



INTEGRATED PROJECT DELIVERY (IPD)

Project Delivery Network (PDN)

Version 1.0
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Preface

The NCDOT Project Delivery Network (PDN) is a scalable support document for those involved with delivery and management of projects. This preface answers some of the typical questions regarding purpose and use of the PDN, alongside defining the common terms used throughout.

What is the purpose of the PDN?

The PDN was developed to provide consistency and transparency throughout the project delivery process, enabling project teams to improve reliability and efficiency. The PDN outlines the stages, activities, tasks, deliverables, and references to accomplish these ends.

Specifically, the PDN is to assist technical team members, led by a Project Manager (whether a project is led by NCDOT or a private engineering firm [PEF]), to realize the following:

- Maintain consistency via a logical progression of activities throughout the project initiation, environmental, and design phases.
- Streamline processes and procedures throughout the project development process.
- Identify team integration points to promote multidisciplinary collaboration at each stage of the process.
- Provide a systematic quality control/quality assurance (QC/QA) process.
- Define key project deliverables and activities to build an MS Project schedule that a Project Manager and project team use to advance project delivery.

How is a project delivered within the PDN?

The PDN takes a project through the following five stages (*with each stage defined in terms of high-level goals that can be accomplished at any point in the stage*):

Stage 1: Project Initiation

Goal: *Develop an initial vision sufficiently to commence the environmental and design process.*

Stage 2: Alignment Defined

Goal: *Complete all analyses and design work to establish a horizontal and vertical roadway alignment, complete the environmental document, and progress design to develop the field inspection plan set.*

Stage 3: Plan-in-Hand

Goal: *Complete all design and finalize the right-of-way package to continue acquisition and relocation activities.*

PDN Common Terms

Stage: A major step of the project development process that concludes with a milestone.

Activity: The overall action(s) completed by a technical Unit to move to the next stage of the PDN. An activity is represented by an identifier (e.g., 1FS1, 2HY2) as shown on the PDN Activity Diagram (discussed further below).

Task: The step(s) and process(es) necessary to complete an activity.

Detail: The task description to explain what and why of a task.

PDN Activity Diagram: A “map” of all PDN’s activities that could be used to deliver a project.

Stage 4: Plans, Specifications, & Estimate (PS&E)

Goal: *Finalize all plans, specifications, and estimates to be packaged for letting.*

Stage 5: Letting and Post-Letting (**In development**)

Goal: *Prepare the project's designs, plans, and documents for advertisement and complete necessary post-letting activities.*

Each stage concludes with a milestone to assess the status of the project and review the project schedule and progression (see diamonds in the PDN Activity Diagram).

What role does coordination play in the PDN?

Coordination is essential for project success. Led by the Project Manager, team integration and communication among disciplines on the project team and with outside stakeholders and consultants are necessary to deliver a successful project that meets project goals on schedule and within budget. One of the foundational elements of the PDN is that it can be used by multiple audiences (Divisions, Technical Units, private engineering firms [PEFs], or contractors) to understand the roles and responsibilities of each team member.

Where will the project documentation be stored?

All documents related to the project will be stored electronically on the applicable project SharePoint site, following SharePoint Guidance and naming conventions. All final key documents for the project will be saved using the ATLAS Workbench to ensure they are tagged and named appropriately and can be found easily moving forward. All NCDOT and/or private engineering firm (PEF) team members will have access to the project SharePoint site. Team members can choose to be notified when documents pertaining to their tasks are uploaded.

How is this PDN updated?

The PDN is intended to be dynamic and continually improved upon, and over time, the processes described herein are going to be updated to ensure process refinement and best practices. As such, NCDOT encourages suggestions and comments from users to improve the process or identify opportunities for further acceleration or streamlining. The Integrated Project Delivery (IPD) team has set up a formal process for submitting comments and suggestions as questions, markups, or live edits in a form linked near the location this PDN is available for download.

Submitted comments will be reviewed on a regular basis for incorporation into the document. While an update to the PDN can take place at any time depending on the critical nature of the change, updates are planned twice for this first year of publication. After that, the IPD team will send out an annual request to each discipline area for review of their portion of the document. This will also be an opportunity for all users to review and update any other processes.

How are project stages and activities presented in the PDN?

Each stage consists of multiple activities, consisting of five parts:

- 1) Activity identifier and brief heading (defined further below)
- 2) Brief overview of the activity
- 3) Reference list and links to commonly used documents that guide a user on completing the activity
- 4) Responsibility table that list all deliverables that may need to be developed/completed (defined further below)
- 5) Details for each task that provide a further description on how to apply the steps, processes, and reference materials to complete the activity

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Activity Identifier

2CS1 Prepare Initial Design Estimates

Overview

Develop the construction cost estimates for the Alignment Defined Stage, occurring just prior to the Field Inspection Review Meeting.

References

- [Construction Estimating Guide](#)
- [Preliminary Estimate Request Form](#)

Responsibility Table

Deliverables

Deliverable	Task	Responsible Party	
		Activity Leader	Additional Support
		Preliminary Estimates Section	Project Manager
Construction Cost Estimate	▪ Provide Design Stage Quantities	X	X
	▪ Review Estimate	X	X
Cost Verification Letter	▪ Request Cost Verification Letter	X	X

Task and Details

Provide Design Stage Quantities

The Project Manager provides the most current design stage quantities for the selected alternative to the Preliminary Estimates Section on the Preliminary Estimate Request Form.

Figure 1: Example PDN Activity Breakdown

Activity Identifier

As identified on **Figure 1**, each activity has a unique “Activity Identifier” for tracking purposes in MS Project and for scoping purposes as the project evolves. The activity identifiers consist of the following:

- (Stage Number) (Unit Designation) (Identifying Number)

Using **Figure 1** as an example, the identifier is “2CS1”.

- The “2” indicates the activity is to be completed in the Alignment Defined Stage (Stage 2).
- The “CS” identifies the Contract Standards & Development Unit as the lead for this activity.
- The “1” represents this as the first activity for that Unit in Stage 2.

Responsibility Table

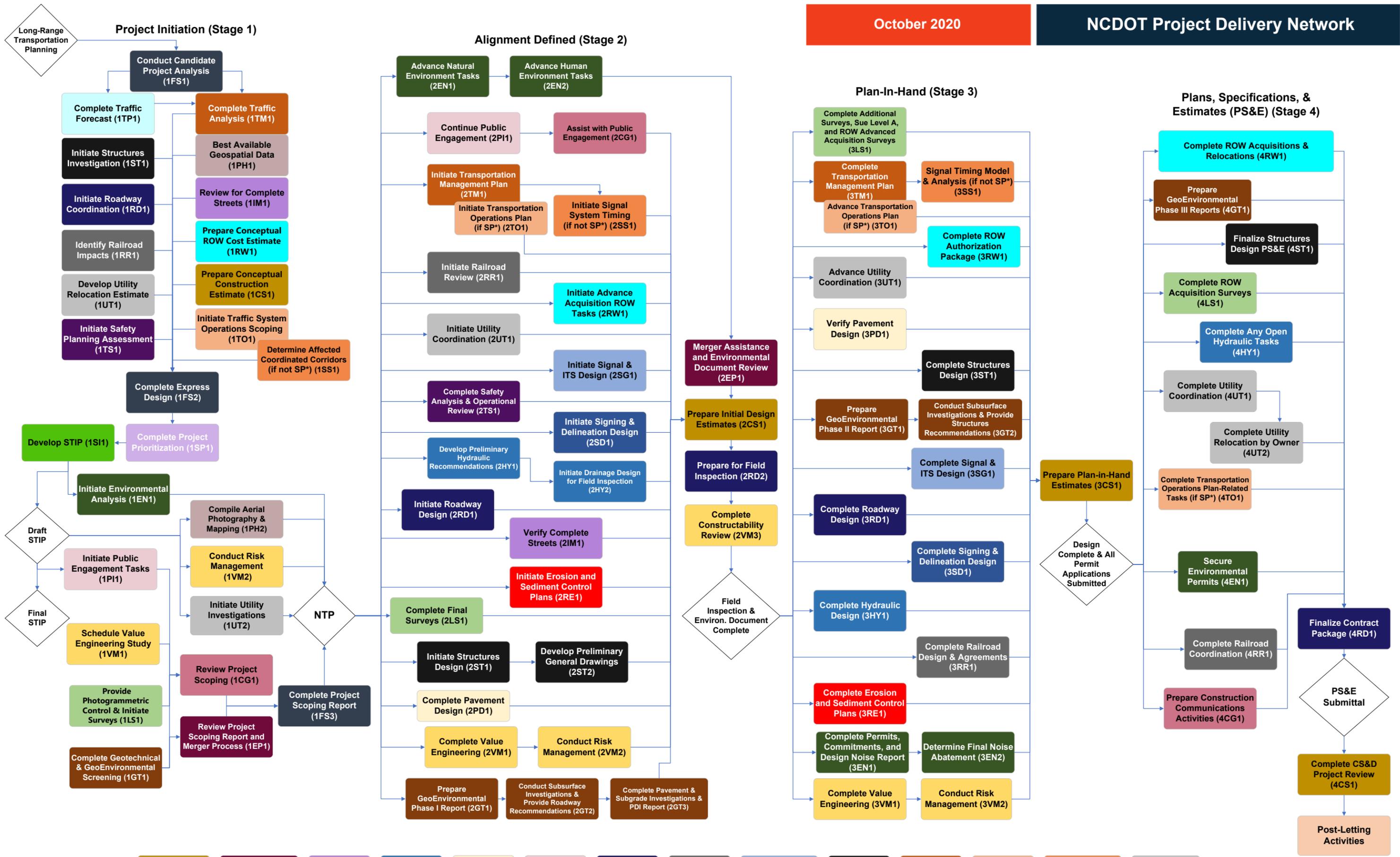
The Responsibility Table for each activity identifies the deliverables, associated task(s), and the responsible party(ies) for each task(s). The listed order of tasks is ***not necessarily the chronological order for completion.***

The Activity Leader is the member of the project team responsible for ensuring that the task is completed successfully, and the Additional Support is anyone other than the Activity Leader who has a responsibility for the task. The table is not intended to list all team members involved, and the Activity Leader may delegate the completion of specific tasks to other team members.

What is the PDN Activity Diagram?

From the first project initiation activities through letting, the following figure (see next page) illustrates a “map” of all the PDN’s activities that could apply when delivering a project. The figure includes many unique features to guide the user.

- The Unit Legend denotes an individual color for each discipline that has an activity to complete.
- Major milestones initiate and conclude each stage, denoted by diamonds.
- Each stage represents a series of activities that may need to be completed before moving onto the next stage.
 - The activities are not laid out chronologically but are grouped by discipline. As such, the network requires collaboration, led by the Project Manager, to determine what activities apply and to define the logical relationships and order of activities for a specific project.
 - Of note, it may be advantageous to advance certain activities within a stage earlier or even advance activities in later stages to the current stage, if it is more efficient to deliver the project.
- Each activity box is interactively linked to its associated section in the PDN.
 - By clicking on an activity box, a user is directed to that section for further details.
 - The header of each section includes a “Back to PDN Overview” link that takes the user back to the diagram.



Unit Legend

- Contract Standards & Development (CS)
- Environmental Policy (EP)
- Integrated Mobility (IM)
- Hydraulics (HY)
- Pavement Design (PD)
- Public Involvement (PI)
- Roadway (RD)
- Railroad (RR)
- Transportation Signals and ITS Design (SG)
- Structures Design (ST)
- Traffic Management (TM)
- Traffic Systems Operations (TO)
- Signal System Timing Operations (SS)
- Utility Coordination and Design (UT)
- Environmental Analysis (EN)
- Feasibility Studies (FS)
- Geotechnical (GT)
- Location and Surveys (LS)
- Photogrammetry (PH)
- Communication Group (CG)
- Roadside Environmental (RE)
- Right-of-Way (RW)
- Signing and Delineation (SD)
- State Transportation Improvement Program (SI)
- Strategic Prioritization Office (SP)
- Traffic Safety (TS)
- Transportation Planning (TP)
- Value Management (VM)

*SP = Significant Project (see 1TO1)

1CS1 Prepare Conceptual Construction Estimate

Overview

Develop conceptual construction cost estimates for all alternatives/alternates under consideration for a project.

Note: *Actions during the Project Initiation Stage may be led and completed by staff from several different NCDOT groups. Any person who has overall responsibility for a project during this Stage is referred to as the “Project Lead.” This lead could be the Feasibility Studies Engineer, the Corridor Development Engineer, the Division Planning Engineer, or someone in a similar role as tasked by a state or local agency.*

References

- [Construction Estimating Guide](#)
- [Preliminary Estimate Request Form](#)

Deliverables

Deliverable	Task	Responsible Party	
		Activity Leader	Additional Support
		Preliminary Estimates Section	Project Lead
Conceptual Construction Estimate	▪ Provide Conceptual Design Stage Quantities	X	X
	▪ Review Conceptual Estimates	X	X
Verified Conceptual Construction Cost Estimate	▪ Provide Conceptual Design Stage Quantities – Selected Alternative	X	X
	▪ Review Conceptual Estimates – Selected Alternative	X	X
Cost Verification Letter	▪ Request Cost Verification Letter	X	X

Provide Conceptual Design Stage Quantities

For conceptual design stage quantities, the Project Lead:

- Requests a cost estimate from the Preliminary Estimates Section.
- Submits the conceptual design stage quantities for each alternative on the Preliminary Estimate Request Form to the Preliminary Estimates squad leader in the Contracts Standards and Development Unit.

Review Conceptual Estimates

The Preliminary Estimates Section prices the estimate, and the Project Lead reviews the conceptual estimates for each alternative, considering the following:

- Costs for each pay item are determined using historical bid data and backup projects of similar work in the market area.
- Estimates are available as the project moves forward and can be part of the considerations for selecting the Least Environmentally Damaging Practical Alternative (LEDPA).

Provide Conceptual Design Stage Quantities – Selected Alternative

The Project Lead provides the most current conceptual stage quantities for the selected alternative to the Preliminary Estimates Section on the Preliminary Estimate Request Form. This is to ensure one is working with the most up-to-date estimate, considering that:

- Quantities/cost may have changed depending on 1) the amount of time that has passed and 2) the number of design changes that may have been implemented since the last estimate request.
- Estimates are to be updated by submitting the Preliminary Estimate Request Form to the Preliminary Estimates Section any time new quantities are available or every two years, whichever occurs first.

Review Conceptual Estimate – Selected Alternative

For the selected alternative, the Preliminary Estimates Section prices the estimate, and the Project Lead:

- Reviews the conceptual estimates to ensure there are no obvious errors in quantities or items.
- Includes a copy of the most recent estimate within the appendix of the Project Scoping Report.

Request Cost Verification Letter

After satisfactory review, the Project Lead requests that a Cost Verification Letter be sent out for the estimate by the Preliminary Estimates Section.

- The Cost Verification Letter is generated through the Enterprise Business Services (EBS) portal and distributed via e-mail to the State Transportation Improvement Program (STIP) Regional Manager.
- The distribution of this letter automatically updates the 'Latest Estimate TIP Construction' cost field in SAP, which is displayed on the 12-month let list. This allows the construction costs to remain current and is used for STIP planning, budgeting, and strategic letting purposes.

2CS1 Prepare Initial Design Estimates

Overview

Develop the construction cost estimates for the Alignment Defined Stage, occurring just prior to the Field Inspection Review Meeting.

References

- [Construction Estimating Guide](#)
- [Preliminary Estimate Request Form](#)

Deliverables

Deliverable	Task	Responsible Party	
		Activity Leader	Additional Support
		Preliminary Estimates Section	Project Manager
Construction Cost Estimate	▪ Provide Design Stage Quantities	X	X
	▪ Review Estimate	X	X
Cost Verification Letter	▪ Request Cost Verification Letter	X	X

Provide Design Stage Quantities

The Project Manager provides the most current design stage quantities for the selected alternative to the Preliminary Estimates Section on the Preliminary Estimate Request Form.

Review Estimate

The Preliminary Estimates Section prices the estimate, and the Project Manager:

- Reviews the estimate for the selected alternative to ensure there are no obvious errors in quantities or items.
- Includes a copy of the most recent estimate within the appendix of the NEPA document.

Request Cost Verification Letter

After satisfactory review, the Project Manager requests that a Cost Verification Letter be sent out for the estimate by the Preliminary Estimates Section.

- The Cost Verification Letter is generated through the EBS portal and distributed via e-mail to the STIP Regional Manager.
- The distribution of this letter automatically updates the 'Latest Estimate TIP Construction' cost field in SAP, which is displayed on the 12-month let list. This allows the construction costs to remain current and is used for STIP planning, budgeting, and strategic letting purposes.

3CS1 Prepare Plan-in-Hand Estimates

Overview

Develop Construction Cost Estimates for the Plan-in-Hand Stage, occurring just prior to the Plan-in-Hand Review Meeting.

References

- [Construction Estimating Guide](#)
- [Preliminary Estimate Request Form](#)

Deliverables

Deliverable	Task	Responsible Party	
		Activity Leader	Additional Support
		Project Manager	Design Lead
Construction Cost Estimate	<ul style="list-style-type: none">Provide Design Stage QuantitiesReview Estimate	X X	X X
Cost Verification Letter	<ul style="list-style-type: none">Request Cost Verification Letter	X	X
Not for Construction Plans	<ul style="list-style-type: none">Upload Not for Construction Plans	X	X

Provide Design Stage Quantities

The Project Manager provides the most current design stage quantities to the Preliminary Estimates Section on Preliminary Estimate Request Form.

Review Estimate

The Preliminary Estimates Section prices the estimate, and the Project Manager reviews the estimate to ensure there are no obvious errors in quantities or items.

Request Cost Verification Letter

After satisfactory review, the Project Manager requests that a Cost Verification Letter be sent out for the estimate by the Preliminary Estimates Section.

- The Cost Verification Letter is generated through the EBS portal and distributed via e-mail to the STIP Regional Manager.
- The distribution of this letter automatically updates the 'Latest Estimate TIP Construction' cost field in SAP, which is displayed on the 12-month let list. This allows the construction costs to remain current and is used for STIP planning, budgeting, and strategic letting purposes.

Upload Not for Construction Plans

After the plans have been approved for release, the Project Manager:

- Places "Not for Construction" stamp on all sheets.
- Uploads the plans to NCDOT and Association of General Contractors websites for contractor review of upcoming projects.

4CS1 Complete CS&D Project Review

Overview

Review the PS&E package for the Advertisement and Letting Process after the PS&E review meeting and prepare the package for letting.

References

- [Roadway Standard Drawings](#)
- [Standard Specifications](#)
- [Plans Checklist](#)
- APLUS
- 12 Month Let List
- Let Plans Preparation – SharePoint Guidance
- Project Flow Chart Generator

Deliverables

Deliverable	Task	Responsible Party					
		Activity Leader	Additional Support				
		Plan Review Engineer	State Proposal Engineer	Contract Time Engineer	Provisions Engineer	Estimating Engineer	State Plans and Standards Engineer
Final Plans	<ul style="list-style-type: none"> ▪ Review Plans 	X					X
Proposal	<ul style="list-style-type: none"> ▪ Establish Contract Times ▪ Facilitate Goal Setting Meeting ▪ Generate Special Provisions ▪ Generate Final Pay Items and Quantities ▪ Assemble Proposal ▪ Advertise Project ▪ Prepare Addendums 		X	X	X	X	X

Review Plans

To complete the plan review, the Plan Review Engineer:

- Reviews the plans and quantities.
- Sends plan checking comments to the Project Manager, who post, sign, and date Final Plan files to the Let Preparation area.
- Passes the PS&E package to the State Proposals Engineer.

Establish Contract Times

The Contract Time Engineer reviews the temporary traffic control plans, Utilities by Others (UBO) Plans, environmental documents, and pay items and quantities to establish any intermediate contract times and

the overall contract times. (This includes the Completion Dates.) This task runs concurrent with the Goal Setting Meeting, Generate Roadway Special Provisions, and Engineer's Final Estimate tasks noted below.

Facilitate Goal Setting Meeting

The State Proposals Engineer facilitates a meeting to establish the DBE participation goals based on federal and state regulations.

Generate Special Provisions

The Provisions Engineer reviews the plans and compiled Transport estimate to provide special provisions for pay items not covered by the Standard Specifications (APLUS program initiated).

Generate Final Pay Items and Quantities

The Estimating Engineer reviews final pay items and quantities to generate the Confidential Engineer's Estimate and to generate the percentage breakdown cost for work activities.

Assemble Proposal

The Provisions Engineer assembles the standard special provisions, the project special provisions, and item sheets into the final proposal.

Advertise Project

The electronically signed and sealed plan files and the electronically signed and sealed proposal are posted to the NCDOT Central Highway Letting web page (4 weeks prior to the letting date and 8 weeks prior to the letting date for special projects).

Prepare Addendums

The State Plans and Standards Engineer and the State Proposals Engineer field questions about projects currently advertised from contractors. Addendums to the plans and proposal are processed as needed.

Letting Date

All bids are received, verified as valid, and read aloud by State Contract Officer (Central Highway Letting Date is the 3rd Tuesday of each Month).

1EN1 Initiate Environmental Analysis

Ensure that all projects, federal or state funded, comply with relevant environmental laws, including the Clean Water Act, National Environmental Policy Act (NEPA), State Environmental Policy Act (SEPA), Section 4(f), Section 106, the Endangered Species Act, Section 6(f), Title VI of the Civil Rights Act, and Farmland Protection Policy Act. It is important to note that all requests for Environmental Analysis Unit action start with the Project Manager submittal via the Environmental Tracking & Coordination System (ETRACS). Any ground disturbing project are to be reviewed by Division and/or Environmental Analysis Unit staff.

Note: *Actions during the Project Initiation Stage may be led and completed by staff from several different NCDOT groups. Any person who has overall responsibility for a project during this Stage is referred to as the “Project Lead.” This lead could be the Feasibility Studies Engineer, the Corridor Development Engineer, the Division Planning Engineer, or someone in a similar role as tasked by a state or local agency.*

References

- [Programmatic Agreement Manual for Minor Transportation Projects in North Carolina](#)
- [Tribal Coordination Protocol](#)
- [ETRACS System and Tutorial](#)
- NRTR Scope Template and Guidance
- [NCDOT Traffic Noise Policy](#)
- [NCDOT Traffic Noise Manual](#)
- [NCDOT Air Quality Handbook](#)

Deliverables

Deliverable	Task	Responsible Party	
		Activity Leader	Additional Support
		Project Lead	Environmental Analysis Unit
Completed ETRACS Requests	<ul style="list-style-type: none"> ▪ <i>Receive Initial ETRACS Request for Human and Natural Environment Studies</i> 	X	X
Comments on Draft Project Scoping Report	<ul style="list-style-type: none"> ▪ <i>Review Draft Project Scoping Report</i> 		X
Natural Resources Technical Report (NRTR) Scope of Work and Fee	<ul style="list-style-type: none"> ▪ <i>Receive a Natural Resources Technical Report (NRTR) ETRACS Request</i> 	X	X
	<ul style="list-style-type: none"> ▪ <i>Receive Section 7 Survey ETRACS Request</i> 	X	X
	<ul style="list-style-type: none"> ▪ <i>Prepare/Review NRTR Scope of Work and Fee</i> 		X
Landowner Letters	<ul style="list-style-type: none"> ▪ <i>Prepare and Send Landowner Notification Letter</i> 		X
Programmatic Agreement Cultural Resources Screening Checklist	<ul style="list-style-type: none"> ▪ <i>Complete Cultural Resource Screening</i> 	X	X
Traffic Noise and Air Quality (TNAQ) Notification	<ul style="list-style-type: none"> ▪ <i>Determine Noise/Air Analyses Needs</i> 	X	X
Community Studies Plan	<ul style="list-style-type: none"> ▪ <i>Determine Community Analyses Needs</i> 		X
BSG Request Form	<ul style="list-style-type: none"> ▪ <i>Assign Biological Surveys</i> 		X

Receive Initial ETRACS Request for Human and Natural Environment Studies

The Environmental Analysis Unit (EAU) receives ETRACS requests from the Project Lead to begin human and natural environment studies as part of the Project Scoping Report (see 1FS3).

- For projects that are scheduled to receive Notice to Proceed within the next 12 months, the requests are to be prioritized.
- For projects scheduled for Notice to Proceed at a later date, ETRACS requests are to be scheduled to begin 12 months before Notice to Proceed is anticipated.

The Project Lead ensures that, as appropriate, ETRACS requests are sent to the following EAUs human and natural environmental groups:

- Environmental Coordination and Permitting (ECAP)
- Biological Surveys Group (BSG)
- Cultural Resources (Historic Architecture and Archaeology)
- Traffic Noise and Air Quality
- Public Involvement, Community Studies, and Visualization (PICSViz)

Review Draft Project Scoping Report

Upon request of the Project Lead relevant groups of the EAU review the draft Project Scoping Report and provide comments to the project team (see 1FS3).

Receive a Natural Resources Technical Report (NRTR) ETRACS Request

The Project Lead submits an ETRACS request to ECAP to develop the Natural Resources Technical Report (NRTR). ECAP determines whether the NRTR is to be developed in-house or if development is assigned to an on-call consultant.

Receive Section 7 Survey ETRACS Request

As ECAP receives the initial ETRACS request, the ECAP Project Manager adds a Section 7 Survey Request to the project in ETRACS, which notifies BSG and populates all the threatened and endangered (T&E) species for the county(ies) in which the project is located.

BSG assigns the review of the terrestrial and aquatic T&E species listed (except for red cockaded woodpecker (RCW), which is reviewed by the resident RCW specialist) to a biologist. If BSG determines Section 7 surveys are needed, a separate scope of work and fee is prepared. The Landowner Letter is submitted to the Consultant for distribution prior to field work.

Prepare/Review NRTR Scope of Work and Fee

If ECAP determines that the NRTR is to be developed by an on-call consultant, then the ECAP Project Manager coordinates the scope of work and fee necessary for the NRTR in accordance with NRTR Scope Template and Guidance. This includes delineation of waterbodies that are potentially jurisdictional (a surveyed MicroStation file or shapefile called a WEX file). Once the WEX file is prepared, the Location and Surveys Unit or Private Engineering Firm coordinates with the US Army Corps of Engineers (USACE) to

develop a delineated file of waters determined jurisdictional for the purposes of Clean Water Act permitting (WET file). Overall work includes:

- Field work for stream and wetland delineations, T&E preliminary surveys, Cultural Resources, etc.
- Preparation of the draft and final NRTR
- Preparation of the WEX/WET file
- Preparation of the draft and final Preliminary Jurisdictional Determination

The scope of work and fee is negotiated and approved by prior to Notice to Proceed, and the NRTR is developed during the Alignment Defined Stage. If BSG determines a Section 7 Survey is needed, a separate scope of work and fee is prepared. Once the scope of work and fee for the NRTR work has been approved, ECAP initiates natural environment studies.

Prepare and Send Landowner Notification Letter

ECAP coordinates approval of the landowner notification area (based on the project study area) with the involved EAU groups. When approved, the ECAP or its consultant prepares a landowner notification letter, which is sent to all landowners within the landowner notification area.

- The landowner notification letter is sent out prior to commencing field work.
- The letter notifies landowners that NCDOT is beginning a project, and personnel may be on their property.
- If the project study area changes, a new landowner letter may be required.

Complete Cultural Resource Screening

The Project Lead completes the Programmatic Agreement Cultural Resources Screening Checklist provided in the Programmatic Agreement Manual for Minor Transportation Projects in North Carolina.

- Using the results of the checklist, or other requirements under state and federal environmental laws and regulations, the Project Lead can then determine if the project is subject to further historic preservation review.
 - If additional review is required, the requester completes an ETRACS request for a Historic Architecture and/or Archaeology Culture Resources Screening Survey.
- The ETRACS request is assigned to an appropriate Culture Resource Specialist and investigations begin.

Identification of Cultural Resources may be finalized during the Project Initiation stage or during the Alignment Defined stage.

Determine Noise/Air Analyses Needs

The Project Manager reviews the NCDOT Traffic Noise Policy and the NCDOT Traffic Noise Manual and the NCDOT Air Quality Handbook to determine if a project may need a traffic noise or air quality analysis. The Project Lead notifies Traffic Noise and Air Quality Group Leader when the Project Scoping Report is being developed with the preliminary determination and seek concurrence or revise as appropriate.

Determine Community Analyses Needs

The Project Lead submits an ETRACS request for the any required Community Analyses. Community Studies reviews the project and determines the level of Community Analyses appropriate for the project (Community Characteristics Report, Community Impact Assessment, Land Use Scenario Assessment, etc.) and develops a Community Studies Plan for completing analyses.

Assign Biological Surveys

BSG assigns one of the following groups to complete T&E species surveys:

- On-call biological consultants
- In-house BSG biologists
- Environmental document consultants

2EN1 Advance Natural Environment Tasks

Overview: Natural Resources Technical Report (NRTR) and WEX/WET File

Coordinate review of the draft and final Natural Resources Technical Report (NRTR), WEX (a MicroStation file or shapefile of delineated, potentially jurisdictional waterbodies)/WET (a MicroStation file or shapefile of delineated, jurisdictional waters) files, and Preliminary Jurisdictional Determination. Review the NEPA/SEPA document to ensure that material in the NRTR is pertinent for NEPA/SEPA compliance, including avoidance and minimization measures and relevant project commitments.

References

- [NRTR Template and Guidance](#)
- [NES Procedures Manual](#)
- [Wetlands Mapping Policy \(Consultant GPS CADD Guidance\)](#)
- [NRTR QAQC Tracking Sheet](#)
- [Preparing Natural Resource Technical Reports](#)
- [Jurisdictional Determination Package](#)

Deliverables

Deliverable	Task	Responsible Party	
		Activity Leader	Additional Support
		ECAP Project Manager	ECAP Team Leader
NRTR	<ul style="list-style-type: none"> ▪ Complete NRTR and WEX file 	X	
WEX File	<ul style="list-style-type: none"> ▪ Complete NRTR and WEX file 	X	
Draft Preliminary Jurisdictional Determination and Buffer Package	<ul style="list-style-type: none"> ▪ Complete Preliminary Jurisdictional Determination and Buffer Package 	X	
Signed Preliminary Jurisdictional Determination and Buffer Package	<ul style="list-style-type: none"> ▪ Conduct Agency Field Review and Create WET File 	X	Location and Surveys
WET File	<ul style="list-style-type: none"> ▪ Conduct Agency Field Review and Create WET File 	X	
Comments on NEPA/SEPA Document	<ul style="list-style-type: none"> ▪ Review NEPA/SEPA Document 	X	X

Complete NRTR and WEX File

The NRTR and the WEX file are developed using the *NRTR Template and Guidance* in conjunction with the *NRTR Procedures Manual and Consultant GPS CADD Guidance*.

- The draft NRTR and the WEX file are submitted to ECAP Project Manager (if done by a consultant) for review.
 - ♦ A final report is submitted within two weeks of receiving ECAP comments on the draft report.
- If the NRTR is done in-house, the ECAP Regional Supervisor reviews the report.

The final NRTR and WEX file are placed on the ATLAS Workbench, with the Project Manager, Hydraulics Unit, Locations/Surveys Unit, Structures Management Unit, Rail Division, and Roadway Unit (and others as appropriate) being notified.

Complete Preliminary Jurisdictional Determination and Buffer Package

The Preliminary Jurisdictional Determination and Buffer (if applicable) Package are part of the deliverables for an NRTR.

- When a consultant is contracted to do the NRTR work, this package is submitted to the ECAP Project Manager for review and comment at the same time as the NRTR submittal.
 - A final package is to be submitted within two weeks of receiving ECAP comments on the draft package.
- The final package is placed on ATLAS Workbench and the ECAP Project Manager submits the package to the US Army Corps of Engineers (USACE) for review.

Conduct Agency Field Review and Create WET File

The ECAP Project Manager coordinates the scheduling of a field review with the USACE, North Carolina Division of Water Resources (NCDWR), and consultant (if applicable). The Project Manager is notified of this meeting but is not required to attend. Typically, the EAU or Private Engineering Firm staff lead the field meeting.

- During this field review, the USACE and NCDWR evaluate streams, wetlands, ponds, and other surface waters delineated during the NRTR field work and determine what is jurisdictional.
- At the end of the field review the consultant updates the WEX file to only include features determined jurisdictional. The updated WEX file is then renamed as the WET file.
- The Preliminary Jurisdictional Determination and Buffer (as appropriate) Package are updated and resubmitted to the USACE for signature.

The signed Preliminary Jurisdictional Determination is placed in ATLAS Workbench by the ECAP Project Manager.

Review NEPA/SEPA Document

The Project Manager submits an ETRACS request for the ECAP Project Manager, or team lead, to review the natural resources section(s) of NEPA/SEPA documents. This review is to:

- Focus on the accuracy of the information in the document.
- Ensure that avoidance and minimization measures have been captured.
- Ensure the Project Special Commitments (Green Sheets) agreements made with the agencies have been captured.

The EAU team lead uploads comments made on the NEPA/SEPA document to the project SharePoint site.

Overview: Biological Surveys

When necessary, complete surveys for federally listed threatened and endangered (T&E) species in areas of suitable habitat in the project study area and obtain a biological conclusion to ensure compliance with the Endangered Species Act of 1973 and Marine Mammal Protection Act.

References

- [USFWS Section 7 Consultation](#)

Deliverables

Deliverable	Task	Responsible Party	
		Activity Leader	Additional Support
		BSG Project Manager	BSG Team Leader
Biological Surveys	<ul style="list-style-type: none"> Initiate and Complete BSG Survey 	X	X
BSG Concurrence on Biological Conclusions	<ul style="list-style-type: none"> Review Biological Conclusions and NRTR 	X	X
Request USFWS or NMFS Concurrence on Species Determination	<ul style="list-style-type: none"> Review Biological Conclusions 	X	X
Complete Surveys for T&E Species	<ul style="list-style-type: none"> Complete Surveys for T&E Species 	X	X
Biological Assessment	<ul style="list-style-type: none"> Initiate Section 7 Consultation 	X	X
USFWS or NMFS Biological Opinion	<ul style="list-style-type: none"> Complete for Section 7 Consultation 	X	X
Comment on NEPA/SEPA Document	<ul style="list-style-type: none"> Review NEAP/SEPA document 	X	X

Initiate and Complete Biological Surveys

The BSG Project Manager assigns one of the following groups to conduct T&E surveys:

- On-call biological consultants
- In-house BSG biologists
- Environmental document consultant

Review Biological Conclusions and NRTR

To complete this task, the BSG Project Manager is to:

- Reviews the T&E survey results in the draft NRTR.
- Review the biological conclusions and determine if they agree with the assessment.
- Meet to discuss if there is a disagreement with biological conclusions.

If a determination other than “Unresolved” or “No Effect” is recommended for a federally listed T&E species, BSG sends a request for concurrence letter to the US Fish and Wildlife (USFWS) or the National Oceanic and Atmospheric Administration (NOAA) National Marine Fisheries Service (NMFS) to determine if consultation under Section 7 of the Endangered Species Act (ESA) or the Marine Mammal Protection Act is required. The USFWS has primary responsibility for terrestrial and freshwater organisms, while the responsibilities of the NMFS are mainly marine wildlife such as whales and anadromous fish such as salmon. However, the agencies share responsibility for some species that occur in both marine environments and freshwater or terrestrial habitats, such as sea turtles and Atlantic salmon.

Initiate Section 7 Consultation

BSG Project Manager coordinates with USFWS or NMFS to determine if formal or informal Section 7 Consultation is required.

- If it is determined that a project “May Affect but is Not Likely to Adversely Affect” a listed species, Information Consultation is required.
- If it is determined that a project “May Affect and is Likely to Adversely Affect” or would “Adversely Affect” a listed species, Formal Consultation is required, which includes the development of a Biological Assessment by NCDOT and a Biological Opinion by USFWS or NMFS. The team develops the Biological Assessment with review and acceptance from BSG.

Complete Section 7 Consultation

Based on the Biological Assessment, USFWS or NMFS determines if any additional information is needed. Upon receipt of all required information, the agency develops their Biological Opinion. The service has 45 days to render the Biological Opinion once formal consultation is completed (90 days after initiation).

- The Biological Opinion may contain conditions that are required during and after construction.
- The BSG Project Manager ensures these commitments are included in the Project Commitments when they review the environmental document.

Review NEPA/SEPA Document

The Project Manager submits an ETRACS request for the BSG Project Manager to review the T&E species discussions in the NEPA/SEPA documents as needed. This review is to:

- Focus on the accuracy of the information in the document.
- Ensure that avoidance and minimization measures have been captured.
- Ensure the Project Special Commitments (Green Sheets) agreements made with the agencies have been captured.

The BSG Project Manager uploads comments made on the NEPA/SEPA document to the project SharePoint site.

2EN2 Advance Human Environment Tasks

Overview: Community Studies

Complete the Community Characteristics Report and the Indirect and Cumulative Effects report (if scoped) for the delineated study area or study corridors to inform project decision-making, design, and permitting. A Community Characteristic Report is only needed if community impacts influence alternative selection. Review Indirect and Cumulation Effect only if screening indicates an assessment is needed. Complete the Community Impact Assessment or Direct and Indirect Screening Tool of the preliminary design for the preferred alternative, as well as the Land Use Scenario Assessment (if indicated), and document project decisions, commitments, recommendations, outstanding direct impacts, and potential future development areas.

References

- [Community Characteristics Report / Community Impact Assessment](#)
- [Indirect and Cumulative Effects / Land Use Scenario Assessment Folder](#)

Deliverables

Deliverable	Task	Responsible Party	
		Activity Leader	Additional Support
		Consultant Project Manager	PICSViz Team Member/ On-call Staff
Community Characteristics Report	▪ <i>Develop Community Characteristics Report</i>	X	X
Indirect and Cumulative Effects Report	▪ <i>Develop Indirect and Cumulative Effects Report</i>	X	X
Community Impacts Assessment	▪ <i>Develop Community Impact Assessment</i>	X	X
Land Use Scenario Assessment	▪ <i>Develop Land Use Scenario Assessment</i>	X	X
Comments on NEPA/SEPA Document	▪ <i>Review NEPA/SEPA Document</i>	X	X

Develop Community Characteristics Report (if scoped)

When understanding community resources and potential impacts can help in the development of project alternatives, particularly for projects in developed areas, a Community Characteristic Report is developed. If scoped for the project, a consultant is assigned and develops a Community Characteristics Report based on current templates, guidance, and tools maintained by Community Studies, and refines direct impact and demographic study areas based on the current project study area. For more complex or potentially controversial projects, the Project Manager may request that Community Studies direct on-call staff to develop the Community Characteristics Report and coordinate with Public Involvement. All generated materials are reviewed and approved by Community Studies with activities that include:

- Download the latest templates, guidance, and tools
- Develop Demographic Study Area (DSA) and Direct Community Impact Area (DCIA) in accordance with guidance

- Coordinate with Community Studies to approve DSA and DCIA
- Prepare and email input forms to area planners, schools, and emergency management personnel, and conduct telephone or in-person interviews as appropriate
- Assess project area demographics, ATLAS maps, satellite images and other data sources prior to conducting interviews and field visit
- Conduct field visit according to guidance
- Prepare draft CCR and submit via ETRACS request to Community Studies for review and comment
- Revise CCR based on Community Studies comments and submit via email to Community Studies for final review
- Finalize CCR and submit via email to Community Studies for distribution, ATLAS upload and posting to ATLAS Workbench

Develop Indirect and Cumulative Effects Report (if scoped)

An Indirect and Cumulative Effects Screening Report (ICE) is often developed based on the findings of Transportation Impact Causing Activities (TICAs) in the Direct and Indirect Screening Tool (DIST), Community Characteristics Report (CCR), or the Short Form Community Impact Assessment (CIA). If scoped for the project, a consultant is assigned and develops an Indirect and Cumulative Effects report based on current templates, guidance, and tools maintained by Community Studies, and refines the Future Land Use Study Area (FLUSA) based on the current project study area. For projects in high growth areas or for Merger projects, the Project Manager may request that Community Studies direct contract staff to develop the ICE and coordinate with Mitigation and ICI. All generated materials are reviewed and approved by Community Studies, with activities that include:

- Download the latest templates, guidance, and tools
- Develop the Future Land Use Study Area (FLUSA) in accordance with guidance
- Coordinate with Community Studies to approve the FLUSA
- Prepare and email input forms to area planners, utilities staff and other personnel, and conduct telephone or in-person interviews as appropriate
- Assess project area demographics and growth trends, ATLAS maps, satellite images and other data sources prior to conducting interviews and field visit
- Conduct field visit according to guidance
- Prepare draft ICE and submit via ETRACS request to Community Studies for review and comments
- Revise ICE based on Community Studies comments and submit via email to Community Studies for final review
- Finalize ICE and submit via email to Community Studies for distribution, ATLAS upload and posting to ATLAS Workbench.
- Community Studies coordinates the ICE Matrix finding with Mitigation and ICI, and scopes a Land Use Scenario Assessment if warranted by permitting needs

Develop Community Impacts Assessment

To document the avoidance, minimization, and mitigation of impacts of a project alternative on community resources, as well as of any unresolved impacts remaining at preliminary design, a Community Impacts Assessment is prepared. As assigned, the consultant develops a Community Impact Assessment

based on current templates, guidance, and tools maintained by Community Studies, and using the DCIA and DSA from the Community Characteristics Report (CCR), if one was prepared, or developing these areas if not. Projects following a standard schedule incorporate data from the CCR by reference. Projects that have experienced delays coordinate with Community Studies to determine if any CCR data is to be updated. For more complex or potentially controversial projects, the Project Manager may request that Community Studies direct contract staff to develop the Community Impact Assessment and coordinate with Public Involvement and Office of Civil Rights. All generated materials are reviewed and approved by Community Studies, with activities that include:

- Download the latest templates, guidance, and tools
- If no CCR was done, develop Demographic Study Area (DSA) and Direct Community Impact Area (DCIA) in accordance with guidance
- If newly developed, coordinate with Community Studies to approve the DSA and DCIA
- Prepare and email input forms to area planners, schools and emergency management personnel, and conduct telephone or in-person interviews as appropriate and when determined necessary by Community Studies
- Assess project area demographics, ATLAS maps, satellite images and other data sources prior to conducting interviews and field visit in accordance with guidance
- Conduct field visit according to guidance
- Prepare draft CIA and submit via ETRACS request to Community Studies for review and comments.
- Revise CIA based on Community Studies comments and submit via email to Community Studies for final review
- Finalize CIA and submit via email to Community Studies for distribution, ATLAS upload and posting to ATLAS Workbench.

Section 4(f) (recreational, not historic) and Section 6(f) resource presence are identified during Community Studies screening or by the CCR. If potential resource impacts to public parks, recreation areas, waterfowl and/or wildlife refuges are identified as part of the Community Impact Assessment, the project manager coordinates with Federal Highway Administration about resources protected under Section 4(f) of the Department of Transportation Act (applies to federal projects only) or with NC Department of Environmental Quality about resources protected under Section 6(f) of the Land and Water Conservation Fund Act (applies to all projects), and cooperate with other stakeholders, as appropriate.

Develop Land Use Scenario Assessment

If indicated by findings of the Indirect and Cumulative Effects matrix, or at the request of a permitting or resource agency (e.g., USACE, NCDWR, USFWS, etc.) a consultant is assigned and develops a Land Use Scenario Assessment (LUSA) report based on current templates, guidance, and tools maintained by Community Studies, and develops one or more Potential Development Areas (PDAs) within the Future Land Use Study Area (FLUSA). The purpose of a LUSA is to map and compare existing conditions within PDAs with future projections based on Build and No Build scenarios. For projects in high growth areas or for Merger projects, the Project Manager may request that Community Studies direct contract staff to develop the LUSA and coordinate with Mitigation and ICI. All generated materials are reviewed and approved by Community Studies, with activities that include:

- Download the latest templates, guidance, and tools
- Develop Potential Development Areas (PDAs) in accordance with guidance
- Coordinate with Community Studies to approve the PDAs
- Prepare and email input forms to area planners, development review staff and other personnel, and conduct telephone or in-person interviews as appropriate
- Assess project area development trends, development approvals and permits, ATLAS maps, satellite images and other data sources prior to conducting interviews and field visit
- Conduct field visit according to guidance
- Prepare draft LUSA and submit via ETRACS request to Community Studies for review and comments
- Revise LUSA based on Community Studies comments and submit via email to Community Studies for final review
- Finalize LUSA and submit via email to Community Studies for distribution, ATLAS upload and posting to ATLAS Workbench.
- Community Studies coordinates the LUSA findings with Mitigation and ICI as needed for permitting

Review NEPA/SEPA Document

The Project Manager submits an ETRACS request for Community Studies to review the relevant sections of NEPA or SEPA documents, as needed.

This review is to:

- Focus on the accuracy of the information in the document.
- Ensure that avoidance, minimization measures have been captured, and that any outstanding issues are document and adequacy explained.
- Ensure the Project Special Commitments (Green Sheets) agreements made with stakeholders have been captured.

Community Studies uploads the comments on the NEPA/SEPA document to the project SharePoint site.

Overview: Complete Cultural Resource Tasks

Determine the potential effects of projects to cultural resources, historic architecture and archaeology, as required by Section 106 of the National Historic Preservation Act and Section 4(f) (applies to federal projects only). Section 4(f) resources may also include publicly owned public parks and recreation lands and waterfowl and wildlife refuges, in addition to historic resources. These additional resource types are identified and discussed in the Community Impact Assessment.

References

- [Programmatic Agreement Manual for Minor Transportation Projects in North Carolina](#)
- [Historic Architecture Group Procedures and Work Products](#)
- [Archaeology Work Products](#)
- [Tribal Coordination Protocol](#)

Deliverables

Deliverable	Task	Responsible Party	
		Activity Leader	Additional Support
		Cultural Resource Specialist	Project Manager
Historic Architecture and Landscapes No Survey Required Form	▪ Complete Cultural Resource Screening	X	
No Archaeological Survey Required Form	▪ Complete Cultural Resource Screening	X	X
Historic Architecture and Landscapes Survey Required Form (if needed)	▪ Complete Cultural Resource Screening	X	X
Archaeological Survey Required Form (if needed)	▪ Complete Cultural Resource Screening	X	X
Archaeology Report	▪ Complete Archaeology Report	X	X
No National Register of Historic Places Eligible or Listed Archaeological Sites Present Form	▪ Complete Archaeology Report	X	X
Archaeology Assessment of Effects Required Form	▪ Complete Archaeology Report	X	X
Historic Architecture Building Inventory	▪ Complete Historic Architecture Building Inventory	X	X
No Historic Architecture and Landscapes Effects Required Form (if needed)	▪ Complete Historic Architecture Building Inventory	X	X
Historic Architecture Eligibility Evaluation Report	▪ Complete Historic Architecture Eligibility Evaluation Report	X	X
Historic Architecture and Landscapes Effects Required Form	▪ Complete Historic Architecture Eligibility Evaluation Report	X	X
No National Register of Historic Places Eligible or Listed Historic Properties Present Form	▪ Complete Historic Architecture Eligibility Evaluation Report	X	X
No National Register of Historic Places Eligible or Listed Archaeological Sites Affected Form	▪ Conduct Cultural Resource Effects Determination (Archaeological)	X	X
No National Register of Historic Places Eligible or Listed Archaeological Sites Adversely Affected Form	▪ Conduct Cultural Resource Effects Determination (Archaeological)	X	X
Archaeological Adverse Effect Determination Form	▪ Conduct Cultural Resource Effects Determination (Archaeological)	X	X

Deliverable	Task	Responsible Party	
		Activity Leader	Additional Support
		Cultural Resource Specialist	Project Manager
National Register of Historic Places Eligible or Listed Historic Properties Effects Determination Form	<ul style="list-style-type: none"> Conduct Cultural Resource Effects Determination (Historic Architecture and Landscapes) 	X	X
No National Register of Historic Places Eligible or Listed Historic Properties Present Form	<ul style="list-style-type: none"> Complete form Upload to SharePoint 	X	
No National Register of Historic Places Eligible or Listed Historic Properties Affected Form	<ul style="list-style-type: none"> Complete form Upload to SharePoint 	X	
Draft Finding of Adverse Effect	<ul style="list-style-type: none"> Develop Section 106 MOA 	X	X
MOA	<ul style="list-style-type: none"> Develop Section 106 MOA 	X	X
Comments on NEPA/SEPA Document	<ul style="list-style-type: none"> Review NEPA/SEPA Document 		

Identify Section 4(f) and 6(f) Resources (if needed)

The Cultural Resource Specialist reviews the study area to determine if Section 4(f) or Section 6(f) resources are present. The Project Manager determines if Section 6(f) resources are present and coordinates with PICSviz if present. Cultural Resources is involved if the Section 6(f) qualified to be included in the National Register of Historic Places (NRHP)

If present, the Project Manager and the Cultural Resources Specialist coordinate to determine if the project has the potential to impact these properties.

Complete Cultural Resource Screenings (if needed)

The Cultural Resources Specialists for Historic Architecture and Archaeology shall determine and document the discipline-specific Area of Potential Effects for the project based on the study area. Using the best available information, the Cultural Resources Specialists determine if there are any known or potential historic property(ies) or archaeological sites that exist in the Area of Potential Effect and determines the need for further field surveys.

- The Cultural Resources Specialists may issue a No Survey Required Form or a Survey Required Form for historic architecture and archaeology and posts the forms to the project SharePoint site. The Historic Architecture Culture Resource Specialist may issue a Survey Required Form, and the Archaeological Culture Resource Specialist may issue a No Survey Required form or vice versa. The two Specialists may also issue the same form.
- If there is a known historic property(ies) or archaeological site(s) and the Cultural Resources Specialist can reasonably predict that the scope of the undertaking does not have the potential to effect the resource(s), the Cultural Resources Specialist may issue a No National Register of Historic Places Eligible or Listed Historic Properties Present or Affected Form or a No National Register of Historic Places Eligible or Listed Archaeological Sites Present or Affected Form.
- If the known historic property or archaeological site may be affected, the Cultural Resources Specialists issue an Historic Architecture and Landscapes Assessment of Effects Form or an Archaeology Assessment of Effects Required Form .

The Cultural Resources Specialists uploads the applicable form(s) to the project SharePoint site.

