Form FM-SE-01

Concept of Operations (ConOps)
TEMPLATE

TEMPLATE Version: *2.1*

TEMPLATE Approval Date: *July 23, 2024*

Procedure for Using this Template to Create a Deliverable:

1. Enter your name, firm, and date in the Author Field Document control panel.

2. Replace [*bracketed text*] and empty sections with your project information and/or document content.

   Note that bracketed text in blue italics is surrounded by brackets, using the document's font, with the instructions on the content with which to replace the instructions. When you remove or highlight the entire bracketed portion and replace with text, the text should appear in the desired text format of the document. Also, the Document Title is a property/field of the document visible from the file system and will appear differently than with blue italics and can utilize the "Update Field" functionality.

3. Each section contains *instructions preceded with a checkbox □ for that section in blue italics.* Additional helpful information and description of the required content for that section will be indicated as well, next to the lightbulb icon 💡 .

4. Some sections also contain boilerplate text to use as a starting point. Review and modify the boilerplate content, if it exists, and add additional content as necessary to fulfill the requirement of each section. Use the Styles *H1 – H5* for section headers, *Figure Caption* for captions below figures, and *Table Caption* for captions above tables so that the Table of Contents, List of Figures, and List of Tables can be automatically updated.

5. Define acronyms at the first usage in parenthesis after the expanded term and add to the "List of Acronyms" section.

6. Delete the template title page, these instructions pages, all blue instructions, and the detailed instruction notes and examples that are identified with the lightbulb 💡 throughout the document.

7. Update the file name and file location in the document control panel by right-clicking the field, then select "Update Field."

8. Update the Headers and Footers to have the appropriate document title and version.

9. Delete the List of Tables or List of Figures if they do not contain any items.

10. Update the Table of Contents, List of Tables, and List of Figures by right-clicking and selecting "Update Field," and then select "Update entire table."

11. Have the document modified and reviewed as appropriate, and have each reviewer and modifier enter their name, organization, and date in the document control panel.

12. Submit the document for approval and go through the review/revision needed to obtain approval to finalize the document.

13. Repeat the review cycle and resubmit for approval as needed to obtain approval to finalize the document.

14. Enter the approver's name, organization, and date in the "Approved By" section of the document control panel.

15. Enter the approval date on the title page and in the footer throughout the document and update the revision history at the end of the document.

16. Remove the DRAFT watermark on the title page and the content pages by entering the Edit Header and Footer mode of the document and deleting the DRAFT image.

17. Print the document to PDF and review it outside of the Microsoft Word application.

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18. Submit the Word and PDF versions of the document as the final documents.

Template Revision History

Version	Date	Name	Description
1.0	11/12/2015	Derek Vollmer	Original template for compliance with Rule 940
1.1	6/1/2018	Clay Packard	Added content sections for a level 2 project for compliance with Agency for State Technology
2.0	6/7/2018	Josie Sanchez	Overhauled the template format to distinguish instructions, example, and boilerplate text for clarity and user-friendliness
2.0	07/10/2018	Victor Blue	Edits to improve treatment of user needs
2.0	07/19/2018	Victor Blue	Edits per 7/17 meeting discussion
2.0	07/19/2018	Steve Bahler	Review and comments on Victor Blue edits
2.0	07/25/2018	Victor Blue	Review and response to Steve Bahler edits
2.0	7/26/2018	Steve Petty	Editorial review; edits
2.0	02/13/2019	Victor Blue	Review and edits per FHWA response and FDOT 750-040-003 Procedure
2.0	02/22/2019	Steve Bahler	Review focusing on tailoring and consistency throughout the document
2.0	02/25/2019	Victor Blue	Revisions and EL features
2.0	03/14/2019	Schelley Cassidy	Editorial review; edits
2.0	07/17/2019	Victor Blue	Edits and final review
2.0	07/17/2019	Schelley Cassidy	Review and compile final
2.0	07/22/2019	Schelley Cassidy	Fix footer and compile final
2.1	02/20/2024	Steve Bahler	Formal update review cycle comments and edits
2.1	02/22/2024	Amber Greene	Edits
2.1	2/23/2024	Steve Bahler	Quality control and visual check

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Concept of Operations (ConOps) for [insert project name]

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Approval Date: [*Insert Approval Date*]

DOCUMENT CONTROL PANEL		
File Name:	[*insert project file name*]	
File Location:	[*insert project file URL*]	
Version Number:	[*insert version #*]	
	Name	**Date**
Created By:	[*insert author name, organization*]	[*insert creation date*]
Reviewed By:	[*insert reviewer name, organization*]	[*insert review date*]
Modified By:	[*insert modifier name, organization*]	[*insert modified date*]
Approved By:	[*insert approver name, organization*]	[*insert approval date*]

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List of Tables

List of Figures

Add figures as needed.

