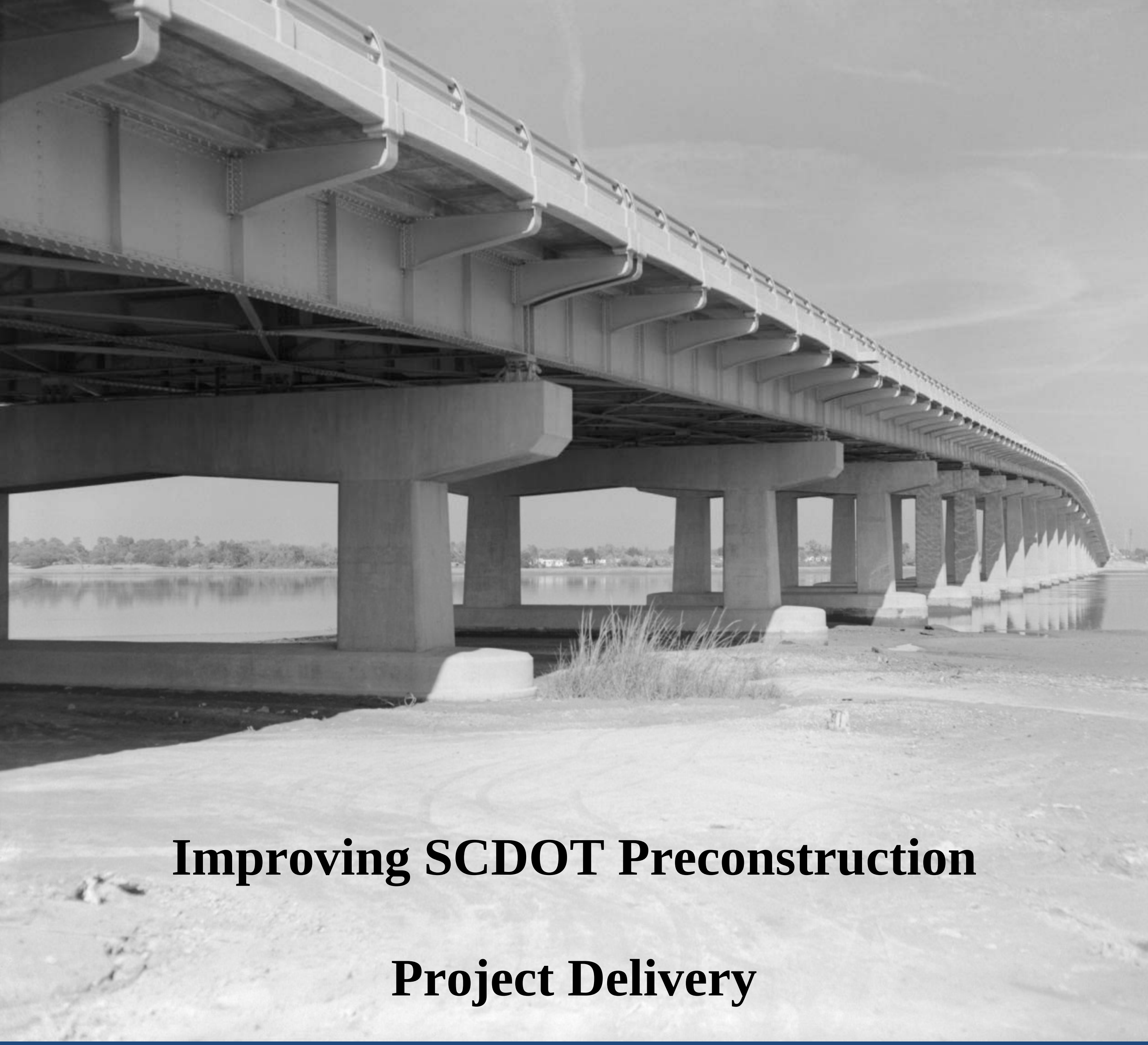

Improving SCDOT Preconstruction Project Delivery

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SCDOT Program Manager

SCDOT

Abstract

South Carolina Department of Transportation (SCDOT) Preconstruction Division is responsible for efficiently developing highway improvement projects that enhances the safety and mobility of the citizens of South Carolina. Transportation agencies across the country are increasingly challenged to deliver projects with greater speed and efficiency. SCDOT has traditionally struggled with setting reliable project delivery schedules and meeting those expectations as reflected in agency project delivery performance metrics. The strategic performance goal set by our Agency Leadership is to deliver at least 75% of the planned projects each year. SCDOT did not meet this performance measure goal in FFY 2017, in which only 60% of projects delivered on schedule. This research project examines the current Project Development Process and identifies gaps that could be further evaluated and updated to guide staff to processes to improve the success of project planning and design. In addition, this project includes a benchmark study of other Department of Transportations for identification of the industry's best management practices. These practices could be implemented in order to streamline processes and improve project communication and documentation. The recommended procedural improvements in this study are focused on alignment of agency processes and practices with SCDOT strategic goals to improve project delivery and increase the reliability of our road and bridge network.

Improving SCDOT Preconstruction Project Delivery

The South Carolina Department of Transportation (SCDOT) Preconstruction Division supports the SCDOT mission by developing, designing and delivering quality engineering projects for the construction of highways and bridges across the state of South Carolina. Our goal is to provide these projects efficiently and to meet the agency performance measures for delivering projects on-time and on-budget. Presently, SCDOT outlines their planned project obligations by federal fiscal years FFY (October 1- September 30). This is documented in a published SC Statewide Transportation Improvement Program (STIP) which covers a six year period of program delivery. The strategic performance goal set by our Agency Leadership is to meet 75% of the planned obligations by delivering projects to construction on schedule. SCDOT did not meet this performance measure goal in FFY 2017, in which only 60% of projects delivered on schedule. The purpose and scope of this project is to identify the potential gaps in the current project delivery processes and to research industry best management practices at other DOTs to identify potential process improvements for SCDOT's project delivery performance.

This research includes analysis of SCDOT bridge project delivery historical data and staff surveys. The critical starting point in any process improvement is the establishment of the baseline performance for the existing processes. The data analysis and surveys confirm that SCDOT has a history of meeting planned project schedules and budgets at an average rate of only 14%. The reasons for project delays, schedule changes and/or budget adjustments vary. However, in most cases these could be attributed to the realization of unmitigated project risks during project development. Additionally, there appears to be significant delays in the initiation and scoping of projects as well as poor documentation of scope, budget and schedule baselines.

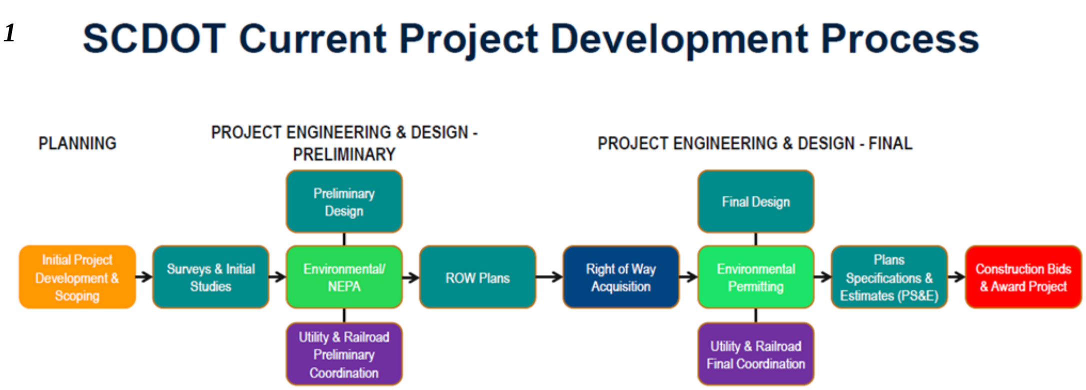
These gaps should be further analyzed and a value engineering study conducted on the process as a means of determining where waste could be eliminated and to maximize the value added to the process.

This project also includes literature research and a benchmark study in an effort to identify strategic best management practices or measures that could be implemented to streamline processes and improve project communication and documentation. This study will include recommendations for possible process improvement strategies that the agency can take into consideration in future strategic plans.

SCDOT Current Project Development Process

SCDOT has a general Preconstruction Project Development Process that outlines the roles and responsibilities of the project team in developing a project. This process can be found on the SCDOT webpage (at http://www.dot.state.sc.us/doing/road_projects.aspx) and is also included in Appendix A of this report. This process was last updated in December 2011 and is outdated in many aspects due to changes in other ancillary processes. There are several hand-offs in this process between groups within SCDOT as the project is developed. The current process lacks clear delineation of initiation and completion of activities including project control, reporting and documentation standards. An overview is shown in the figure below:

Figure 1



Prior Preconstruction Process Improvements

SCDOT has implemented numerous process improvements in the last ten years in efforts to streamline the project development process and improve project coordination. Recent process improvements include:

1. Re-organization of Preconstruction functional groups into team oriented Regional Production Groups to co-locate teams and improve coordination/communication.
2. Environmental Documentation and Permitting streamlining efforts including addition of Regulatory Agency Liaisons and SCDOT Environmental Staff.
3. Formal Consultant Contracting Procedures, Tools and Training.
4. Creation of a Design Build Group for alternative project delivery methods.
5. Improved Public Involvement & Transparency with GIS Project Viewer, Public Involvement Portal, social media outlets, Customer Service Office and phone bank.
6. Implementation of Agency Performance Measures.
7. Implementation of Formal Utility Coordination Manuals, Tools & Training.
8. Expansion of on-call consultant contracting options for specific project tasks.

All of the improvements outlined above have resulted in improved processes, documentation, training and communication during project delivery.

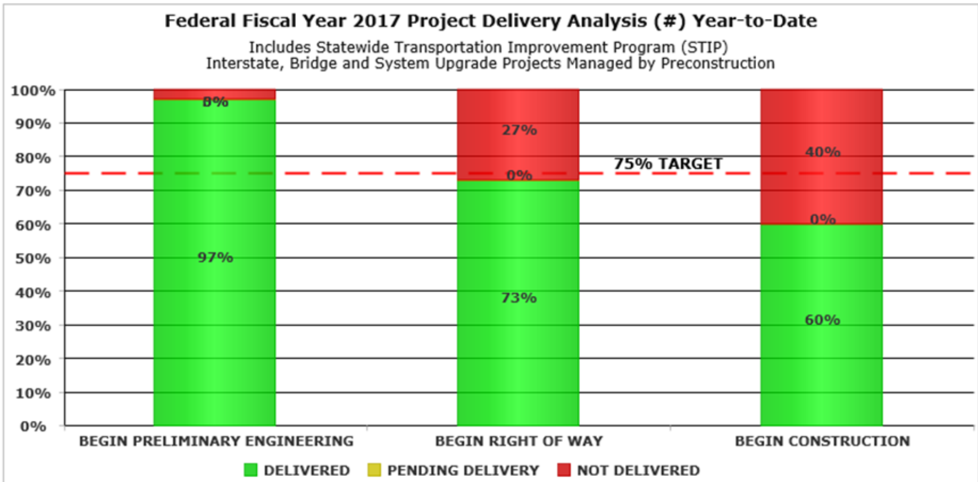
Current Project Delivery Performance

The first step in improving project delivery is to assess our historical project delivery performance in order to gauge how well our current processes are performing.

SCDOT Organizational Performance DASHBOARDS

SCDOT implemented performance dashboards on our website in order to communicate organizational performance in meeting the goals and objectives outlined in the Strategic Plan. The agency currently only tracks one Project Delivery performance measure for improvement and has not yet met the targeted performance goals for project delivery in the figure below:

Figure 2



Historical SCDOT Bridge Project Performance

As a part of this research, bridge project data was collected from the Project Programming System (P2S) database of active bridge projects since 2010. Prior to 2010, the bridge program was included in the STIP as a lump sum program and did not outline funding or delivery year commitments to individual bridge projects. Since 2010, the funding and delivery commitments to bridge projects have been itemized to individual bridge projects. The data collected and analyzed for the bridge program are included in Appendix B of this report. This data only includes bridge projects delivered by Preconstruction and does not include maintenance or design build bridge projects. This data includes 141 bridge projects that were (or are) currently under development by Preconstruction from 2010 until 2017. Of these projects, 39% are being developed using in-house design forces and 61% are being developed using consultant design forces. Analysis of the bridge project delivery data revealed several gaps that may be indicative of potential issues in the current project development process:

1. The bridge projects funded in the STIP are typically not adequately funded for project delivery, planning only about 50% of the actual funding required.

2. There is a significant delay (7-12 months on average) between commission approval of a bridge project and the actual initiation of Preliminary Engineering work on the project. The exact cause of this delay could not be identified but it could possibly be the planning process for public notice, local approval and/or official notification to Preconstruction to initiate work. This could also be due, in some cases, to heavy Preconstruction workloads and delays in initiation of the project scoping. Planning typically plans bridge projects in bundles once a year instead of in smaller groups over the course of the year. This creates a pinch point for Preconstruction's ability to initiate work on a large number of projects.
3. Initial project delivery schedules tend to be overly optimistic and not based on actual past project delivery performance data or tied to project risk assessments.
4. Project Management workloads are not evenly distributed among regional production groups resulting in groups with lower ratios having less project delays.
5. A majority of bridge projects experience delays on average of 15-20 months due to unexpected or unplanned risk events occurring during the project development. Such as a higher level environmental permit or floodplain map revision approval was required, or the right of way acquisition was more complex than anticipated.

Review of this data confirms that there are some significant gaps in the project planning process, documentation, hand-offs and the resulting project delivery process.

Literature Research

The researched literature focused on identifying common reasons for project delivery delays across other DOTs and identifying their best management practices for project management and project delivery that have been implemented with success.

Causes of Project Delivery Delays

The Strategic Highway Research Program issued a report in 2012 that identified common constraints to transportation project delivery (Parametrix, Inc, Venner Consulting, Institute for Natural Resources, 2012). The sixteen most common constraints identified in this study are:

1. Avoiding Policy Decisions through continual analysis;

2. Conflicting Resource Values;
3. Difficulty agreeing on impacts or mitigation;
4. Inability to maintain agreements;
5. Ineffective internal communication;
6. Inefficient agency consultation;
7. Inordinate focus on singular issues;
8. Insufficient public engagement or support;
9. Issues arise late in process;
10. Lengthy review/revisions cycles;
11. Negative or critical media coverage;
12. Relocation process delays;
13. Revisiting past decisions;
14. Shortage of staff dedicated to project development;
15. Slow decision making; Stakeholder controversy and opposition;
16. Unusually large or complex projects.

This report also recommends strategies organized around improving internal coordination and communication, streamlining decision making, improving resource agency involvement and collaboration, improving public involvement and support, demonstrating real commitment to the projects, and coordinating work across phases of delivery.

Another study performed by the American Association of State Highway and Transportation Officials identified two primary challenges that affect delivery of transportation projects as (1) coordination of federal requirements; and (2) the processes used to deliver projects (AASHTO 2007). This study also found that “a major transportation project can easily take 10 to 15 years from start to finish, even in the absence of controversial issues that can slow it down still further”. This study recommends that DOTs focus on improving the traditional, sequential project planning and delivery process in order to expedite and improve project delivery.

A more recent study performed by the Texas Transportation Institute identified the typical causes of Project Delays in the Preconstruction phase as follows (Beaty, Ellis, Epps, Glover, Norboge, Stockton, 2011):

1. Project priority changes in relationship to other projects;
2. Federal/State Legislation;
3. Interagency Coordination;
4. Project Management Issues (poor project definition, lack of documentation of assumptions, and missed milestones);
5. Funding;
6. Litigation;
7. Railroad Permits;
8. Right of Way Acquisition delays;
9. Utility Coordination/Agreements delays;
10. Mandatory Environmental review process delays;
11. US Army Corps of Engineers permit delays;
12. Local funding agreements not executed as anticipated;
13. Delays in PS&E preparation (either in-house or consultant);
14. Unanticipated Letting events (high bids, delayed bid openings, protects).

The cause of project delays outlined in this Texas study appeared to be more specific to the project development process and similar to those specific reasons for project delays reflected in the analysis of SCDOT's bridge project data. This data reveals gaps in the project development process that should be analyzed further for process improvements.

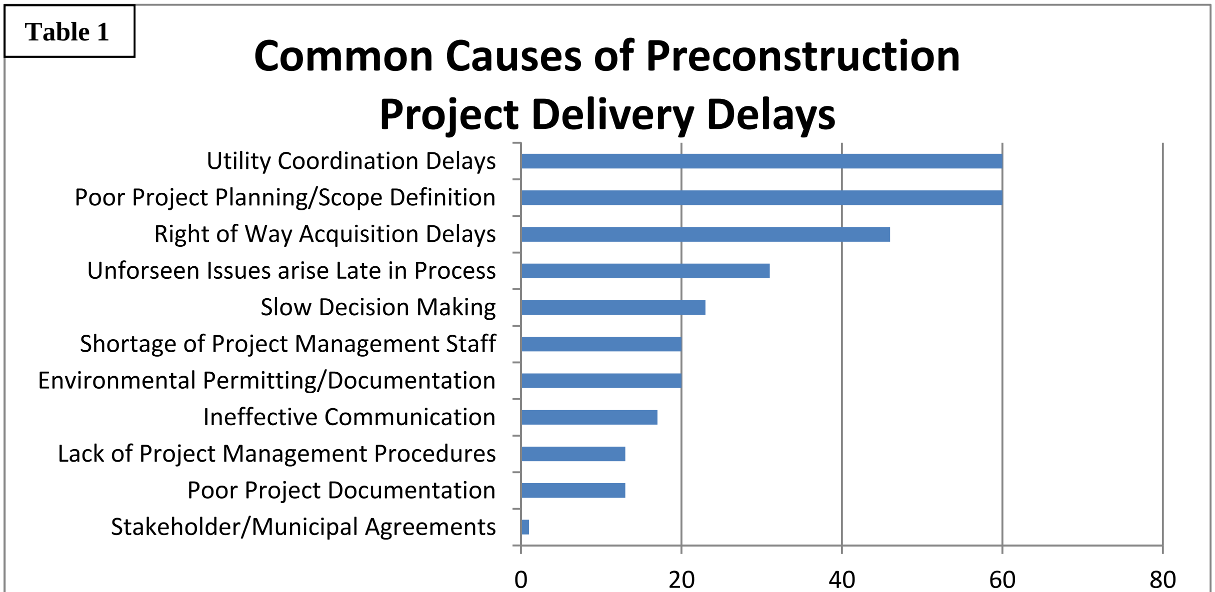
SCDOT Project Delivery Staff Surveys

As a part of this project, surveys of SCDOT Preconstruction project management and design management staff were conducted in order to obtain their input on the most common causes of project delivery delays as well as receptivity for potential improvement strategies. The survey results are provided in Appendix C of this report. This survey reveals that a majority of staff felt that project scopes, goals and constraints were not clearly communicated at project initiation. Staff members were also dissatisfied with the current tools and guidance available for project management and project scheduling. There appears to be an overwhelming dissatisfaction with the functionality and performance of the scheduling software currently available to staff in its existing configuration (85% of project managers and 100% of design managers). A majority of staff members surveyed supported (80%) the implementation of new project management information system or software.

Causes of Project Delivery Delays

The SCDOT staff survey identified the following primary causes for project delivery delays:

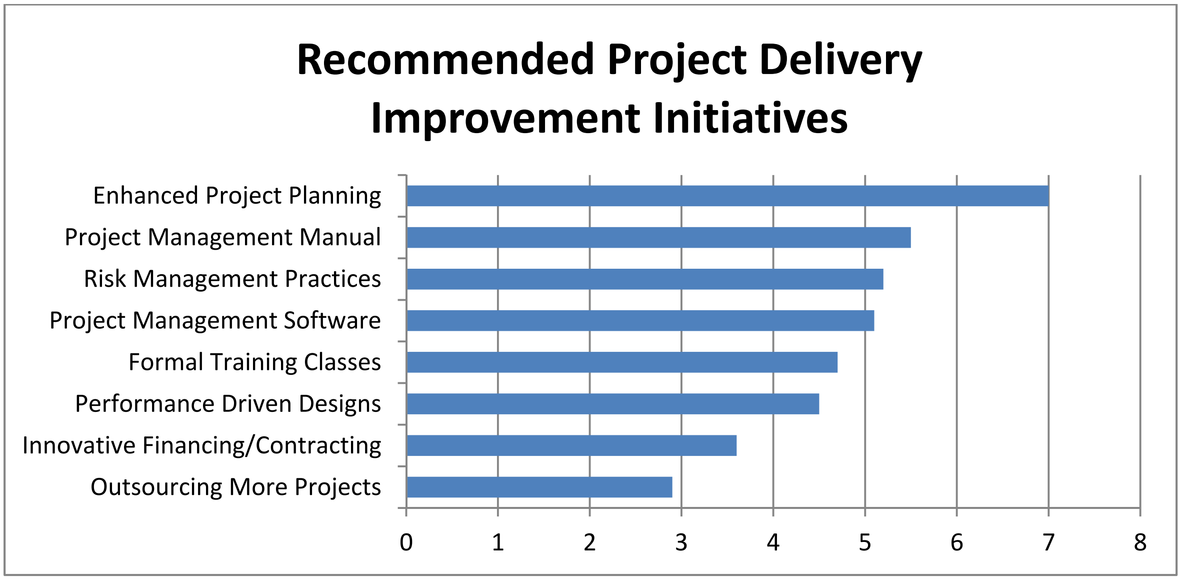
Table 1



Strategies for Improving Project Delivery

The survey respondents were also provided with a list of recommended project delivery improvement strategies as identified through researched literature. The Transportation Research Board Report on "Accelerating Transportation Project and Program Delivery: Conception to Completion" identified best management practices as a result of their case studies (Keck, Patel, Scolaro, Bloch, & Ryan, 2010). This study identified trends in the transportation industry toward the following strategies: Performance Measures; Front-End Approach to Planning, Scoping, Purpose & Need; Project Management Institute Practices; Leadership Support for Change; Communication, Collaboration & Cooperation Strategies for Interagency Coordination; Team Approach; Organizational Structure Realignment; and Transparency. Some of the practices outlined in this study have already been implemented at SCDOT. These strategies were not included in the survey. The survey respondents were asked to prioritize the improvement strategies by importance for those strategies that they would like to be considered for implementation at SCDOT. The results are outlined in the table below.

