

# Attachment 9

## NCTA CBOS to RSS ICD

# BOS/RTCS INTERFACE CONTROL DOCUMENT

Version 6.0

## Back Office System Project

## North Carolina Turnpike Authority

Contract #1318092

Prepared by:

The logo for Transcore, featuring the word "TRANSCORE" in a blue, italicized, sans-serif font. A curved line arches over the letters "A", "N", and "S".

October 22, 2019

The Transcore logo, consisting of the word "TRANSCORE" in a white, italicized, sans-serif font with a curved line over "ANS", and the tagline "Trusted Transportation Solutions" in a smaller, white, sans-serif font below it. The logo is set against a dark blue background with a faint grid pattern.

## Revision History

VERSION	DATE	SECTIONS AFFECTED	CHANGE DESCRIPTION
1.0	02/05/2019	All	Initial release
2.0	05/01/19	All	Updated version based on previous comments
3.0	5/23/19	7	Removed 7.5 in table per comments
3.1	5/29/19	All	Updated based on feedback from NCTA review
4.0	5/30/19	All	Updated based on meeting with I-77
4.1	7/8/19	Sec. 6 and Appendix B	Added plate types to Appendix B and also added Vehicle_Axle to TRXN Files
4.2	7/12/19	4.3-010	Updated to ensure consistency
4.3	7/18/19	All	Updated based on comments
5.0	7/31/2019	All	Updated based on comments, also updated Lane Transaction ID (Char Count) in Roadway Transaction (TRXN) File -- Detail Structure
6.0	10/22/2019	3.2 FTSL 5 Full Plate Status List Files (FPSL) 6 Transaction File 9 TREC File	Updated Table 13: Full Transponder Status List (FTSL) File -- Detail Structure -- fixed the formatting to include DD in MODE_EFF_DATE_TIME, also updated TAG_Protocol from TBD to 0 = Unknown Updated acronym in header from FPLS to FPSL Updated Table 34: Roadway Transaction (TRXN) File -- Detail Structure, TAG1_Protocol from TBD to 0 = Unknown Updated Table 55: Back Office Transaction Reconciliation (TREC) File -- Detail Structure- values were updated to *Values: 000000000000000001-- 9223372036854775807

©2019 TC IP, Ltd. All rights reserved. TRANSCORE is a registered trademark. These trademarks are used under license. All other trademarks listed are the property of their respective owners. Contents are subject to change.

This document is prepared for North Carolina Turnpike Authority as part of contract number 1318092. The concepts, ideas, information, and graphics presented inside are confidential in their entirety and the property of TransCore. It may be used by recipient only for the purpose for which it was transmitted. North Carolina Turnpike Authority shall attain prior written consent from TransCore before copying or communicating the document in any manner if doing so compromises the *Integrity* of TransCore's intellectual property rights therein.

## Contents

<b>Revision History .....</b>	<b>2</b>
<b>Contents .....</b>	<b>3</b>
<b>Tables.....</b>	<b>5</b>
<b>Terms/Acronyms/Abbreviations .....</b>	<b>7</b>
<b>1. Introduction .....</b>	<b>8</b>
1.1. Purpose .....	8
1.2. File Processing Order .....	11
<b>2. Acknowledgement Files .....</b>	<b>13</b>
2.1. File Name .....	13
2.2. File Layout.....	14
2.3. Processing Requirements.....	15
2.4. Sample File .....	16
<b>3. Full Transponder Status List (FTSL) Files.....</b>	<b>17</b>
3.1. File Name.....	17
3.2. File Layout.....	17
3.3. Generation and Processing Requirements.....	20
3.4. Sample File .....	21
<b>4. Incremental Transponder Status List (ITSL) Files .....</b>	<b>22</b>
4.1. File Name.....	22
4.2. File Layout.....	23
4.3. Processing Requirements.....	24
4.4. Sample File .....	25
<b>5. Full Plate Status List (FPSL) Files .....</b>	<b>26</b>
5.1. File Name.....	26
5.2. File Layout.....	26
5.3. Generation and Processing Requirements.....	28
5.4. Sample file .....	29
<b>6. Roadway Transaction (TRXN) Files .....</b>	<b>30</b>
6.1. File Name.....	30
6.2. File Layout.....	31
6.3. Processing Requirements.....	35
6.4. Sample File .....	37
<b>7. Roadway Transaction Correction (CTRN) Files .....</b>	<b>38</b>
7.1. File Name.....	38
7.2. File Layout.....	38
7.3. Processing Requirements.....	40
7.4. Sample File .....	41
<b>8. Roadway Transaction Image Files .....</b>	<b>42</b>

- 8.1. File Name ..... 42
- 8.2. File Name Layout..... 43
- 8.3. Processing Requirements..... 43
- 8.4. Sample File ..... 43
- 9. Back Office Transaction Reconciliation (TREC) Files ..... 45**
  - 9.1. File Name ..... 45
  - 9.2. File Layout ..... 45
  - 9.3. Processing Requirements..... 47
  - 9.4. Sample File ..... 48
- Appendix A: Agency, Plazas, and Vehicle Class/Type..... 49**
- Appendix B: Supported Plate Types ..... 50**
- Appendix C: Directory Structure and Communication Protocols ..... 53**

## Tables

Table 1: General BOS/RTCS ICD Requirements .....	9
Table 2: File Processing Order.....	12
Table 3: BOS/RTCS Acknowledgment File Requirements.....	13
Table 4: BOS/RTCS Acknowledgment File -- File Naming Convention.....	13
Table 5: BOS/RTCS Acknowledgment File -- File Name Requirements.....	13
Table 6: BOS/RTCS Acknowledgment File -- Header Structure .....	14
Table 7: BOS/RTCS Acknowledgment File -- Header Structure Requirements.....	15
Table 8: BOS/RTCS Acknowledgment File Processing Requirements.....	15
Table 9: Full Transponder Status List (FTSL) File Requirements.....	17
Table 10: Full Transponder Status List (FTSL) File -- File Naming Convention.....	17
Table 11: Full Transponder Status List (FTSL) File -- File Name Requirements.....	17
Table 12: Full Transponder Status List (FTSL) File -- Header Structure.....	18
Table 13: Full Transponder Status List (FTSL) File -- Detail Structure .....	19
Table 14: Full Transponder List (FTSL) File Generation and Processing Requirements.....	20
Table 15: Incremental Transponder Status List (ITSL) File Requirements.....	22
Table 16: Incremental Transponder Status List (ITSL) File -- File Naming Convention .....	22
Table 17: Incremental Transponder Status List (ITSL) File -- File Name Requirements.....	23
Table 18: Incremental Transponder Status List (ITSL) File -- Header Structure .....	23
Table 19: Incremental Transponder Status List (ITSL) File -- Header Structure Requirement.....	24
Table 20: Incremental Transponder Status List (ITSL) File -- Detail Structure.....	24
Table 21: Incremental Transponder Status List (ITSL) File -- Detail Structure Requirement.....	24
Table 22: Incremental Transponder Status List (ITSL) File Processing Requirements.....	25
Table 23: Full Plate Status List (FPSL) File Requirements.....	26
Table 24: Full Plate Status List (FPSL) File -- File Naming Convention.....	26
Table 25: Full Plate Status List (FPSL) File -- File Naming Convention Requirements.....	26
Table 26: Full Plate Status List (FPSL) File -- Header Structure.....	27
Table 27: Full Plate Status List (FPSL) File -- Detail Structure .....	27
Table 28: Full Plate Status List (FPSL) File Generation and Processing Requirements.....	28
Table 29: Roadway Transaction (TRXN) File Requirements.....	30
Table 30: Roadway Transaction (TRXN) File -- File Naming Convention.....	30
Table 31: Roadway Transaction (TRXN) File -- File Naming Convention Requirements.....	30
Table 32: Roadway Transaction (TRXN) File -- Header Structure.....	31
Table 33: Roadway Transaction (TRXN) File -- Header Structure Requirement.....	31
Table 34: Roadway Transaction (TRXN) File -- Detail Structure .....	32
Table 35: Roadway Transaction (TRXN) File -- Detail Structure Requirements.....	35
Table 36: Roadway Transaction (TRXN) File Processing Requirements.....	35

Table 37: Roadway Transaction Correction (CTRN) File Requirements.....	38
Table 38: Roadway Transaction Correction (CTRN) File -- File Naming Convention.....	38
Table 39: Roadway Transaction Correction (CTRN) File -- File Naming Convention Requirements.....	38
Table 40: Roadway Transaction Correction (CTRN) File -- Header Structure.....	38
Table 41: Roadway Transaction Correction (CTRN) File -- Header Structure Requirements.....	39
Table 42: Roadway Transaction Correction (CTRN) File -- Detail Structure .....	39
Table 43: Roadway Transaction Correction (CTRN) File -- Detail Structure Requirements.....	39
Table 44: Roadway Transaction Correction (CTRN) File Processing Requirements.....	40
Table 45: Roadway Transaction Image File Requirements.....	42
Table 46: Roadway Transaction Image File -- File Naming Convention.....	42
Table 47: Roadway Transaction Image File -- File Naming Convention Requirements.....	42
Table 48: Roadway Transaction Image File -- Structure.....	43
Table 49: Roadway Transaction Image File Processing Requirements.....	43
Table 50: Back Office Transaction Reconciliation (TREC) File Requirements.....	45
Table 51: Back Office Transaction Reconciliation (TREC) File -- File Naming Convention.....	45
Table 52: Back Office Transaction Reconciliation (TREC) File -- File Naming Convention Requirements.....	45
Table 53: Back Office Transaction Reconciliation (TREC) File -- Header Structure .....	45
Table 54: Back Office Transaction Reconciliation (TREC) File -- Header Structure Requirements.....	46
Table 55: Back Office Transaction Reconciliation (TREC) File -- Detail Structure .....	46
Table 56: Back Office Transaction Reconciliation (TREC) File -- Detail Structure Requirements.....	47
Table 57: Back Office Transaction Reconciliation (TREC) File Processing Requirements.....	47

## Terms/Acronyms/Abbreviations

<b>ACK</b>	Acknowledgement File
<b>BOS</b>	Back Office System
<b>CTRN</b>	Roadway Transaction Correction
<b>Entity</b>	The part of the system exchanging data from/to: In this ICD, the Entities are BOS and RTC
<b>ETC</b>	Electronic Toll Collection
<b>Facility/Roadway</b>	Subsection of the Entity Exchanging Data Files - In this ICD, Facility equals Roadways: <ul style="list-style-type: none"> <li>• T33 - Reserved for Triangle Expressway</li> <li>• T40 - Used for I-77 Express Lanes</li> <li>• T41 - Used for Monroe Expressway</li> <li>• T42 - Used for US485 Express Lanes</li> </ul>
<b>FPSL</b>	Full Plate Status List – A comprehensive list of license plates in use to identify patron accounts by each interoperable Authority
<b>FTSL / ITSL</b>	Full/Incremental Transponder Status List – A comprehensive list of transponders issued by each interoperable Authority
<b>IAG</b>	InterAgencyGroup
<b>IBT</b>	Image-Based Transaction
<b>ICD</b>	Interface Control Document
<b>NCTA</b>	North Carolina Turnpike Authority
<b>ODS</b>	Occupancy Detection System
<b>RTCS (RTC)</b>	Roadway Toll Collection Systems - Referenced as three letters (Facilities) in the file formats
<b>SFTP</b>	Secure File Transfer Protocol
<b>TRXN</b>	Roadway Transaction

# 1. INTRODUCTION

---

## 1.1. Purpose

This North Carolina Turnpike Authority (NCTA) Back Office System (BOS) to Roadway Toll Collection Systems (RTCS) Interface Control Document (ICD) describes the general file structure used by the BOS and RTCS providers to construct files that are exchanged between systems. This ICD defines the format, content and physical transfer of the files transferred between the BOS and RTCS.

