long Term Maintenance Resource and Fleet/ Asset Planning: Forecast asset disposal/retirement based on user-defined criteria, such as mileage and/or other metrics, for user-defined time periods.**
- **Capital Programming: Provide support for long term forecasting of capital needs.**

MASS Group can integrate TME® with an Asset Investment Planning (AIP) system utilizing 3rd Party Applications Integration. TME® Asset Management maintains a complete record for Asset including all operating and maintenance history for the Asset. Every action taken against a piece of equipment is recorded – whether it's a repair, change in status, check-in/out, reconciliation, move from a location, etc.

4.2.2.3.5. System Integrations/Interfaces

Several interfaces will have to be designed and developed to support WVDOT's Fleet and Equipment management functionality. These interfaces include but are not limited to:

- **An interface with wvOASIS Advantage Financials Procurement module to initiate purchase requisitions in wvOASIS based on asset planning performed in the Fleet Management system;**

- **An interface with wvOASIS Advantage Financials Procurement and Fixed Assets module upon receipt and initiation of commissioning of the new fleet or equipment asset. The fleet and equipment asset record will be initially created in wvOASIS as the system of record for State of West Virginia assets and then interfaced to the Fleet Management System to create the fleet record in the VPS and allow WVDOT to enter additional information about the fleet/equipment asset beyond that maintained in wvOASIS;**
- **An interface with the West Virginia Board of Risk and Insurance Management (BRIM) to provide vehicle information for risk management and insurance;**
- **An interface with wvOASIS Advantage Financials and Human Resource Management to support setup of repair orders as task orders in Advantage to allow employees to charge time to repair orders in Advantage Human Resource Management (HRM);**
- **An interface with wvOASIS Advantage Financials to receive actual hours and labor costs for each repair order/task order back when payroll is processed;**
- **An interface with wvOASIS Advantage Financials to obtain vehicle and equipment usage information entered by WVDOT staff as part of time reporting in Advantage Human Resource Management (HRM);**
- **A two-way interface with the Inventory module within wvOASIS Advantage Financials to support tracking of inventory activity related to Fleet and Equipment operations (charge outs to a repair order, returns to inventory when a repair order closed out, etc.);**
- **Two-way interface with Fuel Master application for fuel usage; and**
- **Two-way interface with DOA Fleet Management Office for leased passenger equipment.**

Integration Experience

TME® is a 100% web/cloud based (Internet/Intranet), cost effective, highly scalable, and easily configurable and implemented asset management solution that can seamlessly support and improve the visibility, accountability, and management of the WVDOT's assets. TME®'s all-encompassing suite of capabilities will allow all three business units to manage and control all of their assets with a single System, provide linkages to the company's other information management systems, and serve as a foundation to support future growth. With an open architecture utilizing SQL Server, it connects readily to the ODBC platform for select-only queries.

Previous interface implementations have required minimal time from the End Users of the System. Generally, a few hours per week to discuss fields and requirements is all that is necessary. Additional time from IT personnel to provide access, generate new CSV files based on changes needed or revision of data from different systems going in to the common relational database will be necessary as well.

Examples of Integrations by MASS Group and Acumen:

- Sage 100: Integration with Sage 100 via Webstor middleware. Webstore pushes and pulls data from Sage and TME® pushes and pulls data from Webstor. The interface with Webstor is done via scheduled SQL stored procedures. The stored procedures run every 10 minutes to ensure that updates in both platforms are synced right away.
- SAP: SAP is used to pass data by populating shared tables in the TME® SQL database. TME® reads these records, marks them as processed and updates its own tables as needed.
- JD Edwards: JDE is interfaces in a couple of ways. Products and the work orders to build them are generated in JDE and exported via CSV files. There is a processing engine written to pull that data and post the updates. When work orders are closed in JDE a web service is called, passing the work order number to TME® and the web service closes the work order in TME®.
- Student Information Systems (SIS): SIS interfaces via a custom web service to Import Users (Teachers) and Contacts (Students) via a CSV file upload to a client application; additionally, a custom table is updated with User and Contact associations by which a TME® and custom logic dictates which Students can check out items from any given Teacher.

- Ellucian Banner: Banner communicates via standard web services to add new Assets into TME® and update Banner with the last scanned date for each Asset as part of their annual reconciliation conducted within TME®.
- Almanac (Client Custom Application): MASS Group built a custom application that makes a call to Almanac APIs built by the client to populate fields and drop-downs on a TME® Metrology Work Request screen.
- DisplayLink: Client uses direct linking available in many of the features in TME® to populate a dashboard that pulls data from numerous systems.
- Xytech Media Pulse: MASS Group developed a custom web service to Import new Assets along with location and check out status (updated information pulled in with each check out/in transaction in Media Pulse) as part of the TME® RFID tracking solution.
- GIS: Acumen has integrated numerous EAM systems with ArcGIS Server 10, ArcSDE/Geodatabase Design and Implementation, Geomedia, MapInfo, QGIS, GRASS, and PostGIS

4.2.2.3.6. Modeling and Analytics

The VPS shall:

- **Capture asset-related costs throughout the entire life cycle of the fleet and equipment asset from commissioning through disposal;**
- **Allocate costs to individual assets and aggregate costs for various asset groupings, including models, types, classes and subclasses; and**
- **Provide for the use of alternatives identification procedures, level-of-service criteria, maintenance cost minimization, and multi-period optimization within the modeling and analytics functions.**

TME® provides the ability to record the capital cost of an asset at all levels of the hierarchy. All costs associated to work orders are available summarized or by line item grouped by work order or rolled up to the Asset, Location, or any other appropriate grouping. MASS Group would need to develop a modeling methodology based on WVDOT's specifications to provide the functionality for the use of alternative identification procedures, level-of-service criteria, maintenance cost minimization, etc. within the modeling and analytics functions.

4.2.2.3.7. Management and Reporting

The VPS shall provide a range of standard pre-defined reports that are available using role-based access, support integration with leading third-party reporting tools and incorporate an ad-hoc query capability within the proposed software solution.

TME® Reports provides over 300+ out of the box reports. In addition, TME® provides over 150 standard report templates covering all data collected within TME® including, but not limited to Asset Management, Inventory Tracking, Trending, Work Order, Labor and Performance Reports. Users with certain rights can create report templates as well as copy and customize existing reports. Additionally, reports generated in TME® can be exported in several file formats including .HTML, .XLS, .PDF, .CSV and .DOC.

Additional third-party reporting tools can be integrated with TME utilizing 3rd Party Integration. For more information on TME Reports, please see TAB 9 - Reports.

4.3.13.5. System Support Services

The Vendor should address the following technical elements within this subsection:

- **Standard methodology for developing a business continuity plan, continuity capabilities and high availability infrastructure, as well as a detailed explanation of the related approach, activities, procedures, tools, and templates and how the Vendor manages these activities and leverages the tools and templates;**
- **Disaster recovery guidance and execution (if necessary) for the duration of the project in accordance with the WVDOT's disaster recovery plan;**
- **Performance tuning of databases, application servers, web servers, and other software and devices deployed as part of the proposed solution. This includes batch and online software tuning, as well as data conversion software tuning; and**
- **Software upgrade methodology, as well as a detailed explanation of the related approach. activities, procedures, tools, and templates, and how the Vendor manages these activities and leverages the tools and templates.**

Disaster Recovery Plan

Updated info 1/5/2021:

The backup rotation for the database when hosted by MASS Group on AWS is automated and includes daily incremental backups saved for one week; weekly full backups saved for a year; four cycles. These are password protected and stored on a backup server. These are then backed up to CrashPlan.

Windows Server images are captured weekly and stored on Carbonite Cloud. Daily backups of the SQL Server are stored to Carbonite as well.

Timeframe for recovery is anywhere from a couple of hours to a day depending on what failed—server reconfiguration is minimal effort compared to the failure of SQL Server.

Redundancy Disaster Recovery and Data backup Safety

For each deliverable we create a disaster recovery plan

MASS Group has disaster recovery already in place for the TME application including We leverage multiple DR Methods to ensure your data is protect and always available.

TME Data Preservation Model

TME inherent data preservation model within the TME DB infrastructure does not allow for the physical deletion of data. Deleted data will be marked as such and is completely retrievable by the IT admin.

Data Backup

MASS Group maintains off site encrypted backups for each client on: Daily basis, Weekly, Monthly and Yearly.

Backup DVD data is available for our client to ship on demand free of cost under the platinum SLA.

Redundant Backup and Data Center 24/7

MASS Group Inc. operates a 100% redundant data center in a secondary secure site. This site is ready 24/7 for our customers as a back for the primary data center. It is also used as Backup data storage repository. We also leverage a 3rd off site location to store back data.

Option Third-Party Storage

Optional Iron Mount source code and data backup service agreement on request.

Data Security

MASS Group is a DoD classified site and many of our personal have top secret clearance. We are required adhere to the most stringent Micro software security model which is layered on top of the department of defense security requirements for all our installation including cloud based as well as on site installation deliverables.

Software Upgrades

TME®'s software maintenance program includes software upgrades, updates, patches, fixes, and documentation updates as they become available. This support shall include remote diagnostics; onsite issue resolution (if necessary); fixes; updates; and updates to training and technical documentation to support software changes.

Software upgrades and updates occur approximately every 4-6 months and are included in the annual maintenance program. TME® users are also eligible to receive service packs. In the event of scheduled application maintenance, MASS Group will provide at least 24 hours notification.

System Enhancement

MASS Group will provide enhancements to the system based on customer feedback, upcoming trends, changes in technology (internet browsers, database platforms, etc.). These are instituted via upgrades or a regular basis. Release notes are provided in advance for review by WVDOT and online demonstrations of new features and functionality are available by request.

4.3.13.6. Lessons Learned

The Vendor should provide a discussion of the significant lessons learned from experience at previous projects of similar size and scope, and how the Vendor plans to apply those lessons to the Fleet and Equipment Management System project.

In previous Fleet and Equipment Management System projects, progress in implementing the system has been impacted by the following factors:

- No project Champion(s) on the client side
- Availability of client project Champion(s) and key stakeholders
- Lack of client knowledge regarding project scope and requirements
- Lack of understanding of the capabilities and availability of key stakeholders and end users

Going forward, MASS Group has sought to ensure that the following elements are in place before starting a new project with a new or existing client:

Champions and Stakeholders

- A project Champion(s) on the client side, and, communicating with the project Champion(s) to determine their availability for the duration of the project.
- Ensuring that the client Champion(s) have detailed knowledge of the project's scope and requirements.
- Meeting with stakeholders to gain an understanding of their capabilities as well as determining the availability for the duration of the project.

Development

- For the project to meet its deadlines and deliverables, MASS Group requires that SMEs are available to work alongside client stakeholders from the start of the project.
- Avoiding scope creep:
    - During the initial implementation, MASS Group works with the client stakeholders to ensure that all "must-have" requirements are prioritized and completed prior to Go-Live.
    - Additional or "nice-to-have" requirements are prioritized at a lower level and addressed after the Go-Live date

TAB 8 – PROJECT'S GOALS AND OBJECTIVES

4.2.1.1. Vendor's proposal should provide an architectural design based on the capacity and storage requirements listing in this RFP. The proposal should include a description of the methodology that will be utilized to size, plan, and execute the implementation of a turnkey solution.

Please see section 4.3.10.2.4. Future Direction for information on TME®'s architectural design. Please see section 4.3.13.3. Project Management Methodology And Approach for information on the methodology MASS Group, Inc. utilizes to size, plan, and execute TME turn-key implementation.

4.2.1.2. Vendor's proposal should outline all software and hardware components required to meet the mandatory requirements. The proposal should identify any features/functionality that exceed the mandatory requirements. The proposal must contain technical documentation on each component in the proposed solution. This documentation will allow for a comprehensive evaluation.

Please see section 4.3.10.2. Technology Products for information on the software and hardware components required to meet WVDOT's mandatory requirements.

4.2.1.3. Vendor should describe the process for deploying the components outlined in the proposal and should address a recommended approach for the migration of existing data and services.

4.2.1.4. Vendor should describe the VPS technical support and maintenance needs along with their staff capability to support them and include a detailed plan for hardware/software support and knowledge transfer, installation, ongoing support, and training.

Please see section 4.3.10.2.3. Product Maintenance for information on VPS technical support and maintenance needs for the System. For information on knowledge transfer, installation, ongoing support, and training, please see section 4.2.2.2. Project Location and On-site Work.

4.2.1.5. The proposed solution should be compatible with the State of West Virginia software standards and security policies. The solution should be compatible with Google Workspace products (the State is currently transitioning from Microsoft Office to Google Workspace) and the State of West Virginia's acceptable use policy. These policies are located at: https://technology.wv.gov/security/Pages/policies-issued-by-the-cto.aspx.

MASS Group's proposed solution is compatible with the State of West Virginia's software standards and security policies. TME® is SSL HTTP secured. If WVDOT chooses, MASS Group can put WVDOT's instance on AWS GovCloud (US). The AWS GovCloud is a physical hardware security module (HSM) that is dedicated to WVDOT. It is physically located in an AWS regional cloud data center, but only WVDOT would have administrative access to the key server. Only WVDOT would have access to the key.

4.2.1.6. Vendor's proposed solution should support WVDOT in achieving operational excellence in terms of the Fleet Equipment Scheduled Maintenance process as follows:

- **Facilitate the configuration of Preventive Maintenance criteria, which will trigger preventive maintenance activities and notify owners about preventive maintenance due activities for equipment and vehicles.**
- **Facilitate in-house repair orders and work reporting in the system.**
- **Keep all preventive maintenance repair history updated.**

- **Record and track commercial preventive maintenance repairs performed by a third party through either entry of the work performed into the system or importing of information provided by the third party who performed the work.**
- **Facilitate the management of specific, hierarchal preventive maintenance scheduling.**

Please see TAB 9 - Work Tracking for information on MASS Group's approach to facilitating Preventive Maintenance for WVDOT.

4.2.1.7. Vendor's proposed solution should support WVDOT in achieving operational excellence in terms of the Equipment Repair business process as follows:

- **Facilitate in-house repair orders and work reporting in the system.**
- **Support importing of commercial repair data for work performed by a third party.**
- **Keep all repair history up to date.**

Please see TAB 9 - Work Tracking for information on MASS Group's approach to facilitating repair orders and work reporting for WVDOT's System.

4.2.1.8. Vendor's proposed solution should support WVDOT in achieving operational excellence in terms of the Fueling process as follows:

- **Accurately track the fuel usage and cost history of all State-owned equipment and vehicles by vehicle.**
- **Track all types of fueling transactions including automated bulk fueling transactions (currently tracked using the Fuel Master system), commercial fuel cards, and manual fueling transactions.**
- **Provide for the billing of fuel issues to other State Agencies.**

Fuel is consumed directly to an Asset as a tracked Inventory item in TME®. WVDOT will thus be able to track fuel inventory levels, consumption by each vehicles and the costs. TME® may be integrated with a Fuel Management application by means of 3rd Party Applications Integration.

4.2.1.9. Vendor's proposed solution should support WVDOT in managing the full asset lifecycle and in prioritizing assets for replacement as follows:

- **Support managing of fleet and equipment cost allocation and in conjunction with wvOASIS support billing for equipment usage.**
- **Plan for retirement/replacement of equipment and the acquisition of equipment.**
- **Manage asset ownership assignments and transfers during the lifecycle of the assets.**

Please see TME Asset Management section in TAB 9 - Capabilities of Proposed VPS Solution for more information on MASS Group's approach to providing a full asset lifecycle and replacement. wvOASIS may be integrated with TME by means of 3rd Party Integrations. WVDOT will have the ability to manage fleet and equipment cost allocation and billing for equipment usage with wvOASIS in the new System.

TAB 9 – CAPABILITIES OF PROPOSED VPS SOLUTION

TME® is a 100% web/cloud based (Internet/Intranet), cost effective, highly scalable, and easily configurable and implemented asset management solution that can seamlessly support and improve the visibility, accountability, and management of the WVDOT's assets and inventory items.

Due to its web-based nature, TME can be deployed either as an On-Premise application, on an on-site server, web-hosted onsite, or web-hosted from an offsite location. MASS Group, Inc. will provide pricing for both deployment approaches in the Cost Proposal.

WORK TRACKING

Preventive Maintenance

Preventative Maintenance (PMs, Calibrations, Services, etc.) schedules can be set up assets as well as for entire locales (buildings/sections) that require routine maintenance, inspections and/or calibrations. Equipment is entered into the System at set-up, and then regular maintenance intervals (e.g., every month, every quarter) are scheduled for easy onscreen monitoring and email notifications that preventive maintenance is due. Documents, Data Collections, Notifications, Steps, etc., can all be set up and flow through to the work order every time it is generated. WVDOT will easily be able to manage, prioritize and document work to comply with standards, whether ISO, ASA, CMS, Joint Commission, etc.

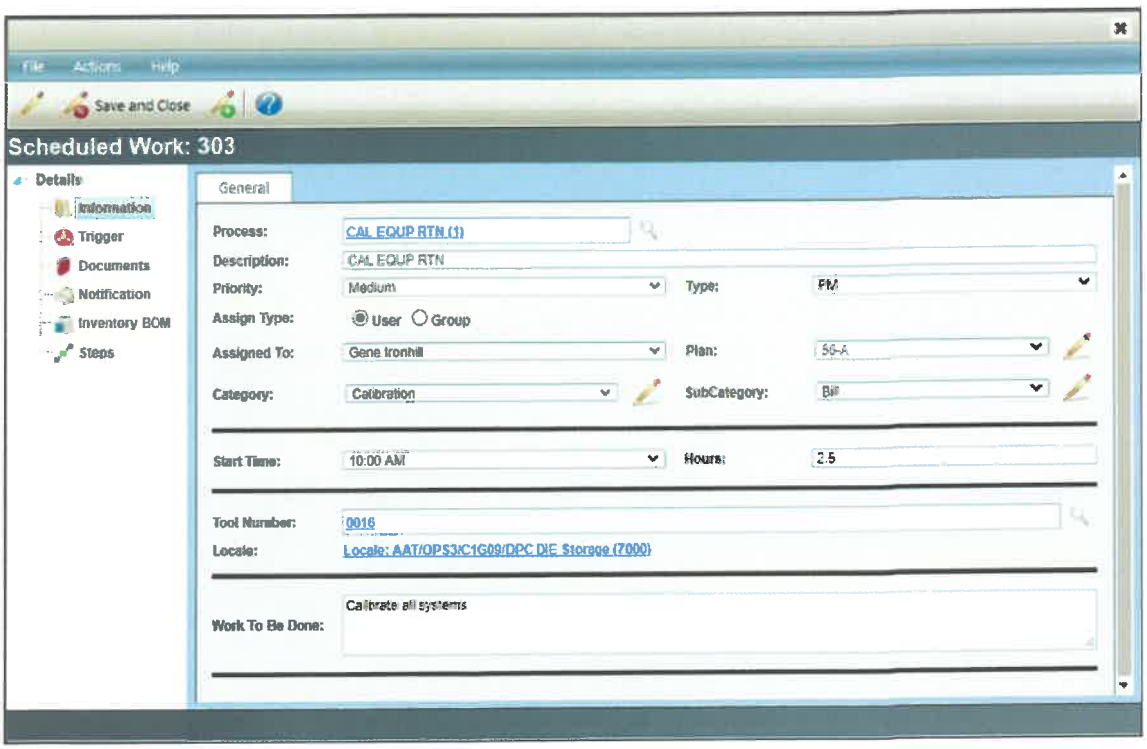


Figure 11 Scheduled Work Detail Screen

Triggers can be set based on one or more factors: time, metrics, and other scheduled work. See below for additional details:

- Time: The trigger screen displays a visual GUI for setting up a recurrent (or even one time) event. It includes the ability to use a floating date to reset the next scheduled trigger date based on the closing of the previously generated work order as opposed to its generated date.
- Metrics: The same trigger screen allows the User to select Meters from which to generate the PM based on meter readings. Alternatively, the User can select a metric (i.e., hours in Uptime) from a drop-down list of which to generate the work order.
- Other Scheduled Work: The triggering of one scheduled work can trigger other scheduled work activities. For example, cleaning of air vent A can trigger the cleaning of air vents B and C.

Scheduled Work, current, pending, completed and overdue work orders are displayed graphically in the Work Tracking Calendar. All actions taken against a work order are logged with the User ID, date/time stamp and relevant information. Users can consume inventory that have been associated with pricing; log work hours against a rate code associated with an hour rate; provide comments to update progress (or lack thereof with comments); update the downtime/uptime status of the Asset, etc. As a result, key stakeholders will have a complete picture of equipment performance and the ability to thoroughly analyze total cost of ownership (TCO).

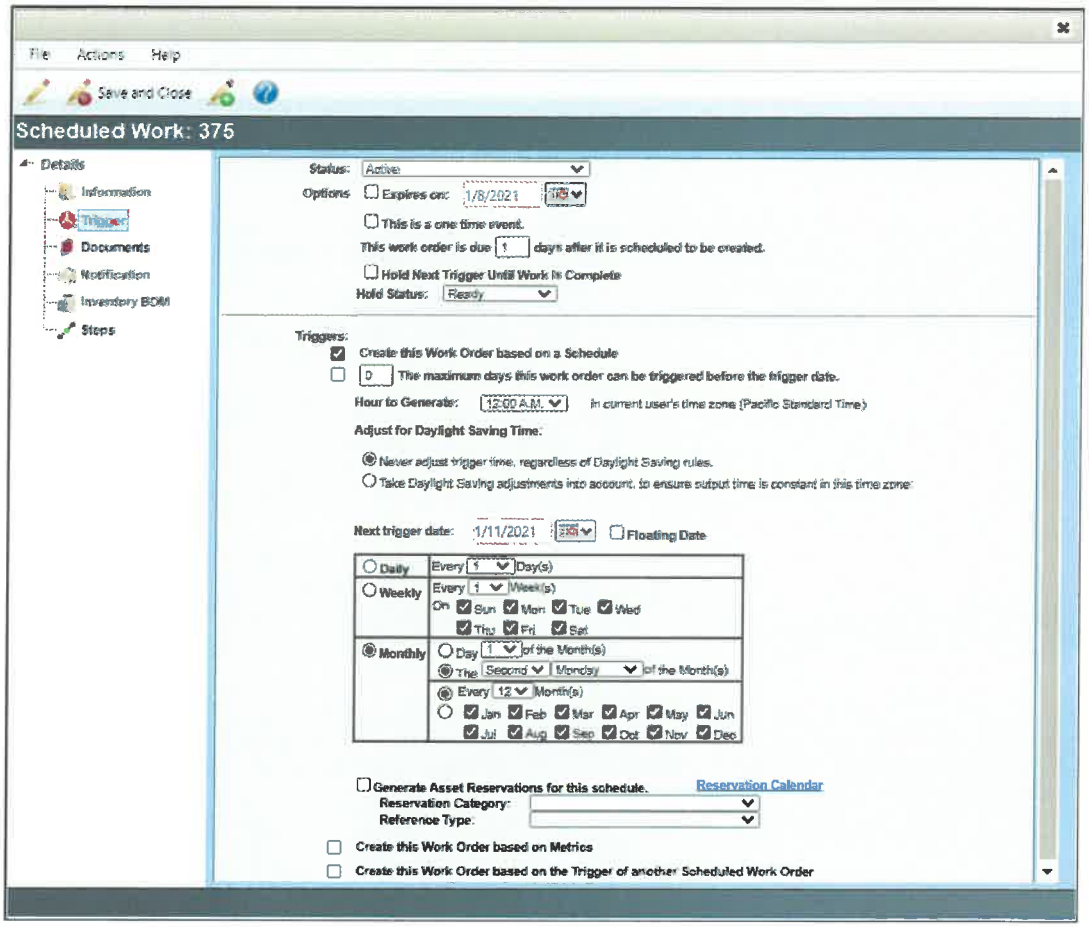


Figure 12 Scheduled Work Trigger Screen

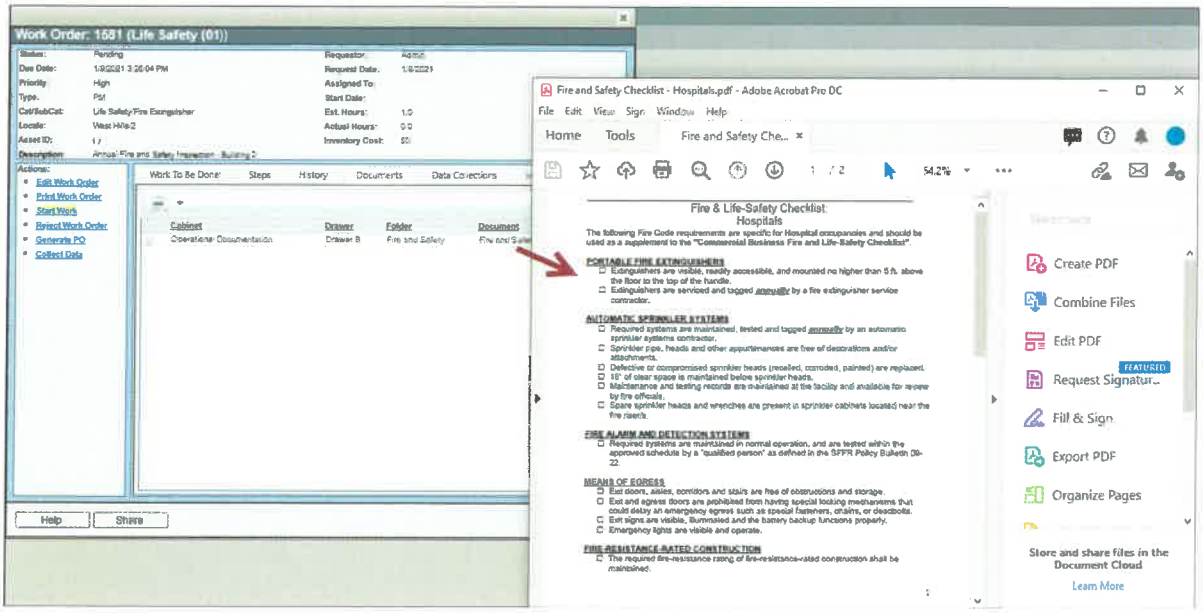


Figure 13 Life Safety Work Order

Work Order Management

TME® can generate repair and service request work orders. The TME® Work Tracking module tracks all aspects related to work performed on assets, from installing new equipment to issuing response or preventive maintenance work orders. Tracking and managing work requests, labor, planning, and scheduling allows organizations to make the most of their resources while improving productivity. Current, pending, completed and overdue work orders are displayed graphically in the Work Tracking Calendar.

Work Orders such as mechanic, equipment repairs, maintenance requests, janitorial work, or any work required by WVDOT can be generated and assigned to personnel (individuals or groups) with associated costs tracked and tabulated. TME® provides the ability to create new work orders, automatically or manually route/assign them to personnel, and track their progress through completion.

TME® provides the ability to set up work order templates for different types of work, assets, processes, etc. Each template can also incorporate specific notifications to designated personnel regarding the status of the work order overall. It also can include steps that further define certain types of work, sets up distinct pieces of data collection (such as an inspection, measurements, etc.), includes documentation separate from the overall work order, and notifies different groups or individuals via email or text the status of the step within the work order. The steps themselves are basically work orders within a work order that can be set up as required or optional, and therefore ensure that technicians are not only aware of requirements but document the start and finish of those requirements by merely starting and completing a step with a simple click of a button.

TME® logs all actions taken against a work order and/or step with the date/time stamp, user name, action taken, comments made, etc. WVDOT will have all information needed within easy reach for any audit or program review.

The Work Order Viewer provides a list of all pending and past due work orders and can be sorted or filtered by selecting criteria such as work order status and Asset ID. This is particularly useful to show past due work orders. Completed work orders can also be displayed using the search function.

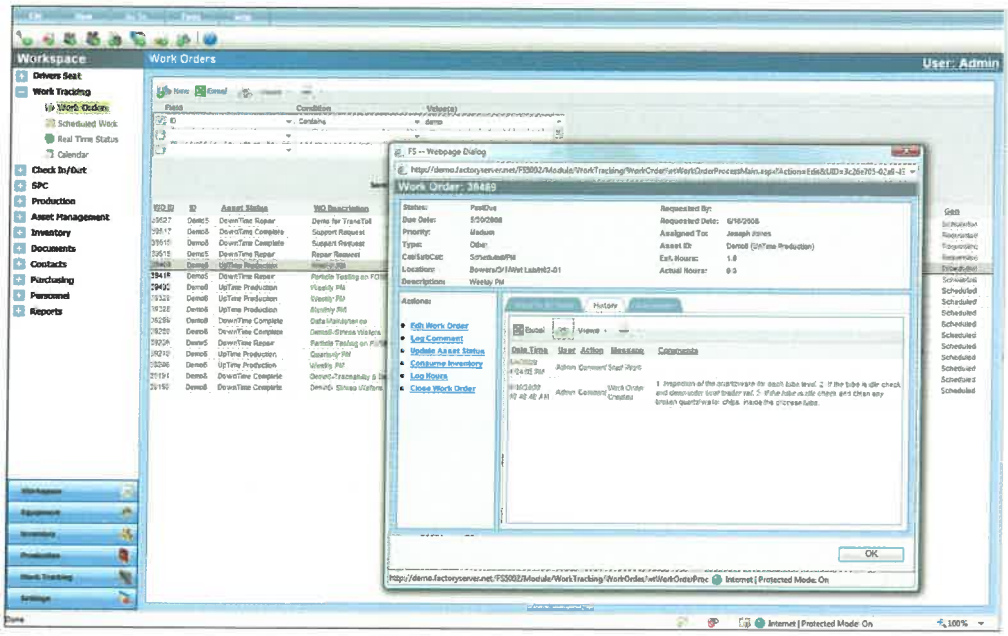


Figure 14 Work Order Screen

On a macro scale, Work Order Reports can be run to display all pending, past due and completed work orders based on equipment, locations, and other criteria. On a micro scale, Work Order Reports will show the complete history of the repair, including work history of multiple technicians and a detailed log of each status change to report on time-to-respond, time-to-repair, and other key work order metrics. Labor and Inventory costs can be reported on at the work order level or rolled up to an Asset, group of Assets or even a location. WVDOT will have the capability to price the mechanic work orders at any level.

Generation of Service Orders

Service Orders are easily created from within the Operations control on the Dashboard. Unscheduled (reactive) or service work may be requested by User who has been given access. Work Orders are generated by first identifying the desired asset and then describing the repair requested. All other data is automatically pulled from the database including the specific asset ID, location of the asset, the supplier, and other information such as requestor, time, priority, and work order category. Non-equipment related (support) work orders may also be requested—i.e., air conditioning or safety related items.

Automatic Generation of Work Orders Based on Testing

Assets that require periodic testing can have the data entered as an SPC collection whereby if any point is out of speciation, a work order will trigger automatically. This provides a complete cycle of failure and corrective action documentation for regulatory review and audits.

Work Order Cost Tracking

The TME® Work Tracking module tracks all aspects related to work performed on assets, from installing new equipment to issuing response or preventive maintenance work orders. Tracking and managing work requests, labor, planning, and scheduling allows organizations to make the most of their resources while improving productivity. Current, pending, completed and overdue work orders are displayed graphically in the Work Tracking Calendar.

Work Orders such as life safety tasks, mechanic, equipment repairs, maintenance requests, janitorial work, or any work required by WVDOT can be generated with associated costs (in hours or outsourced) tracked and tabulated.

Labor is tracked as Users log hours to the Work Order against a rate code. The header of the Work Order shows the total hours recorded against the Work Order, not the cost. This is so that Users do not know the dollar amount per hour for each rate code (many clients have outside vendors recording their work within TME® and do now want to reveal rates or they simply do not want Users to know what the different rates are amongst the technicians). Full Labor costing is available via Reports.