Table 2



The results of the survey clearly indicate that staff is aware of deficiencies in the current processes, support and tools available to them for delivering projects. The Staff appears to be supportive of project delivery improvement strategies that could be implemented by SCDOT Leadership.

Potential Strategies for Improving Project Delivery

Benchmark Study

In order to identify what project delivery strategies have been implemented by other DOTs, a benchmark study was also conducted. The results of this benchmark study are included in Appendix D of this report. This study revealed that approximately 29% of DOTs surveyed (15/51) have implemented formal project management procedures in the form of a Project Management Manual to include formal project manager training programs. Most of these DOTs have also adopted the industry best management practices for project management as outlined by the Project Management Institute (PMI). Approximately 22% of DOTs have also restructured to create Project Management Offices (PMO) within their organization to further facilitate improved project delivery and project performance. The creation of a PMO creates a collaborative co-located environment that allows strategic assignment of projects based on complexity to Project Managers. The PMO leadership and senior staff are also responsible for development of manuals, tools and processes that streamline project delivery. Many of the DOTs that implemented these project delivery strategies have improved Project Delivery Performance Measures for Projects delivered on time and within budget as seen in some of the performance measures in Appendix D.

Review of Industry Project Management Best Practices

The National Cooperative Highway Research Program Report on "Best Practices in Project Delivery Management" identified four focus areas for best management practices. These areas include Project Management, Performance Measures, Contracting Practices and Community Involvement (Detmer, Lester, McMinimee, Mroczka, Nichols, Schaftlein, Taylor, Teikari, Warne & Yew, 2009). Some of the best management practices identified in this study for project management included Project Management Structure, Shared Leadership, Risk Management, Use of Consultants, Investment in data management tools, and maintaining core competencies. Most of these are also areas identified as weaknesses at SCDOT. Current SCDOT leadership has already implemented improvements in the focus areas of Performance Measures, Innovative Contracting Practices, Use of Consultants and Community Involvement.

Review of Project Management Institute Publications on best management practices was also conducted as part of this project. PMI is the world's leading organization for project management practices and resources. PMI has a publication entitled "Implementing Organizational Project Management" that is specifically designed to assist organizations in the implementation of industry best management practices (PMI, 2014). This publication would be an excellent resource for consideration of any future changes to the agency's Target Operating Model.

The National Cooperative Highway research program has also published "Guidance for Transportation Project Management" which provides a toolbox that offers detailed project management practices which may be used to achieve a higher level of project success (Jacobs Engineering, PSMJ Resources Inc. & Virginia Polytechnic Institute and State University, 2009). The recommended best management practices in this report align with industry practices outlined by PMI which have been customized for the transportation industry. This document could be used by DOTs to help develop agency specific guidance.

The literature research and benchmark study reveals several key project delivery strategies that other DOTs across the nation have implemented with success. These are strategies that should be considered by SCDOT. The strategies include: implementation of industry recommended project management practices and processes; formalized processes and training;

implementation of Project Management Information Systems that streamline coordination, documentation and project/program performance metrics; preservation of Organizational Process Assets for use in planning future projects; Risk Management Practices for informed decisions; project prioritization based on risk, funding and other considerations relevant to the organizations strategic plan.

Recommended Process Improvement Concept

This report identifies the greatest gap exists in the current processes and practices for Project Planning & Scoping prior to project initiation. There is no formally documented and detailed process for this activity or any formal hand-off documentation of the project initiation and commitment. In addition, there is also a lack of leadership approval and stakeholder buy-in at this early stage of project development, thus leading to confusion on the project scope, goals and constraints throughout project development. This increases the risk of change and rework during project development. Implementation of a formal process that includes formal project charter/definition documentation, business case review, stakeholder buy-in, alignment with agency financial planning and leadership approval prior to project delivery initiation would streamline project development. Appendix E of this report includes a conceptual proposal for the potential implementation of this recommended Project Life Cycle process improvement. The development of this proposal is aligned with industry best practices as outlined by PMI and other DOTs that were researched as a part of this project.

Conclusions

SCDOT is a large agency with a very important mission that impacts the daily lives of every citizen of South Carolina. The public relies on SCDOT to provide reliable and safe transportation facilities and SCDOT has a large system to maintain with limited resources. The public has recently entrusted SCDOT with additional gas tax funding that will be utilized to improve the current condition of the system under an aggressive 10 year project delivery plan. SCDOT is challenged with delivering this plan concurrently with the increasing loss of institutional knowledge as experienced staff retires under the Teacher & Employee Retention Program (TERI) program. Therefore, SCDOT must be innovative in how they utilize and develop their current resources. It is critical that SCDOT invest in documenting procedures and practices and provide streamlining tools to employees in order to assist in their development and project performance.

This study identified gaps within the current SCDOT Project Delivery Process to include:

1. Insufficient documentation of Project Scope, Goals & Constraints that align with Agency Goals and Constraints / Executive Leadership Buy-In prior to project delivery;
2. Informal Project Management Processes and Procedures;
3. Outdated Plan Development Processes that do not align with current practices;
4. Inadequate Staff training and professional development programs directly related to job functions and responsibilities;
5. Inadequate Project Documentation Software or Information Management Systems that document project decisions, baselines and performance;
6. Inadequate Risk Identification and Management for Projects & Programs to better inform decisions and establishment of goals and constraints;
7. Inadequate documentation of process performance, auditing individual processes for opportunities/value improvements, and documenting lessons learned for continuous process improvement and adaptation.

While some of the recommended improvement strategies will take some time to implement, the following interim strategies could be implemented in order to assist in the transition.

Priority #1: SCDOT should consider a long term strategy of development and implementation of a formal project planning process with a documented project charter to hand-off to Preconstruction for Project Delivery. Recently, SCDOT has implemented the Project Definition Report that is utilized for projects being considered for alternative design build project delivery. Since this Planning Strategy could take some time to implement, an interim strategy could be to utilize the Project Definition Report (PDR) on all projects in the interim as an effort to document baseline scope, budgets and schedules for new projects. Planning staff should be included in the development of this document in order to facilitate improved communication and collaboration between Planning and Preconstruction as this transition is initiated. A longer term solution would be the implementation of a Project Life Cycle process that includes a formal project planning process. This project life cycle would include documenting the project scope or project charter (similar to the PDR) that would streamline the hand-off of projects from Planning to Project Delivery. A proposal for SCDOT's Project Life Cycle is included in Appendix E.

Priority #2: A strategy should be considered to invest in allocating funding for development and implementation of a Project Management Manual and supporting tools. Many DOTs have reorganized to include a Project Management Office (PMO) structure within their organization in order to assist in facilitating development of Manuals and Tools. The leadership of the PMO along with experienced project managers within its structure is charged with leading the development of the support manuals, processes and tools. An alternative strategy would be to select key staff members to work together on a task force with the assistance of a consultant to implement this initiative. SCDOT offered the PMI Project Management Professional training class to SCDOT Project Management staff last year. Exposing the task force to this course and other industry practice knowledge courses is an important component to selection of the right strategies for SCDOT.

Priority #3: Implementation of risk management practices into project planning and delivery for better informed project goals and decisions. This strategy could be accomplished in tandem with the second initiative outlining development of Project Management Procedures and Tools. However, an interim strategy to assist in quick wins towards implementation of this goal would be to contract with a risk management consultant firm on a small purchase contract to develop a risk management tool customized for SCDOT along with a risk management training class for staff.

Priority #4: Implementation of Project Management Information System (PMIS) or collaboration software which is the most challenging and time intensive initiative proposed. This system should include a scheduling component or include a concurrent overhaul of the current scheduling software to be interactive with the new system. A key factor in improving project delivery performance is the measurement of current project delivery performance which a PMIS should facilitate. An interim strategy that could be considered is to make some minor improvements to the current P2S project programming system so that project scope, budget and schedule baselines are captured on new projects. This system has the capability to produce reports once this data is captured in the system that could compare the baseline to the current in order to measure project performance over time. This improvement may be addressed under the current maintenance agreement with the software developer.

In conclusion, SCDOT has made many improvements over the last decade that has assisted in streamlining project delivery and addressing many of the constraints to transportation project development. However, there are still some challenges to be tackled in the upcoming years in order to achieve the agency's strategic goals. A critical component to implementation of any change is executive leadership support and direction for any adopted initiatives. The goal is to streamline processes and implement efficient engagement of all divisions as One Team in the success of the Department's project delivery. Implementing a Project Life Cycle process model, as outlined in Appendix E, engages Planning staff in the project definition process and documenting the hand off of projects to project delivery will streamline these efforts. Committing only to those projects with defined scopes and realistic budgets aligned with Agency financial constraints will reduce unnecessary rework due to changing priorities, budgets and scopes. These improvements will improve the efficiency of project delivery in the future with a more focused and dependable delivery approach. The goal of these recommendations is alignment of project delivery with SCDOT strategic agency goals, business plans and Asset Management.

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Appendix A

SCDOT Project Development Process, 2011

PRECONSTRUCTION PROJECT DEVELOPMENT PROCESS

Table of Contents

December 2011

Preconstruction Project Development Process

Showing Sub-Tasks & Responsible Party

Note: The Program Manager (PM) is the project leader and will lead the Project Development Team (PDT) throughout this process in order to move the project to completion. The process below assumes the project has a defined purpose and need and is approved by the Commission and is included in the State Transportation Improvement Program (STIP). Candidate projects (or groups of projects) would normally be identified in accordance with Legislative Act 114 through coordination with the Planning Office and the Metropolitan Planning Organization (MPO) or Council of Government (COG). Local Public Agency (LPA) or County Transportation Committee (CTC) projects developed by the Department may follow an abridged process.

This information is not inclusive of all items that will be required but is general information for the user. The numbering convention used below should not be considered ordered steps but as a way to indicate milestones or other general tasks. Several items include alphanumeric codes in parenthesis that reference primavera tasks (i.e. PM010).

"Dates for Assembling Information on Construction Obligations" should be followed where applicable. (http://iwww.dot.state.sc.us/PreConstruction/Support/letting/operationscenter.shtml)

1. Advanced Project Planning Report (APPR) and Corridor Feasibility Studies (CFS)

- The Office of Planning works with MPOs and COGs to identify eligible projects and facilitates their inclusion in their Transportation Improvement Programs (TIP) and the STIP. Whenever a major widening or new location project is selected from a long-range plan for inclusion in the STIP, the Planning Office develops an Advanced Project Planning Report (APPR) or Corridor Feasibility Study (CFS). An APPR and CFS is a document that identifies impacts to the surrounding environment and communities. The SCDOT Program Manager should have an approved (by MPO or Local Representative) APPR developed by Planning Office for the proposed project prior to scoping the project and requesting authorization of funding for design services from the Federal Highway Administration (FHWA).

2. Initial Project Development Team Meeting (Scoping Meeting)

The purpose of this meeting is to explain the purpose and need of the project to the Project Development Team – Program Manager

- Coordinate establishment of the Project Development Team (PDT) – Program Manager [Regional Production Group (RPG) Design Staff, Preconstruction Support Design Staff, Surveys Office, Environmental Office, Utilities Office, Rights of Way (R/W) Office, Railroad Projects Office, Traffic Engineering, Program Controls Unit, District Engineering Offices, and FHWA]
- Determine if outside design resources will be necessary for the project – Program Manager, Design Manager, RPG Engineer
- Revise schedule based on time necessary to issue notice to proceed for outside design resources – Program Manager

Team Member	Items to Gather for Initial Project Meeting
Program Manager	Purpose and need of project. Scope of project (construction, reconstruction, Non-Freeway Resurfacing, Restoration and Rehabilitation (3R)). Logical termini for project, fiscal year obligation commitments
RPG Design Office (Including, when applicable, Road Design, Hydraulic Design, Bridge Design, Roadway Structure Design, and Geotechnical Design)	Gather available plans, and reports relevant to the project corridor. (Structure Inventory & Appraisal (SI&A) reports, soil information, aerial photos, and functional classifications)
Traffic Engineering	Gather available traffic and crash information currently on file. Determine “Significant” category and traffic control limitations
Environmental Office	Gather available environmental information
Planning Office	Gather available planning information and design year volumes
Utilities Office	Determine if corridor has major utility distribution/collector lines (Exact location not required at this time)
Program Controls	Collect project information to establish draft project schedule
District Office	Gather information to assist in preliminary design

[For all Federal Aid projects, the FHWA environmental and operations representative needs to be part of the review].

- Schedule and conduct office/field review, allowing a minimum of two weeks advance notice – Program Manager (PM020)
- Define Termini, Purpose of Project – Program Manager
- Identify public involvement requirements/methods. Complete public involvement form – Program Manager
- Prepare and distribute “minutes” from initial project meeting – Program Manager

Departments listed below should be contacted and possibly added as a member to the project development team as necessary

- The Bridge Construction Office should be used as a resource on bridge projects as necessary
- Traffic Control office may also need to be involved early in the design phase to address constructability/staging concerns
- Landscape Architect should be used as a resource if landscaping is likely to be an element of the project.
- Railroad Projects Office to provide information regarding requirements and future plans.
- Office of Materials and Research – See EDM 15 for pavement type selection process.

3. Initial Cost Estimates and Schedule

- Request cost estimate from Value Engineering – Program Manager (Due to time necessary to complete cost estimates previous estimates provided to MPO/COG may be necessary for initial programming).
- Coordinate the gathering of cost estimates from all affected sections, such as RPG, Right of Way, Utilities, Railroad Projects Office, Traffic Engineer, etc.–Value Engineer
- Compile and distribute cost estimate to Program Manager for review & comments – Value Engineer
- Distribute cost estimate to the appropriate funding authority – Program Manager
- With Program Manager, coordinate with MPO/COG, etc., and modify project costs and termini in STIP as appropriate – Planning Office

4. Program Action Request (PAR) Submitted

- Estimate funding for Consultant and in-house services as needed – Program Manager
- Include Railroad preliminary engineering cost in PE budget as needed – Program Manager
- Prepare and submit PAR, with proposed schedule [including establishing bridge PCNs, as appropriate] - Program Manager (PM010)

5. Project Authorization Received – Preliminary Engineering Funding Approved

- Immediately notify Program Manager once charge code is established – Preconstruction Resource Management (PCM005, PCM010)
- Notify PDT of project information (File Number, PCN, and Charge Code) – Program Manager

6. Surveys and Initial Studies

- Submit application, fees, and insurance requirements to railroad for approval 60 days prior to conducting surveys or geotechnical borings on railroad right of way – Railroad Projects Office
- Identify areas that may need geotechnical data to facilitate design – RPG Geotechnical Design
- Consider identifying wetland boundaries for survey crew to locate when surveying – Environmental Office (ENV030), Program Manager, Design Manager
- Prepare project-specific portion of eminent domain ad and submit along with PCN & charge code to Environmental Office – Program Manager
- Submit first bridge letter for bridge replacement projects (see EDM 36) – Program Manager
- Submit eminent domain advertisement to appropriate media outlets for advertisement – Environmental Office (ENV010)
- Gather crash diagram and safety rank information from Traffic Engineering – Design Manager
- Prepare the survey and Subsurface Utility Engineering (SUE) request, allowing a brief review period by the PDT then submit the survey and SUE request to the Surveys Office - RPG Roadway Design (RDPD010, SURV010)
- Select and contract with Consultant (SUE, Mapping, etc.), when requested by Project Development Team and provide SUE data to RPG Roadway Design – Surveys Office

[Note: If follow-up survey requests become necessary, for instance, to extend a side road or ditch survey, the request will be prepared and submitted by RPG Roadway Design]

- Once survey data check is complete, submit survey information to RPG Roadway Design and notify the Program Manager (via E-mail) – Surveys Office (SURV020, SURV030, SURV040, SURV130, SURV140, SURV150)
- Submit Initial Studies Request (ISR) to Environmental Office – Surveys Office (PM050)
- Prepare and submit requests for traffic data and analysis to the Director of Traffic Engineering, including pavement loading – RPG Roadway Design
- Prepare and submit requests for pavement design to Pavement Design Engineer – RPG Roadway Design (RDRW042, RDRW043)
- Surveys received by RPG Roadway Design

7. Preliminary Design

- Coordinate with Environmental Management Office (EMO) to present at Agency Coordination Effort (ACE) meeting.
- Plot existing topography and determine plan sheet layout – RPG Roadway Design (RDPD030).
- Develop Design Criteria Report for Program Manager approval noting any design exceptions to SCDOT and/or AASHTO design standards – RPG Roadway Design, RPG Structure Design, RPG Hydraulic Design
- Prepare horizontal design (noting in design notebook and copying PM any changes made to minimize impacts to natural resources) – RPG Roadway Design and RPG Structure Design (RDPD030)
- Request Bridge Hydrology Design – RPG Roadway Design (RDRW020, HY010)
- Request Landscape Architect's input on landscape design – Program Manager
- For projects requiring alternative geometric designs, Value Engineer to prepare comparative cost estimates – Program Manager
- Provide bridge hydrology & hydraulic information for RPG Roadway and RPG Structure Design – RPG Hydrology Design (HY020, RDRW041)
- Prepare vertical design and bridge layout design – RPG Roadway and RPG Structure Design
- Place preliminary design onto existing topography and develop preliminary plans –RPG Roadway Design (RDPD050)
- If necessary, distribute the design to all members of the Project Development Team to review – Program Manager
- If necessary, distribute to Preconstruction Support (thru Program Manager) for QA review of design criteria, geometric design, pedestrian and bicycle accommodations, landscaping – RPG Roadway Design and/or RPG Structure Design
- Perform "Line and Grade" Design Field Review (see IB 2006-7), noting any potential design exceptions – RPG Roadway Design (RDRW060)
- Perform intersection analysis on major intersections on request of Program Manager – Traffic Engineering
- Develop Transportation Management Plan checklist (TMP) for Program Manager to complete and forward to Traffic Engineering – RPG Roadway Design (RDRW0401, RDRW0601)

- Distribute plans and cross sections to RPG Hydraulic Design to initiate drainage design-RPG Roadway Design (RDRW065, HY090)
- Verify receiving streams for project then check if listed on SCDHEC's most current 303(d) list and table for total maximum daily loads (TMDL) – RPG Hydraulic Design (HY001)
- Complete NEPA Bridge Scope and Risk Assessment Form – Environmental Office
- If necessary, coordinate and hold Public Information Meeting (PIM) – Program Manager
- Prepare Public Information Meeting Displays – RPG Roadway Design
- Initiate and coordinate value engineering study as necessary – Program Manager (PM040)

7.1 Design Review Meeting Conducted, Preliminary Design Finalized

- Analyze written comments received from preliminary design review process/PIM and determine feasibility of incorporating into design; notify team members of results – Program Manager with RPG Roadway Design and/or RPG Bridge and Roadway Structure Design
- Schedule/conduct office and, if necessary, field review with the Project Development Team to review comments and team members sign-off on revision/addition to preliminary design then resolve all design issues before finalizing the preliminary design – RPG Roadway Design and/or RPG Bridge Structure Design (RDRW060)

[Note: Provide one week minimum advance notice]

- Determine whether to require Fee Simple right of way or Slope Permission to cover construction slopes beyond new right of way – Program Manager
- Evaluate alternatives to retaining walls, e.g. purchasing additional right of way, changing alignment, etc., to determine most appropriate design – Design Manager
- Identify proposed structures that may require geotechnical investigation and submit to RPG Geotechnical Design to determine areas requiring geotechnical investigations – RPG Bridge Structure Design and RPG Roadway Structure Design
- Establish retaining wall and culvert structure alignment and stationing, provide to RPG Roadway Design Group a sketch showing additional right of way needed due to structure footprint or construction requirements – RPG Roadway Structure Design
- For roadway projects complete Geotechnical Checklist to determine if a geotechnical investigation should be performed – RPG Roadway Design
- Establish proposed boring locations & request Rights of Way Office to obtain drilling access permission - RPG Geotechnical Design
- Coordinate with Environmental Office to determine if site is historically significant or if there is soil, surface water, or subsurface water contamination – RPG Geotechnical Design
- Add proposed boring locations as determined by RPG Geotechnical Design to plans – RPG Roadway Design
- Request preliminary soil borings from Office of Materials and Research in areas needing geotechnical study– RPG Geotechnical Design
- Finalize Design Criteria Report for Program Manager approval noting any design exceptions to SCDOT and/or AASHTO design standards – RPG Roadway Design, RPG Structure Design, RPG Hydraulic Design
- RPG Roadway Structure Design Office to create list of facing options for visible structures to be presented at the Public Hearing – Program Manager
- Update cost estimates, if necessary, based on revised geometric design and structural requirements–Value Engineer

- Coordinate review of cost estimate and resolve the differences, if necessary – Program Manager
- Review and revise the project schedule as necessary – Program Manager and Program Controls Unit
- Incorporate changes requested by Railroad after Program Manager's approval and resubmit revised design to Railroad company – RPG Roadway Design and Railroad Projects Office
- Complete and distribute copies of the final preliminary design to all members of the Project Development Team excluding Program Controls – RPG Roadway Design
- Initiate design exception process identified by road, bridge, and hydraulic design – Design Manager
- Provide preliminary structure plan and profile and structure loading to RPG Geotechnical Design – RPG Bridge Structure Design or RPG Roadway Structure Design
- Provide preliminary geotechnical report including structure recommendations to RPG Structure Design – RPG Geotechnical Design
- Provide preliminary geotechnical report including relevant hydraulic parameters to RPG Hydraulic Design – RPG Geotechnical Design

7.2 Preliminary Right of Way Plans Completed

- Prepare preliminary right of way plans, cross sections, etc., necessary for a field review coordinated with Project Development Team and schedule a Right of Way Plans Field Review (See IB 2006-6) – RPG Roadway Design Office (RDRW085, RDRW95)

[Note: Program Manager will send plans to MPO and COG team members]

- Provide conceptual signing and traffic signal/ITS information as related to right of way acquisition, as necessary – Traffic Engineering
- Send typical section sheets to Pavement Design Engineer to verify pavement design – RPG Roadway Design
- Contact Utilities Office to review preliminary right of way plans to ensure all needed information is included on plans – RPG Roadway Design
- Develop Preliminary Bridge Plans- RPG Structure Design (BR1020, BR2020, BR3020, BRRR1050)
- Request subsurface investigations based on preliminary bridge plans – RPG Geotechnical Design (GT010)
- Coordinate with the Construction Office and establish the Constructability Review Team and date of their review – Program Manager (Reference: SCDOT Construction Manual – Section 101.3.1 (Constructability Review))

