Transportation Systems Management & Operations Traffic Infrastructure Process (TSMO-TIP)

Implementation Webinar

Bureau of Traffic Operations

March 16, 2016, 1:00pm-3:00pm

Mark Lloyd | 414-224-1947

Outline

1. Welcome and Introductions (5 min)
2. TSMO-TIP Background (15 min)
3. Process Overview (10 min)
   - Flowchart
   - Tools
4. Walking through the Process (60 min)
5. Next Steps (10 min)
6. Discussion and Questions (20 min)

Please type questions in the chat box throughout the webinar

1. Introductions

TSMO-TIP Contacts

Mark Lloyd, PE

WisDOT Bureau of Traffic Operations

ITS Planning Engineer

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David Karnes, PE

WisDOT Bureau of Traffic Operations

Traffic Systems Supervisor

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Presenters

Mark Lloyd | WisDOT Bureau of Traffic Operations

- TSMO-TIP Project Introduction

Peter Rafferty | UW-Madison TOPS Lab

- TSMO-TIP Historical Information

Jon Riehl | UW-Madison TOPS Lab

- TSMO-TIP Technical Information and Needs Analysis Tool

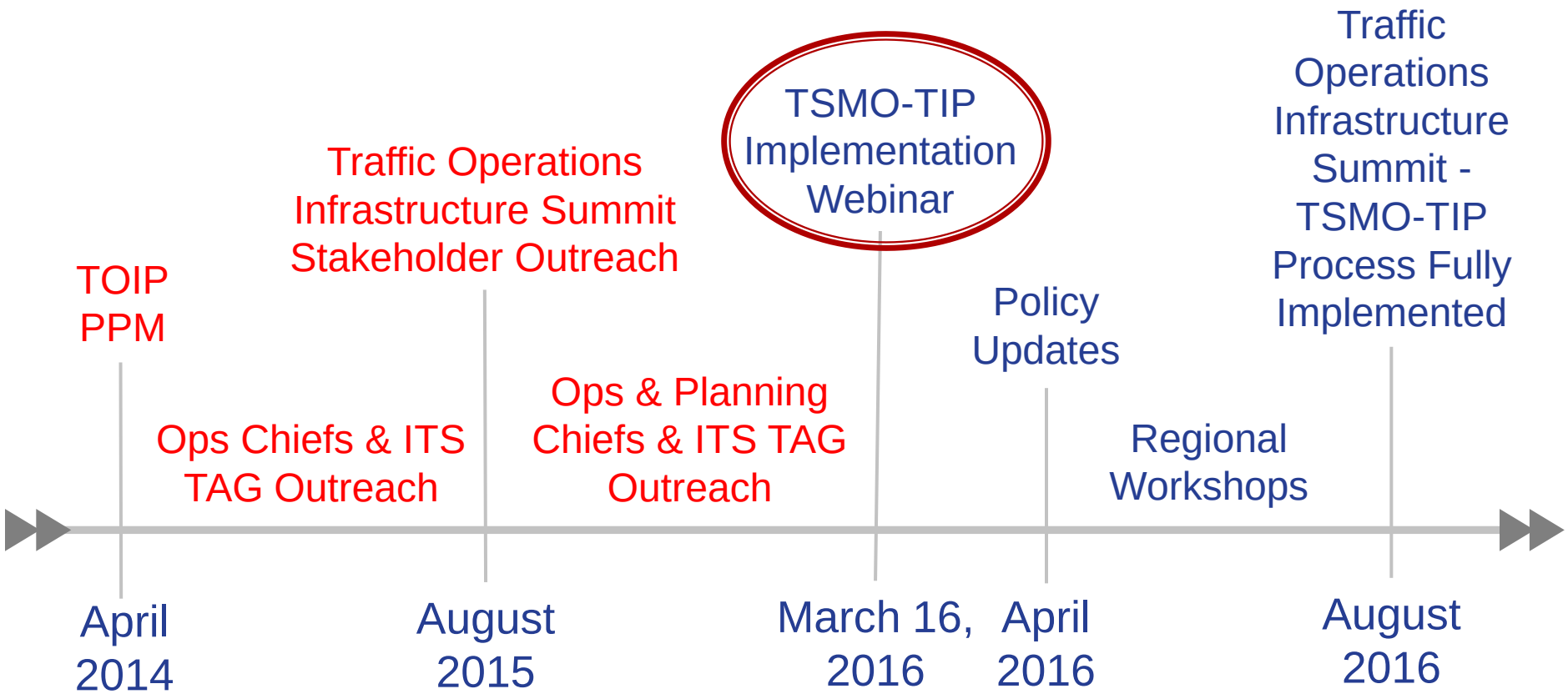
Natalie Mengelkoch | Kimley-Horn

- TSMO-TIP Benefits Tool

Webinar Objectives

- Explain the TSMO-TIP Process
- Describe how the process will help WisDOT and your region deploy TSM&O infrastructure in a more efficient and documented way
- Gain regional buy in or identify items of SIGNIFICANT concern
- Share process implementation schedule

Implementation Timeline



Stakeholder Outreach

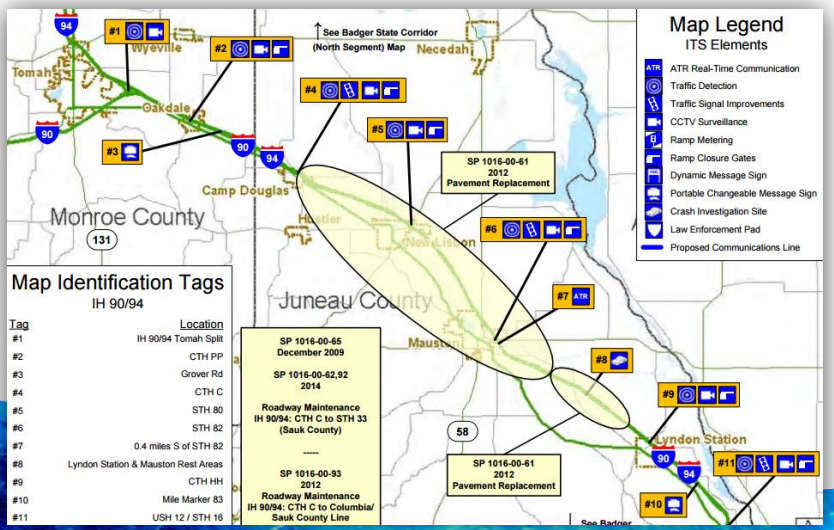
TSMO-TIP Implementation

- Projects not yet approved will go through this process to justify and document deployments
  - BTO will assist regions with FY17 Standalone major ITS projects
  - Multi-year projects already approved are unaffected
- New projects going forward must go through this process

2. TSMO-TIP Background

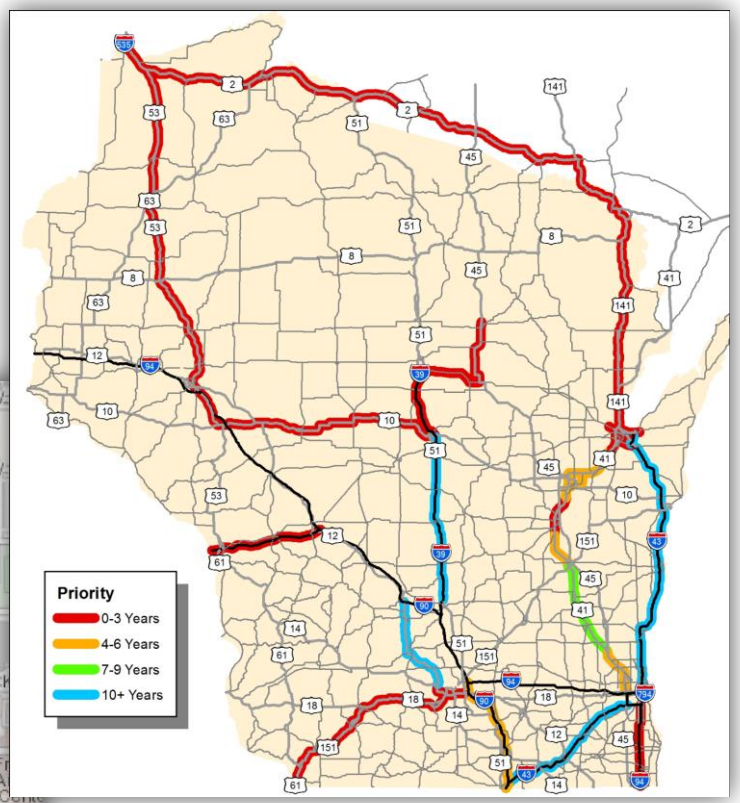
History

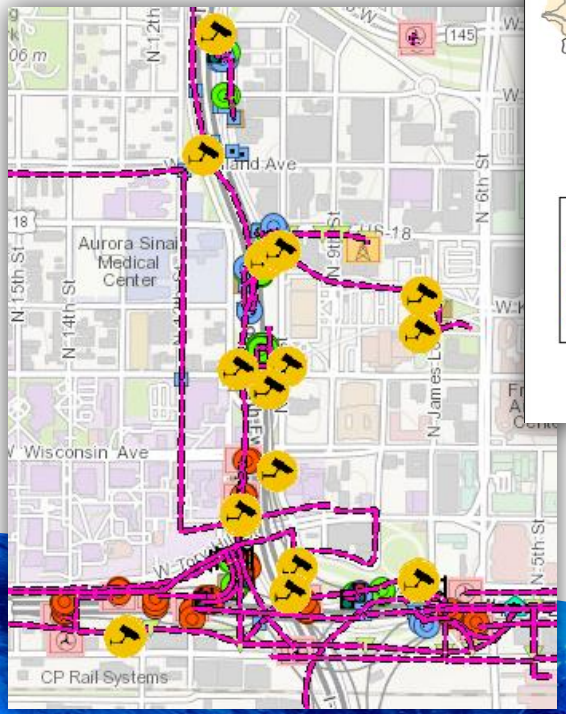
- ITS Deployments in Wisconsin
- Traffic Operations Infrastructure Plan (TOIP)
  - Implementation Plan
  - Communications Systems Layer
  - Bi-Annual Updates
- TOIP Project/Program Management (PPM)



TOIP Current Deployment Status

- Roughly 90-95% deployed
- Mature Network
- Toward an Annual Cycle
- Standalone Program





Key TOIP Project / Program Management (PPM) Outcomes

- Develop draft methodology and associated tools
  - Potential operational improvements
  - New technologies
  - Improved GIS analysis, planning, and prioritization
- Focus on ITS deployments
- Inclusive stakeholders, with regular review
- The PPM drove the change to TSMO-TIP
- Program status defined in the State of the State report
- Implementation of the TSMO-TIP, will close the PPM

Defining TSM&O – MAP-21

- Not just ITS
- MAP-21 revised federal definition of TSM&O (23 U.S.C. § 101(a)(30))
  - Integrated strategies to optimize existing infrastructure performance
  - **Multimodal and intermodal**, **cross-jurisdictional** systems, services, and projects
  - Preserve capacity and improve security, safety, and reliability of transportation system
  - Includes coordinated regional implementation and interoperability
- WisDOT TSM&O State of the State Report adopts MAP-21 definition adding:
  - "Plans to retire system components that no longer provide sufficient benefit to warrant continuation or are technologically obsolete."

Example TSM&O Traffic Infrastructure Strategies

- Work Zone Management
- Traffic Incident Management
- Service Patrols
- Special Event Management
- Road Weather Management
- Transit Management
- Traffic Signal Coordination
- Surveillance and Monitoring
- Traveler Information
- Ramp Management
- Managed Lanes
- Active Traffic Management
- Integrated Corridor Management
- Truck Parking

TSM&O Stakeholders

- Division of Transportation System Development (DTSD)
  - Bureau of Traffic Operations (BTO)
    - Traffic Systems & Management Section
    - Traffic Engineering & Safety Section
  - Bureau of Highway Maintenance (BHM)
  - Regional operations managers
  - Regional traffic & planning staff
  - Bureau of Project Development (BPD)
- Division of Transportation Investment Management (DTIM)
  - Bureau of State Highway Programs (BSHP)
  - Bureau of Planning and Economic Development (BPED)
- Wisconsin State Patrol (WSP)
- Wisconsin TOPS Lab
- Federal Highway Administration (FHWA)
- Counties
  - Milwaukee and Dane County Sheriffs
- Municipalities
  - City of Milwaukee
  - City of Madison Traffic
- Planning Organizations
  - Southeast Wisconsin Regional Planning Commission (SEWRPC)
  - Madison Area Transportation Planning Board (MATPB)

TSM&O Capability Maturity Model

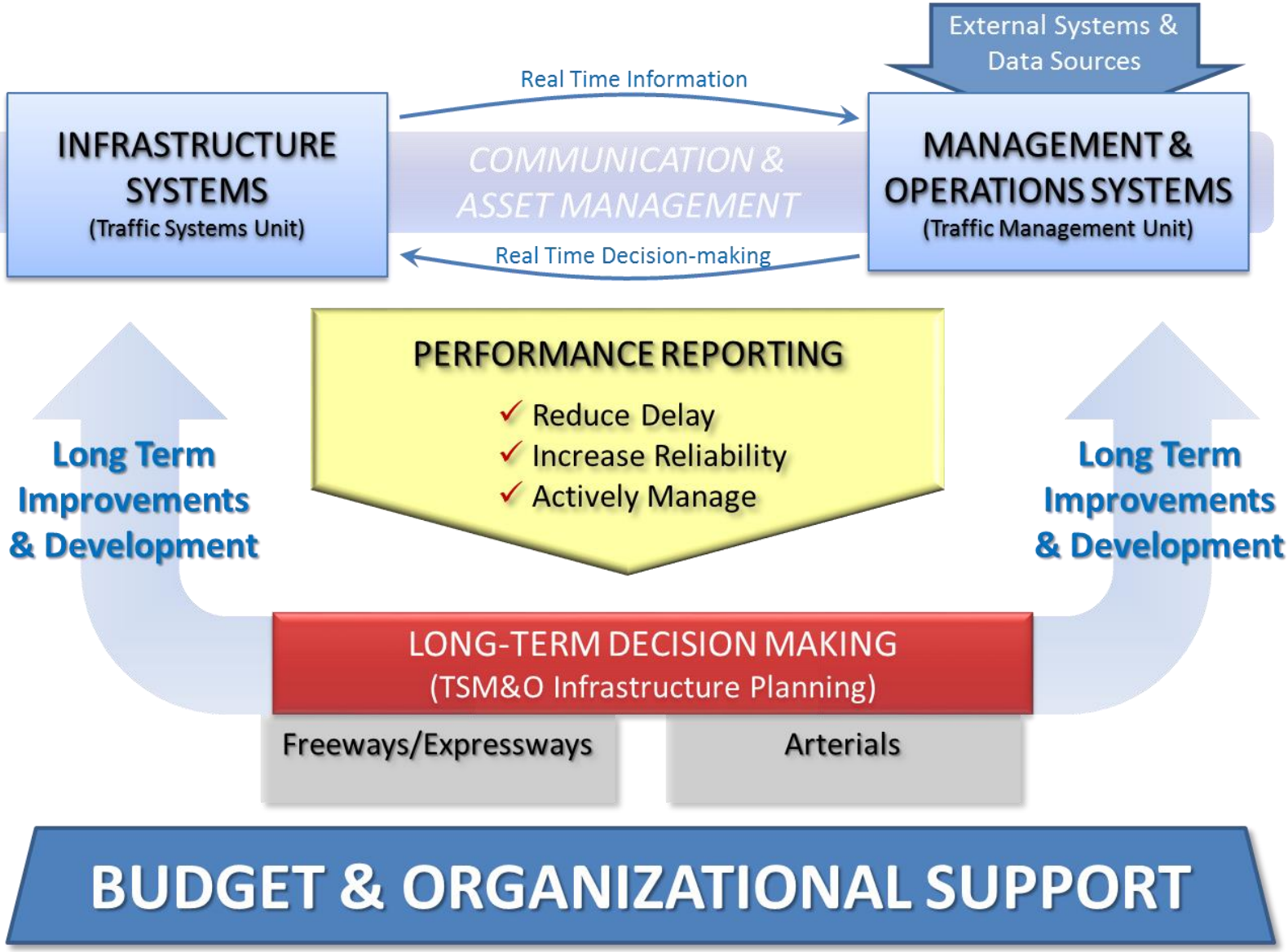
Six Dimensions

- Business Processes
- **Systems & Technology**
- Performance Measurement
- Culture
- Organization / Workforce
- Collaboration

Relevant Examples

- Develop this new traffic infrastructure process
- Peer review and working group
- Annual cycle with updates and linkages to other WisDOT business processes
- Truck parking, ITS architecture, regional coordination, etc.

