



Ministry of  
Transportation  
and Infrastructure

TRAFFIC CONTROLLER DESIGN MANUAL

**Section 100**

**POLICIES AND PROCEDURES**

Transportation Systems and Road Safety Engineering

July 2024

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## TABLE OF CONTENTS

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<b>101</b>	<b>INTRODUCTION</b> .....	<b>1</b>
	101.1 PURPOSE OF THIS MANUAL .....	1
	101.2 USING THIS MANUAL .....	1
	101.3 MANUAL REVISIONS AND ADDITIONS.....	2
	101.4 RELATED MANUALS AND DOCUMENTS.....	3
<b>102</b>	<b>TRAFFIC CONTROLLER DESIGN POLICY</b> .....	<b>4</b>
	102.1 INTRODUCTION .....	4
	102.2 DEFINITIONS .....	4
	102.3 POLICY .....	5
	102.4 COSTS .....	5
<b>103</b>	<b>TRAFFIC CONTROLLER REQUEST</b> .....	<b>7</b>
	103.1 INTRODUCTION .....	7
	103.2 PROCEDURE.....	7
<b>104</b>	<b>TRAFFIC CONTROLLER CABINET AUDITS</b> .....	<b>10</b>
	104.1 INTRODUCTION .....	10
	104.2 PROCEDURES .....	10

## TABLE OF CONTENTS

---

### LIST OF FIGURES

Figure 1. TSRS Organization Chart.....	2
Figure 2. Traffic Signal Controller Equipment Request Form.....	7

### LIST OF TABLES

Table 1. Description and examples of manual format.....	1
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**Electronic versions of this manual and appendices available at:**

<https://www2.gov.bc.ca/gov/content/transportation/transportation-infrastructure/engineering-standards-guidelines/electrical-engineering>

# 101 INTRODUCTION

## 101.1 PURPOSE OF THIS MANUAL

- .1 The purpose of this manual is to provide guidance on traffic controller cabinets and units in the Ministry's right-of-way. This manual provides traffic signal controller technical information and business operating procedures.
- .2 The intended audience for this manual includes Ministry staff, consultants, and contractors. It is expected that the reader of this manual has some background knowledge of traffic controller cabinets and units; this manual is supplementary to field training. This manual complements the content found in Traffic Controller Assembly Manuals Volume 1 and 2.
- .3 For additional information covered in this manual, please contact Ministry ITS Operations.

## 101.2 USING THIS MANUAL

- .1 A structured number format is used to order the information in this manual. This format allows each point to be referenced using a unique identifier, so the reader can refer to, or find a specific point quickly and easily.
- .2 This manual is divided into sections, chapters, clauses, sub-clauses, paragraphs, sub-paragraphs, and sub-sub-paragraphs. Each element is numbered sequentially, with sections beginning at the highest level. The numbering for all other element begins with the section number. Table 1 describes each element and gives examples.

ELEMENT	NUMBERING	EXAMPLE
Sections	Are numbered starting at 100 in intervals of 100.	100, 200, 300...
Chapters	Use the same numbering as sections but increment by 1.	101, 102, 103...
Clauses	Use a decimal and a one-digit number incrementing by 1.	101.1, 101.2, 101.3...
Sub-clauses	Use a decimal and a one-digit number incrementing by 1.	101.1.1, 101.1.2, 101.1.3
Paragraphs	Use a decimal and a one-digit number incrementing by 1.	.1, .2, .3...
Sub-paragraphs	Use a decimal and a one-digit number incrementing by 1.	.1, .2, .3...
Sub-sub-paragraphs	Use a decimal and a one-digit number incrementing by 1.	.1, .2, .3...

Table 1. Description and examples of manual format

- .3 Using this format, it is easy to identify any part of the manual. For example, if you wish to find 302.1.3.2, you will refer to section 300, chapter 2, clause 1, paragraph 3, sub-paragraph 2.

## INTRODUCTION

### 101.3 MANUAL REVISIONS AND ADDITIONS

- .1 Users of this manual may submit suggestions or comments aimed at improving this manual to Ministry of Transportation and Infrastructure, Transportation Systems and Road Safety (TSRS) Engineering located in Coquitlam, BC. TSRS Engineering includes electrical and traffic engineers, technologists, technicians, and administrators. See Figure 1 for TSRS organization chart, and key staff mentioned in this manual.

