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INDIANA DEPARTMENT OF TRANSPORTATION
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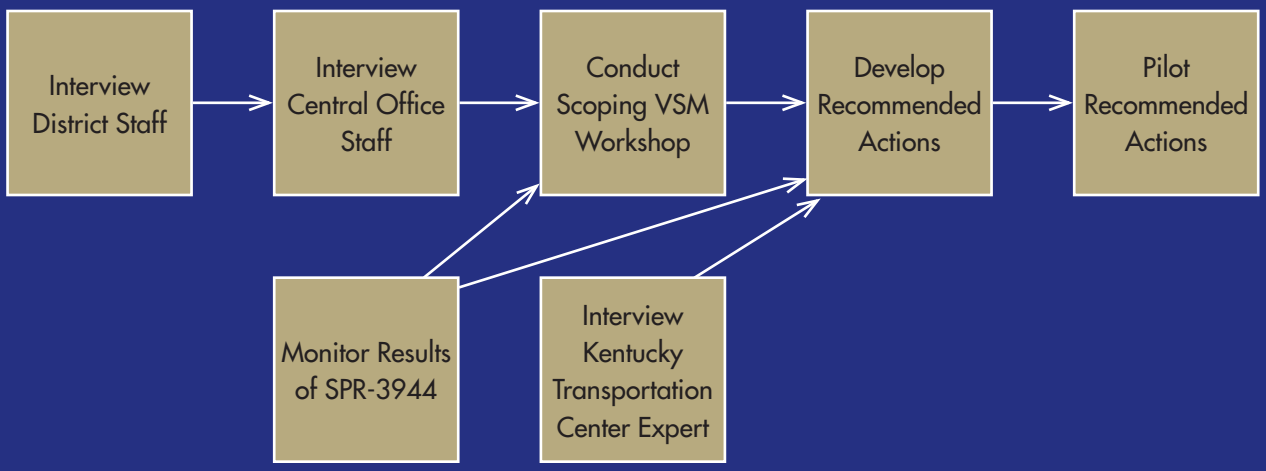
Pre-Contract Scoping Processes Value Stream Mapping



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JOINT TRANSPORTATION RESEARCH PROGRAM

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16. Abstract

The Indiana Department of Transportation (INDOT) is divided into six districts, with district offices located in LaPorte, Fort Wayne, Crawfordsville, Greenfield, Vincennes, and Seymour. Pre-contract scoping of INDOT projects is decentralized, with each district having responsibility (with support from INDOT Central Office staff) for scoping the projects being considered for their district. One month prior to the launch of this project, INDOT created a new Central Office position of Statewide Director of Scoping.

At the time of the launch of this project, it was recognized that there was a need to improve the Pre-Contract Scoping Process because of inconsistency between INDOT districts, lack of coordination/synergy between projects for appropriate bundling and lack of long-range planning (Engineering without borders). The consequences of these issues/problems include: cost-overruns, time delays, and change orders.

This research project was chartered to analyze Pre-Contract Scoping as a business process, identify opportunities for process improvements and help implement these process improvements.

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EXECUTIVE SUMMARY

PRE-CONTRACT SCOPING PROCESSES VALUE STREAM MAPPING

Introduction

The Indiana Department of Transportation (INDOT) is divided into six districts: LaPorte, Fort Wayne, Crawfordsville, Greenfield, Vincennes, and Seymour. Each district has the responsibility (with support from INDOT Central Office staff) for scoping the projects being considered for that district. One month prior to the launch of this project, INDOT created a new Central Office position of Statewide Director of Scoping.

At the time this project was launched, INDOT recognized that there was a need to improve the pre-contract scoping process because of inconsistencies between districts, lack of coordination/synergy between projects for appropriate bundling, and lack of long-range planning (engineering without borders). The consequences of these issues included cost-overruns, time delays, and change orders.

This research project was chartered to analyze pre-contract scoping as a business process, identify opportunities for process improvements, and help implement these improvements.

Findings

Three fundamental issues contribute to the scoping process problems:

1. The scoping process is inefficient and inconsistent.
2. Staffing for scoping is insufficient.
3. The programmed project budgets are locked in based on early, uncertain cost estimates.

While numerous actions have been recommended, and some piloted, those with the highest impact will be the actions that address these three fundamental issues, as follows:

1. Numerous proposed actions will improve the efficiency and consistency of the scoping process. Scoping peer group meetings can provide a vehicle for driving these improvement actions.
2. While the effects of staffing shortages can be accommodated somewhat by making the scoping process more efficient, staffing strategies (such as creating higher level, more esteemed scoping/planning positions) should be pursued.
3. Further refinement and implementation of the proposed future state of the programming process will provide a framework to allow later locking in of project budgets.

Implementation

Continuous improvement concepts and tools were used as the fundamental methodology for this project. The overall approach was to identify a current state of the scoping process, analyze it to identify opportunities for improvement, and then develop a desired future state and associated recommendations for actions to move toward it.

Tools used in this approach included interviewing subject matter experts (SMEs), group brainstorming, and process mapping. Mapping techniques included Value Stream Mapping (VSM) and SIPOC (supplier-input-process-output-customer) diagrams.

The first step in establishing the current state was to understand the approaches to scoping at each of the six districts. Each district was visited, and key personnel involved in scoping activities and management of the scoping process and support processes were interviewed. This included scoping engineers, scoping managers, asset engineers, system assessment managers (SAMs), and technical services directors (TSDs).

The next step was to get input from key Central Office staff to gain their insights into the current state scoping process. Directors of Bridges, Pavement, MIS, Safety Engineering, and Statewide Scoping were interviewed.

After that, a two-day scoping VSM workshop was conducted with members of all six districts and Central Office Statewide Scoping staff. District representation included TSDs, SAMs, and scoping practitioners (scoping engineers, scoping managers, and asset engineers). The purposes of the workshop were to map the current state, identify improvement opportunities, and develop the desired future state and associated action plans.