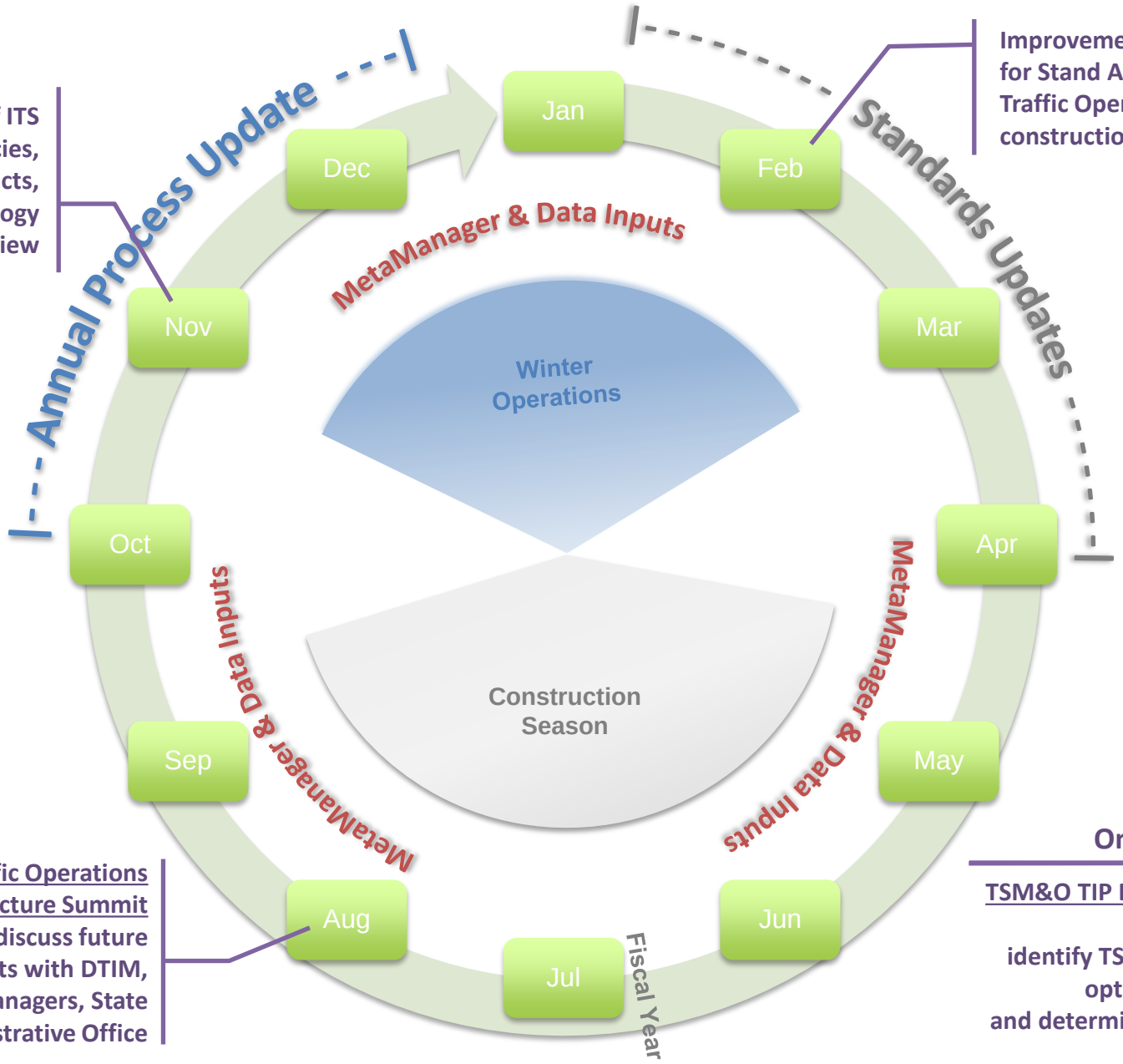
WisDOT received a federal grant to advance these


External Systems & Data Sources
Real Time Information
INFRASTRUCTURE SYSTEMS
(Traffic Systems Unit)
COMMUNICATION & ASSET MANAGEMENT
MANAGEMENT & OPERATIONS SYSTEMS
(Traffic Management Unit)
Real Time Decision-making
PERFORMANCE REPORTING
✓ Reduce Delay
✓ Increase Reliability
✓ Actively Manage
Long Term Improvements & Development
Long Term Improvements & Development
LONG-TERM DECISION MAKING
(TSM&O Infrastructure Planning)
Freeways/Expressways
Arterials
BUDGET & ORGANIZATIONAL SUPPORT

TSM&O-TIP Objectives

- Develop a traffic infrastructure deployment process focused on:
  - Continuous performance improvement
    - Annual process open to technological advances
  - Current and short-term needs
    - Needs analysis tool to identify system issues
  - Decision making support
    - Process checklist and benefits analysis tool
  - Process documentation
    - Project justification and historical reference
- Support federal requirements

TSMO-TIP Annual Cycle



Traffic Operations Infrastructure Summit
Review past and discuss future deployments with DTIM, Operations Managers, State Patrol, and Administrative Office

Ongoing

TSM&O TIP Evaluation Process
Identify needs, identify TSM&O deployment options and evaluate, and determine funding source

3. TSMO-TIP Process Overview

TSMO-TIP Flowchart – Process Tasks

A
- **Statewide Needs Inventory** | BTO Traffic Systems Unit with stakeholder support

B
- **Regional Project List w/ Priority Ranking** | BTO and Regional ITS Coordinators

C
- **Draft Statewide Deployment List** | BTO and Regional ITS Coordinators

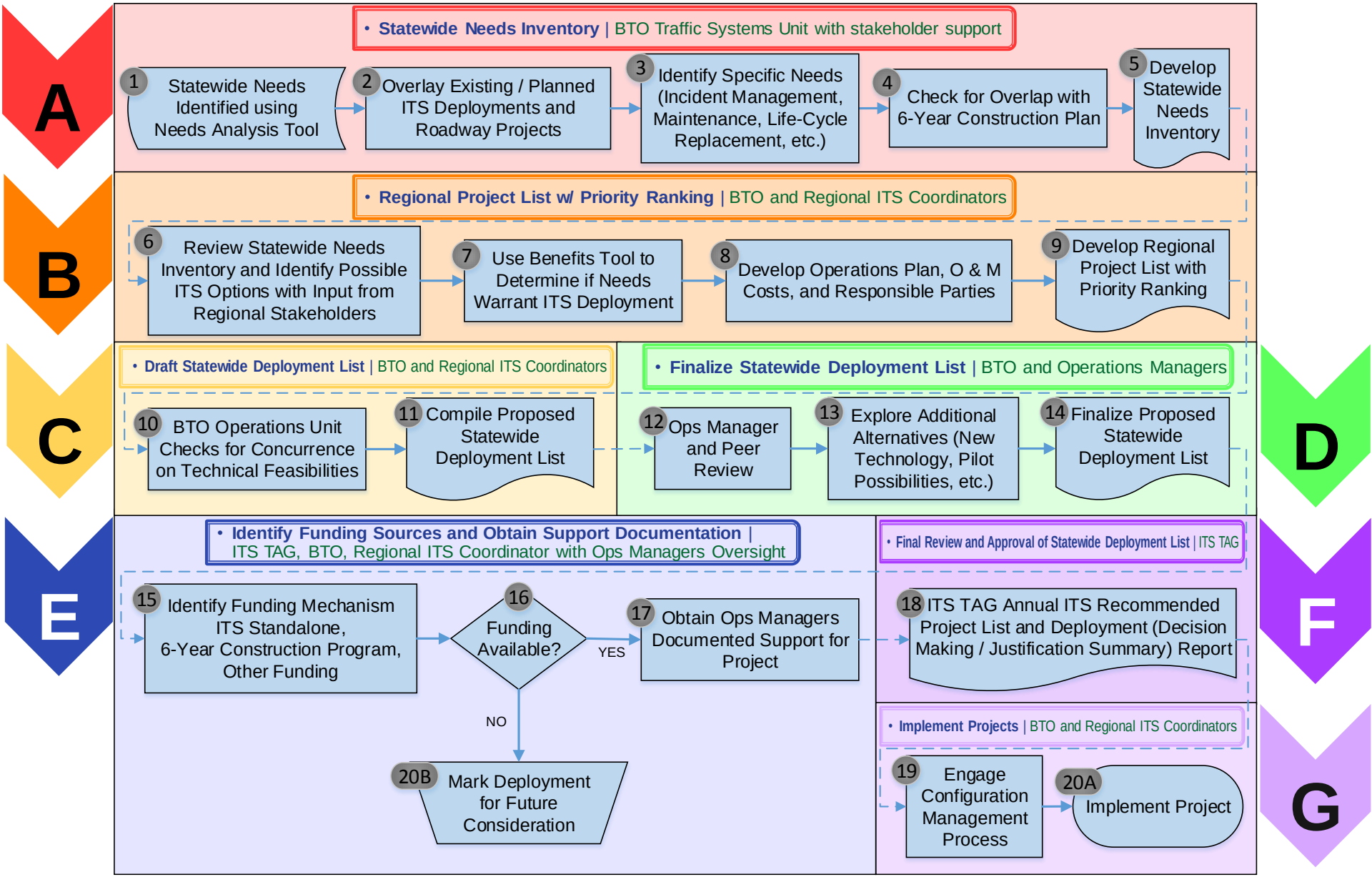
D
- **Finalize Statewide Deployment List** | BTO and Operations Managers

E
- **Identify Funding Sources and Obtain Support Documentation** | ITS TAG et al.

F
- **Final Review and Approval of Statewide Deployment List** | ITS TAG

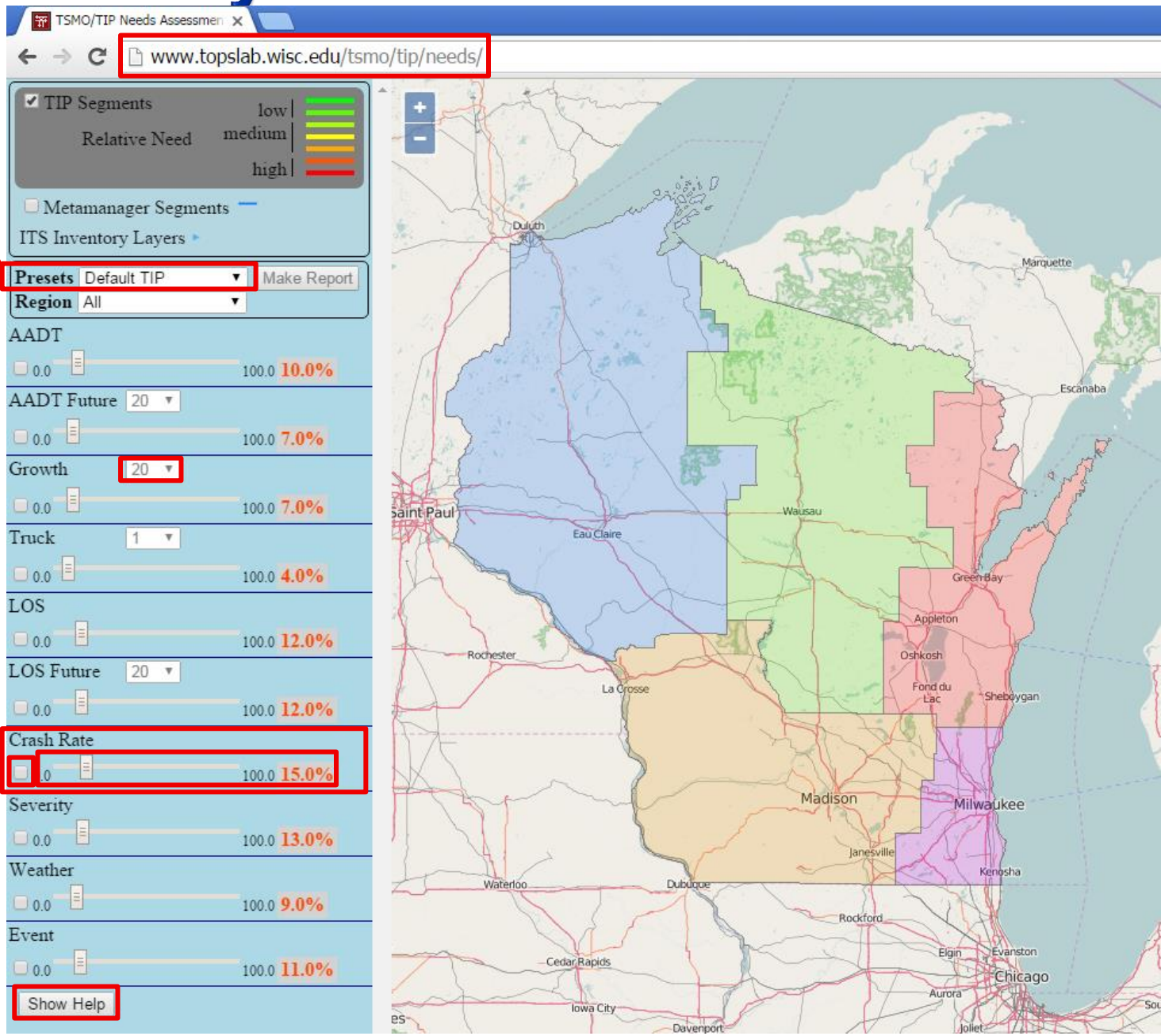
G
- **Implement Projects** | BTO and Regional ITS Coordinators

