Project Management Plan

Next Generation Traffic Management Data Dictionary (NG TMDD) Standardization

August 16, 2022

PMP in support of:	Task Order No. HOIT220105PR
For approval by:	Deborah Curtis, Highway Research Engineer Federal Highway Administration
For use by:	Siva Narla, Senior Director, Transportation Technology Institute of Transportation Engineers
	Co-Chairs – TBD.
	Members of the TMDD Steering Committee
	Consulting Team for the NG TMMD Standard Project
Prepared by:	Douglas Benison, Patrick Chan, P.E., and Manny Insignares Consensus Systems Technologies Corp. (ConSysTec)

CHANGE HISTORY

Date	Version	Note
07/18/22	v01	Initial Draft Project Management Plan (PMP)
7/19/02	V01	QA by Chan and Insignares
8/16/2022	V1.01	Deliver to USDOT

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1 PURPOSE OF THE PROJECT MANAGEMENT PLAN

This document defines a Project Management Plan (PMP) for the project Next Generation Traffic Management Data Dictionary (NG TMDD) Standardization, under the United States Department of Transportation (USDOT) Task Order No. HOIT220105PR, awarded to the Institute of Transportation Engineers (ITE). This PMP establishes a common understanding of the management of the project for:

a) The USDOT Intelligent Transportation Systems (ITS) Joint Program Office (JPO) who is sponsoring the work;

b) The Standard Development Organizations (SDOs) overseeing the development, specifically ITE and the American Association of State Transportation and Highway Officials (AASHTO);

c) The consulting team contracted to perform the work; and

d) The consultants, manufacturers, and public transportation professionals who participate in the NG TMDD Steering Committee (SC) which will use the deliverable items specified in this PMP.

This PMP conforms to the Project Management Plan Template found in Technical Exhibit 4 of the Task Order Proposal Request (TOPR) for the project. It includes plans for scope management, communications, deliverables and milestones, quality management, and human resource management. Portions of this PMP may be updated during the course of the project if the management team or the USDOT determines that modification would significantly facilitate the project management functions. The PMP is not intended to be a progress tracking tool or to be modified for minor changes in schedule once the project has started.

1.1 Background of Project

The original scope of the TMDD standard outlined more than 20 years ago focused on support for coordinated Transportation Management Center (TMC) operations. The standard included a common set of Information Layer messages and dialogs to enable TMCs to share information about roadway events and device status and coordinate with National Transportation Communications for ITS Protocol (NTCIP) standards to define how the information could be carried at the Application, Transport, and Subnetwork Level Layers.

The current TMDD (TMDD v3.1) is a mature standard, but needs to evolve to address new and emerging operational needs and industry trends. The most notable of these trends is the emergence and role of private non-infrastructure owner/operators that collect and manage real-time transportation data. There is a need to share more granular data using a Systems to Systems approach to support multiple entities to achieve common operational goals. One key missing ingredient, however, is locational accuracy where lane-specific details about an event or device are required in addition to having a map (sometimes provided by a 3rd Party) that provides high precision position information about the transportation infrastructure. Early electronic maps were rudimentary at the onset compared to today's maps, and operations staff had to know the road network well to compensate for limited resolution and data gaps. TMDD messages and data elements were originally designed to share general information on roadway event types (e.g., incidents, construction) rather than share information on the specific details of an event, such as identifying the specific lane where an incident occurred on a map.

Other industry and agency concerns to be addressed by NG TMDD include:

- TMDD does not align with the Traffic Incident Management (TIM) model;
- TMDD is unable to define the complexity of work zone data (such as temporal details and geographic accuracy);
- TMDD is unable to exchange discrete microscopic data at the unit vehicle level as the TMDD is designed to exchange aggregate (macroscopic) data; and
- TMDD is not designed for data from mobile sources (such as roadway weather data from snowplows), probe data, mobile/portable dynamic message signs, or connected vehicles.

New encoding and protocol technologies are available to help address these concerns. JSON (Javascript Object Notation) for example, is a relatively new encoding technology that is text based similar to eXtensible Markup Language (XML), but simpler to implement and use with Java and Javascript objects. JSON is frequently used in conjunction with REST (Representational State Transfer) as a protocol technology that uses Hypertext Transfer Protocol (HTTP). New initiatives, such as the Work Zone Data Exchange (WZDx) and Connected Vehicle Pooled Fund Study (CVPFS) have started using these technologies. Recently, JSON and REST (JSON/REST) have largely replaced XML/Web Services, while GeoJson can be used to describe roadway geometry impacted by impediments such as incidents, construction, and work zones. These new protocols for information sharing have evolved to address exchanging large quantities of data in real-time.

Currently, TMDD v3.1 is available on the ITE website in two volumes: Volume 1 includes the Concept-of-Operations and Requirements, while Volume 2 includes the Design Content for Dialogs, Messages, and Data Elements in XML format. A new NG TMDD standard will need encoding schemes similar to that of XML schemes currently specified as well as new schemes to accommodate emerging operational needs. In addition, the new standard will need to replace the NTCIP protocols (NTCIP 23xx) currently referenced by TMDD. To the extent possible, backward compatibility with NTCIP 23xx will be maintained so legacy systems can use the new TMDD messages developed. The following work statement will identify the steps necessary to develop a non-proprietary, industry-based consensus NG TMDD standard as a modification to the current two volume format.

Under this task order, the ITE will:

- Provide project management of all tasks described in the Performance Work Statement (PWS) for Task Order No. HOIT220105PR, Next Generation Traffic Management Data Dictionary (NG TMDD) Standardization.
- Identify and engage the services of a qualified ITS system engineer(s)
- Develop an NG TMDD Standard Concept of Operations (ConOps) draft, including detailed use cases and user needs, culminating in a NG TMDD Standard ConOps walkthrough.
- Develop an NG TMDD System Requirements Specifications (SRS) draft, including detailed requirements and full user need to requirements traceability, culminating in a NG TMDD Standard SRS walkthrough.
- Develop an NG TMDD Standard System Design Details (SDD) draft, including detailed design dialogs, messages and data elements with full user need to requirements to design traceability, culminating in a NG TMDD Standard SDD walkthrough.
- Publish an NG TMDD Standard that has achieved consensus in accordance with the SDOs approval processes.
- Accomplish this same set of tasks for the next evolution of the NG TMDD Standard

1.2 Objective

The primary objective of this task order is to publish a non-proprietary, industry-based consensus standard for the NG TMDD. The final output will be a published standard that supports center-to-center (C2C) communications and interfaces with data centers to include: 3rd party data providers, connected vehicle data, harmonization with traffic incident management metrics and work zone data, and bringing up-to-date the data exchange methods and data formats specified in the standard with technologies being used in modern deployments

1.3 Purpose of the Scope Management Plan

This Scope Management Plan establishes the scope management approach and processes as they pertain to scope description, verification and control measures. It establishes the processes which ensure that the NG TMDD Project includes all of the work required to complete the project while excluding all work that is unnecessary.

2 SCOPE STATEMENT

2.1.1 Project Scope Description

The subsections below describe the project activities listed in the Gantt Chart in Section 4.3, Project Schedule. The project follows a systems engineering process and explicitly incorporates layers of review and modification of the deliverable documents corresponding to the NTCIP Standards consensus process. Each of the major project tasks are listed below with the objectives, approach and deliverables identified. Specific TOPR tasks are identified in brackets (i.e. [TOPR Task #]). Specific TOPR deliverables are identified as such (i.e. [TOPR Deliverable]).

2.1.1.1 Task 1 Project Management [TOPR Task 1]

Approach

The ITE project team will participate in a "kick-off" meeting with the USDOT and its representatives to ensure that all parties have a clear understanding of the requirements of the Performance Work Statement (PWS) and the USDOT's expectations for the project. The kick-off meeting will take place within 45 working days of the Task Order Award Date.

Deliverables

- Kick-off Meeting

2.1.1.1.1 Task 1.1 Monthly Progress Report [TOPR Task 1.1]

Approach

ITE will provide monthly progress reports. Each monthly progress report will include:
- Monthly Status Reports – In accordance with the IDIQ Contract Section C.4.10.1.
- Project Schedule – In accordance with the IDIQ Contract Section C.4.10.1.
- Risk Register – In accordance with the IDIQ Contract Section C.4.10.1.

ITE will also submit invoices according to the specified monthly period addressing work completed and hours expended. ITE will submit invoices in accordance with the invoice guidance and billing Instructions.

ITE will also attend progress meetings with USDOT. The Task Order Contracting Officer's Representative (TOCOR), and other USDOT personnel, as appropriate, may meet periodically with ITE to review ITE's performance of this PWS. At these meetings, the Contracting Officer (CO) will apprise ITE of how the government views ITE's performance and the ITE will apprise the TOCOR and CO of any problems being experienced. Appropriate action will be taken to resolve outstanding issues.

Deliverables

- Progress Reports [TOPR Deliverable]
- Invoice Reporting
- Progress Meetings

2.1.1.1.2 Task 1.2 Project Management Plan (PMP) [TOPR Task 1.2]

Approach

ITE will provide a PMP based on Technical Exhibit 4, Project Management Plan Template in the PWS, and modified as needed. The PMP will also provide a detailed project schedule in Microsoft Project format, listing all milestones and project management activities. The project schedule will be delivered a minimum of 10 working days prior to the kick-off meeting.

The PMP describes the overall approach to managing the efforts described in this SOW, and coordinating the work performed by all team members. The PMP will contain the following:

- **Scope Management Plan.** Describes the tasks to be performed and the approach to performing these tasks.
- **Team Management Plan.** Describes the overall structure of the project team, explain the roles and responsibilities of all key individuals, and describe the reporting relationships among the Project Management Team and the Consultant Team, collectively known as the "Project Team". The Team Management Plan will include the resumes of all key personnel, representing domain experts and a qualified technical editor. The Team Management Plan and team members are subject to USDOT approval as part of the overall approval of the PMP.
- **Quality Management Plan.** Describes the quality management efforts and how it will ensure that the documents submitted as deliverables herein, will:
    - contain suitable material for the target audience
    - be organized in presentation
    - contain proper word use and English diction
    - contain detailed illustrations
    - be comprehensive, complete and correct
    - be edited for grammatical and editorial errors

  The Quality Management Plan is subject to USDOT approval as part of the overall approval of the PMP.
- **Communications Management Plan.** Describes how ITE will coordinate their efforts with the USDOT, particularly the TOCOR and the CO. The Communications Management Plan will also describe how ITE will work with SAE International to develop and review all major sections of the standard.
- **Detailed Project Schedule.** ITE will prepare a detailed project schedule, in Microsoft Project, that lists all of the planned tasks and milestones for the project. The Project Schedule will address all project management and project engineering management activities. The detailed project schedule will reflect a work breakdown structure (WBS) comprised of at least three levels. A pdf version of the schedule will be included in the PMP. ITE will provide an updated Project Schedule, reflecting actual work performed, with every Monthly Progress Report that it submits. The monthly updated Project Schedule will reflect both the base lined task start and end dates and the actual start and end dates for each task in the Project Schedule. The project schedule will be provided in both Microsoft Project and Adobe Acrobat format backwards compatible to Adobe Acrobat version 6.0.

Deliverables

- Draft PMP
- Final PMP [TOPR Deliverable]

2.1.1.1.3 Task 1.3 Systems Engineering Management Plan (SEMP) [TOPR Task 1.3]

Approach

ITE will develop a SEMP, using IEEE Std. 1220-2005 as guidance. The SEMP will contain the following:

- **Configuration Management Plan.** Identifies an initial set of outputs that will form a baseline and defines the process for managing the configuration of the baseline outputs.
- **Verification and Validation Plan.** Defines the procedures on how the outputs of this project will be checked to confirm the document is complete and correct, and satisfies the needs identified.
- **Risk Management Plan.** Documents risks that might affect the project and the characteristics of the risk. Types of risks that must be considered include risks potentially impacting: technical, project schedule, scope, and costs. A Risk Management Log will be maintained on an on-going basis during the entire period of performance to track risks, mitigation plans, and status. Each risk will have a unique number, probability of occurrence and impact of occurrence rating.

ITE may revise the approved version of the PMP, SEMP, and schedule only with pre-approval from the TOCOR and CO and will deliver, to the TOCOR and CO, any modified version within 10 working days after receiving TOCOR and CO approval.

Once the draft PMP, SEMP, and schedule are ready for review, ITE will schedule a kick-off meeting with the USDOT and its representatives to review each document and ensure that all parties are in agreement on the overall approach to project execution.