7.3 Preliminary Right of Way Design Field Review (see IB 2006-6)

- Coordinate and conduct a Right of Way Plans Field Review of the preliminary right of way plans by the Project Development Team. This review will determine the impact the roadway drainage has on right of way and construction. Include the District Utility Coordinator – RPG Roadway Design (RDRW095)
- Revise plans in accordance with comments from the Field Review – RPG Roadway Design

- Provide road plans, including plan and profile, cross-sections, pavement designs, and typical sections to Work Zone Traffic Control Coordinator in Traffic Engineering to begin preparation of work zone traffic control staging plans – RPG Roadway Design
- Provide revised plans including cross sections to RPG Geotechnical Design RPG Roadway Design
- Provide proposed structure design criteria to RPG Geotechnical Design – RPG Bridge Structure Design or RPG Roadway Structure Design
- Request final subsurface investigations for proposed structures – RPG Geotechnical Design (GT040)
- Notify Signing & Marking Plans Preparation Engineer in Traffic Engineering upon completion of plan and profile sheets to permit scheduling of signing and pavement marking plans preparation – RPG Roadway Design
- Notify Signal Systems Engineer of new signals (identified by District Traffic Engineer or Traffic Engineering Studies) and/or signal replacements – Program Manager
- Traffic Engineering to submit completed IMR or IJR to Program Manager – Traffic Engineering
- Submit Final Interchange Modification/Justification Report to FHWA – Program Manager

8. Utility and Railroad Preliminary Coordination

- For Railroad involvement, RPG Roadway Design to contact the Railroad Projects Office to review the project and determine what needs to be provided in Preliminary Design Plans submittal to the Railroad Company – RPG Roadway Design
- Conduct Utilities Coordination Meeting, when applicable – Utilities Office and Program Manager
- Determine if environmental permits should include impacts for relocating utilities – Program Manager, Utilities Office and Environmental Office

9. Environmental / National Environmental Policy Act (NEPA)

- Prepare and submit Project Planning Report (PPR) to the Environmental Office with a copy circulated through the appropriate offices – Program Manager (PM030)

[Note: PPR's shall be shared with the RPG Bridge Structure Design Office for projects involving a bridge]

- Begin preparing environmental document – Environmental Office (ENV020, ENV030, ENV040, ENV050, ENV060, ENVCE010, ENVEA010, ENVEA0101)
- Submit a copy of the Project Planning Report to the State Energy Office and FHWA, as appropriate – Environmental Office
- On all Consultant projects involving adding capacity or new location construction where the Consultant is responsible for preparing the environmental document, complete the project planning report concerning transportation efficiency and forward it to the Environmental Office for transmittal to the State Energy Office – Program Manager
- Request permit determination from Environmental Office – Program Manager
- Identify Essential Fish Habitat (EFH) impacts for road and bridge projects in tidal areas – Environmental Office
- Provide conceptual landscaping information as related to right of way acquisition, as necessary – Landscape Architect

- Submit Municipal Agreement to appropriate municipality – Program Manager
- Review project schedule with Project Development Team and determine appropriate estimated completion date for approved environmental document and public hearing displays – Program Manager

9.1 Environmental Document Submitted for Approval

- Distribute environmental document to the Program Manager and FHWA for review and comment – Environmental Office

[Note: Program Manager may request input from Project Development Team concerning the environmental document]

- Revise environmental document, as necessary, and submit document for FHWA's approval [Also, notify Program Manager via e-mail that document has been submitted] - Environmental Office (ENVEA0102)

9.2 Environmental Document Approval Received

- Distribute copy of the approved environmental document to the Program Manager - Environmental Office
- Coordinate and prepare the public hearing handout if required – Environmental Office and Program Manager
- Determine if visualization techniques are needed. Coordinate with Rights of Way, Environmental, and RPG Roadway Design – Program Manager
- Review information to be placed on public hearing display with Environmental Office – Program Manager
- Complete the preparation of the public hearing displays – RPG Roadway Design
- Arrange appropriate location/date for public hearing – Program Manager

[Note: Program Manager to coordinate with Environmental Office and Communications & Creative Services to insure that all appropriate SCDOT, FHWA, MPO/COG, elected officials and other personnel are notified of the hearing]

- Request public hearing sign panels and coordinate the installation of the public hearing signs with District staff – Program Manager
- Prepare project-specific portion of public hearing advertisement and submit to Environmental Office – Program Manager (ENVEIS0401)
- Complete the preparation of the public hearing advertisement and submit appropriately – Environmental Office
- Review public hearing displays with appropriate staff and FHWA, a minimum of three weeks prior to the public hearing – Program Manager
- Review public hearing display with the City or Town Leaders, if located within the municipal limits – Program Manager
- Send copies of public hearing plans, environmental document, etc., at least two weeks (15 days) prior to the public hearing, to the District Office and to the local contact person as identified on the public hearing signs – Program Manager
- Send formal notice of the public meeting to all utility companies involved on the project at least two weeks prior to the meeting requesting their attendance – Program Manager

9.3 Design Public Hearing Completed

- Coordinate/conduct public hearing – Program Manager (ENVEA0201, ENVEIS0402)

[Note: Encourage MPO/COG staff to actively participate]

- Respond to public hearing comments and determine feasibility of revising plans to address public comments – Program Manager (ENVEA0202, ENVEIS0403)
- Revise preliminary design plans, as necessary – RPG Roadway Design
- Estimate the cost of utility relocation particularly those that have prior rights – Utilities Office
- Estimate cost of any wetland mitigation effort – Environmental Office
- Review and revise, as necessary, the project schedule – Program Manager and Program Controls Unit
- Request updated cost estimates from Value Engineer – Program Manager
- Distribute updated cost estimate to the Project Development Team including the FHWA - Program Manager
- Coordinate the resolution of any substantial changes in the cost estimate and initiate any necessary STIP adjustment – Program Manager
- When retaining walls have been selected as the most appropriate alternative for the site, notify RPG Roadway Structure Design of required facing to be used (selected from the list of options created during preliminary design, Task 11) – Program Manager

9.4 Finding Of No Significant Impact (FONSI) Submitted for Approval

- Review with the Program Manager any project changes that may have occurred since document approval, prepare the Finding of No Significant Impact (FONSI) request, prepare public hearing certification package and allow Program Manager to review – Environmental Office
- Submit public hearing certification package to FHWA – Environmental Office (ENVEA0203, ENVEIS0204)

[Note: Program Manager may share the FONSI request with the Project Development Team for comments]

9.5 FONSI Approval Received

- Provide copy of approved FONSI to Program Manager – Environmental Office
- If necessary, coordinate with Environmental Office and prepare project-specific portion of advertisement that the FONSI is approved – Program Manager

  [Note: If the project involves a Categorical Exclusion and a public hearing is held, the Program Manager will coordinate with the Environmental Office and insure that the appropriate Study Report and advertisement is prepared and submitted]
- Complete the preparation of the advertisement and submit appropriately – Environmental Office
- Receive approved IMR or IJR from FHWA – Program Manager

10. Right of Way Plans Completed and Signed

- Complete the drainage design and review with the Project Development Team – RPG Hydraulic Design (HY100)
- Verify execution of Municipal State Highway Project Agreement, if required. If Agreement has not been executed, re-submit for execution by the City or Town - Program Manager
- Provide completed right of way plans to the Landscape Architect to receive recommended landscaping comments – RPG Roadway Design
- Submit design exception for review and approval by Design Manager, Program Manager, Preconstruction Support, RPG Engineer, Director of Preconstruction, and FHWA if necessary – RPG Roadway Design, RPG Hydraulic Design, RPG Structure Design
- Notify Value Engineer to initiate updated cost estimates (utilizing input from R/W, utilities, traffic engineering, environmental (wetland mitigation)) – Program Manager
- Review and revise the project schedule as necessary – Program Controls Unit
- Include right of way requirements for new or modified structures as provided by RPG Roadway Structure Design, Traffic Engineering (signals, signs, and ITS) - RPG Roadway Design
- Verify adequate right of way established for bridge construction access – RPG Roadway Design
- Coordinate the resolution of any substantial changes in estimated costs and share the information appropriately – Program Manager
- Complete Quality Control review of right of way plans. Obtain necessary initials and submit to Roadway Design Support for Quality Assurance review – RPG Roadway Design
- Complete Quality Assurance Review of right of way plans and return comments to RPG Engineer – Roadway Design Support
- Complete the right of way plans, including resolution of review comments and routing for final signatures – RPG Roadway Design
- Submit the signed right of way plans to the Operations Center within Preconstruction Support to forward to Rights of Way Office and FHWA, as needed; notifying the Program Manager – RPG Roadway Design (RDRW140)
- Provide completed right of way plans to the Utilities Office and District Office to initiate final utility coordination and final railroad coordination, as necessary – RPG Roadway Design (UT020, UTRR100)
- Provide signed right of way plans to Traffic Engineering to begin finalizing pavement marking, signing, signal, and traffic control plans – RPG Roadway Design
- Submit executed Municipal State Highway Project Agreement to the Rights of Way Office – Program Manager (PM055)
- Approved right of way plans signify the end of preliminary engineering per 23 CFR 636.103

11. Right of Way Acquisition Authorization Recieved

- Submit R/W cost estimate via email to Program Manager for concurrence of amount prior to submitting to Preconstruction Resource Management – Rights of Way Office
- Coordinate the resolution of any substantial changes in the cost estimate and initiate any necessary STIP adjustment – Program Manager
- Submit right of way cost estimate to Preconstruction Resource Management– Rights of Way Office

- Coordinate the obligation of right of way funds and notify the Program Manager and Director of R/W immediately upon approval of funds – Preconstruction Resource Management (PCM020, PCM030)
- Initiate R/W acquisition process – Rights of Way Office

12. Right of Way Acquisition

- Right of way special provisions, as a result of negotiations, provided to RPG Design Manager to be reflected in the plans or contract special provisions – Rights of Way Office
- All relocations will be completed prior to award, or the appropriate special provisions are provided to RPG Road Design to be included in the contract special provisions as agreed upon by the FHWA – Rights of Way Office
- Right of Way acquisition process completed, with all tracts either acquired or condemned – Rights of Way Office

  [FHWA needs Right of Way certificate on all Interstate projects and projects greater than $50 million on the National Highway System and other projects as requested by FHWA (See SCDOT/FHWA Stewardship and Oversight Plan)]
- Right of Way Certification provided to FHWA, Program Manager, Obligation Management and Director of Construction Office 2 months prior to letting – Rights of Way Office

13. Environmental/ Water Quality Permit(s)

- Prepare necessary water quality permit application(s) after considering the following design elements – Environmental Office (ENV030, ENV060)
  - Outfall and ditch requirements design by Hydrology
  - Traffic control requirements including temporary lanes for traffic shifts
  - Utility impacts (shall be reviewed on a case by case basis)
  - Bridge construction access requirements
- Submit water quality permits for approval
- Coordinate the resolution of any issues raised by permitting agencies – Environmental Office (ENVP010)

14. Utility and Railroad Final Coordination

- Begin coordination necessary to secure Utility Agreements and No-cost relocation sketches – District Office (UT010, UT030-UT440)
- Send right of way plans to the railroad with a detailed letter explaining the project as it affects the Railroad to initiate their preliminary engineering review for approval– Railroad Projects Office (UTRR010, UTRR020, UTRR030, UTRR090, UTRR100, UTRR110)
- Utility relocations, special requirements, funding, and other items, as needed, are in place and included in the contract, as appropriate – Program Manager

14.1 Finalize Utility Coordination/Relocation

- Verify PCN & charge code are established for utility relocations 3 months prior to letting – Program Manager

- All Utility Agreements and No-cost relocation sketches received from the District are reviewed, approved, and utilities are authorized to begin work 2 months prior to letting – Utilities Office (UT450)

15. Final Design

- All project requirements as a result of field reviews, design exceptions, constructability reviews, and maintenance of traffic concerns are addressed – Program Manager
- Provide construction plans to the construction field office for review by the Resident Construction Engineer – RPG Roadway Design
- Provide bridge construction plans to the Bridge Construction Office for review – RPG Bridge Structure Design
- Local municipality needs are identified and included in the special provisions where appropriate. This could vary from lane closure restrictions for special events, to landscaping coordination, to coordination of preferred detour routing and signing – Program Manager
- Examine the construction plans for completeness with emphasis on the estimated quantities. District may add or revise quantities as deemed necessary to construct the project. Make changes to quantities on the summary of estimated quantities sheet sent by RPG Road and Bridge Design. A Construction Plans Review field review may be held but is not required (PS&E Review (see IB 2006-9))- District/Resident Engineer
- Coordinate the resolution of any substantial changes in the cost estimate and initiate any necessary STIP adjustment – Program Manager
- If a pavement design is older than 3 years determine need for a Pavement Design Review. Resubmit forms for traffic information and pavement design, as needed – RPG Roadway Design
- Environmental commitments and constraints are provided to Program Manager and Design Manager in order to be clearly indicated in the proposal and/or plans – Environmental Office
- Ensure environmental permit conditions match final plans – RPG Roadway Design
- Request right of way revisions to plans subject to approval by Program Manager – Rights of Way Office
- Finalize box culverts, retaining wall and shoring designs; provide details to RPG Roadway Design for plans – RPG Roadway Structure Design (RDCP040, RDCP050)
- Provide completed pavement marking, signing, traffic signal and ITS plans, special provisions and updated staging plans as necessary to Design Manager –Traffic Engineering
- Provide to RPG Design Manager any required landscape special provisions and estimates – Landscape Architect
- Conclude participation agreement with governmental entities concerning maintenance of landscaping – Program Manager
- Complete road construction plans including structure plan, profile, and cross section sheets as provided by RPG Roadway Structure Design – RPG Roadway Design (RDCP053)
- Obtain Pavement Design Engineer’s signature on typical section sheets – RPG Roadway Design
- Complete bridge construction plans, complete special provisions and estimates – RPG Bridge Structure Design
- Input quantities into PES – RPG Roadway Design and RPG Bridge Structure Design

- Complete Quality Control review of Construction Plans. Obtain necessary initials and submit to Roadway Design Support and/or Structural Design Support for Quality Assurance review – RPG Roadway Design and/or RPG Bridge Structure Design (RDCP060)
- Complete QA Review of Construction Plans and return comments to RPG Engineer – Roadway Design Support and/or Structural Design Support (RDCP065)
- Engineer of Record begins researching and writing special provisions and/or supplemental specifications as indicated by Design Group and Traffic Engineering – Design Manager
- Complete the Construction Plans, including resolution of review comments and routing for necessary signatures – RPG Roadway Design (RDCP085)

16. Construction Plans Completed & Signed

- Engineer of Record signs and seals plans and special provisions – RPG Engineer (or designee) (RDCP085)
- Complete Notice of Intent (NOI)/Stormwater Pollution Prevention Plan (SWPPP) package and submit to Engineer of Record for signature – RPG Hydraulic Design (HY002, ENV060)
- Submit NOI package to Director of Construction Office – Design Manager

17. Plans, Specifications and Estimates (PS&E)

17.1 Contract Proposal Preparation

- Submit special provisions to Letting Preparation Engineer – Engineer of Record
- Complete engineer's estimate in PES for use by Program Manager, Contracts Administration and Preconstruction Resource Management – Letting Preparation
- Complete cost estimate updates including review of PE and R/W expenditures and remaining budgets – Program Manager
- Ensure adequate funds for construction, CEI, and contingencies are committed for CTC and Local Public Agency (LPA) projects – Program Manager
- Place final proposal in shared network directory for Program Manager and Design Manager to review – Letting Preparation
- Complete special provisions and prepare proposal for printing – Letting Preparation
- Coordinate the resolution of any substantial changes in the estimated costs and share the information appropriately – Program Manager
- On large projects, prepare a Critical Path Method (CPM) schedule to establish reasonable construction schedule - Construction Office
- Evaluate project for a minimum required contractor performance score - Director of Construction

17.2 PS&E Submittal

- Upon receipt of approved water quality permits, notify Program Manager – Environmental Office
- Distribute copies of approved water quality permits as necessary – Environmental Office

- Notify FHWA and Program Manager of water quality permit approval dates or problems encountered – Environmental Office
- Submit PS&E package to FHWA, as appropriate – Letting Preparation Engineer

18. Construction Authorization Received

- Coordinate Obligation of funds. Receive and distribute FHWA Project Authorization Approval – Preconstruction Resource Management (PCM040, PCM050)
- Distribute Utility Agreements and/or relocation sketches – Utilities Office
- Inform Contract Administrator if any special submittals are required from the contractor upon submittal of bid (utility bid sheets, landscape/irrigation bid sheets) - Letting Preparation Engineer
- Prepare and publish ad for highway letting for project – Contracts Administration
- Conduct pre-bid conference on large and multi-phased projects, address utility conflict issues and if necessary prepare addenda to disseminate the minutes and questions and answers from the Pre-Bid meeting – Director of Construction Office
- Provide attendee list if there was a mandatory pre-bid conference to Contract Administrator – Program Manager

19. Construction Bids Received

- As soon as possible after bid opening, submit bid information to appropriate Program Manager – Contracts Administration
- Coordinate the resolution of any substantial differences between bid and STIP amounts – Program Manager
- Coordinate contract award with the FHWA on all oversight projects, provide necessary bid information – Contracts Administration
- As soon after bid opening as possible, load bid information into TrnsPort Program in order to analyze the bid and to expand the bid history – Contracts Administration
- Invite Program Manager to Bid Review Committee Meeting to review bids for award/reject recommendation – Director of Construction Office

20. Award Project – Monitor Project Expenditures & Report Periodically to MPO, COG

- Notify Program Manager via email upon approval of award – Contracts Administration
- Schedule/conduct preconstruction conference – Resident Construction Engineer
- Provide information periodically to Program Manager on status of construction and construction expenditures, when requested – Director of Construction Office
- Provide information periodically to Program Manager on status of condemnation cases, R/W hold offs, and remaining anticipated R/W expenditures, when requested – Rights of Way Office
- Distribute Railroad Agreements to the appropriate railroad company – Rights of Way Office (UTRR040, UTRR050, UTRR060, UTRR070, UTRR080, UTRR120, UTRR130, UTRR140, UTRR150)
- Verify invoices for utility relocations are paid. Notify Program Manager – Utilities Office (UT460)

PRECONSTRUCTION PROJECT DEVELOPMENT PROCESS

November 2011

Appendix B

SCDOT Bridge Project Data from Project Programming System (P2S)