List of Acronyms and Abbreviations

AADT .... Average Annual Daily Traffic
AST .... Agency for State Technology
CCTV .... Closed Circuit Television
ConOps .... Concept of Operations
CFR ....Code of Federal Regulations
DMS ....Dynamic Message Sign
FAC...Florida Administrative Code
FCC ....Federal Communication Commission
FDOT .... Florida Department of Transportation
FHP ....Florida Highway Patrol
FHWA...Federal Highway Administration
FTE ....Florida's Turnpike Enterprise
HAR .... Highway Advisory Radio
ID ....User Need Identification Number
ITS.. Intelligent Transportation Systems
MOU ....Memorandum of Understanding
MVDS...Microwave Vehicle Detection System
PD&E...Project Development and Environment
PSEMP... Project Systems Engineering Management Plan
RCTO...Regional Concept for Transportation Operations
RFP .... Request for Proposals
RITSA... Regional ITS Architecture
RTVM..Requirements Traceability Verification Matrix
SEA...Systems Engineering Analysis
SELS .... Statewide Express Lanes Software
SFCS .... State of Florida Cybersecurity Standards
SITSA ....State ITS Architecture
SIS...Strategic Intermodal System
TMC.. Transportation Management Center
TSM&O .... Transportation Systems Management and Operations
TTS ....Travel Time System
URL.. Uniform Resource Locator

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1. Overview

☐ *Adjust the following sentence as appropriate for this ConOps.*

The first section of the Concept of Operations (ConOps) document provides six elements: system identification, purpose and audience, an overview of the document, a high-level overview of the proposed system, stakeholders, and references. These elements are described in the following sections.

> ♀ *The Federal Highway Administration (FHWA) requires Systems Engineering Analysis (SEA) for all Intelligent Transportation Systems (ITS) projects using federal funds, by FHWA Rule 940. The Florida Department of Transportation (FDOT) ensures compliance with Rule 940 by use of the FDOT Systems Engineering and Intelligent Transportation Systems (ITS) Architecture Procedure, 750-040-003.*
>
> ♀ *The ITS SEA should be on a scale commensurate with the project scope. This document recommends scaling the system engineering according to the risk and complexity evaluated with Procedure 750-040-003. Procedure 750-040-003 gives criteria for determining low- and high-risk projects, leaning conservatively toward determining high-risk status, and instructs preparers in the use of three FDOT forms in project development:*
>> o *FDOT Project Risk Assessment and Regulatory Compliance Checklist (FDOT Form 750-040-05) used to (a) assess if the project is low risk or high risk and (b) address all regulatory SE items in 23 Code of Federal Regulations (CFR), Part 940.11.*
>> o *FDOT Systems Engineering Project Checklist (FDOT Form 750-040-06) for all federally funded high-risk ITS projects.*
>> o *FDOT ITS Architecture Change Request Form (FDOT Form 750-040-04) for requesting changes to the Regional ITS Architecture (RITSA) or State ITS Architecture (SITSA).*
>
> ♀ *These forms should be completed prior to completion of this ConOps document, as applicable.*
>
> ♀ *If addressed at a scale commensurate with the project scope, using this template will result in a ConOps document that meets State of Florida Cybersecurity Standards (SFCS) .*
>
> ♀ *For managed lanes projects, either this template or a Managed Lanes ConOps template may be used. Contact the State Connected Mobility & Technologies Engineer about using a Managed Lanes ConOps template that prompts considerations specific to managed lanes projects.*
>
> ♀ *In addition, for managed lanes projects, if the project involves a direct connection between two managed lanes facilities, the following is considered:*
>> o *If the direct connection is a separate project distinct from the adjoining managed lanes facilities projects, then a ConOps document specific to the direct connection is required.*
>> o *If the direct connection is part of one of the adjoining managed lane projects, the connection is included in that project and references the ConOps document of the other managed lanes facility.*

1.1 Identification

Project Name: [*Insert the official project name*].
Financial Project Identification: [*Insert the financial project identification code, when it becomes available*].
Federal Aid Project Number: [*Insert the federal aid project number, when it becomes available*].

> ♀ *The Financial Project Identification Number and Federal Aid Project Number will generally not be authorized until after acceptance of the ConOps document by FHWA.*

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☐ *If a system's related ConOps documentation has been developed hierarchically, describe the position of this document relative to other ConOps documentation.*

1.2   Purpose and Intended Audience

The purpose of this ConOps document is:

☐ *Insert* description *of the purpose(s) of the specific ConOps.*

> ♀ *The purpose of this ConOps document depends on the scope and goals of the project. Generally, the purpose includes the following:*
> - o *To communicate user needs and the proposed system expectations.*
> - o *To communicate the system developer's understanding of the user needs and how the system will meet those needs.*
> - o *To build consensus among user groups or developers.*
> - o *To create the basis for requirements development and verification.*
> - o *To create the framework for system validation.*
> - o *To provide an overview for, or to be part of, a press release or information brochure.*

The intended audience for this ConOps document is:

☐ *Insert description of the audience for this specific ConOps.*

> ♀ *The audience may include the following types of stakeholders:*
> - o *Non-technical program management and sponsors.*
> - o *Technical management of participating agencies.*
> - o *System developers.*
> - o *Operations managers and operators.*
> - o *Others who fulfill special roles or oversight of the project.*
> *The audience may consist of people from multiple parties with varying levels of technical knowledge. Therefore, it is important that the document is written to clearly define technical terms and utilize layman's English for the majority of the text.*

1.3   Document Overview

☐ *Adjust the following sentence as appropriate for this ConOps.*

This ConOps document describes the existing system or operation, the shortcomings or unmet needs, changes that would address the needs, and the final system after the changes are made to the system or operation.