Complete Archaeology Report (if needed)

If the Cultural Resources Screening for archaeology determines that a survey is required, the Cultural Resources Specialist initiates a survey to identify any currently unknown archaeological sites in accordance with applicable guidelines, standards, and regulations. If archaeological sites are identified, the Cultural Resources Specialist evaluates the eligibility for listing on the National Register of Historic Places. The Cultural Resources Specialist incorporates information provided by consulting parties and Native American Tribes when evaluating the site's eligibility.

- If the Cultural Resources Specialist determines that no sites are listed or eligible for listing in the National Register of Historic Places, a No National Register of Historic Places Eligible or Listed Archaeological Sites Present Form is issued.
- If the Cultural Resources Specialists determines that sites are listed or eligible for listing in the National Register of Historic Places, an Archaeology Assessment of Effects Required Form is issued.

The Cultural Resources Specialist uploads the applicable Cultural Resource Form to the ATLAS Workbench site, notifying the Project Manager.

Complete Historic Architecture Building Inventory (if needed)

If the Cultural Resources Screening for historic architecture determines that a survey is required, the Cultural Resources Specialist for historic architecture initiates a survey to identify historic properties in accordance with the Historic Architecture Group Procedures and Work Products Manual and applicable guidelines, standards and regulations.

- If potential historic properties are identified, the Cultural Resources Specialist evaluates the eligibility for listing on the National Register of Historic Places. The Cultural Resources Specialist incorporates information provided by consulting parties and Native American Tribes when evaluating the properties eligibility.
- If properties are identified as being potentially eligible for listing on the National Register of Historic Places, the Cultural Resources Specialists has a full Evaluation Report completed.
- If no properties are identified as being potentially eligible for listing on the National Register of Historic Places, the Cultural Resources Specialists issues the No National Register of Historic Places Eligible or Listed Historic Properties Present or Affected Form.

The Cultural Resources Specialist uploads the applicable historic architecture form to the ATLAS Workbench site, notifying the Project Manager.

Complete Historic Architecture Eligibility Evaluation Report (if needed)

If historic properties that are potentially eligible for listing on the National Register of Historic Places are identified during the Building Inventory, an Evaluation Report is completed. This report is submitted to the Historic Preservation Office and consulting parties for comments.

- If the Historic Preservation Office concurs that there are historic properties eligible for listing on the National Register of Historic Places, the Cultural Resources Specialist issues a Historic Architecture and Landscapes Assessment of Effects Form.
- If the Historic Preservation Office concurs that there are no historic properties eligible for listing on the National Register of Historic Places, the Cultural Resources Specialist issues a No National Register of Historic Places Eligible or Listed Historic Properties Present Form.

The Cultural Resources Specialist uploads the applicable historic architecture form to the ATLAS Workbench site, notifying the Project Manager.

Conduct Cultural Resource Effects Determination (if needed)

Archaeological Effects

The Cultural Resources Specialist determines if the National Register of Historic Places listed or eligible sites are affected by the project.

- If National Register of Historic Places listed or eligible archaeological sites are present but not affected, the Cultural Resources Specialist issues a No National Register of Historic Places Eligible or Listed Archaeological Sites Present or Affected Form.
- If National Register of Historic Places eligible or listed archaeological sites are affected, Cultural Resources Specialist issues the Archaeological Adverse Effect Determination Form and follows the stipulations outlined in the Programmatic Agreement, including data recovery if needed.

The Cultural Resources Specialist uploads the applicable archaeological form to the ATLAS Workbench site, notifying the Project Manager.

Historic Architecture and Landscapes Effects (if needed)

The Cultural Resources Specialist determines if National Register of Historic Places listed or eligible historic architecture sites are affected by the project. After an Historic Architecture and Landscapes Assessment of Effects Form is issued, the Project Manager ensures that the historic boundary is included on the design plans and requests an Effects meeting with the lead Federal Agency and Historic Preservation Office to request concurrence on affects to historic properties.

Following the meeting, the Cultural Resources Specialist issues a Historic Architecture and Landscapes Assessment of Effects Form and follows the stipulations outlined in the Programmatic Agreement.

The Cultural Resources Specialist uploads the applicable Cultural Resource Form to the ATLAS Workbench site, notifying the Project Manager.

Develop Section 106 MOA (if needed)

After consultation has concluded with all appropriate parties and it is determined that an Adverse Effect cannot be avoided, the Cultural Resources Specialist(s), for the affected resource(s), prepares a draft Finding of Adverse Effect for the lead federal agency so that the Advisory Council on Historic Preservation can be notified of the adverse effect finding. The lead federal agency reviews and distributes the Finding of Adverse Effect document to applicable parties.

The Cultural Resources Specialist(s) then works with the Historic Preservation Office, the lead federal agency, and other applicable parties to negotiate the terms of a Memorandum of Agreement (MOA) and uploads it to the ATLAS Workbench site.

Review of NEPA/SEPA Document

The Project Manager submits an ETRACS request Cultural Resources Specialist(s) to review the relevant cultural resources discussions of NEPA/SEPA documents as needed. This review is to:

- Focus on the accuracy of the information in the document.
- Ensure that avoidance and minimization measures have been captured.
- Ensure the Project Special Commitments (Green Sheets) agreements made with the agencies have been captured.

Cultural Resources Specialist(s) uploads comments on the NEPA/SEPA document to the project SharePoint site, notifying the Project Manager.

Overview: Traffic Noise and Air Quality

Complete the traffic noise analysis, Traffic Noise Report, Air Quality Reports, and any prerequisite deliverables and tasks, once alternatives have been developed.

References

- [NCDOT Traffic Noise Policy](#)
- [NCDOT Traffic Noise Manual](#)
- [NCDOT Air Quality Handbook](#)
- [Air Quality Handbook Appendix A](#)
- [Air Quality Handbook Appendix B](#)

Deliverables

Deliverable	Task	Responsible Party	
		Activity Leader	Additional Support
		Traffic Noise and Air Quality Project Manager	Traffic Noise and Air Quality Group Team Member/ On-call Consultant
Traffic Noise Work Plan Right of Entry Letter	<ul style="list-style-type: none"> ▪ Develop Traffic Noise Work Plan 	X	X
Traffic Noise Report	<ul style="list-style-type: none"> ▪ Complete the Traffic Noise Report ▪ Perform Noise Model Validation 	X	X
Air Quality Report	<ul style="list-style-type: none"> ▪ Prepare Air Quality Report 	X	X

Develop Traffic Noise Work Plan

The consultant or Traffic Noise and Air Quality team member develops a draft Traffic Noise Work Plan based on current templates and guidance included in the *Traffic Noise Manual* maintained by Traffic Noise and Air Quality group as defined in above references. The draft Traffic Noise Work Plan identifies items such as noise study areas, noise-sensitive receptors, and potential noise measurement locations.

- With the submission of the draft Traffic Noise Work Plan, a Traffic Noise and Air Quality team member submit a draft right of entry letter using the standard template.
- The work plan and right of entry letters are approved by the Traffic Noise and Air Quality Project Manager prior to any noise measurements or noise modeling.
- The Traffic Noise and Air Quality Project Manager then issues a right of entry letter.

Complete the Traffic Noise Report

The consultant or Traffic Noise and Air Quality specialist develops a draft Traffic Noise Report based on current templates and guidance maintained by Traffic Noise and Air Quality group and in accordance with the *Traffic Noise Manual*. The draft Traffic Noise Report evaluates the existing and no-build conditions, and the build conditions for each detailed study alternative. Mitigation is considered for all impacted receptors.

- If the draft Traffic Noise Report is prepared by an on-call consultant, the Project Manager submits an ETRACS request to Traffic Noise and Air Quality group to review the draft Traffic Noise Report.
- The on-call consultant revises the draft Traffic Noise Report based on Traffic Noise and Air Quality group comments.
- The revised Traffic Noise Report and a memo describing the response to each comment is submitted via ETRACS.
- Additional reviews and rounds of comments are prepared as necessary to finalize the Traffic Noise Report.

Perform Noise Model Validation

An on-call consultant or Traffic Noise and Air Quality Project Manager conducts validation of project models using the noise measurement results in accordance with the *Traffic Noise Manual*.

The Project Manager uploads the final Traffic Noise Report to the ATLAS Workbench. Traffic Noise and Air Quality group supplies streamlined text for the environmental document, Noise Study Areas, and the location of long-term measurement sites to the Project Manager for use in the environmental document.

Prepare Air Quality Report

The consultant completes the Air Quality Template to perform a Project-Level Air Quality Analysis, if required based on the type and extent of the project.

- Once Notice to Proceed has been issued, perform the air analysis and submit the draft Air Quality Report, as described in the 2020 NCDOT Air Quality Handbook, to the Traffic Noise and Air Quality group for review and comment.
- After the Traffic Noise and Air Quality group comments are received, prepare a final Air Quality Report.
- The Traffic Noise and Air Quality group provides a draft of the Streamlined Project-Level Air Quality Text for use in the environmental document.

3EN1 Complete Permit, Commitments, and Design Noise Report

Overview

Apply for the required project permits once drawings have been completed and impacts are calculated. Prepare the Design Noise Report and compile obligations from the environmental document, avoidance and minimization measures, Project Special Commitments, and completed Section 106 Memorandum of Agreement (MOA) and Section 7 consultation, as appropriate.

References

- [Permit Application Timeline](#)
- [Permit Types and Due Dates](#)
- [Individual Permit Application Template](#)
- [e-PCN](#)
- [NCDOT Traffic Noise Policy](#)
- [NCDOT Traffic Noise Manual](#)

Deliverables

Deliverable	Task	Responsible Party	
		Activity Leader	Additional Support
Permit Applications	<ul style="list-style-type: none"> ▪ <i>Prepare Permit Applications</i> 	ECAP Project Manager or Division Environmental Officer	ECAP Team Lead or NCDOT Project Management Unit/ Division Project Manager
Design Noise Report	<ul style="list-style-type: none"> ▪ <i>Develop Design Noise Report</i> 	Traffic Noise and Air Quality Group	Project Manager or On-call Consultant

Prepare Permit Applications

The ECAP Project Manager receives draft permit drawings for review of completeness, avoidance and minimization measures, and accurate capturing of impact type and location. Based on this information, the ECAP Project Manager submits applications for the following permits and others, as appropriate:

- Section 404: Nationwide, Regional General, or Individual Permit (USACE)
- Section 401: Water Quality Certification (NCDWR)
- Buffer Permit (NCDWR)
- Coastal Area Management Act (CAMA) Permit (NC Division of Coastal Management)
- Section 10 Permit (USACE and US Coast Guard)
- Federal Energy Regulatory Commission (FERC) Permit

Once the permit applications have been submitted to the appropriate agency(ies), the ECAP Project Manager notifies the Project Manager and the applicable units/disciplines.

Develop Design Noise Report

The consultant or Traffic Noise and Air Quality specialist develops a draft Design Noise Report based on current templates and guidance maintained by Traffic Noise and Air Quality group and in accordance with the *Traffic Noise Manual*. The Design Noise Report evaluates the entire preferred/selected alternative, considers mitigation for all impacted receptors and creates a noise wall envelope(s) in MicroStation for any noise wall(s) found to be feasible and reasonable.

- If the Design Noise Report is prepared by a consultant, the Project Manager submits an ETRACS request to the Traffic Noise and Air Quality group to review of the draft Design Noise Report.
- The consultant revises the draft Design Noise Report based on the Traffic Noise and Air Quality group comments.
- The revised Design Noise Report and a memo describing the response to each comment is submitted via ETRACS.
- Additional reviews and rounds of comments are prepared as necessary to finalize the Design Noise Report.

When a draft Design Noise Report is submitted, the Traffic Noise and Air Quality group is responsible for circulating the Design Noise Report to all appropriate parties for inter-disciplinary review to identify feasibility concerns. This includes Division, Utilities, Signing and Delineation, Geotech, Structures, Rail, and other appropriate parties to review for hydraulics and roadway.

If feasibility concerns are identified, Traffic Noise and Air Quality group works with the consultant team and the reviewing party to resolve.

3EN2 Determine Final Noise Abatement

Overview

Complete this step when noise abatement is found feasible, reasonable, and recommended for a project. If applicable, conduct the balloting process (detailed in the *Traffic Noise Manual*) to determine who is for or against the noise wall construction. Prepare a memorandum that summarizes the public balloting process, results, and final determination of noise wall installation.

References

- [NCDOT Traffic Noise Policy](#)
- [NCDOT Traffic Noise Manual](#)

Deliverables

Deliverable	Task	Responsible Party	
		Activity Leader	Additional Support
		Traffic and Air Quality Project Manager	Traffic and Air Quality Team Member/ On-call Consultant
Benefited Receptor Mailing List	<ul style="list-style-type: none"> ▪ Conduct Noise-Related Public Ballot Process 	X	X
Notice of Upcoming Ballot and/or Public Noise Meeting	<ul style="list-style-type: none"> ▪ Conduct Noise-Related Public Ballot Process 	X	
Noise Ballots	<ul style="list-style-type: none"> ▪ Conduct Noise-Related Public Ballot Process 	X	X
Memorandum on final determination of noise abatement	<ul style="list-style-type: none"> ▪ Prepare Memorandum on Final Determination of Noise Abatement 	X	X

Conduct Noise-Related Public Ballot Process

The Traffic Noise and Air Quality group conducts the noise-abatement public ballot process detailed in the *Traffic Noise Manual*. The process determines the preferences of noise barrier construction (for or against) of property owners and tenants of all benefited receptors (including properties represented by equivalent receptors).

Prepare Memorandum on Final Determination of Noise Abatement

To prepare this memorandum, the Traffic Noise and Air Quality group:

- Documents the final determination on which noise abatement measures are to be implemented for a project and then notifies the Project Manager, FHWA, and other appropriate parties.
- Prepare the Memorandum on the Final Determination of Noise Abatement.
- Uploads it to ATLAS Workbench and provides it to the Project Manager for distribution to the appropriate parties (e.g., the Roadway Design Lead, Structures Lead, and Geotechnical Design Geotechnical Engineer).

4EN1 Secure Environmental Permits

Overview

Coordinate with the agency representative for any additional information that is needed to issue the permit(s). Once the agency(ies) issues the permit(s), update the Project Special Commitments (Green Sheets) to include any special permit conditions and prepare the permit package for distribution.

References

- [Project Special Commitments \(Green Sheets\) Guidance](#)

Deliverables

Deliverable	Task	Responsible Party	
		Activity Leader	Additional Support
		ECAP Project Manager	ECAP Team Leader
		Permit Package	<ul style="list-style-type: none"> Finalize Permit Package and Address Agency Comments
Project Special Commitments (Green Sheets)	<ul style="list-style-type: none"> Update Project Commitments 	X	

Finalize Permit Package and Address Agency Comments

The ECAP Project Manager coordinates with the agency representative as necessary to finalize the needed permits for the project. These permits may include:

- Section 404 - Nationwide, Regional General, or Individual Permit (USACE)
- Section 401 - Water Quality Certification (NCDWR)
- Buffer permit (NCDWR)
- Coastal Area Management Act (CAMA) (NC Division of Coastal Management)
- Section 10 Permit (USACE and US Coast Guard)
- Federal Energy Regulatory Commission (FERC) Permit

When the permits are received, the ECAP Manager reviews them for any additional permit conditions required by agencies. If there are additional permit conditions, the ECAP Project Manager ensures they are included in the Project Special Commitments (Green Sheets). The ECAP Project Manager also develops and uploads a permit package that includes all project permits and notifies the Project Manager, Contract, Preconstruction Unit Heads, and Division.

1EP1 Review Project Scoping Report and Merger Process

Overview

Assist with the development and/or review of Merger Pre-Screening, Merger Screening (if needed), Merger Concurrence Point 1 (CP 1) (if needed), Project Scoping Report, and Project Initiation forms in accordance with NCDOT *Merger Pre-screening Guidance* and NCDOT *Merger Guidance*.

Note: *Actions during the Project Initiation Stage may be led and completed by staff from several different NCDOT groups. Any person who has overall responsibility for a project during this Stage is referred to as the “Project Lead.” This lead could be the Feasibility Studies Engineer, the Corridor Development Engineer, the Division Planning Engineer, or someone in a similar role as tasked by a state or local agency.*

References

- [NCDOT Merger Pre-Screening Guidance](#)
- [NCDOT Project Scoping Report](#)
- [NCDOT Project Initiation Form](#)
- [NCDOT Merger Guidance](#)
- [Merger Calendar](#)

Deliverables

Deliverable	Task	Responsible Party	
		Activity Leader	Additional Support
		Project Lead	Environmental Policy Unit
Merger Pre-Screening – Review Pre-Screening Form	<ul style="list-style-type: none"> ▪ Review Pre-Screening Form ▪ Schedule Merger Screening Meeting 	X	X
Merger Plan	<ul style="list-style-type: none"> ▪ Coordinate and Review Merger Plan 	X	X
Comments on Project Scoping Report	<ul style="list-style-type: none"> ▪ Review Project Scoping Report 		X
Merger CP1 Procedure and Packet	<ul style="list-style-type: none"> ▪ Setup Merger CP1 Meeting ▪ Review Merger CP1 Meeting Packet ▪ Host Merger CP1 Pre-meeting ▪ Distribute Merger CP1 Meeting Materials and Conduct Meeting 	X	X
Comments on Merger CP1 Meeting Summary	<ul style="list-style-type: none"> ▪ Distribute Merger CP1 Meeting Materials and Conduct Meeting 		X
Merger CP1 Meeting Video	<ul style="list-style-type: none"> ▪ Distribute Merger CP1 Meeting Materials and Conduct Meeting 	X	X

Review Pre-Screening Form

The Environmental Policy Unit reviews each Merger Pre-Screening Form to ensure that the form has been completely and accurately filled out. The Project Lead sends a request via ETRACS for the Environmental Policy Unit to assign a reviewer to the completed draft form. The Environmental Policy Unit conducts the review within one week of receipt.

After reviewing the form, the Environmental Policy Unit leads the following activities:

- If a project pre-screens out of the Merger Process and the Environmental Policy Unit agrees, approve and upload the form to ATLAS.
- If a project pre-screens into the Merger Process and the Environmental Policy Unit disagrees, schedule a Merger Screening meeting and revise and file the form.
- If a project pre-screens out of the Merger Process and the Environmental Policy Unit disagrees, schedule a Merger Screening meeting and revise and file the form.
- If a project pre-screens into the Merger Process and the Environmental Policy Unit agrees, schedule a Merger Screening meeting and file the form.

The Environmental Policy Unit task lead places completed the Merger Pre-Screening form on the ATLAS Workbench.

Schedule Merger Screening Meeting

If needed, the Environmental Policy Unit schedules and attends the Merger Screening meetings. The Environmental Policy Unit provides assistance with regards to:

- Environmental regulations
- Merger process
- Facilitation if issues arise during the meeting
- Review of the draft Merger Plan, if the project proceeds into the Merger Process

Coordinate and Review Merger Plan

If a project screens into the Merger Process, the Project Lead develops the Merger Plan in coordination with the Environmental Policy Unit. Plan development is to be discussed during the Merger Screening Meeting to streamline and customize the Merger Process to benefit the project.

The Project Lead sends an ETRACS request to the Environmental Policy Unit to review the draft Merger Plan. The Environmental Policy Unit reviews the Merger Plan prior to finalization and distribution to the Merger Team, posting the Plan to the project SharePoint site. The Merger Plan is a living document, updated at each concurrence point. Upon completion of the Merger Process, the final Merger Plan is posted to the ATLAS Workbench.

Review Project Scoping Report

The Project Lead develops an ETRACS request for the Environmental Policy Unit to review the Project Scoping Report. The Environmental Policy Unit reviews and provides comments for each Project Scoping Report to ensure the document is complete and accurate, completing the review within one week of receipt. The completed review is placed on the project SharePoint site.

Attend Project Initiation Meeting

The Environmental Policy Unit attends the Project Initiation Meeting and is available to assist as the Project Manager takes over the project from the Project Lead at the time of Notice to Proceed and the Alignment Defined Stage. The Environmental Policy Unit assists the Project Manager in establishing the type of National Environmental Policy Act (NEPA) and State Environmental Policy Act (SEPA) documentation to be prepared for the project.

Setup Merger CP1 Meeting

In general, the formal Merger Screening Meeting and Merger CP1 is a combined meeting. If to be held separately, the Project Manager sends an ETRACS request to the Environmental Policy Unit to set a time for a Merger CP1 meeting on the Merger Calendar. The Project Manager consider the following when requesting a meeting:

- The request take place at least two months in advance of the requested date.
- Dates have been reserved each month for in-person Merger meetings in Raleigh.
- A calendar is posted each year with selected dates for western and eastern projects.

While it is expected that all Merger meetings be held in Raleigh on the selected dates so Merger Team members can plan accordingly, it is possible to have meetings on other dates or in other locations. For instance, some meetings may require a field visit and are held at a location near the project (e.g., Division office) and/or on-site.

Review Merger CP1 Meeting Packet

The Project Lead provides the draft Merger CP1 meeting packet to the Environmental Policy Unit for review. This packet is to include:

- Meeting purpose
- Project description, vicinity map, and study area figure
- Nearby State Transportation Improvement Program (STIP) projects
- Project schedule
- Identified needs
- Proposed purpose
- Proposed Purpose and Need Statement
- Proposed study area
- Avoidance and minimization measures to date

The Environmental Policy Unit reviews the meeting packet within one week of receipt. For a Purpose and Need statement that involves safety, the Environmental Policy Unit is to collaborate safety data with the Traffic Safety Unit (see 1TS1 for related information).

Host Merger CP1 Pre-Meeting

Current policy requires a pre-meeting prior to the Merger CP1 meeting. As part of setting up the meeting, the Environmental Policy Unit is to host a pre-meeting with members of the Merger Team to solicit any questions or concerns the agencies might have.

- Pre-meetings include, at a minimum, NCDOT, Federal Highway Administration (FHWA) (for federal projects), US Army Corps of Engineers (USACE), and the North Carolina Division of Water Resources (NCDWR).
- All pre-meetings are scheduled a minimum of three weeks in advance of the respective Merger meeting to allow adequate time to modify the Merger packet, if necessary.

The project team is prepared to address any concerns expressed at the pre-meeting prior to or at the Merger meeting (i.e., in the Merger packet or in the meeting presentation).

Distribute Merger CP1 Meeting Materials and Conduct Meeting

The Environmental Policy Unit ensures that the completed Merger CP1 meeting packet and relevant logistical information (e.g., meeting invitation, videoconference link, and/or teleconference number) is circulated to Merger Team members at least two weeks prior to the scheduled meeting date. The Environmental Policy Unit is to also secure audio and visual equipment, a telephone conference number, and video meeting link, starting these at the beginning of the meeting. The Environmental Policy Unit attends the meeting and can provide a recording of the meeting video upon request.

After the meeting, the Environmental Policy Unit reviews the draft meeting summary and provides comments within one week.

2EP1 Merger Assistance and Environmental Document Review

Assist with helping projects navigate the Merger Process (if applicable for the project), review all environmental documents, and conduct annual reviews of environmental documents to ensure consistency and compliance.

References

- [NCDOT Merger Guidance](#)
- [FHWA NCDOT CE Agreement](#)

Deliverables

Deliverable	Task	Responsible Party	
		Activity Leader	Additional Support
		Environmental Policy Unit	Project Manager
Comments on Merger CP Packet	<ul style="list-style-type: none"> ▪ Review Merger CP Meeting Packet 	X	X (The Project Manager develops and submits the packet to the Environmental Policy Unit)
Comments on Merger Public Engagement Materials	<ul style="list-style-type: none"> ▪ Review Merger Public Engagement Materials 	X	X
Merger CP Meeting Video Recording (as requested) and/or Meeting Minutes	<ul style="list-style-type: none"> ▪ Distribute Merger CP Meeting Materials and Conduct Meeting 	X	Merger CP Meeting Video Recording (as requested) and/or Meeting Minutes
Comments on Environmental Documents	<ul style="list-style-type: none"> ▪ Review Environmental Documents ▪ Review Section 4(f) Documentation 	X	X
Annual CE Review and Report	<ul style="list-style-type: none"> ▪ Provide Categorical Exclusions (CE) Compliance Review 	X	

The following tasks are required for all Merger Concurrence Point (CP) meetings (i.e., CP2, CP2A, CP3, and CP4A), unless specifically noted below.

Setup Merger CP Meeting

All merger meetings can be in person, online/teleconference, or coordinated via email. The Environmental Policy Unit’s activities begin when the Unit receives an ETRACS request to place a Merger CP meeting on the Merger Calendar. This request takes place at least two months in advance of the requested date. Dates have been reserved each month for in-person Merger meetings in Raleigh. A calendar is posted each year with selected dates for western and eastern projects.

While it is expected that all Merger meetings are held in Raleigh on the selected dates so Merger Team members can plan accordingly, it is possible to have meetings on other dates or in other locations. For instance, some meetings may require a field visit and are held at a location near the project (e.g., Division office) and/or on-site.

- For the Merger CP2A meeting, the project team may elect to schedule a field meeting to review the proposed major crossing structure locations and get a better idea of the quality of the impacted

resources. If needed, the Project Manager is to coordinate the meeting date, time, and location with the Merger Team, notifying the Environmental Policy Unit as a courtesy.

Review Merger CP Meeting Packet

The Project Manager provides the draft Merger CP meeting packet to the Environmental Policy Unit for review, which minimally includes the following for each Merger CP:

- Meeting purpose
- Project description, vicinity map, and study area figure
- Summary of Merger Process decisions to date
- Nearby STIP projects
- Project schedule
- Summary of public engagement (as applicable)
- Avoidance and minimization measures to date

For Merger CP2, the packet also includes:

- Summary of alternatives considered
- Summary of proposed detailed study alternatives

For Merger CP2A, the packet also includes:

- Water resources summary
- Major Hydraulic Crossings and Alignment Review

For Merger CP3 and CP4A, the packet also includes:

- Cost Estimates
- Impact summary
- Recommended least environmentally damaging practicable alternative (LEDPA)
- Avoidance and minimization measures summary for each concurrence point and for any activities that have taken place since Merger CP3

The Environmental Policy Unit reviews the draft Merger CP meeting packet within one week of receipt.

Host Merger CP Pre-Meeting

Prior to a scheduled Merger meeting, the project team may host a call with the Merger Team to solicit any questions or concerns the agencies might have.

- Pre-meetings include, at a minimum, NCDOT, Federal Highway Administration (FHWA) (for federal projects), US Army Corps of Engineers (USACE), and the North Carolina Division of Water Resources (NCDWR).
- All pre-meetings are scheduled a minimum of three weeks in advance of the respective Merger meeting to allow adequate time to modify the Merger packet, if necessary.

Pre-meetings are required at Merger CP3 and are encouraged at Merger CP2, CP2A, and CP4A for complex projects. The project team is prepared to address any concerns expressed at the pre-meeting prior to or at the Merger meeting (i.e., in the Merger packet or in the meeting presentation).

Distribute Merger CP Meeting Materials and Conduct Meeting

The Environmental Policy Unit ensures that the completed packet and relevant logistical information (e.g., meeting invitation, videoconference link, and/or teleconference number) is circulated to Merger Team members at least two weeks prior to the scheduled meeting date. The Environmental Policy Unit is to also secure audio and visual equipment, a telephone conference number, and video meeting link, initiating each at the beginning of the meeting. The Environmental Policy Unit attends the meeting and can provide a recording of the meeting video upon request.

After the meeting, the Environmental Policy Unit reviews the draft meeting summary and provides comments within one week.

Review Merger Public Engagement Materials

Public engagement (e.g. public meeting, newsletter) for a project in the Merger process includes items found in the Merger Guidance to meet USACE regulations. The Environmental Policy Unit reviews the draft public engagement materials for Merger projects to ensure compliance with USACE regulations.

Review Environmental Documents

The Environmental Policy Unit is responsible for providing quality control reviews for all National Environmental Policy Act (NEPA) (Environmental Assessments [EAs]/Findings of No Significant Impact [FONISs], Environmental Impact Statements [EISs], and Records of Decision [RODs]) and State Environmental Policy Act (SEPA) documents. Upon request of the Project Manager via ETRACS, the Environmental Policy Unit may also provide quality control reviews of Categorical Exclusions (CEs) and Minimum Criteria Determination Checklist (MCDCs). Once an ETRACS request is received, the Environmental Policy Unit:

- Reviews the environmental documents (draft and final versions) and provides comments back to the preparer within three weeks of receipt.
- Aids the Project Manager with lead federal agency review.
- Ensures the final environmental document is uploaded to the ATLAS Workbench.

Review Section 4(f) Documentation

The Environmental Policy Unit is available to help coordinate and complete Section 4(f) documentation, as needed.

- Often completed with the draft environmental document and is necessary when a project is impacting a Section 4(f) recreational resource. (The Environmental Analysis Unit [Cultural Resources] staff generally coordinates Section 4(f) documentation for historic resource impacts.)
- May involve *de minimis* or “programmatic use” coordination with FHWA and the local official with jurisdiction, or it may involve more complex Section 4(f) use evaluations.

This documentation is very project specific. More information on this task is detailed on the Environmental Policy Unit resource page.

Provide Categorical Exclusion (CE) Compliance Review

Under the terms of the *NCDOT and FHWA Categorical Exclusion (CE) Programmatic Agreement*, the Environmental Policy Unit conducts an annual Compliance Review and Report of CEs completed by the various Units and Divisions. The review includes at least one CE from each Unit or Division that developed a CE within the calendar year and a total of at least 10 percent of all completed CEs.

As part of the Report, the Environmental Policy Unit develops a list of CEs completed by Type, which is provided to FHWA. The Environmental Policy Unit develops and finalizes the Compliance Review Report, making it available to NCDOT staff and FHWA. NCDOT and FHWA then meet to review areas of improvement and best practices noted in the CE review and report, determining if trainings or other steps are needed to ensure continued improvement in CE development.

1FS1 Conduct Candidate Project Analysis

Overview

Determine the universe of projects being considered for submission in the next two cycles of project prioritization.

Note: *Actions during the Project Initiation Stage may be led and completed by staff from several different NCDOT groups. Any person who has overall responsibility for a project during this Stage is referred to as the “Project Lead.” This lead could be the Feasibility Studies Engineer, the Corridor Development Engineer, the Division Planning Engineer, or someone in a similar role as tasked by a state or local agency.*

References

- [Express Design Project Scoping Report Process](#)

Deliverables

Deliverable	Task	Responsible Party	
		Activity Leader	Additional Support
		Feasibility Studies/Corridor Development Unit	
Corridor Study/Feasibility Study	<ul style="list-style-type: none"> ▪ Evaluate Need for a Feasibility Study or Corridor Study 	X	Division Staff, MPO/RPO, Transportation Planning
Candidate Projects List	<ul style="list-style-type: none"> ▪ Develop Candidate Projects List 		

Provide System Planning Studies

It is anticipated that System Planning Studies are to be provided to the Corridor Development Engineer, Metropolitan and/or Rural Planning Organizations (MPOs/RPOs), or Division staff (as appropriate) for consideration of candidate projects.

The Feasibility Studies/Corridor Development Unit is available to assist with Systems Planning Studies, but this Unit’s role occurs outside the normal Project Delivery Network process.

The results are compiled when developing the Candidate Projects List (see below).

Evaluate Need for a Feasibility Study or Corridor Study

Feasibility studies or corridor studies are a critical part of the Unit’s mission. The Feasibility Studies/Corridor Development Unit leads these studies, but this effort occurs outside the normal Project Delivery Network process. Feasibility studies and corridor studies are shared with the Divisions, MPOs/RPOs, and the Corridor Development Engineers.

The results of these studies are used to develop the Candidate Projects List (see below).

Compile Corridor Study/PEL Study (TP/MPO/RPO)

The Feasibility Studies/Corridor Development Unit provides information on completed Systems Planning, Feasibility, or Corridor Studies to the Corridor Development Engineer, MPOs/RPOs, or Division staff for their use in developing candidate projects. Responses to these requests are anticipated to take five business days from receipt.

The Feasibility Studies/Corridor Development Unit is available to assist as the project is being evaluated prior to development of Express Designs as needed (see 1FS2 for related information).

Develop Candidate Projects List

In development.

1FS2 Complete Express Design

Overview

As the first in-take of projects from external sources like Metropolitan Planning Organizations (MPOs), Rural Planning Organizations (RPOs), and Division offices, produce a consistent and reliable description of projects that includes a cost estimate, purpose and need statement, and high-level environmental screening.

References

- [Express Design Project Scoping Report Process](#)

Deliverables

Deliverable	Task	Responsible Party	
		Activity Leader	Additional Support
		Feasibility Studies/Corridor Development Unit	Assigned Private Engineering Firm
Express Design Evaluation Package	Receive Project Express Design Evaluation Request	X	
	Conduct Express Design Evaluation	X	X
	Finalize Express Design Deliverables	X	X
	Submit the Express Design Evaluation	X	

Receive Project Express Design Evaluation Request

If the Project Lead determines that additional information is needed to fully evaluate a potential project, he/she sends a request to the Feasibility Studies/Corridor Development Unit to conduct an Express Design Evaluation.

Note: It is anticipated that all projects have an Express Design evaluation. As this process is being implemented, the Feasibility Studies/Corridor Development Unit focuses on ensuring that all candidate projects needing an Express Design Evaluation are developed and supplied to the Corridor Development Engineer to allow for the project to be reviewed using SPOT Online and reviewed to determine if the project is ready of prioritization submittal (see 1SP1 for related information).

If a project is submitted to the Strategic Prioritization Office (SPOT) and has not already had an Express Design Evaluation initiated, then SPOT submits a Project Evaluation Request to the Feasibility Studies/Corridor Development Unit for inclusion into the Express Design Evaluation program.

Conduct Express Design Evaluation

The Feasibility Studies/Corridor Development Unit performs Express Design Evaluations on candidate projects as capacity permits.

To evaluate the candidate projects, the Feasibility Studies/Corridor Development Unit is to:

- Obtain the Long Range Transportation Plan (LRTP) (Metropolitan Transportation Plan [MTP] or Comprehensive Transportation Plan [CTP]).
- Coordinate with Metropolitan and/or Rural Planning Organizations (MPOs/RPOs)/Division Engineer/Project Lead and possibly the impacted municipality or county.
- Obtain existing traffic data (TPD) and perform appropriate level of capacity analysis in coordination with the Transportation Planning Division (see 1TP1 for related information).
- Coordinate with the Traffic Safety Planning Engineer to complete an Express Design traffic safety screening (see 1TS1 for related information).
- Coordinate with Traffic Management Unit (Congestion Management), as appropriate.
- Conduct high-level environmental screening using ATLAS.
- Conduct highway stormwater screening.
- Prepare conceptual designs based on the Express Design.
- Prepare ITS cost estimates.
- Coordinates the conceptual construction cost estimate with the Contract Standards and Development Unit (see 1CS1 for related information).
- Coordinate the preliminary estimate of utility relocation cost with the Utilities Coordinator (see 1UT1 for related information).
- Coordinate the conceptual right-of-way (ROW) cost estimate with the Central ROW Office (see 1RW1 for related information).

Finalize Express Design Deliverables

Following the *Express Design Project Scoping Report Process*, the Feasibility Studies/Corridor Development Unit compiles a package of information developed during the Express Design Evaluation, including the conceptual design, cost estimates, and Project Initiation Form (also known as the Express Design Summary).

The Feasibility Studies/Corridor Development Unit coordinates with the local RPO/MPO to ensure that the finalized Express Design is compatible with the local vision for the project. The Feasibility Studies/Corridor Development Unit revises the Express Design, if needed.

The final Express Design is uploaded to the ATLAS Workbench, which copies the document package to the Scoping Help SharePoint site.

Submit the Express Design Evaluation

The Feasibility Studies/Corridor Development Unit submits the Express Design Evaluation to SPOT, including the anticipated costs of the improvements. In addition, the Feasibility Studies/Corridor Development Unit notifies key NCDOT and MPO/RPO partners of the package being complete.

1FS3 Complete Project Scoping Report

Overview

Begin when a project is programmed in the State Transportation Improvement Program (STIP) to validate and enhance project information developed in the earlier Express Design Evaluation. To do this the Feasibility Studies/Corridor Development Unit develops a Project Scoping Report that has more alternatives, details, and may engage key stakeholders in discussions of those options.

References

- [Express Design Project Scoping Report Process](#)
- [Construction Contract Decision Matrix](#)

Deliverables

Deliverable	Task	Responsible Party	
		Activity Leader	Additional Support
		Feasibility Studies/Corridor Development Unit	Assigned Private Engineering Firm
Project Scoping Report Package	Review/Update Information from the Express Design Evaluation	X	X
	Develop and Complete Project Scoping Report	X	X

Review/Update Information from the Express Design Evaluation

If, during prioritization (see 1SP1 for related information), a project is selected for programming in the STIP (see 1S11 for related information), a review and update (if necessary) of the project data developed during the Express Design Evaluation is required. The *Express Design Project Scoping Report Process* is used to update the Express Design Evaluation information, as appropriate, and provides more in-depth information in the Project Scoping Report to inform the Project Manager how the project is to proceed in the Alignment Defined Stage.

Develop and Complete Project Scoping Report

Following review and update (if necessary) of the Express Design Evaluation, the Feasibility Studies/Corridor Development Unit develops the Project Scoping Report package as detailed in the *Express Design Project Scoping Report Process*.

To develop the package, the Feasibility Studies/Corridor Development Unit is to:

- Prepare the Project Scoping Screening Checklist
- Coordinate with the Traffic Safety Planning Engineer to complete a Project Scoping Report traffic safety screening (see 1TS1 for related information).
- Receive traffic forecast from the Transportation Planning Division (see 1TP1 for related information).
- Develop survey limits and request map (see 1LS1 for related information).

- Coordinate development of SUE level D with the Location & Survey Division Team Lead (see 1LS1 for related information).
- Coordinate the best available geospatial data from the Photogrammetry Unit (see 1PH1 for related information).
- Coordinate with the Roadway Design Unit as appropriate (see 1RD1 for related information).
- Develop the Project Scoping Technical Report.
- Complete the Construction Contract Decision Matrix.
- Complete the NEPA/Section 404 Merger Pre-Screening Form (and Merger Screening meeting and Concurrence Point 1, if appropriate) (see 1EP1 for related information).
- Update the Project Initiation Form (Express Design Summary).
- Coordinate with the Geotechnical Unit (GeoEnvironmental) to complete the GeoEnvironmental screening process (see 1GT1 for related information)
- Coordinate with the Geotechnical Unit to complete the Geotechnical Report for Planning (see 1GT1 for related information).
- Create ETRACS requests to the Environmental Analysis Unit (EAU) and Environmental Policy Unit (EPU) (see 1EN1 and 1EP1 for related information).
- Develop an initial Public Involvement Plan (PIP) in coordination with the Public Involvement Lead (see 1PI1 for related information).
- Initiate railroad coordination, if required for the project (see 1RR1 for related information).
- Prepare the Coordination Log.
- Create an ETRACS request to the Communications Group when the Project Scoping Report is complete to request comments (see 1CG1 for related information).
- Contact the Value Management Unit when the Scoping Report is complete so that this Unit can initiate its work (see 1VM1 for related information).

The Feasibility Studies/Corridor Development Unit uploads the Project Scoping Report package to ATLAS Workbench, which copies the package to the Scoping Help SharePoint site.

1GT1 Complete Geotechnical and GeoEnvironmental Screening

Overview

Identify and complete an accurate depiction of historical and existing facilities within the project limits and identify geotechnical issues that complicate or lead to unusual construction.

References

- [Geotechnical Investigation and Recommendations Manual](#)
- [GeoEnvironmental Product Matrix](#)

Deliverables

Deliverable	Task	Responsible Party		
		Activity Leader		Additional Support
		GeoEnvironmental Project Manager	Project Geological Engineer	Design Geotechnical Engineer
Geotechnical Input on Express Design	<ul style="list-style-type: none"> ▪ Provide Geotechnical Input on Express Design 	X	X	X
Geotechnical Report for Planning	<ul style="list-style-type: none"> ▪ Develop Geotechnical Report for Planning 	X	X	
GeoEnvironmental Scoping Comments Report	<ul style="list-style-type: none"> ▪ Develop GeoEnvironmental Screening Report 	X		

Provide Geotechnical Input on Express Design

Led by the GeoEnvironmental Project Manager and/or Project Geological Engineer, the geotechnical team identifies what major Geotechnical/GeoEnvironmental issues in study area are to be avoided. While input typically is not requested, it may originate from Transportation Planning Division for large projects, known existing conditions, or projects involving unique features, such as large and/or complex structures.

Develop Geotechnical Report for Planning

In accordance with the *Geotechnical Investigation and Recommendations Manual*, the geotechnical team:

- May provide pre-scoping comments followed by a formal screening report.
- Conduct a site visit with possible early borings when a large and/or complex bridge, three-sided culvert, or other unusual structure is a possibility or complete hand probes of areas of soft/organic soil in the study area that can be avoided by an alternative/alternate.
- Document findings and potential construction issues in the report.

Develop GeoEnvironmental Screening Report

To complete the screening report, the GeoEnvironmental Project Manager is to:

- Conduct a desktop review of GIS database files and ATLAS links of the project study area for GeoEnvironmental sites of concern.
- Prepare a report that includes a map and shapefile of the noted sites of concern.

2GT1 Prepare GeoEnvironmental Phase I Report

Overview

Develop the GeoEnvironmental Phase I Report.

References

- [NCDOT GeoEnvironmental Phase I Scope of Work](#)
- [NCDOT GeoEnvironmental Phase I Spreadsheet Template](#)
- [NCDOT GeoEnvironmental Phase I Template](#)
- [NCDOT GeoEnvironmental Product Matrix](#)

Deliverables

Deliverable	Task	Responsible Party
		Activity Leader
		GeoEnvironmental Project Manager
GeoEnvironmental Phase I Report	▪ Complete GeoEnvironmental Phase I Report and Related Materials	
GeoEnvironmental Phase I Spreadsheet		X
GeoEnvironmental GIS Shape File		

Complete GeoEnvironmental Phase I Report and Related Materials

This task is to develop Phase I products in accordance with the guidelines and references linked above.

For the GeoEnvironmental Phase I Report, the GeoEnvironmental Project Manager identifies sites of concern within the preferred alternative study limits via field reconnaissance, historical aerial review, and regulatory review. This information is included in the HazMat section of the environmental document or checklist.

To complete the GeoEnvironmental Phase I Spreadsheet, the GeoEnvironmental Project Manager populates the spreadsheet template with details of sites of concern for upload into Geotech database.

The GeoEnvironmental Project Manager develops the GeoEnvironmental GIS shape file, using the GIS template to populate details of sites of concern and upload into the ATLAS workbench.

2GT2 Conduct Subsurface Investigations and Provide Roadway Recommendations

Overview

Conduct subsurface investigation and provide design and construction recommendations to inform the Design Recommendation Plan Set.

Note: *This activity involves field work with equipment, which could be affected by weather, difficulty of access, property owners, moratoriums, traffic control and conflicts with existing traffic control, etc.*

References

- [Geotechnical Investigation and Recommendations Manual](#)

Deliverables

Deliverable	Task	Responsible Party		
		Activity Leader	Additional Support	
		Regional Geotechnical Manager	Design Geotechnical Engineer	Project Geological Engineer
Roadway Subsurface Investigation Inventory Report with graphics	<ul style="list-style-type: none"> ▪ <i>Provide Roadway Inventory and Recommendations</i> 		X	X
Roadway Slope Recommendation Memo			X	X
Roadway Recommendation Report possibly with graphics			X	X
Special Provisions			X	X

Provide Roadway Inventory and Recommendations

This task is to conduct subsurface investigation to inform the Design Recommendation Plan Set (see 2RD1 for related information). In accordance with the *Geotechnical Investigation and Recommendation Manual*, the Geotechnical Engineering Unit completes a Roadway Subsurface Investigation Inventory Report (with graphics). The inventory is initiated when the Project Manager sends a request for recommendations, with a date information is needed by, and location of electronic plans to the appropriate geotechnical division: Geo_Pre-let_Div1-6@ncdot.gov, Geo_Pre-let_Div7-8@ncdot.gov or Geo_Pre-let_Div9-14@ncdot.gov.

From there, the geotechnical team:

- Assigns the work to an in-house field office or Private Engineering Firm.
- Holds a kickoff meeting and develops an investigation plan.
- Notifies 811 to locate utilities, where needed, and completes a field investigation
- Assigns samples for lab testing and compiles results.
- Enters field log data into gINT and post bore logs.
- Develops stratigraphy and complete graphics.

The geotechnical team summarizes results in the inventory report and lists soils present in the project area and geotechnical areas of special interest.

For the Roadway Recommendation Report (possibly with graphics), the Design Engineer or Project Geological Engineer completes Section I of recommendations, with the Project Geological Engineer completing Section II thru IV of recommendations.

The Geotechnical Engineering Unit provides a Roadway Slope Recommendations Memo to the Project Manager, if the Roadway Recommendation Report is not available prior to development of the Field Inspection Plan Set. Additional report content includes development of:

- Recommendation graphics,
- Geotechnical quantity summary (attached to report), and
- Geotechnical summary of quantities spreadsheet.

For Special Provisions, the Geotechnical Engineering Unit considers:

- Special handling of material.
- Blasting or vibration requirements in addition to what is in the NCDOT *Spec Book Transmit Inventory and Recommendation Report*

The inventory and recommendation report are then uploaded to the project SharePoint site.

2GT3 Complete Pavement and Subgrade Investigations and Pavement Design Investigation (PDI) Report

Overview

Conduct subsurface investigation of existing pavement and subgrade and provide recommendations for proposed pavement designs. Refer to the NCDOT *Geotechnical Investigation and Recommendation Manual* linked below.

Note: *This activity involves field work with equipment, which could be affected by weather, difficulty of access, property owners, moratoriums, traffic control and conflicts with existing traffic control, etc.*

References

- [Geotechnical Investigation and Recommendations Manual](#)

Deliverables

Deliverables	Task	Responsible Party	
		Activity Leader	Additional Support
		Geopavement Supervisor	Geopavement Engineer
Pavement Design Investigation (PDI) Report	<ul style="list-style-type: none"> ▪ Provide Pavement Design Investigation Report 	X	X

Provide Pavement Design Investigation (PDI) Report

This task involves conducting subsurface investigation of existing pavement and subgrade, providing recommendations for proposed pavement designs (see 2PD1 for related information). In accordance with the *Geotechnical Investigation and Recommendation Manual*, the Geotechnical Engineering Unit receives a request from Pavement Design Engineer or Project Manager to begin work.

From there, the Geotechnical Engineering Unit:

- Develops an investigation plan and conducts a scoping meeting with the Private Engineering Firm.
- Notifies 811 to locate utilities, where needed, and completes a field investigation
- Assigns samples for lab testing and compiles results.
- Enters field log data into gINT and post bore logs.
- Develop graphics with pavement core photos.

The geotechnical team summarizes results that includes recommendations, a geotechnical quantity summary (attached to report), and geotechnical summary of quantities spreadsheet. The Pavement Design Investigation (PDI) Report is then provided to the Pavement Design Engineer and Project Manager.

3GT1 Prepare GeoEnvironmental Phase II Report

Overview

Develop the GeoEnvironmental Phase II Report.

References

- [GeoEnvironmental Report Standards](#)
- [Geotechnical Investigation and Recommendations Manual](#)

Deliverables

Deliverable	Task	Responsible Party	
		Activity Leader	
		GeoEnvironmental Supervisor	GeoEnvironmental Project Manager
GeoEnvironmental Phase II Report	<ul style="list-style-type: none"> ▪ <i>Develop GeoEnvironmental Phase II Reporting</i> 	X	X
GeoEnvironmental Right-of-Way Recommendations		X	X
GeoEnvironmental Design and Environmental Conflict Memo		X	X

Complete GeoEnvironmental Phase II Reporting

The task of developing the Phase II report involves:

- Collecting samples from sites of concern to determine risk and potential impacts to the project.
- Completing the GeoEnvironmental right-of-way recommendations, where acquisition recommendations on sites of concern inform the Right-of-Way Plan Set and Phase II Investigation results.

The GeoEnvironmental Project Manager then prepares a *GeoEnvironmental Design and Environmental Conflict Memo* that is sent to the Project Manager, identifying conflicts discovered during the Phase II investigation.

3GT2 Conduct Subsurface Investigations and Provide Structures Recommendations

Overview

Conduct subsurface investigation and recommendations for proposed structures.

Note: *This activity involves field work with equipment, which could be affected by weather, difficulty of access, property owners, moratoriums, traffic control and conflicts with existing traffic control, etc.*

References

- [Geotechnical Investigation and Recommendations Manual](#)
- [Temporary Shoring Standard Provision](#)
- [Standard Temporary Shoring Detail 1801.01](#)
- [Standard Sound Barrier Wall Foundations](#)
- [GeoEnvironmental Report Standards](#)

Deliverables

Deliverables	Task	Responsible Party		
		Activity Leader	Additional Support	
		Regional Geotechnical Manager	Design Geotechnical Engineer	Project Geological Engineer
Structure Subsurface Investigation Inventory Report with graphics	<ul style="list-style-type: none"> ▪ Provide Structure Inventory and Foundation Recommendations 			X
Design Scour Report			X	
Foundation Recommendation Report		X	X	
Structure Special Provisions			X	
Temporary Shoring Recommendations	<ul style="list-style-type: none"> ▪ Provide temporary shoring recommendation 		X	
Retaining Wall Subsurface Investigation Inventory Graphics	<ul style="list-style-type: none"> ▪ Provide Retaining Wall Inventory and Recommendations 			X
Retaining Wall Recommendation Report with Details			X	
Retaining Wall Special Provisions			X	
Sound Barrier Subsurface Investigation Inventory Graphics	<ul style="list-style-type: none"> ▪ Provide Sound Barrier Inventory and Recommendations 			X
Sound Barrier Recommendations Report with graphics			X	
Sound Barrier Special Provisions			X	

Provide Structure Inventory and Foundation Recommendations

In accordance with the *Geotechnical Investigation and Recommendation Manual*, the process to develop the necessary recommendations and documentation is initiated when the Project Manager sends a

request for recommendations, date information is needed, and location of electronic plans to: Geo_Pre-let_Div1-6@ncdot.gov, Geo_Pre-let_Div7-8@ncdot.gov or Geo_Pre-let_Div9-14@ncdot.gov.

