CENTRAL PINES
REGIONAL COUNCIL

ITS DEPLOYMENT ROADMAP

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Prime Consultant:

EXULT® ENGINEERING

In Collaboration With:

ICF

INTRODUCTION

The Intelligent Transportation Systems (ITS) Deployment Roadmap represents a collaborative effort led by the Triangle ITS Working Group. The ITS Working Group convenes quarterly to discuss regional ITS initiatives and activities – identifying opportunities to collaborate and leverage partner knowledge and resources.

The ITS Deployment Roadmap describes the current, near (0-5 years), medium (5-10 years), and long-term (10+ years) ITS projects identified throughout the region. ITS projects are drawn from the ITS Strategic Deployment Plan (SDP), current Statewide Transportation Improvement Program (STIP), and feedback from the ITS Working Group. The ITS Roadmap is intended to serve as a guide for regional Transportation Systems Management and Operations (TSMO), planning, funding allocation and deployment. It is intended to be a living document that is updated regularly as TSMO and funding provides additional clarity for scoping and prioritization of projects.

SOME OF THE HIGH-LEVEL GOALS THAT THE ITS WORKING GROUP HAS SOUGHT TO ADDRESS THROUGHOUT THIS ROADMAP INCLUDE:

- Cohesive and integrated planning among each of the six TSMO Strategies.
- Standardization of critical infrastructure to support regional integration.
- Deployment of communication infrastructure to support regional connectivity and integration for long-term operations and maintenance efficiency.
- Establishment of a program among ITS regional working group partners to share findings from technology pilots and evaluations.
- Development of continued effective funding for implementation, operations and maintenance of each TSMO Strategy.
- Incorporation of long-term operations and maintenance as a primary consideration when deploying TSMO technology.

THE ITS DEPLOYMENT ROADMAP INCLUDES THE FOLLOWING SECTIONS:

GLOSSARY OF ACRONYMS

AARA – Automating Actionable Road Anomalies
ATM – Active Traffic Management
ATMS – Advanced Transportation Management System
ATSPM – Automated Traffic Signal Performance Measures
AVL – Automatic Vehicle Location
CAMPO – Capital Area Metropolitan Planning Organization
CCTV – Closed Circuit Television
CPRC – Central Pines Regional Council
CV – Connected Vehicle
DCHCMPO – Durham-Chapel Hill-Carrboro Metropolitan Planning Organization
DMS – Dynamic Message Sign
EVP – Emergency Vehicle Pre-emption
FAMS – Fiber Asset Management System
GIS – Geographic Information Systems
IAMS – ITS Asset Management System
ICM – Integrated Corridor Management
ITS – Intelligent Transportation Systems
IWOM – ITS Work Order Management
LOS – Level of Service
MMCVP – Multimodal Connected Vehicle Pilot
NCDOT – North Carolina Department of Transportation
NMS – Network Monitoring Systems
O&M – Operations & Maintenance
P3 – Public Private Partnerships
RM – Ramp Metering
ROI – Return on Investment
SDP – Strategic Deployment Plan
SPOT – Strategic Transportation Prioritization
SS – Signal System
STIP – Statewide Transportation Improvement Program
TMC – Traffic Management Center
TSMO – Transportation Systems Management and Operations
TSP – Transit Signal Priority
WWD – Wrong Way Driving

TSMO STRATEGY KEY

The ITS Roadmap provides a summary of information for each strategic focus area and project. Strategic focus areas include Regional Planning Strategy, Freeway Operations Strategy, Arterial Operations Strategy, Technology/Pilot Implementation Strategy, Operations and Maintenance Strategy, and Data Management Strategy. Separate tables are provided for each strategic focus area in a consistent format. The following columns and symbols are used within each strategic focus area table to succinctly present the information and intended order of deployment.

