Stage 1 Business Analysis

California Department of Technology, SIMM 19A.3 (Ver. 3.0.9, 02/01/2022)

1.1 General Information

1. **Agency or State entity Name: 2660 - Transportation, Department of**

   If Agency/State entity is not in the list, enter here with the organization code.

   Click or tap here to enter text.

2. **Proposal Name and Acronym: Bridge Management System (BMS)**

3. **Proposal Description: (Provide a brief description of your proposal in 500 characters or less.)**

   The California Department of Transportation (Caltrans) is proposing the replacement of the existing Structure Maintenance Automated Report Transmittal (SMART) application in response to updated mandates outlined in Title 23 USC 144 Section 5. The current SMART system falls short of meeting the revised National Bridge Inspection Standards (NBIS) introduced by the Federal Highway Administration (FHWA) in 2022. This proposal seeks to establish a robust Bridge Management System (BMS) that satisfies the new data collection and reporting requirements, while integrating seamlessly with current workflows such as inspection, project development, load rating, maintenance design, and hydraulics. This initiative is an important step toward optimizing bridge asset management capabilities in compliance with the updated federal legislation.

4. **Proposed Project Execution Start Date: 12/30/2024**

5. **S1BA Version Number: Version 1**

1.2 Submittal Information

1. **Contact Information**

   Contact Name: Marisa Rey

   Contact Email: Marisa.Rey@dot.ca.gov

   Contact Phone: 916-203-4250

2. **Submission Type:** New Submission

   If Withdraw, select Reason: Choose an item.

   If Other, specify reason here: N/A

   Sections Changed, if this is a Submission Update: (List all sections changed.)

   N/A

   Summary of Changes: (Summarize updates made.)

   N/A

3. **Attach** Project Approval Executive Transmittal to your email submission.

4. **Attach** Stage 1 Project Reportability Assessment to your email submission.

1.3 Business Sponsorship

1. **Executive Champion (Sponsor)**

   Title: Division Chief, Division of Maintenance

   Name: Sergio Aceves

   Business Program Area: Maintenance

2. **Business Owner**

   Title: Deputy Division Chief, Structure Maintenance & Investigations

   Name: Vassil Simeonov

   Business Program Area: Structure Maintenance & Investigations (SM&I)

3. **Product Owner**

   Title: Senior Bridge Engineer, Office of Bridge Asset Management

   Name: Justin Alamares

   Business Program Area: Structure Maintenance & Investigations (SM&I)

1.4 Stakeholder Assessment

The Stakeholder Assessment is designed to give the project team an overview of communication channels that the state entity needs to manage throughout the project. More stakeholders may result in increased complexity to a project.

1. **Indicate which of the following are interested in this proposal and/or the outcome of the project. (Select 'Yes' or 'No' for each.)**

   State Entity Only: No

   Other Departments/State Entities: Yes

   Public: No

   Federal Entities: Yes

   Governor's Office: No

   Legislature: No

   Media: No

   Local Entities: Yes

   Special Interest Groups: No

   Other: No

2. **Describe how each group marked 'Yes' will be involved in the planning process.**

   Caltrans Structure Maintenance & Investigations (SM&I):

   SM&I will serve as the primary driver and leader of the planning process for this project. Their guidance and involvement will include:

   - Provide requirements and objectives based on anticipated business needs, including mandates from the FHWA NBIS, ensuring the project meets all regulatory requirements.
   - Identify key stakeholders to be engaged in the planning process and during the subsequent stages of the project.
   - Leverage strong working relationships developed with both Caltrans and local agency partners.
   - Plan for the data integrations with existing Caltrans programs such as the integrated Maintenance Management System (IMMS), Traffic Operations, and the Transportation Asset Management System (TAMS).
   - Outline the framework by which the output data from the new BMS will be used in various programs like the State Highway Operation and Protection Program (SHOPP), Caltrans

Major Maintenance Program (HM3), Senate Bill 1 (SB1), and Infrastructure Investments and Jobs Act (IIJA).

Federal Entities:

The FHWA establishes the regulations that governs the nationally required bridge/tunnel data that is collected.

