

09/30/21 09:48:01
WV Purchasing Division

PROPOSAL TO:

**West Virginia Department of
Transportation**

CRFP 0803 DOT2200000002
WVDOT ROW System RFP

SUBMITTED:
Sept 30th, 2021

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Dataview
Consulting

September 30th, 2021

Tara Lyle,
Buyer Supervisor
Department of Administration,
Purchasing Division
2019 Washington St E,
Charleston, WV 25305

RE: CRFP 0803 DOT2200000002

Dear Ms. Lyle,

Dataview Consulting LLC is pleased to respond to your RFP NO. CRFP 0803 DOT2200000002 for a Right of Way Management System.

I will serve as the Dataview Consulting LLC designated point of contact authorized to negotiate contract, obligate contract and as a contact for clarifications. I may be reached at sanjeev.musafir@dataview.com or 609 608 6638.

Dataview Consulting LLC with this letter:

- Accepts that the entire proposal and the price contained therein is binding upon Dataview in all respects for a period of 180 days from receipt of the BAFO (Best and Final Offer), or from submission if no BAFO is requested.
- Designates that Dataview Consulting LLC will function as Vendor (i.e., the primary contractor) in response to the RFP.
- Confirms that Dataview Consulting LLC is the equipment manufacturer (OEM)/Owner the proposed software solution
- Accepts that the Vendor and any subcontractors in the Vendor's proposal 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.
- Accepts that all staff members of the Dataview's proposed team shall follow all WVDOT and State of West Virginia administrative policies, procedures, requirements, specifications, and standards.
- Acknowledges receipt of amendments to this RFP.

The Dataview Team has worked on multiple Public Sector projects and has extensive experience supporting, building, and customizing enterprise level applications. Our team

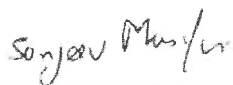
consists of senior solution architects, ERP (Enterprise Resource Planning) domain experts, software developers and system administrators, allowing us to provide operational services, software development and project management services. Our experience includes building a custom Statewide Capital Project Management System for WVDOT that has been certified by the Federal Highway Administration FHWA.

Based on our cumulative knowledge of the WVDOT business and experience with various systems, Dataview Consulting LLC is proposing a customized Right of Way Management System built on top of Dataview's existing HUB Architecture framework. The solution will be deployed onsite to the State of West Virginia Data Center. The highlights of the proposed solution are:

- Integration with existing State of West Virginia, FHWA FMIS and DOT Enterprise Systems including wvOASIS Financial and HRM applications, WVDOT Hub Application
- Single Sign-on using the existing ERP Authentication
- Configurable workflow using BPMN ensuring consistency of processes
- Configurable notification functionality to ensure efficient and timely processing of all Right-of-Way, Utility, Railroad and Property Management transactions.
- Integration with 3rd party digital signature applications such as DocuSign
- Document Management System supporting document attachments within the proposed solution as well as within other WVDOT applications such as ProjectWise.
- Full Audit tracking for field level changes
- Support for customizing and generating forms and letters
- Architecture based on Microsoft ASP.net framework allowing the State to maintain and modify the application in the future.
- Business Intelligence based on industry leading Microsoft PowerBI tool.

As part of the Right of Ways Management System implementation, Dataview will provide project management, software configuration, testing, training, cutover and post-go live support services.

Sincerely,



Sanjeev Musafir

Partner

Dataview Consulting LLC

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Tab 1 – Executive Summary

1 EXECUTIVE SUMMARY

1.1 PROPOSED SOLUTION

Dataview is proposing to leverage the existing West Virginia Department of Transportation (WVDOT) Hub application framework for the new Right-of-Way (ROW) solution. With this approach, WVDOT can maximize its existing investment by reusing many features already built for the current Hub application (referred to as the Hub Capital Project Management module in this proposal). WVDOT can also use any newly developed ROW features to expand the capabilities of the Hub Capital Project Management module or in a new module to address future WVDOT needs. This approach will result in a fully integrated solution controlled by WVDOT and built specifically to address the unique business goals of the agency.

At the outset, tailor made solutions such as the Hub can sometimes appear like a larger financial investment than existing COTS solutions. However, hidden integration challenges with existing or new systems, excessive upgrade and support costs, limited control over features and functionality, and inaccessible and proprietary source code can all introduce financial and operational risks completely outside of WVDOT's control. Building the new ROW solution in the Hub framework reduces or removes these risks with WVDOT in full control of the framework. This approach will lead to greater long-term financial, and operational returns compared to the implementation of an existing COTS option.

The following diagram highlights the proposed, integrated solution and demonstrates existing capabilities such as external system integration, security, workflow, and attachments that ROW Module can leverage.

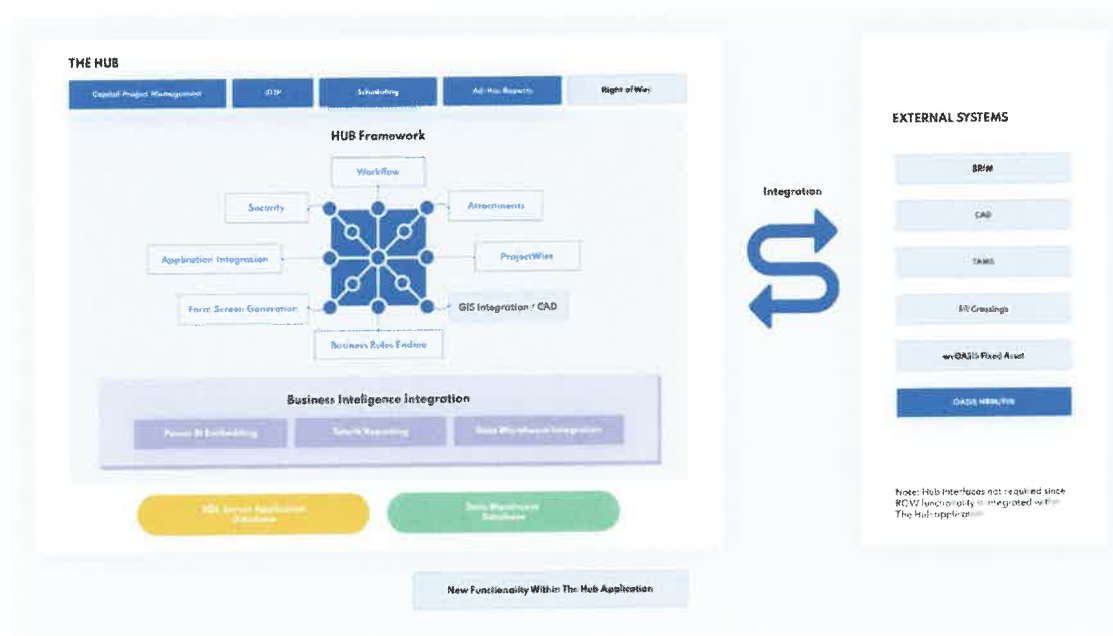


Figure 1 Dataview's Proposed Integrated Solution

The following table lists Dataview's risk potential in key implementation areas when compared to other vendors.

Risk Areas	Risk Potential: Dataview	Risk Potential: Other Vendors	Details:
Prior Experience with WVDOT (Agency Knowledge)	Low	Medium /High	Dataview has a long-standing relationship with WVDOT.
WVDOT Specific Training & Change Management	Low	Medium /High	Dataview is in tune with the specific training and change management needs of WVDOT.
Infrastructure	Low	Medium /High	The Hub Framework leverages existing wvOASIS infrastructure.
Hardware	Low	Medium /High	The Hub Framework is installed on WVDOT existing and WVDOT owned hardware. Minimal increases in compute power is required.
Disaster Recovery	Low	Medium /High	The Hub Framework leverages existing wvOASIS disaster recovery procedures.
Direction of Product	Low	Medium /High	The Hub Framework is a tailor-made application for WVDOT. WVDOT has full control of the direction of the application.
Access to Source Code	Low	Medium /High	Dataview does not restrict access to the Hub Framework source code. WVDOT staff will have access to maintain or modify the code.
Application Upgrades	Low	Medium /High	Dataview will keep all components of the Hub Framework up to date as part of the ongoing agreement. Additionally, WVDOT will have access to the source code and the agency's staff can perform upgrades as desired when Dataview's support agreement has ended.
Long-term Maintenance & Support	Low	Medium /High	Dataview will provide maintenance and support for the Hub Framework as part of the ongoing agreement. Additionally, Dataview will train WVDOT staff to maintain and support the application when Dataview's support agreement has ended.
Application Software (Framework, Workflow, Security, Validation Engine, Forms, Attachments, etc.)	Low	Medium /High	These features already exist as part of the Hub application. They will be reused for the ROW module or any future WVDOT Module.
Business Intelligence	Low	Medium /High	These features already exist as part of the Hub application. They will be reused for the ROW module or any future WVDOT Module.
Integration with external systems	Low	Medium /High	The existing Hub framework already integrates with existing external systems (wvOASIS, FMIS, SiteManager, MS Project, and REMIS).
Data Conversion	Low	Medium /High	Dataview has firsthand experience with WVDOT's legacy data.

1.1.1 ROW Application Approach

At a very high level, Dataview will develop an intuitive solution to manage the functionality of ROW Acquisition, Property Management, Utility Relocation and Railroad Agreements, Payment Processing and Contract Management, in addition to capturing data that will be integrated with forms generation like the following:

- GENERAL PROCEDURES, ORGANIZATION, AND FEDERAL AID PROGRAMMING – *Already developed as part of the Hub (Capital Project Management solution)*
- DESIGN-BUILD RIGHT-OF-WAY PROCESS
- ESTIMATE AND FIELD REVIEW
- LEGAL
- ACQUISITION
- APPRAISAL
- RIGHT-OF-WAY CONSULTANT SERVICES

- PROPERTY MANAGEMENT
- CEMETERIES
- RELOCATION ASSISTANCE AND PAYMENT PROCEDURES

Our approach is to develop an end-to-end ROW process that is maintained and captured within one application from Project Initiation to Authorization to ROW activities to Tracking Expenditures and Revenues. We envision an application with two integrated modules, an External Module and an Internal Module.

1.1.1.1 External Module

This module of the application will act as a public portal (*ROW Portal*) for external entities (i.e. Displacees, Lawyers, ROW Consultants) WVDOT engages in the ROW project/phases. WVDOT will provide access to the project and ROW phase information to the external entities they contract with from within the Internal ROW Module. These external entities will in turn capture the necessary information and update it electronically within the external module, attach any supporting documents, and submit to WVDOT with electronic signatures for review. WVDOT team members will review the external entities submissions and then approve or reject with comments. Internal entities will be notified and act accordingly until all tasks are approved by WVDOT. Once the external tasks are approved the external entities will no longer be able to make any updates, however, they will still be able to view their information in read-only mode.

1.1.1.2 Internal Module

This is the core module of ROW functionality that will allow WVDOT to manage all data (external and internal) to successfully finalize ROW activities. From the Capital Project Management application, WVDOT users can initiate projects, authorize, initiate, and complete ROW activities, and track financial activities. Using the Hub Framework Workflow, District and Programming Division users can approve or reject internal processes until all ROW activities are satisfied. WVDOT users will be able to generate forms, formatted for printing, from this data based on the categories mentioned in the Application Approach section of this document. Printing functionality will be configurable. Users will be able to print all forms, or a subset of the forms associated with a ROW phase which can then be emailed or printed.



Figure 2 Proposed Application Framework

1.1.2 Hub Application Framework

Dataview is proposing to leverage the Dataview Hub framework to extend the HUB application and integrate ROW processes. Providing a familiar framework allows us to reduce

cost, time to production, training and leverage what is built-in instead of purchasing a new framework.

The following are benefits of leveraging the Hub framework as a springboard for the ROW module:

1. The same infrastructure currently used by Hub. No additional software or hardware is required for purchase. This eliminates purchasing and infrastructure setup costs.
2. The same Disaster Recovery DR site used for Hub. This also eliminates setup and testing costs.
3. The same single sign-on Portal as the Hub and wvOASIS ERP applications.
4. Leverage the current Hub framework feature set:
 - Scheduling
 - Workflow Approval Process
 - wvOASIS integration
 - FMIS integration & FHWA certification
 - Business Intelligence and Data Warehouse
 - Ad-Hoc reporting
 - GIS integration (Hub wave 2 implementation)
 - Form & form wizard generation and management for capturing ROW documents and printing - This functionality is currently developed for the West Virginia Department of Natural Resources (DNR)
 - Public facing Portal
 - Attachments
 - Fluid User Interface and navigation will lead to better productivity
 - Auditing
 - Notification
 - Security

1.1.3 Technical Architecture

Dataview proposes an on-premises solution that will be deployed in the State's Data Center and built using the existing Hub Development Framework. It will leverage and share existing wvOASIS ERP infrastructure that has been deployed for the WVDOT Capital Project Management System. This approach will reduce overall infrastructure costs and allow WVDOT to leverage existing technical and operations staff to manage the system. Users will use existing MyApps Single Sign-On (SSO) credentials to access ROW functionality.

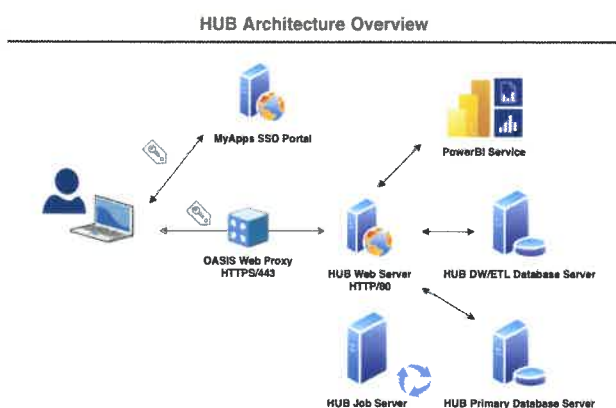


Figure 3 Hub Architecture Overview

Similar to the Capital Project Management System module, the new ROW module will use wvOASIS Disaster Recovery infrastructure and annually audited processes. Figure 3 illustrates the wvOASIS Disaster Recovery setup with the NetApp storage infrastructure making frequent snapshots and replicating them to the Disaster Recovery data center. During a Disaster Recovery event, operations staff will follow the established ROW Disaster Recovery Runbook. This process involves orchestrating the migration to the recovery data center with VMware

Recovery Manager; Activating access policies on wvOASIS's Disaster Recovery Palo Alto

cluster; updating public and private DNR records to point to Disaster Recovery IP addresses; Performing Database recovery. The expected wvOASIS Recovery Point Objective is 30 minutes and Recovery Time Objective is 8 hours. Recovery Point Objective covers the maximum data loss and Recovery Time Objective is the time to restoration of services once a decision has been made to cutover services.

By sharing both the hardware platform and software platform of WVDOT's Capital Project Management System, the ROW module should yield a substantial cost saving versus dedicated cloud or on-premises hosting.

1.2 PROJECT MANAGEMENT & SERVICES

Dataview's Project Management and System Development Methodology Model is driven by three main guiding principles: Welcoming Change Through Customer Collaboration, Frequently Deliver Value Through Working Software, and Provide Technical Excellence. These principles support a continuous delivery approach known as "Scrum", that uses short development cycles ([Sprints](#)) to deliver working software iteratively and incrementally throughout the life cycle of the project. Our continuous delivery model allows for greater customer alignment and collaboration, early customer feedback, ability to adapt to change, and quick and incremental return on investment when compared to other, less iterative approaches.

The delivery approach itself brings a high degree of control and visibility to project activities for our customers throughout the project lifecycle, establishing a repeatable, reusable framework that can be leveraged for the project duration. Our implementation framework includes an approach for the key project activities including project management, change management, system configuration, system testing, user testing, user acceptance, and key deliverables and milestones for the complete proposed solution, including third-party software.

Dataview will take a phased approach to project implementation. We break down the work into four high-level phases: *Foundation, Development, Cutover and Post Implementation*.

Foundations – Lasting only a few weeks, emphasis will be made by Dataview to build relationships with WVDOT stakeholders, establish access to onsite State resources, prepare the supporting environment for the project, conduct collaborative workshops to understand needs, adjust the high-level release plan, create the initial product backlog, and create the Sprint 1 plan. Additionally, communication plans will be formalized and key stakeholders identified.

Development - During this phase, work is planned and delivered in small, incremental iterations called 'sprints'. We anticipate that these sprints will be 2 weeks in duration. In a sprint, we complete all stages of the software development lifecycle (SDLC). This includes defining the requirements, designing, developing (coding), testing, and deploying the application to the standards of the project. The primary outcome of every sprint is a piece of working software so that WVDOT can provide hands on feedback.

Cutover – The cutover phase is intended to prepare tasks needed for production environment cutover. Specific activities in this phase are dictated by the needs of the project but can include:

- Perform Mock Conversions – Rehearsal to confirm tasks, responsibilities, and timelines.

- Conduct Readiness Assessment – Review mock conversion results to identify process improvements and determine cutover readiness.
- Install Production Environments
- Live Production Operations (Go-Live!)

Post Implementation - The goal of this phase is to maintain the solution, facilitate knowledge transfer, and hand-off support functions to the State. Specific activities can include:

- Perform tuning activities such as bug fixing, enhancements for performance and usability
- Achieve user self-supportability
- Manage and Maintain the Production Support Responsibilities while the transfer of the System Administration Responsibilities to the Client is in progress

Dataview has the experience and ability to perform the scope of work and requirements identified in this RFP. We have created a rapid and achievable methodology that mitigates risk of failure while promoting business transformation adoption. Our shared goal is not simply developing a ROW solution but to enable substantive business transformation for the WVDOT.

Below is a summary of proposed services that Dataview will provide.

Service	Work Description Summary
Project Management	<ul style="list-style-type: none"> • Deliver project using project management methodology that is consistent with the Project Management Institute (PMI) and Agile Alliance standards and guidelines • Iterative Agile development to collaboratively build the product and refine scope during project implementation. <ul style="list-style-type: none"> ◦ Project Management services covering all aspects of Project Management including: Project Initiation, Project Planning, Project Execution, Monitoring and Controlling, Project Closing.
Requirements Confirmation & Development	<ul style="list-style-type: none"> • Agile Development with Customer Workshop Facilitation. Artifacts to include Release Plans, Product Backlogs and Sprint Backlogs.
Systems Analysis & Business Process Design	<ul style="list-style-type: none"> • Follow the industry best practices as described by the Project Management Institute (PMI) guide to Business Analysis and the International Institute of Business Analysis (IIBA) guide to the Business Analysis Body of Knowledge (BABOK) to provide analysis and design services
Development of a Concept of Operations (ConOps)	<ul style="list-style-type: none"> • Collaborate with WVDOT to create a ConOps document detailing stakeholders, System Operations and System Interactions • Review and Refine document to gain consensus and stakeholder approval
Technical architecture & infrastructure design	<ul style="list-style-type: none"> • Capacity Planning and Procurement – Review existing infrastructure to identify impact of project and plan for future capacity needs. Work with WVDOT to refine initial sizing for prod and non-production environments • On-Prem Hosting – Identify deployment architecture, hybrid deployment models such as cloud-based Development and System Test environments and on-premises UAT/Pre-Prod and Production. Document and install required environments and databases based on project schedule. • Software Version Management - Code Version management and Build Management using GitHub and Azure DevOps. • Disaster Recovery – Work with the wvOASIS Technical to setup a DR architecture that will support recovery point and recovery time needs for WVDOT ROW business processes. • Performance Tuning – Plan and execute volume tests to tune application tiers and database • Operations - Augment WVDOT team for any post go-live system administration and operation needs.
Software Configuration	<ul style="list-style-type: none"> • Setup initial environments with Day-0 data

	<ul style="list-style-type: none"> Implement process to document, manage and track configuration changes to Day-0 data for eventual production migration.
Security Configuration	<ul style="list-style-type: none"> Work collaboratively with WVDOT to document user security profiles and roles Implement role-based access control security in application Integration with myApps Portal for Single Sign-On.
Customizations, Enhancements & Modifications	<ul style="list-style-type: none"> ROW module to be a custom module built on Hub Development framework Hub framework based on industry standard and leading frameworks ASP.Net Core, Microsoft Power BI and Microsoft SQL Server. Modifications to be baselined for ease of future maintenance
Automated Interfaces	<ul style="list-style-type: none"> Develop interfaces and integration with external systems using SSIS and SQL. Team has a deep understanding of ERP business functionality and experience building integration with HR, Payroll and Financial Systems.
Custom Forms	<ul style="list-style-type: none"> Support for MailMerge feature using word document templates. Custom embedded reports available as alternative
Custom Reports	<ul style="list-style-type: none"> Support for Report development using embedded reports and Power BI Dataview to work with WVDOT to identify, design and build custom reports
Custom Workflow	<ul style="list-style-type: none"> Build BPMN workflows based on business process flow
Data Conversion	<ul style="list-style-type: none"> Convert data from legacy enterprise systems using SSIS, custom scripts and SQL Server tools Setup review sessions Execute multiple mock runs to validate conversion window
Testing	<ul style="list-style-type: none"> Performance Testing – Automated load-testing before go-live to validate the solution architecture and ability to meet workload. Automated Testing – Use of automated software testing tools to reduce repetitive execution of tests and aid in comparison of actual and predicted outcomes. Test Driven Development – Software development process relying on software requirements being converted to test cases before software is fully developed and tracking software development by repeatedly testing the software against all test cases.
Training	<ul style="list-style-type: none"> Work with WVDOT to do needs assessment to determine training need by role <ul style="list-style-type: none"> Training to include: Core Project Team Training, Technical Training, User Acceptance/Test Training, End User Training, Ongoing End User Training
Documentation	<ul style="list-style-type: none"> Provide Installation guides, System Administration Guides, User Guides, Release Notes and Upgrade Guides Customize documents based on WVDOT processes, procedures, and policies <ul style="list-style-type: none"> Develop a comprehensive Deployment Cutover Plan that addresses the activities required to bring the ROW module into production. Planning tasks to include the following activities: Prep Work Schedule, Risks and mitigation, Contingency plan, Role and Responsibilities, Procedures, Support Transition
Production Cutover Planning	
Production Cutover Checklist	<ul style="list-style-type: none"> Create a checklist for different areas such as functional readiness, reports, interfaces, conversions, end-user training and departmental readiness. Review readiness assessment for go-live
Production Maintenance & Support	<ul style="list-style-type: none"> Provide post-go live operational support to WVDOT Provide KT to transition activities to WVDOT

1.3 APPLICATION FEATURES

The ROW application will be developed as an additional module using Dataview's Hub Development Framework providing the State with full source code to the solution which is built upon Microsoft's industry leading development platform providing WVDOT with a high-performance, non-proprietary, widely used and supported technology solution.

Below is a summary of the application platform:

- Development: Microsoft ASP.NET Core
- Database: Microsoft SQL Server
- Integration: Microsoft SSIS
- Business Intelligence: Microsoft PowerBI (SaaS)

This approach provides several benefits to WVDOT. Using Microsoft's widely used development platform empowers WVDOT to easily find technical staff for application support and customization, issue resolution, and design of new features given Microsoft's extensive documentation and support community. Also, by using Dataview's Hub Development Framework technical staff familiar with one application will have less of a learning curve before assisting development and support of a different Hub Development Framework application.

The User Interface will be dynamic and consistent with the Capital Project Management System User Interface. Familiarity with the Capital Project Management System User Interface and navigation will reduce WVDOT training needs by avoiding the need to learn and support an unfamiliar user interface.

Integration: The Hub integrates with multiple systems to reduce data entry and avoid data integrity issues. Integrations are established with GIS data to infer accurate route information in addition to other dimensions, the WVDOT ERP system for budget, expenditures and revenue billing and collections and Payroll, FMIS for FHWA to authorize federal dollars, and AASHTOware for procurement bids and purchase orders. Interface status logs can be viewed in the application.

Workflow: The Hub Framework has a built-in workflow engine that is configurable to the needs of the client. Approver actions are accompanied with notes for the next approver to act on. Users have access to a workflow inbox to view items they need to act on or have acted on for a given project. Workflow histories for all projects can be easily accessed by users.

Scheduling: Integration with MS Project for scheduling tracking projects. Project milestones can either be predefined as templates or can be directly created within the application. Scheduled/expected can be tracked and compared to actuals dates. The scheduling feature can generate a GANTT chart.

Business Intelligence: The Hub Framework has built-in data warehouse and ETL (Extract, Transform and Load) processes. Reports and dashboards are built using Power BI with the ability to customize. Also, reports and dashboards are embedded within the application for quick user access. Ability to run reports against real-time data is available using the same technology.

Auditing: The Hub Framework has auditing enabled to track all updates by any user to any project information. The audit trail can be viewed online and is searchable with an array of fields for any project.

Search: The Hub Framework application is searchable by many key fields. It utilizes a functionality of quick search based on one search box with many underlying fields and it also has a custom search screen with multiple searchable fields.

Alerts & Notifications: Workflow notifications when projects are assigned for review and approval. Ability to configure alerts based on data conditions.

Help System: The Hub Framework supports both an internal page and field level help system as well as an integration with external help systems such as Zendesk if a more complete cloud-based help desk solution is required.

E-signatures: The Hub framework currently supports internal e-signatures by storing credentials for users as part of workflow. External Integration with third party DocuSign e-signature is also provided.

Document Management: The framework supports attachments with configurable type and size, stored on the application server or separate storage location. Forms are secured via application security. Based on requirements, the framework API will be used to integrate with third party content management systems such as ProjectWise. The API will use a predefined folder and key setup to link ROW records to attachment locations in ProjectWise.

Forms Management: The Hub framework supports the setup of word form template documents that can be used to generate correspondence word or PDF documents with the correct data merged. The system administrator will be able to configure new templates. An additional inbuilt reports module can also be used to generate bulk PDF outputs.

GIS Integration: The Dataview team is currently working on integrating WVDOT's existing ESRI ArcGIS Solution as part of Phase 2 of the Capital Project Management implementation. The integration will be further enhanced as part of the ROW Module to meet additional requirements.

1.4 PUBLIC SECTOR EXPERIENCE

Dataview has been solely focused on Public Sector software development and consulting since 2013, working with multiple States and Agencies. Some of our recent and current clients are highlighted below:

- **State of WV ERP Board (2014 – Present)** – Operational Support, System Administration, ERP Implementation, Project Management and Software Development
- **State of WV DOT (2015 – Present)** – Consulting Services and Application Development
- **State of California Caltrans Department (2014-15)** – ERP Infrastructure Upgrade, Interface upgrade and Business Intelligence upgrade
- **State of Alabama – Department of Finance (2017 – Present)** – Operational Support, Application Upgrade, Infrastructure Upgrade, System Administration and Software Development
- **LA County Office of Education (2018-Present)** – Business Intelligence development for Budget, HR and Financial
- **State of California Caltrans Department (2014-15)** – ERP Infrastructure Upgrade, Interface upgrade and Business Intelligence upgrade

A project like the Right-of-Way Module, with multiple touch points with external systems, requires a team that has not only extensive experience working with those systems but also a very good understanding of existing WVDOT Business Processes. We believe the Dataview team is uniquely qualified to meet these challenges. The Dataview team has:

- **Process Knowledge:** Experience with WVDOT processes and workflow building the Capital Project Management System
- **Integration Experience** – Developed integration with wvOASIS HRM Payroll systems and wvOASIS Financial Application

- FHWA Certification Experience – Successfully worked with State of West Virginia in FHWA certification of the Capital Project System.

1.4.1 Key Staff Background

The following staff members will be part of the Dataview Right-of-Way Implementation team in a full time or advisory role.

Olga Ekberg – *Senior Project Advisor* - Olga has worked in the State Department of Transportation (DOT) arena for over 30 years. Her work as a Highway Engineer for the Colorado Department of Transportation (CDOT) gave her the footing to provide analysis and advice in DOT computer system design, development, and implementation on multiple projects including a front-end solution to AASHTOWare's early construction management solution, BAMS, SAP's ERP solution for CDOT, and a custom solution for WVDOT, based on Dataview's Hub Development framework, to provide project management, budgeting, scheduling and STIP solutions within an integrated system.

Mohsine Badre - Mo has more than 25 years of experience in the Information Technology industry. Mo has a wide range of experience in system analysis, design, development, and implementation of both custom and package-based systems for state and local government. His functional experience includes Advantage Financial ERP, Advantage HRM/Payroll, Advantage Budgeting, and infoAdvantage. His technical experience includes application development, application architecture, Data Integration, Data Warehouse, and Business Intelligence.

Sanjeev Musafir - Sanjeev has more than 23 years of experience in technical architecture and software product development. Before founding Dataview, Sanjeev worked for 17 years at CGI implementing ERP solutions for large public sector clients including the City of New York and the State of West Virginia. Sanjeev has a proven record of success in building and leading software development teams, directing software deployment, managing architecture design and product development.

Kunal Shah – *Project Manager* - Kunal is a Scrum Master (CSM) certified; PMI-ACP Program Manager with 17+ years of experience in diverse industries including government contracting, state and local government, mortgage, payroll services, and technology. Kunal has commanding knowledge in ERP HR applications that include payroll, Time and Leave, Benefits Enrollment, Onboarding, and Financial ERP applications.

Chad Alford – *Infrastructure Engineer* - Chad has over 18 years of experience in the Information Technology industry. His technical expertise includes performance management, security, infrastructure management, software design, business process improvement, change management, and process automation.

Tim Stutes – *Data Conversion and Integration Architect* - Tim has has over 25 years of experience in the Information Technology industry. Tim's experience involves team leadership, definition, design, development, and implementation of government software projects relating to ERP Accounting and HRM. Tim's experience also includes serving as the senior technical architect leading the development of the Hub integration with wvOASIS, FHWA FMIS and other WVDOT applications.

Tab 2 – Vendor Company Profile

2 VENDOR COMPANY PROFILE

VENDOR COMPANY PROFILE

The Vendor shall include a detailed narrative description of its organization. The narrative should include the following:

- Brief overview of business operations, with an emphasis on the development and implementation of Right-Of-Way, Utility Relocation and Railroad Agreement management system solutions for state departments of transportation and other public sector organizations;
- Date established;
- Ownership (public, partnership, subsidiary, etc.);
- Location in which the Vendor is incorporated;
- Office location(s) responsible for the performance of proposed tasks;
- Full disclosure of any proposed off-site activity and the locations involved;
- Vendor's organizational chart relevant to this project;

2.1 VENDOR COMPANY PROFILE

Dataview Consulting LLC is a Delaware registered LLC, formed in 2013 and currently based out of Lacrosse, WI.

Below are brief bios for each of our founding owners:

- **Sanjeev Musafir** – Sanjeev is a Solutions Architect with more than 20 years of experience in building and leading software development teams, directing software deployment, and managing architecture design and product development. He has worked for multiple large public clients such as City of New York, State of West Virginia, State of Alabama and Commonwealth of Massachusetts in implementing ERP solutions, coordinating systems integration, and developing custom software.
- **Mohsine (Mo) Badre** - With more than 25 years in the Information Technology industry, Mo has a wide range of experience in system analysis, design, development, and implementation of both custom and package-based systems for state and local government. His primary areas of focus are in Data Warehousing, Data Integration, and Business Intelligence.

Dataview provides technical consulting, operations, and software development services focused on addressing the needs of the public sector. The founders of Dataview and their key staff have extensive experience implementing large and complex Enterprise Resource Planning (ERP) products as well as with the design and development of custom solutions for public sector clients. Additional details on our services are available at www.dataview.com.

Due to our focus on public sector consulting, our team has extensive experience working with and understanding the unique needs of public sector clients.

Our mission is to be a leading solutions provider in the public sector and to empower every public sector organization with the right tools and insights to operate their businesses. We want to be known as an industry leader in reliability, cost-effectiveness, innovation, and user-friendly service.

Our vision is simple: We strive to be technology agnostic, selecting the technology and tools that best meet the needs of our clients. Working collaboratively throughout the project life cycle, we want to engage project stakeholders to provide them with a sense of ownership from day one.

Prior to joining Dataview, our founders and principals have experience working on projects for large public sector clients, such as City of New York, State of New Jersey, State of Massachusetts, Colorado Department of Transportation, Maricopa County / Maricopa County Department of Transportation and U.S. Department of Energy.

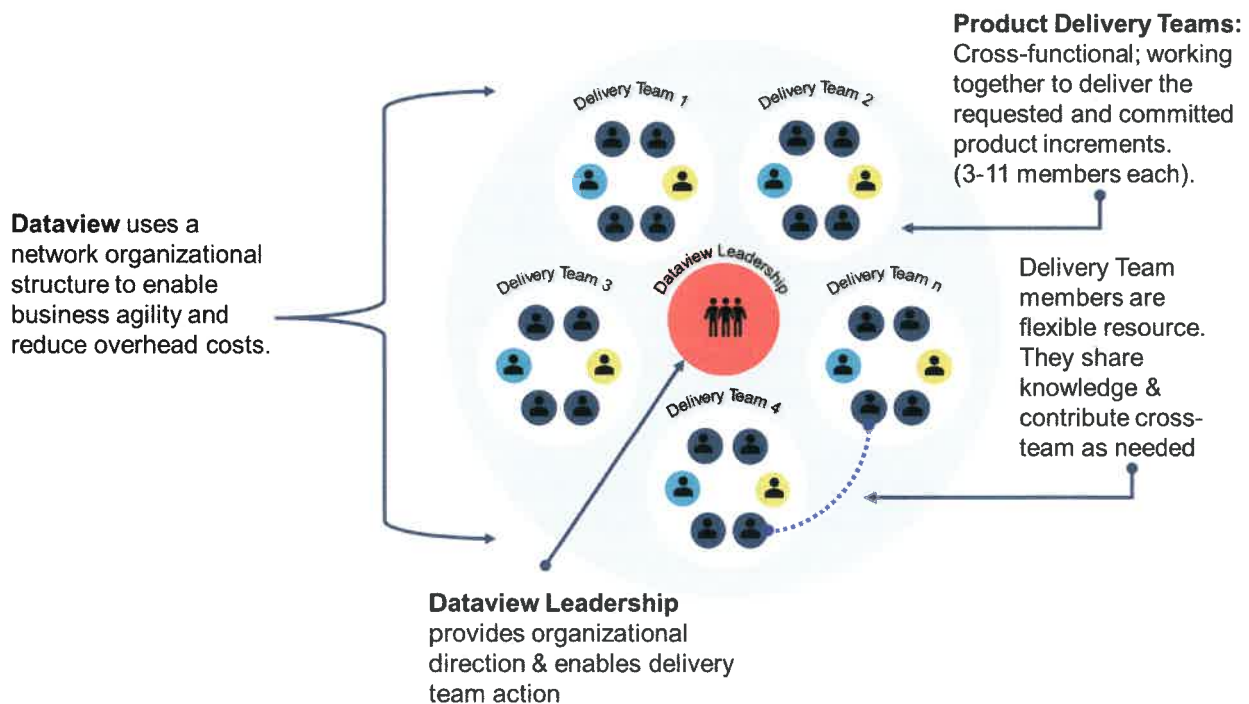
Dataview has a distributed design and development team with both near-shore and offshore locations. This approach allows the team to provide follow-the-sun/24-hour design, development, and support to our clients. Our team has experience working remotely with clients and so will limit our onsite presence in keeping with COVID-19 protocols. Team members will schedule onsite visits for major milestones or for specific meetings or discussions where onsite presence is more productive. Our leadership team is based in Wisconsin and New York and provides corporate oversight and leadership to the distributed team.

2.2 ORGANIZATIONAL CHART

2.2.1 Dataview's Organizational Model

Dataview uses a network-based, "flat", organizational model rather than a top-down hierarchical structure found in most traditional organizations. This model enables our organization to adapt and react quickly to changes in the complex and often unpredictable environments that our customers operate in while staying lean and reducing the overhead costs found in most traditional companies. Decisions are made by a consensus building vote where every team member is given a chance to express their opinion on a requirement or design decision which allows for open discussion to determine the optimal path before a unanimous decision is made.

Dataview's organizational model consists of a small leadership team surrounded by a dense network of empowered Product Delivery Teams.



2.2.1.1 Leadership Team

The Leadership Team's primary responsibilities include providing organizational vision and direction, staff and contract management, and the removal of any organizational impediments that are affecting the Delivery Teams' ability to produce and exceed customer's expectations. This team is intentionally made as lean as possible to reduce unnecessary administrative/overhead cost for our customers.

2.2.1.2 Product Delivery Teams

The Product Delivery Teams are kept small, comprised of 3-11 cross-functional personnel. The cross-functional makeup for each team can vary but are matched to the particular needs of the project and customer. Typically, at the minimum, this would include Business Analysis, Quality Assurance, and Software Developer personnel. However, many of our projects also include personnel with expertise such as Data Conversion, System Integration, and Business Intelligence Reporting.

Each Product Delivery team is focused and committed to the common goal of delivering a successful product for a single customer's needs. On larger projects, several Product Delivery Teams may be required. Though even when scaling to multiple teams for a single customer, the membership of each team is kept small and work is divided so that dependencies between teams are vastly limited. We find that this approach minimizes distractions and allows our teams to stay concentrated on the goals and tasks of their designated customer and the work at hand. This leads to better coordination, reduced waste, and quicker delivery and response times, resulting in reduced costs and better outcomes for our customers.

2.2.1.3 *Communities of Practice*

Additionally, Dataview has established internal “Communities of Practice” (CoPs). These CoPs are organized groups of personnel who share a common interest in a specific technical or business domain. These groups are made up of members from all Product Delivery teams within the organization. Members of these CoPs regularly collaborate to share information such as best practices or lessons learned, troubleshoot specific project issues, improve their skillsets, and advance their particular domain within Dataview. This results in a continuously improving organization that our customer’s benefit from through more rapid problem solving, a deeper knowledge pool, and improved product quality. Furthermore, an ancillary benefit from this approach is that, because knowledge is shared, it allows us to easily allocate more personnel to a customer if a temporary need arises.

2.2.1.4 *Summary*

Although Dataview’s organizational model is non-traditional, this does not mean it is unproven. Many companies in the Software Development industry have recognized the benefits of a more flexible, network-based organization and are attempting to transition to this model. However, many of the larger software development organizations have not yet attempted or have failed in these transitions, causing dysfunction and resulting in lower quality software, higher costs, and less responsive delivery teams for their customers. Our model’s success has been demonstrated through the accomplishment of the various small- and large-scale projects with which we’ve assisted our customers. Ultimately, Dataview is trying to reduce most overhead costs associated with software development by adopting the lean methodology.

Name	Roles and Responsibilities
Dataview Leadership	Provide organizational vision and direction, staff, and contract management. Provide direct access to Dataview’s leadership when required. Review status updates with state executives as required.
Product Delivery Teams	Small, cross-functional teams comprised of 3-11 members. Cross-functional makeup are matched to the needs of the project and customer. Each team is focused and committed to the common goal of delivering a successful product for a single customer’s needs. Several teams may be required for a single project or customer, but work is divided so that cross-team dependencies are limited.

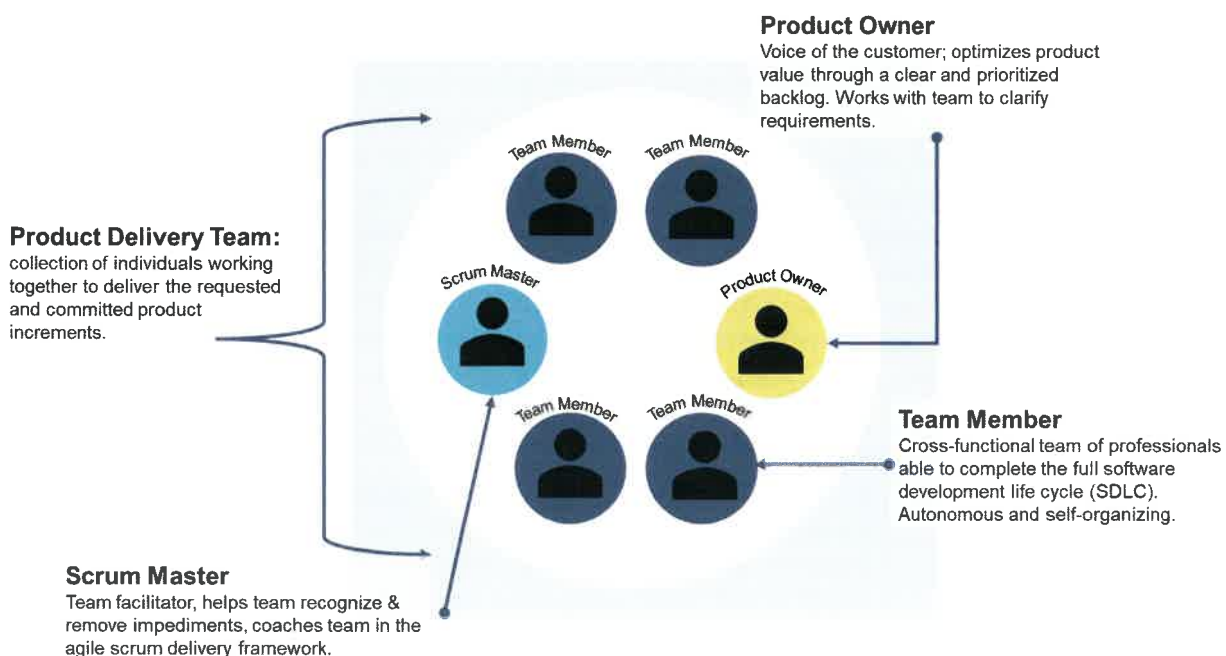
2.2.2 Dataview's Product Delivery Team Model

Dataview's Product Delivery Team Model closely follows a popular agile framework known as "Scrum". Scrum was created in 1993 and is now in use by thousands of companies, including Google, Apple, and Amazon.

Scrum employs an iterative, incremental approach to optimize predictability and to control risk. Scrum engages groups of people who collectively have all the skills and expertise to do the work and share or acquire such skills as needed.

2.2.2.1 Product Delivery Team Roles and Responsibilities

Our Product Delivery Team's are made of three basic roles: Product Owner, Scrum Master, and Team Member.



2.2.2.1.1 Team Members

Team Members are the people in the Scrum Team that are committed to creating any aspect of a usable Increment each Sprint.

The specific skills needed by the Team Members are often broad and will vary with the domain of work. However, the Team Members are always accountable for:

- Creating a plan for the Sprint, the Sprint Backlog;
- Instilling quality by adhering to a Definition of Done;
- Adapting their plan each day toward the Sprint Goal; and,
- Holding each other accountable as professionals.

2.2.2.1.2 Product Owner

The Product Owner is accountable for maximizing the value of the product resulting from the work of the Scrum Team.

The Product Owner is also accountable for effective Product Backlog management, which includes:

- Developing and explicitly communicating the Product Goal;
- Creating and clearly communicating Product Backlog items;
- Ordering Product Backlog items; and,
- Ensuring that the Product Backlog is transparent, visible, and understood.

2.2.2.1.3 Scrum Master

The Scrum Master is accountable for establishing Scrum as defined in the Scrum Guide. They do this by helping everyone understand Scrum theory and practice, both within the Scrum Team and the organization.

The Scrum Master is accountable for the Scrum Team's effectiveness. They do this by enabling the Scrum Team to improve its practices, within the Scrum framework.

The Scrum Master serves the Scrum Team in several ways, including:

- Coaching the team members in self-management and cross-functionality;
- Helping the Scrum Team focus on creating high-value Increments that meet the Definition of Done;
- Causing the removal of impediments to the Scrum Team's progress; and,
- Ensuring that all Scrum events take place and are positive, productive, and kept within the timebox.

The Scrum Master serves the Product Owner in several ways, including:

- Helping find techniques for effective Product Goal definition and Product Backlog management;
- Helping the Scrum Team understand the need for clear and concise Product Backlog items;
- Helping establish empirical product planning for a complex environment; and,
- Facilitating stakeholder collaboration as requested or needed.

The Scrum Master serves the organization in several ways, including:

- Leading, training, and coaching the organization in its Scrum adoption;
- Planning and advising Scrum implementations within the organization;
- Helping employees and stakeholders understand and enact an empirical approach for complex work; and,
- Removing barriers between stakeholders and Scrum Teams.

2.2.2.2 *Dataview's Talent Model*

Dataview takes pride in hiring talent that not only has world-class knowledge in specific areas, but also have many different talents and abilities across different areas. This does not just

include “hard skills” that can be measured (such as expertise in a particular programming language) but also “soft skills” that make our team members great to work with such as, communication, adaptability, and attention to detail.

Each project is unique and the challenges often unpredictable and require different skillsets. In order for our Product Delivery teams to be successful, we must hire a special kind of team member that has both deep knowledge in a specialized area and the ability to work across other disciplines. We refer to this unique attribute as being “T-Shaped”.

In most cases, employees will fall into one of three general categories, “I-Shaped”, “Generalists”, or “T-Shaped”. “I-Shaped” employees have a deep knowledge in one specialized area but are not capable in other areas. “Generalists” have broad knowledge and are capable in many areas but not specialized in any particular area. The last type of employees, referred to as “T-Shaped”, combine the best attributes of both “I-Shaped” and “Generalists” employees by not only having deep knowledge in one specialized area, but also being capable in many areas.

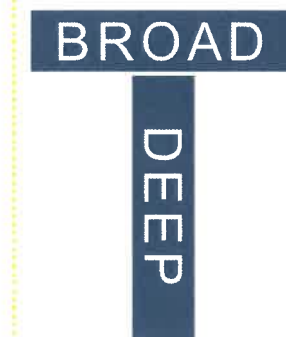
“I-Shaped” experts; Deep knowledge in one specialized area but not capable in other areas.



“Generalists”; Broad knowledge and capable in many areas but not specialized in any



“T-Shaped”; Deep knowledge in one specialized area and capable in many other areas.



The hiring of “T-Shaped” individuals further contributes to our goals of providing our customers with great flexibility and adaptability to respond to unpredictable changes in the project, while also keeping our teams as lean and efficient as possible.

Often when a project is faced with work that requires a diverse set of skills, this work gets scheduled and balanced against who is available and when they are available (this is known as demand-leveling). However, this only works under the assumption that nothing in the project will ever change. We know that often for our customers the only constant is change. The introduction of new laws and regulations, agency re-organization, or public scrutiny in a particular area are just some examples that could lead to change. If change does occur, it creates risk for the project because the right resources may not be available when needed to respond to the demands created by the change.

With our “T-Shaped” hiring approach, the risk of changes on the project are minimized. Not every task in a particular domain requires the deepest knowledge in that domain to complete the task. Therefore, we can offload tasks that do not require experts to team members who are capable of completing these tasks and place the experts in a more “guidance” focused role. This

allows them the time to work on tasks that do require their deep expertise or to quickly clear bottlenecks that may be affecting dependent tasks for other team members. Because the individuals on each team have a broad set of skills and are dedicated fully to the project, this approach allows work to be addressed according to customer priority rather than any particular resource's availability.

2.3 PUBLIC SECTOR PROJECT EXPERIENCE

Dataview has extensive public sector experience in developing web based custom applications, implementing COTS (commercial off-the-shelf applications), integrating ERP systems, building technical infrastructures, business intelligence, and data warehousing. Our versatile staff are experts in multiple technologies, including JAVA, C#, .Net, Angular, Oracle, and SQL Server. Below are examples of Dataview technical experience related to application development, software customization, and project implementation that showcase our expertise in these areas, relevant to the expected scope of the ROW Management System implementation:

Application Development - Department of Transportation, State of West Virginia - custom software development of Capital Project Management System (Hub) Application.

- *Project Management* - Agile Development.
- *Application Development* – ASP.NET, SQL Server and SSIS with Bootstrap and Telerik UI components.
- *ERP and System Integration* – Integration with ERP, ArcGIS, and Federal FMIS System.
- *Data Conversion* – Conversion of data from legacy DB2 system.
- *Reporting and Dashboards Development* – Embedded Power BI for external reports and Telerik Charts/Reports for internal dashboards.
- *Hosting* – Azure cloud hosting for non-production environments; WV Department of Transportation on-premises for production environment.
- *Security Integration* - Integration with the State's Active Directory and portal for single sign-on.
- *Cutover Activities*– Augmenting State operations team for system administration and operation needs until post-go-live transition.

Implementation & Customization– Department of Finance, State of Alabama

- *Operations* – 24x7 Application operations and database management support for the State of Alabama Financial System (STAARS).
- *Disaster Recovery (DR)* – Defined a DR architecture for the ERP Financial OLTP and BI System.
- *Data Integration* – Integration between procurement and ERP Financial system for vendor, budgeting, and payment data.
- *Software Development*: Development of a custom Single-Sign-On portal that will allow the State users a single portal to access the Financial, HRM and custom applications.

Implementation & Customization – ERP Board - State of West Virginia

- *Project Management services* for WV ERP Upgrade and WV Travel System Upgrade Project.
- *Content Management and ERP Customization* - Java based enhancements to ERP system to integrate with Alfresco ECM.
- *Operations & Support* – Technical support for State HR/Payroll and Financial ERP solution (wvOASIS) and nightly operations. The ERP solution supports 40K+ current State employees.
- *Prelim Payroll Application* – ASP.NET and Angular based application to allow agencies to execute payroll mock-runs and perform financial analysis before running payroll in production.

We believe Dataview has the skills and experience required to successfully perform the scope of work required in this RFP. We believe this project may have similar challenges that Dataview has successfully dealt with in our other projects including:

- Large public sector State agencies with multiple Stakeholders
- Integration with multiple enterprise systems
- Legacy systems with detailed workflow and processing rules.
- Business Processes needing documented and improved.

2.4 SOFTWARE DEVELOPMENT AND IMPLEMENTATION PROJECTS

Listed below are four projects highlighting Dataview's ability in software design, development, integration, and implementation that we feel are relevant to the scope of work of the ROW implementation:

Capital Project Management System for Department of Transportation for the State of West Virginia

The State needed to decommission its current mainframe system and move away from its patchwork of legacy systems. A new system was required to meet FHWA certification requirements, and previous attempts to build a new system using COTS had failed. The State was given a hard deadline by FHWA for a new system based on their requirements.

Dataview was bought in to do an analysis of existing processes and implement a solution. Since the documentation of the existing system was dated and limited, the team had to work closely with WV Stakeholders and FHWA staff to start documenting requirements. Instead of designing an approach to incorporate the business process "as-is", the decision was made to improve upon the process by building an application that leveraged best-of-breed technology to remove all paper-based processing and improve automation.

The project was delivered by a distributed team of Business Analysts, Solution Architects, and Developers – leveraging Azure Dev Ops for Project Management and issue tracking using Agile Development with 2-week sprints.

The Dataview team built the Capital Project Management System based on the Hub Development Framework. Phase 1 of the functionality was successfully delivered within Budget

and on-time. The software has obtained FHWA certification and production cut-over is set for October 2021 to coincide with WVDOH's schedule.

The application supports customizable workflows, notifications to users, integration with ERP and FHWA systems, and integration with the States ArcGIS Route information. The Active projects in the system are integrated with the State's ERP system for expenditures and collecting revenues.

The team is currently working on Phase 2 of the custom Capital Project Management System for WVDOH that includes additional functionality such as Forecasting.

As part of the implementation, the Dataview team:

- Assisted and Coordinated UAT testing with State.
- Managed full SDLC – including configuration management, Integration Testing, Regression Testing, and UAT coordination.
- Assisted state with training materials to train both internal and field staff.

Prelim Payroll Reporting Application for ERP Board for the State of West Virginia

State of West Virginia had the challenge of confirming the required monies to be moved by various agencies to fund for payroll processing during their biweekly payroll. To achieve this the State had to run multiple (3) payroll runs (Prelim Payroll) without doing the final posting (Final Payroll) to generate the necessary reports that could be sent to agencies. Dataview analyzed the requirements and available data and came up with a new application that could pull the information from the existing Kronos, HRM, Payroll and Financial systems and do the necessary calculations to be shared with the Agencies. The Agency staff can now log into the new application and view the aggregate agency financial data and drill down to the employee payroll and timesheet level to validate the information. With this application, the State of West Virginia is in the process of moving away from the Prelim Payroll process that took 8 hours for each run. The new application processes the same data in less than 2 hours. The application was built using Angular 2 and Asp.net Core with SQL Server database backend. The application is used by agencies across the state and maintains data for 40K+ state employees.

Land and Streams Permitting Application for Department of Natural Resources (DNR for the State of West Virginia)

Dataview is assisting the DNR, Office of Land and Streams with an application to manage the Stream Activity Permitting process. The application is being built as a new Permitting module in the Hub Development Framework. The following functionality will be included in the module:

- Self-Sign-Up Public Portal to allow companies and individuals to put in details to apply for permits
- Workflow process for DNR staff to review and approve applications
- Form functionality to generate correspondence with applicants
- Generate and track invoices for customers

- Integration with wvOASIS Accounts Receivable system to generate invoices and track cash receipts
- Integration with West Virginia ePay system to track Payment

AlabamaBuys (Ivalua) and ERP integration for Department of Finance for State of Alabama

Dataview built a real-time integration between the States public facing procurement application (AlabamaBuys) and the Financial ERP System. The integration supports real-time budget validation and vendor lookups with near real-time integration of purchase orders, payments, and vendor maintenance documents. The integration was built on the industry leading Apache Camel Integration framework and uses Elastic Search and Kibana for real-time dashboards for operational monitoring.

2.5 COMPANY STATEMENTS

- Full disclosure of any potential conflict of interest;
- A Statement of whether, in the last ten (10) years, the Vendor and any 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, and if so, an explanation providing relevant details;
- A Statement of whether there are any pending Securities Exchange Commission investigations involving the Vendor, and if such pending or in progress, an explanation providing relevant details and an attached opinion of counsel as to whether the pending investigation(s) may impair the Vendor's performance in a Contract under this RFP;
- A Statement documenting all open or pending litigation initiated by Vendor or where Vendor is a defendant in a customer matter;
- Full disclosure of any public sector Right-of-Way, Utility Relocation and Railroad Agreement management system related contracts terminated for cause or convenience in the past five (5) years;
- Full disclosure of any criminal or civil offense; and Statements of financial stability, indicating that the Vendor has the financial capacity to provide the entire solution and that the Vendor has adequate resources to continue as an ongoing concern.

Dataview states that:

- In the last ten (10) years, the Vendor and any officers in their individual or professional capacity or associated with another company have **not** 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
- There are **no** pending Securities Exchange Commission investigations involving the Vendor
- There are **no** open or pending litigation initiated by Dataview or where Dataview is a defendant in a customer matter
- Dataview has **not** had any public sector Right-of-Way, Utility Relocation and Railroad Agreement management system related contracts terminated for cause or convenience in the past five (5) years.
- Dataview is **not** involved in any criminal or civil offense.
- A Statement of financial stability from the Dataview CPA, *Robert J Shalhoub & Co LLC*, has been attached in Appendix A, indicating that Dataview has the financial capacity to provide the entire solution and that the Vendor has adequate resources to continue as an ongoing concern.

Tab 3 – Subcontractor Company Profiles

3 SUBCONTRACTOR COMPANY PROFILES

3.1 RIGHT-OF-WAY, UTILITY RELOCATION AND RAILROAD AGREEMENT SYSTEM SOFTWARE PROVIDER

Right-of-Way, Utility Relocation and Railroad Agreement System Software Provider

For the Right-of-Way, Utility Relocation and Railroad Agreement Software Provider, the Vendor shall provide the same information as the Vendor Company Profile listed above in Section 4.3.8. (if the Vendor is not the Software Provider). If the Vendor is the Software Provider, no information is required in this subsection.

The solution will use Dataview's Development Framework and will not require a System Software Provider.

3.2 THIRD PARTY SOFTWARE PROVIDERS

Third Party Software Providers

For any Third-Party Software Provider included in the proposal, Vendor shall provide the same information listed for the Vendor Company Profile in Section 4.3.8. If there are no Third-Party Software Providers, no information is required in this subsection.

There will be no third-party software providers. Any third-party development libraries will be licensed, integrated into the software, and supported by Dataview.

3.3 SERVICE PROVIDERS

Service Providers

For any Service Providers included in the proposal, Vendor shall provide a description of the role and level of involvement proposed for the Subcontractor and shall provide the same information listed for the Vendor Company Profile in Section 4.3.8, as applicable. Vendor shall include a copy of the teaming agreement or subcontracting agreement between the Vendor and each Service Provider as an attachment to its proposal. Subcontractor Corporate Information is not required if the Subcontractor is providing five (5) or fewer staff members in the proposal.

No sub-contractor will be providing more than five (5) staff members.

Tab 4 – Licensed Product Information

4 LICENSED PRODUCT INFORMATION

Business Applications

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

- Each Software Provider (please list the primary Right-of-Way, Utility Relocation and Railroad Agreement 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.

4.1 BUSINESS APPLICATIONS

As previously discussed, the Right-of-Way Module will be built on the HUB Development Framework. The current release of the *HUB Development Framework* is *Release 2.0*. The Right-of-Way Module Development will start on the latest HUB Development Framework available on project start and will be migrated to the newest HUB Development Framework Release during the project implementation. Below are some timelines and features of future releases of the HUB Development Framework.

HUB Development Framework Release 3 will be finalized by end of 2021 and will include the following additional improvements:

- E-signatures with support for third-party tools such as DocuSign
- User Configurable Screens that allow users to customize field labels and data elements.
- Improvements to the Workflow Engine's performance and configuration

Dataview is working with DNR to build a Permitting module for the Land and Stream group on the HUB Development Framework. This module will add the following additional features to *HUB Development Framework Release 3*:

- Public Portal Feature to collect questionnaires and permit applications
- Forms and Letter generation using word templates
- Invoice Generation
- Integration with WV STO ePay system
- Integration with wvOASIS Accounts Payable module
 - Receivable documents Interfaces
 - Reconcile Invoices with ERP Cash Receipts data

4.2 TECHNOLOGY PRODUCTS

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.

Below is a list of all components used by the HUB Development Framework. This includes some of the third-party libraries used by the framework:

- Application Server
 - Windows Server (2019 Standard Edition fully patched)
 - Internet Information Services (IIS) for Windows Server
 - FTP Server
 - HUB Application Software
 - .NET CORE (3.1.18)
 - Workflow Engine (4.1.4)
 - Telerik UI (2021.2.616) (for developers)
- Database Server
 - Microsoft SQL Server (2019 Standard Edition fully patched)
 - Database Back Up
 - Database Replication
 - SSIS
 - Microsoft SQL Server Data Tools (15.9.5)
 - COZYROC SSIS+ (1.9)
- Jobs Scheduler
 - SOS Job Scheduler (Master Service 1.12.9)
 - JOC Cockpit (3.1.18)
 - Universal Agent (1.13.8)
- Storage Area Network
- Power BI Server (SaaS)
- Disaster Recovery
 - VMware (8.1)

Dataview's application is a web-browser based application which is supported on the newest releases of all commonly used browsers. The solution does not require any software installation on end user devices. In other words, there is no fat client installation necessary. The solution will be deployed on on-prem State infrastructure and meet the State's current requirements. For any field offices that are outside the State's network, capacity planning will be conducted, and network needs will be identified.

4.3 AD HOC REPORTING TOOLS AND BUSINESS INTELLIGENCE

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.

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.

Dataview provides two solutions for ad-hoc reporting and business intelligence to meet the standards of any organization. The two solutions are as follows:

We provide a lightweight solution that is embedded in the application that both power users and business users can use to develop their own reports. This solution can be used to develop canned report and ad-hoc reports with ease of drag and drop objects into the canvas and calculations and functions similar to MS Excel. This solution is accessible from the application like any screen and users can create, save, and share their reports with others. This tool also allows users to also create pixel perfect paginated reports for printing.



The Hub Development Framework also utilizes the leading data analytics solution in the market in Microsoft Power BI. Microsoft Power BI is an interactive and intuitive BI solution that allows users to interact and analyze their data. Microsoft Power BI is integrated with the HUB framework, which allows dashboards and reports to be accessible from the application. We also provide workspaces for users who need to create their own dashboards and reports for their own use or to ultimately share them with the user community. Power BI is a SaaS solution and

OVERVIEW Sales Report

Key influencers Top segments

What influences N/A? to be

Units by Country and Sales Size

Sales Amount by Brand Name

Units Sold by Year, Quarter and Manufacturer

Sales Amount by Year, Month and Brand Name

The dashboard displays a variety of data visualizations including a bar chart for top influencers, a horizontal bar chart for units by country, a treemap for sales by brand, a Sankey diagram for units by year and manufacturer, and a step chart for sales by year and month.

TAB 4: Licensed Product Information - Page 5 of 9

4.4 PRODUCT MAINTENANCE

Product Maintenance

In this section of the proposal, the approach of the Right-of-Way, Utility Relocation and Railroad Agreements system Software Provider(s) and the Third-party Software Provider(s) to meet the WVDOT's requirements to provide product maintenance is described.

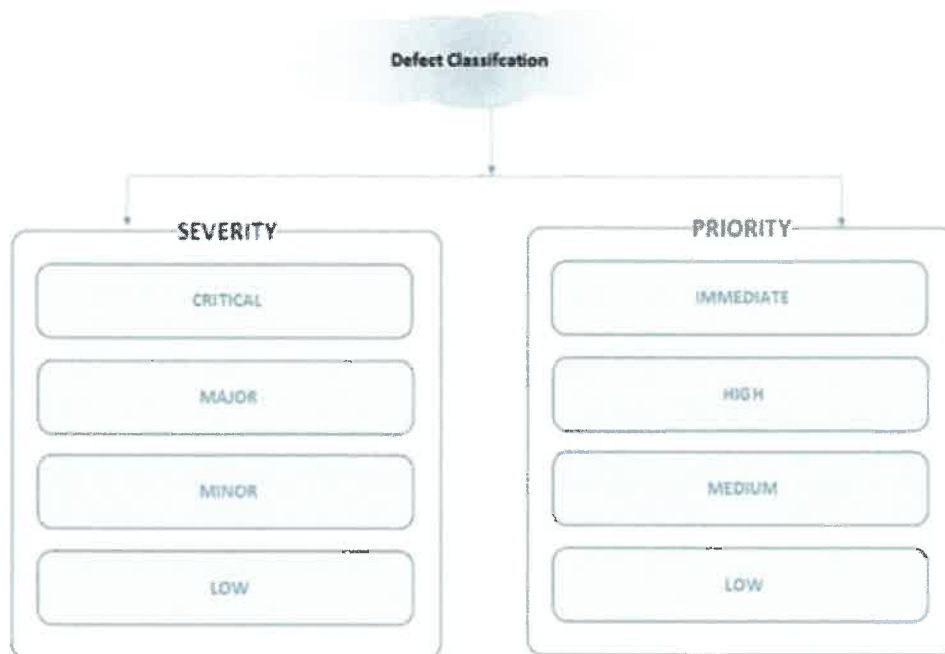
Upon notification of a maintenance problem, Vendor should perform an adequate level of problem determination to identify and resolve the issues (if possible) based upon known product or customized solution issues. After first having completed proper due diligence, problem determination, and using Software Provider resources and content to attempt to resolve the support incident, the Vendor may triage to the Software Provider and leverage the Software Provider as tier two support whereby the Software Provider may work directly with the WVDOT to fix a particular problem while the Vendor continues to take full responsibility for the outcome of the incident by monitoring progress, logging, tracking, and obtaining other resources (if the Software Provider has not solved the issues) and any other effort required to resolve support incidents that arise during the life of the Contract.

