Minnesota Statewide Regional ITS Architecture and Systems Engineering Checklist for CLASS A: STANDARD ITS APPLICATION - TRAFFIC SIGNALS
### FHWA Final Rule 940 and FTA National ITS Architecture Policy

For all ITS projects or projects with an ITS component, a Systems Engineering Checklist shall be completed and submitted with the Project Submittal Form. For questions regarding the completion of this checklist contact Rashmi Brewer, P.E. – MnDOT Office of Traffic, Safety and Technology at 651-234-7063 or e-mail at Rashmi.Brewer@state.mn.us.

Fiber Optic Signal Interconnect, CCTV Camera, and Flashing Yellow Arrow Upgrades
(see Class B-2 Checklist for Fiber Optic Signal Interconnect and CCTV Cameras)

SECTION 1 – Project Information

1.1 CONTACT PERSON (e.g. PROJECT MANAGER)

Name/Title: Sarah Tracy, Assistant Traffic Engineer

Signature: *Sarah Tracy*

Telephone: (952) 891-7177

Agency: Dakota County Transportation
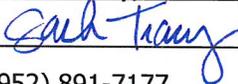
Date: 4/17/18

Email: sarah.tracy@co.dakota.mn.us

1.2 PROJECT LIMITS, SIGNAL SYSTEM ID AND DESCRIPTION *(list all – attach additional sheet if needed)*

CSAH 46 from Kenrick Ave to CSAH 31
- CSAH 46 and Ipava Avenue
- CSAH 46 and Lac Lavon Drive / Interlachen Boulevard
- CSAH 46 and Garden View Drive / Highview Avenue
- CSAH 46 and Galaxie Avenue
- CSAH 46 and Foliage Avenue
- CSAH 46 and Flagstaff Avenue

CSAH 31 from 170th Street to CSAH 38
- CSAH 31 and 170th Street
- CSAH 31 and CSAH 46
- CSAH 31 and 142nd Street
- CSAH 31 and 140th Street
- CSAH 31 and CSAH 33
- CSAH 31 and CSAH 38

Status: ☐ New   ☒ Replace

1.3 PROJECT NUMBER

1.3A Federal Project Number: CMAQ 1918

1.3B State/Local Project Number:

CP 31-87 (SP 019-030-009)

1.4 PROJECT SCHEDULE

Letting Date: 6/5/2018

Anticipated Start Date: 7/9/2018

1.5 NATURE OF WORK *(check all that apply)*

☐ Scoping   ☐ Design   ☐ Software/Integration   ☒ Construction
☐ Operations & Management   ☐ Evaluations   ☐ Planning   ☒ Equipment Replacement
☐ Research & Development   ☐ Others (Please Specify) _____

1.6 PROJECT FEATURES AND ITS APPLICATIONS *(check all that apply)*

Traffic Signal Features for Project Site(s):

☐ Basic Traffic Signal   ☒ Flashing Yellow Arrow   ☐ Advanced Warning Flasher
☐ Railroad Preemption   ☐ Emergency Vehicle Preemption*   ☐ Transit Signal Priority*
☐ Enforcement Lights   ☒ Traffic Signal Interconnect

* This checklist applies to emergency vehicle preemption (EVP) and transit signal priority (TSP) that is controlled at an intersection level without traffic control center oversight. For systems with traffic control center oversight, please use Class B-2: Arterial Traffic Management Checklist.

Note: High Resolution (e.g. Smart Signal) is not covered by this standard application. Please use Class B-2: Arterial Traffic Management or Class C: Large Scale/Complex ITS Projects Checklist.

1.7 SYSTEMS ENGINEERING DOCUMENTATION

A programmatic Systems Engineering analysis has been developed for this application. A Concept of Operations and a Functional Requirements document are available as references and **shall be reviewed for consistency** at http://www.dot.state.mn.us/its/projects/2006-2010/systemsengforstandarditsapplications.html.

☒ Standard Traffic Signal Systems Engineering documents (i.e. Concept of Operations and Functional Requirements) have been reviewed, and the project is consistent with these documents.

Or,

☐ If the project is not entirely consistent with the standard Systems Engineering documents, a project specific concept of operations and/or functional requirements will be developed using the standard Systems Engineering documents as a base. Contact the MnDOT Office of Traffic, Safety and Technology contact person listed at top of page 1 for guidance and assistance.

1.8 RELATIONSHIP TO OTHER PROJECTS AND PHASES
Please list any construction and tied projects.

Project Title	**Project Number**
CSAH 31 ADA Improvements	CP 31-97

SECTION 2 – Regional Architecture Assessment

2.1 PROJECT IS INCLUDED IN THE MINNESOTA STATEWIDE REGIONAL ARCHITECTURE

(Refer to ITS Initiatives and Project Concepts for Implementation, Sections 4.3 and 4.4 of Volume 9,
Minnesota Statewide Regional ITS Architecture, *2014,*
http://www.dot.state.mn.us/its/projects/2006-2010/mnitsarchitecture/its-volume-9.pdf)

☒ Yes ☐ No

If "No", please list additional ITS devices, features, and/or functions that are not listed in **1.6** and send a copy of the complete checklist via email to the MnDOT Office of Traffic, Safety and Technology contact person listed at top of page 1.

If "Yes", Project ID (from *ITS Implementation Projects*): <u>S07, S13</u>

Is the project consistent with the description in the Architecture? ☒ Yes ☐ No

If "No", please summarize the differences below and send a copy of the complete checklist via email to the MnDOT Office of Traffic, Safety and Technology contact person listed at top of page 1.

