PROJECT MANAGER'S BOOT CAMP

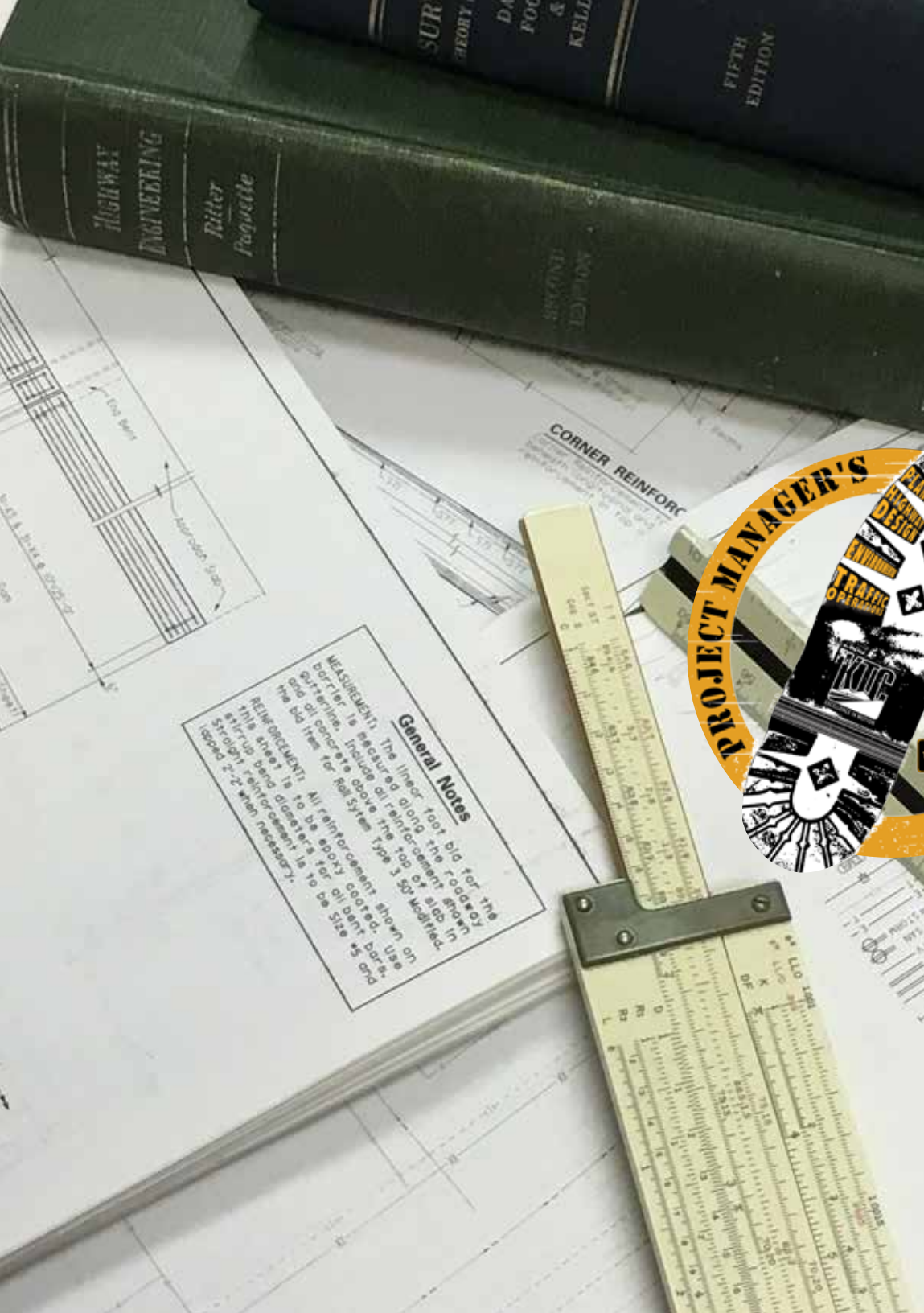KENTUCKY TRANSPORTATION CABINET

Project Manager's Boot Camp Purpose and Need

Purpose: The Kentucky Transportation Cabinet's mission is to provide a safe, efficient, environmentally sound, and fiscally responsible transportation system that opens up economic opportunities and enhances the quality of life in Kentucky. This is our fundamental purpose and it guides our efforts to serve the citizens of the Commonwealth. The Cabinet's Department of Highways helps fulfill this mission by persistently working to maintain and improve the Commonwealth's roads and bridges. To maintain and improve roads and bridges, the Department has two legislatively enacted programs — the Highway Plan, which is a construction program, and a maintenance program. The biennial budget process is responsible for authorizing and enacting these programs. The purpose of Project Manager's Boot Camp is to improve the Department's success rate in delivering the Highway Plan. A successful project is one that meets the defined scope with quality solutions and deliverables on schedule and within the budget specified in the Highway Plan. Improving the success rate of project delivery helps the Cabinet fulfill its mission and enrich the lives of all Kentuckians.

Need: There are times in past years when the Department of Highways has not attained the project delivery success rates set by Cabinet. In 2003, the Department held training sessions focused on project management which communicated to Project Managers the importance of understanding the numerous challenges associated with each phase of project delivery. This training challenged Project Mangers to take ownership of whole project. The goal of this training was to improve the Department's project delivery success rate. Although the 2003 training was successful, in the years which followed there has been tremendous staff turnover. In addition to personnel losses, there has been no training for new and continuing Project Managers. These issues have contributed to a challenge of meeting project delivery success rates. The Department has created the Project Manager's Boot Camp training to meet its current needs, and help the Cabinet fulfill its mission.

PROJECT MANAGERS
BOOTCAMP

KENTUCKY
TRANSPORTATION CENTER

excellence in motion

PROJECT MANAGER'S BOOT CAMP

KENTUCKY TRANSPORTATION CABINET

KTC

excellence in motion

Kentucky Transportation Center
University of Kentucky
176 Oliver H Raymond Building
Lexington, KY 40506-0281   859-257-4513

www.ktc.uky.edu

Table of Contents

Day 1: Introduces the basics of project management, defines what program managers do and what their responsibilities are, and demonstrates characteristics of successful project managers.

Introductory Presentation

The purpose of Project Management Boot Camp (PMBC) is to improve the successful delivery of the Highway Plan (all Department of Highway projects) to the construction program. The Kentucky Transportation Cabinet (KYTC) conducts boot camp for project managers. Attendees will learn how to improve the project management craft and they will understand the roles and responsibilities of project managers and other individuals involved in a project. Because the success rate of projects during the 2012 biennial cycle failed to meet KYTC's and the public's expectations, the motive of PMBC is to enhance the successful delivery of projects. A project's success is measured by whether it meets the scope, budget, and timeline of projects, as described within the Highway Plan. PMBC has four primary learning objectives for project managers:

- **Understand KYTC's Mission**
- **Understand that project managers are instrumental for helping the Department of Highways successfully deliver the Construction Program – successful program delivery helps KYTC fulfill its mission**
- **Understand that project managers bear responsibility for the entire project**
- **Understand the Critical Path and how that will assist Project Managers in carefully building their teams and managing their projects**

To emphasize PMBC's core objectives, the introductory presentation will emphasize what PMBC is and what PMBC is not. The camp will not recommend strategies to

deliver more projects, nor will it attempt to foist more responsibilities on project managers without giving them the adequate tools and support to implement their projects. PMBC is not intended to shift responsibility away from consultants and contractors, and although PMBC is not Preconstruction Project Managers Academy (PPMA), it can be viewed as a reboot of that program from the early 2000s – the 2.0 version of PPMA. PMBC, however, has been redesigned to meet the needs of KYTC's current organizational structure. Along with the learning outcomes noted above, PMBC's key aim is to train project managers. This training will ultimately make KYTC a more effective organization with a higher success rate on project delivery.

KYTC views PMBC as a place where participants can discuss how the state's transportation future will be shaped. Project managers will be introduced to a suite of new tools and ideas that can be used during project execution. Because the camp is a venue for dialogue, the Cabinet believes project managers will be equipped with the analytical skills to explore and evaluate tools, and ultimately, to decide if the benefits of implementing a tool outweigh the risks.

Roles and Responsibilities of a Project Manager

Improving project delivery requires that the project manager understand what roles they occupy. Upon receipt of an assignment, the project manager is accountable

for the entire project — this role is transferred from KYTC to the project manager during the project's development. However, the State Highway Engineer has the ultimate oversight of project managers and of the program for the Highway Plan delivery. The project manager is involved during the planning process, is responsible for project development, and acts as a consultant during the project delivery.

Delivering successful projects calls for project managers to be team builders; they assemble the teams that develop and complete the project. Effective team builders unify their employees and decide how to allocate valuable human, financial, and material resources.

Project managers must be prudent decision makers. They make decisions in a timely manner so that the project keeps moving forward. KYTC expects project managers to consult with subject matter experts when necessary to consider the recommendations, and decide the best course of action.

The project manager serves as a taskmaster. After teams are put together, the project manager makes sure that all work is accomplished and that all of the project components fit together. There is one critical point for project managers to understand: they should deliver the project, not the bureaucracy. Delivering the bureaucracy hinders project execution and can negatively impact a project's scope, budget, schedule, and can impede the project delivery success rate. As a taskmaster, the project manager coordinates work among multiple stakeholders, including the Cabinet's senior management, the project team, consultants, the sponsor, and other entities.

The final role as a project manager is to set a good example and to act as a mentor to other KYTC project team members. By sharing their experience and knowledge with others — as well as by offering constructive feedback — they facilitate the training of future project managers. Educating and developing the next generation of project managers is a significant contribution and will ensure that project delivery success rates continue to climb.

In addition to the five roles outlined above, project managers are accorded six main responsibilities. First, it is the responsibility of the project manager to deliver the project. Project delivery should be on time, on budget, and within the defined scope. As such, project managers should plan their activities to achieve these objectives. It is imperative that project managers understand the project scope— they should be an expert on the project.

While the project manager may not have the expertise, they get involved during the planning stages so they gain knowledge of the project's purpose and scope. However, if a project manager does not participate in planning, they should work diligently to close any knowledge gaps. They may hold discussions with the sponsor or the Central Office to learn about what motivated the project. This knowledge senables the project manager to create a plan for design services and project development — both of which are required to complete the preliminary engineering and environmental assessments.

After decisions have been made about project execution, the project manager develops a comprehensive understanding of what is needed to deliver the project successfully.

Third, the project manager evaluates resources, including project budgets, schedule, and the personnel available to work on the project. From the beginning of a project, the project manager compares current cost estimates with the prescribed budget. Once they understand what work needs to be accomplished, they can break down the project structure and conduct a critical path analysis. The critical path analysis will tell the project manager whether the necessary work can be completed in the time that has been allocated for it. Project managers will need to evaluate the availability of personnel and assemble a team that can meet the project's needs. Additionally, the project manager should gauge their availability and decide if seeking out management assistance will be necessary.

Once the project is underway, project managers will need to adjust the project expectations and adapt. The project manager continually reassesses and re-evaluates a project's status to understand where it is in the development process; they bear responsibility for keeping the project moving. Project completion requires constant evaluation of whether there is sufficient funding, time, personnel, and other resources. Because the projects are a part of the Highway Plan, changes to the scope, schedule, or budget impacts the Cabinet's success rate and ability to fulfill its mandate. When project managers recognize a shortage of funding, time, personnel, and/or resources, the issue should be reported to the Cabinet immediately and a corrective plan established to get the project back on track.

Next, it is the responsibility of a project manager to maintain communication with internal parties (e.g., with the project team, D.O. and C.O.), and with external stakeholders (e.g., the public, sponsor, and other entities with an interest in the project). Ongoing communication is what makes the project management engine operate efficiently and effectively. Poor communication will negatively impact project delivery and create unneeded turmoil. The project manager acts as a mentor to everyone on the team.

The final responsibility of the project manager is to exemplify leadership. Leadership entails managing the process—the project manager has to continuously monitor and evaluate a project's status. Doing so keeps the project manager apprised of where the project is in the development process.
Project managers identify adaptive management strategies to deliver the project on time. Further, project managers must be firm and timely decision makers. Decision making is critical for moving projects forward, and the project manager must constantly weigh tradeoffs among project goals when deciding on a course of action. Project managers will have to fight fires and obstacles, and being able to navigate and overcome potential roadblocks will prevent interruptions in project development and execution. Throughout the project, the project manager will

negotiate with different stakeholders, figure out how to resolve disputes, and adopt a solutions-oriented approach to finding compromises.

This presentation concludes with 12 rules for project managers, which are listed below:

1. Understand the problems, opportunities, and expectations of a project manager.

2. Recognize that project teams will have conflicts, but this is a natural part of group development.

3. Understand who the stakeholders are and their agendas.

4. Realize that organizations are very political and use politics to your advantage. Acknowledge political realities in the project process and learn to work successfully within the politics.

5. Realize that project management is "leader intensive" but that you must be flexible.

6. Understand that project success is defined by four components: budget, schedule, scope, and quality.

7. Realize that cohesive teams are built by being a motivator, coach, cheerleader, peacemaker, and conflict resolver.

8. Notice that your team will develop attitudes based on the emotions you exhibit—both positive and negative.

9. Always ask "what-if" questions and avoid becoming comfortable with the status of the project.

10. Don't get bogged down in minutiae and lose sight of the purpose of the project.

11. Manage your time efficiently.

12. Above all, plan, plan, plan.

Who Moved My Cheese

Employees must adapt to the changing occupational demands of their professions. Not only is the rate of change increasing, jobs that were unknown just ten years ago are now in high demand. The top 10 in-demand jobs in 2010 did not exist in 2004. Technological and industrial innovations occur frequently, and many of the technologies people rely on today to do their jobs will be obsolete in a short time. As such, employees must have the flexibility to learn new skills quickly and efficiently. Combine these transformations with an increasingly mobile workforce where individuals move from job to job faster than ever, and significant challenges confront KYTC and other public agencies.

This session focuses on the process of change and how project managers can adapt to the changing demands placed on them. The presentation begins with a brief timeline of KYTC's history, from 1974 to the present. In 1974, the Cabinet had 9,474 employees, of whom 520 were engineers. Today, the Cabinet employs 4,784 people; of whom 443 are engineers. Increased workload places significant pressure on project managers and team members to deliver quality projects in a timely manner. From 1985 to 2014, KYTC program expenditures approximately doubled, and currently there are over 1,500 active projects.
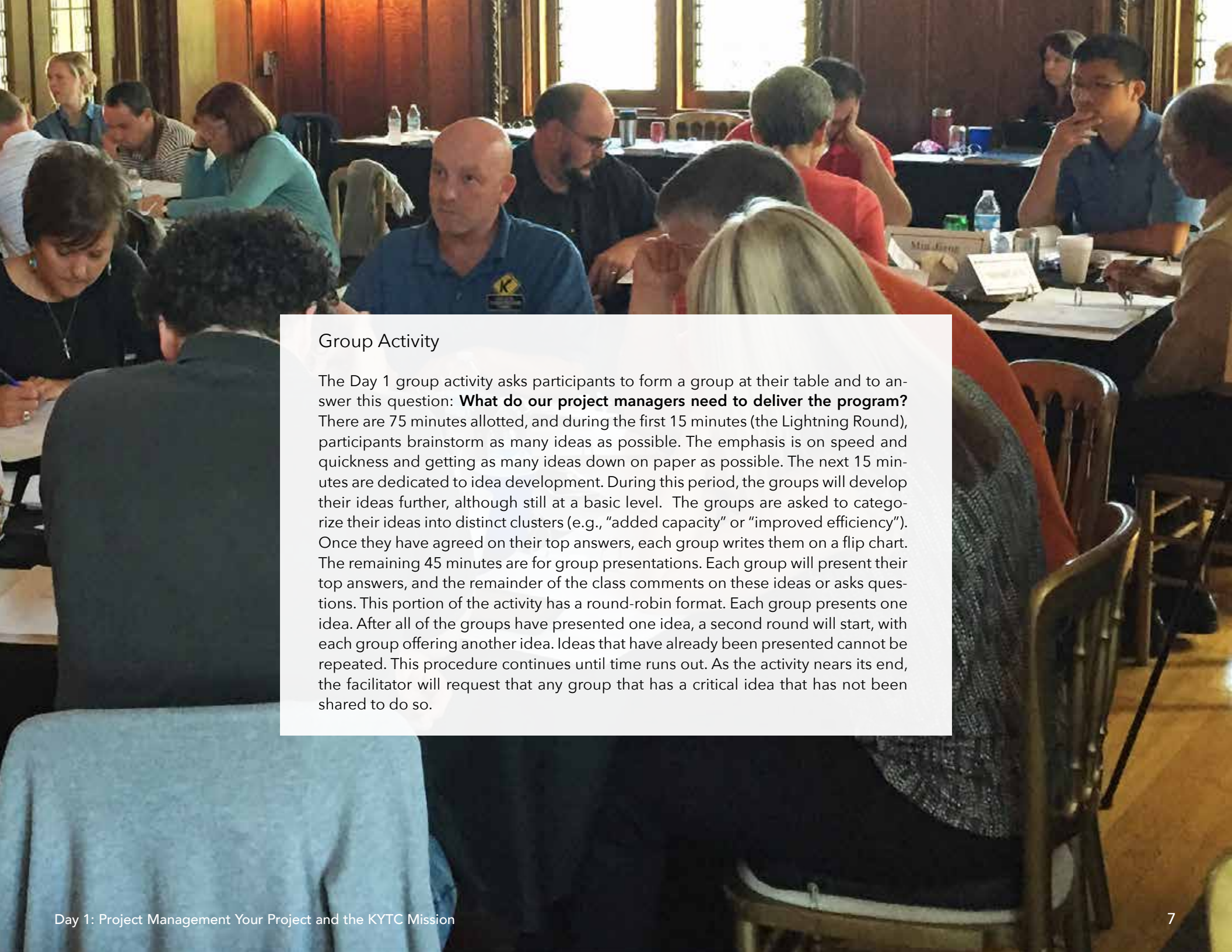
To get the participants thinking about how they cope with changes, they were asked to read the book, Who Moved My Cheese?, before the start of PMBC. The book is not discussed in full, but the presentation asks project managers to think about the characters in the book – four mice – who adapt (or do not adapt) to change in very different ways. During the course of each project, project managers are asked to embrace and cope with both expected and unexpected changes. Six change themes from the book are applied to project management skills:

• **Change happens** –Project managers should know that change is inevitable.
• **Anticipate change** – although it is critical that project managers recognize change will happen, they also need to anticipate change, which means remaining on the lookout for what may influence project delivery now and in the future.
• **Monitor change** – project managers should remain vigilant about monitoring change; monitoring can inform potential adaptation strategies.
• **Adapt to change** – the more quickly project managers are able to dispense with older ways of doing things that are no longer tenable, the more effective they will be and the more likely they will be to deliver successful projects.
• **Change** – adapting to change means that project managers will actually need to change their practices.
• **Enjoy the change** – project managers should relish this process, recognizing it as a sort of adventure and an opportunity to improvise new ways of doing things.

