

**NCDOT
ROLES AND
RESPONSIBILITIES IN
PROJECT DELIVERY**

February 2019

DRAFT - SUBJECT TO CHANGE

WHY WERE THESE GUIDELINES DEVELOPED?

The NCDOT Roles and Responsibilities in Project Delivery document was established to define a transparent, repeatable and accountable process to optimize the way we deliver projects. This document is intended to help project managers and technical unit leads to understand and execute their roles within the project development process.

BECOMING A MATRIX MANAGEMENT ORGANIZATION

Teamwork is an essential part of a matrix organization. By streamlining processes and relying on a team-based approach, decision-making is improved and extraneous or inefficient work is eliminated. By removing the project manager from more technical obligations, they are freed to serve as a liaison between the project stakeholders, technical units, and department leadership. The result will be improved project monitoring, communication, coordination and decision making, resulting in a more efficient delivery of projects.

INTEGRATED PROJECT DELIVERY VISION

A culture where we promise what we are going to do and we deliver what we promise.

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Section 1

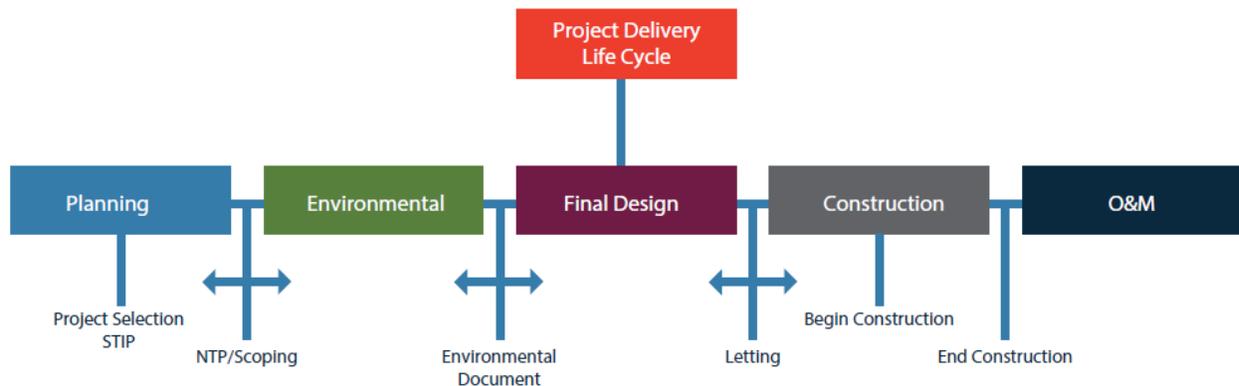
1. Project Delivery in a Matrix Organization

1.1. Introduction

The Roles and Responsibilities in Project Delivery (R&RPD) provide Department staff with general instructions on their roles in managing, developing and delivering projects within a matrix organization. It is intended to assist them as they perform their duties in advancing projects through the Department's project delivery process. The goals of the R&RPD are to:

- Implement an integrated approach toward project delivery and management.
- Ensure project delivery and management processes are repeatable and regularly evaluated for improvements in collaboration with the Department's functional units.
- Achieve efficiency in project team production, client service (internal and external), and stakeholder communication.
- Establish principles and implement techniques to manage project risks proactively and identify opportunities to advance projects.

The project delivery process follows the [Project Management Institute's](#) standards and is structured to support the Department's efforts to improve project development and delivery across Divisional (Planning, Engineering, Construction, Operations, and Administration) lines. The project delivery process is applicable to all transportation project delivery methods and technical units.



This section provides an overview of the Department's approach toward accelerating project delivery, introduces project management processes including risk management, quality control measures and performance management measures that help project teams setup and deliver successful projects.

1.2. Methods for Accelerating Program Delivery

One of the Department's goals is continuous process improvement. NCDOT wants to accelerate the delivery of the State Transportation Improvement Program (STIP) advancing projects from concept to concrete expeditiously without sacrificing statutory requirements, public engagement, the environment or project quality. This continuous effort will include evaluation of recommendations for improving procedures, identifying training needs, taking advantage of technology improvements and data sharing opportunities. NCDOT will also continually evaluate methods to accelerate program delivery and individual project delivery opportunities.

One key way to achieve the goal of program acceleration is by managing program and project risks. The risks associated with a transportation program depend on a number of elements; including but not limited to available information, resource (staff and funding) availability, project complexities, communication, and political issues. Risks can impact the basic delivery concepts by which the Department measures project progress: scope, budget and schedule. Risk management approaches are discussed in Section 1.4.4.

1.2.1. Accelerating Program Delivery

One basic definition of the Department's program management is organizing, managing and prioritizing transportation projects based on needs, resource availability and schedules. The Department's approach toward optimizing program performance consists of the following initiatives:

- **Implementing new project delivery methods** – New delivery methods (Design-Build, Construction Manager/ General Contractor, etc.) will support prompt delivery of transportation projects, will improve resource allocations, and allow for better management of project risks.
- **Becoming a matrix organization** – Empowered project teams and effective program leadership will result in team-based tasks/processes that accelerate program delivery. Moving the decision-making authority to the lowest appropriate level and giving the project manager the responsibility and authority for their projects will result in a high-quality program of projects, delivered on time, on budget and to the customers' satisfaction.

1.2.2. Optimizing Project Delivery

Performance can be measured in terms of cost and schedule to complete the project or a project phase to the clients' satisfaction (Figure 1). The performance of a transportation project can be optimized by collaboratively communicating the goals and risks of the project within the matrix organizational model. The Project Manager is a champion of the project. Engaging a full team and proactively managing risks can lead to strong performance and delivery of projects. Note that this strong performance enhances the Department's credibility with project stakeholders and with the public.

The Department's approach toward optimizing project delivery consists of the following initiatives:

- **Implementing a formal scoping process** – A strengthened and refined scoping process provides a detailed understanding of proposed projects earlier in the project development process. This approach establishes confidence in project baselines (refer to Section 1.4). A well-defined project baseline is critical for assessing and managing project risks and

uncertainties. Please refer to *Project Development and Scoping Guidelines* located on the Project Management Unit Connect NCDOT SharePoint Portal.

- **Implementing a standard cost estimating approach during the project planning phase** - Reliable and realistic project cost estimates are critical to a successful project planning and development process. Implementing a standard cost estimating approach that can be used by stakeholders at all phases of the development process will ensure consistent, timely, and accurate estimates that can be used to effectively program limited financial resources.
- **Implementing Project Management Standards** - An integrated, consistent, repeatable project management approach will promote efficiency in decision making, team communication, scope management, risk management, change management and issue resolution processes. The project management process is based on the Plan-Do-Check-Act framework. Through this process, project baselines and performance is continually monitored and corrective actions are taken to optimize performance. Refer to Section 3.1 for additional information.

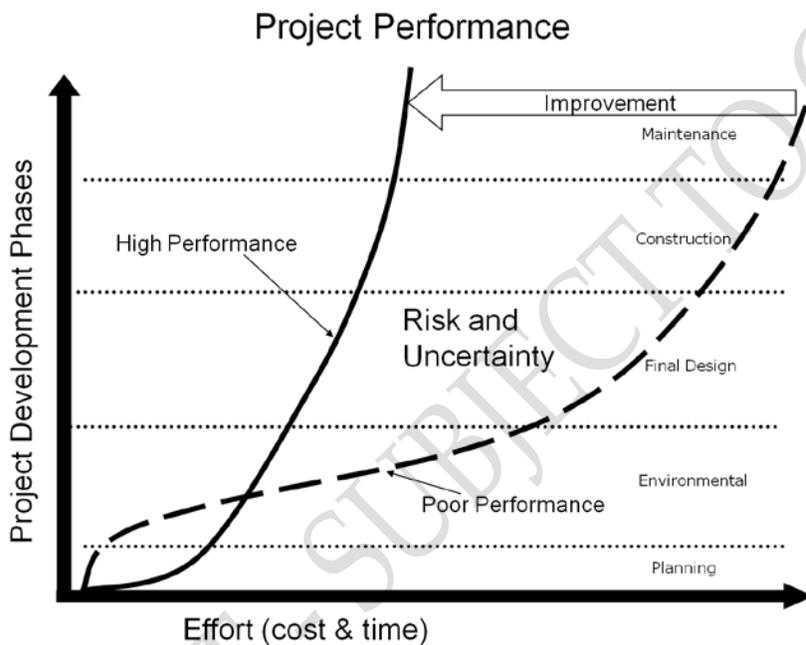


Figure 1. Project Delivery Lifecycle

1.3. Project Baselines

The project baseline is defined as the original scope, cost, and schedule. These items should be agreed upon in the purpose and need statement for the project prior to the start of work. The baseline is based on available knowledge, experience, similar projects, available resources and does not include any consideration for unknowns. As additional information becomes available, the project baseline should be adjusted as needed. Adjusted project baselines include consideration for those unknowns as discussed in Section 1.6. Adjusted values are determined through use of contingency factors or through risk analysis and are used to develop project allowances (Section 1.7). (Under Development)

Project baselines can successfully be defined through a multi-disciplinary approach that focuses on defining project scope, cost, schedule and quality process early during project development.

The project baselines are then reassessed at major milestones and transition points. The *Project Development and Scoping Guidelines* located on the Project Management Unit Connect NCDOT SharePoint Portal identify and recommend detailed project scoping be performed at two stages of project development with the input of the entire project team: Project Planning Phase (Scoping Level I), Environmental Phase (Scoping Level II) (Under Development).

After conducting the scoping process and defining the project baselines, the project team should assess the impact of project-related risks to the baselines. (Under Development)

1.3.1. Project Scope

Project scope (see project description –Section 3.4.1.1.) defines the work required to deliver the project. The scope should be commensurate with the project knowledge, level of engineering and project uncertainties. For example, during the planning phase, the project scope (description) might account for various project outcomes and scenarios; e.g., enhance access and mobility within the I-85 corridor. During the environmental phase, after project uncertainties and scenarios are addressed, the project scope (description) could become: widen northbound I-85 to improve traffic operations and safety.

Sometimes the scope of a project can change during project development. Changes, including uncontrolled growth in a project scope at any time after the project begins is called scope creep. Scope creep typically occurs when the scope of a project is not properly defined, documented, or controlled.

Project team's scope of work (see Team's Mission Statement –Section 3.4.1.2) identifies major activities, deliverables and milestones that must be performed to accomplish objectives of a project/project phase. The project cost and schedule estimates; as well as the quality processes, are established based on the scope of work.

The project scope should be clearly defined by the purpose and need statement at the end of the statewide planning process. (Under Development - How the project scoping report and prioritization process feeds into this is under review).

1.3.2. Project Schedule

The project schedule is the anticipated length of time the project will take to plan, develop and construct. The project manager, with the input of the project team, has their consultant prepare a schedule to track project activities and deliverables for each phase of project development. Project Schedules should be completed for all projects using the Microsoft Office Project scheduling software. Each schedule should include the following inputs:

- The project milestones which are a functional decomposition of the project tasks, and
- Delivery time for each milestone which is length of time to complete a project milestone.
- The critical path of project tasks which is the network of activities when done in sequence that will determine the shortest possible duration to complete the project.

The project manager is responsible for reporting on the status of major milestones(Notice to proceed, Environmental Document, Right of Way Plans Complete, Letting, Begin Construction, End construction) to the NCDOT Leadership and stakeholders. For a complete list of project milestone structure, task durations and deliverables for a Design- Bid-Build method of delivery (Planning to end of Final Design), refer to the *Design and Submittal Guidelines* posted on the Project Management Unit Connect NCDOT SharePoint Portal.

