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Connected Corridors: I-210 Pilot Integrated Corridor Management System

System Interface Design Specification

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Version 1.0

Partners for Advanced Transportation Technology works with researchers, practitioners, and industry to implement transportation research and innovation, including products and services that improve the efficiency, safety, and security of the transportation system

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1. INTRODUCTION

This document provides the data dictionary for the Connected Corridors ICM system.

Note: This is a first version of the data interface specification. Typically, the data interface specification would be the result of system requirements, high-level design, subsystem requirements, and detailed design, with continuous updates as the system progresses through its lifecycle. With the size and complexity of the Connected Corridors ICM system, substantial changes can be expected from this first version. The primary purpose of this initial document is to create an initial framework from which the final system data specification can be developed as the system is defined, developed, and implemented.

This initial version accomplishes the following:

- Establishes the Transportation Management Data Dictionary (TMDD) version 3.03d as a standard for describing data transfer both with systems that provide information and within subsystems of the ICM system whenever applicable
- Provides an initial specification of the TMDD elements that are expected to be required for Connected Corridors
- Identifies a limited number of initial extensions to TMDD that will be necessary from the initial system requirements document
- Identifies types of data (from a review of the initial system requirements document) for which TMDD will not be appropriate, along with other specifications that may be more suitable for each type of data identified. Note that this document does not yet choose specific standards or specifications outside of TMDD, but rather recommends possible alternatives. As the system requirements and design process progresses, and more detail becomes available, it will then be appropriate to select from possible alternatives and provide additional detail regarding implementation of those standards and specifications.
- Resolves issues within the TMDD specifications regarding SOAP implementation, making the result compliant with the WSI Basic Profile 2.0 specification.

The changes that can be expected as the system requirements and design process continues include:

- Selection and identification of the specific standards and specifications for information not related to TMDD
- Details of implementation of those selected standards and specifications
- Additional data formatting and type information
- Subsystem data definition implementation details, where differences between subsystems may exist
- References to source system data specifications, where available
- References to target system data specifications, where available
- Details of data definition mappings between systems that provide or consume information to/from the ICM system

The Connected Corridors ICM system is fundamentally a data-driven system, with a significant volume of information from multiple systems located in multiple jurisdictions being received by the system for processing, decision support, traffic state determination, traffic prediction, status monitoring, control, storage, and system management. This data will include:

1. Corridor asset inventory describing the physical road, infrastructure such as intersection signals and ramp meters, sensors available, and organizational assets such as decision authorities and incidence response assets.
2. Corridor asset state information, indicating the current state of the corridor assets such as road condition, signal plans currently being implemented, and availability of incidence response assets.
3. Traffic data, characterizing the current state of traffic, including sensor data.
4. ICM traffic state and traffic forecast information.
5. ICM response plan information, including response plans developed, response plans implemented, response plan workflow and approval information, response plan execution results.
6. System rules used for creation, analysis, and implementation of response plans.
7. Corridor and system metrics and analysis results.
8. System information, such as system security data (users, roles, permissions), system maintenance data, data archives, system and user configuration information, system configuration management, and system activity logs.

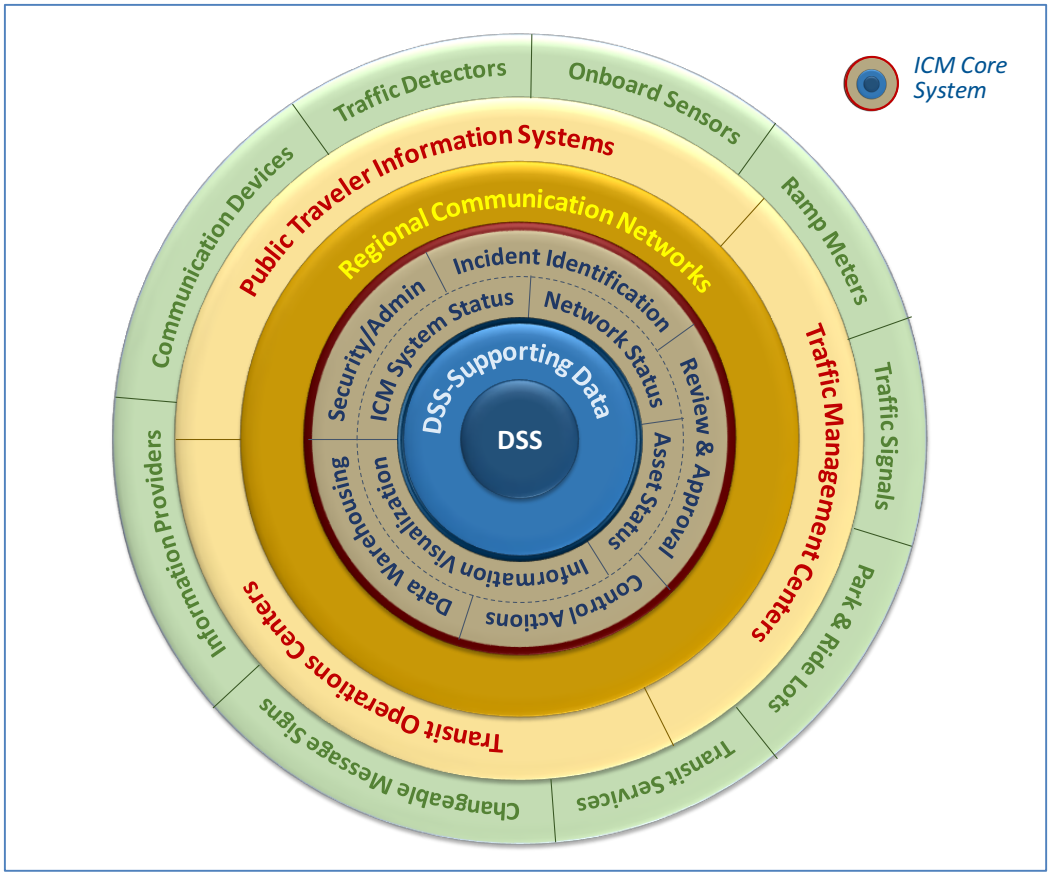

Figure 1 – High-Level ICM System Conceptual Diagram

Figure 1 provides a high-level concept view of the Connected Corridors ICM system. The ICM system consists of an ICM Core System that contains incident detection, corridor state/status functions, traffic state determination and prediction, system management functions, information visualization and reporting, decision support functions, data management functions, system management functions, response plan development, and corridor control functions.

The ICM Core System is part of the larger ICM Environment, which contains the primary systems that provide information to the ICM Core System and that consume the response plans from the ICM Core System. These ICM Environment elements include regional and local transportation communication networks and transportation management systems, public traveler information systems, the transportation network elements connected to those systems (sensors, ramp meters, intersection signals, organizational assets, changeable message signs, etc.), parking resources, and transit systems.

This document provides the following information for data within the ICM Core System and the ICM Environment:

1. Defines TMDD as the standard for data elements and Application Programming Interfaces (APIs) whenever applicable.
2. Defines which TMDD messages are required for system operation.
3. Lists and defines data classes and their attributes to be stored within the data hub (currently attributes for TMDD classes and expected extensions only).
4. Provides an inventory of current known sources of information for the system.

Note: This is a preliminary version of the document and is subject to revision as the design and development of the system progresses. It is expected that as the requirements and design process continues, significant additions and revisions will be required.

1.1. DOCUMENT ORGANIZATION

This document is organized into two primary sections:

- **Data Inventory**—The Data Inventory (section 2) lists, at a high level, the assets which are used in the I-210 Connected Corridors ICM project. Assets consist of elements such as physical roads, freeway sensors, changeable message signs, intersection signals, ramp meters, arterial traffic sensors, road maintenance crews, emergency personnel, and organizations.

- **Data Dictionary**—The Data Dictionary (section 3) specifies the data format specifications for data, the data elements and types, and the descriptions and definition of data elements within the system. The data classes, types, and their elements are organized in this document by a set of data layers that are distinguished by the function they perform within the system and the frequency by which the information is provided to or updated within the system. The Data Dictionary section provides information about the TMDD messages that are applicable to the specific data layer and the data contained within those messages. As the system requirements and design process continues, additional information about other types of data required, their specifications, and data storage details will be provided as well.

1.2. DATA LAYERS

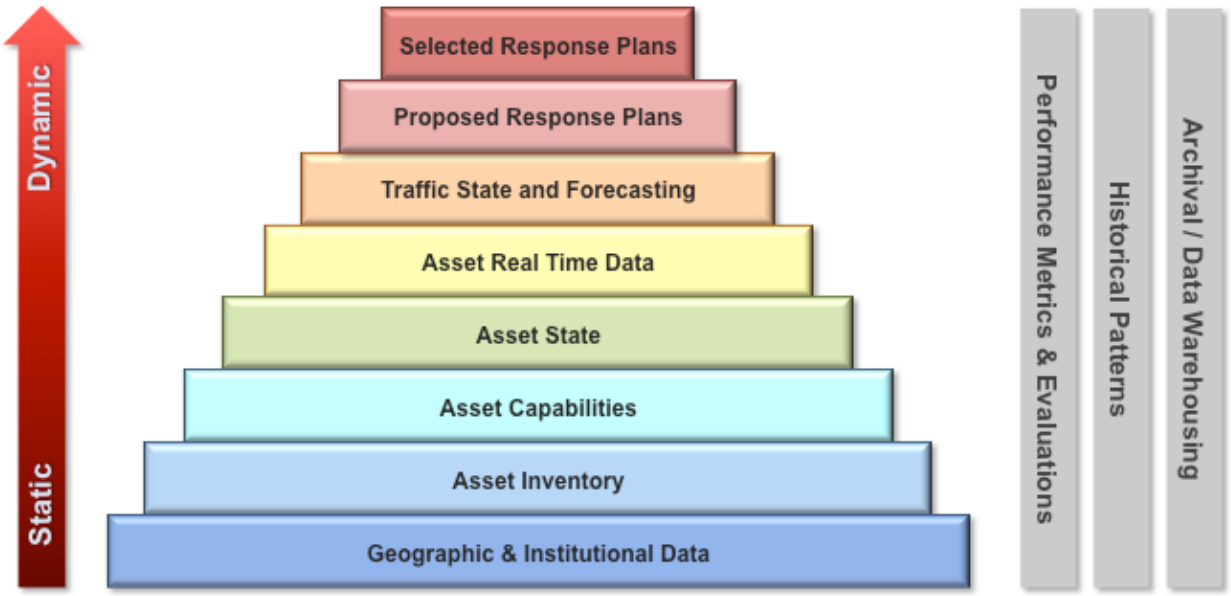

Figure 2 - Data Layers

To assist with categorization of the data, different types of data can be categorized into the data layers shown in Figure 2 and listed below, starting with the most static data and becoming progressively more dynamic. Primary data layers include the Geographic and Institutional Data, Asset Inventories, Asset Capabilities, Asset State, Asset Real-Time Data, Traffic State and Forecasting data, Proposed Response Plans, and Selected Response Plans. Cross-cutting and supporting data layers include those on the right of Figure 2, including Performance Metrics and Evaluations, Historical Pattern data, and Archive and Data Warehouse information.

1.2.1. Primary Data Layers

1.2.1.1. Geographic and Institutional Data

This layer includes base map information, geographic and geospatial information, political information, jurisdictional information, and organizational information at the highest institutional level.

1.2.1.2. Asset Inventory: Transportation Networks, Physical Infrastructure, Departments

This layer contains the transportation networks (roadways, transit, pedestrian) in the corridor and the assets (signals, ramp meters, sensors, etc.) within those networks. The assets are summarized by type in the inventory section of this document. Organizational Departmental Information is also contained in this layer.

1.2.1.3. Asset Capabilities: Signal Plans, Ramp Plans, Organizational Availability, and Traveler Behavior Information

This layer contains signal plan and ramp plan data associated with the assets in the physical infrastructure layer. It also contains traveler behavior information for the transportation networks: fundamental diagrams, demands and split ratios. It also contains working hours for response crews and other organizational assets.

1.2.1.4. Asset States

This layer contains the current status of each asset listed in the inventory, such as road closures or devices that are not working, or response crew availability.

1.2.1.5. Asset Real-Time Data

This layer contains the real-time data reported by each device or asset such as the data contained in the PeMS and IEN data feed, and requests to control assets in the corridor.

1.2.1.6. Traffic State and Traffic Forecasts

This layer contains the traffic state estimation and traffic forecast data.

1.2.1.7. Proposed Response Plans

This layer includes details of the proposed response plans, including the properties of each plan and model prediction results.

1.2.1.8. Selected Response Plan

This layer includes details of the selected response plan, regardless of whether the plan is implemented or not. It also includes the real-time implementation results of any deployed response plan.

1.2.2. Cross-cutting Layers

There are three categories of system data that cross multiple data layers: performance metrics and evaluation, historical patterns, and archival and data warehousing.

Note: These three layers, and in particular the historical patterns and archival data and warehousing are highly dependent and duplicative of the data in the other layers. As requirements and design processes for the ICM system development progress, additional sections will be added to this document to provide specifications for these layers. At this time, however, these layers are not being specified in this document.

1.2.2.1. Performance Metrics and Evaluations

In order to evaluate how well a selected response plan worked, performance metrics will be defined and stored in the system. The metrics of the selected response plan, as well as the other proposed response plans can be evaluated and compared to each other and to the actual traffic that resulted after implementing the selected response plan. This layer will also include the information necessary for post-incident analysis, as well as overall system performance analysis, either quarterly or annually.

1.2.2.2. Historical Patterns

Historical traffic patterns can be used to assist in developing scenarios for estimation, particularly in the areas of demand and split ratios.

1.2.2.3. Archival and Data Warehousing

The data warehouse will store the data coming into the ICM system. This data will feed the Decision Support System and will be used for the performance metrics and historical patterns described above. It can also be used for reporting and other analysis as needed.

1.3. ADDITIONAL LAYERS AND INFORMATION

There are additional sections in this document that describe both common base data elements (Global Data Elements) that are used throughout the different layers, and data classes that are used by the system itself (System Data Classes) and do not represent traffic entities.

2. DATA INVENTORY

This section identifies the data sources that may be used to support the operation of the ICM System.

Expected data sources:

Source	Information Type	System	Vendor	Product
CHP CAD	Incident	CAD	Manual input by operator	CHP CAD
Caltrans incident	Incident	Caltrans ATMS	Parsons	Custom
Caltrans FW Lane closure	Lane status	LCS		
LA County	Lane status	City Lane Closure System (HSR)		
Pasadena	Lane status	City Lane Closure System (HSR)		
Arcadia	Lane status	City Lane Closure System (HSR)		
Duarte	Lane status	City Lane Closure System (HSR)		
Monrovia	Lane status	City Lane Closure System (HSR)		
Caltrans FW Traffic	Loop sensing	PeMS (Caltrans D7 ATMS)	Parsons	Custom
Caltrans Intersections	Intersection signal	TSMSS	Transcore	Transuite
Pasadena	Intersection signal	• i2 Traffic Management System • QuickNet Traffic Management System • SCATS Traffic Management System • Transparity	McCain	Transparity
LA County	Intersection signal	County TMC	Kimley Horne	KITS
Arcadia	Intersection signal	Arcadia TMC	Transcore	Transuite
Duarte	Intersection signal	County TMC	Kimley Horne	KITS
Monrovia	Intersection signal	County TMC	Kimley Horne	KITS
Caltrans FW Ramps	Ramp meters	Caltrans ATMS	Parsons	Custom
Caltrans Video	Video	via RIITS		

Source	Information Type	System	Vendor	Product
Pasadena	Video	RIITS		
Arcadia	Video	RIITS		
Caltrans FW CMS	DMS	Caltrans ATMS	Parsons	Custom
LA County	DMS	Corridor Trailblazer		
Arcadia	DMS	Corridor Trailblazer		
Duarte	DMS	Corridor Trailblazer		
Monrovia	DMS	Corridor Trailblazer		
Metro	Transit	Gold Line (NextBus)	NextBus	
Metro	Transit	• Metro Bus CAD/AVL (RIITS) • Metro Rail CAD/AVL(RIITS)		
Foothill Transit	Transit	Foothill Transit CAD/AVL(RIITS)		
Pasadena Transit	Transit	Pasadena Transit CAD/AVL(RIITS)		
RIITS Environmental sensing	Environmental	RIITS		
Bluetooth traffic 1	Travel time	Vendor	Iteris or Other	
Bluetooth traffic 2	Travel time	County TMC	Unknown	

Other potential data sources:

Source Agency	Information Type	System
CHP	Incident Reports	Traffic Incident Information Webpage (Sigalerts)
FSP	Incident Reports	Unknown
County Sheriff	Incident Reports	Unknown
Pasadena PD	Incident Reports	Pasadena Traffic Record System
Arcadia PD	Incident Reports	Unknown
Monrovia PD	Incident Reports	Unknown
Duarte PD	Incident Reports	Unknown
Verdugo Fire Communications Center	Incident Reports	Verdugo Fire Communications CAD
Waze	Incident Reports	Crowdsourced reported incidents
Caltrans	Travel time measurements	None
LA County	Travel time measurements	None

Source Agency	Information Type	System
Pasadena	Travel time measurements	Digiwest BlueMAC Bluetooth sensor network
Arcadia	Travel time measurements	Iteris Vantage Velocity Bluetooth sensor network
Monrovia	Travel time measurements	None
Duarte	Travel time measurements	None
Metro/SCAG	Average link speeds	INRIX database
HERE	Point measurements	HERE vehicle tracking data
HERE	Vehicle tracking; route patterns	HERE vehicle tracking data
Google/Waze	Vehicle tracking; route patterns	Vehicle tracking system?
LA County	CCTV Feeds	1 camera (COHU)
Monrovia	CCTV Feeds	2 cameras
Duarte	CCTV Feeds	None
Pasadena	CMS status	• McCain (4 signs) • Skyline (1 sign) • Daktronics (Future signs)
	Parking Occupancy	Unknown
	Weather Information	Weather stations installed within I-210 corridor
	Weather Information	Unknown

TSMSS – Traffic Signal Management and Surveillance Systems

The table below contains names of various TMDD dialogs and identifies who needs to be capable of handling those dialogs. The numbers in the columns (1-9) refer to the systems below:

1. Caltrans ATMS
2. Caltrans LCS
3. Caltrans TSMSS - Transuite
4. Arcadia TMC - Transuite
5. County TMC - KITS
6. Pasadena TMC - Transparity
7. City Lane Closure System (HSR)
8. Corridor Trailblazer
9. RIITS

Legend: R = Required
N = Not Required
F = Not Required for Current I-210 Operations, Future Corridors As Needed
* = As needed

Dialog Name	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**Corridor Mgmt System**
dlCCTVControlRequest	N	N	N	N	N	N	N	N	R	R
dlCCTVInventoryRequest	N	N	N	N	N	N	N	N	R	R
dlCCTVInventoryUpdate	N	N	N	N	N	N	N	N	R	R
dlCCTVStatusRequest	N	N	N	N	N	N	N	N	R	R
dlCCTVStatusUpdate	N	N	N	N	N	N	N	N	R	R
dlCenterActiveVerificationRequest	R	R	R	R	R	R	R	R	R	R
dlCenterActiveVerificationSubscription	R	R	R	R	R	R	R	R	R	R
dlCenterActiveVerificationUpdate	R	R	R	R	R	R	R	R	R	R
dlDetectorDataRequest	R	*	R	R	R	R	*	*	*	R
dlDetectorDataSubscription	R	*	R	R	R	R	*	*	*	R
dlDetectorDataUpdate	R	*	R	R	R	R	*	*	*	R
dlDetectorInventoryRequest	R	*	R	R	R	R	*	*	*	R
dlDetectorInventoryUpdate	R	*	R	R	R	R	*	*	*	R
dlDetectorMaintenanceHistoryRequest	R	*	R	R	R	R	*	*	*	R
dlDetectorStatusRequest	R	*	R	R	R	R	*	*	*	R
dlDetectorStatusUpdate	R	*	R	R	R	R	*	*	*	R
dlDeviceCancelControlRequest	R	R	R	R	R	R	R	R	N	R
dlDeviceControlStatusRequest	R	R	R	R	R	R	R	R	N	R
dlDeviceInformationSubscription	R	R	R	R	R	R	R	R	R	R
dlDMSControlRequest	R	N	N	N	N	N	N	R	N	R
dlDMSFontTableRequest	N	N	N	N	N	N	N	N	N	N
dlDMSInventoryRequest	R	N	N	N	N	N	N	R	N	R
dlDMSInventoryUpdate	R	N	N	N	N	N	N	R	N	R
dlDMSMessageAppearanceRequest	R	N	N	N	N	N	N	R	N	R
dlDMSMessageInventoryRequest	R	N	N	N	N	N	N	R	N	R
dlDMSMessageInventorySubscription	R	N	N	N	N	N	N	R	N	R
dlDMSMessageInventoryUpdate	R	N	N	N	N	N	N	R	N	R
dlDMSPriorityQueueRequest	R	N	N	N	N	N	N	R	N	R
dlDMSStatusRequest	R	N	N	N	N	N	N	R	N	R

Dialog Name	1	2	3	4	5	6	7	8	9	Corridor Mgmt System
dlDMSStatusUpdate	R	N	N	N	N	N	N	R	N	R
dlESSInventoryRequest	N	N	N	N	N	N	N	N	R	R
dlESSInventoryUpdate	N	N	N	N	N	N	N	N	R	R
dlESSObservationMetadataRequest	N	N	N	N	N	N	N	N	R	R
dlESSObservationReportRequest	N	N	N	N	N	N	N	N	R	R
dlESSObservationReportUpdate	N	N	N	N	N	N	N	N	R	R
dlESSStatusRequest	N	N	N	N	N	N	N	N	R	R
dlESSStatusUpdate	N	N	N	N	N	N	N	N	R	R
dlEventIndexRequest	R	*	N	N	N	N	*	*	*	R
dlEventIndexSubscription	R	*	N	N	N	N	*	*	*	R
dlEventIndexUpdate	R	*	N	N	N	N	*	*	*	R
dlFullEventUpdateRequest	R	*	N	N	N	N	*	*	*	R
dlFullEventUpdateSubscription	R	*	N	N	N	N	*	*	*	R
dlFullEventUpdateUpdate	R	*	N	N	N	N	*	*	*	R
dlHARControlRequest	N	N	N	N	N	N	N	N	N	R
dlHARControlScheduleRequest	N	N	N	N	N	N	N	N	N	R
dlHARControlScheduleUpdate	N	N	N	N	N	N	N	N	N	R
dlHARInventoryUpdate	N	N	N	N	N	N	N	N	N	R
dlHARInventoryRequest	N	N	N	N	N	N	N	N	N	R
dlHARMessageInventoryRequest	N	N	N	N	N	N	N	N	N	R
dlHARMessageInventoryUpdate	N	N	N	N	N	N	N	N	N	R
dlHARPriorityQueueRequest	N	N	N	N	N	N	N	N	N	R
dlHARStatusRequest	N	N	N	N	N	N	N	N	N	R
dlHARStatusUpdate	N	N	N	N	N	N	N	N	N	R
dlIntersectionSignalControlRequest	N	N	R	R	R	R	N	N	N	R
dlIntersectionSignalControlScheduleRequest	N	N	R	R	R	R	N	N	N	R
dlIntersectionSignalControlScheduleUpdate	N	N	R	R	R	R	N	N	N	R
dlIntersectionSignalInventoryRequest	N	N	R	R	R	R	N	N	N	R
dlIntersectionSignalInventoryUpdate	N	N	R	R	R	R	N	N	N	R
dlIntersectionSignalPriorityQueueRequest	N	N	R	R	R	R	N	N	N	R
dlIntersectionSignalStatusRequest	N	N	R	R	R	R	N	N	N	R
dlIntersectionSignalStatusUpdate	N	N	R	R	R	R	N	N	N	R
dlIntersectionSignalTiming PatternInventoryRequest	N	N	R	R	R	R	N	N	N	R
dlIntersectionSignalTiming PatternInventorySubscription	N	N	R	R	R	R	N	N	N	R
dlIntersectionSignalTimingPatternInventoryUpdate	N	N	R	R	R	R	N	N	N	R
dlLCSControlRequest	N	R	N	N	N	N	R	N	N	R
dlLCSControlScheduleRequest	N	R	N	N	N	N	R	N	N	R
dlLCSControlScheduleUpdate	N	R	N	N	N	N	R	N	N	R
dlLCSInventoryRequest	N	R	N	N	N	N	R	N	N	R
dlLCSInventoryUpdate	N	R	N	N	N	N	R	N	N	R
dlLCSStatusRequest	N	R	N	N	N	N	R	N	N	R
dlLCSStatusUpdate	N	R	N	N	N	N	R	N	N	R
dlLinkInventoryRequest	R	*	N	N	N	N	*	*	*	R
dlLinkInventoryUpdate	R	*	N	N	N	N	*	*	*	R
dlLinkStatusRequest	*	*	N	N	N	N	*	*	*	*
dlLinkStatusUpdate	*	*	N	N	N	N	*	*	*	*
dlNodeInventoryRequest	R	*	N	N	N	N	*	*	*	R
dlNodeInventoryUpdate	R	*	N	N	N	N	*	*	*	R

Dialog Name	1	2	3	4	5	6	7	8	9	Corridor Mgmt System
dlNodeStatusRequest	*	*	N	N	N	N	*	*	*	*
dlNodeStatusUpdate	*	*	N	N	N	N	*	*	*	*
dlOrganizationInformationRequest	R	R	R	R	R	R	R	R	R	R
dlOrganizationInformationSubscription	R	R	R	R	R	R	R	R	R	R
dlOrganizationInformationUpdate	R	R	R	R	R	R	R	R	R	R
dlRampMeterControlRequest	R	N	N	N	N	N	N	N	N	R
dlRampMeterControlScheduleRequest	F	N	N	N	N	N	N	N	N	F
dlRampMeterControlScheduleUpdate	F	N	N	N	N	N	N	N	N	F
dlRampMeterInventoryRequest	R	N	N	N	N	N	N	N	N	R
dlRampMeterInventoryUpdate	R	N	N	N	N	N	N	N	N	R
dlRampMeterPlanInventoryRequest	F	N	N	N	N	N	N	N	N	F
dlRampMeterPlanInventorySubscription	F	N	N	N	N	N	N	N	N	F
dlRampMeterPlanInventoryUpdate	F	N	N	N	N	N	N	N	N	F
dlRampMeterPriorityQueueRequest	F	N	N	N	N	N	N	N	N	F
dlRampMeterStatusRequest	R	N	N	N	N	N	N	N	N	R
dlRampMeterStatusUpdate	R	N	N	N	N	N	N	N	N	R
dlResponsePlanApprovalRequest	R	N	N	N	N	N	N	N	N	R
dlResponsePlanApprovalSubscription	R	N	N	N	N	N	N	N	N	R
dlResponsePlanApprovalUpdate	R	N	N	N	N	N	N	N	N	R
dlResponsePlanLogRequest	N	N	N	N	N	N	N	N	N	R
dlResponsePlanLogSubscription	N	N	N	N	N	N	N	N	N	R
dlResponsePlanLogUpdate	N	N	N	N	N	N	N	N	N	R
dlResponsePlanStatusRequest	R	N	N	N	N	N	N	N	N	R
dlResponsePlanStatusSubscription	R	N	N	N	N	N	N	N	N	R
dlResponsePlanStatusUpdate	R	N	N	N	N	N	N	N	N	R
dlResponsePlanRequest	R	N	N	N	N	N	N	N	N	R
dlResponsePlanSubscription	R	N	N	N	N	N	N	N	N	R
dlResponsePlanTerminationRequest	N	N	N	N	N	N	N	N	N	R
dlResponsePlanUpdate	R	N	N	N	N	N	N	N	N	R
dlRouteInventoryRequest	R	*	N	N	N	N	*	*	*	R
dlRouteInventoryUpdate	R	*	N	N	N	N	*	*	*	R
dlRouteStatusRequest	R	*	N	N	N	N	*	*	*	R
dlRouteStatusUpdate	R	*	N	N	N	N	*	*	*	R
dlSectionControlRequest	N	N	R	R	R	R	N	N	N	R
dlSectionControlScheduleRequest	N	N	R	R	R	R	N	N	N	R
dlSectionControlScheduleUpdate	N	N	R	R	R	R	N	N	N	R
dlSectionControlStatusRequest	N	N	R	R	R	R	N	N	N	R
dlSectionPriorityQueueRequest	N	N	R	R	R	R	N	N	N	R
dlSectionSignalTimingPatternInventoryRequest	N	N	R	R	R	R	N	N	N	R
dlSectionSignalTimingPatternInventorySubscription	N	N	R	R	R	R	N	N	N	R
dlSectionSignalTimingPatternInventoryUpdate	N	N	R	R	R	R	N	N	N	R
dlSectionStatusRequest	N	N	R	R	R	R	N	N	N	R
dlSectionStatusUpdate	N	N	R	R	R	R	N	N	N	R
dlTrafficNetworkInformationSubscription	R	*	N	N	N	N	*	*	*	R
dlVideoSwitchInventoryRequest	N	N	N	N	N	N	N	N	*	*
dlVideoSwitchInventoryUpdate	N	N	N	N	N	N	N	N	*	*
dlVideoSwitchStatusRequest	N	N	N	N	N	N	N	N	*	*
dlVideoSwitchStatusUpdate	N	N	N	N	N	N	N	N	*	*

3. DATA DICTIONARY

This data dictionary provides basic data class descriptions for ICM data objects. It is broken down by the layers described in Figure 2 - Data Layers. Generic data elements that are frequently referenced as data types within the primary classes are included in a section for Global Data Elements.

Some of the data frames below have a "CC Required" column which is used when one or more elements in the data frame are optional in TMDD but are required in order for the Connected Corridors system to operate. It also indicates extensions to TMDD which are required for Connected Corridors. Regardless of whether or not a "CC Required" column appears in the data frame, **all elements and data frames must comply with the TMDD 3.03d standard**.

3.1. GLOBAL DATA ELEMENTS

The Global Data elements provide a set of base data elements that are often referenced in multiple data layers and provide common data elements such as time, person, or location information for different data classes.

3.1.1. DateTimeZone

This data frame is used to describe date and time information, including time zone information. This is the same as the DateTimeZone data frame described in TMDD 3.3.10.1.

Attribute Name	Type/Element	Reference	CC Required
Date	Element		Yes
Time	Element		Yes
Offset	Element		No

3.1.2. ContactDetails

This data frame contains contact information for a specific person but it can also be used for a group.

This is the same as the ContactDetails data frame described in TMDD 3.3.16.1.

Attribute Name	Type/Element	Reference	CC Required
Contact-Id	Element		Yes

Attribute Name	Type/Element	Reference	CC Required
Person-Name	Element		No
Person-Title	Element		No
Phone-Number	Element		No
Phone-Alternate	Element		No
Mobile-Phone-Number	Element		No
Mobile-Phone-Id	Element		No
Fax-Number	Element		No
Pager-Number	Element		No
Pager-Id	Element		No
Email-Address	Element		No
Radio-Unit	Element		No
Address-Line1	Element		No
Address-Line2	Element		No
City	Element		No
State	Element		No
Zip-Code	Element		No
Country	Element		No

3.1.3. GeoLocation

This data frame specifies the geographic location of a device, building or any other object.

This is the same as the GeoLocation data frame described in TMDD 3.6.9.4.

Attribute Name	Type/Element	Reference	CC Required
Latitude	Element		Yes
Longitude	Element		Yes
Horizontal-Datum	Element		No
Height	Type: Height	TMDD 3.6.9.5	No

3.1.4. Height

This data frame specifies the height of an object and is the same as the Height data frame described in TMDD 3.6.9.5.

Attribute Name	Type/Element	Reference	CC Required
Altitude	Element		Yes
Verticaldatum	Element		Yes
Verticallevel	Element		No

3.1.5. UrlReference

This data frame specifies a uniform resource locator and is the same as the UrlReference data frame described in TMDD 3.3.10.2.

Attribute Name	Type/Element	Reference	CC Required
Url-Reference	Element		Yes
Url-Reference-Medium	Element		No

3.1.6. BoundingBox

This is an extended data frame which contains the dimensions of a bounding box as well-known text. It is used to define a zone-of-influence for an event per System Requirements specs 8.4.5, 8.4.4 and 8.5.2.4.