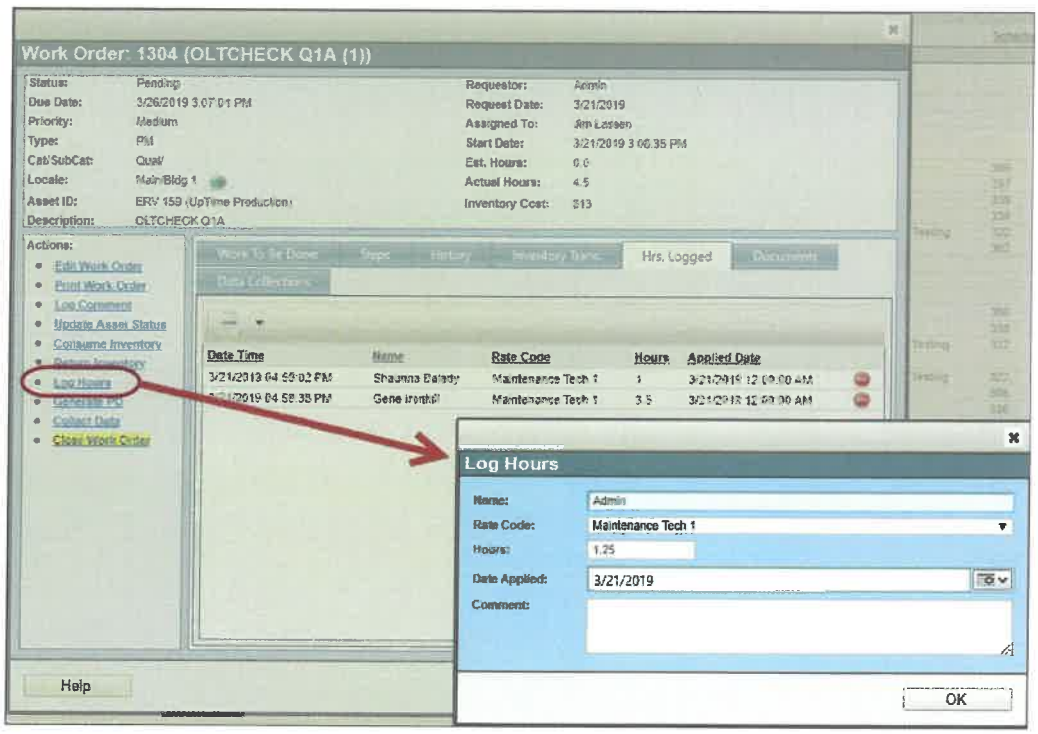


Figure 15 Logging Hours to Work Order

Inventory (tracked and non-tracked) such as spare parts, consumables, etc., are consumed directly to the Work Order thereby applying costs to associated Assts. Additionally, costs can be rolled up to locations, categories, and/or groups of Assets.

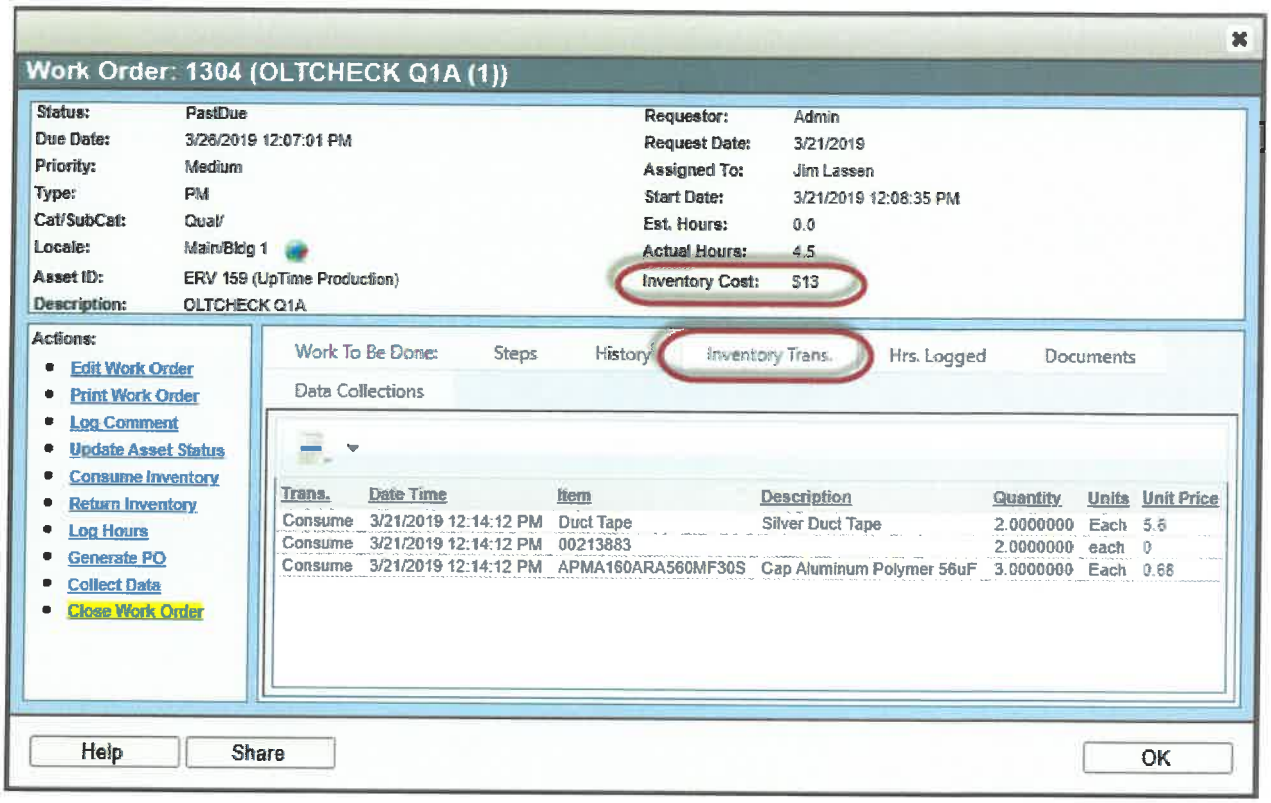


Figure 16 Consuming Inventory to Work Order

Not only are the costs available via Reports based on time-range, vehicle type, agency, etc., they can be provided onto custom configured reports that in turn are sent out as invoices. The corporate logo can be included along with proper terms and conditions.

Real-Time Equipment Status

Equipment Status in TME® is defined according to the standard specification for equipment maintenance and includes three major and 14 minor status conditions. The status of equipment is kept current on the Real Time Asset Status and Asset Equipment Status in TME® is defined according to the standard specification for equipment maintenance and includes three major and 14 minor status conditions. The status of equipment is kept current on the Real Time Asset Status and Asset Downtime screens which refresh every minute. Colors on the Real Time Status screen represent the current state of equipment to easily see if the equipment is in production, standby, down state or not in operation. The screen can be filtered to show specific assets and sorted by various groupings. By selecting an equipment of interest, the system links directly to a detailed summary of the equipment status.

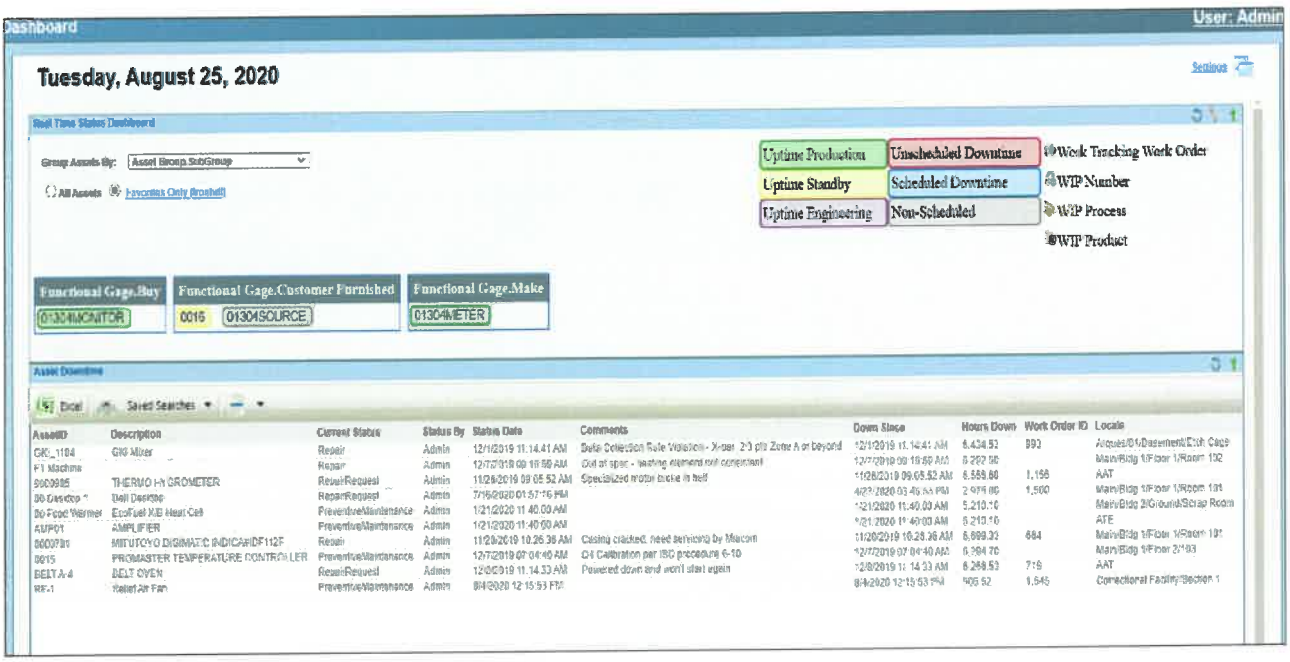
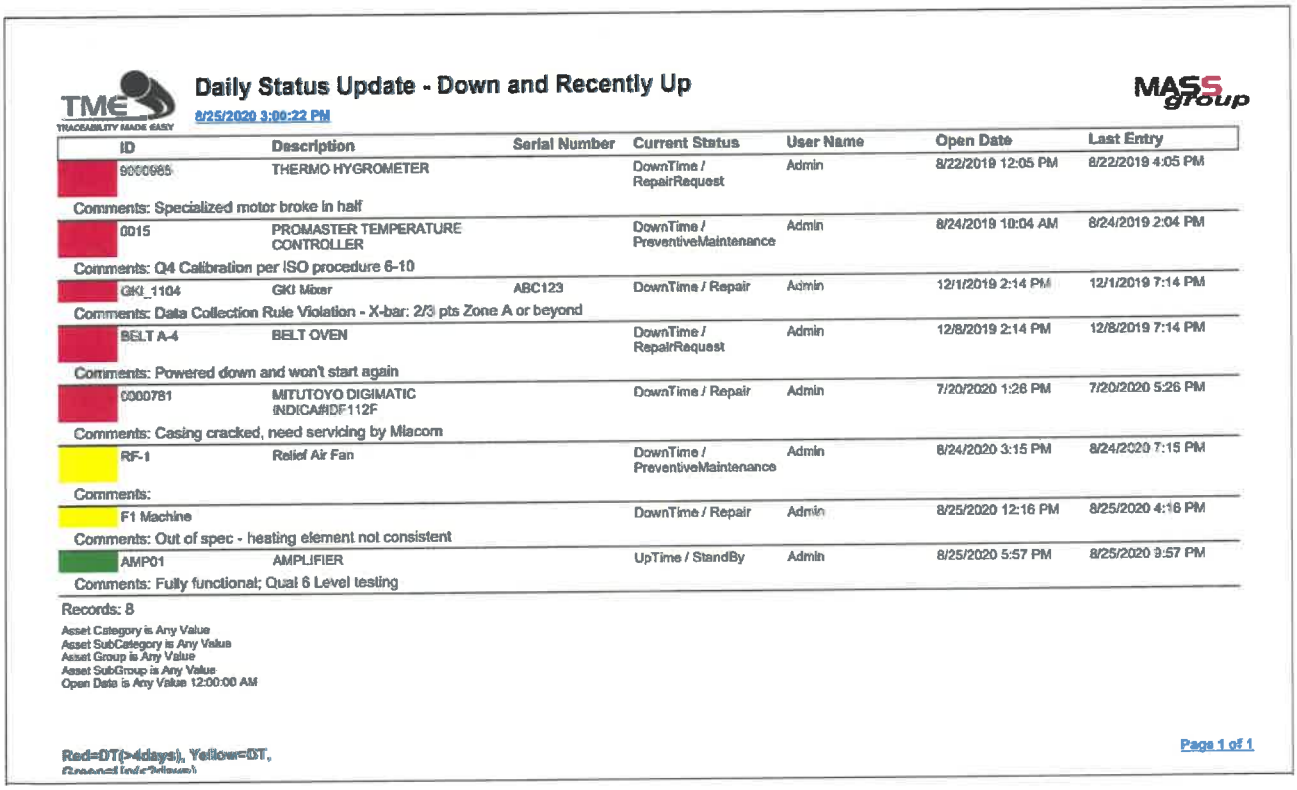


Figure 17 Real-Time Status Screen



Daily Status Update - Down and Recently Up

8/25/2020 3:00:22 PM

ID	Description	Serial Number	Current Status	User Name	Open Date	Last Entry
9000985	THERMO HYGROMETER		DownTime / RepairRequest	Admin	8/22/2019 12:05 PM	8/22/2019 4:05 PM
Comments: Specialized motor broke in half						
0015	PROMASTER TEMPERATURE CONTROLLER		DownTime / PreventiveMaintenance	Admin	8/24/2019 10:04 AM	8/24/2019 2:04 PM
Comments: Q4 Calibration per ISO procedure 6-10						
GKI_1104	GKI Mixer	ABC123	DownTime / Repair	Admin	12/1/2019 2:14 PM	12/1/2019 7:14 PM
Comments: Data Collection Rule Violation - X-bar: 2/3 pts Zone A or beyond						
BELT A-4	BELT OVEN		DownTime / RepairRequest	Admin	12/8/2019 2:14 PM	12/8/2019 7:14 PM
Comments: Powered down and won't start again						
0000781	MITUTOYO DIGIMATIC INDICA#DF112F		DownTime / Repair	Admin	7/20/2020 1:26 PM	7/20/2020 5:26 PM
Comments: Casing cracked, need servicing by Mlacom						
RF-1	Relief Air Fan		DownTime / PreventiveMaintenance	Admin	8/24/2020 3:15 PM	8/24/2020 7:15 PM
Comments:						
F1 Machine			DownTime / Repair	Admin	8/25/2020 12:16 PM	8/25/2020 4:16 PM
Comments: Out of spec - heating element not consistent						
AMP01	AMPLIFIER		UpTime / StandBy	Admin	8/25/2020 5:57 PM	8/25/2020 9:57 PM
Comments: Fully functional; Qual 6 Level testing						

Records: 8

Asset Category is Any Value
Asset SubCategory is Any Value
Asset Group is Any Value
Asset SubGroup is Any Value
Open Date is Any Value 12:00:00 AM

Red=DT(>4days), Yellow=DT,

Page 1 of 1

Figure 18 Daily Status Update Report

TME® Asset Management

TME® Asset Management maintains a complete database for all assets including fleet, vehicle equipment, tools, building equipment (valves and fire extinguishers), maintenance equipment, office equipment, IT equipment and any other user defined asset. Assets are assigned an Asset ID and can have additional information listed, such as asset description, manufacturer, Owner, asset model, group, subgroup, serial numbers, service dates etc. Additionally, Assets can be organized by Category (as defined by WVDOT), SubCategory, model, vendor, manufacturer, or group, such as a department, building, or campus. The System allows the End User flexibility to determine which asset characteristics are to be included and how the assets are to be organized.

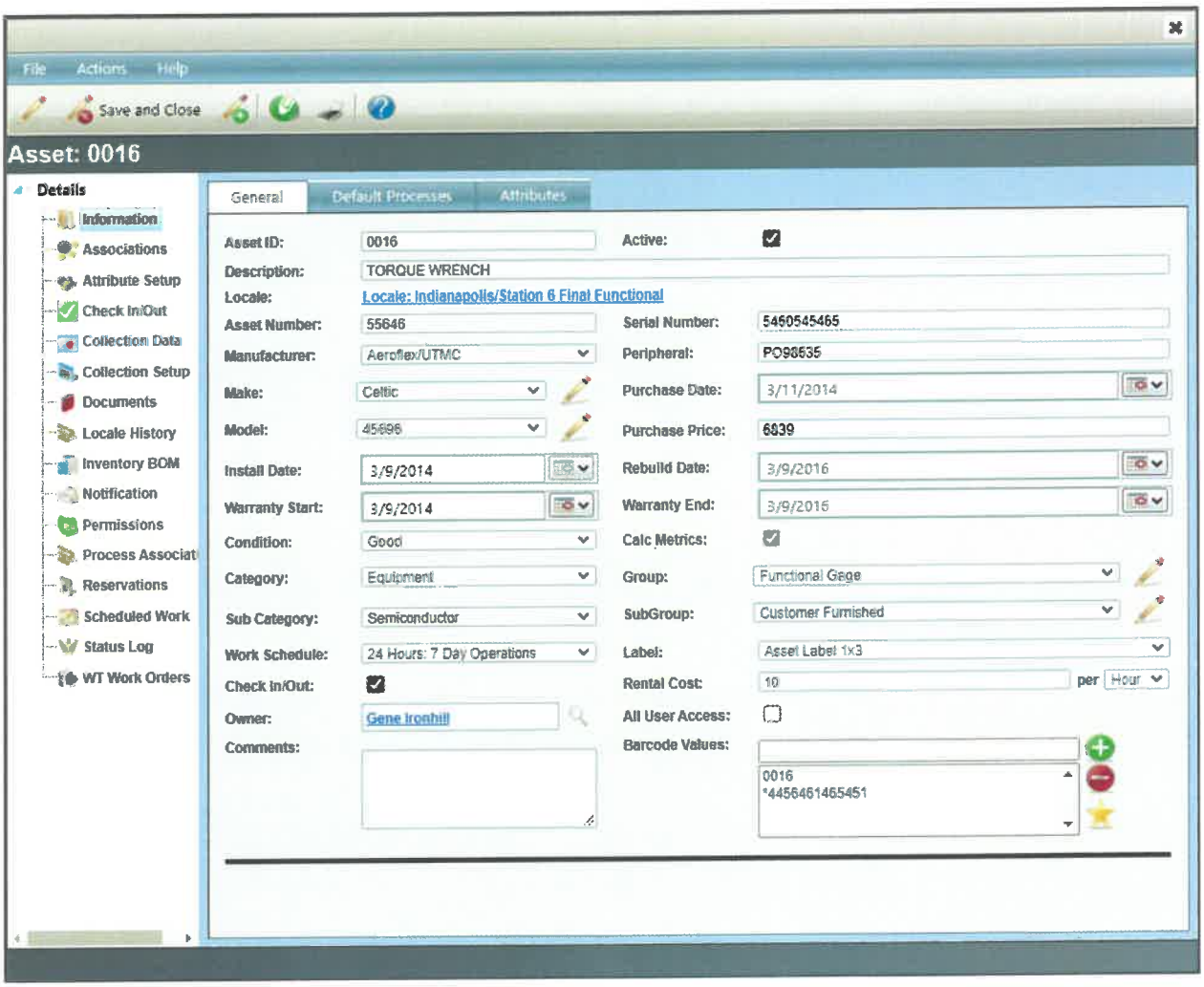


Figure 19 Asset Profile/Detail Screen

Other items can be tracked for each Asset, including purchase date, cost, and warranty information. Documents, manuals, or photos can also be linked directly to an Asset to be readily available. Every action taken against a piece of equipment is recorded – whether it's a repair, change in status, check-in/out, reconciliation, move from a location, etc.

User Defined Fields and Managed Drop-Down Lists

TME® provides the functionality for objects such as Assets, Inventory Items and Work Orders to be associated with user defined fields for single-instance or multi-instance data collection. These fields can be text, number, document link/upload, Statistical Process Control (SPC), date, drop-down list and formula formats. Examples of the use of these fields includes

the collection of depreciation calculations, disposition information, purchase order, contract number, meter readings, specification documentation, etc.

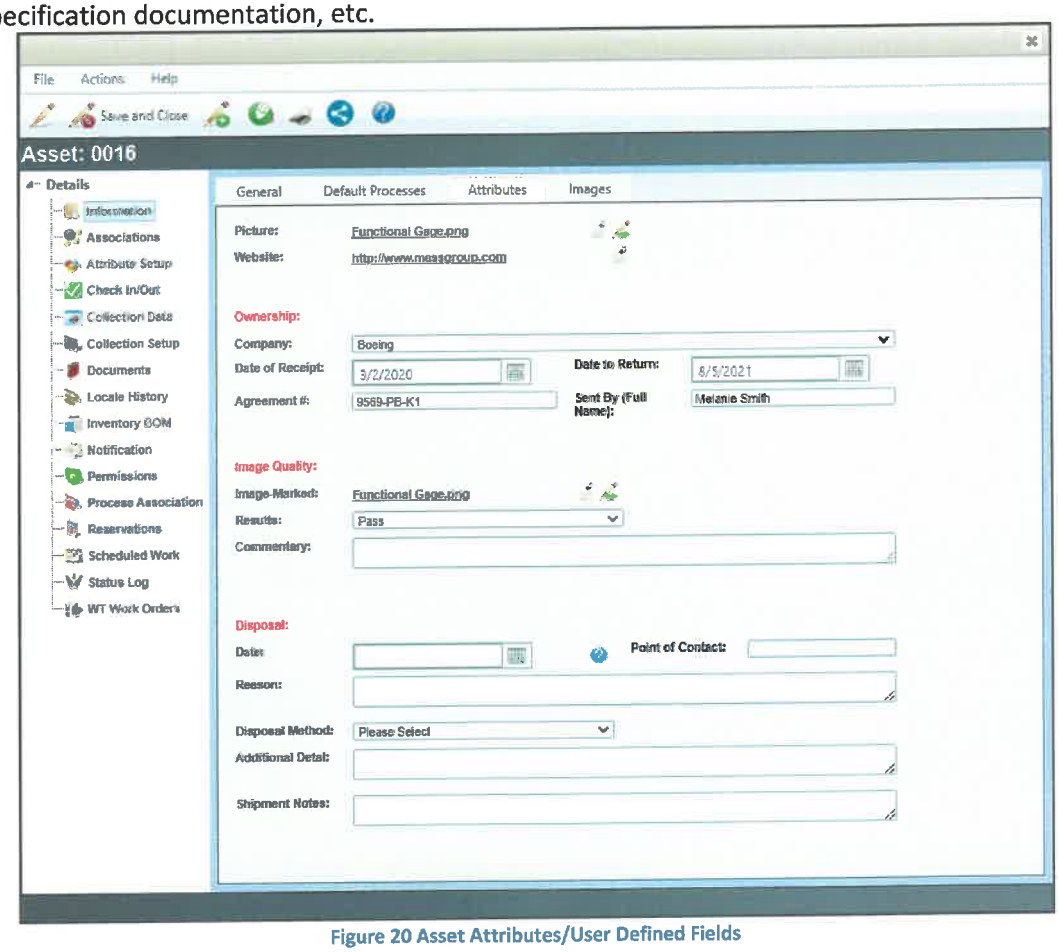


Figure 20 Asset Attributes/User Defined Fields

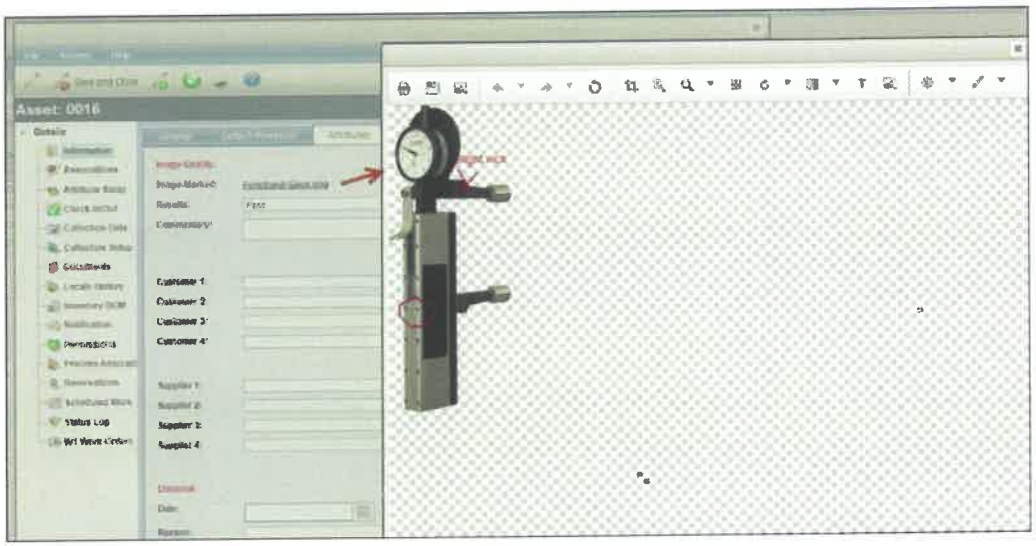


Figure 21 Functional Gage as an Attribute Image - Marked Up

User defined fields are also utilized to set up Data Collections for multi-instance collections such as daily checklists, mileage readings, etc. The data is time/stamped and recorded with the logged in User ID for complete history that is accessible onscreen from the Asset Detail screen or compiled onto a report.

The Data Collection can be configured to generate a Work Order based on a value submitted, whether it's a Yes/No, Greater than "#", or a meter reading. Meter Reading values can be configured to generate a Preventive Maintenance (PM) work order.

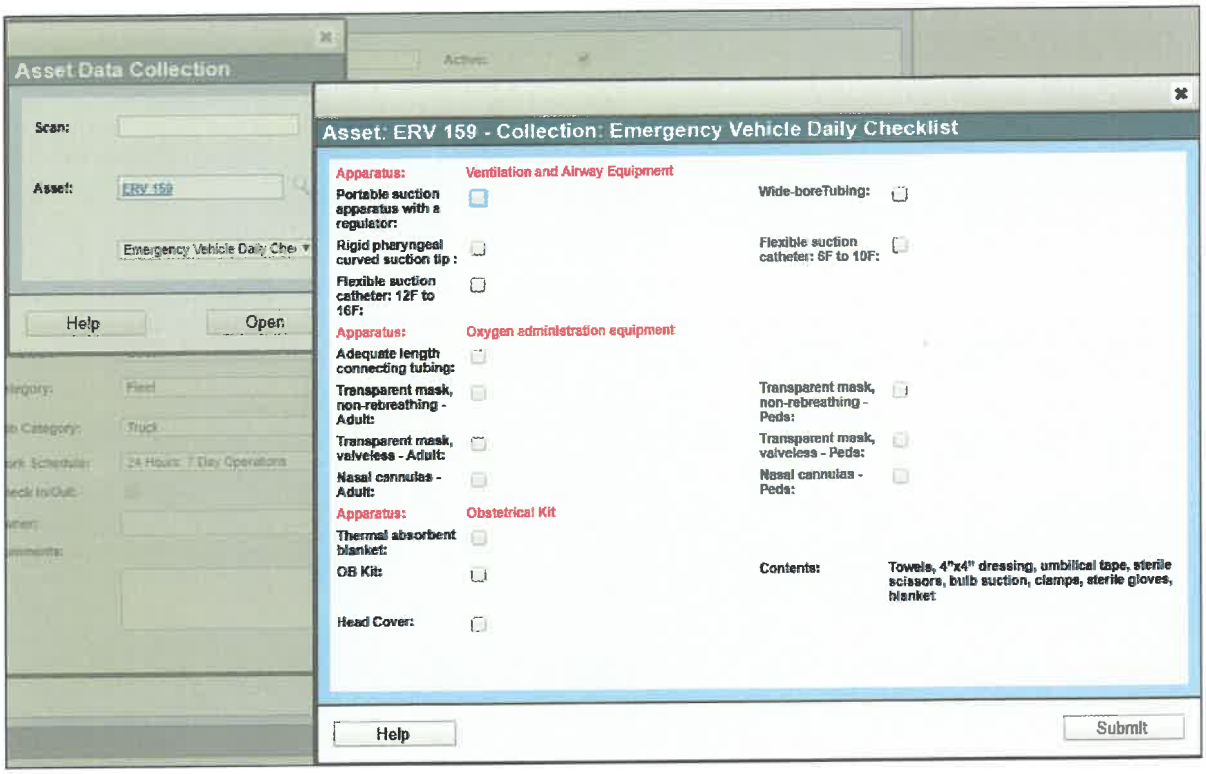


Figure 22 Example of an Apparatus Checklist

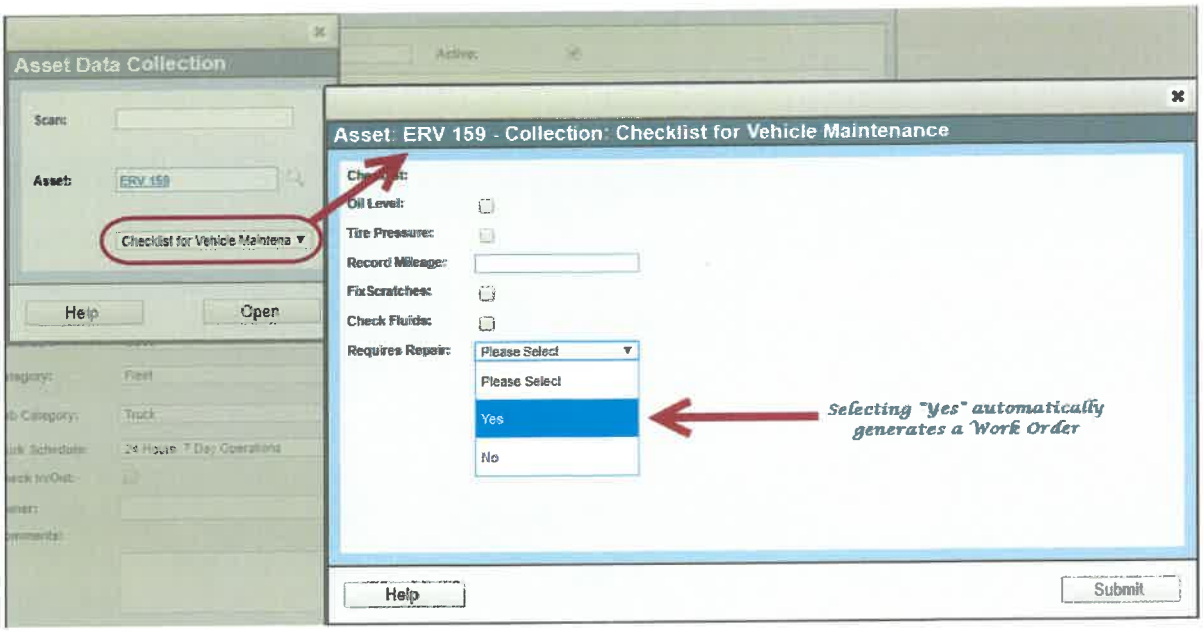


Figure 23 Example of a Daily Vehicle Maintenance Checklist

Hierarchal Location Management

In addition, each Asset can be assigned a location in a site. Locations can be configured to include site, building, floor, room, area or can be set up to reflect your specific location designations. Asset locations can be modified in TME® to reflect changes in the facility over time.

TME® provides five levels of hierarchical location definitions utilizing drop-down lists. These levels are defined by WVDOT and named accordingly. An unlimited number of User defined collection points are included to add defining characteristics—i.e., type of facility, space accommodations, measurements, etc. By tagging assets and locations with RFID or barcodes, users can effectively track assets down through the multi-tiered locations.