☐ *Briefly state how this document may be a special case.*

> ♀ *For managed lanes projects, either this template or a Managed Lanes ConOps template may be used. Contact the State Managed Lanes Engineer about using a Managed Lanes ConOps template that prompts considerations specific to managed lanes projects.*

1.4   High-Level System Overview

☐ *Briefly state the purpose of the proposed system or subsystem to which the ConOps applies.*

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⚲ *Optionally provide a high-level graphical overview of the system. This can be in the form of a physical layout diagram, a top-level functional block diagram, or some other type of diagram that depicts the system and its environment.*

⚲ *In addition, for managed lanes projects, reference the Managed Lanes Diagram as an aid for use throughout the ConOps. This diagram identifies the ingress, egress, tolling infrastructure (data and tolling gantries), and signage necessary to meet the requirements of the Managed Lanes design. Provide a copy in the Appendices.*

1.5   Stakeholders

☐ *Identify the stakeholders and users, which will include the project sponsor, system owner, user agencies, maintenance and support entities, evaluation and certification entities, law enforcement and first responders, and the operating centers or sites that will run the system.*

⚲ *Include the roles and responsibilities of the contact/department.*

Table 1: Stakeholders

Stakeholder	Project Role

1.6   Referenced Documentation

Provide a List of References or Bibliography of the documents used in developing this ConOps document:

☐ *Optionally, establish a centralized project repository to house and archive all project documentation and provide the location here (Show file path in the document control panel).*

☐ *Cite the documentation that is relevant to the project.*

⚲ *Documentation that might be cited includes, but is not limited to, project authorizations, relevant technical documentation, sources of design and communications standards, significant correspondence, documentation concerning related projects, risk analysis reports, feasibility studies, any earlier project ConOps or systems engineering documents, regional or corridor ITS Strategic Plan, Regional Concept for Transportation Operations (RCTO), and/or Regional ITS Architecture.*

⚲ *This section lists the publisher, document identification number, title, revision, and date, and the web address of documentation referenced in this document. This section should also identify a contact for all documents not available through standard channels.*

⚲ *Use a table as shown below (Table 2) or the Bibliography tool in Microsoft Word (an example appears below the table). Do not do both. Word requires entering the citation into References/Managed Sources.*

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Enter the citation information and type the Internet uniform resource locator (URL) address in the Publisher cell. Use the References/Style/APA. Then use the button in References/Bibliography to generate the list.

Table 2: Referenced Documentation

Document Name	ID, Revision, Date, etc.	Link, or Contact Info to Obtain
Project Management and Oversight under the Florida Administrative Code, Chapter 74-1 (FAC 74-1)	Accessed February 2019	https://www.flrules.org/gateway/ChapterHome.asp?Chapter=74-1.
Systems Engineering and ITS Architecture Procedure 750-040-003	04/19/2023	FDOT Forms Management/Procedures https://pdl.fdot.gov/api/procedures/downloadProcedure/750-040-003
23 Code of Federal Regulations (CFR) Part 940, Intelligent Transportation System Architecture and Standards – Final Rule (latest edition).	Federal Regulation	http://www.gpo.gov/fdsys/granule/CFR-2008-title23-vol1/CFR-2008-title23-vol1-part940.

References

Agency for State Technology. (Accessed February 2019). *Project Management and Oversight under Florida Administrative Code, Chapter 74-1 (FAC 74-1).* https://www.flrules.org/gateway/ChapterHome.asp?Chapter=74-1.

FDOT. (2019). *Systems Engineering and ITS Architecture Procedure 750-040-003.* FDOT Forms Management/Procedures: https://pdl.fdot.gov/api/procedures/downloadProcedure/750-040-003

FHWA. (Accessed 2015). *23 Code of Federal Regulations (CFR) Part 940, Intelligent Transportation System Architecture and Standards – Final Rule (latest edition).* http://www.gpo.gov/fdsys/granule/CFR-2008-title23-vol1/CFR-2008-title23-vol1-part940.

2. Current System Situation

2.1 Background, Objectives, and Scope

☐ *Provide an overview of the current system or situation, including the background, mission, objectives, and scope, as applicable.*

♀ In addition, for managed lanes projects, *reference existing FDOT statewide policies and guidelines for planning, design, and operations of managed lanes.*

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2.2 Operational Constraints

☐ *Describe the limitations of the operational characteristics of the system.*

🔆 *This description can be tailored depending on the complexity and risk of the proposed project. If limited scope and complexity, it is only necessary to mention the limitations the project will address. This could include limits on hours of operation, hardware limitations, or resource limitations. This should include policies that are imposed on the operation that impact how the system is or will be designed.*

🔆 *For managed lanes projects, examples include:*
   o *Capacity: bottleneck locations, average annual daily traffic (AADT), seasonal characteristics, throughput, and travel time.*
   o *Regional: summarize key findings for the region in the Managed Lanes Regional Concept of Transportation Operations (RCTO) including jurisdictional constructions for operations and maintenance, interface with transit services, and planned improvements.*
   o *TSM&O: identify any constraints on operations such as the limitation to the integration of existing systems and devices.*

2.3 Description of the Current System or Situation

☐ *Provide a thorough description of the current system*

🔆 *Details for a description of the current system should be tailored depending on the risk and complexity of the proposed project for which this ConOps document is being developed. For example, if this ConOps document will impact only a limited portion of the existing systems, the description can be limited to the portions of the current systems that will be impacted by the new or modified systems. Description elements may include operational characteristics, major system components, component interconnections, external system interfaces, current system functions, diagrams illustrating inputs, outputs, and data flows, such as intelligent transportation systems (ITS) architecture market package diagrams, system costs, performance statistics, any other descriptors of importance or interest.*