This presentation concludes with the attendees participating in a maze challenge, which gives them a chance to work through the ideas about change in a concrete way.

Group Activity

The Day 1 group activity asks participants to form a group at their table and to answer this question: **What do our project managers need to deliver the program?** There are 75 minutes allotted, and during the first 15 minutes (the Lightning Round), participants brainstorm as many ideas as possible. The emphasis is on speed and quickness and getting as many ideas down on paper as possible. The next 15 minutes are dedicated to idea development. During this period, the groups will develop their ideas further, although still at a basic level. The groups are asked to categorize their ideas into distinct clusters (e.g., "added capacity" or "improved efficiency"). Once they have agreed on their top answers, each group writes them on a flip chart. The remaining 45 minutes are for group presentations. Each group will present their top answers, and the remainder of the class comments on these ideas or asks questions. This portion of the activity has a round-robin format. Each group presents one idea. After all of the groups have presented one idea, a second round will start, with each group offering another idea. Ideas that have already been presented cannot be repeated. This procedure continues until time runs out. As the activity nears its end, the facilitator will request that any group that has a critical idea that has not been shared to do so.

Day 2: Overview of the Kentucky Highway Plan, introduction of key terms and concepts used in project management, and the role of communication in project management.

Costs and Schedules – Who Really Cares and Why?

This presentation opens with a simple yet profoundly critical observation: projects are promises. It is the project manager's job to guarantee that every project has a constituency, that project costs are realistic, and that each project schedule is reasonable.

This presentation discusses the Kentucky Highway Plan (KHP), which is prepared and developed every two years by the Kentucky Transportation Cabinet (KYTC). The KHP lists all of the major highway improvements KYTC wants to pursue over the ensuing six-year period. Ultimately, the state legislature is responsible for enacting it. The most recent version, released in 2010, includes $5.8 billion in projects. KYTC consults with ADDs, Metropolitan Planning Organizations (MPOs), District Offices, and elected officials to determine which projects merit inclusion in the KHP.

The plan is a tool that lets the state legislature maintain oversight of highway funds and proposed projects. However, there are several things to remember about the KHP. It is not the transportation budget document, it is not unchangeable, nor is it fully funded.

KYTC cycles through work phases, moving from planning and preconstruction to construction and operations. Eventually, proposed improvements circle back around to planning. The Highway Plan documents needs and translates them into preconstruction projects.

One critical issue is how a transportation need becomes a promise. All proposed projects speak to a precise, data-defined need, and each need competes for inclusion in the KHP. After a project is added to the Highway Plan, it instantly attains a constituency – and that constituency has the expectation that schedules will be met. Once a project schedule has been established, it effectively becomes a "promise to deliver." Delivering projects on time is essential because elected officials will make promises to their constituents about completion dates. In turn, constituents hold those officials accountable. As such, KYTC must establish reasonable project schedules to minimize the possibility for conflict and confusion, and project managers must stick to that schedule.

The Cabinet is equally responsible for finishing a project within budget. There are several reasons for this. The Highway Plan is fiscally balanced by the Authorization Review Team (ART), and when cost overruns hit projects, there is a direct impact on the KHP schedules. Thus, KYTC must select which promises to keep and they must deal with changes that threaten to alter project delivery schedules. The Cabinet's credibility suffers damage when promises are not kept.

The presentation closes by reiterating four critical points project managers should always bear in mind:

• **Every project is a promise**
• **Every project has a constituency**
• **Every project cost must be realistic**
• **Every project schedule must be reasonable**

Because the public demands accountability for project delivery, when project delivery goes amiss, KYTC shoulders the responsibility. When project managers are guided by the four points above, they are more likely to oversee successful project completion in a way that meets the public and the Cabinet's expectations.
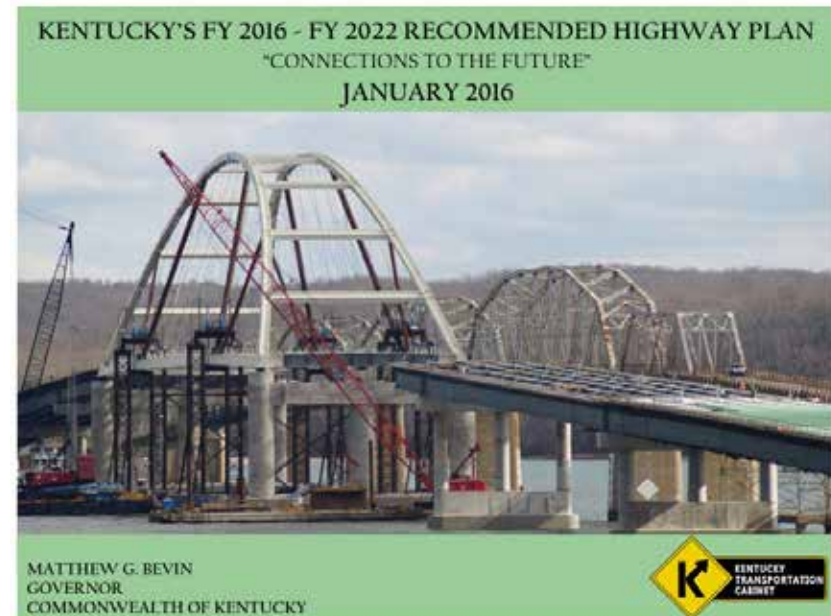
The Task at Hand

The Road Plan: Prioritization of the Projects

This presentation briefly reviews the complex process used to prioritize road projects. After the final Highway Plan is completed and enacted, the Cabinet evaluates the projects and moves forward. The project manager has to "crack the code" to determine how projects are ranked for prioritization. And this code is always changing. For example, powerful sponsors have the ability to push a priority, and the Federal Program often ranks first because the Cabinet needs to spend all the federal monies it has been allotted. Bridge replacements are often kept in the Cabinet's back pocket, so to speak. This may change based on Governor's Budget Address. However, if a bridge is closed due to severe damage, the project moves up the priority listing.

The presentation includes a number of practical tips for dealing with prioritization issues. For example, CDEs and the Central Office leadership need to collaborate when elected officials apply political pressure to the Transportation Engineer Branch Manager (TEBM) and/or project manager. To move a district priority forward, project managers and other stakeholders need to rank and lobby for the project. If necessary, they should seek out political support or a sponsor. Some projects find themselves on the "**prioritization yo-yo**"— that is, one day the need is a high priority, the next day the need is de-emphasized. There are no surefire tactics for dealing with this situation other than to muddle through. Many issues fall outside the control of project managers. Nevertheless, if they are adaptive to change and keep their eye on the pulse of project rankings, they can help the Cabinet fulfill its mission and improve project delivery.

Below are the 2014 Highway Plan and the 2016 Recommended Highway Plan available at:
http://transportation.ky.gov/Program-Management/Pages/2016-Highway-Plan.aspx

Project Management 101

This presentation draws from the Project Management Institute's Project Management Body of Knowledge (PMBOK) to introduce attendees to the basics of project management. Project is defined as: a temporary endeavor undertaken to create a unique product, service, or result. Temporary does not suggest that a project will be wrapped up quickly; rather, it means a project has a definite beginning and end, and therefore defined scope and resources. Projects at KYTC often last years, and if KYTC is to successfully deliver projects, then project managers must excel at project management.

Project management involves organizing and managing resources so that a project is completed within the defined scope, time, and cost constraints. As noted in other presentations, project managers will not have expertise in all facets of their projects. Sometimes, project managers will have little authority over the people who work on a project. An ongoing challenge is that numerous projects compete for scarce resources. A responsible project manager keeps a project moving forward by using robust planning, seeking a variety of resources, and practicing lucid communication skills.

There are key terms for project managers to learn, such as portfolios and programs. Programs are groups of related projects that have a broader scope than individual projects; they require coordinated management to realize benefits that are not available through managing them individually. The following chart differentiates between project management and program management:

Area	Project Management	Program Management
Focus	Single objective	Business strategy
Scope	Narrow	Wide-ranging, Cross-functional
Deliverables	Few, clearly defined	Many, from many projects contributing to the whole
Timescale	Clearly defined	Loosely defined, continuous
Change	To be avoided	Regarded as inevitable
Success Factors	Time, budget, scope achieved	Mission, cash-flow, ROI
Plan	Specific, detailed, bounded	High-level and evolving

The presentation explores all attributes of project and program management. Groups at each table will discuss work responsibilities and compare the roles of program and project managers. Project management can be classified into five processes:

- **Initiation**
- **Planning and Design**
- **Execution**
- **Monitoring and Controlling**
- **Closing**

Participants will be asked questions that illustrate the best way to execute a project. For example, if a pilot is flying to Florida, what bearing will they select? The idea behind these questions is to prove that there is no simple formula that can be applied to project management. Projects with an identified design phase are the responsibility of the Project Development Branch Manager (PDM). PDMs participate in pre-design work, in developing the concept, and they are tasked with the final design phases.

All projects are performed and delivered under specified constraints, which vary from project to project. These constraints are scope, time, and cost; this forms the project management triangle. Often a fourth constraint exists — quality. It's not always possible for project managers to balance and prioritize the speed of project delivery, the quality, and the cost. The constraints in the project management triangle prevent project managers from optimizing each element.

Project managers must decide where sacrifices can be made so project success does not suffer. The presentation concludes with a discussion of why project(s) fail and what project managers can do to prevent this from happening. Some of the most common triggers of project failure are:

- **Poor project specification**
- **Failure to manage user expectations**
- **Unclear scope/objectives**
- **Lack of buy-in from key players**
- **Over-optimism**
- **Failure to manage change**
- **Inappropriate staff**
- **Under-resourcing**
- **Too much reliance on a single individual**

When project managers do not communicate in a lucid and timely manner with stakeholders, project team members, contractors, and other entities, they set up projects to fail.

The Importance of Communicating Well During Meetings (An Interlude within Project Management 101)

When project managers do not communicate in a lucid and timely manner with stakeholders, project team members, contractors, and other entities, they set up projects to fail. This mini-lecture covers the six golden rules of managing meetings. Meetings help maintain good communication within the office and among stakeholders. It's important for project managers to respectfully run meetings as they would have others run the meetings they attend. Preparation is essential for all participants – meeting organizers should distribute agendas the day before a meeting, or earlier if there is a significant amount of material to review. The organizer should be ready to present on all relevant material and be well versed on all agenda items. If there is no clear purpose for a meeting, the organizer should question whether the meeting is warranted. Next, meeting organizers should establish and strictly adhere to a meeting schedule, and this includes setting appropriate intervals between meetings. Time is scarce, and the team may get frustrated when the amount of time allotted for a meeting exceeds the time it takes to accomplish the objectives. Another golden rule of managing meetings: **STAY ON TOPIC**. Often, a participant will steer the meeting off on a tangent and if the meeting organizer is guilty of this, it can cause friction with leadership. At least one participant can be tasked with focusing on the substantive agenda items. If the project management team finds the meetings are unproductive, it will be necessary to rethink the strategy or cancel meetings. Lastly, when a meeting concludes, the organizer should state the next steps, and they should provide a written summary of the future work agenda. When the team lacks clear guidance or is unsure how to proceed, holding them accountable is an exceedingly difficult task.

Project Management 101 wraps up with suggested do's and don'ts for project management. Project managers should understand the project, be ready to ask for help if they need it, and devote time to early work. However, they should avoid:

1) overloading people with tasks,

2) agreeing to an unreasonable deadline,

3) approving a budget that is too low without raising concerns,

4) assuming that other people have the same priorities, and

5) using tools and procedures that are unnecessary.

This presentation highlights the criteria for delivering a successful project. These include: communicating with all parties lucidly and continuously, investing time at the outset of the project to understand the purpose and need, clearly defining the project scope, setting realistic objectives, defining roles and responsibilities, and working to keep the project team motivated by telling members their contributions are valuable. In closing, Project Management 101 reiterates the importance of communication and offers suggestions to project managers for enhancing their communication skills. The PMBC session that follows more fully treats the topic of communication.

Project Management: Communication

The single most important aspect of project management is communication. A project manager communicates through the exchange of ideas and messages. And they convey information using speech, signals, or writing. When an organization is hampered by poor communication, its ability to deliver promises and obligations suffers. However, if communication is thorough, accurate, and timely, organizations become vibrant and effective.

Mike Hancock, the current secretary of the Kentucky Transportation Cabinet, is a great communicator, and the 10 attributes of successful communication are modeled after his skills:

• Listen
• Encourage dialogue, collaboration, and sharing
• Be specific
• Simplify the complex
• Encourage questions
• Hit the key points as quickly as possible
• Repeat important information
• Be thoughtful and well prepared
• Get to the point

Work Breakdown Structures

This presentation deals with two main topics – scope and work breakdown structures (WBSs). WBSs are used to manage a project's scope and to prevent it from becoming unwieldy.

Managing a project scope entails defining and controlling what is and what is not included within a project's aim and objectives. At the outset of a project, project managers will predict requirements and define the scope. Once the purpose of the project is known, the scope can be defined. Carefully managing and implementing the project scope establishes a baseline that keeps projects on track. Project managers can gain a thorough understanding of the scope by breaking the project into smaller pieces; this helps with seeing how those pieces will eventually fit together into a whole. Understanding the project scope enhances

understanding of project objectives, confers knowledge of what is necessary to meet the project goals, serves as a reminder of the original objectives as project implementation moves forward, and wards off scope creep. Scope creep refers to uncontrolled changes or continuous growth in a project's scope. Scope creep may take place when a project's scope is not precisely defined, documented, or controlled, and this can be prevented with good planning, documentation, and verification. Once the scope is understood and has been defined, a WBS can be developed.

A WBS groups project elements by hierarchy in a manner that organizes and defines a project's entire scope. Generally, a WBS will be oriented toward creating deliverables. An effective WBS will subdivide project deliverables into smaller components. More specifically, they pinpoint discrete work elements, relate them to one another, and describe how these contribute to the end product. A WBS simply defines the product and service. It does not answer questions such as who, when, or how the work will be accomplished.

A WBS facilitates scope determination and verification, time and cost tracking, financial management, estimates and scheduling, and activity determinations; the presentation covers these activities in greater detail. WBSs can be effective tools, however, they are only effective when they are put to use and serve as a guidance document throughout project implementation. Project managers should not let a WBS preclude them from being flexible and from adapting their management strategies. Overall, project managers should view a WBS as an asset that will help them deliver successful projects on time. Boot camp participants will see several visual examples of a WBS, and then they will take part in a group exercise, which lets participants examine an infrastructure project and develop a sample work breakdown structure.

Day 3: Methodologies for estimating project costs, the differentiation of program management from project development, and stressing the importance of adhering to ethical principles

Project Cost Management

Day 3 opens by revisiting some of the themes that were discussed during Day 2 – the Project Management Body of Knowledge, the Project Management Triangle, and the project manager's key responsibilities. Participants should take home a key message from this session: every project cost should be realistic. With this in mind, the specifics of project cost management are presented, including guidelines for estimating, budgeting, and controlling costs. Understanding the basic definitions of estimate, budget, and cost is the first step. To ensure the project can be completed within the approved budget, cost control requires serious analysis of the relationship between project funds and the material work that has been accomplished. Participants will have a discussion in groups about the difference between an estimate and a budget. Budget accounts for all of the costs for a single project phase, or sometimes for the entire project. An estimate need not be monetary (e.g., how far along is a project phase); estimates can also be developed as the project is ongoing and compared to the budget. Estimates have the potential to impact project scopes, while budgets are authoritative. When a budget is set, it means that someone has looked at the estimate and has agreed to move forward with the project. After a budget receives approval, any increases can only be approved through an organizational and/or governmental authority

(i.e., KYTC). Of course, once a budget is set, there is an expectation that project managers will adhere to it.

Another key point: the expense involved in making changes to a project increases with project time. Project managers have the most ability to influence costs during the early stages of a project, which is why it's critical that the project scope is defined early on and every effort is made to stick with it. As the project moves forward, the price of making changes or correcting errors increases – significantly so as the project nears completion. Project managers should continuously compare project expenditures to the work performed–this ensures delivery of a quality project. There are three questions to ask about the standing of a project: **1)** Where are we? (MEASUREMENT), **2)** Are we where we planned to be? (EVALUATION), and **3)** How can the project get back on track, if it's gone off track? (CORRECTION).

Cost estimates are an important element of project cost management, and project managers must have a good handle on developing them. Estimates will be done at each project stage, and there are numerous tools project managers can use. There are three basic cost estimation strategies. **ANALOGOUS COST** estimating uses the

actual cost of a previous, similarly scoped project as the basis for a new project.

This method is best when there is a limited amount of detailed information about the project. For example, when information deficits persist at the beginning of a project, analogous cost estimating becomes a valuable strategy. This tool relies on historical information and expert judgment, and it usually costs less and is less time consuming than other techniques.

However, analogous cost estimating is less accurate than the other techniques. The second estimation strategy is **BOTTOM-UP ESTIMATING**, which gauges the cost of individual work items and tallies them to derive a total. The final technique is **PARAMETRIC ESTIMATING**, which uses statistical relationships between historical data and other variables to estimate activity parameters (e.g., cost, budget, and duration). Each technique has different strengths. For example, analogous and parametric estimating are ideal for performing high-level estimates, whereas bottom-up estimates are better suited for detailed estimates (e.g., cost per work unit). Project estimates should be completed at various points: during the Highway Plan creation, when there is a scope change, at project milestones, for the final project submittal, and upon request. There are, of course, problems with estimates. Creating project estimates for a large and complex project is a time-consuming job that requires intricate attention to detail. And indeed, the Highway Plan often contains an unrealistic budget because budgets are challenging to develop and people are biased toward underestimating costs. It is critical that project managers compare budgets and cost estimates, and if discrepancies arise, KYTC leadership should be informed immediately.

For KYTC projects, the budget is taken from the Biennial Highway Plan. Project costs directly influence program costs. The Highway Plan is fiscally balanced by the ART Team; when project costs increase they reverberate through schedules and budgets. Often, sacrifices will be necessary, but project managers should always recall that broken promises impair KYTC's credibility. As such, meticulous attention to detail, especially during the early stages of a project, can alleviate potential issues. There are number of ways to keep track of budgets and reporting, including the preconstruction database and the project manager toolbox. Controlling costs should be of paramount concern for project managers. Project cost control includes:

• Monitoring project scope, along with estimates and budget
• Ensuring that only appropriate project changes are permitted
• Informing leadership and requesting authorization for changes to the project that will affect costs

The presentation closes with a group activity – participants discuss their philosophy of cost management of Design, Right of Way &Utilities. Conversations should accentuate these important points:

1) the project manager's product initiates the construction budget,
2) routinely checking the proposed design can help a project manager align work with the construction budget,
3) know that the construction plan can impact R&U, and
4) balancing budgets and spending time on cost estimates at the beginning of a project will help save money as the project approaches completion.

Project Development Resources from the Division of Planning

Project managers can access many resources from the Division of Planning. Projects without a clearly defined purpose or need could benefit from planning studies– which is what the Division specializes in. The aim of a planning study is to develop a documented and defensible purpose and need. A study can:

1) identify a phase of the project that merits further study,
2) eliminate unfeasible options, and
3) gauge initial public feedback.