Next, a recommended SME from the University of Kentucky's Kentucky Transportation Center was interviewed. And finally, the recommended actions were evaluated, and, where possible, pilot implementations were executed.

Throughout the project, progress and results of SPR-3944 ("Pre-Contract Scoping Processes: Synthesis of Best Practices"), which was being conducted concurrently with this project, were monitored and incorporated.

CONTENTS

LIST OF TABLES

LIST OF FIGURES

1. INTRODUCTION

The Indiana Department of Transportation (INDOT) is divided into six districts, with district offices located in LaPorte, Fort Wayne, Crawfordsville, Greenfield, Vincennes, and Seymour. Pre-contract scoping of INDOT projects is decentralized, with each district having responsibility (with support from INDOT Central Office staff) for scoping the projects being considered for their district. One month prior to the launch of this project, INDOT created a new Central Office position of Statewide Director of Scoping.

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The consequences of these issues/problems include: cost-overruns, time delays, and change orders.

This research project was chartered to analyze pre-contract scoping as a business process, identify opportunities for process improvements and help implement these process improvements.

Note that parallel to this project, JTRP Project SPR-3944 "Pre-Contract Scoping Processes: Synthesis of Best Practices" was being conducted to assess scoping best practices in Departments of Transportation around the country.

2. METHODOLOGY

Continuous Improvement concepts and tools were used as the fundamental methodology for this project. The overall approach was to identify a current state of the scoping process, analyze the current state to identify opportunities for improvement, and then develop a desired future state and associated recommendations for actions to move toward the future state.

Tools used in this approach included interviewing subject matter experts (SMEs), group brainstorming, and process mapping. Mapping techniques included Value Stream Mapping (VSM) and SIPOC (supplier-input-process-output-customer) diagrams.

The first step (Figure 2.1) in establishing current state was to understand the approaches to scoping at each of the districts. Each of the six districts was visited, interviewing key personnel involved in scoping activities and management of the scoping process and support processes (Table 2.1). This included scoping engineers, scoping managers, asset engineers, system assessment managers (SAMs), and technical services directors (TSDs).

The next step was to get input from key Central Office staff to gain their insights into the current state scoping process. Directors of Bridges, Pavement, Management Information Systems (MIS), Safety Engineering, and Statewide Scoping were interviewed (Table 2.1).

Next, a two-day scoping VSM workshop was conducted with members of all six districts and Central Office Statewide Scoping staff members. District representation included TSDs, SAMs and scoping "practitioners" (scoping engineers, scoping managers, and asset engineers). The purposes of the workshop were to map current state, identify improvement opportunities, and develop desired Future State and associated action plans.

Next, a recommended SME from the University of Kentucky's Kentucky Transportation Center was interviewed.

Throughout the project, progress and results of SPR-3944 were monitored and incorporated.

Finally, the recommended actions were evaluated, and, where possible, pilot implementations were executed.

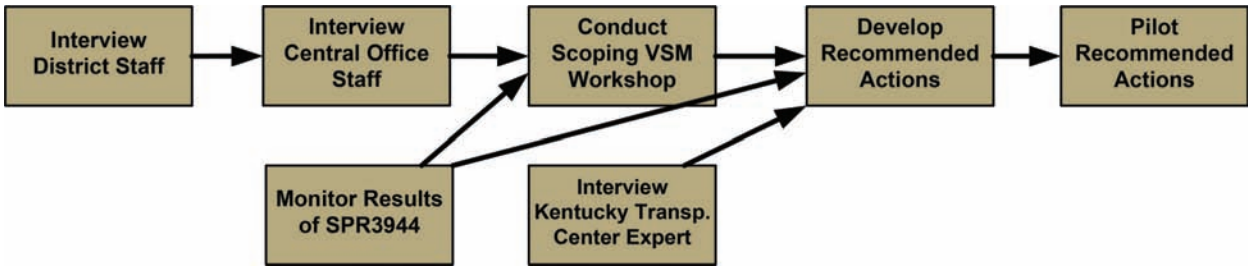

Figure 2.1 Flow diagram of the project methodology.

TABLE 2.1
Summary table of interviews conducted.

	District Staff					Central Office Staff					
Interview Location	**Scoping Engineer**	**Scoping Manager**	**Asset Engineer**	**SAM**	**TSD**	**Director Bridges**	**Director MIS**	**Director Pavement**	**Director Statewide Scoping**	**Director Traffic Engrg**	**Perform-ance Analyst**
Central Office						1	1	1	1	1	1
Crawfordsville District		1			1						
Fort Wayne District	1			1	1						
Greenfield District	1										
LaPorte District	1				1						
Seymour District			1		1						
Vincennes District				1	1						
No. of staff interviewed (total = 18)	**3**	**1**	**1**	**2**	**5**	**1**	**1**	**1**	**1**	**1**	**1**

3. RESULTS/ACTIVITY SUMMARY

3.1 Interviews with District Staff

Each district was visited to conduct interviews with TSDs, SAMs, and scoping engineers (see Figure 3.1). Three districts were visited a second time to conduct follow-up interviews. Table 3.1 details the interviews conducted.

3.1.1 District Staffing

One of the initial purposes of the interviews was to understand the current state of each district's organization and staffing for the scoping function. Figure 3.2 depicts the organization structures of each of the districts with respect to scoping resources.

While each district is responsible for scoping its own projects, it is recognized that district staffing for scoping varies significantly. In all districts, the scoping function reports to the SAM, who reports to the TSD. In all but one district, the asset engineers, who are integrally involved in scoping, also report to the SAM (Greenfield asset engineers report to the TSD).

The variation in organization structure is not considered to be an issue, as there are compelling reasons at each district for the structure in place. The bigger concern is the general lack of staffing and experience for scoping. Three districts have open scoping engineer positions, one has its only scoping engineer with less than one year of experience in scoping, and one has a scoping engineer that was just hired out of college. The open position at Vincennes is due to a recent resignation, while that at Seymour has been open for over a year and is not currently projected to be filled. (See Table 3.2 for current state of district staffing and experience.)