- **Table heading** and **color** indicate the strategic focus area.
- **Timing & ID** – describes the estimated deployment schedule for the given project, as well as serving as a reference ID specific to that project. The letter represents current, near, medium, and long-term projects.
  - C.X projects are currently ongoing or recently completed
  - N.X projects are planned to begin within the near term (0-5 years)
  - M.X projects are planned for the medium term (5-10 years)
  - L.X projects are longer term projects planned for more than 10 years
- **Project & Champion** – provides the project name and lead agency.
- **Description** – provides a brief description of the project.
- **SDP Alignment (A)** – designates the SDP project numbers that the project is aligned with.
- **Predecessor (P)** – refers to projects that are expected to be completed prior to the given project, i.e., dependencies.
- **Program or Project Grouping (G)** – defines the type of project. Project types include program, pilot, planning, design/implementation, or construction.
- **Related STIP & Constr. Yr.** – provides the STIP number and expected construction year for those projects that are currently programmed.
- **Cost** – defines approximate project cost, using the following key:
  - $: up to $1M
  - $$: $1M - $3M
  - $$$: $3M - $5M
  - $$$$: $5M - $10M
  - $$$$$: >$10M
- **Grant Eligibility** – identifies the likelihood a grant could be secured to assist in funding the project indicated by filled bars designating low, medium, or high.

TRIANGLE REGION ITS STRATEGIC DEPLOYMENT PLAN (SDP) PROJECTS

ID	Project Type	Near-Term (0-5 Years)	Mid-Term (5-10 Years)	Long-Term (10+ Years)
1	Transit Signal Priority /Bus Rapid Transit	$$		
2	Unified Transit Farebox System	$		
3	Implement AVL Technology for Transit	$$		
4	New Municipal Traffic Signal System – Fuquay-Varina	$$		
5	New Municipal Traffic Signal System – Knightdale	$		
6	New Municipal Traffic Signal System – Morrisville	$		
7	New Municipal Traffic Signal System – Wake Forest	$$		
8	New Municipal Traffic Signal System – Clayton	$		
9	Upgrade Municipal Traffic Signal System – Apex		$	
10	New Municipal Traffic Signal System – Garner		$	
11	Upgrade Municipal Traffic Signal System – Raleigh		$$	
12	New Municipal Traffic Signal System – Holly Springs			$$
13	Traffic Signal System Upgrade – City of Durham	$$$		
14	Traffic Signal System Upgrade – Town of Cary		$$	
15	Complete Regional Fiber Network – NCDOT			$$
16	Consolidate Municipal Signal Systems Management			$
17	Establish Agreements for System Consolidation and Management	$		
18	Assess New Sub-Regional TMC		$	
19	Centralize Data Warehousing and Distribution		$	
20	Coordinated Corridor Traffic Signal Timing	$$		
21	Establish software and hardware platforms to serve connected vehicles and automated vehicles	$		
22	Regional standards for software, hardware, and communication platforms	$		
23	Inventory current deployments	$$		
24	Replace /upgrade outdated devices	$		
25	Integrated Corridor Management			$$
26	Managed Motorways	$$$		
27	Training for Incident Response	$		
28	Emergency Pre-Emption	$		
29	Adaptive Traffic Signal Systems		$$	
30	Occupancy Detection in Parking Decks		$	
31	Staff Training for Operation and Maintenance of ITS Equipment	$		
32	Expand Travel Information Coverage	$		