Attribute Name	Type/Element	Reference
Bounding-Box-Wkt	Element: well-known-text	

3.1.7. LinkRestrictions

This is an extended data frame which contains additional attributes for a link.

Attribute Name	Type/Element	Reference	Description
Time-Restrictions	Type: TBD	System Requirements spec 8.5.2.3	Times during which links are not available for detours such as when children are walking to/from schools or arterials are heavily travelled by buses.
HOV-Lane-Count	Element: Number of HOV lanes	System Requirements spec 8.7.1.2	For freeway segment, on-ramp or freeway-to-freeway connector
HOV-Restriction-Type	Element: 2+ or 3+ occupants	System Requirements spec 8.7.1.2	For freeway segment, on-ramp or freeway-to-freeway connector

Attribute Name	Type/Element	Reference	Description
HOV-Time-Restrictions	Type: TBD	System Requirements spec 8.7.1.2	For freeway segment, on-ramp or freeway-to-freeway connector: Periods during which HOV restriction is in effect

3.2. LAYER: GEOGRAPHIC AND INSTITUTIONAL DATA

Geographic and Institutional data includes information regarding:

- Geographic and institutional boundaries
- Organizational information, including listings and details regarding organizations and individuals
- Ownership information
- Map- and location-based information

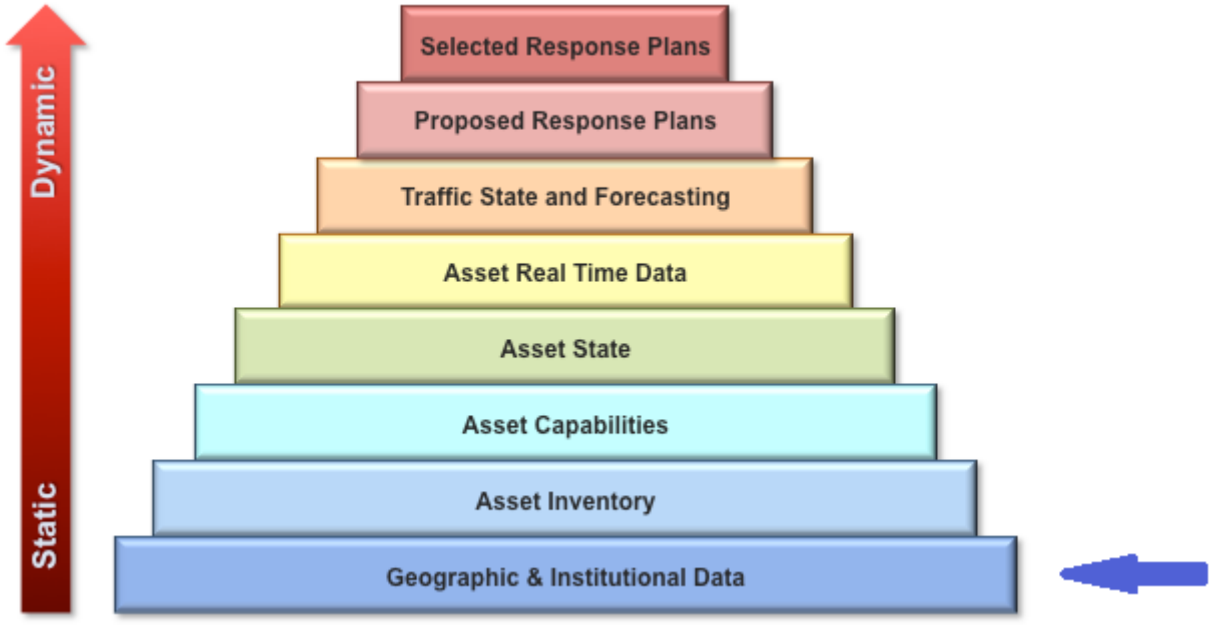

Figure 3 - Geographic & Institutional Layer

3.2.1. Data Messages

TMDD Message Dialogs include the following:

Name	Reference	Description
dlOrganizationInformationRequest	TMDD 3.1.15.1	Request for Organization and Center Information
dlOrganizationInformationSubscription	TMDD 3.1.15.2	Request for subscription to updates to Organization and Center Information

Other messaging dialogs required include the following:

Name	Reference	Description
Maps API	Google Maps API (https://developers.google.com/maps/documentation/javascript/reference?hl=en) or HERE Maps API (https://developer.here.com/documentation)	Requests for mapping tile and map based information for display
Map Information	Map information subscription	Downloaded updates for map and geospatial information required for Decision Support System

3.2.2. Data Class Descriptions

Data Class Descriptions include data elements for basic objects. Classes may be referenced within other classes (parent classes), and may be referenced in multiple parent classes. These do not represent database structures, but instead are based primarily on TMDD, or are structured similarly. Database design is expected to occur during system design.

See the beginning of section 3 for a description of the "CC Required" column.

3.2.2.1. Organization Class

3.2.2.1.1. OrganizationCenterInformation

This provides information for an organization center and is the same as the OrganizationCenterInformation data frame in TMDD 3.3.16.2.

Attribute Name	Type/Element	Reference	CC Required
Center-Id	Element		Yes
Center-Name	Element		No
Center-Location	Type: GeoLocation	TMDD 3.6.9.4	No

Attribute Name	Type/Element	Reference	CC Required
Center-Description	Element		No
Center-Type	Element		No
Center-Contact-Details	Type: Contact Details	TMDD 3.3.16.1	No

3.2.2.1.2. OrganizationInformation

The organization class can specify organizations, departments, teams, crews, etc. An organization can also specify a parent organization so that a hierarchy can be defined.

This provides basic Organization information and is similar to the OrganizationInformation data frame in TMDD 3.3.16.3 with the addition of the Parent-Organization element.

Attribute Name	Type/Element	Reference	CC Required
Organization-Id	Element		Yes
Organization-Name	Element		No
Organization-Location	Element		No
Organization-Function	Element		No
Organization-Contact-Details	Type: Contact Details	TMDD 3.3.16.1	No
Center-Contact-List	Type: Sequence of "Organization Center Information" types	TMDD 3.3.16.3	No
Last-Update-Time	Type: DateTimeZone	TMDD 3.3.10.1	No
Parent-Organization	Element		No

3.3. LAYER: ASSET INVENTORY

Asset Inventory includes the following:

- Road inventory
- Transit inventory, including types and routes
- Pedestrian walkways and thoroughfares
- Ramp meters
- Intersection signals
- Dynamic Message Signs
- Environmental Sensors?
- Gates
- CCTV/Video assets
- HAR Radio assets
- Physical sensors
- Organizational assets – organizational departments and their assets, including groups, service vehicles, maintenance crews, incident response crews, traffic engineers, control centers, emergency and first responders

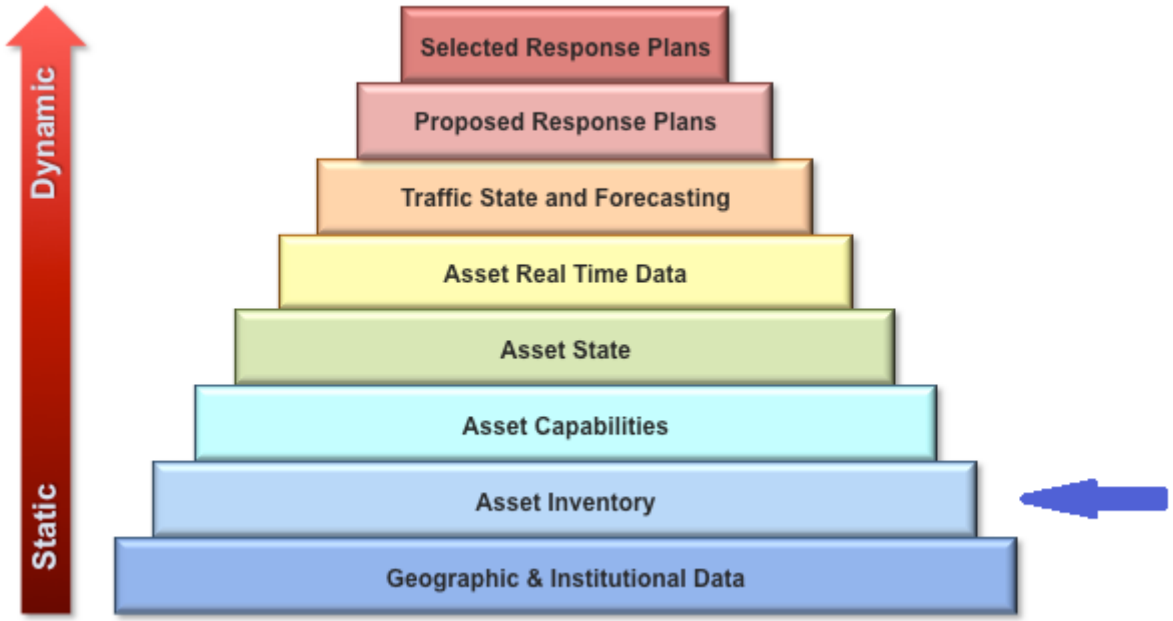

Figure 4 - Asset Inventory Layer

3.3.1. Data Messages

TMDD Message Dialogs include the following:

Name	Reference	Description
dlCCTVInventoryRequest	TMDD 3.1.2.1	Request for inventory of CCTVs
dlDetectorInventoryRequest	TMDD 3.1.4.1	Request for inventory of detectors and sensors
dlDeviceInformationSubscription	TMDD 3.1.5.3	Request for updates for device inventory
dlDMSInventoryRequest	TMDD 3.1.6.1	Request for inventory of dynamic message signs
dlESSInventoryRequest	TMDD 3.1.7.1	Request for inventory of environmental sensors
dlHARInventroyRequest	TMDD 3.1.10.1	Request for inventory of highway advisory radios
dlIntersectionSignalInventoryRequest	TMDD 3.1.11.1	Request for inventory of intersection signals
dlLCSInventoryRequest	TMDD 3.1.12.1	Request for inventory of lane control signals
dlLinkInventoryRequest	TMDD 3.1.13.1	Request for traffic network links
dlNodeInventoryRequest	TMDD 3.1.14.1	Request for traffic network nodes
dlOrganizationInformationRequest	TMDD 3.1.15.1	Request for Organization and Center Information
dlOrganizationInformationSubscription	TMDD 3.1.15.2	Request for subscription to updates to Organization and Center Information
dlRampMeterInventoryRequest	TMDD 3.1.16.1	Request for ramp meter inventory
dlRouteInventoryRequest	TMDD 3.1.17.1	Request for traffic route inventory
dlTrafficNetworkInformationSubscription	TMDD 3.1.19.1	Request for subscription to information updates for network links, nodes, and routes
dlVideoSwitchInventoryRequest	TMDD 3.1.20.1	
dlCCTVInventoryUpdate	TMDD 3.1.21.1	
dlDetectorInventoryUpdate	TMDD 3.1.23.1	
dlDMSInventoryUpdate	TMDD 3.1.24.1	
dlESSInventoryUpdate	TMDD 3.1.25.1	
dlHARInventoryUpdate	TMDD 3.1.28.1	
dlIntersectionSignalInventoryUpdate	TMDD 3.1.29.1	
dlLCSInventoryUpdate	TMDD 3.1.30.1	
dlOrganizationInformationUpdate	TMDD 3.1.31.1	
dlRampMeterInventoryUpdate	TMDD 3.1.32.1	
dlLinkInventoryUpdate	TMDD 3.1.34.1	
dlNodeInventoryUpdate	TMDD 3.1.35.1	
dlRouteInventoryUpdate	TMDD 3.1.36.1	
dlVideoSwitchInventoryUpdate	TMDD 3.1.37.1	

Other messaging dialogs required include the following:

Name	Reference	Description
PARKING FACILITY	APTA TCIP-S-001 4.1.1 * or ISO/TS 18234-7:2013 **	Inventory for parking facilities including capacity, location, facility operator, whether a parking availability monitoring system is used. System Requirements specs 8.2.3, 8.2.6, 8.7.1.2
TRANSIT	APTA TCIP-S-001 4.1.1 *	Inventory for transit services

* American Public Transportation Association Standard for Transit Communications Interface Profiles

** Intelligent transport systems -- Traffic and travel information via transport protocol experts group, generation 1 (TPEG1) binary data format -- Part 7: Parking information (TPEG1-PKI)

3.3.2. Data Class Descriptions

See the beginning of section 3 for a description of the "CC Required" column.

3.3.2.1. CCTV Class

3.3.2.1.1. CCTVInventory

This provides information for a CCTV asset and is the same as the CCTVInventory data frame in TMDD 3.3.2.3.

Attribute Name	Type/Element	Reference	CC Required
Device-Inventory-Header	Type: DeviceInventoryHeader	TMDD 3.3.5.8	Yes
Cctv-Requests-Supported-List	Element: Sequence of "Cctv-request-command" types		Yes
Cctv-Image-List	Element		Yes
Cctv-Titling-Text	Element		No
Cctv-Camera-Type	Element		No
Cctv-Camera-Pan-Left-Limit	Element		No
Cctv-Camera-Pan-Right-Limit	Element		No
Cctv-Camera-Tilt-Up-Limit	Element		No

Attribute Name	Type/Element	Reference	CC Required
Cctv-Camera-Tilt-Down-Limit	Element		No
Cctv-Camera-Zoom-Limit	Element		No
Cctv-Camera-Focus-Limit	Element		No
Cctv-Camera-Iris-Limit	Element		No
Cctv-Camera-Environmental	Element		No

3.3.2.2. ConnectionManagement Class

3.3.2.2.1. Authentication

This provides authentication information and is the same as the Authentication data frame in TMDD 3.3.3.1.

Attribute Name	Type/Element	Reference	CC Required
User-Id	Element		Yes
Password	Element		Yes
Operator-Id	Element		No

3.3.2.3. Detector Class

3.3.2.3.1. DetectorInventory

This provides detector information and is the same as the DetectorInventory data frame in TMDD 3.3.4.4.

Attribute Name	Type/Element	Reference	CC Required
Detector-Station-Inventory-Header	Type: DeviceInventoryHeader	TMDD 3.3.5.8	Yes
Detector-Inventory-List	Type: Sequence of "DetectorInventoryDetails" types	TMDD 3.3.4.5	Yes

3.3.2.3.2. DetectorInventoryDetails

This provides detector detail for a single detector and is based on the DetectorInventoryDetails data frame in TMDD 3.3.4.5.

Attribute Name	Type/Element	Reference	Description	CC Required
Detector-Inventory-Header	Type: DeviceInventoryHeader	TMDD 3.3.5.8		Yes
Detector-Type	Element			Yes
Detection-Lanes	Element: Sequence of "Link-lane-number" types			Yes
Is-Detector-Speed-Trap-Flag	Element			Yes
Vehicle-Classification-Bin1	Element			No
Vehicle-Classification-Bin2	Element			No
Vehicle-Classification-Bin3	Element			No
Vehicle-Classification-Bin4	Element			No
Vehicle-Classification-Bin5	Element			No
Vehicle-Classification-Bin6	Element			No
Reporting-System	Element: Name of reporting system	System Requirements spec 8.7.1.2	For devices used to monitor traffic flow or travel time data, this is the name of the reporting system to which the sensor is connected.	Yes

3.3.2.3.3. DetectorMaintenanceHistory

This provides detector maintenance information and is the same as the DetectorMaintenanceHistory data frame in TMDD 3.3.4.6.

Attribute Name	Type/Element	Reference	CC Required
Restrictions	Type: Restrictions	TMDD 3.3.16.5	Yes
Organization-Information	Type: OrganizationInformation	TMDD 3.3.16.3	Yes
Detector-History-List	Type: Sequence of "DetectorMaintenanceHistoryDetail" types	TMDD 3.3.4.7	Yes

3.3.2.3.4. DetectorMaintenanceHistoryDetail

This provides detector maintenance detail information and is the same as the DetectorMaintenanceHistoryDetail data frame in TMDD 3.3.4.7.

Attribute Name	Type/Element	Reference	CC Required
Station-Id	Element		Yes
Detector-Id	Element		Yes
Detector-Type	Element		Yes
Detector-Installation-Date	Type: DateTimeZone	TMDD 3.3.10.1	No
Detector-Calibration-Date	Type: DateTimeZone	TMDD 3.3.10.1	No
Detector-Calibration-Method	Element		No
Detector-Last-Operational-Date	Type: DateTimeZone	TMDD 3.3.10.1	Yes
Detector-Last-Non-Operational-Date	Type: DateTimeZone	TMDD 3.3.10.1	Yes
Detector-Repair-Description	Element		Yes
Last-Update-Time	Type: DateTimeZone	TMDD 3.3.10.1	Yes

3.3.2.3.4.1. PeMSStation

Note: The three table layouts discussed below are preliminary designs and subject to change. They are only for internal use within the system.

The freeway detector station data is stored in the data warehouse in a table called PEMS_VD_STATIONS which has one record for each station.

PEMS_VD_STATIONS table layout:

Column Name	Data Type	Description of stored value
ID	BigInt	The unique ID for this PEMS VDS Station
FWY_NUM	Integer	Numeric value for the freeway that this detector is located on.
DIRECTION	Character	A one byte char value indicating a cardinal heading.
DISTRICT	Numeric	The caltrans distric number.
COUNTY	Numeric	The numeric value of the county as defined is the FIPS county table.
CITY	Numeric	The numeric value of the city as defined is the FIPS city table.
STATE_PM	Numeric	The State Post Miles. The postmile starts at zero at the western or southern end of the route or at the western or southern boundary of the county through which the route is traveling.

Column Name	Data Type	Description of stored value
STATE_PM_CODE	Character Varying	The State Post Miles Code.
ABS_PM	Numeric	The State Post Miles. This number normally represents the distance from the freeway or highway origination or from the border of the state.
LATITUDE	Numeric	Latitude in decimal degrees.
LONGITUDE	Numeric	longitude in decimal degrees.
ADJ_LATITUDE	Numeric	The *ADJUSTED* latitude in decimal degrees.
ADJ_LONGITUDE	Numeric	The *ADJUSTED* longitude in decimal degrees.
DET_LENGTH	Numeric	The length of the detector
DET_TYPE	Character	Type of detector eg: ML, OR, FR
LANES	Numeric	Number of lanes this detector covers.
DET_NAME	Character Varying	This is generally the exit ramp street from the freeway
USER_ID_1	Character Varying	User Defined Data
USER_ID_2	Character Varying	User Defined Data
USER_ID_3	Character Varying	User Defined Data
USER_ID_4	Character Varying	User Defined Data
PEMS_REV_DATE	Date	
GEOM	Geometry	The spatial location POINT(x,y,z) that is detector is located.
ADJ_GEOM	Geometry	The * ADJUSTED* spatial location POINT(x,y,z) that is detector is located.

The database also contains two reference tables for the cities and counties in the corridor. Each city name is associated with a unique numeric ID that is stored in the PEMS_VD_STATIONS_CITIES table. Similarly, Each county name is associated with a unique numeric ID that is stored in the PEMS_VD_STATIONS_COUNTIES table. When station data is stored in the PEMS_VD_STATIONS table the numeric ID's of the city and county are stored instead of the city and county names.

PEMS_VD_STATIONS_CITIES table layout:

Column Name	Data Type	Description of stored value
ID	Numeric	Unique ID for a city in the corridor
NAME	Character Varying	Name of the city

PEMS_VD_STATIONS_COUNTIES table layout:

Column Name	Data Type	Description of stored value
ID	Numeric	Unique ID for a county in the corridor
NAME	Character Varying	Name of the county

3.3.2.4. DMS Class

3.3.2.4.1. DMSInventory

This provides dynamic message sign device information and is based on the DMSInventory data frame in TMDD 3.3.6.6.

Attribute Name	Type/Element	Reference	Description	CC Required
Device-Inventory-Header	Type: DeviceInventoryHeader	TMDD 3.3.5.8		Yes
Dms-Sign-Type	Element			Yes
Signtechnology	Element			No
Signheightpixels	Element			No
Signwidthpixels	Element			No
Signheight	Element			No
Signwidth	Element			No
Charheightpixels	Element			No
Charwidthpixels	Element			No
Dms-Beacon-Type	Element			No
Dms-Vertical-Border	Element			No
Dms-Horizontal-Border	Element			No
Dms-Vertical-Pixel-Pitch	Element			No
Dms-Horizontal-Pixel-Pitch	Element			No
Dms-Max-Pages	Element			Yes
Dms-Max-Message-Length	Element			Yes
Dms-Color-Scheme	Element			No
Dms-Multi-Tag-Support	Element			No
Display-Line-Count	Element: Number of display lines	System Requirements spec 8.7.1.2	For each fixed CMS that may be used by the ICM system to disseminate information to travelers	Yes
Character-Per-Line-Count	Element: Total number of characters that can be displayed per line	System Requirements spec 8.7.1.2	For each fixed CMS that may be used by the ICM system to disseminate information to travelers	Yes

3.3.2.5. ESS Class

3.3.2.5.1. ESSInventory

This provides environmental sensor device information and is the same as the ESSInventory data frame in TMDD 3.3.7.4.

Attribute Name	Type/Element	Reference	CC Required
Device-Inventory-Header	Type: DeviceInventoryHeader	TMDD 3.3.5.8	Yes
Ess-Inventory-List	Type: Sequence of "ESSInventoryDetails" types	TMDD 3.3.7.5	Yes

3.3.2.5.2. ESSInventoryDetails

This provides details of environmental sensor inventory for a single sensor and is the same as the ESSInventoryDetails data frame in TMDD 3.3.7.5.

Attribute Name	Type/Element	Reference	CC Required
Ess-Sensor-Inventory-Header	Type: DeviceInventoryHeader	TMDD 3.3.5.8	Yes
Lane-Number	Element		No
Sensor-Location-Elevation	Element		No
Sensor-Location-Height	Element		No
Sensor-Type	Element		No
Sensor-Operation-Type	Element		No
Sensor-Mobility-Type	Element		No
Ess-Sensor-Inventory-Header	Element		No

3.3.2.5.3. ESSDataCollectorInformation

This provides environmental sensor collector metadata and is the same as the ESSDataCollectorInformation data frame in TMDD 3.3.7.2.

Attribute Name	Type/Element	Reference	CC Required
Data-Collector-Description	Element		Yes
Data-Collector-Installation-Date	Type: DateTimeZone	TMDD 3.3.10.1	Yes

Attribute Name	Type/Element	Reference	CC Required
Data-Collector-Manufacturer	Element		Yes
Data-Collector-Product-Name	Element		Yes
Data-Collector-Model-Number-Software-Version	Element		Yes

3.3.2.5.4. ESSSiteMetadataDetail

This provides environmental site metadata is the same as the ESSSiteMetadataDetail data frame in TMDD 3.3.7.14.

Attribute Name	Type/Element	Reference	CC Required
Site-Id	Element		No
Site-Description	Element		Yes
Site-Directions-Description	Element		No
Site-Representativeness	Element		No
Site-Obstructions-Description	Element		No
Site-Landscape-Description	Element		No
Site-Has-Access-Control-Flag	Element		No
Site-Roadway-Name	Element		No
Site-Roadway-Linear-Reference	Element		No
Site-Roadway-Linear-Reference-Version	Element		No
Site-Roadway-Linear-Reference-Units	Element		No
Site-Roadway-To-Station-Distance	Element		No
Site-Roadway-To-Station-Elevation	Element		No
Site-Jurisdiction-Name	Element		No
Site-State-Code	Element		No
Site-Country-Code	Element		No
Site-Slope-Angle	Element		No
Site-Grade-Direction	Element		No
Site-Wind-Roughness-From-North	Element		No
Site-Wind-Roughness-From-South	Element		No
Site-Wind-Roughness-From-East	Element		No
Site-Wind-Roughness-From-West	Element		No
Site-Soil-Description	Element		No
Site-Soil-Percent-Sand	Element		No
Site-Soil-Percent-Silt	Element		No
Site-Soil-Percent-Clay	Element		No

3.3.2.5.5. ESSStationMetadataDetail

This provides environmental sensor station metadata and is the same as the ESSStationMetadataDetail data frame in TMDD 3.3.7.15.

Attribute Name	Type/Element	Reference	CC Required
Station-Category	Element		Yes
Station-Id	Element		Yes
Station-Location	Type: GeoLocation	TMDD 3.6.9.4	Yes
Station-Elevation	Element		Yes
Station-Description	Element		No
Station-Type	Element		No
Station-Horizontal-Datum	Element		No
Station-Vertical-Datum	Element		No
Station-Power-Source	Element		No
Station-Door-Status	Element		No
Station-Battery-Status	Element		No
Station-Line-Volts	Element		No
Station-Maintenance-Group-Name	Element		No
Station-Maintenance-Contact-Information	Type: Contact Details	TMDD 3.3.16.1	No
Station-Maintenance-Frequency	Element		No
Station-Maintenance-Calibration-Frequency	Element		No
Station-Maintenance-Status	Element		No
Station-Installation-Date	Type: DateTimeZone	TMDD 3.3.10.1	No
Station-Number-Of-Devices	Element		No
Station-Comm-Method	Element		No
Station-Telephone-Number	Element		No
Station-Ip-Address	Element		No
Station-Manufacturer	Element		No
Station-Observation-Collection-Frequency	Element		No
Station-Observation-Collection-Offset	Element		No
Station-Transmission-Frequency	Element		No
Station-Transmission-Offset	Element		No
Station-Transmission-Format	Element		No

3.3.2.5.6. ESSSensorMetadataDetail

This provides environmental sensor metadata and is the same as the ESSSensorMetadataDetail data frame in TMDD 3.3.7.12.

Attribute Name	Type/Element	Reference	CC Required
Station-Id	Element		Yes
Sensor-Id	Element		Yes
Sensor-Description	Element		No
Sensor-Information-Distribution-Group	Element		Yes

Attribute Name	Type/Element	Reference	CC Required
Sensor-Installation-Date	Element		No
Ess-Observation-Type	Element		Yes
Sensor-Min-Value-Range	Element		No
Sensor-Max-Value-Range	Element		No
Sensor-Manufacturer	Element		Yes
Sensor-Model-Number	Element		Yes
Sensor-Index	Element		Yes
Sensor-Rate-Of-Change-Interval	Element		No
Sensor-Max-Positive-Rate-Of-Change	Element		No
Sensor-Max-Negative-Rate-Of-Change	Element		No
Sensor-Persistence-Interval	Element		No
Sensor-Persistence-Threshhold	Element		No
Sensor-Like-Instrument-Threshhold	Element		No
Sensor-Maintenance-Calibration-Date	Element		No
Sensor-Last-Maintenance-Date	Element		No
Sensor-Serial-Number	Element		No
Sensor-Resolution	Element		No
Sensor-Accuracy	Element		No
Sensor-Min-Value-Output	Element		No
Sensor-Max-Value-Output	Element		No
Sensor-To-Station-North-South-Offset	Element		No
Sensor-To-Station-East-West-Offset	Element		No
Sensor-To-Station-Elevation-Offset	Element		No
Sensor-To-Surface-Elevation-Offset	Element		No
Sensor-Embedded-Material-Description	Element		No
Sensor-Output-Average-Interval	Element		No
Sensor-Output-Internal-Units	Element		No
Sensor-Last-Out-Of-Service-Begin-Date-Time	Element		No
Sensor-Last-Out-Of-Service-End-Date-Time	Element		No
Sensor-Sampling-Interval	Element		No

3.3.2.6. HAR Class

3.3.2.6.1. HARInventory

This provides HAR attribute information is the same as the HARInventory data frame in TMDD 3.3.11.4.

Attribute Name	Type/Element	Reference	CC Required
Device-Inventory-Header	Type: DeviceInventoryHeader	TMDD 3.3.5.8	No

Attribute Name	Type/Element	Reference	CC Required
Device-Beacon	Element		No
Har-Characteristics	Element		No
Har-Frequency-Description	Element		No
Har-Call-Sign	Element		No

3.3.2.7. IntersectionSignal Class

3.3.2.7.1. IntersectionSignalInventory

This provides information for a single intersection signal device and is based on the IntersectionSignalInventory data frame in TMDD 3.3.12.5.

Attribute Name	Type/Element	Reference	Description	CC Required
Device-Inventory-Header	Type: DeviceInventoryHeader	TMDD 3.3.5.8		Yes
Intersection-Name	Element			Yes
Controller-Master-Id	Element			Yes
Intersection-Link-List	Type: Sequence of "IntersectionSignal InventoryLinkList" types	TMDD 3.3.12.6		No
Movement-List	Type: Sequence of "IntersectionSignalMovement" types	TMDD 3.3.12.8		No
Phase-List	Type: Sequence of "IntersectionSignal InventoryPhase" types	TMDD 3.3.12.7		Yes
Overlap-Phase-List	Type: Sequence of "IntersectionSignalOverlapPhase" types	TMDD 3.3.12.9		Yes
Ring-List	Type: Sequence of "IntersectionSignalRing" types	TMDD 3.3.12.14		Yes
Special-Functions-List	Type: Sequence of "IntersectionSignal SpecialFunctions" types	TMDD 3.3.12.17		No
Time-Reference-Code	Element			No
Pattern-Sync-Reference	Element			No

Attribute Name	Type/Element	Reference	Description	CC Required
Signal-Controller-Type	Element: Type of signal controller used	System Requirements specs 8.7.1.2 and 8.7.1.3	For each signalized intersection under ICM management	Yes (Extended)
Signal-Controller-Firmware	Element: Name of controller firmware	System Requirements spec 8.7.1.2	For each signalized intersection under ICM management	Yes (Extended)

3.3.2.7.2. IntersectionSignalInventoryLinkList

This provides the intersection signal link information and is the same as the IntersectionSignalInventoryLinkList data frame in TMDD 3.3.12.6.

Attribute Name	Type/Element	Reference	CC Required
Link-Id	Element		No
Link-Direction	Element		No

3.3.2.7.3. IntersectionSignalInventoryPhase

This provides intersection signal phase information and is the same as the IntersectionSignalInventoryPhase data frame in TMDD 3.3.12.7.

Attribute Name	Type/Element	Reference	CC Required
Phase-Identifier	Element		Yes
Coordinated-Phase	Element		Yes
Concurrent-Phases-List	Element: Sequence of "NTCIP.PhaseNumber" types		Yes
Active-Movements-List	Element: Sequence of "Organization-resource-identifier" types		No

3.3.2.7.4. IntersectionSignalMovement

This provides intersection signal movement information and is the same as the IntersectionSignalMovement data frame in TMDD 3.3.12.8.

Attribute Name	Type/Element	Reference	CC Required
Movement-Identifier	Element		No
Approach-Link-Id	Element		No
Departing-Link-Id	Element		No
Crossing-Point	Type: GeoLocation	TMDD 3.6.9.4	No
Approach-Vector	Element		No
Turning-Movement-Code	Element		No
Turning-Movement-Lanes	Element: Sequence of "Organization Center Information" types		No
Turning-Movement-Text	Element		No

3.3.2.7.5. IntersectionSignalOverlapPhase

This provides intersection signal overlap phase information and is the same as the IntersectionSignalOverlapPhase data frame in TMDD 3.3.12.9.

Attribute Name	Type/Element	Reference	CC Required
Overlap-Identifier	Element		Yes
Overlap-Included-Phases	Element: Sequence of "NTCIP.PhaseNumber" types		Yes
Active-Movements-List	Element: Sequence of "Organization-resource-identifier" types		No

3.3.2.7.6. IntersectionSignalRing

This provides intersection signal ring information and is the same as the IntersectionSignalRing data frame in TMDD 3.3.12.14.

Attribute Name	Type/Element	Reference	CC Required
Ring-Identifier	Element		Yes
Ring-Phase-Assignment	Element: Sequence of "NTCIP.PhaseNumber" types		Yes

3.3.2.7.7. IntersectionSignalSequenceData

This provides intersection signal ring phase sequence information and is the same as the IntersectionSignalSequenceData data frame in TMDD 3.3.12.16.

Attribute Name	Type/Element	Reference	CC Required
Ring-Identifier	Element		Yes
Sequence-Data	Element: Sequence of "NTCIP.PhaseNumber" types		Yes

3.3.2.7.8. IntersectionSignalSpecialFunctions

This provides intersection signal controller special functions and is the same as the IntersectionSignalSpecialFunctions data frame in TMDD 3.3.12.17.