The issues with filling and retaining scoping engineer positions vary by district, but are an ongoing obstacle to scoping capacity. Interviewees offered several contributing factors, including:

- Certain districts are generally difficult to staff due to location (Seymour, Vincennes)
- Scoping engineer positions tend to be low/entry-level slots, so they are prone to turnover
- There is little to no existing career progression for scoping engineer advancement
- INDOT turnover in general is considered problematic, with Scoping being included

So while staffing and experience are short, and it is recognized that capacity is thereby limited, adding additional positions (which cannot be filled) is not considered a viable solution.

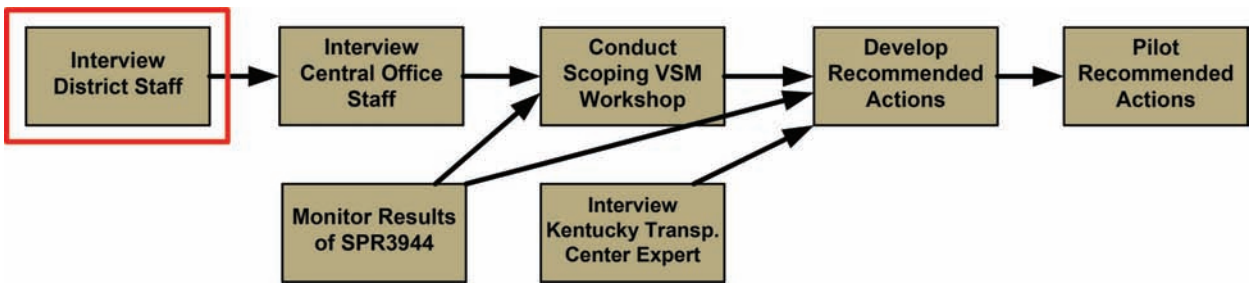

Figure 3.1 First step in project methodology was to interview district staff.

TABLE 3.1
Details of interviews conducted at the districts and Central Office.

				District Staff					Central Office Staff					
	Date	Interview Location	Interviewee(s)	Scoping Engineer*	Scoping Manager	Asset Engineer	SAM	TSD	Director Bridges	Director MIS	Director Pavement	Director Statewide Scoping	Director Traffic Engrg	Performance Analyst
1	06/02/15	Central Office	Louis Feagans									1		
2	06/17/15	LaPorte District	Sarah Ford					1						
3	07/09/15	Crawfordsville District	Bob Montgomery, Mike Eubank		1			1						
4	07/15/15	Greenfield District	Nathan Sturdevant	1										
5	07/15/15	Fort Wayne District	Jason Kaiser, Lew Kreger, Sarah Farlow	1			1	1						
6	07/20/15	Seymour District	Becky Gross, James Ude			1		1						
7	07/17/15	Vincennes District	Valerie Cockrum, Khalil Dughaish				1	1						
8	08/06/15	Crawfordsville District	Mike Eubank, Derek Weinberg		1**									1
9	08/06/15	LaPorte District	Mike Miltz, Sarah Ford	1				1**						
10	08/13/15	Central Office	Brad Steckler										1	
11	08/13/15	Central Office	Jay Lytle							1				
12	08/28/15	Central Office	David Holtz								1			
13	08/28/15	Central Office	Anne Rearick						1					
14	08/28/15	Fort Wayne District	Sarah Farlow	1**										
No. of staff interviewed (total = 18)				**3**	**1**	**1**	**2**	**5**	**1**	**1**	**1**	**1**	**1**	**1**

*"Scoping engineer" includes individuals with other titles whose have primary scoping engineering responsibilities.
**Indicates people interviewed multiple times.