The primary input into setting the project milestones is the project scope and team's scope of work. The project milestones are created by breaking down the project into manageable components in terms of size, complexity and duration. Use the *Milestone and Submittal Guidelines* spreadsheet to document project tasks and major deliverables. This spreadsheet is located on the Project Management Unit Connect NCDOT SharePoint Portal. The intent of the spreadsheet is to assist project teams preparing the milestones and to create consistency in identifying project phases, tasks, etc.

The critical path project schedule is a network of project tasks that must be completed in sequence to accomplish all assigned scope of work in the shortest amount of time. Not all tasks that are required to be completed on a project fall on the critical path and may be able to be completed concurrently to the critical path project tasks. Depending on project needs and complexities, different methods can be used to account for risks and uncertainties associated with the tasks duration or project schedule. Identification of potential risks for each project should be incorporated to determine the impact of risk to the project base schedule (refer to Section 1.6).

At NCDOT, the project schedule is typically prepared using Microsoft Office Project for the preconstruction phase and Primavera for the construction phase. For basic scheduling concepts and basic training on how to use MS Office Project, refer to the Project Management Unit Connect NCDOT SharePoint Portal.

1.3.3. Project Budget

The project budget is the anticipated cost of the project, including planning, environmental, preliminary design, final design, construction, and outsourcing costs. To ensure consistency with the STIP and Department's reporting requirements, separate budgets must be developed and tracked for preliminary engineering, right of way and utilities, and construction. Engineering includes all costs from the start of planning to the end of final design (internal and consultants). Right-of-way costs include appraisal, acquisition, relocation, demolition, engineering, legal, utility relocation, and railroad.

Construction includes quantities, unit prices and construction engineering. To establish a budget, the project team must first define the project scope, team's scope of work and the project schedule.

1.3.3.1 Engineering and Consultant Budget

The project manager establishes a budget to cover and track internal and consultant costs for each phase of the project development. The engineering budget for each phase of the project includes costs (either internal or consultant) for the needed preliminary engineering and technical studies. This estimate must be based on most likely level of effort to accomplish each task. Depending on project needs and complexities, different methods are used to account for risks and uncertainties associated with the project costs: a) applying a contingency factor to project base cost, or b) performing risk analysis to determine the impact of risk to the project base costs (refer to Section 1.6).

The NCDOT Scope and Man-day Estimate Form, located on the Project Management Unit Connect NCDOT SharePoint Portal, is developed to assist the project team in preparing consultant "base" man- day estimates and budgets. The form allows the project manager to select the required discipline(s), includes standard direct expenditure allowances, and reports discipline-specific and total costs.

1.3.3.2 *Right-of-Way and Construction Budget (Under Development)*

(Under Development - to be synched up with the Feasibility Studies Unit processes)

1.3.4. Project Quality

Quality processes consist of two components: quality control (QC), and quality assurance (QA). QC includes regular checking and back-checking of the plans, specifications, and estimate, and the processes required to ensure work from the various technical divisions and consultants is congruent. QA is the process of ensuring the QC plan has been followed and a further check that appropriate standards have been met. Responsibilities relevant to project quality are as follows:

- **Project Manager** - is responsible for the project quality process. The project manager must ensure that the project team has developed a quality control (QC) and quality assurance (QA) plan. The project manager provides guidance and direction on the QA/QC plan, and ensures that the plan is implemented and executed properly. The project manager is responsible for the cohesiveness of the engineering design plan set all the way to final plan turn in to contracts and proposals.
- **Project Team** - is responsible for developing, implementing and executing the QA/QC plan. Unless a specific QA/QC plan is required, the normal procedures within each division and section can be utilized.
- **Technical Units** - are responsible for the QA/QC of their technical contributions to the project.
- **QA Team (optional)** - On large, complex projects the department may have the need to assemble a QA team that will be responsible for the Q functions of the entire project.

The QA/QC plan is developed after the project/phase scope, schedule and cost is fully defined.

1.4. Project Management

This document was developed to optimize project delivery, improve team performance and to supply easily understood reporting documentation. It defines a common approach for application of project management techniques that can be applied to all NCDOT transportation projects. This structured approach will help project teams to think about project goals and risks; help define, organize and plan their project; and guide project teams to monitor and control project performance from inception to completion.

However, project management requires more than an understanding of roles and responsibilities. Effective management is achieved by combining project management tools/techniques with sound application of project management principles.

1.4.1. Project Management Processes

For detailed information regarding project management processes, the reader is referred to "A Guide to the Project Management Body of Knowledge" published by the Project Management Institute (Website: www.pmi.org).

The project management processes are divided into five groups (these are not project phases): Initiating Processes; Planning Processes; Executing Processes; Monitoring and Controlling Processes; and Closing Processes.

- **Initiating Processes:** Defines project specific team members and how and what they will contribute to completing the project or project phase.
- **Planning Processes:** The course of action required to attain the scope and objectives that the project was undertaken to address. The outcome of planning processes, along with the initiating processes, is the project management plan.
- **Executing Processes:** Obtains endorsement for the project management plan from the project team and upper management.
- **Monitoring and Controlling Processes:** Regularly measures and monitors progress to identify variances from the project management plan so that corrective action can be taken when necessary to meet project objectives. This part of the procedure also identifies potential best practices that can be used for future projects.
- **Closing Processes:** Formalizes acceptance of the product, service or result and brings the project or a project phase to an orderly end. These processes also evaluate team performance during the project for use in assessments.

The project manager uses the project management planning processes to develop the project management plan. The project management plan is the primary source of information for how the project will be planned, executed, monitored, controlled, and closed.

To standardize project management processes within the Department, project managers are required to prepare and upkeep a management plan for all their assigned projects. Project management plan preparation guidelines are included in Section 3.

1.4.2. Project Management Guiding Principles

Due to different project types and complexities, project management techniques and responsibilities should be tailored to the specific risks and opportunities of each project.

1. **Know your area of responsibility:** Understand and follow your role and responsibilities. Help others to understand how important each member's role is in achieving the project's success.
2. **Prepare a project management plan to achieve the project goals and requirements:** Involve Division staff, functional units, task owners and stakeholders in developing cost, scope, and schedule to ensure feasibility and buy-in. Do this in a group atmosphere. Ensure you have a reasonable and doable plan. Identify risks and plan actions to avoid, mitigate, monitor, and manage identified project risks.
3. **Establish functional and effective technical and stakeholder teams:** Establish healthy and productive technical and stakeholder teams to include:
 - a. Shared vision and goals.
 - b. Commitment through participation.
 - c. Clarity of team roles - establish clear ownership of tasks.
 - d. Clear, open and timely communications.
 - e. Trust among team members.
 - f. Timely feedback on issues.
 - g. Effective leadership of the team.
4. **Track the project, measure the team's progress and communicate it to team members and technical supervisors:** Set project baselines and measures of progress and track them.

5. **Document and communicate important decisions and issues:** Provide regular progress reports to the Project Management Unit Chief, the Chief Engineer's office, the Division Engineer, technical managers, technical staff and stakeholders. Proactive communication at all levels meeting the expectation of internal and external stakeholders is critical to a successful project that is completed within scope, on time, and on budget.
6. **Be Proactive:** Apply these principles and solve problems effectively and in a timely manner. Exercise flexibility in the project approach and project plan based on new information. However, never lose sight of the project goals and objectives.
7. **Ensure Customer Satisfaction:** Pay attention to customer needs and requirements. Provide regular updates to the Division Engineer to ensure that they are current on the progress and direction of this effort.
8. **Make Decisions:** Make decisions that are equitable and within your area of responsibility. Communicate the reason for tough decisions to your team widely. If necessary, follow the established issue resolution process (refer to Section 1.7.2).

1.4.3. Risk Management Process

Risk management is an integral part of the project management process. The primary goal of risk management is to optimize project performance. By identifying project risks and anticipating potential problems early during project development, strategies can be implemented to manage project risks and thus improve project performance.

The risk management process consists of a series of steps that are applied at various times throughout project development. These steps consist of the following:

- **Structuring:** In this step the project "base" is adequately defined. The planned project scope, cost, schedule, and assumptions regarding project is defined and documented.
- **Risk Identification:** Risk and opportunities relative to the project "base" are identified with the input of the project team. This can be accomplished by following a "risk checklist" and/or through a brainstorming session. This list is maintained in a risk register and updated regularly as the project is developed.
- **Risk Assessment:** The relative severity of the risk (impacts to scope, budget, schedule, quality, etc.) is assessed and prioritized for management strategies.
- **Risk Management Plan:** High priority risks are evaluated and strategies for risk management are developed. Adequate contingencies are established to account for residual risks.
- **Risk Management Implementation:** Involves implementing and monitoring progress of risk reduction activities as well as periodically reviewing and updating risks, risk management plan and established contingencies.

After project baselines are established, the project manager, with the input of the project team, identifies, categorizes and documents all risks and opportunities that could impact the project's baseline (refer to Appendix B - summary of types and categories of risks (Under Development)). Risk assessment is then performed to adequately determine the significance of each risk using a risk matrix (severity and consequence Under Development).

Risk analysis could be done qualitatively or quantitatively. **Qualitative Risk Analysis** assesses the impact and likelihood of the identified risks and develops prioritized lists of these risks for further analysis or direct mitigation. **Quantitative Risk Analysis** is numerical modeling of the

probability that a project will meet its cost and time objectives. Quantitative analysis is based on a simultaneous evaluation of the impacts of all identified and quantified risks.

After risk assessment and analysis, the project team will identify actions in response to the project risks, concentrating on risks of most significance. Risk response actions may include: avoid, transfer, mitigate, share, exploit, enhance and accept. Strategies are then developed to implement the response actions.

1.5. Stakeholder Engagement

While the project team has authority over a project, it is important to note that the team must act in the service of the traveling public and the taxpayers of the State of North Carolina. A project is not a success if it does not consider stakeholders, and if the project is not delivered in an efficient manner.

Projects must offer appropriate opportunities for public involvement when selecting the project alternatives, be sensitive to those who will be impacted by the project, and be aware of potential issues associated with project construction. It is the project manager's responsibility to ensure that proactive stakeholder engagement is conducted throughout the life of the project.

Elected officials, resource agencies and other governmental agencies are key agency stakeholders critical to the success on any project. The project manager must establish strong partnerships with these agencies, engage in regular communication, and ensure that the needs of these stakeholders are addressed. Examples of key agency stakeholders are the FHWA, the municipal government in which a project is located, the local planning organization, state and federally recognized tribes, or the Army Corp of Engineers just to name a few.

The needs of internal stakeholders must also be taken into account. Efficient and proactive engagement of team members will expedite deliverable reviews, ensure decisions are effectively communicated avoiding rework, and provide feedback on team member performance. For Project Managers, internal stakeholders include Executive Management, Division and technical staff.

1.6. Accounting for Risk in Project Cost and Schedule

Efficient project delivery relies on identifying potential risk within the project as soon as possible. Potential risk types include:

- External
- Technical
- Environmental
- Organizational
- Project Management
- Regulatory

A detailed listing of potential risk types is listed in appendix C. During the initial phases of project scoping, the project manager should look for potential risk issues and rate the severity of the risk in relation to project cost and schedule. For example, if there are known concerns with the environmental impacts on a given project and the proposed mitigation strategies have been controversial with local environmental groups, steps should be taken early to mitigate these

concerns to the extent practicable including adjusting the project cost to address potential mitigation and adjusting the time to complete assuming potential litigation. If there are extensive utilities in the potential area of construction, these should be noted when developing project alternative. Early identification and proactive responses are keys to maintain schedule and budget.

1.7. Project Team Operating Guidelines

This section defines the minimum standards on how project teams will govern themselves.