To begin a planning study, the project manager submits a funding request via the Planning Liaison and submits the need to the Strategic Corridor Team. After NTP, planning studies generally take 9-12 months to complete, although studies with specific goals may be finished in as little as one month. Study length is contingent upon the level of environmental, geotechnical, and traffic overview required; the length, complexity, and level of public involvement; and the range of alternatives.

The Division of Planning also provides Data Needs Analyses (DNA). The primary benefit of a DNA is that it could function as PL&G on smaller projects. A DNA compiles data and early decisions into a single, comprehensive document and ensures that the project team has a good understanding of project needs. DNAs are usually necessary for projects without previous Planning effort, however, they are recommended for all projects.
DNA occurs after a project appears in SYP or after it is highly ranked in DTP. Critically, a DNA should begin before Phase I Design. To begin a DNA, a project manager should contact district planning staff. In most cases, a DNA takes two weeks to complete, however, time frame may depend on whether meetings with the sponsor or the project team are required.

The purpose of questioning the legality of an action is to determine or an established code of ethics

Traffic forecasting is another service the Division of Planning offers. A traffic forecast estimates the current and future traffic activity on a route. Traffic forecasts are necessary to inform pavement designs, apply for turn lane warrants, and perform capacity analysis. A project manager can request traffic forecasts by submitting the appropriate forms to the Division of Planning. The minimum amount of time required to complete a traffic forecast is eight weeks. However, depending on project complexity, a forecasting project may take up to one year. Forecast preparation is contingent on the current data available, whether or not a model is necessary (and then, whether a model exists), and the peak portion of the year. Updating a model requires approximately three months, while development of a new model takes 6–12 months.

A Transportation Improvement Plan (TIP) Amendment is needed when there is a change in cost, funding, or open-to-traffic date; when new projects emerge; or when the project description changes. A TIP is an MPO version of STIP, and it is required in all locations that fall within an MPO. The district planning supervisor in the Division of Planning can initiate a TIP. Like the other services described in this session, the amount of time needed to complete a TIP varies widely – from a few days to a year. Completion hinges on whether the project is already in the TIP, fiscal constraints, and a MPOs willingness to adjust the TIP. Projects managers should rely on District and CO Planning for guidance through the process.

The Division of Planning also provides a process for ensuring air quality conformity. This generally takes one or two weeks, concurrent with TIP amendment. Initiating this process begins by discussing plans for old roads in team meetings and by contacting a district planning supervisor. The duration of this process depends on whether additions or modifications are made to a project, the timing of necessary interagency coordination, and current conformity status. Official orders relate to the maintenance and/or ownership transfer, and they are needed whenever locals are agreeable. Project managers must acquire a Fiscal Court Resolution as soon as possible (ideally around PL&G). The transfer of maintenance occurs once a project is open to traffic, while ownership transfers are finalized, and after all condemnation proceedings have been wrapped up. Right-of-Way executes the ownership change, while the Division of Planning coordinates information. This process takes two or three weeks. In the case of a maintenance transfer, however, there is no clear timeline for transferring ownership – this varies from case to case.

Lastly, the Division of Planning conducts micro-simulation review, which is an in-depth traffic analysis. The review is required if a consultant performs a micro-simulation or if traffic patterns are complex. Micro-simulations estimate factors such as peak hour traffic, queuing, and delays in signal systems. The Modeling Team is responsible for these studies; they can be completed in 2–4 weeks. Other resources the Division of Planning provides include:

• **Bicycle and Pedestrian Liaison**
• **Freight Liaison**
• **MPO/ADD Liaison**
• **External Agency Coordination**
• **Roadway Data (HIS)**
• **Truck and Traffic Counts**
• **Truck Network – Including Coal Haul**
• **Travel Time/Speed**
• **Maps**

Transportation Funding

This presentation gives project managers a brief overview of the Cabinet's sources of funding. There are five principal funding alternatives – **1)** GARVEES, which are debt instruments guaranteed by a pledge of future Title 23 Federal-aid funding; **2)** toll revenues; **3)** traditional tax-exempt bonds; **4)** public-private partnerships; and **5)** current cash flow. In fiscal year 2015, KYTC received approximately $2.3 billion in funding. Of this, $1.5 billion came from the road fund. The remainder was sourced from federal funds (approximately $730 million), general funds, and restricted funds. Of the Road Fund monies, approximately 57 percent was derived from the motor fuel tax, while the rest came from motor vehicle use and other sources.

The state's gas tax is described by being broken into its two components. The variable component is 9 percent of the average wholesale price of a gallon of gas. The fixed component is a supplemental highway user tax of 5 cents per gallon for gasoline and 2 cents per gallon on special fuels. Quarterly adjustments are made to the variable component based on surveys administered by the Department of Revenue. Annual increases or decreases are capped at +/- 10 percent of the

average wholesale price (the current price at fiscal year end). The effective wholesale price cannot dip below a statutory floor, which is $2.177 per gallon. Of this gas tax revenue, 48.2 percent is dedicated, by law, to the Revenue Sharing Program. In fiscal year 2015, 51.8 percent of the motor fuels tax was allocated to state construction; the remainder was split between municipal, county, and rural secondary road aid. Information is also given on the distribution of KYTC funding and to what extend the Road Fund has budget flexibility.

The presentation delves into the Federal Highway Program and Highway Trust Fund. The last time a fully funded transportation bill passed the U.S. Congress on time was 1998, when TEA-21 was signed into law. It expired in 2003. After this, SAFETEA-LU was passed, after two years and 12 extensions of the previous bill. MAP-21 was enacted in July 2012, roughly three years after SAFETEA-LU expired. During this time, 10 extensions were passed to continue funding. Currently, MAP-21 has been extended, and there is no indication that a fully funded transportation bill will become law in the near future. Between 2002 and 2015, the gap between total Highway Trust Fund Receipts minus General Fund transfers has gradually widened, and the average gap between fiscal year 2015 and 2023 is forecast to be $16.9 billion. Approximately 86% of highway project spending goes toward construction activities, with the remainder set aside for design, utilities, and right-of-way work. The federal gasoline tax has not been increased since 1993. Since then, its purchasing power has declined 38 percent. If left at its current rate, by 2024 the tax will increase to 52 percent.

Professional Ethics

Broadly defined, ethics are moral principles that govern a person or group's behavior. Ethics deal with the concept of what is right and what is wrong. This raises a simple question: who or what defines right and wrong behavior? In many situations there are no easy answers about right and wrong. Many situations are colored by grayness — that is, the correct choice is not always self-apparent. However, in many situations if a person adopts a reflective and careful approach to the analysis of an ethical dilemma, the resolution becomes clearer. For project managers, there are three "ethics check" questions that should be ask when they

are confronted with an ethical dilemma:

- **Is it legal?**
- **Is it balanced?**
- **How will it make me feel about myself?**

The purpose of questioning the legality of an action is to determine if a person will violate civil law, criminal law, company policies, or an established code of ethics. Obviously, project managers should not engage in any action that is — or gives the appearance of being — improper, illegal, or immoral. Although this appears straightforward, there is the reasonableness standard to consider as well, namely, the letter of the law versus the spirit of the law. When a person obeys the letter of the law but not the spirit, they behave consistently with the law's literal interpretation, but not with the intent of the people who wrote the law. When a person obeys with the spirit of the law but not the letter, a person does what the law is intended to do, but perhaps may not adhere to its literal wording. Often, when a person deliberately follows the letter of the law but not the spirit they do so by exploiting technicalities, loopholes, and ambiguous language. One approach project managers can adopt is to understand the intent of the law and then evaluate what options are available according to the letter and spirit of the law. Project managers can follow three recommendations when their decisions deviate from policy or guidance:

- **Do not deviate for personal gain — only for the common good**
- **"Back-sight a benchmark" to reduce possible errors and increase accuracy**
- **Do not hide decisions, and be accountable to those around you**

When asking whether a potential solution is balanced, project managers should attempt to discern whether a course of action treats everyone equitably over the short- and long-term. They should also ask whether the action promotes a win-win relationship. Balance is achieved when project managers do no harm, accord dignity, benefit others, exercise caution, and care for others. Likewise, balanced solutions to problems seek fairness, promote autonomy, let a project manager be faithful to their guiding ethical principles, and encourage ethical decision making down the line, thus allowing them to deliver their best work.

The final "ethics check" question is: "How will it make me feel about myself?" The purpose of legal questions is to get a project manager to look at the existing standards. The balance question should prompt introspection, motivating project managers to evaluate whether a course of action is fair and rational. The final question is self-directed and focuses on a person's emotions and standards of morality. Unethical acts will harm a person's self-esteem. A simple way to assess how an action makes a person feel is to have them ask him/herself how they would feel if their actions were reported in the newspaper the following day. If the thought of seeing their actions in print triggers a sense of unease in a project manager (or anyone), they may want to reevaluate their course of action. Although getting into the habit of conducting "ethics checks" is beneficial and can point us toward the correct behavior, it is important to recall that the most challenging aspect of being ethical is not deciding what is right, but instead following through and doing what is right.

The presentation ends with four guiding concepts to help project managers perform their work:

• Be consistent
• Have a legitimate reason for every business decision
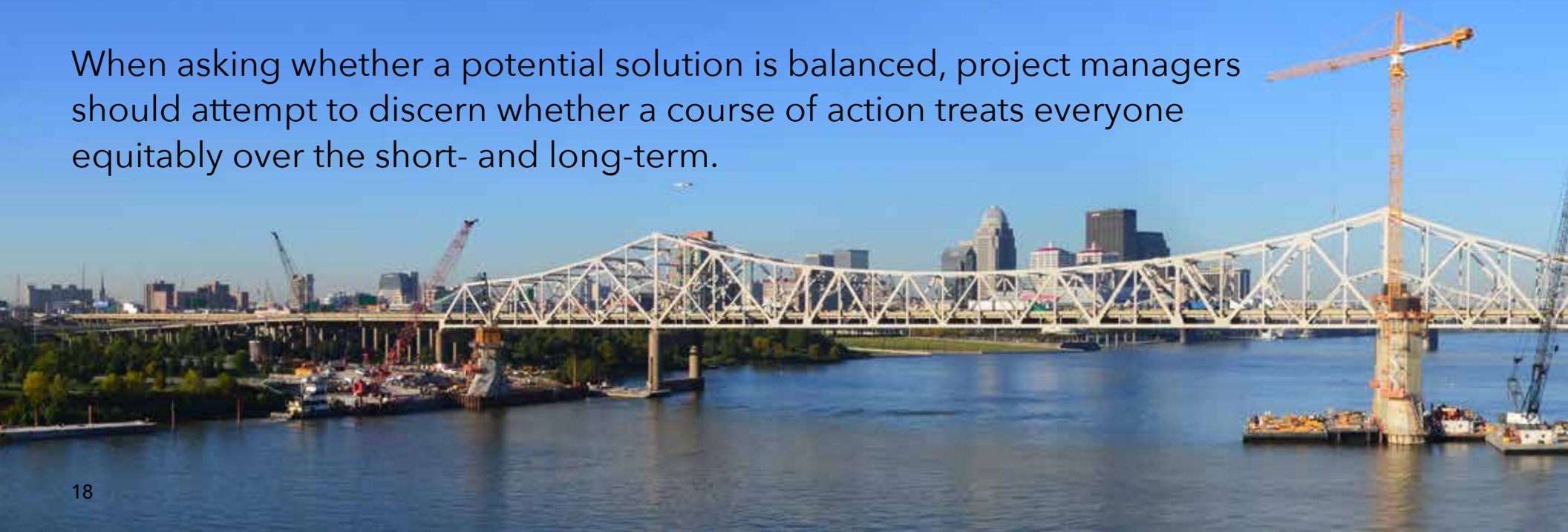• Document events
• If there is any doubt, call an expert

No project manager should ever settle for the minimum acceptable standard. They should aim for their professional actions to exemplify the highest standard of ethical behavior. They can accomplish this, in part, by placing the interest of the people and constituencies they serve first. Project managers should always be willing to put in extra time and effort to preserve their integrity and reputation, so they are held up as an ideal – a person that new project managers in training could emulate.

Program Management in Project Development

This presentation examines different facets of program management and where it fits into the project development process. There is an exhaustive discussion of the following topics (because the slides are text heavy, readers are asked to consult slides 3–8 of the presentation):

• **How the Division of Program Management works for project managers on individual projects**
• **The way in which project managers are viewed as internal customers of the Division of Program Management, and how this division operates under ideal circumstances**
• **An overview of the Division of Program Management's mandate, why it is important, and how it assists in project delivery and approval**

When asking whether a potential solution is balanced, project managers should attempt to discern whether a course of action treats everyone equitably over the short- and long-term.

- **What the Division of Program Management does to help project managers complete their projects**
- **State funding versus the Federal-aid Highway Funding process**
- **The steps to follow after Highway Pan booklets and the KYTC Oracle Preconstruction Status System has been updated to include projects identified and scheduled in the Highway Plan**

Next, the presentation covers the Kentucky Highway Plan. The Cabinet submits a Recommended Highway Plan to the General Assembly in January of even-numbered years. The highway plan lists proposed projects. For each project, scheduled project phases, proposed types of funding, scheduled fiscal year, and the estimated cost of each project phase is included. After the General Assembly reviews the projects in the highway Plan, members can revise the list of projects, add new projects, or remove a project before it is finalized. The Highway Plan is usually approved by April, however, approval is contingent upon a state budget being passed. When the Division of Program Management receives requests for project funding, it uses the Highway Plan to determine whether the requested project is eligible for state or federal funding. If the project is eligible, the Division will evaluate both the availability of funding and how to prioritize the requested funding.
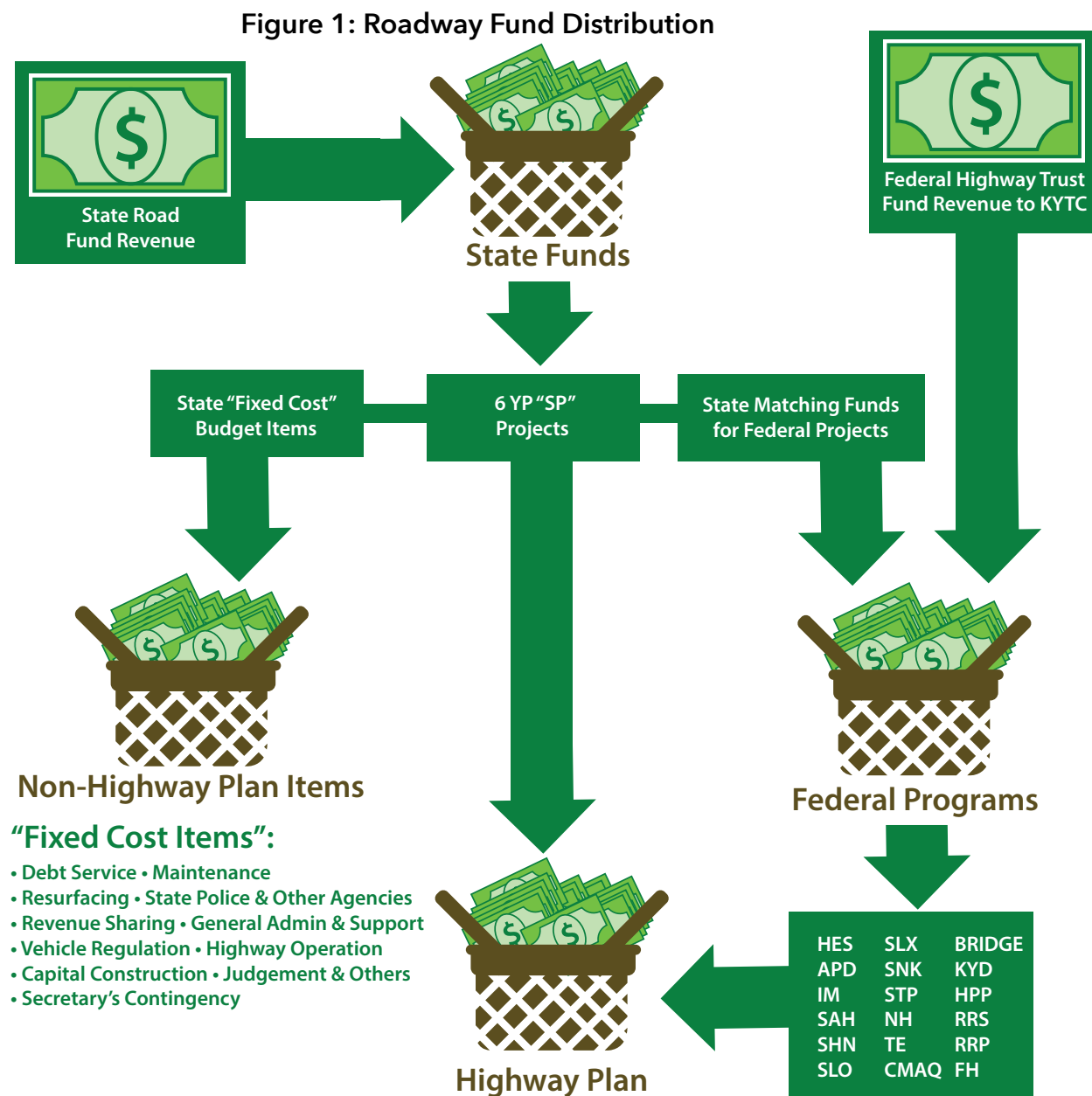
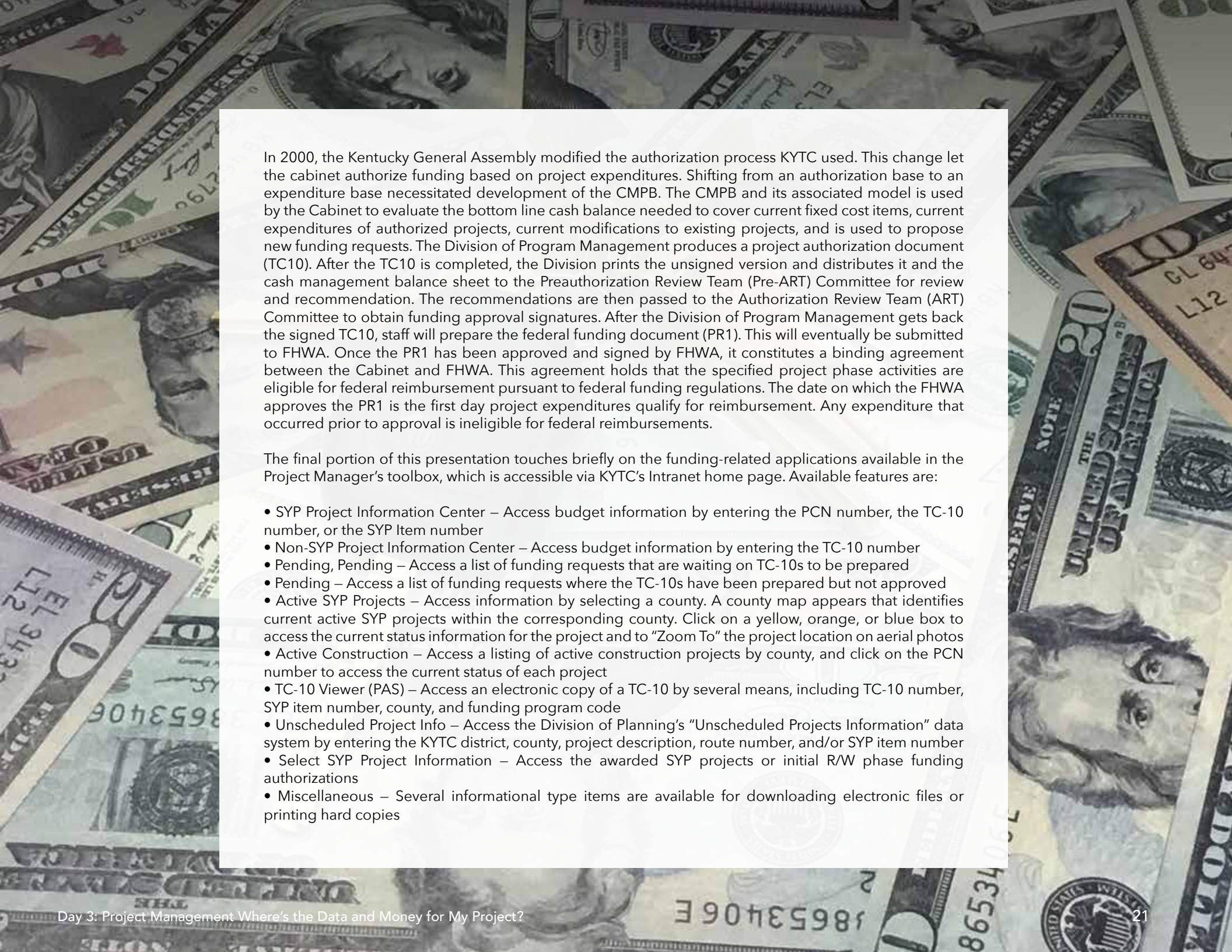The Federal-Aid Highway Funding Program is conducted in accordance with the current federal funding formulas and regulations stipulated in the current transportation act. A critical distinction is that the Federal-aid program is not a grant program; it is a reimbursement program. As such, project expenses are initially covered by state funds. Then, the state sends a request to FHWA for reimbursement of eligible costs. Near the end of each fiscal year, FHWA sends a request to each state asking them to prepare a submission for End of the Year Distribution of Additional Obligation Authority for the Federal-aid highway formula funding. Three conditions must be met for a state to request additional obligation authority. First, the state must prove it can use the current remaining obligation authority. Second, the state must demonstrate that there are available projects that federal funds could be allocated to before the end of the fiscal year. Lastly, a state must have available funding apportionments that fall into the Formula Funds category that it would like to obligate if given the sanction to do so. Project managers will hear the Division of Program Management refer to programming federal funds as Advance Construction (AC). The AC process enables states to request and to receive FHWA approval to perform designated project activities prior to using current apportionments and obligation authority of Federal-aid highway funds. The money paid out for these activities will be eligible for reimbursement after the amount of AC is converted using available apportionment and obligation authority of Federal-aid funds – think of AC as using the state's Federal-aid funding credit card.