🔆 *In addition, for managed lanes projects, provide managed lanes diagrams and functional schematics describing the existing system. Identify current toll system applications, such as toll communications and toll payment method, including how tolls are determined for specific user trips. Describe the existing ITS field devices within the project limits, including the TMC and district responsible for operation and maintenance. Describe the CCTV cameras, dynamic message signs (DMSs), microwave vehicle detection systems (MVDSs), Travel Time System (TTS), and any other devices present such as Highway Advisory Radio (HAR) or Radar Speed Display. Identify software and the version being used by a TMC, district, private operator, or Florida's Turnpike Enterprise (FTE). Identify existing maintenance contracts, including toll systems maintenance. Describe incident management measures, Road Ranger practices, emergency vehicle access, and lane and speed enforcement. Toll-related customer services are handled by FTE's Consolidated Customer Service System. Assess how current customer service activities (non-FTE) are carried out, including customer service logs related to inquiries and how they are tracked to completion. Address current coordination between the managed lane operator (e.g., FDOT district, toll authority, or private operator) and FTE in terms of customer service. Include any multi-modal corridor assessment, land use and travel characteristics, such as trip information and traffic volume, and transit ridership.*

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2.4   User Class Profiles

☐ *List the agencies or organizations that are involved with, impacted by, or interested in the system. Specify their roles, responsibilities, and contractual relationship, including procurement methods.*

  ♀ *User classes are based on the types of users of the system, according to common responsibilities, skill levels, work activities, or the ways they interact with the system. Include in the list of user classes the distinguishing characteristics of each.*

☐ *List and describe how agencies, organizations, and other actors fit into user classes.*

  ♀ *User classes are based on the types of users of the system, according to common responsibilities, skill levels, work activities, or the ways they interact with the system. Include in the list of user classes the distinguishing characteristics of each.*

  ♀ *For example, a supervisor user class may have certain capabilities or responsibilities that an operator class may not have, and the ConOps document should describe the roles, capabilities, responsibilities, and interactions of each. User class roles may already be well defined in Standard Operating Procedures but need not be so detailed in the ConOps document.*

2.5   Support Environment

☐ *Describe how the current system is supported and maintained.*

  ♀ *For example, this section describes the agents responsible for system operations and maintenance and could include agents who own and operate hardware and software, policies and procedures related to the system operation, policies, procedures, and criteria related to system or equipment replacement. If applicable, identify whether a vendor under contract maintains the system and the type of service agreement. For lower risk and complexity projects, this section can be tailored to only mention portions of the support environment that will be impacted by the project.*

3.   Change Justification

3.1   Justification for Changes

☐ *Introduce the reasons for the proposed system.*

  ♀ *Change justification should be tailored depending on the scope, risk, and complexity of the proposed change. Typical reasons for change may include new or modified user needs, missions, or objectives; problems, dependencies, or limitations of the current system or operation; additional benefits that could be achieved; or other motivating factors.*

  ♀ *In addition, for managed lanes projects, cite the reasons for developing the proposed managed lanes project, based on Project Development and Environment (PD&E) purpose and need, Master Plan studies, and RCTO documentation. Provide justification for the implementation of complementary TSM&O strategies based on FDOT guidance (e.g., warrants for ramp signaling), if applicable.*

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⚲ *If the managed lanes project is located on a Strategic Intermodal System (SIS) corridor, identify intermodal, multi-modal, and freight-related interfaces for the project. Identify goals and objectives for the managed lanes and other TSM&O operations, derived from the RCTO and/or PD&E study.*

3.2 User Needs

☐ *Identify, in the table below, the user needs that the project aims to meet or accomplish. Users are stakeholders, such as the system owner/operator, law enforcement, first responders, transit agencies, and drivers; each having its own project-related needs.*

⚲ *Defining user needs is an essential first step to determine what the users aim to accomplish with the system. In the end, the system validation step will determine whether the project has succeeded in meeting the users' needs. Project requirements describe what the system will do and be in order to meet user needs. Requirements enable the construction of a proposed system that will meet user needs.*

⚲ *List User Needs in Table 3 for the various stakeholders. The User Need Identification Number (ID), UNxxx, will be used in the Requirements Traceability Verification Matrix (RTVM) for reference of the need. User needs will help to identify:*
  - o *Requirements that will follow in the Requirements document and the RTVM.*
  - o *Performance criteria that will be used to evaluate the project's success in the System Validation Plan.*

⚲ *Also, note user needs that have changed from any earlier versions of the project and explain the need for the change. User needs should be limited to those which the project is expected to meet.*

Table 3: User Needs

User Need ID	User	Need
UN001		
UN002		
UN003		

⚲ *For large scope and complex projects, it is appropriate to identify performance measures and goals for user needs. For example, if the user needs to improve response to traffic incidents, one possible performance measure could be to reduce the time needed to verify the location, type, and severity of the incident. The performance measure could be "incident verification time," and the goal could be "20% decrease" or "under one minute on average." The performance measures and goals will be used to create the System Validation Plan. Performance Measures are to be expanded upon in Section 7.4, "Performance Measures for System Validation."*

4. Concepts for the Proposed System

4.1 Background, Objectives, and Scope

☐ *Provide an overview of the new or modified system, including the following, as applicable:*

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- o *Background*
- o *Mission, objectives, and/or goals*
- o *Scope*

♀ *Refer to any prior planning documents, Statewide or Regional ITS Architecture, federal grant application, or overarching system ConOps document that identify this improvement.*

♀ *Distinguish any differences with Section 3.1, which are justifications for changes, in case some changes are not to be included or deferred to future projects.*

♀ *In addition, for managed lanes projects, the managed lanes goal is for the average travel speed in the managed lanes be 45 miles per hour (mph) or greater.*

4.2   Operational Policies and Constraints

☐ *Describe the operational policies and constraints that apply to the proposed system.*