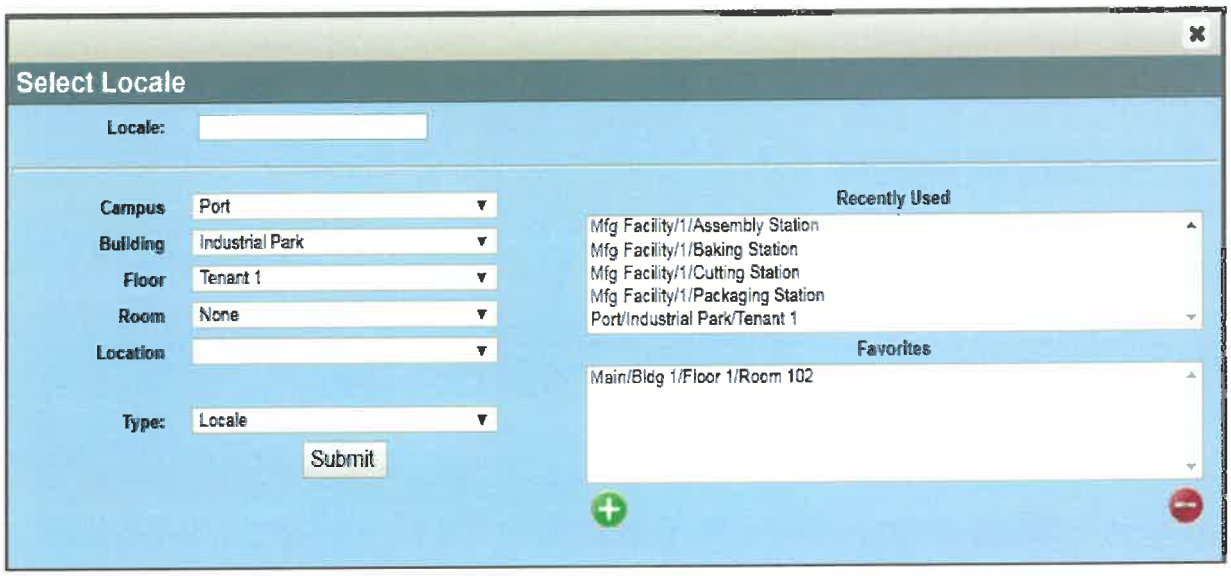


Figure 24 Locale Selector Screen - Includes Ability to Scan Locale Barcode

Parent/Child Relationship

TME® provides the ability to establish parent/child relationships amongst assets. Additionally, a multi-edit feature provides the ability for Users to edit fields for multiple assets as selected in a single transaction.

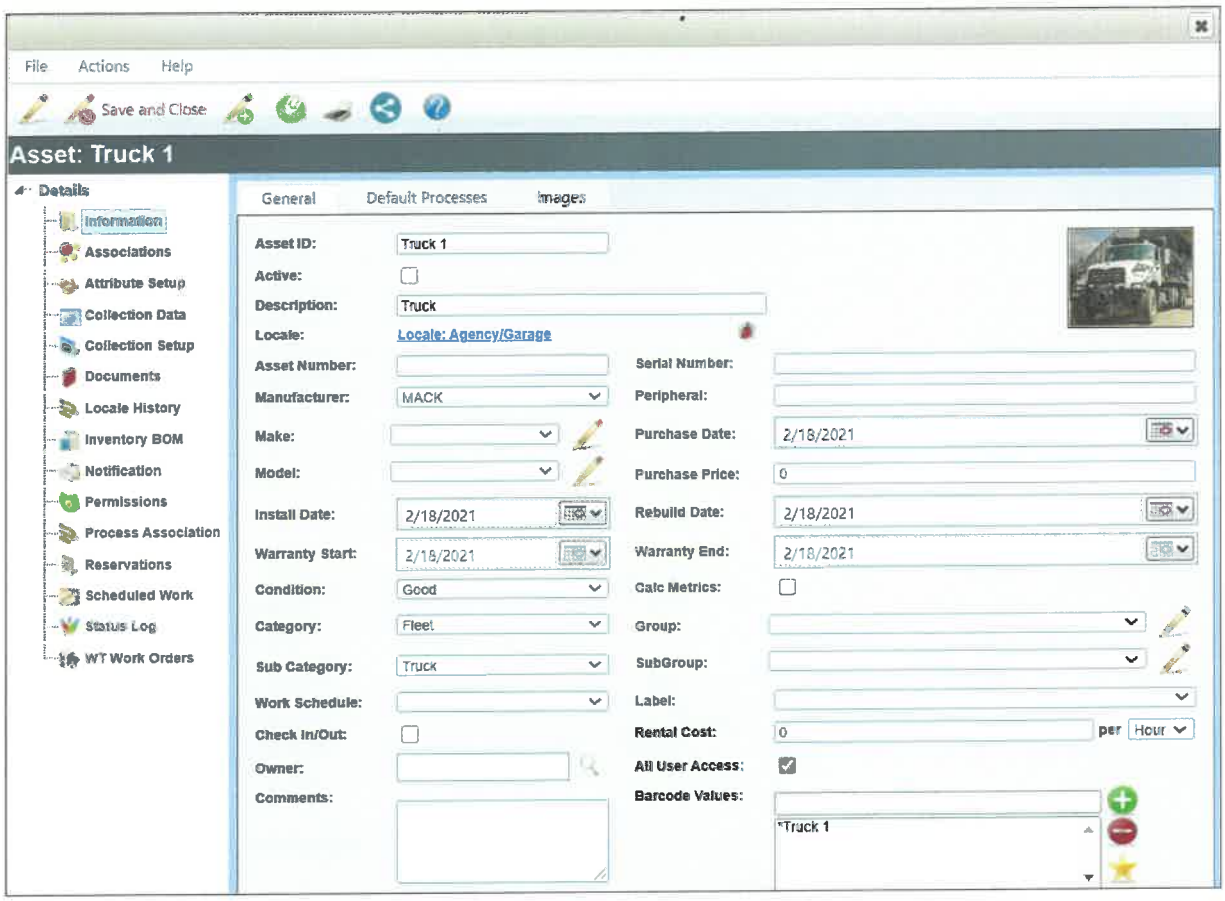


Figure 25 Asset Detail Screen for a Truck

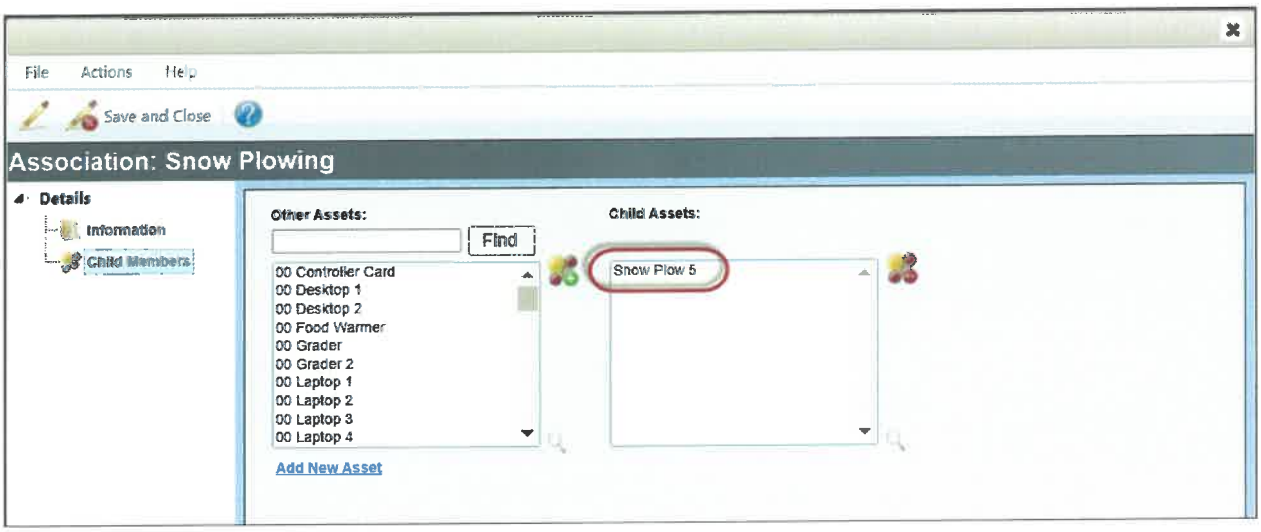


Figure 26 Association of Snow Plow to Truck

The Child Asset is associated by moving from the list of Assets over to the Child Assets field. This is done by selecting the Asset in the list on the left and clicking on the icon. To remove, select the Asset from the field on the right and click on the icon. There is no limit to the number of assets selected for a named association (in this case "Snow Plowing") or the number of associations that may be configured.

Notifications

Automatic notifications are inherent in TME® throughout the system regarding various transactions and statuses. MASS Group can also configure reports and scheduled work to provide full detail to generate on a predefined schedule and be sent out to designated personnel. Reports can be generated not only at on a set schedule with specific parameters but designated to go out at different hours of the day. This will provide locations across the US the ability to have their data generated at their preferred time schedule.

Equipment/Asset Check In/Out

Check In/Out tracks the time, date, length of time, and the identity of the person who checked out/in an asset. This feature is particularly useful for tracking mobile assets (e.g., vehicles, keys, tools, etc.) that are used by multiple personnel and moved from location to location for any period of time. Rental costs by the hour or day can be associated to each Asset. WVDOT will be able to run a report of charges to personnel/ departments and generate revenue accordingly. RFID tags or barcodes can be associated to the Assets. When users check out an asset, the asset tag is scanned and saved. The asset will then be "checked out" to them. When the user returns the asset, it is scanned and "checked in." TME® tracks all transactions and work orders for the Assets. Combined with the setup of all preventive maintenance, calibrations and scheduled events, WVDOT will be able to analyze trends based on experience and forecast budgets based on future scheduled events. Over time, WVDOT will be able to have a full understanding of the costs, labor time, unscheduled downtime, etc., of any given Asset or group of Assets.

Scheduled Inventory Audit (Reconciliation) Support

Reconciliation can be completed easily by choosing the location and scanning every barcode or RFID tag in sight. TME® will show onscreen (whether on computer via the web application or offline via handheld device uploaded with TME® Mobile) what Assets were scanned, which ones are still missing, and those barcodes that have been scanned but are not in the system. The End User will have the opportunity right then and there to input the Asset description, serial number and an ID for any unknown barcode not associated with an Asset.

Reconciliations can be configured to be conducted by specific personnel over a set timeframe. All scans are logged with a time/date stamp and User ID of the personnel conducting the scans. Notifications of overdue reconciliations are available via reports set up to generate on a regular schedule to designated personnel.

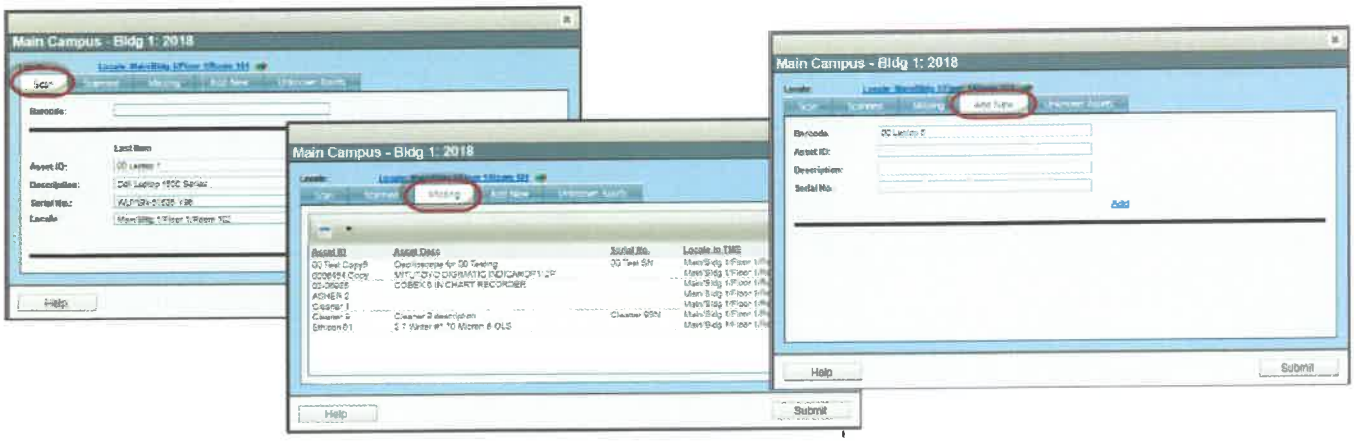


Figure 27 Data Collection Screens when Reconciling Assets

Bar Code and RFID Tag Support

TME® integrates the latest in barcode and RFID technology, making data collection fast, easy, and accurate. Barcode labels for assets can be printed to include the name, description, serial number, barcode, and any other needed fields such as make or model number directly from TME®. The labels use standard barcodes and can be configured for multiple sizes and designs per WVDOT's needs. Although highly recommended, barcodes are not required for use in TME®. If an Asset does not have one upon delivery from supplier, it can be generated and printed directly from TME® to any label printer (local or network).

RFID Tags can be associated to the Assets as well. Tags can include a barcode and human readable to server as both an RFID signal source and barcode value. As TME® can accommodate multiple barcode/tag values per Asset, the RFID tag value and barcode do not need to be identical.

Figure 28 Example of Standard Asset Label

Barcode labels can be reprinted at any time for any item. If using pre-printed generic labels, it can be added and both barcodes associated to the item.

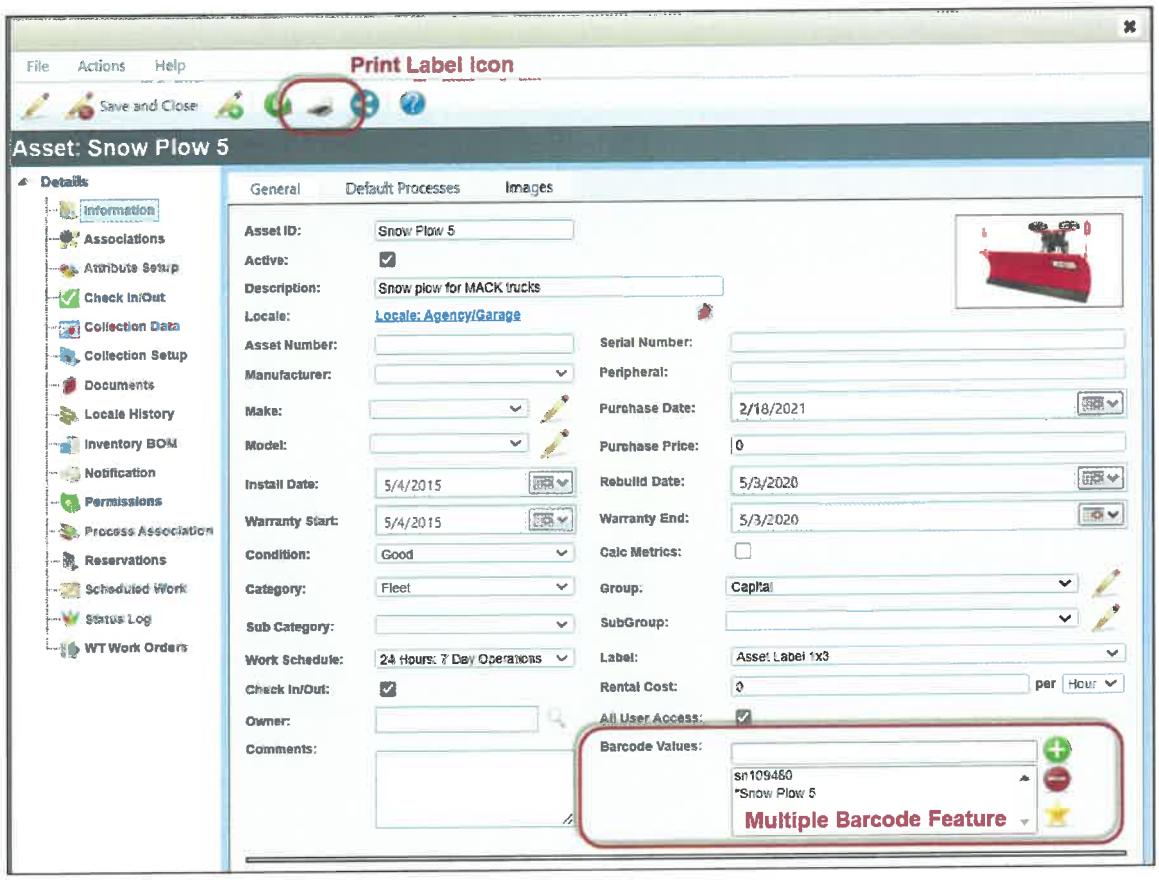


Figure 29 Snow Plow Detail Screen - Multiple Barcodes and Print Label Icon

INVENTORY MANAGEMENT

TME® Inventory Management helps you to manage inventory receiving, consumption, supply levels, expiration and shelf life to achieve Just-In-Time Inventory. TME® sends alerts when inventory approaches critical levels to WVDOT or stockroom personnel, ensuring that you always have the right amount of stock on hand. By delivering up-to-the minute information on your inventory, TME® helps you to avoid costly errors such as increased pricing resulting from insufficient stock, or reduced cash flow or space due to stock surplus. By utilizing Batch Numbers (Containers), WVDOT will be able to report on traceability of the consumable items throughout the facility and its usage.

The following screenshot provides a glimpse into the look and feel of TME® along with a sampling of a basic workflow—from item identification to receiving to consume.

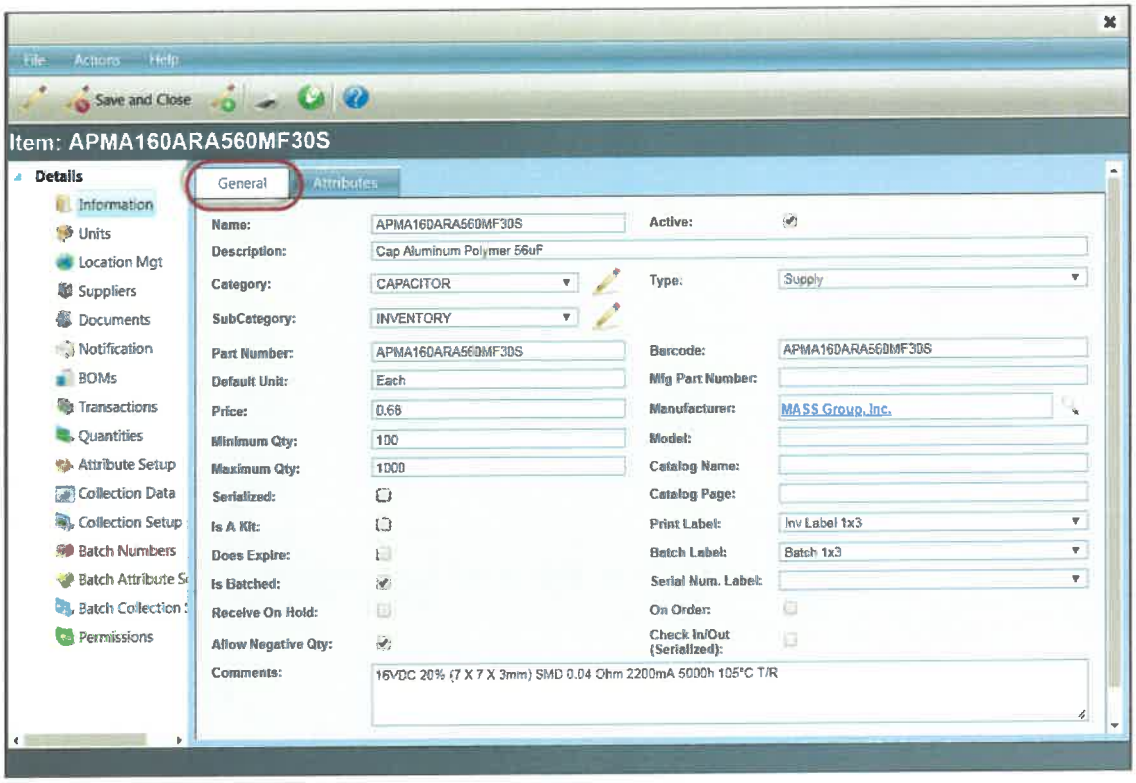


Figure 30 Item Detail Screen

Purchase Orders

TME® Purchase Orders allows you to automatically create requisition and purchase order forms to order supplies, spare parts, and contractor services quickly and accurately. Personnel can digitally request new purchase orders, modify purchase quantities, and select approved suppliers. Purchase orders can be or emailed ensuring that you have the supplies or services you need on time. Printed orders can be customized and formatted to match WVDOT's for purposes of submitting as an official order to the supplier.

Purchase Order ID: 16

PO Number: CH16 **Request Type:** Electronics
Description: Parts for fleet maintenance
Supplier: LONGHILL
Supplier Address: 111 Main Street, Redding, CA 96001,
Supplier Phone: 818-888-8888
Location: Chatsworth **Date Requested:** 10/4/2016 8:00:00 PM
Date Required: 11/18/2016 **Expiration Date:** 11/4/2016
Comments

Ship To: Gamal Balady **Bill To:** Brian Turner
Address: 21601 Devonshire St. **Address:**
City: Chatsworth **City:** Las Vegas
State & Zip: CA91311 **State & Zip:** NV
Carrier: USPS **Method of Shipment:** Ground
Insurance Req?: No
Requestor Name: Gamal Balady **Released By:** Admin
Requestor Email: gironhill@massgroup.com
Requestor Phone: 818-709-1255
Requestor Dept: Facilities

Name	Description	Manufacturer	Qty	Unit	Price	Total
1210-A	Epibond Epoxy		50		$19.25	$962.50
BM-CAPACITOR-003	CAPACITOR; 6X658A, 370VAC, 60HZ	GE	50	EACH	$2.35	$117.50
BM-CARB-KIT-002	CARBURATOR KIT; f/CHAINSAW		10	KIT	$225.00	$2,250.00
BM-ELE-FUSE-020	FUSE; 600VAC, 10A	ECON	150	EACH	$5.00	$750.00
					Total:	$4,080.00

Figure 31 Sample Purchase Order

Receiving Inventory

By selecting the appropriate Purchase Order (PO), the supplier and inventory item information automatically populates the Receiving screen. The supplier and items (non-tracked items as well) can also be selected manually in the absence of a PO. Quantity, batch number and/or serial number information can be added on the spot. Once submitted, the quantity on hand for the items at the designated location(s) is automatically updated.

POs can be received fully within a single transaction or partially via multiple transactions. WVDOT will be able to track all items on order and follow up with suppliers accordingly.

There are an unlimited number of user defined fields on a receipt for the inclusion of name plate data such as inspection codes for quality control, shipment number, etc. Mandating the entering of attribute data will establish optimal receiving procedures that will prevent acceptance of shipments which are off-spec, incorrect, or improperly packaged, and reducing unnecessary waste generation and returns.

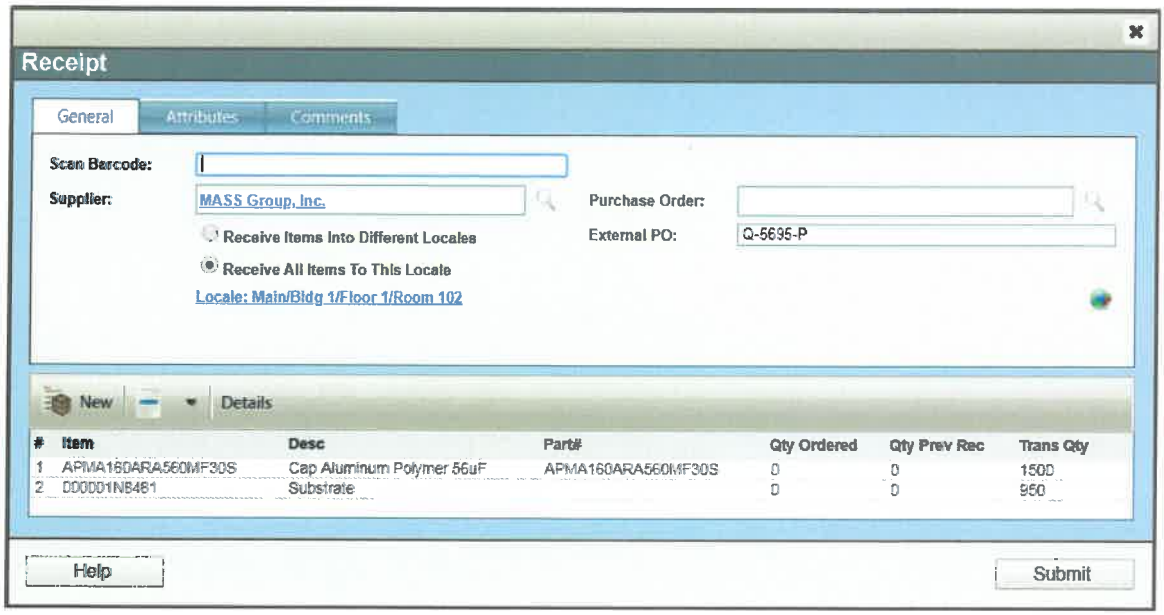


Figure 32 Inventory Receipt

Warehouse and On-Hand Parts

TME® helps you to manage inventory consumption, supply levels, expiration and shelf life to achieve Just-In-Time Inventory. TME® sends alerts when inventory approaches critical levels to WVDOT or stockroom personnel, ensuring that you always have the right amount of stock on hand. By delivering up-to-the minute information on your inventory, TME® helps you to avoid costly errors such as increased pricing resulting from insufficient stock, or reduced cash flow or space due to stock surplus.

WVDOT personnel will have real time maintenance and management of all inventories including spare parts, tires, filters, lubricants, bearings, seals, and consumables supplies at multi storeroom locations. TME® Inventory can record transactions taken against inventory items, such as Consume, Scrap, Transfer, Put, Take and Return. Quantities of inventory items can also be grouped and tracked by lot numbers. The System also allows you to associate inventory to a specific user, vehicle, building, storeroom etc.

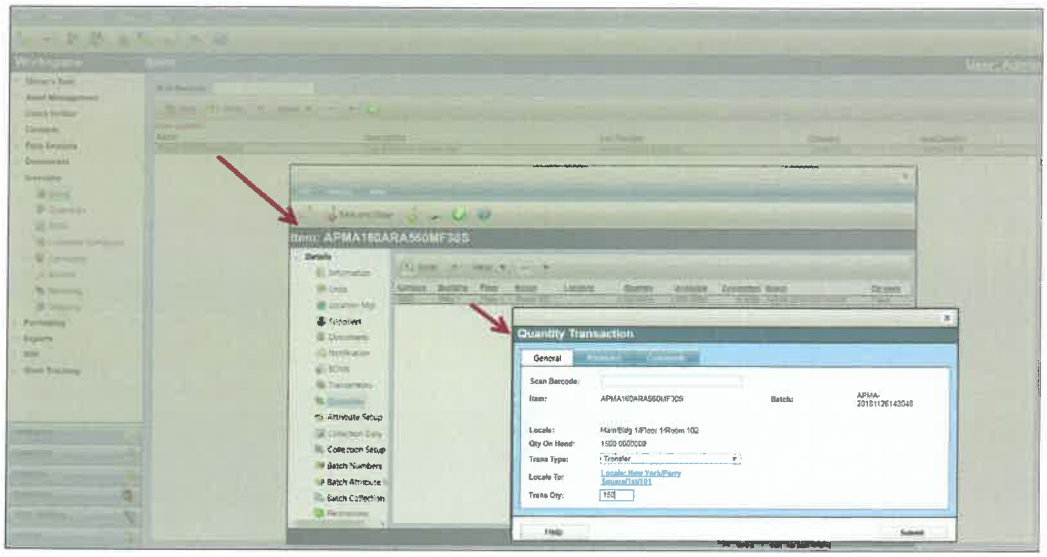
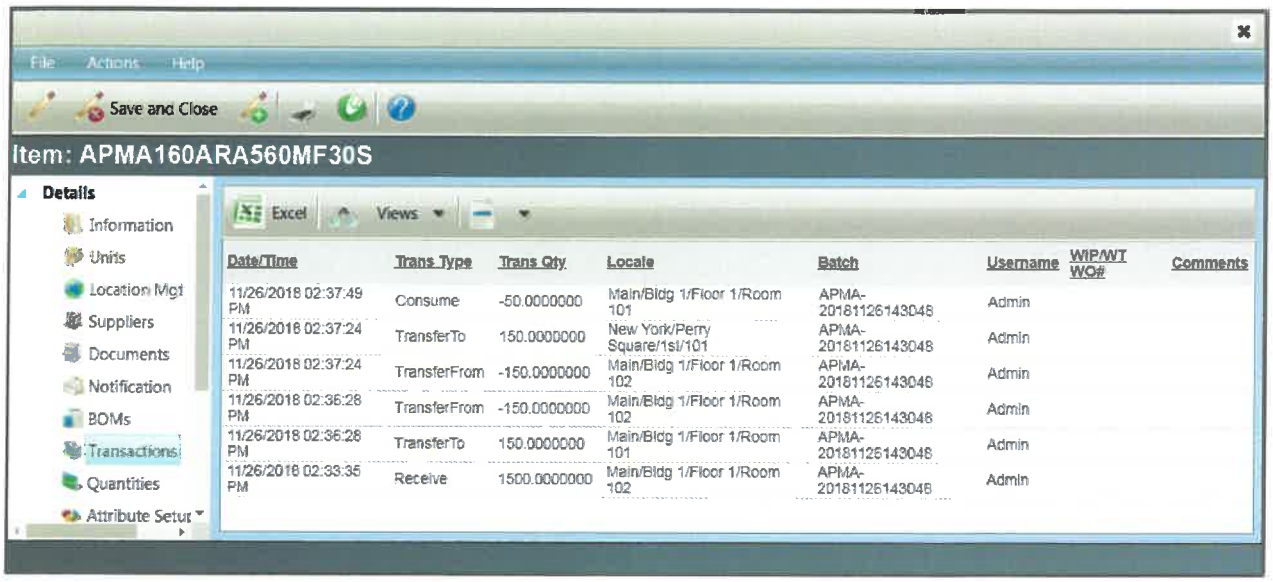


Figure 33 Transfer Transaction Directly for Item Quantity Screen



Date/Time	Trans Type	Trans Qty	Locale	Batch	Username	WIP/WT WO#	Comments
11/26/2018 02:37:49 PM	Consume	-50.0000000	Main/Bldg 1/Floor 1/Room 101	APMA-20181126143048	Admin		
11/26/2018 02:37:24 PM	TransferTo	150.0000000	New York/Perry Square/1st/101	APMA-20181126143048	Admin		
11/26/2018 02:37:24 PM	TransferFrom	-150.0000000	Main/Bldg 1/Floor 1/Room 102	APMA-20181126143048	Admin		
11/26/2018 02:36:28 PM	TransferFrom	-150.0000000	Main/Bldg 1/Floor 1/Room 102	APMA-20181126143048	Admin		
11/26/2018 02:36:28 PM	TransferTo	150.0000000	Main/Bldg 1/Floor 1/Room 101	APMA-20181126143048	Admin		
11/26/2018 02:33:35 PM	Receive	1500.0000000	Main/Bldg 1/Floor 1/Room 102	APMA-20181126143048	Admin		

Figure 34 Transaction Log - Full History with Username and Date/Time Stamp

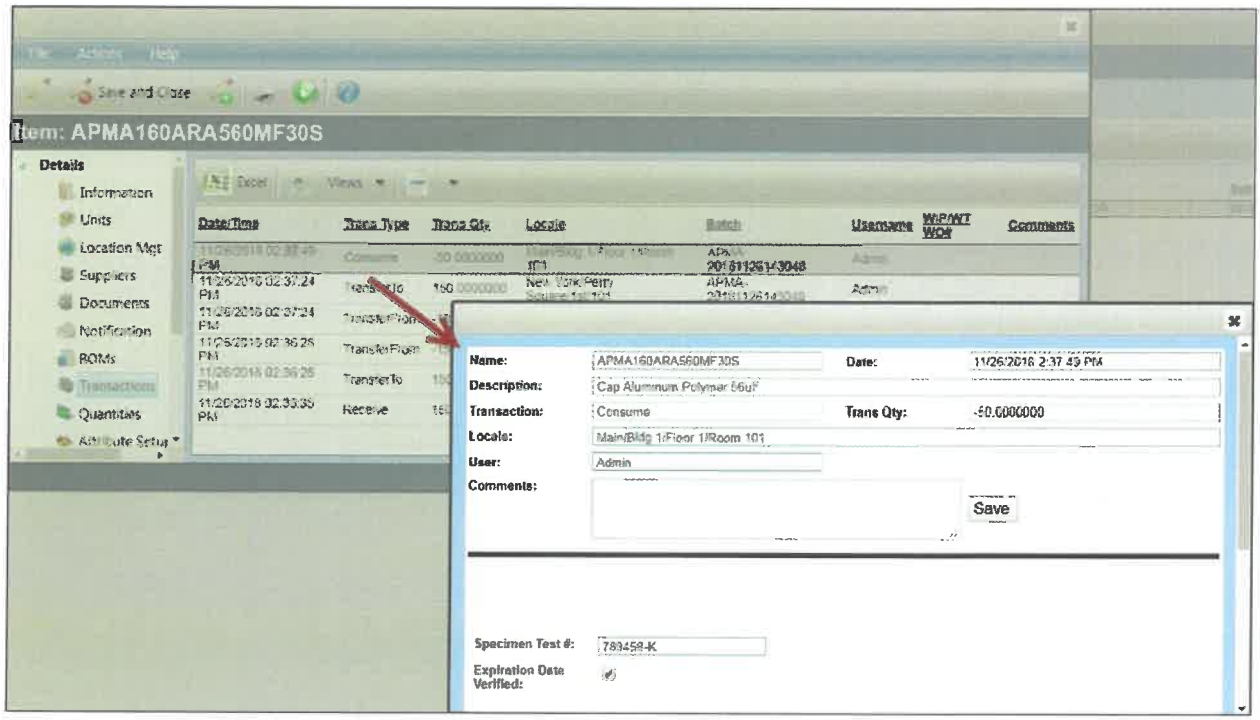


Figure 35 Consume Transaction Detail Screen

TME® integrates the latest in barcode technology throughout the modules, making data collection fast, easy, and accurate. Tags for items can be printed to include the name, expiration date, barcode, serial number, and any other needed fields such as batch/container number directly from TME®. The labels can be configured for multiple sizes and designs per WVDOT's needs.