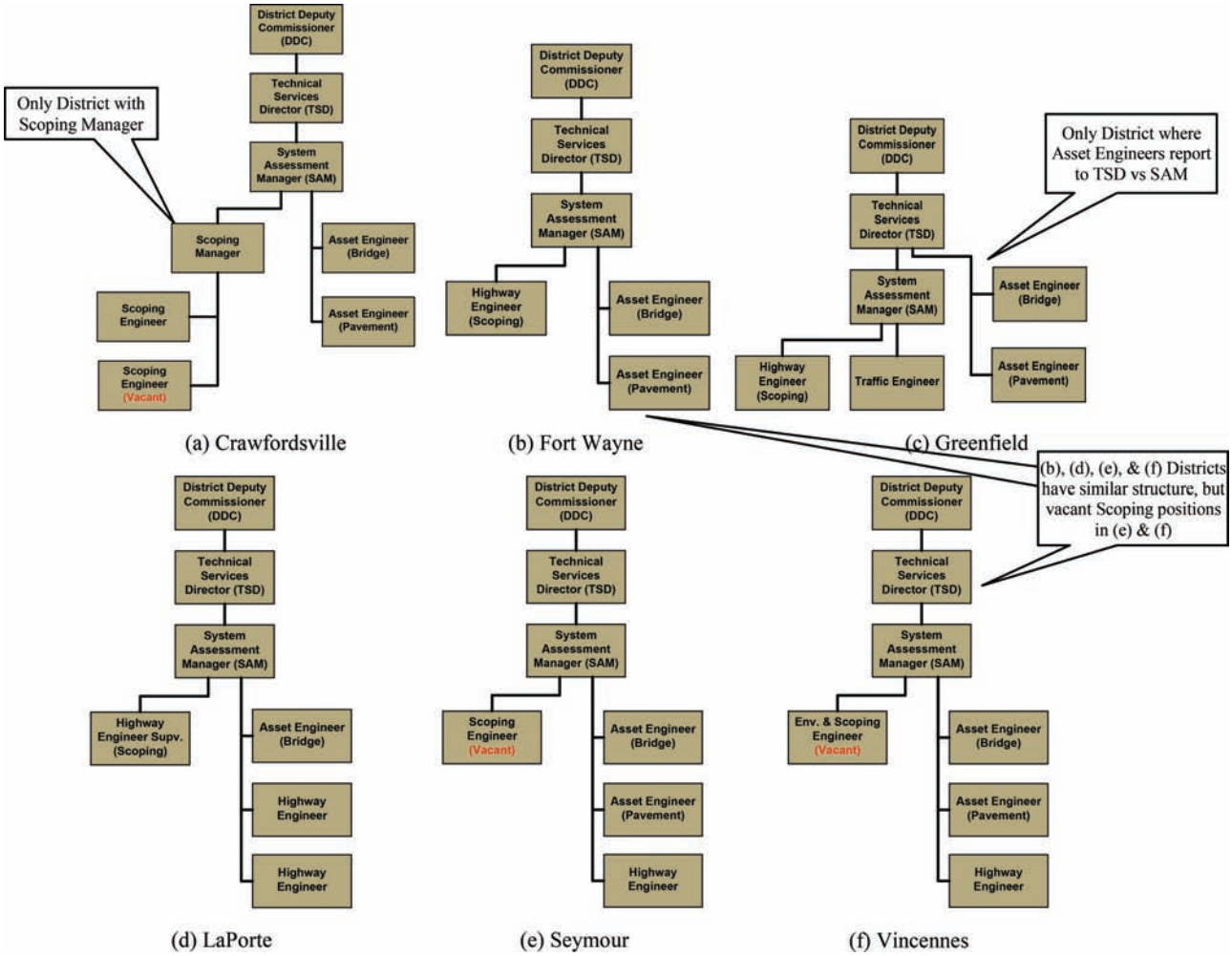

Figure 3.2 Comparison of district technical services organizations charts (scoping-related).

TABLE 3.2
Current state of district staffing for scoping, and estimating tools used.

	District					
	LaPorte	**Fort Wayne**	**Crawfordsville**	**Greenfield**	**Vincennes**	**Seymour**
Scoping manager	0	0	1	0	0	0
Highway engineering supervisor / Scoping Engineering	1	0	1	0	0	0
Scoping engineer	0	1	1**	1	0**	0**
Overall scoping capacity*	Moderate	Moderate	Good	Low	None	None
Overall scoping experience*	Good	Good	Excellent	Low	None	None
Estimating tools used for mini-scope						
BidTabs	X			X		
Tracer	X	X				
Parametric			X			

*Excluding asset engineers.
**Excludes one open position.

3.1.2 The Scoping Process

Typically, except when scoping large/complex projects, a "mini-scope" is developed for the project (using a standardized "call application report project" form).

The Mini-Scope's purpose is to provide:

- problem (purpose and need) identification
- identification and analysis of alternative solutions
- selection of "best" solution (what, where, when)
- initial/preliminary cost estimation
- identification of how the project "moves the needle" (i.e., impacts KPIs)
- input to project selection and programming

Mini-scopes are commonly completed by asset engineers and/or scoping engineers. Different districts use different tools for cost estimating (e.g., BidTabs, Tracer, Parametric).

Table 3.2 summarizes tools primarily used by scoping engineers at each district for mini-scopes.

For large/complex projects, a full engineering assessment report (EA) is conducted in lieu of the mini-scope.

District scoping practitioners indicated in interviews that it is unclear when EAs are to be completed in lieu of mini-scopes. Some districts tend to do more EAs, and one district does EAs on nearly all projects.

Districts also reported in interviews that they tend to have limited time to devote to any individual mini-scope because they have to do so many (approximately 125/year typical per district). They report frustration that their experience is that a low percentage of projects will get funded (e.g., 40–50% overall, but only 10–20% for pavement projects), so spending significant time on mini-scopes feels like a waste of time.

Projects are selected and programmed based on the cost estimates in the mini-scopes, and project budgets are locked in based on these same estimates. After projects are programmed, full EAs are developed (except for simple projects), and cost estimates are refined.

The *greatest concern* expressed by all six districts is that the project budgets locked in based on the mini-scopes, and that these estimates are so preliminary that budgets are inaccurate.

3.1.3 Scoping Context

Interviews at each district included discussions of the definition of scoping, and how the scoping function fits in the overall context of the planning and program management processes. Figure 3.3 depicts a flow diagram developed based on these discussions, indicating how scoping activities relate to the overall project selection and programming process.

Figure 3.3 displays the concern mentioned above regarding project budgets based on mini-scopes.

A second concern reflected in Figure 3.3 is the inherent difficulty bundling/blending projects. Projects are grouped by asset teams, prioritized by the asset teams, and funds are allocated by the program management group (PMG) by percentage to the asset teams. While the role of the asset teams is critical in validating and prioritizing projects, the separation inherent in this approach inhibits strategic grouping of projects across asset teams.

3.1.4 Others Learnings from Interviews with District Staff

- Some district scoping practitioners have developed their own tools (e.g., checklists, tracking spreadsheets, etc.)
- Little communication/information sharing between district scoping practitioners
- Project conceptualization/initiation is done all year long by SAMs
- More Central Office involvement with Pavement, less with Bridges
- No program for new scoping engineers
- The only metrics/measures for Scoping are individual's performance on getting them done on time
- Central Office Hydraulics support is severely backlogged and causing delays/bottleneck
    - Would like to quantify the impact of this
- Scoping practitioners spend a lot of time gathering information and waiting on information from others
- Mini-scopes are done in-house, but some EAs are consulted-out (due to lack of in-house resources)
- Capital Programs at Central Office complain about scoping (specifically about inaccuracies of cost estimates)
- At least one district does mini-scopes on place-holder projects, but most don't

3.2 Interviews with Central Office Staff

Interviews were conducted with key INDOT Central Office staff (Figure 3.4) who provide support to the scoping process and, in some cases, are customers of the scoping process. Table 3.1 details the interviews conducted.