Attribute Name	Type/Element	Reference	CC Required
Special-Function-Identifier	Element		Yes
Special-Function-Description	Element		No

3.3.2.8. LCS Class

3.3.2.8.1. LCSInventory

This provides information for an LCS device in the LCS inventory is the same as the LCSInventory data frame in TMDD 3.3.13.3.

Attribute Name	Type/Element	Reference	CC Required
Device-Inventory-Header	Type: DeviceInventoryHeader	TMDD 3.3.5.8	Yes
Controlled-Lane-Number	Element		Yes
Link-Lane-Count	Element		Yes

3.3.2.9. Link Class

3.3.2.9.1. LinkInventory

This provides information for the inventory of road network links. This is the same as the LinkInventory data frame in TMDD 3.3.14.2.

Attribute Name	Type/Element	Reference	CC Required
Restrictions	Type: Restrictions	TMDD 3.3.16.5	No
Organization-Information	Type: OrganizationInformation	TMDD 3.3.16.3	Yes
Link-Inventory-List	Type: Sequence of "LinkInventoryList" types	TMDD 3.3.14.3	Yes

3.3.2.9.2. LinkInventoryList

This provides information for a single link within the link inventory. This is based on the LinkInventoryList data frame in TMDD 3.3.14.3.

Attribute Name	Type/Element	Reference	Description	CC Required
Network-Id	Element			Yes
Network-Name	Element			No
Link-Id	Element			Yes
Link-Name	Element			No
Alternate-Link-Name	Element			No
Link-Route-Designator	Element			No
Secondary-Link-Route-Designator	Element			No
Link-Type	Element			Yes
Link-Begin-Node-Id	Element			Yes
Link-Begin-Node-Location	Type: GeoLocation	TMDD 3.6.9.4		Yes
Link-End-Node-Id	Element			Yes
Link-End-Node-Location	Type: GeoLocation	TMDD 3.6.9.4		Yes
Linear-Reference	Element			No
Linear-Reference-Version	Element			No
Link-Length	Element			No
Link-Capacity	Element			No
Link-Speed-Limit	Element			No
Link-Speed-Limit-Truck	Element			No
Link-Speed-Limit-Units	Element			No
Link-Jurisdiction	Element			No

Attribute Name	Type/Element	Reference	Description	CC Required
Link-Owner	Element			No
Left-Shoulder-Width	Element			No
Right-Shoulder-Width	Element			No
Lane-Separator	Element			No
Last-Update-Time	Type: DateTimeZone	TMDD 3.3.10.1		No
Link-Restrictions	Type: LinkRestrictions	Custom type; see Global Data Elements	Times during which links are not available for detours such as when children are walking to/from schools or arterials are heavily travelled by buses.	Yes (extended)
Left-Turn-Bay-Length	Element: Length of turn bay	System Requirements spec 8.7.1.2	For approach to a signalized intersection under ICM management	Yes (extended)
Right-Turn-Bay-Length	Element: Length of turn bay	System Requirements spec 8.7.1.2	For approach to a signalized intersection under ICM management	Yes (extended)
Link-Geom-Location	Element: Geometry Spatial Data Type		Geometry of the link	Yes (extended)

3.3.2.10. Node Class

3.3.2.10.1. NodeInventory

This provides information for the inventory of road network nodes. This is the same as the NodeInventory data frame in TMDD 3.3.15.1.

Attribute Name	Type/Element	Reference	CC Required
Restrictions	Type: Restrictions	TMDD 3.3.16.5	No
Organization-Information	Type: OrganizationInformation	TMDD 3.3.16.3	Yes
Node-Inventory-List	Type: Sequence of "NodeInventoryList" types	TMDD 3.3.15.2	Yes

3.3.2.10.2. NodeInventoryList

This provides information for a single node within the node inventory. This is the same as the NodeInventoryList data frame in TMDD 3.3.15.2.

Attribute Name	Type/Element	Reference	CC Required
Network-Id	Element		Yes
Network-Name	Element		No
Node-Id	Element		Yes
Node-Name	Element		No
Node-Description	Element		No
Node-Route-Designator	Element		No
Node-Direction	Element		No
Linear-Reference	Element		No
Linear-Reference-Version	Element		No
Node-Type	Element		No
Node-Location	Type: GeoLocation	TMDD 3.6.9.4	Yes
Node-Links-Number	Element		No
Last-Update-Time	Type: DateTimeZone	TMDD 3.3.10.1	No

3.3.2.11. Organization Class

3.3.2.11.1. OrganizationInformationRequest

This provides information for the request of organization information. This is the same as the OrganizationInformationRequest data frame in TMDD 3.3.16.4.

Attribute Name	Type/Element	Reference	CC Required
Authentication	Type: Authentication	TMDD 3.3.3.1	No
Organization-Requesting	Type: OrganizationInformation	TMDD 3.3.16.3	Yes
Organization-Information-Type	Element		Yes
Organization-Id	Element		No
Center-Id-List	Element		No

3.3.2.12. RampMeter Class

3.3.2.12.1. RampMeterInventory

This provides information on a single ramp meter device. This is the same as the RampMeterInventory data frame in TMDD 3.3.17.4.

Attribute Name	Type/Element	Reference	CC Required
Device-Inventory-Header	Type: DeviceInventoryHeader	TMDD 3.3.5.8	Yes
Metered-Inventory-List	Type: RampMeterInventoryDetails	TMDD 3.3.17.5	Yes

3.3.2.12.2. RampMeterInventoryDetails

This provides details on a single ramp meter device. This is based on the RampMeterInventoryDetails data frame in TMDD 3.3.17.5.

Attribute Name	Type/Element	Reference	Description	CC Required
Metered-Lane-Inventory-Header	Type: DeviceInventoryHeader	TMDD 3.3.5.8		Yes
Ramp-Exit-Roadway-Name	Element			Yes
Lane-Number	Element			Yes
Lane-Type	Element			Yes
Associated-Detectors	Element: Sequence of "Organization-resource-identifier" types			Yes
Absolute-Minimum-Metering-Rate	Element			Yes
Absolute-Maximum-Metering-Rate	Element			Yes
System-Minimum-Metering-Rate	Element			Yes
System-Maximum-Metering-Rate	Element			Yes

Attribute Name	Type/Element	Reference	Description	CC Required
Signal-Controller-Type	Element: Type of signal controller used	System Requirements specs 8.7.1.2	For each metered on-ramp or freeway-to-freeway connector under ICM management	Yes (Extended)
Signal-Controller-Metering-Program	Element: Ramp metering program installed in controller	System Requirements spec 8.7.1.2	For each metered on-ramp or freeway-to-freeway connector under ICM management	Yes (Extended)
Queue-Sensor-Distance	Element: Distance of queue sensors from ramp metering stop line	System Requirements spec 8.7.1.2	For each metered on-ramp or freeway-to-freeway connector under ICM management	Yes (Extended)

3.3.2.13. Route Class

3.3.2.13.1. RouteInventory

This provides information for a list of routes. This is the same as the RouteInventory data frame in TMDD 3.3.18.1.

Attribute Name	Type/Element	Reference	CC Required
Restrictions	Type: Restrictions	TMDD 3.3.16.5	No
Organization-Information	Type: OrganizationInformation	TMDD 3.3.16.3	Yes
Route-Inventory-List	Type: Sequence of "RouteInventoryList" types	TMDD 3.3.18.2	Yes

3.3.2.13.2. RouteInventoryList

This provides information for an individual route. This is the same as the RouteInventoryList data frame in TMDD 3.3.18.2.

Attribute Name	Type/Element	Reference	CC Required
Network-Id	Element		Yes
Network-Name	Element		Yes
Route-Id	Element		Yes
Route-Link-Id-List	Element: Sequence of "Transportation-network-identifier" types		Yes
Route-Type	Element		Yes
Route-Name	Element		Yes
Alternate-Route-Name-List	Element: Sequence of "Transportation-network-name" types		No
Route-Length	Element		Yes
Route-Node-Id-List	Element: Sequence of "Transportation-network-identifier" types		No
Route-Url	Element		No
Last-Update-Time	Type: DateTimeZone	TMDD 3.3.10.1	Yes

3.3.2.14. Section Class

3.3.2.14.1. SectionStatus

This provides information for an organizational section status. This is the same as the SectionStatus data frame in TMDD 3.3.19.7.

Attribute Name	Type/Element	Reference	CC Required
Restrictions	Type: Restrictions	TMDD 3.3.16.5	No
Organization-Information	Type: OrganizationInformation	TMDD 3.3.16.3	Yes
Section-Id	Element		Yes
Section-Name	Element		Yes
Node-Id-List	Element: Sequence of "Organization-resource-identifier" types		Yes
Section-Control-Mode	Element		Yes
Timing-Pattern-Id	Element		Yes
Timing-Pattern-Name	Element		Yes
Cycle-Time	Element		Yes
Operator-Id	Element		Yes
Event-Id	Element		Yes
Response-Plan-Id	Element		Yes
Last-Comm-Time	Type: DateTimeZone	TMDD 3.3.10.1	Yes

3.3.2.15. VideoSwitch Class

3.3.2.15.1. VideoSwitchInventory

This provides information for an individual video switch. This is the same as the VideoSwitchInventory data frame in TMDD 3.3.21.3.

Attribute Name	Type/Element	Reference	CC Required
Device-Inventory-Header	Type: DeviceInventoryHeader	TMDD 3.3.5.8	Yes
Input-Channel-List	Type: Sequence of "VSVideoChannelData" types	TMDD 3.3.21.5	Yes
Output-Channel-List	Type: Sequence of "VSVideoChannelData" types	TMDD 3.3.21.5	Yes
Input-Channel-Count	Element		No
Output-Channel-Count	Element		No
Request-Supported-Type	Element		No

3.3.2.15.2. VSVideoChannelData

This provides information for a single video channel for a video switch device. This is the same as the VSVideoChannelData data frame in TMDD 3.3.21.5.

Attribute Name	Type/Element	Reference	CC Required
Channel-Id	Element		Yes
Channel-Name	Element		Yes
Channel-Titling-Text	Element		Yes

3.4. LAYER: ASSET CAPABILITIES

Asset Capabilities includes the following:

- Intersection signal plans
- Ramp meter plans
- Transit schedules, trips and routes
- Response Plans
- Dynamic Message Signs Display options
- Traveler characterizations
- Organizational assets – employees, including people, service vehicles, maintenance crews, incident response crews, traffic engineers, control centers, emergency and first responders

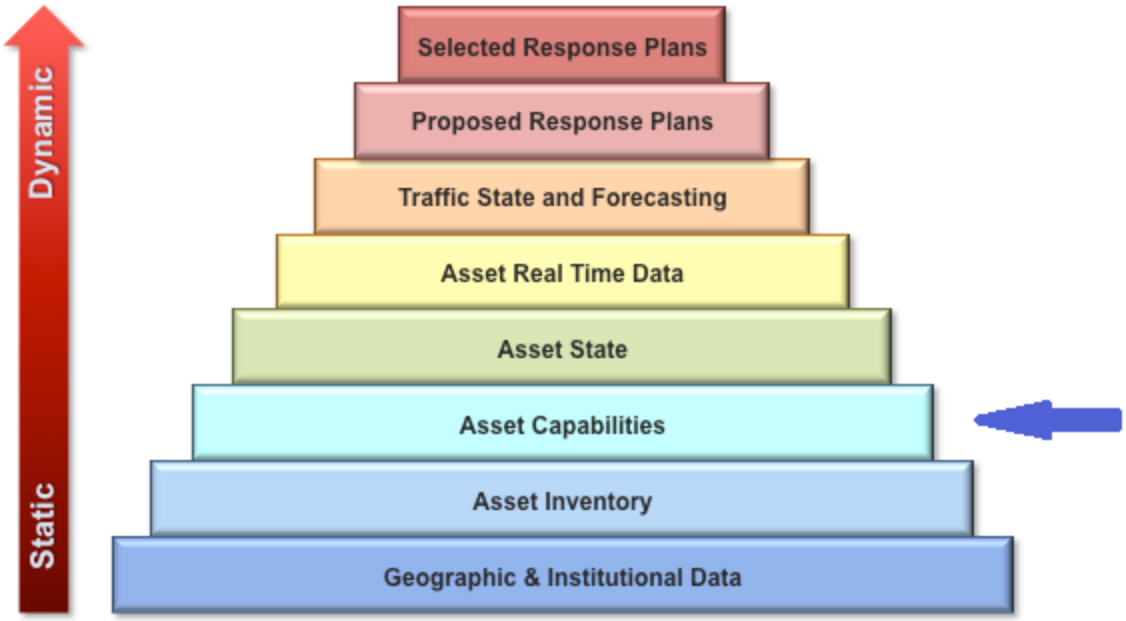

Figure 5 - Asset Capabilities Layer

3.4.1. Data Messages

TMDD Data messages include the following:

Name	Reference	Description
dlDMSMessageInventoryRequest	TMDD 3.1.6.3	Request for inventory of dynamic message sign messages
dlDMSMessageInventorySubscription	TMDD 3.1.6.4	Request for inventory updates of dynamic message sign messages

Name	Reference	Description
dlDMSFontTableRequest	TMDD 3.1.6.6	
dlHARMessageInventoryRequest	TMDD 3.1.10.2	Request for inventory of highway advisory radio messages
dlIntersectionSignalTiming PatternInventoryRequest	TMDD 3.1.11.3	Request for inventory of intersection signal timing patterns
dlIntersectionSignalTiming PatternInventorySubscription	TMDD 3.1.11.4	Request for inventory of intersection signal timing patterns
dlRampMeterControlScheduleRequest	TMDD 3.1.16.4	Request for ramp meter control schedules
dlRampMeterPlanInventoryRequest	TMDD 3.1.16.6	Request for ramp meter plan inventories
dlRampMeterPlanInventorySubscription	TMDD 3.1.16.7	Request for ramp meter plan inventory updates
dlSectionSignalTimingPatternInventoryRequest	TMDD 3.1.18.6	Request for organizational section timing pattern inventory
dlSectionSignalTimingPatternInventorySubscription	TMDD 3.1.18.7	Request for organizational section timing pattern inventory updates
dlDMSMessageInventoryUpdate	TMDD 3.1.24.2	
dlHARMessageInventoryUpdate	TMDD 3.1.28.2	
dlIntersectionSignalTimingPatternInventoryUpdate	TMDD 3.1.29.2	
dlIntersectionSignalControlScheduleUpdate	TMDD 3.1.29.4	
dlLCSControlScheduleUpdate	TMDD 3.1.30.3	
dlRampMeterControlScheduleUpdate	TMDD 3.1.32.3	
dlRampMeterPlanInventoryUpdate	TMDD 3.1.32.4	
dlSectionControlScheduleUpdate	TMDD 3.1.33.2	
dlSectionSignalTimingPatternInventoryUpdate	TMDD 3.1.33.3	

Other messaging dialogs required include the following:

Name	Reference	Description
TRANSIT	GTFS * or APTA TCIP-S-001 4.1.1 **	Schedules, trips, routes and fares for transit services

* General Transit Feed Specification

** American Public Transportation Association Standard for Transit Communications Interface Profiles

3.4.2. Data Class Descriptions

See the beginning of section 3 for a description of the "CC Required" column.

3.4.2.1. ConnectionManagement

3.4.2.1.1. ErrorReport

This provides an error response to an individual request. This is the same as the ErrorReport data frame in TMDD 3.3.3.4.

Attribute Name	Type/Element	Reference	CC Required
Restrictions	Type: Restrictions	TMDD 3.3.16.5	No
Organization-Information	Type: OrganizationInformation	TMDD 3.3.16.3	Yes
Organization-Requesting	Type: OrganizationInformation	TMDD 3.3.16.3	Yes
Error-Code	Element		Yes
Error-Text	Element		Yes

3.4.2.2. Device Class

3.4.2.2.1. DeviceControlScheduleHeader

This is the header information for a device control request. This is the same as the DeviceControlScheduleHeader data frame in TMDD 3.3.5.4.

Attribute Name	Type/Element	Reference	CC Required
Restrictions	Type: Restrictions	TMDD 3.3.16.5	No
Organization-Information	Type: OrganizationInformation	TMDD 3.3.16.3	Yes
Device-Id	Element		Yes
Time-Base-Schedule-Number	Element		Yes
Time-Base-Schedule-Month	Element		Yes
Time-Base-Schedule-Day	Element		Yes
Time-Base-Schedule-Date	Element		Yes
Time-Base-Schedule-Day-Plan	Element		Yes
Day-Plan-Hour	Element		Yes
Day-Plan-Minute	Element		Yes

Attribute Name	Type/Element	Reference	CC Required
Last-Update-Time	Type: DateTimeZone	TMDD 3.3.10.1	Yes

3.4.2.2.2. DeviceInformationRequest

This provides the information regarding a request for device inventory, status, schedule, or timing plan information. This is the same as the DeviceInformationRequest data frame in TMDD 3.3.5.6.

Attribute Name	Type/Element	Reference	CC Required
Authentication	Type: Authentication	TMDD 3.3.3.1	No
Organization-Information	Type: OrganizationInformation	TMDD 3.3.16.3	Yes
Organization-Requesting	Type: OrganizationInformation	TMDD 3.3.16.3	Yes
Device-Type	Element		Yes
Device-Information-Type	Element		Yes
Device-Filter	Type: DeviceInformationRequestFilter	TMDD 3.3.5.7	Yes

3.4.2.2.3. DeviceInformationRequestFilter

This is used to provide filters for a device information request. This is the same as the DeviceInformationRequestFilter data frame in TMDD 3.3.5.7.

Attribute Name	Type/Element	Reference	CC Required
Device-Id-List	Element: Sequence of "Organization-resource-identifier" types		No
Network-Id-List	Element: Sequence of "Transportation-network-identifier" types		No
Link-Id-List	Element: Sequence of "Transportation-network-identifier" types		No
Link-Designator-List	Element: Sequence of "Link-route-designator" types		No
Linear-Reference	Type: LinearReferenceRange	TMDD 3.3.14.1	No
Section-Id-List	Element: Sequence of "Organization-resource-identifier" types		No
Pattern-Id-List	Element: Sequence of "Organization-resource-identifier" types		No
Center-Id-List	Element: Sequence of "Organization-resource-identifier" types		No

3.4.2.2.4. DeviceInventoryHeader

This is the header for a device inventory response.This is the same as the DeviceInventoryHeader data frame in TMDD 3.3.5.8.

Attribute Name	Type/Element	Reference	CC Required
Restrictions	Type: Restrictions	TMDD 3.3.16.5	No
Organization-Information	Type: OrganizationInformation	TMDD 3.3.16.3	Yes
Device-Id	Element		Yes
Device-Location	Type: GeoLocation	TMDD 3.6.9.4	Yes
Device-Name	Element		Yes
Device-Description	Element		Yes
Device-Control-Type	Element		Yes
Controller-Description	Element		Yes
Network-Id	Element		No
Node-Id	Element		No
Node-Name	Element		No
Link-Id	Element		No
Link-Name	Element		No
Link-Direction	Element		No
Linear-Reference	Element		No
Linear-Reference-Version	Element		No
Route-Designator	Element		No
Device-Url	Type: UrlReference	TMDD 3.3.10.2	No
Last-Update-Time	Type: DateTimeZone	TMDD 3.3.10.1	Yes

3.4.2.3. DMS Class

3.4.2.3.1. DMSCharacterTableEntry

This provides information regarding a DMS character table entry. This is the same as the DMSCharacterTableEntry data frame in TMDD 3.3.6.1.

Attribute Name	Type/Element	Reference	CC Required
Character-Number	Element		No
Character-Width	Element		No
Character-Bitmap	Element		No

3.4.2.3.2. DMSFontTable

This provides information for a DMS device font table. This is the same as the DMSFontTable data frame in TMDD 3.3.6.4.

Attribute Name	Type/Element	Reference	CC Required
Restrictions	Type: Restrictions	TMDD 3.3.16.5	No
Organization-Information	Type: OrganizationInformation	TMDD 3.3.16.3	No
Device-Id	Element		No
Defaultfont	Element		No
Fontnumber	Element		No
Fontheight	Element		No
Fontcharspacing	Element		No
Fontlinespacing	Element		No
Fontversionid	Element		No
Fontstatus	Element		No
Charactertable	Type: Sequence of "DMSCharacterTableEntry" types	TMDD 3.3.6.1	No
Last-Update-Time	Type: DateTimeZone	TMDD 3.3.10.1	No

3.4.2.3.3. DMSFontTableRequest

This provides information required for a DMS font table request. This is the same as the DMSFontTableRequest data frame in TMDD 3.3.6.5.

Attribute Name	Type/Element	Reference	CC Required
Device-Information-Request-Header	Type: DeviceInformation Request	TMDD 3.3.5.6	No
Fontnumber	Element		No

3.4.2.3.4. DMSMessageAppearance

This provides the message appearance characteristics for a DMS device. This is the same as the DMSMessageAppearance data frame in TMDD 3.3.6.7.

Attribute Name	Type/Element	Reference	CC Required
Restrictions	Type: Restrictions	TMDD 3.3.16.5	No
Organization-Information	Type: OrganizationInformation	TMDD 3.3.16.3	Yes

Attribute Name	Type/Element	Reference	CC Required
Device-Id	Element		Yes
Dms-Sign-Type	Element		Yes
Signheightpixels	Element		No
Signwidthpixels	Element		No
Signheight	Element		No
Signwidth	Element		No
Charheightpixels	Element		No
Charwidthpixels	Element		No
Dms-Vertical-Border	Element		No
Dms-Horizontal-Border	Element		No
Dms-Vertical-Pixel-Pitch	Element		No
Dms-Horizontal-Pixel-Pitch	Element		No
Dms-Max-Pages	Element		Yes
Dms-Max-Message-Length	Element		Yes
Dms-Color-Scheme	Element		No
Dms-Multi-Tag-Support	Element		No

3.4.2.3.5. DMSMessageAppearanceRequest

This is the information required for a request of a DMS message appearance attributes. This is the same as the DMSMessageAppearanceRequest data frame in TMDD 3.3.6.8.

Attribute Name	Type/Element	Reference	CC Required
Device-Information-Request-Header	Type: DeviceInformation Request	TMDD 3.3.5.6	Yes
Dms-Message-Appearance	Type: dMSMessage AppearanceRequestType	TMDD 3.3.6.9	Yes

3.4.2.3.6. DMSMessageAppearanceRequestType

This provides the choices for a DMS message appearance request. This is the same as the dMSMessageAppearanceRequestType data frame in TMDD 3.3.6.9.

Attribute Name	Type/Element	Reference	CC Required
Dms-Message	Element		Yes
Message-Number	Element		Yes
Return-Current-Message-Snapshot	Element		Yes

3.4.2.3.7. DMSMessageInventory

This provides the DMS message library for a single DMS device. This is the same as the DMSMessageInventory data frame in TMDD 3.3.6.10.

Attribute Name	Type/Element	Reference	CC Required
Restrictions	Type: Restrictions	TMDD 3.3.16.5	No
Organization-Information	Type: OrganizationInformation	TMDD 3.3.16.3	Yes
Device-Id	Element		Yes
Message-Memory-Type	Element		Yes
Message-Number	Element		Yes
Message	Element		Yes
Message-Owner-Organization-Information	Type: OrganizationInformation	TMDD 3.3.16.3	Yes
Enable-Beacon-Flag	Element		Yes
Message-Run-Time-Priority	Element		Yes
Message-Status	Element		Yes
Last-Update-Time	Type: DateTimeZone	TMDD 3.3.10.1	Yes

3.4.2.3.8. DMSMessageInventoryRequest

This is the information required for a request of a DMS message inventory. This is the same as the DMSMessageInventoryRequest data frame in TMDD 3.3.6.11.

Attribute Name	Type/Element	Reference	CC Required
Device-Information-Request-Header	Type: DeviceInformation Request	TMDD 3.3.5.6	Yes
Message-Number	Element		No
Message-Memory-Type	Element		No

3.4.2.4. HAR Class

3.4.2.4.1. HARMessageInventory

This provides the message library for a single HAR device. This is the same as the HARMessageInventory data frame in TMDD 3.3.11.5.

Attribute Name	Type/Element	Reference	CC Required
Restrictions	Type: Restrictions	TMDD 3.3.16.5	No
Organization-Information	Type: OrganizationInformation	TMDD 3.3.16.3	No
Device-Id	Element		No
Message-Number	Element		No
Current-Message	Element		No
Last-Update-Time	Type: DateTimeZone	TMDD 3.3.10.1	No

3.4.2.5. IntersectionSignal Class

3.4.2.5.1. IntersectionSignalControlSchedule

This provides the control schedule for a single intersection signal device. This is the same as the IntersectionSignalControlSchedule data frame in TMDD 3.3.12.4.

Attribute Name	Type/Element	Reference	CC Required
Device-Control-Schedule-Header	Type: DeviceControlScheduleHeader	TMDD 3.3.5.4	Yes
Request-Control-Mode	Element		Yes
Timing-Pattern-Id	Element		Yes

3.4.2.5.2. IntersectionSignalTimingPatternInventory

This provides the signal timing pattern for a center's intersection signal timing pattern inventory. This is the same as the IntersectionSignalTimingPatternInventory data frame in TMDD 3.3.12.19.

Attribute Name	Type/Element	Reference	CC Required
Restrictions	Type: Restrictions	TMDD 3.3.16.5	No
Organization-Information	Type: OrganizationInformation	TMDD 3.3.16.3	Yes
Device-Id	Element		Yes
Timing-Pattern-Id	Element		Yes
Timing-Pattern-Name	Element		Yes
Cycle-Length	Element		Yes
Offset-Time	Element		Yes
Phase-Tp-List	Type: IntersectionSignalTP InventoryPhase	TMDD 3.3.12.21	Yes
Sequence-Information	Type: IntersectionSignalSequenceData	TMDD 3.3.12.16	Yes

Attribute Name	Type/Element	Reference	CC Required
Last-Update-Time	Type: DateTimeZone	TMDD 3.3.10.1	Yes

3.4.2.5.3. IntersectionSignalTimingPatternInventoryRequest

This provides the information necessary to request an intersection signal timing pattern inventory. This is the same as the IntersectionSignalTimingPatternInventoryRequest data frame in TMDD 3.3.12.20.

Attribute Name	Type/Element	Reference	CC Required
Device-Information-Request-Header	Type: DeviceInformationRequest	TMDD 3.3.5.6	Yes
Timing-Pattern-Id	Element		No

3.4.2.5.4. IntersectionSignalTPInventoryPhase

This provides the phase attributes of a timing pattern. This is the same as the IntersectionSignalTPInventoryPhase data frame in TMDD 3.3.12.21.

Attribute Name	Type/Element	Reference	CC Required
Phase-Identifier	Element		Yes
Coordinated-Phase	Element		Yes
Split-Mode	Element		Yes
Phase-Split	Element		Yes
Maximum-Green-Duration	Element		Yes
Minimum-Green-Duration	Element		Yes
Vehicle-Clearance-Duration	Element		Yes
Vehicle-Red-Duration	Element		Yes
Minimum-Walk-Duration	Element		No
Pedestrian-Clearance-Duration	Element		No
Steady-Dont-Walk-Duration	Element		No

3.4.2.6. LCS Class

3.4.2.6.1. LCSControlSchedule

This provides a schedule for a lane control device. This is the same as the LCSControlSchedule data frame in TMDD 3.3.13.2.

Attribute Name	Type/Element	Reference	CC Required
Device-Control-Schedule-Header	Type: DeviceControlScheduleHeader	TMDD 3.3.5.4	Yes
Lane-Request-Command	Element		Yes

3.4.2.7. Link Class

3.4.2.7.1. LinearReferenceRange

This defines the range of linear reference values for which a request is valid. This is the same as the LinearReferenceRange data frame in TMDD 3.3.14.1.

Attribute Name	Type/Element	Reference	CC Required
Linear-Reference-Start	Element		Yes
Linear-Reference-End	Element		Yes

3.4.2.8. Organization Class

3.4.2.8.1. OrganizationCenterInformation

This is the information that describes a single organization center. This is the same as the OrganizationCenterInformation data frame in TMDD 3.3.16.2.

Attribute Name	Type/Element	Reference	CC Required
Center-Id	Element		Yes
Center-Name	Element		No
Center-Location	Type: GeoLocation	TMDD 3.6.9.4	No
Center-Description	Element		No
Center-Type	Element		No
Center-Contact-Details	Type: ContactDetails	TMDD 3.3.16.1	No

3.4.2.8.2. OrganizationInformation

The organization class can specify organizations, departments, teams, crews, etc. An organization can also specify a parent organization so that a hierarchy can be defined.

This is similar to the OrganizationInformation data frame in TMDD 3.3.16.3 with the addition of the Parent-Organization element.

Attribute Name	Type/Element	Reference	CC Required
Organization-Id	Element		Yes
Organization-Name	Element		No
Organization-Location	Element		No
Organization-Function	Element		No
Organization-Contact-Details	Type: ContactDetails	TMDD 3.3.16.1	No
Center-Contact-List	Type: Sequence of "Organization Center Information" types	TMDD 3.3.16.3	No
Last-Update-Time	Type: DateTimeZone	TMDD 3.3.10.1	No
Parent-Organization	Element		No

3.4.2.8.3. Restrictions

This describes restrictions for forwarding organization center information. This is the same as the Restrictions data frame in TMDD 3.3.16.5.

Attribute Name	Type/Element	Reference	CC Required
Organization-Information-Forwarding-Restrictions	Element		Yes

3.4.2.9. RampMeter Class

3.4.2.9.1. RampMeterControlSchedule

This provides the ramp meter control schedule for an individual ramp meter. This is the same as the RampMeterControlSchedule data frame in TMDD 3.3.17.3.

Attribute Name	Type/Element	Reference	CC Required
Device-Control-Schedule-Header	Type: DeviceControlScheduleHeader	TMDD 3.3.5.4	Yes
Metered-Lane-Identifier	Element		Yes
Action-Number	Element		Yes
Meter-Action-Control	Element		Yes
Meter-Requested-Plan	Element		Yes
Meter-Requested-Rate	Element		Yes
Meter-Vehicles-Per-Green	Element		Yes
Min-Meter-Rate	Element		Yes
Max-Meter-Rate	Element		Yes
Meter-Lane-Usage-Mode	Element		No

3.4.2.9.2. RampMeterPlanInventory

This provides an entry in a center's ramp meter plan inventory. This is the same as the RampMeterPlanInventory data frame in TMDD 3.3.17.8.

Attribute Name	Type/Element	Reference	CC Required
Restrictions	Type: Restrictions	TMDD 3.3.16.5	No
Organization-Information	Type: OrganizationInformation	TMDD 3.3.16.3	Yes
Device-Id	Element		Yes
Meter-Plan	Element		Yes
Meter-Level	Element		Yes
Meter-Rate	Element		Yes
Flow-Rate-Threshhold	Element		Yes
Occupancy-Threshhold	Element		Yes
Speed-Threshhold	Element		Yes
Last-Update-Time	Type: DateTimeZone	TMDD 3.3.10.1	Yes

3.4.2.10. Section Class

3.4.2.10.1. SectionControlSchedule

This provides information for a centers traffic signal control schedule for an individual section. This is the same as the SectionControlSchedule data frame in TMDD 3.3.19.4.

Attribute Name	Type/Element	Reference	CC Required
Restrictions	Type: Restrictions	TMDD 3.3.16.5	No
Organization-Information	Type: OrganizationInformation	TMDD 3.3.16.3	Yes
Section-Id	Element		Yes
Time-Base-Schedule-Number	Element		Yes
Time-Base-Schedule-Month	Element		Yes
Time-Base-Schedule-Day	Element		Yes
Time-Base-Schedule-Date	Element		Yes
Time-Base-Schedule-Day-Plan	Element		Yes
Day-Plan-Hour	Element		Yes
Day-Plan-Minute	Element		Yes
Last-Update-Time	Type: DateTimeZone	TMDD 3.3.10.1	Yes

Attribute Name	Type/Element	Reference	CC Required
Node-Id-List	Element: Sequence of "Organization-resource-identifier" types		Yes
Request-Control-Mode	Element		Yes
Timing-Pattern-Id	Element		Yes

3.4.2.10.2. SectionTimingPatternInventory

This provides information for an entry in a sections timing pattern inventory. This is the same as the SectionTimingPatternInventory data frame in TMDD 3.3.19.8.