BOS and RTCS shall each implement a bi-directional interface for the exchange of transponder, license plate, transaction and other data as defined herein. This interface shall be comprised of the following files:

- Acknowledgement Files
- Full Transponder Status List (FTSL) Files
- Incremental Transponder Status List (ITSL) Files
- Full Plate Status List (FPSL) Files
- Roadway Transaction (TRXN) Files
- Roadway Transaction Correction (CTRN) Files
- Roadway Transaction Image Files
- Back Office Transaction Reconciliation (TREC) Files

**Table 1: General BOS/RTCS ICD Requirements**

REQUIREMENT #	REQUIREMENT	TYPE
ICD-1-001	The NCTA BOS and RTCS shall each maintain an SFTP service for the purpose of receiving files described in this document. File senders shall deliver all files to a single configurable subdirectory of the file recipient's SFTP service.	Functional

REQUIREMENT #	REQUIREMENT	TYPE
ICD-1-002	In order to prevent recipients from processing a file while it is being transmitted, File Sender shall deliver files to a "sending" folder. After a file has been successfully transmitted, Sender shall rename the file to a "sent" folder.	Functional
ICD-1-003	File Recipient shall only process files having valid filenames as specified in this document.	Functional

REQUIREMENT #	REQUIREMENT	TYPE
ICD-1-004	File Recipient shall immediately remove processed files from its SFTP receiving subdirectory.	Functional
ICD-1-005	Periodically, File Recipient shall delete all files from its receiving SFTP subdirectory which have aged sufficiently, and which have invalid filenames, including dot files. All files deleted in this fashion shall trigger alerts and/or e-mails as appropriate. The age threshold for invalid file deletion and the schedule interval for deleting invalid files shall both be configurable.	Functional
ICD-1-006	The NCTA BOS and RTCS shall each implement appropriate validation and verification processes and reports to ensure that all data is accurately and completely transmitted to and from the entities. Failed validations or verifications shall trigger alerts and/or emails as appropriate. Failed validations or verifications shall also cause the generation of appropriate reports detailing the reason(s) for failed validation/verification.	Business
ICD-1-007	Sent files shall be retained for a minimum of 90 days after delivery. Received files shall be retained for a minimum of 90 days after receipt. These retention times shall be configurable.	Functional
ICD-1-008	All date/time values shall be EST/EDT time except as otherwise noted.	Functional
ICD-1-009	All optional fields shall be populated with null	Functional

## 1.2. File Processing Order

The RTCS and BOS will have a designed priority of file processing. The intent is that certain file types should be processed before others in order to keep the systems running optimally. The following defines the processing order:

**Table 2: File Processing Order**

ORDER #	BOS	RTCS
1	ACK	ACK
2	TRXN	FTSL
3	CTRN	ITSL
4		FPSL
5		TREC

## 2. ACKNOWLEDGEMENT FILES

The Acknowledgment files are created by the recipients of interface files, to inform file originators that files have been received in their entirety, and to report the success or failure of initial file processing steps.

The following table provides requirements pertaining to acknowledgment files.

**Table 3: BOS/RTCS Acknowledgment File Requirements**

REQUIREMENT #	REQUIREMENT	TYPE
ICD-2-001	The BOS shall create and return an Acknowledgement File to the originating Entity for each received file spec as defined in this ICD. The BOS shall not prepare Acknowledgment files for any other file type described in this document.	Functional
ICD-2-002	The RTCS shall create and return an Acknowledgement File to the BOS for each received FTSL/ITSL immediately after processing the file. The RTCS shall not prepare Acknowledgment files for any other file type described in this document.	Functional
ICD-2-003	Validation or verification errors shall be indicated with appropriate non-zero Acknowledgement File values of RETURN_CODE.	Functional
ICD-2-004	Acknowledgement Files shall contain a single record only.	Functional
ICD-2-005	Acknowledgement Files shall be delivered uncompressed.	Functional
ICD-2-006	The BOS shall issue alerts and/or emails as appropriate if an expected Acknowledgement File is not received within a configurable time interval after successful transmission of any file defined in this specification, or if an unexpected Acknowledgement File is received or an Acknowledgement File with an error code is received.	Functional

### 2.1. File Name

**Table 4: BOS/RTCS Acknowledgment File -- File Naming Convention**

Filename	{ORIG_FILENAME}_{ORIG_FILEEXT}.ACK
Filename Zipped	NA
Example Filename	BOS_20181101132700_ITSL.ACK

The example in the table above shows an ACK file that acknowledges receipt of the file BOS\_20181101132700\_000001.ITSL.ACK

**Table 5: BOS/RTCS Acknowledgment File -- File Name Requirements**

REQUIREMENT #	REQUIREMENT	TYPE
ICD-2.1-001	The ACK file name shall be comprised of the file name of the file being ACK'd, less that file's ".zip" extension. The ACK file name extension shall be the constant "ACK."	Functional

## 2.2. File Layout

**Table 6: BOS/RTCS Acknowledgment File -- Header Structure**

FIELD NAME	TYPE/SIZE	DELIMITER	MANDATORY / OPTIONAL	DESCRIPTION/VALID VALUES
FILE_TYPE	CHAR(4)	,	M	Value: 'ACK '
FROM_ENTITY	CHAR(3)	,	M	BOS_ Back Office System T33 - Reserved for Triangle Expressway T40 - Used for I-77 Express Lanes T41 - Used for Monroe Expressway T42 - Used for US74 Express Lanes
TO_ENTITY	CHAR(3)	,	M	BOS_ Back Office System T33 - Reserved for Triangle Expressway T40 - Used for I-77 Express Lanes T41 - Used for Monroe Expressway T42 - Used for US74 Express Lanes
ORIG_FILE_NAME	CHAR(50)	,	M	The file name of the file acknowledged as having been received from the To Entity. Left justified and padded with trailing blanks.
FILE_DATE_TIME	CHAR(14)	,	M	Date ACK file is created. Format: YYYYMMDDHHMMSS This is to be used by the recipient of the Acknowledgement File as the acknowledgement date/time.
RETURN_CODE	CHAR(2)	,	M	A Code indicating the status of the file being acknowledged. Values: 00 – File was successfully received and verified. 01 – Header record count does not match the number of detail records found in the file. 02 – Invalid Detail record(s) 03 – Dup Filename from Previously Ack'd (00,06) file. 05 – Duplicate file sequence number. 06 – Gap in sequence number. 07 – Invalid ZIP file or other file structure defect 08 – Invalid Header record. 09 – Failure to pass one or more sanity checks.

FIELD NAME	TYPE/SIZE	DELIMITER	MANDATORY / OPTIONAL	DESCRIPTION/VALID VALUES
				10 – Invalid Incremental Time. Invalid FTSL_FILE_DATE_TIME or FPSL_FILE_DATE_TIME. 11 – Duplicate transponder or plate numbers found in single (FTSL,ITSL,FPSL) file 12 – Invalid transponder or plate numbers found in (FTSL,ITSL,FPSL) file 13 – Duplicate records detected 14 – File Skipped due to out of date (FTSL, ITSL, FPSL,) file. 15 – Unexpected or unknown Agency/Facility (FTSL, ITSL, FPSL) file 16 – Unknown Transaction Serial Number 17 – Unknown File sequence Number 99 – Other error encountered.
REJECT_REASON	CHAR(100)	CRLF	O	Text Representing the reason of a file rejection. Intent is to give insight to the originating entity of the reason/defect of the file.  Example: "Line 125, Unknown Entry Plaza"
Record Total (With Delimiter)	184			

**Table 7: BOS/RTCS Acknowledgment File -- Header Structure Requirements**

REQUIREMENT#	REQUIREMENT	TYPE
ICD-2.2-001	The ACK record shall be structured and defined as shown in Table "BOS/RTCS Acknowledgment File – Header Structure."	Functional

### 2.3. Processing Requirements

**Table 8: BOS/RTCS Acknowledgment File Processing Requirements**

REQUIREMENT#	REQUIREMENT	TYPE
ICD-2.3-001	The Acknowledgement File FILE_DATE_TIME field shall be populated by the FROM_ENTITY with the acknowledgement date/time of the received file being acknowledged.	Functional
ICD-2.3-002	The FROM_ENTITY of an Acknowledgement File shall have the ability to generate a report showing any detail records that were skipped due to invalid data (RETURN_CODE = '02') and shall have this report available for the TO_ENTITY if needed.	Functional
ICD-2.3-003	The NCTA BOS shall trigger alerts and/or e-mails as appropriate if an expected Acknowledgement File is received that contains a non-zero RETURN_CODE value.	Functional

REQUIREMENT #	REQUIREMENT	TYPE
ICD-2.3-004	The RTCS shall trigger alerts and/or e-mails as appropriate if an expected Acknowledgement File is received that contains a non-zero RETURN_CODE value.	Functional
ICD-2.3-005	The NCTA BOS shall trigger alerts and/or e-mails as appropriate when sending an Acknowledgement File that contains a non-zero RETURN_CODE value.	Functional
ICD-2.3-006	The NCTA RTCS shall trigger alerts and/or e-mails as appropriate when sending an Acknowledgement File that contains a non-zero RETURN_CODE value.	Functional
ICD-2.3-007	Both the BOS and RTCS must have the ability to “re-process” acknowledgement files such that the acknowledgement status improves the resultant outcome. Once a file is acknowledged [00] Success (Or [06] in Transaction Files) no further acknowledgements shall be processed for a given file.  Example: BOS rejects a file XXXX with 02, and RTCS processes the ACK. Later, BOS reprocesses the file, thus causing an ACK00 to be sent to the RTCS, the RTCS would be expected process/accept the 00.	Functional
ICD-2.3-008	When Possible and Applicable, the ACK file should contain information for why a file was rejected.	Functional

## 2.4. Sample File

TBD

### 3. FULL TRANSPONDER STATUS LIST (FTSL) FILES

The Full Transponder Status List (FTSL) files are created by the NCTA BOS to inform the RTCS of the status of each transponder associated with an account held by the NCTA BOS and interoperability agencies.

**Table 9: Full Transponder Status List (FTSL) File Requirements**

REQUIREMENT #	REQUIREMENT	TYPE
ICD-3-001	Every FTSL File shall be a single large file containing the most recent transponder status list for all home and away authorities/facilities received to the BOS at the time of the FTSL creation.	Functional
ICD-3-002	Every FTSL File shall be compressed (“zip”) and sent to the RTCS.	Functional
ICD-3-003	FTSL File shall be transmitted on a user configurable scheduled basis that shall be no less frequent than daily.	Functional
ICD-3-004	The RTCS shall generate appropriate alerts if an FTSL File was not received from each expected BOS by a user configurable time-of-day.	Functional

#### 3.1. File Name

**Table 10: Full Transponder Status List (FTSL) File -- File Naming Convention**

Filename	BOS_RTC_YYYYMMDDHHMMSS.FTSL
Filename Zipped	BOS_RTC_YYYYMMDDHHMMSS_FTSL.ZIP
Example Filename	BOS_RTC_20181101132700.FTSL
Example Filename Zipped	BOS_RTC_20181101132700_FTSL.ZIP
Example ACK Filename	BOS_RTC_20181101132700_FTSL.ACK

The examples in the table above show an FTSL file archive created for NCTA RTCS at 11/01 13:27:00 (local time).