SCDOT In-House Delivered Bridge Projects from FFY 2010-2017

Project ID	Project RPG	Project Name	Project Description	Project Commission Approval Date	Programming/ PE Obligation	Project Proposed Letting Date	Planned Project Delivery Timeline (months)	Actual Let Date	Actual Project Delivery Timeline (months)	Schedule Variance (months)	Original STIP Project Costs	Project Current Cost Estimate	Project Actual Costs	Cost Overun/ Underrun	Time Lapse From PL to PE (months)
P030403	Upstate	US 29 over Southern Railroad	US 29 bridge replacement over Southern RR.	9/15/2016	10/1/2018	5/1/2021	31.0				$3,765,000	$3,760,000			24
P030402	Upstate	SC 85 NB over Lawson Fork Creek	SC 85 NB Bridge Replacement over Lawson For	9/15/2016	3/3/2017	2/1/2020	34.0				$5,390,000	$5,390,000			5
P030392	Upstate	US 29 SB over North Tyger River	Replace US 29 SB bridge over North Tyger Rive	9/15/2016	1/10/2017	2/1/2020	36.0				$4,390,000	$4,390,000			3
P028354	Upstate	US 29 at Southern RWY	US 29 (Old Georgia Highway) Bridge Replacem	10/16/2014	4/30/2015	4/1/2019	47.0				$5,750,000	$9,230,000			6
P027407	Upstate	S-1557 over Fairforest Creek	Replace S-1557 bridge over Fairforest Creek	12/6/2012	5/30/2014	1/1/2017	31.0	1/9/2018	43.0	12	$2,979,000	$2,979,000	$4,397,000	$1,418,000	17
P027023	Upstate	S-267 over Twelve Mile Creek	S-267 (Belle Shoals Road) bridge replacement	12/6/2012	7/21/2014	10/1/2017	38.0	11/14/2017	39.0	1	$3,420,000	$3,436,000	$3,723,000	$303,000	19
41339	Upstate	S-45 BRIDGE REPLACEMENT OVE	S-45 (Old Pacolet Road) Bridge Replacmenet o	6/19/2008	1/18/2012	4/1/2014	26.0	10/14/2014	32.0	6	$3,151,000	$3,800,000	$4,476,000	$1,325,000	42
P030389	Upstate	US 25 NB over S-119 & North Salu	US 25 NB Bridge Replacement over N. Saluda R	9/15/2016	3/3/2017	4/1/2023	72.0				$9,129,000	$9,129,000			5
P030388	Upstate	US 76 EB over Broadway Creek	US 76 EB Bridge Replacement over Broadway C	9/15/2016	11/27/2017	2/1/2023	62.0				$4,455,000	$4,455,000			14
P030387	Upstate	US 29 over Devil Fork Creek	US 29 Bridge Replacement over Devils Fork Cre	9/15/2016	10/17/2017	7/1/2021	44.0				$4,215,000	$4,215,000			13
P029127	Upstate	S-75 over Middle Tyger River	S-75 (Mount Lebanon Church Road) Bridge Re	7/16/2015	8/24/2015	2/1/2019	41.0				$6,420,000	$6,568,000			1
P028355	Upstate	S-272 over Reedy River	S-272 (West Georgia Road) Bridge Replacemen	10/16/2014	2/17/2015	6/1/2018	39.0				$3,845,000	$6,250,000			4
27178	Upstate	S-164 over Enoree River	Bridge Replacement	7/16/2015	8/13/2015	3/1/2019	42.0				$2,798,000	$3,166,000	$4,250,000		0
P030400	Upstate	US 378 Bridge over Little Saluda R	Replace the US 378 bridge over Little Saluda R	3/16/2017	10/17/2017	12/1/2024	85.0				$7,120,000	$7,120,000			7
41401	Upstate	S- 893 BRIDGE REPLACEMENT RO	ROADWAY WORK FOR BRIDGE OVER ENOREE	6/19/2008	10/20/2011	2/11/2014	27.0	2/11/2014	27.0	0		$2,870,361	$3,052,530	$3,052,530	40
40192	Upstate	S-143 & S-88 over Stevens Creek	Bridge Replacement	3/18/2010	6/28/2010	12/1/2014	53.0	1/12/2016	66.0	13	$6,700,000	$6,947,339	$6,263,000	-$437,000	3
35179	Upstate	S-68 over Turkey Creek	S-68/S-227 (Key Road) Bridge replacement ove	12/6/2012	2/1/2014	8/1/2018	54.0				$3,350,000	$6,000,000	$5,624,000		13
31134	Upstate	S-32 over Little River	Replace S-32 Bridge over Little River in Abbevi	12/6/2012	6/12/2014	12/1/2018	53.0					$6,563,000	$6,956,700		18
30818	Upstate	S-101 over Wilson Creek	Bridge Replacement S-101 over Wilson Creek	2/18/2010	6/16/2010	6/9/2015	59.0	6/9/2015	59.0	0	$5,000,000	$5,145,364	$4,546,929	-$453,071	3
P030341	PeeDee	US 521 over Old RR Bed	Replace/Remove Bridge on US 521 over Old RR	6/21/2016	10/28/2016	9/1/2019	34.0				$1,050,000	$1,050,000			4
P028340	PeeDee	US 301 over Pudding Swamp (No	Replacement of 2 Bridges on US 301 over Pudd	10/16/2014	2/2/2015	3/1/2019	48.0				$5,996,000	$5,996,000			3
P026923	PeeDee	US 401 over Scape Ore Swamp	Replace Bridge on US 401 over Scape Ore Swa	12/6/2012	1/16/2014	8/1/2018	54.0				$5,630,000	$5,888,000			13
P026922	PeeDee	US 521 over Deep Creek	Bridge Replacement on US 521 over Deep Cree	12/6/2012	1/16/2014	2/1/2018	48.0				$2,977,000	$3,135,898	$3,634,137		13
39569	PeeDee	S-101 over Turkey Creek	Bridge Replacement of S-101 (East Fulton Stre	2/18/2010	10/14/2010	2/8/2015	51.0	12/8/2015	61.0	10	$1,300,000	$1,516,835	$4,098,824	$2,798,824	7
P027058	PeeDee	S-49 over High Hill Creek	Bridge Replacement over High Hill Creek on S-	12/6/2012	2/24/2014	6/1/2018	51.0				$2,027,000	$2,095,746			14
P027057	PeeDee	S-76 over Jefferies Creek	Replace bridge over Jefferies Creek on S-21-76	12/6/2012	1/16/2014	12/1/2018	58.0				$2,356,000	$2,412,000	$2,746,776		13
P027005	PeeDee	S-41 over Smith Swamp	Replace bridge over Smith Swamp on S-41 (Se	12/6/2012	1/16/2014	6/19/2017	41.0	9/19/2017	44.0	3	$1,997,000	$2,065,298	$1,927,338	-$69,662	13
P026869	Midlands	SC 70 over Little Salkehatchie Riv	Replace bridge/approaches over Little Salkeha	12/6/2012	4/2/2014	5/1/2018	48.0				$4,258,000	$4,386,000			15
0042933RD0	Midlands	S-1304 Bridge Replacement over	Replace Bridge/Appros (Off-System) over Shav	6/19/2008	8/23/2013	5/9/2016	32.0	5/9/2017	44.0	12	NA	$2,150,000	$2,424,192		62
0041511RD0	Midlands	S-180 N/S RR Bridge Replacemen	Replace Bridge/Approaches (Off-System) over	6/19/2008	3/5/2012	6/10/2014	27.0	HOLD			NA	$1,151,000			44
0040308RD0	Midlands	US 301 SBL over Four Hole Swam	Bridge Replacement over Four Hole Swamp or	2/18/2010	7/16/2010	9/1/2014	49.0	5/10/2017	81.0	32	$5,300,000	$5,324,325	$8,971,617	$3,671,617	4
P028721	Lowcountr	S-791 over N. Mulberry Creek	S-791 Bridge Replacement over North Mulberr	10/16/2014	6/1/2015	12/1/2018	42.0			6	$4,879,000	$5,397,700	$5,447,700		7
P027127	Lowcountr	US 176 over Dean Swamp	Replace two bridges on US 176.	12/6/2012	8/7/2014	3/1/2019	54.0			7	$6,280,000	$10,567,000	$10,557,200	$4,277,200	20
0040477RD0	Lowcountr	US 78 over Four Hole Swamp	Bridge Replacement	2/18/2010	10/18/2010	4/10/2015	53.0	11/10/2015	60.0	7	$4,300,000	$4,366,108	$11,138,661	$6,838,661	8
0039672RD0	Lowcountr	S-20 over Tidal Stream (Hoopstic	Bridge Replacement S-20 (Bohickett Road) ove	2/18/2010	12/8/2010	6/12/2013	30.0	7/12/2016	67.0	37	$2,500,000	$2,588,240	$4,405,482	$1,905,482	9
0039614RD0	Lowcountr	S-32 over Noisette Creek	Bridge Replacement S-32 (Spruill Avenue) over	2/18/2010	11/16/2010	1/10/2014	37.0	6/10/2014	42.0	5	$7,890,000	$7,110,001	$6,442,462	-$1,447,538	8
0038226RD0	Lowcountr	S-379 over Noisette Creek	Bridge replacement over Noisette Creek on O'	6/19/2008	12/22/2008	5/10/2011	28.0	6/10/2014	65.0	37	$4,320,000	$4,682,485	$5,846,002	$1,526,002	6
0038120RD0	Lowcountr	SC 174 over Russell Creek	SC 174 Bridge Replacement over Russell Creek	6/19/2008	10/30/2008	4/10/2011	29.0	11/10/2015	84.0	55	$825,000	$6,126,677	$10,051,698	$9,226,698	4
0038057RD0	Lowcountr	SC 174 over Sand Creek	SC 174 Bridge Replacement over Sand Creek N	6/19/2008	9/24/2008	4/10/2011	30.0	11/10/2015	85.0	55	$2,973,000	$2,870,001	$10,083,539	$7,110,539	3
0037131RD0	Lowcountr	SC 171 BRIDGE APPROACHES	SC 171 OVER FOLLY RIVER (FOLLY ROAD)	9/17/2007	11/15/2007	1/13/2012	49.0	3/13/2012	51.0	2	$8,935,000	$18,616,570	$19,300,864	$10,365,864	1
0033667X	Lowcountr	SC 174 over Store Creek	SC 174 Bridge Replacement over Store Creek N	9/17/2007	4/7/2005	4/10/2011	72.0	11/10/2015	127.0	55	$2,045,000	$3,091,597	$5,343,558	$3,298,558	0
0024011X	Lowcountr	SC 165 Replace Br/Appros	Replace 3 Bridges over Caw Caw Swamp 2 mil	4/17/2014	8/22/1999	3/1/2018	222.0				$15,100,000	$15,000,000	$16,344,299		0
P028384	Midlands	SC 72 over Stony Fork Creek	SC 72 Bridge Replacement over Stony Fork in Y	10/16/2014	2/17/2015	2/1/2020	59.0				$4,685,000	$4,835,000			4
P028383	Midlands	S-51 over Gills Creek	S-51 Bridge Replacement over Gills Creek in La	10/16/2014	2/17/2015	2/1/2020	59.0				$2,903,000	$3,053,000			4
P028381	Midlands	US 21 Bus over Steel Creek (Fort	Replacement of US 21 BUS Bridge over Steele	10/16/2014	2/17/2015	8/1/2018	41.0				$6,390,000	$6,540,000			4
P026828	Midlands	S-655 over Fishing Creek	Federal-aid replacement of S-655 Bridge over	12/6/2012	12/9/2013	12/1/2016	35.0	12/12/2017	48.0	13	$5,529,000	$6,048,000	$4,222,677	-$1,306,323	12
P026827	Midlands	US 521 over Cane Creek	Bridge Replacement of US 521 Bridge over Car	2/18/2010	2/17/2015	12/1/2018	45.0				$4,590,000	$4,690,000	$4,690,000		59
0039111RD0	Midlands	S-770 over Hanging Rock Creek	S-770 Bridge Replacement over Hanging Rock	2/18/2010	9/21/2010	7/1/2014	45.0	2/9/2016	64.0	19	$2,200,000	$2,396,433	$4,580,874	$2,380,874	7
0038122RD0	Midlands	S-642 over North Branch of Scott	Replace existing S-642 (College Street) Bridge	6/19/2008	10/30/2008	8/13/2014	69.0	10/13/2015	83.0	14	$2,100,000	$2,448,157	$5,336,663	$3,236,663	4
0031331X	Midlands	S-26 over Camping Creek	Replace existing S-26 (Macedonia Church Road	12/6/2012	4/12/2014	6/1/2018	49.0				$2,050,000	$2,232,000	$2,183,218		16

SCDOT In-House Delivered Bridge Projects from FFY 2010-2017

Project ID	Project RPG	Project Name	Project Description	Project Commission Approval Date	Programming/ PE Obligation	Project Proposed Letting Date	Planned Project Delivery Timeline (months)	Actual Let Date	Actual Project Delivery Timeline (months)	Schedule Variance (months)	Original STIP Project Costs	Project Current Cost Estimate	Project Actual Costs	Cost Overun/ Underrun	Time Lapse From PL to PE (months)
P028450	Lowcountry	SC 641 over Willow Swamp	Bridge replacement on SC 641 over Willow Cre	10/16/2014	2/17/2015	1/1/2018	34.0				$4,274,000	$5,360,000	$4,898,260		4
P028448	Lowcountry	US 21 over Sandy Run Creek	Bridge replacement on US 21 over Sandy Run	10/16/2014	2/3/2015	7/1/2019	52.0				$5,280,000	$5,330,000	$5,301,600		3
39102	Lowcountry	S-79 over Jarvis Creek	Replace Bridge over Jarvis Creek, including roa	2/18/2010	9/14/2010	5/11/2015	55.0	5/11/2016	67.0	12	$3,300,000	$7,754,300	$11,892,519	$8,592,519	6
0031914X	Midlands	S-101 Bridge over Wildcat Creek	BR OVER WILDCAT CREEK 3.4 MI SW ROCK HIL	3/18/2010	9/21/2010	11/1/2013	37.0	9/9/2014	47.0	10	$1,900,000	$1,850,000	$3,785,410	$1,885,410	6
0040187RD0	RPG 4 - UP	S-223 over Garner Branch	Bridge Replacement on S-223 (Possum Trot Ro	3/18/2010	6/28/2010	11/9/2011	16.0	12/10/2013	41.0	25	$3,200,000	$3,373,990	$2,071,853	-$1,128,147	3

SCDOT Consultant Delivered Bridge Projects From FFY 2010-2017

Project ID	Project Name	Project Description	Project Commission Approval Date	Project PE Programming Date	Project Proposed Letting Date	Planned Project Delivery Timeline (months)	Actual Let Date	Schedule Variance (months)	Original STIP Cost	Project Current Cost Estimate	Project Actual Costs	Cost Overrun/ Underrun	Total Project Delivery Timeline (months)	Time Lapse from PL to PE (months)
P027413	SC 85 over Southern R.R. an	Replace bridge on SC 85 over Southe	12/6/2012	6/6/2014	5/1/2018	46.0				$24,028,000				18
0040188RD(	S-83 over Buffalo Creek	S-83 (Blacksburg Highway) Bridge Re	2/18/2010	7/14/2010	12/11/2012	28.0	8/11/2015	24	$6,039,000	$9,973,390	$7,312,688	$1,273,688	60.0	4
P030422	SC 72 Bridge over CSX Railro	Replace the SC 72 bridge over CSX ra	9/15/2016	10/28/2016	12/10/2020	49.0				$15,509,390				1
P030399	US 76 over Reedy River	US 76 bridge replacement over the R	3/16/2017	11/28/2017	12/10/2024	84.0				$13,280,000				8
P030397	I-20 WB Bridge Replacemen	Replace I-20 Westbound bridge over	9/15/2016	10/28/2016	12/10/2023	85.0				$12,840,000				1
P030396	I-20 WB Bridge over SC 19	I-20 West bound Bridge replacement	9/15/2016	10/28/2016	12/10/2023	85.0				$20,210,000				1
P030395	I-20 WB Bridge Over South E	Replace I-20 Westbound bridge over	9/15/2016	10/28/2016	12/10/2023	85.0				$25,340,000				1
P030257	I-20 EB & WB Bridges over S	I-20 East bound and West bound Bri	6/15/2017	10/28/2016	12/10/2023	85.0				$26,030,000				0
P028422	SC 421 over Little Horse Cre	Replace Bridge/Approaches over Litt	4/17/2014	2/2/2015	12/1/2017	33.0				$4,736,000				9
P027065	SC 823 over Little River	SC 823 Bridge Replacement over Littl	12/6/2012	4/18/2014	12/1/2017	43.0				$6,500,000				16
0040197RD(	S-98/S-22 over Enoree River	S-98/S-22 Bridge Replacement over E	2/18/2010	6/28/2010	7/10/2014	48.0	8/11/2015	13	$5,400,000	$5,716,573	$6,708,188	$1,308,188	61.0	4
0035369RD(	US 378 over Little River	Bridge Replacement on US 378 over	2/18/2010	6/28/2010	12/10/2012	29.0	7/14/2015	32	$9,700,000	$10,003,314	$18,694,988	$8,994,988	60.0	4
0033531RD(	US 25 over Log Creek	Bridge Replacement over Log Creek 6	2/18/2010	6/28/2010	12/9/2012	29.0	12/9/2014	12	$3,355,000	$3,910,252	$4,585,169	$1,230,169	53.0	4
0031268X	S-75 at US 29	S-75 (Cherokee Road) Bridge Replace	4/17/2014	10/22/2014	12/1/2017	37.0		12		$11,194,599	$16,194,600			6
P030462	US 76 WB over Wateree Riv	Replace the US 76 WB bridge over th	9/15/2016	10/28/2016	4/1/2022	65.0				$35,849,999				1
P030461	US 76 Bypass over US 76 Bu	Replace US 76 BYP bridge over US 76	9/15/2016	10/28/2016	3/1/2022	64.0				$7,450,000				1
P030439	US 76 Bypass over US 15	Replace US 76 Bridge over US 15	9/15/2016	10/28/2016	3/1/2022	64.0				$7,300,000				1
P030340	US 1 at SCL Railroad (No. 1)	Replace US 1 Bridge over S.C.L. Railro	9/15/2016	10/28/2016	7/1/2020	44.0				$5,275,000				1
P030167	US 521 over Big Pine Tree Cr	Bridge Replacement	5/17/2016	10/28/2016	3/1/2021	52.0				$8,823,360				5
P028329	US 1 at S.C.L. RR (No. 3)	Replace US 1 Bridge (Jefferson Davis	12/6/2014	2/2/2015	3/1/2019	48.0				$7,260,000				1
0039107RD(	US 301 over Little Pee Dee R	Bridge Replacement on US 301 over	2/18/2010	9/15/2010	12/11/2014	50.0	8/11/2015	8	$8,800,000	$9,469,051	$11,419,977	$2,619,977	58.0	6
0037725RD(	S- 31 BRIDGE REPLACEMENT	5 OVERFLOW BRIDGES IN WACCAMA	6/19/2008	7/24/2008	2/12/2011	30.0	3/12/2013	25	$5,600,000	$6,111,852	$6,258,782	$658,782	55.0	1
0035221X	US 15 BRIDGE REPLACEMEN	BRIDGE OVER CSX RAILROAD (SOUTH	9/19/2007	11/28/2005	11/8/2011	71.0	5/8/2012	6	$13,900,000	$16,733,235	$18,654,197	$4,754,197	77.0	0
0032045RD(	S-20 over Bear Creek (2)	Bridge Replacement on S-20 (Teals M	2/18/2010	10/14/2010	4/11/2013	29.0	8/11/2015	28	$2,400,000	$4,987,575	$6,323,505	$3,923,505	57.0	7
0030684X	US 701 over Great Pee Dee	Design/Build Bridge Replacements of	9/19/2007	12/3/2003	10/10/2013	118.0	1/6/2015	15	$22,790,000	$48,626,047	$57,039,293	$34,249,293	133.0	0
P030489	US 1 over SCL Railroad	US 1 Bridge Replacement over CSX (I	4/17/2014	10/28/2016	12/1/2019	37.0			$4,750,000	$6,250,000				30
P028337	S-39 over Little Fork Creek	S-39 Bridge Replacement over Little F	4/17/2014	2/23/2015	5/19/2018	38.0	9/19/2017	0	$2,460,000	$2,860,000	$3,438,789	$978,789	30.0	10
P028336	US 52 Bus over Swift Creek	US 52 Business Bridge Replacement o	4/17/2014	3/3/2015	7/1/2018	39.0			$3,933,000	$4,570,100				10
P028335	US 1 over Black Creek and Li	US 1 Bridge Replacement over Black	4/17/2014	2/23/2015	4/1/2019	49.0			$9,180,000	$9,180,000				10
P028334	US 76 over Lynches River	US 76 Bridge Replacement over the L	4/17/2014	2/23/2015	3/1/2019	48.0			$16,066,000	$2,481,000				10
0036261BR(	US 401 over Jefferies Creek,	Bridge Replacements over High Hill C	12/6/2012	10/24/2014	12/1/2017	37.0			$7,156,277	$8,313,278				22
0034067X	S-12 Con over Jefferies Cree	Bridge Replacement over Jefferies Cr	12/6/2012	4/10/2014	12/1/2017	43.0			$2,860,000	$2,860,000				16
P030429	US 1 over Big Horse Creek	Bridge Replacement over Big Horse C	9/15/2016	12/22/2016	9/1/2022	68.0				$2,725,000				3
P030428	US 1 over Shaws Creek	Bridge Replacement over Shaws Cree	9/15/2016	12/22/2016	9/1/2022	68.0				$3,360,000				3
P030256	US 301 NB over Snake Swam	Replace the US 301 North Bound brid	9/15/2016	10/28/2016	2/1/2021	51.0				$11,240,000				1
P028423	US 301 over S. Edisto River	Replace bridge/approaches over Sou	4/17/2014	2/23/2015	12/1/2020	69.0				$11,754,000				10
P026870	US 1 over South Edisto River	REPLACE BRIDGE/APPROS OVER SOU	12/6/2012	4/2/2014	12/1/2017	43.0			$6,497,000	$7,269,000				15
0039096RD(	US 278 over Three Runs Cre	Replace bridge/approaches over Thre	2/18/2010	9/15/2010	11/14/2014	49.0	3/14/2017	28	$5,100,000	$5,912,063	$5,850,989	$750,989	77.0	6
0038090RD(	S-31 NB/SB Norfolk Souther	Replace Dual Bridges/Appros (Off-Sy	10/18/2007	10/16/2008	7/12/2015	80.0	7/12/2016	12	$2,210,000	$431,243	$5,682,240	$3,472,240	92.0	11
P030420	US 601 Bridge Replacement	US 601 Bridge Replacement over Col	9/15/2016	11/10/2016	12/1/2020	48.0			$10,669,717	$0				1
P030265	US 378 over Twelve Mile Cre	Replacement of US 378 Bridge over T	9/15/2016	11/10/2016	4/1/2021	52.0			$16,054,770	$0				1
P030264	US 76 over US 601	Replace US 76 Bridge over US 601	9/15/2016	11/10/2016	12/1/2020	48.0			$3,323,431	$0				1
P030115	US 21 over Southern & SCL F	Blossom St (US 21 Connector) bridge	12/1/2016	10/28/2016	10/1/2023	83.0			$47,576,877	$55,580,000				0