TSMO-TIP Flowchart – Detailed Tasks

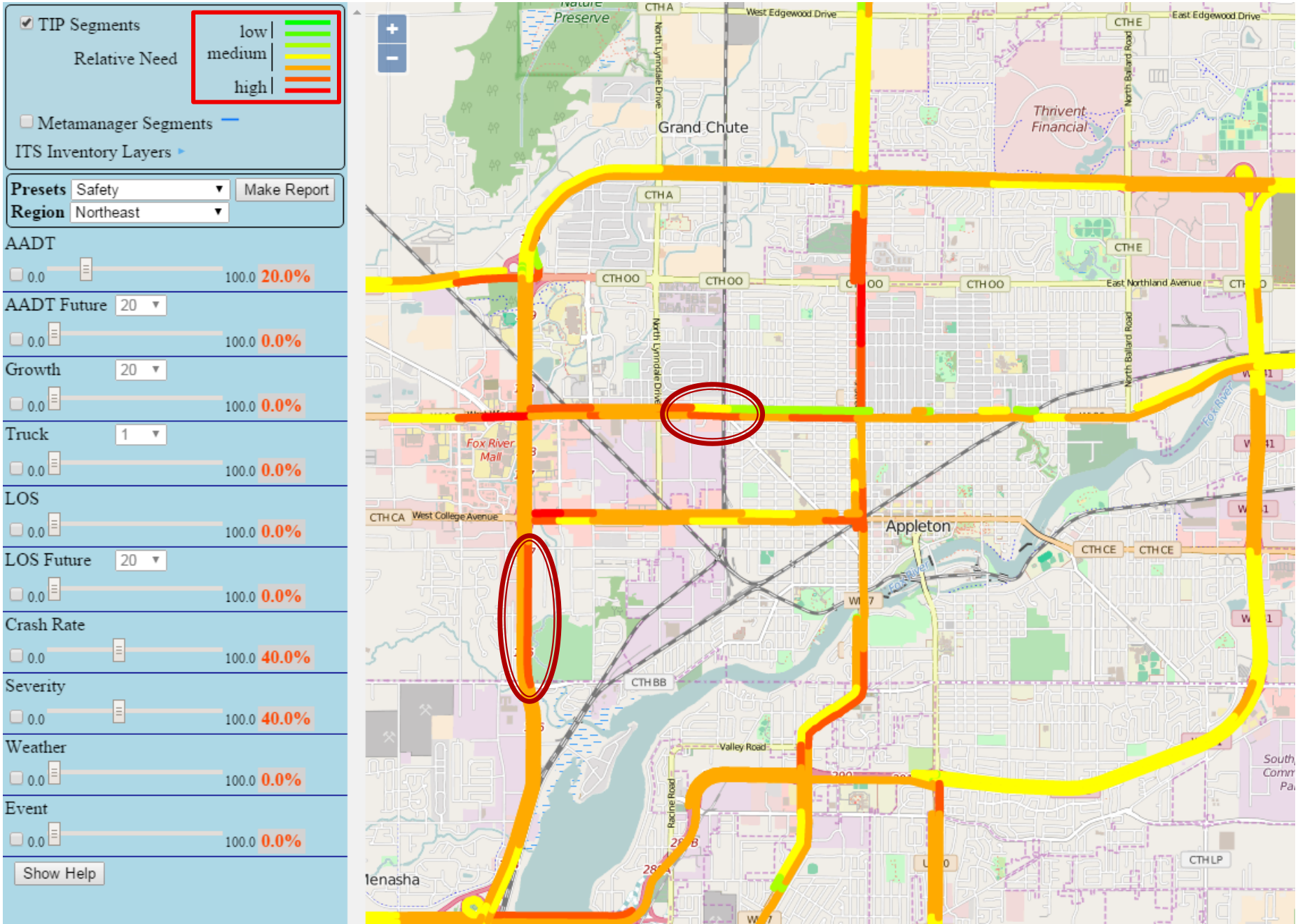


Needs Analysis Tool – Overview

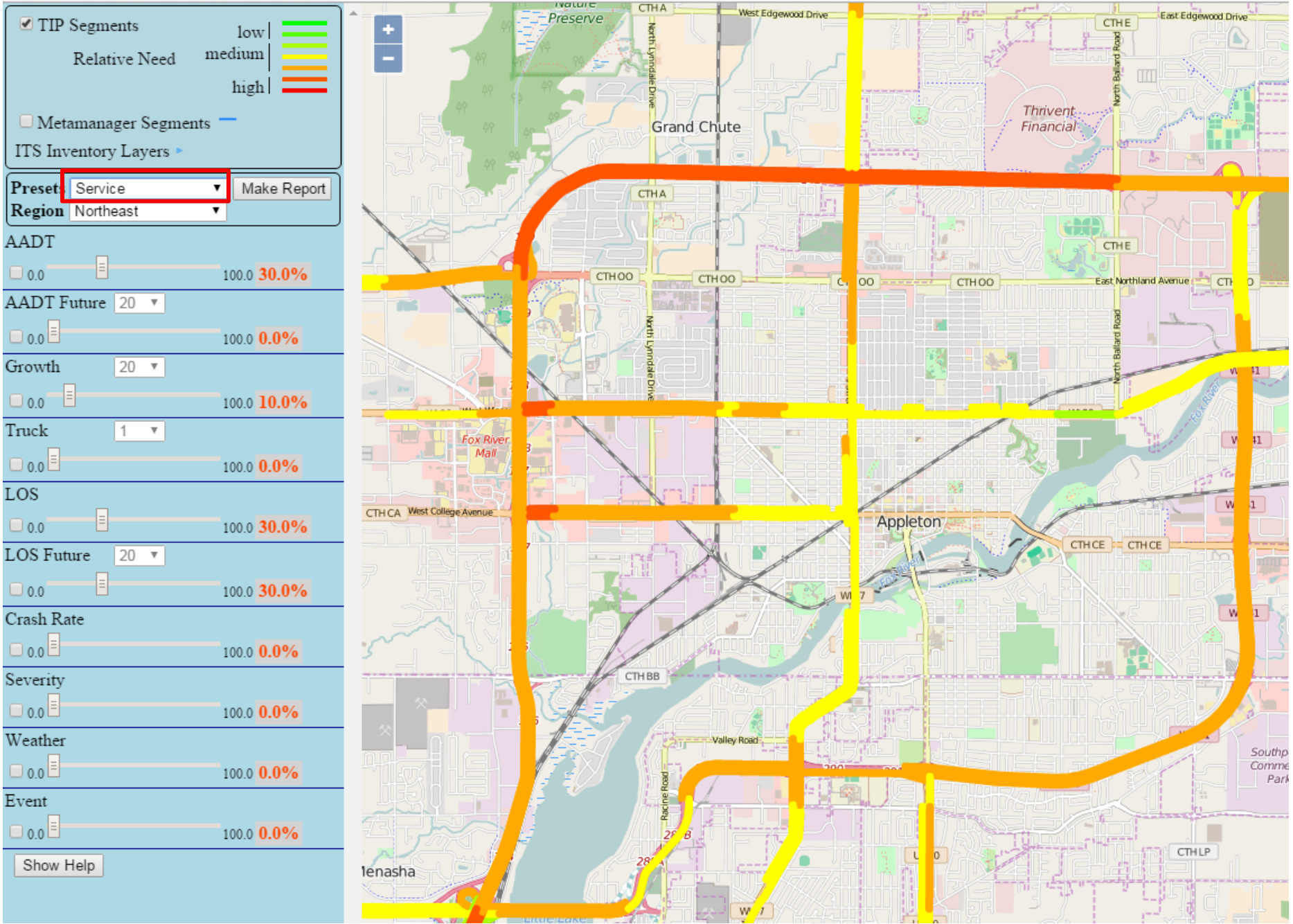
Presets:
- Default TIP
- Safety
- Mobility – Present
- Mobility – Future
- Service
- Freight Performance



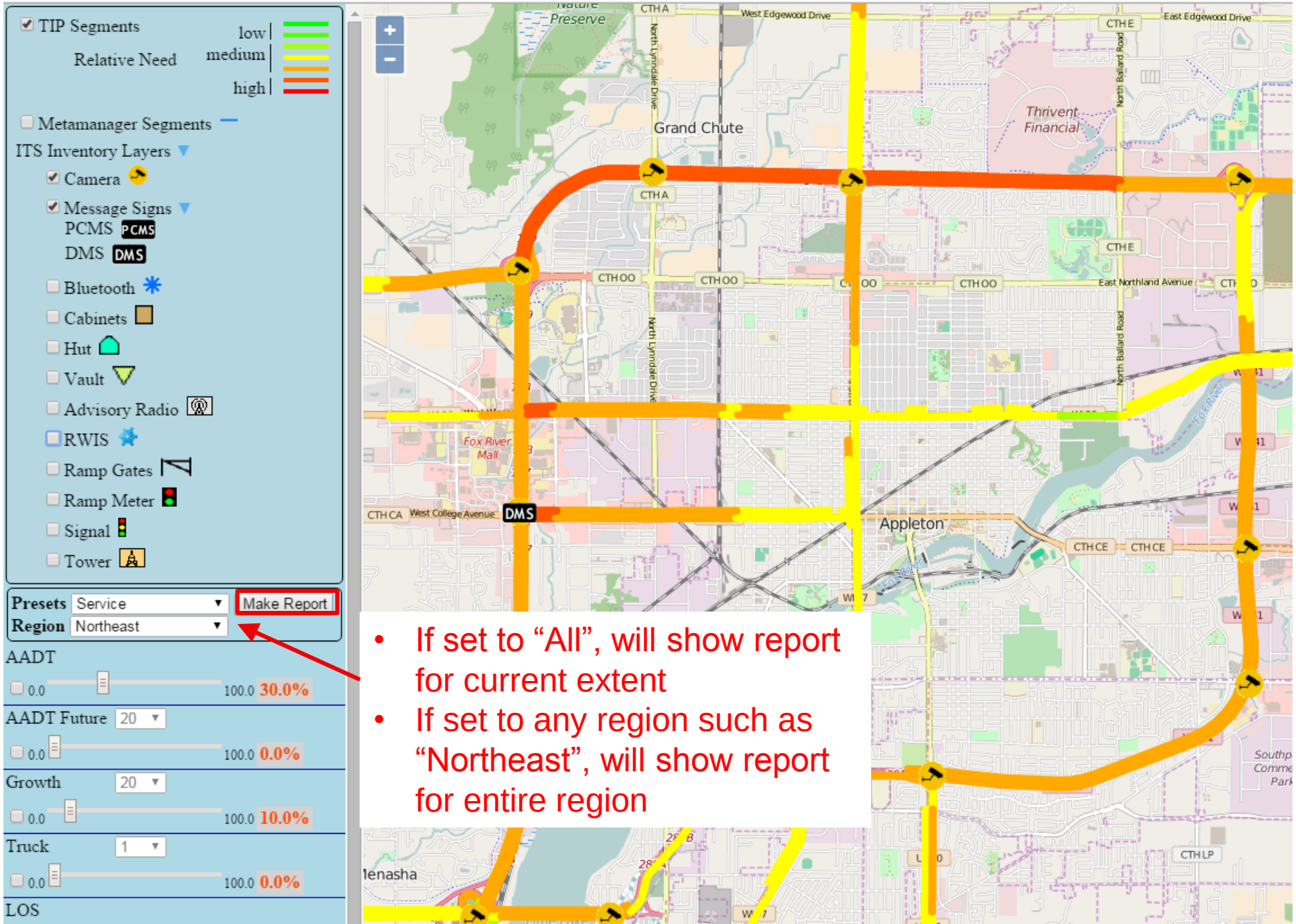
Needs Analysis Tool – Overview



Needs Analysis Tool – Overview



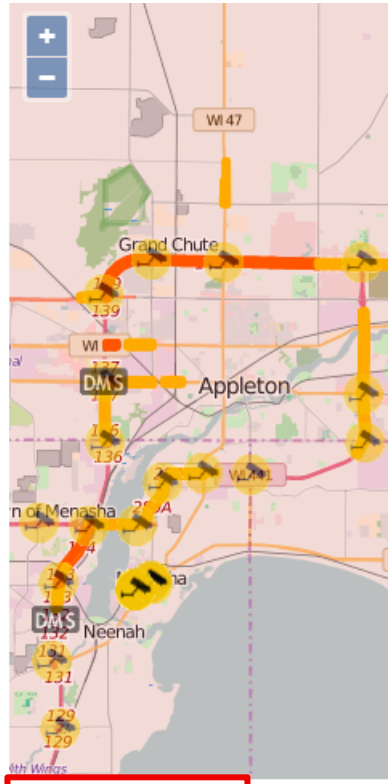
Needs Analysis Tool – Overview



- If set to “All”, will show report for current extent
- If set to any region such as “Northeast”, will show report for entire region

Needs Analysis Tool – Overview

pdp_id	hwy_dir	weighted score	aadtyr_1	aadtyr_20	crash_rate	crash_severity	event	growth_20	losyr_1	losyr_20	trkdyr_1	weather
17823	125E	1.8496	35450	41360	1036.33	94	6.0	16.67	6.36	6.62	8.8	43.0
17840	125W	1.8496	35450	41360	1946.65	180	6.0	16.67	6.36	6.62	8.8	43.0
17510	113N	1.8122	4430	5330	413.34	12	6.0	20.32	2.68	2.72	7.2	42.0
17527	113S	1.8122	39300	44390	312.7	66	16.0	12.95	2.54	2.66	8.8	47.0
16996	096W	1.7628	30780	34900	642.7	52	6.0	13.39	6.39	6.6	7.2	43.0
16908	096E	1.7628	30780	34900	514.16	38	6.0	13.39	6.39	6.6	7.2	43.0
16613	094W	1.7381	38910	46710	23.76	10	8.0	20.05	2.73	3.13	8.1	41.0
16695	094W	1.7381	23940	28770	50.87	25	2.0	20.18	2.51	2.91	21.5	45.0
8665	041S	1.7182	66590	82380	75.34	83	6.0	23.71	4.47	5.98	12.4	43.0
8456	041N	1.7182	66590	82380	27.67	18	6.0	23.71	4.47	5.98	12.4	43.0
8455	041N	1.7182	66590	82380	0.0	0	6.0	23.71	4.47	5.98	12.4	43.0
8666	041S	1.7182	66590	82380	0.0	0	6.0	23.71	4.47	5.98	12.4	43.0
17258	102N	1.6903	1180	1430	48.66	2	1.0	21.19	1.6	1.64	7.1	52.0
17564	114E	1.6903	14140	21750	47.5	36	6.0	53.82	4.86	5.99	8.6	42.0
8395	041N	1.6657	44260	56560	43.08	28	6.0	27.79	3.08	3.76	12.4	39.0
8189	040N	1.6657	690	790	0.0	0	1.0	14.49	2.0	2.06	9.5	49.0



Default shows orange or higher score segments

Can show all

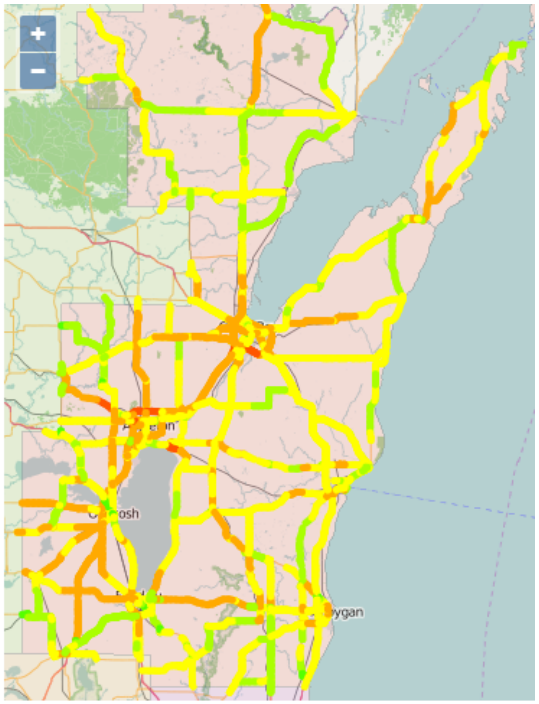
Show all Segments

Parameter Weights: Service

- aadtyr_1: 30%
- aadtyr_20: 0%
- crash_rate: 0%
- crash_severity: 0%
- event: 0%
- growth_20: 10%
- losyr_1: 30%
- losyr_20: 30%
- trkdyr_1: 0%
- weather: 0%

