Next Generation Traffic Management Data Dictionary Volume II – Design Document

Proposed Recommended Standard
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The project team responsible for the development of this document included the following companies:

- Consensus Systems Technologies
- Gurus Infotech Inc

ngTMDD Committee Members

At the time that this document was prepared, the following individuals were members of the ngTMDD Steering Committee:

Alan Benson (Co-Chair), Caltrans
Neil Boudreau, Massachusetts DOT
Joe Gorman, Michigan DOT
Russell Holt, Rhode Island DOT
Tony Leingang, Washington DOT
Fausto Rodriguez, Connecticut DOT
Shane Zumpf (Co-Chair), TriHydro
Anthony Patire, UC Berkeley
Robert Rausch, TransCore
Kristin Virshbo, Castle Rock
Israel Lopez, Skyline Technoligies
Glenn Massarano, Yunex Traffic

Additional Contributors and Reviewers

In addition to the TMDD Steering Committee, many others contributed to the development of this standard, and their input and assistance were critical to the final product. The following list includes those volunteers and others who gave their time to help the consultant and the committee ensure that the resulting standard met their needs. In addition to this arena, the new version of the TMDD has been expanded to support exchanges regarding roadway weather and archived data user services.

Finally, the committee acknowledges the assistance and input provided by the USDOT Turner Fairbank Highway Research Center by Deborah Curtis and the guidance and assistance received from FHWA Intelligent Transportation Systems Joint Program Office, Architecture, and Standards Program Robert Sheehan.

The following is an additional list of those who volunteered their time and travel to contribute to the input and review during the development of this standard:

Contributor			Affiliation
No	**First Name**	**Last Name**	
1	Ashraf	Ahmed	Institute of Transportation Engineers (ITE)
2	Bruce	Eisenhart	Consensus Systems Technologies
3	Siva	Narla	Institute of Transportation Engineers (ITE)
4	Mike	Winters	JTI Traffic
5	Adam	Carreon	Arizona DOT
6	Thomas	Batz	Info Sense Global
7	Bryan	Kruger	Synesis Partners
8	David E	Fosbroke	CDC
9	Justin	Anderson	FHWA
10	Ross	Sheckler	Icone Products
11	Walter	Crear	TransCore
12	Molly	Behan	Volpe
13	Manny	Insignares	Consensus Systems Technologies
14	Justin	Blackmon	Castle Rock
15	AJ	Lahiri	Consensus Systems Technologies
16	Zorica	Cvijovic	Trihydro Corporation
17	Elise	Feldpausch	Michigan DOT
18	Robert	White	Nashville DOT
19	David	Craig	General Motors
20	Adam	Kovar	Icone Products
21	Aaron	Cherney	Synesis partners
22	Alexander	Lemka	Maricopa County
23	Christopher	Poe	Kittelson & Associates
24	David	Blackstone	Woolpert
25	Edward	Alegre	LA Metro
26	Todd	Foster	Ver-Mac
27	AJ	Skillern	Southwest Research Institute (SWRI)
28	Dave	Miller	Yunex Traffic
29	Tony	Leingang	Washington DOT
30	Guojian (Jay)	Lin	California DOT
31	Brandon	Patocka	City of Omaha
32	Kingsley	Azubike	FHWA
33	Niloo	Parvinashtiani	Iteris
34	Eliseo	Gutierrez	Michigan DOT
35	Kellen	Shain	Noblis
36	Jim	Williams	Inrix

Contributor			Affiliation
No	**First Name**	**Last Name**	
37	Stephen	Mensah	Stantec
38	Kali	Fogel	LA Metro
39	Lou	Yingyan	Leidos
40	Jane D	Witherell	Connecticut DOT
41	Joseph	Kuenzi	Oregon DOT
42	Alan	Clelland	DKS Associates
43	Steve	Dellenback	Southwest Research Institute (SWRI)
44	Robert	Sheehan	FHWA ITS JPO
45	Kelvin	Daratha	Washington DOT
46	Doug	Benison	Consensus Systems Technologies
47	Nu	Rosenbohm	Consensus Systems Technologies
48	Purnachandra	Nimmagadda	Gurus Infotech Inc
49	Ajay	Chintamaneni	Gurus Infotech Inc
50	Uma Mahesh	Madineni	Gurus Infotech Inc
51	Poorna Chandra	Methuku	Gurus Infotech Inc
53	Qassim	Abdullah	Woolpert
55	Matthew	Miller	IOWA DOT
56	Sudhakar	Nallamothu	FHWA
57	Curtis	Hay	General Motors
58	Ahnaf	Morshed	AASHTO
60	Brenda	Boyce	Booz Allen
61	Mohamadreza	Haghani	Leidos
62	Mae Margarette	Fromm	Leidos
63	Neil E	Boudreau	Massachusetts DOT
64	Mike	Winters	JTI Traffic
65	Clay	Packard	Florida DOT
66	Jim	Marousek	BAH
67	Mohammed	Zaatari	Noblis
68	Kristin	Virshbo	Castle Rock ITS
69	Lawrence	Dwyer	AASHTO
70	Tony	Leingang	Washington DOT
71	Steven	Johnson	HDR Inc
72	Tony	English	Neaera Consulting
74	Darryl	Keeton	Sensagrate
75	Mick	Cseke	Arcadis
76	Benjamin	Acimovic	Colorado DOT
77	Abby B	Smith	Oregon DOT
78	Wolfgang	Buckel	Yunex Traffic

Contributor			Affiliation
No	First Name	Last Name	
79	Rachel	Jones	The Road Commission for Oakland County, MI (RCOC)
80	Eli	Sherer	GEWI
81	Scott	Heydt	Horizon Signal
82	Joshua	Hudson	Washington DOT
84	Mike	Mercer	Noblis
85	Lauren	Cordova	Panasonic
86	Kevin	Drummond	SWARCO
87	Mark	Pittman	Bentley Systems
88	Nisar	Ahmed	Bay Area Metro
89	Michael	Schnuerle	Open Mobility Foundation
90	Jacob	Brady	Arcadis
91	Molly	Behan	US DOT (Volpe Center)
92	Jingwei	Xu	Here Technologies
94	Lee T	Mixon	Mixon Hill
95	David E.	Fosbroke	(CDC/NIOSH/DSR/SFIB)
96	Serge	Beaudry	Ver-Mac

Foreword

This Next Generation Traffic Management Data Dictionary (ngTMDD) was developed by engaging with stakeholders representing the industry at large including but not limited to infrastructure owners/operators, systems integrators, data producers, and the end users of data and services. The work was supported by the United States Department of Transportation (USDOT) Intelligent Transportation Systems (ITS) Joint Program Office (JPO). Several associations such as the American Association of State Highway Transportation Officials (AASHTO), the Institute of Transportation Engineers (ITE), the National Electrical Manufacturers Associations (NEMA), and SAE International were involved in ensuring effective stakeholder representation and adherence to standards development processes as Standards Development Organizations (SDOs).

This ngTMDD standard was developed following a Systems Engineering process and includes a Needs to Requirements Traceability Matrix (NRTM) and a Requirements Traceability Matrix (RTM). Users of this ngTMDD standard should use the NRTM and RTM to determine how to design a C2C Interface that satisfies their specific needs.

More information on this effort can be found on the ITE Website.

The Standards Development Organizations (SDOs) supporting this standard include the following:

ITE

Siva R. K Narla
Transportation Technology
Senior Director
Institute of Transportation Engineers
1627 Eye Street, NW, Suite 600
Washington, DC 20006
Phone: 202-785-0060

AASHTO

Lawrence Dwyer
Program Director, Operations
American Association of State Highway
and Transportation Officials (AASHTO)
555 Twelve Street, NW, Suite 1000
Washington, DC 20004
Phone: 202-624-7856

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Institute of Transportation Engineers (ITE)
1627 Eye Street, NW, Suite 550
Washington, DC 20006
email: standards@ite.org

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Introduction

This publication is a major revision of TMDD V3.1, published on January 13, 2020. This update includes adding new requirements and user needs, as well as fixing several ambiguities and errors discovered while implementing the standard.

This document provides the foundation of the Center-to-Center (C2C) Concept of Operations and Requirements for Advanced Transportation Management System (ATMS). It should be noted that the ATMS is a very complex system, and many other standards are necessary for development and C2C operations. This document, however, addresses the most fundamental elements of an ATMS.

This document is intended primarily for the following audience:

- Transportation operations managers
- Transportation operations personnel
- Transportation engineers
- Transportation management procurement officers
- System integrators
- Device manufacturers

C2C communications can be used to:

- Provide event information to other centers.
- Provide traffic and travel data to other centers.
- Help coordinate operations within the defined C2C network; and
- Provide remote control of traffic control devices.

The C2C environment is operationally diverse. All systems that exchange information do not serve the same functions. Still, the Next-Generation Traffic Management Data Dictionary (ngTMDD) Standard for Center-to-Center Communications, hereafter referred to as the ngTMDD, is used for data exchanges among centers. Even systems with the same functions may not operate identically. This diversity requires both a flexible approach to the required content in each data exchange and a rigorous definition of the data being exchanged.
The C2C environment is sparsely deployed. There have been few large integrated regional deployments, so operational experience is available only from a few sites. The time to fully deploy a regional or statewide system may be lengthy, covering five years or more. The overall approach to standards needs to support the replacement of nearly all C2C software over time.

The ITS standards development process uses a system engineering process that requires a Concept of Operations (ConOps) document to define user needs. Further, the established system engineering process states that requirements must only be developed for those functions or operations for which a need has been established.

The ConOps and Requirements stage in this process is to identify and operationally describe the ways in which the system will be used. In the case of this document, this entails identifying the various ways in which those addressed above may use C2C connections to other centers to fulfill their duties. This ConOps and Requirements provide the reader with:

1. A detailed description of the scope of this standard.
2. An explanation of what operations the C2C connections provide.
3. A starting point in the procurement process and

4. An understanding of the perspective of the designers of the standard.

The ConOps and Requirements are independent of the underlying C2C protocols. The protocols are transparent to the system operators, and no references to the specific features provided by an underlying protocol are included in the ConOps.

The design stage of the systems engineering process specifies a solution based on the requirements. The design contains definitions of ngTMDD data concepts (dialogs, messages, data frames, and data elements) written in JSON schema.

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1. Document Introduction

1.1 Purpose

This document, ngTMDD Standard for "Next-Generation Traffic Management Data Dictionary Volume II: Design Content," defines the design content of the TMDD that satisfies the user needs and fulfills the functional requirements identified in Volume I. The design content of ngTMDD Volume II includes dialogs, message sets, data frames, and data elements, which are essential elements required for the interoperable exchange of information.

Using the design contents, the purpose of the ngTMDD Standard for "Traffic Management Center-to-Center Communications Volume II: Design Content" is to provide services to external centers (EC) via a communications interface.

Volume II also contains the Requirements Traceability Matrix (RTM), which has multiple purposes, including:

- specifies which optional capabilities an implementation must be supported to confirm to both the purchase specification and the TMDD standard.
- Traces the user needs and requirements defined in the standard to the content elements defined in this Volume II of the ngTMDD.

The two volumes together make up the ngTMDD Standard. Figure 1 depicts the relationship between the volumes in the document.

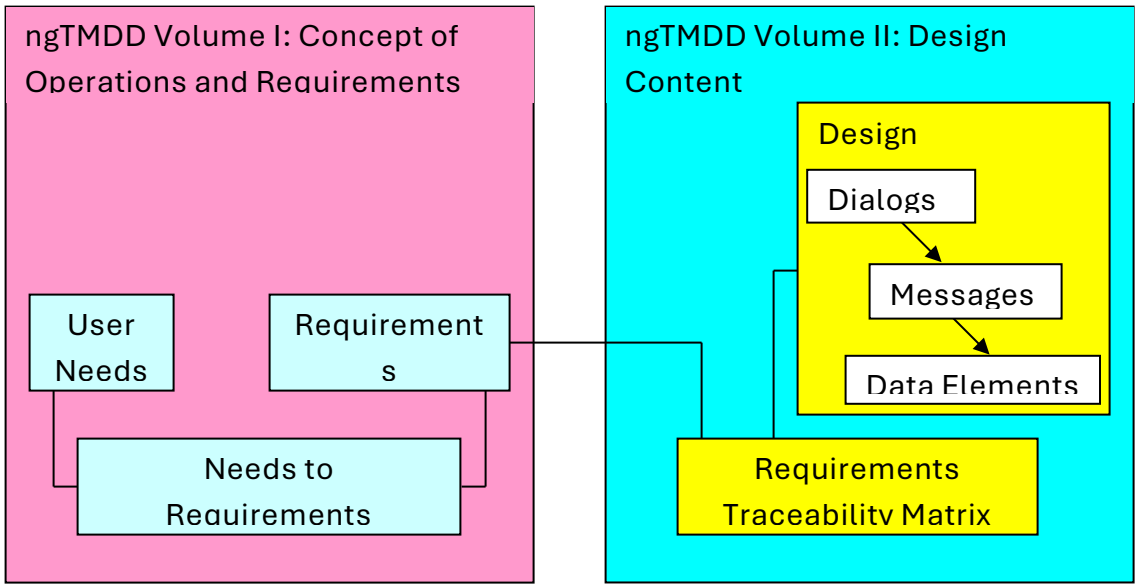

Figure 1 Relationship Between ngTMDD Volume I and Volume II

1.2 Background

The next-generation Traffic Management Data Dictionary (ngTMDD) Standard for Center-to-Center Communications is an informational level standard that is to be used to develop a standard-based system interface for information exchange between a center and other centers.

1.3 Approach

The structure of this standard, ngTMDD Version v1.0, follows a system engineering process. A systems engineering process (SEP) is a structured way of thinking about and defining a system. The systems engineering process is an iterative approach to technical management, acquisition and supply, system design, product realization, and technical evaluation at each level of the system, beginning at the top (the system level) and propagating those processes through a series of steps which eventually lead to a preferred system solution. Figure 2 shows a representation of the systems engineering process called the VEE diagram. This general process has been customized for use for this standard – it follows the process steps on the left side of the VEE indicated by the oval in Figure 2.

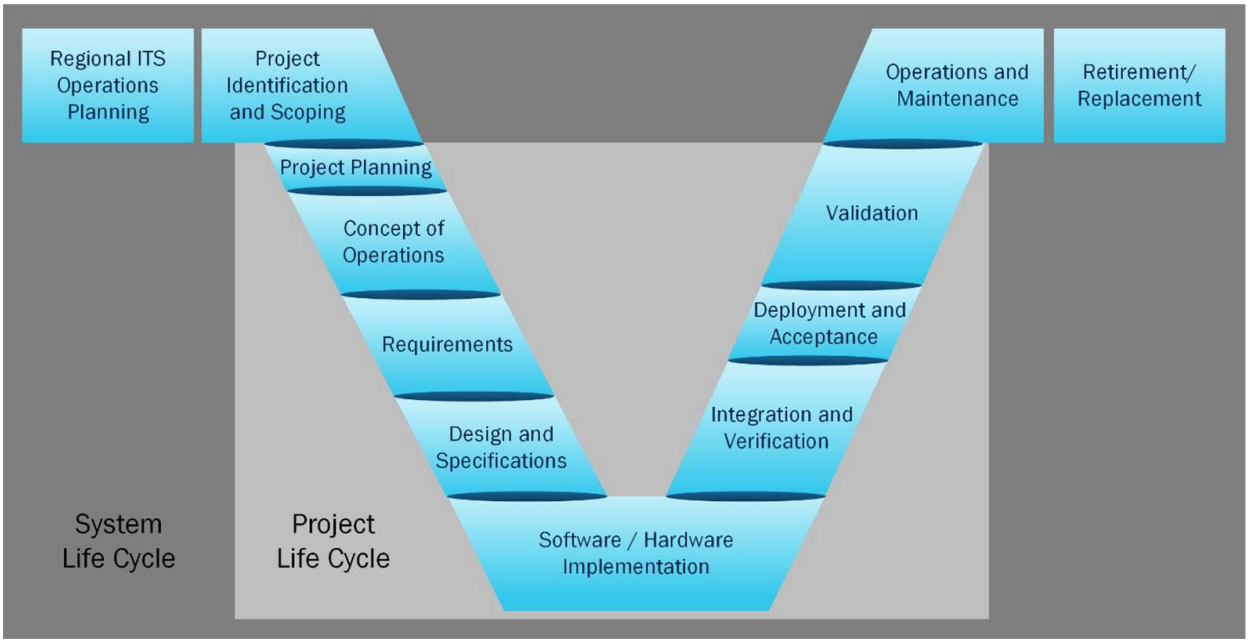

Figure 2 Systems Engineering Process "VEE" Diagram

Due to the nature of this standard, no software coding or hardware fabrication is involved in the final outputs. Nor is there testing per se. The two volumes of this ngTMDD standard focus on the concept of operations (defined by user needs), system requirements (primarily functional requirements), and design (both aspects of high-level and detailed design).

1.4 Document Purpose and Organization

The purpose of the ngTMDD Data Dictionary Volume II: Design Content document is to identify and describe the design content, in terms of dialogs, message sets, and data elements (data concepts), which satisfies the needs and fulfills the requirements for a traffic management center (TMC) to provide services to external centers (EC) via a systems interface.

These needs and requirements are identified and described in the companion volume ngTMDD Data Dictionary Volume I: Concept of Operations and Requirements. It also addresses topics surrounding the use of the standard, such as:

- Terms and Definitions.
- Acronyms.

- References.
- Conformance to the standard.
- Extensions to the standard; and
- Backward compatibility of this version of the standard with previous versions.

ngTMDD Volume II: Design Content is organized as follows.

- Section 1 of this document (Document Introduction) introduces the ngTMDD standard and describes its organization.
- Section 2 of this document (ngTMDD Interface Dialogs) identifies and describes the sequence of message exchanges needed for communications between a TMC and an EC.
- Section 3 of this document provides a highly structured definition of the ngTMDD data concepts that fulfill the ngTMDD requirements.
- Section 4 of this document is the Requirements Traceability Matrix (RTM), which provides a table documenting the data concepts that fulfill each requirement defined in Volume I.

2. ngTMDD Interface Dialogs

2.1 Normative

Section 2.1, sections 2.4 through 2.7, and sections 3.1 through 3.6 of Volume II are normative.

2.1.1 ngTMDD Electronic Design Files

The electronic design files of the ngTMDD are normative to the standard. These electronic design files contain the source design of the ngTMDD used in developing Volume II.

A description of each ngTMDD electronic design file is included below:

File	Format	Description	md5sum
ngTMDD.json	JSON Schema	Contains the JSON Schema definitions of ngTMDD messages, data frames, and data elements.	

Table 1 Normative ngTMDD Electronic Design Files

The md5sum is a checksum that an implementor may use to verify that they have acquired the same ngTMDD electronic design files as used by Volume II.

2.2 Tutorial

2.2.1 What is a Dialog?

A dialog describes a sequence of message exchanges. For example, a request-response dialog would include two messages being shared between an external center (EC) and owner center (OC) to accomplish information sharing. The first message would include the request for information, followed by a message containing the information (response). Some dialogs are simple and include one or two exchanges. In contrast, complex dialogs would include a larger number of steps and alterations of sequence steps based on some criteria (for example, special error handling).

Dialogs can be described using the Unified Modeling Language (UML) Sequence Diagrams

2.3 Generic ngTMDD Dialogs

Based on the overview presented above, ngTMDD defines several generic interface dialogs that include the following information:

- Description
- Sequence Diagram

2.3.1 Generic Request-Response Dialog

2.3.1.1 Description

The request-response dialog supports the sending of information or control messages initiated by an external center, followed by a response from the owner center upon request.

Should an error occur when creating or sending the response message from the owner center, the owner center returns an error message.

2.3.1.2 Sequence Diagram

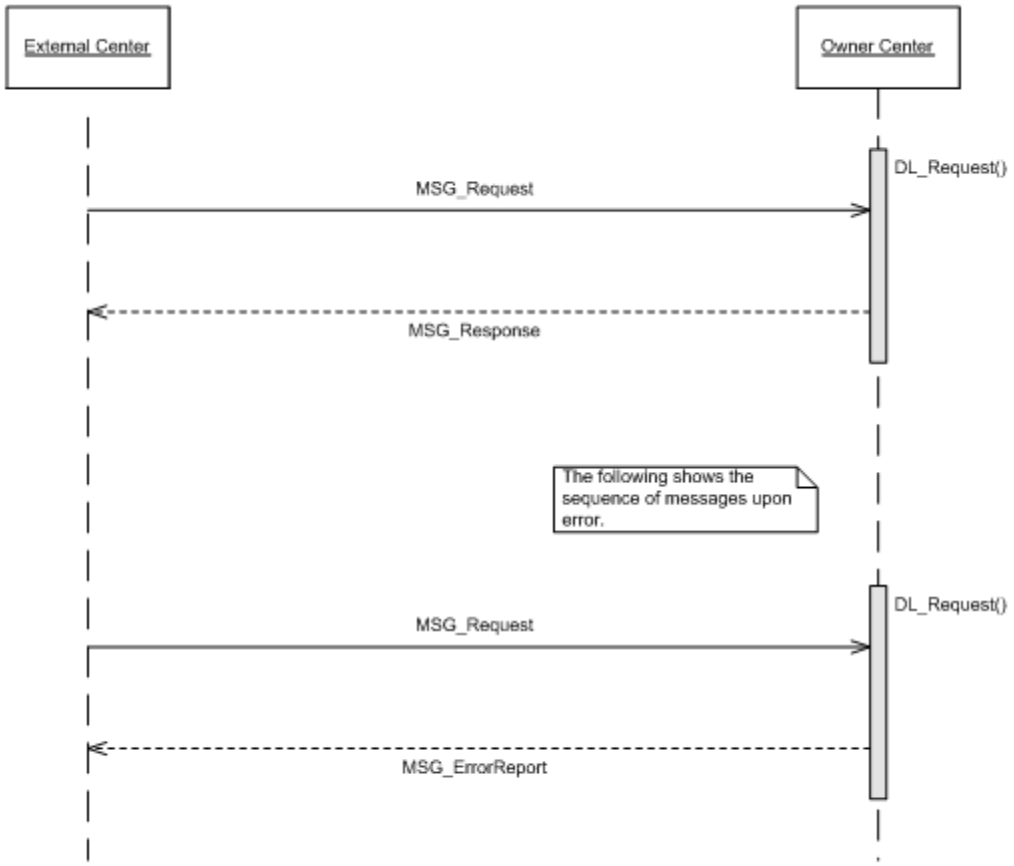

Figure 3 Generic Request-Response Dialog

2.3.2 Generic Subscription Dialog

2.3.2.1 Description

The subscription dialog, initiated by an EC and accepted by an OC, is mandatory for generating information updates from an OC to an EC. Upon subscription for information updates by an EC, the OC shall provide a confirmation receipt. Upon error, the OC shall return an error message.

To enable this mechanism, the OC will have to have published or otherwise made known to an EC what information it has available to which the EC can subscribe. An EC only needs to subscribe to the OC data it is interested in (regardless of whether these OC data are defined as mandatory or optional in the ngTMDD standard).

2.3.2.2 Sequence Diagram

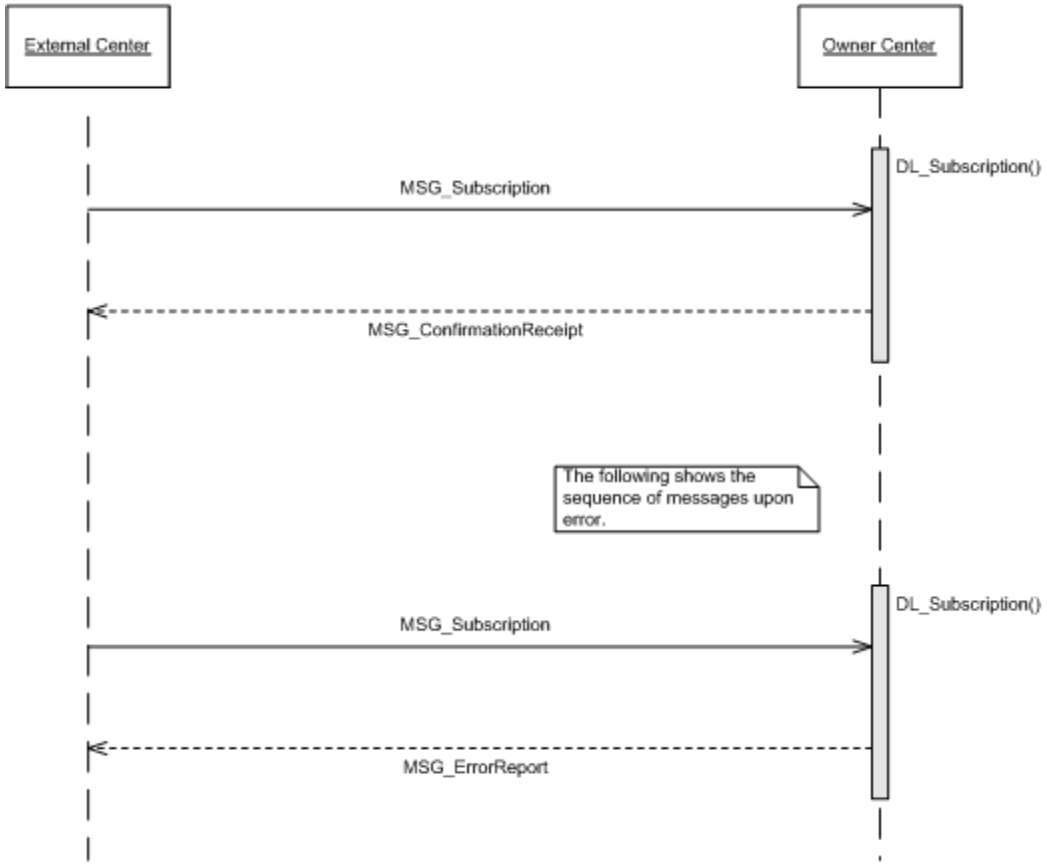

Figure 4 Generic Subscription Dialog

2.3.3 Generic Publication Update Dialog

2.3.3.1 Description

Upon acceptance of a subscription dialog, an OC shall provide information updates to an EC. Upon error, the EC shall return an error message.

To enable this mechanism, the EC will have to make known to an OC that of all the information the OC can make, it is only interested in the ones the EC has subscribed to.

2.3.3.2 Sequence Diagram

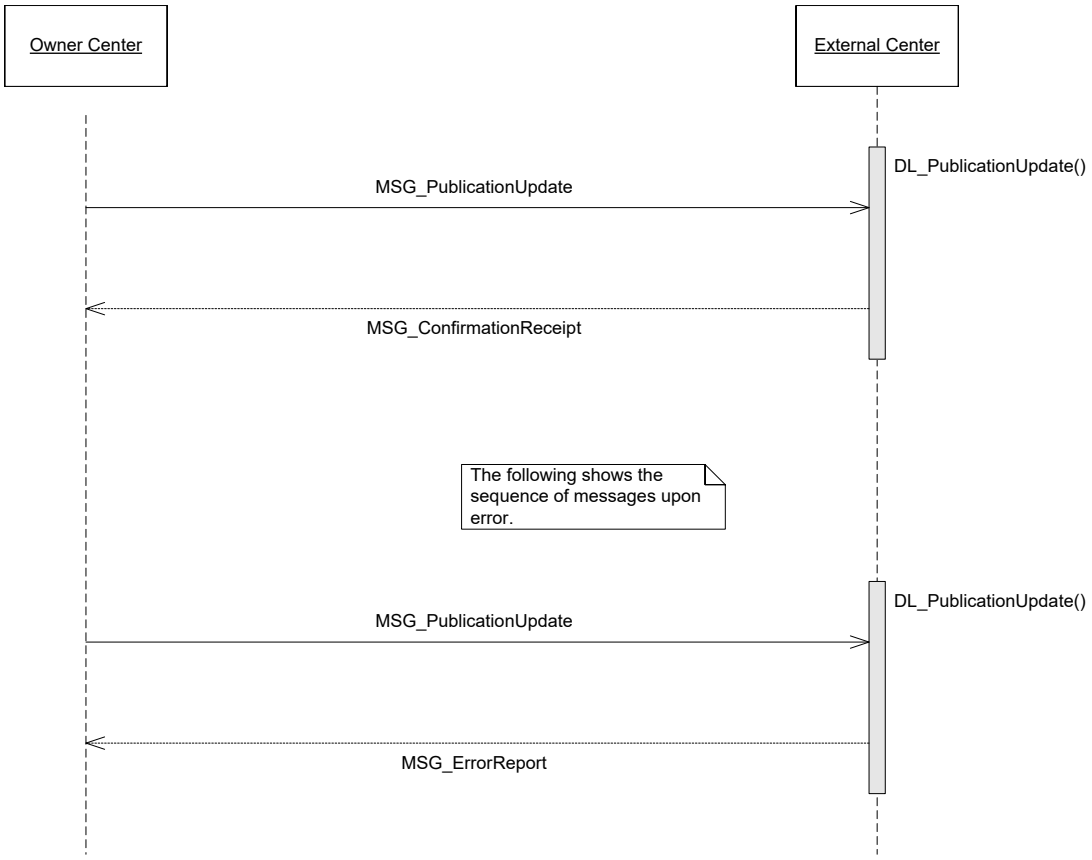

Figure 5 Generic Publication Update Dialog

3. ngTMDD JSON Data Concept Definitions

3.1 Introduction

This section defines the design definitions based on the functional requirements identified in Section 3 of the Next-Generation Traffic Management Data Dictionary Volume 1 - ConOps and Requirements document.

3.2 Architecture and Design

To define data catalog standards for ngTMDD C2C network communication, we adopted a JSON-based approach. JSON, a lightweight data-interchange format, was chosen for its human-readable and machine-readable nature, making it suitable for data exchange between different systems and organizations.

3.2.1 Technologies

- Data Modeling: A systematic process of defining the data elements, attributes, and relationships within the data catalog, which ensures data consistency and interoperability.
- JSON Schema: A formal specification for JSON that defines the structure, constraints, and semantics of JSON data. It is used to validate and generate JSON data.
- API Design: The design of APIs to facilitate data exchange between C2C network participants. RESTful API principles are used to ensure scalability and flexibility.

3.2.2 Key Design Considerations

- Data Element Standardization: Define a common set of data elements and their corresponding data types to ensure consistent data interpretation across different systems.
- Data Quality: Establish data quality standards to maintain data accuracy, completeness, and timeliness.
- Security: Implement security measures to protect sensitive data using authentication mechanisms.
- Interoperability: Design the data catalog to be interoperable with various systems and platforms.
- Scalability: The design should be scalable to accommodate future growth and increasing data volumes.

3.3 DETAILED DESIGN DEFINITIONS

3.3.1 Connection Management

The requirements to manage the interface connections between centers are as follows:

3.3.1.1 Exchange Center Connection Information

Each center that is part of the C2C network supports the exchange of center information with the following requirements.

3.3.1.1.1 Send Center Connection Information Upon Request

An owner center shall respond to an authorized external center requesting center connection information from the owner center with a message containing the owner center's connection information.

3.3.1.1.2 Publish Center Connection Information

This section describes the design for how an owner center publishes a message to all authorized subscribing external centers using the schema structure defined in annexure A.2 of this document.

3.3.1.1.3 Subscribe to Center Connection Information

This section describes the design for how external centers receives a published message by an owner center using the schema structure defined in annexure A.3 of this document.

3.3.1.1.4 CenterConnectionRequest


```
{
   "description": "Send a center connection information request to an owner center",
   "type": "object",
   "$reqId": "3.3.1.1.4",
   "properties": {
      "externalOrganizationId": {
         "$reqId": "3.3.1.1.4.1",
         "description": "Include requesting organization information in the center connection information request",
         "type": "string"
      }
   },
   "required": [
      "externalOrganizationId"
   ]
}
```

3.3.1.1.5 CenterConnectionResponse


```
{
   "description": "Send center connection information to external centers",
   "type": "object",
   "$reqId": "3.3.1.1.5",
   "properties": {
      "ownerOrganizationId": {
         "$reqId": "3.3.1.1.5.1.a",
         "description": "Owner organization information details",
         "type": "string"
      },
      "centerName": {
         "$reqId": "3.3.1.1.5.1.b",
         "description": "Name assigned to the center by the owner organization",
         "type": "string"
      },
      "centerId": {
         "$reqId": "3.3.1.1.5.1.c",
         "description": "Unique identifier for the center assigned by the owner organization",
         "type": "string"
      },
      "isActive": {
         "$reqId": "3.3.1.1.5.1.d",
         "description": "Indicate active center connection status",
         "type": "boolean"
      },
      "connectionTypesSupported": {
         "$reqId": "3.3.1.1.5.1.e",
         "description": "List of connection types supported by the center",
         "type": "array",
         "items": {
            "type": "string"
         }
      },
      "informationAccessRestrictions": {
         "$reqId": "3.3.1.1.5.2.1",
         "$ref": "#/$defs/InformationRestrictions"
      },
      "versionIdentifier": {
         "$reqId": "3.3.1.1.5.2.2",
         "description": "Indicate the version of the ngTMDD data dictionary standard for system
compliance",
         "$ref": "#/$defs/VersionIdentifiers"
      },
      "rateOfCommunication": {
         "$reqId": "3.3.1.1.5.2.3",
         "description": "Provide frequency of communication updates as part of the connection",
         "type": "number"
```

```
      }
    },
    "required": [
      "ownerOrganizationId",
      "centerName",
      "centerId",
      "isActive",
      "connectionTypesSupported"
    ]
}
```

3.3.1.2 Support Request-Response

An owner center shall send a response message to an authorized external center's request message.

3.3.1.3 Support Subscription-Publication

The requirements to support subscription-publication of messages between centers are as follows:

3.3.1.3.1 Support Periodic Updates

An owner center shall send information messages at fixed time intervals to an authorized external center requesting information updates on a periodic basis.

3.3.1.3.2 Support Event-Driven Updates

An owner center shall send information messages containing updated information after an action, a change in status, or a change in the data, to an authorized external center requesting information updates on an event-driven basis.

3.3.1.4 Exchange Subscription Information

The following are requirements for exchanging information about subscriptions such as the list of available dialogs, subscription types and their behaviors.

3.3.1.4.1 Send Subscription Information Upon Request

An owner center shall respond to an authorized external center requesting information about a subscription including dialogs supported, subscription types and behaviors.

3.3.1.4.2 SubscriptionInformationRequest

```
{
  "description": "Send a subscription information request to an owner center",
  "type": "object",
  "$reqId": "3.3.1.4.2",
  "properties": {
    "externalOrganizationId": {
      "$reqId": "3.3.1.4.2.1",
```

```
        "description": "Include requesting organization information in the subscription information request from external center to owner center",
        "type": "string"
      }
    },
    "required": [
      "externalOrganizationId"
    ]
}
```


3.3.1.4.3 SubscriptionInformationResponse


```
{
    "description": "Send subscription information to external centers",
    "type": "object",
    "$reqId": "3.3.1.4.3",
    "properties": {
      "ownerOrganizationId": {
        "$reqId": "3.3.1.4.3.1.a",
        "description": "Information regarding the owner organization",
        "type": "string"
      },
      "centerName": {
        "$reqId": "3.3.1.4.3.1.b",
        "description": "Center name assigned by the owner organization",
        "type": "string"
      },
      "dialogName": {
        "$reqId": "3.3.1.4.3.1.c",
        "description": "Name of the dialog",
        "$ref": "#/$defs/DialogNames"
      },
      "subscriptionTypes": {
        "$reqId": "3.3.1.4.3.1.d",
        "description": "Supported subscription types including one-time, periodic, and on-change.",
        "$ref": "#/$defs/SubscriptionTypes"
      },
      "supportedDataTypes": {
        "$reqId": "3.3.1.4.3.1.e",
        "description": "Support single device dialog for data interchange in generic subscriptions",
        "type": "array",
        "items": {
          "type": "string"
        }
      },
      "inventoryDialogFull": {
        "$reqId": "3.3.1.4.3.2.a",
        "description": "Inventory dialog for full inventory list support within subscriptions",
        "type": "string"
```

```
        },
        "inventoryDialogIncremental": {
            "$reqId": "3.3.1.4.3.2.b",
            "description": "Support an inventory dialog with CRUD actions in incremental inventory list for
subscriptions; if not supported, full inventory list must be used.",
            "type": "string"
        },
        "periodicity": {
            "$reqId": "3.3.1.4.3.2.c",
            "description": "Supported periodic subscription and polling intervals for field elements",
            "type": "string"
        },
        "changeTriggerFields": {
            "$reqId": "3.3.1.4.3.2.d",
            "description": "Change trigger fields for on-change subscriptions",
            "type": "array",
            "items": {
                "type": "string"
            }
        },
        "devicesSupported": {
            "$reqId": "3.3.1.4.3.2.e",
            "description": "Limitations on the number of supported devices",
            "type": "number"
        }
    },
    "required": [
        "ownerOrganizationId",
        "centerName",
        "dialogName",
        "subscriptionTypes",
        "supportedDataTypes",
        "inventoryDialogFull",
        "inventoryDialogIncremental",
        "periodicity",
        "changeTriggerFields",
        "devicesSupported"
    ]
}
```

3.3.1.5 Exchange List of Currently Active Subscriptions

The following are requirements for exchanging information about currently active subscriptions.

3.3.1.5.1 Send List of Currently Active Subscriptions Upon Request

Acenter shall respond to an authorized center requesting a list of currently active subscriptions with the requesting center providing a list of active subscriptions. The list shall include subscriptions sending data as well as those receiving data.

3.3.1.5.2 Publish List of Currently Active Subscriptions

This section describes the design for how an owner center publishes a message to all authorized subscribing external centers using the schema structure defined in annexure A.2 of this document.

3.3.1.5.3 Subscribe to List of Currently Active Subscriptions

This section describes the design for how external centers receives a published message by an owner center using the schema structure defined in annexure A.3 of this document.

3.3.1.5.4 CurrentlyActiveSubscriptionsRequest


```
{
  "description": "Request a list of all active subscriptions, including sending and receiving, from another center.",
  "type": "object",
  "$reqId": "3.3.1.5.4",
  "properties": {
    "organizationId": {
      "$reqId": "3.3.1.5.4.1.a",
      "description": "Information about the requesting organization",
      "type": "string"
    },
    "authentication": {
      "$reqId": "3.3.1.5.4.1.b",
      "description": "Authentication details for secure access",
      "$ref": "#/$defs/AuthHeader"
    },
    "startDate": {
      "$reqId": "3.3.1.5.4.1.c",
      "description": "Start date and time for failed subscription reporting",
      "$ref": "#/$defs/DateTime"
    }
  },
  "required": [
    "organizationId",
    "authentication",
    "startDate"
  ]
}
```

3.3.1.5.5 CurrentlyActiveSubscriptionsResponse


```
{
   "description": "Send a list of active subscriptions and failed subscriptions after initiation.",
   "type": "object",
   "$reqId": "3.3.1.5.5",
   "properties": {
      "centerName": {
         "$reqId": "3.3.1.5.5.1.a",
         "description": "Name of the center assigned by the owner organization",
         "type": "string"
      },
      "organizationId": {
         "$reqId": "3.3.1.5.5.1.b",
         "description": "Unique identifier for the center assigned by the owner organization or regional
agreement",
         "type": "string"
      },
      "activeSubscriptionSendingDataList": {
         "$reqId": "3.3.1.5.5.1.c",
         "description": "List of active subscriptions sending data to the requesting center including details
such as subscription request dialog, data update dialog, data types, subscription type, subscription
parameters, and subscription identifier.",
         "type": "array",
         "items": {
            "type": "string"
         }
      },
      "activeSubscriptionsReceivingDataList": {
         "$reqId": "3.3.1.5.5.1.d",
         "description": "List of active subscriptions receiving data from the requesting center, including
subscription request dialog, data update dialog, data types, subscription type, subscription parameter list,
and subscription identifier.",
         "type": "array",
         "items": {
            "type": "string"
         }
      },
      "subscriptionUpdateSourceEndpoint": {
         "$reqId": "3.3.1.5.5.2.1",
         "description": "Send the subscription update source endpoint to identify the source of subscription
data",
         "type": "string"
      },
      "ownerCenterSubscriptionRequestEndpoint": {
         "$reqId": "3.3.1.5.5.2.2",
         "description": "Send the subscription request endpoint to the receiving center with source
identification information",
         "type": "string"
```

```
    },
    "subscriptionUpdateTargetEndpoint": {
      "$reqId": "3.3.1.5.5.2.3",
      "description": "Send subscription update target endpoint information to receiving center",
      "type": "string"
    },
    "subscriptionName": {
      "$reqId": "3.3.1.5.5.2.4",
      "description": "Send a subscription name to the receiving center",
      "type": "string"
    },
    "subscriptionRequestReceivedDateTime": {
      "$reqId": "3.3.1.5.5.2.5",
      "description": "Send the date and time of the subscription request to the receiving center",
      "$ref": "#/$defs/DateTime"
    },
    "subscriptionFirstMessageSentDateTime": {
      "$reqId": "3.3.1.5.5.2.6",
      "description": "Send the date and time of the first subscription message to the receiving center",
      "$ref": "#/$defs/DateTime"
    },
    "mostRecentUpdateMessageSendDateTime": {
      "$reqId": "3.3.1.5.5.2.7",
      "description": "Send the date and time of the most recent subscription update to the receiving
center.",
      "$ref": "#/$defs/DateTime"
    },
    "mostRecentUpdateMessageSize": {
      "$reqId": "3.3.1.5.5.2.8",
      "description": "Send the size in bytes of the most recent subscription update",
      "type": "number"
    },
    "totalNumberMessagesSent": {
      "$reqId": "3.3.1.5.5.2.9",
      "description": "Send the total number of subscription messages within a specified time interval",
      "type": "number"
    },
    "timeIntervalTotalNumberMessagesSent": {
      "$reqId": "3.3.1.5.5.2.10",
      "description": "Send time interval for total number of subscription messages",
      "type": "number"
    },
    "listErrorsEncountered": {
      "$reqId": "3.3.1.5.5.2.11",
      "description": "Send a list of errors encountered for subscription messages within a specified time
interval",
      "type": "array",
      "items": {
```

```
            "type": "string"
          }
        },
        "timeIntervalListErrors": {
          "$reqId": "3.3.1.5.5.2.12",
          "description": "Send the time interval for the list of errors encountered to the receiving center",
          "type": "number"
        },
        "ListCurrentlyFailedSubscriptionsContent": {
          "$ref": "#/$defs/ListCurrentlyFailedSubscriptionsContent"
        }
    },
    "required": [
      "centerName",
      "organizationId",
      "activeSubscriptionSendingDataList",
      "activeSubscriptionsReceivingDataList"
    ]
}
```

3.3.1.6 Confirmation Receipts

The following are requirements for providing a confirmation of receipt of a response message during the exchange of information between centers.

3.3.1.6.1 ConfirmationReceipts

```
{
    "description": "Send a confirmation receipt for response message receipt",
    "type": "object",
    "$reqId": "3.3.1.6.1",
    "properties": {
        "organization": {
          "$reqId": "3.3.1.6.1.1.a",
          "description": "Information about the organization that operates the center",
          "$ref": "#/$defs/OrganizationInformation"
        },
        "organizationCenterName": {
          "$reqId": "3.3.1.6.1.1.b",
          "description": "Assigned name of the center by the owner organization",
          "type": "string"
        }
    },
    "required": [
        "organization",
        "organizationCenterName"
    ]
}
```

3.3.1.7 Support Error Handling Report

The following are requirements for reporting errors encountered during the exchange of information between centers.

3.3.1.8.1.1 Valid certificates

The external center shall provide a valid certificate in order to be authenticated. A valid certificate is defined as one that has Note that external center authentication and owner center authentication are two separate authentication processes. In general, they will use the same authentication method. Basic authentication should not be utilized. The authentication information is sent to establish the identity of a remote operator for the purpose of granting access to a protected service. If the owner center requires it, the external center may also provide the unique identifier of the operator making the request as part of the authentication information sent to an owner center. Most organizations have well-defined security policies and procedures covering a variety of system security issues. Some of the data and operations available via the C2C interface are quite sensitive and need to be protected against improper use. Authentication to verify the identity of a user making a request from an external center is needed as described above.

3.3.1.8.2 Operator Identifier - Requests

This operator identifier is sent if the user name and the identifier of the operator are different values.

3.3.1.8.3 Operator Identifier - Responses

The owner center shall provide the unique identifier of the owner operator who acknowledged the request message as part of the response message.

3.3.1.9 Support Restrictions on Message Content

Centers may place restrictions on the dissemination of the information provided in the messages that they send.

3.3.1.10 Security

The following are requirements for providing a secure connection for the exchange of information between centers.

3.3.1.10.1 Connection Security

Centers exchanging data shall provide connection security using Secure Socket Layer (SSL) / Transport Layer Security (TLS) Public Key Infrastructure (PKI) as the cybersecurity protocol to establish secure connections between two systems. This approach utilizes public key encryption and digital certificates to ensure the confidentiality and integrity the of data transmitted between systems. In simple terms, SSL/TLS PKI works by generating a

pair of unique keys, a public key and a private key, for each system or device. The public key is used to encrypt data before it is transmitted over the internet, while the private key is used to decrypt the data once it reaches its destination. This ensures that only authorized parties can access and read the transmitted data while in transit. In particular the SSL/TLS protocol can be used to encrypt the connection between the owning center and the externals centers.

3.3.1.10.2 Encryption

All data in transit to or from the owning center shall be encrypted through a standards-based communications medium using HTTPS, SSH, or other means that utilizes a minimum of NIST Advanced Encryption Standard (AES) 128-bit encryption

3.3.2 Provide Information on Organizations, Centers and Contacts

This section covers the topic of organizations and people that own, operate and maintain the centers in the C2C network. Maintaining relationships between said organizations and people is important in order to meet organizational and regional objectives. The administrative data, identified in these requirements, enable said C2C relationships. The requirements that support the exchange of information about organizations, centers, and the people for each organization and center in the C2C network are described below.

3.3.2.1 Send Organization Information Upon Request

An owner center shall respond to an authorized external center requesting its organization information with a message containing the owner center's organization information.

3.3.2.2 Publish Organization Information

This section describes the design for how an owner center publishes a message to all authorized subscribing external centers using the schema structure defined in annexure A.2 of this document.

3.3.2.3 Subscribe to Organization Information

This section describes the design for how external centers receives a published message by an owner center using the schema structure defined in annexure A.3 of this document.

3.3.2.4 OrganizationInformationRequest


```
{
  "description": "Send an organization information request to an owner center",
  "type": "object",
  "$reqId": "3.3.2.4",
  "properties": {
    "organizationId": {
      "$reqId": "3.3.2.4.1.a",
      "description": "Unique identifier for the requesting organization",
```

```
            "type": "string"
        },
        "organizationInformationType": {
            "$reqId": "3.3.2.4.1.b",
            "description": "Type of organization information (e.g., organization, center)",
            "$ref": "#/$defs/OrganizationTypes"
        },
        "authInformation": {
            "$reqId": "3.3.2.4.2.1",
            "description": "Requirements for authentication from external center to owner center in
organization information request",
            "$ref": "#/$defs/AuthHeader"
        },
        "ownerOrganizationId": {
            "$reqId": "3.3.2.4.2.2",
            "description": "Provide unique identifier of the organization in the information request",
            "type": "string"
        },
        "ownerCenterId": {
            "$reqId": "3.3.2.4.2.3",
            "description": "Provide unique identifier for each center in the organization information request",
            "type": "string"
        }
    },
    "required": [
        "organizationId",
        "organizationInformationType"
    ]
}
```


3.3.2.5 OrganizationInformationResponse


```
{
    "description": "Send organization information to an external center",
    "$reqId": "3.3.2.5",
    "$ref": "#/$defs/OrganizationInformation"
}
```


3.3.3 Events Information Sharing

The event information message, also known as the full event update message, is used to open, update and close events. The requirements for exchanging event information between centers are as follows:

3.3.3.1 Send Event Information Upon Request

An owner center shall respond to an authorized external center requesting event information with a message containing the owner center's event information.

3.3.3.2 Publish Event Information

This section describes the design for how an owner center publishes a message to all authorized subscribing external centers using the schema structure defined in annexure A.2 of this document.

3.3.3.3 Subscribe to Event Information

This section describes the design for how external centers receives a published message by an owner center using the schema structure defined in annexure A.3 of this document.

3.3.3.4 EventInformationRequest


```
{
  "description": "Send an event information request to an owner center",
  "type": "object",
  "$reqId": "3.3.3.4",
  "properties": {
    "organizationId": {
      "$reqId": "3.3.3.4.1.a",
      "description": "Unique identifier for the requesting organization",
      "type": "string"
    },
    "eventMsgTypeVer": {
      "$reqId": "3.3.3.4.1.b",
      "description": "Version of the event message type (ngTMDDv1)",
      "type": "string"
    },
    "eventMsgNum": {
      "$reqId": "3.3.3.4.1.c",
      "description": "Unique identifier for the event message",
      "type": "number"
    },
    "reqTimestamp": {
      "$reqId": "3.3.3.4.1.d",
      "description": "Date and time the request was sent",
      "$ref": "#/$defs/DateTime"
    },
    "reqFilterLimit": {
      "$reqId": "3.3.3.4.1.e",
      "description": "Request filter limit for specific events and response plans",
      "$ref": "#/$defs/RequestFilterLimit"
    },
    "requestHeader": {
      "$reqId": "3.3.3.4.2.1",
      "description": "Requirements for authorization information in event index request",
      "$ref": "#/$defs/AuthHeader"
    },
    "operatorId": {
```

```
            "$reqId": "3.3.3.4.2.2",
            "description": "Requirements for operator identifier from external center to owner center",
            "type": "string"
        },
        "organization": {
            "$reqId": "3.3.3.4.2.3",
            "description": "Provide organization information as part of the event information request",
            "$ref": "#/$defs/OrganizationInformation"
        }
    },
    "required": [
        "organizationId",
        "eventMsgTypeVer",
        "eventMsgNum",
        "reqTimestamp",
        "reqFilterLimit"
    ]
}
```

3.3.3.5 EventInformationResponse

```
{
    "description": "Send event information to an external center",
    "type": "object",
    "$reqId": "3.3.3.5",
    "properties": {
        "eventMessageHeader": {
            "$reqId": "3.3.3.5.1.a",
            "description": "Header information for event messages",
            "$ref": "#/$defs/EventMessageHeader"
        },
        "eventReference": {
            "$reqId": "3.3.3.5.1.b",
            "description": "Unique identifier for the event associated with the reference",
            "$ref": "#/$defs/EventReference"
        },
        "eventElementDetails": {
            "$reqId": "3.3.3.5.1.c",
            "description": "Requirements for each aspect of event information",
            "type": "array",
            "items": {
                "$ref": "#/$defs/EventElementDetails"
            }
        },
        "informationAccessRestrictions": {
            "$reqId": "3.3.3.6.1",
            "$ref": "#/$defs/InformationRestrictions"
        },
        "eventIndicator": {
```

```
            "$reqId": "3.3.3.6.2",
            "type": "array",
            "items": {
               "$ref": "#/$defs/EventIndicator"
            }
         },
         "otherReferences": {
            "$reqId": "3.3.3.6.3",
            "type": "array",
            "items": {
               "$ref": "#/$defs/OtherReferences"
            }
         },
         "eventComments": {
            "$reqId": "3.3.3.6.4",
            "$ref": "#/$defs/EventComments"
         }
      },
      "required": [
         "eventMessageHeader",
         "eventReference",
         "eventElementDetails"
      ]
}
```


3.3.3.7 Event Index

The event index message is used to determine a list of events that an owner center is currently tracking. The requirements for exchanging event index information between centers are as follows:

3.3.3.7.1 Send Event Index Information Upon Request

An owner center shall respond to an authorized external center requesting event index information with a message containing the owner center's event index information.

3.3.3.7.2 Publish Event Index Information

This section describes the design for how an owner center publishes a message to all authorized subscribing external centers using the schema structure defined in annexure A.2 of this document.

3.3.3.7.3 Subscribe to Event Index Information

This section describes the design for how external centers receives a published message by an owner center using the schema structure defined in annexure A.3 of this document.

3.3.3.7.4 EventIndexRequest


```
{
  "description": "Send an event index request to the owner center",
  "type": "object",
  "$reqId": "3.3.3.7.4",
  "properties": {
    "organizationId": {
      "$reqId": "3.3.3.7.4.1.a",
      "description": "Unique identifier for the requesting organization",
      "type": "string"
    },
    "messageTypeId": {
      "$reqId": "3.3.3.7.4.1.b",
      "$ref": "#/$defs/EventMessageTypes"
    },
    "messageTypeVersion": {
      "$reqId": "3.3.3.7.4.1.c",
      "$ref": "#/$defs/EventMessageTypeVersions"
    },
    "requestDateTime": {
      "$reqId": "3.3.3.7.4.1.d",
      "description": "Date and time the request was sent",
      "$ref": "#/$defs/DateTime"
    },
    "requestFilterLimit": {
      "$reqId": "3.3.3.7.4.1.e",
      "description": "Request filter limit for specific events and response plans based on defined IDs",
      "$ref": "#/$defs/RequestFilterLimit"
    },
    "requestHeader": {
      "$reqId": "3.3.3.7.4.2.1",
      "description": "Requirements for authorization information in the event index request",
      "$ref": "#/$defs/AuthHeader"
    },
    "operatorId": {
      "$reqId": "3.3.3.7.4.2.2",
      "description": "Provide operator information in the event index request",
      "type": "string"
    },
    "requestingOrganization": {
      "$reqId": "3.3.3.7.4.2.3",
      "description": "Provide organization information in the event index request",
      "$ref": "#/$defs/OrganizationInformation"
    }
  },
  "required": [
    "organizationId",
    "messageTypeId",
```

```
      "messageTypeVersion",
      "requestDateTime",
      "requestFilterLimit"
   ]
}
```

3.3.3.7.5 EventIndexResponse

```
{
   "description": "Send event index information to an external center",
   "type": "object",
   "$reqId": "3.3.3.7.5",
   "properties": {
      "associatedURL": {
         "$reqId": "3.3.3.7.5.1.a",
         "description": "URL associated with the entity",
         "type": "string"
      },
      "eventLastUpdated": {
         "$reqId": "3.3.3.7.5.1.b",
         "description": "Date and time of the last event update",
         "$ref": "#/$defs/DateTime"
      },
      "eventId": {
         "$reqId": "3.3.3.7.5.1.c",
         "description": "Unique identifier for the event",
         "type": "string"
      },
      "eventUpdateNumber": {
         "$reqId": "3.3.3.7.5.1.d",
         "description": "Unique identifier for event updates",
         "type": "number"
      },
      "eventStatus": {
         "$reqId": "3.3.3.7.5.1.e",
         "description": "Status of the event (updated, deleted, ended)",
         "$ref": "#/$defs/EventStatus"
      }
   },
   "required": [
      "associatedURL",
      "eventLastUpdated",
      "eventId",
      "eventUpdateNumber",
      "eventStatus"
   ]
}
```

3.3.3.8 Event Response Plan

The requirements to share one or more proposed responses to an event are provided below

3.3.3.8.1 Send Response Plan Information Upon Request

An owner center shall respond to an external center requesting a response plan for an event with a message containing any response plans defined for the event. A message with zero response plans will indicate that no appropriate response plan exists to meet the request.

3.3.3.8.2 Publish Response Plan Information

This section describes the design for how an owner center publishes a message to all authorized subscribing external centers using the schema structure defined in annexure A.2 of this document.

3.3.3.8.3 Subscribe to Response Plan Information

This section describes the design for how external centers receives a published message by an owner center using the schema structure defined in annexure A.3 of this document.

3.3.3.8.4 ResponsePlanRequest


```
{
  "description": "Send a response plan information request to an owner center",
  "type": "object",
  "$reqId": "3.3.3.8.4",
  "properties": {
    "ownerOrganization": {
      "$reqId": "3.3.3.8.4.1.a",
      "description": "Information about the owner organization",
      "$ref": "#/$defs/OrganizationInformation"
    },
    "externalOrganization": {
      "$reqId": "3.3.3.8.4.1.b",
      "description": "Details about the external organization involved",
      "$ref": "#/$defs/OrganizationInformation"
    },
    "requestId": {
      "$reqId": "3.3.3.8.4.1.c",
      "description": "Unique identifier for the request",
      "type": "string"
    },
    "requestHeader": {
      "$reqId": "3.3.3.8.4.2.1",
      "description": "Requirements for authorization information in the response plan request",
      "$ref": "#/$defs/AuthHeader"
    },
```

```
        "requestTime": {
            "$reqId": "3.3.3.8.4.2.2",
            "description": "Include the time of the response plan request in the information request",
            "$ref": "#/$defs/DateTime"
        },
        "corridorId": {
            "$reqId": "3.3.3.8.4.2.3",
            "description": "Include an identifier of the affected transportation corridor in the response plan
information request",
            "type": "string"
        },
        "ResponsePlanFilter": {
            "$reqId": "3.3.3.8.4.2.4",
            "$ref": "#/$defs/ResponsePlanFilter"
        }
    },
    "required": [
        "ownerOrganization",
        "externalOrganization",
        "requestId"
    ]
}
```

3.3.3.8.5 ResponsePlanResponse

```
{
    "description": "Contents of the Response Plan are detailed below",
    "type": "object",
    "$reqId": "3.3.3.8.5",
    "properties": {
        "responsePlanHeader": {
            "$reqId": "3.3.3.8.5.1.a",
            "description": "Header information for the response plan",
            "$ref": "#/$defs/ResponsePlanHeader"
        },
        "evaluationCycle": {
            "$reqId": "3.3.3.8.5.1.b",
            "description": "Information regarding the evaluation cycle",
            "$ref": "#/$defs/EvaluationCycle"
        },
        "responsePlanDetails": {
            "$reqId": "3.3.3.8.5.1.c",
            "description": "Details of the response plan",
            "$ref": "#/$defs/ResponsePlanDetails"
        }
    }
}
```

3.3.3.8.6 Response Plan Status

Response plans may be in different states within their lifecycle. They may be in one of the following states:

3.3.3.8.6.1 Send Response Plan Status Upon Request

An owner center shall respond to an authorized external center requesting response plan status with a message containing response plan status.

3.3.3.8.6.2 Publish Response Plan Status

This section describes the design for how an owner center publishes a message to all authorized subscribing external centers using the schema structure defined in annexure A.2 of this document.

3.3.3.8.6.3 Subscribe to Response Plan Status

This section describes the design for how external centers receives a published message by an owner center using the schema structure defined in annexure A.3 of this document.

3.3.3.8.6.4 ResponsePlanStatusRequest


```
{
  "description": "Send a response plan status information request to an owner center",
  "type": "object",
  "$reqId": "3.3.3.8.6.4",
  "properties": {
    "ownerOrganizationId": {
      "$reqId": "3.3.3.8.6.4.1.a",
      "description": "Information about the owner organization",
      "type": "string"
    },
    "externalOrganizationId": {
      "$reqId": "3.3.3.8.6.4.1.b",
      "description": "Information about external organizations",
      "type": "string"
    },
    "requestId": {
      "$reqId": "3.3.3.8.6.4.1.c",
      "description": "Unique identifier for the request",
      "type": "string"
    },
    "requestHeader": {
      "$reqId": "3.3.3.8.6.4.2.1",
      "description": "Requirements for authorization information in response plan status request",
      "$ref": "#/$defs/AuthHeader"
    },
    "requestTime": {
      "$reqId": "3.3.3.8.6.4.2.2",
      "description": "Include the time of the response plan request in the information request",
```

```
            "$ref": "#/$defs/DateTime"
        }
    },
    "required": [
        "ownerOrganizationId",
        "externalOrganizationId",
        "requestId"
    ]
}
```


3.3.3.8.6.5 ResponsePlanStatusResponse


```
{
    "description": "Send response plan status to an external center",
    "type": "object",
    "$reqId": "3.3.3.8.6.5",
    "properties": {
        "responsePlanHeader": {
            "$reqId": "3.3.3.8.6.5.1.a",
            "description": "Header for a response plan",
            "$ref": "#/$defs/ResponsePlanHeader"
        },
        "status": {
            "$reqId": "3.3.3.8.6.5.1.b",
            "$ref": "#/$defs/ResponsePlanStatusEnum"
        },
        "statusLastUpdated": {
            "$reqId": "3.3.3.8.6.5.1.c",
            "description": "Timestamp of the last status update",
            "$ref": "#/$defs/DateTime"
        }
    },
    "required": [
        "responsePlanHeader",
        "status",
        "statusLastUpdated"
    ]
}
```


3.3.3.8.7 Response Plan Approval

Response plans involving multiple centers or organizations are generally governed by an agreement between the parties which may require approval by multiple agencies, perhaps all agencies within the agreement or all agencies affected by the response plan. The details are dictated by the specifics of the agreement between the agencies. The requirements for the exchange of requests for approval and the response to those requests (either approval or disapproval) are defined below.

3.3.3.8.7.1 Send Response Plan Approval Upon Request

An owner center shall respond to an authorized external center requesting response plan approval with a message containing response plan approval information.

3.3.3.8.7.2 Publish Response Approval

This section describes the design for how an owner center publishes a message to all authorized subscribing external centers using the schema structure defined in annexure A.2 of this document.

3.3.3.8.7.3 Subscribe to Response Plan Approval

This section describes the design for how external centers receives a published message by an owner center using the schema structure defined in annexure A.3 of this document.

3.3.3.8.7.4 ResponsePlanApprovalRequest


```
{
   "description": "Details required for response plan approval request",
   "type": "object",
   "$reqId": "3.3.3.8.7.4",
   "properties": {
      "responsePlanHeader": {
         "$reqId": "3.3.3.8.7.4.a",
         "description": "Header for the response plan",
         "$ref": "#/$defs/ResponsePlanHeader"
      },
      "responsePlanRequestFilter": {
         "$reqId": "3.3.3.8.7.4.b",
         "description": "Filter for response plan request",
         "$ref": "#/$defs/ResponsePlanFilter"
      },
      "requestHeader": {
         "$reqId": "3.3.3.8.7.4.c",
         "description": "Information related to authorization details",
         "$ref": "#/$defs/AuthHeader"
      }
   }
}
```


3.3.3.8.7.5 ResponsePlanApprovalResponse


```
{
   "description": "Send response plan approval response to external center",
   "type": "object",
   "$reqId": "3.3.3.8.7.5",
   "properties": {
      "responsePlanHeader": {
         "$reqId": "3.3.3.8.7.5.1.a",
         "description": "Header for the response plan",
```

```
            "$ref": "#/$defs/ResponsePlanHeader"
        },
        "responsePlanApprovalDecision": {
            "$reqId": "3.3.3.8.7.5.1.b",
            "description": "Approval decision for a response plan",
            "$ref": "#/$defs/ResponsePlanApprovalDecision"
        }
    },
    "required": [
        "responsePlanHeader",
        "responsePlanApprovalDecision"
    ]
}
```


3.3.3.8.8 Response Plan Cancellation

3.3.3.8.8.1 Send Response Plan Cancellation Acknowledgement Upon Request

An owner center shall respond to an authorized external center requesting response plan cancellation with a message containing response plan cancellation information.

3.3.3.8.8.2 ResponsePlanCancellationRequest


```
{
    "description": "Send a request to cancel a response plan to the owner center",
    "type": "object",
    "$reqId": "3.3.3.8.8.2",
    "properties": {
        "responsePlanHeader": {
            "$reqId": "3.3.3.8.8.2.1.a",
            "description": "Header for the response plan",
            "$ref": "#/$defs/ResponsePlanHeader"
        },
        "eventId": {
            "$reqId": "3.3.3.8.8.2.1.b",
            "description": "Unique identifier for the event",
            "type": "string"
        },
        "requestHeader": {
            "$reqId": "3.3.3.8.8.2.1.c",
            "description": "Information regarding authorization for external centers",
            "$ref": "#/$defs/AuthHeader"
        },
        "responsePlans": {
            "$reqId": "3.3.3.8.8.2.2.1",
            "description": "Include a list of response plans to be terminated in the cancellation request",
            "type": "array",
            "items": {
                "type": "string"
```

```
        }
      }
    },
    "required": [
      "responsePlanHeader",
      "eventId",
      "requestHeader"
    ]
}
```

3.3.3.8.8.3 ResponsePlanCancellationResponse

```
{
    "description": "Respond to external center's request for response plan cancellation",
    "type": "object",
    "$reqId": "3.3.3.8.8.3",
    "properties": {
      "responsePlanHeader": {
        "$reqId": "3.3.3.8.8.3.1.a",
        "description": "Header information for the response plan",
        "$ref": "#/$defs/ResponsePlanHeader"
      },
      "eventId": {
        "$reqId": "3.3.3.8.8.3.1.b",
        "description": "Unique identifier for the event",
        "type": "string"
      },
      "responsePlanId": {
        "$reqId": "3.3.3.8.8.3.1.c",
        "description": "Identifier for the response plan being terminated",
        "type": "string"
      },
      "requestStatus": {
        "$reqId": "3.3.3.8.8.3.1.d",
        "description": "Status of the request regarding cancellation agreement",
        "type": "string"
      },
      "statusUpdate": {
        "$reqId": "3.3.3.8.8.3.2.1",
        "description": "Send the time of the last request status update as part of the response plan
cancellation",
        "$ref": "#/$defs/DateTime"
      },
      "cancellationPlanDetails": {
        "$reqId": "3.3.3.8.8.3.2.2",
        "description": "Send cancellation plan with sequence of actions to end response activities",
        "type": "array",
        "items": {
          "type": "string"
```

```
        }
      }
    },
    "required": [
      "responsePlanHeader",
      "eventId",
      "responsePlanId",
      "requestStatus"
    ]
}
```

3.3.3.9 Activity Logs

Activity logs are used to provide information about the actions taken as part of a response to an event, as well as providing a timeline for the event where each action log element represents a change to an event, or a free text description that describes an operator or device function that is associated with an event.

3.3.3.9.1 Send Activity Logs Upon Request

An owner center shall respond to an authorized external center requesting activity logs with a message containing the owner center's activity log information.

3.3.3.9.2 Publish Activity Log Information

This section describes the design for how an owner center publishes a message to all authorized subscribing external centers using the schema structure defined in annexure A.2 of this document.

3.3.3.9.3 Subscribe to Activity Log Information

This section describes the design for how external centers receives a published message by an owner center using the schema structure defined in annexure A.3 of this document.

3.3.3.9.4 ActivityLogRequest

```
{
    "description": "Send an activity log request to an owner center",
    "type": "object",
    "$reqId": "3.3.3.9.4",
    "properties": {
      "ownerOrganizationId": {
        "$reqId": "3.3.3.9.4.1.a",
        "description": "Information about the owner organization",
        "type": "string"
      },
      "externalOrganizationId": {
        "$reqId": "3.3.3.9.4.1.b",
        "description": "Information about external organizations",
        "type": "string"
```

```
        },
        "requestId": {
            "$reqId": "3.3.3.9.4.1.c",
            "description": "Unique identifier for the request",
            "type": "string"
        },
        "authorizationInformation": {
            "$reqId": "3.3.3.9.4.2.1",
            "description": "Requirements for authorization information in activity log request",
            "$ref": "#/$defs/AuthHeader"
        },
        "requestTime": {
            "$reqId": "3.3.3.9.4.2.2",
            "description": "Include the time of the request in the activity log request",
            "$ref": "#/$defs/DateTime"
        }
    },
    "required": [
        "ownerOrganizationId",
        "externalOrganizationId",
        "requestId"
    ]
}
```

3.3.3.9.5 ActivityLogResponse

```
{
    "description": "Send activity logs to an external center containing events and event response information.",
    "type": "object",
    "$reqId": "3.3.3.9.5",
    "properties": {
        "eventId": {
            "$reqId": "3.3.3.9.5.1.a",
            "description": "Unique identifier for the event",
            "type": "string"
        },
        "logId": {
            "$reqId": "3.3.3.9.5.1.b",
            "description": "Unique identifier for the activity log element",
            "type": "string"
        },
        "timestamp": {
            "$reqId": "3.3.3.9.5.1.c",
            "description": "Date and time identification",
            "$ref": "#/$defs/DateTime"
        },
        "activityType": {
            "$reqId": "3.3.3.9.5.1.d",
```

```
        "description": "Classification of activities such as system new, system update, system ended, user activity, and user pager activity.",
        "$ref": "#/$defs/ActivityTypes"
      },
      "changeDescription": {
        "$reqId": "3.3.3.9.5.1.e",
        "description": "Details regarding the modifications made",
        "type": "string"
      },
      "informationAccessRestrictions": {
        "$reqId": "3.3.3.9.5.2.1",
        "$ref": "#/$defs/InformationRestrictions"
      },
      "responsePlanHeader": {
        "$reqId": "3.3.3.9.5.3.1.a",
        "description": "Header for the response plan",
        "$ref": "#/$defs/ResponsePlanHeader"
      },
      "responsePlanLogDetails": {
        "$reqId": "3.3.3.9.5.3.1.b",
        "description": "List of response plan activity log details",
        "$ref": "#/$defs/ResponsePlanActivityLogContent"
      }
    },
    "required": [
      "eventId",
      "logId",
      "timestamp",
      "activityType",
      "changeDescription",
      "responsePlanHeader",
      "responsePlanLogDetails"
    ]
}
```


3.3.4 Provide Roadway Network Data

The owner center shall provide the name of the node as assigned by the owner organization as part of the node status information for each node.

3.3.4.1 Share Traffic Network Information

The requirements to exchange traffic network information between centers are as follows:

3.3.4.2 Share Node Information

The requirements to exchange node information between centers are as follows:

3.3.4.2.1 Share Node Inventory Information

The requirements to exchange node inventory information between centers are as follows:

3.3.4.2.1.1 Send Node Inventory Information Upon Request

An owner center shall respond to an authorized external center requesting node inventory with a message containing the owner center's node inventory information.

3.3.4.2.1.2 Publish Node Inventory Information

This section describes the design for how an owner center publishes a message to all authorized subscribing external centers using the schema structure defined in annexure A.2 of this document.

3.3.4.2.1.3 Subscribe to Node Inventory Information

This section describes the design for how external centers receives a published message by an owner center using the schema structure defined in annexure A.3 of this document.

3.3.4.2.1.4 NodeInventoryRequest


```
{
  "description": "Requirements for a node inventory request from an external center to an owner center",
  "$reqId": "3.3.4.2.1.4",
  "properties": {
    "trafficNetworkInformationRequest": {
      "allOf": [
        {
          "$ref": "#/$defs/TrafficNetworkInformationRequest"
        },
        {
          "type": "object",
          "properties": {
            "networkInformationType": {
              "const": "node inventory"
            }
          }
        }
      ]
    }
  },
  "required": [
    "trafficNetworkInformationRequest"
  ]
}
```


3.3.4.2.1.5 NodeInventoryInformationResponse


```
{
  "description": "Send node inventory information to an external center",
  "type": "object",
```

```
  "$reqId": "3.3.4.2.1.5",
  "properties": {
    "ownerOrganization": {
      "$reqId": "3.3.4.2.1.5.1.a",
      "description": "Information regarding the owner organization",
      "$ref": "#/$defs/OrganizationInformation"
    },
    "roadwayNetworkId": {
      "$reqId": "3.3.4.2.1.5.1.b",
      "description": "Unique identifier for the roadway network",
      "type": "string"
    },
    "nodes": {
      "$reqId": "3.3.4.2.1.5.1.c",
      "description": "Unique identifier for each node",
      "type": "array",
      "items": {
        "$ref": "#/$defs/Node"
      }
    },
    "informationAccessRestrictions": {
      "$reqId": "3.3.4.2.1.5.2.1",
      "$ref": "#/$defs/InformationRestrictions"
    }
  },
  "required": [
    "ownerOrganization",
    "roadwayNetworkId",
    "nodes"
  ]
}
```


3.3.4.2.2 Share Node Status Information

The requirements to exchange node status information between centers are as follows:

3.3.4.2.2.1 Send Node Status Information Upon Request

An owner center shall respond to an authorized external center requesting node status with a message containing the owner center's node status information.

3.3.4.2.2.2 Publish Node Status Information

This section describes the design for how an owner center publishes a message to all authorized subscribing external centers using the schema structure defined in annexure A.2 of this document.

3.3.4.2.2.3 Subscribe to Node Status Information

This section describes the design for how external centers receives a published message by an owner center using the schema structure defined in annexure A.3 of this document.

3.3.4.2.2.4 NodeStatusRequest


```
{
  "description": "Requirements for node status request from external center to owner center",
  "$reqId": "3.3.4.2.2.4",
  "properties": {
    "trafficNetworkInformationRequest": {
      "allOf": [
        {
          "$ref": "#/$defs/TrafficNetworkInformationRequest"
        },
        {
          "type": "object",
          "properties": {
            "networkInformationType": {
              "const": "node status"
            }
          }
        }
      ]
    }
  },
  "required": [
    "trafficNetworkInformationRequest"
  ]
}
```


3.3.4.2.2.5 NodeStatusResponse


```
{
  "description": "Send node status information to an external center",
  "type": "object",
  "$reqId": "3.3.4.2.2.5",
  "properties": {
    "ownerOrganization": {
      "$reqId": "3.3.4.2.2.5.1.a",
      "description": "Information about the owner organization",
      "$ref": "#/$defs/OrganizationInformation"
    },
    "roadwayNetworkId": {
      "$reqId": "3.3.4.2.2.5.1.b",
      "description": "Unique identifier for the roadway network",
      "type": "string"
    },
    "nodesStatus": {
      "$reqId": "3.3.4.2.2.5.1.c",
```

```
            "description": "Unique identifier for each requested node",
            "type": "array",
            "items": {
               "$ref": "#/$defs/NodeStatus"
            }
         },
         "informationAccessRestrictions": {
            "$reqId": "3.3.4.2.2.5.2.1",
            "$ref": "#/$defs/InformationRestrictions"
         }
      },
      "required": [
         "roadwayNetworkId",
         "nodesStatus"
      ]
}
```

3.3.4.3 Share Link Information

The requirements to exchange link information between centers are as follows:

3.3.4.3.1 Share Link Inventory Information

The requirements to exchange link inventory information between centers are as follows:

3.3.4.3.1.1 Send Link Inventory Information Upon Request

An owner center shall respond to an authorized external center requesting link inventory with a message containing the owner center's link inventory information.

3.3.4.3.1.2 Publish Link Inventory Information

This section describes the design for how an owner center publishes a message to all authorized subscribing external centers using the schema structure defined in annexure A.2 of this document.

3.3.4.3.1.3 Subscribe to Link Inventory Information

This section describes the design for how external centers receives a published message by an owner center using the schema structure defined in annexure A.3 of this document.

3.3.4.3.1.4 LinkInventoryRequest

```
{
   "description": "Requirements for link inventory request are detailed in Section 3.3.4.1.1.",
   "$reqId": "3.3.4.3.1.4",
   "properties": {
      "trafficNetworkInformationRequest": {
         "allOf": [
            {
               "$ref": "#/$defs/TrafficNetworkInformationRequest"
            },
```

```
            {
               "type": "object",
               "properties": {
                  "networkInformationType": {
                     "const": "link inventory"
                  }
               }
            }
         ]
      }
   },
   "required": [
      "trafficNetworkInformationRequest"
   ]
}
```

3.3.4.3.1.5 LinkInventoryResponse

```
{
   "description": "Send link inventory information to an external center",
   "type": "object",
   "$reqId": "3.3.4.3.1.5",
   "properties": {
      "ownerOrganization": {
         "$reqId": "3.3.4.3.1.5.1.a",
         "description": "Information about the owner organization",
         "$ref": "#/$defs/OrganizationInformation"
      },
      "rodwayNetworkId": {
         "$reqId": "3.3.4.3.1.5.1.b",
         "description": "Unique identifier for the roadway network",
         "type": "string"
      },
      "links": {
         "$reqId": "3.3.4.3.1.5.1.c",
         "description": "Unique identifier for each link",
         "type": "array",
         "items": {
            "$ref": "#/$defs/Link"
         }
      },
      "informationAccessRestrictions": {
         "$reqId": "3.3.4.3.1.5.2.1",
         "$ref": "#/$defs/InformationRestrictions"
      }
   },
   "required": [
      "ownerOrganization",
      "rodwayNetworkId",
```

```
      "links"
    ]
}
```

3.3.4.3.2 Share Link Status Information

The requirements to exchange link status information between centers are as follows:

3.3.4.3.2.1 Send Link Status Information Upon Request

An owner center shall respond to an authorized external center requesting link status with a message containing the owner center's link status information.

3.3.4.3.2.2 Publish Link Status Information

This section describes the design for how an owner center publishes a message to all authorized subscribing external centers using the schema structure defined in annexure A.2 of this document.

3.3.4.3.2.3 Subscribe to Link Status Information

This section describes the design for how external centers receives a published message by an owner center using the schema structure defined in annexure A.3 of this document.

3.3.4.3.2.4 LinkStatusRequest

```
{
   "description": "Requirements for a link status request from an external center",
   "$reqId": "3.3.4.3.2.4",
   "properties": {
      "trafficNetworkInformationRequest": {
         "allOf": [
            {
               "$ref": "#/$defs/TrafficNetworkInformationRequest"
            },
            {
               "type": "object",
               "properties": {
                  "networkInformationType": {
                     "const": "link status"
                  }
               }
            }
         ]
      }
   },
   "required": [
      "trafficNetworkInformationRequest"
   ]
}
```

3.3.4.3.2.5 LinkStatusResponse


```
{
   "description": "Send link status information to an external center",
   "type": "object",
   "$reqId": "3.3.4.3.2.5",
   "properties": {
      "ownerOrganization": {
         "$reqId": "3.3.4.3.2.5.1.a",
         "description": "Information regarding the owner organization",
         "$ref": "#/$defs/OrganizationInformation"
      },
      "roadwayNetworkId": {
         "$reqId": "3.3.4.3.2.5.1.b",
         "description": "Unique identifier for the roadway network",
         "type": "string"
      },
      "linkStatus": {
         "$reqId": "3.3.4.3.2.5.1.c",
         "description": "Unique identifier for each requested link",
         "type": "array",
         "items": {
            "$ref": "#/$defs/LinkStatus"
         }
      },
      "informationAccessRestrictions": {
         "$reqId": "3.3.4.3.2.5.2.1",
         "$ref": "#/$defs/InformationRestrictions"
      }
   },
   "required": [
      "ownerOrganization",
      "roadwayNetworkId",
      "linkStatus"
   ]
}
```


3.3.4.4 Share Route Information

The requirements to exchange route information between centers are as follows:

3.3.4.4.1 Share Route Inventory Information

The requirements to exchange route inventory information between centers are as follows:

3.3.4.4.1.1 Send Route Inventory Information Upon Request

An owner center shall respond to an authorized external center requesting route inventory with a message containing the owner center's route inventory information.

3.3.4.4.1.2 Publish Route Inventory Information

This section describes the design for how an owner center publishes a message to all authorized subscribing external centers using the schema structure defined in annexure A.2 of this document.

3.3.4.4.1.3 Subscribe to Route Inventory Information

This section describes the design for how external centers receives a published message by an owner center using the schema structure defined in annexure A.3 of this document.