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0038657RD(	SC 7 over CSX & Norfolk Sou	Replace SC 7 (Cosgrove Avenue) brid	6/19/2008	4/20/2009	12/12/2011	31.0	3/12/2013	16	$17,300,000	$22,303,984	$36,159,194	$18,859,194	46.0	10
0037903RD(	US 78 BRIDGE REPLACEMEN	OVER S-39 (MEETING STREET AND NS	6/19/2008	9/9/2008	3/12/2011	30.0	3/12/2013	24	$14,300,000	$25,927,982	$33,245,573	$18,945,573	54.0	2
P030427	SC 72 Bridge Replacement C	SC 72 Bridge Replacement Over Tyge	3/16/2017	7/21/2017	5/1/2025	93.0			$16,230,910	$16,230,910				4
P030426	SC 9 over Wildcat Creek	SC 9 Bridge Replacement Over Wildca	3/16/2017	7/21/2017	5/1/2025	93.0			$6,452,461	$6,452,461				4
P030424	SC 72 Bridge Replacement o	SC 72 Bridge Replacement over Bear	9/15/2016	7/21/2017	5/1/2025	93.0			$6,906,272	$6,906,272				10
P030423	SC 72 Bridge Replacement C	SC 72 Bridge Replacement Over Sout	3/16/2017	7/21/2017	5/1/2025	93.0			$5,611,346	$5,611,346				4
P026824	S-654 over Burgis Creek	Federal-aid replacement of S-654 Bri	12/6/2012	12/9/2013	12/1/2017	47.0			$2,257,000	$2,753,704				12
P026822	US 321 over Allison Creek	Bridge Replacement of US 321 Bridge	2/18/2010	12/9/2013	12/1/2017	47.0			$5,068,000	$5,839,200				45
040558BRD(	SC 5 over Tools Fork Creek	Bridge Replacement over Tools Fork	2/18/2010	12/9/2010	9/13/2013	33.0	10/13/2015	25	$4,000,000	$3,675,000	$6,534,099	$2,534,099	58.0	9
040558ARD(	S-81 over Tools Fork Creek	S-81 Bridge Replacement over Tools	2/18/2010	12/20/2010	9/13/2013	32.0	10/13/2015	25	$1,500,000	$3,370,000	$3,187,528	$1,687,528	57.0	10
0040554RD(	SC 72 over Sandy River	Bridge Replacement over Sandy Rive	2/18/2010	12/9/2010	9/11/2013	33.0	8/11/2015	23	$7,950,000	$7,229,700	$7,271,271	-$678,729	56.0	9
0040440RD(	US 1 over S.C.L. Railroad	Bridge Replacement over SCL Railroa	2/18/2010	9/7/2010	12/1/2015	62.0			$14,800,000	$15,350,010				6
0039108RD(	S-50 over Manchester Creek	Bridge Replacement 4.4 miles NE of F	2/18/2010	9/21/2010	12/1/2014	50.0			$3,600,000	$4,303,796				7
0039042RD(	SC 34 over Little River	Bridge Replacement over Little River	2/18/2010	9/7/2010	9/10/2013	36.0	1/10/2017	40	$7,000,000	$7,385,000	$10,220,632	$3,220,632	76.0	6
0038511RD(	SC 72 over Fishing Creek	Bridge Replacement over Fishing Cre	6/19/2008	9/7/2010	9/10/2013	36.0	3/10/2015	18	$5,300,000	$5,411,137	$10,220,562	$4,920,562	54.0	26
0038510RD(	SC 97 over Rocky Creek	Bridge Replacement on SC 97 (Great	6/19/2008	2/4/2009	9/9/2011	31.0	9/9/2014	36	$7,560,000	$7,677,039	$6,496,975	-$1,063,025	67.0	7
0034019RD(	SC 9 over Broad River, Broad	4 Bridge Replacements over Broad Ri	6/19/2008	5/13/2008	9/8/2011	39.0	11/8/2016	62	$17,445,000	$22,256,295	$29,751,214	$12,306,214	101.0	0
0033592RD(	S-90 over CSX & Southern R	Bridge Replacement over CSX & Sout	2/18/2010	9/1/2010	4/1/2015	55.0			$2,800,000	$4,577,513				6
P030421	US 176 Bridge Replacement	US 176 Bridge Replacement over SCL	9/15/2016	11/10/2016	8/1/2022	68.0			$15,179,000	$15,179,340				1
P030419	I-126 Bridge Replacement o	Bridge Replacement	9/15/2016	11/10/2016	8/1/2022	68.0			$41,269,000	$41,269,380				1
P029073	US 21 over Congaree Creek	Bridge Replacement US 21 over Cong	4/17/2014	9/14/2015	7/10/2021	69.0			$7,475,000	$8,000,000				16
P029072	SC 555 over SCL Railroad	Bridge Replacement of SC 555 over S	12/6/2012	9/14/2015	8/10/2019	46.0			$11,184,000	$11,807,413				33
0040686RD(	I-26 (near MM 110 to near M	Replace existing S-30 (Leaphart Road	9/19/2007	5/2/2011	9/12/2013	28.0	4/12/2016	31	$9,100,000	$9,594,952	$14,468,150	$5,368,150	59.0	43
0040685RD(	I-26 (near MM 110 to near M	Replace S-365 (Rainbow Road) Bridge	1/20/2011	5/2/2011	9/12/2014	40.0	4/12/2016	19	$6,258,000	$6,744,300	$14,026,745	$7,768,745	59.0	3
0039652RD(	US 378 over Horse & Hollow	Replace existing US 378 bridges over	3/18/2010	12/8/2010	12/14/2014	48.0	11/14/2017	35	$12,000,000	$8,595,625	$19,350,134	$7,350,134	83.0	8
0038091RD(	S-12 BRIDGE OVER ROCKY C	REPLACE EXISTING S-12 BRIDGE OVER	6/19/2008	10/1/2008	12/10/2011	38.0	12/10/2013	24	$1,903,000	$2,432,360	$2,800,097	$897,097	62.0	3
0037730RD(	US 76 over Mill Creek (EBL &	Bridge Replacements of East & West	6/19/2008	7/24/2008	9/9/2012	49.0	9/9/2015	36	$6,723,000	$7,756,923	$12,727,515	$6,004,515	85.0	1
0037632RD(	S- 434 BRIDGE OVER EIGHT	REPLACE EXISTING S-434 (WILLINGHA	6/19/2008	6/13/2008	4/12/2011	33.0	2/12/2013	22	$1,010,432	$1,794,734	$2,060,753	$1,050,321	55.0	0
0033481RD(	US 176 BRIDGE OVER BROA	US 176 BRIDGE OVER BROAD RIVER	9/19/2007	2/17/2005	12/8/2009	57.0	12/8/2009	0	NA	$25,522,298	$33,903,700	NA	57.0	0
0032634X	SC 34 over Norfolk Southern	Replace Bridge over Norfolk Souther	4/17/2014	7/22/2014	8/1/2017	36.0			$5,591,000	$6,731,308				3
0032629X	SC 34 over Wilson Creek	Replace SC 34 (Ninety Six Highway) B	4/17/2014	9/9/2014	8/1/2017	34.0			$5,904,000	$6,880,789				4
0030616X	US 601 BRIDGE REPLACEME	CALHOUN COUNTY LINE NS RAILROA	9/19/2007	12/3/2003	5/11/2010	77.0	5/11/2010	0	NA	$42,975,045	$44,825,106	NA	77.0	0
P030262	US 15 SB over Pocotaligo Riv	US 15 SB Bridge Replacement over Po	5/19/2016	None					$0	$0				0
P028309	US 701 over Six Mile Creek	US 701 Bridge Replacement over Six	4/17/2014	2/2/2015	1/1/2019	46.0			$4,274,000	$7,775,000				9
P028308	US 17 Alt over Sampit River	Replacement of US 17 Alternate Brid	4/17/2014	2/2/2015	5/1/2019	50.0			$3,042,000	$4,282,396				9
P027021	S-15 over Withers Swash	S-15 Bridge Replacement over Withe	12/6/2012	4/2/2014	4/11/2017	36.0	7/11/2017	3	$2,350,000	$2,630,000	$3,380,643	$1,030,643	39.0	15
P030481	I-95 SB over SC 46	Replace I-95 SB bridge over SC 46	9/15/2016	5/2/2017	2/1/2022	56.0			$4,746,467	$4,746,467				7
040476BRD(	SC 462 over Euhaw Creek	Replace Bridge over Euhaw Creek (M	2/18/2010	10/18/2010	11/12/2012	24.0	11/12/2014	24	$2,200,000	$1,901,301	$4,019,101	$1,819,101	48.0	8
040476ARD(	SC 462 over Bees Creek	Replace Bridge over Bees Creek (MP	2/18/2010	10/18/2010	11/12/2012	24.0	11/12/2014	24	$2,500,000	$3,261,018	$4,515,875	$2,015,875	48.0	8
0037977RD(	US 21 BRIDGE APPROACHES	ROADWORK FOR BRIDGE OVER ALBE	6/19/2008	9/10/2008	4/12/2011	31.0	3/12/2013	23	$5,055,000	$6,964,428	$7,121,905	$2,066,905	54.0	2
0030738RD(	S- 105 BRIDGE REPLACEMEN	S- 105 BRIDGE REPLACEMENT	1/21/2010	12/9/2003	2/12/2013	110.0	2/12/2013	0	$1,925,000	$2,050,620	$2,142,241	$217,241	110.0	0
0039508RD(	S-20 over Little Lynches Rive	S-20 over Little Lynches River Overflo	3/18/2010	10/7/2010	12/10/2014	50.0	6/10/2014	0	$3,742,000	$5,028,121	$4,938,631	$1,196,631	44.0	6
0039106RD(	S- 327 BRIDGE REPLACEMEN	S- 327 BRIDGE REPLACEMENT ROADV	3/18/2010	9/15/2010	10/9/2012	24.0	10/9/2012	0	$1,350,000	$3,537,123	$3,307,040	$1,957,040	24.0	5

SCDOT IN-HOUSE BRIDGE PROJECT DATA ANALYSIS:

Typical Project Delivery Timeline for In-House Bridges:	**5.0 YEARS**			
RPG 1 Average Project Delivery Timeline:	6.0			
RPG 2 Average Project Delivery Timeline:	4.4			
RPG 3 Average Project Delivery Timeline:	5.1			
RPG 4 Average Project Delivery Timeline:	3.7			
Average Planned Project Delivery Timeline:	4.0			
Average delays in Commission Approval to Preliminary Engineering Inititation for In-House Bridge Projects:	**12 MONTHS**			
RPG 1 Average Project Delayed Start:	5.6			
RPG 2 Average Project Delayed Start:	10.0			
RPG 3 Average Project Delayed Start:	19			
RPG 4 Average Project Delayed Start:	12.0			
Average Project Delivery Delays from Planned to Actual:	**17 MONTHS**			
RPG 1 Average Project Delivery Delays:	29.4			
RPG 2 Average Project Delivery Delays:	6.5			
RPG 3 Average Project Delivery Delays:	17			
RPG 4 Average Project Delivery Delays:	8.1			
AVERAGE PROPOSED Delivery Timeline for OLD Projects:	3.3	years		
PROPOSED Project Delivery Timeline For NEW Projects:	**4.0**	years		
	Total	**# PMs**	**Bridge to PM Ratio:**	**Delivery**
TOTAL BRIDGES PRODUCED BY RPG 1 in these DATA SETS	**14**	2	7.0	6 years
TOTAL BRIDGES PRODUCED BY RPG 2 in these DATA SETS	**11**	3	3.7	4.4 years
TOTAL BRIDGES PRODUCED BY RPG 3 in these DATA SETS	**24**	4	6.0	5.1 years
TOTAL BRIDGES PRODUCED BY RPG 4 in these DATA SETS	**11**	3	3.7	3.7 years

* Differences in Average Project Delivery Timelines could be attributed to project distribution ratios.

Average Cost Variance between Original STIP costs and Actual Costs (Prior to 2015): **$2,848,821** **73%**

Planning estimates range from being 35% too high to 239% too low

On Average Planning Estimates are underestimated by $2,848,821 or 73% lower than realistic costs

SCDOT Consultant Delivered Bridge Projects From FFY 2010-2017

SCDOT CONSULTANT BRIDGE DATA ANALYSIS:		
Typical Project Delivery Timeline for Consultant Bridges:	**5.3 YEARS**	
RPG 1 Average Project Delivery Timeline:	4.2	
RPG 2 Average Project Delivery Timeline:	4.8	
RPG 3 Average Project Delivery Timeline:	5.9	
RPG 4 Average Project Delivery Timeline:	4.9	
Average delays in Commission Approval to Preliminary Engineering Inititation forConsultant Bridge Projects:	**7 MONTHS**	
RPG 1 Average Project Delayed Start:	6.2	
RPG 2 Average Project Delayed Start:	7.3	
RPG 3 Average Project Delayed Start:	8	
RPG 4 Average Project Delayed Start:	5.5	
Average Project Delivery Delays from Planned to Actual:	**20 MONTHS**	
RPG 1 Average Project Delivery Delays:	22.2	
RPG 2 Average Project Delivery Delays:	9.4	
RPG 3 Average Project Delivery Delays:	24	
RPG 4 Average Project Delivery Delays:	20.3	
PROPOSED Project Delivery Timeline for NEW Projects:	**5.1**	years
AVERAGE Proposed Project Delivery Timelines (ALL):	4.3	years
AVERAGE Proposed Delivery Timelines for Complete BR:	3.6	years
Average Cost Variance between Original STIP costs and Actual Costs (Prior ro 2015):	**$4,814,390 67%**	

Planning estimates range from being 14% too high to 163% too low

On Average Planning Estimates are underestimated by $4,814,390 or are 67% lower than realistic costs

Appendix C

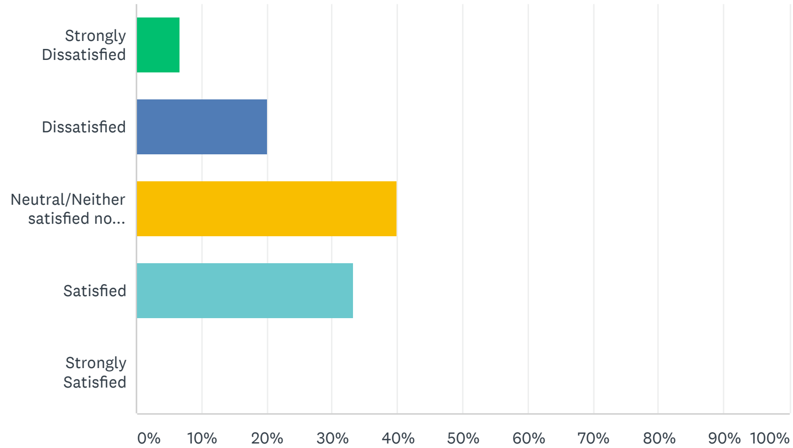
SCDOT Program & Design Management Survey Data

SCDOT Program Manager Survey on Project Delivery

Q1

Are you satisfied with the efficiency of the current SCDOT Preconstruction Project Development Process?

Answered: 30 Skipped: 0

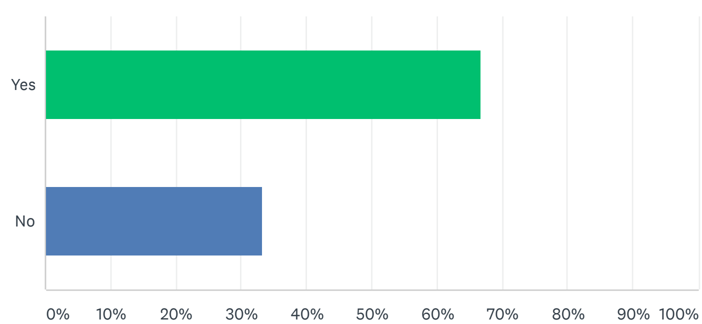


ANSWER CHOICES	RESPONSES	
Strongly Dissatisfied	6.67%	2
Dissatisfied	20.00%	6
Neutral/Neither satisfied nor dissatisfied	40.00%	12
Satisfied	33.33%	10
Strongly Satisfied	0.00%	0
TOTAL		**30**

Q2

My role and responsibilities are clearly defined in the current project development process.

Answered: 30 Skipped: 0

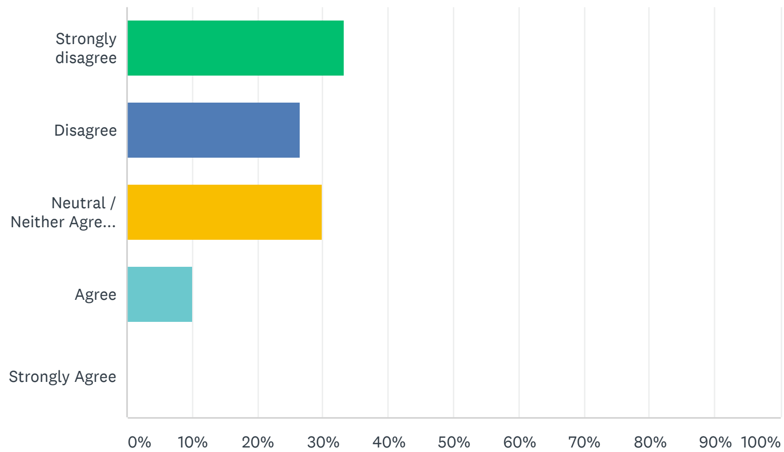


TOTAL	30

Q3

New Project scopes, goals and constraints are clearly communicated by Planning/Leadership at project initiation?

Answered: 30 Skipped: 0

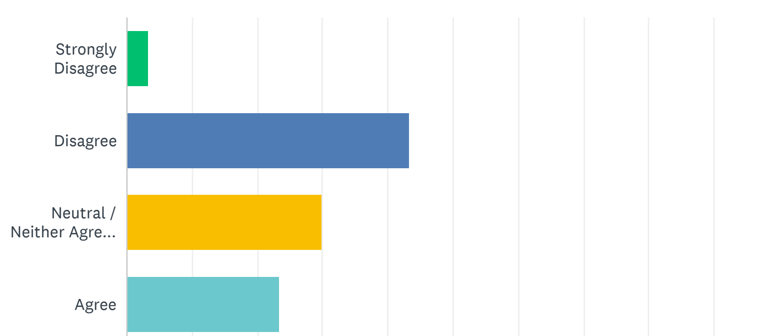


ANSWER CHOICES	RESPONSES	
Strongly disagree	33.33%	10
Disagree	26.67%	8
Neutral / Neither Agree nor Disagree	30.00%	9
Agree	10.00%	3
Strongly Agree	0.00%	0
TOTAL		30

Q4

Overall, I am satisfied with the project management processes, practices and tools provided for project development at SCDOT.

Answered: 30 Skipped: 0

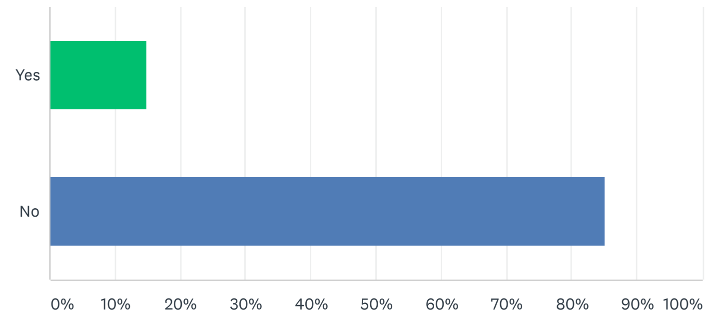


ANSWER CHOICES	RESPONSES	
Strongly Disagree	3.33%	1
Disagree	43.33%	13
Neutral / Neither Agree nor Disagree	30.00%	9
Agree	23.33%	7
Strongly Agree	0.00%	0
TOTAL		**30**

Q5

I am satisfied with the functionality and performance of the Primavera Project Scheduling Software.

Answered: 27 Skipped: 3

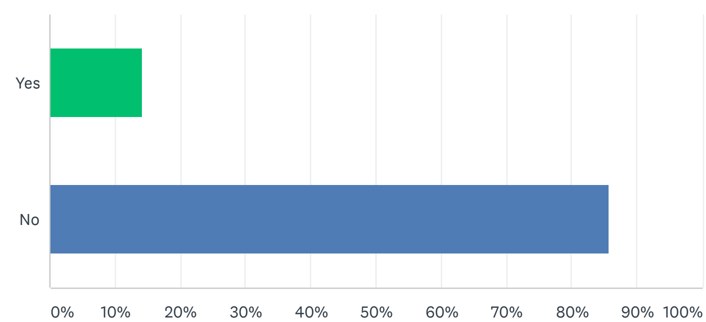


ANSWER CHOICES	RESPONSES	
Yes	14.81%	4
No	85.19%	23
TOTAL		**27**

Q6

I can easily identify variances in planned and actual project schedules in Primavera.

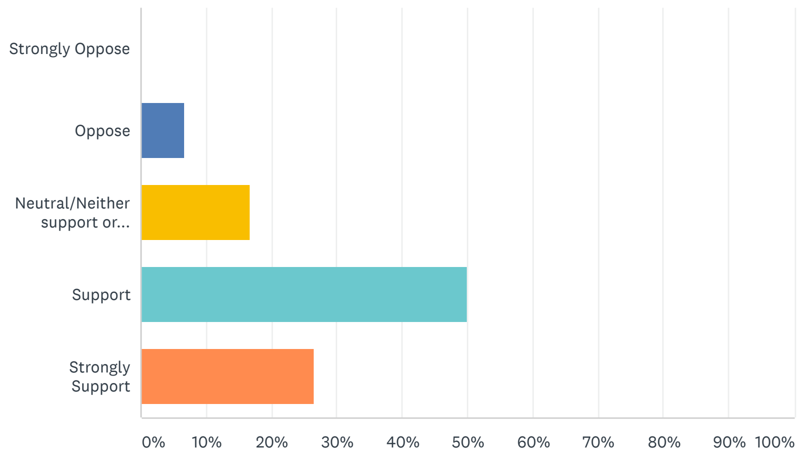
Answered: 28 Skipped: 2



Q7

Would you support implementation of project management software tool for the management of budget, schedule and scope of projects?

Answered: 30 Skipped: 0

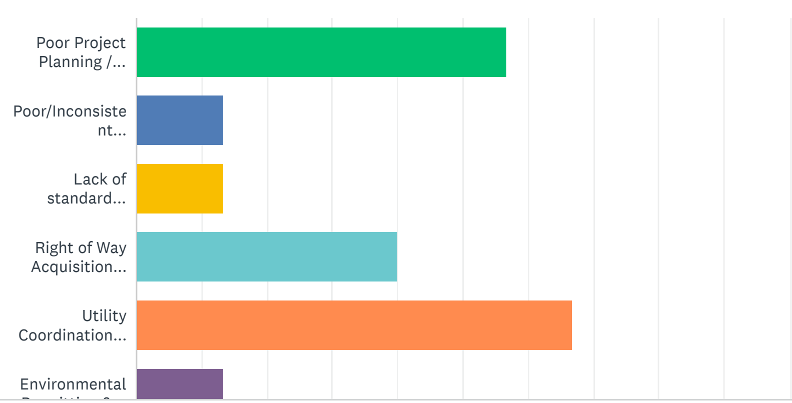


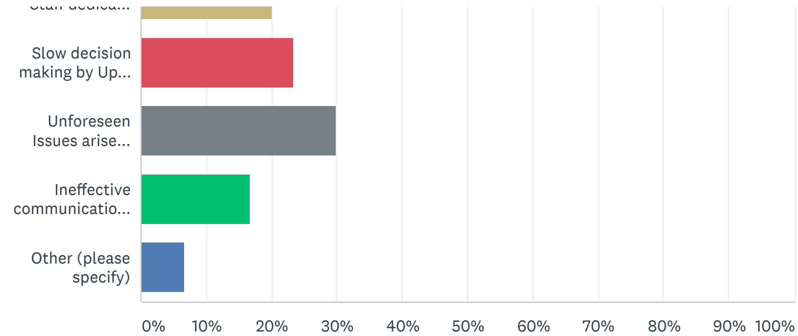
ANSWER CHOICES	RESPONSES	
Strongly Oppose	0.00%	0
Oppose	6.67%	2
Neutral/Neither support or Oppose	16.67%	5
Support	50.00%	15
Strongly Support	26.67%	8
TOTAL		**30**

Q8

What are the most common causes of delay to Preconstruction project development in my experience? (Select the top 3)

Answered: 30 Skipped: 0





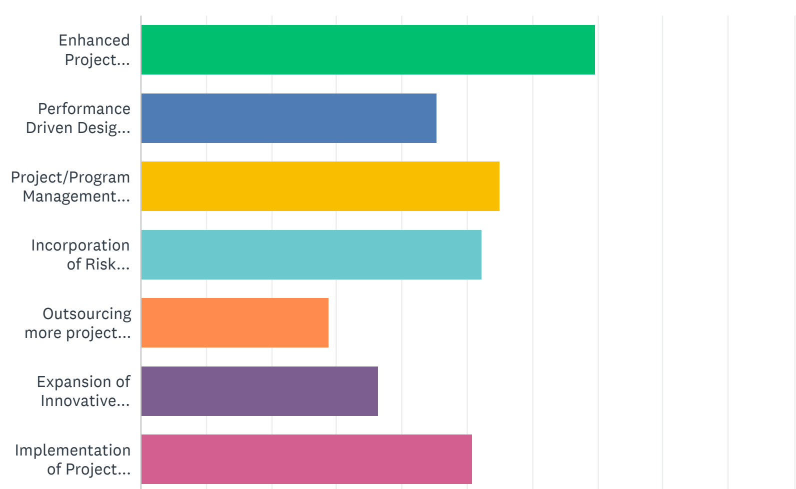
ANSWER CHOICES	RESPONSES	
Poor Project Planning / scope and budget definition at initiation of project	56.67%	17
Poor/Inconsistent documentation of Project files and records	13.33%	4
Lack of standard project management practices, procedures and guidelines	13.33%	4
Right of Way Acquisition Delays	40.00%	12
Utility Coordination Delays	66.67%	20
Environmental Permitting & Documentation Delays	13.33%	4
Municipal Agreements and/or Stakeholder Agreement	0.00%	0
Shortage of Staff dedicated to Project Management	20.00%	6
Slow decision making by Upper Management on Critical Project decisions and agreements	23.33%	7
Unforeseen Issues arise late in the project development process	30.00%	9
Ineffective communication between project teams and support offices	16.67%	5
Other (please specify)	6.67%	2