Figure 36 Example of Standard Batch Label

By tagging your batch numbers, locations, and ownership with barcodes, you can effectively track your inventory down through multi-tiered locations. That is, you can pinpoint the country, warehouse, building, floor, room, shelf and/or row in which the quantity of inventory resides. TME® captures a complete history of inventory location and movement, such as transfers, consumes and disposals.

Notifications

TME® sends alerts when inventory approaches critical levels, ensuring that you always have the right number of parts, supplies, etc. on hand. By delivering up-to-the minute information, WVDOT's personnel will have real time maintenance and management of all inventories including spare parts, tires, filters, lubricants, bearings, seals, and consumables supplies at multi warehouse locations.

Min-Max Order Report by Location

TME®'s Reorder by Location report shows any item that is below its minimum point and how much to order to reach that point for the location. The report also shows the maximum quantity to order to not go over the maximum allowed for a location (this allows for maximum utilization of storage space as well as efficient ordering – having too much stock on hand can be just as bad as running out). Re-order points can be set within TME® for each item overall for the organization or by location. Personnel can receive automatic email alerts to notify them if inventory is low.

Reorder by Location
1/7/2010 6:41:35 PM

Inventory Item	Description	Location	Current Quantity	Reorder Point	Qty Max	Min Qty to Order	Units	Max Qty To Order
20um 10"	20um 10" Water Filter	Kleid/Nolan/1st/101/Section A	10	20	50	10	EA	40
50um 10" Serialized	50um 10" Water Filter	Kleid/Nolan/1st/101/Section A	9	15	30	6	EA	21
50um 20"	50um 20" Water Filter	Andrews/Hughes/1/Etch Lab/Bay 13	3	7	25	4	EA	22
AMHS 8-BIT SENSOR	8-BIT SENSOR	Kleid/Nolan/1st/101/Section A	3	8	21	5	EA	18
AMHS BATTERY A	BATTERY	Andrews/Johnson/2/Parts Room/Parts Cage	8	9	11	1	EA	3
Metrology Distilled Water	Distilled water	Andrews/Johnson/2/Parts Room/Parts Cage	3	4	6	1	EA	3
Metrology Photo Sensor	Genmark Photo Sensor	Bowers/3/1/Ball Room/Zone A	2	16	40	14	EA	38
Wet Lab - 49% HF	Acid	Bowers/2/2/Metrology Storage/Cage 1 / Shelf C / Bin A1	1	2	5	1	EA	4
		Andrews/Johnson/3/Wet Lab/Wet Lab	-1,024	60	60	1,084	Gallon	1,084

Full Location Name is Any Value
Inventory Item is One Of 20um 10|50um 10 Serialized|50um 20|AMHS 8-BIT SENSOR|AMHS BATTERY A|Metrology Distilled Water|Metrology Photo Sensor|Wet Lab - 49% HF

Figure 37 Inventory Reorder by Location Report

Image Upload Capability

Images can easily be uploaded to Assets/equipment and Work Orders in TME®. An unlimited number of images can be associated with equipment with one set as the default thumbnail on the main screen. Images can be opened in a separate window for zoomed in viewing.

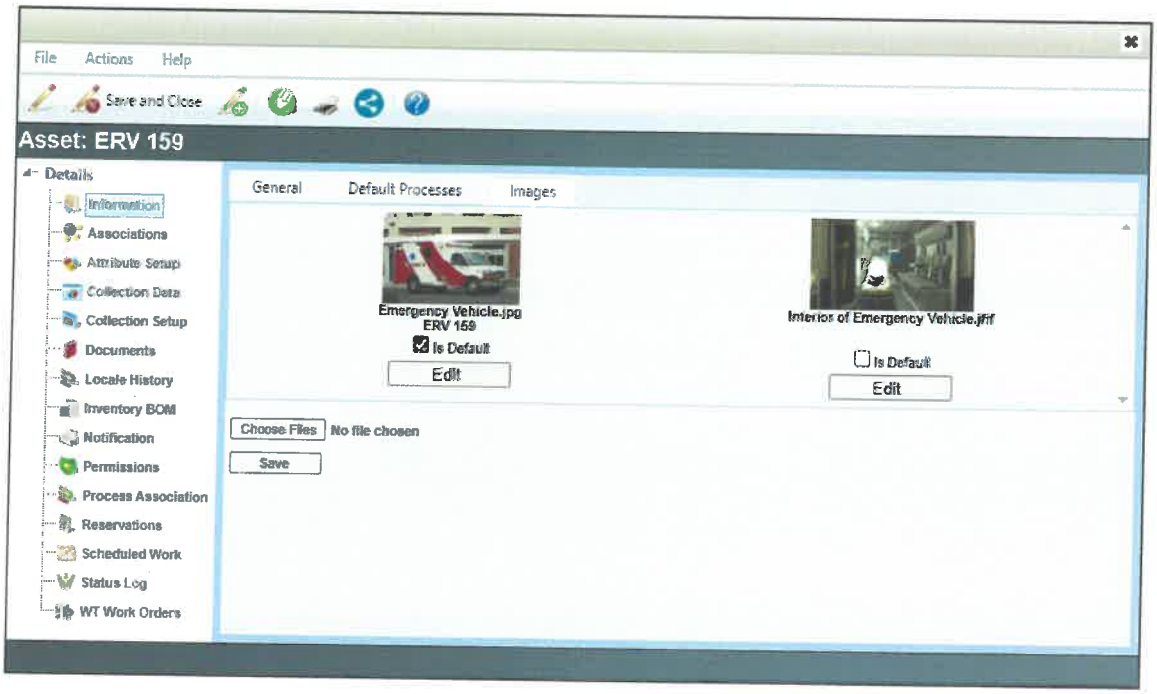


Figure 38 Multiple Images Uploaded to Asset

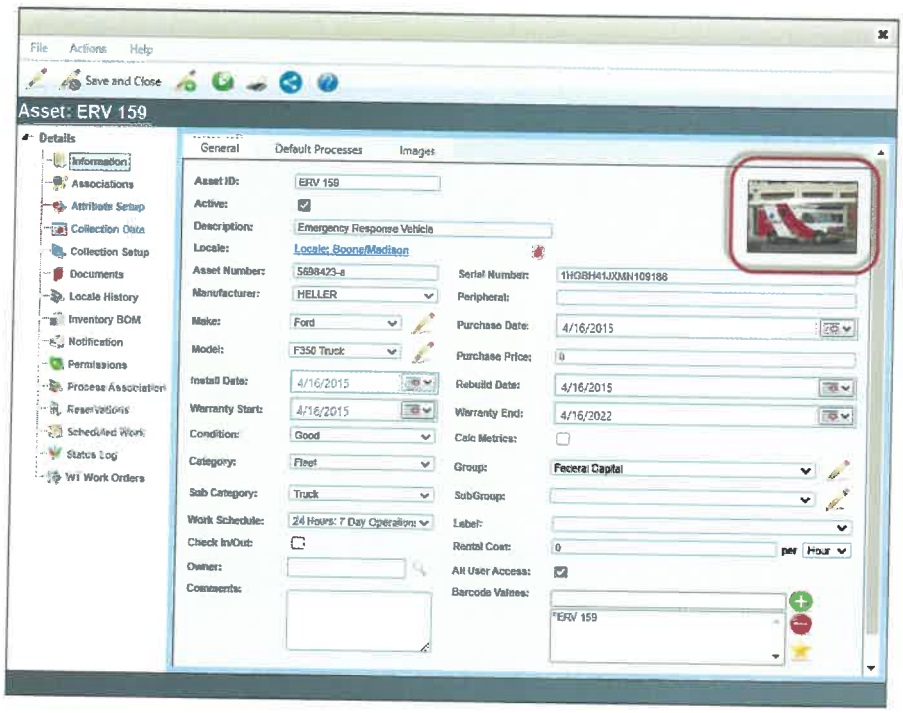


Figure 39 Equipment with Thumbnail Image

An unlimited number of images can be uploaded with Work Orders/PMs and Service/Repair requests via the TME® web application or TME® Mobile.

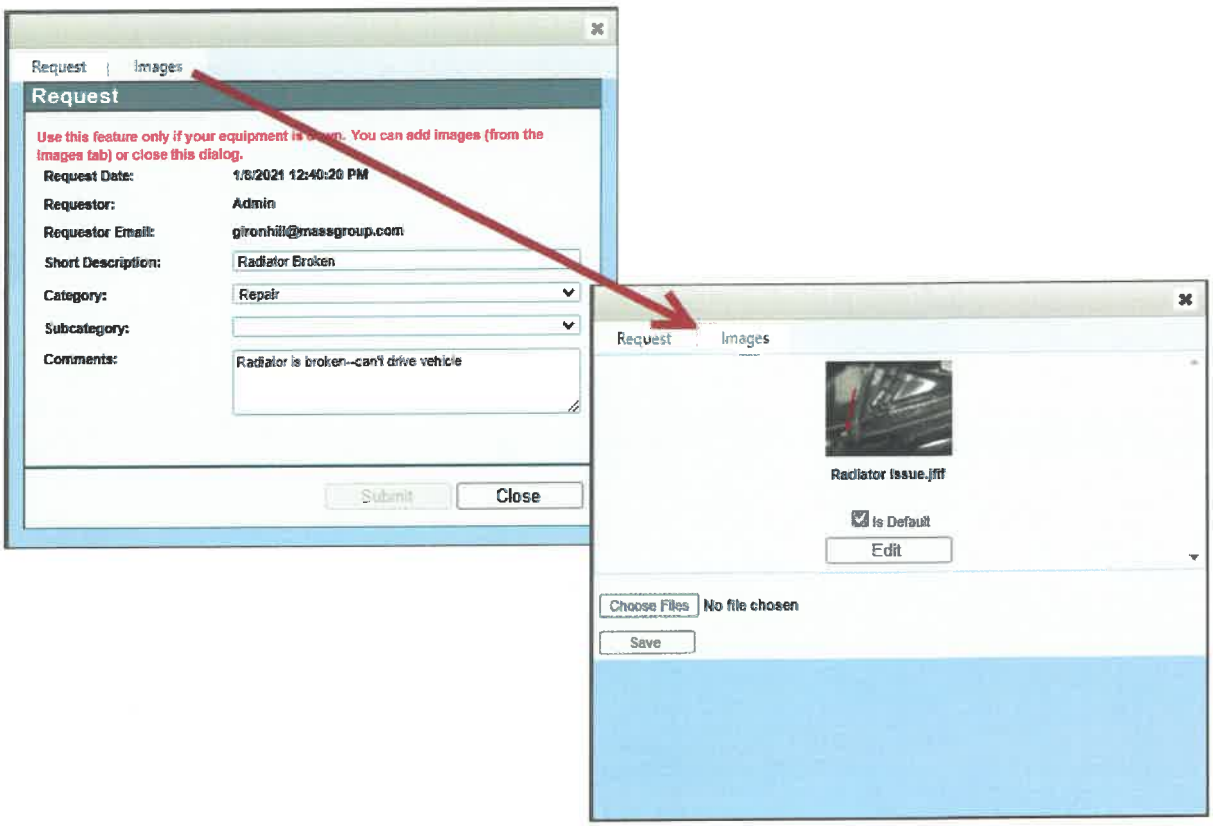


Figure 40 Repair Request with Image Upload

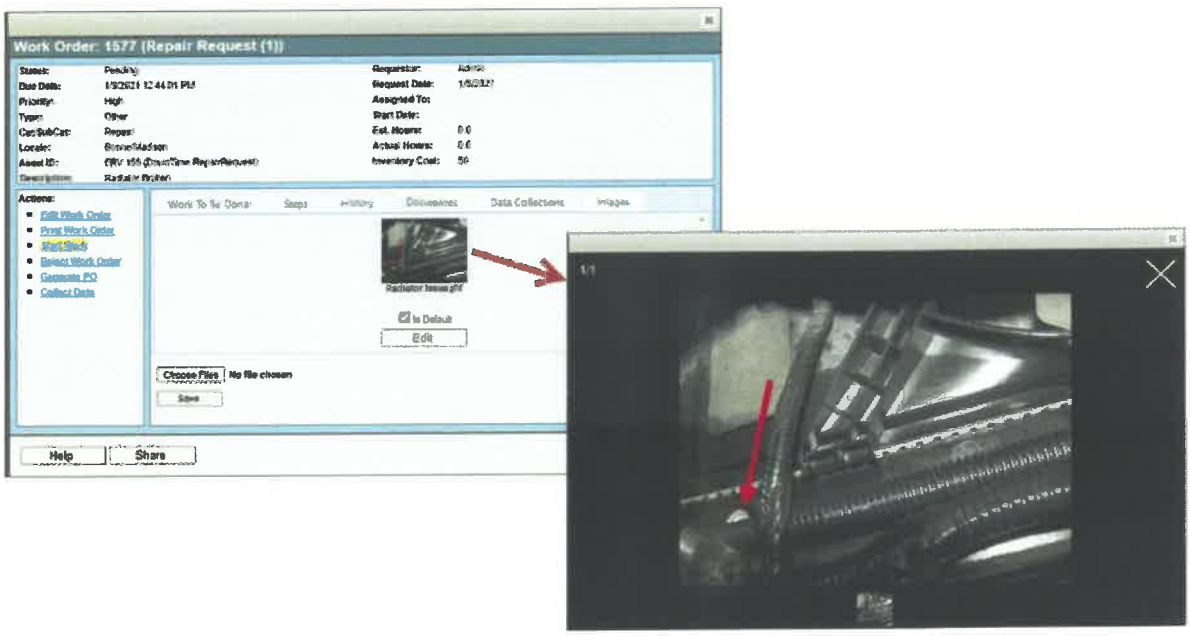


Figure 41 Work Order with Image

Document Management

Documents such as OEM Manuals can be linked via the Document Manager or directly to individual assets, as well as inventory items, scheduled work activities and work orders via Attributes (user defined fields). Multiple options provide the ability to choose central storage with linkage or ad hoc uploads directly to records.

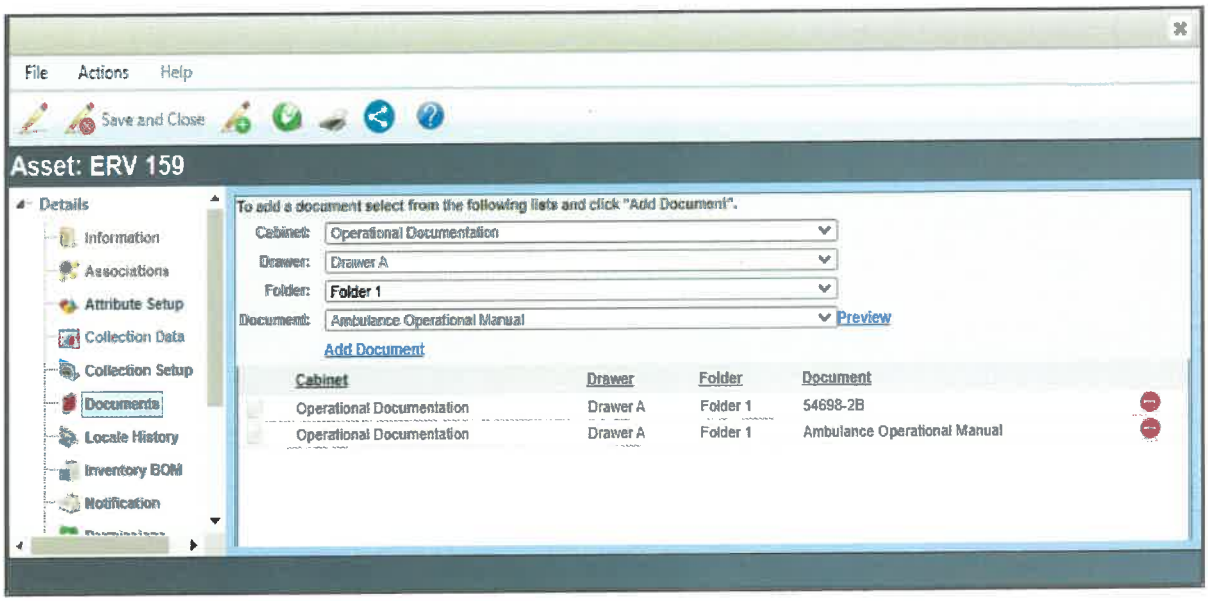


Figure 42 OEM Manual Association via Document Manager

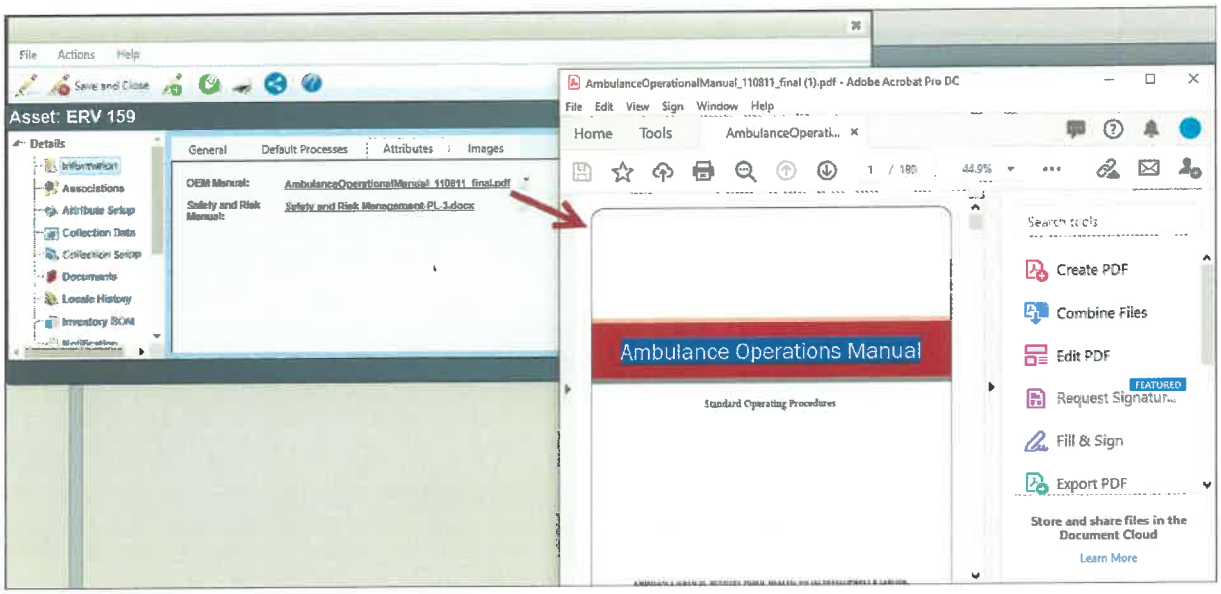


Figure 43 OEM Manual Association via Attributes

DASHBOARDS

Various dashboards can be put together on one screen in any arrangement that the user wishes. This size and position can be set for each dashboard module with up to 3 columns supported. You can build as many dashboard conglomerates as are needed by the various people in the company. One, some or all dashboard modules can be put on a conglomerate.

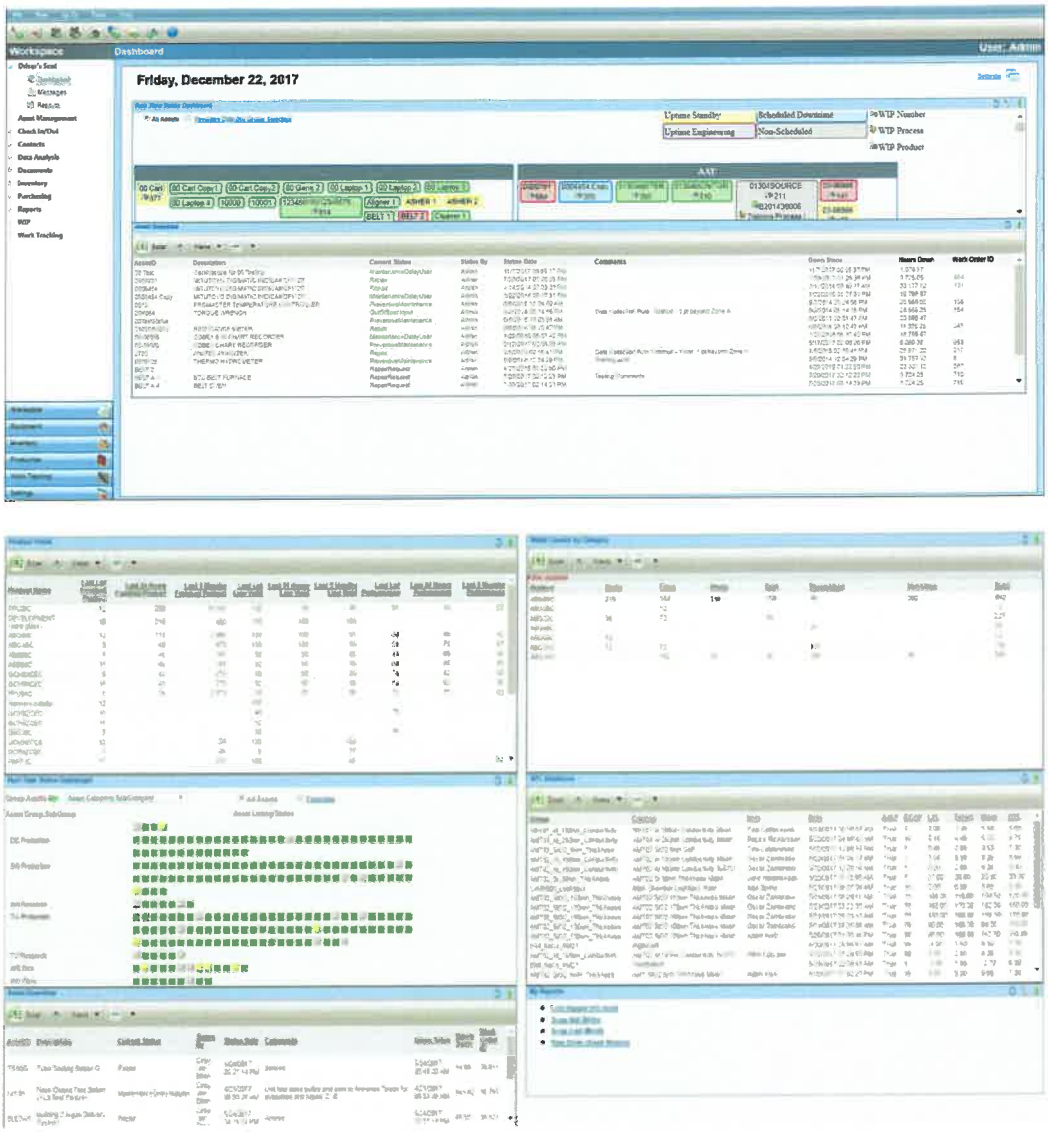


Figure 44 Examples of Dashboards

REPORTS

The TME® Report module can be accessed from any Web browser. TME® provides over 150 standard report templates covering all data collected within TME® including, but not limited to Asset Management, Inventory Tracking, Trending, Work Order, Labor and Performance Reports. Users select from a list of available report templates and enter report criteria before generating the report. They can be opened in formats other than .html and saved to any folder for which the user has access. Reports can be created in multiple formats including .HTML, .XLS, .PDF, .CSV and .DOC.

Authorized Users will also be able to copy and configure reports to their needs within minutes. TME® Report provides extensive report customization capability without the need for programming knowledge or skills.

In addition to standard TME® reports, the System can also generate customized reports based on user-defined parameters such as storage room location versus system wide, category of items, etc.

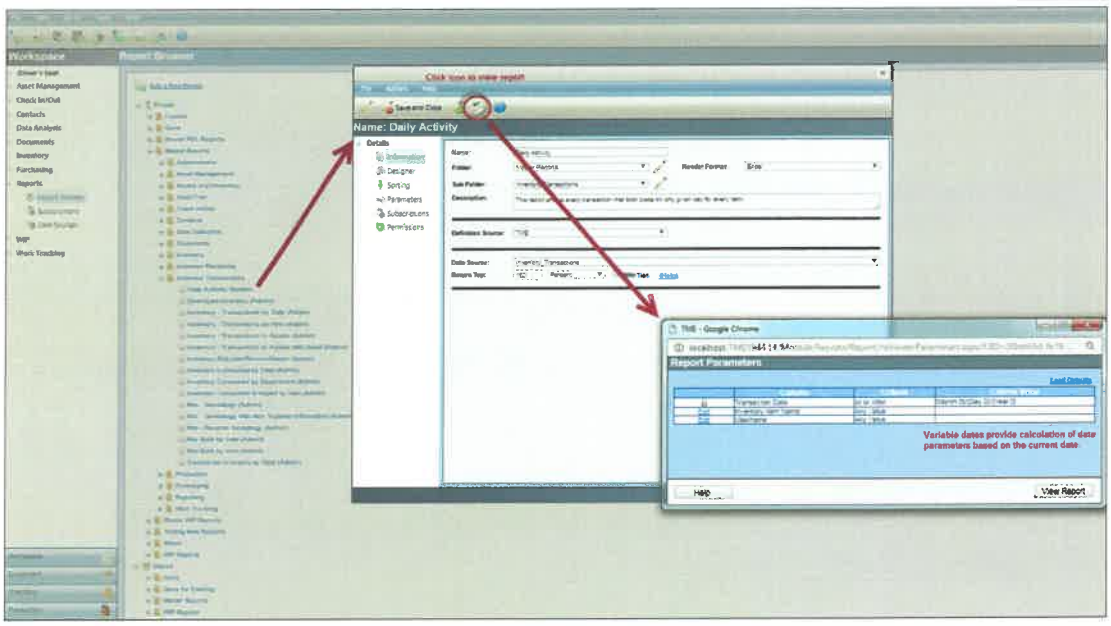


Figure 45 Report Detail Screen / User Report Parameters Screen

TME® Reports offers powerful reporting capabilities, giving you the ability to create reports on any type of recorded data, including data from other external SQL Server databases. In addition to the standard set of Reports, MASS Group can create any type of Custom Report (including data in SQL but outside of TME®).

WVDOT will be able to report on any Assets that have upcoming inspections or require 5-year maintenance (PMs), failed hydrostatic or any other testing, as well as billing and invoicing of maintenance costs, fuel mileage, usage and work completed. Reports can be color coded to flag areas of concern based on data entry or aging (i.e., past due work orders). They can be localized by site or generated for the entire organization. TME® Administrators will have control over what Users can see by sharing only those reports necessary with parameters such as Site or Asset Category locked down.

Report Subscriptions

TME® contains a feature called Report Subscriptions. Any report can be set up and then subscribed to be sent out via email on a pre-defined time interval such as daily, weekly, monthly, bi-monthly, quarterly, yearly etc. These subscriptions are individually set up for recipients, whether a TME® user, email group or an email address entered specifically for the subscription.

TAB 10 – SAMPLE STATEMENT OF WORK (SOW)

4.2.2.5. Services to be Provided Mandatory Requirements

The WVDOT requires that the Vendor provide a complete and comprehensive set of services that are expected to ensure project success.

Following is a high-level list of the implementation services that are expected; however, additional services may be required to ensure implementation success in accordance with the Vendor's proposed methodology:

- **Project management supported by a detailed project work plan;**
- **Requirements confirmation and development;**
- **Development of a Concept of Operations (Con Ops) for managing the fleet and equipment management business processes using the VPS and the interaction of these processes and the VPS with other systems. This ConOps will confirm and show data movement between the VPS and other State of West Virginia applications and databases;**
- **Technical architecture and infrastructure design;**
- **System analysis and business process design;**
- **Software configuration management and tracking;**
- **Customizations (including forms, custom reports, automated interfaces, software enhancements and modifications, arid custom workflows);**
- **Security configuration;**
- **Data conversion;**
- **Testing;**
- **Training;**
- **Documentation;**
- **Knowledge transfer;**
- **Communications and change management;**
- **Deployment I Cutover plan and checklist(s);**
- **Deployment (roll-out) support;**
- **Infrastructure and implementation support; and**
- **Production software and infrastructure maintenance and support, including one major software upgrade.**

Project Management

MASS Group, Inc. will appoint a Project Manager for the project with WVDOT. The Project Manager will be the single point of contact between MASS Group, Inc. and WVDOT. MASS Group will appoint a Project Manager based on the following criteria:

- Prior experience with Fleet and Equipment Management
    - Experience with at least two (2) projects of similar size
    - Previous experience as a deputy project manage/team leader

MASS Group's appointed Project Manager will have knowledge of the general functional and process of the VPS as it relates to equipment management processes.