From there, the Geotechnical Engineering Unit:

- Assigns the work to an in-house field office or Private Engineering Firm.
- Holds a kickoff meeting and develops an investigation plan that includes a review of the theoretical scour from the Bridge Survey and Hydraulic Design Report (BSR) (see 2HY2 for related information).
- Notifies 811 to locate utilities, where needed, and completes a field investigation.
- Assigns samples for lab testing and compiles results.
- Enters field log data into gINT and post bore logs.
- Develops stratigraphy and complete graphics.
- Summarizes the results in the inventory, as necessary.

To complete a Design Scour Report, the Design Geotechnical Engineer calculates geotechnically adjusted scour and develops the report.

For the Foundation Recommendation Report, the Geotechnical Engineering Unit is to:

- Determine most appropriate foundation type for each bent or culvert.
- Determine point of fixity for drilled shafts or piles.
- Obtain structure loads from Structures Management Unit or assigned Private Engineering Firm.

This task also includes developing special provisions, if needed.

The Inventory and Foundation Recommendation Report files are then sent to the originator of the request and Hydraulics Unit.

Provide Temporary Shoring Recommendations

Initiated by the Project Manager, a request for recommendations, date information is needed, and location of electronic plans are sent to Geo_Pre-let_Div1-6@ncdot.gov, Geo_Pre-let_Div7-8@ncdot.gov or Geo_Pre-let_Div9-14@ncdot.gov. The Design Geotechnical Engineer then develops temporary shoring recommendations in accordance with the *Temporary Shoring Standard Provision*. This task is assigned to in-house staff or a Private Engineering Firm and involves:

- Reviewing the proposed structures and subsurface information.
- Determining if standard shoring is appropriate.
- Developing temporary shoring recommendations and providing the recommendations to the Project Manager.

Provide Retaining Wall Inventory and Recommendations

To complete subsurface investigations and providing recommendations for proposed retaining walls, the Project Manager initiates the request for recommendations, date information is needed, and location of electronic plans to Geo_Pre-let_Div1-6@ncdot.gov, Geo_Pre-let_Div7-8@ncdot.gov or Geo_Pre-let_Div9-14@ncdot.gov. The Design Geotechnical Engineer, supported by the Project Geological Engineer, refers to the *Geotechnical Investigation and Recommendation Manual* when developing the recommendations and performs, if possible, the investigation during roadway subsurface investigation.

From there, the Geotechnical Engineering Unit:

- Assigns the work to an in-house field office or Private Engineering Firm.
- Holds a kickoff meeting and develops an investigation plan.
- Notifies 811 to locate utilities, where needed, and completes a field investigation.
- Assigns samples for lab testing and compiles results.
- Enters field log data into gINT and post bore logs.
- Develops stratigraphy and complete graphics.
- Summarizes the results in the inventory, as necessary.

To complete the Retaining Wall Recommendation Report (with details), the Design Geotechnical Engineer is to:

- Determine the most appropriate retaining wall for cut or fill site.
- Confirm no scour issues or recommend countermeasures.
- Check bearing capacity of soils as appropriate.
- Check global stability.
- Develop details.

This task also includes developing special provisions, if needed.

The Inventory and Recommendation Report files are then sent to the Project Manager or the originator of the request.

Provide Sound Barrier Inventory and Recommendations

To complete subsurface investigations and provide recommendations for proposed sound barrier foundations, the Project Manager initiates the request for recommendations, date information is needed, and location of electronic plans to Geo_Pre-let_Div1-6@ncdot.gov, Geo_Pre-let_Div7-8@ncdot.gov or Geo_Pre-let_Div9-14@ncdot.gov. In accordance with the *Geotechnical Investigation and Recommendation Manual*, the Design Geotechnical Engineer develops the recommendations, including any sound barrier inventory graphics. This includes:

- Assigning the work to an in-house field office or Private Engineering Firm.
- Holding a kickoff meeting and developing an investigation plan.
- Notifying 811 to locate utilities, where needed, and completing a field investigation.
- Assigning samples for lab testing and compiling results.
- Entering field log data into gINT and post bore logs.

- Developing stratigraphy and completing graphics.
- Summarizing the results in the inventory, as necessary.

To complete the Sound Barrier Recommendation Report (with details), the Design Geotechnical Engineer is to determine the most appropriate retaining wall for cut or fill site.

This task also includes developing special provisions, if needed.

The Inventory and Recommendation Report files are then sent to the Project Manager or the originator of the request.

4GT1 Prepare GeoEnvironmental Phase III Reports

Overview

Prepare GeoEnvironmental Sites of Concern for Let by removing buried fuel tanks, contaminated materials, and environmental monitoring wells in conflict with the project, documenting each in the GeoEnvironmental Phase III reports. Items that are not practicable to remove prior to project letting are to be addressed in a project special provision. Project Managers, Division, Geotechnical Offices, and North Carolina Department of Environmental Quality (NCDEQ) are recipients of these reports. The Environmental Protection Agency (EPA) also receive a report if a Superfund site is present.

References

- ❑ [GeoEnvironmental Report Standards](#)
- ❑ [NCDOT GeoEnvironmental Product Matrix](#)
- ❑ [Geotechnical Investigation and Recommendations Manual](#)

Deliverables

Deliverable	Task	Responsible Party
		Activity Leader
		GeoEnvironmental Project Manager
Underground Storage Tank Removal Report	<ul style="list-style-type: none"> ▪ Provide GeoEnvironmental Phase III Report 	X
Environmental Groundwater Monitoring Well and Closure Report		X
Contaminated Soil Removal Report		X
Contaminated Materials Management Plan		X

Provide GeoEnvironmental Phase III Reports

The GeoEnvironmental Project Manager prepares the following reports and/or plans to complete the GeoEnvironmental Phase III Reporting. Each report is independent and may not be necessary on every project.

- Underground Storage Tank Removal Report
 - ♦ Remove underground fuel tanks after right-of-way has been acquired and buildings have been demolished.
 - ♦ Document the process, results, and future actions (if necessary) in the report.
 - ♦ Send the report to the Project Manager and NCDEQ.
- Environmental Groundwater Monitoring Well Closure Report
 - ♦ Close monitoring wells in conflict with the project.
 - ♦ Document the process, results, and future actions (if necessary) in the report.
 - ♦ Send the report to the Project Manager and NCDEQ.
- Contaminated Soil Removal Report
 - ♦ Remove contaminated soil prior to project letting if practical.
 - ♦ Document the process, results, and future actions (if necessary) in the report.

- Send the report to Project Manager and NCDEQ.
- Contaminated Materials Management Plan
 - Remove other contaminated media prior to project letting if practical.
 - When it is not practical, develop a Materials Management Plan to describe materials handling during construction.
 - Develop project special provision(s) to be included in the contract that describe material handling, personal protective equipment (if needed), and any other processes necessary to construct the project.
 - Send the plan to the Project Manager and NCDEQ.

2HY1 Develop Preliminary Hydraulic Recommendations

Overview

Develop preliminary hydraulic recommendations and provide support for Merger meetings (if applicable for the project).

References

- [Hydraulics Planning Report Guidance](#)
- [Guidelines for Drainage Studies](#)
- [Post-Construction Stormwater Program Post-Construction Stormwater Controls for Roadway and Non-Roadway Projects](#)
- [Stormwater Best Management Practices Toolbox](#)
- [Highway Floodplain Program](#)
- [U.S. Geological Survey Resources](#)

Deliverables

Deliverable	Task	Responsible Party	
		Activity Leader	Additional Support
		Hydraulic Design Engineer	Project Manager
Hydraulic Planning Report (HPR)	<ul style="list-style-type: none"> ▪ Complete Hydraulic Planning Report (HPR) 	X	X

Complete Hydraulic Planning Report (HPR)

The Hydraulic Design Engineer completes the Hydraulic Planning Report in accordance with the *Hydraulic Planning Report Guidance* and scope of work. To complete this report, the Hydraulic Design Engineer:

- Researches and gather data for the project study area.
- Conducts the preliminary hydraulics field review.
- Identifies hydraulics-related project commitments that are to be included on the Project Special Commitments (Green Sheets).
- Completes preliminary design calculations and structure sizing.
- Identifies any high-risk areas that may require additional effort outside of the original scope or earlier than when it would usually be completed to make adequate preliminary recommendations and verify FEMA compliance can be achieved and the project can meet environmental permitting requirements.
- Reviews Post-Construction Stormwater Program workflows for National Pollutant Discharge Elimination System (NPDES) stormwater requirements.
- Prepares the Preliminary Stormwater Management Plan (SMP).
- Prepares the Hydraulic Planning Report and delivers an electronic copy of the report to the Project Manager and the Hydraulics Reviewer.
- Revises and resubmits as needed to address the Hydraulics Reviewer’s comments.

The Project Manager reviews the report for recommendations that may impact the project's scope, schedule, or budget or which may conflict with other disciplines'/Units' recommendations and is to initiate further coordination when appropriate.

The Project Manager also provides the report to other technical disciplines/Units and initiates additional discussions when appropriate.

- The Roadway Design Unit is to use the report in the development of the Design Recommendation Plan Set (see 2RD1 for related information).
- The Structures Management Unit is to review and notify the Project Manager of any concerns. If the report recommends retaining a hydraulic structure, the Structures Management Unit is to notify the Project Manager and Hydraulic Design Engineer if it recommends replacement of the structure due to structural deficiencies or other reasons.
- The recommendations from the Preliminary Hydraulic Recommendations table included in the report is to be presented during the Merger CP2A meeting by the Project Manager (see 2EP1 for related information).
- The report provides general hydraulics information to both internal and external stakeholders and may aid in the development of scopes of work or man day estimates for later project phases.

Provide Hydraulic Support

The Hydraulic Design Engineer provides support to the Project Manager and other technical disciplines/Units. This support may include:

- Attending meetings and offering hydraulic expertise and recommendations related to the project.
- Responding to drainage-related questions and concerns.
- Coordinating with others to resolve conflicting recommendations among disciplines/Units.

For Merger projects (if applicable), the Hydraulic Design Engineer is to:

- Attend the Merger CP2 and CP2A meetings to respond to drainage-related questions or concerns (see 2EP1 for related information). The Project Manager is to present the recommendations from the Preliminary Hydraulic Recommendations Table developed in the Hydraulic Planning Report at this meeting.
- Attend other Merger meetings to provide hydraulic information, recommendations, and to identify potential issues related to the drainage design.

2HY2 Initiate Drainage Design for Field Inspection

Overview

Review and provide comments on the Design Recommendation Plan Set and complete drainage design to be shown on the Field Inspection Plan Set.

References

- [Guidelines for Drainage Studies](#)
- [Post-Construction Stormwater Program Post-Construction Stormwater Controls for Roadway and Non-Roadway Projects](#)
- [Stormwater Best Management Practices Toolbox](#)
- [Highway Floodplain Program](#)
- [U.S. Geological Survey Resources](#)

Deliverables

Deliverable	Task	Responsible Party		
		Activity Leader	Additional Support	
		Hydraulic Design Engineer	Project Manager	Roadway Design Lead
Review Comments on Design Recommendations Plan Set(s)	Review Roadway Design Plans for Drainage Issues	X		
	Attend Design Recommendations Plan Set Review Meeting	X	X	
Hydraulics Pre-Design Meeting Documentation	Prepare for and Conduct Hydraulics Pre-Design Meeting	X		
Hydraulic Survey Reports for Major Structures	Complete Field Visit and Hydraulic Surveys	X		
	Request Additional Information	X		X
	Prepare Major Structure Reports	X		
Draft Flood Resilience Plan	Complete Draft Flood Resilience Plan	In development	In development	In development
Drainage Plans for Merger CP4B Meeting	Conduct Merger CP4B Meeting (if applicable for the project)	X		X
Merger CP4B Meeting Package and Minutes	Conduct Merger CP4B Meeting (if applicable for the project)	X		
Drainage Plans for Field Inspection	Complete Drainage Designs for the Field Inspection Plan Set	X		
	Review Field Inspection Plan Set and Attend Field Inspection	X	X	
Railroad Drainage Submittals	Coordinate Railroad Drainage Design (if applicable for the project)	X		

Review Roadway Design Plans for Drainage Issues

The Project Manager sends the Design Recommendation Plan Set to the Hydraulic Design Engineer and Hydraulics Reviewer for review. The reviewers are to:

- Provide comments on the plans, identify potential drainage issues, and make recommendations that would improve drainage conditions on the project. Minimally, the review is to include the items listed in Section 4.1 of the *Guidelines For Drainage Studies and Hydraulic Design*.
- Review subsequent roadway plan submittals to make sure comments have been addressed, and no new concerns have been created.

Attend Design Recommendations Plan Set Review Meeting

After receiving the Design Recommendation Plan Set from the Project Manager, the Hydraulic Design Engineer is to attend the Design Recommendation Plan Set review meeting, which is further detailed in 2RD1.

Prepare for and Conduct Hydraulics Pre-Design Meeting

Prior to starting the drainage design, the Hydraulic Design Engineer is to:

- Complete Page 1 of Checklist for Drainage Study and Hydraulic Design and prepare Drainage Design Assumptions, Criteria, and Design Question List in preparation for the Hydraulics Pre-Design Meeting Minutes.
- Schedule and conduct the Hydraulics Pre-design Meeting with the Hydraulics Reviewer in accordance with the *Hydraulic Pre-Design Meeting Guidance*.
- Prepare and submit for review/approval the Hydraulics Pre-Design Meeting Minutes to document decisions made during the meeting and follow up tasks that need to be completed.

Complete Field Visit and Hydraulic Surveys

The hydraulic field visit and surveys are used to familiarize the Hydraulic Design Engineer(s) with the project area, identify and document existing drainage patterns and problems, and identify and obtain additional survey information needed to complete the drainage design.

For this task, the Hydraulic Design Engineer:

- Conducts field surveys in accordance with Chapter 5 Field Reconnaissance and Survey of the *Guidelines For Drainage Studies and Hydraulic Design*.
- Incorporates field notes, photos, and documentation of surveys and data gathered into the drainage redlines, major structure reports, or separate documentation posted on the project SharePoint site.

Request Additional Information

The Hydraulic Design Engineer identifies and requests any additional information or revisions needed from other technical disciplines/Units. The Project Manager coordinates the requests, which may include:

- Additional survey requests
- Subsurface investigation requests
- Existing pipe inspections
- Corrections to survey or WET/WEX files
- Special detail requests

Prepare Major Structure Reports

Major structure reports include the Bridge Survey and Hydraulic Design Reports (BSRs), Detour Survey and Hydraulic Design Reports (DSRs), and Culvert Survey and Hydraulic Design Reports (CSRs).

- A BSR is generally required for all bridges over stream crossings or other waterways.
- A CSR is required for any culvert structure that is on a FEMA-regulated stream or has a hydraulically effective total waterway opening of thirty square feet or more, excluding any area of the culvert that is buried below the streambed.
- A DSR is required if an on-site detour is proposed for any site that requires a BSR or CSR.

The major structure reports are used to document the hydraulic design and to provide information to others. For this task, the Hydraulic Design Engineer is to:

- Complete field reconnaissance and surveys at each major structure prior to completing the report.
- Prepare and Submit draft BSRs to the Project Manager and the Hydraulics Reviewer.
 - The draft BSR is reviewed by the Hydraulics Reviewer, as coordinate with the Structures Management Unit to determine if the proposed structure type, length, span arrangement, and other design information is acceptable.
 - The Structure Management Unit coordinates with the Regional Bridge Construction Engineer and the Area Construction Engineer on constructability issues and concerns.
- Prepare and submit major structure reports to the Project Manager and Hydraulics Reviewer. Note: CSR submittals are to include a construction phasing plan.
- Revise and resubmit the major structure reports upon receiving comments from the Hydraulics Reviewer.
- Upon notification that the report is approved, send the report to the Hydraulics Reviewer for the reviewer to sign the front of the report.

The Project Manager is to distribute the approved structure reports (bridge and culverts) together with any construction phasing plan(s) to the Division Engineer, Area Bridge Engineer, Roadway Design Unit/Roadway Design Lead, Structures Management Unit/Structures Lead, and Geotechnical Engineering Unit/Design Geotechnical Engineer. In addition to the above, CSRs are to be distributed with the construction phasing plan to the Roadside Environmental Unit/Roadside Environmental Engineer.

Complete Draft Flood Resilience Plan

Guidance currently in development.

Conduct Merger CP4B Meeting (if applicable for the project)

If the project is following the Merger Process (see 2EP1 for related information), the Merger CP4B meeting is held after the CP4A meeting and while the drainage designs are being completed for the Field Inspection Plan Set. The Hydraulic Design Engineer presents the preliminary drainage design layouts to the agencies and obtain input, comments, and concerns from the team members.

The Hydraulic Design Engineer is to:

- Notify the Hydraulics Reviewer of the preferred date and amount of time needed for the Merger CP4B meeting approximately two months prior to the preferred date for central managed projects.
 - The Hydraulics Reviewer coordinates with the Environmental Policy Unit to schedule the meeting and notify attendees.
 - For non-central managed projects, follow the direction of the Project Manager for scheduling the meeting and inviting attendees.
- Prepare and submit Merger CP4B meeting plans for review to the Hydraulics Reviewer, Project Manager, and Environmental Analysis Unit for central-managed projects or as directed by the Project Manager for non-central managed projects.
 - It is recommended the CP4B plans be submitted for review at least five weeks prior to the scheduled Merger CP4B meeting to allow adequate time for review and revisions, if necessary.
 - The plans are to be developed in accordance with the Merger CP4B Meeting Guidance.
 - Review comments are returned to the Hydraulic Design Engineer.
- Revise and resubmit the Merger CP4B meeting plans as needed for approval.
 - Upon approval, the Hydraulic Reviewer provides the final meeting plans to the Environmental Policy Unit to post for team members to access.
 - Plans are to be posted at least two weeks prior to the meeting date.
- Conduct the Merger CP4B meeting in accordance with the Merger CP4B Meeting Guidance.
- Prepare meeting minutes in accordance with the Merger CP4B Meeting Guidance to document discussion and decisions made during the meeting.

Complete Drainage Designs for the Field Inspection Plan Set

The Hydraulic Design Engineer completes the Redline Drainage Plans in accordance with the project's scope of work and *Guidelines for Drainage Studies and Hydraulic Design*. The field visit and hydraulic surveys are completed prior to completing the drainage designs. The design is documented on the hydraulic redline plans.

Once complete, the Hydraulic Design Engineer:

- Submits the Redline Drainage Plans along with all supporting documentation and calculations to the Project Manager and the Hydraulics Reviewer. The Redline Drainage Plans is to include the following:
 - Storm drain systems
 - Culvert and cross-pipes
 - Channel and ditch designs
 - Identification of additional right-of-way or easements needed for drainage purposes
 - Stormwater devices
 - Outfall analyses
 - Documentation of existing drainage patterns and other field survey information and notes
- Revises and resubmits the Redline Drainage Plans to address comments received from the Hydraulics Reviewer.

Upon approval of the Redline Drainage Plans, the Hydraulics Reviewer notifies the Project Manager that the drainage design is ready for incorporation into the Field Inspection Plan Set.

Review Field Inspection Plan Set and Attend Field Inspection

The Hydraulic Design Engineer reviews the Field Inspection Plan Set prior to the meeting for any drafting errors or potential conflicts with the drainage design. The Hydraulic Design Engineer attends the Field Inspection Review Meeting. This task includes:

- Responding to questions or concerns relating to the drainage design.
- Initiate discussion on drainage items that may need coordination.
- Participating in traffic control and phasing discussions as it relates to the drainage design.
- Obtaining information needed to complete environmental permit drawings, such as amount and type of clearing required and construction methods and impacts required for construction of major structures (e.g., temporary work bridges, causeways, and work pads).

Coordinate Railroad Drainage Design (if applicable for the project)

If railroad drainage submittals are required for the project, the Hydraulic Design Engineer provides drainage plans, drainage calculations, and other drainage information requested by the Structure Management Unit or Project Manager, as needed for coordination with the applicable railroads for approval.

This information is supplied after the drainage design has been advanced. If the project schedule along with the expected time frame for railroad review and approval allow, it is recommended this coordination take place after any necessary revisions from the Field Inspection Review Meeting have been incorporated.

The Hydraulic Design Engineer submits any required information to the Hydraulics Reviewer for review/comment, and upon approval, the Reviewer provides the information to the requester (Structure Management Unit or Project Manager).

3HY1 Complete Hydraulic Design

Overview

Complete the final drainage designs to be shown on the Right-of-Way Plan Set and complete all required environmental permit drawings and Federal Emergency Management Agency (FEMA) compliance packages.

References

- [Guidelines for Drainage Studies](#)
- [Post-Construction Stormwater Program Post-Construction Stormwater Controls for Roadway and Non-Roadway Projects](#)
- [Stormwater Best Management Practices Toolbox](#)
- [Highway Floodplain Program](#)

Deliverables

Deliverable	Task	Responsible Party	
		Activity Leader	Additional Support
		Hydraulic Design Engineer	Project Manager
Final Drainage Design	<ul style="list-style-type: none"> ▪ Complete Final Drainage Design 	X	X
FEMA Compliance Packages (MOA/CLOMR)	<ul style="list-style-type: none"> ▪ Prepare and Submit FEMA Compliance Packages 	X	
Final Flood Resilience Plan	<ul style="list-style-type: none"> ▪ Complete Final Flood Resilience Plan 	X	
Drainage Summary Sheet(s)	<ul style="list-style-type: none"> ▪ Complete Drainage Summary Sheet(s) 	X	
Stormwater Management Plan	<ul style="list-style-type: none"> ▪ Prepare Stormwater Management Plan 	X	
Environmental Permit Drawings	<ul style="list-style-type: none"> ▪ Complete/Submit Environmental Permit Drawings 	X	
Merger CP4C Meeting Package and Minutes	<ul style="list-style-type: none"> ▪ Conduct Merger CP4C Meeting (if applicable for the project) 	X	X

Complete Final Drainage Design

The final Redline Drainage Plans is completed after the Field Inspection Review Meeting and may require ongoing incorporation of drainage revisions due to field inspection comments, revisions to the roadway design plans during the Plan-in-Hand Stage, constructability concerns (notably those coming out of the Constructability Review), and/or utility conflicts. To complete this task, the Hydraulic Design Engineer is to:

- Revise and resubmit the Redline Drainage Plans as directed by the Project Manager and Hydraulics Reviewer.
- Submit all revisions to the Project Manager and Hydraulics Reviewer.
 - Revised submittals are to include an updated set of Redline Drainage Plans along with all supporting documentation and calculations necessary to review and approve the drainage revisions.

- The Hydraulics Reviewer notifies the Project Manager when the revisions have been approved and may be incorporated into the current roadway plans under this stage.
- Upon final approval, the Hydraulic Design Engineer submits a final record set of updated Redline Drainage Plans, computations, and supplemental data (including photos) for archiving.

Prepare and Submit FEMA Compliance Packages

To complete this task, the Hydraulic Design Engineer:

- Prepares any FEMA compliance packages (MOA, CLOMR, etc.) needed for the project following the procedures for the type of FEMA compliance required.
 - Additional information on this process is included on the [Hydraulic Unit's Highway Floodplain Program website](#) and in Chapter 15 of the *Guidelines For Drainage Studies and Hydraulic Design*.
- Revises and resubmits documents to address comments from FEMA and/or FMP.
 - The Hydraulics Unit (Floodplain Management) uploads approval letters to the project SharePoint site and notifies the Roadway Design Lead, Hydraulics Reviewer, and Project Manager when approval is received.

Complete Final Flood Resilience Plan

Guidance currently in development.

Complete Drainage Summary Sheet(s)

The Hydraulic Design Engineer completes the Drainage Summary Sheets and provides them to the Roadway Design Lead for incorporating into the current roadway design plans/Right-of-Way Plan Set.

Prepare Stormwater Management Plan

In accordance with Section 13.4.1.2 of the *Guidelines for Drainage Studies and Hydraulic Design*, the Hydraulic Design Engineer prepares a Stormwater Management Plan for any project that adds new built upon area for inclusion in the Environmental Permit Drawing Package.

The Hydraulic Design Engineer submits the Stormwater Management Plan for review as part of the Environmental Permit Drawing Package.

Complete/Submit Environmental Permit Drawing Package

The Hydraulic Design Engineer prepares the environmental permit drawing permit package used for the environmental permit application(s) as follows.

- Obtain information needed from others.
 - The Structures Management Unit provides impact quantities for temporary and permanent bridge bents.
 - The Structures Management Unit and Division coordination may be required to determine impacts due to temporary work pads, work bridges, causeways, etc.
 - Others are coordinated with depending on project specifics.
- Complete environmental permit drawings, including (as applicable to the project):
 - Wetland and surface water permit drawings

- Buffer permit (NCDWR) drawings
- Coastal Area Management Act (CAMA) (NC Division of Coastal Management) permit drawings
- Federal Energy Regulatory Commission (FERC) permit drawings
- Submit the drawings with the Stormwater Management Plan to the Project Manager and Hydraulics Reviewer. The Project Manager is to distribute to others, including the Roadway Design Lead and Environmental Analysis Unit for review and comment.
- Revise and resubmit (as needed) to address comments received.
- Conduct the Merger CP4C meeting (if required for the project; see Conduct Merger CP4C Meeting below), incorporate any changes agreed to during the Merger CP4C meeting, and then resubmit the package to the Hydraulics Reviewer.
- Provide CADD files of the impacts.
 - The Utilities Unit uses these CADD files to complete their own permit drawings showing additional utility impacts.
 - The Roadside Environmental Unit uses these files to determine if additional impacts need to be included to account for erosion control measures, notifying the Hydraulic Design Engineer and Hydraulics Reviewer if additional impacts are needed.
 - The Roadway Design Unit uses these files for a consistency review with the current roadway design plans.
- Assist the Environmental Analysis Unit (Environmental Coordination and Permitting), as needed, for them to complete the environmental permit applications or respond to permitting agencies' questions or concerns until necessary permits are secured.

Chapter 14 and Appendix P in the *Guidelines for Drainage Studies and Hydraulic Design* provides additional information on how to prepare these drawings.

Conduct Merger CP4C Meeting (if applicable for the project)

If the project is following the Merger Process (see 2EP1 for related information), the Merger CP4C meeting is held after the Merger CP4B meeting to present the approved Redline Drainage Plans and Environmental Permit Drawing Package to the agencies and allow for discussion of the environmental impacts. Other items that may be discussed are avoidance and minimization measures and changes from what was presented during the Merger CP4B meeting. The Merger CP4C meeting is held after approval of the Redline Drainage Plans and submittal of the Environmental Permit Drawing Package.

The Hydraulic Design Engineer is to:

- Notify the Hydraulics Reviewer of the preferred date and amount of time needed for the Merger CP4C meeting approximately two months prior to the preferred date for central managed projects.
 - The Hydraulics Reviewer coordinates with the Environmental Policy Unit to schedule the meeting and notify attendees.
 - For non-central managed projects, follow the direction of the Project Manager for scheduling the meeting and inviting attendees.
- Prepare and submit Merger CP4C meeting plans (Environmental Permit Drawing Package) to the Hydraulics Reviewer, Project Manager, and Environmental Analysis Unit for central managed projects or as directed by the Project Manager for non-central managed projects.

- The plans are to be developed in accordance with the Merger CP4C Meeting Guidance.
- Review comments are returned to the Hydraulic Design Engineer.
- Revise and resubmit the Merger CP4C meeting plans as needed for approval.
- Upon approval, the Hydraulic Reviewer provides the final meeting plans to the Environmental Policy Unit to distribute to team members.
- Plans are to be posted at least two weeks prior to the meeting date.
- Conduct the Merger CP4C meeting in accordance with the Merger CP4C Meeting Guidance.
- Prepare meeting minutes in accordance with the Merger CP4C Meeting Guidance to document discussion and decisions made during the meeting.

4HY1 Complete Any Open Hydraulic Tasks

The Hydraulics Unit is to complete any outstanding tasks from the previous stages, continuing work toward securing FEMA compliance and continuing to provide support to other disciplines/Units as needed to incorporate plan revisions and secure the permits.

1IM1 Review for Complete Streets

Overview

Assess the *Complete Streets Project Sheet* for multimodal facilities and requested exemptions to identify all planned and existing facilities, in addition to facilities requested by the local municipality.

Note: *Actions during the Project Initiation Stage may be led and completed by staff from several different NCDOT groups. Any person who has overall responsibility for a project during this Stage is referred to as the "Project Lead." This lead could be the Feasibility Studies Engineer, the Corridor Development Engineer, the Division Planning Engineer, or someone in a similar role as tasked by a state or local agency.*

References

- Complete Streets Policy and Implementation Guide*
- [Complete Streets Memo/Policy](#) (*In Development: The design guidance will ultimately be housed in the updated NCDOT Roadway Design Manual.*)
- Complete Streets Project Sheet*
- Bicycle and Pedestrian Crash Data*
- Pedestrian and Bicycle Infrastructure Network GIS Data (ATLAS)*

Deliverables

Deliverable	Task	Responsible Party		
		Activity Leader	Additional Support	Additional Support
		IM Staff	Complete Streets Coordinator	Project Lead
Complete Streets Project Sheet	▪ <i>Conduct Project Review</i>		X	X
Integrated Mobility Division Review/Scoping Memo	▪ <i>Conduct Project Review</i>	X	X	

Conduct Project Review

To conduct a project review, the Project Lead initiates an Integrated Mobility Division scoping request by emailing a scoping request to designated Integrated Mobility Division staff using the *Complete Streets Project Sheet*. The request is to include the:

- State Transportation Improvement Program (STIP) project number
- Description and location
- Deadline for response
- Project contact

Designated Integrated Mobility Division staff prepare a Scoping Memo in response to the request, which identifies relevant adopted state, regional, and local plans and the specific recommendations of these plans related to the project location. Specific recommendations may also reference the:

- Complete Streets Project Sheet

- Design standards and the source (e.g., American Association of State Highway Transportation Officials (AASHTO), Federal Highway Administration (FHWA), or National Association of City Transportation Officials (NACTO)).

The Scoping Memo is transmitted (via email and/or uploaded to the project SharePoint site) to the Project Lead by the requested deadline. Further coordination and consultation with Integrated Mobility Division staff may occur over the course of the project as it relates to facility design. The Scoping Memo is included as a key document in the ATLAS Workbench.

The Project Lead is responsible for reviewing the Scoping Memo to ensure enough detail has been provided by Integrated Mobility Division staff. Further coordination with Integrated Mobility Division staff is recommended for projects with significant physical and environmental constraints to ensure the Complete Streets Policy provisions are carried out consistently and that the Complete Streets Review Committee is engaged, if required.

2IM1 Verify Complete Streets

Overview

Review the roadway design plans to assess if the facility type is appropriate for the project’s design, matches the facilities from the *Complete Streets Project Sheet*, and meets the design standards as dictated by the Complete Streets Policy.

References

- AASHTO Bicycle Design Guide*
- AASHTO Pedestrian Design Guide*
- [Complete Streets Memo/Policy](#) (*In Development: The design guidance will ultimately be housed in the updated NCDOT Roadway Design Manual.*)
- [Roadway Design Manual](#) (*In Development: The manual is in the process of being updated.*)
- Complete Streets Policy and Implementation Guide*
- NACTO Urban Design Guide*

Deliverables

Deliverable	Task	Responsible Party	
		Activity Leader	Additional Support
		IM Staff	Complete Streets Coordinator
Integrated Mobility Division Concurrence Review Memo	<ul style="list-style-type: none"> ▪ <i>Prepare Memo Confirming Review of Roadway Plans for Compliance with Complete Streets Policy</i> 	X	

Prepare Memo Confirming Review of the Roadway Design Plans for Compliance with Complete Streets Policy

The Project Manager initiates an Integrated Mobility Division concurrence review by submitting a design review request to designated Integrated Mobility Division staff. The request is to include the:

- Current roadway design plans (likely the Design Recommendation Plan Set)
- Description and location
- Deadline for response
- Project contact

Integrated Mobility Division staff review the roadway design plans and returns an Integrated Mobility Division Concurrence Review Memo to the Project Manager:

- Concurring with Complete Streets elements reflected in the plans,
- Recommending changes if the plans do not meet the Complete Streets Policy, or
- Providing guidance for initiating a project review by the Complete Streets Review Team.

1LS1 Provide Photogrammetric Control and Initiate Surveys

Overview

Provide photogrammetric control in support of the Photogrammetry Unit, preliminary utility mapping in support of long-range transportation planning, and initiate base mapping surveys once project mapping limits have been completed and reviewed.

Note: *Actions during the Project Initiation Stage may be led and completed by staff from several different NCDOT groups. Any person who has overall responsibility for a project during this Stage is referred to as the "Project Lead." This lead could be the Feasibility Studies Engineer, the Corridor Development Engineer, the Division Planning Engineer, or someone in a similar role as tasked by a state or local agency.*

References

- [Location & Surveys DTM Manual](#)
- [Location & Surveys GPS Guidelines](#)
- [Location & Surveys Hydro Manual](#)
- [Location & Surveys Baseline Guidelines](#)
- [Location & Surveys Traffic Signing Diagrams](#)
- [Location & Surveys SUE Guidelines](#)
- [Location & Surveys Procedure Memos](#)
- [Location & Surveys PropCon](#)

Deliverables

Deliverable	Task	Responsible Party	
		Activity Leader	Additional Support
		Location & Surveys Division Team Lead	Location & Surveys Assistant Division Team Lead
Photogrammetric Control for Preliminary/Planning Mapping (NC Grid Datum)	<ul style="list-style-type: none"> ▪ Complete Photogrammetric Control for Preliminary/Planning Mapping (NC Grid Datum) 	X	X
SUE Level D Mapping	<ul style="list-style-type: none"> ▪ Complete SUE Level D 	X	X
Final Mapping Limits Polygon	<ul style="list-style-type: none"> ▪ Perform Independent Review of Mapping Limits Polygon 	X	X
Photogrammetric Control for Final Survey Mapping (Local Datum)	<ul style="list-style-type: none"> ▪ Complete Photogrammetric Control for Final Survey Mapping (Local Datum) 	X	X

Complete Photogrammetric Control for Preliminary/Planning Mapping (NC Grid Datum)

Photogrammetric control is critical to orient aerial photography onto the North Carolina State Plane Coordinate System. To complete this task, the Location & Survey Division Team Lead, with support from the Assistant Division Team Lead, is to:

- Contact all property owners where aerial targets are placed, or those properties crossed to place an aerial target. Contacts are to be made by letter, phone, or in person and is to be documented using the Location and Surveys PropCon Database found at the *Location & Surveys PropCon*.
- Conforming to Field Procedures, 6B.3-3 in the *Location & Surveys GPS Guidelines*, perform panel control target surveys where panel targets are placed according to a panel plan provided by the Photogrammetry Unit.
- Process and develop panel control in accordance with Office Procedures, 6B.3-4 from the *Location & Surveys GPS Guidelines*.
- Provide panel control to the Photogrammetry Unit, considering:
 - Panel control text file (Grid Datum) for the Photogrammetry Unit to orient aerial photography.
 - Include northing, easting, and elevation projected onto the North Carolina State Plane Coordinate System.

Complete SUE Level D

Being that SUE Level D mapping may be useful for long-range planning and early design development, the Location & Survey Division Team Lead, with support from the Assistant Division Team Lead, is to:

- Research and/or obtain existing utility records by contacting and coordinating with project utility owners in accordance with the *Location & Surveys SUE Guidelines*.
- Develop and provide a SUE Level D CADD file (NC Grid Datum) that maps existing utility records using the latest approved NCDOT MicroStation version.
- Provide the SUE LOS D CADD file to the Feasibility Studies Unit.
- Note: Ensure this deliverable conforms to the *NCDOT CADD Mapping Standards, Procedure Memo PROC 2018-6*, and *Location & Surveys File Naming Convention*.

Perform Independent Review of Mapping Limits Polygon

The mapping limits polygon defines the boundary for mapping and surveys that are needed for project development. To complete this task, the Location & Survey Division Team Lead, with support from the Assistant Division Team Lead, is to:

- Review the mapping limits polygon.
- Review and evaluate mapping limits to confirm they are adequate for the proposed design and analysis, but not excessive to overburden resources. Further coordination with the Photogrammetry Unit and the Project Lead may be needed for this task.
- Revise and provide a mapping limits polygon that involves:
 - Mapping final mapping limits using the latest approved NCDOT MicroStation version.
 - Providing the final mapping limits CADD file to the Photogrammetry Unit and Project Lead.

Complete Photogrammetric Control for Preliminary/Planning Mapping (Local Datum)

With photogrammetric control being critical to orient aerial photography onto a localized North Carolina State Plane Coordinate System, the Location & Survey Division Team Lead, with support from the Assistant Division Team Lead:

- Develops a local project control network by establishing horizontal and vertical survey control using the current Nation Spatial Reference System (NSRS) projected onto the North Carolina State Plane Coordinate System. This process is to conform to the *Location & Surveys GPS Guidelines* and *Location & Surveys Coordinate Systems White Paper*.
- Contact all property owners where aerial targets are placed, or those properties crossed to place an aerial target. Contacts are to be made by letter, phone, or in person and is to be documented using the Location and Surveys PropCon Database found at the *Location & Surveys PropCon*.
- Conforming to Field Procedures, 6B.3-3 in the *Location & Surveys GPS Guidelines*, perform panel control target surveys where panel targets are placed according to a panel plan provided by the Photogrammetry Unit.
- Process and develop panel control in accordance with Office Procedures, 6B.3-4 from the *Location & Surveys GPS Guidelines*.
- Provide panel control to the Photogrammetry Unit, considering:
 - Panel control text file (Local Datum) to the Photogrammetry Unit to orient aerial photography.
 - Include northing, easting, and elevation projected onto the North Carolina State Plane Coordinate System.

2LS1 Complete Final Surveys

Overview

Provide complete surveys and mapping, including wetlands and jurisdictional streams, for the projects mapping limits in support of the design, right-of-way acquisition, and construction phases of the project.

References

- [Location & Surveys DTM Manual](#)
- [Mobile and Terrestrial LiDAR Guidelines](#)
- [Location & Surveys GPS Guidelines](#)
- [Location & Surveys Hydro Manual](#)
- [Location & Surveys Baseline Guidelines](#)
- [Location & Surveys Traffic Signing Diagrams](#)
- [Location & Surveys SUE Guidelines](#)
- [Location & Surveys Procedure Memos](#)
- [Location & Surveys PropCon](#)
- [Location & Surveys Connect Site](#)
- [Location & Surveys Project Review Checklist](#)
- [Location & Surveys Wetland Procedures](#)

Deliverables

Deliverable	Task	Responsible Party	
		Activity Leader	Additional Support
		Location & Surveys Division Team Lead	Location & Surveys Assistant Division Team Lead
Final Surveys	<ul style="list-style-type: none"> ▪ Complete Field Surveys and Project Mapping 	X	X
Surveyed Wetlands	<ul style="list-style-type: none"> ▪ Complete Wetland/Jurisdictional Stream Field Surveys and Mapping 	X	X

Complete Field Surveys and Project Mapping

With accurate field surveys and mapping being the critical foundation for all subsequent design, right-of-way acquisition, and construction phases for a project, the Location & Survey Division Team Lead, with support from the Assistant Division Team Lead, is to:

- Contact all property owners impacted by the mapping limits and those properties accessed to perform required surveys. Contacts are to be made by letter, phone, or in person and is to be documented using the Location and Surveys PropCon Database found at the *Location & Surveys PropCon*.
- Establish the project’s primary control (Azimuth Pairs), secondary control (Baseline), and benchmarks (Vertical) in accordance with the *Location & Surveys GPS Guidelines*, *Location & Surveys Baseline Guidelines*, and *Location & Surveys Coordinate Systems White Paper*.
- Conforming to the *NCDOT CADD Mapping Standards*, complete planimetric classification that includes field classifying and labeling existing planimetric features in the Final Survey CADD File (2D) and map per the latest approved NCDOT MicroStation version.

- Perform and/or obtain pavement and ground DTMs in accordance with the *Location & Surveys DTM Manual* and *Mobile and Terrestrial LiDAR Guidelines*. This includes developing the final DTM and TIN CADD file (3D) using the latest approved NCDOT MicroStation version and *NCDOT CADD Mapping Standards*.
- Perform hydrographic surveys in accordance with the *Location & Surveys Hydro Manual* that obtain field hydrographic features and are included in the Final Survey CADD file (2D) using the latest approved NCDOT MicroStation version and *NCDOT CADD Mapping Standards*.
- In accordance with the *Location & Surveys SUE Guidelines*, perform subsurface utility surveys (SUE LOS B) by:
 - Obtaining subsurface utility LOS B data and including in the Final Survey CADD file (2D) using the latest approved NCDOT MicroStation version and *NCDOT CADD Mapping Standards*.
 - Providing the subsurface Utility LOS B CADD file (2D) using the latest approved NCDOT MicroStation version and *NCDOT CADD Mapping Standards* to obtain linear footage.
- Develop property mapping by performing courthouse research, recon, and locating monumentation, requesting the Right-of-Way Abstract, and investigating as-builts and maps according to records and monumentation. Incorporate into the Final Survey CADD file (2D) using the latest approved NCDOT MicroStation version and *NCDOT CADD Mapping Standards*.
- Develop right-of-way sheets (C-Series Only) by computing existing alignments (ELN) and compiling C-Series right-of-way sheets using the latest approved NCDOT MicroStation version and *NCDOT CADD Mapping Standards*. Complete in conformance with the *Location & Surveys Baseline Guidelines*, *Location & Surveys Procedure Memos*, and *Location & Surveys Connect Site*.
- Complete the Location & Surveys Project Review Checklist (PRC) found at the reference listed above.
- Deliver final survey package to the Project Manager that:
 - Compiles and delivers all scoped project specific geo-referenced MicroStation base mapping files and deliverables in accordance with *Location & Surveys Standard Procedures*.
 - Note: Ensure this deliverable conforms to the *Location & Surveys File Naming Convention* and *Location & Surveys Procedure Memo PROC 2018-6*.

Complete Wetland/Jurisdictional Stream Field Surveys and Mapping

Required Wetland/Jurisdictional Stream Field Surveys and Mapping are critical for obtaining necessary agency permitting. For this task, the Location & Survey Division Team Lead, with support from the Assistant Division Team Lead, is to:

- Perform the wetland/jurisdictional stream field surveys in accordance with the *Location & Surveys Wetland Procedures* to obtain field flag and/or nail locations delineating wetland boundaries and for identifying jurisdictional streams established by the project biologist.
- Develop wetland/jurisdictional stream mapping that conforms to the *Location & Surveys Wetland Procedures* and includes:
 - A compiled field flag and/or nail locations and development of a surveyed WEX or WET CADD file (2D) using the latest approved NCDOT MicroStation version and *NCDOT CADD Mapping Standards*.
 - Identified jurisdictional streams in the Final Survey CADD file (2D) using the latest approved NCDOT MicroStation version and *NCDOT CADD Mapping Standards*.

- Deliver the wetland/jurisdictional stream mapping to the Project Manager, which includes:
 - All scoped project-specific, geo-referenced microStation wetland/jurisdictional stream mapping files that conform to the *Location & Surveys Standard Procedures*.
 - Note: Ensure this deliverable conforms to the *Location & Surveys File Naming Convention*, *Location & Surveys Procedure Memo PROC 2018-6*, and *Location & Surveys Wetland Procedures*.

3LS1 Complete Additional Surveys, SUE Level A, and ROW Advanced Acquisition Surveys

Overview

Provide additional surveys and base mapping for the project’s revised mapping limits in support of the design, right-of-way acquisition, and construction phases, including SUE LOS A investigation for utility conflict resolutions. Provide field delineation and acquisition exhibits and/or descriptions in support of right-of-way (ROW) advanced acquisitions.

References

- [Location & Surveys DTM Manual](#)
- [Location & Surveys GPS Guidelines](#)
- [Location & Surveys Hydro Manual](#)
- [Location & Surveys Baseline Guidelines](#)
- [Location & Surveys Traffic Signing Diagrams](#)
- [Location & Surveys SUE Guidelines](#)
- [Location & Surveys Procedure Memos](#)
- [Location & Surveys Project Review Checklist](#)
- [Location and Surveys Unit Property Survey Manual](#)

Deliverables

Deliverable	Task	Responsible Party	
		Activity Leader	Additional Support
		Location & Surveys Team Lead	Location & Surveys Assistant Team Lead
Additional Surveys	<ul style="list-style-type: none"> ▪ Complete Additional Field Surveys and Revise Project Mapping 	X	X
SUE Level A	<ul style="list-style-type: none"> ▪ Complete SUE Level A and Revise Mapping 	X	X
ROW Advanced Acquisition Surveys	<ul style="list-style-type: none"> ▪ Complete ROW Advanced Acquisition Field Surveys 	X	X
	<ul style="list-style-type: none"> ▪ Complete ROW Advanced Acquisition Mapping 	X	X

Complete Additional Field Surveys and Revised Project Mapping

Building on the work done in 2LS1 and as need for the project, the Location & Survey Division Team Lead, with support from the Assistant Division Team Lead, is to:

- Collaborate with the Photogrammetry Unit for readily available mapping and/or additional flight control to fly and compile shell plan sheets.
- Coordinate with the Project Manager to obtain the final survey file currently being used by the technical disciplines/Units.
- Contact all property owners impacted by the updated mapping limits and those properties accessed to perform required surveys. Contacts are to be made by letter, phone, or in person and

is to be documented using the Location and Surveys PropCon Database found at the *Location & Surveys PropCon*.

- Establish additional primary control (Azimuth Pairs), secondary control (Baseline) and benchmarks (Vertical) in accordance with the *Location & Surveys GPS Guidelines*, *Location & Surveys Baseline Guidelines*, and *Location & Surveys Coordinate Systems White Paper*.
- In accordance with the *NCDOT CADD Mapping Standards*, update the planimetric classification that includes field classifying and labeling existing planimetric features in the updated Final Survey CADD file (2D) and map per the latest approved NCDOT MicroStation version.
- Perform and/or obtain additional pavement and ground DTMs in accordance with the *Location & Surveys DTM Manual* and *Mobile and Terrestrial LiDAR Guidelines*. This includes developing an updated final DTM and TIN CADD file (3D) using the latest approved NCDOT MicroStation version and *NCDOT CADD Mapping Standards*.
- Perform additional hydrographic surveys in accordance with the *Location & Surveys Hydro Manual* that obtain field hydrographic features and are included in the Final Survey CADD file (2D) using the latest approved NCDOT MicroStation version and *NCDOT CADD Mapping Standards*.
- In accordance with the *Location & Surveys SUE Guidelines*, perform additional subsurface utility surveys (SUE LOS B) by:
 - Obtaining subsurface utility LOS B data and including in the Final Survey CADD file (2D) using the latest approved NCDOT MicroStation version and *NCDOT CADD Mapping Standards*.
- Update property mapping by performing additional courthouse research, recon, and locating monumentation, requesting the Right-of-Way Abstract, and investigating as-builts and maps according to records and monumentation. Incorporate into the Final Survey CADD file (2D) using the latest approved NCDOT MicroStation version and *NCDOT CADD Mapping Standards*.
- Update the right-of-way sheets (C-Series Only) by computing existing alignments (ELN) and compiling C-Series right-of-way sheets using the latest approved NCDOT MicroStation version and *NCDOT CADD Mapping Standards*. Complete in conformance with the *Location & Surveys Baseline Guidelines*, *Location & Surveys Procedure Memos*, and *Location & Surveys Connect Site*.
- Complete the Location & Surveys Project Review Checklist (PRC) found at the reference listed above.
- Deliver an updated final survey package to the Project Manager that:
 - Compiles and delivers all scoped project specific geo-referenced MicroStation base mapping files and deliverables in accordance with *Location & Surveys Standard Procedures*.
 - Note: Ensure this deliverable conforms to the *Location & Surveys File Naming Convention* and *Location & Surveys Procedure Memo PROC 2018-6*.

Complete SUE Level A and Revise Mapping

Accurate SUE Level A data is needed to minimize utility conflicts and avoid unnecessary costs and delays when relocating utilities. For this task, the Location & Survey Division Team Lead, with support from the Assistant Division Team Lead:

- Performs/obtains subsurface utility LOS A data and includes this data in the updated Final Survey CADD file (2D) using the latest approved NCDOT MicroStation version and *NCDOT CADD Mapping Standards*.

- Compile and deliver the SUE LOS A Certification Sheets to the Project Manager in accordance with *NCDOT Location & Surveys Standard Procedures*.
- Note: Ensure this deliverable conforms to the *Location & Surveys SUE Guidelines*, *Location & Surveys File Naming Convention*, *Location & Surveys Procedure Memo PROC 2018-6*, and *Location & Surveys Baseline Guidelines*.

Complete ROW Advanced Acquisition Field Surveys

Accurate field delineation of proposed right-of-way and easements allows the Right-of-Way Agents and property owners to visualize impacts to affected parcels. To complete this task, the Location & Survey Division Team Lead, with support from the Assistant Division Team Lead, is to:

- Collaborate with the Project Manager and Division Right-of-Way Agent to identify and prioritize all Advance Acquisition Parcels.
- Verify with the Project Manager and/or Division Right-of-Way Agent that all affected property owners have been contacted and Right-of-Entry has been granted.
- Complete field delineation of proposed right-of-way and easements across all affected project parcels in accordance with the *Location & Surveys Baseline Guidelines*.

Complete ROW Advanced Acquisition Mapping

Accurate advance acquisition exhibits and/or descriptions allow NCDOT to acquire property necessary for timely project construction. To accomplish this, the Location & Survey Division Team Lead, with support from the Assistant Division Team Lead, is to:

- Collaborate with the Project Manager and Right-of-Way Unit to identify and prioritize all advance acquisition parcels requiring an exhibit and/or description.
- Compile and prepare an advance acquisition exhibit (PDF) and/or description (txt) using the latest approved NCDOT MicroStation version and *NCDOT CADD Mapping Standards*. This exhibit and/or description is to conform to the *Location & Surveys Procedure Memo PROC 2018-6* and *Location and Surveys Unit Property Survey Manual*.