Total Respondents: 30

Q9

Which of the following AASHTO recommended project delivery improvement initiatives do you feel SCDOT should consider implementation for improving project delivery? (May select more than one and rank importance)

Answered: 30 Skipped: 0



	1	2	3	4	5	6	7	8	TOTAL	SCORE
Enhanced Project Planning & Scoping prior to project initiation in Project Delivery	64.29% 18	7.14% 2	14.29% 4	3.57% 1	3.57% 1	0.00% 0	7.14% 2	0.00% 0	28	6.96
Performance Driven Design Strategies that maximize investment on the Highway System	5.26% 1	15.79% 3	15.79% 3	21.05% 4	10.53% 2	5.26% 1	15.79% 3	10.53% 2	19	4.53
Project/Program Management Manual with defined procedures, practice, and tools for managing project delivery	18.18% 4	22.73% 5	13.64% 3	18.18% 4	9.09% 2	4.55% 1	9.09% 2	4.55% 1	22	5.50
Incorporation of Risk Management Practices into Project Planning and Delivery for better informed goals and decisions.	8.70% 2	26.09% 6	8.70% 2	13.04% 3	21.74% 5	21.74% 5	0.00% 0	0.00% 0	23	5.22
Outsourcing more project designs to consultants in order to focus limited agency staff more on project delivery oversight	0.00% 0	0.00% 0	15.79% 3	10.53% 2	10.53% 2	10.53% 2	15.79% 3	36.84% 7	19	2.89
Expansion of Innovative Financing and Contracting Tools, such as Construction Manager – General Contractor, Public Private Partnership, etc...	0.00% 0	15.79% 3	10.53% 2	5.26% 1	15.79% 3	15.79% 3	15.79% 3	21.05% 4	19	3.63
Implementation of Project Management Collaboration Software to manage Project & Program Performance (schedules, budgets, and scope) and document decision making	12.00% 3	20.00% 5	24.00% 6	12.00% 3	0.00% 0	12.00% 3	12.00% 3	8.00% 2	25	5.08
Formal training classes for position specific skills (project management, design, etc...)	0.00% 0	23.81% 5	14.29% 3	14.29% 3	19.05% 4	19.05% 4	4.76% 1	4.76% 1	21	4.71

Q10

Do you have any suggestions for programs or

Share Link

Tweet Share

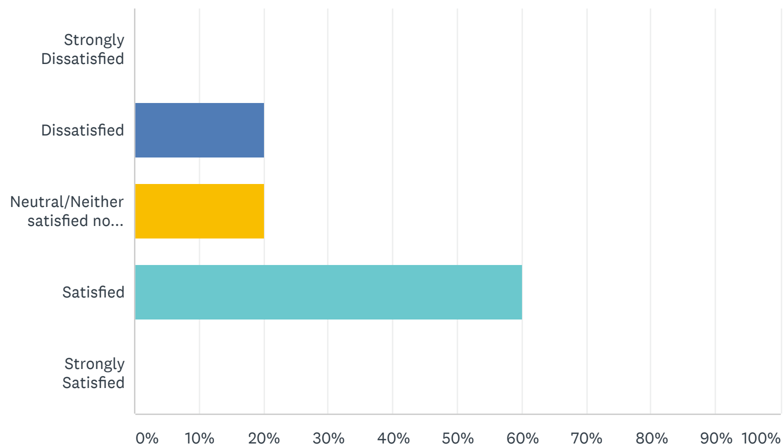
30 responses

SCDOT Design Managers Survey on Project Delivery

Q1

Are you satisfied with the efficiency of the current SCDOT Preconstruction Project Development Process?

Answered: 5 Skipped: 0

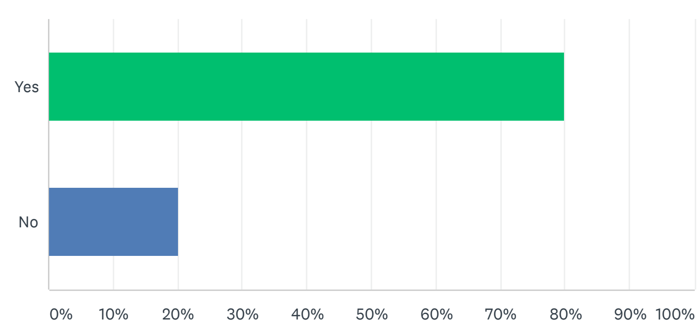


ANSWER CHOICES	RESPONSES	
Strongly Dissatisfied	0.00%	0
Dissatisfied	20.00%	1
Neutral/Neither satisfied nor dissatisfied	20.00%	1
Satisfied	60.00%	3
Strongly Satisfied	0.00%	0
TOTAL		**5**

Q2

My role and responsibilities are clearly defined in the current project development process.

Answered: 5 Skipped: 0

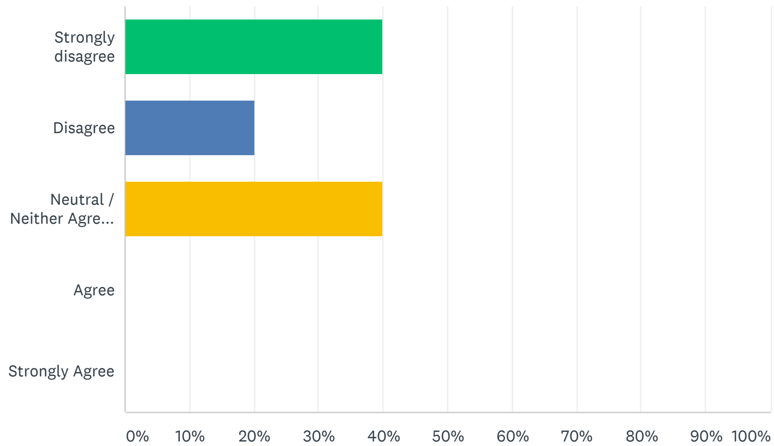


TOTAL	5

Q3

New Project scopes, goals and constraints are clearly communicated by Planning/Leadership at project initiation?

Answered: 5 Skipped: 0

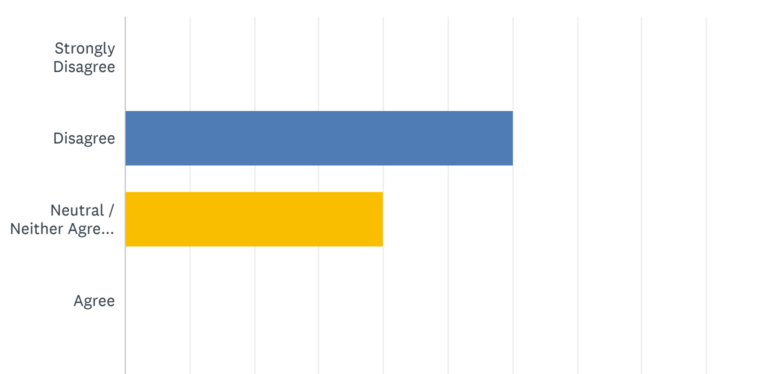


ANSWER CHOICES	RESPONSES	
Strongly disagree	40.00%	2
Disagree	20.00%	1
Neutral / Neither Agree nor Disagree	40.00%	2
Agree	0.00%	0
Strongly Agree	0.00%	0
TOTAL		5

Q4

Overall, I am satisfied with the project management processes, practices and tools provided for project development at SCDOT.

Answered: 5 Skipped: 0

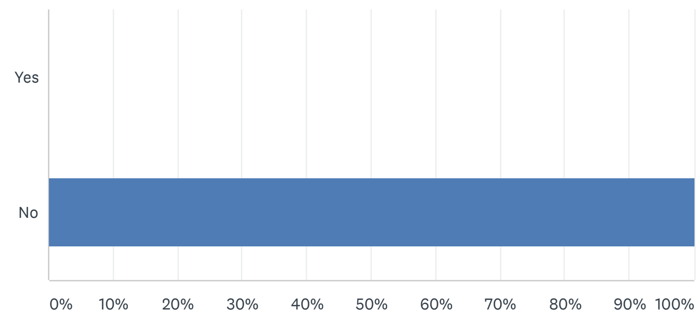


ANSWER CHOICES	RESPONSES	
Strongly Disagree	0.00%	0
Disagree	60.00%	3
Neutral / Neither Agree nor Disagree	40.00%	2
Agree	0.00%	0
Strongly Agree	0.00%	0
TOTAL		**5**

Q5

I am satisfied with the functionality and performance of the Primavera Project Scheduling Software.

Answered: 5 Skipped: 0

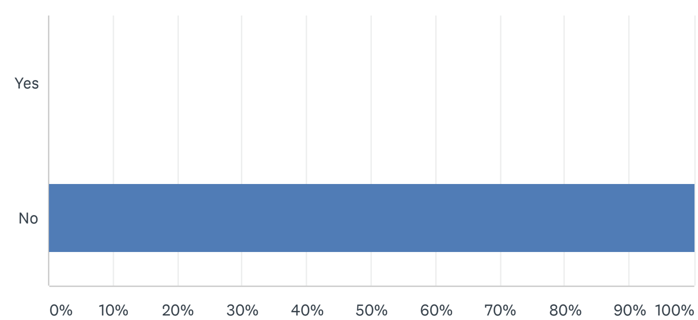


ANSWER CHOICES	RESPONSES	
Yes	0.00%	0
No	100.00%	5
TOTAL		**5**

Q6

I can easily identify variances in planned and actual project schedules in Primavera.

Answered: 5 Skipped: 0

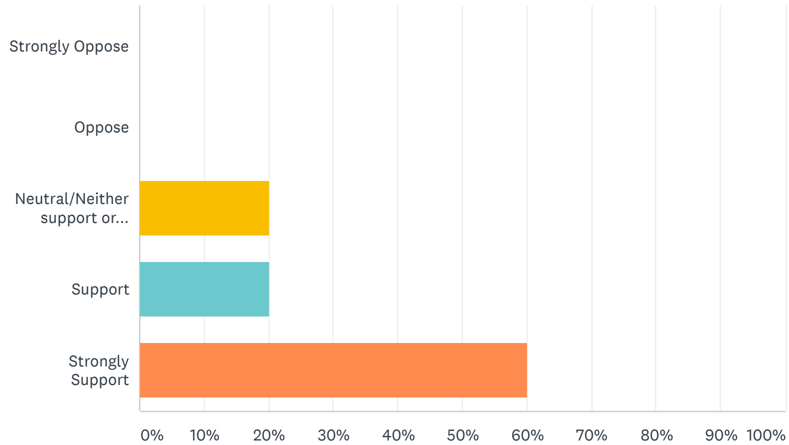


ANSWER CHOICES	RESPONSES	
Yes	0.00%	0

Q7

Would you support implementation of project management software tool for the management of budget, schedule and scope of projects?

Answered: 5 Skipped: 0

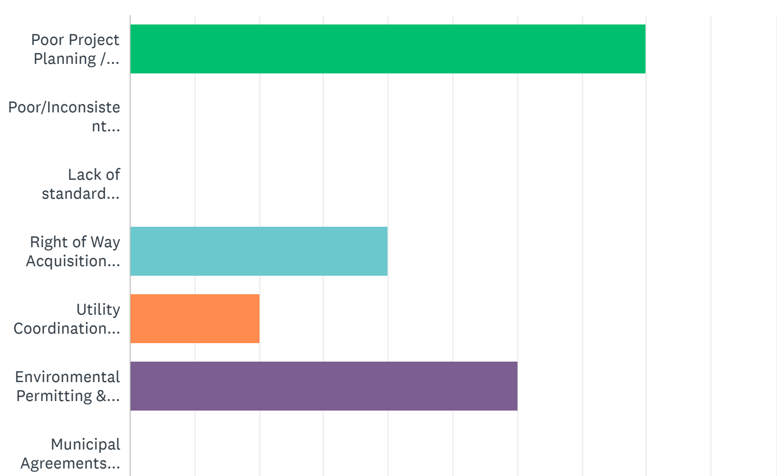


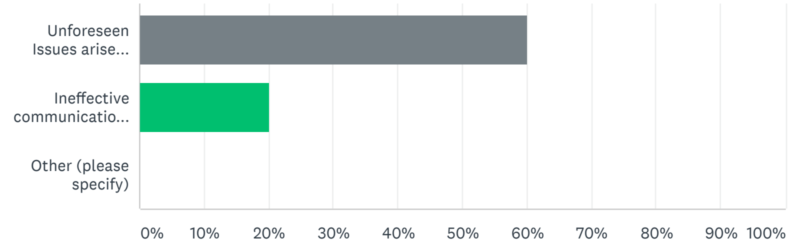
ANSWER CHOICES	RESPONSES	
Strongly Oppose	0.00%	0
Oppose	0.00%	0
Neutral/Neither support or Oppose	20.00%	1
Support	20.00%	1
Strongly Support	60.00%	3
TOTAL		**5**

Q8

What are the most common causes of delay to Preconstruction project development in my experience? (Select the top 3)

Answered: 5 Skipped: 0





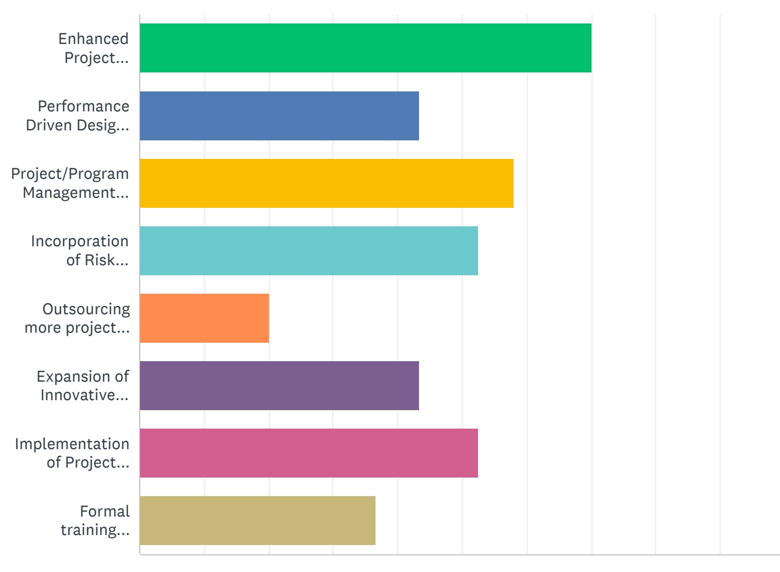
ANSWER CHOICES	RESPONSES	
Poor Project Planning / scope and budget definition at initiation of project	80.00%	4
Poor/Inconsistent documentation of Project files and records	0.00%	0
Lack of standard project management practices, procedures and guidelines	0.00%	0
Right of Way Acquisition Delays	40.00%	2
Utility Coordination Delays	20.00%	1
Environmental Permitting & Documentation Delays	60.00%	3
Municipal Agreements and/or Stakeholder Agreement	0.00%	0
Shortage of Staff dedicated to Project Management	0.00%	0
Slow decision making by Upper Management on Critical Project decisions and agreements	20.00%	1
Unforeseen Issues arise late in the project development process	60.00%	3
Ineffective communication between project teams and support offices	20.00%	1
Other (please specify)	0.00%	0

Total Respondents: 5

Q9

Which of the following AASHTO recommended project delivery improvement initiatives do you feel SCDOT should consider implementation for improving project delivery? (May select more than one and rank importance)

Answered: 5 Skipped: 0



& Scoping prior to project initiation in Project Delivery										
Performance Driven Design Strategies that maximize investment on the Highway System	0.00% 0	33.33% 1	0.00% 0	0.00% 0	33.33% 1	0.00% 0	33.33% 1	0.00% 0	3	4.33
Project/Program Management Manual with defined procedures, practice, and tools for managing project delivery	20.00% 1	20.00% 1	20.00% 1	20.00% 1	0.00% 0	20.00% 1	0.00% 0	0.00% 0	5	5.80
Incorporation of Risk Management Practices into Project Planning and Delivery for better informed goals and decisions.	0.00% 0	25.00% 1	50.00% 2	0.00% 0	0.00% 0	0.00% 0	25.00% 1	0.00% 0	4	5.25
Outsourcing more project designs to consultants in order to focus limited agency staff more on project delivery oversight	0.00% 0	0.00% 0	0.00% 0	0.00% 0	33.33% 1	0.00% 0	0.00% 0	66.67% 2	3	2.00
Expansion of Innovative Financing and Contracting Tools, such as Construction Manager – General Contractor, Public Private Partnership, etc…	0.00% 0	33.33% 1	0.00% 0	0.00% 0	0.00% 0	66.67% 2	0.00% 0	0.00% 0	3	4.33
Implementation of Project Management Collaboration Software to manage Project & Program Performance (schedules, budgets, and scope) and document decision making	0.00% 0	25.00% 1	0.00% 0	50.00% 2	25.00% 1	0.00% 0	0.00% 0	0.00% 0	4	5.25
Formal training classes for position specific skills (project management, design, etc…)	33.33% 1	0.00% 0	0.00% 0	0.00% 0	0.00% 0	0.00% 0	33.33% 1	33.33% 1	3	3.67

Q10

Do you have any suggestions for programs or opportunities that SCDOT could provide in order to improve project delivery?

Answered: 2 Skipped: 3

Appendix D

Benchmark Study Results of other DOT Practices in the United States

State	Link to Project Management Information	Project Management Manual	Formal Training Program	Incorporates PMI Practices	PMI Certification	Year PM Program Initiated	PM/Project Software	Project Delivery Performance Measures	Delivery Performance Projects Delivered as Promised	PMO office	PM Tools/Audits & Other Information
Alabama	http://www.dot.state.al.us/	No	No	No	No	NA	CMS, Estimator	No		No	
Alaska	http://www.dot.state.ak.us/stwddes/dcspubs/index.shtml#manuals	No	No	No	No	NA	AASHTOWare	No		No	Utilizes a very simplistic PMP for documenting the project work plan http://www.dot.state.ak.us/stwddes/dcsprecon/assets/pdf/preconhwy/chapters/chapter4.pdf
Arizona	https://www.azdot.gov/business/ManagementServices	No	No	No	No	NA	dTIMS, DMG	No		No	
Arkansas	http://www.arkansashighways.com/program_mgmt/program_mgmt.aspx	No	No	No	No	NA	Excel	No		No	
California	http://www.dot.ca.gov/projmgmt/index.html	Yes	Yes	Yes	voluntary	2007	PRSM	Yes	98%	Yes	
Colorado	https://www.codot.gov/business/designsupport/bulletins_manuals/project-development-manual	No	No	No	voluntary	NA	AASHTOWare & ProjectWise	No			PDP manual, very general more like a design manual
Connecticut	http://www.ct.gov/dot/cwp/view.asp?a=4800&Q=558390	No	No	No	No	2014	MS Project, Projectwise & Bluebeam	No		No	http://www.ct.gov/dot/cwp/view.asp?a=4800&Q=558390
Delaware	https://www.deldot.gov/Business/drc/index.shtml?dc=projectmanagement	No	No	No	No	NA	Primavera	No		No	
Florida	http://www.fdot.gov/designsupport/pmhandbook/	Yes	Yes	Yes	preferred		Primavera, AASHTOWare	No		Yes	http://www.fdot.gov/designsupport/ToolBox/default.shtm
Georgia	http://www.dot.ga.gov/PartnerSmart/Business/Documents/ProjectMgmt/PMHandbook.pdf	Yes	Yes	Yes	voluntary	2009	Primavera, PSR & TPROWEB	Yes	56%		http://www.dot.ga.gov/PartnerSmart/Business/Documents/ProjectMgmt/PMHandbook.pdf
Hawaii	http://hidot.hawaii.gov/highways/	No	No	No	No	NA	Skier Unifier	No			
Idaho	http://apps.itd.idaho.gov/apps/manuals/ProjectCharter/ProjectCharterPrintable.htm	Yes	No	Yes	No	2013	MS Project, Project Web App	Yes	48%		
Illinois	http://www.idot.illinois.gov/transportation-system/transportation-management/index	No	No	No	No	NA	EPM Live	Yes	73%		
Indiana	https://www.in.gov/indot/2697.htm	Yes	No	No	No		SPMS, AgileAssets	No			http://www.in.gov/indot/files/ProjectDevelopmentProcessManual.pdf
Iowa	http://www.transportationmatters.iowadot.gov/2017/05/so-many-projects-so-few-resources-new-process-for-project-initiation-and-programming-.html	Yes	Yes	Yes	No	2017	RFI issued in Jul 2017 to request information from vendors on PM Software	No		Yes	http://www.intrans.iastate.edu/research/documents/research-reports/Iowa_DOT_project_mgmt_guidance_w_cvr.pdf
Kansas	http://www.ksdot.org/publications.asp	No	No	No	No	NA	AASHTOWare	No		No	
Kentucky	http://transportation.ky.gov/Environmental-Analysis/Pages/Project-Management.aspx	No	Yes	No	No	NA	EMARS	No		No	http://www.pmtoolbox.kytc.ky.gov/default.asp
Louisiana	http://wwwsp.dotd.la.gov/Inside_LaDOTD/Divisions/Engineering/Project_Management/Pages/Project-Delivery-Manual.aspx	Yes	Yes	Yes	No	2013	PPMS	No		Yes	
Maine	http://www.maine.gov/mdot/	No	No	No	No	NA	PPMS	No		No	
Maryland	http://www.mdot.maryland.gov/newMDOT/Planning/index.html	No	No	No	No	NA	AASHTOWare, Projectwise, Primavera	No		No	http://apps.roads.maryland.gov/webprojectlifecycle/ProjectHome.aspx