TSMO STRATEGIES

REGIONAL PLANNING STRATEGY

ID	Project & Champion	Description	SDP Alignment (A) Predecessor (P) Program or Project Grouping (G)	Related STIP & Constr. Yr.	Cost	Grant Eligibility
C.1	TSMO Deployment Guide **Champ:** NCDOT State TSMO Planning Engineer	Developing guidance for various TSMO/ITS deployments with recommendations for planning, funding, design, implementation, operations and maintenance.	A: SDP #22, 26, 29, 31 P: N/A G: Planning	**2024/2025**	–	–
C.2	Middle Mile Broadband **Champ:** NCDOT State TSMO Planning Engineer	Explore Broadband P3 Partnership as a means of ITS maintenance funding for freeway facilities within the region.	A: N/A P: N/A G: Planning	**2023/2024**	–	–
C.3	Statewide ITS Comm Plan **Champ:** NCDOT State ITS Engineer	NCDOT is evaluating controlled access facilities statewide to establish fiber and device deployment standards, prioritize deployment needs, and assess funding strategies	A: SDP #15, 25, 26, 31 P: N/A G: Planning	**2024/2025**	–	–
C.4	Signal Management Plan **Champ:** NCDOT State ITS and Signals Management Engineer	This effort will seek to standardize hardware/software as well as staffing and training across the state. In an aim to be proactive in signal system management and maintenance, NCDOT has conducted peer exchanges with other state DOTs. The Department has also conducted a series of trainings for the new ATMS software; municipalities, contractors, consultants, etc. have all been invited to participate.	A: SS's, SDP #22 P: N/A G: Planning	**2024**	–	–
N.1	Fiber and Technology Deployment Master Plan **Champ:** CPRC Transportation Director	Inventory existing conditions, establish regional rules of thumb, develop proposed deployment GIS mapping, evaluate long-term operations and maintenance needs, and establish project-based approach for deployment.	A: SDP #18, 22, 23, 24 P: N/A G: Planning	–	$	
N.2	TSMO Technology Standardization Workshops **Champ:** CPRC Transportation Director	Hold internal workshops to discuss and document approach for standardization of various technologies.	A: N/A P: N/A G: Planning	–	$	
N.3	TSMO Technology Pilot Approach **Champ:** CPRC Transportation Director	Establish plan for piloting new technologies as a region, prioritize pilot projects, align with grant opportunities, assign champions for each technology, and associate with relevant projects in the STIP.	A: 21 P: N.1 G: Planning	–	$	
M.1	Regional ITS Plan Update **Champ:** CPRC Transportation Director/MPOs	Update Regional ITS Master Plan every 5-10 years. Could consider amendments vs. new plans. Should include connections between ITS Plan and Long Range Plans.	A: SDP #18, 22, 23, 24 P: N.1 G: Planning	–	$	
L.1	Regional ITS Plan Update **Champ:** CPRC	Update Regional ITS Master Plan every 5-10 years. Could consider amendments vs. new plans. Should include connections between ITS Plan and Long Range Plans.	A: SDP #18, 22, 23, 24 P: M.1 G: Planning	–	$	

FREEWAY OPERATIONS STRATEGY

ID	Project & Champion	Description	SDP Alignment (A) Predecessor (P) Program or Project Grouping (G)	Related STIP & Constr. Yr.	Cost	Grant Eligibility
C.5	Freeway ATMS **Champ:** NCDOT ITS Operations Engineer	Deploy freeway ATMS to support streamlined incident management and traveler information.	A: SDP #15, 18, 26, 27, 32 P: N/A G: Tech Imp/Pilot	**2024**	–	–
N.4	Incident Management **Champ:** NCDOT State Traffic Operations Engineer	NCDOT to continue focus on the incident management program, expanding as appropriate to meet congestion and safety needs.	A: SDP #27 P: N/A G: Program	**Program**	$$$	
N.6	Ph 1 Fwy Gaps **Champ:** NCDOT Division 4, 5, 6, 7 & 8 Planning Engineer/CAMPO/ TSMO Planner/ Triangle West	Phase 1 Construction of Prioritized Freeway Deployment Gaps. Systematic funding and construction of prioritized deployment gaps through Freeway TSMO and Roadway Construction Projects.	A: SDP #15, 22 P: N.1 G: Design/Implementation	–	$$$$	
M.2	Ph 2 Fwy Gaps **Champ:** NCDOT Division 4, 5, 6, 7 & 8 Planning Engineer/CAMPO/ TSMO Planner/ Triangle West	Phase 2 Construction of Prioritized Freeway Deployment Gaps Systematic funding and construction of prioritized deployment gaps through Freeway TSMO and Roadway Construction Projects.	A: SDP #15, 22 P: N.6 G: Design/Implementation	–	$$$$	
M.7	Managed Motorways: Eastern Triangle **Champ:** NCDOT Division 5 Planning Engineer/ CAMPO/TSMO Planner	I-40 from SR 1728 (Wade Avenue) to NC 42, I-440, I-87 from I-40 to I-540, US 1 from NC 540 to I-40. Convert facilities to managed freeways, with ramp metering and other ATM/ITS components.	A: SDP #26 P: N/A G: Design/Implementation	**U-6101** **2031-2035**	$$$$$	
L.2	Ph 3 Fwy Gaps **Champ:** NCDOT Division 4, 5, 6, 7 & 8 Planning Engineer/CAMPO/ TSMO Planner/ Triangle West	Phase 3 Construction of Prioritized Freeway Deployment Gaps. Systematic funding and construction of prioritized deployment gaps through Freeway TSMO and Roadway Construction Projects.	A: SDP #15, 22 P: M.2 G: Design/Implementation	–	$$$$	
L.3	Managed Motorways: Western Triangle **Champ:** NCDOT Division 5 Planning Engineer/ CAMPO/Triangle West/TSMO Planner	I-40; NC 54 (Exit 273) to SR 1728 (Wade Avenue), I-40 to SR 1664 (Blue Ridge Road). Convert facility to a managed freeway with ramp metering and other ATM/ITS components.	A: SDP #26 P: N/A G: Design/Implementation	**I-6006** **2031-2035**	$$$$$	