Needs Analysis Tool – Overview

pdp_id	hwy_dir	weighted score	aadtyr_1	aadtyr_20	crash_rate	crash_severity	event	growth_20	losyr_1	losyr_20	trkdyr_1	weather
8480	041N	2.0907	79070	97690	57.05	75	12.0	23.55	5.62	7.0	12.4	44.0
8371	041N	2.0597	31310	35820	27.24	9	7.0	14.4	2.5	2.8	12.1	39.0
11666	053S	1.8932	9220	10680	18.99	5	1.0	15.84	1.84	1.91	13.7	52.0
8478	041N	1.8885	70110	87260	75.17	79	11.0	24.46	4.82	6.6	12.4	43.0
17840	125W	1.8496	35450	41360	1946.65	180	6.0	16.67	6.36	6.62	8.8	43.0
17823	125E	1.8496	35450	41360	1036.33	94	6.0	16.67	6.36	6.62	8.8	43.0
8211	040S	1.8344	1540	1650	0.0	0	2.0	7.14	2.47	2.51	9.5	42.0
17527	113S	1.8122	39300	44390	312.7	66	16.0	12.95	2.54	2.66	8.8	47.0
17510	113N	1.8122	4430	5330	413.34	12	6.0	20.32	2.68	2.72	7.2	42.0
16908	096E	1.7628	30780	34900	514.16	38	6.0	13.39	6.39	6.6	7.2	43.0
16996	096W	1.7628	30780	34900	642.7	52	6.0	13.39	6.39	6.6	7.2	43.0
4635	023W	1.7565	31580	37680	636.55	20	7.0	19.32	5.77	6.49	8.8	38.0
2907	015W	1.7501	14300	18970	0.0	0	5.0	32.66	5.32	5.96	12.3	42.0
4628	023W	1.7483	17790	21810	325.69	5	7.0	22.6	6.35	6.6	8.8	39.0
2880	015E	1.7444	16310	19430	154.95	122	5.0	19.13	4.45	5.0	12.3	41.0
16613	094W	1.7381	38910	46710	23.76	10	8.0	20.05	2.73	3.13	8.1	41.0



Show all Segments

Northeast Region

Parameter Weights: Service

- aadtyr_1: 30%
- aadtyr_20: 0%
- crash_rate: 0%
- crash_severity: 0%
- event: 0%
- growth_20: 10%
- losyr_1: 30%
- losyr_20: 30%
- trkdyr_1: 0%
- weather: 0%

- Can show scores for entire region
- Scores can be exported by copying table into Excel

Needs Tool Link: http://www.topslab.wisc.edu/tsmo/tip/needs/

Benefits Tool

- Calculates estimated benefits ($) for a given project
  - Signal install, replace, rehab, retrofit, retiming, etc.
  - LED replacement
  - Intersection communication
  - Software
  - ITS device replacement
  - DMS
  - CCTV
- Excel-based tool where user supplies inputs (many via drop-down menus)

Project Information

- Documents project information and coordination efforts

Transportation System Management and Operations - Traffic Infrastructure Process

Project Information

Region:
Proposed Project Name:
Requested By:

1 Using each of the following Needs Analysis Tool presets, provide the anticipated level of need in the vicinity of the proposed project:

Default TIP
Safety
Mobility (Present)
Mobility (Future)
Service
Freight Performance

2 Briefly describe the proposed project. Please include the purpose and any relevant information.

3 Identify any stakeholders who have been involved with the development of this project.

- ☐ State Patrol — specify:
- ☐ TOPS Lab (UW) — specify:
- ☐ Project Team — specify:
- ☐ Regional Stakeholders — specify:
- ☐ BTO Stakeholders — specify:
- ☐ Local Agencies — specify:
- ☐ Other Agencies: — specify:

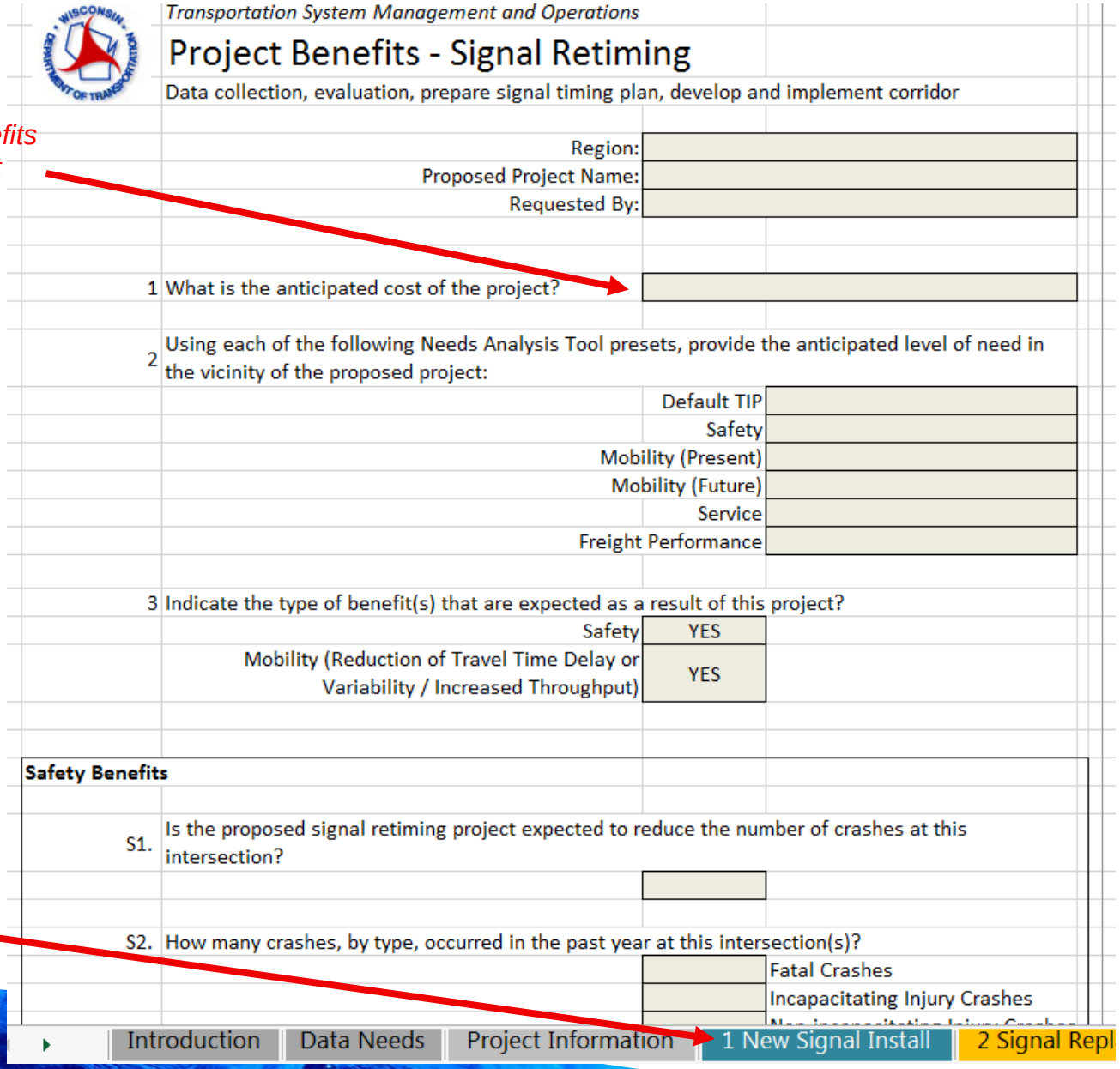
4 Briefly describe the outcome of the collaboration identified above.

5 Please provide any further information that will be relevant when considering this project.

Benefits Tool Overview

Tool will compute estimated benefits and a B/C ratio given project cost

Tabs for each type of project (e.g. CCTV, DMS, intersection comm)



Transportation System Management and Operations

Project Benefits - Signal Retiming

Data collection, evaluation, prepare signal timing plan, develop and implement corridor

Region:	
Proposed Project Name:	
Requested By:	

1	What is the anticipated cost of the project?	

2 Using each of the following Needs Analysis Tool presets, provide the anticipated level of need in the vicinity of the proposed project:

Default TIP	
Safety	
Mobility (Present)	
Mobility (Future)	
Service	
Freight Performance	

3 Indicate the type of benefit(s) that are expected as a result of this project?

Safety	YES
Mobility (Reduction of Travel Time Delay or Variability / Increased Throughput)	YES

Safety Benefits

S1. Is the proposed signal retiming project expected to reduce the number of crashes at this intersection?

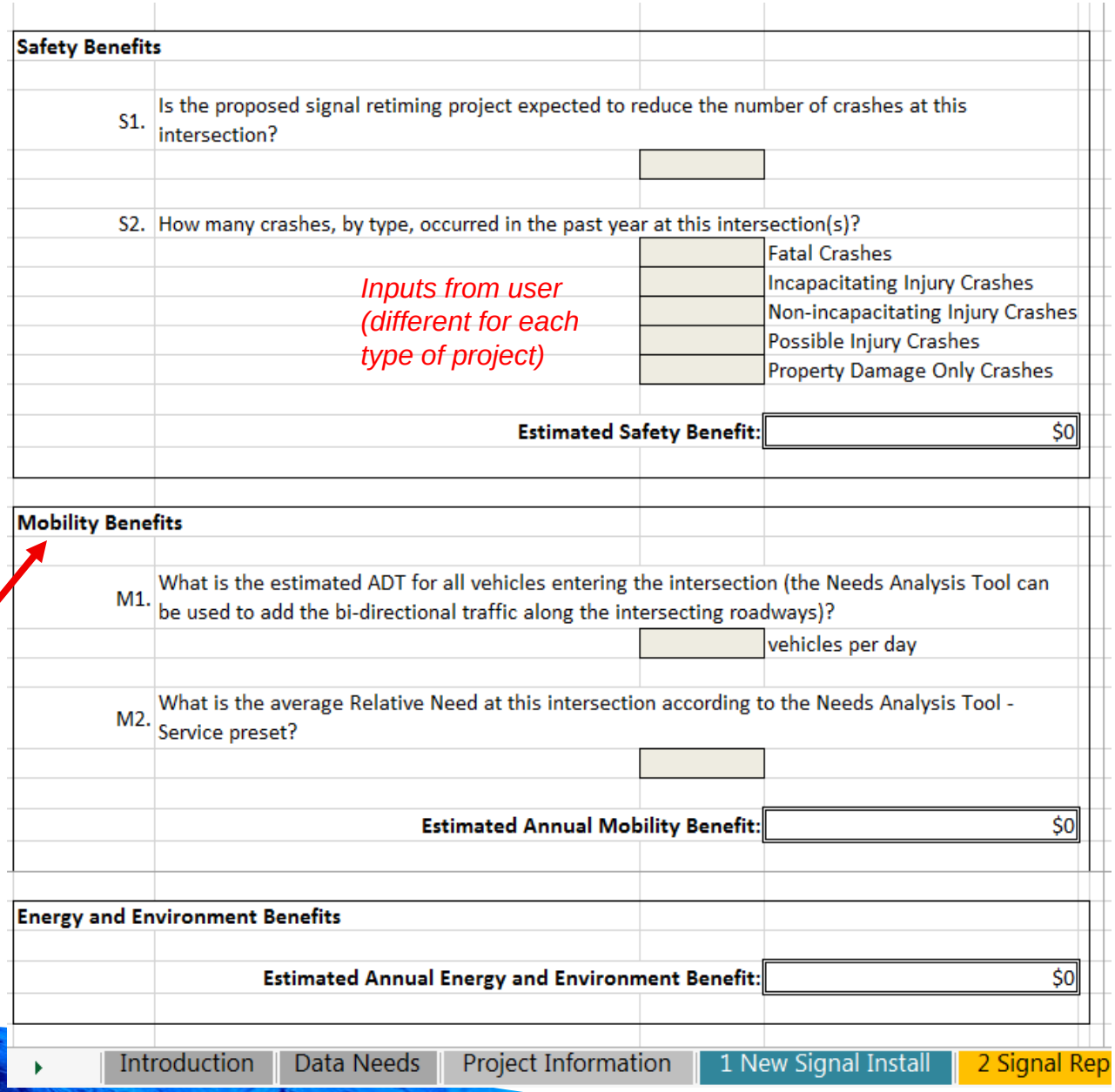
S2. How many crashes, by type, occurred in the past year at this intersection(s)?

	Fatal Crashes
	Incapacitating Injury Crashes

Introduction | Data Needs | Project Information | 1 New Signal Install | 2 Signal Repl

Benefits Tool Overview

Tool will calculate estimated benefits for safety, mobility, energy/environment, and productivity, if applicable.



Safety Benefits

S1. Is the proposed signal retiming project expected to reduce the number of crashes at this intersection?

S2. How many crashes, by type, occurred in the past year at this intersection(s)?

Inputs from user (different for each type of project)

- Fatal Crashes
- Incapacitating Injury Crashes
- Non-incapacitating Injury Crashes
- Possible Injury Crashes
- Property Damage Only Crashes

Estimated Safety Benefit: $0

Mobility Benefits

M1. What is the estimated ADT for all vehicles entering the intersection (the Needs Analysis Tool can be used to add the bi-directional traffic along the intersecting roadways)?

vehicles per day

M2. What is the average Relative Need at this intersection according to the Needs Analysis Tool - Service preset?

Estimated Annual Mobility Benefit: $0

Energy and Environment Benefits

Estimated Annual Energy and Environment Benefit: $0

Introduction | Data Needs | Project Information | 1 New Signal Install | 2 Signal Rep

What data does the user need to obtain to calculate benefits?

Transportation System Management and Operations - Traffic Infrastructure Process

Project Benefits - Data Needs

Tabs for each type of project (e.g. CCTV, DMS, intersection comm)

Anticipated Data Source	Data Request	Project Type											
		1	2	3	4	5	6	7	8	9	10	11	12
		New Signal	Signal Replacement	Signal Rehab	Signal Retrofit	Signal Retiming	LED Replacement	Intersection Communication	Software	ITS Device Replacement	DMS	Camera	Other
User Response	Project Specific Description	X	X	X	X	X	X	X	X	X	X	X	X
	ITS Warrant Information										X	X	
	Signal Warrant Information												
	Urban/Rural	X	X		X								
Estimated	Events per Year										X	X	
	Average Event Duration										X	X	
	Average Travel Time Savings										X	X	
	Peak Period Travel Time Reduction	X											
Asset Management / Maintenance Reports	Maintenance Tickets and Cost		X	X	X			X		X			
Needs Analysis Tool	Crash Data by Type	X	X		X	X		X			X	X	
	Average Vehicles Entering Intersection	X	X		X	X		X					
	Average Daily Traffic Volumes Per Area										X	X	
	Relative Need - Level of Service Preset		X		X	X							

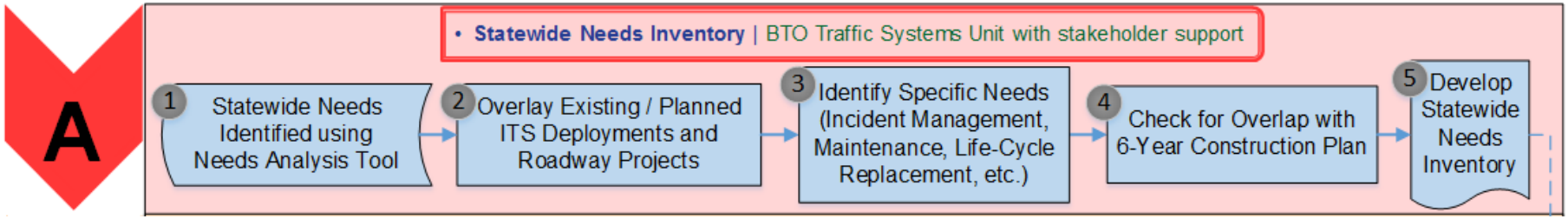
Where will the user be pulling data from?

