

Kansas RTAP
Construction Project
Management Guidebook
for Small Transit
Agencies



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INTRODUCTION

Facility construction for Kansas rural transit agencies increased over the last five years due to available funding through KDOT's Access, Innovation and Collaboration program (AIC). With limited staff to conduct the work needed to plan for and construct a new transit facility, it is necessary for small and rural transit agencies in Kansas to seek out consultants to assist with project development and management of new construction projects. This guidebook's goal is to provide an overview of the process and requirements for undertaking federal construction projects for the first time or with minimal prior experience. Although, available KDOT funding for facility construction may be limited at times, this guidebook still serves as a useful resource so that agencies can be prepared to take advantage of funding opportunities when they arise.

This guidebook provides general guidance on construction project management including project initiation, planning, environmental compliance, real estate acquisition, design, construction, commissioning, and closeout. The guide addresses project-wide functions that take place during the project life cycle and some important considerations for project management. Additionally, the guide highlights some of the project management approaches and lessons learned from peer-transit agencies in Kansas. This guidebook is a companion to the checklist (located in Checklists) provided by the Kansas Department of Transportation used to document the facility development process.

The introduction defines the need and purpose of the guidebook. Chapter 2 discusses the project and its components. Chapters 3-6 cover the phases of a project in sequential order starting from project initiation, planning, environmental clearance, real estate acquisition, design, construction, commissioning, and closeout. Chapter 7 consists of suggestions shared by professionals who have experience with the federal construction process. Each chapter outlines goals and contains a list of important tasks to complete. The essential elements regarding project management are covered in detail and are accompanied by graphics and diagrams in the subsections within a chapter.

This guidebook's contents reiterate and provide guidance on federal circulars related to transit facility construction. The guidance will be provided both verbatim and paraphrased. When the guidance is provided verbatim, it will be quoted and will include a citation. This guidebook could not have been developed without the assistance of Kansas Department of Transportation (KDOT) staff and agency partners. Special thanks to those who provided interviews.

- Anne Smith, Executive Director, Flint Hills Area Transportation Agency, Manhattan, KS;
- Patrick Wallerius, VP/CFO, OCCK, Salina, KS;
- Kara Reynolds, Magistrate Judge, Coffey County, KS (former Director of Coffey County Transportation);
- Sarah Frost, Assistant Vice President, TranSystems, Kansas City, MO; and
- Dr. Brian Lines, Associate Professor at University of Kansas, Lawrence, KS.

PROJECT & ITS COMPONENTS

This chapter introduces the project and necessary components such as project manager, scope, schedule, budget, lifecycle, and other elements that can assist the agency in understanding the construction process of a transit facility. This includes new building facilities, expansion, and renovation of an existing transit facility.

What is a Project?

A *project* is a collection of related tasks that are bound by a clear scope, spending limit, and delivery date to produce the capital assets needed to satisfy an agency's strategic objectives. The initial step for an agency in starting a facility project is to define the project, including the scope, life cycle and phases. It is important to contact KDOT early in the process so they can assist with securing funding for the project and provide ongoing support.

According to the [FTA Circular 5100.1](#), “the FTA typically funds the construction of two types of facilities:

- “...facilities that support transit operations, like administrative and maintenance buildings; and
- facilities that provide passenger amenities and extend into the built environment, like bus or rail terminals, stations, shelters, park-and-ride lots, and intermodal facilities that combine transit and intercity bus or rail services.”²

To know more about FTA Regional Offices, visit [Regional Offices | FTA \(dot.gov\)](#).

Funding and Local Match

Most US Department of Transportation grant programs require cost share with the local agency. This cost share, called “local share” or “local match” requires the applicant to have identified funding to cover a percentage of the project costs. “The federal share is 80 percent for capital projects, 50 percent for operating assistance, and 80 percent for Americans with Disabilities Act (ADA) non-fixed route paratransit service. Section 5311 funds are available to the States during the fiscal year of apportionment plus two additional years (total of three years). Funds are apportioned to States based on a formula that includes land area, population, revenue vehicle miles, and low-income individuals in rural areas.”¹⁴

What is a Project Manager?

A *project manager* (PM) with the necessary expertise is critical to keeping the project on schedule. Without a project manager, an agency will have to deal with each individual participating in the project, such as architects, engineers, contractors, and other parties. Hiring a PM can be more efficient for the entire project's progress. Figures 1 and 2 show how the project development process differs if a PM is used.

“Having the architect be a project manager was helpful in task delegation for someone with the correct expertise. I don't have that expertise and don't have it in house.”
 - Anne Smith, Executive Director, Flint Hills Area Transportation Agency, Manhattan, Kansas

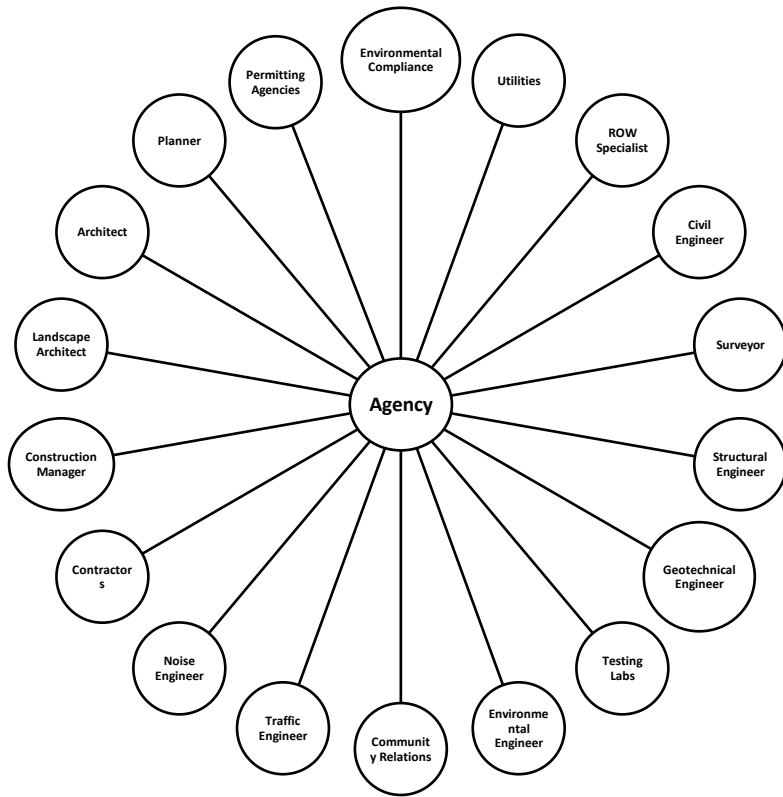


Figure 1: Project without Project Manager

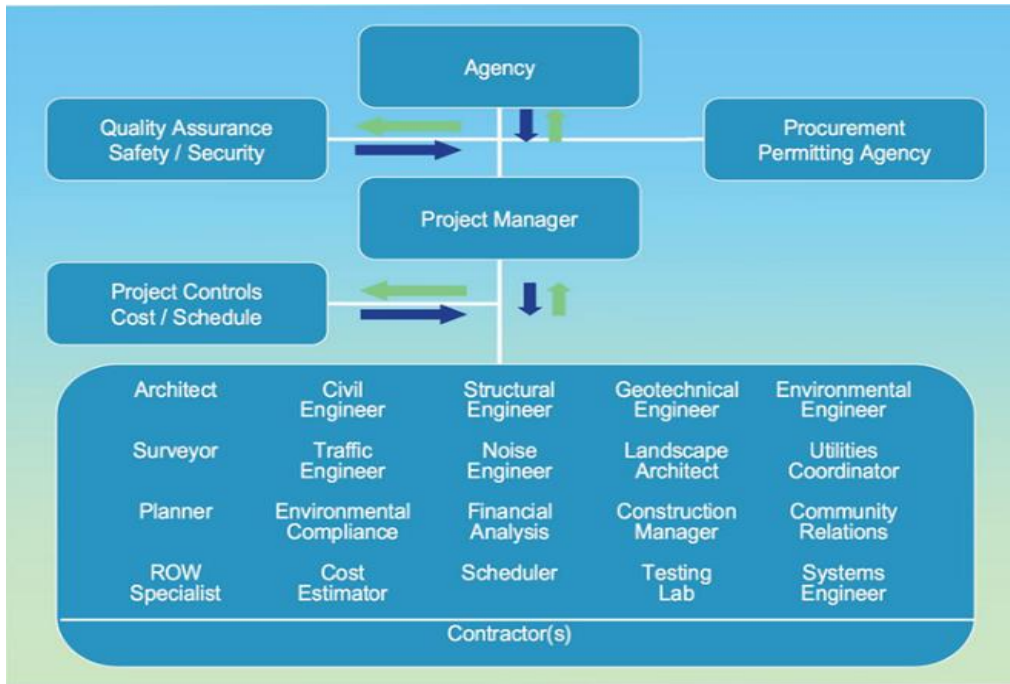


Figure 2: Project with Project Manager

What is a Project Scope?