♀ *This includes, but is not limited to, such elements as hours of operation, staffing, space, and hardware and software constraints.*

♀ *Reference is made to any prior ConOps or planning documents developed for a system that is being revised, enhanced, or expanded and which explain the operational policy and constraint issues.*

♀ *In addition, for managed lanes projects, identify the business rules, operational constraints, and system configuration constraints. For example, as managed lanes deployments expand across the State of Florida, the FDOT is establishing guidance and policy decisions that will affect project operations. The guidance and policy decisions described in this subsection should establish which business rules are applicable or need to be developed. Existing guidance and policy decisions are contained in the following documents at a minimum:*
- *Florida Administrative Code (FAC) 14-100.003*
- *FDOT Managed Lanes Handbook*

In addition, list studies, technical memoranda, RCTO, Standard Operating Procedures, and other references that define the regional or corridor business rules and describe the conduct of toll operations under various scenarios including failure conditions. Corridor-specific business rules may cover operating models, special cases associated with route closures, system malfunctions, sensor failures, telecommunications network issues, setup of Statewide Express Lanes Software (SELS), changes in operating mode, etc.

If the pertinent documents define the business rules associated with the above conditions (and other conditions not shown here), it is not necessary to repeat these rules in this or other sections of the Managed Lanes ConOps document, except where specific rules are relevant to operational conditions or scenarios described within the document.

Describe system physical and operational limitations or other situations that could affect the operations of the managed lanes system, such as geometric limitations, a possible shortfall of funding for operations and maintenance exclusively from toll revenues, and operations during setup and transition to new toll facilities.

If these have been previously described in a prior planning or development document (e.g., RCTO, traffic, and revenue analysis) the above constraints may be briefly summarized, and the document describing the

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constraints should be referenced. Otherwise, if these are being described for the first time, sufficient detail should be provided to provide physical and operational constraints and their potential implications.

4.3   Description of the Proposed System

☐ *Provide a thorough description of the proposed system.*

♀ *This description should be tailored and provide details consistent with the scope, complexity, and risk of the project. FDOT Project Risk Assessment and Regulatory Compliance Checklist (FDOT Form 750-040-05) identifies high-risk project elements such as software development and innovative technologies. This description should describe systems and functional requirements, as applicable, for the following elements:*
   o *Conformity and compatibility to the statewide ITS architecture and/or regional ITS architectures .*
   o *Portions of the statewide and/or regional ITS architecture being implemented.*
      ▪ *Major system components and the interconnections among these components.*
      ▪ *Interfaces to external systems or procedures.*
   o *Operational environment and its characteristics.*
   o *Capabilities or functions of the proposed system.*
   o *Relationship to other systems.*
   o *Charts and accompanying descriptions that depict inputs, outputs, data flows, and manual and automated processes, so that the proposed system or situation is sufficiently understood from the user's point of view.*
   o *Cost of system operations.*
   o *Performance characteristics.*
   o *Quality attributes such as reliability, accuracy, availability, expandability, flexibility, interoperability, maintainability, portability, reusability, supportability, survivability, and usability.*
   o *Provisions for safety, security, privacy, integrity, and continuity of operations in emergencies.*
   o *Compliance with State of Florida Cybersecurity Standards (SFCS).*

♀ *Because the purpose of this section is to describe the proposed system and how it should operate, it is important that the description of the system be simple and clear enough that all intended readers can fully understand. It is important to keep in mind that the ConOps document should be written in layman's terminology. Graphics and pictorial tools should be used wherever possible. Useful graphical tools may include but are not limited to, the contract work breakdown structure, sequence or activity charts, functional block diagrams, and relationship diagrams.*

♀ *The description of the operational environment should identify the facilities, equipment, computing hardware, software, personnel, and operational procedures needed to operate the proposed system. This description should be as detailed as necessary to give the readers an understanding of the numbers, versions, capacity, etc., of the operational equipment to be used. Do not include detailed technical requirements or design details, but rather describe the functionality of the equipment and operational features (functional requirements).*

♀ *The author(s) of a ConOps document should organize the information in this section as appropriate to the proposed system, aiming for a clear description. If parts of the description are excessively large, they can be included in an appendix or incorporated by reference. An example of a material that might be included in an appendix would be a data dictionary. An example of material to be included by reference might be a detailed operation, guidance, or policy manual.*

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💡 *For large scope, complex, or high-risk projects, use Table 4 below to identify "Change Types" and instructions in the "Change" cells or use any other method that expresses its intent. Each change type may have one instance, multiple instances, or none. Prioritize according to features that are essential, desirable, optional, and considered but not included, or prioritize them according to the scale 0 to 10, where 0 means the change was considered but not included and 10 means essential.*

💡 *Only describe changes planned with the project.*

Table 4: Desired Changes

Change Type	Change	Priority
Capability	*(i.e., functions and features to be added, deleted, or modified)*	
System Processing	*(i.e., changes to data uses, such as for communications, performance measures, etc.)*	
Interface	*(i.e., changes to the system interfaces)*	
Personnel	*(i.e., changes in personnel caused by new requirements)*	
Environment	*(i.e., changes in the operational environment)*	
Operations	*(i.e., changes in the operational environment)*	
Support	*(i.e., changes in the support or maintenance requirements)*	
Other	*(i.e., changes in the support or maintenance requirements)*	
Considered	*(i.e., significant changes that were assessed but not included)*	