3.3.4.4.1.4 RouteInventoryRequest


```
{
  "description": "Requirements for route inventory request from external center to owner center",
  "$reqId": "3.3.4.4.1.4",
  "properties": {
    "trafficNetworkInformationRequest": {
      "allOf": [
        {
          "$ref": "#/$defs/TrafficNetworkInformationRequest"
        },
        {
          "type": "object",
          "properties": {
            "networkInformationType": {
              "const": "route inventory"
            }
          }
        }
      ]
    }
  },
  "required": [
    "trafficNetworkInformationRequest"
  ]
}
```


3.3.4.4.1.5 RouteInventoryResponse


```
{
  "description": "Send route inventory information to an external center",
  "type": "object",
  "$reqId": "3.3.4.4.1.5",
  "properties": {
    "ownerOrganization": {
      "$reqId": "3.3.4.4.1.5.1.a",
      "description": "Information regarding the owner organization",
      "$ref": "#/$defs/OrganizationInformation"
    },
    "roadwayNetworkId": {
```

```
            "$reqId": "3.3.4.4.1.5.1.b",
            "description": "Unique identifier for the roadway network",
            "type": "string"
        },
        "routes": {
            "$reqId": "3.3.4.4.1.5.1.c",
            "description": "Unique identifier for each route",
            "type": "array",
            "items": {
                "$ref": "#/$defs/Route"
            }
        },
        "informationAccessRestrictions": {
            "$reqId": "3.3.4.4.1.5.2.1",
            "$ref": "#/$defs/InformationRestrictions"
        }
    },
    "required": [
        "ownerOrganization",
        "roadwayNetworkId",
        "routes"
    ]
}
```

3.3.4.4.2 Share Route Status Information

The requirements to exchange route status information between centers are as follows:

3.3.4.4.2.1 Send Route Status Information Upon Request

An owner center shall respond to an authorized external center requesting route status with a message containing the owner center's route status information.

3.3.4.4.2.2 Publish Route Status Information

This section describes the design for how an owner center publishes a message to all authorized subscribing external centers using the schema structure defined in annexure A.2 of this document.

3.3.4.4.2.3 Subscribe to Route Status Information

This section describes the design for how external centers receives a published message by an owner center using the schema structure defined in annexure A.3 of this document.

3.3.4.4.2.4 RouteStatusRequest

```
{
    "description": "Requirements for route status request from external center to owner center",
    "$reqId": "3.3.4.4.2.4",
    "properties": {
        "trafficNetworkInformationRequest": {
```

```
            "allOf": [
               {
                  "$ref": "#/$defs/TrafficNetworkInformationRequest"
               },
               {
                  "type": "object",
                  "properties": {
                     "networkInformationType": {
                        "const": "route status"
                     }
                  }
               }
            ]
         }
      },
      "required": [
         "trafficNetworkInformationRequest"
      ]
}
```

3.3.4.4.2.5 RouteStatusResponse

```
{
   "description": "Send route status information to an external center",
   "type": "object",
   "$reqId": "3.3.4.4.2.5",
   "properties": {
      "ownerOrganization": {
         "$reqId": "3.3.4.4.2.5.1.a",
         "description": "Information about the owner organization",
         "$ref": "#/$defs/OrganizationInformation"
      },
      "roadwayNetworkId": {
         "$reqId": "3.3.4.4.2.5.1.b",
         "description": "Unique identifier for the roadway network",
         "type": "string"
      },
      "routesStatus": {
         "$reqId": "3.3.4.4.2.5.1.c",
         "description": "Unique identifier for the route",
         "type": "array",
         "items": {
            "$ref": "#/$defs/RouteStatus"
         }
      },
      "informationAccessRestrictions": {
         "$reqId": "3.3.4.4.2.5.2.1",
         "$ref": "#/$defs/InformationRestrictions"
      }
```

```
  },
  "required": [
    "ownerOrganization",
    "roadwayNetworkId",
    "routesStatus"
  ]
}
```

3.3.4.5 Fleet Vehicle Data

The requirements to exchange route information between centers are as follows:

3.3.4.5.1 Share Fleet Vehicle Inventory Information

The requirements to exchange fleet vehicle inventory information between centers are as follows:

3.3.4.5.1.1 Send Fleet Vehicle Inventory Information Upon Request

An owner center shall respond to an authorized external center requesting fleet vehicle inventory with a message containing the owner center's fleet vehicle inventory information.

3.3.4.5.1.2 Publish Fleet Vehicle Inventory Information

This section describes the design for how an owner center publishes a message to all authorized subscribing external centers using the schema structure defined in annexure A.2 of this document.

3.3.4.5.1.3 Subscribe to Fleet Vehicle Inventory Information

This section describes the design for how external centers receives a published message by an owner center using the schema structure defined in annexure A.3 of this document.

3.3.4.5.1.4 FleetVehicleInventoryRequest

```
{
  "description": "Requirements for fleet vehicle inventory request from external center to owner center",
  "$reqId": "3.3.4.5.1.4",
  "properties": {
    "trafficNetworkInformationRequest": {
      "allOf": [
        {
          "$ref": "#/$defs/TrafficNetworkInformationRequest"
        },
        {
          "type": "object",
          "properties": {
            "networkInformationType": {
              "const": "fleet vehicle inventory"
            }
          }
        }
```

```
            ]
        }
    },
    "required": [
        "trafficNetworkInformationRequest"
    ]
}
```


3.3.4.5.1.5 FleetVehicleInventoryResponse


```
{
    "description": "Send fleet vehicle inventory information to an external center",
    "type": "object",
    "$reqId": "3.3.4.5.1.5",
    "properties": {
        "ownerOrganization": {
            "$reqId": "3.3.4.5.1.5.1.a",
            "description": "Information about the owner organization",
            "$ref": "#/$defs/OrganizationInformation"
        },
        "vehicleId": {
            "$reqId": "3.3.4.5.1.5.1.b",
            "description": "Unique identifier for the fleet vehicle",
            "type": "string"
        },
        "vehicleType": {
            "$reqId": "3.3.4.5.1.5.1.c",
            "description": "Classification of vehicle types such as transit, public safety, and maintenance vehicle.",
            "type": "string",
            "enum": [
                "transit",
                "publicSafety",
                "maintenanceVehicle"
            ]
        }
    },
    "required": [
        "ownerOrganization",
        "vehicleId",
        "vehicleType"
    ]
}
```


3.3.4.5.2 Share Fleet Vehicle Information

The requirements to exchange fleet vehicle information between centers are as follows:

3.3.4.5.2.1 Send Fleet Vehicle Information Upon Request

An owner center shall respond to an authorized external center requesting link status with a message containing the owner center's link status information.

3.3.4.5.2.2 Publish Fleet Vehicle Information

This section describes the design for how an owner center publishes a message to all authorized subscribing external centers using the schema structure defined in annexure A.2 of this document.

3.3.4.5.2.3 Subscribe to Fleet Vehicle Information

This section describes the design for how external centers receives a published message by an owner center using the schema structure defined in annexure A.3 of this document.

3.3.4.5.2.4 FleetVehicleRequest


```
{
  "description": "Requirements for a link status request from an external center to an owner center",
  "$reqId": "3.3.4.5.2.4",
  "properties": {
    "trafficNetworkInformationRequest": {
      "allOf": [
        {
          "$ref": "#/$defs/TrafficNetworkInformationRequest"
        },
        {
          "type": "object",
          "properties": {
            "networkInformationType": {
              "const": "fleet vehicle data"
            }
          }
        }
      ]
    }
  },
  "required": [
    "trafficNetworkInformationRequest"
  ]
}
```


3.3.4.5.2.5 FleetVehicleResponse


```
{
  "description": "Send link status information to an external center",
  "type": "object",
  "$reqId": "3.3.4.5.2.5",
  "properties": {
    "ownerOrganization": {
```

```
            "$reqId": "3.3.4.5.2.5.1.a",
            "description": "Information regarding the owner organization",
            "$ref": "#/$defs/OrganizationInformation"
        },
        "vehicleId": {
            "$reqId": "3.3.4.5.2.5.1.b",
            "description": "Unique identifier for the fleet vehicle",
            "type": "string"
        },
        "vehicleInformation": {
            "$reqId": "3.3.4.5.2.5.1.c",
            "description": "Information on location and speed of fleet vehicles",
            "$ref": "#/$defs/VehicleInformation"
        },
        "vehicleDriver": {
            "$reqId": "3.3.4.5.2.5.2.1",
            "description": "Driver for the fleet vehicle",
            "type": "string"
        },
        "vehicleOccupancy": {
            "$reqId": "3.3.4.5.2.5.2.2",
            "type": "number",
            "description": "Average percent vehicle occupancy, expressed as a percentage value with one decimal place of precision. For example, a value of 23.5 represents 23.5%.",
            "minimum": 0.0,
            "maximum": 100.0
        }
    },
    "required": [
        "ownerOrganization",
        "vehicleId",
        "vehicleInformation"
    ]
}
```


3.3.5 Provide Device Inventory, Status and Control

The requirements to exchange device information and provide device command/control capabilities between centers are as follows:

3.3.5.1 Generic Devices

This section contains requirements to share device information between centers, regardless of the device type. Additional requirements to share device information between centers specific to a device are provided in the appropriate section(s). The requirements to share device information between centers are as follows:

3.3.5.1.1 Share Device Information

The following should be considered when exchanging device information between centers: e Itis not necessary to send the device inventory when organization, center or contact information is updated, unless the unique identifier changes; and e The object IDs should be unique within the TMC but concatenating with NTCIP 1104 naming convention (use as prefixes) in a regional environment. NTCIP 1104 naming convention uses the following: country ID, state ID, agency ID, center ID, entity kind, entity type and entity instance. The requirements for a device information request are as follows:

3.3.5.1.1.4 Share Device Schedule Information

The requirements for sharing the schedule information for a device are as follows:

3.3.5.1.2 Device Change Requests

The requirements to support requests from other authorized external centers to change parameters on owner center devices are as follows:

3.3.5.1.2.3 Verify Device Change Request Status

The requirements to check the status of device change requests previously issued by an authorized external center are as follows:

3.3.5.1.2.3.1 Send Device Change Status Upon Request

An owner center shall respond to an authorized external center requesting the status of a previously issued device change request with a message containing the status of the device change request.

3.3.5.1.2.3.3 DeviceChangeStatusResponse


```
{
  "description": "Requirements for device change status response contents",
  "$reqId": "3.3.5.1.2.3.3",
  "$ref": "#/$defs/DeviceChangeResponseHeader"
}
```


3.3.5.1.2.4 Cancel External Change Requests for Devices

The requirements to cancel a device change request previously issued by an authorized external center follow.

3.3.5.1.2.4.1 Send Change Cancellation Response Upon Request

An owner center shall respond to an authorized external center requesting cancellation of a previously issued device change request with a message containing the status of the cancel device change request.

3.3.5.1.2.4.3 DeviceChangeCancellationResponse


```
{
   "description": "Requirements for the contents of the cancel device control request response are defined in the specified section.",
   "$reqId": "3.3.5.1.2.4.3",
   "$ref": "#/$defs/DeviceChangeResponseHeader"
}
```


3.3.5.1.2.5 Device Priority Queue Header Information

For devices, an owner center may receive conflicting requests from different centers, including the owner center, for control of a specific field device. The owner center may maintain a priority queue where conflicting requests are received and then implemented as higher priority requests expire or are cancelled. The requirements for sharing the contents of a device priority queue are as follows:

3.3.5.1.3 External Device Control Command Requirements

3.3.5.1.3.1 Send Device Control Command Response Upon Receipt

An owner center shall respond to an authorized external center requesting to remotely command a device with a message indicating whether the command was implemented or not.

3.3.5.1.3.2 Contents of External Device Control Command

The content for external center command of devices operated by an owner center is as follows:

3.3.5.2 Traffic Detectors

The traffic detector model used assumes that each traffic detector station may have multiple detectors or detector zones. Each detector or detector zone may be located on different links (roadway approaches) and/or each detector or detector zone may be located on different lanes. There are also instances where two detectors or detector zones are located on the same lane to form a speed trap. In these instances, the traffic detector model assumes that this speed trap is assigned its own detector identifier in addition to a detector identifier for each individual detector or detector zone. However, it is also recognized that some implementations do not “poll” traffic detector stations for status information or data, but “poll” each detector or detector zone directly. In these instances, each detector or detector zone has its own unique identifier, and are polled directly. The requirements to exchange traffic detector information and data between centers are as follows:

3.3.5.2.1 Share Detector Inventory Information

The requirements for sharing detector inventory information with other authorized centers are as follows:

3.3.5.2.1.1 Send Detector Inventory Information Upon Request

An owner center shall respond to an authorized external center requesting detector inventory with a message containing the owner center's detector inventory information.

3.3.5.2.1.2 Publish Detector Inventory Information

This section describes the design for how an owner center publishes a message to all authorized subscribing external centers using the schema structure defined in annexure A.2 of this document.

3.3.5.2.1.3 Subscribe to Detector Inventory Information

This section describes the design for how external centers receives a published message by an owner center using the schema structure defined in annexure A.3 of this document.

3.3.5.2.1.4 DetectorInventoryRequest


```
{
   "description": "Include device identifier of the detector station in the detector inventory information request",
   "type": "object",
   "$reqId": "3.3.5.2.1.4",
   "properties": {
      "deviceInformationRequest": {
         "$reqId": "3.3.5.2.1.4.a",
         "description": "Generic device information request for detector device inventory",
         "allOf": [
            {
               "$ref": "#/$defs/DeviceInformationRequest"
            },
            {
               "type": "object",
               "properties": {
                  "deviceType": {
                     "const": "detector"
                  },
                  "deviceInformationType": {
                     "const": "device inventory"
                  }
               }
            }
         ]
      }
   },
   "required": [
```

```
      "deviceInformationRequest"
   ]
}
```

3.3.5.2.1.5 DetectorInventoryResponse

```
{
   "description": "Detector inventory information for owner center to send to external center",
   "type": "object",
   "$reqId": "3.3.5.2.1.5",
   "properties": {
      "deviceInventoryHeader": {
         "$reqId": "3.3.5.2.1.5.1.a",
         "description": "Generic device inventory header information for detectors or detector zones",
         "$ref": "#/$defs/DeviceInventoryResponseHeader"
      },
      "detectorType": {
         "$reqId": "3.3.5.2.1.5.1.b",
         "description": "Type of detector or detector zone including options like inductive loop, magnetic,
magnetometers, pressure cells, microwave radar, ultrasonic, video image, laser, infrared, road tube,
probe, and Roadside Unit.",
         "$ref": "#/$defs/DetectorTypes"
      },
      "detectorStationInventoryInformation": {
         "$reqId": "3.3.5.2.1.5.2.1",
         "description": "Send generic device inventory header information for detector stations as part of
detector inventory information",
         "$ref": "#/$defs/DeviceInventoryResponseHeader"
      },
      "laneNumber": {
         "$reqId": "3.3.5.2.1.5.2.2",
         "description": "Provide a list of lane numbers monitored by each detector in the detector inventory
information",
         "type": "array",
         "items": {
            "type": "number"
         }
      },
      "speedTrapFlag": {
         "$reqId": "3.3.5.2.1.5.2.3",
         "description": "Indicate if the detector is a speed trap in the detector inventory information",
         "type": "boolean"
      },
      "vehicleBin1": {
         "$reqId": "3.3.5.2.1.5.2.4",
         "description": "Provide maximum vehicle length in centimeters for Bin 1 classification in detector
inventory information.",
         "type": "number"
      },
```

```
        "vehicleBin2": {
          "$reqId": "3.3.5.2.1.5.2.5",
          "description": "Provide maximum vehicle length for Bin 2 classification in detector inventory
information",
          "type": "number"
        },
        "vehicleBin3": {
          "$reqId": "3.3.5.2.1.5.2.6",
          "description": "Provide maximum vehicle length for Bin 3 classification in detector inventory",
          "type": "number"
        },
        "vehicleBin4": {
          "$reqId": "3.3.5.2.1.5.2.7",
          "description": "Provide maximum vehicle length for classification as Bin 4 in detector inventory
information",
          "type": "number"
        },
        "vehicleBin5": {
          "$reqId": "3.3.5.2.1.5.2.8",
          "description": "Provide the maximum vehicle length for Bin 5 classification in detector inventory
information",
          "type": "number"
        },
        "vehicleBin6": {
          "$reqId": "3.3.5.2.1.5.2.9",
          "description": "Provide maximum vehicle length in centimeters for Bin 6 classification during data
collection.",
          "type": "number"
        },
        "vehicleBin7": {
          "$reqId": "3.3.5.2.1.5.2.10",
          "description": "Provide maximum vehicle length for Bin 6 as part of detector inventory information",
          "type": "number"
        }
    },
    "required": [
        "deviceInventoryHeader",
        "detectorType"
    ]
}
```


3.3.5.2.2 Share Detector Status Information

The requirements for sharing detector status information with other authorized centers are as follows:

3.3.5.2.2.1 Send Detector Status Information Upon Request

An owner center shall respond to an authorized external center requesting detector status with a message containing the owner center's detector status information.

3.3.5.2.2.2 Publish Detector Status Information

This section describes the design for how an owner center publishes a message to all authorized subscribing external centers using the schema structure defined in annexure A.2 of this document.

3.3.5.2.2.3 Subscribe to Detector Status Information

This section describes the design for how external centers receives a published message by an owner center using the schema structure defined in annexure A.3 of this document.

3.3.5.2.2.4 DetectorStatusRequest


```
{
   "description": "Include the detector station identifier in the detector status request",
   "type": "object",
   "$reqId": "3.3.5.2.2.4",
   "properties": {
      "deviceInformationRequest": {
         "$reqId": "3.3.5.2.2.4.a",
         "description": "Request device status information for a detector type device",
         "allOf": [
            {
               "$ref": "#/$defs/DeviceInformationRequest"
            },
            {
               "type": "object",
               "properties": {
                  "deviceType": {
                     "const": "detector"
                  },
                  "deviceInformationType": {
                     "const": "device status"
                  }
               }
            }
         ]
      }
   },
   "required": [
      "deviceInformationRequest"
   ]
}
```

3.3.5.2.2.5 DetectorStatusResponse


```
{
   "description": "Detector status information for owner center to send to external center",
   "type": "object",
   "$reqId": "3.3.5.2.2.5",
   "properties": {
      "deviceStatusHeader": {
         "$reqId": "3.3.5.2.2.5.1.a",
         "description": "Generic device status header information for each detector or detector zone",
         "allOf": [
            {
               "$ref": "#/$defs/DeviceStatusHeader"
            },
            {
               "properties": {
                  "deviceStatuses": {
                     "items": {
                        "allOf": [
                           {
                              "$ref": "#/$defs/DeviceStatus"
                           },
                           {
                              "properties": {
                                 "deviceType": {
                                    "const": "detector station"
                                 }
                              }
                           }
                        ]
                     }
                  }
               }
            }
         ]
      },
      "detectorStationStatusInformation": {
         "$reqId": "3.3.5.2.2.5.2.1",
         "description": "Send generic device status header information for detector stations as part of the
detector status information.",
         "type": "string"
      },
      "laneNumberDetectorStatus": {
         "$reqId": "3.3.5.2.2.5.2.2",
         "description": "Provide lane number for each detector in status information",
         "type": "string"
      },
      "directionTravel": {
         "$reqId": "3.3.5.2.2.5.2.3",
```

```
            "description": "Provide the direction of travel for each monitored detector as part of the detector status information.",
            "$ref": "#/$defs/Directions"
        }
    },
    "required": [
        "deviceStatusHeader"
    ]
}
```

3.3.5.2.3 Share Detector Data Information

The requirements for sharing detector data information with other authorized centers are as follows:

3.3.5.2.3.1 Send Detector Data Upon Request

An owner center shall respond to an authorized external center requesting detector data with a message containing the owner center's detector data.

3.3.5.2.3.2 Publish Detector Data

This section describes the design for how an owner center publishes a message to all authorized subscribing external centers using the schema structure defined in annexure A.2 of this document.

3.3.5.2.3.3 Subscribe to Detector Data Information

This section describes the design for how external centers receives a published message by an owner center using the schema structure defined in annexure A.3 of this document.

3.3.5.2.3.4 DetectorDataRequest

```
{
    "description": "Contents of a detector data request for an external center to send to an owner center",
    "type": "object",
    "$reqId": "3.3.5.2.3.4",
    "properties": {
        "deviceInformationRequest": {
            "$reqId": "3.3.5.2.3.4.1.a",
            "description": "Generic device information request for detector device type and device data information type",
            "allOf": [
                {
                    "$ref": "#/$defs/DeviceInformationRequest"
                },
                {
                    "type": "object",
                    "properties": {
                        "deviceType": {
                            "const": "detector"
```

```
                    },
                    "deviceInformationType": {
                        "const": "device data"
                    }
                }
            }
        ]
    },
    "detectorStationId": {
        "$reqId": "3.3.5.2.3.4.2.1",
        "description": "Send unique identifier of the detector station as part of the detector data request",
        "type": "string"
    },
    "dataTypeRequest": {
        "$reqId": "3.3.5.2.3.4.2.2",
        "description": "Indicate the type of traffic data desired in the detector data request",
        "$ref": "#/$defs/TrafficDataTypes"
    }
},
"required": [
    "deviceInformationRequest"
]
}
```

3.3.5.2.3.5 DetectorDataResponse

```
{
    "description": "Detector data information for transmission from owner center to external center",
    "type": "object",
    "$reqId": "3.3.5.2.3.5",
    "properties": {
        "organizationId": {
            "$reqId": "3.3.5.2.3.5.1.a",
            "description": "Unique identifier for the owner organization",
            "type": "string"
        },
        "detectorId": {
            "$reqId": "3.3.5.2.3.5.1.b",
            "description": "Unique identifier for each detector",
            "type": "array",
            "items": {
                "type": "string"
            }
        },
        "detectorTimestamp": {
            "$reqId": "3.3.5.2.3.5.1.c",
            "description": "Timestamp for the detector data",
            "$ref": "#/$defs/DateTime"
        },
```

```
    "detectorStationDetectorData": {
      "$reqId": "3.3.5.2.3.5.2.1",
      "description": "Send unique identifier of the detector station as part of detector data information",
      "type": "string"
    },
    "vehicleCount": {
      "$reqId": "3.3.5.2.3.5.2.2",
      "description": "Provide the number of vehicles detected for each detector in the detector data
information",
      "type": "number"
    },
    "averageVehicleOccupancy": {
      "$reqId": "3.3.5.2.3.5.2.3",
      "description": "Provide average vehicle occupancy percentage as part of detector data information
for each detector.",
      "type": "number"
    },
    "dataCollectionStart": {
      "$reqId": "3.3.5.2.3.5.2.4",
      "description": "Provide the start date and time of the data collection period for each detector",
      "$ref": "#/$defs/DateTime"
    },
    "dataCollectionEnd": {
      "$reqId": "3.3.5.2.3.5.2.5",
      "description": "Provide end date and time of the data collection period for each detector in the
detector data information.",
      "$ref": "#/$defs/DateTime"
    },
    "dataType": {
      "$reqId": "3.3.5.2.3.5.2.6",
      "description": "Indicate the type of traffic data provided for each detector",
      "$ref": "#/$defs/TrafficDataTypes"
    },
    "averageVehicleSpeed": {
      "$reqId": "3.3.5.2.3.5.2.7",
      "description": "Provide average vehicle speed in kilometers per hour during data collection period
for each detector.",
      "type": "string"
    },
    "averageVehicleQueue": {
      "$reqId": "3.3.5.2.3.5.2.8",
      "description": "Provide average number of vehicles in the queue during data collection for each
detector",
      "type": "number"
    },
    "vehicleStops": {
      "$reqId": "3.3.5.2.3.5.2.9",
      "description": "Provide the number of stopped vehicles measured during the data collection period
```

```
as part of the detector data information",
            "type": "number"
        },
        "vehicleCountBin1": {
            "$reqId": "3.3.5.2.3.5.2.10",
            "description": "Provide the number of vehicles detected and classified in Bin 1 during the data
collection period as part of the detector data information.",
            "type": "number"
        },
        "vehicleCountBin2": {
            "$reqId": "3.3.5.2.3.5.2.11",
            "description": "Provide the number of vehicles detected and classified in Bin 2 based on vehicle
length during the data collection period for each detector.",
            "type": "number"
        },
        "vehicleCountBin3": {
            "$reqId": "3.3.5.2.3.5.2.12",
            "description": "Provide the number of vehicles detected and classified in Bin 3 based on vehicle
length during the data collection period as part of detector data.",
            "type": "number"
        },
        "vehicleCountBin4": {
            "$reqId": "3.3.5.2.3.5.2.13",
            "description": "Provide the number of vehicles detected and classified in Bin 4 based on vehicle
length during the data collection period as part of the detector data information.",
            "type": "number"
        },
        "vehicleCountBin5": {
            "$reqId": "3.3.5.2.3.5.2.14",
            "description": "Provide the number of vehicles detected and classified in Bin 5 based on vehicle
length during the data collection period as part of the detector data information.",
            "type": "number"
        },
        "vehicleCountBin6": {
            "$reqId": "3.3.5.2.3.5.2.15",
            "description": "Provide the number of vehicles detected and classified in Bin 6 based on vehicle
length during the data collection period as part of detector data information.",
            "type": "number"
        },
        "vehicleCountBin7": {
            "$reqId": "3.3.5.2.3.5.2.16",
            "description": "Provide the number of vehicles detected and classified in Bin 7 based on vehicle
length during the data collection period as part of detector data information.",
            "type": "number"
        },
        "vehicleCountBin8": {
            "$reqId": "3.3.5.2.3.5.2.17",
            "description": "Provide the number of vehicles detected and classified in Bin 8 based on vehicle
```

```
length during the data collection period as part of detector data information.",
            "type": "number"
        },
        "vehicleCountBin9": {
            "$reqId": "3.3.5.2.3.5.2.18",
            "description": "Provide the number of vehicles detected and classified in Bin 9 based on vehicle
length during the data collection period as part of detector data information.",
            "type": "number"
        },
        "vehicleCountBin10": {
            "$reqId": "3.3.5.2.3.5.2.19",
            "description": "Provide the number of vehicles detected and classified in Bin 10 based on vehicle
length during the data collection period as part of detector data information.",
            "type": "number"
        },
        "vehicleCountBin11": {
            "$reqId": "3.3.5.2.3.5.2.20",
            "description": "Provide the number of vehicles detected and classified in Bin 11 based on vehicle
length during the data collection period as part of detector data information.",
            "type": "number"
        },
        "vehicleCountBin12": {
            "$reqId": "3.3.5.2.3.5.2.21",
            "description": "Provide the number of vehicles detected and classified in Bin 12 based on vehicle
length during the data collection period as part of detector data information.",
            "type": "number"
        },
        "vehicleCountBin13": {
            "$reqId": "3.3.5.2.3.5.2.22",
            "description": "Provide the number of vehicles detected and classified in Bin 13 based on vehicle
length during the data collection period as part of detector data information.",
            "type": "number"
        },
        "vehicleCountBin14": {
            "$reqId": "3.3.5.2.3.5.2.23",
            "description": "Provide the number of vehicles detected and classified in Bin 14 based on vehicle
length during the data collection period as part of detector data information.",
            "type": "number"
        },
        "detectorStatus": {
            "$reqId": "3.3.5.2.3.5.2.24",
            "description": "Provide operational status of the detector in detector data information with
supported values.",
            "type": "string",
            "enum": [
                "on",
                "off",
                "outOfService",
```

```
            "unavailable",
            "unknown",
            "marginal",
            "failed"
          ]
        },
        "vehicleClassCountBin1": {
          "$reqId": "3.3.5.2.3.5.2.25",
          "description": "Provide the number of vehicles detected and classified as Class Group 1 (Motorcycles) during the data collection period for each detector.",
          "type": "number"
        },
        "vehicleClassCountBin2": {
          "$reqId": "3.3.5.2.3.5.2.26",
          "description": "Provide the number of Class Group 2 (Passenger Cars) detected and classified by FHWA in Bin 2 during the data collection period for each detector.",
          "type": "number"
        },
        "vehicleClassCountBin3": {
          "$reqId": "3.3.5.2.3.5.2.27",
          "description": "Provide number of Class Group 3 vehicles detected and classified during the data collection period as part of detector data information.",
          "type": "number"
        },
        "vehicleClassCountBin4": {
          "$reqId": "3.3.5.2.3.5.2.28",
          "description": "Provide number of vehicles classified as Class Group 4 (Buses) in detector data information.",
          "type": "number"
        },
        "vehicleClassCountBin5": {
          "$reqId": "3.3.5.2.3.5.2.29",
          "description": "Provide the number of Class Group 5 vehicles detected and classified in Bin 5 during the data collection period for each detector.",
          "type": "number"
        },
        "vehicleClassCountBin6": {
          "$reqId": "3.3.5.2.3.5.2.30",
          "description": "Provide the number of Class Group 6 vehicles detected and classified during the data collection period for each detector.",
          "type": "number"
        },
        "vehicleClassCountBin7": {
          "$reqId": "3.3.5.2.3.5.2.31",
          "description": "Provide the number of Class Group 7 vehicles detected and classified during the data collection period as part of the detector data information.",
          "type": "number"
        },
```

```
      "vehicleClassCountBin8": {
        "$reqId": "3.3.5.2.3.5.2.32",
        "description": "Provide number of Class Group 8 vehicles detected and classified during data collection period",
        "type": "number"
      },
      "vehicleClassCountBin9": {
        "$reqId": "3.3.5.2.3.5.2.33",
        "description": "Provide the number of vehicles detected and classified as Class Group 9 during the data collection period for each detector.",
        "type": "number"
      },
      "vehicleClassCountBin10": {
        "$reqId": "3.3.5.2.3.5.2.34",
        "description": "Provide the number of Class Group 10 vehicles detected during the data collection period as part of detector data information",
        "type": "number"
      },
      "vehicleClassCountBin11": {
        "$reqId": "3.3.5.2.3.5.2.35",
        "description": "Provide the number of Class Group 11 vehicles detected and classified during the data collection period for each detector.",
        "type": "number"
      },
      "vehicleClassCountBin12": {
        "$reqId": "3.3.5.2.3.5.2.36",
        "description": "Provide the number of Class Group 12 vehicles detected and classified during data collection",
        "type": "number"
      },
      "vehicleClassCountBin13": {
        "$reqId": "3.3.5.2.3.5.2.37",
        "description": "Provide the number of vehicles classified as Class Group 13 during the data collection period for each detector",
        "type": "number"
      },
      "vehicleClassCountBin14": {
        "$reqId": "3.3.5.2.3.5.2.38",
        "description": "Provide the number of vehicles detected and classified as Class Group 14 (Unclassified) during the data collection period in detector data information.",
        "type": "number"
      }
    },
    "required": [
      "organizationId",
      "detectorId",
      "detectorTimestamp"
```

```
  ]
}
```

3.3.5.2.4 Share Detector Maintenance History

The requirements for sharing detector maintenance history information with other authorized centers are as follows:

3.3.5.2.4.1 Send Detector Maintenance History Information Upon Request

An owner center shall respond to an authorized external center requesting detector maintenance history with a message containing the owner center's detector history information.

3.3.5.2.4.2 DetectorMaintenanceHistoryRequest

```
{
  "description": "Contents for a detector maintenance history request from an external center to an owner center",
  "type": "object",
  "$reqId": "3.3.5.2.4.2",
  "properties": {
    "deviceInformationRequest": {
      "$reqId": "3.3.5.2.4.2.1.a",
      "description": "Request for generic device information with device type as 'detector' and information type as 'device maintenance history'",
      "allOf": [
        {
          "$ref": "#/$defs/DeviceInformationRequest"
        },
        {
          "type": "object",
          "properties": {
            "deviceType": {
              "const": "detector"
            },
            "deviceInformationType": {
              "const": "device maintenance history"
            }
          }
        }
      ]
    },
    "detectorStationId": {
      "$reqId": "3.3.5.2.4.2.2.1",
      "description": "Send unique identifier of the detector station in the maintenance history request",
      "type": "string"
    }
  },
  "required": [
```

```
      "deviceInformationRequest"
   ]
}
```

3.3.5.2.4.3 DetectorMaintenanceHistoryResponse

```
{
   "description": "Detector maintenance history information for owner center to send to external center",
   "type": "object",
   "$reqId": "3.3.5.2.4.3",
   "properties": {
      "organization": {
         "$reqId": "3.3.5.2.4.3.1.a",
         "description": "Information regarding the owner organization",
         "$ref": "#/$defs/OrganizationInformation"
      },
      "detectorId": {
         "$reqId": "3.3.5.2.4.3.1.b",
         "description": "Unique identifier for each detector or detector zone",
         "type": "array",
         "items": {
            "type": "number"
         }
      },
      "detectorStation": {
         "$reqId": "3.3.5.2.4.3.2.1",
         "description": "Send unique identifier of the detector station as part of the detector maintenance
history information",
         "type": "string"
      },
      "detectorType": {
         "$reqId": "3.3.5.2.4.3.2.2",
         "description": "Provide the type of detector in the maintenance history information for each
detector",
         "$ref": "#/$defs/DetectorTypes"
      },
      "installationDateTime": {
         "$reqId": "3.3.5.2.4.3.2.3",
         "description": "Provide initial installation date and time of the detector in maintenance history",
         "$ref": "#/$defs/DateTime"
      },
      "detectorCalibrationDateTime": {
         "$reqId": "3.3.5.2.4.3.2.4",
         "description": "Provide the date and time of the last detector calibration in maintenance history
information.",
         "$ref": "#/$defs/DateTime"
      },
      "operationalDateTime": {
         "$reqId": "3.3.5.2.4.3.2.5",
```

```
        "description": "Provide the last date and time the operational status of the detector changed as part of maintenance history information.",
        "$ref": "#/$defs/DateTime"
      },
      "nonOperationalDateTime": {
        "$reqId": "3.3.5.2.4.3.2.6",
        "description": "Provide the last date and time the detector changed from \u2018not operational\u2019 to another operational state in the maintenance history.",
        "$ref": "#/$defs/DateTime"
      },
      "historyDateTimeChangeInformation": {
        "$reqId": "3.3.5.2.4.3.2.7",
        "description": "Provide the date and time of the last change to detector history as part of the maintenance history information",
        "$ref": "#/$defs/DateTime"
      }
    },
    "required": [
      "organization",
      "detectorId"
    ]
}
```


3.3.5.3 CCTVs

The requirements to exchange CCTV information and provide CCTV command/control capabilities between centers are as follows:

3.3.5.3.1 Share CCTV Inventory Information

The requirements for sharing CCTV inventory information with other authorized centers are as follows:

3.3.5.3.1.1 Send CCTV Inventory Information Upon Request

An owner center shall respond to an authorized external center requesting CCTV inventory with a message containing the owner center's CCTV inventory information.

3.3.5.3.1.2 Publish CCTV Inventory Information

This section describes the design for how an owner center publishes a message to all authorized subscribing external centers using the schema structure defined in annexure A.2 of this document.

3.3.5.3.1.3 Subscribe to CCTV Inventory Information

This section describes the design for how external centers receives a published message by an owner center using the schema structure defined in annexure A.3 of this document.

3.3.5.3.1.4 CCTVInventoryInformationRequest


```
{
   "description": "Include CCTV inventory information request details in communication from external center to owner center",
   "type": "object",
   "$reqId": "3.3.5.3.1.4",
   "properties": {
      "deviceInformationRequest": {
         "$reqId": "3.3.5.3.1.4.a",
         "description": "Generic device information request for CCTV camera with device inventory type",
         "allOf": [
            {
               "$ref": "#/$defs/DeviceInformationRequest"
            },
            {
               "type": "object",
               "properties": {
                  "deviceType": {
                     "const": "cctv camera"
                  },
                  "deviceInformationType": {
                     "const": "device inventory"
                  }
               }
            }
         ]
      }
   },
   "required": [
      "deviceInformationRequest"
   ]
}
```


3.3.5.3.1.5 CCTVInventoryInformationResponse


```
{
   "description": "CCTV inventory information for the owner center to send to an external center",
   "type": "object",
   "$reqId": "3.3.5.3.1.5",
   "properties": {
      "deviceInventoryHeader": {
         "$reqId": "3.3.5.3.1.5.1.a",
         "description": "Generic device inventory header information",
         "$ref": "#/$defs/DeviceInventoryResponseHeader"
      },
      "cctvRequestsSupportedList": {
         "$reqId": "3.3.5.3.1.5.1.b",
         "$ref": "#/$defs/CCTVRequestTypes"
      },
```

```
      "cctvImageList": {
        "$reqId": "3.3.5.3.1.5.1.c",
        "$ref": "#/$defs/CCTVImageTypes"
      },
      "textInsertion": {
        "$reqId": "3.3.5.3.1.5.2.1",
        "description": "Provide titling text on camera images as part of CCTV inventory information",
        "type": "string"
      },
      "cameraType": {
        "$reqId": "3.3.5.3.1.5.2.2",
        "$ref": "#/$defs/CCTVCameraTypes"
      }
    },
    "required": [
      "deviceInventoryHeader",
      "cctvRequestsSupportedList",
      "cctvImageList"
    ]
}
```

3.3.5.3.2 Share CCTV Status Information

The requirements for sharing CCTV status information with other authorized centers are as follows:

3.3.5.3.2.1 Send CCTV Status Information Upon Request

An owner center shall respond to an authorized external center requesting CCTV status with a message containing the owner center's CCTV status information.

3.3.5.3.2.2 Publish CCTV Status Information

This section describes the design for how an owner center publishes a message to all authorized subscribing external centers using the schema structure defined in annexure A.2 of this document.

3.3.5.3.2.3 Subscribe to CCTV Status Information

This section describes the design for how external centers receives a published message by an owner center using the schema structure defined in annexure A.3 of this document.

3.3.5.3.2.4 CCTVStatusRequest

```
{
  "description": "Include CCTV status request details from external center to owner center",
  "type": "object",
  "$reqId": "3.3.5.3.2.4",
  "properties": {
    "deviceInformationRequest": {
      "$reqId": "3.3.5.3.2.4.a",
```

```
        "description": "Generic device information request for CCTV camera with device status",
        "allOf": [
          {
            "$ref": "#/$defs/DeviceInformationRequest"
          },
          {
            "type": "object",
            "properties": {
              "deviceType": {
                "const": "cctv camera"
              },
              "deviceInformationType": {
                "const": "device status"
              }
            }
          }
        ]
      }
    },
    "required": [
      "deviceInformationRequest"
    ]
}
```

3.3.5.3.2.5 CCTVStatusResponse

```
{
    "description": "CCTV status information for owner center to send to external center",
    "type": "object",
    "$reqId": "3.3.5.3.2.5",
    "properties": {
      "deviceStatusHeader": {
        "$reqId": "3.3.5.3.2.5.1.a",
        "description": "Generic device status header information",
        "allOf": [
          {
            "$ref": "#/$defs/DeviceStatusHeader"
          },
          {
            "properties": {
              "deviceStatuses": {
                "items": {
                  "allOf": [
                    {
                      "$ref": "#/$defs/DeviceStatus"
                    },
                    {
                      "properties": {
                        "deviceType": {
```

```
                                "const": "cctv camera"
                            }
                        }
                    }
                ]
            }
        }
    }
  ]
},
"cctvError": {
  "$reqId": "3.3.5.3.2.5.2.1",
  "$ref": "#/$defs/CCTVStatusErrorTypes"
},
"cctvFormat": {
  "$reqId": "3.3.5.3.2.5.2.2",
  "description": "Provide the current format of CCTV images as part of the CCTV status
information",
  "$ref": "#/$defs/CCTVImageTypes"
},
"cctvPresetPosition": {
  "$reqId": "3.3.5.3.2.5.2.3",
  "description": "Provide the value of the preset position in CCTV status information if it exists",
  "type": "string"
},
"cctvPanPosition": {
  "$reqId": "3.3.5.3.2.5.2.4",
  "description": "Provide the current pan position of the CCTV device in 1/100th degree units as part
of the CCTV status information.",
  "type": "string"
},
"cctvTiltPosition": {
  "$reqId": "3.3.5.3.2.5.2.5",
  "description": "Provide current tilt position of CCTV in 1/100th degree units as part of CCTV status
information",
  "type": "string"
},
"cctvZoomPosition": {
  "$reqId": "3.3.5.3.2.5.2.6",
  "description": "Provide current zoom position of the CCTV device as part of CCTV status
information",
  "type": "string"
},
"cctvIrisPosition": {
  "$reqId": "3.3.5.3.2.5.2.7",
  "description": "Provide current iris position of the CCTV device as part of CCTV status
information",
```

```
            "type": "string"
        },
        "cctvFocusPosition": {
            "$reqId": "3.3.5.3.2.5.2.8",
            "description": "Provide the current focus position of the CCTV device as part of the CCTV status information",
            "type": "string"
        },
        "cameraEnvFeaturesStatus": {
            "$reqId": "3.3.5.3.2.5.2.9",
            "description": "Provide the status of environmental features for each CCTV as part of the CCTV status information",
            "$ref": "#/$defs/CCTVEnvironmentalFeatures"
        }
    },
    "required": [
        "deviceStatusHeader"
    ]
}
```


3.3.5.3.3 External Change Requests for CCTV Devices

The requirements to support CCTV change requests from other authorized centers are as below. Only the following types of change requests to remote CCTV devices are supported by this standard: preset, jog positioning, direction, focus, iris, wiper on/off, lock-for-the-camera, pan, tilt, zoom and text overlay.

3.3.5.3.3.1 Send CCTV Change Response Upon Request

An owner center shall respond to an authorized external center requesting a change to the CCTV device with a message containing the status of the request.

3.3.5.3.3.2 CCTVChangeRequest


```
{
    "description": "Include type of request and requested value in CCTV change request",
    "type": "object",
    "$reqId": "3.3.5.3.3.2",
    "properties": {
        "deviceChangeRequest": {
            "$reqId": "3.3.5.3.3.2.a",
            "description": "Generic device change request header information for CCTV camera",
            "allOf": [
                {
                    "$ref": "#/$defs/DeviceChangeRequestHeader"
                },
                {
                    "type": "object",
                    "properties": {
                        "deviceType": {
```

```
                    "const": "cctv camera"
                }
            }
        }
    ]
},
"requestType": {
    "$reqId": "3.3.5.3.3.2.b",
    "description": "Type of request for camera functions (preset, jog positioning, direction, focus,
manual iris, environmental on/off, lock-for-the-camera, pan, tilt, zoom, text overlay)",
    "$ref": "#/$defs/CCTVRequestTypes"
},
"requestValue": {
    "$reqId": "3.3.5.3.3.2.c",
    "description": "Value that is being requested",
    "type": "string"
}
},
"required": [
    "deviceChangeRequest",
    "requestType",
    "requestValue"
]
}
```

3.3.5.3.3.3 CCTVChangeResponse

```
{
  "description": "Include details in the owner center response to CCTV change request from an external
center",
  "type": "object",
  "$reqId": "3.3.5.3.3.3",
  "properties": {
    "deviceChangeResponseHeader": {
      "$reqId": "3.3.5.3.3.3.a",
      "description": "Generic device change response header information",
      "allOf": [
        {
          "$ref": "#/$defs/DeviceChangeResponseHeader"
        },
        {
          "type": "object",
          "properties": {
            "deviceType": {
              "const": "cctv camera"
            }
          }
        }
      ]
```

```
      }
    },
    "required": [
      "deviceChangeResponseHeader"
    ]
}
```

3.3.5.3.4 Request CCTV Change Status

The requirements to check the status of CCTV change requests previously issued by an authorized external center are as follows.

3.3.5.3.4.1 Send CCTV Change Status Upon Request

An owner center shall respond to an authorized external center requesting the status of a previously issued CCTV change request as described in “3.3.5.1.2.3.1 Send Device Change Status Upon Request”.

3.3.5.3.4.2 CCTVChangeStatusRequest

```
{
    "description": "Include CCTV change status request details from external center to owner center",
    "type": "object",
    "$reqId": "3.3.5.3.4.2",
    "properties": {
      "deviceChangeStatusRequest": {
        "$reqId": "3.3.5.3.4.2.a",
        "description": "Generic device change status request for CCTV camera",
        "$ref": "#/$defs/DeviceChangeStatusRequest"
      }
    },
    "required": [
      "deviceChangeStatusRequest"
    ]
}
```

3.3.5.3.4.3 CCTVChangeStatusResponse

```
{
    "description": "Include response details for CCTV change status request",
    "type": "object",
    "$reqId": "3.3.5.3.4.3",
    "properties": {
      "deviceChangeResponseHeader": {
        "$reqId": "3.3.5.3.4.3.a",
        "description": "Generic device change response header information",
        "allOf": [
          {
            "$ref": "#/$defs/DeviceChangeResponseHeader"
          },
          {
```

```
                "type": "object",
                "properties": {
                  "deviceType": {
                    "const": "cctv camera"
                  }
                }
              }
            ]
          }
        },
        "required": [
          "deviceChangeResponseHeader"
        ]
}
```

3.3.5.3.5 Cancel Change Requests for CCTV

The requirements to cancel a CCTV change request previously issued by an authorized external center are as follows.

3.3.5.3.5.1 Send CCTV Change Cancellation Response Upon Request

An owner center shall respond to authorized external center requesting cancellation of a previously issued CCTV change request as described in “3.3.5.1.2.4.1 Send Change Cancellation Response Upon Request”.

3.3.5.3.5.2 CCTVChangeCancellationRequest

```
{
  "description": "CCTV change cancellation request details from external center to owner center",
  "type": "object",
  "$reqId": "3.3.5.3.5.2",
  "properties": {
    "deviceChangeRequestHeader": {
      "$reqId": "3.3.5.3.5.2.a",
      "description": "Generic cancel request for device change with device type set to 'cctv camera'",
      "allOf": [
        {
          "$ref": "#/$defs/DeviceChangeRequestHeader"
        },
        {
          "type": "object",
          "properties": {
            "deviceType": {
              "const": "cctv camera"
            }
          }
        }
      ]
    }
```

```
    },
    "required": [
      "deviceChangeRequestHeader"
    ]
}
```

3.3.5.3.5.3 CCTVChangeCancellationResponse

```
{
    "description": "Response to CCTV change cancellation request from external center shall include relevant information",
    "type": "object",
    "$reqId": "3.3.5.3.5.3",
    "properties": {
      "deviceChangeResponseHeader": {
        "$reqId": "3.3.5.3.5.3.a",
        "description": "Generic device change response header information",
        "allOf": [
          {
            "$ref": "#/$defs/DeviceChangeResponseHeader"
          },
          {
            "type": "object",
            "properties": {
              "deviceType": {
                "const": "cctv camera"
              }
            }
          }
        ]
      }
    },
    "required": [
      "deviceChangeResponseHeader"
    ]
}
```

3.3.5.3.6 Share Image Links for CCTV

The requirements to share image links to an authorized external center are as follows.

3.3.5.3.6.1 Send Image Links for CCTV Upon Request

An owner center shall respond to an authorized external center's request with a message containing the image links for the requested CCTV inventory.

3.3.5.3.6.2 Publish CCTV Link Information

This section describes the design for how an owner center publishes a message to all authorized subscribing external centers using the schema structure defined in annexure A.2 of this document.

3.3.5.3.6.3 Subscribe to CCTV Link Information

This section describes the design for how external centers receives a published message by an owner center using the schema structure defined in annexure A.3 of this document.

3.3.5.3.6.4 CCTVImageLinkRequest


```
{
   "description": "Include CCTV device identifier and type of image requested in CCTV request from external center to owner center",
   "type": "object",
   "$reqId": "3.3.5.3.6.4",
   "properties": {
      "deviceInformationRequest": {
         "$reqId": "3.3.5.3.6.4.a",
         "description": "Generic device information request for CCTV camera with image link type",
         "allOf": [
            {
               "$ref": "#/$defs/DeviceInformationRequest"
            },
            {
               "type": "object",
               "properties": {
                  "deviceType": {
                     "const": "cctv camera"
                  },
                  "deviceInformationType": {
                     "const": "image link"
                  }
               }
            }
         ]
      },
      "cctvId": {
         "$reqId": "3.3.5.3.6.4.b",
         "description": "Unique identifier for the CCTV device",
         "type": "string"
      },
      "imageType": {
         "$reqId": "3.3.5.3.6.4.c",
         "description": "Type of image requested (snapshot, suppressed stream, unsuppressed stream)",
         "$ref": "#/$defs/ImageRequestedType"
      }
   },
   "required": [
      "deviceInformationRequest",
      "cctvId",
      "imageType"
```

```
  ]
}
```

3.3.5.3.6.5 CCTVImageLinkRequestResponse

```
{
  "description": "Include type of image and URL in CCTV inventory information",
  "type": "object",
  "$reqId": "3.3.5.3.6.5",
  "properties": {
    "deviceInventoryHeader": {
      "$reqId": "3.3.5.3.6.5.a",
      "description": "Generic device inventory header information",
      "$ref": "#/$defs/DeviceInventoryResponseHeader"
    },
    "imageType": {
      "$reqId": "3.3.5.3.6.5.b",
      "description": "Type of image provided (snapshot, suppressed stream, unsuppressed stream)",
      "type": "string",
      "enum": [
        "snapshot",
        "suppressedStream",
        "unsuppressedStream"
      ]
    },
    "imageURL": {
      "$reqId": "3.3.5.3.6.5.c",
      "description": "URL to the provided image",
      "type": "string"
    }
  },
  "required": [
    "deviceInventoryHeader",
    "imageType",
    "imageURL"
  ]
}
```

3.3.5.3.7 External Commands for CCTV Devices

The requirements for an external center to send commands to remotely control to a CCTV that is normally managed by an owner center are as follows. Only the following types of commands to remote CCTV devices are supported by this standard: preset, jog positioning, direction, focus, iris, wiper on/off, lock-for- the-camera, pan, tilt, zoom and text overlay.

3.3.5.3.7.1 Send CCTV Control Command Status

An owner center shall respond to an authorized external center configuring a CCTV via a one-time control command with a message containing the status of the command.

3.3.5.3.7.2 CCTVControlCommandRequest


```
{
  "description": "Include type of command and control command value in CCTV control command",
  "type": "object",
  "$reqId": "3.3.5.3.7.2",
  "properties": {
    "deviceControlCommand": {
      "$reqId": "3.3.5.3.7.2.a",
      "description": "Generic device control command information for CCTV camera",
      "allOf": [
        {
          "$ref": "#/$defs/ExternalDeviceControlRequest"
        },
        {
          "type": "object",
          "properties": {
            "deviceType": {
              "const": "cctv camera"
            }
          }
        }
      ]
    },
    "commandType": {
      "$reqId": "3.3.5.3.7.2.b",
      "description": "Various command types for camera operation and control",
      "$ref": "#/$defs/DeviceControlCommandTypes"
    },
    "controlCommandValue": {
      "$reqId": "3.3.5.3.7.2.c",
      "description": "Value representing a control command",
      "type": "string"
    }
  },
  "required": [
    "deviceControlCommand",
    "commandType",
    "controlCommandValue"
  ]
}
```


3.3.5.3.7.3 CCTVControlCommandResponse


```
{
  "description": "Response to CCTV control command from external center",
```

```
  "type": "object",
  "$reqId": "3.3.5.3.7.3",
  "properties": {
    "deviceControlResponse": {
      "$reqId": "3.3.5.3.7.3.a",
      "description": "Response information for generic device control commands",
      "$ref": "#/$defs/ExternalDeviceControlCommandResponse"
    }
  },
  "required": [
    "deviceControlResponse"
  ]
}
```

3.3.5.4 Dynamic Message Signs

The requirements to exchange DMS information and provide DMS command/control capabilities between centers are as follows:

3.3.5.4.1 Share DMS Inventory Information

The requirements for sharing DMS inventory information with other authorized centers are as follows:

3.3.5.4.1.1 Send DMS Inventory Information Upon Request

An owner center shall respond to an authorized external center requesting DMS inventory with a message containing the owner center's DMS inventory information.

3.3.5.4.1.2 Publish DMS Inventory Information

This section describes the design for how an owner center publishes a message to all authorized subscribing external centers using the schema structure defined in annexure A.2 of this document.

3.3.5.4.1.3 Subscribe to DMS Inventory Information

This section describes the design for how external centers receives a published message by an owner center using the schema structure defined in annexure A.3 of this document.

3.3.5.4.1.4 DMSInventoryRequest

```
{
  "description": "Include DMS inventory information request details from external center to owner center",
  "type": "object",
  "$reqId": "3.3.5.4.1.4",
  "properties": {
    "deviceInformationRequest": {
      "$reqId": "3.3.5.4.1.4.a",
      "description": "Generic device information request for dynamic message sign device inventory",
      "allOf": [
        {
```

```
                "$ref": "#/$defs/DeviceInformationRequest"
            },
            {
                "type": "object",
                "properties": {
                    "deviceType": {
                        "const": "dynamic message sign"
                    },
                    "deviceInformationType": {
                        "const": "device inventory"
                    }
                }
            }
        ]
    }
  },
  "required": [
    "deviceInformationRequest"
  ]
}
```


3.3.5.4.1.5 DMSInventoryResponse


```
{
  "description": "DMS inventory information to send from owner center to external center",
  "type": "object",
  "$reqId": "3.3.5.4.1.5",
  "properties": {
    "deviceInventoryHeader": {
      "$reqId": "3.3.5.4.1.5.1.a",
      "description": "Generic device inventory header information",
      "$ref": "#/$defs/DeviceInventoryResponseHeader"
    },
    "signType": {
      "$reqId": "3.3.5.4.1.5.1.b",
      "description": "Sign type for each device, including various categories such as BOS, CMS,
VMSChar, VMSLine, VMSFull, and portable versions.",
      "type": "string",
      "enum": [
        "BOS",
        "CMS",
        "vmsChar",
        "vmsLine",
        "vmsFull",
        "portableBOS",
        "portableCMS",
        "portableVmsChar",
        "portableVmsLine",
        "portableVmsFull",
```

```
            "other",
            "portableOther"
         ]
      },
      "signTechnology": {
         "$reqId": "3.3.5.4.1.5.2.1",
         "description": "Provide sign technology details for each DMS in the inventory, including supported values such as LED, flip-disk, fiber optic, shuttered, bulb, drum, other, and unknown.",
         "type": "string",
         "enum": [
            "LED",
            "flipDisk",
            "fiberOptic",
            "shuttered",
            "bulb",
            "drum",
            "other",
            "unknown"
         ]
      },
      "signPixelHeight": {
         "$reqId": "3.3.5.4.1.5.2.2",
         "description": "Provide the pixel height of the DMS face in the inventory information for each DMS.",
         "type": "string"
      },
      "signPixelWidth": {
         "$reqId": "3.3.5.4.1.5.2.3",
         "description": "Provide pixel width of the DMS face in DMS inventory information",
         "type": "string"
      },
      "signHeight": {
         "$reqId": "3.3.5.4.1.5.2.4",
         "description": "Provide the height of the DMS face in millimeters as part of the DMS inventory information",
         "type": "string"
      },
      "signWidth": {
         "$reqId": "3.3.5.4.1.5.2.5",
         "description": "Provide the width of the DMS face in millimeters as part of DMS inventory information",
         "type": "string"
      },
      "characterPixelHeight": {
         "$reqId": "3.3.5.4.1.5.2.6",
         "description": "Provide character pixel height of the DMS in inventory information",
         "type": "string"
      },
```

```
    "characterPixelWidth": {
      "$reqId": "3.3.5.4.1.5.2.7",
      "description": "Provide the character pixel width of the DMS in the DMS inventory information",
      "type": "string"
    },
    "dmsBeaconType": {
      "$reqId": "3.3.5.4.1.5.2.8",
      "description": "Provide beacon type supported by the DMS in inventory information",
      "type": "string",
      "enum": [
        "none",
        "oneBeacon",
        "twoBeaconSyncFlash",
        "twoBeaconOpposedFlash",
        "fourBeaconSyncFlash",
        "fourBeaconAlternateRowFlash",
        "fourBeaconAlternateColumnFlash",
        "fourBeaconAlternateDiagonalFlash",
        "fourBeaconNoSync",
        "oneBeaconStrobe",
        "twoBeaconStrobe",
        "fourBeaconStrobe",
        "other"
      ]
    },
    "verticalBorder": {
      "$reqId": "3.3.5.4.1.5.2.9",
      "description": "Provide the vertical border dimensions in millimeters for each DMS in the
inventory",
      "type": "string"
    },
    "horizontalBorder": {
      "$reqId": "3.3.5.4.1.5.2.10",
      "description": "Provide the horizontal border in millimeters around the DMS face as part of the
DMS inventory information.",
      "type": "string"
    },
    "signVerticalPixelPitch": {
      "$reqId": "3.3.5.4.1.5.2.11",
      "description": "Provide vertical distance (pixel spacing) between pixel centers in millimeters for
DMS inventory.",
      "type": "string"
    },
    "signHorizontalPixelPitch": {
      "$reqId": "3.3.5.4.1.5.2.12",
      "description": "Provide horizontal distance in millimeters between the center of one pixel and the
center of the neighboring pixel as part of DMS inventory information.",
      "type": "string"
```

```
      },
      "maximumNumberPages": {
         "$reqId": "3.3.5.4.1.5.2.13",
         "description": "Provide the maximum number of pages supported for a single message in DMS
inventory information",
         "type": "string"
      },
      "maximumMessageLength": {
         "$reqId": "3.3.5.4.1.5.2.14",
         "description": "Provide the maximum length for a single message in DMS inventory information",
         "type": "string"
      },
      "colorScheme": {
         "$reqId": "3.3.5.4.1.5.2.15",
         "description": "Provide supported color scheme for each DMS in inventory information",
         "type": "string",
         "enum": [
            "monochrome1bit",
            "monochrome8bit",
            "colorClassic",
            "color24bit"
         ]
      },
      "multiTagsSupported": {
         "$reqId": "3.3.5.4.1.5.2.16",
         "description": "Provide MULTI tag information for DMS inventory",
         "type": "string"
      }
   },
   "required": [
      "deviceInventoryHeader",
      "signType"
   ]
}
```


3.3.5.4.2 Share DMS Status Information

The requirements for sharing DMS status information with other authorized centers are as follows:

3.3.5.4.2.1 Send DMS Status Information Upon Request

An owner center shall respond to an authorized external center requesting DMS status with a message containing the owner center's DMS status information.

3.3.5.4.2.2 Publish DMS Status Information

This section describes the design for how an owner center publishes a message to all authorized subscribing external centers using the schema structure defined in annexure A.2 of this document.

3.3.5.4.2.3 Subscribe to DMS Status Information

This section describes the design for how external centers receives a published message by an owner center using the schema structure defined in annexure A.3 of this document.

3.3.5.4.2.4 DMSStatusInformationRequest


```
{
  "description": "Include DMS status request information from external center to owner center",
  "type": "object",
  "$reqId": "3.3.5.4.2.4",
  "properties": {
    "deviceInformationRequest": {
      "$reqId": "3.3.5.4.2.4.a",
      "description": "Generic device information request for dynamic message sign status",
      "allOf": [
        {
          "$ref": "#/$defs/DeviceInformationRequest"
        },
        {
          "type": "object",
          "properties": {
            "deviceType": {
              "const": "dynamic message sign"
            },
            "deviceInformationType": {
              "const": "device status"
            }
          }
        }
      ]
    }
  },
  "required": [
    "deviceInformationRequest"
  ]
}
```


3.3.5.4.2.5 Contents of the DMS Status Response

The DMS status information for an owner center to send to an external center is as follows:

3.3.5.4.2.5.1 DMSStatusInformationResponse


```
{
  "description": "Include current message displayed on each DMS device in status information",
```

```
  "type": "object",
  "$reqId": "3.3.5.4.2.5.1",
  "properties": {
    "deviceStatusHeader": {
      "$reqId": "3.3.5.4.2.5.1.a",
      "description": "Generic device status header information",
      "allOf": [
        {
          "$ref": "#/$defs/DeviceStatusHeader"
        },
        {
          "properties": {
            "deviceStatuses": {
              "items": {
                "allOf": [
                  {
                    "$ref": "#/$defs/DeviceStatus"
                  },
                  {
                    "properties": {
                      "deviceType": {
                        "const": "dynamic message sign"
                      }
                    }
                  }
                ]
              }
            }
          }
        }
      ]
    },
    "dmsMessage": {
      "$reqId": "3.3.5.4.2.5.1.b",
      "description": "Current message displayed on DMS device",
      "type": "string"
    },
    "currentMessageNumberDms": {
      "$reqId": "3.3.5.4.2.5.2.1",
      "description": "Provide the message number currently displayed on the DMS device as part of
DMS status information.",
      "type": "number"
    },
    "timeRemaining": {
      "$reqId": "3.3.5.4.2.5.2.2",
      "description": "Provide time remaining for current message display in DMS status information",
      "type": "string"
    },
```

```
      "messageSource": {
        "$reqId": "3.3.5.4.2.5.2.3",
        "$ref": "#/$defs/DMSMessageSources"
      },
      "messageBeacon": {
        "$reqId": "3.3.5.4.2.5.2.4",
        "description": "Indicate if the beacon is enabled or disabled for the message displayed on the
DMS device",
        "type": "string"
      },
      "dmsOnDisplayImage": {
        "$reqId": "3.3.5.4.2.5.2.5",
        "description": "Provide a URL to an image of the current DMS display",
        "type": "string"
      }
    },
    "required": [
      "deviceStatusHeader",
      "dmsMessage"
    ]
}
```

3.3.5.4.3 External Change Requests for DMS Devices

The requirements to support DMS change requests from other authorized centers are as follows. Only requests to display a specific message on a remote DMS device are supported.

3.3.5.4.3.1 Send DMS Change Response Upon Request

An owner center shall respond to an authorized external center requesting a message change on a DMS via a one-time change request with a message containing the status of the request.

3.3.5.4.3.2 DMSChangeRequest

```
{
  "description": "Include requested message in MULTI language in DMS change request",
  "type": "object",
  "$reqId": "3.3.5.4.3.2",
  "properties": {
    "deviceChangeRequestHeader": {
      "$reqId": "3.3.5.4.3.2.a",
      "description": "Generic device change request header information for dynamic message sign",
      "allOf": [
        {
          "$ref": "#/$defs/DeviceChangeRequestHeader"
        },
        {
          "type": "object",
```

```
                "properties": {
                  "deviceType": {
                    "const": "dynamic message sign"
                  }
                }
              }
            ]
        },
        "messageCommandType": {
          "$reqId": "3.3.5.4.3.2.b",
          "description": "Types of message commands (custom, library, remove)",
          "type": "string",
          "enum": [
            "customMessage",
            "libraryMessage",
            "removeMessage"
          ]
        },
        "messageRequested": {
          "$reqId": "3.3.5.4.3.2.c",
          "description": "Message requested in multiple languages",
          "type": "string"
        },
        "messageNumber": {
          "$reqId": "3.3.5.4.3.2.d",
          "description": "Message number, memory type (permanent, changeable, volatile), and CRC of the
requested message.",
          "type": "number"
        },
        "memoryType": {
          "$reqId": "3.3.5.4.3.2.e",
          "$ref": "#/$defs/DMSMessageMemoryType"
        },
        "messageCRC": {
          "$reqId": "3.3.5.4.3.2.f",
          "type": "string"
        }
    },
    "required": [
        "deviceChangeRequestHeader",
        "messageCommandType",
        "messageRequested",
        "messageNumber",
        "memoryType",
        "messageCRC"
    ]
}
```

3.3.5.4.3.3 DMSChangeResponse


```
{
  "description": "Owner center response to DMS change request must include specific information",
  "type": "object",
  "$reqId": "3.3.5.4.3.3",
  "properties": {
    "deviceChangeResponseHeader": {
      "$reqId": "3.3.5.4.3.3.a",
      "description": "Generic device change response header information",
      "allOf": [
        {
          "$ref": "#/$defs/DeviceChangeResponseHeader"
        },
        {
          "type": "object",
          "properties": {
            "deviceType": {
              "const": "dynamic message sign"
            }
          }
        }
      ]
    }
  },
  "required": [
    "deviceChangeResponseHeader"
  ]
}
```


3.3.5.4.4 Request DMS Change Status

The requirements to check the status of a DMS change request previously issued by an authorized external center are as follows.

3.3.5.4.4.1 Send DMS Change Status Upon Request

An owner center shall respond to an authorized external center requesting the status of a previously issued DMS change request as described in “3.3.5.1.2.3.1 Send Device Change Status Upon Request”.

3.3.5.4.4.2 DMSChangeStatusRequest


```
{
  "description": "Include required information in the DMS change status request sent from an external center to an owner center.",
  "type": "object",
  "$reqId": "3.3.5.4.4.2",
  "properties": {
    "deviceChangeStatusRequest": {
      "$reqId": "3.3.5.4.4.2.a",
```

```
        "description": "Request for generic device change status with device type set to 'dynamic message sign'",
        "allOf": [
          {
            "$ref": "#/$defs/DeviceChangeStatusRequest"
          },
          {
            "type": "object",
            "properties": {
              "deviceType": {
                "const": "dynamic message sign"
              }
            }
          }
        ]
      }
    },
    "required": [
      "deviceChangeStatusRequest"
    ]
}
```

3.3.5.4.4.3 DMSChangeStatusResponse

```
{
    "description": "Owner center response to DMS change status request must include specific information.",
    "type": "object",
    "$reqId": "3.3.5.4.4.3",
    "properties": {
      "deviceChangeResponseHeader": {
        "$reqId": "3.3.5.4.4.3.a",
        "description": "Generic device change response header information",
        "allOf": [
          {
            "$ref": "#/$defs/DeviceChangeResponseHeader"
          },
          {
            "type": "object",
            "properties": {
              "deviceType": {
                "const": "dynamic message sign"
              }
            }
          }
        ]
      }
    },
    "required": [
```

```
      "deviceChangeResponseHeader"
   ]
}
```

3.3.5.4.5 Cancel External Change Requests for DMS Devices

The requirements to cancel a DMS change request previously issued by an authorized external center are as follows.

3.3.5.4.5.1 Send Cancel DMS Change Response Upon Request

An owner center shall respond to authorized external center requesting cancellation of a previously issued DMS change request as described in “3.3.5.1.2.4.1 Send Change Cancellation Response Upon Request”.

3.3.5.4.5.2 DMSChangeCancellationRequest

```
{
   "description": "DMS change cancellation request details from external to owner center",
   "type": "object",
   "$reqId": "3.3.5.4.5.2",
   "properties": {
      "deviceChangeCancellationRequest": {
         "$reqId": "3.3.5.4.5.2.a",
         "description": "Generic cancel device change request for dynamic message sign",
         "allOf": [
            {
               "$ref": "#/$defs/DeviceChangeCancellationRequest"
            },
            {
               "type": "object",
               "properties": {
                  "deviceType": {
                     "const": "dynamic message sign"
                  }
               }
            }
         ]
      }
   },
   "required": [
      "deviceChangeCancellationRequest"
   ]
}
```

3.3.5.4.5.3 DMSChangeCancellationResponse

```
{
   "description": "Include owner center response to DMS change cancellation request",
   "type": "object",
   "$reqId": "3.3.5.4.5.3",
```

```
  "properties": {
    "deviceChangeResponseHeader": {
      "$reqId": "3.3.5.4.5.3.a",
      "description": "Generic device change response header information",
      "allOf": [
        {
          "$ref": "#/$defs/DeviceChangeResponseHeader"
        },
        {
          "type": "object",
          "properties": {
            "deviceType": {
              "const": "dynamic message sign"
            }
          }
        }
      ]
    }
  },
  "required": [
    "deviceChangeResponseHeader"
  ]
}
```

3.3.5.4.6 Share DMS Message Appearance

The requirements to share how a message would appear on a DMS with other authorized centers are as follows:

3.3.5.4.6.1 Send DMS Message Appearance Upon Request

An owner center shall respond to an authorized external center requesting how a message would appear on a DMS with messages containing the pertinent information required to reconstruct the message.

3.3.5.4.6.2 DMSMessageAppearanceRequest

```
{
  "description": "Include DMS message appearance request details from external center to owner center",
  "type": "object",
  "$reqId": "3.3.5.4.6.2",
  "properties": {
    "deviceInformationRequest": {
      "$reqId": "3.3.5.4.6.2.a",
      "description": "Request generic device information for dynamic message signs, specifying message appearance and device identifier.",
      "allOf": [
        {
          "$ref": "#/$defs/DeviceInformationRequest"
```

```
            },
            {
               "type": "object",
               "properties": {
                  "deviceType": {
                     "const": "dynamic message sign"
                  },
                  "deviceInformationType": {
                     "const": "message appearance"
                  }
               }
            }
         ]
      },
      "messageRequested": {
         "$reqId": "3.3.5.4.6.2.b",
         "description": "Message requested in multiple languages",
         "type": "string"
      },
      "messageNumber": {
         "$reqId": "3.3.5.4.6.2.c",
         "description": "Message number, memory type and CRC of the requested message",
         "type": "number"
      },
      "memoryType": {
         "$reqId": "3.3.5.4.6.2.d",
         "description": "Current status of the message flag",
         "$ref": "#/$defs/DMSMessageMemoryType"
      },
      "messageCrc": {
         "$reqId": "3.3.5.4.6.2.e",
         "type": "string"
      },
      "messageFlag": {
         "$reqId": "3.3.5.4.6.2.f",
         "type": "boolean"
      }
   },
   "required": [
      "deviceInformationRequest",
      "messageRequested",
      "messageNumber",
      "messageFlag"
   ]
}
```

3.3.5.4.6.3 DMSMessageAppearanceResponse


```
{
   "description": "DMS message appearance information for communication between owner center and external center",
   "type": "object",
   "$reqId": "3.3.5.4.6.3",
   "properties": {
      "ownerOrganization": {
         "$reqId": "3.3.5.4.6.3.1.a",
         "description": "Information regarding the owner organization",
         "$ref": "#/$defs/OrganizationInformation"
      },
      "deviceId": {
         "$reqId": "3.3.5.4.6.3.1.b",
         "description": "Unique identifier for each DMS device",
         "type": "string"
      },
      "dmsSignType": {
         "$reqId": "3.3.5.4.6.3.1.c",
         "description": "Sign type for each DMS device",
         "type": "string"
      },
      "signHeightInPixels": {
         "$reqId": "3.3.5.4.6.3.2.a",
         "description": "Height of the sign in pixels",
         "type": "number"
      },
      "signWidthInPixels": {
         "$reqId": "3.3.5.4.6.3.2.b",
         "description": "Width of the sign specified in pixels",
         "type": "number"
      },
      "signHeight": {
         "$reqId": "3.3.5.4.6.3.2.c",
         "description": "Height of the sign",
         "type": "number"
      },
      "signWidth": {
         "$reqId": "3.3.5.4.6.3.2.d",
         "description": "Weight of the sign",
         "type": "number"
      },
      "characterPixelHeight": {
         "$reqId": "3.3.5.4.6.3.2.e",
         "description": "Height of the character pixels",
         "type": "string"
      },
      "characterPixelWidth": {
```

```
        "$reqId": "3.3.5.4.6.3.2.f",
        "description": "Width of a character in pixels",
        "type": "string"
      },
      "signVerticalBorder": {
        "$reqId": "3.3.5.4.6.3.2.g",
        "description": "Vertical boundary for signage",
        "type": "string"
      },
      "signHorizontalBorder": {
        "$reqId": "3.3.5.4.6.3.2.h",
        "description": "Sign indicating horizontal border",
        "type": "string"
      },
      "signVerticalPixelPitch": {
        "$reqId": "3.3.5.4.6.3.2.i",
        "description": "Vertical pixel pitch for signage",
        "type": "string"
      },
      "signHorizontalPixelPitch": {
        "$reqId": "3.3.5.4.6.3.2.j",
        "description": "Measurement of the distance between pixels on a horizontal axis in a sign.",
        "type": "string"
      },
      "maxPages": {
        "$reqId": "3.3.5.4.6.3.2.k",
        "description": "Maximum limit of pages allowed",
        "type": "string"
      },
      "maxMessageLength": {
        "$reqId": "3.3.5.4.6.3.2.l",
        "description": "Maximum allowable length of the message",
        "type": "string"
      },
      "colorScheme": {
        "$reqId": "3.3.5.4.6.3.2.m",
        "description": "Color scheme identification",
        "type": "string"
      },
      "multiTagsSupported": {
        "$reqId": "3.3.5.4.6.3.2.n",
        "description": "Support for MULTI tags",
        "type": "string"
      }
    },
    "required": [
      "ownerOrganization",
      "deviceId",
```

```
      "dmsSignType",
      "signHeightInPixels",
      "signWidthInPixels",
      "signHeight",
      "signWidth",
      "characterPixelHeight",
      "characterPixelWidth",
      "signVerticalBorder",
      "signHorizontalBorder",
      "signVerticalPixelPitch",
      "signHorizontalPixelPitch",
      "maxPages",
      "maxMessageLength",
      "colorScheme",
      "multiTagsSupported"
   ]
}
```

3.3.5.4.7 Share DMS Message Table

The requirements for sharing DMS message tables with other authorized centers are as follows:

3.3.5.4.7.1 Send DMS Message Table Upon Request

PRZcAT oO FEe>epa0TD An owner center shall respond to an authorized external center requesting DMS message table information with a message containing the owner center's DMS message table information.

3.3.5.4.7.2 Publish DMS Message Table Information

This section describes the design for how an owner center publishes a message to all authorized subscribing external centers using the schema structure defined in annexure A.2 of this document.

3.3.5.4.7.3 Subscribe to DMS Message Table Information

This section describes the design for how external centers receives a published message by an owner center using the schema structure defined in annexure A.3 of this document.

3.3.5.4.7.4 DmsMessageTableInventoryRequest

```
{
   "description": "Contents of a DMS Message Table Inventory request from an external center to an owner center",
   "type": "object",
   "$reqId": "3.3.5.4.7.4",
   "properties": {
      "deviceInformationRequest": {
         "$reqId": "3.3.5.4.7.4.1.a",
         "description": "Generic device information request for dynamic message sign with device
```

```
information type set to device plan.",
          "allOf": [
            {
              "$ref": "#/$defs/DeviceInformationRequest"
            },
            {
              "type": "object",
              "properties": {
                "deviceType": {
                  "const": "dynamic message sign"
                },
                "deviceInformationType": {
                  "const": "device plan"
                }
              }
            }
          ]
        },
        "dmsMessageNumberIdentifier": {
          "$reqId": "3.3.5.4.7.4.2.1",
          "description": "Provide the desired message number as part of the DMS message table inventory
request for each DMS",
          "type": "number"
        },
        "dmsMemoryType": {
          "$reqId": "3.3.5.4.7.4.2.2",
          "description": "Indicate memory type for DMS message table in inventory request",
          "$ref": "#/$defs/DMSMessageMemoryType"
        }
    },
    "required": [
      "deviceInformationRequest"
    ]
}
```


3.3.5.4.7.5 DMSMessageTableInventoryResponse


```
{
    "description": "DMS Message Table Inventory information for communication between owner center
and external center",
    "type": "object",
    "$reqId": "3.3.5.4.7.5",
    "properties": {
        "deviceInventoryHeader": {
          "$reqId": "3.3.5.4.7.5.1.a",
          "description": "Generic device inventory header information",
          "$ref": "#/$defs/DeviceInventoryResponseHeader"
        },
        "messageMemoryType": {
```

```
        "$reqId": "3.3.5.4.7.5.1.b",
        "description": "Type of memory used for storing messages",
        "type": "string"
      },
      "messageId": {
        "$reqId": "3.3.5.4.7.5.1.c",
        "description": "Unique identifier for each message",
        "type": "number"
      },
      "messageMultiLanguage": {
        "$reqId": "3.3.5.4.7.5.1.d",
        "description": "Message available in multiple languages for each communication",
        "type": "string"
      },
      "messageOwner": {
        "$reqId": "3.3.5.4.7.5.1.e",
        "description": "Identify the owner for each message",
        "type": "string"
      },
      "messageBeaconFlag": {
        "$reqId": "3.3.5.4.7.5.1.f",
        "description": "Indicate if the message beacon is enabled or disabled for the message",
        "type": "string"
      },
      "messageRunTimePriority": {
        "$reqId": "3.3.5.4.7.5.1.g",
        "description": "Message run-time priority for each message",
        "type": "string"
      },
      "messageStatus": {
        "$reqId": "3.3.5.4.7.5.1.h",
        "description": "Status indicators for message processing (Not used, modifying, validating, valid,
error, modifyReq, validateReq, and notUsedReq)",
        "type": "string",
        "enum": [
          "NotUsed",
          "modifying",
          "validating",
          "valid",
          "error",
          "modifyReq",
          "validateReqAndNotUsedReq"
        ]
      },
      "dmsMessageInventoryDateTimeChangeInformation": {
        "$reqId": "3.3.5.4.7.5.2.1",
        "description": "Provide last changed date and time for DMS message table inventory",
        "$ref": "#/$defs/DateTime"
```

```
      },
      "dmsMessageCrc": {
         "$reqId": "3.3.5.4.7.5.2.2",
         "description": "Provide CRC-16 value for DMS message number and memory type in DMS
message table inventory",
         "$ref": "#/$defs/DMSMessageCRC"
      }
   },
   "required": [
      "deviceInventoryHeader",
      "messageMemoryType",
      "messageId",
      "messageMultiLanguage",
      "messageOwner",
      "messageBeaconFlag",
      "messageRunTimePriority",
      "messageStatus"
   ]
}
```

3.3.5.4.8 Share DMS Font Table

The requirements for sharing DMS font tables with other authorized centers are as follows:

3.3.5.4.8.1 Send DMS Font Table Upon Request

An owner center shall respond to an authorized external center requesting DMS font tables with a message containing the owner center's DMS font table information.

3.3.5.4.8.2 DMSFontTableRequest

```
{
   "description": "Contents of a DMS Font Table request from an external center to an owner center",
   "type": "object",
   "$reqId": "3.3.5.4.8.2",
   "properties": {
      "deviceInformationRequest": {
         "$reqId": "3.3.5.4.8.2.1.a",
         "description": "Generic device information request for dynamic message sign with device font
table type",
         "allOf": [
            {
               "$ref": "#/$defs/DeviceInformationRequest"
            },
            {
               "type": "object",
               "properties": {
                  "deviceType": {
                     "const": "dynamic message sign"
                  },
                  "deviceInformationType": {
```

```
                    "const": "device font table"
                }
            }
        }
    ]
},
"dMSFontId": {
    "$reqId": "3.3.5.4.8.2.2.1",
    "description": "Provide the font number desired in the DMS font table request for each DMS",
    "type": "string"
}
},
"required": [
    "deviceInformationRequest"
]
}
```

3.3.5.4.8.3 DMSFontTableResponse

```
{
"description": "DMS Font Table information for owner center to send to external center",
"type": "object",
"$reqId": "3.3.5.4.8.3",
"properties": {
    "deviceInventoryHeader": {
        "$reqId": "3.3.5.4.8.3.1.a",
        "description": "Generic device inventory header information",
        "$ref": "#/$defs/DeviceInventoryResponseHeader"
    },
    "fontNumber ": {
        "$reqId": "3.3.5.4.8.3.1.b",
        "description": "Font identification number for each font",
        "type": "string"
    },
    "defaultFontNumber ": {
        "$reqId": "3.3.5.4.8.3.1.c",
        "description": "Font number for the default font",
        "type": "string"
    },
    "fontHeight": {
        "$reqId": "3.3.5.4.8.3.1.d",
        "description": "Font height in pixels for each font",
        "type": "string"
    },
    "fontCharacterSpacing ": {
        "$reqId": "3.3.5.4.8.3.1.e",
        "description": "Font character spacing in pixels for each font",
        "type": "string"
    },
```

```
      "fontLineSpacing": {
        "$reqId": "3.3.5.4.8.3.1.f",
        "description": "Font line spacing in pixels for each font",
        "type": "string"
      },
      "fontVersionId": {
        "$reqId": "3.3.5.4.8.3.1.g",
        "description": "Font version identifier for each font",
        "type": "string"
      },
      "fontState": {
        "$reqId": "3.3.5.4.8.3.1.h",
        "description": "State of each font",
        "type": "string"
      },
      "characterNumber ": {
        "$reqId": "3.3.5.4.8.3.1.i",
        "description": "Character number for each font",
        "type": "string"
      },
      "characterWidth ": {
        "$reqId": "3.3.5.4.8.3.1.j",
        "description": "Character width in pixels for each font",
        "type": "string"
      },
      "characterBitmap": {
        "$reqId": "3.3.5.4.8.3.1.k",
        "description": "Character bitmap for each font",
        "type": "string"
      },
      "fontTableDateTimeChangeInformation": {
        "$reqId": "3.3.5.4.8.3.2.1",
        "description": "Provide the date and time of the last change to the font table as part of the DMS
font table information.",
        "$ref": "#/$defs/DateTime"
      }
    },
    "required": [
      "deviceInventoryHeader",
      "fontNumber ",
      "defaultFontNumber ",
      "fontHeight",
      "fontCharacterSpacing ",
      "fontLineSpacing",
      "fontVersionId",
      "fontState",
      "characterNumber ",
      "characterWidth ",
```

```
      "characterBitmap"
   ]
}
```

3.3.5.4.9 Share DMS Priority Queue Information

The requirements for sharing the contents of a DMS priority queue are as follows:

3.3.5.4.9.1 Send DMS Priority Queue Information Upon Request

An owner center shall respond to an authorized external center requesting the contents of its DMS priority queue with a message containing the contents of an owner center's DMS priority queue.

