Virginia DOT: HMMS System Assessment

Targeted Group Assessment
(no Individual Assessments)
General Action Plan

Virginia DOT (VDOT) implemented a new maintenance management system (HMMS) The system is currently used primarily for work order management. VDOT management were interested in exploring potential extensions to HMMS to support additional asset management functions. They used the assessment process to identify gaps in system capabilities, standards, or governance that could be addressed to support expanded future HMMS functionality and use.

Step 1: Assessment Planning

Participants were selected based on their current level of HMMS use and involvement. Three Districts were represented, including both urban and rural perspectives. District HMMS power users were involved, as was one additional user per District, selected for their unique and informed perspective.

Based on input from the assessment sponsor and HMMS business lead, the assessment was targeted to a subset of elements that were of greatest importance to the current and anticipated functions and applications of the system.

Step 2: Benchmarking and Improvement Selection

A 60-minute kickoff meeting introduced participants to the assessment context, framework and approach. The targeted assessment elements were confirmed, and two, 90-minute group benchmarking meetings were scheduled. The assessment was completed beginning with selected elements in Area E (Act on Data) and working backwards to Area A (Specify and Standardize Data).

Step 3: Evaluation and Implementation Action Planning

Potential improvement actions were identified but not formally evaluated using the TAM Data Assistant. The facilitator produced an assessment summary presentation and worked with the core team to consolidate and select proposed improvement actions. A single 90-minute meeting was used to confirm outcomes and proposed actions.

Step 4: Closeout and Next Steps

A summary presentation captured the assessment context, process, outcomes and proposed actions. This presentation was finalized with management input.

Sponsor

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Assistant State Maintenance Eng.

Core Team

Allison Scott
HMMS Business Lead

William Duke
Consultant Facilitator

Participants

Brian Mosier
HMMS Power User (Hampton Roads District)

Travis Estes
HMMS Power User (Culpeper District)

Kristen Williby
HMMS Power User (Salem District)

Matt Simeone
Hampton Roads Interstate Maintenance Mgr.

Tommy Spring
Assistant Residency Administrator

Jessica Coffey
District Project Mgmt. Engineer

Eric Hetzer
Information Technology

Assessment Experience:

The assessment was complicated both by the broad context of the assessment and by the fact that the HMMS was a relatively new system, used in business areas and processes that are still evolving at VDOT. For many assessment elements, this made specific technical improvement actions difficult to identify. Instead, the assessment identified general functionality areas to be explored through future efforts scoped to take a deeper dive into both user requirements and HMMS customization/configuration capabilities and limitations.

Assessment Findings:

Overall, the assessment confirmed that there were significant opportunities to both build knowledge and awareness of current capabilities as well as explore new system enhancements. Current and desired state practice benchmarks, as well as key themes and potential improvement actions are summarized by area.

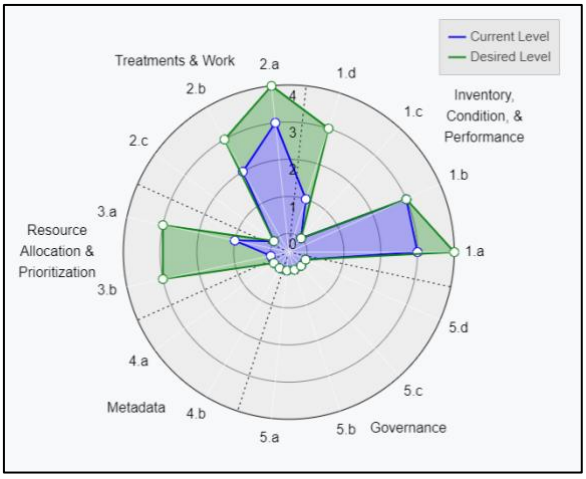
Area A: Specify and Standardize Data

Benchmarking

- Data models for inventory, condition, and work data are not standardized
- Limited capabilities to track linear assets and associated asset data
- Inconsistent understanding of analysis methodologies deployable within the system

Potential Improvements

- Establish formal standards and document supported methodologies
- Provide expanded capability to track linear assets and associated asset data