MASS Group will comply with WVDOT's project management requirements to ensure that the appointed Project Manager:

- Is accountable for all services and deliverables provided in the RFP;
- Provides on-time delivery of deliverables;
- Provides successful deployment of the solution that meets WVDOT's requirements, and
- Provides successful and ongoing operation of the Fleet and Equipment Management System components.
- Spends the majority of work time on:
    - System Design
    - Construction
    - Testing, and
    - Initial deployment
- Is available to work onsite as the point of contact for WVDOT

AVAILABILITY OF PROJECT MANAGER

MASS Group will comply with WVDOT's request that the Project Manager have on-call availability:

- The Project Manager will be accessible by telephone or mobile phone within four (4) hours of being contacted by WVDOT
- The Project Manager will be available to:
    - Manage daily project-related issues
    - Provide updates to WVDOT on the progress of the project with status reports
    - Conduct and participate in weekly status meetings
    - Manage resources assigned to the project

4.2.2.6.2. PROJECT WORK PLAN

Upon signing of the purchase order, MASS Group will provide a project work plan to WVDOT for customer approval within 20 days of NTP. The Project Management Plan (PMP) will describe MASS Group's project team organization, relationships, key project staff and project team member contact information.

Vendor Project Approach

The PMP provided by MASS Group will address the needs of WVDOT as outlined in the RFP. As such, MASS Group will provide a detailed delivery approach, any associated project risk(s), a plan or method for handling associated risks, and MASS Group's procedures for implementing, managing, and controlling the project. MASS Group intends to develop a comprehensive plan for the project that is collaborative in nature. The PMP will detail all work needed to successfully complete the project along with the responsibilities of MASS Group and WVDOT staff. MASS Group will adhere to the provisions of the Project Management Body of Knowledge (PMBOKTM) in developing the PMP. Additionally, the PMP will provide the objectives, solutions, criteria for success, and any associated assumptions or constraints.

MASS Group will provide WVDOT with an organizational chart detailing the key project staff members, a resource plan for MASS Group and WVDOT detailing the work/staff load for each specific role and responsibilities associated with each role. A detailed schedule will also be included for project. MASS Group will provide management of the project schedule and address any changes in scope.

The PMP will also include, but is not limited to details regarding MASS Group's approach and plan for:

- Cost/budget management;

- Document management;
- Project communications management; and
- Risk and issue management.

MASS Group will use Microsoft Project 2019® as the development tool for the PMP. The PMP will follow the standards for the work plan as outlined in RFP section 4.2.2.6.2. including a staffing plan for MASS Group and WVDOT staff. MASS Group will provide the staffing as a Microsoft Excel file. Both the PMP and staffing plan will be updated continuously as needed during the project.

4.2.2.6.3. Status Reporting

MASS Group will provide a plan for reporting project milestones to WVDOT. All major activities on the project will be communicated to WVDOT on a bi-weekly basis. Key MASS Group staff will participate in the bi-weekly status meetings during the project.

4.2.2.6.4. Issue Resolution

MASS Group will provide a description of its approach to issue resolution in the PMP. The issue resolution section will detail any tools or techniques that are integration with configuration management, software change control, and/or overall project management methodology. The issue resolution section of the PMP will include, but is not limited to details regarding:

- Issue identification
- Tracking of issues
- Review and prioritization of issues
- Analysis of issues
- Resolution of the issue(s)
- Escalations regarding issues

4.2.2.6.5. Project Controls, Standards, and Procedures

MASS Group will provide information describing MASS Group's project controls, standards and procedures for the project tasks, including:

- Project documentation outlining the templates used by MASS Group to develop the solution;
- Details of the proposed solution for WVDOT (On-Premise, SaaS);
- Protocol for meetings with WVDOT;
- MASS Group's standards and procedures for design, review, and testing;
- Descriptions of procedures and/or tools needed for solution integrity;
- MASS Group's scope control processes;
- Communication plan for the project;
- MASS Group's process for verifying and validating deliverables;
- MASS Group's process(es) for verifying the content and expectations for the deliverables.

4.2.2.6.6. Risk Management Plan and Procedures

Based on the requirements and deliverables associated with this project, MASS Group will develop a risk management plan for WVDOT. The risk management will identify any potential risks associated with the project and provide recommendations on how to mitigate or manage those risks. MASS Group's risk management plan will also outline the tools and methods for identifying and managing risks associated with the project.

4.2.2.6.7. Communication and Cooperation

MASS Group intends to maintain an open line of communication with all project stakeholders. MASS Group will provide WVDOT with a project plan. Discussions regarding the project plan will be completed prior to the start of the project. Going forward, any changes to the project plan must be reviewed and approved by WVDOT before the change can be implemented. Meetings will be conducted with WVDOT stakeholders to review any needed changes or additions to the project plan. Additionally, MASS Group project staff will be available by email, phone or via web meeting to discuss any concerns with or changes to the project plan.

4.2.2.7. Work Products/Compliance with Standards

MASS Group will provide the following work products:

- Documentation of Project Controls, Standards, and Procedures;
- Project Work Plan;
- Issue and Risk Logs; and
- PMP

MASS Group will comply with standards for work products identified in section 4.2.2.7. in the RFP. This includes the use of word processing and project management software and the compatibility thereof.

4.2.2.8. Technical Architecture and Infrastructure Design

MASS Group will provide WVDOT with the following deliverables:

- Technical design of the environment (including staged time and scalability options)
- Installation and set-up of the environment
- Software installation
- A pre-populated "sandbox" using WVDOT data
- Installation of all other associated software applications

MASS Group will provide support for all technical activities including:

- Technical assistance with sizing and procurement of hardware and software for the solution (if On-Premise);
- Designing the technical architecture and infrastructure
- Assistance with configuring the infrastructure and any associated change management needs
- Software installation
- Providing access to TME® Mobile
- Database management

- Business Continuity Plan
- Disaster Recovery Plan and execution (if needed)
- Optimization/tuning of WVDOT hardware for integration with the solution
- Plan and methods for upgrading software
- Hardware sizing recommendations and architecture

4.2.2.9. System Analysis and Business Process Design

MASS Group will include the following deliverables with its system analysis and business process design:

- Fit/Gap Analysis Documentation;
- Business Process Improvement Documentation;
- System Business Process Design Documentation; and
- Development Specification Documentation.

MASS Group will also provide a detailed description of its approach to analyzing WVDOT business requirements. After the system is installed and data migration has begun, MASS Group will provide a demonstration of the solution using WVDOT's data. WVDOT stakeholders will have the opportunity to provide feedback on the accuracy and fit of the data in the test system. MASS Group will make necessary changes to the data per the requirements of WVDOT. Gap analysis will be conducted to ensure the accuracy of the data before uploading the data into the live System.

4.2.2.10. Software Configuration

MASS Group will provide the following deliverables to meet WVDOT's software requirements:

- Configured Application Software;
- Updated documentation to support configuration.

MASS Group will comply with requirements provided for the solution as outlined in Attachment A. Additionally, MASS Group will provide its approach to meeting the requirements outlined in Attachment A. The document will describe all tools, procedures, documentation, validation processes, and knowledge transfer processes used by MASS Group for the project.

4.2.2.11. Custom Development and Custom Objects

MASS Group will provide a description to its approach to the development of custom objects for the solution. This includes, but is not limited to enhancements and modifications, automated interfaces, custom forms, reports, and workflow configuration.

4.2.2.12. Enhancements and Modifications

Much of the customization and configuration of TME will be handled during the implementation training as it is available through web application – drop down list configuration, user defined field, label changes, saved searches, etc. Any items not covered will be discussed during meetings as needed.

New features and enhancements are described in release notes with every version of TME®. MASS Group will set up meetings for those items that require a large amount of knowledge dispersal and release notes are not enough.

4.2.2.13. Automated Interfaces

MASS Group will comply with all requirements for automated interfaces as outlined in section 4.2.2.13. MASS Group will provide WVDOT with an interface plan for all required interfaces with the System including all assumptions, methodologies, opportunities for consolidation or integration, and any needed revisions to interface requirements. Typically, TME® can interface with other systems utilizing web services, the import of CSV files or connection to common relational databases. To assist with the interfacing of 3rd party systems, MASS Group has a team of skilled, in house implementation personnel that are experienced in configuring and installing the methodology that makes the most sense for how the data should be collected from another system or ERP.

WVDOT will be responsible for providing subject matter knowledge of the existing interfaces and data associated with those interfaces. Subject Matter Experts (SMEs) from WVDOT will be needed to code and to test interfaces to the new System. WVDOT will also be responsible for verifying the accuracy of all interfaces and integrations with the System to ensure the accuracy of the interfaces.

4.2.2.14. Custom Forms

MASS Group will develop custom forms, approved by WVDOT, for requirements that fall outside of the support of the VPS.

4.2.2.15. Custom Reports

MASS Group will develop the following custom reports for the WVDOT solution:

- Reports that meet WVDOT and federal reporting requirements;
- All priority 1 and 2 reports;
- All priority 3 reports that do not meet WVDOT's standard report requirements.

4.2.2.16. Custom Workflow Configuration

MASS Group will provide the following custom workflow deliverables:

- Completed Programs for Enhancements and Modifications;
- All completed custom reports;
- Completed automated interfaces;
- All completed forms;
- All completed custom workflows.

MASS Group will provide a detailed description to its approach to configuring and deploying custom workflows in the project plan. This includes information on the scheduling and prioritization for deploying custom workflows in the System. MASS Group will also provide recommendations on which workflows and notifications should be used for specific functions.

MASS Group will define the level of complexity for each custom workflow using the Workflow Complexity Levels chart provided in the RFP. MASS Group will modify, or custom develop workflows identified as Priority 1,2 or 3 in the matrices provided that the workflow falls outside of the standard workflows provided by TME®.

4.2.2.17. Data Conversion

MASS Group will provide the following data conversion deliverables:

- Data Conversion Plan;
- Data Conversion Log; and
- Converted Data in Production Database

TME® software implementation can be completed within 30-60 days of award (oftentimes less) depending on the readiness of WVDOT and the availability of the data as compiled by WVDOT. Should the data harvesting and collection effort take longer, the time frame will be extended. With the use of Excel spreadsheet templates, standardized import tools, no scripting, immersive onsite training and highly experienced personnel, MASS Group will have WVDOT utilizing the System and extracting much needed data to improve its day-to-day operations.

Steps for data import:

A. MASS Group trains and provides best practices to WVDOT on setting up the data on Excel template spreadsheets
B. WVDOT scrubs available data, pastes it onto the templates
C. MASS Group reviews the data and checks for standard items (i.e., duplicate category names due to misspelling, locale strings (Campus, Building, Floor, Room, and Location) not entered from left to right, letters entered into a date or number field, etc.)
D. MASS Group imports the data into the TME® Test site set up specifically for WVDOT to review and use during training; MASS Group checks the data validity with specific spot checks throughout the system
E. End User training takes place which provides an opportunity for WVDOT to see the data in use within the System
F. WVDOT / MASS Group revises the data, if necessary, based on discoveries made during training
G. MASS Group reviews and imports into the live TME® site

MASS Group will comply will all expected vendor responsibilities for Data Conversion as outlined in section 4.2.2.17. of the RFP.

4.2.2.18. Security Configuration

MASS Group utilizes AWS Firewall and VPC Security for Authentication/Security. SAML is not supported. TME® is SSL HTTP secured. If WVDOT chooses, MASS Group can put WVDOT's instance on AWS GovCloud (US). The AWS GovCloud is a physical hardware security module (HSM) that is dedicated to WVDOT. It is physically located in an AWS regional cloud data center, but only WVDOT would have administrative access to the key server. Only WVDOT would have access to the key.

MASS Group will provide additional information describing its risk management approach regarding application development and deployment, particularly in terms of threats to the System, identification of vulnerabilities, analysis, prioritization, and mitigation techniques.

4.2.2.19. Testing

MASS Group uses the Agile development process, utilizing the Scrum framework to test software. MASS uses JIRA and Confluence as a single repository for:

- Feature Requests
- Improvements
- Bugs
- Support Tickets
- Product Specifications
- Design documents
- Meeting Minutes

MASS Group has a dedicated QA department that tests software for flaws during development and testing. MASS Group will provide WVDOT with a formal testing plan before the implementation of the System. The test plan will include MASS Group's approach to:

- Unit testing;
- System testing;
- Integration testing;
- Performance (load/stress) testing; and
- User acceptance testing

4.2.2.19.1. System Test Plans

MASS Group will provide WVDOT with a system test plan that verifies the following:

- All new configured, modified, and unmodified software work in concert and as expected;
- The system has been properly configured for use for WVDOT;
- Reports and correspondence work in accordance with WVDOT requirements;
- All scripts or job streams run properly;
- All security roles, functions and controls operate as intended; and
- All interfaces function properly.

MASS Group will work with the project management, IT staff, as well SMEs to develop a comprehensive test plan for the solution.

4.2.2.19.2. Application System Testing

MASS Group will conduct system tests to ensure that the system is functional and in accordance with the approved VPS test plan approved by WVDOT. All findings will be documented and analyzed by MASS Group staff. MASS will coordinate with the WVDOT to test the System to provide WVDOT stakeholders with proof of system operability and functionality.

4.2.2.19.3. User Acceptance Test Planning

MASS Group will provide WVDOT with a user acceptance test plan prior to user acceptance testing (UAT). The test plan will include, but is not limited to:

- Test cycle structuring
- Design and development of test scripts for the System
- WVDOT developed test scripts
- Explanations of:
    - User actions
    - Transactions
    - Processing outcomes
- Test tracking
- Outcome tracking
- Any exception follow-up procedures

4.2.2.19.4. User Acceptance Testing Assistance

MASS Group will provide assistance during UAT including:

- Submission of off-line jobs
- Backups
- Database restoration
- Analysis and explanation of outcomes
- Corrections to errors or bugs found in the System
- Providing answers when needed

4.2.2.19.5. Performance Testing and System Tuning

MASS Group will provide the following deliverables for performance testing and system tuning:

- Master Test Plan;
- System Test Plans;
- Execution and completion of Application System Testing
- User Acceptance Test Plan;
- Execution and completion of User Acceptance Test;
- Performance Test Plan;
- Performance Testing Assistance; and
- Performance Testing.

MASS Group will ensure that the delivered test plans and the execution/completion of the test plans are in line with WVDOT's needs and requirements for a successful completion of the project. MASS Group will coordinate with WVDOT personnel to conduct performance testing.

4.2.2.20. TRAINING

MASS Group will conduct end-user technical training and provide knowledge transfer to WVDOT's key personnel at the site listed in the RFP. One of MASS Group's certified trainers will perform Train-the-Trainer sessions on all software components, hardware devices, system administration, and hard and soft copies of training materials. MASS Group offers cost-effective methods of training such as web-based training and train-the-trainer approaches. Training will be done on a demo system using WVDOT's data. Exercises will be performed and reviewed throughout the training.

Over the course of two days (Days 1 – 2), System Administrators will be trained thoroughly on TME® application software administration, software configuration, performance optimization, and application programming interfaces/scripts, reports etc. in addition to onsite training, we will provide continuance web based live training on demand to ensure that personnel are using the System in the most efficient way. Additionally, MASS Group will provide on-site training and assistance regarding tag placement, handheld barcode reader usage and basic operations and maintenance of the TME® software application.

After the completion of Admin training, End Users will be trained based on what they need to learn. Depending on how much of TME® they will be using, the remaining days are divided into two or three sessions. Each session may be identical or specific to the functions of a group of Users. MASS Group will work with WVDOT to determine how to best set up the training.

Sample Training Agenda – Administrator

Day 1-Morning

- TME® Overview
- System Set Up and Settings
- Driver's Seat – Messages and Dashboard: Operations, Asset Scheduling, Time Clock
- Contacts and Documents

Day 1-Afternoon

- Asset Management
- Check In/Out
- Inventory

Day 2-Morning

- Work Tracking – Work Orders, Scheduled Work, and Projects
- Data Collection

Day 2-Afternoon

- Reports (creating, editing and viewing)—bring in additional participants who need to be able to create reports, but are attending the training on Day 3 for non-Administrators

Upon completion, Administrators will have the knowledge and skills to set up the system as necessary to comply with corporate processes as well as the ability to complete tasks and functions of the maintenance technicians and operators. Though as with all learning curves, continued use and practice over time will provide fluency and the ability to streamline.

Documentation

Soft copies of the Administrator manual and User manual to be printed in-house are included with the training, at no additional cost.

4.2.2.20.1. Training Plan

MASS Group will provide a detailed training plan for the analysis, design, implementation, and evaluation of the overall VPS training program. The training will address the goals and objectives of the training program and identify the training to be provided at all levels of the project.

4.2.2.20.2. Training Curriculum

MASS Group will develop a training curriculum for WVDOT to train its users in the development, configuration, implementation, maintenance support, and use of the VPS.

4.2.2.20.3 End User Training

MASS Group will provide Trainer-the-Trainer classroom environment for WVDOT staff. The following deliverables will be made available at the time of training:

Classroom Materials

MASS Group provides comprehensive on line and print, customer operator manuals and laminated instructions to simplify end-user operations. There are a variety of references and material available for TME®:

- User Training Manuals available for download
- Job Aids for specific workflows and features
- Online Help Articles and links to chapters of User Training Manual
- Integration Specifications and Documentation
- Release Notes with every Upgrade

MASS Group will provide as built artifacts on elements such as data migration, integration, Standard Operating Procedures (SOP) for the system functionality, etc., within 30 days after Go-Live.

Online Help is also always available. Articles relevant to the current screen are easily accessed with a single click. The total contents of Online Help are available and structured by Module, features and capabilities. In addition, the training manual chapters are hyperlinked and accessible from the What's New in TME® screen.

Trainer - the - Trainer Candidates

MASS Group will provide Train-the-Trainer sessions for WVDOT System Administrators and other key WVDOT staff. These Trainer - the - Trainer sessions will include, but are not limited to:

- Best practices for training on solution
- Practice training sessions
- All business processes and system functionality
- Training on how to customize training materials
- Training on set-up of specific reference data in the sandbox

Training Environment

MASS Group will provide a training environment for all training sessions. The WVDOT test environment will contain WVDOT data. Candidates will have an opportunity to learn system concepts using data from WVDOT as well as have the opportunity to evaluate the accuracy of the data in the system.

MASS Group will provide backup, restore, and troubleshooting assistance for the training environment.

4.2.2.20.4. Technical and Operations Personnel Training

MASS Group will provide classroom and hands-on training on the VPS system to WVDOT personnel. These sessions will provide WVDOT personnel with the skills necessary to operate and maintain the System after Go Live. The following is a sample timeline for technical and operations personnel training.

4.2.2.20.5. Software Education Sessions

MASS Group will provide the following deliverables for software training on the WVDOT system:

- Project Team training
- A comprehensive training plan
- Training Curriculum for system training
- End User training on the system
- Training for Technical and Operation Personnel
- Training Materials; and
- Software Education Sessions

Software training will include, but is not limited to:

- Software configuration
- Organization of software libraries
- System operation procedures
- System Administrator responsibilities
- Other "system housekeeping" topics

MASS Group will conduct all training at WVDOT facilities.

4.2.2.20.6. Documentation

MASS Group provides comprehensive on-line and print, customer operator manuals and laminated instructions to simplify end-user operations. We will provide Standard Operating Procedures (SOP) for any system functionality. Soft copies of the Administrator manual and User manual to be printed in-house are included with the training, at no additional cost.

4.2.2.20.6.1. Security Administrator's Guide

MASS Group will provide a comprehensive security guide combining general reference information and WVDOT - specific procedures for security administrators.

4.2.2.20.6.2. Workflow Administration Guide

MASS Group will provide a Workflow Administration Guide describing the responsibilities of WVDOT workflow administrators. The Workflow Administration Guide will include, but is not limited to the following topics:

- Policies and procedures for workflow setup;
- User setup;
- Work group setup;
- Workflow rules setup;
- Provisions for establishing alternates for absent users; and
- Archiving and reporting procedures.

4.2.2.20.6.3. Online Help

MASS Group will provide the following online help deliverables to WVDOT:

- Security Administrators Guide
- User Documentation
- Workflow Administration Guide
- Online Help
- Data Element Dictionary; and
- Entity Relationship Diagrams

Online Documentation

MASS Group provides comprehensive on line and print, customer operator manuals and laminated instructions to simplify end-user operations. We will provide Standard Operating Procedures (SOP) for any system functionality. Soft copies of the Administrator manual and User manual to be printed in-house are included with the training, at no additional cost.

Online Training for Users

Online training is provided in the form of web meetings that are scheduled for an hour at a time one to two times a week (as needed) for the first two to three months following Go Live. After that timeframe, WVDOT can schedule spot trainings with MASS Group for thirty minutes as needed as part of the annual tech support. Should WVDOT desire intensive online training, MASS Group will provide a quote for a series of trainings that WVDOT can schedule throughout the course of a year.

4.2.2.20.7. Knowledge Transfer

MASS Group will provide the knowledge transfer deliverables to WVDOT:

- Knowledge Transfer Plan; and
- Formal Knowledge Transfer Signoffs.

MASS Group will provide WVDOT with a comprehensive Knowledge Transfer Plan describing MASS Group's knowledge transfer strategy during the project. The knowledge transfer plan will include specific procedures MASS Group uses to mentor WVDOT staff, as well as its approach to transferring operational control to WVDOT staff after Go-Live. MASS Group will coordinate with WVDOT Staff to document expected knowledge transfer activities along with the timing and method of knowledge transfer to be used. The Knowledge Transfer Plan will be updated during the course of the project to ensure that design, configuration, development, testing, and other associated tasks performed by WVDOT personnel is documented.

4.2.2.21. Deployment (Roll-out) Support

During rollout of the system, MASS Group will provide on-site support throughout the entire implementation period. MASS Group will provide the following deliverables during system implementation:

- A detailed Deployment Cut-over Plan
- Contingency Plan

The Deployment Cut-over Plan will include but is not limited to the following topics:

- Data conversion
- Technical preparation and system changeover activities;
- Cut-over activities checklist;
- Staffing requirements for MASS Group and WVDOT during cut-over
- A contingency plan development process

4.2.2.21.1.1. Production Cut-over (Go-Live) Checklist

MASS Group will provide a production Cut-Over (Go-Live) checklist to WVDOT to track each activity required to determine the VPS solution is ready to be deployed. The checklist will require review and approval by WVDOT stakeholders before it used in the cut-over effort.

4.2.2.21.1.2. Establish Procedures for User Support

If desired, for an additional cost, MASS Group offers Premium End User Support Services which include:

- Onsite Technical Support for emergency incidences
- Issuance of regular reports summarizing key performance indicators such as total incidences, mean time to response, mean time to resolution, supplier dependent downtime %, customer dependent downtime %, pareto of common failures, pareto of common resolutions, etc.
- Online training related to product improvements, new releases, and development initiatives
- Onsite customized training
- Quarterly check-ins by one of our Account Managers to audit and validate the System

- Assistance with setup of User Group by topic upon request

4.2.2.21.1.3. Production Transfer

MASS Group will provide the following production transfer deliverables to WVDOT:

- Commencement of Stable Production System

MASS Group will turn over all system components into the production environment. MASS Group will ensure that the source code, compiled modules, job streams, other components of the production environment, and all documentation is ready and organized for the production turnover.

4.2.2.22. Production Maintenance and Support

MASS Group will provide full onsite post-implementation maintenance and support for 6 months after Go-Live. MASS Group will jointly manage and perform post-implementation support with WVDOT for an additional 6 months. MASS Group will continue to provide mentoring to assigned WVDOT staff during this time period. MASS Group and WVDOT will jointly manage production support of the System.

4.2.2.22. Production Maintenance and Support

MASS Group possesses the experience, knowledge, and lessons learned associated with large public sector transportation management implementations. For more information on MASS Group's project experience, please see TAB 5 - References.

TAB 11 – REQUIREMENTS MATRIX RESPONSES

The printed pages of the Matrix A response are at the end of this proposal following the Required Forms and Next Steps section.

REQUIRED FORMS

DESIGNATED CONTACT / CERTIFICATION & SIGNATURE FORM

DESIGNATED CONTACT: Vendor appoints the individual identified in this Section as the Contract Administrator and the initial point of contact for matters relating to this Contract.

Operations/HR/Contract manager
(Name, Title)
Kaitlin Alvarez, Operations/ HR / Contract Manager
(Printed Name and Title)
6280 S. Valley View Blvd., Suite 230, Las Vegas, NV 89118
(Address)
Phone: 818-709-1255 / Fax: 818-709-1468
(Phone Number) / (Fax Number)
accounting@massgroup.com
(email address)

CERTIFICATION AND SIGNATURE: By signing below, or submitting documentation through wvOASIS, I certify that: I have reviewed this Solicitation in its entirety; that I understand the requirements, terms and conditions, and other information contained herein; that this bid, offer or proposal constitutes an offer to the State that cannot be unilaterally withdrawn; that the product or service proposed meets the mandatory requirements contained in the Solicitation for that product or service, unless otherwise stated herein; that the Vendor accepts the terms and conditions contained in the Solicitation, unless otherwise stated herein; that I am submitting this bid, offer or proposal for review and consideration; that I am authorized by the vendor to execute and submit this bid, offer, or proposal, or any documents related thereto on vendor's behalf; that I am authorized to bind the vendor in a contractual relationship; and that to the best of my knowledge, the vendor has properly registered with any State agency that may require registration.

By signing below, I further certify that I understand this Contract is subject to the provisions of West Virginia Code § 5A-3-62, which automatically voids certain contract clauses that violate State law.

Manufacturing Automation & Software Systems, Inc. dba. MASS Group Inc.
(Company)

Gamal Balady President & CEO
(Authorized Signature) (Representative Name, Title)

Gamal Balady, President & CEO
(Printed Name and Title of Authorized Representative)

September 21, 2021
(Date)

Phone: 818-709-1255 / Fax: 818-709-1468
(Phone Number) (Fax Number)

Revised 07/01/2021

FLEET AND EQUIPMENT MANAGEMENT RFP ACKNOWLEDGEMENT FORM

Department of Administration Purchasing Division 2019 Washington Street East Post Office Box 50130 Charleston, WV 25305-0130	State of West Virginia Centralized Request for Proposals Service - Prof

Proc Folder: 887002 Doc Description: FLEET MANAGEMENT SYSTEM - 7021EC12 Proc Type: Central Master Agreement			Reason for Modification:
Date Issued	**Solicitation Closes**	**Solicitation No**	**Version**
2021-08-09	2021-09-02 13:30	CRFP 0803 DOT2200000001	1

BID RECEIVING LOCATION

BID CLERK
DEPARTMENT OF ADMINISTRATION
PURCHASING DIVISION
2019 WASHINGTON ST E
CHARLESTON WV 25305
US

VENDOR

Vendor Customer Code:

Vendor Name : Manufacturing Automation & Software Systems, Inc. dba. MASS Group, Inc.

Address : 6280

Street : South Valley View Blvd., Suite 230

City : Las Vegas

State : Nevada **Country :** U.S. **Zip :** 89118

Principal Contact : Gamal Balady, President & CEO

Vendor Contact Phone: 818-709-1255 **Extension:**

FOR INFORMATION CONTACT THE BUYER
Tara Lyle
(304) 558-2544
tara.l.lyle@wv.gov

Vendor Signature X Gamal Balady **FEIN#** 95-4677514 **DATE** 9/21/2021

All offers subject to all terms and conditions contained in this solicitation

Date Printed: Aug 9, 2021 Page: 1 FORM ID: WV-PRC-CRFP-002 2020/05

ADDITIONAL INFORMATION

THE STATE OF WEST VIRGINIA PURCHASING DIVISION FOR THE AGENCY, WEST VIRGINIA DIVISION OF HIGHWAYS, IS SOLICITING PROPOSALS FOR FLEET AND MATERIAL MANAGEMENT SYSTEM, PER THE ATTACHED DOCUMENTS.

QUESTIONS REGARDING THE SOLICITATION MUST BE SUBMITTED IN WRITING TO TARA.L.LYLE@WV.GOV PRIOR TO THE QUESTION PERIOD DEADLINE CONTAINED IN THE INSTRUCTIONS TO VENDORS SUBMITTING BIDS

ONLINE RESPONSES FOR THIS SOLICITATION ARE PROHIBITED

INVOICE TO	SHIP TO
DIVISION OF HIGHWAYS OFFICE OF THE SECRETARY 1900 KANAWHA BLVD E, BLDG 5 RM A109 CHARLESTON WV 25305-0440 US	DIVISION OF HIGHWAYS EXECUTIVE DIVISION 1900 KANAWHA BLVD E, BLDG 5 CHARLESTON WV 25305-0430 US

Line	Comm Ln Desc	Qty	Unit of Measure	Unit Price	Total Price
1	DEVELOPMENT IMPLEMENTATION SUPPORT FLEET MGT SYSTEM				

Comm Code	Manufacturer	Specification	Model #
43233701			

Extended Description:
SOFTWARE DEVELOPMENT, INSTALLATION, SUPPORT AND TRAINING

SEE ATTACHMENTS.

SCHEDULE OF EVENTS

Line	Event	Event Date

Date Printed: Aug 9, 2021 Page: 2 FORM ID: WV-PRC-CRFP-002 2020/05

	Document Phase	Document Description	Page 3
DOT22B0000001	Final	FLEET MANAGEMENT SYSTEM - 7D21EC12	

ADDITIONAL TERMS AND CONDITIONS

See attached document(s) for additional Terms and Conditions

ADDENDUM NO. 1 ACKNOWLEDGMENT FORM

Department of Administration Purchasing Division 2019 Washington Street East Post Office Box 50130 Charleston, WV 25305-0130	State of West Virginia Centralized Request for Proposals Service - Prof

Proc Folder: 887002 Doc Description: FLEET MANAGEMENT SYSTEM - 7021EC12 Proc Type: Central Master Agreement	Reason for Modification: Addendum No. 1 - to extend the question period deadline and extend the bid opening.

Date Issued	Solicitation Closes	Solicitation No	Version
2021-08-17	2021-09-09 13:30	CRFP 0803 DOT2200000001	2

BID RECEIVING LOCATION

BID CLERK
DEPARTMENT OF ADMINISTRATION
PURCHASING DIVISION
2019 WASHINGTON ST E
CHARLESTON WV 25305
US

VENDOR

Vendor Customer Code:
Vendor Name : Manufacturing Automation & Software Systems, Inc. dba. MASS Group, Inc.
Address : 6280
Street : S. Valley View Blvd., Suite 230
City : Las Vegas
State : Nevada Country : U.S. Zip : 89118
Principal Contact : Gamal Balady, President & CEO
Vendor Contact Phone: 818-709-1255 Extension:

FOR INFORMATION CONTACT THE BUYER
Tara Lyle
(304) 558-2544
tara.l.lyle@wv.gov

Vendor Signature X Gamal Balady FEIN# 95-4677514 DATE 9/21/2021

All offers subject to all terms and conditions contained in this solicitation

Date Printed: Aug 17, 2021 Page: 1 FORM ID: WV-PRC-CRFP-002 2020/05

ADDITIONAL INFORMATION

ADDENDUM NO. 1

1. To extend the question deadline period to 08/20/2021 by 4:00 pm. Please see attached pages.
2. To extend the bid opening from 09/02/2021 to 09/09/2021 at 1:30 pm.

ONLINE RESPONSES FOR THIS SOLICITATION ARE PROHIBITED

No other changes.

INVOICE TO	SHIP TO
DIVISION OF HIGHWAYS OFFICE OF THE SECRETARY 1900 KANAWHA BLVD E, BLDG 5 RM A109 CHARLESTON WV 25305-0440 US	DIVISION OF HIGHWAYS EXECUTIVE DIVISION 1900 KANAWHA BLVD E, BLDG 5 CHARLESTON WV 25305-0430 US

Line	Comm Ln Desc	Qty	Unit of Measure	Unit Price	Total Price
1	DEVELOPMENT IMPLEMENTATION SUPPORT FLEET MGT SYSTEM				

Comm Code	Manufacturer	Specification	Model #
43233701			

Extended Description:
SOFTWARE DEVELOPMENT, INSTALLATION, SUPPORT AND TRAINING

SEE ATTACHMENTS.