Attribute Name	Type/Element	Reference	CC Required
Restrictions	Type: Restrictions	TMDD 3.3.16.5	No
Organization-Information	Type: OrganizationInformation	TMDD 3.3.16.3	Yes
Section-Id	Element		Yes
Section-Timing-Pattern-Id	Element		Yes
Section-Timing-Pattern-Name	Element		Yes
Section-Cycle-Length	Element		Yes
Intersection-Tp-List	Type: Sequence of "SectionSignalTiming PatternInventory" types	TMDD 3.3.19.10	Yes
Last-Update-Time	Type: DateTimeZone	TMDD 3.3.10.1	Yes

3.4.2.10.3. SectionSignalTimingPatternInventoryRequest

This is a request for a section signal timing pattern inventory. This is the same as the SectionSignalTimingPatternInventoryRequest data frame in TMDD 3.3.19.9.

Attribute Name	Type/Element	Reference	CC Required
Device-Information-Request-Header	Type: DeviceInformationRequest	TMDD 3.3.5.6	Yes
Section-Timing-Pattern-Id	Element		No

3.4.2.10.4. SectionSignalTimingPatternInventory

This is information for a single traffic signal in a signal section timing pattern inventory. This is the same as the SectionSignalTimingPatternInventory data frame in TMDD 3.3.19.10.

Attribute Name	Type/Element	Reference	CC Required
Intersection-Id	Element		Yes
Cycle-Length	Element		Yes
Offset-Time	Element		Yes
Phase-Tp-List	Type: Sequence of "IntersectionSignalTPInventoryPhase" types	TMDD 3.3.12.21	Yes
Sequence-Information	Type: Sequence of "IntersectionSignalSequenceData" types	TMDD 3.3.12.16	Yes

3.4.2.11. TransportationNetwork Class

3.4.2.11.1. TrafficNetworkInformationRequest

This is the information required to request an inventory or status of network links, nodes, or routes. This is the same as the TrafficNetworkInformationRequest data frame in TMDD 3.3.20.1.

Attribute Name	Type/Element	Reference	CC Required
Authentication	Type: Authentication	TMDD 3.3.3.1	No
Organization-Requesting	Type: OrganizationInformation	TMDD 3.3.16.3	Yes
Network-Information-Type	Element		Yes
Network-Identifiers	Element: Sequence of "Transportation-network-identifier" types		Yes
Roadway-Network-Id-List	Element: Sequence of "Transportation-network-identifier" types		Yes

3.4.2.12. Transit Class

These objects are defined by files in GTFS (General Transit Feed Specification) and are included per System Requirements specs 8.2.2, 8.2.6 and 8.7.1.2.

3.4.2.12.1. Agency

This is the layout of the Agency.txt GTFS file which defines one or more transit agencies that provide the data in this feed.

Attribute Name	Type/Element	Reference
Agency_Id	Element	
Agency_Name	Element	
Agency_Url	Element	
Agency_Timezone	Element	
Agency_Lang	Element	
Agency_Phone	Element	
Agency_Fare_Url	Element	

3.4.2.12.2. Stops

This is based on the layout of the stops.txt GTFS file which defines individual locations where vehicles pick up or drop off passengers.

Attribute Name	Type/Element	Reference	Description
Stop_Id	Element		
Stop_Code	Element		
Stop_Name	Element		
Stop_Desc	Element		
Stop_Lat	Element		
Stop_Lon	Element		
Zone_Id	Element		
Stop_Url	Element		
Location_Type	Element		
Parent_Station	Element		
Stop_Timezone	Element		
Wheelchair_Boarding	Element		
Park_And_Ride_Facility_Exists	Element: Yes/No	System Requirements spec 8.7.1.2	Indicates presence of park-and-ride facility at each station

3.4.2.12.3. Routes

This is the layout of the routes.txt GTFS file which defines transit routes. A route is a group of trips that are displayed to riders as a single service.

Attribute Name	Type/Element	Reference
Route_Id	Element	
Agency_Id	Element	
Route_Short_Name	Element	
Route_Long_Name	Element	
Route_Desc	Element	
Route_Type	Element	
Route_Url	Element	
Route_Color	Element	
Route_Text_Color	Element	

3.4.2.12.4. Trips

This is the layout of the trips.txt GTFS file which defines trips for each route. A trip is a sequence of two or more stops that occurs at a specific time.

Attribute Name	Type/Element	Reference
Route_Id	Element	
Service_Id	Element	
Trip_Id	Element	
Trip_Headsign	Element	
Trip_Short_Name	Element	
Direction_Id	Element	
Block_Id	Element	
Shape_Id	Element	
Wheelchair_Accessible	Element	
Bikes_Allowed	Element	

3.4.2.12.5. Stop_Times

This is the layout of the stop_times.txt GTFS file which defines times that a vehicle arrives at and departs from individual stops for each trip.

Attribute Name	Type/Element	Reference
Trip_Id	Element	
Arrival_Time	Element	

Attribute Name	Type/Element	Reference
Departure_Time	Element	
Stop_Id	Element	
Stop_Sequence	Element	
Stop_Headsign	Element	
Pickup_Type	Element	
Drop_Off_Type	Element	
Shape_Dist_Traveled	Element	
Timepoint	Element	

3.4.2.12.6. Calendar

This is the layout of the calendar.txt GTFS file which defines dates for service IDs using a weekly schedule. Specify when service starts and ends, as well as days of the week where service is available.

Attribute Name	Type/Element	Reference
Service_Id	Element	
Monday	Element	
Tuesday	Element	
Wednesday	Element	
Thursday	Element	
Friday	Element	
Saturday	Element	
Sunday	Element	
Start_Date	Element	
End_Date	Element	

3.4.2.12.7. Calendar_Dates

This is the layout of the calendar_dates.txt GTFS file which defines exceptions for the service IDs defined in the calendar.txt file. If calendar_dates.txt includes ALL dates of service, this file may be specified instead of calendar.txt.

Attribute Name	Type/Element	Reference
Service_Id	Element	
Date	Element	
Exception_Type	Element	

3.4.2.12.8. Fare_Attributes

This is the layout of the fare_attributes.txt GTFS file which defines fare information for a transit organization's routes.

Attribute Name	Type/Element	Reference
Fare_Id	Element	
Price	Element	
Currency_Type	Element	
Payment_Method	Element	
Transfers	Element	
Transfer_Duration	Element	

3.4.2.12.9. Fare_Rules

This is the layout of the fare_rules.txt GTFS file which defines rules for applying fare information for a transit organization's routes.

Attribute Name	Type/Element	Reference
Fare_Id	Element	
Route_Id	Element	
Origin_Id	Element	
Destination_Id	Element	
Contains_Id	Element	

3.4.2.12.10. Shapes

This is the layout of the shapes.txt GTFS file which defines rules for drawing lines on a map to represent a transit organization's routes.

Attribute Name	Type/Element	Reference
Shape_Id	Element	
Shape_Pt_Lat	Element	
Shape_Pt_Lon	Element	
Shape_Pt_Sequence	Element	
Shape_Dist_Traveled	Element	

3.4.2.12.11. Frequencies

This is the layout of the frequencies.txt GTFS file which defines headway (time between trips) for routes with variable frequency of service.

Attribute Name	Type/Element	Reference
Trip_Id	Element	
Start_Time	Element	
End_Time	Element	
Headway_Secs	Element	
Exact_Times	Element	

3.4.2.12.12. Transfers

This is the layout of the transfers.txt GTFS file which defines rules for making connections at transfer points between routes.

Attribute Name	Type/Element	Reference
From_Stop_Id	Element	
To_Stop_Id	Element	
Transfer_Type	Element	
Min_Transfer_Time	Element	

3.4.2.12.13. Feed_Info

This is the layout of the feed_info.txt GTFS file which defines additional information about the feed itself, including publisher, version, and expiration information.

Attribute Name	Type/Element	Reference
Feed_Publisher_Name	Element	
Feed_Publisher_Url	Element	
Feed_Lang	Element	
Feed_Start_Date	Element	
Feed_End_Date	Element	
Feed_Version	Element	

3.5. LAYER: ASSET STATE

This layer contains the current status of each asset listed in the inventory, such as road closures or devices that are not working, or response crew availability.

Figure 6 - Asset State Layer

3.5.1. Data Messages

TMDD Data Message Dialogs include the following:

Name	Reference	Description
dlCCTVStatusRequest	TMDD 3.1.2.2	Request for CCTV status
dlCenterActiveVerificationRequest	TMDD 3.1.3.1	Request for Center Active/Not Active Status
dlCenterActiveVerificationSubscription	TMDD 3.1.3.2	Request for Subscription to Center Active/Not Active Status
dlDetectorStatusRequest	TMDD 3.1.4.2	Request for Detector status
dlDetectorMaintenanceHistoryRequest	TMDD 3.1.4.5	Request for Detector Maintenance History
dlDeviceControlStatusRequest	TMDD 3.1.5.2	Request for Status of Device Control Request
dlDMSStatusRequest	TMDD 3.1.6.2	Request for DMS status
dlESSStatusRequest	TMDD 3.1.7.2	Request for environmental sensor status

Name	Reference	Description
dlHARStatusRequest	TMDD 3.1.10.3	Request for HAR status
dlIntersectionSignalStatusRequest	TMDD 3.1.11.2	Request for Intersection Signal status
dlLCSStatusRequest	TMDD 3.1.12.2	Request for LCS status
dlLinkStatusRequest	TMDD 3.1.13.2	Request for Link status
dlNodeStatusRequest	TMDD 3.1.14.2	Request for Node status
dlRampMeterStatusRequest	TMDD 3.1.16.2	Request for Ramp Meter status
dlRouteStatusRequest	TMDD 3.1.17.2	Request for Route status
dlSectionStatusRequest	TMDD 3.1.18.1	Request for Organizational Section status
dlSectionControlStatusRequest	TMDD 3.1.18.2	Request for status of section control request
dlVideoSwitchStatusRequest	TMDD 3.1.20.2	Request for Video Switch status
dlCCTVStatusUpdate	TMDD 3.1.21.2	Request for CCTV status update
dlDetectorStatusUpdate	TMDD 3.1.23.2	Request for Detector status update
dlDMSStatusUpdate	TMDD 3.1.24.3	Request for DMS status update
dlESSStatusUpdate	TMDD 3.1.25.2	Request for ESS status update
dlHARStatusUpdate	TMDD 3.1.28.3	Request for HAR status update
dlIntersectionSignalStatusUpdate	TMDD 3.1.29.3	Request for Intersection Signal status update
dlLCSStatusUpdate	TMDD 3.1.30.2	Request for LCS status update
dlSectionStatusUpdate	TMDD 3.1.33.1	Request for Organizational Section status update
dlLinkStatusUpdate	TMDD 3.1.34.2	Request for Link status update
dlNodeStatusUpdate	TMDD 3.1.35.2	Request for Node status update
dlRouteStatusUpdate	TMDD 3.1.36.2	Request for Node status update
dlVideoSwitchStatusUpdate	TMDD 3.1.37.2	Request for Video Switch status update

Other messaging dialogs required include the following:

Name	Reference	Description
PARKING FACILITY	APTA TCIP-S-001 4.1.1 * or ISO/TS 18234-7:2013 **	State of parking facilities, including available spaces and occupancy rate.
TRANSIT	APTA TCIP-S-001 4.1.1 *	State of transit services.
FREIGHT	FRATIS ***	State of freight services.

* American Public Transportation Association Standard for Transit Communications Interface Profiles

** Intelligent transport systems -- Traffic and travel information via transport protocol experts group, generation 1 (TPEG1) binary data format -- Part 7: Parking information (TPEG1-PKI)

*** The standards used in the Freight Advanced Traveler Information Systems (FRATIS) bundle of applications.

3.5.2. Data Class Descriptions

Data Class Descriptions include data elements for basic objects. Data classes may be referenced in other data classes (parent classes), and may be referenced in multiple parent classes. These do not represent database structures, but instead are based primarily on TMDD, or are structured similarly. Database design is expected to occur during system design.

See the beginning of section 3 for a description of the "CC Required" column.

3.5.2.1. CCTV Class

3.5.2.1.1. CCTVStatus

This provides the CCTV status of a single CCTV device. This is the same as the CCTVStatus data frame in TMDD 3.3.2.4.

Attribute Name	Type/Element	Reference	CC Required
Device-Status-Header	Type: DeviceStatusHeader	TMDD 3.3.5.13	Yes
Cctv-Error	Element		No
Cctv-Image-List	Element: Sequence of "Cctv-image-supported" types		No

Attribute Name	Type/Element	Reference	CC Required
Cctv-Position-Preset	Element		No
Cctv-Position-Pan	Element		No
Cctv-Position-Tilt	Element		No
Cctv-Position-Zoom-Lens	Element		No
Cctv-Position-Iris-Lens	Element		No
Cctv-Position-Focus-Lens	Element		No
Cctv-Environmental-Status	Element		No

3.5.2.2. Connection Management Class

3.5.2.2.1. CenterActiveVerificationRequest

This is the information required to request active status of a center. This is the same as the CenterActiveVerificationRequest data frame in TMDD 3.3.3.2.

Attribute Name	Type/Element	Reference	CC Required
Authentication	Type: Authentication	TMDD 3.3.3.1	Yes
Organization-Requesting	Type: OrganizationInformation	TMDD 3.3.16.3	Yes

3.5.2.2.2. CenterActiveVerificationResponse

This is the information provided to indicate whether a center is active or not. This is the same as the CenterActiveVerificationResponse data frame in TMDD 3.3.3.3.

Attribute Name	Type/Element	Reference	CC Required
Restrictions	Type: Restrictions	TMDD 3.3.16.5	No
Organization-Information	Type: OrganizationInformation	TMDD 3.3.16.3	Yes
Center-Id	Element		Yes
Center-Name	Element		Yes

3.5.2.3. Detector Class

3.5.2.3.1. DetectorMaintenanceHistoryRequest

This is a request for detector maintenance history for a list of detector devices. This is the same as the DetectorMaintenanceHistoryRequest data frame in TMDD 3.3.4.8.

Attribute Name	Type/Element	Reference	CC Required
Device-Information-Request-Header	Type: DeviceInformationRequest	TMDD 3.3.5.6	Yes
Detector-Station-Id	Element		Yes

3.5.2.3.2. DetectorStatus

This is the status for an individual detector. This is the same as the DetectorStatus data frame in TMDD 3.3.4.9.

Attribute Name	Type/Element	Reference	CC Required
Detector-Station-Status-Header	Type: DeviceStatusHeader	TMDD 3.3.5.13	No
Detector-Status-List	Type: Sequence of "DetectorStatusDetails" types	TMDD 3.3.4.10	Yes

3.5.2.3.3. DetectorStatusDetails

This provides the details for the status of an individual sensor or station. This is the same as the DetectorStatusDetails data frame in TMDD 3.3.4.10.

Attribute Name	Type/Element	Reference	CC Required
Detector-Status-Header	Type: DeviceStatusHeader	TMDD 3.3.5.13	Yes
Detector-Lane-Number	Element		Yes
Lane-Direction	Element		Yes
Detector-Outputmode	Element		No

3.5.2.4. Device Class

3.5.2.4.1. DeviceControlResponse

This is the confirmation or rejection of a device control request. This is the same as the DeviceControlResponse data frame in TMDD 3.3.5.3.

Attribute Name	Type/Element	Reference	CC Required
Organization-Information	Type: OrganizationInformation	TMDD 3.3.16.3	Yes
Device-Id	Element		Yes
Request-Id	Element		Yes
Operator-Id	Element		Yes
Operator-Lock-Id	Element		Yes
Request-Status	Element		Yes
Operator-Last-Revised	Type: DateTimeZone	TMDD 3.3.10.1	No

3.5.2.4.2. DeviceControlStatusRequest

This is the information required to request the status of a previous device control request. This is the same as the DeviceControlStatusRequest data frame in TMDD 3.3.5.5.

Attribute Name	Type/Element	Reference	CC Required
Authentication	Type: Authentication	TMDD 3.3.3.1	No
Organization-Requesting	Type: OrganizationInformation	TMDD 3.3.16.3	Yes
Device-Id	Element		Yes
Request-Id	Element		Yes

3.5.2.4.3. DeviceStatusHeader

This is the header information included with all device status information. This is the same as the DeviceStatusHeader data frame in TMDD 3.3.5.13.

Attribute Name	Type/Element	Reference	CC Required
Restrictions	Type: Restrictions	TMDD 3.3.16.5	No
Organization-Information	Type: OrganizationInformation	TMDD 3.3.16.3	Yes
Device-Id	Element		Yes
Device-Status	Element		Yes
Center-Id	Element		Yes

Attribute Name	Type/Element	Reference	CC Required
Device-Comm-Status	Element		Yes
Operator-Id	Element		Yes
Event-Id	Element		Yes
Response-Plan-Id	Element		Yes
Last-Comm-Time	Type: DateTimeZone	TMDD 3.3.10.1	Yes

3.5.2.5. DMS Class

3.5.2.5.1. DMSStatus

This is the status of an individual dms device. This is based on the DMSStatus data frame in TMDD 3.3.6.13.

Attribute Name	Type/Element	Reference	Description	CC Required
Device-Status-Header	Type: DeviceStatusHeader	TMDD 3.3.5.13		Yes
Current-Message	Element			Yes
Message-Number	Element			No
Message-Time-Remaining	Element			No
Message-Source-Mode	Element			No
Message-Beacon	Element			No
Location-When-Not-In-Use	Element: Location where device is normally stored when not used	System Requirements spec 8.7.1.2	For each moveable DMS that may be used by the ICM system to disseminate information to travelers	Yes (extended)

3.5.2.6. ESS Classes

3.5.2.6.1. ESSSensorStatusDetails

This provides the status of a single environmental sensor. This is the same as the ESSSensorStatusDetails data frame in TMDD 3.3.7.13.

Attribute Name	Type/Element	Reference	CC Required
Device-Status-Header	Type: DeviceStatusHeader	TMDD 3.3.5.13	Yes

3.5.2.6.2. ESSStatus

This provides the status of a single environmental sensor station. This is the same as the ESSStatus data frame in TMDD 3.3.7.16.

Attribute Name	Type/Element	Reference	CC Required
Ess-Station-Status-Header	Type: DeviceStatusHeader	TMDD 3.3.5.13	Yes
Ess-Sensor-List	Type: Sequence of "ESSSensorStatusDetails" types	TMDD 3.3.7.13	Yes

3.5.2.7. HAR Class

3.5.2.7.1. HARStatus

This provides the status of a single highway advisory radio device. This is the same as the HARStatus data frame in TMDD 3.3.11.7.

Attribute Name	Type/Element	Reference	CC Required
Device-Status-Header	Type: DeviceStatusHeader	TMDD 3.3.5.13	No
Har-Current-Message	Element		No
Message-Beacon	Element		No
Message-Number	Element		No

3.5.2.8. IntersectionSignal Class

3.5.2.8.1. IntersectionSignalOverlapStatusGroup

This provides the active signal indications for a group of overlap phases for a single intersection signal. This is the same as the IntersectionSignalOverlapStatusGroup data frame in TMDD 3.3.12.10.

Attribute Name	Type/Element	Reference	CC Required
Overlap-Status-Group-Number	Element		No
Overlap-Status-Group-Greens	Element		No
Overlap-Status-Group-Yellows	Element		No
Overlap-Status-Group-Reds	Element		No

3.5.2.8.2. IntersectionSignalPhaseSplit

This describes the time in tenths of a second that a intersection signal phase is allowed to receive. This is the same as the IntersectionSignalPhaseSplit data frame in TMDD 3.3.12.11.

Attribute Name	Type/Element	Reference	CC Required
Phase-Identifier	Element		Yes
Phase-Duration	Element		Yes

3.5.2.8.3. IntersectionSignalPhaseStatusGroup

This provides the active signal indications for a group of phases for an intersection signal. This is the same as the IntersectionSignalPhaseStatusGroup data frame in TMDD 3.3.12.12.

Attribute Name	Type/Element	Reference	CC Required
Phase-Status-Group-Number	Element		Yes
Phase-Status-Group-Greens	Element		Yes
Phase-Status-Group-Yellows	Element		Yes
Phase-Status-Group-Reds	Element		Yes
Phase-Status-Group-Walks	Element		No
Phase-Status-Group-Pedclears	Element		No
Phase-Status-Group-Dontwalks	Element		No

3.5.2.8.4. IntersectionSignalRingStatus

This provides that status of the phases of a signal ring. This is the same as the IntersectionSignalRingStatus data frame in TMDD 3.3.12.15.

Attribute Name	Type/Element	Reference	CC Required
Ring-Identifier	Element		Yes
Ring-Status	Element		Yes

3.5.2.8.5. IntersectionSignalStatus

This provides the status for a single intersection signal. This is based on the IntersectionSignalStatus data frame in TMDD 3.3.12.18.

Attribute Name	Type/Element	Reference	Description	CC Required
Device-Status-Header	Type: DeviceStatusHeader	TMDD 3.3.5.13		Yes
Signal-Control-Source	Element			Yes
Planned-Signal-Timing-Mode	Element			Yes
Current-Signal-Timing-Mode	Element			Yes
Section-Id	Element			Yes
Planned-Signal-Timing-Mode-Description	Element			Yes
Timing-Pattern-Id-Current	Element			Yes
Timing-Pattern-Description	Element			Yes
Actuation-Mode	Element			Yes
Timing-Phase-Plan-Mode	Element			Yes
Cycle-Length-Planned	Element			Yes
Cycle-Length-Current	Element			Yes
Cycle-Length-Previous	Element			Yes
Cycle-Length-Master	Element			Yes
Cycle-Counter	Element			Yes
Cycle-Counter-Master	Element			Yes
Offset-Reference	Element			Yes
Offset-Time-Planned	Element			Yes
Offset-Time-Current	Element			Yes
Offset-Time-Previous	Element			Yes
Controller-Timestamp	Type: DateTimeZone	TMDD 3.3.10.1		Yes
Phase-Split-List	Type: Sequence of "IntersectionSignal PhaseSplit" types	TMDD 3.3.12.11		Yes
Ring-Status-List	Type: Sequence of "IntersectionSignal RingStatus" types	TMDD 3.3.12.15		Yes
Phase-Status	Type: Sequence of "IntersectionSignal PhaseStatusGroup" types	TMDD 3.3.12.12		Yes

Attribute Name	Type/Element	Reference	Description	CC Required
Overlap-Status	Type: Sequence of "IntersectionSignal OverlapStatusGroup" types	TMDD 3.3.12.10		No
Active-Special-Functions-List	Element: Sequence of "Organization-resource-identifier" types			No
Preempt-Priority-Description	Element			No
Operation-Agency	Element: Agency responsible for the operation of the intersection	System Requirements spec 8.7.1.3	For each signalized intersection under ICM management	Yes (Extended)
Maintenence-Agency	Element: Agency responsible for maintenance of the intersection	System Requirements spec 8.7.1.3	For each signalized intersection under ICM management	Yes (Extended)
Prohibited-Right-On-Red	Element: Yes/No	System Requirements spec 8.7.1.3	For each signalized intersection under ICM management. Indicates whether right turns on red movements are prohibited.	Yes (Extended)
Operation-Alteration-Authorization	Element: TBD	System Requirements spec 8.5.2.2	Will indicate whether changes to the operation of this signalized intersection are authorized.	Yes (Extended)

3.5.2.9. LCS Class

3.5.2.9.1. LCSStatus

This provides the status of a single lane control system device. This is the same as the LCSStatus data frame in TMDD 3.3.13.4.

Attribute Name	Type/Element	Reference	CC Required
Device-Status-Header	Element		Yes
Lane-Current-State	Element		Yes
Link-Direction	Element		Yes

3.5.2.10. Link Class

3.5.2.10.1. LinkStatus

This provides the status of a list of links. This is the same as the LinkStatus data frame in TMDD 3.3.14.4.

Attribute Name	Type/Element	Reference	CC Required
Restrictions	Type: Restrictions	TMDD 3.3.16.5	No
Organization-Information	Type: OrganizationInformation	TMDD 3.3.16.3	Yes
Link-Inventory-List	Type: Sequence of "LinkStatusList" types	TMDD 3.3.14.5	Yes

3.5.2.10.2. LinkStatusList

This provides the status of an individual link. This is the same as the LinkStatusList data frame in TMDD 3.3.14.5.

Attribute Name	Type/Element	Reference	CC Required
Network-Id	Element		Yes
Link-Id	Element		Yes
Link-Name	Element		No
Link-Status	Element		Yes
Link-Direction	Element		No
Lanes-Number-Open	Element		No
Priority-Type	Element		No
Restriction-Axle-Count	Element		No

Attribute Name	Type/Element	Reference	CC Required
Restriction-Height	Element		No
Restriction-Length	Element		No
Restriction-Weight	Element		No
Restriction-Width	Element		No
Restriction-Weight-Axle	Element		No
Restriction-Units	Element		No
Surface-Condition	Element		No
Saturation-Flag	Element		No
Oversaturated-Threshold	Element		No
Level-Of-Service	Element		No
Lane-Numbers	Element: Sequence of "Link-lane-number" types		No
Link-Data-Stored	Element		No
Detection-Method	Element		No
Link-Traffic-Data-Algorithm	Element		No
Stops	Element		No
Delay	Element		No
Alternate-Route-Delay	Element		No
Headway	Element		No
Travel-Time	Element		No
Capacity-Existing	Element		No
Travel-Time-Increase	Element		No
Speed-Average	Element		No
Speed-Vehicle-Estimated	Element		No
Speed-Limit	Element		No
Advisory-Speed-Limit	Element		No
Truck-Speed-Limit	Element		No
Speed-Limit-Units	Element		No
Density	Element		No
Occupancy	Element		No
Volume	Element		No
Event-Description-Time	Element		No
Last-Update-Time	Type: DateTimeZone	TMDD 3.3.10.1	No

3.5.2.11. Node Class

3.5.2.11.1. NodeStatus

This provides the status of a list of nodes. This is the same as the NodeStatus data frame in TMDD 3.3.15.3.

Attribute Name	Type/Element	Reference	CC Required
Restrictions	Type: Restrictions	TMDD 3.3.16.5	No

Attribute Name	Type/Element	Reference	CC Required
Organization-Information	Type: OrganizationInformation	TMDD 3.3.16.3	Yes
Node-Status-List	Type: Sequence of "NodeStatusList" types	TMDD 3.3.15.4	Yes

3.5.2.11.2. NodeStatusList

This provides the status of an individual node. This is the same as the NodeStatusList data frame in TMDD 3.3.15.4.

Attribute Name	Type/Element	Reference	CC Required
Network-Id	Element		Yes
Network-Name	Element		No
Node-Id	Element		Yes
Node-Name	Element		No
Node-Status	Element		Yes
Last-Update-Time	Type: DateTimeZone	TMDD 3.3.10.1	No

3.5.2.12. Ramp Meter Classes

3.5.2.12.1. RampMeterLaneStatusDetails

This is the status of an individual ramp meter lane. This is based on the RampMeterLaneStatusDetails data frame in TMDD 3.3.17.7.

Attribute Name	Type/Element	Reference	Description	CC Required
Metered-Lane-Status-Header	Type: DeviceStatusHeader	TMDD 3.3.5.13		Yes
Meter-Implemented-Action	Element			Yes
Requested-Meter-Command-Source	Element			Yes
Implemented-Meter-Command-Source	Element			Yes
Meter-Implemented-Plan	Element			Yes
Meter-Implemented-Rate	Element			Yes
Meter-Implemented-Vehicles-Per-Green	Element			No
Meter-Requested-Action	Element			Yes
Meter-Requested-Plan	Element			Yes
Meter-Requested-Rate	Element			Yes

Attribute Name	Type/Element	Reference	Description	CC Required
Meter-Requested-Vehicles-Per-Green	Element			No
Operational-Min-Meter-Rate	Element			No
Operational-Max-Meter-Rate	Element			No
Meter-Demand-Detector-Status	Element			Yes
Meter-Passage-Detector-Status	Element			Yes
Meter-Queue-Detector-Status	Element			Yes
Meter-Cycle-Count	Element			No
Metered-Lane-Vehicle-Count	Element			Yes
Meter-Queue-Detected-Flag	Element			Yes
Metered-Lane-Violation-Count	Element			No
HOV-Allow-Meter-Bypass	Element: Yes/No	System Requirements spec 8.7.1.2	Indicates whether HOV vehicles are allowed to bypass the ramp meter	Yes (Extended)

3.5.2.12.2. RampMeterStatus

This is the status of a single ramp meter device. This is based on the RampMeterStatus data frame in TMDD 3.3.17.10.

Attribute Name	Type/Element	Reference	Description	CC Required
Device-Status-Header	Type: DeviceStatusHeader	TMDD 3.3.5.13		Yes
Metered-Status-List	Type: Sequence of "RampMeterLaneStatus Details" types	TMDD 3.3.17.7		Yes
Mainline-Flow-Rate	Element			Yes
Mainline-Vehicle-Occupancy	Element			Yes
Mainline-Vehicle-Speed	Element			Yes

Attribute Name	Type/Element	Reference	Description	CC Required
Operation-Alteration-Authorization	Element: TBD	System Requirements spec 8.5.2.2	Will indicate whether metering changes are authorized.	Yes (Extended)

3.5.2.13. Route Class

3.5.2.13.1. RouteStatus

This provides the status of a list of routes. This is the same as the RouteStatus data frame in TMDD 3.3.18.3.

Attribute Name	Type/Element	Reference	CC Required
Network-Id	Type: Restrictions	TMDD 3.3.16.5	No
Route-Id	Type: OrganizationInformation	TMDD 3.3.16.3	Yes
Route-Status	Type: Sequence of "RouteStatusList" types	TMDD 3.3.18.4	Yes

3.5.2.13.2. RouteStatusList

This provides the status of an individual route. This is the same as the RouteStatusList data frame in TMDD 3.3.18.4.

Attribute Name	Type/Element	Reference	CC Required
Network-Id	Element		Yes
Route-Id	Element		Yes
Route-Status	Element		Yes
Route-Name	Element		Yes
Detour-Route-In-Effect-Flag	Element		Yes
Surface-Condition	Element		No
Route-Capacity	Element		No
Level-Of-Service	Element		No
Saturation-Flag	Element		No
Route-Data-Stored-Type	Element		No
Route-Traffic-Data-Algorithm	Element		No
Delay	Element		Yes

Attribute Name	Type/Element	Reference	CC Required
Alternate-Route-Delay	Element		No
Headway	Element		No
Travel-Time	Element		Yes
Travel-Time-Increase	Element		Yes
Volume	Element		No
Speed-Average	Element		Yes
Density	Element		No
Occupancy	Element		No
Current-Speed-Advisory	Element		No
Speed-Limit-Units	Element		No
Event-Description-Time	Element		No
Last-Update-Time	Type: DateTimeZone	TMDD 3.3.10.1	Yes

3.5.2.14. Section Class

3.5.2.14.1. SectionControlResponse

This provides the acceptance or rejection of a section control request. This is the same as the SectionControlResponse data frame in TMDD 3.3.19.3.

Attribute Name	Type/Element	Reference	CC Required
Restrictions	Type: Restrictions	TMDD 3.3.16.5	No
Organization-Information	Type: OrganizationInformation	TMDD 3.3.16.3	Yes
Section-Id	Element		Yes
Request-Id	Element		Yes
Operator-Id	Element		Yes
Request-Status	Element		Yes
Operator-Last-Revised	Type: DateTimeZone	TMDD 3.3.10.1	Yes
Request-Control-Mode	Element		No
Timing-Pattern-Id	Element		Yes

3.5.2.14.2. SectionControlStatusRequest

This contains the information describing the control status of an individual traffic signal section. This is the same as the SectionControlStatusRequest data frame in TMDD 3.3.19.5.

Attribute Name	Type/Element	Reference	CC Required
Authentication	Type: Restrictions	TMDD 3.3.16.5	Yes
Organization-Requesting	Type: OrganizationInformation	TMDD 3.3.16.3	Yes
Section-Id	Element		Yes

Attribute Name	Type/Element	Reference	CC Required
Request-Id	Element		Yes

3.5.2.15. VideoSwitch Class

3.5.2.15.1. VideoSwitchDeviceStatus

This provides the status of an individual video switch. This is the same as the VideoSwitchDeviceStatus data frame in TMDD 3.3.21.2.