Following this discussion of the federal funding process, the presentation highlights the Kentucky Statewide Transportation Improvement Program (STIP). To reiterate, the Enacted Highway Plan is a state document that is required under the Kentucky Revised Statutes. Federal regulations also mandate that KYTC submit to FHWA and Federal Transit Administration (FTA) a STIP. The STIP, which is developed by the Division of Program Management during the summer of even-numbered years, identifies all of the transportation programs and projects in Kentucky that will use federal funding. This encompasses highway, public transit, aviation, transportation enhancement, Safe Routes to School, and recreational trail projects. Projects – along with scheduled costs – that are slated for completion over the next four Federal fiscal years are included in the document. Along with the STIP, the Division of Program Management monitors and writes administrative modifications and amendments for the approved STIP. The FHWA cannot approve the use of Federal-aid highway funds until the state's current STIP specifies the corresponding project phase. Along with STIP requirements, federally funded projects located in any of the state's nine Metropolitan Planning Organization's (MPO) areas are required to be identified within their MPO Transportation Improvement Program (TIP) before receiving authorized project funds. If proposed projects are not included in an MPO's TIP, the Cabinet will ask the MPO to revise their TIP so it is contained within it, a process that may take several months to complete.

At this point, the presentation moves into a discussion of how project funding requests are processed and it outlines KYTC's cash management balance process (CMBP). This diagram summarizes the funding cycle:

Figure 1: Roadway Fund Distribution

State Road Fund Revenue

State Funds

Federal Highway Trust Fund Revenue to KYTC

State "Fixed Cost" Budget Items

6 YP "SP" Projects

State Matching Funds for Federal Projects

Non-Highway Plan Items

"Fixed Cost Items":
- Debt Service • Maintenance
- Resurfacing • State Police & Other Agencies
- Revenue Sharing • General Admin & Support
- Vehicle Regulation • Highway Operation
- Capital Construction • Judgement & Others
- Secretary's Contingency

Federal Programs

HES	SLX	BRIDGE
APD	SNK	KYD
IM	STP	HPP
SAH	NH	RRS
SHN	TE	RRP
SLO	CMAQ	FH

Highway Plan

In 2000, the Kentucky General Assembly modified the authorization process KYTC used. This change let the cabinet authorize funding based on project expenditures. Shifting from an authorization base to an expenditure base necessitated development of the CMPB. The CMPB and its associated model is used by the Cabinet to evaluate the bottom line cash balance needed to cover current fixed cost items, current expenditures of authorized projects, current modifications to existing projects, and is used to propose new funding requests. The Division of Program Management produces a project authorization document (TC10). After the TC10 is completed, the Division prints the unsigned version and distributes it and the cash management balance sheet to the Preauthorization Review Team (Pre-ART) Committee for review and recommendation. The recommendations are then passed to the Authorization Review Team (ART) Committee to obtain funding approval signatures. After the Division of Program Management gets back the signed TC10, staff will prepare the federal funding document (PR1). This will eventually be submitted to FHWA. Once the PR1 has been approved and signed by FHWA, it constitutes a binding agreement between the Cabinet and FHWA. This agreement holds that the specified project phase activities are eligible for federal reimbursement pursuant to federal funding regulations. The date on which the FHWA approves the PR1 is the first day project expenditures qualify for reimbursement. Any expenditure that occurred prior to approval is ineligible for federal reimbursements.

The final portion of this presentation touches briefly on the funding-related applications available in the Project Manager's toolbox, which is accessible via KYTC's Intranet home page. Available features are:

• SYP Project Information Center – Access budget information by entering the PCN number, the TC-10 number, or the SYP Item number
• Non-SYP Project Information Center – Access budget information by entering the TC-10 number
• Pending, Pending – Access a list of funding requests that are waiting on TC-10s to be prepared
• Pending – Access a list of funding requests where the TC-10s have been prepared but not approved
• Active SYP Projects – Access information by selecting a county. A county map appears that identifies current active SYP projects within the corresponding county. Click on a yellow, orange, or blue box to access the current status information for the project and to "Zoom To" the project location on aerial photos
• Active Construction – Access a listing of active construction projects by county, and click on the PCN number to access the current status of each project
• TC-10 Viewer (PAS) – Access an electronic copy of a TC-10 by several means, including TC-10 number, SYP item number, county, and funding program code
• Unscheduled Project Info – Access the Division of Planning's "Unscheduled Projects Information" data system by entering the KYTC district, county, project description, route number, and/or SYP item number
• Select SYP Project Information – Access the awarded SYP projects or initial R/W phase funding authorizations
• Miscellaneous – Several informational type items are available for downloading electronic files or printing hard copies

Day 4: Strategies for collaborating with and managing consultants, an overview of the division of professional services, and revisiting ethics in the context of working with consultants and delivering projects.

GEC: Fact vs. Fiction

This presentation describes the role of General Engineer Consultants (GECs) in project delivery. This segment debunks the fallacies associated with GECs and provides insights into how a project manager can work with GECs to deliver successful projects. A GEC is a team of experts who provide those services critical to executing project delivery. A GEC team serves as an alternate in the project manger's toolbox, and should be viewed as an extension of KYTC County and District staff. GECs are not new; the Cabinet has used them since the 1960s to complete the state's parkway systems, the AA Highway, and the Industrial Parkway.

Currently, GECs are participating on the Louisville-Southern Indiana Ohio River Bridges Project and on the Mountain Parkway Expansion. The scope of the Ohio River Bridges Project includes adding two bridges to the Ohio River that connect Louisville and southern Indiana, and reconfiguring interchanges on three interstates in a high-traffic urban area. This is the largest joint transportation project ever undertaken by Kentucky and Indiana. Approximately 20 years will have elapsed from the initial planning stages and environmental assessments to completion. The total cost of the project is $2.3 billion. The Mountain Parkway Expansion improves a 46-mile stretch of road between Campton and Prestonsburg. The original estimates placed total costs at $750 million. Despite the obvious differences in the projects, there are key similarities – they are expensive, demand a large-scale construction effort, are complex, have a constrained timeline, and have generated immense public interest.

GECs are involved with these projects as part of KYTC's broader goals for GECs, which is to provide experience and continuity over the life of long-term mega projects. GECs complement existing KYTC staff and bring an experienced, knowledgeable team to work on these projects. GEC teams can be adjusted as needed and can shorten the amount of time required for project delivery. GECs provide two critical benefits. First, they are flexible. They can add or reduce resources as needed. Second, GECs are focused, which means the entire team's attention is dedicated to project delivery. GECs may have responsibilities in a

number of areas, including:

- Preliminary design
- Environmental
- Construction oversight
- Right-of-way acquisition
- General project management
- Utility coordination
- Preparing contract RFP
- Record keeping
- Contract administration
- Construction supervision
- Financial and project management plans

It is the project manager's responsibility to ensure all of the pieces fit together, that all work is coordinated and completed, and ultimately to deliver the project. GECs assist in KYTC's management of critical path by maintaining an intense focus on a single project, having the flexibility to add resources when needed, providing commitment to longer-term projects, and having the experience necessary to anticipate and avoid pitfalls. On the Ohio River Bridges Project, the GEC reduced the total estimated cost from $4.1 billion to $2.3 billion by recommending and implementing an alternative design. An RFP was developed in seven months; this typically consumes 18 months. These efforts whittled down the projected five-year construction schedule to three years. The GEC working on the Mountain Parkway Expansion was able to reduce costs by $40 million and helped secure a $24 million TIGER grant to develop Restaurant Row. Having a GEC also expedited project delivery, with only two years passing between line and grade to construction.

The presentation closes by dispelling two commonly held myths about GECs. The first is that GECs are taking over the Cabinet. This is incorrect. GECs focus on specific projects – not broad programs. Second, many believe that the Cabinet uses GECs to outsource project decision-making. KYTC rigorously oversees the activity of GECs, and GECs also coordinate with district staff. As such, project managers and other KYTC employees should regard GECs as collaborative partners.

Where's My Help

Managing Consultants

This presentation offers project managers practical guidance for interacting with and managing consultants. Thematically, the talk is broken into four sections:

• The consultant decision
• The consultant procurement
• The consultant management
• Consultant management philosophy

To kick off the session, participants are asked why consultants are used. They discuss the answer within their table, and although the answers will vary, the most common reasons for using consultants are: a lack of resources (including people and experience), significant expertise that benefits a project, the availability of funding, and to overcome the challenge of delivering multi-tiered activities (e.g., NEPA [National Environmental Protection Act], Traffic, Geotech, and Structures). Before deciding whether to hire a consultant, a project manager should first thoroughly understand the new project. Once the project manager has a solid grasp of project specifics, they should put together a KYTC core team. Because projects have a long duration, a project manager and team will evaluate current and future resources to decide whether the project can be kept in-house. The team should also identify what level of NEPA compliance is required. Setting up a scope meeting with FHWA may be necessary if the categorical exclusion (CE) is at Level 3 or above. Beginning a DNA study may also facilitate the decision-making process and help project managers decide whether to keep a project in-house. This may be contingent on the status of funding requests. For example, if limited funding has been allocated to a project, keeping everything in-house may be better than hiring a consultant.

Three additional pieces of information should be analyzed before deciding to keep a project in-house — identification of services needed to deliver the project, a complete understanding of the work breakdown structure, and total comprehension of the critical path. Based on the evaluations, program managers can opt for one of three strategies. First, they can decide to do all of the work in-house. The second option is to perform all of the preliminary engineering in-house while advertising the production of the final design to a consultant. The final option is to advertise all elements of the work (i.e., "turn key"). A project manager must be certain they are delivering the project in a manner consistent with the meeting schedule, scope, and budget.

Once a project manager has decided to retain a consultant, they have to plan the next steps. Session participants are asked to brainstorm those steps by following the procedures described for the first discussion activity. Answers will vary, but generally, the next steps include:

• Writing the advertisement
• Holding a first selection committee meeting
• Holding a second selection committee meeting
• Holding a pre-design conference
• Contract negotiation

Professional Services

This presentation reviews what the Division of Professional Services offers to project managers to help them deliver projects in a timely manner. The talk begins with a brief discussion of design and total funding per biennium. From 2004 to 2014, design funding followed a normal-shaped curve, with $150 million allocated in 2004. The amount climbed to $314 million in 2010, before declining to $225 million in 2014. Total funding has followed a similar pattern, with disbursements rising from $2.256 billion to $5.060 billion in 2010. This fell during the most recent biennium to $3.636 billion. A breakdown of funding by district is also presented, with Districts 5 and 9 receiving the most funding over the previous three fiscal years. After wrapping up this overview of funding, the presentation delves into what Professional Services' main objectives are.

The Division of Professional Services is a customer-based division. Its primary clients are the District Project Manager and KYTC, while its secondary client is the Design Consultant. Among other things, Professional Services helps control the project's schedule, budget, and service quality. Its primary responsibilities are those functions that do not involve project managers; this includes prequalifying consultants, developing fee proposal packages, writing contracts and modifications, and processing invoices, which entails letter agreements and final pay estimates. Professional Services assists project managers with project advertisements–the goal is to move from RFP to NTP in fewer than 100 days. With the guidance of project managers, staff also perform qualifications-based selection and generate production-hour estimates. As part of the latter activity, Professional Services produces a recommended production-hour range sheet. This has reduced the number of days it takes to procure new agreements and modify statewide contracts by over one month on average. Over the past 10 years, with the help of Professional Services, both contract fees per year and the number of contracts per year have been on an upward trajectory.

Professional Services has shown significant flexibility in how it conducts business, recently revising a number of processes to improve project delivery. These include bundling projects, revising prequalification deadlines, transferring the processing of shop plans to Structures, and revising constructions and capacity. Indeed, Professional Services adheres to a policy of adaptive management, and develops recommended ranges and evaluation factors. The staff also makes services available to consultants.

Delivering a project in an effective, timely manner involves understanding the project need so that an adequate project team can be assembled. Professional Services builds a full team that will deliver all of the elements required of a project. Working to coordinate all team members early in the project's lifecycle is critical. Project managers should keep in mind that additional management needs and services in the RFP are what enable consultant management. Professional Services

assists with traditional advertisements as well as with phased advertisements. Typically, advertising is done for preliminary engineering and environmental work before re-advertising for the final design. Phased advertisements are commonly used on larger or more complex projects, where the schedule assumes greater importance than the possibility of procurement loss. Phased advertisements usually target better-equipped consultants. Professional Services has driven up the number of advertisements per year and increased the amount of competition for each job.

Professionalism and Ethics

This presentation introduces project managers to the basics of professionalism and ethics. Very simply, ethics refer to moral principles that govern an individual or group's behavior. Ethical questions are concerned with distinguishing between right and wrong behavior. Ethics encompass our behavior, the standards we hold ourselves to, and how we treat each other. What is challenging about deriving ethical principles is that many people define right and wrong behavior in a number of different ways. Oftentimes an ethical dilemma does not present a clear-cut right or wrong answer. As with many things in life, there is a grey area between right and wrong. However, even in the most ambiguous situations we should not use this lack of clarity as an excuse to overlook ethics.

Patient examination of muddled dilemmas can often resolve clearer answers. Therefore, it is critical to deliberately analyze each situation to determine whether an ethical resolution can be achieved – always recall that there is no right way to do the wrong thing. With this in mind, the presentation offers a list of Ethics Check questions:

- *Is it legal?*
- *Is it balanced?*
- *How will it make me feel about myself?*

No project manager should participate in an action that is, or gives the appearance of being, improper, illegal, or immoral. As such, project managers must determine whether their actions potentially violate civil or criminal law, KYTC policies, or some other code of ethics. Project managers should also bear in mind the reasonableness standard (i.e. the letter of the law vs. the spirit of the law). When a person obeys the letter but not the spirit of the law, they are following the literal interpretation, but not necessarily the intent. On the other hand, obeying the spirit but not the letter of the law is to comply with what the law's authors intended even if this goes against its expressed purpose. When a person intentionally follows the

letter of the law, but not the spirit, they may be exploiting technicalities, loopholes, or other linguistic ambiguities to justify their behavior. Following the reasonableness standards demands that when a project manager deviates from policy or guidance they: 1) do not do so for personal gain, only for the common good; 2) back-sight a benchmark, which suppresses errors and increases accuracy; and 3) are transparent about intentions.

The purpose of asking whether an action is balanced is to determine whether it is fair to all involved parties over the short- and long-term. That is, does it promote a win-win relationship? To achieve balance, project managers should:

- *Do no harm*   - *Seek fairness*
- *Accord dignity to others*   - *Promote autonomy*
- *Perform actions that benefit others*   - *Be faithful*
- *Exercise caution*   - *Deliver the best product possible*
- *Care for others*   - *Make ethical decisions*

The final ethics check question project managers must ask themselves is how will a particular action make them feel about themselves. The three ethics check questions serve different purposes. The question about the legality of actions gets project managers looking at existing standards. The inquiry about balance is intended to activate a person's sense of fairness and rationality. And the final question about a person's emotions is designed to promote introspection, so that a person can reflect on their standards of morality. Another strategy to test the ethics of a decision is for a person to ask how they would feel if their actions were reported publicly the following day. If the thought of a decision becoming public fills a person with angst and fear, they should probably reconsider their course of action.

The presentation closes with a real-world example and four key concepts that project managers can use to guide their behavior. These concepts are:

- *Be consistent*
- *Have a legitimate business reason to support every decision*
- *Document events*
- *When in doubt, call an expert*

Attaining the highest level of professionalism requires that a project manager never settle for the minimum and always embody the highest standard. Project managers must place the interests of the people they serve ahead of their own, even if this proves demanding or inconvenient. Indeed, working in a professional and ethical manner is critical because a person's reputation is based on how others perceive them.

Day 5: Introduction to the National Environmental Protection Act, an overview of environmental documentation, a description of the critical path for environmental processes, and an In-depth review of key environmental regulations.