3.3.5.4.9.2 DMSPriorityQueueRequest

```
{
   "type": "object",
   "$reqId": "3.3.5.4.9.2",
   "properties": {
      "devicePriorityQueueRequest": {
         "$reqId": "3.3.5.4.9.2.a",
         "description": "Generic device queue request for dynamic message sign",
         "allOf": [
            {
               "$ref": "#/$defs/DevicePriorityQueueRequest"
            },
            {
               "type": "object",
               "properties": {
                  "deviceType": {
                     "const": "dynamic message sign"
                  }
               }
            }
         ]
      }
   },
   "required": [
      "devicePriorityQueueRequest"
   ]
}
```

3.3.5.4.9.3 DMSPriorityQueueResponse

```
{
   "description": "Include requested message in MULTI language or message number in DMS priority queue response",
   "type": "object",
   "$reqId": "3.3.5.4.9.3",
   "properties": {
```

```
      "devicePriorityQueueHeader": {
        "$reqId": "3.3.5.4.9.3.a",
        "description": "Header information for the generic device priority queue",
        "allOf": [
          {
            "$ref": "#/$defs/DevicePriorityQueueResponse"
          },
          {
            "type": "object",
            "properties": {
              "deviceType": {
                "const": "dynamic message sign"
              }
            }
          }
        ]
      },
      "messageRequestedMultiLanguage": {
        "$reqId": "3.3.5.4.9.3.b",
        "description": "Message request in multiple languages",
        "type": "string"
      },
      "messageNumber": {
        "$reqId": "3.3.5.4.9.3.c",
        "description": "Unique identifier for the requested message number",
        "type": "number"
      }
    },
    "required": [
      "devicePriorityQueueHeader",
      "messageRequestedMultiLanguage",
      "messageNumber"
    ]
}
```

3.3.5.4.10 Share DMS Graphics Table

The requirements for sharing DMS graphic tables with other authorized centers are as follows:

3.3.5.4.10.1 Send DMS Graphic Table Upon Request

An owner center shall respond to an authorized external center requesting DMS graphic tables with a message containing the owner center's DMS graphic table information.

3.3.5.4.10.2 DMSGraphicTableRequest

```
{
  "description": "Include DMS graphic table request details from external center to owner center",
  "type": "object",
```

```
  "$reqId": "3.3.5.4.10.2",
  "properties": {
    "deviceInformationRequest": {
      "$reqId": "3.3.5.4.10.2.a",
      "description": "Request for generic device information request with device type set to 'dynamic
message sign' and device information type set to 'device graphic table'",
      "allOf": [
        {
          "$ref": "#/$defs/DeviceInformationRequest"
        },
        {
          "type": "object",
          "properties": {
            "deviceType": {
              "const": "dynamic message sign"
            },
            "deviceInformationType": {
              "const": "device graphic table"
            }
          }
        }
      ]
    }
  },
  "required": [
    "deviceInformationRequest"
  ]
}
```


3.3.5.4.10.3 DMSGraphicTableResponse


```
{
  "description": "DMS Graphic Table information for external center request",
  "type": "object",
  "$reqId": "3.3.5.4.10.3",
  "properties": {
    "ownerOrganization": {
      "$reqId": "3.3.5.4.10.3.1.a",
      "description": "Information about the owner organization",
      "$ref": "#/$defs/OrganizationInformation"
    },
    "deviceId": {
      "$reqId": "3.3.5.4.10.3.1.b",
      "description": "Unique identifier for each device",
      "type": "string"
    },
    "graphicNumber": {
      "$reqId": "3.3.5.4.10.3.1.c",
      "description": "Unique identifier for each graphic",
```

```
      "type": "string"
    },
    "graphicName": {
      "$reqId": "3.3.5.4.10.3.1.d",
      "description": "Name of each graphic",
      "type": "string"
    },
    "graphicHeight": {
      "$reqId": "3.3.5.4.10.3.1.e",
      "description": "Height of each graphic in pixels",
      "type": "string"
    },
    "graphicWidth": {
      "$reqId": "3.3.5.4.10.3.1.f",
      "description": "Width of each graphic in pixels",
      "type": "string"
    },
    "graphicType": {
      "$reqId": "3.3.5.4.10.3.1.g",
      "description": "Type of each graphic",
      "type": "string"
    },
    "graphicId": {
      "$reqId": "3.3.5.4.10.3.1.h",
      "description": "Unique identifier for each graphic",
      "type": "string"
    },
    "graphicSpacing": {
      "$reqId": "3.3.5.4.10.3.1.i",
      "description": "Font line spacing measurement in pixels for each font",
      "type": "string"
    },
    "graphicColor": {
      "$reqId": "3.3.5.4.10.3.1.j",
      "description": "Specify if the graphic has a transparent color and identify the color.",
      "type": "string"
    },
    "graphicState": {
      "$reqId": "3.3.5.4.10.3.1.k",
      "description": "State of each graphic",
      "type": "string"
    },
    "graphicTableDateTimeChangeInformation": {
      "$reqId": "3.3.5.4.10.3.2.1",
      "description": "Provide date and time of last graphics table change as part of DMS graphic table
information.",
      "$ref": "#/$defs/DateTime"
    },
```

```
      "graphicTableBitmap": {
        "$reqId": "3.3.5.4.10.3.2.2",
        "description": "Provide bitmap for each graphic in the graphics table as part of DMS graphic table information.",
        "type": "string"
      }
    },
    "required": [
      "ownerOrganization",
      "deviceId",
      "graphicNumber",
      "graphicName",
      "graphicHeight",
      "graphicWidth",
      "graphicType",
      "graphicId",
      "graphicSpacing",
      "graphicColor",
      "graphicState"
    ]
}
```

3.3.5.4.11 External Commands for DMS Devices

The requirements for an external center to send messages to control a DMS that is normally managed by an owner center are as follows. Arse >gaooD

3.3.5.4.11.1 Send DMS Control Command Status

An owner center shall respond to an authorized external center configuring a DMS via a one-time control command with a message containing the status of the command.

3.3.5.4.11.2 DMSControlCommandRequest

```
{
    "description": "Content of DMS command sent from external center to owner center",
    "type": "object",
    "$reqId": "3.3.5.4.11.2",
    "properties": {
      "deviceControlCommandHeader": {
        "$reqId": "3.3.5.4.11.2.1.a",
        "description": "Generic device control command header information for dynamic message sign",
        "allOf": [
          {
            "$ref": "#/$defs/ExternalDeviceControlRequest"
          },
          {
            "type": "object",
            "properties": {
              "deviceType": {
```

```
                    "const": "dynamic message sign"
                }
            }
        }
      ]
    },
    "messageCommandType": {
      "$reqId": "3.3.5.4.11.2.1.b",
      "description": "Type of message command (custom, library, remove)",
      "type": "string",
      "enum": [
        "customMessage",
        "libraryMessage",
        "removeMessage"
      ]
    },
    "messageRequestedMultiLanguage": {
      "$reqId": "3.3.5.4.11.2.1.c",
      "description": "Message requested in multiple languages",
      "type": "string"
    },
    "messageNumber": {
      "$reqId": "3.3.5.4.11.2.1.d",
      "description": "Message number, memory type (permanent, changeable, volatile), and CRC of the
requested message",
      "type": "number"
    },
    "memoryType": {
      "$reqId": "3.3.5.4.11.2.1.e",
      "$ref": "#/$defs/DMSMessageMemoryType"
    },
    "messageCrc": {
      "$reqId": "3.3.5.4.11.2.1.f",
      "type": "string"
    },
    "beaconControl": {
      "$reqId": "3.3.5.4.11.2.2.1",
      "description": "Indicate if the beacon is to be enabled or disabled in the DMS control command",
      "type": "string"
    }
  },
  "required": [
    "deviceControlCommandHeader",
    "messageCommandType",
    "messageRequestedMultiLanguage",
    "messageNumber"
  ]
}
```

3.3.5.4.11.3 DMSControlCommandResponse


```
{
  "description": "Include a response to a DMS control command from an external center",
  "type": "object",
  "$reqId": "3.3.5.4.11.3",
  "properties": {
    "deviceControlCommandResponse": {
      "$reqId": "3.3.5.4.11.3.a",
      "description": "Response information for generic device control commands",
      "$ref": "#/$defs/ExternalDeviceControlCommandResponse"
    }
  },
  "required": [
    "deviceControlCommandResponse"
  ]
}
```


3.3.5.5 Environment Sensors

The environmental sensor station (ESS) model assumes that each environmental sensor station may have multiple environmental sensors. Each environmental sensor may collect different types of environmental or roadway data. Each environmental sensor may also be located on different links (roadways), on different lanes, bodies of water, or different elevations. The requirements to exchange ESS information between centers are as follows:

3.3.5.5.1 Share ESS Inventory Information

The requirements for sharing ESS inventory information with other authorized centers are as follows:

3.3.5.5.1.1 Send ESS Inventory Information Upon Request

An owner center shall respond to an authorized external center requesting ESS inventory with a message containing the owner center's ESS inventory information.

3.3.5.5.1.2 Publish ESS Inventory Information

This section describes the design for how an owner center publishes a message to all authorized subscribing external centers using the schema structure defined in annexure A.2 of this document.

3.3.5.5.1.3 Subscribe to ESS Inventory Information

This section describes the design for how external centers receives a published message by an owner center using the schema structure defined in annexure A.3 of this document.

3.3.5.5.1.4 ESSInventoryInformationRequest


```
{
  "description": "Include ESS inventory information request details from external center to owner center",
```

```
  "type": "object",
  "$reqId": "3.3.5.5.1.4",
  "properties": {
    "$reqId": "3.3.5.5.1.4.a",
    "description": "Generic device information request for ESS with device inventory type",
    "allOf": [
      {
        "$ref": "#/$defs/DeviceInformationRequest"
      },
      {
        "type": "object",
        "properties": {
          "deviceType": {
            "const": "environmental sensor station"
          },
          "deviceInformationType": {
            "const": "device inventory"
          }
        }
      }
    ]
  },
  "required": [
    "deviceInformationRequest"
  ]
}
```

3.3.5.5.1.5 ESSInventoryInformationResponse

```
{
  "description": "ESS inventory information from owner center to external center.",
  "type": "object",
  "$reqId": "3.3.5.5.1.5",
  "properties": {
    "deviceInventoryHeader": {
      "$reqId": "3.3.5.5.1.5.1.a",
      "description": "Header information for environmental sensor station in device inventory",
      "$ref": "#/$defs/DeviceInventoryResponseHeader"
    },
    "deviceInventoryHeaderList": {
      "$reqId": "3.3.5.5.1.5.1.b",
      "description": "Generic device inventory header information for each environmental sensor
connected to the environmental sensor station",
      "type": "array",
      "items": {
        "$ref": "#/$defs/DeviceInventoryResponseHeader"
      }
    },
    "laneNumber": {
```

```
        "$reqId": "3.3.5.5.1.5.2.1",
        "description": "Provide the lane number for each environmental sensor in the ESS inventory information",
        "type": "string"
      },
      "deviceElevation": {
        "$reqId": "3.3.5.5.1.5.2.2",
        "description": "Provide the elevation of the environmental sensor in decimeters as part of ESS inventory information.",
        "type": "string"
      },
      "deviceHeight": {
        "$reqId": "3.3.5.5.1.5.2.3",
        "description": "Provide the height of the environmental sensor from the base of the station in decimeters as part of ESS inventory information.",
        "type": "string"
      },
      "deviceType": {
        "$reqId": "3.3.5.5.1.5.2.4",
        "description": "Provide the type of environmental sensor in ESS inventory information",
        "type": "string",
        "enum": [
          "atmospheric",
          "wind",
          "temperature",
          "precipitation",
          "visibility",
          "pavement",
          "subsurface",
          "other",
          "unknown"
        ]
      },
      "deviceOperationType": {
        "$reqId": "3.3.5.5.1.5.2.5",
        "description": "Provide operation type of the environmental sensor station in the ESS inventory information",
        "type": "string",
        "enum": [
          "staffed",
          "automatic",
          "unknown",
          "other"
        ]
      },
      "deviceMobilityType": {
        "$reqId": "3.3.5.5.1.5.2.6",
        "description": "Provide mobility type of environmental sensor station in ESS inventory",
```

```
            "type": "string",
            "enum": [
               "permanent",
               "transportable",
               "mobile",
               "other"
            ]
         }
      },
      "required": [
         "deviceInventoryHeader",
         "deviceInventoryHeaderList"
      ]
}
```


3.3.5.5.2 Share ESS Status Information

The requirements for sharing ESS status information with other authorized centers are as follows:

3.3.5.5.2.1 Send ESS Status Information Upon Request

An owner center shall respond to an authorized external center requesting ESS status with a message containing the owner center's ESS status information.

3.3.5.5.2.2 Publish ESS Status Information

This section describes the design for how an owner center publishes a message to all authorized subscribing external centers using the schema structure defined in annexure A.2 of this document.

3.3.5.5.2.3 Subscribe to ESS Status Information

This section describes the design for how external centers receives a published message by an owner center using the schema structure defined in annexure A.3 of this document.

3.3.5.5.2.4 ESSStatusRequest


```
{
   "description": "Include ESS status request details in communication from external center to owner center",
   "type": "object",
   "$reqId": "3.3.5.5.2.4",
   "properties": {
      "deviceInformationRequest": {
         "$reqId": "3.3.5.5.2.4.a",
         "description": "Device information request for environmental sensor status",
         "allOf": [
            {
               "$ref": "#/$defs/DeviceInformationRequest"
            },
```

```
            {
               "type": "object",
               "properties": {
                  "deviceType": {
                     "const": "environmental sensor station"
                  },
                  "deviceInformationType": {
                     "const": "device status"
                  }
               }
            }
         ]
      }
   },
   "required": [
      "deviceInformationRequest"
   ]
}
```

3.3.5.5.2.5 ESSStatusResponse

```
{
   "description": "Include generic device status header information in the ESS status information sent to external center",
   "type": "object",
   "$reqId": "3.3.5.5.2.5",
   "properties": {
      "deviceStatusHeader": {
         "$reqId": "3.3.5.5.2.5.a",
         "description": "Header information for the status of an environmental sensor station device.",
         "allOf": [
            {
               "$ref": "#/$defs/DeviceStatusHeader"
            },
            {
               "properties": {
                  "deviceStatuses": {
                     "items": {
                        "allOf": [
                           {
                              "$ref": "#/$defs/DeviceStatus"
                           },
                           {
                              "properties": {
                                 "deviceType": {
                                    "const": "environmental sensor station"
                                 }
                              }
                           }
```

```
                    ]
                }
            }
        }
    }
    ]
},
"connectedDeviceStatusHeader": {
    "$reqId": "3.3.5.5.2.5.b",
    "description": "Generic device status header information for environmental sensors connected to the environmental sensor station.",
    "allOf": [
        {
            "$ref": "#/$defs/DeviceStatusHeader"
        },
        {
            "properties": {
                "deviceStatuses": {
                    "items": {
                        "allOf": [
                            {
                                "$ref": "#/$defs/DeviceStatus"
                            },
                            {
                                "properties": {
                                    "deviceType": {
                                        "const": "environmental sensor station"
                                    }
                                }
                            }
                        ]
                    }
                }
            }
        }
    ]
}
},
"required": [
    "deviceStatusHeader",
    "connectedDeviceStatusHeader"
]
}
```


3.3.5.5.3 Share ESS Observation Data

The requirements for sharing ESS observation data information with other authorized centers are as follows:

3.3.5.5.3.1 Send ESS Observation Data Upon Request

An owner center shall respond to an authorized external center requesting ESS observation data with a message containing the owner center's ESS observation data information.

3.3.5.5.3.2 Publish ESS Observation Data

This section describes the design for how an owner center publishes a message to all authorized subscribing external centers using the schema structure defined in annexure A.2 of this document.

3.3.5.5.3.3 Subscribe to ESS Observation Data

This section describes the design for how external centers receives a published message by an owner center using the schema structure defined in annexure A.3 of this document.

3.3.5.5.3.4 ESSObservationDataRequest


```
{
   "description": "Include ESS observation data request details from external center to owner center",
   "type": "object",
   "$reqId": "3.3.5.5.3.4",
   "properties": {
      "deviceInformationRequest": {
         "$reqId": "3.3.5.5.3.4.a",
         "description": "Request for generic device information for environmental sensor station with device
data type",
         "allOf": [
            {
               "$ref": "#/$defs/DeviceInformationRequest"
            },
            {
               "type": "object",
               "properties": {
                  "deviceType": {
                     "const": "environmental sensor station"
                  },
                  "deviceInformationType": {
                     "const": "device data"
                  }
               }
            }
         ]
      }
   },
   "required": [
      "deviceInformationRequest"
   ]
}
```

3.3.5.5.3.5 ESSobservationDataResponse


```
{
   "description": "Include unique identifiers for the ESS station and each ESS sensor, along with timestamp and observation block data in ESS observation data transmission.",
   "type": "object",
   "$reqId": "3.3.5.5.3.5",
   "properties": {
      "ownerOrganization": {
         "$reqId": "3.3.5.5.3.5.a",
         "description": "Owner organization information details",
         "$ref": "#/$defs/OrganizationInformation"
      },
      "stationId": {
         "$reqId": "3.3.5.5.3.5.b",
         "description": "Unique identifier for the ESS station",
         "type": "string"
      },
      "essSensorId": {
         "$reqId": "3.3.5.5.3.5.c",
         "description": "Unique identifier for each ESS sensor",
         "type": "string"
      },
      "timestampEssObservationData": {
         "$reqId": "3.3.5.5.3.5.d",
         "description": "Timestamp of the ESS observation data",
         "$ref": "#/$defs/DateTime"
      },
      "observationBlockData": {
         "$reqId": "3.3.5.5.3.5.e",
         "description": "Observation block data including weather, pavement, and subsurface conditions.",
         "type": "string",
         "enum": [
            "weather",
            "pavement",
            "subsurface"
         ]
      }
   },
   "required": [
      "ownerOrganization",
      "stationId",
      "essSensorId",
      "timestampEssObservationData",
      "observationBlockData"
   ]
}
```

3.3.5.5.4 Share ESS Metadata

The requirements for sharing ESS metadata information with other authorized centers are as follows:

3.3.5.5.4.1 Send ESS Metadata Information Upon Request

An owner center shall respond to an authorized external center requesting ESS metadata information with a message containing the owner center's ESS metadata information.

3.3.5.5.4.2 ESSMetadataRequest


```
{
   "description": "Specify the ESS metadata request details from an external center to an owner center",
   "type": "object",
   "$reqId": "3.3.5.5.4.2",
   "properties": {
      "deviceInformationRequest": {
         "$reqId": "3.3.5.5.4.2.a",
         "description": "Request for generic device information for environmental sensor station with device
metadata type",
         "allOf": [
            {
               "$ref": "#/$defs/DeviceInformationRequest"
            },
            {
               "type": "object",
               "properties": {
                  "deviceType": {
                     "const": "environmental sensor station"
                  },
                  "deviceInformationType": {
                     "const": "device metadata"
                  }
               }
            }
         ]
      }
   },
   "required": [
      "deviceInformationRequest"
   ]
}
```


3.3.5.5.4.3 ESSMetadataResponse


```
{
   "description": "Content of ESS metadata information sent from external center to owner center",
   "type": "object",
   "$reqId": "3.3.5.5.4.3",
   "properties": {
```

```
"fileName": {
    "$reqId": "3.3.5.5.4.3.1.a",
    "description": "Name of the file containing observations",
    "type": "string"
},
"fileDirectoryPath": {
    "$reqId": "3.3.5.5.4.3.1.b",
    "description": "Logical directory path for the observation file",
    "type": "string"
},
"protocolUsed": {
    "$reqId": "3.3.5.5.4.3.1.c",
    "description": "Protocol for retrieving observations",
    "type": "string"
},
"networkDnsName": {
    "$reqId": "3.3.5.5.4.3.1.d",
    "description": "Network DNS name and IP address of the collector host server",
    "type": "string"
},
"networkAdressPort": {
    "$reqId": "3.3.5.5.4.3.1.e",
    "description": "Logical network address port on the collector host server",
    "type": "string"
},
"observationCollectionFrequency": {
    "$reqId": "3.3.5.5.4.3.1.f",
    "description": "Frequency of observation collection",
    "type": "string"
},
"observationCollectionOffset": {
    "$reqId": "3.3.5.5.4.3.1.g",
    "description": "Time in minutes after midnight UTC for the first observation collection",
    "type": "string"
},
"offsetMinutesUTC": {
    "$reqId": "3.3.5.5.4.3.1.h",
    "description": "Minutes offset from UTC for the agency's collector host server",
    "type": "string"
},
"hostTimeZone": {
    "$reqId": "3.3.5.5.4.3.1.i",
    "description": "Standard Time Zone of the agency's collector host location",
    "type": "string"
},
"daylightSavings": {
    "$reqId": "3.3.5.5.4.3.1.j",
    "description": "Indicate if Daylight Savings Time is observed on the server",
```

```
            "type": "string"
        },
        "requestHeader": {
            "$reqId": "3.3.5.5.4.3.2.1",
            "description": "Requirements for Authorization information in ESS metadata are specified in
Section 3.3.1.8.1.",
            "$ref": "#/$defs/AuthHeader"
        },
        "CollectorConfigurationContent": {
            "$ref": "#/$defs/CollectorConfigurationContent"
        },
        "organization": {
            "$reqId": "3.3.5.5.4.3.3",
            "description": "Provide organization information of the owner associated with ESS metadata",
            "$ref": "#/$defs/OrganizationInformation"
        },
        "SensorSpecificInformation": {
            "$ref": "#/$defs/SensorSpecificInformation"
        },
        "SiteSpecificInformation": {
            "$ref": "#/$defs/SiteSpecificInformation"
        },
        "StationSpecificInformation": {
            "$ref": "#/$defs/StationSpecificInformation"
        },
        "ClimateRecordInformation": {
            "$ref": "#/$defs/ClimateRecordInformation"
        },
        "DataCollectorInformation": {
            "$ref": "#/$defs/DataCollectorInformation"
        },
        "ImageInformation": {
            "$ref": "#/$defs/ImageInformation"
        }
    },
    "required": [
        "fileName",
        "fileDirectoryPath",
        "protocolUsed",
        "networkDnsName",
        "networkAdressPort",
        "observationCollectionFrequency",
        "observationCollectionOffset",
        "offsetMinutesUTC",
        "hostTimeZone",
        "daylightSavings"
    ]
}
```

3.3.5.6 Lane Closure Gates

The requirements to exchange gate information and provide gate command/control capabilities between centers are as follows:

3.3.5.6.1 Share Gate Inventory Information

The requirements for sharing gate inventory information with other authorized centers are as follows:

3.3.5.6.1.1 Send Gate Inventory Information Upon Request

An owner center shall respond to an authorized external center requesting gate inventory with a message containing the owner center's gate inventory information.

3.3.5.6.1.2 Publish Gate Inventory Information

This section describes the design for how an owner center publishes a message to all authorized subscribing external centers using the schema structure defined in annexure A.2 of this document.

3.3.5.6.1.3 Subscribe to Gate Inventory Information

This section describes the design for how external centers receives a published message by an owner center using the schema structure defined in annexure A.3 of this document.

3.3.5.6.1.4 GateInventoryRequest

```
{
   "description": "Include gate inventory information request details for owner center from external center",
   "type": "object",
   "$reqId": "3.3.5.6.1.4",
   "properties": {
      "deviceInformationRequest": {
         "$reqId": "3.3.5.6.1.4.a",
         "description": "Request for generic device information for a gate, specifying device inventory
type.",
         "allOf": [
            {
               "$ref": "#/$defs/DeviceInformationRequest"
            },
            {
               "type": "object",
               "properties": {
                  "deviceType": {
                     "const": "gate"
                  },
                  "deviceInformationType": {
                     "const": "device inventory"
                  }
               }
```

```
            }
          ]
        }
    },
    "required": [
      "deviceInformationRequest"
    ]
}
```

3.3.5.6.1.5 GateInventoryResponse

```
{
    "description": "Gate inventory information for owner center to external center",
    "type": "object",
    "$reqId": "3.3.5.6.1.5",
    "properties": {
      "deviceInventoryHeaderInformation": {
        "$reqId": "3.3.5.6.1.5.1.a",
        "description": "Generic device inventory header information",
        "$ref": "#/$defs/DeviceInventoryResponseHeader"
      },
      "numberLanesGateInventory": {
        "$reqId": "3.3.5.6.1.5.2.1",
        "description": "Provide the number of lanes controlled by the gate as part of the gate inventory
information",
        "type": "number"
      }
    },
    "required": [
      "deviceInventoryHeaderInformation"
    ]
}
```

3.3.5.6.2 Share Gate Status Information

The requirements for sharing gate status information with other authorized centers are as follows:

3.3.5.6.2.1 Send Gate Status Information Upon Request

An owner center shall respond to an authorized external center requesting gate status with a message containing the owner center's gate status information.

3.3.5.6.2.2 Publish Gate Status Information

This section describes the design for how an owner center publishes a message to all authorized subscribing external centers using the schema structure defined in annexure A.2 of this document.

3.3.5.6.2.3 Subscribe to Gate Status Information

This section describes the design for how external centers receives a published message by an owner center using the schema structure defined in annexure A.3 of this document.

3.3.5.6.2.4 GateStatusRequest


```
{
   "description": "Include gate status request details in communication from external center to owner center",
   "type": "object",
   "$reqId": "3.3.5.6.2.4",
   "properties": {
      "deviceInformationRequest": {
         "$reqId": "3.3.5.6.2.4.a",
         "description": "Generic device information request for gate status",
         "allOf": [
            {
               "$ref": "#/$defs/DeviceInformationRequest"
            },
            {
               "type": "object",
               "properties": {
                  "deviceType": {
                     "const": "gate"
                  },
                  "deviceInformationType": {
                     "const": "device status"
                  }
               }
            }
         ]
      }
   },
   "required": [
      "deviceInformationRequest"
   ]
}
```


3.3.5.6.2.5 GateStatusResponse


```
{
   "description": "Include gate status of each device (opened, closed, partially open/closed) in the information sent to external center",
   "type": "object",
   "$reqId": "3.3.5.6.2.5",
   "properties": {
      "deviceStatusHeader": {
         "$reqId": "3.3.5.6.2.5.a",
         "description": "Generic device status header information",
         "allOf": [
```

```
            {
               "$ref": "#/$defs/DeviceStatusHeader"
            },
            {
               "properties": {
                  "deviceStatuses": {
                     "items": {
                        "allOf": [
                           {
                              "$ref": "#/$defs/DeviceStatus"
                           },
                           {
                              "properties": {
                                 "deviceType": {
                                    "const": "gate"
                                 }
                              }
                           }
                        ]
                     }
                  }
               }
            }
         ]
      },
      "gateStatus": {
         "$reqId": "3.3.5.6.2.5.b",
         "$ref": "#/$defs/GateDeviceStatus"
      }
   },
   "required": [
      "deviceStatusHeader",
      "gateStatus"
   ]
}
```

3.3.5.6.3 External Control Requests for Gates

The requirements to support gate control requests from other authorized centers are as follows. Only control requests to open or close a remote gate device are supported.

3.3.5.6.3.1 Send Gate Control Response Upon Request

An owner center shall respond to an authorized external center requesting remote control of a gate viaa one-time control request with a message containing the status of the request.

3.3.5.6.3.2 GateControlRequest


```
{
   "description": "Include gate request command in the control request (gate open, gate closed)",
   "type": "object",
   "$reqId": "3.3.5.6.3.2",
   "properties": {
      "deviceChangeRequestHeader": {
         "$reqId": "3.3.5.6.3.2.a",
         "description": "Generic device change request header information with the device type set to
'gate'.",
         "allOf": [
            {
               "$reqId": "3.3.5.3.5.2.a",
               "description": "Generic cancel request for device change with device type set to 'cctv
camera'",
               "$ref": "#/$defs/DeviceChangeRequestHeader"
            },
            {
               "type": "object",
               "properties": {
                  "deviceType": {
                     "const": "gate"
                  }
               }
            }
         ]
      },
      "gateRequestedCommand": {
         "$reqId": "3.3.5.6.3.2.b",
         "description": "Command for gate operations (open or closed)",
         "type": "string",
         "enum": [
            "gateOpen",
            "gateClosed"
         ]
      }
   },
   "required": [
      "deviceChangeRequestHeader",
      "gateRequestedCommand"
   ]
}
```


3.3.5.6.3.3 GateControlResponse


```
{
   "description": "Include owner center response to a gate control request from an external center",
   "type": "object",
   "$reqId": "3.3.5.6.3.3",
```

```
  "properties": {
    "deviceChangeResponseHeader": {
      "$reqId": "3.3.5.6.3.3.a",
      "description": "Generic device change response header information",
      "allOf": [
        {
          "$ref": "#/$defs/DeviceChangeResponseHeader"
        },
        {
          "type": "object",
          "properties": {
            "deviceType": {
              "const": "gate"
            }
          }
        }
      ]
    }
  },
  "required": [
    "deviceChangeResponseHeader"
  ]
}
```

3.3.5.6.4 Request Gate Control Status

The requirements to check the status of a gate control request previously issued by an authorized external center are as follows.

3.3.5.6.4.1 Send Gate Control Status Upon Request

An owner center shall respond to an authorized external center requesting the status of a previously issued gate control request as described in “3.3.5.1.2.3.1 Send Device Change Status Upon Request”.

3.3.5.6.4.2 GateControlStatusRequest

```
{
  "description": "Include gate control status request details from an external center to an owner center",
  "type": "object",
  "$reqId": "3.3.5.6.4.2",
  "properties": {
    "deviceChangeStatusRequest": {
      "$reqId": "3.3.5.6.4.2.a",
      "description": "Generic device change status request with specified device type",
      "allOf": [
        {
          "$ref": "#/$defs/DeviceChangeStatusRequest"
        },
        {
```

```
                "properties": {
                    "deviceType": {
                        "const": "gate"
                    }
                }
            }
        ]
    }
  },
  "required": [
    "deviceChangeStatusRequest"
  ]
}
```

3.3.5.6.4.3 GateControlStatusResponse

```
{
  "description": "Include response to gate control status request from external center",
  "type": "object",
  "$reqId": "3.3.5.6.4.3",
  "properties": {
    "deviceControlResponseHeader": {
      "$reqId": "3.3.5.6.4.3.a",
      "description": "Generic device change response header information",
      "allOf": [
        {
          "$ref": "#/$defs/DeviceChangeResponseHeader"
        },
        {
          "type": "object",
          "properties": {
            "deviceType": {
              "const": "gate"
            }
          }
        }
      ]
    }
  },
  "required": [
    "deviceControlResponseHeader"
  ]
}
```

3.3.5.6.5 Cancel External Control Requests for Gates

The requirements to cancel a gate control request previously issued by an authorized external center are as follows.

3.3.5.6.5.1 Send Gate Control Cancellation Response Upon Request

The requirement for an owner center to respond to an authorized external center requesting cancellation of a previously issued gate control request is found in "3.3.5.1.2.4.1 Send Change Cancellation Response Upon Request".

3.3.5.6.5.2 GateControlCancellationRequest


```
{
   "description": "Include gate control cancellation request details from external center to owner center",
   "type": "object",
   "$reqId": "3.3.5.6.5.2",
   "properties": {
      "deviceChangeCancellationRequest": {
         "$reqId": "3.3.5.6.5.2.a",
         "description": "Generic cancel device change request for gate device type",
         "allOf": [
            {
               "$ref": "#/$defs/DeviceChangeCancellationRequest"
            },
            {
               "properties": {
                  "deviceType": {
                     "const": "gate"
                  }
               }
            }
         ]
      }
   },
   "required": [
      "deviceCancellationChangeRequest"
   ]
}
```


3.3.5.6.5.3 GateControlCancellationResponse


```
{
   "description": "Response to gate control cancellation request must be included in owner center's
reply.",
   "type": "object",
   "$reqId": "3.3.5.6.5.3",
   "properties": {
      "deviceChangeResponseHeader": {
         "$reqId": "3.3.5.6.5.3.a",
         "description": "Generic device change response header information",
         "allOf": [
            {
               "$ref": "#/$defs/DeviceChangeResponseHeader"
            },
```

```
            {
               "type": "object",
               "properties": {
                  "deviceType": {
                     "const": "gate"
                  }
               }
            }
         ]
      }
   },
   "required": [
      "deviceChangeResponseHeader"
   ]
}
```

3.3.5.6.6 Share Gate Schedule

The requirements to share the gate time base schedule with other authorized centers are as follows:

3.3.5.6.6.1 Send Gate Schedule Information Upon Request

An owner center shall respond to an authorized external center requesting gate schedules with a message containing the owner center's gate time base schedule information.

3.3.5.6.6.2 Publish Gate Schedule Information

This section describes the design for how an owner center publishes a message to all authorized subscribing external centers using the schema structure defined in annexure A.2 of this document.

3.3.5.6.6.3 Subscribe to Gate Schedule Information

This section describes the design for how external centers receives a published message by an owner center using the schema structure defined in annexure A.3 of this document.

3.3.5.6.6.4 GateScheduleRequest

```
{
   "description": "Include gate time base schedule request details from external center to owner center",
   "type": "object",
   "$reqId": "3.3.5.6.6.4",
   "properties": {
      "deviceInformationRequest": {
         "$reqId": "3.3.5.6.6.4.a",
         "description": "Generic device information request for gate device type and device schedule
information type.",
         "allOf": [
            {
               "$ref": "#/$defs/DeviceInformationRequest"
```

```
            },
            {
               "type": "object",
               "properties": {
                  "deviceType": {
                     "const": "gate"
                  },
                  "deviceInformationType": {
                     "const": "device schedule"
                  }
               }
            }
         ]
      }
   },
   "required": [
      "deviceInformationRequest"
   ]
}
```

3.3.5.6.6.5 GateScheduleResponse

```
{
   "description": "Include gate action information (open/closed) in gate schedule",
   "type": "object",
   "$reqId": "3.3.5.6.6.5",
   "properties": {
      "deviceScheduleInformation": {
         "$reqId": "3.3.5.6.6.5.a",
         "description": "Generic device schedule information",
         "$ref": "#/$defs/DeviceScheduleInformation"
      },
      "gateAction": {
         "$reqId": "3.3.5.6.6.5.b",
         "description": "State of the gate (open or closed)",
         "type": "string",
         "enum": [
            "gateOpen",
            "gateClosed"
         ]
      }
   },
   "required": [
      "deviceScheduleInformation",
      "gateAction"
   ]
}
```

3.3.5.6.7 External Commands for Gates

The requirements to control gates from other authorized centers are as follows. Only control requests to open or close a remote gate device are supported.

3.3.5.6.7.1 Send Gate Control Command Status

An owner center shall respond to an authorized external center controlling a gate via a one-time control command with a message containing the status of the command.

3.3.5.6.7.2 GateControlCommandRequest


```
{
  "description": "Include gate command (gate open, gate closed) in the gate control request",
  "type": "object",
  "$reqId": "3.3.5.6.7.2",
  "properties": {
    "deviceControlCommandHeader": {
      "$reqId": "3.3.5.6.7.2.a",
      "description": "Device control command header information for a gate device",
      "allOf": [
        {
          "$ref": "#/$defs/ExternalDeviceControlRequest"
        },
        {
          "type": "object",
          "properties": {
            "deviceType": {
              "const": "gate"
            }
          }
        }
      ]
    },
    "gateCommand": {
      "$reqId": "3.3.5.6.7.2.b",
      "description": "Command to open or close the gate",
      "type": "string",
      "enum": [
        "gateOpen",
        "gateClosed"
      ]
    }
  },
  "required": [
    "deviceControlCommandHeader",
    "gateCommand"
  ]
}
```

3.3.5.6.7.3 GateControlCommandResponse


```
{
   "description": "Owner center response to gate control command from external center",
   "type": "object",
   "$reqId": "3.3.5.6.7.3",
   "properties": {
      "deviceControlCommandResponse": {
         "$reqId": "3.3.5.6.7.3.a",
         "description": "Information regarding the response to generic device control commands",
         "$ref": "#/$defs/ExternalDeviceControlCommandResponse"
      }
   },
   "required": [
      "deviceControlCommandResponse"
   ]
}
```


3.3.5.7 Lane Control Signals

The requirements to exchange lane control signal (LCS) information and provide LCS command/control capabilities between centers are as follows:

3.3.5.7.1 Share LCS Inventory Information

The requirements for sharing LCS inventory information with other authorized centers are as follows:

3.3.5.7.1.1 Send LCS Inventory Information Upon Request

An owner center shall respond to an authorized external center requesting LCS inventory with a message containing the owner center's LCS inventory information.

3.3.5.7.1.2 Publish LCS Inventory Information

This section describes the design for how an owner center publishes a message to all authorized subscribing external centers using the schema structure defined in annexure A.2 of this document.

3.3.5.7.1.3 Subscribe to LCS Inventory Information

This section describes the design for how external centers receives a published message by an owner center using the schema structure defined in annexure A.3 of this document.

3.3.5.7.1.4 LCSInventoryInformationRequest


```
{
   "description": "Include LCS inventory information request details in communication from external center to owner center",
   "type": "object",
   "$reqId": "3.3.5.7.1.4",
   "properties": {
```

```
        "deviceInformationRequest": {
          "$reqId": "3.3.5.7.1.4.a",
          "description": "Generic device information request for lane control signal device inventory",
          "allOf": [
            {
              "$ref": "#/$defs/DeviceInformationRequest"
            },
            {
              "type": "object",
              "properties": {
                "deviceType": {
                  "const": "lane control signal"
                },
                "deviceInformationType": {
                  "const": "device inventory"
                }
              }
            }
          ]
        }
      },
      "required": [
        "deviceInformationRequest"
      ]
}
```

3.3.5.7.1.5 LCSInventoryInformationResponse

```
{
    "description": "LCS inventory information to send to an external center",
    "type": "object",
    "$reqId": "3.3.5.7.1.5",
    "properties": {
        "deviceInventoryHeader": {
            "$reqId": "3.3.5.7.1.5.1.a",
            "description": "Generic device inventory header information",
            "$ref": "#/$defs/DeviceInventoryResponseHeader"
        },
        "deviceId": {
            "$reqId": "3.3.5.7.1.5.1.b",
            "description": "Unique identifier for the link controlled by each device",
            "type": "array",
            "items": {
                "type": "string"
            }
        },
        "controlledLaneNumber": {
            "$reqId": "3.3.5.7.1.5.1.c",
            "description": "Lane number controlled by the device",
```

```
            "type": "array",
            "items": {
               "type": "number"
            }
         },
         "lanesNumber": {
            "$reqId": "3.3.5.7.1.5.2.1",
            "description": "Provide the number of lanes on the link as part of the LCS inventory information for each LCS.",
            "type": "array",
            "items": {
               "type": "number"
            }
         }
      },
      "required": [
         "deviceInventoryHeader",
         "deviceId",
         "controlledLaneNumber"
      ]
}
```


3.3.5.7.2 Share LCS Status Information

The requirements for sharing LCS status information with other authorized centers are as follows:

3.3.5.7.2.1 Send LCS Status Information Upon Request

An owner center shall respond to an authorized external center requesting LCS status with a message containing the owner center's LCS status information.

3.3.5.7.2.2 Publish LCS Status Information

This section describes the design for how an owner center publishes a message to all authorized subscribing external centers using the schema structure defined in annexure A.2 of this document.

3.3.5.7.2.3 Subscribe to LCS Status Information

This section describes the design for how external centers receives a published message by an owner center using the schema structure defined in annexure A.3 of this document.

3.3.5.7.2.4 LCSStatusRequest


```
{
   "description": "Include LCS status request details in external center to owner center communication",
   "type": "object",
   "$reqId": "3.3.5.7.2.4",
   "properties": {
      "deviceInformationRequest": {
```

```
        "$reqId": "3.3.5.7.2.4.a",
        "description": "Generic device information request for lane control signal status",
        "allOf": [
          {
            "$ref": "#/$defs/DeviceInformationRequest"
          },
          {
            "type": "object",
            "properties": {
              "deviceType": {
                "const": "lane control signal"
              },
              "deviceInformationType": {
                "const": "device status"
              }
            }
          }
        ]
      }
    },
    "required": [
      "deviceInformationRequest"
    ]
}
```

3.3.5.7.2.5 LCSStatusResponse

```
{
    "description": "Include lane status and link direction in LCS status information",
    "type": "object",
    "$reqId": "3.3.5.7.2.5",
    "properties": {
      "deviceStatusHeader": {
        "$reqId": "3.3.5.7.2.5.a",
        "description": "Generic device status header information",
        "allOf": [
          {
            "$ref": "#/$defs/DeviceStatusHeader"
          },
          {
            "properties": {
              "deviceStatuses": {
                "items": {
                  "allOf": [
                    {
                      "$ref": "#/$defs/DeviceStatus"
                    },
                    {
                      "properties": {
```

```
                                "deviceType": {
                                    "const": "lane control signal"
                                }
                            }
                        }
                    ]
                }
            }
        }
    ]
},
"lanesStatus": {
    "$reqId": "3.3.5.7.2.5.b",
    "description": "Status of the lane (open, closed, opening, closing, unknown, turning lane)",
    "type": "string",
    "enum": [
        "open",
        "closed",
        "opening",
        "closing",
        "unknown",
        "turningLane"
    ]
},
"linkDirection": {
    "$reqId": "3.3.5.7.2.5.c",
    "description": "Define link direction options (e.g., northbound, eastbound, both directions, etc.)",
    "type": "string",
    "enum": [
        "northbound",
        "northeastBound",
        "eastbound",
        "southeastBound",
        "southbound",
        "southwestBound",
        "westbound",
        "northwestBound",
        "notDirectional",
        "positiveDirection",
        "negativeDirection",
        "bothDirections",
        "other"
    ]
}
},
"required": [
    "deviceStatusHeader",
```

```
      "lanesStatus",
      "linkDirection"
   ]
}
```

3.3.5.7.3 External Change Requests for Lane Control Devices

The requirements to support LCS change requests from other authorized centers are as follows. Only requests to open or close a lane on a remote LCS device are supported.

3.3.5.7.3.1 Send LCS Change Response Upon Request

An owner center shall respond to an authorized external center requesting a change to an LCS device via a one-time control request with a message containing the status of the request.

3.3.5.7.3.2 LCSChangeRequest

```
{
   "description": "Include lane control signal indication requested in LCS change request",
   "type": "object",
   "$reqId": "3.3.5.7.3.2",
   "properties": {
      "deviceChangeStatusRequest": {
         "$reqId": "3.3.5.7.3.2.a",
         "description": "Header information for device change request for lane control signal",
         "allOf": [
            {
               "$ref": "#/$defs/DeviceChangeStatusRequest"
            },
            {
               "properties": {
                  "deviceType": {
                     "const": "lane control signal"
                  }
               }
            }
         ]
      },
      "laneControlSignal": {
         "$reqId": "3.3.5.7.3.2.b",
         "description": "Indicates lane control signal status (open, closed, other)",
         "$ref": "#/$defs/LaneControlCommands"
      }
   },
   "required": [
      "deviceChangeStatusRequest",
      "laneControlSignal"
   ]
}
```

3.3.5.7.3.3 LCSChangeResponse


```
{
   "description": "Response to LCS change request shall include specified information from the owner
center",
   "type": "object",
   "$reqId": "3.3.5.7.3.3",
   "properties": {
      "deviceChangeResponseHeader": {
         "$reqId": "3.3.5.7.3.3.a",
         "description": "Header information for generic device change response",
         "allOf": [
            {
               "$ref": "#/$defs/DeviceChangeResponseHeader"
            },
            {
               "type": "object",
               "properties": {
                  "deviceType": {
                     "const": "lane control signal"
                  }
               }
            }
         ]
      }
   },
   "required": [
      "deviceChangeResponseHeader"
   ]
}
```


3.3.5.7.4 Request LCS Change Status

The requirements to check the status of an LCS change request previously issued by an authorized external center are as follows.

3.3.5.7.4.1 Send LCS Change Status Upon Request

An owner center shall respond to an authorized external center requesting the status of a previously issued LCS change request as described “3.3.5.1.2.3.1 Send Device Change Status Upon Request”.

3.3.5.7.4.2 LCSChangeStatusRequest


```
{
   "description": "Information required for LCS change status request from external center to owner
center",
   "type": "object",
   "$reqId": "3.3.5.7.4.2",
   "properties": {
      "deviceChangeStatusRequest": {
```

```
            "$reqId": "3.3.5.7.4.2.a",
            "description": "Generic device change status request for lane control signal",
            "allOf": [
               {
                  "$ref": "#/$defs/DeviceChangeStatusRequest"
               },
               {
                  "properties": {
                     "deviceType": {
                        "const": "lane control signal"
                     }
                  }
               }
            ]
         }
      },
      "required": [
         "deviceChangeStatusRequest"
      ]
   }
```

3.3.5.7.4.3 LCSChangeStatusResponse

```
   {
      "description": "Include response to LCS change status request from external center",
      "type": "object",
      "$reqId": "3.3.5.7.4.3",
      "properties": {
         "deviceChangeResponseHeader": {
            "$reqId": "3.3.5.7.4.3.a",
            "description": "Header information for generic device change response",
            "allOf": [
               {
                  "$ref": "#/$defs/DeviceChangeResponseHeader"
               },
               {
                  "type": "object",
                  "properties": {
                     "deviceType": {
                        "const": "lane control signal"
                     }
                  }
               }
            ]
         }
      },
      "required": [
         "deviceChangeResponseHeader"
```

```
  ]
}
```

3.3.5.7.5 Cancel External Requests for LCS

The requirements to cancel an LCS control request previously issued by an authorized external center are as follows.

3.3.5.7.5.1 Send LCS Change Cancellation Response Upon Request

An owner center shall respond to an authorized external center requesting cancellation of a previously issued LCS control request as described in “3.3.5.1.2.4.1 Send Change Cancellation Response Upon Request”.

3.3.5.7.5.2 LCSChangeCancellationRequest

```
{
  "description": "Include details of the cancel LCS change request from external center to owner center",
  "type": "object",
  "$reqId": "3.3.5.7.5.2",
  "properties": {
    "deviceChangeCancellationRequest": {
      "$reqId": "3.3.5.7.5.2.a",
      "description": "Generic cancel device change request for lane control signal",
      "allOf": [
        {
          "$ref": "#/$defs/DeviceChangeCancellationRequest"
        },
        {
          "properties": {
            "deviceType": {
              "const": "lane control signal"
            }
          }
        }
      ]
    }
  },
  "required": [
    "deviceChangeCancellationRequest"
  ]
}
```

3.3.5.7.5.3 LCSChangeCancellationResponse

```
{
  "description": "Include response details to LCS change cancellation request from external center",
  "type": "object",
  "$reqId": "3.3.5.7.5.3",
  "properties": {
    "deviceChangeResponse": {
```

```
        "$reqId": "3.3.5.7.5.3.a",
        "description": "Generic device change response header information",
        "allOf": [
          {
            "$ref": "#/$defs/DeviceChangeResponseHeader"
          },
          {
            "type": "object",
            "properties": {
              "deviceType": {
                "const": "lane control signal"
              }
            }
          }
        ]
      }
    },
    "required": [
      "deviceChangeResponse"
    ]
}
```

3.3.5.7.6 Share LCS Schedules

The requirements to share LCS time base schedule tables with other authorized centers are as follows:

3.3.5.7.6.1 Send LCS Schedule Information Upon Request

An owner center shall respond to an authorized external center requesting LCS schedules with a message containing the owner center's LCS time base schedule information.

3.3.5.7.6.2 Publish LCS Schedule Information

This section describes the design for how an owner center publishes a message to all authorized subscribing external centers using the schema structure defined in annexure A.2 of this document.

3.3.5.7.6.3 Subscribe to LCS Schedule Information

This section describes the design for how external centers receives a published message by an owner center using the schema structure defined in annexure A.3 of this document.

3.3.5.7.6.4 LCSScheduleRequest

```
{
    "description": "Include LCS time base schedule request details in communication from external center to owner center",
    "type": "object",
    "$reqId": "3.3.5.7.6.4",
    "properties": {
```

```
      "deviceInformationRequest": {
        "$reqId": "3.3.5.7.6.4.a",
        "description": "Generic device schedule information for lane control signals",
        "allOf": [
          {
            "$ref": "#/$defs/DeviceInformationRequest"
          },
          {
            "type": "object",
            "properties": {
              "deviceType": {
                "const": "lane control signal"
              },
              "deviceInformationType": {
                "const": "device schedule"
              }
            }
          }
        ]
      }
    },
    "required": [
      "deviceInformationRequest"
    ]
}
```

3.3.5.7.6.5 LCSScheduleResponse

```
{
    "description": "Include lane control signal indication in LCS schedule information",
    "type": "object",
    "$reqId": "3.3.5.7.6.5",
    "properties": {
      "deviceScheduleInformation": {
        "$reqId": "3.3.5.7.6.5.a",
        "description": "Generic device schedule information",
        "$ref": "#/$defs/DeviceScheduleInformation"
      },
      "laneControlSignalIndication": {
        "$reqId": "3.3.5.7.6.5.b",
        "description": "Indication of lane control signal status (open, closed, or other)",
        "$ref": "#/$defs/LaneControlCommands"
      }
    },
    "required": [
      "deviceScheduleInformation",
      "laneControlSignalIndication"
    ]
}
```

3.3.5.7.7 External Commands for Lane Control Devices

The requirements to support LCS control commands from other authorized centers are as follows. Only commands to open or close a lane on a remote LCS device are supported.

3.3.5.7.7.1 Send LCS Response Upon Command

An owner center shall respond to an authorized external center configuring a ramp meter via a one-time control command with a message containing the status of the command.

3.3.5.7.7.2 LCSControlCommandRequest


```
{
  "description": "Include lane control command in the LCS control command sent to owner center.",
  "type": "object",
  "$reqId": "3.3.5.7.7.2",
  "properties": {
    "deviceControlCommandHeader": {
      "$reqId": "3.3.5.7.7.2.a",
      "description": "Generic device control command header information for lane control signal",
      "allOf": [
        {
          "$ref": "#/$defs/ExternalDeviceControlRequest"
        },
        {
          "type": "object",
          "properties": {
            "deviceType": {
              "const": "lane control signal"
            }
          }
        }
      ]
    },
    "laneControlCommand": {
      "$reqId": "3.3.5.7.7.2.b",
      "description": "Commands for lane control (open, closed, other)",
      "$ref": "#/$defs/LaneControlCommands"
    }
  },
  "required": [
    "deviceControlCommandHeader",
    "laneControlCommand"
  ]
}
```


3.3.5.7.7.3 LCSControlCommandResponse


```
{
  "description": "Owner center response to an LCS control command from an external center",
  "type": "object",
```

```
  "$reqId": "3.3.5.7.7.3",
  "properties": {
    "deviceControlCommandResponse": {
      "$reqId": "3.3.5.7.7.3.a",
      "description": "Response information for generic device control commands",
      "$ref": "#/$defs/ExternalDeviceControlCommandResponse"
    }
  },
  "required": [
    "deviceControlCommandResponse"
  ]
}
```


3.3.5.8 Ramp Meters

The ramp meter model used assumes that each ramp meter controller may control multiple ramp meter lanes, each with its own metering rate. Each metered lane may be located on different ramps, or each ramp meter lane may be located on the same ramp but different lanes (e.g., one ramp meter for a general-purpose lane and another ramp meter for an HOV lane). The requirements to exchange ramp meter information between centers are as follows:

3.3.5.8.1 Share Ramp Meter Inventory Information

The requirements for sharing ramp meter inventory information with other authorized centers are as follows:

3.3.5.8.1.1 Send Ramp Meter Inventory Information Upon Request

An owner center shall respond to an authorized external center requesting ramp meter inventory with a message containing the owner center's ramp meter inventory information.

3.3.5.8.1.2 Publish Ramp Meter Inventory Information

This section describes the design for how an owner center publishes a message to all authorized subscribing external centers using the schema structure defined in annexure A.2 of this document.

3.3.5.8.1.3 Subscribe to Ramp Meter Inventory Information

This section describes the design for how external centers receives a published message by an owner center using the schema structure defined in annexure A.3 of this document.

3.3.5.8.1.4 RampMeterInventoryRequest


```
{
  "description": "Include ramp meter inventory request details from external center to owner center",
  "type": "object",
  "$reqId": "3.3.5.8.1.4",
  "properties": {
```

```
      "deviceInformationRequest": {
        "$reqId": "3.3.5.8.1.4.a",
        "description": "Generic device information request for ramp meter with device inventory type",
        "allOf": [
          {
            "$ref": "#/$defs/DeviceInformationRequest"
          },
          {
            "type": "object",
            "properties": {
              "deviceType": {
                "const": "ramp meter"
              },
              "deviceInformationType": {
                "const": "device inventory"
              }
            }
          }
        ]
      }
    },
    "required": [
      "deviceInformationRequest"
    ]
}
```

3.3.5.8.1.5 RampMeterInventoryResponse

```
{
    "description": "Ramp meter inventory information for external center",
    "type": "object",
    "$reqId": "3.3.5.8.1.5",
    "properties": {
      "deviceInventoryHeader": {
        "$reqId": "3.3.5.8.1.5.1.a",
        "description": "Header information for generic device inventory",
        "$ref": "#/$defs/DeviceInventoryResponseHeader"
      },
      "deviceInventoryHeaderList": {
        "$reqId": "3.3.5.8.1.5.1.b",
        "description": "Generic device inventory header information for each metered lane",
        "type": "array",
        "items": {
          "$ref": "#/$defs/DeviceInventoryResponseHeader"
        }
      },
      "meteredLaneId": {
        "$reqId": "3.3.5.8.1.5.1.c",
        "description": "Unique identifier for each metered lane node",
```

```
            "type": "array",
            "items": {
               "type": "string"
            }
         },
         "laneDirection": {
            "$reqId": "3.3.5.8.1.5.1.d",
            "description": "Direction of travel on the link for each metered lane",
            "type": "array",
            "items": {
               "$ref": "#/$defs/Directions"
            }
         },
         "roadwayEntranceName": {
            "$reqId": "3.3.5.8.1.5.1.e",
            "description": "Name of the roadway intersected by entrance ramps for each metered lane",
            "type": "array",
            "items": {
               "type": "string"
            }
         },
         "laneNumberRampMeters": {
            "$reqId": "3.3.5.8.1.5.2.1",
            "description": "Provide the lane number for each metered lane in the ramp meter inventory
information",
            "type": "array",
            "items": {
               "type": "number"
            }
         },
         "laneTypeRampMeters": {
            "$reqId": "3.3.5.8.1.5.2.2",
            "description": "Provide lane type for each lane controlled by ramp meter in ramp meter inventory
information",
            "type": "array",
            "items": {
               "type": "string",
               "enum": [
                  "general traffic",
                  "HOV lane",
                  "bus lane",
                  "right turn bypass",
                  "other"
               ]
            }
         },
         "associatedDetectorsIdentifiers": {
            "$reqId": "3.3.5.8.1.5.2.3",
```

```
            "description": "Provide identifiers of detectors associated with ramp meter in inventory information for each metered lane.",
            "type": "array",
            "items": {
               "type": "string"
            }
         },
         "absoluteMinimumMeteringRate": {
            "$reqId": "3.3.5.8.1.5.2.4",
            "description": "Indicate the absolute minimum metering rate in vehicles per hour for each metered lane in the ramp meter inventory",
            "type": "array",
            "items": {
               "type": "number"
            }
         },
         "absoluteMaximumMeteringRate": {
            "$reqId": "3.3.5.8.1.5.2.5",
            "description": "Indicate the absolute maximum metering rate in vehicles per hour for ramp meter inventory",
            "type": "array",
            "items": {
               "type": "number"
            }
         },
         "systemMinimumMeteringRate": {
            "$reqId": "3.3.5.8.1.5.2.6",
            "description": "Indicate the system metering rate in vehicles per hour as part of the ramp meter inventory for each metered lane.",
            "type": "array",
            "items": {
               "type": "number"
            }
         },
         "systemMaximumMeteringRate": {
            "$reqId": "3.3.5.8.1.5.2.7",
            "description": "Indicate system maximum metering rate in vehicles per hour for ramp meter inventory",
            "type": "array",
            "items": {
               "type": "number"
            }
         }
      },
      "required": [
         "deviceInventoryHeader",
         "deviceInventoryHeaderList",
         "meteredLaneId",
```

```
      "laneDirection",
      "roadwayEntranceName"
   ]
}
```

3.3.5.8.2 Share Ramp Meter Status Information

The requirements for sharing ramp meter status information with other authorized centers are as follows:

3.3.5.8.2.1 Send Ramp Meter Status Information Upon Request

An owner center shall respond to an authorized external center requesting ramp meter status with a message containing the owner center's ramp meter status information.

3.3.5.8.2.2 Publish Ramp Meter Status Information

This section describes the design for how an owner center publishes a message to all authorized subscribing external centers using the schema structure defined in annexure A.2 of this document.

3.3.5.8.2.3 Subscribe to Ramp Meter Status Information

This section describes the design for how external centers receives a published message by an owner center using the schema structure defined in annexure A.3 of this document.

3.3.5.8.2.4 RampMeterStatusRequest

```
{
   "description": "Include CCTV status request details in communication from external center to owner center",
   "type": "object",
   "$reqId": "3.3.5.8.2.4",
   "properties": {
      "deviceInformationRequest": {
         "$reqId": "3.3.5.8.2.4.a",
         "description": "Request for generic device information with device type set to 'ramp meter' and information type set to 'device status'.",
         "allOf": [
            {
               "$ref": "#/$defs/DeviceInformationRequest"
            },
            {
               "type": "object",
               "properties": {
                  "deviceType": {
                     "const": "ramp meter"
                  },
                  "deviceInformationType": {
                     "const": "device status"
                  }
```

```
                }
            }
        ]
    }
  },
  "required": [
    "deviceInformationRequest"
  ]
}
```

3.3.5.8.2.5 RampMeterStatusResponse

```
{
  "description": "Ramp meter status information for owner center to external center",
  "type": "object",
  "$reqId": "3.3.5.8.2.5",
  "properties": {
    "deviceStatusHeader": {
      "$reqId": "3.3.5.8.2.5.1.b",
      "description": "Generic device status header information",
      "allOf": [
        {
          "$ref": "#/$defs/DeviceStatusHeader"
        },
        {
          "properties": {
            "deviceStatuses": {
              "items": {
                "allOf": [
                  {
                    "$ref": "#/$defs/DeviceStatus"
                  },
                  {
                    "properties": {
                      "deviceType": {
                        "const": "ramp meter"
                      }
                    }
                  }
                ]
              }
            }
          }
        }
      ]
    },
    "rampMeterOperationalMode": {
      "$reqId": "3.3.5.8.2.5.1.d",
      "description": "Current operational mode of each ramp meter",
```

```
            "$ref": "#/$defs/DeviceOperationalModes"
        },
        "requestedMeteringCommandSource": {
            "$reqId": "3.3.5.8.2.5.2.1",
            "description": "Indicate the command source requesting control of the metered lane in ramp meter status information",
            "type": "array",
            "items": {
                "type": "string",
                "enum": [
                    "manual",
                    "communications",
                    "interconnect",
                    "timebaseControl",
                    "default"
                ]
            }
        },
        "implementedMeteringCommandSource": {
            "$reqId": "3.3.5.8.2.5.2.2",
            "description": "Indicate the command source controlling the metered lane in ramp meter status information",
            "type": "array",
            "items": {
                "type": "string",
                "enum": [
                    "manual",
                    "communications",
                    "interconnect",
                    "timebaseControl",
                    "default"
                ]
            }
        },
        "implementedPlan": {
            "$reqId": "3.3.5.8.2.5.2.3",
            "description": "Indicate the metering plan number for ramp meter status information",
            "type": "array",
            "items": {
                "type": "string"
            }
        },
        "implementedRate": {
            "$reqId": "3.3.5.8.2.5.2.4",
            "description": "Indicate the current base metering rate in vehicles per hour as part of ramp meter status information for each metered lane",
            "type": "array",
            "items": {
```

```
            "type": "number"
         }
      },
      "implementedVehiclesPerGreen": {
         "$reqId": "3.3.5.8.2.5.2.5",
         "description": "Indicate the number of vehicles allowed to pass during green and yellow intervals in ramp meter status information",
         "type": "array",
         "items": {
            "type": "number"
         }
      },
      "requestedAction": {
         "$reqId": "3.3.5.8.2.5.2.6",
         "description": "Indicate the requested action for the metered lane in ramp meter status information",
         "type": "array",
         "items": {
            "type": "string",
            "enum": [
               "dark",
               "restInGreen",
               "fixedRate",
               "trafficResponsive",
               "emergencyGreen"
            ]
         }
      },
      "requestedPlanRampMeterStatus": {
         "$reqId": "3.3.5.8.2.5.2.7",
         "description": "Indicate the metering plan number requested for ramp meter status information for each metered lane",
         "type": "array",
         "items": {
            "type": "number"
         }
      },
      "requestedRateRampMeterStatus": {
         "$reqId": "3.3.5.8.2.5.2.8",
         "description": "Indicate the requested metering rate in vehicles per hour for ramp meter status information",
         "type": "array",
         "items": {
            "type": "number"
         }
      },
      "requestedVehiclesPerGreen": {
         "$reqId": "3.3.5.8.2.5.2.9",
```

```
        "description": "Indicate the number of vehicles allowed to pass during green and yellow intervals in ramp meter status information",
        "type": "array",
        "items": {
          "type": "number"
        }
      },
      "operationalMinimumMeteringRate": {
        "$reqId": "3.3.5.8.2.5.2.10",
        "description": "Provide operational minimum metering rate in vehicles per hour for ramp meter status information by lane.",
        "type": "array",
        "items": {
          "type": "number"
        }
      },
      "operationalMaximumMeteringRate": {
        "$reqId": "3.3.5.8.2.5.2.11",
        "description": "Provide operational maximum metering rate for each metered lane in vehicles per hour",
        "type": "array",
        "items": {
          "type": "number"
        }
      },
      "demandDetectorStatus": {
        "$reqId": "3.3.5.8.2.5.2.12",
        "description": "Indicate the status of the demand detector as part of the ramp meter status information for each metered lane",
        "$ref": "#/$defs/DemandDetectorStatus"
      },
      "passageDetectorStatus": {
        "$reqId": "3.3.5.8.2.5.2.13",
        "description": "Indicate the status of the passage detector as part of ramp meter status information for each metered lane",
        "$ref": "#/$defs/PassageDetectorStatus"
      },
      "queueDetectorStatus": {
        "$reqId": "3.3.5.8.2.5.2.14",
        "description": "Indicate the status of the queue detector in ramp meter status information for each metered lane",
        "$ref": "#/$defs/QueueDetectorStatus"
      },
      "cycleCount": {
        "$reqId": "3.3.5.8.2.5.2.15",
        "description": "Indicate the count of green intervals in the most recent calculation interval for ramp meter status information",
        "type": "array",
```

```
        "items": {
          "type": "number"
        }
      },
      "passengerVehicleCount": {
        "$reqId": "3.3.5.8.2.5.2.16",
        "description": "Indicate the number of actuations of the passage detector in ramp meter status information for each metered lane",
        "type": "array",
        "items": {
          "type": "number"
        }
      },
      "queueDetectedFlag": {
        "$reqId": "3.3.5.8.2.5.2.17",
        "description": "Indicate if a queue has been detected beyond the queue detector on the ramp in ramp meter status information",
        "type": "array",
        "items": {
          "type": "boolean"
        }
      },
      "violationVehicleCount": {
        "$reqId": "3.3.5.8.2.5.2.18",
        "description": "Indicate number of vehicle violations of passage detector in ramp meter status information",
        "type": "array",
        "items": {
          "type": "number"
        }
      },
      "mainlineFlowRate": {
        "$reqId": "3.3.5.8.2.5.2.19",
        "description": "Provide average mainline flow rate in vehicles per hour as part of ramp meter status information",
        "type": "number"
      },
      "mainlineVehicleOccupancy": {
        "$reqId": "3.3.5.8.2.5.2.20",
        "description": "Provide average percent vehicle occupancy in ramp meter status information",
        "type": "number"
      },
      "mainlineVehicleSpeed": {
        "$reqId": "3.3.5.8.2.5.2.21",
        "description": "Provide average vehicle speed in kilometers per hour in ramp meter status information",
        "type": "number"
      }
```

```
  },
  "required": [
    "deviceStatusHeader",
    "rampMeterOperationalMode"
  ]
}
```

3.3.5.8.3 External Change Requests for Ramp Meters

The requirements to support ramp meter change requests from other authorized centers are as follows. Only change requests to select an operational mode or metering plan on a remote ramp meter device is supported.

3.3.5.8.3.1 Send Ramp Meter Change Response Upon Request

An owner center shall respond to an authorized external center requesting a change to the ramp meter device via a one-time change request with a message containing the status of the request.

3.3.5.8.3.2 RampMeterChangeRequest

```
{
  "description": "Contents for a ramp meter change request from an external center to an owner center",
  "type": "object",
  "$reqId": "3.3.5.8.3.2",
  "properties": {
    "deviceChangeRequestHeader": {
      "$reqId": "3.3.5.8.3.2.1.a",
      "description": "Generic device change request header information with device type set to 'ramp
meter'",
      "allOf": [
        {
          "$ref": "#/$defs/DeviceChangeRequestHeader"
        },
        {
          "type": "object",
          "properties": {
            "deviceType": {
              "const": "ramp meter"
            }
          }
        }
      ]
    },
    "meteredLaneId": {
      "$reqId": "3.3.5.8.3.2.1.b",
      "description": "Unique identifier for metered lanes",
      "type": "string"
    },
    "operationalModeRequested": {
```

```
            "$reqId": "3.3.5.8.3.2.1.c",
            "ref": "#/$defs/DeviceOperationalModes"
        },
        "requestedPlanRampMeterChange": {
            "$reqId": "3.3.5.8.3.2.2",
            "description": "Provide metering plan number for ramp meter change request if operational mode
is trafficResponsive",
            "type": "array",
            "items": {
                "type": "number"
            }
        },
        "requestedRateRampMeterChange": {
            "$reqId": "3.3.5.8.3.2.3",
            "description": "Indicate requested metering rate in ramp meter change request for each metered
lane",
            "type": "array",
            "items": {
                "type": "number"
            }
        }
    },
    "required": [
        "deviceChangeRequestHeader",
        "meteredLaneId",
        "operationalModeRequested"
    ]
}
```


3.3.5.8.3.3 RampMeterChangeResponse


```
{
    "description": "Response to ramp meter change request shall be included by the owner center",
    "type": "object",
    "$reqId": "3.3.5.8.3.3",
    "properties": {
        "deviceChangeResponseHeader": {
            "$reqId": "3.3.5.8.3.3.a",
            "description": "Generic device change response header information",
            "allOf": [
                {
                    "$ref": "#/$defs/DeviceChangeResponseHeader"
                },
                {
                    "type": "object",
                    "properties": {
                        "deviceType": {
                            "const": "ramp meter"
                        }
```

```
            }
          }
        ]
      }
    },
    "required": [
      "deviceChangeResponseHeader"
    ]
}
```

3.3.5.8.4 Request Ramp Meter Change Status

The requirements to check the status of a ramp meter change request previously issued by an authorized external center are as follows.

3.3.5.8.4.1 Send Ramp Meter Change Status Upon Request

An owner center shall respond to an authorized external center requesting the status of a previously issued ramp meter change request as described found in “3.3.5.1.2.3.1 Send Device Change Status Upon Request”.

3.3.5.8.4.2 RampMeterChangeStatusRequest

```
{
    "description": "Include ramp meter change status request from external center to owner center",
    "type": "object",
    "$reqId": "3.3.5.8.4.2",
    "properties": {
      "deviceChangeStatusRequest": {
        "$reqId": "3.3.5.8.4.2.a",
        "description": "Generic device change status request for ramp meter device type",
        "allOf": [
          {
            "$ref": "#/$defs/DeviceChangeStatusRequest"
          },
          {
            "properties": {
              "deviceType": {
                "const": "ramp meter"
              }
            }
          }
        ]
      }
    },
    "required": [
      "deviceChangeStatusRequest"
    ]
}
```

3.3.5.8.4.3 RampMeterChangeStatusResponse


```
{
   "description": "Include requirements to cancel a ramp meter change request in the owner center response",
   "type": "object",
   "$reqId": "3.3.5.8.4.3",
   "properties": {
      "deviceChangeResponseHeader": {
         "$reqId": "3.3.5.8.4.3.a",
         "description": "Generic device change response header information for ramp meter",
         "allOf": [
            {
               "$ref": "#/$defs/DeviceChangeResponseHeader"
            },
            {
               "type": "object",
               "properties": {
                  "deviceType": {
                     "const": "ramp meter"
                  }
               }
            }
         ]
      }
   },
   "required": [
      "deviceChangeResponseHeader"
   ]
}
```


3.3.5.8.5.1 Send Cancel Ramp Meter Change Response Upon Request

An owner center shall respond to an authorized external center requesting cancellation of a previously issued ramp meter change request as described in “3.3.5.1.2.4.1 Send Change Cancellation Response Upon Request”.

3.3.5.8.5.2 RampMeterChangeCancellationRequest


```
{
   "description": "Include ramp meter change cancellation request details from external center to owner center",
   "type": "object",
   "$reqId": "3.3.5.8.5.2",
   "properties": {
      "deviceChangeCancellationRequest": {
         "$reqId": "3.3.5.8.5.2.a",
         "description": "Generic cancel device change request for ramp meter",
         "allOf": [
            {
```

```
                "$ref": "#/$defs/DeviceChangeCancellationRequest"
            },
            {
                "properties": {
                    "deviceType": {
                        "const": "ramp meter"
                    }
                }
            }
        ]
    }
},
"required": [
    "deviceChangeCancellationRequest"
]
}
```

3.3.5.8.5.3 RampMeterChangeCancellationResponse

```
{
"description": "Include response to ramp meter change cancellation request from external center",
"type": "object",
"$reqId": "3.3.5.8.5.3",
"properties": {
    "deviceChangeResponseHeader": {
        "$reqId": "3.3.5.8.5.3.a",
        "description": "Generic device change response header information",
        "allOf": [
            {
                "$ref": "#/$defs/DeviceChangeResponseHeader"
            },
            {
                "type": "object",
                "properties": {
                    "deviceType": {
                        "const": "ramp meter"
                    }
                }
            }
        ]
    }
},
"required": [
    "deviceChangeResponseHeader"
]
}
```

3.3.5.8.6 Share Ramp Meter Schedule

The requirements to share ramp meter time base schedule tables with other authorized centers are as follows:

3.3.5.8.6.1 Send Ramp Meter Schedule Information Upon Request

An owner center shall respond to an authorized external center requesting ramp meter schedules with a message containing the owner center's ramp meter time base schedule information.

3.3.5.8.6.2 Publish Ramp Meter Schedule Information

This section describes the design for how an owner center publishes a message to all authorized subscribing external centers using the schema structure defined in annexure A.2 of this document.

3.3.5.8.6.3 Subscribe to Ramp Meter Schedule Information

This section describes the design for how external centers receives a published message by an owner center using the schema structure defined in annexure A.3 of this document.

3.3.5.8.6.4 RampMeterScheduleRequest


```
{
   "description": "Include ramp meter time base schedule request details",
   "type": "object",
   "$reqId": "3.3.5.8.6.4",
   "properties": {
      "deviceInformationRequest": {
         "$reqId": "3.3.5.8.6.4.a",
         "description": "Request for generic device schedule information with the device type set to 'ramp
meter' and device information type set to 'device schedule' ",
         "allOf": [
            {
               "$ref": "#/$defs/DeviceInformationRequest"
            },
            {
               "type": "object",
               "properties": {
                  "deviceType": {
                     "const": "ramp meter"
                  },
                  "deviceInformationType": {
                     "const": "device schedule"
                  }
               }
            }
         ]
      }
```

```
    },
    "required": [
      "deviceInformationRequest"
    ]
}
```

3.3.5.8.6.5 RampMeterScheduleResponse

```
{
    "description": "Information on the ramp meter time base schedule sent from owner center to external center",
    "type": "object",
    "$reqId": "3.3.5.8.6.5",
    "properties": {
      "deviceScheduleInformation": {
        "$reqId": "3.3.5.8.6.5.1.a",
        "description": "Generic device schedule information",
        "$ref": "#/$defs/DeviceScheduleInformation"
      },
      "meteredLaneIdentifier": {
        "$reqId": "3.3.5.8.6.5.1.b",
        "description": "Unique identifier for the metered lane",
        "type": "string"
      },
      "rampMeterTBCAction": {
        "$reqId": "3.3.5.8.6.5.1.c",
        "description": "Action entry for executing ramp meter TBC",
        "type": "string"
      },
      "meteredLaneActionControl": {
        "$reqId": "3.3.5.8.6.5.2.1",
        "description": "Indicate the action for a metered lane in the ramp meter schedule information",
        "$ref": "#/$defs/MeteredLaneActionControl"
      },
      "timebasePlanControl": {
        "$reqId": "3.3.5.8.6.5.2.2",
        "description": "Provide the metering plan number for each metered lane action number, required for traffic-responsive timebase action control in ramp meter schedule.",
        "type": "string"
      },
      "timebaseRateControl": {
        "$reqId": "3.3.5.8.6.5.2.3",
        "description": "Provide the metering rate in vehicles per hour when timebase action control is 'fixedRate'.",
        "type": "string"
      },
      "timebaseVehiclesPerGreenControl": {
        "$reqId": "3.3.5.8.6.5.2.4",
        "description": "Provide the number of vehicles allowed to pass during green and yellow intervals
```

```
for each metered lane action number in ramp meter schedule information.",
          "type": "array",
          "items": {
            "type": "number"
          }
        },
        "timebaseControlMinimumMeteringRate": {
          "$reqId": "3.3.5.8.6.5.2.5",
          "description": "Provide operational minimum metering rate for each metered lane action number in
ramp meter schedule information",
          "type": "array",
          "items": {
            "type": "number"
          }
        },
        "timebaseControlMaximumMeteringRate": {
          "$reqId": "3.3.5.8.6.5.2.6",
          "description": "Provide operational maximum metering rate for each metered lane action number
in the ramp meter schedule",
          "type": "array",
          "items": {
            "type": "number"
          }
        },
        "timebaseControlLaneUsageMode": {
          "$reqId": "3.3.5.8.6.5.2.7",
          "description": "Provide mainline station traffic parameters for each mainline lane action number in
ramp meter schedule information.",
          "type": "array",
          "items": {
            "type": "string",
            "enum": [
              "notUsed",
              "schemeF(mainlineFlowate)",
              "schemeO(mainlineOccupancy)",
              "schemeFO(mainlineFlowRateAndOccupancy)",
              "schemeS(mainlineSpeed)",
              "schemeFS(mainlineFlowRateAndSpeed)",
              "schemeOS(mainlineOccupancyAndSpeed)",
              "schemeFOS(mainlineFlowRateAndOccupancyAndSpeed)"
            ]
          }
        }
      },
      "required": [
        "deviceScheduleInformation",
        "meteredLaneIdentifier",
        "rampMeterTBCAction"
```

```
  ]
}
```

3.3.5.8.7 Share Ramp Metering Plan Information

The requirements for sharing ramp metering plan information with other authorized centers are as follows:

3.3.5.8.7.1 Send Metering Plan Upon Request

An owner center shall respond to an authorized external center requesting metering plan information with a message containing the owner center's metering plan information.

3.3.5.8.7.2 Publish Metering Plan Information

This section describes the design for how an owner center publishes a message to all authorized subscribing external centers using the schema structure defined in annexure A.2 of this document.

3.3.5.8.7.3 Subscribe to Metering Plan Information

This section describes the design for how external centers receives a published message by an owner center using the schema structure defined in annexure A.3 of this document.

3.3.5.8.7.4 MeteringPlanRequest

```
{
  "description": "Include metering plan inventory request details from external center to owner center",
  "type": "object",
  "$reqId": "3.3.5.8.7.4",
  "properties": {
    "deviceInformationRequest": {
      "$reqId": "3.3.5.8.7.4.a",
      "description": "Generic device information request for ramp meter with device information type set to device plan",
      "allOf": [
        {
          "$ref": "#/$defs/DeviceInformationRequest"
        },
        {
          "type": "object",
          "properties": {
            "deviceType": {
              "const": "ramp meter"
            },
            "deviceInformationType": {
              "const": "device plan"
            }
          }
        }
      ]
```

```
    }
  },
  "required": [
    "deviceInformationRequest"
  ]
}
```

3.3.5.8.7.5 MeteringPlanResponse

```
{
  "description": "Metering plan inventory information to send from owner center to external center",
  "type": "object",
  "$reqId": "3.3.5.8.7.5",
  "properties": {
    "deviceInventoryHeader": {
      "$reqId": "3.3.5.8.7.5.1.a",
      "description": "Generic device inventory header information",
      "$ref": "#/$defs/DeviceInventoryResponseHeader"
    },
    "meterPlan": {
      "$reqId": "3.3.5.8.7.5.1.b",
      "description": "Unique identifier for the metering plan",
      "type": "number"
    },
    "meterLevel": {
      "$reqId": "3.3.5.8.7.5.1.c",
      "description": "Level of measurement for metering",
      "type": "number"
    },
    "meterRate": {
      "$reqId": "3.3.5.8.7.5.1.d",
      "description": "Rate of vehicles metered per hour",
      "type": "number"
    },
    "flowRateThreshold": {
      "$reqId": "3.3.5.8.7.5.1.e",
      "description": "Threshold for flow rate measured in vehicles per hour",
      "type": "number"
    },
    "occupancyThreshold": {
      "$reqId": "3.3.5.8.7.5.1.f",
      "description": "Occupancy threshold represented in tenths of percent",
      "type": "number"
    },
    "speedThreshold": {
      "$reqId": "3.3.5.8.7.5.1.g",
      "description": "Speed threshold in kilometers per hour",
      "type": "number"
    },
```

```
      "meteringPlanDateTimeChangeInformation": {
         "$reqId": "3.3.5.8.7.5.2.1",
         "description": "Provide the date and time of the last change to the metering plan as part of the metering plan information",
         "$ref": "#/$defs/DateTime"
      }
   },
   "required": [
      "deviceInventoryHeader",
      "meterPlan",
      "meterLevel",
      "meterRate",
      "flowRateThreshold",
      "occupancyThreshold",
      "speedThreshold"
   ]
}
```

3.3.5.8.8 Share Ramp Meter Priority Queue Information

The requirements for sharing the contents of a ramp meter priority queue are as follows:

3.3.5.8.8.1 Send Ramp Meter Priority Queue Information Upon Request

An owner center shall respond to an authorized external center requesting the contents of its ramp meter priority queue with a message containing the contents of an owner center's ramp meter priority queue.