💡 *In addition, for managed lanes projects, provide a managed lanes diagram and cite applicable reference documents (e.g., RCTO, corridor-level ConOps document, or plans). Identify the separation type (e.g., buffer separation with managed lanes markers, wide buffer, barrier, or grade-separated) and if the managed lanes are reversible or directional. Describe how the Managed Lanes project is connected to other regional managed lanes facilities (existing and/or future). Include any other Transportation Systems Management and Operations (TSM&O) systems, such as new or existing ramp signals, variable speed limit, and lane control systems and how they are impacted by the managed lane facility or influence the operation of the facility. Identify necessary SELS and SunGuide modifications. These may be presented in a separate subsidiary ConOps document if changes to the current regional installation are significant, or if a new installation is required. Provide graphics showing the relationship between SELS, SunGuide and the TMC's traveler information systems, external non-FDOT traffic control systems with communication links to FDOT, the FTE toll communications, and other managed lanes facilities operated by more than one district. If proposing a non-standard deployment of the managed press lanes operational system's dynamic message signs, vehicle detection, or cameras, describe their functions.*

4.4   Modes of Operation

☐ *Describe the proposed system's various modes of operation.*

💡 *Examples of modes of operation include standard, after-hours, maintenance, diagnostic, emergency, training, fail-safe, or backup. Modes could also address the degree to which an emerging technology or innovative system or subsystem will be automated with limited or no human or operator input.*

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♀ *In addition, for managed lanes projects, describe the overall framework for incident management activities, including action items relative to developing policies and procedures. Include emergency access between general use or general toll lanes and managed lanes, access ramps, break-in between managed lane markers, emergency access points along barrier-separated facilities, crossovers, staging, and investigation areas. Include incident response from all viable sources and towing capabilities. Describe Florida Highway Patrol (FHP) enforcement and response in the tolled and crossover environment. Describe the toll signing scheme with a project toll diagram to be agreed to between the operating FDOT district and FTE prior to inclusion.*

4.5   User Involvement and Interaction

☐ *Describe the users and the way they interact with the system.*

♀ *The level of detail in this section should be tailored based on the scope, complexity, and risk of the project. If user interaction is not changing from the way users currently interact with the system, it is sufficient to state that user interaction is unchanged. Types of user interaction may include:*
   o *The identification of the users, organizational structure, skill levels, roles, and work activities.*
   o *Methods of interacting with the system.*
   o *Purposes for interaction with the system ranging from active control, to adjusting parameters, to monitoring, etc.*
   o *Interactions among users with each other, per project architecture data flows.*
   o *TMC and operator use of the system in different modes of operation.*
   o *Other methods of involvement.*

♀ *In addition, for managed lanes projects, include a Roles and Responsibility Matrix summarizing functions, roles, and responsibilities for implementation, operations, and maintenance of the managed lanes system. The district and FTE project managers jointly develop this matrix.*

4.6   Assumptions and Constraints

☐ *Describe assumptions or constraints applicable to the previously identified changes that may affect the system.*

♀ *For large scope, higher-risk projects, describe assumptions and constraints that will affect users during development, implementation, burn-in, and operation of the new or modified system. This may include system functionality (e.g., range of camera view), inclusion in the statewide procurement list, Federal Communication Commission (FCC) licensing, or any other assumptions or constraining factors. If there are no known assumptions or constraints, the section is not needed.*

♀ *In addition, for managed lanes projects, assumptions and constraints may include:*
   o *New policies and procedures required for traffic and incident management coordination, maintenance, demand management activities, etc.*
   o *Geometric limitations such as shoulder width, ramp geometrics, number of managed lanes (only one managed lane), separation type, and other elements that influence system performance.*
   o *Additional staff and budget resources needed vs. the amount that can be budgeted or acquired.*
   o *Performance requirements used for developing and operating the system.*

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- o *Definition of interagency agreements, including memoranda of understanding (MOUs) and Mutual Aid agreements, new agreements needed, existing agreements that are to remain in force, or modifications that may be needed to existing agreements.*
- o *Products or technologies that may be used based on inclusion in the FDOT Approved Products List.*
- o *Current technologies, interfaces, or standards in the region to be supported.*
- o *Operational hours and staffing limitations.*
- o *Construction and work zone limitations.*
- o *Policy/privacy requirements are relative to video imaging or data sharing.*
- o *Public outreach and publicity need relative to new travel patterns or operational policies.*
- o *Compatibility and incompatibility are relative to access between Managed Lanes facilities, including truck and carpool regulations, HazMat, and other freight operations, etc.*

4.7 Risks

☐ *List any risks identified with the proposed changes to the system or with the management of the schedule or budget. If the project is complex or has high risk, evaluate the risks, and prioritize their importance. A sample risk register is shown below.*

Table 5: Risk Register

Risk #	Risk Owner	Description of Risk and Impact	Likelihood (1-4)	Impact (1-4)	Rating (L + I) (2-8)	Mitigation Strategy	Status
1							
2							
3							

♀ *This section is only required for projects which were initially assessed as higher risk prior to starting the ConOps document development. Table 5 should address high risk features identified in the FDOT Project Risk Assessment and Regulatory Compliance Checklist plus additional risks identified through Stakeholder engagement during development of the ConOps.*

♀ *The table uses estimates of likelihood (1-4) and impact (1-4) of the risk. When added, they become a risk rating (2-8), which can be used to rank the risks. Alternatively, qualitative measures can be used (low-medium-high).*

♀ *Among other project risks, cybersecurity risks should be addressed to meet State of Florida Cybersecurity Standards (SFCS) .*

4.8 Support Environment

☐ *Document the agency support environment and maintenance concepts for the proposed system.*