SCHEDULE OF EVENTS		
Line	Event	Event Date

	Document Phase	Document Description	Page 3
DOT22D0000001	Final	FLEET MANAGEMENT SYSTEM - 7021EC12	

ADDITIONAL TERMS AND CONDITIONS

See attached document(s) for additional Terms and Conditions

ADDENDUM NO. 2 ACKNOWLEDGEMENT FORM

Department of Administration Purchasing Division 2019 Washington Street East Post Office Box 50130 Charleston, WV 25305-0130	State of West Virginia Centralized Request for Proposals Service - Prof

Proc Folder: 887002 **Doc Description:** Addendum No 2 - FLEET MANAGEMENT SYSTEM **Proc Type:** Central Master Agreement			**Reason for Modification:** Addendum No. 2
Date Issued	**Solicitation Closes**	**Solicitation No**	**Version**
2021-09-03	2021-09-16 13:30	CRFP 0803 DOT2200000001	3

BID RECEIVING LOCATION

BID CLERK
DEPARTMENT OF ADMINISTRATION
PURCHASING DIVISION
2019 WASHINGTON ST E
CHARLESTON WV 25305
US

VENDOR

Vendor Customer Code:

Vendor Name : Manufacturing Automation & Software Systems, Inc. dba. MASS Group, Inc.

Address : 6280

Street : S. Valley View Blvd., Suite 230

City : Las Vegas

State : Nevada **Country :** U.S. **Zip :** 89118

Principal Contact : Gamal Balady, President & CEO

Vendor Contact Phone: 818-709-1255 **Extension:**

FOR INFORMATION CONTACT THE BUYER
Tara Lyle
(304) 558-2544
tara.l.lyle@wv.gov

Vendor Signature X Gamal Balady **FEIN#** 95-4677514 **DATE** 9/21/2021

All offers subject to all terms and conditions contained in this solicitation

Date Printed: Sep 3, 2021 Page: 1 FORM ID: WV-PRC-CRFP-002 2020/05

ADDITIONAL INFORMATION
ADDENDUM NO. 2 1. Responses to vendor questions attached. 2. To extend the bid opening from 09/09/2021 to 09/16/2021 at 1:30 pm. 3. Attachments A and B have been revised and attached to unlock some protected fields in the previous attachments. ***ONLINE RESPONSES FOR THIS SOLICITATION ARE PROHIBITED*** Please see Section 6 entitled BID SUBMISSION for more information. No other changes.

INVOICE TO	SHIP TO
DIVISION OF HIGHWAYS OFFICE OF THE SECRETARY 1900 KANAWHA BLVD E, BLDG 5 RM A109 CHARLESTON WV 25305-0440 US	DIVISION OF HIGHWAYS EXECUTIVE DIVISION 1900 KANAWHA BLVD E, BLDG 5 CHARLESTON WV 25305-0430 US

Line	Comm Ln Desc	Qty	Unit of Measure	Unit Price	Total Price
1	DEVELOPMENT IMPLEMENTATION SUPPORT FLEET MGT SYSTEM				

Comm Code	Manufacturer	Specification	Model #
43233701			

Extended Description:
SOFTWARE DEVELOPMENT, INSTALLATION, SUPPORT AND TRAINING

Attachments A and B revised on Addendum No. 2 issued 9/3/2021

SEE ATTACHMENTS.

SCHEDULE OF EVENTS		
Line	Event	Event Date

	Document Phase	Document Description	Page 3
DOT2200000001	Final	Addendum No 2 - FLEET MANAGEMENT SYSTEM	

ADDITIONAL TERMS AND CONDITIONS

See attached document(s) for additional Terms and Conditions

ADDENDUM NO. 3 ACKNOWLEDGEMENT FORM

Department of Administration
Purchasing Division
2019 Washington Street East
Post Office Box 50130
Charleston, WV 25305-0130

State of West Virginia
Centralized Request for Proposals
Service - Prof

Proc Folder:	887002
Doc Description:	Addendum No 3 - FLEET MANAGEMENT SYSTEM
Proc Type:	Central Master Agreement
Reason for Modification:	Addendum No. 3 - to provide responses to timely submitted questions and move the bid opening to 09/23/2021.

Date Issued	Solicitation Closes	Solicitation No	Version
2021-09-13	2021-09-23 13:30	CRFP 0803 DOT2200000001	4

BID RECEIVING LOCATION

BID CLERK
DEPARTMENT OF ADMINISTRATION
PURCHASING DIVISION
2019 WASHINGTON ST E
CHARLESTON WV 25305
US

VENDOR

Vendor Customer Code:
Vendor Name : Manufacturing Automation & Software Systems, Inc., dba. MASS Group, Inc.
Address : 6280
Street : S. Valley View Blvd., Suite 230
City : Las Vegas
State : Nevada **Country :** U.S. **Zip :** 89118
Principal Contact : Gamal Balady, President & CEO
Vendor Contact Phone: 818-709-1255 **Extension:**

FOR INFORMATION CONTACT THE BUYER
Tara Lyle
(304) 558-2544
tara.l.lyle@wv.gov

Vendor Signature X Gamal Balady **FEIN#** 95-4677514 **DATE** 9/21/2021

All offers subject to all terms and conditions contained in this solicitation

Date Printed: Sep 13, 2021 **Page:** 1 FORM ID: WV-PRC-CRFP-002 2020/05

ADDITIONAL INFORMATION

ADDENDUM NO. 3

1. To provide responses to vendor questions timely submitted, however, were inadvertently omitted from Addendum No. 2 issued 09/03/2021.

2. To extend the bid opening from 09/16/2021 to 09/23/2021 at 1:30 pm.

ONLINE RESPONSES FOR THIS SOLICITATION ARE PROHIBITED Please see Section 6 entitled BID SUBMISSION for more information.

No other changes.

INVOICE TO	SHIP TO
DIVISION OF HIGHWAYS OFFICE OF THE SECRETARY 1900 KANAWHA BLVD E, BLDG 5 RM A109 CHARLESTON WV 25305-0440 US	DIVISION OF HIGHWAYS EXECUTIVE DIVISION 1900 KANAWHA BLVD E, BLDG 5 CHARLESTON WV 25305-0430 US

Line	Comm Ln Desc	Qty	Unit of Measure	Unit Price	Total Price
1	DEVELOPMENT IMPLEMENTATION SUPPORT FLEET MGT SYSTEM				

Comm Code	Manufacturer	Specification	Model #
43233701			

Extended Description:
SOFTWARE DEVELOPMENT, INSTALLATION, SUPPORT AND TRAINING

Attachments A and B revised on Addendum No. 2 issued 9/3/2021

SEE ATTACHMENTS.

SCHEDULE OF EVENTS

Line	Event	Event Date

	Document Phase	Document Description	Page 3
DOT2200000001	Draft	Addendum No 3 - FLEET MANAGEMENT SYSTEM	

ADDITIONAL TERMS AND CONDITIONS

See attached document(s) for additional Terms and Conditions

SOLICITATION NUMBER: CRFP DOT2200000001
Addendum Number: 3

The purpose of this addendum is to modify the solicitation identified as CRFP DOT2200000001 ("Solicitation") to reflect the change(s) identified and described below.

Applicable Addendum Category:

[X] Modify bid opening date and time

[ ] Modify specifications of product or service being sought

[ ] Attachment of vendor questions and responses

[ ] Attachment of pre-bid sign-in sheet

[ ] Correction of error

[X] Other

Description of Modification to Solicitation:

1. To provide response to vendor questions submitted timely, however, were inadvertently omitted from Addendum No. 2 issued on 9/3/2021. See attached pages.

2. The bid opening has moved from 09/16/2021 to 09/23/2021. The bid opening time remains at 1:30 pm.

Additional Documentation: Documentation related to this Addendum (if any) has been included herewith as Attachment A and is specifically incorporated herein by reference.

Terms and Conditions:

1. All provisions of the Solicitation and other addenda not modified herein shall remain in full force and effect.

2. Vendor should acknowledge receipt of all addenda issued for this Solicitation by completing an Addendum Acknowledgment, a copy of which is included herewith. Failure to acknowledge addenda may result in bid disqualification. The addendum acknowledgement should be submitted with the bid to expedite document processing.

CRFP DOT2200000001
ADDENDUM NO. 3

QUESTIONS:

Q1: **Is any GIS integration required? For example for locating accidents. It is listed in the RFP under 4.2.2.3.8. Technical Specification but not in the requirement spreadsheet State of WV have any ETL tools which can be leveraged for Data mapping and Transformation? What is the vendor expectation with regards to ETL tool?**

A1: WVDOT requires the Vendor's proposed Fleet Management solution to have the *capability* to integrate with the WVDOT GIS environment to allow for future integration, but there is no specific requirement to integrate the Fleet Management System with the WVDOT GIS environment as part of the initial implementation.

Q2: **Are we expected to write the SOP's for fleet maintenance or only to tailor them to the VPS.**

A2: The awarded Vendor will be responsible for providing input to WVDOT on what tailoring of SOPS will be required based on the capabilities of the Vendor's proposed Fleet Management solution.

Q3: **For the SRA what kind of assets need to be managed : rolling stock, wayside equipment and rails?**

A3: The new Fleet Management System must be able to support the SRA's rolling stock, work equipment and light duty trucks, passenger cars, etc. SRA infrastructure assets will be managed in the Transportation Asset Management System or TAMS, which is built on the Deighton dTIMS solution.

Q4: **RPT-044 Can you explain what is the functionality required for the distribution of reports by web or pda (Is this Mobile Device)? State of WV have any ETL tools which can be leveraged for Data mapping and Transformation? What is the vendor expectation with regards to ETL tool?**

A4: The intent of the requirement is to be able to publish a link via a variety of channels or mechanisms to provide a link to an authorized user to allow them to be able to view a report online.

Q5: **Do you work in single or multiple shifts?**

A5: Both. There is typically one shift during standard operations, but there will be multiple shifts during snow and ice operations.

Q6: **APP-052: Can you give an example of what is required for this functionality? (Provide capability to define/set-up batch checkpoints)**

A6: APP-052 refers to the ability to set-up restart or sync points in a batch job. In the event of an error, all processing prior to the checkpoint would synchronize or commit to the database, while steps after the checkpoint could be in an error state.

Q7: **4.2.2.4 Federal Highway Administration Certification: Is this required or will billing to FHWA be done using wvOASIS?**

A7: The actual billing of FHWA is performed through wvOASIS. However, FHWA reserves the right to review downstream systems which generate transactions which are charged to a project and potentially eligible for billing. To the extent FHWA desires to review or better understand how fleet charges which may be billed to a Federal project are initiated in the Fleet Management System and then flow over to wvOASIS, the Vendor will be expected to support WVDOT in answering these types of information requests from FHWA.

OTHER INFORMATION:

1. The bid opening has moved from 09/16/2021 to 09/23/2021. The bid opening time remains at 1:30 pm.

ADDENDUM ACKNOWLEDGEMENT FORM
SOLICITATION NO.: CRFP DOT2200000001

Instructions: Please acknowledge receipt of all addenda issued with this solicitation by completing this addendum acknowledgment form. Check the box next to each addendum received and sign below. Failure to acknowledge addenda may result in bid disqualification.

Acknowledgment: I hereby acknowledge receipt of the following addenda and have made the necessary revisions to my proposal, plans and/or specification, etc.

Addendum Numbers Received:
(Check the box next to each addendum received)

[X]	Addendum No. 1	[ ]	Addendum No. 6
[X]	Addendum No. 2	[ ]	Addendum No. 7
[X]	Addendum No. 3	[ ]	Addendum No. 8
[ ]	Addendum No. 4	[ ]	Addendum No. 9
[ ]	Addendum No. 5	[ ]	Addendum No. 10

I understand that failure to confirm the receipt of addenda may be cause for rejection of this bid. I further understand that that any verbal representation made or assumed to be made during any oral discussion held between Vendor's representatives and any state personnel is not binding. Only the information issued in writing and added to the specifications by an official addendum is binding.

MASS Group, Inc.
Company

Jamal Balaw
Authorized Signature

9/21/2021
Date

NOTE: This addendum acknowledgement should be submitted with the bid to expedite document processing.

NEXT STEPS

Contact Gamal Balady of MASS Group, Inc. to request additional information or a demonstration of the software at 818-709-1255 or govbids@massgroup.com. Thank you for the opportunity to earn your business and assist with your Fleet and Equipment Management System.

Req. #	Priority	Category	Sub-Category	Business (Functional) Requirement	Vendor Response	Customization (Estimate of Resources)	Capability Planned for Future Release	Core Module(s)	Third Party Solution(s)	Comments/Notes
FLT-003	1	Fleet Management	Acquisition Replacement and Surplus	Integrate with wvOASIS asset management and purchasing function to support sale of surplus property.	Customization	Small				The ability to utilize web services and other methods of integration is off-the-shelf; however integration with another system may require development work dependent on how the other system communicates.
FLT-004	1	Fleet Management	Acquisition Replacement and Surplus	Integrate with BRIM to remove fleet/equipment unit from the State inventory for insurance purposes if sold to an external entity.	Customization	Small				The ability to utilize web services and other methods of integration is off-the-shelf; however integration with another system may require development work dependent on how the other system communicates.
FLT-005	1	Fleet Management	Acquisition Replacement and Surplus	Integrate with BRIM to transfer surplus property from one State agency to another State agency if fleet/equipment unit is sold to another State agency.	Customization	Small				The ability to utilize web services and other methods of integration is off-the-shelf; however integration with another system may require development work dependent on how the other system communicates.
FLT-031	2	Fleet Management	Acquisition Replacement and Surplus	Integrate with wvOASIS purchasing function to automatically generate a requisition for an approved fleet/equipment unit pre-populating with available information from the fleet/equipment request form.	Customization	Small				The ability to utilize web services and other methods of integration is off-the-shelf; however integration with another system may require development work dependent on how the other system communicates.
FLT-051	1	Fleet Management	Cost and Billing	Integrate with wvOASIS cost allocation function to allocate indirect costs associated with fleet management to fleet/equipment units based on various parameters.	Customization	Small				The ability to utilize web services and other methods of integration is off-the-shelf; however integration with another system may require development work dependent on how the other system communicates.
FLT-067	2	Fleet Management	Cost and Billing	Integrate with wvOASIS accounts receivable function to support billing for accident/driver abuse repairs.	Customization	Small				The ability to utilize web services and other methods of integration is off-the-shelf; however integration with another system may require development work dependent on how the other system communicates.
FLT-080	2	Fleet Management	Fueling	Integrate with wvOASIS accounts payable, purchasing and inventory functions to manage internal fuel distribution function.	Customization	Small				The ability to utilize web services and other methods of integration is off-the-shelf; however integration with another system may require development work dependent on how the other system communicates.
FLT-085	2	Fleet Management	Fueling	Provide capability to integrate with a third party automated fueling system to obtain fuel usage.	Customization	Small				The ability to utilize web services and other methods of integration is off-the-shelf; however integration with another system may require development work dependent on how the other system communicates.
FLT-087	2	Fleet Management	Fueling	Integrate with and upload transactions from a fuel card system.	Customization	Small				The ability to utilize web services and other methods of integration is off-the-shelf; however integration with another system may require development work dependent on how the other system communicates.
FLT-088	2	Fleet Management	Fueling	Integrate with wvOASIS inventory function and/or third-party fuel management system.	Customization	Small				The ability to utilize web services and other methods of integration is off-the-shelf; however integration with another system may require development work dependent on how the other system communicates.
FLT-090	2	Fleet Management	Fueling	Integrate with wvOASIS accounts receivable and general ledger functions to generate intergovernmental billings for fuel purchases by one state agency from another state agency.	Customization	Small				The ability to utilize web services and other methods of integration is off-the-shelf; however integration with another system may require development work dependent on how the other system communicates.
FLT-091	2	Fleet Management	Fueling	Integrate with wvOASIS accounts receivable and billing functions to bill external customers for fuel purchases. External customers include local political subdivisions such as county sheriffs, etc.	Customization	Small				The ability to utilize web services and other methods of integration is off-the-shelf; however integration with another system may require development work dependent on how the other system communicates.
FLT-099	1	Fleet Management	General	Integrate with the wvOASIS Financial System to provide information on vehicles, maintenance equipment and other fleet units utilized in performing maintenance work activities.	Customization	Small				The ability to utilize web services and other methods of integration is off-the-shelf; however integration with another system may require development work dependent on how the other system communicates.
FLT-107	1	Fleet Management	General	Integrate fleet and equipment management functions with other relevant wvOASIS functions, including but not limited to asset management, accounts payable, accounts receivable, general ledger, grants, inventory, project accounting, purchasing and time and labor.	Customization	Small				The ability to utilize web services and other methods of integration is off-the-shelf; however integration with another system may require development work dependent on how the other system communicates.
FLT-108	1	Fleet Management	General	Interface with wvOASIS cost accounting and allocation, inventory, personnel administration and time and labor to obtain the required actual cost data.	Customization	Small				The ability to utilize web services and other methods of integration is off-the-shelf; however integration with another system may require development work dependent on how the other system communicates.
FLT-111	1	Fleet Management	General	Integrate with the wvOASIS time and labor function to capture vehicle usage reported by an employee on their time sheet and update the fleet inventory information with mileage to date as appropriate.	Customization	Small				The ability to utilize web services and other methods of integration is off-the-shelf; however integration with another system may require development work dependent on how the other system communicates.
FLT-168	2	Fleet Management	Inventory	Integrate automatically with the West Virginia Board of Risk and Insurance Management (BRIM) to add new fleet/equipment record to BRIM SQL Server database or to update the BRIM database with changes recorded in wvOASIS.	Customization	Small				The ability to utilize web services and other methods of integration is off-the-shelf; however integration with another system may require development work dependent on how the other system communicates.
FLT-170	2	Fleet Management	Inventory	Integrate with wvOASIS purchasing function to automatically create initial fleet/equipment unit record upon receipt of vehicle populating initially with appropriate information available within wvOASIS purchasing function; authorized user must be able to then add additional information within the fleet/equipment unit record.	Customization	Small				The ability to utilize web services and other methods of integration is off-the-shelf; however integration with another system may require development work dependent on how the other system communicates.
FLT-174	2	Fleet Management	Inventory	Integrate with Accounts Payable function to automatically generate payment request for monthly or other recurring payments for leased vehicles; this could be a payment to an external entity or an intergovernmental transfer to another State agency.	Customization	Small				The ability to utilize web services and other methods of integration is off-the-shelf; however integration with another system may require development work dependent on how the other system communicates.
FLT-175	2	Fleet Management	Inventory	Integrate with Accounts Payable function to automatically generate payment request for monthly or other recurring payments for financed vehicles.	Customization	Small				The ability to utilize web services and other methods of integration is off-the-shelf; however integration with another system may require development work dependent on how the other system communicates.
FLT-176	2	Fleet Management	Inventory	Integrate with Accounts Payable function to automatically generate payment request for renewal of required licenses and permits.	Customization	Small				The ability to utilize web services and other methods of integration is off-the-shelf; however integration with another system may require development work dependent on how the other system communicates.
FLT-179	2	Fleet Management	Inventory	Integrate with BRIM to automatically provide notification of accident and available information on the accident including attachment and transfer to BRIM of electronic files (pictures, police reports, estimates, etc.).	Customization	Small				The ability to utilize web services and other methods of integration is off-the-shelf; however integration with another system may require development work dependent on how the other system communicates.
FLT-194	3	Fleet Management	Inventory	Integrate with the R.L. Polk and Company Vehicle Identification Number Analysis's software to populate the fleet unit attributes to the extent possible.	Customization	Small				The ability to utilize web services and other methods of integration is off-the-shelf; however integration with another system may require development work dependent on how the other system communicates.
FLT-215	2	Fleet Management	Parts Inventory	Integrate with the wvOASIS inventory function to maintain an inventory of an unlimited number of consumable inventory parts, materials, other inventory.	Customization	Small				The ability to utilize web services and other methods of integration is off-the-shelf; however integration with another system may require development work dependent on how the other system communicates.
FLT-229	1	Fleet Management	Parts Inventory	Integrate with wvOASIS to support frequent updates for quantity (On-hand, on-order, etc.), cost, location (warehouse/bin/stockpile) and related information to support the Fleet system having current updated inventory information in near real-time.	Customization	Small				The ability to utilize web services and other methods of integration is off-the-shelf; however integration with another system may require development work dependent on how the other system communicates.
FLT-230	1	Fleet Management	Parts Inventory	Integrate with wvOASIS to update consumable inventory (parts, materials and other inventory) consumed in work orders/repair orders.	Customization	Small				The ability to utilize web services and other methods of integration is off-the-shelf; however integration with another system may require development work dependent on how the other system communicates.
FLT-335	2	Fleet Management	Work Orders	Integrate with BRIM to automatically report the estimated repair costs associated with accidents.	Customization	Small				The ability to utilize web services and other methods of integration is off-the-shelf; however integration with another system may require development work dependent on how the other system communicates.
FLT-336	2	Fleet Management	Work Orders	Allow for automated routing of work order back to operator (requestor) and/or operator's supervisor for approval of the estimate and completion of the work order.	Customization	Small				The ability to utilize web services and other methods of integration is off-the-shelf; however integration with another system may require development work dependent on how the other system communicates.
FLT-346	2	Fleet Management	Work Orders	Provide the capability to integrate with management systems of multiple outsourced maintenance providers to electronically transfer work order information.	Customization	Small				The ability to utilize web services and other methods of integration is off-the-shelf; however integration with another system may require development work dependent on how the other system communicates.
FLT-361	2	Fleet Management	Work Orders	Update employee time information in the wvOASIS time and labor function based on the actual time reported by the employee on the work order. Total time for an employee for each day should be pre-populated on the time sheet based on the total time charged to work orders that day.	Customization	Small				The ability to utilize web services and other methods of integration is off-the-shelf; however integration with another system may require development work dependent on how the other system communicates.
FLT-362	2	Fleet Management	Work Orders	Update parts inventory in wvOASIS inventory function based on parts used on a work order.	Customization	Small				The ability to utilize web services and other methods of integration is off-the-shelf; however integration with another system may require development work dependent on how the other system communicates.
FLT-363	2	Fleet Management	Work Orders	Update parts inventory in wvOASIS inventory function based on any parts credited in a work order returned to inventory.	Customization	Small				The ability to utilize web services and other methods of integration is off-the-shelf; however integration with another system may require development work dependent on how the other system communicates.
FLT-368	2	Fleet Management	Work Orders	Integrate with wvOASIS accounts payable function to support payment for completed work orders via procurement card or warrant for external repairs and intergovernmental billing for repairs performed by one State agency for another agency.	Customization	Small				The ability to utilize web services and other methods of integration is off-the-shelf; however integration with another system may require development work dependent on how the other system communicates.
FLT-369	2	Fleet Management	Work Orders	Integrate with wvOASIS general ledger function to support intergovernmental billing for repairs performed by one State agency for another agency.	Customization	Small				The ability to utilize web services and other methods of integration is off-the-shelf; however integration with another system may require development work dependent on how the other system communicates.

Req. #	Priority	Category	Sub-Category	Data Field Requirement	Vendor Response	Customization Estimate, if Applicable	Core Module(s)	Comments/Notes
FDF-001	1	Fleet Management	General	Store and display fleet/equipment class name, code, and description.	Off the Shelf			
FDF-002	1	Fleet Management	General	Store and display skills/certifications required by operator.	Off the Shelf			
FDF-003	1	Fleet Management	General	Store and display rental rate, cost per hour (for activity costing purposes).	Off the Shelf			
FDF-004	1	Fleet Management	General	Store Utilization entry.	Off the Shelf			
FDF-005	1	Fleet Management	General	Store and display fleet/equipment class name, code, and description.	Off the Shelf			
FDF-006	1	Fleet Management	General	Store and display skills/certifications required by operator.	Off the Shelf			
FDF-007	1	Fleet Management	General	Store and display rental rate, cost per hour (for activity costing purposes).	Off the Shelf			
FDF-008	1	Fleet Management	General	Store Utilization entry.	Off the Shelf			
FDF-009	2	Fleet Management	General	Store warranties for equipment and parts.	Off the Shelf			
FDF-010	1	Fleet Management	Inventory	Store and display fleet/equipment type name and class code.	Off the Shelf			
FDF-011	1	Fleet Management	Inventory	Store and display fleet/equipment unit ID number.	Off the Shelf			
FDF-012	1	Fleet Management	Inventory	Store and display manufacturer.	Off the Shelf			
FDF-013	1	Fleet Management	Inventory	Store and display make.	Off the Shelf			
FDF-014	1	Fleet Management	Inventory	Store and display model.	Off the Shelf			
FDF-015	1	Fleet Management	Inventory	Store and display serial number (16 to 20 alpha-numeric characters).	Off the Shelf			
FDF-016	1	Fleet Management	Inventory	Store and display USDOT number.	Off the Shelf			
FDF-017	1	Fleet Management	Inventory	Store and display 7 Digit ED number (WVDOT assigned equipment number) with possibility for expansion on the field.	Off the Shelf			
FDF-018	1	Fleet Management	Inventory	Store at least 30 preventive maintenance schedules applicable to each fleet/equipment unit; preventive maintenance schedules must be supported for time, miles/hours, fuel consumed, or any combination of all three.	Off the Shelf			
FDF-019	1	Fleet Management	Inventory	Store and display assigned organization.	Off the Shelf			
FDF-020	1	Fleet Management	Inventory	Store and display current location of equipment.	Off the Shelf			
FDF-021	1	Fleet Management	Inventory	Store and display prior history of equipment assignment.	Off the Shelf			
FDF-022	1	Fleet Management	Inventory	Store and display eligibility of the equipment to be pooled.	Off the Shelf			
FDF-023	1	Fleet Management	Inventory	Store and display fleet/equipment type name and class code.	Off the Shelf			
FDF-024	1	Fleet Management	Inventory	Store and display fleet/equipment unit ID number.	Off the Shelf			
FDF-025	1	Fleet Management	Inventory	Store and display manufacturer.	Off the Shelf			
FDF-026	1	Fleet Management	Inventory	Store and display make.	Off the Shelf			
FDF-027	1	Fleet Management	Inventory	Store and display model.	Off the Shelf			
FDF-028	1	Fleet Management	Inventory	Store and display serial number (16 to 20 alpha-numeric characters).	Off the Shelf			
FDF-029	1	Fleet Management	Inventory	Store and display USDOT number.	Off the Shelf			
FDF-030	1	Fleet Management	Inventory	Store and display prior history of equipment assignment.	Off the Shelf			
FDF-031	2	Fleet Management	Inventory	Store a minimum of 5 major component makes, models and serial #s per fleet/ equipment unit (e.g., chassis, engine).	Off the Shelf			
FDF-032	2	Fleet Management	Inventory	Store at least 15 warranties applicable to each fleet/equipment unit or major subcomponent of the fleet/equipment unit; warranties must be supported for time, miles or any combination of the two.	Off the Shelf			
FDF-033	2	Fleet Management	Inventory	Store unlimited notes for each fleet/equipment unit record.	Off the Shelf			
FDF-034	2	Fleet Management	Inventory	Store lease/rental information for any equipment which is leased.	Off the Shelf			
FDF-035	2	Fleet Management	Inventory	Store vendor identification number for lessor for external leases.	Off the Shelf			
FDF-036	2	Fleet Management	Inventory	Store lease term.	Off the Shelf			
FDF-037	2	Fleet Management	Inventory	Store lease start date.	Off the Shelf			
FDF-038	2	Fleet Management	Inventory	Store lease end date.	Off the Shelf			
FDF-039	2	Fleet Management	Inventory	Store lease payment terms (lease amount, period).	Off the Shelf			
FDF-040	2	Fleet Management	Inventory	Store lease payment due date.	Off the Shelf			
FDF-041	2	Fleet Management	Inventory	Store financing information for any fleet units which are financed.	Off the Shelf			
FDF-042	2	Fleet Management	Inventory	Store accidents involving a fleet unit.	Off the Shelf			
FDF-043	2	Fleet Management	Inventory	Store date of accident.	Off the Shelf			
FDF-044	2	Fleet Management	Inventory	Store employee operating fleet/equipment unit.	Off the Shelf			
FDF-045	2	Fleet Management	Inventory	Store other employees in fleet unit or working with equipment.	Off the Shelf			
FDF-046	2	Fleet Management	Inventory	Store accident description.	Off the Shelf			
FDF-047	2	Fleet Management	Inventory	Store names/contact information of non-State employees involved in incident/accident.	Off the Shelf			
FDF-048	2	Fleet Management	Inventory	Store work orders (multiple) associated with any repairs.	Off the Shelf			
FDF-049	2	Fleet Management	Inventory	Store other optional fields based on fleet class and/or fleet/equipment type.	Off the Shelf			
FDF-050	2	Fleet Management	Inventory	Store and display separate fields for Home and Controlling Organizations.	Off the Shelf			
FDF-051	2	Fleet Management	Inventory	Store and display warranty information and any recall history.	Off the Shelf			
FDF-052	2	Fleet Management	Inventory	Store and display repair history.	Off the Shelf			
FDF-053	2	Fleet Management	Inventory	Store and display history of equipment utilization.	Off the Shelf			
FDF-054	2	Fleet Management	Inventory	Store and display current equipment status (Active, Pooled, Reserved, Under Repair, Scheduled for Maintenance, etc.) - X,S,A,R,W,P. X=Down, S=Sale, A=Active, R=Repair, W=Warranty, and P=Pool	Off the Shelf			

FDF-055	2	Fleet Management	Inventory	Store and display combined current equipment status of equipment units which are needed to be reserved as a unit; for example, a loader and hauler.	Off the Shelf			
FDF-056	2	Fleet Management	Inventory	Store a minimum 3 fuel types per fleet/equipment unit.	Off the Shelf			
FDF-057	2	Fleet Management	Inventory	Store work orders (multiple) associated with any repairs.	Off the Shelf			
FDF-058	2	Fleet Management	Inventory	Store and display warranty information and any recall history.	Off the Shelf			
FDF-059	3	Fleet Management	Inventory	Store vendor identification number for bank or finance company.	Off the Shelf			
FDF-060	3	Fleet Management	Inventory	Store loan date.	Off the Shelf			
FDF-061	3	Fleet Management	Inventory	Store loan start and end date.	Off the Shelf			
FDF-062	3	Fleet Management	Inventory	Store loan terms (rate, period, payment).	Off the Shelf			
FDF-063	3	Fleet Management	Inventory	Store loan payment due date.	Off the Shelf			
FDF-064	3	Fleet Management	Inventory	Store organization to whom loan payment is made (bank or other).	Off the Shelf			
FDF-065	3	Fleet Management	Inventory	Store loan payment location.	Off the Shelf			
FDF-066	3	Fleet Management	Inventory	Store loan payment address.	Off the Shelf			
FDF-067	2	Fleet Management	Motorpool	Store for each motor pool: unique motor pool identifier.	Off the Shelf			
FDF-068	2	Fleet Management	Motorpool	Store for each motor pool: unit.	Off the Shelf			
FDF-069	2	Fleet Management	Motorpool	Store for each motor pool: motor pool manager.	Off the Shelf			
FDF-070	2	Fleet Management	Motorpool	Store for each motor pool: pool location.	Off the Shelf			
FDF-071	2	Fleet Management	Motorpool	Store for each motor pool: unique motor pool identifier.	Off the Shelf			
FDF-072	2	Fleet Management	Motorpool	Store for each motor pool: unit.	Off the Shelf			
FDF-073	2	Fleet Management	Motorpool	Store for each motor pool: motor pool manager.	Off the Shelf			
FDF-074	2	Fleet Management	Motorpool	Store for each motor pool: pool location.	Off the Shelf			
FDF-075	1	Fleet Management	Parts Inventory	Store part type code.	Off the Shelf			
FDF-076	2	Fleet Management	Parts Inventory	Store part number.	Off the Shelf			
FDF-077	2	Fleet Management	Parts Inventory	Store manufacturer.	Off the Shelf			
FDF-078	2	Fleet Management	Parts Inventory	Store manufacturer part number.	Off the Shelf			
FDF-079	2	Fleet Management	Parts Inventory	Store serial number.	Off the Shelf			
FDF-080	2	Fleet Management	Parts Inventory	Store alternate part number.	Off the Shelf			
FDF-081	2	Fleet Management	Parts Inventory	Store description.	Off the Shelf			
FDF-082	2	Fleet Management	Parts Inventory	Store part usage codes (multiple).	Off the Shelf			
FDF-083	2	Fleet Management	Parts Inventory	Store part reference fields (multiple).	Off the Shelf			
FDF-084	2	Fleet Management	Parts Inventory	Store cross reference fields (multiple).	Off the Shelf			
FDF-085	2	Fleet Management	Parts Inventory	Store part usage codes (multiple).	Off the Shelf			