4. Walking through the Process

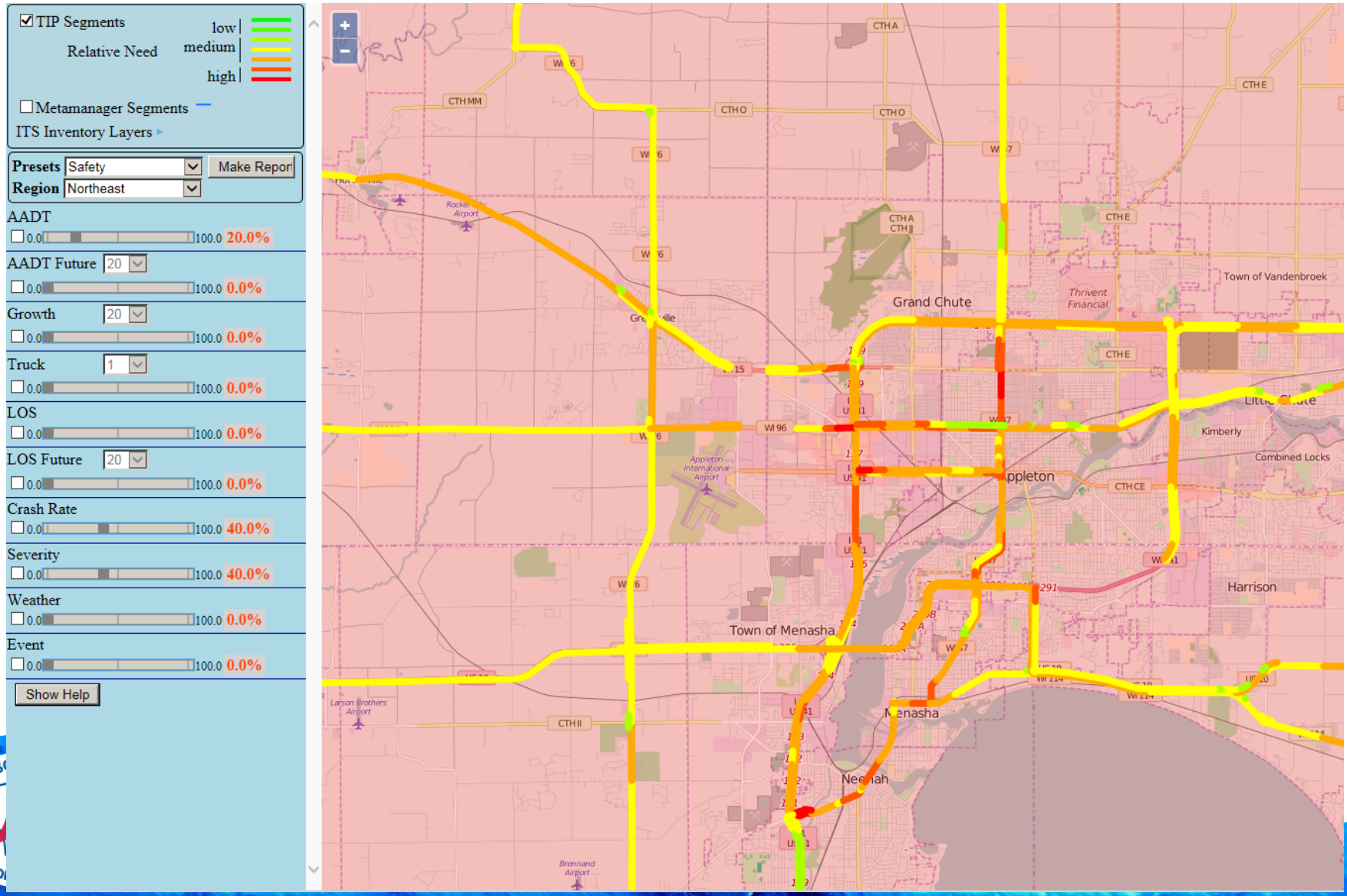
Flowchart Walkthrough

- All 20 Steps
- Format of Discussion (for each step)
  - Step overview
  - Case study example
  - Questions

- We'll monitor the chat box throughout and answer questions after each step

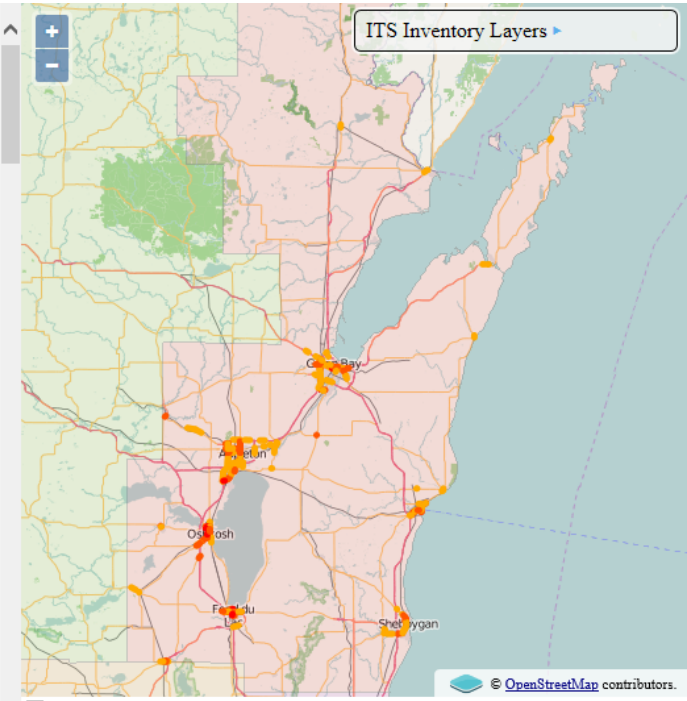

A
• Statewide Needs Inventory | BTO Traffic Systems Unit with stakeholder support
1 Statewide Needs Identified using Needs Analysis Tool
2 Overlay Existing / Planned ITS Deployments and Roadway Projects
3 Identify Specific Needs (Incident Management, Maintenance, Life-Cycle Replacement, etc.)
4 Check for Overlap with 6-Year Construction Plan
5 Develop Statewide Needs Inventory

Step 1: Statewide Needs Identified using Needs Analysis Tool



Step 1: Statewide Needs Identified using Needs Analysis Tool

pdp_id	hwy_dir	weighted score	aadtyr_1	aadtyr_20	crash_rate	crash_severity	event	growth_20	losyr_1	losyr_20	trkdyr_1	weather
9720	045S	3.8236	11760	14350	8046.19	21	8.0	22.02	2.09	2.14	7.3	36.0
9721	045S	3.8197	14980	17320	7204.86	32	8.0	15.62	3.17	3.24	6.3	36.0
9730	045S	3.6141	3950	4240	4079.07	138	7.0	7.34	3.46	3.49	8.3	39.0
17527	125W	3.3731	35450	41360	1946.65	180	6.0	16.67	6.21	6.57	4.1	43.0
18366	151N	3.2841	5210	5920	5723.66	46	6.0	13.63	1.0	1.0	6.7	41.0
9449	045N	3.1848	11760	14350	1937.04	202	8.0	22.02	2.09	2.14	7.3	36.0
17274	114W	3.1833	25250	29960	1842.9	167	6.0	18.65	3.52	3.8	4.7	40.0
17275	114W	3.1677	4210	4530	7933.57	3	6.0	7.6	3.33	3.37	4.1	40.0
6374	032S	3.1521	7820	9290	7291.35	4	5.0	18.8	1.52	1.58	8.3	44.0
4009	021E	2.96	11970	14600	3201.55	85	8.0	21.97	3.61	3.68	7.2	36.0
6357	032S	2.9535	9100	10670	6205.49	6	12.0	17.25	2.9	3.0	8.3	43.0
6359	032S	2.9535	9100	10670	6205.49	6	12.0	17.25	2.9	3.0	8.3	43.0
16611	096E	2.937	26920	28940	1264.55	179	6.0	7.5	4.14	4.29	4.6	43.0
9417	045N	2.8789	8230	8840	1770.7	137	7.0	7.41	3.53	3.59	8.3	39.0
6193	032N	2.8426	9100	10670	4343.85	29	11.0	17.25	2.9	3.0	8.3	43.0
6207	032N	2.7752	2010	2450	4669.99	35	12.0	21.89	1.0	1.0	4.1	44.0
9722	045S	2.727	9540	10260	2833.74	67	9.0	7.55	2.13	2.19	8.3	36.0
9278	044N	2.724	13890	14310	1002.11	192	9.0	3.02	5.36	5.78	6.6	36.0
17235	114E	2.7008	25250	29960	1606.63	114	6.0	18.65	3.52	3.8	4.7	40.0
9282	044S	2.6968	10860	13250	3880.88	28	9.0	22.01	2.68	2.71	7.7	35.0
9851	047N	2.632	21430	25000	769.68	215	6.0	16.66	3.96	4.15	5.2	43.0
6187	032N	2.5709	18830	21730	1548.89	124	12.0	15.4	2.79	2.85	5.5	43.0
19650	310W	2.5465	4010	4870	4574.68	10	4.0	21.45	2.61	2.97	7.6	41.0
9440	045N	2.5305	9030	9700	2960.53	35	9.0	7.42	6.63	6.71	4.1	36.0
9413	045N	2.5031	3390	3640	3423.97	41	7.0	7.37	2.61	2.62	8.3	39.0
13701	067N	2.5025	4390	5150	3902.74	25	6.0	17.31	3.17	3.17	8.3	48.0
4576	023W	2.4721	27400	32540	1039.76	129	7.0	18.76	4.17	5.61	4.6	38.0
9442	045N	2.4367	2450	2630	3789.39	30	9.0	7.35	3.09	3.09	4.1	36.0
2868	015E	2.4161	25850	31540	673.61	165	6.0	22.01	3.75	4.69	4.7	44.0
4479	023E	2.3933	27400	32540	873.8	135	7.0	18.76	4.17	5.61	4.6	38.0



☐ Show all Segments

Northeast Region

Parameter Weights: Safety

- aadtyr_1: 20%
- aadtyr_20: 0%
- crash_rate: 40%
- crash_severity: 40%
- event: 0%
- growth_20: 0%
- losyr_1: 0%
- losyr_20: 0%
- trkdyr_1: 0%
- weather: 0%

A

Step 1: Statewide Needs Identified using Needs Analysis Tool

- Reports generated by region and preset
- Presets include TIP default, safety, mobility (present and future), service, and freight performance
- Thirty reports generated and evaluated
- Top areas in each report identified as a “needs area”

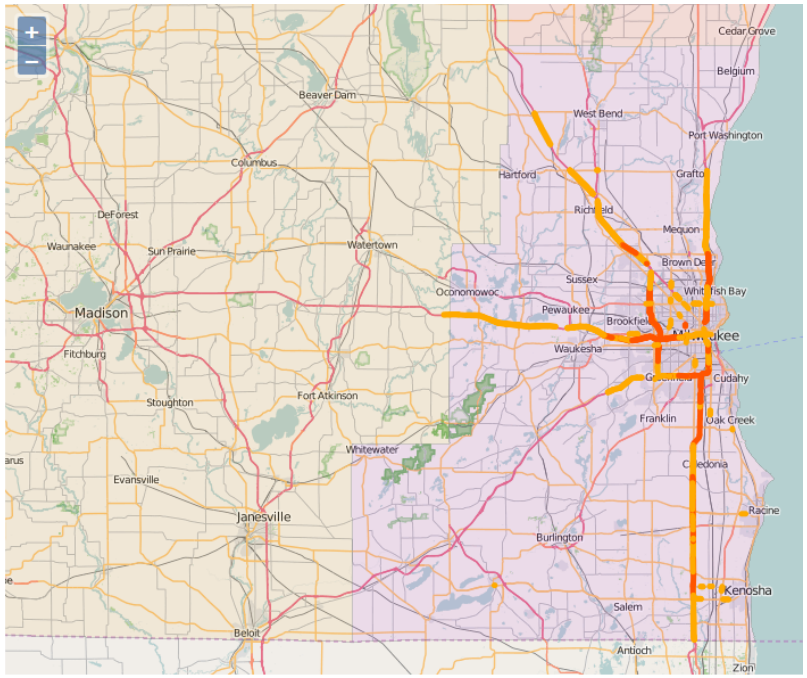
Task A – Steps 2-5

- Step 2: Overlay existing / planned ITS deployments and roadway projects
  - Done on Needs Analysis Tool
  - Map printed for each “Needs Area”
- Step 3: Identify specific needs
  - e.g., Incident Management, Maintenance, Life-Cycle Replacement, etc.
  - Using engineering judgement and input from regions
- Step 4: Check for overlap with 6-Year Construction Plan
- Step 5: BTO develops Statewide Needs Inventory

Task A: Case Study Example

Step 1. Data Extraction from Needs Tool

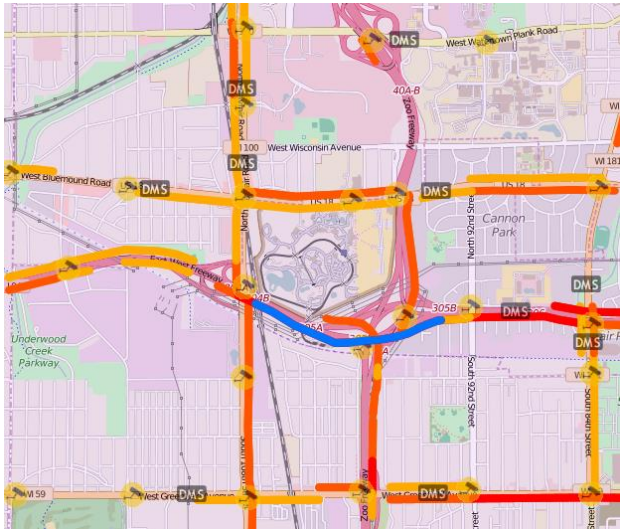
pdp_id	hwy_dir	weighted score	aadtyr_1	aadtyr_5	crash_rate	crash_severity	event	growth_20	losyr_1	losyr_20	trkdyr_1	weather
8290	041N	2.3096	133850	135980	4.8	10	27.0	7.54	7.0	7.0	15.4	46.0
9207	043N	2.1585	94130	97120	63.52	78	27.0	14.27	6.51	7.0	16.4	42.0
9456	043S	2.1585	94130	97120	77.95	87	27.0	14.27	6.51	7.0	16.4	42.0
9457	043S	2.1585	94130	97120	34.39	10	27.0	14.27	6.51	7.0	16.4	42.0
9206	043N	2.1585	94130	97120	131.82	25	27.0	14.27	6.51	7.0	16.4	42.0
8291	041N	2.1343	133850	135980	52.8	44	27.0	7.54	7.0	7.0	15.4	45.0
8294	041N	2.1089	133200	136740	67.7	6	27.0	11.83	5.39	6.28	18.9	45.0
8293	041N	2.1089	133200	136740	61.62	141	27.0	11.83	5.39	6.28	18.9	45.0
8279	041N	1.999	109490	112150	24.85	9	22.0	10.73	4.34	4.86	22.3	44.0
8278	041N	1.999	109490	112150	102.73	16	22.0	10.73	4.34	4.86	22.3	44.0
8277	041N	1.999	109490	112150	48.66	71	21.0	10.73	4.34	4.86	22.3	44.0
9341	043S	1.9858	45920	48680	32.91	10	10.0	26.02	3.25	3.79	8.8	43.0
9342	043S	1.9858	45920	48680	25.87	8	10.0	26.02	3.25	3.79	8.8	43.0
9340	043S	1.9858	43490	46050	29.06	33	10.0	25.48	3.21	3.72	13.9	44.0
9458	043S	1.9831	94130	97120	69.84	75	27.0	14.27	6.51	7.0	16.4	42.0