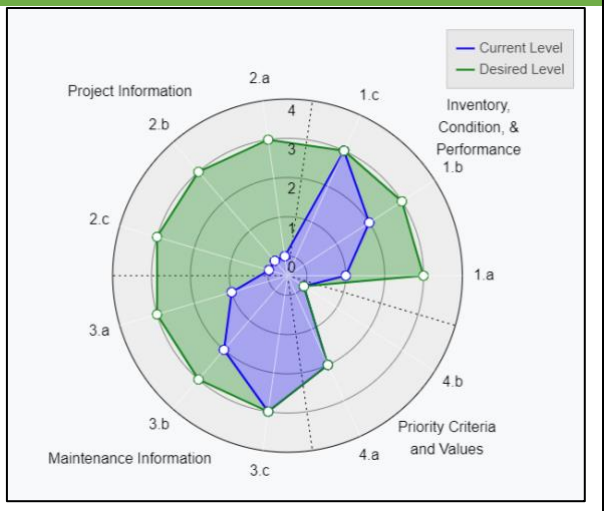
Area B: Collect Data

Benchmarking

- Standard QC/QA capabilities of the system are unclear
- Challenges with field connectivity

Potential Improvements

- Document asset data tracking and entry control capabilities
- Document asset data quality management capabilities (e.g., automated issue flagging and reporting, quality review workflows)



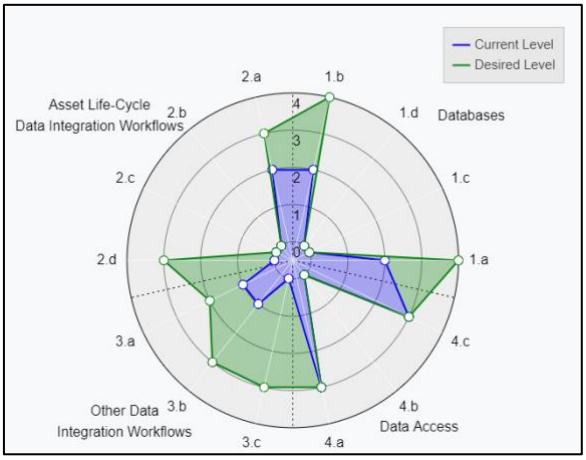
Area C: Store, Integrate, and Access Data

Benchmarking

- Barriers to enterprise access to HMMS data for reporting and analysis
- Inconsistencies with other system and contract data
- Gaps in supporting data

Potential Improvements

- Document existing integrations and data integration capabilities
- Integrate prioritized external datasets
- Add HMMS data to data warehouse



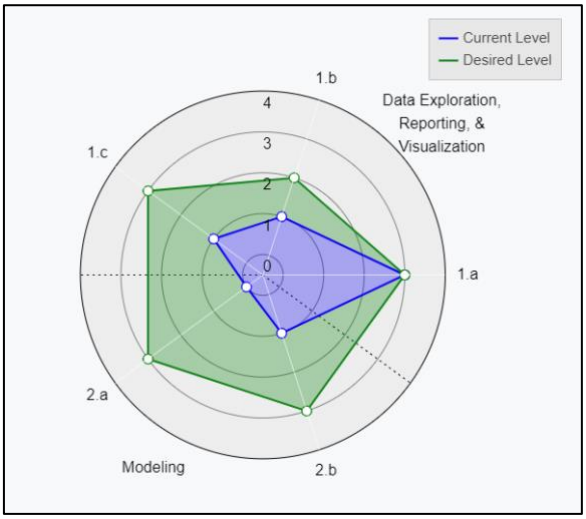
Area D: Analyze Data

Benchmarking

- Performance analysis capabilities are not fully aligned with desired decisions
- Need more user-friendly, accessible reporting
- Lack of understanding of and trust in analysis outcomes

Potential Improvements

- Document asset needs analysis and work prioritization capabilities
- Support standard reporting and analysis configuration and update



Area E: Act on Data

Benchmarking

- System not currently supporting full range of asset maintenance decisions.
- Lack of understanding of the systems decision-support tools and capabilities

Potential Improvements

- Improve alignment of analysis results with desired decisions
- Document and share decision-making best practices

Proposed Actions:

Action	Description
Document HMMS Inventory Tracking Capabilities	Document current HMMS capabilities and limitations for inventory data tracking, specifically addressing both "spot assets" (single point location) and "non-spot assets" (linear or area-based locations), addressing known needs, including: 1) spatial location referencing capabilities and data model requirements 2) LRS location referencing capabilities and data model requirements 3) multi-component asset modeling capabilities and limitations 4) inventory data processing/summary capabilities (e.g. roll up of data across components or elements into general asset classifications) 5) automated updates to inventory based on treatment/work history 6) office and field-based asset inventory management capabilities and limitations (create, read, update, and delete) Define process to create/update asset data model, define any automated processing/calculations and associated HMMS configuration steps. Provide templates and other standard documentation to support established processes.
Document HMMS Condition Tracking Capabilities	Document current HMMS capabilities and limitations for condition data tracking, addressing known needs for: 1) observations where asset inventory is not currently available 2) detailed, multi-component condition assessment limitations 3) condition data processing/summary capabilities (e.g. process detailed assessment information into summary measures (G/F/P, deficient/non-deficient) based on pre-defined rules) 4) combining observation capabilities (e.g. combining multiple assessments over time based on pre-defined rules) 5) segmentation of "non-spot" assets (e.g. assessment of a particular stretch of road but not a single point) 6) automate updates to condition data based on treatment/work history 7) office and field-based asset condition management capabilities and limitations (create, read, update, and delete)