1.7.1. Accountability

The project manager is ultimately responsible for the delivery of a project from concept to letting. It is imperative that the project manager understand the vision of the project stakeholders ensuring that the scope schedule and budget are in alignment with meeting these expectations. The project manager must think strategically, looking ahead, identifying potential risks. By communicating with all project team members and stakeholders regularly, these projects risks can be identified early minimizing the potential for scope creep, cost increases and project delays.

As the project manager is accountable for delivering the project, project team members are accountable for successfully fulfilling their respective roles and responsibilities. Organizational level authority, roles, responsibilities and accountability of project team members are identified in Section 2.

Each team member is responsible for their performance. The project manager should communicate directly with team members to ensure that expectations are understood and when problems are encountered. When direct communications do not adequately resolve an issue, the matter is addressed by the individuals involved through the respective organizational chains of command (see Section 1.8.2). At the end of a project, it is important to provide feedback to team members and their supervisors, detailing what worked well and what could use improvement.

1.7.2. Issue Resolution Process

The purpose of this section is to outline the Project Issue Resolution Process (PIRP). The PIRP is intended to be used to resolve issues between functional units, between in-house technical staff and consultant staff and/or between functional units and the project manager. The project manager should always be included in the PIRP regarding any issue when the cost, scope, schedule and/or quality (CSSQ) are expected to be affected regardless of the level the issue has reached. Issues are classified by levels (see below). Level 1 issues are generally project specific and minor. All Level 2 and higher issues must be documented, and the project manager should track the issue resolution documentation. Issues should be resolved within the timeframe agreed upon in the project management plan. If necessary, Level 1 and Level 2 issues will be included in the project meeting minutes. The meeting minutes will contain action items for the resolution of issues within the project team according to the project management plan.

1.7.2.1 Level 1 - Technical Issues

Level 1 of the PIRP is the lowest level and generally takes place between technical units and/or with consultant staff. Examples include minor issues encountered during technical reviews (such as changes to a demographic study area or a minor issue found in a plan set with interpretation of the design standards). Discussions between affected parties should commence immediately once an issue is discovered and the issue should be resolved according to the project

management plan. Most issues can and should be resolved at this level and generally without input from the project manager.

1.7.2.2 Level 2 – Cost, Scope, Schedule, Quality, and Contractual Issues

Level 2 is intended to resolve issues elevated from Level 1 because of potential cost, scope, schedule, quality and/or contractual (local agency, consultants, etc.) issues. The project manager will be contacted and asked for an opinion on the issue and proposed resolution. If the project manager agrees with the proposed resolution no further action is necessary. If the project manager does not agree or proposes a different solution due to CSSQ and contractual issues, discussions should commence immediately, and the issue resolved according to the project management plan or referred to Level 3, if necessary.

1.7.2.3 Level 3 – Technical, Cost, Scope, Schedule and Quality, and Contractual Issues

Level 3 shall be utilized upon failure to resolve an issue among project team members. At this level, the project manager shall be informed of the issue and will take an active role in coordinating a resolution. Technical managers (State Roadway Engineer, State Hydraulic Engineer, etc...), from the respective technical units will communicate directly and, in cases where CSSQ is affected, the project manager will take part in those communications. The recommended time frame to resolve critical issues for this level is three days. If a functional manager is unavailable during the three-day timeframe, the issue should be moved up to Level 4.

1.7.2.4 Level 4 – Policy Issues

Level 4 of the PIRP is the last step and generally should only be used in those cases when Departmental policy or questions of legality are concerned or staffs associated with Level 3 resolution are not available. In those rare instances when an issue cannot be resolved by the respective units at the Unit Head level, issues may be elevated to the Technical Services Chief or the Chief Engineer if the issue is between units not under a single Unit Head. The project manager will coordinate a resolution and make the Technical Services Chief and the Chief Engineer aware of any CSSQ concerns. If a legal matter is at the core of the issue, the Assistant Attorney General may review the matter and render a recommendation. The recommended timeframe for this level is 1 week.

1.7.3. Team Meetings

The following sections are a guide only and are intended to “standardize” the way the project managers conduct and document team meetings. It is recognized that most meetings will not include all these topics. Team meeting frequency is developed and set as part of the Project Management Plan.

1.7.3.1 Meeting Preparation

The following steps should be followed prior to each meeting:

1. Prepare and distribute the meeting agenda three to five days prior to the meeting date. The meeting agenda should include a summary of the meeting goals/objectives and previous action items.
2. If team members are in Asheville or another off site location, schedule a video-conference or tele-conference if possible.

3. Consider one-on-one meetings with functional units and stakeholders to coordinate and/or resolve complicated issues prior to the team meeting.
4. Bring audio/visual tools. Record the meeting if necessary.
5. Bring a copy of the action items from the last meeting.

1.7.3.2 Typical Meeting Agenda

Meeting agenda should include the following topics.

1. Introductions
2. Meeting goals/objectives
3. Overall project status report
 - a. Status of project
 - b. Update since last meeting
 - i. Progress
 - ii. Changes
 - c. Progress needed
 - d. Current schedule
 - e. Current cost estimate
4. Technical unit status reports
 - a. Current tasks/goals and % complete
 - b. Information supplied
 - c. Information needed and required date
 - d. How is the schedule?
 - e. Any problems/risks?
 - f. Proposed solutions?
 - g. Summarize risks, solutions and establish resolution plan
5. Action items
 - a. Status of last meeting's items
 - b. Summary of new items
6. Next meeting

1.7.3.3 Meeting Notes

Meeting notes are critical. The preparation and distribution of meeting notes is the responsibility of the project manager. Meeting notes should be a complete summary of what was discussed, agreed upon, etc. Try to avoid "he said, she said" type of comments **and instead focus on the outcome and action items. The minutes should be distributed in a timely manner (2-3 days).** Insert an action items status, with dates, responsible party, etc.

Section 2

2. Roles and Responsibilities of Project Teams

2.1. Introduction

Project management involves planning, coordinating, tracking, and controlling all aspects of projects from inception through close out. Project management responsibilities include coordination and decision making necessary to advance a project.

The intent of this section is to provide the project teams with general instructions on their roles in managing, coordination, decision making and advancing projects within the context of a matrix organization. This project management guidance is designed to be used by all project managers and technical staff across the NCDOT. Position titles may vary depending on location and organizational structure.

2.2. The Project Team

The project team consists of the Department's project manager, technical staff and consultants performing technical tasks in support of achieving the project objectives. The project team may include:

- Project Manager
- Technical Managers
- Technical Staff
- Division Staff
- Professional Engineering Firm

The project manager leads the project team to achieve project goals, manage risks and opportunities, and resolve issues. *The project's technical managers, technical staff and consultants report to the project manager on all project related issues and tasks.*

In developing the project team, the project manager can consult the Project Management Unit Manager as well as senior project managers. The technical managers will assign technical staff based on availability and expertise with input from the project manager.

2.2.1. Project Development Committee

The Project Development Committee (PDC) consists of the Director of Technical Services, Division Engineers, Project Management Unit Manager, The Director of Highway Operations, and Professional Services Management Unit.

2.2.1.1 The Committee Produces:

- Standards for project development processes within the context of a matrix organization.
- Amendments to this section.

2.2.1.2 *The Committee Is Accountable For:*

- Providing leadership across the Department to ensure project teams are functioning within the context of a matrix organization.

2.2.1.3 *The Committee Has Authority For:*

- Holding the appropriate Unit Head, project managers, and project teams accountable for project delivery.
- Revising programs and projects priorities.
- Resolving issues between functional units.

2.2.2. Project Management Supervisor

The Project Management Supervisor is responsible for leading project managers, risk assessments, and managing projects assigned to their unit as a program.

2.2.2.1 *The Project Management Supervisor Produces:*

- The unit's program goals, objectives, schedules, budget, and project listings.
- The unit's program status and evaluation reports.
- The unit's policies and procedures.
- The unit's standards for developing project management plans.

2.2.2.2 *The Project Management Supervisor Is Accountable For:*

- Negotiating and accomplishing the unit's program goals within the Department's allocations.
- Monitoring and evaluating the unit's program management process.
- Ensuring effective communication between project stakeholders, team-members, and project managers.
- Keeping the unit's program current and in line with the Department's financial goals.
- Providing leadership and coordination across the program continuously to ensure program goals are being met.
- Mentoring the project managers in the roles, responsibilities and program management guidelines.

2.2.2.3 *The Project Management Supervisor Has Authority for:*

- Managing all assigned projects.
- Approving and prioritizing projects during all production phases.
- Approval of project management plans.
- Assuring transfer of information from technical unit manager to technical unit manager across functional areas.

2.2.3. Project Managers

A Project Manager will be assigned to all projects depending on their size, complexity, and level of risk. The more complex projects will require a project manager with more experience and may involve a project management team that consists of multiple project managers.

The Technical units will report to the project manager for their activities related to the technical units' operations, and for their project status reporting.

Project managers plan, monitor, coordinate, and evaluate project activities from the project initiation through post-construction review. Project management is their major activity and they are generally assigned several projects. The project manager should be familiar with DOT technical processes and procedures.

Throughout the project development process, the project manager monitors the progress of project development to ensure it is in accordance with the project management plan. The project manager is responsible for coordinating and communicating with the project team.

2.2.3.1 The Project Manager Produces:

- Projects that meet cost, scope, schedule, and quality requirements.
- Project management plans.
- Consultant procurement agreements.
- Project status reports.

2.2.3.2 The Project Manager Is Accountable For:

- Overseeing project scoping and development planning.
- Monitoring, evaluating, and reporting the project schedule.
- Monitoring, evaluating, adjusting and reporting the project expenditures.
- Ensuring the project team is well-organized and working well.
- Early identification and resolution of project issues.
- Identifying and managing project risks.
- Conducting regular project status and design reviews.
- Coordinating and communicating among project customers and technical teams.
- Managing the project to attain the project goals and achieve customers' satisfaction.
- Conducting public and stakeholder coordination and involvement.
- Maintaining project files and records.
- Ensuring that the Professional Engineering Firms and Technical Units are developing projects meeting the NCDOT quality standards.

2.2.3.3 The Project Manager Has Authority For:

- Resolving and/or elevating project issues.
- Managing the project within the established cost, scope, schedule, and quality requirements.

- Initiating NCDOT's formal process for change management (scope, schedule and budget change form located on the Project Management Unit Connect NCDOT SharePoint portal).
- Negotiating technical resource needs.
- Ensuring timely resolution of conflicts.
- Conducting consultant procurement and negotiation.
- Providing input for evaluation of team members' performance.

2.2.4 Technical Unit Heads (Technical support role)

The Department's technical areas include a wide array of planning, engineering, administrative, contracting, construction management, and maintenance activities.

Their responsibilities include setting statewide functional policies, procedures, and standards; providing technical support; and providing quality assurance for their functional area. Quality assurance activities include project reviews, continuous evaluation and update of policies, procedures, and standards and assurance of compliance with those policies, procedures, and standards. Responsibilities also may include overseeing Federal or State programs and their related projects.

2.2.4.1 The Technical Unit Head Produces:

- Completed technical tasks within the project's cost, scope, schedule and quality requirements.
- Technical task production audits and evaluations for quality assurance (and quality control when appropriate) within their functional specialty.
- Timely and thorough reviews when requested.

2.2.4.2 The Technical Unit Head Is Accountable For:

- Optimizing use of technical area resources (staff, equipment, and consultants) to achieve project scope, schedule, budget and quality.
- Leading the production of project tasks as identified in the project management plan.
- Maintaining quality of functional area products and processes.
- Training technical staff and maintaining their technical expertise.
- Providing technical area's assistance in project scoping, design, and construction.