Offer insight on the federal standards, regulations, and mandates, especially those associated with the FHWA NBIS and NTIS.

- Perform an annual audit on the data and inspection practices to ensure the project is aligned with national compliance standards.

Local Entities:

Local entities, while primarily adhering to Caltrans and FHWA guidelines, they play an important role in the bridge management system. Their insights, particularly their push towards digital inspection reports, significantly shape the program. They actively consume the information within the system, receiving investigation reports and work recommendations, and their ongoing engagement is crucial in ensuring that the program effectively serves the needs of all stakeholders.
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1.5 Business Program

1. **Business Program Name:** Structure Maintenance and Investigations (SM&I).

2. **Program Background and Context:** (Provide a brief overview of the entity's business program(s) current operations.)

   Under the FHWA's National Bridge Inspection Program (NBIP), the SM&I is responsible for inspecting the safety and integrity of about 25,000 bridges, half of which are directly owned by Caltrans. The inspection protocol involves collecting, updating, and verifying over 100 federally mandated data points and assessing the element level conditions for each structure. These operations, incepted as part of the Federal-Aid Highway Act of 1968, allow a comprehensive evaluation of bridge health and evaluation of different parts of a bridge's condition. In response to the Moving Ahead for Progress in the 21st Century Act (MAP-21), Caltrans collects data points that cover a range of appraisal and condition-related items, synthesizing multiple metrics to evaluate different parts of bridge health and longevity.

   The information gathered is critical in making informed decisions about bridge maintenance and repair. As part of this inspection program, the SM&I provides valuable recommendations to maintain and enhance bridge health. These recommendations are distributed to a variety of bridge owners, including Caltrans Districts, other state agencies, and local entities (Counties, Cities, etc.). For the state, these recommendations shape the District Maintenance crews' workload, influence the State Highway Operation and Protection Program (SHOPP) requirements, Highway Maintenance (HM3) program needs, Traffic Operations and permit route planning, Senate Bill 1 (SB1) program needs, Infrastructure Investment and Jobs Act (IIJA) needs, and the Transportation Asset Management System (TAMS).

   The SMART system, operational since 1997, has been instrumental in serving SM&I staff, Caltrans Districts, and various other authorized entities. This Oracle-based database facilitates a range of services including data entry, query, management, quality assurance, inventory, inspection

scheduling, and the automated calculation of structural adequacy and system performance indicators. It effectively supports the complete cycle of bridge data management for these stakeholders.

The revisions of the NBIS by the FHWA presents a significant challenge. Despite its robust functionality, the existing SMART system lacks the capability to incorporate the needed modifications to comply with these revised regulations.

3. **How will this proposed project impact the product or services supported by the state entity?**

   This project will have a far-reaching impact on the services offered by Caltrans, as it is crucial to ensuring compliance with the updated mandates. It will enhance the precision and quality of bridge health data, directly influencing multiple Caltrans forecasting programs, including the State Highway System Management Plan (SHSMP).

   The improved system will streamline the continuous flow of critical project program data, enabling Caltrans to determine bridge maintenance needs and associated budget allocations more accurately across the state. The data derived from this program is integral to infrastructure planning, maintenance, and state budgeting.

1.6 Project Justification

1. **Strategic Business Alignment**

   Enterprise Architect

   Title: Enterprise Architect

   Name: Jaswinder Saini

   Strategic Plan Last Updated? 1/4/2021

   Strategic Business Goal: Safety First

   Alignment: This proposal is primarily focused on enhancing the safety of the state's bridge infrastructure. By ensuring compliance with the NBIP mandates and enhancing the quality of bridge health data, Caltrans is taking concrete steps towards eliminating fatalities and serious injuries. Reliable data can identify potential safety issues early and address them proactively, thus reducing risks to the public. Additionally, the health and safety of Caltrans' employees is also at the forefront of this proposal. The improved bridge data will support accurate project planning and resource allocation, thus reducing potential workplace accidents during maintenance or inspection operations.