ITE will place the revised version of each contract deliverable (including the detailed project schedule) under document configuration control, with version numbers assigned to each document. All documents submitted to, and approved by, USDOT will be assigned a unique version number.

Authorization to proceed to the remaining tasks is pursuant to the TOCOR's written approval of the PMP and SEMP.

Deliverables

- Draft SEMP
- Final SEMP [TOPR Deliverable]

2.1.1.2 Task 2 Develop the NG TMDD Standard [TOPR Task 2]

Overall Objective

Develop a NG TMDD Standard that builds on the TMDD v3.1 Standard.

Approach

ITE will consider in the near-term relevant advances in technologies since the initial creation of TMDD v3.1 and assess issues and integrate lessons learned from current deployments and comments and recommendations from those Infrastructure Owner Operators (IOO) and other data consumers and producers that are either current TMDD users or are interested in becoming TMDD users. The NG TMDD Standard will develop an approach to address the use of the legacy TMDD v3.1 and describe a pathway to simplify testing and adoption of changes for the longer term without compromising interoperability.

2.1.1.2.1 Task 2.1 Develop the NG TMDD Standard ConOps [TOPR Task 2.1]

Approach

ITE will develop a draft Concept of Operations (ConOps) for developing a NG TMDD Standard Concept of Operations (ConOps) following the guidance of NTCIP 8002 Annex B-1 and IEEE Std. 1362-1998. After the draft ConOps is complete the ITE and their selected subcontractors will hold a walkthrough based on IEEE Std. 1028-1997.

Deliverables

- NG TMDD Standard ConOps

2.1.1.2.2 Task 2.1.1 TMDD Steering Committee [TOPR Task 2.1.1]

The ITE will convene a TMDD Steering Committee (SC) or other Transportation Data Sharing (e.g. – Connected Transportation Interoperability (CTI) data sharing type committee) consistent with its standards development process.

Approach

The TMDD SC will include a wide variety of members including those with experience: relevant to either the development and/or implementation of the legacy TMDD, third party data provides (e.g. Waze), other data sharing efforts (e.g., Work Zone Data Exchange (WZDx)), and any other IOOs or data producers and consumers interested in using the TMDD. As the NG TMDD standard will likely touch on connected vehicle messaging capabilities, the SC will ensure that a subject matter expert (SME) from SAE International has the opportunity to participate in all of the TMDD SC activities and document reviews

Deliverables

- NG TMDD Standards Working Group Roster (i.e., TMDD SC Roster) [TOPR Deliverable]

2.1.1.2.3 Task 2.1.2 Develop Draft Concept of Operations (ConOps) [TOPR Task 2.1.2]

Approach

ITE will review the TMDD v3.1, relevant NTCIP standards, SE documentation from new Work Zone Data Initiatives (WZDx) and CVPFS (CV Data Framework API) initiatives, WZDx Specification, the CalTrans TMDD Modernization documents and lesson learned from CV Pilot projects (i.e., Wyoming CV Pilot).

ITE will take the following steps in drafting the draft version of the ConOps:

- Interview key stakeholders as part of the research process to gain an understanding and develop additional use cases (scenarios) and user needs.
- A stakeholder list will be developed and must be approved by USDOT prior to conducting the interviews.
- Develop a questionnaire to be used during stakeholder interviews. ITE will deliver a draft version of the questionnaire to USDOT for review and comment. The questionnaire will be finalized for use within 10 working days of receiving comments from the USDOT. After the questionnaire is approved by the USDOT, it will be used in the Stakeholder interviews.
- ITE will develop a draft ConOps for the NG TMDD Standard. IEEE Std. 1362-1998 is the document that will be used for guidance in this area.
- Develop the user needs for the NG TMDD Standard. These user needs will be derived from the research and interview activities. The needs developed will meet the test of being “well-written.” Technical Exhibit 5 in the PWS includes a definition of a “well-written” need. The ConOps will describe expected technical, environmental, and institutional constraints for the system of interest. The ConOps will provide system concepts (including a high-level discussion of technical and non-technical requirements), operational scenarios, and the rationale for key concept decisions.
- Develop a context diagram as part of the ConOps that shows the environment the NG TMDD will work in and any possible options in the high-level architecture. The ITE will deliver a NG TMDD Standard ConOps Draft to the TMDD SC and USDOT to be used during the walkthrough defined in the following subtask.

Deliverables

- Draft NG TMDD Standard ConOps [TOPR Deliverable]

2.1.1.2.4 Task 2.1.3 Walkthrough on Draft Concept of Operations [TOPR Task 2.1.3]

Approach

In consultation with the TOCOR, ITE will prepare a list of knowledgeable SMEs comprised of industry stakeholders to invite to attend a face-to-face review of the draft ConOps. SMEs include stakeholders such

as USDOT, State and local transportation agencies; TMC operations experts; ITS telecommunications experts; connected vehicle program experts; infrastructure owner operators (IOO) and 3rd party providers or consumers that have participated in C2C communication projects; new users of TMDD that use new technologies such as Caltrans for connected corridors, and relevant other SDOs and working groups such as CVPFS, CV Pilots, WZDI and users of the WZDx specification.

A formal walkthrough is a proven method to validate the user needs and system concepts for the proposed standard. ITE will lead a walkthrough of the Draft ConOps document at a face-to-face meeting with the TMDD SC and additional invited SMEs, in which additional stakeholders are invited to participate.

The purpose of the walkthrough is to allow the TMDD SC and stakeholders to provide comments on the concepts in the ConOps document from a functional, technical, management, and implementation perspective. The ConOps Walkthrough Plan will be based on IEEE Std. 1028- 1997. ITE will implement the walkthrough plan once approved by USDOT. ITE will submit a draft walkthrough plan for approval by USDOT 20 working days prior to the planned walkthrough and will update the Plan based on USDOT comments.

ITE will handle all arrangements for the walkthrough, including the invitations, distributing a walkthrough workbook and draft document (for review) in advance, registrations, travel reimbursement, note taking, and coordination of the walkthrough. In consultation with USDOT, the walkthrough will be conducted at a location and time that facilitates the largest participation from the key stakeholders, and provide a web-enabled conference call for those who cannot participate in person.

The ConOps walkthrough is estimated to require approximately two full days. During the walkthrough, a walkthrough workbook will be developed and revised and edited with stakeholder's comments in real-time during the walkthrough. ITE will deliver a 'Walkthrough Comment Resolution" report which details each walkthrough comment and the Team's recommended resolution.

Deliverables

- Draft ConOps Walkthrough Plan
- Final ConOps Walkthrough Plan [TOPR Deliverable]
- ConOps Walkthrough Comment Resolution Report [TOPR Deliverable]

2.1.1.2.5 Task 2.2: Develop NG TMDD Standard System Requirements [TOPR Task 2.2]

Approach

ITE will develop a NG TMDD Standard System Requirements Specification (SRS) Document following the guidance of NTCIP 8002 Annex B-1 and IEEE Std. 1362-1998. The draft SRS will have full traceability between user needs and requirements. After the draft SRS is complete a walkthrough based on IEEE Std. 1028-1997 will be held.

Deliverables

- NG TMDD Standard System Requirements Specification (SRS) Document

2.1.1.2.6 2.2.1: Develop Draft NG TMDD Standard System Requirements [TOPR Task 2.2.1]

Overall Objectives

- Develop a Draft NG TMDD Standard System Requirements Specification.

Approach

ITE will develop a System Requirements Specification (SRS) document based on the ConOps, following the guidance of IEEE Std. 830-1998. The SRS will contain a Protocol Requirements List (PRL) that is conformant to NTCIP 8002 Annex B1. The PRL is a table that provides a mapping from each need to its associated requirement. The requirements documented in the SRS will meet the test of being "well-formed" requirements based on Technical Exhibit 5 listed in the PWS.

ITE will ensure that relevant requirements identified in TMDD v3.1 exist within this draft and have the proper traceability to user needs. Any requirements not included from the TMDD v3.1 will be identified with the rationale for why they were not included.

To shorten the schedule to include a validation phase (Task 3), the SRS is proposed to focus only on the high priority needs as identified by the TMDD SC. By focusing on only high priority needs, the project results in a standard that can be published in less than 2 years, which is helpful to agencies that are already deploying or planning to deploy systems that require data exchanges within the scope of NG TMDD. Requirements to satisfy the non-high priority needs will be addressed in Task 4.2.

Deliverables

- Draft NG TMDD Standard SRS [TOPR Deliverable]

2.1.1.2.7 Task 2.2.2: Walkthrough on Draft System Requirements Specification [TOPR Task 2.2.2]

Approach

In consultation with the TOCOR, the ITE will prepare a list of knowledgeable SMEs comprised of stakeholders (USDOT, State and local transportation agencies; TMC operations experts; ITS telecommunications experts; connected vehicle program experts; IOOs and 3rd party providers or consumers that have participated in C2C communication projects, new users of TMDD that use new technologies such as Caltrans for connected corridors, and relevant other SDOs and working groups such as CVPFS, CV Pilots, WZDI and users of the WZDx specification) to invite to attend a face-to-face review of the draft SRS. The SMEs will provide comments on the requirements from a functional, technical, management and implementation perspective.

In consultation with the TOCOR, the ITE will arrange for a time and facility where the walkthrough will take place. ITE will be responsible for invitations, distributing advance material including the current ConOps, draft SRS, registrations, note taking, and coordination of the walkthrough.

IEEE Std. 1028-1997 is the document that will be used for guidance in planning the walkthrough. A SRS Walkthrough Plan will be prepared and provided to USDOT for approval at least 30 days prior to the scheduled walkthrough.

As part of this task, the ITE will deliver a SRS Walkthrough Comment Resolution Report which details each walkthrough comment and the ITE's recommended resolution within 10 working days after the completion of the SRS Walkthrough.

Deliverables

- SRS Walkthrough Plan [TOPR Deliverable]
- SRS Walkthrough Comment Resolution Report [TOPR Deliverable]

2.1.1.2.8 Task 2.3: Develop NG TMDD Standard System Design Details [TOPR Task 2.3]

Approach

ITE will develop an NG TMDD Standard System Design Details (SDD) Document following the guidance of NTCIP 8002 Annex B-1 and IEEE Std. 1362-1998. The draft SDD will have full traceability between user needs, requirements and design elements. After the draft SDD is complete ITE will hold a walkthrough based on IEEE Std. 1028-1997

Deliverables

- NG TMDD Standard System Design Details (SDD) Document

2.1.1.2.9 Task 2.3.1: Develop Draft NG TMDD Standard System Design Details. [TOPR Tasks 2.3.1]

Overall Objectives

- Develop a System Design Description (SDD) section in the standards document based on the ConOps and SRS.

Approach

ITE will develop a System Design Details (SDD) document based on the ConOps and SRS. IEEE Std. 1016-1998 is the document that will be used for guidance in this area. ITE will document the design solution for each requirement developed in the previous tasks. The SDD will specify the content, constraints on formats, timing, and other factors needed.

ITE will include a Requirements Traceability Matrix (RTM) in the SDD. The RTM is a table that provides a mapping from each requirement to its associated design content. The RTM will be conformant with NTCIP 8002 Annex B1.

it is expected that parts of the SDD will be completely rewritten from TMDD v3.1. Although many of the data elements to fulfill the requirements in the SRS may remain the same, the format(s) for those data elements may be presented differently. The design details for TMDD v3.1 is based on NTCIP 2306 and XML, and also ASN.1 prior to TMDD v3.1. However those technologies are considered outdated and inefficient for the expected needs and current trends. Thus, it is expected that the SDD will consist of new dialogs, new or updated data elements, and presented in a different format or formats. Design guidance may also be added to SDD, to support future technologies or formats so implementations are not tied to specific technologies that may become obsolete. The design guideline is also expected to provide guidance on cybersecurity for implementations. Any design elements not included from the TMDD v3.1 Standard should be identified with the rationale for why they were not included.

ITE will conduct verification and validation checks as per the SEMP. ITE will deliver a Draft NG TMDD Standard SDD with the rest of the document (ConOps and SRS) to the USDOT and SMEs to be used during the walkthrough defined in the following subtask.