♀ *This section should describe the support agency or agencies, facilities, equipment, support software, repair or replacement criteria, maintenance levels and cycles, storage, distribution, and supply methods.*

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♀   *In addition, for managed lane projects, identify software versions proposed for use by the TMC, district, private operator, or FTE. Identify any future maintenance contracts or agreements needed, including the toll systems maintenance.*

5.   Operational Scenarios

☐   *Describe operational scenarios illustrating how the proposed system should operate and interact with its external interfaces under normal and complex sets of circumstances. Describe how users – Regional and/or Local Agency TMC operators, drivers, police, maintainers, etc. – interact with the system and how they will negotiate the use of the system or travel through the system in normal use and in the most difficult circumstances they may encounter. Efforts should be made to show that the system addresses any operational, maintenance, or failure situation that could reasonably arise.*

♀   *A scenario is a step-by-step description of how the proposed system should operate and interact with its users and its external interfaces under a given set of circumstances. Scenarios are written in layman's language and should be as nontechnical as possible. Scenarios should be described in a manner that will allow readers to walk through them and gain an understanding of how all the various parts of the proposed system function and interact. The scenarios tie together all parts of the system, users, and other entities by describing how they interact. Scenarios may also be used to describe what the system should not do.*

Scenarios should be structured so that each describes a specific operational sequence that illustrates the role of the system, and its interactions with users and other interfacing systems. Operational scenarios should be described for all operational modes of the proposed system. Scenarios should encompass a set of situations from normal to complex. Each scenario should include events, actions, inputs, information, and interactions as appropriate to provide a comprehensive understanding of the operational aspects of the proposed system.

It may be necessary to develop several variations of each scenario, including one for normal operation, one for exception handling, one for degraded mode operation, maintenance, etc.

Scenarios play several important roles. The first is to bind together all the individual parts of a system into a comprehensible whole. Scenarios help the readers of a ConOps document understand how all the pieces interact to provide operational capabilities. The second role of scenarios is to provide readers with operational details for the proposed system; this enables them to understand user roles, how the system should operate, and the various operational features to be provided.

In addition, scenarios can serve as the basis for the first draft of a user's manual, standard operating procedures, and as the basis for developing acceptance test plans. The scenarios are also useful for the FDOT and the developer to use when validating that the system design satisfies user needs and expectations as part of a Systems Validation Plan.

Creative writing and graphics should be employed to make scenarios interesting and easy to read. A good ConOps document will have a storyline that features different characters that relate to the situation and environment where the proposed system is being contemplated. The storyline will have a common thread that weaves through all the characters as they interact with the system. Storylines should be selected that highlight key system features based on the initial understanding of the problem

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to be solved, and the user needs so that readers can understand the consequences of their needs when they are translated to a system that meets those needs.

Scenarios are a vital component of a ConOps document and, therefore, should receive substantial emphasis. The number of scenarios and level of detail specified will be proportional to the complexity and risk of the project.

5.1 Normal Operations Scenario(s)

☐ *Describe and summarize the normal operations scenarios from the perspective of the various users.*

- ♀ *This section will serve as a baseline for normal systems operations and the state to which maintenance and failure operations should return when their conditions end.*

- ♀ *Organize the scenarios as needed in narrative and/or tabular form depending on the complexity of the project.*

- ♀ *Describe how operators and users will use the system during normal operations to negotiate safe and efficient movement and what difficulties they may encounter.*

5.2 Maintenance Scenario(s)

☐ *Describe and summarize the maintenance operations scenarios from the perspective of the various users.*

- ♀ *Determine the kinds of operational events that may occur due to system maintenance.*

- ♀ *Organize the scenarios as needed in narrative and/or tabular form depending on the complexity of the project.*

- ♀ *Describe how operators and users will use the system during maintenance operations to negotiate safe and efficient movement and what difficulties they may encounter.*

5.3 Failure Scenario(s)

☐ *Describe and summarize the failure or degraded operations scenarios from the perspective of the various users.*

- ♀ *Determine the kinds of operational events that may occur due to system failure or degradation.*

- ♀ *Organize the scenarios as needed in narrative and/or tabular form, depending on the complexity of the project.*

- ♀ *Describe how operators and users will use the system during failure or degraded operations to negotiate safe and efficient movement and what difficulties they may encounter.*

- ♀ *In addition, for managed lanes projects, examine operations during a crash in (a) the toll lane(s) and (b) the general-purpose lanes.*

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6.   Summary of Impacts

☐ *Describe and summarize the operational impacts of the proposed system from the users' perspectives.*

 🔴 *This section can also include a description of the temporary impacts that can be realized during the development, installation, or training periods. This information is provided to allow all affected departments to prepare for the changes that will be brought about by the new system, and to allow the FDOT divisions/departments or other agencies to plan for the impacts. Impacts can be categorized into several areas, including developmental impacts, organizational impacts, and operational impacts. Developmental impacts relate to* the *disruption of ongoing activities or planning for new systems. Organizational impacts include changes in staffing or personnel coverage. Operational impacts include time demands on operators and real-time interaction conflicts with other systems.*

 🔴 *Even though most ITS projects are programmatical categorical exclusions from an environmental perspective, some environmental, endangered species, and/or cultural resource analyses may still be required. This section could identify project elements that will require either new above ground (poles) or below ground (poles or conduit) construction. Actual environmental documentation will be performed as a separate activity.*

 🔴 *In addition, for managed lanes projects, new toll operations will increase workloads of TMC operations, incident responders, ITS maintenance, and roadway maintenance resources. Subsequently, this will require additional training for the system users. This additional workload will require additional funding for the operation and maintenance of the proposed system.*