Attribute Name	Type/Element	Reference	CC Required
Device-Status-Header	Type: DeviceStatusHeader	TMDD 3.3.5.13	Yes
Switched-Channel-List	Type: Sequence of "VSSwitchedChannelData" types	TMDD 3.3.21.4	Yes

3.5.2.15.2. VSSwitchedChannelData

This provides the I/O channel assignments for a video switch. This is the same as the VSSwitchedChannelData data frame in TMDD 3.3.21.4.

Attribute Name	Type/Element	Reference	CC Required
Input-Channel-Id	Element		Yes
Output-Channel-Id	Element		Yes
Channel-Titling-Text	Element		No

3.6. LAYER: ASSET REAL-TIME DATA

This layer contains the real-time data reported by each device or asset such as the data contained in the PeMS and IEN data feed, and requests to control assets in the corridor. It is likely that during system design that system performance requirements, coupled with the high data volume and throughput requirements, will be the primary drivers of data transmission, persistence, and retrieval methods and formats. Actual formats may be significantly different than those listed in this section.

Figure 7 - Asset Real-Time Data Layer

3.6.1. Data Messages

TMDD Data Message Dialogs include the following:

Name	Reference	Description
dlDetectorDataRequest	TMDD 3.1.4.3	Request for detector data
dlDetectorDataSubscription	TMDD 3.1.4.4	Request for Subscription to detector data
dlDMSMessageAppearanceRequest	TMDD 3.1.6.5	Request for Status of Device Control Request
dlESSObservationMetadataRequest	TMDD 3.1.7.3	Request for ESS Observation Metadata
dlESSObservationReportRequest	TMDD 3.1.7.4	Request for ESS Observation Report
dlFullEventUpdateRequest	TMDD 3.1.8.1	Request for update on all events
dlEventIndexRequest	TMDD 3.1.8.2	Request for index of events

Name	Reference	Description
dlFullEventUpdateSubscription	TMDD 3.1.8.4	Request for subscription to event updates
dlEventIndexSubscription	TMDD 3.1.8.5	Request for subscription to event idex
dlDetectorDataUpdate	TMDD 3.1.23.3	Request for detector data update
dlESSObservationReportUpdate	TMDD 3.1.25.3	Request for ESS observations
dlFullEventUpdateUpdate	TMDD 3.1.26.1	Event Update
dlEventIndexUpdate	TMDD 3.1.26.2	EventIndexUpdate

Other messaging dialogs required include the following:

Name	Reference	Description
TRANSIT	APTA TCIP-S-001 4.1.1 *	Contains location information for transit assets. May also contain ridership and rider capacity data if available.
FREIGHT	FRATIS **	Contains location information for freight assets.
PROBES	Dependent upon data provider(s) selected	Contains probe data including probe identity (anonymous), geospatial location, and speed.

* American Public Transportation Association Standard for Transit Communications Interface Profiles

** The standards used in the Freight Advanced Traveler Information Systems (FRATIS) bundle of applications.

3.6.2. Data Class Descriptions

Data Class Descriptions include data elements for basic objects. Classes may be referenced in other classes (parent classes), and may be referenced in multiple parent classes. These do not represent database structures, but instead are based primarily on TMDD, or are structured similarly. Database design is expected to occur during system design.

See the beginning of section 3 for a description of the "CC Required" column.

3.6.2.1. Detector Class

3.6.2.1.1. DetectorData

This provides the data for a single detector station or sensor. This is the same as the DetectorData data frame in TMDD 3.3.4.1.

Attribute Name	Type/Element	Reference	CC Required
Restrictions	Type: Restrictions	TMDD 3.3.16.5	No
Organization-Information	Type: OrganizationInformation	TMDD 3.3.16.3	Yes
Detector-Data-List	Type: Sequence of "DetectorDataDetail" types	TMDD 3.3.4.2	Yes

3.6.2.1.2. DetectorDataDetail

This provides the detail information for an individual detector or station. This is the same as the DetectorDataDetail data frame in TMDD 3.3.4.2.

Attribute Name	Type/Element	Reference	CC Required
Station-Id	Element		No
Detector-Id	Element		Yes
Detection-Time-Stamp	Type: DateTimeZone	TMDD 3.3.10.1	Yes
Vehicle-Count	Element		Yes
Vehicle-Occupancy	Element		Yes
Start-Time	Type: DateTimeZone	TMDD 3.3.10.1	Yes
End-Time	Type: DateTimeZone	TMDD 3.3.10.1	Yes
Detector-Data-Type	Element		Yes
Vehicle-Speed	Element		Yes
Queue-Length	Element		Yes
Vehicle-Stops	Element		Yes
Vehicle-Count-Bin1	Element		No
Vehicle-Count-Bin2	Element		No
Vehicle-Count-Bin3	Element		No
Vehicle-Count-Bin4	Element		No
Vehicle-Count-Bin5	Element		No
Vehicle-Count-Bin6	Element		No
Vehicle-Count-Bin7	Element		No
Detector-Status	Element		Yes

Attribute Name	Type/Element	Reference	CC Required
Vehicle-Occupancy-Ext	Element: Integer containing lane occupancy	Purpose: The existing Vehicle-Occupancy element limits precision to 2 digits but PeMS data reports 4 digits	Yes - Only applies to Caltrans D7 ATMS (PeMS) (Extended)

3.6.2.1.3. DetectorDataRequest

This provides information required for a request for detector data for one or more sensors or stations. This is the same as the DetectorDataRequest data frame in TMDD 3.3.4.3.

Attribute Name	Type/Element	Reference	CC Required
Device-Information-Request-Header	Type: DeviceInformationRequest	TMDD 3.3.5.6	Yes
Detector-Station-Id	Element		Yes
Detector-Data-Type	Element		Yes

3.6.2.1.4. DetectorDataExtended

This extended data frame only applies to the Corridor Management System (CMS).

This extended data frame contains additional data for the DetectorData data frame (TMDD 3.3.4.1).

Attribute Name	Type/Element	Reference	CC Required
Hub-Org-Id	Element: Integer	Unique organization ID, assigned by the Data Hub	Yes - Only for CMS and Data Hub
Hub-Sensor-Id	Element: Integer	Unique asset ID across all organizations, assigned by the Data Hub	Yes - Only for CMS and Data Hub
Inventory-Check	Element: Enumerated: Pass (1), Fail: In inventory but missing data (2) Fail: Not in inventory (3) *Note: Subject to change*		Yes - Only for Data Hub, optional for CMS

Attribute Name	Type/Element	Reference	CC Required
Flow-Balance-Check	Type: FlowBalanceResult (Extended)	Contains results of flow balance validation checks	Yes - Only for Data Hub, optional for CMS
Data-Value-Check	Type: TBD	Contains results of data value validation checks	Yes - Only for Data Hub, optional for CMS

3.6.2.1.5. FlowBalanceResult

This extended data frame is only for internal use in the Data Hub.

This extended data frame contains results of flow balance checks.

Note: The attributes and data types in this data frame are subject to change.

Attribute Name	Type/Element	Reference	CC Required
Flow-Bal-Test-Id	Element: Integer	ID of the validation test	Yes - Only for Data Hub, optional for CMS
Flow-Bal-Result	Element: Enumerated: Pass (1), Fail (2)	Validation test result	Yes - Only for Data Hub, optional for CMS

3.6.2.2. Device Class

3.6.2.2.1. DeviceReference

This provides a reference to a device via an identifier and type. This is the same as the DeviceReference data frame in TMDD 3.3.5.12.

Attribute Name	Type/Element	Reference	CC Required
Device-Id	Element		Yes
Device-Type	Element		Yes

3.6.2.3. ESS Class

3.6.2.3.1. ESSClimateRecordDetail

This provides the monthly average low and high for a specific environmental sensor site. This is the same as the ESSClimateRecordDetail data frame in TMDD 3.3.7.1.

Attribute Name	Type/Element	Reference	CC Required
Climate-Observation-Month	Element		Yes
Climate-Observation-Month-Min-Value	Element		Yes
Climate-Month-Max-Value	Element		Yes

3.6.2.3.2. ESSImageInformation

This provides the metadata for an ESS image. This is the same as the ESSImageInformation data frame in TMDD 3.3.7.3.

Attribute Name	Type/Element	Reference	CC Required
Image-Description	Element		Yes
Image-Url	Element		Yes

3.6.2.3.3. ESSObservationDataSetMetadataDetail

This provides the ESS metadata for a specific station, sensor, climate record and site. This is the same as the ESSObservationDataSetMetadataDetail data frame in TMDD 3.3.7.6.

Attribute Name	Type/Element	Reference	CC Required
Ess-Data-Set-File-Name	Element		Yes
Ess-Data-Set-File-Directory-Path	Element		Yes
Ess-Data-Set-File-Access-Protocol	Element		Yes
Ess-Data-Set-File-Access-Address	Element		Yes
Ess-Data-Set-File-Access-Port-Address	Element		Yes
Ess-Observation-Collection-Frequency	Element		Yes
Ess-Observation-Collection-Offset	Element		Yes
Ess-Host-Server-Offset-Minutes	Element		Yes
Ess-Host-Server-Time-Zone	Element		Yes
Ess-Host-Server-Daylight-Savings-In-Effect-Flag	Element		Yes
User-Id	Element		No
Password	Element		No

3.6.2.3.4. ESSObservationMetadata

This provides the metadata for a individual ESS device. This is the same as the ESSObservationMetadata data frame in TMDD 3.3.7.7.

Attribute Name	Type/Element	Reference	CC Required
Restrictions	Type: Restrictions	TMDD 3.3.16.5	No
Ess-Observation-Data-Set-Metadata	Type: ESSObservationDataSet MetadataDetail	TMDD 3.3.7.6	Yes
Ess-Collector-Configuration	Type: Sequence of "ESSObservation MetadataItem" types	TMDD 3.3.7.8	No
Organization-Information	Type: OrganizationInformation	TMDD 3.3.16.3	No
Ess-Sensor-Metadata-List	Type: Sequence of "ESSSensorMetadataDetail" types	TMDD 3.3.7.12	No
Site-Information	Type: ESSSiteMetadataDetail	TMDD 3.3.7.14	No
Station-Information	Type: ESSStationMetadataDetail	TMDD 3.3.7.15	No
Climate-Record-Information	Type: ESSClimateRecordDetail	TMDD 3.3.7.1	No
Data-Collector-Information	Type: ESSDataCollectorInformation	TMDD 3.3.7.2	No
Image-Information	Type: ESSImageInformation	TMDD 3.3.7.3	No

3.6.2.3.5. ESSObservationMetadataItem

This provides an observation positional order, name, units, and scaling factor. This is the same as the ESSObservationMetadataItem data frame in TMDD 3.3.7.8.

Attribute Name	Type/Element	Reference	CC Required
Ess-Observation-Positional-Order	Element		Yes
Ess-Observation-Label	Element		Yes
Ess-Observation-Type	Element		No
Ess-Observation-Null-Value	Element		No
Ess-Observation-Units	Element		Yes
Ess-Observation-Decimal-Scaling-Factor	Element		Yes

3.6.2.3.6. ESSObservationReport

This provides the ESS observation reports for a specific set of devices. This is the same as the ESSObservationReport data frame in TMDD 3.3.7.9.

Attribute Name	Type/Element	Reference	CC Required
Restrictions	Type: Restrictions	TMDD 3.3.16.5	No
Organization-Information	Type: OrganizationInformation	TMDD 3.3.16.3	Yes
Station-Id	Element		Yes
Ess-Data-List	Type: Sequence of "ESSObservationReportDetail" types	TMDD 3.3.7.10	Yes

3.6.2.3.7. ESSObservationReportDetail

This provides the ESS observation report detail information for an individual device. This is the same as the ESSObservationReportDetail data frame in TMDD 3.3.7.10.

Attribute Name	Type/Element	Reference	CC Required
Ess-Sensor-Id	Element		Yes
Ess-Observation-Timestamp	Type: DateTimeZone	TMDD 3.3.10.1	Yes
Ess-Observation-Type	Type: ESSObservationType	TMDD 3.3.7.11	Yes

3.6.2.3.8. ESSObservationType

This provides a block of ESS observation data, either weather, pavement, or subsurface. This is the same as the ESSObservationType data frame in TMDD 3.3.7.11.

Attribute Name	Type/Element	Reference	CC Required
Weather-Data	Type: EssWeatherBlock	TMDD 3.6.4.6	Yes
Pavement-Data	Type: EssPavementBlock	TMDD 3.6.4.29	Yes
Subsurface-Data	Type: EssSubSurfaceData	TMDD 3.6.4.30	Yes

3.6.2.3.9. EssWeatherBlock

This provides a block of ESS weather data provided in an OER encoded string. This is the same as the EssWeatherBlock in TMDD 3.6.4.6.

Attribute Name	Type/Element	Reference	CC Required
EssWeatherBlock	Element		Yes

3.6.2.3.10. EssPavementBlock

This provides a block of ESS pavement data provided in an OER encoded string. This is the same as the EssPavementBlock in TMDD 3.6.4.29.

Attribute Name	Type/Element	Reference	CC Required
EssPavementBlock	Element		Yes

3.6.2.3.11. EssSubSurfaceData

This provides a block of ESS subsurface data provided in an OER encoded string. This is the same as the EssSubSurfaceData in TMDD 3.6.4.30.

Attribute Name	Type/Element	Reference	CC Required
EssSubSurfaceData	Element		Yes

3.6.2.4. Event Class

3.6.2.4.1. AdditionalText

This provides additional event information, notes, comments, etc. This is the same as the AdditionalText data frame in TMDD 3.3.8.2.

Attribute Name	Type/Element	Reference	CC Required
Description	Element		Yes
Language	Element		No
Report-Medium	Element		No

3.6.2.4.2. AlternateRouteDetail

This provides an alternate route for an event. This is based on the AlternateRouteDetail data frame in TMDD 3.3.8.3.

Attribute Name	Type/Element	Reference	Description	CC Required
Alternate-Route-Type	Element			Yes
Destination	Type: LandmarkLocation	TMDD 3.3.8.33		No
Location-On-Alternate-Route	Type: Sequence of "LinkLocation" types	TMDD 3.3.8.34		No
Vehicle-Type	Element: Text	System Requirements specs 8.7.1.6 and 8.5.3	Specifies whether the alternate route is for passenger cars, trucks or buses	No

3.6.2.4.3. AreaLocation

This provides area and location information for an event. This is the same as the AreaLocation data frame in TMDD 3.3.8.4.

Attribute Name	Type/Element	Reference	CC Required
Area-Id	Element		No
Area-Name	Element		No
Location-Rank	Element		No
Upward-Area-Reference	Type: AreaLocation	TMDD 3.3.8.4	No

3.6.2.4.4. DataExtent

This provides information regarding the spatial qualities of the event. This is the same as the DataExtent data frame in TMDD 3.3.8.5.

Attribute Name	Type/Element	Reference	CC Required
Length-Affected	Element		No
Proportion-Affected	Element		No
Above-Altitude	Element		No
Below-Altitude	Element		No

3.6.2.4.5. DataIncidentDetails

This provides vehicle and human injury/fatalities associated with the event. This is the same as the DataIncidentDetails data frame in TMDD 3.3.8.6.

Attribute Name	Type/Element	Reference	CC Required
Vehicles-Involved-Count	Element		Choice: select one
Cars-Involved-Count	Element		Choice: select one
Trucks-Involved-Count	Element		Choice: select one
Buses-Involved-Count	Element		Choice: select one
Human-Fatalities-Count	Element		Choice: select one
Human-Injuries-Count	Element		Choice: select one
Human-Major-Injuries-Count	Element		Choice: select one
Human-Minor-Injuries-Count	Element		Choice: select one

3.6.2.4.6. DataLinkRestrictions

This provides vehicle and speed restrictions on a road link. This is the same as the DataLinkRestrictions data frame in TMDD 3.3.8.7.

Attribute Name	Type/Element	Reference	CC Required
Speed-Limit-Advisory	Element		Choice: select one
Speed-Limit	Element		Choice: select one
Speed-Limit-Truck	Element		Choice: select one
Restriction-Length	Element		Choice: select one
Restriction-Height	Element		Choice: select one
Restriction-Width	Element		Choice: select one
Restriction-Weight-Vehicle	Element		Choice: select one
Restriction-Weight-Axle	Element		Choice: select one
Restriction-Axle-Count	Element		Choice: select one

3.6.2.4.7. DataLinkState

This provides the current state of a road link. This is the same as the DataLinkState data frame in TMDD 3.3.8.8.

Attribute Name	Type/Element	Reference	CC Required
Delay	Element		Choice: select one
Peak-Delay	Element		Choice: select one
Alternate-Route-Delay	Element		Choice: select one
Alternate-Route-Peak-Delay	Element		Choice: select one

Attribute Name	Type/Element	Reference	CC Required
Headway	Element		Choice: select one
Travel-Time	Element		Choice: select one
Capacity-Existing	Element		Choice: select one
Travel-Time-Increase	Element		Choice: select one
Speed-Average	Element		Choice: select one
Speed-Vehicle-Estimated	Element		Choice: select one
Description-Time	Element		Choice: select one
Density	Element		Choice: select one
Occupancy	Element		Choice: select one
Volume	Element		Choice: select one

3.6.2.4.8. DataParking

This provides the current state of parking. This is the same as the DataParking data frame in TMDD 3.3.8.9.

Attribute Name	Type/Element	Reference	CC Required
Parking-Spaces	Element		Choice: select one
Parking-Occupancy	Element		Choice: select one

3.6.2.4.9. DataRoadWeather

This provides the current state of weather. This is the same as the DataRoadWeather data frame in TMDD 3.3.8.10.

Attribute Name	Type/Element	Reference	CC Required
Avg-Wind-Direction	Element		Choice: select one
Avg-Wind-Speed	Element		Choice: select one
Avg-Wind-Gust-Speed	Element		Choice: select one
Air-Temperature	Element		Choice: select one
Dewpoint-Temp	Element		Choice: select one
Max-Temp	Element		Choice: select one
Min-Temp	Element		Choice: select one
Relative-Humidity	Element		Choice: select one
Atmospheric-Pressure	Element		Choice: select one
Precip-Rate	Element		Choice: select one
Snowfall-Accum-Rate	Element		Choice: select one
Visibility	Element		Choice: select one
Uv-Index	Element		Choice: select one
Probability	Element		Choice: select one

3.6.2.4.10. DataSurfaceConditions

This provides the current state of surface conditions. This is the same as the DataSurfaceConditions data frame in TMDD 3.3.8.11.

Attribute Name	Type/Element	Reference	CC Required
Water-Depth	Element		Choice: select one
Adjacent-Snow-Depth	Element		Choice: select one
Roadway-Snow-Depth	Element		Choice: select one
Roadway-Snow-Pack-Depth	Element		Choice: select one
Ice-Thickness	Element		Choice: select one
Surface-Temperature	Element		Choice: select one
Pavement-Temperature	Element		Choice: select one
Surface-Water-Depth	Element		Choice: select one
Surface-Salinity	Element		Choice: select one
Surface-Freeze-Point	Element		Choice: select one
Mobile-Friction	Element		Choice: select one

3.6.2.4.11. EventAdvice

This provides information regarding advisories associated with the event. This is the same as the EventAdvice data frame in TMDD 3.3.8.12.

Attribute Name	Type/Element	Reference	CC Required
Suggestion	Element		Choice: select one
Warning	Element		Choice: select one
Instruction-Recommendation	Element		Choice: select one
Instruction-Mandatory	Element		Choice: select one
Alternate-Route	Element		Choice: select one

3.6.2.4.12. EventComments

This provides event comment information. This is the same as the EventComments data frame in TMDD 3.3.8.13.

Attribute Name	Type/Element	Reference	CC Required
Event-Comment	Element		Yes
Operator-Id	Element		No
Operator-Comment	Element		No
Language	Element		No

3.6.2.4.13. EventDescription

This is the same as the EventDescription data frame in TMDD 3.3.8.14.

Attribute Name	Type/Element	Reference	CC Required
Phrase	Type: EventType	TMDD 3.3.8.29	Choice: select one
Cause	Type: EventType	TMDD 3.3.8.29	Choice: select one
Advice	Type: EventAdvice	TMDD 3.3.8.12	Choice: select one
Qualifier	Type: EventQualifier	TMDD 3.3.8.23	Choice: select one
Quantity	Type: EventQuantity	TMDD 3.3.8.24	Choice: select one
Related-Landmark	Type: LandmarkLocation	TMDD 3.3.8.33	Choice: select one
Detour	Type: AlternateRouteDetail	TMDD 3.3.8.3	Choice: select one
Additional-Text	Type: AdditionalText	TMDD 3.3.8.2	Choice: select one
Qualifier-Time	Type: DateTimeZone	TMDD 3.3.10.1	Choice: select one

3.6.2.4.14. EventElementDetail

This is based on the EventElementDetail data frame in TMDD 3.3.8.15.

Attribute Name	Type/Element	Reference	Description	CC Required
Element-Id	Element			No
Schedule-Element-Id	Element			No
Event-Category	Element			Yes
Event-Source	Type: EventSource	TMDD 3.3.8.26		No
Event-Descriptions	Type: Sequence of "EventDescription" types	TMDD 3.3.8.14		Yes
Event-Locations	Type: Sequence of "EventLocation" types	TMDD 3.3.8.21		Yes
Event-Times	Type: EventTimes	TMDD 3.3.8.27		Yes
Event-Name	Element			Yes
Event-Lanes	Type: Sequence of "EventLane" types	TMDD 3.3.8.20		Yes
Event-Transit-Locations	Type: Sequence of "EventTransitLocation" types	TMDD 3.3.8.28		No
Event-Hazmat-Details	Type: Sequence of "Hazmat" types	TMDD 3.3.8.32		No
Confidence-Level	Element			No
Access-Level	Element			No

Attribute Name	Type/Element	Reference	Description	CC Required
Event-Zone-Of-Influence	Type: BoundingBox	Custom type; see Global Data Elements	Contains well-known-text coordinates of region covering the zone of influence.	Yes (Extended)

3.6.2.4.15. EventFilterRequest

This is the same as the EventFilterRequest data frame in TMDD 3.3.8.16.

Attribute Name	Type/Element	Reference	CC Required
Authentication	Type: Authentication	TMDD 3.3.3.1	No
Request-Header	Type: RequestHeader	TMDD 3.3.8.41	Yes
Request-Type	Type: RequestType	TMDD 3.3.8.44	Yes
Request-Filters	Type: Sequence of "RequestFilter" types	TMDD 3.3.8.40	No
Request-Locations	Type: Sequence of "RequestLocation" types	TMDD 3.3.8.42	No
Request-Times	Type: RequestTimes	TMDD 3.3.8.43	No

3.6.2.4.16. EventHeadline

This is the same as the EventHeadline data frame in TMDD 3.3.8.17.

Attribute Name	Type/Element	Reference	CC Required
Headline	Type: EventType	TMDD 3.3.8.29	Yes
Headline-Element	Element		Yes

3.6.2.4.17. EventIndex

This is the same as the EventIndex data frame in TMDD 3.3.8.18.

Attribute Name	Type/Element	Reference	CC Required
Feu-Url	Type: UrlReference	TMDD 3.3.10.2	Yes
File-Update-Time	Type: DateTimeZone	TMDD 3.3.10.1	No
Event-Update-Time	Type: DateTimeZone	TMDD 3.3.10.1	Yes
Event-Id	Element		Yes
Event-Update	Element		Yes
Status	Element		Yes

3.6.2.4.18. EventIndicator

This is the same as the EventIndicator data frame in TMDD 3.3.8.19.

Attribute Name	Type/Element	Reference	CC Required
Status	Element		Yes
Duration-Exceeded-Flag	Element		Yes
Priority-Level	Element		Yes
Severity	Element		Yes
Impact-Level	Element		Yes
Active-Flag	Element		Yes
Planned-Event-Class	Element		Yes

3.6.2.4.19. EventLane

This is the same as the EventLane data frame in TMDD 3.3.8.20.

Attribute Name	Type/Element	Reference	CC Required
Lanes-Type	Element		Yes
Link-Direction	Element		Yes
Lanes-Total-Original	Element		Yes
Lanes-Total-Affected	Element		Yes
Event-Lanes-Affected	Element: Sequence of "Link-lane-number" types		Yes
Lanes-Status	Element		Yes

3.6.2.4.20. EventLocation

This is the same as the EventLocation data frame in TMDD 3.3.8.21.

Attribute Name	Type/Element	Reference	CC Required
Area-Location	Type: AreaLocation	TMDD 3.3.8.4	No
Location-On-Link	Type: LinkLocation	TMDD 3.3.8.34	No
Landmark	Type: LandmarkLocation	TMDD 3.3.8.33	Choice: select one
Geo-Location	Type: GeoLocation	TMDD 3.6.9.4	Choice: select one

3.6.2.4.21. EventPeriod

This is the same as the EventPeriod data frame in TMDD 3.3.8.22.

Attribute Name	Type/Element	Reference	CC Required
Days-Of-The-Week	Element		Yes
Effective-Period-Qualifier	Element		No
Holiday-Day	Element		No

3.6.2.4.22. EventQualifier

This is the same as the EventQualifier data frame in TMDD 3.3.8.23.

Attribute Name	Type/Element	Reference	CC Required
Qualifier-Generic	Element		Choice: select one
Location-Generic	Element		Choice: select one
Lane-Roadway	Element		Choice: select one
Transit-Mode	Element		Choice: select one
Vehicle-Group-Affected	Element		Choice: select one
Traveler-Group-Affected	Element		Choice: select one
Responder-Group-Affected	Element		Choice: select one
Incident-Response-Equipment	Element		Choice: select one
Transit-Locations	Element		Choice: select one
Incident-Response-Status	Element		Choice: select one

3.6.2.4.23. EventQuantity

This is the same as the EventQuantity data frame in TMDD 3.3.8.24.

Attribute Name	Type/Element	Reference	CC Required
Extent	Type: DataExtent	TMDD 3.3.8.5	Choice: select one
Link-State	Type: DataLinkState	TMDD 3.3.8.8	Choice: select one
Incident-Details	Type: DataIncidentDetails	TMDD 3.3.8.6	Choice: select one
Road-Weather	Type: DataRoadWeather	TMDD 3.3.8.10	Choice: select one
Parking-Data	Type: DataParking	TMDD 3.3.8.9	Choice: select one
Surface-Conditions	Type: DataSurfaceConditions	TMDD 3.3.8.11	Choice: select one
Link-Restrictions	Type: DataLinkRestrictions	TMDD 3.3.8.7	Choice: select one

3.6.2.4.24. EventReference

This is the same as the EventReference data frame in TMDD 3.3.8.25.

Attribute Name	Type/Element	Reference	CC Required
Event-Id	Element		Yes
Event-Update	Element		Yes
Response-Plan-Id	Element		Yes
Update-Time	Type: DateTimeZone	TMDD 3.3.10.1	Yes

3.6.2.4.25. EventSource

This is the same as the EventSource data frame in TMDD 3.3.8.26.

Attribute Name	Type/Element	Reference	CC Required
Information-Source	Type: OrganizationInformation	TMDD 3.3.16.3	No
Event-Detection-Method	Element		No

3.6.2.4.26. EventTimes

This is the same as the EventTimes data frame in TMDD 3.3.8.27.

Attribute Name	Type/Element	Reference	CC Required
Update-Time	Type: DateTimeZone	TMDD 3.3.10.1	Yes
Valid-Period	Type: ValidPeriod	TMDD 3.3.8.45	Yes
Schedule-Element-Ids	Element: Sequence of "Event-schedule-element-identifier" types		No
Sequence-Time	Type: DateTimeZone	TMDD 3.3.10.1	Yes
Start-Time	Type: DateTimeZone	TMDD 3.3.10.1	Yes
Alternate-Start-Time	Type: DateTimeZone	TMDD 3.3.10.1	Yes
Alternate-End-Time	Type: DateTimeZone	TMDD 3.3.10.1	Yes
Expected-Start-Time	Type: DateTimeZone	TMDD 3.3.10.1	Yes
Expected-End-Time	Type: DateTimeZone	TMDD 3.3.10.1	Yes
Recurrent-Times	Type: Sequence of "RecurrentTime" types	TMDD 3.3.8.39	Yes
Planned-Event-Continuous-Flag	Element		Yes

3.6.2.4.27. EventTransitLocation

This is the same as the EventTransitLocation data frame in TMDD 3.3.8.28.

Attribute Name	Type/Element	Reference	CC Required
Transit-Route-Id	Element		Yes
Transit-Direction	Element		No
Transit-Stop-Detail	Element		No
Transit-Location-Text	Element		No

3.6.2.4.28. EventType

This is the same as the EventType data frame in TMDD 3.3.8.29.

Attribute Name	Type/Element	Reference	CC Required
Traffic-Conditions	Element		Choice: select one
Accidents-And-Incidents	Element		Choice: select one
Closures	Element		Choice: select one
Roadwork	Element		Choice: select one
Obstruction	Element		Choice: select one
Delay-Status-Cancellation	Element		Choice: select one
Unusual-Driving	Element		Choice: select one
Mobile-Situation	Element		Choice: select one
Device-Status	Element		Choice: select one
Restriction-Class	Element		Choice: select one
Incidentresponsestatus	Element		Choice: select one
Disasters	Element		Choice: select one
Disturbances	Element		Choice: select one
Sporting-Events	Element		Choice: select one
Special-Events	Element		Choice: select one
Parking-Information	Element		Choice: select one
System-Information	Element		Choice: select one
Weather-Conditions	Element		Choice: select one
Precipitation	Element		Choice: select one
Winds	Element		Choice: select one
Visibility-And-Air-Quality	Element		Choice: select one
Temperature	Element		Choice: select one
Pavement-Conditions	Element		Choice: select one
Winter-Driving-Restrictions	Element		Choice: select one
Winter-Driving-Index	Element		Choice: select one
Suggestionadvice	Element		Choice: select one
Warningadvice	Element		Choice: select one
Adviceinstructionsrecommendations	Element		Choice: select one
Adviceinstructionsmandatory	Element		Choice: select one

Attribute Name	Type/Element	Reference	CC Required
Laneroadway	Element		Choice: select one
Alternateroute	Element		Choice: select one
Transitmode	Element		Choice: select one
Vehiclegroupaffected	Element		Choice: select one
Travelergroupaffected	Element		Choice: select one
Respondergroupaffected	Element		Choice: select one
Incidentresponseequipment	Element		Choice: select one
Transitoperations	Element		Choice: select one
Transitincident	Element		Choice: select one
Transitconstruction	Element		Choice: select one

3.6.2.4.29. FullEventUpdate

This is the same as the FullEventUpdate data frame in TMDD 3.3.8.30.

Attribute Name	Type/Element	Reference	CC Required
Restrictions	Type: Restrictions	TMDD 3.3.16.5	No
Message-Header	Type: MessageHeader	TMDD 3.3.8.35	Yes
Event-Reference	Type: EventReference	TMDD 3.3.8.25	Yes
Project-References	Type: Sequence of "ProjectReference" types	TMDD 3.3.8.38	No
Event-Indicators	Type: Sequence of "EventIndicator" types	TMDD 3.3.8.19	Yes
Other-References	Type: Sequence of "OtherReference" types	TMDD 3.3.8.36	Yes
Event-Headline	Type: EventHeadline	TMDD 3.3.8.17	Yes
Event-Element-Details	Type: Sequence of "EventElementDetail" types	TMDD 3.3.8.15	Yes
Event-Comments	Type: EventComments	TMDD 3.3.8.13	No
Full-Report-Texts	Type: Sequence of "FullReportText" types	TMDD 3.3.8.31	No

3.6.2.4.30. FullReportText

This is the same as the FullReportText data frame in TMDD 3.3.8.31.

Attribute Name	Type/Element	Reference	CC Required
Report-Medium	Element		Yes
Description	Element		Yes
Language	Element		No

3.6.2.4.31. Hazmat

This is the same as the Hazmat data frame in TMDD 3.3.8.32.