Deliverables

- Draft NG TMDD Standard SDD [TOPR Deliverable]

2.1.1.2.10 Task 2.3.2: Walkthrough on NG TMDD Standard System Design Details [TOPR Task 2.3.2]

Approach

In consultation with the TOCOR, ITE will prepare a list of knowledgeable SMEs comprised of stakeholders (USDOT, State and local transportation agencies; TMC operations experts; ITS telecommunications experts; connected vehicle program experts; infrastructure owner operators (IOO) and 3rd party providers or consumers that have participated in C2C communication projects, new users of TMDD that use new

technologies such as Caltrans for connected corridors, and relevant other SDOs and working groups such as the CVPFS, CV Pilots, WZDI and users of the WZDx specification) to invite to attend a face-to-face review of the draft SDD. ITE will submit the stakeholder list to USDOT for approval prior to organizing the SDD Walkthrough.

The SMEs will provide comments on the design from a functional, technical, management and implementation perspective. In consultation with the TOCOR, ITE will arrange for a time and facility where the face-to-face walkthrough will take place. ITE will be responsible for invitations, distributing advance material including the final ConOps, final SRS, draft SDD, registrations, travel reimbursement, note taking, and coordination of the walkthrough.

IEEE Std. 1028-1997 is the document that will be used for guidance in planning the walkthrough. A SDD Walkthrough Plan will be prepared and provided to USDOT for approval at least 30 days prior to the scheduled walkthrough. As part of this task, the ITE will deliver a SDD Walkthrough Comment Resolution Report which details each walkthrough comment and the ITE's recommended resolution within 10 working days of the completion of the SDD Walkthrough.

Deliverables

- List of knowledgeable Subject Matter Experts
- SDD Walkthrough Plan [TOPR Deliverable]
- SDD Walkthrough Comment Resolution Report [TOPR Deliverable]

2.1.1.2.11 Task 2.4: Publish NG TMDD Standard [TOPR Task 2.4]

Approach

ITE will publish a fully balloted and approved NG TMDD Standard that meets the systems engineering documentation guidance in NTCIP 8002 Annex B-1 and IEEE Std. 1362-1998.

Deliverables

- Publish the NG TMDD Standard

2.1.1.2.12 Task 2.4.1: Develop Recommended NG TMDD Standard Document [TOPR Task 2.4.1]

Approach

ITE will develop the NG TMDD Standard containing the Systems Engineering content defined in this PWS. The NG TMDD Standard will be based on the ConOps, SRS, and SDD developed herein, and contain a PRL and an RTM.

Following the process established for the development of TMDD standards (See Figure 1), each draft (Working Group Draft, User Comment Draft, Proposed Recommended Standard, Recommended Standard, Ballot Version, Published Version), will be circulated to the TMDD SC and SMEs for comments.

ITE will address the comments, and a technical editor will review the document before ITE submits a draft for approval by the TMDD SC.

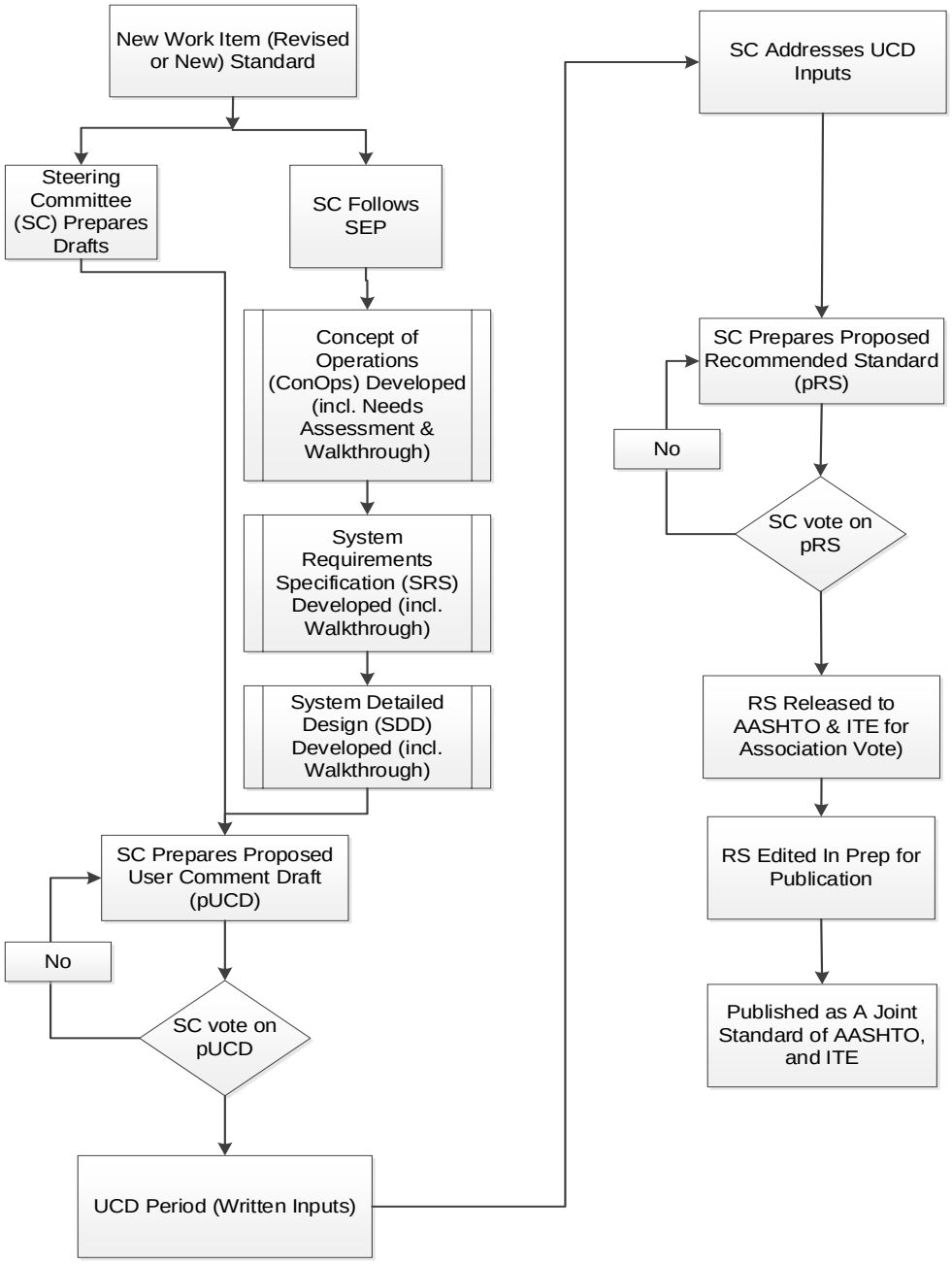


Figure 1 Consensus Process used by the NTCIP Standards

ITE will prepare a response sheet for comments received. ITE will then propose resolutions for all draft comments, and conduct a TMDD SC meeting to finalize agreements on the resolution of the comments. ITE will then prepare and address all comments to the satisfaction of the TMDD SC, the SDOs involved and USDOT.

ITE will revise the draft NG TMDD Standard, to address the comments and resolution approved by USDOT. A proposed Ballot ready standard will be prepared by ITE and submitted to the TMDD SC for ballot.
After TMDD SC approval, ITE will submit the Recommended NG TMDD Standard for official SDO balloting.

ITE will support comment resolution and updates of the Ballot version of the standard until all ballot comments have been resolved to the satisfaction of the SDOs and USDOT.

Deliverables

- NG TMDD Standard User Comment Draft
- Recommended NG TMDD Standard [TOPR Deliverable]

2.1.1.2.13 Task 2.4.2: Publish NG TMDD Standard. [TOPR Task 2.4.2]

Approach

At the successful completion of ballot by all SDOs, ITE will prepare the publication ready Final NG TMDD Standard and publish the standard.

Deliverables

- Final NG TMDD Standard [TOPR Deliverable]

2.1.1.3 Task 3.0: Development of a Cloud-Based Data Application

Overall Objectives

- Develop a small-scale proof of concept cloud-based data application using the recommended NG TMDD standard with an existing TMDD deployment.

Approach

ITE will lead the development of small-scale cloud-based data application as a proof of concept, validating a subset of the needs, requirements and design content of the newly published NG TMDD standard. Task 3 is approximately 1 year in duration and begins upon completion of the recommended NG TMDD standard (Task 2.4.1.2 in Figure 1), roughly 18 months after NTP.

Deliverables

- Cloud-based data application based on NG TMDD standard as a proof of concept

2.1.1.4 Task 4 – Develop Amendment

Overall Objectives

ITE will begin immediately after the publication of the initial NG TMDD standard the development of an amendment. The purpose of the amendment is to address additional but lower priority needs identified by the SC.

Approach

ITE will identify those additional priority needs, develop requirements to satisfy those needs, and develop the design details to fulfill those requirements. Lessons learned and comments from the Task 3 would be addressed during the development of the Amendments in Task 4.4.1.

Task 4 is expected to be 14 months in duration, with a published amendment as a deliverable, 36 months after NTP.

Deliverables

- A published amendment to NG TMDD Standard

2.1.1.4.1 Task 4.1 Develop Draft Amended Concept of Operations (ConOps)

Approach

ITE will review the comments and outputs from Task 3, Development of a Cloud-Based Data Application. ITE will also review any comments that may be received on the published NG TMDD.

ITE will take the following steps in drafting the draft version of the amended ConOps:

- ITE will develop a draft amended ConOps for the NG TMDD Standard. IEEE Std. 1362-1998 is the document that will be used for guidance in this area.
- Develop the user needs for the amended NG TMDD Standard. These user needs will be derived from the research, interview activities, and comments received. The needs developed will meet the test of being "well-written." The amended ConOps will describe expected technical, environmental, and institutional constraints for the system of interest. The amended ConOps will provide system concepts (including a high-level discussion of technical and non-technical requirements), operational scenarios, and the rationale for key concept decisions.
- Develop a context diagram as part of the amended ConOps that shows the environment the NG TMDD will work in and any possible options in the high-level architecture. The ITE will deliver an amended NG TMDD Standard ConOps Draft to the TMDD SC and USDOT to be used during the walkthrough defined in the following subtask.

Deliverables

- NG TMDD ConOps Amendment

2.1.1.4.2 Task 4.2: Develop Amended Draft NG TMDD Standard System Requirements

Overall Objectives

- Develop an Amended Draft NG TMDD Standard System Requirements.

Approach

ITE will develop an amended SRS document based on the amended ConOps, following the guidance of IEEE Std. 830-1998. The amended SRS will contain a PRL that is conformant to NTCIP 8002 Annex B1. The PRL is a table that provides a mapping from each need to its associated requirement. The requirements documented in the amended SRS will meet the test of being "well-formed" requirements based on Technical Exhibit 5 listed in the PWS.

Deliverables

- NG TMDD SRS Amendment

2.1.1.4.3 Task 4.3: Develop Amended Draft NG TMDD Standard System Design Details.

Overall Objectives

- Develop an amended System Design Description (SDD) section in the standards document based on the amended ConOps and FRS.

Approach

ITE will develop an amended SDD document based on the amended ConOps and SRS. IEEE Std. 1016-1998 is the document that will be used for guidance in this area. ITE will document the design solution for each requirement developed in the previous tasks. The amended SDD will specify the content, constraints on formats, timing, and other factors needed.

ITE will include a RTM in the SDD. The RTM is a table that provides a mapping from each requirement to its associated design content. The RTM will be conformant with NTCIP 8002 Annex B1.

ITE will ensure that relevant design elements identified in NG TMDD v3.1 within this draft and have the proper traceability to requirements and user needs. Any design elements not included from the amended NG TMDD v4.0 Specification should be identified with the rationale for why they were not included.

ITE will conduct verification and validation checks as per the SEMP. ITE will deliver an amended Draft NG TMDD Standard SDD with the rest of the document (amended ConOps and amended SRS) to the USDOT and Subject Matter Experts to be used during the walkthrough defined in the following subtask

Deliverables

- NG TMDD SDD Amendment

2.1.1.4.4 Task 4.4: Publish NG TMDD Standard Amendment

Approach

ITE will publish a fully approved amended NG TMDD Standard that meets the systems engineering documentation guidance in NTCIP 8002 Annex B-1 and IEEE Std. 1362-1998.

Deliverables

- Amended NG TMDD Standard

2.1.1.4.5 Task 4.4.1: Develop Recommended NG TMDD Standard Amendment

Approach

The ITE will develop the amended NG TMDD Standard containing the Systems Engineering content defined in the PWS. The NG TMDD Standard Amendment will be based on the amended ConOps, SRS, and SDD developed herein, and contain a PRL and an RTM.

ITE will circulate draft to the SMEs for comments.

ITE will conduct/support the SDO process and prepare a response sheet for the comments.