Overview of the NEPA Process

This presentation familiarizes project managers with different aspects of the National Environmental Policy Act (NEPA) and its potential impacts on the design and implementation of projects. There are a number of essential elements, including: the identification of how new projects impact the environment, whether there are alternative methods of project delivery that would minimize or eliminate adverse impacts, mitigation strategies that will be necessary if environmental consequences cannot be eliminated or minimized, coordination of multiple agencies that participate in the environmental process, public involvement, and a record of steps taken to reduce negative environmental impacts. Since it is critical for project managers to rely on integrated decision-making from a project's outset, design and environmental work should proceed in concert with one another. When this happens, alternative implementation strategies can be proposed during a project's early stages. With alternatives in hand, the Cabinet will be able to avoid costly and time-consuming efforts to re-engineer a project. From the beginning of a project, the project manager should engage in and document the decision-making process. Project managers should strive to achieve balance between public impacts, the needs of other agencies' environmental directives, cost, safety, and mitigation techniques.

Before describing the environmental process in more detail, the presentation revisits two key aspects of any project – the purpose and the need.

The purpose refers to the problem statement, whereas the need statement includes empirical justification that a problem exists. Taken together, the purpose and need statements explain why KYTC is tackling a project and spending public funds in the process. Multiple types of needs can be used to justify a project. For example, a road segment may require increased capacity, new roads may be used to facilitate improved system linkages, there may be deficiencies with the existing roadways, and social or economic demands may require that a road be expanded. Irrespective of why a project is necessary, all needs statements must be supported by data or facts. Generally, the purpose and need statements are accompanied by goals and objectives, which are yardsticks against which a project's success will be measured. Articulating the purpose and need for a project will establish a solid foundation for later decision-making and will offer the basis for comparing alternative design and implementation procedures. For any project, there are many alternatives that would satisfy the purpose and needs. However, only a reasonable number of examples, selected from among the full range of alternatives, should be analyzed and compared. To meaningfully evaluate the alternative options, it is important that each project option embody logical goals and have independent utility. Ideally, alternatives should not lead to project segmentation.

After discussion on evaluating alternatives, the presentation returns to assessing the adverse environmental impacts a new project will produce. There is a

sequence— which must be followed on all projects — for addressing damaging environmental impacts. If possible, project managers should avoid impacts, and at the least, they are required to minimize them.

When minimizing impacts is not feasible, it is necessary to mitigate for an impact. Typically, this involves paying in-lieu fees or purchasing mitigation bank credits to compensate for project impacts. The FHWA's policy on mitigation holds that the steps required to mitigate the detrimental impacts of a project must be incorporated into the action. The mitigation options selected by the project manager are stated as commitments in environmental documents, after which the Cabinet is responsible for seeing that mitigation is successfully performed. Depending on the location of a project and the environment it cuts through, a number of mitigation techniques may be necessary, including archaeological mitigation, stream restoration, noise abatement, or historic mitigation.

Each step of the NEPA process must be thoroughly documented. If something was not documented, for all intents and purposes it did not happen. Documentation must provide evidence that alternatives and their respective impacts were analyzed prior to project delivery. Written documents also inform stakeholders of what policies are being pursued, and therefore are critical for streamlining interagency coordination. The documentation should fully and impartially describe the analysis performed. And ultimately, it stands as the administrative record for a project. Project managers should bear in mind during the analysis and review that NEPA is a procedural law, not a substantive one. Substantive law creates, defines, and regulates rights, as opposed to adjective, procedural, or remedial law, which provides a method of enforcing rights. Substantive law is exactly what its name implies: the body, essence, and substance that guides the conduct of citizens. Procedural law prescribes a method of enforcing rights or of obtaining redress for the invasion of rights. NEPA directs how federal agencies make decisions about proposals that adversely impact the environment, but it does not require a particular conclusion or direct what decision must be made. A number of courts have held that federal agencies must take a hard look at their proposals in light of available information, analysis, and the potential for environmental impacts. Doing so will let them make informed decisions about implementing particular actions or deciding on alternatives. There are a number of consequences that can arise from improper decision-making, including legal challenges (which effectively stall a project), scheduling delays, and budget overruns. As such, it is imperative that project managers closely follow the NEPA process outlined in the presentation, as this reduces the likelihood of a project's rejection or being subject to legal challenges and other hang-ups later on.

Environmental Documentation

For the basics of NEPA (see above), this presentation discusses in greater detail how the environmental process is documented. Environmental documentation is used during the transportation decision-making process. It informs the design and measures taken to reduce the environmental impacts of project implementation. Environmental documentation performs a number of functions. It makes a record of the investigations, reviews, compliance, and consultations; discusses the steps that have been taken to minimize impacts; summarizes any mitigation commitments; recommends and ultimately identifies the selected alternate. The documentation is necessary for approved location. The type of documentation required for a project is determined by how significant the environmental impacts will be. There are three classes of action: 1) environmental impact statements, 2) environmental assessments/findings of no significant impact, and 3) categorical exclusions. Deciding whether a particular impact is significant will vary from project to project, and the decision to generate an environmental impact statement (EIS) may be related to factors other than environmental impacts.

At the outset of a project, the Cabinet evaluates whether a project will have significant environmental impacts. If, from the beginning, KYTC knows there will be significant impacts, it can issue a notice of intent and begin the scoping process, which is followed by drafting of an EIS (see below). If it is unclear a project will result in significant impacts, an Environmental Assessment will be conducted. As part of an assessment, base studies of existing conditions and impacts will be conducted. The Cabinet will evaluate all alternatives, however, solutions are not usually identified at this juncture. Possible mitigation strategies will be described, and the assessment may go to the FHWA for review and approval, followed by a public hearing. If the assessment reveals that a project will result in significant impacts, the Cabinet will draft an EIS. However, if the environmental assessment demonstrates a project will not significantly impact the environment, KYTC will issue a Finding of No Significant Impact (FONSI). The FONSI will identify and describe the selected alternative and why it was chosen, document the impacts of the winning alternative, discuss any mitigation commitments, and respond to public comments received. Even if a FONSI is issued, the FHWA must still approve it. The conclusion of this process generally occurs 2–4 years after the project has been initiated.

The Cabinet is obligated to produce an EIS for any major federal actions with significant environmental impacts. In general, it will take 4–10 years to complete this process. When the EIS is developed, it describes the proposed action and addresses the six core NEPA elements (i.e., alternatives, impacts, mitigation, public involvement, interagency involvement, and documentation). An EIS entails publishing a Notice of Intent in the Federal Register, performing a scoping study to identify what factors are the most important, conducting base studies for all alternatives (base studies look at the impacts to air, historic features, archaeology, aquatic and terrestrial ecosystems, socioeconomic impacts, and noise pollution). In many cases, a Draft EIS is prepared and may or may not identify the preferred alternatives. Once completed, FHWA attorneys have the authority to approve the Draft EIS before it is circulated among other government agencies and the public for comment. The Final EIS contains all material from the draft version plus additional language that identifies the preferred alternative and why it has been selected over others. The Final EIS describes all proposed mitigation, outlines how comments from the public and other agencies have been addressed, contains the final 4(f) findings, and includes the legal sufficiency review and approval from the FHWA. The document is then distributed to the EPA, other government agencies, and the general public. A Record of Decision (ROD) may incorporate the Final EIS by reference. It pinpoints the selected alternative, summarizes the basis for the Cabinet's decision, outlines Section 4(f), and discusses mitigation and monitoring or enforcement programs for construction. It addresses public comments and includes the final FHWA approval.

The final class of NEPA action is categorical exclusions (CEs). CEs are projects that individually or cumulatively do not significantly affect the human or natural environment. The FHWA and KYTC have established an agreement that identifies four levels of CE. The level of CE is contingent on the context and intensity of the impact. Projects that are CE Level 3 or 4 require final approval from the FHWA, whereas projects with lesser impacts or complexity can be approved by the Division of Environmental Analysis (DEA). The impacts that are acceptable under particular levels of CE include right-of-way acquisition, limited relocations, impacts to threatened/endangered species, and nationwide or individual U.S. Army Corps of Engineers permits. The level of documentation required varies with CE level. Minor projects use a single-page format and only require a

signature from the District EC or DEA Director. Projects at CE Levels 1–3 must consider all environmental areas, have a checklist format to improve data reporting, document mitigation commitments, include signatures from the appropriate parties per level, and demonstrate public involvement commensurate with the project's scale. Depending on project complexity, it will generally take 1–2 years to finish a CE.

Under some circumstances, environmental documents may need to be reevaluated. Reevaluation stems from changes to the project, area or environment, or from regulations. Reevaluations can address minor changes that occur during Phase II design. There are different thresholds for conducting a reevaluation. For example, the Draft EIS must be reevaluated if the Final EIS is not issued within three years. Likewise, the Final EIS or ROD must be reevaluated if there have been no major steps taken on a project over the preceding three years. Both FONSIs and CEs should be revaluated after two years.

This presentation closes with a discussion of how much environmental investigation is necessary on state-funded projects. Project managers should bear in mind that if a federal permit is required or if federal lands are implicated in the project, then NEPA applies. Although the federal agency will be responsible for developing the relevant environmental documentation, it may rely on KYTC to demonstrate NEPA compliance. However, it is recommended that some level of environmental overview or analysis should be performed for most state-funded projects. On larger projects that are likely to demand permits from the U.S. Army Corps of Engineers, the focus should be on Section 106 (historic preservation) and Section 7 (endangered species) consultations – both of which should be accomplished early in the project. On state-funded projects, project managers should remain cognizant of the potential impacts of their actions and be aware of other parties' interests. Ideally, they should involve the public and other agencies to a degree appropriate for the project's size. Lastly, project managers need to maintain flexibility in their decision-making process, use common sense to determine reasonable outcomes, and adjust project design and implementation to minimize environmental impacts in a way that does not adversely affect the total project cost or schedule.

Understanding the Critical Path of the Environmental Process

This session provides in-depth overviews of the following:

- **Section 106 of the National Historic Preservation Act (NHPA)**
- **Section 4(f)**
- **Section 6(f)**
- **Noise Abatement**

The NHPA requires federal agencies to avoid inflicting unnecessary harm on historic properties, including structures and archaeological sites. During analysis of potential impacts, all possible effects should be considered and the Advisory Council on Historic Preservation (ACHP), as well as the public, should have the opportunity to comment on a proposed project. Section 106 is not a substantive law. Rather, it is a procedural law that requires consultation.

The Section 106 process is straightforward. First, an area of potential effect (APE) is established. Then, project managers will need to identify properties within the APE that are currently listed on or are eligible for the National Register of Historic Places. From here, the project's effects will be assessed, with the possibility of three findings: 1) no effect, 2) no adverse effect, or 3) adverse effect. If there are adverse effects, the ACHP is given the opportunity to participate and the details of the resolution should be contained in a memorandum of agreement (MOA) between stakeholders. There are several ways to resolve adverse effects: using alternatives to avoid impacts, adopting minimization measures, or performing mitigation. The MOA is a negotiated outcome that will document any mitigation commitments. From a practical standpoint, Section 106 has a number of implications for project managers. First, project managers should begin on this work early in the design phase because it can be a time-consuming effort. In all likelihood, the project manager will have to consult with multiple parties and perform avoidance/minimization analysis. Project managers should be aware that people who are opposed to a project may leverage Section 106 requirements to sidetrack or derail a project. As such, project managers will need to be vigilant to avoid this fateSection 4(f) is shorthand for Section 4(f) of the U.S. Department of Transportation Act of 1966. This section mandates that park and recreational lands, wildlife and waterfowl refuges, and historic sites be taken into account when a transportation project is developed. Section 4(f) applies to projects that receive funding from or require approval by an agency of the U.S. Department of Transportation. Section 4(f) is the most frequently challenged legislation in the FHWA. Because it is a substantive law, it dictates outcomes. It holds that the use of publicly owned parks, recreation areas, and wildlife refuges that are open to the public, or historic properties, cannot be approved for use on a transportation project unless: 1) there is no feasible and prudent alternative, and 2) the project incorporates all possible planning to minimize harm. Feasibility, however, is a slipper concept. An alternative is considered feasible if it can be constructed using sound engineering principles. In almost every case, the alternatives studied in the Draft EIS or Environmental Assessment are feasible. More practically, if an engineer can design it, it is probably feasible.

Next, it is important to answer what is not prudent. An alternative is not prudent if it compromises the project sufficiently that the purpose and need would not be fulfilled. Alternatives also are not prudent if they introduce unacceptable safety or operational problems, produce severe unavoidable impacts (e.g., community disruptions), or carry additional expenses of an extraordinary magnitude. Property covered by Section 4(f) can be used in the following ways: 1) taken by fee simple or permanent easement, 2) temporarily occupy land that is considered adverse, or 3) use constructively. Additionally, there are three ways to address the use of Section 4(f) lands: a 1) Section 4(f) Statement, 2) Programmatic Section 4(f) finding, or 3) a de minimis finding. Project managers should adhere to the established Section 4(f) document process. If they are to issue a Section 4(f) Statement, first, they will need to address why it is necessary to use 4(f)-designated lands, explain why there are no feasible and prudent alternatives, and specify any measures being used to minimize impacts. Once this documentation is complete, the FHWA approves it for circulation and sends it to the agency with jurisdiction and DOI for comment. A final document addresses comments that have been received. Programmatic Section 4(f) findings apply to minor uses of historic properties; a historic bridge; the minor involvement of a park, recreation area, or wildlife refuge; and independent bikeways or walkway projects. These projects will bring a net benefit. It is imperative that the agency with jurisdiction agrees with this approach. There is no legal sufficiency review or Department of the Interior (DOI) coordination when a Programmatic 4(f) finding is made.

A de minimis finding applies when the jurisdictional agency agrees there are no adverse effects to Section 4(f) properties. The agency responsible for this determination should formalize it in a written document. Project managers are advised to deal with Section 4(f) early in the project because significant changes could be required which may add 6–12 months. Project managers should maintain thorough records of what decisions are made and when.

Section 6(f) of the Land and Water Conservation Fund Act (LWCFA) applies to park and recreational areas that have been improved with Land and Water Conservation funds. If a transportation project requires use of these lands, the project manager will need to coordinate with the DOI. It mandates a 1:1 replacement of property used, where ratio is based on the property's value. A memorandum of agreement and property transfer are typically required. If a project manager anticipates that a project could impact Section 6(f) lands, they should work to either avoid those impacts or define them early on so that the appropriate property transfers can occur. Appraisals, interagency coordination, negotiating settlements, and producing documentation all add time to the process. If these issues are not addressed upfront, a year could be added to the project schedule.

Lastly, transportation projects may require the installation of noise abatement structures. Project managers will need to allocate time during Phases I and II of the design process for deciding on the best noise abatement procedures. During Phase II design, they will typically hold a noise wall meeting to determine the best structural implements to dampen noise from a newly constructed road. Similarly, with hazardous materials, project managers should identify problematic parcels during the Phase I Design /Overview and conduct assessments early on in Phase II Design. They should prioritize the acquisition of the parcels early on in the project. The nature of the hazardous materials can influence appraisals, potentially shaping design principles used at this juncture.

Section 404 of the Clean Water Act

Section 404 of the Clean Water Act (CWA) spells out procedures for mitigating and compensating for damage inflicted upon Waters of the United States (WOUS) during a road construction project. (It has more far-reaching implications, but for the purposes of this presentation only the impacts of project delivery are considered). When a project affects WOUS, the Cabinet must apply for a Section 404 permit from the U.S. Army Corps of Engineers. Most frequently, road projects damage or destroy streams or wetlands, although in some cases other waters may be affected. Whenever a project impacts jurisdictional waters, KTC must develop plans to avoid, minimize, or compensate for losses to those waters, in that order. Following this mitigation sequence is required under Section 404. The first option under the mitigation sequence is avoidance. This option is the most ideal from an ecological and geomorphic point of view, but can be costly, delay projects, and increase the project manager's permitting work. During the initial design stages, a project manager should identify streams and wetlands that a project will potentially impact and subsequently, generate plans to avoid or mitigate those losses. When a stream is unavoidably impacted and mitigation is required (through the payment of in-lieu fees or the purchase of mitigation bank credits), stream impact costs are calculated based on length, stream quality, and type (i.e., perennial, intermittent, or ephemeral stream). Generally, the Cabinet pays $300–$755 per linear foot to compensate for losses. If wetlands are impacted, costs are assessed on a per acre basis. Depending on the amount of time that passes between impact and the compensation, KYTC may have to pay for temporal losses.

Mitigation and compensation are time-consuming processes, therefore a project manager should account for the additional time and cost in the project timeline. Depending on the complexity of the project, a consultant may be needed. This is especially true on statewide projects, design contracts, and larger projects. A project manager may also have to work with staff from the Division of Environmental Analysis (DEA). Whether a project manager has to work with an outside consultant or DEA staff, they should recognize those individuals will have to make time to complete the necessary work and should plan ahead accordingly. Another issue: Section 404 specifies that no discharge of dredged or fill material will be permitted if a practical alternative exists that would have less adverse consequences on ecosystems. If losses are unavoidable, the project manager will need to identify the alternative that produces the least environmental damage. During the early project stages, a project manager should determine if impacts can be avoided. If this is not possible, and mitigation or compensation will be necessary, they will need to contact a DEA subject-matter expert for assistance.

It is critical project managers be proactive in thinking through the costs and time associated with Section 404 impacts.

After discussing the basics of Section 404, the presentation covers the steps involved in Section 404 permitting. To set the permitting process in motion, project managers will send right-of-way plans to the Central Office. They will also need to quantify project impacts and determine the appropriate permit type. There are three types of Section 404 permits: Nationwide Permit, Letter of Permission (LOP), and an Individual Permit. The type of permit required is a function of: the extent and magnitude of impacts, the cumulative impacts, the quality of resource being impacted, what Section 7 and 106 impacts have been identified, and any controversy that a project may generate. A Nation-wide Permit's notification requirements (BNR) are:

• **There are fewer than 300 feet of stream impacts**
• **There are no Section 7 or 106 issues**
• **There are no special use waters involved**
• **There are no special aquatic sites impacted**
• **There are no impacts to schedule and no mitigation costs**

An actual permit application is required when there are:

• **300–500 feet of stream impacts**
• **0.1–0.5 acres of wetland affected**
• **Section 7 and 106 concerns**
• **Impacts to special use water/aquatic sites**

Typically, the U.S. Army Corps of Engineers will take 3–4 months to approve a Nationwide Permit that requires mitigation of impacts.

KYTC may apply for an LOP when the following conditions are met:

• **Greater than 500 feet of stream impact**
• **Greater than ½ acre of wetland impact**
• **Fewer than 7 acres total (stream/wetland) impact**
• **Mitigation required**

An LOP also requires a 21-day Resource Agency Notice. Project managers should allow 6–8 months for the Corps to grant approval.