A *project scope* is a written document or plan that considers the specific project goals, project operations, service quality, and regulatory requirements such as the National Environmental Policy Act (NEPA), Americans with Disabilities Act (ADA) and Buy America Act. To properly budget and resource the project, the agency must have a project scope.

What is a Project Schedule?

A *Project Schedule* helps to provide the start and the end date for a project. Having a well-defined project schedule consisting of the tasks to complete, deliverables, and budgeting should be created to make a logical connection between activities and determining a “critical path.”

To stay on top of schedule and budget, Patrick Wallerius, Vice President and Chief Financial Officer for OCCK, Inc, Salina, Kansas, advises teams to have weekly or biweekly construction meetings with general contractor representatives and job superintendents. He also recommends finding issues that need to be addressed.

Kara Reynolds (Former Executive Director, Coffey County Public Transportation, Burlington, Kansas) emphasizes that an applicant is "not going to apply today and have this built in 12 months. It's going to take a period of time."

What is Project Life Cycle?

A project schedule helps organize the planning process for a project's development. However, it is important to consider the costs to operate and maintain the project for the entire *life cycle*. The life cycle of a project starts when the project is permitted to be implemented. The scope and costs will gain more clarity as the project progresses. Project life cycle phases for a typical construction project are initiation, planning, design, construction, commissioning, and closeout. Each of these phases are explained in detail in the upcoming chapters.

What is a Project Budget?

Every project should have a budget to efficiently utilize the funds. An initial project budget is developed when applying for federal assistance for the project. At

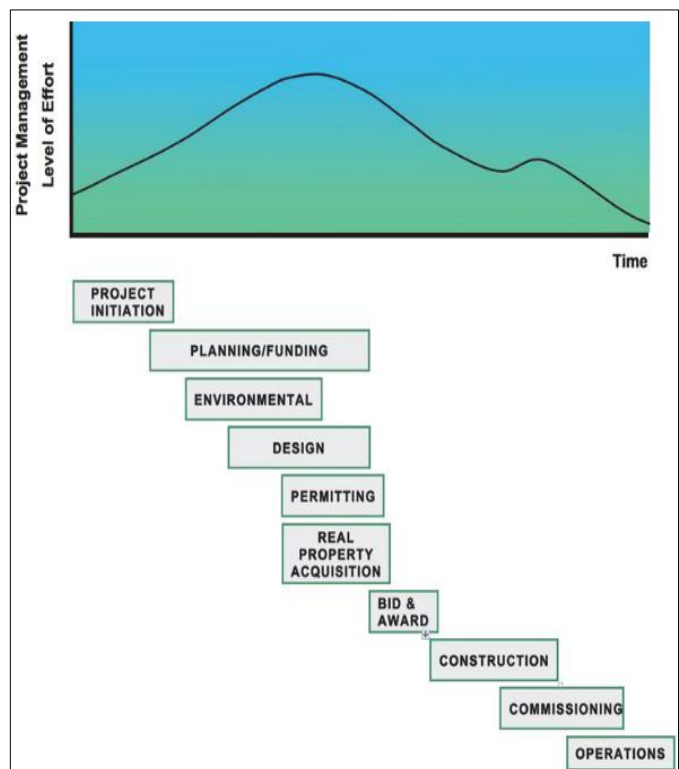


Figure 3: Typical Project Life Cycle – Traditional Design/Bid/Build³

every phase of the project, the project manager develops a budget based on the cost estimates and updates it regularly. The budget should only be fixed after the completion of environmental evaluation, design to establish the scope, cost, scheduling, third party and relocation effects.³

“It's nice to have a PM on a project that is in regular contact with every sub[contractor] to get you the lowest price and track the estimation at each phase.” – Anne Smith

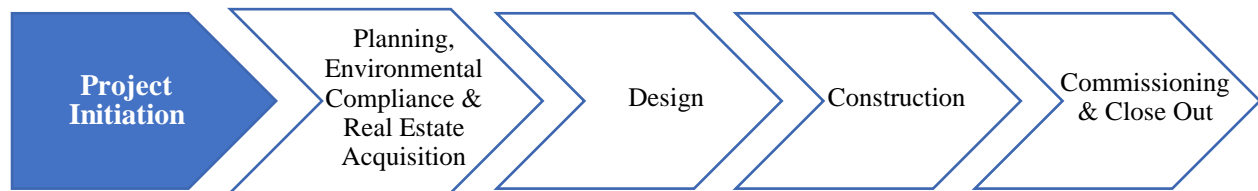
What are the Objectives of Project Management?

The *Objectives of Project Management* provide deliverables that stay within the scope, budget, and schedule. These are also at acceptable levels of risks, quality, safety, and life cycle costs. The biggest risk to a project's success is scope creep. When stakeholders increase the number of deliverables or delay deadlines, scope creep occurs. The project timetable may be extended, and team morale may suffer. However, scope creep can be avoided by rescoping the project, trying a change control process, deprioritizing another deliverable or using a resource management plan.⁴

What is a Project Management Plan?

The project manager should have a *Project Management Plan* (PMP) which includes, but is not limited to, sub plans, project definitions (Chapter 3), cost estimates, schedules, third party agreements and rights-of-way, geotechnical reports, project delivery methods, Value Engineering reports (Chapter 5), safety analyses (Chapter 6), accessibility, and constructability review report.³

PROJECT INITIATION



This chapter provides an overview of the first phase, project initiation, in which agencies plan how to implement the approved/authorized project. The Project Requirements Definition (PRD) is used to define what the project will provide and document the outcome. Following that, the agency investigates how to manage and carry out the project's activities, selects the project delivery method, evaluates the type and number of resources required, and describes these in the Project Management Plan (PMP). The two important documents in this phase are:

- PRD: This includes documenting the goals and deliverables of the project.
- PMP: This includes documenting the procedure for managing and carrying out work and the resources needed to implement the project, baseline for scope, schedule, cost, quality, and risk associated with the project.

It is critical to find a professional and experienced Project Management Consultant (PMC), or Project Manager, to carry out the management. A PMC advises on project planning and delivery through the evaluation of PRD, PMP and other documentation, and assists in the management of services during the implementation phase.

Defining the Project

A PMC will improve and detail the services/deliverables, write the statement (or scope) of work (SOW), and review the infrastructure management plan during this phase. A well-structured PRD contributes to the project's framework and defines a logical approach. For the agency and the project manager to have a mutual understanding, the agency executive must embrace the PRD.⁵

Planning the Project

- Capability and Capacity Assessment: Capability can be defined as the quality of skills, expertise, and ability to do tasks, whereas capacity is the number of resources required to meet project objectives. To determine the necessary resources, the project manager must gather information about who has experience and/or has completed comparable types of projects. The capability and capacity of the project is subject to review by the FTA.
- Project Delivery Strategy: Agencies must develop a project delivery strategy to determine how much work they can undertake on their own and how much needs to be given to an outside organization to perform. This is followed by a risk assessment for all project work.