Req. #	Priority	Category	Sub-Category	Business (Functional) Requirement	Vendor Response	Customization Estimate, if Applicable	Capability Planned for Future Release	Core EAM Module(s)	Third Party Solution(s)	Comments/Notes
RPT-001	1	Management Reporting	General	Provide a wide range of pre-defined reports that support day-to-day fleet management, work management and planning and budgeting business functions. Reports should be able to be scheduled and automatically generated and distributed (pushed to the user) by the operational system at a user defined time for publication.	Off the Shelf					
RPT-002	2	Management Reporting	General	Provide capability to copy and modify existing reports as the basis for a new report.	Off the Shelf					
RPT-003	2	Management Reporting	General	Provide tools within the Vendor solution to configure new reports.	Off the Shelf					
RPT-004	3	Management Reporting	General	Provide an ad-hoc query tool within the Vendor solution. The adhoc query toolset within the Vendor solution will not require knowledge and training on its own proprietary language for the majority of users (non power users).	Off the Shelf					
RPT-005	2	Management Reporting	General	Provide the ability to utilize JasperReports with the EAMS database	Off the Shelf					
RPT-006	3	Management Reporting	General	Provide the ability to integrate other third-party reporting tools (Crystal Reports, PowerBI, etc.) with the Vendor solution.	Off the Shelf					
RPT-007	2	Management Reporting	General	Provide an entity relationship diagram(s) to support development of end-user reports through the ad-hoc query tool within the Vendor solution or a third-party reporting application.	Off the Shelf					
RPT-008	2	Management Reporting	General	Provide ability to view key performance indicators and other organizational performance data on a user-friendly intuitive dashboard.	Off the Shelf					
RPT-009	1	Management Reporting	General	Provide the capability to integrate with a future WVDOT business intelligence environment.	Off the Shelf					
RPT-010	1	Management Reporting	General	Provide a solution which is architected to support the ability to have 24-hour/7 day a week access (excluding defined maintenance windows) to the reporting functions.	Off the Shelf					
RPT-011	2	Management Reporting	General	Provide user access to predefined reports available withinthe Vendor solution without requiring the installation of any client software.	Off the Shelf					
RPT-012	2	Management Reporting	General	Provide user access to the functionality of the adhoc query tool for a minimum of 80% of the available functionality without requiring the installation of any client software (it is recognized that some capabilities utilized by power users may require the installation of additional software on the client desktop).	Off the Shelf					
RPT-013	2	Management Reporting	General	Provide user access to the forecasting capabilities within the Vendor solution for a minimum of 50% of the available forecasting capabilities without requiring the installation of any client software.	Off the Shelf					
RPT-014	2	Management Reporting	General	Provide user access to analysis, modeling and dashboarding tools within the Vendor solution for a minimum of 50% of the available capabilities within these functions without requiring the installation of any client software.	Off the Shelf					
RPT-015	1	Management Reporting	General	Leverage the roles and security definitions that will be deployed for the main Fleet Management product within the reporting and business function to minimize duplication of security administration functions.	Off the Shelf					
RPT-016	2	Management Reporting	General	Support utilization of the same hardware and operating system specifications (architectural landscape) that are required for the operational platform for the reporting environment to the extent feasible.	Off the Shelf					
RPT-017	2	Management Reporting	General	Provide a reporting solution which is architected to allow sizing of data repositories to meet changing business needs allowing clients and servers to be added, upgraded or removed as computing capacity needs change, without reconfiguring the operational system or reporting environment.	Off the Shelf					
RPT-018	2	Management Reporting	Report Portal	Provide users with a personalized report portal that allows access to only those reports that the user is authorized to see consistent with role-based security definitions.	Off the Shelf					
RPT-019	3	Management Reporting	Report Portal	Display on the reports portal a list of reports that have been distributed to the user (i.e. the user has been granted authorization to view a report by the designated report publisher/owner).	Off the Shelf					
RPT-020	3	Management Reporting	Report Portal	Display on the reports portal a list of saved personalized reports and ad-hoc queries that the user has authority to either create or modify in the user's personal reports list.	Off the Shelf					
RPT-021	3	Management Reporting	Report Portal	Allow users to search existing reports inventory and subscribe to reports after requesting and receiving permission from the report owner/publisher.	Off the Shelf					
RPT-022	3	Management Reporting	Report Portal	Provide the ability for designated report publishers to un-publish reports to individual users or groups of users, with the un-publication subject to approval based on WVDOT business rules.	Off the Shelf					
RPT-023	3	Management Reporting	Report Portal	Allow end-users to share saved personalized reports and ad-hoc queries for use by another user.	Off the Shelf					

Req. #	Priority	Category	Sub-Category	Business (Functional) Requirement	Vendor Response	Customization Estimate, if Applicable	Capability Planned for Future Release	Core EAM Module(s)	Third Party Solution(s)	Comments/Notes
RPT-024	3	Management Reporting	Report Portal	Allow end-users to delete shared reports from their personal reports list without deleting the shared report from another user's personal reports list.	Off the Shelf					
RPT-025	3	Management Reporting	Report Portal	Allow users to refresh (run) saved personal reports or ad-hoc queries from the portal with an option to run in the background and send a notification to the user upon completion.	Off the Shelf					
RPT-026	3	Management Reporting	Standard Report Features	Allow users to execute reports and modify report query parameters on-line and allow users to save modified report parameter sets as personal versions without impacting the base query.	Off the Shelf					
RPT-027	2	Management Reporting	Standard Report Features	Provide drill down capability from summary information to the supporting detail transactions and drill up from the detail transaction to the summary information.	Off the Shelf					
RPT-028	2	Management Reporting	Standard Report Features	Provide, as part of drill down functionality, the ability to print the expanded sections of the drill down results with the content of the original query results.	Off the Shelf					
RPT-029	3	Management Reporting	Standard Report Features	Link the report generator directly to the data dictionary to provide point and click data item selection and drag-and-drop formatting by the user.	Off the Shelf					
RPT-030	3	Management Reporting	Standard Report Features	Allow users to define or modify the sort order of reports.	Off the Shelf					
RPT-031	3	Management Reporting	Standard Report Features	Allow users to search for data, transactions or documents using a range of data values.	Off the Shelf					
RPT-032	3	Management Reporting	Standard Report Features	Provide authorized users with the capability to perform a search within a report output/results set.	Off the Shelf					
RPT-033	3	Management Reporting	Standard Report Features	Provide authorized users with the capability to perform searches with full "if..then..else" logic within a report output/results set.	Off the Shelf					
RPT-034	4	Management Reporting	Standard Report Features	Provide authorized users with the capability to perform free-form text searching within a report output/results set. Search capability shall include the specification of words that are in a given range of words and shall include embedded, attached or linked documents.	Off the Shelf					
RPT-035	2	Management Reporting	Standard Report Features	Present data in both tabular and graphical formats.	Off the Shelf					
RPT-036	3	Management Reporting	Standard Report Features	Provide reporting and analytical capabilities with a similar user interface/user experience to the extent practical as other Fleet Management system functions (reporting toolset should not have a significantly different look and feel to the end-user from other parts of the Vendor system).	Off the Shelf					
RPT-037	3	Management Reporting	Standard Report Features	Provide ability to allow the results from any online search or query performed within the Vendor solution to be printed.	Off the Shelf					
RPT-038	2	Management Reporting	Standard Report Features	Provide standard print capabilities such as those typically available in Windows-based products such as print preview, print a range of pages, print a number of copies, etc.	Off the Shelf					
RPT-039	2	Management Reporting	Standard Report Features	Provide ability to schedule a report to run automatically if certain conditions (business rules) are met.	Off the Shelf					
RPT-040	2	Management Reporting	Standard Report Features	Support export of query and report results as an external database (for example in Microsoft Access or SQL Server readable formats).	Off the Shelf					
RPT-041	2	Management Reporting	Standard Report Features	Support export of query and report results in a variety of different industry standard formats including but not limited to .xls or .xlsx, .doc or .docx, PDF, .txt, XML, ASCII, comma delimited, tab delimited, etc.	Off the Shelf					
RPT-042	3	Management Reporting	Standard Report Features	Provide for report distribution based on events, process milestones, or predefined data thresholds or values, e.g., based on data values contained within the report (i.e., conditional operators >, <, =, etc.)	Off the Shelf					
RPT-043	3	Management Reporting	Standard Report Features	Provide the capability to integrate third party report distribution software solutions.	Off the Shelf					
RPT-044	3	Management Reporting	Standard Report Features	Provide functionality to distribute reports by a variety of methods such as sending links to reports via email, web, fax, or PDA.	Off the Shelf					
RPT-045	3	Management Reporting	Standard Report Features	Support effective date selection and query including Boolean operations such as date ranges.	Off the Shelf					

Req. #	Priority	Category	Sub-Category	Business (Functional) Requirement	Vendor Response	Customization Estimate, if Applicable	Capability Planned for Future Release	Core EAM Module(s)	Third Party Solution(s)	Comments/Notes
RPT-046	3	Management Reporting	Standard Report Features	Provide functionality for the user to incorporate formulas, functions, and mathematical calculations into reports as well as typical grouping, mathematical and statistical functions on data in reports (such as sum, count, average, etc.)	Off the Shelf					
RPT-047	3	Management Reporting	Standard Report Features	Provide the ability to create and specify report templates.	Off the Shelf					
RPT-048	3	Management Reporting	Standard Report Features	Provide wizards to guide the users through report building steps.	Off the Shelf					
RPT-049	3	Management Reporting	Standard Report Features	Provide cursor selection and drag-and-drop features to assist users in formatting of files, elements, and operands (e.g., +,-, /, *) from data dictionary or other pre-established lists.	Off the Shelf					
RPT-050	3	Management Reporting	Standard Report Features	Provide graphical report layout tools and drag-and-drop features to assist users in formatting reports and inquires.	Off the Shelf					
RPT-051	3	Management Reporting	Standard Report Features	Provide support for graphical data visualization features including but not limited to stacked bar charts, min/mid/max line graphs, regression lines, dashboard gauges, etc.	Off the Shelf					
RPT-052	3	Management Reporting	Standard Report Features	Provide ability to link from reporting tool to Microsoft Office graphic, spreadsheet and presentation applications.	Off the Shelf					
RPT-053	3	Management Reporting	Ad-hoc Query	Allow users to build ad-hoc queries to report on any fields in the Vendor solution for which they are authorized using one or more of a combination of different criteria; provide online access to a data dictionary showing data element and table to assist query building.	Off the Shelf					
RPT-054	3	Management Reporting	Ad-hoc Query	Allow a user to save an ad-hoc query for later execution without impacting any base query that was used as a start point.	Off the Shelf					
RPT-055	3	Management Reporting	Ad-hoc Query	Display a user's saved ad-hoc queries by descriptive name on the user's report portal.	Off the Shelf					
RPT-056	3	Management Reporting	Ad-hoc Query	Allow a user to authorize one or more additional users to have access to a saved ad-hoc query through the report portal.	Off the Shelf					
RPT-057	3	Management Reporting	Ad-hoc Query	Display any ad-hoc queries that are authorized (shared) by one user for use by a second user on the second user's report portal.	Off the Shelf					
RPT-058	2	Management Reporting	Ad-hoc Query	Provide ability to track data by user-defined performance indicators.	Off the Shelf					
RPT-059	2	Management Reporting	Report Administration	Provide a solution architected so as to centrally manage the reporting tool set to ensure that any updates are distributed to users and that all users are accessing the same version of the reporting software.	Off the Shelf					
RPT-060	1	Management Reporting	Report Administration	Ensure solution is architected so system performance is not impacted when a large report or inquiry is being run.	Off the Shelf					
RPT-061	3	Management Reporting	Report Administration	Provide the ability to schedule, view and modify the start time for batch printing including any dependencies on certain business conditions or events; provide option to restrict batch printing of large volume outputs by job or to certain authorized users to minimize on paper usage.	Customization	Small				
RPT-062	1	Management Reporting	Report Administration	Enable users to run ad hoc reports and queries without degradation of system performance.	Off the Shelf					TME Reports utilizes built-in reporting s
RPT-063	2	Management Reporting	Report Administration	Allow the system administrator or other authorized user to define limits on the execution time for a report or query and/or the numbers being retrieved.	Off the Shelf					
RPT-064	2	Management Reporting	Report Administration	Cancel automatically a query or report job if it fails to meet system administrator defined criteria (e.g., time limits, infinite loops, excessive pages, etc.).	Off the Shelf					
RPT-065	2	Management Reporting	Report Administration	Provide the ability for authorized users or system administrator to terminate any query or report that significantly reduces system performance.	Off the Shelf					
RPT-066	3	Management Reporting	Report Administration	Allow system administrator or other authorized user to override parameters for an individual query or report.	Off the Shelf					
RPT-067	3	Management Reporting	Report Administration	Provide functionality to audit exports of report data and modifications to report definitions.	Off the Shelf					
RPT-068	2	Management Reporting	Report Administration	Provide the ability to configure reports such that information can be suppressed based on a user's role.	Off the Shelf					
RPT-069	2	Management Reporting	Report Administration	Provide reports on user production statistics by user ID, time of day, length of job, etc. to determine who is viewing a report, what reports are being used and resources consumed by department/user suitable for billing purposes.	Off the Shelf					
RPT-070	2	Management Reporting	Report Administration	Maintain an active metadata repository that contains definitions of all data elements and attributes within the Vendor'ssolution (maintain both product meta-data and user configured changes).	Off the Shelf					

Req. #	Priority	Category	Sub-Category	Business (Functional) Requirement	Vendor Response	Customization Estimate, if Applicable	Capability Planned for Future Release	Core Module(s)	Third Party Solution(s)	Comments/Notes
APP-001	1	Application Architecture	General	Provide a suite of fully-integrated application modules in which data captured in one module is readily available for use and updated as appropriate in other modules of the system.	Off the Shelf					
APP-002	1	Application Architecture	General	Provide ability to share all related business information across functional areas and organizations, subject to application security and user-defined business rules and security considerations.	Off the Shelf					
APP-003	1	Application Architecture	General	Provide an integrated data management structure that is utilized across the proposed software solution minimizing system processing or administration required on the data integration points.	Off the Shelf					
APP-004	1	Application Architecture	General	Provide user-controlled definition and maintenance of system values and business rules in tables, system configuration files, coding, and business rules in data structures and interfaces without requiring programmer intervention to modify and providing the capability for an application administrator or other authorized users to manage and maintain system configurations, settings, and data tables.	Off the Shelf					
APP-005	2	Application Architecture	General	Update all related modules and tables immediately with a single entry; that is, any change to a project attribute or project status information is made only once but takes effect throughout the system.	Off the Shelf					
APP-006	2	Application Architecture	General	Provide means of altering tables and/or data structures to support user-defined fields and capability for system administrator or other authorized users to create new data items on-line and automatically update a global data dictionary with these new elements.	Off the Shelf					
APP-007	2	Application Architecture	General	Provide application administrator or other authorized user with screen layout configuration capabilities including movement of fields on the screen and/or across tables, removal of fields, addition of user-defined fields, reorder or consolidation of tables, buttons to enable prints and selection of related reports, links to other business objects (such as CAD drawings, user manuals, project records, contract records, etc.).	Off the Shelf					
APP-008	2	Application Architecture	General	Support consistency in terms of field labels such that a screen label defined in one place would be referred to in the same way everywhere and separated by line of business, role, etc.	Off the Shelf					
APP-009	2	Application Architecture	General	Within the system, utilize a design which provides the end user with a perspective of real-time update of data (even if some processes may be happening in the background to complete database updates); that is, users should not be required to toggle back and forth from a screen being used to perform a business process using a job queue to check the status of a batch/background task being able to proceed to the next screen in a series of screens required to perform a specific business function/task.	Off the Shelf					
APP-010	2	Application Architecture	General	Perform transactions in real-time in the sense that online access will display the most current element value (e.g., if a user changes the value of a data element on one screen, the newly changed data value will be shown when the user moves to another screen with that same data element).	Off the Shelf					
APP-011	1	Application Architecture	General	Edit all system input according to user-defined business rules so that the rules are appropriately and consistently applied and data is validated at the time the data is entered into the system (on-line or via a batch transaction).	Off the Shelf					
APP-012	2	Application Architecture	General	Utilize effective-dated transactions and table updates (either dated for future action or dated to be retroactive) with the ability to specify data edits by type of transaction.	Off the Shelf					
APP-013	2	Application Architecture	General	Support multiple concurrent application sessions for each user; each concurrent session must be able to support the same security profile or a different profile if the user has multiple profiles.	Off the Shelf					
APP-014	2	Application Architecture	General	Provide capability for a user to have multiple screens or tabs open within a single user session.	Off the Shelf					
APP-015	2	Application Architecture	General	Maintain security logs and audit trails distinctly for each concurrent user session.	Off the Shelf					
APP-016	2	Application Architecture	General	Support encryption, masking, or hiding of any fields with restricted access to only authorized users by department/business unit and role and responsibility.	Off the Shelf					
APP-017	2	Application Architecture	General	Provide capability to indicate at the field level user classes or individual users who are authorized to view masked or encrypted fields.	Off the Shelf					
APP-018	2	Application Architecture	General	Allow display of masked, hidden, or encrypted fields by an authorized user.	Off the Shelf					
APP-019	1	Application Architecture	General	Comply with the Rehabilitation Act of 1973 and Americans with Disabilities Act (ADA) Section 508 standards for accessibility of all system functions.	Off the Shelf					
APP-020	1	Application Architecture	User Interface	Utilize a consistent user interface across the software (excluding proposed third party solutions) including user definable hot keys; screen naming functions; navigation patterns; consistent use of controls; and online help and menus (as defined by the user's security profile).	Off the Shelf					
APP-021	2	Application Architecture	User Interface	Ensure messages appear in a consistent format across all system functions for both batch and on-line processing.	Off the Shelf					
APP-022	2	Application Architecture	User Interface	Allow manual entry and also context specific drop-down lists of all valid values for each validated field where appropriate.	Off the Shelf					
APP-023	2	Application Architecture	User Interface	Provide immediate transfer/paste of value[s] from a "pop up" list of values tables to the appropriate field when selected.	Off the Shelf					
APP-024	2	Application Architecture	User Interface	Architect so as to have interfaces proceed directly and automatically to the next appropriate field when data is entered, for example "Tabbing" through fields in a defined sequence.	Off the Shelf					
APP-025	2	Application Architecture	User Interface	Allow user to directly access other input screens and modules without need for backing out of menus or menu paths.	Off the Shelf					
APP-026	2	Application Architecture	User Interface	Allow navigation between multiple, related input screens without losing any information input on the original (or header) screen.	Off the Shelf					
APP-027	2	Application Architecture	User Interface	Allow user to move backward within a menu structure and screens without losing previously entered data.	Off the Shelf					
APP-028	2	Application Architecture	User Interface	Allow a user to cancel transaction and/or exit any document or screen without saving changes.	Off the Shelf					
APP-029	3	Application Architecture	User Interface	Support cut and paste for copying data between screens.	Off the Shelf					
APP-030	2	Application Architecture	User Interface	Provide a display that indicates (e.g., highlighting) all required fields for entry on any screen.	Off the Shelf					
APP-031	2	Application Architecture	User Interface	Provide a search and filter capability on user screens containing columns of data.	Off the Shelf					
APP-032	2	Application Architecture	Functions and Features	Support use of keyboard data entry only (i.e., allow screen functions to be performed without use of a mouse).	Modification to Base Code		Within 12 months			All detail screens provide the ability to use the keyboard for data entry. MASS Group is working on the maneuverability from module to module.
APP-033	1	Application Architecture	Functions and Features	Support the generation of email messages by the system based on various system/business events, utilizing SMTP for outbound messages.	Off the Shelf					
APP-034	2	Application Architecture	Functions and Features	Allow any master record or validation table entry to be activated or inactivated.	Off the Shelf					
APP-035	1	Application Architecture	Functions and Features	Provide for wildcard, partial, and multi-term searches; include ability to define must-have and optional criteria.	Off the Shelf					
APP-036	2	Application Architecture	Functions and Features	Provide capability to auto-populate the value of a field based on the value of a previously entered field using user-defined business rules and/or validations.	Off the Shelf					
APP-037	2	Application Architecture	Functions and Features	Allow overriding of system or user-defined defaults based on business rules with an audit trail within individual functions.	Off the Shelf					
APP-038	2	Application Architecture	Functions and Features	Allow for descriptions on all transactions.	Off the Shelf					
APP-039	2	Application Architecture	Functions and Features	Provide/support spell check capability.	Off the Shelf					
APP-040	2	Application Architecture	Functions and Features	Support text formatting in the system (i.e., the ability to support mixed case letters, word wrap, line wrap, and character count when there is a limit, etc.).	Off the Shelf					
APP-041	2	Application Architecture	Functions and Features	Provide query features that supports alternate field lookup (e.g., using item name to look up item code or project name to look up project number).	Off the Shelf					
APP-042	2	Application Architecture	Functions and Features	Provide table look-up fields that can be linked to or refer to other tables.	Off the Shelf					
APP-043	2	Application Architecture	Functions and Features	Utilize effective and expiration dates to version reference tables and data.	Off the Shelf					
APP-044	1	Application Architecture	Functions and Features	Provide capability to add, change, and inactivate reference tables in both batch and on-line mode.	Off the Shelf					
APP-045	2	Application Architecture	Functions and Features	Provide capability to recognize and capture rejected (bypassed) transactions for review, correction and reprocessing; Place batch loaded reference data into a suspended state if errors exist in non-key fields. This process should be non-blocking and the processing should continue.	Off the Shelf					
APP-046	2	Application Architecture	Functions and Features	Provide capability to perform cross-reference table validations.	Off the Shelf					

APP-047	1	Application Architecture	Functions and Features	Support use of "digital signatures" or "online approvals" to initiate or approve a business event within the system using user authentication within the system via validation of user credentials at the time the user signed on to the system; Support these digital signatures for approvals and rejections of workflow tasks	Off the Shelf					
APP-048	2	Application Architecture	Functions and Features	Provide ability to integrate with third-party eSignature solutions to support electronic signature approval processes initiated within the software solution	Off the Shelf					
APP-049	2	Application Architecture	Functions and Features	Support mass changes to defined groups of transactions or data with appropriate audit trail.	Off the Shelf					
APP-050	2	Application Architecture	Functions and Features	Provide capability to review and approve a batch load prior to execution.	Off the Shelf					
APP-051	2	Application Architecture	Functions and Features	Provide capability to back out (rollback) previously executed batch loads.	Off the Shelf					
APP-052	2	Application Architecture	Functions and Features	Provide capability to define/set-up batch checkpoints.	Off the Shelf					
APP-053	2	Application Architecture	Functions and Features	Provide a sequential unique identifier for a batch process.	Off the Shelf					
APP-054	3	Application Architecture	Functions and Features	Support ability to add printable and non-printable notes to any field or document.	Off the Shelf					
APP-055	2	Application Architecture	Functions and Features	Support creation of user-defined form letters or business forms using system-defined naming standards configurable by the system administrator or authorized user.	Off the Shelf					
APP-056	2	Application Architecture	Functions and Features	Provide capability to set-up standard document and letter templates at the department/business unit level for use throughout the system with names, titles, labels, pre-defined backgrounds, etc. using system-defined naming standards configurable by the system administrator or authorized user	Off the Shelf					
APP-057	2	Application Architecture	Functions and Features	Provide automatic date and time stamping of all documents generated by the system.	Off the Shelf					
APP-058	2	Application Architecture	Functions and Features	Provide functionality to copy a document in order to create a new document of the same type.	Off the Shelf					
APP-059	2	Application Architecture	Functions and Features	Generate special clauses on documents as defined by users or by standard clauses.	Off the Shelf					
APP-060	2	Application Architecture	Functions and Features	Provide ability to view multiple different file formats for attachment in all modules/functions including, but not limited to, Microsoft Office products, PDF's, and image file formats.	Off the Shelf					
APP-061	2	Application Architecture	Functions and Features	Support ability to use the "print screen" function on any screen.	Off the Shelf					
APP-062	1	Application Architecture	Functions and Features	Provide ability for authorized end-users to import from a .xls, csv, or a text file meeting import formatting requirements.	Off the Shelf					
APP-063	1	Application Architecture	Workflows	Provide tools to model and modify pre-existing workflows or create new workflows (the workflows shall be implementable globally or by specific business units).	Off the Shelf					
APP-064	1	Application Architecture	Workflows	Support establishment of user-defined rules-based workflows for any system event or transaction.	Does Not Meet		Within 18 months			
APP-065	2	Application Architecture	Workflows	Provide bi-directional electronic routing of documents for approval or other tasks through workflow.	Off the Shelf					
APP-066	2	Application Architecture	Workflows	Support routing of workflow to multiple destinations based on various user-defined criteria.	Off the Shelf					
APP-067	2	Application Architecture	Workflows	Integrate with Active Directory to access organizational hierarchies and incumbent information for current employees in order to establish workflow routing.	Customization	Small				The ability to utilize web services and other methods of integration is off-the-shelf; however integration with another system may require development work dependent on how the other system communicates
APP-068	2	Application Architecture	Workflows	Support parallel approvals and single-threaded approvals in the same approval path.	Modification to Base Code		Within 12 months			Current approval workflows will need to be modified to provide parallel approvals.
APP-069	2	Application Architecture	Workflows	Reverse any approvals and return the workflow transaction to the originating user and any other users who had previously approved the transaction in the event that one or more reviewers disapproves a transaction.	Off the Shelf					
APP-070	2	Application Architecture	Workflows	Allow workflow destination to be defined as specific users or a class of users or by using some other user-defined criteria.	Off the Shelf					
APP-071	1	Application Architecture	Workflows	Allow for copying/extending preconfigured workflows to meet specific business requirements.	Off the Shelf					
APP-072	1	Application Architecture	Workflows	Support definition of workflow events based on user-defined criteria including transaction code; department/business unit; user roles and responsibilities; user position in organization; data values and other user-defined values or parameters.	Off the Shelf					
APP-073	2	Application Architecture	Workflows	Allow user-defined standard approval timeframes.	Modification to Base Code		Within 12 months			
APP-074	2	Application Architecture	Workflows	Allow user-defined alternative approval paths.	Off the Shelf					Approval times are not restricted; MASS Group will build this in
APP-075	1	Application Architecture	Workflows	Support multiple levels of approvals for transactions based on profile security and other user-defined criteria.	Modification to Base Code		Within 12 months			
APP-076	1	Application Architecture	Workflows	Allow a user to enter descriptive information in a note field or to upload and attach a file (Microsoft Office, Microsoft Office 365, PDF, JPEG, etc.) to content items within the workflow and store these notes with user id and date/time stamp.	Off the Shelf					MASS Group will incorporate this feature to add multiple levels in lieu of a single level of approval.
APP-077	2	Application Architecture	Workflows	Allow workflows to be designated as either 'informational' or 'action (such as approval) required.	Off the Shelf					
APP-078	2	Application Architecture	Workflows	Ensure a transaction is not finalized until all required approval workflows are complete.	Off the Shelf					
APP-079	2	Application Architecture	Workflows	Allow a workflow to be designed to support either simultaneous actions or require consecutive actions, as defined by an authorized user.	Off the Shelf					
APP-080	1	Application Architecture	Workflows	Provide a dashboard which displays the status of workflows including workflows pending for a user-defined period of time.	Off the Shelf					
APP-081	1	Application Architecture	Workflows	Provide capability for personnel, or their supervisors to delegate their approval authority to another individual or work group, along with allowing the delegate to access their "inbox" should that be desired by the user. This function is primarily to allow for coverage when an employee is out on leave.	Off the Shelf					
APP-082	2	Application Architecture	Workflows	Provide email notification of workflow items.	Off the Shelf					
APP-083	2	Application Architecture	Workflows	Provide capability to allow an application system administrator to authorize a user to be able to opt in/opt out of email notifications.	Off the Shelf					
APP-084	2	Application Architecture	Workflows	Allow user with appropriate authorization to disable email notification (opt in/opt out capability).	Off the Shelf					
APP-085	2	Application Architecture	Workflows	Provide integrated workflow error handling.	Off the Shelf					
APP-086	2	Application Architecture	Workflows	Track workflow approvals and rejections.	Off the Shelf					
APP-087	1	Application Architecture	Workflows	Support various user-defined transaction statuses, including approved, rejected, pending, under consideration, etc.	Off the Shelf					
APP-088	1	Application Architecture	Workflows	Provide for the display of the status of items submitted to a workflow at any time.	Off the Shelf					
APP-089	1	Application Architecture	Workflows	Maintain document status based on routing and approvals and allow authorized users to determine where the document is in the routing process.	Off the Shelf					
APP-090	2	Application Architecture	Workflows	Notify users automatically via email when items in their "inbox" have gone unprocessed for a user-defined period of time.	Off the Shelf					
APP-091	2	Application Architecture	Workflows	Route transactions automatically to a workgroup after a specific time of inaction (based on user-defined criteria).	Modification to Base Code		Within 12 months			MASS Group will incorporate this feature.
APP-092	2	Application Architecture	Workflows	Allow steps in the workflow to be bypassed by allowing approvers higher in the approval chain to approve transactions. Should this transaction be in the "inbox" of an approver lower in the approval chain automatically remove transaction from lower approver's inbox.	Off the Shelf					
APP-093	2	Application Architecture	Workflows	Support the use of a "master approver" for each workflow who may approve a transaction at any time whether included in the normal workflow or not.	Off the Shelf					
APP-094	1	Application Architecture	Mobile Technology	System should be "mobile-friendly" for mobile platforms/environments including IOS and Android.	Off the Shelf					
APP-095	1	Application Architecture	Mobile Technology	Utilize responsive design to ensure that web pages display accurately on a range of screen sizes and orientations including smart phones, desktops, tablets, etc.	Off the Shelf					
APP-096	1	Application Architecture	Security	Comply with WVDOT and any applicable State of West Virginia security policies.	Off the Shelf					
APP-097	1	Application Architecture	Security	Comply with encryption requirements in Internal Revenue Service Publication 1075.	Modification to Base Code		Within 12 months			MASS Group will enhance to meet the extended IRS standards.
APP-098	1	Application Architecture	Security	Comply with Federal Information Processing Standard (FIPS) 140 or most current.	Off the Shelf					
APP-099	1	Application Architecture	Security	Comply with ISO/IEC 15408: Common Criteria for Information Technology Security Evaluation.	Off the Shelf					
APP-100	1	Application Architecture	Security	Support digital certificates.	Off the Shelf					
APP-101	1	Application Architecture	Security	Support public key infrastructure (PKI).	Off the Shelf					