As the software vendor and implementor Dataview will provide support for issue identification and resolution during both implementation and post go-live. During installation and deployment, the Dataview team will work with the State technical staff to setup monitoring at the OS level, database level, and application level. This will allow the WVDOT team to collect the necessary traces and logs for incident logging. The Dataview technical team will also work to incorporate infrastructure and application alerts into any existing State monitoring tools if required.

Dataview is proposing to use the existing wvOASIS JIRA tool for issue tracking and resolution. JIRA is already in use for the Capital Project Module implementation and wvOASIS ERP, so the WVDOT team is familiar with the tool. It can be further leveraged for the ROW Module implementation and post go-live maintenance support.

Dataview will provide WVDOT a Maintenance Manager contact who will review JIRA tickets, answer calls, and receive emails for critical production issues. Once an issue is received it will be logged into an issue and incident -tracking system. An initial triage will be done by the Dataview QA Manager, supported by a cross-functional team of Business Analysts, Application Architects and Infrastructure Engineers. The team may reach out to WVDOT to gather additional information to recreate the environment. The Dataview support team will triage and identify issue severity and priority in the following categories:

- **Severity:** Is the parameter to specify the impact of a particular defect on the project. This is assigned by QA.
- **Priority:** Is the parameter to decide the order in which the defects need to be fixed. This is assigned by the Product Owner or Program Manager.



Severity	Priority
S1- Application crash, System crash, Application not installable, Application not responding. Stops testing. Impacts WVDOT ability to complete business process	P1- Fix should be given in an immediate patch instead of waiting for next build
S2 – Data issue, Data corruption, Feature not meeting its requirements/use case(s) and behaves differently than expected but WVDOT is able to complete business process, though not optimally	P2 – Fix can be given in an upcoming build, typically within a month.
S3- Feature not working as expected, but has some workaround	P3 – Fix can be given in the next 2-3 builds, within 2-3 months.
S4- Cosmetic Issue	P4 – Fix can be worked into a future release. They are not important to be fixed but should be logged for record and can be picked up in next release

Based on the severity and priority of the issue, a patch, build or release will be made available to WVDOT. The Dataview team will provide the necessary instructions to deploy the patch.

4.5 FUTURE DIRECTION

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.

Dataview started building the HUB Development Framework in 2019, incorporating best-of-breed technologies to create an open, scalable, and robust non-proprietary framework that our WVDOT customers can build their enterprise applications on. The Dataview team of Solution Architects and Domain Experts leveraged their extensive experience building and designing enterprise-level Statewide systems to create a modular platform for building focused business modules. Some of the items that have been incorporated in the framework in the last couple of years are:

- Configurable Workflow Engine
- Embedded Telerik Dashboards and Reports
- Integration with Power BI
- SAML Based Authorization
- Integration with MS Project

Dataview has an aggressive plan to continue to build additional modules and add more features in the next few releases. Dataview is in the initial stages of planning for *Framework Release 4*, slated for mid-2023. This release will include the following modules and high-level functionality:

- Capital Planning
 - Multi-year capital program and project planning
 - Project Scoring
 - Fund source determination
 - Enhanced Analysis & Forecasting
 - Interest capitalization
 - Adjustments for inflation
 - What-if Forecasting & Analysis
 - Budget Allocation & Analysis
- Contract Management
 - Contract creation
 - Scheduling
 - Contracts

- Cost payments
- Document Tracking
- Forecasting/Analysis
 - Plans vs Actuals
 - Forecasted Costs
- Progress reports
- Issue tracking
- Contract Administration

Phase 2 of the Capital Project Management System for WVDOT is currently underway. This phase will add the following architecture features to the *Release 3 and Release 4* framework based on project schedule:

- Forecasting Features
- Integration with ESRI ArcGIS software
- Ability to view and generate Project Schedule GANTT charts
- Embedded Report Designer
- Integration with collaborative Chat and Email tools

Tab 5 – References

5 REFERENCES

References

The WVDOT intends to conduct reference checks for account references provided by Vendors. It may, at its sole discretion, contact additional clients not presented as references.

State of West Virginia Contact Information

State of West Virginia - ERP	
Organization Name	wvOASIS ERP
Project Name	wvOASIS
Project Description	ERP Solution for the State of West Virginia
Contact Name	Matt Ellison Kent Hartsog
Contact Mailing Address	1007 Bullit Street, Charleston, WV 25301
Contact Phone Number	Matt Ellison (304) 546-2707 Kent Hartsog (304) 546-3593
Contact Email Address	Matt.ellison@wvoasis.gov Kent.hartsog@wvoasis.gov
Right-of-Way, Utility Relocation and Railroad Agreements Software Product and Release Number(s) Implemented	
Project Start and End Date	2015 - 2023
Contract Value	NA

State of West Virginia - DOH	
Organization Name	DOH
Project Name	HUB
Project Description	Capital Project Management System
Contact Name	Carla Rotsch Greg Bailey
Contact Mailing Address	1900 Kanawha Blvd E, Charleston (Building 5), WV 25305
Contact Phone Number	Greg Bailey (304)-549-7888 Carla Rotsch (304)-382-2137
Contact Email Address	Gregory.L.Bailey@wv.gov carla.p.rotsch@wv.gov
Right-of-Way, Utility Relocation and Railroad Agreements Software Product and Release Number(s) Implemented	
Project Start and End Date	2015 - 2023
Contract Value	NA

State of West Virginia - DNR	
Organization Name	Department of Natural Resources
Project Name	Land and Stream Permitting System

Project Description	Public Portal and internal system to manage permits, invoices and payments.
Contact Name	Brian Bolyard
Contact Mailing Address	324 4 th Ave. South Charleston, WV 25303
Contact Phone Number	(304) 516-3296
Contact Email Address	brian.r.bolyard@wv.gov
Right-of-Way, Utility Relocation and Railroad Agreements Software Product and Release Number(s) Implemented	
Project Start and End Date	2021 - 2022
Contract Value	NA

State of California - CalTrans	
Organization Name	California Department of Transportation (CALTRANS)
Project Name	
Project Description	ERP Technical Upgrade
Contact Name	Scott Sanders
Contact Mailing Address	3035 Prospect Park Drive, Suite 150 Rancho Cordova, CA 95670
Contact Phone Number	(916) 496-6441
Contact Email Address	ssanders@intervision.com
Right-of-Way, Utility Relocation and Railroad Agreements Software Product and Release Number(s) Implemented	
Project Start and End Date	
Contract Value	NA

State of Alabama	
Organization Name	Department of Finance – State Business Systems
Project Name	STAARS ERP system
Project Description	ERP Solution for the State of Alabama
Contact Name	Valisha Kirkland
Contact Mailing Address	100 N. Union Street, Suite 500 Montgomery, AL 36130
Contact Phone Number	Office (334) 353-5728 Mobile (334) 201-5816
Contact Email Address	valisha.kirkland@finance.alabama.gov
Right-of-Way, Utility Relocation and Railroad Agreements Software Product and Release Number(s) Implemented	
Project Start and End Date	??
Contract Value	NA

Tab 6 –Proposed Project Staff and Organization

6 PROPOSED PROJECT STAFF AND ORGANIZATION

Project Organization

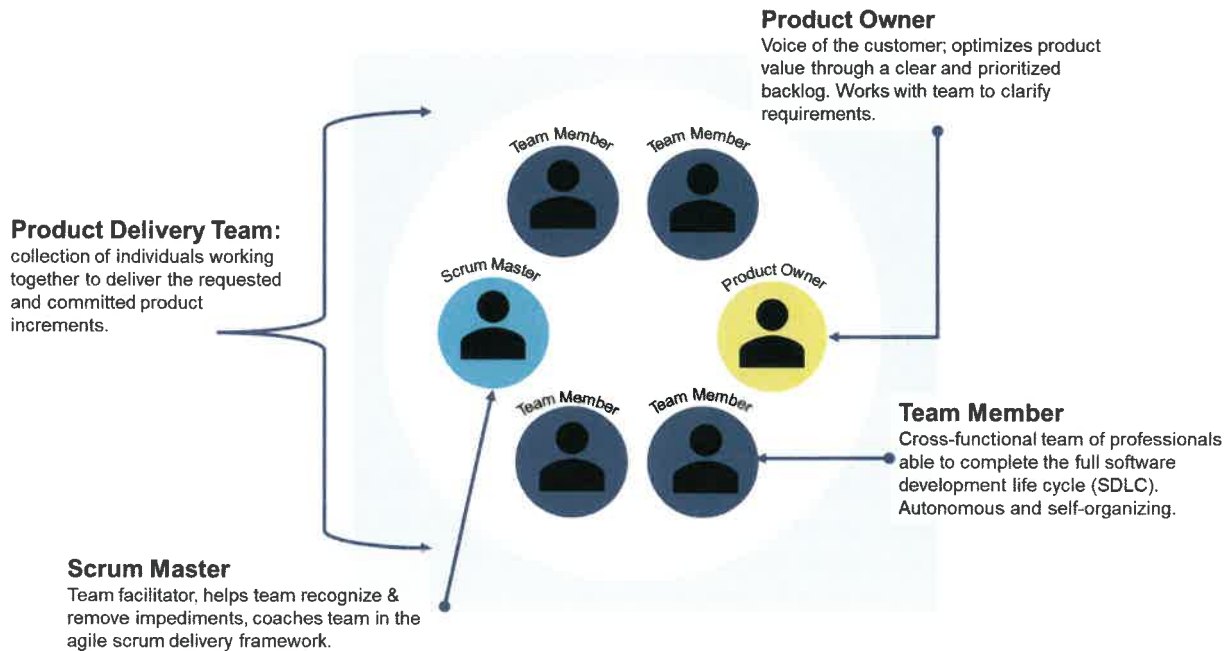
Vendors shall describe their project staffing strategy to coincide with their recommended implementation approach, including any proposed phasing. As part of this project staffing strategy, the Vendor shall recommend when WVDOT participation is expected, how the WVDOT's employees are going to be integrated 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.

6.1 PROJECT ORGANIZATION

Dataview operates in a flat organizational structure supportive of our agile project management practices. This structure gives us greater resource flexibility, reduces overhead, and streamlines decision making ability which allows our organization to remain lean and focused on delivering value for our customers. Our project organization structure also ensures that resources are well versed in the different roles that they will have to support throughout the lifecycle of the implementation which ensures multiple individuals attaining expertise in technology as well as functionality of the application.

The core delivery team is cross-functional, meaning it is comprised of business, technical, and quality assurance experts with diverse backgrounds working toward the common goal of delivering working software for WVDOT. Together, the members of this team will have most of the skills required to deliver on this goal. If highly specialized skills or domain knowledge are required for portions of the project, Dataview may engage members of the extended Subject Matter Expert Team. The members of this team may work across projects based on the project phase or to assist with a specific issue.

Although each of our team members have their own refined skillsets and deep specialty expertise, we encourage broadening skills and knowledge sharing to minimize skill gap risks and increase overall team effectiveness. Therefore, team members titles are not named by specialization, but rather given one of three general roles: Developer, Product Owner, or Scrum Master.



6.1.1 Core Delivery Team Roles and Responsibilities:

Product Owner: The Product Owner will be the primary liaison between WVDOT stakeholders and our delivery team. The Product Owner is expected to incorporate stakeholder feedback to create the highest value product increments. The Product Owner is responsible for maintaining the product release plan, product backlog, and ensuring all stakeholders are aware of plans and priorities. Often, the Product Owner is the lead facilitator in client workshops and sprint reviews.

Scrum Master: The Scrum Master is a team facilitator and servant leader who is accountable for addressing distractions, disruptions, and obstacles so that the rest of the team is free to focus on producing outputs aligned with product goals. The Scrum Master coaches the team on the agile methodology and best practices, facilitates key sessions as requested, and encourages the team to continuously improve.

Developers: Developers are responsible for perform the tasks of designing, building, integrating, and testing product backlog items into increments of potentially shippable software. Developers have a wide range of skillsets such as front-end development, back-end development, solutions architecture, business analysis, quality assurance, integration, conversion, and business intelligence. The developer team is staffed by team members with the following skills, Roles and Responsibilities:

Name	Roles and Responsibilities
Delivery Oversight	Provide project oversight and contract management. Provide direct access to InterVision's CEO and executive staff when required. Review status updates

	with state executives. Manage any staffing changes or updates. Responsible for overall success of the project.
Project Team Project Manager	Day to day management of the overall project. Responsible for scope, schedule, and implementation. Prepares and delivers weekly updates and monthly schedule. Assigns work and finalizes completed successful implementation.
Lead Business Analyst	Responsible for business requirements, preparing test plan and test scripts. Manages and performs testing. Prepares test reports and final acceptance test.
Tester/Business Analyst	Responsible for documentation and testing support. Prepare test scripts, execute test scripts, manage bugs and test log.
Lead Security Architect	Leads the security team. Responsible for project adherence to the WVDOT's security standards. Works closely with the state's security staff to identify and resolve any security gaps. Responsible for any penetration security testing.
Lead Technical Architect	Responsible for technical aspect of the upgrade and cutover from Oracle to SQL. Lead on system design, data conversion, image conversion and pilot implementation. Manages all technical staff.
Architecture/Infrastructure	Responsible for the cutover from the Oracle environment to the new SQL environment. Works closely with security staff. Performs performance testing and resolves any known issues.
Middleware Administrator	Responsible for configuration, WebSphere and application installation. Key role in performance testing.
BI Specialist	Responsible for the BI upgrade portion of the project and reports testing.
BO Developer	Responsible for data warehouse and reports upgrade, deployment and configuration. Also responsible for testing.
Data Conversion Lead	Responsible for conversion map design and development, unit testing, mock cutover and parallel testing
Data Migration	Responsible for migration of data and data migration testing.

Dataview ensures that besides the core team, there is always a robust depth of the supporting team that will assist with the tasks/ deliverables every sprint. Dataview will also involve WVDOT members throughout the lifecycle of the implementation as outlined in the list below.

Every engagement begins with a capability analysis to establish the core delivery team. During this analysis, Dataview will collaborate closely with WVDOT to ensure that the skills of the proposed team are aligned with the needs of the project. Appropriate adjustments to the proposed team are made and the core delivery team of 5-11 members is formally established. Our staffing approach to projects is based on bringing on the core delivery members based on the needs of the phase. This is done with sufficient on-boarding time so that they are productive from the start of that phase.

Below is a summary of the proposed project phases and staffing. The project management methodology and phases are described in further detail in later sections.

Phase	Staffing
Foundations	<p>This is the project initiation phase. During this phase, emphasis will be put on building relationships with WVDOT stakeholders, setting up any logistics for delivery team access, preparing the supporting environment for the project, creating a detailed project plan, identifying teams and resources.</p> <p>In this phase we quickly identify the core WVDOT Staff team, Stakeholders, and decision makers to complete design reviews. With the assistance from this core team, we will also determine an approach for balancing project needs against existing constraints on WVDOT staff due to existing workload and roles. Ongoing engagement from this core team is also essential to continually provide feedback and priorities at each phase to ensure we are delivering the most value. Different work groups will be created to focus and gather detailed requirements for the different business and technical areas.</p> <p>A Dataview team SME will be assigned to each of these areas. These SMEs will be supported by the Senior Project Advisor and Scrum Master. The Scrum Master will also present a project plan/ roadmap and will start defining the Sprints.</p> <p>The Dataview Technical Architects and Infrastructure engineers will also start setting up the development and system testing environments.</p>
Development	<p>In this Phase, the Scrum Master along with the cross functional team members (including SMEs, analysts, developers etc.) will start building the product in iterative cycles called sprints with a verifiable and demonstrable product at the end of each sprint. The WVDOT members will provide feedback every sprint which will lead to incremental changes. A Product backlog will also be maintained which will be continually refined to ensure that the highest priority</p>

	<p>requirements are being worked on. This product backlog will be discussed with WVDOT SMEs to get the consensus.</p> <p>WVDOT SMEs and staff will meet with Dataview SMEs, Dataview Solution Architects, Senior Project Advisor and Scrum Master to review requirements.</p> <p>Dataview will also work with WVDOT to create test teams for the different areas in order to test the different features and new builds that are added to the base code every sprint. This continuous testing will ensure WVDOT users get familiar with the application.</p> <p>In extension of the testing above, Dataview will work with WVDOT to train the rest of the staff with SMEs and users that are more familiar with the system.</p> <p>Dataview will also develop interfaces/ integration and migrate converted data into the application. These requirements will be defined in the backlog and will be added to the Sprints.</p> <p>The staffing in this phase will initially include the Business Analysts and Technical Architects. Once the initial back log has been created and available for assignment, the Application and BI Developers will be assigned to the team and start development activities.</p>
Cutover	<p>In this phase, the Production Servers will be installed and configured. The Dataview core team will work with WVDOT to perform all cutover activities including but not limited to execution of internal performance testing, multiple mock cutovers, providing support to the WVDOT tech team until transition.</p> <p>The Dataview Infrastructure/Operations staff will be added to the team and focus on the setting up the production operational and maintenance procedures. The Technical Architects and Infrastructure staff will execute the performance testing and tuning of Application Servers and Database servers.</p>
Post Implementation	<p>Dataview team will facilitate the knowledge transfer to the WVDOT team and maintain the solution. Some of the other activities include any tuning activities such as bug fixing, enhancements for performance and usability, assessment of the deployment against the complete vision, identifying any gaps, and managing/maintaining the Production Support Responsibilities until transfer of the System Administration Responsibilities to WVDOT is achieved.</p> <p>The Dataview Operations team will now be fully staffed and work with the WVDOT operations team to start transitioning of work activities. The Development team will now focus on bug fixes and providing technical support.</p>

		provisioning and managing the HUB Capital Project Management application servers and databases.
Data Conversion and Integration Architect	Tim Stutes	Tim has more than 25 years of experience in the field of information system services. Nearly all his experience has been involved with the team leadership, definition, design, development, and implementation of government software projects relating to ERP Accounting and HRM. Mr. Stutes has successfully served in technical analysis and development, technical lead, and business analysis roles. Tim the senior technical architect leading the development of the HUB integration with wvOASIS, FHWA FMIS and other WVDOT applications.

6.4 RESUMES

Resumes

The Vendor shall provide resumes for each role to be filled by Vendor personnel. Proposed consultants should be available to staff the project. For purposes of planning project staffing, the Vendor should assume a start date of November 1, 2021.

Kunal Shah

703-864-6663

Kunal.Shah@dataview.com

Summary of Qualifications

Scrum Master (CSM) certified; PMI-ACP Program Manager with 15+ years of experience in diverse industries including government contracting, state and local government, mortgage, payroll services, and technology. I have commanding knowledge in ERP HR applications that include payroll, Time and Leave, Benefits Enrolment, Onboarding amongst others. I have also worked with different Financial ERP applications.

Areas of Expertise:

- Coordinating multiple implementations in a fast-paced environment
- Finding solutions for clients from small companies to enterprise-wide state and local governments
- Ensuring continuous delivery using DevOps principles for multiple upgrades/ implementations
- Managing resources, budgets, and client expectations throughout the project lifecycle
- Supervising teams and resolving conflict, both internal and external
- Excellent presentation and interpersonal skills at all levels of an organization
- Knowledge and expertise in various Project Management Practices/ Frameworks including the Rational Unified Process, Scrum/Agile, and Waterfall models

Professional Experience

Dataview Consulting LLC

2019 - present

Lead Business Analyst**SME/ Conversion specialist – Alabama Buys implementation**

- SME/ Conversion specialist for the State of Alabama that updated it's procurement system from CGI Advantage to Ivalua's procurement solution which was being implemented by KPMG.
- Wrote conversion scripts for vendor and contract migration and supplied the extracts to KPMG to load into Ivalua.
- Managed all the pre-go live and go-live testing effort for the State Procurement team and the Comptroller's Office by working with KPMG to resolve the issues for the various rounds of testing on both the Advantage and Ivalua sides.
- Created training plans and conducted training for new hires at the State related to Advantage and Ivalua
- Provided post go-live support to the State and KPMG in resolving issues and answering related questions.

SME – WVDOT HUB implementation - State of West Virginia

- Built a new application that tracks all of the projects that are managed by WVDOT. This application interfaces with the financial system as well as the federal highways application. The application is being built using the agile framework with a two week sprint.
- Wore several hats including SME, testing lead using the Telerik automation suite, security lead, documentation specialist, training lead.

Functional Manager/ SME – State of West Virginia upgrade:

- As a part of the PMO created daily and weekly reports for the deputy auditor and senior PMO leadership. Reports were created by analyzing data and utilizing Microsoft BI tools.
- Reviewed contracts and determined if there were any disputes with contractual obligations and what was delivered by the vendor.
- Subject Matter expert of Security/ Workflow, Human Resources Modules including Travel, Position and Employee maintenance, Onboarding, Payroll, Benefits, Time and Leave, FIN modules such as Procurement, Cost Accounting, Budgeting.
- Successfully setup User Preferences for various documents, setting up row level security for various documents/ pages related to Cost Accounting and COA, ensuring that SQL optimization works for documents in workflow when selected through Worklist Administration.
- Advised the State on the best practices for setup of security workflow, procedures and testing methodologies for the upgrade.
- Managed the UAT testing of the 3.11 application.
- Managed the ACA implementation for the State for 2019.
- Conducted demos for new features of the Advantage application – release 3.11

CGI., Fairfax VA
2019

2015 -

Functional Manager - State of Maine upgrade

- Managed a successful go-live of the DATAVIEW State of ME upgrade using Agile methodology. Utilized techniques like T-shirt sizing, daily scrums, paired programming and co-location (using conference calls) during this implementation.

- Ensured continuous delivery by delivering weekly defects fixes which were tested internally and then by the State
- Conducted Daily Scrums as the Scrum Master with local and offshore teams.
- Created weekly reports for upper management that had details like the Sprint Backlog, Number of Items in the Backlog that were on track, ahead of schedule or at risk
- Subject Matter Expert for the Security and Workflow for the State
- Reviewed all of the updates to the Security and Workflow modules with the State and determined their value to the State.
- Lead multiple Demos with various departments of the State as well as the Controller walking through the new features and determining which of those would be a good fit based on the State's Business Processes.
- Worked with Complex SQL into the DB along with Complex Excel formulae and functions to filter records in multiple columns etc.
- Drafted Test Scripts for the new features and presented them to the State.
- Assisted the State in the UAT cycle for the upgrade
- Drafted Functional Designs for some of the Financial features for the State
- Unit tested the entire application for new security and workflow features
- Helped State with the configuration

Functional Manager for Advantage HRM State of Michigan

- Managed a successful go-live of the HRM suite for the State of MI using Agile framework. Utilized techniques like T-shirt sizing, daily scrums, paired programming and co-location (using conference calls) during this implementation.
- Ensured continuous delivery by delivering defects fixes / new features to the State. Continuous integration was ensured by testing new updates/ features with existing functionality to ensure system stability.
- Led a team of twenty analysts and developers to create functional designs and test scripts.
- Managed reviews sessions to ensure these documents were completed within the given time frame.
- Maintained a status spreadsheet with the status of completion and error log to track resolution.
- Created and sent reports every day to management to review using advanced analytics.
- Developed innovative ways to complete deadlines when they were slipping. Held status calls twice a day based on a 24x7 outsourcing model.
- After live launch, led a team of ten developers and functional members to get defects resolved.
- Worked with Confluence. Maintained a daily defect list that was accessible to the entire team.

Functional Manager for Monterey County

- Managed a team of functional and technical resources for the Monterey County HRM 3.10.02 release implementation.
- Drafted concept papers and assisted the team in drafting functional designs and test scripts.
- Ran weekly meetings with the on-site team and the client to address any questions/clarifications
- Managed a list of defects with hard deadlines that was updated daily and presented to the client and the on-site team. This list translated to an internal list on confluence that the team maintained which outlined the issues, comments, ETAs etc.

3.11.2 Functional Manager

- Managed Benefits Enrollment; ESS; Travel; Time & Leave portions of the application, among others
- Performed analysis on defects that were resolved for custom projects and added them to the baseline list of items that were required for internal releases.

- Assigned defects to the team and reviewed the retests for the different patch set releases.

Other Responsibilities at CGI

- Created LOEs for clients and internal projects.
- Conducted performance reviews for the team and set expectations and goals for the next year.
- Maintained project plans and matched actuals based on time entered by the team.

Pleasant Valley Business Solutions (PVBS), Reston VA*2012 - 2015***Program Manager**

- Managed a team of five implementing Microsoft Dynamics NAV for Government Contractors. The cycle consisted of gathering requirements, training, conversion, implementing and going live. The team also prepared advanced analytics reports utilizing Microsoft BI tools that helped clients with data such as sales per region, vendor lists, receivables etc.
- Ensured compliance with Federal Acquisition Regulations (FAR) and Defense Contract Audit Agency (DCAA) regulations.
- Successfully managed 21 implementations totaling over \$4 million over the span of approximately three years, with the majority of implementations under or at budget.
- Closely managed budgets for clients and successfully obtained budget extensions when necessary to account for additional project scope.
- Led weekly team status meetings with clients and provided Budget vs. Actuals reports, timesheet details reports, weekly issue lists, Project Status Reports, and minutes outlining action items using analytics.
- Mitigated risk by anticipating obstacles and relaying them to the client with detailed documentation and potential solutions.
- Managed weekly utilization and scheduling for the team and ensured maximum billable time using analytics.
- Pioneered innovative team building and cross functional project management techniques to expedite workflow, simplify processes, and reduce operating costs.
- Drafted IT documentation such as Installation Checklists and Architecture Diagrams.
- Assisted the IT team when required by verifying server architecture setup prior to the start of the implementation, applying patches and assisting clients with technical issues.
- Extensively used SharePoint to manage tasks, issues, risks and change requests; used SharePoint designer to create workflows and send automatic notifications to the team.

CGI Inc., Fairfax VA*2006 - 2012***Functional Lead for the WV Oasis Advantage HRM/ Kronos/ Meridian implementation, 2012**

- Led gap sessions covering benefits, payroll, position control, personnel administration, employee relations and performance with the client for four weeks with over 35 State employees and DATAVIEW staff.
- Conducted a gap session with the client and Kronos for time and leave with approximately 40 individuals comprising State representatives, Kronos and DATAVIEW.
- Assimilated information from the gap sessions, updated BAFO requirements, and created Deliverable Expectation Documents.
- Led the effort in prototyping for Benefits Administration.

Functional Lead - 3.10 Release New Development Advantage HRM, 2011

- Added new functionality to the new mobile MSS application. Responsible for the logic and UI for the employee scheduling that allows the manager to approve time and leave for employees.
- Led the automation test suite roll out. Provided training for the entire onshore and offshore functional team to migrate to the automation testing model.
- Added complex functionality to the existing system for ESS, MSS, and HRM.
- Responsible for reviewing concepts, functional designs and system test scripts
- Managed execution of test scripts by holding daily status calls and monitoring defect statuses
- Assisted junior team members functionally as well as procedurally

Functional Lead/Release Manager for minor release 3.9 for Advantage HRM, 2009 - 2011

- Led an initiative to clear out a defects backlog. Responsible for reviewing the system tests performed by onshore and offshore analysts. Assisted in testing complex defects when required.
- Assisted in managing a minor release that contained approximately 2000 defects. The patch resulted in a 99% success ratio for the release.
- Monitored the three regression cycles by holding daily status calls with the regression team.
- Involved in the resource allocation process for all phases of the Advantage 3.9 release.
- Served as SME for deductions/benefits processing, ESS, security/workflow, payroll processing, integration, recruiting and staffing and retirement systems.
- Managed the Defect Request queue for client-reported issues through twice-weekly status reports to members and emails and phone follow up. Managed weekly client defect patches.
- Created weekly metrics for 3.9 release using trend charts.

Release Manager for fix pack release 3.8.0.2 for Advantage HRM, 2008 - 2009

- Managed a fix pack release with approximately 300 defects. All the defects were resolved, tested and patched into the release. This resulted in a 100% success ratio for the release.
- Monitored progress of the 3.8.0.2 team by gathering metrics and holding daily status calls.
- Monitored the progress of a round of regression testing by having daily status calls with the team and obtaining daily status updates on percentage completion of regression scripts.

Business Analyst for LA County – Advantage HRM, 2007 - 2008

- Responsible for writing concepts, functional designs and system test scripts for functional areas such as FLSA, leave, position control and time and labor.
- Assisted LA County during various stages of UAT to test new functionality and raise defects.

Business Analyst for NY DOE-OTPS Business Analyst – Advantage Financial, 2006 - 2007

- Responsible for writing Detail Designs from Approach Papers, translating them into System Test Scripts and participating in reviews, walkthroughs and meetings for these documents.
- Led the effort in successful shakedown testing for the 3.7.0.1 release, regression testing and the creation and execution of Unit Test Cases.

Freddie Mac, McLean, VA

2005 - 2006

Business Analyst - Amortization Redesign team

- Responsible for capturing functional requirements, creating business requirement documents and Application Use Cases that provide scope for the technical team.
- Facilitated a successful interface between the users and the different teams.
- Responsible for the UAT and SIT.
- Wrote SQL queries to test the integrity of the database in the data warehouse.
- Participated in Design walk-through with SMEs to baseline the business architecture.

ADP, Roseland NJ

2004

Quality Assurance Analyst: Welcome Center Design team

- Responsible for the analysis of Business and User requirements and the subsequent creation of test plans, test specifications and test procedures for various testing efforts.
- Responsible for the creation of a tutorial to explain the process of starting a test plan, scripting it and saving it in version control once it was done.
- Successfully managed three regression cycles, each with a new build of the application.

Education

Certified Scrum Master (CSM) - 2015, Agile Certified Practitioner (PMI-ACP) - 2015, Project Management Professional (PMP) – In progress, Salesforce Administrator – In progress

M.S. Computer Engineering – State University of NY – Binghamton – May 2003

B.S. Electrical Engineering – Mumbai University, Mumbai India – May 2000

Olga L. Ekberg

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Summary of Qualifications

I have worked in the State Department of Transportation (DOT) arena for over 30 years. My work as a Highway Engineer for the Colorado Department of Transportation (CDOT) gave me the footing to provide analysis and advice in DOT computer system design, development, and implementation for a front-end solution to AASHTOWare's early construction management solution, BAMS.

As the Federal Aid Billing (FAB) lead for CDOT in the implementation of SAP's ERP solution, I guided and facilitated the effort to achieve one of the early FHWA certifications using SAP's ERP solution. The successful FAB implementation required a custom solution utilizing modular functionality from FI/CO, Project Systems (PS) and Budget Management.

At West Virginia, I led the effort for WVDOT to achieve FHWA Certification in the first of a two-phased approach. Following the initial implementation of the ERP solution for WVDOT, I am working as the Product Owner for the second phase; the implementation of a custom solution to provide project management, budgeting, scheduling and STIP solutions within an integrated system, the HUB. The HUB replaces legacy systems and paper forms to automate the initiation, budgeting, funding, and scheduling of DOT projects including the State and Federal STIP processes associated with Highway Projects. This solution is scheduled to be certified in early 2021 and go live shortly thereafter.

Professional Experience

Dataview Consulting, Inc**March 2019 - Present****Principal Consultant****Product Owner for implementation of the HUB – Project Management, Budgeting and Tracking integrated to the State Financial System**

- Provide guidance for development of custom software for WVDOT
- Business Analysis and Development Strategy
- Product Development
- Facilitate early requirements session and initial draft of Scope
- Partner with Scrum Master to lead team in all phases of Agile Development
- Relationship management with West Virginia DOT and FHWA
- Department of Transportation Subject Matter Expert
- FHWA Certification Lead
- User Acceptance Testing coordination and guidance
- Training and Organizational Change Management coordination and guidance

Dataview Consulting, Inc**July 2015 – March 2019****Principal Consultant**

FHWA Certification Lead – West Virginia Dept of Transportation ERP

- Expert knowledge of FHWA certification requirements and process
- Support implementation of ERP solution to meet FHWA requirements and successful FHWA certification for WVDOT
- Expert knowledge and detailed support for the implementation of ERP solution:
 - DOT project accounting/cost accounting
 - FHWA Billing Process
 - FMIS system
 - Integration (i.e. AASHTOWare, ESRI, Deighton, AgileAssets, etc.)
 - Conversion from mainframe COBOL solution
 - User Acceptance Testing
- Risk/Issue Management
- Incident Management
- Client and Vendor Management
- Requirement analysis, review, and clarification
- User Acceptance Testing leadership and coordination
- Leadership support for conversion, cutover and go-live
- Ongoing coordination and reporting for FHWA – Local and National

DATAVIEW**2013 – 2015****Senior Consultant****Advantage ERP Cost Accounting and Cost Allocation Team Lead**

- Project/Grant/Cost Accounting Expertise for DATAVIEW Advantage Financial

Governor's Office of Information Technology**2010 - 2013****Information Technology Director for Office of the Governor, Colorado Department of Transportation (CDOT), and Office of Economic Development and History Colorado**

- Provide IT leadership for technology-based strategic and operational direction to CDOT and History Colorado

Colorado Department of Transportation**2006 - 2010****ERP Program Manager**

- Manage the SAP Technical Support Team including:
 - System Administration
 - Functional Configuration
 - Training
 - Development
 - Business Intelligence
- Manage multi-million budget for personal services, operating and capital
- Provide recommendations, requests and updates regarding the SAP program to CDOT's CIO and the SAP Executive Steering Committee
- Oversee project management activities for the SAP Program
- Manage procurement activities for the SAP Program
- Manage organizational relationships, expectations and agreements for CDOT's business divisions

Manage relationships, communication, and coordination with CDOT's other Information Technology functional groups to ensure a reliable and updated technical environment

Viking Solutions**2001 - 2006****Consultant Owner****CDOT ERP Implementation****2005 – 2006**

- Federal Aid Billing (FAB) Lead for the implementation of a customized SAP solution timed and executed to fit into the overall ERP implementation project timeline.
- Thorough understanding of SAP functionality required for Federal Aid Billing, including but not limited to FI/CO, Project Systems (PS), Budget Management and the custom solution built specifically for CDOT

CDOT ERP Implementation**2003 - 2005**

Participated in researching and writing the Request for Proposal (RFP) for ERP software packages. Evaluated RFP submittals and as part of the selection team, provided feedback on all submittals and made recommendations on the most qualified package.

CDOT IT Strategy Development**2001 - 2003****AT&T Broadband, Englewood, CO 2000 - 2001****Senior Web Project Manager****Colorado Department of Transportation 1987– 2000****Webmaster 1998 - 2000****Programmer / Analyst 1990 – 1998****Highway Engineer 1987 - 1990**

Sanjeev Musafir

609-008-6638

sanjeev.musafir@dataview.com

Summary of Qualifications

Sanjeev Musafir has more than 22 years of experience as a technical architect and software product development. Before founding Dataview, Sanjeev worked for 17 years at DATAVIEW implementing ERP solutions for large public sector clients including the City of New York and the State of West Virginia. Sanjeev has a proven record of success in building and leading software development teams, directing software deployment, managing architecture design and product development.

Sanjeev has an MS in Computer Science from the University of Iowa and an MBA from Dartmouth with focus on general management and entrepreneurship.

Professional Experience

Dataview Consulting, Co-Founder and Partner

2014 – Present

State of West Virginia, WVDOT Solutions Architect 2019-Present

- Lead design and development of HUB Application framework
- Work with business team to create product architecture
- Manage application performance tuning and identified bottlenecks
- Mentor junior developers and assisted in code reviews

State of West Virginia wvOASIS Advantage ERP Project Consultant/Technical Architect 2015 – Present

- Define nightly cycle jobs and dependencies
- Manage Advantage ERP Financial, HRM and Payroll Nightly Cycles
- Assist in Advantage ERP 3.9 build process and configuration management
- Assist System Administrators in performance tuning for applications, databases and servers
- Work with Functional teams in troubleshooting and logging production defects
- Support and customize BIRT Forms and BIRT Server configuration
- Assist Advantage 3.11 upgrade team in Software installation, configuration and testing
- Assist State technical team in reviewing deployment technical architecture and infrastructure design

State of Alabama STAARS Managed Services Consultant/Technical Architect August 2017 – Present

- Provide support to Operational teams in researching issues and ERP architecture guidance
- Scripting of Nightly cycle jobs and batch scripts
- Assist system administrators in monitoring and researching performance issues

DATAVIEW Inc, New York City, New York
2014**2007 –****State of West Virginia**
wvOASIS Advantage ERP Project
Technical Manager
2011 – 2014

- Technical lead for RFP Response, Proposal Orals and Negotiations for a \$100m Statewide ERP implementation for the State of West Virginia.
- Managed technical architects in reviewing RFP requirements and creating solution architecture.
- Worked with 3rd Party Hardware and Software vendors for cost effective and timely procurement.
- Responsible for managing onsite technical team to deploy project on schedule and within budget.

City of New York,
FMS/3 Project
Technical Infrastructure Lead
2007 – 2010

- Technical Lead for multi-year, \$75m web-based financial management and budgetary control system implementation for City of New York (DATAVIEW's largest-ever project). Provide technical management, software and hardware architecture, deployment, requirements determination, technology evaluation and selection, procurement, staffing, and post-delivery support.
- Recruited and trained 25-person offshore team and 15-person onshore team on schedule, avoiding \$2M in potential financial penalties.
- Developed 2-year production capacity plan and led procurement of >\$10M in hardware/software.
- Improved system performance 20% through performance tuning.
- Saved \$100,000 and 20% under budget overall through utilization of open source tools.
- Reduced defects to less than 5% through best practices and development standards.
- Enhanced productivity by identifying and eliminating performance bottlenecks to meet SLAs.

American Management Systems, Fairfax, VA**1997– 2004****Advantage ERP Product Engineering Team**
Technical Architect/Development Manager
1999-2004

- Development, design, and deployment Advantage 3.x ERP Product.
- Recruited and trained infrastructure team responsible for development, implementation, system administration, and support.
- Selected to lead product's first implementation for Massachusetts Comptroller's Office. Directed 2-year project valued at \$60M, Supervised onsite product architects and system administrators. Effectively met all deployment and configuration goals.
- Facilitated >\$100M in new contracts with clients, based on success of MA Comptroller project.
- Technical Manager for beta implementation of first-ever web-based administrative system for county government.

Illinois Dept. of Human Services
Consolidated Accounting & Reporting System
Development Manager
1997-1999

- Directed team of 15 developers in modifying Illinois Dept. of Human Services Consolidated Accounting & Reporting System.

Identified needs and developed solutions.

Education

MBA in Business & Entrepreneurship, Tuck School of Business at Dartmouth, Hanover, NH
MS in Computer Science, University of Iowa, Iowa City, IA
BE in Electronics & Communications, Regional Engineering College, Tiruchirapalli, India

Mohsine Badre

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Summary of Qualifications

With more than 25 years in the Information Technology industry, Mo has a wide range of experience in system analysis, design, development, and implementation of both custom and package-based systems for state and local government. For the Past 10 years Mo has focused on implementing and upgrading infoAdvantage from release 3.5 through release 3.9 he has also upgraded SAP Business Objects from version 6.5 to BO XI R2, BO XI R2 to BO XI R3.1. He has supported the infoAdvantage team in upgrading to BO XI R4. His functional experience includes Advantage Financial, Advantage HRM/Payroll, Advantage Budgeting, and infoAdvantage. His technical experience includes application development, application architecture, Data Integration, Data Warehouse, and Business Intelligence. Mo has experience with Oracle, DB2, SQL Server, .Net, MS Power BI, SAP BI Tools, COBOL, C++, MS Office, MS BI Tools, Windows, and UNIX.

Professional Experience

Dataview, Charleston WV

Co-Founder and Partner

12/2013 – Present

wvWVDOT – HUB Application

Mo Serves as the BI Lead and solutions architect for the Capital Project Management System HUB application. Mo's responsibilities include Integration of Microsoft Power BI with HUB application, Integration with the State of West Virginia ERP system to reflect actuals and payroll expenditures in

the HUB data warehouse. In addition to the BI responsibilities, Mo serves as application solution architect and draws expertise from previous engagement with NYC to implement a custom Capital Project Management System.

wvOASIS – ERP System

Mo serves as BI Lead, data integration lead, and client facing lead for DataView for the wvOASIS ERP project for the State of West Virginia. Responsibilities include BI technical lead for Advantage Financial, Advantage HRM/Payroll, Advantage Budgeting, Kronos, and AgileAsset applications. Additional responsibilities include Customization to the Advantage applications and ad-hoc support for data conversion and data integration between legacy systems and wvOASIS applications.

DATAVIEW, New York, NY

Director Consulting Services

3/1997 – 11/2013

Business Intelligence Team Lead, DATAVIEW, Financial Management System (FMS), Financial Information Services Agency (FISA), City of New York, (January 2008 – October 2011)

- FMS is an AMS Advantage Financial 3.x upgrade of the City's current AMS Financial 2.x solution, which supported all aspects of the City's financial management operations for accounting, budgeting, capital projects, vendor information, contracts, procurement, and expenditures.
- Mr. Badre managed a large team of more than 30 members to design and develop a reporting solution based on the AMS infoAdvantage (baseline offering solution).
- He oversaw the design and development of ETL using Pervasive Data Integrator PDI. Worked directly with the infoAdvantage architect to significantly improve performance and switch some ETL components from PDI to JAVA by leveraging the existing infoAdvantage JAVA framework.
- Worked directly with the functional team lead to improve the infoAdvantage functional universes and developed new custom universes to improve performance.
- He also oversaw the design and development of over 300 reports using Business Objects Enterprise BO XI R3.1.
- Mr. Badre coordinated the development effort with and provided support to our Off-Shore India team.
- He managed the design, development, and implementation of a custom solution to integrate security roles from multiple applications into the business object application. Implemented row level security based on multiple attributes using 'OR' operator which is not supported by BOE.
- Implemented a nightly cycle solution to execute BOE publications and distribute the reports to destinations within BOE.
- Prototyped a flexible solution to deliver personalized and complete publications based on security requirements not supported by BOE.
- Mr. Badre worked directly with Client's DBA to develop a strategy for table space, indices, and database reorg.

Reporting Team Lead, DATAVIEW, VENDEX Replacement Project, City of New York - Mayor's Office of

Contract Services (MOCS), (February 2006 – January 2008)

- The FMS/3 project is an ADVANTAGE 3 Financial upgrade. The Mayor's Office of Contract Services (MOCS) is one of the main client stakeholders for the FMS/3 project. The MOCS project includes replacement of their current VENDEX legacy system, implementation of a Vendor Portal, and an end-to-end Procurement workflow initiative. The new VENDEX will be based off Advantage 3 Financial architecture and document structure, as well as heavily utilizing Vendor Management and Performance Evaluation modules.
- Mr. Badre successfully managed and led a team of business analysts and developers to design and develop an Oracle data warehouse, a PL SQL Extract, Transform, and Load (ETL), and 150 reports based on Business Objects XI R2. Mr. Badre also provided support to the Conversion and interface teams to bridge the gap between the functional and technical requirements. As a senior member of the VENDEX team, Mr. Badre also provided support to the application team by reviewing the requirements and designs and making sure that they are met by the application.

Business Analyst, DATAVIEW, NYC Serv, City of New York, Department of Finance (DOF) – (November 2002 – May 2004)

- In the fall of 2002, DATAVIEW-AMS was asked by the Department of Finance to perform a transition study for the NYC Serv system. As part of this study, DATAVIEW-AMS was asked to determine the steps necessary to transition NYC Serv operation and maintenance responsibilities from the Department of Finance's (DOF's) current development contractor, International Business Machines Company (IBM), to DATAVIEW-AMS. In January 2003,

DATAVIEW-AMS began taking maintenance and operational responsibility for components of the NYC Serv system. NYC Serv is an application which allows citizens to consolidate their dealings with the City, provides a unified front end for revenue collections and integrates numerous City legacy systems.

- Mr. Badre managed the deployment of hardware and adjudication applications to five payment centers. He ensured that all computers, peripherals, and applications were deployed correctly. He also conducted tests in each payment center prior to the live dates and provided support and training to judges throughout all five centers.

Programmer Analyst, Business Analyst, Application Architect, DATAVIEW, Financial Management System (FMS), City of New York – Financial Information Services Agency (FISA), (June 1997 – October 2002)

- In 1997, the City of New York engaged DATAVIEW-AMS to implement its next generation Financial Management System (FMS). FMS is an enterprise-wide application developed to support all aspects of the City's financial management operations for accounting, budgeting, capital projects, vendor information, contracts, procurement, and expenditures. The main client stakeholders are FISA, which houses the system, Office of the Comptroller, Office of Management and Budget (OMB), and the Mayor's Office of Contracts. FMS is used by 4,000 persons Citywide and manages the financial activities of a \$65-billion-dollar budget.
- The FMS application is a highly customized business solution developed on the ADVANTAGE Financial 2.0 platform. DATAVIEW-AMS, acting as the systems integrator, oversaw all elements of this very large-scale deployment effort, including: application design, customization and maintenance, installation of a new computing infrastructure (data center, City-wide TCP/IP network, desktop computing assets), user implementation support (business change readiness, training, problem resolution), and third-party tool integration.
- Mr. Badre joined the conversion team as a business analyst and programmer analyst. His responsibilities were as follows:
 - He led a team of developers for the Capital Fund Budget.
 - Conducted meetings with key senior client managers at the Office of Management and Budget OMB to gather requirements.
 - Mr. Badre created design documents and conducted review meetings with the client.
 - He also created technical designs and directly oversaw the development and testing of each Capital Fund Budget process.
 - Supported the application team in testing the FMS application with real data.
 - Mr. Badre assisted the client in testing the new application as part of their User Acceptance Testing UAT.
 - Developed reconciliation processes to reconcile data between the new system and the legacy system.
- Mr. Badre also joined the application architect team and his responsibilities were as follows:
 - He managed all modifications to the Capital Fund Budget sub-system. He reviewed the new business requirements and their impact on the application.
 - Conducted meetings with the business owners and gathered their requirements.
 - He created functional and technical designs as well as application impact-analysis documents for new modification.
 - Coded complex mods and worked with developers to review the technical designs and their development.
 - Trained the client's application architect team in the major components of Capital Fund Budget.

- Developed a reconciliation/data integration process for the Capital Fund Budget sub-system.

**Programmer/Analyst, DATAVIEW-AMS, ADVANTAGE Financial, Suffolk County, NY
(March 1997 – June 1997)**

- DATAVIEW-AMS implemented a client/server financial system, ADVANTAGE Financial for Suffolk County, Suffolk County Community College, and the Suffolk County Department of Public Works.
- Mr. Badre was responsible for developing and unit testing batch processes using COBOL, UNIX, and Sybase.

Education

Bachelors in Environmental Engineering, Institute of Applied technologies, Rabat Morocco

Bachelors of Business Administration, Computer Information Systems, Bernard Baruch College, (City University of New York), New York, NY

Timothy Stutes

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Summary of Qualifications

Mr. Stutes has more than 25 years of experience in the field of information system services. Nearly all his experience has been involved with the team leadership, definition, design, development, and implementation of government software projects relating to ERP Accounting and HRM. Mr. Stutes has successfully served in technical analysis and development, technical lead, and business analysis roles.

Professional Experience

DATAVIEW CONSULTING

MARCH 2020-PRESENT

wwVVDOT – HUB Application

Mr. Stutes serves as the Data Conversion and Interfaces Lead for the HUB DOT application development project.

Mr. Stutes' responsibilities include design, development and implementation of data conversion routines and artifacts in coordination with client and Dataview SMEs in an agile environment. Artifacts produced include SQL scripts, SSDT packages to perform ETL and migrate legacy data from disparate sources into HUB. Mr. Stutes is also responsible for planning all mock conversion as well as production cutover activity.

Mr. Stutes also leads Integration of HUB application with Federal FMIS and State of West Virginia ERP system via batch interfaces using SQL Server SSDT packages.

DATAVIEW, INC. 2019

JUNE 1995 – NOV

wwOASIS Upgrade, State of West Virginia – 10/18 TO 11/19

As a SME in the area of interfaces on wwOASIS Upgrade, Mr. Stutes was responsible for analysis and modifications to adapt all HRM production interfaces to comply with 3.11 DATAVIEW ADVANTAGE HRM release

wwOASIS Phase E, State of West Virginia Division of Highways – 07/17 TO 10/18

As Data Conversion Lead on wwOASIS Phase E, Mr. Stutes was responsible for systems analysis, design, development, and implementation of all Data Conversion artifacts. He coordinated responsibilities with DATAVIEW/State project managements and other team leads (e.g. Application, Conversion, Interface and Enterprise Readiness teams .

Multiple clients, ADVANTAGE 360 SaaS – 08/16 TO 07/17

As a SME in the area on interfaces and data conversion, Mr. Stutes designed and coded interfaces and conversion processes, including all common functions (DB connect, SQL lookup, properties file lookups). He also designed and developed the HRM/Payroll extract process to create files in support of all HRM interfaces.

SIGMA, State of Michigan – 07/14 TO 7/16

As Data Conversion Lead on SIGMA, Mr. Stutes was responsible for a distributed functional / technical team of 10+ members to perform systems analysis, design, development, and implementation of all Data Conversion artifacts. He coordinated responsibilities with DATAVIEW/State project management and other functional and technical team leads (e.g. Application, Conversion, Interface and Enterprise Readiness teams), and directly oversaw a team of five system consultants.

wvOASIS Phases A - D, State of West Virginia – 12/11 TO 7/14

As Data Conversion Lead on wvOASIS, Mr. Stutes was responsible for training and managing a distributed functional / technical team of 10+ members to perform systems analysis, design, development, and implementation of all Data Conversion artifacts. He coordinated responsibilities with DATAVIEW/State project management and other functional and technical team leads (e.g. Application, Conversion, Interface and Enterprise Readiness teams), and directly oversaw a team of eight system consultants.

PIMACORE, Pima County, Arizona – 09/10 TO 12/11

At PIMACORE, Mr. Stutes served as a Subject Matter Expert in the area of conversion and interfaces to ADVANTAGE Financial using Pervasive Data Integrator, batch scripts, and custom Java. Mr. Stutes designed and coded interfaces and conversion processes, including all common functions (DB connect, SQL lookup, properties file lookups). Conversions included all of Accounts Receivable, Procurement, and Vendor conversions from several legacy sources and formats (Oracle, excel, flat files). The interfaces included input / output to the client's other third party applications as well as interfaces between Advantage Financial & HRM to / from Advantage Performance Budgeting.

CALTRANS, California Department of Transportation, State of California – 01/10 TO 10/10

At CALTRANS, Mr. Stutes served as a Subject Matter Expert in the area of conversion. He designed and coded conversion processes, including all common functions (DB connect, SQL lookup, properties file lookups).

CMIPS II, California Department of Social Services, State of California – 10/09 TO 01/10

At CMIPS II, Mr. Stutes served as a Subject Matter Expert in the area of conversion to ADVANTAGE HR using Pervasive Data Integrator. Mr. Stutes designed and coded the most complex of the conversion processes, including all common functions (DB connect, SQL lookup, properties file lookups) and the entire batch framework. He also was the approver for Pervasive conversion maps coded by other developers.

ADVANTAGE 3 Financial Upgrade, County of Volusia, Florida – 02/09 TO 10/09

At County of Volusia, Mr. Stutes was responsible for the development of 15+ inbound interfaces into ADVANTAGE Financial 3.7.0.2.. Along with producing documents in ADVANTAGE-ready xml, the PDI maps also produced reports with control breaks and summary totals to be used by County accounting staff to verify the completeness and accuracy of the interface loads. Mr. Stutes's functional knowledge of ADVANTAGE and expertise with PDI resulted in project staff asking Mr. Stutes to take over the struggling ADVANTAGE 2x to 3x data conversion effort. Volusia County had several atypical conversion requests, requiring substantial changes to baseline PDI maps, as well as several new maps. He completed the analysis, design, and development of these maps, and executed the initial phases of the conversion plan into Production, with zero issues directly related to conversion.

TEMPO Upgrade, Department of Environmental Quality, State of Louisiana – 09/07 TO 07/08

Mr. Stutes designed, built and tested PowerBuilder code for the TEMPO product that followed all team coding and testing standards.

DIESEL Retrofit, Department of Environmental Quality, State of New Jersey – 04/07 TO 11/07

Mr. Stutes was responsible for the development of several Microsoft Excel templates for the reporting of vehicle inventories to the department. During the course of the project, these templates grew to become mini-applications. Mr. Stutes was able to resolve every technical challenge thrown at him, resolve reported issues quickly and establish a working relationship with the client within a limited amount of time. Mr. Stutes also developed several custom java classes to parse xml files that contained instructions to import the Microsoft Excel spreadsheet data into the RSP application.

Advantage 3.0 Upgrade, City of Austin, Austin, Texas – 08/04 TO 03/06

Mr. Stutes served the City of Austin's ADVANTAGE 3 project from its start through its live date. Mr. Stutes served as the conversion team lead and lead technical. As conversion lead, he coordinated the highly-customized effort to convert the City's accounting tables and ledgers from its existing application(s) into the ADVANTAGE product's schema. He designed, coded, and executed the conversion plan, developed custom conversion utilities, and planned, coded, and executed conversion reporting. Mr. Stutes also designed, coded, and implemented several java and Versata modifications to the ADVANTAGE Financial software. Mr. Stutes also supported installation of all software components associated with the ADVANTAGE paradigm.

Advantage 3.0 Upgrade, City of Cincinnati, Cincinnati, Ohio – 03/03 TO 08/04

Mr. Stutes served as the functional lead in the Accounts Receivable, Fixed Assets, Security and Workflow areas. He also designed modifications to the ADVANTAGE 3 application, and worked with the client to reengineer business processes, as appropriate. Mr. Stutes also served as the Conversion lead, coordinating the effort to convert the City's accounting tables and ledgers from its existing application(s) into the ADVANTAGE product's schema. The conversion effort involved development using the Data Junction ETL toolkit as well as custom Java conversion utilities. Mr. Stutes also served as the Technical / Implementation lead, coding and testing modifications to the ADVANTAGE application.

Internal Project, ADVANTAGE 3.0 Development, DATAVIEW– 08/99 TO 11/00

Mr. Stutes joined the ADVANTAGE 3.0 internal project at its inception in September 1999 as a functional analyst on the Accounts Receivable team. While on that team, he co-authored two of the most complex

functional designs within the AR subsystem (Cash Receipts & Billing). When the development effort started, Mr. Stutes was named as the Accounts Receivable development team leader. He managed a team of eight programmer / analysts -- three full time AMS developers as well as a team of five full time contract developers. In addition to management responsibilities, Mr. Stutes authored the more complicated AR technical designs, and did Versata and custom Java development

Education

MBA., Louisiana State University, Management Information Systems

B.Sc., University of Southwestern Louisiana, Management

Chad Alford

Summary of Qualifications

Senior IT consultant with strong technical background with proven record of client success. Chad has over (17) years of information technology experience and nine (11) years of consulting experience helping public sector clients providing a wide array of services. His background ranges from performance management, security, infrastructure management, software design, business process improvement, change management, and process automation.

Professional Experience

State of West Virginia, WVDOT
Consultant / Infrastructure and Change Management Lead
2019-Present

Mr. Alford serves as the Infrastructure and Change Management lead for the Capital Project Management System HUB application.

Mr. Alford's responsibilities include working with the OASIS technical team to customize and optimize the Capital Project Management System deployment to meet the client's security, change management, and Disaster and Recovery processes.

State of Alabama
STAARS Managed Services
Consultant / Infrastructure Lead
August 2017 – Present

- Oversee project infrastructure for state-wide ERP solution ensuring storage, servers, databases and networking are operational and appropriately maintained.
- Work with project team and client technical teams to meet changing requirements, migrations and upgrades.

State of West Virginia
WV OASIS Advantage ERP Project
Consultant/Lead Infrastructure Engineer
2012 – 2019

- Create sizing, licensing and capacity planning models for project and propose infrastructure solutions.
- Oversee implementation of new infrastructure from planning to successful disaster recovery testing certification.
- Coordinate delivery and implementation of third-party services.
- Lead hardware and software upgrades.
- Provide support to application teams.
- Help configure single sign-on integration between applications.

- Provide deployment administration and support for (System Test, Training, UAT & Production) environments.
- Work with Oracle professional services and client to implement Oracle Advanced Security features to meet auditing and regulatory compliance (Oracle Encryption, Oracle DB Firewall, Oracle AuditVault, Oracle Database Vault) for ERP applications.
- Oversee routine testing of DR/COOP solution, document test outcomes and review findings with project leadership
- Implement numerous automation processes to reduce workload and maximize reliability of routine processes.
- Train and mentor team members

• **Performance Management Specialist**, Charleston, WV (8/11 – 9/12) – Assigned to Hewlett-Packard's Enterprise Services group providing full stack management for U.S. Department of the Treasury, World Bank, U.S. Department of Housing and Urban Development in ITIL/ISO environments. Provide performance monitoring and automation services, leading tiger teams to resolve critical issues.

• **Database and Storage Admin**, Charleston, WV (5/10 – 7/11) – Provide Database and storage administration services for platforms that are critical to North American operations revenue stream as well as administration and support systems that affect users globally (time & attendance, payroll, auditing).

• **Senior Developer**, Charleston, WV (11/08 – 3/10) – Assigned to the State of West Virginia working at the client's site overseeing technical projects and systems. Provide development and project management services to ensure desktop and web application deliverables are on-time and meet state and federal requirements.

• **Data Engineer**, Fairmont, WV (12/07 -12/08) – Assigned to the DoD NG-ABIS national security biometrics project. Developed and rolled out a new biometrics platform used in military base security, terrorist tracking, and as a DoD forensics repository. This system processes biometric identification requests for soldiers in the field, cross-checking across multiple government biometrics systems. Provide Database and storage administration, security, and performance resolution services.

• **Lead Database and Storage Admin**, Charleston, WV (2006 – 12/07) – In charge of all data tier operations for Ticketmaster contact centers supporting 40+ applications, 200+ databases, and 4 data centers. Operations affect users in six countries and across four companies.

Security Clearances Issued

2011 U.S. Department of the Treasury - Public Trust

2011 U.S. Department of Housing and Urban Development - Public Trust

2008 U.S. Department of Justice – Secret, Top Secret

2008 U.S. Department of Defense - Secret, Top Secret

Education

West Virginia University Institute of Technology, BS Computer Science

6.5 STAFFING CHANGES

Staffing Changes

No change may be made in the staffing of the Right-of-Way, Utility Relocation and Railroad Agreement project without the prior approval of the WVDOT. Throughout the term of the Contract resulting from this RFP, the Vendor shall:

- Provide qualified personnel to perform all Services required in this RFP;
- Promptly remove and replace personnel at the request of the WVDOT; and
- Provide written notice and seek WVDOT approval of any plan to add, remove and replace personnel.

Dataview has proposed a team based on the current expected project timelines and projected staff availability. In case of any extenuating circumstances, Dataview will consult with WVDOT to implement any staff changes and will adhere to the guidelines put forward by WVDOT for any staffing updates. Dataview already has a relationship with WVDOT since 2015 and has successfully met all of the staffing requirements without endangering any deadlines. We are very confident that we will be able to staff this project throughout its timeline.

Tab 7 – Vendor’s Proposed Plan for Providing Services

7 TIMELINE AND IMPLEMENTATION PHASING APPROACH

Timeline and Implementation Phasing Approach

The Vendor shall describe its proposed implementation timing and phasing approach and include a phasing schedule and timeline which outlines their project plan and detailed staffing. It should be based on the Vendor's experience with the solution being proposed and provide the WVDOT with the best balance of cost and risk for the implementation of the VPS. The Vendor should also provide a thorough explanation of its rationale to support its proposed phasing. Related cost information should be presented in the Cost Proposal and shall not be included in the Technical Proposal.

Any required clarifications regarding the phasing or timelines should be addressed during the Discussion and Best and Final Offer process.

The description provided should include the following information for each module:

- Implementation timeframes;
- Milestones and implementation phasing (if any);
- Deliverables with planned approval date and mapped in the work plan; and
- Any software upgrades that should occur during the project.

7.1 IMPLEMENTATION TIMEFRAMES

Dataview will take a phased approach to project implementation for the WV DOT ROW Module. We are proposing to break down the work in to four high-level phases (Foundations, Development, Cutover, and Post-Implementation) and 3 major product releases (Release 1, 2, and 3).

Each release will correspond to the priorities as listed in the WV DOT ROW System RFP. Release 1 will address all priority 1 requirements, Release 2 will address all priority 2 requirements, and Release 3 will address all priority 3 requirements. Not all phases will be required for each release as indicated below.

- Foundations (Release 1 only)
- Development (Releases 1, 2, and 3)
- Cutover (Release 1 only)
- Post Implementation (Following Release 1)

7.1.1 Implementation Options

Dataview is proposing two implementation timeframes.

7.1.1.1 Implementation Option 1:

Implementation Option 1 has all 3 releases ending by 12/31/2022. Post Implementation support will begin immediately after Release 1 and extend 6 months after the final release until 6/30/2023. This option assumes a larger Dataview staff than what is needed for Option 2 will be approved to work on this project to meet the shorter timeframe.

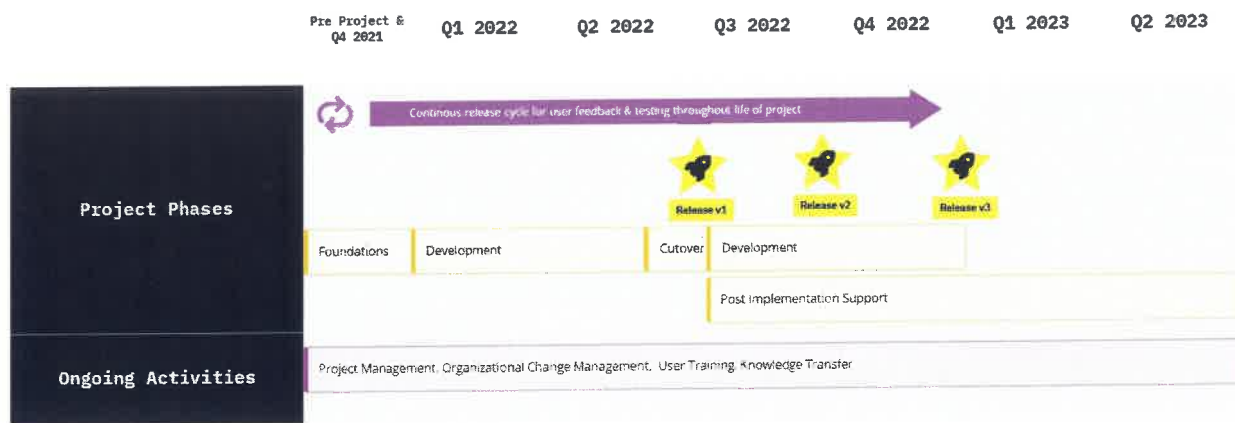


Figure 4 Option 1 Timeline and Implementation Phasing Approach

Release	Phase	Start Date	End Date
Release 1	Foundations	11/01/2021	12/31/2021
	Development	01/01/2022	06/15/2022
	Cutover	06/16/2022	06/30/2022
Release 2	Development	7/01/2022	09/30/2022
Release 3	Development	10/01/2022	12/31/2022
Post Implementation	Post Implementation	06/30/2022	6/30/2023

7.1.1.2 Implementation Option 2:

Implementation Option 2 has all 3 releases ending on 03/31/2023. Post Implementation support will begin immediately after Release 1 and extend 6 months after the final release until 09/30/2023. This option assumes a smaller Dataview staff than what is needed for Option 1 will be approved to work on this project to meet the longer timeframe.