- *Project Organization and Management Structure:* For smaller projects, matrix organizations are needed. Staff along the project chain of command report to the project manager to obtain direct assignments. They should also report technical performance to the functional supervisor.
- “[For facility projects] an option is to have a building committee and make decisions through them. I used an ad hoc committee, but it included board members,” Anne Smith suggests.
- *Project Management Plan:* The project size, complexity and phases are considered when planning or adjusting the PMP. The PMP consists of the management approach based on project delivery strategy, management and financial authority, organization structure, and assignments delegated to agency/contractors. After the PMP is documented, the project scope, budget, and schedule are enhanced to create baselines for SOW’s costs and schedule. These baselines may be phase baselines or project baselines depending on sufficient engineering. A baseline will only change if there is a revision to project goals and/or objectives by the agency’s management.
 - *Supporting Management Plans:* These are added to the project depending on their size and complexity:
 - Construction Management Plan (CMP);
 - Construction Quality Plan (CQP);
 - Operations and Maintenance Plan (OMP); and
 - Safety and Security Management Plan (SSMP).

“The number one thing that leads to a good project is a good team. That’s the only thing that really, truly matters. It all comes down to the individual people leading the team. I think [it can be easy to] take the eye off the ball to get through those administrative steps, rather than seeing that step as the first piece of effective project management and control. They see it as a burden that they must jump through, and it is usually the biggest fallacy that I encounter in the industry.” – Dr. Brian Lines, Associate Professor, Construction Management, University of Kansas Department of Civil, Environmental and Architectural Engineering, Lawrence, Kansas.

Contract Management Planning

A contract management plan is a working document that summarizes the practical elements required to manage your agreements properly, such as objectives, milestones, and key contacts. Contract management plans include the specifics needed to efficiently implement and deliver the contract. This aids performance tracking to ensure advantages are obtained, expectations are clearly communicated (without legal jargon), continuity is ensured in the case of personnel changes, and organization is maintained.

- *Procurement of Professional Services Contracts by Competitive Proposal/Request for Proposals (RFP):* Typically, the competitive proposal method of procurement involves more than one offerer (for instance, a design consultant and a design manager). This is used when conditions are not appropriate for the use of sealed bids, which are solely based on the price of the work.

- Procurement of Architectural and Engineering Services (A&E): Qualifications based Procurement Method: One must use competitive bid procedures based on the Brooks Act as defined in 40 USC Section 541 when contracting for A&E services. Price is excluded as an evaluation factor, and negotiations are conducted with the most qualified firm only.

“In small cities, your housing authority or CDBG (Community Development Block Grant) office can offer local experience on architects and constructors that are familiar with federal aid projects.” Kara Reynolds explains that she “didn't feel like it was hard to find potential contractors, but because [she] had assistance from the housing authority.”

“Having knowledge of construction and bidding processes, made the process a lot easier, but [I] thought that getting the request for [the] proposal out to the architects was probably the hardest part.” – Patrick Wallerius

Procurement of Construction Contracts by Sealed Bids/Invitation to Bid (IFB): Bids are publicly solicited, and a firm-fixed price contract is awarded to the responsible bidder whose bid, conforming to all the material terms and conditions of the bids, is the lowest in price.

- Procurement Process: There are several steps involved in the construction procurement process. The critical steps in the procedure are listed below:
 - a. Prepare notice: Accurately describe the project's needs. The notice must also include all materials provided to potential bidders for the purpose of bidding (whether physically attached or incorporated by reference);
 - b. Publicize notice: Prospective bidders must receive the notice, which must also be made publicly known. It is crucial that bidders have enough time after the notice has been published and distributed to prepare and submit their offers before the time and date established for the opening of bids;
 - c. Received bids: By the time and location specified in the invitation, bidders must submit their sealed bids to the agency. At the time and location specified in the invitation, bids are publicly opened;
 - d. Award contract: Bidders shall deliver their sealed bids to the address by the time mentioned in the invitation. Bids are publicly opened at the time and place indicated in the invitation

Contract Provisions

The agency and the contracting officer should know of local, state, and federal labor laws (such as the Davis-Bacon Act), if construction is involved, when creating the solicitation document and contract for purchases of equipment and supplies. Furthermore, the contract officer needs to properly coordinate the insurance clauses with their insurance department or legal experts.

Buy America

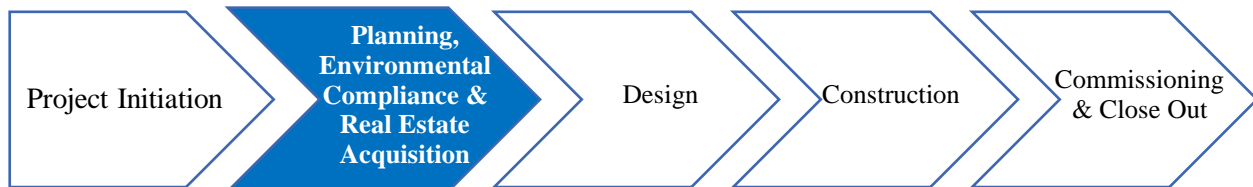
Grant applicants and subrecipients are required by 49 U.S.C. 5307(d)(1)(E) to certify that, while conducting a procurement, they would adhere to all applicable Buy America regulations. These laws are outlined in 49 U.S.C. 5323(j). All third-party purchases supported by FTA are subject to the Buy America standards. The government "Buy America" regulations, which are published in the government Acquisition Regulation at 48 CFR 25.1 and 25.2, which relate to direct federal procurements, are distinct from these standards, which are published at 49 CFR part 661. To guarantee compliance with the requirements in effect at the time the recipient would conduct the purchase, FTA strongly advises the recipient to check the Buy America regulations before conducting any procurement. The FTA Buy America website (<http://www.fta.dot.gov/buyamerica>) has more information.²

ADA: Recipients are responsible for ensuring that transit facilities correspond to the criteria and guidelines for accessibility set out in 49 CFR sections 37, 38, and 39, as applicable. Where any variation from the stated standards is planned, as permitted under 36 CFR part 1191, the recipient must seek a determination of equal facilitation from the FTA administrator under procedures set forth in section 37.9(d).

DBE Requirements: A disadvantaged business enterprise, or DBE, is a for-profit small business concern that is at least 51 percent owned by one or more people who are both socially and economically disadvantaged, or, in the case of a corporation, 51 percent of its stock is owned by one or more of these people. One or more of the socially and economically disadvantaged people who own the business also control its management and day-to-day operations.

Anne Smith reflects on when she created “a DBE policy [for her team] that was unnecessarily onerous and had some conversation with [their] triennial reviewer.” After talking with reviewer and getting feedback, Smith advises “to have an expert to be able to talk through those things.”

PLANNING, ENVIRONMENTAL COMPLIANCE AND REAL ESTATE ACQUISITION



This chapter provides information on how to take the project through the planning and environmental compliance process. This chapter also includes steps to be taken into consideration for real estate acquisition. This is a crucial stage in the project; if it is not performed well, it could have a significant impact on the cost and schedule of design, construction, or operations.

Planning Phase

Every project or set of initiatives must have a planning foundation. In consideration of this, FTA mandates that grant applicants submitted via the FTA electronic award management system (a process that is conducted on behalf of the agency by KDOT) to contain the plan reasoning. Section 5339 Bus and Bus Facilities Program does not consider planning charges to be eligible costs; however, spending related to environmental compliance, such as engineering and design, are considered eligible capital expenses. The projects which are federally funded must be on a Metropolitan Planning Organization's (MPO) Transportation Improvement Plan (TIP) (if the project is within a metropolitan area) and the State Transportation Improvement plan (STIP).²

- *Role of the Agency:* The agency is to ensure the project lead has appropriate qualifications, responsibility, authority, and available time. This lead may or may not be the project manager or consultant. The agency must ensure that the lead will work closely with other organizations such as service planning, operations, maintenance, and procurement. They must be adept at the project development process including anticipating issues, developing plans, collaborating with stakeholders, bringing necessary resources to advance the project, and meeting budget, schedule, quality, and safety requirements.
- *Role of Consultants/Contractors:* The planning phase is conducted by project management; however, planning studies generally include the use of consultants. The consultant team should have skills in compliance with the National Environmental Policy Act (NEPA), transportation planning, engineering, architecture, and community outreach. The planning consultant team should consist of design experts for the preliminary engineering phase. The environmental team should be a separate company from the engineering team to avoid conflict of interest

between identifying and analyzing the impacts. The engineering team must not provide engineering services for the same project that it designs the scope for unless a new selection process occurs. For projects currently funded through the KDOT AIC Program, the environmental and planning efforts are conducted by KDOT's AIC consultant support.³

- Planning Studies
 - a. Functional Studies: These types of studies are developed to define and document the user requirements without considering site limitations or opportunities. For example, for a bus stop the considerations would be loading capacity, type of shelter, shelter features, ADA accessibility, lighting, advertising, and signage. Also, in the case of sustainable design, considering the impact on the environment and operating costs is needed. The project manager should communicate with internal and external stakeholders and collaborate with the agency's short and long-term plans. After the user requirements have been identified, the report can be adopted through the agency's general process.
 - b. Site Selection: The project manager will develop and lead a team to identify a general area where the facility may be constructed. The team should consider multiple alternative sites within that area to determine the preferred sites for further study.