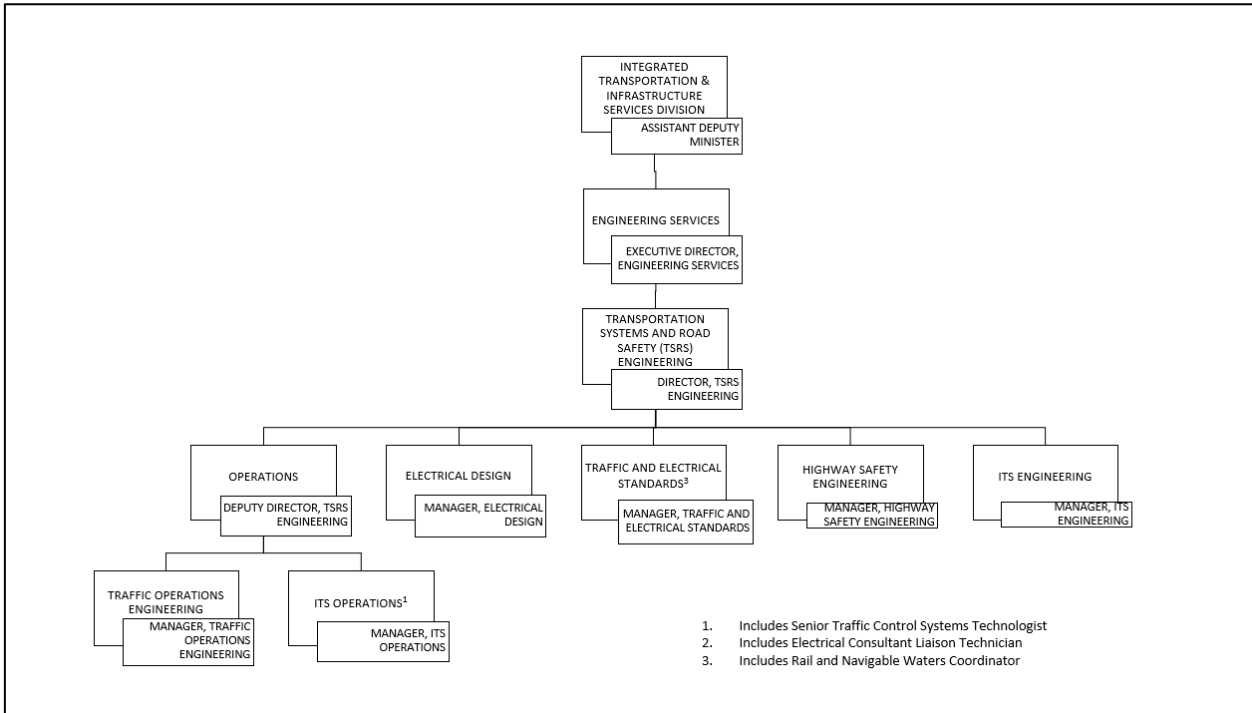


Figure 1. TSRS Organization Chart

- .2 Manual revisions and additions will be issued as-and-when required and can be found on the Ministry Engineering Publications website at:  
<https://www2.gov.bc.ca/gov/content/transportation/transportation-infrastructure/engineering-standards-guidelines/technical-bulletins/bulletins-traffic-electrical>
- .3 Users must check the Engineering Publications website for technical bulletins and technical circulars that may rescind, supersede, or augment the information contained in this manual. These documents can be found on the website noted above.

## INTRODUCTION

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- .4 Ministry Transportation Systems and Road Safety Engineering contact information is as follows:

Ministry of Transportation & Infrastructure  
Transportation Systems and Road Safety Engineering  
Suite 310 – 1500 Woolridge Street  
Coquitlam, BC V3K 0B8  
Phone: 604-527-2221