   Strategic Business Goal: Cultivate Excellence

   Alignment: The proposed upgrade of the SMART system reflects a commitment to fostering a culture of excellence. By modernizing this vital tool, Caltrans will enhance professional and leadership development, emphasizing a performance-driven workforce. This proposal will also strengthen internal and external relationships considering diverse perspectives during the

system design and development, ensuring a system effective for all users, thus fostering a culture of excellence within Caltrans.

Strategic Business Goal: Multimodal Network

Alignment: While this proposal primarily focuses on bridge infrastructure, it indirectly supports the multimodal network strategy by ensuring safe, reliable passage for vehicles, cyclists, and pedestrians on our bridges. The improved SMART system will allow the department to better use technology and data contributing to a more seamless multimodal travel experience.

Strategic Business Goal: Climate Action

Alignment: This proposal, while primarily focused on bridge health and safety, indirectly contributes to this goal. The new system will provide comprehensive data on bridge health, aiding in the identification of bridges that may be vulnerable to climate change impacts, such as extreme weather events and sea-level rise. This data can prioritize maintenance and upgrades, while strengthening the department's infrastructure's resilience to climate change.

Strategic Business Goal: Equity and Livability

Alignment: The proposed improvements to the SMART system will greatly enhance Caltrans' ability to maintain the safety and integrity of bridges across all communities in the state. This initiate underscores the department's commitment to reducing transportation-related disparities, as it allows for efficient, data-driven allocation of maintenance and improvement efforts.

Mandate(s): Federal

Bill Number/Code, if applicable: 23 Code of Federal Regulations Part 650

Add the Bill language that includes system-relevant requirements:

Section 650.315

(a) Each State transportation department, Federal agency, or Tribal government must prepare and maintain an inventory of all bridges subject to this subpart. Inventory data, as defined in Section 650.305, must be collected, updated, and retained by the responsible State transportation department, Federal agency, or Tribal government and submitted to FHWA on an annual basis or whenever requested. For temporary bridges open to traffic greater than 24 months, inventory data must be collected and submitted per this section. Inventory data must include element level bridge inspection data for bridges on the NHS (National Highway System) collected in accordance with the "Manual for Bridge Element Inspection" (incorporated by reference, see Section 650.317). Specifications for collecting and reporting this data are contained in the "Specifications for the National Bridge Inventory" (incorporated by reference, see Section 650.317).

2. Business Driver(s)

Financial Benefit: Yes

Increased Revenue: No

Cost Savings: No

Cost Avoidance: Yes

Cost Recovery: No

Will the state incur a financial penalty or sanction if this proposal is not implemented? Yes

If the answer to the above question is “Yes,” please explain:

As part of the governing regulation, failure to comply with this regulation may result in a redirection of 10% of the federal project funds apportioned to the State (Caltrans) under Sections 119 and 133 to correct the non-compliance with the inspection standards established under 23 U.S.C. Section 144 (5). SM&I is approximately 88% funded by Federal funds.

Improvement

Better Services to the People of California: Yes

Efficiencies to Program Operations: Yes

Improved Equity, Diversity, and/or Inclusivity: Yes

Improved Health and/or Human Safety: Yes

Improved Information Security: Yes

Improved Business Continuity: Yes

Improved Technology Recovery: Yes

Technology Refresh: Yes

Technology End of Life: Yes

1.7 Business Outcomes Desired

Executive Summary of the Business Problem or Opportunity:

With the recent release of new FHWA regulations in May 2022, significant changes to the NBIP demand critical changes to the existing Bridge Management System (BMS), known as SMART. Developed in the mid-1990s, SMART is an Oracle-based database and user platform providing SM&I staff with distributed network access to a wide variety of bridge data.

SMART application modules support the complete lifecycle of bridge data management, encompassing inventory and condition data, inspection scheduling and tracking, quality assurance/quality control data review, and bridge maintenance/preservation project tracking. Housing all bridge characteristics, condition data, engineering evaluations, maintenance work history, and inspection results, SMART has served as SM&I's primary resource for information about bridges and Caltrans's official BMS. However, to comply with the enhanced requirements of the new federal mandates, a new BMS technology solution is needed. This proposal would not only replace the existing functions of SMART with modern asset management software but also cater to the revised requirements of the Code of Federal

Regulations (CFR), which include increased bridge data collection and reporting requirements.