The Cabinet must apply for an Individual Permit when there is:

- **Greater than 500 feet of stream impact**
- **Greater than ½ acre of wetland impact**
- **Controversy**
- **Mitigation required**

With an Individual Permit, a 30-day Corps of Engineers Public Notice is required. It will potentially involve the Corps performing more 404(b)(1) analysis, and in general, a project manager should anticipate up to a year (or more, depending on complexity) to receive the permit. Project managers should recall that DEA staff will help navigate the Section 404 permitting process – they should take advantage of this resource, which will help streamline planning and design and prevent delays.

Endangered Species Act and Section 7

The Endangered Species Act (ESA) mandates that all federal agencies work toward the conservation and protection of endangered and threatened species. Section 7 of the ESA, entitled "Interagency Cooperation," specifies that federal agencies must consult with the U.S. Fish and Wildlife Service when performing an action that may affect a species listed as endangered or threatened. Road projects executed by the state of Kentucky must also comply with Section 7 regulations. Once assessment has been conducted, a determination of: **1. No Effect, 2. Not Likely to Adversely Affect, or 3. May Affect** is issued. If an action is judged to have **No Effect**, it will not impact threatened or endangered species. Actions that are **Not Likely to Adversely Affect** a habitat will have insignificant impacts and/or impacts that can be minimized or mitigated. A judgment of **May Affect** means that an action will have adverse effects on threatened and endangered species. The first step taken to comply with Section 7 of the ESA is a habitat assessment. The purpose of this assessment is to determine if the habitat of a listed or endangered species is located within the project area. Evaluations may be performed by subject-matter experts from either the DEC or DEA. There are two possible outcomes from a habitat assessment: 1) a no effect finding, which means there is no habitat for threatened or endangered species in the project area, or 2) requiring a biological assessment, which indicates that habitat has been identified and closer study of the project area is needed. Habitat assessments should be performed during Phase I Design. Once right-of-way plans have been sent to the Central Office, it is too late to conduct one. All that is needed for the assessment is the project location and a brief description of the work that will be done. Most assessments are completed in a single day. Very basically, they rely on data about streams, tree species, soil types, underlying geology, and landscape position to make habitat determinations. If the habitat assessment returns a no effect finding, the project can move forward.

Should a habitat assessment demonstrate that habitat for an endangered or threatened species is present, a biological assessment will be performed. This assessment either surveys the project area to determine what species are present and what impacts the project will bring, or surveyors assume a species is present and document possible effects accordingly. Biological assessments are required for federal aid projects and the issuance of federal permits (from the U.S. Army Corps of Engineers or U.S. Coast Guard), even for state-funded projects. The purpose of biological assessments is to provide the U.S. Fish and Wildlife Service with the data needed to either make a **Not Likely to Adversely Affect** determination or provide the foundation for their staff to write a Biological Opinion (in the case that a project may affect critical habitat). A key consideration for project managers with biological assessments is scheduling. In most cases, KYTC will need to retain consultants to perform biological assessments, although in some cases DEA staff are qualified to complete them.

As with the habitat assessment, project managers should bear in mind that consultants and DEA staff will need to carve out time to complete the work. Other scheduling constraints may apply as well. Some assessments can only be completed during particular seasons in order to observe the full array of species present on a site. Also, the biological assessment needs to be completed at least one year prior to letting. Assessments must be wrapped up before the Cabinet submits other federal permits or approval actions.

Completed biological assessments will include a project description; a discussion of what effects the project will have on threatened or endangered species (this includes direct, indirect, and cumulative impacts); measures that will be used to avoid, minimize, or mitigate impacts while conserving the species; and a final determination of effect. Consultants or DEA staff completing the assessment will need critical information from the project team to assess the impacts, such as: pier location, blasting, construction scheduling, and disturbed limits. Project managers may want to pay close attention to environmentally sensitive areas during design to prevent significant delays with project delivery. The project team must be aware of and in agreement with any commitments made in the biological assessment to minimize or mitigate project impacts. These commitments will inform the Fish and Wildlife Service in making its effect determination. This determination is needed for other permits and authorizations to be valid. Not adhering to these commitments may prompt a Fish and Wildlife Service re-opening consultation. Ideally, the result of a biological assessment will be a **Not Likely to Adversely Affect** determination. Once a biological assessment has been submitted to the Fish and Wildlife Service, it will develop a Biological Opinion, a document that states the likelihood of an action jeopardizing the continued existence of an endangered or threatened species. Project managers should be aware that it will take at least six months for the Fish and Wildlife Service to issue a Biological Opinion. Biological assessments, according to the FHWA, are good for up to five years after their completion if there are no changes to the project scope. The Fish and Wildlife Service recognizes an assessment as valid as long as no new listings, scope changes, or a significant amount of time has passed since it was completed.

Project managers and their team should take steps to avoid or minimize impacts (e.g., avoid a may affect determination). Section 7 reviews often consume significant amounts of time. As such, project managers need to schedule accordingly and work to expedite the process. DEA subject-matter experts are available to assist them during the Section 7 review, and project managers should take advantage of this resource.

Day 6: Addresses how various KYTC divisions can assist project managers, and provides detailed guidance on the roles that structural design, traffic operations, utility and rail coordination, highway design, and Geotechnical have in project delivery

Division of Structural Design

This presentation gives an extremely thorough treatment of the role the Division of Structural Design (DSD) plays in delivering projects. DSD's main function is to design and prepare contract plans for all highway department structures. It also works on other special structures that may be required for a project. Additionally, DSD designs and formulates repair plans for existing highway structures. Typically, this work is conducted on behalf of Operations and Maintenance. DSD houses three branches. The Bridge Design and Rehabilitation Branch assembles the following: plans, specifications, and estimates for new structures; existing structures slated for widening; culverts; walls; sign supports; and emergency plans. The Consultant Review Branch reviews structural plans submitted by consultants, develops labor estimates for consultant projects, negotiates with consultants where necessary, and manages statewide structure design contracts. This branch will also offer advice to the Division of Construction and Resident engineers during project delivery. Lastly, the Geotechnical Branch performs surface investigations, makes cut slope recommendations, does slope stability analysis, reviews contractor submissions on various earth retention structures, and manages statewide drilling and engineering contacts.

There are four pieces of information that project managers should keep in mind. First, project managers are responsible for establishing the line and grades for highways. These grades should provide the proper vertical clearance over obstructions. Next, the grade should establish the necessary hydraulic opening over proximate rivers and streams. And fourth, Project Managers must properly estimate the depth of superstructure and spans. If these estimates are incorrect, the structures will not fit together. After collecting the above information, the project manager must pull together certain components that are necessary for the DSD to move forward with structural design. These include the situation folder (the order form for a structure), a geotechnical report, and the design funds that are available to complete the work. To estimate the number of labor hours it will take to build a structure, DSD needs to know what type of structure is requested; the number of spans, foundation type, width, and maximum span length; and any special considerations that apply to the project, such as aesthetic treatments or the need to accelerate bridge construction.

After the situation folder has been completed, it is imperative that project managers understand the project is not complete. There are other considerations to bear in mind. Project managers will need to leave enough time for the Division of Railroads to review plans, and if necessary, obtain permission on a Railroad ROW. If the project involves construction of a bridge that will also carry a railroad, the review process will likely stretch out longer than it would otherwise. For projects that require U.S. Coast Guard Navigational Permits or Federal Aviation Permits, project managers should build extra time into their schedules to acquire them. Often, it takes years for the Coast Guard to process permit applications. Lastly, project managers should recognize that geotechnical reports must be completed before design work on structures can proceed. Neglecting any of these issues could lead to project delays. After outlining general principles for working with DSD, the presentation offers in-depth treatment of topics such as culvert layouts, superstructure depth estimation, bridge length estimation, bridge layouts. Because of the level of detail contained in the presentation, discussions of these topics are not reproduced here. Instead, readers should refer to the presentations to obtain specific information.

Staff at DSD view consulting with project managers early in the project development process as one of their principal tasks. Project managers should ask DSD staff targeted questions about their projects and about concerns relevant to them. Keeping inquiries focused on a specific project will ensure the feedback DSD offers is salient. Sometimes DSD will offer preliminary consultation services to locate joints for partial removal of existing structures so that the load carry capacity does not dip below acceptable levels. Another issue DSD sometimes confronts is involving public opinion to select structure type. The primary consideration when selecting the types of structures that will be used on a project should be economics and keeping project costs low. If the project manager has to take other factors into account, such as public feedback, the preferences of local citizens, or local politicians, they need to clear everything through the State Highway Engineer's Office before using selection criteria other than economics.

34

After highlighting these problem areas, the presentation comprehensively discusses accelerated bridge construction techniques and runs through a number of example projects DSD has worked on. These case studies showcase DSD's abilities while illustrating some of the important concepts introduced at the presentation's outset. Again, readers are referred to the presentation slides for a detailed treatment of these issues. The presentation closes by reminding project managers that even though economic considerations should be an overriding factor in structure selection, in some situations choosing the most economical structure may not meet the project's objectives or needs. There can be times when roadway, drainage, and ROW issues prevent selection of the most cost-effective option. When challenges arise related to the choice of structure design, project managers should contact DSD.

Traffic Operations in Project Development

The Division of Traffic Operations' (Traffic Operations) primary goals are to ensure the safety of roadways and the traveling public and to maintain steady, uninterrupted traffic flows. Both of these objectives are achieved primarily through the use of traffic control devices. This presentation begins with an emphasis on how staff in Traffic Operations can facilitate project delivery and collaborate with project managers. Traffic Operations contains three branches. The Systems Operations Branch can offer project managers advice on traffic simulation and modeling. Meanwhile, the Traffic Engineering Branch can be called upon to issue approvals for electrical devices (e.g., signals, beacons, and school flashers) and lighting, assist with developing the geometric layouts of interchanges, and conduct reviews of panel signs. Frequently, a staff member of the Traffic Engineering Branch will participate on project teams as the primary traffic and safety subject-matter expert. They also lend their expertise on the application and interpretation of the Manual on Uniform Traffic Control Devices so that new projects appropriately install signage, markings, signals, and temporary traffic controls, among other items. Lastly, the Traffic Design Services Branch aids project managers with plan development for electrical devices and lighting, plan review for electrical devices and lighting, and management of statewide consultants. Staff participates on project teams as subject-matter experts in electrical design.

Although Traffic Operations help project managers streamline project delivery, project managers can also assist Traffic Operations staff. Project development

benefits when Traffic Operations receives early notification of electrical device issue needs on projects. Project managers have three options for electrical plan development — they can bring in a project consultant, collaborate with Traffic Design Services (in-house), or use a statewide consultant. There is a set process for the approval and design of electrical plans. First, project managers need to determine what devices and plans are needed. Once they have identified the project's needs, they send a request to the Traffic Engineering Branch. After Traffic Engineering receives the request, a liaison will review and secure the appropriate approvals, after which plans are developed. Although plan development usually takes a few days to complete, the legwork may take months.
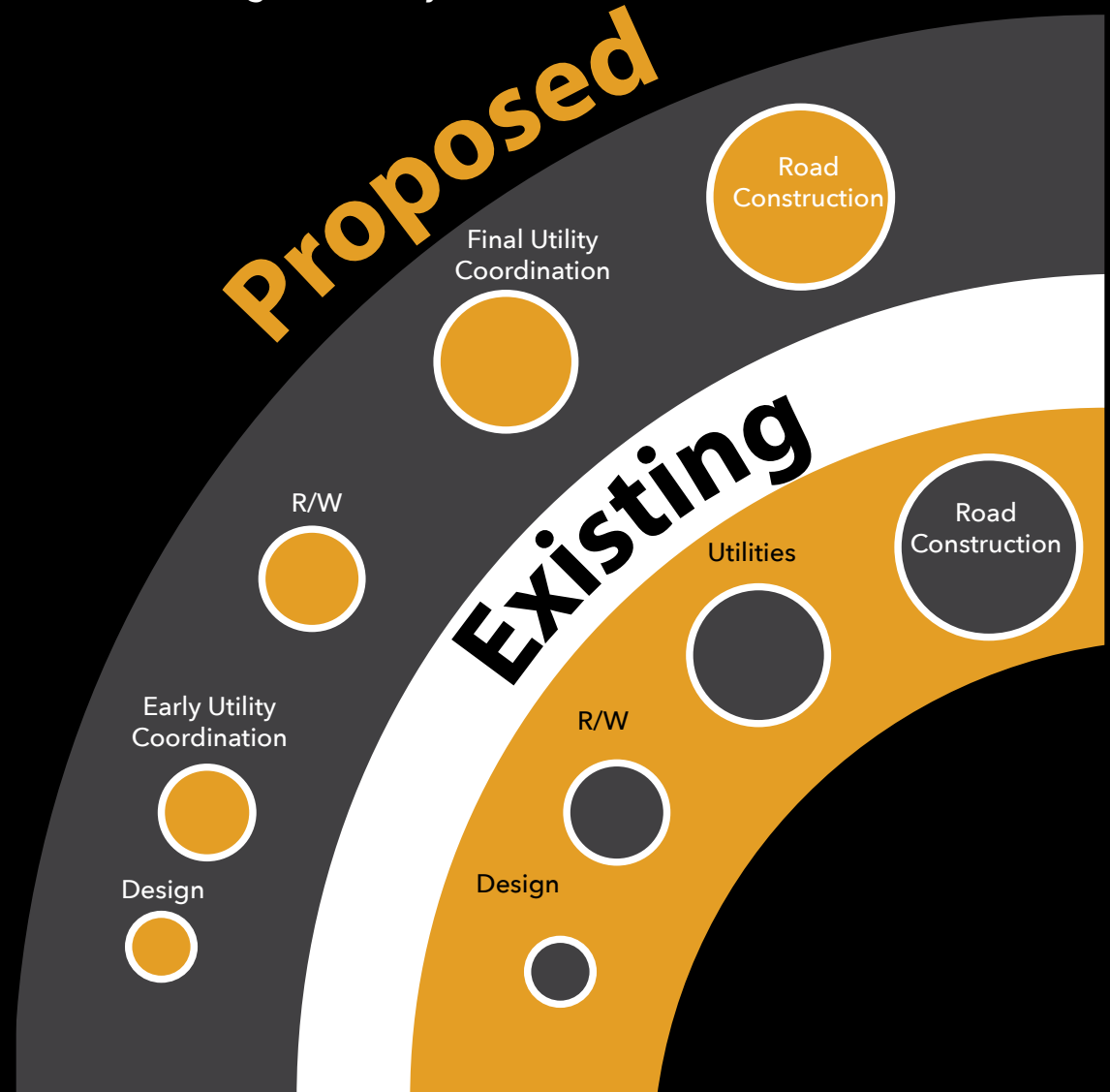
A concern that project managers should tackle early on is pole placement. Further, project managers will need to obtain approvals on speed limits from the Secretary of the Transportation Cabinet, while the State Highway Engineer is responsible for approving markings that are wider than those typically used as well as any modifications to the pavement marker system. The Deputy State Highway Engineer has the authority to approve traffic signals, flashing beacons, school flashers, and lighting designs. To work effectively, Traffic Operations, requests that project managers involve the division as soon as possible on their projects – this is especially true for major projects. Along with engaging Traffic Operations early in project development, they should submit formal requests for devices and plans in a timely manner and maintain ongoing communication with staff, which includes requesting plans and giving a timeframe for submittals.

If project managers delay in contacting and involving Traffic Operations, a cascade of negative consequences will result. Some of these include:

• **Inability to schedule work**
• **Undesirable pole placements**
• **Lack of plan review**
• **Use of undesirable signal phasing**
• **Inaccurate estimates**
• **The need for additional surveying work**
• **A rush to obtain supporting documents for approvals and/or agreements with locals**
• **Little or no review of electrical plans**
• **Misconception of project components**
• **Last minute changes to intersection layouts, geometry, and utility plans**

By working with Traffic Operations from a project's outset, project managers can expedite delivery and avoid unnecessary delays.

Figure 2: Utility Coordination Process Workflow

are delayed, this compresses the time available to complete the sequence.

Utility and Rail Coordination in Project Development

This presentation documents the role utility and rail coordination (hereafter, Utilities and Rail) plays in project delivery. Figure 1 illustrates the processes that must unfold before Utilities and Rail can begin work. This is the current sequence. Often, road construction is slated to begin on a fixed date, and if early project phases are delayed, this compresses the time available to complete the sequence. For example, a delay in final design work will slow down the ROW process, which in turn produces knock-on effects throughout the process. Changes have been proposed to modify this work progression, with utility and rail being able to use design funds to execute engineering service agreements. A second proposed change is that during the ROW stage, when utility funding becomes available, utilities should be ready to finalize plans. These changes will prevent slowdowns from impacting project delivery.

Currently, the utility agreement applies to design and relocation. Proposed changes to the work process would allow for a separate engineering agreement that would let engineering work begin earlier in project development. To do this, funds would shift from design to utility work. There is also an offer on the table for the road designer to perform utility design, especially for utilities that are 100% reimbursable (i.e., municipalities). However, the relocation design will need to remain under the review and approval of the owner, which is the utility company. The presentation runs through the responsibilities of Utilities and Rail. Project managers should reserve the utility phase for the final relocation design and for relocations. On each project, Utilities and Rail has a number of responsibilities following early coordination work, including: conflict validation, finalizing estimates, developing final plans and relocation agreements, working on relocation construction, developing utility clearance notes, and delivering specs. KYTC contractors often have experience working on utility construction. Utilities and Rail has proposed contracting out utility construction within the road project. There are a number of Cabinet districts and companies presently doing this, although KYTC would like to universalize this practice.

With respect to railroad coordination, there are a number of activities that project managers and utilities and rail need to accomplish. ROW entry must be acquired and plan reviews need to be coordinated with railroad companies. KYTC must coordinate flagging activities in order to protect railroad facilities that could be impacted by the project. Further utilities and rail must ensure that KYTC contractors execute their work adequately and conform with expected standards (which includes having the proper insurance and using the appropriate construction techniques). There are a number of steps that are necessary to ensure that railroad coordination proceeds smoothly: 1) all plans and proposals require approval, 2) KYTC must receive permission to enter railroad properties, 3) contractor insurance must be procured, 4) flagging services are complete, and 5) all work should receive advance scheduling. All of these issues should be resolved at least two weeks before work begins. The deliverables required by Utilities and Rail include the railroad agreement, documents related to parcel acquisition, rail notes for proposal, and reimbursement for any services. On the utilities side of the equation, Utilities and Rail encourages project managers to seek out the division's assistance early in project development. They offer a number of services to facilitate project delivery. Early in project development, Utilities and Rail can assist with identifying necessary easements and they can work with project managers to create a design that avoids any existing or proposed facilities. Another way to achieve success with utility planning and execution is to work side by side with roadway contractors. Ultimately, contractors are responsible for coordinating relocation activities, but project managers must scrutinize their work to ensure project objectives are met.