2.2.4.3 The Technical Unit Head Has Authority For:

- Planning, allocating, and controlling technical resources.
- Committing technical task production resources to projects.
- Monitoring and auditing technical task production.
- Approving design exceptions
- Leading functional area technical managers and technical staff.
- Developing and enforcing quality control and quality assurance procedures.

2.2.4. Technical Managers (Technical delivery role)

A technical manager in a functional area may be responsible for producing a technical portion of a project, either directly or through consultant services. The technical manager will do the planning, arranging, and coordinating work necessary to ensure the production of their portion of work. Although technical managers coordinate closely with project managers, their technical supervision comes from their Technical Unit manager.

Technical managers are expected to report the status of their work on a regular basis to the project manager. The information reported should reflect work accomplishments, work in progress, work plans for the next period, current issues, any help needed, work acceleration opportunities, and any work delivery challenges.

2.2.4.1 The Technical Manager Produces:

- Plans for technical tasks within project cost, scope, schedule, quality, and resource needs.
- Complete other contractual technical tasks as identified in the project management plan.
- Information and assistance to the project manager for scoping projects.

2.2.4.2 The Technical Manager Is Accountable For:

- Cost, scope, schedule, and quality associated with the technical tasks within the overall project goals
- Professional/technical quality of work consistent with applicable policies, procedures, and standards
- Adequate and timely notice to other technical units and the project manager of any necessary changes to project cost, scope, schedule, and quality.
- Technical managers are expected to report the status of their work on a regular basis to the project manager
- Acquiring, managing, and coordinating consultant activities within their area of responsibility

2.2.4.3 The Technical Manager Has Authority For:

- Negotiating and developing cost, scope, and schedule for their technical portion of the project.
- Ensuring technical tasks are conducted as identified in the project management plan.
- Assigning technical staff to the project team.

2.2.5. Technical Staff

The technical staff in a technical unit area is responsible for performing technical aspects of a project task. They also coordinate their project activities with the activities of other technical staff within other technical units and technical managers. Technical staff are expected to report the status of their work to the technical manager. The information reported should reflect work accomplishments, work in progress, work plans for the next period, current issues, any resources needed, work acceleration opportunities, and any work delivery threats.

Technical staff can be authorized to perform the technical manager's project responsibilities in addition to their technical duties.

2.2.5.1 *The Technical Staff Produces:*

- Technical tasks completed based on established policy, procedures, standards, and as identified in the project management plan.
- Technical tasks status reports.
- Information and assistance to technical managers for scoping projects.

2.2.5.2 *The Technical Staff Is Accountable For:*

- Technical task's cost, scope, and schedule.
- Professional/technical quality of work consistent with applicable policies, procedures, and standards.
- Adequate and timely notice to their technical manager so that the technical manager can notify other technical units and the project manager of any necessary changes to project cost, scope, schedule, and quality.
- Assuring transfer of information from technical staff to technical staff across units.
- Reviewing and coordinating consultant work for project tasks assigned by the technical unit.

2.2.5.3 *The Technical Staff Has Authority For:*

- Technical decisions to accomplish technical tasks as identified in the project management plan.

2.2.6. Division Staff

The Division Engineer is responsible for delivering the work program for their area and is one of the primary stakeholders for any project. The Division Engineer, the Division staff and the local stakeholders in the community understand the communities in which they live and work. They are the project manager and the project team's primary customers. The local relationships between Division staff and local stakeholders are critical when issues arise and negotiations are needed. Division staff are an invaluable tool for the project manager. The project

manager's relationship with the division can often make the difference between a successful project or one that fails to meet the performance objectives.

2.2.6.1 *The Division Staff Produces:*

- Quality Assurance reviews of the project documentation to ensure that the plans and specifications incorporated meet the intent of the project purpose and need.
- Provide assistance to the project manager and technical units regarding local stakeholder concerns and input.

2.2.6.2 *The Division Staff Is Accountable For:*

- Communicating local information to the project manager that could impact the scope, schedule and budget of the project.
- Quality assurance reviews of the project documentation to ensure that the plans and specifications meet the needs of construction, operations and maintenance.

2.2.6.3 *The Division Staff Has Authority For:*

- The Division Engineer is the final decision-making authority for issues that cannot be resolved at the project manager/ technical staff level with local stakeholders and for program related issues.

2.2.7. Professional Engineering Firms (PEF)

PEFs provide technical expertise to assist the Department, and serve as an extension of NCDOT staff. They are responsible for the project management duties and technical design development associated with NCDOT's project delivery process.

Each PEF doing work with NCDOT has a project specific internal project manager, an employee of the consulting company responsible for managing the project as well as successfully delivering the contracted work for the NCDOT project manager. The PEF project manager should be in constant communication with the NCDOT project manager on project activities.

The PEF typically reports the status of the contracted scope, schedule and budget to the NCDOT Project Manager monthly. It is the responsibility of the PEF to communicate with the NCDOT Project Manager on any potential delivery challenges as it relates to the scope, schedule, budget, and quality of the contracted work.

The GESC Best Practices link shown (Link) provides examples for how professional engineering firms can assist NCDOT project managers in achieving their production goals.

2.2.7.1 *The PEF Produces:*

- Project management services.
- Technical recommendations and solutions.

- Technical task(s), plans, and reports completed based upon established policy, procedures, standards, and as identified in the project management plan within the requirements of the PEF agreement.
- Status reports for contracted deliverables and project schedules.
- Information and assistance to technical managers and the project manager for scoping projects.
- Cost, schedule, and professional services estimates.

2.2.7.2 The PEF is Accountable For:

- Technical task's cost, scope, and schedule.
- Professional/technical quality of work consistent with applicable Departmental policies, procedures, and standards, and/or quality standards negotiated in the PEF agreement.
- Adequate and timely notice to technical and project managers of any necessary changes to project cost, scope, schedule, and quality, and changes to the PEF agreement.
- Assuring transfer of information from technical managers/staff to technical managers/staff across technical units.
- Compliance with all terms of the consultant agreement.

2.2.7.3 The PEF Has Authority For:

- Technical decisions to accomplish technical task(s) within agreed upon consultant agreement.
- Developing and negotiating cost, scope, and schedule for technical task(s), plans, and reports production.

2.3. Roles and Responsibilities as Related to Project Development Phase and Delivery Method (Under Development)

2.3.1. Typical Transportation Project Development Process (Under Development)

NCDOT has summarized typical project flowcharts and a list of potential deliverables on its Connect Site under [Project Management](#). Please note that these processes are currently being revised; please visit the site often to keep track of changes.

2.3.2. Project Team's Responsibilities and Authority (Under Development)

The project team's authority and responsibilities vary depending on project complexity, delivery method and stage of project development. The intent of this section is to clarify these variations. Also, guidelines are provided for the project manager to establish project budget, schedule and scope.

For all project delivery methods, the project manager authority is as defined in Section 2.2.3. The project manager carries this authority from project inception (after completion of the planning phase) until transfer of the project to maintenance.

Section 3

3. Project Management Plan Guidelines

The project management plan is the primary source of information for how the project will be planned, executed, monitored, controlled, and closed. It is the responsibility of the project manager to prepare and update the project management plan in collaboration with the project team. The project management plan should be scaled to the complexity of the project. A 10-mile, new location project with substantial impacts could require a more robust plan than a bridge replacement or intersection improvement.

The project management plan defines the activities and processes that the project team will follow to meet the project goals. A project management plan does not replace NCDOT's policies and formal processes. For example, a project team may develop and put into practice a project specific change management plan that defines individual responsibilities to report change. Such a process will complement (not replace) NCDOT's formal process for change management (Scope, Budget, and Schedule Change Form, located on the Project Management Unit Connect NCDOT SharePoint Portal).

The following sections provide project management practices that apply to most NCDOT projects and, when applied, will enhance the chance of the project's success. The project team should decide on the length and complexity of the document for a given project.

3.1. Project Management Processes

Project Management Processes are a set of interrelated activities that are performed by the project manager and project team to deliver a project or a project phase. These activities typically overlap, interact and are iterative. Project management processes can be divided into five groups: initiating, planning, executing, monitoring/controlling and closing.

The underlying concept for these processes is the Plan-Do-Check-Act framework:

- Plan what we are going to do,
- Do what we planned to do,
- Check if the results met our expectations,
- and Act on things that need to be changed.

The project management planning processes correspond to the "plan" component. The executing processes correspond to the "do" component, and the monitoring and controlling processes correspond to the "check and act" components. The initiating and closing processes are used to start and close a project or a project phase.

Please note that Project Management Processes are independent of Project Delivery processes and can be applied to a project (from planning to the end of construction) or a project phase (construction phase). For major projects, typically a project manager is assigned to the project at the beginning of the Project Planning Phase and will remain with the project until the end of the construction phase. Following these guidelines, the project manager will develop a

project management plan for the planning phase, and will update the plan before start of the environmental phase, final design phase and construction phase to reflect changes in the scope of work, delivery methods, costs, schedules, risks, project team members, etc.

3.1.1. Initiation Processes:

The initiation process will define steps necessary to start a new project or a project phase. The project manager uses these processes to define the project expectations and define what they are tasked to perform. This would include project scope, deliverables, boundaries, timeframes, and technical staff needed to perform the work. The project manager uses the information developed during the initiation to form and align the project team. The project team will review their assignments, define their responsibilities; agree on their operating guidelines, and prepare their mission statement. After completing the initiate and align processes, the team will start working on a plan to deliver their assignments.

3.1.2. Planning Processes:

The project team uses the planning processes to plan successful delivery of the project and/or project phase. The project manager, with collaboration of the project team, develops a project's Budget, Schedule, Risk Management Plan, Communication Plan, Change Management Plan, and Quality Plan. The outcome of the planning processes is the project management plan. This plan is endorsed by the project team and upper management to gain their commitment and to identify and resolve any significant issues with the plan.

The project management plan should be reviewed on a regular basis and updated as necessary. Include timelines for the project management plan updates in the project schedule.

3.1.3. Executing Processes:

The Executing processes consist of actively managing the execution of the project in conformance with the endorsed project management plan. The project team is fully mobilized to deliver the project or project phase. Information regarding status of project deliverables is gathered and reported. Communication between project team members is critical in this phase, as decisions made in one area can impact decisions made in others.

3.1.4. Monitoring & Controlling Processes:

The project team monitors project development and baselines to track progress, identify potential issues, communicate changes, and to take corrective actions. If a potential issue jeopardizes the project objectives, appropriate project management planning processes are revisited, solutions identified, and the project management plan is updated.

3.1.5. Transition and Closing Processes:

The Transition and Closing processes are used to either transition the project to its next phase or to bring the project to an end. The project team may decide to implement certain elements of the transition process at appropriate intervals (lessons learned, rewards and recognition), or identify a transition process that is not anticipated within existing NCDOT formal processes.

3.2. Project Specific SharePoint Site

The project manager must request that a project specific SharePoint site be developed. To request a site, please use the guidance provided in the attached link <https://connect.ncdot.gov/site/preconstruction/Pages/Preconstruction-Help.aspx>. The project manager should identify those people to whom access to the site should be granted. These may include consultants, FHWA, local governments, resource agencies and utilities. Once the site is established, the project manager should monitor the information on the site to ensure that all required decision making documentation is uploaded and available to be archived upon project completion.

3.3. Project Management Plan Template

Guidelines and typical steps necessary to collect information to prepare a project management plan are discussed in Sections 3.2 through 3.10. Each section includes general discussions, guidelines, and typical steps describing how to collect needed information.