3.3 Monitoring Results of SPR-3944

Parallel to this project, JTRP Project SPR-3944 "Pre-Contract Scoping Processes: Synthesis of Best Practices" was being conducted to assess scoping best practices in Departments of Transportation around the country. Professor Dulcy Abraham, the Principal Investigator for the project, provided thorough ongoing updates of results of the interviews conducted with numerous state DOT representatives (Figure 3.5). These results included various models and information provided by the DOT interviewees. Specifically, models provided by Minnesota DOT and California DOT were referenced in the Scoping VSM Workshop.

3.4 Scoping Value Stream Mapping Workshop

A two-day scoping VSM workshop (Figure 3.6) was conducted August 31, 2015, and September 1, 2015, with members of all six districts and Central Office

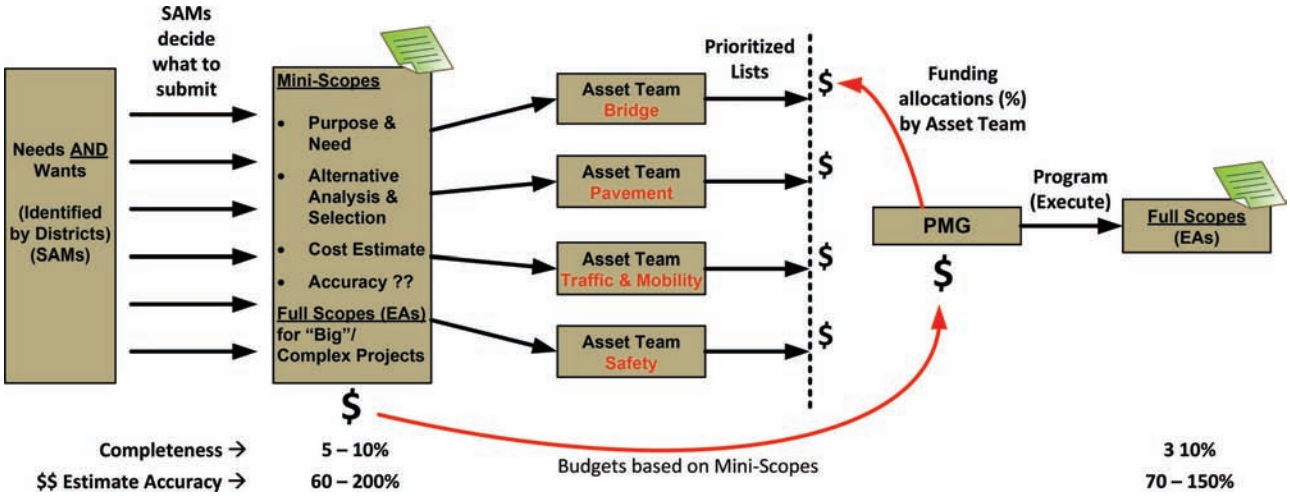

Figure 3.3 Scoping functions in context of project selection and programming.

Figure 3.4 The second step in project methodology was to interview Central Office staff.

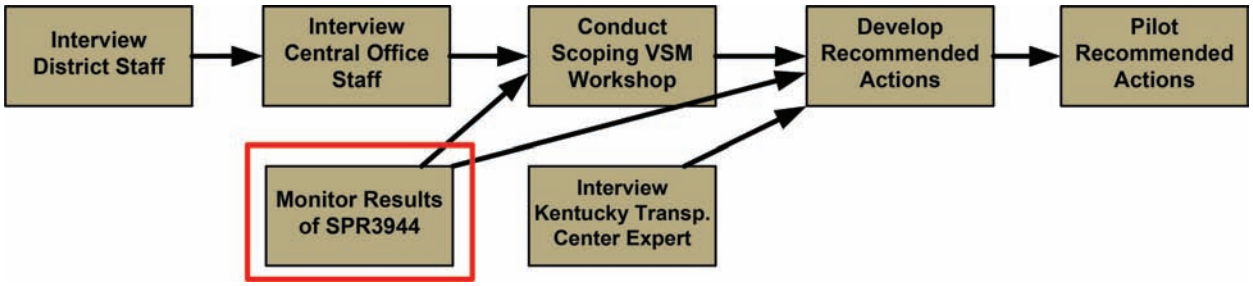

Figure 3.5 Throughout the project the results of SPR-3944 were monitored.

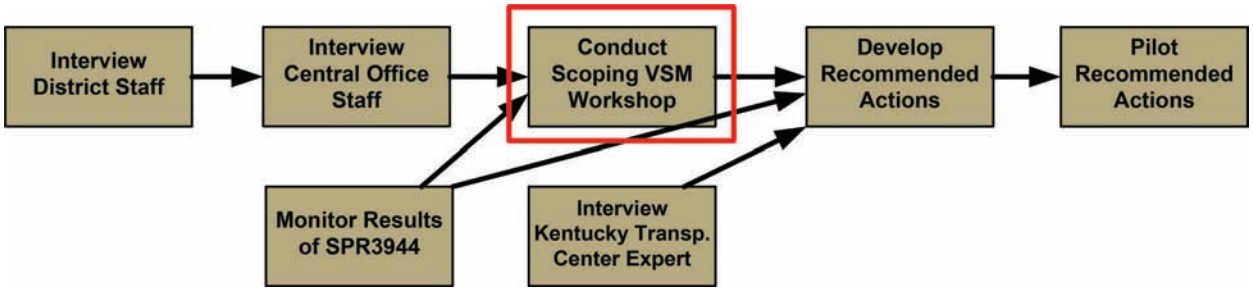

Figure 3.6 Next, a scoping value stream mapping (VSM) workshop was conducted.

Statewide Scoping staff members. District representation included TSDs, SAMs and scoping "practitioners" (scoping engineers, scoping managers, and asset engineers). Table 3.3 provides details of the workshop participants.

The purposes of the workshop were to map current state, identify improvement opportunities, and develop desired Future State and associated action plans.