Highway Design in Project Development

The Division of Highway Design's mission is "the timely delivery of engineering solutions and construction documents that maximize the use of highway funds and enhance the safety and operations of the highway system, the natural environment, and the human environment." The presentation unpacks this statement a little and fills project managers in on the resources and services that Highway Design staff can provide. Highway Design has four key goals:

- **Assemble the contract plan and deliver it to the letting process**
- **Develop the criteria, procedures, and policies for highway and road design**
- **Offer technical expertise and assistance**
- **Provide or facilitate training**

More specifically, Highway Design is responsible for a number of activities throughout the design process. These include: making sure the project complies with all legal and industry standards (e.g., criteria, Greenbook, FHWA), preparing plans (including CADD standards and plan formats), setting guidelines (e.g., manuals and standard drawings), and preparing the highway plan itself. As part of moving complete projects to the letting process, project managers should see Highway Design as the vehicle through which project plans are delivered to the letting process.

There are eight branches in Highway Design, and each performs a specific function. The presentation includes contact data for branch staff (which readers should consult for this information and the branch's administrative structure). Here, the responsibilities of each branch are summarized. Administrative Support provides human resources support for project development, oversees supplies and consumable resources, and helps coordinate interactions between the Highway Design Director and project teams. The Roadway Rehabilitation Branch provides a variety of expertise, and is home to subject-matter experts on rehabilitation projects. Next, the Developmental Branch develops and supports highway design techniques, coordinates and supplies training, and offers design and project services to Project Development Managers and the State Highway Engineer. Specializing in the preparation, oversight, and review of pavement designs is the Pavement Branch. This branch also develops the pavement design process and generates plans for projects that rehabilitate non-freeway projects. The staff is knowledgeable enough to give advice on pavement salvage. The Technical Support Branch develops and supports design hardware and software while serving as the liaison to the Office of Information Technology. It is the owner and operator of CADD Standards, Graphic Standards, and Project Wise. Working at the interface
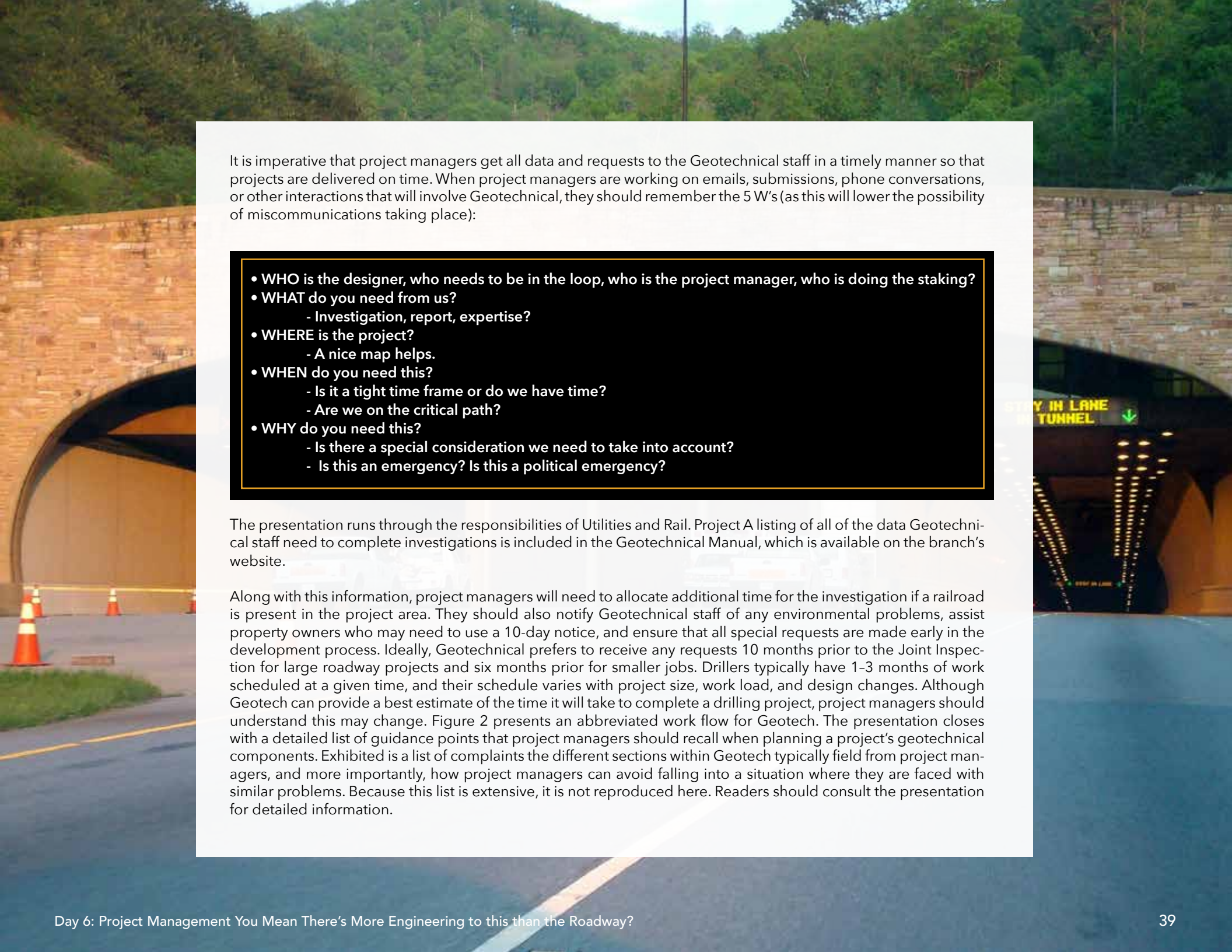
of roadway and hydrological issues is the Drainage Branch. It authors and publishes the drainage policy, reviews and advises project managers on drainage design, and scrutinizes projects to ensure they comply with all regulations. The Quality Assurance staff perform value engineering studies, do constructability reviews, post construction reviews, and maintain a database of lessons learned. There are also a number of Location Engineers with various specialty areas. Location engineers provide an array of services, including lending technical expertise and support, furnishing budget and scope oversight, serving as a liaison for projects through

all stages of design and plan development, and working on behalf of project managers and project teams when they need to interact with outside agencies and other divisions. The Roadway Design Branch oversees project development, aids project managers, and makes available staff who are expert resources. When a project is assigned to a District Project Development Branch Manager, the Location Engineers function as partners in the decision making. Lastly, the Plan Processing Branch has the responsibility of collecting final project components, performing bid-availability reviews, and doing the final assembly of all roadway plan projects.

Geotechnical Overview

This presentation runs through considerations and issues that project managers should bear in mind when dealing with the geotechnical dimension of their projects. It summarizes the resources the Geotech Branch has available for project managers. The Geotechnical Branch is one of three branches housed in the DSD; there are five groups within Geotech. The Structures section provides designers with the expertise they will need to develop structure plans. The Roadway section assists designers with the development of roadway plans. Geology section staff consider the geological implications of project development, and help project managers create roadway and structure plans that are suited to an area's geological and geomorphic setting. The Construction and Landslides section plays a significant role in the state's construction projects. Staff assist with landslide repairs on active construction projects - stabilizing the subgrade, performing excess material site reviews, and developing solutions for any problems that have a strong geotechnical component. Irrespective of who issues geotechnical recommendations, the Construction and Landslides staff will help project managers with interpretation. The Drilling Services section is also available to work on all matters related to drilling. Lastly, the Soils Lab (which performs 9,000 to 10,000 tests each year) makes a variety of state-of-the-art evaluations available to project managers to ensure construction methods are adapted to the pedological context.

Overall, the Geotechnical Branch uses two separate statewide contracts. One of these is a statewide engineering and laboratory testing agreement, which includes four firms working on a round-robin basis. There are also statewide drilling agreements, which give project teams access to four firms, also operating on a round robin basis. Among the four firms, teams will have access to over 20 crews. These agreements give the Geotechnical Branch greater flexibility and allow staff to tap into outside expertise on special projects. Further, the contracts let staff fast track projects, even when there are heavy workloads.

It is imperative that project managers get all data and requests to the Geotechnical staff in a timely manner so that projects are delivered on time. When project managers are working on emails, submissions, phone conversations, or other interactions that will involve Geotechnical, they should remember the 5 W's (as this will lower the possibility of miscommunications taking place):

- **WHO is the designer, who needs to be in the loop, who is the project manager, who is doing the staking?**
- **WHAT do you need from us?**
    - **Investigation, report, expertise?**
- **WHERE is the project?**
    - **A nice map helps.**
- **WHEN do you need this?**
    - **Is it a tight time frame or do we have time?**
    - **Are we on the critical path?**
- **WHY do you need this?**
    - **Is there a special consideration we need to take into account?**
    - **Is this an emergency? Is this a political emergency?**

The presentation runs through the responsibilities of Utilities and Rail. Project A listing of all of the data Geotechnical staff need to complete investigations is included in the Geotechnical Manual, which is available on the branch's website.

Along with this information, project managers will need to allocate additional time for the investigation if a railroad is present in the project area. They should also notify Geotechnical staff of any environmental problems, assist property owners who may need to use a 10-day notice, and ensure that all special requests are made early in the development process. Ideally, Geotechnical prefers to receive any requests 10 months prior to the Joint Inspection for large roadway projects and six months prior for smaller jobs. Drillers typically have 1–3 months of work scheduled at a given time, and their schedule varies with project size, work load, and design changes. Although Geotech can provide a best estimate of the time it will take to complete a drilling project, project managers should understand this may change. Figure 2 presents an abbreviated work flow for Geotech. The presentation closes with a detailed list of guidance points that project managers should recall when planning a project's geotechnical components. Exhibited is a list of complaints the different sections within Geotech typically field from project managers, and more importantly, how project managers can avoid falling into a situation where they are faced with similar problems. Because this list is extensive, it is not reproduced here. Readers should consult the presentation for detailed information.

Day 7: Underscores the importance of right-of-way acquisition in project management, reviews procedures necessary to execute condemnation procedures, and underscores the role of time and risk management in project management and delivery

Right-of-Way in Project Development

The Right-of-Way (ROW) phase extends throughout the entire project development process from planning to construction. After introducing the ROW process, the remainder of the presentation discusses the three major branches of ROW and walks through the activities handled by each one.

Acquiring the transportation ROW is a critical function of the Cabinet. The purpose of obtaining ROW is to procure the land that KYTC needs to build or expand roads. The ROW Project Manager is a key member of any project team, and coordinates with other branches to perform assigned tasks. They will be involved in all major activities and decisions that occur during project delivery, beginning with the project's initial identification and ending with the ROW certification. Near the outset of a project, the ROW Agent Supervisor receives an official order from the Director and prepares a ROW status report. They will delegate the acquisition stage report, which is required on all projects. The Agent Supervisor delegates assignments, which includes appraisal, acquisition, and relocation; they also plan project delivery.

The Appraisal Branch (hereafter Appraisal) ensures that a project complies with federal and state laws and regulations. Staff receive, approve, and distribute

appraisals. They also provide in-house training when necessary. To generate an appraisal, staff must have access to ROW plans with sections and Pipe Sheets; they must also consider the completed title work (for the parcels that need appraisal).

A review appraiser will be assigned to each project and oversee the process. From start to finish, the appraisal phase can take several months, and it begins with preparing plans and contacting property owners whose parcels lie in the ROW. Once staff have consulted property owners, they will conduct background research and gather the records necessary to develop an appraisal. Once this has taken place, staff will finalize the appraisal and submit it to the ROW Agent Supervisor. At this point, the appraisal goes into review, which entails a fair amount of paperwork and fieldwork to validate the appraisal. Staff will then assemble and finalize the review and incorporate revisions as necessary. After completion, the report will be submitted to the Central Office (CO) Appraisal Branch, and the final appraisal will be summarized prior to being signed by the ROW Supervisor. The CO Appraisal Branch is responsible for approving the appraisal. After approval has been received, it goes to the appropriate district and an acquisition agent

will begin the process of acquiring the parcel. To acquire the parcel, the agent works on plan preparation (coloring) and completes paperwork (including deeds, memoranda of understanding (MOUs), and improvement removal contracts). They will then contact the property owner to set up an appointment to discuss the acquisition. If needed, the property may be condemned.

Once a parcel has been acquired, the agent informs the ROW Supervisor, prepares the acquisition payment packet, and submits the payment packet for signature. They then forward the signed payment packet to the CO for check processing.

The Relocation Branch (hereafter Relocation) prepares relocation status reports and worksheets, which are required of all projects that necessitate relocation. The staff also computes relocation requirements, provides advisory assistance as needed, regularly advises the ROW Supervisor, and provides status updates. Relocation staff will, at this point, ready a relocation packet and submit the payment packet for signatures. Once the ROW Supervisor has signed off on the payment packet, it is forwarded to the CO for check processing. An agent then delivers a check to the property owner and gives them a notice to vacate.

The Relocation/Property Management Branch (hereafter RPM) is tasked with creating a project summary of improvements and establishing salvage values. They request inspections of any retained buildings that may be constructed with asbestos containing materials (ACM). Staff in RPM oversee building remediation and they are responsible for rent collections (if applicable). They also manage the disposal of buildings (including the bid process). Lastly, they will complete a Project Summary of Improvements form, which goes into the project file.

It is possible to outsource ROW services, and the presentation provides an overview of this process. For appraisal outsourcing, a request must be submitted from the ROW Supervisor. This request should describe all of the work that will be needed (e.g., appraisal, appraisal reviews). The project report will be completed by District ROW, which is then submitted to Purchasing prior to the selection of an appraiser. For acquisition and relocation outsourcing, a request must be made to the CO ROW. This document will contain a summary of the type of work needed. Based on this, an RFP will be generated, and the selection

of a contractor generally takes 4–6 months. Upon selection, a Notice to Proceed is issued.

The scope of project requirements receives a lengthy treatment in the presentation. Scoping begins with a project overview, development of plans, and other related project documents. Appraisal's role in the scoping process is to complete sales and submit a formal appraisal. Acquisition staff completes the Project File Folder and assembles a payment summary batch checklist. Staff will also attend to ROW deeds, MOUs, Pro Rata taxes, and the condemnation process. RPM staff first complete work with the owner and tenant occupants. They also issue acquisition stage reports (which are required on all projects), property owner worksheets, relocation packets, relocation status reports, and notify Property Management Agents when a property has been vacated. Administrative staff have responsibility for the following:

• **Submission of Invoices**
• **PDF of the signed TC 61-408 Pay Estimate**
• **PDF of the signed PSC Invoice Form**
• **Consultant Monthly Progress Reports**
• **Scanned copy of the Letter Agreement**
  (applicable only to statewide agreements)
• **For Cost Plus a Fixed Fee Contract, including a breakdown of estimated costs**
• **For Final pay request, including a copy of the last project chronology memo**
(final pay request are to be submitted via hard copy, not electronically)

Staff with a dedicated focus on property management develop project summaries of improvements, including the salvage values, all requirements for retaining improvements, the overseeing of vacant property, and photos of the improvements. If public meetings are required, staff will run them. Furthermore, staff ensure that ROW status remains updated as well as any relocation status reports. The only point of contact is the ROW project manager. Required of all projects, however, are monthly status meetings with the appropriate ROW project staff. To complete the project, an ROW clearance date should be established, distinct from the letting date, which is not applicable to the requirements described here. All completed files should be returned to KYTC within 30 days of project completion if any portion of the ROW process has been outsourced.

The presentation then covers other general principles that project managers should bear in mind about ROW. A number of ROW activities should be initiated or completed during the design phase. Project managers should initiate title work and provide deed sources and Property Value Administration (PVA) tax cards to the ROW staff. Project managers should also involve ROW staff in Preliminary Line and Grade (PLG) planning and JI. This assists in ROW reduction and provides alternatives to acquiring difficult parcels.

The ROW project manager should maintain close ties with all people involved in the project (including Design, Utilities, Design Consultants, Acquisition Consultants, and Legal). It is important to establish clear goals. This includes setting clearance dates and task completion dates (e.g., appraisal, acquisition, relocation). It is also critical to circulate updated status reports among all members of the project team and to other individuals at KYTC who are involved in the project.

The project manager is responsible for submitting ROW plans to the Division of ROW. This includes an electronic, signed copy of the layout sheet, a completed TC 61-12E form, deed descriptions of property acquisitions, and a copy of the environmental checklist (if applicable). District Planning Engineers should be copied on this submission. If revisions are necessary for the ROW, the project manager will send a memo to the CO Division of ROW and Utilities that states the revision number, the location in Projectwise where the changes have been stored (and in PDF format), and ROW summary sheets that will be used in plan sets.

If project managers anticipate ROW condemnation being necessary, they should identify the relevant parcels early on and submit them for condemnation. These will be processed by the CO, which assigns an attorney to guide the process (the next presentation contains detailed information on condemnation proceedings). It is critical to note that letting dates are unimportant for completing the ROW process. What matters is the ROW clearance date and proper planning. The clearance date should be at least 45 days prior to the letting date. The timeline will involve the project manager, location engineer, and CO ROW. Once the ROW has cleared it is certified.

Condemnation Proceedings

This presentation introduces the basics of condemnation proceedings and

the importance they play in project delivery. Eminent domain is based on the Fifth Amendment of the U.S. Constitution. Similar language appears in the Kentucky Constitution (Section 13): "No man's [sic] property shall be taken or applied to public use without the consent of his representatives and without just compensation." The Kentucky Revised Statutes (KRS) define terminology related to eminent domain and acquisition of private property, namely: that any condemned property must be taken for public use. KRS 416.550 stipulates that, "Before initiating a condemnation action, the condemning authority must attempt to acquire the property from the owner through good faith negotiations." Good faith means that an agent of the state cannot present the owner with a take-it-or-leave-it offer. They must give the owner sufficient time to obtain an independent appraisal. However, an inadequate offer does not serve as evidence of the state lacking good faith.

The shift from initial condemnation to Right of Entry (ROE) includes several steps. First, as per KRS 416.570, the Cabinet files a verified petition in the Circuit Court of the county where the property is located. The petition must include the names of all property owners and any other parties that have an interest (e.g., mortgagees, easement holders, tenants, and marital interests). Once the petition has been filed, commissioners are appointed. Commissioners are impartial owners of land in the county, and they must submit their assessment of a property's value within 15 days. The valuation judgment is summarized in a report that the Commissioners issue. Once the Commissioners' report has been completed, summons is issued to all of the interested parties. The summons put all parties on notice of the condemnation and the Commissioners' award. Warning Order Attorneys are appointed for 50+ days, and are asked to report to court. The property owner must provide an answer to the summons within 20 days. If the owners do not answer the summons, the court will enter an interlocutory judgment, which contains: 1) a finding that the petitioners have the right to either condemn the property or use and occupy the property, 2) a finding that the report of the commissioners conforms to the provisions of KRS 416.580, 3) authorization to take possession of the property, and 4) proper provisions for conveying the title to the land and material. If the owner files and answers a pleading that allows the petitioner to condemn the property in question, the court will hear the owners' case to determine whether or not the petitioner has the right to condemn it.

If the court finds that the petitioner does not have these rights, an interlocutory judgment is entered that contains: 1) a finding that the commissioners' reports conforms to the provisions of KRS 416.580, 2) a finding that the petitioner is not legally able to condemn the property, and 3) an order dismissing the petition and directing the petitioner to pay all costs. Within 30 days from the ROE of an interlocutory judgment authorizing the petitioner to take possession of the property, either party may file exceptions with the clerk of the Circuit Court. The statement of exceptions will be tried, and all questions related to the amount of compensation due to the owner will be determined by a jury. Once the trial has concluded, the condemnor may take ownership of the land once he/she pays the amount of money due to the owner. If a trial occurs, to the condemnation process may take up to 18 months to be resolved. Once all claims have been settled, the state will take possession of the property.