4LS1 Complete ROW Acquisition Surveys

Overview

Provide right-of-way field delineation, metes and bounds descriptions, and eminent domain exhibit maps in support of right-of-way acquisitions. Prepare final right-of-way (ROW) CADD file for the final ROW Series Plan Set.

References

- [Location & Surveys Baseline Guidelines](#)
- [Location & Surveys Deed Description Memo](#)
- [Location & Surveys Row Procedure Memo](#)
- [Location and Surveys Unit Property Survey Manual](#)
- [Location & Surveys Procedure Memo PROC 2018-3](#)
- [Location & Surveys Project Review Checklist](#)
- [Location & Surveys Procedure Memo PROC 2018-6](#)
- [Location & Surveys Procedure Memo PROC 2018-5](#)

Deliverables

Deliverable	Task	Responsible Party	
		Activity Leader	Additional Support
		Location & Surveys Team Lead	Location & Surveys Assistant Team Lead
ROW Field Delineation	<ul style="list-style-type: none"> ▪ Complete ROW Field Delineation 	X	X
ROW Metes and Bounds Descriptions	<ul style="list-style-type: none"> ▪ Complete ROW Metes and Bounds Descriptions 	X	X
Eminent Domain Exhibit Maps	<ul style="list-style-type: none"> ▪ Complete Eminent Domain Exhibit Maps 	X	X
ROW Reference File	<ul style="list-style-type: none"> ▪ Complete ROW Reference File 	X	X
Final ROW Series Plan Set	<ul style="list-style-type: none"> ▪ Complete Final ROW Series Plan Set 	X	X

Complete ROW Field Delineation

Accurate field delineation of proposed right-of-way and easements allows the ROW Agents and property owners to visualize impacts to affected parcels. For this task, the Location & Survey Division Team Lead, with support from the Assistant Division Team Lead, is to:

- Verify that ROW authorization has been granted by the Board of Transportation and collaborate with the Project Manager and Division Right-of-Way Agent to prioritize staking of parcels.
- Contact all property owners identified in the ROW file for property acquisition and those properties that may need to be accessed to perform ROW surveys. Contacts are to be made by letter, phone, or in person and is to be documented using the Location and Surveys PropCon Database found at the *Location & Surveys PropCon*.
- Perform field right-of-way delineation in accordance with the *Location & Surveys Baseline Guidelines* and *R-W Monumentation Verification*. This work includes:
 - ♦ Computing and verifying plan locations of proposed right-of-way and easement monuments.

- Completing field delineation of proposed right-of-way and easements across all affected parcels in accordance with the set of plans used for acquisition.

Complete ROW Metes and Bounds Descriptions

Accurate right-of-way metes and bounds descriptions allow NCDOT to acquire necessary property to construct the project. To do this, the Location & Survey Division Team Lead, with support from the Assistant Division Team Lead, is to:

- Collaborate with the Project Manager and Division Right-of-Way Agent to prepare and provide ROW metes and bounds descriptions for the entire project.
- Provide ROW metes and bounds descriptions and sketch maps in PDF format to Project Manager and Division Right-of-Way in accordance with *Location & Surveys Deed Description Memo*.

Complete Eminent Domain Exhibit Maps

NCDOT uses eminent domain exhibits in the condemnation process for both mediation and as a courtroom exhibit. Exhibits are to be prepared in accordance with North Carolina General Statutes §136-106 and are on a strict schedule mandated by this statute. To support the preparation of these exhibits, the Location & Survey Division Team Lead, with support from the Assistant Division Team Lead:

- Compiles and prepares an Eminent Domain Map using the latest approved NCDOT MicroStation version and *NCDOT CADD Mapping Standards*. Location and Surveys Unit (Project Data & Condemnation) modifies the Eminent Domain Map to produce an Eminent Domain Exhibit used by the Attorney General's Office attorney to present NCDOT's case.
- Collaborates with North Carolina Attorney General's Office and Location and Surveys Unit (Project Data & Condemnation) to revise the Eminent Domain Map and/or Exhibit as required.
- Note: Ensure these deliverables conform to the Location & Surveys Procedure Memo PROC 2018-6 and Location and Surveys Unit Property Survey Manual.

Complete ROW Reference File

The final ROW Reference CADD file (2D) is an accurate depiction of as-staked field monumentation. This CADD file is referenced as part of the Final Roadway Design Plans and is the basis of the Final ROW Series Plan Set. In accordance with the *Location & Surveys ROW Procedure Memo*, the Location & Survey Division Team Lead, with support from the Assistant Division Team Lead, is to:

- Receive the ROW Reference CADD file (2D) from the Project Manager via the project SharePoint site.
- Modify the ROW Reference CADD file (2D) when the ROW revision letter is received.
 - Revision(s) may be requested by the Division Right-of-Way Agent as part of right-of-way negotiations, by the Project Designer resulting from a design revision, by the Resident Engineer resulting from a constructability issue, or by the surveyor in responsible charge during right-of-way delineation.
 - All right-of-way revisions are to be documented with a ROW Revision Memorandum by the Project Manager or Division Right-of-Way Agent.

- Collaborate with the Project Manager and Division Right-of-Way Agent on all right-of-way revisions and the ROW Reference CADD File (2D) modifications.

Complete Final ROW Series Plan Set

The Final ROW Series Plan Set provides information necessary for reestablishment of all permanent right-of-way and easement monumentation by NCDOT or private surveyors. The plan set is prepared in accordance with North Carolina General Statutes §136-19.4A to address concerns of the North Carolina Board of Examiners for Engineers and Surveyors and the private surveying community. To complete the Final ROW Series Plan Set, the Location & Survey Division Team Lead, with support from the Assistant Division Team Lead, is to:

- Prepare the Final ROW Series D, E, and RW Series Sheets using the latest approved NCDOT MicroStation version and *NCDOT CADD Mapping Standards*.
- Modify the C-Series Right-of-Way Sheets if required. The C-Series Right-of-Way Sheets are located under the projects “Let Preparation” topic on the NCDOT Connect Preconstruction Site.
- Complete the Final ROW Series D, E, and RW Series Sheets using the Final Roadway Design Plans and ROW Reference CADD file (2D).
- Include the PLS seal of the surveyor in responsible charge of Right-of-Way Field Delineation on the Final ROW Series Plan Set sheets.
- Create a PDF version of all final ROW Series Plan Set sheets with the electronic signature of the surveyor in responsible charge.
- Upload the PDF version of the signed and sealed Final ROW Series Plan Set under the projects “Let Preparation – 150 Folder” on the project’s SharePoint site.
- Ensure this deliverable conforms to the *Location & Surveys ROW Procedure Memo*, *Location & Surveys Creating NCDOT Right-of-Way Plans*, *Location & Surveys Right-of Way Connect Site*, *Location & Surveys Procedure Memo PROC 2018-3*, and *Location & Surveys File Naming Convention*.

2PD1 Complete Pavement Design

Overview

Coordinate Geotechnical Pavement Design Investigation (PDI) with the Geotechnical Engineering Unit; evaluate condition of existing pavement; and produce the Final Pavement Design Memo that includes pavement designs for all roads, ramps, and loops (including minimum overlay requirements).

References

- [NCDOT Pavement Design Procedure](#)

Deliverables

Deliverable	Task	Responsible Party	
		Activity Leader	Additional Support
		Pavement Design Engineer	
Final Pavement Design Memo	▪ <i>Coordinate Geotechnical Pavement Design Investigation (PDI)</i>	X	Geopavement Engineer
	▪ <i>Evaluate Condition of Existing Pavement</i>	X	
	▪ <i>Review Traffic Forecast</i>	X	Traffic Forecast Engineer
	▪ <i>Determine Alternative Pavement Designs for New Locations and Widening</i>	X	Roadway Design Engineer
	▪ <i>Determine Treatment of Existing Pavement and Minimum Overlay Requirements</i>	X	Roadway Design Engineer
	▪ <i>Perform Life-Cycle Cost Analysis on Pavement Alternatives</i>	X	
	▪ <i>Prepare Pavement Review Package Presenting Alternatives</i>	X	
	▪ <i>Select Pavement Design Alternatives at Pavement Review Committee Meeting</i>	X	Pavement Review Committee
	▪ <i>Determine if Shoulder Drains are Required</i>	X	
	▪ <i>Prepare Final Pavement Design Memo</i>	X	Project Manager

Coordinate Geotechnical Pavement Design Investigation (PDI)

The Pavement Design Engineer meets with the Geotechnical Engineering Unit to determine if a PDI is required for the project.

- If so, ensure the project has a PDI scheduled.
 - ♦ If no PDI is scheduled, request that the Geotechnical Engineering Unit adds this to the list of PDIs to be performed.
 - ♦ Determine the estimated completion date of the PDI.
 - ♦ Determine if supplementary or preliminary PDI activities should be performed by the Materials & Tests Unit and/or a consultant to help accelerate the pavement design prior to receiving the full PDI from the Geotechnical Engineering Unit or to augment the data acquired during the PDI.

- If no PDI is required, determine if a pavement investigation (a simplified PDI performed by the Materials & Tests Unit) is required.
 - If yes, schedule the Materials & Tests pavement investigation.
 - If no, use historical data (obtained from the pavement management system database, as-built construction drawings, old pavement design files, or conversations with Division personnel) for the pavement design.

Evaluate Condition of Existing Pavement

The Pavement Design Engineer reviews the pavement condition information contained in the pavement management system. This review includes:

- Reviewing historical imagery of the roadway.
- Reviewing as built and letting plans of previous projects (if available.)
- Performing a site visit to verify the pavement condition and review pavement drainage and other considerations.
- If required, performing Materials & Tests pavement investigation, including additional coring and/or dynamic cone penetration (DCP) testing and/or falling weight deflectometer (FWD) testing.

Review Traffic Forecast

To review the traffic forecast for reasonableness and completeness, the Pavement Design Engineer:

- Obtains the most updated traffic forecast diagrams. These documents are produced by Transportation Planning Division/Technical Services Unit and are typically available on the respective project SharePoint site.
- Determines if any supplementary traffic information is required.
 - If required, work with the Project Manager and/or the Division to obtain additional information not contained within the traffic forecasts or the Traffic Survey Group's website.

Determine Alternative Pavement Designs for New Locations and Widening

The Pavement Design Engineer follows the *Pavement Design Procedure* to produce alternate pavement designs (as required) depending on project type, project length, traffic level, and complexity.

Determine Treatment of Existing Pavement and Minimum Overlay Requirements

Based on the information from the roadway design plans (in support of developing the Design Recommendation Plan Set; see 2RD1), traffic forecast, PDI, and pavement condition evaluations, the Pavement Design Engineer determines the minimum treatments required to ensure structural adequacy of the existing pavements.

- The minimum treatments are included in the Pavement Review Package and in the Final Pavement Design Memo, as discussed below.
- In cases of significant overlays, the Pavement Design Engineer coordinates with the Project Manager and Roadway Design Lead to verify if this is acceptable, or if other options need to be considered in order to meet roadway profile elevation/overhead clearance requirements.

Perform Life-Cycle Cost Analysis on Pavement Alternatives

Using the alternative pavement designs and existing treatment options proposed, the Pavement Design Engineer then:

- Calculates quantities,
- Obtains unit cost information from the Estimating Management Unit, and
- Calculates life-cycle costs per NCDOT's *Life-Cycle Cost policy*.

Prepare Pavement Review Package Presenting Alternatives

The Pavement Design Engineer combines the current roadway design plans, traffic forecast, pavement condition, pavement design, geotechnical, and life-cycle cost information into a simplified package for review by the Pavement Review Committee. To ensure timely review, the Pavement Design Engineer is to consider the following:

- The Pavement Review Committee meets monthly.
- Email the Pavement Review Package to the committee one week before the meeting.
- Committee membership is defined in the *NCDOT Pavement Design Procedure*.

Select Pavement Design Alternatives at Pavement Review Committee Meeting

The Pavement Review Committee follows the *NCDOT Pavement Selection policy* to select the chosen alternative(s), considering all information in the pavement review package, as well as additional information brought up by Pavement Review Committee members.

Determine if Shoulder Drains are Required

The Pavement Design Engineer is to determine if shoulder drains are required for the project based on current roadway design plans (e.g., profile and cross section), project size, traffic level, and geotechnical information. For unique situations, the Pavement Design Engineer is to reach out to the Geotechnical Engineering Unit for input.

Prepare Final Pavement Design Memo

To complete the Pavement Design Memo, the Pavement Design Engineer summarizes all final pavement design determinations to include:

- The selected pavement designs for all alignments on the project.
- The selected treatment for existing pavement for all alignments on the project.
- Shoulder drains requirements, if needed for the project.

The Pavement Design Engineer also provides the Project Manager any additional information, such as additional geotechnical information and quantities if available in the PDI. The Project Manager coordinates this information with the Roadway Design Lead for use in developing the typical sections and quantity calculations.

- If design is provided by a Division, a Division representative is required to seal the plan sheets.

3PD1 Verify Pavement Design

Overview

Verify that the Final Pavement Design Memo is still valid, review typical sections, and establish shoulder drain details, drain locations, and outlet locations.

References

- [NCDOT Pavement Design Procedure](#)

Deliverables

Deliverable	Task	Responsible Party	
		Activity Leader	Additional Support
		Pavement Design Engineer	Project Manager
Final Pavement Design Verification Memo	▪ Review Pavement Design and Current Pavement Conditions	X	X
	▪ Prepare Verification Memo	X	X
Typical Section Review Email	▪ Prepare Email on Typical Section Issues	X	
Shoulder Drain Memo	▪ Prepare Complete Shoulder Drain Memo	X	X

Review Pavement Design and Current Pavement Conditions

For the initial step in verifying the Final Pavement Design Memo, the Pavement Design Engineer is to:

- Review the pavement design to verify adequacy based on current NCDOT specifications, current NCDOT pavement design procedures, updated traffic information (if any), current roadway design plans (including changes to the alignment configuration, profile, or cross section; the addition or removal of Y lines) and additional geotechnical information (if any).
- Review the updated pavement condition information contained in the pavement management system, which involves a:
 - Review of any historical imagery of the roadway taken after the final pavement design was completed in 2PD1.
 - Review as built and letting plans of projects that have taken place on the roadway since the completion of the final pavement design (if any).
 - Perform a site visit to verify pavement condition, if required.
- Work with the Project Manager, and other relevant parties, to adjust the design as necessary.
 - In these cases, options that do not change the roadway elevation or cross slope as currently set in the Design Recommend Plan Set are to be used.

Prepare Verification Memo

The Pavement Design Engineer provides a memo that verifies the final pavement design as previously provided and/or includes any necessary modifications and updates. This includes:

- Providing pavement designs for newly added Y lines or temporary pavements.

- Adjusting pavement thicknesses to match curb and gutter elevations if paved shoulders were changed to curb and gutter by the Roadway Design Lead.
- Changing mix type due to an increase in traffic from an updated traffic forecast, etc.
- Changing treatment of existing pavement.

Prepare Email on Typical Section Issues

For the Pavement Design Engineer to seal the typical sections and confirm that the pavement can be constructed to provide reliable and cost-effective performance, the Pavement Design Engineer:

- Reviews the typical sections to ensure accuracy/compliance to the Final Pavement Design Memo and the verification memo.
- Prepare email documentation on issues, coordinating with relevant parties to correct issues with the typical sections, if any.

Complete Shoulder Drain Memo

For shoulder drains required on the project as determined under 2PD1, the Pavement Design Engineer is to:

- Select or develop the appropriate shoulder drain details by obtaining the most recent pavement profile, cross section, and plan information from the Roadway Design Unit.
- Determine shoulder drain locations and outlet locations based on the roadway's geometry.
- Determine outlet locations based on the project topography and the locations of existing and/or proposed drainage structures.
- Prepares the Shoulder Drain Memo for the Project Manager to present as recommendations for the shoulder drain details, summarizing the locations of shoulder drains and outlet locations.

The Pavement Design Engineer and Project Manager coordinate this information to the Roadway Design Lead for use in developing the roadway design plans.

1PH1 Best Available Geospatial Data

Overview

Upon request, obtain, analyze, and provide best available orthoimagery, elevation data, and county GIS property data for the project area. If needed, provide more current data by flying the project area and delivering either an orthophoto with elevation data or small-scale topographic mapping with elevation data and an orthophoto or train customers who wish to obtain the data on their own.

Note: *Actions during the Project Initiation Stage may be led and completed by staff from several different NCDOT groups. Any person who has overall responsibility for a project during this Stage is referred to as the “Project Lead.” This lead could be the Feasibility Studies Engineer, the Corridor Development Engineer, the Division Planning Engineer, or someone in a similar role as tasked by a state or local agency.*

References

- [Photogrammetry Resource Page](#)

Deliverables

Deliverable	Task	Responsible Party	
		Activity Leader	Additional Support
		Project Lead	Photogrammetry Assistant Unit Head
Orthoimagery	▪ Obtain Orthoimagery	X	X
Elevation Data (NCDOT login)	▪ Obtain Elevation Data (NCDOT or Custom)	X	X
County GIS Property Data	▪ Obtain County GIS Property Data	X	X
Small-Scale Topographic Mapping	▪ Provide More Current Mapping Product	X	X

Obtain Orthoimagery

The Project Lead can access orthoimagery (3-band RGB Color imagery at 0.5-foot GSD) on his/her own through the instructions provided on the Photogrammetry Resource Page or submit a request to the Photogrammetry Unit.

Obtain Elevation Data (NCDOT or Custom)

The Project Lead can obtain Quality Level 2 (QL2) Aerial LiDAR elevation data (Bare Earth or DEM) on his/her own or submit a request to the Photogrammetry Unit for LiDAR elevation data on the Photogrammetry Resource Page. Output from the tool is an ASCII formatted file with an *.DAT extension for use with Bentley MicroStation and Bentley Connect/ORD.

Obtain County GIS Property Data

The Project Lead submits a request to the Photogrammetry Unit for County GIS Property Data in a MicroStation or ArcGIS format. Alternatively, he/she can download County GIS Property Data in an ArcGIS format from NCOneMap. The Photogrammetry Resource Page details the process used by Photogrammetry Unit staff to convert ArcGIS County Property Data to a MicroStation format.

Provide More Current Mapping Product

If the Project Lead determines that the best available geospatial data is obsolete, he/she submits a request to the Photogrammetry Unit to obtain current mapping. The Photogrammetry Resource Page includes instructions on how to request photogrammetric mapping and the process used by Photogrammetry Unit to produce mapping. This work includes:

- Obtaining controlled aerial photography
- Compiling elevation data
- Creating the orthoimagery
- Compiling topographic mapping

1PH2 Compile Aerial Photography and Mapping

Overview

Upon request, obtain controlled aerial photography that covers the project mapping limits to ensure horizontal and vertical mapping accuracies are achieved. Use in-house staff or a Private Engineering Firm to perform aerotriangulation using ground survey control provided by the Location and Surveys Unit and airborne GNSS-IMU control, compiling planimetric and digital terrain mapping data, and creating a digital mosaic.

References

- [Photogrammetry Resource Page](#)

Deliverables

Deliverable	Task	Responsible Party	
		Activity Leader	Additional Support
		Photogrammetry Assistant Unit Head	Aviation
Controlled Aerial Photography	<ul style="list-style-type: none"> ▪ <i>Schedule and Fly Project</i> 	X	X
Large Scale Planimetric Mapping			
Elevation Data	<ul style="list-style-type: none"> ▪ <i>Providing Mapping Product</i> 	X	
Digital Mosaic			
Airborne Survey reports			

Schedule and Fly Project

Controlled aerial photography requires coordination with both the Location and Surveys Unit and the Aviation Unit. This involves the following steps:

- Create a Flight and Ground Control Survey Plan that shows the proposed flight lines for the project with specific flying heights, forward overlap, and side overlap that optimally facilitates aerotriangulation to ensure horizontal and vertical mapping accuracies are achieved.
- Obtain ground control survey.
 - The Photogrammetry Unit creates a ground control plan that shows the approximate location of proposed ground control targets (panels).
 - The panel plan is submitted to the Location and Surveys Unit to layout out the panels and to survey coordinates for each panel point.
 - The Location and Surveys Unit localizes the control coordinates to the project control network.
- Upon notification of completion of the panels, the Photogrammetry Unit coordinates with the Aviation Unit to fly the project to obtain the aerial photography.
- After the project has been flown, the Photogrammetry Unit completes post-processing for both the aerial photography and the GNSS-IMU data that was collected during the flight.

Provide Mapping Product

Once the aerial photography is obtained and all data posted processed, the Photogrammetry Unit either uses in-house staff or a Private Engineering Firm to complete the mapping product. The Photogrammetry Unit is to localize all ancillary support data to the project control network. Aerotriangulation using the ground surveyed panel coordinates is performed next to establish accurate exterior orientation parameters for each photograph.

An Aerotriangulation Report is completed, sealed and certified by an NC PLS, if the work is contracted with a Private Engineering Firm. The planimetric mapping and ground elevation data is also compiled, and a digital mosaic completed, while the mapping is compiled.

1P11 Initiate Public Engagement Tasks

Overview

Required as part of the environmental process, ensure stakeholder input is received and the public is informed on the project, providing transparency in the public engagement process.

Note: *Actions during the Project Initiation Stage may be led and completed by staff from several different NCDOT groups. Any person who has overall responsibility for a project during this Stage is referred to as the “Project Lead.” This lead could be the Feasibility Studies Engineer, the Corridor Development Engineer, the Division Planning Engineer, or someone in a similar role as tasked by a state or local agency.*

References

- [Public Involvement Guidelines](#)
- [Practitioners Guide](#)
- [Public Engagement Toolkit](#)

Deliverables

Deliverable	Task	Responsible Party	
		Activity Leader	Additional Support
		Public Involvement Lead	Public Involvement Team Member/Communications Public Involvement Officer
RPO/MPO CTP/LRTP Outreach Documentation	<ul style="list-style-type: none"> ▪ Outreach Before/During State Transportation Improvement Program (STIP) Development 	X	
Public Involvement Plan (PIP)	<ul style="list-style-type: none"> ▪ Develop the Public Involvement Plan (PIP) 	X	X

Outreach Before/During State Transportation Improvement Program (STIP) Development

The Project Lead develops an Environmental Tracking and Coordination System (ETRACS) request to solicit Public Involvement support. The Public Involvement Lead then documents the following related to this task:

- Document and upload to project files both process- and project-specific Metropolitan and/or Rural Planning Organization (MPO/RPO) or local government public outreach efforts for NCDOT use and Title VI documentation.
- Document and upload to project files both process- and project-specific Strategic Prioritization Office (SPOT) outreach efforts
- Preliminary screenings prior to the Project Scoping Report that includes Community Studies’ Community Screenings for areas of potential concern and Public Involvement’s initial recommendations as part of the Public Involvement Plan (PIP). The PIP is to be scaled to the project and is reviewed prior to Notice to Proceed to determine if updates are needed.

Conduct STIP Outreach

The Public Involvement Lead assists in the development of the State Transportation Improvement Program (STIP), including:

- Coordination on projects included at each level of the STIP.
- Communicating project schedules and specific public outreach needs.

Develop the Public Involvement Plan (PIP)

The Project Lead sends an ETRACS request to Public Involvement to develop a draft Public Involvement Plan (PIP). The purpose of a PIP is for NCDOT staff, local and regional partners, and consultants/contractors to work in concert throughout a project when developing an understanding of community resources and demographics, what information is to be exchanged between the stakeholders and NCDOT, and the best ways to engage and inform the public and stakeholders for decision making.

The Public Involvement Lead develops the draft PIP, which become a part of the Project Scoping Report (see 1FS3 for related information). At this stage, the draft PIP is to initially address the following project details, all of which are finalized as part of 2PI1.

- Project overview
- Goals and objectives for outreach on the project, in part based on findings in the Community Understanding Report and Project Sheet
- Key messages to be communicated to the public
- Project-specific or potentially controversial issues from local knowledge, the Community Understanding Report, project sheets, or Community Screening
- Potential for Environmental Justice, Limited English Proficiency, or other Title VI considerations
- Stakeholders and interested groups, including special populations such as the elderly, college students, or business owners
- Public engagement roles and responsibilities
- Commitments made to stakeholders in previous project phases
- Potential communication methods/outreach tools
- Preliminary schedule for public engagement activities
- Measures for evaluating the success of the public outreach program

As a dynamic document, the Public Involvement Lead, in collaboration with the Project Lead, updates the PIP throughout the design development process to reflect changes in the project's scope, schedule or from stakeholder comments.

Participate in the Project Initiation Meeting

In collaboration with the Project Manager (when the project is transitioned to him/her from the Project Lead), the Public Involvement Lead participates in the Project Initiation Meeting to address any future public engagement strategies, so that input on the stakeholder process is identified early. The level of public engagement and outreach needed on a project depends on several factors, including:

- Type, size, and duration of the project

- Complexity of the project and project area
- Significance of direct, indirect, cumulative, recurring, and disproportionate impacts
- Resource notability and sensitivity
- Number of partners and sources of potential funding
- Anticipated controversy

The availability of the Community Screening (see 1EN1 for related information) is foundational for the Public Involvement Lead to reference when identifying the level of public outreach and to further develop the PIP.

2PI1 Continue Public Engagement

Overview

During this phase, assist with project-specific public engagement activities to ensure a transparent process is followed as required under the National Environmental Policy Act (NEPA) and the State Environmental Policy Act (SEPA).

References

- [Public Involvement Guidelines](#)
- [Practitioners Guide](#)
- [Public Engagement Toolkit](#)

Deliverables

Deliverable	Task	Responsible Party	
		Activity Leader	Additional Support
		Public Involvement Lead	Public Involvement Team Member/ Communications Public Involvement Officer
Public Involvement Plan (PIP)	<ul style="list-style-type: none"> ▪ <i>Finalize Public Involvement Plan (PIP)</i> 	X	X
Scoping Letter	<ul style="list-style-type: none"> ▪ <i>Develop Project Scoping Letter</i> 		X
Mailing List	<ul style="list-style-type: none"> ▪ <i>Compile Mailing List</i> 		X
Public Outreach Materials	<ul style="list-style-type: none"> ▪ <i>Coordinate Public Outreach Event Notifications</i> 	X	
Newsletter/Postcard Approval	<ul style="list-style-type: none"> ▪ <i>Develop/Update Newsletter/Postcards</i> 		X
Environmental Document Comments	<ul style="list-style-type: none"> ▪ <i>Review Environmental Document</i> 	X	X
Public Meeting/Public Hearings	<ul style="list-style-type: none"> ▪ <i>Conduct Public Meetings and/or Public Hearing</i> 		X

Finalize Public Involvement Plan (PIP)

The Project Manager sends an Environmental Tracking and Coordination System (ETRACS) request to Public Involvement to complete the final Public Involvement Plan (PIP). Based on the Project Scoping Report and Community Screening, as well as discussions with the Project Manager, Communications Lead and/or project team, Public Involvement update the PIP to include:

- Potential outreach methods best suited to the project
- Public meetings
- Local and elected public officials’ meetings
- Additional Public Involvement needs for Merger Projects
- Small group meetings to inform the public about the project for review and approval by the Project Manager and Environmental Analysis Unit (Public Involvement, Community Studies, and Visualization [PICSviz])

These activities build upon the work to incorporate the PIP in the Project Initiation Stage.

Develop Project Scoping Letter

The Project Manager sends an ETRACS request to Public Involvement. In accordance with the *Public Involvement Guidelines*, the Private Engineering Firm/consultant prepares the project scoping letter and submits the letter, where it is reviewed to determine if updates are needed to the PIP and to assist with scheduling.

Compile Mailing List

Upon receipt of an ETRACS request for support, the Public Involvement Lead completes the following in accordance with the *Public Involvement Guidelines*.

- Provide the draft mailing list to the assigned Private Engineering Firm or other consultant, who updates the mailing list through project duration.
- Review the project study area map and project mailing area
- Ensure approved mailing list is detailed on the project SharePoint site

Coordinate Public Outreach Event Notifications

Upon receipt of an ETRACS request for support, the Public Involvement Lead:

- Arranges meeting locations and facilities.
- Ensures the public is notified as to where and when the public meeting(s) is to occur.
- Collaborates with the Communications Office to release a press notice regarding each meeting. Note: The Communications Office also notify citizens of the public meetings using social media outlets (e.g., Facebook and Twitter) (see 2CG1 for related information).
- Uploads the project map and available documents to the NCDOT Public Meeting webpage.

Develop/Update Newsletter/Postcards

The Project Manager sends an ETRACS request to Public Involvement. During the project the Private Engineering Firm, or other consultant, may prepare a newsletter/postcard for distribution to persons on the project mailing list and to State officials. Public Involvement approves the newsletter/postcard prior to distribution; the Private Engineering Firm, or other consultant, is responsible for printing and distributing the newsletter.

Review Environmental Document

If a Project Manager determines that Public Involvement's review of the environmental document is necessary, an ETRACS request is sent.

Conduct Public Meeting and/or Public Hearing

For all public meetings and/or public hearings, the Project Manager and Public Involvement Lead references the NCDOT's public meeting process.

Complete Any Open Public Engagement Tasks

While there are no specific public engagement activities or tasks in the Plan-in-Hand and PS&E stages, Public Involvement remains an available resource if any meetings are required during final design or the construction stage, all in coordination with the Communications Group and the Project Manager.

1CG1 Review Project Scoping

Overview

As part of Project Initiation Stage, evaluate the project’s communication needs.

Note: *Actions during the Project Initiation Stage may be led and completed by staff from several different NCDOT groups. Any person who has overall responsibility for a project during this Stage is referred to as the “Project Lead.” This lead could be the Feasibility Studies Engineer, the Corridor Development Engineer, the Division Planning Engineer, or someone in a similar role as tasked by a state or local agency.*

References

- [NCDOT Programmatic Agreement Cultural Resources Screening Checklist](#)
- [Tribal Coordination Protocol](#)

Deliverables

Deliverable	Task	Responsible Party
		Activity Leader
		Communications Lead
Project Scoping Report Review Comments	▪ <i>Review Project Scoping Report</i>	X

Review Project Scoping Report

Upon receipt of an Environmental Tracking and Coordination System (ETRACS) request from the Project Lead for any project with an offsite detour or strong potential for controversy (or likelihood of complexity), the Communications Lead reviews the current Project Scoping Report and notifies the Feasibility Studies Unit (and Public Involvement Lead as applicable) of any issues or needs regarding outreach and communication for a project (see 1FS3 and 1PI1 for related information).

The Communications Lead additionally helps on this task, if needed.

2CG1 Assist with Public Engagement

Overview

Help to facilitate public meetings, assist with media interview requests, develop visualizations, create and administers webpages, and review project notification needs or requirements.

References

- [NCDOT Programmatic Agreement Cultural Resources Screening Checklist](#)
- [Tribal Coordination Protocol](#)
- [Project Special Commitments \(Green Sheet\) Guidance](#)

Deliverables

Deliverable	Task	Responsible Party	
		Activity Leader	Additional Support
		Communications Lead	Public Involvement Lead
Various Outreach Materials	<ul style="list-style-type: none"> ▪ <i>Create or Administer Outreach Materials</i> ▪ <i>Environmental Document Review</i> 	X	X

Create or Administer Outreach Materials

Upon request of the Project Manager via Environmental Tracking and Coordination System (ETRACS), the Communications group is available to provide media outreach or other public engagement work as needed. The Communications Lead can help facilitate several activities related to public outreach on the project, including:

- Assisting Public Involvement with newsletters, public meetings, and interview requests.
- Creating and administering web pages and social media outreach.
- Developing project-specific visualizations and video production in coordination with EAU (Public Involvement, Community Studies, and Visualization (PICSviz)).

Environmental Document Review

Upon request of the Project Manager via ETRACS, the Communications group is available to review the draft environmental document to determine if there are, or needs to be, any public outreach-related Project Special Commitments (Green Sheets) during the project’s construction phase.

4CG1 Prepare Construction Communications Activities

Overview

Because outreach during construction is critical for safety and informing the public of road or lane closures, if a traffic pattern is to change, and if detours are needed, prepare for construction outreach and develop a Construction Public Information Plan in coordination with the Project Manager and stakeholders (e.g., schools and Emergency Medical Services providers). The Project Manager notifies the Communications Office via Environmental Tracking and Coordination System (ETRACS) prior to the start of construction.

References

- None

Deliverables

Deliverables	Task	Responsible Party	
		Activity Leader	Additional Support
		Communications Lead	Project Manager
Construction Outreach Material (varies by need)	<ul style="list-style-type: none"> Identify Construction Outreach Needs 	X	X
Construction Public Information Plan	<ul style="list-style-type: none"> Develop the Construction Public Information Plan 	X	X

Identify Construction Outreach Needs

The Communications Lead works with the Project Manager and the Traffic Management Unit (Work Zone Traffic Control) to ensure the necessary public outreach occurs during the construction phase. This involves a pro-active identification of outreach needs when the Communications Lead receives notice from the Project Manager that the project has been placed on the letting list.

Some items to consider include:

- Send notice on letting when road closures and/or lane shifts occur for projects with road closures and/or work zone issues.
- Outline when to use social media, Public Service Announcements, local media, and other means to push communications out to interested parties.
- Develop/update/review the project website for accuracy.
- Provide legislative liaison support that communicates with state and federal legislative bodies.
- Receive notice from the Project Manager if a problem occurs in the field.
- Circulate notice once construction is complete.

Develop the Construction Public Information Plan

In coordination with the Project Manager, the Communications Lead develops a plan to formalize outreach to stakeholders during construction. This is a formal or informal deliverable, depending on the scale of the project.

Lead Interviews (if needed)

In coordination with the Project Manager, the Communications Lead may:

- Provide on-camera interviews, especially for Division projects.
- Hold news media briefings.

1RD1 Initiate Roadway Coordination

Overview

Ensure that the Express Design is both consistent with the vision established for the corridor by internal and external stakeholders and represents sound roadway design principles and practices.

References

- ❑ American Association of State Highway Transportation Officials (AASHTO) *A Policy on Geometric Design of Highways and Streets*
- ❑ [Roadway Design Manual](#) (*In Development: The manual is in the process of being updated.*)
- ❑ [Complete Streets Memo/Policy](#) (*In Development: The design guidance will ultimately be housed in the updated NCDOT Roadway Design Manual.*)
- ❑ [Mapping & Surveys for Planning and Design Activities Guide](#)

Deliverables

Deliverable	Task	Responsible Party	
		Activity Leader	Additional Support
		Roadway Design Engineer	
Comments on Express Designs	<ul style="list-style-type: none"> ▪ Provide Roadway Input on Express Design 	X	
		Roadway Design Engineer or appropriate Division personnel	Division Location and Surveys Engineer and/or Photogrammetric Engineer
Comments on Mapping Limits	<ul style="list-style-type: none"> ▪ Perform Independent Review of Mapping Limit Polygon 	X	X

Provide Roadway Input on Express Design

Considering the need for early coordination as an Express Design is developed, the Roadway Design Engineer is to engage as follows:

- Review the roadway design elements of the Express Design as provided by the Feasibility Studies Engineer by:
 - Evaluating the design to ensure design elements are in alignment with the AASHTO *A Policy on Geometric Design of Highways and Streets* and NCDOT’s *Roadway Design Manual and Complete Streets Memo/Policy*.
 - Evaluating the design to ensure it reflects any multimodal accommodations coordinated with municipalities, metropolitan or rural planning organizations, and/or that which is recommended by the NCDOT.
- Generate comments on the Express Design, considering that:
 - Comments are to focus on any issues that could adversely affect decision-making as they are being evaluated in the prioritization process.

- Comments are submitted to Feasibility Studies Engineer in written format with any necessary accompanying documentation that would assist in the comments being understood.

In all, the Roadway Design Engineer provides roadway design technical expertise during this activity that involves:

- Responding verbally or in writing, as appropriate, to any questions or concerns that may arise about roadway design policies, practices, and/or procedures as the Express Design is being developed.
- Participating in any meetings in which the Roadway Design Unit or Roadway Design Engineer is requested to attend.

Perform Independent Review of Mapping Limits Polygon

To perform this review task, the Roadway Design Engineer reviews mapping limits polygon as provided by the Feasibility Studies Engineer to:

- Evaluate limits to ensure the limits are adequate for design, but not so excessive that it overburdens resources.
 - There are times where further coordination with Location and Surveys and/or Photogrammetry may be needed.
- Provide comments to the Feasibility Studies Engineer in written format with any necessary accompanying documentation that would assist in the comments being understood.

2RD1 Initiate Roadway Design

Overview

Complete the project’s Design Recommendation Plan Set and associated roadway tasks to establish the essential roadway design elements that facilitate multiple activities across multiple disciplines early in this stage. This activity provides needed data that is incorporated into the environmental document, serves as a visual aid during public engagement activities, and sets a foundation for coordination activities with other technical units, so that these units can develop and advance their design recommendations and plans early.

References

- American Association of State Highway Transportation Officials (AASHTO) *A Policy on Geometric Design of Highways and Streets and Errata*
- American Association of State Highway Transportation Officials (AASHTO) *Roadside Design Guide 4th Edition and Errata*
- [Roadway Design Manual](#) (*In Development: The manual is in the process of being updated.*)
- [Roadway Standard Drawings](#)
- [Complete Streets Memo/Policy](#) (*In Development: The design guidance will ultimately be housed in the updated NCDOT Roadway Design Manual*)
- [Subregional Tier Guidelines](#) (*In Development: The design guidance will ultimately be housed in the updated NCDOT Roadway Design Manual*)
- [Resurfacing, Restoration, and Rehabilitation \(R-R-R\) of Highways and Streets](#)
- [Roadway Design Consultant Coordination Guidelines](#) (*In Development: Part or all of this may be incorporated into the updated NCDOT Roadway Design Manual or remain a separate guidance*)
- *Public Involvement and Mapping Guidelines* (*In Development: This will ultimately be housed in the updated Roadway Design Manual.*)
- [Design Exception Guidelines](#) (*In Development: The guidelines are being updated and will ultimately be housed in the updated Roadway Design Manual.*)
- American Association of State Highway Transportation Officials (AASHTO) *Roadway Lighting Design Guide*
- *Roadway Lighting Policy* (*In Development: This will ultimately be housed in the updated Roadway Design Manual.*)
- National Cooperative Highway Research Program (NCHRP) *Report 152 “Warrants of Highway Lighting”*
- *Location and Design Approval Procedures*

Deliverables

Deliverable	Task	Responsible Party	
		Activity Leader	Additional Support
		Roadway Design Plan Review Group Leader or Division Personnel	Roadway Design Lead
Approved Design Criteria and Associated Typical Sections	<ul style="list-style-type: none"> Complete Design Assumptions and Typical Sections 	X	X
		Roadway Design Lead	
Design Public Meeting Maps	<ul style="list-style-type: none"> Complete Design Recommendation Plan Set 	X	
		Roadway Design Lead	Engineers from Various Technical Disciplines and Division
Design Recommendation Plan Set	<ul style="list-style-type: none"> Complete Design Recommendation Plan Set 	X	X (Roles noted in the descriptions below)
		Technical Services Director or Division Engineer	Roadway Design Lead/State Roadway Design Engineer or Division Personnel
Approved Design Exception	<ul style="list-style-type: none"> Formalize Design Exceptions 	X	X
		Roadway Lighting Design Engineer	Division Engineer
Initial Lighting Assessment	<ul style="list-style-type: none"> Determine Lighting Needs and Owner 	X	
Lighting Evaluation Report	<ul style="list-style-type: none"> Determine Lighting Needs and Owner 	X	
Agreement with Municipality for Lighting Ownership and Maintenance	<ul style="list-style-type: none"> Determine Lighting Needs and Owner 		X
		Technical Services Director or Division Engineer	State Roadway Design Engineer or Division Team Lead
Location and Design Approval Support Document	<ul style="list-style-type: none"> Issue Location and Design Approval (LADA) 		X
Location and Design Approval Letter (LADA)	<ul style="list-style-type: none"> Issue Location and Design Approval (LADA) 	X	X

Complete Design Assumptions and Typical Sections

With coordination of the inclusion of Complete Streets elements occurring during the Project Initiation Stage, the Project Manager provides the results of that coordination to the Roadway Design Lead for inclusion in the design assumptions. While the Roadway Design Lead may not perform all operations associated with the development of the roadway designs, the Roadway Design Lead ultimately seals the final plans and, as such, has responsible charge for the roadway designs and documentation of design decisions. To determine design assumptions and typical sections, the Roadway Design Lead completes the design criteria package and submits for approval.

- The design criteria and typical sections are generated in accordance with the *AASHTO A Policy on Geometric Design of Highways and Streets*, *AASHTO Roadside Design Guide*, *Roadway Design*

Manual, and *NCDOT Standards*. Decisions made about elements that are considered non-standard are documented in written format.

- The design criteria and typical sections are submitted to the Project Manager, who engages the Roadway Design Unit or Division designee for review and comment.

The Roadway Design Review Engineer or Division designee then reviews the design criteria package to ensure the appropriate references are used and values for each element are correct based on those references. The reviewer also confirms consistency between the design criteria and typical sections.

The reviewer provides comments and any associated documents to the Project Manager for dissemination to the Roadway Design Engineer. Once complete, a meeting can be requested to discuss concerns or gain clarity on statements.

- Note: An NCDOT representative is ultimately responsible for any comments developed by a Private Engineering Firm operating on the NCDOT's behalf.

The Roadway Design Plan Review Group Leader or appropriate Division personnel then issues design criteria approval, and once comments have been adequately resolved, the Roadway Design Plan Review Group Lead or appropriate Division personnel provides documentation of approval to the Project Manager.

Complete the Design Recommendation Plan Set

The development of final surveys is a coordinated effort between the Locations and Surveys and Photogrammetry units, which begins in the Project Initiation Stage. The final survey product is then delivered to the Roadway Design Lead prior to initiating the Design Recommendation Plan Set. The designs developed for this plan set is also be used to facilitate the completion of the environmental document.

To develop this plan set, the Roadway Design Lead develops the horizontal and vertical alignments for all affected roadways that involves:

- Developing the horizontal and vertical alignments to be reflective of the approved design criteria, the AASHTO *A Policy on Geometric Design of Highways and Streets* and NCDOT's Roadway Design policies, procedures, and practices as defined in the *Roadway Design Manual*.
- Coordinating with the other technical disciplines/units (e.g., Hydraulics, Utilities, Geotechnical, Structures Management, etc.) and Division staff to verify that no new issues presented themselves based on the delivery of the final surveys.
- Evaluating the horizontal and vertical alignments to ensure each fits the context of the subject roadways. Design decisions deviating from the guidance in the previous bullet is to be thoroughly documented in written format.

Additionally, as part of this task, the Roadway Design Lead is to:

- Layout roadway and structural design elements, basing both on the layout of:
 - Roadway design elements on the approved design criteria and recommendations from the Traffic Management Unit.

- Structural design elements on the approved design criteria, recommendations from the Hydraulic Design Engineer (if bridging a body of water), the Rail Division and Structure Management Units (if bridging a railroad), and coordination with the Structures Lead on the bridge type.
- Layout superelevation transitions that involve:
 - Verifying that the superelevation transitions conform to the current *AASHTO Policy on Geometric Design of Highways and Streets* and NCDOT Standard Drawings.
 - Coordinating with the hydraulic engineer to identify areas where hydroplaning concerns exist. Efforts are made to ensure the concerns are adequately resolved.
- Calculate vertical clearance, if applicable, and document the vertical clearance calculations in a format that is easy to understand and verify.
 - Note: The minimum clearances for each structure over a roadway or railroad are provided in the approved design criteria.
 - Vertical clearance calculations are generated to confirm they have been met.
- Develop gore calculations, if applicable, and document the calculations in a format that is easy to understand and verify.
 - Note: The gore calculations are generated to ensure the rollover limitations are not violated as detailed in the *Roadway Design Manual*.
- Perform sight distance calculations as prescribed in the *Roadway Design Manual* documenting the calculations in a format that is easy to understand and verify.

3D Model Development

The Roadway Design Lead also generates a 3D Model of the proposed design for all construction proposed by the project and layout cross sections and limits of construction (slope stakes), considering:

- The cross sections and limits of construction are to be reflective of the 3D model.
- Design elements shown in the plan view are to be the same as the 3D model.

The appropriate version of software to be used is to be detailed in the scope of work.

Right-of-Way and Easement Layout

The Roadway Design Lead is to also layout initially proposed right-of-way and easements generated based on guidance in the *Roadway Design Manual* and in coordination with the appropriate Division personnel. Station and offset labels are not required for the Design Recommendation Plan Set.

Maintenance of Traffic Narrative

The Roadway Design Lead coordinates the development of the maintenance of traffic narrative, which is meant to be:

- A viable plan for maintenance of traffic conveyed in written format to demonstrate the project can be constructed as designed.
- The Work Zone Traffic Engineer is engaged early in the design process to discuss potential traffic management challenges and solutions.

Public Involvement Engagement

For public engagement at this stage, the Roadway Design Lead develops design public meeting maps to conform with the *Public Involvement and Mapping Guidelines*. The Project Manager is to then set up a review meeting to evaluate the maps to ensure they accurately portray the project.

- Attendees at the meeting are the Roadway Design Lead and representation from each of the following: the Division, Public Involvement Unit, Environmental Analysis Unit (Community Studies and Visualization), experts representing the technical disciplines/units (Hydraulics, Utilities, Work Zone Traffic Control, Structures Management, etc.), and any other relevant stakeholders.
- The technical experts for centrally managed projects are to be representatives from the respective central units.

Once all comments from the review meeting are addressed and the maps updated, the Project Manager is notified so that the Public Involvement Officer and/or Communications Group can update their website.

After the Design Public Meeting has been held and the comment period closed, the Project Manager schedules a Post-Public Meeting Resolution Meeting to determine the best path forward to address the comments.

- Attendees to the meeting include those invited to the map review and anyone else who can provide feedback on the concerns from the public.
- The resolutions requiring revisions to the designs as presented to the public are incorporated into the plans.

Potential Retaining Wall Location Evaluation

To complete this subtask, the Roadway Design Lead evaluates roadway design information for potential locations where retaining walls are a cost-effective solution to reduce impacts. The evaluation includes coordination efforts with the Hydraulics Design Engineer, Design Geotechnical Engineer, Structures Lead, Utility Coordinator, and appropriate Division personnel. Of note:

- Where considered viable, the retaining wall locations are incorporated in the typical sections, plan sheets, and cross section sheets.
- Retaining wall envelopes are developed for each retaining wall location.

The Roadway Design Lead notifies the Project Manager when this is complete. The Project Manager then requests the retaining wall investigations and design recommendations from the Geotechnical Engineering Unit (see 3GT2 for related information).

Design Recommendation Plan Set Preparation

The Roadway Design Lead is to lay out the title sheet, plan and profile sheets, and cross section sheets to include a title sheet that:

- Encompasses all the work proposed by the project,
- Contains an accurate description of the project limits and type of work, and
- Provides the design data used to establish the design criteria for the mainline.

The horizontal and vertical alignment data, along with the 3D model information, are transferred into plan, profile, and cross section sheets as prescribed in the *Roadway Design Manual*.

The Roadway Design Lead also incorporates the final pavement design into the typical sections upon receipt of the final pavement design recommendations in the final Pavement Design Memo (see 2PD1 for related information). Of note:

- The designs are evaluated to determine if any are incompatible with the proposed designs.
- If any concerns arise or the recommendations are incomplete, the Pavement Design Engineer is contacted for further discussion.
- The final pavement designs are to be accurately reflected in the pavement schedule, typical sections, and paving details per the guidance in the *Roadway Design Manual*.

The Roadway Design Lead also develop an earthwork summary, which is all to be provided in the plans per the guidance in the *Roadway Design Manual*.

Design Recommendation Plan Set Review and Finalization

Once the plans are complete, the Roadway Design Lead notifies the Project Manager, so that the Project Manager can schedule the Design Recommendation Plan Set Review Meeting. The Project Manager distributes the plans to the technical disciplines/Units and/or appropriate Division personnel ahead of the meeting.

For roadway designs developed by a Private Engineering Firm, the Roadway Design reviewer or Division designee is to use appropriate means including the *Roadway Design Manual*, *Roadway Design Consultant Coordination Guidelines*, and plan review checklists to complete a quality assurance review.

- This review ensures the plan set is complete and in compliance with current NCDOT and Roadway Design Unit guidance, policies, and procedures.
- An NCDOT representative is ultimately responsible for any comments developed by a consultant operating on the NCDOT's behalf.

From there, the Roadway Design Lead updates the plans based on comments from the Design Recommendation Plan Set Review Meeting, considering the following.

- Comments and recommendations from the review meeting are analyzed to determine if they are feasible.
- If results of the analyses do not provide a clear resolution, results are circulated to all relevant designers and Division personnel for a final determination.
- The designs and plans are updated to include all final recommendations.

The Roadway Design Lead notifies the Project Manager once the plans are complete so that the Project Manager can distribute the plan set to the disciplines/technical units and/or appropriate Division personnel through the project SharePoint site.

Formalize Design Exceptions

During the development of the Design Recommendation Plan Set, it may not be feasible to meet all the required design criteria. If it is determined that design element identified in the design exception checklist cannot be met, a formal design exception is required.

To complete this task, the Roadway Design Lead completes the design exception package and submit the package to State Roadway Design Engineer as follows:

- The design exception checklist is completed per the design exception guidance in the *Roadway Design Manual*.
- All pertinent data in the design exception request letter is completed and includes responses to all questions on the “Basis of the Exception”.
- The letter, checklist, and location of the design plans is submitted to the State Roadway Design Engineer or Division designee for review.

The State Roadway Design Engineer or Division designee then reviews the design exception package for accuracy and completeness, considering that:

- Written comments and associated documents are provided to the Project Manager for dissemination to the Roadway Design Lead.
- If deemed necessary, a meeting is held to ensure clarity of comments and responses.

Once comments have been adequately addressed, the State Roadway Design Engineer signs the document and forwards it to the Technical Services Director, who reviews the package and provides additional comments, if needed. If there are no comments, the Technical Services Director approves the design exception by signing the document.

Determine Lighting Needs and Owner

NCDOT-owned and maintained lighting systems are typically installed inside full control of access facilities. The exceptions are complex intersections, such as a roundabout or continuous flow intersection (CFI).