**Table 11: Full Transponder Status List (FTSL) File -- File Name Requirements**

REQUIREMENT #	REQUIREMENT	TYPE
ICD-3.1-001	The FTSL file name shall be comprised of: <ul style="list-style-type: none"> <li>• three character recipient identifier (TO_ENTITY)</li> <li>• an underscore</li> <li>• date/time the file was created (using local time) in YYYYMMDDHHMMSS format</li> <li>• and the constant “FTSL.”</li> </ul>	Functional
ICD-3.1-002	The FTSL File shall be a standard “zip” file with a file extension of “zip.”	Functional

#### 3.2. File Layout

The structure of each FTSL file found in an FTSL zip file is described by the following table.

**Table 12: Full Transponder Status List (FTSL) File -- Header Structure**

FIELD NAME	TYPE/SIZE	DELIMITER	MANDATORY / OPTIONAL	DESCRIPTION/VALID VALUES
FILE_TYPE	CHAR(4)	,	M	Value: FTSL
FILE_DATE_TIME	CHAR(14)	,	M	Date Time file created. Format: YYYYMMDDHHMMSS Date shall match the date/time in the file name. This value will also be used the identifier for Incremental Transponder Files.
RECORD_COUNT	CHAR(8)	,	M	Count of all transponders in file. Does not include header record. Values: 00000000 – 99999999
COUNT_STAT1	CHAR(8)	,	M	Count of all transponders with status code 1. Values: 00000000 – 99999999
COUNT_STAT2	CHAR(8)	,	M	Count of all transponders with status code 2. Values: 00000000 – 99999999
COUNT_STAT3	CHAR(8)	,	M	Count of all transponders with status code 3. Values: 00000000 – 99999999
COUNT_STAT4	CHAR(8)	,	M	Count of all transponders with status code 4. Values: 00000000 – 99999999
COUNT_STAT5	CHAR(8)	,	M	Count of all transponders with status code 5. Values: 00000000 – 99999999
COUNT_STAT6	CHAR(8)	,	M	Count of all transponders with status code 6. Values: 00000000 – 99999999
COUNT_STAT7	CHAR(8)	,	M	Count of all transponders with status code 7. Values: 00000000 – 99999999
COUNT_STAT8	CHAR(8)	,	M	Count of all transponders with status code 8. Values: 00000000 – 99999999
COUNT_STAT9	CHAR(8)	,	M	Count of all transponders with status code 9. Values: 00000000 – 99999999
FILE_NUM	CHAR(8)	CRLF	M	A Sequential number used by Back Office to uniquely identify the Transponder File. (Unique across the Full and Incremental Transponder file) Values: 00000000 - 99999999
Record Total (With Delimiter)	120			

**Table 13: Full Transponder Status List (FTSL) File -- Detail Structure**

FIELD NAME	TYPE/SIZE	DELIMITER	MANDATORY / OPTIONAL	DESCRIPTION / VALID VALUES
TAG_PROTOCOL	CHAR(1)	,	M	Transponder Protocol Values: 0 = Unknown
TAG_AGENCY_ID	CHAR(4)	,	M	Transponder Agency/ Facility
TAG_NUMBER	CHAR(20)	,	M	Transponder serial number
ACCOUNT_ID	CHAR(10)	,	O	Unique Identifier for Account to which the transponder is assigned, right justified, space filled to the left.
TAG_STATUS	CHAR(1)	,	M	Current transponder status: 1 = Valid (report use to CSC) 2 = Low Balance (report use to CSC) 3 = Zero balance (report use to VPC)(Type 1 Violation) 4 = Invalid or lost/stolen (report use to VPC)(Type 1 Violation) 5 = non-revenue 6 = Transit Vehicles transponder 7 = Motorcycle transponder 8 = First Responder transponder 9 = HOV only transponder
DECLARED_TAG_MODE	CHAR(1)	,	M	Declared Transponder Mode as reported by the BOS Values: 1 – SOV 2 – HOV2 3 – HOV3 0 - Undefined
MODE_EFF_DATE_TIME	CHAR(14)	,	O	Date/Time of declared transponder mode: YYYYMMDDHHMMSS
TAG_NONREV	CHAR(1)	,	O	Indicator to whether a transponder is declared globally Non-Rev Values: 0 – No 1 - Yes
TAG_CAV	CHAR(1)	,	O	Not Used

FIELD NAME	TYPE/SIZE	DELIMITER	MANDATORY / OPTIONAL	DESCRIPTION / VALID VALUES
TAG_SWITCHABLE_HOV	CHAR(1)	CRLF	O	Indicator to whether a transponder is a switchable HOV model. Values: 0 – No 1 - Yes
Record Total (With Delimiter)	65			

### 3.3. Generation and Processing Requirements

**Table 14: Full Transponder List (FTSL) File Generation and Processing Requirements**

REQUIREMENT #	REQUIREMENT	TYPE
ICD-3.3-001	On at least a daily basis the BOS will generate, zip and send a FTSL file to the RTCS. The FTSL will contain the complete known transponder status values at the time of file creation.	Functional
ICD-3.3-002	The RTCS shall verify that it has received one or more FTSL files daily.	Functional
ICD-3.3-003	If an FTSL file is missing, the RTCS will continue to use the most recently received file. (Including any incremental files discussed in Section 3.)	Functional
ICD-3.3-004	The RTCS shall reject improperly formatted FTSL files and shall return an Acknowledgement File with RETURN_CODE value of '02' to the BOS.	Functional
ICD-3.3-005	The RTCS shall reject any file that data contents from an unknown / unsupported Agency/Facility and shall return an Acknowledgement File with RETURN_CODE value of '12' to the BOS.	Functional
ICD-3.3-006	Any duplication of transponder numbers in a single FTSL file shall cause the RTCS reject the file and send an Acknowledgement File with RETURN_CODE of '11.'	Functional
ICD-3.3-007	If an FTSL file header record is encountered with record count not matching the actual count of detail records, the RTCS shall reject the file and send an Acknowledgement File RETURN_CODE value of '01.'	Functional
ICD-3.3-008	If the format of a header record is invalid (e.g., character data in a numeric field, etc.), the RTCS shall reject the file and send an Acknowledgement File RETURN_CODE value of '08.' The RTCS shall then utilize the most recent valid FTSL file (and its subsequent updates ITSL).	Functional
ICD-3.3-009	The RTCS shall perform appropriate sanity checks on each file to prevent unusual growth or reduction (by absolute number and/or percentage 20%) in the number of records from the previous valid FTSL File. Any File that fails a sanity check shall cause the RTCS to hold that file for manual verification and to send an Acknowledgement File RETURN_CODE value of '09'	Functional
ICD-3.3-010	The RTCS shall provide a means to allow the processing of FTSL File(s) that failed sanity checking to continue after manual verification.	Functional

REQUIREMENT #	REQUIREMENT	TYPE
ICD-3.3-011	The RTCS shall not process FTSL files 'out of order.' If the RTCS receives an FTSL for a FILE_NUM older than the RTCS's currently approved/accepted FTSL or ITSL file. The RTCS shall send an Acknowledgement file with a RETURN_CODE of '14' indicating the file was skipped.	Functional
ICD-3.3-012	The RTCS shall replace an existing full transponder status file upon successfully validating and processing a new/comprehensive transponder status file received.	Functional
ICD-3.3-013	The RTCS will process a FTSL file, even in the case if it is missing previous ITSL files	Functional

### 3.4. Sample File

TBD

## 4. INCREMENTAL TRANSPONDER STATUS LIST (ITSL) FILES

The Incremental Transponder Status List (ITSL) files are created by the BOS to inform the RTCS of updates to transponder statuses of new and/or existing transponders known in the system. The ITSL file contains the most recent update to any transponder status change occurring since the generation of the last Full Transponder Status File.

**Table 15: Incremental Transponder Status List (ITSL) File Requirements**

REQUIREMENT #	REQUIREMENT	TYPE
ICD-4-001	The ITSL file created by the BOS shall be a collection of the most recent transponder status updates known by the NCTA.	Functional
ICD-4-002	The NCTA BOS shall generate and transmit ITSL files according to a configurable, periodic schedule (initial value of 60 minutes).	Functional
ICD-4-003	If no ITSL files are available to send at a scheduled status update file creation time, then the BOS shall not send a file to the RTCS.	Functional
ICD-4-004	The RTCS shall reject non-ITSL files, and ITSL files from unrecognized or unexpected Facility/Agencies found in an ITSL File, and in such case shall return an Acknowledgement File with RETURN_CODE value of '15' to the BOS.	Functional
ICD-4-005	The BOS shall only transmit an ITSL file if its associated FTSL file has already been transmitted to the RTCS.	Functional
ICD-4-006	The ITSL file shall support a configurable threshold to trigger the creation of a FTSL. Example: If the ITSL file contains more than {configurable} records then a full FTSL file will be generated by BOS.	Functional

### 4.1. File Name

**Table 16: Incremental Transponder Status List (ITSL) File -- File Naming Convention**

Filename	BOS_RTC_YYYYMMDDHHMMSS_YYYYMMDDHHMMSS.ITSL
Filename Zipped	BOS_RTC_YYYYMMDDHHMMSS_YYYYMMDDHHMMSS_ITSL.ZIP
Example Filename	BOS_RTC_20181101132705_20181101133700.ITSL
Example Filename Zipped	BOS_RTC_20181101132705_20181101133700_ITSL.ZIP
Example ACK Filename	BOS_RTC_20181101132705_20181101133700_ITSL.ACK

The examples in the table above shows an ITSL file created by the BOS at 11/1/2018 at 13:37:00 which is an incremental update to the FTSL file created at 11/1/2018 at 13:27:05 (local time).

**Table 17: Incremental Transponder Status List (ITSL) File -- File Name Requirements**

REQUIREMENT #	REQUIREMENT	TYPE
ICD-4.1-001	The ITSL File name shall be comprised of: <ul style="list-style-type: none"> <li>• three character recipient identifier (TO_ENTITY)</li> <li>• an underscore</li> <li>• date/time of the corresponding full Transponder Status list (FTSL) file</li> <li>• an underscore</li> <li>• date/time the file was created (using local time) in YYYYMMDDHHMMSS format</li> <li>• and the constant "ITSL"</li> </ul>	Functional
ICD-4.1-002	The ITSL File shall be a standard "zip" file with a file extension of "zip."	Functional

#### 4.2. File Layout

The structure of each ITSL file is described in the following table.