In the first half day of the workshop, the entire group engaged in a facilitated discussion of the current state scoping process and program management process. Group brainstorming was used to identify the following:

- Definition/purpose of scoping
- The pain currently associated with shortcomings in the scoping process
- Criteria for scoping (i.e., what makes a "good" scope)
- Customers of the scoping process

The group also reviewed, discussed, and fine-tuned the current state scoping/programming process flow depicted in Figure 3.3, identifying key concerns and issues with the current state process.

The group was next divided into two breakout teams, as detailed in Table 3.3. Breakout Team 1, comprised of the scoping "practitioners," focused on the tactical aspects of scoping. Breakout Team 2, comprised of Central Office staff, TSDs, and SAMs, focused on the strategic aspects, including staffing and the overall planning and program management process.

The teams spent the afternoon of workshop Day 1 and the morning of workshop Day 2 using various brainstorming methods to further define current state, identify improvement opportunities, and define Future State. On the afternoon of workshop Day 2, the teams developed recommended action plans.

3.4.1 Team 1 Summary

The methodology used by Team 1 centered on SIPOC modeling (supplier-input-process-output-customer). The group first developed a SIPOC diagram. This modeling approach allowed the team to detail the scoping process aspects into the supplier, input, process, output and customer categories, along with the process measures and process infrastructure (i.e., supporting systems and tools). The team used this SIPOC model to identify improvement ideas, from which they developed the recommendations listed in Figure 3.7.

3.4.2 Team 2 Summary

The approach taken by Team 2 centered on the current state flow diagram from Figure 3.3, and the issues identified during the full-group discussion.

The primary concern was that the project budgets were locked in too early, based on the low-certainty cost estimates of the mini-scopes. The team's efforts focused on modeling a Future State that would allow for higher degree of certainty in cost estimates prior to locking in project budgets.

The group reviewed models from Minnesota DOT and California DOT, and brainstormed possible future state flow diagrams/maps.

The team also brainstormed issues with staffing and job classifications.

The Future State model has continued to be refined subsequent to the workshop. The latest version of this model is shown in Figure 3.8.

The team generated action items for the Central Office representatives (Louis Feagans and John Weaver) and for the TSDs and SAMs, as shown in Figure 3.9.

3.5 Interview with Kentucky Transportation Center Expert

On October 16, Jeff Jasper, Research Engineer and Trainer at the University of Kentucky's Kentucky Transportation Research Center, was interviewed at his campus office (Figure 3.10). Mr. Jasper is retired from the Kentucky Transportation Cabinet, where he most recently was Director of Highway Design.

Key learnings and insights from the interview are detailed in the Appendix to this report.

While the learnings and insights from this interview were numerous, two key takeaways appear most significant when considered in the context of this project:

1. In addition to the tactical and strategic approaches pursued by the two teams in the scoping workshop, it is important to train scoping practitioners in the philosophies to be fostered (e.g., Practical Solutions/Open Roads). Jeff has developed and implemented an 8-day project management training for planners which includes these philosophies.
2. The Kentucky Transportation Cabinet has high-level planning positions ("liaisons" to district planning personnel) who do project scoping. These positions are highly esteemed.

3.6 Recommended Actions

Action recommendations (Figure 3.11) were developed from three sources:

1. Scoping workshop Team 1's recommended actions
2. Scoping workshop Team 2's action items
3. Insights from the interview with Jeff Jasper

Recommended actions are summarized in Table 3.4.

3.7 Piloting Recommended Actions

For some of the recommended actions, pilot implementations (Figure 3.12) are being conducted or pursued:

- Scoping peer group meetings
- Automated mini-scopes
- Computer model for identifying project needs
- Implementing "later" lock down of project budgets

TABLE 3.3
Detail of participants of the scoping Value Stream Mapping (VSM) workshop.

		District Staff						Central Office Staff	
		Scoping Engineer*	Scoping Manager	Asset Engineer	SAM	TSD	Director Statewide Scoping	Statewide Asset Mgt Engineer	Performance Analyst
Location	**Participant**	**Breakout Team "1"**			**Breakout Team "2"**				
Central Office	Louis Feagans						1		
Central Office	John Weaver							1	
Central Office	Derek Weinberg								1
Crawfordsville District	Bill Smith				1				
Crawfordsville District	Mike Eubank		1						
Fort Wayne District	Jason Kaiser					1			
Fort Wayne District	Lew Kreger				1				
Fort Wayne District	Sarah Farlow	1							
Greenfield District	Carolyn Coffin				1				
Greenfield District	Nathan Sturdevant	1							
LaPorte District	Steve Benczik				1				
LaPorte District	Mike Miltz	1							
Seymour District	Becky Gross					1			
Seymour District	Jason Lowther				1				
Vincennes District	Khalil Dughaish				1				
Vincennes District	David Christmas			1					
Vincennes District	David Dallas			1					
No. of participants (total = 17)		**3**	**1**	**2**	**6**	**2**	**1**	**1**	**1**

*"Scoping engineer" includes individuals with other titles whose have primary scoping engineering responsibilities.

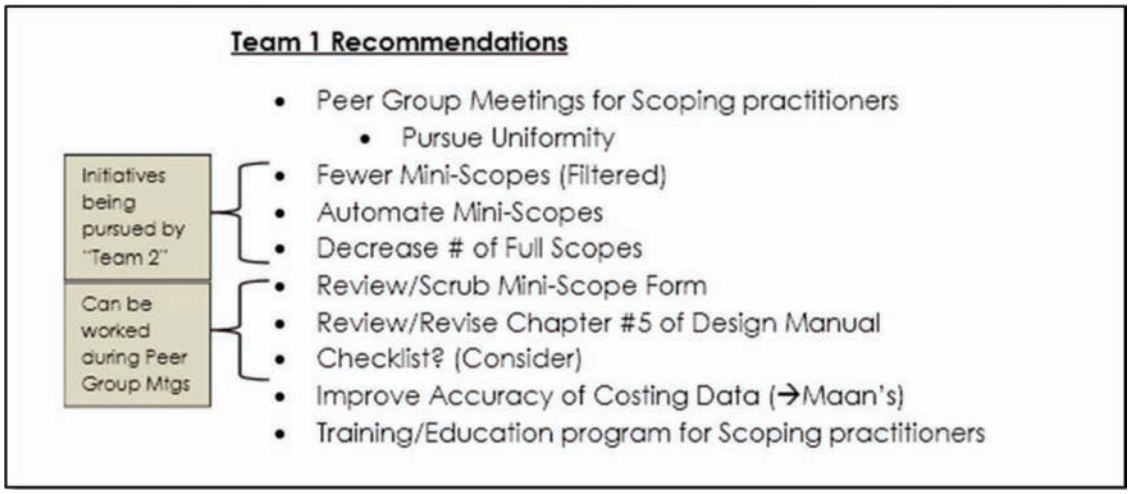

Figure 3.7 Team 1 recommendation list.