Prior to preparing a lighting evaluation, the Roadway Lighting Design Engineer is to refer to the *Roadway Lighting Policy* and NCHRP Report 152 as part of determining the warrant for an evaluation that assess:

- The access control of the interchange or corridor,
- If complex intersections (continuous flow, roundabout, etc.) are in the design and/or
- If the night-to-day accident ratio for existing conditions at the interchange or along the corridor is met.

When a lighting evaluation is warranted, the Roadway Lighting Design Engineer is to:

- Prepare a lighting evaluation for the interchange or corridor in accordance with NCHRP Report 152.
- Prepare a Lighting Evaluation Map showing the result of all evaluated interchanges and/or continuous roadway sections within the project.

The Roadway Lighting Design Engineer provides the lighting evaluation and map to the NCDOT Roadway Lighting Team Lead for review. The results of the lighting evaluation are discussed at the next quarterly

Lighting Committee meeting, with the inclusion of lighting in the project determined by the NCDOT Lighting Committee.

Where the lighting evaluation shows that lighting is not justified, the Division Engineer works with the impacted municipality to determine if the municipality is interested in partnering with the NCDOT on including lighting in the project.

Issue Location and Design Approval (LADA)

To review and issue a Location and Design Approval, the State Roadway Design Engineer or designee performs a consistency review between the environmental document and the roadway design plans in accordance with the Location and Design Approval procedures. Upon review, a letter is drafted for the signature of the Technical Services Director, with supporting documentation attached.

2RD2 Prepare for Field Inspection

Develop a coordinated set of design plans (Field Inspection Plan Set) that can be used for the Field Inspection Review Meeting and a constructability review, so that all vested parties are able to review and discuss concerns that could impact how a project is built.

References

- American Association of State Highway Transportation Officials (AASHTO) *Roadside Design Guide 4th Edition and Errata*
- [Roadway Design Manual](#) (*In Development: The manual is in the process of being updated.*)
- [Roadway Standard Drawings](#)
- [Roadway Design Consultant Coordination Guidelines](#) (*In Development: Part or all of this may be incorporated into the updated NCDOT Roadway Design Manual or remain a separate guidance.*)

Deliverables

Deliverable	Task	Responsible Party	
		Activity Leader	Additional Support
		Roadway Design Lead	Engineers from Various Technical Disciplines and Division
Field Inspection Plan Set	<ul style="list-style-type: none"> ▪ Complete Field Inspection Plan Set 	X	X
Quantities for Construction Estimate	<ul style="list-style-type: none"> ▪ Complete Field Inspection Plan Set 	X	X

Complete Field Inspection Plan Set

To complete the Field Inspection Plan Set, the Roadway Design Lead incorporates input from several sources as follows.

Hydraulic Design Input

The relevant information in the completed major structure reports (e.g., the Bridge Survey and Hydraulic Design Reports (BSRs), Detour Survey and Hydraulic Design Reports (DSRs), and Culvert Survey and Hydraulic Design Reports (CSRs)) and the completed drainage plans for field inspection are evaluated to ensure consistency between the hydraulic design and the roadway design plans (see 2HY2 for related information). The Roadway Design Lead incorporates the hydraulic design, details, and quantities into the 3D model and the roadway design plan, profile, and cross section sheets per the guidance in the *Roadway Design Manual*.

The Roadway Design Lead discusses concerns about the intent and/or accuracy of the hydraulic design with the Hydraulics Design Engineer to determine possible solutions. If the recommended solution has the potential to jeopardize the scope, schedule, or budget, the Roadway Design Lead notifies the Project Manager, so that the Project Manager can determine what further coordination is needed.

Preliminary General Drawing Input

The preliminary general drawing is reviewed to ensure consistency with how the structure information relevant to the roadway design plans is shown per guidance in the *Roadway Design Manual* (see 2ST2 for related information).

The Roadway Design Lead discusses concerns about the intent and/or accuracy of the preliminary general drawing with Structures Lead and Hydraulics Design Engineer, if the needed, to determine possible solutions. If the recommended solution has the potential to jeopardize the scope, schedule, or budget, the Roadway Design Lead notifies the Project Manager, so that the Project Manager can determine what further coordination is needed.

Geotechnical Slope and Roadway Input

The geotechnical slope and roadway recommendations are reviewed and incorporated into the roadway design, plan, profile, and cross section sheets, and the earthwork summary per the guidance in the *Roadway Design Manual* (see 2GT2 for related information).

The Roadway Design Lead discusses concerns about the intent and/or accuracy of the geotechnical slope and/or roadway recommendations with the Design Geotechnical Engineer to determine possible solutions. If the recommended solution has the potential to jeopardize the scope, schedule, or budget, the Roadway Design Lead notifies the Project Manager, so that the Project Manager can determine what further coordination is needed.

Work Zone Traffic Control Input

The maintenance of traffic narrative provided in the Design Recommendation Plan Set is further developed into concept plans for the traffic control plans. The roadway design plans are updated to reflect the concepts plans.

The Roadway Design Lead discusses concerns about the intent and/or accuracy of the traffic control concepts with the Work Zone Traffic Control (WZTC) Project Engineer to determine possible solutions (see 2TM1 for related information). If the recommended solution has the potential to jeopardize the scope, schedule, or budget, the Roadway Design Lead notifies the Project Manager, so that the Project Manager can determine what further coordination is needed.

Right-of-Way and Easement Layout Update

The Roadway Design Lead revises the initial right-of-way and easements provided in the Design Recommendation Plan Set by incorporating the completed drainage design for the field inspection plans (see 2HY2), geotechnical recommendations (see 2GT2), utility coordination (see 2UT1), temporary or permanent erosion and sediment control measures (see 2RE1), and signal poles (see 2SG1) per the guidance in the *Roadway Design Manual*.

- Station and offset information is included in the plan set at this stage.
- The appropriate discipline/Unit supplying the information listed in the bullet above and/or the Division are contacted if there are any concerns with how to contain the impacts.

Construction Estimate Quantities

The Roadway Design Lead and other associated disciplines/Units develop quantities for pay items associated with the construction of the proposed designs per guidance in the *Roadway Design Manual*. The quantities are provided to the Project Manager, so that the Project Manager can request an updated construction cost estimate be generated by the Contract Standards and Development Unit (see 2CS1 for related information).

Plan Set Review and Finalization

Once the plans are complete, the Roadway Design Lead notifies the Project Manager, so that the Project Manager can schedule the Field Inspection Review Meeting. The Project Manager distributes the plans to the technical disciplines/Units and/or appropriate Division personnel in advance of the meeting. The Project Manager provides the Field Inspection Plan Set to the Value Management Office to complete a Constructability Review (see 2VM3 for related information). The team confirm there is enough time to allow a thorough review from the Value Management Office prior to the Field Inspection Review Meeting.

For roadway designs developed by a Private Engineering Firm, the Roadway Design reviewer or Division designee uses appropriate means including the *Roadway Design Manual*, *Roadway Design Consultant Coordination Guidelines*, and plan review checklists to complete a quality assurance review.

- This review is to ensure the plan set is complete and in compliance with current NCDOT and Roadway Design Unit guidance, policies, and procedures.
- An NCDOT representative is ultimately responsible for any comments developed by a consultant operating on the NCDOT's behalf.

From there, the Roadway Design Lead updates the plans based on comments from the Field Inspection Review Meeting, considering the following.

- Comments and recommendations from the review meeting are analyzed to determine if they are feasible.
- If results of the analyses do not provide a clear resolution, results are circulated to all relevant designers and Division personnel for a final determination.
- The designs and plans are updated to include all final recommendations.

The Roadway Design Lead notifies the Project Manager once the plans are complete so that the Project Manager can distributed to the Value Management Unit for the Constructability Review (see 2VM3 for related information).

3RD1 Complete Roadway Design

Overview

Evaluate and/or incorporate decisions from the field inspection, constructability review, and all remaining design recommendations from technical disciplines/Units into the plans, resulting in a set of plans with no major constructability or right-of-way issues.

References

- American Association of State Highway Transportation Officials (AASHTO) *Roadside Design Guide 4th Edition and Errata*
- [Roadway Design Manual](#) (*In Development: The manual is in the process of being updated.*)
- [Roadway Standard Drawings](#)
- [Roadway Design Consultant Coordination Guidelines](#) (*In Development: Part or all of this may be incorporated into the updated NCDOT Roadway Design Manual or remain a separate guidance.*)
- [Standard Specifications for Roads and Structures](#)
- American Association of State Highway Transportation Officials (AASHTO) *Roadway Lighting Design Guide*
- Roadway Lighting Policy* (*In Development: This will ultimately be housed in the updated Roadway Design Manual.*)
- National Electrical Code (NEC)

Deliverables

Deliverable	Task	Responsible Party	
		Activity Leader	Additional Support
		Roadway Design Lead	Engineers from Various Technical Disciplines and Division
Right-of-Way Plan Set w/ Noise Wall Locations	<ul style="list-style-type: none"> ▪ Complete the Right-of-Way Plan Set 	X	X (Roles noted in the descriptions below)
Quantities for Construction Estimate	<ul style="list-style-type: none"> ▪ Complete the Right-of-Way Plan Set 	X	X (Roles noted in the descriptions below)
		Roadway Design Lead	Hydraulic Design Lead
Roadway Design Plans Set for Permit Application	<ul style="list-style-type: none"> ▪ Conduct Permit Drawing Consistency Review 	X	X
		Roadway Lighting Design Engineer	
Photometric Layout	<ul style="list-style-type: none"> ▪ Complete Lighting Layout 	X	
Lighting Plans Prepared in MicroStation	<ul style="list-style-type: none"> ▪ Complete Lighting Layout 	X	
Voltage Drop Calculations	<ul style="list-style-type: none"> ▪ Complete Lighting Layout 	X	

		Roadway Design Lead	Pavement Design Lead
Typical Sections for Pavement Design Review	<ul style="list-style-type: none"> Submit/Review Typical Sections (Pavement Management) 	X	X

Complete the Right-of-Way Plan Set

The other technical disciplines/Units continue to make minor adjustments to finalize their plans, and the approved design noise report is issued at the beginning of this Plan-in-Hand Stage. The Right-of-Way Plan Set is then used by the:

- Location and Surveys Unit for staking of proposed right-of-way and easements, and
- Right-of-Way Unit for appraisal and acquisitions.

Noise Wall Location Incorporation

The Roadway Design Lead incorporates noise wall locations from the Design Noise Report. The Design Noise Report is generated by the Environmental Analysis Unit (Traffic Noise and Air Quality) or their designee (see 3EN1 and 3EN2 for related information).

Once the report is provided by the Project Manager, the Roadway Design Lead incorporates approved noise wall locations into the plan set per guidance in the *Roadway Design Manual*.

- Note: Anticipated revisions to the plans include potential modifications to the typical sections, plan sheets, 3D model, cross sections, slope stakes, and proposed right-of-way and/or easements.

If required, the Roadway Design Lead participates in coordination to resolve any conflicts the noise wall locations may present within the designs. Others engaged in this coordination include the Hydraulics Design Engineer, Design Geotechnical Engineer, Utility Coordinator, Structures Lead, Work Zone Traffic Control (WZTC) Project Design Engineer, and the appropriate Division personnel. If the recommended solution has the potential to jeopardize the scope, schedule, or budget, the Project Manager determines what further coordination is needed to obtain a final resolution.

Plan Set Compilation

The Roadway Design Lead receives final designs, plans, and/or results of coordination efforts from all or a portion of the following disciplines/Units: Hydraulics, Utilities, Work Zone Traffic Control, Structures Management, Signing and Delineation, Roadside Environmental, Geotechnical Engineering, and Rail Division. Their information is reviewed for consistency with the roadway design plans per the *Roadway Design Manual*.

- If there are concerns that need to be addressed, the appropriate lead is engaged to determine possible solutions.
- If the recommended solution has the potential to jeopardize the scope, schedule, or budget, the Roadway Design Lead informs the Project Manager, so that the Project Manager can determine what further coordination is needed.

Construction Estimate Quantities

The Roadway Design Lead and other associated disciplines/Units update the quantities for pay items associated with the construction of the proposed designs per guidance in the *Roadway Design Manual* to reflect any design revisions and/or updated recommendations from other technical Units or the Division. The quantities are provided to the Project Manager, so that the Project Manager can request an updated construction cost estimate be generated by the Contract Standards and Development Unit (see 3CS1 for related information).

Plan Set Review and Finalization

Once the plans are complete, the Roadway Design Lead notifies the Project Manager, so the Project Manager can schedule the Plan-in-Hand Review Meeting that involves review of the Right-of-Way Plan Set. The Project Manager distributes the plans to the technical disciplines/Units and/or appropriate Division personnel in advance of the meeting. If needed (depending on the complexity of the project or if significant changes have occurred from the Alignment Defined Stage), the Project Manager determines the need for an additional Constructability Review. If used, the Project Manager provides the Right-of-Way Plan Set to the Value Management Office to coordinate this additional Constructability Review.

The Roadway Design Lead updates the plans based on comments from the Plan-in-Hand Review Meeting, considering the following.

- Comments and recommendations from the review meeting are analyzed to determine if they are feasible.
- If results of the analyses do not provide a clear resolution, results are circulated to all relevant engineers and Division personnel for a final determination.
- The designs and plans are updated to include all final recommendations.

The Roadway Design Lead notifies the Project Manager once the plan set is complete.

Conduct Permit Drawing Consistency Review

The development of environmental permit drawings is a critical component for obtaining approval from the appropriate environmental agencies prior to let. To complete this task, the Roadway Design Lead compares the draft environmental permit drawings with the current roadway design plans.

- Upon receipt of the draft environmental permit drawings from the Project Manager or Hydraulics Design Engineer, the Roadway Design Lead compares the plans to ensure the impacts are the same.
- The elements under review include slope stakes, proposed right-of-way and easement impacts, clearing methodology, and the data associated with major hydraulic crossings.

The Roadway Design Lead provides written comments on any inconsistencies and provides any associated documents to the Hydraulics Design Engineer. If needed, the Roadway Design Lead coordinates with the Hydraulics Design Engineer and any other technical experts to resolve the concern.

Any resolution of inconsistencies requiring revisions to the roadway design are incorporated into the roadway design plans, and once inconsistencies are resolved, the Roadway Design Lead notifies the Project

Manager, so that the Project Manager can provide the location of the roadway design plans to the Environmental Analysis Unit (Environmental Coordination and Permitting).

Complete Lighting Layout

If lighting is warranted or existing lighting conflicts with construction, the Roadway Lighting Design Engineer prepares and provides a photometric layout, including:

- Luminaire variables and preliminary light pole locations determinations.
- Light Levels calculations.

The Roadway Lighting Design Engineer also prepares a lighting design package, including:

- Voltage drop calculations based on the system operating voltage and circuit loads.
- A Photometric layout replicated in MicroStation
- Determination of underpass lighting requirements.

All of this is done in coordination with the Roadway Design Lead, with the total number of lighting plan sheets provided to the Roadway Design Lead for inclusion in the roadway design plans' index of sheets.

The Roadway Lighting Design Engineer prepares any special provisions for any lighting item not included in the *Standard Specifications for Roads and Structures*.

Submit/Review Typical Sections (Pavement Management)

Once all design has been completed to the point where no more revisions are anticipated to the typical sections, the Roadway Design Lead provides typical section sheets to the Pavement Design Engineer for review (see 3PD1 for related information).

In updating the typical sections, the Roadway Design Lead evaluates the comments and/or corrections from the Pavement Design Engineer when updating to the typical sections.

- If there is uncertainty about a comment, the Pavement Design Engineer is engaged to resolve them.
- The agreed upon changes to the typical sections are made so that the plans are ready for seals and signatures in the next stage.

4RD1 Finalize Contract Package

Overview

With right-of-way acquisition and utility relocations well underway, compile the Final Roadway Design Plans, Specifications, and Estimate (PS&E) with any other required documentation to assist the Contract Standards and Development Unit to develop the contract for the Advertisement and Letting Process.

References

- [Roadway Design Manual](#) (*In Development: The manual is in the process of being updated.*)
- [Roadway Design Consultant Coordination Guidelines](#) (*In Development: Part or all of this may be incorporated into the updated NCDOT Roadway Design Manual or remain a separate guidance.*)

Deliverables

Deliverable	Task	Responsible Party	
		Activity Leader	Additional Support
		Roadway Design Lead	
Review Set of Final Plans	<ul style="list-style-type: none"> ▪ Complete Contract Package 	X	
		Roadway Design Lead	
Final Construction Quantities for Roadway Design Plans	<ul style="list-style-type: none"> ▪ Complete Contract Package 	X	
		Roadway Design Lead	Engineers from Various Technical Disciplines and Division
Sealed Contract Roadway Design Plans	<ul style="list-style-type: none"> ▪ Submit Contract/Final Plans 	X	X (Roles noted in the descriptions below)

Complete the Contract Package

For compiling a complete contract package, the Roadway Design Lead updates the plans, as needed, for any design changes that occurred after the end of the Plan-in-Hand Stage. The process includes completing:

- The appropriate documentation required by the Contract Standards and Development Unit or Division Contract Engineer in proper format to either be included in the plans or provided as standalone documents.
- Items include the index of sheets, list of standard drawings, general notes, special provisions, relevant summary plan sheets summaries, Transport quantities, and key documents.

For roadway designs developed by a Private Engineering Firm, the Roadway Design reviewer or Division designee is to use appropriate means including the *Roadway Design Manual*, *Roadway Design Consultant Coordination Guidelines*, and plan review checklists to complete a quality assurance review.

- This review is to ensure the plan set is complete and in compliance with current NCDOT and Roadway Design Unit guidance, policies, and procedures.
- An NCDOT representative is ultimately responsible for any comments developed by a consultant operating on the NCDOT's behalf.

The Roadway Design Lead notifies the Project Manager when the Roadway Design Review Plan Set and the contract documentation have been placed on the project SharePoint site in the Let Preparation area. The Project Manager then notifies Plan Review Engineer or the Division Contract Engineer.

The Plan Review Engineer or the Division Contract Engineer provides comments to the Project Manager. The Roadway Design Lead provides a response to all comments so that the group is aware of what has changed.

Submit Contract/Final Plans

Plan sheets are uploaded into DocuSign or equivalent software and sent to the Roadway Design Lead, Hydraulic Design Lead, and Pavement Design Engineer for dated seals and signatures.

Special detail sheets are uploaded to DocuSign and sent to the State Plans and Standards Engineer for dated seal and signature.

The Project Manager is notified when the final sealed roadway design plan set/PS&E has been uploaded onto the project SharePoint site in the Let Preparation area. The Project Manager notifies the Plan Review Engineer or the Division Contract Engineer for final compilation.

2RE1 Initiate Erosion and Sediment Control Plans

Overview

Begin the preliminary erosion and sediment control plans after or concurrent with advancement of the drainage design to provide locations for erosion and sediment control (E&SC) measures and to identify sufficient right-of-way/easement needs for installation, maintenance, and removal of the measures. Determine additional permit needs.

References

- [Roadside Environmental - Soil and Water Webpage](#)
- [Erosion and Sediment Control Design and Construction Manual](#)
- [NCDEQ Erosion and Sediment Control Planning and Design Manual](#)

Deliverables

Deliverable	Task	Responsible Party	
		Activity Leader	Additional Support
		Roadside Environmental Engineer	Erosion Control Engineering Supervisor
Water Quality Worksheet (Form ESC-1)	<ul style="list-style-type: none"> ▪ Document Review and Surface Water Delineation for Design Requirements 	X	
Environmental Document Review (Form ESC-2)	<ul style="list-style-type: none"> ▪ Document Review and Surface Water Delineation for Design Requirements 	X	
Pre-Design Meeting Minutes	<ul style="list-style-type: none"> ▪ Conduct E&SC Pre-Design Meeting 	X	X
Preliminary E&SC Plans	<ul style="list-style-type: none"> ▪ Conduct E&SC Project Site Visit 	X	
	<ul style="list-style-type: none"> ▪ Determine Outfall Locations and Design Preliminary E&SC Measures for ROW 	X	
ROW/Easement Request File	<ul style="list-style-type: none"> ▪ Develop ROW/Easement Request File 	X	

Document Review and Surface Water Delineation for Design Requirements

To complete this task, the Roadside Environmental Engineer is to:

- Provide a project investigation and watershed analysis by reviewing the project’s environmental documents for commitments related to E&SC design, mitigation, landscaping, and vegetation re-establishment.
- Complete and submit the *Water Quality Worksheet* (Form ESC-1) and *Environmental Document Review* (Form ESC-2) (both located on the Soil and Water webpage) to verify E&SC design requirements and to document environmental commitments to be addressed by the E&SC plans and Roadside Environmental Unit operations.

The *Water Quality Worksheet* and *Environmental Document Review* are reviewed by Roadside Environmental Unit staff and uploaded onto the project SharePoint site when complete.

Conduct E&SC Project Site Visit

The Roadside Environmental Engineer performs a site visit to evaluate existing groundcover, soils, and jurisdictional features for E&SC design. This work includes:

- Comparing design file topography with existing field topography for discrepancies.
- Evaluating and noting any potential construction and maintenance issues for E&SC measures.
- Documenting and photographing current condition of noted jurisdictional streams and wetlands or other sensitive drainage features.
- Distributing the notes and photos to Roadside Environmental Unit reviewer, uploading all onto the project SharePoint site.

Conduct E&SC Pre-Design Meeting

In conducting the meeting with the Roadside Environmental Unit staff after the site visit, the Roadside Environmental Engineer is to:

- Discuss E&SC design concept for the project, including potential design exceptions, any issues noted during the site visit, and any current Division preferences or potential constructability conflicts.
- Submit draft meeting minutes for review and comment to attendees and other Units, as necessary.
- Submit final meeting minutes to attendees and upload onto the project SharePoint site.

Determine Outfall Locations and Design Preliminary E&SC Measures for ROW

For determining outfall locations and when designing the preliminary E&SC measures, the Roadside Environmental Engineer is to:

- Complete preliminary E&SC plans showing locations of excavated basins or other outfall E&SC measures and the required temporary construction easement for the installation, maintenance, and removal of the measures.
 - Preliminary E&SC plans are to be distributed for review prior to the Field Inspection Review Meeting.
 - Distribute the preliminary E&SC plans to the appropriate Units (e.g., the Project Manager, Structures Management, Roadway Design, Division Construction, Utilities, Right-of-Way, Division Environmental Officer, REU Field Operations, Central Construction).
- Determine applicability of other permits or variances (e.g., NC Division of Water Resources Central Coastal Plain Capacity Use Area (CCPCUA) Permits, NC Department of Environmental Quality Trout Buffer Variance and High-Quality Waters (HQW) Variance, etc.) and begin application coordination as required.

Develop ROW/Easement Request File

When developing the ROW/Easement Request file (which may also occur at the beginning of the Plan-in-Hand stage), the Roadside Environmental Engineer:

- Delineates temporary construction easement that are necessary for the construction, maintenance, and removal of E&SC measures after review and comment from the Field Inspection.
- Coordinates with right-of-way, utilities, and other disciplines/Units to identify and resolve noted conflicts with the planned E&SC measures.

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- Produces a completed easement request CADD file and distributes to the Right-of-Way team and the Project Manager.

3RE1 Complete Erosion and Sediment Control Plans

Overview

Complete the erosion and sediment control (E&SC) plans.

References

- [Roadside Environmental - Soil and Water Webpage](#)
- [Erosion and Sediment Control Design and Construction Manual](#)
- [NCDEQ Erosion and Sediment Control Planning and Design Manual](#)
- [BMP for Construction and Maintenance Activities](#)

Deliverables

Deliverable	Task	Responsible Party	
		Activity Leader	Additional Support
		Roadside Environmental Engineer	Erosion Control Engineering Supervisor
E&SC Plan Set	Complete E&SC plans for Clearing and Grubbing Construction Phase	X	
	Complete E&SC plans for Intermediate and Final Construction Phases	X	
	Calculate Matting Requirements for Ditches and Slopes	X	
	Design Pipe/Culvert Construction Sequences	X	
	Add Details, Notes, and Vegetation Management Plans	X	
E&SC Special Provisions & Quantities	Calculate Final E&SC Quantities and Develop Project Specific E&SC Special Provisions	X	
Approved Applicable Permits/Variations	Apply and Receive Approval for other Applicable Permits Related to the E&SC Plans	X	X

Complete E&SC Plans for Clearing and Grubbing Construction Phase

For this portion of the plans, the Roadside Environmental Engineer is to design the clearing and grubbing E&SC plans in accordance with the *Erosion and Sediment Control Design and Construction Manual* and NCDEQ’s *Erosion and Sediment Control Planning and Design Manual*. This work includes:

- Delineating the watersheds that drain through the project and their discharge points based on existing topography and drainage features.
- Designing any basins at existing outfalls and routing runoff with temporary ditches with velocity controls, as needed.
- Identifying and protecting jurisdictional features.
- Delineating the ESA, as required.
- Designing perimeter protection to contain runoff not conveyed to an E&SC basin.
- Designing inlet protection for existing inlets and drainage inflow points.

Complete E&SC Plans for Intermediate and Final Construction Phases

For this portion of the plans, the Roadside Environmental Engineer designs final phase and any necessary intermediate phase E&SC plans in accordance with the *Erosion and Sediment Control Design and Construction Manual* and the NCDEQ *Erosion and Sediment Control Planning and Design Manual*. This work includes:

- Delineating watersheds that drain through the project and their discharge points based on proposed topography and drainage plans.
- Designing basins at outfalls using proposed pipes and drainage channels.
- Designing temporary ditches, as needed, to convey runoff to E&SC basins.
- Designing velocity controls for proposed drainage channels and temporary ditches.
- Incorporating clearing and grubbing E&SC plans, as practical.
- Designing perimeter protection to contain runoff not conveyed to an E&SC basin.
- Designing inlet protection for proposed inlets and other drainage inflow points.
- Designing for temporary drainage associated with temporary traffic detours or construction activities that may not be captured in the clearing and grubbing or final phase E&SC plans.

Calculate Matting Requirements for Ditches and Slopes

To calculate matting requirements, the Roadside Environmental Engineer:

- Analyzes flow rates and determines stabilization requirements for channels with erosive velocities and slopes with potential for erosive failure throughout the project.
- Denotes stabilization using matting or other groundcover in a summary table or annotation on the E&SC plans.

Design Pipe/Culvert Construction Sequences

When designing the pipe/culvert construction sequencing, the Roadside Environmental Engineer is to:

- Design construction sequence drawings and narratives, for pipes/culverts carrying jurisdictional streams sufficient to convey the stream through the project construction site, while maintaining separation from the work site.
- Design temporary drainage (e.g., pipes, channels, etc.) as needed to maintain stream passage during construction. Include designs for temporary pipes carrying jurisdictional streams that are needed for work zone traffic control and other construction activities.
- Incorporate pipe/culvert construction sequences into the clearing & grubbing phase E&SC plans.

Add Details, Notes, and Vegetation Management Plans

For this task, the Roadside Environmental Engineer:

- Completes the E&SC plans by incorporating appropriate title sheet information, needed details, and notes on the E&SC plan sheets for project-specific environmental information into the plan.
- Adds project-specific vegetation management plans (e.g., reforestation, streambank reforestation, wetland grass or reforestation, etc.) or landscaping as required through permitting or project commitments to the E&SC plans.

Calculate Final E&SC Quantities and Develop Project Specific E&SC Special Provisions

The Roadside Environmental Engineer submits quantity calculations and develops project Special Provisions (Green Sheets) for all items in the E&SC plans not covered under the NCDOT Standard Specifications. This task involves calculating quantities for all E&SC items and applying maintenance factors for final quantities. All related information is uploaded to the project SharePoint site.

Apply and Receive Approval for other Applicable Permits Related to the E&SC Plans

Applications for other project-specific required permits/variances (e.g., NC Department of Environmental Quality Trout Buffer, NC Division of Water Resources Central Coastal Plain Capacity Use Area (CCPCUA) Permits, NC Department of Environmental High Quality Waters (HQW), etc.) are to be submitted for approval by the regulatory agency (see 3HY1 and 3EN1 for related information).

1RR1 Identify Railroad Impacts

Overview

Determine impacts when the Rail Division Unit is contacted concerning a potential project rail corridor impact or invite the Rail Division Unit to a scoping or planning meeting.

References

- [American Railway Engineering and Maintenance-of-Way Association \(AREMA\) Manual for Railway Engineering](#)
- [Federal Highway Administration \(FHWA\) Manual on Uniform Traffic Control Devices \(MUTCD\)](#)
- [FHWA Highway-Rail Crossing Handbook](#)
- [CSX Public Projects Manual](#)
- [Norfolk Southern \(NS\) Public Projects Manual](#)
- [Roadway Design Manual](#) (*In Development: The manual is in the process of being updated.*)
- [Rail Grade Separation Guidelines](#)
- [Complete Streets Memo/Policy](#) (*In Development: The design guidance will ultimately be housed in the updated NCDOT Roadway Design Manual*)
- [Guidelines for Median Separations at Highway-Railway At-Grade Crossings](#)
- [State Maintained Road/Railroad Crossing Closure Procedures](#)
- [Summary of State Highway-Railroad Grade Separation Policies](#)

Deliverables

Deliverable	Task	Responsible Party	
		Activity Leader	Additional Support
		Railroad Coordination Engineer	Planning Manager
Scoping Response Letter	<ul style="list-style-type: none"> ▪ Determine a Finding of No Rail Impacts ▪ Determine a Finding of One or More Rail Impacts ▪ Submit Scoping Letter 	X	X
		X	X
		X	X

Determine a Finding of No Rail Impacts

To determine a “Finding of No Rail Impacts,” the Railroad Coordination Engineer is to:

- Examine rail corridor mapping to determine proximity of the project to nearest rail corridor(s) and determine whether the proposed project is not proximate to a rail corridor.
- In the event there is a no rail impact finding, review the project to determine if there is an abandoned corridor maintained by NCDOT or if there are other rail impacts that are not obvious (e.g., newly built tracks that only the Rail Division would be familiar with).

If examinations result in a negative (or no) finding, the Railroad Coordination Engineer sends a “Finding of No Rail Impacts” to the Feasibility Studies/Corridor Development Unit Lead.

Determine a Finding of One or More Rail Impacts

To determine a “Finding of One or More Rail Impacts,” the Railroad Coordination Engineer, with support from Rail Division Staff, is to:

- Examine rail corridor mapping to determine proximity of the project in relationship to nearest rail corridor(s).
- Describe impacts if the proposed project crosses, shares right-of-way, or operationally impacts one or more rail corridors.
 - Impacts may include widening a roadway into railroad right-of-way; a Y-line that has an at-grade crossing or other improvement that impacts railroad right-of-way; or a new location projects that are proposed to be grade-separated (preferably over the railroad).

If examinations result in a positive finding, the Railroad Coordination Engineer sends a “Finding of One or More Rail Impacts” to the Feasibility Studies/Corridor Development Unit Lead.

Submit Scoping Response Letter

The Railroad Coordination Engineer provides a scoping response letter to the Feasibility Studies/Corridor Development Unit Lead that is also distributed internally within the Rail Division Unit. Details of the letter identify the railroad impacts.

Attend Meetings

The Rail Division Staff attends or, in some cases, initiates planning-level meeting with other Units or stakeholders.

- The Rail Division Staff, as requested, reviews the preliminary plans, planning documents, or meeting summaries, providing written feedback to the Feasibility Studies/Corridor Development Unit Lead on any rail impacts.
- The Rail Division Staff may also be invited to attend follow-up meetings as the project progresses.

Agency Coordination

Apart from meeting and plan reviews, the Rail Division Staff also reaches out to any Class I Railroads and other partnering agencies to solicit participation, feedback, or other requests for information to support a project.

2RR1 Initiate Railroad Review

Overview

Initiate railroad review and design (if necessary) when there are identified rail corridor impacts on a project.

References

- [American Railway Engineering and Maintenance-of-Way Association \(AREMA\) Manual for Railway Engineering](#)
- [Federal Highway Administration \(FHWA\) Manual on Uniform Traffic Control Devices \(MUTCD\)](#)
- [FHWA Highway-Rail Crossing Handbook](#)
- [CSX Public Projects Manual](#)
- [Norfolk Southern \(NS\) Public Projects Manual](#)
- [Roadway Design Manual](#) (*In Development: The manual is in the process of being updated.*)
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- [Guidelines for Median Separations at Highway-Railway At-Grade Crossings](#)
- [State Maintained Road/Railroad Crossing Closure Procedures](#)
- [Summary of State Highway-Railroad Grade Separation Policies](#)

Deliverables

Deliverable	Task	Responsible Party	
		Activity Leader	Additional Support
		Railroad Coordination Engineer	Planning Manager
Railroad Design Line and Grade	<ul style="list-style-type: none"> ▪ Approve Railroad Design Line and Grade 	X	X
Railroad PE Agreement	<ul style="list-style-type: none"> ▪ Establish Railroad PE Agreement 	X	X
Roadway Plans for Rail Review	<ul style="list-style-type: none"> ▪ Submit Roadway Plans for Rail Review 	X	X
Crossing Scope for Off-Site Detour	<ul style="list-style-type: none"> ▪ Define Crossing Scope for Off-Site Detour 	X	X

Approve Railroad Design Line and Grade

The Railroad Coordination Engineer receives the current railroad design plans from the Project Manager for review and provides initial comments. Once revised, the Railroad Coordination Engineer submit the revised design to the appropriate railroad. The Railroad Coordination Engineer works with the railroad to obtain comments and coordinates with the Project Manager on required plan revisions necessary for railroad approval.

Establish Railroad PE Agreement

The Railroad Coordination Engineer develops, coordinates, and executes a preliminary engineering agreement for any railroad encroachments. The exceptions are:

- Structures over/under the railroad, which are handled by the Structures Management Unit.
- City projects, which are generally handled by the municipality if it is a city project.

Submit Roadway Plans for Rail Review

The Railroad Coordination Engineer reviews the Design Recommendation Plan Set, providing initial comments at the associated review meeting. The Railroad Coordination Engineer submits the revised Design Recommendation Plan Set to the appropriate railroad. The Railroad Coordination Engineer works with the railroad to obtain comments and coordinates with the Project Manager on required plan revisions necessary for railroad approval.

Define Crossing Scope for Off-Site Detour

For all projects that impact a railroad crossing or contemplate a detour that would divert traffic to another railroad crossing, the Rail Division is to review the temporary traffic control (TTC) plans (see 2TM1 for related information). The Rail Division receives the TTC plans from the Project Manager for review and provides initial comments back.

The Work Zone Traffic Control (WZTC) Project Engineer revises the plans based on Rail Division review, resubmitting the plans to the Rail Division for submission to the appropriate railroad.

The Rail Division works with railroad to obtain comments and coordinates with the Project Manager on necessary plan revisions.

3RR1 Complete Railroad Design and Agreements

Overview

Complete the railroad design and execute all necessary railroad agreements.

References

- ❑ [American Railway Engineering and Maintenance-of-Way Association \(AREMA\) Manual for Railway Engineering](#)
- ❑ [Federal Highway Administration \(FHWA\) Manual on Uniform Traffic Control Devices \(MUTCD\)](#)
- ❑ [FHWA Highway-Rail Crossing Handbook](#)
- ❑ [CSX Public Projects Manual](#)
- ❑ [Norfolk Southern \(NS\) Public Projects Manual](#)
- ❑ [Roadway Design Manual](#) (*In Development: The manual is in the process of being updated.*)
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Deliverables

Deliverable	Task	Responsible Party	
		Activity Leader	Additional Support
		Railroad Coordination Engineer	Planning Manager
Railroad Signal Planimetric	<ul style="list-style-type: none"> ▪ Prepare Railroad Signal Planimetric and Complete Railroad Crossing Signal Design 	X	X
Railroad Crossing Signal Design	<ul style="list-style-type: none"> ▪ Prepare Railroad Signal Planimetric and Complete Railroad Crossing Signal Design 	X	X
Railroad Design Plans	<ul style="list-style-type: none"> ▪ Provide Final Railroad Design Plans to the Railroad 	X	X
Relevant Railroad Agreements	<ul style="list-style-type: none"> ▪ Complete Railroad Agreements 	X	X

Prepare Railroad Signal Planimetric and Complete Railroad Crossing Signal Design

The Railroad Coordination Engineer receives the Field Inspection Plan Set, which includes advanced drainage design from the Hydraulics Design Engineer, that is used to prepare a planimetric for railroad signal locations.

The Railroad Coordination Engineer sends the railroad planimetric and Authorization for Preliminary Engineering (A4PE) to the railroad to complete their final design for the railroad crossing signal plans. The Railroad sends the signal design back to the Railroad Coordination Engineer, who complete an Approved for Construction (A4C) upon completion of the final signal design.

Provide Final Railroad Design Plans to the Railroad

The Railroad Coordination Engineer receives the current railroad design plans from the Project Manager for review, providing initial comments on the plans. Once revised, the plans are resubmitted to the Railroad Coordination Engineer to be submitted to the appropriate railroad. The Railroad Coordination Engineer works with the railroad to obtain comments and coordinates with the Project Manager on required plan revisions to either the railroad design plans and/or the roadway design plans (if necessary) for railroad approval.

Complete Railroad Agreements

The Railroad Coordination Engineer completes and coordinates a railroad agreement for any railroad encroachments, except for structures over/under the railroad, which are handled by others.

4RR1 Complete Railroad Coordination

Overview

Complete all railroad coordination. The other mechanism for continuing this task is getting involved in stakeholder meetings and coordination meetings.

References

- [American Railway Engineering and Maintenance-of-Way Association \(AREMA\) Manual for Railway Engineering](#)
- [Federal Highway Administration \(FHWA\) Manual on Uniform Traffic Control Devices \(MUTCD\)](#)
- [Federal Highway Administration \(FHWA\) Highway-Rail Crossing Handbook](#)
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Deliverables

Deliverable	Task	Responsible Party	
		Activity Leader	Additional Support
		Railroad Coordination Engineer	Planning Manager
Railroad Agreements	<ul style="list-style-type: none"> ▪ Receive/Execute Relevant Railroad Agreements 	X	X
Project Special Provisions	<ul style="list-style-type: none"> ▪ Provide Project Special Provisions to Contract Standards 	X	X

Receive/Execute Relevant Railroad Agreements

The Railroad Coordination Engineer coordinates the execution of the final railroad agreement for the railroad encroachment (if needed), except for structures over/under the railroad, which are handled by others.

Provide Project Special Provisions to Contract Standards

The Railroad Coordination Engineer provides any project-specific Special Provisions to the Contract Standards and Development Unit.

1RW1 Prepare Conceptual ROW Cost Estimate

Overview

Prepare conceptual right-of-way (ROW) cost estimates (per a request from the Division, Roadway, or outside consultant firm) early in the planning process and prior to the Project Initiation Meeting.

Note: *Actions during the Project Initiation Stage may be led and completed by staff from several different NCDOT groups. Any person who has overall responsibility for a project during this Stage is referred to as the "Project Lead." This lead could be the Feasibility Studies Engineer, the Corridor Development Engineer, the Division Planning Engineer, or someone in a similar role as tasked by a state or local agency.*

References

- [Right-of-Way SharePoint Site](#)

Deliverables

Deliverable	Task	Responsible Party	
		Activity Leader	Additional Support
		Central ROW Office	Division, Roadway, or Outside Consultant Firm
Conceptual ROW Cost Estimate	<ul style="list-style-type: none"> Develop Conceptual Right-of-Way Cost Estimate 	X	X

Develop Conceptual Right-of-Way Cost Estimate

The Project Lead, Roadway Design Unit, or Private Engineering Firm/consultant sends a conceptual ROW cost estimate request to the Central ROW Office. The request includes a set of plans showing the ROW to be acquired (if available), along with a letter requesting the cost estimate, and the due date for the estimate.

Upon receiving the request, the Appraisal Estimate Coordinator assigns the conceptual ROW cost estimate request to an in-house staff member or contracts with a qualified fee appraiser to perform the estimate.

- If a contracted appraiser is used, the Appraisal Estimate Coordinator sends plans and the request to the appraiser and requests a signed contract to allow the contracted appraiser to perform the work.

The Appraiser completes the conceptual ROW cost estimate and sends to Appraisal Estimate Coordinator, who reviews the estimate and adds additional costs and multipliers to the estimate to account for the possibility of relocation, administrative adjustments, and condemnation/court costs.

The Appraisal Estimate Coordinator sends the completed conceptual ROW cost estimate to the original requestor.

2RW1 Initiate Advance Acquisition ROW Tasks

Overview

Begin advanced acquisitions of project right-of-way (ROW) based on hardships, protective purchases, or complex relocation or utility issues associated with certain parcels.

References

- [Right-of-Way SharePoint Site](#)

Deliverables

Deliverable	Task	Responsible Party		
		Activity Leader	Additional Support	
		Division Engineer's Office	Division ROW Office or PEF/Consultant	Central ROW Office AARC Committee
Advance Acquisition Property Owner Contacts	Review/Approve Advanced Acquisition Requests	X	X	X
	Setup Funding			X
	Contact Property Owners		X	X
Advanced Acquisition ROW Authorization	Request Advanced Acquisition ROW Authorization	X	X	X
	Request Additional PE Funding	X	X	X

Verify Existing ROW

The Locations and Surveys Unit, along with the Division ROW Office, verify the existing ROW and assist in determining the acquisition areas on an early/advanced acquisition parcel, so as not to acquire land that is already in existing ROW limits.

Review/Approve Advanced Acquisition Requests

The Division ROW Office, the Division Engineer, or the Division Construction Engineer sends an Advanced Acquisition and Advanced Acquisition Hardship Requests to the Advanced Acquisition Review Committee for review and approval. In accordance with the *ROW Manual*, the request includes:

- A letter from the property owner requesting the hardship acquisition (if available), along with any documentation provided by the property owner to support the hardship case.
- Plans (if available) for review.
- An explanation of the issues, if the request is based on a complex relocation or utility issue.

Setup Funding

Once approved, the Advanced Acquisition Review Committee requests funding either through Preliminary Engineering funding (for costs up to and including requesting an appraisal) or Right-of-Way/Utility (ROW) funding for one or more parcels. ROW funding must be available in order to settle or condemn an advanced acquisition parcel.

Contact Property Owners

The Acquisition Agent assigned to the parcel(s) begins the ROW acquisition process and contacts the appropriate property owners.

- If the parcel(s) in question is assigned to a Private Engineering Firm/ROW consultant, then a contract is executed by the Division finance section, with the assistance of the Division ROW Office.
- However, if this is performed out of the Central ROW Office, then the assigned Private Engineering Firm/ROW consultant signs a contract through the Consultant Coordinator in order to proceed.
- Assignment of parcels to Acquisition Agents is based on the current workload of the agents available to perform the work.

Request Advanced Acquisition ROW Authorization

If Preliminary Engineering funding was used to make initial contact and request the appraisal, the Acquisition Agent is to:

- Request ROW funding in the amount of the settlement, relocation, and recording fees in order to close/condemn on the parcel.
- This is typically done at settlement of a hardship acquisition and at settlement or condemnation of other advanced acquisition parcels.

Request Additional PE Funding

The Acquisition Agent requests additional Preliminary Engineering funds or authorized ROW funds for early/advanced acquisitions from the fiscal unit.

Verify Field Inspection Plans/Revise as Needed

Reviewing the Field Inspection Plan Set provides the project team insight into obvious oversights, such as missing driveways, missing improvements, etc. The Acquisition Agent, Project Manager, or Division ROW Office level handles this type of review prior to the Field Inspection Review Meeting.

3RW1 Complete ROW Authorization Package

Overview

Although not solely performed by the ROW Unit, authorize right-of-way (ROW) as informed by letter from the Project Manager and after the NCDOT Board of Transportation approves the authorization. Prepare the associated cost estimates for projects.

References

- [Right-of-Way SharePoint Site](#)

Deliverables

Deliverable	Task	Responsible Party		
		Activity Leader	Additional Support	
		Division or Resident Engineer's Office	Fiscal Section	Central ROW Office
ROW Authorization Letter	Verify ROW Plans/Revise as Needed	X		
	Receive Board Authorization	X		X
	Request ROW Delineation	X		
	Submit ROW Authorization Letter	X	X	X
ROW Cost Estimate	Develop ROW Cost Estimate	X		X

Verify ROW Plans/Revise as Needed

Upon final review of the Right-of-Way Plan Set (see 3RD1 for related information):

- Any request for revisions is sent through the Locations and Surveys Unit and the Division office for approval.
- The Project Manager submits the verified plans to the NCDOT Board of Transportation for approval.

Receive Board Authorization

The NCDOT Board of Transportation approves a project to move forward to ROW acquisition, and the Project Manager issues a formal letter authorizing ROW acquisition to the Locations and Surveys Unit and Central ROW Office.

Request ROW Delineation

As requested by the Project Manager, the Locations and Surveys Unit typically assists with determining the location of the ROW (see 4LS1 for related information). The Acquisition Agent can measure from back of ditch to back of ditch on the other side of the road for an estimate of State-maintained ROW.

Submit ROW Authorization Letter

After the project has been approved by the NCDOT Board of Transportation and the project funding for ROW is setup, the Project Manager issues a formal letter to the Locations and Surveys Unit and Central

ROW Office authorizing ROW acquisition. The Central ROW office sends the ROW Authorization Letter to the appropriate Division ROW Office.

Develop ROW Cost Estimate

The Project Manager sends a ROW cost estimate request to the Central ROW Office.

Upon receiving the request, the Appraisal Estimate Coordinator assigns the conceptual ROW cost estimate request to an in-house staff member or contracts with a qualified fee appraiser to perform the estimate.

- If a contracted appraiser is used, the Appraisal Estimate Coordinator sends plans and the request to the appraiser and requests a signed contract to allow the contracted appraiser to perform the work.

The Appraiser completes the ROW cost estimate and sends to Appraisal Estimate Coordinator, who reviews the estimate and adds additional costs and multipliers to the estimate to account for the possibility of relocation, administrative adjustments, and condemnation/court costs.

The Appraisal Estimate Coordinator sends the completed ROW cost estimate to the original requestor.

Identify Early Acquisitions for Utilities and Displacements

Similar to 2RW1, the Division ROW Office or Central ROW Office reviews the Right-of-Way Plan Set for complex relocations due to utility relocations or complex displacements (such as a large business with lots of equipment and people to move) ahead of the ROW authorization to identify possible advanced acquisition.

- Preliminary Engineering funds may be requested, if not already available, and used for everything up through requesting an appraisal.
- The ROW project is to be authorized in order to use ROW funds when settling the claim or moving displaces or utilities.

Initiate Additional Advanced Acquisition Property Owner Contacts

The Acquisition Agent begins the advanced acquisition process of complex relocation or utility parcels and contacts the appropriate property owners. 2RW1 and 4RW1 provide additional information on this process.

Request Additional Advanced Acquisition ROW Authorization

If necessary, the Division ROW Office or the Central ROW Office requests funding to advanced acquisitions on complex relocation or utility parcels, or in an effort to acquire a property as a protective purchase in order to keep it from being developed prior to full ROW authorization on a project.

4RW1 Complete ROW Acquisitions and Relocations

Overview

Acquire right-of-way (ROW), complete the condemnation process for parcels not settled, and assist occupants through the relocation process.

References

- [Right-of-Way SharePoint Site](#)

Deliverables

Deliverable	Task	Responsible Party			
		Activity Leader		Additional Support	
		Central ROW Office	Division ROW Office	Acquisition Agent	Relocation Agent
Negotiations	<ul style="list-style-type: none"> ▪ <i>Commence Parcel Negotiations</i> 		X	X	
Condemnation	<ul style="list-style-type: none"> ▪ <i>Initiate Condemnation Activities</i> 	X	X	X	
Relocations	<ul style="list-style-type: none"> ▪ <i>Relocate Occupants</i> 				X

Commence Parcel Negotiation

In accordance with the ROW Manual, the following describes the parcel negotiation process led by either Central or Division ROW Office.

The first step is to create project parcel files in Division ROW Office or by the Private Engineer Firm/ROW consultant firm handling the acquisitions, ensuring all parcels are entered into SAP through the ROW Central Office.

To begin negotiations, an Acquisition Agent calls, mails a letter, or knocks on doors to initiate contacts with property owners. The formal initial contact where the project is located and its effects on the property are required to be made in person if the owner lives in the State.

To order appraisals and title requests, the Acquisition Agent sends an appraisal request to the Area Appraisal office where its assigned to an Area Appraiser.

- The Area Appraiser handles the contract with a fee appraiser to perform the work or delegate the work to an in-house appraiser.
- The Acquisition Agent orders the title opinion through a local attorney’s office.
- The attorney researches the title and returns the title opinion back to the acquisition agent.
- The Acquisition Agent reviews the title opinion in order to ensure he/she is dealing with the proper owners of the property.

When submitting/reviewing/approving appraisals, the appraiser assigned to appraise a parcel follows the appraisal guidelines, and the completed appraisal is transmitted back to the Area Appraisal Office for

review by either an in-house review appraiser or a fee review appraiser. The appraisal is approved by the Area Appraisal Office or the NCDOT State Appraiser.

An Acquisition Agent handles the step of meeting with property owners and making offers.

- If it is a small claim, the Acquisition Agent may be able to make an offer to the property owner upon initial contact with a claim report without an appraisal.
- Otherwise the Acquisition Agent would have received the approved appraisal back from the Area Appraisal Office and can meet with the property owner again to make the acquisition offer.

The Acquisition Agent has to negotiate at least 30 days prior to requesting condemnation, unless an amicable settlement is reached, or the property owner asks the agent to go ahead and file the condemnation prior to the 30-day period ending. An agent can negotiate for longer than the required 30 days as the project time limits allow. If at all possible, a right of entry is obtained in order to allow work to begin on a parcel prior to the settlement funds or condemnation funds being disbursed to the property owner.

For settling ROW claims, the Acquisition Agent draws up the Deed and/or Easement agreements, presenting them to the property owner, or their representation, for the property owner's signature. Once the Acquisition Agent has received the signed documents, he/she can put together a final report to send to their Project Manager or Division ROW Agent for approval. The Division ROW Agent sends the approved final report to the ROW Central Office Document Auditing section to begin the process of requesting a check.

Upon requesting a check (payment), the ROW Document Auditing section reviews the final report package for any errors, and works with the Division ROW office to resolve any errors. After the review is complete, the proper managerial signatures are obtained, prior to uploading the file into SAP, and requesting the check from the Fiscal Unit.