3.3.5.8.8.2 RampMeterPriorityQueueRequest

```
{
   "description": "Include ramp request details in the communication from external center to owner center.",
   "type": "object",
   "$reqId": "3.3.5.8.8.2",
   "properties": {
      "deviceQueueRequest": {
         "$reqId": "3.3.5.8.8.2.a",
         "description": "Generic device queue request for rampmeter",
         "$ref": "#/$defs/DevicePriorityQueueRequest"
      }
   },
   "required": [
      "deviceQueueRequest"
   ]
}
```

3.3.5.8.8.3 RampMeterPriorityQueueResponse

```
{
   "description": "Ramp meter priority queue for owner center to send to external center",
```

```
  "type": "object",
  "$reqId": "3.3.5.8.8.3",
  "properties": {
    "devicePriorityQueueHeader": {
      "$reqId": "3.3.5.8.8.3.1.a",
      "description": "Header information for the generic device priority queue",
      "allOf": [
        {
          "$ref": "#/$defs/DevicePriorityQueueResponse"
        },
        {
          "type": "object",
          "properties": {
            "deviceType": {
              "const": "ramp meter"
            }
          }
        }
      ]
    },
    "operationalModeRequested": {
      "$reqId": "3.3.5.8.8.3.1.b",
      "$ref": "#/$defs/DeviceOperationalModes"
    },
    "meteredLaneIdentifier": {
      "$reqId": "3.3.5.8.8.3.2.1",
      "description": "Provide the identifier of the metered lane for each change request in the ramp
meter priority queue response.",
      "type": "array",
      "items": {
        "type": "number"
      }
    },
    "requestedPlanRampMeterQueue": {
      "$reqId": "3.3.5.8.8.3.2.2",
      "description": "Provide metering plan number for each change request in the ramp meter priority
queue response",
      "type": "array",
      "items": {
        "type": "number"
      }
    },
    "requestedRateRampMeterQueue": {
      "$reqId": "3.3.5.8.8.3.2.3",
      "description": "Provide metering rate in vehicles per hour for each change request in the ramp
meter priority queue response",
      "type": "array",
      "items": {
```

```
            "type": "number"
          }
        }
    },
    "required": [
      "devicePriorityQueueHeader",
      "operationalModeRequested"
    ]
}
```

3.3.5.8.9 External Commands for Ramp Metering Devices

The requirements to for an external center to send control commands to remotely control a Ramp Metering Device that is normally managed by an owner center are as follows.

3.3.5.8.9.1 Send Ramp Meter Control Command Status

An owner center shall respond to an authorized external center configuring a ramp meter via a one-time control command with a message containing the status of the command.

3.3.5.8.9.2 RampMeterControlCommandRequest

```
{
    "description": "Content of the ramp meter control command",
    "type": "object",
    "$reqId": "3.3.5.8.9.2",
    "properties": {
      "deviceControlRequestHeader": {
        "$reqId": "3.3.5.8.9.2.1.a",
        "description": "Header information for generic device control command with device type set to
'ramp meter'",
        "allOf": [
          {
            "$ref": "#/$defs/ExternalDeviceControlRequest"
          },
          {
            "type": "object",
            "properties": {
              "deviceType": {
                "const": "ramp meter"
              }
            }
          }
        ]
      },
      "meteredLaneIdentifier": {
        "$reqId": "3.3.5.8.9.2.1.b",
        "description": "Unique identifier for metered lanes",
        "type": "string"
      },
```

```
      "operationalModeRequested": {
         "$reqId": "3.3.5.8.9.2.1.c",
         "$ref": "#/$defs/DeviceOperationalModes"
      },
      "commandRampMeterControlPlan": {
         "$reqId": "3.3.5.8.9.2.2",
         "description": "Provide the metering plan number as part of the ramp meter control command for each metered lane if operational mode is trafficResponsive.",
         "type": "array",
         "items": {
            "type": "number"
         }
      },
      "commandRampMeterControlRate": {
         "$reqId": "3.3.5.8.9.2.3",
         "description": "Indicate requested metering rate in vehicles per hour for ramp meter control request",
         "type": "array",
         "items": {
            "type": "number"
         }
      }
   },
   "required": [
      "deviceControlRequestHeader",
      "meteredLaneIdentifier",
      "operationalModeRequested"
   ]
}
```


3.3.5.8.9.3 RampMeterControlCommandResponse


```
{
   "description": "Include generic device control command response information in ramp meter control command response",
   "$reqId": "3.3.5.8.9.3",
   "$ref": "#/$defs/ExternalDeviceControlCommandResponse"
}
```


3.3.5.9 Traffic Signal Controllers

3.3.5.9.1 Share Signal Inventory Information

The requirements for sharing signal inventory information with other authorized centers are as follows:

3.3.5.9.1.1 Send Signal Inventory Information Upon Request

An owner center shall respond to an authorized external center requesting signal inventory with a message containing the owner center's signal inventory information.

3.3.5.9.1.2 Publish Signal Inventory Information

This section describes the design for how an owner center publishes a message to all authorized subscribing external centers using the schema structure defined in annexure A.2 of this document.

3.3.5.9.1.3 Subscribe to Signal Inventory Information

This section describes the design for how external centers receives a published message by an owner center using the schema structure defined in annexure A.3 of this document.

3.3.5.9.1.4 SignalInventoryRequest


```
{
   "description": "Include signal controller inventory information in the request from external center to owner center",
   "type": "object",
   "$reqId": "3.3.5.9.1.4",
   "properties": {
      "deviceInformationRequest": {
         "$reqId": "3.3.5.9.1.4.a",
         "description": "Request device information for a signal controller with device inventory type",
         "allOf": [
            {
               "$ref": "#/$defs/DeviceInformationRequest"
            },
            {
               "type": "object",
               "properties": {
                  "deviceType": {
                     "const": "signal controller"
                  },
                  "deviceInformationType": {
                     "const": "device inventory"
                  }
               }
            }
         ]
      }
   },
   "required": [
      "deviceInformationRequest"
   ]
}
```

3.3.5.9.1.5 SignalInventoryResponse


```
{
   "description": "Signal inventory information to be sent from an owner center to an external center",
   "type": "object",
   "$reqId": "3.3.5.9.1.5",
   "properties": {
      "deviceInventoryHeader": {
         "$reqId": "3.3.5.9.1.5.1.a",
         "description": "Generic device inventory header information",
         "$ref": "#/$defs/DeviceInventoryResponseHeader"
      },
      "intersectionName": {
         "$reqId": "3.3.5.9.1.5.1.b",
         "description": "Identifier for the intersection",
         "type": "string"
      },
      "fieldManagementStation": {
         "$reqId": "3.3.5.9.1.5.2.1",
         "description": "Provide the unique identifier of the field management station in signal inventory
information",
         "type": "string"
      },
      "linkIdentifiers": {
         "$reqId": "3.3.5.9.1.5.2.2",
         "description": "Provide unique identifier of each link at the intersection in the signal inventory
information",
         "type": "array",
         "items": {
            "type": "string"
         }
      },
      "directionTraffic": {
         "$reqId": "3.3.5.9.1.5.2.3",
         "description": "Provide traffic direction information for each link at the intersection in the signal
inventory",
         "type": "string",
         "enum": [
            "northbound",
            "northeastBound",
            "eastbound",
            "southeastBound",
            "southbound",
            "southwestBound",
            "westbound",
            "northwestBound",
            "notDirectional",
            "positiveDirection",
            "negativeDirection",
```

```
            "bothDirections",
            "other"
         ]
      },
      "movementIdentifier": {
         "$reqId": "3.3.5.9.1.5.2.4",
         "description": "Identifier for each vehicle or pedestrian movement at the intersection in signal
inventory information",
         "type": "array",
         "items": {
            "type": "string"
         }
      },
      "vehicleMovementApproachLink": {
         "$reqId": "3.3.5.9.1.5.2.5",
         "description": "Provide the unique identifier of the approach link for each vehicle movement in the
signal inventory information.",
         "type": "array",
         "items": {
            "type": "string"
         }
      },
      "pedestrianMovementApproachLink": {
         "$reqId": "3.3.5.9.1.5.2.6",
         "description": "Provide the unique identifier of the approach link crossed by each pedestrian
movement in the signal inventory information.",
         "type": "array",
         "items": {
            "type": "string"
         }
      },
      "departingLink": {
         "$reqId": "3.3.5.9.1.5.2.7",
         "description": "Provide unique identifier of the link for each vehicle movement in signal inventory
information.",
         "type": "array",
         "items": {
            "type": "string"
         }
      },
      "crossingPoint": {
         "$reqId": "3.3.5.9.1.5.2.8",
         "description": "Indicate the crossing point for turning movements in signal inventory information",
         "$ref": "#/$defs/GeoLocation"
      },
      "turningMovementApproachVector": {
         "$reqId": "3.3.5.9.1.5.2.9",
         "description": "Provide the angle of the link into the intersection measured in hundredths of a
```

```
degree for each movement as part of signal inventory information.",
          "type": "array",
          "items": {
            "type": "number"
          }
        },
        "turningMovementType": {
          "$reqId": "3.3.5.9.1.5.2.10",
          "description": "Indicate the type of turning movement for each signal controller in the signal
inventory information",
          "type": "string",
          "enum": [
            "maneuverStraightAllowed",
            "maneuverLeftAllowed",
            "maneuverRightAllowed",
            "maneuverUTurnAllowed"
          ]
        },
        "turningMovementLanes": {
          "$reqId": "3.3.5.9.1.5.2.11",
          "description": "Indicate lane number(s) and type of turning movement for vehicle movement in
signal inventory information.",
          "type": "array",
          "items": {
            "type": "number"
          }
        },
        "turningMovementDescription": {
          "$reqId": "3.3.5.9.1.5.2.12",
          "description": "Provide a textual description of each movement as part of the signal inventory
information for each signal controller",
          "type": "array",
          "items": {
            "type": "string"
          }
        },
        "enabledPhases": {
          "$reqId": "3.3.5.9.1.5.2.13",
          "description": "Provide an identifier for each phase enabled at the intersection in the signal
inventory information",
          "type": "array",
          "items": {
            "type": "string"
          }
        },
        "concurrentPhases": {
          "$reqId": "3.3.5.9.1.5.2.14",
          "description": "Provide phase identifiers for concurrent phases in signal inventory information",
```

```
            "type": "array",
            "items": {
               "type": "string"
            }
         },
         "activeMovements": {
            "$reqId": "3.3.5.9.1.5.2.15",
            "description": "Provide movement identifiers for active vehicle or pedestrian movements for each
signal phase in the signal inventory information.",
            "type": "array",
            "items": {
               "type": "string"
            }
         },
         "overlapphaseAssignment": {
            "$reqId": "3.3.5.9.1.5.2.16",
            "description": "Provide an identifier for each overlap in use at the intersection and the included
phases as part of the signal inventory information.",
            "type": "array",
            "items": {
               "type": "string"
            }
         },
         "ringphaseAssignment": {
            "$reqId": "3.3.5.9.1.5.2.17",
            "description": "Provide an identifier for each ring at the intersection and a list of phases assigned
to that ring as part of signal inventory information for each signal controller.",
            "type": "array",
            "items": {
               "type": "string"
            }
         },
         "specialFunctionInformation": {
            "$reqId": "3.3.5.9.1.5.2.18",
            "description": "Provide an identifier and textual description for each special function output in the
signal inventory information",
            "type": "array",
            "items": {
               "type": "string"
            }
         },
         "timeReference": {
            "$reqId": "3.3.5.9.1.5.2.19",
            "description": "Provide time reference for signal inventory information",
            "type": "string",
            "enum": [
               "WWV",
               "GPS",
```

```
            "PowerLinesync",
            "NTPServer",
            "other",
            "unknown"
         ]
      },
      "syncReferenceTime": {
         "$reqId": "3.3.5.9.1.5.2.20",
         "description": "Provide the time reference in minutes past midnight for traffic signal controller
sync",
         "type": "array",
         "items": {
            "type": "number"
         }
      },
      "supportedTimingModes": {
         "$reqId": "3.3.5.9.1.5.2.21",
         "description": "Provide the different timing modes for intersection signal inventory",
         "type": "string",
         "enum": [
            "fixedTime",
            "actuated",
            "criticalIntersectionControl",
            "trafficResponsive",
            "adaptive"
         ]
      }
   },
   "required": [
      "deviceInventoryHeader",
      "intersectionName"
   ]
}
```


3.3.5.9.2 Share Signal Section Inventory Information

The requirements for sharing signal section inventory information with other authorized centers are as follows:

3.3.5.9.2.1 Send Signal Section Inventory Information Upon Request

An owner center shall respond to an authorized external center requesting signal section inventory with a message containing the owner center's signal section inventory information.

3.3.5.9.2.2 Publish Signal Section Inventory Information

This section describes the design for how an owner center publishes a message to all authorized subscribing external centers using the schema structure defined in annexure A.2 of this document.

3.3.5.9.2.3 Subscribe to Signal Section Inventory Information

This section describes the design for how external centers receives a published message by an owner center using the schema structure defined in annexure A.3 of this document.

3.3.5.9.2.4 SignalSectionInventoryRequest


```
{
   "description": "Include signal section inventory information request details from external center to owner center",
   "type": "object",
   "$reqId": "3.3.5.9.2.4",
   "properties": {
      "deviceInformationRequest": {
         "$reqId": "3.3.5.9.2.4.a",
         "description": "Generic device information request for signal section with device inventory type",
         "allOf": [
            {
               "$ref": "#/$defs/DeviceInformationRequest"
            },
            {
               "type": "object",
               "properties": {
                  "deviceType": {
                     "const": "signal section"
                  },
                  "deviceInformationType": {
                     "const": "device inventory"
                  }
               }
            }
         ]
      }
   },
   "required": [
      "deviceInformationRequest"
   ]
}
```


3.3.5.9.2.5 SignalSectionInventoryResponse


```
{
   "description": "Include generic device inventory header and intersection name for each signal controller in signal section inventory information",
   "type": "object",
```

```
  "$reqId": "3.3.5.9.2.5",
  "properties": {
    "sectionId": {
      "$reqId": "3.3.5.9.2.5.a",
      "description": "Unique identifier for the section",
      "type": "string"
    },
    "deviceInventoryHeader": {
      "$reqId": "3.3.5.9.2.5.b",
      "description": "Generic device inventory header information for each signal controller",
      "$ref": "#/$defs/DeviceInventoryResponseHeader"
    },
    "intersectionName": {
      "$reqId": "3.3.5.9.2.5.c",
      "description": "Intersection name for each signal controller",
      "type": "string"
    }
  },
  "required": [
    "sectionId",
    "deviceInventoryHeader",
    "intersectionName"
  ]
}
```


3.3.5.9.3 Share Intersection Status Information

The requirements for sharing intersection status information with other authorized centers are as follows:

3.3.5.9.3.1 Send Intersection Status Information Upon Request

An owner center shall respond to an authorized external center requesting intersection status with a message containing the owner center's intersection status information.

3.3.5.9.3.2 Publish Intersection Status Information

This section describes the design for how an owner center publishes a message to all authorized subscribing external centers using the schema structure defined in annexure A.2 of this document.

3.3.5.9.3.3 Subscribe to Intersection Status Information

This section describes the design for how external centers receives a published message by an owner center using the schema structure defined in annexure A.3 of this document.

3.3.5.9.3.4 IntersectionStatusRequest


```
{
  "description": "Include intersection status request details from an external center to an owner center",
  "type": "object",
```

```
  "$reqId": "3.3.5.9.3.4",
  "properties": {
    "deviceInformationRequest": {
      "$reqId": "3.3.5.9.3.4.a",
      "description": "Generic device information request for signal controller status",
      "allOf": [
        {
          "$ref": "#/$defs/DeviceInformationRequest"
        },
        {
          "type": "object",
          "properties": {
            "deviceType": {
              "const": "signal controller"
            },
            "deviceInformationType": {
              "const": "device status"
            }
          }
        }
      ]
    }
  },
  "required": [
    "deviceInformationRequest"
  ]
}
```

3.3.5.9.3.5 Contents of the Intersection Status Information

The intersection status information for an owner center to send to an external center is as follows:

3.3.5.9.3.5.1 IntersectionStatusResponse

```
{
  "description": "Include intersection status information from owner center to external center",
  "type": "object",
  "$reqId": "3.3.5.9.3.5.1",
  "properties": {
    "deviceStatusHeader": {
      "$reqId": "3.3.5.9.3.5.1.a",
      "description": "Generic device status header information",
      "allOf": [
        {
          "$ref": "#/$defs/DeviceStatusHeader"
        },
        {
          "properties": {
            "deviceStatuses": {
```

```
                    "items": {
                        "allOf": [
                            {
                                "$ref": "#/$defs/DeviceStatus"
                            },
                            {
                                "properties": {
                                    "deviceType": {
                                        "const": "signal controller"
                                    }
                                }
                            }
                        ]
                    }
                }
            }
        }
    },
    "signalControlSource": {
        "$reqId": "3.3.5.9.3.5.1.b",
        "description": "Signal control source for the signal controller",
        "$ref": "#/$defs/SignalControlSource"
    },
    "plannedSignalTimingMode": {
        "$reqId": "3.3.5.9.3.5.1.c",
        "description": "Planned signal timing mode of the signal controller including various modes such as local, central, and coordinated options.",
        "$ref": "#/$defs/SignalControllerCurrentTimingModes"
    },
    "currentSignalTimingMode": {
        "$reqId": "3.3.5.9.3.5.1.d",
        "description": "Current signal timing mode of the signal controller",
        "$ref": "#/$defs/SignalControllerCurrentSignalTimingMode"
    },
    "sectionIdentifierIntersectionStatus": {
        "$reqId": "3.3.5.9.3.5.2.1",
        "description": "Provide unique identifier of the section assigned to the intersection in status information; if none, value shall be NULL.",
        "type": "string"
    },
    "plannedSignalTimingModeDescription": {
        "$reqId": "3.3.5.9.3.5.2.2",
        "description": "Provide a textual description of the planned signal timing mode as part of intersection status information",
        "type": "string"
    },
    "timingPatternIdentifierCurrent": {
```

```
        "$reqId": "3.3.5.9.3.5.2.3",
        "description": "Provide the signal timing pattern number in intersection status information",
        "type": "number"
      },
      "timingPatternDescription": {
        "$reqId": "3.3.5.9.3.5.2.4",
        "description": "Provide current signal timing pattern description as part of intersection status
information",
        "type": "string"
      },
      "actuationMode": {
        "$reqId": "3.3.5.9.3.5.2.5",
        "description": "Indicate the current actuation mode of the planned signal timing mode in
intersection status information",
        "type": "string",
        "enum": [
          "fixedTime",
          "semiActuated",
          "fullyActuated",
          "unknown",
          "other"
        ]
      },
      "phaseRecalls": {
        "$reqId": "3.3.5.9.3.5.2.6",
        "description": "Indicate operational characteristics of each phase in intersection status
information",
        "type": "string",
        "enum": [
          "minimumVehicleRecall",
          "maximumVehicleRecall",
          "pedestrianRecall",
          "minimumVehicleAndPedestrianRecall",
          "maximumVehicleAndPedestrianRecall",
          "softRecall",
          "softAndPedestrianRecall",
          "phaseOmitted",
          "other",
          "none"
        ]
      },
      "cycleLengthPlanned": {
        "$reqId": "3.3.5.9.3.5.2.7",
        "description": "Provide the planned cycle length of the current signal timing pattern in seconds as
part of intersection status information.",
        "type": "number"
      },
      "cycleLengthCurrent": {
```

```
        "$reqId": "3.3.5.9.3.5.2.8",
        "description": "Provide the actual cycle length of the traffic signal controller in seconds as part of intersection status information.",
        "type": "number"
      },
      "cycleLengthPrevious": {
        "$reqId": "3.3.5.9.3.5.2.9",
        "description": "Provide actual cycle length in seconds for the previous cycle of the traffic signal controller as part of intersection status information.",
        "type": "number"
      },
      "fieldManagementStationCycleLengthActual": {
        "$reqId": "3.3.5.9.3.5.2.10",
        "description": "Provide actual cycle length in seconds for the current cycle of the field management station as part of intersection status information.",
        "type": "number"
      },
      "localControllerCycleCounter": {
        "$reqId": "3.3.5.9.3.5.2.11",
        "description": "Provide local cycle timer information for the current cycle of the traffic signal controller in seconds as part of intersection status information.",
        "type": "number"
      },
      "fieldManagementStationCycleCounter": {
        "$reqId": "3.3.5.9.3.5.2.12",
        "description": "Provide field management station cycle timer information for the current cycle of the local controller in seconds as part of intersection status information.",
        "type": "number"
      },
      "offsetReference": {
        "$reqId": "3.3.5.9.3.5.2.13",
        "description": "Indicate the reference point of the coordinated phase for the signal timing offset in intersection status information.",
        "type": "string",
        "enum": [
          "startOfGreen",
          "endOfGreen",
          "endOfYellow",
          "startOfPedestrianClearance"
        ]
      },
      "offsetPlanned": {
        "$reqId": "3.3.5.9.3.5.2.14",
        "description": "Provide planned offset of current signal timing pattern in seconds as part of intersection status information",
        "type": "number"
      },
      "offsetActual": {
```

```
        "$reqId": "3.3.5.9.3.5.2.15",
        "description": "Provide the actual offset for the current cycle in seconds as part of intersection status information.",
        "type": "number"
      },
      "offsetPrevious": {
        "$reqId": "3.3.5.9.3.5.2.16",
        "description": "Provide the actual offset for the previous cycle in seconds as part of intersection status information.",
        "type": "number"
      },
      "controllerTimestamp": {
        "$reqId": "3.3.5.9.3.5.2.17",
        "description": "Provide current date and time on traffic signal controller as part of intersection status information",
        "type": "number"
      },
      "coordinatedPhases": {
        "$reqId": "3.3.5.9.3.5.2.18",
        "description": "Provide identifiers for current coordinated phases in intersection status information.",
        "type": "string"
      },
      "phaseSplits": {
        "$reqId": "3.3.5.9.3.5.2.19",
        "description": "Indicate the current phase split time in tenths of a second as part of the intersection status information for each phase.",
        "type": "array",
        "items": {
          "type": "number"
        }
      },
      "ringStatus": {
        "$reqId": "3.3.5.9.3.5.2.20",
        "description": "Indicate current status of each ring in intersection status information",
        "type": "string",
        "enum": [
          "minimumGreen",
          "extension",
          "maximumGreen",
          "greenRest",
          "yellowChange",
          "redClearance",
          "redRest",
          "undefined",
          "gapOut",
          "maxOut",
          "forceOff"
```

```
        ]
      },
      "activePhaseSequence": {
        "$reqId": "3.3.5.9.3.5.2.21",
        "description": "Provide phase identifiers of currently active phases in sequential order for each ring in the intersection status information.",
        "type": "array",
        "items": {
          "type": "string"
        }
      },
      "phaseStatusGreens": {
        "$reqId": "3.3.5.9.3.5.2.22",
        "description": "Indicate which phases are green in intersection status information",
        "type": "array",
        "items": {
          "type": "string"
        }
      },
      "phaseStatusYellows": {
        "$reqId": "3.3.5.9.3.5.2.23",
        "description": "Indicate which phases are currently yellow in the intersection status information",
        "type": "array",
        "items": {
          "type": "string"
        }
      },
      "phaseStatusReds": {
        "$reqId": "3.3.5.9.3.5.2.24",
        "description": "Indicate which phases are currently red in the intersection status information",
        "type": "array",
        "items": {
          "type": "string"
        }
      },
      "phaseStatusWalks": {
        "$reqId": "3.3.5.9.3.5.2.25",
        "description": "Indicate current walk phases in intersection status information",
        "type": "array",
        "items": {
          "type": "string"
        }
      },
      "phaseStatusPedestrianClearance": {
        "$reqId": "3.3.5.9.3.5.2.26",
        "description": "Indicate which phases are currently flashing-don't-walk in intersection status information.",
        "type": "array",
```

```
      "items": {
        "type": "string"
      }
    },
    "phaseStatusDontWalks": {
      "$reqId": "3.3.5.9.3.5.2.27",
      "description": "Indicate steady-don't-walk phases in intersection status information",
      "type": "array",
      "items": {
        "type": "string"
      }
    },
    "overlapStatusGreens": {
      "$reqId": "3.3.5.9.3.5.2.28",
      "description": "Indicate which overlaps are currently green in intersection status information",
      "type": "array",
      "items": {
        "type": "string"
      }
    },
    "overlapStatusYellows": {
      "$reqId": "3.3.5.9.3.5.2.29",
      "description": "Indicate which overlaps are currently yellow in intersection status information",
      "type": "array",
      "items": {
        "type": "string"
      }
    },
    "overlapStatusReds": {
      "$reqId": "3.3.5.9.3.5.2.30",
      "description": "Indicate which overlaps are currently red in the intersection status information for
each signal.",
      "type": "array",
      "items": {
        "type": "string"
      }
    },
    "specialFunctions": {
      "$reqId": "3.3.5.9.3.5.2.31",
      "description": "Indicate active special function numbers as part of intersection status information
for each signal.",
      "type": "array",
      "items": {
        "type": "string"
      }
    },
    "signalPriority": {
      "$reqId": "3.3.5.9.3.5.2.32",
```

```
        "description": "Provide a text description of preemption or signal priority for each intersection in the status information.",
        "type": "array",
        "items": {
          "type": "string"
        }
      }
    },
    "required": [
      "deviceStatusHeader",
      "signalControlSource",
      "plannedSignalTimingMode",
      "currentSignalTimingMode"
    ]
}
```

3.3.5.9.4 External Change Requests for Traffic Signals

The requirements to support signal control requests from other authorized centers are as follows. Only control requests to change the traffic signal timing mode, select a signal timing pattern, or make an offset adjustment on a remote traffic signal controller device are supported.

3.3.5.9.4.1 Send Signal Change Response Upon Request

An owner center shall send a one-time response message identifying the status of a requested traffic signal control change to the authorized external center that requested the change.

3.3.5.9.4.2 SignalChangeRequest

```
{
    "description": "Include signal change request details from external center to owner center",
    "type": "object",
    "$reqId": "3.3.5.9.4.2",
    "properties": {
      "deviceInformationRequest": {
        "$reqId": "3.3.5.9.4.2.a",
        "description": "Generic device change request header information for signal controller device type",
        "allOf": [
          {
            "$ref": "#/$defs/DeviceChangeRequestHeader"
          },
          {
            "type": "object",
            "properties": {
              "deviceType": {
                "const": "signal controller"
```

```
                }
            }
        }
      ]
    },
    "changeRequestType": {
      "$reqId": "3.3.5.9.4.2.b",
      "$ref": "#/$defs/SignalDeviceChangeRequestTypes"
    },
    "requestTimingMode": {
      "$reqId": "3.3.5.9.4.2.c",
      "description": "Requested change to signal timing mode",
      "$ref": "#/$defs/SignalControllerTimingModes"
    },
    "sectionTimingPatternId": {
      "$reqId": "3.3.5.9.4.2.d",
      "description": "Requested section signal timing pattern for change type 'change signal timing
pattern'",
      "type": "number"
    },
    "offsetAdjustment": {
      "$reqId": "3.3.5.9.4.2.e",
      "description": "Requested offset in seconds for 'make offset adjustment' change type",
      "type": "number"
    }
  },
  "required": [
    "deviceInformationRequest",
    "changeRequestType",
    "requestTimingMode",
    "sectionTimingPatternId",
    "offsetAdjustment"
  ]
}
```

3.3.5.9.4.3 SignalChangeResponse

```
{
  "description": "Response to signal controller change request from authorized external center",
  "type": "object",
  "$reqId": "3.3.5.9.4.3",
  "properties": {
    "deviceChangeResponseHeader": {
      "$reqId": "3.3.5.9.4.3.1.a",
      "description": "Generic device change response header information",
      "allOf": [
        {
          "$ref": "#/$defs/DeviceChangeResponseHeader"
        },
```

```
            {
              "type": "object",
              "properties": {
                "deviceType": {
                  "const": "signal controller"
                }
              }
            }
          ]
        },
        "sectionIdentifierSignalChange": {
          "$reqId": "3.3.5.9.4.3.2.1",
          "description": "Provide unique identifier of the section assigned to the traffic signal controller in the signal change response",
          "type": "string"
        },
        "signalTimingModeCurrent": {
          "$reqId": "3.3.5.9.4.3.2.2",
          "description": "Provide the current signal timing mode in the signal control response",
          "$ref": "#/$defs/SignalControllerCurrentTimingModes"
        },
        "signalTimingPatternIdentifierCurrent": {
          "$reqId": "3.3.5.9.4.3.2.3",
          "description": "Provide the current signal timing pattern as part of the signal control response",
          "type": "string"
        },
        "signalOffsetCurrent": {
          "$reqId": "3.3.5.9.4.3.2.4",
          "description": "Indicate the offset in seconds as part of the signal control response",
          "type": "number"
        }
      },
      "required": [
        "deviceChangeResponseHeader"
      ]
    }
```

3.3.5.9.5 Request Signal Change Status

The requirements to check the status of a signal control request previously issued by an authorized external center are as follows.

3.3.5.9.5.1 Send Signal Controller Change Status Upon Request

An owner center shall respond to an authorized external center requesting the status of a previously issued signal controller change request as described “3.3.5.1.2.3.1 Send Device Change Status Upon Request”.

3.3.5.9.5.2 SignalControllerChangeStatusRequest


```
{
   "description": "Include signal controller change status request details from external center to owner center",
   "type": "object",
   "$reqId": "3.3.5.9.5.2",
   "properties": {
      "deviceChangeStatusRequest": {
         "$reqId": "3.3.5.9.5.2.a",
         "description": "Change device status request for signal controller",
         "allOf": [
            {
               "$reqId": "3.3.5.9.5.2.a",
               "description": "Change device status request for signal controller",
               "$ref": "#/$defs/DeviceChangeStatusRequest"
            },
            {
               "type": "object",
               "properties": {
                  "deviceType": {
                     "const": "signal controller"
                  }
               }
            }
         ]
      }
   },
   "required": [
      "deviceChangeStatusRequest"
   ]
}
```


3.3.5.9.5.3 SignalControllerChangeStatusResponse


```
{
   "description": "Response to DMS change status request must be included by the owner center.",
   "type": "object",
   "$reqId": "3.3.5.9.5.3",
   "properties": {
      "deviceControlResponseHeader": {
         "$reqId": "3.3.5.9.5.3.a",
         "description": "Generic device change response header information",
         "allOf": [
            {
               "$ref": "#/$defs/DeviceChangeResponseHeader"
            },
            {
               "type": "object",
               "properties": {
```

```
                "deviceType": {
                  "const": "signal controller"
                }
              }
            }
          ]
        }
    },
    "required": [
      "deviceControlResponseHeader"
    ]
}
```

3.3.5.9.6 Cancel External Change Requests for Traffic Signals

The requirements to cancel a signal control request previously issued by an authorized external center are as follows.

3.3.5.9.6.1 Send Cancel Signal Controller Change Response Upon Request

An owner center shall respond to an authorized external center requesting cancellation of a previously issued signal controller change request as described “3.3.5.1.2.4.1 Send Change Cancellation Response Upon Request”.

3.3.5.9.6.2 SignalControllerCancellationRequest

```
{
    "description": "Include signal controller change cancellation request details in communication from external center to owner center.",
    "type": "object",
    "$reqId": "3.3.5.9.6.2",
    "properties": {
      "deviceChangeCancellationRequest": {
        "$reqId": "3.3.5.9.6.2.a",
        "description": "Cancel device change request for signal controller",
        "allOf": [
          {
            "$ref": "#/$defs/DeviceChangeCancellationRequest"
          },
          {
            "type": "object",
            "properties": {
              "deviceType": {
                "const": "signal controller"
              }
            }
          }
        ]
      }
    },
```

```
  "required": [
    "deviceChangeCancellationRequest"
  ]
}
```

3.3.5.9.6.3 SignalControllerCancellationResponse

```
{
  "description": "Response to signal controller change cancellation request from external center",
  "type": "object",
  "$reqId": "3.3.5.9.6.3",
  "properties": {
    "deviceChangeResponseHeader": {
      "$reqId": "3.3.5.9.6.3.a",
      "description": "Generic device change response header information",
      "allOf": [
        {
          "$ref": "#/$defs/DeviceChangeResponseHeader"
        },
        {
          "type": "object",
          "properties": {
            "deviceType": {
              "const": "signal controller"
            }
          }
        }
      ]
    }
  },
  "required": [
    "deviceChangeResponseHeader"
  ]
}
```

3.3.5.9.7 Share Traffic Signal Timing Pattern Schedule

The requirements to share traffic signal timing pattern time base schedule tables for individual signal controllers with other authorized centers are as follows:

3.3.5.9.7.1 Send Signal Timing Pattern Schedule Information Upon Request

An owner center shall respond to an authorized external center requesting signal timing pattern schedules with a message containing the owner center's signal timing pattern time base schedule information.

3.3.5.9.7.2 Publish Signal Timing Pattern Schedule Information

This section describes the design for how an owner center publishes a message to all authorized subscribing external centers using the schema structure defined in annexure A.2 of this document.

3.3.5.9.7.3 Subscribe to Signal Timing Pattern Schedule Information

This section describes the design for how external centers receives a published message by an owner center using the schema structure defined in annexure A.3 of this document.

3.3.5.9.7.4 SignalTimingPatternScheduleRequest


```
{
  "description": "Include signal timing pattern time base schedule request details",
  "type": "object",
  "$reqId": "3.3.5.9.7.4",
  "properties": {
    "deviceControlScheduleHeader": {
      "$reqId": "3.3.5.9.7.4.a",
      "description": "Generic device schedule information for signal controller",
      "allOf": [
        {
          "$ref": "#/$defs/DeviceInformationRequest"
        },
        {
          "type": "object",
          "properties": {
            "deviceType": {
              "const": "signal controller"
            },
            "deviceInformationType": {
              "const": "device schedule"
            }
          }
        }
      ]
    }
  },
  "required": [
    "deviceControlScheduleHeader"
  ]
}
```


3.3.5.9.7.5 SignalTimingPatternScheduleResponse


```
{
  "description": "Signal timing pattern schedule information sent from owner center to external center",
  "type": "object",
  "$reqId": "3.3.5.9.7.5",
  "properties": {
```

```
      "deviceControlScheduleInformation": {
        "$reqId": "3.3.5.9.7.5.a",
        "description": "Generic device schedule information",
        "$ref": "#/$defs/DeviceScheduleInformation"
      },
      "timeBaseScheduleDay": {
        "$reqId": "3.3.5.9.7.5.b",
        "description": "Time base schedule day pattern timing modes for traffic control",
        "$ref": "#/$defs/TimeBaseScheduleDayTimingModes"
      },
      "timingPatternId": {
        "$reqId": "3.3.5.9.7.5.c",
        "description": "Identifier for the signal timing pattern in the time base schedule day pattern",
        "type": "string"
      }
    },
    "required": [
      "deviceControlScheduleInformation",
      "timeBaseScheduleDay",
      "timingPatternId"
    ]
}
```

3.3.5.9.8 Share Signal Timing Pattern Information

The requirements for sharing signal timing pattern information with other authorized centers are as follows:

3.3.5.9.8.1 Send Signal Timing Pattern Upon Request

An owner center shall respond to an authorized external center requesting signal timing pattern information with a message containing the owner center's signal timing pattern information.

3.3.5.9.8.2 Publish Signal Timing Pattern Information

This section describes the design for how an owner center publishes a message to all authorized subscribing external centers using the schema structure defined in annexure A.2 of this document.

3.3.5.9.8.3 Subscribe to Signal Timing Pattern Information

This section describes the design for how external centers receives a published message by an owner center using the schema structure defined in annexure A.3 of this document.

3.3.5.9.8.4 SignalTimingPatternRequest

```
{
  "description": "Content for signal timing pattern request from external center to owner center",
  "type": "object",
  "$reqId": "3.3.5.9.8.4",
```

```
  "properties": {
    "deviceInformationRequest": {
      "$reqId": "3.3.5.9.8.4.1.a",
      "description": "Request for generic device information with device type set to 'signal controller' and information type set to 'device plan'.",
      "allOf": [
        {
          "$ref": "#/$defs/DeviceInformationRequest"
        },
        {
          "type": "object",
          "properties": {
            "deviceType": {
              "const": "signal controller"
            },
            "deviceInformationType": {
              "const": "device plan"
            }
          }
        }
      ]
    },
    "signalTimingPatternIdentifier": {
      "$reqId": "3.3.5.9.8.4.2.1",
      "description": "Provide signal timing pattern numbers as part of the signal timing pattern inventory request",
      "type": "array",
      "items": {
        "type": "string"
      }
    }
  },
  "required": [
    "deviceInformationRequest"
  ]
}
```

3.3.5.9.8.5 SignalTimingPatternResponse

```
{
  "description": "Signal timing pattern plan inventory information for external center",
  "type": "object",
  "$reqId": "3.3.5.9.8.5",
  "properties": {
    "deviceInventoryHeader": {
      "$reqId": "3.3.5.9.8.5.1.a",
      "description": "Generic device inventory header information",
      "$ref": "#/$defs/DeviceInventoryResponseHeader"
    },
```

```
    "timingPatternId": {
      "$reqId": "3.3.5.9.8.5.1.b",
      "description": "Identifier for the signal timing pattern",
      "type": "string"
    },
    "cycleLength": {
      "$reqId": "3.3.5.9.8.5.1.c",
      "description": "Cycle length in seconds for the signal timing pattern",
      "type": "number"
    },
    "offsetTime": {
      "$reqId": "3.3.5.9.8.5.1.d",
      "description": "Offset time in seconds for the signal timing pattern",
      "type": "number"
    },
    "phaseIds": {
      "$reqId": "3.3.5.9.8.5.1.e",
      "description": "Unique identifier for each phase in the signal timing pattern",
      "type": "array",
      "items": {
        "type": "string"
      }
    },
    "phaseIndication": {
      "$reqId": "3.3.5.9.8.5.1.f",
      "description": "Indication of coordinated phase(s) in signal timing pattern",
      "type": "number"
    },
    "spiltMode": {
      "$reqId": "3.3.5.9.8.5.1.g",
      "description": "Specify split-mode for each phase in the signal timing pattern",
      "$ref": "#/$defs/SignalControllerSplitModes"
    },
    "phaseSplit": {
      "$reqId": "3.3.5.9.8.5.1.h",
      "description": "Phase split timing for each signal pattern in tenths of a second",
      "type": "number"
    },
    "descriptionSignalTimingPattern": {
      "$reqId": "3.3.5.9.8.5.2.1",
      "description": "Provide description of signal timing patterns as part of timing pattern information.",
      "type": "string"
    },
    "maximumGreenDuration": {
      "$reqId": "3.3.5.9.8.5.2.2",
      "description": "Indicate maximum duration of green time for vehicle movement in signal timing
pattern",
      "type": "number"
```

```
    },
    "minimumGreenDuration": {
      "$reqId": "3.3.5.9.8.5.2.3",
      "description": "Indicate minimum duration of green time for vehicle movement in signal timing pattern",
      "type": "number"
    },
    "vehicleYellowDuration": {
      "$reqId": "3.3.5.9.8.5.2.4",
      "description": "Indicate vehicle clearance duration in tenths of a second for each signal timing pattern",
      "type": "number"
    },
    "vehicleRedClearanceDuration": {
      "$reqId": "3.3.5.9.8.5.2.5",
      "description": "Indicate secondary vehicle clearance duration in tenths of a second for each signal timing pattern",
      "type": "number"
    },
    "minimumWalkDuration": {
      "$reqId": "3.3.5.9.8.5.2.6",
      "description": "Indicate the minimum walk time duration for pedestrian movement for each signal timing pattern",
      "type": "number"
    },
    "pedestrianClearanceDuration": {
      "$reqId": "3.3.5.9.8.5.2.7",
      "description": "Indicate pedestrian clearance duration for each signal timing pattern",
      "type": "number"
    },
    "steadyDontWalkDuration": {
      "$reqId": "3.3.5.9.8.5.2.8",
      "description": "Indicate secondary pedestrian clearance duration in tenths of a second for pedestrian movement in signal timing patterns",
      "type": "number"
    },
    "phaseSequenceInformation": {
      "$reqId": "3.3.5.9.8.5.2.9",
      "description": "Indicate the phase sequence for each signal timing pattern for each signal",
      "type": "number"
    },
    "signalTimingPatternDateTimeChangeInformation": {
      "$reqId": "3.3.5.9.8.5.2.10",
      "description": "Provide the date and time of the last signal timing pattern change as part of the signal timing information",
      "$ref": "#/$defs/DateTime"
    }
  },
```

```
  "required": [
    "deviceInventoryHeader",
    "timingPatternId",
    "cycleLength",
    "offsetTime",
    "phaseIds",
    "phaseIndication",
    "spiltMode",
    "phaseSplit"
  ]
}
```

3.3.5.9.9 Share Section Status Information

The requirements for sharing section status information with other authorized centers are as follows:

3.3.5.9.9.1 Send Section Status Information Upon Request

An owner center shall respond to an authorized external center requesting section status with a message containing the owner center's section status information.

3.3.5.9.9.2 Publish Section Status Information

This section describes the design for how an owner center publishes a message to all authorized subscribing external centers using the schema structure defined in annexure A.2 of this document.

3.3.5.9.9.3 Subscribe to Section Status Information

This section describes the design for how external centers receives a published message by an owner center using the schema structure defined in annexure A.3 of this document.

3.3.5.9.9.4 SectionStatusInformationRequest

```
{
  "description": "Include section status request details in communication from external center to owner center",
  "type": "object",
  "$reqId": "3.3.5.9.9.4",
  "properties": {
    "deviceInformationRequest": {
      "$reqId": "3.3.5.9.9.4.a",
      "description": "Request for signal section device status information",
      "allOf": [
        {
          "$ref": "#/$defs/DeviceInformationRequest"
        },
        {
          "type": "object",
          "properties": {
```

```
                    "deviceType": {
                        "const": "signal section"
                    },
                    "deviceInformationType": {
                        "const": "device status"
                    }
                }
            }
        ]
    }
  },
  "required": [
    "deviceInformationRequest"
  ]
}
```


3.3.5.9.9.5 SectionStatusInformationResponse


```
{
  "description": "Section status information to be sent from owner center to external center.",
  "type": "object",
  "$reqId": "3.3.5.9.9.5",
  "properties": {
    "organizationInformation": {
      "$reqId": "3.3.5.9.9.5.1.a",
      "description": "Information about the owner organization",
      "$ref": "#/$defs/OrganizationInformation"
    },
    "sectionId": {
      "$reqId": "3.3.5.9.9.5.1.b",
      "description": "Unique identifier for the section",
      "type": "string"
    },
    "sectionControllerId": {
      "$reqId": "3.3.5.9.9.5.1.c",
      "description": "Unique identifiers for each signal controller in the section",
      "type": "string"
    },
    "sectionTimingMode": {
      "$reqId": "3.3.5.9.9.5.1.d",
      "description": "Section timing mode of the section for signal controllers",
      "$ref": "#/$defs/SignalControllerTimingModes"
    },
    "sectionTimingPatterns": {
      "$reqId": "3.3.5.9.9.5.1.e",
      "description": "Unique identifier for the section timing pattern, which is a list of signal timing patterns for each assigned signal controller.",
      "type": "array",
      "items": {
```

```
            "$ref": "#/$defs/SectionTimingPattern"
          }
        },
        "sectionName": {
          "$reqId": "3.3.5.9.9.5.2.1",
          "description": "Provide section name as assigned by owner organization in section status
information",
          "type": "string"
        },
        "descriptionSectionTimingPatternSectionStatus": {
          "$reqId": "3.3.5.9.9.5.2.2",
          "description": "Provide description of the current signal timing pattern as part of section status
information.",
          "type": "string"
        },
        "sectionCycleLengthSectionStatus": {
          "$reqId": "3.3.5.9.9.5.2.3",
          "description": "Provide the cycle length of the current section timing pattern as part of the section
status information.",
          "type": "number"
        },
        "operatorIdentifierSectionStatus": {
          "$reqId": "3.3.5.9.9.5.2.4",
          "description": "Requirements for the operator identifier in section status information",
          "type": "string"
        },
        "eventIdentifierSectionStatus": {
          "$reqId": "3.3.5.9.9.5.2.5",
          "description": "Provide unique identifier of the event associated with the section status
information",
          "type": "string"
        },
        "eventResponsePlanSectionStatus": {
          "$reqId": "3.3.5.9.9.5.2.6",
          "description": "Provide event response plan number as part of section status information",
          "type": "number"
        },
        "sectionStatusDateTimeChangeInformation": {
          "$reqId": "3.3.5.9.9.5.2.7",
          "description": "Provide date and time of the last change to section status in the section status
information",
          "$ref": "#/$defs/DateTime"
        }
      },
      "required": [
        "organizationInformation",
        "sectionId",
        "sectionControllerId",
```

```
      "sectionTimingMode",
      "sectionTimingPatterns"
   ]
}
```

3.3.5.9.10 External Change Requests for Signal Sections

The requirements to support signal section control requests from other authorized centers are as follows. Only control requests to change the traffic signal timing mode or current signal timing pattern of a remote signal section is supported.

3.3.5.9.10.1 Send Signal Section Change Response Upon Request

An owner center shall send to an authorized external center requesting a change to a traffic signal section via a one-time change request with a message containing the status of the request.

3.3.5.9.10.1.1 SignalSectionChangeRequest

```
{
   "description": "Include signal section change request details in communication from external center to owner center",
   "type": "object",
   "$reqId": "3.3.5.9.10.1.1",
   "properties": {
      "deviceControlRequestHeader": {
         "$reqId": "3.3.5.9.10.1.1.a",
         "description": "Generic device control request header information for signal section",
         "allOf": [
            {
               "$ref": "#/$defs/DeviceChangeRequestHeader"
            },
            {
               "type": "object",
               "properties": {
                  "deviceType": {
                     "const": "signal section"
                  }
               }
            }
         ]
      },
      "changeRequestType": {
         "$reqId": "3.3.5.9.10.1.1.b",
         "description": "Type of change request for the section (timing mode or timing pattern)",
         "type": "string",
         "enum": [
            "changeSectionTimingMode",
            "changeSectionTimingPattern"
         ]
```

```
      },
      "requestTimingMode": {
        "$reqId": "3.3.5.9.10.1.1.c",
        "description": "Requested change in signal timing mode options",
        "$ref": "#/$defs/SignalControllerTimingModes"
      },
      "sectionTimingPattern": {
        "$reqId": "3.3.5.9.10.1.1.d",
        "description": "Requested section signal timing pattern for changes to signal timing pattern",
        "$ref": "#/$defs/SectionTimingPattern"
      }
    },
    "required": [
      "deviceControlRequestHeader",
      "changeRequestType",
      "requestTimingMode",
      "sectionTimingPattern"
    ]
}
```

3.3.5.9.10.2 Contents of Signal Section Change Response

The contents owner center response to a signal controller change request from an authorized external center are as follows:

3.3.5.9.10.2.1 SignalSectionChangeResponse

```
{
    "description": "Response to signal section controller change request shall be included",
    "type": "object",
    "$reqId": "3.3.5.9.10.2.1",
    "properties": {
      "deviceChangeResponseHeader": {
        "$reqId": "3.3.5.9.10.2.1.a",
        "description": "Generic device change response header information",
        "allOf": [
          {
            "$ref": "#/$defs/DeviceChangeResponseHeader"
          },
          {
            "type": "object",
            "properties": {
              "deviceType": {
                "const": "signal section"
              }
            }
          }
        ]
      },
      "sectionTimingModeCurrent": {
```

```
            "$reqId": "3.3.5.9.10.2.2.1",
            "description": "Provide section timing mode currently in effect in the signal section change
response",
            "$ref": "#/$defs/SignalControllerCurrentTimingModes"
        },
        "sectionTimingPattern": {
            "$reqId": "3.3.5.9.10.2.2.2",
            "description": "Provide the current signal timing pattern in the signal section control response.",
            "$ref": "#/$defs/SectionTimingPattern"
        }
    },
    "required": [
        "deviceChangeResponseHeader"
    ]
}
```


3.3.5.9.11 Request Section Change Status

The requirements to check the status of a section control request previously issued by an authorized external center are as follows:

3.3.5.9.11.1 Send Section Change Status Upon Request

An owner center shall respond to an authorized external center requesting the status of a previously issued section change request with a message containing the status of the section control request.

3.3.5.9.11.2 SectionChangeStatusRequest


```
{
    "description": "Include signal section change status request from external center to owner center",
    "type": "object",
    "$reqId": "3.3.5.9.11.2",
    "properties": {
        "deviceChangeStatusRequest": {
            "$reqId": "3.3.5.9.11.2.a",
            "description": "Generic change device status request for signal section device type",
            "allOf": [
                {
                    "$ref": "#/$defs/DeviceChangeStatusRequest"
                },
                {
                    "type": "object",
                    "properties": {
                        "deviceType": {
                            "const": "signal section"
                        }
                    }
                }
            ]
```

```
      }
    },
    "required": [
      "deviceChangeStatusRequest"
    ]
}
```

3.3.5.9.11.3 SectionChangeStatusResponse

```
{
    "description": "Response to signal section change status request from owner center shall include necessary information.",
    "type": "object",
    "$reqId": "3.3.5.9.11.3",
    "properties": {
      "deviceControlResponseHeader": {
        "$reqId": "3.3.5.9.11.3.a",
        "description": "Generic device change response header information",
        "allOf": [
          {
            "$ref": "#/$defs/DeviceChangeResponseHeader"
          },
          {
            "type": "object",
            "properties": {
              "deviceType": {
                "const": "signal section"
              }
            }
          }
        ]
      }
    },
    "required": [
      "deviceControlResponseHeader"
    ]
}
```

3.3.5.9.12 Cancel Control Requests for Remote Signal Sections

The requirements to cancel a section change request previously issued by an authorized external center are as follows.

3.3.5.9.12.1 Send Cancel Signal Section Change Response Upon Request

An owner center shall respond to an authorized external center requesting cancellation of a previously issued signal section change request as described in “3.3.5.1.2.4.1 Send Change Cancellation Response Upon Request”.

3.3.5.9.12.2 SignalSectionCancellationRequest


```
{
   "description": "Include details in the signal section change cancellation request from external center to owner center",
   "type": "object",
   "$reqId": "3.3.5.9.12.2",
   "properties": {
      "deviceChangeCancellationRequest": {
         "$reqId": "3.3.5.9.12.2.a",
         "description": "Generic cancel device change request for signal section device type",
         "allOf": [
            {
               "$ref": "#/$defs/DeviceChangeCancellationRequest"
            },
            {
               "properties": {
                  "deviceType": {
                     "const": "signal section"
                  }
               }
            }
         ]
      }
   },
   "required": [
      "deviceChangeCancellationRequest"
   ]
}
```


3.3.5.9.12.3 SignalSectionCancellationResponse


```
{
   "description": "Response to signal section change cancellation request from external center",
   "type": "object",
   "$reqId": "3.3.5.9.12.3",
   "properties": {
      "deviceChangeResponseHeader": {
         "$reqId": "3.3.5.9.12.3.a",
         "description": "Generic response header information for device change",
         "allOf": [
            {
               "$ref": "#/$defs/DeviceChangeResponseHeader"
            },
            {
               "type": "object",
               "properties": {
                  "deviceType": {
                     "const": "signal section"
                  }
```

```
            }
          }
        ]
      }
    },
    "required": [
      "deviceChangeResponseHeader"
    ]
}
```

3.3.5.9.13 Share Section Timing Pattern Schedule

The requirements to share section timing pattern time base schedule tables with other authorized centers are as follows:

3.3.5.9.13.1 Send Section Timing Pattern Schedule Information Upon Request

An owner center shall respond to an authorized external center requesting section signal timing pattern schedules with a message containing the owner center's section timing pattern time base schedule information.

3.3.5.9.13.2 Publish Section Timing Pattern Schedule Information

This section describes the design for how an owner center publishes a message to all authorized subscribing external centers using the schema structure defined in annexure A.2 of this document.

3.3.5.9.13.3 Subscribe to Section Timing Pattern Schedule Information

This section describes the design for how external centers receives a published message by an owner center using the schema structure defined in annexure A.3 of this document.

3.3.5.9.13.4 SectionTimingPatternScheduleRequest

```
{
    "description": "Include components for the signal section plan inventory request in communication from external center to owner center.",
    "type": "object",
    "$reqId": "3.3.5.9.13.4",
    "properties": {
      "deviceInformationRequest": {
        "$reqId": "3.3.5.9.13.4.a",
        "description": "Request for generic device information with section status type and device plan information type",
        "allOf": [
          {
            "$ref": "#/$defs/DeviceInformationRequest"
          },
          {
            "type": "object",
            "properties": {
```

```
                "deviceType": {
                  "const": "signal section"
                },
                "deviceInformationType": {
                  "const": "device plan"
                }
              }
            }
          ]
        }
    },
    "required": [
      "deviceInformationRequest"
    ]
}
```

3.3.5.9.13.5 SectionTimingPatternScheduleResponse

```
{
    "description": "Include section timing pattern schedule information from owner center to external center",
    "type": "object",
    "$reqId": "3.3.5.9.13.5",
    "properties": {
      "organizationInformation": {
        "$reqId": "3.3.5.9.13.5.a",
        "description": "Information regarding the owner organization",
        "$ref": "#/$defs/OrganizationInformation"
      },
      "sectionId": {
        "$reqId": "3.3.5.9.13.5.b",
        "description": "Unique identifier for each section",
        "type": "string"
      },
      "timeBaseScheduleNumber": {
        "$reqId": "3.3.5.9.13.5.c",
        "description": "Unique identifier for the time base schedule",
        "type": "number"
      },
      "timeBaseScheduleMonth": {
        "$reqId": "3.3.5.9.13.5.d",
        "description": "Time base schedule month",
        "type": "number"
      },
      "timeBaseScheduleDay": {
        "$reqId": "3.3.5.9.13.5.e",
        "description": "Schedule for the day of the week",
        "type": "number"
      },
```

```
    "timeBaseScheduleDate": {
      "$reqId": "3.3.5.9.13.5.f",
      "description": "Schedule date for the time base",
      "$ref": "#/$defs/DateTime"
    },
    "timeBaseScheduleDayPattern": {
      "$reqId": "3.3.5.9.13.5.g",
      "description": "Schedule pattern for the time base",
      "type": "number"
    },
    "timeBaseScheduleDayHour": {
      "$reqId": "3.3.5.9.13.5.h",
      "description": "Time base schedule for daily hour pattern",
      "type": "number"
    },
    "timeBaseScheduleDayMinute": {
      "$reqId": "3.3.5.9.13.5.i",
      "description": "Minute-based schedule day pattern",
      "type": "number"
    },
    "timeBaseScheduleLastChange": {
      "$reqId": "3.3.5.9.13.5.j",
      "description": "Date and time of the last change to the time base schedule",
      "$ref": "#/$defs/DateTime"
    },
    "specialFunctionIdentifier": {
      "$reqId": "3.3.5.9.13.5.k",
      "description": "List of unique identifiers for each signal controller assigned to the section",
      "type": "array",
      "items": {
        "type": "string"
      }
    },
    "timeBaseScheduleDayPatternMode": {
      "$reqId": "3.3.5.9.13.5.l",
      "description": "Time base schedule day pattern timing modes for traffic control",
      "$ref": "#/$defs/SignalControllerTimingModes"
    },
    "sectionTimingPatternId": {
      "$reqId": "3.3.5.9.13.5.m",
      "description": "Identifier for the section timing pattern in the time base schedule day pattern",
      "type": "array",
      "items": {
        "type": "string"
      }
    }
  },
  "required": [
```

```
      "organizationInformation",
      "sectionId",
      "timeBaseScheduleNumber",
      "timeBaseScheduleMonth",
      "timeBaseScheduleDay",
      "timeBaseScheduleDate",
      "timeBaseScheduleDayPattern",
      "timeBaseScheduleDayHour",
      "timeBaseScheduleDayMinute",
      "timeBaseScheduleLastChange",
      "specialFunctionIdentifier",
      "timeBaseScheduleDayPatternMode",
      "sectionTimingPatternId"
   ]
}
```

3.3.5.9.14 Share Signal Change Priority Queue Information

The requirements for sharing the contents of a traffic signal control priority queue are as follows:

3.3.5.9.14.1 Send Signal Priority Queue Information Upon Request

An owner center shall respond to an authorized external center requesting the contents of its traffic signal control priority queue with a message containing the contents of an owner center's traffic signal control priority queue.

3.3.5.9.14.2 SignalChangePriorityQueueRequest

```
{
   "description": "Include signal controller priority queue request details in communication from external center to owner center",
   "type": "object",
   "$reqId": "3.3.5.9.14.2",
   "properties": {
      "deviceQueueRequest": {
         "$reqId": "3.3.5.9.14.2.a",
         "description": "Generic device queue request for signal controller",
         "$ref": "#/$defs/DevicePriorityQueueRequest"
      }
   },
   "required": [
      "deviceQueueRequest"
   ]
}
```

3.3.5.9.14.3 SignalChangePriorityQueueResponse

```
{
   "description": "Include traffic signal priority queue response information from owner center to external center",
```

```
  "type": "object",
  "$reqId": "3.3.5.9.14.3",
  "properties": {
    "devicePriorityQueueHeader": {
      "$reqId": "3.3.5.9.14.3.a",
      "description": "Generic device priority queue response header information",
      "allOf": [
        {
          "$ref": "#/$defs/DevicePriorityQueueResponse"
        },
        {
          "type": "object",
          "properties": {
            "deviceType": {
              "const": "signal controller"
            }
          }
        }
      ]
    },
    "changeRequestType": {
      "$reqId": "3.3.5.9.14.3.b",
      "$ref": "#/$defs/SignalDeviceChangeRequestTypes"
    },
    "requestTimingMode": {
      "$reqId": "3.3.5.9.14.3.c",
      "description": "Requested change in signal timing mode if the change type is 'change signal timing
mode'",
      "$ref": "#/$defs/SignalControllerTimingModes"
    },
    "sectionTimingPattern": {
      "$reqId": "3.3.5.9.14.3.d",
      "description": "Requested section signal timing pattern if change type is 'change signal timing
pattern'.",
      "$ref": "#/$defs/SectionTimingPattern"
    },
    "offset": {
      "$reqId": "3.3.5.9.14.3.e",
      "description": "Requested offset in seconds for 'make offset adjustment' change type",
      "type": "number"
    }
  },
  "required": [
    "devicePriorityQueueHeader",
    "changeRequestType"
  ],
  "allOf": [
    {
```

```
      "if": {
        "properties": {
          "changeRequestType": {
            "const": "change signal timing mode"
          }
        }
      },
      "then": {
        "required": [
          "requestTimingMode"
        ]
      }
    },
    {
      "if": {
        "properties": {
          "changeRequestType": {
            "const": "change signal Qtiming pattern"
          }
        }
      },
      "then": {
        "required": [
          "sectionTimingPattern"
        ]
      }
    },
    {
      "if": {
        "properties": {
          "changeRequestType": {
            "const": "make offset adjustment"
          }
        }
      },
      "then": {
        "required": [
          "offset"
        ]
      }
    }
  ]
}
```

3.3.5.9.15 Share Section Change Priority Queue Information

The requirements for sharing the contents of a traffic signal section change priority queue are as follows:

3.3.5.9.15.1 Send Section Change Priority Queue Information Upon Request

An owner center shall respond to an authorized external center requesting the contents of its section change priority queue with a message containing the contents of an owner center's section change priority queue.

3.3.5.9.15.2 SectionChangePriorityQueueRequest


```
{
   "description": "Include details of signal section priority queue request in communication from external center to owner center",
   "type": "object",
   "$reqId": "3.3.5.9.15.2",
   "properties": {
      "deviceQueueRequest": {
         "$reqId": "3.3.5.9.15.2.a",
         "description": "Generic device queue request for signal section device type",
         "$ref": "#/$defs/DevicePriorityQueueRequest"
      }
   },
   "required": [
      "deviceQueueRequest"
   ]
}
```


3.3.5.9.15.3 SectionChangePriorityQueueResponse


```
{
   "description": "Include the type of change requested for each section in the section change priority queue response.",
   "type": "object",
   "$reqId": "3.3.5.9.15.3",
   "properties": {
      "devicePriorityQueueHeader": {
         "$reqId": "3.3.5.9.15.3.a",
         "description": "Response header information for generic device priority queue",
         "allOf": [
            {
               "$ref": "#/$defs/DevicePriorityQueueResponse"
            },
            {
               "type": "object",
               "properties": {
                  "deviceType": {
                     "const": "signal section"
                  }
               }
            }
         ]
      },
```

```
      "changeType": {
        "$reqId": "3.3.5.9.15.3.b",
        "description": "Type of change requested for each section (e.g., change signal timing mode,
change signal timing pattern)",
        "$ref": "#/$defs/ChangeRequested"
      },
      "sectionTimingModeRequestedChange": {
        "$reqId": "3.3.5.9.15.3.c",
        "description": "Request change in section timing mode for signal controllers",
        "$ref": "#/$defs/SignalControllerTimingModes"
      },
      "sectionTimingPattern": {
        "$reqId": "3.3.5.9.15.3.d",
        "description": "Requested section signal timing pattern for change type",
        "$ref": "#/$defs/SectionTimingPattern"
      }
    },
    "required": [
      "devicePriorityQueueHeader",
      "changeType"
    ],
    "allOf": [
      {
        "if": {
          "properties": {
            "changeType": {
              "const": "change section timing mode"
            }
          }
        },
        "then": {
          "required": [
            "sectionTimingModeRequestedChange"
          ]
        }
      },
      {
        "if": {
          "properties": {
            "changeType": {
              "const": "change section timing pattern"
            }
          }
        },
        "then": {
          "required": [
            "sectionTimingPattern"
          ]
```

```
        }
      }
    ]
}
```

3.3.5.9.16 Share Section Timing Pattern Information

The requirements for sharing section timing pattern information with other authorized centers are as follows:

3.3.5.9.16.1 Send Section Timing Pattern Upon Request

An owner center shall respond to an authorized external center requesting signal section timing pattern information with a message containing the owner center's signal section timing pattern information.

3.3.5.9.16.2 Publish Section Timing Pattern Information

This section describes the design for how an owner center publishes a message to all authorized subscribing external centers using the schema structure defined in annexure A.2 of this document.

3.3.5.9.16.3 Subscribe to Section Timing Pattern Information

This section describes the design for how external centers receives a published message by an owner center using the schema structure defined in annexure A.3 of this document.

3.3.5.9.16.4 SectionTimingPatternInformationRequest

```
{
   "description": "Include signal section timing plan inventory request details from external center to owner center.",
   "type": "object",
   "$reqId": "3.3.5.9.16.4",
   "properties": {
      "deviceInformationRequest": {
         "$reqId": "3.3.5.9.16.4.a",
         "description": "Generic device information request for signal section device plan",
         "allOf": [
            {
               "$ref": "#/$defs/DeviceInformationRequest"
            },
            {
               "type": "object",
               "properties": {
                  "deviceType": {
                     "const": "signal section"
                  },
                  "deviceInformationType": {
                     "const": "device plan"
                  }
```

```
            }
          }
        ]
      }
    },
    "required": [
      "deviceInformationRequest"
    ]
}
```

3.3.5.9.16.5 Contents of the Section Timing Pattern Information Response

The signal section timing pattern plan inventory information for an owner center to send to an external center is as follows:

3.3.5.9.16.5.1 SectionTimingPatternInformationResponse

```
{
    "description": "Include signal section timing pattern inventory information for each signal controller assigned to the section in communications from an owner center to an external center",
    "type": "object",
    "$reqId": "3.3.5.9.16.5.1",
    "properties": {
      "organizationInformation": {
        "$reqId": "3.3.5.9.16.5.1.a",
        "description": "Information about the owner organization",
        "$ref": "#/$defs/OrganizationInformation"
      },
      "sectionId": {
        "$reqId": "3.3.5.9.16.5.1.b",
        "description": "Unique identifier for the section",
        "type": "string"
      },
      "sectionTimingPatternId": {
        "$reqId": "3.3.5.9.16.5.1.c",
        "description": "Identifier for the section timing pattern which lists individual signal timings.",
        "type": "array",
        "items": {
          "type": "string"
        }
      },
      "sectionCycleLength": {
        "$reqId": "3.3.5.9.16.5.1.d",
        "description": "Cycle length in seconds for each signal controller assigned to the section",
        "type": "number"
      },
      "sectionControllerId": {
        "$reqId": "3.3.5.9.16.5.1.e",
        "description": "Unique identifiers for each signal controller assigned to the section",
        "type": "array",
```

```
            "items": {
               "type": "string"
            }
         },
         "cycleLength": {
            "$reqId": "3.3.5.9.16.5.1.f",
            "description": "Cycle length in seconds for each signal controller assigned to the section",
            "type": "number"
         },
         "offsetTime": {
            "$reqId": "3.3.5.9.16.5.1.g",
            "description": "Offset time (seconds) for each signal controller assigned to the section",
            "type": "array",
            "items": {
               "type": "string"
            }
         },
         "timingPatternId": {
            "$reqId": "3.3.5.9.16.5.1.h",
            "description": "Unique identifier for the signal timing pattern for each signal controller",
            "type": "string"
         },
         "phaseId": {
            "$reqId": "3.3.5.9.16.5.1.i",
            "description": "Identifier for each phase in use for signal controllers",
            "type": "array",
            "items": {
               "type": "string"
            }
         },
         "cordinatedPhasesList": {
            "$reqId": "3.3.5.9.16.5.1.j",
            "description": "List of coordinates phases for each signal controller assigned to the section",
            "type": "array",
            "items": {
               "type": "string"
            }
         },
         "splitMode": {
            "$reqId": "3.3.5.9.16.5.1.k",
            "description": "Specify split-mode options for each phase in use for each signal controller assigned
to the section",
            "$ref": "#/$defs/SignalControllerSplitModes"
         },
         "splitTime": {
            "$reqId": "3.3.5.9.16.5.1.l",
            "description": "Split time in tenths-of-a-second for each phase of the signal controller",
            "type": "array",
```

```
            "items": {
               "type": "number"
            }
         },
         "descriptionSectionTimingPattern": {
            "$reqId": "3.3.5.9.16.5.2.1",
            "description": "Provide the description of the section timing pattern for each signal timing pattern in the signal section timing pattern information",
            "type": "string"
         },
         "sectionTimingPatternInventoryDateTimeChangeInfo": {
            "$reqId": "3.3.5.9.16.5.2.2",
            "description": "Provide the date and time of the last change to the section timing pattern inventory as part of the signal section timing pattern information.",
            "$ref": "#/$defs/DateTime"
         }
      },
      "required": [
         "organizationInformation",
         "sectionId",
         "sectionTimingPatternId",
         "sectionCycleLength",
         "sectionControllerId",
         "cycleLength",
         "offsetTime",
         "timingPatternId",
         "phaseId",
         "cordinatedPhasesList",
         "splitMode",
         "splitTime"
      ]
   }
```


3.3.5.9.17 External Commands for Traffic Signal Controllers

The requirements to for an external center to send commands to remotely control a Traffic Signal Controller that is normally managed by an owner center are as follows.

3.3.5.9.17.1 Send Signal Control Response Upon Command

An owner center shall respond to an authorized external center configuring a signal controller via a one- time control command with a message containing the status of the command.

3.3.5.9.17.2 TrafficSignalControllerCommandRequest


```
{
   "description": "Signal control command requirements for external center to owner center",
   "type": "object",
   "$reqId": "3.3.5.9.17.2",
```

```
  "properties": {
    "deviceControlRequestHeader": {
      "$reqId": "3.3.5.9.17.2.a",
      "description": "Generic device control command header information for signal controller device type",
      "allOf": [
        {
          "$ref": "#/$defs/ExternalDeviceControlRequest"
        },
        {
          "type": "object",
          "properties": {
            "deviceType": {
              "const": "signal controller"
            }
          }
        }
      ]
    },
    "controlCommandType": {
      "$reqId": "3.3.5.9.17.2.b",
      "description": "Type of control command for signal management",
      "type": "string",
      "enum": [
        "changeSignalTimingMode",
        "changeSignalTimingPattern"
      ]
    },
    "signalTimingModeChange": {
      "$reqId": "3.3.5.9.17.2.c",
      "description": "Change in signal timing mode",
      "type": "string",
      "enum": [
        "free",
        "fixedTime",
        "actuated",
        "semiActuated",
        "criticalIntersectionControl",
        "trafficResponsive",
        "adaptive",
        "flashProgrammed"
      ]
    },
    "changeSignalTiming": {
      "$reqId": "3.3.5.9.17.2.d",
      "description": "Change to the signal timing pattern if the change type is 'change signal timing pattern'",
      "type": "string"
```

```
      }
    },
    "required": [
      "deviceControlRequestHeader",
      "controlCommandType",
      "signalTimingModeChange",
      "changeSignalTiming"
    ]
}
```

3.3.5.9.17.3 TrafficSignalControllerCommandResponse

```
{
    "description": "Response to signal controller control command from an external center",
    "type": "object",
    "$reqId": "3.3.5.9.17.3",
    "properties": {
      "deviceControlResponse": {
        "$reqId": "3.3.5.9.17.3.a",
        "description": "Response information for generic device control commands",
        "$ref": "#/$defs/ExternalDeviceControlCommandResponse"
      }
    },
    "required": [
      "deviceControlResponse"
    ]
}
```

3.3.5.10 Roadside Units

The requirements to exchange RSU information between centers are as follows:

3.3.5.10.1 Share RSU Inventory Information

The requirements for sharing RSU inventory information with other authorized centers are as follows:

3.3.5.10.1.1 Send RSU Inventory Information Upon Request

An owner center shall respond to an authorized external center requesting RSU inventory with a message containing the owner center's RSU inventory information.

3.3.5.10.1.2 Publish RSU Inventory Information

This section describes the design for how an owner center publishes a message to all authorized subscribing external centers using the schema structure defined in annexure A.2 of this document.

3.3.5.10.1.3 Subscribe to RSU Inventory Information

This section describes the design for how external centers receives a published message by an owner center using the schema structure defined in annexure A.3 of this document.

3.3.5.10.1.4 RSUInventoryRequest


```
{
   "description": "Include roadside unit (RSU) inventory information request details from external center to owner center",
   "type": "object",
   "$reqId": "3.3.5.10.1.4",
   "properties": {
      "deviceInformationRequest": {
         "$reqId": "3.3.5.10.1.4.a",
         "description": "Generic device information request for roadside unit device inventory",
         "allOf": [
            {
               "$ref": "#/$defs/DeviceInformationRequest"
            },
            {
               "type": "object",
               "properties": {
                  "deviceType": {
                     "const": "roadside unit"
                  },
                  "deviceInformationType": {
                     "const": "device inventory"
                  }
               }
            }
         ]
      }
   },
   "required": [
      "deviceInformationRequest"
   ]
}
```


3.3.5.10.1.5 RSUInventoryResponse


```
{
   "description": "Roadside unit (RSU) inventory information to send from owner center to external center",
   "type": "object",
   "$reqId": "3.3.5.10.1.5",
   "properties": {
      "deviceInventoryHeader": {
         "$reqId": "3.3.5.10.1.5.1.a",
         "description": "Generic device inventory header information",
         "$ref": "#/$defs/DeviceInventoryResponseHeader"
      }
   },
   "required": [
      "deviceInventoryHeader"
```

```
    ]
}
```

3.3.5.10.2 Share RSU Status Information

The requirements for sharing RSU status information with other authorized centers are as follows:

3.3.5.10.2.1 RSUStatusRequest

An owner center shall respond to an authorized external center requesting RSU status with a message containing the owner center's RSU status information.

3.3.5.10.2.2 Publish RSU Status Information

This section describes the design for how an owner center publishes a message to all authorized subscribing external centers using the schema structure defined in annexure A.2 of this document.

3.3.5.10.2.3 Subscribe to RSU Status Information

This section describes the design for how external centers receives a published message by an owner center using the schema structure defined in annexure A.3 of this document.

3.3.5.10.2.4 RSUStatusRequest

```
{
   "description": "Include RSU status request details from external center to owner center",
   "type": "object",
   "$reqId": "3.3.5.10.2.1",
   "properties": {
      "deviceInformationRequest": {
         "$reqId": "3.3.5.10.2.4.a",
         "description": "Generic device information request for Roadside Unit with device status",
         "allOf": [
            {
               "$ref": "#/$defs/DeviceInformationRequest"
            },
            {
               "type": "object",
               "properties": {
                  "deviceType": {
                     "const": "roadside unit"
                  },
                  "deviceInformationType": {
                     "const": "device status"
                  }
               }
            }
         ]
      }
```

```
    },
    "required": [
      "deviceInformationRequest"
    ]
}
```

3.3.5.10.2.5 RSUStatusResponse

```
{
    "description": "RSU status information for owner center to send to external center",
    "type": "object",
    "$reqId": "3.3.5.10.2.5",
    "properties": {
      "deviceStatusHeader": {
        "$reqId": "3.3.5.10.2.5.1.a",
        "description": "Generic device status header information",
        "allOf": [
          {
            "$ref": "#/$defs/DeviceStatusHeader"
          },
          {
            "properties": {
              "deviceStatuses": {
                "items": {
                  "allOf": [
                    {
                      "$ref": "#/$defs/DeviceStatus"
                    },
                    {
                      "properties": {
                        "deviceType": {
                          "const": "roadside unit"
                        }
                      }
                    }
                  ]
                }
              }
            }
          }
        ]
      },
      "rsuStatusMessage": {
        "$reqId": "3.3.5.10.2.5.2.1",
        "description": "The current overall status of the RSU.",
        "type": "string",
        "enum": [
          "other",
          "okay",
```

```
            "warning",
            "critical",
            "unknown"
          ]
        },
        "rsuModeStatusMessage": {
          "$reqId": "3.3.5.10.2.5.2.2",
          "description": "The current mode of operation of the RSU.",
          "type": "string",
          "enum": [
            "other",
            "standby",
            "operate",
            "fault"
          ]
        },
        "rsuSecEnrollCertStatusMessage": {
          "$reqId": "3.3.5.10.2.5.2.3",
          "description": "The status of the enrollment certificates for the RSU.",
          "type": "string",
          "enum": [
            "other",
            "unknown",
            "notEnrolled",
            "enrolled"
          ]
        }
      },
      "required": [
        "deviceStatusHeader"
      ]
}
```


3.3.5.10.3 Share RSU Data Information

The requirements for sharing RSU data information with other authorized centers are as follows:

3.3.5.10.3.1 RSUDataRequest

An owner center shall respond to an authorized external center requesting RSU data with a message containing the owner center's RSU data.

3.3.5.10.3.2 Publish RSU Data

This section describes the design for how an owner center publishes a message to all authorized subscribing external centers using the schema structure defined in annexure A.2 of this document.

3.3.5.10.3.3 Subscribe to RSU Data

This section describes the design for how external centers receives a published message by an owner center using the schema structure defined in annexure A.3 of this document.

3.3.5.10.3.4 RSUDataRequest


```
{
   "description": "Contents of a RSU data request for an external center to send to an owner center",
   "type": "object",
   "$reqId": "3.3.5.10.3.1",
   "properties": {
      "deviceInformationRequest": {
         "$reqId": "3.3.5.10.3.4.1.a",
         "description": "Generic device information request for RSU device type and device data
information type",
         "allOf": [
            {
               "$ref": "#/$defs/DeviceInformationRequest"
            },
            {
               "type": "object",
               "properties": {
                  "deviceType": {
                     "const": "roadside unit"
                  },
                  "deviceInformationType": {
                     "const": "device data"
                  }
               }
            }
         ]
      }
   },
   "required": [
      "deviceInformationRequest"
   ]
}
```


3.3.5.10.3.5 RSUDataResponse


```
{
   "description": "RSU data information for transmission from owner center to external center",
   "type": "object",
   "$reqId": "3.3.5.10.3.5",
   "properties": {
      "organizationId": {
         "$reqId": "3.3.5.10.3.5.1.a",
         "description": "Unique identifier for the owner organization",
         "type": "string"
      },
```

```
      "messages": {
        "type": "array",
        "items": {
          "ref": "#/$defs/RSUMessage"
        }
      }
    },
    "required": [
      "organizationId",
      "messages"
    ]
}
```

3.3.6 Share Archive Data

Archiving data is generally applied to the areas of traffic monitoring, roadway characteristics and event data. The archiving of data is also concerned with how that data is collected. The archived data, once collected, can also be exchanged between centers. These centers may be data archives or operational centers. The requirements to share archived data and metadata between centers are as follows:

3.3.6.1 Link Identifier - Traffic Monitoring Data

The owner center shall provide the link identifier information for where the data in the data set can be found as part of the traffic monitoring data inventory.

3.3.6.1.1 Share Traffic Monitoring Data Inventory Information

The requirements to support the sharing of traffic monitoring data inventory information with other authorized centers are as follows. This inventory information defines what traffic monitoring data is available to other centers for the purpose of data archiving.

3.3.6.1.1.1 Send Traffic Monitoring Data Inventory Information Upon Request

An owner center shall respond to an authorized external center requesting traffic monitoring data with a message containing the owner center's traffic monitoring data inventory information.

3.3.6.1.1.2 TrafficMonitoringDataInventoryRequest

```
{
  "description": "Send a traffic monitoring data inventory request to an owner center",
  "type": "object",
  "$reqId": "3.3.6.1.1.2",
  "properties": {
    "requestingOrganizationInformation": {
      "$reqId": "3.3.6.1.1.2.1.a",
      "description": "Requesting organization information",
      "$ref": "#/$defs/OrganizationInformation"
```

```
        },
        "ownerOrganizationInformation": {
            "$reqId": "3.3.6.1.1.2.1.b",
            "description": "Owner organization information for traffic monitoring data inventory request",
            "$ref": "#/$defs/OrganizationInformation"
        },
        "authorization": {
            "$reqId": "3.3.6.1.1.2.2.1",
            "description": "Requirements for authorization information in traffic monitoring data inventory
request",
            "$ref": "#/$defs/AuthHeader"
        },
        "operatorId": {
            "$reqId": "3.3.6.1.1.2.2.2",
            "description": "Requirements for operator identifier in traffic monitoring data inventory request",
            "type": "string"
        },
        "dataSetType": {
            "$reqId": "3.3.6.1.1.2.2.3",
            "description": "Send the type of data set of interest in the traffic monitoring data inventory request",
            "type": "string",
            "enum": [
                "trafficMonitoringData"
            ]
        },
        "dataCollectionPeriod": {
            "$reqId": "3.3.6.1.1.2.2.4",
            "description": "Send data collection period of interest in the traffic monitoring data inventory
request",
            "type": "number"
        },
        "geoLocation": {
            "$reqId": "3.3.6.1.1.2.2.5",
            "description": "Send geographic location of interest in traffic monitoring data inventory request",
            "$ref": "#/$defs/GeoLocation"
        }
    },
    "required": [
        "requestingOrganizationInformation",
        "ownerOrganizationInformation"
    ]
}
```

3.3.6.1.1.3 TrafficMonitoringDataInventoryResponse

```
{
    "description": "Send traffic monitoring data inventory to external centers",
    "type": "object",
    "$reqId": "3.3.6.1.1.3",
```

```
  "properties": {
    "organization": {
      "$reqId": "3.3.6.1.1.3.1.a",
      "description": "Information about the owner organization",
      "$ref": "#/$defs/OrganizationInformation"
    },
    "dataSetType": {
      "$reqId": "3.3.6.1.1.3.1.b",
      "description": "Type of data set",
      "type": "string"
    },
    "dataSetDescription": {
      "$reqId": "3.3.6.1.1.3.1.c",
      "description": "Description of the data set",
      "type": "string"
    },
    "dataCollectionTimePeriod": {
      "$reqId": "3.3.6.1.1.3.1.d",
      "description": "Period during which data is collected",
      "type": "number"
    },
    "dataSetPublicationDateTime": {
      "$reqId": "3.3.6.1.1.3.1.e",
      "description": "Date and time when the publication was released",
      "$ref": "#/$defs/DateTime"
    },
    "informationAccessRestrictions": {
      "$reqId": "3.3.6.1.1.3.2.1",
      "$ref": "#/$defs/InformationRestrictions"
    },
    "purposeDataSet": {
      "$reqId": "3.3.6.1.1.3.2.2",
      "description": "Provide a description of the purpose of the data set in the traffic monitoring data
inventory",
      "type": "string"
    },
    "titleDataSet": {
      "$reqId": "3.3.6.1.1.3.2.3",
      "description": "Provide the title of the data set assigned by the owner center as part of the traffic
monitoring data inventory.",
      "type": "string"
    },
    "versionDataSet": {
      "$reqId": "3.3.6.1.1.3.2.4",
      "description": "Provide the version of the data set as part of the traffic monitoring data inventory",
      "type": "string"
    },
    "publicationInformationDataSet": {
```

```
        "$reqId": "3.3.6.1.1.3.2.5",
        "description": "Provide publication information of the data set as part of the traffic monitoring data inventory",
        "type": "string"
      },
      "progressDataSet": {
        "$reqId": "3.3.6.1.1.3.2.6",
        "description": "Indicate the progress of the data set in the traffic monitoring data inventory",
        "type": "string",
        "enum": [
          "complete",
          "workInProgress",
          "planned"
        ]
      },
      "maintenanceDataSet": {
        "$reqId": "3.3.6.1.1.3.2.7",
        "description": "Indicate maintenance and update frequency of the traffic monitoring data set",
        "type": "string",
        "enum": [
          "continually",
          "daily",
          "weekly",
          "monthly",
          "annually",
          "unknown",
          "asNeeded",
          "irregular",
          "nonePlanned",
          "freeText"
        ]
      },
      "dataSetURL": {
        "$reqId": "3.3.6.1.1.3.2.8",
        "description": "Provide URL information for accessing the traffic monitoring data set",
        "type": "string"
      },
      "dataSetURLReferenceMedium": {
        "$reqId": "3.3.6.1.1.3.2.9",
        "description": "Provide file type or medium for URL reference information",
        "type": "string"
      },
      "roadwayNetworkId": {
        "$reqId": "3.3.6.1.1.3.2.10",
        "description": "Provide roadway network identifier information as part of traffic monitoring data inventory",
        "type": "string"
      },
```

```
      "linkId": {
        "$reqId": "3.3.6.1.1.3.2.11",
        "type": "string"
      },
      "routeDesignator": {
        "$reqId": "3.3.6.1.1.3.2.12",
        "description": "Provide route designator information for traffic monitoring data inventory",
        "type": "string"
      },
      "linearReference": {
        "$reqId": "3.3.6.1.1.3.2.13",
        "description": "Provide linear reference location and version information for traffic monitoring data
inventory",
        "type": "string"
      }
    },
    "required": [
      "organizationInfo",
      "dataSetType",
      "dataSetDescription",
      "dataCollectionTimePeriod",
      "dataSetPublicationDateTime"
    ]
}
```


3.3.6.2 Share Processing Documentation Metadata

The requirements to support the sharing of processing documentation metadata information with other authorized centers are as follows. The processing documentation metadata contains information on the processes used to collect and process field data.