### 101.4 RELATED MANUALS AND DOCUMENTS

- .1 When preparing designs, designers must comply with all relevant sections in the most recent revisions of the following documents and manuals:
- .1 MUTCD, Canadian
  - .2 NEMA Standards Publication No. TS1 & TS2 – Traffic Control Systems
  - .3 Canadian Electrical Code including B.C. Electrical Bulletins.
  - .4 NEMA Standards Publication TS 2-2016 – Traffic Controller Assemblies with NTCIP Requirements Version 03.07
  - .5 Ministry Engineering Standards and Manuals:
    - .1 Electrical and Traffic Engineering Manual  
<https://www2.gov.bc.ca/gov/content/transportation/transportation-infrastructure/engineering-standards-guidelines/electrical-engineering>
    - .2 Standard Specifications for Highway Construction  
<https://www2.gov.bc.ca/gov/content/transportation/transportation-infrastructure/engineering-standards-guidelines/standard-specifications-for-highway-construction>
  - .2 If there are discrepancies between this manual and the documents and manuals listed above, contact Ministry Transportation Systems and Road Safety Engineering located in Coquitlam, BC for clarification.

## 102 TRAFFIC CONTROLLER DESIGN POLICY

### 102.1 INTRODUCTION

- .1 This section describes the policies applicable to various parties involved in the procurement and commissioning processes of the Ministry's traffic controller equipment. The policy in this chapter applies to the installation of new traffic controller equipment and modifications to existing traffic controller equipment at a signalized intersection within the Ministry's right-of-way. Ministry ITS Operations can provide guidance for policy compliance in this chapter.

### 102.2 DEFINITIONS

- .1 The terms used in this document are defined as follows:
  - .1 **Ministry:** Ministry of Transportation and Infrastructure.
  - .2 **Traffic Signal:** The combination of all equipment required to operate a signalized intersection.
  - .3 **Traffic Controller Cabinet and Unit:** The combination of all electronic and electrical components within a traffic controller cabinet and the traffic controller mainframe unit.
  - .4 **Traffic Controller Cabinet:** The electrical enclosure for housing the traffic controller unit and associated traffic signal control equipment.
  - .5 **Traffic Controller Unit:** For the Ministry, this would include the Econolite Cobalt and LMD 8000
  - .6 **UPS:** Uninterruptible Power Supply.
  - .7 **ITS Operations:** The Ministry's Intelligent Transportation System Operations Department.
  - .8 **Traffic Engineering:** The Ministry's Traffic Engineering and Operations Department.
  - .9 **Electrical Maintenance Service Agreement (EMSA):** The executed agreement between the Ministry and the EMC to deliver services as detailed within the Electrical Maintenance Service Agreement.
  - .10 **Electrical Maintenance Contractor (EMC):** A party that has entered a contract with the province to provide electrical maintenance services in the relevant electrical service area, as detailed within the EMSA.
  - .11 **Electrical Installation Contractor (EIC):** A party that has entered into a contract with the province to provide electrical installation services for the applicable construction project.

- .12 **Electrical Service Area (ESA):** Is the geographical area as defined in the EMSA, maintained by the applicable EMC.
- .13 **Traffic Controller Audit:** A physical site inspection of the selected Traffic Controller Cabinet and Unit, and UPS by Ministry staff or an external professional approved by the Ministry.
- .14 **Traffic Signal Record (TSR):** A document completed by the EMC and sent to the Ministry to confirm traffic signal work has been completed in accordance with the Ministry approved Signal Timing Sheet.
- .15 **Signal Timing Sheet (STS):** A document outlining the signal operation requirements set by a Traffic Engineer. This document is to be Ministry approved before the EMC can commission the signal.
- .16 **Work Order:** A written order issued by the Ministry to the EMC to perform Additional Services in accordance with the EMSA.
- .17 **Additional Service:** All work initiated and authorized by Work Order in accordance with the EMSA.
- .18 **Electrical Services Coordinator:** The Ministry's representative overseeing the electrical operations for the applicable ESA and is also the main point of contact for requesting services from the EMC.
- .19 **Project Manager (PM):** The Ministry's representative overseeing the development of projects and is responsible for coordinating project activities involving the EMC and EIC.