Once Fiscal has approved the check in SAP, and have cut the check, the check can be delivered either by the Acquisition Agent directly to the property owner, or by a closing attorney, depending on the amount of the check.

In closing a ROW Claim, the ROW deeds and easements are recorded in the Register of Deeds office in that particular County, either by the Acquisition Agent, or the closing attorney.

To complete relocation, a relocation agent follows 49 CFR 24 to ensure all residential and non-residential displacees are given every opportunity to claim all eligible relocation benefits under Federal and State law. Per State law, 49 CFR 24 is followed on all projects, whether they are Federally funded or not.

Recording of ROW typically happens at the closing of the ROW claim. The Acquisition Agent or the closing attorney can record the deed and easements.

To secure a ROW certification, the Division ROW Agent informs the Project Manager of the need to acquire additional ROW, if the design and construction improvements are not within existing ROW.

- If all construction activities are within the existing ROW, then the Division ROW Agent prepares the ROW Certification, signs for approval, and submits the ROW Certification to the ROW Central Office, Division Program Manager, Project Manager, and the Resident Engineer’s Office.
- If a project requires additional ROW, the ROW Acquisition Agent collaborates with the Project Manager and Division ROW Agent to complete the ROW Certification Request (with or without delays of entry).
 - In this process, the Division ROW Agent verifies that all parcels have been acquired or that a Right of Entry has been obtained. Parcels that have *NOT* been acquired are classified as a delay of entry parcel.
 - The Division ROW Agent also verifies that all displacees have been relocated or will be relocate before the construction begins. If occupants have *NOT* been relocated, this is a delay of entry parcel.

The next step is the approval of the ROW Certification, certifying that the project has all parcels cleared for construction activities.

- If all parcels are not cleared for the project to commence construction activities:
 - The lead Acquisition Agent provides a “Committed” timeline identifying the date each parcel is to be cleared and provides the Project Manager the delay of entry date for inclusion in the project specifications.
- The Project Manager and Resident Engineer reviews and agrees to the delays of entry and forwards the ROW Certification request to the Division ROW Agent.
- The Division ROW Agent signs the ROW Certification pending the delays of entry.
- The Division ROW Agent sends the Certification to the Central ROW Office for approval. The Certification is then sent to Roadway and Construction.

For projects with ROW delays of entry:

- This task is used to track the status and progress of parcels needed for construction that have delays of entry on them after a project is advertised.
- The ROW Lead Agent continues the acquisition process to obtain either a signed ROW deed or easement, or an agreement for entry. All deadlines provided in the ROW Certification must be adhered to in order to prevent any and all ROW delay claims.

Once every parcel that was advertised with delays of entry has been cleared for construction, the Division ROW Agent prepares and submits a revised ROW Certification clearing the project of all delays of entry.

Lastly, the Central ROW Office staff sends the Final ROW Series Plan Set from the Location and Surveys Unit for recording (see 4LS1 for related information).

Initiate Condemnation Activities

If standard parcel negotiations are unsuccessful, the following condemnation activities are initiated per Chapter 13 of the NCDOT ROW Manual.

- Obtain signed Frm10-F from Area Agent.
- Review title report, legal description, and ROW maps.

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Project
Initiation

Alignment
Defined

Plan-in-Hand

PS&E

Letting

- Submit Final Report for Condemnation.
- Request check from the Fiscal Unit.
- Submit file and check to Attorney General (AG) Office.
- Complete meditation and/or trial, if necessary.
- Obtain consent judgment/property deed.

Relocate Occupants

Occupants are relocated per Chapter 15 of the *ROW Manual* and 49 CFR 24.

2SD1 Initiate Signing and Delineation Design

Overview

Using the roadway model as a guide, develop a signing and delineation design for the project. Locate overhead and ground mounted type A and B-signs and establish pavement delineation in accordance with *Manual of Uniform Traffic Control Devices (MUTCD)*, *NCDOT Roadway Standard Drawings*, and *NCDOT Signing and Delineation Manual*.

References

- Federal Highway Administration (FHWA) *Manual on Uniform Traffic Control Devices (MUTCD)*
- FHWA *Standard Highway Signs and Markings*
- [Signing and Delineation Unit Website](#)
- [Signing and Delineation Procedure Manual](#)
- [Standard Specifications for Roads and Structures](#)
- [Traffic Engineering Practices, Policies, and Legal Authority \(TEPPL\)](#)
- [Roadway Standard Drawings](#)
- [Roadway Design Manual](#) (*In Development: The manual is in the process of being updated.*)
- [Construction Manual](#)
- [NC Supplement to the Manual on Uniform Traffic Control Devices](#)
- [Logo Manual](#)
- American Association of State Highway Transportation Officials (AASHTO) *Roadside Design Guide*
- AASHTO *A Policy on Geometric Design of Highways and Streets*

Deliverables

Deliverable	Task	Responsible Party	
		Activity Leader	Additional Support
		Signing and Delineation Designer	Regional Signing and Delineation Engineer
Preliminary Signing and Delineation Strip Map	<ul style="list-style-type: none"> ▪ Complete Preliminary Signing and Delineation Layout 	X	X
Document Conflicts	<ul style="list-style-type: none"> ▪ Identify Conflicts with Utilities, Right-of-Way, Wall, and ITS Device Conflicts 	X	X
Plan Submittals	<ul style="list-style-type: none"> ▪ Distribute Plans 	X	X

Complete Preliminary Signing and Delineation Layout

The Signing and Delineation Designer is to develop the plans using *NCDOT Roadway Standard Drawings*, the *MUTCD*, *TEPPL*, and *NCDOT Signing and Delineation Procedure Manual*. QC review is required before distribution for all labels, callouts, notes, and information. In reference to Chapter 4 of the *NCDOT Signing and Delineation Procedure Manual*, the Signing and Delineation Designer is to complete the following:

- Develop Signing and Delineation Strip Map.
- Identify Overhead Sign locations (stations).
- Identify if a Work Zone Signing Staging plan is needed.
- Determine Cantilever or Full Span.
- Determine Barrier needs/foundation protection and guardrail.
- Determine sign messaging.
- Identify sign locations.
- Determine simple (guardrail) or break away support.

The Signing and Delineation Designer is to coordinate with the Signing and Delineation Unit, Division Office for approval of routing and sign messaging in accordance with MUTCD, TEPL, FHWA, and AASHTO.

- Review for safety elements that may cause require roadway modifications.
- Review for compliance with MUTCD, TEPL and *Roadway Standard Drawings*.
- Review lane configuration and complex interchanges, exit only, and lane drops.
- Replace, modify, or upgrade existing signs where necessary in accordance with MUTCD and TEPL.
- Send plans and communicate with appropriate Division Traffic Engineer and Regional Traffic Engineer to acquire and review for combined comments with Signing and Delineation Unit staff (see 2TS1 for related information).

In reference to Chapter 5 of the NCDOT *Signing and Delineation Procedure Manual*, the Signing and Delineation Designer is to complete the following for delineation design:

- Acquire a pavement marking recommendation letter from Signing and Delineation Standards Section.
 - This letter can be found under the SharePoint site Preconstruction Projects file structure or by contacting the Signing and Delineation Standards Engineer.
- Base the striping plan on the roadway model.
- Ensure lane continuity (also see Chapter 2 of the NCDOT *Signing and Delineation Manual*).
- Note lane configurations, such as lane drops and lane reductions (additional signs may be required).
- Design lane widths and intersection layouts.
- Coordinate with the Signal Lead on stop bar and crosswalk locations.
- Locate and determine curb ramps types.

The Signing and Delineation Designer is to send plans and fully communicate with appropriate Division Traffic Engineer and Regional Traffic Engineer to acquire and review for combined comments with Signing and Delineation Unit staff.

For all submittals, the Signing and Delineation Designer is to upload the submittal onto the project SharePoint site.

Identify Conflicts with Utilities, Right-of-Way, Wall, and ITS Device Conflicts

The Signing and Delineation Designer is to considers placement of signing, considering that regulatory, warning and guide signs have a higher priority. Of note, the:

- Remaining signs shall only be installed where adequate spacing is available between other higher priority signs.
- Other signs shall not be installed in a position where they obscure the road users' view of other traffic control devices.

Additionally, the Signing and Delineation Designer is to:

- Ensure there are no utility (e.g., gas, fiber), wall (e.g., retaining, noise), ITS device, or drainage (e.g., drop inlets) conflicts.
- Ensure the sign is visible and not obstructed by other roadway features (e.g., bridge, vertical/horizontal curvature).
- Determine if additional right-of-way is required.
- Document if signs are required to be adjusted due to conflicts.

Determine Signing Construction Limits

Signing construction limits can extend past construction limits. When completing this task, the Signing and Delineation Designer is to:

- Account for construction phasing for opening of portions of roadway.
- Ensure necessary routing is established throughout the project.
- Ensure all signs, including advanced and route continuity, are considered when reviewing overall signing plan.
- Coordinate with the Traffic Management Unit (Work Zone Traffic Control) if signs are located outside of the construction limits.

Submit Lane Continuity and Merging Recommendations

The Signing and Delineation Designer is to ensure lane continuity in reference to Section 2.7 of the NCDOT *Signing and Delineation Procedure Manual*. This includes review of the geometric layout to ensure that elements such as signing requirements, intersection operation, merging, exit only, lane/route continuity, end of freeway plans and temporary connection plans are sufficient for the safety of roadway users.

Distribute Plan Submittals

The Signing and Delineation Designer is to submit plans to appropriate Division office and Regional Traffic Engineer staff for review and comment.

3SD1 Complete Signing and Delineation Design

Overview

Complete the signing and delineation plans in reference to NCDOT *Roadway Standard Drawings*, the MUTCD, TEPL, and NCDOT *Signing and Delineation Procedure Manual*.

References

- Federal Highway Administration (FHWA) *Manual on Uniform Traffic Control Devices (MUTCD)*
- FHWA *Standard Highway Signs and Markings*
- [Signing and Delineation Unit Website](#)
- [Signing and Delineation Procedure Manual](#)
- [Standard Specifications for Roads and Structures](#)
- [Traffic Engineering Practices, Policies, and Legal Authority \(TEPL\)](#)
- [Roadway Standard Drawings](#)
- [Roadway Design Manual](#) (*In Development: The manual is in the process of being updated.*)
- [Construction Manual](#)
- [NC Supplement to the Manual on Uniform Traffic Control Devices](#)
- [Logo Manual](#)
- American Association of State Highway Transportation Officials (AASHTO) *Roadside Design Guide*
- AASHTO *A Policy on Geometric Design of Highways and Streets*

Deliverables

Deliverable	Task	Responsible Party	
		Activity Leader	Additional Support
		Signing and Delineation Designer	Regional Signing and Delineation Engineer
Approved Strip Map	<ul style="list-style-type: none"> ▪ <i>Complete Unsealed Signing and Delineation Plans</i> 	X	X
Overhead Sign Locations	<ul style="list-style-type: none"> ▪ <i>Complete Unsealed Signing and Delineation Plans</i> 	X	X
Three Way Check-QC/QA	<ul style="list-style-type: none"> ▪ <i>Final Signing and Delineation Plans</i> 	X	X
Final Plans		X	X
Sign Designs and Support Chart		X	X
Project Special Provisions		X	X
Quantities		X	X
Guardrail/Barrier Locations		X	X

Complete Unsealed Signing and Delineation Plans

The Signing and Delineation Designer is to complete and submit the strip map to the Project Manager (or responsibility party determined during scoping). This includes steps that involve:

- Providing approved strip map of the signing concept including labeled and stationed pavement markings and delineation
- Addressing all right-of-way, utility, drainage, retaining/noise wall conflicts, or provide a plan of action for addressing these conflicts.
- Providing one half-size hard copy and PDF in accordance with MUTCD, the NCDOT *Signing and Delineation Procedure Manual*, and NCDOT *Roadway Standard Drawings* (Sections 9 and 12) of the:
 - Proposed signing plan (including notes, sign and support designs, and stations)
 - List of guardrail/barrier locations
 - Compile and provide a list of all overhead sign locations to the Signing Project Engineer
 - Proposed pavement marking plan, including notes, pavement marking stations, labels and proposed curb ramp locations and types
- Addressing comments by the Signing and Delineation Unit and the applicable Division from the previous design phase review.

The Signing and Delineation Designer is to upload the submittal onto the project SharePoint site.

Final Signing and Delineation Plans

To finalize the Signing and Delineation plans, the Signing and Delineation Designer is to:

- Perform a three-way check and appropriate QC/QA in accordance with Chapter 4 of the NCDOT *Signing and Delineation Procedure Manual*. Ensure that the Signing and Delineation Unit and the applicable Division comments are addressed.
- Complete and submit final plans via an unsealed electronic submittal of final plans and sign designs in both DGN and PDF format.
- Complete and submit sign designs and support chart via an electronic copy of the sign designs with one design per PDF page (if required).
- Complete and submit quantities that include:
 - Electronic submittal of final quantity estimates for signing and pavement marking items.
 - Uploadable file for pay items in the appropriate format.
- Include approved sign and support designs (if revisions were made)
- Complete Special Provisions that are project specific and not included within the current NCDOT Standard Specifications.
- Complete and submit guard rail/ barrier locations, if needed, prior to final plans.

Once reviewed and approved by the Signing and Delineation Unit, the Signing and Delineation Designer is to electronically submit sealed PDFs, using DocuSign (or other esignatures tool acceptable). The Signing and Delineation Designer is to upload the submittal onto the project SharePoint site. As appropriate, NCDOT staff would also complete and submit a Private Engineering Firm evaluation at this time.

2SG1 Initiate Signal and ITS Design

Overview

Begin the activity as soon as the Signal Recommendations are received from the Regional Traffic Engineer. Ensure early coordination of Signal and ITS structures and equipment locations with Utilities to mitigate issues related to power and overhead/underground conflicts during signal/ITS construction.

References

- Federal Highway Administration (FHWA) Manual on Uniform Traffic Control Devices (MUTCD)
- [ITS and Signals Unit Design Manual Part 1 - Signal Design](#)
- [ITS and Signals Unit Design Manual Part 3 - ITS](#)
- [ITS & Signal Plan Guidelines](#)
- [Roadway Standard Drawings](#)
- [Standard Specifications for Roads and Structures](#)

Deliverables

Deliverable	Task	Responsible Party	
		Activity Leader	Additional Support
		Signal/ITS Lead	Utility Lead/Utility Owners
Signal Pole/Cabinet Location Diagrams	<ul style="list-style-type: none"> ▪ Complete Preliminary Signal Pole Locations 	X	X
ITS Device Location Diagrams	<ul style="list-style-type: none"> ▪ Complete Preliminary ITS Device Locations 	X	X

Complete Preliminary Signal Pole/Cabinet Locations

To establish the preliminary signal pole/cabinet locations, the Signal/ITS Lead is to develop signal pole/cabinet location diagrams following the references noted herein. This includes:

- Where possible, locating poles outside the clear zone.
 - Where clear zone requirements cannot be met due to utility considerations or limited right-of-way, locate poles as far as is practical from the edge of pavement.
- Where mastarms are desired, designing for a maximum of 75-foot arm length.
 - If the arm length exceeds 75 feet, consult with the ITS and Signals Unit (Signal Design Section).
- Avoiding conflicts by coordinating with utility owners and other Units/disciplines, including utilities, roadway design, and hydraulics.
- Providing signal cabinet locations to ensure the availability of power at proposed locations.

For acceptance and transmittal, the Signal/ITS Lead is to:

- Submit coordinated pole/cabinet locations to the ITS and Signals Unit (Signal Design Section) and Utilities Unit for review.
- Transmit final accepted pole/cabinet locations to the ITS and Signals Unit (Signal Design Section), Utilities Unit, and the Project Manager.

Complete Preliminary ITS Device Locations

To establish the preliminary ITS device locations, the Signal/ITS Lead is to develop the ITS Device Location Diagrams following the references noted herein. This includes:

- Avoiding conflicts by coordinating with utility owners and other Units/disciplines, including utilities, roadway design, and hydraulics.
- Providing device cabinet locations to ensure the availability of power at proposed locations.

For acceptance and transmittal, the Signal/ITS Lead is to:

- Submit coordinated device locations to the ITS and Signals Unit (Signals Management Section) and Utilities Unit for review.
- Transmit final accepted pole/cabinet locations to the ITS and Signals Unit (Signals Management Section), Utilities Unit, and the Project Manager.

3SG1 Complete Signal and ITS Design

Overview

Following the Signal Recommendations, NCDOT *ITS & Signal Plan Guidelines*, and other references, complete signal, signal communications, and ITS designs.

References

- Federal Highway Administration (FHWA) *Manual on Uniform Traffic Control Devices (MUTCD)*
- [ITS and Signals Unit Design Manual Part 1 - Signal Design](#)
- [ITS and Signals Unit Design Manual Part 2 - Signals Management](#)
- [ITS and Signals Unit Design Manual Part 3 - ITS](#)
- [ITS & Signal Plan Guidelines](#)
- National Electrical Safety Code*
- National Electric Code*
- [Roadway Standard Drawings](#)
- [Standard Specifications for Roads and Structures](#)
- [ITSS Project Special Provisions – PSP – Current Version](#)

Deliverables

Complete Signal Plans

Deliverable	Task	Responsible Party	
		Activity Leader	Additional Support
		Signal Lead	ITS Lead
Signal Plan and Electrical Detail Sheets	<ul style="list-style-type: none"> ▪ <i>Complete Signal Plan and Electrical Detail Sheets</i> 	X	
Quantity and Cost Estimates	<ul style="list-style-type: none"> ▪ <i>Complete Quantity and Cost Estimates</i> 	X	X
Project Special Provisions	<ul style="list-style-type: none"> ▪ <i>Develop Project Special Provisions</i> 	X	X
Project Documentation	<ul style="list-style-type: none"> ▪ <i>Complete Project Documentation</i> 	X	

Complete Signal Plan and Electrical Detail Sheets

To complete this task, the Signal Lead is to submit the signal designs to the Project Manager and ITS and Signals Unit (Signal Design Section). This includes:

- Using Signal Recommendations (provided by the Regional Traffic Engineer), NCDOT *ITS and Signals Unit Design Manual*, and NCDOT *ITS & Signal Plan Guidelines*, develop and submit the initial signal design package after completing QC.
- Electrical details are not required at this submittal.

To finalize the signal design and in submitting the electrical details, the Signal Lead is to:

- Provide a written response to each signal-related comment from the previous submittal.
- Revise and QC the design in accordance with the responses.

- Ensure revisions conform to the Signal Recommendations (provided by the Regional Traffic Engineer), NCDOT *ITS and Signals Unit Design Manual*, and NCDOT *ITS & Signal Plan Guidelines*.

Once all previous comments are addressed, the Signal Lead is to submit plan sheets to the ITS and Signals Unit (Signal Design Section) and the Project Manager, uploading plans on the project SharePoint site.

Complete Quantity and Cost Estimates

To complete the quantity and cost estimate, the Signal Lead is to:

- Perform quantity takeoffs following the NCDOT *ITS and Signals Unit Design Manual*, NCDOT *Standard Specifications for Roads and Structures*, and the most recent ITS and Signals Unit (Signal Design Section) pay item list.
- Use standard pay items when possible and coordinate with the ITS and Signals Unit (Signal Design Section) when generic pay items are necessary.
- Develop cost estimates using recent bid data available on the NCDOT's website and ITS and Signals Unit (Signal Design Section) resources.
- Submit the cost estimates to the ITS and Signals Unit (Signal Design Section) and Project Manager.

Develop Project Special Provisions

The Signal Lead is to use the [ITSS Project Special Provisions-PSP-Current Version](#) and quantity list when preparing the project-related special provisions, submitting the special provisions to the ITS and Signals Unit (Signal Design Section) for review.

Once completed and accepted, the Signal Lead is to upload completed documents on the project SharePoint site.

Complete Project Documentation

The Signal Lead is to do the following concurrently with developing the signal plans and submittals:

- Submit Autoturn simulations for left-turning vehicles for all signal designs on the project.
 - Provide signed clearance time calculations and clearance distances for all signal designs on the project
 - Provide metal pole elevations and calculations for metal pole heights.
 - Design for 17 feet of roadway clearance except when otherwise specified.
 - Provide standard strain pole selections and justifications.
 - Provide documentation of latest counts per intersection and justification of phase selection.
 - Provide copies of signal related email correspondence with the NCDOT or Municipal personnel, notes from any signal-related phone conversations, and any field notes.
 - Provide a database or configuration file for each location.
 - Ensure the file includes all the necessary programming entries to achieve the desired operation of the signal design for the location.
 - Ensure the file is compatible with the local controller software that is being used and is able to be downloaded directly to the controller unit without conversion.
- Place all simulations, calculations, and other documentation in the project's "Intelligent Traffic Systems and Signals" folder on the project SharePoint site.

Complete ITS Plans

Deliverable	Task	Responsible Party	
		Activity Leader	Additional Support
		ITS Lead	Signal Lead
Signal Communications Plan Sheets	<ul style="list-style-type: none"> Complete Signal Communications Plan Sheets 	X	
Utility Make-Ready Plans	<ul style="list-style-type: none"> Complete Utility Make-Ready Plans 	X	
ITS Plan Sheets	<ul style="list-style-type: none"> Complete ITS Plan sheets 	X	
Quantity and Cost Estimates	<ul style="list-style-type: none"> Complete Quantity and Cost Estimate 	X	X
Project Special Provisions	<ul style="list-style-type: none"> Develop Project Special Provisions 	X	X

Complete Signal Communications Plan Sheets

When developing the signal communication plans, the ITS Lead is to submit signal communications designs to the Project Manager and ITS and Signals Unit (ITS and SM Section). The ITS Lead is to reference the Signal Recommendations, NCDOT *ITS and Signals Unit Design Manual*, and NCDOT *ITS & Signal Plan Guidelines* when preparing these plans.

To finalize the signal communications design, the ITS Lead is to:

- Provide written responses to each signal communications-related comment from the previous submittal.
- Revise and QC the design in accordance with the responses.
- Ensure revisions conform to the Signal Recommendations (provided by the Regional Traffic Engineer), NCDOT *ITS and Signals Unit Design Manual*, and NCDOT *ITS & Signal Plan Guidelines*.

Once all previous comments are addressed, the ITS Lead is to submit plan sheets to the ITS and Signals Unit (ITS and SM Section) and the Project Manager, uploading plans on the project SharePoint site.

Complete Utility Make-Ready Plans

To complete this task, the ITS Lead is to submit the utility make-ready designs to the Project Manager and ITS and Signals Unit (Signal Design Section). The ITS Lead is to reference the NCDOT *ITS and Signals Unit Design Manual* and NCDOT *ITS & Signal Plan Guidelines* when preparing the design.

To finalize the utility make-ready designs, the ITS Lead is to:

- Provide written responses to each related comment from the previous submittal.
- Revise and QC the design in accordance with the responses.
- Ensure revisions conform to the Signal Recommendations (provided by the Regional Traffic Engineer), NCDOT *ITS and Signals Unit Design Manual*, and NCDOT *ITS & Signal Plan Guidelines*.

Once all previous comments are addressed, the ITS Lead is to submit plan sheets to the ITS and Signals Unit (ITS and SM Section) and the Project Manager, uploading plans on the project SharePoint site.

Complete ITS Plan Sheets

For the ITS Plan Sheets, the ITS Lead is to submit this deliverable to the Project Manager and ITS and Signals Unit (Signal Design Section). The ITS Lead is to reference the NCDOT *ITS and Signals Unit Design Manual* and NCDOT *ITS & Signal Plan Guidelines* when preparing the plans.

To finalize the plans, the ITS Lead is to:

- Provide written responses to each related comment from the previous submittal.
- Revise and QC the design in accordance with the responses.
- Ensure revisions conform to the Signal Recommendations (provided by the Regional Traffic Engineer), NCDOT *ITS and Signals Unit Design Manual*, and NCDOT *ITS & Signal Plan Guidelines*.

Once all previous comments are addressed, the ITS Lead is to submit plan sheets to the ITS and Signals Unit (ITS and SM Section) and the Project Manager, uploading plans on the project SharePoint site.

Complete Quantity and Cost Estimate

To complete the quantity and cost estimate, the ITS Lead is to:

- Perform quantity takeoffs following the NCDOT *ITS and Signals Unit Design Manual*, NCDOT *Standard Specifications for Roads and Structures*, and the most recent ITS and Signals Unit (Signal Design Section) pay item list.
- Use standard pay items when possible and coordinate with the ITS and Signals Unit (ITS and SM Section) when generic pay items are necessary.
- Develop cost estimates using recent bid data available on the NCDOT's website and ITS and Signals Unit (ITS and SM Section) resources
- Submit the cost estimates to the ITS and Signals Unit (ITS and SM Section) and Project Manager.

Develop Project Special Provisions

The ITS Lead is to use the [ITSS Project Special Provisions-PSP-Current Version](#) and quantity list when preparing project-related special provisions, submitting to the ITS and Signals Unit (ITS and SM Section) for review.

Once completed and accepted, the ITS Lead is to upload completed documents on the project SharePoint site.

1S11 Develop STIP

Overview

Prepare the State Transportation Improvement Program (STIP) to both communicate projects that NCDOT intends to work on during the next 10 years and to satisfy federal and state funding requirements.

References

- Federal Highway [regulation](#) on State Transportation Improvement Program (STIP) development and [regulation](#) on project selection
- State Transportation Improvement Program (STIP) [Guidance](#)
- Federal Transit State Transportation Improvement Program (STIP) [Regulations in 49 CFR 613](#)
- Federal Transit State Transportation Improvement Program (STIP) [Guidance](#)
- State Transportation Improvement Program ([STIP requirements \(§ 136-189.11\)](#) and [development of transportation system \(§ 136-66.2\)](#) around municipalities
- [Strategic Mobility Formula](#)

Deliverables

Deliverable	Task	Responsible Party	
		Activity Leader	Additional Support
		Assistant Director, Division of Planning, and Programming	
Draft State Transportation Improvement Program	▪ <i>Develop Draft STIP Details</i>	X	STIP Regional Managers
Draft State Transportation Improvement Program website update, including interactive map	▪ <i>Publish Draft STIP</i>	X	STIP Unit GIS Lead
Final State Transportation Improvement Program	▪ <i>Develop Final STIP</i>	X	STIP Regional Managers
Final State Transportation Improvement Program website update, including interactive map	▪ <i>Develop Final STIP</i>	X	Program Manager – STIP Unit
Final State Transportation Improvement Program – Division Supplements	▪ <i>Develop Final STIP</i>	X	STIP Regional Managers
Final State Transportation Improvement Program – MPO and RPO Supplements	▪ <i>Develop Final STIP</i>	X	STIP Regional Managers

The development of the State Transportation Improvement Program (STIP) is closely connected with the Strategic Project Prioritization Process (see 1SP1).



Collect Public Input

As a steward of taxpayer dollars, NCDOT seeks input from the public on projects that the NCDOT intends to fund over the next 10 years. Prior to the submission of projects for evaluation in the Project Prioritization Process, NCDOT Divisions hold public input sessions to receive input on projects that are submitted. The Division Engineers consider this input when submitting projects through the Project Prioritization Process.

Following the release of the Draft STIP, NCDOT holds additional public comment opportunities to receive feedback on the Draft STIP. However, since the Strategic Transportation Investments (STI) law directs NCDOT to select projects for funding based on score, it is important to make sure the correct projects are submitted for evaluation.

This input process satisfies federal requirements that the public has an opportunity to comment on the STIP prior to approval by the Board of Transportation (see 1SP1 for related information).

- NCDOT Divisions, Metropolitan Planning Organizations (MPOs), and Rural Planning Organizations (RPOs) submit projects for evaluation in the Project Prioritization Process (managed by the SPOT office).
- Projects are reviewed and scored using the process, criteria, and weights approved the Board of Transportation (managed by the Strategic Prioritization Office or SPOT office).
- Project scores are then provided to the STIP Unit for programming in the STIP.

Develop Draft STIP Details

The STIP Unit develops the draft STIP details, including setting up the Draft STIP database that:

- Starts with most recent Board of Transportation-adopted STIP. This is used as the basis for the next Draft STIP.
- Adds 2 or 3 years to the end of the STIP in the STIP database. This accounts for the next 2 or 3 years, so the STIP remains 10 years in duration.
- Attributes all committed projects. Based on the most recent Board of Transportation-adopted `STIP, all projects classified as committed (i.e., those that do not have to be reprioritized in the next prioritization cycle) are designated in the STIP database. Similarly, all projects that are subject to reprioritization in the next prioritization cycle are designated in the STIP database as well.

Next, the STIP Unit determines the STIP budget.

- The STIP Unit works with Funds Administration Section within the Financial Management Division on a 10-year STIP Budget. The Funds Administration Section provides a forecasted 10-year STIP budget in a MS-Excel™ spreadsheet.
- Discussions occur on estimated expenses for Preliminary Engineering, Congestion Mitigation Air Quality (CMAQ) projects, bonus allocation projects, Appalachian Development Highway System (ADHS) projects, and other programs, as these funds are allocated prior to the 40/30/30 split (40 percent Statewide Mobility, 30 percent Division Needs, 30 Percent Regional Impact) STI funding as documented in the Strategic Mobility Formula.

- Funds Administration Section also provides variance calculation, which compares previous authorizations in each of the 22 STI funding buckets (1 Statewide Mobility, 7 Regional Impacts, 14 Division Needs) to previous allocations.
- The STIP Unit receives certified county population from the State Demographer. This data is used in determining Regional Impact budget amounts for the seven funding regions

Add Projects to Draft STIP

Projects placed in the STIP prior to adding high-scoring projects from the prioritization process include:

- Interstate Maintenance projects (Statewide Mobility)
- Bridge replacement projects (All 22 STI funding buckets)
- Highway safety projects (All 22 STI funding buckets)
- Committed projects selected/funded from prior prioritization cycles (All 22 STI funding buckets)
- STBG-DA and TAP-DA projects selected by MPOs over 200,000 in population (Primarily Division Needs funding buckets)
- Rail-highway crossing projects (Division Needs funding buckets)
- Economic development projects (Division Needs funding buckets)

These projects are programmed in the STIP with information on phase (typically right-of-way, utilities, construction, and sometimes preliminary engineering), funding source and amount, and schedule. The process for which projects are programmed in the STIP is as follows.

STIP Expenditures



Add Alternative Criteria Projects

The STIP Unit works with the:

- Chief Engineers Office on Interstate Maintenance Projects over the next 10 years. Projects are programmed in the Draft STIP. The funding source is initially set to National Highway Performance Program (NHPP) funds, although may be changed to National Highway Freight Program (NHFP) funding.
- Structures Management Unit on bridge projects over the next 10 years in the STIP. The projects are programmed in the Draft STIP. Funding source is determined by project location, using the most restrictive funds first, such as Surface Transportation Block Grant (STBG) Off-System Bridges and/or STBG less than 5,000 in population.
- Mobility and Safety Division, generally on a quarterly basis, for safety projects. These projects are added to the Draft STIP as received.
- Rail Division to add new rail-highway crossing projects to the Draft STIP.
- MPOs over 200,000 in population for STBG Direct Assistance (STBG-DA) and Transportation Alternatives Program-Direct Attributable (TAP-DA) projects that are to be added to the Draft STIP on a continual basis, as approved by the MPOs.

Perform 5/10-Year Analysis

Once all of the alternate criteria and committed projects are entered into the STIP database, the STIP Unit performs the “5/10-year analysis,” which is a comparison of the STIP budget to the programmed funds.

- Over the first 5 years of the STIP, NCDOT can program funds +/- 15 percent of the budget, as defined in the STI law. Funding for projects in the first 5 years of the STIP is considered committed. Projects in the last 5 years of the STIP are to be reprioritized in the next round to the STIP, competing with new projects for funding.
- Over the entire 10 years of the STIP, NCDOT can program funds +/- 10 percent of the budget.

The results of this initial analysis are used for determining available funding within the 22 buckets for projects selected during the latest prioritization cycle.

Select Statewide Mobility Projects

Using the statewide mobility scores provided by the SPOT office for eligible projects (see 1SP1 for related information), the STIP Unit selects and programs projects based on the scores in descending order, until the remaining statewide mobility funds in the Draft STIP are assigned.

Project schedules are determined based on:

- Available funding,
- Prioritization score,
- Project delivery estimate (preference is given to projects previously programmed in the STIP),
- Local knowledge, and
- Input from the Divisions.

Funding sources may initially be set to federal funding, using the most restrictive funding, but switched to state trust funds, as appropriate. This is meant to be an iterative process. As projects are added to the STIP, the STIP Unit engineers continually perform the 5/10-year analysis to make sure programmed projects in the statewide mobility category meet the 15 percent and 10 percent budgetary tests and adjust schedules, as needed.

In addition, the following constraints are considered as projects are programmed in the statewide mobility category:

- Statewide mobility corridor cap: No more than 10 percent of the funds projected to be allocated to the statewide strategic mobility category over any 5-year period may be assigned to any project or group of projects in the same corridor within a Division or within adjoining Divisions.
- Aviation projects: No more than \$500,000 can be allocated to a single airport project per year.

Select Regional Impact Projects

After Statewide Mobility Projects are programmed, SPOT works with the Metropolitan or Rural Planning Organizations (MPOs/RPOs) and Divisions to assign points to Regional Impact Projects. SPOT then finalizes the Regional Impact Scores and the TIP Unit Programs Regional Impact Projects. Using the Regional Impact total scores provided by the Strategic Prioritization Office for eligible projects (incorporating local input

points) (see 1SP1 for related information), the STIP Unit selects and programs projects based on the scores in descending order for each of the seven funding regions, until the remaining Regional Impact funds in the Draft STIP are assigned.

The STIP Unit applies “normalization” as projects are selected, which allocates funding between highway and non-highway projects, based on minimum guarantees of funding (based on percentage).

The normalization process for each Region is as follows:

Step 1: Non-Highway Only (Statewide Competition)

- Determine 4 percent of total Regional Impact budget (10-year, adjusted).
- Determine how much in the 4 percent Non-Highway bucket is already allocated; the amount remaining is available for prioritization.
- Sort eligible Non-Highway projects by score in descending order.
- Select projects until all funding is allocated.

Step 2: Highway Only (Regional Competition)

- Within each region, subtract the amount of Non-Highway projects programmed (over 10 years).
- Set aside 6 percent of each Region’s allocation (10-year, adjusted).
- Determine how much of the remaining funding is already allocated; the amount remaining is available for prioritization.
- Within each Region, sort eligible Highway projects by score in descending order.
- Select projects until all funding is allocated.

Step 3: All-Modes (Flex) (Regional Competition)

- Determine the amount of funding set aside under Step 2 (10-year, adjusted from step 2).
- Within each Region, sort eligible Highway and Non-Highway projects by score in descending order.
- Select projects until all funding is allocated.

This is an iterative process. As projects are added to the STIP, the STIP Unit engineers continually perform the 5/10-year analysis to make sure programmed projects in each Region meet the 15 percent and 10 percent budgetary tests.

In addition, the following constraints are considered as projects are programmed in the Regional Impact category:

- Public Transportation projects: No more than 10 percent of a region’s funds can be allocated to public transportation projects (over the entire 10-year STIP).
- Light Rail and Commuter Rail projects: Total state funding for a commuter rail or light rail project shall not exceed the lesser of 10 percent of the distribution region allocation or 10 percent of the estimated total project costs used during the prioritization scoring process.
- Aviation project: No more than \$300,000 can be spent on any single airport project per year

Select Division Needs Projects

After Statewide and Regional Projects are programmed into the STIP, the Divisions provide Local Input points for Division Needs Projects. Using the Division Needs total scores provided by the SPOT office for eligible projects (incorporating local input points), the STIP Unit selects and programs projects based on the scores in descending order for each of the 14 Divisions, until the remaining Division Needs funds in the Draft STIP are assigned.

The normalization process for each Division is as follows:

Step 1: Non-Highway (Division Competition)

- Determine 4 percent of total Division Needs budget (10-year, adjusted), then divide by 14.
- Determine for the amount of funding that is already allocated; the amount of funding remaining is available for prioritization.
- Within each Division, sort Non-Highway projects by score in descending order.
- Select projects until funding is allocated.

Step 2: Highway Only (Division Competition)

- Within each Division, subtract the amount of funding (4 percent) from Step 1 (over 10 years).
- Set aside 6 percent of each Division's allocation (10-year, adjusted).
- Determine how much of the remaining funding is already committed to determine the amount remaining available for prioritization.
- Within each Division, sort highway projects by score in descending order.
- Select projects until funding is allocated.

Step 3: All-Modes (Flex) (Division Competition)

- Determine the amount of funding set aside under Step 2 (10-year, adjusted from step 2).
- Within each Division, sort Highway and Non-Highway projects by score in descending order.
- Select projects until funding is allocated.

Project schedules are determined based on:

- Available funding,
- Prioritization score,
- Project delivery estimate (preference is given to projects previously programmed in the STIP),
- Local knowledge, and
- Input from the Divisions.

Funding sources may initially be set to federal funding, using the most restrictive funding, but switched to state trust funds, as appropriate. This is meant to be an iterative process. As projects are added to the STIP, the STIP Unit engineers continually perform the 5/10-year analysis to make sure programmed projects in each Division meet the 15 percent and 10 percent budgetary tests and adjust schedules, as needed.

In addition, the following constraints are considered as projects are programmed in the Division Needs category:

- Aviation projects: No more than \$18.5M can be allocated to aviation projects per year.
- Bicycle and pedestrians projects: No state funds shall be allocated to independent bicycle and pedestrian projects.

Publish Draft STIP

Once all levels of STIP projects have been finalized, the Draft STIP is presented to the Board of Transportation for approval. The STIP Unit works with the Communications Group to publish the Draft STIP. The Draft STIP is for 11 years (current year plus 10 years). To publish the Draft STIP:

- A PDF document from the STIP database is produced.
- The Draft STIP is typically released at a Board of Transportation meeting.
- The STIP website is updated with the Draft STIP and interactive map in coordination with the Communications Group (see 1CG1 for related information).

Develop Final STIP

To develop the Final STIP:

- Start with Draft STIP.
- Update schedules and funding, as needed.
- Perform 5/10-year analysis to ensure the Final STIP is within budgetary constraints defined in STI law.
- Add the Prologue to document.
- Add the public engagement documentation (see 1P11 for related information).

The Final STIP is a 10-year document. The PDF document from the STIP database is produced, with minimal hard copies, and the Final STIP is presented to the Board of Transportation for approval.

Following the Board of Transportation approval:

- The STIP website is updated with Final STIP and interactive map.
- The STIP Unit sends Division, MPO, and RPO Supplements to respective organizations.
- Affected MPOs begin Air Quality Conformity Determination analysis (currently Metrolina region only).
- MPOs approve TIPs, notify STIP Unit as approved.

Upon all MPOs approving TIPs, the STIP Unit packages the Board of Transportation-approved STIP and MPO TIPs, sending to FHWA and FTA for approval. Once FHWA and FTA approve the new STIP, the new STIP becomes the official STIP.

1SP1 Complete Project Prioritization

Overview

Develop a project score for each project and provide the final scores to the State Transportation Improvement Program (STIP) Unit for use and guidance in developing the STIP.

References

- [Prioritization Resources SharePoint Page](#)
- [Prioritization Data SharePoint Page](#)

Deliverables

Deliverable	Task	Responsible Party	
		Activity Leader	Additional Support
Spreadsheet of Final Quantitative Scores for all Submitted Projects in 6 Modes	<ul style="list-style-type: none"> ▪ <i>Develop Project Prioritization Scores</i> ▪ <i>Release Pn.0 Data Scores and Statewide Mobility Project List</i> ▪ <i>Complete Regional Impact Project Public Comment Period</i> ▪ <i>Release Regional Impact Project List</i> ▪ <i>Complete Division Needs Project Public Comment Period</i> 	SPOT Lead	<ul style="list-style-type: none"> ▪ Congestion Management Unit ▪ DIT GIS Unit ▪ Logical Termini Consultant ▪ TPD: NCSTM Consultant ▪ Feasibility Studies Unit ▪ Traffic Safety Unit ▪ ITS/Signals Unit ▪ NC Turnpike Authority ▪ TREDIS (Consultant) ▪ Aviation Division ▪ Ferry Division ▪ Integrated Mobility Division ▪ ITRE ▪ Rail Division ▪ Chief Engineer’s Office ▪ Communications Group ▪ Public Involvement Unit
Map of Evaluated Projects with Scoring Data (and funded status when applicable)	<ul style="list-style-type: none"> ▪ <i>Develop GIS Map of Evaluated Projects</i> 	SPOT Lead	SPOT GIS Support

Develop Project Prioritization Scores

Project prioritization is developed each year in accordance with the Strategic Transportation Investments (STI) law (GS 126-189.10 and .11). For each prioritization phase (Pn.0, where n equals the phase number), the Strategic Prioritization Office (SPOT) develops the project prioritization scores. The SPOT Lead follows the process detailed in the current version of the *Prioritization n.0 Submittal Guidance and Resources* found on the Prioritization Data SharePoint site.

Metropolitan Planning Organizations (MPOs), Rural Planning Organizations (RPOs), and Divisions submit candidate projects during a submittal window into SPOT On!ine. SPOT On!ine captures project data and processes key scoring components. SPOT staff perform project data verification and calculate scores for each candidate project. As part of their review of the candidate projects, SPOT staff coordinates with the following Units, as appropriate:

- Photogrammetry
- Railroad

- Signal System Timing
- Structures

Once SPOT staff have verified the scoring data and calculated scores, the final spreadsheet is provided to the STIP Unit for programming (see 1SI1 for related information). The STIP Unit provides the draft STIP back to SPOT staff for formatting and sharing with our partners.

While the STIP Unit is programming candidate projects, SPOT organizes a committee to review 51 Local Input Point Methodologies from every MPO, RPO, and Division on how that organization applies and assigns their local input points to the Regional Impact and Division Needs categories.

Release Pn.0 Data Scores and Draft STIP

SPOT staff work with the Communications Group to update the www.ncdot.gov website about the release of the Pn.0 quantitative scores (see 1CG1 for related information). SPOT staff develop a spreadsheet and map of the draft STIP projects. A mass email is generated and sent to all the MPO/RPO/Divisions who submitted projects to let them know of the release.

Complete Regional Impact Project Public Comment Period

To complete this task, the SPOT staff:

- Work with the Chief Engineer's Office and Public Involvement Unit to establish each Division's public comment period for Regional Impact projects (see 1PI1 for related information).
- Assist each Division with spreadsheets and visuals and provide other support during each public comment period.
- Re-initialize the SPOT Online portal for the acceptance of Regional Local Input Points.
- Export the Regional Local Input Points results, then compile the new Regional Impact scores and pass the updated spreadsheet to the STIP Unit for draft Regional Impact programming.

Release Regional Impact Project List

SPOT staff work with the Communications Group to update the www.ncdot.gov website about the release of the Pn.0 regional scores. SPOT staff draft programmed Regional Impact projects into a spreadsheet and map. SPOT and the Communications Group generate a mass email and send to all the MPO/RPO/Divisions who submitted projects to let them know of the release.

Complete Division Needs Project Public Comment Period

Similar to the Regional Impact process, SPOT staff:

- Work with the Chief Engineer's Office and Public Involvement Unit to establish public comment periods for each Division for Division Needs projects.
- Assist each Division with spreadsheets and visuals and provide other support during each public comment period.
- Re-initialize the SPOT Online portal for the acceptance of Division Needs Local Input Points.
- Export the Division Needs Local Input Points results, then compile the new Division Needs scores and pass the updated spreadsheet to the STIP Unit for draft Division Needs programming.

Develop GIS Map of Evaluated Projects

To develop this map with scoring data, the SPOT Lead follows the process detailed in the current version of the Prioritization Guidance. This GIS map of evaluated projects is provided to all partners.

1SS1 Determine Affected Coordinated Corridors (if not a Significant Project)

Overview

Beginning the activity as soon as the project limits are set, determine all affected coordinated corridors is crucial to the scoping, design, and implementation of signal timing plans for the duration and completion of the project.

Note: For Significant Level 1 or Level 2 projects, follow 1TO1 for Traffic Systems Operations, which includes signal system timing and operations and traffic operations activities. 1TO1 includes steps to determine a project’s significance level.

References

- [NCDOT Signals Map](#)

Deliverables

Deliverable	Task	Responsible Party
		Activity Leader
		Signal System Engineer
List of Affected Signal Systems and Signals	▪ Complete List of Affected Signal Systems	X
Signal System Number(s) for New System(s)	▪ Complete List of Affected Signal Systems	X

Complete List of Affected Signal Systems

The Signal System Engineer prepares a list of the affected signal systems, which involves:

- Determining which signal systems, if any, are affected along the project corridor using the NCDOT Signals Map.
- Compiling a list of all affected signal system and the signals within those systems. This list includes:
 - ♦ Any new systems being constructed by the project or signals being added to existing systems by the project.
 - ♦ Identification of the party responsible for traffic operations along the corridor (i.e., NCDOT or Municipality).

The Signal Systems Engineer assigns a signal system number to any new system(s) being constructed by the project. The list is used for scoping to determine the number of signals impacted by the project that need to be retimed.

2SS1 Initiate Signal System Timing (if not a Significant Project)

Overview

Determine whether the staging and phasing of the construction necessitates and/or would benefit from corresponding signal coordination changes.

Note: For Significant Level 1 or Level 2 projects, follow 2TO1 for Traffic Systems Operations, which includes signal system timing and operations and traffic operations activities.

References

- [List of Signals and Signal Systems \(developed during Project Initiation\)](#)
- [Work Zone Traffic Control \(WZTC\) Traffic Management Plan](#)
- [Signal System Timing and Operations Timeline and Process Documents](#)
- [Traffic Data Request](#)
- [Travel Time Runs](#)

Deliverables

Deliverable	Task	Responsible Party
		Activity Leader
		Signal System Engineer
Construction Signal Timing Phases	<ul style="list-style-type: none"> ▪ Construction Phasing Analysis 	X
Summary of Existing Signal System Operations	<ul style="list-style-type: none"> ▪ Develop Summary of Existing Signal System Operations 	X
Existing Synchro and Tru-Traffic files	<ul style="list-style-type: none"> ▪ Develop Summary of Existing Signal System Operations 	X

Construction Phasing Analysis

Based on the timing and phasing of construction, the WZTC Project Engineer coordinates with the Signal System Engineer to determine how many sets of construction-specific signal coordination phases are needed, along with the justification for each phase (see 2TM1 for related information). Potential justification may include:

- Long-term road closures and corresponding detours
- Long-term capacity reductions
- Elimination of high-volume traffic movements

The Signal System Engineer works with the Signal Lead (see 3SG1 for related information) and Work Zone Traffic Control (WZTC) Project Engineer (see 3TM1 for related information) regarding temporary traffic patterns at signalized intersections.

Develop Summary of Existing Signal System Operations

The Signal System Engineer then gathers all available controller data and provides a summary of the overall existing signal system operations.

- Collect all signal plans including current, construction-specific, and final.
- Upload all signal timing databases to verify existing operations.
- Gather all available signal controller data, including vehicle detector logs, split monitor logs, and any high-resolution data and automated traffic signal performance metrics (ATSPM).
- Notify relevant engineer of any discrepancies between signal plans and current operation.
- Verify existing communications, schedule synchronicity, and overall intended operations are in place.

The Signal System Engineer prepares a Synchro file and a Tru-traffic file for each existing timing plan. The traffic volumes from the corridor-wide volume map are coded into the networks.

3SS1 Signal Timing Model and Analysis (if not a Significant Project)

Overview

Model the corridor using the latest approved version of *Synchro*. Fine-tune the model based on field observation.

Note: For Significant Level 1 or Level 2 projects, follow 3TO1 for Traffic Systems Operations, which includes signal system timing and operations and traffic operations activities.

References

- [Signal System Timing and Operations Timeline and Process Documents](#)

Deliverables

Deliverable	Task	Responsible Party
		Activity Leader
		Signal System Engineer
Synchro Microsimulation Model(s)	<ul style="list-style-type: none"> Develop Synchro Microsimulation Model 	X
Network Volume Overview Map	<ul style="list-style-type: none"> Develop Network Volume Overview Map 	X
Signal Timing Databases	<ul style="list-style-type: none"> Develop Signal Timing Databases 	X
Summary of Design Cycle Length and Schedules	<ul style="list-style-type: none"> Prepare Signal Timing Summary Report 	X

Develop Synchro Microsimulation Model

For the purposes of coordination optimization, the Signal System Engineer models the corridor using the latest approved version of the Synchro microsimulation software.

- Model the corridor following the Synchro guidelines in the PEF Project Review Checklist.
- Fine-tune the model based on field observations and Tru-Traffic travel time runs.

If there is to be construction phase signal coordination plans, each phase is modeled. Synchro models are to be reviewed by someone other than the design engineer.

Develop Network Volume Overview Map

The Signal System Engineer requests turning movements counts for critical intersections along the corridor from the Traffic Safety Unit. The Traffic Safety Unit sends the completed turning movement counts to the Signal System Engineer when completed (see 2TS1 for related information).

Using the traffic counts, the Signal System Engineer interpolates and volume-balances critical intersection turning movement counts to develop a corridor-wide volume map.

Develop Signal Timing Databases

To complete this task, the Signal System Engineer is to develop timing databases following the guidelines in the “PEF Project Review Checklist.”

If there are construction phase signal coordination plans, each phase is modeled. Timing databases shall be reviewed by someone other than the design engineer.

During the appropriate traffic pattern, the signal timings databases and the summary of design are used by the Signal System Engineer to implement the timings and perform “after” travel time runs to evaluate the proposed signal timing plans.

Prepare Signal Timing Summary Report

The Signal System Engineer summarizes the timing plans and schedule for each timing plan according to the latest guidance from the PEF Project Review Checklist.

1ST1 Initiate Structures Investigation

Overview

Provide technical input on Express Design, determine preliminary structure cost and evaluate the condition of each existing bridge, and determine if replacement, rehabilitation, or widening is necessary.