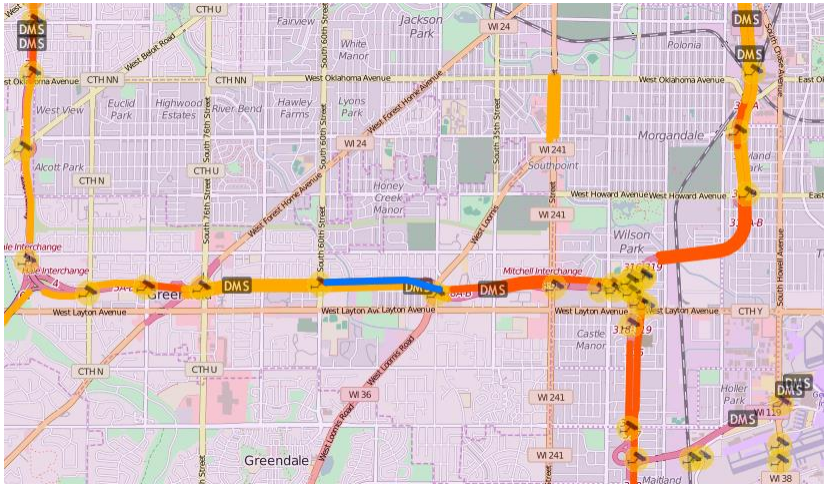
Example – Southeast Region “Mobility (Present)” – Highest need segments

Task A: Case Study Example

Southeast Region – 6 Highest Needs Areas (Overall)



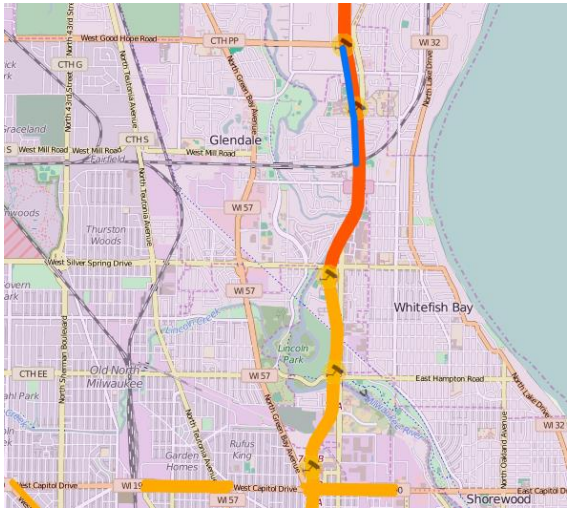
I-94 at Zoo Interchange, Eastbound and Westbound are two highest needs

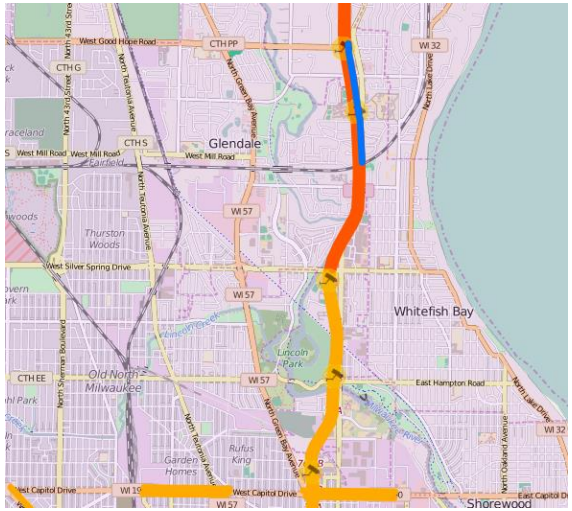


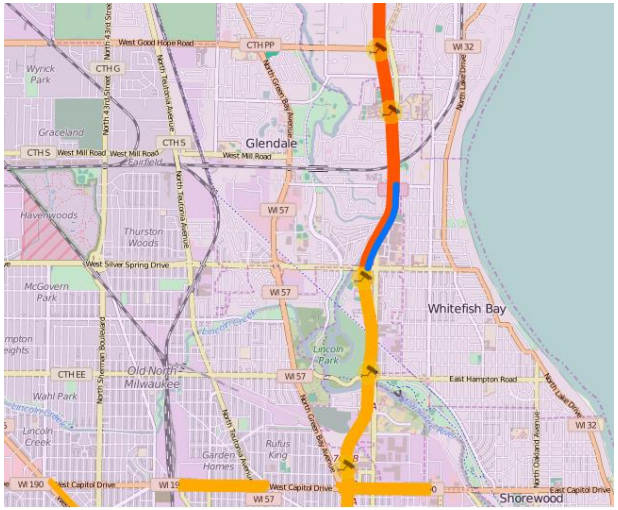
I-43/41/894 (Airport Freeway) third highest need

Task A: Case Study Example

Southeast Region – 6 Highest Needs Areas (Overall)



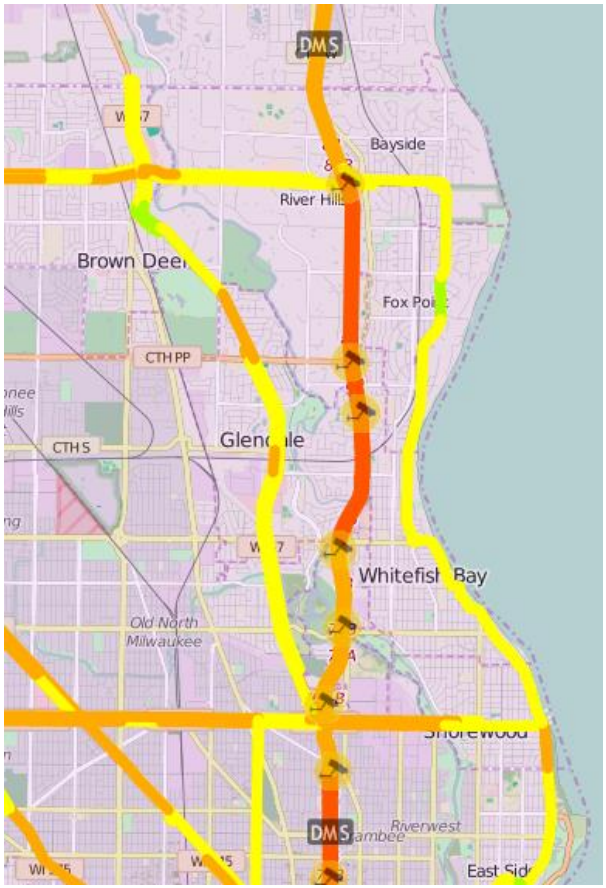




I-43 near Glendale, two northbound and one southbound segment are ranked fourth through sixth highest needs

Closer analysis reveals that many more neighboring segments are in the top 50 overall highest needs, with both directions being a problem

Task A: Case Study Example



Step 2. Overlay Current Deployments

- Two DMS, 9 miles apart, Southbound only
- 7 cameras

Step 3. Identify Specific Needs through further review

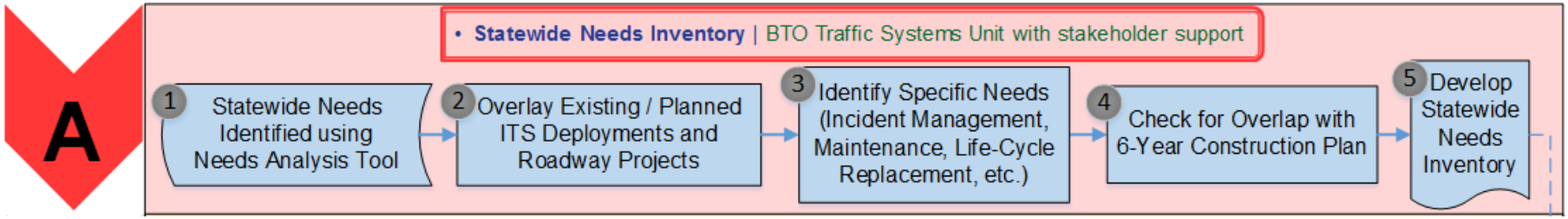
- Review specific problems on each segment
- Probe data study
- Camera data study
- Other considerations

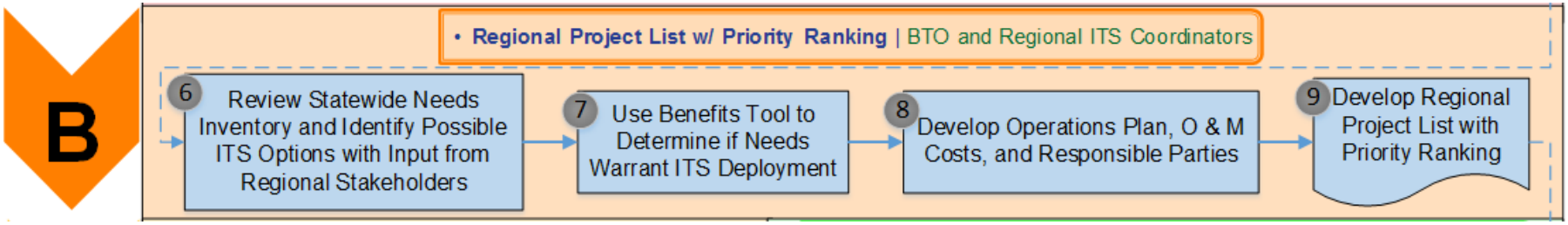
Task A: Case Study Example

- Step 4: Check for overlap with 6-Year Construction Plan
  - Note whether there is overlap or not
  - If overlap, identify project ID and type
  - Looking to incorporate 6-Year Construction Plan in Needs Tool

- Step 5: BTO develops Statewide Needs Inventory
  - Example included one of many needs identified in the inventory

Questions?


A
• Statewide Needs Inventory | BTO Traffic Systems Unit with stakeholder support
1 Statewide Needs Identified using Needs Analysis Tool
2 Overlay Existing / Planned ITS Deployments and Roadway Projects
3 Identify Specific Needs (Incident Management, Maintenance, Life-Cycle Replacement, etc.)
4 Check for Overlap with 6-Year Construction Plan
5 Develop Statewide Needs Inventory


B
• Regional Project List w/ Priority Ranking | BTO and Regional ITS Coordinators
6 Review Statewide Needs Inventory and Identify Possible ITS Options with Input from Regional Stakeholders
7 Use Benefits Tool to Determine if Needs Warrant ITS Deployment
8 Develop Operations Plan, O & M Costs, and Responsible Parties
9 Develop Regional Project List with Priority Ranking

B Task B Overview

- Step 6: Review Statewide Needs Inventory and identify possible ITS options with input from regional stakeholders
- Step 7: Use Benefits Tool to determine if needs warrant ITS deployment for specific project
  - Developed by Kimley-Horn
  - Most inputs come from regional knowledge of the area or the Needs Analysis Tool
  - Some inputs require engineering judgement and estimation
- Step 8: Develop Regional Operations Plan, O & M Costs, and Responsible Parties
- Step 9: Regions develop Regional Project List with priority ranking

B

Step 7 Benefits Tool

Transportation System Management and Operations

Project Benefits - Signal Retiming

Data collection, evaluation, prepare signal timing plan, develop and implement corridor coordination plan

Region:	
Proposed Project Name:	
Requested By:	

1 What is the anticipated cost of the project?

2 Using each of the following Needs Analysis Tool presets, provide the anticipated level of need in the vicinity of the proposed project:

Default TIP	
Safety	
Mobility (Present)	
Mobility (Future)	
Service	
Freight Performance	

3 Indicate the type of benefit(s) that are expected as a result of this project?

Safety	YES
Mobility (Reduction of Travel Time Delay or Variability / Increased Throughput)	YES

Safety Benefits

S1. Is the proposed signal retiming project expected to reduce the number of crashes at this intersection?

S2. How many crashes, by type, occurred in the past year at this intersection(s)?

	Fatal Crashes
	Incapacitating Injury Crashes
	Non-incapacitating Injury Crashes
	Possible Injury Crashes
	Property Damage Only Crashes

Estimated Safety Benefit: $0

Mobility Benefits

M1. What is the estimated ADT for all vehicles entering the intersection (the Needs Analysis Tool can be used to add the bi-directional traffic along the intersecting roadways)?

B Task B: Case Study Example

Step 6. Review Statewide Needs Inventory and identify possible ITS options with input from regional stakeholders

- Through meetings with Southeast Region and other stakeholders, determine possible alternatives
  - Install northbound DMS(s)
  - Install southbound DMS in between current DMSs
  - Others?
- Choose an alternative (for each needs area)
  - **Install northbound DMS just south of Exit 78**

B Task B: Case Study Example

Step 7: Use Benefits Tool to determine if needs warrant ITS deployment for specific project

Project Information

Transportation System Management and Operations - Traffic Infrastructure Process

Project Information

Region:	Southeast
Proposed Project Name:	Northbound DMS on I-43 just south of Exit 78
Requested By:	Jon Riehl

1 Using each of the following Needs Analysis Tool presets, provide the anticipated level of need in the vicinity of the proposed project:

Default TIP	MEDIUM
Safety	HIGH
Mobility (Present)	HIGH
Mobility (Future)	MEDIUM
Service	HIGH
Freight Performance	MEDIUM

2 Briefly describe the proposed project. Please include the purpose and any relevant information.

Install DMS on I-43 northbound just south of Exit 78 (W. Silver Spring Dr) to offer Wisconsin State Route 32 as an alternate route if necessary.

Task B: Case Study Example

Step 7: Use Benefits Tool to determine if needs warrant ITS deployment for specific project

Project Information

3 Identify any stakeholders who have been involved with the development of this project.

☐ State Patrol	specify:	
☐ TOPS Lab (UW)	specify:	
☐ Project Team	specify:	
☐ Regional Stakeholders	specify:	
☐ BTO Stakeholders	specify:	
☐ Local Agencies	specify:	
☐ Other Agencies:	specify:	

4 Briefly describe the outcome of the collaboration identified above.

5 Please provide any further information that will be relevant when considering this project.

Along I-43 north of downtown Milwaukee, two southbound DMS are currently deployed (just south of Exit 85 and at Exit 74). One northbound DMS is currently deployed (south of Exit 73).

Task B: Case Study Example

B

DMS Project Benefit Sheet

Project cost (could be from RITA ITS costs database)

These will be updated based on responses to the warrants below

This project is to inform travelers of traffic conditions (DMS Warrant #2)

Transportation System Management and Operations

Project Justification - ITS DMS Warrants

New DMS deployment.