Release	Phase	Start Date	End Date
Release 1	Foundations	11/01/2021	12/31/2021
	Development	01/01/2022	09/15/2022
	Cutover	09/16/2022	09/30/2022
Release 2	Development	10/01/2022	12/31/2022
Release 3	Development	01/01/2023	03/31/2023
Post Implementation	Post Implementation	09/30/2022	9/30/2023

7.1.2 Phase Descriptions

7.1.3 Foundations

The duration of the Foundations phase is intended to only last a few weeks. During this phase, emphasis will be made by Dataview to build relationships with WVDOT stakeholders, establish logistics for delivery team access to onsite State resources, prepare the supporting environment for the project, conduct collaborative workshops to understand needs, adjust the high-level release plan, create the initial product backlog, and create the Sprint 1 plan. Additionally, communication plans will be formalized, and key stakeholders identified.

7.1.4 Development

During the Development phase, work is planned and delivered in small, incremental, iterations, called 'sprints'. We anticipate that these sprints will be 2-weeks in duration. In a sprint, we complete all stages of the software development lifecycle (SDLC). This includes defining the requirements, designing, developing (coding), testing, and deploying the application to the standards of the projects. The primary outcome of every sprint is a piece of working software. This software is delivered at much more rapid pace than more traditional approaches and can be release immediately for User Acceptance Testing. These sprints are staggered and repeat as dictated by the project schedule. Each sprint is an incremental delivery. The outcome of the Development Phase is a production ready release.

7.1.5 Cutover

The cutover phase is intended to prepare tasks needed for production environment cutover. Specific activities in this phase are dictated by the needs of the project but can include:

- Performance Testing – Conduct automated tests to confirm that the application meets the predicted workload requirements.
- Setup Security – Enable any integration with existing Active Directories and County Portal if necessary.
- Perform Data Cleansing and Production Conversion
- Perform Mock Conversions – Rehearse cutover to confirm cutover tasks & responsibilities and timelines.
- Conduct Readiness Assessment – Review the mock conversion results to identify process improvements.
- Decide if the software, the sites, and the users are ready for the application to be deployed
- Install Production Environments
- Live Production Operations (Go-Live!)

7.1.6 Post Implementation

The goal of the Post Implementation phase is to maintain the solution and facilitate knowledge transfer and hand-off support functions to the State.

Specific activities in this phase are dictated by the needs of the project but can include:

- Perform tuning activities such as bug fixing, enhancements for performance and usability
- Assess the deployment against the complete vision and identify any gaps
- Achieve stakeholder concurrence that solution is consistent with the product vision
- Achieve user self-supportability

- Manage and Maintain the Production Support Responsibilities while the transfer of the System Administration Responsibilities to the Client is in progress
- Conduct a Lessons Learned Review

7.2 MILESTONES AND IMPLEMENTATION PHASING (IF ANY)

Dataview expects Major Milestones to correspond with Phase Conclusion and Major Release completion and deliverable acceptance. Minor Milestones will be indicated by priority feature completion and user acceptance.

A list of milestones is listed below:

7.2.1 Release 1 Milestones

7.2.1.1 Major Milestones (Phase & Release Completion):

- Foundations Phase Completed
- Development Completed
- Cutover Completed

7.2.1.2 Minor Milestones (Feature Delivery)

7.2.1.2.1 Priority 1: Right-of-Way Feature Delivery

- Project Information
- Parcel Information
- GIS Viewer Functionality
- Appraisals
- Acquisition – Negotiation
- Relocation
- Legal Condemnation
- Acquisition & Relocation Payments
- Contract Management
- Property Management
- Administration Payment
- Contractor Payments
- Workflow Lifecycle Configuration
- Letter Generation & Form Configuration
- Dashboards & Reporting Configuration
- Data Maintenance & Administration
- Security & Audit Logging Configuration
- User Interface (Mobile Optimized)
- In Application Help & User Documentation
- Priority 1 Integrations (Integrations (HUB Project Management Module, wvOASIS Advantage Fixed Assets, Transportation Asset Inventory, ProjectWise, BRIM, ESRI GIS, Facilities Management, wvOASIS: Accounts Payable, General Ledger, HR Management, Procurement)

7.2.1.2.2 Priority 1: Utility Relocation & Railroad Feature Delivery

- Project Information
- Agreements

- Relocation Activities
- Workflow Lifecycle Configuration
- Letter Generation & Form Configuration
- Dashboards & Reporting Configuration
- Data Maintenance & Administration
- Security & Audit Logging Configuration
- User Interface (Mobile Optimized)
- In Application Help & User Documentation
- Priority 1 Integrations (Integrations (HUB Project Management Module, wvOASIS Advantage Fixed Assets, Transportation Asset Inventory, ProjectWise, BRIM, ESRI GIS, Facilities Management, wvOASIS: Accounts Payable, General Ledger, HR Management, Procurement)

7.2.1.2.3 Legacy Data Conversion

- Data Conversion Documentation

7.2.1.2.4 Technical Architecture

- Technical Documentation
- Job Scheduling & Processing
- Networking & Database Architecture
- Reliability, Supportability, Performance, Business Continuity Processes, Design & Supporting Architecture

7.2.2 Release 2 Milestones

7.2.2.1 Major Milestones (Phase & Release Completion):

- Development Completed

7.2.2.2 Minor Milestones (Feature Delivery)

7.2.2.2.1 Priority 2: Right-of-Way Feature Delivery

- Project Information
- Parcel Information
- GIS Viewer Functionality
- Appraisals
- Acquisition – Negotiation
- Relocation
- Legal Condemnation
- Acquisition & Relocation Payments
- Contract Management
- Property Management
- Administration Payment
- Contractor Payments
- Workflow Lifecycle Configuration
- Letter Generation & Form Configuration
- Dashboards & Reporting Configuration
- Data Maintenance & Administration
- Security & Audit Logging Configuration
- User Interface (Mobile Optimized)

- In Application Help & User Documentation
- Priority 1 Integrations (Integrations (HUB Project Management Module, wvOASIS Advantage Fixed Assets, Transportation Asset Inventory, ProjectWise, BRIM, ESRI GIS, Facilities Management, wvOASIS: Accounts Payable, General Ledger, HR Management, Procurement)

7.2.2.2.2 Priority 2: Utility Relocation & Railroad Feature Delivery

- Project Information
- Agreements
- Relocation Activities
- Workflow Lifecycle Configuration
- Letter Generation & Form Configuration
- Dashboards & Reporting Configuration
- Data Maintenance & Administration
- Security & Audit Logging Configuration
- User Interface (Mobile Optimized)
- In Application Help & User Documentation
- Priority 1 Integrations (Integrations (HUB Project Management Module, wvOASIS Advantage Fixed Assets, Transportation Asset Inventory, ProjectWise, BRIM, ESRI GIS, Facilities Management, wvOASIS: Accounts Payable, General Ledger, HR Management, Procurement)
- Technical Architecture
- Technical Documentation
- Job Scheduling & Processing
- Networking & Database Architecture
- Reliability, Supportability, Performance, Business Continuity Processes, Design & Supporting Architecture

7.2.3 Release 3 Milestones

7.2.3.1 Major Milestones (Phase & Release Completion):

- Development Completed

7.2.3.2 Minor Milestones (Feature Delivery)

7.2.3.2.1 Priority 3: Right-of-Way Feature Delivery

- Project Information
- Parcel Information
- GIS Viewer Functionality
- Appraisals
- Acquisition – Negotiation
- Relocation
- Legal Condemnation
- Acquisition & Relocation Payments
- Contract Management
- Property Management
- Administration Payment
- Contractor Payments

- Workflow Lifecycle Configuration
- Letter Generation & Form Configuration
- Dashboards & Reporting Configuration
- Data Maintenance & Administration
- Security & Audit Logging Configuration
- User Interface (Mobile Optimized)
- In Application Help & User Documentation
- Priority 1 Integrations (Integrations (HUB Project Management Module, wvOASIS Advantage Fixed Assets, Transportation Asset Inventory, ProjectWise, BRIM, ESRI GIS, Facilities Management, wvOASIS: Accounts Payable, General Ledger, HR Management, Procurement)

7.2.3.2.2 Priority 3: Utility Relocation & Railroad Feature Delivery

- Project Information
- Agreements
- Relocation Activities
- Workflow Lifecycle Configuration
- Letter Generation & Form Configuration
- Dashboards & Reporting Configuration
- Data Maintenance & Administration
- Security & Audit Logging Configuration
- User Interface (Mobile Optimized)
- In Application Help & User Documentation
- Priority 1 Integrations (Integrations (HUB Project Management Module, wvOASIS Advantage Fixed Assets, Transportation Asset Inventory, ProjectWise, BRIM, ESRI GIS, Facilities Management, wvOASIS: Accounts Payable, General Ledger, HR Management, Procurement)

7.2.3.2.3 Technical Architecture

- Technical Documentation
- Job Scheduling & Processing
- Networking & Database Architecture
- Reliability, Supportability, Performance, Business Continuity Processes, Design & Supporting Architecture

7.3 DELIVERABLES WITH PLANNED APPROVAL DATE AND MAPPED IN THE WORK PLAN

Dataview expects Major Milestones to correspond with Phase Conclusion and Major Release completion and deliverable acceptance. Each phase is listed below with the expected deliverables and end dates for each implementation option.

Release	Phase	Option 1 End Date	Option 2 End Date
Release 1	Foundations	12/31/2021	12/31/2021
	Development	06/15/2022	09/15/2022
	Cutover	06/30/2022	09/30/2022
Release 2	Development	09/30/2022	12/31/2022
Release 3	Development	12/31/2022	03/31/2023
Post Implementation	Post Implementation	6/30/2023	9/30/2023

Foundations

The Foundations phase will conclude with the following deliverables:

- Initial Technical Environment Design with staged timing and scalability consideration
- Technical Environment Installation and Set-up
- Installed Application Software
- Installed Pre-Populated "User Sandbox" environment
- Installed Software Instances
- Initial Knowledge Transfer Plan
- Documentation of Project Controls, Standards, and Procedures (Definition of Done Documentation*)
- Initial Work Plan (Initial Product Backlog* & High-Level Release Plan*)
- Updated Project Management Documentation required by WVDOT
- Initial Issue and Risk Log
- Initial Fit/Gap Analysis Documentation
- Initial Business Process Improvement Documentation
- Updated Sprint 1 backlog*

* Indicated deliverables are part of Dataview's System Development Methodology Model. Dataview believes these deliverables meet the requirements of the requested deliverables in this RFP. Upon award, Dataview will review these deliverable formats with WVDOT to ensure that these deliverables do meet all WVDOT requirements. Dataview can customize these deliverables as necessary to ensure compliance with desired requirements.

Development

Each sprint will conclude with the following deliverables (where applicable and unless otherwise negotiated with WVDOT) with final release deliverables provided before each Production Release.

- Working, "potentially shippable" software*
- A release to the User Acceptance Testing environment (unless otherwise negotiated with WVDOT)*
- Sprint Review*

- Documentation of Project Controls, Standards, and Procedures (Definition of Done Documentation*)
- Updated Project Work Plan (Product Backlog & Roadmap*)
- Updated Project Management Documentation required by WVDOT
- Updated Issue and Risk Log
- Updated Fit/Gap Analysis Documentation
- Updated Business Process Improvement Documentation
- Updated System Business Process Design Documentation
- Updated Development Specification Documentation
- Updated Configured Application Software
- Updated Documentation to Support Configuration
- Updated Programs for Enhancements and Modifications
- Updated Custom Reports
- Updated Automated Interfaces
- Updated Forms
- Updated Custom Workflows
- Updated Conversion Plan
- Updated Master Test Plan
- Updated System Test Plans
- Updated Application System Testing execution/completion
- Updated: User Acceptance Test Plan
- Updated User Acceptance Test execution/completion
- Updated Performance Test Plan
- Updated Performance Testing Assistance; Performance Testing
- Updated: Project Team Training
- Updated: Comprehensive Training Plan
- Updated: Training Curriculum
- Updated: Security Administrators Guide (and updates)
- Updated User Documentation (and updates)
- Updated Workflow Administration Guide (and updates)
- Formal Knowledge Transfer Signoffs
- Updated Contingency Plan
- Updated: Deployment Cut-over Plan

* Indicated deliverables are part of Dataview's System Development Methodology Model. Dataview believes these deliverables meet the requirements of the requested deliverables in this RFP. Upon award, Dataview will review these deliverable formats with WVDOT to ensure that these deliverables do meet all WVDOT requirements. Dataview can customize these deliverables as necessary to ensure compliance with desired requirements.

Cutover

The Cutover Phase will conclude with the following deliverables (other cutover related deliverables such as the Deployment Cutover Plan will be delivered before cutover has started. As such, these will be delivered at the end of the Development Phase.

- Data Conversion Log

- Converted Data in Production Database
- Commencement of Stable Production System

Post Implementation

The Post Implementation Phase will conclude with the following deliverables:

- Transfer of the System Administration Responsibilities to WVDOT
- Report of Gap Analysis Findings
- Report of Lessons Learned Review Findings

7.4 SOFTWARE UPGRADES THAT SHOULD OCCUR DURING THE PROJECT

Dataview uses various third-party tools as part of the HUB's Core Development Framework. Dataview will perform upgrades of these tools as needed to ensure these tools are operating reliably, efficiently, and safely with the latest security updates. Tools with potential upgrades may include:

- Application Server
 - Windows Server (2019 Standard Edition fully patched)
 - Internet Information Services (IIS) for Windows Server
 - FTP Server
- HUB Application Software
 - .NET CORE (3.1.18)
 - Workflow Engine (4.1.4)
 - Telerik UI (2021.2.616) (for developers)
- Database Server
 - Microsoft SQL Server (2019 Standard Edition fully patched)
 - Database Back Up
 - Database Replication
 - SSIS
 - Microsoft SQL Server Data Tools (15.9.5)
 - COZYROC SSIS+ (1.9)
- Jobs Scheduler
 - SOS Job Scheduler (Master Service 1.12.9)
 - JOC Cockpit (3.1.18)
 - Universal Agent (1.13.8)
- Storage Area Network
- Power BI Server (SaaS)
- Disaster Recovery
 - VMware (8.1)

7.5 SYSTEM DEVELOPMENT METHODOLOGY OVERVIEW

4.3.13.2. System Development Methodology Overview

It is the Vendor's responsibility to propose a system development methodology (SDM) that is defined, documented, repeatable, and emphasizes project management best practices.

The project scope and cost should include training the WVDOT project team staff on the Vendor's SDM.

The proposal should identify certifications the Vendor has received, such as Software Engineering Institute's (SEI) "Capability Maturity Model" (CMM) assessments, the International Organization for Standardization (ISO) 900x certifications, the "Institute of Electrical and Electronics Engineers" (IEEE) Software Engineering Standards, and any other pertinent certifications.

7.6 DATAVIEW'S SYSTEM DEVELOPMENT METHODOLOGY GUIDING PRINCIPLES

Dataview's System Development Methodology Model is driven by three main guiding principles: Welcoming Change Through Customer Collaboration, Frequently Deliver Value Through Working Software, and Provide Technical Excellence. These principles support a continuous delivery approach known as "Scrum", that uses short development cycles (Sprints) to deliver working software iteratively and incrementally throughout the life cycle of the project. Our continuous delivery model allows for greater customer alignment and collaboration, early customer feedback, ability to adapt to change, and quick and incremental return on investment when compared to other, less iterative approaches.

The Dataview Team understands that enterprise application software development and implementations are complex in nature and require extensive planning and coordination. We tailor our delivery approach to each client and work with them to form a mutually beneficial relationship.

The delivery approach itself brings a high degree of control and visibility to project activities for our customers throughout the project lifecycle, establishing a repeatable, reusable framework that can be leveraged for the project duration. Our implementation framework includes an approach for the key project activities including project management, change management, system configuration, system testing, user testing, user acceptance, and key deliverables and milestones for the complete proposed solution, including third-party software.

Three main principles guide our overall approach:

- Welcome Change Through Customer Collaboration
- Frequently Deliver Value Through Working Software
- Provide Technical Excellence

In traditional projects, customers are usually involved at four key points during a project when:

1. the project starts
2. scope is negotiated
3. major deliverables are due

4. the project ends

In this approach, detailed project plans and requirements documents are created by the vendor and approved by the customer at the beginning of the project. This process can be long, often several months, but the resulting documents are clear and specific. When it is finally time to start developing the software, everyone has an idea of exactly how the project will be implemented.

This approach works well when all the requirements can be granularly defined at project outset, and everyone is certain that they will not be modified. However, this approach breaks down the moment change is introduced. Any adjustment during the life of the project can introduce risk to quality, schedule, and cost. Additionally, this risk becomes more significant the further the project progresses. Thus, change is generally discouraged or outright denied by vendors and customers alike. If a change is accepted, it must be formally negotiated between vendor and customer and is often accompanied by an increase in cost and schedule. If pressure is applied to maintain cost and schedule, then it is usually at the sacrifice of product quality. Additionally, this approach tends to pit customers and vendors against each other, creating an unproductive and adversarial relationship. Many times, the final product ends up late, over budget, low quality, and/or not meeting customer expectations.

7.6.1 Welcome Change Through Customer Collaboration

Dataview's approach is a stark contrast to scenario described above. We encourage an environment where our delivery team and customers continually collaborate to find the best way forward together. We know that an environment where trust, respect, and open communication between our team and our customers result in far better outcomes than one where these elements are ignored.

Instead of discouraging change, we actively encourage flexibility, and welcome additions, corrections, emerging needs, or changing priorities throughout the project lifecycle. Years of Public Sector experience has taught us that change is unavoidable. Maybe a business processes was implemented, or the organization was reorganized, or budgets were reprioritized. Regardless of the source, we know that change can come at any time and we pride ourselves in the ability to respond for our customers.

Knowing that change is likely, we do not invest significant effort upfront to create comprehensive and detailed project plans and requirements documents. Instead, we focus on deeply understanding our customer's needs, developing relationships, and gathering just enough information to map out the release plan and begin developing the first iteration of the product immediately so that customers can have hands-on experience with the software as soon as possible.

7.6.2 Frequently Deliver Value Through Working Software

For many software projects, it can take months or even years before customers are given the opportunity to use the application. Because of this, the return on investment is not realized until the project is nearing completion. Additionally, although customers may be given an opportunity to review mockups or system specifications, actual hands-on feedback with the software is also delayed.

We at Dataview know that this approach does not produce the most value for our customers. That is why we take a more iterative approach towards value delivery. We analyze, design,

build, test, and deploy working software on a frequent and consistent basis (often 1-4) weeks. We work closely with our customers to identify and build the highest priority features first, which allows us to deliver maximum value early in the project when very little of our customer's money has been invested. This frequent delivery provides our customers a cumulative return on investment rather than the "big-bang" approach in other methods.

Customer reviews are also built into this process, and we invite all stakeholders to evaluate and use the software at the end of each iteration. Frequent delivery also gives customers an opportunity to provide valuable feedback. Through this continuous feedback, we can collaborate and adjust the plan or even the whole direction as needed. Because of this, we can ensure that we are always building the right product for WVDOT's needs. This allows WVDOT to measure the progress of the project through the outcome of working and valuable software.

7.6.3 Provide Technical Excellence

Technical Excellence for Dataview is more than our knowledge in all aspects of software development and the delivery. It is the ability to foresee and eliminate problems before they become issues. It is keeping a positive attitude and taking great pride in our work and delivering for our customers. It is refining ourselves and continuing to improve every day.

7.7 SCRUM FRAMEWORK OF AGILE DEVELOPMENT

Dataview's System Development Methodology Model closely follows the most popular and widely used agile framework known as, Scrum. Scrum is unique, in that the framework is lightweight, which gives it flexibility to adapt to our customer's unique needs, yet, it has a proven and incredibly powerful set of values, principles and practices that allow us to deliver complex, innovative products for our customers.

Scrum was created in 1993 and is in use by thousands of companies, including Google, Apple, and Amazon. The name "Scrum" comes from a 1986 Harvard Business Review where the authors made an analogy comparing high-performing, cross-functional teams to the scrum formation used by rugby teams.

Dataview's Scrum relies on our cross-functional product delivery teams to deliver products and services in short cycles, enabling:

- Accelerated delivery
- Better visibility into projects
- Fast feedback
- Rapid adaptation to change and increased ability to manage changing priorities
- Continuous improvement
- More alignment between business and IT

7.7.1 Process Overview

Our Product Delivery Teams use Scrum to employ an iterative, incremental approach to optimize predictability and to control risk. Our Product Delivery Teams are made of people who collectively have all the skills and expertise to do the work and share or acquire such skills as needed.

At a high-level, Dataview's System Development Methodology process is as follows:

- The Product Owner will work with WVDOT to create a prioritized wish list called a product backlog.
- During sprint planning, the Product Delivery team will pull a small portion from the items towards the top of the list. This portion becomes the sprint backlog. The Product Delivery Team then decides how to implement the sprint backlog within the time frame of the sprint.
- The team has the given sprint, anticipated to be 2-weeks, to complete its work, but it meets each day to assess its progress, in a quick 15-minute meeting known as the “daily scrum”.
- During the sprint, the scrum master serves the team by keeping it focused on its goal.
- At the end of the sprint, the outcome is a potentially shippable piece of software. This software has been validated against the requirements, developed, tested, and documented and is ready for the customer to play with and test.
- The sprint ends with a sprint review and retrospective.
- As the next sprint begins, the team chooses another chunk of the product backlog and begins working again.

This process is demonstrated in the graphic below, created by the Scrum Alliance trade association.

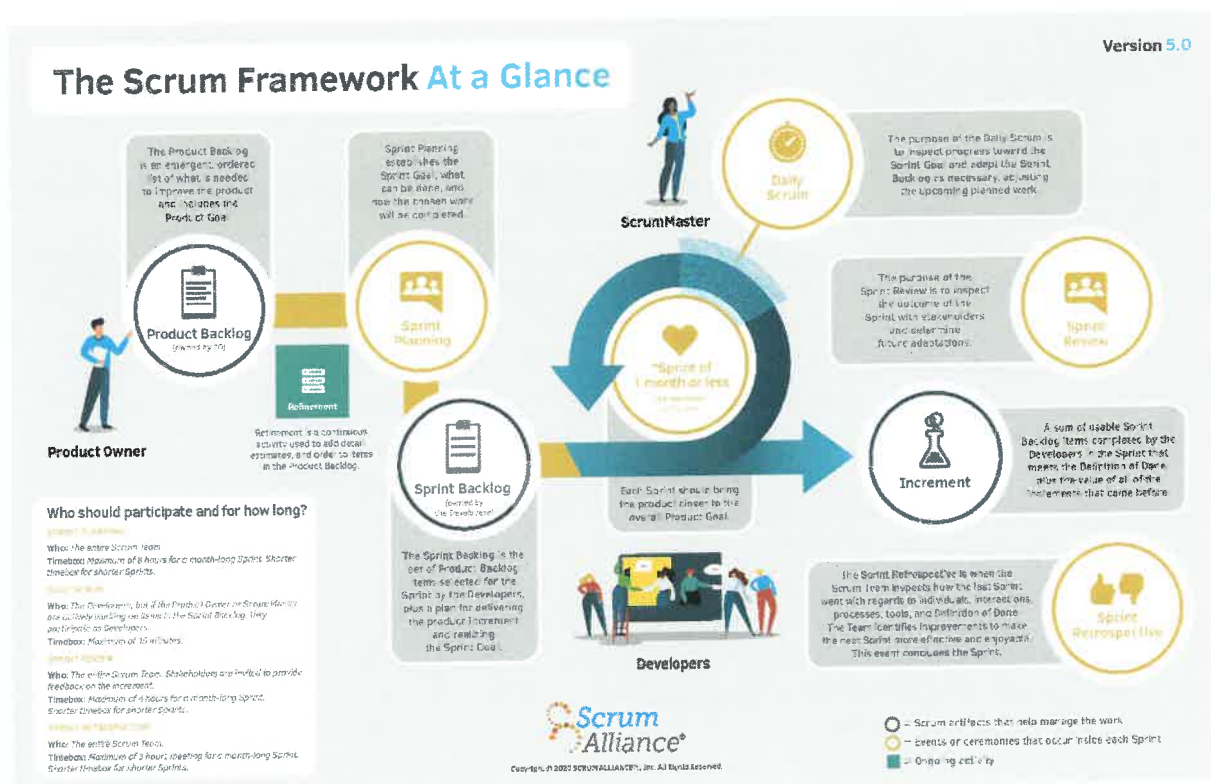


Figure 5 Scrum Framework at a Glance (credit: Scrum Alliance)

7.7.2 Empirical Process Control

Scrum is based on empirical process control, which relies on transparency, inspection, & adaptation. Scrum is also both iterative and incremental.

- **Transparency:** To make decisions, people need visibility into the process and the current state of the product. To ensure everyone understands what they are seeing, participants in an empirical process must share one language. Scrum's frequent reviews give team members and WVDOT stakeholders a clear view into the state of the project.
- **Inspection:** To prevent deviation from the desired process or end-product, people need to inspect what is being created, and how, at regular intervals. WVDOT gets inspect the completed work and their process at the end of every iteration during the sprint reviews and the team inspects their process at the sprint retrospectives.
- **Adaptation:** When deviations occur, the process or product should be adjusted as soon as possible in conjunction with WVDOT stakeholders. Our Product Delivery teams can adapt the product at the end of every sprint to WVDOT address uncovered functional or technical discoveries or changing stakeholder priorities.
- **Iterative:** A process for arriving at a decision or a desired result by repeating rounds of analysis or a cycle of operations. The objective is to bring the desired decision or result closer to discovery with each repetition (iteration). Scrum's use of a repeating cycle of iterations is iterative.
- **Incremental:** A series of small improvements to an existing product or product line that usually helps maintain or improve its competitive position over time. Incremental innovation is regularly used within the high technology business by companies that need to continue to improve their products to include new features increasingly desired by consumers. The way Scrum teams deliver pieces of functionality into small batches is incremental.

7.7.3 Dataview Product Delivery Team Values

- **Commitment:** Because we have great control over our own destiny, we become more committed to success.
 - Our Product Delivery Team value of commitment is essential for building an agile culture. Our teams work together as a unit. This means that our Product Delivery Teams trust each other to follow through on what they say they are going to do. When team members aren't sure how work is going, they ask. Our teams only agree to take on tasks they believe they can complete, so they are careful not to overcommit.
- **Focus:** Because we focus on only a few things at a time, we work well together and produce excellent work. We deliver valuable items sooner.
 - Our value of focus is one of the best skills our teams can develop. Focus means that whatever our teams start they finish--so agile teams are relentless about limiting the amount of work in process (limit WIP).
- **Openness:** As we work together, we practice expressing how we're doing and what's in our way. We learn that it is good to express concerns so that they can be addressed.
 - Our teams consistently seek out new ideas and opportunities to learn. Our teams are also honest when they need help.
- **Respect:** As we work together, sharing successes and failures, we come to respect each other and to help each other become worthy of respect.
 - Our team members demonstrate respect to one another and to stakeholders. Our teams know that their strength lies in how well they collaborate and that everyone has a distinct contribution to make toward completing the work of the sprint. They

respect each other's ideas, give each other permission to have a bad day occasionally, and recognize each other's accomplishments.

- **Courage:** Because we are not alone, we feel supported and have more resources at our disposal. This gives us the courage to undertake greater challenges.
 - Our value of courage is critical to our Product Delivery team's success. Our teams must feel safe enough to say no, to ask for help, and to try new things. Our teams must be brave enough to question the status quo when it hampers their ability to succeed.

7.7.4 Dataview Product Delivery Team Responsibilities

A Scrum team has three accountabilities:

- **Team Members:** Anyone on the team that is delivering the work.
- **Product Owner:** Holds the vision for the product and prioritizes the product backlog
- **Scrum Master:** Helps the team best use Scrum to build the product

The Scrum team works together to achieve a shared goal and deliver value to users of their product or service.

7.7.4.1 Team Members

Team Members are the people in the Scrum Team that are committed to creating any aspect of a usable Increment each Sprint.

The specific skills needed by the Team Members are often broad and will vary with the domain of work. However, the Team Members are always accountable for:

- Creating a plan for the Sprint, the Sprint Backlog
- Instilling quality by adhering to a Definition of Done
- Adapting their plan each day toward the Sprint Goal and,
- Holding each other accountable as professionals.

7.7.4.2 Product Owner

The Product Owner is accountable for maximizing the value of the product resulting from the work of the Scrum Team.

The Product Owner is also accountable for effective Product Backlog management, which includes:

- Developing and explicitly communicating the Product Goal
- Creating and clearly communicating Product Backlog items
- Ordering Product Backlog items and,
- Ensuring that the Product Backlog is transparent, visible, and understood.

Scrum Master

The Scrum Master is accountable for establishing Scrum as defined in the Scrum Guide. They do this by helping everyone understand Scrum theory and practice, both within the Scrum Team and the Dataview organization.

The Scrum Master is accountable for the Scrum Team's effectiveness. They do this by enabling the Scrum Team to improve its practices, within the Scrum framework.

The Scrum Master serves the Scrum Team in several ways, including:

- Coaching the team members in self-management and cross-functionality
- Helping the Scrum Team focus on creating high-value Increments that meet the Definition of Done
- Causing the removal of impediments to the Scrum Team's progress and,
- Ensuring that all Scrum events take place and are positive, productive, and kept within the timebox.

The Scrum Master serves the Product Owner in several ways, including:

- Helping find techniques for effective Product Goal definition and Product Backlog management
- Helping the Scrum Team understand the need for clear and concise Product Backlog items
- Helping establish empirical product planning for a complex environment; and,
- Facilitating stakeholder collaboration as requested or needed.

The Scrum Master serves the organization in several ways, including:

- Leading, training, and coaching the organization in its Scrum adoption
- Planning and advising Scrum implementations within the organization
- Helping employees and stakeholders understand and enact an empirical approach for complex work and,
- Removing barriers between stakeholders and Scrum Teams.

7.7.5 Scrum Events

Scrum includes five events that occur inside each sprint.

- **The Sprint:** The heartbeat of Scrum. Each sprint should bring the product closer to the product goal and is a month or less in length.
- **Sprint Planning:** The entire Scrum team establishes the sprint goal, what can be done, and how the chosen work will be completed. Maximum of 8 hours for a month-long Sprint. Shorter timebox for shorter sprints.
- **Daily Scrum:** The Developers inspect the progress toward the sprint goal and adapt the sprint backlog as necessary, adjusting the upcoming planned work. May include Product Owner or Scrum Master if they are actively working on items in the sprint backlog. Maximum of 15 minutes each day.
- **Sprint Review:** The entire Scrum team inspects the sprint's outcome with stakeholders and determines future adaptations. Stakeholders are invited to provide feedback on the increment.
- **Sprint Retrospective:** The Scrum team inspects how the last sprint went regarding individuals, interactions, processes, tools, and definition of done. The Team identifies improvements to make the next sprint more effective and enjoyable. This is the conclusion of the sprint. Maximum of 3 hours for a month-long sprint, shorter timebox for shorter sprints.

Scrum accountabilities, artifacts, and events work together within a Scrum cycle. Each sprint should bring the product closer to the overall product goal.

7.7.5.1 *Backlog Refinement*

Refinement is a continuous activity used to add details, estimates, and order to items in the product backlog. This activity will happen in a collaborative manner with the Product Owner, WVDOT, and Product Delivery Team members.

7.7.6 **Scrum Artifacts**

Scrum artifacts help manage the work:

- **Product Backlog:** An emergent, ordered list of what is needed to improve the product and includes the product goal.
- **Sprint Backlog:** The set of product backlog items selected for the sprint by the Developers, plus a plan for delivering the product increment and realizing the sprint goal.
- **Increment:** A sum of usable sprint backlog items completed by the Developers in the sprint that meets the definition of done, plus the value of all the increments that came before. Each increment is a recognizable, visibly improved, operating version of the product.

The team displays its plans and progress so that all team members and WVDOT can always see what the team is accomplishing.

Each artifact has an associated commitment that ensures quality and keeps the team focused on delivering value to its users.

- **Definition of Done:** When the product increment is delivered, it needs to be “done” according to a shared understanding of what “done” means. The definition of done is meant to ensure that the standard of quality. The definition of done will be tailored to meet the specific requirements of WVDOT as outlined in the RFP.
- **Sprint Goal:** A specific and singular purpose for the sprint backlog. This goal helps everyone focus on the essence of what needs to be done and why.
- **Product Goal:** To plan the work to be done each sprint, teams must have an idea of their product's overall objective. Each team may have multiple product goals over its lifetime, but only one at a time.

7.8 PROJECT MANAGEMENT METHODOLOGY AND APPROACH

4.3.13.3. Project Management Methodology and Approach

The Vendor shall describe its approach to managing the project. As part of its project management approach, the Vendor should describe the project management tools, standards, controls, and procedures that are going to be utilized to create a proven, reliable process. This section should also include a brief description of the Vendor's approach for managing the project on a daily basis. The intent of this information is to provide assurance to the WVDOT of the Vendor's demonstrated ability to manage large, complex software projects such as the Right-of-Way, Utility Relocation and Railroad Agreement system project in a manner that ensures quality, project success, long-tenn viability, and lowest cost of ownership.

7.9 DATAVIEW’S PROJECT MANAGEMENT METHODOLOGY AND APPROACH

7.9.1 Project Management

Our project management methodology is consistent with the Project Management Institute (PMI) and Agile Alliance standards and guideline publications that equip project teams with tools, situational guidelines, and an understanding of the available agile techniques and approaches to enable better results in their project. Through our experiences working with WVDOT, we also believe that this approach is compatible with the West Virginia Office of Technology (WVOT) Project Management Methodology as these are also closely aligned with PMI Standards.

Our managers and team leaders have extensive knowledge all aspects of the Project Management Process including:

- Project Initiation
- Project Planning
- Project Execution
- Monitoring and Controlling
- Project Closing

Additionally, managers, team leaders, and team members are well versed in the following Project Management Knowledge Areas:

- Project Time Management
- Project Cost Management
- Project Quality Management
- Project Human Resource Management
- Project Communications Management
- Project Risk Management
- Project Procurement Management
- Project Stakeholder Management

7.9.2 Project Manager

Often, those who are more familiar with how a traditional project is executed wonder where the Project Manager role fits within Dataview’s agile project methodology. A Project Manager is not a defined role in our methodology or in any of the industry leading agile best practices. However, this does not mean that the responsibilities usually held by the Project Manager, such as managing scope, stakeholder communication, and risk management, are unaccounted for. Instead, these responsibilities are distributed among the various scrum roles and other managers within our organization. The table and graphic below demonstrates how some of the responsibilities as defined by the Project Management Institute (PMI) are distributed.

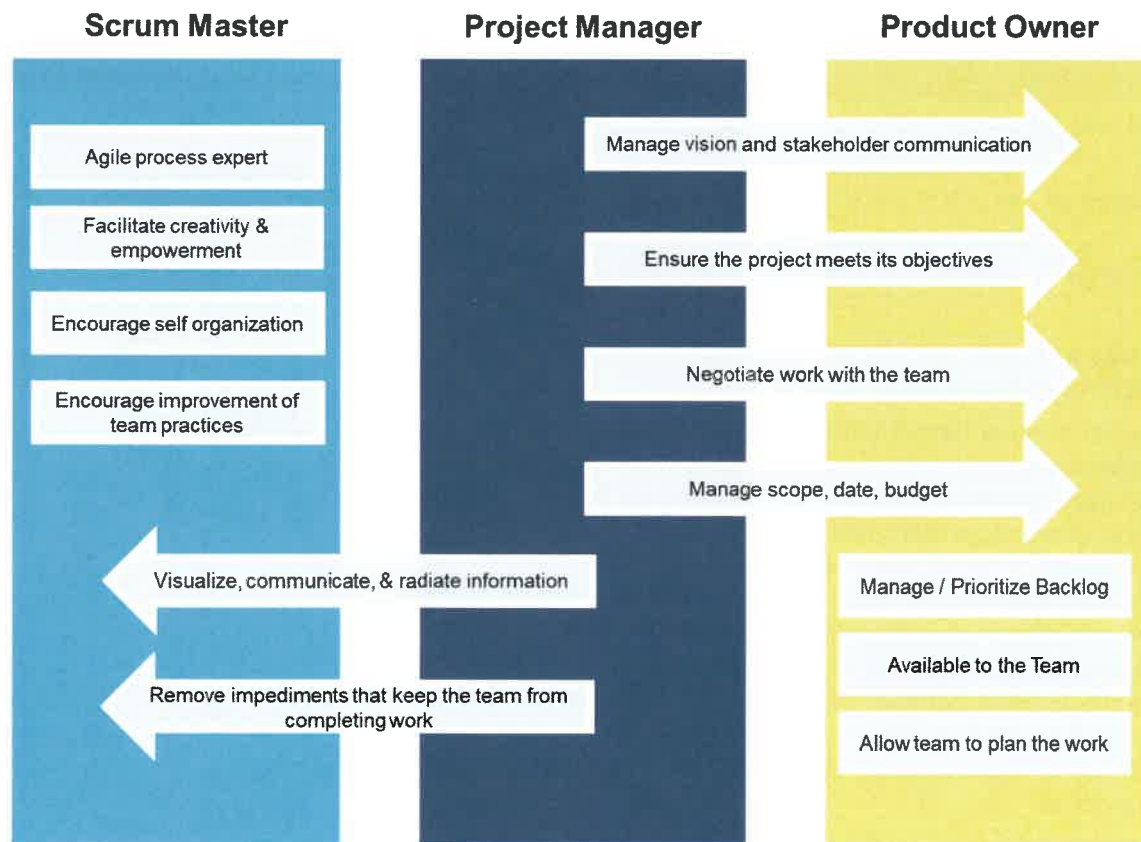
PMI Project Management Activity	Product Owner	Scrum Master	Development Team	Other Manager
Scope	Project Level		Sprint Level	
Time	Project Level	Helps team manage time	Sprint Level	
Cost	✓			
Quality	✓	✓	✓	✓
Team			✓	Formation
Communication	✓	✓	✓	✓
Risk	Project Level		Sprint Level	✓

The table below lists the responsibilities required of the Project Manager as outlined in the RFP. WVDOT shall consider Dataview's Product Owner role to be the accountable point of contact for these responsibilities. Any changes to the proposed Product Owner will be communicated and approved by WVDOT prior to the change.

WVDOT RFP Responsibilities	Dataview Accountable Party
Single point of contact between WVDOT and the successful Vendor	Product Owner
Employee of the prime Vendor	Product Owner
Authorized to represent the Vendor in all matters related to the project	Product Owner
Authority to make commitments and decisions that are binding on the Vendor and any subcontractors	Product Owner
Expected to have demonstrated prior experience as a project manager on at least two (2) projects of comparable size and scope and experience as a project manager, deputy project manager, or functional/technical team leader on at least one public sector implementation of the Vendor's proposed Right-of-Way, Utility Relocation and Railroad Agreement software suite for an organization of comparable size to WVDOT (total annual expenditures of \$1 billion and 5,000 employees).	Product Owner
Expected to have general functional and process knowledge of the VPS in relation to Right-of-Way, Utility Relocations and Railroad Agreements.	Product Owner
Accountable for all services and deliverables provided under the Contract resulting from this RFP.	Product Owner
Work to ensure the on-time delivery and successful deployment of a functioning system that meets the WVDOT's requirements and the successful ongoing operation of the Right-of-Way, Utility Relocation and Railroad Agreements system components.	Product Owner

Dedicate a significant portion of their work time to this project during the system design, construction, testing and initial deployment phases of the project.	Product Owner
Work onsite most of the time and shall function as the WVDOT's primary point of contact with the Vendor.	Product Owner
Expected to be onsite during any FHWA meetings concerning WVDOT's certification.	Product Owner
When not on the project site, the Project Manager shall be accessible by telephone/cell phone with a four (4) hour maximum response time.	Product Owner
Expected to respond to day-to-day problems, manage issues, provide status reports, participate in weekly status meetings, and manage personnel resources.	Product Owner

The graphic below further demonstrates how the Project Manager's responsibilities are divided between the leadership within Dataview.



7.9.3 Project Work Plan

A Project Work Plan and Project Management Plan (PMP) will be prepared and submitted to WVDOT for approval within 20 days of NTP.

A sample work plan for release one is inserted below. This plan is only a sample based on the knowledge known at the time of writing this response to the RFP. This plan will be updated by Dataview's Product owner and reviewed with WVDOT every sprint cycle as appropriate.

This plan will be further refined based on specific WVDOT requirements listed below and updated upon priority and requirement clarification following Dataview's initial Foundations phase.

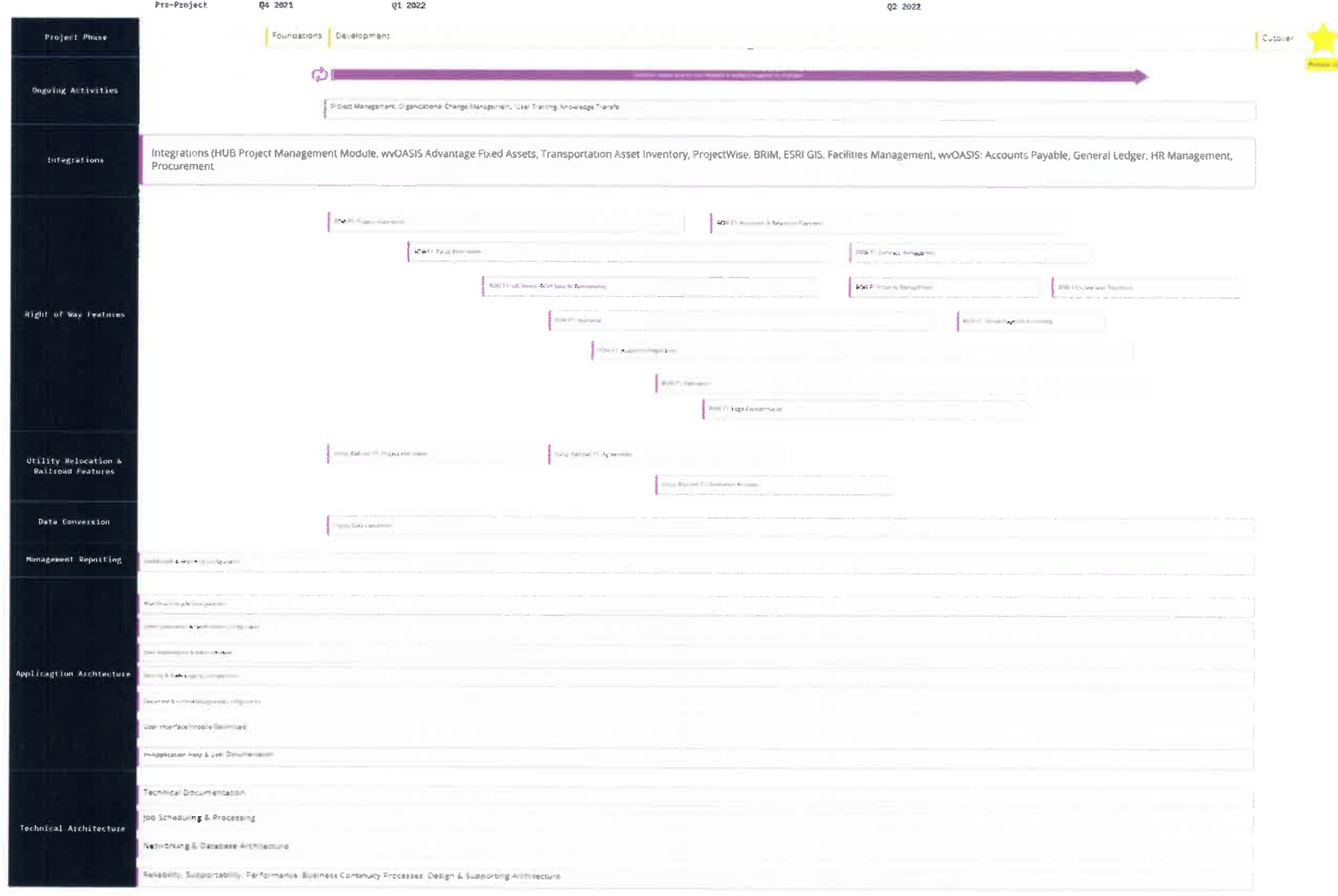
7.9.3.1 Project Work Plan Components

- Project management activities
- Plan for the entire project
- Tasks, schedules, dependencies, critical paths, and responsible parties
- Outline where offshore resource assistance will be necessary
- Project Deliverables
- Estimated work effort, duration, start and end dates
- Appropriate milestones

7.9.3.1.1 Work Plan Assumptions

The proposed work plan is aggressive and the assumptions in this subsection are provided to assist the State in understanding the estimating basis the Dataview Team used with regards to project scope, timing, and roles and responsibilities.

1. The project start will be November 1, 2021 as indicated by the RFP.
2. State end users will be available to test the application for the duration of the project.
3. State end users will be available for training during specified times for the duration of the project.
4. Key State stakeholders are dedicated and available for all product reviews and will provide Dataview with timely feedback.
5. The State and Dataview will mutually agree upon a set of project standards that will prescribe the adopted processes, responsibilities, and timeframes for key project activities, including, but not limited to: deliverables review and acceptance, issue management, risk management, software construction standards and work product reviews, change order management and quality management.



7.9.3.2 *Project Management Plan Components*

- Project team organization
 - Including an overall organizational chart of the key project staff contributing to the management and delivery including the person responsible for leading the various subcomponents of the project
- Reporting relationships
- Key project staff
- Team member contact information
- Project delivery approach
- Project risks and the plan for managing those risks
- Procedures for implementing, managing, and controlling the overall project.
- Solution descriptions
- Solution objectives
- Criteria for success
- Assumptions and constraints
- Resource plan for Vendor and WVDOT including delineation of expected staff loading and specific roles and responsibilities for each individual assigned to the project
- Schedule management
- Scope/change management
- Cost/budget management
- Document management
- Project communications management
- Risk and issue management
- Status Reporting

Dataview will provide a status update and demonstration of the working software at the Sprint Review. The Sprint Review will occur every two weeks. At a minimum, the Sprint Review will include Dataview's Product Owner and WVDOT's project contact. However, anyone else from WVDOT is welcome to attend. This may include key users or work group leaders.

- At a minimum, the sprint review will cover the following:
 - A demonstration of new functionalities developed during the sprint.
 - A listing of significant departures from the Project Work Plan with explanations of causes, effects on other areas, and strategies to achieve realignment
 - Changes to project objectives, scope, schedule, or budget
 - A listing of tasks completed since the last report
 - Tasks that were delayed and reasons for the delay, with expected revised completion date
 - Planned activities for the next scheduled period
 - Summary of major concerns, risks or issues encountered, proposed resolutions, and actual resolutions
 - Any other topics that require attention from the WVDOT Project Manager.

7.9.3.3 *Issue Resolution*

Dataview will support the needs of the State by collaboratively establishing a process to identify, track, review and prioritize, analyze, escalate, and resolve issues in a timely manner to prevent them from adversely affecting the project's progress and direction.

Dataview uses a tool called Azure DevOps Boards for issue tracking. All team members are responsible for issue identification and escalation of issues when needed. Within Azure, each issue can be clearly defined, prioritized, and assigned to individual team members for resolution or escalation.

The WVDOT stakeholders can be granted access to Azure DevOps to track issues in real-time. Any issue that requires the WVDOT participation to resolve will be communicated through the project's Product Owner unless an alternate team member is agreed upon with the WVDOT. Azure DevOps workflow can be configured to include review by WVDOT stakeholders if desired.

After award, the WVDOT and the Dataview shall agree on a protocol for collaboratively identifying, recording, tracking, and resolving implementation issues. This protocol is expected to address the topics above, responsible parties, and specific steps to be taken on issues or disputes arising during the implementation process.

7.9.3.4 *Project Controls, Standards, and Procedures*

Dataview's project controls, standards, and procedures are guided by the Project Management Institute's PMBOK and Scrum Framework of Agile Product Delivery.

State Requirement	Description
Managing project documentation	Dataview will use Microsoft SharePoint for managing project documentation. SharePoint allows the Dataview team to use organization-wide templates for preparing deliverables or work products. These templates can be modified to meet State requirements. The state can be granted access to Dataview's SharePoint repository for easy access this project's deliverables and work products. SharePoint provides collaboration, versioning, and central document management.
Meeting procedures	Dataview uses an agenda-driven approach to meetings to ensure that they are efficient and productive for all parties. Dataview meetings will start and end on time and have a clear purpose. A facilitator will professionally conduct these meeting to ensure that all participates are respected for their views and contributions. Clear action items are assigned after meeting. Meeting minutes are documented for every meeting and distributed to all attendees following meeting conclusion.
Development standards	Dataview is committed to delivering consistently high-quality products throughout the entire implementation of the projects. Our methodologies are derived directly from industry leading standards and best practices set forth by accredited organizations including the Project Management Institute (PMI), Scrum Alliance, International Electrotechnical Commission (IEC), and Institute of Electrical and Electronics Engineers (IEEE).
Software change control procedures	Dataview utilizes the Scrum agile framework to control change within the project. Change management is an inherent part of the Scrum process. The Product Owner works in collaboration with the WVDOT to determine the value and priority of new requirements in relation to existing requirements and adds these requirements to the product backlog. The WVDOT will have a chance to review the implemented requirements at the end of every sprint and have an opportunity to

	<p>include new requirements or reassess relative priority of requirements with every sprint.</p> <p>As an organization, Dataview views change as a positive way to improve a product as the project progresses. Unlike traditional organizations, we view changes late in the project, when Dataview and the WVDOT know the most about the product, are often the most valuable changes.</p>
Scope management	<p>Dataview utilizes the Scrum agile framework to control scope within the project. In this approach, the Dataview product owner will gather high-level requirements at the beginning of the project. Requirements that will be implemented in the immediate future will be broken down and further detailed. Requirements continue to be gathered and refined throughout the project as the team's knowledge of customer needs and project realities grows.</p> <p>Resources and schedule are fixed initially. The Dataview team and the WVDOT determines scope by considering which features directly support the product vision, the release goal, and the sprint goal. The Dataview Team creates the most valuable features first to guarantee their inclusion and to ship those features as soon as possible. New features with high priority don't necessarily cause budget or schedule slip; they simply push out the lowest-priority features. Less valuable features might never be created, which may be acceptable to the business and the customer after they have the highest-value features.</p>
Communications Management	<p>Dataview recognizes the importance of effective communication throughout the software implementation to ensure the WVDOT and Dataview team members are sufficiently informed about project activities, status, direction/vision, expectations, risks, and issues. To ensure effective communication, Dataview has developed a standard Internal Project Communication plan which provides team members information about communications regarding internal project manager and an Organizational Communication plan which details information about communication with WVDOT stakeholders including process owners, end users, and executive leadership.</p>
Development Standards Management	<p>Dataview uses standard processes and tools to ensure quality product delivery. These standards are applied to each work item delivered whether it is a requirement implementation or other deliverable. These standards include a rigorous internal quality assurance review that include Self Review, Review by Team Member SME, Walkthrough, and Product Owner Review.</p>
Deliverable Management	<p>Dataview employs a rigorous process for Deliverable Management. Each deliverable undergoes rigorous internal reviews by the Dataview Team before being formally delivered to WVDOT reviewers. Components of deliverable management process include:</p> <ul style="list-style-type: none"> -Document tracking processes and repositories -Internal and external review and approval processes for each deliverable and standard guidelines to follow when reviewing the deliverable.

	<ul style="list-style-type: none"> -Key reviewers for State Staff and Dataview members. -Acceptance criteria for each deliverable
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7.9.3.5 Project Management Tools

Tool	How Tools are Used
Microsoft Visio	Microsoft Visio is a software application that aids communication and can be used for capturing and presenting ideas to stakeholders. Some applications for Visio include: <ul style="list-style-type: none"> • Preparing UML diagrams such as use case, activity and sequence diagrams. • Preparing process flow charts. • Creating data models. • Creating architecture diagrams, among other functions.
Microsoft Word	Used for creating documents for work products and deliverables.
Microsoft PowerPoint	Used for creating presentations for meetings, work products, and deliverables.
Microsoft SharePoint	Used as a document repository to store templates, work products, and deliverables.
Microsoft Teams	For team meetings and video conferencing
Microsoft Azure DevOps	Version control, reporting, requirements management, automated builds, testing, and release management.
Microsoft Azure Boards	Team-work tracking, backlog management, custom reports
Microsoft Azure Pipelines	Build automation and release management
Microsoft Azure Test Plans	Planned and exploratory test case tracking
Microsoft Power BI	Various dashboards to monitor internal quality, productivity, predictability, responsiveness, key performance indicators (KPIs)
Telerik Test Studio	Automated testing tool for functional, performance, and load testing.

7.9.3.6 Risk Management Plan and Procedures

Dataview will support the needs of the State by collaboratively establishing a process to identify, track, review and prioritize, analyze, escalate, and resolve risks in a timely manner to prevent them from adversely affecting the project's progress and direction.

Dataview uses a tool called Azure DevOps Boards for risk tracking. All team members are responsible for risk identification and escalation of risks when needed. Within Azure, each risk can be clearly defined, prioritized, and assigned to individual team members for mitigation.

The WVDOT stakeholders can be granted access to Azure DevOps to track risks in real-time. Any risk that requires the WVDOT participation to resolved will be communicated through the project's Product Owner unless an alternate team member is agreed upon with the WVDOT. Azure DevOps workflow can be configured to include review by WVDOT stakeholders if desired.

7.9.3.7 Communication and Cooperation

Dataview will communicate and cooperate with all parties involved in the project, as well as

all stakeholders of the larger WVDOT Transportation Management System effort and the statewide wvOASIS ERP initiative. All Dataview staff on this project are guaranteed to have excellent communication skills and conduct themselves professionally and courteously in all instances.

Dataview will maintain communication to ensure project success. Project plans developed by Dataview will be reviewed and approved by the WVDOT prior to implementation.

Dataview shall perform communication with WVDOT performed through, but not limited to:

- Ad-hoc and regularly scheduled and ad hoc on-site or Web meetings
- Conference calls
- Email
- Bi-weekly written status reports provided to the WVDOT by Dataview; and
- Project Plans.

7.10 DETAILED DESCRIPTION OF SERVICES/DELIVERABLES TO BE PROVIDED

4.3.13.4. Detailed Description of Services/Deliverables to be Provided

The Vendor should describe in detail how each of the services listed in Section 4.2.2. shall be provided in accordance with the Vendor's methodology.

The table below gives a brief summary of the proposed services. Each service is described in further detail in this section.

Service	Work Description Summary
Project Management	<ul style="list-style-type: none"> • Deliver project using project management methodology that is consistent with the Project Management Institute (PMI) and Agile Alliance standards and guideline • Iterative Agile development to collaboratively build product and refine scope during project implementation. • Project Management services to cover all aspects of Project Management including: <ul style="list-style-type: none"> ○ Project Initiation ○ Project Planning ○ Project Execution ○ Monitoring and Controlling ○ Project Closing
Requirements Confirmation and Development	<ul style="list-style-type: none"> • Agile Development with Customer Workshop Facilitation. Artifacts to include Release Plans, Product Backlogs and Sprint Backlogs.
Systems Analysis and Business Process Design	<ul style="list-style-type: none"> • Follow the industry best practices as described by the Project Management Institute (PMI) guide to Business Analysis and the International Institute of Business Analysis (IIBA) guide to the Business Analysis Body of Knowledge (BABOK) to provide analysis and design services

Development of a Concept of Operations (ConOps)	<ul style="list-style-type: none"> • Collaborate with WVDOT to create a ConOps document detailing stakeholders, System Operations and System Interactions • Review and Refine document to gain consensus and stakeholder approval
Technical architecture and infrastructure design	<ul style="list-style-type: none"> • Capacity Planning and Procurement – Review existing infrastructure to identify impact of project and plan for future capacity needs. Work with WVDOT to refine initial sizing for prod and non-production environments • On-Prem Hosting – Identify deployment architecture, hybrid deployment models such as cloud-based Development and System Test environments and on-premises UAT/Pre-Prod and Production. Document and Install required environments and databases based on project schedule. • Software Version Management - Code Version management and Build Management using GitHUB and Azure DevOps. • Disaster Recovery – Work with the wvOASIS Technical team to setup a DR architecture that will support recovery point and recovery time needs for WVDOT ROW business processes. • Performance Tuning – Plan and execute volume tests to tune application tiers and database • Operations - Augment WVDOT team for any post go-live system administration and operation needs.
Software Configuration	<ul style="list-style-type: none"> • Setup initial environments with Day-0 data • Implement process to document, manage and track configuration changes to Day-0 data for eventual production migration
Security Configuration	<ul style="list-style-type: none"> • Work collaboratively with WVDOT to document user security profiles and roles • Implement role-based access control security in application • Integration with myApps Portal for Single Sign-On.
Customizations, Enhancements and Modifications	<ul style="list-style-type: none"> • ROW module to be a custom module built on the HUB Development framework • The HUB framework based on industry standard and leading frameworks ASP.Net Core, PowerBI and MS SQL Server. • Modifications to be baselined for ease of future maintenance
Automated Interfaces	<ul style="list-style-type: none"> • Develop interfaces and integration with external systems using SSIS and SQL. The Team has deep understanding of ERP business functionality and experience building integration with HR, Payroll and Financial Systems. • Development of up to 16 interfaces is included in the pricing

Custom Forms	<ul style="list-style-type: none"> • Support for MailMerge feature using word document templates. Custom embedded reports available as alternative • Dataview to work with WVDOT to identify forms and implement • Development of up to 25 forms is included in the pricing
Custom Reports	<ul style="list-style-type: none"> • Support for Report development using embedded reports and Power BI • Dataview to work with WVDOT to identify, design and build custom reports • Development of up to 25 reports is included in the pricing
Custom Workflow	<ul style="list-style-type: none"> • Build BPMN workflows based on business process flow
Data Conversion	<ul style="list-style-type: none"> • Convert data from legacy enterprise systems using SSIS, custom scripts and SQL Server tools • Setup review sessions • Execute multiple mock runs to validate conversion window
Testing	<ul style="list-style-type: none"> • Performance Testing – Automated load-testing before go-live to validate the solution architecture and ability to meet workload. • Automated Testing – Use of automated software testing tools to reduce repetitive execution of tests and aid in comparison of actual and predicted outcomes. • Test Driven Development – Software development process relying on software requirements being converted to test cases before software is fully developed and tracking software development by repeatedly testing the software against all test cases.
Training	<ul style="list-style-type: none"> • Work with WVDOT to do needs assessment to determine training need by role <ul style="list-style-type: none"> ◦ Training to include: ◦ Core Project Team Training ◦ Technical Training ◦ User Acceptance/Test Training ◦ End User Training ◦ Ongoing End User Training
Documentation	<ul style="list-style-type: none"> • Provide Installation guides, System Administration Guides, User Guides, Release Notes and Upgrade Guides • Customize documents based on WVDOT processes, procedures, and policies
Production Cutover Planning	<ul style="list-style-type: none"> • Develop a comprehensive Deployment Cutover Plan that addresses the activities required to bring the ROW module into production. Planning tasks to include the following activities: <ul style="list-style-type: none"> ◦ Prep Work Schedule ◦ Risks and mitigation ◦ Contingency plan ◦ Role and Responsibilities

	<ul style="list-style-type: none"> ◦ Procedures ◦ Support Transition
Production Cutover Checklist	<ul style="list-style-type: none"> • Create a checklist for different areas such as functional readiness, reports, interfaces, conversions, end-user training and departmental readiness. • Review readiness assessment for go-live
Production Maintenance and Support	<ul style="list-style-type: none"> • Provide post-go live operational support to WVDOT • Provide KT to transition activities to WVDOT

7.10.1 Project Management

As described in sections 7.6 Dataview's System Development Methodology Guiding Principles and 7.8 Project Management Methodology and Approach our project management methodology is consistent with the Project Management Institute (PMI) and Agile Alliance standards and guideline publications that equip project teams with tools, situational guidelines, and an understanding of the available agile techniques and approaches to enable better results in their project. Through our experiences working with WVDOT, we also believe that this approach is compatible with the West Virginia Office of Technology (WVOT) Project Management Methodology as these are also closely aligned with PMI Standards.

Our managers and team leaders have extensive knowledge and will provide project management services in all aspects of the Project Management Process including:

- Project Initiation
- Project Planning
- Project Execution
- Monitoring and Controlling
- Project Closing

Additionally, managers, team leaders, and team members are well versed in all Project Management Knowledge areas and will provide services in the following:

- Project Time Management
- Project Cost Management
- Project Quality Management
- Project Human Resource Management
- Project Communications Management
- Project Risk Management
- Project Procurement Management
- Project Stakeholder Management

Our managers, team leaders, and team will use the following tools and techniques to provide Project Management Services:

Analysis

- Alternatives Analysis
- Assessment of Other Risk Parameters
- Assumption and Constraint Analysis
- Cost of Quality

- Cost-Benefit Analysis
- Decision Tree Analysis
- Document Analysis
- Earned Value Analysis
- Influence Diagrams
- Iteration Burndown Chart
- Make or Buy Analysis
- Performance Reviews
- Process Analysis
- Proposal Evaluation
- Regression Analysis
- Reserve Analysis
- Risk Data Quality Assessment
- Risk Probability and Impact Assessment
- Root Cause Analysis
- Sensitivity Analysis
- Simulation
- Stakeholder Analysis
- SWOT Analysis
- Technical Performance Analysis
- Trend Analysis
- Variance Analysis
- What-if Scenario Assessment

Representation

- Affinity Diagrams
- Cause-and-Effect Diagrams
- Control Charts
- Flow Charts
- Hierarchical Charts
- Logical Data Model
- Matrix Diagrams
- Matrix-Based Charts
- Mind Mapping
- Probability and Impact Matrix
- Scatter Diagrams

Integration Management

- Change Control Tools
- Information Management
- Knowledge Management

Schedule Management

- Agile Release Planning

- Critical Path Method
- Dependency Determination and Integration
- Leads and Lags
- Precedence Diagramming Method
- Resource Optimization
- Rolling Wave Planning
- Schedule Compression
- Schedule Network analysis

Scope Management

- Context Diagram
- Product Analysis
- Prototypes

Cost Management

- Cost Aggregation
- Financing
- Funding Limit Reconciliation
- Historical Information Review
- To-Complete Performance Index

Communications Management

- Communication Methods
- Communication Models
- Communication Requirements Analysis

Quality Management

- Design for X
- Project Reporting
- Quality Improvement Methods
- Test and Inspection Planning
- Testing/Product Evaluations

Resources Management

- Individual and Team Assessments
- Organizational Theory
- Pre-assignment
- Recognition and Rewards
- Virtual Teams
- Training

Risk Management

- Contingent Response Strategies
- Prompt Lists

- Representations of Uncertainty
- Risk Categorization
- Strategies for Threats
- Strategies for Opportunities
- Strategies for Overall Project Risk

Procurement Management

- Advertising
- Bidder Conferences
- Claims Administration
- Source Selection Analysis

Stakeholder Management

- Ground Rules
- Stakeholder Engagement and Assessment Matrix
- Stakeholder Mapping / Representation

7.10.2 Requirements Confirmation and Development

Dataview Team Members responsible for requirements confirmation and development follow the industry best practices as described by the Project Management Institute (PMI) guide to Business Analysis and the International Institute of Business Analysis (IIBA) guide to the Business Analysis Body of Knowledge (BABOK). These best practices are then applied within in our Agile System Development Methodology.