3.3.6.2.1 Send Processing Documentation Metadata Information Upon Request

An owner center shall respond to an authorized external center requesting processing documentation metadata with a message containing the owner center's processing documentation metadata information.

3.3.6.2.2 ProcessingDocMetaDataInfoRequest


```
{
  "description": "Send processing documentation metadata information request to owner center",
  "type": "object",
  "$reqId": "3.3.6.2.2",
  "properties": {
    "usernameRequestingOperator": {
      "$reqId": "3.3.6.2.2.1.a",
      "description": "User name of the requesting operator",
      "type": "string"
    },
```

```
      "authentication": {
        "$reqId": "3.3.6.2.2.1.b",
        "description": "Password of the requesting operator",
        "type": "string"
      },
      "organizationInfo": {
        "$reqId": "3.3.6.2.2.1.c",
        "description": "Requesting organization information",
        "$ref": "#/$defs/OrganizationInformation"
      }
    },
    "required": [
      "usernameRequestingOperator",
      "authentication",
      "organizationInfo"
    ]
}
```

3.3.6.2.3 ProcessingDocMetaDataInfoResponse

```
{
    "description": "Send processing documentation metadata information to external centers",
    "type": "object",
    "$reqId": "3.3.6.2.3",
    "properties": {
      "organizationInfo": {
        "$reqId": "3.3.6.2.3.1.a",
        "description": "Information regarding the owner organization",
        "$ref": "#/$defs/OrganizationInformation"
      },
      "lastUpdateDate": {
        "$reqId": "3.3.6.2.3.1.b",
        "description": "Date the metadata was created or last updated",
        "$ref": "#/$defs/DateTime"
      },
      "processingMetadataName": {
        "$reqId": "3.3.6.2.3.1.c",
        "description": "Name assigned to the metadata standard by the owner organization",
        "type": "string"
      },
      "processingMetadataVersion": {
        "$reqId": "3.3.6.2.3.1.d",
        "description": "Unique identifier for the version of the metadata",
        "type": "string"
      },
      "informationAccessRestrictions": {
        "$reqId": "3.3.6.2.3.2.1",
        "$ref": "#/$defs/InformationRestrictions"
      },
```

```
      "publicationDateTime": {
        "$reqId": "3.3.6.2.3.2.2",
        "description": "Provide the publication date and time of the processing documentation metadata",
        "$ref": "#/$defs/DateTime"
      },
      "processingMethod": {
        "$reqId": "3.3.6.2.3.2.3",
        "description": "Provide the name of the processing method used in processing documentation
metadata",
        "type": "string"
      },
      "processingMethodDescription": {
        "$reqId": "3.3.6.2.3.2.4",
        "description": "Provide a description of the processing method used in processing documentation
metadata",
        "type": "string"
      },
      "applicationRules": {
        "$reqId": "3.3.6.2.3.2.5",
        "description": "Provide rules for method application to original source data in processing
documentation metadata.",
        "type": "array",
        "items": {
          "type": "string"
        }
      },
      "enumeration": {
        "$reqId": "3.3.6.2.3.2.6",
        "description": "Provide an enumeration of processing method results in processing documentation
metadata",
        "type": "array",
        "items": {
          "type": "string"
        }
      }
    },
    "required": [
      "organizationInfo",
      "lastUpdateDate",
      "processingMetadataName",
      "processingMetadataVersion"
    ]
}
```

3.4 Other References

3.4.1 ActivityTypes


```
{
   "type": "string",
   "enum": [
      "systemNew",
      "systemUpdate",
      "systemEnded",
      "userActivity",
      "userPagerActivity"
   ]
}
```


3.4.2 AreaLocation


```
{
   "description": "Optional requirements for event location information when area location is used",
   "type": "object",
   "$reqId": "3.3.3.5.1.3.4.1",
   "properties": {
      "areaIdentifier": {
         "$reqId": "3.3.3.5.1.3.4.1.1",
         "description": "Provide unique identifier of the defined area in event location information",
         "type": "string"
      },
      "nameArea": {
         "$reqId": "3.3.3.5.1.3.4.1.2",
         "description": "Provide the name of the area assigned by the owner organization as part of the
event location information.",
         "type": "string"
      },
      "areaLocationRank": {
         "$reqId": "3.3.3.5.1.3.4.1.3",
         "description": "Provide the location rank of the area assigned by the owner organization as part of
the event location information.",
         "type": "number"
      },
      "secondaryAreaLocationReference": {
         "$reqId": "3.3.3.5.1.3.4.1.4",
         "description": "Provide secondary identifier for event location information",
         "type": "string"
      }
   }
}
```

3.4.3 AuthHeader


```
{
   "type": "object",
   "$comment": "Reference: https://www.w3.org/Protocols/HTTP/HTRQ_Headers.html#z9",
   "properties": {
      "Authorization": {
         "type": "string",
         "pattern": "Bearer\\s+([A-Za-z0-9-_=.]+)",
         "description": "OAuth 2.0 Bearer Token"
      }
   },
   "required": [
      "Authorization"
   ]
}
```


3.4.4 CCTVCameraTypes


```
{
   "description": "Provide type of CCTV camera in inventory information, including black & white and color options.",
   "type": "string",
   "enum": [
      "blackAndWhite",
      "color"
   ]
}
```


3.4.5 CCTVEnvironmentalFeatures


```
{
   "type": "object",
   "properties": {
      "cameraPower": {
         "$ref": "#/$defs/CameraFeatureStatus"
      },
      "heaterPower": {
         "$ref": "#/$defs/CameraFeatureStatus"
      },
      "wiper": {
         "$ref": "#/$defs/CameraFeatureStatus"
      },
      "washer": {
         "$ref": "#/$defs/CameraFeatureStatus"
      },
      "blower": {
         "$ref": "#/$defs/CameraFeatureStatus"
      }
   },
```

```
  "required": [
    "cameraPower",
    "heaterPower",
    "wiper",
    "washer",
    "blower"
  ]
}
```

3.4.6 CCTVImageTypes

```
{
  "description": "List of supported image types for CCTV devices and environmental requests",
  "type": "string",
  "enum": [
    "JPEG",
    "TIFF",
    "MPEG",
    "NTSC",
    "PAL",
    "SECAM",
    "HDTV",
    "ATSC",
    "MJPEG",
    "Other"
  ]
}
```

3.4.7 CCTVRequestTypes

```
{
  "description": "Types of requests supported for CCTV devices",
  "type": "string",
  "enum": [
    "preset",
    "jogPositioning",
    "direction",
    "focus",
    "manualIris",
    "environmental(Wipers)On/Off",
    "lockForTheCamera",
    "pan",
    "tilt",
    "zoom",
    "textOverlay"
  ]
}
```

3.4.8 CCTVStatusErrorTypes


```
{
   "description": "Indicate the type of error experienced by the CCTV in the status information",
   "type": "string",
   "enum": [
      "communicationsError",
      "powerFailure",
      "deviceError",
      "controllerError"
   ]
}
```


3.4.9 CameraFeatureStatus


```
{
   "type": "string",
   "enum": [
      "on",
      "off",
      "unknown"
   ]
}
```


3.4.10 ChangeRequested


```
{
   "type": "string",
   "enum": [
      "changeSectionTimingMode",
      "changeSectionTimingPattern"
   ]
}
```


3.4.11 ClimateRecordInformation


```
{
   "description": "Include climate record metadata information in ESS metadata sent to external center if
available",
   "type": "object",
   "$reqId": "3.3.5.5.4.3.7",
   "properties": {
      "minObservedValue": {
         "$reqId": "3.3.5.5.4.3.7.a",
         "description": "Minimum observed value for this observation type for the month",
         "type": "string"
      },
      "maxObservedValue": {
         "$reqId": "3.3.5.5.4.3.7.b",
         "description": "Maximum observed value for this observation type this month",
```

```
        "type": "string"
      },
      "month": {
        "$reqId": "3.3.5.5.4.3.7.c",
        "description": "Month to which the climate record applies",
        "type": "string"
      }
    }
}
```


3.4.12 CollectorConfigurationContent


```
{
  "description": "Requirements for an owner center to send collector configuration metadata information to an external center",
  "type": "object",
  "$reqId": "3.3.5.5.4.3.2.2",
  "properties": {
    "headerIndex": {
      "$reqId": "3.3.5.5.4.3.2.2.1.a",
      "description": "Index indicating the order of observation type in collected observations",
      "type": "string"
    },
    "columnLabel": {
      "$reqId": "3.3.5.5.4.3.2.2.1.b",
      "description": "Column label name for collected observation data",
      "type": "string"
    },
    "collectionUnitType": {
      "$reqId": "3.3.5.5.4.3.2.2.1.c",
      "description": "Type of collection units used by the collector",
      "type": "string"
    },
    "scaleFactor": {
      "$reqId": "3.3.5.5.4.3.2.2.1.d",
      "description": "Unit's multiplier or scale factor for adjusting decimal position of observations",
      "type": "string"
    },
    "observationType": {
      "$reqId": "3.3.5.5.4.3.2.2.2",
      "description": "Provide the observation type being collected as part of the collector configuration information",
      "type": "string"
    },
    "nullValue": {
      "$reqId": "3.3.5.5.4.3.2.2.3",
      "description": "Indicate the value for error or missing value in collector configuration information",
      "type": "string"
    }
```

```
    },
    "required": [
        "headerIndex",
        "columnLabel",
        "collectionUnitType",
        "scaleFactor"
    ]
}
```

3.4.13 DMSMessageCRC

```
{
    "type": "object",
    "properties": {
        "messageNumber": {
            "type": "number"
        },
        "memoryType": {
            "type": "string"
        }
    },
    "required": [
        "messageNumber",
        "memoryType"
    ]
}
```

3.4.14 DMSMessageMemoryType

```
{
    "type": "string",
    "enum": [
        "permanent",
        "changeable",
        "volatile",
        "currentBuffer"
    ]
}
```

3.4.15 DMSMessageSources

```
{
    "description": "Provide the message source of the currently displayed message on the DMS as part of the DMS status information",
    "type": "string",
    "enum": [
        "local",
        "external",
        "central",
        "timeBasedScheduler",
```

```
      "powerRecovery",
      "reset",
      "commLoss",
      "powerLoss",
      "endDuration",
      "other"
   ]
}
```

3.4.16 DataCollectorInformation

```
{
   "description": "Include requirements for data collector and image information in ESS metadata sent to external center",
   "type": "object",
   "$reqId": "3.3.5.5.4.3.8",
   "properties": {
      "dataCollectorDescription": {
         "$reqId": "3.3.5.5.4.3.8.a",
         "description": "Description of the provided image",
         "type": "string"
      },
      "stationInstallationDate": {
         "$reqId": "3.3.5.5.4.3.8.b",
         "description": "URL for access to CCTV images associated with the sensor",
         "type": "string"
      },
      "stationManufacturer": {
         "$reqId": "3.3.5.5.4.3.8.c",
         "description": "Name of the manufacturer",
         "type": "string"
      },
      "productName": {
         "$reqId": "3.3.5.5.4.3.8.d",
         "description": "Name of the product",
         "type": "string"
      },
      "collectorModelNumber": {
         "$reqId": "3.3.5.5.4.3.8.e",
         "description": "Model number or software version of the collector",
         "type": "string"
      }
   }
}
```

3.4.17 DateTime

```
{
   "type": "string",
```

```
  "format": "date-time",
  "$comment": "json-schema spec describes date-time format as: YYYY-MM-DDThh:mm:ssZ in UTC time. For example, 2025-03-31T11:00:00Z"
}
```

3.4.18 DateTimeRange

```
{
  "type": "object",
  "properties": {
    "start": {
      "$ref": "#/$defs/DateTime"
    },
    "end": {
      "$ref": "#/$defs/DateTime"
    }
  },
  "required": [
    "start",
    "end"
  ]
}
```

3.4.19 DemandDetectorStatus

```
{
  "type": "array",
  "items": {
    "type": "string",
    "enum": [
      "recalled",
      "working",
      "otherError",
      "erraticCount",
      "maxPresence",
      "noActivity",
      "errorAtSensor",
      "depNoActivity",
      "depMaxPresence"
    ]
  }
}
```

3.4.20 DetectorTypes

```
{
  "type": "string",
  "enum": [
    "inductiveLoop",
    "magnetic",
```

```
      "magnetometers",
      "pressureCells",
      "microwaveRadar",
      "ultrasonic",
      "videoImage",
      "laser",
      "infrared",
      "roadTube",
      "probe",
      "unknown",
      "other"
    ]
}
```

3.4.21 Device

```
{
  "type": "object",
  "$reqId": "3.3.5.1.1.2",
  "properties": {
    "deviceId": {
      "type": "string",
      "$reqId": "3.3.5.1.1.2.1.b"
    },
    "geoLocation": {
      "$reqId": "3.3.5.1.1.2.1.c",
      "$ref": "#/$defs/GeoLocation"
    },
    "deviceName": {
      "type": "string",
      "$reqId": "3.3.5.1.1.2.1.d"
    },
    "userDeviceDescription": {
      "type": "string",
      "$reqId": "3.3.5.1.1.2.2.1"
    },
    "deviceControlType": {
      "type": "string",
      "$reqId": "3.3.5.1.1.2.2.2",
      "enum": [
        "status only",
        "command only",
        "status and command",
        "not specified"
      ]
    },
    "systemDescription": {
      "$reqId": "3.3.5.1.1.2.2.3",
      "$ref": "#/$defs/SystemDescription"
```

```
},
"roadwayNetworkId": {
    "type": "string",
    "$reqId": "3.3.5.1.1.2.2.4"
},
"nodeId": {
    "type": "string",
    "$reqId": "3.3.5.1.1.2.2.5"
},
"nodeName": {
    "type": "string",
    "$reqId": "3.3.5.1.1.2.2.6"
},
"linkId": {
    "type": "string",
    "$reqId": "3.3.5.1.1.2.2.7"
},
"linkName": {
    "type": "string",
    "$reqId": "3.3.5.1.1.2.2.8"
},
"linkDirection": {
    "$reqId": "3.3.5.1.1.2.2.9",
    "$ref": "#/$defs/Directions"
},
"linearReference": {
    "type": "string",
    "$reqId": "3.3.5.1.1.2.2.10"
},
"linearReferenceVersion": {
    "type": "string",
    "$reqId": "3.3.5.1.1.2.2.11"
},
"routeDesignator": {
    "type": "string",
    "$reqId": "3.3.5.1.1.2.2.12"
},
"deviceUrl": {
    "type": "string",
    "$reqId": "3.3.5.1.1.2.2.13"
},
"deviceUrlReferenceMedium": {
    "type": "string",
    "$reqId": "3.3.5.1.1.2.2.14"
},
"lastChangedInformation": {
    "$reqId": "3.3.5.1.1.2.2.15",
    "$ref": "#/$defs/DateTime"
```

```
      }
    },
    "required": [
      "deviceId",
      "geoLocation",
      "deviceName"
    ]
}
```

3.4.22 DeviceChangeCancellationRequest

```
{
    "description": "Requirements for device change cancellation request from external center to owner center",
    "type": "object",
    "$reqId": "3.3.5.1.2.4.2",
    "properties": {
      "requestHeader": {
        "$reqId": "3.3.5.1.2.4.2.1.a",
        "description": "Authorization information for external centers",
        "$ref": "#/$defs/AuthHeader"
      },
      "requestingOrganizationId": {
        "$reqId": "3.3.5.1.2.4.2.1.b",
        "description": "Requesting organization information",
        "type": "string"
      },
      "deviceType": {
        "$reqId": "3.3.5.1.2.4.2.1.c",
        "description": "Type of device, such as CCTV camera, dynamic message sign, gate, lane control signal, ramp meter, signal controller, or signal section.",
        "$ref": "#/$defs/DeviceTypes"
      },
      "deviceId": {
        "$reqId": "3.3.5.1.2.4.2.1.d",
        "description": "Unique identifier for the device",
        "type": "string"
      },
      "requestId": {
        "$reqId": "3.3.5.1.2.4.2.1.e",
        "description": "Unique sequence number identifying the control request to be canceled within the requesting center.",
        "type": "string"
      },
      "operatorId": {
        "$reqId": "3.3.5.1.2.4.2.2.1",
        "description": "Requirements for the operator identifier making device change cancellation request",
        "type": "string"
```

```
      }
    },
    "required": [
      "requestHeader",
      "requestingOrganizationId",
      "deviceType",
      "deviceId",
      "requestId"
    ]
}
```

3.4.23 DeviceChangeRequestHeader

```
{
    "description": "Contents of device change requests from external centers to owner centers",
    "type": "object",
    "$reqId": "3.3.5.1.2.1",
    "properties": {
      "requestHeader": {
        "$reqId": "3.3.5.1.2.1.1.a",
        "description": "Authorization information for external centers",
        "$ref": "#/$defs/AuthHeader"
      },
      "requestingOrganizationId": {
        "$reqId": "3.3.5.1.2.1.1.b",
        "description": "Requesting organization information",
        "type": "string"
      },
      "deviceType": {
        "$reqId": "3.3.5.1.2.1.1.c",
        "description": "Type of device such as CCTV camera, dynamic message sign, gate, lane control signal, ramp meter, signal controller, or signal section.",
        "$ref": "#/$defs/DeviceTypes"
      },
      "deviceId": {
        "$reqId": "3.3.5.1.2.1.1.d",
        "description": "Unique identifier for the device",
        "type": "string"
      },
      "requestId": {
        "$reqId": "3.3.5.1.2.1.1.e",
        "description": "Unique sequence number identifying the control request",
        "type": "string"
      },
      "requestPriority": {
        "$reqId": "3.3.5.1.2.1.1.f",
        "description": "Provide priority level for device change request where 1 = Lowest Priority, 10 = Highest Priority, Default = 0 (not queued).",
        "$ref": "#/$defs/Rank"
```

```
        },
        "operatorId": {
            "$reqId": "3.3.5.1.2.1.2.1",
            "description": "Requirements for operator identifier in device change request",
            "type": "string"
        },
        "eventId": {
            "$reqId": "3.3.5.1.2.1.2.2",
            "description": "Provide unique identifier of the event for device change request",
            "type": "string"
        },
        "changeRequestStartDateTime": {
            "$reqId": "3.3.5.1.2.1.2.4",
            "description": "Provide the date and time for the device change request",
            "$ref": "#/$defs/DateTime"
        },
        "changeRequestExpirationDateTime": {
            "$reqId": "3.3.5.1.2.1.2.5",
            "description": "Provide expiration date and time for the device change request",
            "$ref": "#/$defs/DateTime"
        },
        "changeRequestDateTimeInformation": {
            "$reqId": "3.3.5.1.2.1.2.6",
            "description": "Provide the current date and time in the device change request",
            "$ref": "#/$defs/DateTime"
        }
    },
    "required": [
        "requestHeader",
        "requestingOrganizationId",
        "deviceType",
        "deviceId",
        "requestId",
        "requestPriority"
    ]
}
```

3.4.24 DeviceChangeResponseHeader

```
{
    "description": "Requirements for owner center response to device change request from external
center",
    "type": "object",
    "$reqId": "3.3.5.1.2.2",
    "properties": {
        "ownerOrganization": {
            "$reqId": "3.3.5.1.2.2.1.a",
            "description": "Information about the owner organization",
            "$ref": "#/$defs/OrganizationInformation"
```

```
    },
    "deviceType": {
      "$reqId": "3.3.5.1.2.2.1.b",
      "description": "Type of device (e.g., CCTV camera, dynamic message sign, gate, lane control signal, ramp meter, signal controller, signal section)",
      "$ref": "#/$defs/DeviceTypes"
    },
    "deviceId": {
      "$reqId": "3.3.5.1.2.2.1.c",
      "description": "Unique identifier for the device",
      "type": "string"
    },
    "requestId": {
      "$reqId": "3.3.5.1.2.2.1.d",
      "description": "Unique sequence number identifying the control request",
      "type": "string"
    },
    "requestStatus": {
      "$reqId": "3.3.5.1.2.2.1.e",
      "description": "Status of the request including completed, received, various rejection reasons, cancelled, or unknown.",
      "type": "string",
      "enum": [
        "completed",
        "received",
        "rejected - insufficient privileges",
        "rejected - device is locked",
        "rejected - read-only parameter",
        "rejected - bad value",
        "rejected - other",
        "cancelled",
        "unknown"
      ]
    },
    "operatorId": {
      "$reqId": "3.3.5.1.2.2.2.1",
      "description": "Requirements for operator identifier during device change request acknowledgment",
      "type": "string"
    },
    "operatorLockId": {
      "$reqId": "3.3.5.1.2.2.2.2",
      "description": "Provide unique identifier of the owner operator who locked the device in the device change request response.",
      "type": "string"
    },
    "operatorLastRevisedDeviceStatus": {
      "$reqId": "3.3.5.1.2.2.2.3",
```

```
        "description": "Provide the date and time of the last status revision in the device change request response",
        "$ref": "#/$defs/DateTime"
      }
    },
    "required": [
      "ownerOrganization",
      "deviceType",
      "deviceId",
      "requestId",
      "requestStatus"
    ]
}
```


3.4.25 DeviceChangeStatusRequest


```
{
    "description": "Include device change status request details from external center to owner center",
    "type": "object",
    "$reqId": "3.3.5.1.2.3.2",
    "properties": {
      "requestHeader": {
        "$reqId": "3.3.5.1.2.3.2.a",
        "description": "Authorization information for external centers",
        "$ref": "#/$defs/AuthHeader"
      },
      "requestingOrganizationId": {
        "$reqId": "3.3.5.1.2.3.2.b",
        "description": "Information about the requesting organization",
        "type": "string"
      },
      "deviceType": {
        "$reqId": "3.3.5.1.2.3.2.c",
        "description": "Type of device including CCTV camera, dynamic message sign, gate, lane control signal, ramp meter, signal controller, and signal section.",
        "$ref": "#/$defs/DeviceTypes"
      },
      "deviceId": {
        "$reqId": "3.3.5.1.2.3.2.d",
        "description": "Unique identifier for the device",
        "type": "string"
      },
      "requestId": {
        "$reqId": "3.3.5.1.2.3.2.e",
        "description": "Unique sequence number for identifying the control request",
        "type": "string"
      }
    },
    "required": [
```

```
      "requestHeader",
      "requestingOrganizationId",
      "deviceType",
      "deviceId",
      "requestId"
   ]
}
```

3.4.26 DeviceControlCommandTypes

```
{
   "type": "string",
   "enum": [
      "preset",
      "jogPositioning",
      "direction",
      "focus",
      "manualIris",
      "environmentalOn/Off",
      "lockForTheCamera",
      "pan",
      "tilt",
      "zoom",
      "textOverlay"
   ]
}
```

3.4.27 DeviceFilter

```
{
   "type": "object",
   "$reqId": "3.3.5.1.1.1.2",
   "properties": {
      "deviceIds": {
         "$reqId": "3.3.5.1.1.1.2.1",
         "description": "Include a list of unique identifiers for devices in the device information request",
         "type": "array",
         "items": {
            "type": "string"
         }
      },
      "roadwayNetworkIds": {
         "$reqId": "3.3.5.1.1.1.2.2",
         "description": "Include a list of unique identifiers for roadway networks in the device information
request",
         "type": "array",
         "items": {
            "type": "string"
         }
```

```
    },
    "linkIds": {
      "$reqId": "3.3.5.1.1.1.2.3",
      "description": "Include a list of unique identifiers for links in the device information request",
      "type": "array",
      "items": {
        "type": "string"
      }
    },
    "routeDesignators": {
      "$reqId": "3.3.5.1.1.1.2.4",
      "description": "Include a list of route designators in the device information request",
      "type": "array",
      "items": {
        "type": "string"
      }
    },
    "linearReferenceFilter": {
      "$reqId": "3.3.5.1.1.1.2.5",
      "description": "Include a range between two linear reference locations in the device information
request",
      "$ref": "#/$defs/LinearReferenceRange"
    },
    "sectionIds": {
      "$reqId": "3.3.5.1.1.1.2.6",
      "description": "Include a list of unique identifiers for sections in the device information request",
      "type": "array",
      "items": {
        "type": "string"
      }
    },
    "centerIds": {
      "$reqId": "3.3.5.1.1.1.2.7",
      "description": "Include a list of unique identifiers for centers in the device information request",
      "type": "array",
      "items": {
        "type": "string"
      }
    },
    "timeRangeFilter": {
      "$reqId": "3.3.5.1.1.1.2.8",
      "description": "Include a valid time period in the device information request",
      "$ref": "#/$defs/DateTimeRange"
    }
  }
}
```

3.4.28 DeviceInformationRequest


```
{
   "description": "Requirements for the Device Information Request from an external center to an owner center.",
   "type": "object",
   "$reqId": "3.3.5.1.1.1",
   "properties": {
      "ownerOrganization": {
         "$reqId": "3.3.5.1.1.1.1.a",
         "description": "Information regarding the owner organization",
         "$ref": "#/$defs/OrganizationInformation"
      },
      "deviceType": {
         "$reqId": "3.3.5.1.1.1.1.b",
         "description": "Identification of various device types such as detector, CCTV camera, dynamic message sign, environmental sensor station, gate, lane control signal, ramp meter, signal controller, and signal section.",
         "$ref": "#/$defs/DeviceTypes"
      },
      "deviceInformationType": {
         "$reqId": "3.3.5.1.1.1.1.c",
         "description": "Types of device information including inventory, status, schedule, plan, maintenance history, data, metadata, message appearance, font table, and graphic table.",
         "$ref": "#/$defs/DeviceInformationTypes"
      },
      "deviceFilter": {
         "$reqId": "3.3.5.1.1.1.2",
         "description": "Filter for device information requests",
         "$ref": "#/$defs/DeviceFilter"
      },
      "requestHeader": {
         "$reqId": "3.3.5.1.1.1.3.1",
         "description": "Requirements for authorization information in device information requests",
         "$ref": "#/$defs/AuthHeader"
      },
      "operatorId": {
         "$reqId": "3.3.5.1.1.1.3.2",
         "description": "Requirements for the operator identifier in device information requests",
         "type": "string"
      }
   },
   "required": [
      "ownerOrganization",
      "deviceType",
      "deviceInformationType"
   ]
}
```

3.4.29 DeviceInformationTypes


```
{
   "$reqId": "3.3.5.1.1.1.1.c",
   "description": "Types of device information including inventory, status, schedule, plan, maintenance history, data, metadata, message appearance, font table, and graphic table.",
   "type": "string",
   "enum": [
      "deviceInventory",
      "deviceStatus",
      "deviceSchedule",
      "devicePlan",
      "deviceMaintenanceHistory",
      "deviceData",
      "deviceMetadata",
      "messageAppearance",
      "deviceFontTable",
      "deviceGraphicTable",
      "imageLink"
   ]
}
```


3.4.30 DeviceInventoryResponseHeader


```
{
   "description": "Requirements for owner center response header to external center request for device information",
   "type": "object",
   "$reqId": "3.3.5.1.1.2",
   "properties": {
      "ownerOrganization": {
         "$reqId": "3.3.5.1.1.2.1.a",
         "description": "Information regarding the owner organization",
         "$ref": "#/$defs/OrganizationInformation"
      },
      "devices": {
         "$reqId": "3.3.5.1.1.2.1.b",
         "description": "Information for each device",
         "type": "array",
         "items": {
            "$ref": "#/$defs/Device"
         }
      }
   },
   "required": [
      "ownerOrganization",
      "devices"
   ]
}
```

3.4.31 DeviceOperationalModes


```
{
   "description": "Requested operational mode for device (dark, restInGreen, fixedRate, trafficResponsive, emergencyGreen, holdRestInGreen).",
   "type": "string",
   "enum": [
      "dark",
      "restInGreen",
      "fixedRate",
      "trafficResponsive",
      "emergencyGreen",
      "holdRestInGreen"
   ]
}
```


3.4.32 DevicePriorityQueueRequest


```
{
   "description": "Requirements for an external center's request to view the device request queue",
   "type": "object",
   "$reqId": "3.3.5.1.2.5.1",
   "properties": {
      "deviceType": {
         "$reqId": "3.3.5.1.2.5.1.1.a",
         "description": "Device type for each priority queue including CCTV camera, dynamic message sign, gate, ramp meter, signal controller, signal section",
         "type": "string",
         "enum": [
            "cctv camera",
            "dynamic message sign",
            "gate",
            "ramp meter",
            "signal controller",
            "signal section"
         ]
      },
      "requestingOrganizationId": {
         "$reqId": "3.3.5.1.2.5.1.1.b",
         "description": "Unique identifier for the requesting organization",
         "type": "string"
      },
      "deviceIds": {
         "$reqId": "3.3.5.1.2.5.1.1.c",
         "description": "Unique identifier for each device",
         "type": "array",
         "items": {
            "type": "string"
         }
```

```
        },
        "requestHeader": {
          "$reqId": "3.3.5.1.2.5.1.2.1",
          "description": "Requirements for authorization information in device priority queue request",
          "$ref": "#/$defs/AuthHeader"
        }
      },
      "required": [
        "deviceType",
        "requestingOrganizationId",
        "deviceIds"
      ]
}
```

3.4.33 DevicePriorityQueueResponse

```
{
    "type": "object",
    "$reqId": "3.3.5.1.2.5.2",
    "properties": {
        "deviceType": {
            "type": "string",
            "$reqId": "3.3.5.1.2.5.2.1.a",
            "enum": [
                "cctv camera",
                "dynamic message sign",
                "gate",
                "ramp meter",
                "signal controller",
                "signal section"
            ]
        },
        "deviceId": {
            "type": "string"
        },
        "currentPriority": {
            "description": "Provide priority level for device priority queue where 1 = Lowest Priority, 10 =
Highest Priority, Default = 0 (not queued).",
            "$ref": "#/$defs/Rank"
        },
        "controlRequests": {
            "type": "array",
            "items": {
                "type": "object",
                "properties": {
                    "requestingOrganization": {
                        "type": "string"
                    },
                    "queueStatus": {
```

```
                    "type": "string",
                    "enum": [
                        "command request priority",
                        "no queue"
                    ]
                },
                "operatorId": {
                    "type": "string",
                    "$reqId": "3.3.5.1.2.5.2.2.1"
                },
                "uniqueSequenceNumber": {
                    "type": "number",
                    "$reqId": "3.3.5.1.2.5.2.2.2"
                },
                "eventId": {
                    "type": "string",
                    "$reqId": "3.3.5.1.2.5.2.2.3"
                },
                "eventResponsePlan": {
                    "type": "number",
                    "$reqId": "3.3.5.1.2.5.2.2.4"
                },
                "requestStartDateTime": {
                    "$reqId": "3.3.5.1.2.5.2.2.5",
                    "$ref": "#/$defs/DateTime"
                },
                "requestExpirationDateTime": {
                    "$reqId": "3.3.5.1.2.5.2.2.6",
                    "$ref": "#/$defs/DateTime"
                }
            },
            "required": [
                "requestingOrganization",
                "queueStatus"
            ]
        }
    }
  },
  "required": [
    "deviceType",
    "deviceId",
    "currentPriority",
    "controlRequests"
  ]
}
```

3.4.34 DeviceSchedule


```
{
   "type": "object",
   "properties": {
      "deviceId": {
         "type": "string",
         "$reqId": "3.3.5.1.1.4.1.b"
      },
      "timeBaseScheduleNumber": {
         "type": "string",
         "$reqId": "3.3.5.1.1.4.1.c"
      },
      "timeBaseScheduleMonth": {
         "type": "number",
         "$reqId": "3.3.5.1.1.4.1.d"
      },
      "timeBaseScheduleDayofWeek": {
         "type": "number",
         "$reqId": "3.3.5.1.1.4.1.e"
      },
      "timeBaseScheduleDate": {
         "type": "number",
         "$reqId": "3.3.5.1.1.4.1.f"
      },
      "timeBaseScheduleDayPlan": {
         "type": "number",
         "$reqId": "3.3.5.1.1.4.1.g"
      },
      "timeBaseScheduleDayPlanHour": {
         "type": "number",
         "$reqId": "3.3.5.1.1.4.1.h"
      },
      "timeBaseScheduleDayPlanMinute": {
         "type": "number",
         "$reqId": "3.3.5.1.1.4.1.i"
      },
      "dateandTimeLastChangeTimeBaseSchedule": {
         "$reqId": "3.3.5.1.1.4.1.j",
         "$ref": "#/$defs/DateTime"
      }
   },
   "required": [
      "deviceId",
      "timeBaseScheduleNumber",
      "timeBaseScheduleMonth",
      "timeBaseScheduleDayofWeek",
      "timeBaseScheduleDate",
```

```
      "timeBaseScheduleDayPlan",
      "timeBaseScheduleDayPlanHour",
      "timeBaseScheduleDayPlanMinute",
      "dateandTimeLastChangeTimeBaseSchedule"
   ]
}
```

3.4.35 DeviceScheduleInformation

```
{
   "description": "Include unique identifier of each device in the device schedule information",
   "type": "object",
   "$reqId": "3.3.5.1.1.4.1",
   "properties": {
      "ownerOrganization": {
         "$reqId": "3.3.5.1.1.4.1.a",
         "description": "Unique identifier for the owner organization",
         "$ref": "#/$defs/OrganizationInformation"
      },
      "deviceSchedules": {
         "$reqId": "3.3.5.1.1.4.1.b",
         "description": "Unique identifier for each device",
         "type": "array",
         "items": {
            "$ref": "#/$defs/DeviceSchedule"
         }
      }
   },
   "required": [
      "ownerOrganization",
      "deviceSchedules"
   ]
}
```

3.4.36 DeviceStatus

```
{
   "type": "object",
   "properties": {
      "deviceType": {
         "$reqId": "3.3.5.1.1.3.1.b",
         "$ref": "#/$defs/DeviceTypes"
      },
      "deviceId": {
         "type": "string",
         "$reqId": "3.3.5.1.1.3.1.c"
      },
      "operationalStatus": {
         "type": "string",
```

```
            "$reqId": "3.3.5.1.1.3.1.d",
            "enum": [
               "on",
               "off",
               "outOfService",
               "unavailable",
               "unknown",
               "marginal",
               "failed"
            ]
         },
         "controllingCenterId": {
            "type": "string",
            "$reqId": "3.3.5.1.1.3.2.1"
         },
         "deviceCommunicationsStatus": {
            "type": "string",
            "$reqId": "3.3.5.1.1.3.2.2",
            "enum": [
               "operational",
               "offline",
               "failed",
               "unknown"
            ]
         },
         "operatorId": {
            "type": "string",
            "$reqId": "3.3.5.1.1.3.2.3"
         },
         "deviceStatusLastChanged": {
            "$reqId": "3.3.5.1.1.3.2.4",
            "$ref": "#/$defs/DateTime"
         }
      },
      "required": [
         "deviceType",
         "deviceId",
         "operationalStatus"
      ]
   }
```


3.4.37 DeviceStatusHeader


```
{
   "description": "Requirements for exchanging device status information between centers",
   "type": "object",
   "$reqId": "3.3.5.1.1.3",
   "properties": {
      "ownerOrganization": {
```

```
            "$reqId": "3.3.5.1.1.3.1.a",
            "description": "Information regarding the owner organization",
            "$ref": "#/$defs/OrganizationInformation"
        },
        "deviceStatuses": {
            "$reqId": "3.3.5.1.1.3.1.b",
            "description": "Types of devices including detector, detector station, CCTV camera, dynamic message sign, environmental sensor station, gate, lane control signal, ramp meter, signal controller, and signal section.",
            "type": "array",
            "items": {
                "$ref": "#/$defs/DeviceStatus"
            }
        }
    },
    "required": [
        "ownerOrganization",
        "deviceStatuses"
    ]
}
```


3.4.38 DeviceTypes


```
{
    "type": "string",
    "enum": [
        "detector",
        "detectorStation",
        "cctvCamera",
        "dynamicMessageSign",
        "environmentalSensorStation",
        "gate",
        "laneControlSignal",
        "rampMeter",
        "signalController",
        "signalSection",
        "roadsideUnit"
    ]
}
```


3.4.39 DialogNames


```
{
    "type": "string",
    "enum": [
        "requestResponse",
        "subscription",
        "publication"
```

```
  ]
}
```

3.4.40 Directions

```
{
  "type": "string",
  "enum": [
    "northBound",
    "northeastBound",
    "eastBound",
    "southeastBound",
    "southBound",
    "southwestBound",
    "westBound",
    "northwestBound",
    "notDirectional",
    "positiveDirection",
    "negativeDirection",
    "bothDirections",
    "anyOther"
  ]
}
```

3.4.41 EvaluationCycle

```
{
  "type": "object",
  "$reqId": "3.3.3.8.5.3",
  "properties": {
    "evaluationCycleId": {
      "$reqId": "3.3.3.8.5.3.1.a",
      "description": "Unique identifier for the evaluation cycle",
      "type": "string"
    },
    "evaluationCycleReason": {
      "$reqId": "3.3.3.8.5.3.1.b",
      "description": "Reason for the evaluation cycle",
      "type": "string"
    },
    "startTime": {
      "$reqId": "3.3.3.8.5.3.1.c",
      "description": "Start time for the evaluation process",
      "$ref": "#/$defs/DateTime"
    },
    "cycleDuration": {
      "$reqId": "3.3.3.8.5.3.1.d",
      "description": "Duration of the evaluation cycle",
      "$ref": "#/$defs/DateTime"
```

```
        },
        "planCount": {
          "$reqId": "3.3.3.8.5.3.1.e",
          "description": "Count of ranked response plans",
          "type": "number"
        },
        "submittedPlanCount": {
          "$reqId": "3.3.3.8.5.3.1.f",
          "description": "Count of submitted response plans",
          "type": "number"
        },
        "eventId": {
          "$reqId": "3.3.3.8.5.3.1.g",
          "description": "Unique identifier for the event",
          "type": "string"
        },
        "linkState": {
          "$reqId": "3.3.3.8.5.3.2.1",
          "description": "Include link state information in the evaluation cycle content sent from an owner center to an external center",
          "$ref": "#/LinkStatusResponse"
        },
        "planList": {
          "$reqId": "3.3.3.8.5.3.2.2",
          "description": "Include a list of active response plans in the evaluation cycle content",
          "type": "array",
          "items": {
            "type": "string"
          }
        }
    },
    "required": [
        "evaluationCycleId",
        "evaluationCycleReason",
        "startTime",
        "cycleDuration",
        "planCount",
        "submittedPlanCount",
        "eventId"
    ]
}
```


3.4.42 EventAccessLevels


```
{
    "description": "Owner center may place restrictions on information dissemination to external centers",
    "type": "string",
    "enum": [
        "publicDomain",
```

```
      "allAgencies",
      "selectedAgencies",
      "originatingAgency",
      "originatingUsersOnly"
   ]
}
```

3.4.43 EventComments

```
{
   "description": "Include event comments information in the event information sent to an external center",
   "type": "object",
   "$reqId": "3.3.3.6.4",
   "properties": {
      "commentTimestamp": {
         "$reqId": "3.3.3.6.4.1.a",
         "description": "Timestamp for the comment",
         "$ref": "#/$defs/DateTime"
      },
      "operatorId": {
         "$reqId": "3.3.3.6.4.1.b",
         "description": "Unique identifier for the operator",
         "type": "string"
      },
      "commentText": {
         "$reqId": "3.3.3.6.4.1.c",
         "description": "Additional internal notes for roadway event description, not to be shared publicly",
         "type": "string"
      }
   },
   "required": [
      "commentTimestamp",
      "operatorId",
      "commentText"
   ]
}
```

3.4.44 EventDescription

```
{
   "description": "Include event description information in the event details sent from owner center to
external center",
   "$reqId": "3.3.3.5.1.3.3",
   "type": "object",
   "properties": {
      "eventITISCodes": {
         "$reqId": "3.3.3.5.1.3.3.a",
         "type": "array",
         "description": "An array of numeric ITIS Code values as defined in SAE J2540; If an ITIS Code
```

```
cannot be used, then ITIS text values must be used as defined in SAE J2540. If both code and text are provided, the code value will be used.",
            "items": {
               "$ref": "#/$defs/ITISCode"
            }
         },
         "locationReference": {
            "$reqId": "3.3.3.5.1.3.3.b",
            "description": "An unstructured text string representing a location consistent with the ITIS Codes.",
            "type": "string"
         }
      },
      "required": [
         "eventITISCodes"
      ]
   }
```


3.4.45 EventDescriptionConfidenceLevels


```
{
   "description": "Include event description confidence level information in event element details",
   "type": "string",
   "enum": [
      "unconfirmedReport",
      "twoUnconfirmedReports",
      "threeUnconfirmedReports",
      "fourOrMoreUnconfirmedReports",
      "provisionalPlan",
      "firmPlan",
      "officialReportFromScene",
      "detailedOfficialReportFromScene",
      "detailedOfficialReportsCoveringWholeArea",
      "legallyEnforcedDecision"
   ]
}
```


3.4.46 EventElementDetails


```
{
   "description": "Requirements for the contents of the event element details information sent to an external center, with multiple instances possible; optional if the message closes an open event.",
   "type": "object",
   "$reqId": "3.3.3.5.1.3",
   "properties": {
      "eventTime": {
         "$reqId": "3.3.3.5.1.3.1",
         "$ref": "#/$defs/EventTime"
      },
      "eventSource": {
```

```
        "$reqId": "3.3.3.5.1.3.2",
        "$ref": "#/$defs/EventSource"
      },
      "eventDescription": {
        "$reqId": "3.3.3.5.1.3.3",
        "type": "array",
        "items": {
          "$ref": "#/$defs/EventDescription"
        }
      },
      "eventLocation": {
        "$reqId": "3.3.3.5.1.3.4",
        "$ref": "#/$defs/EventLocation"
      },
      "eventName": {
        "$reqId": "3.3.3.5.1.3.5",
        "description": "Provide short description of the event",
        "type": "string"
      },
      "eventLane": {
        "$reqId": "3.3.3.5.1.3.6",
        "description": "Event lane information will be included if supported by the owner center.",
        "type": "array",
        "items": {
          "$ref": "#/$defs/EventLane"
        }
      },
      "eventDescriptionConfidenceLevel": {
        "$reqId": "3.3.3.5.1.3.7",
        "$ref": "#/$defs/EventDescriptionConfidenceLevels"
      },
      "informationAccessRestrictions": {
        "$reqId": "3.3.3.5.1.3.8",
        "$ref": "#/$defs/EventAccessLevels"
      },
      "eventHazardousMaterialCode": {
        "$reqId": "3.3.3.5.1.3.9",
        "$ref": "#/$defs/EventHazardousMaterialCode"
      }
    }
}
```


3.4.47 EventHazardousMaterialCode


```
{
  "description": "Send hazardous material information as part of event details if applicable",
  "type": "object",
  "$reqId": "3.3.3.5.1.3.9",
  "properties": {
```

```
      "eventHazmatCode": {
         "$reqId": "3.3.3.5.1.3.9.1",
         "description": "Provide identification of observed hazardous material using CFR Title 49 codes for
incidents",
         "type": "string"
      },
      "eventHazmatPlacardCode": {
         "$reqId": "3.3.3.5.1.3.9.2",
         "description": "Provide identification of observed hazardous material using placard codes for
incidents.",
         "type": "string"
      }
   }
}
```

3.4.48 EventIndicator

```
{
   "description": "Include event indicator information in the event information sent to an external center",
   "type": "object",
   "$reqId": "3.3.3.6.2",
   "properties": {
      "eventStatus": {
         "$reqId": "3.3.3.6.2.1",
         "$ref": "#/$defs/EventStatus"
      },
      "eventDurationExceededFlag": {
         "$reqId": "3.3.3.6.2.2",
         "description": "Indicate when event duration or expected end date/time is exceeded as part of
event indicator information",
         "type": "string"
      },
      "eventImpactLevel": {
         "$reqId": "3.3.3.6.2.3",
         "description": "Provide the impact of an event on the roadway as part of the event indicator
information, using a scale from 1 to 10.",
         "$ref": "#/$defs/Rank"
      },
      "eventActiveFlag": {
         "$reqId": "3.3.3.6.2.4",
         "description": "Indicate if the event represents an active schedule in the event indicator
information",
         "type": "string"
      },
      "eventClass": {
         "$reqId": "3.3.3.6.2.5",
         "description": "Provide event class as part of event indicator information for planned events",
         "type": "string",
         "enum": [
```

```
            "incident",
            "construction",
            "special event"
         ]
      }
   }
}
```

3.4.49 EventLane

```
{
   "$reqId": "3.3.3.5.1.3.6",
   "description": "Event lane information will be included if supported by the owner center.",
   "type": "object",
   "properties": {
      "laneType": {
         "$reqId": "3.3.3.5.1.3.6.1.1",
         "description": "Provide the type of lane as part of the event lane information",
         "type": "string",
         "enum": [
            "accelerationLane",
            "auxiliaryLane",
            "bikeLane",
            "busLane",
            "busOnlyLane",
            "busOnShoulderLane",
            "collectorDistributorLane",
            "contraflowLane",
            "decelerationLane",
            "dynamicPartTimeShoulderUse",
            "expressTollLane",
            "frontageServiceRoadLane",
            "highOccupancyVehicleLane",
            "leftTurnLane",
            "managedLane",
            "medianLane",
            "nonTollExpressLane",
            "parkingLane",
            "ramp",
            "reversibleLane",
            "rightTurnLane",
            "seperatedBikeway",
            "shoulder",
            "speedChangeLane",
            "staticPartTimeShoulderUse",
            "throughMainline",
            "truckOnlyLane",
            "twoWayLeftTurnLane",
            "uTurnLane",
```

```
                "expresswayLane",
                "scenicRouteLane",
                "alternateLane",
                "bypassLane",
                "connectorLane",
                "businessLane",
                "spurLane",
                "loopLane"
            ]
        },
        "directionTravel": {
            "$reqId": "3.3.3.5.1.3.6.1.2",
            "description": "Provide direction of travel on the link as part of event lane information",
            "$ref": "#/$defs/Directions"
        },
        "totalNumberLanes": {
            "$reqId": "3.3.3.5.1.3.6.1.3",
            "description": "Provide total number of lanes at the event location as part of event lane
information",
            "type": "number"
        },
        "lanesAffected": {
            "$reqId": "3.3.3.5.1.3.6.1.4",
            "description": "Provide the total number of lanes affected by the event as part of the event lane
information.",
            "type": "number"
        },
        "laneNumberAffected": {
            "$reqId": "3.3.3.5.1.3.6.1.5",
            "description": "Provide lane number for each lane affected by the event in event lane information",
            "type": "array",
            "items": {
                "type": "number"
            }
        },
        "laneStatus": {
            "$reqId": "3.3.3.5.1.3.6.1.6",
            "description": "Describe the status of the lane affected by the event in event lane information",
            "type": "string"
        }
    },
    "required": [
        "eventLaneInformation"
    ]
}
```

3.4.50 EventLocation


```
{
   "description": "Include event location information in event element details; multiple instances may be sent.",
   "type": "array",
   "$reqId": "3.3.3.5.1.3.4",
   "items": {
      "type": "object",
      "properties": {
         "areaLocation": {
            "$reqId": "3.3.3.5.1.3.4.a",
            "description": "Geographical area identification",
            "$ref": "#/$defs/AreaLocation"
         },
         "linkLocation": {
            "$reqId": "3.3.3.5.1.3.4.b",
            "description": "Location of the link",
            "$ref": "#/$defs/LinkLocation"
         },
         "landmarkLocation": {
            "$reqId": "3.3.3.5.1.3.4.c",
            "description": "Location of a landmark",
            "$ref": "#/$defs/LandmarkLocationInformation"
         },
         "geoLocation": {
            "$reqId": "3.3.3.5.1.3.4.d",
            "description": "Coordinates of the geographic location (longitude and latitude)",
            "$ref": "#/$defs/GeoLocation"
         }
      }
   }
}
```


3.4.51 EventMessageHeader


```
{
   "description": "Requirements for event message header information from owner center to external center.",
   "type": "object",
   "$reqId": "3.3.3.5.1.1",
   "properties": {
      "organization": {
         "$reqId": "3.3.3.5.1.1.1.a",
         "description": "Organization information of the event originator",
         "$ref": "#/$defs/OrganizationInformation"
      },
      "eventMsgTypeVersion": {
         "$reqId": "3.3.3.5.1.1.1.b",
```

```
            "description": "Version of the event message type",
            "type": "number"
        },
        "eventMsgNum": {
            "$reqId": "3.3.3.5.1.1.1.c",
            "description": "Unique identifier for the event message",
            "type": "number"
        },
        "messageSentAt": {
            "$reqId": "3.3.3.5.1.1.1.d",
            "description": "Date and time the message was sent",
            "$ref": "#/$defs/DateTime"
        },
        "requestingOrganization": {
            "$reqId": "3.3.3.5.1.1.2.1",
            "description": "Provide organization information in the event message header",
            "$ref": "#/$defs/OrganizationInformation"
        },
        "msgExpiryTime": {
            "$reqId": "3.3.3.5.1.1.2.2",
            "description": "Provide the date and time for message invalidation in the event message header",
            "$ref": "#/$defs/DateTime"
        }
    },
    "required": [
        "organization",
        "eventMsgTypeVersion",
        "eventMsgNum",
        "messageSentAt"
    ]
}
```


3.4.52 EventMessageTypeVersions


```
{
    "description": "Version of the event message type",
    "type": "string",
    "enum": [
        "ngtmddV1",
        "ngtmddV1.1"
    ]
}
```


3.4.53 EventMessageTypes


```
{
    "description": "Identifier for event message type",
    "type": "string",
    "enum": [
```

```
      "eventInformation",
      "eventIndex"
   ]
}
```

3.4.54 EventReference

```
{
   "description": "Requirements for contents of event reference information sent to an external center",
   "type": "object",
   "$reqId": "3.3.3.5.1.2",
   "properties": {
      "eventId": {
         "$reqId": "3.3.3.5.1.2.1.a",
         "description": "Unique identifier for the event",
         "type": "string"
      },
      "eventUpdateNumber": {
         "$reqId": "3.3.3.5.1.2.1.b",
         "description": "Unique identifier for event updates",
         "type": "number"
      },
      "msgUpdatedAt": {
         "$reqId": "3.3.3.5.1.2.1.c",
         "description": "Date and time of message update",
         "$ref": "#/$defs/DateTime"
      }
   },
   "required": [
      "eventId",
      "eventUpdateNumber",
      "msgUpdatedAt"
   ]
}
```

3.4.55 EventSource

```
{
   "description": "Include event source information in the elements details sent to an external center.",
   "type": "object",
   "$reqId": "3.3.3.5.1.3.2",
   "properties": {
      "organization": {
         "$reqId": "3.3.3.5.1.3.2.1",
         "description": "Provide information on the organization that is the source of the event information
as part of the event source information.",
         "$ref": "#/$defs/OrganizationInformation"
      },
      "eventDetectionMethod": {
```

```
            "$reqId": "3.3.3.5.1.3.2.2",
            "description": "Indicate how the event was detected as part of the event source information",
            "type": "string"
        }
    }
}
```

3.4.56 EventStatus

```
{
    "description": "Provide incident status as part of the event indicator information with supported values.",
    "type": "string",
    "enum": [
        "planned",
        "forecast",
        "contingencyPlan",
        "responsePlanActivated",
        "reported",
        "confirmed",
        "closed",
        "responding",
        "current",
        "updated",
        "clearing",
        "ended",
        "delete",
        "cancelled",
        "postponed",
        "reopened"
    ]
}
```

3.4.57 EventTime

```
{
    "description": "Include event time information in the event details sent from owner center to external
center",
    "type": "object",
    "$reqId": "3.3.3.5.1.3.1",
    "properties": {
        "eventUpdatedDateTime": {
            "$reqId": "3.3.3.5.1.3.1.1",
            "description": "Include the date and time the event was updated in the event time information",
            "$ref": "#/$defs/DateTime"
        },
        "eventValidPeriod": {
            "$ref": "#/$defs/EventValidPeriod"
        },
        "effectivePeriodQualifer": {
```

```
        "$reqId": "3.3.3.5.1.3.1.2.2",
        "description": "Indicate effective period qualifiers as part of the effective period information",
        "type": "string",
        "enum": [
          "not-specified",
          "morning",
          "afternoon",
          "evening",
          "night",
          "daytime",
          "off peak periods",
          "at peak periods",
          "until further notice",
          "morning peak",
          "afternoon peak",
          "midday periods"
        ]
      },
      "eventNotInEffectDays": {
        "$reqId": "3.3.3.5.1.3.1.2.3",
        "description": "Provide each day of the month a holiday falls on when the event is not in effect as part of effective period information.",
        "type": "string"
      },
      "plannedEventScheduleElementId": {
        "$reqId": "3.3.3.5.1.3.1.2.4",
        "description": "Provide event schedule element identifier for planned event category type",
        "type": "string"
      },
      "sequenceDateTime": {
        "$reqId": "3.3.3.5.1.3.1.2.5",
        "description": "Provide date and time for each element in the event sequence as part of the event time information.",
        "$ref": "#/$defs/DateTime"
      },
      "eventStartDateTime": {
        "$reqId": "3.3.3.5.1.3.1.2.6",
        "description": "Provide the date and time the event started for current event categories as part of event time information.",
        "$ref": "#/$defs/DateTime"
      },
      "expectedStartDateTime": {
        "$reqId": "3.3.3.5.1.3.1.2.7",
        "description": "Provide expected start date and time for planned event",
        "$ref": "#/$defs/DateTime"
      },
      "expectedEndDateTime": {
        "$reqId": "3.3.3.5.1.3.1.2.8",
```

```
        "description": "Provide the expected end date and time for planned events as part of the event time information.",
        "$ref": "#/$defs/DateTime"
      },
      "recurrentTimesEventEffect": {
        "$reqId": "3.3.3.5.1.3.1.2.9",
        "description": "Provide recurrent times for events as part of effective period information",
        "type": "array",
        "items": {
          "type": "string"
        }
      },
      "plannedEventContinuousFlag": {
        "$reqId": "3.3.3.5.1.3.1.2.10",
        "description": "Indicate if the schedule is continuous for planned events between expected start and end date/time",
        "type": "boolean"
      },
      "roadwayClearanceTime": {
        "$reqId": "3.3.3.5.1.3.1.2.11",
        "description": "Provide the date and time the event ended for current event categories",
        "$ref": "#/$defs/DateTime"
      }
    },
    "required": [
      "eventUpdatedDateTime"
    ]
}
```


3.4.58 EventValidPeriod


```
{
    "description": "Include event valid period information in requests from owner center to external center",
    "type": "object",
    "$reqId": "3.3.3.5.1.3.1.2.1",
    "properties": {
      "expectedEndTime": {
        "$reqId": "3.3.3.5.1.3.1.2.1.a",
        "description": "Expected end date and time of the event",
        "$ref": "#/$defs/DateTime"
      },
      "eventRemainingDuration": {
        "$reqId": "3.3.3.5.1.3.1.2.1.b",
        "description": "Estimated remaining duration of event (minutes) for category 'current', measured from the last update time",
        "type": "string"
      },
      "effectivePeriod": {
        "$reqId": "3.3.3.5.1.3.1.2.1.c",
```

```
            "description": "Effective periods indicating valid days of the week for the event.",
            "type": "number"
        }
    }
}
```

3.4.59 ExternalDeviceControlCommandResponse

```
{
    "description": "Include device type and unique identifier in device control command response",
    "type": "object",
    "$reqId": "3.3.5.1.3.3",
    "properties": {
        "organization": {
            "$reqId": "3.3.5.1.3.3.a",
            "description": "Information regarding the owner organization",
            "$ref": "#/$defs/OrganizationInformation"
        },
        "deviceType": {
            "$reqId": "3.3.5.1.3.3.b",
            "description": "Type of device (e.g., CCTV camera, dynamic message sign, gate, lane control
signal, ramp meter, signal controller)",
            "type": "string",
            "enum": [
                "cctv camera",
                "dynamic message sign",
                "gate",
                "lane control signal",
                "ramp meter",
                "signal controller"
            ]
        },
        "deviceId": {
            "$reqId": "3.3.5.1.3.3.c",
            "description": "Unique identifier for the device",
            "type": "string"
        },
        "requestId": {
            "$reqId": "3.3.5.1.3.3.d",
            "description": "Unique sequence number identifying the control request from the requesting
center",
            "type": "string"
        },
        "commandStatus": {
            "$reqId": "3.3.5.1.3.3.e",
            "description": "Status of the command indicating completion, progress, or various rejection
reasons",
            "type": "string",
            "enum": [
```

```
            "completed",
            "in progress",
            "rejectedInsufficientPrivileges",
            "rejectedDeviceIsLocked",
            "rejectedReadOnlyParameter",
            "rejectedBadValue",
            "rejectedOther",
            "unknown"
          ]
        }
    },
    "required": [
      "organization",
      "deviceType",
      "deviceId",
      "requestId",
      "commandStatus"
    ]
}
```


3.4.60 ExternalDeviceControlRequest


```
{
    "description": "Include remote device control command details in external center communication",
    "type": "object",
    "$reqId": "3.3.5.1.3.2.1",
    "properties": {
        "authorizationHeader": {
            "$reqId": "3.3.5.1.3.2.1.a",
            "description": "Information regarding authorization for external centers",
            "$ref": "#/$defs/AuthHeader"
        },
        "organization": {
            "$reqId": "3.3.5.1.3.2.1.b",
            "description": "Requesting organization information",
            "$ref": "#/$defs/OrganizationInformation"
        },
        "deviceType": {
            "$reqId": "3.3.5.1.3.2.1.c",
            "description": "Type of device (e.g., CCTV camera, dynamic message sign, gate, lane control
signal, ramp meter, signal controller)",
            "type": "string",
            "enum": [
                "cctvCamera",
                "dynamicMessageSign",
                "gate",
                "laneControlSignal",
                "rampMeter",
                "signalController"
```

```
            ]
        },
        "deviceId": {
            "$reqId": "3.3.5.1.3.2.1.d",
            "description": "Unique identifier for the device",
            "type": "string"
        },
        "requestId": {
            "$reqId": "3.3.5.1.3.2.1.e",
            "description": "Unique sequence number identifying the control request",
            "type": "string"
        },
        "operatorId": {
            "$reqId": "3.3.5.1.3.2.2.1",
            "description": "Requirements for the operator identifier in remote device command requests",
            "type": "string"
        }
    },
    "required": [
        "authorizationHeader",
        "organization",
        "deviceType",
        "deviceId",
        "requestId"
    ]
}
```

3.4.61 GateDeviceStatus

```
{
    "description": "Indicate the status of each gate device (opened, closed, partially open/closed)",
    "type": "string",
    "enum": [
        "gateOpened",
        "gateClosed",
        "gatePartiallyOpen/Closed"
    ]
}
```

3.4.62 GeoLocation

```
{
    "oneOf": [
        {
            "$ref": "https://geojson.org/schema/LineString.json"
        },
        {
            "$ref": "https://geojson.org/schema/Polygon.json"
        },
```

```
      {
        "$ref": "https://geojson.org/schema/Point.json"
      }
    ]
}
```

3.4.63 ITISCode

```
{
  "type": "object",
  "description": "An array of numeric ITIS Code values as defined in SAE J2540; If an ITIS code cannot be used, then ITIS text values must be used as defined in SAE J2540. If both code and text are provided, the code value will be used.",
  "properties": {
    "code": {
      "type": "number"
    },
    "text": {
      "type": "string"
    }
  },
  "anyOf": [
    {
      "required": [
        "code"
      ]
    },
    {
      "required": [
        "text"
      ]
    }
  ]
}
```

3.4.64 ImageInformation

```
{
  "type": "object",
  "$reqId": "3.3.5.5.4.3.9",
  "properties": {
    "imageDescription": {
      "$reqId": "3.3.5.5.4.3.9.a",
      "type": "string"
    },
    "imageURL": {
      "$reqId": "3.3.5.5.4.3.9.b",
      "type": "array",
      "items": {
```

```
            "type": "string"
          }
        }
    },
    "required": [
      "imageDescription",
      "imageURL"
    ]
}
```

3.4.65 ImageRequestedType

```
{
    "type": "string",
    "enum": [
      "snapshot",
      "suppressedStream",
      "unsuppressedStream"
    ]
}
```

3.4.66 InformationRestrictions

```
{
    "description": "Owner center may place restrictions on information dissemination to external centers.",
    "$reqId": "3.3.1.9.1",
    "type": "string",
    "enum": [
      "unrestricted",
      "notToPublic",
      "restrictedToLawEnforcement",
      "restrictedToRecipientOrganizationOnly"
    ]
}
```

3.4.67 IntersectionSignalSequenceData

```
{
    "type": "object",
    "properties": {
      "ringId": {
        "type": "string"
      },
      "sequenceData": {
        "type": "array",
        "items": {
          "type": "number"
        }
      }
    },
```

```
  "required": [
    "ringId",
    "sequenceData"
  ]
}
```

3.4.68 IntersectionSignalTPInventoryPhase

```
{
  "type": "object",
  "properties": {
    "phaseId": {
      "type": "number"
    },
    "coordinatedPhase": {
      "type": "number"
    },
    "splitMode": {
      "type": "string",
      "enum": [
        "other",
        "none",
        "minimumVehicleRecall",
        "maximumVehicleRecall",
        "pedestrianRecall",
        "maximumVehicleAndPedestrianRecall",
        "phaseOmitted"
      ]
    },
    "phaseSplit": {
      "type": "number"
    },
    "maximumGreenDuration": {
      "type": "number"
    },
    "minimumGreenDuration": {
      "type": "number"
    },
    "vehicleClearanceDuration": {
      "type": "number"
    },
    "vehicleRedDuration": {
      "type": "number"
    },
    "minimumWalkDuration": {
      "type": "number"
    },
    "pedestrianClearanceDuration": {
      "type": "number"
```

```
        },
        "steadyDontWalkDuration": {
            "type": "number"
        }
    },
    "required": [
        "phaseId",
        "coordinatedPhase",
        "splitMode",
        "phaseSplit"
    ]
}
```

3.4.69 LandmarkLocationInformation

```
{
    "description": "Include landmark location information in the event location description sent from owner center to external center.",
    "type": "object",
    "$reqId": "3.3.3.5.1.3.4.6",
    "properties": {
        "landmarkType": {
            "$reqId": "3.3.3.5.1.3.4.6.a",
            "description": "Type of location for a landmark",
            "type": "string"
        },
        "landmarkName": {
            "$reqId": "3.3.3.5.1.3.4.6.b",
            "description": "Name of the landmark",
            "type": "string"
        },
        "landmarkPointName": {
            "$reqId": "3.3.3.5.1.3.4.7.1",
            "description": "Provide the name of a point within a landmark as part of event location information",
            "type": "string"
        },
        "landmarkLocationRank": {
            "$reqId": "3.3.3.5.1.3.4.7.2",
            "description": "Provide the location rank of the landmark in event location information as assigned by the owner organization.",
            "type": "number"
        },
        "landmarkLocation": {
            "$reqId": "3.3.3.5.1.3.4.7.3",
            "description": "Provide geographic location (longitude, latitude) of the landmark as part of event location information.",
            "$ref": "#/$defs/GeoLocation"
        },
```

```
      "secondaryLandmarkLocation": {
        "$reqId": "3.3.3.5.1.3.4.7.4",
        "description": "Provide secondary landmark location as part of event location information",
        "$ref": "#/$defs/GeoLocation"
      }
    },
    "required": [
      "landmarkType",
      "landmarkName"
    ]
}
```

3.4.70 LaneControlCommands

```
{
    "type": "string",
    "enum": [
      "laneOpen",
      "laneClosed",
      "other"
    ]
}
```

3.4.71 LevelServices

```
{
    "type": "string",
    "enum": [
      "a",
      "b",
      "c",
      "d",
      "e",
      "f"
    ]
}
```

3.4.72 LinearReference

```
{
    "type": "object",
    "properties": {
      "name": {
        "type": "string"
      },
      "version": {
        "type": "number"
      },
      "location": {
        "type": "object",
```

```
            "$ref": "#/$defs/GeoLocation"
        }
    },
    "required": [
        "name",
        "version",
        "location"
    ]
}
```

3.4.73 LinearReferenceRange

```
{
    "type": "object",
    "properties": {
        "start": {
            "$ref": "#/$defs/LinearReference"
        },
        "end": {
            "$ref": "#/$defs/LinearReference"
        }
    },
    "required": [
        "start",
        "end"
    ]
}
```

3.4.74 Link

```
{
    "type": "object",
    "properties": {
        "linkId": {
            "type": "string",
            "$reqId": "3.3.4.3.1.5.1.c"
        },
        "linkType": {
            "$reqId": "3.3.4.3.1.5.1.d",
            "$ref": "#/$defs/LinkTypes"
        },
        "beginningNode": {
            "$reqId": "3.3.4.3.1.5.1.e",
            "$ref": "#/$defs/Node"
        },
        "endingNode": {
            "$reqId": "3.3.4.3.1.5.1.g",
            "$ref": "#/$defs/Node"
        },
```

```
"roadwayNetworkName": {
    "type": "string",
    "$reqId": "3.3.4.3.1.5.2.2"
},
"linkName": {
    "type": "string",
    "$reqId": "3.3.4.3.1.5.2.3"
},
"alternateNames": {
    "type": "string",
    "$reqId": "3.3.4.3.1.5.2.4"
},
"routeDesignator": {
    "type": "string",
    "$reqId": "3.3.4.3.1.5.2.5"
},
"secondaryRouteDesignator": {
    "type": "string",
    "$reqId": "3.3.4.3.1.5.2.6"
},
"linearReference": {
    "$reqId": "3.3.4.3.1.5.2.7",
    "$ref": "#/$defs/LinearReference"
},
"linkLength": {
    "type": "string",
    "$reqId": "3.3.4.3.1.5.2.8"
},
"linkCapacity": {
    "type": "string",
    "$reqId": "3.3.4.3.1.5.2.9"
},
"linkLaneInformation": {
    "type": "array",
    "$reqId": "3.3.4.3.1.5.2.10",
    "items": {
        "$ref": "#/$defs/LinkLane"
    }
},
"linkSpeedLimit": {
    "type": "string",
    "$reqId": "3.3.4.3.1.5.2.11"
},
"linkTruckSpeedLimit": {
    "type": "string",
    "$reqId": "3.3.4.3.1.5.2.12"
},
"speedLimitUnits": {
```

```
            "type": "string",
            "$reqId": "3.3.4.3.1.5.2.13"
        },
        "linkLawEnforcementJurisdiction": {
            "type": "string",
            "$reqId": "3.3.4.3.1.5.2.14"
        },
        "designatedOwner": {
            "type": "string",
            "$reqId": "3.3.4.3.1.5.2.15"
        },
        "leftShoulderWidth": {
            "type": "string",
            "$reqId": "3.3.4.3.1.5.2.16"
        },
        "rightShoulderWidth": {
            "type": "string",
            "$reqId": "3.3.4.3.1.5.2.17"
        },
        "medianType": {
            "$reqId": "3.3.4.3.1.5.2.18",
            "$ref": "#/$defs/MedianTypes"
        },
        "dateTimeChangeInformation": {
            "$reqId": "3.3.4.3.1.5.2.19",
            "$ref": "#/$defs/DateTime"
        },
        "nextLink": {
            "$reqId": "3.3.4.3.1.5.2.20",
            "$ref": "#/$defs/Link"
        },
        "previousLink": {
            "$reqId": "3.3.4.3.1.5.2.21",
            "$ref": "#/$defs/Link"
        }
    },
    "required": [
        "linkId",
        "linkType",
        "beginningNode",
        "endingNode"
    ]
}
```


3.4.75 LinkLane


```
{
    "type": "object",
    "properties": {
```

```
      "laneId": {
        "type": "integer"
      },
      "laneOrder": {
        "type": "integer"
      },
      "laneType": {
        "type": "string"
      }
    },
    "required": [
      "laneId",
      "laneOrder",
      "laneType"
    ]
}
```

3.4.76 LinkLocation

```
{
    "description": "Include a primary Point on a Link Location in event location information",
    "type": "object",
    "$reqId": "3.3.3.5.1.3.4.2",
    "properties": {
      "pointOnALinkLocation": {
        "$reqId": "3.3.3.5.1.3.4.2.1",
        "$ref": "#/$defs/PointOnALinkLocation"
      },
      "linkOwnership": {
        "$reqId": "3.3.3.5.1.3.4.3.1",
        "description": "Indicate the name of the organization that owns the link in event location
information.",
        "type": "string"
      },
      "routeDesignator": {
        "$reqId": "3.3.3.5.1.3.4.3.2",
        "description": "Provide route designator information as part of event location information.",
        "type": "string"
      },
      "secondRouteDesignator": {
        "$reqId": "3.3.3.5.1.3.4.3.3",
        "description": "Provide second route designator information as part of event location information",
        "type": "string"
      },
      "linkIdentifier": {
        "$reqId": "3.3.3.5.1.3.4.3.4",
        "description": "Provide the unique identifier of the link in the event location information.",
        "type": "string"
      },
```

```
    "linkName": {
      "$reqId": "3.3.3.5.1.3.4.3.5",
      "description": "Provide the name of the link assigned by the owner organization in the event location information.",
      "type": "string"
    },
    "linkLane": {
      "$reqId": "3.3.3.5.1.3.4.3.6",
      "description": "Provide the lane number where the event occurred as part of the event location information.",
      "type": "number"
    },
    "secondaryPoint": {
      "$reqId": "3.3.3.5.1.3.4.3.7",
      "description": "Provide secondary point on a link location information as part of the event location information",
      "$ref": "#/$defs/PointOnALinkLocation"
    },
    "linkDirection": {
      "$reqId": "3.3.3.5.1.3.4.3.8",
      "description": "Provide direction of travel on the link as part of event location information",
      "$ref": "#/$defs/Directions"
    },
    "linkAlignment": {
      "$reqId": "3.3.3.5.1.3.4.3.9",
      "description": "Provide link alignment information as part of event location information with supported values including northbound, eastbound, southbound, westbound, inner loop, and outer loop.",
      "type": "string",
      "enum": [
        "northbound",
        "eastbound",
        "southbound",
        "westbound",
        "inner loop",
        "outer loop"
      ]
    },
    "linearReferenceVersionEvents": {
      "$reqId": "3.3.3.5.1.3.4.3.10",
      "description": "Provide linear reference version information as part of event location information",
      "type": "string"
    },
    "alternateLinkLocation": {
      "$reqId": "3.3.3.5.1.3.4.3.11",
      "description": "Provide alternate link location information as part of the event location information",
      "type": "array",
      "items": {
        "$ref": "#/$defs/LinkLocation"
```

```
        }
      }
    },
    "required": [
      "pointOnALinkLocation"
    ]
}
```

3.4.77 LinkStatus

```
{
    "type": "object",
    "$reqId": "3.3.4.3.2.5",
    "properties": {
      "linkId": {
        "type": "string",
        "$reqId": "3.3.4.3.2.5.1.c"
      },
      "linkState": {
        "type": "string",
        "$reqId": "3.3.4.3.2.5.1.d",
        "enum": [
          "no determination",
          "open",
          "restricted",
          "closed"
        ]
      },
      "linkName": {
        "type": "string",
        "$reqId": "3.3.4.3.2.5.2.2"
      },
      "linkDirection": {
        "$reqId": "3.3.4.3.2.5.2.3",
        "$ref": "#/$defs/Directions"
      },
      "lanesOpen": {
        "type": "number",
        "$reqId": "3.3.4.3.2.5.2.4"
      },
      "linkPriority": {
        "type": "string",
        "$reqId": "3.3.4.3.2.5.2.5",
        "enum": [
          "special events",
          "snow ice clearance",
          "weather evacuation",
          "defense movements",
          "hazmat",
```

```
        "agricultural access",
        "none"
      ]
    },
    "linkRestrictionsAxles": {
      "type": "number",
      "$reqId": "3.3.4.3.2.5.2.6"
    },
    "linkRestrictionsHeight": {
      "type": "number",
      "description": "The units for the vehicle height restrictions are in centimeters.",
      "$reqId": "3.3.4.3.2.5.2.7"
    },
    "linkRestrictionsLength": {
      "type": "number",
      "description": "The units for the vehicle length restrictions are in centimeters.",
      "$reqId": "3.3.4.3.2.5.2.8"
    },
    "linkRestrictionsWeight": {
      "type": "number",
      "description": "The units for the vehicle weight restrictions are in kilograms.",
      "$reqId": "3.3.4.3.2.5.2.9"
    },
    "linkRestrictionsWidth": {
      "type": "number",
      "description": "The units for the vehicle width restrictions are in centimeters.",
      "$reqId": "3.3.4.3.2.5.2.10"
    },
    "linkRestrictionsAxleWeight": {
      "type": "number",
      "description": "The units for the vehicle axle weight restrictions are in kilograms.",
      "$reqId": "3.3.4.3.2.5.2.11"
    },
    "linkRestrictionsUnits": {
      "type": "string",
      "$reqId": "3.3.4.3.2.5.2.12",
      "enum": [
        "centimeters",
        "inches"
      ]
    },
    "linkSurfaceConditions": {
      "type": "string",
      "$reqId": "3.3.4.3.2.5.2.13",
      "enum": [
        "dry",
        "wet",
        "snow or slush",
```

```
            "ice",
            "oil",
            "debris",
            "rocks",
            "salted",
            "broken pavement",
            "power lines down",
            "material spill",
            "chemical spill",
            "none"
        ]
    },
    "linkSaturation": {
        "type": "string",
        "$reqId": "3.3.4.3.2.5.2.14",
        "$ref": "#/$defs/Saturations"
    },
    "linkSaturationThresholdPercentage": {
        "type": "number",
        "$reqId": "3.3.4.3.2.5.2.15"
    },
    "linkLevelService": {
        "type": "string",
        "$reqId": "3.3.4.3.2.5.2.16",
        "enum": [
            "A",
            "B",
            "C",
            "D",
            "E",
            "F"
        ]
    },
    "laneNumbers": {
        "type": "string",
        "$reqId": "3.3.4.3.2.5.2.17"
    },
    "linkDataStoredType": {
        "type": "string",
        "$reqId": "3.3.4.3.2.5.2.18",
        "enum": [
            "current link volume",
            "current occupancy",
            "current average speed",
            "current delay time",
            "current travel time",
            "roadway status",
            "daily peak volume",
```

```
            "hour of peak volume"
        ]
    },
    "roadwayEventSource": {
        "type": "string",
        "$reqId": "3.3.4.3.2.5.2.19",
        "enum": [
            "transit agency",
            "traffic agency",
            "commercial traffic service",
            "unknown motorist observer",
            "commercial fleet operator",
            "DOT",
            "automobile club patrol",
            "spotter aircraft",
            "private breakdown service",
            "camera observation",
            "non-police emergency service patrol",
            "inductive loop monitoring station",
            "microwave monitoring station",
            "mobile platform measurement",
            "mobile telephone caller previously unknown",
            "police patrol",
            "public and private utilities",
            "road condition model",
            "registered motorist observer",
            "roadside telephone caller",
            "snowplow report",
            "traffic monitoring station",
            "video processing monitoring station",
            "vehicle probe measurement",
            "weather mode"
        ]
    },
    "trafficDataType": {
        "$reqId": "3.3.4.3.2.5.2.20",
        "$ref": "#/$defs/TrafficDataTypes"
    },
    "linkStops": {
        "type": "number",
        "$reqId": "3.3.4.3.2.5.2.21"
    },
    "linkDelayTimeInSeconds": {
        "type": "number",
        "$reqId": "3.3.4.3.2.5.2.22"
    },
    "linkDelayTimeInSecondsAlternateRoute": {
        "type": "number",
```

```
      "$reqId": "3.3.4.3.2.5.2.23"
    },
    "linkHeadway": {
      "type": "number",
      "$reqId": "3.3.4.3.2.5.2.24"
    },
    "linkTravelTime": {
      "type": "number",
      "$reqId": "3.3.4.3.2.5.2.25"
    },
    "linkExistingCapacity": {
      "type": "number",
      "$reqId": "3.3.4.3.2.5.2.26"
    },
    "linkTravelTimeIncrease": {
      "type": "number",
      "$reqId": "3.3.4.3.2.5.2.27"
    },
    "linkAverageSpeed": {
      "type": "number",
      "description": "The units for the speed is in kilometers per hour.",
      "$reqId": "3.3.4.3.2.5.2.28"
    },
    "linkEstimatedSpeed": {
      "type": "number",
      "description": "The units for the speed is in kilometers per hour.",
      "$reqId": "3.3.4.3.2.5.2.29"
    },
    "linkSpeedLimit": {
      "type": "number",
      "description": "The units for the speed is in kilometers per hour.",
      "$reqId": "3.3.4.3.2.5.2.30"
    },
    "linkCurrentAdvisorySpeed": {
      "type": "number",
      "description": "The units for the speed is in kilometers per hour.",
      "$reqId": "3.3.4.3.2.5.2.31"
    },
    "linkTruckSpeedLimit": {
      "type": "number",
      "description": "The units for the speed is in kilometers per hour.",
      "$reqId": "3.3.4.3.2.5.2.32"
    },
    "speedLimitUnits": {
      "type": "string",
      "$reqId": "3.3.4.3.2.5.2.33",
      "enum": [
        "kilometers per hour",
```

```
            "miles per hour"
          ]
        },
        "linkDensity": {
          "type": "number",
          "description": "The units for this property is in vehicles per kilometer.",
          "$reqId": "3.3.4.3.2.5.2.34"
        },
        "linkOccupancy": {
          "type": "number",
          "$reqId": "3.3.4.3.2.5.2.35"
        },
        "linkVolume": {
          "type": "string",
          "description": "The units for this property is in vehicles per hour.",
          "$reqId": "3.3.4.3.2.5.2.36"
        },
        "eventDescriptionTime": {
          "$ref": "#/$defs/DateTime",
          "$reqId": "3.3.4.3.2.5.2.37"
        },
        "linkLaneStatus": {
          "type": "string",
          "$reqId": "3.3.4.3.2.5.2.38"
        },
        "linkLaneDirectionStatus": {
          "type": "string",
          "$reqId": "3.3.4.3.2.5.2.39",
          "enum": [
            "normal",
            "contraflow"
          ]
        },
        "lastChangedInformation": {
          "$reqId": "3.3.4.3.2.5.2.40",
          "$ref": "#/$defs/DateTime"
        }
      },
      "required": [
        "linkId",
        "linkState"
      ]
    }
```