ITE will conduct NG TMDD SC meetings to finalize agreements on the resolution of the comments. ITE will prepare responses and resolve said responses to the satisfaction of the SDOs involved and USDOT.

Deliverables

- NG TMDD Standard Amendment User Comment Draft
- Recommended NG TMDD Standard Amendment

2.1.1.4.6 Task 4.4.2: Publish NG TMDD Amendment

Approach

ITE will prepare the publication ready Final NG TMDD Amendment and publish the Amendment once the TMDD SC has approved it.

Deliverables

- Final NG TMDD Standard Amendment

2.1.2 Performance Requirements Summary

The ITE service requirements are summarized into performance objectives that relate directly to mission essential items. The performance threshold briefly describes the minimum acceptable levels of service required for each requirement. These thresholds are critical to mission success.

Table 1. Performance Requirements Summary

Performance Objective	Performance Standard	Performance Threshold	Method of Surveillance
PRS # 1 ITE will provide plans and background materials as required.	ITE provided plans listed in Task 1 and background materials as required.	Zero deviation from standard and no grammatical/spelling errors.	COR Review
PRS # 2 ITE shall provide the PMP.	ITE provided a final PMP that followed the PWS guidance, contained the required sections, delivered on time.	Zero deviation from standard and no grammatical/spelling errors.	100%, FHWA will review upon receipt
PRS # 3 ITE shall provide the Draft NG TMDD Standard ConOps.	ITE provided a final document that followed the PWS guidance, contained the required sections, delivered on time.	Zero deviation from standard and no grammatical/spelling errors.	100%, FHWA will review upon receipt
PRS #4 ITE shall provide the Draft NG TMDD Standard SRS	ITE provided a final document that followed the PWS guidance, contained the required sections, delivered on time.	Zero deviation from standard and no grammatical/spelling errors	100%, FHWA will review upon receipt
PRS # 5 ITE shall provide the Draft NG TMDD Standard SDD	ITE provided a final document that followed the PWS guidance, contained the required sections, delivered on time.	Zero deviation from standard and no grammatical/spelling errors.	100%, FHWA will review upon receipt
PRS # 6 ITE shall provide a Recommended NG TMDD Standard	ITE provided a final document that followed the PWS guidance, contained the required sections, delivered on time.	Zero deviation from standard and no grammatical/spelling errors.	100%, FHWA will review upon receipt
PRS # 7 ITE shall provide a Final NG TMDD Standard	ITE provided a final document that followed the PWS guidance, contained the required sections, delivered on time.	Zero deviation from standard and no grammatical/spelling errors.	100%, FHWA will review upon receipt

2.1.3 Project Exclusions

No exclusions have been identified.

2.1.4 Project Constraints

The following constraints have been established for the NG TMDD Standard Project:

a) The project schedule end date is June 20, 2025.
b) Capital expenditures are contractually limited and must be preapproved by ITE.
c) Project travel costs are contractually limited and must be preapproved by ITE.

2.1.5 Project Assumptions

The following assumptions are being made for the NG TMDD Standard Project:

a) Additional teleconferences will be used as needed to meet the project goals.
b) Time has been built into many of the tasks due to the need for TMDD SC and USDOT reviews.
c) ITS JPO will have a representative participating in the TMDD SC as a non-voting member.
d) Documents produced for this project are to be suitable for their defined purpose as determined by the TMDD SC.
e) Throughout the project, there will be various versions of the project schedule produced to take advantage of economies discovered or to account for anomalies unforeseen. As long as there is no change in scope, this PMP does not need to be modified.

2.2 Scope Verification

The scope description found in Section 2.1.1 has been developed using the scope provided in the TOPR / PWS ensuring that all tasks and deliverables identified in the TOPR are included in this PMP. Project tasks in the scope description are mapped to TOPR tasks using the form "[TOPR Task]." Deliverable items in the scope description are mapped to TOPR deliverables using the form "[TOPR Deliverable]." Acceptance of this PMP by the ITS JPO verifies the initial scope of the NG TMDD Standard Project.

It is the responsibility of the Project Manager to verify interim project deliverables against the scope as defined in the scope description (see Section 2.1.1). If there is a proposed change of scope (see Section 2.3), ITS JPO must formally accept the change prior to its incorporation into the project.

2.3 Scope Control

The Project Manager and the ITE Team will work together to control of the scope of the project. The ITE Team will leverage the project scope description (see Section 2.1.1) and the project schedule (see Section 4.3) as a statement of work for each task. The ITE Team will ensure that they perform only the work described in the project scope description and generate the deliverables identified. The Project Manager will oversee the ITE Team and the progression of the project to ensure that this scope control process is followed.

A change in scope is defined by a change in the overall budget, a change that extends the overall schedule, or a change in the work to be performed. Any member of the Project Management Team, the ITE Team, the TMDD SC, or the ITS JPO may propose a change in scope. The proposed change is assessed by the Project Management Team and ITE Team. If the Project Management Team and ITE Team determine that a change in scope is warranted, formal approval from ITS JPO is required. This PMP is to be updated in the case of an approved change in scope.

3 COMMUNICATIONS PLAN

3.1 Purpose of the Communications Plan

This Communications Management Plan sets the communications framework for the administration of the NG TMDD Standard Project. It identifies representatives of the key stakeholders for the project, their roles, and contact information.

3.2 Stakeholder Points of Contact

ITS JPO Task Order Contracting Officer's Representative (TOCOR)

Acts on behalf of the Contracting Officer (CO).

Steve Sill, ITS Architecture & Standards Program Manager
RITA ITS JPO
United States Department of Transportation
1200 New Jersey Avenue, SE
Washington, DC 20590
Phone: 202-366-1603
Email: steve.sill@dot.gov

Deborah Curtis
Highway Research Engineer
Turner Fairbank Highway Research Center
6300 Georgetown Pike
McLean, VA 22101-2296
Phone: 202-493-3267
Email: Deborah.Curtis@dot.gov

Project Administrator/Coordinator

(Primary)
Siva R. K. Narla, Senior Director, Transportation Technology
Institute of Transportation Engineers
1627 I ("Eye") Street, NW, Suite 550 Washington, DC 20006
Phone: 202-464-6219
Email: snarla@ite.org

(Deputy)
Nicola Tavares, Technical Projects Specialist
Institute of Transportation Engineers
1627 I ("Eye") Street, NW, Suite 550 Washington, DC 20006
Phone: 202-464-6208
Email: ntavares@ite.org

Project Manager

Douglas Benison, Project Manager
Consensus Systems Technologies
200 East 89th Street, Unit 34A
New York, NY 10128
Phone: 516-581-7850
Email: doug.benison@consystec.com

NG TMDD Steering Committee Member Co-Chairs

TBD.

3.3 Communications with ITS JPO

Communications between the project team and ITS JPO will formally take place once monthly and deliverables occur as described in Section 3. It is anticipated that ITS JPO will have one or more technical staff participating in the TMDD SC where they will have extemporaneous and informal communication with the project team. Official communications between ITS JPO and the Project Team should be made through the Project Administrator/Coordinator and the TOCOR (see Section 2.3).

3.4 Communications with SAE International

The PWS requires that the TMDD SC receives input and supports with SAE International, who owns the SAE J2735 standard, which is a key standard for connected vehicles. Official communications between SAE International and the Project Team should be made through the Project Administrator/Coordinator and the TOCOR (see Section 2.3). It is anticipated that SAE International and its representatives will be invited to participate in the walkthroughs. SAE International will also be invited to review the UCD version of the NG TMDD.

4 DELIVERABLES AND MILESTONES

4.1 Monthly Progress Reports

On a monthly basis, the Project Administrator/Coordinator will provide a progress report to the CO. This report will contain the following:

a) Project Schedule
b) Deliverables Status
c) Red Flags
d) Budget
    i) Limitation of Funds Analysis
    ii) Chart 1: Current /Cumulative Expenditures by Month vs. Planned Expenditures
    iii) Chart 2: Cumulative Expenditures vs. Funds Obligated by Month of Task Order
    iv) Chart 3: Current Month Expenditures, Cumulative Expenditures vs. Total Budget, by Budget Line Item

The project schedule will reflect the baseline task start and end dates and the actual start and end dates for each task in the project schedule and the percentage of project completion. The project schedule will be provided in both Microsoft Project and Adobe Acrobat.

4.2 Deliverable Summary

Documents and software deliverables are to be sent electronically to the CO. Table 2 identifies the deliverables based on the project tasks.

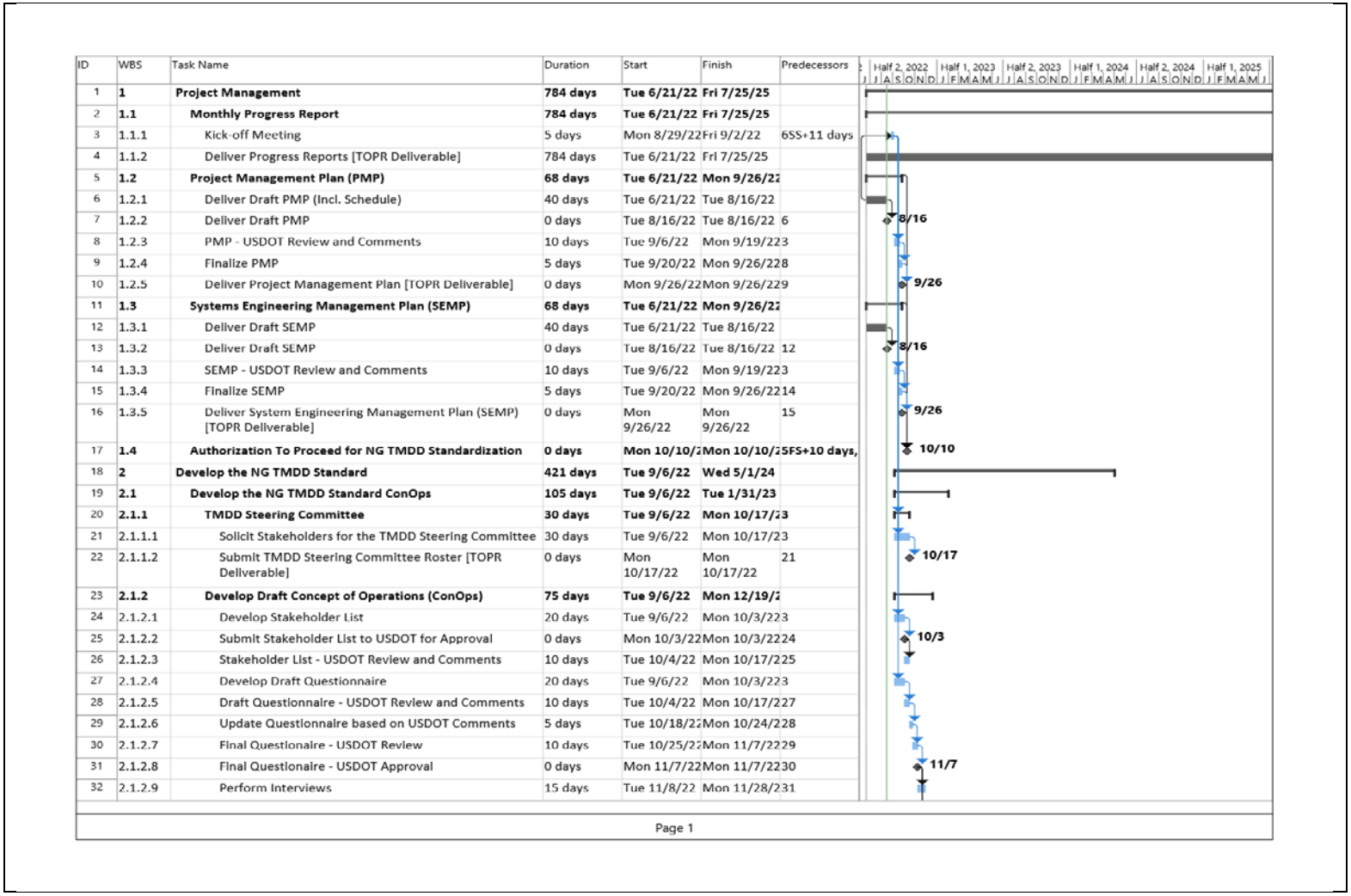
Table 2. Deliverables by Project Task

Task	Deliverable Item	Delivery Date
1.1	**Kickoff Meeting**	9/2/22
	Progress Reports [TOPR Deliverable]	Monthly
1.2	**Draft PMP**	8/16/22
	Deliver Project Management Plan (PMP) [TOPR Deliverable]	9/26/22
1.3	**Draft SEMP**	8/16/22
	Final System Engineering Management Plan (SEMP) [TOPR Deliverable]	9/26/22
2.1	**Draft NG TMDD Standard ConOps [TOPR Deliverable]**	12/19/22
	NG TMDD Standards Working Group Roster (TMDD Steering Committee Roster) [TOPR Deliverable]	10/17/22