Our analysts apply knowledge, skills, tools, and techniques and provide services to:

- Determine problems and opportunities
- Identify business needs and recommend viable solutions to meet those needs and support strategic decision making
- Elicit, analyze, specify, communicate, and manage requirements and other product information; and
- Define benefits and approaches for measuring and realizing value and analyzing those results.

Our analysts have extensive experience and knowledge with requirements confirmation and development and will provide services in the following:

- **Needs Assessment:** Analyzing current business problems or opportunities to understand what is necessary to attain the desired future state.
- **Stakeholder Engagement:** Identifying and analyzing those who have an interest in the outcome of the solution to determine how to collaborate and communicate with them.
- **Elicitation:** Planning and preparing for elicitation, conducting elicitation, and confirming elicitation results to obtain information from sources.
- **Analysis:** Examining, breaking down, synthesizing, and clarifying information to further understand it, complete it, and improve it.
- **Traceability and Monitoring:** Tracing, approving, and assessing changes to product information to manage it throughout the business analysis effort.

- **Solution Evaluation:** Validating a full solution or a segment of a solution that is about to be or has already been implemented to determine how well a solution meets the business needs and delivers value to the organization.

Our analysts will use the following tools and techniques to provide services in requirements confirmation and development:

- Planning Business Analysis Approach
- Plan Stakeholder Engagement
- Plan Business Analysis Governance
- Identify Business Analysis Performance Improvements
- Prepare for Elicitation
- Conduct Elicitation
- Confirm Elicitation Results
- Communicate Business Analysis Information
- Manage Stakeholder Collaboration
- Trace Requirements
- Maintain Requirements
- Prioritize Requirements
- Assess Requirements Changes
- Approve Requirements

7.10.3 System Analysis and Business Process Design

Dataview Team Members responsible for system analysis and business process design are required to follow the industry best practices as described by the Project Management Institute (PMI) guide to Business Analysis and the International Institute of Business Analysis (IIBA) guide to the Business Analysis Body of Knowledge (BABOK).

Our analysts have extensive experience and knowledge with System Analysis and Business Process Design will provide services in the following:

- Determine problems and opportunities
- Identify business needs and recommend viable solutions to meet those needs and support strategic decision making
- Elicit, analyze, specify, communicate, and manage requirements and other product information; and
- Define benefits and approaches for measuring and realizing value and analyzing those results.

Our analysts have extensive experience and knowledge with System Analysis and Business Process Design and will provide services in the following:

- **Needs Assessment:** Analyzing current business problems or opportunities to understand what is necessary to attain the desired future state.
- **Stakeholder Engagement:** Identifying and analyzing those who have an interest in the outcome of the solution to determine how to collaborate and communicate with them.
- **Elicitation:** Planning and preparing for elicitation, conducting elicitation, and confirming elicitation results to obtain information from sources.

- **Analysis:** Examining, breaking down, synthesizing, and clarifying information to further understand it, complete it, and improve it.
- **Traceability and Monitoring:** Tracing, approving, and assessing changes to product information to manage it throughout the business analysis effort.
- **Solution Evaluation:** Validating a full solution or a segment of a solution that is about to be or has already been implemented to determine how well a solution meets the business needs and delivers value to the organization.

Our analysts will use the following tools and techniques to provide services in system analysis and design:

- Current State Analysis
- Future State Analysis
- Risk Assessment
- Change Strategy Definition
- Requirements Specification and Modeling
- Requirements Verification
- Requirements Validation
- Requirements Architecture Definition
- Design Options Definition
- Potential Value and Recommend Solution Analysis
- Solution Performance Measurement
- Solution Performance Measurement Analysis
- Solution Limitations Analysis
- Enterprise Limitations Analysis
- Recommend Actions to Increase Solution Value

7.10.4 Development of a Concept of Operations (ConOps)

During the Foundation phase, Dataview will work with WVDOT Staff to create a Concept of Operations to document the goals, objectives, system components, and stakeholders for the new ROW module. As part of the analysis, Dataview and WVDOT will collaborate to document:

1. ROW Application Objectives and Goals
2. User Information
 - a. Document ROW application stakeholders
 - b. Organization Structure and relationship to the ROW application
 - c. Major user groups, their roles and work tasks
3. System Operations
 - a. Document the high-level activities and interactions between activities and roles
 - b. Order of operations and workflow
 - c. Related Policies and Procedures
 - d. Opportunities for Business Process Improvement
4. System Interaction
 - a. Document the flow of information between related systems
 - b. Impact of new system on information flow
 - c. Impact of failure and Recovery approach
5. Infrastructure
 - a. Current Hardware and Software

b. Planned Hardware and Software

The document will allow the Dataview and WVDOT project team to put its vision on paper and gain stakeholder approval and consensus. In addition, providing an early blueprint of the overall strategy will reduce the project risk.

7.10.5 Technical Architecture and Infrastructure Design

Dataview's approach for the technical architecture and infrastructure design of the WVDOT ROW architecture draws on the Team's experience working in large-scale public sector implementations and proven industry leading technology platforms. This section identifies the approach, services, and major technical deliverables of the WVDOT ROW project.

7.10.5.1 Technical Assistance for Sizing and Procurement

For the ROW Solution, Dataview is proposing an on-premises solution sharing the existing wvOASIS ERP infrastructure. Dataview will work closely with the WV DOT at the onset of the project to collaborate on a capacity planning that will identify initial sizing requirements. As part of the analysis, the Dataview technical team will work with the WV DOT Functional and Technical teams to gather the existing transaction, user volumes, storage utilization and future growth trends. The goal is to document the existing infrastructure, new hardware requirements and plan for future capacity needs.

Dataview has included an initial hardware sizing in the proposal based on a typical deployment. While it should serve as a initial reference point for the proposed solution's hardware and software requirements, this hardware sizing will be revisited before the final provisioning process in order to validate any assumptions related to redundancy, scalability or performance that were made as part of our sizing process. Dataview will working directly with the WVDOT and wvOASIS technical staff in server provisioning and procurement, if any additional hardware needs to be purchased.

7.10.5.2 Technical Architecture and Infrastructure Design

The HUB Development framework employs an industry standard n-tier architecture based on ASP.net Core platform which provides a wide variety of deployment options based on the scalability and security requirements. The application presentation layer uses standard HTML, CSS and JavaScript. It does not use any browser specific extensions and features. This approach of using a browser based thin client eliminates any software distribution issues, minimizes network traffic, and supports ubiquitous user access from outside of the organization's infrastructure if required. All traffic is over HTTPS (secured sockets layer for encryption support) providing the necessary level of security.

The HUB application architecture is very simple to deploy and scale. The figure below shows the basic technical architecture of a HUB deployment.

HUB Architecture Overview

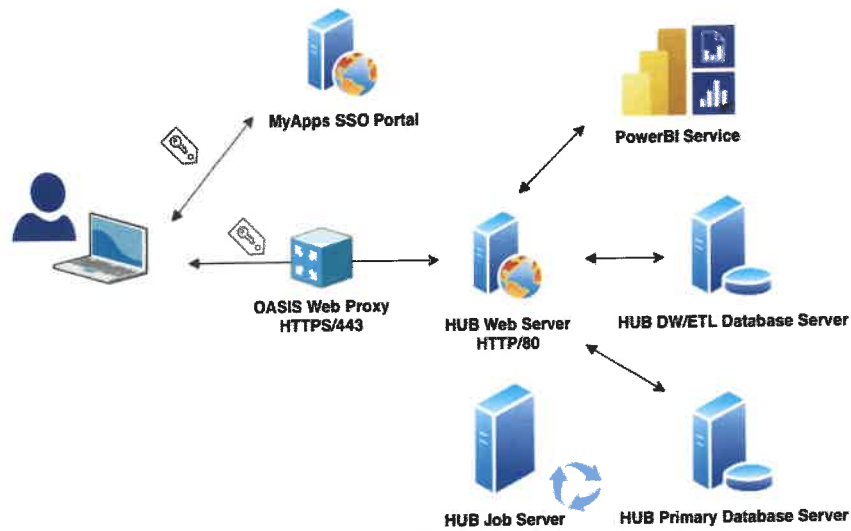


Figure 7 Hub Architecture Overview

The Dataview team will work with the WVDOT and wvOASIS ERP technical team to document all the system architecture components, installation, and configuration steps.

7.10.5.3 Configuration and Change Management Methodology

The Dataview team will implement a Configuration Management (CM) process to maintain reliable environments during the implementation. The Dataview Development team will use *Github* for version control software. It will be used to manage multiple iterations and will keep track of version history of development and configuration artifacts throughout the WVDOT ROW software development lifecycle.

Github tracked Configuration Items

Type	Configuration Item
Documents	<ul style="list-style-type: none"> ▪ Work products such as requirements specification, architecture document, and implementation model ▪ Analysis and design models ▪ Testing planning documents like unit test plan, system test plan, etc. ▪ Project plans ▪ Training materials ▪ User documentation ▪ Technical documentation

Type	Configuration Item
Source	<ul style="list-style-type: none">▪ Source code▪ Conversion scripts▪ Configuration files▪ Operating system shell scripts▪ Integration components (including SQL Scripts and SSIS transformations)

The existing wvOASIS JIRA Issue and Incident Tracker will be used to track issues, migrations and environment related configurations across environments.

Dataview will also assist WVDOT to setup up version control code repository upon delivery of the final build to the WVDOT. The processes and procedures to manage the configuration and change management activities will be documented in the Configuration Management Plan.

7.10.5.4 Initial Software Installation

The ROW module will be an additional module built upon the HUB Development framework. The Dataview technical team will do an initial installation with the initial build of the ROW release. The goal during the initial deployment is to rapidly have an environment to start the product demonstration as part of the sprint review and to start the implementation of a change management process to manage changes for the project. The first development environment will be setup in Dataview's azure environment to expedite the project kick off. The later environments will be setup on-premise in the States data center, based on project schedule. Our general order of installation begins with the baseline/prototype environment, following by development, testing, UAT, training, pre-prod, and, finally, production. The team will follow the following steps in the installation of environments in the State data center:

- Work with wvOASIS IT team to provision a database server virtual machine and an application server virtual machine.
- Install SQL Server and IIS with on ASP.net core on the database and application server respectively.
- Install the application build and load day-zero database.
- Configure MyApps SSO and setup application security for State Project Team
- Finally, a series of tests are performed to verify the installation is complete and the components are working effectively.
- At the conclusion of the install process, the HUB framework application and its components are sufficiently functional to begin the initial configuration, demonstration, and prototyping phase activities.

During the installation process, the Dataview technical team will begin the knowledge transfer process with the WVDOT technical staff, as it is our goal to deliver a solution that is ultimately managed and operated by WVDOT.

7.10.5.5 Structure and Maintenance of Planned Database Instances

The HUB development framework uses a single, SQL Server relational database to store data for all modules, eliminating the need for data synchronization and data duplication. The transactional data within the operational database model has been normalized for high volume transaction processing with some de-normalization for performance improvements.

Dataview will deliver detailed installation documentation that provides step-by-step instructions on the deployment of the necessary database instance(s), as well as a day-zero database export file and Data Definition Language (DDL) SQL scripts to minimize the initial setup time. Dataview will also provide the necessary DBA expertise to assist with the setup the SQL Server database for both Production and non-production environments. Dataview will assist with the setup of any operational backups and data replication to DR site.

During the implementation process, multiple environments will be required to support testing, training and conversion and deployment. Dataview will factor these requirements into the hardware sizing process, and recommend a configuration with capacity from a hardware and storage perspective for these non-production environments. Typically, databases for training and unit testing are a fraction of the size of the production database. The conversion database generally becomes the production database or a full-sized system test database.

Considering the complexity of maintaining multiple environments and their associated databases, Configuration Management (CM) procedures will be setup for managing the database changes similar to handling code changes. The baseline day-zero DDL should be maintained, and any subsequent database changes will be maintained under the version control tool. As part of the CM process any fixes or customizations to the baseline DDL will be maintained in the version control software and first be applied to a system test environment and the DDL. The upgrade scripts should then be applied to the UAT environments and after sufficient testing should then be migrated to the production database as part of the migration process.

The Dataview DBA will also assist in support activities during project implementation such as copying test data across database instances or doing backup and restore to facilitate testing cycles. During the Performance tuning, Dataview will provide database recommendations to optimize database performance.

7.10.5.6 WVDOT ROW Environments

Dataview will work with the State team in installing and configuring the environments required to support the phased implementation of the WVDOT ROW Solution. The appropriate configuration management processes will be implemented to support the various environments

In the initial stage of the infrastructure setup, the environments required for the preliminary implementation activities will be defined and constructed. These environments are essentially for design, development and testing, with limited end user and transaction volumes. As the project progresses, other environments such as training will be established eventually resulting in the configuration of the production environment. The table below shows the planned environment that Dataview will assist in installing and configuring.

ROW Environment Types and Usage

Environment Type	Usage
Baseline (Vanilla)	An environment that contains the non-customized, delivered baseline HUB framework software

Environment Type	Usage
Sandbox	An environment available to do specific tests on the code. The environment is not used for delivery of any code to the WVDOT Test environments. Sandbox environments are used for different targeted proof of concepts.
Development	Initial destination for deployment of development and configuration artifacts and used by the Dataview Development teams for unit testing. Development environments are also used to support analysis, prototyping, and design activities. Multiple development environments could be built to support parallel activities such as interface and conversion development activities
System Test	Artifacts which pass unit testing are promoted to this environment for release/iteration testing by Dataview Testing team.
User Acceptance Test (UAT)	Artifacts which pass system testing are promoted to this environment for testing by the WVDOT Test team and supported by Dataview Team. Functional verification are the main priorities of testing activities occurring in this environment.
Training	To develop and provide training for each system functionality before the deployment to production. The number of training environments will be dictated by the number and type of training sessions being run concurrently. One of the training environments will be used by instructors to create the training material and used to populate the other training delivery environments.
Conversion	Database environment that will be used by the conversion team to execute mock conversion run in preparation for deployment of each phase and for data reconciliation. The Database environment will be sized commensurate with the size of the Phase. This is a temporary environment required till conversion activities are completed.
QA/Production Patch	An environment configured like Production with simulated production sizes; large enough processing and storage capacity to extrapolate full size performance and application behavior. Any patch that needs to be performance tested is tested here with a production-like hardware configuration.
Production	Environment sized to meet WVDOT ROW user and transaction load. Environment will be setup with Disaster Recovery architecture

7.10.5.7 Disaster Recovery

Dataview has considerable experience in working with the wvOASIS group in establishing and maintaining a hot site for disaster recovery and business continuance. Dataview has worked with the wvOASIS ERP team in configuring DR services, risk assessment, and planning, as well as implementation, testing, and training for these services. As both a software vendor and a service provider with experience developing, implementing, and operating large enterprise applications, the Dataview team comes prepared with a deep understanding of DR planning and services beyond what is expected from typical software vendors who have limited operational experience.

As part of the deploying the Capital Project Management module, Dataview worked with the wvOASIS ERP technical team in configuring and testing the application failover. This prior experience in configuring mitigates the DOT's risk in this new implementation.

Similar to the Capital Project Management System module, the new ROW module will use the wvOASIS Disaster Recovery infrastructure and processes that are audited annually. The Dataview team will work with the State technical staff in configuring wvOASIS Disaster Recovery setup with the NetApp storage infrastructure making frequent snapshots and replicating those snapshots to the Disaster Recovery data center.

As part of the project, Dataview will work with the WVDOT technical team to develop a relevant Business Continuity (BC) and Disaster Recovery (DR) Plan. The project team will meet with the WV DOT project sponsor and stakeholders to review the purpose and goals of the project to provide a common understanding of project activities, desired accomplishments, and modules or task that will be performed. The BC and DR Plans for the ROW implementation will address the following key objectives:

- To develop consistent DR Plans that allow team to respond to disastrous events and provide viable resumption and recovery capabilities
- To build prevention and mitigation controls into current processes in order to reduce the risk and impact of a disastrous event
- To create an iterative DR process integrated into the development of new business processes

In attaining these key objectives, the Dataview approach includes the following components:

- Determining the top BC and DR Risks.
- Do a business impact analysis to determine which data and functionalities are deemed most critical and should therefore be recovered immediately
- Develop the appropriate Recovery Point Objective (RPO) and Recovery Time Objective (RTO) for the application
- Identify the minimum resources required for immediate recovery including facility parameters, equipment, system software, data, staff, and time
- Provision for different type of backups : offline, online, incremental, cumulative incremental, and differential back-ups
- Setup replication tools or facilities used to supplement the recovery functions supplied by the RDBMS vendor
- Do mock failure to execute and validate DR architecture

Additional DR architecture, DR Planning and DR Execution details are discussed in later sections.

7.10.5.8 Performance Tuning

The Dataview implementation team includes Database, System and Application Administrators that have extensive experience in implementing, deploying and performance tuning of the enterprise applications. Dataview team will be directly involved in the implementation process, providing hands-on expertise and knowledge transfer related to performance tuning and maintenance of the ROW Solution. The team will work on tuning the solution at the database level, operating system and application server levels.

Dataview will work with WVDOT staff to review individual system and business processes and in an iterative process setup the configurations in the test environments.

- Cutover – During the Cutover stage the configurations tested in the test regions will be applied to Production in preparation for go-live. The final milestone in the Cutover Stage is production go live.
- Post Implementation –During the Post-Implementation stage the solution is maintained and support functions are transferred to WVDOT.

7.10.6.1 Approach and Methodology

The configuration activities occur primarily in the Foundation and Development stages. A repeatable methodology to design and implement configuration will be implemented during the phases.

The Application Administration Team will build a "Day 0" environment to establish, test, and maintain the initial table configuration. The initial configuration will be applied to the application during the Development Stage of the project to the "Day 0" environment. The Day 0 environment will then be used to create other environments, include training, system testing and UAT environments. The setup will include Application, Security and Workflow configuration.

File configuration will also begin in a "Day 0" environment and will be propagated to other environments as they are created. However, information such as server names and directories will be application specific and require changes for each application. The "Day 0" environment will be tightly controlled with access restricted to members of the Application Administration and Configuration team.

The Dataview Subject Matter Experts will conduct joint design sessions with the WVDOT team to identify solutions that can be achieved through configuration settings. Functional solutions to the stated requirements that can be provided through baseline configurations will be prototyped in the application. This will demonstrate configuration options and their impact on the system, providing WVDOT with information they need to choose the appropriate settings. Documents produced from the analysis and design activities will describe the configuration options selected to support the envisioned solution. These documents will be reviewed and approved by the WVDOT management team members.

The Configuration settings setup in the test regions will be included in the test scripts. Once successfully tested, the configurations will be applied to the "Day 0" configuration. If configuration errors are detected, procedures exist to correct the "Day 0" and other environments. The configuration is retested to confirm the changes are correct. This way, the "Day 0" environment is verified and preserved, and ready to be propagated to the production environment.

During cutover as part of the Production setup, the "Day 0" environment configurations will be migrated to Production.

7.10.6.2 Validation

Testing for configuration validation will incorporated into System, Integration and Acceptance test scripts. System Testing activities will directly review business and application configuration settings are set properly. System Testing will also verify that the selected configuration options produce the required processing results. Integration Testing will validate a series of business activities function properly to meet the WVDOT's business needs, which are dependent upon configuration selections made for the

WVDOT. User Acceptance Test case scenarios will be built around WVDOT's business requirements and procedures.

7.10.6.3 Documentation

The finalized configuration options will be incorporated into the specific user documentation, such as the user guides, testing material, training materials run sheets and Workflow Administration Guide.

7.10.6.4 Knowledge Transfer

The Dataview team will work collaboratively with the WVDOT team members to ensure that there are many opportunities to learn about the system configuration. This begins in the Foundation through system training and participation in the system analysis and design. It is strengthened in the Development Stage, through assisting with configuration setup and review of testing materials. It is emphasized in during User Acceptance Testing, as users execute the User Acceptance Test scripts designed to reflect the business requirements. And finally, it is appropriately disseminated to staff members in the Implementation Stage through knowledge transfer and formal training sessions.

7.10.7 Security Configuration

7.10.7.1 Overview

The Dataview application security implements an approach that leverages multiple layers of access control to prevent unauthorized use of system, maintain system process controls and log all transactions. This section provides an overview of the Dataview deployment best practices to implement security and the HUB framework security architecture. Dataview will collaborate with the State to identify and refine the deployment and maintenance of security controls to meet the State's needs.

Our approach is to integrate applications, data, infrastructure, network security, governance processes, and controls. We organize the services by security service domain:

- **Identity Management and Access Control Services** – refers to the services for the creation, modification, and deletion of users including authentication, access control to data, and processes, and supports separation of duties. The ROW application will integrate with MyApps using SAML2 token for identity management and authorization control.
- **Data Protection Services** – involves maintaining the integrity of the WVDOT ROW data, including the processing of sensitive data leveraging data encryption, masking, and digital signatures.
- **Infrastructure Security and Protection Services** – security measures taken to prevent the network from being accessed by unauthorized users or compromised in any way. This includes intrusion protection and detection and protection from viruses, denial of service, and other Web-based threats. The Dataview team will work with the wvOASIS ERP infrastructure team and State Security team to follow and implement the necessary infrastructure security standards.
- **Audit and Logging** – refers to security features that maintain the necessary transaction logs for system administration and auditing purposes. The HUB development framework provides ability for every transaction is logged and time stamped for monitoring.

7.10.7.2 *Application Security Controls*

The HUB Development framework provides a robust set of user security rules based on the industry standard approach of Role-Based Access Control (RBAC). Each user has a security role or multiple roles assigned to them. The roles can be grouped into a Role Group for easier maintenance. When they logon to the system, their role, or roles, will control access to application screen, fields and tables. The HUB framework performs a series of checks to verify whether a particular user has access to perform the action being requested.

7.10.7.3 *Implementation Methodology*

Dataview will work with the WVDOT Security Team to create the Security Administration Plan. The Security Administration Plan that will provide the foundation for security administration and provide a blueprint for the configuration of security. The Security Administration Plan, implementation tools, and accompanying training will help the WVDOT to converge on a security approach and design that best meets the State's needs and allows for the necessary analysis and design iteration and refinement. The key will be to start early, involve both the technical and functional teams, and execute tests of real business scenarios during security testing activities.

The assignment of user security profiles will be done leveraging information such as job classification, as well as an understanding for specific operational responsibilities.

Our approach will be to design a security configuration with granular building blocks that allows flexibility in establishing security User Groups, where a group represents a group of security roles that are commonly applied together. This approach allows for the definition of enterprise-wide security building blocks that can be used for different common user profiles. The standardization of security will simplify maintenance of security configuration and support the ability to audit security compliance with rules and regulations.

With the Security Administration Plan in place, we will perform initial activities that establish the people, processes, and procedures, and foundational activities from which to roll-out security implementation.

Key Security Activities and Primary Responsibilities

Security Activity	Primary Responsibility	
	Dataview Team	WVDOT
Train WVDOT ROW Project Security & Workflow Team	✓	
Gather Foundational Materials (Internal Control Plans and User Metrics)		✓
Identify WVDOT Security Policies		✓
Draft Security Administration Plan, with configuration for security groups, security roles, user profiles, data level security, infrastructure and sensitive data	✓	

Approve WVDOT ROW Security Policies		✓
Review Security Administration Plan		✓
Create WV ROW Application Security Templates for different role groups	✓	
Update Templates with Users and Security Roles		✓
Apply Security Templates	✓	
Create and Test Application Security Configuration	✓	
Approve Security Administration Plan and Security Configuration		✓
Provide post Roll-out User Security Maintenance		✓
Monitor Security Compliance		✓

7.10.8 Customizations, Enhancements & Modifications

Dataview is proposing a custom ROW application module built upon the HUB Development framework. Based on our experience working with WVDOT for the Capital Project Management module for HUB, we feel that a custom development will best fit the unique needs of WVDOT. Dataview will work with WVDOT to maximize the use of configurations to meet the business requirements, though custom development work will be necessary to conform to State requirements. All the custom development will be baselined and the enhanced source code also made available to the state for future maintenance and modifications. All custom development will be documented in such a way as to ensure ease of reapplying when WVDOT applies new releases of the software in future years. The estimated cost of the customization associated with the requirement matrix have been included in the Dataview Cost Proposal.

Dataview has refined its development process working with WVDOT on the Capital Project Management Module of the HUB. The team will continue to leverage the best practices for development identified as part of that implementation and refine the process based on lessons learnt.

The HUB Development framework is built using ASP.Net Core framework and leverages Bootstrap and Telerik UI libraries. Core application customizations and development is done using Visual Studio. The other tools used by the development team are:

- Microsoft SSIS
- SQL Server Management Studio
- PowerBI Reports and Dashboards
- Workflow Designer

Working collaboratively with the WVDOT staff, the Dataview team will create and refine user stories for the different business requirements. Once review and finalized, the user stories will go into the Product Backlog list to get assigned to the Development team for a specific sprint. Based on the type of enhancement and the skill required (core framework, UI, Report or BI), the development activity will be assigned to a specific resource.

7.10.9.3.1 Requirements Validation

The Requirements Validation step of the interface methodology is intended for the WVDOT and the Dataview Team to review and confirm understanding for those interface-related requirements.

7.10.9.3.2 Functional Design

Interface requests approved by the WVDOT Team then proceed to the Functional Design step. The purpose of the Functional Design is to establish the layout specifications and the method to be used for exchanging data with the interface partner.

7.10.9.3.3 Development of Interfaces

Dataview technical team will implement the ROW Solution side of both inbound and outbound interfaces. WVDOT or other partner system owners will be responsible for developing and unit testing programs that extract data from legacy systems using formats and protocols defined by Dataview. In addition, WVDOT or partner system owners would also be responsible for development of programs to load data into legacy applications.

7.10.9.3.4 Test Data

Following the Development step, our methodology requires that three distinct sets of test data be available to conduct interface testing.

- **Small volume file - emulated data** – used to verify basic interface processing logic. These initial interface files are often created through emulation rather than by the actual systems that will create the files.
- **Small volume file - real data** – intended to mimic typical production data values. This second set of interface files are to be created by the actual systems that will create the interface files.
- **Full volume file - real data** – intended to support testing that simulates anticipated production conditions.

Responsibility for providing this test data depends on the direction of the interface relative to the new ROW system. Test data for inbound interfaces will be the responsibility of the WVDOT, whereas test data for outbound interfaces will be the joint responsibility Dataview and WVDOT.

7.10.9.3.5 Testing of Interfaces

In order to maximize the quality, reliability, and performance of interfaces our methodology includes a rigorous, multi-stage testing step. Our first stage of testing, Unit Testing, is conducted by Dataview at the completion of development. At that point, the small volume generic data is used to verify that the interface functions as designed. Our second stage of testing involves System Testing. These tests typically involve small volume real data and are performed to verify the business function accuracy of the interface. The final stage of testing, User Acceptance Testing (UAT), is intended to verify that the interface is ready for production operations. This testing verifies that known issues have been addressed, that the interface is in place and properly configured, and that supporting procedures have been established. Each of these three testing stages will utilize the corresponding test data sets described in the Test Data section above.

Testing will involve the coordinated efforts of the WVDOT Project Team, the Dataview Team, and external interface partners. Dataview will conduct the tests on inbound interfaces to verify that the data is acceptable to the system. Any testing of the processes established to provide the inbound data is the responsibility of the interface partner. Likewise, Dataview will produce outbound interfaces, but it will be the responsibility of the interface recipient to test their processes for receiving and accepting the data.

7.10.10 Custom Forms

The HUB framework supports the following multiple approaches to satisfy the requirement for custom forms.

- The HUB framework MailMerge functionality allows Word document templates to be configured in the application.

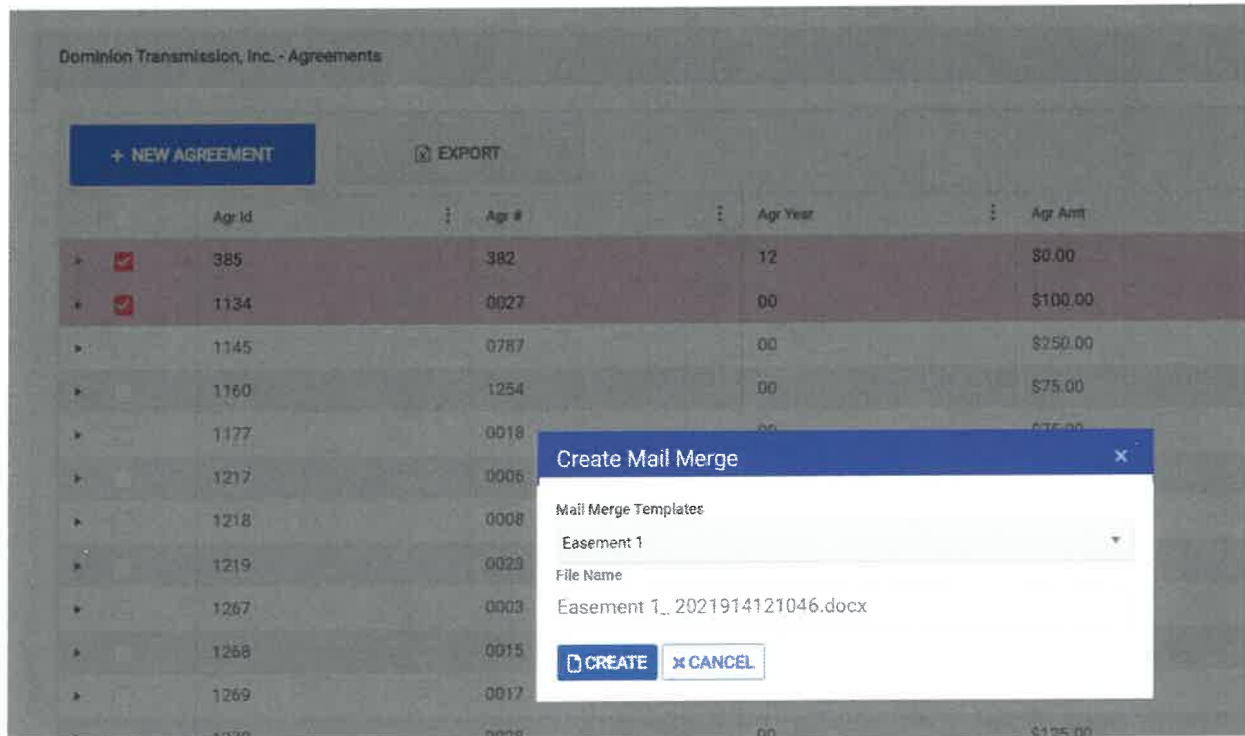


Figure 8 Online Mail Merge Feature

- PowerBI Reports can be setup to generate formatted output.
- Telerik Embedded reports can be configured in the application and generated formatted and printable output

These capabilities provide the ability for WVDOT to create letters, memos, and forms that incorporate application data with standard and common letter information. Based on business processes, the configured templates or reports can be merged with application data to dynamically populate each letter with information from the operation database or the data warehouse in conjunction with pre-written letter text. The output can be generated by the end user, online or on a scheduled batch mode.

Dataview will work with the WVDOT to create, configure and test the required custom forms.

7.10.11 Custom Reports

Dataview understands the requirement to develop custom reports identified in the requirements matrices and will work with WVDOT to identify and develop the necessary custom reports.

Dataview provides two reporting solutions that meet the business needs of any organization. Both solutions are integrated with the HUB framework and are easily accessible and managed by administrators and can also be organized by users from their personal landing page. Dataview also delivers a data warehouse that is built using industry standards. The data warehouse tables are denormalized into a star schema. Data integration uses SSIS ETL (extract, Transform, and Load) packages to move data from operational database into the data warehouse.

Standard Reports

Dataview HUB framework currently uses Telerik reporting, a mature reporting .NET reporting tool that is fully embedded and integrated within the HUB framework. It is fully capable of creating complex report with complex layouts, with different styles and can manipulate data easier and faster. It allows viewing and exporting of reports into multiple formats. The designer has a graphical interface with drag and drop capability of objects into the reporting canvas. Calculations use formulas similar to Microsoft Excel. This application can be used to deliver canned reports that are pixel-perfect formatted for printing. Power users and business users alike can be granted access to the reporting application like any screen to develop reports. Reports can be shared and dropped into the central repository. The report solution has an intuitive and easy to use graphical interface with drag and drop objects into the report canvas. This way frequently accessible reports are easily found and retrieved. The following screenshot displays the integrated designer web report application.

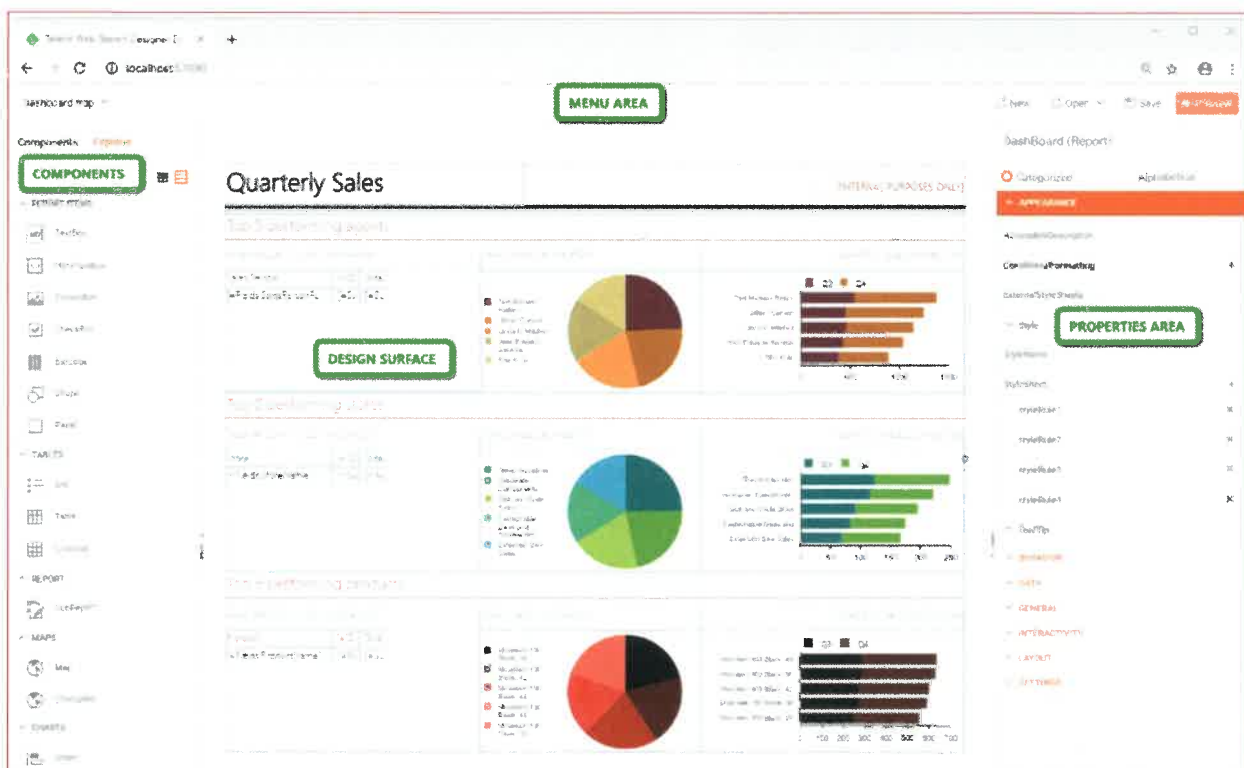


Figure 9 Web Report Designer

Power BI

Microsoft Power BI is the largest and fastest-growing business intelligence cloud solution. The HUB framework uses embedded power BI for integration. As a cloud solution, Power BI provides a BI platform to meet client compliance and regulation needs. Power BI reports and dashboards are managed from the HUB framework and users can access them like accessing any screen in the application. This provides a seamless integration and keeps users engaged and focus within one application

Power BI developers require an additional license to be able to develop, deploy and share reports with the user community. Developers can either use the service to develop dashboards and reports or power BI desktop. Power BI desktop is a client tool that requires an additional installation on the user's machine. Power BI desktop is used for creating data models as well as reports. While the power bi service is targeted to business users for development the Power BI desktop is reserved for power users and developers.

Power BI dashboards and reports are very interactive and allow users to interact with data dynamically. It supports multiple chart component, ArcGIS, Tables, Cards, Slicers and Filters among other components. When reports and dashboards are developed using these components, the interactivity across these components is seamless and allows users to zoom in and out of data effortlessly. The following screenshot displays a sample dashboard using Power BI.

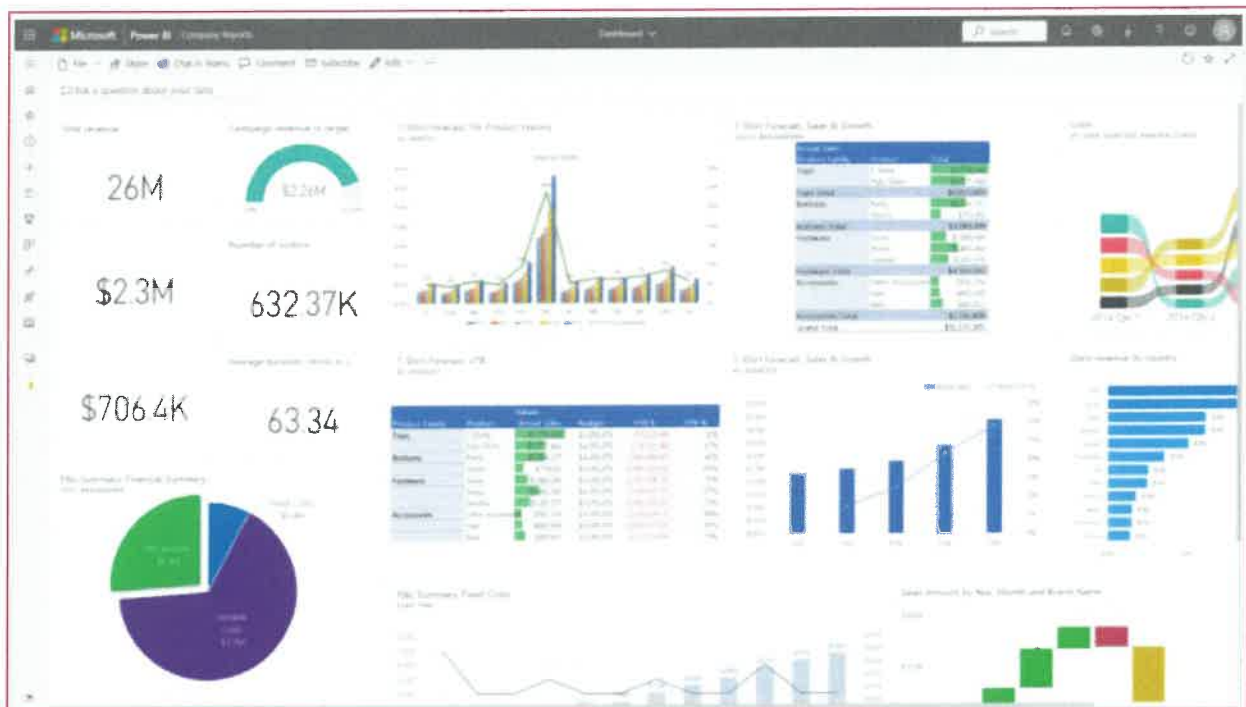


Figure 10 Power BI Dashboard

7.10.12 Custom Workflow

We recognize the WVDOTs desire, as presented in the RFP, to re-engineer existing approval requirements and rules, along with any modifications, in addition to creating new electronic workflow capabilities to streamline and enhance the efficiency and effectiveness of the business processes and increase collaboration and sharing within the organization. The HUB framework includes an embedded ASP.net workflow engine (<https://workflowengine.io/>) that provides safeguards, restrictions, and mechanisms to address WVDOT's workflow requirements. The workflow engine is tightly integrated with the HUB application user and security setup to provide seamless business process flow. Web Service based API is available for integration of the workflow engine with external systems if required.

The HUB application has the capability to be setup with one or more inboxes showing the tasks that the user needs to review and act on and outboxes to show activities that are pending action from other users.

From a high-level perspective, the HUB workflow is based on workflow rules that are established for different workflow objects. An embedded workflow designer that supports BPMN notation or XML rules files can be used to setup or modify the workflow rules.

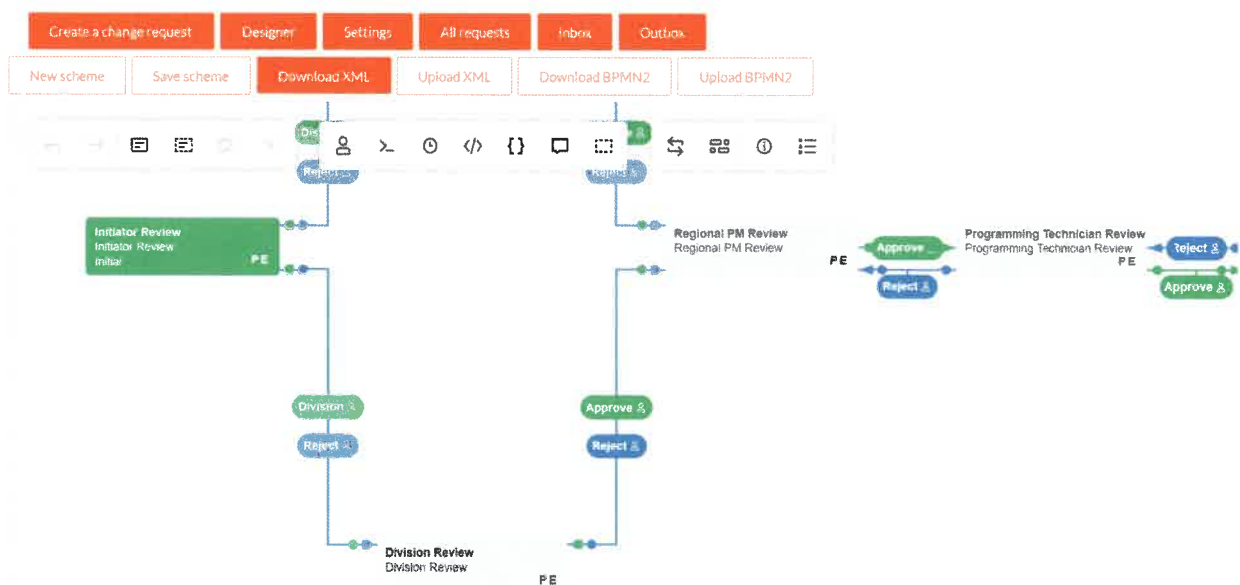


Figure 11 Workflow Designer

The Dataview team will work with the WVDOT functional staff to review requirements and implement the necessary workflows. The primary activities of the workflow task area are to determine workflow needs and to design, configure, and test an application workflow model. This

approach is a critical factor in successfully deploying processes and workflows in complex, multi-phase implementations:

Requirements Validation – The Dataview team will work with the WVDOT team to review and confirm an understanding of the workflow requirements

Define Approach – Dataview team will present and approach to the WVDOT team for implement the workflow rules for the requirement. Its purpose is to ensure that the affected areas are in agreement and to help the WVDOT to finalize a decision on the implementation approach for the WV ROW project. The Dataview presented approach will be a vehicle to facilitate discussion on key decisions the WVDOT must make regarding workflow implementation.

Configuration and Build Step – Once the approach has been approved, a corresponding user story will be written and added to the backlog for implementation in a given sprint.

Testing - Workflow setup will also be subjected to System, Integration and User Acceptance Testing. The System Testing will verify Workflow controls are configured appropriately, routing documents through the proper channels

7.10.13 Data Conversion

Dataview understands that successful data conversion is not a purely technical endeavor, and requires more than the mapping, development, and execution of an automated translation of legacy data to new target data structures at cutover. It requires a thorough analysis of legacy and target functionality and supported business needs, an understanding of the overall system cutover plan, and close coordination between related functional and technical areas.

To ensure successful data conversion, Dataview experts will conduct / facilitate the following activities:

- **Tools and Deployment:** Install and produce initial conversion prototypes using ETL (Extract Transform Load) and other tools.
 - Dataview has expertise with multiple ETL and reporting tools and platforms, including SQL Server SSIS / SSDT / SQL staging tables, views, and stored procedures / PowerBI / Microsoft Access and Excel
 - While Microsoft tools are recommended and anticipated to accommodate HUB ROW data conversion needs, Dataview also has experience with other platforms and tools such as Oracle, DB2, Pentaho Data Integrator, and Pervasive (Actian) Data Integrator
 - Conversion artifacts, such as required queries, views, stored procedures, and ETL packages will be tracked, managed and deployed via version control software, with Git recommended as the preferred tool.
 - All conversion artifacts required to populate an instance of HUB ROW application will be grouped into a conversion “build”.
 - Conversion artifacts must be configurable and deployable as part of “builds” to support data migration in each application instance (Sandbox, Development, System Test, User Acceptance Test, Production) in concordance with corresponding application build levels. A conversion build should be deployable to any application instance in its entirety or by artifact.

- **Analysis, Design, Development, Unit Test, and System Test:** Use agile methodology to define data conversion requirements and develop conversion approaches to best accommodate each conversion need.
 - Conduct Scrum sessions to define the effort to create and refine required data conversion transformations and mappings, produce ETL artifacts and routines, define reconciliation steps, and document results for each unit to assure accuracy and completeness. Each artifact will define the extract from source, necessary transformation, and load to a specific target.
 - CSV / Excel, flat file, XML, ADO, OLE, and ODBC are among the many source and target connectors supported out of the box by SQL Server SSIS, which accommodate the following listed conversion sources:
 - For Right-of-Way, a number of offline systems and spreadsheets will be utilized to assemble information about parcels being acquired and relocation assistance in progress.
 - Property management information will be converted from the REMIS system, with some information potentially drawn from wvOASIS or offline systems and spreadsheets.
 - For Utility Relocations and Railroad Agreements, information for active relocations and agreements will be converted from the current Utility Relocation database, with additional new information being captured in the system then added manually
 - Create overall conversion plan to highlight any assumptions, timings, volume, order of execution, known data translation limitations, and contingencies. Define expectations, dependencies, durations, and handoffs to support data conversion as part of an overall cutover plan. Sensitivity and security of all data elements while at rest or in motion must also be considered. The conversion plan should discuss and define the approach to accommodate data that is “historical” as distinguished from “live” data to support ongoing business in production.
 - Retain conversion ETL artifacts and legacy conversion sources (as desired) post-cutover to provide tracking and auditability between legacy and new production over time.
- **Methodology:** Work with blended client / Dataview team of technical and functional resources in Scrum sessions to evaluate each conversion source and target, and assign to one of 3 conversion methodologies (automated, semi-automated, manual) that best suits each specific conversion’s volume and complexity to minimize risks and ensure success.
 - Automated methodology is the preferred approach, which uses ETL tools to extract and translate directly from legacy sources to load to the corresponding conversion targets. Data sources may include direct DB connections to legacy, exposed services in legacy, or provided extract files.
 - Semi-automated methodology uses ETL tools where partial rules can be defined but implies that expert analysis and intervention from SMEs may be required where rules cannot be completely codified to produce load-ready results. Data

sources for semi-automated conversions may include direct DB connections to legacy, exposed services in legacy, or provided extract files. However, these conversions will likely involve an interim data format (like Excel workbooks) to allow users to analyze and correct omissions or errors.

- Manual methodology describes the approach to directly key low-volume or static values directly into HUB ROW application where level of effort for design and development exceeds that of manual entry
- **Data Cleansing:** Identify, define, and list manual or programmatic activities to resolve source data issues (for example, incomplete or malformed data from disparate sources) to be addressed preceding or within data conversion extract, transformation, or load process.
 - Data cleansing is a shared responsibility between Dataview and client SMEs.
- **User Acceptance Test:** Define objectives, environments, participants, and file size/data limitations for user acceptance testing of data conversion.
 - Dataview and client functional experts would confirm that converted data is accurate and meets business needs as part of the target application(s) before proceeding to Mock Conversion.
- **Mock Conversion:** Conduct at least 2 documented “dry runs” or “dress rehearsals” of all cutover activities associated with data conversion using production data volume and configuration, if possible, to confirm timing, scheduling, and any interdependencies that impact the production cutover plan.
 - Mock conversions will include the validation, verification, and reporting strategy to be used for production cutover.
- **Validation and Verification Strategy:** Define and confirm the validation and verification strategies to confirm complete and accurate data conversion execution.
 - Validation makes sure that converted data is clean, functionally correct, and meaningful. In short, validation confirms that the ETL process is properly applying the business rules in data transformation. Validation typically involves sampling of converted data by functional experts who are most familiar with the business needs and functionality of both the source and target systems.
 - Verification makes sure that converted data is complete, well-formed, and accurate. Verification activities include row counts, summary totals, and query / report comparisons. Verification typically happens before converted data is released for functional review, and is largely a technical responsibility that ensures all necessary data is present and meets pre-defined programmatic requirements.
 - In combination, validation and verification ensure a complete and thorough reconciliation of data conversion results.
- **Error Corrections and Reconciliation:** Identify the steps to address errors that are detected as part of reconciliation, including restores and conversion re-execution.

7.10.14 Testing

At Dataview, we have established a comprehensive testing framework and strategy to make certain that the delivered software exceeds the quality standards held by our customers. Our methodologies are integrated directly with our agile software development model and consist of both manual and automated tests. Our methodologies ensure that the software is continuously verified for correctness, quality, and performance before incremental delivery.

Testing services include:

Unit tests: Consist of testing individual methods and functions of the classes, components or modules used by the software.

Integration tests: Verify that different modules or services used by the application work well together.

Functional tests: Focus on the business requirements of an application. They only verify the output of an action and do not check the intermediate states of the system when performing that action.

End-to-end tests: Replicates a user behavior with the software in a complete application environment.

User Acceptance testing: Formal tests are executed to verify if a system satisfies its business requirements. These tests are performed by end-users.

Performance testing: Check the behaviors of the system when it is under significant load. These tests are non-functional and can have various forms to understand the reliability, stability, and availability of the platform.

Smoke testing: Basic tests that check basic functionality of the application. Their goal is to give you the assurance that the major features of your system are working as expected.

7.10.15 Training

Working with WVDOT, Dataview will conduct a Needs Assessment during the Foundation phase of the project to determine their training needs by role. Dataview uses surveys and interviews to gather data from State staff. The Dataview project training team works with other project teams and the state to gather data about the system to determine the training needs. The Training Plan is based on this Needs Assessment. The Training Plan will outline the different user roles and the appropriate training for each role.

This analysis is a thorough review of all training waves, including a confirmation of trainee profiles and finalization of the required curriculum. WVDOT and Dataview will jointly complete the Audience-Needs-Analysis during the Foundation phase. A modular and role-based curriculum, at the business process level, will be defined. For example, an Administrator staff member may take several courses, including Getting Started (to learn about how to navigate in ROW application), and FHWA Billing (to learn about how to prepare receivable documents for this purpose). All courses in the curriculum will be

grouped by business or technical area, have a description that outlines the content, course number/code, indicate duration or length, list objectives, and will be identified with a number and type (e.g., self-guided, instructor led, etc.). Based on analysis, the following types of training may be provided:

- Core Project Team Training
- Technical Training
- User Acceptance/Test Training
- End User Training
- Ongoing End User Training

Additional details on the Training approach and deliverables are available in Tab 6.

7.10.16 Documentation

The ROW module will be delivered with a full complement of documentation, regarding product installation procedures, operational needs, user interaction and system development. Dataview will provide the following documentation:

- **Installation Guide** - provides basic installation and configuration steps for HUB framework software and the other products needed to run it.
- **System Administration Guide** - helps system administrators initiate, configure, monitor all processing for the solution.
- **User Guides** - provide basic knowledge and understanding of ROW functionality through detailed description of its functions and capabilities.
- **Release Notes** - itemizes changes to software since the prior release or build
- **Upgrade Guide** – For major releases, provides instructions for installation and configuration of the new software

The manuals described above are provided in PDF format. In addition to the manuals, context-aware help information will be available through the application.

During the project implementation, as changes to the software are identified and designed, the supporting documentation will also be updated to reflect the changes. Such changes will affect the User Guides and System Administration Guides. The updated documentation will be delivered with the modified software and will be reviewed as part of the testing process. When errors are found, they will be reported as defects, tracked and re-assessed once the changes are applied.

Additional changes may be made to reflect decisions regarding policies and procedures specific to the WVDOT. These will be included in the review and approval cycles along with other deliverables

7.10.17 Production Cutover Planning

The Dataview Team recognizes the importance of an organized, well-orchestrated and coordinated cutover to production. Our approach to system implementation and production roll-out consists of a series of planning activities and tasks focused on moving system components

to production, executing the final conversion run, and implementing the solution functionality in production.

Dataview will work with the WVDOT to develop a comprehensive Deployment Cutover Plan that addresses the activities required to bring the ROW module into production. Planning for this critical period begins early in the project and continues to the point of finalizing the plan components. The table below summarizes the tasks associated with cutover planning.

Deployment Cutover Planning Tasks

Task	Description
<i>Implementation preparation</i>	Defines order and timing of Tasks that will be done in preparation for installation and production
<i>Schedule</i>	Establishes the schedule for the roll-out
<i>Process and procedure testing</i>	Defines the validations performed during production pilot to test operational readiness
<i>Risks and mitigations</i>	Defines the risks to implementation and how those risks are mitigated
<i>Detailed implementation map</i>	Provides a roadmap of the cutover tasks, including system roll-out, conversion run, approval signoff, go- no-go, and manual procedures
<i>Contingency plans</i>	Outlines the contingency plans that will be in place if implementation issues arise with a focus on business continuity should system rollback procedures become necessary
<i>Conversion</i>	Defines the production conversion run in terms of timeframe and tasks
<i>Production</i>	Defines the solution components and procedures that will be followed during production
<i>Support transition</i>	Describes the process of transition support
<i>Roles and responsibilities</i>	Details the roles and responsibilities for each team member and group during cutover, production, and the support transition period
<i>DBA procedures</i>	Lists the procedures that will be followed by the database administrator when making change to the database
<i>Production turnover checklist</i>	Documents the format and content of the production turnover checklist

Based on the deployment cutover planning the final **Contingency Plan** and the **Deployment Cut-over plan** deliverable will be created that will identifies the timing, tasks, and sequence associated with deploying and cutting over to the new ROW Module solution, shutting down existing legacy solutions, coordinating interfaces, executing conversion, validating cutover tasks, and communication processes during cutover.

7.10.18 Production Cutover Checklist

Dataview has considerable experience working with both WVDOT (for HUB Capital Project Management module) and wvOASIS ERP (for various ERP modules) in creating production cutover checklists and managing Production cutover activities. Dataview will work with WVDOT to conduct a readiness assessment to assess whether operational processes and components are defined and appropriately staffed.

Predefined spreadsheet templates will be developed for different areas, such as functional readiness, reports, interfaces, conversions, end-user training and departmental readiness. The project teams in each area will complete the templates and provide a self-rating of green, yellow or red with comments where appropriate.

The Project leadership team will then review the readiness assessment and conduct interviews if any clarifications are required. Upon completion of the interviews, the team will provide a written report, usually within one week of the onsite visit which contains their findings and recommendations.

The goal of this transition management activity is to assess readiness based on the state of the organization, results of user training, presence of user support and problem resolution processes, and the readiness of the technical infrastructure. This activity is a pre-cursor to the Executive Stakeholders in their required Go/No-Go decision. Once WVDOT has determined it is prepared to go live and fulfill operational roles, the system implementation and cutover process can begin.

The Production cutover is guided by a comprehensive a Cutover Checklist which lays out detailed steps for making the new system operational. They specify how the system cutover will be accomplished, list tasks, roles and responsibilities, and contingencies/fallback strategies. Below is the sample of the cutover checklist from the Capital Project Management module cutover.

ID	Work Item Type	Mock Target Date	Target Date	Estimated Hours	Title	Assigned To	Client Support Team	State
8040	Task	9/26/2021 0:00	9/30/2021 0:00	0.25	Point PowerBI Reconciliation reports to Prod DB	Sean Burner		To Do
8019	Task		9/30/2021 0:00		Switch powerbi Workspace IDs to point to production	Chad Alford		To Do
9490	Task		9/30/2021 17:00	0.25	Verify RIL data matches FMIS	Ryan Brown	Yueming; Karen	To Do
7994	Task		10/1/2021 0:00		Update latest RIL external tables	Ryan Brown		Done
8074	Task	9/24/2021 8:00	10/1/2021 8:00	0.25	Dataview pull data if any mismatched FMIS and OASIS CFDA Numbers	Olga Ekberg		Done
8075	Task	9/24/2021 0:00	10/1/2021 0:00	1	Denise correct CFDA data in Oasis	Olga Ekberg	Denise	To Do
8076	Task	9/24/2021 0:00	10/1/2021 0:00	0.25	Dataview verify data correction	Olga Ekberg		To Do
8018	Task	9/24/2021 0:00	10/1/2021 0:00	3	Create the build	Chad Alford		Done
9425	Task	9/24/2021 0:00	10/1/2021 0:00	2	Execute seeding	Chad Alford		Done

Figure 12 Sample Production Cutover Checklist

7.10.19 Production Maintenance and Support

Dataview is proposing that the WVDOT, similar to the HUB Capital Project Management module, use the existing wvOASIS infrastructure and the State data center to deploy the additional ROW module. This approach allows the project to leverage the existing tools and technologies that WVDOT and wvOASIS ERP technical staff is familiar with. Dataview will work with the State technical team to build expertise and confidence in supporting the solution in production operations. Dataview will provide onsite support during the Post Implementation stage. During this time, Dataview will assist WVDOT and wvOASIS ERP staff in monitoring operations and resolving incidents reported by users. Dataview support team will manage and present a Production Incident Log.

Before the ROW Module production operations begin, Dataview will designate a primary contact to work with the implementation team and to oversee responses to the reported productions issues.

Dataview has proposed 6 months of Post Implementation Operations support after the project goes live assisting with operations monitoring and working with the State on training to transition the production operational activities. During this period, Dataview will provide support in the following areas:

- Production operations monitoring - Dataview will work with WVDOT and wvOASIS ERP staff to monitor ROW production environment.
- Production incident resolution - Incident resolution will be a joint effort between Dataview and the WVDOT. The Dataview staff will coordinate incident resolution and triage activities with the WVDOT and wvOASIS ERP staff as needed.
- Recommended adjustments to operational procedures
- Post-production conversion activities
- Provide Transition Training to State technical for ongoing maintenance and support

Once the post-implementation period has elapsed, Dataview will transition from onsite support of daily operations to providing telephone and/or web-based support on an on-call basis.

Dataview will provide training to help ensure that State personnel have the necessary skills to operate and maintain the system once in production. Once operations are handed off to WVDOT, the State personnel will perform all operations and system administrative functions with assistance as needed by Dataview. This training will include: systems operations, including system startup, job scheduling, and any other tasks necessary to operate the system.

7.11 SYSTEM SUPPORT SERVICES

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.

7.12 BUSINESS CONTINUITY PLANNING

Dataview has considerable experience in working with the wvOASIS group in establishing and maintaining a hot site for disaster recovery and business continuance. Dataview has worked with the wvOASIS ERP team in configuring DR services, risk assessment, and planning, as well as implementation, testing, and training for these services. As both a software vendor and a service provider with experience developing, implementing and operating large enterprise applications, the Dataview team comes prepared with a deep understanding of DR planning and services beyond what is expected from typical software vendors who have limited operational experience.

As part of the deploying the Capital Project Management module, Dataview worked with the wvOASIS ERP technical team in configuring and testing the application failover. This prior experience in configuring mitigates the DOT's risk in this new a implementation.

The following is a detailed outline of our Best Practices approach to develop a relevant Business Continuity (BC) and Disaster Recovery (DR) Plan. The project team will meet with the WV DOT project sponsor and stakeholders to review the purpose and goals of the project to provide a common understanding of project activities, desired accomplishments, and modules or task that will be performed.

The BC and DR Plans for the ROW implementation will address the following key objectives:

- To develop consistent DR Plans that allow team to respond to disastrous events and provide viable resumption and recovery capabilities
- To build prevention and mitigation controls into current processes in order to reduce the risk and impact of a disastrous event
- To create an iterative DR process integrated into the development of new business processes

In attaining these key objectives, the Dataview approach includes the following components:

- Determining the top BC and DR Risks.
- A business impact analysis to determine which data and functionalities are deemed most critical and should therefore be recovered immediately
- Develop the appropriate Recovery Point Objective (RPO) and Recovery Time Objective (RTO) for the application
- Identify the minimum resources required for immediate recovery including facility parameters, equipment, system software, data, staff, and time
- Provision for different type of backups : offline, online, incremental, cumulative incremental, and differential back-ups
- Tools or facilities used to supplement the recovery functions supplied by the RDBMS vendor
- A DR Test Plan

7.13 RISK ANALYSIS

There will be an assessment of the risk of disaster to the ROW solution and any of the supporting systems. This allows the team to gain a better understanding of the goals of upper

management leading to a preliminary scope for project management and timing. The risk assessment determines what types of risks are present and will present the likelihood of each, allowing management to make informed decisions about the level of risk that will be accepted. The exhibit below summarizes the activities and results of this step.

Exhibit 2: Risk Analysis Activities and Results

Key Activities	Results
Evaluate potential interruptions and their probability	Expectations agreement
Develop detailed work plan	Detailed work plan
Identify, evaluate, and recommend project tools	Database of resource/asset inventories for Recovery
Risk Assessment Review back-up procedures Analyze exposures Identify critical records, systems, and networks Research DR strategies and events	Risk assessment report

7.14 BUSINESS IMPACT ANALYSIS

The business impact analysis works in conjunction with the risk assessment by giving management a reasonable estimate for losses in the event of a disaster. The risk model is used to gain insight into the State's business operation.