They should consider:

 - Multiple sites to analyze natural features and site conditions; and
 - Potential impacts to environment, cultural and archaeological features, real estate acquisition (cost and time), and estimated costs for relocation.
 - c. Technical Studies: This is a more in-depth study of alternative sites including geotechnical investigation, soil and water testing for contaminated material, traffic studies, zoning studies, identification of wetlands and other natural features, and other technical assessments.
- Utilities and Third-party Coordination: The project manager plays a key role in communicating and negotiating with the utilities and impacted third parties. Getting an early start with utilities and impacted third parties helps to keep the project on schedule and budget. Utility companies can provide information about existing and newly proposed utilities for the project. After the letters of intent are signed, third party agreements are executed between the agency and impacted third parties.

Environmental Compliance

The environmental screening process requires agencies to consider the full benefits and impacts of the development of a federally funded project. Every project's possible environmental effect must be considered by the agency before receiving federal funding. Environmental reviews and permit authorizations help agencies to make funding decisions for new projects with confidence and to safeguard communities from detrimental impacts.^{3,6,7}

The environmental screening process is an important step that **must be undertaken before property can be acquired and design can begin**. This process is complex but is scaled to the size of the project and to its potential impacts. While the process can take a bit of time, it helps transit agencies to make good decisions about their facility development. Anne Smith from Flint Hills

ATA agreed, saying, “The environmental screening is very important as it helped us understand potential environmental problems with the project site which can be mitigated.”

The National Environmental Policy Act (NEPA) (42 U.S.C. 4321) and other relevant federal environmental legislation, such as the National Historic Preservation Act, regulations, and executive orders, are used to guide environmental studies. Depending on the type of project and how it could affect people and the environment, different resources will be needed to accomplish this process (time, documentation, consulting service, for example). To scale the level of study needed with the potential impacts, there are the following levels of environmental screening:

- a. Categorical Exclusion (CE): Projects identified as CEs are those that, based on a preliminary screening, do not appear to result in significant environmental impacts. A CE is excluded from the requirement to develop lengthy screening processes. The amount of analysis and documentation required for a CE is limited. A Documented Categorical Exclusion (DCE) is for projects slightly greater in scope than those qualifying as a CE and requiring more documentation. Most rural transit facilities are categorical exclusions because in most cases there are not any environmental issues with the site. An example of a project that may be categorically excluded from further environmental review is the construction of new bus storage and maintenance facilities in areas that are primarily used for industrial or transportation purposes, provided that such construction is in accordance with existing zoning and situated on or near a street with sufficient capacity to accommodate anticipated bus and support vehicle traffic.
- b. Environmental Assessment (EA) & Environmental Impact Statement (EIS): Projects that are complex in scope and/or are viewed as controversial by the public may require the preparation of an EA. This level of environmental review provides the public an opportunity to comment and will determine whether the project will result in any significant impacts. If the analysis in an EA concludes that the project will result in significant impacts, or if from the early planning stages, it is determined the size and scope of the project will result in significant impacts, an EIS may be required. Most grantees typically need to enlist consultant services when preparing an EA or EIS. The FTA may issue a Record of Decision (ROD) detailing the work completed, decisions made, and mitigation commitments to be honoured during the final design and construction after the distribution and approval of a Draft Environmental Impact Statement (DEIS) and Final Environmental Impact Statement (FEIS).

Figure 4 provides an overview of the environmental screening process depending on the level of study.

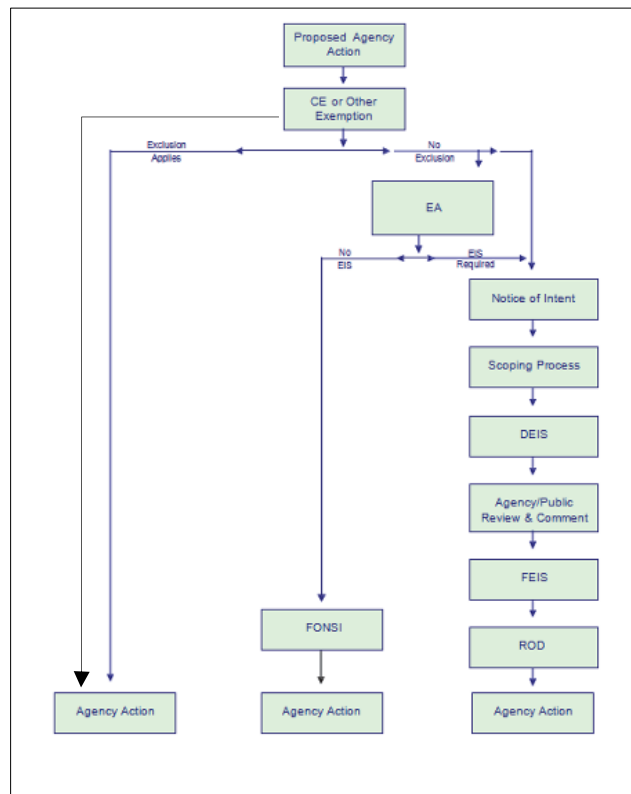


Figure 4: Overview of NEPA Process (full size)³

Roles of the Different Partners in the Process: There are many parties included in the NEPA process for rural transit agencies in Kansas, as shown below.

Federal Transit Administration

- Allocate funding for the project
- Review and approve the level of environmental screen and the final screening document
- Provide oversight over the procurement and construction process

Kansas Department of Transportation

- May allocate funding to local agencies
- Coordinate with Federal Transit Administration as Designated Recipient if FTA funds are awarded

Other Federal & State Agencies

- Provide review and approval of specific study areas of the NEPA process based on their purview (for example, the Corps of Engineers is charged with the review of waterways)

Local Transit Agency

- Apply to KDOT or to other appropriate agency for funding for a transit facility
- Identify the source of local match
- Manage the procurement of design and construction services with support from KDOT (or their contractor)
- Manage the development of the environmental screening document with support from KDOT (or their contractor)

Figure 5: Parties Incorporated into the NEPA Process

Typical Environmental Study Review Areas: The following things are to be completed when performing an environmental study, with the scale of analysis being based on the type of environmental study being conducted (CE, EA, or EIS):

- Land Use and Zoning:
 - Describe the property's zoning and how it aligns with the intended usage.
 - Include a zoning map of the project's location and the neighborhood. It is possible to receive land use plans and zoning maps from the tax assessor, a city, a county, or a metropolitan planning organization.
 - Include a land use map of the project area that shows how the land and water are used.
- Land Acquisitions and Displacements:
 - Describe land purchases and the relocation of buildings used for homes and businesses.
 - Include the property's ownership, date, kind of sale, and present use (such as lease or purchase).