The project team is encouraged to use the project management template (Under Development) on the Project Management Unit Connect NCDOT SharePoint Portal. This template reflects the minimum standards and guidance to manage NCDOT projects. The project manager, with support from the project team, should scale the Project Management Plan to the specific needs of the project. For federally funded projects with total construction costs exceeding \$500 million dollars, at the completion of the environmental phase, a project management plan must be prepared following the FHWA's project management guidelines, as this is the threshold for a Federal Major Project.

3.4. Initiate and Align Processes

The first step in each phase of every NCDOT project is to Initiate and Align the Project Team.

Initiate and Align includes processes for developing a clear understanding of the purpose, vision, and goals of the project and using them to define the characteristics of successful performance of the project.

During this phase, the project sponsor, project manager and project team work closely to finalize the following:

- Project description
- Team Mission/ Assignment and Mission statement
- Project team structure
- Project team's roles and responsibilities
- Major milestones
- Boundaries
- Measures of success, and
- Operating Guidelines.

3.4.1. Initiate the Project

The project manager uses their understanding of the project description to begin identifying technical units/resources that could be involved in the project and their roles and responsibilities. The project manager reviews and verifies the initial project description, team mission/assignment, major milestones, and boundaries through discussions with the primary technical unit managers that will be involved in delivering the project. With the input of the appropriate Division, the project manager also identifies Critical Success Factors for the project. These factors describe what the project team must accomplish to fulfill its mission and to achieve project success (e.g., address stakeholders' needs, no change orders, on-time and within budget, etc.). These factors are used to determine team's measures of success.

3.4.1.1 Project Description

The Project Description is a formal statement that defines the purpose and need for the "product" or "outcome" that the project is intended to produce. The STIP provides the initial project description for the project manager. It is used to establish a common purpose and need of both the project and the phase among the members of the project team. Examples:

- Enhance access and mobility within the I-95 corridor.
- Widen northbound US 401 to improve traffic operations.
- Widen the roadway to include one HOV lane and three general purpose lanes in each direction.

In some cases, the project description may require modification as the project progresses.

3.4.1.2 Team Mission/Assignment

Team mission/assignment is a short statement based on the project description that defines the overall actions that the project team will take to deliver their project and/or project phase.

- Complete a corridor study, the environmental phase, construction, etc.

The project description and team mission are then used to develop the project's scope of work. The scope of work is the basis of preparing project cost and schedule estimates and the quality process.

3.4.1.3 Major Milestones

Milestones identify specific project elements and the dates by which they must be accomplished in order to consider the project or phase successful. The following major milestones apply to all NCDOT projects that follow the Design-Bid-Build method of delivery. The project manager should revise these milestones for other delivery methods.

- Project Scoping Report Complete / Notice to Proceed (NTP)
- Environmental Documentation Complete
- Right of Way Plans Complete
- Let Date
- Begin Construction
- End Construction

3.4.1.4 Major Success Factors

Major success factors describe what the project team must accomplish to fulfill its mission and to achieve project success. They include outcomes that determine the success or failure of the work of the project team. These factors are developed by the project manager with the input of the project team. Examples:

- Change orders less than 3% project construction cost.
- Project completed within schedule.
- Stakeholder acceptance.

3.4.1.5 Identify Technical Support

The project manager, based on the project description and his/her understanding of the scope of work, identifies the technical skills needed to accomplish the work. This step will aid the project manager in identifying and finalizing project team members.

Roadway Design	Materials & Test
Structures	Legal
Construction	Communication Office
Environmental Analysis	Right-of-Way
FHWA	Traffic Mobility and Safety
Division	Civil Rights
ITS	Financial Management
Hydraulics	Traffic Information
Local Agency	Utilities
Location	Landscape Architecture
Maintenance	Other

3.4.1.6 Aligning the Team

During this stage the project manager assembles the project team and identifies if consultant support is needed. If the overall project is to be designed by a consultant, the project manager should obtain these services as early as possible to assist with the project initiation processes.

At the project scoping meeting, the project team will start planning how the project will be delivered. They will review the project description, team assignments, major milestones and success factors required to deliver a quality project. The development of the project management plans will begin with the review and refinement of budgets, schedule, change management plans, risk management plans, quality plans and closure plans for the project and each technical unit.

3.4.1.7 Identify the Team

The project manager works with technical unit managers to identify schedule and commit appropriate resources to the project and/or project phase. The project manager compiles relevant project team member contact information.

3.4.1.8 *Review Major Milestones*

The project manager and the project team identify the risks, impacts, and implications of failure to meet each major milestone, and/or identify measures that must be achieved to meet the milestones.

3.4.1.9 *Measures of Success*

The project manager and project team will review the critical success factors and identify corresponding measures of success – those “indicators” that will provide an accurate indication of project team progress and performance in meeting each of the critical success factors, major milestones, deliverables, etc. Once measures of success have been identified, the team defines the specific indicators, signals, threshold values, etc., that will be monitored and reported in order to provide timely and accurate visibility of the likely outcome of each critical success factor.

3.5. Planning Processes

Planning processes define how the project team will deliver a project or a project phase. These processes will refine project objectives and develop a plan on how to achieve those objectives.

During this phase, the project manager and project team work collaboratively to finalize the following:

- Project or project phase schedule
- Project or project phase budget
- Risk management (guidance Under Development)
- Communication plan
- Change management plan
- Quality plan, and
- Transition and closure plan.

The project management plan is the output of the planning processes. Changes during project development may impact parts of the project management plan. As such, the project management plan must be updated on regular basis to reflect changes and/or lessons learned.

3.5.1. Schedule

Schedule is the anticipated length of time to complete a project or a project phase. The project manager and the project team work together to develop milestones, a list of deliverables, and a detailed project schedule using an appropriate scheduling tool/software (refer to Section 1.3.2). In this section, the project team identifies:

- The project milestones and deliverables list and the project schedule baseline.
- How often the project schedule will be updated and tracked.

As the project is progressed and schedule is tracked, target milestones are reviewed. If the schedule identifies delays in project performance base lines, the project manager coordinates

with the project team and identifies and implements a recovery plan. The recovery plan may include performing overtime, adding additional staff, hiring consultants, reducing the project scope of work, etc. If the recovery plan was unsuccessful, the reasons for it are documented and necessary approvals are obtained. If the measure is ahead of the target, then reasons for faster delivery are identified and documented to determine if they could be used to expedite future projects. Excess resources are released; overtime usage is stopped or reduced, etc.

3.5.2. Budget

Budget is the anticipated cost of the project and/or a project phase and includes engineering, right of way, construction and outsourcing costs. Refer to Sections 1.3.3 and 1.6 of this manual for additional information regarding project budgets and allowances.

In this section, the project team identifies:

- The project budget baseline (engineering, right of way, and construction).
- Basis for the project baseline estimates (method of estimating, man-hour estimates, construction estimate, etc.).
- The method the project engineering, right of way, and construction budget will be tracked; and how often the project budget will be tracked and reported.
- The frequency and method for updating the project engineering, right of way, and construction budget.
- Target milestone and deliverable dates with established budgets to measure the project performance, at least on a yearly basis.

As the project is progressed and budget is tracked, target milestones/deliverables with established budgets are reviewed. If tracked budget identifies over-expenditures, the project team identifies and implements a recovery plan. If risks are realized, the team works together to minimize the budget impact.

3.5.3. Risk Management

According to the international standard ISO 31000, risk management is “the effects of uncertainty on objectives.” In the broadest sense, it is anything that can be an obstacle in achieving goals and objectives. Risks should be managed at the Department, program, and project levels. The project manager is responsible for managing risks at the project level and communicating to their supervisor risks that should be raised to the Department or program level.

Project risk management requires project team members who are familiar with the specifics of the project and understand the issues that could impact project performance. All members of the project team should assist in identifying risk. Types of risk are shown in Appendix B.

A robust risk management system results in improved project delivery. It helps make the business case for transportation investments and builds public trust in the Department. It avoids managing-by-crisis and promotes proactive strategies. (Risk Management Plan Development and Risk Driven Change Management Guidelines are Under Development)

3.5.4. Communication Plan

The project communication plan addresses the informational needs of the project team, stakeholders, the public, and the media. It focuses on two major facets of the project communication process:

- Project working and reporting Information.
- Public information, including community outreach and media relations.

The process of developing plans for public information, community outreach, and media relations requires the involvement of a public information officer.

The project manager and the project team will collaborate to:

- Identify all project participants and stakeholders, including their functions and interests associated with the project and its performance.
- Identify the project-specific information needs of each participant and stakeholder. Using the list of project milestones, identify the information produced from each deliverable and develop a draft communication matrix. This includes identifying the distribution, recipients, medium, frequency, and timing, etc., for the information from each deliverable.
- Review and adjust the draft communication matrix with the project team and the public information officer and identify any constraints on communication with any participant or stakeholder (organizational, contractual, legal, etc.).
- Review the draft communication matrix with the appropriate participants and stakeholders, including the information they will be receiving, its frequency, medium, etc. Verify its suitability and usefulness for their purposes and gain their endorsement.
- Using the communication matrix as a basis and the communication plan template as the outline, develop the draft communication plan for the project.
- Review the draft communication plan with the communication office, project team, and upper management.

3.5.5. Change Management Plan

Develop a plan for identifying, quantifying, approving, and reporting changes to the project performance baseline; emphasize cost, scope, schedule, and quality. The change management plan is developed to address project specific changes within project allowances (budget and schedule) given to the project manager and the project team.

The project manager and the project team will collaborate to:

- 1 Define and document the baseline components representing cost, scope, and schedule. For each component of the baseline, identify the specific project thresholds that trigger the formal change management process.:
 - Project milestones.
 - Project baseline schedule.
 - Project budget.
 - Prior adjustments to the baseline.

Depending on the project, also define certain elements that document site and performance conditions: limits of work; geotechnical or other physical characteristics; periods of work; or other performance constraints, etc.

- 2 Develop and document project-specific processes and instructions for the change management process and document them in the change management plan.
 - Identify, report, and track potential change issues.
 - Team and individual responsibilities for identifying and reporting all potential change issues.
 - Establishment and use of a single change issue tracking and management log.
 - Review the Risk Management Plan and risk response strategies and determine requirements for managing risk-driven change.
 - Analyze change impacts and develop response strategies and recovery plans.
 - Identify endorsement requirements for changes to the project performance baseline.
 - Update the project performance baseline.
 - Develop guidance for documentation and incorporation of change in design or other product records.

NOTE: Divisions and technical units may have formal processes and procedures in place for managing the change process, and compliance may be mandatory. Always review the appropriate procedures and consult with Division/technical unit management before establishing specific project procedures.

- 3 Gain endorsement for the project-specific change management plan from appropriate technical units.
- 4 Review the plan with the project team and provide instructions on the specific responsibilities of each team member.

3.5.6. Quality Plan

Quality management includes all activities of project management that determine the project quality objectives and applicable standards, the responsibilities of project participants, and the requirements for quality assurance (QA) and quality control (QC).

Quality planning involves identifying which quality standards are relevant to the project and determining how to satisfy them. The activities of the quality planning process basically translate existing quality policy and standards into a project quality plan, and the project quality plan into a project quality compliance matrix for documenting performance and results.

The project manager and the project team will collaborate to:

1. Review each work element of the project milestones and determine the applicable quality standards for each process, product, and deliverable.
2. List each of the applicable standards with the appropriate work element in the draft quality plan.

3. Using the draft quality plan, review each work element and applicable standards with performing staff:

- Verify understanding of assignment.
- Verify understanding of specific quality standards and requirements.
- Verify qualifications for performance.
- Develop specific plans for performance and achievement of the quality standard.
- Develop specific plans for documenting performance and results.
- Verify the level of effort required, including budget and schedule.
- Customer (as appropriate).
- Review all proposed quality standards.
- Review draft quality plan.
- Review costs and benefits of areas where the value of required quality standards may be marginalized.
- Identify specific reporting requirements.
- Obtain endorsement.