Exhibit 3 : Business Impact Analysis

Key Activities	Results
Evaluate business resources for criticality Determine Recovery Time Objective (RTO) and Recovery Point Objective(RPO) Evaluate potential interruptions Determine activities/operations recovery priorities Perform impact analysis	Impact Analysis Report

7.15 BACKUP PROCEDURE ANALYSIS

The next step is Backup Procedure Analysis. Throughout this step, the recovery expert will analyze the current procedures that are in place, how often they are performed, what types of backups are done, and what types are required. The ultimate goal of this step is to understand what backup procedures are in place, what backup procedures are required, and what backup procedures should be added. These are summarized in Exhibit 3.

Exhibit 3: Backup Procedure Analysis

Key Activities	Results
Perform backup & replication analysis	Backup and storage requirements report

Review backup & replication strategy	Backup & replication methods and software report
Review backup & replication procedures	Backup & replication analysis
Perform storage requirement analysis	Backup & replication strategy recommendations
Review current storage requirements	
Review backup documentation	
Review backup verification documentation	
Review storage documentation	

7.16 MINIMUM RESOURCES ANALYSIS

In this step, Minimum Resources Analysis the minimum resources required for immediate recovery including facility parameters, equipment, system software, data, staff, and time will be identified. The results of this analysis will be a report to detail what is required at different levels of disaster recovery; for example, a 25 percent, a 50 percent, a 75 percent, or a 100 percent loss of functionality due to identified disasters.

7.17 BACKUP AND RECOVERY STRATEGIES

During the Recovery Strategies step alternative strategies to mitigate the risks identified will be formulated. Throughout this step, the recovery planning expert will work with business and wvOASIS ERP technical team to identify the best recovery and data replication solution based on existing tools and processes. The ultimate goal of this step is to provide management with complete information so that an informed decision can be made with respect to which recovery alternative is the most cost-effective and appropriate solution.

7.18 RECOVERY PROCESS

A plan will be developed based on the States infrastructure and then an evaluation is performed as to how to integrate this plan into the State's overall DR/BCP Strategy. The plan must address the resumption of work, the recovery procedures, and the restoration procedures. The plan will be fully documented and available for use in the event of a disaster.

Dataview will work with the WV DOT and the wvOASIS ERP team to make sure the plan is compliant with the overall recovery procedures and processes.

Exhibit 4 below shows a summary of the activities and results.

Exhibit 4: Recovery Process Activities

Key Activities	Results
Develop response plan for critical applications/technologies	Disaster Recovery Plan Prevention Response
Develop damage assessment requirements	Partial recovery Back outs

Develop migration requirements Identify operational requirements Develop restoration procedures Document team procedures Assist in the development of IT processing requirements	Resumption Recovery Restoration Recovery team procedures Change control procedures Recovery plan update procedures
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7.19 IMPLEMENTATION PLAN

As part of the implementation, the Dataview team will work with the State wvOASIS technical team to setup up the necessary database backups and server replication tools to implement the DR recovery.

7.20 TEST PLAN

The DR Test Plan will include the execution of a virtual test failover and recovery where the system is failed over to the DR site. Testing the DR Plan will make sure that the plan is correctly designed and implemented. Dataview will work with the DOT project team and the wvOASIS Technical team to execute the test plan and recovery. The DR Test may be executed for different phases of the project if there is a change in deployment architecture or major change in functionality. Key activities and results are summarized in exhibit below.

Exhibit 5: Test Plan Activities

Key Activities	Results
Test the DR Plan design	Documented Test Plan, with expected results
Plan the initial exercise	Documented initial exercise results
Plan a program for semi-annual exercising	Exercise log and documentation formats
Plan exercises for plan updates	Exercise criteria and evaluation techniques
Assist with the execution of the initial exercise	Semi-annual exercise plans
Evaluate the exercise results	
Revise plan, if necessary	
Conduct initial team training	Trained recovery team members
Conduct initial staff awareness training	Structured training materials

The Dataview Disaster Recovery/Business Continuity Plan for the ROW solution will provide the information needed to make certain that application is available and, in the event of disaster, recovery is possible. The DR strategy should be incorporated into the larger wvOASIS infrastructure plan

7.21 SOFTWARE REDUNDANCY & HIGH AVAILABILITY METHODOLOGY

Dataview will design the ROW application to be highly available to support end users and critical processes, outside of any planned downtime for business events and scheduled maintenance.

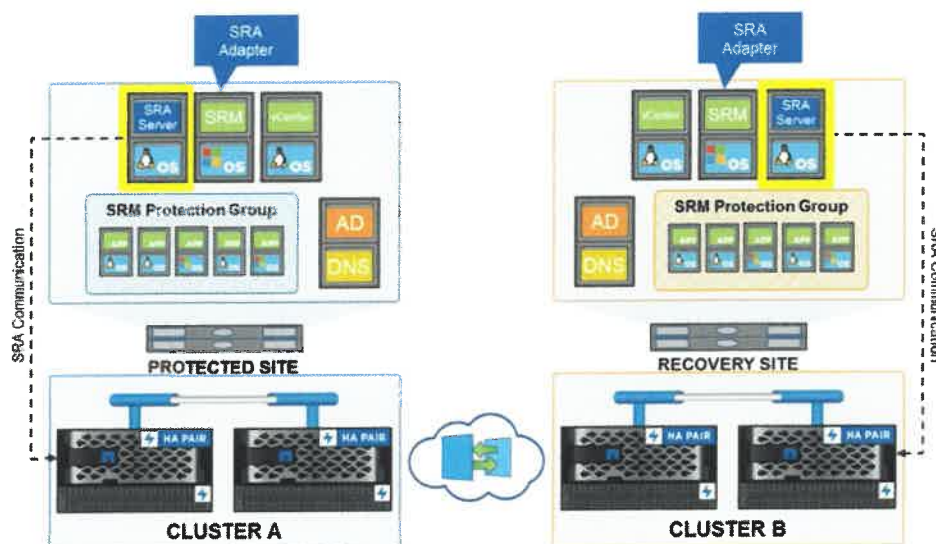
A major component of Dataview's strategy is to leverage VMWare virtualization to provide failover to reduce the probability of a failure. This approach provides redundancy and high availability without adding cost to maintain excess failover capacity.

The ROW Solution n-tier Architecture with its Web, Application, and Data tiers of our n-tier application architecture is well suited for a virtualized environment, with different application tiers setup for different levels of failover.

7.22 BUSINESS CONTINUITY CAPABILITIES AND HIGH AVAILABILITY INFRASTRUCTURE

Similar to the Capital Project Management System application, the new ROW application will use the wvOASIS Disaster Recovery infrastructure and processes that are audited annually. The figure below illustrates the wvOASIS Disaster Recovery setup with the NetApp storage infrastructure making frequent snapshots and replicating those snapshots to the Disaster Recovery data center. In the case of a Disaster Recovery event operations staff would follow the established ROW Disaster Recovery Runbook. At a high level this involves orchestrating the migration to the recovery data center with VMware Recovery Manager then performing any networking and server specific tasks like updating DNS records, Load Balancer/Proxy configurations, and Database recovery. The expected wvOASIS Recovery Point Objective is 30 minutes and Recovery Time Objective is 8 hours. Recovery Point Objective covers the maximum data loss and Recovery Point Objective is the time to restoration services once a decision has been made to cutover services.

wvOASIS Disaster Recovery setup



wvOASIS's VMware platform provide fast flexibility in scaling up server resources to meet increased workload demand; depending on the server type and resource these actions can be instantaneous or require a 15 minutes maintenance window delay.

7.23 DISASTER RECOVERY GUIDANCE AND EXECUTION

Any enterprise application system is vulnerable to disruptions ranging from mild to severe. The robust fault tolerant deployment architecture of the ROW application based on VMWare high availability architecture will reduce the need to failover to a secondary disaster recovery (DR) site.

While many of the disruptions can be minimized and handled by a high availability approach, as described in the earlier sections, severe disruptions are typically outside an organization's control and require an efficient DR plan. As described previously, the Dataview DR architecture will leverage replication to the secondary wvOASIS Disaster Recovery site. Under extreme conditions, the ROW application primary site may not be available due to some form of disaster, the application will failover to the remote WV wvOASIS DR site to quickly restore critical business functions.

As previously described, Dataview will work with the State to implement a highly automated disaster recovery failover architecture using VMware Site Recovery Manager and data replication technology in conjunction with the wvOASIS ERP DR best practices.

With the proposed system redundancy, failover processes, and DR processes, the ROW application will be highly available to support WV DOT users and critical processes with a high availability outside of scheduled maintenance and restrictions due to business events, within an environment optimized to also minimize the WV DOT's Total Cost of Ownership (TCO).

The following deliverables for Disaster Recovery and High Availability will be created:

- Disaster Recovery Plan and Test Results
- Application and Database Failover Test Plan and Results
- Operation Guide for database backups and recovery

The Dataview Team will work with the state to review and test the failover capabilities of the new ROW Infrastructure components. Before go live, the Dataview Team will execute a failover test by disabling different architecture tiers and validating the failover capabilities. The results of the failover test will be documented and shared with the state.

Performance Tuning

Capacity Planning

Dataview will work closely with the WV DOT at the onset of the project to collaborate on a capacity planning that will identify initial sizing requirements and define processes for continuous monitoring, assessment, and refinement of the Solution infrastructure. As part of the analysis, the Dataview technical team will work with the WV DOT Functional and Technical teams to gather the existing transaction, user volumes, storage utilization

and future growth trends. The goal is to document the existing infrastructure, new hardware requirements and plan for future capacity needs.

Application, Database and Web Server Tuning

The Dataview implementation team includes Database, System and Application Administrators that have extensive experience in implementing, deploying and performance tuning of the enterprise applications. Dataview team will be directly involved in the implementation process, providing hands-on expertise and knowledge transfer related to the tuning and maintenance of the ROW Solution. The team will work on tuning the solution at the database level, operating system and application server levels.

The HUB framework has been designed to log various application performance metrics to assist in performance tuning. These features will be documented and delivered as part of the standard documentation.

Dataview has developed a methodology for performance analysis and tuning of all the solution tiers, that is incorporated in the software development lifecycle. The process consists of the following four major steps:

- *Design Review* – Held during the application design/story board stage, a Design Review is a discussion-oriented session that is customized to meet specific business requirements identified by State team. The purpose of the review is to analyze solution architecture, evaluate the feasibility of the proposed design, identify potential problems (e.g., systems, network, data placement, application design), and document recommendations and alternative solutions.
The data conversion jobs will be reviewed to identify dependencies between the different conversion steps and opportunities to improve conversion steps using parallel execution. Large conversion steps will be identified for detailed performance testing. The available window for conversion will be taken in account to validate the strategy.
- *Testing for Indicators of Performance* – The traditional end-to-end performance tests are too late in the life-cycle of a project. A Test for Indicators of Performance (TIP) is a “light weight” performance test, during the implementation of ROW Solution. A TIP gives an initial/early “indicator of performance and scalability.” While an end-to-end performance test assumes a stable, complete application for which we will develop end user scenarios, workload mixes and appropriate database populations in order to simulate the performance and throughput expected in a production environment, a TIP does not assume anything other than bare application functionality and test data. The purpose of the TIP is to give an early warning indicator that can be tuned in time for the end-to-end performance test.
- Dataview will internally execute a TIP benchmarks during development stage for the different deployment phases to identify performance bottle necks early in the deployment and testing process. The results of the TIP will be used as input into a capacity planning exercise that will provide the broad specifications for the production

environment. Similarly large conversion jobs will be tested with a subset of data to identify performance metrics. The results will be reviewed with the intention of optimizing the process in order to meet the expected conversion window.

- **Regression Test**– Dataview uses Telerik Test Studio to build regression and automated test scripts. Our solution comes with a set of Telerik Test Studio regression test scripts and test data to conduct this benchmark. Periodic checkpoints will be taken during project implementation. These checkpoints will focus on confirming that the solution once completely implemented, will meet agreed upon performance goals. This will be done by executing the automated regression test. The objective is to confirm that there are no large fluctuations (relative to the TIP results) in our solution as software components are added/updated during the implementation cycle.
- **Performance Test** – Once the solution goes to UAT testing and is stable, a Performance Test will be executed. The performance test is a benchmark that will perform an end-to-end performance test to record network and hardware capacity for peak periods. In addition, any last bottlenecks in the system, like database lock contention, will be addressed. The benchmark workload will be based on WV DOT ROW requirements—this includes the average/peak transaction arrival rates and the number of total/concurrent users. Similarly, one or more mock conversion runs may be done that will execute the complete conversion to validate ability to meet the conversion window.

The results of a Performance test will be used to identify any application scalability issues and also to refine the production capacity and validate the hardware configurations.

Software upgrade methodology, tools, and templates

This section discusses the Software Upgrade Methodology that Dataview has developed to upgrade to future versions of the HUB Development Framework and the tools that should be used when upgrading.

When upgrading application software there are two perspectives that need to be considered: *Technical Perspective* and the *Functional Perspective*. The Technical Perspective entails viewing the upgrade in terms of the technical application enhancements associated with the upgrade, the system components to be upgraded, Hardware upgrade/refresh and the tools to perform the upgrade. The Functional Perspective looks at the upgrade in terms of the functional enhancements or customizations in the prior release and new functionality in the new release.

Dataview has established a methodology for upgrading the HUB Development Framework implementations which incorporates both the Technical and the Functional Perspectives. There are four phases for upgrading to a newer version of HUB Development Framework and follow a similar phasing as the initial project

implementation methodology. The standard stages involved in an HUB Development Framework software upgrade are described below.

- **Foundation** – The primary objectives of the Foundation stage are to evaluate the current environment's release version and to select the release version to be implemented, and to develop a project blueprint. The evaluation of the current environment includes areas such as technical architecture, customizations, interfaces, reports, and training. The project blueprint consists of selecting the upgrade release based on the enhancements and patches for each available upgrade release and comparing the current environment with the selected upgrade release.
- **Build** – The objective of the Build stage is to configure, integrate, build, and test the solution and transition components. At the end of the Build stage, the organization should be ready to migrate and operate the new system, business process, and work settings.
- **Implementation** – The primary objective of the implementation stage is to integrate the components from the Build stage with the rest of the organization's ongoing business.
- **Post-Implementation** – It mainly covers the support required after the Upgrade has gone live.

Dataview is proposing an enhanced annual maintenance contract for WVDOT. In the enhanced maintenance, besides access to the newest ROW module and HUB framework releases, Dataview will provide 320 hours of consulting and support services for upgrade and maintenance activities each year.

Each of these stages is described in more detail below:

Foundation Stage

The initial objective of the Foundation Stage is to evaluate the current environment. An accurate inventory of the current environment in the following areas should be maintained:

Hardware Architecture – The inventory includes listing all hardware in use as well as the configuration of each piece of hardware (such as operating systems, processors, memory etc.).

Software Architecture – The software inventory will determine the current release of including any maintenance or fix packs that have been applied as well as an inventory of all tools used (i.e., IIS Server, ASP.net version, 3rd party libraries used etc.).

Functionality Utilization – Assesses the baseline functionality utilized by the organization in the current environment. The result of the functionality assessment is a list of components in use.

Functionality Customizations – This assessment will examine customizations applied to the current ROW solution that are not in the baseline software.

Interfaces – The interface assessment will identify all baseline and custom interfaces in use.

Business Intelligence – The BI assessment will identify dashboards and custom reports in the current ROW environment.

With the assessment of the current environment, WV DOT will have a clear picture of its environment and its usage. Based on the type of software upgrade a detailed inventory of all areas may not be required. Also, if there are limited changes since the initial implementation, the prior inventory should be reusable, with minor updates, for the upgrade. So, this step may just be a quick assessment of what is already documented to validate it is still valid.

Another aspect of the Foundation Stage entails the incorporation of strong Change Management policies into the implementation and upgrade processes. Dataview and WVDOT need to institute effective Change Management policies to properly manage changes to the software. This will facilitate the entire upgrade effort by providing a documented history of all prior modifications and issues.

An additional objective of the Foundation Stage is to develop a blueprint for the upgrade project. The blueprint will include an Upgrade Project Plan, the technical architecture for the upgrade release, a communication plan (such as status meetings), and tracking procedures (e.g. issues reporting and tracking, change management processes). The Upgrade Project Plan is a detailed list of tasks for the upgrade project.

The Foundation Stage also defines the exact process for promoting the upgrade through the stages of testing and, ultimately, migrating to the Production environment. Promotion through a series of test environments greatly reduces the risk that an upgrade will lead to any surprises or unexpected disruptions to the State's business. A regression test suite should be identified and maintained, which should be used in every upgrade. This will verify that the upgrade does not adversely affect any existing functionality.

Build Stage

The objective of the Build Stage is to configure, integrate, build, and test the solution and transition components.

During the Build Stage, the developers will compare and merge any customizations into the new baseline release ASP.net source code and do an application build using Visual Studio. The database upgrade scripts will be executed to upgrade the application database to the new release. The build will then be deployed using the instructions provided in the install guide. Any configuration XML files that are delivered as part of the new release will be imported into application.

At the end of the Build stage, the upgraded software should be ready for migration and operation of the new system, business process, and work settings. The results of the Build Stage include a working test environment with full hardware and software upgrades, including all customizations, interfaces and BI changes. It is a good practice to manage all software artifacts in the WVDOT's version control tools, to comply with the Change Management and Configuration Management policies. This ensures that all upgrade changes are carefully tracked such that it is clear what will be eventually migrated to production.

The Build Stage includes a well thought out application testing plan, which will confirm that WVDOT is testing the relevant components of the application prior to go-live. The test plan would typically include system testing and acceptance testing stages, with potentially additional test stages, depending on the State's preferences. As with the Foundation Stage, the testing plan will only require minor changes from the plan executed with the initial Implementation. It may need to be altered to include any of the enhanced functionality that WVDOT wishes to use.

In addition to testing the functionality the WVDOT currently uses, new features and functionality of the upgraded release should be reviewed since they may provide an opportunity for the State to improve certain business processes.

Implementation Stage

The Implementation Stage is centered around 'go-live' for the upgraded release. As a go-live decision draws near, a Production Cutover Plan is created. The Production Cutover Plan is an extension of the overall Upgrade Project Plan. The Production Cutover Plan will list all tasks, resources, and timelines needed for a successful go live.

Post-Implementation Stage

Dataview proposes a 6 to 12 months Post Implementation support after the project goes live. During this stage, Dataview will provide onsite support in the following areas:

- Production operations monitoring – Dataview will work with WVDOT staff to monitor ROW application processing in the production environment. This task entails the monitoring of servers, integration processes, and system performance.
- Production Incident Resolution – Incident resolution will be a joint effort between Dataview and WVDOT staff. Dataview onsite staff will coordinate incident resolution activities with WVDOT staff and Dataview product team staff as needed.
- Recommend adjustments to operational procedures.
- Post-Production conversion activities
- Transition to Dataview product team for on-going support.
- Enhancements – Dataview will work onsite with WVDOT to document Scope Changes or enhancements to be tracked in the defect tracking system for a future discussion decided by WVDOT.

Once Post implementation period has elapsed, Dataview will transition from onsite support of daily operations to providing web-based and telephone support through our desk support services.

In this stage, the users will begin using the new functionality after go-live. Dataview has proposed the enhanced level of maintenance and support for WVDOT, to provide the WVDOT with direct access to Dataview staff for post-implementation support.

Upgrade Tools and Logistics

Dataview will make upgrade releases available to the WVDOT at regular intervals. The release will include the following artifacts:

1. *Release Notes*: List of enhancements and bug fixes in the release
2. *Technical Compatibility Chart* – Document that shows the supported list of system software and 3rd party libraries
3. *Build and Install Guide* – Steps to upgrade to install, build and configure the software
4. *Source Code* – The source code of the newest release, with revision history from github will be made available. WVDOT can compare and merge any enhancements into the new release.
5. *Workflow XML files* – Files will be provided for any changes to baseline workflows that can be imported or merged with the customized workflow XML.
6. *Database Upgrade Scripts* – Since additional tables or columns may be needed, the software includes the relevant database DDL scripts to automatically upgrade the previous releases to the new database structure. In addition, database DML scripts will be provided for any new table data.
7. *Build DLLs* – Baseline builds of the software that can be used if there are no customizations to merge into build

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 Right-of-Way, Utility Relocation and Railroad Agreements management system project.

7.24 LESSONS LEARNED

An enterprise software implementation such as the ROW solution has inherent risks that can jeopardize the success of the project but also have significant benefits such as achieving cost savings, improved efficiency and productivity. In order to recognize the benefits of such a complex endeavor, the WVDOT must avoid the pitfalls encountered by other organizations to achieve success. A carefully planned project that accounts for the lessons learned by the other organizations can be the difference between a successful project and a failed one.

A typical list of reasons for failure can be broadly categorized in three type of risks :

- Process Risks
- Technology Risks
- People Risk

At Dataview, we have learned these lessons first-hand and in every instance, we have managed to overcome the hurdles to deliver on time and on budget, solutions to these very difficult challenges. As we encounter new challenges, we incorporate the lessons learned into our project management methodology so that future projects and clients can benefit from our experience. We believe that there is no substitute for the experience and knowledge of WVDOT that Dataview brings that is a key factor in preempting a number of the obstacles to the goal of a successful project.

Process Risks

Retrofitting old business processes in the new system

WVDOT has taken an important step in recognizing the need to implement a new ROW system. Implementation of a new enterprise system offers the best opportunity to take a look at the existing business processes and to redesign them to bring more efficiency, transparency, productivity and to incorporate industry best practices.

However, there can be resistance to changing the business processes as the users are very familiar and comfortable with the way they operate on a day-to-day basis. This leads to attempts to retrofit the old business processes in the new system resulting in continuation of the same old inefficient way of doing business in the new system and foregoing the opportunity to utilize the industry best practices. When the new system itself does not fully support the basic functions of the client's organization, this issue gets compounded.

Lesson Applied by Dataview Team

- Build a system to meet the business needs based on best practices
- Start on Business Process review, Change management and Training during project implementation

Lack of understanding of what the new system is designed to achieve

If the project stakeholders do not understand what the new system is designed to achieve and its key features and functionalities, they will fail to maximize the usage and achieve the value of the new system. Not having a good grasp of the system and its relation to the "to-be" state can lead to poorly designed processes and frustrated users.

Lesson Applied by Dataview Team

- Identify key project stakeholders and users who have good understanding of current system and business processes as well as future needs.
- Use agile methodology to build and design system. This would allow more time to gather requirements and receive feedback

Inadequate requirements definition

Detailed requirements become the foundation for the scope of the project. It is important for the clients to understand their current environment and business processes at the onset of the project.

If the current environment and the business processes are not mapped out, it leads to often misplaced priorities during the implementation of the new solution. Inadequate requirements definition results in the current business processes not getting addressed appropriately resulting in eventual scope creep and budget overruns to fix these issues.

Lesson Applied by Dataview Team

- Identify key project stakeholders and users who have good understanding of current system and business processes as well as future needs.
- Use agile methodology to build and design system. This would allow more time to gather requirements and receive feedback

Inadequate project scope control

As discussed above, the requirements defined in the selection process generally become the scope of the project. However, as the project progresses, due to changed priorities, other external factors and/or missed requirements, scope changes can occur. Allowing scope changes without fully understanding their implications can not only cause an impact on the project timeline and budget but also may result in the loss of functionality implemented.

Lesson Applied by Dataview Team

- Implement a strong project governance model to review all scope changes and prevent unwarranted scope creep

Technology solution related challenges**Poor software and system integrator (SI) selection**

A successful project implementation requires both robust software application that provides the required business functionality and associated value and an implementation team with the requisite experience and process knowledge that will transform the software from concept to production in a timely manner, with full value realization.

Often when projects get delayed it is because of a poor fit between the software and the business processes intended to bring more efficiency to the client's operations. When the new software does not support the basic functions of the client, lots of time and money is spent to redesign the business processes around the new functionality.

Lesson Applied by Dataview Team

- Select vendor who is familiar with public sector practices and governance controls
- System Integrator should be very familiar with the software being implemented and experience with the complex customizations required in typical Statewide enterprise implementations

Vendor lock-in & Proprietary Software

Occasionally the software selected for implementation is based on proprietary technology or requires specialized skills. This makes it difficult for the customer to hire staff with the necessary skills to maintain the product. The specialized nature of the product also makes future upgrades difficult and prevents any ability to migrate to other solutions in the future.

Lesson Applied By Dataview Team

- Select non-proprietary and industry standard technology platform
- Ensure access to skills required to maintain product in open market
- Require access to ability to modify and customize if required in future

Implementation approach of the software

In both a "big bang" or phased implementation approach, the costs are typically comparable. However, in a highly competitive environment where the requirements need to be fleshed out or there are other competing projects for resources, the "big bang" approach, where all system functionality is rolled out at the same time, poses significant challenges and risks. With a phased approach, a subset of the entire application is rolled out while the

remaining application is still being constructed, and the remaining functionality is then rolled out months later. The phased implementation approach is not only less risky but also it allows for more time for critical activities such as testing and training, resulting in faster end user adoption of the system. Based on the approach for phasing, project management supported by an agile framework may be better suited than project management supported by the waterfall methodology.

Lesson Applied by Dataview Team

- Review and validate features by product early in project implementation
- Implement agile framework to iterate over requirements and product delivery in each phase

People Element Related Challenges

Lack of focus on cultural change management and user training

Most often when enterprise software projects fail, it is not because of the technology, but rather due to lack of focus on the key "people" elements - cultural change management and training. Going from legacy mainframe based systems or a patch work of spreadsheets to a modern web-based system with significant improvements or changes in business processes (for example, paperless approvals) can cause anxiety and concerns in the user community. Given the decentralized nature of the business, it is imperative to have thoughtful and detailed change management and user training approach. If careful attention is not paid to these key elements, it may result in significant push back and resistance from agencies, training issues, and user adoption issues resulting in project delays.

Lesson Applied by Dataview Team

- Include training, Knowledge transfer and Change Management as core part of Project implementation

Unrealistic timeframe expectations

One of the most common reasons why the project timelines get pushed back is that unrealistic expectations for the project go-live timeline. Setting inadequate timeline for implementation and transition puts undue pressure on the project team and can result in delays and budget overruns.

Lesson Applied by Dataview Team

- Avoid limiting project timelines based on arbitrary deadlines rather than business need and requirements.
- Actively discuss the impact of schedule on project costs and quality

Inadequate resources assigned to the project

It is always imperative to have fully dedicated staff to work on the project without having to worry about their day-to-day jobs.

An enterprise software project requires realistic expectations for the resources - number, time and skills. If the resources requirement is underestimated, it will result in delays in the project and in the cost overruns as the clients need to hire extra staff to fill the void. Clients very often

do not appropriately staff the project, and end up having project staff that is part-time doing project work, and part-time working on their ongoing job.

Lesson Applied by Dataview Team

- Actively review the assigned resources and escalate staffing risks to senior management
- Involve additional backup resources in each area to provide coverage in case of temporary resource conflicts or absence

Dataview's approach to addressing these challenges

Dataview has built an agile project management methodology that is flexible and repeatable that provides the structure for preempting, quickly reacting and mitigating some of these challenges. The success of the Dataview approach is proven in the successful projects we have done for the State of WV including the WVDOT Capital Project Management development. We establish and adjust our framework for our client's organizations and have a culture of success unparalleled in the industry. Employing our methodologies and lessons learned, we have planned a project composed of implementation tracks that minimize project risks and staffing impacts while maximizing quick wins and project successes to build organizational confidence and investment. We are proposing a ROW module, designed specifically for WVDOT business processes and requirements. Our proposed solution will promote rapid user adoption since it will better meet the need of the user community instead of trying to force a change based on software limitation.

We have proposed a strong project governance structure with senior executive sponsorship and involvement. This will enable effective project management as stakeholders are clearly identified, communication processes are consistent, transparent, and well documented, and decision processes have clear and well-accepted owners who are well informed and empowered to make timely decisions.

Our proposed implementation plan will include a detailed change management approach. We have made substantial commitment to cultural change management in our work plan by staffing the project with change management experts from Day 1 until project close out. This investment in cultural change management will allow us to bring the State staff along with us in daily change engagement, so that system adoption is a natural conclusion of their learning experience. Given our experience of working with WVDOT and the State of West Virginia, we believe that we are more familiar with the departments business needs and challenges than any other proposer will be. Thus, we are uniquely qualified to address the business process reengineering and change management that will be involved.

We have proposed a knowledgeable implementation team with years of systems and business process experience working with WVDOT, the State of West Virginia and other the public sector clients - state governments, departments of transportation, municipal governments. They understand the challenges and dynamics in the requirements of complex software development and implementations.

We look forward to working with the WVDOT through this procurement process to demonstrate firsthand the quality of our services, the strength of our solution, the expertise of our members, and the commitment we bring to our client partnerships.

Tab 8 – Responses to State Goals and Objectives

8 RESPONSES TO STATE GOALS AND OBJECTIVES

Goals and Objectives

The Vendor shall complete the responses to each of the State's goals and the objectives identified in Section 4.2.1. Vendors shall describe how they will comply with each. The completed response should be inserted in the Technical Proposal in TAB 8.

8.1 ARCHITECTURE DESIGN

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

The HUB Development framework employs an industry standard n-tier architecture based on ASP.net Core platform which provides a wide variety of deployment options based on the scalability and security requirements. The application presentation layer uses standard HTML, CSS and JavaScript. It does not use any browser specific extensions and features. This approach of using a browser based thin client eliminates any software distribution issues, minimizes network traffic, and supports ubiquitous user access from outside of the organization's infrastructure if required. All traffic is over HTTPS (secured sockets layer for encryption support) providing the necessary level of security.

The HUB application architecture is very simple to deploy and scale. The figure below shows the basic technical architecture of a HUB deployment.

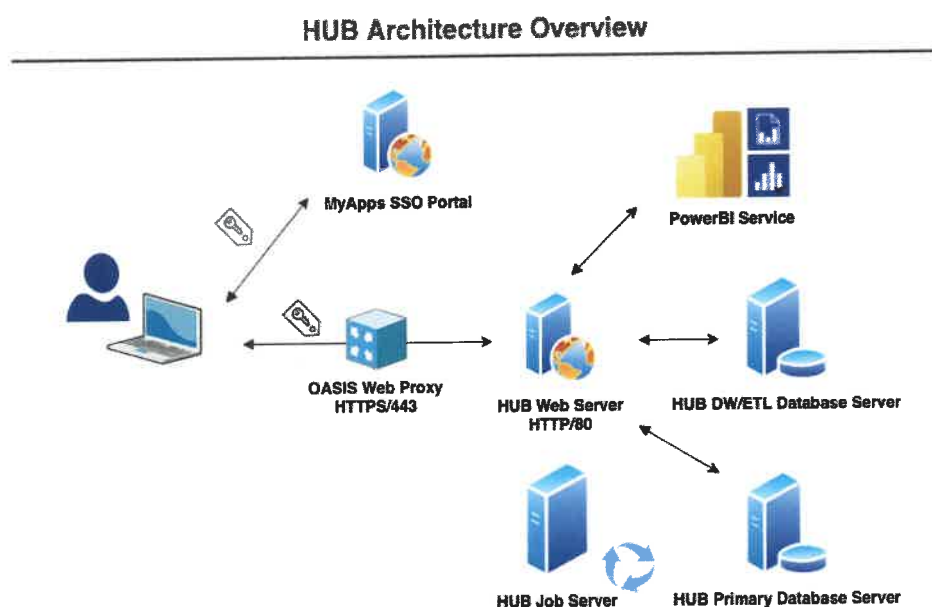


Figure 13 Hub Architecture Overview

An initial sizing of the of the non-production environments is done based on the number of test users and the amount of test and converted data in the production. Since the environments are created and deployed on a VMware server, it is easy to scale up based on testing needs and environments. Additionally, new testing environments can be spun up by adding new virtual servers. Typically to optimize the non-production Database license, one or more environments would share the same database. Below is a proposed deployment. The figure shows a typical deployment. The Development and System test environments will be deployed in Dataview's Development Azure servers. The remaining environments: UAT, Training, QA and Production will be deployed in the State's infrastructure, possibly in the wvOASIS ERP infrastructure to allow for closer integration to the Financial and HRM ERP applications. This approach also allows the ROW Project implementation to leverage some common components such as Job Schedulers and Storage Area Network for file storage.

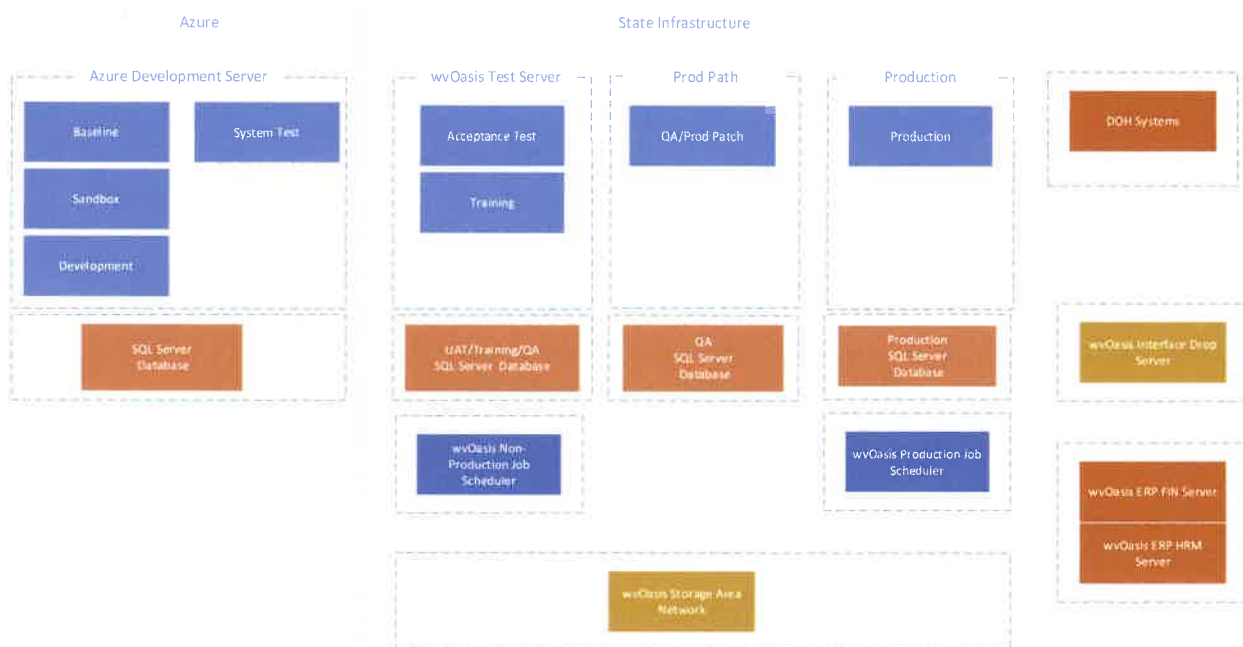


Figure 14 Typical Deployment Process

As part of the implementation, the Dataview team will and initial Capacity Planning and Sizing analysis. As part of this analysis, the Dataview technical team will work with WVDOT Functional and Technical teams to gather the transaction and user volume trends, server, and storage utilization. The goal is to document the existing infrastructure and to identify the impact of the project and plan for future Production capacity needs. Based on this analysis the final production server size and storage requirements will be recommended. Below is the typical sizing we have used for similar implementations.

Production Environment (Production)

Description	O.S. Version	Size
HUB Job Server	Microsoft Windows Server 2019 Standard	2 cores/16GB ram/60GB disk
HUB Web Server	Microsoft Windows Server 2019 Standard	4 cores/16GB ram/60GB disk
HUB Primary Database Server	Microsoft Windows Server 2019 Standard	4 cores/16GB ram/250GB disk
HUB DW/ETL Database Server	Microsoft Windows Server 2019 Standard	4 cores/16GB ram/500GB disk

Non-Production State Environments (Acceptance Test/Prod Path)

Description	O.S. Version	Size
HUB Job Server	Microsoft Windows Server 2019 Standard	2 cores/16GB ram/60GB disk
HUB Web Server	Microsoft Windows Server 2019 Standard	4 cores/16GB ram/60GB disk
HUB Primary Database Server	Microsoft Windows Server 2019 Standard	4 cores/16GB ram/250GB disk
HUB DW/ETL Database Server	Microsoft Windows Server 2019 Standard	4 cores/16GB ram/500GB disk

Non-Production Azure Development Environments (System Test/Development/Sandbox)

Description	O.S. Version	Size
HUB Web Server	Microsoft Windows Server 2019 Standard	Standard D2s v3 (2 vcpus, 8 GiB memory)
HUB Database Server	Microsoft Windows Server 2019 Standard	Standard D2s v3 (2 vcpus, 8 GiB memory)

8.2 SOFTWARE AND HARDWARE COMPONENTS

4.2.1.2. Vendor's proposal shall **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.

Below is a list of software and hardware components that would be required or utilized for the project:

- Application Server
 - Windows Server (2019 Standard Edition fully patched)
 - Internet Information Services (IIS) for Windows Server
 - FTP Server
 - Hub Application Software
 - .NET CORE (3.1.18)
 - Workflow Engine (4.1.4)
 - Telerik UI (2021.2.616) (for developers)
- Database Server
 - Microsoft SQL Server (2019 Standard Edition fully patched)
 - Database Back Up
 - Database Replication
 - SSIS
 - Microsoft SQL Server Data Tools (15.9.5)
 - COZYROC SSIS+ (1.9)
- Jobs Scheduler
 - SOS Job Scheduler (Master Service 1.12.9)
 - JOC Cockpit (3.1.18)
 - Universal Agent (1.13.8)
- Storage Area Network
- Power BI Server (SaaS)
- Disaster Recovery
 - VMware (8.1)

8.3 DEPLOYMENT PROCESS & DATA MIGRATION

4.2.1.3. Vendor shall 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.

8.3.1 Installation and Deployment

Dataview's project delivery team will create documentation specific to the ROW implementation for WVDOT. An *Installation and Configuration Guide* and *Build and Deployment Guide* will be delivered. If WVDOT desires, knowledge transfer sessions can be setup ensuring WVDOT personnel are fully trained and comfortable setting up new environments following the documentation.

Dataview's project delivery teams utilize two delivery and deployment methodologies for projects: 1) temporary Azure based environments utilized during the development phase for rapid testing and 2) permanent project environments. Our team leverages Azure DevOps for Azure based deployments which automatically deploys approved code updates to environments, this keeps our teams fast and efficient and billable hours to a minimum.

8.3.2 Data Migration

Dataview understands that successful data conversion is not a purely technical endeavor, and requires more than the mapping, development, and execution of an automated translation of legacy data to new target data structures at cutover. It requires a thorough analysis of legacy and target functionality and supported business needs, an understanding of the overall system cutover plan, and close coordination between related functional and technical areas.

To ensure successful data conversion, Dataview experts will conduct / facilitate the following activities:

- **Tools and Deployment:** Install and produce initial conversion prototypes using ETL (Extract Transform Load) and other tools.
 - Dataview has expertise with multiple ETL and reporting tools and platforms, including SQL Server SSIS / SSDT / SQL staging tables, views, and stored procedures / PowerBI / Microsoft Access and Excel
 - While Microsoft tools are recommended and anticipated to accommodate HUB ROW data conversion needs, Dataview also has experience with other platforms and tools such as Oracle, DB2, Pentaho Data Integrator, and Pervasive (Actian) Data Integrator
 - Conversion artifacts, such as required queries, views, stored procedures, and ETL packages will be tracked, managed, and deployed via version control software, with Git recommended as the preferred tool.
 - All conversion artifacts required to populate an instance of HUB ROW application will be grouped into a conversion "build."
 - Conversion artifacts must be configurable and deployable as part of "builds" to support data migration in each application instance (Sandbox, Development, System Test, User Acceptance Test, Production) in concordance with

corresponding application build levels. A conversion build should be deployable to any application instance in its entirety or by artifact.

- **Analysis, Design, Development, Unit Test, and System Test:** Use agile methodology to define data conversion requirements and develop conversion approaches to best accommodate each conversion need.
 - Conduct Scrum sessions to define the effort to create and refine required data conversion transformations and mappings, produce ETL artifacts and routines, define reconciliation steps, and document results for each unit to assure accuracy and completeness. Each artifact will define the extract from source, necessary transformation, and load to a specific target.
 - CSV / Excel, flat file, XML, ADO, OLE, and ODBC are among the many source and target connectors supported out of the box by SQL Server SSIS, which accommodate the following listed conversion sources:
 - For Right-of-Way, a number of offline systems and spreadsheets will be utilized to assemble information about parcels being acquired and relocation assistance in progress.
 - Property management information will be converted from the REMIS system, with some information potentially drawn from wvOASIS or offline systems and spreadsheets.
 - For Utility Relocations and Railroad Agreements, information for active relocations and agreements will be converted from the current Utility Relocation database. Manual additions or corrections may be applied as needed.
 - Create overall conversion plan to highlight any assumptions, timings, volume, order of execution, known data translation limitations, and contingencies. Define expectations, dependencies, durations, and handoffs to support data conversion as part of an overall cutover plan. Sensitivity and security of all data elements while at rest or in motion must also be considered. The conversion plan should discuss and define the approach to accommodate data that is “historical” as distinguished from “live” data to support ongoing business in production.
 - Retain conversion ETL artifacts and legacy conversion sources (as desired) post-cutover to provide tracking and auditability between legacy and new production over time.
- **Methodology:** Work with blended client / Dataview team of technical and functional resources in Scrum sessions to evaluate each conversion source and target, and assign to one of 3 conversion methodologies (automated, semi-automated, manual) that best suits each specific conversion’s volume and complexity to minimize risks and ensure success.
 - Automated methodology is the preferred approach, which uses ETL tools to extract and translate directly from legacy sources to load to the corresponding conversion targets. Data sources may include direct DB connections to legacy, exposed services in legacy, or provided extract files.
 - Semi-automated methodology uses ETL tools where partial rules can be defined but implies that expert analysis and intervention from SMEs may be required where rules cannot be completely codified to produce load-ready results. Data

sources for semi-automated conversions may include direct DB connections to legacy, exposed services in legacy, or provided extract files. However, these conversions will likely involve an interim data format (like Excel workbooks) to allow users to analyze and correct omissions or errors.

- Manual methodology describes the approach to directly key low-volume or static values directly into the HUB ROW application where level of effort for design and development exceeds that of manual entry.
- **Data Cleansing:** Identify, define, and list manual or programmatic activities to resolve source data issues (for example, incomplete or malformed data from disparate sources) to be addressed preceding or within the data conversion extract, transformation, or load process.
 - Data cleansing is a shared responsibility between Dataview and client SMEs.
- **User Acceptance Test:** Define objectives, environments, participants, and file size/data limitations for user acceptance testing of data conversion.
 - Dataview and client functional experts would confirm that converted data is accurate and meets business needs as part of the target application(s) before proceeding to Mock Conversion.
- **Mock Conversion:** Conduct at least 2 documented “dry runs” or “dress rehearsals” of all cutover activities associated with data conversion using production data volume and configuration, if possible, to confirm timing, scheduling, and any interdependencies that impact the production cutover plan.
 - Mock conversions will include the validation, verification, and reporting strategy to be used for production cutover.
- **Validation and Verification Strategy:** Define and confirm the validation and verification strategies to confirm complete and accurate data conversion execution.
 - Validation makes sure that converted data is clean, functionally correct, and meaningful. In short, validation confirms that the ETL process is properly applying the business rules in data transformation. Validation typically involves sampling of converted data by functional experts who are most familiar with the business needs and functionality of both the source and target systems.
 - Verification makes sure that converted data is complete, well-formed, and accurate. Verification activities include row counts, summary totals, and query / report comparisons. Verification typically happens before converted data is released for functional review and is largely a technical responsibility that ensures all necessary data is present and meets pre-defined programmatic requirements.
 - In combination, validation and verification ensure a complete and thorough reconciliation of data conversion results.
- **Error Corrections and Reconciliation:** Identify the steps to address errors that are detected as part of reconciliation, including restores and conversion re-execution.

8.4 SUPPORT AND MAINTENANCE

4.2.1.4. Vendor shall 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.

Dataview is the software vendor for the ROW Module and the HUB Development framework. It will be the primary source for providing all application software patches. As part of the project implementation, Dataview team will include software maintenance patches and will provide a provide special software builds for any critical and serious patches for 6 months after go-live of the module. Dataview has proposed an enhanced maintenance contract for after go-live which includes access to future releases, bug fixes, and a fixed number of consulting hours. [Refer to costing sheet]

Dataview will provide WVDOT with the source code and a perpetual non-transferrable license for the module. This will allow the State to maintain and modify the application if it so desires.

Any third-party development libraries used in software will be supported via Dataview as part of the maintenance contract.

Licenses for System Software such as SQL Server or Windows purchased directly by the wvOASIS team will be supported by the software vendor.

8.5 COMPATIBILITY WITH STATE OF WEST VIRGINIA STANDARDS

4.2.1.5. The proposed solution shall be **compatible with the State of West Virginia software** standards and security policies. The solution shall be compatible with Google Workspace products (the State is currently transitioning from Microsoft Office to Google Workspace) and State of West Virginia's acceptable use policy.

Dataview has been working with the State of West Virginia supporting solutions in the State's Data Center. In our various projects, we have worked with State staff in implementing multiple solutions. This has given us a unique understanding of the needs and requirements for applications that are deployed by the State. Over the years, we have standardized our solutions including the Hub development framework such that it meets the State's architecture, deployment, security, and operational standards. Some of these features are:

- We will leverage existing State wvOASIS infrastructure for deploying our solutions. This allows us to ensure that any new hardware and software that we use is secure and configured as per the State's requirements. This approach also confirms that the uptime and any other SLA's required of the infrastructure do not deviate from State needs.

- Like the HUB Project Management solution, the ROW solution will use the wvOASIS Data Backup tool, storage area network and retention policies, thus meeting the State's standards.
- The Dataview team is familiar with using tools used by the State such as the wvOASIS JIRA for Change and Configuration Management. The ROW project will also use similar tools and support the State's Standards.
- We share and reuse existing State infrastructure components where possible. This includes load balancers, storage area networks, job schedulers and Business Intelligence infrastructure. This approach not only reduces the complexity of deployment of new applications but also reduces long term maintenance risk since no new technology is introduced in the State's Data Center.
- ROW Application will use the existing myApps authentication infrastructure with SAML 2 tokens. This ensures that our applications follow the same password policies that the ERP applications are using. In addition, this alleviates the need for users to remember additional credentials or password management process.
- The Hub Development framework is based on the Microsoft ASP.NET Core which is a free and open-source web framework and successor to ASP.NET. Our other tools such as SQL Server Database and Microsoft Power BI are also industry leading platforms by Microsoft. Leveraging popular and non-proprietary stack provides the State with a platform that has all security issues quickly identified and promptly patched as per the State's standards.
- ROW Application Interfaces will use XML, CSV or Flat Files. Any real-time integration is typically done using Web Services over SSL – both approaches are non-proprietary and meet the State's existing standards.
- Email communication is using SMTP protocol that is compatible with Google and other email relays.

8.6 OPERATIONAL EXCELLENCE

4.2.1.6. Vendor's proposed solution shall support WVDOT in achieving operational excellence in terms of the Right-of-Way acquisition processes as follows:

- Provide the ability to support the management and tracking of the full lifecycle of the WVDOT right-of-way acquisition processes including project set-up, parcel identification and set-up, management of acquisition activities, appraisals, negotiation, condemnation, and relocation;
- Provide the ability to support managing and tracking property management business processes; and Provide the ability to support the management and tracking of consultant contract agreements and manage review/tracking of consultant invoices in support of right-of-way processes.

4.2.1.7. Vendor's proposed solution shall support WVDOT in achieving operational excellence in terms of the Utility Relocation business processes as follows:

- Provide the ability to support the management and tracking of the full lifecycle of the WVDOT utility relocation processes including project setup, identification and documentation of utilities potentially impacted by the project and the nature of the impact, tracking required coordination with impacted utilities, creating relocation agreements with each utility required for the project, tracking the completion of the relocation work, and tracking and supporting payment of invoices for costs to be reimbursed by the WVDOT.

4.2.1.8. Vendor's proposed solution shall support WVDOT in achieving operational excellence in terms of the Railroad Agreements as follows:

- Provide the ability to support the management and tracking of the full lifecycle of required WVDOT railroad agreements requiring railroad coordination, including project set up, identification and documentation of railroad right-of-way impacted by the project, creating railroad agreements when required, and tracking and supporting payment of invoices for costs to be reimbursed by the WVDOT.

8.6.1 Operational Excellence in Right-Of-Way Acquisition Processes

Dataview will enable WVDOT to support the management and tracking of the full lifecycle of the WVDOT right-of-way acquisition processes through:

- An intuitive project set-up process already in place at WVDOT with the Hub;
 - Hub projects are structured to store project identification information, high level ROW, Utilities and Environmental information, Route Segment information and estimated dates and costs;
 - Phases are tracked individually for Engineering, ROW and Construction;
 - Acquisition, appraisal and parcel information will be intrinsically joined to the ROW Phase information stored, tracked and reported on through the Hub;
- Robust integration with WVDOT's geospatial data including ESRI Roads and Highways, and the Roadway Inventory Log (RIL);
 - Wave 2 for the Hub will fortify and expand the geospatial functionality to include initiating projects from a map interface as well as additional integration points with ESRI Roads and Highways, ensuring continuity and consistency in the reporting on geospatial data across applications;

- ROW functionality within the Hub Framework will leverage the same geospatial functionality;
- Parcel identification and set-up will use the same user-friendly user interface deployed in the Hub and used by Engineering, ROW and Construction team members for project identification and set-up;
 - Parcels and sub-parcels will be recorded and tracked using the same grid structure used by the Hub;
 - Parcel information will be easily tracked at each level of detail and accumulated at the project level;
 - Calculations, logic, and documentation, will incorporate parcel information at every relevant level;
- Management of acquisition activities, appraisals, negotiation, condemnation, and relocation will capitalize on the workflow and notifications already available in the Hub as well as employ new documentation standards for the numerous templates and auto-generated documents required for Right-of-Way activities;
- Property management business requirements are met through the functionality already deployed in the Hub as well as variations of that functionality specifically configured to facilitate the complex demands of property management;
- Consultant contract agreements and invoices must incorporate not only much of the workflow and notification functionality already developed in the Hub but will also require integration to wvOASIS Financials. In addition to the integration developed and deployed for the Hub, the Dataview team has designed and developed interfaces to Advantage financials for many clients across several application platforms;

8.6.2 Operational Excellence in Utility Relocation Business Processes

Dataview will enable WVDOT to support the management and tracking of the full lifecycle of the WVDOT utility relocation processes:

- The project set-up process built into the Hub can be leveraged to accommodate the identification and documentation of utilities impacted by the project. The nature of the impact and the actions required for that can be designed into the user interface for selection with specific processing rules assigned to each value available for selection;
- Relocation agreements with each utility will utilize a set of templates with auto-fill capabilities designed and built specifically for WVDOT needs;
- WVDOT can leverage the workflow and notification functionality built into the Hub to track the completion of the relocation work;
- WVDOT will record and process utility invoices in the Hub through a user interface consistent with functionality already in place;
- Invoice approvals will be managed through the workflow inherent to the Hub architecture and will be interfaced to wvOASIS financials for disbursement to the Utility;

8.6.3 Operational Excellence in Railroad Agreements

Dataview will enable WVDOT to support the management and tracking of the full lifecycle of WVDOT railroad agreements:

- The user-friendly interface designed in the Hub implemented at WVDOT will provide the ability to record, track, and document railroad right-of-way impacted by a project;

- Leverage the process within the Hub for attaching project agreements;
 - Design and develop logic based on railroad agreements to ensure compliance;
- Similar to FHWA requirements, railroad requirements will be built into the logic and the flow of the system, meeting all railroad specific criteria required on projects.

Tab 9 – Capabilities of Proposed Solution

9 CAPABILITIES OF PROPOSED VPS SOLUTION

The Vendor shall in narrative format describe the capabilities of its proposed VPS to meet the requirements outlined in Section 4.2.2.3 to 4.2.2.13 for a Right-of-Way, Utility Relocation and Railroad Agreements management system. Vendors are encouraged to include screen shots and other visuals as appropriate to highlight system capabilities and enhance the readability of this section.

The Vendor shall also include within TAB 9 a description of the technical architecture of its proposed solution and the basis for the Vendor's recommendation of this technical architecture. Depending on the technical architecture being recommended, the Vendor shall include the additional information below:

On-Premise Model - Technical specifications for the development, testing, training, production and disaster recovery/reporting landscapes required to implement the VPS, with sufficient detail to allow WVDOT and WVOT to estimate the cost of implementation and operation of the environment.

Vendor should be prepared to support initial software configuration, development and testing in a Vendor hosted environment to allow sufficient time for the required environment to be established by WVDOT and WVOT. All project activities beginning not later than user acceptance testing shall occur in the State managed on-premise environment.

SaaS or Cloud Model - Detailed discussion of the technical environment in which the VPS will operate including information on the data centers which will host the development/testing/training, production, and disaster recovery environments. The production and disaster recovery environments shall be hosted in data centers which are geographically distant from each other.

9.1 CAPABILITIES OF PROPOSED VPS SOLUTION

Before we detail the proposed ROW solution offered by Dataview, we will provide a high-level process flow of a Right-of-Way (ROW) project in the Hub. Focus is maintained on the sections in the Hub relevant to the proposed solution.

At a high level, the Hub is a Capital Project Management System for the State of WV Department of Transportation (WVDOT). Based on the business processes at WVDOT, users initiate and process capital improvement projects through a workflow structured to meet WVDOT requirements. While a project is awaiting authorization, phases are added as required for Engineering, ROW, and Construction. Newly added during the design of the Hub was the "Other" phase to accommodate work that is not part of a standard capital project such as State Planning and Research (SPR) projects. Typically, for the proposed solution, the Engineering and ROW phases will interface regularly during the life cycle of the ROW acquisition process.

Figure 15 is a screenshot of the Estimated Cost tab. A district or division user records estimated values and dates to the different phases for the project, including start and end dates and an

estimate of cost for each relevant phase. The user can also indicate if the project will be federally funded.

The screenshot shows the 'Estimated Cost' tab in 'The Hub' application. The interface includes a sidebar with navigation options: HOME, PROJECT, BUSINESS INTELLIGENCE, WORKFLOW, STEP SNAPSHOT, and ADMINISTRATION. The main content area is titled '2021010030' and displays a form for estimating costs. The form is organized into four columns: Engineering Cost?, ROW Cost?, Construction Cost?, and Other Cost?. Each column contains fields for various cost-related information, such as 'Engineering', 'ROW', 'Construction', and 'Other'. The form also includes sections for 'Federal Project?', 'Estimated Cost', 'Allocation Code', 'Desired Start Date', 'Desired End Date', and 'Recommended To be Perf By'. The top of the page shows the user's email 'admin@dataview.com' and a 'SUBMIT DATA' button.

Figure 15 Hub Estimated Cost Tab

The Programming team adds phases to the project (Figure 16). In addition to start and end dates for each phase, the programming team provides the participating and non-participating amounts required to successfully complete the phase. As more knowledge is gathered for the phase, or if there are scope or funding changes while completing the phase, modifications can be made to dates, funding, federal status, and other pertinent information using the Change Request process. The Change Request process is designed to include the information necessary and the approval process already in place at WVDOT to process all project changes, thus replacing the BF-98 process.

The screenshot shows the 'Phases and Change Requests' section in 'The Hub' application. The interface includes a sidebar with navigation options: HOME, PROJECT, BUSINESS INTELLIGENCE, WORKFLOW, STEP SNAPSHOT, and ADMINISTRATION. The main content area is titled '2013000918' and displays a table of project phases and a table of change requests. The 'PHASE' table has columns for 'Phase Code', 'Start Date', 'End Date', 'Federal Project No', 'Estimated/Authorized', 'Suspended', 'Participating Amount', 'Non-Participating Amount', and 'Total'. The 'CHANGE REQUEST' table has columns for 'CR No', 'Start Date', 'End Date', 'Federal Project', 'Workflow', 'RMS St', 'Estimated/Authorized', 'Suspended', 'Merged', 'Participating Am', 'Non-Participating Am', and 'Total'. The top of the page shows the user's email 'admin@dataview.com' and a 'SUBMIT DATA' button.

Figure 16 Hub Phases and Change Requests

The workflow for the phases is structured and relies on the expertise of WVDOT personnel at each step to ensure that information is complete, accurate and relevant. The Programming team reviews or creates and approves each phase and works with the responsible districts or divisions to ensure that the Phase is properly categorized as federal or state, includes all relevant appropriation and/or federal funding and determines the STIP categorization. Phase workflow is structured into Federal and State STIP paths.

Scheduling and milestones are tracked for each phase and are added when the project is initiated. Milestones within the Hub are designed to accommodate the project scheduling process at WVDOT. Scheduling is initially added by the Programming team and is integrated into Microsoft Project templates requested by the Engineering Division. Figure 17 provides an idea of the milestones on a capital project with Engineering, ROW and Construction phases.

As scheduling changes are made by the Engineering Division through MS Project, and Milestones are affected, change requests are incorporated and follow an approval process consistent with WVDOT business processes.

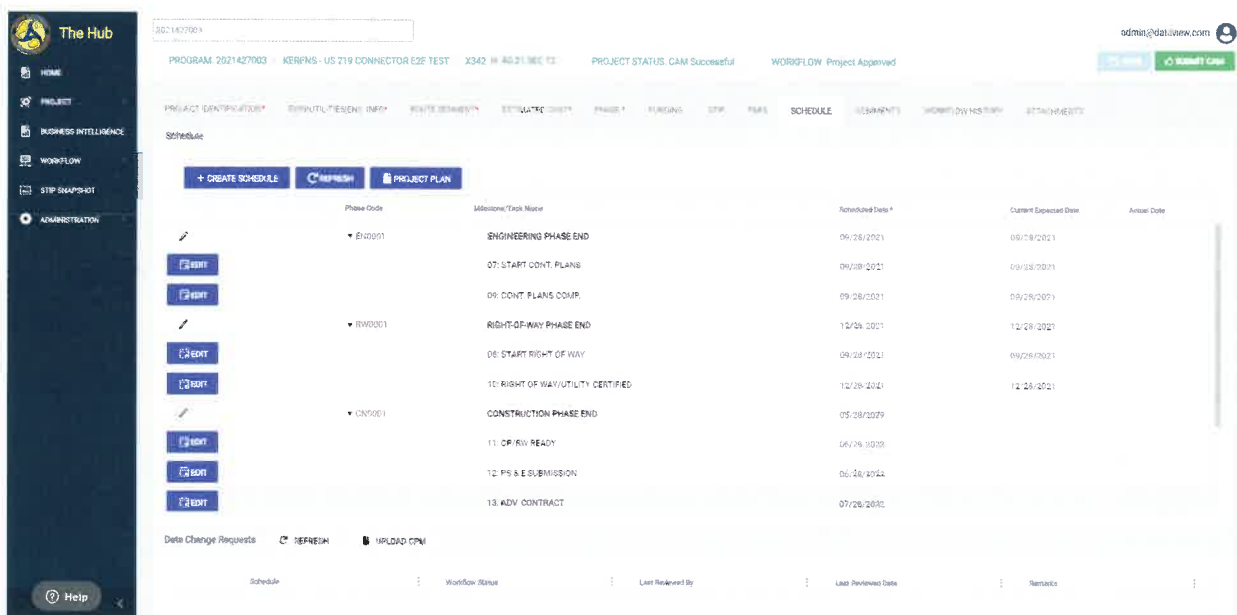


Figure 17 Hub Scheduling

Regardless of whether the project is federally or state-only funded, funding is managed in one location in the system. Organizationally, programming these funds lies with either the State STIP Coordinator or the Federal Section of Programming.

The Funding tab in the Hub (Figure 18) displays the funding for each phase – opened to the ROW phase. This example has been fully funded and is not awaiting change requests. If a change request were in process, the Programming or Federal Aid team would either add a new funding line, or simply add funds to an existing funding line.

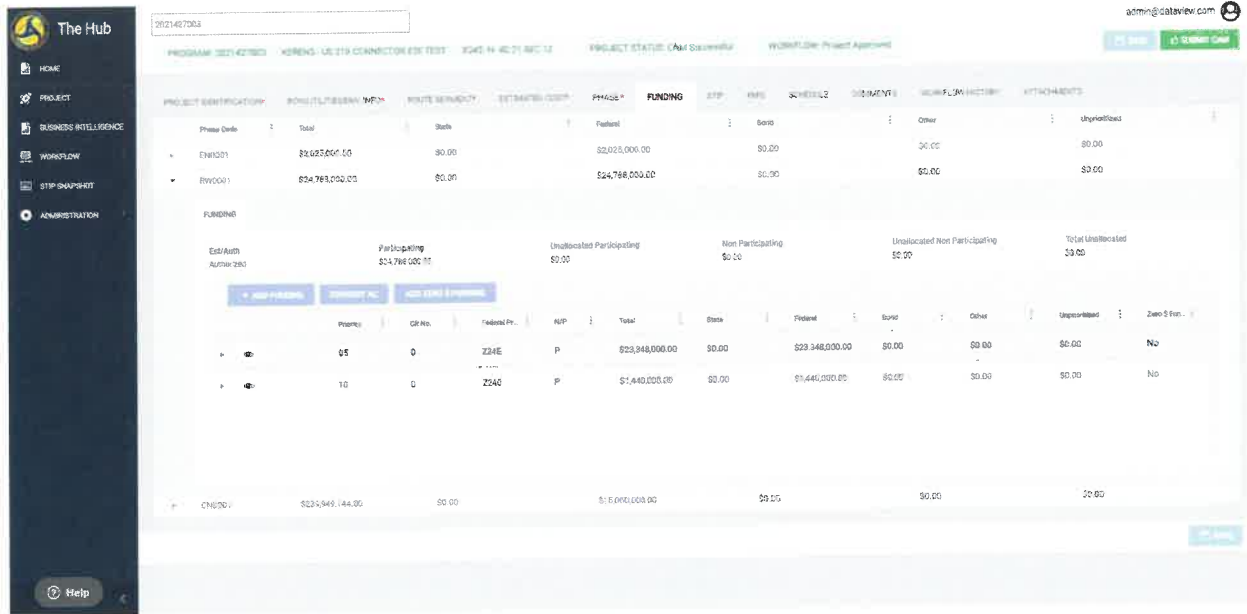


Figure 18 Hub Funding

Dataview's vision for the proposed solution is as described below. The process flow has been divided into four high level sections and gives a detailed explanation of how the Hub integrates with the proposed solution.