Region:	Southeast
Proposed Project Name:	DMS Deployment on I-43 northbound @ Exit 78
Requested By:	Jon Riehl

1	What is the anticipated cost of the project (total design, construction, and communication cost)?	$100,000

2 Please complete the Warrant Analysis below to determine which warrant best aligns to the project. The summary of your results is listed here:

W1, Weather Conditions	NOT WARRANTED
W2, Traffic Conditions	WARRANTED
W3, Traffic Control	NOT WARRANTED
W4, Special Events	NOT WARRANTED
W5, Parking Availability	NOT WARRANTED
W6, Public Transportation	NOT WARRANTED

DMS Warrant Analysis:

DMS Warrant #1 - To Inform Travelers of Weather Conditions

Consideration		Response
1	If the location is prone to weather situations that travelers would not otherwise be forewarned about (e.g. spots where fog regularly forms, bridges that ice early, mountain passes with weather that differs from approaches).	NO
2	If there is available road weather information for the area downstream of the candidate DMS location.	NO
3	If there is the capability (either manually by staff members or automated through a condition reporting system) to create event specific descriptions of weather conditions to be displayed on the DMS.	NO
4	If there is a need to disseminate event specific descriptions (rather than simply activating a flashing warning sign that says "Weather Alert When Flashing").	NO
5	If there are options for either alternate routes or services, that might be described on the DMS, where travelers may wait out conditions.	NO
6	If flashing beacon signs have been tried and not proven to generate responses from travelers.	NO
7	If weather events contribute to a significant number of crashes or road closures which have major impacts to travelers.	NO

DMS Warrant #1 is: NOT WARRANTED

B Task B: Case Study Example

DMS Project Benefit Sheet

DMS Warrant #2 - To Inform Travelers of Traffic Conditions

Consideration		Response
1	If the target area is monitored by CCTV cameras, traffic detectors, or another method of monitoring the conditions, or has travel times for the downstream stretch of road.	YES
2	Events occurring in the area unexpectedly impact or impede traffic (e.g. close a lane, encounter slow traffic in one or more lanes, or events on the shoulder) an average of at least two times per month.	YES
3	If there are acceptable alternate routes with capacity to accept vehicles that may deviate based upon the information.	YES
4	If the location is a stretch of road where no alternate route are possible and travelers would benefit from information describing the cause and/or extent of delays in order to relieve driver anxiety or	NO
5	If there are horizontal or vertical curves that create safety issues when traffic is stopped unexpectedly.	NO
6	The route being considered for the DMS has on average at least 2 hours per day of peak period travel where traffic flow exceeds 1,100 veh/hr/lane.	YES
7	The route being considered for the DMS has on average experienced conditions considered Level of Service C.	YES
8	The route being considered for the DMS experiences average annual daily traffic (AADT) of 16,800 for a 2 lane road; 33,600 for a 4 lane road; 50,400 for a 6 lane road, 67,200 for an 8 lane road.	YES
	DMS Warrant #2 is:	WARRANTED

Can see ITS deployments such as CCTV on Needs Analysis Tool

Look at northbound incidents between Exits 78 and 82 (detour area)

WIS 32 offers a parallel detour

Estimate from AADT and relative service levels on Needs Analysis tool

B Task B: Case Study Example

DMS Project Benefit Sheet

DMS Warrant #3 - Changing Traffic Control or Conditions (Work Zone)		
Consideration		Response
1	The candidate location is upstream of an area with construction or maintenance activities that are expected to cause at least 15 minutes of delay to the mainline traffic.	NO
2	If the candidate location is upstream of traffic control or construction/maintenance activities that are expected to change more frequently than once every 60 days.	NO
3	If the posted work zone speed limit is greater than 45 MPH.	NO
	DMS Warrant #3 is:	NOT WARRANTED

DMS Warrant #4 - Special Events		
Consideration		Response
1	If the location contains a venue that houses ticketed events (typically with rapid and tight arrival patterns for a specified start time).	NO
2	If the event venue typically houses at least two weekday (M-F) ticketed event per week (including seasonal sporting events that only occur during the season).	NO
3	If the event venue typically houses at least 10 events per year attracting 30,000 visitors or more.	NO
4	If the setting of the venue is such that mainline traffic (not attending the event) is impacted by the conditions.	NO
5	If there are alternate parking or traffic options that could be displayed on signs to direct visitors to more preferred options.	NO
	DMS Warrant #4 is:	NOT WARRANTED

Other warrants in spreadsheet – we aren't going to meet these…

B Task B: Case Study Example

3	Using each of the following Needs Analysis Tool presets, provide the anticipated level of need in the vicinity of the proposed project:	
	Default TIP	MEDIUM
	Safety	HIGH
	Mobility (Present)	HIGH
	Mobility (Future)	MEDIUM
	Service	HIGH
	Freight Performance	MEDIUM
4	Estimate the average number of traffic/weather/special events that occur per year that will be positively affected by use of the proposed DMS.	
	60	events per year
5	Estimate the average duration (minutes) of traffic events (due to weather or incidents) that occur and will be positively affected by use of the proposed DMS.	
	60	minutes
6	Estimate the average travel time savings from adjusting one's route based on direction given on the proposed DMS.	
	5	minutes
7	Provide the current AADT along the corridor where the proposed DMS will be deployed (the Needs Analysis Tool may be used to obtain the value).	
	120,000	veh per day
	Estimated Annual Mobility Benefit:	$110,000
	Estimated Annual Energy and Environment Benefit:	$42,000
	Estimated Annual Benefit:	$152,000
	Estimated Benefit/Cost Ratio:	1.52

Manual Inputs

Sum of number of crashes (over 5 years) on northbound segments between Exits 78 and 82, converted to yearly rate

Use engineering judgment / experience

Can be pulled from Needs Analysis tool

ROI can be seen (even within the first year)

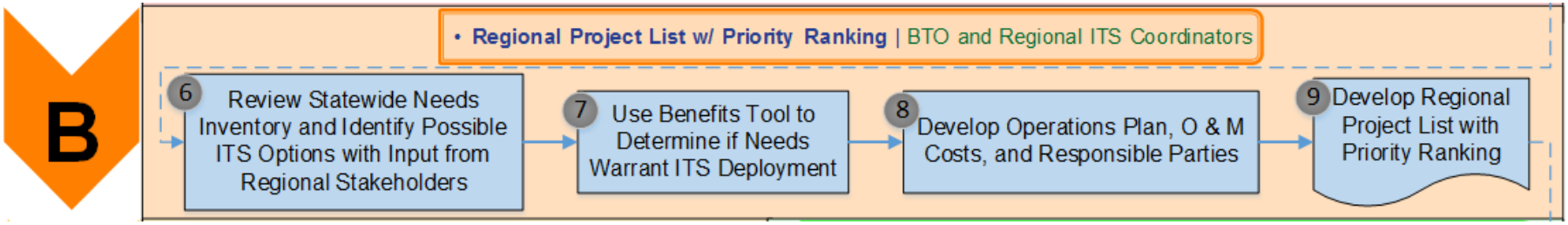
B Task B: Case Study Example

- Step 8: Develop Regional Operations Plan, O & M Costs, and Responsible Parties
  - For each project
  - Coordinate with regional stakeholders
    - Is WIS 32 alternate route prepared for traffic diversion
    - Other regional coordination opportunities
  - Complete necessary documentation
    - How does this deployment fit within current system

Task B: Case Study Example

- Step 9: Regions develop Regional Project List with priority ranking
  - Regional staff ranks regional projects
    - Stakeholder input
    - Engineering judgment
    - Other considerations

Questions?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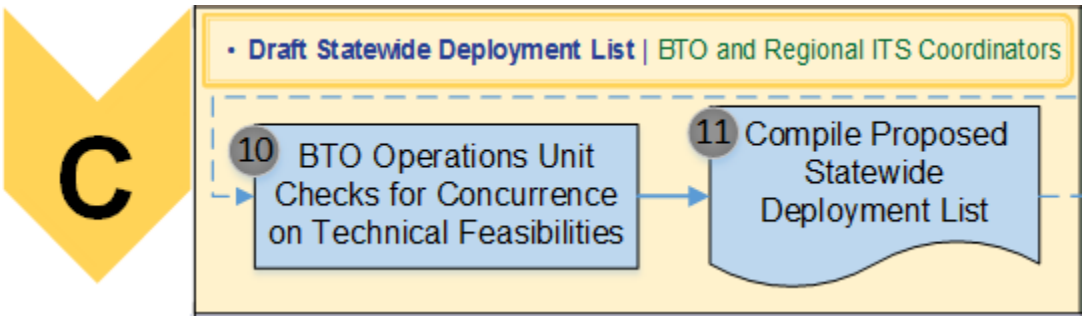

C
• Draft Statewide Deployment List | BTO and Regional ITS Coordinators
10 BTO Operations Unit Checks for Concurrence on Technical Feasibilities
11 Compile Proposed Statewide Deployment List

C Task C Overview

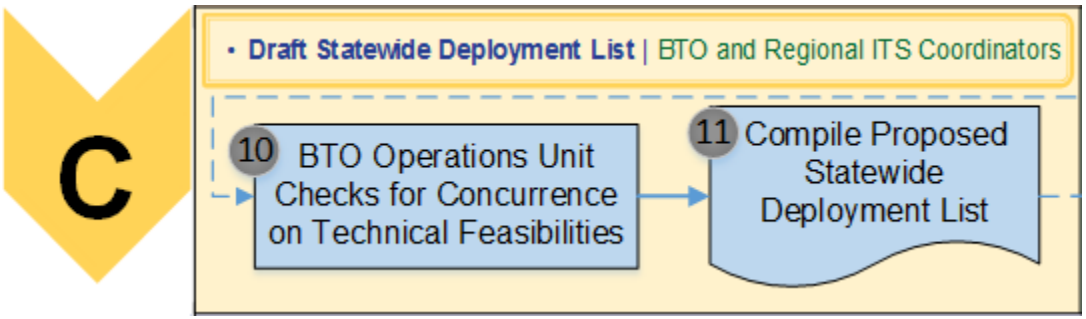
- Step 10: Regional ITS coordinators work with BTO to check for concurrence on technical feasibilities
  - Review projects and verify
    - Has technology been deployed before?
    - Is there still ability to implement technology?
    - Review Annual Evaluation Report on TSM&O Technologies to determine pros/cons and costs of implementing new technologies
- Step 11: BTO compile proposed Statewide Deployment List

C

Task C: Case Study Example

- Step 10: Regional ITS coordinators work with BTO to check for concurrence on technical feasibilities
  - For this example, DMS has been deployed before and the ability still exists to deploy and maintain this technology
- Step 11: BTO compile proposed Statewide Deployment List
  - Compile this and other regional deployment lists into one statewide list, modifying projects on the list as necessary

Questions?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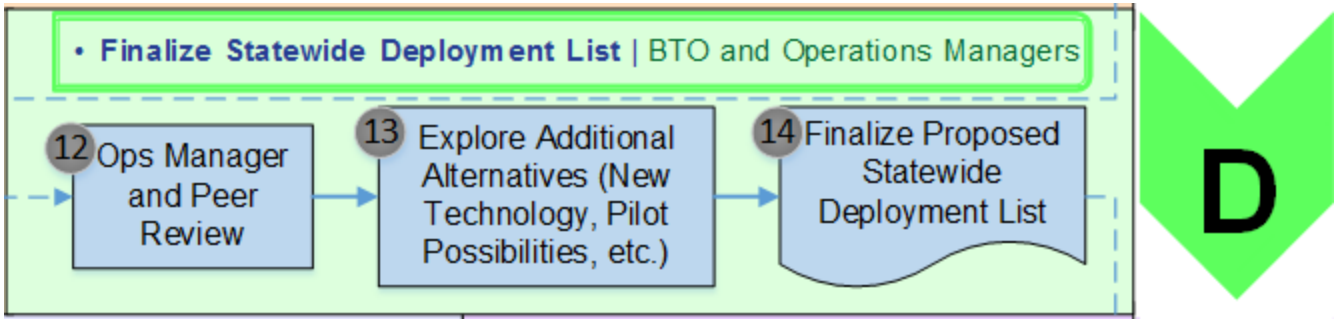

• Finalize Statewide Deployment List | BTO and Operations Managers
12 Ops Manager and Peer Review
13 Explore Additional Alternatives (New Technology, Pilot Possibilities, etc.)
14 Finalize Proposed Statewide Deployment List
D

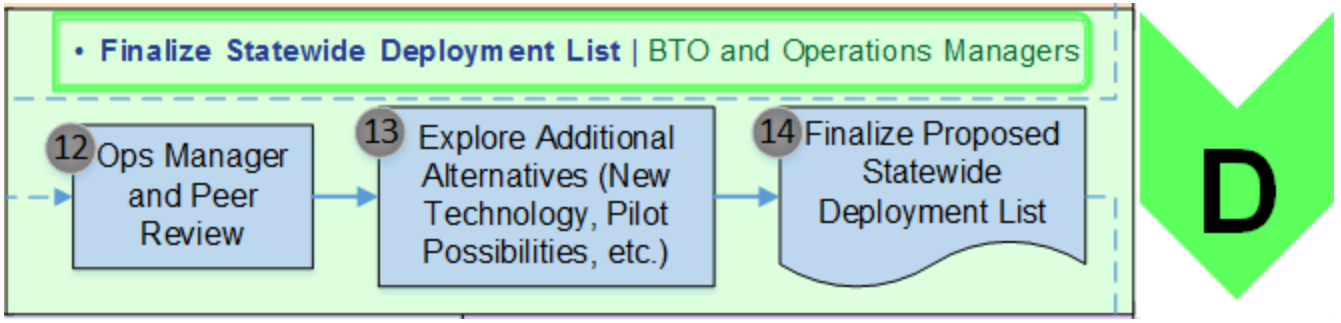
Task D Overview

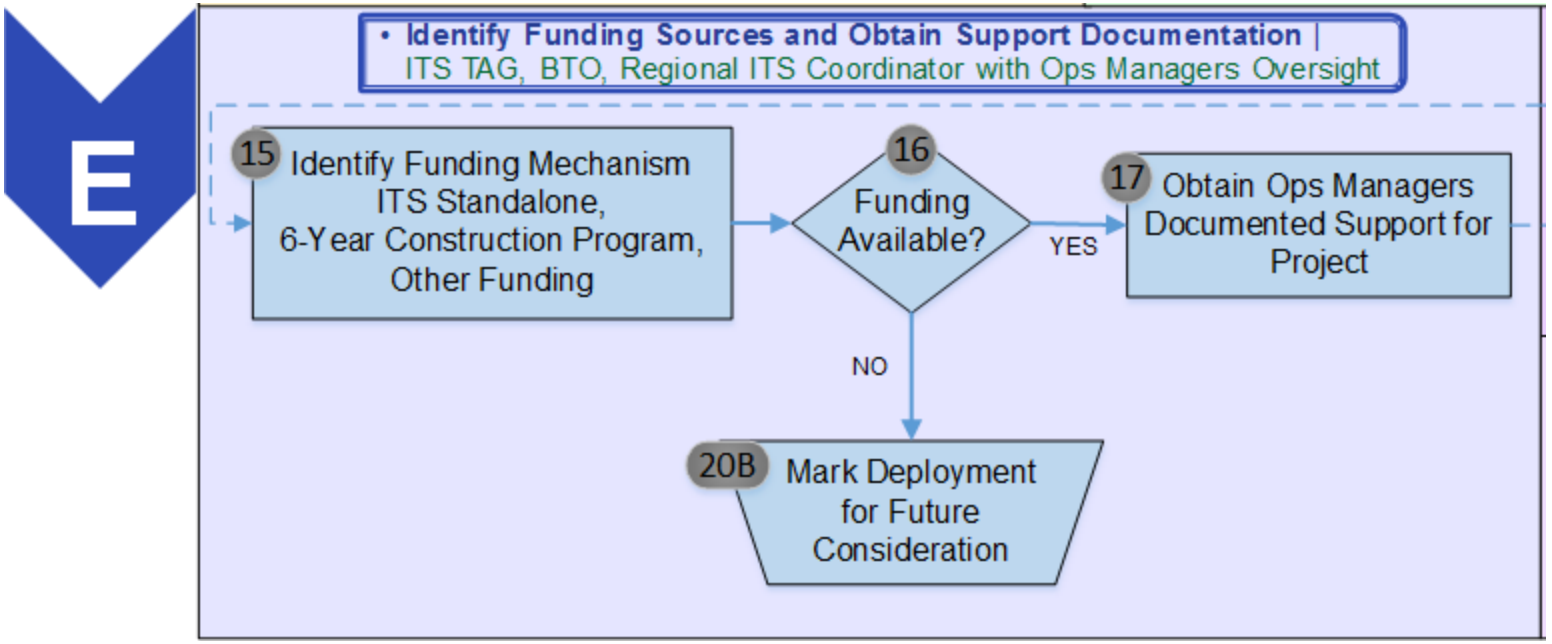
- Step 12: Ops Managers and peers review list
- Step 13: Additional alternatives are explored
  - New technologies or pilot possibilities
- Step 14: BTO created finalized Proposed Statewide Deployment List

Task D: Case Study Example

- Step 12: Ops Managers and peers review list
- Step 13: Additional alternatives are explored
  - Let's say BTO has been working on a probe data project and decide to implement a new travel time app
  - This app is determined to supplement or eliminate this project
  - Perhaps the decision is made to table this DMS deployment for a year to see if their travel time app solves the need
- Step 14: BTO creates finalized Proposed Statewide Deployment List
  - Similar to previous list, modifying projects as necessary

Questions?