**Table 18: Incremental Transponder Status List (ITSL) File -- Header Structure**

FIELD NAME	TYPE/SIZE	DELIMITER	MANDATORY / OPTIONAL	DESCRIPTION/VALID VALUES
FILE_TYPE	CHAR(4)	,	M	Value: ITSL
FILE_DATE_TIME	CHAR(14)	,	M	Date Time file created. Format: YYYYMMDDHHMMSS Date shall match the date/time in the file name.
FTSL_FILE_DATE_TIME	CHAR(14)	,	M	File Date Time of last (full) FTSL file for which this is an update. This number is to match the 'YYYYMMDDHHMMSS' in the filename.
RECORD_COUNT	CHAR(8)	,	M	Count of all transponders in file. Does not include header record. Values: 00000000 – 99999999
COUNT_STAT1	CHAR(8)	,	M	Count of all transponders with status code 1. Values: 00000000 – 99999999
COUNT_STAT2	CHAR(8)	,	M	Count of all transponders with status code 2. Values: 00000000 – 99999999
COUNT_STAT3	CHAR(8)	,	M	Count of all transponders with status code 3. Values: 00000000 – 99999999
COUNT_STAT4	CHAR(8)	,	M	Count of all transponders with status code 4. Values: 00000000 – 99999999

FIELD NAME	TYPE/SIZE	DELIMITER	MANDATORY / OPTIONAL	DESCRIPTION/VALID VALUES
COUNT_STAT5	CHAR(8)	,	M	Count of all transponders with status code 5. Values: 00000000 – 99999999
COUNT_STAT6	CHAR(8)	,	M	Count of all transponders with status code 6. Values: 00000000 – 99999999
COUNT_STAT7	CHAR(8)	,	M	Count of all transponders with status code 7. Values: 00000000 – 99999999
COUNT_STAT8	CHAR(8)	,	M	Count of all transponders with status code 8. Values: 00000000 – 99999999
COUNT_STAT9	CHAR(8)	,	M	Count of all transponders with status code 9. Values: 00000000 – 99999999
FILE_NUM	CHAR(8)	CRLF	M	A Sequential number used by Back Office to uniquely identify the Transponder File. (Unique across the Full and Incremental Transponder file) Values: 00000000 - 99999999
Record Total (With Delimiter)	135			

**Table 19: Incremental Transponder Status List (ITSL) File -- Header Structure Requirement**

REQUIREMENT #	REQUIREMENT	TYPE
ICD-4.2-001	The ITSL header record shall be structured and defined as shown in Table “Full Transponder Status List file – Header Structure.”	Functional

**Table 20: Incremental Transponder Status List (ITSL) File -- Detail Structure**

FIELD NAME	TYPE/SIZE	DESCRIPTION/VALID VALUES
All fields from the Full Transponder Validation List File		The ITSL File detail structure is identical to the detail structure of the Full Transponder Status List (FTSL).

**Table 21: Incremental Transponder Status List (ITSL) File -- Detail Structure Requirement**

REQUIREMENT #	REQUIREMENT	TYPE
ICD-4.2-002	The ITSL detail record shall be structured and defined as shown in Table “Incremental Transponder Status List – Detail Structure.”	Functional

### 4.3. Processing Requirements

Processing requirements for individual ITSL files are detailed in the following table.

**Table 22: Incremental Transponder Status List (ITSL) File Processing Requirements**

REQUIREMENT #	REQUIREMENT	TYPE
ICD-4.3-001	If a header record is encountered with record count not matching the actual count of detail records, the RTCS shall reject the ITSL and send an Acknowledgement File RETURN_CODE value of '01.'	Functional
ICD-4.3-002	If the format of a header record is invalid (e.g., character data in a numeric field, etc.), the RTCS shall reject the ITSL file(s) involved and send an Acknowledgement File RETURN_CODE value of '08.'	Functional
ICD-4.3-003	If an invalid ITSL detail record is encountered (e.g., inappropriate TAG_STATUS, etc.), the RTCS shall reject the ITSL file using an Acknowledgement File having RETURN_CODE of '02.'	Functional
ICD-4.3-004	The RTCS shall support user configurable sanity check values.	Functional
ICD-4.3-005	Any ITSL File that fails a sanity check shall cause the RTCS to hold all ITSL Files for manual verification, and to send an Acknowledgement File RETURN_CODE value of '09.'	Functional
ICD-4.3-006	The RTCS shall provide a means to allow the processing of an ITSL File that failed sanity checking to continue after manual verification.	Functional
ICD-4.3-007	The RTCS shall reject any ITSL file that includes records where the Transponder Authority or Facility does not match a configured/known Authority/Facility. In this situation, the RTCS shall send an Acknowledgement File with RETURN_CODE value of '12.'	Functional
ICD-4.3-008	Any duplication of transponder numbers in a single ITSL file shall cause the RTCS to reject the ITSL file(s) involved and send an Acknowledgement File with RETURN_CODE of '11.'	Functional
ICD-4.3-009	If the RTCS receives an ITSL for a FTSL FILE_DATE_TIME that is older than the RTCS's currently approved/accepted FTSL file, the RTCS shall send an Acknowledgement file with a RETURN_CODE of '14' indicating the file was skipped. This validation is optional for RTCS.	Functional
ICD-4.3-010	The RTCS shall not process ITSL files 'out of order.' If the RTCS receives an ITSL for a FILE_NUM older than the RTCS's currently approved/accepted FTSL or ITSL file. The RTCS shall send an Acknowledgement file with a RETURN_CODE of '14' indicating the file was skipped.	Functional

#### 4.4. Sample File

TBD

## 5. FULL PLATE STATUS LIST (FPSL) FILES

The Full Plate Status List (FPSL) files are created by the NCTA BOS to inform the RTCS of the status of **valid** license plates associated with an account held by the NCTA BOS and interoperability agencies.

**Table 23: Full Plate Status List (FPSL) File Requirements**

REQUIREMENT #	REQUIREMENT	TYPE
ICD-5-001	Every FPSL file shall include up to the last 30 days of plate status list for all known authorities/facilities received to the BOS at the time of the FPSL creation.	Functional
ICD-5-002	Every FPSL file shall be compressed (“zip”) and sent to the RTCS.	Functional
ICD-5-003	FPSL File shall be transmitted on a user configurable scheduled basis that shall be no less frequent than daily.	Functional
ICD-5-004	The RTCS shall generate appropriate alerts if an FPSL File was not received from each expected BOS by a user configurable time-of-day.	Functional

### 5.1. File Name

**Table 24: Full Plate Status List (FPSL) File -- File Naming Convention**

Filename	BOS_RTC_YYYYMMDDHHMMSS.FPSL
Filename Zipped	BOS_RTC_YYYYMMDDHHMMSS_FPSL.ZIP
Example Filename	BOS_RTC_20181101132700.FPSL
Example Filename Zipped	BOS_RTC_20181101132700_FPSL.ZIP
Example ACK Filename	BOS_RTC_20181101132700_FPSL.ACK

The examples in the table above show an FPSL archive created for NCTA RTCS at 11/01 13:27:00 (local time).

**Table 25: Full Plate Status List (FPSL) File -- File Naming Convention Requirements**

REQUIREMENT #	REQUIREMENT	TYPE
ICD-5.1-001	The FPSL File name shall be comprised of: <ul style="list-style-type: none"> <li>three-character recipient identifier (TO_ENTITY),</li> <li>an underscore</li> <li>date/time the file was created (using local time) in YYYYMMDDHHMMSS format</li> <li>the constant “FPSL.”</li> </ul>	Functional
ICD-5.1-002	The FPSL File shall be a standard “zip” file with a file extension of “zip.”	Functional

### 5.2. File Layout

The structure of each FPSL file found in the FPSL zip file is described by the following table.

**Table 26: Full Plate Status List (FPSL) File -- Header Structure**

FIELD NAME	TYPE/SIZE	DELIMITER	MANDATORY / OPTIONAL	DESCRIPTION/VALID VALUES
FILE_TYPE	CHAR(4)	,	M	Value: FPSL
FILE_DATE_TIME	CHAR(14)	,	M	DateTime file created. Format: YYYYMMDDHHMMSS Date shall match the date/time in the file name. This value will also be used the identifier for Incremental Plate Files.
RECORD_COUNT	CHAR(8)	CRLF	M	Count of all plates in file. Does not include header record. Values: 00000000 – 99999999
Record Total (With Delimiter)	30			

**Table 27: Full Plate Status List (FPSL) File -- Detail Structure**

FIELD NAME	TYPE/SIZE	DELIMITER	MANDATORY / OPTIONAL	DESCRIPTION / VALID VALUES
LIC_STATE	CHAR(2)	,	M	Standard State abbreviation (or Province abbreviation for Canada).
LIC_NUMBER	CHAR(10)	,	M	License Plate of patron (left justified, space filled to right).
LIC_TYPE	CHAR(10)	,	O	License Plate Type of patron (left justified, space filled to right).
ACCOUNT_ID	CHAR(10)	,	O	Unique Identifier for Account to which the transponder is assigned, right justified, space filled to the left.
EFF_START_DATE	CHAR(14)	,	M	Effective start datetime of this plate. Format: YYYYMMDDHHMMSS
EFF_END_DATE	CHAR(14)	,	O	Effective end datetime of this plate. Format: YYYYMMDDHHMMSS NULL when plate is still valid.
STATUS	CHAR(1)	,	M	Values: 'V' – Valid The Plate file always shows valid Plates and their effective ranges. This value will always be V.
SOURCE_AGENCY	CHAR(3)	,	M	Three-character agency code for which this plate originates. Left justified with spaces at the end. See Appendix A for supported Agency codes.
VEH_NONREV	CHAR(1)	,	O	Indicator to whether a plate is declared globally Non-Rev Values: 0 – No 1 - Yes

FIELD NAME	TYPE/SIZE	DELIMITER	MANDATORY / OPTIONAL	DESCRIPTION / VALID VALUES
VEH_CAV	CHAR(1)	CRLF	O	Not Used
Record Total (With Delimiter)	77			

### 5.3. Generation and Processing Requirements

**Table 28: Full Plate Status List (FPSL) File Generation and Processing Requirements**

REQUIREMENT #	REQUIREMENT	TYPE
ICD-5.3-001	On at least a daily basis the BOS will generate, zip and send a FTPL file to the RTCS. The FTPL will contain the complete known valid plates at the time of file creation.	Functional
ICD-5.3-002	The RTCS shall verify that it has received one or more FTPL files daily.	Functional
ICD-5.3-003	If an FTPL file is missing, the RTCS will continue to use the most recently received FTPL file. (Including any incremental files discussed in Section 3.)	Functional
ICD-5.3-004	The RTCS shall reject improperly formatted FTPL files and shall return an Acknowledgement File with RETURN_CODE value of '02' to the BOS.	Functional
ICD-5.3-005	The RTCS shall reject any file that data contents from an unknown / unsupported Agency/Facility and shall return an Acknowledgement File with RETURN_CODE value of '12' to the BOS.	Functional
ICD-5.3-006	Any duplication of plate numbers in a single FTPL file shall cause the RTCS reject the file and send an Acknowledgement File with RETURN_CODE of '11.'	Functional
ICD-5.3-007	If an FTPL file header record is encountered with record count not matching the actual count of detail records, the RTCS shall reject the file and send an Acknowledgement File RETURN_CODE value of '01.'	Functional
ICD-5.3-008	If the format of a header record is invalid (e.g., character data in a numeric field, etc.), the RTCS shall reject the file and send an Acknowledgement File RETURN_CODE value of '08.' The RTCS shall then utilize the most recent valid FTPL file (and its subsequent updates FTPL).	Functional
ICD-5.3-009	The RTCS shall perform appropriate sanity checks on each file to prevent unusual growth or reduction (by absolute number and/or percentage) in the number of records from the previous valid FTPL File. Any File that fails a sanity check shall cause the RTCS to hold that file for manual verification and to send an Acknowledgement File RETURN_CODE value of '09'	Functional
ICD5.3-010	The RTCS shall provide a means to allow the processing of FTPL File(s) that failed sanity checking to continue after manual verification.	Functional

REQUIREMENT #	REQUIREMENT	TYPE
ICD-5.3.-011	The RTCS shall not process FTPL files 'out of order.' If the RTCS receives an FTPL for a FILE_DATE_TIME older than the RTCS's currently approved/accepted FTPL file. The RTCS shall send an Acknowledgement file with a RETURN_CODE of '14' indicating the file was skipped.	Functional

#### 5.4. Sample file

TBD

## 6. ROADWAY TRANSACTION (TRXN) FILES

The Roadway Transaction (TRXN) files are created by the RTCS's FACILITY to report ETC and IBT transactions to the NCTA BOS. The file format/structure will remain same for all files however separate files will be created by RTCS depending upon the RTCS requirements.