3.4.78 LinkTypes


```
{
  "type": "string",
  "enum": [
```

```
        "freeway",
        "arterial",
        "collector",
        "local",
        "serviceRoad",
        "tunnel",
        "detour",
        "dedicatedLink",
        "militaryRoad",
        "railroadLink",
        "airLink",
        "ferry",
        "onRamp",
        "offRamp",
        "dedicatedHovLane",
        "tollRoad",
        "unknown",
        "other"
    ]
}
```

3.4.79 ListCurrentlyFailedSubscriptionsContent

```
{
    "description": "Include content of currently filed subscriptions list",
    "type": "object",
    "$reqId": "3.3.1.5.5.3",
    "properties": {
        "subscriptionRequestDialog": {
            "$reqId": "3.3.1.5.5.3.a",
            "description": "Dialog for subscription request",
            "type": "string"
        },
        "dataUpdateDialog": {
            "$reqId": "3.3.1.5.5.3.b",
            "description": "Dialog for updating data",
            "type": "string"
        },
        "dataType": {
            "$reqId": "3.3.1.5.5.3.c",
            "description": "Data type included in the update",
            "type": "string"
        },
        "subscriptionType": {
            "$reqId": "3.3.1.5.5.3.d",
            "description": "Type of subscription offered",
            "type": "string"
        },
        "subscriptionParameters": {
```

```
      "$reqId": "3.3.1.5.5.3.e",
      "description": "List of parameters for subscription",
      "type": "array",
      "items": {
        "type": "string"
      }
    },
    "subscriptionId": {
      "$reqId": "3.3.1.5.5.3.f",
      "description": "Unique identifier for the subscription",
      "type": "string"
    },
    "failureDateTime": {
      "$reqId": "3.3.1.5.5.3.g",
      "description": "Date and time of the failure",
      "$ref": "#/$defs/DateTime"
    },
    "failureReason": {
      "$reqId": "3.3.1.5.5.3.h",
      "description": "Code or reason for failure",
      "type": "string"
    },
    "failureDescription": {
      "$reqId": "3.3.1.5.5.3.i",
      "description": "Description of the failure",
      "type": "string"
    },
    "flag": {
      "$reqId": "3.3.1.5.5.3.j",
      "description": "Indicator for receiving or sending status.",
      "type": "string"
    },
    "subscriptionUpdateSourceEndpoint": {
      "$reqId": "3.3.1.5.5.4.1",
      "description": "Send the subscription update source endpoint to the receiving center",
      "type": "string"
    },
    "ownerCenterSubscriptionRequestEndpoint": {
      "$reqId": "3.3.1.5.5.4.2",
      "description": "Send the subscription request endpoint to the receiving center.",
      "type": "string"
    },
    "subscriptionUpdateTargetEndpoint": {
      "$reqId": "3.3.1.5.5.4.3",
      "description": "Send the subscription update target endpoint to the receiving center",
      "type": "string"
    }
  },
```

```
  "required": [
    "subscriptionRequestDialog",
    "dataUpdateDialog",
    "dataType",
    "subscriptionType",
    "subscriptionParameters",
    "subscriptionId",
    "failureDateTime",
    "failureReason",
    "failureDescription",
    "flag"
  ]
}
```

3.4.80 MedianTypes

```
{
  "type": "string",
  "enum": [
    "curbed",
    "concreteBarrier",
    "concreteBarrierWithVisibilityScreen",
    "guardRail",
    "openGrass",
    "openSand",
    "paintedMedianNoAccess",
    "separatedRoadways",
    "unprotected"
  ]
}
```

3.4.81 MeteredLaneActionControl

```
{
  "$reqId": "3.3.5.8.6.5.2.1",
  "description": "Indicate the action for a metered lane in the ramp meter schedule information",
  "type": "string",
  "enum": [
    "dark",
    "restInGreen",
    "fixedRate",
    "trafficResponsive",
    "emergencyGreen",
    "skip"
  ]
}
```

3.4.82 NetworkInformationTypes


```
{
   "type": "string",
   "enum": [
      "networkInventory",
      "nodeInventory",
      "nodeStatus",
      "linkInventory",
      "linkStatus",
      "routeInventory",
      "routeStatus",
      "fleetVehicleInventory",
      "fleetVehicleData"
   ]
}
```


3.4.83 Node


```
{
   "type": "object",
   "properties": {
      "nodeId": {
         "type": "string",
         "$reqId": "3.3.4.2.1.5.1.c"
      },
      "nodeLocation": {
         "$reqId": "3.3.4.2.1.5.1.d",
         "$ref": "#/$defs/GeoLocation"
      },
      "roadwayNetworkName": {
         "type": "string",
         "$reqId": "3.3.4.2.1.5.2.2"
      },
      "nodeName": {
         "type": "string",
         "$reqId": "3.3.4.2.1.5.2.3"
      },
      "nodeDescription": {
         "type": "string",
         "$reqId": "3.3.4.2.1.5.2.4"
      },
      "routeDesignator": {
         "type": "string",
         "$reqId": "3.3.4.2.1.5.2.5"
      },
      "nodeDirection": {
         "$reqId": "3.3.4.2.1.5.2.6",
         "$ref": "#/$defs/Directions"
```

```
        },
        "linearReference": {
          "type": "object",
          "$reqId": "3.3.4.2.1.5.2.7",
          "$ref": "#/$defs/LinearReference"
        },
        "nodeType": {
          "type": "string",
          "$reqId": "3.3.4.2.1.5.2.8",
          "$ref": "#/$defs/NodeTypes"
        },
        "numberOfLinks": {
          "type": "number",
          "$reqId": "3.3.4.2.1.5.2.9"
        },
        "nodeLastChangedInformation": {
          "type": "object",
          "$reqId": "3.3.4.2.1.5.2.10",
          "$ref": "#/$defs/DateTime"
        }
    },
    "required": [
        "nodeId",
        "nodeLocation"
    ]
}
```

3.4.84 NodeStatus

```
{
    "type": "object",
    "$reqId": "3.3.4.2.2.5",
    "properties": {
        "nodeId": {
          "type": "string",
          "$reqId": "3.3.4.2.2.5.1.c"
        },
        "nodeState": {
          "type": "string",
          "$reqId": "3.3.4.2.2.5.1.d",
          "enum": [
            "no determination",
            "open",
            "restricted",
            "closed"
          ]
        },
        "roadwayNetworkName": {
          "type": "string",
```

```
            "$reqId": "3.3.4.2.2.5.2.2"
        },
        "nodeName": {
            "type": "string",
            "$reqId": "3.3.4.2.2.5.2.3"
        },
        "lastChangedInformation": {
            "type": "object",
            "$reqId": "3.3.4.2.2.5.2.4",
            "$ref": "#/$defs/DateTime"
        }
    },
    "required": [
        "nodeId",
        "nodeState"
    ]
}
```


3.4.85 NodeStatusTypes


```
{
    "type": "string",
    "enum": [
        "noDetermination",
        "open",
        "restricted",
        "closed"
    ]
}
```


3.4.86 NodeTypes


```
{
    "type": "string",
    "enum": [
        "freewayInterchange",
        "arterialWithSecondaryCrossStreet",
        "arterialWithCrossingArterial",
        "frontageRoadWithArterial",
        "railroadCrossing",
        "transitCrossing",
        "busRouteNode",
        "trainRouteNode",
        "wharfFerryNode",
        "transferPoint",
        "pedestrianCrossing"
    ]
}
```

3.4.87 OrganizationCenter


```
{
   "description": "Provide information about centers owned or operated by the organization in the organization information sent to a receiving center.",
   "type": "object",
   "$reqId": "3.3.2.5.2.4",
   "properties": {
      "organizationCenterId": {
         "$reqId": "3.3.2.5.2.4.1",
         "description": "Provide unique identifier of center owned or operated by the organization as part of the organization center information",
         "type": "string"
      },
      "organizationCenterName": {
         "$reqId": "3.3.2.5.2.4.2.1",
         "description": "Provide the name of the center in organization center information",
         "type": "string"
      },
      "organizationCenterLocation": {
         "$reqId": "3.3.2.5.2.4.2.2",
         "description": "Indicate geographic location (longitude, latitude) of the sending center in organization center information",
         "$ref": "#/$defs/GeoLocation"
      },
      "organizationCenterDescription": {
         "$reqId": "3.3.2.5.2.4.2.3",
         "description": "Provide a textual description of the center as part of organization center information.",
         "type": "string"
      },
      "organizationCenterType": {
         "$reqId": "3.3.2.5.2.4.2.4",
         "description": "Indicate if the center is a 'fixed' or 'mobile' center in organization center information",
         "type": "string",
         "enum": [
            "fixed",
            "mobile"
         ]
      },
      "organizationCenterContactInformation": {
         "$reqId": "3.3.2.5.2.4.2.5",
         "description": "Provide unique identifier of the default contact person for the organization center",
         "type": "string"
      }
   },
   "required": [
```

```
      "organizationCenterId"
   ]
}
```

3.4.88 OrganizationContactInformation

```
{
   "type": "object",
   "$reqId": "3.3.2.5.2.3",
   "description": "Provide default contact person information for the organization",
   "properties": {
      "contactGroupId": {
         "$reqId": "3.3.2.5.2.3.1",
         "description": "Provide the unique identifier of the default contact person as part of the
organization contact information",
         "type": "string"
      },
      "contactGroupName": {
         "$reqId": "3.3.2.5.2.3.2.1",
         "description": "Provide the name of the contact person for the organization in the information sent
to the receiving center",
         "type": "string"
      },
      "contactGroupRole": {
         "$reqId": "3.3.2.5.2.3.2.2",
         "description": "Provide a description of the contact person's job or role in the organization as part
of the organization information",
         "type": "string"
      },
      "workPhoneNumber": {
         "$reqId": "3.3.2.5.2.3.2.3",
         "description": "Provide the work telephone number of the contact person in organization
information",
         "type": "string"
      },
      "alternatePhoneNumber": {
         "$reqId": "3.3.2.5.2.3.2.4",
         "description": "Provide an alternate phone number for the contact person in organization
information",
         "type": "string"
      }
   },
   "required": [
      "contactGroupId"
   ]
}
```

3.4.89 OrganizationInformation


```
{
   "type": "object",
   "properties": {
      "organizationId": {
         "$reqId": "3.3.2.5.1",
         "description": "Include the unique identifier of the organization in the information sent from the sending center to the receiving center.",
         "type": "string"
      },
      "organizationName": {
         "$reqId": "3.3.2.5.2.1",
         "description": "Provide organization name in the organization information sent to the receiving center.",
         "type": "string"
      },
      "organizationLocation": {
         "$reqId": "3.3.2.5.2.2",
         "description": "Provide the location of the organization in the organization information sent to the receiving center.",
         "$ref": "#/$defs/GeoLocation"
      },
      "organizationContactInformation": {
         "$reqId": "3.3.2.5.2.3",
         "$ref": "#/$defs/OrganizationContactInformation"
      },
      "organizationCenter": {
         "$reqId": "3.3.2.5.2.4",
         "$ref": "#/$defs/OrganizationCenter"
      },
      "orgInformationLastUpdated": {
         "$reqId": "3.3.2.5.2.5",
         "description": "Provide the date and time of the last change to organization information in the data sent to a receiving center.",
         "$ref": "#/$defs/DateTime"
      }
   },
   "required": [
      "organizationId"
   ]
}
```


3.4.90 OrganizationTypes


```
{
   "type": "string",
   "enum": [
      "organization",
```

```
      "center"
    ]
}
```

3.4.91 OtherReferences

```
{
   "description": "Associate one event with another event for comprehensive situational awareness",
   "type": "object",
   "$reqId": "3.3.3.6.3",
   "properties": {
      "tripReference": {
         "$reqId": "3.3.3.6.3.1",
         "description": "Provide trip reference information related to the event in the event information sent
to an external center.",
         "type": "string"
      },
      "responsibleReference": {
         "$reqId": "3.3.3.6.3.2",
         "description": "Provide event reference information as part of the event information sent to an
external center.",
         "type": "string"
      },
      "relatedEvent": {
         "$reqId": "3.3.3.6.3.3",
         "description": "Provide event reference information of a related event in the event information sent
to an external center.",
         "type": "string"
      },
      "previousEvent": {
         "$reqId": "3.3.3.6.3.4",
         "description": "Provide event reference information of a previous event in the event information
sent to an external center.",
         "type": "string"
      },
      "splitEvent": {
         "$reqId": "3.3.3.6.3.5",
         "description": "Provide event reference information of a split event in event information sent to an
external center",
         "type": "string"
      },
      "mergedEvent": {
         "$reqId": "3.3.3.6.3.6",
         "description": "Provide event reference information of a merged event in the event information
sent to an external center",
         "type": "string"
      },
      "siblingEvent": {
         "$reqId": "3.3.3.6.3.7",
```

```
        "description": "Provide event reference information of a sibling event in event information sent to an external center.",
        "type": "string"
      },
      "associatedDevice": {
        "$reqId": "3.3.3.6.3.8",
        "description": "Provide device reference information related to the event in the event information sent to an external center.",
        "type": "string"
      },
      "associatedUrl": {
        "$reqId": "3.3.3.6.3.9",
        "description": "Provide a URL as part of event information sent to an external center for additional event details",
        "type": "string"
      }
    }
}
```


3.4.92 PassageDetectorStatus


```
{
  "type": "array",
  "items": {
    "type": "string",
    "enum": [
      "recalled",
      "working",
      "otherError",
      "erraticCount",
      "maxPresence",
      "noActivity",
      "errorAtSensor",
      "depNoActivity"
    ]
  }
}
```


3.4.93 PointOnALinkLocation


```
{
  "description": "Include geographic location (longitude, latitude) for event location information",
  "type": "object",
  "$reqId": "3.3.3.5.1.3.4.4",
  "properties": {
    "linearReferenceLocation": {
      "$reqId": "3.3.3.5.1.3.4.5.1",
      "description": "Provide linear reference location in event location information",
      "type": "string"
```

```
    },
    "linkNameEventPoint": {
      "$reqId": "3.3.3.5.1.3.4.5.2",
      "description": "Provide the name of the roadway for event location information",
      "type": "string"
    },
    "pointName": {
      "$reqId": "3.3.3.5.1.3.4.5.3",
      "description": "Provide the name of a point along the roadway as part of the event location
information.",
      "type": "string"
    },
    "crossStreetIdentifier": {
      "$reqId": "3.3.3.5.1.3.4.5.4",
      "description": "Provide unique identifier of each cross street in event location information",
      "type": "string"
    },
    "crossStreetName": {
      "$reqId": "3.3.3.5.1.3.4.5.5",
      "description": "Provide unique names of each cross street as part of event location information",
      "type": "string"
    },
    "signedDestination": {
      "$reqId": "3.3.3.5.1.3.4.5.6",
      "description": "Provide signed destination information as part of the event location information",
      "type": "string"
    },
    "pointLocationRank": {
      "$reqId": "3.3.3.5.1.3.4.5.7",
      "description": "Include location rank from 0 to 10 in event location information, indicating relative
importance.",
      "$ref": "#/$defs/Rank"
    },
    "landmarkType": {
      "$reqId": "3.3.3.5.1.3.4.5.8",
      "description": "Include landmark type information as part of event location information",
      "type": "string"
    },
    "secondaryLinkLocation": {
      "$reqId": "3.3.3.5.1.3.4.5.9",
      "description": "Provide secondary link location as part of event location information",
      "type": "string"
    }
  }
}
```

3.4.94 QueueDetectorStatus


```
{
   "type": "array",
   "items": {
      "type": "string",
      "enum": [
         "recalled",
         "working",
         "otherError",
         "erraticCount",
         "maxPresence",
         "noActivity",
         "errorAtSensor",
         "noDepActivity",
         "maxDepPresence"
      ]
   }
}
```


3.4.95 RSUMessage


```
{
   "type": "object",
   "properties": {
      "message": {
         "$reqId": "3.3.5.10.3.5.1.b",
         "description": "The message payload received or broadcast by the RSU",
         "type": "string"
      },
      "messageNumber": {
         "$reqId": "3.3.5.10.3.5.1.c",
         "description": "The message number received or broadcast by the RSU",
         "type": "number"
      },
      "messageType": {
         "$reqId": "3.3.5.10.3.5.1.d",
         "description": "The V2X message type of message received or broadcast by the RSU",
         "type": "string",
         "enum": [
            "TIM",
            "RSM",
            "SPaT",
            "MAP",
            "SRM",
            "SSM",
            "BSM",
            "RTCM",
            "other"
```

```
            ]
        },
        "messageSource": {
            "$reqId": "3.3.5.10.3.5.1.e",
            "description": "The message source of message received or broadcast by the RSU",
            "type": "string",
            "enum": [
                "v2sConnected",
                "storedMessage",
                "managementStation",
                "gnss",
                "ca",
                "other"
            ]
        },
        "activeMessage": {
            "$reqId": "3.3.5.10.3.5.1.f",
            "description": "The active message type of message received or broadcast by the RSU",
            "type": "string",
            "enum": [
                "storeAndRepeatMessage",
                "immediateForwardMessage",
                "receivedMessagesForwardedFromV2XInterface",
                "transmittedMessagesForwardedOverV2XInterface",
                "waveServiceAdvertisements"
            ]
        }
    },
    "required": [
        "message",
        "messageNumber"
    ]
}
```

3.4.96 Rank

```
{
    "type": "number",
    "minimum": 0,
    "maximum": 10
}
```

3.4.97 RequestFilterLimit

```
{
    "type": "object",
    "properties": {
        "requestFilterLimit": {
            "type": "array",
```

```
        "items": {
          "type": "string",
          "enum": [
            "specific events",
            "specific response plans",
            "all current events",
            "all event updates",
            "all response plans",
            "no filtering"
          ]
        }
      },
      "eventIds": {
        "type": "array",
        "items": {
          "type": "string"
        },
        "description": "Required if 'specific events' is selected.",
        "minItems": 1
      },
      "responsePlanIds": {
        "type": "array",
        "items": {
          "type": "string"
        },
        "description": "Required if 'specific response plans' is selected.",
        "minItems": 1
      }
    },
    "required": [
      "requestFilterLimit"
    ],
    "allOf": [
      {
        "if": {
          "properties": {
            "requestFilterLimit": {
              "contains": {
                "const": "specific events"
              }
            }
          }
        },
        "then": {
          "required": [
            "eventIds"
          ]
        }
```

```
      },
      {
        "if": {
          "properties": {
            "requestFilterLimit": {
              "contains": {
                "const": "specific response plans"
              }
            }
          }
        },
        "then": {
          "required": [
            "responsePlanIds"
          ]
        }
      }
    ]
}
```

3.4.98 ResponsePlanActivityLogContent

```
{
  "description": "Send response plan log details to the external center",
  "type": "object",
  "$reqId": "3.3.3.9.5.4",
  "properties": {
    "deviceType": {
      "$reqId": "3.3.3.9.5.4.1.a",
      "description": "Device type involved in the response plan",
      "type": "string"
    },
    "deviceId": {
      "$reqId": "3.3.3.9.5.4.1.b",
      "description": "Unique identifier for the device involved in the response plan",
      "type": "string"
    },
    "commandSent": {
      "$reqId": "3.3.3.9.5.4.1.c",
      "description": "Command sent to the device in the response plan",
      "type": "string"
    },
    "commandStatus": {
      "$reqId": "3.3.3.9.5.4.1.d",
      "description": "Response plan command status for each sent command",
      "type": "string"
    },
    "acknowledgement": {
      "$reqId": "3.3.3.9.5.4.1.e",
```

```
        "description": "Text of any acknowledgement sent in response to a command",
        "type": "string"
      },
      "commandSendTime": {
        "$reqId": "3.3.3.9.5.4.2.1",
        "description": "Contain command send time and command acknowledgement received time in the response plan activity log details.",
        "$ref": "#/$defs/DateTime"
      }
    },
    "required": [
      "deviceType",
      "deviceId",
      "commandSent",
      "commandStatus",
      "acknowledgement"
    ]
}
```


3.4.99 ResponsePlanApprovalDecision


```
{
    "description": "Send response approval decision to external center regarding response plan activities",
    "type": "object",
    "$reqId": "3.3.3.8.7.5.2",
    "properties": {
      "organization": {
        "$reqId": "3.3.3.8.7.5.2.1.a",
        "description": "Identifier for the organization providing the decision",
        "$ref": "#/$defs/OrganizationInformation"
      },
      "decision": {
        "$reqId": "3.3.3.8.7.5.2.1.b",
        "description": "Outcome of the decision-making process",
        "type": "string",
        "enum": [
          "approved",
          "rejected",
          "decisionNotReceived"
        ]
      },
      "approvalMethod": {
        "$reqId": "3.3.3.8.7.5.2.1.c",
        "description": "Indication of the method of approval (automated, manual)",
        "type": "string",
        "enum": [
          "automated",
          "manual"
        ]
```

```
        },
        "decisionTime": {
          "$reqId": "3.3.3.8.7.5.2.2.1",
          "description": "Include the time of the approval decision in the response plan approval notification
to the external center.",
          "$ref": "#/$defs/DateTime"
        }
    },
    "required": [
        "organization",
        "decision",
        "approvalMethod"
    ]
}
```

3.4.100 ResponsePlanDetails

```
{
    "type": "object",
    "$reqId": "3.3.3.8.5.4",
    "properties": {
        "startTime": {
          "$reqId": "3.3.3.8.5.4.1.a",
          "description": "Time when the activity begins",
          "$ref": "#/$defs/DateTime"
        },
        "projectedEndTime": {
          "$reqId": "3.3.3.8.5.4.1.b",
          "description": "Estimated time the projected activity will conclude",
          "$ref": "#/$defs/DateTime"
        },
        "participatingAgencies": {
          "$reqId": "3.3.3.8.5.4.1.c",
          "description": "List of agencies involved in response plan activities",
          "type": "array",
          "items": {
            "type": "string"
          }
        },
        "detourList": {
          "$reqId": "3.3.3.8.5.4.2.1",
          "description": "Send the list of detours as part of the response plan to the external center.",
          "type": "array",
          "items": {
            "type": "string"
          }
        },
        "rampMeterActions": {
          "$reqId": "3.3.3.8.5.4.2.2",
```

```
        "description": "Send a list of ramp meter control actions included in the response plan to the external center.",
        "type": "array",
        "items": {
          "type": "string"
        }
      },
      "intersectionSignalControlActions": {
        "$reqId": "3.3.3.8.5.4.2.3",
        "description": "Send a list of intersection signal control actions in the response plan to the external center",
        "type": "array",
        "items": {
          "type": "string"
        }
      },
      "dmsControlActions": {
        "$reqId": "3.3.3.8.5.4.2.4",
        "description": "Send a list of DMS control actions within the response plan to the external center",
        "type": "array",
        "items": {
          "$ref": "#/DMSControlCommandResponse"
        }
      },
      "harMessageControlActions": {
        "$reqId": "3.3.3.8.5.4.2.5",
        "description": "Send a list of HAR message control actions in the response plan to the external center",
        "type": "array",
        "items": {
          "type": "string"
        }
      },
      "otherMessages": {
        "$reqId": "3.3.3.8.5.4.2.6",
        "description": "Send a list of informational messages included in the response plan to the external center",
        "type": "array",
        "items": {
          "type": "string"
        }
      },
      "lcsScheduleChanges": {
        "$reqId": "3.3.3.8.5.4.2.7",
        "description": "Send a list of LCS schedule cancellations in the response plan to the external center",
        "type": "array",
        "items": {
```

```
            "$ref": "#/LCSScheduleResponse"
          }
        },
        "speedRestrictions": {
          "$reqId": "3.3.3.8.5.4.2.8",
          "description": "Send speed reduction actions included in the response plan to the external center",
          "type": "array",
          "items": {
            "type": "string"
          }
        },
        "roadClosureActions": {
          "$reqId": "3.3.3.8.5.4.2.9",
          "description": "Send road closure actions included in the response plan to the external center",
          "type": "array",
          "items": {
            "type": "string"
          }
        },
        "personnelDeploymentActions": {
          "$reqId": "3.3.3.8.5.4.2.10",
          "description": "Send a list of personnel deployment actions in the response plan to the external
center",
          "type": "array",
          "items": {
            "type": "string"
          }
        },
        "deviceControlActions": {
          "$reqId": "3.3.3.8.5.4.2.11",
          "description": "Send a list of device control cancellations within the response plan to the external
center",
          "type": "array",
          "items": {
            "type": "string"
          }
        },
        "aggregateApprovalDecisions": {
          "$reqId": "3.3.3.8.5.4.2.12",
          "description": "Send aggregate approval decision for response plan to external center",
          "type": "array",
          "items": {
            "type": "string"
          }
        },
        "individualApprovalDecisions": {
          "$reqId": "3.3.3.8.5.4.2.13",
          "description": "Send a list of individual approval decisions from all participating agencies to the
```

```
external center",
            "type": "array",
            "items": {
               "type": "string"
            }
         }
      },
      "required": [
         "startTime",
         "projectedEndTime",
         "participatingAgencies"
      ]
}
```


3.4.101 ResponsePlanFilter


```
{
   "description": "Include a response plan filter in the response plan information request based on
specified criteria",
   "type": "object",
   "$reqId": "3.3.3.8.4.2.4",
   "properties": {
      "eventId": {
         "$reqId": "3.3.3.8.4.2.4.a",
         "description": "Unique identifier for the event",
         "type": "string"
      },
      "evaluationCycles": {
         "$reqId": "3.3.3.8.4.2.4.b",
         "description": "List of evaluation cycles",
         "type": "array",
         "items": {
            "$ref": "#/$defs/EvaluationCycle"
         }
      },
      "responsePlanRanks": {
         "$reqId": "3.3.3.8.4.2.4.c",
         "description": "Rank list of response plans",
         "type": "array",
         "items": {
            "type": "string"
         }
      },
      "responsePlanIds": {
         "$reqId": "3.3.3.8.4.2.4.d",
         "description": "List of response plan identifiers",
         "type": "array",
         "items": {
            "type": "string"
```

```
            }
        },
        "planType": {
            "$reqId": "3.3.3.8.4.2.4.e",
            "description": "Type of plan classification",
            "type": "string"
        },
        "responsePlanStatuses": {
            "$reqId": "3.3.3.8.4.2.4.f",
            "description": "List of statuses for response plans",
            "type": "array",
            "items": {
                "$ref": "#/$defs/ResponsePlanStatusEnum"
            }
        }
    }
}
```

3.4.102 ResponsePlanHeader

```
{
    "description": "Send the response plan header to an external center",
    "type": "object",
    "$reqId": "3.3.3.8.5.2",
    "properties": {
        "eventId": {
            "$reqId": "3.3.3.8.5.2.1.a",
            "description": "Unique identifier for the event",
            "type": "string"
        },
        "planId": {
            "$reqId": "3.3.3.8.5.2.1.b",
            "description": "Unique identifier for the response plan",
            "type": "string"
        },
        "planType": {
            "$reqId": "3.3.3.8.5.2.1.c",
            "description": "Type of plan being referenced",
            "type": "string"
        },
        "responsePlanRanking": {
            "$reqId": "3.3.3.8.5.2.2.1",
            "description": "Include a ranking of the response plan in the response plan header",
            "$ref": "#/$defs/Rank"
        },
        "submissionTime": {
            "$reqId": "3.3.3.8.5.2.2.2",
            "description": "Include submission time of response plan for approval in the header",
            "$ref": "#/$defs/DateTime"
```

```
      }
    },
    "required": [
      "eventId",
      "planId",
      "planType"
    ]
}
```

3.4.103 ResponsePlanStatusEnum

```
{
    "description": "Response plan status options include generated, submitted-for-approval, being implemented, implemented, completed, or rejected.",
    "type": "string",
    "enum": [
      "generated",
      "submittedForApproval",
      "beingImplemented",
      "implemented",
      "completed",
      "rejected"
    ]
}
```

3.4.104 Route

```
{
    "type": "object",
    "properties": {
      "routeId": {
        "type": "string",
        "$reqId": "3.3.4.4.1.5.1.c"
      },
      "linkIds": {
        "type": "array",
        "$reqId": "3.3.4.4.1.5.1.d",
        "items": {
          "type": "string"
        }
      },
      "routeType": {
        "type": "string",
        "$reqId": "3.3.4.4.1.5.1.e",
        "enum": [
          "travel",
          "transit",
          "detour",
          "alternate",
```

```
            "evacuation",
            "snow",
            "emergencyVehicles",
            "managedLanes",
            "flood",
            "scenic",
            "hazmat",
            "truck",
            "bicycle",
            "walking"
        ]
    },
    "roadwayNetworkName": {
        "type": "string",
        "$reqId": "3.3.4.4.1.5.2.2"
    },
    "routeName": {
        "type": "string",
        "$reqId": "3.3.4.4.1.5.2.3"
    },
    "alternateRouteNames": {
        "type": "string",
        "$reqId": "3.3.4.4.1.5.2.4"
    },
    "routeLength": {
        "type": "number",
        "$reqId": "3.3.4.4.1.5.2.5"
    },
    "nodesIdList": {
        "type": "array",
        "$reqId": "3.3.4.4.1.5.2.6",
        "items": {
            "type": "string"
        }
    },
    "routeImageUrl": {
        "type": "string",
        "$reqId": "3.3.4.4.1.5.2.7"
    },
    "routeImageUrlReferenceMedium": {
        "type": "string",
        "$reqId": "3.3.4.4.1.5.2.8"
    },
    "lastChangedInformation": {
        "$reqId": "3.3.4.4.1.5.2.9",
        "$ref": "#/$defs/DateTime"
    }
},
```

```
  "required": [
    "routeId",
    "linkId",
    "routeType"
  ]
}
```

3.4.105 RouteStatus

```
{
  "type": "object",
  "properties": {
    "routeId": {
      "type": "string",
      "$reqId": "3.3.4.4.2.5.1.c"
    },
    "routeState": {
      "type": "string",
      "$reqId": "3.3.4.4.2.5.1.d",
      "enum": [
        "no determination",
        "open",
        "restricted",
        "closed"
      ]
    },
    "routeName": {
      "type": "string",
      "$reqId": "3.3.4.4.2.5.2.2"
    },
    "routeDetourStatusFlag": {
      "type": "boolean",
      "$reqId": "3.3.4.4.2.5.2.3"
    },
    "routeSurfaceConditions": {
      "type": "string",
      "$reqId": "3.3.4.4.2.5.2.4",
      "enum": [
        "dry",
        "wet",
        "snow or slush",
        "ice",
        "oil",
        "debris",
        "rocks",
        "salted",
        "broken pavement",
        "power lines down",
        "material spill",
```

```
            "chemical spill",
            "none"
        ]
    },
    "routeExistingCapacityPercentage": {
        "type": "number",
        "$reqId": "3.3.4.4.2.5.2.5"
    },
    "routeLevelService": {
        "type": "string",
        "$reqId": "3.3.4.4.2.5.2.6",
        "enum": [
            "A",
            "B",
            "C",
            "D",
            "E",
            "F"
        ]
    },
    "routeSaturation": {
        "type": "string",
        "$reqId": "3.3.4.4.2.5.2.7",
        "$ref": "#/$defs/Saturations"
    },
    "routeDataStoredType": {
        "type": "string",
        "$reqId": "3.3.4.4.2.5.2.8",
        "enum": [
            "current route volume",
            "current occupancy",
            "current average speed",
            "current delay time",
            "current travel time",
            "roadway status"
        ]
    },
    "routeTrafficAlgorithmDataType": {
        "$reqId": "3.3.4.4.2.5.2.9",
        "$ref": "#/$defs/TrafficDataTypes"
    },
    "routeDelayTime": {
        "type": "number",
        "$reqId": "3.3.4.4.2.5.2.10"
    },
    "routeDelayTimeAlternateRoute": {
        "type": "number",
        "$reqId": "3.3.4.4.2.5.2.11"
```

```
},
"routeHeadway": {
    "type": "number",
    "$reqId": "3.3.4.4.2.5.2.12"
},
"routeTravelTime": {
    "type": "number",
    "$reqId": "3.3.4.4.2.5.2.13"
},
"routeTravelTimeIncreasePercentage": {
    "type": "number",
    "$reqId": "3.3.4.4.2.5.2.14"
},
"routeVolume": {
    "type": "number",
    "$description": "expressed in vehicles per hour",
    "$reqId": "3.3.4.4.2.5.2.15"
},
"routeAverageSpeed": {
    "type": "number",
    "$description": "expressed in kilometers per hour",
    "$reqId": "3.3.4.4.2.5.2.16"
},
"routeDensity": {
    "type": "number",
    "$description": "expressed in vehicles per kilometer",
    "$reqId": "3.3.4.4.2.5.2.17"
},
"routeOccupancyPercentage": {
    "type": "number",
    "$reqId": "3.3.4.4.2.5.2.18"
},
"routeCurrentAdvisorySpeed": {
    "type": "string",
    "$description": "expressed in kilometers per hour",
    "$reqId": "3.3.4.4.2.5.2.19"
},
"speedLimitUnitsRouteStatus": {
    "type": "string",
    "$reqId": "3.3.4.4.2.5.2.20",
    "enum": [
        "kilometers per hour",
        "miles per hour"
    ]
},
"eventDescriptionTimeRouteStatus": {
    "$ref": "#/$defs/DateTime",
    "$reqId": "3.3.4.4.2.5.2.21"
```

```
        },
        "lastChangedInformation": {
            "$ref": "#/$defs/DateTime",
            "$reqId": "3.3.4.4.2.5.2.22"
        }
    },
    "required": [
        "routeId",
        "routeStatus"
    ]
}
```

3.4.106 Saturations

```
{
    "type": "string",
    "enum": [
        "notOversaturated",
        "oversaturated"
    ]
}
```

3.4.107 SectionTimingPattern

```
{
    "type": "object",
    "properties": {
        "intersectionId": {
            "type": "string"
        },
        "cycleLength": {
            "type": "number"
        },
        "offsetTime": {
            "type": "number"
        },
        "phaseTPList": {
            "type": "array",
            "items": {
                "$ref": "#/$defs/IntersectionSignalTPInventoryPhase"
            }
        },
        "sequenceInformation": {
            "type": "array",
            "items": {
                "$ref": "#/$defs/IntersectionSignalSequenceData"
            }
        }
    },
```

```
  "required": [
    "intersectionId",
    "cycleLength",
    "offsetTime",
    "phaseTPList"
  ]
}
```

3.4.108 SensorSpecificInformation

```
{
  "description": "Requirements for sensor specific metadata information that may be included in ESS metadata information",
  "type": "object",
  "$reqId": "3.3.5.5.4.3.4",
  "properties": {
    "stationId": {
      "$reqId": "3.3.5.5.4.3.4.1.a",
      "description": "Unique identifier for the ESS station",
      "type": "string"
    },
    "essSensorId": {
      "$reqId": "3.3.5.5.4.3.4.1.b",
      "description": "Unique identifier for the ESS sensor",
      "type": "string"
    },
    "sensorInformationDistributionGroup": {
      "$reqId": "3.3.5.5.4.3.4.1.c",
      "description": "Distribution group for sensor information",
      "type": "string"
    },
    "observationType": {
      "$reqId": "3.3.5.5.4.3.4.1.d",
      "description": "Type of observation collected by the sensor based on NTCIP 1204 types",
      "type": "string"
    },
    "sensorManufacturer": {
      "$reqId": "3.3.5.5.4.3.4.1.e",
      "description": "Manufacturer identification for the sensor",
      "type": "string"
    },
    "manufacturerModelNumber": {
      "$reqId": "3.3.5.5.4.3.4.1.f",
      "description": "Manufacturer's model number for the sensor",
      "type": "string"
    },
    "sensorIndex": {
      "$reqId": "3.3.5.5.4.3.4.1.g",
      "description": "Order index for similar sensors",
```

```
            "type": "string"
        },
        "sensorDescription": {
            "$reqId": "3.3.5.5.4.3.4.2.1",
            "description": "Provide a description of the sensor as part of sensor-specific metadata
information",
            "type": "string"
        },
        "minimumValueSensorRange": {
            "$reqId": "3.3.5.5.4.3.4.2.2",
            "description": "Provide the minimum value of the sensor range if different from manufacturer
specifications as part of sensor metadata",
            "type": "string"
        },
        "maximumValueSensorRange": {
            "$reqId": "3.3.5.5.4.3.4.2.3",
            "description": "Provide maximum value of sensor range if different from manufacturer's
specifications as part of sensor metadata.",
            "type": "string"
        },
        "maximumPositiveRateChange": {
            "$reqId": "3.3.5.5.4.3.4.2.4",
            "description": "Provide the maximum positive rate of change during the defined rate interval as
part of the sensor specific metadata",
            "type": "string"
        },
        "maximumNegativeRateChange": {
            "$reqId": "3.3.5.5.4.3.4.2.5",
            "description": "Provide maximum negative rate of change as part of sensor specific metadata
information",
            "type": "string"
        },
        "rateInterval": {
            "$reqId": "3.3.5.5.4.3.4.2.6",
            "description": "Provide the rate interval (in seconds) for maximum rates in sensor metadata if a
custom value is desired.",
            "type": "string"
        },
        "persistenceInterval": {
            "$reqId": "3.3.5.5.4.3.4.2.7",
            "description": "Provide the duration in seconds for which observed values can remain constant in
sensor metadata information",
            "type": "string"
        },
        "persistenceThreshold": {
            "$reqId": "3.3.5.5.4.3.4.2.8",
            "description": "Provide the smallest amount of change allowed between observations for custom
value in sensor metadata",
```

```
        "type": "string"
      },
      "likeInstrumentThreshold": {
        "$reqId": "3.3.5.5.4.3.4.2.9",
        "description": "Provide the largest observed difference permitted among like instruments as part of sensor specific metadata information if a custom value is desired.",
        "type": "string"
      },
      "dateCalibration": {
        "$reqId": "3.3.5.5.4.3.4.2.10",
        "description": "Provide the last date the sensor was calibrated in sensor metadata information",
        "type": "string"
      },
      "dateLastMaintenance": {
        "$reqId": "3.3.5.5.4.3.4.2.11",
        "description": "Provide the last date maintenance was performed on the sensor as part of sensor specific metadata information",
        "type": "string"
      },
      "serialNumber": {
        "$reqId": "3.3.5.5.4.3.4.2.12",
        "description": "Provide the manufacturer's serial number for the sensor in the sensor specific metadata information",
        "type": "string"
      },
      "sensorResolution": {
        "$reqId": "3.3.5.5.4.3.4.2.13",
        "description": "Provide smallest increment or measurement from the sensor in metadata information",
        "type": "string"
      },
      "sensorAccuracy": {
        "$reqId": "3.3.5.5.4.3.4.2.14",
        "description": "Provide known potential variation of observation (accuracy) for the sensor in sensor-specific metadata information",
        "type": "string"
      },
      "minimumValueOutput": {
        "$reqId": "3.3.5.5.4.3.4.2.15",
        "description": "Provide the minimum sensor output value in the sensor metadata information",
        "type": "string"
      },
      "maximumValueOutput": {
        "$reqId": "3.3.5.5.4.3.4.2.16",
        "description": "Provide the maximum sensor output value in sensor specific metadata information",
        "type": "string"
      },
      "sensorStationNorthSouthOffset": {
```

```
        "$reqId": "3.3.5.5.4.3.4.2.17",
        "description": "Provide north/south distance in meters of the sensor from the station reference location in sensor specific metadata",
        "type": "string"
      },
      "sensorStationEastWestOffset": {
        "$reqId": "3.3.5.5.4.3.4.2.18",
        "description": "Provide east/west distance of the sensor from the station reference location in meters as part of sensor metadata",
        "type": "string"
      },
      "sensorStationElevationOffset": {
        "$reqId": "3.3.5.5.4.3.4.2.19",
        "description": "Provide the vertical distance of the sensor from the station reference location in the sensor specific metadata information",
        "type": "string"
      },
      "sensorSurfaceOffset": {
        "$reqId": "3.3.5.5.4.3.4.2.20",
        "description": "Provide vertical distance from pavement surface as part of the sensor specific metadata information",
        "type": "string"
      },
      "embeddedMaterialDescription": {
        "$reqId": "3.3.5.5.4.3.4.2.21",
        "description": "Provide a description of the material of the embedded sensor in sensor metadata information",
        "type": "string"
      },
      "outputAverageInterval": {
        "$reqId": "3.3.5.5.4.3.4.2.22",
        "description": "Provide average interval in milliseconds for sensor observations as part of sensor specific metadata information",
        "type": "string"
      },
      "outputInternalUnits": {
        "$reqId": "3.3.5.5.4.3.4.2.23",
        "description": "Provide internal units of measurement reported by the sensor in the metadata information sent to an external center",
        "type": "string"
      },
      "initialInstallationDateEssSensor": {
        "$reqId": "3.3.5.5.4.3.4.2.24",
        "description": "Provide the installation date of the sensor as part of the sensor metadata information",
        "type": "string"
      },
      "beginDatetimeOutServicePeriod": {
```

```
            "$reqId": "3.3.5.5.4.3.4.2.25",
            "description": "Provide date and time the sensor was taken out of service as part of the sensor metadata information",
            "type": "string"
        },
        "endDatetimeOutServicePeriod": {
            "$reqId": "3.3.5.5.4.3.4.2.26",
            "description": "Provide the date and time the sensor was put back into service as part of the sensor metadata information",
            "type": "string"
        },
        "samplingInterval": {
            "$reqId": "3.3.5.5.4.3.4.2.27",
            "description": "Provide interval time in seconds between consecutive sensor readings in sensor specific metadata information",
            "type": "string"
        }
    },
    "required": [
        "stationId",
        "essSensorId",
        "sensorInformationDistributionGroup",
        "observationType",
        "sensorManufacturer",
        "manufacturerModelNumber",
        "sensorIndex"
    ]
}
```


3.4.109 SignalControlSource


```
{
    "type": "string",
    "enum": [
        "Unknown",
        "other",
        "centralTimeOfDay(Intersection)",
        "centralOperatorCommanded(Intersection)",
        "centralTimeOfDay(Section)",
        "centralOperatorCommanded(Section)",
        "local",
        "localTimeOfDay",
        "localManual",
        "localBackupLossOfCentral",
        "centralAdaptive"
    ]
}
```

3.4.110 SignalControllerCurrentSignalTimingMode


```
{
   "type": "string",
   "enum": [
      "unknown",
      "other",
      "free",
      "fixedTime",
      "actuated",
      "semiActuated",
      "criticalIntersectionControl",
      "trafficResponsive",
      "adaptive",
      "flashProgrammed",
      "conflictFlash",
      "freeDueToFault",
      "flashAutomatic",
      "flashPreempt",
      "flashLocalManual",
      "flashFault",
      "flashMmu/Cmu",
      "flashReasonsUnknown",
      "flashStartup",
      "specialFunction",
      "coordinatedAlarm",
      "transition",
      "preempt",
      "signalPriority",
      "standby"
   ]
}
```


3.4.111 SignalControllerCurrentTimingModes


```
{
   "type": "string",
   "enum": [
      "unknown",
      "other",
      "local",
      "localManual",
      "localTimeOfDay",
      "localTrafficResponsive",
      "centralTimeOfDay",
      "centralTrafficResponsive",
      "centralHoldForceOmit",
      "centralHolidaySchedule",
      "centralStandby",
```

```
      "coordinatedCriticalIntersectionControl",
      "coordinatedAdaptive",
      "coordinatedTransitPriority",
      "flashProgrammed"
   ]
}
```

3.4.112 SignalControllerSplitModes

```
{
   "type": "string",
   "enum": [
      "other",
      "none",
      "minimumVehicleRecall",
      "maximumVehicleRecall",
      "pedestrianRecall",
      "maximumVehicleAndPedestrianRecall",
      "phaseOmitted"
   ]
}
```

3.4.113 SignalControllerTimingModes

```
{
   "type": "string",
   "enum": [
      "unknown",
      "other",
      "free",
      "fixedTime",
      "actuated",
      "semiActuated",
      "criticalIntersectionControl",
      "trafficResponsive",
      "adaptive",
      "flashProgrammed"
   ]
}
```

3.4.114 SignalDeviceChangeRequestTypes

```
{
   "description": "Type of change request for each signal device",
   "type": "string",
   "enum": [
      "changeSignalTimingMode",
      "changeSignalTimingPattern",
      "makeOffsetAdjustment"
```

```
  ]
}
```

3.4.115 SiteSpecificInformation

```
{
  "description": "Requirements for site specific metadata information that may be included in ESS metadata sent to an external center.",
  "type": "object",
  "$reqId": "3.3.5.5.4.3.5",
  "properties": {
    "siteSpecificMetadataInformation": {
      "$reqId": "3.3.5.5.4.3.5.1",
      "description": "Include a description of the site in ESS metadata information sent to an external center.",
      "type": "string"
    },
    "roadwayName": {
      "$reqId": "3.3.5.5.4.3.5.2",
      "description": "Provide the name or number of the nearest highway as part of site-specific metadata information",
      "type": "string"
    },
    "linearReferenceEssMetadata": {
      "$reqId": "3.3.5.5.4.3.5.3",
      "description": "Provide linear reference location and version information in site-specific metadata for external center",
      "type": "string"
    },
    "linearReferenceUnits": {
      "$reqId": "3.3.5.5.4.3.5.4",
      "description": "Provide units reported for the roadway marker as part of site-specific metadata information",
      "type": "string"
    },
    "distanceRoadway": {
      "$reqId": "3.3.5.5.4.3.5.5",
      "description": "Provide distance in meters from the closest point on the roadway surface to the site reference point as part of site-specific metadata.",
      "type": "string"
    },
    "elevationRoadway": {
      "$reqId": "3.3.5.5.4.3.5.6",
      "description": "Provide the difference in elevation between the center surface of the roadway and the site reference point in site-specific metadata information.",
      "type": "string"
    },
    "jurisdiction": {
      "$reqId": "3.3.5.5.4.3.5.7",
```

```
        "description": "Provide the county or jurisdictional name of the site location in the site-specific metadata information",
        "type": "string"
      },
      "state": {
        "$reqId": "3.3.5.5.4.3.5.8",
        "description": "Provide the state (2 letter postal ID) as part of site-specific metadata information",
        "type": "string"
      },
      "country": {
        "$reqId": "3.3.5.5.4.3.5.9",
        "description": "Provide the country the site is located in as part of the site-specific metadata information",
        "type": "string"
      },
      "accessDirections": {
        "$reqId": "3.3.5.5.4.3.5.10",
        "description": "Provide directions to access the site from a major roadway in site-specific metadata information",
        "type": "string"
      },
      "siteRepresentativeness": {
        "$reqId": "3.3.5.5.4.3.5.11",
        "description": "Provide description of unique meteorological or topographical features as part of site-specific metadata",
        "type": "string"
      },
      "siteObstructions": {
        "$reqId": "3.3.5.5.4.3.5.12",
        "description": "Provide description of physical properties affecting observation accuracy in site-specific metadata",
        "type": "string"
      },
      "siteLandscape": {
        "$reqId": "3.3.5.5.4.3.5.13",
        "description": "Provide description of the landscape surrounding the site as part of site-specific metadata",
        "type": "string"
      },
      "siteAccessControl": {
        "$reqId": "3.3.5.5.4.3.5.14",
        "description": "Indicate if access to the site is controlled in site-specific metadata information",
        "type": "string"
      },
      "siteSlope": {
        "$reqId": "3.3.5.5.4.3.5.15",
        "description": "Provide the grade of the landscape surrounding the site as part of the site-specific metadata information",
```

```
            "type": "string"
        },
        "siteGradeDirection": {
            "$reqId": "3.3.5.5.4.3.5.16",
            "description": "Provide the direction of the landscape grade in degrees from North as part of site-
specific metadata.",
            "type": "string"
        },
        "siteWindRoughness": {
            "$reqId": "3.3.5.5.4.3.5.17",
            "description": "Provide roughness of the wind in four directions as part of site-specific metadata",
            "type": "string"
        },
        "siteSoilType": {
            "$reqId": "3.3.5.5.4.3.5.18",
            "description": "Provide type of soil as part of site-specific metadata information",
            "type": "string"
        },
        "uniqueSiteIdentifier": {
            "$reqId": "3.3.5.5.4.3.5.19",
            "description": "Provide unique identifier of the site as part of site-specific metadata information",
            "type": "string"
        }
    },
    "required": [
        "siteSpecificMetadataInformation"
    ]
}
```


3.4.116 StationSpecificInformation


```
{
    "description": "Requirements for station specific metadata information in ESS metadata",
    "type": "object",
    "$reqId": "3.3.5.5.4.3.6",
    "properties": {
        "stationCategory": {
            "$reqId": "3.3.5.5.4.3.6.1.a",
            "description": "Category of the station (permanent, transportable, mobile, other)",
            "type": "string",
            "enum": [
                "permanent",
                "transportable",
                "mobile",
                "other"
            ]
        },
        "stationId": {
            "$reqId": "3.3.5.5.4.3.6.1.b",
```

```
        "description": "Unique identifier for the station assigned by the owner organization",
        "type": "string"
      },
      "geoLocation": {
        "$reqId": "3.3.5.5.4.3.6.1.c",
        "description": "Geographic coordinates of the station (longitude and latitude)",
        "$ref": "#/$defs/GeoLocation"
      },
      "stationElevation": {
        "$reqId": "3.3.5.5.4.3.6.1.d",
        "description": "Elevation of the station base from mean sea level (meters)",
        "type": "number"
      },
      "stationDescription": {
        "$reqId": "3.3.5.5.4.3.6.2.1",
        "description": "Provide a description of the station in station specific metadata information",
        "type": "string"
      },
      "stationOperationType": {
        "$reqId": "3.3.5.5.4.3.6.2.2",
        "description": "Provide operation type of the station in station specific metadata information",
        "type": "string"
      },
      "stationGeoCordinateReferencingModel": {
        "$reqId": "3.3.5.5.4.3.6.2.3",
        "description": "Provide the datum geocoordinate referencing model as part of station specific
metadata information.",
        "type": "string"
      },
      "stationPowerSource": {
        "$reqId": "3.3.5.5.4.3.6.2.4",
        "description": "Indicate the power source for the station as part of the station specific metadata
information.",
        "type": "string"
      },
      "doorStatus": {
        "$reqId": "3.3.5.5.4.3.6.2.5",
        "description": "Indicate if any doors attached to the station are open in the station specific
metadata",
        "type": "string"
      },
      "batteryStatus": {
        "$reqId": "3.3.5.5.4.3.6.2.6",
        "description": "Provide battery percentage as part of station specific metadata information",
        "type": "string"
      },
      "lineVolts": {
        "$reqId": "3.3.5.5.4.3.6.2.7",
```

```
        "description": "Provide typical voltage for the power source in station specific metadata information",
        "type": "string"
      },
      "stationMaintenanceGroupName": {
        "$reqId": "3.3.5.5.4.3.6.2.8",
        "description": "Provide a description of the maintenance group for the station in the station specific metadata information.",
        "type": "string"
      },
      "preventiveMaintenanceInterval": {
        "$reqId": "3.3.5.5.4.3.6.2.9",
        "description": "Provide preventive maintenance frequency in days for the station as part of station specific metadata",
        "type": "string"
      },
      "maintenanceCalibrationInterval": {
        "$reqId": "3.3.5.5.4.3.6.2.10",
        "description": "Provide calibration maintenance frequency description for the station in metadata information",
        "type": "string"
      },
      "maintenanceStatus": {
        "$reqId": "3.3.5.5.4.3.6.2.11",
        "description": "Indicate the maintenance status of the station in station specific metadata information",
        "type": "string"
      },
      "initialInstallationDate": {
        "$reqId": "3.3.5.5.4.3.6.2.12",
        "description": "Provide the date the station was initially installed as part of the station specific metadata information",
        "$ref": "#/$defs/DateTime"
      },
      "numberDevices": {
        "$reqId": "3.3.5.5.4.3.6.2.13",
        "description": "Provide number of sensor interface devices supported by the station in station specific metadata information",
        "type": "string"
      },
      "communicationsMethod": {
        "$reqId": "3.3.5.5.4.3.6.2.14",
        "description": "Provide method of communications to the station in station-specific metadata",
        "type": "string"
      },
      "stationPhoneNumber": {
        "$reqId": "3.3.5.5.4.3.6.2.15",
        "description": "Provide telephone number for station contact in station specific metadata",
```

```
            "type": "string"
        },
        "stationIpAddress": {
            "$reqId": "3.3.5.5.4.3.6.2.16",
            "description": "Provide IP address of the station in station specific metadata information",
            "type": "string"
        },
        "stationManufacturer": {
            "$reqId": "3.3.5.5.4.3.6.2.17",
            "description": "Provide manufacturer information as part of station specific metadata for external
center",
            "type": "string"
        },
        "observationCollectionInterval": {
            "$reqId": "3.3.5.5.4.3.6.2.18",
            "description": "Provide frequency in minutes between collection cycles in station specific metadata
information",
            "type": "string"
        },
        "observationCollectionOffset": {
            "$reqId": "3.3.5.5.4.3.6.2.19",
            "description": "Provide the number of minutes after UTC midnight for the first collection in station
specific metadata",
            "type": "string"
        },
        "transmissionInterval": {
            "$reqId": "3.3.5.5.4.3.6.2.20",
            "description": "Provide transmission cycle frequency in minutes as part of station specific
metadata information",
            "type": "string"
        },
        "transmissionOffset": {
            "$reqId": "3.3.5.5.4.3.6.2.21",
            "description": "Provide the number of minutes after UTC midnight for the first transmission in
station specific metadata",
            "type": "string"
        },
        "transmissionFormat": {
            "$reqId": "3.3.5.5.4.3.6.2.22",
            "description": "Provide description of the transmission format from station to network data logger
in station specific metadata information",
            "type": "string"
        },
        "stationMaintenanceContactInformation": {
            "$reqId": "3.3.5.5.4.3.6.2.23",
            "description": "Provide the unique identifier of the default contact person as part of station specific
metadata information.",
            "type": "string"
```

```
        }
    },
    "required": [
        "stationCategory",
        "stationId",
        "geoLocation",
        "stationElevation"
    ]
}
```

3.4.117 SubscriptionTypes

```
{
    "type": "string",
    "enum": [
        "oneTime",
        "periodic",
        "onChange"
    ]
}
```

3.4.118 SystemDescription

```
{
    "type": "object",
    "properties": {
        "manufacturer": {
            "type": "string"
        },
        "modelNumber": {
            "type": "number"
        },
        "firmware": {
            "type": "string"
        },
        "firmwareVersion": {
            "type": "string"
        }
    },
    "required": [
        "manufacturer",
        "modelNumber",
        "firmware",
        "firmwareVersion"
    ]
}
```

3.4.119 TimeBaseScheduleDayTimingModes


```
{
   "type": "string",
   "enum": [
      "unknown",
      "other",
      "free",
      "fixedTime",
      "actuated",
      "semiActuated",
      "criticalIntersectionControl",
      "trafficResponsive",
      "adaptive",
      "flashProgrammed"
   ]
}
```


3.4.120 TrafficDataTypes


```
{
   "type": "string",
   "enum": [
      "actual",
      "reconstructed",
      "historical",
      "predicted",
      "smoothed",
      "averaged",
      "estimated"
   ]
}
```


3.4.121 TrafficNetworkInformationRequest


```
{
   "description": "Send a traffic network information request to the owner center",
   "type": "object",
   "$reqId": "3.3.4.1.1",
   "properties": {
      "requestingOrganizationId": {
         "$reqId": "3.3.4.1.1.1.a",
         "description": "Requesting organization information",
         "type": "string"
      },
      "networkInformationType": {
         "$reqId": "3.3.4.1.1.1.b",
         "description": "Type of network information requested (inventory, status, data)",
         "$ref": "#/$defs/NetworkInformationTypes"
      },
```

```
        "requestHeader": {
            "$reqId": "3.3.4.1.1.2.1",
            "description": "Optional requirements for authorization information in traffic network information
requests",
            "$ref": "#/$defs/AuthHeader"
        },
        "operatorId": {
            "$reqId": "3.3.4.1.1.2.1.1",
            "description": "Requirements for operator identifier from external center to owner center",
            "type": "string"
        },
        "roadwayNetworkId": {
            "$reqId": "3.3.4.1.1.2.2",
            "description": "Provide unique identifiers for each roadway network in the traffic network
information request",
            "type": "string"
        },
        "trafficNetworkId": {
            "$reqId": "3.3.4.1.1.2.3",
            "description": "Provide a list of identifiers for traffic network information requests",
            "type": "array",
            "items": {
                "type": "string"
            }
        }
    },
    "required": [
        "requestingOrganizationId",
        "networkInformationType"
    ]
}
```

3.4.122 VehicleInformation

```
{
    "type": "object",
    "properties": {
        "location": {
            "$ref": "#/$defs/GeoLocation"
        },
        "speed": {
            "type": "number"
        }
    },
    "required": [
        "location",
        "speed"
    ]
}
```

3.4.123 VersionIdentifiers

```
{
   "type": "string",
   "enum": [
      "ngtmddV1.0",
      "ngtmddV1.1"
   ]
}
```

4. Requirements Traceability Matrix

The Requirements Traceability Matrix (RTM), presented in Table 1 below, maps the requirements defined in Section 3 of the ngTMDD Data Dictionary Volume I: Concept of Operations & Requirements Section 3 to the design elements defined in ngTMDD Data Dictionary Volume II: Design Content.

4.1 Requirements Traceability Matrix

Req ID	Requirement	Dialog ID	Data Concept Type	Data Concept ID	Data Concept Name	Is Required	Additional Specifications
3.3.1	Connection Management						
3.3.1.1	Exchange Center Connection Information						
3.3.1.1.1	**Send Center Connection Information Upon Request**	**4.1**	**Dialog**				
3.3.1.1.2	**Publish Center Connection Information**	**4.2**	**Dialog**				
3.3.1.1.3	**Subscribe to Center Connection Information**	**4.3**	**Dialog**				
3.3.1.1.4	Contents of Center Connection Information		Data Frame	3.3.1.1.4	CenterConnectionRequest		
3.3.1.1.4.1	Required Center Connection Information Request Content		Data Element	3.3.1.1.4.1	externalOrganizationId	M	
3.3.1.1.5	Contents of Center Connection Information		Data Frame	3.3.1.1.5	CenterConnectionResponse		
a	Owner organization information		Data Element	3.3.1.1.5.1.a	ownerOrganizationId	M	
b	Center name as assigned by the		Data Element	3.3.1.1.5.1.b	centerName	M	

Req ID	Requirement	Dialog ID	Data Concept Type	Data Concept ID	Data Concept Name	Is Required	Additional Specifications
	owner organization;						
c	Unique identifier of the center as assigned by the owner organization;		Data Element	3.3.1.1.5.1.c	centerId	M	
d	Indication that center connection is active; and		Data Element	3.3.1.1.5.1.d	isActive	M	
e	List of type of connections supported by center.		Data Element	3.3.1.1.5.1.e	connectionTypesSupported	M	
3.3.1.1.5.2.1	Required Center Connection Information Request Content		Data Frame	3.3.1.1.5.2.1	informationAccessRestrictions		
3.3.1.1.5.2.2	Required Center Connection Information Request Content		Data Frame	3.3.1.1.5.2.2	versionIdentifier		
3.3.1.1.5.2.3	Time Domains Supported		Data Element	3.3.1.1.5.2.3	rateOfCommunication		
3.3.1.2	Support Request-Response						
3.3.1.3	Support Subscription-Publication						
3.3.1.3.1	Support Periodic Updates						
3.3.1.3.2	Support Event-Driven Updates						

Req ID	Requirement	Dialog ID	Data Concept Type	Data Concept ID	Data Concept Name	Is Required	Additional Specifications
3.3.1.4	**Exchange Subscription Information**	**4.1**	**Dialog**		**SubscriptionInformation**		
3.3.1.4.1	Send Subscription Information Upon Request						
3.3.1.4.2	Contents of Center Connection Information		Data Frame	3.3.1.4.2	SubscriptionInformationRequest		
3.3.1.4.2.1	Required Subscription Information Request Content		Data Element	3.3.1.4.2.1	externalOrganizationId	M	
3.3.1.4.3	Contents of Center Connection Information		Data Frame	3.3.1.4.3	SubscriptionInformationResponse		
a	Owner organization information;		Data Element	3.3.1.4.3.1.a	ownerOrganizationId	M	
b	Center name as assigned by the owner organization;		Data Element	3.3.1.4.3.1.b	centerName	M	
c	Required Center Connection Information Request Content		Data Frame	3.3.1.4.3.1.c	dialogName	M	
d	Required Center Connection Information Request Content		Data Frame	3.3.1.4.3.1.d	subscriptionTypes	M	

Req ID	Requirement	Dialog ID	Data Concept Type	Data Concept ID	Data Concept Name	Is Required	Additional Specifications
e	Supported data types if subscription is a generic subscription with multiple data typesupport		Data Element	3.3.1.4.3.1.e	supportedDataTypes	M	
a	aninventory dialog if full inventory list is supported within subscriptions;		Data Element	3.3.1.4.3.2.a	inventoryDialogFull	M	
b	an inventory dialog if incremental inventory list is supported with CRUD actions supportwithin subscriptions		Data Element	3.3.1.4.3.2.b	inventoryDialogIncremental	M	
c	Supported periodic subscription time intervals and field element polling intervals or pollingevent;		Data Element	3.3.1.4.3.2.c	periodicity	M	
d	Change trigger fields for on-change subscriptions;		Data Element	3.3.1.4.3.2.d	changeTriggerFields	M	
e	Limitations on the number of devices supported.		Data Element	3.3.1.4.3.2.e	devicesSupported	M	

Req ID	Requirement	Dialog ID	Data Concept Type	Data Concept ID	Data Concept Name	Is Required	Additional Specifications
3.3.1.5	Exchange List of Currently Active Subscriptions						
3.3.1.5.1	**Send List of Currently Active Subscriptions Upon Request**	**4.1**	**Dialog**				
3.3.1.5.2	**Publish List of Currently Active Subscriptions**	**4.2**	**Dialog**				
3.3.1.5.3	**Subscribe to List of Currently Active Subscriptions**	**4.3**	**Dialog**				
3.3.1.5.4	Contents of Center Connection Information		Data Frame	3.3.1.5.4	CurrentlyActiveSubscriptionsRequest		
a	Requesting organization information;		Data Element	3.3.1.5.4.1.a	organizationId	M	
b	Required Center Connection Information Request Content		Data Frame	3.3.1.5.4.1.b	authentication	M	
c	Required Center Connection Information Request Content		Data Frame	3.3.1.5.4.1.c	startDate	M	
3.3.1.5.5	Contents of Center		Data Frame	3.3.1.5.5	CurrentlyActiveSubscriptionsResponse		

Req ID	Requirement	Dialog ID	Data Concept Type	Data Concept ID	Data Concept Name	Is Required	Additional Specifications
	Connection Information						
a	Center name as assigned by the owner organization;		Data Element	3.3.1.5.5.1.a	centerName	M	
b	Unique identifier of the center as assigned by the owner organization or by regional agreement;		Data Element	3.3.1.5.5.1.b	organizationId	M	
c	List of active subscriptions currently sending data to the requesting center		Data Element	3.3.1.5.5.1.c	activeSubscriptionSendingDataList	M	
d	List of active subscriptions currently receiving data from the requesting center		Data Element	3.3.1.5.5.1.d	activeSubscriptionsReceivingDataList	M	
3.3.1.5.5.2.1	Subscription update source endpoint		Data Element	3.3.1.5.5.2.1	subscriptionUpdateSourceEndpoint		
3.3.1.5.5.2.2	Owner center subscription request endpoint		Data Element	3.3.1.5.5.2.2	ownerCenterSubscriptionRequestEndpoint		
3.3.1.5.5.2.3	Subscription update target endpoint		Data Element	3.3.1.5.5.2.3	subscriptionUpdateTargetEndpoint		

Req ID	Requirement	Dialog ID	Data Concept Type	Data Concept ID	Data Concept Name	Is Required	Additional Specifications
3.3.1.5.5.2.4	Subscription Name		Data Element	3.3.1.5.5.2.4	subscriptionName		
3.3.1.5.5.2.5	Required Center Connection Information Request Content		Data Frame	3.3.1.5.5.2.5	subscriptionRequestReceivedDateTime		
3.3.1.5.5.2.6	Required Center Connection Information Request Content		Data Frame	3.3.1.5.5.2.6	subscriptionFirstMessageSentDateTime		
3.3.1.5.5.2.7	Required Center Connection Information Request Content		Data Frame	3.3.1.5.5.2.7	mostRecentUpdateMessageSendDateTime		
3.3.1.5.5.2.8	Most recent update message size		Data Element	3.3.1.5.5.2.8	mostRecentUpdateMessageSize		
3.3.1.5.5.2.9	Total number of messages sent		Data Element	3.3.1.5.5.2.9	totalNumberMessagesSent		
3.3.1.5.5.2.10	Time interval for the total number of messages sent		Data Element	3.3.1.5.5.2.10	timeIntervalTotalNumberMessagesSent		
3.3.1.5.5.2.11	List of errors encountered		Data Element	3.3.1.5.5.2.11	listErrorsEncountered		
3.3.1.5.5.2.12	Time interval for the list of errors		Data Element	3.3.1.5.5.2.12	timeIntervalListErrors		
3.3.1.5.5.3	Required List of Currently Failed Subscriptions Content		Data Frame	3.3.1.5.5.3	ListCurrentlyFailedSubscriptionsContent		
a	Required Center Connection Information Request Content		Data Element	3.3.1.5.5.3.a	subscriptionRequestDialog	M	

Req ID	Requirement	Dialog ID	Data Concept Type	Data Concept ID	Data Concept Name	Is Required	Additional Specifications
b	Required Center Connection Information Request Content		Data Element	3.3.1.5.5.3.b	dataUpdateDialog	M	
c	Required Center Connection Information Request Content		Data Element	3.3.1.5.5.3.c	dataType	M	
d	Required Center Connection Information Request Content		Data Element	3.3.1.5.5.3.d	subscriptionType	M	
e	Required Center Connection Information Request Content		Data Element	3.3.1.5.5.3.e	subscriptionParameters	M	
f	Required Center Connection Information Request Content		Data Element	3.3.1.5.5.3.f	subscriptionId	M	
g	Failure date and time;		Data Frame	3.3.1.5.5.3.g	failureDateTime	M	
h	Required Center Connection Information Request Content		Data Element	3.3.1.5.5.3.h	failureReason	M	
i	Required Center Connection Information Request Content		Data Element	3.3.1.5.5.3.i	failureDescription	M	
j	Required Center Connection Information Request Content		Data Element	3.3.1.5.5.3.j	flag	M	

Req ID	Requirement	Dialog ID	Data Concept Type	Data Concept ID	Data Concept Name	Is Required	Additional Specifications
3.3.1.5.5.4.1	Required Center Connection Information Request Content		Data Element	3.3.1.5.5.4.1	subscriptionUpdateSourceEndpoint		
3.3.1.5.5.4.2	Required Center Connection Information Request Content		Data Element	3.3.1.5.5.4.2	ownerCenterSubscriptionRequestEndpoint		
3.3.1.5.5.4.3	Required Center Connection Information Request Content		Data Element	3.3.1.5.5.4.3	subscriptionUpdateTargetEndpoint		
3.3.1.6	Confirmation Receipts						
3.3.1.6.1	Contents of Center Connection Information		Data Frame	3.3.1.6.1	ConfirmationReceipts		
a	Required Center Connection Information Request Content		Data Frame	3.3.1.6.1.1.a	organization	M	
b	Center name as assigned by the owner organization		Data Element	3.3.1.6.1.1.b	organizationCenterName	M	
3.3.1.7	Support Error Handling Report		Data Frame		SupportErrorHandlingReport		
3.3.1.7.1	Contents of Center Connection Information		Data Frame	3.3.1.7.1	ErrorReport		
a	Required Center Connection		Data Frame	3.3.1.7.1.1.a	receivingOrganization	M	

Req ID	Requirement	Dialog ID	Data Concept Type	Data Concept ID	Data Concept Name	Is Required	Additional Specifications
	Information Request Content						
b	Required Center Connection Information Request Content		Data Frame	3.3.1.7.1.1.b	sendingOrganization	M	
c	Required Center Connection Information Request Content		Data Frame	3.3.1.7.1.1.c	uniqueErrorIdentifier	M	
d	Error text.		Data Element	3.3.1.7.1.1.d	errorText	M	
3.3.1.7.1.2.1	Required Center Connection Information Request Content		Data Frame	3.3.1.7.1.2.1	restrictions		
3.3.1.8.1.1	Valid certificates		Data Frame		ValidCertificates		
3.3.1.8.2	Operator Identifier - Requests		Data Frame		OperatorId		
3.3.1.8.3	Operator Identifier - Responses		Data Frame		OwnerOperatorId		
3.3.1.9	Support Restrictions on Message Content		Data Frame				
3.3.1.9.1	Restrictions - Response Message Content		Data Frame	3.3.1.9.1	Restrictions		
3.3.1.10	Security		Data Frame		Security		
3.3.1.10.1	Connection Security		Data Frame		ConnectionSecurity		
3.3.1.10.2	Encryption		Data Frame		Encryption		

Req ID	Requirement	Dialog ID	Data Concept Type	Data Concept ID	Data Concept Name	Is Required	Additional Specifications
3.3.2	Provide Information on Organizations, Centers and Contacts						
3.3.2.1	**Send Organization Information Upon Request**	**4.1**	**Dialog**				
3.3.2.2	**Publish Organization Information**	**4.2**	**Dialog**				
3.3.2.3	**Subscribe to Organization Information**	**4.3**	**Dialog**				
3.3.2.4	Contents of Center Connection Information		Data Frame	3.3.2.4	OrganizationInformationRequest		
a	Unique identifier of the requesting organization; and		Data Element	3.3.2.4.1.a	organizationId	M	
b	Required Center Connection Information Request Content		Data Frame	3.3.2.4.1.b	organizationInformationType	M	
3.3.2.4.2.1	Required Center Connection Information Request Content		Data Frame	3.3.2.4.2.1	authInformation		
3.3.2.4.2.2	Owner Organization Identifier		Data Element	3.3.2.4.2.2	ownerOrganizationId		

Req ID	Requirement	Dialog ID	Data Concept Type	Data Concept ID	Data Concept Name	Is Required	Additional Specifications
3.3.2.4.2.3	Owner Center Identifier		Data Element	3.3.2.4.2.3	ownerCenterId		
3.3.2.5	Contents of Center Connection Information		Data Frame	3.3.2.5	OrganizationInformationResponse		
3.3.3	Events Information Sharing						
3.3.3.1	**Send Event Information Upon Request**	**4.1**	**Dialog**				
3.3.3.2	**Publish Event Information**	**4.2**	**Dialog**				
3.3.3.3	**Subscribe to Event Information**	**4.3**	**Dialog**				
3.3.3.4	Contents of Center Connection Information		Data Frame	3.3.3.4	EventInformationRequest		
a	Unique identifier of the requesting organization;		Data Element	3.3.3.4.1.a	organizationId	M	
b	Event message type version		Data Element	3.3.3.4.1.b	eventMsgTypeVer	M	
c	Event message number;		Data Element	3.3.3.4.1.c	eventMsgNum	M	
d	Required Center Connection Information Request Content		Data Frame	3.3.3.4.1.d	reqTimestamp	M	
e	Required Center Connection		Data Frame	3.3.3.4.1.e	reqFilterLimit	M	

Req ID	Requirement	Dialog ID	Data Concept Type	Data Concept ID	Data Concept Name	Is Required	Additional Specifications
	Information Request Content						
3.3.3.4.2.1	Required Center Connection Information Request Content		Data Frame	3.3.3.4.2.1	requestHeader		
3.3.3.4.2.2	Operator Identifier - Events		Data Element	3.3.3.4.2.2	operatorId		
3.3.3.4.2.3	Required Center Connection Information Request Content		Data Frame	3.3.3.4.2.3	organization		
3.3.3.5	Contents of Center Connection Information		Data Frame	3.3.3.5	EventInformationResponse		
3.3.3.5.1.3.4.6	Contents of Center Connection Information		Data Frame	3.3.3.5.1.3.4.6	LandmarkLocationInformation		
a	Landmark location type; and		Data Element	3.3.3.5.1.3.4.6.a	landmarkType	M	
b	Landmark name.		Data Element	3.3.3.5.1.3.4.6.b	landmarkName	M	
3.3.3.5.1.3.4.7.1	Landmark Point Name		Data Element	3.3.3.5.1.3.4.7.1	landmarkPointName		
3.3.3.5.1.3.4.7.2	Landmark Location Rank		Data Element	3.3.3.5.1.3.4.7.2	landmarkLocationRank		
3.3.3.5.1.3.4.7.3	Required Center Connection Information Request Content		Data Frame	3.3.3.5.1.3.4.7.3	landmarkLocation		

Req ID	Requirement	Dialog ID	Data Concept Type	Data Concept ID	Data Concept Name	Is Required	Additional Specifications
3.3.3.5.1.3.4.7.4	Required Center Connection Information Request Content		Data Frame	3.3.3.5.1.3.4.7.4	secondaryLandmarkLocation		
a	Required Center Connection Information Request Content		Data Frame	3.3.3.5.1.a	eventMessageHeader	M	
b	Required Center Connection Information Request Content		Data Frame	3.3.3.5.1.b	eventReference	M	
c	Event Element Details.The requirements for each aspect of the event information are given below.		Data Element	3.3.3.5.1.c	eventElementDetails	M	
3.3.3.6.1	Required Center Connection Information Request Content		Data Frame	3.3.3.6.1	informationAccessRestrictions		
3.3.3.6.2	Event Indicator		Data Element	3.3.3.6.2	eventIndicator		
3.3.3.6.3	Other References		Data Element	3.3.3.6.3	otherReferences		
3.3.3.6.4	Required Center Connection Information Request Content		Data Frame	3.3.3.6.4	eventComments		
3.3.3.7	Event Index						
3.3.3.7.1	**Send Event Index**	**4.1**	**Dialog**				

Req ID	Requirement	Dialog ID	Data Concept Type	Data Concept ID	Data Concept Name	Is Required	Additional Specifications
	Information Upon Request						
3.3.3.7.2	**Publish Event Index Information**	**4.2**	**Dialog**				
3.3.3.7.3	**Subscribe to Event Index Information**	**4.3**	**Dialog**				
3.3.3.7.4	Contents of Center Connection Information		Data Frame	3.3.3.7.4	EventIndexRequest		
a	Unique identifier of the requesting organization;		Data Element	3.3.3.7.4.1.a	organizationId	M	
b	Required Center Connection Information Request Content		Data Frame	3.3.3.7.4.1.b	messageTypeId	M	
c	Required Center Connection Information Request Content		Data Frame	3.3.3.7.4.1.c	messageTypeVersion	M	
d	Required Center Connection Information Request Content		Data Frame	3.3.3.7.4.1.d	requestDateTime	M	
e	Required Center Connection Information Request Content		Data Frame	3.3.3.7.4.1.e	requestFilterLimit	M	
3.3.3.7.4.2.1	Required Center Connection Information Request Content		Data Frame	3.3.3.7.4.2.1	requestHeader		

Req ID	Requirement	Dialog ID	Data Concept Type	Data Concept ID	Data Concept Name	Is Required	Additional Specifications
3.3.3.7.4.2.2	Operator Identifier - Event Index		Data Element	3.3.3.7.4.2.2	operatorId		
3.3.3.7.4.2.3	Required Center Connection Information Request Content		Data Frame	3.3.3.7.4.2.3	requestingOrganization		
3.3.3.7.5	Contents of Center Connection Information		Data Frame	3.3.3.7.5	EventIndexResponse		
a	Associated URL;		Data Element	3.3.3.7.5.1.a	associatedURL	M	
b	Required Center Connection Information Request Content		Data Frame	3.3.3.7.5.1.b	eventLastUpdated	M	
c	Unique identifier of the event;		Data Element	3.3.3.7.5.1.c	eventId	M	
d	Event update number; and		Data Element	3.3.3.7.5.1.d	eventUpdateNumber	M	
e	Required Center Connection Information Request Content		Data Frame	3.3.3.7.5.1.e	eventStatus	M	
3.3.3.8	Event Response Plan						
3.3.3.8.1	**Send Response Plan Information Upon Request**	**4.1**	**Dialog**				
3.3.3.8.2	**Publish Response Plan Information**	**4.2**	**Dialog**				

Req ID	Requirement	Dialog ID	Data Concept Type	Data Concept ID	Data Concept Name	Is Required	Additional Specifications
3.3.3.8.3	**Subscribe to Response Plan Information**	**4.3**	**Dialog**				
3.3.3.8.4	Contents of Center Connection Information		Data Frame	3.3.3.8.4	ResponsePlanRequest		
a	Required Center Connection Information Request Content		Data Frame	3.3.3.8.4.1.a	ownerOrganization	M	
b	Required Center Connection Information Request Content		Data Frame	3.3.3.8.4.1.b	externalOrganization	M	
c	Request identifier		Data Element	3.3.3.8.4.1.c	requestId	M	
3.3.3.8.4.2.1	Required Center Connection Information Request Content		Data Frame	3.3.3.8.4.2.1	requestHeader		
3.3.3.8.4.2.2	Required Center Connection Information Request Content		Data Frame	3.3.3.8.4.2.2	requestTime		
3.3.3.8.4.2.3	Corridor identifier		Data Element	3.3.3.8.4.2.3	corridorId		
3.3.3.8.4.2.4	Required Center Connection Information Request Content		Data Frame	3.3.3.8.4.2.4	ResponsePlanFilter		
3.3.3.8.5	Contents of Center Connection Information		Data Frame	3.3.3.8.5	ResponsePlanResponse		

Req ID	Requirement	Dialog ID	Data Concept Type	Data Concept ID	Data Concept Name	Is Required	Additional Specifications
a	Required Center Connection Information Request Content		Data Frame	3.3.3.8.5.1.a	responsePlanHeader		
b	Required Center Connection Information Request Content		Data Frame	3.3.3.8.5.1.b	evaluationCycle		
c	Required Center Connection Information Request Content		Data Frame	3.3.3.8.5.1.c	responsePlanDetails		
3.3.3.8.6	Response Plan Status		Data Frame				
3.3.3.8.6.1	**Send Response Plan Status Upon Request**	**4.1**	**Dialog**				
3.3.3.8.6.2	**Publish Response Plan Status**	**4.2**	**Dialog**				
3.3.3.8.6.3	**Subscribe to Response Plan Status**	**4.3**	**Dialog**				
3.3.3.8.6.4	Contents of Center Connection Information		Data Frame	3.3.3.8.6.4	ResponsePlanStatusRequest		
a	Owner organization information		Data Element	3.3.3.8.6.4.1.a	ownerOrganizationId	M	
b	External organization information		Data Element	3.3.3.8.6.4.1.b	externalOrganizationId	M	
c	Request identifier		Data Element	3.3.3.8.6.4.1.c	requestId	M	