Action	Description
Document HMMS Asset Treatment and Work Tracking Capabilities	Document current capabilities and limitations for treatment and work tracking, addressing known needs for: 1) standardizing asset activities and associated data collection 2) relating work to financials, equipment, employee, and organization 3) capturing work order relationships to one or more assets or locations 4) quantifying work on assets that are not inventoried 5) updating inventory or condition information based on work data 6) work summary capabilities (e.g. statewide performance measures, roll up detailed assessment information based on pre-defined rules) 7) defining default or recurring work schedules 8) identifying treatment recommendations based on inventory or condition data 9) office and field-based asset condition management capabilities and limitations (create, read, update, and delete)
Document HMMS Data Quality Management Capabilities	Document current capabilities and limitations to support standardized data quality management approaches, addressing known needs for: 1) Data validation and controls on initial data entry 2) QA/QC Analysis, Flagging, Updates through: - simple data quality rules - relational data quality rules - dataset level validations - location validation rules (spatial or location referencing-based) - workflow/timeliness rules 3) Regular data quality review and acceptance business processes
Identify HMMS Data Integration Capabilities	Document current capabilities and limitations for data integration, addressing known needs for: 1) non-HMMS asset inventory or condition data sources (e.g. ArcGIS Online/Portal apps, other systems, Interstate MRP) 2) non-HMMS planned work (e.g. paving schedules, SYIP, on-call contracts) 3) budget/allocation/expenditure data and chart of accounts (e.g. financial master data, Cardinal) 4) customer service center requests 5) other data (e.g. traffic, crash, functional classification)
Document HMMS Data Reporting Capabilities	Document current capabilities and limitations for data integration and reporting. Address known needs, such as internal user and enterprise data consumer reporting of: 1) inventory and/or component detail data 2) condition summary and/or detail condition data 3) work summary and/or detail work data 4) combined reporting of HMMS inventory, condition, and work history 5) quality management related data 6) data accessibility for enterprise reporting

Action	Description
Identify HMMS Analysis and Prioritization Support Capabilities	Document current capabilities and limitations to support asset needs analysis and work prioritization. Specifically address current applications and known needs, including: 1) using inventory and condition data to calculate relative priority (e.g., Low/Medium/High/Critical priorities) 2) incorporating past work accomplishments and planned work to adjust priorities 3) apply external data (e.g., network, traffic, crash data) to establish asset priorities 4) creating and applying lifecycle or condition/performance forecasting models to identify needs 5) comparing condition or work against established performance targets (by asset, by work type, by District or system, etc.) 6) leveraging external data analysis and business intelligence tools
Identify HMMS Decision-Support Support Capabilities	Document current capabilities and limitations to support asset or work prioritization. Specifically address current applications and known needs, including: 1) connecting decisions to maintenance performance measures 2) aligning HMMS decisions to available funding 3) identifying meaningful work priorities 4) monitoring asset lifecycle 5) estimating network-level needs (statewide, District-specific)
Develop HMMS Stakeholder Engagement Materials	Consolidate current capabilities documentation, related process documentation and supporting templates, examples, and instructions to support future asset data modeling by asset data stewards or similar business staff. Develop user engagement materials (e.g., HMMS use case vignettes/case studies, presentations, checklists, SharePoint sites) to support information sharing and access to support materials. Engage asset stewards and other motivated stakeholders to explore application of engagement material application to identify and develop specific system use cases. Work with these stakeholders to ensure and expand the usefulness of the materials and understand typical next steps (e.g., system configuration, IT support requests) and expand these materials as necessary to support anticipated activities.
Provide Stakeholder Engagement and Training	Leverage engagement materials to provide stakeholder training (through workshops, virtual meetings, etc.) necessary to raise awareness of HMMS capabilities and use expectations. Share current system capabilities, encourage active use and self-service (as applicable), and highlight opportunities and processes to expand system capabilities towards additional use cases.

Action	Description
Resource and Support Ongoing Use Improvement	Dedicate staff time and additional resources necessary to support requests for HMMS configuration and/or additional information sharing generated through stakeholder engagement. Regularly check in with asset stewards, system users, and district management to proactively identify user needs.