2.2 TRAFFIC SIGNAL DATA COLLECTION AND SHARING

Please use the table below to provide the following information:
  (1) Operational data obtained from the system
  (2) Frequency of obtaining the data (e.g. every 5 minutes, daily, weekly, monthly, etc.)
  (3) Purpose(s) of obtaining the data,
  (4) Is the data archived, and
  (5) Who do you share the data with? (e.g. MnDOT RTMC, U of M Traffic Observatory, etc.)
The list below is not a complete list. Please add additional data and rows to the list as appropriate.

Data Obtained	Frequency of Obtaining Data	Purposes *(Check all that apply)*	Is Data Archived?	Data Sharing Partners
Controller Status (for example, mode of operation, timing plan changes, timing verification, faults, malfunctions, failures, conflicts, maintenance calls, event logs, alarms)	☒ ≤ 5 min ☐ Hourly ☐ Daily ☐ Weekly ☐ Monthly ☐ Other	☒ Monitoring and Control ☒ Operational Analysis ☒ Planning Analysis ☒ Performance Reporting ☐ Other (please specify):	☐ Yes ☒ No	MnDOT Signals
Timing Plan Data (for example, cycle length, phasing, splits, offsets, Ped. times)	☒ ≤ 5 min ☐ Hourly ☐ Daily ☐ Weekly ☐ Monthly ☐ Other	☒ Monitoring and Control ☒ Operational Analysis ☒ Planning Analysis ☒ Performance Reporting ☐ Other (please specify):	☐ Yes ☒ No	MnDOT Signals
Detector Data (other than presence detection. For example, traffic counts, vehicle classifications)	☒ ≤ 5 min ☐ Hourly ☐ Daily ☐ Weekly ☐ Monthly ☐ Other	☒ Monitoring and Control ☐ Operational Analysis ☐ Planning Analysis ☐ Performance Reporting ☐ Other (please specify):	☐ Yes ☒ No	

2.3 ITS STANDARDS
(for information only)

Applicable ITS Standards for traffic signal projects may include:
- ITE TMDD 3.1: Traffic Management Data Dictionary (TMDD) and Message Sets for External Traffic Management Center Communications (MS/ETMCC)
- NTCIP Center-to-Field Group
- NTCIP 1201: Global Object Definitions
- NTCIP 1202: Object Definitions for Actuated Traffic Signal Controller (ASC) Units
- NTCIP 1206: Object Definitions for Data Collection and Monitoring (DCM) Devices
- NTCIP 1209: Data Element Definitions for Transportation Sensor Systems (TSS)
- NTCIP 1210: Field Management Stations (FMS) - Part 1: Object Definitions for Signal System Masters
- NTCIP 1211: Object Definitions for Signal Control and Prioritization (SCP)
- ASTM E2468-05: Object Definitions for Signal Control and Prioritization (SCP)
- ASTM E2665-08: Standard Specifications for Archiving ITS-Generated Traffic Monitoring Data
- IEEE 1570-2002: Standard for the Interface Between the Rail Subsystem and the Highway Subsystem at a Highway Rail Intersection

General information on ITS Standards can be found at http://www.standards.its.dot.gov/.
Minnesota Standards are listed in Section 10 of Volume 10, Minnesota Statewide Regional ITS Architecture, 2014 as generated by Turbo Architecture.

SECTION 3 – Procurement

3.1 PROCUREMENT METHODS *(check all that apply)*

☒ Construction Contract
☐ Professional Technical Services Contract/Agreement
☐ Joint Powers Contract/Agreement
☐ Interagency Contract/Agreement
☐ Work Order Contract/Agreement
☐ Commodities Contract
☒ Purchase Order (State/Local Furnish)
☐ Other _____

Comments: None

SECTION 4 – Operations and Management Commitment

4.1 ESTIMATED ANNUAL OPERATIONS AND MANAGEMENT COSTS
(O&M cost for each traffic signal is approximately $1,700 to $2,100 per year (in 2014 dollars). Source: USDOT ITS Joint Program Office Costs Database, http://www.itscosts.its.dot.gov/)

$1,650 per signal per year X 12 signals = $19,800 per year

Note: All signals are existing signal systems that are being upgraded which already have resources dedicated to management, operations, and maintenance.

APPROVAL (Refer to page 7 of the HPDP ITS Systems Engineering Requirement for a list of approval agencies)

I certify that to the best of my knowledge all of the information on this checklist is accurate. I acknowledge that I am aware of the requirements set forth in the HPDP – ITS Systems Engineering for this project.

Name/Title: Jacob Folkeringa, Project Manager   Agency: SRF Consulting Group
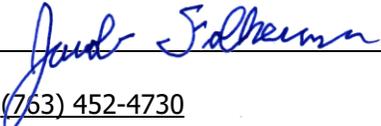
Signature: _____   Date: 4/17/2018

Telephone: (763) 452-4730   Email: jfolkeringa@srfconsulting.com

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REVIEWED FOR COMPLIANCE WITH STATE AND FEDERAL RULES/POLICY, AND APPROVED FOR FEDERAL AID FUNDING

Name/Title: Cathy Huebsch,   Agency: MnDOT - Metro District
            District Federal Aid Engineer

Signature: _____   Date: 5/22/2018 _____

Telephone: 651-234-7766   Email: cathy.huebsch@state.mn.us