**Table 29: Roadway Transaction (TRXN) File Requirements**

REQUIREMENT #	REQUIREMENT	TYPE
ICD-6-001	The RTCS shall create and transmit TRXN Files according to a configurable schedule, to inform the NCTA BOS of all Transactions occurring at RTCS facilities.	Functional
ICD-6-002	The NCTA BOS shall trigger alerts and/or emails, as appropriate, when a (TRXN) file has not been received within a configurable time interval.	Functional
ICD-6-003	Each TRXN File shall be compressed into a containing "zip" file by the RTCS before transmission.	Functional

### 6.1. File Name

**Table 30: Roadway Transaction (TRXN) File -- File Naming Convention**

Filename	{FROM_FACILITY}_{TO_ENTITY}_{FILE_NUM}_YYYYMMDDHHMMSS.TRXN
Filename Zipped	{FROM_FACILITY}_{TO_ENTITY}_{FILE_NUM}_YYYYMMDDHHMMSS_TRXN.ZIP
Example Filename	T33__BOS_00000001_20181101132700.TRXN
Example Filename Zipped	T33__BOS_00000001_20181101132700_TRXN.ZIP
Example ACK Filename	T33__BOS_00000001_20181101132700_TRXN.ACK

The examples in the table above show a TRXN with a sequence number of 1 created by the NCTA RTCS at 11/01 13:27:00 (local time).

**Table 31: Roadway Transaction (TRXN) File -- File Naming Convention Requirements**

REQUIREMENT #	REQUIREMENT	TYPE
ICD-6.1-001	The TRXN Zip File name shall be comprised of a three character sender identifier (FROM_FACILITY); an underscore; the identifier {FILE_NUM} that uniquely identifies the TRXN File to the BOS left-padded with zeroes to 8 digits; the date/time the file was created (using local time) in YYYYMMDDHHMMSS format; an underscore; and the constant "TRXN".	Functional
ICD-6.1-002	The TRXN Zip File shall be a standard "zip" file with a file extension of "zip."	Functional
ICD-6.1-003	The TRXN Zip File shall contain a single TRXN File.	Functional
ICD-6.1-004	The TRXN Zip File's content file name shall be comprised of a four character sender identifier (FROM_FACILITY); an underscore; the three character {TO_ENTITY}, an underscore, the identifier {FILE_NUM} that uniquely identifies the Transaction File to the RTCS, left-padded with zeroes to 8 digits; and the date/time the file was created (using local time) in YYYYMMDDHHMMSS format. The file name extension shall be the constant "TRXN".	Functional

## 6.2. File Layout

**Table 32: Roadway Transaction (TRXN) File -- Header Structure**

FIELD NAME	TYPE/SIZE	DELIMITER	MANDATORY / OPTIONAL	DESCRIPTION/VALID VALUES
FILE_TYPE	CHAR(4)	,	M	Values: TRXN
FROM_FACILITY	CHAR(4)	,	M	Value shall match the value in the Filename. T33 - Reserved for Triangle Expressway T40 - Used for I-77 Express Lanes T41 - Used for Monroe Expressway T42 - Used for US74 Express Lanes
TO_ENTITY	CHAR(3)	,	M	Value: BOS Value shall match the value in the file name.
FILE_DATE_TIME	CHAR(14)	,	M	Date/Time file created. Format: YYYYMMDDHHMMSS Date shall match the date/time in the file name.
RECORD_COUNT	CHAR(6)	,	M	Count of all Transactions/records in file. Does not include header record. Values: 000000 – 999999
FILE_NUM	CHAR(8)	,	M	A Sequential number used by FROM_FACILITY to uniquely identify the Roadway Transaction File. (Unique to the file type) Values: 00000000 - 99999999
RTCS_FILE_TYPE	CHAR(8)	,	M	Used by specific RTCS providers based on requirement, defaulted to TRXN.
FILE_CHECKSUM	CHAR(8)	CRLF	M	32 Bit checksum computed for the file. This excludes the header record This is populated as an 8-digit ASCII Hex value.
Record Total (With Delimiter)	64			

**Table 33: Roadway Transaction (TRXN) File -- Header Structure Requirement**

REQUIREMENT #	REQUIREMENT	TYPE
ICD-6.2-001	The TRXN header record shall be structured and defined as shown in Table "Roadway Transaction File – Header Structure."	Functional

**Table 34: Roadway Transaction (TRXN) File -- Detail Structure**

FIELD NAME	TYPE/SIZE	DELIMITER	MANDATORY / OPTIONAL	DESCRIPTION / VALID VALUES
TRANSACTION_ID	CHAR(19) *	,	M	The unique key of a Transaction ID assigned by the RTCS. This Number is assumed to be unique between all Plazas within a RTCS. *Values: 0000000000000000001 – 9223372036854775807
TRANSACTION_TYPE	CHAR(1)	,	M	The Type of the Transaction Values: E- ETC (Transponder Status in [1,2,5,6,7,8,9]) I – IBT (Transponder Status in [3,4], not in Transponder Status Files, or no transponder in transaction)
TAG1_PROTOCOL	CHAR(1)	,	O	Transponder Protocol Values: 0 = Unknown Null for IBT transactions
TAG1_AGENCY_ID	CHAR(4)	,	O	Tag Agency / Facility Null for IBT transactions
TAG1_NUMBER	CHAR(20)	,	O	Tag number. Zero Padded. Null when not available
TAG1_STATUS	CHAR(1)	,	O	Current transponder status: 1 = Valid (report use to CSC) 2 = Low Balance (report use to CSC) 3 = Zero balance (report use to VPC)(Type 1 Violation) 4 = Invalid or lost/stolen (report use to VPC)(Type 1 Violation) 5 = non-revenue 6 = Transit Vehicles transponder 7 = Motorcycle transponder 8 = First Responder transponder 9 = HOV only transponder Null if data is unavailable.
TAG2_PROTOCOL	CHAR(1)	,	O	Tag Protocol Values: TBD Null for IBT transactions
TAG2_AGENCY_ID	CHAR(4)	,	O	Tag number. Zero Padded. Null when not available
TAG2_NUMBER	CHAR(20)	,	O	Tag number. Zero Padded. Null when not available

FIELD NAME	TYPE/SIZE	DELIMITER	MANDATORY / OPTIONAL	DESCRIPTION / VALID VALUES
TAG2_STATU S	CHAR(1)	,	O	Current transponder status: 1 = Valid (report use to CSC) 2 = Low Balance (report use to CSC) 3 = Zero balance (report use to VPC)(Type 1 Violation) 4 = Invalid or lost/stolen (report use to VPC)(Type 1 Violation) 5 = non-revenue 6 = Transit Vehicles transponder 7 = Motorcycle transponder 8 = First Responder transponder 9 = HOV only transponder Null if data is unavailable.
LIC_STATE	CHAR(2)	,	O	Post-Image Review, authoritative value for license plate state/issuing jurisdiction for Image Based Toll. Null when not available
LIC_NUMBER	CHAR(10)	,	O	Post-Image Review, authoritative value for license plate number for Image Based Toll. Null when not available
LIC_TYPE	CHAR(10)	,	O	Post-Image Review, authoritative value for license plate type for Image Based Toll. Null when not available
OCR_CONFID ENCE	CHAR(3)	,	O	OCR Confidence Level % Values 0 to 999
OCCUPANCY	CHAR(1)	,	O	Determined Tag Occupancy: Values: 1,2,3,Null
OCC_MODE_ SOURCE	CHAR(1)	,	O	Source Origination of the reported Tag Mode Values: D – Digital S – Switchable O- ODS Null - Undefined
OCC_MODE_ DIGITAL	CHAR(1)	,	O	Reported Occupancy from Digital: Values: 1,2,3,Null
OCC_MODE_ SWITCH	CHAR(1)	,	O	Reported Occupancy from Switchable Tag: Values: 1,2,3,Null
OCC_MODE_ ODS	CHAR(1)	,	O	Reported Occupancy from ODS: Values: 1,2,3,Null

FIELD NAME	TYPE/SIZE	DELIMITER	MANDATORY / OPTIONAL	DESCRIPTION / VALID VALUES
TRX_ENTRY_DATE_TIME	CHAR(20)	,	O	Date/Time of Entry Transaction. Format: YYYYMMDDHHMMSSFFFFFFF For Barrier Systems: Null
TRX_ENTRY_PLAZA	CHAR(3)	,	O	Entry Plaza identifier. Left justified and padded with trialing blanks. For Barrier Systems: Null
TRX_ENTRY_LANE	CHAR(3)	,	O	Entry Lane identifier. Left justified and padded with trialing blanks. For Barrier Systems: Null
TRX_EXIT_DATE_TIME	CHAR(20)	,	M	Date/Time of Exit Transaction. Format: YYYYMMDDHHMMSSFFFFFFF
TRX_EXIT_PLAZA	CHAR(3)	,	M	Exit Plaza identifier. Left justified and padded with trialing blanks.
TRX_EXIT_LANE	CHAR(3)	,	M	Exit Lane identifier. Left justified and padded with trialing blanks.
EXIT_SPEED	CHAR(3)	,	O	Speed in MPH of the vehicle as it exited the facility. Values 000 - 999
FULL_IMAGES_SENT	CHAR(1)	,	O	The number of FULL images the BOS should receive for the transaction if any. Values: 0-1 Required for mage-based transaction
ROI_IMAGES_SENT	CHAR(1)	,	O	The number of ROI images the BOS should receive for the Transaction if any. Values: 0-1 Required for image-based transaction
ODS_IMAGES_SENT	CHAR(1)	,	O	The number of ODS images the BOS should receive for the transaction if any. Values: 0-1
ODS_CONFIDENCE	CHAR(3)	,	O	ODS Confidence Level % Values 0 to 999
VIDEO_TOLL_AMOUNT	CHAR(5)	,	M	The cash toll due as calculated by the RTCS. Values: 00000 (\$000.00) – 99999 (\$999.99)
ETC_TOLL_AMOUNT	CHAR(5)	,	M	The ETC toll due as calculated by the RTCS. Values: 00000 (\$000.00) – 99999 (\$999.99)
RTCS_INVOICE_AMOUNT	CHAR(5)	,	O	The amount that will be included in the Invoice from RTCS to BOS (Based on RTCS specific business rules) Values: 00000 (\$000.00) – 99999 (\$999.99)