Office of Legal Services

The presentation examines the legal issues pertinent to KYTC, including the duties and responsibilities of transportation agencies, definition of terms in tort law and required elements of a tort, and the immunity and liability for KYTC and its employees.

Transportation agencies are legally obligated to ensure that all work is done in accordance with relevant plans and specifications. Among other things, they are responsible for warning the traveling public of defects, obstructions, and unsafe road conditions by placing barriers, warning signs, or other visible devices along roadways.

A tort is a private or civil wrong or injury for which a court will provide a remedy—the form is an action for damages. The doctrine of sovereign immunity bars suits by citizens against the state, and Kentucky law provides limited sovereign immunity for its states and employees. However, this immunity only applies when employees perform tasks that are expected of them. Figure 1 illustrates the process for assessing negligence claims and the criteria used to determine whether or not an employee is eligible for immunity. It is critical that employees do what their job requires of them. To avoid potential legal action, they should place safety first, keep to assigned specifications and standards, and if there is a written policy, they need to follow it (e.g., MUTCD). The presentation closes with a series of multiple choice and true/false questions designed to assess project managers' knowledge of KYTC's legal obligations and the circumstances under which employees may be sued.

Project Risk and Time Management

This presentation delves into the risk and time management aspects of project delivery. Drawing from the Project Management Body of Knowledge, the project management triangle is shown. The idea behind the project management triangle is that any project is performed and delivered under a set of constraints. Most typically, these include time, cost, and scope. These are represented on each side of the triangle. One side of the triangle cannot be altered without influencing the other sides. And when these constraints are modified, they impact the quality of the delivered project. A successful project is one that delivers the project within scope, on time, within budget, and with a quality solution (i.e., deliverables). Ensuring successful project delivery hinges on good time and risk management principles.

Project time management is a component of overall project management in which a timeline is analyzed, developed for the completion of a project or deliverable, and controlled until the project is complete. To manage time adequately, project managers need to define and sequence activities associated with project delivery. This requires collecting project requirements and defining the scope (i.e., a thorough description of a project). Additionally, project managers must estimate activity resources and durations to establish a realistic schedule and to ensure that activity sequences flow smoothly and without interruption. After calculating these estimates, the project manager can move on to developing the schedule, and once work begins, they control it. Project managers are responsible for creating project budgets, developing a work breakdown structure, analyzing the critical path to assess whether a project can be finished in time, and deciding what personnel are needed. Although project managers are responsible for and must understand the entire project, they must have a well-coordinated project team to assist with its delivery. A well-assembled project team is a valuable asset because they help the project manager grasp how the different project components fit together, thus allowing successful delivery. Ultimately, project time management is really about communicating and managing expectations. Indeed, it is up to the project manager to adjust project expectations when necessary. These adjustments may stem from funding, time, or personnel shortages. If the project manager is not convinced there is enough time to deliver the project, they should demonstrate that the critical path makes timely project delivery improbable.

The following table illustrates the importance of time management for project and program delivery:

Figure 3: Project Management Process Workflow

Area	Project Management	Program Management
Focus	Single objective	Business strategy
Scope	Narrow	Wide-ranging, Cross-functional
Deliverables	Few, clearly defined	Many, from many projects contributing to the whole
Timescale	Clearly defined	Loosely defined, continuous
Change	To be avoided	Regarded as inevitable
Success Factors	Time, budget, scope achieved	Mission, cash-flow, ROI
Plan	Specific, detailed, bounded	High-level and evolving

A project manager works vertically, and their primary objective is to get the project to letting as quickly as possible. On the other hand, program managers work to manage the interdependency among projects. Their goal is to deliver the program, which is measured on a set time table. Figure 3 captures the relationship among project management processes, classified into five groups.

It is imperative that project managers conduct ongoing evaluations to assess a project's current status (measuring progress), assess status in relationship to the planned schedule, and if the project has gotten off track, determine how it can get back on track. After this discussion, participants take part in a time management exercise.

Project risk management encompasses the following activities:

• Plan Risk Management
• Identification of Risks
• Qualitative Risk Analysis
• Quantitative Risk Analysis
• Plan Risk Responses
• Controlling Risks

During the early project phases, the project manager should complete a risk management plan. This establishes an agreed-upon foundation to assess risks. There are two methods used to analyze risk – qualitative and quantitative risk assessment. Qualitative risk analysis helps the project manager prioritize for further analysis or action by evaluating and combining the likelihood of particular events occurring and their probable impact. With quantitative risk analysis, the project manager numerically evaluates the identified risks on project objectives. It is up to the project manager to monitor and control project work. This includes: comparing the actual project performance to the planned performance, assessing performance for mitigation measures, identifying new risks (and monitoring for appropriate action), maintaining the project information base, providing forecasts and information to support reporting, and overseeing the implementation of approved changes.

Project managers need to monitor and control outputs as well. Change requests may have a significant impact on project delivery. Requests can potentially expand, adjust, or reduce a project's scope. There are three types of action that can be used to mitigate the effects of change requests. Corrective action is a documented direction that executes project work. Preventative actions are those that reduce the probability of negative consequences associated with the risks. For defect repairs, the project manager can recommend either repairing the defective element or replacing it entirely. Project management plan updates are also useful for monitoring and controlling outputs.

Project managers generate performance reports throughout the course of a project. This includes issuing status reports and making progress measurements and forecasts. Performance reports will evaluate actual data against a baseline scenario to gauge a project's progress and performance as well as to forecast outcomes.

Common questions that are answered on performance reports include:

A particularly useful tool for organizing project schedules and needed work is the Gantt Chart, a means of graphically representing the entire project.

• Are we fulfilling all of the planned tasks?

• Are we measuring performance and variances against the scope, schedule, cost, quality, and risk baselines?

• Are there circumstances which have caused the project's parameters to change?

• Have we set up performance measurement criteria against the Customer's baseline practices?

• Who will be measuring?

      o What's their incentive?
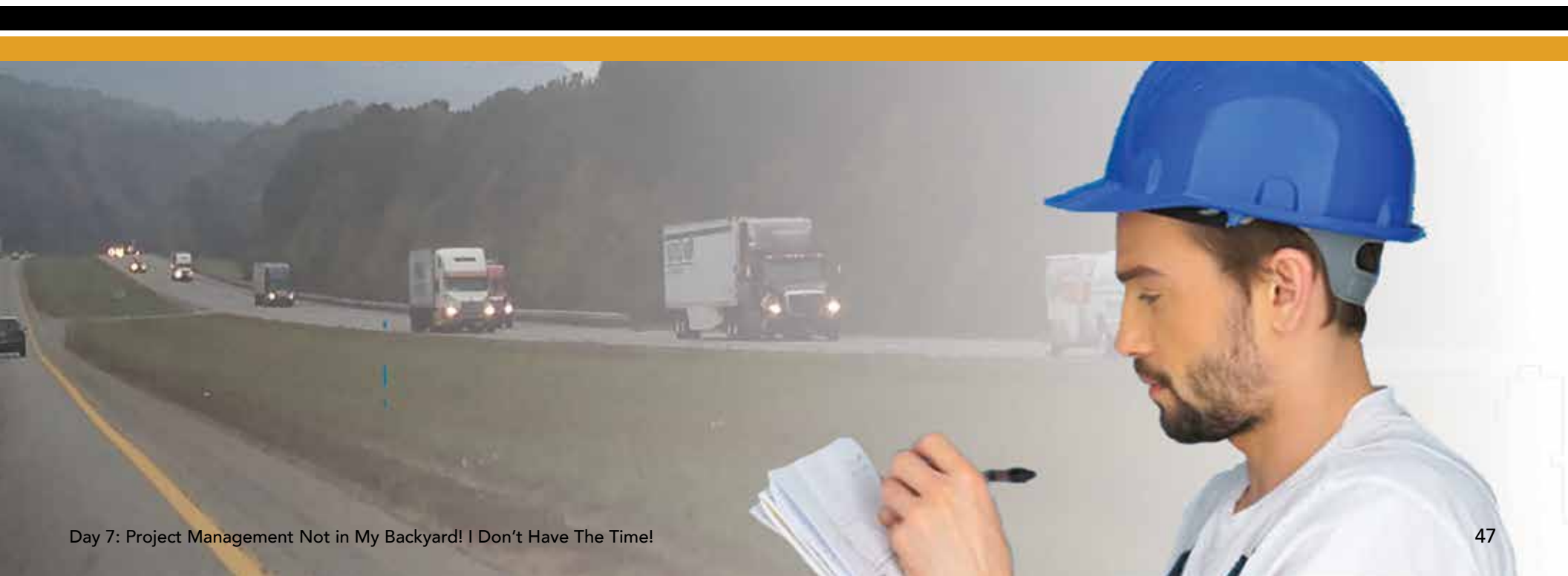
• When is transition complete?

      o Who decides?

Performance measurement entails collecting, analyzing, monitoring, reporting, and managing project costs throughout the construction process. The measures and actions implicated in performance measurement include:

1) Earned value calculation and analysis, which requires the correlation and integration of schedule and cost data;
2) Variance and productivity analysis;
3) Contingency management;
4) Integrated cost/scheduling reporting;
5) Corrective actions; and
6) Decision making.

A particularly useful tool for organizing project schedules and needed work is the Gantt Chart, a means of graphically representing the entire project. A Gantt Chart lists project activities on the y-axis, while a time scale occupies the x-axis. The Gantt Chart depicts the expected duration of each activity and tracks the internal relationships among them.

The presentation closes with a basic recipe for the Critical Path. This begins with development of the work breakdown structure (WBS) that determines how long each activity will take. Project managers need to identify the interdependencies of activities and their logical endpoints (e.g., milestones, deliverables). Slack/Float can be gauged in two ways: Late Finish–Early Finish and Late Start–Early Start. There is no float along the Critical Path. The Critical Path informs project managers of where they do and do not have flexibility. Should a project fall behind, adding resources to activities off the critical path will not get the project on track again. It is possible for Critical Path to change during the project. There a number of ways for a project manager to positively influence the Critical Path: adding resources to critical path activities, starting critical activities earlier, shortening durations, overlapping critical activities where possible, and eliminating activities that do not add value.

Day 8: Timeline for getting a project to letting, Describes the advertising and bidding process for awarding contracts, Reviews lessons learned from the course

Getting It to the Bid

Once all of the tasks described in earlier presentations have been completed, the project manager's final task is to get the project to letting. The Division of Highway Design (DHD) contributes to this by assembling the contract plan set and delivering it to letting. More specifically, the DHD's Plan Processing Branch collects the final project components, reviews whether the project is biddable, and performs the final assembly of all roadway plan projects. The

Plan Processing Branch has developed a timeline that project managers should follow as letting approaches:

If there are any changes made to the plans after the notice has been distributed, this is sent to Construction Procurement as an addendum. Once a project has been awarded, a record set of plans goes back to the DHD and is uploaded to ProjectWise.

Weeks Before Letting	Tasks
15	- Check prints submitted as PDF files - Project manager notifies Plan Processing, uploads files to ProjectWise, and specifies the location of files - Markups of the Check Prints are sent to project managers once Plan Processing has reviewed them
7	- Project manager revises the plans based on the markups and submits the final plans and all documents to the Director of Highway Design and the Branch Manager of Plan Processing - Final plans are rechecked for content and any corrections to PDF bookmarks are made
5	- After final plans have been assembled, Plan Processing sends hard copies of the plans, estimator file, and the completion dates to Construction Procurement
3	- Construction Procurement distributes a Notice to Contractors that states plans are available on the Plan Room website

If there are any changes made to the plans after the notice has been distributed, this is sent to Construction Procurement as an addendum. Once a project has been awarded, a record set of plans goes back to the DHD and is uploaded to ProjectWise.

The Division of Construction Procurement houses three branches: Prequalification and Compliance; Advertising, Proposals, and Awards; and Plans, Specifications, and Estimates (PS&E). Before a project is advertised, PS&E collects plans and special notes before they build the project in WebPrecon. Staff compare quantities against summary sheets. They input bid items and quantities, and then deliver full oversight project plans and specifications to the FHWA. Once the deadline has passed, projects are submitted to the Advertising, Proposals, and Awards Branch. Staff there will prepare and distribute Draft Authority to advertise for review, usually allocating 3 to 4 days for review. After this has been completed, the Final Authority to Advertise is put together and forwarded to the State Highway Engineer for their approval. Also prior to the advertisement of federal projects, field estimates go to the Disadvantaged Business Enterprise (DBE) committee. The committee reviews estimates for DBE work items and recommends a DBE goal. The State Highway Engineer will then review and approve those goals. Turnaround time for this activity is, on average, one week. Further, wage rate determinations should be completed so that wage rates can be added to the proposal, along with any special provisions. All proposals are created in the eProposal Generator and checked for any errors. From here, electronic bid files are generated.

On Advertisement Day, the Cabinet posts an advertisement in the newspaper in addition to publishing all relevant documents to its website. These documents include:

– Notice to Contractor
– Qualifications for Bidder
– Bid Item Quantity Index
– Material Listing
– Bidder Registration Form
– Proposals

All electronic bid files are uploaded to BidExpress. Once the advertisement has gone out (during the Advertisement Period) any questions that are submitted will go directly to the project manager. However, if questions are received prior to letting, they must go to Construction Procurement. The project team will answer the question and then post an answer online so that all bidders have access. Under no circumstance should the project engineer respond directly to a contractor's questions. If addenda are needed, the person who uploaded the project to WebPrecon should provide this. Construction Procurement develops the "Engineer's Estimate" to establish the fair and reasonable costs for constructing a project — including profit and overhead. For large firms, a cost-based estimate is used (this includes labor, equipment, and materials). Conversely, for smaller firms, a historical-based estimate is developed. This estimate is only for evaluating a contractor's bid and should remain confidential before a project goes to letting. The amount of time between the letting and the award is typically 12 days. A contractor or project manager may, however, request an expedited award. Although Specifications grant up to 60 days for an award, it is very rare to wait this long. Pre-bid meetings can be held at the discretion of the project manager or designer. Most often, these meetings are forums in which the details of complex projects are clarified. If a meeting does occur, attendees are required to sign in and Construction Procurement posts the meeting's minutes on the Cabinet's website. These meetings offer a good opportunity to learn about a project's background, for staff to ask their own questions, and to hear from interested contractors.

Special thanks to the PM Bootcamp Committee members:
Jeff Jasper, Darrin Eldridge, Sarah McCormack, Bill Gulick , Joette Fields, Paul Looney, James Ballinger, Gary Valentine, & Doug Kreis (see image to the right)

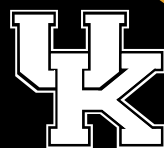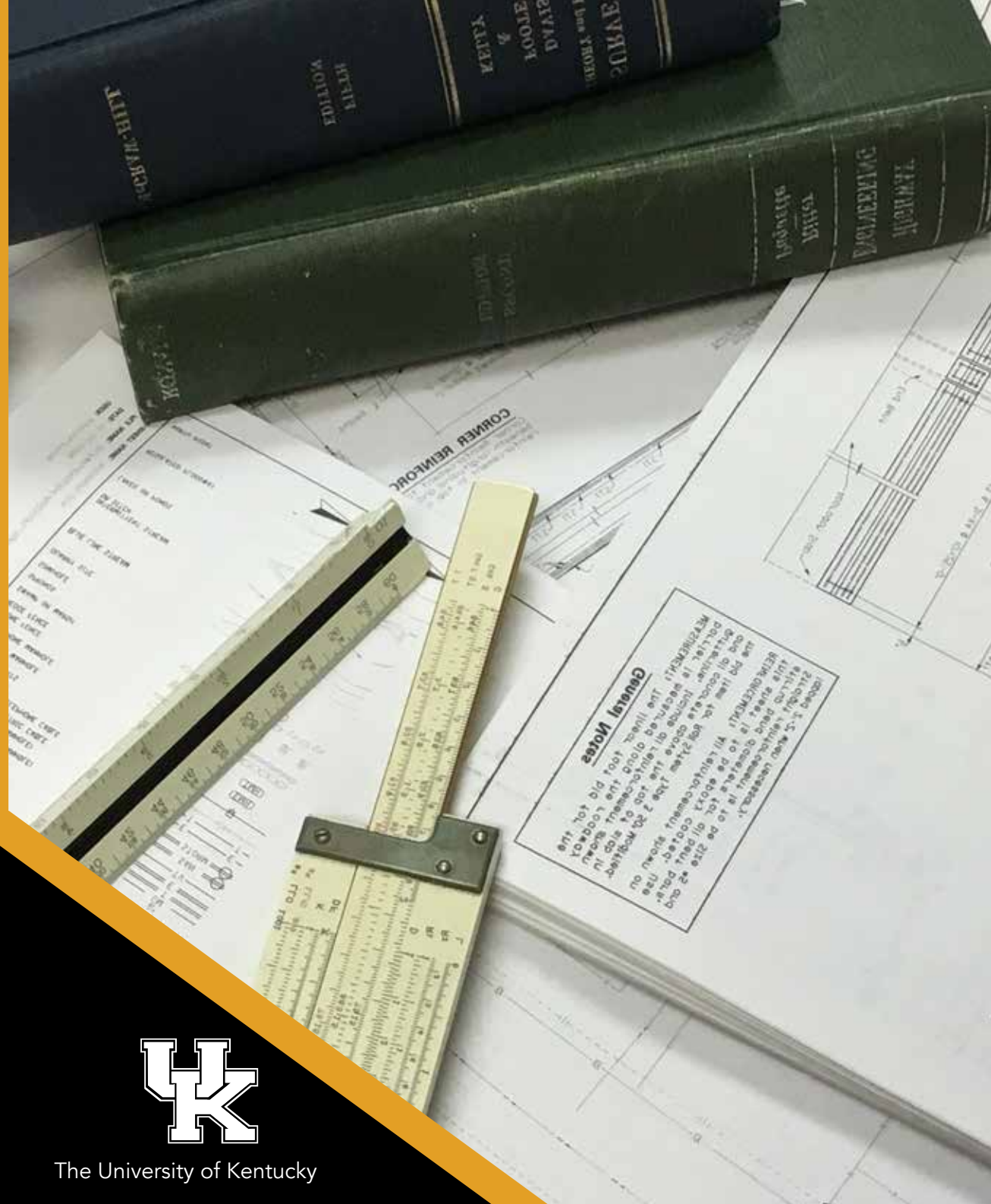www.uky.edu   www.ktc.uky.edu   www.transportation.ky.gov

For more information about PM
Bootcamp or other projects by KTC
Please contact
Doug Kreis, PhD, PE, MBA, PMP
Associate Director
176 Raymond Building,
University of Kentucky
Lexington, KY 40506-0281
(P) 859.257.6898
(E) doug.kreis@uky.edu

The University of Kentucky