Req ID	Requirement	Dialog ID	Data Concept Type	Data Concept ID	Data Concept Name	Is Required	Additional Specifications
3.3.3.8.6.4.2.1	Required Center Connection Information Request Content		Data Frame	3.3.3.8.6.4.2.1	requestHeader		
3.3.3.8.6.4.2.2	Required Center Connection Information Request Content		Data Frame	3.3.3.8.6.4.2.2	requestTime		
3.3.3.8.6.5	Contents of Center Connection Information		Data Frame	3.3.3.8.6.5	ResponsePlanStatusResponse		
a	Required Center Connection Information Request Content		Data Frame	3.3.3.8.6.5.1.a	responsePlanHeader	M	
b	Required Center Connection Information Request Content		Data Frame	3.3.3.8.6.5.1.b	status	M	
c	Required Center Connection Information Request Content		Data Frame	3.3.3.8.6.5.1.c	statusLastUpdated	M	
3.3.3.8.7	Response Plan Approval						
3.3.3.8.7.1	**Send Response Plan Approval Upon Request**	**4.1**	**Dialog**				
3.3.3.8.7.2	**Publish Response Approval**	**4.2**	**Dialog**				
3.3.3.8.7.3	**Subscribe to Response Plan Approval**	**4.3**	**Dialog**				

Req ID	Requirement	Dialog ID	Data Concept Type	Data Concept ID	Data Concept Name	Is Required	Additional Specifications
3.3.3.8.7.4	Contents of Center Connection Information		Data Frame	3.3.3.8.7.4	ResponsePlanApprovalRequest		
a	Required Center Connection Information Request Content		Data Frame	3.3.3.8.7.4.a	responsePlanHeader		
b	Required Center Connection Information Request Content		Data Frame	3.3.3.8.7.4.b	responsePlanRequestFilter		
c	Required Center Connection Information Request Content		Data Frame	3.3.3.8.7.4.c	requestHeader		
3.3.3.8.7.5	Contents of Center Connection Information		Data Frame	3.3.3.8.7.5	ResponsePlanApprovalResponse		
a	Required Center Connection Information Request Content		Data Frame	3.3.3.8.7.5.1.a	responsePlanHeader	M	
b	Required Center Connection Information Request Content		Data Frame	3.3.3.8.7.5.1.b	responsePlanApprovalDecision	M	
3.3.3.8.8	Response Plan Cancellation						
3.3.3.8.8.1	**Send Response Plan Cancellation Acknowledgem**	**4.1**	**Dialog**				

Req ID	Requirement	Dialog ID	Data Concept Type	Data Concept ID	Data Concept Name	Is Required	Additional Specifications
	ent Upon Request						
3.3.3.8.8.2	Contents of Center Connection Information		Data Frame	3.3.3.8.8.2	ResponsePlanCancellationRequest		
a	Required Center Connection Information Request Content		Data Frame	3.3.3.8.8.2.1.a	responsePlanHeader	M	
b	An event identifier		Data Element	3.3.3.8.8.2.1.b	eventId	M	
c	Required Center Connection Information Request Content		Data Frame	3.3.3.8.8.2.1.c	requestHeader	M	
3.3.3.8.8.2.2.1	List of Response Plans to be Cancelled		Data Element	3.3.3.8.8.2.2.1	responsePlans		
3.3.3.8.8.3	Contents of Center Connection Information		Data Frame	3.3.3.8.8.3	ResponsePlanCancellationResponse		
a	Required Center Connection Information Request Content		Data Frame	3.3.3.8.8.3.1.a	responsePlanHeader	M	
b	The event identifier		Data Element	3.3.3.8.8.3.1.b	eventId	M	
c	The identifier of the response plan being terminated		Data Element	3.3.3.8.8.3.1.c	responsePlanId	M	
d	The status of the request		Data Element	3.3.3.8.8.3.1.d	requestStatus	M	

Req ID	Requirement	Dialog ID	Data Concept Type	Data Concept ID	Data Concept Name	Is Required	Additional Specifications
3.3.3.8.8.3.2.1	Required Center Connection Information Request Content		Data Frame	3.3.3.8.8.3.2.1	statusUpdate		
3.3.3.8.8.3.2.2	Cancellation Plan Details		Data Element	3.3.3.8.8.3.2.2	cancellationPlanDetails		
3.3.3.9	Activity Logs						
3.3.3.9.1	**Send Activity Logs Upon Request**	**4.1**	**Dialog**				
3.3.3.9.2	**Publish Activity Log Information**	**4.2**	**Dialog**				
3.3.3.9.3	**Subscribe to Activity Log Information**	**4.3**	**Dialog**				
3.3.3.9.4	Contents of Center Connection Information		Data Frame	3.3.3.9.4	ActivityLogRequest		
a	Owner organization information		Data Element	3.3.3.9.4.1.a	ownerOrganizationId	M	
b	External organization information		Data Element	3.3.3.9.4.1.b	externalOrganizationId	M	
c	Request identifier		Data Element	3.3.3.9.4.1.c	requestId	M	
3.3.3.9.4.2.1	Required Center Connection Information Request Content		Data Frame	3.3.3.9.4.2.1	authorizationInformation		
3.3.3.9.4.2.2	Required Center Connection		Data Frame	3.3.3.9.4.2.2	requestTime		

Req ID	Requirement	Dialog ID	Data Concept Type	Data Concept ID	Data Concept Name	Is Required	Additional Specifications
	Information Request Content						
3.3.3.9.5	Contents of Center Connection Information		Data Frame	3.3.3.9.5	ActivityLogResponse		
a	Event identifier;		Data Element	3.3.3.9.5.1.a	eventId	M	
b	Activity log element identifier;		Data Element	3.3.3.9.5.1.b	logId	M	
c	Required Center Connection Information Request Content		Data Frame	3.3.3.9.5.1.c	timestamp	M	
d	Required Center Connection Information Request Content		Data Frame	3.3.3.9.5.1.d	activityType	M	
e	Description of change.		Data Element	3.3.3.9.5.1.e	changeDescription	M	
3.3.3.9.5.2.1	Required Center Connection Information Request Content		Data Frame	3.3.3.9.5.2.1	informationAccessRestrictions		
a	Required Center Connection Information Request Content		Data Frame	3.3.3.9.5.3.1.a	responsePlanHeader	M	
b	Required Center Connection Information Request Content		Data Frame	3.3.3.9.5.3.1.b	responsePlanLogDetails	M	

Req ID	Requirement	Dialog ID	Data Concept Type	Data Concept ID	Data Concept Name	Is Required	Additional Specifications
3.3.4	Provide Roadway Network Data						
3.3.4.1	Share Traffic Network Information						
3.3.4.1.1	Contents of the Traffic Network Information Request		Data Frame	3.3.4.1.1	TrafficNetworkInformationRequest		
3.3.4.2	Share Node Information						
3.3.4.2.1	Share Node Inventory Information						
3.3.4.2.1.1	**Send Node Inventory Information Upon Request**	**4.1**	**Dialog**		**sendNodeInventoryInformationUponRequest**		
3.3.4.2.1.2	**Publish Node Inventory Information**	**4.2**	**Dialog**				
3.3.4.2.1.3	**Subscribe to Node Inventory Information**	**4.3**	**Dialog**				
3.3.4.2.1.4	Contents of Center Connection Information		Data Frame	3.3.4.2.1.4	NodeInventoryRequest		
3.3.4.2.1.5	Contents of Center Connection Information		Data Frame	3.3.4.2.1.5	NodeInventoryInformationResponse		
a	Required Center Connection		Data Frame	3.3.4.2.1.5.1.a	ownerOrganization	M	

Req ID	Requirement	Dialog ID	Data Concept Type	Data Concept ID	Data Concept Name	Is Required	Additional Specifications
	Information Request Content						
b	Unique identifier of the roadway network;		Data Element	3.3.4.2.1.5.1.b	roadwayNetworkId	M	
c			Data Element	3.3.4.2.1.5.1.c	nodes	M	
3.3.4.2.1.5.2	Optional Node Inventory Information Content						
3.3.4.2.1.5.2.1	Required Center Connection Information Request Content		Data Frame	3.3.4.2.1.5.2.1	informationAccessRestrictions		
3.3.4.2.2	Share Node Status Information						
3.3.4.2.2.1	**Send Node Status Information Upon Request**	**4.1**	**Dialog**				
3.3.4.2.2.2	**Publish Node Status Information**	**4.2**	**Dialog**				
3.3.4.2.2.3	**Subscribe to Node Status Information**	**4.3**	**Dialog**				
3.3.4.2.2.4	Contents of Center Connection Information		Data Frame	3.3.4.2.2.4	NodeStatusRequest		
3.3.4.2.2.5	Contents of Center		Data Frame	3.3.4.2.2.5	NodeStatusResponse		

Req ID	Requirement	Dialog ID	Data Concept Type	Data Concept ID	Data Concept Name	Is Required	Additional Specifications
	Connection Information						
a	Required Center Connection Information Request Content		Data Frame	3.3.4.2.2.5.1.a	ownerOrganization		
b	Unique identifier of the roadway network;		Data Element	3.3.4.2.2.5.1.b	roadwayNetworkId	M	
c	Unique identifier of each node requested; and		Data Element	3.3.4.2.2.5.1.c	nodesStatus	M	
3.3.4.2.2.5.2	Optional Node Status Information Content						
3.3.4.2.2.5.2.1	Required Center Connection Information Request Content		Data Frame	3.3.4.2.2.5.2.1	informationAccessRestrictions		
3.3.4.3	Share Link Information				LinkInformation		
3.3.4.3.1	Share Link Inventory Information						
3.3.4.3.1.1	**Send Link Inventory Information Upon Request**	**4.1**	**Dialog**				
3.3.4.3.1.2	**Publish Link Inventory Information**	**4.2**	**Dialog**				
3.3.4.3.1.3	**Subscribe to Link Inventory Information**	**4.3**	**Dialog**				

Req ID	Requirement	Dialog ID	Data Concept Type	Data Concept ID	Data Concept Name	Is Required	Additional Specifications
3.3.4.3.1.4	Contents of Center Connection Information		Data Frame	3.3.4.3.1.4	LinkInventoryRequest		
3.3.4.3.1.5	Contents of Center Connection Information		Data Frame	3.3.4.3.1.5	LinkInventoryResponse		
a	Required Center Connection Information Request Content		Data Frame	3.3.4.3.1.5.1.a	ownerOrganization	M	
b	Unique identifier of the roadway network;		Data Element	3.3.4.3.1.5.1.b	rodwayNetworkId	M	
c			Data Element	3.3.4.3.1.5.1.c	links	M	
3.3.4.3.1.5.2	Optional Link Inventory Information Content						
3.3.4.3.1.5.2.1	Required Center Connection Information Request Content		Data Frame	3.3.4.3.1.5.2.1	informationAccessRestrictions		
3.3.4.3.2	Share Link Status Information				LinkStatusInformation		
3.3.4.3.2.1	**Send Link Status Information Upon Request**	**4.1**	**Dialog**				
3.3.4.3.2.2	**Publish Link Status Information**	**4.2**	**Dialog**				

Req ID	Requirement	Dialog ID	Data Concept Type	Data Concept ID	Data Concept Name	Is Required	Additional Specifications
3.3.4.3.2.3	**Subscribe to Link Status Information**	**4.3**	**Dialog**				
3.3.4.3.2.4	Contents of Center Connection Information		Data Frame	3.3.4.3.2.4	LinkStatusRequest		
3.3.4.3.2.5	Contents of Center Connection Information		Data Frame	3.3.4.3.2.5	LinkStatusResponse		
a	Required Center Connection Information Request Content		Data Frame	3.3.4.3.2.5.1.a	ownerOrganization	M	
b	Unique identifier of the roadway network;		Data Element	3.3.4.3.2.5.1.b	roadwayNetworkId	M	
c	Unique identifier of each link requested; and		Data Element	3.3.4.3.2.5.1.c	linkStatus	M	
3.3.4.3.2.5.2	Optional Link Status Information Content						
3.3.4.3.2.5.2.1	Required Center Connection Information Request Content		Data Frame	3.3.4.3.2.5.2.1	informationAccessRestrictions		
3.3.4.4	Share Route Information						
3.3.4.4.1	Share Route Inventory Information				RouteInventoryInformation		

Req ID	Requirement	Dialog ID	Data Concept Type	Data Concept ID	Data Concept Name	Is Required	Additional Specifications
3.3.4.4.1.1	**Send Route Inventory Information Upon Request**	**4.1**	**Dialog**				
3.3.4.4.1.2	**Publish Route Inventory Information**	**4.2**	**Dialog**				
3.3.4.4.1.3	**Subscribe to Route Inventory Information**	**4.3**	**Dialog**				
3.3.4.4.1.4	Contents of Center Connection Information		Data Frame	3.3.4.4.1.4	RouteInventoryRequest		
3.3.4.4.1.5	Contents of Center Connection Information		Data Frame	3.3.4.4.1.5	RouteInventoryResponse		
a	Required Center Connection Information Request Content		Data Frame	3.3.4.4.1.5.1.a	ownerOrganization	M	
b	Unique identifier of the roadway network;		Data Element	3.3.4.4.1.5.1.b	roadwayNetworkId	M	
c	Unique identifier of each route;		Data Element	3.3.4.4.1.5.1.c	routes	M	
3.3.4.4.1.5.2	Optional Route Inventory Information Content						
3.3.4.4.1.5.2.1	Required Center Connection		Data Frame	3.3.4.4.1.5.2.1	informationAccessRestrictions		

Req ID	Requirement	Dialog ID	Data Concept Type	Data Concept ID	Data Concept Name	Is Required	Additional Specifications
	Information Request Content						
3.3.4.4.2	Share Route Status Information				RouteStatusInformation		
3.3.4.4.2.1	**Send Route Status Information Upon Request**	**4.1**	**Dialog**				
3.3.4.4.2.2	**Publish Route Status Information**	**4.2**	**Dialog**				
3.3.4.4.2.3	**Subscribe to Route Status Information**	**4.3**	**Dialog**				
3.3.4.4.2.4	Contents of Center Connection Information		Data Frame	3.3.4.4.2.4	RouteStatusRequest		
3.3.4.4.2.5	Contents of Center Connection Information		Data Frame	3.3.4.4.2.5	RouteStatusResponse		
a	Required Center Connection Information Request Content		Data Frame	3.3.4.4.2.5.1.a	ownerOrganization	M	
b	Unique identifier of the roadway network;		Data Element	3.3.4.4.2.5.1.b	roadwayNetworkId	M	
c	Unique identifier of the route; and		Data Element	3.3.4.4.2.5.1.c	routesStatus	M	
3.3.4.4.2.5.2	Optional Route Status						

Req ID	Requirement	Dialog ID	Data Concept Type	Data Concept ID	Data Concept Name	Is Required	Additional Specifications
	Information Content						
3.3.4.4.2.5.2.1	Required Center Connection Information Request Content		Data Frame	3.3.4.4.2.5.2.1	informationAccessRestrictions		
3.3.4.5	Fleet Vehicle Data						
3.3.4.5.1	Share Fleet Vehicle Inventory Information						
3.3.4.5.1.1	**Send Fleet Vehicle Inventory Information Upon Request**	**4.1**	**Dialog**				
3.3.4.5.1.2	**Publish Fleet Vehicle Inventory Information**	**4.2**	**Dialog**				
3.3.4.5.1.3	**Subscribe to Fleet Vehicle Inventory Information**	**4.3**	**Dialog**				
3.3.4.5.1.4	Contents of Center Connection Information		Data Frame	3.3.4.5.1.4	FleetVehicleInventoryRequest		
3.3.4.5.1.5	Contents of Center Connection Information		Data Frame	3.3.4.5.1.5	FleetVehicleInventoryResponse		
a	Required Center Connection		Data Frame	3.3.4.5.1.5.1.a	ownerOrganization	M	

Req ID	Requirement	Dialog ID	Data Concept Type	Data Concept ID	Data Concept Name	Is Required	Additional Specifications
	Information Request Content						
b	Unique identifier of the fleet vehicle; and		Data Element	3.3.4.5.1.5.1.b	vehicleId	M	
c	Vehicle type		Data Element	3.3.4.5.1.5.1.c	vehicleType	M	
3.3.4.5.2	Share Fleet Vehicle Information						
3.3.4.5.2.1	**Send Fleet Vehicle Information Upon Request**	**4.1**	**Dialog**				
3.3.4.5.2.2	**Publish Fleet Vehicle Information**	**4.2**	**Dialog**				
3.3.4.5.2.3	**Subscribe to Fleet Vehicle Information**	**4.3**	**Dialog**				
3.3.4.5.2.4	Contents of Center Connection Information		Data Frame	3.3.4.5.2.4	FleetVehicleRequest		
3.3.4.5.2.5	Contents of Center Connection Information		Data Frame	3.3.4.5.2.5	FleetVehicleResponse		
a	Required Center Connection Information Request Content		Data Frame	3.3.4.5.2.5.1.a	ownerOrganization	M	
b	Unique identifier of the fleet vehicle;		Data Element	3.3.4.5.2.5.1.b	vehicleId	M	

Req ID	Requirement	Dialog ID	Data Concept Type	Data Concept ID	Data Concept Name	Is Required	Additional Specifications
c	Required Center Connection Information Request Content		Data Frame	3.3.4.5.2.5.1.c	vehicleInformation	M	
3.3.4.5.2.5.2.1			Data Element	3.3.4.5.2.5.2.1	vehicleDriver		
3.3.4.5.2.5.2.2			Data Element	3.3.4.5.2.5.2.2	vehicleOccupancy		
3.3.5	Provide Device Inventory, Status and Control						
3.3.5.1	Generic Devices						
3.3.5.1.1	Share Device Information						
3.3.5.1.1.2	Contents of Device Inventory Response Header		Data Frame	3.3.5.1.1.2	DeviceInventoryResponseHeader		
a	Owner organization information		Data Frame	3.3.5.1.1.2.1.a	ownerOrganization	M	
b	Required Center Connection Information Request Content		Data Element	3.3.5.1.1.2.1.b	devices	M	
3.3.5.1.1.2.2	Optional Device Inventory Content						
3.3.5.1.1.3	Contents of Device Status Header		Data Frame	3.3.5.1.1.3	DeviceStatusHeader		
a	Owner organization information		Data Frame	3.3.5.1.1.3.1.a	ownerOrganization	M	

Req ID	Requirement	Dialog ID	Data Concept Type	Data Concept ID	Data Concept Name	Is Required	Additional Specifications
b	Required Center Connection Information Request Content		Data Element	3.3.5.1.1.3.1.b	deviceStatuses	M	
3.3.5.1.1.3.2	Optional Device Status Header Content						
3.3.5.1.1.4	Share Device Schedule Information						
3.3.5.1.1.4.1	Required Device Schedule Information Content		Data Frame	3.3.5.1.1.4.1	DeviceScheduleInformation		
a	Owner organization identification		Data Frame	3.3.5.1.1.4.1.a	ownerOrganization	M	
b	Required Center Connection Information Request Content		Data Element	3.3.5.1.1.4.1.b	deviceSchedules	M	
3.3.5.1.2	Device Change Requests		Data Frame		DeviceChangeRequest		
3.3.5.1.2.2	Contents of Device Change Request Response		Data Frame	3.3.5.1.2.2	DeviceChangeRequestResponse		
a	Owner organization information		Data Frame	3.3.5.1.2.2.1.a	ownerOrganization	M	
b	Device type		Data Frame	3.3.5.1.2.2.1.b	deviceType	M	
c	Required Center Connection		Data Element	3.3.5.1.2.2.1.c	deviceId	M	

Req ID	Requirement	Dialog ID	Data Concept Type	Data Concept ID	Data Concept Name	Is Required	Additional Specifications
	Information Request Content						
d	Required Center Connection Information Request Content		Data Element	3.3.5.1.2.2.1.d	requestId	M	
e	Required Center Connection Information Request Content		Data Element	3.3.5.1.2.2.1.e	requestStatus	M	
3.3.5.1.2.2.2.1	Required Center Connection Information Request Content		Data Element	3.3.5.1.2.2.2.1	operatorId		
3.3.5.1.2.2.2.2	Required Center Connection Information Request Content		Data Element	3.3.5.1.2.2.2.2	operatorLockId		
3.3.5.1.2.2.2.3	Operator Last Revised Date and Time - Device Change		Data Frame	3.3.5.1.2.2.2.3	operatorLastRevisedDeviceStatus		
3.3.5.1.2.3	Verify Device Change Request Status						
3.3.5.1.2.3.1	**Send Device Change Status Upon Request**	**4.1**	**Dialog**				
3.3.5.1.2.3.2	Required Device Change Status Request Content		Data Frame	3.3.5.1.2.3.2	DeviceChangeStatusRequest		
3.3.5.1.2.3.3	Contents of Center Connection Information		Data Frame	3.3.5.1.2.3.3	DeviceChangeStatusResponse		

Req ID	Requirement	Dialog ID	Data Concept Type	Data Concept ID	Data Concept Name	Is Required	Additional Specifications
3.3.5.1.2.4	Cancel External Change Requests for Devices						
3.3.5.1.2.4.1	**Send Change Cancellation Response Upon Request**	**4.1**	**Dialog**				
3.3.5.1.2.4.2	Contents of Device Change Cancellation Request		Data Frame	3.3.5.1.2.4.2	DeviceChangeCancellationRequest		
3.3.5.1.2.4.3	Contents of Center Connection Information		Data Frame	3.3.5.1.2.4.3	DeviceChangeCancellationResponse		
3.3.5.1.2.5	Device Priority Queue Header Information		Data Frame		DevicePriorityQueueHeaderInformation		
3.3.5.1.2.5.1	Contents of Device Priority Queue Request		Data Frame	3.3.5.1.2.5.1	DevicePriorityQueueRequest		
3.3.5.1.2.5.2	Contents of Device Priority Queue Response Header		Data Frame	3.3.5.1.2.5.2	DevicePriorityQueueResponseHeader		
3.3.5.1.2.5.2.2	Optional Device Priority Queue Response Header Content						
3.3.5.1.3	External Device Control Command Requirements						

Req ID	Requirement	Dialog ID	Data Concept Type	Data Concept ID	Data Concept Name	Is Required	Additional Specifications
3.3.5.1.3.1	**Send Device Control Command Response Upon Receipt**	**4.1**	**Dialog**				
3.3.5.1.3.2	Contents of External Device Control Command		Data Frame				
3.3.5.1.3.2.1	Required External Device Control Command Content			3.3.5.1.3.2.1	ExternalDeviceControlRequest		
3.3.5.1.3.2.2	Optional External Device Control Command Content						
3.3.5.1.3.3	Required External Device Control Command Response Content		Data Frame	3.3.5.1.3.3	ExternalDeviceControlCommandResponse		
a	Owner organization information		Data Frame	3.3.5.1.3.3.a	organization	M	
b	Required Center Connection Information Request Content		Data Element	3.3.5.1.3.3.b	deviceType	M	
c	Required Center Connection		Data Element	3.3.5.1.3.3.c	deviceId	M	

Req ID	Requirement	Dialog ID	Data Concept Type	Data Concept ID	Data Concept Name	Is Required	Additional Specifications
	Information Request Content						
d	Required Center Connection Information Request Content		Data Element	3.3.5.1.3.3.d	requestId	M	
e	Required Center Connection Information Request Content		Data Element	3.3.5.1.3.3.e	commandStatus	M	
3.3.5.2	Traffic Detectors						
3.3.5.2.1	Share Detector Inventory Information						
3.3.5.2.1.1	**Send Detector Inventory Information Upon Request**	**4.1**	**Dialog**				
3.3.5.2.1.2	**Publish Detector Inventory Information**	**4.2**	**Dialog**				
3.3.5.2.1.3	**Subscribe to Detector Inventory Information**	**4.3**	**Dialog**				
3.3.5.2.1.4	Contents of Center Connection Information		Data Frame	3.3.5.2.1.4	DetectorInventoryRequest		
a	Generic device information request		Data Frame	3.3.5.2.1.4.a	deviceInformationRequest	M	

Req ID	Requirement	Dialog ID	Data Concept Type	Data Concept ID	Data Concept Name	Is Required	Additional Specifications
3.3.5.2.1.5	Contents of Center Connection Information		Data Frame	3.3.5.2.1.5	DetectorInventoryResponse		
a	Required Center Connection Information Request Content		Data Frame	3.3.5.2.1.5.1.a	deviceInventoryHeader	M	
b	Detector type		Data Element	3.3.5.2.1.5.1.b	detectorType	M	
3.3.5.2.1.5.2.1	Required Center Connection Information Request Content		Data Frame	3.3.5.2.1.5.2.1	detectorStationInventoryInformation		
3.3.5.2.1.5.2.2	Lane Number - Detector Inventory		Data Element	3.3.5.2.1.5.2.2	laneNumber		
3.3.5.2.1.5.2.3	Speed Trap Flag		Data Element	3.3.5.2.1.5.2.3	speedTrapFlag		
3.3.5.2.1.5.2.4	Vehicle Bin 1		Data Element	3.3.5.2.1.5.2.4	vehicleBin1		
3.3.5.2.1.5.2.5	Vehicle Bin 2		Data Element	3.3.5.2.1.5.2.5	vehicleBin2		
3.3.5.2.1.5.2.6	Vehicle Bin 3		Data Element	3.3.5.2.1.5.2.6	vehicleBin3		
3.3.5.2.1.5.2.7	Vehicle Bin 4		Data Element	3.3.5.2.1.5.2.7	vehicleBin4		
3.3.5.2.1.5.2.8	Vehicle Bin 5		Data Element	3.3.5.2.1.5.2.8	vehicleBin5		
3.3.5.2.1.5.2.9	Vehicle Bin 6		Data Element	3.3.5.2.1.5.2.9	vehicleBin6		
3.3.5.2.1.5.2.10	Vehicle Bin 7		Data Element	3.3.5.2.1.5.2.10	vehicleBin7		

Req ID	Requirement	Dialog ID	Data Concept Type	Data Concept ID	Data Concept Name	Is Required	Additional Specifications
3.3.5.2.2	Share Detector Status Information						
3.3.5.2.2.1	**Send Detector Status Information Upon Request**	**4.1**	**Dialog**				
3.3.5.2.2.2	**Publish Detector Status Information**	**4.2**	**Dialog**				
3.3.5.2.2.3	**Subscribe to Detector Status Information**	**4.3**	**Dialog**				
3.3.5.2.2.4	Contents of Center Connection Information		Data Frame	3.3.5.2.2.4	DetectorStatusRequest		
a	Generic device information request		Data Frame	3.3.5.2.2.4.a	deviceInformationRequest	M	
3.3.5.2.2.5	Contents of Center Connection Information		Data Frame	3.3.5.2.2.5	DetectorStatusResponse		
a	The generic device status header information		Data Frame	3.3.5.2.2.5.1.a	deviceStatusHeader	M	
3.3.5.2.2.5.2.1	Detector Station Status Information		Data Element	3.3.5.2.2.5.2.1	detectorStationStatusInformation		
3.3.5.2.2.5.2.2	Lane Number - Detector Status		Data Element	3.3.5.2.2.5.2.2	laneNumberDetectorStatus		
3.3.5.2.2.5.2.3	Required Center Connection		Data Frame	3.3.5.2.2.5.2.3	directionTravel		

Req ID	Requirement	Dialog ID	Data Concept Type	Data Concept ID	Data Concept Name	Is Required	Additional Specifications
	Information Request Content						
3.3.5.2.3	Share Detector Data Information						
3.3.5.2.3.1	**Send Detector Data Upon Request**	**4.1**	**Dialog**				
3.3.5.2.3.2	**Publish Detector Data**	**4.2**	**Dialog**				
3.3.5.2.3.3	**Subscribe to Detector Data Information**	**4.3**	**Dialog**				
3.3.5.2.3.4	Contents of Center Connection Information		Data Frame	3.3.5.2.3.4	DetectorDataRequest		
a	Generic device information request		Data Frame	3.3.5.2.3.4.1.a	deviceInformationRequest	M	
3.3.5.2.3.4.2.1	Detector Station - Data Request		Data Element	3.3.5.2.3.4.2.1	detectorStationId		
3.3.5.2.3.4.2.2	Data Type Request		Data Element	3.3.5.2.3.4.2.2	dataTypeRequest		
3.3.5.2.3.5	Contents of Center Connection Information		Data Frame	3.3.5.2.3.5	DetectorDataResponse		
a	Unique identifier of the owner organization;		Data Element	3.3.5.2.3.5.1.a	organizationId	M	
b	Identifier of each detector		Data Element	3.3.5.2.3.5.1.b	detectorId	M	
c	Required Center Connection		Data Frame	3.3.5.2.3.5.1.c	detectorTimestamp	M	

Req ID	Requirement	Dialog ID	Data Concept Type	Data Concept ID	Data Concept Name	Is Required	Additional Specifications
	Information Request Content						
3.3.5.2.3.5.2.1	Detector Station - Detector Data		Data Element	3.3.5.2.3.5.2.1	detectorStationDetectorData		
3.3.5.2.3.5.2.2	Vehicle Count		Data Element	3.3.5.2.3.5.2.2	vehicleCount		
3.3.5.2.3.5.2.3	Average Vehicle Occupancy		Data Element	3.3.5.2.3.5.2.3	averageVehicleOccupancy		
3.3.5.2.3.5.2.4	Required Center Connection Information Request Content		Data Frame	3.3.5.2.3.5.2.4	dataCollectionStart		
3.3.5.2.3.5.2.5	Required Center Connection Information Request Content		Data Frame	3.3.5.2.3.5.2.5	dataCollectionEnd		
3.3.5.2.3.5.2.6	Data Type		Data Element	3.3.5.2.3.5.2.6	dataType		
3.3.5.2.3.5.2.7	Average Vehicle Speed		Data Element	3.3.5.2.3.5.2.7	averageVehicleSpeed		
3.3.5.2.3.5.2.8	Average Vehicle Queue		Data Element	3.3.5.2.3.5.2.8	averageVehicleQueue		
3.3.5.2.3.5.2.9	Vehicle Stops		Data Element	3.3.5.2.3.5.2.9	vehicleStops		
3.3.5.2.3.5.2.10	Vehicle Count - Bin 1		Data Element	3.3.5.2.3.5.2.10	vehicleCountBin1		
3.3.5.2.3.5.2.11	Vehicle Count - Bin 2		Data Element	3.3.5.2.3.5.2.11	vehicleCountBin2		
3.3.5.2.3.5.2.12	Vehicle Count - Bin 3		Data Element	3.3.5.2.3.5.2.12	vehicleCountBin3		
3.3.5.2.3.5.2.13	Vehicle Count - Bin 4		Data Element	3.3.5.2.3.5.2.13	vehicleCountBin4		
3.3.5.2.3.5.2.14	Vehicle Count - Bin 5		Data Element	3.3.5.2.3.5.2.14	vehicleCountBin5		

Req ID	Requirement	Dialog ID	Data Concept Type	Data Concept ID	Data Concept Name	Is Required	Additional Specifications
3.3.5.2.3.5.2.15	Vehicle Count - Bin 6		Data Element	3.3.5.2.3.5.2.15	vehicleCountBin6		
3.3.5.2.3.5.2.16	Detector Status		Data Element	3.3.5.2.3.5.2.16	vehicleCountBin7		
3.3.5.2.3.5.2.17	Vehicle Class Count - Bin 1		Data Element	3.3.5.2.3.5.2.17	vehicleCountBin8		
3.3.5.2.3.5.2.18	Vehicle Class Count - Bin 2		Data Element	3.3.5.2.3.5.2.18	vehicleCountBin9		
3.3.5.2.3.5.2.19	Vehicle Class Count - Bin 3		Data Element	3.3.5.2.3.5.2.19	vehicleCountBin10		
3.3.5.2.3.5.2.20	Vehicle Class Count - Bin 4		Data Element	3.3.5.2.3.5.2.20	vehicleCountBin11		
3.3.5.2.3.5.2.21	Vehicle Class Count - Bin 5		Data Element	3.3.5.2.3.5.2.21	vehicleCountBin12		
3.3.5.2.3.5.2.22	Vehicle Class Count - Bin 6		Data Element	3.3.5.2.3.5.2.22	vehicleCountBin13		
3.3.5.2.3.5.2.23	Vehicle Class Count - Bin 7		Data Element	3.3.5.2.3.5.2.23	vehicleCountBin14		
3.3.5.2.3.5.2.24	Vehicle Class Count - Bin 8		Data Element	3.3.5.2.3.5.2.24	detectorStatus		
3.3.5.2.3.5.2.25	Vehicle Class Count - Bin 9		Data Element	3.3.5.2.3.5.2.25	vehicleClassCountBin1		
3.3.5.2.3.5.2.26	Vehicle Class Count - Bin 10		Data Element	3.3.5.2.3.5.2.26	vehicleClassCountBin2		
3.3.5.2.3.5.2.27	Vehicle Class Count - Bin 11		Data Element	3.3.5.2.3.5.2.27	vehicleClassCountBin3		
3.3.5.2.3.5.2.28	Vehicle Class Count - Bin 12		Data Element	3.3.5.2.3.5.2.28	vehicleClassCountBin4		
3.3.5.2.3.5.2.29	Vehicle Class Count - Bin 13		Data Element	3.3.5.2.3.5.2.29	vehicleClassCountBin5		
3.3.5.2.3.5.2.30	Vehicle Class Count - Bin 14		Data Element	3.3.5.2.3.5.2.30	vehicleClassCountBin6		
3.3.5.2.3.5.2.31			Data Element	3.3.5.2.3.5.2.31	vehicleClassCountBin7		

Req ID	Requirement	Dialog ID	Data Concept Type	Data Concept ID	Data Concept Name	Is Required	Additional Specifications
3.3.5.2.3.5.2.32			Data Element	3.3.5.2.3.5.2.32	vehicleClassCountBin8		
3.3.5.2.3.5.2.33			Data Element	3.3.5.2.3.5.2.33	vehicleClassCountBin9		
3.3.5.2.3.5.2.34			Data Element	3.3.5.2.3.5.2.34	vehicleClassCountBin10		
3.3.5.2.3.5.2.35			Data Element	3.3.5.2.3.5.2.35	vehicleClassCountBin11		
3.3.5.2.3.5.2.36			Data Element	3.3.5.2.3.5.2.36	vehicleClassCountBin12		
3.3.5.2.3.5.2.37			Data Element	3.3.5.2.3.5.2.37	vehicleClassCountBin13		
3.3.5.2.3.5.2.38			Data Element	3.3.5.2.3.5.2.38	vehicleClassCountBin14		
3.3.5.2.4	Share Detector Maintenance History				detectorMaintenanceHistory		
3.3.5.2.4.1	**Send Detector Maintenance History Information Upon Request**	**4.1**	**Dialog**				
3.3.5.2.4.2	Contents of Center Connection Information		Data Frame	3.3.5.2.4.2	DetectorMaintenanceHistoryRequest		
a	Generic device information request		Data Frame	3.3.5.2.4.2.1.a	deviceInformationRequest	M	
3.3.5.2.4.2.2.1	Detector Station - Detector History Request		Data Element	3.3.5.2.4.2.2.1	detectorStationId		
3.3.5.2.4.3	Contents of Center		Data Frame	3.3.5.2.4.3	DetectorMaintenanceHistoryResponse		

Req ID	Requirement	Dialog ID	Data Concept Type	Data Concept ID	Data Concept Name	Is Required	Additional Specifications
	Connection Information						
a	Required Center Connection Information Request Content		Data Frame	3.3.5.2.4.3.1.a	organization	M	
b	Identifier of each detector or detector zone		Data Element	3.3.5.2.4.3.1.b	detectorId	M	
3.3.5.2.4.3.2.1	Detector Station - Detector History		Data Element	3.3.5.2.4.3.2.1	detectorStation		
3.3.5.2.4.3.2.2	Detector Type		Data Element	3.3.5.2.4.3.2.2	detectorType		
3.3.5.2.4.3.2.3	Required Center Connection Information Request Content		Data Frame	3.3.5.2.4.3.2.3	installationDateTime		
3.3.5.2.4.3.2.4	Required Center Connection Information Request Content		Data Frame	3.3.5.2.4.3.2.4	detectorCalibrationDateTime		
3.3.5.2.4.3.2.5	Required Center Connection Information Request Content		Data Frame	3.3.5.2.4.3.2.5	operationalDateTime		
3.3.5.2.4.3.2.6	Required Center Connection Information Request Content		Data Frame	3.3.5.2.4.3.2.6	nonOperationalDateTime		
3.3.5.2.4.3.2.7	Required Center Connection Information Request Content		Data Frame	3.3.5.2.4.3.2.7	historyDateTimeChangeInformation		

Req ID	Requirement	Dialog ID	Data Concept Type	Data Concept ID	Data Concept Name	Is Required	Additional Specifications
3.3.5.3	CCTV						
3.3.5.3.1	Share CCTV Inventory Information						
3.3.5.3.1.1	**Send CCTV Inventory Information Upon Request**	**4.1**	**Dialog**				
3.3.5.3.1.2	**Publish CCTV Inventory Information**	**4.2**	**Dialog**				
3.3.5.3.1.3	**Subscribe to CCTV Inventory Information**	**4.3**	**Dialog**				
3.3.5.3.1.4	Contents of Center Connection Information		Data Frame	3.3.5.3.1.4	CCTVInventoryInformationRequest		
a	Generic device information request		Data Frame	3.3.5.3.1.4.a	deviceInformationRequest	M	
3.3.5.3.1.5	Contents of Center Connection Information		Data Frame	3.3.5.3.1.5	CCTVInventoryInformationResponse		
a	Required Center Connection Information Request Content		Data Frame	3.3.5.3.1.5.1.a	deviceInventoryHeader	M	
b	Required Center Connection Information Request Content		Data Frame	3.3.5.3.1.5.1.b	cctvRequestsSupportedList	M	

Req ID	Requirement	Dialog ID	Data Concept Type	Data Concept ID	Data Concept Name	Is Required	Additional Specifications
c	Required Center Connection Information Request Content		Data Frame	3.3.5.3.1.5.1.c	cctvImageList	M	
3.3.5.3.1.5.2.1	Text Insertion - CCTV Inventory		Data Element	3.3.5.3.1.5.2.1	textInsertion		
3.3.5.3.1.5.2.2	Required Center Connection Information Request Content		Data Frame	3.3.5.3.1.5.2.2	cameraType		
3.3.5.3.2	Share CCTV Status Information						
3.3.5.3.2.1	**Send CCTV Status Information Upon Request**	**4.1**	**Dialog**				
3.3.5.3.2.2	**Publish CCTV Status Information**	**4.2**	**Dialog**				
3.3.5.3.2.3	**Subscribe to CCTV Status Information**	**4.3**	**Dialog**				
3.3.5.3.2.4	Contents of Center Connection Information		Data Frame	3.3.5.3.2.4	CCTVStatusRequest		
a	Generic device information request		Data Frame	3.3.5.3.2.4.a	deviceInformationRequest	M	
3.3.5.3.2.5	Contents of Center Connection Information		Data Frame	3.3.5.3.2.5	CCTVStatusResponse		

Req ID	Requirement	Dialog ID	Data Concept Type	Data Concept ID	Data Concept Name	Is Required	Additional Specifications
a	The generic device status header information		Data Frame	3.3.5.3.2.5.1.a	deviceStatusHeader	M	
3.3.5.3.2.5.2.1	CCTV Error		Data Element	3.3.5.3.2.5.2.1	cctvError		
3.3.5.3.2.5.2.2	Required Center Connection Information Request Content		Data Frame	3.3.5.3.2.5.2.2	cctvFormat		
3.3.5.3.2.5.2.3	CCTV Preset Position		Data Element	3.3.5.3.2.5.2.3	cctvPresetPosition		
3.3.5.3.2.5.2.4	CCTV Pan Position		Data Element	3.3.5.3.2.5.2.4	cctvPanPosition		
3.3.5.3.2.5.2.5	CCTV Tilt Position		Data Element	3.3.5.3.2.5.2.5	cctvTiltPosition		
3.3.5.3.2.5.2.6	CCTV Zoom Position		Data Element	3.3.5.3.2.5.2.6	cctvZoomPosition		
3.3.5.3.2.5.2.7	CCTV Iris Position		Data Element	3.3.5.3.2.5.2.7	cctvIrisPosition		
3.3.5.3.2.5.2.8	CCTV Focus Position		Data Element	3.3.5.3.2.5.2.8	cctvFocusPosition		
3.3.5.3.2.5.2.9	Required Center Connection Information Request Content		Data Frame	3.3.5.3.2.5.2.9	cameraEnvFeaturesStatus		
3.3.5.3.3	External Change Requests for CCTV Devices						
3.3.5.3.3.1	**Send CCTV Change Response Upon Request**	**4.1**	**Dialog**				

Req ID	Requirement	Dialog ID	Data Concept Type	Data Concept ID	Data Concept Name	Is Required	Additional Specifications
3.3.5.3.3.2	Contents of Center Connection Information		Data Frame	3.3.5.3.3.2	CCTVChangeRequest		
a	Generic device change request header information		Data Frame	3.3.5.3.3.2.a	deviceChangeRequest	M	
b	Required Center Connection Information Request Content		Data Frame	3.3.5.3.3.2.b	requestType	M	
c	Requested value.		Data Element	3.3.5.3.3.2.c	requestValue	M	
3.3.5.3.3.3	Contents of Center Connection Information		Data Frame	3.3.5.3.3.3	CCTVChangeResponse		
a	Generic device change response header information		Data Frame	3.3.5.3.3.3.a	deviceChangeResponseHeader	M	
3.3.5.3.4	Request CCTV Change Status						
3.3.5.3.4.1	**Send CCTV Change Status Upon Request**	**4.1**	**Dialog**				**See 3.3.5.1.2.3.1**
3.3.5.3.4.2	Contents of Center Connection Information		Data Frame	3.3.5.3.4.2	CCTVChangeStatusRequest		
a	Required Center Connection Information Request Content		Data Frame	3.3.5.3.4.2.a	deviceChangeStatusRequest	M	

Req ID	Requirement	Dialog ID	Data Concept Type	Data Concept ID	Data Concept Name	Is Required	Additional Specifications
3.3.5.3.4.3	Contents of Center Connection Information		Data Frame	3.3.5.3.4.3	CCTVChangeStatusResponse		
a	Generic device change response header information		Data Frame	3.3.5.3.4.3.a	deviceChangeResponseHeader	M	
3.3.5.3.5	Cancel Change Requests for CCTV						
3.3.5.3.5.1	**Send CCTV Change Cancellation Response Upon Request**	**4.1**	**Dialog**				**See 3.3.5.1.2.4.1**
3.3.5.3.5.2	Contents of Center Connection Information		Data Frame	3.3.5.3.5.2	CCTVChangeCancellationRequest		
a	Generic cancel device change request		Data Frame	3.3.5.3.5.2.a	deviceChangeRequestHeader	M	
3.3.5.3.5.3	Contents of Center Connection Information		Data Frame	3.3.5.3.5.3	CCTVChangeCancellationResponse		
a	Generic device change response header information		Data Frame	3.3.5.3.5.3.a	deviceChangeResponseHeader	M	
3.3.5.3.6	Share Image Links for CCTV						

Req ID	Requirement	Dialog ID	Data Concept Type	Data Concept ID	Data Concept Name	Is Required	Additional Specifications
3.3.5.3.6.1	**Send Image Links for CCTV Upon Request**	**4.1**	**Dialog**				
3.3.5.3.6.2	**Publish CCTV Link Information**	**4.2**	**Dialog**				
3.3.5.3.6.3	**Subscribe to CCTV Link Information**	**4.3**	**Dialog**				
3.3.5.3.6.4	Contents of Center Connection Information		Data Frame	3.3.5.3.6.4	CCTVImageLinkRequest		
a	Generic device information request		Data Frame	3.3.5.3.6.4.a	deviceInformationRequest	M	
b	Identifier of the CCTV device		Data Element	3.3.5.3.6.4.b	cctvId	M	
c	Required Center Connection Information Request Content		Data Frame	3.3.5.3.6.4.c	imageType	M	
3.3.5.3.6.5	Contents of Center Connection Information		Data Frame	3.3.5.3.6.5	CCTVImageLinkRequestResponse		
a	Required Center Connection Information Request Content		Data Frame	3.3.5.3.6.5.a	deviceInventoryHeader	M	
b	The type of image provided		Data Element	3.3.5.3.6.5.b	imageType	M	
c	A.uniform resource locator		Data Element	3.3.5.3.6.5.c	imageURL	M	

Req ID	Requirement	Dialog ID	Data Concept Type	Data Concept ID	Data Concept Name	Is Required	Additional Specifications
3.3.5.3.7	External Commands for CCTV Devices						
3.3.5.3.7.1	**Send CCTV Control Command Status**	**4.1**	**Dialog**				
3.3.5.3.7.2	Contents of Center Connection Information		Data Frame	3.3.5.3.7.2	CCTVControlCommandRequest		
a	Generic device control command information		Data Frame	3.3.5.3.7.2.a	deviceControlCommand	M	
b	Required Center Connection Information Request Content		Data Frame	3.3.5.3.7.2.b	commandType	M	
c	Control command value.		Data Element	3.3.5.3.7.2.c	controlCommandValue	M	
3.3.5.3.7.3	Contents of Center Connection Information		Data Frame	3.3.5.3.7.3	CCTVControlCommandResponse		
a	Required Center Connection Information Request Content		Data Frame	3.3.5.3.7.3.a	deviceControlResponse	M	
3.3.5.4	Dynamic Message Signs		Data Frame				
3.3.5.4.1	Share DMS Inventory Information						

Req ID	Requirement	Dialog ID	Data Concept Type	Data Concept ID	Data Concept Name	Is Required	Additional Specifications
3.3.5.4.1.1	**Send DMS Inventory Information Upon Request**	**4.1**	**Dialog**				
3.3.5.4.1.2	**Publish DMS Inventory Information**	**4.2**	**Dialog**				
3.3.5.4.1.3	**Subscribe to DMS Inventory Information**	**4.3**	**Dialog**				
3.3.5.4.1.4	Contents of Center Connection Information		Data Frame	3.3.5.4.1.4	DMSInventoryRequest		
a	Generic device information request		Data Frame	3.3.5.4.1.4.a	deviceInformationRequest	M	
3.3.5.4.1.5	Contents of Center Connection Information		Data Frame	3.3.5.4.1.5	DMSInventoryResponse		
a	Required Center Connection Information Request Content		Data Frame	3.3.5.4.1.5.1.a	deviceInventoryHeader	M	
b	Sign type		Data Element	3.3.5.4.1.5.1.b	signType	M	
3.3.5.4.1.5.2.1	Sign Technology		Data Element	3.3.5.4.1.5.2.1	signTechnology		
3.3.5.4.1.5.2.2	Sign Pixel Height		Data Element	3.3.5.4.1.5.2.2	signPixelHeight		
3.3.5.4.1.5.2.3	Sign Pixel Width		Data Element	3.3.5.4.1.5.2.3	signPixelWidth		

Req ID	Requirement	Dialog ID	Data Concept Type	Data Concept ID	Data Concept Name	Is Required	Additional Specifications
3.3.5.4.1.5.2.4	Sign Height		Data Element	3.3.5.4.1.5.2.4	signHeight		
3.3.5.4.1.5.2.5	Sign Width		Data Element	3.3.5.4.1.5.2.5	signWidth		
3.3.5.4.1.5.2.6	Character Pixel Height		Data Element	3.3.5.4.1.5.2.6	characterPixelHeight		
3.3.5.4.1.5.2.7	Character Pixel Width		Data Element	3.3.5.4.1.5.2.7	characterPixelWidth		
3.3.5.4.1.5.2.8	DMS Beacon Type		Data Element	3.3.5.4.1.5.2.8	dmsBeaconType		
3.3.5.4.1.5.2.9	Vertical Border		Data Element	3.3.5.4.1.5.2.9	verticalBorder		
3.3.5.4.1.5.2.10	Horizontal Border		Data Element	3.3.5.4.1.5.2.10	horizontalBorder		
3.3.5.4.1.5.2.11	Sign Vertical Pixel Pitch		Data Element	3.3.5.4.1.5.2.11	signVerticalPixelPitch		
3.3.5.4.1.5.2.12	Sign Horizontal Pixel Pitch		Data Element	3.3.5.4.1.5.2.12	signHorizontalPixelPitch		
3.3.5.4.1.5.2.13	Maximum Number of Pages		Data Element	3.3.5.4.1.5.2.13	maximumNumberPages		
3.3.5.4.1.5.2.14	Maximum Message Length		Data Element	3.3.5.4.1.5.2.14	maximumMessageLength		
3.3.5.4.1.5.2.15	Color Scheme		Data Element	3.3.5.4.1.5.2.15	colorScheme		
3.3.5.4.1.5.2.16	MULTI Tags Supported		Data Element	3.3.5.4.1.5.2.16	multiTagsSupported		
3.3.5.4.2	Share DMS Status Information						
3.3.5.4.2.1	**Send DMS Status Information Upon Request**	**4.1**	**Dialog**				

Req ID	Requirement	Dialog ID	Data Concept Type	Data Concept ID	Data Concept Name	Is Required	Additional Specifications
3.3.5.4.2.2	**Publish DMS Status Information**	**4.2**	**Dialog**				
3.3.5.4.2.3	**Subscribe to DMS Status Information**	**4.3**	**Dialog**				
3.3.5.4.2.4	Contents of Center Connection Information		Data Frame	3.3.5.4.2.4	DMSStatusInformationRequest		
a	Generic device information request		Data Frame	3.3.5.4.2.4.a	deviceInformationRequest	M	
3.3.5.4.2.5	Contents of the DMS Status Response		Data Frame				
3.3.5.4.2.5.1	Contents of Center Connection Information		Data Frame	3.3.5.4.2.5.1	DMSStatusInformationResponse		
a	The generic device status header information		Data Frame	3.3.5.4.2.5.1.a	deviceStatusHeader	M	
b	Current message displayed on each DMS device.		Data Element	3.3.5.4.2.5.1.b	dmsMessage	M	
3.3.5.4.2.5.2	Optional DMS Status Content						
3.3.5.4.2.5.2.1	Current Message Number - DMS		Data Element	3.3.5.4.2.5.2.1	currentMessageNumberDms		

Req ID	Requirement	Dialog ID	Data Concept Type	Data Concept ID	Data Concept Name	Is Required	Additional Specifications
3.3.5.4.2.5.2.2	Time Remaining		Data Element	3.3.5.4.2.5.2.2	timeRemaining		
3.3.5.4.2.5.2.3	Message Source		Data Element	3.3.5.4.2.5.2.3	messageSource		
3.3.5.4.2.5.2.4	Message Beacon		Data Element	3.3.5.4.2.5.2.4	messageBeacon		
3.3.5.4.2.5.2.5	DMS On-Display Image		Data Element	3.3.5.4.2.5.2.5	dmsOnDisplayImage		
3.3.5.4.3	External Change Requests for DMS Devices						
3.3.5.4.3.1	**Send DMS Change Response Upon Request**	**4.1**	**Dialog**				
3.3.5.4.3.2	Contents of Center Connection Information		Data Frame	3.3.5.4.3.2	DMSChangeRequest		
a	Generic device change request header information		Data Frame	3.3.5.4.3.2.a	deviceChangeRequestHeader	M	
b	Message command type		Data Element	3.3.5.4.3.2.b	messageCommandType	M	
c	Message requested in MULTI language; or		Data Element	3.3.5.4.3.2.c	messageRequested	M	
d	Message number		Data Element	3.3.5.4.3.2.d	messageNumber	M	
e	memory type		Data Element	3.3.5.4.3.2.e	memoryType	M	

Req ID	Requirement	Dialog ID	Data Concept Type	Data Concept ID	Data Concept Name	Is Required	Additional Specifications
f	CRC of the message being requested.		Data Element	3.3.5.4.3.2.f	messageCRC	M	
3.3.5.4.3.3	Contents of Center Connection Information		Data Frame	3.3.5.4.3.3	DMSChangeResponse		
a	Generic device change response header information		Data Frame	3.3.5.4.3.3.a	deviceChangeResponseHeader	M	
3.3.5.4.4	Request DMS Change Status						
3.3.5.4.4.1	**Send DMS Change Status Upon Request**	**4.1**	**Dialog**				**See 3.3.5.1.2.3.1**
3.3.5.4.4.2	Contents of Center Connection Information		Data Frame	3.3.5.4.4.2	DMSChangeStatusRequest		
a	Generic device change status request		Data Frame	3.3.5.4.4.2.a	deviceChangeStatusRequest	M	
3.3.5.4.4.3	Contents of Center Connection Information		Data Frame	3.3.5.4.4.3	DMSChangeStatusResponse		
a	Generic device change response header information		Data Frame	3.3.5.4.4.3.a	deviceChangeResponseHeader	M	
3.3.5.4.5	Cancel External Change Requests for DMS Devices						

Req ID	Requirement	Dialog ID	Data Concept Type	Data Concept ID	Data Concept Name	Is Required	Additional Specifications
3.3.5.4.5.1	**Send Cancel DMS Change Response Upon Request**	**4.1**	**Dialog**				**See 3.3.5.1.2.4.1**
3.3.5.4.5.2	Contents of Center Connection Information		Data Frame	3.3.5.4.5.2	DMSChangeCancellationRequest		
a	Generic cancel device change request		Data Frame	3.3.5.4.5.2.a	deviceChangeCancellationRequest	M	
3.3.5.4.5.3	Contents of Center Connection Information		Data Frame	3.3.5.4.5.3	DMSChangeCancellationResponse		
a	Generic device change response header information		Data Frame	3.3.5.4.5.3.a	deviceChangeResponseHeader	M	
3.3.5.4.6	Share DMS Message Appearance						
3.3.5.4.6.1	**Send DMS Message Appearance Upon Request**	**4.1**	**Dialog**				
3.3.5.4.6.2	Contents of Center Connection Information		Data Frame	3.3.5.4.6.2	DMSMessageAppearanceRequest		
a	Generic device information request		Data Frame	3.3.5.4.6.2.a	deviceInformationRequest	M	
b	Message requested in		Data Element	3.3.5.4.6.2.b	messageRequested	M	

Req ID	Requirement	Dialog ID	Data Concept Type	Data Concept ID	Data Concept Name	Is Required	Additional Specifications
	MULTI language; or						
c	Message number		Data Element	3.3.5.4.6.2.c	messageNumber	M	
d	memory type		Data Element	3.3.5.4.6.2.d	memoryType		
e	CRC of the message being requested.		Data Element	3.3.5.4.6.2.e	messageCrc		
f	The current message flag.		Data Element	3.3.5.4.6.2.f	messageFlag	M	
3.3.5.4.6.3	Contents of Center Connection Information		Data Frame	3.3.5.4.6.3	DMSMessageAppearanceResponse		
a	Required Center Connection Information Request Content		Data Frame	3.3.5.4.6.3.1.a	ownerOrganization	M	
b	Unique identifier of each DMS device; and		Data Element	3.3.5.4.6.3.1.b	deviceId	M	
c	Sign type of each DMS device.		Data Element	3.3.5.4.6.3.1.c	dmsSignType	M	
a	Sign height		Data Element	3.3.5.4.6.3.2.a	signHeightInPixels	M	
b	Sign width		Data Element	3.3.5.4.6.3.2.b	signWidthInPixels	M	
c	Sign height;		Data Element	3.3.5.4.6.3.2.c	signHeight	M	
d	Sign weight;		Data Element	3.3.5.4.6.3.2.d	signWidth	M	
e	Character pixel height;		Data Element	3.3.5.4.6.3.2.e	characterPixelHeight	M	

Req ID	Requirement	Dialog ID	Data Concept Type	Data Concept ID	Data Concept Name	Is Required	Additional Specifications
f	Character pixel width;		Data Element	3.3.5.4.6.3.2.f	characterPixelWidth	M	
g	Sign vertical border;		Data Element	3.3.5.4.6.3.2.g	signVerticalBorder	M	
h	Sign horizontal border;		Data Element	3.3.5.4.6.3.2.h	signHorizontalBorder	M	
i	Sign vertical pixel pitch;		Data Element	3.3.5.4.6.3.2.i	signVerticalPixelPitch	M	
j	Sign horizontal pixel pitch;		Data Element	3.3.5.4.6.3.2.j	signHorizontalPixelPitch	M	
k	Maximum number of pages;		Data Element	3.3.5.4.6.3.2.k	maxPages	M	
l	Maximum message length;		Data Element	3.3.5.4.6.3.2.l	maxMessageLength	M	
m	Color scheme; and		Data Element	3.3.5.4.6.3.2.m	colorScheme	M	
n	MULTI tags supported.		Data Element	3.3.5.4.6.3.2.n	multiTagsSupported	M	
3.3.5.4.7	Share DMS Message Table						
3.3.5.4.7.1	**Send DMS Message Table Upon Request**	**4.1**	**Dialog**				
3.3.5.4.7.2	**Publish DMS Message Table Information**	**4.2**	**Dialog**				
3.3.5.4.7.3	**Subscribe to DMS Message Table Information**	**4.3**	**Dialog**				
3.3.5.4.7.4	Contents of Center		Data Frame	3.3.5.4.7.4	DmsMessageTableInventoryRequest		

Req ID	Requirement	Dialog ID	Data Concept Type	Data Concept ID	Data Concept Name	Is Required	Additional Specifications
	Connection Information						
a	Generic device information request		Data Frame	3.3.5.4.7.4.1.a	deviceInformationRequest	M	
3.3.5.4.7.4.2.1	DMS Message Number Identifier		Data Element	3.3.5.4.7.4.2.1	dmsMessageNumberIdentifier		
3.3.5.4.7.4.2.2	Required Center Connection Information Request Content		Data Frame	3.3.5.4.7.4.2.2	dmsMemoryType		
3.3.5.4.7.5	Contents of Center Connection Information		Data Frame	3.3.5.4.7.5	DMSMessageTableInventoryResponse		
a	Required Center Connection Information Request Content		Data Frame	3.3.5.4.7.5.1.a	deviceInventoryHeader	M	
b	Message memory type;		Data Element	3.3.5.4.7.5.1.b	messageMemoryType	M	
c	Message identifier		Data Element	3.3.5.4.7.5.1.c	messageId	M	
d	Message in MULTI language for each message;		Data Element	3.3.5.4.7.5.1.d	messageMultiLanguage	M	
e	Message owner for each message;		Data Element	3.3.5.4.7.5.1.e	messageOwner	M	
f	If the message beacon is enabled or		Data Element	3.3.5.4.7.5.1.f	messageBeaconFlag	M	

Req ID	Requirement	Dialog ID	Data Concept Type	Data Concept ID	Data Concept Name	Is Required	Additional Specifications
	disabled for this message;						
g	Message run-time priority for each message; and		Data Element	3.3.5.4.7.5.1.g	messageRunTimePriority	M	
h	Message status		Data Element	3.3.5.4.7.5.1.h	messageStatus	M	
3.3.5.4.7.5.2.1	Required Center Connection Information Request Content		Data Frame	3.3.5.4.7.5.2.1	dmsMessageInventoryDateTimeChangeInformation		
3.3.5.4.7.5.2.2	Required Center Connection Information Request Content		Data Frame	3.3.5.4.7.5.2.2	dmsMessageCrc		
3.3.5.4.8	Share DMS Font Table						
3.3.5.4.8.1	**Send DMS Font Table Upon Request**	**4.1**	**Dialog**				
3.3.5.4.8.2	Contents of Center Connection Information		Data Frame	3.3.5.4.8.2	DMSFontTableRequest		
a	Generic device information request		Data Frame	3.3.5.4.8.2.1.a	deviceInformationRequest	M	
3.3.5.4.8.2.2.1	DMS Font Identifier		Data Element	3.3.5.4.8.2.2.1	dMSFontId		
3.3.5.4.8.3	Contents of Center Connection Information		Data Frame	3.3.5.4.8.3	DMSFontTableResponse		

Req ID	Requirement	Dialog ID	Data Concept Type	Data Concept ID	Data Concept Name	Is Required	Additional Specifications
a	Required Center Connection Information Request Content		Data Frame	3.3.5.4.8.3.1.a	deviceInventoryHeader	M	
b	Font number for each font;		Data Element	3.3.5.4.8.3.1.b	fontNumber	M	
c	Font number of the default font;		Data Element	3.3.5.4.8.3.1.c	defaultFontNumber	M	
d	Font height in pixels for each font;		Data Element	3.3.5.4.8.3.1.d	fontHeight	M	
e	Font character spacing in pixels for each font;		Data Element	3.3.5.4.8.3.1.e	fontCharacterSpacing	M	
f	Font line spacing in pixels for each font;		Data Element	3.3.5.4.8.3.1.f	fontLineSpacing	M	
g	Font version ID for each font;		Data Element	3.3.5.4.8.3.1.g	fontVersionId	M	
h	Font state for each font;		Data Element	3.3.5.4.8.3.1.h	fontState	M	
i	Character number for each character for each font;		Data Element	3.3.5.4.8.3.1.i	characterNumber	M	
j	Character width in pixels for each character for each font; and		Data Element	3.3.5.4.8.3.1.j	characterWidth	M	
k	Character bitmap for each character for each font.		Data Element	3.3.5.4.8.3.1.k	characterBitmap	M	

Req ID	Requirement	Dialog ID	Data Concept Type	Data Concept ID	Data Concept Name	Is Required	Additional Specifications
3.3.5.4.8.3.2.1	Required Center Connection Information Request Content		Data Frame	3.3.5.4.8.3.2.1	fontTableDateTimeChangeInformation		
3.3.5.4.9	Share DMS Priority Queue Information						
3.3.5.4.9.1	**Send DMS Priority Queue Information Upon Request**	**4.1**	**Dialog**				
3.3.5.4.9.2	Contents of Center Connection Information		Data Frame	3.3.5.4.9.2	DMSPriorityQueueRequest		
a	Generic device queue request		Data Frame	3.3.5.4.9.2.a	devicePriorityQueueRequest	M	
3.3.5.4.9.3	Contents of Center Connection Information		Data Frame	3.3.5.4.9.3	DMSPriorityQueueResponse		
a	Generic device priority queue header information		Data Frame	3.3.5.4.9.3.a	devicePriorityQueueHeader	M	
b	The message requested in MULTI language; or		Data Element	3.3.5.4.9.3.b	messageRequestedMultiLanguage	M	
c	The number of the message being requested.		Data Element	3.3.5.4.9.3.c	messageNumber	M	
3.3.5.4.10	Share DMS Graphics Table						

Req ID	Requirement	Dialog ID	Data Concept Type	Data Concept ID	Data Concept Name	Is Required	Additional Specifications
3.3.5.4.10.1	**Send DMS Graphic Table Upon Request**	**4.1**	**Dialog**				
3.3.5.4.10.2	Contents of Center Connection Information		Data Frame	3.3.5.4.10.2	DMSGraphicTableRequest		
a	Generic device information request		Data Frame	3.3.5.4.10.2.a	deviceInformationRequest	M	
3.3.5.4.10.3	Contents of Center Connection Information		Data Frame	3.3.5.4.10.3	DMSGraphicTableResponse		
a	Required Center Connection Information Request Content		Data Frame	3.3.5.4.10.3.1.a	ownerOrganization	M	
b	Unique identifier of each device;		Data Element	3.3.5.4.10.3.1.b	deviceId	M	
c	The number for each graphic;		Data Element	3.3.5.4.10.3.1.c	graphicNumber	M	
d	The name of each graphic;		Data Element	3.3.5.4.10.3.1.d	graphicName	M	
e	The height of each graphic in pixels;		Data Element	3.3.5.4.10.3.1.e	graphicHeight	M	
f	The width of each graphic in pixels;		Data Element	3.3.5.4.10.3.1.f	graphicWidth	M	
g	The type of each graphic;		Data Element	3.3.5.4.10.3.1.g	graphicType	M	
h	The ID for each graphic;		Data Element	3.3.5.4.10.3.1.h	graphicId	M	

Req ID	Requirement	Dialog ID	Data Concept Type	Data Concept ID	Data Concept Name	Is Required	Additional Specifications
i	The font line spacing in pixels for each font;		Data Element	3.3.5.4.10.3.1.i	graphicSpacing	M	
j	If the graphic has a transparent color and what the color is; and		Data Element	3.3.5.4.10.3.1.j	graphicColor	M	
k	The state of each graphic		Data Element	3.3.5.4.10.3.1.k	graphicState	M	
3.3.5.4.10.3.2.1	Required Center Connection Information Request Content		Data Frame	3.3.5.4.10.3.2.1	graphicTableDateTimeChangeInformation		
3.3.5.4.10.3.2.2	Graphic Table Bitmap		Data Element	3.3.5.4.10.3.2.2	graphicTableBitmap		
3.3.5.4.11	External Commands for DMS Devices						
3.3.5.4.11.1	**Send DMS Control Command Status**	**4.1**	**Dialog**				
3.3.5.4.11.2	Contents of Center Connection Information		Data Frame	3.3.5.4.11.2	DMSControlCommandRequest		
a	Generic device control command header information		Data Frame	3.3.5.4.11.2.1.a	deviceControlCommandHeader	M	
b	Message command type		Data Element	3.3.5.4.11.2.1.b	messageCommandType	M	

Req ID	Requirement	Dialog ID	Data Concept Type	Data Concept ID	Data Concept Name	Is Required	Additional Specifications
c	Message requested in MULTI language; or		Data Element	3.3.5.4.11.2.1.c	messageRequestedMultiLanguage	M	
d	Message number		Data Element	3.3.5.4.11.2.1.d	messageNumber	M	
e	memory type		Data Element	3.3.5.4.11.2.1.e	memoryType		
f	CRC of the message being requested.		Data Element	3.3.5.4.11.2.1.f	messageCrc		
3.3.5.4.11.2.2.1	Beacon Control		Data Element	3.3.5.4.11.2.2.1	beaconControl		
3.3.5.4.11.3	Contents of Center Connection Information		Data Frame	3.3.5.4.11.3	DMSControlCommandResponse		
a	Required Center Connection Information Request Content		Data Frame	3.3.5.4.11.3.a	deviceControlCommandResponse	M	
3.3.5.5	Environment Sensors		Data Frame				
3.3.5.5.1	Share ESS Inventory Information						
3.3.5.5.1.1	**Send ESS Inventory Information Upon Request**	**4.1**	**Dialog**				
3.3.5.5.1.2	**Publish ESS Inventory Information**	**4.2**	**Dialog**				

Req ID	Requirement	Dialog ID	Data Concept Type	Data Concept ID	Data Concept Name	Is Required	Additional Specifications
3.3.5.5.1.3	**Subscribe to ESS Inventory Information**	**4.3**	**Dialog**				
3.3.5.5.1.4	Contents of Center Connection Information		Data Frame	3.3.5.5.1.4	ESSInventoryInformationRequest		
3.3.5.5.1.5	Contents of Center Connection Information		Data Frame	3.3.5.5.1.5	ESSInventoryInformationResponse		
a	Required Center Connection Information Request Content		Data Frame	3.3.5.5.1.5.1.a	deviceInventoryHeader	M	
b	Generic device inventory header information		Data Element	3.3.5.5.1.5.1.b	deviceInventoryHeaderList	M	
3.3.5.5.1.5.2.1	Lane Number - ESS		Data Element	3.3.5.5.1.5.2.1	laneNumber		
3.3.5.5.1.5.2.2	Device Elevation		Data Element	3.3.5.5.1.5.2.2	deviceElevation		
3.3.5.5.1.5.2.3	Device Height		Data Element	3.3.5.5.1.5.2.3	deviceHeight		
3.3.5.5.1.5.2.4	Device Type		Data Element	3.3.5.5.1.5.2.4	deviceType		
3.3.5.5.1.5.2.5	Device Operation Type		Data Element	3.3.5.5.1.5.2.5	deviceOperationType		
3.3.5.5.1.5.2.6	Device Mobility Type		Data Element	3.3.5.5.1.5.2.6	deviceMobilityType		
3.3.5.5.2	Share ESS Status Information						

Req ID	Requirement	Dialog ID	Data Concept Type	Data Concept ID	Data Concept Name	Is Required	Additional Specifications
3.3.5.5.2.1	**Send ESS Status Information Upon Request**	**4.1**	**Dialog**				
3.3.5.5.2.2	**Publish ESS Status Information**	**4.2**	**Dialog**				
3.3.5.5.2.3	**Subscribe to ESS Status Information**	**4.3**	**Dialog**				
3.3.5.5.2.4	Contents of Center Connection Information		Data Frame	3.3.5.5.2.4	ESSStatusRequest		
a	Generic device information request		Data Frame	3.3.5.5.2.4.a	deviceInformationRequest	M	
3.3.5.5.2.5	Contents of Center Connection Information		Data Frame	3.3.5.5.2.5	ESSStatusResponse		
a	Generic device status header information		Data Frame	3.3.5.5.2.5.a	deviceStatusHeader	M	
b	Generic device status header information		Data Frame	3.3.5.5.2.5.b	connectedDeviceStatusHeader	M	
3.3.5.5.3	Share ESS Observation Data						
3.3.5.5.3.1	**Send ESS Observation Data Upon Request**	**4.1**	**Dialog**				

Req ID	Requirement	Dialog ID	Data Concept Type	Data Concept ID	Data Concept Name	Is Required	Additional Specifications
3.3.5.5.3.2	**Publish ESS Observation Data**	**4.2**	**Dialog**				
3.3.5.5.3.3	**Subscribe to ESS Observation Data**	**4.3**	**Dialog**				
3.3.5.5.3.4	Contents of Center Connection Information		Data Frame	3.3.5.5.3.4	ESSObservationDataRequest		
a	Generic device information request		Data Frame	3.3.5.5.3.4.a	deviceInformationRequest	M	
3.3.5.5.3.5	Contents of Center Connection Information		Data Frame	3.3.5.5.3.5	ESSobservationDataResponse		
a	Required Center Connection Information Request Content		Data Frame	3.3.5.5.3.5.a	ownerOrganization	M	
b	Unique identifier of the ESS station;		Data Element	3.3.5.5.3.5.b	stationId	M	
c	Unique identifier of each ESS sensor;		Data Element	3.3.5.5.3.5.c	essSensorId	M	
d	Required Center Connection Information Request Content		Data Frame	3.3.5.5.3.5.d	timestampEssObservationData	M	
e	The observation block data		Data Element	3.3.5.5.3.5.e	observationBlockData	M	

Req ID	Requirement	Dialog ID	Data Concept Type	Data Concept ID	Data Concept Name	Is Required	Additional Specifications
3.3.5.5.4	Share ESS Metadata						
3.3.5.5.4.1	**Send ESS Metadata Information Upon Request**	**4.1**	**Dialog**				
3.3.5.5.4.2	Contents of Center Connection Information		Data Frame	3.3.5.5.4.2	ESSMetadataRequest		
a	Generic device information request		Data Frame	3.3.5.5.4.2.a	deviceInformationRequest	M	
3.3.5.5.4.3	Contents of Center Connection Information		Data Frame	3.3.5.5.4.3	ESSMetadataResponse		
a	Name of the file that contains the observations;		Data Element	3.3.5.5.4.3.1.a	fileName	M	
b	Logical directory path to the observation file;		Data Element	3.3.5.5.4.3.1.b	fileDirectoryPath	M	
c	Protocol used to retrieve observations;		Data Element	3.3.5.5.4.3.1.c	protocolUsed	M	
d	The network DNS name		Data Element	3.3.5.5.4.3.1.d	networkDnsName	M	
e	The logical network address port on the collector host server;		Data Element	3.3.5.5.4.3.1.e	networkAdressPort	M	

Req ID	Requirement	Dialog ID	Data Concept Type	Data Concept ID	Data Concept Name	Is Required	Additional Specifications
f	Observation collection frequency;		Data Element	3.3.5.5.4.3.1.f	observationCollectionFrequency	M	
g	Observation collection offset		Data Element	3.3.5.5.4.3.1.g	observationCollectionOffset	M	
h	The number of minutes offset from UTC for the agency,Äôs collector host server;		Data Element	3.3.5.5.4.3.1.h	offsetMinutesUTC	M	
i	Standard Time Zone where the agency's collector host is located; and		Data Element	3.3.5.5.4.3.1.i	hostTimeZone	M	
j	Indication of whether Daylight Savings Time is observed on the server.		Data Element	3.3.5.5.4.3.1.j	daylightSavings	M	
3.3.5.5.4.3.2.1	Required Center Connection Information Request Content		Data Frame	3.3.5.5.4.3.2.1	requestHeader		
3.3.5.5.4.3.3	Required Center Connection Information Request Content		Data Frame	3.3.5.5.4.3.3	organization		
3.3.5.6	Lane Closure Gates						
3.3.5.6.1	Share Gate Inventory Information						

Req ID	Requirement	Dialog ID	Data Concept Type	Data Concept ID	Data Concept Name	Is Required	Additional Specifications
3.3.5.6.1.1	**Send Gate Inventory Information Upon Request**	**4.1**	**Dialog**				
3.3.5.6.1.2	**Publish Gate Inventory Information**	**4.2**	**Dialog**				
3.3.5.6.1.3	**Subscribe to Gate Inventory Information**	**4.3**	**Dialog**				
3.3.5.6.1.4	Contents of Center Connection Information		Data Frame	3.3.5.6.1.4	GateInventoryRequest		
a	Generic device information request		Data Frame	3.3.5.6.1.4.a	deviceInformationRequest	M	
3.3.5.6.1.5	Contents of Center Connection Information		Data Frame	3.3.5.6.1.5	GateInventoryResponse		
a	Required Center Connection Information Request Content		Data Frame	3.3.5.6.1.5.1.a	deviceInventoryHeaderInformation	M	
3.3.5.6.1.5.2.1	Number of Lanes - Gate Inventory		Data Element	3.3.5.6.1.5.2.1	numberLanesGateInventory		
3.3.5.6.2	Share Gate Status Information						
3.3.5.6.2.1	**Send Gate Status Information Upon Request**	**4.1**	**Dialog**				

Req ID	Requirement	Dialog ID	Data Concept Type	Data Concept ID	Data Concept Name	Is Required	Additional Specifications
3.3.5.6.2.2	**Publish Gate Status Information**	**4.2**	**Dialog**				
3.3.5.6.2.3	**Subscribe to Gate Status Information**	**4.3**	**Dialog**				
3.3.5.6.2.4	Contents of Center Connection Information		Data Frame	3.3.5.6.2.4	GateStatusRequest		
a	Generic device information request		Data Frame	3.3.5.6.2.4.a	deviceInformationRequest	M	
3.3.5.6.2.5	Contents of Center Connection Information		Data Frame	3.3.5.6.2.5	GateStatusResponse		
a	The generic device status header information		Data Frame	3.3.5.6.2.5.a	deviceStatusHeader	M	
b	Gate status of each gate device		Data Element	3.3.5.6.2.5.b	gateStatus	M	
3.3.5.6.3	External Control Requests for Gates						
3.3.5.6.3.1	**Send Gate Control Response Upon Request**	**4.1**	**Dialog**				
3.3.5.6.3.2	Contents of Center Connection Information		Data Frame	3.3.5.6.3.2	GateControlRequest		

Req ID	Requirement	Dialog ID	Data Concept Type	Data Concept ID	Data Concept Name	Is Required	Additional Specifications
a	Generic device change request header information		Data Frame	3.3.5.6.3.2.a	deviceChangeRequestHeader	M	
b	Gate request command		Data Element	3.3.5.6.3.2.b	gateRequestedCommand	M	
3.3.5.6.3.3	Contents of Center Connection Information		Data Frame	3.3.5.6.3.3	GateControlResponse		
a	Generic device change response header information		Data Frame	3.3.5.6.3.3.a	deviceChangeResponseHeader	M	
3.3.5.6.4	Request Gate Control Status						
3.3.5.6.4.1	**Send Gate Control Status Upon Request**	**4.1**	**Dialog**				
3.3.5.6.4.2	Contents of Center Connection Information		Data Frame	3.3.5.6.4.2	GateControlStatusRequest		
a	Generic device change status request		Data Frame	3.3.5.6.4.2.a	deviceChangeStatusRequest	M	
3.3.5.6.4.3	Contents of Center Connection Information		Data Frame	3.3.5.6.4.3	GateControlStatusResponse		
a	Generic device change response header information		Data Frame	3.3.5.6.4.3.a	deviceControlResponseHeader	M	

Req ID	Requirement	Dialog ID	Data Concept Type	Data Concept ID	Data Concept Name	Is Required	Additional Specifications
3.3.5.6.5	Cancel External Control Requests for Gates						
3.3.5.6.5.1	**Send Gate Control Cancellation Response Upon Request**	**4.1**	**Dialog**				**See 3.3.5.1.2.4.1**
3.3.5.6.5.2	Contents of Center Connection Information		Data Frame	3.3.5.6.5.2	GateControlCancellationRequest		
a	Generic cancel device change request		Data Frame	3.3.5.6.5.2.a	deviceChangeCancellationRequest		
3.3.5.6.5.3	Contents of Center Connection Information		Data Frame	3.3.5.6.5.3	GateControlCancellationResponse		
a	Generic device change response header information		Data Frame	3.3.5.6.5.3.a	deviceChangeResponseHeader	M	
3.3.5.6.6	Share Gate Schedule						
3.3.5.6.6.1	**Send Gate Schedule Information Upon Request**	**4.1**	**Dialog**				
3.3.5.6.6.2	**Publish Gate Schedule Information**	**4.2**	**Dialog**				

Req ID	Requirement	Dialog ID	Data Concept Type	Data Concept ID	Data Concept Name	Is Required	Additional Specifications
3.3.5.6.6.3	**Subscribe to Gate Schedule Information**	**4.3**	**Dialog**				
3.3.5.6.6.4	Contents of Center Connection Information		Data Frame	3.3.5.6.6.4	GateScheduleRequest		
a	Generic device information request		Data Frame	3.3.5.6.6.4.a	deviceInformationRequest	M	
3.3.5.6.6.5	Contents of Center Connection Information		Data Frame	3.3.5.6.6.5	GateScheduleResponse		
a	Required Center Connection Information Request Content		Data Frame	3.3.5.6.6.5.a	deviceScheduleInformation	M	
b	Gate action		Data Element	3.3.5.6.6.5.b	gateAction	M	
3.3.5.6.7	External Commands for Gates						
3.3.5.6.7.1	**Send Gate Control Command Status**	**4.1**	**Dialog**				
3.3.5.6.7.2	Contents of Center Connection Information		Data Frame	3.3.5.6.7.2	GateControlCommandRequest		
a	Generic device control command		Data Frame	3.3.5.6.7.2.a	deviceControlCommandHeader	M	

Req ID	Requirement	Dialog ID	Data Concept Type	Data Concept ID	Data Concept Name	Is Required	Additional Specifications
	header information						
b	Gate command		Data Element	3.3.5.6.7.2.b	gateCommand	M	
3.3.5.6.7.3	Contents of Center Connection Information		Data Frame	3.3.5.6.7.3	GateControlCommandResponse		
a	Required Center Connection Information Request Content		Data Frame	3.3.5.6.7.3.a	deviceControlCommandResponse	M	
3.3.5.7	Lane Control Signals						
3.3.5.7.1	Share LCS Inventory Information						
3.3.5.7.1.1	**Send LCS Inventory Information Upon Request**	**4.1**	**Dialog**				
3.3.5.7.1.2	**Publish LCS Inventory Information**	**4.2**	**Dialog**				
3.3.5.7.1.3	**Subscribe to LCS Inventory Information**	**4.3**	**Dialog**				
3.3.5.7.1.4	Contents of Center Connection Information		Data Frame	3.3.5.7.1.4	LCSInventoryInformationRequest		
a	Generic device information request		Data Frame	3.3.5.7.1.4.a	deviceInformationRequest	M	

Req ID	Requirement	Dialog ID	Data Concept Type	Data Concept ID	Data Concept Name	Is Required	Additional Specifications
3.3.5.7.1.5	Contents of Center Connection Information		Data Frame	3.3.5.7.1.5	LCSInventoryInformationResponse		
a	Required Center Connection Information Request Content		Data Frame	3.3.5.7.1.5.1.a	deviceInventoryHeader	M	
b	Unique identifier of the link that each device is controlling; and		Data Element	3.3.5.7.1.5.1.b	deviceId	M	
c	Lane number controlled by each device.		Data Element	3.3.5.7.1.5.1.c	controlledLaneNumber	M	
3.3.5.7.1.5.2.1	Number of Lanes - LCS Inventory		Data Element	3.3.5.7.1.5.2.1	lanesNumber		
3.3.5.7.2	Share LCS Status Information						
3.3.5.7.2.1	**Send LCS Status Information Upon Request**	**4.1**	**Dialog**				
3.3.5.7.2.2	**Publish LCS Status Information**	**4.2**	**Dialog**				
3.3.5.7.2.3	**Subscribe to LCS Status Information**	**4.3**	**Dialog**				
3.3.5.7.2.4	Contents of Center Connection Information		Data Frame	3.3.5.7.2.4	LCSStatusRequest		