### 102.3 POLICY

- .1 All designs for new traffic controller equipment and modifications to existing traffic controller equipment shall be managed by the Ministry's ITS Operations.
- .2 Qualified and experienced technicians employed by the Ministry's EMC may design and assemble traffic controllers on behalf of the Ministry.
- .3 In the event of a Motor Vehicle Incident (MVI) resulting in damages to the existing Traffic Controller Cabinet and Unit, the damaged equipment, regardless of severity, shall be removed and replaced by the EMC within the timeframe detailed in the Electrical Maintenance Service Agreement.
- .4 If a Traffic Controller Cabinet and Unit is required for Corrective Maintenance at an existing Traffic Signal, the EMC shall contact ITS Operations for approval.
- .5 ITS Operations shall manage the supply and procurement of Traffic Controller Cabinets and Units for the Ministry.



- .6 There is fixed pricing for Traffic Controller Cabinets and Units. The fixed pricing includes the material cost and for the administration required by the Ministry.

# 103 TRAFFIC CONTROLLER REQUEST

## 103.1 INTRODUCTION


- .1 This chapter outlines the procedures required to administer and implement a Traffic Controller Cabinet and Unit to the location requested. These procedures consist of the following:
  - .1 Information and Design Stage.
  - .2 Assembly and Testing Stage.
  - .3 Installation and Commissioning Stage.

## 103.2 PROCEDURE

- .1 Information and Design Stage:
  - .1 A formal written request for a Traffic Controller Cabinet and Unit using the “Traffic Signal Controller Equipment Request Form” (see Figure 2) shall be submitted to Ministry ITS Operations by the requesting party.
  - .2 The required design documentation to support a controller equipment request is as follows:
    - .1 Draft or signed & sealed Traffic Engineering Checklist (TEC).
    - .2 Draft or signed & sealed Signal Timing Sheet (STS).
    - .3 Draft or signed & sealed Intersection Electrical Drawings (where applicable).
  - .3 Once all design documentation has been received and verified, ITS Operations will notify the EMC to prepare the requested Traffic Controller Cabinet(s) and Unit(s).
  - .4 If a request involves the upgrade or modification to an existing Traffic Controller Cabinet and Unit, the Ministry will coordinate with the requesting project team and confirm the equipment modification(s) required.
- .2 Assembly and Testing Stage:
  - .1 ITS Operations shall notify the Electrical Services Coordinator to issue a Work Order to initiate the work required in the Assembly and Testing Stage.
  - .2 The EMC shall configure, program and test the Traffic Controller Cabinet and Unit to operate in accordance with the issued design documentation.

# TRAFFIC CONTROLLER REQUEST

- .3 The assembled traffic controller cabinet shall be fully tested in a non-operational environment prior to being installed in the field.



BRITISH COLUMBIA

Ministry of  
Transportation  
and Infrastructure

## TRAFFIC SIGNAL CONTROLLER EQUIPMENT REQUEST FORM

REQUEST#:

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**STEP 1 - Project Information**

Project Name:

Project Scope:

Project Location:

Electrical Service Area:

Project Manager:

Date Requested:

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**STEP 2 - Equipment Request Information**

Equipment Detail	Price	Qty	PST (7%)	Engineering Services (10%)	Total
Traffic Signal Controller (Cobalt):			\$ 0.00	\$ 0.00	\$ 0.00
Traffic Signal Cabinet (P8):			\$ 0.00	\$ 0.00	\$ 0.00
<b>Grand Total:</b>	<b>\$ 0.00</b>				

Comments:

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**STEP 3 - CPS Coding Information**

Project Coding

<input style="width: 20px; height: 15px;" type="text"/>	<input style="width: 20px; height: 15px;" type="text"/>	<input style="width: 20px; height: 15px;" type="text"/>	<input style="width: 20px; height: 15px;" type="text"/>	<input style="width: 20px; height: 15px;" type="text"/>	<input style="width: 20px; height: 15px;" type="text"/>	<input style="width: 20px; height: 15px;" type="text"/>	<input style="width: 20px; height: 15px;" type="text"/>
ITC	Service Line	Project	Product				
<input style="width: 20px; height: 15px;" type="text"/>	<input style="width: 20px; height: 15px;" type="text"/>	<input style="width: 20px; height: 15px;" type="text"/>	<input style="width: 20px; height: 15px;" type="text"/>	<input style="width: 20px; height: 15px;" type="text"/>	<input style="width: 20px; height: 15px;" type="text"/>	<input style="width: 20px; height: 15px;" type="text"/>	<input style="width: 20px; height: 15px;" type="text"/>
Bus Function	Work Activity	Coil Type	STOB				