Task	Deliverable Item	Delivery Date
	Draft ConOps Walkthrough Plan	11/28/22
	Final ConOps Walkthrough Plan [TOPR Deliverable]	12/20/22
	Walkthrough Workbooks for ConOps Walkthrough	12/20/22
	ConOps Walkthrough Comment Resolution Report [TOPR Deliverable]	1/31/23
2.2	**Draft NG TMDD Standard SRS [TOPR Deliverable]**	3/15/23
	SRS Walkthrough Plan [TOPR Deliverable]	2/22/23
	SRS Walkthrough Comment Resolution Report [TOPR Deliverable]	4/26/23
2.3	**Draft NG TMDD Standard SDD [TOPR Deliverable]**	7/21/23
	List of knowledgeable Subject Matter Experts	6/20/23
	SDD Walkthrough Plan [TOPR Deliverable]	7/24/23
	SDD Walkthrough Comment Resolution Report [TOPR Deliverable]	9/1/23
2.4	**NG TMDD Standard User Comment Draft**	9/18/23
	Recommended NG TMDD Standard [TOPR Deliverable]	12/22/23
	Final NG TMDD Standard Document [TOPR Deliverable]	5/1/24
3.0	**Cloud-based Data Application based on NG TMDD Standard as a Proof of Concept**	12/26/24
4.1	**NG TMDD ConOps Amendment**	7/12/24
4.2	**NG TMDD SRS Amendment**	10/14/24
4.3	**NG TMDD SDD Amendment**	2/4/25
4.4	**NG TMDD Standard Amendment User Comment Draft**	2/11/25
	Recommended NG TMDD Standard Amendment	5/9/25
	Final NG TMDD Standard Amendment	6/16/25

4.3 Project Schedule

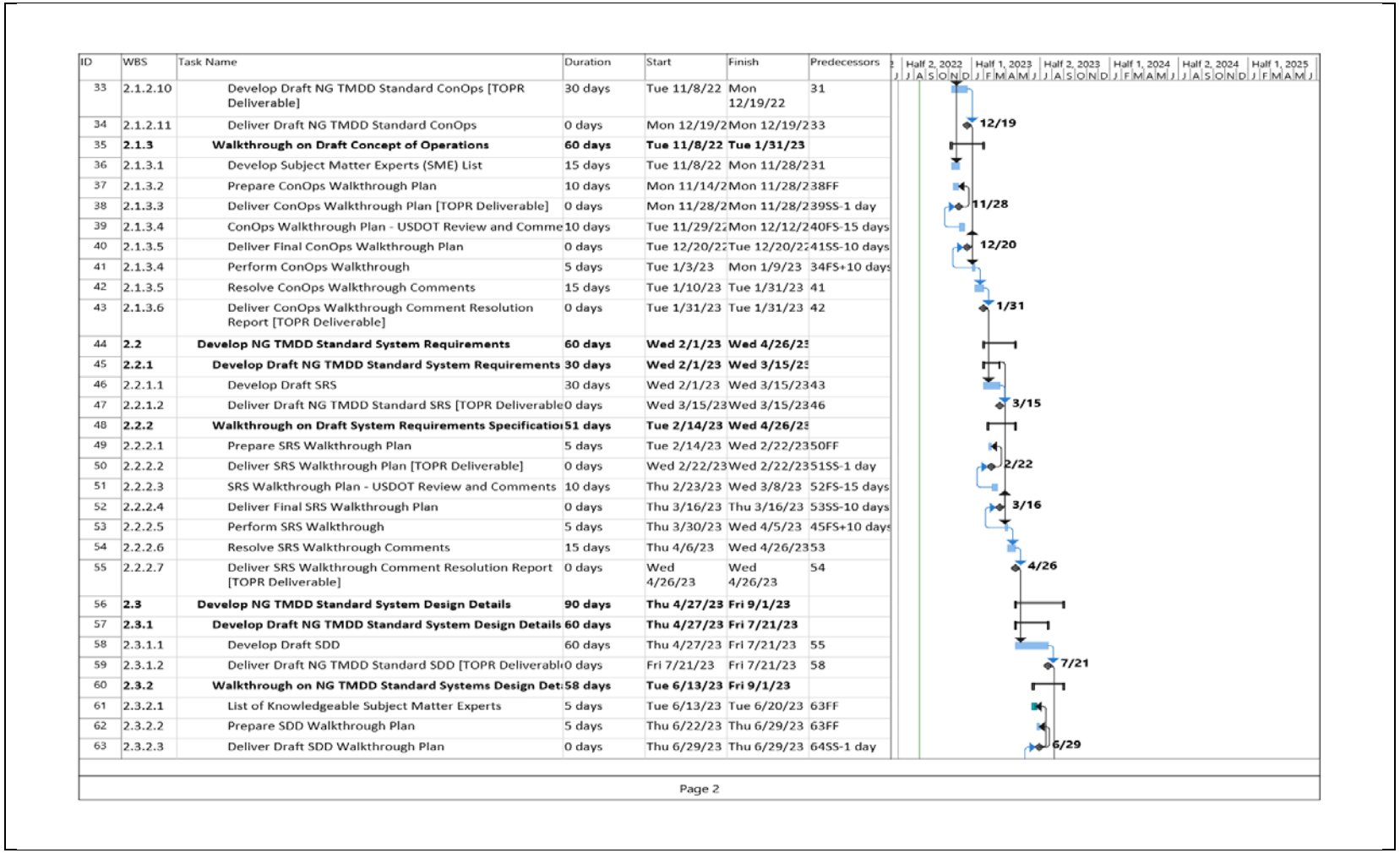
The Gantt Chart in Figures 2 through 6 provides the NG TMDD Standard project schedule. Project tasks and deliverables that correspond to an explicit task included in the TOPR are identified. Deliverables are identified by a diamond shape (◆). Teleconferences are identified by a diamond shape within a circle (⦿). Face-to-face meetings are identified by solid circle (●).



ID	WBS	Task Name	Duration	Start	Finish	Predecessors
1	**1**	**Project Management**	**784 days**	**Tue 6/21/22**	**Fri 7/25/25**	
2	**1.1**	**Monthly Progress Report**	**784 days**	**Tue 6/21/22**	**Fri 7/25/25**	
3	1.1.1	Kick-off Meeting	5 days	Mon 8/29/22	Fri 9/2/22	6SS+11 days
4	1.1.2	Deliver Progress Reports [TOPR Deliverable]	784 days	Tue 6/21/22	Fri 7/25/25	
5	**1.2**	**Project Management Plan (PMP)**	**68 days**	**Tue 6/21/22**	**Mon 9/26/22**	
6	1.2.1	Deliver Draft PMP (Incl. Schedule)	40 days	Tue 6/21/22	Tue 8/16/22	
7	1.2.2	Deliver Draft PMP	0 days	Tue 8/16/22	Tue 8/16/22	6
8	1.2.3	PMP - USDOT Review and Comments	10 days	Tue 9/6/22	Mon 9/19/22	3
9	1.2.4	Finalize PMP	5 days	Tue 9/20/22	Mon 9/26/22	8
10	1.2.5	Deliver Project Management Plan [TOPR Deliverable]	0 days	Mon 9/26/22	Mon 9/26/22	9
11	**1.3**	**Systems Engineering Management Plan (SEMP)**	**68 days**	**Tue 6/21/22**	**Mon 9/26/22**	
12	1.3.1	Deliver Draft SEMP	40 days	Tue 6/21/22	Tue 8/16/22	
13	1.3.2	Deliver Draft SEMP	0 days	Tue 8/16/22	Tue 8/16/22	12
14	1.3.3	SEMP - USDOT Review and Comments	10 days	Tue 9/6/22	Mon 9/19/22	3
15	1.3.4	Finalize SEMP	5 days	Tue 9/20/22	Mon 9/26/22	14
16	1.3.5	Deliver System Engineering Management Plan (SEMP) [TOPR Deliverable]	0 days	Mon 9/26/22	Mon 9/26/22	15
17	**1.4**	**Authorization To Proceed for NG TMDD Standardization**	**0 days**	**Mon 10/10/2**	**Mon 10/10/2**	**5FS+10 days,**
18	**2**	**Develop the NG TMDD Standard**	**421 days**	**Tue 9/6/22**	**Wed 5/1/24**	
19	**2.1**	**Develop the NG TMDD Standard ConOps**	**105 days**	**Tue 9/6/22**	**Tue 1/31/23**	
20	**2.1.1**	**TMDD Steering Committee**	**30 days**	**Tue 9/6/22**	**Mon 10/17/2**	**3**
21	2.1.1.1	Solicit Stakeholders for the TMDD Steering Committee	30 days	Tue 9/6/22	Mon 10/17/2	3
22	2.1.1.2	Submit TMDD Steering Committee Roster [TOPR Deliverable]	0 days	Mon 10/17/22	Mon 10/17/22	21
23	**2.1.2**	**Develop Draft Concept of Operations (ConOps)**	**75 days**	**Tue 9/6/22**	**Mon 12/19/2**	
24	2.1.2.1	Develop Stakeholder List	20 days	Tue 9/6/22	Mon 10/3/22	3
25	2.1.2.2	Submit Stakeholder List to USDOT for Approval	0 days	Mon 10/3/22	Mon 10/3/22	24
26	2.1.2.3	Stakeholder List - USDOT Review and Comments	10 days	Tue 10/4/22	Mon 10/17/22	25
27	2.1.2.4	Develop Draft Questionnaire	20 days	Tue 9/6/22	Mon 10/3/22	3
28	2.1.2.5	Draft Questionnaire - USDOT Review and Comments	10 days	Tue 10/4/22	Mon 10/17/22	27
29	2.1.2.6	Update Questionnaire based on USDOT Comments	5 days	Tue 10/18/22	Mon 10/24/22	28
30	2.1.2.7	Final Questionaire - USDOT Review	10 days	Tue 10/25/22	Mon 11/7/22	29
31	2.1.2.8	Final Questionaire - USDOT Approval	0 days	Mon 11/7/22	Mon 11/7/22	30
32	2.1.2.9	Perform Interviews	15 days	Tue 11/8/22	Mon 11/28/2	31

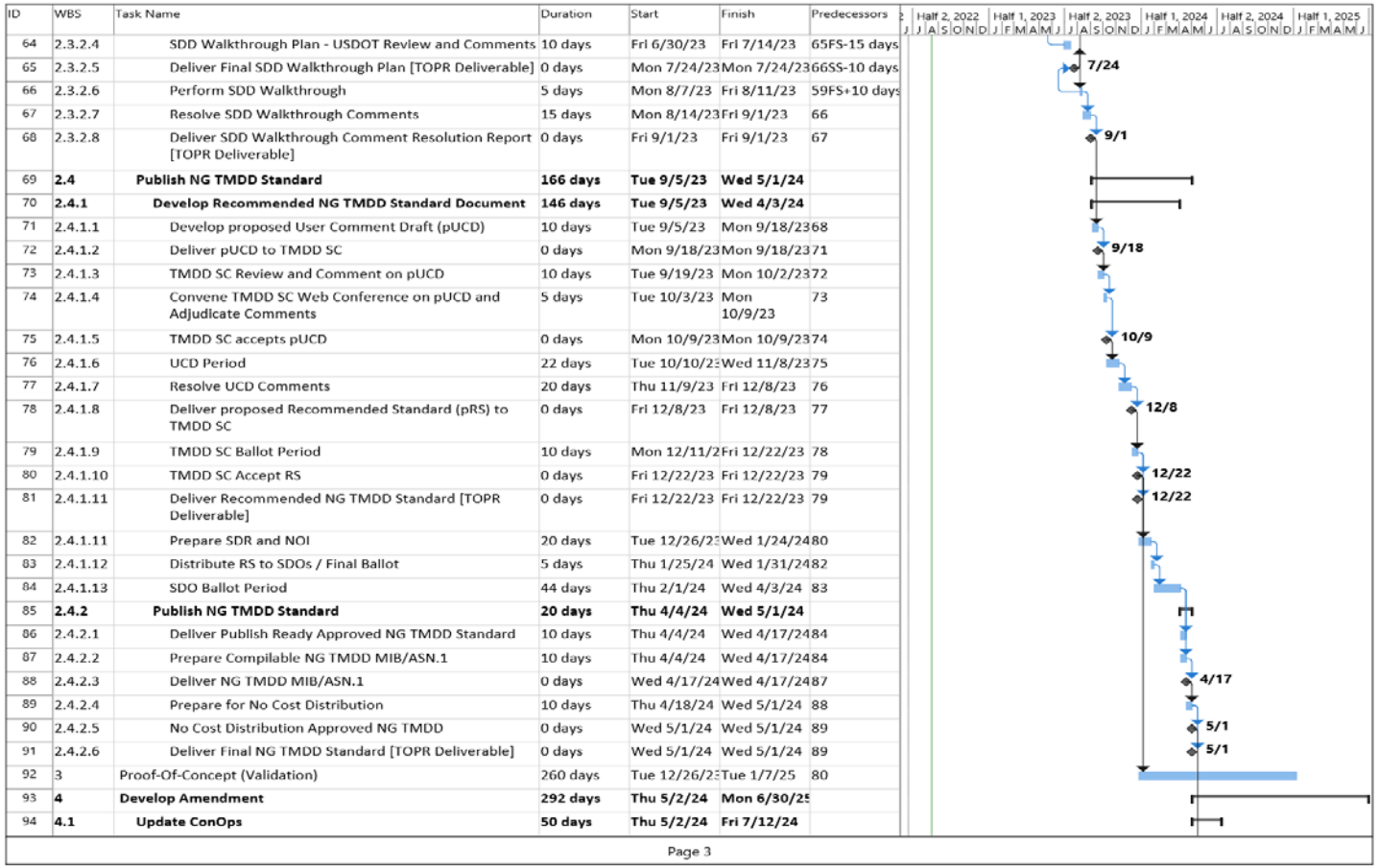
Page 1

Figure 2. NG TMDD Standard Project Schedule (Part 1 of 4)