- The Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970 must be adhered to and supported by documentation if FTA funding is used to purchase property or if the property serves as a local match. **Prior to the FTA's approval of a NEPA evaluation, no offers (with intent to sell or donate) or appraisals may be made.**
- Socioeconomics, Community Disruption and Environmental Justice:
 - Describe the impacted community's socioeconomic status.
 - Describe the effects the proposed project will have on the neighborhood.
 - Determine any local resources that would be impacted, along with the type and size of the impact.
- Carbon Monoxide (CO) Hot Spots:
 - If there are serious traffic impacts at any affected intersection or area where buses congregate and if the area is in an air quality non-attainment area for CO, the study must demonstrate that CO hot spots will not be created because of the project.
- Noise and Vibration:
 - Determine the source of noise created through the construction or operation of the facility.
 - Determine the impact of noise created through the construction or operation of the facility.
- Water Quality and Wetlands:
 - If relevant, prove there are no wetlands or that the proposed project will not impact any wetland areas.
 - Describe the project's possible effects if any wetlands are involved.
 - Due to ground disturbance or point sources that would discharge pollutants into US waterways, determine whether National Pollutant Discharge Elimination System (NPDES) permits are necessary.
 - Map out any potential wetlands and boundaries.
 - Describe how the project will affect nearby and on-site wetlands.
 - If the project has an impact on wetlands, you must provide proof of the U.S. Army Corps of Engineers' consultations, permits, and mitigation and minimizing efforts.
- Floodplains:
 - Analyze the project's proximity to a 100-year floodplain using Flood Insurance Rate Maps.
- Ecologically Sensitive Areas and Endangered Species:
 - Describe any natural habitats (such as forests, prairies, marshes, rivers, lakes, and streams) that exist on or close to the project area, including any designated wildlife or waterfowl refuges.
 - If applicable, mention the outcomes of any discussions you may have had with the state department of natural resources and the U.S. Fish and Wildlife Service regarding potential impacts to important ecosystems and threatened or endangered plants and animals.

- Traffic and Parking:
 - Describe any potential traffic effects, such as temporary disruptions during construction or demolition, as well as whether the existing roads have enough room to accommodate the additional volume of buses and other vehicles expected as a result of the proposed project.
- Historic Properties:
 - Describe any historical, archaeological, or cultural resources that are near the proposed project and how the project will affect them.
- Public Parklands and Recreation Areas:
 - On a project location map, mark parks, recreational spaces, wildlife refuges, and/or trails (Section 4(f) resources).
 - Describe how the project will impact the actions and goals of these resources.
- Hazardous Materials:
 - Describe if the property has been assessed for contaminated soil and groundwater and what measures will be implemented to protect humans and the environment, in the project area, from contamination that may be present during project construction and operation.
- Safety and Security:
 - Describe the steps that would need to be performed to ensure the project's continued safe and secure functioning.
- Environmental Justice (EJ):
 - Public involvement should include strategies for engaging EJ populations in meaningful participation.
 - Analyze impacts to EJ populations to determine if impacts are disproportionate.

Section 4(f) of the U.S. Department of Transportation Act of 1966: According to this section, federally sponsored or approved planned activity may not be approved if it includes the proposed use of land from any publicly owned public park, recreation area, wildlife and/or waterfowl refuge, or any significant historic site unless:³

- The FTA decides that using the land from the property is the only practical and sensible alternative, and the action includes all preparation to minimize damage to the property resulting from such use.
- The FTA concludes that the use of the Section 4(f) properties would have a minimum impact on the property, including any efforts to minimize harm (such as avoidance, reduction, mitigation, or enhancing measures) committed to by the applicant.

Compliance Process: For projects that can have an impact on Section 4(f) lands, the compliance process normally consists of three steps:

1. Determining Significance
2. Developing Alternatives
3. Evaluation

The National Historic Preservation Act of 1966: The National Historic Preservation Act was passed by Congress in 1966, requiring federal decision-makers to consider historic properties when planning projects. Federal agencies must consider how their actions would affect historic assets under Section 106 of the National Historic Preservation Act.

A manual for integrating procedures to comply with Section 106 of the National Historic Preservation Act and NEPA has been created by the Council on Environmental Quality (CEQ). The following ideas include the integration of Section 106 of the National Historic Preservation Act with:³

- Begin integration of NEPA and Section 106 processes. The earlier it begins, the better it works.
- Educate stakeholders on the benefits of integrating, through coordination or substitution, the NEPA and Section 106 processes.
- Develop comprehensive planning schedules and tracking mechanisms for the NEPA and Section 106 processes to keep them synchronized.
- Develop communication plans that meet agency outreach and consultation requirements. This is done to maximize opportunities for the public and consulting party, and to minimize duplication of effort by agency staff. Plans should specify whether the agency will use coordination or substitution.
- Use NEPA documents to facilitate Section 106 consultation and use Section 106 to inform the development and selection of alternatives in NEPA documents.
- Develop an integrated strategy to accomplish specialized studies to provide information and analysis needed under NEPA and Section 106.
- Complete Section 106 and the appropriate NEPA review (CE, EA, or EIS) before issuing a final agency decision, (before a local transit agency gives its decision)

Real Estate Acquisition and Relocation

The Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970 (Uniform Act), as amended (42 U.S.C. 61), requires assurances from grant applicants that they will comply with the act, DOT implementing regulations (49 CFR part 24), and FTA Circular 5010.1 if they plan to use federal funding for a project that considers for the purchase of real property.⁸

The regulations are DOT-wide rules that apply to all federally funded projects that entail the purchase of real estate or the relocation of individuals. To promote consistency in the handling of property owners and displaced people, the law is detailed in defining specific steps that must be followed.

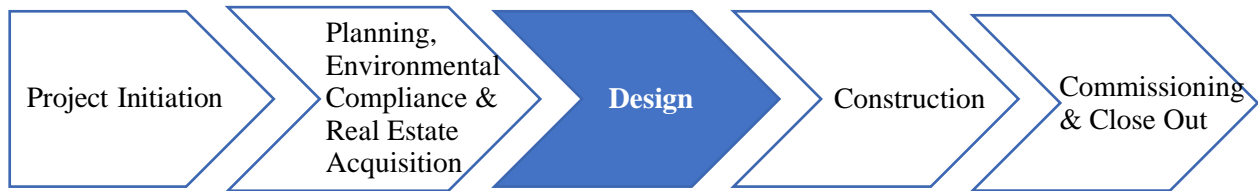
Recipients should be aware of the legal requirement for relocation planning throughout the early phases of project development if they are considering a federally assisted project that will require the transfer of people. They should be aware of state regulations governing real estate compensation and requirements for moving persons and their personal belongings. The following are some necessary steps that should be taken before buying a property with federal funding:³

- Complete alternatives and environmental analysis and identify the parcels needed;
- Assign a real estate specialist with URA knowledge and demonstrated experience, including changes associated with MAP-21, summarized in a 2015 frequently asked questions posting on the FTA website;
- Prepare a Real Estate Acquisition and Reallocation Plan (RAMP);
- Research tax and plat records to identify owner of property;
- Select a title company to work with and order title commitments to verify legal ownership of property and describe any title curative issues;
- Contact the property owner(s) and obtain a right of entry to get permission from property owner to enter property to perform due diligence;
- Survey the property;
- Begin environmental site analysis;
- Send property owner(s) a general information letter explaining the project and the possible need of property.

When seeing it applied to current KDOT AIC projects, Sarah Frost says that she does “not see that much real estate acquisition. Sometimes [she has] to do the alternative site analysis.” Her team conducts “multiple environmental analysis with pros and cons” and then they base their selection off these results.

Patrick Wallerius mentioned that “one of the biggest challenges we have is knowing when to procure property and how to appropriately procure property. And then understanding what they need to do on the NEPA side.” He advised to do some research before starting the process.

DESIGN



The design phase includes oversight of project development and engineering, managing the project schedule, constructability reviews, value engineering (VE), Quality Control (QC) and quality assurance (QA). The Design phase, real estate acquisition, and third-party coordination involve interaction.

Role of Agency in Design: The agency must monitor the design consultant's statement of work (SOW) and keep track of progress. To avoid delays in the process, approvals and reviews should be submitted by the agency on time. The agency also needs to keep track of the construction capital costs estimates during the design so that the project stays within the budget.

Role of the Project Manager

- Examine and accept engineering, project development, and design concepts;
- Coordinate and provide feedback for the design review;
- Take part in risk assessment and VE sessions;
- Control the activities of the design consultant;
- Track the budget and schedule for the design;
- Control QA;
- Accept the capital budget and schedule;
- Accept the packet of construction bids.

Role of Design Consultants

- Establish design guidelines, recognize project risks, and take appropriate action;
- Create projects that support the documentation for the environmental clearance;
- Perform VE and risk analysis, develop engineering standards, and conduct technological research;
- As the design process progresses, project capital costs and the schedule for construction;
- Arrange for the development of engineering drawings and specifications as well as design submissions and reviews;
- Establish and apply internal QA/QC criteria for assessing deliverables;
- Update the capital cost and construction schedule as the design process progresses;
- Produce any last-minute design guidelines and plans for the construction bid package.