9.1.1 Right-of-Way Plans and Incidental work Authorization

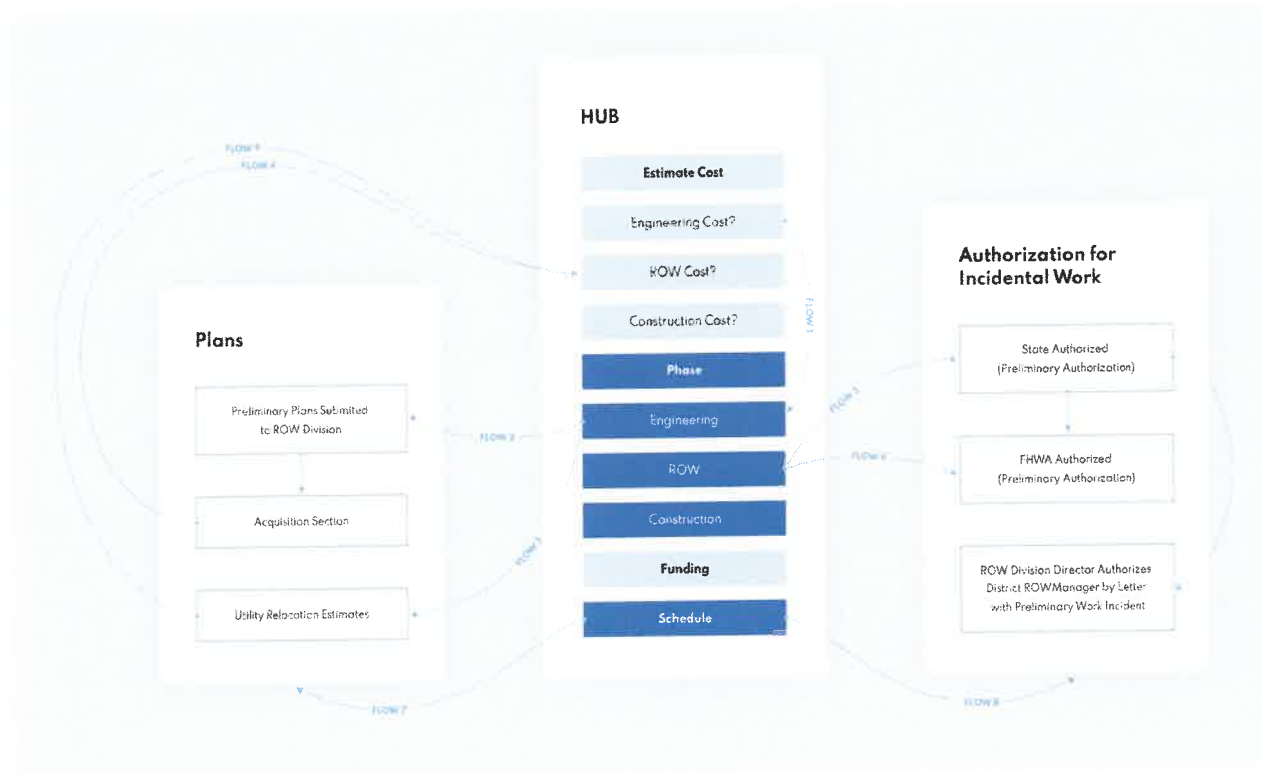


Figure 19 ROW Plans and Incidental Work Authorization

The flow diagram defines the relationship between the Hub and planning and incidental work authorization. The various inflows and outflows from the proposed solution are explained below

Flow 1 is the funding that is allocated to the engineering phase that will create the preliminary ROW plans that are then fed into the proposed solution (Flow 2). Flow 3 represents the utility relocation estimates that are created by the utilities section of the engineering division.

Dataview will provide a solution enabling the user to create and store the Right-of-Way Certificates for the advertised contract and facilitate the integration with wvOASIS HRM to obtain a list of employees in order to select a Right-of-Way Consultant for the given parcel. The interface will have to obtain a list based on the parameters entered by the user like the rate that corresponds to the budget, the step and or grade required for the consultant, years of experience etc.

The solution will also be able to create and store letters of interest which will be approved by the District Right-of-Way Manager using the Hub workflow engine as discussed elsewhere on this tab. The letter will be in the form of a pre-defined template that the user will be able to use to draft the letter of interest. The solution will also be able to import and store preliminary ROW plan sheets from WVDOT CAD (as a created interface).

When the ROW phase is setup in the Hub, all of its relevant project information such as Status of the phase, whether it is Federally funded, dates, schedules, budgets etc. will be interfaced in to the proposed solution. If there are updates in the Hub, there will be corresponding updates in the proposed solution.

Once the preliminary ROW plans are reviewed by the Acquisition Section, they will prepare the ROW cost estimates. This is depicted by Flow 4 that estimates the ROW cost. Dataview's solution will utilize the workflow engine to allow review of the plans before sending them over to the Hub via an interface.

Flows 7 and 8 show the schedules that are referenced for the Engineering and ROW phases that are used by the Plans and Authorization for Incidental Work. Once funding and schedules are established for the ROW phase(s) which will be integrated into the solution and will be updated as updates and changes are made in the Hub, Flows 5 and 6 define the State and/or Federal approvals needed for the ROW acquisition, which will utilize the Hub's workflow engine to route them to the ROW Division Director for approval.

Flow 9 shows the utility relocation estimates being routed back into the Hub to create a new ROW phase. This will be possible with the interface between the proposed solution and the Hub.

9.1.2 Right-of-Way Acquisition Lifecycle

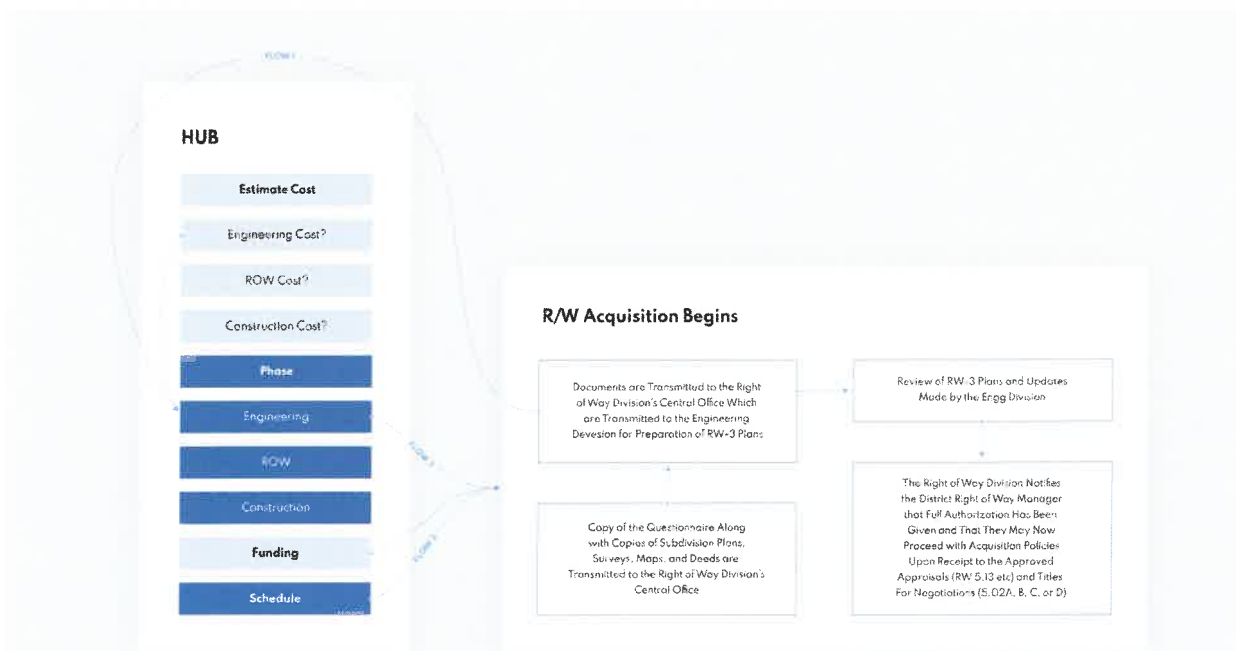


Figure 20 ROW Acquisition Lifecycle

The flow diagram displays the relationship between the Hub and the ROW Acquisition life cycle. The various inflows and outflows from the proposed solution are explained below

The solution will allow the user to display and store the ROW questionnaire and related documents (copies of subdivision plats, surveys, maps, deeds etc.) that were collected during field review and using the workflow engine transmit them to the ROW Central office.

The District Right-of-Way Manager will have the capability to mark any corrections in the solution on the preliminary plans. The ROW Central office will then transmit the documents to the Engineering division (using workflow) for the preparation of the RW-3 plans (Flow 1). Based on the schedule defined in the Hub, these RW-3 plans will be reviewed and updated by the engineering division (Flow 3). The Schedule will also define when the acquisition will begin (Flow 2). Dataview will provide an interface that will allow the preliminary ROW plans to be routed to the Engineering division to prepare the RW-3 plans. Once the RW-3 plans are created, they will be interfaced back into the solution where they will be reviewed by the District Right-of-Way. The solution will be able to enter, store and display the dates RW3 Plans are submitted to ROW Division

Lastly, the Right-of-Way Division notifies the District Right-of-Way Manager (using workflow) that full authorization has been given and that they may now proceed with acquisition policies upon receipt to the approved appraisals (RW 5.13 etc) and titles for negotiations (5.02A, B, C, or D).

9.1.3 Negotiation/ Property Management/ Settlement or Condemnation

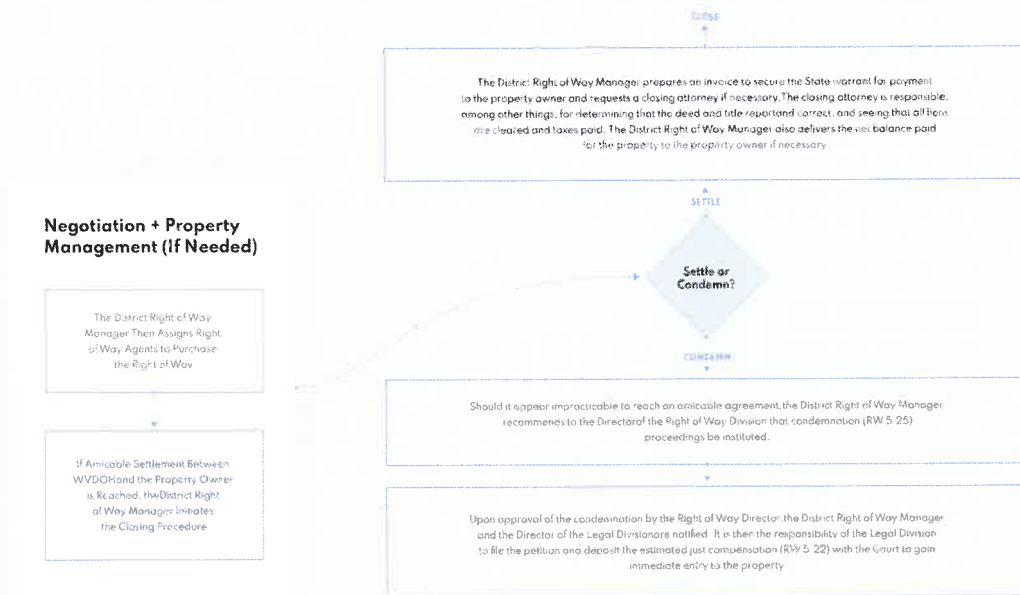


Figure 21 Negotiation/ Property Management/ Settlement or Condemnation

Once the approved appraisals and titles are received, the District Right-of-Way Manager then assigns Right-of-Way agents to purchase the Right-of-Way. If they are unable to reach an amicable settlement, the property then goes into condemnation proceedings. To facilitate this process, the solution will allow the user to enter, display and store the Title of the parcel, will have the ability to select and assign an appraiser - form RW- 6.06 (and a review appraiser if necessary - form 6.10-C), the ability to support and document waiver valuation - form RW-5.13 and generating and/ or storing letters of entry, releases, acquisition deeds, and any other necessary documents required for negotiation. The letter will be in the form of a pre-defined template that the user will be able to use to draft the letter of entry. Other letters that the proposed solution will be able to draft and maintain are the 30 and 90 day letters issues to the owners of the parcels.

If the consultant is able to negotiate successfully then the parcel will move to closing, the deeds and the Statement of Just Compensation – forms RW 6.11 and RW 5.13 will be reviewed by the district Right-of-Way manager which will be routed using the workflow engine. The solution will provide the ability to enter, store, and display recommendations for just compensation, provide online approval capabilities for district Right-of-Way managers to electronically review and approve just compensation. The solution will also be capable of recording and tracking the amount of a proposed administrative settlement.

If the consultant is unable to negotiate successfully then the property goes into condemnation. The solution will provide the ability to generate a letter – a request to institute condemnation proceedings based on initiation by the district Right-of-Way manager and the ability to document the last offer to the property owner; amount asked by property owner if the property owner has

disclosed a price and the number of negotiations attempt with the property owner. The solution will also provide the ability to route a condemnation request to authorized reviewers and approvers using the workflow engine, initiate condemnation proceedings based on user approvals, store relevant dates, document the outcome of court proceedings, document legal settlement etc.

9.1.4 Relocation/ Clear ROW and Release for Construction

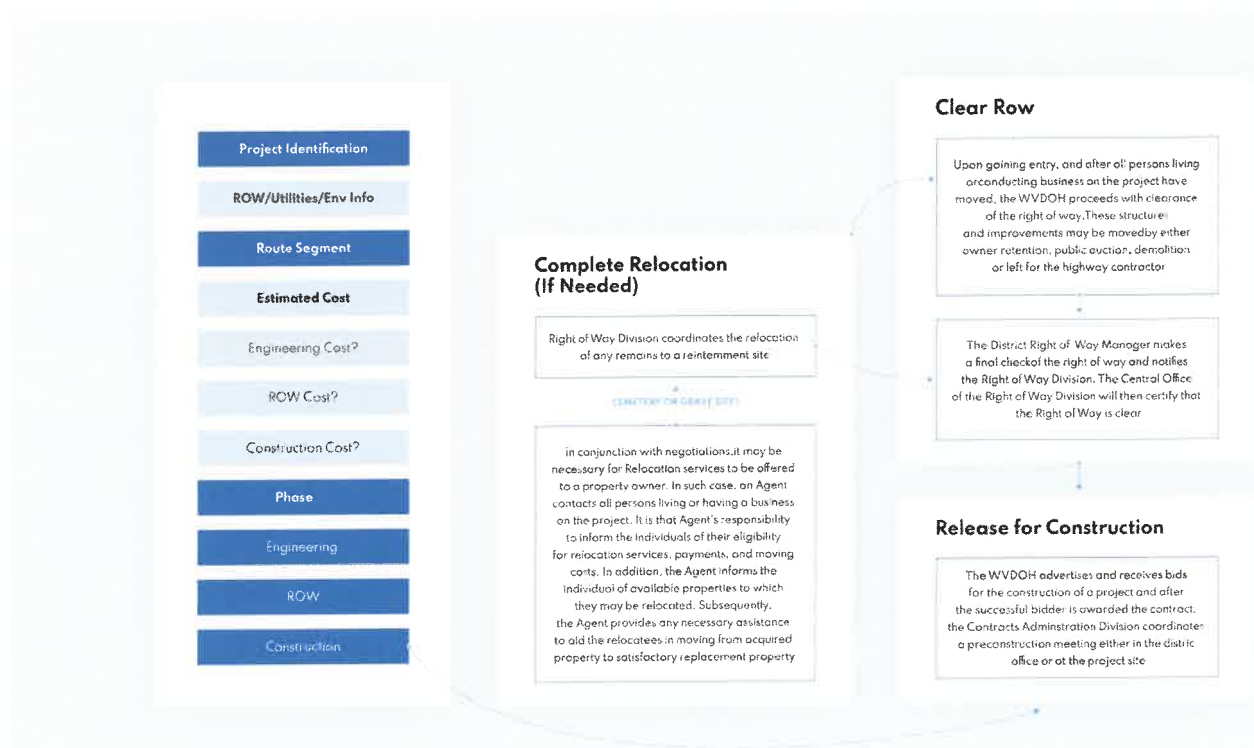


Figure 22 Relocation/ Clear ROW and Release for Construction

The flow diagram defines the relationship between the Hub and the Release for Construction Process. Based on the Schedule and once the property owners have been relocated (if required) and the Right-of-Way has been cleared, construction can commence. All parcels requiring relocation services will be the responsibility of the consultant. This shall include Replacement Housing Appraisals, residential and business moves, and all relocation services required by the Uniform Act and 23 CFR Chapter 1, Subchapter H and 49 CFR Subtitle A, Part 24. Included in this process is the distribution of all mandatory documents &/or information that must be given to the relocatee. This includes obtaining estimates, signatures on relocation forms and any document related to securing entry and title to the parcel. If Replacement Housing is necessary, The Replacement Housing Payment Appraisals must be approved by the District Right-of-Way Manager. Any other relocation claim forms requiring payment must be approved by the District Right-of-Way Manager. The solution will provide the ability to generate multiple warrant requests and to support multiple payees. This will be accomplished by the solution being able to create multiple checks and warrants for instance. The application will also be able to display the fund balances on a project/project phase when a payment request is generated in the right-of-way solution. The solution will also be able to generate alerts, review

and approve relocation payments, support the schedule of closings, generate a relocation payment by warrant or EFT, track status which could be implemented as a dashboard which would allow users to use advanced filters to get relevant information.

Post acquisition, the consultant will have to perform property management functions which include securing the property purchased in regards to safety, public health, appearance, and protection of assets. The solution will provide the ability to request and track the progress on all Property Management appraisal report requests, provide the ability to track lease term dates, provide the ability to track and manage when property is sold.

An interface to wvOASIS will allow this parcel to be added to the Fixed Asset register. The interface will create an FA document in wvOASIS that will capture the details of the property along with validating against the budget COA string. Mechanisms will be built to ensure that the document does not get created in wvOASIS if there are errors on the budget validation or the interface violates any of the wvOASIS rules.

The solution is also able to generate a negotiator's certification based on property owners acceptance of an offer and a request by assigned right-of-way agent. This will allow the asset to move into the construction phase

9.1.5 Utility Relocation and Railroad

For Utility Relocation and Railroad, Dataview will provide a GIS viewer (integration into WVDOT ArcGIS) that will allow users of the solution to review the location of the current utility or railroad structure and an ability to plot the relocation/ railroad to a new location of choice. The user will also be able to enter certain parameters on the GIS viewer that will present them with the results of their selection.

The solution will also provide an ability to input all of the relevant information of the asset requiring relocation including name, description, location, contact information, relevant dates, discussions around the asset, responsible party, WVDOT responsible staff member, ability to maintain product milestone schedule. Based on the design some of these details such as the dates, schedule, and name may be interfaced from the Hub.

9.1.6 Contract Management

For Contract management, Dataview will provide an integrated solution that will allow WVDOT to manage all ROW contracts for the ROW application. Screens will be provided to manage ROW vendors and their status. Users will be able to select a vendor and ROW project/phase. Funding information will automatically be inferred from the associated phase in Hub where users can specify the contract amount. Contract amount will be validated so that it does not exceed the phase amount or phase amount minus contracts already generated for that phase. When the user reviews and approves the contract, the system will automatically generate a contract ID that matches OASIS conventions and generate a transaction to send to OASIS for processing. Key contract attributes will be tracked within ROW application and expenditures against the contract will also be tracked in ROW application using a nightly interface. In order to implement an effective solution for contract management we would like to focus on the following:

Prior to bringing vendors into the ROW application, we would like the vendors to register with OASIS using the Vendor Self Service VSS (<https://wvoasis.gov/VSS/Default.aspx>) application. This way the ROW application can use OASIS as a central repository for vendors and avoid duplication of vendors and erroneous data entry and transaction failures. We will use the vendor code provided to WVDOT to sync data between OASIS and ROW applications. Using the vendor code from OASIS we will be able to infer all required attributes necessary for ROW to function and to be able to generate contracts with the correct vendor information. This information can be refreshed frequently or on a nightly basis. There may be cases where some vendors may be individuals and won't be able to register with OASIS, in this case we can use a Miscellaneous vendor code, however the name and address information will need to be provided by the users in the ROW application to be able to process the contract successfully in OASIS.

It is also recommended that WVDOT should make a decision of what type of purchasing document/transaction they want to use in OASIS. OASIS provides two types of procurement document as a vehicle for purchasing.; One is commodity base such as Purchase Order (PO), Contract (CT), Master Agreement/Delivery Order (MA/DO) or Non-Commodity Base document like General Accounting Expense (GAE).

Users will have the ability to generate contracts directly from the ROW application. Once the contract is created, reviewed and approved, our back processes will pick the transaction and submit it to OASIS. This process can be scheduled at predetermined frequency during the day. Coordinating with OASIS ERP Technical team is required for this step. Once the contract is submitted, our back-end processes will run periodically to identify any changes in status or approvals that are required within OASIS and reflect them in the ROW application. This way users do not have to go to OASIS to view the status of their contracts.

For contract Change Orders or contract modifications, users will be able to click on the original contract or the previous change order which ever is the latest in the system and trigger a change order without having to re-enter all the information in the new version of the contract. Users then can modify the specific fields in the new version and follow the approval steps and submit them to OASIS.

A screen for scope of work will be provided to capture vendor or consultant performance ratings and it will be connected to the project/phase/contract information for a wholistic view.

In Summary, Dataview has extensive experience in providing these types of integration and has Subject Matter Expertise in the OASIS application.

9.1.7 Payment Processing

The payment processing for payment requests will be managed from the ROW application in a similar fashion as contract management. Once the contract is submitted and approved to 'Final' in OASIS, users can go into the contract management screen select the contract they want to pay and create a payment request from the contract. All the information will be inferred from the contract and the user can update the payment amount and scheduled payment date. Once reviewed and approved in the ROW application, our back-end processes will generate a PRC document and submit it to OASIS for processing. Once the PRC is approved and finalized in OASIS, the ROW application will be updated to reflect the current status. Also, when the disbursement process (checks/warrants) is run in OASIS we will update the information in the

ROW application. This way the complete expenditure chain will be captured in one single application.

An inquiry screen will provide a complete view of expenditures at summary and detail level across contracts, payment requests and disbursements by project and project/phase.

OASIS data will also be integrated in the data warehouse for reporting and analytics.

9.2 TECHNICAL ARCHITECTURE

9.2.1 Architecture Overview

Dataview proposes an on-premises solution that will be deployed in the State's Data Center and will be built using the existing Hub Development Framework, it will leverage and share the existing wvOASIS ERP infrastructure that has been deployed for the DOH Capital Project Management System. This approach will reduce the overall infrastructure cost and allow DOH to leverage existing technical and operations staff for managing the system. Users will use their existing MyApps Single Sign-On (SSO) credentials to access ROW functionality.

Similar to the Capital Project Management System module, the new ROW module will use the wvOASIS Disaster Recovery infrastructure and processes that are audited annually. Figure 23 below illustrates the wvOASIS Disaster Recovery setup with the NetApp storage infrastructure making frequent snapshots and replicating those snapshots to the Disaster Recovery data center. In the case of a Disaster Recovery event operations staff would follow the established ROW Disaster Recovery Runbook. At a high level this involves orchestrating the migration to the recovery data center with VMware Recovery Manager then performing any networking and server specific tasks like updating DNS records, Load Balancer/Proxy configurations, and Database recovery. The expected wvOASIS Recovery Point Objective is 30 minutes and Recovery Time Objective is 8 hours. Recovery Point Objective covers the maximum data loss and Recovery Point Objective is the time to restoration services once a decision has been made to cutover services.

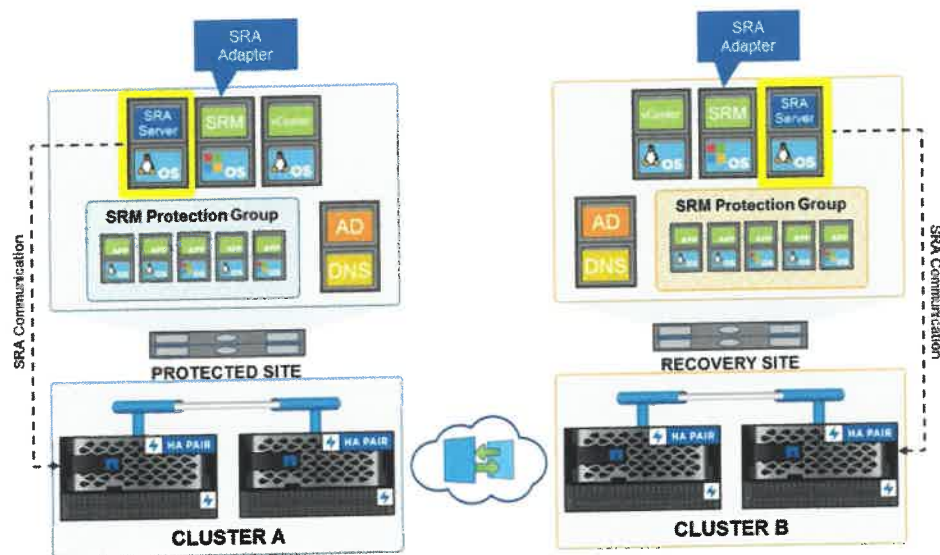


Figure 23 vVOASIS Disaster Recovery Setup

vVOASIS's VMware platform provide fast flexibility in scaling up server resources to meet increased workload demand; depending on the server type and resource these actions can be instantaneous or require a 15 minute maintenance window delay.

By sharing both the hardware platform and software platform of DOH's Capital Project Management System the ROW application should yield a substantial cost saving versus dedicated cloud hosting or dedicated on-premises hosting.

9.2.2 Customization

The ROW application will be built using the HUB Development framework. The framework is built on the Microsoft ASP.net Core framework that can run on multiple Operating Systems. The framework is based on industry standard development practices and non-proprietary standards. Microsoft SQL Server is used as the database backend. The HUB Framework follows a standard relational database model using the ASP.net core Entity Framework for data access. The technical staff can use Microsoft Visual Studio can be used to create new tables and data access libraries. The application architecture follows industry standard Model-View-Controller methodology that is easy to maintain and modify. Dataview will provide the State with the source code and provide the technical training and knowledge to modify and add tables and screens to the application.

9.2.3 Database

The HUB Framework uses the Microsoft SQL Server as a database backend. The database design follows standard ER relational model that is easy to understand and modify based on functional needs. Microsoft provided administration tools or other 3rd party tools can be used for administration and performance tuning.

The application uses optimistic locking using row versioning to reduce data contention and allow high scalability. Application validations, database constraints, foreign key definition along with Database transactions enforce the validity of the data.

The initial database will be sized based on the capacity planning review and projected growth. As part of the performance testing, the Dataview team will work with the State team to tune the database servers, identify additional indexes and setup the necessary alerts.

9.2.4 Job Scheduling

The Hub framework support Cron based scheduling of simple tasks via the in-built task scheduler. For more extensive scheduling and monitoring capabilities, the HUB framework uses the open-source SOS Job Scheduler (<https://www.sos-berlin.com/en/jobscheduler-features>) that is also currently used by the wvOASIS ERP as the enterprise scheduler. This approach avoids adding an additional technology or tool the existing technology stack that is familiar to the State. This job scheduler provides job scheduling features such as:

- Setup of Job flows with dependencies between steps
- Calendar and time-based job scheduling
- Event based Job Triggering
- Email Alert notifications of failures
- Cross platform support using job agents
- Execution History and Audit Trail of jobs
- Programming and Scripting support
- Centralized configuration
- Browser-based control and monitoring
- Ability to rerun jobs
- Authorization and Authentication setup

Below is a screenshot of the job scheduler dashboard and job reports.

9.3.3 Security

The Hub framework provides users, roles, and role groups configuration to make it easy to setup and maintain access. The security access is defined at the page, table, or field level and mapped to roles. Based on the roles assigned to the user, the user can view or perform actions on specific screens or fields.

Role groups are a convenience feature that allow the security administrator to group roles together as a single group for assigning and maintaining user access. This is done for roles that are commonly assigned together. For example, all district supervisors may need edit access for a specific set of district data. If multiple roles are required to provide access to the full dataset, then those roles can be configured as a single role group that can then be assigned to all district supervisors.

The ROW application will be setup for Single-Sign-On in myApps using SAML2. This will allow DOH staff to use their existing credentials to access the new deployment. This approach will allow the new application to leverage existing myApps:

- Existing onboarding processes
- Multi-Factor authentication based on States security policies.
- Self-service features to reset passwords and setup security questions.

Below is an example of a security setup screen in the application:



Figure 32 User Security

9.3.4 Auditing

The Hub framework provides comprehensive data auditing features that track all changes to application tables including the initial value, new value, user information and time of change. The information can easily be searched based on table name, affecting user, time of change, and field name. Below is the current Hub framework audit search screen.

Search Audit Logs for Project Table

Table Name

Field Name

Changed By

Date or Time Modified

CLEAR

SEARCH

Audit Log Id	ChangeSet #	Line #	ProjectId	StateProject	Field Name	Changed By	Date Chang...	Old Value	New Value
970	1631517016	1	2021010029	G001-033/00 1...	EngAllocationO...	udaya.chuliat@...	09/13/2021 12:...		1
971	1631517016	2	2021010029	G001-033/00 1...	EngDesiredEnd...	udaya.chuliat@...	09/13/2021 12:...		10/9/2021 12:0...
972	1631517016	3	2021010029	G001-033/00 1...	EngDesiredStar...	udaya.chuliat@...	09/13/2021 12:...		10/1/2021 12:0...
973	1631517016	4	2021010029	G001-033/00 1...	EngEstimatedC...	udaya.chuliat@...	09/13/2021 12:...		1400
974	1631517016	5	2021010029	G001-033/00 1...	EngIsFederalPr...	udaya.chuliat@...	09/13/2021 12:...	False	True

Figure 33 Hub Audit Log

Additionally, the Hub framework security audit logs capture user activity and actions. Below is an example listing of the security audit activity listing for a Hub user.

Username	EventTime	HubActivityType	HubAuditType	HubActionResult
ryan.brown@dataview.com	8/15/2021 7:10:28 PM	Login	Authentication	Success
ryan.brown@dataview.com	8/15/2021 7:23:28 PM	Login	Authentication	Success
ryan.brown@dataview.com	8/16/2021 3:56:23 PM	Login	Authentication	Success
ryan.brown@dataview.com	8/16/2021 4:29:31 PM	Login	Authentication	Success
ryan.brown@dataview.com	8/16/2021 5:07:14 PM	Login	Authentication	Success
ryan.brown@dataview.com	8/16/2021 5:36:18 PM	Login	Authentication	Success
ryan.brown@dataview.com	8/16/2021 6:06:37 PM	Login	Authentication	Success
ryan.brown@dataview.com	8/23/2021 8:07:36 AM	Login	Authentication	Success
ryan.brown@dataview.com	8/23/2021 8:57:23 AM	Login	Authentication	Success
ryan.brown@dataview.com	8/23/2021 9:27:27 AM	Login	Authentication	Success
ryan.brown@dataview.com	8/23/2021 10:04:17 AM	Login	Authentication	Success
ryan.brown@dataview.com	8/23/2021 2:49:38 PM	Login	Authentication	Success
ryan.brown@dataview.com	8/23/2021 3:46:56 PM	Login	Authentication	Success
ryan.brown@dataview.com	8/23/2021 4:01:27 PM	Login	Authentication	Success
ryan.brown@dataview.com	8/23/2021 4:03:09 PM	Login	Authentication	Success
ryan.brown@dataview.com	8/23/2021 4:05:25 PM	Login	Authentication	Success
ryan.brown@dataview.com	8/23/2021 9:30:45 AM	Login	Authentication	Success
ryan.brown@dataview.com	8/23/2021 10:44:04 AM	Login	Authentication	Success
ryan.brown@dataview.com	8/23/2021 1:01:22 PM	Login	Authentication	Success
ryan.brown@dataview.com	8/23/2021 7:01:27 PM	Login	Authentication	Success
ryan.brown@dataview.com	8/24/2021 8:17:19 AM	Login	Authentication	Success
ryan.brown@dataview.com	8/24/2021 10:48:59 AM	Login	Authentication	Success
ryan.brown@dataview.com	8/30/2021 8:04:58 PM	Login	Authentication	Success
ryan.brown@dataview.com	8/31/2021 2:22:49 PM	Login	Authentication	Success
ryan.brown@dataview.com	8/31/2021 9:38:24 PM	Login	Authentication	Success
ryan.brown@dataview.com	9/1/2021 6:06:22 PM	Login	Authentication	Success
ryan.brown@dataview.com	9/1/2021 7:07:14 PM	Report	Report	Success
ryan.brown@dataview.com	9/1/2021 7:07:14 PM	Modify	Report	Success

Figure 34 Hub User Activity Log

9.3.5 Help System

The Hub Framework integrates with Zendesk to provide a full-featured help and helpdesk functionality to users. The Zendesk Help system provides a context aware and searchable help tool which can be accessed without navigating the user away from their current page of focus.

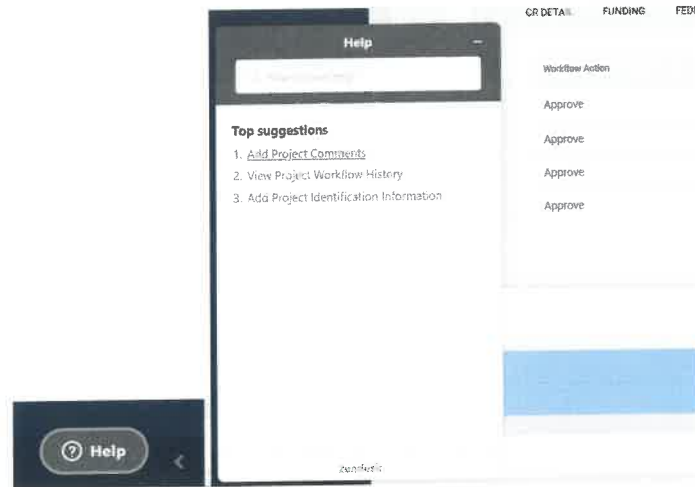


Figure 35 Context Aware Help

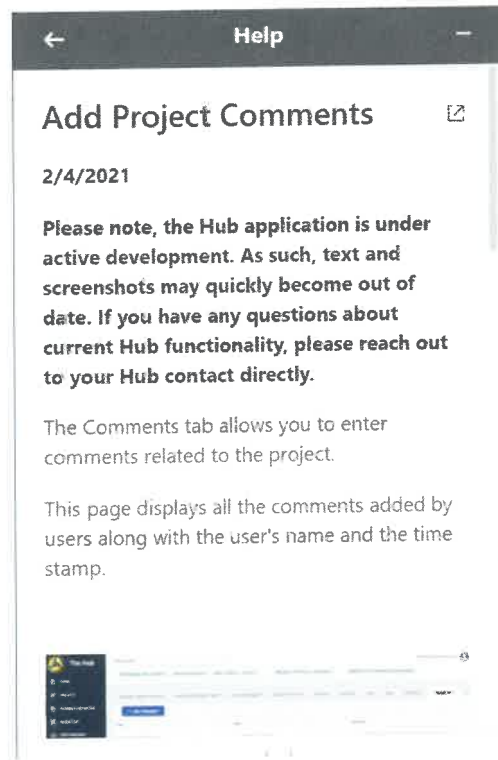


Figure 36 Formatted Help Content

The help content can be edited and managed using the Zendesk Administration portal by authorized users. User guides and navigation aids can also be made available via the help system and made searchable through the built-in tool. The help content supports HTML formatting making it easy to read and navigate for end users.

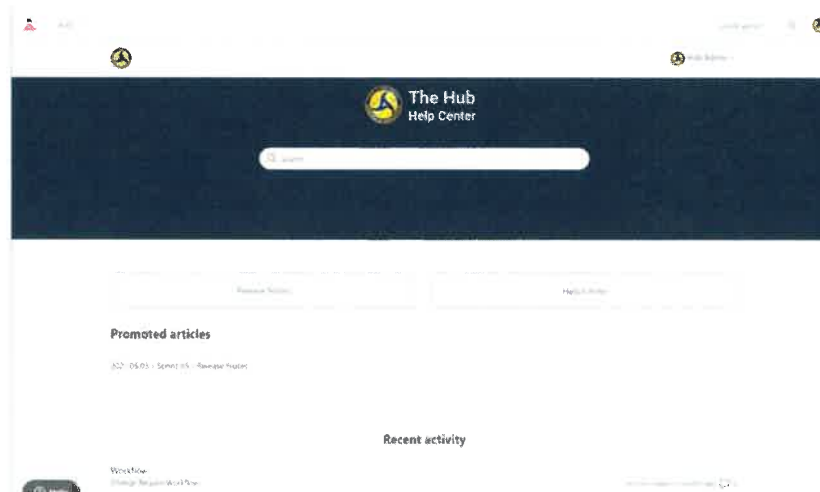


Figure 37 Zendesk Help Center

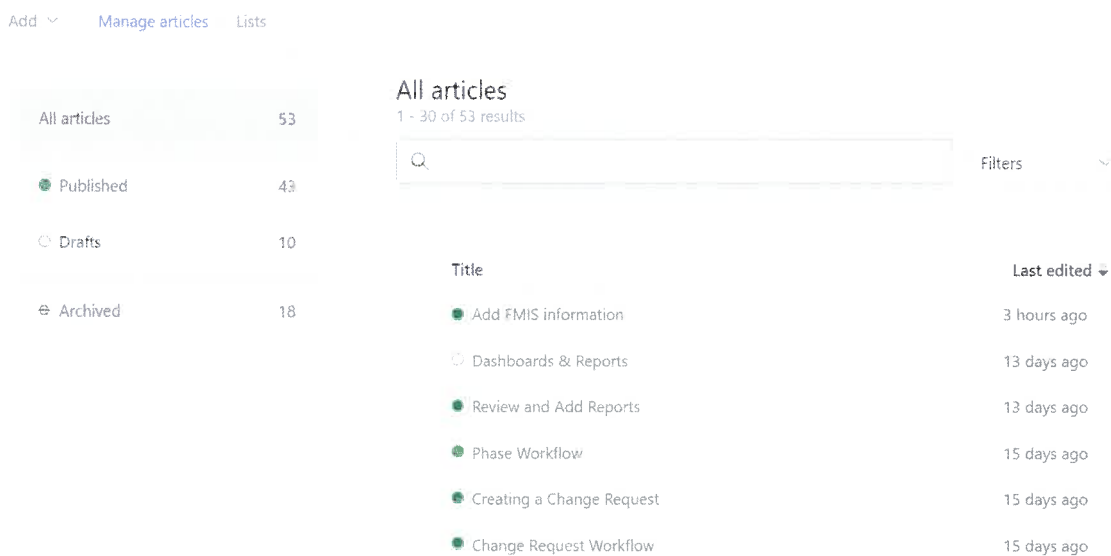


Figure 38 Zendesk Help File Administration

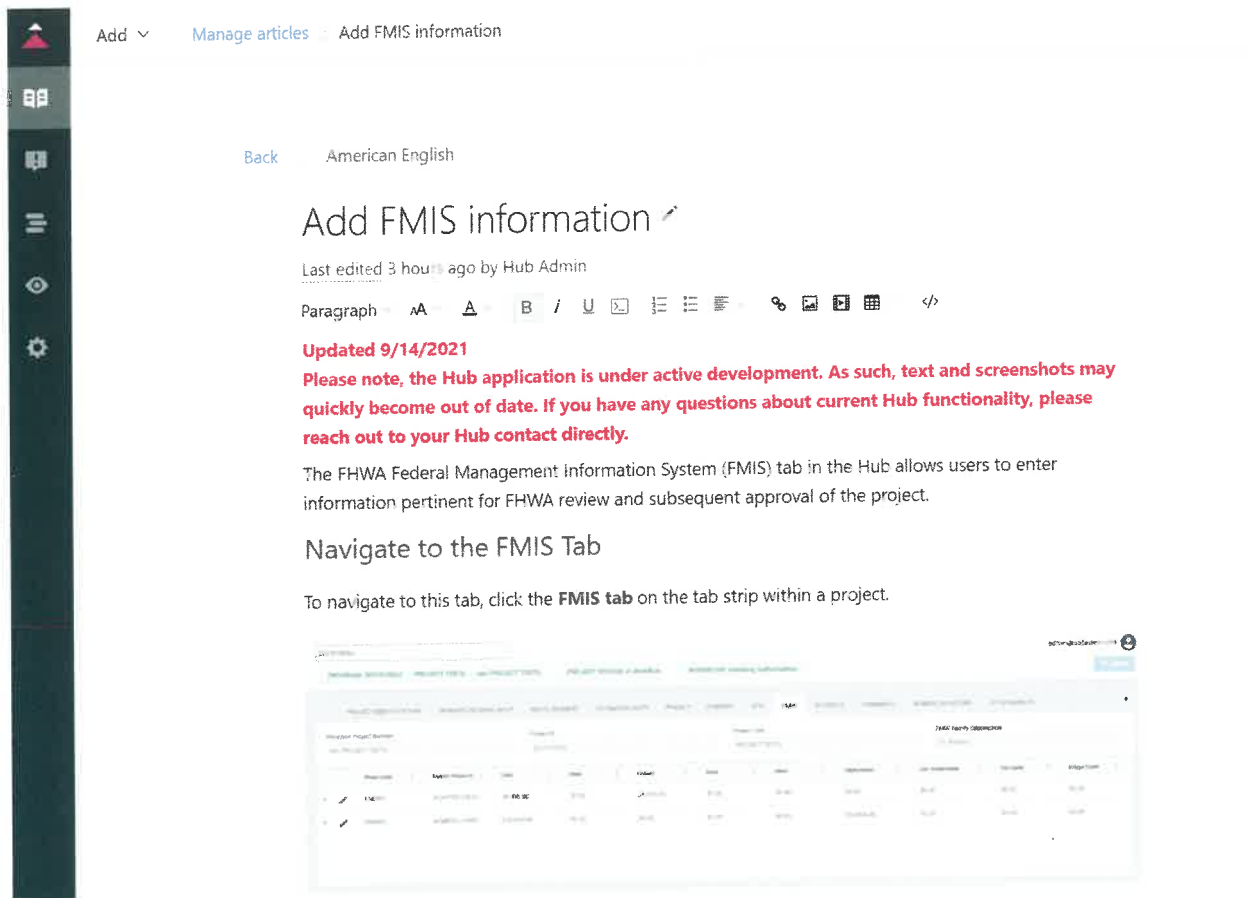


Figure 39 Customizing Help Content

An internal field-level help system is also available that can be setup in addition to or instead of the Zendesk help system. With this feature, users can obtain guidance on specific data entry fields through the press of an assigned hotkey.

9.3.6 Forms Management

The Hub Framework supports creating mailings and correspondence using mail merge. Existing word templates can be configured in the application. The user can then select the multiple input records to use for the mail merge action. The target records are used along with the template to produce Word or PDF output and loaded as an attachment for printing or mailing.

The solution will provide the ability to define, store and auto-populate templates for various forms and letters. The solution will allow users to key in information if they desire but will also have the ability to auto-populate data based on available information already in the system. For instance, the user can choose to key in the specifics about the questionnaire (RW 5.01) that they are using to get information about the parcel, or they can utilize the information that has been integrated from the HUB along with Right-of-Way Certificate, letter of interest, preliminary plans etc. Similarly, the appraiser and the Review Appraiser can fill out forms RW – 6.06 and RW – 6.10 - C manually or utilize information from the RW-3 or the information can be populated in the template once the authorization from the Right-of-Way Manager is received to

purchase the property. The solution will also be dynamic enough to recognize that when the value of the property is \$25,000 or less, it automatically triggers a RW-5.13 to waiver valuation.

In Other words, the solution will be intelligent enough to understand the different flows and based on a robust business rules and workflow engine, will trigger certain actions and populate form templates with requisite data while also allowing the user to overwrite any of that information manually.

As an extension of the forms templates, the solution will also maintain templates for the different letters created during the life cycle of the Right-of-Way. Right-of-Way Certificates, letters of Interest, 30 day/ 90 day letters etc will be auto filled based on data in the solution and will also be editable by the user before they are finalized and sent electronically or printed.

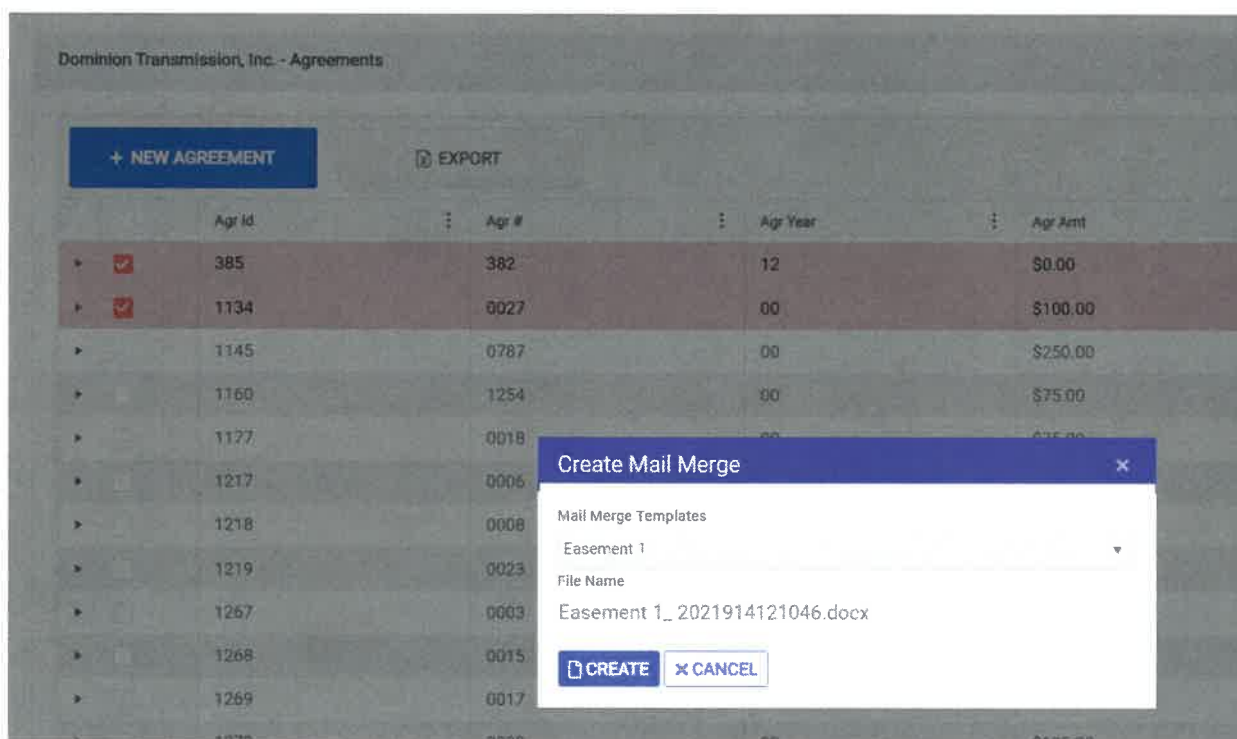


Figure 40 Forms Generation

9.3.7 Document Management

The Hub framework provides support for uploading and storing attachments on various screens and entities. The files are stored on the configured shared network drive. The ability to load, delete, and access the files can be controlled through Hub application security. The file types and maximum file size allowed also can be configured as needed.

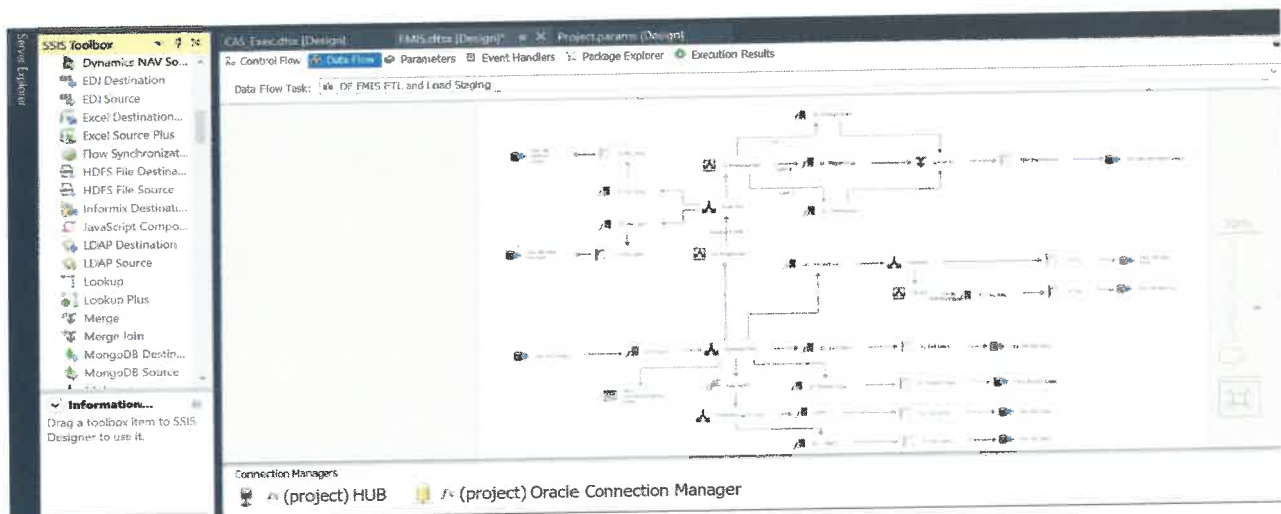


Figure 43 Microsoft Visual Studio (SSDT) Dataflow

For scheduling, HUB integration leverages CRON to execute SSIS packages and move, rename, and FTP files at pre-determined times via the HUB Interface Framework

9.4.2 HUB Interface Framework

Integrations to and from The HUB are managed through a robust HUB Interface Framework, implemented in Microsoft SSIS.

- Each integration between the HUB and a partner system is defined to the Framework as a distinct **Process**
 - For each process, ETL is developed in Microsoft Visual Studio as an SSIS package (s) to accommodate Extract, Transformation, and Load requirements specific to the process
 - Each process is fully customizable and extensible
 - A process may be an inbound or outbound integration
- Each **Process** is invoked through the Interface Framework
 - The Interface Framework handles functionality that is “common” across processes
 - executing the ETL packages that make up the process,
 - handing common functions like file input/output,
 - tracking execution status, return codes from partners, summary statistics, and details specific to each execution instance of a process

9.4.3 Interface Administration

HUB Interface Framework Administration pages allow users to review any previous (or active) executions of each process.

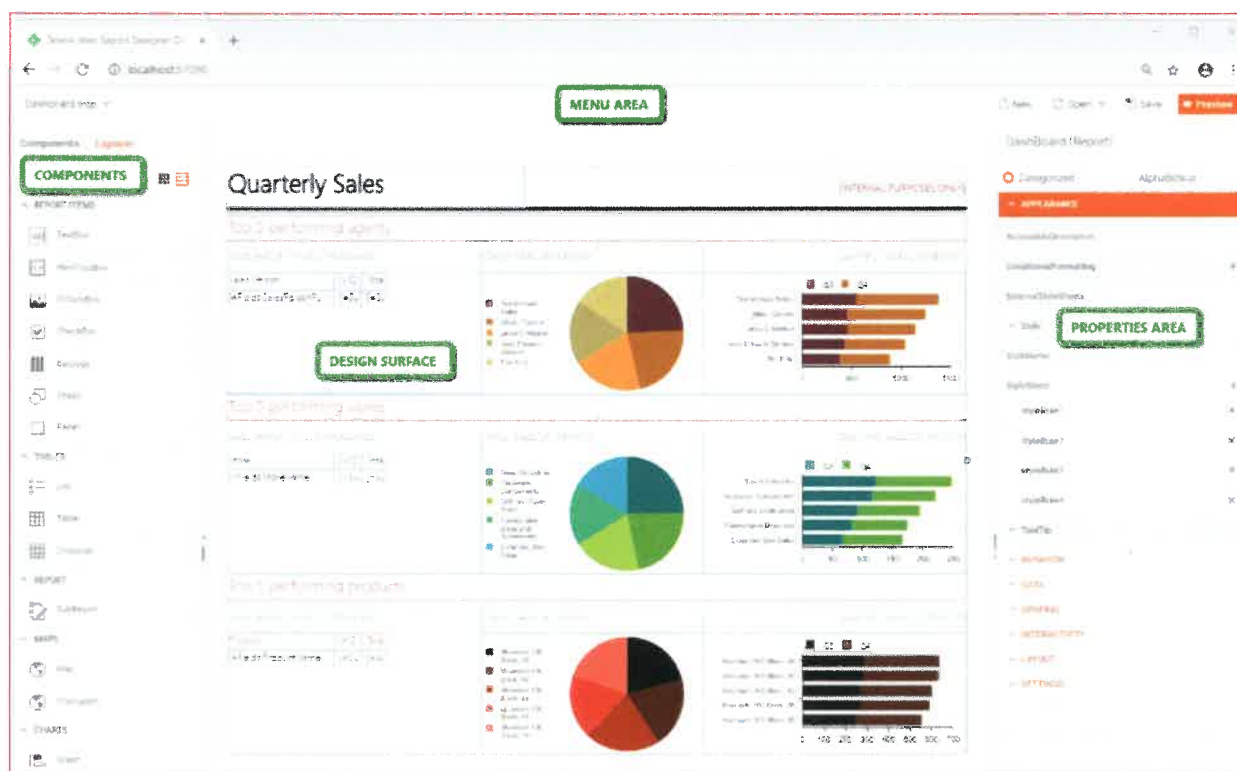


Figure 50 Web Report Designer

9.5.2 Power BI

Microsoft Power BI is the largest and fastest-growing business intelligence cloud solution. The Hub framework uses embedded power BI for integration. As a cloud solution, Power BI provides a BI platform to meet client compliance and regulation needs. Power BI reports and dashboards are managed from the Hub framework and users can access them like accessing any screen in the application. This provides a seamless integration and keeps users engaged and focus within one application

Power BI developers require an additional license to be able to develop, deploy and share reports with the user community. Developers can either use the service to develop dashboards and reports or power BI desktop. Power BI desktop is a client tool that requires an additional installation on the user's machine. Power BI desktop is used for creating data models as well as reports. While the power bi service is targeted to business users for development the Power BI desktop is reserved for power users and developers.

Power BI dashboards and reports are very interactive and allow users to interact with data dynamically. It supports multiple chart component, ArcGIS, Tables, Cards, Slicers and Filters among other components. When reports and dashboards are developed using these components, the interactivity across these components is seamless and allows users to zoom in

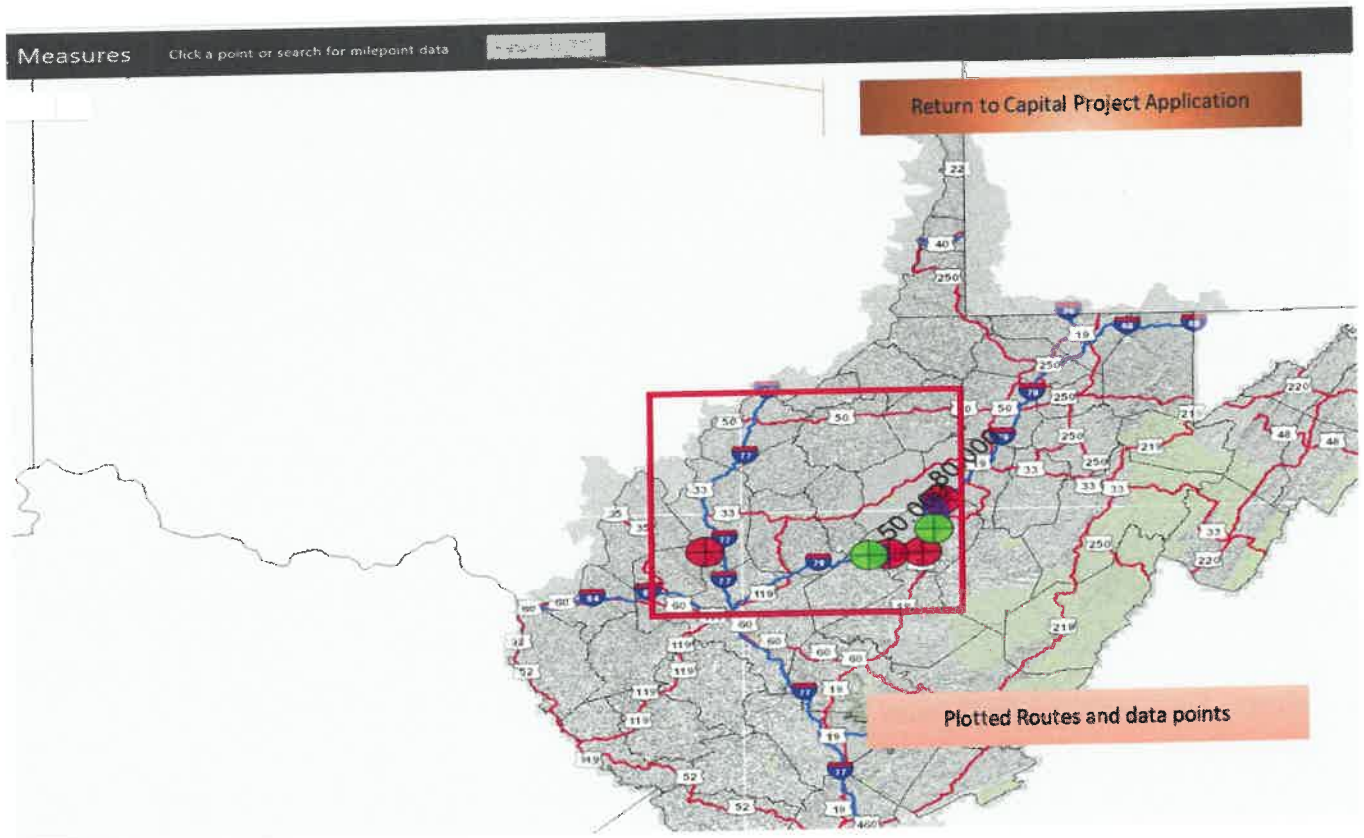


Figure 53 HUB GIS Viewer Route Plotting Prototype

As part of the ROW module implementation the Dataview team will work with the State to enhance the GIS viewer to integrate with the WVOT's existing ArcGIS environment to provide features such as:

- Plot parcel, utility and railroad agreements on a map and drill down to view related details in the application
- Provide ability for user to select area of interest and show related parcel, utility and railroad agreements information from the application
- Provide ability for ad-hoc queries to plot parcel, utility and railroad agreements on a map

Tab 10 – Draft Statement of Work

10 DRAFT STATEMENT OF WORK

10.1 DRAFT STATEMENT OF WORK

This Statement of Work (SOW) is between Dataview Consulting LLC and the West Virginia Department of Transportation resulting from RFP CRFP-0803-DOT2200000002-2 for the Right of Way application implementation. This SOW clarifies the services, roles, responsibilities, implementation schedule, compensation and payment schedule, and project assumptions as mutually agreed upon by Dataview and WVDOT.

This SOW includes the RFP and Addendums including a potential request for BAFO, Dataview's Proposal response dated September 23, 2021 and terms identified in this RFP.

10.1.1 Period of Performance

This Statement of Work is effective as of November 1, 2021 through December 31, 2025.

10.1.2 Statement of Work Managers

The Statement of Work Managers for the project will be as follows:

WVDOT SOW Manager	Dataview SOW Manager
TBD	Sanjeev Musafir, Partner & Co Founder

10.1.3 Attachments

This statement of work may incorporate attachments for additional textual support.

- Attachment A
- Attachment B

10.1.4 Definitions

TBD

10.1.5 Functionality to be Provided

The functionality to be provided by the ROW application is as follows:

Module	Functionality
ROW application	<ul style="list-style-type: none"> • ROW Data entry screens with business rules and validations • Form screens with printed form generation • Security • Workflow • Attachments • Vendor and vendor evaluation management screens • Contract management screens • Accounts payable management screens • The Hub integration (Capital Project Management)
ROW Public Portal	<ul style="list-style-type: none"> • Security • Workflow

	<ul style="list-style-type: none"> • Forms • Vendor account management
Integration	<ul style="list-style-type: none"> • wvOASIS (financial and HRM) • BRIM • CAD • TAMS • Rail-Road crossings
Business Intelligence	<ul style="list-style-type: none"> • Power BI integration • Ad-hoc integration • Extract Transform and Load (ETL) • Data warehouse • Dashboards • Reports

10.1.6 Technical Infrastructure

This section describes the infrastructure, hosting services and assumptions with the technical infrastructure required for the project.

Dataview is responsible for the development environment to develop and deliver the ROW application and its components. WVDOT is responsible for coordinating infrastructure provisioning in the OASIS infrastructure. Dataview will provide installation services for UAT and Prod environments in the OASIS infrastructure.

10.1.6.1 Hosted Development Environment

Dataview will host the ROW application in its development environment in Azure (Microsoft Cloud Solution). The hosted development environment will consist of the following:

- Baseline Hub application and its framework
- Power BI integration
- Integration services to external systems
- Conversion data
- Emergency patches

Dataview will provision an environment and will deploy all necessary tools to develop the ROW application. Dataview will be owner of this environment

10.1.6.2 Hosted Quality Assurance Environment

Dataview will provision a Quality Control environment in Azure to perform system testing. All components will go through rigorous testing before deploying them in WVDOT environment. This environment will be controlled by Dataview.

Both the development and QA environments will require support from WVDOT and OASIS ERP staff. The following table lists the roles and responsibilities of these two environments:

Task	Dataview Team	WVDOT Team
Procure, provision, and install software components in Azure	Lead	Review
Maintain and operate	Lead	Review
Provide VPN access	Assist	Lead

10.1.6.3 User Acceptance Testing (UAT) and Production Environments

Dataview and WVDOT will leverage the existing infrastructure and deploy the ROW module into 'The Hub' application. No hardware or additional software will need to be acquired. A server for the public portal will need to be provisioned to support traffic coming from external users (i.e. legal vendors and consultants). Dataview will have primary responsibility of the UAT and Production environment for managing the ROW application. The following table lists the roles and responsibilities for the UAT and Production environments:

Task	Dataview Team	WVDOT Team
Provision and install software components in Azure	Lead	Assist
Maintain and operate UAT and Production	Lead	Assist
Operate and maintain ROW environment after one year	Lead	Assist
Provide VPN access	Assist	Lead

10.1.7 Disaster Recovery Environment

Dataview will leverage the OASIS disaster recovery environment. No additional procurement is required. No additional configuration will be required since DR has been already implemented as part of 'The Hub' application.

10.1.8 Schedule of Performance

The phases discussed in the implementation phase section of this RFP will be implemented per the timeline of Go-Live as depicted below.