State	Link to Project Management Information	Project Management Manual	Formal Training Program	Incorporates PMI Practices	PMI Certification	Year PM Program Initiated	PM/Project Software	Project Delivery Performance Measures	Delivery Performance Projects Delivered as Promised	PMO office	PM Tools/Audits & Other Information
Massachusetts	http://www.massdot.state.ma.us/highway/Departments/ProjectManagement.aspx	No	No	No	No	NA	MS Project, Primavera, FAPRO	Yes	41%	No	http://www.massdot.state.ma.us/Portals/8/docs/designGuide/CH2_a.pdf
Michigan	http://www.michigan.gov/mdot/0,4616,7-151-9621---,00.html	No	No	No	No	NA	Planisware, Projectwise	No		No	
Minnesota	http://www.dot.state.mn.us/pm/	Yes	Yes	Yes	Yes	2009	PPMS, PUMA & Primavera	No		Yes	http://www.dot.state.mn.us/pm/processes.html
Mississippi	http://mdot.ms.gov/portal/home.aspx	No	No	No	No	NA	PPMS, PDPM	No		No	
Missouri	http://www.modot.org/plansandprojects/	No	No	No	No	NA	PPMS	Yes	71%	No	
Montana	http://www.mdt.mt.gov/pubinvolve/project-mgmt.shtml	No	No	No	No	NA	AgileAssets	No		No	
Nebraska	http://dot.nebraska.gov/business-center/pm/	No	No	No	No	NA	AASHTOWare	Yes	74%	No	
Nevada	https://www.nevadadot.com/	No	No	No	No	NA	PPMS, AASHTOWare	Yes	88%	Yes	
New Hampshire	https://www.nh.gov/dot/org/projectdevelopment/highwaydesign/units/projectmanagement/index.htm	No	No	No	No	NA	Primavera	Yes	80%	Yes	
New Jersey	http://www.state.nj.us/transportation/capital/pd/phase.shtm	Yes	Yes	Yes	No	2016	PMRS	Yes	87%	Yes	
New Mexico	http://dot.state.nm.us/content/nmdot/en/Program_Management.html	No	No	No	No	NA	PPMS, Primavera	No		No	
New York	https://www.dot.ny.gov/index	Yes	No	No	No	NA	Projectwise, PRSM	No		No	https://www.dot.ny.gov/divisions/engineering/design/dqab/pdm
North Carolina	https://connect.ncdot.gov/resources/DMPDT/Pages/default.aspx	No	No	No	No	NA	NA	Yes	86%	No	http://www.ncleg.net/news/TIPRFPattachment.pdf
North Dakota	http://www.dot.nd.gov/	No	No	No	No	NA	AASHTOWare, CPM	Yes	79%	No	
Ohio	http://www.dot.state.oh.us/pages/home.aspx	No	No	No	Yes	NA	PMIS	Yes	97%	No	
Oklahoma	https://www.ok.gov/odot/About_ODOT/Contact_ODOT_Divisions/Project_Management_Division.html	No	No	No	No	NA	Projectwise	No		No	
Oregon	http://www.oregon.gov/ODOT/ProjectDel/Pages/Project-Delivery-Guide.aspx	Yes	Yes	Yes	No	2008	PDWP,PCS RMS (MS Project), ProjectWise	Yes	100%	No	http://www.oregon.gov/ODOT/ProjectDel/Documents/PD-Guide/pdg_appendixd_managing_pd_process.pdf
Pennsylvania	http://www.penndot.gov/ProjectAndPrograms/Pages/default.aspx	No	No	No	No	NA	ECMS	No		No	http://www.penndot.gov/_layouts/pa.penndot.formsandpubs/formsandpubs.aspx
Rhode Island	http://www.dot.ri.gov/	No	Yes* contracted with vendor to provide PMI training in 2017	No	No	2016	PMP	No		Yes	https://www.pmp.dot.ri.gov/PMP/DesktopDefault.aspx?aM=ubid&podid=-1&oM=opening&cI=1&cp=disp&appindex=0&appid=0
South Dakota	http://sddot.com/transportation/highways/Default.aspx	No	No	No	No	NA	Primavera	Yes	61%	No	
South Carolina	http://www.scdot.org/	No	No	No	No	NA	P2S, Primavera, Projectwise	Yes	58%	No	http://www.scdot.org/doing/road_projects.aspx
Tennessee	https://www.tn.gov/tdot	No	No	No	No	NA	Primavera	Yes	63%	No	
Texas	http://www.txdot.gov/inside-txdot/division.html	No	Yes* offers PMI training to employees	No	No	NA	PMIS, Primavera, Projectwise	Yes	87.20%	No	http://www.txdot.gov/inside-txdot/forms-publications/publications/project-mgmt.html

State	Link to Project Management Information	Project Management Manual	Formal Training Program	Incorporates PMI Practices	PMI Certification	Year PM Program Initiated	PM/Project Software	Project Delivery Performance Measures	Delivery Performance Projects Delivered as Promised	PMO office	PM Tools/Audits & Other Information
Utah	https://www.udot.utah.gov/main/f?p=100:pg:0:::1:T,V:4011,	Yes	Yes	Yes	No	2013	Microsoft Project	Yes	75%	No	
Vermont	http://vtrans.vermont.gov/highway/structures-hydraulics/project-development-process	No	No	No	No	NA	GIS based Project Database online	No		No	http://vtrans.vermont.gov/docs
Virginia	http://www.virginiadot.org/business/project_management.asp	Yes	No	No	preferred	NA	MS Project, Primavera, AASHTOWare	Yes	75%	Yes	
Washington	http://www.wsdot.wa.gov/Projects/ProjectMgmt/	Yes	Yes	Yes	No	2005	PMRS, Primavera P6 & Contract Manager	No		No	
West Virginia	http://www.transportation.wv.gov/highways/Pages/default.aspx	No	No	No	No	NA	Primavera, ProjectWise, PRS	No		No	
Wisconsin	http://wisconsindot.gov/Pages/doing-bus/eng-consultants/cnslt-rsrces/rdwy/fdm.aspx	Yes	Yes	Yes	No	2007	AASHTOWare, Primavera, PMP & TPMS (WisDOT Tool), MIIP, FIIPS, BOXI	Yes	95%	Yes	http://wisconsindot.gov/Documents/doing-bus/eng-consultants/cnslt-rsrces/swig/sw-05-05.pdf
Wyoming	http://www.dot.state.wy.us/home/engineering_technical_programs/manuals_publications.html	No	No	No	No	NA* Has a Strategic Plan to incorporate PM Training by 2018	Primavera, AASHTOWare	No		No	
	Percentage of Total Surveyed with a YES:	29%	27%	24%				41%		22%	

Appendix E

Project Life Cycle Process Improvement Proposal

South Carolina Department of Transportation
January 4, 2018

Proposal for

SCDOT Project Life Cycle

I. Summary/Introduction

South Carolina Department of Transportation (SCDOT) Preconstruction Division is responsible for efficiently developing highway improvement projects that enhance safety and mobility for the travelling public in South Carolina. Transportation agencies across the country are increasingly challenged to deliver projects with greater speed and efficiency. SCDOT has traditionally struggled with setting reliable project delivery schedules and meeting those expectations as reflected in agency project delivery performance metrics. The strategic performance goal set by our Agency Leadership is to deliver at least 75% of the planned projects each year. The 2017 project delivery performance was reported at 60%. Through analysis of the project delivery performance data, it appears that the current Project Development Process has gaps in the Project Planning, Scoping, Project Documentation and project management tasks. The project development process is structured to outline those activities that would initiate after a project has a defined purpose and need, is approved by the SCDOT Commission and is included in the Statewide Transportation Improvement Program (STIP). Therefore, the project's life cycle is not initiated in this project development process, but initiated in the prior planning processes. Planning processes are not currently documented and there is no official documentation of the project purpose and need that facilitates the hand off to the Project Delivery Unit to initiate the Project Development Process. Since this proposal will cover processes outside of the Project Development Process, we will use the term Project Life Cycle to describe these processes which transcend only those processes performed by the Project Delivery Unit. The project life cycle is defined as the framework for managing projects from project initiation, planning, execution and closure. This proposal outlines some project life cycle improvements that could help close some of these gaps in the current agency processes for projects. Implementation of these improvements will require Agency Leadership Support. The total budget requested for these changes is $150,000 initially for short term improvements, with a proposed larger future investment to be determined through this process for the implementation of an agency Project Management Information System. These improvements are focused on alignment of agency processes and practices with SCDOT strategic goals to improve project delivery and increase the reliability of our road and bridge network.

II. Needs/Problems

Recent research reveals that SCDOT currently has some gaps in the execution of the current Project Development Process that could be improved. The highest ranked gap identified was insufficient documentation of Project Scopes, Goals and Constraints that align with Agency Goals and Constraints. The current project development process assumes that a Planning Phase is occurring prior to the initiation of project development by the Project Delivery Unit. In this planning phase, the project purpose and need is defined, the SCDOT Commission approved the project and the project is included in the STIP. This process is documented in an Advanced Project Planning Report which facilitates the hand off between Planning and Project Delivery. The Project Delivery Unit includes Preconstruction, Environmental, Right of Way, Program Controls and Construction divisions. This planning task is no longer performed consistently by the Planning office and in the recent past when performed for some select projects, the APPRs were inaccurate due to inadequate collaboration and input from the Project Delivery Unit during development. Therefore, projects are typically not documented and are allocated insufficient budgets, scopes and schedules when committed for initiation in our current project development process. The Project Delivery Unit generally spends a significant amount of time at the initiation of the project in understanding the project scope, goals and constraints and securing leadership and stakeholder buy-in on the project. Many times some work previously performed by Planning must be reworked due to inadequate documentation, assumptions and forecast timelines utilized by Planning. Project Managers are generally charged with leading this effort and establishing the project scope, goals and constraints in a vacuum without access to other agency priorities and projects that could impact these decisions if considered from an agency viewpoint. This leads to misalignment of project goals with Strategic goals and frequent changes to projects during the development which results in prolonged project development timelines. In most cases, this has an effect on the entire project delivery program due to increasing budget demands on most of the projects within the program, which results in unmet project delivery commitments. In addition, Project Planning and Project Management Procedures and Practices are not well documented so there is also no consistency in the development of projects.

Staff requests that Leadership consider implementing a formal project planning process at the executive level that can align project scopes, goals and constraints with the Agency's Strategic Goals and Financial Plans. Documentation of the project scopes, goals and constraints are essential to securing buy-in early and setting the baselines for project delivery. Effective communication and collaboration between project planning staff and project delivery staff is essential in establishing an accurate and reasonable project charter or business case for executive consideration and agency planning.

- Length of time needs/problems have existed = 8 years; this problem has surfaced since SCDOT initiated itemized project budget and schedule commitments in the STIP.

- Interim improvements have been made by utilization of the Project Definition Report and Project Delivery Unit Input on Potential Project Lists. However, Project level staff are struggling to establish Agency aligned goals and constraints that take into consideration Asset Management, Maintenance Cycles and other Agency Financing Constraints in the context of the entire program. A true Project Definition report should not only include project data, but include analysis and recommendations for decision. The analysis should include risk analysis, cost benefit analysis, menu of project scope options with cost and schedule implications for management consideration. Executive Leadership could then be making decisions based on this information and setting the goals and constraints for projects and the program as a whole.

- Impact of problem to Agency: Current process application results in project delivery delays that have impacts on multiple projects in the priority list due to poor project planning and documentation. This in turn also creates difficulties in successful management of financial resources over time to meet project budgetary requirements.

- Impact of problem to travelling public: Long project delivery timelines and shifting project commitments that result in loss of public trust and delays to all projects within the program.

III. Goals/Objectives

The desired goal is to expedite project delivery and streamline processes. These goals and objectives are focused on the Project Life Cycle which could assist the Agency in development of their target operating model. The following goals are outlined for consideration to expedite project delivery at SCDOT:

- Goal 1: Revise Project Life Cycle or Project Development Process to include formal planning processes for all projects to improve the establishment of project scope, purpose and need, realistic budgets and schedules (including goals and constraints that align with agency plans) prior to project commitment. The deliverable from this planning process should be a tangible document that facilitates clear communication in the hand off of projects from Planning to Preconstruction. Project Delivery staff should be involved in providing technical input into the project planning processes for One Team effort. **Benefits** of this strategy include:

- Facilitates communication and collaboration between Planning and Project Delivery Staff, engaging all members of the team in the project development process for greater understanding of each other's needs and responsibilities.

- Reduces the front end planning effort workloads on Project Delivery staff and frees up staff to focus on Delivering Quality Projects that have been clearly defined and committed.

- Increases the accuracy of planning project budgets and schedules, which may reduce the number of projects that are initiated for project delivery to those that have clear scopes and budget commitments, thus allowing the project delivery unit to perform more efficiently.

- Reduces the overall project delivery timeline by completing planning processes prior to project commitments.

- Identifies the level of risk associated with projects prior to commitment for better informed decision making at the executive level.

- Goal 2: Secure Stakeholder Buy-In during project planning in order to reduce the risk of change in the project during project development. Secure any local funding or maintenance commitments necessary for project scope enhancements requested by local municipalities during the project planning process. Planning staff to take a stronger leadership role and more hands-on involvement with the COGs and MPOs. **Benefits** of this strategy include:

    - Engages Planning staff with project sponsors and stakeholders and the COG & MPO Program Staff. Reduces workload on Program Managers in managing COG & MPO Programs so they can focus on Project Delivery rather than project planning.

    - Reduces Changes in project scope, budgets and schedules once committed projects are initiated when scopes are well documented and stakeholder buy-in is secured early.

    - Project scope issues can be discovered and negotiated during planning in an effort to reduce project RISK during development.

    - Projects with disputes or issues would not be committed to project delivery until resolved thus eliminating projects in the delivery unit that are consistently reworked as negotiations are ongoing during delivery in current processes.

- Goal 3: Implement an Agency Risk Management Policy. Many DOTs have incorporated Risk Management into Project Planning and Project Delivery in efforts to better manage risks to the agency. Re-instate FTE for Preconstruction Value Engineer with a focus on risk management and value engineering. This position would collect and analyze all the risk data developed on projects and programs. **Benefits** of this strategy include:

    - Identification of risk for major projects and programs prior to commitment. Level of Risk could be a deciding factor on the timing of the Department's commitment to the project or portfolio.

    - Performing risk management at the project and program level will create useful data to be analyzed on a higher level for identification of trends and opportunities.

    - Analysis of reoccurring risks could assist the agency in identifying targeted areas for improvements in order to reduce the Agency's Risk Exposure or align projects and programs within the Agency's Acceptable Level of Risk Tolerance.

    - Utilize Value Engineering process to "value engineer" processes at the division and group level for continuous process improvements. Program performance data can be utilized to identify gaps where potential value engineering studies would be beneficial.

- Goal 4: Engage Agency Leadership in approval of recommended project portfolios for efficient alignment of projects with Agency Strategic Goals. Project portfolios should be aligned with asset management plans to include consideration to maintenance cycles long term agency performance goals. **Benefits** of this strategy include:

    - Detailed upfront planning of projects will result in more accurate, risk based project information being available to management on the projects and programs that we intend to deliver.

    - Director level management works to develop recommended project/program portfolios that will align with strategic goals and present recommendations to leadership for consideration.

  - Project/Program Portfolios with risk ratings can be utilized for better informed decision making at the executive level. Considerations to cash flow, risk, maintenance cycles, and asset management can happen at the executive level to ensure that delivery of committed projects and programs ALIGN with agency strategic goals, constraints and business plans. * This cannot be performed at the project or program level with any success.

  - Reduces project overlaps and increases efficient project portfolios. For example, a bridge replacement project within a widening or pavement reconstruction project that could be combined into one project or timing of project delivery could be more efficient if grouped together.

- <u>Goal 5</u>: Document project management performance and results using a Project Management Information System. These systems document project plans and performance and result in a collection of <u>organizational assets.</u> Position the agency to be able to identify our successes as well as areas where we can improve. These assets can be used in order to further refine the processes and improvement of project delivery over time. Risk Registers in particular could assist the Agency in identifying commonly encountered risks that should be evaluated for improved efficiencies in future projects and programs. **Benefits** of this strategy include:

  - Documentation of projects assists in capturing project decisions, history and performance so that projects are clearly defined for a changing and developing workforce. Reduces the risk of rework or repeated decision making when project plans and decisions are not clearly documented or are documented in an unorganized or hard to access manner.

  - Project plans from completed projects can be used to gather lessons learned and feed into the planning of future projects. These documents are also helpful to inexperienced staff in assisting their initiation of new projects. Let's capture what we do, so that we can share our successes and learn from our failures.

  - Project Management Information Systems can be configured to streamline the documentation of project plans and performance in a digital format that could be accessible to any member of the Project or Agency Team that needs the information. Digital platforms also create searchable databases where project plans could be found and accessed quickly for staff.

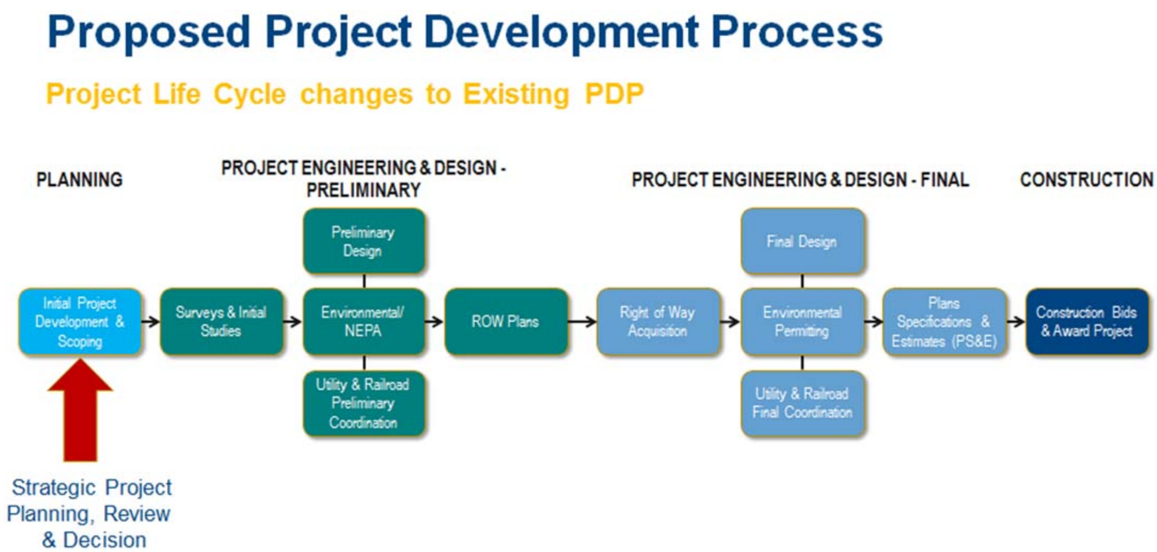
- These systems are also capable of analyzing cash flow based on real time project cost and schedule information.
- Project management information system platforms also streamline analysis of project and program performance on a higher level.
- Project Management Information Systems incorporate interactive, resource loaded scheduling components that would improve schedule and resource management at the project level as well as at the working unit, division and program level. This would give managers the tools they need to manage resources and commit to reliable delivery schedules.

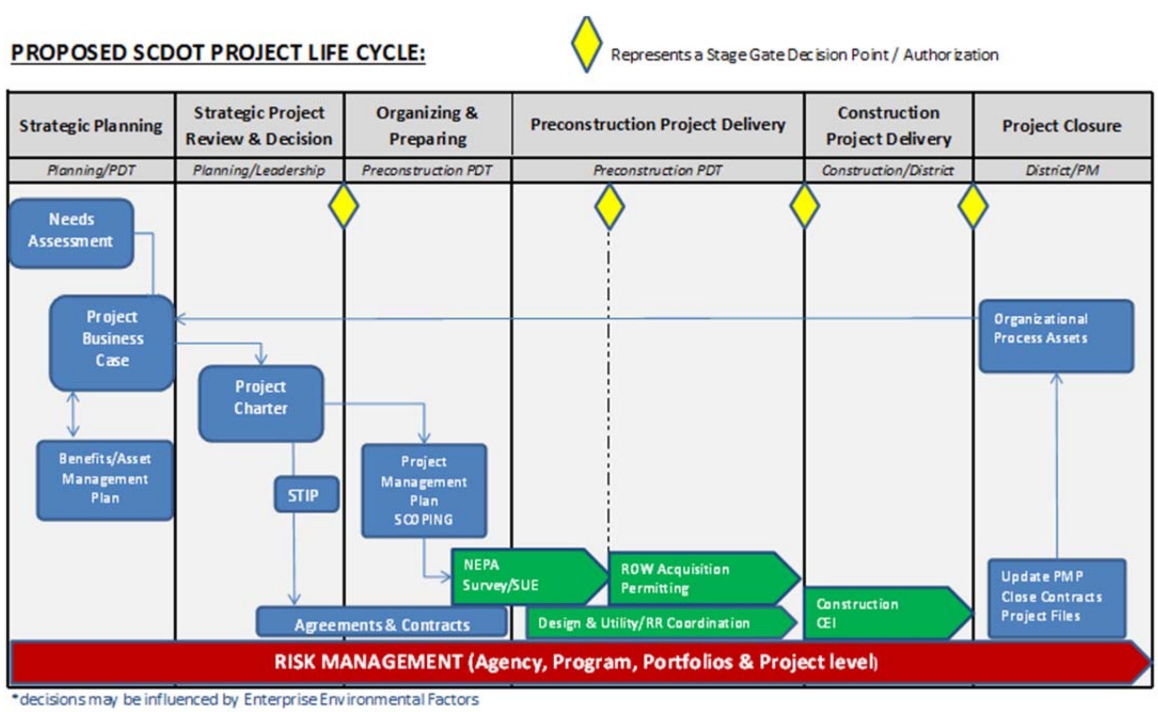
IV. Procedures/Scope of Work

The proposed Project Life Cycle outlined in this section is based on industry best management practices for alignment of project and program portfolios with Agency Strategic Goals and Objectives. The project life cycle is a larger process that fits within the Agency's Target Operating Model. These proposed changes do not necessarily mean wholesale drastic changes to the current Preconstruction Project Development Process or constitute an Organizational Re-organization. However, some reorganization, newly documented processes or process updates may help facilitate the implementation of changes in some areas.

Organizational Project Management – It's an Agency TEAM effort!