Design Phases

Project Scoping: The design phases help to develop and enhance project requirements. Estimating and project costs start at project scoping and needs to be done at each phase to control the project budget. Project scoping helps to get an accurate preliminary cost estimate and to know if the SOW is achievable within the approved budget.

Some costs that should be taken into consideration during the design process includes³

- Agency project administration;
- Surveys and geotechnical investigation;
- Real estate acquisition and third-party coordination;
- Need of consultant and/or project manager and their fees;
- Design and construction; and
- Value engineering and peer reviews (explained later in this chapter).

Project Development: This phase starts with creating a conceptual design which includes:

- *Design Criteria:* The design team will create designs based on the SOW provided. A statement of work document specifies a project's scope, deliverables, requirements, payment terms, deadlines, and other characteristics to make sure that the client and project team are on the same page. Typically, this is produced at the project's initial stages. A project document acts as the foundation for all succeeding stages.⁹ The project manager will review and check if they satisfy the needs of the project requirements definition. The project manager will also need input from the stakeholders promptly to be on the same page.
- *Alternatives Analysis:* The design team will develop alternatives so the agency can perform analysis and rank the options. After identification of the preferred alternative, the design team will move forward.
- *Design Prior to Completion of NEPA:* The design team will develop graphics and conceptual designs. The designs should consist of architectural plans, elevations, landscaping plans, site boundaries, and topographic surveys. At this phase, an adequate level of engineering and design is required to understand the mitigation measures and prepare monitoring plans along with cost estimates. This level of design prior to the engineering phase is considered to be at 30% completion, and signifies the first opportunity for a design review.

"Basic elements for the example maintenance facility project to be included during the conceptual design process include assessing the spatial area requirements for general bus maintenance, fare removal, fueling, exterior washing, interior cleaning, and bus storage. Additional space will be required for administrative and operating staff offices, training rooms, lunch rooms, locker rooms, and associated toilet facilities. Space will also be needed for parts storage, body and paint shops, tire shops, and heavy repair areas. On-site parking will be required for vehicles for employees and vendors who will park on the site. Accommodations should be provided for such items as landscaping, site security, storm water management facilities, and potentially, water treatment facilities. "

-FTA Design Guide

Engineering Phase: Federal law requires that development of design plans for engineering cannot begin prior to NEPA completion as denoted by FTA Record of Decision (ROD), Finding of No Significant Impact (FONSI), or a CE determination. At this phase, the engineering design team will develop the construction bid package with all the details consisting of final drawings and specifications to acquire construction contract bids.

Design Management: As the project manager for the agency, it is their duty to oversee all phases of project development and engineering as outlined in the PRD and related PMP. The decision as to whether the design management will be carried out by the project manager, an independent in-house employee, or a program management consultant (PMC) that is hired for the task of design management, will need to be made as part of the initial assessment of the agency's current capacity and capabilities and the scope of the project. The following are duties and responsibilities of the design phase project manager³:

- Complete the project's budget and task scope;
- Check to see if the design team is providing the products and services specified in the scope;
- Help the design consultant and provide advice;
- Establish and keep track of the project timetable;
- Keep track of project expenditures, such as those associated with design, ROW acquisition, utility relocations, construction, etc., to ensure that they stay under budget;
- Examine and organize evaluations of all design submissions, including draft and final real estate and right-of-way plans, design drawings, special provisions, specifications, and budgets;
- Accept the deliverables and assess their quality. Check the design consultant's compliance with the QA/QC plan;
- Arrange and direct meetings for design reviews, constructability evaluations, and plan checks; and
- Coordinate activities between the agency and other parties concerned (such as utility companies, municipal authorities, environmental agencies, and municipal officials).

Design Reviews: Design reviews are interim check ins to assure the quality of the product during development. These reviews happen at specific points during design development, 30%, 60%, and 90% completion. These reviews are used to confirm that the right deliverables—such as studies, final drawings, technical specifications, and construction bid documents—are being created and that the design consultant is keeping up with the project's budget and schedule. A current construction cost estimate should also be examined during each assessment and contrasted with the expected cost. The following are key objectives in the review:³

- Adherence to design criteria, environmental documents;
- Quality of the design;
- Identification of errors and omissions;

- Building codes compliance;
- Operational and functional objectives are met;
- Coordination between design disciplines;
- Adherence of cost estimates to the budget; and
- Designers' feedback before progressing further.

30-60-90 Framework

30-60-90 is a framework for design critique which utilizes benchmarks at 30% complete, 60% complete, and 90% complete. Design critique provides a formalized check in at various stages of the project allowing interdisciplinary coordination. At each stage of the framework different aspects of design development can be addressed and it provides an opportunity for feedback to be given before the completion of the final design concept.¹³

At 30% design, the first review typically takes place. This happens prior to the engineering phase and the project manager will assure that major design features are in accordance with prior discussion and that significant progress is being made in terms of drawing, specification, and other documents of the like.

At 60% design, a second design review takes place. At this point design is nearly completed and comments from the previous design review have been addressed. At this stage drawings should be sent to a permitting agency for a plan check.

At 90% design, the third design review takes place. During this stage drawings and specification should be finished, if comments from the second review have been resolved. Aside from any last-minute comments, this review should consist of sign-offs and approvals.³

Third Party Coordination

This includes the relocation or rearrangement of existing facilities that impact the project construction. This needs careful planning, negotiation and execution of time and third-party work. Some examples are³:

- Utilities (electric power, gas, telephone, cable, etc.)
- Public infrastructure (highways, roads, bridges, streets, drainage, sewer, water, railroads, etc.)
- Easements and ROW acquisitions

Value Engineering (VE)

The goal of VE is to complete the project's necessary functions for the lowest possible initial total cost and lifetime cost.

- When? VE should be performed in the early process before decisions such as civil, system, and architectural areas have been included. The VE will be completed at or before the conclusion of Project Development or before 30 percent of design.
- How? Electrical, mechanical, civil/structural, and construction engineers, as well as experts in architecture, cost analysis, construction management, and transit operations &

maintenance, can all be found among VE personnel during these sessions. The leader may be a certified value specialist (CVS).

- *Implementation?* The design team will decide whether to accept or reject each suggestion after the project manager has read the VE recommendations. Then, a VE response report will be completed. A summary of approved VE concepts with updated capital and implementation costs, a list of rejected proposals and the reasons behind those rejections, should be included in the final report.

Peer Reviews

Peer reviews should be an early phase in the design process due to the way it can bring an outside viewpoint and improve the functionality of the design, construction, and operation. Peer reviews can be used in addition to a VE study, which is often conducted later in the design process, to offer a fair evaluation of the design stage. Peer review revolves around the question, "Can we do this better?" The team is advised to get in touch with other transit operations and maintenance specialists, or PMCs, to benefit from their knowledge with comparable design initiatives, regardless of whether you or the team have prior experience with the entire design process or not.

Constructability Review

The process of going over every aspect of a construction plan, from architectural design and materials sourcing to job-site logistics and labor, is known as a constructability review. The goal is to find any potential problems or barriers that may arise during the project execution phase. The design team will need to conduct constructability reviews depending on the project complexity as part of the design process.

Participants in constructability reviews might be drawn from the agency, the design team, or the agency can ask for help from other transportation agencies, code officials, independent experts, or contractors. Prior to the engineering phase of design, the initial constructability reviews should be conducted. With a focus on staging and scheduling of work with respect to specific site restrictions, a follow-up constructability evaluation should be carried out shortly after design completion or before construction papers are finished.¹⁰

Risk Assessment

Project risk is an unexpected event or circumstance that has a chance of occurring and that may prevent a project from meeting its schedule and cost estimate/budget. During the design phase and before project development, the project manager must assess the risk to analyze impacts of unexpected events. There are two main categories of risk: design/construction and financial. Design/construction risks involve inclement weather, unforeseen site conditions, permitting delays, and so forth. Financial risks involve revenue shortfalls, changes in cash demands and interest rates, and so forth.³

Quality Assurance and Quality Control

For the project's design phase, a QA/QC plan must be established. The strategy should provide answers to the issues of who is in charge and when specific actions should be taken. More

importantly, the quality plan needs to be kept up to date as the design phase progresses so that when a new phase is started, it will reflect the necessary quality standards.