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Recovery Coding

<input style="width: 20px; height: 15px;" type="text"/>	<input style="width: 20px; height: 15px;" type="text"/>	<input style="width: 20px; height: 15px;" type="text"/>	<input style="width: 20px; height: 15px;" type="text"/>	<input style="width: 20px; height: 15px;" type="text"/>	<input style="width: 20px; height: 15px;" type="text"/>	<input style="width: 20px; height: 15px;" type="text"/>	<input style="width: 20px; height: 15px;" type="text"/>
ITC	Service Line	Project	Product				
<input style="width: 20px; height: 15px;" type="text"/>	<input style="width: 20px; height: 15px;" type="text"/>	<input style="width: 20px; height: 15px;" type="text"/>	<input style="width: 20px; height: 15px;" type="text"/>	<input style="width: 20px; height: 15px;" type="text"/>	<input style="width: 20px; height: 15px;" type="text"/>	<input style="width: 20px; height: 15px;" type="text"/>	<input style="width: 20px; height: 15px;" type="text"/>
Bus Function	Work Activity	Coil Type	STOB				

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**STEP 4 - Signatories**

<u>ITS Operations</u>	<u>Project Expense Authority</u>
Signature: <input style="width: 100%; height: 30px;" type="text"/>	Signature: <input style="width: 100%; height: 30px;" type="text"/>
Name: <input style="width: 100%;" type="text"/>	Name: <input style="width: 100%;" type="text"/>
Title: <input style="width: 100%;" type="text"/>	Title: <input style="width: 100%;" type="text"/>
Date: <input style="width: 100%;" type="text"/>	Date: <input style="width: 100%;" type="text"/>

Figure 2. Traffic Signal Controller Equipment Request Form

## TRAFFIC CONTROLLER DESIGN POLICY

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- .4 If a change to the traffic controller program or configuration is required, and the change alters the operational design from the design documentation, the EMC shall notify ITS Operations of the issue and proposed change before implementation.
- .3 Installation and Commissioning Stage:
  - .1 The EMC shall perform the installation and commissioning work as detailed in the Work Order. The traffic signal commissioning is obligated to the EMC to perform, in accordance with the EMSA.
  - .2 The EMC shall provide "redlines" or "mark-ups" on a printed traffic cabinet drawing to ITS Operations upon completion of this stage.
  - .3 ITS Operations shall archive and maintain all controller design documentation and correspondence relating to the commissioned Traffic Controller Cabinet and Unit.

## **104 TRAFFIC CONTROLLER CABINET AUDITS**

### **104.1 INTRODUCTION**

- .1 It is the responsibility of Ministry ITS Operations to conduct periodic field audits of active Traffic Controller Cabinet and Units in the province. An audit shall involve the design documents held by the Ministry, and record documents kept in Traffic Controller Cabinet.

### **104.2 PROCEDURES**

- .1 An auditor from ITS Operations shall be assigned to conduct traffic controller audits. An external qualified auditor may be contracted at the discretion of ITS Operations.
- .2 ITS Operations shall identify and select up to five percent of the Ministry's Traffic Controller Cabinet and Unit inventory for auditing annually.
- .3 ITS Operations shall notify the respective Electrical Services Coordinator and EMC of any upcoming audits in their Electrical Service Area to avoid conflicts with pre-planned maintenance or developments by the EMC.
- .4 The auditor shall:
  - .1 Verify and compare the record documentation stored in the Traffic Controller Cabinet against the record documents from the Ministry's archive.
  - .2 Verify the programming and operation of the Traffic Controller Cabinet and Unit against the issued design documents.
  - .3 Inspect the internal and external conditions of the Traffic Controller Cabinet and the UPS cabinet as per guidelines outlined in this manual.
- .5 ITS Operations shall prepare an audit report, summarizing each audit completed and listing any deficiencies that require Corrective Maintenance. The audit report shall be sent to the Electrical Services Coordinator to distribute to their respective EMC.
- .6 ITS Operations shall follow-up with the Electrical Services Coordinator to confirm that all deficiencies noted in the audit report have been addressed by the EMC.