4. Complete the quality compliance plan and review updating and reporting procedures with appropriate team members.

The purpose of the project quality plan is to document the project's quality standards and goals and to provide a baseline against which the QA/QC efforts of the project team may be compared. A project quality compliance matrix provides a convenient tool for documenting those planned efforts, their accomplishments, and their outcomes.

The steps described by this procedure are intended to meet certain objectives for quality management on NCDOT projects, primarily:

Consistency - To develop and put into practice a consistent approach to meeting appropriate quality standards, objectives, and requirements on all NCDOT projects.

Value - To establish and perform only those quality management activities that add value to NCDOT projects.

Avoidance of Rework - To shift focus from review and correction of work performed to those activities that enhance the quality during the planning and performance of the work in order to minimize costly rework.

Responsibilities - To clearly establish responsibilities for meeting appropriate quality standards on all NCDOT projects.

***NOTE:** The Quality Matrix in the Project Management Template (Under Development) identifies typical QA/QC items for Design-Bid-Build delivery. For other delivery methods, adjust as appropriate. The Quality Control Matrix for construction must be developed after the contract is awarded.*

3.5.7. Transition and Closure Plan

Transition and closure is the process of completing a major activity or phase, or the project itself. This includes transferring the completed work and remaining project responsibilities to others; completing document archiving; and closing out the administrative and financial processes associated with the activity, phase, or project.

Transition and closure planning begins with the development of the transition and closure plan. It outlines the points in the project at which formal NCDOT transition and closure activities will take place; the requirements of the transition; the responsible organization; and the process steps that will be taken to accomplish an efficient and effective transition. For processes that do not fit into NCDOT formal transition and closing processes, the project team should determine what practices are most appropriate and/or decide on the level of thoroughness of each practice.

Elements of the transition and closure plan are implemented at appropriate intervals prior to the full completion of the work of the activity or phase (lessons learned, preparing no-longer-needed files for archiving, etc.). All transition and closure activities are completed before the activity, phase, or project is deemed complete and the project manager is released from responsibility for the project.

All transition activities should be linked to the appropriate project milestones and activities for tracking and status monitoring. This provides an effective method to ensure they are not overlooked.

3.5.7.1 Establish the Transition Points

Identify the major activities and milestones of the project that will require a formal transition process. Other transition points may be more obscure and associated with the project type, or specific to the project itself. Consider the following criteria:

- Delivery and acceptance of major elements of work.
- Transfer of responsibility for all or a major portion of the project.
- Major changeover of project staff, resources, or location of performance.

3.5.7.2 Acceptance of Work

Develop the acceptance criteria, including an acceptance checklist, for each major activity or deliverable. Identify responsible parties for each activity or deliverable to be accepted – who will develop/deliver the element and who will accept the work. Identify activities and responsibilities involved in the completion and acceptance process. Develop a transition and/or closure schedule for the specific transition event or incorporate transition or closure activities into the project performance schedule.

Examples:

- Traffic Management Plan
- Geometric approval
- Structure recommendations
- Permit requirements

3.5.7.3 Lessons Learned

Establish specific project team activities and responsibilities for identifying, documenting, reporting, and compiling lessons learned. During the course of the project, and as each transition point is reached, compile and report the lessons learned file for the appropriate area or phase of the work.

Lessons learned should be a standing agenda item at project status meetings.

3.5.7.4 Archiving

Project data should be archived in accordance with the state of North Carolina retention policy and those established by each technical unit or Division.

3.6. Executing Processes

The project management plan is implemented to achieve project objectives. Activities include, but are not limited to:

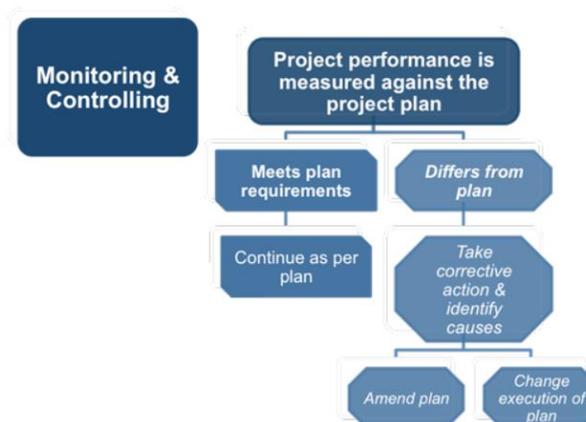
- Project resources are mobilized and managed to complete assigned tasks and responsibilities.
- Consultant/contractor procurement processes are started and completed.
- Work on project deliverables are started and completed.
- Reporting processes are followed.
- Communication, quality, change management and risk management processes are initiated, updated and followed.
- Team members are assigned to assist with each deliverable of the project management plan, e.g., roadway technical manager, hydraulic technical manager, etc.

3.7. Controlling and Monitoring Processes

The project manager's responsibilities include controlling and monitoring a project (or several projects). Control as it pertains to project management means setting standards, measuring actual performance and taking corrective action. Monitoring as it pertains to project management is the continuous process of providing stakeholders with detailed information on the progress and/or delay of the project based on the project plan, which includes scope, schedule, budget, resources, and action items.

'Controlling and monitoring' and 'monitoring and controlling' happen simultaneously. Some key elements to monitored and controlled on a project include:

- Scope and Change Control
- Schedule Control
- Budget Control
- Quality Control
- Risk Control
- Communication Control



Many projects run into challenges, also known as “opportunities” to solve challenges. That is exactly what a project manager runs into when, while monitoring the project plan elements, the project manager finds either an opportunity to accelerate or otherwise improve a project, or a challenge that may put the project plan at risk.

Once the project manager identifies a potential change in the project plan, control measures need to then be evaluated and revised to meet or exceed the original project plan and project goals.

Any challenges that have been identified as likely impacting the project plan negatively should be communicated with the project team as soon as it is identified. Engaging the project team, each with unique experiences and knowledge, could provide resolution or minimization of the identified challenge.

If, after communicating with the project team, the challenge identified still poses a risk to the project plan, upper management should be communicated with. Together, the project manager, project team (as appropriate), and upper management can then put control measures in place to help resolve or minimize the identified challenge.

This is the basic Controlling and Monitoring process that helps a project manager successfully manage a project as it moves from ‘concept to concrete’ through project delivery.

Section 4

4. Project Reporting

4.1. Introduction

It is the responsibility of the project manager to monitor, control and report status of the project performance, including the project's scope, schedule, cost and quality. This reporting will be done verbally during meetings (status meetings, staff meetings, team meetings, etc.) and in writing. This section provides guidance for reporting project status.

Documentation of project reporting will be conducted for two separate purposes. First is the Executive Project Status Report used by the Department's upper management, project stakeholders and external stakeholders. This report is entered into the SAP system. The intent of the monthly Executive Project Status Report is to provide an executive level account of the project that details the current status, identifies the risks to the project and how these risks are being mitigated to keep the project on schedule. The second report is the Project Management Status Report. The intent of this document is to provide a more detailed account of the project status including items project milestones, agreements, permits, right of way and utilities.

4.2. Frequency of Update

Complete both the Executive Project Status Report and the Project Management Status Report monthly for all projects. Project managers must complete these reports by the first Friday of each month or as important changes occur that need to be communicated immediately. The Executive Project Status Report will be posted on the State of North Carolina Enterprise Business Services portal at <https://www.ebs.nc.gov/irj/portal>. The Project Management Status Report will be completed by the last Friday of each month and posted on the project specific SharePoint site as described in section 3.2. of this document.

4.3. Responsibility

4.3.1. The Executive Project Status Report

It is the responsibility of the project manager to monitor, evaluate, and report the progress of a project using the project management guidelines. The information reported should reflect work accomplishments, work in progress, work plans for the next period, current issues, resources needed, work acceleration opportunities, and work delivery threats.

4.3.2. Project Management Status Report

It is the responsibility of the consultant project manager to complete this report and submit to the NCDOT project manager for review and approval. The information reported should reflect:

SECTION 4
PROJECT REPORTING

- Detailed activities, milestones and deliverables completed for the previous month and those scheduled for the upcoming month. Schedule and contingency/risk reserve status, and if the project is on target for the schedule performance measures.
- Project expenditures – report if they are in alignment with established scope and budget.
- Update on funding sources and status of goals that must be met or used to obligate project funds.
- Status of the quality process and QA/QC activities (what has happened and where you are on the plan activities).
- Status of approved changes, impacts of new changes, etc.
- Report/update on major project issues (progress since last report)
- Status of risk management activities and steps taken to mitigate major risks
- Resources needed
- Work acceleration opportunities
- Detailed status of agreements, permits, right of way and utilities

4.4. Reporting Forms

Samples of both reports are shown are located on the Project Management Connect NCDOT SharePoint Portal.

Section 5

5. External Stakeholder Coordination and Agreements

5.1. Introduction

This section sets forth the roles and responsibilities of a project manager in the ensuring that the required coordination and agreements have been conducted and procured throughout the life of the project.

The project manager is responsible for proactive coordination with local, state, and federal agencies as well as with other project specific organizations to obtain the needed coordination/agreements required to ensure project packages are complete and ready for letting. Many times, the project manager will need to coordinate with technical units within NCDOT who are actively working with the external stakeholder to procure the agreement/permit, to meet these requirements. Project managers are responsible for conducting the following coordination and ensuring agreements are completed throughout the various stages of the project life cycle.

5.2. Project Life Cycle

5.2.1. Project Concept to Environmental

The task of developing the initial project concept is the responsibility of the MPO/RPO/TPO. However, it is critical that the project manager participates and fully understands the objective of the project concept and how the purpose and need for the project was developed. All proposed scoping, funding and scheduling proposals made should be vetted against the following concepts to ensure that stakeholder expectations are understood and realistic. Items that the project manager should provide thought leadership to are:

- Funding sources
 - Federal
 - State
 - Local
- Accuracy of the project scope
- Stakeholder identification and needs
- Accuracy of the cost estimate
- Status of planning and environmental documents
- Expected start date
- Project duration
- Needed coordination and agreements
 - Local agencies
 - Resource agencies
 - Utilities
 - Other project specific organizations i.e. railroads, transit, airports etc.
- Expected letting date
- Expected completion date

- Ensure that the project scoping report is complete and the project purpose and need are clearly established
- Ensure project funding types as defined in the STIP are applicable for the stated project purpose and need.

5.2.2. Environmental to Final Design

The project manager in cooperation with relevant NCDOT staff take the purpose and need from the project scoping report and develop the necessary environmental and preliminary design documents to achieve a final environmental clearance document. The environmental clearance document type is dictated by the amount of environmental impact the preferred alternative will cause and the degree to which this impact can be mitigated. It is the project manager's responsibility to help strike a balance between the environmental and human factors that are affected by the project. Ensuring that involvement of all stakeholders is critical to finding the proper balance. This includes the following activities:

- Determine the contract delivery method (design/bid/build, design/build, CM/GC, etc.)
- Determine which federal agencies will be involved and an agency point of contact
- Determine the most likely type of environmental document, the needed team members, an initial implementation and communicate plan
- Coordinate to get Notice To Proceed (NTP)
- Coordinate the amount of preliminary design needed to determine a preferred alternative
- Coordinate on Merger Screening needs
- Coordinate for Merger Screening
- Set and post project schedule
- Determine public involvement needs
- Local Official coordination
- Determination of environmental effects, avoidance and minimization
- Required agency agreements for permitting, including memoranda of agreements
- Coordination with utilities
- Coordination with other project specific organizations i.e. railroads, transit, airports, freight haulers, ports etc.
- Agency approval of environmental document.