Decisions about the standards of quality for manufacturing and construction must be planned and incorporated in the contract agreements since they are the principal output of the design phase for construction contractors. As a result, throughout the project's design phase, the agency should adhere to the design control section of the quality management system that was established as part of the PMP.

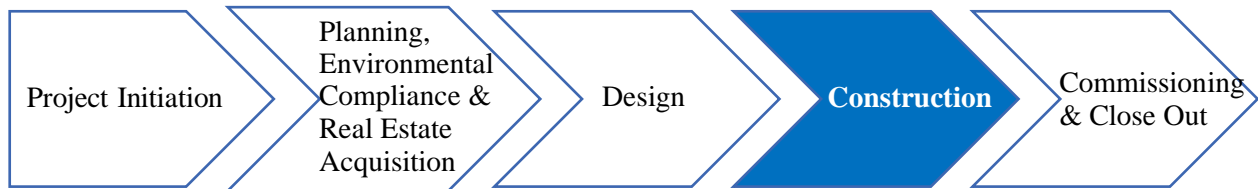
Sustainability

FTA strongly supports environmental sustainability and encourages sustainable practices in project development where it is financially feasible.

- *What is a Green Building?* The main objectives of green building are reducing energy consumption and operational costs, maximizing the use of sustainable materials, minimizing negative impacts on interior air quality, and improving the health, motivation, and productivity of human occupants.
- *Selection and Evaluation of Sustainability Options:* The LEED program is one instrument for evaluating green design; similar standards are also available. The United States Green Building Council (USGBC) developed the technique known as LEED, or Leadership in Energy and Environmental Design, to enable independent verification of green building designs. This widely accepted certification program evaluates a building's performance based on several factors, including energy and water savings, decreased CO₂ emissions, enhanced indoor environmental quality, resource management, and sensitivity to environmental concerns.

Note: Choosing LEED or similar certifications will most likely increase the project budget in the form of design costs, commissioning, energy modelling, and LEED certification document.

CONSTRUCTION



This section includes management of project construction by contractors, third parties, and the agency. Scheduling, cost estimation, change controls, organizational management, document control, partnering and value engineering will also be covered. This section includes information on construction using the design/bid/build (DBB) method, which is most frequently selected, and the design/build (DB), which is the most common alternative project delivery method.

Role of Agency in Construction: Making timely, clear decisions and being on track with the project manager is important at the construction phase. There should be open lines of communication and delegated authority in the project structure and management strategy, as stated by the project management plan. The agency should also relieve project staff members of operational activities that can interfere with the project-related obligations.

Delegated authority: On projects, a project sponsor should be in overall control and should report to a project board. The project sponsor may delegate authority for certain decisions to others, such as spending up to a certain limit.

Role of the Consultant Construction Manager (CM): The agency will need to hire a (CM) consultant to hire project professionals with construction management knowledge and experience. The CM serves as the agency's representative when dealing with the contractors, supervises any work carried out in accordance with the contract's designs and specifications, evaluates the quality of the work, and advises payment for the contractors' invoices. The resident engineer (RE), who serves as the primary point of contact for the contractor and is stationed at the site for larger projects, is a critical member of the CM team. *For the AIC grant program, the project architect generally serves as the CM.*

Role of the Design Consultant in Construction: The design consultant, also known as the designer of record, creates contract drawings and specifications and officially seals the plans. They also provide design services during construction processes like³

- Obtain and reply to Requests for Information (RFI) sent by potential construction bidders to the designer via the CM. The contractor may ask for clarification of the design intent contained in the drawings and specifications by submitting an RFI.
- Evaluate the contractor submittals required by the designs and specifications regarding the construction deliverables and advise on accepting them. This includes adhering to the contract's Buy America clauses (whether DBB or DB project delivery).

- Examine the requests for changes and calculate the cost of change orders.
- Visit the location regularly to ensure that the design is compliant and to offer certification services as requested by the permitting agency.

Role of Contractor in Construction:

- Perform construction work defined by the contract drawings and specifications using means and methods that are the contractor's responsibility.
- Obtain the permits related to the work for which the contractor is responsible and coordinate the necessary inspections.
- Develop and implement a quality control (QC) plan for inspection and testing of the work.
- Develop and implement a safety plan to ensure a safe work site.
- Deliver submittals defined by the contract drawings and specifications, such as:
 - Shop drawings, manufacturer's drawings, calculations and data, and product information
 - Contract schedule, updated monthly, that notes progress and looks ahead to upcoming work.
 - Requests for payment supported by reports as called for in the contract.
 - Record drawings of the as-built work
 - O&M manuals and training of Agency staff called for in the contract specifications.
- Submit RFIs to the CM to obtain clarification of the design intent.
- Submit Requests for Change (RFC).³

Construction Management

Configuration Management: The red arrows in Figure 6 represent processes that the project manager should implement to provide for the configuration administration of contractor RFCs:

- Record the various changes that take place throughout construction, explain their nature and state whether the contractor deserves additional payment. The RFC, change orders, change notices, supporting correspondence, cost, schedule, and scope impacts, meeting minutes, and negotiation records are all included in the documentation.
- Track and speed up the change resolution process by tracking the RFC's progress through the review and approval process after it is raised. Configuration management keeps track of who oversees the subsequent step in the resolution process, such as who is in charge when new data needs to be collected and/or evaluated.
- Papers related to the project, such as contracts, drawings and specifications, timelines and budgets, and design papers, should be updated to reflect a change in the contract.

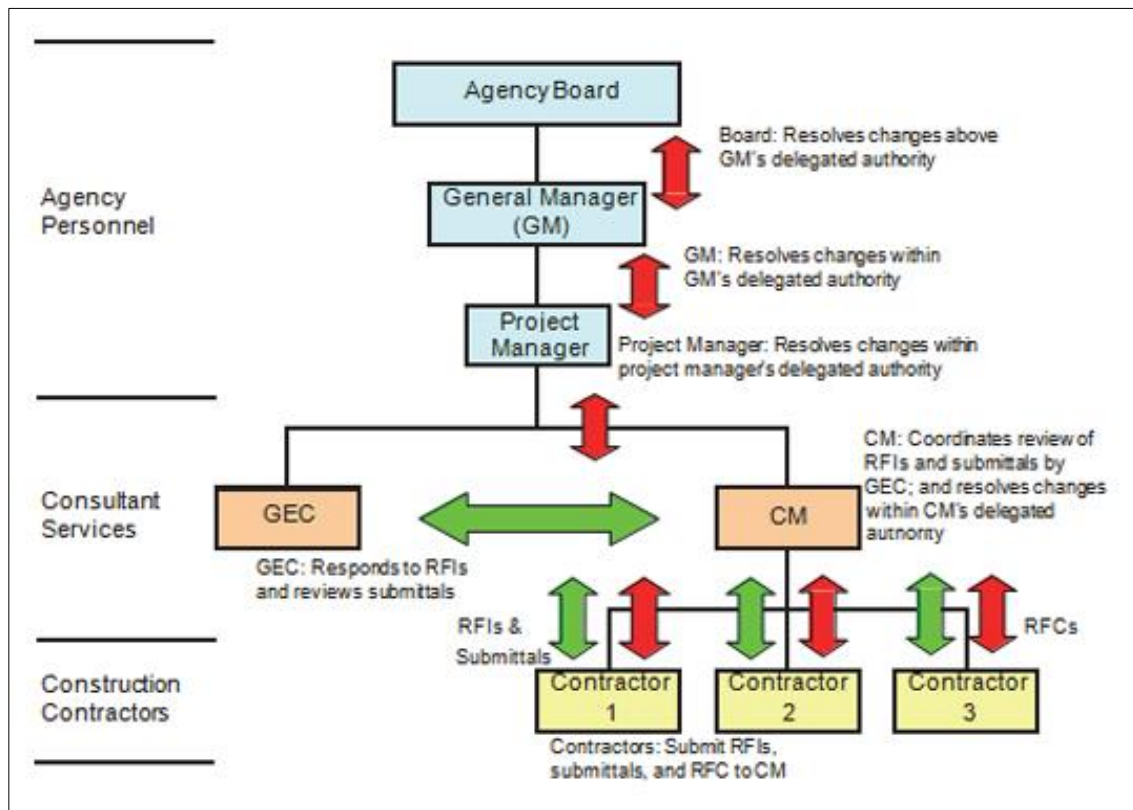


Figure 6: Project Organization, Assigned Authorities, and Lines of Communication for Construction³