The Project Development Process does need updating but its general overarching structure is not broken in the general process by which projects are developed. The current issues or gaps in the process are more in the application of the process. Many members of the team do not understand the process or how activities are initiated, documented and handed off to the next step. Focus should be given to ensuring that division and group processes, procedures, tools, roles and responsibilities are clearly defined for staff working in those roles. The project life cycle proposed in this document does not require wholesale changes to the process, but modifications to the applications. The first change would be to clearly define a PLANNING phase of work and engage Planning staff in the leadership of this phase.





Under the proposed Project Life Cycle depicted above, the SCDOT Planning Department would lead the initial project development and scoping activities prior to project commitments in the STIP. This change would take some responsibilities off the overloaded Project Delivery staff and more effectively utilize our Planning staff resources. Project Delivery staff would not be completely removed from this process but would be a technical collaborator to the strategic planning process. This change would effectively integrate the Project Delivery Processes with Planning Processes for more effective and strategic project portfolio development with key alignment with Agency Goals and Constraints.

The Project Development Process would not be greatly altered under this scenario. The Planning office would assume the leadership responsibilities for the first task in the current project development process. While the Project Development Process should be considered for updating as new ancillary processes and supporting tools are updated and added, the overall structure of the process is not altered.

The roles and responsibilities for the Departments are as follows under this Project Life Cycle:

PLANNING:

- Performs Long Range Planning Activities that support identification of the needs on the state roadway and bridge system.
- Performs regional corridor studies focused on identifying the future needs of the system that will drive and support project decision making. Focus on efficient project grouping and timing for the most efficient investment in the State System.
- Performs Project Planning level scoping and data collection (in coordination with Project Delivery Unit) for establishing reasonable project scopes, potential delivery schedules and budget requirements. This information should be documented in a Project Definition Report or Project Charter.
- Planning leads coordination of planned projects with local Stakeholders for input and buy-in. Preconstruction program managers for the regional areas can assist in this effort at Planning's request for a unified collaboration.
- Perform Risk Analysis on the proposed projects in order to provide management with an assessment of the level of risk for projects and programs. *Risk Analysis should initiate in the Planning Phase and be carried through the Project Delivery Phase. If the FTE for a Risk/Value Engineer is implemented, then this person would facilitate the risk analysis process with Planning Unit initiating the effort with the Risk/Value Engineer's assistance. The Project Delivery Unit would serve as subject matter experts during the risk process. Risk Analysis can be performed on individual projects as well as groups of projects for less complex projects that could be analyzed in groups.*

- Perform analysis of projects with Agency Asset Management plans to prioritize projects based on efficient management of assets. Ensure analysis of overlapping needs in order to efficiently group potential investments/projects.
- Facilitate Director Level review of projects in order to align project scope options and groupings in an effort to align potentially selected projects with manageable maintenance cycles and most efficient grouping and timing of project scopes. This effort may include some cost benefit analysis to determine the best path forward. This portfolio should be screened for alignment with Division Strategic Goals and Business/Financial Constraints.
- Director Level Review produces proposed project portfolio that could be presented to Executive Leadership for consideration and alignment with Strategic Goals and Business/Financial Constraints from an Agency Level. Allocate time for Project Delivery Unit review and concurrence with proposed projects and portfolios to ensure that proposals can be executed as proposed.
- Planning Leadership facilitates presentations of proposed project portfolios to Executive Leadership for Consideration and Approval.
- Planning facilitates adding approved projects to the STIP in a manner that distributes workloads to Project Delivery Units for initiation. Evaluate project distribution for years of initiation and delivery in consideration of delivery unit's ability to initiate a large number of projects at one time.
- Planning distributes Project Definition Report or Project Charter to the Project Delivery Unit for project delivery execution. This report should include the project data, any project analysis to include risk registers and project scope option selections. A Stakeholder register should also be included that identifies the stakeholders that were consulted and any corresponding scope requirements and/or agreements or funding that was committed in the project. This document should clearly communicate the project purpose and need, priorities, baseline scope, budget and delivery schedule for the project.

PROJECT DELIVERY UNIT:

- Assist in reviewing potential projects in coordination with Planning efforts to ensure that project design and delivery risks, goals and constraints are clearly understood for each potential project.
- Environmental staff to provide assistance to Planning in determining the Environmental Resource concerns and potential impacts with the potential project.
- Assist Planning in Risk Analysis by providing Subject Matter Experts for the Risk Identification, Assessment and Planning.
- Provide support as requested by Planning in assisting them with stakeholder coordination and buy in on prospective projects in planning.

- Plan project portfolio execution prior to project approval in the STIP, to determine what resources may be available to deliver the project. Initiate scope preparation for projects that will need to be delivered using consultant resources.
- Once notified by Planning that a project has been approved in the STIP, initiate programming of PE funding and initiation of surveys, consultant contracts and project delivery efforts.
- Document the Project plans and progress and Deliver a Quality Project in an efficient manner within the budget and schedule constraints and goals provided by Executive Leadership.

*Note – A key component of this change is to document the Project Planning Process and the Project Management Processes so that there is clear communication of detailed roles and responsibilities.

V. Timetable

The expected timetable for the Project Life Cycle improvements is outlined below. The implementation has been broken into phases.

Phase	Description of Work	Start and End Dates
Phase 1	**Creation of Strategic Planning Unit** – reassignment of staff or FTEs for securing staff with necessary skill set	Early 2018 – June 2018
Phase 2a	**Documentation of Strategic Planning Processes and Procedures** (led by Strategic Planning Unit Leader in cooperation with a task force of SMEs.	June – August 2018
Phase 2b	**Documentation of Risk Management Policy** – secure consultant services to assist task force in creation of Risk Management Tool and Manual to be issued with Policy Change (led by Preconstruction).	June – August 2018
Phase 3a	**Initiation of Project Planning Procedures**	Fall 2018
Phase 3b	**Documentation of Project Management Manual** – Led by Preconstruction	August 2018 – June 2019
Phase 4	First Cycle of **Prospective Project Portfolios** reviewed by Leadership	Spring 2019
Phase 5	**RFP for Project Management**	June 2019

	Information System based on approved Project Planning and Project Management Procedures. Full implementation for this initiative could be 2-4 years.	

VI.Budget

State the proposed costs and budget of the project. Also include information on how you intend to manage the budget.

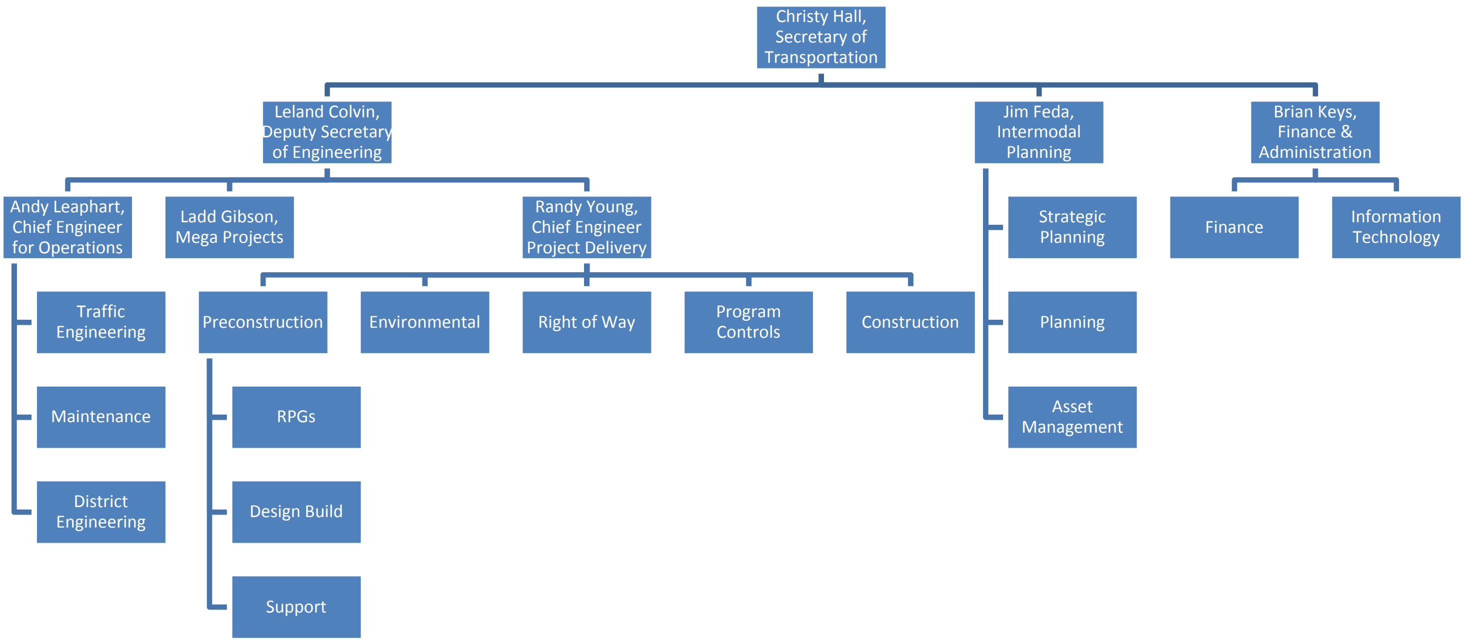
Phase	Description of Work	Anticipated Costs
Phase 1	Creation of Strategic Planning Unit	$0
Phase 2a	Documentation of Planning Processes & Training	$50,000
Phase 2b	Documentation of Risk Management Policy, Tools & Training	$30,000**
Phase 3	Documentation of Project Management Processes & Training	$100,000
Phase 5	Project Management Information System	Costly Investment - TBD
	Total	$ 180,000

*Costs reflected above are for small purchase contracts for consultant services to assist in documentation of processes and manuals. In-house contributions would be assignment of staff subject matter experts to serve on task force committees to guide and direct consultant work on these initiatives.

**There may be some remaining SHRP2 Grant funds available in an Expediting Project Delivery Grant (RPG 3) for this Risk Management Task.

Key Personnel

List the key personnel who will be responsible for completion of the project, as well as other personnel involved in the project.



VII. Evaluation

The progress will be evaluated throughout and at the end of the project life cycle implementation. The Project Delivery Unit will implement some minor changes to the Project Programming system in the initiation of this strategy in order to easily measure and report on project performance. This will assist the Agency in monitoring what the actual project performance is currently under the existing project development process. As changes are implemented in the future project life cycle, then incremental improvements may be measured with the project and program performance reports. Adjustments may be necessary as project and program performance are monitored over time and additional improvements may be identified as performance is routinely monitored and gaps in the process will be more easily identified.

VIII. Endorsements

This proposal has been distributed for review by the Project Delivery Unit and Planning Unit Directors. Initial feedback indicates that most staff are ready for changes that will improve project delivery. Further refinement of the implementation plan should be performed by our Leadership before seeking endorsement from Division Directors and other upper level management staff.

IX. Next Steps

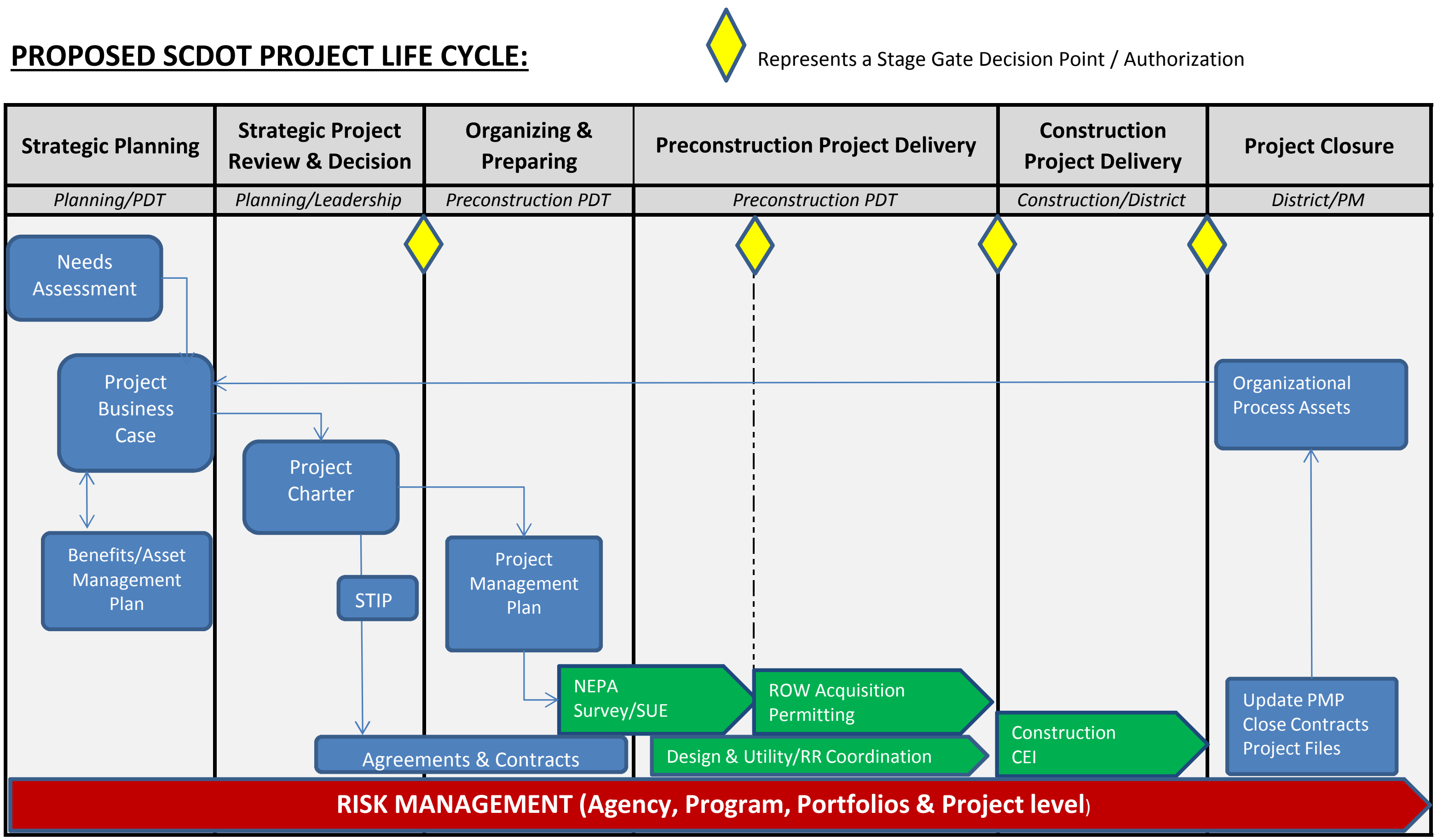
The actions required to execute.

- Executive Leadership Review & Consideration
- Refinement of Implementation Plan with Target Operating Model
- Upper Management Input and Buy-In
- Executive Leadership Policy Change & Position Appointments

X. Appendix

Project Life Cycle supporting materials including descriptions and attributes.

PROPOSED SCDOT PROJECT LIFE CYCLE:



*decisions may be influenced by Enterprise Environmental Factors

PROJECT LIFE CYCLE ACTIVITY DESCRIPTIONS & ATTRIBUTES (continued)

NEEDS ASSESSMENT (Planning Activities):
Long Range Transportation Improvement Planning for the Entire System aligned with manageable maintenance cycles.
ACT 114 Ranking of State Highway Improvement Priorities for further analysis and business planning.
Coordination with Transportation Asset Management Plans

PROJECT BUSINESS CASE (Planning Activities - Collect Information & Analyze the Options / Collaboration with Project Delivery Units):
Documented economic feasibility study that establishes the benefit of a selected project and that is used to develop sufficient project definition as a basis for further project management activities, includes cost benefit analysis. Includes the following:

Business Needs:
Determination of what is prompting the need for action;
Situational Statement documenting the problem to be addressed including the value to be delivered to the organization
Identification of Stakeholders affected & Collect Requirements
Identification of the scope (must include coordination with RPGs for regional context and confirmation)

Analysis of the Situation:
Identification of organizational strategies, goals, and objectives
Identification of root causes of the problem
Gap Analysis of capabilities needed for the project versus existing capabilities of the organization
Indentification of known risks
Identification of critical success factors
Identification of decision criteria by which the various courses of action may be assessed

Decision Criteria Catagories used for analysis of the situation are:
Required - *criterion that must be met in order to address the problem*
Desired - *criteria that are desired to address the problem*
Optional - *criterion that are not essential but may be a differentiator between alternative courses of action*

Identification of a Decision Matrix of Options to be Considered:
Do Nothing Option - Project not authorized
Minimum Work Possible Option - may include some design exceptions and meets minimum performance criteria for the design life.
Required / Standards Met Option - no design exceptions or variances (may be more than one of these options documented)
Optional Plus Option - includes identified beneficial opportunities for the highest cost benefit for the agencies long term goals for the system (may be more than one of these options documented).
*Basis for cost and schedule estimates should be provided including degree of confidence (inflation, cost of financing, risk reserves, etc).
*Consideration should be given to Performance Based Design Criteria in order to maximize investments on critical routes while balancing performance based investments on less critical routes for a feasible cost benefit investment into the State Highway System.

PROJECT LIFE CYCLE ACTIVITY DESCRIPTIONS & ATTRIBUTES (continued)

Recommendations (Development of Recommended Options for Decision):
A statement of the recommended option to pursue in the project;
Analysis results for the potential option;
Constraints, Assumptions, Risks, and dependencies for the potential options, and
Project Success Measures;
Implementation Approach with Roles & Responsibilities

Evaluation by Upper Management for Strategic Alignment (DECISIONS):
Statement describing the plan for measuring benefits the project will deliver, including operational aspects of the recommended option beyond the initial
Alignment with Reasonable Future Maintenance Cycles
Alignment with Operational Strategies

PROJECT BENEFITS / TRANSPORTATION ASSET MANAGEMENT PLAN (Planning Activities):
Target Benefits (Cost versus Benefit Analysis)
Strategic Alignment with Agency Business Plans & Asset Management
Timeline for realizing benefits
Benefits Owner
Performance Metrics
Assumptions
Risks
*DOCUMENTED DECISIONS SHOULD BE THE OUTCOME AT THIS POINT IN THE PROCESS

AGREEMENTS/CONTRACTS:
If participation agreements are able to negotiated prior and implemented with the development of the Project Charter, that will help stream line the process.

PROJECT CHARTER or PROJECT DEFINITION REPORT (Includes information, summary of analysis and DECISIONS):
Document issued by the project sponsor that formally authorizes the initiation of a project, assigns the project manager and give PM the authority to apply
Project Purpose & Need
Measurable project objectives and related success criteria (including development/delivery method)
High Level Project Description, boundaries and key deliverables
Overall Project Risk & Planning Risk Responses
Summary Milestone Schedule
Preapproved Financial Resources (Basis of Cost Estimates)
Key Stakeholder List & INCLUDED/EXCLUDED Requirements
Project Approval Requirements (including project success criteria)
Project exit criteria/conditions for closing a phase or cancelling the project
Assigned Project Manager, responsibility and authority level (RACI Charts)
Name and Authority of the project sponsor or other person(s) authorizing the project charter
*Ensures common understanding by the Stakeholders of the key deliverables, milestones and the roles and responsibilities of everyone involved in the project.

PROJECT LIFE CYCLE ACTIVITY DESCRIPTIONS & ATTRIBUTES (continued)

ASSUMPTIONS LOG (included with the Project Charter):
High Level Strategic & Operational Assumptions and constraints

PROJECT MANAGEMENT PLAN (Working Documents that Documents Project Delivery - planned and actual):
Document that outlines how the project will be executed, monitored and controlled. Consider use of Project Management software with customized Plans,
*may be summary level or detailed depending on the complexity of the project
*once baseline PMP is approved, then sustantial changes must be approved as outlined by the Change Control Process
*Consider developing a PMP template that includes those procedures and criteria that would be common to all projects
Subsidiary management plans:
Scope Management Plan
Requirements Management Plan
Schedule Management Plan
Cost Management Plan (includes estimating guidelines and basis of estimates at each phase)
Quality Management Plan
Resource Management Plan
Communications Management Plan
Risk Management Plan
Proecurement Management Plan
Stakeholder Management Plan
Baselines:
Scope Baseline
Schedule Baseline
Cost Baseline
Additional Components:
Change Management Plan
Configuration Management Plan (Projectwise filing & naming conventions/ Req't for Updates to PMP)
*Performance Measurement Baseline (*Project Management Software can automate the calculation of current and projected performance)*
Project Life Cycle
Development/Delivery Approach
Management Reviews
**project documents are not part of the PMP but are stored in Projectwise in accordance with the Configuration Management Plan*

PROJECT LIFE CYCLE ACTIVITY DESCRIPTIONS & ATTRIBUTES

ENTERPRISE ENVIRONMENTAL FACTORS:

Enterprise Environmental Factors refer to conditions, not under the control of the project team, that influence, constrain, or direct the project. They can be external or internal to the organization.

INTERNAL

Organizational culture, structure and governance
Geographical distribution of facilities and resources
Infrastructure
Information technology software
Existing Resource competencies and availability
Employee capability
Agency Risk Tolerance & Strategy*
Operating conditions of the assets
Established Communication channels, tools, and systems;
Enterprise/Integrated Risk Management (Programs/Portfolios/Projects)*
Funding Constraints

EXTERNAL

Marketplace conditions
Social and cultural influences and issues
Legal restrictions (laws and regulations)
Commercial Databases
Academic Research
Government or Industry standards
Financial considerations
Physical environmental elements
Stakeholders Expectations & Risk Thresholds

ORGANIZATIONAL PROCESS ASSETS:

Organizational Process Assets are the plans, processes, policies, procedures, and knowledge bases specific to and used by the performing organization. They influence the management of a project.

Processes, Policies, and Procedures; and
Organizational Knowledge Areas
Historical Performance Information (Cost/Schedule/Scope)*
Lessons Learned Register/Repository from Prior Projects*
Risk Data (analyze realized risk trends)*
Templates (PMP, Risk Registers, Contracts, etc…)*
Contractual Agreements
Consultant Task Manhour and Fee Estimate Repositories*
PerformanceTrend & Variance Analysis for improvement*
Existing Formal and informal cost budgeting-related policies, procedures and guidelines (cost budget tools for consistency)*
Organizational Quality Management System*
Results from Previous Audits
Organizational Resource & Work Breakdown Structures*
Employee Development & Recognition Programs

Agency policies/procedures for issue, risk, change and data management*

*GAP area in existing processes/policies