ARTERIAL OPERATIONS STRATEGY

ID	Project & Champion	Description	SDP Alignment (A) Predecessor (P) Program or Project Grouping (G)	Related STIP & Constr. Yr.	Cost	Grant Eligibility
C.6	Regional SS Standards **Champ:** NCDOT State ITS and Signals Management Engineer	Regional Signal System Standardization Identified MaxTime/Kinetic as regional/statewide signal system platform (Complete)	A: SDP #22, SS's P: N/A G: Technology Implementation	**2023**	–	–
C.7	Durham TSP **Champ:** Durham Transportation Engineer/ GoDurham/ GoTriangle	Implement transit signal priority along Fayetteville Street and Holloway Street corridors within Durham.	A: SDP #1, 13 P: N/A G: Technology Implementation/Pilot	**2024**	–	–
C.8	Raleigh TSP **Champ:** Raleigh Transportation Engineer/ GoRaleigh/ GoTriangle	Implement transit signal priority along New Bern Ave.	A: SDP #1, 11 P: N/A G: Technology Implementation/Pilot	**2023**	–	–
C.9	Cary TSP **Champ:** Cary Transportation Engineer/GoCary/ GoTriangle	Implement transit signal priority along main corridors within Cary.	A: SDP #1,14 P: N/A G: Technology Implementation/Pilot	**2024**	–	–
C.10	Traffic SS Upgrade Durham **Champ:** Durham Transportation Engineer/NCDOT State ITS Engineer	Traffic Signal System Upgrade City of Durham Upgrade ITS/Signal System in City of Durham.	A: SS's, SDP #13 P: N/A G: Design/Construction	**U-5968 & 2021**	–	–
C.11	Traffic SS Fuquay-Varina **Champ:** F-V/ NCDOT State ITS Engineer	New Municipal Traffic Signal System - Fuquay-Varina Construct Townwide ITS /Signal System in the Town of Fuquay. Signal System Standardization	A: SDP #4 P: N/A G: Design/Construction	**U-6022 & 2023**	–	–
C.12	Traffic SS Knightdale **Champ:** Knightdale/ NCDOT State ITS Engineer	New Municipal Traffic Signal System – Knightdale Construct Townwide ITS /Signal System in the Town of Knightdale. Signal System Standardization	A: SDP #5 P: N/A G: Design/Construction	**U-6026 & 2023**	–	–
C.13	Traffic SS Wake Forest **Champ:** W-F/ NCDOT State ITS Engineer	New Municipal Traffic Signal System - Wake Forest Construct Townwide ITS /Signal System in the Town of Wake Forest. Signal System Standardization	A: SDP #7 P: N/A G: Design/Construction	**U-6023 & 2023**	–	–
C.14	Traffic SS Clayton **Champ:** Clayton/ NCDOT State ITS Engineer	New Municipal Traffic Signal System – Clayton Construct ITS/signal system for Clayton signals, meeting objectives of Regional ITS Master Plan.	A: SDP #8 P: N/A G: Design/Construction	**U-5943 & 2025**	–	–

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ARTERIAL OPERATIONS STRATEGY *CONTINUED*