FIELD NAME	TYPE/SIZE	DELIMITER	MANDATORY / OPTIONAL	DESCRIPTION / VALID VALUES
IMAGE_ZIP_FILE	CHAR(50)	,	O	Filename of zip file containing full images and ROI images Required for image-based transaction
ODS_ZIP_FILE	CHAR(50)	,	O	Filename of zip file containing ODS Images
VEHICLE_CLASS	CHAR(3)	,	O	Classification of vehicle 000-999 Please refer to Appendix for possible values
VEHICLE_AXLE	CHAR(3)	,	O	Actual number of axles determined by the lane Values: 001 – 999
VEHICLE_TYPE	CHAR(3)	CRLF	O	101 – Low Occupancy, 102 – High Occupancy, 103 – Motorcycles, 104 – Special Vehicles, 105 – Exempt, 106 – Transit Vehicles, 107-First Responder (See Appendix A for detailed description)
Record Total (With Delimiter)	342			

**Table 35: Roadway Transaction (TRXN) File -- Detail Structure Requirements**

REQUIREMENT #	REQUIREMENT	TYPE
ICD-6.4-001	The TRXN detail record shall be structured and defined as shown in Table "Roadway Transaction File – Detail Structure."	Functional

### 6.3. Processing Requirements

**Table 36: Roadway Transaction (TRXN) File Processing Requirements**

REQUIREMENT #	REQUIREMENT	TYPE
ICD-6.5-001	The RTCS shall ensure that FILE_NUM forms a sequential key against the Facility and File Type such that it can be used to uniquely identify a distinct Roadway Transaction File. Example: File Seq# 1 can exist for: T33, TRXN T40, TRXN ...	Functional
ICD-6.5-002	If the BOS detects that the FILE_NUM of an Transaction File equals that of a distinct, previously received Roadway Transaction File from the FROM_FACILITY and filetype, it shall reject the file and return an Acknowledgement File with RETURN_CODE of '05.'  Check is based on FROM_FACILITY, FILE_NUM, and FILE_TYPE	Functional

REQUIREMENT #	REQUIREMENT	TYPE
ICD-6.5-003	If the BOS detects that the FILE_NUM of a Roadway Transaction File is distinct from previously received FILE_NUMs from the FROM_FACILITY and FILE_TYPE but does not equal the most recently processed FILE_NUM received from the FROM_FACILITY plus one (1), then the BOS shall return an Acknowledgement File with RETURN_CODE of '06' to signify that a gap in sequence numbers was found. However, the out-of-sequence Roadway Transaction File shall still be processed by the BOS.	Functional
ICD-6.5-004	If a header record is encountered with record count not matching the actual count of detail records, the BOS shall reject the file and send an Acknowledgement File RETURN_CODE value of '01.'	Functional
ICD-6.5-005	If the format of a header record is invalid (e.g., character data in a numeric field, etc.), the BOS shall reject the file and send an Acknowledgement File RETURN_CODE value of '08.'	Functional
ICD-6.5-006	If, in a Roadway Transaction file, the BOS finds a value of TRANSACTION_ID that was previously transmitted successfully in another Transaction File from the same FROM_FACILITY; or if the BOS finds a value of TRANSACTION_ID more than once in a Transaction File, then the CSC shall reject the file using Acknowledgement Code '13.' TRANSACTION_ID is unique to the ENTITY, not the facility.	Functional
ICD-6.5-007	If an invalid Roadway Transaction File detail record is encountered (e.g., invalid or inappropriate codes, invalid transaction identifier, etc.) the BOS CSC shall reject the file and return an Acknowledgement File with RETURN_CODE of '02.'	Functional
ICD-6.5.008	License Plate Fields can be populated with Null for ETC transactions if/when the plate information is not available.	Functional
ICD-6.5-009	Transponder fields can be populated with Null for IBT transactions if/when the plate information is not available.	Functional
ICD-6.5-010	The RTCS shall not send Transaction transactions that include only asterisks for transponder and plate fields.	Functional
ICD-6.5-011	For multi-Toll Zone Transactions, the RTCS shall send the time, plaza and lane of the first toll zone of the Transaction in TRX_ENTRY_DATE_TIME, TRX_ENTRY_PLAZA, and TRX_ENTRY_LANE; and shall send time, plaza and lane of the last toll zone of the Transaction in TRX_EXIT_DATE_TIME, TRX_EXIT_PLAZA, and TRX_ENTRY_LANE.  For barriers or single Toll Zone Transactions, RTCS shall populate TRX_EXIT_DATE_TIME, TRX_EXIT_PLAZA and TRX_EXIT_LANE with the time and location of the toll; and shall populate TRX_ENTRY_DATE_TIME, TRX_ENTRY_PLAZA and TRX_ENTRY_LANE with asterisks.	Functional
ICD-6.5-012	For TRANSACTION_TYPE I "Image-based transactions" – one of the following fields must be populated to ensure accurate DMV return information: VEHICLE_AXLE (Preferred field) LIC_TYPE (only populate if Vehicle axle is not populated)	Functional

#### 6.4. **Sample File**

TBD

## 7. ROADWAY TRANSACTION CORRECTION (CTRN) FILES

The Roadway Transaction Correction (CTRN) files are created by the RTCS to report ETC and IBT transaction corrections to the NCTA BOS.

**Table 37: Roadway Transaction Correction (CTRN) File Requirements**

REQUIREMENT #	REQUIREMENT	TYPE
ICD-7-001	Each Roadway Transaction Correction (CTRN) File shall be compressed into a containing "zip" file (the CTRN Zip File) by the RTCS before transmission.	Functional

### 7.1. File Name

**Table 38: Roadway Transaction Correction (CTRN) File -- File Naming Convention**

Filename	{FROM_ENTITY}_{TO_ENTITY}_{FILE_NUM}_YYYYMMDDHHMMSS.CTRN
Filename Zipped	{FROM_ENTITY}_{TO_ENTITY}_{FILE_NUM}_YYYYMMDDHHMMSS_CTRN.ZIP
Example Filename	T33__BOS_00000001_20181101132700.CTRN
Example Filename Zipped	T33__BOS_00000001_20181101132700_CTRN.ZIP
Example ACK Filename	T33__BOS_00000001_20181101132700_CTRN.ACK

The examples in the table above show an CTRN with a sequence number of 1 created by the NCTA RTCS at 11/01 13:27:00 (local time).

**Table 39: Roadway Transaction Correction (CTRN) File -- File Naming Convention Requirements**

REQUIREMENT #	REQUIREMENT	TYPE
ICD-7.3-001	The CTRN Zip file name shall be comprised of a three character sender identifier (FROM_ENTITY); an underscore; the identifier {FILE_NUM} that uniquely identifies the Transaction Correction File to the BOS left-padded with zeroes to 8 digits; the date/time the file was created (using local time) in YYYYMMDDHHMMSS format; an underscore; and the constant ("CTRN").	Functional
ICD-7.3-002	The CTRN Zip File shall be a standard "zip" file with a file extension of "zip."	Functional
ICD-7.3-003	The CTRN Zip File shall contain a single Transaction Correction File.	Functional

### 7.2. File Layout

**Table 40: Roadway Transaction Correction (CTRN) File -- Header Structure**

FIELD NAME	TYPE/SIZE	DELIMITER	MANDATORY / OPTIONAL	DESCRIPTION/VALID VALUES
FILE_TYPE	CHAR(4)	,	M	Value: CTRN
FROM_ENTITY	CHAR(3)	,	M	Value shall match the value in the Filename. T33 - Reserved for Triangle Expressway T40 - Used for I-77 Express Lanes T41 - Used for Monroe Expressway T42 - Used for US74 Express Lanes

FIELD NAME	TYPE/SIZE	DELIMITER	MANDATORY / OPTIONAL	DESCRIPTION/VALID VALUES
TO_ENTITY	CHAR(3)	,	M	Value: BOS Value shall match the value in the file name.
FILE_DATE_TIME	CHAR(14)	,	M	Date/Time file created. Format: YYYYMMDDHHMMSS Date shall match the date/time in the file name.
RECORD_COUNT	CHAR(6)	,	M	Count of all transponders in file. Does not include header record. Values: 000000 – 999999
FILE_NUM	CHAR(8)	CRLF	M	A Sequential number used by FROM_ENTITY to uniquely identify the Correction File. Values: 00000000 - 99999999
Record Total (With Delimiter)	41			

**Table 41: Roadway Transaction Correction (CTRN) File -- Header Structure Requirements**

REQUIREMENT #	REQUIREMENT	TYPE
ICD-7.4-001	The CTRN header record shall be structured and defined as shown in Table "Transaction Correction File – Header Structure."	Functional

**Table 42: Roadway Transaction Correction (CTRN) File -- Detail Structure**

FIELD NAME	TYPE/SIZE	DELIMITER	MANDATORY / OPTIONAL	DESCRIPTION / VALID VALUES
CORR_REASON	CHAR(2)	,	M	Code Denoting the reason for the correction. Values: 00 – Resubmittal due to flip from transponder to video. 01 – Resubmittal due to developer error 02 – Resubmittal due to service provider (BOS) error
CORR_DATE_TIME	CHAR(14)	,	M	Transaction Correction Date Format: YYYYMMDDHHMMSS
All other fields from the Roadway Transaction File	299			All fields from the original Roadway Transaction File. See Roadway Transaction File.
Record Total (With Delimiter)	317			

**Table 43: Roadway Transaction Correction (CTRN) File -- Detail Structure Requirements**

REQUIREMENT #	REQUIREMENT	TYPE
ICD-7.4-002	The detail record shall be structured and defined as shown in Table "ETC Correction Transaction File – Detail Structure."	Functional

### 7.3. Processing Requirements

**Table 44: Roadway Transaction Correction (CTRN) File Processing Requirements**

REQUIREMENT #	REQUIREMENT	TYPE
ICD-7.5-001	The RTCS shall ensure that FILE_NUM forms a sequential key that can be used to uniquely identify a distinct Transaction Correction File.	Functional
ICD-7.5-002	If the BOS detects that the FILE_NUM of a Transaction Correction File equals that of a distinct, previously received Transaction Correction File from the FROM_ENTITY, it shall reject the file and return an Acknowledgement File with RETURN_CODE of '05.'	Functional
ICD-7.5-003	If the BOS detects that the FILE_NUM of a Transaction Correction File is distinct from previously received FILE_NUMs from the FROM_ENTITY but does not equal the most recently processed FILE_NUM received from the FROM_ENTITY plus one (1), then the BOS shall return an Acknowledgement File with RETURN_CODE of '06' to signify that a gap in sequence numbers was found. However, the out-of-sequence Transaction Correction File shall still be processed by the BOS.	Functional
ICD-7.5-004	If a header record is encountered with record count not matching the actual count of detail records, the BOS shall reject the file and send an Acknowledgement File RETURN_CODE value of '01.'	Functional
ICD-7.5-005	If the format of a header record is invalid (e.g., character data in a numeric field, etc.), the BOS shall reject the file and send an Acknowledgement File RETURN_CODE value of '08.'	Functional
ICD-7.5-006	If the BOS finds detects a value for TRANSACTION_ID for which has not been previously sent in a TRXN file, then the BOS shall reject file using Acknowledgement Code '18.'	Functional
ICD-7.5-007	If, in a Transaction Correction file, the BOS finds a value of TRANSACTION_ID that was previously transmitted successfully in another Correction File from the same FROM_ENTITY; or if the BOS finds a value of TRANSACTION_ID more than once in a Correction File, then the CSC shall reject the file using Acknowledgement Code '13.'	Functional
ICD-7.5-008	If an invalid Transaction Correction File detail record is encountered (e.g., invalid or inappropriate codes, invalid transaction identifier, etc.) the BOS CSC shall reject the file and return an Acknowledgement File with RETURN_CODE of '02.'	Functional
ICD-7.5.009	License Plate Fields can be populated with Null for ETC transactions if/when the plate information is not available.	Functional
ICD-7.5-010	Transponder fields can be populated with Null for IBT transactions if/when the plate information is not available.	Functional
ICD-7.5-011	The RTCS shall not send Transaction transactions that include only asterisks for transponder and plate fields.	Functional