• Finalize Statewide Deployment List | BTO and Operations Managers
12 Ops Manager and Peer Review
13 Explore Additional Alternatives (New Technology, Pilot Possibilities, etc.)
14 Finalize Proposed Statewide Deployment List
D


E
• Identify Funding Sources and Obtain Support Documentation |
ITS TAG, BTO, Regional ITS Coordinator with Ops Managers Oversight
15 Identify Funding Mechanism
ITS Standalone,
6-Year Construction Program,
Other Funding
16 Funding Available?
YES
17 Obtain Ops Managers Documented Support for Project
NO
20B Mark Deployment for Future Consideration

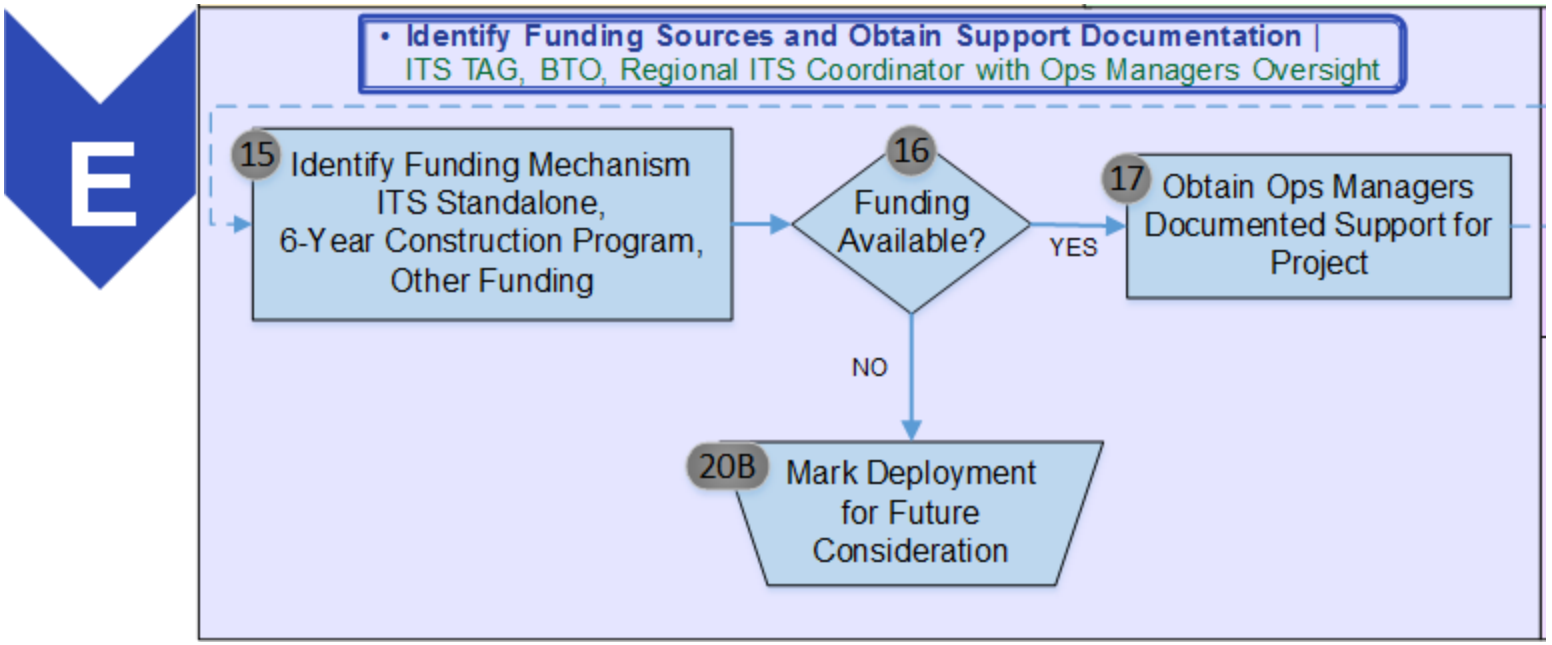
Task E Overview

- Step 15: Identify funding mechanism for each project
  - 6-Year Construction Program
  - Signals and ITS Standalone
  - Other Funding
  - No Funding?
- Step 16: Funding available?
- Step 17: Obtain Ops Managers documented support for project

Task E: Case Study Example

- Step 15: Identify funding mechanism for each project
  - Let's hypothetically say that the DMS was selected on the finalized Proposed Statewide Deployment List
  - Check for funding and decide that this will be funded through ITS Standalone
- Step 16: Funding available? → Yes
- Step 17: Obtain Ops Managers documented support for project
  - Complete documentation for this and each other regional project

Questions?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15 Identify Funding Mechanism
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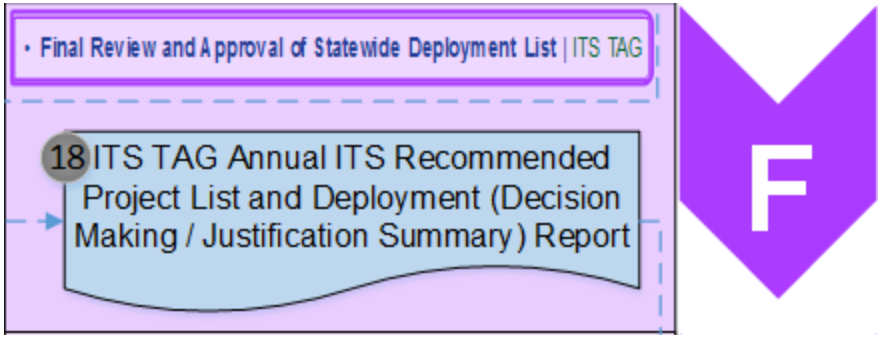

• Final Review and Approval of Statewide Deployment List | ITS TAG
18 ITS TAG Annual ITS Recommended Project List and Deployment (Decision Making / Justification Summary) Report
F

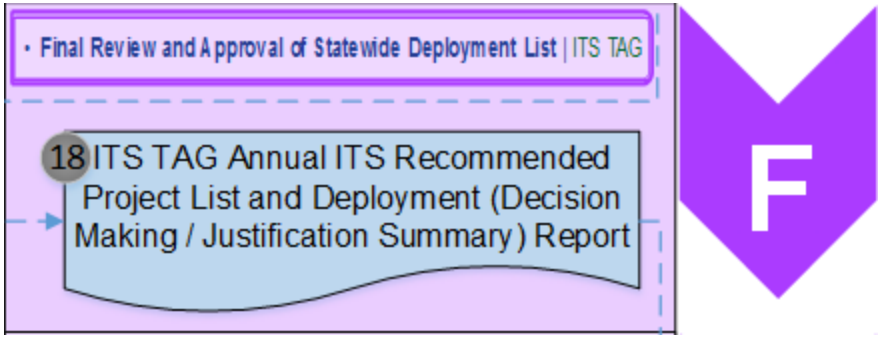
Task F Overview

- Step 18: ITS TAG review and completion of Annual ITS Recommended Project List and Deployment Report

Task F: Case Study Example

- Step 18: ITS TAG review and completion of Annual ITS Recommended Project List and Deployment Report
  - ITS TAG reviews example project and agrees that it makes sense to deploy the DMS
  - Project (and others) are added to Final Deployment List

Questions?


Final Review and Approval of Statewide Deployment List | ITS TAG
18
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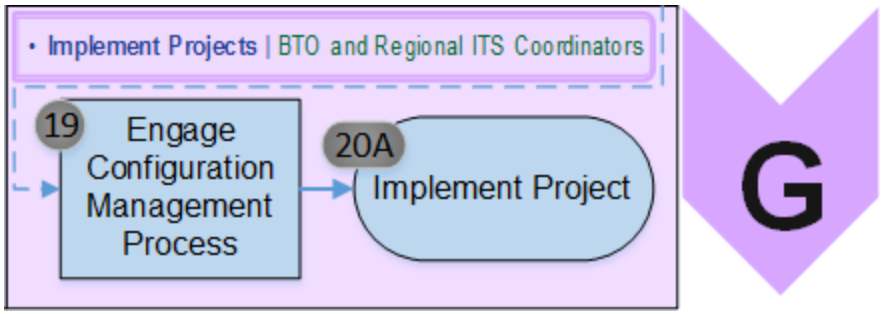

• Implement Projects | BTO and Regional ITS Coordinators
19
Engage Configuration Management Process
20A
Implement Project
G

G

Task G: Overview

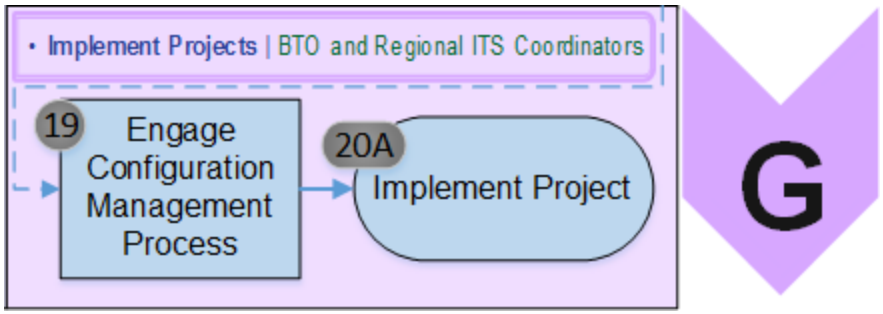
- Step 19: Engage Configuration Management Process
- Step 20: Implement Project

G

Task G: Case Study Example

- Step 19: Engage Configuration Management Process
  - Exact specifications of the project are determined
  - All parties involved in implement, operating, and maintaining the deployment are engaged
- Step 20: Implement Project
  - DMS is installed, added to the system, operated, and maintained

Questions?


• Implement Projects | BTO and Regional ITS Coordinators
19
Engage Configuration Management Process
20A
Implement Project
G

TSMO-TIP Flowchart – Process Tasks

A
- **Statewide Needs Inventory** | BTO Traffic Systems Unit with stakeholder support

B
- **Regional Project List w/ Priority Ranking** | BTO and Regional ITS Coordinators

C
- **Draft Statewide Deployment List** | BTO and Regional ITS Coordinators

D
- **Finalize Statewide Deployment List** | BTO and Operations Managers

E
- **Identify Funding Sources and Obtain Support Documentation** | ITS TAG et al.

F
- **Final Review and Approval of Statewide Deployment List** | ITS TAG

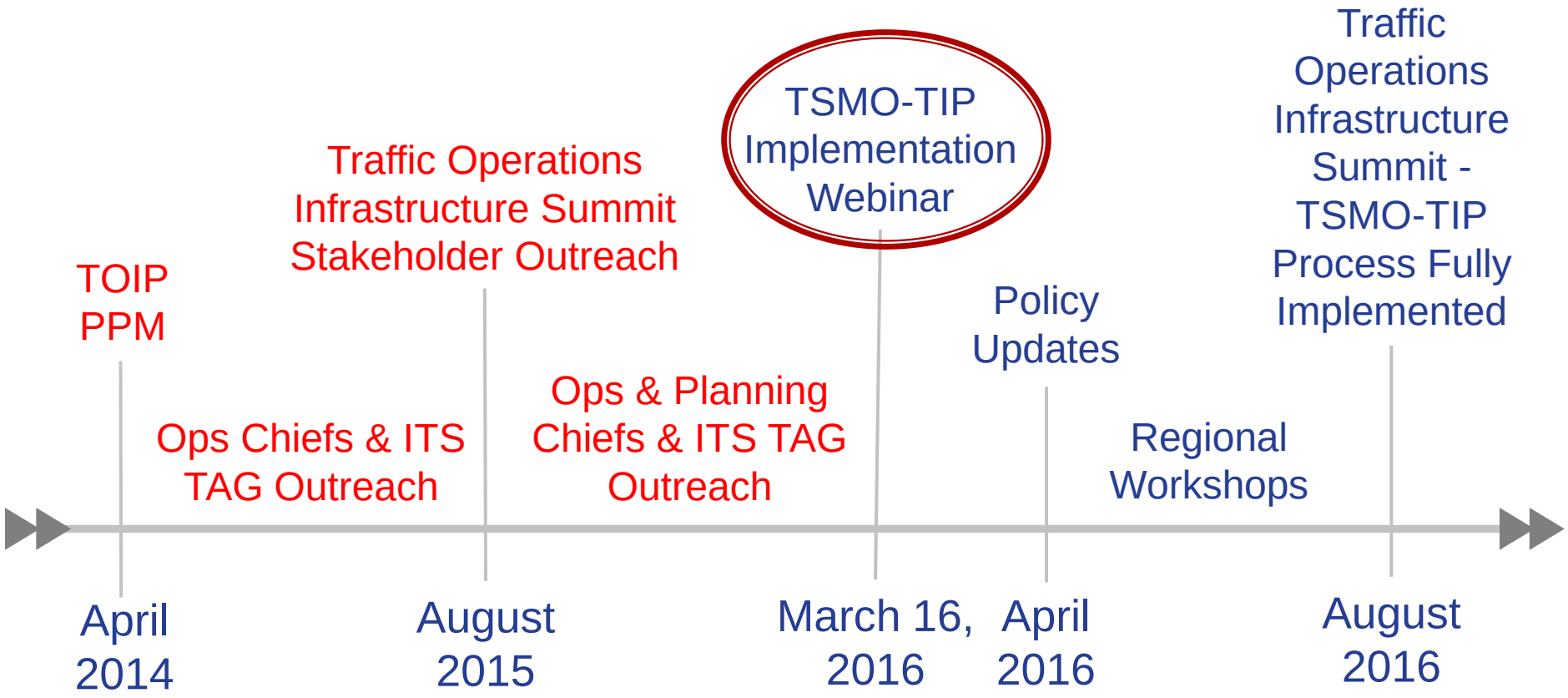
G
- **Implement Projects** | BTO and Regional ITS Coordinators

5. Next Steps

Webinar Objectives

- Explain the TSMO-TIP Process
- Describe how the process will help WisDOT and your region deploy TSM&O infrastructure in a more efficient and documented way
- Gain regional buy in or identify items of SIGNIFICANT concern
- Share process implementation schedule

Implementation Timeline



Stakeholder Outreach

Next Steps

- Updated policy in development for traffic supervisor review
- Provide final comments on process by April 1
- BTO will hold regional workshops April-July
- August summit to fully implement process

- New projects going forward must go through this process

Final Questions?

Additional Resources

- TSMO-TIP Temporary Webpage
  - http://www.topslab.wisc.edu/tsmo/tip/
  - All current documentation
  - Needs Analysis Tool
  - Benefits Tool
  - Instructional Support
  - Recorded Webinar

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