7.   Analysis of the Proposed System

7.1   Alternatives

☐ *Summarize the major operational alternatives considered, the trade-offs among them, and the rationale for the decisions reached.*

 🔴 *Only include this analysis for large scale high-risk projects. In the context of a ConOps document, alternatives are operational alternatives and not design alternatives, except to the extent that design alternatives may be limited by the operational capabilities desired in the new system. This information can be useful in determining, now and later, whether a given approach was analyzed and evaluated, or why an approach or solution was rejected.*

7.2   Cost, Schedule, and Procurement Options

☐ *Summarize cost, schedule, and procurement options:*

 🔴 *Only include this analysis for large scale, high-risk projects. A Project Systems Engineering Management Plan will cover these in more detail and can be referenced in the ConOps to avoid duplication of content.*

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       o   *Describe the proposed system's rough order of magnitude capital cost, including design, construction, integration, configuration, acceptance testing, evaluation, and annual operating and maintenance costs with assumptions made.*

       o   *Include an approximate schedule for the development based on months after contract award.*

       o   *List the procurement options for accomplishing the desired changes.*

7.3   Systems Engineering Plan

☐ *Describe how the remaining systems engineering process will use the ConOps.*
- ♀ *Include at least:*
  - o *The Project Systems Engineering Management Plan (PSEMP).*
  - o *The RTVM that will use the user needs from Section 3.2.*
  - o *The Systems Verification Plan.*
  - o *The design process that will use the information in Section 4, "Concepts for the Proposed System."*
  - o *The Systems Validation Plan that will take account of user needs and performance measures* are *developed in Section 3.2 and scenarios of Section 5.*

7.4   Performance Measurement for System Validation

☐ *Expand on the User Needs discussion in Section 3.2 to identify performance measures that will be needed to validate the success of the project in meeting goals and user needs. Identify data that may need to be collected before and after the system is implemented so that a before-after analysis can be performed.*

♀ *The measures referred to in this section are Measures of Effectiveness that validate the project and its effectiveness in meeting user needs, rather than Measures of Performance that verify that equipment meets requirements in testing. Both Measures of Effectiveness and Measures of Performance are called Performance Measures, so care must be taken to use these terms correctly.*

♀ *The Measures of Effectiveness may be further refined in a System Validation Plan (as needed per risk and complexity) that will be based on this ConOps document. The System Validation Plan would give additional details of the process and analysis. The validation step differs from the verification step, which involves the testing of equipment and systems before the system begins service. System validation often involves collecting both before data and after data, for comparison. Some data may be available from a feasibility study if one was performed and was recent enough for before-after analysis. Before data may be available through existing traffic management center (TMC) operations without additional expense or may require the installation of temporary data collection devices (e.g., Closed-circuit television (CCTV) cameras and speed detectors). Adequate measures to collect before and after data require planning at the ConOps document stage, so data collection requirements are included in the Requirements Traceability Verification Matrix (RTVM) and request for proposals (RFP), if being done by a contractor. System validation data collection should not be tagged onto a contract as an afterthought.*

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♀   *In addition, for managed lanes projects, describe the performance measures, data, and tools for periodic analysis of the proposed system. At a minimum, these measures should match all statewide reported managed lanes performance measures, as well as district and FTE, reported performance measures for existing toll facilities. Other measures may be appropriate depending on whether the facility uses reversible lane operations, whether it connects into other managed lane facilities as part of a regional network, as well as whether there are significant seasonal variations in traffic. For many of the above measures, current performance reports may already be generated using SELS or other software packages, but new or modified reports may be needed depending on the performance criteria used. Any software changes required to meet said new performance measures should be introduced and described within the appropriate section(s) herein as well as following all necessary SELS Change Management Team protocols.*

8.   Notes

☐   *Replace the boilerplate below with notes if applicable:*

This section will be annotated, as needed, with changes to the approved ConOps document made over the course of the project. There are no notes at this time.

♀   *This section should contain any additional information that will aid in understanding the ConOps document. If there are no notes, this section should still be included with the notation that there are no notes at this time. Subsequent revisions of the ConOps document usually require that notes be added to date and explain the revisions.*

9.   Appendices

☐   *Add appendices of larger, related content or leave a note to state there are no Appendices at this time.*

♀   *To facilitate the ConOps document's ease of use and maintenance, some information may be placed in appendices to the document. Each appendix should be referenced in the main body of the document where that information would normally have been provided. Appendices may be bound as separate documents for easier handling.*

♀   *In addition, for managed lanes projects, appendices may include operational analysis identifying tolling strategies and rates; business rules; administrative rules and regulations for toll exemptions; system planning bulletins and directives; toll calculation procedures in the event of closures, closure recovery, or other specific incidents; incident management plan; and/or, enforcement plan, among others.*

10.   Glossary

☐   *Add important terms used in the ConOps document to this glossary or remove this section.*

♀   *The inclusion of a clear and concise compilation of the definitions and terms used in the ConOps document that may be unfamiliar to readers is important. A glossary should be maintained and updated during the ConOps document's concept analysis and development processes. To avoid unnecessary work due to misinterpretations, all definitions should be reviewed and agreed upon by all involved parties. Definitions used in the Glossary should match those used in the text.*

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- *Update the Document Revision History below with changes upon document approval:*

DOCUMENT REVISION HISTORY				
Version Number	**Approved Date**	**Description of Change(s)**		**Created/ Modified By**

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