Attribute Name	Type/Element	Reference	CC Required
Hazmat-Code	Element		No
Placard-Code	Element		No
Placard-Displayed-Accuracy	Element		No

3.6.2.4.32. LandmarkLocation

This is the same as the LandmarkLocation data frame in TMDD 3.3.8.33.

Attribute Name	Type/Element	Reference	CC Required
Landmark-Type	Element		Yes
Landmark-Name	Element		Yes
Landmark-Point-Name	Element		No
Location-Rank	Element		No
Geo-Location	Type: GeoLocation	TMDD 3.6.9.4	No
Upward-Area-Reference	Type: AreaLocation	TMDD 3.3.8.4	No

3.6.2.4.33. LinkLocation

This is the same as the LinkLocation data frame in TMDD 3.3.8.34.

Attribute Name	Type/Element	Reference	CC Required
Link-Ownership	Element		No
Link-Designator	Element		No
Second-Link-Designator	Element		No
Link-Id	Element		No
Link-Name	Element		No
Primary-Location	Type: PointOnLink	TMDD 3.3.8.37	No
Secondary-Location	Type: PointOnLink	TMDD 3.3.8.37	No
Link-Direction	Element		No
Link-Alignment	Element		No
Linear-Reference-Version	Element		No
Alternate-Designations	Type: Sequence of "LinkLocation" types	TMDD 3.3.8.34	No

3.6.2.4.34. MessageHeader

This is the same as the MessageHeader data frame in TMDD 3.3.8.35.

Attribute Name	Type/Element	Reference	CC Required
Organization-Sending	Type: OrganizationInformation	TMDD 3.3.16.3	Yes
Organizations-Receiving	Type: Sequence of "OrganizationInformation" types	TMDD 3.3.16.3	Yes
Organizations-Responding	Type: Sequence of "OrganizationInformation" types	TMDD 3.3.16.3	No
Message-Type-Version	Element		Yes
Message-Number	Element		Yes
Message-Time-Stamp	Type: DateTimeZone	TMDD 3.3.10.1	Yes
Message-Expiry-Time	Type: DateTimeZone	TMDD 3.3.10.1	No

3.6.2.4.35. OtherReference

This is the same as the OtherReference data frame in TMDD 3.3.8.36.

Attribute Name	Type/Element	Reference	CC Required
Trip-Reference	Element		Yes
Responsible-Event	Type: EventReference	TMDD 3.3.8.25	Yes
Related-Event	Type: EventReference	TMDD 3.3.8.25	Yes
Previous-Event	Type: EventReference	TMDD 3.3.8.25	Yes
Split-Event	Type: EventReference	TMDD 3.3.8.25	Yes
Merged-Event	Type: EventReference	TMDD 3.3.8.25	Yes
Sibling-Event	Type: EventReference	TMDD 3.3.8.25	Yes
Associated-Device	Type: DeviceReference	TMDD 3.3.5.12	Yes
Associated-Url	Type: UrlReference	TMDD 3.3.10.2	Yes

3.6.2.4.36. PointOnLink

This is the same as the PointOnLink data frame in TMDD 3.3.8.37.

Attribute Name	Type/Element	Reference	CC Required
Geo-Location	Type: GeoLocation	TMDD 3.6.9.4	No
Linear-Reference	Element		No
Link-Name	Element		No
Point-Name	Element		No
Cross-Street-Designator	Element: Sequence of "Transportation-network-identifier" types		No

Attribute Name	Type/Element	Reference	CC Required
Cross-Street-Name	Element: Sequence of "Transportation-network-name" types		No
Signed-Destination	Element: Sequence of "Event-signed-destination" types		No
Location-Rank	Element		No
Landmark-Type	Element		No
Upward-Area-Reference	Type: AreaLocation	TMDD 3.3.8.4	No

3.6.2.4.37. ProjectReference

This is the same as the ProjectReference data frame in TMDD 3.3.8.38.

Attribute Name	Type/Element	Reference	CC Required
Project-Reference	Element		Yes
Permit-Reference	Element		Yes
Project-Contacts	Type: OrganizationInformation	TMDD 3.3.16.3	Yes
Project-Description	Element		Yes

3.6.2.4.38. RecurrentTime

This is the same as the RecurrentTime data frame in TMDD 3.3.8.39.

Attribute Name	Type/Element	Reference	CC Required
Recurrent-Period	Type: EventPeriod	TMDD 3.3.8.22	Yes
Schedule-Times	Element: Sequence of "Event-timeline-schedule-times" types		Yes
Utc-Offset	Element		Yes

3.6.2.4.39. RequestFilter

This is the same as the RequestFilter data frame in TMDD 3.3.8.40.

Attribute Name	Type/Element	Reference	CC Required
Category	Element		No
Priority-Level	Element		No
Confidence-Level	Element		No
Access-Level	Element		No

Attribute Name	Type/Element	Reference	CC Required
Action-Request-Flag	Element		No
Severity	Element		No
Hazmat-Code	Element: Sequence of "Event-hazmat-code" types		No
Placard-Code	Element: Sequence of "Event-placard-code" types		No
Organizations-Requested	Type: Sequence of "OrganizationInformation" types	TMDD 3.3.16.3	No
Headline	Type: EventType	TMDD 3.3.8.29	No

3.6.2.4.40. RequestHeader

This is the same as the RequestHeader data frame in TMDD 3.3.8.41.

Attribute Name	Type/Element	Reference	CC Required
Organization-Information	Type: OrganizationInformation	TMDD 3.3.16.3	Yes
Organization-Requesting	Type: Sequence of "OrganizationInformation" types	TMDD 3.3.16.3	No
Message-Type-Id	Element		Yes
Message-Type-Version	Element		Yes
Message-Number	Element		No
Message-Time-Stamp	Type: DateTimeZone	TMDD 3.3.10.1	Yes

3.6.2.4.41. RequestLocation

This is the same as the RequestLocation data frame in TMDD 3.3.8.42.

Attribute Name	Type/Element	Reference	CC Required
Area-Locations	Type: AreaLocation	TMDD 3.3.8.4	No
Link-Categories	Element		No
Link-Designator	Element: Sequence of "Link-route-designator" types		No

3.6.2.4.42. RequestTimes

This is the same as the RequestTimes data frame in TMDD 3.3.8.43.

Attribute Name	Type/Element	Reference	CC Required
Start-Time	Type: DateTimeZone	TMDD 3.3.10.1	No
End-Time	Type: DateTimeZone	TMDD 3.3.10.1	No

3.6.2.4.43. RequestType

This is the same as the RequestType data frame in TMDD 3.3.8.44.

Attribute Name	Type/Element	Reference	CC Required
Request-Focus	Element		Yes
Event-Ids	Element: Sequence of "Organization-resource-identifier" types		No
Response-Plan-Ids	Element: Sequence of "Organization-resource-identifier" types		No

3.6.2.4.44. ValidPeriod

This is the same as the ValidPeriod data frame in TMDD 3.3.8.45.

Attribute Name	Type/Element	Reference	CC Required
Expected-End-Time	Type: DateTimeZone	TMDD 3.3.10.1	Yes
Estimated-Duration	Element		Yes
Effective-Periods	Type: Sequence of "EventPeriod" types	TMDD 3.3.8.22	Yes

3.7. LAYER: TRAFFIC STATE AND FORECASTING DATA

This layer contains the current traffic state and traffic forecast data.

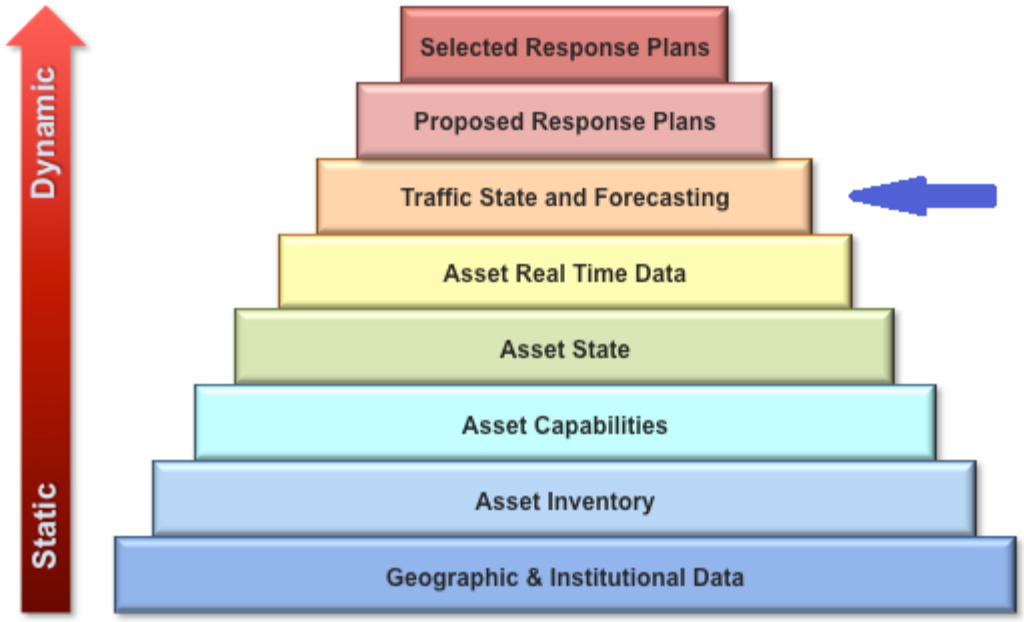

Figure 8 - Traffic State & Forecasting Layer

3.7.1. Data Messages

There are no applicable TMDD data messages. Information that will be contained in this layer include:

Name	Reference	Description
Traffic Current Link State		Includes link identifier, capacity, lanes available, closed lane identifiers, speed, flow, and density, start date/time, duration
Traffic Predicted Link State		Includes link identifier, capacity, lanes available, closed lane identifiers, speed, flow, and density, start date/time, duration
Traffic Current Approach Turn State		Includes approach link identifier, exit link identifiers, start date/time, duration, approach volume, and for each exit link identifier, a turn volume and turn ratio
Traffic Predicted Approach Turn State		Includes approach link identifier, exit link identifiers, start date/time, duration, approach volume, and for each exit link identifier, a turn volume and turn ratio

Name	Reference	Description
Traffic Current State Quality Index		Estimation of the quality of the traffic state estimation
Traffic State Prediction Quality Index		Estimation of the quality of the traffic state prediction
Route Current Delay		Total traveller delay for a specified route and mode (total travellers, fleet, automobile, transit) based on current traffic conditions
Routed Predicted Delay		Total traveller delay for a specified route and mode (total travellers, fleet, automobile, transit) based on predicted traffic conditions at a specified point in time
Aggregated Current Delay		Total traveller delay for a specified geographic area (corridor, city, county, region) and mode (total travellers, fleet, automobile, transit) based on current traffic conditions
Aggregated Predicted Delay		Total traveller delay for a specified geographic area (corridor, city, county, region) and mode (total travellers, fleet, automobile, transit) based on predicted traffic conditions at a specified point in time
Route Current Vehicle Miles Travelled		VMT for a specific route and mode (total travellers, fleet, automobile, transit) based on current traffic conditions
Route Predicted Vehicle Miles Travelled		VMT for a specific route and mode (total travellers, fleet, automobile, transit) based on predicted traffic conditions at a specific point in time
Aggregated Current Vehicle Miles Travelled		Aggregated VMT for a specified geographic area (corridor, city, county, region) and mode (total travellers, fleet, automobile, transit) based on current traffic conditions
Aggregated Predicted Vehicle Miles Travelled		Aggregated VMT for a specified geographic area (corridor, city, county, region) and mode (total travellers, fleet, automobile, transit) based on predicted traffic conditions at a specific point in time
Route Current Person Miles Travelled		PMT for a specific route and mode (total travellers, fleet, automobile, transit) based on current traffic conditions
Route Predicted Person Miles Travelled		PMT for a specific route and mode (total travellers, fleet, automobile, transit) based on predicted traffic conditions at a specific point in time
Aggregated Current Person Miles Travelled		Aggregated PMT for a specified geographic area (corridor, city, county, region) and mode (total travellers, fleet, automobile, transit) based on current traffic conditions

Name	Reference	Description
Aggregated Predicted Person Miles Travelled		Aggregated PMT for a specified geographic area (corridor, city, county, region) and mode (total travellers, fleet, automobile, transit) based on predicted traffic conditions at a specific point in time
Route Current Vehicle Hours Travelled		VHT for a specific route and mode (total travellers, fleet, automobile, transit) based on current traffic conditions
Route Predicted Vehicle Hours Travelled		VHT for a specific route and mode (total travellers, fleet, automobile, transit) based on predicted traffic conditions at a specific point in time
Aggregated Current Vehicle Hours Travelled		Aggregated VHT for a specified geographic area (corridor, city, county, region) and mode (total travellers, fleet, automobile, transit) based on current traffic conditions
Aggregated Predicted Vehicle Hours Travelled		Aggregated VHT for a specified geographic area (corridor, city, county, region) and mode (total travellers, fleet, automobile, transit) based on predicted traffic conditions at a specific point in time
Route Current Person Hours Travelled		PHT for a specific route and mode (total travellers, fleet, automobile, transit) based on current traffic conditions
Route Predicted Person Hours Travelled		PHT for a specific route and mode (total travellers, fleet, automobile, transit) based on predicted traffic conditions at a specific point in time
Aggregated Current Person Hours Travelled		Aggregated PHT for a specified geographic area (corridor, city, county, region) and mode (total travellers, fleet, automobile, transit) based on current traffic conditions
Aggregated Predicted Person Hours Travelled		Aggregated PHT for a specified geographic area (corridor, city, county, region) and mode (total travellers, fleet, automobile, transit) based on predicted traffic conditions at a specific point in time

3.8. LAYER: PROPOSED RESPONSE PLANS

This layer includes details of the proposed response plans, including the properties of each plan and model prediction results.

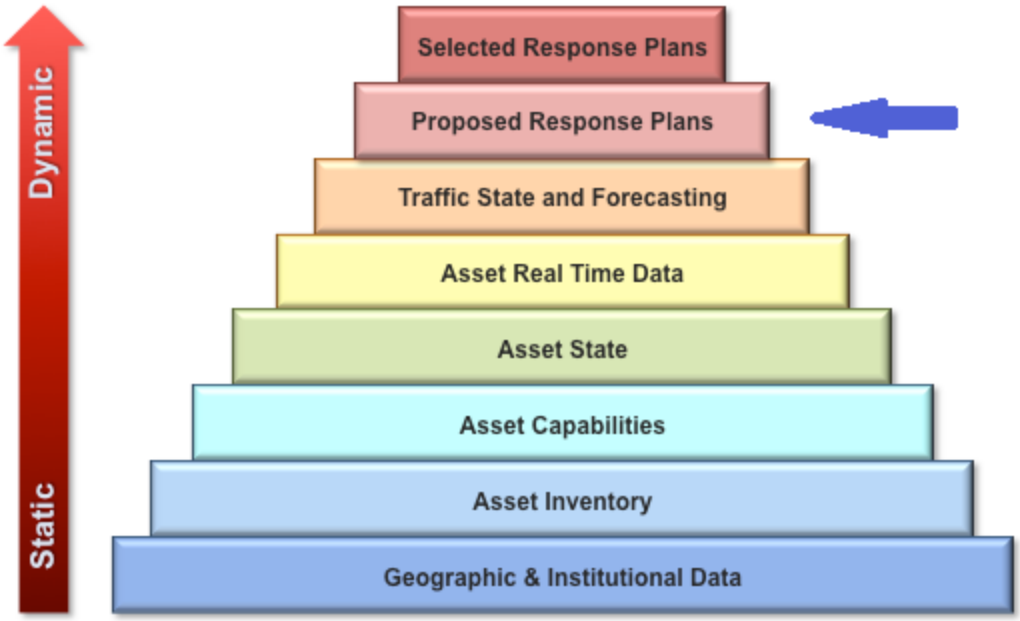

Figure 9 - Proposed Response Plans Layer

3.8.1. Data Messages

TMDD Data Message Dialogs include the following:

Name	Reference	Description
dlDeviceCancelControlRequest	TMDD 3.1.5.1	Request for device control cancellation
dlDMSControlRequest	TMDD 3.1.6.7	Request for Status of Device Control Request
dlDMSPriorityQueueRequest	TMDD 3.1.6.8	Request for DMS priority queue
dlHARControlRequest	TMDD 3.1.10.4	Request for HAR control
dlHARControlScheduleRequest	TMDD 3.1.10.5	Request for HAR Control Schedule
dlHARPriorityQueueRequest	TMDD 3.1.10.6	Request for HAR Priority Queue
dlIntersectionSignalControlRequest	TMDD 3.1.11.5	Request for intersection signal control
dlIntersectionSignalControlScheduleRequest	TMDD 3.1.11.6	Request for intersection signal Control Schedule
dlIntersectionSignalPriorityQueueRequest	TMDD 3.1.11.7	Request for intersection signal Priority Queue

Name	Reference	Description
dlLCSControlRequest	TMDD 3.1.12.3	Request for LCS control
dlLCSControlScheduleRequest	TMDD 3.1.12.4	Request for LCS Control Schedule
dlRampMeterControlRequest	TMDD 3.1.16.3	Request for ramp meter control
dlRampMeterControlScheduleRequest	TMDD 3.1.16.4	Request for ramp meter Control Schedule
dlRampMeterPriorityQueueRequest	TMDD 3.1.16.5	Request for ramp meter Priority Queue
dlSectionControlRequest	TMDD 3.1.18.2	Request for section control
dlSectionControlScheduleRequest	TMDD 3.1.18.3	Request for section Control Schedule
dlSectionPriorityQueueRequest	TMDD 3.1.18.5	Request for section Priority Queue
dlHARControlScheduleUpdate	TMDD 3.1.28.4	HAR Control Schedule update
dlResponsePlanApprovalRequest	New	Contains a request for a response plan approval decision
dlResponsePlanApprovalSubscription	New	Contains a request for a subscription for response plan approval decisions
dlResponsePlanApprovalUpdate	New	Contains the decision of whether or not a response plan is accepted
dlResponsePlanStatusRequest	New	Contains a request for a response plan approval status update
dlResponsePlanStatusSubscription	New	Contains a request for a subscription for response plan approval status updates
dlResponsePlanStatusUpdate	New	Contains the decision of whether or not a response plan is accepted, to be pushed to other agencies
dlResponsePlanRequest	New	Contains a request for a response plan
dlResponsePlanSubscription	New	Contains a request for a subscription for new response plans
dlResponsePlanUpdate	New	Contains a new proposed response plan

Other information that will be contained in this layer includes:

Name	Reference	Description
Proposed Response Plan Traffic Forecast Summary		Contains summary of response plan traffic forecast
Proposed Response Plan Current Traffic State		Contains the current traffic state that was used to initiate the forecast
Proposed Response Plan Traffic Forecast Details		Contains details of response plan traffic forecast

3.8.2. Data Class Descriptions

Data Class Descriptions include data elements for basic objects. Classes may be referenced in other classes (parent classes), and may be referenced in multiple parent classes. These do not represent database structures, but instead are based primarily on TMDD, or are structured similarly. Database design is expected to occur during system design.

See the beginning of section 3 for a description of the "CC Required" column.

3.8.2.1. CCTV Class

3.8.2.1.1. CCTVControlDetails

This is the same as the CCTVControlDetails data frame in TMDD 3.3.2.1.

Attribute Name	Type/Element	Reference	CC Required
Cctv-Position-Preset	Element		Yes
Cctv-Position-Pan	Element		Yes
Cctv-Position-Tilt	Element		Yes
Cctv-Position-Zoom-Lens	Element		Yes
Cctv-Position-Iris-Lens	Element		Yes
Cctv-Position-Focus-Lens	Element		Yes
Cctv-Environment	Element		Yes
Cctv-Text	Element		Yes
Cctv-Lock	Element		Yes

3.8.2.1.2. CCTVControlRequest

This is the same as the CCTVControlRequest data frame in TMDD 3.3.2.2.

Attribute Name	Type/Element	Reference	CC Required
Device-Control-Request-Header	Type: DeviceControlRequestHeader	TMDD 3.3.5.2	Yes

Attribute Name	Type/Element	Reference	CC Required
Cctv-Request-Command	Element		Yes
Cctv-Command-Parameters	Type: CCTVControlDetails	TMDD 3.3.2.1	Yes

3.8.2.2. Device Class

3.8.2.2.1. DeviceCancelControlRequest

This is the same as the DeviceCancelControlRequest data frame in TMDD 3.3.5.1.

Attribute Name	Type/Element	Reference	CC Required
Authentication	Type: Authentication	TMDD 3.3.3.1	Yes
Organization-Requesting	Type: OrganizationInformation	TMDD 3.3.16.3	Yes
Device-Id	Element		Yes
Request-Id	Element		Yes

3.8.2.2.2. DeviceControlRequestHeader

This is the same as the DeviceControlRequestHeader data frame in TMDD 3.3.5.2.

Attribute Name	Type/Element	Reference	CC Required
Authentication	Type: Authentication	TMDD 3.3.3.1	Yes
Organization-Requesting	Type: OrganizationInformation	TMDD 3.3.16.3	Yes
Device-Id	Element		Yes
Request-Id	Element		Yes
Event-Id	Element		Yes
Response-Plan-Id	Element		Yes
Command-Request-Priority	Element		Yes
Command-Start-Time	Type: DateTimeZone	TMDD 3.3.10.1	Yes
Command-End-Time	Type: DateTimeZone	TMDD 3.3.10.1	Yes
Command-Request-Time	Type: DateTimeZone	TMDD 3.3.10.1	Yes

3.8.2.2.3. DeviceControlResponse

This is the same as the DeviceControlResponse data frame in TMDD 3.3.5.3.

Attribute Name	Type/Element	Reference	CC Required
Organization-Information	Type: OrganizationInformation	TMDD 3.3.16.3	Yes

Attribute Name	Type/Element	Reference	CC Required
Device-Id	Element		Yes
Request-Id	Element		Yes
Operator-Id	Element		Yes
Operator-Lock-Id	Element		No
Request-Status	Element		Yes
Operator-Last-Revised	Type: DateTimeZone	TMDD 3.3.10.1	Yes

3.8.2.2.4. DevicePriorityQueueHeader

This is the same as the DevicePriorityQueueHeader data frame in TMDD 3.3.5.9.

Attribute Name	Type/Element	Reference	CC Required
Restrictions	Type: Restrictions	TMDD 3.3.16.5	No
Device-Id	Element		Yes
Device-Type	Element		Yes
Current-Device-Priority	Element		Yes
Device-Priority-Queue-List	Type: Sequence of "DevicePriorityQueueItem" types	TMDD 3.3.5.10	Yes

3.8.2.2.5. DevicePriorityQueueItem

This is the same as the DevicePriorityQueueItem data frame in TMDD 3.3.5.10.

Attribute Name	Type/Element	Reference	CC Required
Organization-Requesting	Type: OrganizationInformation	TMDD 3.3.16.3	Yes
Command-Request-Priority	Element		Yes
Operator-Id	Element		Yes
Request-Id	Element		Yes
Event-Id	Element		Yes
Response-Plan-Id	Element		Yes
Command-Start-Time	Type: DateTimeZone	TMDD 3.3.10.1	Yes
Command-End-Time	Type: DateTimeZone	TMDD 3.3.10.1	Yes

3.8.2.2.6. DevicePriorityQueueRequest

This is the same as the DevicePriorityQueueRequest data frame in TMDD 3.3.5.11.

Attribute Name	Type/Element	Reference	CC Required
Authentication	Type: Authentication	TMDD 3.3.3.1	No
Organization-Requesting	Type: OrganizationInformation	TMDD 3.3.16.3	Yes
Device-Id-List	Element: Sequence of "Organization-resource-identifier" types		Yes

3.8.2.3. DMS Class

3.8.2.3.1. DMSControlDetails

This is the same as the DMSControlDetails data frame in TMDD 3.3.6.2.

Attribute Name	Type/Element	Reference	CC Required
Dms-Message	Element		Choice: select one
Message-Number	Element		Choice: select one

3.8.2.3.2. DMSControlRequest

This is the same as the DMSControlRequest data frame in TMDD 3.3.6.3.

Attribute Name	Type/Element	Reference	CC Required
Device-Control-Request-Header	Type: DeviceControlRequestHeader	TMDD 3.3.5.2	Yes
Dms-Request-Command	Element		Yes
Dms-Command-Parameters	Type: DMSControlDetails	TMDD 3.3.6.2	Yes
Dms-Beacon-Control	Element		No

3.8.2.3.3. DMSPriorityQueue

This is the same as the DMSPriorityQueue data frame in TMDD 3.3.6.12.

Attribute Name	Type/Element	Reference	CC Required
Device-Priority-Queue-Header	Type: DevicePriorityQueueHeader	TMDD 3.3.5.9	Yes
Dms-Request-Command	Element		Yes
Dms-Queue-Parameters	Type: DMSControlDetails	TMDD 3.3.6.2	Yes

3.8.2.4. HAR Class

3.8.2.4.1. HARControlDetails

This is the same as the HARControlDetails data frame in TMDD 3.3.11.1.

Attribute Name	Type/Element	Reference	CC Required
Har-Message	Element		No
Har-Message-Number	Element		No

3.8.2.4.2. HARControlRequest

This is the same as the HARControlRequest data frame in TMDD 3.3.11.2

Attribute Name	Type/Element	Reference	CC Required
Device-Control-Request-Header	Type: DeviceControlRequestHeader	TMDD 3.3.5.2	No
Har-Request-Command	Element		No
Har-Command-Parameters	Type: HARControlDetails	TMDD 3.3.11.1	No

3.8.2.4.3. HARControlSchedule

This is the same as the HARControlSchedule data frame in TMDD 3.3.11.3.

Attribute Name	Type/Element	Reference	CC Required
Device-Control-Schedule-Header	Type: DeviceControlScheduleHeader	TMDD 3.3.5.4	No
Message-Number	Element		No

3.8.2.4.4. HARPriorityQueue

This is the same as the HARPriorityQueue data frame in TMDD 3.3.11.6

Attribute Name	Type/Element	Reference	CC Required
Device-Priority-Queue-Header	Type: DevicePriorityQueueHeader	TMDD 3.3.5.9	No
Har-Request-Command	Element		No
Har-Queue-Parameters	Type: HARControlDetails	TMDD 3.3.11.1	No

3.8.2.5. IntersectionSignal Class

3.8.2.5.1. IntersectionSignalControlDetails

This is the same as the IntersectionSignalControlDetails data frame in TMDD 3.3.12.1.

Attribute Name	Type/Element	Reference	CC Required
Request-Timing-Mode	Element		No
Timing-Pattern-Id	Element		No
Offset-Adjustment	Element		No

3.8.2.5.2. IntersectionSignalControlRequest

This is the same as the IntersectionSignalControlRequest data frame in TMDD 3.3.12.2.

Attribute Name	Type/Element	Reference	CC Required
Device-Control-Request-Header	Type: DeviceControlRequestHeader	TMDD 3.3.5.2	Yes
Intersection-Request-Command	Element		Yes
Intersection-Command-Parameters	Type: IntersectionSignalControlDetails	TMDD 3.3.12.1	Yes

3.8.2.5.3. IntersectionSignalControlResponse

This is the same as the IntersectionSignalControlResponse data frame in TMDD 3.3.12.3.

Attribute Name	Type/Element	Reference	CC Required
Device-Control-Response-Header	Type: DeviceControlResponse	TMDD 3.3.5.3	Yes
Section-Id	Element		No
Request-Control-Mode	Element		No
Timing-Pattern-Id	Element		No
Offset-Adjustment	Element		No

3.8.2.5.4. IntersectionSignalPriorityQueue

This is the same as the IntersectionSignalPriorityQueue data frame in TMDD 3.3.12.13.

Attribute Name	Type/Element	Reference	CC Required
Device-Priority-Queue-Header	Type: DevicePriorityQueueHeader	TMDD 3.3.5.9	Yes
Intersection-Request-Command	Element		Yes
Intersection-Queue-Parameters	Type: IntersectionSignal ControlDetails	TMDD 3.3.12.1	Yes

3.8.2.6. LCS Class

3.8.2.6.1. LCSControlRequest

This is the same as the LCSControlRequest data frame in TMDD 3.3.13.1.

Attribute Name	Type/Element	Reference	CC Required
Device-Control-Request-Header	Element		Yes
Lcs-Request-Command	Element		Yes

3.8.2.7. RampMeter Class

3.8.2.7.1. RampControlDetails

This is the same as the RampControlDetails data frame in TMDD 3.3.17.1.

Attribute Name	Type/Element	Reference	CC Required
Meter-Requested-Plan	Element		Yes
Meter-Requested-Rate	Element		Yes

3.8.2.7.2. RampMeterControlRequest

This is the same as the RampMeterControlRequest data frame in TMDD 3.3.17.2.

Attribute Name	Type/Element	Reference	CC Required
Device-Control-Request-Header	Type: DeviceControlRequestHeader	TMDD 3.3.5.2	Yes
Metered-Lane-List	Type: RampMeterLaneControlDetails	TMDD 3.3.17.6	Yes

3.8.2.7.3. RampMeterLaneControlDetails

This is the same as the RampMeterLaneControlDetails data frame in TMDD 3.3.17.6.

Attribute Name	Type/Element	Reference	CC Required
Metered-Lane-Identifier	Element		Yes
Meter-Request-Command	Element		Yes
Meter-Command-Parameters	Type: RampControlDetails	TMDD 3.3.17.1	Yes

3.8.2.7.4. RampMeterPriorityQueue

This is the same as the RampMeterPriorityQueue data frame in TMDD 3.3.17.9.

Attribute Name	Type/Element	Reference	CC Required
Device-Priority-Queue-Header	Type: DevicePriorityQueueHeader	TMDD 3.3.5.9	Yes
Metered-Lane-Identifier	Element		No
Meter-Request-Command	Element		Yes
Meter-Queue-Parameters	Type: RampControlDetails	TMDD 3.3.17.1	No

3.8.2.8. Section Class

3.8.2.8.1. SectionControlDetails

This is the same as the SectionControlDetails data frame in TMDD 3.3.19.1.

Attribute Name	Type/Element	Reference	CC Required
Request-Control-Mode	Element		No
Timing-Pattern-Id	Element		Yes
Section-Offset-Adjustment	Element		Yes

3.8.2.8.2. SectionControlRequest

This is the same as the SectionControlRequest data frame in TMDD 3.3.19.2.

Attribute Name	Type/Element	Reference	CC Required
Authentication	Type: Authentication	TMDD 3.3.3.1	Yes
Organization-Requesting	Type: OrganizationInformation	TMDD 3.3.16.3	Yes
Section-Id	Element		Yes
Request-Id	Element		Yes
Section-Request-Command	Element		Yes
Section-Command-Parameters	Type: SectionControlDetails	TMDD 3.3.19.1	Yes
Event-Id	Element		Yes
Response-Plan-Id	Element		Yes
Command-Request-Priority	Element		No
Command-Begin-Time	Type: DateTimeZone	TMDD 3.3.10.1	Yes
Command-End-Time	Type: DateTimeZone	TMDD 3.3.10.1	Yes
Command-Request-Time	Type: DateTimeZone	TMDD 3.3.10.1	Yes

3.8.2.8.3. SectionPriorityQueue

This is the same as the SectionPriorityQueue data frame in TMDD 3.3.19.6.

Attribute Name	Type/Element	Reference	CC Required
Device-Priority-Queue-Header	Type: DevicePriorityQueueHeader	TMDD 3.3.5.9	Yes
Section-Request-Command	Element		Yes
Section-Queue-Parameters	Type: SectionControlDetails	TMDD 3.3.19.1	Yes

3.8.2.9. VideoSwitch Class

3.8.2.9.1. VideoSwitchControlRequest

This is the same as the VideoSwitchControlRequest data frame in TMDD 3.3.21.1.

Attribute Name	Type/Element	Reference	CC Required
Device-Control-Request-Header	Type: DeviceControlRequestHeader	TMDD 3.3.5.2	Yes
Input-Channel-Id	Element		Yes
Output-Channel-Id	Element		Yes
Channel-Titling-Text	Element		No
Set-Output-Channel-Lock	Element		No
Frames-Per-Second	Element		No
Frame-Height-Pixels	Element		No
Frame-Width-Pixels	Element		No
Video-Format	Element		No

3.8.2.10. ResponsePlan Class

This is a new class to handle response plan objects.