ID	Project & Champion	Description	SDP Alignment (A) Predecessor (P) Program or Project Grouping (G)	Related STIP & Constr. Yr.	Cost	Grant Eligibility
N.5	Traffic SS Holly Springs **Champ:** H-S/ NCDOT State ITS Engineer	New Municipal Traffic Signal System - Holly Springs. Signal System Standardization Construct ITS/signal system for Holly Springs signals, meeting objectives of Regional ITS Master Plan.	A: SDP #12 P: C.4, C.6 & N.1 G: Design/Construction	**HP-0008 2028**	$$$	
N.7	Corridor Signal Timing **Champ:** NCDOT State Signal System Engineer	Coordinated Corridor Traffic Signal Timing Modernize operations and maintenance LOS definition, create traffic signal training plan, and determine funding approach.	A: SDP #20, 22, 31 P: C.4 G: Design/Construction	–	$$$	
N.8	Traffic SS Morrisville **Champ:** Cary Transportation Engineer/NCDOT State ITS Engineer	New Municipal Traffic Signal System - Morrisville Construct ITS/signal system for Morrisville signals, meeting objectives of Regional ITS Master Plan.	A: SDP #6 P: C.4, C.6 & N.1 G: Design/ Construction	**U-5967 & 2029**	$$$	
N.9	Traffic SS Upgrade Apex **Champ:** Apex Transportation Engineer/NCDOT State ITS Engineer	Upgrade Municipal Traffic Signal System - Apex Construct ITS/signal system for Apex signals, meeting objectives of Regional ITS Master Plan.	A: SDP #9 P: C.4, C.6 & N.1 G: Design/ Construction	**U-6117 & 2028**	$$$$	
N.10	Traffic SS Upgrade Raleigh **Champ:** Raleigh Transportation Engineer/NCDOT State ITS Engineer	Upgrade Municipal Traffic Signal System - Raleigh Upgrade ITS/signal system for Raleigh signals, meeting objectives of Regional ITS Master Plan.	A: SDP #11 P: C.4, C.6 & N.1 G: Design/ Construction	**U-6119 & 2030**	$$$$$	
N.11	Traffic SS Garner **Champ:** Garner Transportation Engineer/NCDOT State ITS Engineer	New Municipal Traffic Signal System – Garner Construct ITS/signal system for Garner signals, meeting objectives of Regional ITS Master Plan.	A: SDP #10 P: C.4, C.6 & N.1 G: Design/ Construction	**U-6194 & 2031**	$$$$	
M.3	Traffic SS Upgrade Cary **Champ:** Cary Transportation Engineering Manager/NCDOT State ITS Engineer	Upgrade Municipal Traffic Signal System -Town of Cary Upgrade ITS/signal system for Cary signals, meeting objectives of Regional ITS Master Plan.	A: SDP #14 P: C.4, C.6 & N.1 G: Design/ Construction	**HP-0010 PE Only**	$$$	
M.4	Ph 1 Arterial Gaps **Champ:** CPRC Until Specific Gaps Identified	Phase 1 Construction of Prioritized Arterial Deployment Gaps Systematic funding and construction of prioritized deployment gaps through Arterial TSMO and Roadway Construction Projects.	A: SDP #15, 22, SS's P: N.1 G: Design/ Implementation	–	$$$$$	
M.5	Div 5 Non-Municipal SS **Champ:** NCDOT State ITS Engineer	Division 5 Non-Municipal Signal System Construct ITS/signal system for Division 5 non-municipal signals, meeting objectives of Regional ITS Master Plan.	A: SDP #15, 22, SS's P: C.4, C.6 & N.1 G: Design/ Construction	**HP-0005 2031-2035**	$$$$$	

ARTERIAL OPERATIONS STRATEGY *CONTINUED*

ID	Project & Champion	Description	SDP Alignment (A) Predecessor (P) Program or Project Grouping (G)	Related STIP & Constr. Yr.	Cost	Grant Eligibility
M.6	Traffic SS Chapel Hill **Champ:** C-H Transportation Engineer/NCDOT State ITS Engineer	Chapel Hill Citywide Signal System Upgrade ITS/signal system for Chapel Hill signals, meeting objectives of Regional ITS Master Plan.	A: SDP #15, 22, SS's P: C.4, C.6 & N.1 G: Design/ Construction	**HP-0006** **PE Only**	$$$$$	
M.8	Traffic SS Wendell and Zebulon **Champ:** W&Z/ NCDOT State ITS Engineer	Wendell and Zebulon Signal System Construct ITS/signal system for Wendell and Zebulon signals, meeting objectives of Regional ITS Master Plan.	A: P: C.4, C.6 & N.1 G: Design/ Construction	-	$$$$	
L.4	Ph 2 Arterial Gaps **Champ:** CPRC Until Specific Gaps Identified	Phase 2 Construction of Prioritized Arterial Deployment Gaps Systematic funding and construction of prioritized deployment gaps through Arterial TSMO and Roadway Construction Projects.	A: SDP #15, 22, SS's P: M.4 G: Design/Implementation	–	$$$$$	