APP-102	1	Application Architecture	Security	Support Transport Layer Security (TLS) > 1.2.	Off the Shelf					
APP-103	1	Application Architecture	Security	Provide an efficient, flexible way to control and administer access to all components of the solution using role-based security.	Off the Shelf					
APP-104	1	Application Architecture	Security	Provide role-based security and privileges and access rights by position and department/business unit.	Off the Shelf					
APP-105	1	Application Architecture	Security	Provide granular management and administrator control over transactions, forms access, field updates, row locking, interfacing events, data queries and other types of authorizations using role-based security.	Off the Shelf					
APP-106	1	Application Architecture	Security	Provide capability to establish "security profiles" or templates by user-defined job category or role, and to apply the templates to individuals and to user groups to grant privileges.	Off the Shelf					
APP-107	1	Application Architecture	Security	Restrict display of system functions upon sign-in to the software to only the options, functions, menu selections, screens, and data fields to which the user or business unit has rights to.	Off the Shelf					
APP-108	1	Application Architecture	Security	Provide ability to ensure that if two or more distinct security roles are needed to perform a business function and all needed roles are held by the same user, the user must log on separately under each security role in order to perform the full business transaction. Further, if a user has approval privileges over a business process that they also enter data for, the user shall NOT be able to approve their own work or requests. User-generated work or requests must be approved by a different/independent approver (such as a supervisor).	Modification to Base Code		Within 12 months			MASS Group will incorporate this feature.
APP-109	1	Application Architecture	Security	Provide ability for the system within the security function of the application to allow an authorized user to configure available controls, actions, and access for interfaces based upon user role / privileges.	Off the Shelf					
APP-110	1	Application Architecture	Security	Integrate with Active Directory to define users to the system, including following user information: unique user identification; user first name; user last name; department/business unit; user email address; and effective date of user access to the system.	Customization	Small				The ability to utilize web services and other methods of integration is off-the-shelf; however integration with another system may require development work dependent on how the other system communicates
APP-111	1	Application Architecture	Security	Allow the system administrator or other authorized users to define user access groups based on job responsibilities to ensure separation of duties; the system administrator must be able to define a group name, a description of the role and capabilities of the user group. Additional fields may be utilized for further separation. User groups may	Off the Shelf					
APP-112	1	Application Architecture	Security	Integrate with Active Directory to obtain user groups and assignments of users to those groups. Provide capability to grant user groups access to each system function and establish the type of access to be allowed (add, change, inquire, delete) along with an effective start and end date for this access.	Customization	Small				The ability to utilize web services and other methods of integration is off-the-shelf; however integration with another system may require development work dependent on how the other system communicates
APP-113	1	Application Architecture	Security	Allow system administrator, or other authorized user, to assign users to one or more user groups including an effective-date and optional end-date for inclusion in each user group.	Off the Shelf					
APP-114	1	Application Architecture	Security	Allow system administrator or other authorized users to remove users from one or more user groups including recording of an effective date for end of inclusion in each user group.	Off the Shelf					
APP-115	2	Application Architecture	Security	Log incidents of invalid password attempts which exceed a system-configurable maximum allowable number of attempts capturing user identification entered, type of violation (invalid user id, invalid password or invalid id and password) and date and time of the violation; place the violation log in the audit trail log.	Modification to Base Code		Within 12 months			
APP-116	2	Application Architecture	Security	Log incidents of security violations within the system capturing user identification, IP address with X-Forward IP if load balancer is involved, system function for which unauthorized access was attempted, and date and time of security violation.	Modification to Base Code		Within 12 months			MASS Group will incorporate this feature.
APP-117	2	Application Architecture	Security	Allow the system administrator or authorized users to generate a formatted user-defined report of invalid password attempts or security violations within the system.	Modification to Base Code		Within 12 months			MASS Group will incorporate this feature.
APP-118	2	Application Architecture	Security	Provide an online function for review of the logs of invalid password attempts or security violations by the system administrator or other authorized users.	Modification to Base Code		Within 12 months			MASS Group will incorporate this feature.
APP-119	1	Application Architecture	Security	Ensure report and ad-hoc query results are subject to the system security model such that users cannot access data through reports and queries for which they are not authorized in the operational system.	Off the Shelf					
APP-120	1	Application Architecture	Security	Support access to the software solution by authorized third-party business partners through VPN or VDI technology, subject to WVDOT and state of West Virginia security procedures for external access.	Off the Shelf					
APP-121	1	Application Architecture	Security	Provide capability for the system to allow users to choose from a list of security roles (user or group based) if the user has more than one role available to them.	Off the Shelf					
APP-122	2	Application Architecture	Security	Provide capability for the system administrator or an authorized user to delegate proxy roles to other users with an expiration date, and provide capability to notify user of the new proxy; Start and end dates must be within 30 calendar days of each other.	Off the Shelf					
APP-123	1	Application Architecture	Security	Allow system administrator or other authorized user to define the allowable period for user inactivity while logged on; such time shall be consistent with WVDOT and State of West Virginia security policy.	Off the Shelf					
APP-124	1	Application Architecture	Security	Disconnect or log out a user session when it exceeds the allowable period of inactivity as established by the system administrator and configured in the system.	Off the Shelf					
APP-125	2	Application Architecture	Security	Warn user that they will be disconnected before automatically logging user out of the system.	Off the Shelf					
APP-126	1	Application Architecture	Security	Ensure security on report creation or distribution software so that a user cannot view/create a report containing data that they are not authorized to see within the system.	Off the Shelf					
APP-127	1	Application Architecture	Audit Trail	Maintain an audit trail of all user actions that update and access the database including at a minimum user id, action performed, and time/date stamp; this includes any update via online, batch, web services or self-service functions.	Off the Shelf					
APP-128	1	Application Architecture	Audit Trail	Provide a standardized audit trail format / row for each data structure (whether that's a table row or document depending on database type) in the system and track information including but not limited to: timestamp when the record was inserted, changed or deleted; user id or program id inserting, changing or deleting the record; copy of record before change/deletion; and copy of record after add/modification.	Off the Shelf					
APP-129	1	Application Architecture	Audit Trail	Provide an audit trail for each interface program which shows: user or program initiating an interface, the date and time of interface execution and the interface completion status (Completed, Completed with Errors, Cancelled, Ended with Errors, etc.).	Off the Shelf					
APP-130	2	Application Architecture	Archiving	Provide reporting and analysis tools which guide a system data administrator in determining which data is appropriate and safe to archive.	Off the Shelf					
APP-131	2	Application Architecture	Archiving	Provide capability to store specific data elements for an indefinite period of time while other data may be able to be archived after user-defined periods based on record retention policies.	Off the Shelf					
APP-132	2	Application Architecture	Archiving	Provide authorized user with ability to mark (and unmark) records for deletion but not removed database until archived.	Off the Shelf					
APP-133	2	Application Architecture	Archiving	Provide capability to purge, archive, and restore inactive records based on user-defined criteria and tracking history.	Off the Shelf					
APP-134	2	Application Architecture	Archiving	Allow system administrator to define archiving criteria for different types of data.	Off the Shelf					
APP-135	2	Application Architecture	Archiving	Provide an automated archiving routine that archives data following the user-defined archiving rules; the process shall be able to be scheduled or manually initiated by an authorized user.	Off the Shelf					
APP-136	2	Application Architecture	Archiving	Provide for restoration of archived data by various parameters including the date range of the archiving process and other user-defined business rules.	Off the Shelf					
APP-137	2	Application Architecture	Archiving	Provide a flexible, automated archival routine to archive inactive reference data; this archival routine must validate that other table entries do not use the inactive data before archiving it and maintain overall system referential data integrity.	Off the Shelf					
APP-138	1	Application Architecture	Help	Provided a centrally stored and maintained system wide help function.	Off the Shelf					
APP-139	1	Application Architecture	Help	Provide context-sensitive, field-level on-line help features for all screen elements, screen errors, and error codes.	Off the Shelf					
APP-140	2	Application Architecture	Help	Unlike an on-line help feature which directs the user either to a help screen specific to the field they are on if help is available for that field or to a help screen which is specific to the screen they are on if no field level help is available.	Off the Shelf					
APP-141	1	Application Architecture	Help	Provide table-driven error message handling.	Off the Shelf					
APP-142	1	Application Architecture	Help	Allow authorized users to modify and maintain error message text.	Off the Shelf					
APP-143	2	Application Architecture	Help	Ensure an error message points the user to the field in error (e.g., by identifying the field name, field number or providing a link to tab to the field).	Off the Shelf					
APP-144	2	Application Architecture	Help	Provide capability to identify processing or navigation path for a screen.	Off the Shelf					

APP-145	2	Application Architecture	Help	Allow customization of help files provided with the system by the application system administrator or other authorized users to incorporate WVDOT-wide or business unit/department specific information.	Off the Shelf					
APP-146	2	Application Architecture	Help	Allow customization of help files by the system administrator or other authorized user by department/business unit or by roles and responsibilities within the proposed system; users must be able to modify the part of the help text that they are authorized to maintain without impacting other help text.	Modification to Base Code		Within 12 months			MASI Group will incorporate this feature.
APP-147	2	Application Architecture	Help	Ensure all customized help text and files carry forward automatically during system updates and upgrades.	Modification to Base Code		Within 12 months			MASI Group will incorporate this feature.
APP-148	1	Application Architecture	User Documentation	Provide user documentation that is comprehensive, clear and easy to use (e.g., user documentation must provide quick answers to questions regarding the navigation of application screens, execution of pre-defined reports, and use of the ad-hoc query capability); it must also contain clear and thorough descriptions of all screen and batch processing functions, screen data, programs, system reports, and any processing parameters.	Off the Shelf					
APP-149	1	Application Architecture	User Documentation	Provide all system documentation and manuals electronically.	Off the Shelf					
APP-150	1	Application Architecture	User Documentation	Provide search functions for on-line documentation, across all documentation and within components/parts of the on-line documentation.	Off the Shelf					
APP-151	2	Application Architecture	User Documentation	Allow system administrator to authorize components of the system documentation to be available for download by authorized users.	Off the Shelf					
APP-152	2	Application Architecture	User Documentation	Provide capability to allow authorized users to download user documentation approved by the system administrator for distribution as one or multiple PDF files.	Off the Shelf					
APP-153	2	Application Architecture	User Documentation	Enable users to incorporate user-defined documentation into system documentation (e.g., user procedures, business rules, etc.), which is accessible in the same manner as documentation from the software provider.	Off the Shelf					
APP-154	2	Application Architecture	User Documentation	Support version control for user-defined documentation.	Off the Shelf with Configuration					
APP-155	1	Application Architecture	Upgradeability	Provide capability for all upgrade and patched processes for the system to automatically re-apply configurations and customizations made by WVDOT / Should these customizations/configurations have to manually be re-applied, the system shall identify these exceptions for manual re-application before applying any upgrade/patch software).	Off the Shelf					

WVDOT Fleet and Equipment Management Requirements Matrix
Technical Architecture Requirements

Req. #	Priority	Category	Sub-Category
TEC-001	1	Technical Architecture	General
TEC-002	1	Technical Architecture	General
TEC-003	1	Technical Architecture	General
TEC-004	1	Technical Architecture	General
TEC-005	1	Technical Architecture	General
TEC-006	2	Technical Architecture	General
TEC-007	1	Technical Architecture	General
TEC-008	1	Technical Architecture	General
TEC-009	1	Technical Architecture	General
TEC-010	1	Technical Architecture	General
TEC-011	1	Technical Architecture	General
TEC-012	2	Technical Architecture	General
TEC-013	2	Technical Architecture	General
TEC-014	2	Technical Architecture	General
TEC-015	2	Technical Architecture	General
TEC-016	2	Technical Architecture	terprise Application Integrat
TEC-017	2	Technical Architecture	terprise Application Integrat
TEC-018	2	Technical Architecture	terprise Application Integrat
TEC-019	2	Technical Architecture	terprise Application Integrat

TEC-020	2	Technical Architecture	terprise Application Integrati
TEC-021	2	Technical Architecture	Data Integration
TEC-022	2	Technical Architecture	Data Integration
TEC-023	2	Technical Architecture	Data Integration
TEC-024	2	Technical Architecture	Data Integration
TEC-025	2	Technical Architecture	Data Integration
TEC-026	2	Technical Architecture	Data Integration
TEC-027	2	Technical Architecture	Data Integration
TEC-028	2	Technical Architecture	Data Integration
TEC-029	2	Technical Architecture	Data Integration
TEC-030	2	Technical Architecture	Data Integration
TEC-031	2	Technical Architecture	Data Integration
TEC-032	2	Technical Architecture	Data Integration
TEC-033	2	Technical Architecture	Data Integration
TEC-034	2	Technical Architecture	Data Integration
TEC-035	2	Technical Architecture	Data Integration
TEC-036	2	Technical Architecture	ETL Tools
TEC-037	2	Technical Architecture	ETL Tools
TEC-038	2	Technical Architecture	ETL Tools

TEC-039	2	Technical Architecture	ETL Tools
TEC-040	2	Technical Architecture	ETL Tools
TEC-041	2	Technical Architecture	ETL Tools
TEC-042	2	Technical Architecture	ETL Tools
TEC-043	2	Technical Architecture	ETL Tools
TEC-044	2	Technical Architecture	ETL Tools
TEC-045	2	Technical Architecture	ETL Tools
TEC-046	1	Technical Architecture	System Tools
TEC-047	1	Technical Architecture	System Tools
TEC-048	2	Technical Architecture	System Tools
TEC-049	2	Technical Architecture	System Tools
TEC-050	2	Technical Architecture	System Tools
TEC-051	2	Technical Architecture	System Tools
TEC-052	2	Technical Architecture	System Tools
TEC-053	1	Technical Architecture	Database
TEC-054	1	Technical Architecture	Database
TEC-055	1	Technical Architecture	Database
TEC-056	1	Technical Architecture	Database
TEC-057	1	Technical Architecture	Database
TEC-058	1	Technical Architecture	Database
TEC-059	1	Technical Architecture	Database
TEC-060	2	Technical Architecture	Database
TEC-061	1	Technical Architecture	Database
TEC-062	1	Technical Architecture	Database
TEC-063	1	Technical Architecture	Database
TEC-064	1	Technical Architecture	Database
TEC-065	2	Technical Architecture	Database

TEC-066	1	Technical Architecture	Reliability
TEC-067	1	Technical Architecture	Performance
TEC-068	1	Technical Architecture	Performance
TEC-069	1	Technical Architecture	Performance
TEC-070	1	Technical Architecture	Performance
TEC-071	1	Technical Architecture	Performance
TEC-072	1	Technical Architecture	Performance
TEC-073	1	Technical Architecture	Performance
TEC-074	2	Technical Architecture	Performance
TEC-075	2	Technical Architecture	Performance
TEC-076	1	Technical Architecture	Performance
TEC-077	2	Technical Architecture	Performance
TEC-078	1	Technical Architecture	Business Continuity
TEC-079	1	Technical Architecture	Business Continuity
TEC-080	1	Technical Architecture	Business Continuity
TEC-081	1	Technical Architecture	Business Continuity
TEC-082	1	Technical Architecture	Business Continuity
TEC-083	1	Technical Architecture	Supportability

TEC-084	1	Technical Architecture	Supportability
TEC-085	1	Technical Architecture	Supportability
TEC-086	1	Technical Architecture	Networking
TEC-087	1	Technical Architecture	Networking
TEC-088	1	Technical Architecture	Custom Development
TEC-089	2	Technical Architecture	Custom Development
TEC-090	2	Technical Architecture	Custom Development
TEC-091	2	Technical Architecture	Custom Development
TEC-092	2	Technical Architecture	Custom Development
TEC-093	2	Technical Architecture	Custom Development
TEC-094	2	Technical Architecture	Custom Development
TEC-095	2	Technical Architecture	Custom Development
TEC-096	2	Technical Architecture	Custom Development
TEC-097	2	Technical Architecture	ob Scheduling and Processin
TEC-098	1	Technical Architecture	ob Scheduling and Processin
TEC-099	1	Technical Architecture	ob Scheduling and Processin
TEC-100	2	Technical Architecture	ob Scheduling and Processin
TEC-101	2	Technical Architecture	ob Scheduling and Processin
TEC-102	2	Technical Architecture	ob Scheduling and Processin
TEC-103	2	Technical Architecture	ob Scheduling and Processin
TEC-104	2	Technical Architecture	ob Scheduling and Processin
TEC-105	2	Technical Architecture	ob Scheduling and Processin
TEC-106	2	Technical Architecture	ob Scheduling and Processin
TEC-107	2	Technical Architecture	ob Scheduling and Processin
TEC-108	2	Technical Architecture	ob Scheduling and Processin
TEC-109	2	Technical Architecture	ob Scheduling and Processin
TEC-110	2	Technical Architecture	ob Scheduling and Processin
TEC-111	2	Technical Architecture	ob Scheduling and Processin

WVDOT Fleet and Equipment Management Requirements Matrix
Technical Architecture Requirements

TEC-112	2	Technical Architecture	ob Scheduling and Processin
TEC-113	2	Technical Architecture	ob Scheduling and Processin
TEC-114	2	Technical Architecture	ob Scheduling and Processin
TEC-115	2	Technical Architecture	ob Scheduling and Processin
TEC-116	1	Technical Architecture	Technical Documentation
TEC-117	1	Technical Architecture	Technical Documentation
TEC-118	1	Technical Architecture	Technical Documentation
TEC-119	1	Technical Architecture	Technical Documentation
TEC-120	1	Technical Architecture	Technical Documentation
TEC-121	1	Technical Architecture	Technical Documentation
TEC-122	1	Technical Architecture	Technical Documentation
TEC-123	1	Technical Architecture	Technical Documentation
TEC-124	1	Technical Architecture	Technical Documentation
TEC-125	1	Technical Architecture	Technical Documentation

WVDOT Fleet and Equipment Management Requirements Matrix
Technical Architecture Requirements

Business (Functional) Requirement
Provide a solution architecture with expandable configurations and customizations, along with the capability to scale more or less for concurrent users and data storage as needed.
Utilize a vendor-independent design that is based on non-proprietary technology and does not required the solution to be operated on proprietary hardware or operating system platforms.
Implement a system design architected to allow system availability on a continuous basis, (i.e., 24x7). Support high-availability including during patches and updates. Provide a robust data recovery architecture design that minimizes system downtime.
Utilize a service-oriented architecture (SOA) to facilitate seamless integration with heterogeneous internal and external systems.
Provide the SOA capability which is platform and protocol independent and complies with Advancing Open Standards for the Information Society (OASIS) standards such as WS-Security, WS-Reliability, etc. and utilizing other open-standards (such as JSON, XML, OAuth and SAML).
Support virtualization for all tiers.
Provide a browser-based interface.
Deliver content via the current and most recent previous supported browser versions that include but are not limited to Microsoft Edge, Google Chrome, Mozilla Firefox and Safari.
Ensure that content can be delivered via a web browser without requiring browser security settings to be lowered beyond typical industry standards in order for system functionality to perform properly.
Deliver content via browser without Active X controls or plug-in support (such as Java Runtime Environment, Adobe Flash, etc.)
Deliver content via web browser capability available on the iOS and Android.
Ensure any additional required software required on a desktop can be deployed through industry standard Office Automation push technology.
Support the following character sets: UTF-8 Unicode, UTF-16 Unicode, and ASCII.
Utilize application stack at all points in terms of the operating system, network, database, desktop, and storage.
Ensure Web and security server is 64 bit.
Support connectivity services through TCP/IP IPPB v4 IPPB v6.
Provide connectivity across and between WVDOT's network zones.
Provide communication services that guarantee message delivery and handles queuing and encryption for various types of communication (e.g., publish and subscribe, request/reply, etc.)
Provide configurable data-transformation services to handle data validation, calculations, lookups, padding, scrambling, truncation, etc.

Provide ability to link software solution business process flows with business process flows in other state and WVDOT applications to support automating a business transaction which crosses application systems (for example, linking a workflow with an ERP workflow such as payments to outside entities).
Provide capability for bulk data uploads/imports from CSV or through API calls.
Support multiple data-transfer methods such as XML, JSON, CSV and flat files (e.g. ASCII, variable and/or fixed length, comma-delimited, etc.)
Provide capability of exposing business objects and processes as web services through robust technical frameworks such as RESTful JSON microservices. Web services, APIs, etc., must maintain the same referential integrity as batch and on-line user transactions. This should include Application Programming Interfaces [API] and API programming documentation containing proper use (such as related RESTful commands) and valid parameters and parameter values that may be utilized, along with expected return data structure and example(s) (XML, JSON, etc...). As a substitue to the latter, in lieu of providing an API with documentation (or additionally), provide access directly to the database, tables, and columns with documentation of database table structure, table purpose, and associated ER diagrams.
Support data encryption where appropriate based on user-defined business rules following Advanced Encryption Standards (AES) for data both in transit and at rest in all file structures.
Encrypt any data with personally identifiable information in transit and at rest in all file structures.
Provide capability for data in the software solution to be extensible to authorized users from both an exposure and consumption standpoint.
Provide capability to execute interfaces with other systems on a pre-defined schedule or on the request of an authorized user.
Edit interfaced data by applying the same business rules that are defined for the equivalent transaction entered through the system.
Generate an error report for any validation issues or other errors identified during execution of a data load or an interface program.
Display validation errors on-line within a job history function or print in a report format at user option.
Place records not passing validation into a suspense file or table within the software solution.
Allow correction of suspended records within the software solution.
Provide capability to validate data during both the initial load step and during processing steps.
Allow the system administrator or other authorized users to browse the suspense file in the system.
Provide facilities for verification and batch controls tools to ensure the complete file was received and that the file was not a duplicate.
Provide data integration and data management tools with a range of extract, transform, and load (ETL) capabilities.
Support ability to integrate third-party ETL tools to perform ETL functions.
Utilize scripting or other object-oriented structured languages to define advanced transformation routines/procedures.

Provide 'data exchange management' to schedule and monitor inbound and outbound files, notify appropriate contacts in the event of problems, automatically detect duplicate files, and perform other data interchange management functions.
Validate and handle exceptions during transformation.
Verify and maintain referential integrity as part of any transformation process.
Provide the capability to override the default source mapping and use specific SQL statements.
Provide ability to map data from multiple source systems and into multiple target source systems.
Provide ability to schedule and monitor the extraction, cleansing, transformation, and loading processes.
Provide ability to rebuild/reload transactions from a specific date/time forward.
Provide report design and generation tools within the system solution.
Provide end-user interface design tools within the system solution.
Provide tools for system monitoring within the system solution.
Provide configuration management tools within the system solution.
Provide source management tools within the system solution.
Provide ability to work with third-party configuration management and source management tools .
Provide tools for Application Program Interface (API) maintenance within the system solution.
Maintain referential integrity of data through either database referential integrity declarations or application code.
Support data replication, load balancing and synchronization across multiple physical or virtual servers as appropriate.
Leverage DBMS database features and database and application design to reduce contention between updates by online users and those of concurrently running batch processes.
Ensure that on-line search queries will not be delayed by waiting for locks to be released.
Ensure in a two user scenario when both users retrieve data and attempt to update data one after another, to avoid loss of updates and/or to avoid overwriting of each other's data the system must notify the second user as the data is being updated by the first user (provide selection of "first in wins", last, etc.).
Ensure that in a two transaction read/update cycle, the user will always update ONLY what was being read, avoiding the so-called 'update collision' or 'deadly embrace'.
Support automatic "clean up" of partial database updates after suspended network sessions or after other failures.
Allow database structure changes to be made with a minimal impact to system availability.
Provide utilities which support automatic replication of table updates to multiple databases; provide replication of tables across application instances (test, training, dev, QA, prod, etc.).
Support record-locking at the row level.
Support configuration of data attributes by the system administrator.
Provide structured query language (SQL) capabilities for database queries.
Include new data items automatically in migration paths during software upgrades.

WVDOT Fleet and Equipment Management Requirements Matrix
Technical Architecture Requirements

Provide a solution which is architected to enable support for 99.99% availability of the production environment for online inquiry and updates seven days a week (other than for a defined maintenance window and other scheduled outages approved by WVDOT).
Provide a solution which is architected to support up to **300** concurrent users across all system functions; respondent must be able to provide WVDOT with documented evidence of the ability of its proposed system solution to support these user volumes at the required performance levels as part of the evaluation and selection process.
Provide a solution which is architected to fully process a transaction within the application and database environments within one second of receipt of the transaction 75% of the time and all transactions within five seconds for **300** concurrent users.
Provide a solution which is architected to support best practice load-balancing techniques.
Ensure that batch processing does not adversely impact on-line responsiveness or availability.
Provide a solution architected to support implementation of application controlled parallel batch processing.
Provide support for user session isolation such that a failure in one session has no impact on other user sessions.
Provide a solution architected to support access to data for pre-defined reports, ad-hoc queries, and business intelligence without impacting online transaction performance.
Support utilization of industry leading third-party performance monitoring tools for real-time monitoring by administrators of response time, system use and capacity, concurrent users, and system errors.
Support utilization of industry leading third-party performance testing tools with proposed software solution to verify compliance with performance requirements.
Provide ability to integrate with DBMS tools which allow the database administrator or authorized user to tune the system for performance.
Provide for an automatic timeout for ad hoc queries (e.g., 10 minutes) configurable by the system administrator.
Provide an architecture which supports fail-over to a parallel load-balanced environment on a real-time basis.
Provide a system design architected to ensure that normal system operations are restored within four hours of a catastrophic disruption of a production system component 99% of the time.
Provide the capability to perform full backups, incremental backups, and recovery capabilities for data and application components. Back-ups shall not require maintenance windows; backups shall be able to function in the background of a production SOA or clustered environment and not impact system availability.
Provide a system design which supports the capability to provide disaster recovery at an off-site location.
Allow for maintenance of a current back-up of the system solution including application data and system tables and configurations to be utilized for restoration in the event of catastrophic failure and loss of data.
Construct using current but mature industry-standard application development tools, techniques and standards that can be maintained for the expected life of the system.

Allow at a minimum for configuration across multiple environments including production, patch, user acceptance test, system test, user training, development and sand box.
Provide production support for the last two major releases of the proposed software solution.
Support execution of the proposed software solution over a TCP/IP network with a minimum speed of 10mb/sec.
Identify access requirements through firewalls and follow standard port designations, where possible.
Ensure any program code provided by the systems integrator or any of its software providers within the proposed system solution passes industry standard vulnerability checks prior to promotion into the WVDOT environment.
Allow authorized technical staff to create new tables.
Allow authorized technical staff to create new fields.
Allow authorized technical staff to create new objects.
Allow authorized technical staff to change field structure.
Allow for identification/reporting of new user-defined tables.
Allow for identification/reporting of new user-defined fields.
Allow for identification/reporting of new user-defined objects.
Support inclusion of any user-defined or developed objects (user-defined tables, fields, and other objects, etc.) in the upgrade path.
Provide a central enterprise job scheduler which can schedule jobs (across platforms and across multiple servers within a platform).
Integrate with a software scheduler to provide job scheduling functionality for the system solution.
Provide capability to design/manage a batch job stream with multiple dependencies.
Provide capability to notify designated users via email or text based on job and job completion status. The user shall be able to tailor whether or not they see a notification based on statuses such as Completed, Completed with Errors, Incomplete, Failed, Not run. For example, a user may elect to not see any notifications for Completed jobs, just the exceptions like Errors, Incomplete, Failed, etc.
Provide capability to utilize job scheduling tools to automate administrative tasks such as database backups or regular report production.
Provide ability to establish job dependencies and control subsequent job execution based on user-defined condition codes.
Allow authorized users to control priority of the batch processes.
Allow authorized users to control job start times.
Provide an audit trail of job execution at a minimum noting the job's name, start time, end time, and status.
Allow authorized user to modify job status (e.g., changing status of a job to "Complete", etc.).
Provide capability to establish job groups.
Provide capability to re-start a multi-step job from a user-defined point/step.
Allow authorized users to control job by transaction type.
Produce a log of job results and append to this log if the job re-runs.
Provide the capability to establish and maintain user-defined calendars of scheduled jobs.

WVDOT Fleet and Equipment Management Requirements Matrix
Technical Architecture Requirements

Provide a suspense file for rejected batch transactions.
Allow an authorized user to delete rejected records from the suspense file.
Produce daily report of error transactions by system function.
Provide ability for an authorized user to edit a transaction in error and resubmit.
Provide comprehensive technical system documentation and technical manuals for the solution system including any third-party add-on modules included in the proposed system solution. Documentation shall include comprehensive technical system documentation and technical manuals for the proposed system including any third-party add-on modules included in the proposed system solution .
Include program descriptions in technical system documentation.
Include screen definitions and descriptions in technical system documentation.
Include database definitions, logical data model, and record layouts in technical system documentation.
Include audit trail management documentation in technical system documentation.
Include security administration documentation in technical system documentation.
Include installation documentation in technical system documentation.
Include performance tuning documentation in technical system documentation.
Include workflow process and administration documentation in technical system documentation.
Include disaster recovery procedures in technical system documentation.

WVDOT Fleet and Equipment Management Requirements Matrix
Technical Architecture Requirements

Vendor Response	Customization Estimate, if Applicable	Capability Planned for Future Release
Off the Shelf		
Off the Shelf		
Off the Shelf		
Off the Shelf		
Off the Shelf		
Off the Shelf		
Off the Shelf		
Off the Shelf		
Off the Shelf		
Off the Shelf		
Off the Shelf		
Off the Shelf		
Off the Shelf		
Off the Shelf		
Off the Shelf		
Off the Shelf		
Off the Shelf		
Off the Shelf		
Off the Shelf		

Off the Shelf		
Off the Shelf		
Off the Shelf		
Off the Shelf		
Off the Shelf		
Off the Shelf		
Off the Shelf		
Off the Shelf		
Off the Shelf		
Off the Shelf		
Off the Shelf		
Off the Shelf		
Off the Shelf		
Off the Shelf		
Off the Shelf		
Off the Shelf		
Off the Shelf		
Off the Shelf		
Off the Shelf		
Off the Shelf		

Off the Shelf		
Off the Shelf		
Off the Shelf		
Off the Shelf		
Off the Shelf		
Off the Shelf		
Off the Shelf		
Off the Shelf		
Off the Shelf		
Off the Shelf		
Off the Shelf		
Off the Shelf		
Off the Shelf		
Off the Shelf		
Off the Shelf		
Off the Shelf		
Off the Shelf		
Off the Shelf		
Off the Shelf		
Off the Shelf		
Off the Shelf		
Off the Shelf		
Off the Shelf		
Off the Shelf		
Off the Shelf		
Off the Shelf		
Off the Shelf		

Off the Shelf		
Off the Shelf		
Off the Shelf		
Off the Shelf		
Off the Shelf		
Off the Shelf		
Off the Shelf		
Off the Shelf		
Off the Shelf		
Off the Shelf		
Off the Shelf		
Customization		
Off the Shelf		
Off the Shelf		
Off the Shelf		
Off the Shelf		
Off the Shelf		
Off the Shelf		

Off the Shelf		
Off the Shelf		
Off the Shelf		
Off the Shelf		
Off the Shelf		
Off the Shelf		
Off the Shelf		
Off the Shelf		
Off the Shelf with Configuration		
Off the Shelf		
Off the Shelf		
Off the Shelf		
Off the Shelf		
Off the Shelf with Configuration		
Off the Shelf with Configuration		
Off the Shelf		
Off the Shelf		
Off the Shelf		
Off the Shelf		
Off the Shelf		
Off the Shelf		
Off the Shelf		
Off the Shelf		
Off the Shelf		
Off the Shelf		
Off the Shelf		

Off the Shelf		
Off the Shelf		
Off the Shelf		
Off the Shelf		
Off the Shelf		
Off the Shelf		
Off the Shelf		
Off the Shelf		
Off the Shelf		
Off the Shelf		
Off the Shelf		
Off the Shelf		
Off the Shelf		

Core Module(s)	Third Party Solution(s)

Comments/Notes