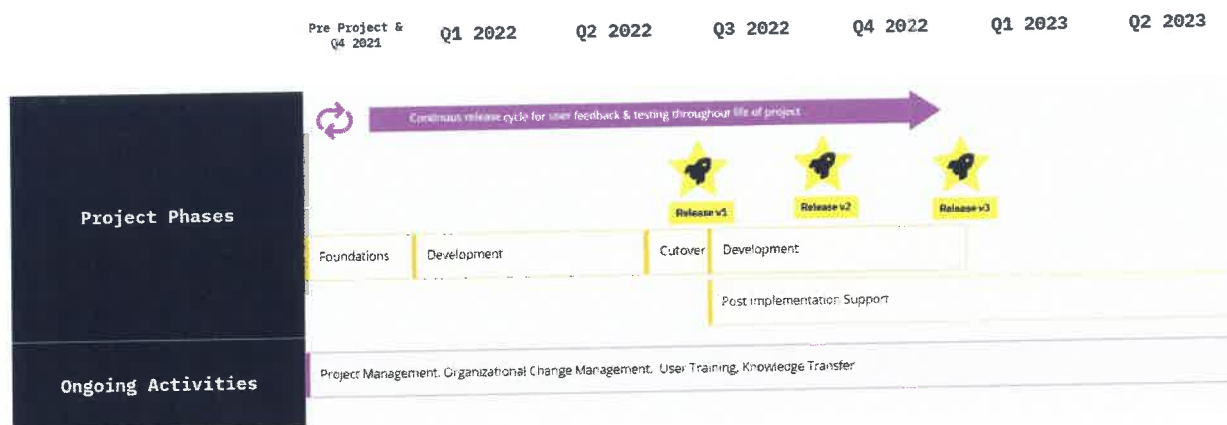


Figure 54 Project Timeline

10.1.9 Work Location

The intent of WVDOT is to provide Dataview as much flexibility as possible in performing project activities in the most efficient and most effective way to while providing an appropriate onsite presence to facilitate knowledge transfer to the WVDOT team.

Dataview acknowledges that it shall comply with the Acceptable Work Locations by WVDOT. To support Dataview onsite staff, the following logistics will be required:

- WVDOT to provide access to conference rooms for Dataview staff to conduct meetings with the Dataview product team.
- WVDOT will provide workspaces for all onsite Dataview team members
- Each Dataview onsite team members will provide their own laptops configured with virus protection.

10.1.10 Deliverable Review

As part of the deliverable development process, Dataview will create and submit to WVDOT deliverable requirements for each deliverable type. The deliverable will identify the content or outline for the deliverable, acceptance criteria, the review complexity and identify the State's approvers.

Dataview will subject each to its internal quality control processes prior to submitting the deliverable to WVDOT for review.

These deliverables will be a working in progress and will incrementally be updated throughout the lifecycle of the project but prior to go-live. Following submission of the deliverable, WVDOT shall review the deliverable to determine readiness for use and compliance with the design specifications. If WVDOT finds material deficiencies in a deliverable, it will formally communicate them in writing to Dataview. Dataview team shall correct deficiencies and resubmit the corrected deliverable. WVDOT will review the corrections of the deficiencies and should not raise additional deficiencies without approval. WVDOT will not unreasonably withhold or delay its approval of a deliverable. The following table presents an example of a deliverable review cycle

Task	Standard Duration
Conduct Design Session	1 day
Create Deliverable	1 day
Internal Review of Deliverable	1 day
Submit Deliverable to WVDOT	0 days
State Review and Approve Deliverable	2 days
Dataview to Incorporate Final Comments	1 day
WVDOT Review Updates to Deliverable	1 day
Submit Final Deliverable	0 days

For each deliverable the State project director or their designee will be responsible for compiling WVDOT comments and inputs from various WVDOT project team members and stakeholders. They will provide written feedback on all deliverables in the form of a list of issues that need to be addressed. Dataview will respond to this list with brief remarks indicating the action taken or the disposition of each comment. WVDOT will confine comments on second and subsequent reviews of a Deliverable to determining that the points that were raised in the prior review have been addressed. The WVDOT's intent is that new comments will not be made on second and subsequent reviews unless a new issue occurs as a result of the changes Dataview made to the prior version of the Deliverable in the course of addressing issues that were raised by WVDOT. Exceptions to this process will be reviewed by WVDOT and Dataview Project Director to evaluate impacts to project schedule.

10.1.11 Implementation Methodology

Dataview System Development Methodology Model is driven by three main guiding principles: Welcoming Change Through Customer Collaboration, Frequently Deliver Value Through Working Software, and Provide Technical Excellence. These principles support a continuous delivery approach known as “Scrum”, that uses short development cycles to deliver working software iteratively and incrementally throughout the life cycle of the project. Our continuous delivery model allows for greater customer alignment and collaboration, early customer feedback, ability to adapt to change, and quick and incremental return on investment when compared to other, less iterative approaches.

10.1.12 Project Management

Our project management methodology is consistent with the Project Management Institute (PMI) and Agile Alliance standards and guideline publications that equip project teams with tools, situational guidelines, and an understanding of the available agile techniques and approaches to enable better results in their project. Through our experiences working with WVDOT, we also believe that this approach is compatible with the West Virginia Office of Technology (WVOT) Project Management Methodology as these are also closely aligned with PMI Standards.

10.1.12.1 Project Management Roles and Responsibilities

The Dataview and WVDOT management teams will work collaboratively to lead the project to meet the goals and objectives for the ROW project. The following table identifies key project management activities and the associated responsibilities:

Task	Dataview Team	WVDOT Team
Project Management Stage		
Report to Governance Board	Assist	Lead
Develop Weekly Report	Lead	Assist
Develop and Maintain Project Management Plan	Lead	Assist
Maintain Project Work plan and associated reporting	Lead	Assist
Conduct Project Team Meetings	Lead	Assist
Conduct Change Control Board Meetings	Assist	Lead
Manage Issue Tracking and Resolution	Lead	Assist
Dataview Team Resource Management	Lead	Participate
State Team Resource Management	Participate	Lead
Manage Change Request Tracking	Lead	Assist
Manage Project Time Reporting	Lead	Assist

WVDOT Project manager will review the project issues and proposed resolutions in a timely manner as mutually agreed upon in order not to affect the project schedule. If resolution cannot be achieved the specified timeframe, the WVDOT project manager will escalate to the appropriate levels.

10.1.13 Incident Management

An Incident is an unexpected or unexplained result identified when actual results do not match expected results. A Defect is an Incident that identifies a confirmed deviation from Design Specifications in a system component that must be corrected. While Defects are most often

associated with software components, defects can be identified in designs, documentation, test scripts, environment configuration, data set-up, developed code, or business processes. When Incidents occur regarding the capabilities and functions in the ROW Solution, they will be resolved in a manner consistent with the Design Specifications. Incidents can occur as a result of misunderstandings or misinterpretations regarding requirements.

10.1.14 Incident Severity and Resolution Timeframes

The classification of Incidents during the project will be based on the severity levels defined in table below.

Severity	Description	Timeframe for Initiating Work	Timeframe for Resolution
1 - Critical	An incident causing critical impact preventing the ROW's business operation where no workaround is immediately available.	The vendor must begin diagnostics on the incident within two (2) hours of the incident being reported to the vendor and continue work until resolved.	Dataview must resolve at least 95% of all Critical Incidents within one (1) business day of Incident identification through either implementation of a software correction or an acceptable workaround. If the Incident is resolved through a workaround, the Incident may be re-classified as a Serious or Moderate Incident depending on the nature of the workaround for final resolution through a software correction.
2 – Serious	An Incident causing significant impact to the State's business operation. However, there is a work around allowing business operations to proceed in the interim.	The Vendor must begin diagnostics on the Incident within two (2) hours of the issue being reported to the Vendor.	Dataview must resolve at least 95% of all Serious Incidents within five (5) business days or other mutually agreed upon timeframe of Incident identification through either implementation of a software correction or an acceptable workaround (where a workaround was not already in place). If the Incident is resolved through a workaround, the Incident may be re-classified as a Moderate Incident depending on the nature of the workaround for final resolution through a software correction.
3 – Moderate	An Incident that impairs some State business operations, but a practical workaround exists.	The Vendor must begin diagnostics on the Incident within ten (10) business days of the issue being reported to the Vendor.	For Incidents which relate to the System configuration or enhancements interfaces, workflows, forms and reports developed as part of the ROW project, Dataview must resolve at least 90% of all Moderate Incidents through a software correction or other solution acceptable to the State within twenty (20) business days or mutually agreed upon timeframe of Incident identification. With the approval of the State, software corrections may be packaged with other software changes and migrated during a regularly scheduled production migration activity. For Incidents which require a software correction to the base Advantage software, the software correction must be provided in the

Severity	Description	Timeframe for Initiating Work	Timeframe for Resolution
			next Minor or Major Release, whichever is sooner, if reported prior to release cut-off
4 – Minor	An Incident that has no impact or a limited immediate impact on State business operations		For Incidents which relate to the System configuration or enhancements interfaces, workflows, forms and reports developed as part of the ROW project, Dataview must resolve all Minor Incidents through a software correction or other solution acceptable to the State within a mutually agreed upon timeframe of Incident identification. With the approval of the State, software corrections may be packaged with other software changes and migrated during a regularly scheduled production migration activity.
5 – Enhancement	Out of scope functionality/requirement		

10.1.15 Quality Management

Quality control for the project confirms that the deliverables meet the design specifications and are approved. At the beginning of the project, the project management team will establish quality control procedures by identifying specific members of the project team who will help test compliance of the various deliverables. Throughout the project Dataview will provide for consistent use of the procedures outlined in the Project Management Plan, review and approve each of the deliverables before they are submitted to the State for acceptance and take appropriate action should non-compliance issues arise.

10.1.16 Training

Dataview will be responsible for the development and design of the training materials. WVDOT will be responsible for augmenting the training materials with the appropriate policies and business rules associated with implementation. This approach enables efficient maintenance of materials and drives behavior early in the training sessions that support State staff using online references for policy and business rule procedures. As part of its training, Dataview will produce the deliverables listed in the table below.

Deliverable	Description	Acceptance Criteria
Project Team Training	Conduct one product walkthrough, for each of the project phases. This walkthrough for the core project team will cover key concepts of the ROW Solution, high-level methodology concepts, introduction to navigation, key technical training and a learning kickoff during the Foundation Stage. The Project Team Members will be in one of two tracks; technical or functional.	Core Project Team training delivered per the Training Plan
Comprehensive Training Plan	Documentation of a detailed training program for the ROW Solution addressing	Comprehensive training plan including training goals and

	the needs of the project team, system users, trainers and technical staff.	objectives, training audience needs analysis, outlines for software education sessions, types of training to be deployed by user group, training facilities, training schedule, plan for development of training materials and estimated number of trainers required, and techniques to be used to measure the effectiveness of training.
Updated Comprehensive Training Plan	Additions or revisions to the Comprehensive Training Plan, as necessary based on information gained in each Phase	Updates as identified by WVDOT and Dataview
Training Curriculum	Documentation of the training courses, watch, try, print, quizzes, target audience, format and type of training, dates etc.	Training Curriculum Delivered
Technical and Operations Personnel Training	Conduct technical and operations training for up to 15 Technical Team and System Administrators per Phase. This training for the core project team will cover key concepts of the software, technical tools and utilities, and operational aspects.	Technical and operations training delivered to appropriate State staff as per the training plan
Training Materials	Design, development and delivery of user community courseware and training database.	Training materials development completed, delivered as per the training plan
UAT Tester Training	Training sessions to familiarize User Acceptance Testers with the functionality of the system. DATAVIEW will train the State testers to prepare them for their role in executing the user acceptance test scripts.	UAT training sessions completed as per the training plan
Train the trainer	Conduct Functional "Train the Trainer" training. This includes training State trainers, as defined in our proposal, conducting the first two sessions of each classroom training module, and then providing in-classroom monitoring and support to the WVDOT trainer for two additional sessions.	Preparation of State trainers will include practice training sessions on the software, business process and associated system training exercises, setup of the training environment including data to be used in conducting training sessions, training support as described and back up, restore and troubleshooting assistance during delivery of end user training.
End User Training	Conduct the first two sessions of each classroom training course, and then provide in-classroom monitoring and support to the State trainer for two additional sessions.	

10.1.17 Training Roles and Responsibilities

Dataview and WVDOT roles are presented in the table below.

Task	Dataview Team	WVDOT Team
Project team delivery	Lead	Participate
Technical team training gap identification	Lead	Participate
Development of End-User training plan	Lead	Assist
Define course needs and end users attendance	Participate	Lead
Augment end user training materials	Assist	Lead
Train the trainer	Lead	Assist
End user training	Assist	Lead
Knowledge transfer	Lead	Assist

10.1.18 Implementation

Dataview and WVDOT roles in the implementation strategy are presented in the table below.

Task	Dataview Team	WVDOT Team
Development environment	Lead	Review
User Acceptance Test environment installation	Lead	Assist
Production environment installation	Lead	Assist
Implementation Plan	Lead	Assist
Configure Application	Lead	Assist
Operations Documentation	Lead	Assist
Create and Execute Cutover Plan	Lead	Assist
Execute Cutover Plan for components owned by WVDOT	Assist	Lead
Provide Post go-live support for first 6 months	Lead	Assist
Provide Post implementation 6 months after go-live	Assist	Lead

10.1.19 Base Software Upgrade

Dataview will be responsible for upgrading the base software for the ROW application. Each WVDOT environment will be upgraded. First, the upgrade will be deployed to UAT environment where users can perform system testing and report any issues that may result from the software upgrade. Once all issues are resolved then the upgrade will be deployed to Production.

10.1.20 Security

Dataview will configure security using Single Sign-On for authentication and ROW security for authorization. The ROW application will support the Security Assertion Markup Language (SAML 2.0) to integrate with MyApps and authenticate users. The ROW application will then authorize access levels to functionality within ROW based on security configuration for each user. The following table identifies the security deliverables.

Deliverable	Description	Acceptance Criteria
Security Configuration Plan	Documentation of analysis conducted to establish and	Security Plan containing the described content.

	maintain security across the ROW Solution across the State's network. The approach for managing security across multiple software products, the use of firewall hardware and software, intrusion detection / prevention and other security measures will be described. Risk and vulnerabilities, and mitigation strategies are also included.	
Security Administrators guide	Security Administrators Guide addresses the set-up of security for the ROW Solution to support the functions to be performed by WVDOT's Security Administrators.	Security Administrator's Guide contains the described content

10.1.20.1 Infrastructure Security Roles and Responsibilities

Task	Dataview Team	WVDOT Team
Identify ROW Security policies and procedures	Assist	Lead
Validate OASIS technical deployment Architecture based on policies	Assist	Lead
Identify Access Needs for ROW users, Project Staff and Administrators	Lead	Assist
Prepare Security Configuration	Lead	Assist
Implement Security Controls	Lead	Assist
Monitor Security Compliance	Assist	Lead

10.1.20.2 Application Security Roles and Responsibilities

Task	Dataview Team	WVDOT Team
Conduct Security and workflow training	Lead	Participate
Provide current Security policies to include what WVDOT considers sensitive and confidential	Participate	Lead
Develop Security Configuration Plan with configuration for user roles, role groups, user profiles, data level security and data level security	Lead	Assist
Create and Test Application Security	Lead	Assist
Approve Security Configuration Plan and Security Configuration	Participate	Lead
Create ROW Application Security Templates	Lead	Assist
Update Templates with Users and Security Roles	Participate	Lead
Review Templates submitted by Districts	Participate	Lead
Upload Security Templates	Lead	Assist
Perform User Acceptance Test	Assist	Lead

Task	Dataview Team	WVDOT Team
Provide Post-Roll-out User Security Maintenance	Participate	Lead
Monitor Security Compliance	Participate	Lead

10.1.21 Data Conversion

During the Foundation stage for each phase, WVDOT and Dataview teams will perform an examination of the system solution and the environment in which it will be implemented. The results of the Foundation stage activities will be reviewed in detail with WVDOT and updated into the project plan. The plan will provide general estimation information on each data conversion item where implementation work will be required. For conversion, Dataview will assume primary responsibility for developing the Data Conversion Plan. Dataview will be responsible for designing, developing, and executing the required data transformations and load routines and for managing the automation of conversion. WVDOT will be responsible for developing routines to extract data from their legacy systems and validating data quality and accuracy. Dataview will provide planning assistance and advisory support in performing required manual data conversions. For example, Dataview will provide guidance for data entry through online screens.

The following are provided to assist the State in understanding the basis the Dataview Team used with regard to estimate project scope, timing, and resources.

- System testing of converted data will be performed with sample data to validate conversion processes work according to Design acceptance.
- Two mock conversions will be performed per phase. A mock conversion is a full volume conversion test that is also referred to as a conversion integration test, conversion acceptance test, a conversion dry run, or a conversion dress rehearsal.
- For data the State wishes to access that is not loaded to the ROW online transaction processing (OLTP) System, the State will be solely responsible for the design, development, and implementation of a solution for accessing this data.
- State acceptance of the production data conversion will be completed in the timeframe defined in the project schedule and is a pre-requisite to initiating production operations for each Phase.
- The success and level of accuracy of data conversion will depend upon the State's data cleansing effort and ability to format the data to be converted into the proper formats for loading into the ROW application. As part of the mock conversion results analysis, WVDOT and Dataview will evaluate data results and formulate an approach to addressing data issues.

10.1.21.1 Conversion Deliverables

The conversion deliverables are presented in the table below:

Deliverable	Description	Acceptance Criteria
Data Conversion Plan	Data Conversion Plan will include the following:	Data conversion plan that contains activities related to converting data from

Deliverable	Description	Acceptance Criteria
	<ul style="list-style-type: none"> • Identification of the data types to be converted or loaded to the ROW Solution • Identification of data sources and data volumes. • Identification of which conversions are to be completed in an automated, semi-automated or manual fashion. • Roles and responsibilities of all parties and the timing requirements of the activities. • Extract, transformation and load methods to be used. 	legacy systems to the ROW solution including method of load, data sources, data volumes, justification for automated conversion, roles, responsibilities and timing of conversion events
Delivered Programs for Data Conversion	Dataview will deliver unit tested programs to transform and load data extracted by the State.	Data Conversion Programs unit test results have been documented as per project standards and approved by the State.
Mock Data Conversion Plan	The mock conversion plan will document activities, data sources by conversion process, dependencies, schedule, and individual assignments.	Mock data conversion plan identifies the sequence of conversion activities including the dependencies and inputs for each conversion process. The plan identifies activities, responsible individuals, and schedule.
Mock Data Conversion Log	The Mock Data Conversion Log will document the results including time and date of input data sources, conversion statistics (record counts, key dollar amounts, run times), data validation results (including State provided results), data issues, error messages and conversion defects. Up to two full test runs of the data conversion process will incorporate testing of State developed extract program from the legacy systems and Dataview developed routines to transform and load data into the ROW Solution.	Completion of mock data conversions as per the Mock Data Conversion Plan
Converted Data in Production	Load the production environment with go live converted data. This includes both execution of the automated data conversion process and Dataview guidance to the State in performing manual data conversion processes. The production conversion run will include: <ul style="list-style-type: none"> • Creation of production conversion plan that documents activities, dependencies, and schedule. The 	Production database populated with go-live converted data, verified by the State per the criteria defined in the Data Conversion Plan.

Deliverable	Description	Acceptance Criteria
	<p>conversion plan will establish acceptance criteria for the production conversion.</p> <ul style="list-style-type: none"> • Creation of a Data Conversion Log including time and date of input data sources, conversion statistics (record counts, key dollar amounts, run times), data validation results (as provided by WVDOT), data issues (including those issues identified by WVDOT's data validation), error messages, and conversion defects. • Reconciliation results as provided by the WVDOT's business owners. 	

10.1.21.2 Conversion Roles and Responsibilities

The following table lists the conversion roles and responsibilities for WVDOT and Dataview.

Tasks	Dataview Team	WVDOT Team
Design Data mappings	Lead	Assist
Extract Data from Legacy Systems and map it to ROW application	Assist	Lead
Create a Data Conversion Plan	Lead	Assist
Provide Subject Matter Expertise for Legacy System Data	Participate	Lead
Transform and import extracted data into ROW Solution; create crosswalk structures	Lead	Assist
Manage and coordinate conversion activities including status reporting, issue tracking, work plan maintenance	Lead	Assist
Perform Data Cleansing	Participate	Lead
Provide guidance to the State on performing required data clean-up efforts identified through the mock data conversion process.	Lead	Assist
Execute mock conversions and production conversion automated processes	Lead	Assist
Validate quality and accuracy of converted data for mock conversions and production conversion	Assist	Lead
Manual conversion of data (including non-electronic data) and crosswalks	Assist	Lead

10.1.22 Integration

Dataview will interface with the external application listed in the RFP. The timely completion of interfaces is important for successful training, testing and production cutover. WVDOT will provide access to both functional and technical resources knowledgeable in the external systems listed in the RFP to facilitate, test, reconcile and verify interface processes. Dataview resources can be used to facilitate OASIS interfaces for Accounts Payable, Contract Management and Fixed Assets.

10.1.22.1 Interface Deliverables

The following table documents the interface deliverables.

Deliverable	Description	Acceptance
Integration Plan	Detailed document that defines fundamental concepts and activities related to interfacing between, the ROW Solution and related State legacy system, external systems, and specific roles and responsibilities.	Interface Plan to include key assumptions, business needs assessment for each interface and justification for automation, opportunities for reducing the number of interfaces, revised interface requirements, interface architecture and middleware, risk and mitigation, error correction methods, audit controls, temporary interface controls, and plans to coordinate testing efforts.
Delivered Automated Integration Programs	After unit test, the new and/or modified interfaces for the State will be delivered	Automated interfaces unit tested with documented test results and unit test package per established project standards.

10.1.22.2 Interface Development Roles and Responsibilities

The following table documents the roles and responsibilities for integration design and development.

Tasks	Dataview Team	WVDOT Team
Analysis and Assessment of interface requirements	Lead	Assist
Interface Planning and Design	Lead	Assist
Interface development and unit test: required transformation and load processes to ROW application	Lead	Assist
Interface development and unit test: Extracts from legacy and external systems, load processes to ROW application	Lead	Assist
Transform and import extracted data into ROW Solution; create crosswalk structures	Assist	Lead
Conduct Integration/System testing	Lead	Assist
User Acceptance Testing (UAT)	Assist	Lead
Management reporting and deployment tracking of production interfaces	Lead	Assist
Deploy interfaces in production environment including certification process and agency coordination	Assist	Lead

10.1.23 Reports and Forms

Dataview will use Power BI, embedded Ad-hoc query tool, and its reporting portal to deliver reporting requirements. It will also deliver inquiry screens that will help users view information in aggregated format. Dataview will also deliver forms based on its ad-hoc reporting tool as well as

Microsoft Word libraries to generate formatted forms for printing and integrate and embed data from the ROW application into the forms. All forms and reports will be developed based on WVDOT requirements.

10.1.23.1 Reports and Forms Deliverables

The following table documents the forms and reports deliverables.

Deliverable	Description	Acceptance
Reports and Forms Plan	Defines fundamental concepts and activities related to reporting and forms requirements, and specific roles and responsibilities.	Reports Plan to include key assumptions, business needs assessment for reports and forms, complexity definition, opportunities for reducing the number of reports and forms, revised reports and forms requirements, Go-Live required reports and forms, risk and mitigation, error correction methods, audit controls, and plans to coordinate testing efforts.
Delivered Reports	After unit test, the new and/or modified reports for the State will be delivered	Reports unit tested with documented test results Completed program documentation and unit test package per established project standards
Delivered Forms	After unit test, the new and/or modified forms for the State will be delivered	Forms unit tested with documented test results Completed program documentation and unit test package per established project standards as verified by WVDOT

10.1.23.2 Reports and Forms Development Roles and Responsibilities

The following table documents the associated roles and responsibilities for reports and forms development activities.

Tasks	Dataview Team	WVDOT Team
Developing Reporting and Forms Strategy	Lead	Assist
Identification and Definition of Reporting Requirements	Assist	Lead
Identification and Definition of Forms Requirements	Assist	Lead
Disposition of Reporting Requirements to include defining how the ROW solution will meet the confirmed requirements	Lead	Assist
Report Design	Lead	Assist

Tasks	Dataview Team	WVDOT Team
Form Design	Lead	Assist
Report Development	Lead	Assist
Form Development	Lead	Assist
Review results of report and form unit testing to validate results	Lead	Assist
Review results of report and form unit testing to verify capability of unit tested report to meet documented requirements and for compliance with approved report specification	Assist	Lead
Verification, Certification and Distribution of Reports and Forms	Assist	Lead

10.1.24 Workflow

During the Foundation stage, Dataview will gather the requirements for ROW application and will configure ROW workflow. Dataview will provide training to ROW administrators on the configuration and maintenance of workflow processes. Dataview will take the lead in designing and configuring workflow and WVDOT will be responsible for providing the requirements and reviewing the design and configuration. Dataview will create a workflow Administration Guide and workflow plan to support this workflow in the ROW application.

10.1.24.1 Workflow Deliverables

The following table documents the workflow deliverables.

Deliverable	Description	Acceptance
Workflow Administration Guide	Workflow administration guide covers the setup of the approval rules, approval roles and approvers (users) for the ROW Solution and includes the documentation required to position WVDOT to administer and maintain workflow. Each ROW Solution component will have a section that addresses the specific workflow set-up processes for that component.	Workflow administration guide includes procedures for workflow setup, user setup, work group setup, workflow rules setup, alternate routing and workflow monitoring and reporting.
Delivered Workflow	After unit test, the new and/or modified workflows for WVDOT will be delivered	Complete workflow documentation and unit test package per established project standards

10.1.24.2 Workflow Roles and Responsibilities

The following table outlines the tasks and roles and responsibilities for the workflow process.

Tasks	Dataview Team	WVDOT Team
Outline the current workflow and contrast new procedures	Assist	Lead
Design and configure workflows as defined in this Statement of Work	Lead	Assist
Identify 'district specific' workflow requirements	Participate	Lead

Tasks	Dataview Team	WVDOT Team
Identify 'programming division specific' workflow requirements	Participate	Lead
Design and configure 'District specific' workflows	Lead	Assist
Design and configure 'programming division specific' workflows	Lead	Assist
System Test workflows	Lead	Assist
User acceptance Test workflows	Assist	Lead
Perform issue resolution for workflows	Lead	Assist
Assign individuals to workflow groups	Lead	Assist
Implement and educate agencies on new workflow procedures at System implementation	Participate	Lead

10.1.25 Testing

Testing will be performed at a number of points during the project. Through each phase of the project, the testing cycle is repeated and will include deliverables specific to the test type. Each test type is designed to achieve a specific goal. The integrated project team will work together to complete testing. The table below captures the types of tests that will be conducted during the lifecycle of this project.

Tasks	Dataview Team
Unit Testing	Validates that individual units of code operate according to approved Design Specifications.
System Testing	Validates that dependent business processes and functional requirements can be fully executed and produce the pre-defined expected results for each business scenario and test script.
Regression Testing	Validates that application corrections or enhancements between Phases or within a Phase do not negatively affect previously tested or deployed components. Regression Testing is an integral part of Dataview's testing methodology and is utilized in each testing cycle as appropriate.
Integration Testing	Validates that dependent business processes across functional areas and ROW system components interact seamlessly. Validates that enhancements, security, workflow, configurations, data conversion programs, interfaces, reports, and forms work together.
Performance Testing	Validates the readiness of the application to support WVDOT's transaction and user volumes. Performance Testing includes: <ul style="list-style-type: none"> • Online Performance Test • Online Stress Test • Batch Performance Test
User Acceptance Testing	User-conducted final acceptance test to validate the system is functioning as designed, verify the conversion process, and confirm the system is ready to be moved into the production environment. UAT is a full end-to-end test of the entire system being deployed for a project phase, simulating the business environment.

The results of tests, both successful and unsuccessful, are recorded and reviewed to validate requirements are met. Incidents identified during testing are validated, corrected and retested until the exit criteria for the test type is met.

10.1.25.1 Testing Deliverables

The following table documents the testing deliverables that will be produced for the ROW solution.

Deliverable	Description	Acceptance
System Test Plan	The System Test Plan will include entrance and exit criteria for the system test and document the basis for WVDOT acceptance of the Application System Test. The System Test Plans will also be used as a starting point for the creation of the Acceptance Test plan. In addition, procedures are defined for tracking, reporting, and correcting incidents identified during testing. The plan describes the support structure for issue tracking and resolution.	The plan addresses testing of ROW Solution components being implemented in the phase, including configured, modified, and un-modified system components, reports, forms, online and batch job streams, security roles and interfaces
Integration Test Plan	The Integration Test Plan will include entrance and exit criteria for the integration test and document the basis for State acceptance of the Integration Test.	he plan addresses testing of solution components being implemented in the phase, including configured, modified, and un-modified system components, reports, forms, online and batch job streams, security roles and interfaces
Performance Test Plan	The plan documents the approach, test protocols and test cases for conducting a performance test to verify the ability of the system to perform as required for the anticipated transaction volume and number of users. The Performance Test Plan will include entrance and exit criteria for the performance test and document the basis for WVDOT acceptance of the Performance Test.	The plan addresses testing of application solution components being implemented in the phase.
Acceptance Test Plan	Dataview will collaborate with WVDOT to generate the Acceptance Test plan based on the System Test plan and WVDOT requirements. The Acceptance Test Plan will include entrance and exit criteria for the acceptance test and document the basis for WVDOT acceptance of the Application System Test.	The plan addresses testing of solution components being implemented in the Phase, including configured, modified, and un-modified system components, reports, forms, online and batch job streams, security roles and interfaces.
System Testing	Validates that dependent business processes and functional requirements can be fully executed and produce the pre-defined expected results for each business scenario and test script.	Application system testing completed and executed in accordance with the System Test Plan. Test results for each test case / script, defects, and fixes are included in the documentation of the test results. Exit criteria

Deliverable	Description	Acceptance
		established in System Test Plan are met.
Integration Test	Validates that dependent business processes across functional areas and ROW system components interact seamlessly. Validates that enhancements, security, workflow, configurations, data conversion programs, interfaces, reports, and forms work together.	Exit criteria established in the Integration Test Plan are met.
Performance Testing	Validates the readiness of the application to support WVDOT transaction and user volumes based on the Performance Test Plan which includes: <ul style="list-style-type: none"> • Online Performance Test • Online Stress Test • Batch Performance Test Documentation of performance test results based on execution of performance test scripts will be included.	Documented results of the performance test execution will be provided, including recommendations for tuning the system to improve overall system performance. The State will verify that the system is performing at the agreed-to performance specifications. Exit criteria documented in the Performance Test Plan are met.
Acceptance Testing Assistance	User-conducted final acceptance test to validate the system is functioning as designed, verify the conversion process, and confirm the system is ready to be moved into the production environment. UAT is a full end-to-end test of the entire system being deployed for a project phase, simulating the business environment. As part of Acceptance Testing, system documentation for the current release of the ROW Solution will be provided by the Dataview Team once the system is made available for Acceptance Testing including technical, system and user documentation, source code for custom Development Objects in electronic format.	Acceptance criteria defined during the Foundation portion of the Phase and in the Acceptance Test Plan are met.

10.1.25.2 Testing Roles and Responsibilities

The following table documents the roles and responsibilities for testing.

Test Type	Tasks	Dataview Team	WVDOT Team
Unit Testing	Unit Testing for forms, reports, interfaces, workflow, enhancements and conversion components developed by Dataview	Lead	Assist

Test Type	Tasks	Dataview Team	WVDOT Team
	Unit Testing for interfaces, conversion components, workflows and any other custom objects developed by WVDOT (e.g., extract processes from legacy and external systems and load processes to legacy and external systems)	Assist	Lead
	Provide responses to State programmer questions related to ROW functionality	Lead	Assist
	Manage and track status of activities	Lead	Assist
System Testing	Develop System Test plan	Lead	Assist
	Provide examples of test scripts	Lead	Assist
	Develop system test scripts for forms, reports, interfaces, conversion components, enhancements and workflows developed by Dataview	Lead	Assist
	Develop system test scripts for interfaces, conversion components, workflows and any other custom objects developed by the State	Assist	Lead
	Test forms, reports, interfaces, conversion components, enhancements, and workflows developed by Dataview	Lead	Assist
	Test interfaces, conversion components, workflows and any other custom objects developed by the WVDOT	Assist	Lead
	Perform issue resolution for forms, reports, interfaces, conversion components enhancements, and workflows developed by Dataview	Lead	Assist
	Perform issue resolution for interfaces, conversion components, workflows and any other custom objects developed by the WVDOT	Assist	Lead
	Provide guidance related to ROW solution functionality	Lead	Assist
	Manage and Track status of activities	Lead	Assist
Regression Testing	Develop regression test scripts for configuration of the ROW Solution including forms, reports, interfaces, conversion components, enhancements and workflows developed by Dataview	Lead	Assist
	Perform regression testing of the configuration of the ROW Solution including forms, reports, interfaces, conversion components, enhancements, and workflows developed by Dataview	Lead	Assist

Test Type	Tasks	Dataview Team	WVDOT Team
	Perform issue resolution for configuration of the ROW Solution including forms, reports, interfaces, conversion components enhancements, and workflows developed by Dataview	Lead	Assist
Integration Testing	Develop integration test plan	Lead	Assist
	Develop integration test scripts	Lead	Assist
	Execute integration test	Lead	Participate
	Perform issue resolution for forms, reports, interfaces conversion components, enhancements, and workflows developed by Dataview	Lead	Review
	Manage and track activities	Lead	Assist
Performance Testing	Develop Performance Test Plan	Lead	Assist
	Conduct Performance Testing	Lead	Participate
	Perform issue resolution as required to meet performance requirements within Dataview's defined scope of responsibility	Lead	Participate
	Manage and track status of activities	Lead	Assist
User Acceptance Testing (UAT)	Develop UAT plan	Lead	Assist
	Provide examples of test scripts	Lead	Assist
	Provide UAT Tester training	Lead	Participate
	Develop UAT scripts	Assist	Lead
	Execute UAT scripts	Assist	Lead
	Support UAT Testers	Assist	Lead
	Execute and coordinate FHWA certification test	Assist	Lead
	Setup the UAT environment, submit batch jobs, perform backups, restore databases, and execute data conversion loads as reasonably required to support acceptance testing.	Lead	Assist
	Maintain user profiles and security configuration for UAT testers.	Assist	Lead

Test Type	Tasks	Dataview Team	WVDOT Team
	Provide issue resolution for forms, reports, interfaces, conversion components, enhancements, and work flows developed by Dataview	Lead	Assist
	Manage and track status of activities	Assist	Lead

10.1.26 Production Support

Dataview will be responsible for the production support of the ROW application during the first six (6) months after go-live. Dataview has proposed an enhanced maintenance contract for after go-live which includes access to future releases, bug fixes, and a fixed number of consulting hours. [Refer to costing sheet] Dataview will also provide additional advisory services at the discretion of WVDOT.

The ROW RFP has three one-year contract renewals and Dataview can extend its support throughout the terms of the contract. This can be negotiated after award of the contract.

During the support period, Dataview will retain staff with ROW expertise to provide the adequate support.

10.1.26.1 Production Support Deliverables

The following table list the deliverables for Production support.

Deliverable	Description	Acceptance
Monthly production support activity status report	On a monthly basis, a detailed status report documenting Dataview's production support activities will be submitted	Status report to include activities completed and upcoming, summary of incident tracking, concerns, issues and watch items

10.1.26.2 Production Support and Responsibilities

Dataview and WVDOT will play different roles and responsibilities for the ROW production support.

Tasks	Dataview Team	WVDOT Team
Six Months post go-live		
Provide help desk infrastructure and tools for service management activities such as logging and tracking of issues	N/A	Lead
Help Desk	Assist	Lead
Operations	Lead	Assist
Technical Management	Lead	Assist
Application Management	Lead	Assist
Year One thru Year 3 after initial support (Six months after go-live)		

Tasks	Dataview Team	WVDOT Team
Provide help desk infrastructure and tools for service management activities such as logging and tracking of issues	N/A	Lead
Help Desk	Assist	Lead
Operations	Lead	Assist
Technical Management	Lead	Assist
Application Management	Lead	Assist
After contract original terms (3 renewals)		
Provide help desk infrastructure and tools for service management activities such as logging and tracking of issues	N/A	Lead
Help Desk	Assist	Lead
Operations	Assist	Lead
Technical Management	Assist	Lead
Application Management	Assist	Lead

10.1.27 Compensation

The Dataview team will fulfill its contractual requirements including all deliverables identified in this SOW and fulfill the roles and responsibilities described in the SOW for a firm fixed price of [TOTALPRICE] for the implementation and post implementation of the ROW solution.

The price of Dataview staffing is based on the level of WVDOT staffing identified for the ROW project. WVDOT need to identify adequate staffing for this project. Failure by WVDOT to provide adequate staffing will materially impact Dataview's ability to complete project activities or deliverables per the Project Work Plan or impact the Project Schedule will be addressed through a Change request process. Similarly, failure by Dataview to provide the resources or level of effort reflected in its offer which materially impact Dataview's timely completion of project activities or deliverables per the Project Work Plan or materially impact the Project Schedule will be addressed through the Change Request Process.

Requests for additional services that are not within the scope of this Statement of Work must be documented through the Change Request Process and executed by authorized representatives of both Parties and will require an approved Change Order.

10.1.27.1 Payment Terms

This can be negotiated after contract award.

10.1.27.2 Payment Milestones

The fixed price amount is broken down into payment milestones. This can be negotiated after contract award.

APPENDIX A – REQUIREMENTS MATRIX

WVDOT Right-of-Way, Utilities and Railroad Management System Right-of-Way (ROW) Requirements

A	B	C	D	E	F	G	H	I	J	K
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
1										
ROW-001	1	Right-of-Way	General	Provide the ability to support the management and tracking of the full lifecycle of the WVDOT right-of-way acquisition process including: - project set-up; - parcel identification and set-up; - management of acquisition activities; - appraisals; - negotiation; - condemnation; - relocation; and - property management.	Modification to Base Code	Small				Leveraging Hub Framework to create specific functionality for ROW activities. Look and feel will be similar, for ROW details.
ROW-002	1	Right-of-Way	General	Provide the ability to support the management and tracking of the WVDOT right-of-way acquisition process according to the WVDOT right-of-way acquisition procedures manual and the Federal Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970.	Off the Shelf with Configuration					Workflow similar to the Hub
ROW-003	1	Right-of-Way	General	Provide the ability to support the various types of right-of-way acquisitions, including but not limited to: - fee simple; - permanent easement; - temporary easement; - functional replacement; - Federal Land transfer; and - the cost of cure for property damages during construction.	Modification to Base Code	Medium				Functionality for this requirement will leverage Hub Framework, and in addition will incorporate new functionality developed specifically for the ROW requirements
ROW-004	1	Right-of-Way	General	Provide the ability to support management and tracking of utility relocation activities required for transportation projects according to the WVDOT utility relocation manual. Please refer to Utility Relocation and Railroad tab for additional detailed requirements.	Off the Shelf with Configuration					Workflow similar to the Hub
ROW-005	1	Right-of-Way	General	Provide the ability to support management and tracking of railroad agreements required for transportation projects. Please refer to Utility Relocation and Railroad tab for additional detailed requirements.	Off the Shelf with Configuration					Workflow similar to the Hub
ROW-006	1	Right-of-Way	General	Provide the ability to integrate WVDOT right-of-way and utility relocation functions with other relevant WVDOT and wvOASIS ERP functions, including but not limited to: - HUB, - wvOASIS Advantage Fixed Assets, - Transportation Asset Inventory, - ProjectWise, - BRIM, - ESRI GIS, - Facilities Management, - wvOASIS Accounts Payable, - wvOASIS General Ledger, - wvOASIS Human Resource Management, and - wvOASIS Procurement.	Modification to Base Code	Medium				Integration is seamless in Hub. Integration to wvOASIS will leverage interfaces already designed for the Hub and interfaces designed by the members of the Dataview team for other functionality for the State of West Virginia.
ROW-007	1	Right-of-Way	Workflow	Provide the ability to support the definition of workflows to manage electronic review and approval of title information, appraisals, acquisitions, negotiations, relocation of displaces, utility relocation, railroad agreements, etc. These workflows will define and electronically route users through the steps for completing the defined work activities and obtain the necessary approvals for the various right-of-way acquisition, utility relocation and railroad agreement business processes.	Off the Shelf with Configuration					Workflow similar to the Hub
ROW-008	1	Right-of-Way	Workflow	Provide the ability to define and generate workflows for each of the steps in a business process based on user-defined business rules.	Off the Shelf with Configuration					Workflow similar to the Hub
ROW-009	1	Right-of-Way	Workflow	Provide the ability to utilize a project specific distribution list to manage the required electronic review and approval for each project.	Off the Shelf with Configuration					Workflow similar to the Hub
ROW-010	1	Right-of-Way	Workflow	Provide the ability to report and display the status of a workflow process (i.e., steps approved, who needs to review next, and so on) in a summary/dashboard format. For example: A team lead or other manager may need to review the overall process status. This may also be used for performance monitoring.	Off the Shelf with Configuration					Workflow similar to the Hub
ROW-011	1	Right-of-Way	Workflow	Provide the ability to trigger a workflow based on user-defined business events including completion of activities in the system or the uploading of various documents (e.g., uploading an appraisal file to the system).	Off the Shelf with Configuration					Workflow similar to the Hub
ROW-012	1	Right-of-Way	Workflow	Provide the ability to enter and support comments added during the workflow at each approval step for internal use. These comments should progress with the workflow to the next approver identifying the person who made the comment.	Off the Shelf with Configuration					Workflow similar to the Hub
ROW-013	2	Right-of-Way	Workflow	The customized workflow shall be done only by authorized WVDOT users. That is, modified/different workflows may be required for appraisal, acquisition, and relocation processes for the same project and the workflow may be different for a project on which work is performed by internal staff versus consultants.	Modification to Base Code	Small				Hub Workflow does not provide access to consultants, but this is a small change to the base code.
ROW-014	2	Right-of-Way	Workflow	Provide the ability to assign WVDOT staff members or consultants working on a project to a workflow individually or in groups for each project and for specific workflows.	Off the Shelf with Configuration					Workflow similar to the Hub
ROW-015	2	Right-of-Way	Workflow	Provide the ability to allow authorized users to define the target time for completing a specific workflow step and the entire workflow process. That is, WVDOT may want to establish a target objective that all appraisal reviews are completed within a certain number of days of the appraisal being uploaded to the system.	Modification to Base Code		Within 12 months			Hub Management wants this feature also, and is planned to be part of Wave 2.
ROW-016	2	Right-of-Way	Workflow	Provide the ability to notify users regarding the designated "approve by" date upon their being assigned a workflow step to complete.	Modification to Base Code	Small	Within 12 months			Hub Management wants this feature also, and is planned to be part of Wave 2.

WVDOT Right-of-Way, Utilities and Railroad Management System Right-of-Way (ROW) Requirements

A	B	C	D	E	F	G	H	I	J	K
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
ROW-017	2	Right-of-Way	Workflow	Provide the ability to track and display the total elapsed time from the start to end of a workflow process, as well as, the ability to display time remaining to action a workflow step and complete the entire workflow process based on the user-defined timelines for the individual process step and the entire process workflow.	Modification to Base Code	Small	Within 12 months			Hub Management wants this feature also, and is planned to be part of Wave 2
ROW-018	2	Right-of-Way	Workflow	Provide the ability to alert an individual assigned to a workflow step when an "appropriate" date associated with completion of the workflow step has passed or is within a user definable timeframe for completion. The method of alert is to include both an email and a notification within the right-of-way solution.	Off the Shelf with Configuration					Workflow similar to the Hub
ROW-019	2	Right-of-Way	Workflow	Provide the ability to allow an authorized user to obtain a report of pending workflow steps or workflows which have not been completed within the targeted timeline. This report should have the ability to be filtered by process area (appraisal, negotiation, displacee relocation, utility relocation, and so forth) and by project.	Off the Shelf with Configuration					Workflow report already built for Hub - reconfigured to utilize ROW steps, users, user groups and timeframes
ROW-020	1	Right-of-Way	Workflow	Provide the ability to create a monthly management report with summary statistics concerning performance against target milestones for completing work steps and workflow processes for the month and fiscal year to date. This report should have the ability to be filtered by process area (appraisal, negotiation, displacee relocation, utility relocation, and so forth) and by project.	Modification to Base Code	Small	Within 12 months			Hub Management wants this feature also, and is planned to be part of Wave 2
ROW-021	1	Right-of-Way	Workflow	Provide the ability to generate a report of all missed dates and delayed approvals for the month or fiscal year to date. This report should have the ability to be filtered by process area (appraisal, negotiation, displacee relocation, utility relocation, and so forth) and by project.	Modification to Base Code	Small	Within 12 months			Although not specifically requested by Hub Management, this information is related and easily parsed from the request by Hub Management and can be included in the same release planned for the Hub
ROW-022	1	Right-of-Way	Workflow	Allow for electronic signatures to approve all system actions and the generation of all required notification letters. This electronic signature should be based on the user authenticating themselves to the system through their login information.	Off the Shelf					
ROW-023	1	Right-of-Way	GIS Integration	Provide a full-featured GIS viewer within the right-of-way and utilities function which integrates with WVDOT's existing ESRI ArcGIS environment.	Modification to Base Code	Medium	Within 18 months			Similar functionality is requested for the Hub in the next 12-18 months. ROW-023 marked as medium, other GIS/Geospatial requirements are estimated as small as all will be developed together
ROW-024	1	Right-of-Way	GIS Integration	Provide the ability for users to utilize a GIS viewer within the right-of-way solution to view all project information such as the proposed alignment, ROW boundary, parcels, ownership, etc., including the ability to select a parcel and drill down into attribute information available.	Modification to Base Code	Small				ROW-023 marked as medium, other GIS/Geospatial requirements are estimated as small as all will be developed together
ROW-025	1	Right-of-Way	GIS Integration	Provide the ability to display one or more parcels or required utility relocations on a project meeting specific user-defined criteria on a map from within the GIS viewer in the right-of-way software solution.	Modification to Base Code	Small				ROW-023 marked as medium, other GIS/Geospatial requirements are estimated as small as all will be developed together
ROW-026	1	Right-of-Way	GIS Integration	Provide the ability to spatially map a specific parcel or utility relocation/railroad agreement or set of parcels or utility relocations/railroad agreement that meets a set of user-defined criteria from within the right-of-way and utilities functions of the right-of-way solution. While looking at a list of parcels or utility relocations or detailed information about an individual parcel or utility relocation, the user must be able to select "map" and see the location of the parcel or utility relocation displayed spatially by a GIS viewer within the right-of-way solution.	Modification to Base Code	Small	Within 18 months			Similar functionality is requested for the Hub in the next 12-18 months. ROW-023 marked as medium, other GIS/Geospatial requirements are estimated as small as all will be developed together
ROW-027	1	Right-of-Way	GIS Integration	Provide the ability to enter a set of selection criteria for any pre-defined report and request that the results be displayed spatially by a GIS viewer within the right-of-way solution.	Modification to Base Code	Small				ROW-023 marked as medium, other GIS/Geospatial requirements are estimated as small as all will be developed together
ROW-028	1	Right-of-Way	GIS Integration	Provide the ability to enter a set of selection criteria for an ad-hoc query of parcel or utility relocation/railroad agreement information and request that the results be displayed spatially by the GIS viewer within the right-of-way and utilities function.	Modification to Base Code	Small				ROW-023 marked as medium, other GIS/Geospatial requirements are estimated as small as all will be developed together
ROW-029	1	Right-of-Way	GIS Integration	Provide the ability to select a parcel or utility relocation/railroad agreement from a map in a GIS viewer within the right-of-way and utilities functions in the right-of-way solution and drill down to see detailed information about the parcel or utility relocation within the right-of-way solution.	Modification to Base Code	Small	Within 18 months			Similar functionality is requested for the Hub in the next 12-18 months. ROW-023 marked as medium, other GIS/Geospatial requirements are estimated as small as all will be developed together
ROW-030	1	Right-of-Way	GIS Integration	Provide the ability for the user to select an area of interest from within WVDOT's GIS application and request that all parcels, utility relocations or railroad agreements in that area meeting certain user-defined criteria stored in the right-of-way and utilities function be spatially displayed on a map within WVDOT's GIS solution.	Modification to Base Code	Small	Within 18 months			Similar functionality is requested for the Hub in the next 12-18 months. ROW-023 marked as medium, other GIS/Geospatial requirements are estimated as small as all will be developed together
ROW-031	1	Right-of-Way	GIS Integration	Provide the ability to select one or more parcels, utility relocations or railroad agreements from a map within an area displayed in the WVDOT GIS application and drill down to see the detailed information about the specific parcel or parcels within the right-of-way solution.	Modification to Base Code	Small	Within 18 months			Similar functionality is requested for the Hub in the next 12-18 months. ROW-023 marked as medium, other GIS/Geospatial requirements are estimated as small as all will be developed together
ROW-032	1	Right-of-Way	Forms Management	Provide the ability to define, store and auto-populate templates for various forms and letter templates which are used in the various right-of-way/utilities/railroads processes. The system should have the ability to auto-populate, but also have the ability for manual entry based on user-specified parameters (e.g., project name, parcel, property owner, utility company, utility company contact, and so on).	Modification to Base Code	Small				The Hub framework supports the setup of word form template documents that can be used to generate correspondence word or PDF documents with the correct data merged. The system administrator will be able to configure new templates. Additional inbuilt reports module can also be used to generate bulk PDF output.
ROW-033	1	Right-of-Way	Forms Management	Provide the ability to create various pre-defined WVDOT forms and notification letters based on user-defined triggers or business events.	Modification to Base Code	Small				The Hub framework supports the setup of word form template documents that can be used to generate correspondence word or PDF documents with the correct data merged. The system administrator will be able to configure new templates. Additional inbuilt reports module can also be used to generate bulk PDF output.
ROW-034	1	Right-of-Way	Forms Management	Provide the ability to generate letters with the appropriate letterhead/logo and contact information based on the location of the assigned appraiser and/or right-of-way agent. Depending on the assigned team member, this would be by central office, district office, or consultant.	Modification to Base Code	Small				The Hub framework supports the setup of word form template documents that can be used to generate correspondence word or PDF documents with the correct data merged. The system administrator will be able to configure new templates. Additional inbuilt reports module can also be used to generate bulk PDF output.

WVDOT Right-of-Way, Utilities and Railroad Management System Right-of-Way (ROW) Requirements

A	B	C	D	E	F	G	H	I	J	K
Req. #	Priority	Category	Sub-Category	Business (Functional) Requirement	Vendor Response	Customization Estimate, if Applicable	Capability Planned for Future Releases	Core Module(s)	Third Party Solution(s)	Comments/Notes
92	1	Right-of-Way	Appraisal	Provide ability to monitor and report on the status of appraisals by project (e.g., appraisal pending, appraisal prepared, appraisal approved, appraisal waiting for resubmission, on hold, etc.).	Off the Shelf with Configuration					
93	1	Right-of-Way	Appraisal	Provide ability to automatically/electronically generate an appraisal summary information sheet based on all appraisal information entered in the system.	Off the Shelf with Configuration					
94	1	Right-of-Way	Appraisal	Provide ability to track/manage when an extension is granted to the Appraiser or Review Appraiser on a project.	Off the Shelf with Configuration					
95	1	Right-of-Way	Acquisition-Negotiation	Provide an authorization workflow which utilizes the generated estimates from the Acquisition section to provide a draft authorization request to the Admin Section to initiate the SF-96 process.	Off the Shelf with Configuration					
96	1	Right-of-Way	Acquisition-Negotiation	Integrate with HUB to transmit the authorization following review by the Admin section to Programming for final review and approval within HUB. Provide approval from HUB back to the right-of-way solution.	Off the Shelf					
97	1	Right-of-Way	Acquisition-Negotiation	Provide the ability to enter, store and display the dates RW3 Plans are submitted to ROW Division. For example, track the initial date RW3 Plans are received from Engineering, track the dates of any RW3 Plan Revisions along with a summary of the revision.	Off the Shelf with Configuration					
98	1	Right-of-Way	Acquisition-Negotiation	Provide the ability for users to monitor the status of appraisals to determine when preparation activities for the Acquisition may begin.	Off the Shelf with Configuration					
99	1	Right-of-Way	Acquisition-Negotiation	Provide the ability to assign a right-of-way agent negotiator to each parcel.	Off the Shelf with Configuration					
100	2	Right-of-Way	Acquisition-Negotiation	Provide the ability to automatically/electronically notify the right-of-way agent or negotiator when parcel assignments are made via the right-of-way solution and email.	Off the Shelf with Configuration					
101	1	Right-of-Way	Acquisition-Negotiation	Provide the ability to generate a 90-day notification letter to property owner based on request by an authorized user and retain document (including issue date) in the system. This letter will typically be issued/sent by a WVDOT district right-of-way agent.	Modification to Base Code	Small				
102	1	Right-of-Way	Acquisition-Negotiation	Provide the ability to generate a 30-day notification letter documenting requirement for property owner to vacate the property based on a request by an authorized user and retain document (including the issue date) in the system. This letter will typically be issued/sent by a district right-of-way agent.	Modification to Base Code	Small				
103	1	Right-of-Way	Acquisition-Negotiation	Provide the ability to display and print the WVDOT right-of-way questionnaire, which provides on a single page formatted information about the parcel including location, owners, mineral rights/leases, tenants and deeds, etc.	Off the Shelf with Configuration					
104	1	Right-of-Way	Acquisition-Negotiation	Provide the ability to enter, store, and display a document acquisition and negotiation activities/ log. This includes the ability for a parcel negotiator to enter all acquisition and negotiation information in the right-of-way solution, including times of contact with owner, offers/promises made, acceptance/rejection or counter offer by owner, location of the conversation, in-person, mail, phone, etc.	Off the Shelf with Configuration					
105	1	Right-of-Way	Acquisition-Negotiation	Provide the ability to enter, store, and display the sex and ethnicity of the property owner for statistical reporting purposes (i.e., minority, non-minority, and/or female).	Off the Shelf with Configuration					
106	1	Right-of-Way	Acquisition-Negotiation	Provide the ability to enter, store, and display the approved valuation for negotiation.	Off the Shelf with Configuration					
107	1	Right-of-Way	Acquisition-Negotiation	Provide the ability to enter, store, and display the approved valuation for negotiation if owner retains structures.	Off the Shelf with Configuration					
108	1	Right-of-Way	Acquisition-Negotiation	Provide the ability to enter, store, and display each negotiating session including key information such as the date, time, place, along with the individuals present.	Off the Shelf with Configuration					
109	1	Right-of-Way	Acquisition-Negotiation	Provide the ability for a user to enter, store, and display a brief summary of the steps which are performed during WVDOT's acquisition process for a parcel.	Off the Shelf with Configuration					
110	1	Right-of-Way	Acquisition-Negotiation	Provide the ability to enter, store, and display a brief summary of the explanation of the full effect of the sale.	Off the Shelf with Configuration					
111	1	Right-of-Way	Acquisition-Negotiation	Provide the ability to enter, store, and display a record of when an offer has been made for land and improvements.	Off the Shelf with Configuration					
112	1	Right-of-Way	Acquisition-Negotiation	Provide the ability to enter, store, and display a record of when an offer has been made to allow owner to retain improvements and easements.	Off the Shelf with Configuration					
113	1	Right-of-Way	Acquisition-Negotiation	Provide the ability to enter, store, and display a record of when there has been a counter-offer (if any).	Off the Shelf with Configuration					
114	1	Right-of-Way	Acquisition-Negotiation	Provide the ability to enter, store, and display the person a right-of-way pamphlet was delivered to and the date provided.	Off the Shelf with Configuration					
115	1	Right-of-Way	Acquisition-Negotiation	Provide the ability to enter, store, and display the person a right-of-way relocation brochure was delivered to and the date provided.	Off the Shelf with Configuration					
116	1	Right-of-Way	Acquisition-Negotiation	Provide the ability to enter, store, and display the person to whom the copy of the option was delivered to and the date provided.	Off the Shelf with Configuration					
117	1	Right-of-Way	Acquisition-Negotiation	Provide the ability to enter, store, and display the person to whom the statement of compensation was delivered to and the date provided.	Off the Shelf with Configuration					
118	1	Right-of-Way	Acquisition-Negotiation	Provide the ability to enter, store, and display the replacement housing amount and to whom this amount was given to along with the date it was provided.	Off the Shelf with Configuration					
119	1	Right-of-Way	Acquisition-Negotiation	Provide the ability to enter, store, and display the reasons a settlement could not be reached, if this occurs.	Off the Shelf with Configuration					
120	1	Right-of-Way	Acquisition-Negotiation	Provide the ability to enter, store, and display any owner's comments or those of the owner's representatives.	Off the Shelf with Configuration					
121	1	Right-of-Way	Acquisition-Negotiation	Provide the ability to enter, store, and display as a free-form text field any other relevant information from the negotiations.	Off the Shelf with Configuration					
122	1	Right-of-Way	Acquisition-Negotiation	Provide the ability to enter, store, and display a property owner's response to an offer — acceptance or rejection.	Off the Shelf with Configuration					
123	1	Right-of-Way	Acquisition-Negotiation	Provide the ability to generate a negotiator's certification based on property owners acceptance of an offer and a request by assigned right-of-way agent.	Modification to Base Code	Small				
124	1	Right-of-Way	Acquisition-Negotiation	Provide the ability to record the amount of a proposed administrative settlement (amount of offer agreed to in excess of documented just compensation) and the basis for the recommendation for the administrative settlement.	Off the Shelf with Configuration					
125	1	Right-of-Way	Acquisition-Negotiation	Provide the ability to route administrative settlement for approval via workflow based on user-defined business rules. Provide reviewers/approvers with the option to drill down and see specific details concerning the parcel acquisition (appraisal, negotiations record, etc.) as part of their review process.	Off the Shelf with Configuration					

WV DOT Right-of-Way, Utilities and Railroad Management System Right-of-Way (ROW) Requirements

A	B	C	D	E	F	G	H	I	J	K
Req. #	Priority	Category	Sub-Category	Business (Functional) Requirement	Vendor Response	Customization Estimate, if Applicable	Capability Planned for Future Releases	Core Module(s)	Third Party Solution(s)	Comments/Notes
ROW-126	1	Right-of-Way	Acquisition-Negotiation	*Provide the ability to store and link to documentation as required by WV DOT business rules as part of the electronic review for administrative settlements. In administrative settlements, a memorandum from the District Right-of-Way Manager detailing justification for settlement must be included as part of the review package. Administrative Settlements must be reviewed and approved by the Right-of-Way Director.	Off the Shelf with Configuration					
ROW-127	1	Right-of-Way	Acquisition-Negotiation	Provide the ability to enter, store, and display the assignment of a closing attorney.	Off the Shelf with Configuration					
ROW-128	1	Right-of-Way	Acquisition-Negotiation	Provide the ability to enter, store, and display a scheduled closing date.	Off the Shelf with Configuration					
ROW-129	1	Right-of-Way	Acquisition-Negotiation	Provide the ability to integrate with the wvOASIS accounts payable function to initiate payment request for accepted offer. This should include pre-encumbrance for acquisition amount against project and project phase. This must include capability to generate multiple warrant requests if property has multiple property owners, trusts, amounts due on mortgage to bank, etc.	Modification to Base Code	Medium				Similar to CAS and CAM integration already implemented in Hub, but for AP documents
ROW-130	1	Right-of-Way	Acquisition-Negotiation	Provide the ability to calculate and document a property owner claim for pro-rata share of taxes paid by the property owner on portion of property acquired by WV DOT.	Modification to Base Code	Medium				
ROW-131	1	Right-of-Way	Acquisition-Negotiation	Integrate with the wvOASIS accounts payable function to initiate payment request to reimburse the property owner for their pro-rata share of taxes paid on property acquired by WV DOT. This includes creating the appropriate pre-encumbrance on the project and project phase.	Modification to Base Code	Small				Related to ROW-125, so with ROW-129 being a medium effort, subsequent AP processing requirements will be small and should be planned and developed together
ROW-132	1	Right-of-Way	Acquisition-Negotiation	Provide the ability to generate negotiator's progress report for a specific month, or other user-defined period. This report will document assigned parcels by project and parcel number, whether it is a central office or district project, and the status of each parcel including date of deed/option, amount of deed/option, targeted or actual closing date, date of request for condemnation, amount deposited in court, and date of right of entry.	Modification to Base Code	Small				PowerBI - Already in place with Hub - determine whether Off-the-shelf with configuration or Modification to Base Code since new ETL and workspace will be necessary for ROW
ROW-133	2	Right-of-Way	Acquisition-Negotiation	Provide the ability to automatically/electronically alert and provide notice via email and via the right-of-way solution to the assigned WV DOT project manager and the district right-of-way manager, and other users based on user-defined business rules to flag when parcel acquisition dates are slipping from plan by more than a user-defined set of days or a certain user-defined % of parcels are not acquired.	Modification to Base Code	Small				
ROW-134	1	Right-of-Way	Acquisition-Negotiation	Provide the ability to enter, store, and display the completion of a closing process.	Off the Shelf with Configuration					
ROW-135	1	Right-of-Way	Acquisition-Negotiation	Provide the ability to enter, store, and display the date on which possession is taken on the property.	Off the Shelf with Configuration					
ROW-136	1	Right-of-Way	Acquisition-Negotiation	Provide the ability to enter, store, and display the date on which keys to structures was collected, and by whom.	Off the Shelf with Configuration					
ROW-137	1	Right-of-Way	Acquisition-Negotiation	Provide the ability to enter, store, and display date and time of the ordering and completion of required asbestos inspection were done.	Off the Shelf with Configuration					
ROW-138	1	Right-of-Way	Acquisition-Negotiation	Provide the ability to enter, store, and display the scheduled demolition date and firm performing the demolition.	Off the Shelf with Configuration					
ROW-139	1	Right-of-Way	Acquisition-Negotiation	Provide the ability to enter, store, and display the actual date of completion for demolition.	Off the Shelf with Configuration					
ROW-140	1	Right-of-Way	Acquisition-Negotiation	Integrate with BRIM where required to add property to the BRIM database for insurance purposes. This applies in cases of non-highway use/uneconomic remnant or if a structure is remaining for some period of time.	Modification to Base Code	Medium				Find all BRIM requirements so that duplication of effort is not included in estimation
ROW-141	1	Right-of-Way	Acquisition-Negotiation	Integrate with the wvOASIS fixed asset function to add assets as required to the fixed asset register. This applies in cases of non-highway use/uneconomic remnant or if a structure is remaining for some period of time.	Modification to Base Code	Medium				Fixed Asset changes in OASIS are ongoing - integrating will be dependent on the decisions made on the Fixed Asset Construction Program (FACP) within OASIS. Marking as medium, but is dependent on decisions made by WV DOT and wvOASIS.
ROW-142	1	Right-of-Way	Acquisition-Negotiation	Integrate with the ERP transportation asset inventory function to add all non-highway use assets to the facilities register within the transportation asset inventory function. Integration should generate building number based on WV DOT business rules.	Modification to Base Code	Medium				Simpler than the Capital assets, but still dependent on decisions made by WV DOT, Delighton and wvOASIS.
ROW-143	1	Right-of-Way	Acquisition-Negotiation	Support tracking of the cost of cure to ensure damages payments to a property owner are not subject to taxes. The right-of-way system should first integrate with the wvOASIS accounts payable function to create a vendor marked without a 1099 flag and then integrate with the wvOASIS accounts payable function to create the payment voucher.	Modification to Base Code	Medium				
ROW-144	1	Right-of-Way	Relocation	Provide the ability for users to be able to begin a Conceptual Relocation Plan as soon as the request is received from Engineering/Acquisition for which parcels on which to obtain Appraisals & Title Searches. This will allow the Relocation team to know in advance which parcels are expected to have relocations associated with them.	Modification to Base Code	Medium				
ROW-145	1	Right-of-Way	Relocation	Provide the ability to enter, store, and display relocation owner information at the time a site inspection is performed, including the relocatee business or individual name, address, contact number, FEIN/SSN, Occupancy Code/Category, etc.	Modification to Base Code	Medium				Modification to Customer (VCLUST) information in OASIS - need a VCL and VCM interface as well as supporting search on the VCLUST table for current customers
ROW-146	1	Right-of-Way	Relocation	Provide the ability to enter, store, and display/monitor the status of appraisals, to determine when appraisal activities for the relocation can begin.	Off the Shelf with Configuration					
ROW-147	1	Right-of-Way	Relocation	Provide the ability to enter, store, and display information regarding the current residential and/or non-residential conditions to establish a requirements baseline for replacement properties & location.	Off the Shelf with Configuration					Off the shelf with configuration assumes that the rules for data entry are established and contained within WV DOT review
ROW-148	1	Right-of-Way	Relocation	Provide the ability for end-users who manage relocations to record and maintain possible solutions for relocatees.	Off the Shelf with Configuration					
ROW-149	1	Right-of-Way	Relocation	Provide the ability to enter, store, and display Title, Appraisal, and all other pertinent information associated with the project to assist in determining feasible alternative locations for relocatees.	Off the Shelf with Configuration					
ROW-150	1	Right-of-Way	Relocation	Provide the ability to enter and maintain multiple replacement options, including basic property information, building descriptions, utilities, rental adjustments, floor plans, and safe and sanitary standards for residential relocatees.	Off the Shelf with Configuration					
ROW-151	1	Right-of-Way	Relocation	Provide the ability to enter and maintain online questionnaire information, including Interview Date, Supplemental Determination Date and Amount, Offer of FMV Date, Relocation Offer Date, Vesting Date, Ninety Day Notice Date, Thirty Day Notice Date, Date Relocated/Vacated, and Remarks regarding the Relocation.	Off the Shelf with Configuration					