5.2.3. Project Final Design to Letting

It is the project manager's responsibility to ensure that all technical units, utilities and local agencies complete all aspects of the final design in compliance with the stakeholder and environmental commitments. This requires the project manager to facilitate extensive communication between all parties throughout the life of the project. This facilitation of the commitments, design requirements and communication must be completed ensuring that the work completed is conducted within the scope, schedule and budget of the project. It is imperative that scope creep is controlled and the project is designed true to the purpose and need outlined for the project including:

SECTION 5
EXTERNAL STAKEHOLDER COORDINATION AND AGREEMENTS

- Coordination and compliance on project commitments
- Compliance with the environmental document
- Public involvement needs
- Agency coordination
- Local Official coordination and agreements
- Coordination for permit package
- Coordination with utilities
- Coordination on Right of Way needs
- Coordination with other project specific organizations i.e. railroads, transit, airports, freight haulers, ports etc.
- Coordination for letting documents.

5.2.4. Letting through Construction

Project management responsibilities continue as a project transitions from the final design phase to construction. The project manager serves in a support role to the construction management team. The project manager ensures that the construction team understands and constructs the project in compliance with the stakeholder and environmental commitments. As construction of the project uncovers unexpected issues, the project manager serves as the conduit between the construction team and the consultant designer providing the required design adjustments needed to fit field conditions.

Section 6

6. Project Development Uniform Filing System

6.1. Overview

These guidelines were developed to provide instructions for Project Development records with the intent of making working records accessible to project managers and providing a uniform directory in which all divisions within the Department may access project data more efficiently.

6.2. Management and Responsibility of Filing System

The Department's Record Retention policies will be the central depository for all original documents and data, regardless of the media, generated on the project.

In accordance with current NCDOT record retention policy, working copies and files will be maintained by project managers, administrative staff, and the originating divisions. ([Link for NCDOT Record Retention Policy](#))

All documents and files created or maintained by staff or consultants related to any project undertaken with state or federal funds, and regardless of the purpose or form, should be considered public record subject to applicable statutes regarding filing, retention, archiving, destruction and dissemination to the media or the public. These documents should be filed on the project SharePoint site and ProjectWise Design files in accordance with the preconstruction documentation policies.

<https://connect.ncdot.gov/site/preconstruction/Pages/Preconstruction-Help.aspx>

For more information on managing public records requests, restricted records, retention schedules, and filing systems in general, contact the NCDOT Records Officer, Record Management Section, Administrative Services Division.

Section 7

7. Key Performance Indicators

7.1. Introduction

The success of any project requires each team member to understand the key performance indicators, why each team member's timely contributions are required and how working together is essential to ensure that these objectives are achieved. As project manager you are ultimately responsible for ensuring that the project team achieves the key performance indicators. This requires the project manager to provide regular communication with all stakeholders both internal and external. It requires the project team to utilize creative problem-solving skills as each project will come with its own unique set of challenges. Finally, it requires each project manager to provide mentoring to develop and encourage project team members who may put the team at risk of achieving the key performance indicators.

7.2. Key Performance Indicators

7.2.1. STIP Project Start Date Success

Metric Definition - Percentage of STIP and Bridge projects with Notice to Proceed milestones completed as compared to the planned milestones at the start of the fiscal year.

Reporting Period - July 1 to March 31 each fiscal year

Target - Greater than 90%

7.2.2. Final STIP Environmental Document Success

Metric Definition - Percentage of STIP and Bridge projects with the final environmental document milestone completed as compared to the planned milestones at the start of the fiscal year.

Reporting Period - July 1 to March 31 each fiscal year

Target - Greater than 90%

7.2.3. STIP Right of Way Plan Success

Metric Definition - Percentage of STIP and Bridge projects Right of Way plan milestones completed as compared to the planned milestones at the start of the fiscal year.

Reporting Period - July 1 to March 31 each fiscal year

Target - Greater than 90%

7.2.4. STIP Let Success

Metric Definition - Percentage of STIP and Bridge projects let and awarded as compared to the planned milestones at the start of the fiscal year.

SECTION 7
KEY PERFORMANCE INDICATORS

Reporting Period – July 1 to March 31 each fiscal year

Target – Greater than 90%

7.2.5. Non-STIP Project Success

Metric Definition – Percentage of non-STIP projects let on schedule as compared to the planned let milestones at the start of the fiscal year.

Reporting Period – July 1 to March 31 each fiscal year

Target – Greater than 90%

7.2.6. Environmental Document Completion Time

Metric Definition – Average months to complete a final environmental document.

Reporting Period – Rolling twelve-month period

Target – Categorical Exclusions less than 12 months

Environmental Assessments less than 24 months

Environmental Impact Statements less than 36 months

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Glossary of Terms

1. Technical Unit

An organizational unit within the Department that provides one or more technical services.

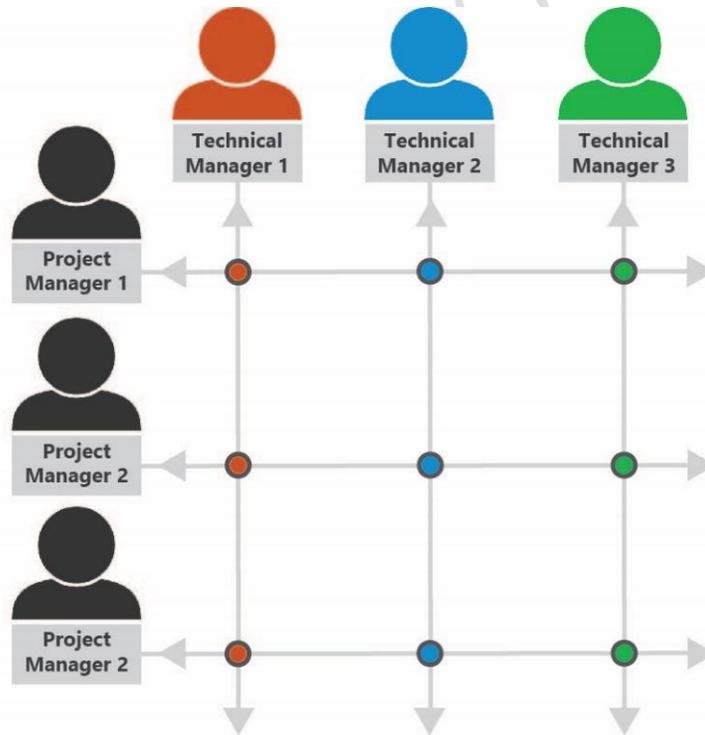
2. Technical Managers

The responsibilities of Technical Managers within the Department are to set policy, procedure, and standards; provide technical support; and provide quality assurance for their functional unit. Technical managers typically manage their resources (assign staff to tasks) to deliver work products within time and budget constraints.

3. Matrix Model

Matrix management model can be defined as a network of interfaces between technical units and project managers. This multidisciplinary process defines the focus of authority and responsibility. It defines who works with whom on a project.

Figure 1. Matrix Network



In Figure 1, the vertical axes represent the vertical management chain and horizontal axes can be a process flow or a project. In a matrix model, the vertical responsibilities as to how the task will be done and who will do it, are assigned to technical managers. Technical managers will set the standards (how the task will be done), the logistics and they manage their resources (who will do the task). The horizontal responsibilities of what, when, why and budget and quality control are assigned to the project managers.

Benefits and key elements of a Matrix Management are improved communication, coordination, and decision making resulting in efficient delivery of projects. Through Matrix Management, the project teams and project managers are empowered to work together to plan, design, monitor and deliver projects.

4. Operation

Projects/tasks/processes/activities in support of sustaining the Department. Operation related projects are not part of this guidance.

5. Project

A project is a discrete endeavor undertaken to create a unique product, service, or result, which has a defined beginning and end. Within the context of this document, a project is defined as collective tasks/processes/activities in support of planning, designing, constructing, and maintaining transportation infrastructure.

6. Program

A group of related projects managed in a coordinated way to obtain benefits and control not available from managing them individually.

7. Project Customers

The project manager serves many customers. Project customers are those with a stake in the project. They are diverse, both internal and external to the Department, and include:

- The traveling public, businesses, residents, and other stakeholders across the state and beyond
- Regulatory agencies
- Accounting and other staff responsible for financial activities
- Technical managers and staff
- Division Engineers and staff
- Project letting and construction staff
- Operations and maintenance staff.

8. Project Budget

Budget is the anticipated cost of the project, including planning, environmental, preliminary design, final design, construction, and outsourcing costs.

9. Project Delivery Methods

The transportation project delivery approach typically is determined based on project risk factors, schedule, funding, and goals. The approach analysis should be conducted as early in the project development process as possible. Examples of delivery approaches include:

- **Design-Bid-Build (DBB)** - Contract documents and detailed specifications are developed by the Department. Based on these documents, bids are solicited from contractors. The contract is awarded to the lowest responsive and responsible bidder.
- **Construction Manager/General Contractor (CMGC)** - The CMGC delivery method involves selection of a general contractor with suitable experience to serve as a construction manager to assist the owner and designer in the design of a project during preconstruction services and perform construction of the project after it is designed. The CMGC delivery system has aspects similar to traditional Design-Bid-Build (DBB) project delivery in that there are still two distinct phases: design and construction. There is a contract for construction services that is separate from the contract for preconstruction. However, for CMGC delivery the general contractor is obtained at the beginning of the design phase allowing for the contractor to offer expertise with regard to the schedule, budget, and constructability, as well as identification, evaluation and mitigation of risk.
- **Design-Build (DB)** - A project delivery method that combines two, usually separate services (engineering services and construction) into a single, fixed-fee contract. The design-build entity may be a single firm, a consortium, joint venture or other organization assembled for a particular project.
- **Progressive Design-Build (PDB)** - A project delivery method that combines engineering services and construction into a single fixed fee contract where the design is completed to a given percentage. At this point a guaranteed maximum price is then submitted by the PDB team for the completion of the design and construction. NCDOT can then either accept this price and complete the project, or terminate the contract and procure the remainder of the design and construction under a conventional design-build contract.
- **Design-Build-Operate-Maintain (DBOM)** - The DBOM model is an integrated partnership that combines the design and construction responsibilities of design-build procurements with operations and maintenance. This project delivery method transfers design, construction, and operation of a single facility or group of assets to a private sector partner. This project delivery approach is also known by a number of different names, including "turnkey" procurement, build-operate-transfer (BOT), and Design-Build-Operate (DBO).
- **Design-Build-Finance-Operate (DBFO)** - A project delivery approach in which responsibilities for designing, building, financing and operating are bundled together and transferred to private sector partners. The DBFO offers a great deal of variety in contractual arrangements, especially to the degree in which financial responsibilities are actually transferred to the private sector. One commonality that cuts across all DBFO projects is that they are either partly or wholly financed by debt leveraging revenue streams dedicated to the project. Revenue sources may include user fees, lease payments, shadow tolls and/or vehicle registration fees. Future revenues are

leveraged to issue bonds or other debt that provide funds for capital and project development costs. They are also often supplemented by public sector grants in the form of money or contributions in kind, such as right-of-way acquisition. In certain cases, private partners may be required to make equity investments as well.