References

- [NCDOT Spatial Data Viewer](#)
- WIGINS Bridge Inspection & Inventory Software*
- Candidate Project/Express Design*

Deliverables

Deliverable	Task	Responsible Party	
		Activity Lead	Additional Support
		Structure Lead	Structures Management Unit (SMU) Field Support
Structures Cost Estimate for Express Design	<ul style="list-style-type: none"> ▪ <i>Provide Existing Structure Reports and Plans</i> 	X	X
	<ul style="list-style-type: none"> ▪ <i>Provide Structures Input on Express Design</i> 	X	X

Provide Existing Structure Reports and Plans

If existing structures are within the general project area, the Structure Lead is to identify all bridge and culvert structures within the area. For existing structures, the Structure Lead collects all related Bridge/Culvert Inspection Reports and any existing structure plans to determine if replacement or rehabilitation is necessary. This is all done in coordination with the Division and Structures Management Unit’s Field Operations Engineer, considering the following.

- Obtain existing inspection reports by contacting Structures Management Unit (Inventory & Appraisal)
 - Use NCDOT Spatial Data Viewer with the structure layer to obtain the Bridge Number.
 - Provide Existing Bridge Numbers to Structures Management Unit (Inventory & Appraisal).
- Request Bridge Inspection Report from Structures Management Unit (Inventory & Appraisal).
- Request structure plans or as-built plans for existing bridge Structures Management Unit (Inventory & Appraisal).

Provide Structures Input on Express Design

To provide structures input on the Express Design, the Structure Lead is to provide the following for all identified structures:

- Coordinate with the Division and Structures Management Unit’s Field Operations Engineer.
- Determine preliminary feasibility for the structure design and preliminary structure depth/clearance, considering:
 - Bridge widening may require smaller girder depths.

- For Grade Separations – coordinate with the Roadway Design Unit for vertical and horizontal clearance requirements.
- For Stream Crossings – coordinate with the Hydraulics Unit for span length and girder height.
- Determine the existing Bridge Numbers using the NCDOT Spatial Data Viewer with the structure layer
- Collect data from a field inspection of all structures within project area, which is to include all bridges, culverts, pipes, and walls.
- Investigate and document current condition of all non- NBIS structures.
- Consult with the Structures Management Unit’s Field Operations Engineer and the Division to determine if replacement is necessary or if rehabilitation is required.

The Structure Lead is to provide a summary of the preliminary structure recommendations to the Feasibility Studies Unit for the Express Design (see 1FS2 for related information).

2ST1 Initiate Structures Design

Overview

Following the development of Design Recommendation Plan Set and the Bridge Survey Report, initiate and finalize structure-related scope and estimating in coordination with the Project Manager.

References

- Structures Management Unit Scoping Sheet*
- Scope & Manday Estimate*
- American Association of State Highway Transportation Officials (AASHTO) *Load and Resistance Factor Design (LRFD) Bridge Design Manual*
- [Structures Management Unit Design Manual](#)
- [Structures Management Unit Design Manual – Standard Letters/Policy Memos](#)
- [Structures Management Unit SharePoint Guidelines](#)

Deliverables

Deliverable	Task	Responsible Party	
		Activity Leader	Additional Support
		Project Manager	Private Engineering Firm Project Manager
Preliminary / Final Scoping Sheet	<ul style="list-style-type: none"> ▪ <i>Develop and Finalize Structure Scoping Sheet</i> 	X	X
Preliminary / Final Manday Estimate	<ul style="list-style-type: none"> ▪ <i>Develop Preliminary Manday Estimate</i> 	X	X
	<ul style="list-style-type: none"> ▪ <i>Finalize Manday Estimate</i> 	X	X

Develop and Finalize Structure Scoping Sheet

To develop the structure scoping sheet, the Structures Lead, with support from the Structures Management Unit’s Private Engineering Firm (PEF) Project Manager (as applicable), is to:

- Enter Structure Data for each site.
- Develop a delivery schedule.
- Coordinate on the Structure Data and Schedule.

Develop Preliminary Manday Estimate

To develop the preliminary manday estimate, the consultant Structures Lead develops and submits an initial “blank” manday estimate. The Project Manager then requests an initial estimate from the PEF Project Manager (as applicable). The consultant Structures Lead completes and submits the initial manday estimate.

Finalize Manday Estimate

To finalize the manday estimate, the PEF Project Manager (as applicable) assists in estimate negotiation.

- Final estimate for manday and cost are to be within an allowable tolerance (5% hours, 10% cost).

The Structures Management Unit then return the final estimate to the Project Manager, and the consultant Structures Lead submits a final PEF estimate to the Project Manager. Upon completion, the Project Manager issues notice to proceed and a purchase order (PO) number to the consultant Structures Lead.

2ST2 Develop Preliminary General Drawings

Overview

Complete and distribute the Preliminary General Drawings (PGDs) for all structures on the project.

References

- ❑ *Structures Management Unit Scoping Sheet*
- ❑ *Structures Management Unit Estimate Sheet*
- ❑ *Manday Estimate (kitchen sink)*
- ❑ American Association of State Highway Transportation Officials (AASHTO) *Load and Resistance Factor Design (LRFD) Bridge Design Manual*
- ❑ [Structures Management Unit Design Manual](#)
- ❑ [Structures Management Unit Design Manual – Standard Letters/Policy Memos](#)
- ❑ [Structures Management Unit SharePoint Guidelines](#)

Deliverables

Deliverable	Task	Responsible Party	
		Activity Leader	Additional Support
		Structures Lead	Private Engineering Firm Project Manager
Draft Preliminary General Drawings (PGDs) for Review	▪ <i>Develop Draft Preliminary General Drawings (PGDs)</i>	X	X
	▪ <i>Submit Draft PGDs to Project Manager for Review (SMU PEF Coordination)</i>	X	X
Preliminary Header Elevations (if required)	▪ <i>Submit Draft PGDs to Project Manager for Review (SMU PEF Coordination)</i>	X	X
Final Preliminary General Drawings (PGDs) for Distribution	▪ <i>Finalize and Distribute Final PGDs</i>	X	X

Develop Draft Preliminary General Drawings (PGDs)

When developing the PGDs, the Structures Lead is to reference the current roadway design plans (i.e., the Design Recommendation Plan Set) and the Bridge Survey and Hydraulic Design Reports (BSR) and coordinate as needed with the project Design Geotechnical Engineer.

- For grade separations, determine bridge length, clearances, and girder type when:
 - Developing preliminary span lengths
 - Developing preliminary girder designs
 - Evaluating potential utility conflicts
- For stream crossings, verify span lengths provided in the BSR when:
 - Developing preliminary span lengths
 - Developing preliminary girder designs
 - Evaluating potential jurisdictional impacts

The Structures Lead drafts the profile and plan sheet and typical section and location sketch sheet.

Submit Draft PGD to Project Manager for Review (SMU PEF Coordination)

Following initial draft, the Structures Lead uploads the draft PGDs to the project Sharepoint site for review, which includes:

- Structures Management Unit (SMU)/Private Engineering Firm (PEF) coordination.
- Division.

The Structures Lead is to allow up to 10 days for review comments.

If needed, the Structures Lead develops the preliminary header elevations in accordance with Section 6.2.2.9 of the *Structures Management Unit Design Manual*.

Finalize and Distribute Final PGDs

To finalize the PGD, the Structures Lead reaches concurrence and addresses review comments, submitting the Final PGD to the Project Manager.

The Project Manager/Structures Management Unit emails the Final PGD using the distribution list that includes the following:

- Area Bridge Construction Engineer
- Geotechnical Unit Head, including the Regional Geotechnical Design Engineer
- Hydraulic Unit Head
- Structures Management Unit Head
- Roadway Design Unit Head
- Transportation Mobility Unit Head
- Utilities Unit
- Construction Unit.

The Final PGD package also includes links for the following:

- Construction Unit Questionnaire
- Google Map of bridge
- Structure Inspection Report and existing bridge plans (if available)
- Bridge Survey Report
- Project Commitments
- Design Recommendation Plat Set

The Project Manager/Structures Management Unit requests both the schedule for Geotechnical Unit foundation recommendations and feedback from Area Bridge Construction. The Structures Lead provides the preliminary header elevations to the Area Bridge Construction Engineer for review, if needed.

3ST1 Complete Structures Design

Overview

Complete the structure design and draft plans for all structures, all in coordination with the Hydraulics Unit and Environmental Analysis Unit (EAU) for environmental impacts and environmental permit drawings and with the Geotechnical Unit for foundation loads.

References

- [Structures Management Unit Design Manual](#)
- American Association of State Highway Transportation Officials (AASHTO) *Load and Resistance Factor Design (LRFD) Bridge Design Manual*
- Area Bridge Construction Engineer Questionnaire Response
- [Request for Foundation Recommendations](#)
- *Geotechnical Load Request*
- [Structures Management Unit SharePoint Guidelines](#)

Deliverables

Deliverable	Task	Responsible Party					
		Activity Leader	Additional Support				
		Project Manager	Structures Lead	Geotechnical Unit	Construction Unit	EAU	Hydraulics Unit
Vertical Abutment Wall Envelopes	<ul style="list-style-type: none"> ▪ Provide Vertical Abutment Wall Envelopes to Geotechnical Unit 		X	X			
Access Drawings	<ul style="list-style-type: none"> ▪ Provide Access Drawings – Stream Crossings 	X	X	X	X	X	X
Permit Impacts	<ul style="list-style-type: none"> ▪ Provide Structure Permit Impacts 	X	X	X	X	X	X
Geotechnical Foundation Loads	<ul style="list-style-type: none"> ▪ Provide Geotechnical Foundation Loads 	X	X	X			
Final Structure Plans Review	<ul style="list-style-type: none"> ▪ Complete Final Structure Plans 	X	X				

Provide Vertical Abutment Wall Envelopes to Geotechnical Unit

For structures with vertical abutment walls, the Structures Lead is to develop the wall envelope, submitting the envelope to the Project Manager. The Project Manager/Structures Management Unit submits the wall envelope to the Geotechnical Unit for wall design.

Provide Access Drawings – Stream Crossings

For stream crossings and in coordination with the Hydraulics Unit and Environmental Analysis Unit, the Structures Lead is to provide the General Drawing of Site denoting access type (e.g., rock causeway, temporary work bridge) to the Hydraulic Design Engineer.

- For a rock causeway:
 - Provide area for the causeway.

- Show staging for removal or construction.
- Provide the Hydraulics Design Engineer with specific information required for Environmental Permit Drawings.
- For a temporary work bridge:
 - In most cases, assume 30-foot spans, 30-foot width for mainline, 20-foot width for fingers, and 16-inch pipe piles.
 - Provide area of piles for temporary impacts.
 - Show temporary bridge on the General Drawing.

Provide Structure Permit Impacts (Wetlands, Surface Water, etc.)

In order to establish structure permit impacts, the Structures Lead is to coordinate with the Hydraulics Unit and Environmental Analysis Unit (EAU) in calculating temporary and permanent structure impacts:

- For temporary structure impacts for temporary work bridge: calculate area of pipe piles
- For permanent structure impacts for bridge: calculate area of piles, shafts, footings
 - Surface waters
 - Wetlands
 - Environmentally sensitive areas

The Structures Lead provides the General Drawing of Site and Impacts to the Hydraulics Design Engineer

Provide Geotechnical Foundation Loads

After the distribution of Preliminary General Drawings (PGDs), the Structures Lead coordinates with the Project Manager, Structures Management Unit, and Geotechnical Engineering Unit as follows.

- The Geotechnical Engineering Unit submits its Request for Loads.
- The Structures Lead submits foundation loads to the Geotechnical Engineering Unit.
- The Geotechnical Engineering Unit return the Foundation Recommendations.

Complete Final Structure Plans

In accordance with the *Structures Management Unit Design Manual*, the Structures Lead develops the final Structure design and associated plans that includes the following.

Structure Design

- Superstructure: Deck design (chart) – link slabs, integrals
 - Finalize bridge length and layout
 - A typical section
 - Girder design
 - Steel: studs, BFS, charpy v-notch, deflection, plate sizes, diaphragms
 - Concrete: stirrups, strand pattern, conc strength, diaphragms
 - Girder rating
 - Bearings
 - Joints
 - Rails
- Substructure

- End Bent, caps, footings, piles
- Bent: caps, columns, footings, piles, shafts
- Geotech loads/ coordination
- Abutment walls
- Slopes
- Approach slabs

Structure Drawings

- | | | |
|--|---|---|
| <ul style="list-style-type: none">▪ General Drawing (Staging Sequence)▪ BOM▪ Rating (LRFR)▪ Erection Sequence▪ Typical section & details▪ Plan of spans▪ Closed drainage▪ Framing plans▪ Girder sheets | <ul style="list-style-type: none">▪ Diaphragm details▪ Bearings▪ Deflections/camber▪ Rail▪ Sidewalk/median▪ Guardrail attachment▪ Joints▪ Total Super BOM▪ End bents▪ Bents▪ End Bent 2 | <ul style="list-style-type: none">▪ PS Conc Pile Std▪ Sign attachments▪ Electrical conduit system▪ Fender system▪ Navigational lighting conduit▪ Slope protection▪ App slabs▪ Standard notes |
|--|---|---|

Culvert Design

- Culvert length
- Culvert design
- LRFR rating
- Wing design

Culvert Drawings

- Location sketch
- Total quantities
- Rating sheet (LRFR)
- Profile along CL culvert
- Plans
- Guardrail attachment
- Section views (including sills if required)
- Wing details

Retaining Walls

- Envelopes (structure critical walls only)

Sound Barrier Walls

- Plans (ref standards)

4ST1 Finalize Structures Design PS&E

Overview

Submit plans, specifications, and estimates (PS&E) to the Structures Management Unit, who submits to Contract Standards and Development Unit for letting.

References

- [Structures Management Unit Design Manual](#)
- [Structures Management Unit SharePoint Guidelines](#)
- [Roadway Design/Structures Checklist](#)
- [Structures Working Days Guidelines](#)
- [Structures PSP Lineup Sheet](#)

Deliverables

Deliverable	Task	Responsible Party				
		Activity Leader	Additional Support			
		Project Manager	Structures Lead	Structures Unit	Geotechnical Unit	Roadway Unit
Structures Final Plans	▪ In development	X	X	X		
Structures Working Days	▪ In development		X	X		
Structures Project Special Provisions	▪ In development		X	X		
Structures Quantity Estimate (CSV)	▪ In development		X	X		
Structure Design Files	▪ In development		X	X		
Bridge Construction Elevations	▪ In development		X	X		
Roadway Structures Checklist	▪ In development	X	X	X		X
Wall Plans	▪ In development	X	X	X	X	

1TM1 Complete Traffic Analysis

Overview

Obtain a traffic operations analysis that evaluates the study area, both with and without the proposed project.

Note: *Actions during the Project Initiation Stage may be led and completed by staff from several different NCDOT groups. Any person who has overall responsibility for a project during this Stage is referred to as the “Project Lead.” This lead could be the Feasibility Studies Engineer, the Corridor Development Engineer, the Division Planning Engineer, or someone in a similar role as tasked by a state or local agency.*

References

- [Traffic Engineering Suite](#)
- [Capacity Analysis Guidelines](#)
- [Simulation Guidelines](#)
- [Guidelines for Determining Work Zone Level of Significance](#)

Deliverables

Deliverable	Task	Responsible Party	
		Activity Leader	Additional Support
		Congestion Management Project Engineer/Project Design Engineer	Congestion Management Regional Engineer
Traffic Operations Analysis Technical Memorandum	▪ <i>Initiate/Scope Traffic Operations Analysis</i>	X	X
	▪ <i>Develop Analysis</i>	X	X
	▪ <i>Complete the Traffic Operations Analysis Technical Memorandum</i>	X	X
Work Zone Level of Significance Documentation	▪ <i>Determine Level of Significance</i>	X	

Initiate/Scope Traffic Operations Analysis

The traffic operations analysis is to develop the measures of effectiveness (MOEs), typically in the form of level of service (LOS), and is to support the environmental document’s purpose and need statement for projects that have congestion or mobility related needs. The traffic operations analysis also includes the recommended lane geometries, storage lengths, and the design configurations for any alternatives included in the study.

To initiate this analysis, the Traffic Management Unit (Congestion Management) determines the level of project complexity based on the levels of traffic operations:

- Level 0 - Low traffic volume locations where traffic operations are not critical to the design or analysis of the project.
 - ♦ Typical projects include low volume bridge replacements and basic maintenance operations.
 - ♦ No detailed traffic analysis is required.

- Level 1 (Basic) - Level 1 analysis involves basic traffic operations that can be reviewed by use of macroscopic analysis tools.
 - Typical projects include simple intersection operation (unsignalized, signalized, roundabouts), basic corridor analysis, and freeway operations (including merge, diverge, weave) that are mostly under capacity.
 - Traffic Analysis Software typically used for this analysis include: Synchro, HCS, SIDRA.
- Level 2 (Intermediate) - Level 2 analysis involves more complex traffic operations that can be best evaluated reviewed by use of microscopic analysis tools.
 - Typical projects may include freeway operations near or above capacity, innovative intersections and corridors that include designs such as (but are not limited to) Reduced Conflict Intersections, Continuous Flow Intersections, Diverging Diamond Interchanges.
 - Traffic Analysis Software typically used for this analysis is TransModeler.
- Level 3 (Advanced) – Level 3 analysis involves the highest complex traffic operations. These projects require evaluation by use of advanced methodology involving microscopic analysis tools.
 - Typical projects may include (but are not limited to) complex freeway system interchanges, new alignment projects (both freeway and arterial) that involve potential multiple travel routing, and multi-modal projects.
 - Traffic Analysis Software typically used for this analysis is TransModeler.

Once a level of analysis is determined, the Traffic Management Unit (Congestion Management) verifies that the analysis is to be completed by an individual prequalified to perform the analysis. (Note: Prequalification for Congestion Management work codes is by individual, not by firm.)

Once the project is assigned, the Traffic Management Unit (Congestion Management) develops the scope of the work. The limits of the analysis and intersections to be included in the analysis are typically to match those included in the traffic forecast. The traffic analysis also typically includes the following scenarios:

- Base Year No-Build (based on existing conditions)
- Future Year No-Build (based on existing conditions, without the proposed project but with any other fiscally constrained project(s) in place)
- Future Year Build for each Alternative
- Base Year Build may be analyzed for some projects considering:
 - If determined to be warranted by the Congestion Management Project Engineer or Regional Engineer.
 - Typically completed only for the recommended alternative.

The scoping of the analysis is completed in accordance with the *Congestion Management Scope Templates*, which is included in the *Traffic Engineering Suite* under the Scope and Estimate Resources section.

- Level 1 projects are to use the HCS/Synchro/Sidra scope template, and Level 2 and Level 3 projects are to use the TransModeler scope template.
- The scope template is attached to the overall scope for multi-discipline task orders and is not to be modified or renumbered as the tasks are tied to the inputs in the NCDOT Scope and Manday Estimate spreadsheet.

Develop Analysis

The traffic operations analysis is to be completed in the prescribed software package in accordance with the *Congestion Management Guidelines*. Level 1 projects are to adhere the *Capacity Analysis Guidelines*, while Level 2 and 3 projects are to adhere to the *Simulation Guidelines*.

The first step in the analysis process is to develop the Base Year and Future Year No-Build scenarios, with the following considerations.

- These may be developed and submitted separately from the Build analysis, if determined to be appropriate by the project team.
- Preliminary review and approval of the No-Build analysis may be helpful in developing the Purpose and Need for the environmental document. Preliminary review and approval can also be beneficial for complex projects where the build scenarios expand on the no-build analysis and help reduce re-analysis by identifying issues earlier in the process.
- It is recommended that the Base Year and Future Year No-Build models for all Level 3 projects (and some Level 2 projects) be reviewed and approved prior to the development of Build scenarios.

The next step is to develop the analysis of the Build alternatives. The Build analysis is typically accomplished in one of two ways, either the traffic analysis precedes the design, or the design precedes the traffic analysis.

- For projects where the traffic analysis precedes the design, a general design concept is identified for the traffic analysis and the purpose of the analysis is to develop the details of the design to meet the goals of the project (typically a level of service/LOS target).
 - The analysis determines the recommended design layout and provide the required lane configuration and storage lengths.
 - The design recommendations are then provided to the design team for incorporation into the project's design plans.
 - If elements of the recommended design cannot be accommodated in the design due to constraints, then coordination is to occur between the design team and the traffic analysis team to determine how the design can be revised and still meet the project goals.
 - At the end of the process a comparison of the traffic analysis and design analysis shall occur to determine that they match.
- For projects where the design precedes the traffic analysis (not as likely to be addressed in the Project Initiation Stage), a detailed design is developed and provided to the traffic analysis team.
 - The traffic analysis is developed based on the design provided and any locations where the design does not meet the project goals is identified and recommendations on design revisions are provided.
 - Additionally, any locations where the design provided exceeds what is needed to meet the goals of the project is noted and provided to the project's design team (namely the Roadway Design Lead) to determine, through value engineering, if design revisions are warranted (see 1RD1, 2RD1, and 1VM1 for related information).
 - At the end of the process, a comparison of the traffic analysis and design analysis is used to determine that they match.

Complete the Traffic Operations Analysis Technical Memorandum

After receiving approval from the Traffic Management Unit (Congestion Management), the analysis is to be finalized through a Traffic Operations Analysis Technical Memorandum.

- To finalize the Memorandum, the final version is sealed by the North Carolina Professional Engineer that was in responsible charge of the analysis.
- The final Memorandum is delivered to the Project Lead and uploaded to the project SharePoint team site by the Congestion Management Project Engineer or Project Design Engineer.

All of the requirements to develop and complete the technical memorandum are described in the *Capacity Analysis Guidelines* and *Simulation Guidelines*.

Determine Level of Significance

Referencing the *Guidelines for Determining Work Zone Level of Significance*, the Traffic Management Unit (Work Zone Traffic Control) or Transportation Planning Unit evaluates the following project characteristics to determine project/work zone level of significance:

- Category and project type
- Existing volumes and traffic lanes
- Total truck traffic (dual & TTST combined)
- US or NC route
- Project length

The Transportation Planning Unit or Traffic Management Unit (Work Zone Traffic Control) documents the determination in the planning process and coordinates with the Traffic Operations Engineer (see 1TO1 for related information).

2TM1 Initiate Transportation Management Plan

Overview

Begin this activity based on the Design Recommendation Plan Set in order to verify the overall transportation management strategy with the Division, identify any impacts to right-of-way, and identify all items that require coordination with other disciplines/Units for inclusion in the final Transportation Management Plan (TMP).

References

- American Association of State Highway and Transportation Officials (AASHTO) *Roadside Design Guide 4th Edition and Errata*
- American Association of State Highway and Transportation Officials (AASHTO) *A Policy on Geometric Design of Highways and Streets and all Errata*
- Federal Highway Administration (FHWA) *Manual on Uniform Traffic Control Devices (MUTCD)*
- Federal Highway Administration (FHWA) *Standard Highway Signs*
- Federal Highway Administration (FHWA) *Rule on Work Zone Safety and Mobility (23 CFR 630 Subpart J and K)*
- Transportation Research Board (TRB) *Highway Capacity Manual*
- [Roadway Design Manual](#) (*In Development: The manual is in the process of being updated.*)
- [Standard Specifications for Roads and Structures](#)
- [Roadway Standard Drawings](#)
- *Supplement to the Manual on Uniform Traffic Control Devices* (NCSMUTCD)
- *Guidelines for Transportation Management Plan Development*
- *Work Zone Traffic Control (WZTC) Design Manual*
- *Guidelines for the Use of Positive Protection in Work Zones*
- *Temporary Shoring Policies and Procedures*
- *Policy for Providing Temporary Pedestrian Accommodations in Work Zones*
- *Americans with Disabilities Act of 1990 (ADA)*

Deliverables

Deliverable	Task	Responsible Party	
		Activity Leader	Additional Support
		WZTC Project Engineer	WZTC Project Design Engineer
Temporary Traffic Control (TTC) Concept Plans	<ul style="list-style-type: none"> ▪ Complete Concept TTC Plans ▪ Lead TTC Concept Review Meeting 	X	X

Complete Concept Temporary Traffic Control (TTC) Plans

The WZTC Project Engineer, with support from the Work Zone Traffic Control (WZTC) Project Design Engineer, develops the conceptual temporary traffic control (TTC) plans to demonstrate how traffic (motorists, pedestrians, and cyclists) is to be safely maintained during construction activities in a manner

that does not overly degrade mobility, compromise worker safety, or prevent timely and efficient completion of the project. The plans are to include overview drawings, details, preliminary general notes, and written construction staging.

For this task, the WZTC Project Engineer is to:

- Facilitate resolution of constructability concerns and identify all areas where additional coordination with other disciplines/Units is needed.
- Review with and receive concurrence from Division construction staff and provide action items to other disciplines/Units responsible for temporary components of the Final TTC Plans (see 3TM1 for related information).

To prepare the concept plans, the WZTC Project Engineer, with support from the WZTC Project Design Engineering, is to:

- Analyze the Design Recommendation Plan Set (see 2RD1 for related information), Preliminary General Drawings (see 2ST2 for related information), and current hydraulics design (see 2HY1 and 2HY2 for related information), coordinating directly with the Project Manager and each discipline/Unit to ensure the WZTC Project Engineer is reviewing the most up-to-date information.
- Perform a field review/site investigation.
- Determine work zone capacity, obtain hourly traffic counts or Annual Average Daily Traffic (AADT), and determine lane and road closure restrictions.
- Develop a transportation management strategy for vehicles and pedestrians.

The plans also include identifying several items for the plans that include:

- Proposed road closures and detours, including need and expected duration.
- Proposed temporary alignments and grades.
- Location and type of work zone positive protection.
- Locations of proposed temporary drainage.
- Location of proposed temporary shoring for the maintenance of traffic.
- Location and number of temporary signals and signal timing (see 2SG1 and 2SS1 for related information).

The WZTC Project Engineer is to also develop:

- Preliminary general notes, limited to proposed lane and road closure restrictions, as well as hauling restrictions.
- Written construction staging that aligns with the overview drawings and describes in broad terms, the construction that is taking place in each construction phase and how traffic is maintained in each phase.
- Any Phase/Step intermediate contract times.

Lead TTC Concept Review Meeting

After developing the TTC Concept Plans, the Regional WZTC Engineer, with support from the WZTC Project Design Engineering, is to schedule and lead a TTC concept review meeting with the following considerations:

- Set up the TTC review meeting with Division construction, Roadway Design Lead, Hydraulics Design Engineer, Structures Lead, and Regional Traffic Engineer.
 - For complex, significant projects, this meeting may also include the Construction Unit and Statewide Transportation Operation Center (STOC).
 - Depending upon the complexity of the project, it may be beneficial to conduct this meeting as part of the Field Inspection Review Meeting. Otherwise, conduct a separate meeting prior to the Field Inspection Review Meeting.
- Prior to meeting, provide the TTC Concept Plans and an agenda specifying points of discussion and items of further coordination.
- Submit meeting minutes, including action items and the further coordination required to complete Final TTC plans.

3TM1 Complete Transportation Management Plan

Overview

Begin this activity after Division concurrence with temporary traffic control (TTC) concept, where early and effective coordination with other disciplines/Units is needed to deliver a final Transportation Management Plan (TMP).

References

- American Association of State Highway and Transportation Officials (AASHTO) *Roadside Design Guide 4th Edition and Errata*
- American Association of State Highway and Transportation Officials (AASHTO) *A Policy on Geometric Design of Highways and Streets and all Errata*
- Federal Highway Administration (FHWA) *Manual on Uniform Traffic Control Devices (MUTCD)*
- Federal Highway Administration (FHWA) *Standard Highway Signs*
- Federal Highway Administration (FHWA) *Rule on Work Zone Safety and Mobility (23 CFR 630 Subpart J and K)*
- Transportation Research Board (TRB) *Highway Capacity Manual*
- [Roadway Design Manual](#) (*In Development: The manual is in the process of being updated.*)
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- *Supplement to the Manual on Uniform Traffic Control Devices (NCSMUTCD)*
- *Guidelines for Transportation Management Plan Development*
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- *Guidelines for the Use of Positive Protection in Work Zones*
- *Temporary Shoring Policies and Procedures*
- *Policy for Providing Temporary Pedestrian Accommodations in Work Zones*
- *Americans with Disabilities Act of 1990 (ADA)*

Deliverables

Deliverable	Task	Responsible Party	
		Activity Leader	Additional Support
		WZTC Project Engineer	WZTC Project Design Engineer
Final Transportation Management Plan (TMP) Submittal	<ul style="list-style-type: none"> ▪ Complete Final TTC Plans 	X	X

Complete Final TTC Plans

To complete this task, the WZTC Project Engineer, with the support of the WZTC Project Design Engineer, advance the TMP by incorporating all previously agreed upon transportation management strategies and recommendations, completing the required coordination with other disciplines/Units and progressing to final plan format.

Upon receiving Division concurrence with the TTC concept, the WZTC Project Engineer is to directly coordinate with the Project Manager and previously identified disciplines/Units around several specific elements of design.

- Roadway Design Unit/Roadway Design Lead
 - Temporary shoring for staged embankment construction
 - Temporary alignments
 - Temporary pavement
 - Temporary guardrail, end units, guardrail to portable concrete barrier transitions, re-lapping of guardrail
- Structures Management Unit/Structures Lead
 - Temporary shoring for substructure construction
 - Staged bridge construction (construction joint locations)
 - Girder erection over open roads including need and location of shoring towers
 - Anchored portable concrete barriers on bridge decks
- Hydraulics Unit/Hydraulics Design Engineer and Roadside Environmental Unit/Roadside Environmental Engineer
 - Temporary drainage
 - Staged culvert construction
- Geotechnical Engineering Unit/Design Geotechnical Engineer
 - Temporary shoring
 - Temporary slopes
- ITS and Signals Unit/Signal Lead and Signal System Engineer
 - Temporary traffic patterns at signalized intersections
- Regional Traffic Engineer
- Statewide Transportation Operations Center (STOC)
- Transportation Operations and Incident Management

The WZTC Project Engineer documents all coordination efforts, completing coordination with the identified disciplines/Units prior to Plan-in-Hand Review Meeting. Upon request, the WZTC Project Engineer also provides WZTC pay items, estimated quantities, and estimated cost for use by the Contract Standards and Development Unit to prepare the project for letting.

Concurrent with the on-going coordination, the WZTC Project Engineer is to progress the TMP for the PS&E phase, including:

- Title Sheet/Legend
- Final General Notes
- Final Phasing in phase/step format
- Detailed long-term temporary traffic patterns that align with final phasing including:
 - Cut Sections at strategic locations that detail spatial relationship among traffic, traffic control devices, and construction
 - Temporary Pavement Marking
 - Channelization
 - Delineation

- Positive Protection
- Work Zone Signing, including the location and messaging of Portable Changeable Message Signs
- Modifications to existing signing due to temporary traffic patterns
- Pedestrian accommodations
- Offsite detour details that include both Advance Warning and Trail Blazing Signs
- Special Details
 - Work Zone Speed Reduction Signing
 - Portable concrete barriers at Temporary Shoring
 - Special Sign Designs

The WZTC Project Engineer is to also submit the following items with the Final TMP:

- Draft version of TMP estimate of WZTC pay items and estimated quantities.
- Draft version of Intermediate Contract Times using standard ICT templates.
- Draft version of the WZTC Special Provisions generated from the Work Zone Application for Special Provisions (WASP).

1TO1 Initiate Traffic Systems Operations Scoping

Overview

Determine project/work zone category of significance and complete the necessary tasks based on the identified category.

References

- [Work Zone Levels of Significance](#)
- [NCDOT Signals Map](#)
- [Guidelines for Determining Work Zone Level of Significance](#)
- [Integrated Corridor Management \(ICM\) Project Process Outline](#)

Determine Level of Significance

Referencing the *Guidelines for Determining Work Zone Level of Significance*, the Traffic Management Unit (Work Zone Traffic Control) or Transportation Planning Unit documents the level of significance determination, coordinating the findings with the Traffic Operations Engineer (see 1TM1 for related information).

If a project is determined to be a significant project (either Category Level 1 or Level 2 or there is a level of significance after construction), the Traffic Operations Engineer initiates scoping of traffic systems operations strategies needed during and after construction. Determining all affected intelligent transportation system (ITS) devices and coordinating corridors are crucial to the scoping, design, and implementation of comprehensive incident management plans.

If a project is determined to be not significant (either Category Level 3 or Level 4), then Traffic Operations Engineer, as coordinated with others on the team, minimally ensures the ITS device scoping is included in the project. Determining all affected coordinated corridors is crucial to the scoping, design, and implementation of signal timing plans for the duration and completion of the project. Also see 1SS1 for related information on non-significant projects.

Deliverables (if a Significant Project)

Deliverable	Task	Responsible Party	
		Activity Leader	Additional Support
		Traffic Operations Engineer	Signal System Engineer
Operational Risk Assessment	<ul style="list-style-type: none"> ▪ <i>Complete Operational Risk Assessment</i> 	X	
Incident Management Alternate / Detour Map	<ul style="list-style-type: none"> ▪ <i>Develop Initial Incident Management Alternate and Detour Options</i> 	X	
Traffic Operations Strategies Checklist	<ul style="list-style-type: none"> ▪ <i>Develop Initial Traffic Operation Strategies</i> 	X	
Planning Level ITS Device Map	<ul style="list-style-type: none"> ▪ <i>Identify New ITS Devices and Incident Management Signal Equipment Upgrades</i> 	X	
List of Affected Signal Systems and Signals	<ul style="list-style-type: none"> ▪ <i>Identify New ITS Devices and Signal Equipment Upgrades</i> 	X	X

Deliverable	Task	Responsible Party	
		Activity Leader	Additional Support
		Traffic Operations Engineer	Signal System Engineer
Signal System Number(s) for New System(s)	<ul style="list-style-type: none"> Identify New ITS Devices and Signal Equipment Upgrades 	X	X
Planning Level Estimate of Traffic Operations Scope	<ul style="list-style-type: none"> Develop Operational Strategy and ITS Scope Costs 	X	

Complete Operational Risk Assessment

For significant projects, the Operational Risk Assessment of an individual construction project considers safety, congestion, mobility, commerce (e.g. freight), and influence of other projects on the traffic operations of the surrounding road network.

- The Operational Risk Assessment suggests potential strategies to identified risks, including the order that construction projects are carried out.
- A key objective of the Operational Risk Assessment is to inform the project prioritization process and identify preferred project schedule from a traffic operations perspective.

The Traffic Operations Engineer sends a completed Operational Risk Assessment to the Feasibility Studies Unit and Strategic Prioritization Office for preferred phasing of the projects. The Operational Risk Assessment is also used to internally develop traffic operation strategies.

Develop Initial Incident Management Alternate and Detour Options

To ensure that incident management alternate and detour routes are included in the environmental document, the Traffic Operations Engineer develops an initial map detailing potential routes to help refine the project limits (refer to the Integrated Corridor Management Project Process Outline for the alternative routes and/or detour routes for a project). The Traffic Operations Engineer:

- Includes any routes that need updated signal timing.
- Coordinates with the Feasibility Studies Unit to include in the project limits.
- Ensures the applicable Division(s) review the potential routes.

The Traffic Operations Engineer coordinates with the Environmental Analysis Unit if incident management alternate / detour routes are required. Typically permanent ITS devices on incident management detour routes are outside the normal project limits and need to be evaluated as part of the environment document.

The Signal Systems Engineer prepares the map in accordance with the Integrated Corridor Management Project Process Outline. After the map is complete, the Traffic Operations Engineer sends the map to the following units for their reference:

- Environmental Analysis Unit
- Feasibility Studies Unit
- The applicable Division(s)
- Traffic Management Unit (Work Zone Traffic Control)

Develop Initial Traffic Operation Strategies

The Traffic Operations Engineer could develop the following traffic operation strategies to address mobility and safety throughout the project limits to support the construction effort.

- Tow contracts
- Incident management alternate / detour route strategies
- Smart work zone technology
- Other means to improve the mobility and safety of the work zone or address concerns identified in the Operational Risk Assessment

The Traffic Operations Engineer coordinates with the applicable Division(s) on potential strategies to be used during construction, providing a checklist of items that may be feasible for the project.

Identify New ITS Devices and Incident Management Signal Equipment Upgrades

To determine signal equipment upgrades needed for incident management, the Traffic Operations Engineer:

- Determines which signal systems, if any, are affected along the project corridor or identifies/refines incident management alternate and/or detour routes using the NCDOT Signals Map.
- Compiles a list of all affected signal system and the signals within those systems. The list includes:
 - Any new systems being constructed by the project or signals being added to existing systems by the project.
 - The party responsible for traffic operations along the corridor (NCDOT or municipality).

The Signal System Engineer assigns a signal system number to any new system(s) being constructed by the project.

The Traffic Operations Engineer, in coordination with the ITS and Signals Unit (Signal Design Section and Regional ITS Section) and the Signal System Engineer, is to:

- Determine additional permanent ITS devices and locations.
- Provide a planning level map showing new and existing device locations for a corridor.

At this point, the Traffic Operations Engineer also:

- Finalizes the map, sending it to the appropriate Units or Sections included in the planning process.
- Sends the Planning Level ITS device map to the Environmental Analysis Unit to include in the project limits.

The Traffic Operations Engineer continues coordination with the Environmental Analysis Unit as the ITS device strategies are further refined on the incident management alternate / detour routes.

Develop Operational Strategy and ITS Scope Costs

For this task, the Traffic Operations Engineer develops a planning-level cost estimate for any traffic system operational strategies to be included in the conceptual construction estimate (see 1CS1 for related information). This could include:

- Tow contracts
- Integrated Corridor Management (ICM)
- Incident Management Assistance Patrol (IMAP)
- Traffic Management Center (TMC) resources.

The cost could also include:

- Incident management signal system upgrades
- Signal timing
- New permanent ITS devices
- NCDOT operational cost post-construction
- Any other additional equipment needed

The Traffic Operations Engineer submits the cost estimate to the Feasibility Studies/Corridor Development Unit Lead.

Deliverables (if *not a Significant Project*)

Deliverable	Task	Responsible Party
		Activity Leader
		Traffic Operations Engineer
Planning Level ITS Device Map	<ul style="list-style-type: none"> ▪ <i>Identify New ITS Devices</i> 	X
Planning Level Estimate of Traffic Operations Scope	<ul style="list-style-type: none"> ▪ <i>Develop ITS Scope Costs</i> 	X

Identify New ITS Devices

In coordination with the ITS and Signals Unit (ITS Design Section), the Traffic Operations Engineer determines any additional ITS devices and locations. The Traffic Operations Engineer also provides a planning level map showing new and existing device locations for a corridor.

Develop ITS Scope Costs

For this task, the Traffic Operations Engineer develops a planning-level cost estimate for any traffic systems operational strategies to be included in the conceptual construction estimate (see 1CS1 for related information). This is to include new permanent ITS devices. The Traffic Operations Engineer submits the cost estimate to the Feasibility Studies/Corridor Development Unit Lead.

2TO1 Initiate Transportation Operations Plan (if a Significant Project)

Overview

Work with Traffic Management Unit (Work Zone Traffic Control) and ITS and Signals Unit to develop the traffic operations portion of the Transportation Management Plan (TMP). Work Zone Traffic Control develops the temporary traffic control (TTC) plans / Maintenance of Traffic Plan and Traffic Systems Operations develops the plans for Travel Demand Management, signal retiming, integration of ITS devices supporting incident management alternate / detour routes, and Incident Management Plan.

References

- Guidelines for Transportation Management Plan Development*
- Work Zone Traffic Control Design Manual*
- Guidelines for the Use of Positive Protection in Work Zones*
- Integrated Corridor Management (ICM) Project Process Outline*
- Incident Management Assistance Patrol (IMAP) Resources for Significant Project (**In Development**)

Deliverables

Deliverable	Task	Responsible Party
		Activity Leader
		Traffic Operation Engineer
Updated Operational Risk Assessment Matrix	<ul style="list-style-type: none"> ▪ <i>Validate Operational Risk Assessment</i> 	X
Transportation Operations Planning Document	<ul style="list-style-type: none"> ▪ <i>Validate Traffic Operations Strategies</i> 	X
Incident Clearance Requirement List	<ul style="list-style-type: none"> ▪ <i>Initiate Incident Clearance Strategies and Incident Management Plan</i> 	X
Draft Signal Timing Plans	<ul style="list-style-type: none"> ▪ <i>Prepare Signal System Coordination and Upgrades List</i> 	X
Integrated Corridor Management Decision Matrix	<ul style="list-style-type: none"> ▪ <i>Develop Incident Management Alternate/Detour Route Response Plan</i> 	X
List of Smart Work zone equipment	<ul style="list-style-type: none"> ▪ <i>Determine Level of Smart Work Zone Needs for Incident Management</i> 	X
Updated cost estimate	<ul style="list-style-type: none"> ▪ <i>Prepare Detailed Traffic Operations and ITS Cost Estimate</i> 	X
Initial Stakeholder Meeting Minutes	<ul style="list-style-type: none"> ▪ <i>Hold initial stakeholder meetings about Traffic Operation Strategies</i> 	X

Validate Operational Risk Assessment

After projects are selected and prioritized, the Traffic Operations Engineer determines if there are any effects that would require changes to the traffic operation strategies. The Traffic Operations Engineer also updates the Operational Risk Assessment, as needed, to include any updates to the project. The validation also is to update for changes to the project limits or the phasing of adjacent projects.

Validate Traffic Operations Strategies

Once the strategies are selected to mitigate the work zone impacts and the project risks are updated, the Traffic Operations Engineer develops a concept planning document that:

- Assigns leads for each strategy.
- Establishes the need and purpose of each strategy.
- Aligns milestones to ensure synchronization of the strategy development.

Initiate Incident Clearance Strategies and Incident Management Plan

The Traffic Operations Engineer coordinates with the applicable Division to provide a list of the incident clearance requirements for the project, which are to be administered by NCDOT and the contractor. The Traffic Operations Engineer:

- Determines requirement for type and management of tow contracts (e.g., DOT managed, contractor managed, etc.).
- Determines the expansion of Incident Management Assistance Patrol (IMAP) routes.
- Determines if any other means that assists in responding to and clearing incidents quickly are required for the project.

Prepare Signal System Coordination Plans and Upgrades List

The Signal System Engineer coordinate with the applicable Division to:

- Verify with the Signal/ITS Lead (see 2SG1 for related information) if the traffic signals along a potential incident management detour route may require equipment upgrades for NCDOT to communicate with the traffic signals.
- Develop draft signal timing plans along the incident management detour routes.
- Coordinate with the Signal/ITS Lead (see 2SG1 for related information) if updated signal plans are required to replace equipment or install a new signal.
- Coordinate with Signal/ITS Lead (see 2SG1 for related information) if traffic communication plans are required to include traffic signals in a centralized signal system software.

Develop Incident Management Alternate/Detour Route Response Plan

Using the Alternate/Detour Route Map, the Traffic Operations Engineer:

- Coordinates the development of the ITS and Signals plans, signal timing plans, and changeable trailblazers with the other Units.
- Develops response strategies.
- Conducts a field inspection to validate the selected incident management routes with Division and other required stakeholders.
- Develops the integration plan for the ITS devices and traveler information with coordinated signal system timing.
- Develops and validates an Integrated Corridor Management Decision Matrix or ruleset summarizing the responses for each scenario.
- Prepares a Integrated Corridor Management Decision Matrix or ruleset in accordance with the Integrated Corridor Management Project Process Outline.

Determine Level of Smart Work Zone Needs for Incident Management

If a Smart Work Zone is required, the Traffic Operations Engineer:

- Meets with Traffic Management Unit (Work Zone Traffic Control) to discuss options that can be incorporated into the Incident Management Plan.
- Adds the appropriate level of involvement of the State Traffic Operations Center in the operations and maintenance of smart work zone devices.

Prepare Detailed Traffic Operations and ITS Cost Estimate

Once the strategies are developed, the Traffic Operations Engineer prepares a refined estimate to include the cost to the NCDOT and the cost to the contractor. The Traffic Operations Engineer may include an operational cost estimate for the project after construction if items were identified. The estimate may include:

- Portable and temporary ITS devices
- IMAP expansion
- Tow contract management
- Traffic Management Center (TMC) operation
- ITS device installation

Some of these pay items are at NCDOT's cost during and after construction, and others are included in the contractor's construction cost estimate. The estimate is sent to the Project Manager, who reviews the estimate, and Contract Standards and Development Unit (see 2CS1 for related information).

Hold Initial Stakeholder Meetings about Traffic Operations Strategies

The Traffic Operations Engineer meets with project stakeholders to coordinate associated incident management efforts that need to occur during construction within their areas. These stakeholders could include:

- Municipal and/or county Law Enforcement
- Towing industry
- Municipal traffic engineers and/or signal engineers

The Traffic Operations Engineer prepares the meeting minutes and submits these minutes to the Project Manager and all meeting attendees.

3TO1 Advance Transportation Operations Plan (if a Significant Project)

Overview

Finalize traffic operation plans and start discussions with outside agencies.

References

- ❑ *Integrated Corridor Management (ICM) Project Process Outline*
- ❑ *Incident Management Assistance Patrol (IMAP) Resources for Significant Projects (In Development)*
- ❑ *Memorandum of Understanding (MOUs) with Municipalities and Emergency Responders (In Development)*
- ❑ *State Traffic Operations Center (STOC)/Traffic Management Center (TMC) Operator Training (In Development)*
- ❑ *Helping All Work Zones Keep Safe (HAWKS) Process Document (In Development)*

Deliverables

Deliverable	Task	Responsible Party	
		Activity Leader	Additional Support
		Traffic Systems Operation	ITS and Signals Management Section
Final Cost Estimate	<ul style="list-style-type: none"> ▪ <i>Update Construction-Phase Operations Cost Estimate</i> 	X	X
Requirements of Incident Management Plan	<ul style="list-style-type: none"> ▪ <i>Submit Requirements for Incident Management Plan</i> 	X	
Final Incident Management Alternate Detour Route Response Plan	<ul style="list-style-type: none"> ▪ <i>Submit Incident Management Alternate / Detour Route Response Plan</i> 	X	
Final Demand Management Plan	<ul style="list-style-type: none"> ▪ <i>Submit Demand Management Plan</i> 	X	
Draft Tow Contract Documents	<ul style="list-style-type: none"> ▪ <i>Submit Tow Contract Documents</i> 	X	
Draft Law Enforcement Memorandum of Understanding	<ul style="list-style-type: none"> ▪ <i>Initiate Memorandum of Understanding (MOU)/Agreements with Law Enforcement/Municipalities</i> 	X	
Draft Agreement with Municipalities		X	
Coordination Meeting with NCDOT Communications	<ul style="list-style-type: none"> ▪ <i>Coordinate with NCDOT Communication on Public Information Plan</i> 	X	
Final Transportation Operations Plan	<ul style="list-style-type: none"> ▪ <i>Complete Final Traffic Operations Plan</i> 	X	
Final Equipment List	<ul style="list-style-type: none"> ▪ <i>Develop Equipment Purchase Need for Construction</i> 	X	X

Update Construction-Phase Operations Cost Estimate

Using the final Transportation Management Plan (TMP), the Operational Plan, and the final equipment list, the Traffic Operations Engineer develops a final cost estimate for the project in coordination with other Units/Sections, as needed.

Submit Requirements for Incident Management Plan

The Traffic Operations Engineer:

- Prepares and submits the requirements of an incident management plan for the project.
- Coordinates with Traffic Management Unit (Work Zone Traffic Control) to include the relevant information on the temporary traffic control (TTC) plans or the Traffic Operations Plan (see the *Incident Management Plan Guidelines* and 3TM1 for related information).

If the project is to be let by the Division, the Traffic Operations Engineer coordinates with the Division to let equipment, tow contract, and hiring the Incident Management Assistance Patrol (IMAP) drivers. The Traffic Operations Engineer purchases the trucks and provides training for the IMAP drivers.

Submit Incident Management Alternate / Detour Route Response Plan

The Traffic Operations Engineer coordinates with the following leads regarding equipment and data required to be included on the respective plans:

- ITS Lead
- Signal Lead
- Signal System Engineer
- Signing and Delineation Designer

The Traffic Operations Engineer also coordinates with applicable Division and regional personnel.

The Signal System Engineer develops the signal timing plans for incident management detour routes and the thresholds for each plan. The Traffic Operations Engineer:

- Develops message sets for dynamic signs for each detour for each scenario using ITS device locations previously approved.
- Populates a decision matrix or rulesets for each response plan and plan sheets for device locations. The information is populated into tool for State Traffic Operations Center (STOC)/Traffic Management Center (TMC) operators to use during construction.
- Provides a list or chart of equipment needed for each scenario impacted by the detour route.
- Prepares a final response scenario in accordance with the Integrated Corridor Management Project Process Outline.

Submit Demand Management Plan

The Traffic Operations Engineer develops a demand management plan for the project regarding strategies for other alternative modes of transportation during construction (e.g., additional transit routes, ridesharing).

Submit Tow Contract Documents

The Traffic Operations Engineer prepares the draft tow contract documents based on the level of towing required for the project. The Traffic Operations Engineer coordinates with the applicable Division as needed.

Initiate Memorandum of Understanding (MOU)/Agreements with Law Enforcement/Municipalities

The Traffic Operations Engineer continues discussions with law enforcement regarding the project. The Traffic Operations Engineer prepares a draft memorandum of understanding summarizing the project commitments.

The Traffic Operations Engineer continues discussions with the municipalities regarding the project. The Traffic Operations Engineer prepares a draft agreement summarizing the project commitments.

Coordinate with NCDOT Communications on Public Information Plan

If a project requires a Public Information Plan by Traffic Operations, the Traffic Operations Engineer coordinates with applicable Division, Traffic Management Unit (Work Zone Traffic Control), and the Communications Group using the information from the TMP before, during, and/or after construction.

Complete Final Traffic Operations Plan

The Traffic Operations Engineer prepares and submits the final Traffic Operations Plan for bidding or internal execution, which includes:

- A traffic response plan
- A tow contract
- A list of additional items to be included
- Items the contractor is responsible for
- Additional equipment needed for incident management

Develop Equipment Purchase Need for Construction

Using the TMP, the Traffic Operations Engineer determines if any additional equipment is needed to be purchased and included in the overall contract by outside agencies or the Division prior to construction. This list is provided to the Project Manager and Contract Letting for bidding and/or to the Division or region for internal execution. Potential equipment could include:

- Changeable message signs
- Portable closed caption televisions (CCTVs)
- IMAP vehicles
- Trailblazer signs
- Traffic signal equipment

The Traffic Operations Engineer provides a list to FHWA of any exceptions to procure equipment or devices that may be used on future projects.