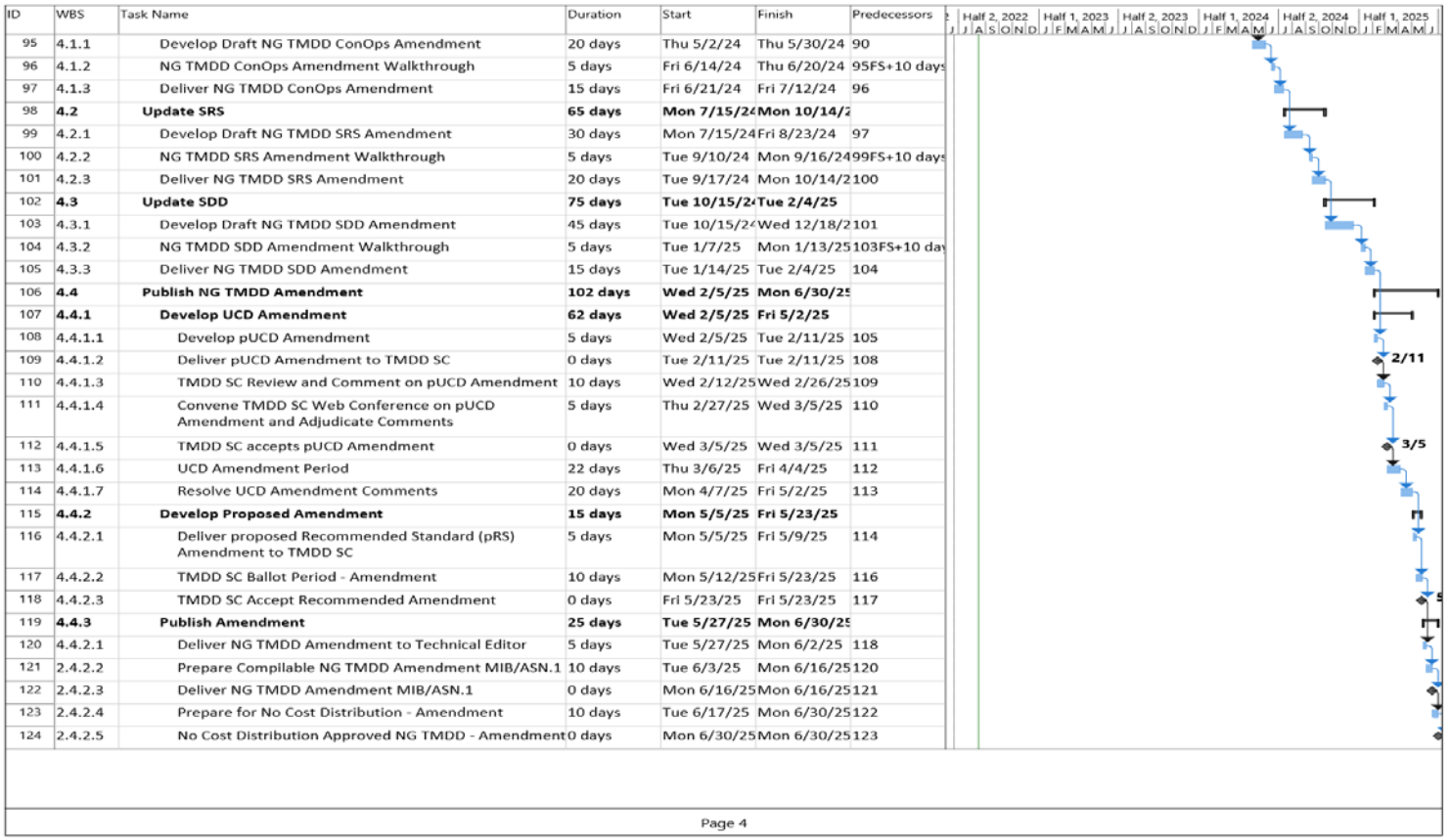
ID	WBS	Task Name	Duration	Start	Finish	Predecessors
33	2.1.2.10	Develop Draft NG TMDD Standard ConOps [TOPR Deliverable]	30 days	Tue 11/8/22	Mon 12/19/22	31
34	2.1.2.11	Deliver Draft NG TMDD Standard ConOps	0 days	Mon 12/19/2	Mon 12/19/2	33
35	**2.1.3**	**Walkthrough on Draft Concept of Operations**	**60 days**	**Tue 11/8/22**	**Tue 1/31/23**	
36	2.1.3.1	Develop Subject Matter Experts (SME) List	15 days	Tue 11/8/22	Mon 11/28/2	31
37	2.1.3.2	Prepare ConOps Walkthrough Plan	10 days	Mon 11/14/2	Mon 11/28/2	38FF
38	2.1.3.3	Deliver ConOps Walkthrough Plan [TOPR Deliverable]	0 days	Mon 11/28/2	Mon 11/28/2	39SS-1 day
39	2.1.3.4	ConOps Walkthrough Plan - USDOT Review and Comme	10 days	Tue 11/29/22	Mon 12/12/2	40FS-15 days
40	2.1.3.5	Deliver Final ConOps Walkthrough Plan	0 days	Tue 12/20/22	Tue 12/20/2	41SS-10 days
41	2.1.3.4	Perform ConOps Walkthrough	5 days	Tue 1/3/23	Mon 1/9/23	34FS+10 days
42	2.1.3.5	Resolve ConOps Walkthrough Comments	15 days	Tue 1/10/23	Tue 1/31/23	41
43	2.1.3.6	Deliver ConOps Walkthrough Comment Resolution Report [TOPR Deliverable]	0 days	Tue 1/31/23	Tue 1/31/23	42
44	**2.2**	**Develop NG TMDD Standard System Requirements**	**60 days**	**Wed 2/1/23**	**Wed 4/26/23**	
45	**2.2.1**	**Develop Draft NG TMDD Standard System Requirements**	**30 days**	**Wed 2/1/23**	**Wed 3/15/23**	
46	2.2.1.1	Develop Draft SRS	30 days	Wed 2/1/23	Wed 3/15/23	43
47	2.2.1.2	Deliver Draft NG TMDD Standard SRS [TOPR Deliverable	0 days	Wed 3/15/23	Wed 3/15/23	46
48	**2.2.2**	**Walkthrough on Draft System Requirements Specificatio**	**51 days**	**Tue 2/14/23**	**Wed 4/26/23**	
49	2.2.2.1	Prepare SRS Walkthrough Plan	5 days	Tue 2/14/23	Wed 2/22/23	50FF
50	2.2.2.2	Deliver SRS Walkthrough Plan [TOPR Deliverable]	0 days	Wed 2/22/23	Wed 2/22/23	51SS-1 day
51	2.2.2.3	SRS Walkthrough Plan - USDOT Review and Comments	10 days	Thu 2/23/23	Wed 3/8/23	52FS-15 days
52	2.2.2.4	Deliver Final SRS Walkthrough Plan	0 days	Thu 3/16/23	Thu 3/16/23	53SS-10 days
53	2.2.2.5	Perform SRS Walkthrough	5 days	Thu 3/30/23	Wed 4/5/23	45FS+10 days
54	2.2.2.6	Resolve SRS Walkthrough Comments	15 days	Thu 4/6/23	Wed 4/26/23	53
55	2.2.2.7	Deliver SRS Walkthrough Comment Resolution Report [TOPR Deliverable]	0 days	Wed 4/26/23	Wed 4/26/23	54
56	**2.3**	**Develop NG TMDD Standard System Design Details**	**90 days**	**Thu 4/27/23**	**Fri 9/1/23**	
57	**2.3.1**	**Develop Draft NG TMDD Standard System Design Details**	**60 days**	**Thu 4/27/23**	**Fri 7/21/23**	
58	2.3.1.1	Develop Draft SDD	60 days	Thu 4/27/23	Fri 7/21/23	55
59	2.3.1.2	Deliver Draft NG TMDD Standard SDD [TOPR Deliverabl	0 days	Fri 7/21/23	Fri 7/21/23	58
60	**2.3.2**	**Walkthrough on NG TMDD Standard Systems Design Det**	**58 days**	**Tue 6/13/23**	**Fri 9/1/23**	
61	2.3.2.1	List of Knowledgeable Subject Matter Experts	5 days	Tue 6/13/23	Tue 6/20/23	63FF
62	2.3.2.2	Prepare SDD Walkthrough Plan	5 days	Thu 6/22/23	Thu 6/29/23	63FF
63	2.3.2.3	Deliver Draft SDD Walkthrough Plan	0 days	Thu 6/29/23	Thu 6/29/23	64SS-1 day

Figure 3. NG TMDD Standard Project Schedule (Part 2 of 4)