However, in light of the new FHWA mandates, the existing BMS application needs an urgent overhaul. These Federal mandates require the implementation of a technology solution capable of handling increased bridge data collection and reporting requirements by March 2025. The failure to meet this deadline will not only jeopardize compliance with Federal regulations but could also result in severe penalties and loss of federal funding. This proposal aims to replace the current functions of SMART with a more advanced application to ensure full compliance with the updated requirements of the CFR.

Additionally, while SMART has been instrumental in bridge management and inspection data collection and bridging data gaps, after over two decades of operation, a significant risk is the reliance on a single Subject Matter Expert (SME) to administer, develop, and support the current system. This individual possesses deep institutional knowledge about the system's functionality and modules, much of which is undocumented. The absence of formal documentation on SMART amplifies this risk as the nuanced understanding and intricate changes to the system remain undocumented. Efforts have been made to train additional staff, but the inherent complexity of in-house developed modules and system modifications pose significant challenges. Loss of this resource would not only disrupt system support but also lead to a substantial loss of institutional knowledge. Transitioning to a new system with thorough documentation will help mitigate this risk.

The new BMS is intended to seamlessly integrate with the existing project planning, load rating, maintenance design, district bridge crew work, and traffic ops systems. It will enable SM&I's inspection teams to operate remotely, staying connected to the BMS while in the field. The system will be built on a platform compatible with multiple devices, including laptops, mobile tablets, and mobile phones.

The successful implementation of this new system will provide the department with a robust and flexible tool for the future management of bridge assets. It will provide multiple paths to view or modify bridge data and help with integrations from various Caltrans legacy or incoming data sources, meeting SM&I's internal strategic requirements.

Objective ID: 1.1

Objective: Upgrade the BMS to comply with the 2022 NBIS (CFR) data collection requirements of the NBIS (CFR). This involves migrating the existing NBI dataset to the new SNBI dataset, undertaking 1:1 data transition, partial data transition, and new data collection.

Metric: Number of data fields (NBI/SNBI) per bridge

Baseline: Current BMS NBI data fields: 116

Target Result: Total BMS SNBI data fields: 154

Objective ID: 1.2

Objective: Meet the new inspection reporting requirements of the revised FHWA regulation. As of May 2022, the FHWA has revised the reporting metric for finalizing bridge data changes to 90 days after inspection.

Metric: Number of days after bridge inspection

Baseline: Current final data modification post-inspection period: 90 or 180 days (state/local)

Target Result: Finalize all bridge data within 90 days post-inspection within one year of implementation.

Objective ID: 1.3

Objective: Ensure alignment with new inspection interval policies that fulfill the 23 CFR 650.311.regulation requirements, specifically addressing the new acceptance criteria for 48-month inspection interval. The current regulation for criteria acceptance of a 48-month inspection interval will expire in 6/2024.

Metric: Inspection frequency (months)

Baseline: 0 (The current system lacks capability to meet the new criteria)

Target Result: The system's ability to apply the new 48-month inspection frequency criteria to all bridges successfully within 6-months of implementation.

Objective ID: 2.1

Objective: Enhance and expand legacy data integrations with Caltrans systems to support two-way data flows within 18-months of implementation.

Metric: Number or % of Caltrans workflows with successful two-way data integration.

Baseline: 0 (All existing workflows are one-way data integration.)

Target Result: Implement two-way data integrations between IMMS, TAMS, Load Ratings, and other Caltrans programs.

Objective ID: 2.2

Objective: Improve efficiency of field data collection to enhance inspector safety while maintaining or improving data quality.

Metric: Post Implementation feedback (survey) on the effectiveness of the new data input feature from inspectors.

Baseline: Not available. Current system lacks optimized data input features, and there is no quantifiable baseline for measuring efficiency.

Target Result: Achieve positive feedback from at least 70% of inspectors on the effectiveness and efficiency of the new processes within 18-months of implementation.