WVDOT Right-of-Way, Utilities and Railroad Management System Right-of-Way (ROW) Requirements

A	B	C	D	E	F	G	H	I	J	K
Req. #	Priority	Category	Sub-Category	Business (Functional) Requirement	Vendor Requirement	Customization Estimate, if Applicable	Capability Planned for Future Release	Core Module(s)	Third Party Solution(s)	Comments/Notes
1										
ROW-152	1	Right-of-Way	Relocation	Provide the ability to enter, store, and monitor/display payments made to tenants and vendors during the relocation process, such as closing payments or any payments that may happen, so they can complete the relocation process.	Modification to Base Code	Small				This will be a part of the Accounts Payable process in order to keep the systems in sync.
ROW-153	2	Right-of-Way	Relocation	Provide the ability to store and retrieve/review all comps, so that when they start to look for replacement housing, the data will already be in the system for that specific project.	Off the Shelf with Configuration					
ROW-154	3	Right-of-Way	Relocation	Provide the ability to integrate with and/or replicate the Mortgage Interest Differential Payments (MIPD) Calculators for relocation purposes. (https://www.thedot.gov/real-estate/uniform_act/relocation/midpdcals/)	Modification to Base Code	Small				Olga - Ask Dataview team if I have coded my concept of small correctly.
ROW-155	2	Right-of-Way	Relocation	Provide the ability to auto generate claims based on information entered through a user-defined workflow checklist.	Modification to Base Code	Small				Assume Claims will be processed through Accounts Payable - needs interface work.
ROW-156	1	Right-of-Way	Relocation	Provide the ability to auto generate the Last Resort Housing Memo, auto populated from the right-of-way solution once the amount exceeds the threshold.	Modification to Base Code	Small				
ROW-157	1	Right-of-Way	Relocation	Provide the ability to upload pictures for the subject property and associated comps and store in ProjectWise and link for later retrieval.	Off the Shelf with Configuration					
ROW-158	1	Right-of-Way	Relocation	Provide the ability to support both business and residential relocation for property owners and tenants.	Modification to Base Code	Small				This requirement will need more detail as work begins - assume that much of the detail is covered in other requirements, but making "modification to base code" and small since it's vague.
ROW-159	2	Right-of-Way	Relocation	Provide the ability to calculate eligible relocation costs for displacees under various relocation alternatives and to support the review of these calculations.	Modification to Base Code	Small				
ROW-160	2	Right-of-Way	Relocation	Provide the ability to prepopulate and create online relocation worksheets and questionnaires within the right-of-way solution. Worksheets and questionnaires shall be prepopulated with information about displacees obtained during the acquisition process.	Modification to Base Code	Medium				
ROW-161	1	Right-of-Way	Relocation	Provide the ability to create and maintain a list of displacees associated with each parcel being acquired. The list of displacees provides information about each individual who is eligible for assistance through the relocation process.	Modification to Base Code	Small				
ROW-162	1	Right-of-Way	Relocation	Provide ability to enter, store, and display demographics on displacees (minority, non-minority, and sex) for use in statistical reporting.	Off the Shelf with Configuration					
ROW-163	2	Right-of-Way	Relocation	Provide the ability to automatically prepare a replacement housing appraisal. This will be triggered by completion of an appraisal.	Modification to Base Code	Small				
ROW-164	1	Right-of-Way	Relocation	Provide the ability to enter, store, and display all (initial and subsequent) meetings with a displacee and document the information and evaluations provided in each meeting.	Off the Shelf with Configuration					
ROW-165	1	Right-of-Way	Relocation	Provide the ability to enter, store, and display the Residential Relocation Questionnaire, which captures information on all current occupants, the cost of current housing and preferences for relocation location.	Modification to Base Code	Small				
ROW-166	1	Right-of-Way	Relocation	Provide the ability to enter, store, and display the Non-Residential Relocation Questionnaire, which includes the name of the business; the owner of the business; demographic information on the owner; the nature/type of business; current lease terms; plans for relocating or discontinuing operations; desired relocation location and other business specific attributes.	Modification to Base Code	Small				
ROW-167	1	Right-of-Way	Relocation	Provide the ability to generate a statement of rent and income for execution by residential displacee pre-populating where information is available in the system (owner name, spouse name, address, etc.).	Modification to Base Code	Small				
ROW-168	1	Right-of-Way	Relocation	Provide the ability to enter, store, and display information on statement of rent and income including occupant name, spouse name, address; length of time at the address; date moved in; monthly rent; utility costs; how rent was verified (cancelled checks, rent receipts, verification with landlord, etc.); and monthly income and how income was verified (pay stub, tax return, etc.).	Off the Shelf with Configuration					
ROW-169	2	Right-of-Way	Relocation	Provide the ability to calculate eligible relocation payments for residential displacees and store within the right-of-way solution.	Modification to Base Code	Small				
ROW-170	2	Right-of-Way	Relocation	Provide the ability to calculate eligible relocation payments for business displacees and store within the right-of-way solution.	Modification to Base Code	Small				
ROW-171	1	Right-of-Way	Relocation	Provide the ability to enter, store, and display various types of relocation payments being offered (since some relocation payment types are taxable and others are not, this is needed to support 1099 generation).	Modification to Base Code	Small				
ROW-172	2	Right-of-Way	Relocation	Provide the ability to integrate with multiple Excel-based relocation calculators and then link to ProjectWise to save/store the calculation worksheets for later retrieval.	Modification to Base Code	Small				Would recommend incorporating calculations currently done in Excel into this system so all data is available and auditable in one location.
ROW-173	1	Right-of-Way	Relocation	Provide the ability to enter, store, and display available replacement housing including location, date available, asking price or rent price, a detailed description of the property, various attributes about the property and whether the property has been inspected, and by whom.	Off the Shelf with Configuration					
ROW-174	3	Right-of-Way	Relocation	Provide the ability to link to the Multiple Listing Service (MLS) for the appropriate area.	Modification to Base Code	Small				
ROW-175	3	Right-of-Way	Relocation	Provide the ability to link to Digital Courthouse for tax information.	Modification to Base Code	Small				
ROW-176	1	Right-of-Way	Relocation	Provide the ability to define an automated workflow to review/approve relocation payments with review steps based on user-defined business rules.	Off the Shelf with Configuration					
ROW-177	1	Right-of-Way	Relocation	Integrate with the wvOASIS ERP accounts payable function to initiate payment request for relocation. This should include pre-encumbrance for relocation amount against project and project phase.	Modification to Base Code	Small				Link to other Accounts Payable integration requirements.
ROW-178	1	Right-of-Way	Relocation	Integrate with the wvOASIS accounts payable function to obtain and record warrant numbers and date payments were made to the State.	Modification to Base Code	Small				
ROW-179	1	Right-of-Way	Relocation	Provide ability to automatically/electronically generate a relocation claim form for execution by a residential displacee.	Modification to Base Code	Small				
ROW-180	1	Right-of-Way	Relocation	Provide ability to automatically/electronically generate a relocation claim form for execution by a business displacee.	Modification to Base Code	Small				
ROW-181	1	Right-of-Way	Relocation	Provide ability to enter, store, and display the final contact with displacee following relocation including new address and contact information and information about the replacement dwelling.	Off the Shelf with Configuration					
ROW-182	1	Right-of-Way	Relocation	Provide ability to compute whether displacees are eligible to make claims based on occupancy or displacement dates.	Modification to Base Code	Small				

WVDOT Right-of-Way, Utilities and Railroad Management System Right-of-Way (ROW) Requirements

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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
ROW-183	2	Right-of-Way	Relocation	Provide ability to generate alerts within the system and a letter to displacees a user-defined number of days/months (12 months, 18 months, etc.) before displacee's eligibility to enter a relocation expense claim is set to expire.	Modification to Base Code	Small				
ROW-184	1	Right-of-Way	Legal Condemnation	Provide the ability to generate a request to institute condemnation proceedings based on initiation by an authorized user. This letter will document last offer to the property owner; amount asked for by property owner if the property owner has disclosed a price; number of negotiations attempt with the property owner or their authorized representative; and reasons for recommending condemnation.	Modification to Base Code	Small				
ROW-185	1	Right-of-Way	Legal Condemnation	Provide the ability to document in a condemnation request the last offer to the property owner; amount asked by property owner if the property owner has disclosed a price; number of negotiations attempt with the property owner or their authorized representative; and reasons for recommending condemnation.	Modification to Base Code	Small				
ROW-186	2	Right-of-Way	Legal Condemnation	Provide the ability to electronically route a condemnation request to authorized reviewers and approvers based on user-defined business rules.	Off the Shelf with Configuration					
ROW-187	2	Right-of-Way	Legal Condemnation	Provide the ability to initiate condemnation proceedings based on approval of the condemnation request by authorized reviewers in the system.	Off the Shelf with Configuration					
ROW-188	1	Right-of-Way	Legal Condemnation	Provide the ability to generate a 5-day Notice Of Condemnation letter to the owner.	Modification to Base Code	Small				
ROW-189	1	Right-of-Way	Legal Condemnation	Integrate with wvOASIS accounts payable to generate request for warrant to compensate process server, including appropriate pre-encumbrance against the project and project phase.	Modification to Base Code	Small				Combine with other AP Interface requirements
ROW-190	1	Right-of-Way	Legal Condemnation	Provide the ability to store all dates relevant to a condemnation, including but not limited to the following: - When request to institute condemnation was received from the District; - Date condemnation packet was submitted to Legal Division; - Date of Take (i.e., the Date the Petition is filed); - Right of Entry Date (ROE); - Scheduled trial date(s); and - Date of settlement/final order.	Off the Shelf with Configuration					Value could be entered manually and can also be obtained from workflow data (for instance for the Date the condemnation packet was submitted to Legal Division) If this is simply data entry, it is off-the-shelf with configuration. The requirement is vague
ROW-191	1	Right-of-Way	Legal Condemnation	Provide the ability to document the outcome of court proceedings and the amount of court award.	Modification to Base Code	Small				
ROW-192	1	Right-of-Way	Legal Condemnation	Integrate with wvOASIS accounts payable to generate a request for warrant payable to Court Clerk for amount of court award, including appropriate pre-encumbrance against the project and project phase.	Modification to Base Code	Small				Combine with other AP Interface requirements
ROW-193	1	Right-of-Way	Legal Condemnation	Provide the ability to generate a 1099 only when appropriate. Right-of-way solution should provide proper 1099 flag to wvOASIS accounts payable. For example, it should ensure that a 1099 is NOT generated for the amount of a condemnation award (since the condemnation award is payable to the Court, which is responsible for any 1099 reporting to property owners upon making payment).	Modification to Base Code	Small				Combine with other AP Interface requirements
ROW-194	1	Right-of-Way	Legal Condemnation	Provide the ability to document a legal settlement prior to condemnation and capture settlement amount and other settlement information in system.	Modification to Base Code	Small				Combine with other AP Interface requirements
ROW-195	1	Right-of-Way	Legal Condemnation	Integrate with the wvOASIS accounts payable function to initiate payment request for settlement amount. This should include pre-encumbrance for acquisition amount against project and project phase.	Modification to Base Code	Small				
ROW-196	2	Right-of-Way	Legal Condemnation	Provide the ability to track the condemnation rate by different parameters (e.g., fiscal year, urban/rural areas, state project, federal project, etc.).	Off the Shelf with Configuration					Combine with other AP Interface requirements
ROW-197	2	Right-of-Way	Legal Condemnation	Provide the ability to generate a notification to the Appraisal Section once the Petition has been filed and ROE has been granted so the Appraisal Report can be updated to the Date of Take for court.	Off the Shelf with Configuration					Workflow
ROW-198	1	Right-of-Way	Acquisition & Relocation Payments	Integrate with the wvOASIS accounts payable function to support payment processing requirements of the right-of-way, utilities, and railroad agreement processes.	Modification to Base Code	Small				Combine with other AP Interface requirements
ROW-199	1	Right-of-Way	Acquisition & Relocation Payments	Provide the ability to support payment of property acquisition and relocation payments to property owners and displacees (who may or may not already be in the State's vendor master). Integrate with wvOASIS and set-up the property owner or displacee in wvOASIS in order to pay property owners and displacees.	Modification to Base Code	Small				Combine with other VCC/VCM VCUST requirements
ROW-200	1	Right-of-Way	Acquisition & Relocation Payments	Integrate with the wvOASIS accounts payable function to initiate payment request for accepted offers. This should include pre-encumbrance for acquisition amount against project and project phase.	Modification to Base Code	Small				Combine with other AP Interface requirements
ROW-201	1	Right-of-Way	Acquisition & Relocation Payments	Provide the ability to generate multiple warrant requests (e.g., if the property has multiple property owners who want individual checks, or payments to trusts, or payments to one or more banks for mortgage balances, and so on).	Modification to Base Code	Medium				Combine with other AP Interface requirements. Estimating it as medium since there will be system edits on whether to generate multiple AP documents for integration or a single AP document
ROW-202	1	Right-of-Way	Acquisition & Relocation Payments	Provide the ability to support multiple payees (i.e., warrants made out to multiple individuals) determined by percentage share due to each individual (ensuring that the State does not pay more than 100% of the assessed-value acquisition amount).	Modification to Base Code	Small				Related to ROW-201 - Making this estimate small as 201 is medium
ROW-203	1	Right-of-Way	Acquisition & Relocation Payments	Provide the ability to display the fund balances on a project/project phase when a payment request is generated in the right-of-way solution.	Off the Shelf with Configuration					
ROW-204	2	Right-of-Way	Acquisition & Relocation Payments	Generate alerts to a project specific distribution list when the available funds on a project or project phase fall below a user-configurable threshold value.	Off the Shelf with Configuration		Within 12 months			Hub users want similar functionality for remaining balance on projects and as the project approaches thresholds on the end date
ROW-205	2	Right-of-Way	Acquisition & Relocation Payments	Generate an alert to a project specific distribution list when the project end date or project financial end date is within a certain user-defined time period.	Off the Shelf with Configuration		Within 12 months			Hub users want similar functionality for remaining balance on projects and as the project approaches thresholds on the end date
ROW-206	1	Right-of-Way	Acquisition & Relocation Payments	Provide the ability to support review and approval of acquisition and relocation payment requests by authorized users based on project number and payment amount through a workflow-driven approval process.	Off the Shelf with Configuration					
ROW-207	1	Right-of-Way	Acquisition & Relocation Payments	Provide the ability to support review and approval of payments by WVDOT Business Manager for payments over a user-defined threshold.	Off the Shelf with Configuration					

WVDOT Right-of-Way, Utilities and Railroad Management System Right-of-Way (ROW) Requirements

A	B	C	D	E	F	G	H	I	J	K
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
ROW-208	1	Right-of-Way	Acquisition & Relocation Payments	Provide the ability to support scheduling of closings following receipt of all required payment approvals.	Modification to Base Code	Small				
ROW-209	1	Right-of-Way	Acquisition & Relocation Payments	Provide the ability to initiate payment request based on obtaining all required approvals.	Modification to Base Code	Small				Combine with other AP Interface requirements. Also incorporates rules/constraints within the ROW system
ROW-210	1	Right-of-Way	Acquisition & Relocation Payments	Provide the ability to record expenditures against project, project phase, and funding source and adjust encumbrance as appropriate via integration with HUB and/or wvoASIS	Off the Shelf					
ROW-211	1	Right-of-Way	Acquisition & Relocation Payments	Provide ability to generate payment for property acquisition by warrant via integration with wvoASIS accounts payable.	Modification to Base Code	Small				Combine with other AP Interface requirements
ROW-212	1	Right-of-Way	Acquisition & Relocation Payments	Provide ability to generate payment for relocation by warrant or EFT with approval of an authorized user.	Modification to Base Code	Small				Combine with other AP Interface requirements
ROW-213	1	Right-of-Way	Acquisition & Relocation Payments	Provide the ability to integrate with wvoASIS to support creation of a 1099 tax form for taxable acquisition and relocation payments by wvoASIS.	Modification to Base Code	Small				Combine with other AP Interface requirements
ROW-214	1	Right-of-Way	Acquisition & Relocation Payments	Provide the ability to flag payments via integration with wvoASIS accounts payable for the withholding of State of West Virginia income taxes for out-of-state property owners. That is, for out-of-state property owners, WV State income tax due should be automatically deducted and remitted to the West Virginia State Tax Department, which would be handled in wvoASIS and intergovernmental transactions transmitting individual taxpayer information to the State Tax Department electronically.	Modification to Base Code	Small				Combine with other AP Interface requirements
ROW-215	2	Right-of-Way	Acquisition & Relocation Payments	Provide the ability to allow authorized users to track status of acquisition and relocation payment requests (excluding personally identifying information).	Off the Shelf with Configuration					
ROW-216	1	Right-of-Way	Acquisition & Relocation Payments	Provide the ability to cancel checks as required via integration with wvoASIS accounts payable. As an example, once the negotiations are complete, the parcel owner may withdraw their acceptance of an offer and the check may need to be pulled and canceled.	Modification to Base Code	Medium				Combine with other AP Interface requirements.
ROW-217	1	Right-of-Way	Admin Payment Processing	Provide the ability for user to enter and store right-of-way relevant data in the right-of-way solution, once the Vendor Customer ID has been created in wvoASIS. This implies a lookup and confirmation from the wvoASIS vendor master and the right-of-way solution via validation of the Vendor Customer ID within the right-of-way solution.	Modification to Base Code	Small				Combine with other VCC/VCM VCUST requirements
ROW-218	1	Right-of-Way	Admin Payment Processing	Provide the ability to track and maintain all payments related to reimbursable Acquisition & Relocation for Design-Build projects.	Off the Shelf with Configuration					
ROW-219	1	Right-of-Way	Contract Management	Integrate with wvoASIS procurement function to support auto-generation of contract numbers for all individual Services Contracts (Appraisal, Acquisition, Relocation, etc.).	Modification to Base Code	Medium				Combine with OASIS Purchasing documents and where possible, payment documents can be referenced back to the contracts
ROW-220	1	Right-of-Way	Contract Management	Integrate with the wvoASIS procurement function to access and maintain a list of contract appraisers, attorneys, right-of-way services firms, and firms performing disinterment and reinterment services.	Modification to Base Code	Small				Combine with OASIS Purchasing documents.
ROW-221	1	Right-of-Way	Contract Management	Provide the ability to maintain a list of approved service providers such as approved appraisers, attorneys, right-of-way consultants.	Modification to Base Code	Small				
ROW-222	1	Right-of-Way	Contract Management	Provide the ability to search a list of real estate specific capabilities and specifications which a consultant is authorized to perform.	Modification to Base Code	Small				
ROW-223	2	Right-of-Way	Contract Management	Provide the ability to maintain a list of key staff members at each appraisal or right-of-way services firm. Integrating with the wvoASIS procurement function as appropriate. This should include vendor identification number, company name, employee name, phone number, fax number, email address, physical address, functional role if applicable (e.g., project manager, appraiser, right-of-way agent, etc.), and any licenses and certifications which the individual holds.	Modification to Base Code	Small				Combine with other VCC/VCM VCUST requirements
ROW-224	2	Right-of-Way	Contract Management	Integrate with the wvoASIS procurement/contracts management function to support the consultant selection process for appraisal and other right-of-way acquisition services.	Modification to Base Code	Small				Combine with OASIS Purchasing documents
ROW-225	2	Right-of-Way	Contract Management	Provide the ability to define a proposed consultant scope of work including a description and the items of work to be performed.	Modification to Base Code	Medium				
ROW-226	2	Right-of-Way	Contract Management	Provide the ability to record an WVDOT estimate of cost of performing services and create pre-encumbrance for this amount against appropriate project, project phase, and funding source.	Off the Shelf					
ROW-227	2	Right-of-Way	Contract Management	Provide the ability to record and store consultant responses to WVDOT issued scopes of work. Response documents should be stored in ProjectWise and linked for later retrieval.	Off the Shelf with Configuration					
ROW-228	1	Right-of-Way	Contract Management	Provide the ability to document WVDOT selection of consultant including selection team scoring and comments.	Modification to Base Code	Small				
ROW-229	1	Right-of-Way	Contract Management	Integrate with wvoASIS purchasing function to create purchase orders for selected consultant and encumber funds against the appropriate project, project phase, and funding sources.	Modification to Base Code	Small				Combine with OASIS Purchasing documents
ROW-230	1	Right-of-Way	Contract Management	Integrate with the wvoASIS procurement/contracts management function to support the creation, maintenance and tracking of contracts for any contracted services such as appraisals, etc.	Modification to Base Code	Small				Combine with OASIS Purchasing documents
ROW-231	1	Right-of-Way	Contract Management	Provide the ability to track contract number, contract amount, contract effective date, contract expiration date, vendor contacts for the contract, and other contract attributes.	Modification to Base Code	Small				Combine with OASIS Purchasing documents
ROW-232	2	Right-of-Way	Contract Management	Provide the ability to support creation and modification of consultant contract templates in system as required.	Modification to Base Code	Small				
ROW-233	2	Right-of-Way	Contract Management	Provide the ability to generate consultants contracts in the system using contract templates as required, based on a set of parameters.	Modification to Base Code	Small				
ROW-234	1	Right-of-Way	Contract Management	Provide the ability to support creation, review, approval and execution of contract change orders.	Modification to Base Code	Small				Although a modification to include contract information, the baseline for change requests is already built in the Hub.
ROW-235	2	Right-of-Way	Contract Management	Provide the ability to record consultant performance ratings on a specific scope of work.	Modification to Base Code	Small				

**WVDOT Right-of-Way, Utilities and Railroad Management System
Utility Relocation and Railroad Agreement Requirements**

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
RR-11	1	Utility Relocation and Railroad Agreements	Agreements	Provide the ability to document detailed utility or railroad relocation agreement. Allow for creation and maintenance of agreement templates and allow authorized users to change/update these agreement templates which can then be utilized to create specific utility or railroad relocation agreements.	Modification to Base Code	Small				
RR-12	1	Utility Relocation and Railroad Agreements	Workflow	Provide the ability to provide an automated workflow to review/approve relocation agreement with review steps based on user-defined business rules.	Off the Shelf with Configuration					
RR-13	1	Utility Relocation and Railroad Agreements	Data Integration	Provide the ability to import changes to project information from HUB.	Off the Shelf					
RR-14	1	Utility Relocation and Railroad Agreements	Data Integration	Provide the ability to integrate with the wvGASIS accounts payable function to initiate payment request for any utility or railroad relocation cost to be reimbursed by the State. This should include pre-encumbrance for relocation amount against project and project phase. Please also refer to the Acquisition & Relocation Payments subcategory on the Right-of-Way tab.	Modification to Base Code	Small				A similar Accounts Payable interface is detailed in the ROW tab for requirements, so the effort is small since it can all be managed via the same interface with parameters sent as needed for each module. Document similar to ROW-23.
RR-15	1	Utility Relocation and Railroad Agreements	Data Integration	Integrate with the WVDOT transportation asset inventory function to pre-populate any available information about the utility or railroad assets which must be relocated.	Modification to Base Code	Small				Similar integration is covered in ROW requirements, so setting effort as small on this requirement, although it would be larger if it was stand-alone.
RR-16	1	Utility Relocation and Railroad Agreements	Data Integration	Integrate with the WVDOT transportation asset inventory function to update the transportation asset inventory with the new location of the utilities within the right-of-way or information about the railroad asset.	Modification to Base Code	Small				Related to other Transportation Asset Inventory requirements.
RR-17	1	Utility Relocation and Railroad Agreements	Data Integration	Integrate with the WVDOT CAD environment to allow linking to and displaying source data files associated with a utility or railroad relocation within the WVDOT CAD environment.	Modification to Base Code	Small				
RR-18	1	Utility Relocation and Railroad Agreements	Data Integration	Integrate with the WVDOT CAD environment to support automatic update of utility and railroad relocation data based on any changes to the design plans.	Modification to Base Code	Medium				Is the data referred to in this requirement geospatial or is it more specific to amounts, etc on design plans?
RR-19	1	Utility Relocation and Railroad Agreements	Data Integration	Integrate with the WVDOT CAD environment when a utility or railroad relocation is initially set-up to import information from the design plan sheets.	Modification to Base Code	Medium				Similar to UTRR-18: Is the data referred to in this requirement geospatial or is it more specific to amounts, etc on design plans?
RR-20	1	Utility Relocation and Railroad Agreements	Data Integration	Integrate with the WVDOT CAD environment or ProjectWise to store as built plan files if provided by utility or railroad.	Off the Shelf with Configuration					
RR-21	1	Utility Relocation and Railroad Agreements	GIS Integration	Provide a geospatial display of utility relocation and railroad agreement information via a GIS viewer within the utility relocation and railroad functionality. Please refer to Requirements ROW-024 through ROW-029 on the Right-of-Way tab which are also intended to apply to utility relocation and railroad agreement information.	Modification to Base Code	Small				
RR-22	1	Utility Relocation and Railroad Agreements	GIS Integration	Integrate with the WVDOT ArcGIS environment to allow users to select an area of interest in the WVDOT GIS and then drill down to utility relocation and railroad agreement information within the utility relocation and railroad agreements application. Please refer to Requirements ROW-030 through ROW-033 on the Right-of-Way tab which are intended to apply to utility relocation and railroad agreements.	Modification to Base Code	Small				As described in UTRR-21, this is similar functionality to requirements in ROW tab; thus estimating at small and expect work to be completed with similar ROW requirements.
RR-25	1	Utility Relocation and Railroad Agreements	Project Information	Provide the ability to document each utility or railroad asset requiring relocation for a project.	Modification to Base Code	Small				Value
RR-26	1	Utility Relocation and Railroad Agreements	Project Information	Provide the ability to store name of utility or railroad.	Off the Shelf with Configuration					
RR-27	1	Utility Relocation and Railroad Agreements	Project Information	Provide the ability to store description of utility or railroad asset to be relocated.	Off the Shelf with Configuration					
RR-28	1	Utility Relocation and Railroad Agreements	Project Information	Provide the ability to store type of utility or railroad asset to be relocated.	Off the Shelf with Configuration					
RR-29	1	Utility Relocation and Railroad Agreements	Project Information	Provide the ability to store location of utility or railroad by multiple location references including physical street address, geospatial reference, construction station, etc.	Modification to Base Code	Small				
RR-30	1	Utility Relocation and Railroad Agreements	Project Information	Provide the ability to store contact information for utility or railroad representative.	Off the Shelf with Configuration					
RR-31	1	Utility Relocation and Railroad Agreements	Project Information	Provide the ability to document a target date for completion of relocation.	Off the Shelf with Configuration					

WV DOT Right-of-Way, Utilities and Railroad Management System
Utility Relocation and Railroad Agreement Requirements

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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
UR-32	1	Utility Relocation and Railroad Agreements	Project Information	Provide the ability to document date relocation is completed.	Off the Shelf with Configuration					
UR-33	1	Utility Relocation and Railroad Agreements	Project Information	Provide the ability to document each discussion with the utility or railroad concerning the relocation including date, time, location of discussion, individuals from WV DOT and the utility/railroad participating and a summary of the discussion.	Off the Shelf with Configuration					
UR-34	1	Utility Relocation and Railroad Agreements	Project Information	Provide the ability to document estimated cost of relocation for each individual utility or railroad asset.	Off the Shelf with Configuration					
UR-35	1	Utility Relocation and Railroad Agreements	Project Information	Provide the ability to document estimated cost of relocation for the entire project either as a summary cost or as a roll-up from the individual cost estimates for each identified relocation activity.	Off the Shelf					
UTRR-36	1	Utility Relocation and Railroad Agreements	Project Information	Provide the ability to document in narrative format agreed to approach for completing the relocation.	Off the Shelf with Configuration					
UR-37	1	Utility Relocation and Railroad Agreements	Project Information	Provide the ability to document party responsible for completing relocation (State, utility, railroad or other).	Off the Shelf with Configuration					
UTRR-38	1	Utility Relocation and Railroad Agreements	Project Information	Provide the ability to document the party responsible for cost associated with relocation (State, utility, railroad or other).	Off the Shelf with Configuration					
UR-39	1	Utility Relocation and Railroad Agreements	Project Information	Provide the ability to store a history of cost estimates for each relocation with the date of the estimate and a description of changes since the last cost estimate.	Off the Shelf with Configuration					
UTRR-40	1	Utility Relocation and Railroad Agreements	Project Information	Provide the ability to store the WV DOT staff member responsible for managing relocation activity for the project.	Off the Shelf with Configuration					
UTRR-41	1	Utility Relocation and Railroad Agreements	Monitoring Relocation Activities	Provide the ability to define key dates to track/record to maintain a Project Milestone Schedule. (As an example, the legacy application maintains the following dates: Start CP Date, Start ROW Date, CP Completion Date, RW/U Certification Date, CP/RW Rdy Date, PS E Sub Date, Adv Cntr Date, Let Contract Date, Award Contract Date, Start Construction Date, and Completion Date.)	Off the Shelf					
UTRR-42	1	Utility Relocation and Railroad Agreements	Monitoring Relocation Activities	Provide the ability to define key dates to track/record to maintain a set of Project Activity Dates. (As an example, the legacy application maintains the following dates: RW Date, RW 1-2's Date, 1-2's Rdy Date, ROW Authorization Date, ROW Certification Date, 3's Ready Date, RFCE Date, PFR Date, UCM Date, RVUS Date, PFR Date, and FOR Date.)	Off the Shelf with Configuration					
UTRR-43	1	Utility Relocation and Railroad Agreements	Monitoring Relocation Activities	Provide the ability to allow District staff to record inspection activities in support of utility relocation or railroad agreement and to indicate when work is completed and inspected.	Modification to Base Code	Small				

**WV DOT Right-of-Way, Utilities and Railroad Management System
Management Reporting Requirements**

Req. #	Priority	Category	Sub-Category	Business (Functional) Requirement	Vendor Response	Customization Estimate, if Available	Capability Planned for Future Release	Core 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 right of way and utilities and railroad relocation management 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 with Configuration					
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 ad-hoc 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 integrate with a WV DOT business intelligence environment.	Customization	Small	Within 12 months			
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					Our solution already integrates with Power BI
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 WV DOT business intelligence environment.	Customization	Small	Within 12 months			
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 within the 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 ad-hoc 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 right of way management system 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					

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**WV DOT Right-of-Way, Utilities and Railroad Management System
Management Reporting Requirements**

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
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 with Configuration					
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 with Configuration					
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 with Configuration					
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 WV DOT business rules.	Modification to Base Code	Small	Within 12 months			We recommend that a group of users should manage this function.
RPT-023	3	Management Reporting	Report Portal	Allow end-users to share saved personalized reports and ad-hoc queries for use by another user.	Customization	Medium	Within 12 months			Does this require security to be dynamic. Can the user who receives the shared report view the same data
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.	Modification to Base Code					
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 with Configuration					
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 with Configuration					
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 with Configuration					
RPT-030	3	Management Reporting	Standard Report Features	Allow users to define or modify the sort order of reports.	Off the Shelf with Configuration					
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.	Customization	Medium	Within 12 months			Need to understand the detailed requirements

**WV DOT Right-of-Way, Utilities and Railroad Management System
Management Reporting Requirements**

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
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 Right of Way 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.	Customization	Small	Within 12 months			We need to understand the business requirements to use as a trigger
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).	Customization	Small	Within 12 months			Need to understand the business requirements. A single query will result in a single file/table.
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.	Modification to Base Code					
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 with Configuration					
RPT-045	3	Management Reporting	Standard Report Features	Support effective date selection and query including Boolean operations such as date ranges.	Off the Shelf					
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.	Modification to Base Code					
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 inquiries.	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/max line graphs, regression lines, dashboard gauges, etc.	Off the Shelf					

**WV DOT Right-of-Way, Utilities and Railroad Management System
Management Reporting Requirements**

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
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 with Configuration					We recommend a central user(s) to play this role otherwise a lot crossing of reports and it will be unmanageable for users
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.	Modification to Base Code	Small	Within 12 months			
RPT-058	2	Management Reporting	Ad-hoc Query	Provide ability to track data by user-defined performance indicators.	Customization	Small	Within 12 months			Need to understand the requirements
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.	Off the Shelf with Configuration					
RPT-062	1	Management Reporting	Report Administration	Enable users to run ad hoc reports and queries without degradation of system performance.	Off the Shelf					
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 with Configuration					
RPT-067	3	Management Reporting	Report Administration	Provide functionality to audit exports of report data and modifications to report definitions.	Modification to Base Code					
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 with Configuration					
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's solution (maintain both product meta data and user configured changes).	Modification to Base Code	Small	Within 12 months			

WV DOT Right-of-Way, Utilities and Railroad Management System
Application Architecture Reqmnts

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					Single relational database model in SQL Server
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					Single relational database model in SQL Server, that is accessed by entity framework layer and security is applied
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					Integration monitoring screens available in application that log all data integration details and interface execution. All data updates in application are logged in audit tables.
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					All reference data that is used in drop downs or other validations is maintained via UI. Application configuration is stored in configuration file or global parameter table.
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.	Modification to Base Code					
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					Application uses Fluent Validator at entity level. So all entity validations are triggered on updates to the table from any source.
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					

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WVDOOT Right-of-Way, Utilities and Railroad Management System
Application Architecture Reqrmts

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					Framework UI is compliant/Certified by PHWA
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					Common set of UI libraries including Telerik UI and Bootstrap are used to give a common look and feel
APP-021	2	Application Architecture	User Interface	Ensure messages appear in a consistent format across all system functions for both batch and online 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					Expandable Tree Menu available to navigate between screens and modules
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					User prompted to save data when navigating out. Navigating in tabs preserves data
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					User prompted to save data when navigating out. Navigating in tabs preserves data
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	1	Application Architecture	User Interface	Support cut and paste for copying data between screens.	Off the Shelf					All UI is browser based and no plugin or control is present. So browser copy/paste of fields can be done to copy text data.
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					All grids have various filtering and sorting capabilities.
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).	Off the Shelf					
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					Using Browser functionality/Using Javascript
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					

WV DOT Right-of-Way, Utilities and Railroad Management System
Application Architecture Reqmnts

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					Ability to soft delete reference table records is available
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					Workflow allow user information logged during processing
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.	Modification to Base Code					
APP-051	2	Application Architecture	Functions and Features	Provide capability to back out (rollback) previously executed batch loads.	Off the Shelf					For nightly batch processing using SQL Server Rollback features
APP-052	2	Application Architecture	Functions and Features	Provide capability to define/set-up batch checkpoints.	Off the Shelf					For nightly batch processing using SQL Server Rollback features
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.	Modification to Base Code					
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 with Configuration					Form Generation templates can be setup with different clauses and used based on user selection
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					Using Browsers Print Functionality
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.	Modification to Base Code		Within 12 months			Currently using SSIS or other SQL Server Management tools. Planned features include UI for end users to allow uploads directly from application instead of external tools.
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					Embedded Designer available
APP-064	1	Application Architecture	Workflows	Support establishment of user-defined rules-based workflows for any system event or transaction.	Customization	Small				User UI can be made available to is hooked into Workflow Engine
APP-065	2	Application Architecture	Workflows	Provide bi-directional electronic routing of documents for approval or other tasks through workflow.	Off the Shelf					

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Application Architecture Reqmnts

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 WVOT identity management solution (Active Directory) to access organizational hierarchies and incumbent information for current employees in order to establish workflow routings.	Off the Shelf						
APP-068	2	Application Architecture	Workflows	Support parallel approvals and single-threaded approvals in the same approval path.	Off the Shelf						
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						Designer allows export as XML or BPMN to copy/edit/extend
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						Workflow rules can be based on data values. The workflow engine can call routines that access different application functionality
APP-073	2	Application Architecture	Workflows	Allow user-defined standard approval timeframes.	Off the Shelf with Configuration						
APP-074	2	Application Architecture	Workflows	Allow user-defined alternative approval paths.	Off the Shelf with Configuration						Workflow can be designed with as many approval states as needed.
APP-075	1	Application Architecture	Workflows	Support multiple levels of approvals for transactions based on profile security and other user-defined criteria.	Off the Shelf with Configuration						
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 context items within the workflow and store these notes with user id and date/time stamp.	Off the Shelf						Attachments are supported on various screens.
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.	Customization	Small					A basic rule can be added as part of workflow to prevent such approval
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-089	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.	Off the Shelf						

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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 aspect ratios 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.	Off the Shelf					
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) v 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					Framework support roles/role groups to control actions to screens/app/data
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).	Off the Shelf with Configuration					
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.	Off the Shelf					
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 offered for further separation, finer grouping.	Off the Shelf					

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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				There were no current requirements to implement authorization from AD since application administrators prefer to manage security in application. If required, authorization claims can be pulled from AD.
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 incident log in the audit trail log.	Off the Shelf					
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.	Off the Shelf			using myAtrix security functionality		
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.	Off the Shelf					
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.	Off the Shelf			using myAtrix security functionality		
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 WV DOT 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 shall be within 30 calendar days of each other.	Modification to Base Code					
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 WV DOT 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 addition/change.	Off the Shelf					

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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 with Configuration					Soft Deletes on Reference tables available. Can be extended to transaction tables as required
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 with Configuration					
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 with Configuration					Soft Deletes on Reference tables available. Can be extended to transaction tables as required
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 with Configuration					
APP-134	2	Application Architecture	Archiving	Allow system administrator to define archiving criteria for different types of data.	Off the Shelf with Configuration					
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 with Configuration					
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 with Configuration					
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 with Configuration					
APP-138	1	Application Architecture	Help	Provide 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	Utilize 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.	Modification to Base Code		Within 12 months			Functionality is planned for next release
APP-142	1	Application Architecture	Help	Allow authorized users to modify and maintain error message text.	Modification to Base Code		Within 12 months			Functionality is planned for next release
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.						
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 WV DOT-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.	Off the Shelf					
APP-147	2	Application Architecture	Help	Ensure all customized help text and files carry forward automatically during system updates and upgrades.	Off the Shelf					
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 component pieces of the on-line documentation.	Off the Shelf					

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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.					
APP-155	1	Application Architecture	Upgradability	Provide capability for all upgrade and patched processes for the system to automatically re-apply configurations and customizations made by WDDOT. (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				Configuration is part of the database tables that is managed using the configuration management processes and restored. Application code configurations can be re-applied using Git/Hg/Mercurial/Pull methodology. Change management process will be documented and available to State to manage change/updates.

WV DOT Right-of-Way, Utilities and Railroad Management System
Technical Architecture Reqrmts

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
TEC-001	1	Technical Architecture	General	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.	Off the Shelf					HUB Framework based on n-tier architecture using open standards ASP.net Core with MS SQL Server.
TEC-002	1	Technical Architecture	General	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.	Off the Shelf					HUB Framework based on n-tier architecture using open standards ASP.net Core with MS SQL Server. The software can be run on different OS and hardware including virtualization.
TEC-003	1	Technical Architecture	General	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.	Off the Shelf					Supports virtualization for high availability and VMWare based replication architecture. The deployment will leverage the vvoClass ERP DR infrastructure meeting th necessary SLA.
TEC-004	1	Technical Architecture	General	Utilize a service-oriented architecture (SOA) to facilitate seamless integration with heterogeneous internal and external systems.	Off the Shelf					
TEC-005	1	Technical Architecture	General	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).	Off the Shelf					
TEC-006	2	Technical Architecture	General	Support virtualization for all tiers.	Off the Shelf					
TEC-007	1	Technical Architecture	General	Provide a browser-based interface.	Off the Shelf					
TEC-008	1	Technical Architecture	General	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.	Off the Shelf					
TEC-009	1	Technical Architecture	General	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.	Off the Shelf					
TEC-010	1	Technical Architecture	General	Deliver content via browser without Active X controls or plug-in support (such as Java Runtime Environment, Adobe Flash, etc.).	Off the Shelf					UI uses only HTML, CSS, JavaScript used. No Plugins required.
TEC-011	1	Technical Architecture	General	Deliver content via web browser capability available on the iOS and Android.	Off the Shelf					
TEC-012	2	Technical Architecture	General	Ensure any additional required software required on a desktop can be deployed through industry standard Office Automation such techniques.	Off the Shelf					No additional software is required on users desktops for HUB framework.
TEC-013	2	Technical Architecture	General	Support the following character sets: UTF-8 Unicode, UTF-16 Unicode, and ASCII.	Off the Shelf					
TEC-014	2	Technical Architecture	General	Utilize application stack at all points in terms of the operating system, network, database, desktop, and storage.	Off the Shelf					
TEC-015	2	Technical Architecture	General	Ensure Web and security server is 64 bit.	Off the Shelf					
TEC-016	2	Technical Architecture	Enterprise Application Integration	Support connectivity services through TCP/IP, IPsec v4, IPsec v6.	Off the Shelf					
TEC-017	2	Technical Architecture	Enterprise Application Integration	Provide connectivity across and between WV DOT's network zones.	Off the Shelf					
TEC-018	2	Technical Architecture	Enterprise Application Integration	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.)	Off the Shelf with Configuration					
TEC-019	2	Technical Architecture	Enterprise Application Integration	Provide configurable data-transformation services to handle data validation, calculations, lookups, mapping, screening, transactions, etc.	Off the Shelf					Functionality available in SSIS framework.
TEC-020	2	Technical Architecture	Enterprise Application Integration	Provide ability to link software solution business process flows with business process flows in other state and WV DOT 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).	Off the Shelf					Supported by configurable workflow engine, SSIS integration and web services.
TEC-021	2	Technical Architecture	Data Integration	Provide capability for bulk data uploads/downloads from CSV or through API calls.	Off the Shelf					Using SSIS and SQL Server Management Studio.
TEC-022	2	Technical Architecture	Data Integration	Support multiple data-transfer methods such as XML, JSON, CSV and flat files (e.g. ASCII, variable length, fixed length, comma-delimited, etc.).	Off the Shelf					
TEC-023	2	Technical Architecture	Data Integration	For all data transfers and processing 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 substitute 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 relationships, and column relationships, etc.	Off the Shelf					
TEC-024	2	Technical Architecture	Data Integration	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.	Off the Shelf with Configuration					As delivered we support PGP.
TEC-025	2	Technical Architecture	Data Integration	Encrypt any data with personally identifiable information in transit and at rest in all file structures.	Off the Shelf					

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TEC-026	2	Technical Architecture	Data Integration	Provide capability for data in the software solution to be extensible to authorized users from both an exposure and consumption standpoint.	Off the Shelf					User roles/role groups to control access
TEC-027	2	Technical Architecture	Data Integration	Provide capability to execute interfaces with other systems on a pre-defined schedule or on the request of an authorized user.	Off the Shelf					
TEC-028	2	Technical Architecture	Data Integration	Edit interfaced data by applying the same business rules that are defined for the equivalent transaction entered through the system.	Off the Shelf					
TEC-029	2	Technical Architecture	Data Integration	Generate an error report for any validation issues or other errors identified during execution of a data load or an interface program.	Off the Shelf					
TEC-030	2	Technical Architecture	Data Integration	Display validation errors on-line within a job history function or print in a report format at user option.	Off the Shelf					
TEC-031	2	Technical Architecture	Data Integration	Place records not passing validation into a suspense file or table within the software solution.	Off the Shelf					
TEC-032	2	Technical Architecture	Data Integration	Allow correction of suspended records within the software solution.	Off the Shelf					
TEC-033	2	Technical Architecture	Data Integration	Provide capability to validate data during both the initial load step and during processing steps.	Off the Shelf					
TEC-034	2	Technical Architecture	Data Integration	Allow the system administrator or other authorized users to browse the suspense file in the system.	Off the Shelf					
TEC-035	2	Technical Architecture	Data Integration	Provide facilities for verification and batch controls tools to ensure the complete file was received and that the file was not a duplicate.	Off the Shelf					
TEC-036	2	Technical Architecture	ETL Tools	Provide data integration and data management tools with a range of extract, transform, and load (ETL) capabilities.	Off the Shelf					
TEC-037	2	Technical Architecture	ETL Tools	Support ability to integrate third-party ETL tools to perform ETL functions.	Off the Shelf					
TEC-038	2	Technical Architecture	ETL Tools	Utilize scripting or other object-oriented structured languages to define advanced transformation requirements/operations.	Off the Shelf					
TEC-039	2	Technical Architecture	ETL Tools	Provide 'data exchange management' to schedule and monitor inbound and outbound files, notify appropriate 'smarts' in the event of problems, automatically detect duplicate files, and perform other data interchange management functions.	Off the Shelf					
TEC-040	2	Technical Architecture	ETL Tools	Validate and handle exceptions during transformation.	Off the Shelf					
TEC-041	2	Technical Architecture	ETL Tools	Verify and maintain referential integrity as part of any transformation process.	Off the Shelf					
TEC-042	2	Technical Architecture	ETL Tools	Provide the capability to override the default source mapping and use specific SQL statements.	Off the Shelf					
TEC-043	2	Technical Architecture	ETL Tools	Provide ability to map data from multiple source systems and into multiple target source systems.	Off the Shelf					
TEC-044	2	Technical Architecture	ETL Tools	Provide ability to schedule and monitor the extraction, cleansing, transformation, and loading process.	Off the Shelf					Support incremental ETL
TEC-045	2	Technical Architecture	ETL Tools	Provide ability to rebuild/reload transactions from a specific date/time forward.	Off the Shelf					
TEC-046	1	Technical Architecture	System Tools	Provide report design and generation tools within the system solution.	Off the Shelf					UI Forms layout designer available. Additional features intended to be added.
TEC-047	1	Technical Architecture	System Tools	Provide end-user interface design tools within the system solution.	Modification to Base Code	Medium		Within 12 months		Application logs performance metrics. Kibana can be used to make external dashboards
TEC-048	2	Technical Architecture	System Tools	Provide tools for system monitoring within the system solution.	Off the Shelf					Using configuration files and Configuration Parameter Table
TEC-049	2	Technical Architecture	System Tools	Provide configuration management tools within the system solution.	Off the Shelf					GitHub can be used with VisualStudio to manage source code
TEC-050	2	Technical Architecture	System Tools	Provide source management tools within the system solution.	Off the Shelf					Tools such as GitHub or Perforce can be used.
TEC-051	2	Technical Architecture	System Tools	Provide ability to work with third-party configuration management and source management tools.	Off the Shelf					Using Visual Studio web services can be added.
TEC-052	2	Technical Architecture	System Tools	Provide tools for Application Program Interface (API) maintenance within the system solution.	Off the Shelf					Foreign keys and DB constraints setup in data model. Application applies fluent validation and entity framework validations to ensure clean data
TEC-053	1	Technical Architecture	Database	Maintain referential integrity of data through either database referential integrity declarations or application code.	Off the Shelf					SQL Server replication features available
TEC-054	1	Technical Architecture	Database	Support data replication, load balancing and synchronization across multiple physical or virtual servers as well as data.	Off the Shelf					Use MS SQL Server features and optimistic locking using row versioning
TEC-055	1	Technical Architecture	Database	Leverage DBMS database features and database and application design to reduce contention between updates by online users and those of concurrently running batch processes.	Off the Shelf					Row level locks reduce/avoid DB contention
TEC-056	1	Technical Architecture	Database	Ensure that on-line search queries will not be delayed by waiting for locks to be released.	Off the Shelf					
TEC-057	1	Technical Architecture	Database	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.).	Off the Shelf					Row versioning using timestamps is implemented
TEC-058	1	Technical Architecture	Database	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 'dead' embrace.	Off the Shelf					Row versioning using timestamps is implemented
TEC-059	1	Technical Architecture	Database	Support automatic "clean up" of partial database updates after suspended network sessions or other global failures.	Off the Shelf					Database transactions enforce atomic transactions

WVDO Right-of-Way, Utilities and Railroad Management System
Technical Architecture Reqrmts

TEC-060	2	Technical Architecture	Database	Allow database structure changes to be made with a minimal impact to system availability.	Off the Shelf					
TEC-061	1	Technical Architecture	Database	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.)	Off the Shelf					
TEC-062	1	Technical Architecture	Database	Support record-locking at the row level.	Off the Shelf					SQL Server replication is available Optimistic locking done at row level
TEC-063	1	Technical Architecture	Database	Support configuration of data attributes by the system administrator.	Off the Shelf					Forms Layout can be configured. User Defined Fields available in database for extensibility
TEC-064	1	Technical Architecture	Database	Provide structured query language (SQL) capabilities for database queries.	Off the Shelf					
TEC-065	2	Technical Architecture	Database	Include new data items automatically in migration paths during software upgrades.	Off the Shelf					Visual Studio Entity Framework can be used for new data model changes. Development and QA methodology includes data seeding for incorporating reference and test data.
TEC-066	1	Technical Architecture	Reliability	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 WVDO).	Off the Shelf					
TEC-067	1	Technical Architecture	Performance	Provide a solution which is architected to support up to 300 concurrent users across all system functions; respondent must be able to provide WVDO 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.	Off the Shelf					
TEC-068	1	Technical Architecture	Performance	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.	Off the Shelf					
TEC-069	1	Technical Architecture	Performance	Provide a solution which is architected to support best practice load-balancing techniques.	Off the Shelf					
TEC-070	1	Technical Architecture	Performance	Ensure that batch processing does not adversely impact on-line responsiveness or availability.	Off the Shelf					
TEC-071	1	Technical Architecture	Performance	Provide a solution architected to support implementation of application controlled parallel batch processing.	Off the Shelf					
TEC-072	1	Technical Architecture	Performance	Provide support for user session isolation such that a failure in one session has no impact on other user sessions.	Off the Shelf					
TEC-073	1	Technical Architecture	Performance	Provide a solution architected to support access to data for pre-defined reports, ad-hoc queries, and business intelligence without impacting online transaction performance.	Off the Shelf					
TEC-074	2	Technical Architecture	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.	Off the Shelf					
TEC-075	2	Technical Architecture	Performance	Support utilization of industry leading third-party performance testing tools with proposed software solution to verify compliance with performance requirements.	Off the Shelf					
TEC-076	1	Technical Architecture	Performance	Provide ability to integrate with DBMS tools which allow the database administrator or authorized user to tune the system for performance.	Off the Shelf					
TEC-077	2	Technical Architecture	Performance	Provide for an automatic timeout for ad hoc queries (e.g., 10 minutes) configurable by the system administrator.	Off the Shelf					
TEC-078	1	Technical Architecture	Business Continuity	Provide an architecture which supports fail-over to a parallel load-balanced environment on a real-time basis.	Off the Shelf					SQL Server profiles allow setup of query timeouts
TEC-079	1	Technical Architecture	Business Continuity	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.	Off the Shelf					
TEC-080	1	Technical Architecture	Business Continuity	Provide the capability to perform full backups, incremental backups, and recovery capabilities for data and application components. Run-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.	Off the Shelf					
TEC-081	1	Technical Architecture	Business Continuity	Provide a system design which supports the capability to provide disaster recovery at an off-site location.	Off the Shelf					
TEC-082	1	Technical Architecture	Business Continuity	Allow for maintenance of a current backup 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.	Off the Shelf					
TEC-083	1	Technical Architecture	Supportability	Construct using current but mature industry-standard application development tools, techniques and standards that can be maintained for the expected life of the system.	Off the Shelf					
TEC-084	1	Technical Architecture	Supportability	Allow at a minimum for configuration across multiple environments including production, patch, user acceptance test, system test, user training, development and sand box.	Off the Shelf					
TEC-085	1	Technical Architecture	Supportability	Provide production support for the last two major releases of the proposed software solution.	Off the Shelf					
TEC-086	1	Technical Architecture	Networking	Support execution of the proposed software solution over a TCP/IP network with a minimum speed of 10mb/sec.	Off the Shelf					To be deployed on Prem in States FSP Data Center
TEC-087	1	Technical Architecture	Networking	Identify access requirements through firewalls and follow standard port designations, where possible.	Off the Shelf					

WV DOT Right-of-Way, Utilities and Railroad Management System
Technical Architecture Requirements

TEC-083	1	Technical Architecture	Custom Development	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.	Off the Shelf					Using Visual Studio
TEC-089	2	Technical Architecture	Custom Development	Allow authorized technical staff to create new tables.	Off the Shelf					Using Visual Studio
TEC-090	2	Technical Architecture	Custom Development	Allow authorized technical staff to create new fields.	Off the Shelf					Using Visual Studio
TEC-091	2	Technical Architecture	Custom Development	Allow authorized technical staff to create new objects.	Off the Shelf					Using Visual Studio
TEC-092	2	Technical Architecture	Custom Development	Allow authorized technical staff to change field structure.	Off the Shelf					Using Visual Studio/SSIS
TEC-093	2	Technical Architecture	Custom Development	Allow for identification/reporting of new user-defined tables.	Off the Shelf					Using Visual Studio/SSIS
TEC-094	2	Technical Architecture	Custom Development	Allow for identification/reporting of new user-defined fields.	Off the Shelf					Using Visual Studio/SSIS
TEC-095	2	Technical Architecture	Custom Development	Allow for identification/reporting of new user-defined objects.	Off the Shelf					Using Visual Studio/SSIS
TEC-096	2	Technical Architecture	Custom Development	Support inclusion of any user-defined or developed objects (user-defined tables, fields, and other objects, etc.) in the upgrade path.	Off the Shelf					Using Visual Studio/SSIS
TEC-097	2	Technical Architecture	Job Scheduling and Process	Provide a central enterprise job scheduler which can schedule jobs (across platforms and across multiple servers within a platform).	Off the Shelf					Using SOS Job Scheduler that is used by WVDOT ERP
TEC-098	1	Technical Architecture	Job Scheduling and Process	Integrate with a software scheduler to provide job scheduling functionality for the system solution.	Off the Shelf					
TEC-099	1	Technical Architecture	Job Scheduling and Process	Provide capability to design/manage a batch job stream with multiple dependencies.	Off the Shelf					
TEC-100	2	Technical Architecture	Job Scheduling and Process	Provide capability to notify designated users via email or text based on job and job completion status. The user shall be able to filter whether or not they see a notification based on statuses such as Completed, Complete 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.	Off the Shelf					
TEC-101	2	Technical Architecture	Job Scheduling and Process	Provide capability to utilize job scheduling tools to automate administrative tasks such as database backups or regular report production.	Off the Shelf					
TEC-102	2	Technical Architecture	Job Scheduling and Process	Provide ability to establish job dependencies and control subsequent job execution based on user-defined condition codes.	Off the Shelf					
TEC-103	2	Technical Architecture	Job Scheduling and Process	Allow authorized users to control priority of the batch processes.	Off the Shelf					
TEC-104	2	Technical Architecture	Job Scheduling and Process	Allow authorized users to control job start times.	Off the Shelf					
TEC-105	2	Technical Architecture	Job Scheduling and Process	Provide an audit trail of job execution at a minimum noting the job's name, start time, end time, and status.	Off the Shelf					
TEC-106	2	Technical Architecture	Job Scheduling and Process	Allow authorized user to modify job status (e.g., changing status of a job to "Complete", etc.).	Off the Shelf					
TEC-107	2	Technical Architecture	Job Scheduling and Process	Provide capability to establish job alerts.	Off the Shelf					
TEC-108	2	Technical Architecture	Job Scheduling and Process	Provide capability to re-start a multi-step job from a user-defined point/item.	Off the Shelf					
TEC-109	2	Technical Architecture	Job Scheduling and Process	Allow authorized users to control job by transaction type.	Off the Shelf					
TEC-110	2	Technical Architecture	Job Scheduling and Process	Produce a log of job results and append to this log if the job re-runs.	Off the Shelf					
TEC-111	2	Technical Architecture	Job Scheduling and Process	Provide the capability to establish and maintain user-defined calendars of scheduled jobs.	Off the Shelf					
TEC-112	2	Technical Architecture	Job Scheduling and Process	Provide a suspense file for selected batch transactions.	Off the Shelf					
TEC-113	2	Technical Architecture	Job Scheduling and Process	Allow an authorized user to delete selected records from the suspense file.	Off the Shelf					
TEC-114	2	Technical Architecture	Job Scheduling and Process	Produce daily report of error transactions by system function.	Off the Shelf					
TEC-115	2	Technical Architecture	Job Scheduling and Process	Provide ability for an authorized user to edit a transaction in error and resubmit.	Off the Shelf					
TEC-116	1	Technical Architecture	Technical Documentation	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.	Off the Shelf					
TEC-117	1	Technical Architecture	Technical Documentation	Include system descriptions in technical system documentation.	Off the Shelf					
TEC-118	1	Technical Architecture	Technical Documentation	Include screen definitions and descriptions in technical system documentation.	Off the Shelf					
TEC-119	1	Technical Architecture	Technical Documentation	Include database definitions, logical data model, and record layouts in technical system documentation.	Off the Shelf					
TEC-120	1	Technical Architecture	Technical Documentation	Include audit trail management documentation in technical system documentation.	Off the Shelf					
TEC-121	1	Technical Architecture	Technical Documentation	Include security administration documentation in technical system documentation.	Off the Shelf					
TEC-122	1	Technical Architecture	Technical Documentation	Include installation documentation in technical system documentation.	Off the Shelf					
TEC-123	1	Technical Architecture	Technical Documentation	Include performance tuning documentation in technical system documentation.	Off the Shelf					
TEC-124	1	Technical Architecture	Technical Documentation	Include workflow process and administration documentation in technical system documentation.	Off the Shelf					
TEC-125	1	Technical Architecture	Technical Documentation	Include disaster recovery procedures in technical system documentation.	Off the Shelf					

APPENDIX B – ACKNOWLEDGMENT OF ADDENDUM(S)

ADDENDUM ACKNOWLEDGEMENT FORM
SOLICITATION NO.: CRFP DOT2200000002

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)

- | | |
|--|--|
| <input checked="" type="checkbox"/> Addendum No. 1 | <input type="checkbox"/> Addendum No. 6 |
| <input checked="" type="checkbox"/> Addendum No. 2 | <input type="checkbox"/> Addendum No. 7 |
| <input type="checkbox"/> Addendum No. 3 | <input type="checkbox"/> Addendum No. 8 |
| <input type="checkbox"/> Addendum No. 4 | <input type="checkbox"/> Addendum No. 9 |
| <input type="checkbox"/> Addendum No. 5 | <input type="checkbox"/> 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.

DATAVIEW CONSULTING

Company

Sonjeev Mus./n.

Authorized Signature

9/29/21

Date

NOTE: This addendum acknowledgement should be submitted with the bid to expedite document processing.

APPENDIX C – LETTER OF FINANCIAL STABILITY

Robert J Shalhoub & Co LLC
Certified Public Accountants

55 Morris Avenue, Suite 218
Springfield, NJ 07081

Tel: 973.379.2044 212.586.9241
Fax: 973.379.2055

September 1, 2021

To Whom It May Concern:

You have requested that we provide you with certain information regarding Dataview Consulting LLC (hereinafter referred to as "client"). Our client has consented to our providing of the requested information.


Dataview Consulting LLC was established on June 17, 2013. Dataview Consulting LLC is financially stable and has the financial capacity to provide the entire solution and has adequate resources to continue as an ongoing concern.

I, Robert J. Shalhoub, CPA (NJ License #20CC00932200) have been the CPA firm and preparing tax returns for Dataview Consulting LLC since 2015.

By providing you with this letter, we have not established with you any direct or indirect client, contractual or quasi-contractual relationship. We do not understand or anticipate that you or any third party will rely on the information contained in this letter as a basis for entering into or continuing any contractual or other relationship with our client. We fully expect that before you or any third party decides to enter into any such relationship with our client, that you and/or that third party will exercise an appropriate level of independent due diligence. Accordingly, the use of this information is solely your responsibility and judgment.

By accepting this letter, you acknowledge all of the above, and also that we are under no obligation to provide you or any third party with any additional information at any time, including but not limited to any changes or corrections to any of the information we have provided in this letter concerning our client.

Very Truly Yours,
Robert J Shalhoub & Co LLC



Robert J. Shalhoub, CPA

APPENDIX D – DESIGNATED CONTACT, CERTIFICATION AND SIGNATURE

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.

Sanjeev Musafir PARTNER
(Name, Title)
SANJEEV MUSAFIR, PARTNER, DATAVIEW CONSULTING
(Printed Name and Title)
1634 KING ST LACROSSE WI 54601
(Address)
609 608 6638
(Phone Number) / (Fax Number)
SANJEEV.MUSAFIR@DATAVIEW.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.

DATAVIEW CONSULTING LLC
(Company)
Sanjeev Musafir PARTNER
(Authorized Signature) (Representative Name, Title)
SANJEEV MUSAFIR PARTNER
(Printed Name and Title of Authorized Representative)
9/22/21
(Date)
609 608 6638
(Phone Number) (Fax Number)