REQUIREMENT #	REQUIREMENT	TYPE
ICD-7.5-012	<p>For multi-Toll Zone Transactions, the RTCS shall send the time, plaza and lane of the first toll zone of the Transaction in TRX_ENTRY_DATE_TIME, TRX_ENTRY_PLAZA, and TRX_ENTRY_LANE; and shall send time, plaza and lane of the last toll zone of the Transaction in TRX_EXIT_DATE_TIME, TRX_EXIT_PLAZA, and TRX_ENTRY_LANE.</p> <p>For barriers or single Toll Zone Transactions, RTCS shall populate TRX_EXIT_DATE_TIME, TRX_EXIT_PLAZA and TRX_EXIT_LANE with the time and location of the toll; and shall populate TRX_ENTRY_DATE_TIME, TRX_ENTRY_PLAZA and TRX_ENTRY_LANE with asterisks.</p>	Functional

**7.4. Sample File**

TBD

## 8. ROADWAY TRANSACTION IMAGE FILES

The Roadway Transaction Image files are created by the RTCS to report Images related to image-based transactions (IBT) to the NCTA BOS.

**Table 45: Roadway Transaction Image File Requirements**

REQUIREMENT #	REQUIREMENT	TYPE
ICD-8-001	Images related to a single image-based transaction shall be compressed into a containing “zip” file by the RTCS before transmission.	Functional
ICD-8-002	Images related to ODS will be zipped in a separate file and the transaction images will be zipped separately.	Functional

### 8.1. File Name

**Table 46: Roadway Transaction Image File -- File Naming Convention**

Filename	{FROM_ENTITY}_{PPPP}_{LLL}_YYYYMMDDHHMMSSFFFFFFF_01.JPG, {FROM_ENTITY}_{PPPP}_{LLL}_YYYYMMDDHHMMSSFFFFFFF_02.JPG
Filename Zipped	{FROM_ENTITY}_{PPPP}_{LLL}_YYYYMMDDHHMMSSFFFFFFF.ZIP
Example Filename	T40__I01_001_20181101132700000001_01.JPG, T40__I01_001_20181101132700000001_02.JPG
Example Filename Zipped	T40__I01_001_20181101132700000001.ZIP
Example ACK Filename	T40__I01_001_20181101132700000001.ACK

The examples in the table above show an Image file created by the RTCS at 11/01 13:27:00.000001 (local time).

**Table 47: Roadway Transaction Image File -- File Naming Convention Requirements**

REQUIREMENT #	REQUIREMENT	TYPE
ICD-8.3-001	The Image ZIP file name shall be comprised of a three character sender identifier (FROM_ENTITY); an underscore; Plaza ID of the transaction (PPPP); an underscore; lane ID of the transaction (LLL); the date and time of the Image-based transaction (using localtime) in YYYYMMDDHHMMSS FFFFFFFF format; that uniquely identifies the file.	Functional
ICD-8.3-002	The Image Zip File shall be a standard “zip” file with a file extension of “zip.”	Functional
ICD-8.3-003	The Image Zip File shall contain two (2) image files, with sequence number of 01 and 02.	Functional
ICD-8.3-004	Overview images shall have the following specifications: Dimensions: 2048x1628 pixels Average size 250KB. Not to exceed 500KB	Functional
ICD-8.3-005	ROI images shall have the following specifications: Dimensions: 250x90 pixels Average size 15KB Manually cropped images with Dimension of around 400x400 would be acceptable for approximately 5% of the transactions.	Functional

## 8.2. File Name Layout

Table 48: Roadway Transaction Image File -- Structure

FIELD NAME	TYPE/SIZE	DELIMITER	MANDATORY / OPTIONAL	DESCRIPTION/VALID VALUES
FROM_ENTITY	CHAR(3)	_	M	Value: T33 - Reserved for Triangle Expressway T40 - Used for I-77 Express Lanes T41 - Used for Monroe Expressway T42 - Used for US74 Express Lanes
PLAZA_ID (PPPP)	CHAR(4)	_	M	Plaza ID of the image-based transaction padded with trailing _ as applicable
LANE_ID (LLL)	CHAR(3)	_	M	Lane ID of the image-based transaction padded with leading 0s as applicable
TRX_DATE_TIME	CHAR(20)	_	M	EXIT Date Time of the image-based transaction. Format: YYYYMMDDHHMMSSFFFFFF.
IMAGE_SEQ_NUM	CHAR(2)	.	M	Image sequence number. Values 01 is the index of the overview image 02 is the index of the ROI image
FILE_EXT	CHAR(3)		M	Value: JPG
Record Total (With Delimiter)	40			

## 8.3. Processing Requirements

Table 49: Roadway Transaction Image File Processing Requirements

REQUIREMENT#	REQUIREMENT	TYPE
ICD-8.5-001	The RTCS shall ensure that FILE_NAME can be used to uniquely identify a distinct Transaction Image File.	Functional
ICD-8.5-002	If the BOS detects that the Name of an Image File equals that of a distinct, previously received Transaction Image File from the FROM_ENTITY, it shall reject the file and return an Acknowledgement File with RETURN_CODE of '05.'	Functional
ICD-8.5-003	If the BOS detects that the number of images in the ZIP file is either more or less than the required images, it shall reject the file and return an Acknowledgement File with RETURN_CODE of '09.'	Functional
ICD-8.5-004	If the BOS detects that the size of images in the ZIP file is either 0KB or more than 500KB, it shall reject the file and return an Acknowledgement File with RETURN_CODE of '09.'	Functional

## 8.4. Sample File

TBD



## 9. BACK OFFICE TRANSACTION RECONCILIATION (TREC) FILES

The Back Office Transaction Reconciliation (TREC) files are created by the NCTA BOS to report reconciliation of transactions submitted by the RTCS.

**Table 50: Back Office Transaction Reconciliation (TREC) File Requirements**

REQUIREMENT #	REQUIREMENT	TYPE
ICD-9-001	Each TREC File shall be compressed into a containing “zip” file (the TREC Zip File) by the NCTA BOS before transmission.	Functional

### 9.1. File Name

**Table 51: Back Office Transaction Reconciliation (TREC) File -- File Naming Convention**

Filename	{FROM_ENTITY}_{TO_ENTITY}_{FILE_NUM}_YYYYMMDDHHMMSS.TREC
Filename Zipped	{FROM_ENTITY}_{TO_ENTITY}_{FILE_NUM}_YYYYMMDDHHMMSS_TREC.ZIP
Example Filename	BOS_T40__00000001_20181101132700.TREC
Example Filename Zipped	BOS_T40__00000001_20181101132700_TREC.ZIP
Example ACK Filename	BOS_T40__00000001_20181101132700_TREC.ACK

The examples in the table above show a TREC with a sequence number of 1 created by the NCTA BOS at 11/01 13:27:00 (local time).

**Table 52: Back Office Transaction Reconciliation (TREC) File -- File Naming Convention Requirements**

REQUIREMENT #	REQUIREMENT	TYPE
ICD-9.3-001	The TREC File Zip file name shall be comprised of a three character sender identifier (FROM_ENTITY); an underscore; the identifier { FILE_NUM} that uniquely identifies the Original Transaction File to the BOS left-padded with zeroes to 8 digits; the date/time the file was created (using local time) in YYYYMMDDHHMMSS format; an underscore; and the constant (“TREC”).	Functional
ICD-9.3-002	The Zip File shall be a standard “zip” file with a file extension of “zip.”	Functional
ICD-9.3-003	The TREC Zip File shall contain a single Transaction Reconciliation File.	Functional

### 9.2. File Layout

**Table 53: Back Office Transaction Reconciliation (TREC) File -- Header Structure**

FIELD NAME	TYPE/SIZE	DELIMITER	MANDATORY / OPTIONAL	DESCRIPTION/VALID VALUES
FILE_TYPE	CHAR(4)	,	M	Value: TREC
FROM_ENTITY	CHAR(3)	,	M	Value: BOS Value shall match the value in the Filename.

FIELD NAME	TYPE/SIZE	DELIMITER	MANDATORY / OPTIONAL	DESCRIPTION/VALID VALUES
TO_ENTITY	CHAR(4)	,	M	Value shall match the value in the Filename. T33 - Reserved for Triangle Expressway T40 - Used for I-77 Express Lanes T41 - Used for Monroe Expressway T42 - Used for US74 Express Lanes
FILE_DATE_TIME	CHAR(14)	,	M	DateTime file created. Format: YYYYMMDDHHMMSS Date shall match the date/time in the file name.
RECORD_COUNT	CHAR(6)	,	M	Count of all transponders in file. Does not include header record. Values: 000000 – 999999
FILE_NUM	CHAR(8)	CRLF	M	A Sequential number used by RTCS to uniquely identify the Original Transaction File. Values: 00000000 - 99999999
Record Total (With Delimiter)	42			

**Table 54: Back Office Transaction Reconciliation (TREC) File -- Header Structure Requirements**

REQUIREMENT #	REQUIREMENT	TYPE
ICD-9.4-001	The TREC header record shall be structured and defined as shown in Table "Transaction Reconciliation File – Header Structure."	Functional

**Table 55: Back Office Transaction Reconciliation (TREC) File – Detail Structure**

FIELD NAME	TYPE/SIZE	DELIMITER	MANDATORY / OPTIONAL	DESCRIPTION / VALID VALUES
TRANSACTION_ID	CHAR(19)	,	M	The unique key of a Transaction ID assigned by the RTCS. *Values: 0000000000000000001 – 9223372036854775807
TRANSACTION_STATUS	CHAR(2)	,	M	Code Denoting the Posting/Reject status of a transaction. Values: 01 – Posted. 02 – Rejected. 03 – In Transit.
REJECT_REASON	CHAR(100)	,	O	Rejected Reason. Mandatory for Rejected records

FIELD NAME	TYPE/SIZE	DELIMITER	MANDATORY / OPTIONAL	DESCRIPTION / VALID VALUES
BOS_AGENCY_CODE	CHAR(3)	,	M	Agency Code of the BOS that processed the transaction Please refer to appendix for valid values
BOS_PROCESSED_DATE_TIME	CHAR(14)	CRLF	M	Transaction Processed Date at the BOS Format: YYYYMMDDHHMMSS
Record Total (With Delimiter)	144			

**Table 56: Back Office Transaction Reconciliation (TREC) File -- Detail Structure Requirements**

REQUIREMENT #	REQUIREMENT	TYPE
ICD-9.4-001	The detail record shall be structured and defined as shown in Table "Transaction Reconciliation File – Detail Structure."	Functional