3.8.2.10.1. ResponsePlan

This is a new object representing each developed response plan.

Attribute Name	Type/Element	Reference	Description	CC Required
Response-Plan-Header	Type: ResponsePlanHeader	Custom type; see "Proposed Response Plans" layer		Yes
Event-Details	Type: FullEventUpdate	TMDD 3.3.8.30		Yes
Activity-Start-Time	Type: DateTimeZone	TMDD 3.3.10.1 System Requirements spec 8.7.1.6	Time when response planning activities were initiated.	Yes
Activity-End-Time	Type: DateTimeZone	TMDD 3.3.10.1 System Requirements spec 8.7.1.6	Time when response planning activities were terminated.	Yes

Attribute Name	Type/Element	Reference	Description	CC Required
Agency-List	Type: Sequence of Organization Information types	TMDD 3.3.16.3 System Requirements specs 8.7.1.6 and 8.5.2.4	Agencies involved in the implementation of the response plan	Yes
Detour-List	Type: Sequence of RouteInventoryList types	TMDD 3.3.18.2 System Requirements specs 8.7.1.6 and 8.5.2.4	Recommended alternate route(s) around the incident or event	Yes
Ramp-Metering-Control-Action-List	Type: Sequence of RampMeterControl Schedule types	TMDD 3.3.17.3 System Requirements specs 8.7.1.6 and 8.5.2.4	Recommended metering actions at each affected freeway on-ramp	Yes
Intersection-Control-List	Type: Sequence of IntersectionSignal ControlSchedule types	TMDD 3.3.12.4 System Requirements specs 8.7.1.6 and 8.5.2.4	Recommended signal timing plan to activate at each affected signalized intersection	Yes
DMS-Message-List	Type: Sequence of DMSControlDetails types	TMDD 3.3.6.2 System Requirements specs 8.7.1.6 and 8.5.2.4	Information dissemination strategy: Messages to post on fixed and portable DMSs	Yes
HAR-Message-List	Type: Sequence of HARControlDetails types	TMDD 3.3.11.1 System Requirements specs 8.7.1.6 and 8.5.2.4	Information dissemination strategy: Which HARs to activate and what message to broadcast on them	Yes
Informational-Message-List	Type: Sequence of InformationalMessage types	Custom type; see "Proposed Response Plans" layer System Requirements specs 8.7.1.6 and 8.5.2.4	Information dissemination strategy: Information to disseminate to 511 systems, and information to make available to third-party information providers and mobile travel application developers	Yes
LCS-Schedule-Cancellation-List	Type: Sequence of DeviceCancelControl Request types	TMDD 3.3.5.1	Request to cancel a previously scheduled lane closure when a response plan requires that the lane remain open	Yes

Attribute Name	Type/Element	Reference	Description	CC Required
Personnel-Deployment-List	Type: Sequence of ResponsePlan PersonnelDeployment types	Custom type; see "Proposed Response Plans" layer System Requirements specs 8.7.1.6 and 8.5.2.4	Will include details about personnel requested to be deployed to specific corridor locations	Yes
Response-Plan-Evaluation	Type: ResponsePlan Evaluation	Custom type; see "Proposed Response Plans" layer System Requirements specs 8.7.1.6 and 8.5.2.5	Will include metrics of the evaluation, the response plan ranking, a risk evaluation and a confidence index	Yes
Response-Plan-Approval	Type: ResponsePlan Approval	Custom type; see "Proposed Response Plans" layer	Includes approval and rejection decisions from each agency	Yes
Response-Plan-Implementation	Type: ResponsePlan Implementation	Custom type; see "Selected Response Plans" layer	Only applies to response plans that are selected for implementation	Yes
Response-Plan-Traffic-State	Type: TBD		Contains information about the traffic state at the time of the response plan was created	Yes

3.8.2.10.2. InformationalMessage

This is a new data frame for information to be disseminated to other systems and parties per Systems Requirements spec 8.7.1.6. It will include information to disseminate to 511 systems and information to make available to third-party information providers and mobile travel application developers.

Attribute Name	Type/Element	Reference	Description	CC Required
Recipient	Type: OrganizationInformation	TMDD 3.3.16.3		Yes
Informational-Text	Element: Text		Text of informational message	Yes

3.8.2.10.3. ResponsePlanRequestHeader

This is a new object containing the information content header related to requests for response plan content.

Attribute Name	Type/Element	Reference	Description	CC Required
Organization-Sending	Type: OrganizationInformation	TMDD 3.3.16.3		Yes
Organization-Receiving	Type: OrganizationInformation	TMDD 3.3.16.3		Yes
Request-Id	Element: Organization-resource-identifier			Yes
Request-Time	Type: DateTimeZone	TMDD 3.3.10.1		Yes
Corridor-Id	Element: Organization-resource-identifier			Yes

3.8.2.10.4. ResponsePlanHeader

This is a new object containing the information content header related to response plan content.

Attribute Name	Type/Element	Reference	Description	CC Required
Event-Id	Element: Organization-resource-identifier	System Requirements spec 8.7.1.6		Yes
Response-Plan-Id	Element: Organization-resource-identifier			Yes
Plan-Type	Element: Enumerated: Response Plan (0), Termination Plan (1)		The "ResponsePlan" data structure is also used for termination plans.	Yes
Evaluation-Cycle	Element: Integer		Sequence starting at 1 for the initial set of response plans and incrementing for each 30- or 15-minute refresh cycle. Start again at 1 for termination plans.	Yes

3.8.2.10.5. ResponsePlanEvaluation

This is a new data frame containing the evaluation, ranking, risk and other metrics related to a response plan. **More data elements will be added in the future.**

Attribute Name	Type/Element	Reference	Description	CC Required
Evaluation-Cycle	Element: Integer		Sequence starting at 1 for the initial set of response plans and incrementing for each 30- or 15-minute refresh cycle. Start again at 1 for termination plans.	Yes
Response-Plan-Rank	Element: Integer		Rank of response plan within the evaluation cycle	Yes
Number-Of-Ranked-Response-Plans	Element: Integer		The number of response plan that were ranked within the evaluation cycle	Yes
Additional Elements TBD				

3.8.2.10.6. ResponsePlanRequest

This is a new object containing a request for a response plan.

Attribute Name	Type/Element	Reference	Description	CC Required
Response-Plan-Request-Header	Type: ResponsePlanRequestHeader	Custom type; see "Proposed Response Plans" layer		Yes

3.8.2.10.7. ResponsePlanUpdate

This is a new object containing information about a response plan.

Attribute Name	Type/Element	Reference	Description	CC Required
Response-Plan-Request-Header	Type: ResponsePlanRequestHeader	Custom type; see "Proposed Response Plans" layer		Yes

Attribute Name	Type/Element	Reference	Description	CC Required
Response-Plan-Status	Element: Enumerated: response-plan-exists (0), response-plan-does-not-exist (1)			Yes
Response-Plan	Type: ResponsePlan	Custom type; see "Proposed Response Plans" layer	Leave blank if response plan does not exist	Yes

3.8.2.10.8. ResponsePlanApprovalRequest

This is a new object containing a request of an approval decision for a proposed response plan..

Attribute Name	Type/Element	Reference	Description	CC Required
Response-Plan-Request-Header	Type: ResponsePlanRequestHeader	Custom type; see "Proposed Response Plans" layer		Yes

3.8.2.10.9. ResponsePlanApproval

This is a new object for the aggregate approval of a response plan or termination plan by all agencies. There may be multiple rounds of proposed modifications before a response plan is approved.

Attribute Name	Type/Element	Reference	Description	CC Required
Response-Plan-Request-Header	Type: ResponsePlanRequestHeader	Custom type; see "Proposed Response Plans" layer		Yes
Response-Plan-Header	Type: ResponsePlanHeader	Custom type; see "Proposed Response Plans" layer		Yes

Attribute Name	Type/Element	Reference	Description	CC Required
Aggregate-Approval-Decision	Type: ResponsePlanAgencyApproval	Custom type; see "Proposed Response Plans" layer	Indicates whether the proposed response plan was approved by all agencies.	Yes
Agency-Approval-Decision-List	Type: Sequence of "ResponsePlanAgencyApproval" types	Custom type; see "Proposed Response Plans" layer	Approval decisions of each agency.	Yes

3.8.2.10.10. ResponsePlanAgencyApproval

This is a new object for the approval of a response plan or termination plan by a specific agency.

Attribute Name	Type/Element	Reference	Description	CC Required
Organization-Approving	Type: Organization Information	TMDD 3.3.16.3	Indicates approval from a specific agency. Leave blank for the aggregated decision.	Yes
Approval-Decision	Element: Enumerated: approved (0), rejected (1)		Indicates whether the proposed response plan was approved.	Yes
Approval-Time	Type: DateTimeZone	TMDD 3.3.10.1 System Requirements spec 8.7.1.6	Time the recommended response plan was approved.	Yes

Attribute Name	Type/Element	Reference	Description	CC Required
Approval-Automation-Level	Type: TBD	System Requirements specs 8.5.3 and 8.5.4	Will include whether recommended response plans should require manual approval or whether the approval can be granted automatically, and periods during which manual approval is required and periods during which automated approval is possible. For periodic response plan updates it will also differentiate between proposed changes from the ICM system vs system users, and the approval setup for each type of control action can be customized separately.	Yes

3.8.2.10.11. ResponsePlanStatusRequest

This is a new object containing a request for the status of a response plan.

Attribute Name	Type/Element	Reference	Description	CC Required
Response-Plan-Request-Header	Type: ResponsePlanRequestHeader	Custom type; see "Proposed Response Plans" layer		Yes

3.8.2.10.12. ResponsePlanStatus

This is a new object containing the status of a response plan.

Attribute Name	Type/Element	Reference	Description	CC Required
Response-Plan-Request-Header	Type: ResponsePlanRequestHeader	Custom type; see "Proposed Response Plans" layer		Yes
Response-Plan-Header	Type: ResponsePlanHeader	Custom type; see "Proposed Response Plans" layer		Yes

Attribute Name	Type/Element	Reference	Description	CC Required
Approval-Status	Element: Enumerated: evaluation-not-started (0), evaluation-in-progress (1), approved (2), rejected (3)			Yes
Status-Last-Revised	Type: DateTimeZone	TMDD 3.3.10.1		Yes

3.8.2.10.13. ResponsePlanPersonnelDeployment

This is a new object containing personnel deployment details for a response plan.

Attribute Name	Type/Element	Reference	Description	CC Required
Personnel-Organization	Type: OrganizationInformation	TMDD 3.3.16.3	Personnel's organization	Yes
Personnel-Contact-Details	Type: ContactDetails	TMDD 3.3.16.1		Yes
Activity-Start-Time	Type: DateTimeZone	TMDD 3.3.10.1		Yes
Activity-End-Time	Type: DateTimeZone	TMDD 3.3.10.1		Yes
Deployment-Location	Type: GeoLocation	TMDD 3.6.9.4	Where the personnel is supposed to go	Yes
Deployment-Instructions	Element: Text		Instructions for the assignment	Yes
Contact-For-Questions	Type: ContactDetails	TMDD 3.3.16.1	Person they can contact for questions; may be blank	Yes
Contact-On-Site	Type: ContactDetails	TMDD 3.3.16.1	Person to contact at the location; may be blank	Yes

3.9. LAYER: SELECTED RESPONSE PLANS

This layer includes details of the selected response plan, regardless of whether the plan is implemented or not. It also includes the real time implementation results of any deployed response plan.

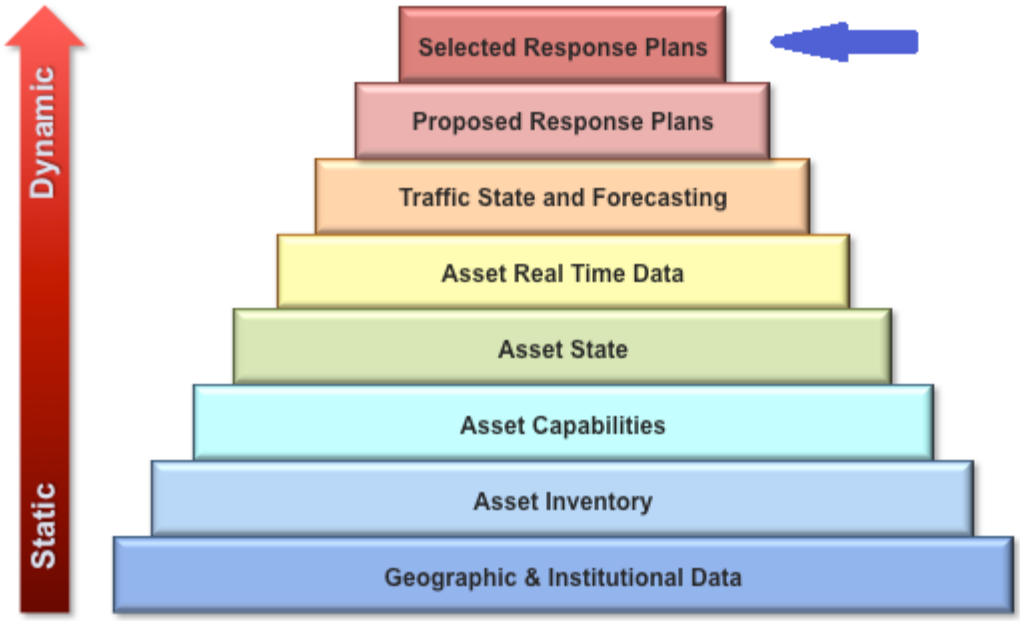

Figure 10 - Selected Response Plans Layer

3.9.1. Data Messages

TMDD Data Message Dialogs include the following:

Name	Reference	Description
dlDeviceCancelControlRequest	TMDD 3.1.5.1	Request for device control cancellation, including to cancel a previously scheduled lane closure when a response plan requires that the lane remain open
dlDMSControlRequest	TMDD 3.1.6.7	Request for Status of Device Control Request
dlDMSPriorityQueueRequest	TMDD 3.1.6.8	Request for DMS priority queue
dlHARControlRequest	TMDD 3.1.10.4	Request for HAR control
dlHARControlScheduleRequest	TMDD 3.1.10.5	Request for HAR Control Schedule

Name	Reference	Description
dlHARPriorityQueueRequest	TMDD 3.1.10.6	Request for HAR Priority Queue
dlIntersectionSignalControlRequest	TMDD 3.1.11.5	Request for intersection signal control
dlIntersectionSignalControlScheduleRequest	TMDD 3.1.11.6	Request for intersection signal Control Schedule
dlIntersectionSignalPriorityQueueRequest	TMDD 3.1.11.7	Request for intersection signal Priority Queue
dlLCSControlRequest	TMDD 3.1.12.3	Request for LCS control
dlLCSControlScheduleRequest	TMDD 3.1.12.4	Request for LCS Control Schedule
dlRampMeterControlRequest	TMDD 3.1.16.3	Request for ramp meter control
dlRampMeterControlScheduleRequest	TMDD 3.1.16.4	Request for ramp meter Control Schedule
dlRampMeterPriorityQueueRequest	TMDD 3.1.16.5	Request for ramp meter Priority Queue
dlSectionControlRequest	TMDD 3.1.18.2	Request for section control
dlSectionControlScheduleRequest	TMDD 3.1.18.3	Request for section Control Schedule
dlSectionPriorityQueueRequest	TMDD 3.1.18.5	Request for section Priority Queue
dlHARControlScheduleUpdate	TMDD 3.1.28.4	HAR Control Schedule update
dlResponsePlanLogRequest	New	Contains a request for a logged response plan implementation command
dlResponsePlanLogSubscription	New	Request for a subscription for logging commands used to implement a response plan
dlResponsePlanLogUpdate	New	Contains commands used to implement a response plan
dlResponsePlanTerminationRequest	New	Contains the decision of whether or not a response plan is accepted, to be pushed to other agencies

Other information that will be contained in this layer include:

Name	Reference	Description
Proposed Response Plan Traffic Forecast Summary		Contains summary of response plan traffic forecast

Name	Reference	Description
Proposed Response Plan Current Traffic State		Contains the current traffic state that was used to initiate the forecast and a snapshot of each current traffic state captured during response plan execution
Proposed Response Plan Traffic Forecast Details		Contains details of response plan traffic forecast

3.9.2. Data Class Descriptions

Data Class Descriptions include data elements for basic objects. Classes may be referenced in other classes (parent classes), and may be referenced in multiple parent classes. These do not represent database structures, but instead are based primarily on TMDD, or are structured similarly. Database design is expected to occur during system design.

See the beginning of section 3 for a description of the "CC Required" column.

3.9.2.1. ResponsePlan Class

This is a new class to handle response plan objects.

3.9.2.1.1. ResponsePlanImplementation

This is a new data frame for the implementation of a selected and approved response plan.

Attribute Name	Type/Element	Reference	Description	CC Required
Plan-Implementation-Status	Element: Text	System Requirements spec 8.6.6	Indicates status of response plan implementation so that a notification can be sent when the response plan has been implemented in its entirety or if the response plan cannot be implemented.	Yes
Implementation-Time	Type: DateTimeZone	TMDD 3.3.10.1 System Requirements spec 8.7.1.6	Time the approved response plan was implemented.	Yes
Implementation-Termination-Time	Type: DateTimeZone	TMDD 3.3.10.1 System Requirements spec 8.7.1.6	Time the implemented response plan was terminated.	Yes

Attribute Name	Type/Element	Reference	Description	CC Required
Event-Termination-Status	Element: Enumerated: not-started (0), in-progress (1), complete (2)	System Requirements specs 8.4.6 and 8.5.5	Indicates status of event termination, so the Response Plan can be terminated after the event is officially terminated.	Yes
Response-Plan-Termination-Approval-Level	Type: TBD	System Requirements spec 8.5.5	Will include whether active response plans can be automatically terminated or whether approval from all agencies involved in its implementation is required before termination, and periods during which manual approval is required and periods during which automated approval is possible.	Yes
Response-Plan-Termination-Approval-Status	Type: TBD	System Requirements spec 8.5.5	Authorized users from the agency will specify whether active response plans can be automatically terminated or whether approval from all agencies involved in its implementation is required before termination, and periods during which manual approval is required and periods during which automated approval is possible.	Yes
Response-Plan-Termination-Status	Element: Enumerated: not-started (0), in-progress (1), complete (2)	System Requirements spec 8.5.5	While a response plan is being terminated this status will indicate the termination is in-progress. When all control devices have returned to normal operation then this status will indicate that the response plan termination is officially complete.	Yes

3.9.2.1.2. ResponsePlanLogRequest

This is a new object containing a request for a response plan implementation command from the log.

Attribute Name	Type/Element	Reference	Description	CC Required
Response-Plan-Request-Header	Type: ResponsePlanRequestHeader	Custom type; see "Proposed Response Plans" layer		Yes

3.9.2.1.3. ResponsePlanLog

This is a new object containing a request for a response plan implementation command to be stored in the log.

Attribute Name	Type/Element	Reference	Description	CC Required
Response-Plan-Request-Header	Type: ResponsePlanRequestHeader	Custom type; see "Proposed Response Plans" layer		Yes
Response-Plan-Header	Type: ResponsePlanHeader	Custom type; see "Proposed Response Plans" layer		Yes
Command-Status	Element: Enumerated: acknowledgement-received (0), acknowledgement-not-received (1), command-not-successfully-sent (2), command-rejected (3)			Yes
Object-Type	Element: Enumerated: Ramp-Metering-Control (0), Intersection-Control (1), DMS (2), HAR (3), Informational-Message (4), LCS-Schedule-Cancellation (5), Personnel-Deployment (6), Other (7)			Yes
Object-Id	Element: Organization-resource-identifier			Yes
Command-Text	Type: Text		Text of command message as a CLOB	Yes

Attribute Name	Type/Element	Reference	Description	CC Required
Command-Acknowledgement-Text	Type: Text		Text of acknowledgement message as a CLOB	Yes
Command-Sent-Time	Type: DateTimeZone	TMDD 3.3.10.1		Yes
Acknowledgement-Received-Time	Type: DateTimeZone	TMDD 3.3.10.1		Yes

3.9.2.1.4. ResponsePlanTerminationRequest

This is a new object containing a request to terminate an active response plan.

Attribute Name	Type/Element	Reference	Description	CC Required
Response-Plan-Request-Header	Type: ResponsePlanRequestHeader	Custom type; see "Proposed Response Plans" layer		Yes
Event-Id	Element: Organization-resource-identifier	System Requirements spec 8.7.1.6		Yes
Response-Plan-Id	Element: Organization-resource-identifier			Yes

3.9.2.1.5. ResponsePlanTerminationResponse

This is a new object containing a response to a request to terminate an active response plan.

Attribute Name	Type/Element	Reference	Description	CC Required
Response-Plan-Request-Header	Type: ResponsePlanRequestHeader	Custom type; see "Proposed Response Plans" layer		Yes
Event-Id	Element: Organization-resource-identifier	System Requirements spec 8.7.1.6		Yes
Response-Plan-Id	Element: Organization-resource-identifier			Yes

Attribute Name	Type/Element	Reference	Description	CC Required
Request-Status	Element: Enumerated: requested-changes-completed (0), requested-changes-in-progress (1), request-rejected-invalid-command-parameters (2), request-rejected-insufficient-privileges-of-the-requesting-operator (3), request-queued-not-implemented (4), other (5)			Yes
Status-Last-Revised	Type: DateTimeZone	TMDD 3.3.10.1		Yes

3.10. SYSTEM DATA CLASSES

3.10.1. Data Messages

There are no applicable TMDD data messages. Information that will be contained in this layer include:

Name	Reference	Description
Alert	System Requirements spec 8.7.2, 8.4.1 and 8.4.5	Includes source, message (which may be text or may be an object type, for example ContactDetails), priority, severity
Response Plan Activity Log	System Requirements spec 8.7.1.6	Includes ID number of incident or event, time when response planning activities were initiated, time when a recommended response plan was proposed, ID number of recommended response plan, response plan evaluation score, time response plan was approved, time response plan was implemented, time response plan was replaced by another plan or terminated, time when response planning activities were terminated
Maintenance Log	System Requirements spec 8.7.1.8	Includes all maintenance alerts and notifications generated by the ICM system, and all maintenance activity logs entered by participating agencies
Event Log	System Requirements spec 8.4.1	Includes all identified incidents/events

3.10.2. System Data Class Elements

System class elements are classes and types that are used to ensure proper operation of the ICM system. These will include the following:

3.10.2.1. Security and User Data Classes

These class elements describe very high level descriptions of basic security types of information. This list of classes is subject to significant change as security design is developed for the ICM system.

Name	Reference	Description
User		Contains information describing a user, such as their name, contact details, parent organization, title
Security Group		Contains the information describing a system security group
Security Group Members List		Contains a list of security group members
Security Role		Contains a description of a specific security role
Security Permissions		Contains security privilege information
Security Role Permissions List		Contains a list of permissions belonging to a security role
Security Group Role List		Contains a list of security roles for a specific security group.
Authentication		Contains information regarding the authentication of the user accessing the system
Authorization		Contains information regarding the authorization of the user to perform a specific action or access a specific piece of information
Authentication Provider		Contains information regarding the provider of authentication services for the user
Authorization Provider		Contains information regarding the provider of authorization services for the user
Security Exception Log		Contains a system security exception log information, including name, system application or component owner
Security Exception		Contains a security exception, such as failed login attempt

3.10.2.2. User Activity Log Data Classes

These class elements describe very high level descriptions of basic activity log information. This list of classes is subject to significant change as security design is developed for the ICM system.

Name	Reference	Description
User Activity Log		Contains information describing a user activity log, including name, application, description
User Activity Log Entry Type		Contains information describing a type of user activity
User Activity Log Inventory		Contains a full list of user activities for a specific user
User Activity Log Entry		Contains an individual user activity log entry

3.10.2.3. Systems Description Classes

These class elements describe the system components, primarily for reference by other information classes.

Name	Reference	Description
Application		Contains information describing an application, including name, organizational owner, contact information, application host, application type, description.
Application Component		Contains information describing an application component, including name, organizational owner, contact information, component host, component type, description.
Application Log	`	Contains information describing log information for an application or component, including name, description, location, type

3.10.2.4. Systems State Classes

These class elements describe the system application and component state. These are again, very high level and subject to change based on system design.

Name	Reference	Description
Application State		Contains information describing an application's state, including working status.
Component State		Contains information describing an application component's state, including working status

Application Log Activity		Contains the application or component log activity

3.10.2.5. Systems Maintenance Classes

These class elements describe the system maintenance actions and state. These are again, very high level and subject to change based on system design.

Name	Reference	Description
Application Maintenance Log		Contains information describing an application's maintenance log, including name, description, type, and last date of update
Application Maintenance Activity		Contains information for a specific application or component maintenance activity, including description, type, start date/time, end date/time, result and any error information
Application Maintenance Activity Result		Contains the details of any application or component maintenance action
Application Maintenance Activity Error		Contains the details of any application or component maintenance error

3.10.2.6. Systems Rules Engine Classes

These class elements describe the system rule engine classes. This is really just a placeholder until a rules engine is selected.

Name	Reference	Description
Rule set		Contains a set of rules.
Rule		Contains an individual rule.
Rule Owner		Contains a record of the owner of a rule
Rule Execution		Contains a rules execution instance
Rule Result		Contains a rules execution instance result

4. DEFINITION OF TERMS

Term	Definition
Alert	Notification sent by the ICM system to individuals or units. Alerts may be displayed on screen, sent by email, sent by text message, sent by radio message, or sent by telephone.
Archive	Data that has been stored for historical purposes and can be retrieved upon request, usually to a location and using a storage method that has large capacity and slower retrieval times.
Area of Impact (area of influence)	The road network elements impacted by an incident or event.
Asset	See *Corridor Asset*.
Asset Inventory	An inventory of corridor assets taken at any point in time. Asset inventory includeslocations of fixed position assets, and types of corridor assets. Can be specified for a type of assets, such as intersection signal asset inventory. Also includes the attributes of each individual asset, such as intersection or ramp meter signal capabilities and currently available signal/ramp meter plans.
Asset State	The condition of a corridor asset at a point in time. This condition includes working state (usually operational, failed, or some degraded operational state), location of mobile assets, signal or ramp meter plan that is in operation at the point in time, and all most recent data received by the asset at the point in time.
Authentication	Verifying a user's identity.
Authorization	Verifying a user's permissions to view specific data elements or perform specific functions.
Availability	A description of whether an asset is available for use in a response plan or not.
Backward Chaining Rules	Rules that are defined so that a specific goal is specified, and the possible alternatives that will achieve that goal are identified by execution of the rule. A potential ICM-related example would be rules that are defined to create a list of alternative routes between two defined points and set limitations on what road links can be used at various times for the route creation. In this example, the goal is a route between the two points. The rules are executed to find all the possible alternatives, essentially working backwards to find solutions that fit the rules given to achieve the goal.
CMS	Changeable message sign. Includes both fixed and mobile devices.
Configuration Management	Maintaining a timeline of changes to an entity, ensuring traceability of changes in time, content, and author of the change.

Term	Definition
Contact Details	Information for a specific individual or organizational unit, including names, phone numbers, email addresses, physical address, specific to the type of contact methods available for the individual or unit.
Corridor Asset	Any corridor element available for use within a response plan or that provides information to the ICM system. Assets include the following types of elements: • Intersection traffic signals • Ramp meters • Organizational units or individuals (people resources) • Equipment • Mobile or stationary CMS elements • Traffic sensors and other measurement devices • Communication elements (511, HAR, third party information providers) • Parking facilities • Transit elements
Corridor State	Information describing the state of the corridor at a specific point in time. State information includes: • Corridor road network closures • Corridor road network lane blockages • Incident information • Event information • Asset inventory • Asset state • Sensor information • Transit information • Transit state • Traffic conditions (density, flow, velocity) on the road network • Response plans currently implemented or in the process of being implemented
Current Traffic State	Determining a value of traffic density, flow, and velocity for each link in the road network at the current time and with the data available at the current time. Also includes values for current turn volumes and ratios at each turn movement within the road network.
Data Hub	A core component of the ICM system which has primary responsibility for receiving, processing, storing, and providing data for all ICM system components.

Term	Definition
Data Quality	A measure of the quality of data being received by the ICM system. Factors considered in data quality of a specific asset or type of assets include: • Percent of working assets • Individual asset state, including level of asset degradation • Percent of time reliable data is provided by the asset • Specific filtering or algorithmic verification of incoming data specific to the asset or asset type
Data Restoration	Restoration of data to service in the event of system or component failure.
Decision Support	A core component of the ICM system, providing traffic conditions, incident and event information, forecasts of traffic, proposed response plans and associated traffic forecasts, asset inventories and asset availability, maintenance information, organizational information, road network conditions, and previous corridor planning and study information to users to support corridor operations and decision making.
Delay	A measure of the typical time a traveler would experience along a route over and above the time the traveler would experience at free-flow traffic conditions.
Demand	A measure of traffic demand (flow) at an entrance to the road network or between specify entry and exit points.
Deterministic	A solution to an algorithm or rule execution for which the execution of the algorithm or rule, given the same input data, will always provide the same answer at any point in time.
Device State	See *Asset State*.
Disaster Recovery Plan	A plan developed that provides procedures, operations, and actions that are taken in the event of system failure or loss of capabilities, including any required system shutdown procedures, data protection actions, system and data recovery actions, procedures for restoration of the system to operational state, and post-event actions to be taken.
DMS	Dynamic Message Sign. This is the same as a *CMS* (see above).
Do Nothing Response	A response plan that includes no changes to any corridor assets' normal, preprogrammed, responses to traffic behavior.
Downtime	The amount of time a system is not fully operational over a specified time interval.
Drill Down	The ability of the user to select an element of information on a display and retrieve additional details related to the information selected.
ESS	Environmental Sensor Station.

Term	Definition
Event	A planned or unplanned occasion or activity occurring within the corridor that is not caused by traffic activity but affects traffic conditions. Examples include road maintenance activity, a major sports event, a public event such as a parade, and a concert or arts activity.
Event-Driven Process	A process or action that is driven by notification or detection of a previous action or set of actions.
Forward Chaining Rules	Rules that are defined to be executed from a set of pre-defined inputs, to achieve an answer by executing the rule against those inputs. An ICM-related example might be a rule that states that any response plan that achieves a delay time improvement over the do-nothing response plan of 25% shall be submitted for selection by the corridor manager.
Geospatial	Relating to location on the earth.
Geospatial Display	Display of information on a map.
GTFS	General Transit Feed Specification. This is a data format used to represent transit routes and schedules on electronic maps.
HAR	Highway Advisory Radio, used for communicating to travelers.
Incident	Traffic-related incident, such as an accident or disabled vehicle.
Incident Confirmation	Positive confirmation within the system of an identified traffic incident.
Incident Identification	Identification of a traffic incident.
Inventory	A collection of assets.
Jurisdiction	Geographic and asset ownership or control by a specific organizational or governmental entity.
Jurisdictional Restriction	A restriction, generally on a corridor asset or road network element, imposed by an organizational or governmental agency.
LCS	Lane Control Signal. Same acronym is also used for Lane Closure System.
Link	A defined section of road.
Node	A point of connection between two or more links, often located at intersections, freeway ramp diversions or ends, changes in lane configuration, or changes in road attributes (such as speed limits).
Non-deterministic	A solution to an algorithm or rule execution for which the execution of the algorithm or rule, given the same input data, will not always provide the same answer at any point in time.
Operational Status	The working state of a corridor asset—generally working, degraded, or not functional, depending upon the capabilities of the asset.
Persistence	Storage of information in a permanent store, such as a database or file system.