TECHNOLOGY/PILOT IMPLEMENTATION STRATEGY

ID	Project & Champion	Description	SDP Alignment (A) Predecessor (P) Program or Project Grouping (G)	Related STIP & Constr. Yr.	Cost	Grant Eligibility
C.15	Deploy CV Technology **Champ:** Cary, Durham, NCDOT	Deploy Connected Vehicle Technology Cary, Durham, MMCVP CV Deployments	A: SDP #1, 21, 22, 28, 32 P: N/A G: Technology Implementation/Pilot	**Cary CV Project** **Durham SS U-5968**	–	–
C.16	Signal Timing **Champ:** Holly Springs/NCDOT State Signal System Engineer	Pilot automation technologies for signal timing efficiency NCDOT is currently testing a new signal timing software (Axilion).	A: SDP #20, 29 P: N/A G: Technology Implementation/Pilot	**Middle Mile Broadband**	–	–
C.17	RM Study in Charlotte **Champ:** NCDOT Signals Structural Engineering Supervisor	Ramp Metering Study in City of Charlotte Ramp metering study being conducted in the City of Charlotte. The goal is to use the study findings to help evaluate where ramp metering would apply and what the standards would be.	A: SS's, SDP #22, 25, 26, 29 P: N/A G: Technology Implementation/Pilot	–	–	–
C.18	AARA Grant **Champ:** NCDOT State Traffic Operations Engineer	The SMART grant program, Automating Actionable Road Anomalies (AARA) – for Traveler Information System, is leveraging datasets, algorithms, and open data feeds to detect approaching anomalies and activate warnings to motorists. Anomalies may include sudden slowdowns, required lane changes, and active work zones.	A: SDP #21 P: N/A G: Technology Implementation/Pilot	–	–	▬
N.12	WWD Technology Pilot **Champ:** NCDOT State ITS Engineer	Pilot for Wrong-Way Driving Technology Continue to evaluate WWD technologies.	A: SDP # 21 P: N/A G: Technology Implementation/Pilot	–	$	▬
N.13	In-vehicle App Partnerships **Champ:** NCDOT State Traffic Systems Operations Engineer/Cary Transportation Engineer/ Durham Transportation Engineer	Promote In-vehicle App Partnerships for Advanced Traveler Information Pursue pilot projects and evaluate technologies prior to extensive deployment. Continue to build relationships with mobile application providers such as Google, Waze, etc.	A: SDP #32 P: N/A G: Technology Implementation/Pilot	–	$	▬
N.14	ATSPM Eval Holly Springs Pilot **Champ:** H-S/ NCDOT State Signal Systems Engineer	Evaluation of ATSPM approach/standards for the region through the Holly Springs Pilot Beginning to evaluate the capability within Kinetics and what reports/dashboards may be helpful. If the baseline version does not provide the desired functions, there is an ATSPM module that could be purchased as an add-on or may look at open-source options as well.	A: SDP #19, 20, 29 P: C.4 G: Technology Implementation/Pilot	–	$	▬
N.15	Analytical Tools Eval for Operations **Champ:** NCDOT State Traffic Systems Operations Engineer/ Municipalities	Evaluation of Analytical Tools for Operations and enhancements for sustainability and resiliency.	A: SDP #21, 22, 25, 26 P: N/A G: Technology Implementation/Pilot	–	$	▬
N.16	EVP **Champ:** Signal System Operator (Municipal/ NCDOT/Regional)/ Coordination with emergency services	Emergency Vehicle Pre-emption Prioritize installing EVP along main corridors and expanding coverage and coordination of existing systems.	A: SDP #21, 22, 28 P: N.1 G: Program	–	$	▬