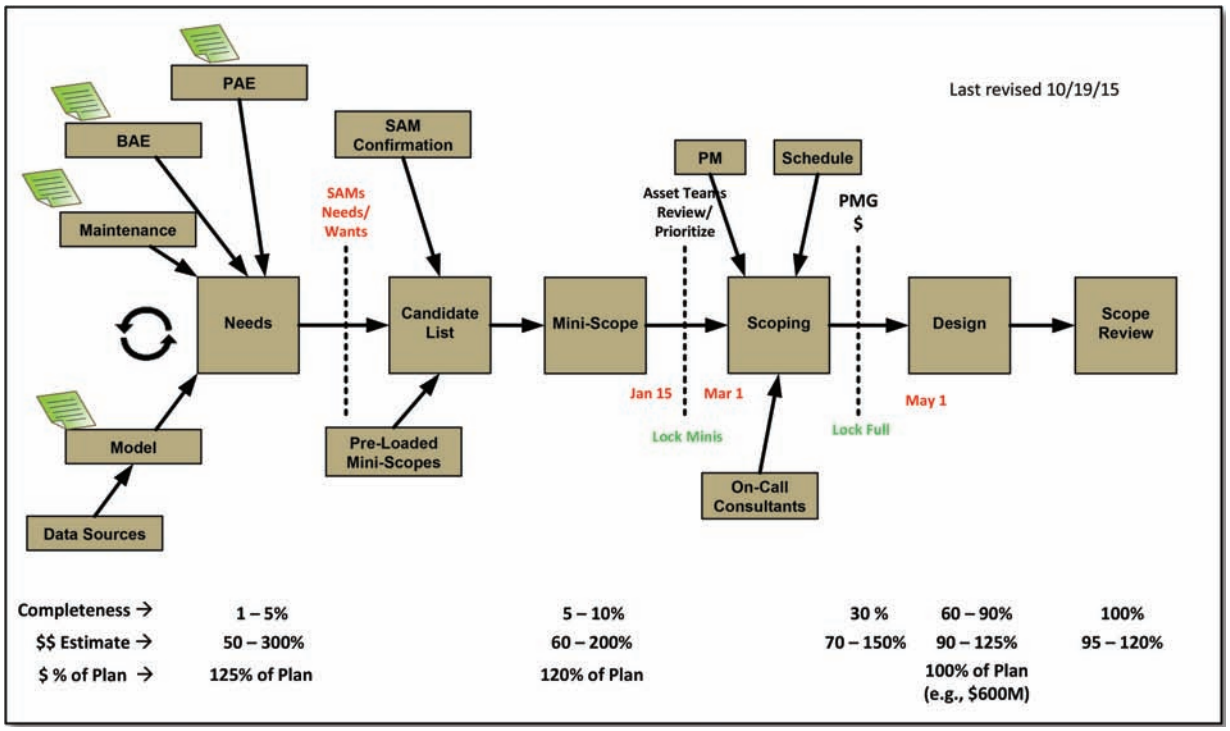

Figure 3.8 Future State Map of programming process.

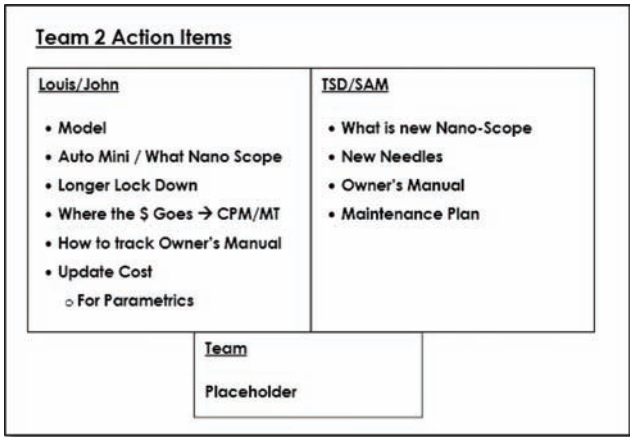

Figure 3.9 Team 2 action item lists.

Figure 3.10 A subject matter expert (SME) from Kentucky Transportation Center was interviewed.

Figure 3.11 Recommended actions were developed.

TABLE 3.4
Summary of recommended actions.