4TO1 Complete Transportation Operations Plan-Related Tasks (if a Significant Project)

Overview

Finalize the remaining tasks on the Transportation Management Plan (TMP) with outside agencies.

References

- ❑ *Integrated Corridor Management (ICM) Project Process Outline*
- ❑ *Incident Management Assistance Patrol (IMAP) Resources for Significant Projects (In Development)*
- ❑ *Memorandum of Understanding (MOUs) with Municipalities and Emergency Responders (In Development)*
- ❑ *State Traffic Operations Center (STOC)/ Traffic Management Center (TMC) Operator Training (In Development)*
- ❑ *Helping All Work Zones Keep Safe (HAWKS) Process Document (In Development)*

Deliverables

Deliverable	Task	Responsible Party
		Activity Leader
		Traffic Operations Engineer
Final Tow Contract Documents	<ul style="list-style-type: none"> ▪ <i>Complete Tow Contract Documents</i> 	X
Final Law Enforcement Memorandum of Understanding (MOUs)	<ul style="list-style-type: none"> ▪ <i>Complete Law Enforcement Memorandums of Understanding</i> 	X
STOC Operators Training	<ul style="list-style-type: none"> ▪ <i>Train STOC Operators</i> 	X
ATMS Integration into STOC	<ul style="list-style-type: none"> ▪ <i>ATMS Integration</i> 	X
IMAP Procurement Schedule	<ul style="list-style-type: none"> ▪ <i>Initiate IMAP Truck Purchases</i> 	X

Complete Tow Contract Documents

The Traffic Operations Engineer finalizes the details of tow contracts and includes this in the special provisions.

Complete Law Enforcement Memorandums of Understanding

The Traffic Operations Engineer finishes discussions with law enforcement regarding the terms of the memorandum of understanding (MOU). The Traffic Operations Engineer completes the MOU and has NCDOT and the law enforcement agency execute the MOU.

Train STOC Operators

Details regarding the training the State Traffic Operations Center (STOC) operator tasks are still in development.

Advanced Traffic Management System (ATMS) Integration

Details regarding the Advanced Traffic Management System (ATMS) integration tasks are still in development.

Initiate IMAP Truck Purchases

The Traffic Operations Engineer coordinates with the applicable Division to prepare a schedule for:

- Hiring Incident Management Assistance Patrol (IMAP) drivers
- Training IMAP drivers
- Purchasing IMAP vehicles for a project

1TP1 Complete Traffic Forecast

Overview

Obtain an approved traffic forecast that provides the traffic data necessary for analysis.

Note: *Actions during the Project Initiation Stage may be led and completed by staff from several different NCDOT groups. Any person who has overall responsibility for a project during this Stage is referred to as the “Project Lead.” This lead could be the Feasibility Studies Engineer, the Corridor Development Engineer, the Division Planning Engineer, or someone in a similar role as tasked by a state or local agency.*

References

- [Project Level Traffic Forecasting Resource Page](#)
- [Traffic Forecasting Manual](#)
- [Traffic Forecasting - Administrative Procedures Handbook](#)
- [Travel Demand Model Coverage Map](#)

Deliverables

Deliverable	Task	Responsible Party	
		Activity Leader	Additional Support
		State Traffic Forecast Engineer	
Approved Traffic Forecast	<ul style="list-style-type: none"> ▪ <i>Initiate Traffic Forecast</i> 	X	Transportation Planning Division Planning Staff
	<ul style="list-style-type: none"> ▪ <i>Scope Traffic Forecast</i> ▪ <i>Produce Traffic Forecast</i> ▪ <i>Complete and Deliver Traffic Forecast</i> 	X	Transportation Planning Division Traffic Forecasting Group

Initiate a Traffic Forecast

To initiate a traffic forecast, the Transportation Planning Division is typically contacted by the Project Lead from the:

- Feasibility Studies Unit for pre-environmental and pre-State Transportation Improvement Plan (STIP) planning and study (see 1FS2 for related information)
- Central Corridor Development Unit for pre-environmental and pre-STIP planning and study (see 1FS2 for related information)
- Divisions for the Transportation Improvement Program (TIP) project development
- Project Management for TIP project development
- Structures Management Unit for bridge replacement projects
- Rail Division, Engineering Coordination, and Safety Branch for railroad crossings/safety improvement projects

A Transportation Planning Division Project Manager and the project team review the project to determine if a traffic forecast is needed. If a traffic forecast is needed, an inquiry can be made about the current

status of the project and the availability of a forecast with the State Traffic Forecast Engineer. If a forecast is not available, or in-progress, one may be requested.

To complete an inquiry:

- A standard Traffic Forecast Request Form (available on the Project Level Traffic Forecasting Resource Page) may be used to request a traffic forecast. However, all that is required is communicating a need for a traffic forecast with the State Traffic Forecast Engineer. The Traffic Request Form or the e-mail inquiry is sent to: TrafficForecast@ncdot.gov.
- The State Traffic Forecast Engineer produces a map and traffic forecast scope and coordinates with the Transportation Planning Division Project Manager and the larger project team regarding all aspects of the traffic forecast.

Scope a Traffic Forecast

As part of the scoping process, the Transportation Planning Division Project Manager, in coordination with the project team and State Traffic Forecast Engineer, determines the junctions and scenarios to be included in a traffic forecast.

Produce a Traffic Forecast

To produce a traffic forecast, the State Traffic Forecast Engineer:

- Collects existing and new traffic data needed
- Acquires the official Travel Demand Model (if available) in coordination with the Project Lead.
 - Contact the State Traffic Forecast Engineer (TrafficForecast@ncdot.gov) for information on the availability of and how to acquire Official Travel Demand Models.
 - Also see the Travel Demand Model Coverage Map on the Connect NCDOT site to see what may be available.
- Develops the traffic forecast AADT estimates, truck percentages, and design factors
 - Traffic forecasts are ideally developed objectively and independently based upon available and approved data, such as official travel demand models, historic AADT estimates, and new traffic data collection.

Complete and Deliver a Traffic Forecast

To finalize the traffic forecast, the State Traffic Forecast Engineer obtains traffic forecast approval from the Transportation Planning Division.

- To assure that a traffic forecast provides objective data that reasonably supports the project through the environmental process without substantial objection, it is provided to the Transportation Planning Division for TPD review and approval. The Traffic Forecast is sent to: TrafficForecast@ncdot.gov.
- After receiving approval from the Transportation Planning Division, the traffic forecast is delivered via e-mail to the Project Lead and uploaded to ATLAS.

1TS1 Initiate Safety Planning Assessment

Overview

Ensure safety is considered early in the life of the project through screening and subsequent incorporation of safety data into project scoping and design decisions.

Note: *Actions during the Project Initiation Stage may be led and completed by staff from several different NCDOT groups. Any person who has overall responsibility for a project during this Stage is referred to as the “Project Lead.” This lead could be the Feasibility Studies Engineer, the Corridor Development Engineer, the Division Planning Engineer, or someone in a similar role as tasked by a state or local agency.*

References

- [Traffic Safety Screening Tool for Express Design \(In Development\)](#)
- [Traffic Safety Screening Tool for Project Scoping Reports \(In Development\)](#)

Deliverables

Deliverable	Task	Responsible Party	
		Activity Leader	Additional Support
		Safety Planning Engineer	Project Lead
Traffic Safety Review for Selected Feasibility Study, Corridor Study, or Express Design	<ul style="list-style-type: none"> ▪ Conduct Traffic Safety Review for Selected Feasibility Study, Corridor Study, or Express Design 	X	X
Traffic Safety Review for Selected Project Scoping Reports	<ul style="list-style-type: none"> ▪ Conduct Traffic Safety Review for Selected Project Scoping Reports 	X	X
Review of Purpose and Need Statements Containing Safety	<ul style="list-style-type: none"> ▪ Review Purpose and Need Statements Containing Safety 	X	

Conduct Traffic Safety Review for Selected Feasibility Study, Corridor Study, or Express Design

Once the Project Lead runs the Traffic Safety Screening Tool for a selected study/design (see 1FS2 for related information), the Safety Planning Engineer:

- Gathers available safety data (e.g., crash data, available volumes (including non-motorists), roadway characteristics data, etc.) in the vicinity of the project limits, as defined in the project description, but may be extended farther based on specific project considerations.
- Summarizes this detail in a report with project safety-related considerations documented to inform project scoping decisions.
- Sends the report to the Project Lead to be included with the study/design.

Conduct Traffic Safety Review for Selected Project Scoping Reports

Once the Project Lead runs the Traffic Safety Screening Tool for a selected Project Scoping Report (see 1FS3 for related information), the Safety Planning Engineer:

- Gathers available safety data (e.g., crash data, available volumes (including non-motorists), roadway characteristics data, etc.) in the vicinity of the project limits, as defined in the project description, but that may be extended farther based on specific project considerations.
- Summarizes this detail in a report with project safety-related considerations documented to inform project scoping decisions.
- Sends the report to the Project Lead to be included with the Project Scoping Report.

Review Purpose and Need Statements Containing Safety

For validating any Purpose and Need Statement that contains safety, the State Traffic Safety Engineer, specifically, sends a memo to the Project Manager, who formally approves the statements regarding safety before it is used as a basis of the environmental document's Purpose and Need.

- This step ensures NCDOT has safety data to defend safety as the Purpose and Need for a project.
- Purpose and Need Statements with no safety component do not need Traffic Safety Unit approval.

The Traffic Safety Unit is very involved in design concepts and design parameters to ensure improvements address any safety concerns identified in the project limits.

2TS1 Complete Safety Analysis and Operational Review

Overview

Ensure the project has adequately addressed any existing safety issues and ensure design elements important to traffic safety are considered.

References

- ❑ Federal Highway Administration (FHWA) *Manual on Uniform Traffic Control Devices (MUTCD)*
- ❑ American Association of State Highway and Transportation Officials (AASHTO) *Highway Safety Manual (HSM)*
- ❑ [Development of Safety Performance Functions for North Carolina](#)
- ❑ [Updated and Regional Calibration Factors for Highway Safety Manual Crash Prediction Models](#)
- ❑ *Signal Recommendations Guidelines for Regional Traffic Engineers (In Development)*
- ❑ *Traffic Safety Analysis Guidelines for NEPA documentation (In Development)*

Deliverables

Deliverable	Task	Responsible Party	
		Activity Leader	
		Regional Traffic Engineer	Safety Planning Engineer
Traffic Signal Recommendations	<ul style="list-style-type: none"> ▪ Provide Traffic Signal Recommendations 	X	
Traffic Safety Alternatives Analysis Report	<ul style="list-style-type: none"> ▪ Develop Traffic Safety Alternatives Analysis Report (CP2/CP3) 		X
Safety Data and Analysis for Environmental Document	<ul style="list-style-type: none"> ▪ Provide Safety Data and Analysis for the Environmental Document 		X
Roadway Plan Comment Memo	<ul style="list-style-type: none"> ▪ Review Roadway Plans 	X	
Signing and Delineation Plan Comment Memo	<ul style="list-style-type: none"> ▪ Review Signing and Delineation Plans 	X	
Comments on the draft Transportation Management Plan (TMP) and temporary traffic control (TTC) plans	<ul style="list-style-type: none"> ▪ Review Concept Transportation Management Plan 	X	
Comments on the final TMP	<ul style="list-style-type: none"> ▪ Review Final Traffic Management Plan 	X	

Provide Traffic Signal Recommendations

The Regional Traffic Engineer reviews the available project information to determine if signalization is appropriate based on projected traffic volumes. To do this:

- The Regional Traffic Engineer consults with the assigned Division Traffic Engineer when making recommendations.
- The Regional Traffic Engineer reviews the traffic forecast and proposed intersection design (i.e., the most current roadway design plans; likely the Design Recommendation Plan Set) as inputs for decision making.

- Information on pedestrian volumes or activity is important to consider as pedestrian accommodations are also part of this review.

The Regional Traffic Engineer prepares a memo with signal recommendations that is sent to the Division, Roadway Design Lead, and the Signal Lead.

Develop Traffic Safety Alternatives Analysis Report (CP2 / CP3)

For merger projects (if applicable), the Safety Planning Engineer or Group prepares an analysis on projects where safety is in the environmental document's Purpose and Need, or on projects where value is added in communicating the anticipated safety impacts of a project.

- The inputs needed for this analysis are the traffic forecast, the design criteria file, and the current roadway design files (likely the Design Recommendation Plan Set).
- The analysis uses Highway Safety Manual predictive modeling methodologies to predict the number of crashes along each alternative being considered, including the "do nothing"/no-build alternative.
- NCDOT-specific calibration factors for models found in the *Development of Safety Performance Functions for North Carolina* and *Updated and Regional Calibration Factors for Highway Safety Manual Crash Prediction Models* are to be used as part of the analysis.
- Design parameters (such as lane widths, shoulder widths and types, and curve radius) and projected traffic volumes are critical inputs. Traffic volumes are used to model the corridor from a safety perspective to give a sense for how each alternative may perform.

The Safety Planning Engineer summarizes the analysis in a report that outlines how each alternative is expected to impact safety and to help select the Least Environmentally Damaging Practicable Alternative (LEDPA). Limitations of the analysis are to be clearly outlined in the report. The Safety Planning Engineer provides the report to the Project Manager.

Provide Safety Data and Analysis for the Environmental Document

Documentation of the existing safety conditions along the project area is typically required for inclusion within the Purpose and Need section of the environmental document and organized by the Safety Planning Engineer. This documentation could include:

- A five-year crash history,
- An explanation of the patterns of crashes that exist in the project area,
- How the project is expected to impact safety, and/or
- A high-level summary of the crash history in the project area.

Review Roadway Plans

The Regional Traffic Engineer's Office reviews the current roadway design plans and traffic forecast, considering:

- General design concerns, such as pedestrian accommodations, lane continuity, typical section, and median breaks.
- Safety-related design recommendations submitted to the Roadway Design Lead and Project Manager in a memo.

Review Signing and Delineation Plans

The Regional Traffic Engineer's Office reviews the current Signing and Delineation Plans, considering:

- General concerns related to signing and pavement markings/delineation.
- Safety-related signing/pavement marking recommendations submitted to the Signal Design Lead and Project Manager in a memo (see 2SD1 for related information).

Review Concept Transportation Management Plan

The Regional Traffic Engineer's Office reviews the concept Transportation Management Plan (TMP) and participates in the temporary traffic control (TTC) concept review meeting. The Regional Traffic Engineer provides input on the following:

- Overall traffic operations and safety
- Appropriate temporary traffic control devices
- Proposed detours
- Proposed phased construction

Safety-related TTC comments are submitted to the Regional Work Zone Traffic Control (WZTC) Engineer and WZTC Project Design Engineer (see 2TM1 for related information).

Review Final Transportation Management Plan

The Regional Traffic Engineer's Office Reviews the final TMP, considering:

- Overall traffic operations and safety
- Temporary traffic control devices
- Detours
- Phased construction

Safety-related TTC comments are submitted to the Regional WZTC Engineer and WZTC Project Design Engineer (see 3TM1 for related information).

1UT1 Develop Utility Relocation Estimate

Overview

Develop a preliminary estimate of utility relocation cost.

References

- [Utility Policy Manual](#)
- [Policies and Procedures for Accommodating Utilities on Highway Rights of Way](#)

Deliverables

Deliverable	Task	Responsible Party	
		Activity Leader	Additional Support
		Utilities Coordinator	
Preliminary Utility Relocation Estimate	▪ <i>Develop Conceptual Utilities Cost Estimate</i>	X	

Develop Conceptual Utilities Cost Estimate

The Utilities Coordinator visits the project site and inventories utility facilities on the project.

Using the inventory of facilities and the standard NCDOT estimating tools, the Utilities Coordinator provides a preliminary estimate of the cost of possible utility relocations, including a short description of utilities observed.

1UT2 Initiate Utility Investigations

Overview

Inventory utility facilities in the project area. Identify utilities that are costly to relocate, have long design or construction times, or otherwise create risks for project construction or schedule if they are relocated.

References

- [Utility Policy Manual](#)
- [Policies and Procedures for Accommodating Utilities on Highway Rights of Way](#)

Deliverables

Deliverable	Task	Responsible Party	
		Activity Leader	Additional Support
		Utilities Coordinator	Utilities Lead
Utility Risk Analysis and Inventory Report	<ul style="list-style-type: none"> ▪ <i>Initiate Utility Owner Contacts</i> ▪ <i>Conduct Preliminary Utility Investigations</i> ▪ <i>Submit Utility Risk Analysis and Inventory</i> 	X X X	X X
Utility Project Outline	<ul style="list-style-type: none"> ▪ <i>Determine Utility Relocations</i> 	X	X
Utility Construction Requests	<ul style="list-style-type: none"> ▪ <i>Submit Utility Construction Requests</i> 	X	

Initiate Utility Owner Contacts

The Utilities Coordinator is to meet with the utility owners to discuss utility facilities in the project study area and vicinity. These meetings are to be with employees of the utility who are familiar with the existing facilities and with plans for future facilities in the study area. These meetings are likely held individually with each utility at a location convenient for the utility employees. Other projects may be discussed in these meetings, if possible and appropriate.

In this meeting, the Utilities Coordinator:

- Explains the scope of the project and the location of all alternatives.
- Explains the projected schedule and expected project duration.
- Requests that the utility:
 - Provide a description of the type, size, and function of all facilities in the area of the project.
 - Identify critical facilities that have restrictions on service interruption for relocation or may be difficult to relocate. A facility may be difficult to relocate because of difficulty in acquiring property for the relocation of the facility, difficulty in coordination of outages with customers being served, or for other reasons, as well as difficulty in construction.
 - Identify facilities with a high cost of relocation.
 - Provide a description of factors that may affect the project schedule, such as lengthy design times, need to establish a construction budget, long-lead times when ordering materials, or long times between construction of the new facilities and abandonment of the old facilities.

- Discusses the expected impact of each of the utility facilities on the project and the impact of the project on the utility facilities.

This meeting may also involve a site visit to verify and correlate information provided by the utilities and to search for previously unknown utilities.

Conduct Preliminary Utility Investigations

Using the information collected from the utilities, the Utilities Coordinator analyzes reasonably expected conflicts between existing and planned utilities and the project. For each alternative, the Utilities Coordinator is to:

- Provide an inventory of utilities encountered.
- Provide a preliminary estimate for utility relocation costs.
- Analyze risks to the project budget and schedule by identifying:
 - Facilities that can be relocated without significant burden to the utility.
 - Facilities that cannot be taken out of service at all or for more than a short period of time.
 - Facilities that are expensive to relocate because of size or conditions of the construction.
 - Facilities that have a long design or construction duration.
 - Any other risk the relocation of the facilities could pose to the project.
- Identify facilities to avoid, and facilities that may be relocated, without significant burdens to the utility or the project.
- Identify whether construction of utility relocation may be necessary outside of the study area.

Submit Utility Risk Analysis and Inventory

The Utilities Coordinator provides a Utility Risk Analysis and Inventory Report that:

- Provides an inventory of utilities and facilities in the study area.
- Includes the information provided by the utilities.
- Documents the analysis of budget and risk in each alternative.
- Makes recommendations to reduce risk or budget.

The Utilities Lead reviews the report and provides comments to the Utilities Coordinator, who updates the document.

Determine Utility Relocations

After the alternative to be constructed has been selected, the Utilities Coordinator revises and condenses the Utility Risk Analysis and Inventory Report into a Utility Project Outline for the selected alternative. The revised report is to include:

- A utility inventory for the alternative.
- An analysis of risks for the alternative.
- A projected budget.
- A preliminary schedule for the utility designs and relocations.
- Recommendations to the project designers on utilities to avoid.
- A strategy for the possible relocations.

The Utility Project Outline guides the project’s design team to avoid major utility impacts. The Utilities Lead reviews the report/outline and provides comments to the Utilities Coordinator, who updates the document.

Submit Utility Construction Requests

For this request, the Utilities Coordinator:

- Identifies utilities that may want construction of their facilities completed by the selected contractor and included as part of the project’s contract.
- Obtains a Utility Construction Request from each of these utilities describing the facilities likely to be in conflict or that may need early analysis.
- Identifies in the Utility Construction Request whether NCDOT is being requested to perform construction or both design and construction.

These requests are submitted concurrently with the Utility Project Outline.

2UT1 Initiate Utility Coordination

Overview

Coordinate with utility owners to identify conflicts between their facilities and the project and develop resolution for those conflicts. Coordinate preliminary utility designs to conform with the *Policies and Procedures for Accommodating Utilities on Highway Rights of Way (Utilities Accommodation Manual)*, preventing conflicts among utilities where possible and determining utility easement requirements.

References

- [Utility Policy Manual](#)
- [Policies and Procedures for Accommodating Utilities on Highway Rights of Way](#)

Deliverables

Deliverable	Task	Responsible Party			
		Activity Leader		Additional Support	
		Utilities Coordinator	Utilities Design Engineer	Utilities Coordinator	Utilities Design Engineer
Utility Coordination Kickoff Meeting Minutes	▪ Provide plans to Utility Owners	X			
	▪ Identify Major Utility Conflicts and Relocation Impacts	X			X
	▪ Conduct Utility Coordination Kickoff Meeting (All Utilities)	X			X
Routing Plan	▪ Initiate Cost Responsibility Analysis	X			
	▪ Receive Preliminary Utility Relocation Plans from Utility Owners	X			X
	▪ Submit Routing Plan	X			X
Relocation Schedule	▪ Create Relocation Schedule	X			
Preliminary Utility Construction Plans	▪ Submit Preliminary Utility Construction Plans		X		
Subsurface Utility Engineering (SUE) Level A Request	▪ Request Subsurface Utility Engineering (SUE) Level A	X			X
Geotechnical Investigation (Trenchless) Request	▪ Request Geotechnical Investigation for Trenchless Utilities		X		
Utility Easement Request and Utility Parcel List	▪ Submit Required Utility Easements and Parcel List	X			X

Provide Plans to Utility Owners

The Utilities Coordinator provides a PDF and DGN set of the Design Recommendation Plan Set and the Utility Project Outline to the utility companies and their designated design representatives. The Utilities Coordinator requests that the utility companies:

- Review the plans for accuracy in the surveyed depiction of their facilities.
- Notify the Utilities Coordinator of facilities that are omitted or are inaccurately depicted.
- Analyze their facilities for conflicts with the project as designed.
- Consider options and schedule for relocation or mitigation of the conflicts.
- Notify the Utilities Coordinator of assistance or input required from NCDOT during the project.

The Utilities Design Engineer reviews the plans provided by the Utilities Coordinator in cooperation with and on behalf of the utilities whose facilities the Utilities Design Engineer is scoped to design.

Identify Major Utility Conflicts and Relocation Impacts

To complete this task, the Utilities Coordinator is to:

- Review the plans to identify likely locations of conflicts.
- Document those conflicts on the Utilities Coordination Working Plans.
 - The Utilities Coordination Working Plans are to contain information on conflicts and proposed relocations for all utilities.
 - These plans also contain the information required by NCDOT to manage utilities within the project and are to be kept up-to-date and available to the project team at all times through the project SharePoint site.

The Utilities Coordinator consults with the Utilities Lead and Utility Design Lead prior to the Utility Coordination Kickoff Meeting to agree on potential conflicts and guidance to be given to the utilities.

The Utilities Design Engineer then:

- Reviews the plans with the applicable utility companies for the facilities scoped for design.
- Identifies conflicts, proposes preliminary relocation designs or a plan to mitigate the conflicts, and secures approval from the owner.
- Provides this information to the Utilities Coordinator prior to the Utility Coordination Kickoff Meeting.

If a Utilities Design Engineer has not been authorized at this stage, the utility is responsible for providing this information at the Kickoff Meeting.

Conduct Utility Coordination Kickoff Meeting (All Utilities)

The Utilities Coordinator schedules and conducts a Utility Coordination Kickoff Meeting to share information and plans with the utilities and to begin coordination among the utilities on relocation issues. The invite to this meeting is to include all utility company contacts, the Utilities Lead, the Utilities Design Lead, Division utilities personnel, the Utilities Design Engineer, the Project Manager, the Hydraulics Design Engineer, and the Signals/ITS Lead.

At this meeting and with assistance from the Utilities Design Engineer, the Utilities Coordinator is to:

- Provide information to the utility companies about the project.
- Review the presumptive cost responsibility and establish which utility companies believe they have a compensable interest.
- Discuss the project schedule, noting feedback from the utility companies about their design and relocation timeframes and the schedule they can meet.
- Elicit information about the risks the utilities believe they pose to the project.
- Discuss preliminary alignments for relocations.
- Ask the utility companies to prepare preliminary plans and identify easement needs.
- Identify action items for NCDOT and the utility companies.

Initiate Cost Responsibility Analysis

The Utilities Coordinator uses the information from the survey and information provided by the utilities to initiate the Cost Responsibility Analysis. To do this, the Utilities Coordinator:

- Investigates documents provided by the utility companies.
- Prepares opinions on the relevance of those documents to any claims of compensable interest.
- Begins preparation of the Cost Responsibility Analysis Report.

It is the responsibility of the utility companies to prove their claims of compensable interest. It is the responsibility of the Utilities Coordinator to review the claims and provide a recommendation to NCDOT and the Project Manager on the merits of the claims.

Receive Preliminary Utility Relocation Plans from Utility Owners

To complete this task, the Utilities Coordinator is to:

- Receive preliminary relocation plans from the utility companies and from the Utilities Design Engineer.
- Review the plans to ensure compliance with the *Utilities Accommodation Manual*.
- Incorporate the relocation plans into the Utilities Coordination Working Plans.

Preliminary relocation plans from the utilities are not final designs. Instead, these plans are to show the scope and alignment of the relocation. The design is to be complete enough to determine easement requirements and environmental impacts from the proposed alignment and construction.

Submit Routing Plan

The Utilities Coordinator submits the Utilities Coordination Working Plans along with a description of important design decisions as Routing Plans. The purpose of the Utilities Coordination Working Plans is to plan utility relocations and share information about the relocations with NCDOT and the project team.

The Utilities Lead reviews the plan and provides comments to the Utilities Coordinator, including a review of the application of the *Utilities Accommodation Manual*, a constructability review, and a review of possible alternatives.

Create Relocation Schedule

The Utilities Coordinator creates a Utilities Relocation Schedule (in Microsoft Project) for use in guiding project scheduling and tracking relocation progress. This schedule is developed in consideration of:

- Utility work by others only.
- Important milestones in project completion, such as design time, relocation time, moratoria, acquisition of special materials, permitting, availability of right-of-way and easements, and construction staging.
- Information obtained from the utilities, the Right-of-Way Agents, project documents, and other sources, as needed.

The Utilities Coordinator maintains this schedule as conditions change and milestones are completed, coordinating this with the Project Manager and the larger project schedule.

The Utilities Lead reviews this schedule and provides comments to the Utilities Coordinator. The review includes the practicality of accomplishing the schedule.

Submit Preliminary Utility Construction Plans

The Utilities Design Engineer submits the Preliminary Utility Construction Plans for review by the Utilities Design Lead. These plans are to:

- Show routing and major design elements.
- Identify any needed easements outside of existing right-of-way.
- Provide draft Special Provisions, especially including any requested pay items for review.

For utilities designed under the control of the utility owner, but to be constructed as part of the project's contract, the Utilities Coordinator coordinates submission of these items to the Utilities Lead for review. The review of plans and special provisions is to address constructability, risk assessment, compliance with policy, and contractibility.

Request Subsurface Utility Engineering (SUE) Level A

The Utilities Coordinator requests and compiles subsurface utility engineering (SUE) Level A requests from the designers of each of the utilities. To do this:

- Collaborate with the Utilities Lead to evaluate the need for each location.
- Create a final SUE request.

The Utilities Design Engineer submits this request to the Utilities Coordinator.

Request Geotechnical Investigation for Trenchless Utilities

A Geotechnical Investigation is used to identify underground conditions along the trenchless installation for the purposes of bidding. The Utilities Design Engineer identifies locations for the geotechnical investigation along the planned location of all trenchless installations of utilities to be constructed. To do this, the Utilities Coordinator is to:

- Identify the expected depth of the utility at each location.
- Collaborate with the Utilities Design Lead and the Geotechnical Engineering Unit to create a final list of requested locations.

For utilities designed under the control of the utility owner, but to be constructed as part of the project's contract, the Utilities Coordinator coordinates submission of this request to the Utilities Lead for review.

Submit Required Utility Easements and Parcel List

The Utilities Design Engineer prepares the easement needs for the facilities scoped for design and submits that request to the Utilities Coordinator.

The Utilities Coordinator then prepares the Utility Easement Request and Utility Parcel List, which includes:

- Obtaining concurrence from the Utilities Project Manager on the eligibility for each utility to request easements that are acquired by NCDOT.
- Vetting easements requested by the utility companies for compliance with NCDOT policy.
- Compiling all eligible easements requested.
 - Draw the compiled easements on the Utilities Working Plans and submit to the Utilities Project Manager for concurrence in the request.
 - After receiving concurrence, submit the easement request for inclusion in the plans.
- For utilities relocating in advance of the project's contract, compiling a list of parcels containing any of those utilities in easement or right-of-way.
 - List which utilities are occupying each parcel.
 - Determine the date each parcel is needed according the schedule of utility construction on each parcel.

The Utilities Lead reviews the requested easements for compliance with the *Utilities Accommodation Manual* for impact on property owners and for possible economizations. The Utilities Coordinator confirms all of this information is incorporated into the Field Inspection Plan Set (see 2RD2 for related information).

3UT1 Advance Utility Coordination

Overview

Coordinate the final design of utilities and needs for environmental permitting.

References

- [Utility Policy Manual](#)
- [Policies and Procedures for Accommodating Utilities on Highway Rights of Way](#)

Deliverables

Deliverable	Task	Responsible Party			
		Activity Leader		Additional Support	
		Utilities Coordinator	Utility Design Engineer	Utilities Coordinator	Utility Design Engineer
Utility Agreement Plans	<ul style="list-style-type: none"> ▪ <i>Submit/Receive Utility Agreement Plans</i> ▪ <i>Initiate Utility Permits</i> 		X X	X	
Utility Environmental Permit Plans and Narrative	<ul style="list-style-type: none"> ▪ <i>Provide Permit Related Utility Impacts</i> 	X			X
Cost Responsibility Analysis Report	<ul style="list-style-type: none"> ▪ <i>Submit Cost Responsibility Analysis</i> 	X			
Final Utilities Coordination Working Plans	<ul style="list-style-type: none"> ▪ <i>Submit Final Utility Coordination Plans</i> 	X			X

Coordinate Service Acquisition for ITS and Signing

The Utilities Coordinator coordinates utility service acquisition for ITS, signing, and lighting along the project corridor as requested by those disciplines/Units.

Submit/Receive Utility Agreement Plans

The Utilities Design Engineer submits the Utility Construction Plans, Special Provisions, and draft quantities estimate for review by the Utilities Design Lead. This includes:

- Showing routing and major design elements.
- After receiving concurrence from the Utilities Project Manager, initiating the NC Department of Environmental Quality (DEQ) permitting process.

For utilities designed under the control of the utility owner, but to be constructed as part of the project’s contract, the Utilities Coordinator coordinates submission of these items to the Utilities Lead for review. The review of plans and Special Provisions is to address constructability, risk assessment, compliance with policy, and contractibility.

The Utility Design Engineer or utility owner’s engineer is to address any comments and submit a set of Utility Agreement Plans.

- The purpose of these plans is to be an attachment to the Utility Construction Agreement or Use and Occupancy Agreement.
- Special Provisions and agreement estimate are also required.

The Utilities Lead generates the appropriate agreement and submits it to the utility company for execution.

Initiate Utility Permits

The Utilities Design Engineer prepares the applications and assists the utility owner in submitting the applications to NC Department of Environmental Quality (DEQ) Public Water Supply Section and Division of Water Quality.

Provide Permit-Related Utility Impacts

The Utilities Coordinator references the Utility Construction Plans and Relocation Plans provided by the utilities to create a set of Utilities Environmental Permit Drawings. These plans consist of an environmental narrative, plans showing impacts, utility profiles, and impact area charts. As part of the plans, the Utilities Coordinator is to:

- Coordinate areas of utility impacts with areas of roadway impacts.
- Not all components are required for all projects.
- Submit to the Utilities Lead to obtain concurrence.
- After obtaining concurrence, submit to the Project Manager.

The Utilities Lead reviews the proposed construction methods, environmental impacts of the utility relocations, and consistency with the current roadway design plans. The Utilities Lead consults with the project's Environmental Lead about proposed environmental impacts.

Submit Cost Responsibility Analysis

The Utilities Coordinator is to submit the Cost Responsibility Analysis Report, providing the recommendation for portion of cost responsibility for each utility and NCDOT. To do this, the Utilities Coordinator:

- Supports the recommendation with an analysis of the policy applied and evidence provided.
- Provides supporting documentation, including deeds, previous agreements, plans, and other evidence of compensable interest.

The Utilities Lead reviews the analysis and requests additional information (if needed), comments as required, and accepts the report when complete. The Utilities Lead files this report on the project SharePoint site and retains with the agreement documents.

Submit Final Utility Coordination Plans

The Utilities Coordinator submits the Final Utilities Coordination Working Plans, showing the alignments to be authorized for all utilities and the current Utilities Relocation Schedule with a description of important design decisions.

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The Utilities Lead performs final review of the relocations that includes a review of the application of the *Utilities Accommodation Manual*, a constructability review, and a review of the relocation schedule. The Utilities Coordinator confirms all of this information is incorporated into the Right-of-Way Plan Set (see 3RD1 for related information).

4UT1 Complete Utility Coordination

Overview

Facilitate the relocation of utilities being relocated by the utility owners.

References

- [Utility Policy Manual](#)
- [Policies and Procedures for Accommodating Utilities on Highway Rights of Way](#)

Deliverables

Deliverable	Task	Responsible Party			
		Activity Leader		Additional Support	
		Utilities Coordinator	Utility Design Engineer	Utilities Coordinator	Utility Design Engineer
Utilities by Others Plans and Special Provisions	<ul style="list-style-type: none"> ▪ Complete Utilities by Others Plans 	X			
Utility Construction PS&E	<ul style="list-style-type: none"> ▪ Complete Utility Construction Plans 		X	X	
Water and Sewer Permits	<ul style="list-style-type: none"> ▪ Receive Water and Sewer Permits 		X	X	
Executed Utility Agreements	<ul style="list-style-type: none"> ▪ Submit Utility Agreements for Authorization ▪ Execute Utility Agreements 	X	X	X	
Utility Authorizations	<ul style="list-style-type: none"> ▪ Issue Utility Construction Authorization 	X			
Utility Certification	<ul style="list-style-type: none"> ▪ Issue Utility Certification 			X	X

Complete Utilities by Others Plans

The purpose of the Utilities by Others Plans is to convey information to the selected contractor about the extent and timing of utility relocations and abandonments, performed by others, for use in developing the bid. The Utilities Coordinator uses the Utilities Coordination Working Plans and Authorized Relocation Plans to create Utilities by Others Plans and Special Provisions. The Utilities Coordinator:

- Creates the plans and special provisions in conformance with templates and guidance provided on the Utilities Connect site.
- Submits these plans and special provisions to the Project Manager.

The Utilities Lead reviews the Utilities by Others Plans and Special Provisions. The review evaluates the information provided on owner, location, and schedule.

Complete Utility Construction Plans

The Utility Design Engineer submits final Utility Construction Plans, Special Provisions, and quantity estimates with cost breakdown by responsible party and betterment to the Project Manager and Utilities Lead. The Utilities Design Engineer also submits an advisory cost estimate. If the utilities are designed under the control of the owner, but to be constructed as part of the project’s contract, the Utilities Coordinator is to coordinate submission of these items to the Utilities Lead for review.

The Utilities Lead reviews the plans, estimates, and special provisions and return comments. The Utilities Lead enters the provided quantity estimates in the estimating system. The Utilities Lead then develops and enters prices for the estimate.

Receive Water and Sewer Permits

The Utilities Design Engineer receives the Authorizations to Construct from NC Department of Environmental Quality (DEQ) Public Water Supply Section and Division of Water Quality. After receiving the Authorizations, the Utilities Coordinator:

- Places them on the project SharePoint site.
- Notifies the Project Manager and the Utilities Lead.

The same process is used for utilities designed under the control of the owner, but to be constructed as part of the project's contract.

Submit Utility Agreements for Authorization

The Utilities Coordinator receives the utility agreements and plans from the utility company. From there, the Utilities Coordinator:

- Reviews the plans for conformity with the *Utilities Accommodation Manual*.
- Reviews the estimates, if needed for the agreement.
- Attaches a cover letter stating that the relocations plans and materials were reviewed and complies with the *Utilities Accommodations Manual* and other applicable policies or recommends that the plans be approved with enumerated exceptions.
- Justifies recommended exceptions.
- Submits to the Project Manager for action.

The Utilities Lead reviews the agreements for compliance with policy.

Execute Utility Agreements

After review, the Utilities Lead submits the utility agreements to the authorized NCDOT official for signature.

Issue Utility Construction Authorization

After execution of each utility agreement for construction by the utility, the Utilities Lead sends an authorization to the utility to begin construction.

Issue Utility Certification

The Utilities Lead completes the Utility Certification and submits it to the authorized NCDOT official for signature. The certification is retained for the project files.

4UT2 Complete Utility Relocations by Owner

Overview

Support the Project Manager and Resident Engineer by maintaining contact with the utilities, maintaining the Utilities Relocation Schedule, and continuing coordination to resolve relocation issues until the relocations by the utilities are complete.

References

- [Utility Policy Manual](#)
- [Policies and Procedures for Accommodating Utilities on Highway Rights of Way](#)

Deliverables

Deliverable	Task	Responsible Party	
		Activity Leader	Additional Support
		Utilities Project Engineer	Utility Design Engineer
Relocation Scheduling Conference	<ul style="list-style-type: none">▪ Hold Relocation Scheduling Conference	X	
Updated Utilities Relocation Schedule	<ul style="list-style-type: none">▪ Maintain Contact with Utilities	X	
	<ul style="list-style-type: none">▪ Update the Utilities Relocation Schedule	X	

Hold Relocation Scheduling Conference

After receiving the Utility Authorization, the Utilities Coordinator schedules and holds the Relocation Scheduling Conference for each utility. The conference is to be attended by the utility company, the utility’s contractor, the Project Manager and Resident Engineer, and others as required. The Utilities Coordinator updates the Utilities Relocation Schedule.

Maintain Contact with Utilities

The Utilities Coordinator maintains weekly contact with the utilities during their relocation construction. The Utilities Coordinator monitors the progress of the relocations and determines if intervention is needed to keep the utility relocations on schedule. If intervention is needed, the Utilities Coordinator contacts and involves needed resources or makes recommendations/implements strategies to maintain the relocations to support the overall project schedule.

Update the Utilities Relocation Schedule

The Utilities Coordinator updates the Utilities Relocation Schedule weekly and distributes the schedule to the Resident Engineer, Utilities Lead, and Project Manager.

Continued Coordination

The Utilities Coordinator continues coordination with utilities to address issues that arise during the relocation phase of the project. The Utilities Design Engineer provides input, as necessary, to resolve issues involving the scoped utilities.

1VM1 Schedule Value Engineering Study

Overview

Ensure that a Value Engineering (VE) study is completed for state or federal projects that meet or exceed the following thresholds:

- Total cost of \$50 million
- Total cost of \$40 million with a major structure
- Projects that intersect or include components of the National Highway System
- Federal major projects (Exceeding \$500 million)

Note: *Actions during the Project Initiation Stage may be led and completed by staff from several different NCDOT groups. Any person who has overall responsibility for a project during this Stage is referred to as the “Project Lead.” This lead could be the Feasibility Studies Engineer, the Corridor Development Engineer, the Division Planning Engineer, or someone in a similar role as tasked by a state or local agency.*

References

- [Value Management Office](#)
- [Value Management Guidelines](#)
- [ArcGIS STIP and NHS maps](#)

Deliverables

Deliverable	Task	Responsible Party	
		Activity Leader	Additional Support
		VMO Project Manager	Project Lead
Scoping Report Assessment	<ul style="list-style-type: none">▪ Assess the State Transportation Improvement Program (STIP)	X	X
Value Engineering Study Schedule	<ul style="list-style-type: none">▪ Schedule Upcoming Value Engineering Studies	X	X

Assess the State Transportation Improvement Program (STIP)

Based on the information in the STIP, the Value Management Office (VMO) Project Manager determines if a Value Engineering Study is needed based on the threshold requirements listed in the above overview. As identified, the VMO supports the Project Lead by facilitating a Value Engineering Study in accordance with the *Value Management Guidelines*.

Schedule Upcoming Value Engineering Studies

The Value Engineering Study is conducted pursuant to FHWA guidance and thresholds to allow a team not currently involved with the project to provide ideas for cost and process improvements. This study requires initial input from the project team, but is completed by the VMO.

The VMO Project Manager schedules upcoming VE studies in accordance with the process described in the *Value Management Guidelines* and sends this schedule to the Project Lead. For projects that do not require a formal value management study, the team may request an informal VE review. This may include a Project Lead’s review of the project to determine if consultation with VMO may be beneficial.

1VM2 Conduct Risk Management

Overview

Conduct an early risk management review to identify potential issues that could jeopardize project delivery. While a risk assessment is not required for all projects, implementation of these reviews provides greater assurance that a project can maintain its scope, schedule, and budget goals. If the risk review reveals potential fatal flaws, reassess the project before a substantial part of the budget is spent.

References

- [Value Management Guidelines](#)
- [Value Management Office](#)
- [Risk Management Guidelines](#)
- [Risk Assessment Worksheet](#)

Deliverables

Deliverable	Task	Responsible Party	
		Activity Leader	Additional Support
		Project Lead	VMO Project Manager
Risk Assessment Worksheet	<ul style="list-style-type: none">▪ Conduct Risk Management Activities	X	X
Risk Assessment Study	<ul style="list-style-type: none">▪ Conduct Risk Management Activities		X

Conduct Risk Management Activities

Per the *Risk Management Guidelines*, risks are captured in the Project Scoping Report and transferred to the Risk Assessment Worksheet (RAW). Based on the severity of the risk, a Risk Assessment Study may be necessary. While a Risk Assessment Study is not required for every project, the Project Lead is to coordinate with the Value Management Office (VMO) to determine if a Risk Assessment Study is appropriate. The VMO supports the Project Lead by providing guidance for the Risk Assessment Study and/or facilitating a Risk Assessment Study in accordance with the *Value Management Guidelines*.

For a Risk Assessment Study, the VMO Project Manager is to:

- Gather a team of experts from the applicable technical disciplines/Units.
- Develop Risk Response Strategy.
- Develop an Implementation Plan.

From there, the Project Lead monitors and controls the identified project risks following the process and procedures detailed in the *Risk Management Guidelines*. This responsibility is transferred to the Project Manager during the Alignment Defined Stage.

2VM1 Complete Value Engineering

Overview

Identify and coordinate the Value Engineering (VE) study early in the Alignment Defined Stage and develop recommendations to be incorporated into both the Design Recommendations Plan Set and Field Inspection Plan Set as both are developed.

References

- [Value Management Guidelines](#)
- [Value Management Office](#)
- [ArcGIS STIP and NHS maps](#)

Deliverables

Deliverable	Task	Responsible Party	
		Activity Leader	Additional Support
		VMO Project Manager	Project Manager
Value Engineering Study Report	<ul style="list-style-type: none"> ▪ Complete Value Engineering Study Report 	X	X
Value Engineering Study Recommendation Forms	<ul style="list-style-type: none"> ▪ Develop and Implement Value Engineering Recommendations 	X	X

Complete Value Engineering Study Report

The VMO Project Manager, in coordination with the Project Manager, completes a VE Study Report following the guidance defined in the *Value Management Guidelines*. The study is scheduled as early after notice to proceed as possible to maximize the opportunity to include recommendations into both the Design Recommendations Plan Set and Field Inspection Plan Set.

Develop and Implement Value Engineering Recommendations

Referencing the *Value Management Guidelines* for developing, reviewing, and implementing VE recommendations, the VMO Project Manager develops recommendations and submits recommendation forms to the Project Manager.

The Project Manager reviews the recommendations with all applicable technical disciplines/Units leads and provides final dispositions to the VMO Project Manager.

The VMO Project Manager records the dispositions in the Action Register, and the Project Manager works with all applicable technical disciplines/Units leads to implement the accepted recommendations into the project’s design documents. The Project Manager confirms implementation of accepted recommendations prior to let, which is verified by VMO per FHWA requirements.

2VM2 Conduct Risk Management

Overview

Conduct an early risk management review to identify potential issues that could jeopardize project delivery. While a risk assessment is not required for all projects, implementation of these reviews provides greater assurance that a project can maintain its scope, schedule, and budget goals. If the risk review reveals potential fatal flaws, reassess the project before a substantial part of the budget is spent.

References

- [Value Management Guidelines](#)
- [Value Management Office](#)
- [Risk Management Guidelines](#)
- [Risk Assessment Worksheet](#)

Deliverables

Deliverable	Task	Responsible Party	
		Activity Leader	Additional Support
		Project Manager	VMO Project Manager
Risk Assessment Worksheet	<ul style="list-style-type: none">Conduct Risk Management Activities	X	X
Risk Assessment Study	<ul style="list-style-type: none">Conduct Risk Management Activities		X

Conduct Risk Management Activities

Per the Risk Management Guidelines, a Project Manager begins this step by identifying additional risks not captured in the Project Scoping Report on the Risk Assessment Worksheet. Based on the severity of the risk, a Risk Assessment Study may be necessary. While a Risk Assessment Study is not required for every project, the Project Manager is to coordinate with the Value Management Office (VMO) to determine if a Risk Assessment Study is appropriate. The VMO supports the Project Manager by providing guidance for the Risk Assessment Study and/or facilitating a Risk Assessment Study in accordance with the *Value Management Guidelines*.

If the project has a substantial change, it is beneficial to review the Risk Assessment Worksheet and determine if the change elevates or diminishes project risks. The Project Manager initiates the review.

For a Risk Assessment Study, the VMO Project Manager is to:

- Gather a team of experts from the applicable technical disciplines/Units.
- Develop Risk Response Strategy.
- Develop an Implementation Plan.

From there, the Project Manager continually monitors and controls the identified project risks following the process and procedures detailed in the *Risk Management Guidelines*.

2VM3 Complete Constructability Review

Overview

Complete this review of the Field Inspection Plan Set as part of the Field Inspection Review Meeting and prior to completing the environmental document to ensure that accepted recommendations are incorporated into the design document and disclosed in the environmental document.

References

- [Value Management Guidelines](#)
- [Value Management Office](#)
- [Constructability Review Program Website](#)
- [CLEAR Submission Form](#)

Deliverables

Deliverable	Task	Responsible Party	
		Activity Leader	Additional Support
		VMO Project Manager	Project Manager
Constructability Review Minutes	▪ Complete Constructability Review	X	
CLEAR Database Submission	▪ Complete Constructability Review		X

Complete Constructability Review

Based on project scope and risk assessment data, the Project Manager may request a constructability review of the Field Inspection Plan Set from the Value Management Office (VMO), which is completed following the process defined in the *Value Management Guidelines*.

The VMO can coordinate the review with contractors associated with the Association of General Contractors (if applicable), leads from other technical disciplines/Units, and/or external stakeholders. The project team participates in study discussions, and the VMO documents its findings pertaining to the constructability of the project.

Any lessons learned from the constructability review is submitted into the Communicate Lessons, Exchange Advice, and Record (CLEAR) database using the reference link above and following the workflow described in the *Value Management Guidelines*.

3VM1 Complete Value Engineering

Overview

Notify the Value Management Office (VMO) of any changes to scope and/or estimate that would warrant a Value Engineering (VE) study at this phase in the project (only if there had previously not been one scheduled in the previous stages).

References

- [Value Management Guidelines](#)
- Value Engineering Study Recommendations
- [Value Management Office](#)
- ArcGIS STIP and NHS maps

Deliverables

Deliverable	Task	Responsible Party	
		Activity Leader	Additional Support
		VMO Project Manager	Project Manager
Value Engineering Study Report	<ul style="list-style-type: none">▪ Complete Value Engineering Study Report	X	X
Value Engineering Study Recommendation Forms	<ul style="list-style-type: none">▪ Develop and Implement Value Engineering Recommendations	X	X

Complete Value Engineering Study Report

If applicable, the VMO Project Manager, in coordination with the Project Manager, completes a VE Study Report following the guidance defined in the *Value Management Guidelines*.

Develop and Implement Value Engineering Recommendations

Referencing the *Value Management Guidelines* for developing, reviewing, and implementing VE recommendations, the VMO Project Manager develops recommendations and submits recommendation forms to the Project Manager.

The Project Manager reviews the recommendations with all applicable technical disciplines/Units leads and provides final dispositions to the VMO Project Manager.

The VMO Project Manager records the dispositions in the Action Register, and the Project Manager works with all applicable technical disciplines/Units leads to implement the accepted recommendations into the project's design documents. The Project Manager confirms implementation of accepted recommendations, which is verified by VMO per FHWA requirements.

3VM2 Conduct Risk Management

Overview

Continue to monitor and control risks, with the Value Management Office (VMO) available for additional support if there are any substantive changes to the project at this phase.

References

- [Value Management Guidelines](#)
- [Value Management Office](#)
- [Risk Management Guidelines](#)
- [Risk Assessment Worksheet](#)

Deliverables

Deliverable	Task	Responsible Party	
		Activity Leader	Additional Support
		Project Manager	VMO Project Manager
Risk Assessment Worksheet	▪ <i>Conduct Risk Management Activities</i>	X	X
Risk Assessment Study Report	▪ <i>Conduct Risk Management Activities</i>		X

Conduct Risk Management Activities

The Project Manager, with support as needed from the VMO Project Manager, continually revises the risk register (as needed) and references the Risk Assessment Study Report to continue to monitor and control project risks, all following the process and procedures detailed in the *Risk Management Guidelines*.

Complete Risk Assessment Study (if needed)

Based on project scope and risk assessment data, the Project Manager may request an additional Risk Assessment Study from the Value Management Office (VMO), which is completed following the process defined in the *Value Management Guidelines*.