Req ID	Requirement	Dialog ID	Data Concept Type	Data Concept ID	Data Concept Name	Is Required	Additional Specifications
a	Generic device information request		Data Frame	3.3.5.7.2.4.a	deviceInformationRequest	M	
3.3.5.7.2.5	Contents of Center Connection Information		Data Frame	3.3.5.7.2.5	LCSStatusResponse		
a	The generic device status header information		Data Frame	3.3.5.7.2.5.a	deviceStatusHeader	M	
b	Lane status		Data Element	3.3.5.7.2.5.b	lanesStatus	M	
c	Link direction		Data Element	3.3.5.7.2.5.c	linkDirection	M	
3.3.5.7.3	External Change Requests for Lane Control Devices						
3.3.5.7.3.1	**Send LCS Change Response Upon Request**	**4.1**	**Dialog**				
3.3.5.7.3.2	Contents of Center Connection Information		Data Frame	3.3.5.7.3.2	LCSChangeRequest		
a	Generic device change request header information		Data Frame	3.3.5.7.3.2.a	deviceChangeStatusRequest	M	
b	Required Center Connection Information Request Content		Data Frame	3.3.5.7.3.2.b	laneControlSignal	M	

Req ID	Requirement	Dialog ID	Data Concept Type	Data Concept ID	Data Concept Name	Is Required	Additional Specifications
3.3.5.7.3.3	Contents of Center Connection Information		Data Frame	3.3.5.7.3.3	LCSChangeResponse		
a	Generic device change response header information		Data Frame	3.3.5.7.3.3.a	deviceChangeResponseHeader	M	
3.3.5.7.4	Request LCS Change Status						
3.3.5.7.4.1	**Send LCS Change Status Upon Request**	**4.1**	**Dialog**				**See 3.3.5.1.2.3.1**
3.3.5.7.4.2	Contents of Center Connection Information		Data Frame	3.3.5.7.4.2	LCSChangeStatusRequest		
a	Generic device change status request		Data Frame	3.3.5.7.4.2.a	deviceChangeStatusRequest	M	
3.3.5.7.4.3	Contents of Center Connection Information		Data Frame	3.3.5.7.4.3	LCSChangeStatusResponse		
a	Generic device change response header information		Data Frame	3.3.5.7.4.3.a	deviceChangeResponseHeader	M	
3.3.5.7.5	Cancel External Requests for LCS						
3.3.5.7.5.1	**Send LCS Change Cancellation**	**4.1**	**Dialog**				**See 3.3.5.1.2.4.1**

Req ID	Requirement	Dialog ID	Data Concept Type	Data Concept ID	Data Concept Name	Is Required	Additional Specifications
	Response Upon Request						
3.3.5.7.5.2	Contents of Center Connection Information		Data Frame	3.3.5.7.5.2	LCSChangeCancellationRequest		
a	Generic cancel device change request		Data Frame	3.3.5.7.5.2.a	deviceChangeCancellationRequest	M	
3.3.5.7.5.3	Contents of Center Connection Information		Data Frame	3.3.5.7.5.3	LCSChangeCancellationResponse		
a	Generic device change response header information		Data Frame	3.3.5.7.5.3.a	deviceChangeResponse	M	
3.3.5.7.6	Share LCS Schedules						
3.3.5.7.6.1	**Send LCS Schedule Information Upon Request**	**4.1**	**Dialog**				
3.3.5.7.6.2	**Publish LCS Schedule Information**	**4.2**	**Dialog**				
3.3.5.7.6.3	**Subscribe to LCS Schedule Information**	**4.3**	**Dialog**				
3.3.5.7.6.4	Contents of Center Connection Information		Data Frame	3.3.5.7.6.4	LCSScheduleRequest		

Req ID	Requirement	Dialog ID	Data Concept Type	Data Concept ID	Data Concept Name	Is Required	Additional Specifications
a	Generic device schedule information		Data Frame	3.3.5.7.6.4.a	deviceInformationRequest	M	
3.3.5.7.6.5	Contents of Center Connection Information		Data Frame	3.3.5.7.6.5	LCSScheduleResponse		
a	Required Center Connection Information Request Content		Data Frame	3.3.5.7.6.5.a	deviceScheduleInformation	M	
b	Required Center Connection Information Request Content		Data Frame	3.3.5.7.6.5.b	laneControlSignalIndication	M	
3.3.5.7.7	External Commands for Lane Control Devices						
3.3.5.7.7.1	**Send LCS Response Upon Command**	**4.1**	**Dialog**				
3.3.5.7.7.2	Contents of Center Connection Information		Data Frame	3.3.5.7.7.2	LCSControlCommandRequest		
a	Generic device control command header information		Data Frame	3.3.5.7.7.2.a	deviceControlCommandHeader	M	
b	Required Center Connection		Data Frame	3.3.5.7.7.2.b	laneControlCommand	M	

Req ID	Requirement	Dialog ID	Data Concept Type	Data Concept ID	Data Concept Name	Is Required	Additional Specifications
	Information Request Content						
3.3.5.7.7.3	Contents of Center Connection Information		Data Frame	3.3.5.7.7.3	LCSControlCommandResponse		
a	Required Center Connection Information Request Content		Data Frame	3.3.5.7.7.3.a	deviceControlCommandResponse	M	
3.3.5.8	Ramp Meter		Data Frame				
3.3.5.8.1	Share Ramp Meter Inventory Information						
3.3.5.8.1.1	**Send Ramp Meter Inventory Information Upon Request**	**4.1**	**Dialog**				
3.3.5.8.1.2	**Publish Ramp Meter Inventory Information**	**4.2**	**Dialog**				
3.3.5.8.1.3	**Subscribe to Ramp Meter Inventory Information**	**4.3**	**Dialog**				
3.3.5.8.1.4	Contents of Center Connection Information		Data Frame	3.3.5.8.1.4	RampMeterInventoryRequest		
a	Generic device information request		Data Frame	3.3.5.8.1.4.a	deviceInformationRequest	M	
3.3.5.8.1.5	Contents of Center		Data Frame	3.3.5.8.1.5	RampMeterInventoryResponse		

Req ID	Requirement	Dialog ID	Data Concept Type	Data Concept ID	Data Concept Name	Is Required	Additional Specifications
	Connection Information						
a	Required Center Connection Information Request Content		Data Frame	3.3.5.8.1.5.1.a	deviceInventoryHeader	M	
b	Generic device inventory header information		Data Element	3.3.5.8.1.5.1.b	deviceInventoryHeaderList	M	
c	Unique identifier of the node for each metered lane;		Data Element	3.3.5.8.1.5.1.c	meteredLaneId	M	
d	Direction of travel on the link		Data Element	3.3.5.8.1.5.1.d	laneDirection	M	
e	Name of the roadway the entrance ramps intersects for each metered lane.		Data Element	3.3.5.8.1.5.1.e	roadwayEntranceName	M	
3.3.5.8.1.5.2.1	Lane Number - Ramp Meters		Data Element	3.3.5.8.1.5.2.1	laneNumberRampMeters		
3.3.5.8.1.5.2.2	Lane Type - Ramp Meters		Data Element	3.3.5.8.1.5.2.2	laneTypeRampMeters		
3.3.5.8.1.5.2.3	Associated Detectors Identifiers		Data Element	3.3.5.8.1.5.2.3	associatedDetectorsIdentifiers		
3.3.5.8.1.5.2.4	Absolute Minimum Metering Rate		Data Element	3.3.5.8.1.5.2.4	absoluteMinimumMeteringRate		
3.3.5.8.1.5.2.5	Absolute Maximum Metering Rate		Data Element	3.3.5.8.1.5.2.5	absoluteMaximumMeteringRate		

Req ID	Requirement	Dialog ID	Data Concept Type	Data Concept ID	Data Concept Name	Is Required	Additional Specifications
3.3.5.8.1.5.2.6	System Minimum Metering Rate		Data Element	3.3.5.8.1.5.2.6	systemMinimumMeteringRate		
3.3.5.8.1.5.2.7	System Maximum Metering Rate		Data Element	3.3.5.8.1.5.2.7	systemMaximumMeteringRate		
3.3.5.8.2	Share Ramp Meter Status Information						
3.3.5.8.2.1	**Send Ramp Meter Status Information Upon Request**	**4.1**	**Dialog**				
3.3.5.8.2.2	**Publish Ramp Meter Status Information**	**4.2**	**Dialog**				
3.3.5.8.2.3	**Subscribe to Ramp Meter Status Information**	**4.3**	**Dialog**				
3.3.5.8.2.4	Contents of Center Connection Information		Data Frame	3.3.5.8.2.4	RampMeterStatusRequest		
a	Generic device information request		Data Frame	3.3.5.8.2.4.a	deviceInformationRequest	M	
3.3.5.8.2.5	Contents of Center Connection Information		Data Frame	3.3.5.8.2.5	RampMeterStatusResponse		
b	The generic device status header information		Data Frame	3.3.5.8.2.5.1.b	deviceStatusHeader	M	

Req ID	Requirement	Dialog ID	Data Concept Type	Data Concept ID	Data Concept Name	Is Required	Additional Specifications
d	Required Center Connection Information Request Content		Data Frame	3.3.5.8.2.5.1.d	rampMeterOperationalMode	M	
3.3.5.8.2.5.2.1	Requested Metering Command Source		Data Element	3.3.5.8.2.5.2.1	requestedMeteringCommandSource		
3.3.5.8.2.5.2.2	Implemented Metering Command Source		Data Element	3.3.5.8.2.5.2.2	implementedMeteringCommandSource		
3.3.5.8.2.5.2.3	Implemented Plan		Data Element	3.3.5.8.2.5.2.3	implementedPlan		
3.3.5.8.2.5.2.4	Implemented Rate		Data Element	3.3.5.8.2.5.2.4	implementedRate		
3.3.5.8.2.5.2.5	Implemented Vehicles Per Green		Data Element	3.3.5.8.2.5.2.5	implementedVehiclesPerGreen		
3.3.5.8.2.5.2.6	Requested Action		Data Element	3.3.5.8.2.5.2.6	requestedAction		
3.3.5.8.2.5.2.7	Requested Plan - Ramp Meter Status		Data Element	3.3.5.8.2.5.2.7	requestedPlanRampMeterStatus		
3.3.5.8.2.5.2.8	Requested Rate - Ramp Meter Status		Data Element	3.3.5.8.2.5.2.8	requestedRateRampMeterStatus		
3.3.5.8.2.5.2.9	Requested Vehicles Per Green		Data Element	3.3.5.8.2.5.2.9	requestedVehiclesPerGreen		
3.3.5.8.2.5.2.10	Operational Minimum Metering Rate		Data Element	3.3.5.8.2.5.2.10	operationalMinimumMeteringRate		

Req ID	Requirement	Dialog ID	Data Concept Type	Data Concept ID	Data Concept Name	Is Required	Additional Specifications
3.3.5.8.2.5.2.11	Operational Maximum Metering Rate		Data Element	3.3.5.8.2.5.2.11	operationalMaximumMeteringRate		
3.3.5.8.2.5.2.12	Demand Detector Status		Data Element	3.3.5.8.2.5.2.12	demandDetectorStatus		
3.3.5.8.2.5.2.13	Passage Detector Status		Data Element	3.3.5.8.2.5.2.13	passageDetectorStatus		
3.3.5.8.2.5.2.14	Queue Detector Status		Data Element	3.3.5.8.2.5.2.14	queueDetectorStatus		
3.3.5.8.2.5.2.15	Cycle Count		Data Element	3.3.5.8.2.5.2.15	cycleCount		
3.3.5.8.2.5.2.16	Passenger Vehicle Count		Data Element	3.3.5.8.2.5.2.16	passengerVehicleCount		
3.3.5.8.2.5.2.17	Queue Detected Flag		Data Element	3.3.5.8.2.5.2.17	queueDetectedFlag		
3.3.5.8.2.5.2.18	Violation Vehicle Count		Data Element	3.3.5.8.2.5.2.18	violationVehicleCount		
3.3.5.8.2.5.2.19	Mainline Flow Rate		Data Element	3.3.5.8.2.5.2.19	mainlineFlowRate		
3.3.5.8.2.5.2.20	Mainline Vehicle Occupancy		Data Element	3.3.5.8.2.5.2.20	mainlineVehicleOccupancy		
3.3.5.8.2.5.2.21	Mainline Vehicle Speed		Data Element	3.3.5.8.2.5.2.21	mainlineVehicleSpeed		
3.3.5.8.3	External Change Requests for Ramp Meters						
3.3.5.8.3.1	**Send Ramp Meter Change Response Upon Request**	**4.1**	**Dialog**				
3.3.5.8.3.2	Contents of Center Connection Information		Data Frame	3.3.5.8.3.2	RampMeterChangeRequest		

Req ID	Requirement	Dialog ID	Data Concept Type	Data Concept ID	Data Concept Name	Is Required	Additional Specifications
a	Generic device change request header information		Data Frame	3.3.5.8.3.2.1.a	deviceChangeRequestHeader	M	
b	Metered lane identifier; and		Data Element	3.3.5.8.3.2.1.b	meteredLaneId	M	
3.3.5.8.3.2.2	Requested Plan - Ramp Meter Change		Data Element	3.3.5.8.3.2.2	requestedPlanRampMeterChange		
3.3.5.8.3.2.3	Requested Rate - Ramp Meter Change		Data Element	3.3.5.8.3.2.3	requestedRateRampMeterChange		
3.3.5.8.3.3	Contents of Center Connection Information		Data Frame	3.3.5.8.3.3	RampMeterChangeResponse		
a	Generic device change response header information		Data Frame	3.3.5.8.3.3.a	deviceChangeResponseHeader	M	
3.3.5.8.4	Request Ramp Meter Change Status						
3.3.5.8.4.1	**Send Ramp Meter Change Status Upon Request**	**4.1**	**Dialog**				**See 3.3.5.1.2.3.1**
3.3.5.8.4.2	Contents of Center Connection Information		Data Frame	3.3.5.8.4.2	RampMeterChangeStatusRequest		
a	Generic device change status request		Data Frame	3.3.5.8.4.2.a	deviceChangeStatusRequest	M	

Req ID	Requirement	Dialog ID	Data Concept Type	Data Concept ID	Data Concept Name	Is Required	Additional Specifications
3.3.5.8.4.3	Contents of Center Connection Information		Data Frame	3.3.5.8.4.3	RampMeterChangeStatusResponse		
a	Generic device change response header information		Data Frame	3.3.5.8.4.3.a	deviceChangeResponseHeader	M	
3.3.5.8.5.1	**Send Cancel Ramp Meter Change Response Upon Request**	**4.1**	**Dialog**				
3.3.5.8.5.2	Contents of Center Connection Information		Data Frame	3.3.5.8.5.2	RampMeterChangeCancellationRequest		
a	Generic cancel device change request		Data Frame	3.3.5.8.5.2.a	deviceChangeCancellationRequest	M	
3.3.5.8.5.3	Contents of Center Connection Information		Data Frame	3.3.5.8.5.3	RampMeterChangeCancellationResponse		
a	Generic device change response header information		Data Frame	3.3.5.8.5.3.a	deviceChangeResponseHeader	M	
3.3.5.8.6	Share Ramp Meter Schedule						
3.3.5.8.6.1	**Send Ramp Meter Schedule Information Upon Request**	**4.1**	**Dialog**				

Req ID	Requirement	Dialog ID	Data Concept Type	Data Concept ID	Data Concept Name	Is Required	Additional Specifications
3.3.5.8.6.2	**Publish Ramp Meter Schedule Information**	**4.2**	**Dialog**				
3.3.5.8.6.3	**Subscribe to Ramp Meter Schedule Information**	**4.3**	**Dialog**				
3.3.5.8.6.4	Contents of Center Connection Information		Data Frame	3.3.5.8.6.4	RampMeterScheduleRequest		
a	Generic device schedule information		Data Frame	3.3.5.8.6.4.a	deviceInformationRequest	M	
3.3.5.8.6.5	Contents of Center Connection Information		Data Frame	3.3.5.8.6.5	RampMeterScheduleResponse		
a	Required Center Connection Information Request Content		Data Frame	3.3.5.8.6.5.1.a	deviceScheduleInformation	M	
b	Metered lane identifier; and		Data Element	3.3.5.8.6.5.1.b	meteredLaneIdentifier	M	
c	Ramp meter TBC action entry to be executed.		Data Element	3.3.5.8.6.5.1.c	rampMeterTBCAction	M	
3.3.5.8.6.5.2.1	Required Center Connection Information Request Content		Data Frame	3.3.5.8.6.5.2.1	meteredLaneActionControl		
3.3.5.8.6.5.2.2	Timebase Plan Control		Data Element	3.3.5.8.6.5.2.2	timebasePlanControl		
3.3.5.8.6.5.2.3	Timebase Rate Control		Data Element	3.3.5.8.6.5.2.3	timebaseRateControl		

Req ID	Requirement	Dialog ID	Data Concept Type	Data Concept ID	Data Concept Name	Is Required	Additional Specifications
3.3.5.8.6.5.2.4	Timebase Vehicles Per Green Control		Data Element	3.3.5.8.6.5.2.4	timebaseVehiclesPerGreenControl		
3.3.5.8.6.5.2.5	Timebase Control Minimum Metering Rate		Data Element	3.3.5.8.6.5.2.5	timebaseControlMinimumMeteringRate		
3.3.5.8.6.5.2.6	Timebase Control Maximum Metering Rate		Data Element	3.3.5.8.6.5.2.6	timebaseControlMaximumMeteringRate		
3.3.5.8.6.5.2.7	Timebase Control Lane Usage Mode		Data Element	3.3.5.8.6.5.2.7	timebaseControlLaneUsageMode		
3.3.5.8.7	Share Ramp Metering Plan Information						
3.3.5.8.7.1	**Send Metering Plan Upon Request**	**4.1**	**Dialog**				
3.3.5.8.7.2	**Publish Metering Plan Information**	**4.2**	**Dialog**				
3.3.5.8.7.3	**Subscribe to Metering Plan Information**	**4.3**	**Dialog**				
3.3.5.8.7.4	Contents of Center Connection Information		Data Frame	3.3.5.8.7.4	MeteringPlanRequest		
a	Generic device information request		Data Frame	3.3.5.8.7.4.a	deviceInformationRequest	M	
3.3.5.8.7.5	Contents of Center		Data Frame	3.3.5.8.7.5	MeteringPlanResponse		

Req ID	Requirement	Dialog ID	Data Concept Type	Data Concept ID	Data Concept Name	Is Required	Additional Specifications
	Connection Information						
a	Required Center Connection Information Request Content		Data Frame	3.3.5.8.7.5.1.a	deviceInventoryHeader	M	
b	Metering plan number;		Data Element	3.3.5.8.7.5.1.b	meterPlan	M	
c	Metering level;		Data Element	3.3.5.8.7.5.1.c	meterLevel	M	
d	Metering rate		Data Element	3.3.5.8.7.5.1.d	meterRate	M	
e	Flow rate threshold		Data Element	3.3.5.8.7.5.1.e	flowRateThreshold	M	
f	Occupancy threshold		Data Element	3.3.5.8.7.5.1.f	occupancyThreshold	M	
g	Speed threshold		Data Element	3.3.5.8.7.5.1.g	speedThreshold	M	
3.3.5.8.7.5.2.1	Required Center Connection Information Request Content		Data Frame	3.3.5.8.7.5.2.1	meteringPlanDateTimeChangeInformation		
3.3.5.8.8	Share Ramp Meter Priority Queue Information						
3.3.5.8.8.1	**Send Ramp Meter Priority Queue Information Upon Request**	**4.1**	**Dialog**				
3.3.5.8.8.2	Contents of Center		Data Frame	3.3.5.8.8.2	RampMeterPriorityQueueRequest		

Req ID	Requirement	Dialog ID	Data Concept Type	Data Concept ID	Data Concept Name	Is Required	Additional Specifications
	Connection Information						
a	Required Center Connection Information Request Content		Data Frame	3.3.5.8.8.2.a	deviceQueueRequest	M	
3.3.5.8.8.3	Contents of Center Connection Information		Data Frame	3.3.5.8.8.3	RampMeterPriorityQueueResponse		
a	Generic device priority queue header information		Data Frame	3.3.5.8.8.3.1.a	devicePriorityQueueHeader	M	
b	Required Center Connection Information Request Content		Data Frame	3.3.5.8.8.3.1.b	operationalModeRequested	M	
3.3.5.8.8.3.2.1	Metered Lane Identifier		Data Element	3.3.5.8.8.3.2.1	meteredLaneIdentifier		
3.3.5.8.8.3.2.2	Requested Plan - Ramp Meter Queue		Data Element	3.3.5.8.8.3.2.2	requestedPlanRampMeterQueue		
3.3.5.8.8.3.2.3	Requested Rate - Ramp Meter Queue		Data Element	3.3.5.8.8.3.2.3	requestedRateRampMeterQueue		
3.3.5.8.9	External Commands for Ramp Metering Devices						
3.3.5.8.9.1	**Send Ramp Meter Control Command Status**	**4.1**	**Dialog**				

Req ID	Requirement	Dialog ID	Data Concept Type	Data Concept ID	Data Concept Name	Is Required	Additional Specifications
3.3.5.8.9.2	Contents of Center Connection Information		Data Frame	3.3.5.8.9.2	RampMeterControlCommandRequest		
a	Generic device control command header information		Data Frame	3.3.5.8.9.2.1.a	deviceControlRequestHeader	M	
b	Metered lane identifier; and		Data Element	3.3.5.8.9.2.1.b	meteredLaneIdentifier	M	
c	Required Center Connection Information Request Content		Data Frame	3.3.5.8.9.2.1.c	operationalModeRequested	M	
3.3.5.8.9.2.2	Command Ramp Meter Control Plan		Data Element	3.3.5.8.9.2.2	commandRampMeterControlPlan		
3.3.5.8.9.2.3	Command Ramp Meter Control Rate		Data Element	3.3.5.8.9.2.3	commandRampMeterControlRate		
3.3.5.8.9.3	Contents of Center Connection Information		Data Frame	3.3.5.8.9.3	RampMeterControlCommandResponse		
3.3.5.9	Traffic Signal Controllers						
3.3.5.9.1	Share Signal Inventory Information						
3.3.5.9.1.1	**Send Signal Inventory Information Upon Request**	**4.1**	**Dialog**				

Req ID	Requirement	Dialog ID	Data Concept Type	Data Concept ID	Data Concept Name	Is Required	Additional Specifications
3.3.5.9.1.2	**Publish Signal Inventory Information**	**4.2**	**Dialog**				
3.3.5.9.1.3	**Subscribe to Signal Inventory Information**	**4.3**	**Dialog**				
3.3.5.9.1.4	Contents of Center Connection Information		Data Frame	3.3.5.9.1.4	SignalInventoryRequest		
a	Generic device information request		Data Frame	3.3.5.9.1.4.a	deviceInformationRequest	M	
3.3.5.9.1.5	Contents of Center Connection Information		Data Frame	3.3.5.9.1.5	SignalInventoryResponse		
a	Required Center Connection Information Request Content		Data Frame	3.3.5.9.1.5.1.a	deviceInventoryHeader	M	
b	Intersection name.		Data Element	3.3.5.9.1.5.1.b	intersectionName	M	
3.3.5.9.1.5.2.1	Field Management Station		Data Element	3.3.5.9.1.5.2.1	fieldManagementStation		
3.3.5.9.1.5.2.2	Link Identifiers		Data Element	3.3.5.9.1.5.2.2	linkIdentifiers		
3.3.5.9.1.5.2.3	Direction of Traffic		Data Element	3.3.5.9.1.5.2.3	directionTraffic		
3.3.5.9.1.5.2.4	Movement Identifier		Data Element	3.3.5.9.1.5.2.4	movementIdentifier		

Req ID	Requirement	Dialog ID	Data Concept Type	Data Concept ID	Data Concept Name	Is Required	Additional Specifications
3.3.5.9.1.5.2.5	Vehicle Movement Approach Link		Data Element	3.3.5.9.1.5.2.5	vehicleMovementApproachLink		
3.3.5.9.1.5.2.6	Pedestrian Movement Approach Link		Data Element	3.3.5.9.1.5.2.6	pedestrianMovementApproachLink		
3.3.5.9.1.5.2.7	Departing Link		Data Element	3.3.5.9.1.5.2.7	departingLink		
3.3.5.9.1.5.2.8	Required Center Connection Information Request Content		Data Frame	3.3.5.9.1.5.2.8	crossingPoint		
3.3.5.9.1.5.2.9	Turning Movement Approach Vector		Data Element	3.3.5.9.1.5.2.9	turningMovementApproachVector		
3.3.5.9.1.5.2.10	Turning Movement Type		Data Element	3.3.5.9.1.5.2.10	turningMovementType		
3.3.5.9.1.5.2.11	Turning Movement Lanes		Data Element	3.3.5.9.1.5.2.11	turningMovementLanes		
3.3.5.9.1.5.2.12	Turning Movement Description		Data Element	3.3.5.9.1.5.2.12	turningMovementDescription		
3.3.5.9.1.5.2.13	Enabled Phases		Data Element	3.3.5.9.1.5.2.13	enabledPhases		
3.3.5.9.1.5.2.14	Concurrent Phases.		Data Element	3.3.5.9.1.5.2.14	concurrentPhases		
3.3.5.9.1.5.2.15	Active Movements		Data Element	3.3.5.9.1.5.2.15	activeMovements		
3.3.5.9.1.5.2.16	Overlap-Phase Assignment		Data Element	3.3.5.9.1.5.2.16	overlapphaseAssignment		
3.3.5.9.1.5.2.17	Ring-Phase Assignment		Data Element	3.3.5.9.1.5.2.17	ringphaseAssignment		

Req ID	Requirement	Dialog ID	Data Concept Type	Data Concept ID	Data Concept Name	Is Required	Additional Specifications
3.3.5.9.1.5.2.18	Special Function Information		Data Element	3.3.5.9.1.5.2.18	specialFunctionInformation		
3.3.5.9.1.5.2.19	Time Reference		Data Element	3.3.5.9.1.5.2.19	timeReference		
3.3.5.9.1.5.2.20	Sync Reference Time		Data Element	3.3.5.9.1.5.2.20	syncReferenceTime		
3.3.5.9.1.5.2.21	Supported {Timing| Modes		Data Element	3.3.5.9.1.5.2.21	supportedTimingModes		
3.3.5.9.2	Share Signal Section Inventory Information						
3.3.5.9.2.1	**Send Signal Section Inventory Information Upon Request**	**4.1**	**Dialog**				
3.3.5.9.2.2	**Publish Signal Section Inventory Information**	**4.2**	**Dialog**				
3.3.5.9.2.3	**Subscribe to Signal Section Inventory Information**	**4.3**	**Dialog**				
3.3.5.9.2.4	Contents of Center Connection Information		Data Frame	3.3.5.9.2.4	SignalSectionInventoryRequest		
a	Generic device information request		Data Frame	3.3.5.9.2.4.a	deviceInformationRequest	M	
3.3.5.9.2.5	Contents of Center		Data Frame	3.3.5.9.2.5	SignalSectionInventoryResponse		

Req ID	Requirement	Dialog ID	Data Concept Type	Data Concept ID	Data Concept Name	Is Required	Additional Specifications
	Connection Information						
a	Unique identifier for the section;		Data Element	3.3.5.9.2.5.a	sectionId	M	
b	Required Center Connection Information Request Content		Data Frame	3.3.5.9.2.5.b	deviceInventoryHeader	M	
c	The intersection name for each signal controller in the intersection		Data Element	3.3.5.9.2.5.c	intersectionName	M	
3.3.5.9.3	Share Intersection Status Information						
3.3.5.9.3.1	**Send Intersection Status Information Upon Request**	**4.1**	**Dialog**				
3.3.5.9.3.2	**Publish Intersection Status Information**	**4.2**	**Dialog**				
3.3.5.9.3.3	**Subscribe to Intersection Status Information**	**4.3**	**Dialog**				
3.3.5.9.3.4	Contents of Center Connection Information		Data Frame	3.3.5.9.3.4	IntersectionStatusRequest		

Req ID	Requirement	Dialog ID	Data Concept Type	Data Concept ID	Data Concept Name	Is Required	Additional Specifications
a	Generic device information request		Data Frame	3.3.5.9.3.4.a	deviceInformationRequest	M	
3.3.5.9.3.5	Contents of the Intersection Status Information		Data Frame				
3.3.5.9.3.5.1	Contents of Center Connection Information		Data Frame	3.3.5.9.3.5.1	IntersectionStatusResponse		
a	The generic device status header information		Data Frame	3.3.5.9.3.5.1.a	deviceStatusHeader	M	
b	Required Center Connection Information Request Content		Data Frame	3.3.5.9.3.5.1.b	signalControlSource	M	
c	Planned signal timing mode of the signal controller		Data Element	3.3.5.9.3.5.1.c	plannedSignalTimingMode	M	
d	Required Center Connection Information Request Content		Data Frame	3.3.5.9.3.5.1.d	currentSignalTimingMode	M	
3.3.5.9.3.5.2	Optional Intersection Status Content						
3.3.5.9.3.5.2.1	Section Identifier - Intersection Status		Data Element	3.3.5.9.3.5.2.1	sectionIdentifierIntersectionStatus		

Req ID	Requirement	Dialog ID	Data Concept Type	Data Concept ID	Data Concept Name	Is Required	Additional Specifications
3.3.5.9.3.5.2.2	Planned Signal Timing Mode Description		Data Element	3.3.5.9.3.5.2.2	plannedSignalTimingModeDescription		
3.3.5.9.3.5.2.3	Timing Pattern Identifier - Current		Data Element	3.3.5.9.3.5.2.3	timingPatternIdentifierCurrent		
3.3.5.9.3.5.2.4	Timing Pattern Description		Data Element	3.3.5.9.3.5.2.4	timingPatternDescription		
3.3.5.9.3.5.2.5	Actuation Mode		Data Element	3.3.5.9.3.5.2.5	actuationMode		
3.3.5.9.3.5.2.6	Phase Recalls		Data Element	3.3.5.9.3.5.2.6	phaseRecalls		
3.3.5.9.3.5.2.7	Cycle Length - Planned		Data Element	3.3.5.9.3.5.2.7	cycleLengthPlanned		
3.3.5.9.3.5.2.8	Cycle Length - Current		Data Element	3.3.5.9.3.5.2.8	cycleLengthCurrent		
3.3.5.9.3.5.2.9	Cycle Length - Previous		Data Element	3.3.5.9.3.5.2.9	cycleLengthPrevious		
3.3.5.9.3.5.2.10	Field Management Station Cycle Length - Actual		Data Element	3.3.5.9.3.5.2.10	fieldManagementStationCycleLengthActual		
3.3.5.9.3.5.2.11	Local Controller Cycle Counter		Data Element	3.3.5.9.3.5.2.11	localControllerCycleCounter		
3.3.5.9.3.5.2.12	Field Management Station Cycle Counter		Data Element	3.3.5.9.3.5.2.12	fieldManagementStationCycleCounter		
3.3.5.9.3.5.2.13	Offset Reference		Data Element	3.3.5.9.3.5.2.13	offsetReference		
3.3.5.9.3.5.2.14	Offset - Planned		Data Element	3.3.5.9.3.5.2.14	offsetPlanned		
3.3.5.9.3.5.2.15	Offset - Actual		Data Element	3.3.5.9.3.5.2.15	offsetActual		

Req ID	Requirement	Dialog ID	Data Concept Type	Data Concept ID	Data Concept Name	Is Required	Additional Specifications
3.3.5.9.3.5.2.16	Offset - Previous		Data Element	3.3.5.9.3.5.2.16	offsetPrevious		
3.3.5.9.3.5.2.17	Controller Timestamp		Data Element	3.3.5.9.3.5.2.17	controllerTimestamp		
3.3.5.9.3.5.2.18	Coordinated Phases		Data Element	3.3.5.9.3.5.2.18	coordinatedPhases		
3.3.5.9.3.5.2.19	Phase Splits		Data Element	3.3.5.9.3.5.2.19	phaseSplits		
3.3.5.9.3.5.2.20	Ring Status		Data Element	3.3.5.9.3.5.2.20	ringStatus		
3.3.5.9.3.5.2.21	Active Phase Sequence		Data Element	3.3.5.9.3.5.2.21	activePhaseSequence		
3.3.5.9.3.5.2.22	Phase Status Greens		Data Element	3.3.5.9.3.5.2.22	phaseStatusGreens		
3.3.5.9.3.5.2.23	Phase Status Yellows		Data Element	3.3.5.9.3.5.2.23	phaseStatusYellows		
3.3.5.9.3.5.2.24	Phase Status Reds		Data Element	3.3.5.9.3.5.2.24	phaseStatusReds		
3.3.5.9.3.5.2.25	Phase Status Walks		Data Element	3.3.5.9.3.5.2.25	phaseStatusWalks		
3.3.5.9.3.5.2.26	Phase Status Pedestrian Clearance		Data Element	3.3.5.9.3.5.2.26	phaseStatusPedestrianClearance		
3.3.5.9.3.5.2.27	Phase Status Dont Walks		Data Element	3.3.5.9.3.5.2.27	phaseStatusDontWalks		
3.3.5.9.3.5.2.28	Overlap Status Greens		Data Element	3.3.5.9.3.5.2.28	overlapStatusGreens		
3.3.5.9.3.5.2.29	Overlap Status Yellows		Data Element	3.3.5.9.3.5.2.29	overlapStatusYellows		
3.3.5.9.3.5.2.30	Overlap Status Reds		Data Element	3.3.5.9.3.5.2.30	overlapStatusReds		
3.3.5.9.3.5.2.31	Special Functions		Data Element	3.3.5.9.3.5.2.31	specialFunctions		

Req ID	Requirement	Dialog ID	Data Concept Type	Data Concept ID	Data Concept Name	Is Required	Additional Specifications
3.3.5.9.3.5.2.32	Preemption / Priority Description		Data Element	3.3.5.9.3.5.2.32	signalPriority		
3.3.5.9.4	External Change Requests for Traffic Signals						
3.3.5.9.4.1	**Send Signal Change Response Upon Request**	**4.1**	**Dialog**				
3.3.5.9.4.2	Contents of Center Connection Information		Data Frame	3.3.5.9.4.2	SignalChangeRequest		
a	Generic device change request header information		Data Frame	3.3.5.9.4.2.a	deviceInformationRequest	M	
b	The type of change request for each signal device		Data Element	3.3.5.9.4.2.b	changeRequestType	M	
c	The requested change in to the signal timing mode		Data Element	3.3.5.9.4.2.c	requestTimingMode	M	
d	The requested section signal timing pattern IF the requested change type is ‚Äúchange signaltiming pattern‚Äù; OR;		Data Element	3.3.5.9.4.2.d	sectionTimingPatternId	M	

Req ID	Requirement	Dialog ID	Data Concept Type	Data Concept ID	Data Concept Name	Is Required	Additional Specifications
e	The requested offset in seconds IF the requested change type is ‚Äúmake offset adjustment		Data Element	3.3.5.9.4.2.e	offsetAdjustment	M	
3.3.5.9.4.3	Contents of Center Connection Information		Data Frame	3.3.5.9.4.3	SignalChangeResponse		
a	Generic device change response header information		Data Frame	3.3.5.9.4.3.1.a	deviceChangeResponseHeader	M	
3.3.5.9.4.3.2.1	Section Identifier - Signal Change		Data Element	3.3.5.9.4.3.2.1	sectionIdentifierSignalChange		
3.3.5.9.4.3.2.2	Signal Timing Mode - Current		Data Element	3.3.5.9.4.3.2.2	signalTimingModeCurrent		
3.3.5.9.4.3.2.3	Signal Timing Pattern Identifier - Current		Data Element	3.3.5.9.4.3.2.3	signalTimingPatternIdentifierCurrent		
3.3.5.9.4.3.2.4	Signal Offset - Current		Data Element	3.3.5.9.4.3.2.4	signalOffsetCurrent		
3.3.5.9.5	Request Signal Change Status						
3.3.5.9.5.1	**Send Signal Controller Change Status Upon Request**	**4.1**	**Dialog**				**See 3.3.5.1.2.3.1**
3.3.5.9.5.2	Contents of Center Connection Information		Data Frame	3.3.5.9.5.2	SignalControllerChangeStatusRequest		

Req ID	Requirement	Dialog ID	Data Concept Type	Data Concept ID	Data Concept Name	Is Required	Additional Specifications
a	Generic change device status request		Data Frame	3.3.5.9.5.2.a	deviceChangeStatusRequest	M	
3.3.5.9.5.3	Contents of Center Connection Information		Data Frame	3.3.5.9.5.3	SignalControllerChangeStatusResponse		
a	Generic device change response header information		Data Frame	3.3.5.9.5.3.a	deviceControlResponseHeader	M	
3.3.5.9.6	Cancel External Change Requests for Traffic Signals		Data Frame				
3.3.5.9.6.1	**Send Cancel Signal Controller Change Response Upon Request**	**4.1**	**Dialog**				**See 3.3.5.1.2.4.1**
3.3.5.9.6.2	Contents of Center Connection Information		Data Frame	3.3.5.9.6.2	SignalControllerCancellationRequest		
a	Generic cancel device change request		Data Frame	3.3.5.9.6.2.a	deviceChangeCancellationRequest	M	
3.3.5.9.6.3	Contents of Center Connection Information		Data Frame	3.3.5.9.6.3	SignalControllerCancellationResponse		
a	Generic device change		Data Frame	3.3.5.9.6.3.a	deviceChangeResponseHeader	M	

Req ID	Requirement	Dialog ID	Data Concept Type	Data Concept ID	Data Concept Name	Is Required	Additional Specifications
	response header information						
3.3.5.9.7	Share Traffic Signal Timing Pattern Schedule						
3.3.5.9.7.1	**Send Signal Timing Pattern Schedule Information Upon Request**	**4.1**	**Dialog**				
3.3.5.9.7.2	**Publish Signal Timing Pattern Schedule Information**	**4.2**	**Dialog**				
3.3.5.9.7.3	**Subscribe to Signal Timing Pattern Schedule Information**	**4.3**	**Dialog**				
3.3.5.9.7.4	Contents of Center Connection Information		Data Frame	3.3.5.9.7.4	SignalTimingPatternScheduleRequest		
a	Generic device schedule information		Data Frame	3.3.5.9.7.4.a	deviceControlScheduleHeader	M	
3.3.5.9.7.5	Contents of Center Connection Information		Data Frame	3.3.5.9.7.5	SignalTimingPatternScheduleResponse		
a	Required Center Connection Information Request Content		Data Frame	3.3.5.9.7.5.a	deviceControlScheduleInformation	M	

Req ID	Requirement	Dialog ID	Data Concept Type	Data Concept ID	Data Concept Name	Is Required	Additional Specifications
b	Required Center Connection Information Request Content		Data Frame	3.3.5.9.7.5.b	timeBaseScheduleDay	M	
c	The time base schedule day pattern signal timing pattern identifier.		Data Element	3.3.5.9.7.5.c	timingPatternId	M	
3.3.5.9.8	Share Signal Timing Pattern Information						
3.3.5.9.8.1	**Send Signal Timing Pattern Upon Request**	**4.1**	**Dialog**				
3.3.5.9.8.2	**Publish Signal Timing Pattern Information**	**4.2**	**Dialog**				
3.3.5.9.8.3	**Subscribe to Signal Timing Pattern Information**	**4.3**	**Dialog**				
3.3.5.9.8.4	Contents of Center Connection Information		Data Frame	3.3.5.9.8.4	SignalTimingPatternRequest		
a	Generic device information request		Data Frame	3.3.5.9.8.4.1.a	deviceInformationRequest	M	
3.3.5.9.8.4.2.1	Signal Timing Pattern Identifier		Data Element	3.3.5.9.8.4.2.1	signalTimingPatternIdentifier		
3.3.5.9.8.5	Contents of Center Connection Information		Data Frame	3.3.5.9.8.5	SignalTimingPatternResponse		

Req ID	Requirement	Dialog ID	Data Concept Type	Data Concept ID	Data Concept Name	Is Required	Additional Specifications
a	Required Center Connection Information Request Content		Data Frame	3.3.5.9.8.5.1.a	deviceInventoryHeader	M	
b	Signal timing pattern identifier for the signal timing pattern;		Data Element	3.3.5.9.8.5.1.b	timingPatternId	M	
c	Cycle length		Data Element	3.3.5.9.8.5.1.c	cycleLength	M	
d	Offset time		Data Element	3.3.5.9.8.5.1.d	offsetTime	M	
e	An identifier for each phase for the signal timing pattern;		Data Element	3.3.5.9.8.5.1.e	phaseIds	M	
f	An indication on which phase		Data Element	3.3.5.9.8.5.1.f	phaseIndication	M	
g	Split-mode		Data Element	3.3.5.9.8.5.1.g	spiltMode	M	
h	Phase-split, in tenths of a second, for each phase for each signal timing pattern.		Data Element	3.3.5.9.8.5.1.h	phaseSplit	M	
3.3.5.9.8.5.2.1	Description of Signal Timing Pattern		Data Element	3.3.5.9.8.5.2.1	descriptionSignalTimingPattern		
3.3.5.9.8.5.2.2	Maximum Green Duration		Data Element	3.3.5.9.8.5.2.2	maximumGreenDuration		
3.3.5.9.8.5.2.3	Minimum Green Duration		Data Element	3.3.5.9.8.5.2.3	minimumGreenDuration		

Req ID	Requirement	Dialog ID	Data Concept Type	Data Concept ID	Data Concept Name	Is Required	Additional Specifications
3.3.5.9.8.5.2.4	Vehicle Yellow Duration		Data Element	3.3.5.9.8.5.2.4	vehicleYellowDuration		
3.3.5.9.8.5.2.5	Vehicle Red Clearance Duration		Data Element	3.3.5.9.8.5.2.5	vehicleRedClearanceDuration		
3.3.5.9.8.5.2.6	Minimum Walk Duration		Data Element	3.3.5.9.8.5.2.6	minimumWalkDuration		
3.3.5.9.8.5.2.7	Pedestrian Clearance Duration		Data Element	3.3.5.9.8.5.2.7	pedestrianClearanceDuration		
3.3.5.9.8.5.2.8	Steady-dont-walk Duration		Data Element	3.3.5.9.8.5.2.8	steadyDontWalkDuration		
3.3.5.9.8.5.2.9	Phase Sequence Information		Data Element	3.3.5.9.8.5.2.9	phaseSequenceInformation		
3.3.5.9.8.5.2.10	Required Center Connection Information Request Content		Data Frame	3.3.5.9.8.5.2.10	signalTimingPatternDateTimeChangeInformation		
3.3.5.9.9	Share Section Status Information						
3.3.5.9.9.1	**Send Section Status Information Upon Request**	**4.1**	**Dialog**				
3.3.5.9.9.2	**Publish Section Status Information**	**4.2**	**Dialog**				
3.3.5.9.9.3	**Subscribe to Section Status Information**	**4.3**	**Dialog**				
3.3.5.9.9.4	Contents of Center		Data Frame	3.3.5.9.9.4	SectionStatusInformationRequest		

Req ID	Requirement	Dialog ID	Data Concept Type	Data Concept ID	Data Concept Name	Is Required	Additional Specifications
	Connection Information						
a	Generic device information request		Data Frame	3.3.5.9.9.4.a	deviceInformationRequest	M	
3.3.5.9.9.5	Contents of Center Connection Information		Data Frame	3.3.5.9.9.5	SectionStatusInformationResponse		
a	Required Center Connection Information Request Content		Data Frame	3.3.5.9.9.5.1.a	organizationInformation	M	
b	Unique identifier of the section;		Data Element	3.3.5.9.9.5.1.b	sectionId	M	
c	Unique identifiers of each signal controller assigned to the section;		Data Element	3.3.5.9.9.5.1.c	sectionControllerId	M	
d	Required Center Connection Information Request Content		Data Frame	3.3.5.9.9.5.1.d	sectionTimingMode	M	
e	Unique identifier of the section timing pattern		Data Element	3.3.5.9.9.5.1.e	sectionTimingPatterns	M	
3.3.5.9.9.5.2.1	Section Name		Data Element	3.3.5.9.9.5.2.1	sectionName		
3.3.5.9.9.5.2.2	Description of Section Timing Pattern - Section Status		Data Element	3.3.5.9.9.5.2.2	descriptionSectionTimingPatternSectionStatus		

Req ID	Requirement	Dialog ID	Data Concept Type	Data Concept ID	Data Concept Name	Is Required	Additional Specifications
3.3.5.9.9.5.2.3	Section Cycle Length - Section Status		Data Element	3.3.5.9.9.5.2.3	sectionCycleLengthSectionStatus		
3.3.5.9.9.5.2.4	Operator Identifier - Section Status		Data Element	3.3.5.9.9.5.2.4	operatorIdentifierSectionStatus		
3.3.5.9.9.5.2.5	Event Identifier - Section Status		Data Element	3.3.5.9.9.5.2.5	eventIdentifierSectionStatus		
3.3.5.9.9.5.2.6	Event Response Plan - Section Status		Data Element	3.3.5.9.9.5.2.6	eventResponsePlanSectionStatus		
3.3.5.9.9.5.2.7	Required Center Connection Information Request Content		Data Frame	3.3.5.9.9.5.2.7	sectionStatusDateTimeChangeInformation		
3.3.5.9.10	**External Change Requests for Signal Sections**	**4.1**	**Dialog**				
3.3.5.9.10.1	Send Signal Section Change Response Upon Request		Data Frame				
3.3.5.9.10.1.1	Contents of Center Connection Information		Data Frame	3.3.5.9.10.1.1	SignalSectionChangeRequest		
a	Generic device control request header information		Data Frame	3.3.5.9.10.1.1.a	deviceControlRequestHeader	M	
b	The type of change request for the section		Data Element	3.3.5.9.10.1.1.b	changeRequestType	M	

Req ID	Requirement	Dialog ID	Data Concept Type	Data Concept ID	Data Concept Name	Is Required	Additional Specifications
c	Required Center Connection Information Request Content		Data Frame	3.3.5.9.10.1.1.c	requestTimingMode	M	
d	Required Center Connection Information Request Content		Data Frame	3.3.5.9.10.1.1.d	sectionTimingPattern	M	
3.3.5.9.10.2	Contents of Signal Section Change Response		Data Frame				
3.3.5.9.10.2.1	Contents of Center Connection Information		Data Frame	3.3.5.9.10.2.1	SignalSectionChangeResponse		
a	Generic device change response header information		Data Frame	3.3.5.9.10.2.1.a	deviceChangeResponseHeader	M	
3.3.5.9.10.2.2	Optional Signal Section Change Response Content						
3.3.5.9.10.2.2.1	Required Center Connection Information Request Content		Data Frame	3.3.5.9.10.2.2.1	sectionTimingModeCurrent		
3.3.5.9.10.2.2.2	Required Center Connection Information Request Content		Data Frame	3.3.5.9.10.2.2.2	sectionTimingPattern		
3.3.5.9.11	Request Section Change Status						

Req ID	Requirement	Dialog ID	Data Concept Type	Data Concept ID	Data Concept Name	Is Required	Additional Specifications
3.3.5.9.11.1	**Send Section Change Status Upon Request**	**4.1**	**Dialog**				
3.3.5.9.11.2	Contents of Center Connection Information		Data Frame	3.3.5.9.11.2	SectionChangeStatusRequest		
a	Generic change device status request		Data Frame	3.3.5.9.11.2.a	deviceChangeStatusRequest	M	
3.3.5.9.11.3	Contents of Center Connection Information		Data Frame	3.3.5.9.11.3	SectionChangeStatusResponse		
a	Generic device change response header information		Data Frame	3.3.5.9.11.3.a	deviceControlResponseHeader	M	
3.3.5.9.12	Cancel Control Requests for Remote Signal Sections						
3.3.5.9.12.1	**Send Cancel Signal Section Change Response Upon Request**	**4.1**	**Dialog**				**See 3.3.5.1.2.4.1**
3.3.5.9.12.2	Contents of Center Connection Information		Data Frame	3.3.5.9.12.2	SignalSectionCancellationRequest		
a	Generic cancel device change request		Data Frame	3.3.5.9.12.2.a	deviceChangeCancellationRequest	M	

Req ID	Requirement	Dialog ID	Data Concept Type	Data Concept ID	Data Concept Name	Is Required	Additional Specifications
3.3.5.9.12.3	Contents of Center Connection Information		Data Frame	3.3.5.9.12.3	SignalSectionCancellationResponse		
a	Generic device change response header information		Data Frame	3.3.5.9.12.3.a	deviceChangeResponseHeader	M	
3.3.5.9.13	Share Section Timing Pattern Schedule						
3.3.5.9.13.1	**Send Section Timing Pattern Schedule Information Upon Request**	**4.1**	**Dialog**				
3.3.5.9.13.2	**Publish Section Timing Pattern Schedule Information**	**4.2**	**Dialog**				
3.3.5.9.13.3	**Subscribe to Section Timing Pattern Schedule Information**	**4.3**	**Dialog**				
3.3.5.9.13.4	Contents of Center Connection Information		Data Frame	3.3.5.9.13.4	SectionTimingPatternScheduleRequest		
a	Generic device information request		Data Frame	3.3.5.9.13.4.a	deviceInformationRequest	M	
3.3.5.9.13.5	Contents of Center		Data Frame	3.3.5.9.13.5	SectionTimingPatternScheduleResponse		

Req ID	Requirement	Dialog ID	Data Concept Type	Data Concept ID	Data Concept Name	Is Required	Additional Specifications
	Connection Information						
a	Required Center Connection Information Request Content		Data Frame	3.3.5.9.13.5.a	organizationInformation	M	
b	Unique identifier of each section;		Data Element	3.3.5.9.13.5.b	sectionId	M	
c	The time base schedule number;		Data Element	3.3.5.9.13.5.c	timeBaseScheduleNumber	M	
d	The time base schedule month;		Data Element	3.3.5.9.13.5.d	timeBaseScheduleMonth	M	
e	The time base schedule day of week;		Data Element	3.3.5.9.13.5.e	timeBaseScheduleDay	M	
f	Required Center Connection Information Request Content		Data Frame	3.3.5.9.13.5.f	timeBaseScheduleDate	M	
g	The time base schedule day pattern;		Data Element	3.3.5.9.13.5.g	timeBaseScheduleDayPattern	M	
h	The time base schedule day pattern hour;		Data Element	3.3.5.9.13.5.h	timeBaseScheduleDayHour	M	
i	The time base schedule day pattern minute;		Data Element	3.3.5.9.13.5.i	timeBaseScheduleDayMinute	M	
j	Required Center Connection Information Request Content		Data Frame	3.3.5.9.13.5.j	timeBaseScheduleLastChange	M	

Req ID	Requirement	Dialog ID	Data Concept Type	Data Concept ID	Data Concept Name	Is Required	Additional Specifications
k	Unique identifiers of each signal controller assigned to the section		Data Element	3.3.5.9.13.5.k	specialFunctionIdentifier	M	
l	Required Center Connection Information Request Content		Data Frame	3.3.5.9.13.5.l	timeBaseScheduleDayPatternMode	M	
m	The time base schedule day pattern section timing pattern identifier		Data Element	3.3.5.9.13.5.m	sectionTimingPatternId	M	
3.3.5.9.14	Share Signal Change Priority Queue Information						
3.3.5.9.14.1	**Send Signal Priority Queue Information Upon Request**	**4.1**	**Dialog**				
3.3.5.9.14.2	Contents of Center Connection Information		Data Frame	3.3.5.9.14.2	SignalChangePriorityQueueRequest		
a	Required Center Connection Information Request Content		Data Frame	3.3.5.9.14.2.a	deviceQueueRequest	M	
3.3.5.9.14.3	Contents of Center Connection Information		Data Frame	3.3.5.9.14.3	SignalChangePriorityQueueResponse		

Req ID	Requirement	Dialog ID	Data Concept Type	Data Concept ID	Data Concept Name	Is Required	Additional Specifications
a	Generic device priority queue response header information		Data Frame	3.3.5.9.14.3.a	devicePriorityQueueHeader	M	
b	The type of change request for each signal device		Data Element	3.3.5.9.14.3.b	changeRequestType	M	
c	The requested change in to the signal timing mode		Data Element	3.3.5.9.14.3.c	requestTimingMode		
d	Required Center Connection Information Request Content		Data Frame	3.3.5.9.14.3.d	sectionTimingPattern		
e	The requested offset in seconds		Data Element	3.3.5.9.14.3.e	offset		
3.3.5.9.15	Share Section Change Priority Queue Information						
3.3.5.9.15.1	**Send Section Change Priority Queue Information Upon Request**	**4.1**	**Dialog**		**SectionChangePriorityQueueInformationUponRequest**		
3.3.5.9.15.2	Contents of Center Connection Information		Data Frame	3.3.5.9.15.2	SectionChangePriorityQueueRequest		
a	Required Center Connection Information Request Content		Data Frame	3.3.5.9.15.2.a	deviceQueueRequest	M	

Req ID	Requirement	Dialog ID	Data Concept Type	Data Concept ID	Data Concept Name	Is Required	Additional Specifications
3.3.5.9.15.3	Contents of Center Connection Information		Data Frame	3.3.5.9.15.3	SectionChangePriorityQueueResponse		
a	Generic device priority queue response header information		Data Frame	3.3.5.9.15.3.a	devicePriorityQueueHeader	M	
b	Required Center Connection Information Request Content		Data Frame	3.3.5.9.15.3.b	changeType	M	
c	Required Center Connection Information Request Content		Data Frame	3.3.5.9.15.3.c	sectionTimingModeRequestedChange		
d	Required Center Connection Information Request Content		Data Frame	3.3.5.9.15.3.d	sectionTimingPattern		
3.3.5.9.16	Share Section Timing Pattern Information						
3.3.5.9.16.1	**Send Section Timing Pattern Upon Request**	**4.1**	**Dialog**				
3.3.5.9.16.2	**Publish Section Timing Pattern Information**	**4.2**	**Dialog**				
3.3.5.9.16.3	**Subscribe to Section Timing Pattern Information**	**4.3**	**Dialog**				
3.3.5.9.16.4	Contents of Center		Data Frame	3.3.5.9.16.4	SectionTimingPatternInformationRequest		

Req ID	Requirement	Dialog ID	Data Concept Type	Data Concept ID	Data Concept Name	Is Required	Additional Specifications
	Connection Information						
a	Generic device information request		Data Frame	3.3.5.9.16.4.a	deviceInformationRequest	M	
3.3.5.9.16.5	Contents of the Section Timing Pattern Information Response		Data Frame				
3.3.5.9.16.5.1	Contents of Center Connection Information		Data Frame	3.3.5.9.16.5.1	SectionTimingPatternInformationResponse		
a	Required Center Connection Information Request Content		Data Frame	3.3.5.9.16.5.1.a	organizationInformation	M	
b	Unique identifier of the section;		Data Element	3.3.5.9.16.5.1.b	sectionId	M	
c	The section timing pattern identifier. A section timing pattern is a list of individual signal timing		Data Element	3.3.5.9.16.5.1.c	sectionTimingPatternId	M	
d	The section cycle length		Data Element	3.3.5.9.16.5.1.d	sectionCycleLength	M	
e	Unique identifiers of each signal controller assigned to the section;		Data Element	3.3.5.9.16.5.1.e	sectionControllerId	M	

Req ID	Requirement	Dialog ID	Data Concept Type	Data Concept ID	Data Concept Name	Is Required	Additional Specifications
f	The cycle length		Data Element	3.3.5.9.16.5.1.f	cycleLength	M	
g	The offset time		Data Element	3.3.5.9.16.5.1.g	offsetTime	M	
h	The unique identifier of the signal timing pattern for each signal controller assigned to the		Data Element	3.3.5.9.16.5.1.h	timingPatternId	M	
i	An identifier for each phase in use for each signal controller.		Data Element	3.3.5.9.16.5.1.i	phaseId	M	
j	A list of the coordinates phases for each signal controller assigned to the section;		Data Element	3.3.5.9.16.5.1.j	cordinatedPhasesList	M	
k	Split-mode		Data Element	3.3.5.9.16.5.1.k	splitMode	M	
l	The split time, in tenths-of-a-second, for each phase in use for each signal controllerassigned to the section.		Data Element	3.3.5.9.16.5.1.l	splitTime	M	
3.3.5.9.16.5.2	Optional Section Timing Pattern Information Response Content						

Req ID	Requirement	Dialog ID	Data Concept Type	Data Concept ID	Data Concept Name	Is Required	Additional Specifications
3.3.5.9.16.5.2.1	Description of the Section Timing Pattern		Data Element	3.3.5.9.16.5.2.1	descriptionSectionTimingPattern		
3.3.5.9.16.5.2.2	Required Center Connection Information Request Content		Data Frame	3.3.5.9.16.5.2.2	sectionTimingPatternInventoryDateTimeChangeInfo		
3.3.5.9.17	External Commands for Traffic Signal Controllers						
3.3.5.9.17.1	**Send Signal Control Response Upon Command**	**4.1**	**Dialog**				
3.3.5.9.17.2	Contents of Center Connection Information		Data Frame	3.3.5.9.17.2	TrafficSignalControllerCommandRequest		
a	Generic device control command header information		Data Frame	3.3.5.9.17.2.a	deviceControlRequestHeader	M	
b	The type of control command		Data Element	3.3.5.9.17.2.b	controlCommandType	M	
c	The change in to the signal timing mode		Data Element	3.3.5.9.17.2.c	signalTimingModeChange	M	
d	The change to the signal timing pattern IF the requested		Data Element	3.3.5.9.17.2.d	changeSignalTiming	M	

Req ID	Requirement	Dialog ID	Data Concept Type	Data Concept ID	Data Concept Name	Is Required	Additional Specifications
	change type is ‚Äúchange signal timingpattern.						
3.3.5.9.17.3	Contents of Center Connection Information		Data Frame	3.3.5.9.17.3	TrafficSignalControllerCommandResponse		
a	Required Center Connection Information Request Content		Data Frame	3.3.5.9.17.3.a	deviceControlResponse	M	
3.3.5.10	Roadside Units		Data Frame				
3.3.5.10.1	Share RSU Inventory Information						
3.3.5.10.1.1	**Send RSU Inventory Information Upon Request**	**4.1**	**Dialog**				
3.3.5.10.1.2	**Publish RSU Inventory Information**	**4.2**	**Dialog**				
3.3.5.10.1.3	**Subscribe to RSU Inventory Information**	**4.3**	**Dialog**				
3.3.5.10.1.4	Contents of Center Connection Information		Data Frame	3.3.5.10.1.4	RSUInventoryRequest		
a			Data Frame	3.3.5.10.1.4.a	deviceInformationRequest	M	
3.3.5.10.1.5	Contents of Center		Data Frame	3.3.5.10.1.5	RSUInventoryResponse		

Req ID	Requirement	Dialog ID	Data Concept Type	Data Concept ID	Data Concept Name	Is Required	Additional Specifications
	Connection Information						
a	Required Center Connection Information Request Content		Data Frame	3.3.5.10.1.5.1.a	deviceInventoryHeader	M	
3.3.5.10.2	Share RSU Status Information						
3.3.5.10.2.1	Contents of Center Connection Information		Data Frame	3.3.5.10.2.1	RSUStatusRequest		
3.3.5.10.2.2	**Publish RSU Status Information**	**4.2**	**Dialog**				
3.3.5.10.2.3	**Subscribe to RSU Status Information**	**4.3**	**Dialog**				
3.3.5.10.2.4	Required RSU Status Request Content		Data Frame	3.3.5.10.2.4	RSUStatusRequest		
a			Data Frame	3.3.5.10.2.4.a	deviceInformationRequest	M	
3.3.5.10.2.5	Contents of Center Connection Information		Data Frame	3.3.5.10.2.5	RSUStatusResponse		
3.3.5.10.2.5.1	Required RSU Status Response Content		Data Frame	3.3.5.10.2.5.1	RSUStatusResponse		
a			Data Frame	3.3.5.10.2.5.1.a	deviceStatusHeader	M	

Req ID	Requirement	Dialog ID	Data Concept Type	Data Concept ID	Data Concept Name	Is Required	Additional Specifications
3.3.5.10.2.5.2	Optional RSU Status Content			3.3.5.10.2.5.2			
3.3.5.10.2.5.2.1			Data Element	3.3.5.10.2.5.2.1	rsuStatusMessage		
3.3.5.10.2.5.2.2			Data Element	3.3.5.10.2.5.2.2	rsuModeStatusMessage		
3.3.5.10.2.5.2.3			Data Element	3.3.5.10.2.5.2.3	rsuSecEnrollCertStatusMessage		
3.3.5.10.3	Share RSU Data Information			3.3.5.10.3			
3.3.5.10.3.1	Contents of Center Connection Information		Data Frame	3.3.5.10.3.1	RSUDataRequest		
3.3.5.10.3.2	**Publish RSU Data**	**4.2**	**Dialog**				
3.3.5.10.3.3	**Subscribe to RSU Data**	**4.3**	**Dialog**				
3.3.5.10.3.4	Contents of the RSU Data Request		Data Frame	3.3.5.10.3.4	RSUDataRequest		
a	Required RSU Data Request Content		Data Frame	3.3.5.10.3.4.1		M	
a			Data Frame	3.3.5.10.3.4.1.a	deviceInformationRequest	M	
3.3.5.10.3.5	Contents of Center Connection Information		Data Frame	3.3.5.10.3.5	RSUDataResponse		
a			Data Element	3.3.5.10.3.5.1.a	organizationId	M	
b	The message payload of all		Data Element	3.3.5.10.3.5.1.b	messagePayload	M	

Req ID	Requirement	Dialog ID	Data Concept Type	Data Concept ID	Data Concept Name	Is Required	Additional Specifications
	messages received or broadcasted by the RSU (list)						
c	The message number of each message received or broadcasted by the RSU.		Data Element	3.3.5.10.3.5.1.c	messageNumber	M	
d	The V2X message type of each message received or broadcasted by the RSU		V2XMessageType	3.3.5.10.3.5.1.d	organizationId	M	
e	The message source of each message received or broadcasted by the RSU		Data Element	3.3.5.10.3.5.1.e	messageSource	M	
f	The active message type of each message received or broadcasted by the RSU		Data Element	3.3.5.10.3.5.1.f	activeMessageType	M	
3.3.6	Share Archive Data		Data Frame				
3.3.6.1	Link Identifier - Traffic Monitoring Data		Data Frame				
3.3.6.1.1	Share Traffic Monitoring Data		Data Frame				

Req ID	Requirement	Dialog ID	Data Concept Type	Data Concept ID	Data Concept Name	Is Required	Additional Specifications
	Inventory Information						
3.3.6.1.1.1	**Send Traffic Monitoring Data Inventory Information Upon Request**	**4.1**	**Dialog**				
3.3.6.1.1.2	Contents of Center Connection Information		Data Frame	3.3.6.1.1.2	TrafficMonitoringDataInventoryRequest		
a	Required Center Connection Information Request Content		Data Frame	3.3.6.1.1.2.1.a	requestingOrganizationInformation	M	
b	Required Center Connection Information Request Content		Data Frame	3.3.6.1.1.2.1.b	ownerOrganizationInformation	M	
3.3.6.1.1.2.2.1	Required Center Connection Information Request Content		Data Frame	3.3.6.1.1.2.2.1	authorization		
3.3.6.1.1.2.2.2	Operator Identifier - Traffic Monitoring Data		Data Element	3.3.6.1.1.2.2.2	operatorId		
3.3.6.1.1.2.2.3	Data Set Type		Data Element	3.3.6.1.1.2.2.3	dataSetType		
3.3.6.1.1.2.2.4	Data Collection Period		Data Element	3.3.6.1.1.2.2.4	dataCollectionPeriod		
3.3.6.1.1.2.2.5	Required Center Connection Information Request Content		Data Frame	3.3.6.1.1.2.2.5	geoLocation		

Req ID	Requirement	Dialog ID	Data Concept Type	Data Concept ID	Data Concept Name	Is Required	Additional Specifications
3.3.6.1.1.3	Contents of Center Connection Information		Data Frame	3.3.6.1.1.3	TrafficMonitoringDataInventoryResponse		
a	Required Center Connection Information Request Content		Data Frame	3.3.6.1.1.3.1.a	organization		
b	Data set type;		Data Element	3.3.6.1.1.3.1.b	dataSetType	M	
c	Description of the data set;		Data Element	3.3.6.1.1.3.1.c	dataSetDescription	M	
d	Data collection time period; and		Data Element	3.3.6.1.1.3.1.d	dataCollectionTimePeriod	M	
e	Required Center Connection Information Request Content		Data Frame	3.3.6.1.1.3.1.e	dataSetPublicationDateTime	M	
3.3.6.1.1.3.2.1	Required Center Connection Information Request Content		Data Frame	3.3.6.1.1.3.2.1	informationAccessRestrictions		
3.3.6.1.1.3.2.2	Purpose of the Data Set		Data Element	3.3.6.1.1.3.2.2	purposeDataSet		
3.3.6.1.1.3.2.3	Title of the Data Set		Data Element	3.3.6.1.1.3.2.3	titleDataSet		
3.3.6.1.1.3.2.4	Version of the Data Set		Data Element	3.3.6.1.1.3.2.4	versionDataSet		
3.3.6.1.1.3.2.5	Publication Information of the Data Set		Data Element	3.3.6.1.1.3.2.5	publicationInformationDataSet		
3.3.6.1.1.3.2.6	Progress of the Data Set		Data Element	3.3.6.1.1.3.2.6	progressDataSet		

Req ID	Requirement	Dialog ID	Data Concept Type	Data Concept ID	Data Concept Name	Is Required	Additional Specifications
3.3.6.1.1.3.2.7	Maintenance of the Data Set		Data Element	3.3.6.1.1.3.2.7	maintenanceDataSet		
3.3.6.1.1.3.2.8	Data Set Uniform Resource Locator (URL)		Data Element	3.3.6.1.1.3.2.8	dataSetURL		
3.3.6.1.1.3.2.9	Data Set URL Reference Medium		Data Element	3.3.6.1.1.3.2.9	dataSetURLReferenceMedium		
3.3.6.1.1.3.2.10	Roadway Network Identifier - Traffic Monitoring Data		Data Element	3.3.6.1.1.3.2.10	roadwayNetworkId		
3.3.6.1.1.3.2.11			Data Element	3.3.6.1.1.3.2.11	linkId		
3.3.6.1.1.3.2.12	Route Designator - Traffic Monitoring Data		Data Element	3.3.6.1.1.3.2.12	routeDesignator		
3.3.6.1.1.3.2.13	Linear Reference - Traffic Monitoring Data		Data Element	3.3.6.1.1.3.2.13	linearReference		
3.3.6.2	Share Processing Documentation Metadata						
3.3.6.2.1	**Send Processing Documentation Metadata Information Upon Request**	**4.1**	**Dialog**				
3.3.6.2.2	Contents of Center		Data Frame	3.3.6.2.2	ProcessingDocMetaDataInfoRequest		

Req ID	Requirement	Dialog ID	Data Concept Type	Data Concept ID	Data Concept Name	Is Required	Additional Specifications
	Connection Information						
a	User name of the requesting operator;		Data Element	3.3.6.2.2.1.a	usernameRequestingOperator	M	
b	Password of the requesting operator; and		Data Element	3.3.6.2.2.1.b	authentication	M	
c	Required Center Connection Information Request Content		Data Frame	3.3.6.2.2.1.c	organizationInfo	M	
3.3.6.2.3	Contents of Center Connection Information		Data Frame	3.3.6.2.3	ProcessingDocMetaDataInfoResponse		
a	Required Center Connection Information Request Content		Data Frame	3.3.6.2.3.1.a	organizationInfo	M	
b	Required Center Connection Information Request Content		Data Frame	3.3.6.2.3.1.b	lastUpdateDate	M	
c	Name assigned to the metadata standard by the owner organization; and		Data Element	3.3.6.2.3.1.c	processingMetadataName	M	
d	Metadata version number.		Data Element	3.3.6.2.3.1.d	processingMetadataVersion	M	
3.3.6.2.3.2.1	Required Center Connection		Data Frame	3.3.6.2.3.2.1	informationAccessRestrictions		

Req ID	Requirement	Dialog ID	Data Concept Type	Data Concept ID	Data Concept Name	Is Required	Additional Specifications
	Information Request Content						
3.3.6.2.3.2.2	Required Center Connection Information Request Content		Data Frame	3.3.6.2.3.2.2	publicationDateTime		
3.3.6.2.3.2.3	Processing Method		Data Element	3.3.6.2.3.2.3	processingMethod		
3.3.6.2.3.2.4	Processing Method Description		Data Element	3.3.6.2.3.2.4	processingMethodDescription		
3.3.6.2.3.2.5	Application Rules		Data Element	3.3.6.2.3.2.5	applicationRules		
3.3.6.2.3.2.6	Enumeration		Data Element	3.3.6.2.3.2.6	enumeration		

Annex A – Dialogs [Informative]

A.1 Dialog – Request Response

A request-response dialog involves a direct, two-way exchange of information between external center and owner center.

A.2 Dialog – Publish

A publish dialog involves a data provider (owner center) broadcasting information to potential data consumers (external centers). The publish dialog is asynchronous. The publisher doesn't necessarily expect a direct response from each recipient. This model is efficient for disseminating information widely and keeping users informed about dynamic changes in the public transport network.

The JSON schema for publishing to Kafka support both periodic and event-driven updates, an additional property to indicate the update type is added:

```
{
  "$schema": " https://json-schema.org/draft/2020-12/schema",
  "title": "PublishEvent",
  "description": "Represents the event publishing payload for Kafka",
  "type": "object",
  "properties": {
    "topic": {
      "type": "string",
      "description": "The topic of the event being published"
    },
    "ownerCenterId": {
      "type": "string",
      "description": "Identifier for the owning center"
    },
    "timestamp": {
      "type": "string",
      "format": "date-time",
      "description": "The timestamp of the publish action"
    },
    "status": {
      "type": "string",
      "description": "The status of the event being published",
      "enum": [
        "Created",
        "Updated",
        "Deleted"
      ]
    },
    "updatedFields": {
```

```
            "type": "array",
            "description": "Fields that were updated",
            "items": {
               "type": "string"
            }
         },
         "updateType": {
            "type": "string",
            "description": "The type of update being performed",
            "enum": [
               "event-driven",
               "periodic"
            ]
         },
         "publishedObject": {
            "type": "object",
            "description": "The object being published, can be of any structure",
            "additionalProperties": true
         }
      },
      "required": [
         "topic",
         "ownerCenterId",
         "timestamp",
         "status",
         "updateType",
         "publishedObject"
      ]
   }
```


A.3 Dialog – Subscribe

A subscribe dialog allows an external center to express interest in receiving specific types of information from the owner center. The subscribe dialog establishes a relationship between the subscriber and the information provider, ensuring that the subscriber receives relevant published information without actively requesting it each time.


```
{
   "$schema": "http://json-schema.org/2020-12/schema#",
   "title": "SubscribeMessage",
   "description": "Represents a message for subscribing to organization updates",
   "type": "object",
   "properties": {
      "topic": {
         "type": "string",
         "description": "The topic to subscribe to"
      },
      "externalCenterId": {
```

```
            "type": "string",
            "description": "Identifier for the external center initiating the subscription"
        },
        "ownerCenterId": {
            "type": "string",
            "description": "Identifier for the owner center providing the updates"
        },
        "subscriptionTimestamp": {
            "type": "string",
            "format": "date-time",
            "description": "Timestamp when the subscription was initiated"
        },
        "authenticationDetails": {
            "type": "object",
            "description": "Details for authentication",
            "properties": {
                "authorizationToken": {
                    "type": "string",
                    "pattern": "Bearer\\s+([A-Za-z0-9-_=.]+)",
                    "description": "OAuth 2.0 Bearer Token"
                }
            },
            "required": [
                "authorizationToken"
            ]
        },
        "subscriptionOptions": {
            "type": "object",
            "description": "Optional subscription settings",
            "properties": {}
        }
    },
    "required": [
        "topic",
        "externalCenterId",
        "ownerCenterId",
        "subscriptionTimestamp",
        "authenticationDetails"
    ]
}
```

Annex B – Migration from XML to JSON Schema [Informative]

This annexure describes the strategic transition from the XML-based TMDD v3.1 standard to the JSON-based ngTMDD (Next Generation Traffic Management Data Dictionary) schema. It addresses the key drivers for this migration and demonstrates how the new

schema better serves modern Center-to-Center (C2C) communications in Intelligent Transportation Systems (ITS).

B.1 Background and Context

The original TMDD v3.1 standard, designed in the early 2000s, was built upon XML (Extensible Markup Language) technology. While XML provided a structured, human-readable format for data exchange, it was developed for a different era of web services and ITS infrastructure. The ngTMDD initiative recognizes the evolution of technology, data volumes, and integration requirements in modern ITS ecosystems.

Today's traffic management centers operate in an environment characterized by:

- Real-time data requirements with millisecond-level latency
- Massive volumes of sensor and device data from IoT networks
- REST APIs and microservices architecture dominance
- Cloud-based deployments and containerization
- Mobile and edge computing paradigms
- Integration with AI/ML systems for predictive analytics

B.2 Key Drivers for Migration to JSON

The following table highlights the primary advantages of JSON over XML for modern C2C communications:

Aspect	XML (TMDD v3.1)	JSON (ngTMDD)
Payload Size	Verbose syntax with extensive tag overhead (~40-60% larger)	Compact format with minimal overhead (~40-60% smaller)
Parsing Speed	Requires DOM or SAX parsing; computationally intensive	Native JavaScript object; faster parsing (~30-40% quicker)
Human Readability	Readable but verbose; harder to scan visually	Minimal syntax; easier to read and understand at a glance
Web Integration	Requires custom serialization; weak REST API native support	Native web standard; seamless REST API integration
Language Support	Varying levels of support across programming languages	Universal support across all modern programming languages
Schema Validation	XSD (XML Schema Definition) is complex and verbose	JSON Schema is simpler and more intuitive to work with
Data Types	All values treated as strings; type conversion required	Native support for strings, numbers, booleans, arrays, objects
Developer Experience	Steeper learning curve; verbose configuration files	Shorter learning curve; familiar syntax for modern developers
API-First Design	Not designed with API-first paradigm	Designed for API-first, microservices architecture
Mobile Compatibility	Poor performance on mobile and low-bandwidth networks	Optimized for mobile clients and constrained networks

B.3 Technical Advantages of JSON Schema

3.1 Reduced Payload Size and Bandwidth

JSON's compact syntax significantly reduces message size. For high-frequency data exchanges typical in traffic management systems, this reduction translates to:

- Lower bandwidth consumption
- Reduced network latency
- Lower server and infrastructure costs
- Improved performance in congested networks
- Better support for resource-constrained edge devices

Example: A typical DMS (Dynamic Message Sign) status message in XML format may require 2.5 KB, while the equivalent JSON representation requires only 1.4 KB, a 44% reduction in payload size.

3.2 Native Data Type Support

JSON provides native support for multiple data types (strings, numbers, booleans, arrays, objects, null), eliminating the need for type conversion logic. This reduces processing overhead and minimizes programming errors related to type mismatches.

3.3 Seamless REST API Integration

JSON is the de facto standard for REST APIs and HTTP-based web services. Modern frameworks (Spring Boot, FastAPI, Express.js, etc.) provide automatic JSON serialization and deserialization, eliminating the need for custom converters and reducing implementation complexity.

3.4 Schema Validation Simplicity

JSON Schema (RFC 2020-12) is significantly simpler than XML Schema Definition (XSD). ngTMDD utilizes JSON Schema draft 2020-12, which provides:

- Clearer schema structure for developers
- Built-in support for validation libraries in all major languages
- Easier integration with API documentation tools (OpenAPI/Swagger)
- Better tooling support for schema-driven code generation
- Simplified extension mechanisms for custom requirements

B.4 Alignment with Modern Architecture Paradigms

Microservices and API-First Design

Modern ITS implementations increasingly adopt microservices architecture where different traffic management functions (signal control, incident management, incident detection) are independent services. JSON's lightweight nature and REST API alignment make it the natural choice for inter-service communication.

Cloud-Native Deployments

Cloud platforms and containerization (Docker, Kubernetes) are now standard in ITS deployments. JSON's efficiency directly impacts cloud infrastructure costs. Additionally, Kubernetes uses JSON/YAML for configuration, aligning ngTMDD with the operational reality of modern deployments.

IoT and Edge Computing

With increasing deployment of edge devices and IoT sensors, bandwidth and processing constraints are critical concerns. JSON's compact nature and native support in IoT frameworks (Node.js, Python, Java) make it ideal for edge-to-center and device-to-cloud communication patterns.

B.5 Interoperability and Developer Experience

Universal Language Support

Every modern programming language (Python, Java, C#, Go, Rust, JavaScript, PHP, etc.) has first-class JSON support. This universal support eliminates the need for language-specific XML parsing libraries and reduces implementation variability across different centers.

Developer Productivity

Modern developers are trained with JSON as the standard for data interchange. JSON familiarity reduces onboarding time, accelerates development cycles, and reduces the learning curve for implementing C2C communication protocols.

Tooling and Automation

JSON enjoys comprehensive tool support:

- Code generation tools (OpenAPI Generator, JSON Schema code generators)
- API testing frameworks (Postman, REST Assured, pytest)
- Schema validation libraries (ajv, jsonschema, json-schema-validator)
- Documentation tools (Swagger UI, ReDoc, API Blueprint)
- IDE support with autocomplete, schema validation, and navigation

B.6 Migration Strategy and Considerations

Phased Implementation

The transition to ngTMDD does not require simultaneous replacement of all centers. A phased approach allows:

- Gradual adoption based on operational priorities and risk tolerance
- Continued operation of TMDD v3.1 systems alongside ngTMDD implementations
- Translation gateways between XML and JSON for interoperability during transition
- Parallel validation and testing before full cutover

Implementation Guidance

The ngTMDD specification (informed by sections 9.1-9.4 of the CWZ Standard RS v00.23 SDR) provides clear implementation guidelines for:

- Message structure and encoding specifications
- Authentication and authorization mechanisms (OAuth 2.0 Bearer tokens)
- Request-response patterns for synchronous C2C communications
- Publish-subscribe patterns for asynchronous data distribution
- Error handling and status reporting conventions
- Data validation and schema enforcement mechanisms

B.7 Real-World Implementation Benefits

ngTMDD delivers tangible benefits to traffic management organizations:

Benefit Category	Specific Advantages
Operational Efficiency	Faster message processing, reduced latency in incident response, improved scalability for growing sensor networks
Cost Reduction	Lower bandwidth costs, reduced server infrastructure requirements, decreased deployment complexity, faster development cycles
Interoperability	Easier integration with third-party systems, vendor ecosystem support, reduced vendor lock-in
Future Readiness	Ready for AI/ML integration, compatible with edge computing and 5G, aligned with ITS standards evolution
Maintenance and Support	Larger developer pool with JSON expertise, extensive community resources, better tool support

B.8 Conclusion

The migration from XML-based TMDD v3.1 to JSON-based ngTMDD represents a strategic evolution of the standard to meet the demands of modern ITS implementations. JSON's technical advantages—reduced payload size, faster parsing, native data types, and

seamless REST API integration—combined with superior developer experience and tooling support, position ngTMDD as the appropriate foundation for future Center-to-Center communications.

This transition is not merely a format change but a fundamental alignment with the architectural, operational, and economic realities of contemporary ITS deployments. Organizations implementing C2C communications are encouraged to adopt ngTMDD to leverage these benefits while maintaining interoperability with legacy systems during their transition period.