ID	WBS	Task Name	Duration	Start	Finish	Predecessors
64	2.3.2.4	SDD Walkthrough Plan - USDOT Review and Comments	10 days	Fri 6/30/23	Fri 7/14/23	65FS-15 days
65	2.3.2.5	Deliver Final SDD Walkthrough Plan [TOPR Deliverable]	0 days	Mon 7/24/23	Mon 7/24/23	66SS-10 days
66	2.3.2.6	Perform SDD Walkthrough	5 days	Mon 8/7/23	Fri 8/11/23	59FS+10 days
67	2.3.2.7	Resolve SDD Walkthrough Comments	15 days	Mon 8/14/23	Fri 9/1/23	66
68	2.3.2.8	Deliver SDD Walkthrough Comment Resolution Report [TOPR Deliverable]	0 days	Fri 9/1/23	Fri 9/1/23	67
69	**2.4**	**Publish NG TMDD Standard**	**166 days**	**Tue 9/5/23**	**Wed 5/1/24**	
70	**2.4.1**	**Develop Recommended NG TMDD Standard Document**	**146 days**	**Tue 9/5/23**	**Wed 4/3/24**	
71	2.4.1.1	Develop proposed User Comment Draft (pUCD)	10 days	Tue 9/5/23	Mon 9/18/23	68
72	2.4.1.2	Deliver pUCD to TMDD SC	0 days	Mon 9/18/23	Mon 9/18/23	71
73	2.4.1.3	TMDD SC Review and Comment on pUCD	10 days	Tue 9/19/23	Mon 10/2/23	72
74	2.4.1.4	Convene TMDD SC Web Conference on pUCD and Adjudicate Comments	5 days	Tue 10/3/23	Mon 10/9/23	73
75	2.4.1.5	TMDD SC accepts pUCD	0 days	Mon 10/9/23	Mon 10/9/23	74
76	2.4.1.6	UCD Period	22 days	Tue 10/10/23	Wed 11/8/23	75
77	2.4.1.7	Resolve UCD Comments	20 days	Thu 11/9/23	Fri 12/8/23	76
78	2.4.1.8	Deliver proposed Recommended Standard (pRS) to TMDD SC	0 days	Fri 12/8/23	Fri 12/8/23	77
79	2.4.1.9	TMDD SC Ballot Period	10 days	Mon 12/11/2	Fri 12/22/23	78
80	2.4.1.10	TMDD SC Accept RS	0 days	Fri 12/22/23	Fri 12/22/23	79
81	2.4.1.11	Deliver Recommended NG TMDD Standard [TOPR Deliverable]	0 days	Fri 12/22/23	Fri 12/22/23	79
82	2.4.1.11	Prepare SDR and NOI	20 days	Tue 12/26/23	Wed 1/24/24	80
83	2.4.1.12	Distribute RS to SDOs / Final Ballot	5 days	Thu 1/25/24	Wed 1/31/24	82
84	2.4.1.13	SDO Ballot Period	44 days	Thu 2/1/24	Wed 4/3/24	83
85	**2.4.2**	**Publish NG TMDD Standard**	**20 days**	**Thu 4/4/24**	**Wed 5/1/24**	
86	2.4.2.1	Deliver Publish Ready Approved NG TMDD Standard	10 days	Thu 4/4/24	Wed 4/17/24	84
87	2.4.2.2	Prepare Compilable NG TMDD MIB/ASN.1	10 days	Thu 4/4/24	Wed 4/17/24	84
88	2.4.2.3	Deliver NG TMDD MIB/ASN.1	0 days	Wed 4/17/24	Wed 4/17/24	87
89	2.4.2.4	Prepare for No Cost Distribution	10 days	Thu 4/18/24	Wed 5/1/24	88
90	2.4.2.5	No Cost Distribution Approved NG TMDD	0 days	Wed 5/1/24	Wed 5/1/24	89
91	2.4.2.6	Deliver Final NG TMDD Standard [TOPR Deliverable]	0 days	Wed 5/1/24	Wed 5/1/24	89
92	3	Proof-Of-Concept (Validation)	260 days	Tue 12/26/23	Tue 1/7/25	80
93	**4**	**Develop Amendment**	**292 days**	**Thu 5/2/24**	**Mon 6/30/25**	
94	**4.1**	**Update ConOps**	**50 days**	**Thu 5/2/24**	**Fri 7/12/24**	

Figure 4. NG TMDD Standard Project Schedule (Part 3 of 4)



ID	WBS	Task Name	Duration	Start	Finish	Predecessors
95	4.1.1	Develop Draft NG TMDD ConOps Amendment	20 days	Thu 5/2/24	Thu 5/30/24	90
96	4.1.2	NG TMDD ConOps Amendment Walkthrough	5 days	Fri 6/14/24	Thu 6/20/24	95FS+10 days
97	4.1.3	Deliver NG TMDD ConOps Amendment	15 days	Fri 6/21/24	Fri 7/12/24	96
98	**4.2**	**Update SRS**	**65 days**	**Mon 7/15/24**	**Mon 10/14/2**	
99	4.2.1	Develop Draft NG TMDD SRS Amendment	30 days	Mon 7/15/24	Fri 8/23/24	97
100	4.2.2	NG TMDD SRS Amendment Walkthrough	5 days	Tue 9/10/24	Mon 9/16/24	99FS+10 days
101	4.2.3	Deliver NG TMDD SRS Amendment	20 days	Tue 9/17/24	Mon 10/14/2	100
102	**4.3**	**Update SDD**	**75 days**	**Tue 10/15/24**	**Tue 2/4/25**	
103	4.3.1	Develop Draft NG TMDD SDD Amendment	45 days	Tue 10/15/24	Wed 12/18/2	101
104	4.3.2	NG TMDD SDD Amendment Walkthrough	5 days	Tue 1/7/25	Mon 1/13/25	103FS+10 day
105	4.3.3	Deliver NG TMDD SDD Amendment	15 days	Tue 1/14/25	Tue 2/4/25	104
106	**4.4**	**Publish NG TMDD Amendment**	**102 days**	**Wed 2/5/25**	**Mon 6/30/25**	
107	**4.4.1**	**Develop UCD Amendment**	**62 days**	**Wed 2/5/25**	**Fri 5/2/25**	
108	4.4.1.1	Develop pUCD Amendment	5 days	Wed 2/5/25	Tue 2/11/25	105
109	4.4.1.2	Deliver pUCD Amendment to TMDD SC	0 days	Tue 2/11/25	Tue 2/11/25	108
110	4.4.1.3	TMDD SC Review and Comment on pUCD Amendment	10 days	Wed 2/12/25	Wed 2/26/25	109
111	4.4.1.4	Convene TMDD SC Web Conference on pUCD Amendment and Adjudicate Comments	5 days	Thu 2/27/25	Wed 3/5/25	110
112	4.4.1.5	TMDD SC accepts pUCD Amendment	0 days	Wed 3/5/25	Wed 3/5/25	111
113	4.4.1.6	UCD Amendment Period	22 days	Thu 3/6/25	Fri 4/4/25	112
114	4.4.1.7	Resolve UCD Amendment Comments	20 days	Mon 4/7/25	Fri 5/2/25	113
115	**4.4.2**	**Develop Proposed Amendment**	**15 days**	**Mon 5/5/25**	**Fri 5/23/25**	
116	4.4.2.1	Deliver proposed Recommended Standard (pRS) Amendment to TMDD SC	5 days	Mon 5/5/25	Fri 5/9/25	114
117	4.4.2.2	TMDD SC Ballot Period - Amendment	10 days	Mon 5/12/25	Fri 5/23/25	116
118	4.4.2.3	TMDD SC Accept Recommended Amendment	0 days	Fri 5/23/25	Fri 5/23/25	117
119	**4.4.3**	**Publish Amendment**	**25 days**	**Tue 5/27/25**	**Mon 6/30/25**	
120	4.4.2.1	Deliver NG TMDD Amendment to Technical Editor	5 days	Tue 5/27/25	Mon 6/2/25	118
121	2.4.2.2	Prepare Compilable NG TMDD Amendment MIB/ASN.1	10 days	Tue 6/3/25	Mon 6/16/25	120
122	2.4.2.3	Deliver NG TMDD Amendment MIB/ASN.1	0 days	Mon 6/16/25	Mon 6/16/25	121
123	2.4.2.4	Prepare for No Cost Distribution - Amendment	10 days	Tue 6/17/25	Mon 6/30/25	122
124	2.4.2.5	No Cost Distribution Approved NG TMDD - Amendment	0 days	Mon 6/30/25	Mon 6/30/25	123

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Figure 5. NG TMDD Standard Project Schedule (Part 4 of 4)

5 QUALITY MANAGEMENT PLAN

5.1 Purpose of the Quality Management Plan

This Quality Management Plan describes how quality will be managed throughout the life of the project. It includes processes and practices for ensuring quality planning, quality control and quality assurance.

5.2 Quality Planning

To be successful, this PMP has integrated a quality system into the project tasks, project schedule, project deliverables and project team. The project relies heavily on the NG TMDD Steering Committee to perform the role of a quality review team. The NG TMDD Steering Committee is made up of subject matter experts including those from public agencies, manufacturers, software providers, and consulting firms. The NG TMDD Steering Committee includes operational users who provide quality input from the user's perspective. The NG TMDD Steering Committee also includes one or more technical staff from ITS JPO. This allows the ITS JPO to have quality input early in the development of project deliverables. It is the responsibility of the NG TMDD Steering Committee Co-Chairs and the Project Manager to ensure that the NG TMDD Steering Committee is made up of individuals appropriate for the quality aspects of the project. The Project Manager and ITE team have been selected for their experience with the deployment of TMDD applications, their depth of knowledge concerning TMDD standards, their particular expertise applying the systems engineering process to the development of NG TMDD standards, and their track record producing quality TMDD products.

There are two types of "quality" addressed by this plan: "product quality" and "process quality." Product quality focuses on the project deliverables. The project scope description (see Section 2.1.1) identifies well-known industry standards for all document deliverables. Process quality focuses on how the project deliverables will be produced. The NG TMDD Standard Project employs a formal systems engineering process. The project scope description and schedule define task and process deliverables such as document walkthroughs and multiple cycles of NG TMDD Steering Committee review, comment and comment resolution periods all directed at the aspect of quality.

5.3 Quality Control

This section describes the process for monitoring and recording the results of executing the quality activities. It applies to the project's products as opposed to its processes.

It is intended that each document will be maintained through a document oriented process. Each document produced as a part of this PMP will maintain a Comment Matrix with a unique comment identifier, the name of the commenter, the date of the comment, the version of the document that the comment pertains to, the comment type (Editorial or Technical), the page number, the section number, the issue, the proposed solution, NG TMDD Steering Committee conclusions and the disposition (Open/Closed). For all software products of this PMP, issue/change tracking will be provided through the OSS.

The NG TMDD Steering Committee reviews of all project deliverables will be performed according to the project schedule. Additional reviews may be meet project needs. Documents will be compared to the industry standards from which they are based to ensure that critical information is not missing. Reviewers will verify that deliverable documents:

a) contain suitable material for the target audience;
b) are organized in presentation;
c) contain proper word use and English diction;
d) contain detailed illustrations;
e) are comprehensive, complete and technically correct; and
f) are edited for grammatical and editorial errors.

Project deliverables will be judged on a “suitable for purpose” basis. The NG TMDD Steering Committee may identify more items or make suggestions for changes to a document than are needed to meet the project goals. In some cases, gaining consensus on technical matters within the NG TMDD Steering Committee can be difficult and time consuming. If any undertaking by the NG TMDD Steering Committee may jeopardize the project schedule, the NG TMDD Steering Committee Co-Chairs will make decisions and recommendations on the WG’s behalf.

5.4 Quality Assurance

A Quality Checklist will be established and maintained by the Project Manager to assist in identifying specific items to be reviewed by the NG TMDD Steering Committee. A Project Issue Log will be established and maintained by the Project Manager to capture any issue regarding the project that should be addressed by the project management team including items that pertain to quality. Items for the Quality Checklist and Project Issue Log may be proposed by any member of the project team. It is up to the project management team to determine if these items should be included on these lists and if any action should be taken. The Project Management Team will discuss any quality items on a weekly basis.

6 TEAM MANAGEMENT PLAN

6.1 Purpose of the Team Management Plan

This Team Management Plan is a tool which aides in the management of the Project Team throughout the NG TMDD Standard Project. It contains the roles, responsibilities and reporting on the project and an organizational chart. Estimated work efforts for the team members, arranged by their organization, are found in Appendix D.

6.2 Roles, Responsibilities and Reporting

Project management responsibilities are jointly held by SDO staff and the NG TMDD Steering Committee co-chairs. SDO staff has administrative and fiscal responsibilities. NG TMDD Steering Committee co-chairs, with assistance from SDO staff, are responsible for managing the NG TMDD Steering Committee. SDO staff with assistance from NG TMDD Steering Committee co-chairs are responsible for managing the consulting team to produce the work item technical deliverables. Both parties are responsible for meeting the agreed schedule and the success of the work item. Table 4 identifies the work item management team. The following steps will be used to manage this work item:

a) Monthly, consultants will report, via email, a summary of the hours expended and remaining by each subtask for which the consultant is assigned; and provide a brief report on the progress made on each ST during the reporting period, as well as an estimate of work to be accomplished in the subsequent reporting period (again, by subtask). The subtask number is used as identified in the work item schedule in Section 4.3. This Consultant Report is not an invoice (due separately) but a summary of work accomplished and hours logged. The Consultant Report is due the first week of the month for the preceding month's activities.
b) ITE staff will provide an indication of the percentage of each subtask completed for the work item, as part of the Monthly Progress Report, or as a revision of MS Project Schedule (included in the Monthly Progress Report). The Project Schedule is due the second week of the month for the preceding month's activities.
c) A NG TMDD management teleconference will be scheduled, on a recurring basis, as needed, to review schedule/progress, financial status, and troubleshoot performance. The teleconference may include: SDO staff, between SDO staff, and the NG TMDD Steering Committee co-chairs. The recurring frequency and time of the teleconference will be agreed by the management team.

The NG TMDD Steering Committee co-chairs, in consultation with SDO staff, may create subgroups of the NG TMDD Steering Committee to focus on technical specialties or to expedite the resolution of unforeseen issues, particularly during the Design Task.