TECHNOLOGY/PILOT IMPLEMENTATION STRATEGY

ID	Project & Champion	Description	SDP Alignment (A) Predecessor (P) Program or Project Grouping (G)	Related STIP & Constr. Yr.	Cost	Grant Eligibility
N.17	Enhanced ICM Deployment **Champ:** NCDOT State Traffic Systems Operations Engineer/ Municipality	ITS Deployment and Enhanced ICM NCDOT is evaluating freeway facilities for ITS device and fiber needs to determine need for comm infrastructure. A follow-on phase to expand to additional routes (freeway/control-of-access facilities) will be added and will look at device locations and needs.	A: SDP #15,25 P: N.1 G:Design/Technology Implementation	–	$$	
M.9	Regional ICM **Champ:** NCDOT State Traffic Systems Operations Engineer	Regional ICM Continue to expand ICM route coverage and ensure regional coordination on detours and arterial usage (i.e., I-885/NC 147; US 70; US 15/501; NC 54)	A: SDP #25 P: N.14 G: Technology Implementation	–	$$	
L.5	ICM **Champ:** NCDOT State Traffic Systems Operations Engineer	Integrated Corridor Management Continue to expand ICM program with priorities identified through evaluation of ICM projects.	A: SDP #25 P: N.14 G: Technology Implementation	–	$$	

OPERATIONS & MAINTENANCE STRATEGY

ID	Project & Champion	Description	SDP Alignment (A) Predecessor (P) Program or Project Grouping (G)	Related STIP & Constr. Yr.	Cost	Grant Eligibility
C.19	Freeway Device Replacement **Champ:** NCDOT State ITS Operations Engineer	Replace /Upgrade Outdated Freeway Devices Replace/Upgrade freeway ITS infrastructure as needed	A: SDP #24 P: N/A G: Program	**Statewide Resilience (CCTV & DMS)**	–	–
C.20	Arterial Device Replacement **Champ:** NCDOT Division 4, 5, 6, 7, 8/Municipalities	Replace / Upgrade Outdated Arterial Devices Upgrade signal hardware and signal system software/firmware for sustainability and resiliency.	A: SDP #22, 24, SS's P: N/A G: Program	**Signal Modern-ization**	–	–
C.21	Statewide ITS Resilience **Champ:** NCDOT State ITS Operations Engineer	Statewide ITS Resilience Implement performance-based maintenance program for freeway ITS infrastructure.	A: SDP #31 P: N/A G: Program	**Statewide ITS Resilience**	–	–
C.22	Freeway ITS FAMS **Champ:** NCDOT State ITS Operations Engineer	Freeway ITS /Fiber Asset Management Populate and expand the ITS Asset Management and Fiber Asset Management systems for Freeway Infrastructure.	A: SDP #17, 19 P: N/A G: Program	**Statewide Resilience & NC Broad-band**	–	–
N.18	Assess regional signal operations/ maintenance LOS needs. **Champ:** CPRC	Review recommendations from Signal Management Plan and evaluate regional preferences for signal operations/maintenance level-of-service in comparison to the signal management plan. If necessary, allocate funding to accomodate any level-of-service differences/preferences among the region.	A: N/A P: C.4 G: Program	–	$$	
N.19	Western Wake SS Agreements **Champ:** CAMPO & Municipalities Involved	Establish Agreements among Western Wake Signal System Partners Establish agreements to support signal system integration.	A: SDP #16,17 P: C.4 G: Program	–	$	
N.20	Eval IAM, IWOM, and NMS **Champ:** TBD during Standardization Process	Evaluate asset management, work order management and network monitoring platforms Evaluate potential regional ITS/fiber asset management/Work order/Network monitoring platform for the region.	A: SDP #17, 19, 23, 24, 31 P: N/A G: Program	–	$	
N.21	Signal O&M Training **Champ:** NCDOT State ITS & Signals Management Engineer	Staff Training for Operation and Maintenance of Signal Infrastructure Establish regional signal operations and maintenance training programs.	A: SDP #22, 31 P: C.4 & C.6 G: Program	–	$	
N.22	ITS Infrastructure O&M Training **Champ:** NCDOT State ITS & Signals Management Engineer	Staff Training for Operation and Maintenance of ITS Infrastructure Establish regional ITS operations and maintenance training programs.	A: SDP #31 P: C.4 & C.6 G: Program	–	$	