Objective ID: 3.1

Objective: Ensure software compatibility and secure access across modern web browsers and devices.

Metric: Compatible with key modern web browsers (Google Chrome, Firefox, Safari, and latest Microsoft Edge) and devices.

Baseline: Microsoft Edge in IE Compatibility Mode

Target Result: Within 12-months of implementation, the system is compatible with key modern web browsers (Google Chrome, Firefox, Safari, and latest Microsoft Edge), and devices being

used by SM&I (laptops, tablets, and smartphones) meeting industry standard and departmental security protocols.

Objective ID: 4.1

Objective: Convert current existing bridge measurement data from metric units to imperial units (feet and inches), in accordance with the new FWHA regulation.

Metric: Percentage of data fields successfully converted to imperial units.

Baseline: 0% (All data in metric units.)

Target Result: 100% of bridge data fields converted to imperial units without loss of precision or accuracy within 12-months of implementation.

1.8 Project Management

1. **Project Management Risk Score:** 0.6

(Attach a completed Statewide Information Management Manual (SIMM) Section 45 Appendix A Project Management Risk Assessment Template to the email submission.)

2. **Project Approval Lifecycle Completion and Project Execution Capacity Assessment**

   Does the proposal development or project execution anticipate sharing resources (state staff, vendors, consultants, or financial) with other priorities within the Agency/state entity (projects, PALs, or programmatic/technology workload)?

   Answer: Yes

   Does the Agency/state entity anticipate this proposal will result in the creation of new business processes or changes to existing business processes?

   Answer (No, New, Existing, or Both)**:** Both New and Existing Processes

1.9 Initial Complexity Assessment

1. **Business Complexity Score:** 2.2

(Attach a completed SIMM Section 45 Appendix C to the email submission.)

2. **Noncompliance Issues:** (Indicate if your current operations include noncompliance issues and provide a narrative explaining how the business process is noncompliant.)

   Programmatic regulations: Yes

   HIPAA/CIIS/FTI/PII/PCI: No

   Security: Yes

ADA: Yes

Other: Yes

Not Applicable: No

Noncompliance Description:

Currently, the SMART application is not in compliance with new FHWA regulations established as of May 2022 (23 CFR Part 650). Given the reliance on MS Internet Explorer in compatibility mode and Oracle Forms, security and ADA compliance is also an issue.

3. **Additional Assessment Criteria**

If there is an existing Privacy Threshold Assessment/Privacy Information Assessment, include it as an attachment to your email submission.

How many locations and total users is the project anticipated to affect?

Number of locations: 3 Caltrans HQ Locations, 12 Districts

Estimated Number of Transactions/Business Events (per cycle): 15,000 per year Approximate number of internal end-users: 250+ (existing)

Approximate number of internal end-users: 250+ (existing)

Approximate number of external end-users: Potentially up to 1,000 (Currently 488 active Agencies)

1.10 Funding

Planning

1. Does the Agency/state entity anticipate requesting additional resources through a budget action to ***complete planning*** through the project approval lifecycle framework? No

If Yes, when will a budget action be submitted to your Agency/DOF for planning dollars?

N/A

2. Please provide the Funding Source(s) and dates funds for planning will be made available:

Internal Division based funding

Project Implementation Funding

1. Has the funding source(s) been identified for ***project implementation***? Yes

If known, please provide the Funding Source(s) and dates funds for implementation will be made available:

Internal Division based funding

Will a budget action be submitted to your Agency/DOF? No

If “Yes” is selected, specify when this BCP will be submitted: N/A

2. Please provide a rough order of magnitude (ROM) estimate as to the total cost of the project: Less than $10 Million

End of agency/state entity document.

Please ensure ADA compliance before submitting this document to CDT.

When ready, submit Stage 1 and all attachments in an email to ProjectOversight@state.ca.gov.

Department of Technology Use Only

Original “New Submission” Date: 01/29/2024

Form Received Date: 01/29/2024

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Form Disposition: Approved

If Other, specify: Click or tap here to enter text.

Form Disposition Date: 01/29/2024

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