The NG TMDD Steering Committee co-chairs and SDO staff will use the TMDD email listserv reflector provided by ITE for communications with the NG TMDD Steering Committee members and interested parties. The NG TMDD Steering Committee co-chairs will use and maintain the TMDD work area of the ITE website (see https://www.ite.org/technical-resources/standards/tmdd/) and the email listserv reflector for meeting agendas, meeting minutes, work item documents and interim work item products

SDO staff will notify the paid work item consultants and those participants pre-approved for travel reimbursement of the ITE policies and procedures, and seek appropriate government approval for such travel.

Table 3 identifies the entire NG TMDD Standard Project Team, their roles within the project, their project responsibilities and their reporting responsibilities

Table 3. NG TMDD Standard Project Team and Reporting

Name	Project Role	Responsibilities	Reporting
		•	•
Benison, Douglas ConSysTec Doug.benison@consystec.com	Subject Matter Expert	• Part of the Project Management Team. • Works with the ITE program manager to maintain project reporting required by the USDOT. • Prepares and maintains the PMP and MS Project schedule. • Plays a quality management function on deliverables. • Provides leadership for the rest of the consulting team. • Prepares project policies and procedures. • Organizes meetings and keeps records. • Coordinates with the Chairs of the NG TMDD Steering Committee Maintains communication and consensus building within the WG.	• Provides weekly progress reports to the Project Administrator/Coordinator per Section 4.2 including an updated Microsoft Project Schedule.
Chan, Patrick ConSysTec 718-767-5120 Patrick.chan@consystec.com	Systems Engineer	• Provides the rigor required to verify that a complete and correct product is being developed. • Prepares and maintains the SEMP. • Develops ConOps, Requirements documents. • Develop systems engineering portions of design documents, including the traceability matrices. • Develops the ballot and published versions of the standard. • Leads walkthroughs of documents at various stages of the project.	• Provides weekly progress reports to the Project Manager per Section 4.2.
Insignares, Manny ConSysTec Manny.insignares@consystec.com	Subject Matter Expert	• Plays a quality management function on deliverables. • Develops ConOps, Requirements documents. • Develop systems engineering portions of design documents, including the traceability matrices. • Develops the ballot and published versions of the standard.	
TBD	Subject Matter Expert	• Provides feedback on the ConOps, FRS, and SDD documents. • Participates in the walkthroughs	•
TBD	Application Developer	• Provides feedback on the FRS document. • Develop the SDD document. • Participates in the walkthrough.	• Provides weekly progress reports to the Project Manager per Section 4.2.
Narla, Siva ITE 202-785-0060 x119 snarla@ite.org	SDO (Lead)	• Part of the Project Management Team. • Official administration and coordination of the project from a contracts perspective. • Monitors project expenditures in labor, travel expenses and capital expenses. • Official project communications channel to the COR.	• Provides monthly progress reports to the COR per Section 4.1 including an updated Microsoft Project Schedule.

Name	Project Role	Responsibilities	Reporting
Rouse, Deborah ITE	Technical Editor	• Ensures project documents contain suitable material for the target audience. • Ensures project documents are organized in presentation. • Reviews project documents for grammatical and editorial errors. • Reviews project documents for proper word use and English diction.	• Provides weekly progress reports to the Project Manager per Section 4.2.
Tavares, Nicola ITE	SDO (Liaisons)	• Part of the Project Management Team. • Ensure conformance with NTCIP Procedures. • Ensure draft NTCIP 1218 v01 RSU content is developed in a manner consistent with other NTCIP standards, NTCIP 8002 Annex B1, and TPG format requirements to assure quality, consistency and clarity.	• Provides weekly progress reports to the Project Manager per Section 4.2.
White, Robert AASHTO rwhite@aashto.org	SDO (Liaisons)	• Part of the Project Management Team.	• Provides weekly progress reports to the Project Manager per Section 4.2.
TBD	NG TMDD Steering Committee Co-Chair	• Part of the Project Management Team. • Provides leadership of the NG TMDD Steering Committee to carry out the work items assigned by the TMDD Steering Committee. • Presides over NG TMDD Steering Committee teleconferences and meetings. • Focuses the effort of the NG TMDD Steering Committee to review documents and provide feedback to the ITE team in a timely fashion. • Builds consensus with the SC members.	• Provides reporting on the progress of the NG TMDD Standard project (via NG TMDD Coordinator) to the NG TMDD Steering Committee. • Makes requests for assistance from the NG TMDD Steering Committee Chair if there are NG Steering Committee issues that cannot be resolved.

Name	Project Role	Responsibilities	Reporting
TBD	NG TMDD Steering Committee Co-Chair	• Part of the Project Management Team. • Provides leadership of the NG TMDD Steering Committee to carry out the work items assigned by the TMDD Steering Committee. • Presides over NG TMDD Steering Committee teleconferences and meetings. • Focuses the effort of the NG TMDD Steering Committee to review documents and provide feedback to the ITE team in a timely fashion. • Builds consensus with the SC members.	• Provides reporting on the progress of the NG TMDD Standard project (via NG TMDD Coordinator) to the NG TMDD Steering Committee. • Makes requests for assistance from the NG TMDD Steering Committee Chair if there are NG Steering Committee issues that cannot be resolved.
		•	•

6.2 Management Tools and Reports

The following tools should be used for management of this work item:

Email for informal reports and messages;

- MS Word 2010 for general reports and documents;
- MS Project 2010 for schedule updates; and
- MS Access 2010 for maintaining a database of comments, their analysis and disposition for the various drafts of the NTCIP 1202 v03 standard.

6.3 Organizational Chart

Figure 7 shows an organizational chart for NG TMDD Project. The chart shows the project team including the NG TMDD Steering Committee due to its critical role in providing industry expertise and quality control. The project management team consists of the Project Administrator/Coordinator(s), the Project Manager and the NG TMDD Steering Committee Co-Chairs.

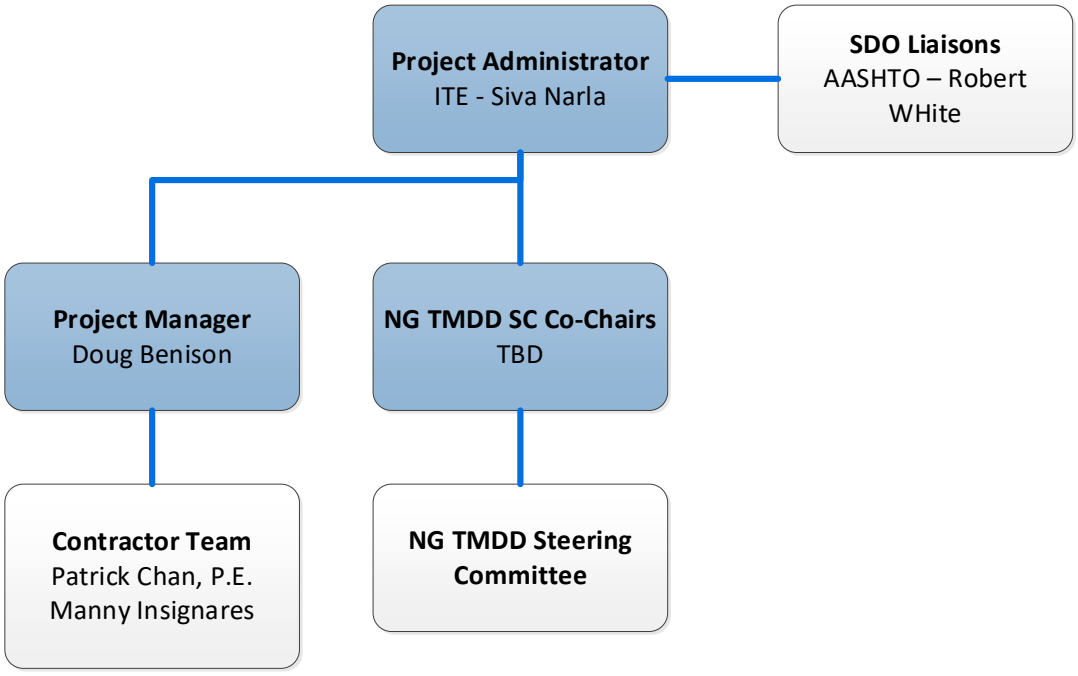

Figure 7. NG TMDD Project Organization

APPENDIX A – REFERENCES

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APPENDIX B – GLOSSARY, ACRONYMS, AND ABBREVIATIONS

Term	Definition
AASHTO	American Association of State Highway and Transportation Officials
C2C	Center-to-center
ConOps	Concept of Operations
CO	Contracting Officer
CTI	Connected Transportation Interoperability
CVPFS	Connected Vehicle Pooled Fund Study
HTTP	Hypertext Transfer Protocol
IOO	Infrastructure Owner Operators
ITE	Institute of Transportation Engineers
ITS	Intelligent Transportation Systems
JPO	Joint Program Office
JSON	Javascript Object Notation
NG TMDD	Next Generation Traffic Management Data Dictionary
NTCIP	National Transportation Communications for ITS Protocol
PMP	Project Management Plan
PRL	Protocol Requirements List
PWS	Performance Work Statement
REST	Representational State Transfer
RTM	Requirements Traceability Matrix
SC	Steering Committee
SDD	System Design Details
SDO	Standards Development Organization
SEMP	Systems Engineering Management Plan
SME	Subject Matter Expert
SRS	System Requirements Specification
TBD	To Be Determined
TIM	Traffic Incident Management
TMC	Traffic Management Center
TMDD	Traffic Management Data Dictionary
TOCOR	Task Order Contracting Officer's Representative
TOPR	Task Order Proposal Request
UCD	User Comment Draft
USDOT	United States Department of Transportation

Term	Definition
Walkthrough	A step-by-step presentation by the author of a document in order to gather information and to establish a common understanding of its content.
WBS	Work Breakdown Structure
WZDx	Work Zone Data Exchange
XML	eXtensible Markup Language

APPENDIX C – PROJECT TEAM RESUMES

This section will be updated

APPENDIX D – WORK EFFORT BY ORGANIZATION AND INVOICING TEMPLATES

The level of effort (labor hours for each subITE) and the Prime ITE for Task 13-003 are set for in Appendices D1 through D5, by WBS.

By SubITE:

1. Resources by labor classification
2. Total number of hours for each subITE,
3. An estimated number of hours for each resource,
4. Total number of estimated hours for each WBS-Sub-deliverable;
5. Percent of total hours for each WBS-Sub-deliverable compared to the total Number of hours in the subITE's budget. This % is developed by using the number of hours for each WBS Sub-deliverable and the total hours dedicated for subITE. For example, if total hours in subcontract= 1,000 hours and there is 100 in a WBS deliverable, 100/1,000=10%.
6. Percent of Total Budget. The percent of total budget is calculated by taking #5 above, the percent of total hours and multiplying this by the total subcontract amount. Thus, if the contract is valued at $100,000 and the WBS Sub-deliverable is valued at 10 percent, the value of the subITE's sub-deliverable is valued at $10,000 when completed and accepted by the client.

Sample Composite Invoice

A sample subITE composite invoice is shown in Appendix D4. It provides sample invoices for a calendar period for ConSysTec, and a Composite Invoice. The composite invoice shows the percentage total invoiced, for all WBS sub-deliverables and the end of the invoice, shows, and the bottom-line, in terms of the percentage completion in terms of dollars for invoiced for the project and total percentage completion. Based on the schedule, it is the intent for ITE to develop an "earned value lite" or performance index for each invoicing period once the project is underway.

Progress will measured by the criteria shown in the PMP and repeated again:

1. A sub-deliverable may be invoiced to the USDOT when a first draft is completed and submitted. The value agreed upon by all parties to this Contract is 35%.
2. A sub-deliverable may be invoiced to the USDOT when comments are incorporated in a subsequent draft or drafts of a deliverable. These subsequent drafts are to be completed and submitted to the USDOT. The comprehensive value agreed upon by all parties to this Contract is 65%. The incremental value is 30% (65% minus 35%).
3. A sub-deliverable may be invoiced to the USDOT when a final deliverable is acceptable and approved in writing by the USDOT. The comprehensive value agreed upon by all parties to this Contract is 100%. The incremental value is 35% (100% minus 65%).

SubITE agreements to ITE will be performance-based. They will be fixed-fee and will be billed based on the percentage completion of each deliverable noted in the Appendices incorporated herein. As discussed in the kick-off meeting of 18 December 2013, ITE and the subITEs may mutually agree to modify the allocation of hours between WBS's if they do not materially change the nature of the Task. If there appears for a material modification in the allocation of WBS level of effort, ITE will seek guidance from USDOT COR and CO on how to best handle the situation.