OPERATIONS & MAINTENANCE STRATEGY *CONTINUED*

ID	Project & Champion	Description	SDP Alignment (A) Predecessor (P) Program or Project Grouping (G)	Related STIP & Constr. Yr.	Cost	Grant Eligibility
N.23	CCTV Feed Sharing Initiative **Champ:** NCDOT State ITS Operations Engineer	Initiative to provide NCDOT CCTV feeds to municipalities. Conversely municipal signal system CCTVs should be available for NCDOT use.	A: SDP #19, 22 P: N/A G: Program	–	$	
M.10	Western Wake Regional Integration **Champ:** CAMPO	Western Wake Regional Integration Consolidated regional operations and maintenance within Western Wake County	A: SDP #16 P: C.4, C.6, & N.1 G: Program	–	$$$$	
M.11	ITS FAMS **Champ:** TBD during Standardization Process	ITS/Fiber Asset Management Standardize regional ITS/fiber asset management platform for the region and populate known infrastructure.	A: SDP #23, 24, 31 P: N.1 G: Program	–	$$	
M.12	Signal System Integration Agreements Ph 2 **Champ:** CAMPO/ CPRC	Establish agreements among Eastern Wake Signal System Partners as well as any other SS integration entities within the region.	A: SDP #16, 17 P: N/A G: Program	–	$	
M.13	SS Performance-based Contract Eval **Champ:** CPRC	Evaluate performance-based maintenance contracts for signal systems Pilot performance-based operations/maintenance contracts on priority corridors.	A: SDP #16, SSs P: N/A G: Program	–	$$$	
M.14	Continued Life-Cycle Replacements **Champ:** CPRC	Plan for continued replacements based on device life-cycles Fund replacement/upgrades for obsolescent infrastructure.	A: SDP #24 P: N/A G: Program	–	$$	
L.6	Signal System Integration Ph 2 **Champ:** CAMPO	Establish regionalized signal systems for Eastern Wake area.	A: SDP #16 P: N/A G: Program	–	$$	
L.7	Signal System Integration Ph 3 **Champ:** CPRC	Establish regionalized signal systems for other applicable sub-regions across the Triangle.	A: SDP #16 P: N/A G: Program	–	$$	
L.8	Continued Life-Cycle Replacements **Champ:** CPRC	Plan for Continued ITS Replacements Based on Device Life-cycles Fund replacement/upgrades for obsolescent infrastructure.	A: SDP #24 P: N/A G: Program	–	$$	

DATA MANAGEMENT STRATEGY

ID	Project & Champion	Description	SDP Alignment (A) Predecessor (P) Program or Project Grouping (G)	Related STIP & Constr. Yr.	Cost	Grant Eligibility
N.24	Data Management Needs Analysis **Champ:** CPRC	CPRC to lead working group to determine TSMO data management needs/priorities for the region.	A: SDP #19 P: N/A G: Program	–	$	
N.25	Data Management Aggregation **Champ:** CPRC until needs are determined by Region	Data Management Aggregation	A: SDP #19, 22 P: N/A G: Program	–	$	
M.15	Centralize Data Warehousing and Distribution **Champ:** CPRC until needs are determined by Region	Centralize Data Warehousing and Distribution	A: SDP #19 P: N/A G: Program	–	$	

TIMELINE

The timeline provides a general view of phasing and order for completion of projects. Projects are split into Near-Term, Mid-Term and Long-Term, but phases have also been added to these time horizons to provide some delineation between what projects might happen first within the 5-year horizon. The project colors denote the TSMO Strategy they are associated with. The small white circles denote current projects which are predecessors to the proposed project. The lines denote other proposed projects that are predecessors to the proposed project.

CATEGORIES

- Regional Planning Strategy
- Freeway Operations Strategy
- Arterial Operations Strategy
- Technology/Pilot Implementation Strategy
- O&M Strategy
- Data Management Strategy

KEY

- N.1 Predecessor
- N.3 Predecessor
- N.6 Predecessor
- N.17 Predecessor
- Project IDs
- Project Predecessor & Successor