Item #	Source	Recommended Action	Pilot Implementation?
1	Workshop Team 1	Establish peer group meetings for scoping practitioners	Yes
2	Workshop Team 1	Complete fewer mini-scopes (filtered)	
3	Workshop Teams 1 & 2	Automate mini-scopes	Yes
4	Workshop Team 1	Decrease number of full scopes	
5	Workshop Team 1	Review/improve mini-scope form	Yes
6	Workshop Team 1	Review/revise/update Chapter #5 of Design Manual	
7	Workshop Team 1	Develop scoping checklist(s)	Yes
8	Workshop Team 1	Improve accuracy of costing data (via Maan's approach)	
9	Workshop Team 1	Develop training/education program for scoping practitioners	
10	Workshop Team 2	Develop computer model for identifying project needs	Yes
11	Workshop Team 2	Implement "later" lock-down of project budgets	Yes
12	Workshop Team 2	Implement different versions of mini-scopes by type (to simplify each)	
13	Workshop Team 2	Implement new "needles"	
14	Jeff Jasper	Implement Jeff's project management training	
15	Team 2 & Jeff Jasper	Consider staffing options to provide higher level scoping positions	

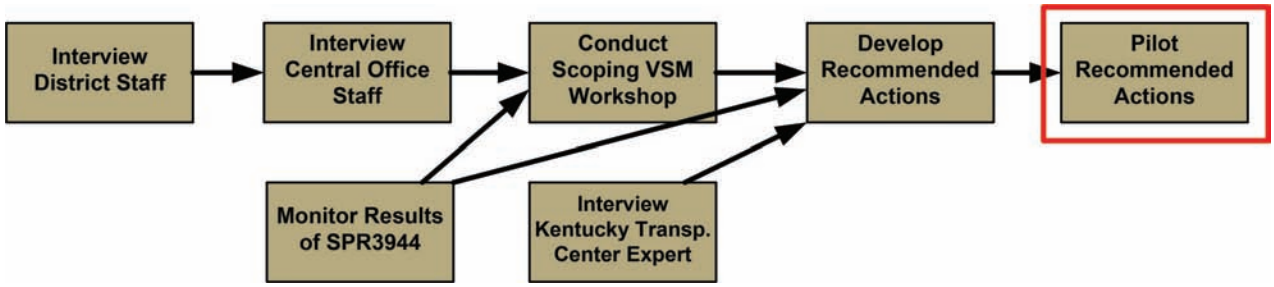

Figure 3.12 Where possible, pilot implementations are being conducted.

4. CONCLUSIONS

Three fundamental issues contribute to the scoping process problems:

- It is widely understood that district/INDOT staffing for scoping is insufficient.
- The scoping process is inefficient and inconsistent.
- The Programmed project budgets are locked in based on early, uncertain cost estimates.

While numerous actions have been recommended above, and some piloted, those with the highest impact will be those that address these three fundamental issues.

Overall recommendations are as follows:

1. **Staffing:** While the effects of staffing shortages can be accommodated somewhat by making the scoping process more efficient, staffing strategies should be pursued, such as:
   a. Prioritize the filling of open Scoping positions at Seymour, Fort Wayne, and Vincennes districts
   b. Creating higher level scoping/planning positions
      - At each district (to aid in filling open positions and retaining existing staff)
      - At Central Office, to liaison with districts (similar to Kentucky model)
2. **Process efficiency improvement:**
   a. Fully implement scoping peer group meetings to provide a vehicle for driving improvement actions such as those recommended in Table 3.4.
   b. Address the staffing/backlog issues causing the severe bottlenecks in hydraulics support.
3. **Later locking of project budgets:**
   a. Implement a stage-gate process for programming to provide a framework to allow later locking in of project budgets. (Similar to models used in other states, per SPR-3944 benchmarking results.)
   b. Integrate computer modeling approaches for identifying project needs as depicted in Figure 3.8.

APPENDIX: LEARNINGS AND INSIGHTS FROM JEFF JASPER INTERVIEW

Key learnings and insights from the interview included:

- Jeff has recently implemented a strong 8-day project management training, based on the Project Management Institute's Project Management Body of Knowledge (PMBOK)
- Jeff expressed his belief that the most significant element of scoping is defining "what you are trying to do" (purpose and need)
- Jeff is an expert in Practical Solutions (INDOT's "Open Roads"); he expressed that the philosophy of Practical Solutions must be fostered with planners in order to incorporate the concepts as early as possible in the project scoping (i.e., the purpose and need)
- He explained the Kentucky Transportation Cabinet's planning process, including the complications associated with the ties to the legislature.
- Three levels of project scoping/analysis are conducted:

1. Project selection and programming is based on 1–2 page overview documents for each project.
2. More detailed analysis (data needs assessment) ("DNA") is conducted after the projects are programmed. (High emphasis with planners on Practical Solutions here.)
3. Planning reports provide fully detailed analysis.

- Life cycle cost considerations must be balanced with safety considerations (e.g., getting more safety improvements implemented faster even though LCC may be higher)
- The project scope (especially the purpose and need) should be considered the mission statement for the project
- Kentucky Transportation Cabinet has 12 districts, but Central Office has the primary responsibility for planning, working with the districts' planning engineers and MPOs.
    - Central Office conducts 2x/year all-day planning meetings with planners from the districts
    - Also have annual "Partnering Conference" for project development group
        - Includes consultants, FHWA, etc. (900 people total)
        - Jeff compared it to Purdue Road School (only not nearly as big)
- Have to teach planners the philosophy being sought, and repeat the message over and over
- Kentucky Transportation Cabinet Central Office has "liaisons" for planning (as well as design, construction, and maintenance)
    - Assigned to specific district(s)
    - Provide expertise to district planners
    - Each also has subject matter expertise (e.g., bridges) shared throughout all districts
    - These are esteemed positions within the Transportation Cabinet

About the Joint Transportation Research Program (JTRP)

On March 11, 1937, the Indiana Legislature passed an act which authorized the Indiana State Highway Commission to cooperate with and assist Purdue University in developing the best methods of improving and maintaining the highways of the state and the respective counties thereof. That collaborative effort was called the Joint Highway Research Project (JHRP). In 1997 the collaborative venture was renamed as the Joint Transportation Research Program (JTRP) to reflect the state and national efforts to integrate the management and operation of various transportation modes.

The first studies of JHRP were concerned with Test Road No. 1—evaluation of the weathering characteristics of stabilized materials. After World War II, the JHRP program grew substantially and was regularly producing technical reports. Over 1,500 technical reports are now available, published as part of the JHRP and subsequently JTRP collaborative venture between Purdue University and what is now the Indiana Department of Transportation.

Free online access to all reports is provided through a unique collaboration between JTRP and Purdue Libraries. These are available at: http://docs.lib.purdue.edu/jtrp

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