Term	Definition
PHT	Person Hours Traveled. The product of the number of travelers (people) and the hours traveled over a specified period of time and within a specified geographic boundary.
Plot-Based Display	Display of information using two- and three-dimensional graphing techniques.
PMT	Person Miles Traveled. The product of the number of travelers (people) and the miles traveled over a specified period of time and within a specified geographic boundary.
Post-event	An event or action taken after a traffic incident and removal or release of response plan elements and after the end of the response plan duration.
Probe Vehicle	A vehicle equipped with sensors allowing them to record the position, speed, and travel direction of the vehicle at regular intervals or when coming into proximity of roadside devices.
Reactive Transitive Query	A type of rules execution where the rule being executed does not find a solution but is still listening to the facts being provided and, upon a change of the facts provided, will re-evaluate automatically and provide a solution if a solution exists. A possible ICM example is a rule that is provided and checks the difference between the current traffic state density and the "historical normal" density on the traffic network. At any time, the difference may not be above a threshold specified by the rule. However, when the difference is updated, the rule will evaluate again without a direction to execute, and if the threshold is exceeded, the rule action (perhaps notification of a potential incident) will be executed.
Real-Time Data	Real-time data denotes information that is delivered immediately after measurement. Depending on the system providing the data, this may include data that was measured a few seconds or a few minutes ago. In transportation systems, this typically means data 15-minutes old or less.
Recovery Point Objective	The maximum amount of time for which data may be lost in the event of a system or component failure. The time measure does not include the recovery time (see *Recovery Time Objective*).
Recovery Time Objective	The maximum amount of time a system or component may be out of service in the event of a system or component failure.
Redundant Capability	A capability of a system function or component to continue operating in the event of loss of a primary dependency or system capability by use of duplicate capacity or function.
Reroute	An alternative route defined within the ICM system chosen for traffic to follow in response to an event or incident.

Term	Definition
Response Crew	Any organizational (human and equipment) assets that respond to an incident or event.
Response Plan	A collection of actions prepared and evaluated by the ICM system for implementation in response to an event or incident. Response plans may be in the following states: • Development - The selection and assembly of response plan elements • Evaluation - System generation of traffic forecast based on the response plan and analysis of the forecast and other response plan components • Proposed - Recommended by the system for implementation based on the evaluation of the plan • Selection - Selection of a plan to be submitted for approval • Active - Approved and in implementation Response plans may include one or more of the following deployment elements: • Recommended traffic reroutes around an incident or event • Intersection traffic signal changes • Ramp meter changes • Organizational asset deployments • Equipment deployments • CMS changes • Communications Required additional supporting elements of a response plan include: • Approval requests and responses (if the response plan is proposed for implementation) • Traffic state at the time of response plan development initiation • Traffic forecast based on the response plan deployment elements • Geographic area of impact (also known as area of influence) • Corridor asset state at the time of response plan development initiation • Initiating incident or event information • Implementation results, including success or failure of each response plan action and traffic state information throughout the response plan duration (if the response plan is deployed)
Response Plan Development	Creation of one or more response plans in response to an incident or event by the ICM system.
Response Plan Implementation	Execution of response plan deployment elements.

Term	Definition
Road Capacity	The maximum number of vehicles a road, road segment, or link is capable of carrying at free-flow speeds over a one-hour period.
Route	An interconnected collection of road links that create a single continuous path between any two points in the road network.
Rule	A single element of logic, expressed within a format and dialog that the rules engine can understand and process.
Rule Action	A resulting action from execution of a rule.
Rule Condition	A condition that a rule checks during rule execution.
Rule Dependency	A dependency between two rules, usually enforced by rule categorization, grouping, or priority.
Rule Fact	A collection of information provided for a rule to use in its execution.
Rule set	A collection of rules and any instructions for their execution intended to be executed as a group within the rules engine.
Rules Engine	A core component of the ICM system that includes an off-the-shelf (commercial or open-source) software system that allows users to define, edit, or delete rules that govern specific logic applied to specific processes. The rules engine executes those rules at run time in the context of a process when the process is invoked. A rules engine is specified within the ICM system to allow users to define identification of traffic incidents, when response plans are to be developed, what response plan elements will be included within a response plan, and to allow the logic of these processes to be redefined by the users over the lifetime of the system.
Scheduled-Driven Process	An action or process that is initiated based on a pre-defined time-based schedule.
Sensor	A corridor asset that senses and reports to the ICM system a measurement of the state of the asset or traffic.
Tabular Display	Display of information in tables.
TMDD	Traffic Management Data Dictionary, which is a standard for communications between traffic centers.
Total Delay	The sum of all delay within a road network over a specified period of time.
Traffic Forecast	A prediction of the future state of traffic density, velocity, and flow for each link in the road network.
Traffic State	The current traffic density, velocity, and flow for each link in the road network.
Transit State	The state of one or more transit providers, including the transit inventory in operation, the working state of each asset, and each asset's location.

Term	Definition
Travel Time	The time it takes to travel between two defined points along a specified route on the traffic network. Three types of travel time can be distinguished: • Point travel time—Travel time observed at a given point in time within the road network • Predicted travel time—Expected future travel time along a given route based on a traveler or vehicle starting a trip at the current time and encountering various predicted traffic conditions along his trip • Experienced travel time—Travel time obtained by measuring the time it actually took for a person or vehicle to travel along a given route.
Turn Movement	A split in the traffic flow at a node in the road network. Each possible link pair at the node in the direction of traffic flow is defined as a turn movement.
Turn Ratio	The flow from the input link to one output link of a turn movement divided by the total flow of the input link at a point in time.
Turn Volume	The traffic volume for a specific turn movement at a point in time.
Two-Factor Authentication	Authentication method that requires two forms of identification. A common two-factor authentication method is to use a username/password combination with an additional method, such as an additional hardware key device.
Unbound Rule Arguments	Arguments specified within a rule condition that are data-dependent.
Uptime	The amount of time a system is fully operational divided by the total period time over a specified time interval. For the purposes of the ICM system, fully operational is defined as reporting as working with no asset degradation and as the ICM system being unable to detect any behavior indicating asset failure or degraded operation.
VHT	Vehicle Hours Traveled. The product of the number of vehicles and the hours traveled over a specified period of time and within a specified geographic boundary.
Visualization	The collection and display of information by the system for the user.
VMT	Vehicle Miles Traveled. The product of the number of vehicles and the miles traveled over a specified period of time and within a specified geographic boundary.

5. APPENDICES

1. DIALOG AND MESSAGE LIST

Gray highlights indicate objects defined by PATH.

Dialog and Message Names	Defined By
dlCCTVControlRequest	
Input: MSG_CCTVControlRequest	TMDD
Output: MSG_DeviceControlResponse	TMDD
Error: MSG_ErrorReport	TMDD
dlCCTVInventoryRequest	
Input: MSG_CCTVInventoryRequest	PATH
Output: MSG_CCTVInventory	TMDD
Error: MSG_ErrorReport	TMDD
dlCCTVInventoryUpdate	
Input: MSG_CCTVInventoryUpdate	PATH
Output: MSG_ConfirmationReceipt	TMDD
Error: MSG_ErrorReport	TMDD
dlCCTVStatusRequest	
Input: MSG_CCTVStatusRequest	PATH
Output: MSG_CCTVStatus	TMDD
Error: MSG_ErrorReport	TMDD
dlCCTVStatusUpdate	
Input: MSG_CCTVStatusUpdate	PATH
Output: MSG_ConfirmationReceipt	TMDD
Error: MSG_ErrorReport	TMDD
dlCenterActiveVerificationRequest	
Input: MSG_CenterActiveVerificationRequest	TMDD
Output: MSG_CenterActiveVerificationResponse	TMDD
Error: MSG_ErrorReport	TMDD
dlCenterActiveVerificationSubscription	
Input: MSG_CenterActiveVerificationSubscription	PATH
Output: MSG_ConfirmationReceipt	TMDD
Error: MSG_ErrorReport	TMDD
dlCenterActiveVerificationUpdate	
Input: MSG_CenterActiveVerificationUpdate	PATH
Output: MSG_ConfirmationReceipt	TMDD
Error: MSG_ErrorReport	TMDD
dlDetectorDataRequest	
Input: MSG_DetectorDataRequest	TMDD
Output: MSG_DetectorData	TMDD
Error: MSG_ErrorReport	TMDD

Dialog and Message Names	Defined By
dlDetectorDataSubscription	
Input: MSG_DetectorDataSubscription	PATH
Output: MSG_ConfirmationReceipt	TMDD
Error: MSG_ErrorReport	TMDD
dlDetectorDataUpdate	
Input: MSG_DetectorDataUpdate	PATH
Output: MSG_ConfirmationReceipt	TMDD
Error: MSG_ErrorReport	TMDD
dlDetectorInventoryRequest	
Input: MSG_DetectorInventoryRequest	PATH
Output: MSG_DetectorInventory	TMDD
Error: MSG_ErrorReport	TMDD
dlDetectorInventoryUpdate	
Input: MSG_DetectorInventoryUpdate	PATH
Output: MSG_ConfirmationReceipt	TMDD
Error: MSG_ErrorReport	TMDD
dlDetectorMaintenanceHistoryRequest	
Input: MSG_DetectorMaintenanceHistoryRequest	TMDD
Output: MSG_DetectorMaintenanceHistory	TMDD
Error: MSG_ErrorReport	TMDD
dlDetectorStatusRequest	
Input: MSG_DetectorStatusRequest	PATH
Output: MSG_DetectorStatus	TMDD
Error: MSG_ErrorReport	TMDD
dlDetectorStatusUpdate	
Input: MSG_DetectorStatusUpdate	PATH
Output: MSG_ConfirmationReceipt	TMDD
Error: MSG_ErrorReport	TMDD
dlDeviceCancelControlRequest	
Input: MSG_DeviceCancelControlRequest	TMDD
Output: MSG_DeviceControlResponse	TMDD
Error: MSG_ErrorReport	TMDD
dlDeviceControlStatusRequest	
Input: MSG_DeviceControlStatusRequest	TMDD
Output: MSG_DeviceControlResponse	TMDD
Error: MSG_ErrorReport	TMDD
dlDeviceInformationSubscription	
Input: MSG_DeviceInformationSubscription	PATH
Output: MSG_ConfirmationReceipt	TMDD
Error: MSG_ErrorReport	TMDD
dlDMSControlRequest	
Input: MSG_DMSControlRequest	TMDD
Output: MSG_DeviceControlResponse	TMDD
Error: MSG_ErrorReport	TMDD

Dialog and Message Names	Defined By
dlDMSInventoryRequest	
Input: MSG_DMSInventoryRequest	PATH
Output: MSG_DMSInventory	TMDD
Error: MSG_ErrorReport	TMDD
dlDMSInventoryUpdate	
Input: MSG_DMSInventoryUpdate	PATH
Output: MSG_ConfirmationReceipt	TMDD
Error: MSG_ErrorReport	TMDD
dlDMSMessageAppearanceRequest	
Input: MSG_DMSMessageAppearanceRequest	TMDD
Output: MSG_DMSMessageAppearance	TMDD
Error: MSG_ErrorReport	TMDD
dlDMSMessageInventoryRequest	
Input: MSG_DMSMessageInventoryRequest	TMDD
Output: MSG_DMSMessageInventory	TMDD
Error: MSG_ErrorReport	TMDD
dlDMSMessageInventorySubscription	
Input: MSG_DMSMessageInventorySubscription	PATH
Output: MSG_ConfirmationReceipt	TMDD
Error: MSG_ErrorReport	TMDD
dlDMSMessageInventoryUpdate	
Input: MSG_DMSMessageInventoryUpdate	PATH
Output: MSG_ConfirmationReceipt	TMDD
Error: MSG_ErrorReport	TMDD
dlDMSPriorityQueueRequest	
Input: MSG_DMSPriorityQueueRequest	PATH
Output: MSG_DMSPriorityQueue	TMDD
Error: MSG_ErrorReport	TMDD
dlDMSStatusRequest	
Input: MSG_DMSStatusRequest	PATH
Output: MSG_DMSStatus	TMDD
Error: MSG_ErrorReport	TMDD
dlDMSStatusUpdate	
Input: MSG_DMSStatusUpdate	PATH
Output: MSG_ConfirmationReceipt	TMDD
Error: MSG_ErrorReport	TMDD
dlESSInventoryRequest	
Input: MSG_ESSInventoryRequest	PATH
Output: MSG_ESSInventory	TMDD
Error: MSG_ErrorReport	TMDD
dlESSInventoryUpdate	
Input: MSG_ESSInventoryUpdate	PATH
Output: MSG_ConfirmationReceipt	TMDD
Error: MSG_ErrorReport	TMDD

Dialog and Message Names	Defined By
dlESSObservationMetadataRequest	
Input: MSG_ESSObservationMetadataRequest	PATH
Output: MSG_ESSObservationMetadata	TMDD
Error: MSG_ErrorReport	TMDD
dlESSObservationReportRequest	
Input: MSG_ESSObservationReportRequest	PATH
Output: MSG_ESSObservationReport	TMDD
Error: MSG_ErrorReport	TMDD
dlESSObservationReportUpdate	
Input: MSG_ESSObservationReportUpdate	PATH
Output: MSG_ConfirmationReceipt	TMDD
Error: MSG_ErrorReport	TMDD
dlESSStatusRequest	
Input: MSG_ESSStatusRequest	PATH
Output: MSG_ESSStatus	TMDD
Error: MSG_ErrorReport	TMDD
dlESSStatusUpdate	
Input: MSG_ESSStatusUpdate	PATH
Output: MSG_ConfirmationReceipt	TMDD
Error: MSG_ErrorReport	TMDD
dlEventIndexRequest	
Input: MSG_EventIndexRequest	PATH
Output: MSG_EventIndex	TMDD
Error: MSG_ErrorReport	TMDD
dlEventIndexSubscription	
Input: MSG_EventIndexSubscription	PATH
Output: MSG_ConfirmationReceipt	TMDD
Error: MSG_ErrorReport	TMDD
dlEventIndexUpdate	
Input: MSG_EventIndexUpdate	PATH
Output: MSG_ConfirmationReceipt	TMDD
Error: MSG_ErrorReport	TMDD
dlFullEventUpdateRequest	
Input: MSG_FullEventUpdateRequest	PATH
Output: MSG_FullEventUpdate	TMDD
Error: MSG_ErrorReport	TMDD
dlFullEventUpdateSubscription	
Input: MSG_FullEventUpdateSubscription	PATH
Output: MSG_ConfirmationReceipt	TMDD
Error: MSG_ErrorReport	TMDD
dlFullEventUpdateUpdate	
Input: MSG_FullEventUpdateUpdate	PATH
Output: MSG_ConfirmationReceipt	TMDD
Error: MSG_ErrorReport	TMDD

Dialog and Message Names	Defined By
dlHARControlRequest	
Input: MSG_HARControlRequest	TMDD
Output: MSG_DeviceControlResponse	TMDD
Error: MSG_ErrorReport	TMDD
dlHARControlScheduleRequest	
Input: MSG_HARControlScheduleRequest	PATH
Output: MSG_HARControlSchedule	TMDD
Error: MSG_ErrorReport	TMDD
dlHARControlScheduleUpdate	
Input: MSG_HARControlScheduleUpdate	PATH
Output: MSG_ConfirmationReceipt	TMDD
Error: MSG_ErrorReport	TMDD
dlHARInventoryUpdate	
Input: MSG_HARInventoryUpdate	PATH
Output: MSG_ConfirmationReceipt	TMDD
Error: MSG_ErrorReport	TMDD
dlHARInventoryRequest	
Input: MSG_HARInventoryRequest	PATH
Output: MSG_HARInventory	TMDD
Error: MSG_ErrorReport	TMDD
dlHARMessageInventoryRequest	
Input: MSG_HARMessageInventoryRequest	PATH
Output: MSG_HARMessageInventory	TMDD
Error: MSG_ErrorReport	TMDD
dlHARMessageInventoryUpdate	
Input: MSG_HARMessageInventoryUpdate	PATH
Output: MSG_ConfirmationReceipt	TMDD
Error: MSG_ErrorReport	TMDD
dlHARPriorityQueueRequest	
Input: MSG_HARPriorityQueueRequest	PATH
Output: MSG_HARPriorityQueue	TMDD
Error: MSG_ErrorReport	TMDD
dlHARStatusRequest	
Input: MSG_HARStatusRequest	PATH
Output: MSG_HARStatus	TMDD
Error: MSG_ErrorReport	TMDD
dlHARStatusUpdate	
Input: MSG_HARStatusUpdate	PATH
Output: MSG_ConfirmationReceipt	TMDD
Error: MSG_ErrorReport	TMDD
dlIntersectionSignalControlRequest	
Input: MSG_IntersectionSignalControlRequest	TMDD
Output: MSG_IntersectionSignalControlResponse	TMDD
Error: MSG_ErrorReport	TMDD

Dialog and Message Names	Defined By
dlIntersectionSignalControlScheduleRequest	
Input: MSG_IntersectionSignalControlScheduleRequest	PATH
Output: MSG_IntersectionSignalControlSchedule	TMDD
Error: MSG_ErrorReport	TMDD
dlIntersectionSignalControlScheduleUpdate	
Input: MSG_IntersectionSignalControlScheduleUpdate	PATH
Output: MSG_ConfirmationReceipt	TMDD
Error: MSG_ErrorReport	TMDD
dlIntersectionSignalInventoryRequest	
Input: MSG_IntersectionSignalInventoryRequest	PATH
Output: MSG_IntersectionSignalInventory	TMDD
Error: MSG_ErrorReport	TMDD
dlIntersectionSignalInventoryUpdate	
Input: MSG_IntersectionSignalInventoryUpdate	PATH
Output: MSG_ConfirmationReceipt	TMDD
Error: MSG_ErrorReport	TMDD
dlIntersectionSignalPriorityQueueRequest	
Input: MSG_IntersectionSignalPriorityQueueRequest	PATH
Output: MSG_IntersectionSignalPriorityQueue	TMDD
Error: MSG_ErrorReport	TMDD
dlIntersectionSignalStatusRequest	
Input: MSG_IntersectionSignalStatusRequest	PATH
Output: MSG_IntersectionSignalStatus	TMDD
Error: MSG_ErrorReport	TMDD
dlIntersectionSignalStatusUpdate	
Input: MSG_IntersectionSignalStatusUpdate	PATH
Output: MSG_ConfirmationReceipt	TMDD
Error: MSG_ErrorReport	TMDD
dlIntersectionSignalTimingPatternInventoryRequest	
Input: MSG_IntersectionSignalTimingPatternInventoryRequest	TMDD
Output: MSG_IntersectionSignalTimingPatternInventory	TMDD
Error: MSG_ErrorReport	TMDD
dlIntersectionSignalTimingPatternInventorySubscription	
Input: MSG_IntersectionSignalTimingPatternInventorySubscription	PATH
Output: MSG_ConfirmationReceipt	TMDD
Error: MSG_ErrorReport	TMDD
dlIntersectionSignalTimingPatternInventoryUpdate	
Input: MSG_IntersectionSignalTimingPatternInventoryUpdate	PATH
Output: MSG_ConfirmationReceipt	TMDD
Error: MSG_ErrorReport	TMDD
dlLCSControlRequest	
Input: MSG_LCSControlRequest	TMDD
Output: MSG_DeviceControlResponse	TMDD
Error: MSG_ErrorReport	TMDD

Dialog and Message Names	Defined By
dlLCSControlScheduleRequest	
Input: MSG_CSControlScheduleRequest	PATH
Output: MSG_LCSControlSchedule	TMDD
Error: MSG_ErrorReport	TMDD
dlLCSControlScheduleUpdate	
Input: MSG_LCSControlScheduleUpdate	PATH
Output: MSG_ConfirmationReceipt	TMDD
Error: MSG_ErrorReport	TMDD
dlLCSInventoryRequest	
Input: MSG_CSInventoryRequest	PATH
Output: MSG_LCSInventory	TMDD
Error: MSG_ErrorReport	TMDD
dlLCSInventoryUpdate	
Input: MSG_LCSInventoryUpdate	PATH
Output: MSG_ConfirmationReceipt	TMDD
Error: MSG_ErrorReport	TMDD
dlLCSStatusRequest	
Input: MSG_CSStatusRequest	PATH
Output: MSG_LCSStatus	TMDD
Error: MSG_ErrorReport	TMDD
dlLCSStatusUpdate	
Input: MSG_LCSStatusUpdate	PATH
Output: MSG_ConfirmationReceipt	TMDD
Error: MSG_ErrorReport	TMDD
dlLinkInventoryRequest	
Input: MSG_LinkInventoryRequest	PATH
Output: MSG_LinkInventory	TMDD
Error: MSG_ErrorReport	TMDD
dlLinkInventoryUpdate	
Input: MSG_LinkInventoryUpdate	PATH
Output: MSG_ConfirmationReceipt	TMDD
Error: MSG_ErrorReport	TMDD
dlLinkStatusRequest	
Input: MSG_LinkStatusRequest	PATH
Output: MSG_LinkStatus	TMDD
Error: MSG_ErrorReport	TMDD
dlLinkStatusUpdate	
Input: MSG_LinkStatusUpdate	PATH
Output: MSG_ConfirmationReceipt	TMDD
Error: MSG_ErrorReport	TMDD
dlNodeInventoryRequest	
Input: MSG_NodeInventoryRequest	PATH
Output: MSG_NodeInventory	TMDD
Error: MSG_ErrorReport	TMDD

Dialog and Message Names	Defined By
dlNodeInventoryUpdate	
Input: MSG_NodeInventoryUpdate	PATH
Output: MSG_ConfirmationReceipt	TMDD
Error: MSG_ErrorReport	TMDD
dlNodeStatusRequest	
Input: MSG_NodeStatusRequest	PATH
Output: MSG_NodeStatus	TMDD
Error: MSG_ErrorReport	TMDD
dlNodeStatusUpdate	
Input: MSG_NodeStatusUpdate	PATH
Output: MSG_ConfirmationReceipt	TMDD
Error: MSG_ErrorReport	TMDD
dlOrganizationInformationRequest	
Input: MSG_OrganizationInformationRequest	TMDD
Output: MSG_OrganizationInformation	TMDD
Error: MSG_ErrorReport	TMDD
dlOrganizationInformationSubscription	
Input: MSG_OrganizationInformationSubscription	PATH
Output: MSG_ConfirmationReceipt	TMDD
Error: MSG_ErrorReport	TMDD
dlOrganizationInformationUpdate	
Input: MSG_OrganizationInformationUpdate	PATH
Output: MSG_ConfirmationReceipt	TMDD
Error: MSG_ErrorReport	TMDD
dlRampMeterControlRequest	
Input: MSG_RampMeterControlRequest	TMDD
Output: MSG_DeviceControlResponse	TMDD
Error: MSG_ErrorReport	TMDD
dlRampMeterControlScheduleRequest	
Input: MSG_RampMeterControlScheduleRequest	PATH
Output: MSG_RampMeterControlSchedule	TMDD
Error: MSG_ErrorReport	TMDD
dlRampMeterControlScheduleUpdate	
Input: MSG_RampMeterControlScheduleUpdate	PATH
Output: MSG_ConfirmationReceipt	TMDD
Error: MSG_ErrorReport	TMDD
dlRampMeterInventoryRequest	
Input: MSG_RampMeterInventoryRequest	PATH
Output: MSG_RampMeterInventory	TMDD
Error: MSG_ErrorReport	TMDD
dlRampMeterInventoryUpdate	
Input: MSG_RampMeterInventoryUpdate	PATH
Output: MSG_ConfirmationReceipt	TMDD
Error: MSG_ErrorReport	TMDD

Dialog and Message Names	Defined By
dlRampMeterPlanInventoryRequest	
Input: MSG_RampMeterPlanInventoryRequest	TMDD
Output: MSG_RampMeterPlanInventory	TMDD
Error: MSG_ErrorReport	TMDD
dlRampMeterPlanInventorySubscription	
Input: MSG_RampMeterPlanInventorySubscription	PATH
Output: MSG_ConfirmationReceipt	TMDD
Error: MSG_ErrorReport	TMDD
dlRampMeterPlanInventoryUpdate	
Input: MSG_RampMeterPlanInventoryUpdate	PATH
Output: MSG_ConfirmationReceipt	TMDD
Error: MSG_ErrorReport	TMDD
dlRampMeterPriorityQueueRequest	
Input: MSG_RampMeterPriorityQueueRequest	PATH
Output: MSG_RampMeterPriorityQueue	TMDD
Error: MSG_ErrorReport	TMDD
dlRampMeterStatusRequest	
Input: MSG_RampMeterStatusRequest	PATH
Output: MSG_RampMeterStatus	TMDD
Error: MSG_ErrorReport	TMDD
dlRampMeterStatusUpdate	
Input: MSG_RampMeterStatusUpdate	PATH
Output: MSG_ConfirmationReceipt	TMDD
Error: MSG_ErrorReport	TMDD
dlResponsePlanApprovalRequest (New)	**PATH**
Input: MSG_ResponsePlanApprovalRequest	PATH
Dataframe: ResponsePlanApprovalRequest	*PATH*
Output: MSG_ResponsePlanApprovalResponse	PATH
Dataframe: ResponsePlanApproval	*PATH*
Error: MSG_ErrorReport	TMDD
dlResponsePlanApprovalSubscription (New)	**PATH**
Input: MSG_ResponsePlanApprovalSubscription	PATH
Dataframe: ResponsePlanApprovalRequest	*PATH*
Output: MSG_ConfirmationReceipt	TMDD
Error: MSG_ErrorReport	TMDD
dlResponsePlanApprovalUpdate (New)	**PATH**
Input: MSG_ResponsePlanApprovalUpdate	PATH
Dataframe: ResponsePlanApproval	*PATH*
Output: MSG_ConfirmationReceipt	TMDD
Error: MSG_ErrorReport	TMDD

Dialog and Message Names	Defined By
dlResponsePlanLogRequest (New)	**PATH**
Input: MSG_ResponsePlanLogRequest	PATH
Dataframe: ResponsePlanLogRequest	*PATH*
Output: MSG_ResponsePlanLogResponse	PATH
Dataframe: ResponsePlanLog	*PATH*
Error: MSG_ErrorReport	TMDD
dlResponsePlanLogSubscription (New)	**PATH**
Input: MSG_ResponsePlanLogSubscription	PATH
Dataframe: ResponsePlanLogRequest	*PATH*
Output: MSG_ConfirmationReceipt	TMDD
Error: MSG_ErrorReport	TMDD
dlResponsePlanLogUpdate (New)	**PATH**
Input: MSG_ResponsePlanLogUpdate	PATH
Dataframe: ResponsePlanLog	*PATH*
Output: MSG_ConfirmationReceipt	TMDD
Error: MSG_ErrorReport	TMDD
dlResponsePlanStatusRequest (New)	**PATH**
Input: MSG_ResponsePlanStatusRequest	PATH
Dataframe: ResponsePlanStatusRequest	*PATH*
Output: MSG_ResponsePlanStatusResponse	PATH
Dataframe: ResponsePlanStatus	*PATH*
Error: MSG_ErrorReport	TMDD
dlResponsePlanStatusSubscription (New)	**PATH**
Input: MSG_ResponsePlanStatusSubscription	PATH
Dataframe: ResponsePlanStatusRequest	*PATH*
Output: MSG_ConfirmationReceipt	TMDD
Error: MSG_ErrorReport	TMDD
dlResponsePlanStatusUpdate (New)	**PATH**
Input: MSG_ResponsePlanStatusUpdate	PATH
Dataframe: ResponsePlanStatus	*PATH*
Output: MSG_ConfirmationReceipt	TMDD
Error: MSG_ErrorReport	TMDD
dlResponsePlanRequest (New)	**PATH**
Input: MSG_ResponsePlanRequest	PATH
Dataframe: ResponsePlanRequest	*PATH*
Output: MSG_ResponsePlanResponse	PATH
Dataframe: ResponsePlanUpdate	*PATH*
Error: MSG_ErrorReport	TMDD
dlResponsePlanSubscription (New)	**PATH**
Input: MSG_ResponsePlanSubscription	PATH
Dataframe: ResponsePlanRequest	*PATH*
Output: MSG_ConfirmationReceipt	TMDD
Error: MSG_ErrorReport	TMDD

Dialog and Message Names	Defined By
dlResponsePlanTerminationRequest (New)	**PATH**
Input: MSG_ResponsePlanTerminationRequest	PATH
Dataframe: ResponsePlanTerminationRequest	*PATH*
Output: MSG_ResponsePlanTerminationResponse	PATH
Dataframe: ResponsePlanTerminationResponse	*PATH*
Error: MSG_ErrorReport	TMDD
dlResponsePlanUpdate (New)	**PATH**
Input: MSG_ResponsePlanUpdate	PATH
Dataframe: ResponsePlanUpdate	*PATH*
Output: MSG_ConfirmationReceipt	TMDD
Error: MSG_ErrorReport	TMDD
dlRouteInventoryRequest	
Input: MSG_RouteInventoryRequest	PATH
Output: MSG_RouteInventory	TMDD
Error: MSG_ErrorReport	TMDD
dlRouteInventoryUpdate	
Input: MSG_RouteInventoryUpdate	PATH
Output: MSG_ConfirmationReceipt	TMDD
Error: MSG_ErrorReport	TMDD
dlRouteStatusRequest	
Input: MSG_RouteStatusRequest	PATH
Output: MSG_RouteStatus	TMDD
Error: MSG_ErrorReport	TMDD
dlRouteStatusUpdate	
Input: MSG_RouteStatusUpdate	PATH
Output: MSG_ConfirmationReceipt	TMDD
Error: MSG_ErrorReport	TMDD
dlSectionControlRequest	
Input: MSG_SectionControlRequest	TMDD
Output: MSG_SectionControlResponse	TMDD
Error: MSG_ErrorReport	TMDD
dlSectionControlScheduleRequest	
Input: MSG_SectionControlScheduleRequest	PATH
Output: MSG_SectionControlScheduleResponse	TMDD
Error: MSG_ErrorReport	TMDD
dlSectionControlScheduleUpdate	
Input: MSG_SectionControlScheduleUpdate	PATH
Output: MSG_ConfirmationReceipt	TMDD
Error: MSG_ErrorReport	TMDD
dlSectionControlStatusRequest	
Input: MSG_SectionControlStatusRequest	TMDD
Output: MSG_SectionControlResponse	TMDD
Error: MSG_ErrorReport	TMDD

Dialog and Message Names	Defined By
dlSectionPriorityQueueRequest	
Input: MSG_SectionPriorityQueueRequest	PATH
Output: MSG_SectionPriorityQueue	TMDD
Error: MSG_ErrorReport	TMDD
dlSectionSignalTimingPatternInventoryRequest	
Input: MSG_SectionSignalTimingPatternInventoryRequest	TMDD
Output: MSG_SectionSignalTimingPatternInventory	TMDD
Error: MSG_ErrorReport	TMDD
dlSectionSignalTimingPatternInventorySubscription	
Input: MSG_SectionSignalTimingPatternInventorySubscription	PATH
Output: MSG_ConfirmationReceipt	TMDD
Error: MSG_ErrorReport	TMDD
dlSectionSignalTimingPatternInventoryUpdate	
Input: MSG_SectionSignalTimingPatternInventoryUpdate	PATH
Output: MSG_ConfirmationReceipt	TMDD
Error: MSG_ErrorReport	TMDD
dlSectionStatusRequest	
Input: MSG_SectionStatusRequest	PATH
Output: MSG_SectionStatus	TMDD
Error: MSG_ErrorReport	TMDD
dlSectionStatusUpdate	
Input: MSG_SectionStatusUpdate	PATH
Output: MSG_ConfirmationReceipt	TMDD
Error: MSG_ErrorReport	TMDD
dlTrafficNetworkInformationSubscription	
Input: MSG_TrafficNetworkStatusSubscription	PATH
Output: MSG_ConfirmationReceipt	TMDD
Error: MSG_ErrorReport	TMDD
dlVideoSwitchInventoryRequest	
Input: MSG_VideoSwitchInventoryRequest	PATH
Output: MSG_VideoSwitchInventory	TMDD
Error: MSG_ErrorReport	TMDD
dlVideoSwitchInventoryUpdate	
Input: MSG_VideoSwitchInventoryUpdate	PATH
Output: MSG_ConfirmationReceipt	TMDD
Error: MSG_ErrorReport	TMDD
dlVideoSwitchStatusRequest	
Input: MSG_VideoSwitchStatusRequest	PATH
Output: MSG_VideoSwitchStatus	TMDD
Error: MSG_ErrorReport	TMDD
dlVideoSwitchStatusUpdate	
Input: MSG_VideoSwitchStatusUpdate	PATH
Output: MSG_ConfirmationReceipt	TMDD
Error: MSG_ErrorReport	TMDD