- **Build-Own-Operate** – A private contractor constructs and operates a facility while retaining ownership. The private sector is under no obligation to the government to purchase the facility or take title.
- **Outsourced Service Contract** – The transfer to a private entity the responsibility for services typically performed by agency staff, such as engineering, construction oversight, and customer service.
- **Asset Management** – This type of delivery method allows a private entity to manage a transportation facility, typically for a long term through a single contract, under the assumptions that a private entity could more efficiently and cost effectively provide the services required.
- **Concession** - Long-term lease agreement that involves the lease of a publicly-financed facility to a private sector entity (concessionaire) for a specified time period. Under the lease, the private sector entity agrees to pay an upfront fee to the public agency in order to obtain the rights to collect the revenue generated by the facility for a defined period of time (usually from 25 to 99 years). In addition to the concession fee, the concessionaire operates and maintains the facility, which may include capital improvements.

10. Project Management

A set of principles, practices, and techniques applied to lead project teams, and control project cost, scope, schedule, and quality to the satisfaction of project customers.

11. Project Schedule

Schedule is the anticipated length of time the project will take to plan, develop and construct, including all relevant milestones and deliverables. The schedule will begin at project initiation and should extend through the letting of the project. Note that the schedule should be constructed at an aggressive but realistic timeline considering potential risks and should be updated as the project progresses. Updates will take place as opportunities to accelerate the schedule are found, or issues causing delays occur.

12. Project Team

The project team consists of the project manager, Department's technical staff, Division staff, and consultants performing technical tasks in support of achieving the project objectives. The project manager leads the project team to achieve project goals; manage risks and opportunities; manage project cost, scope, quality, and schedule; and resolve issues.

Prior to and during scoping, the project manager assembles the project team, based on the required tasks to meet project goals. The project manager may add members to the project team during project development.

13. Project Quality

Quality projects do not happen by accident. The project team should ensure that all work products meet applicable standards (including standards of care), serve project goals, and ultimately meet the needs of project customers. Quality work products will minimize project delays, ensure constructability, and help meet the project's cost, scope, and schedule. Projects developed, designed, and constructed in accordance with applicable policies, procedures and standards; delivered within the cost, scope, and schedule; and sensitive to the needs of the people of North Carolina are quality projects.

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Appendix A: Roles and Responsibilities

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Roles and Responsibilities

A.1. Project Management

- Coordinate all cost, scope, and schedule issues.
- Coordinate with outside entities and NCDOT Management.
- Provide leadership and direction to the project team.
- Develop the project management plan.
- Maintain the project schedule and budget.

A.2. Roadway Design

- Coordinate technical issues and incorporate products from other technical groups into the plans and estimate.
- Design oversight; including meeting all applicable standards, policy and procedures.
- Provide technical advice regarding individual design elements.
- Develop and provide project information as needed by other units.
- Update the project team on technical decisions/recommendations of NCDOT management.
- Prepare project geometric approval.
- Act as an advocate for the Roadway Design Unit by communicating concerns/issues between the project team and the Roadway Design Unit.

A.3. Hydraulics

- Provide technical hydraulic design guidance.
- Prepare hydraulic design plans and estimates.
- Prepare and maintain the Drainage Report.
- Ensure design meets all Drainage Manual and other applicable standards, policies, and procedures.
- Act as an advocate for the Hydraulics Unit by communicating concerns/issues between the project team and the Hydraulics Unit.

A.4. Structure Management

- Provide information related to all structures (bridges, RCBs, sign structures, noise walls, etc.).
- Provide guidance for the design or modification of structural elements.
- Prepare the structural design plans and estimate.
- Ensure design meets all applicable standards, policies, and procedures.
- Railroad Agreements

- Act as an advocate for the Structure Management Unit by communicating concerns/issues between the project team and the Structure Management Unit.

A.5. Traffic Mobility and Safety

- Provide technical guidance on traffic related issues.
- Provide technical traffic operations information.
- Prepare traffic design plans and estimate (signs, signals, lighting).
- Coordinate with Roadway Design Unit, construction and others on traffic control and striping plans.
- Ensure design meets all applicable standards, policies and procedures.
- Provide technical guidance on safety related issues.
- Provide crash data.
- Schedule and coordinate the Roadside Safety Review.
- Act as an advocate for the Traffic Mobility and Safety Branch by communicating concerns/issues between the project team and the Traffic Mobility and Safety Branch.

A.6. Right of Way

- Provide technical guidance on right of way issues.
- Provide right of way verification.
- Prepare right of way documents and plans.
- Prepare project right of way certification.
- Act as an advocate for the Right of Way Branch by communicating concerns/issues between the project team and the Right of Way Branch.

A.7. Geotechnical

- Provide technical guidance on geotechnical related issues.
- Prepare and maintain the geotechnical reports.
- Act as an advocate for the Geotechnical Unit by communicating concerns/issues between the project team and the Geotechnical Unit.

A.8. Pavement Design & Collection (Under Development)

- Prepare pavement designs.

A.9. Environmental Analysis

- Provide environmental documentation and applicable permits.
- Coordinate any mitigation to address environmental impacts.

- Communicate with the appropriate State, Local, and Federal agencies to obtain the required permits.
- Coordinate public meetings required by NEPA/SEPA.
- Prepare the project environmental certification.
- Act as an advocate for the Environmental Analysis Unit by communicating concerns/issues between the project team and the Environmental Analysis Unit.

A.10. Environmental Policy

- Recommend environmental document type.
- Provide review of environmental documentation.
- Provide NEPA/SEPA guidance.
- Act as an advocate for the Environmental Policy Unit by communicating concerns/issues between the project team and the Environmental Policy Unit.

A.11. Location and Surveys/Photogrammetry

- Provide mapping, aerials and survey, and alignment data to the project team.
- Prepare location control sheets for inclusion in contract plans.
- Act as an advocate for the Location and Survey's Unit by communicating concerns/issues between the project team and the Location and Surveys Unit.

A.12. Contract Standards and Specifications

- Prepare special provisions.
- Prepare special details
- Review final plans, special provisions, and estimates.
- Prepare final estimate and develop contract.
- Act as an advocate for the Contract Standards and Specifications Section by communicating concerns/issues between the project team and the Contract Standards and Specifications Section.

A.13. Transportation Planning

- Provide technical traffic operations information.
- Provide traffic data and projections.
- Act as an advocate for the Traffic Information Division by communicating concerns/issues between the project team and the Traffic Information Division.
- Provide guidance and advice during the design phase to the project team on constructability and maintainability issues.

A.14. Utilities (Under Development)

-

A.15. Divisions

- Provide input to the design team regarding the project elements that the Division would like to see included or addressed in the project.
- Provide constructability and traffic control technical assistance.
- Develop working days, damages, etc. for the special provisions.
- Provide technical maintenance information.
- Highway contract administrators.
- Responsible for approving highway contract change orders.
- Responsible for project development of Division managed projects.
- Act as an advocate for the Division office by communicating concerns/issues between the project team and the Division office.

A.16. Rail Division (Under Development)

-

A.17. Transportation Program Management (Under Development)

-

A.18. Bicycle and Pedestrian Division (Under Development)

-

A.19. Landscape Design & Development (Under Development)

-

A.20. Roadside Environmental (Under Development)

-

A.21. Rest Area Section (Under Development)

-

Appendix B: Sample Project Benefits and Risks

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Sample Project Benefits and Risks

B.1. Sample Benefits

The benefits listed here serve to counterbalance the costs, risks, and uncertainty of the project and explain to the reader why we are doing the project in the first place. Initially these should be derived from the project purpose and need statement, but feel free to go beyond that and use more subjective and positive points. Be careful not to change the project purpose and need.

Remember to state benefits that can be backed up and to qualify statements as necessary (i.e. expected to, anticipated, preliminary, proposed), especially when in NEPA. The following are examples of project benefits:

- Improve capacity
- Improve operations
- Improve safety
- Improve access
- Meet stakeholder/public expectations
- Improve quality of life
- Support economic development
- Reduce trip times
- Reduce vehicle emissions
- Reduce idling
- Provide pedestrian and bicycle access
- Improve mobility
- Meet ADA standards
- Reduce maintenance costs
- Beautify roadway, neighborhood, structure, etc.
- Improve or protect environment
- Improve water quality
- Meet driver expectations
- Improve driver comfort
- Increase clearance
- Reduce erosion

B.2. Sample Risk Elements

B.2.1. Technical Risks

- Design incomplete

APPENDIX B
SAMPLE PROJECT BENEFITS AND RISKS

- Right of Way analysis in error
- Environmental analysis incomplete or in error
- Unexpected geotechnical issues
- Change requests because of errors
- Inaccurate assumptions on technical issues in planning stage
- Surveys late and/or surveys in error
- Materials/geotechnical/foundation in error
- Structural designs incomplete or in error
- Hazardous waste site analysis incomplete or in error
- Need for design exceptions
- Consultant design not up to Department standards
- Context sensitive solutions
- Fact sheet requirements (exceptions to standards)
- Others

B.2.2. External Risks

- Landowners unwilling to sell
- Priorities change on program
- Inconsistent cost, time, scope, and quality objectives
- Local communities pose objections
- Funding changes for fiscal year
- Political factors change
- Stakeholders request late changes
- New stakeholders emerge and demand new work
- Influential stakeholders request additional needs to serve their own commercial purposes
- Threat of lawsuits
- Stakeholders choose time and/or cost over quality
- Others

B.2.3. Environmental Risks

- Permits or agency actions delayed or take longer than expected
- New information required for permits
- Environmental regulations change
- Water quality regulations change
- Reviewing agency requires higher-level review than assumed
- Lack of specialized staff (biology, anthropology, archeology, etc.)

APPENDIX B
SAMPLE PROJECT BENEFITS AND RISKS

- Historic site, endangered species, wetlands present
- EIS required
- Controversy on environmental grounds expected
- Environmental analysis on new alignments is required
- Formal NEPA/404 consultation is required
- Formal Section 7 consultation is required
- Section 106 issues expected
- Project in an area of high sensitivity for archaeological resources
- Section 4(f) resources affected
- Project on a Scenic Highway
- Project in a floodplain or a regulatory floodway
- Project does not conform to the state implementation plan for air quality at the program and plan level
- Water quality issues
- Negative community impacts expected
- Hazardous waste preliminary site investigation required
- Growth inducement issues
- Cumulative impact issues
- Pressure to compress the environmental schedule
- Others

B.2.4. Organizational Risks

- Inexperienced staff assigned
- Losing critical staff at crucial point of the project
- Insufficient time to plan
- Unanticipated workload
- Delay getting approvals, decisions
- Functional units not available, overloaded
- Lack of understanding of complex internal funding procedures
- Not enough time to plan
- Priorities change on existing program
- New priority project inserted into program
- Inconsistent cost, time, scope and quality objectives
- Others

B.2.5. Project Management Risks

- Project purpose and need is poorly defined
- Project scope definition is poor or incomplete
- Project cost, scope, schedule, objectives, and deliverables are not clearly defined or understood
- No control over staff priorities
- Too many projects
- Consultant or contractor delays
- Estimating and/or scheduling errors
- Unplanned work that must be accommodated
- Communication breakdown with project team
- Pressure to deliver project on an accelerated schedule
- Lack of coordination/communication
- Lack of upper management support
- Change in key staffing throughout the project
- Inexperienced workforce/inadequate staff/resource availability
- Local agency issues
- Public awareness/support
- Agreements

B.2.6. Right of Way Risks

- Utility relocation may not happen in time
- Freeway agreements
- Railroad involvement
- Objections to Right of Way appraisal take more time and/or money
- Others

B.2.7. Construction Risks

- Inaccurate contract time estimates
- Permit work windows
- Utility
- Surveys
- Buried man-made objects/unidentified hazardous waste
- Other

B.2.8. Regulatory Risks

- Water quality regulations change
- New permits or new information required

DRAFT - SUBJECT TO CHANGE