### 9.3. Processing Requirements

**Table 57: Back Office Transaction Reconciliation (TREC) File Processing Requirements**

REQUIREMENT #	REQUIREMENT	TYPE
ICD-9.5-001	The BOS shall ensure that FILE_NUM corresponds to the sequence number from the original transaction file.	Functional
ICD-9.5-002	If the RTCS shall process one or more reconciliation files corresponding to the original transaction file.	Functional
ICD-9.5-003	If the RTCS detects that the FILE_NUM of a Transaction Reconciliation File does not match to any of the FILE_NUM originally submitted, the RTCS shall return an Acknowledgement File with RETURN_CODE of '17' to signify that an Unknown sequence number was found.	Functional
ICD-9.5-004	If a header record is encountered with record count not matching the actual count of detail records, the RTCS shall reject the file and send an Acknowledgement File RETURN_CODE value of '01.'	Functional
ICD-9.5-005	If the format of a header record is invalid (e.g., character data in a numeric field, etc.), the RTCS shall reject the file and send an Acknowledgement File RETURN_CODE value of '08.'	Functional
ICD-9.5-006	If the RTCS detects a value for TRANSACTION_ID for which has not been previously sent in a Roadway Transaction (TRXN) file, then the RTCS shall reject file using Acknowledgement Code '16.'	Functional
ICD-9.5-007	If an invalid TREC File detail record is encountered (e.g., invalid or inappropriate codes, invalid transaction identifier, etc.) the RTCS shall reject the file and return an Acknowledgement File with RETURN_CODE of '02.'	Functional
ICD-9.5-008	BOS will transmit TREC files every 4 hours	Functional

#### 9.4. **Sample File**

TBD

## APPENDIX A: AGENCY, PLAZAS, AND VEHICLE CLASS/TYPE

Please refer to the latest IAG appendix for list of Agency Codes, Plazas and Vehicle class

[https://www.e-zpassiag.com/images/agency\\_portal/official\\_documents/filespec\\_appendix/IAG\\_Inter-CSC\\_Files\\_-\\_Appendix\\_2018-08-21.xlsx](https://www.e-zpassiag.com/images/agency_portal/official_documents/filespec_appendix/IAG_Inter-CSC_Files_-_Appendix_2018-08-21.xlsx)

<https://www.e-zpassiag.com/interoperability/87-interoperability/file-specifications/332-file-specifications>

Vehicle Type:

ETC_CLASS_CHARGED	Name	Description
101	Low Occupancy Vehicles	2 axle motor vehicles, other than Motorcycles, without trailers, with the following dimensions: Length <= 20' Width <= 8.5' Height <= 12' Which has not been declared as HOV using one of the accepted channels.
102	High Occupancy Vehicles	2 axle Motor vehicles, without trailers, with the following dimensions: Length <= 20' Width <= 8.5' Height <= 12' Which has been declared as HOV using one of the accepted channels.
103	Motorcycles	Motor vehicles, with 2 or 3 wheels not larger than a LOV
104	Special Vehicles	Vehicles meeting one or more of the following characteristics: <input type="checkbox"/> Length > 20' <input type="checkbox"/> Width > 8.5' <input type="checkbox"/> Height > 12' <input type="checkbox"/> Vehicle with Trailer <input type="checkbox"/> More than 2 axles
105	Exempt	Vehicles identified as Exempt through a Transponder
106	Transit Vehicles	Vehicles with a tag with status "Transit Vehicle"
107	First Responder	Vehicles with a tag with status "First Responder"

## APPENDIX B: SUPPORTED PLATE TYPES

Please refer to the following list of supported plate types:

Code*	Article Name
OB	OMNIBUS: "OMNIBUS" MUST APPEAR ON THE PLATE.
OR	ORGANIZATION: INCLUDES GIRL SCOUTS, KIWANIS, KNIGHTS OF COLUMBUS, LADIES, AUXILIARY AND MASONS
AM	AMBULANCE
AP	APPORTIONED: THE WORD "APPORTIONED" MUST APPEAR ON THE PLATE
AQ	ANTIQUE, INCLUDES CLASSIC, HISTORIC, STREETROD, PIONEER, HORSELESS, CARRIAGE, VINTAGE OR COLLECTOR SERIES
AR	AMATEUR RADIO OR CITIZEN'S BAND RADIO OPERATOR, ALSO CALLED HAM RADIO OPERATOR
AT	ALL-TERRAIN VEHICLES, IN INSTANCES WHERE A LICENSE PLATE HAS BEEN ISSUED
BU	BUS, CHURCH, SCOUTING FRANCHISE, SCHOOL, PUBLIC/PRIVATE CARRIER, ETC. SEE SCHOOL VEHICLE FOR SCHOOL BUS
CO	COMMERCIAL
CC	CONSULAR CORPS
CI	CITY-OWNED, MUNICIPAL VEHICLE
CL	COLLEGIATE: INCLUDES COLLEGES AND UNIVERSITIES
CM	COMMEMORATIVE: INCLUDES BICENTENNIALS, CENTENNIALS, PEARL HARBOR SURVIVOR AND STATEHOOD ANNIVERSARIES
CN	CONSERVATION: TO INCLUDE HIGHWAY BEAUTIFICATION, SOIL CONSERVATION WILD, LIFE-WILDLIFE INCLUDES BIRDS AND WATERFOWL
CU	COUNTY-OWNED VEHICLE
DA	DRIVE-AWAY
DB	DUNE BUGGY
DD	DENTIST
DL	DEALER: DOES NOT APPLY TO MOTORCYCLE DEALER
DP	DIPLOMATIC: INCLUDES DIPLOMAT AND DIPLOMATIC STAFF
DU	DUPLICATE, REISSUE, OR REPLACEMENT, ONLY IF THIS IS SO INDICATED ON THE PLATE
DV	DISABLED VETERAN
DX	DISABLED PERSON, ENTITLES PERSON TO CERTAIN PARKING PRIVILEGES ALSO SEE HANDICAPPED PERSON
EX	EXEMPT: ALL TYPES OF VEHICLES CAN DISPLAY AND EXEMPT PLATE
FD	FIRE DEPARTMENT: FOR VOLUNTEER FIRE DEPT. AND PRIVATELY OPERATED FIRE DEPT. SEE CITY-OWNED FOR CITY FIRE DEPT PLATES
FG	FOREIGN GOVERNMENT
FM	FARM VEHICLE: INCLUDES FARM AND AGRICULTURE PLATES
HI	HEARING IMPAIRED
IP	INTERNATIONAL PLATE

IT	IN-TRANSIT: TYPE OF TEMPORARY PLATE
JJ	JUDGE OR JUSTICE
LE	LEGISLATIVE: U.S. MEMBER OF U.S. CONGRESS.
LF	LAW ENFORCEMENT, POLICE DEPARTMENT, STATE POLICE, SHERIFF, ETC.
LS	LEGISLATIVE: STATE SENATOR, REPRESENTATIVE, ASSEMBLY-MAN, DELEGATE, ETC.
MC	MOTORCYCLE: MOTORIZED BIKES AND MOTOR SCOOTERS ARE REGISTERED AS MOTORCYCLES IN SOME STATES
MD	MOTORCYCLE DEALER
MF	MANUFACTURER
ML	MILITARY VEHICLE, CANADIAN
MP	MOPED
MR	ARMED FORCES RESERVIST, PERSONALLY OWNED VEHICLE PLATES
MV	MILITARY VEHICLE: U. S.
MY	MILITARY: ANY TYPE OF MILITARY AIRCRAFT REGARDLESS OF DESIGN OR PRIMARY USE
NG	NATIONAL GUARD, MEMBER PERSONALLY OWNED VEHICLE PLATES
NP	CIVILIAN: NON-PASSENGER INCLUDES ALL CIVILIAN AIRCRAFT DESIGNED AND OR USED FOR PURPOSE OTHER THAN TRANSPORTING PASSENGERS
PC	REGULAR PASSENGER AUTOMOBILE PLATES
PE	PERSONALIZED/CUSTOMIZED, ALL TYPES OF VEHICLES
PF	PROFESSIONS: INCLUDED ARCHITECTS, CHIROPRACTORS, EDUCATORS, ENGINEERS, NURSES, VISITING NURSES DO NOT USE FOR DENTIST, JUDGES, LAW, ENFORCEMENT PHARMACIST AND PHYSICIAN
PH	DOCTOR
PP	CIVILIAN, PASSENGER: INCLUDES ALL CIVILIAN AIRCRAFT DESIGNED AND OR USED PRIMARILY FOR TRANSPORTING PASSENGERS WHETHER COMMERCIALY OR PRIVATELY OPERATED
PR	PRESS: INCLUDES NEWS MEDIA/TELEVISION AND NEWS PHOTOGRAPHERS
PS	PROFESSIONAL SPORTS TEAM
PX	PHARMACIST
RE	RECIPROCAL OR RECIPROCITY
RV	RENTED VEHICLE OR TRAILER, INCLUDES LIVERY
SC	SPECIAL PURPOSE, COMMERCIAL VEHICLE STREET CLEANERS, WELDING TRUCKS, ETC.
SN	SNOWMOBILE: IN INSTANCES WHERE A LICENSE PLATE HAS BEEN ISSUED
ST	STATE-OWNED VEHICLE: INCLUDED HIGHWAY DEPARTMENT, DEPARTMENT OF PUBLIC SAFETY, ETC.
SV	SCHOOL VEHICLE: INCLUDES SCHOOL BUS AND DRIVER EDUCATION CAR
TK	TRUCK
TL	TRAILER, BOAT, CAMPER, CARGO, TRAVEL, HOUSE, MOBILE HOME, SEMI, UTILITY ETC.
TM	TEMPORARY
TP	TRANSPORTER
TR	SEMI TRUCK

TX	CAB
US	U.S. GOVERNMENT VEHICLES
VF	MEDAL OF HONOR
ZZ	ATV AND SNOWMOBILES, DISPLAYING A REGISTRATION NUMBER INCLUDES CAMPER TRUCK MOUNTED, CONSTRUCTION EQUIPMENT, HEARSE, MATERIAL HANDLING EQUIPMENT, MOTOR/MOTORIZED HOME, REPOSSESSION, WRECKER, ETC.

\*Note: The number zero "0" is used for the letter "O" in the plate type Code.

## APPENDIX C: DIRECTORY STRUCTURE AND COMMUNICATION PROTOCOLS

The file transfers between RTCS and BOS will utilize SFTP (secure file transfer protocol) over the Internet or site to site VPN where it is required. The transfer files are created by BOS and individual RTCS as described in the ICD sections above. The files will be generated in ASCII format and compressed as specified.

- RTCS Dropbox will be hosted and maintained by individual transactions originating facility (Example I77MP, Monroe and US74)
- BOS Dropbox will be hosted and maintained by NCTA
- The drop boxes will be accessed via a Public IP address, with necessary firewall restrictions built in
- The directory structure will follow below naming conventions
  - **/<RTCS>/incoming/<File Type>/sending** while the file is being transmitted
  - **/<RTCS>/incoming/<File Type>/sent** where the file will be renamed to once the transmission is complete
  - **/<RTCS>/incoming/<File Type>/processed** where the files will be moved once successfully picked up and processed
  - **/<RTCS>/incoming/<File Type>/error** where the files will be moved if there is an error while picking up files (unknown file type)
- BOS will maintain different folders for each RTCS and provide authentication. Access will be restricted for RTCS users to their respective folders.