The green arrows in Figure 6 represent processes that the project manager should implement to provide for the configuration administration of contractor RFIs and submittals:

- Document the CM's receipt of RFIs from the contractor, track and expedite the CM's response, and coordinate information from the designer of record where design issues are involved.
- Document the timely receipt of contractor submittals called for in the contract specifications and track their review/acceptance. Submittals include³
 - Contractor's schedule
 - Safety plan
 - Quality plan
 - Shop drawings
 - Progress reports
 - Invoices
 - Record drawings and documents
 - Operations and maintenance manuals

Schedule Control: The project manager must manage the interfaces between contractor, third-party, and agency construction operations while keeping an eye on the big picture and the master

timetable. The size and complexity of the project will determine how to approach master schedule control:

- The CM must supply a scheduler for larger and more complicated projects who will track construction progress using a scheduling program to keep track of the critical route and keep a master schedule of construction operations.
- For comparatively small projects, the usage of Microsoft Project or Excel-based bar charts that are directly worked out with the RE(s) should be sufficient to act as a master timetable for CMs to monitor construction progress.

The project manager should do the following to control the project schedule:

- Create a high-level master schedule and limit detail to what is necessary to control interfaces.
- Focus management on the critical path activities that drive the overall project duration.
- Require each contractor, through the contract terms and conditions, to submit:
 - A baseline contract schedule following award, for review and approval.
 - Monthly updates of progress against the approved baseline schedule.
 - A revised baseline schedule for agency-approved contract changes.
- Use contractor submissions to update the master schedule and focus management effort on:
 - Changes to the critical path through construction.
 - Contractor activities forecasted to be late, that impact the critical path.
 - Interface activities forecasted to be late that impact a contractor's progress.
 - Validation of progress on activities that control contract milestone payments.
- Incorporate schedule milestones for work critical to project completion and/or interfaces with other contractors, including liquidated damages for late performance in the contract conditions.

Cost and Change Control: A management culture that is timely, decisive, and fairly handles contractor requests for changes (RFCs) is the best strategy for reducing the cost of changes. Experience has taught project managers that it is expensive to let a stack of outstanding changes develop. An accumulation causes conflict and draws management's focus away from beneficial project activities. The following management methods will help to decide on RFCs quickly, firmly, and fairly:

- As shown by the red arrows in Figure 6 above, distribute responsibility and financial authority for contract change choices via the project chain of command.
- To decide on significant, complicated, and/or controversial contract changes, a change control board composed of senior project workers should be used.
- Include a reserve for construction risks that the agency has taken on that could lead to contract adjustments in the construction budget.
- Through the partnership process, establish an early agreement with the contractor of the procedure for addressing RFCs, including a procedure for resolving disputes.

- Determine the merit of the change based on the terms of the contract; create an independent cost estimate before discussions begin.
- After a successful discussion, store the written record and any supporting documentation in the file for future audits by other parties.
- Implement configuration management processes to support change control.

Document Control: The administration of documents created during construction is known as document control. Document control processes are required to manage reporting of building progress linked to modifications, RFIs, and submittals in addition to the documents:

- Records from the site, such as a daily record of events, activities, weather, equipment, personnel, and communications.
- Inspection report on the contractor's work and practices, including construction work performed, instructions given or received, unsatisfactory conditions, delays encountered, workforce and equipment, or other problems.
- Construction Report of all significant items, meetings with the contractor or other parties, agreements, special notes regarding equipment or organization, labor conditions, weather or other potential delays, and other issues that affect the history of the job.
- Accident reporting and safety management.
- QA results.

Progress Payments: Agencies should have a payment plan for how and when the contractor should receive payments and by what method. The project manager should authorize payments only after the contractors' requirements and progress has been verified by the CM.

Communications Management and Community Outreach

Developing a plan for communicating information about the project and facilitating community outreach is an essential aspect of any project, but especially projects that impact local communities or businesses. While agencies receiving federal funding should already have an established public participation plan developed during the Title VI program process that can be applied for community outreach, it is also important to address specific audiences within this scenario such as local community and business groups, media, and political stakeholders. Communication management for these areas may require approaches not currently specified within an agency's public participation plan. Below is a table depicting communication guidelines tailored to specified audiences that should be considered during the project development.³

Audience	Communications Guidelines
Local Community and Business Groups	Identify project impacts of concern to local community and business groups.
	Communicate frequently and timely on the status of the project and associated impacts (community meetings, informational newsheets).
	Demonstrate sincere empathy and understanding on adverse impacts.
	Mitigate adverse impacts (e.g., limit construction at nights/weekends, provide temporary signage where access to business is impacted during construction).
Media	Limit media contact to designated Project Sponsor personnel.
	Require contractors to refer all media comment to the Project Sponsor.
	Establish the Project Sponsor's position and message on project issues.
	Address media questions so as to communicate the Project Sponsor's message.
	Cultivate the media to present positive news on project events.
Political Stakeholders	Above all else, make certain that a political stakeholder is not taken by surprise by a project event, good or bad.
	Regularly brief political stakeholders on project events and issues.
	Discuss project issues with political stakeholders before they have to comment or decide on them in a public venue such as at a board meeting or media interview.
	Include political stakeholders in project milestone events so that their support and contributions can be recognized.

Figure 7 - Guidelines for Managing Communications

Third-Party Coordination

Early in the design process, the project manager must negotiate and establish agreements with third parties so that they can evaluate their impact on the overall schedule, give the utilities enough time to plan and implement any necessary design, and identify interfaces with other contractors to include in the contract's provisions. The agreements between the project management and third parties should cover the work that the third-party plans to complete. Any additional costs for upgrades should be covered by the third party, and the project manager should agree to only refund the third party for the cost of moving to a comparable facility.

Quality Management

Scope of quality management during construction:

- Examining the contract documents to ensure that quality factors have been considered.
- Monitoring construction to ensure it adheres to quality standards.
- Quality inspections are currently underway and being received.

- Consultants, contractors, and suppliers are subject to quality program audits to guarantee their suitability and compliance.

Role of Agency in Quality Management During Construction: The agency's main priorities are quality assurance and management. Larger projects might need a secondary quality management plan, and the PMP should outline the project's quality management strategy. Scheduling audits and oversighting reviews in a timely manner is performed by the agency to act in accordance with their quality plans and agency's policies. The agency's quality manager should report outside of the project manager's chain of command to prevent conflicts of interest (COI) between project progress and quality management.

Audits: A complete program of regular audits should be included in the agency's quality management plan. The audits check to see if the CM and contractors have adhered to the relevant parts of the quality management plan and implemented them successfully. To make sure that sufficient corrective action has been implemented, follow-up audits, including re-audits, if necessary, should be conducted.

Role of the Contractor in Quality Management during Construction: Quality plan complying with the SOW is required to be submitted to the agency for approval by construction contractors and suppliers.

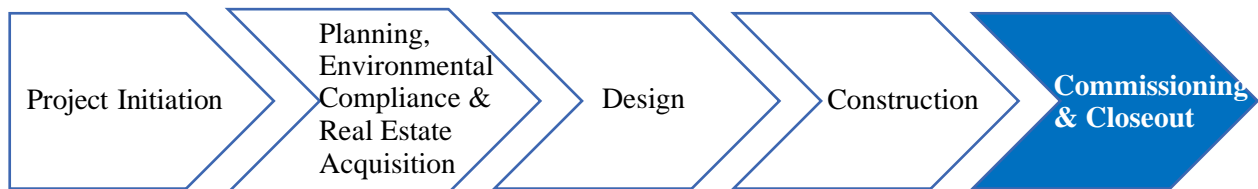
The contractor maintains control over the deliverables' quality by keeping track of it and comparing it to the standards outlined in the design papers. The actions involved in quality control on the construction site include installation, inspection, testing, and documentation.

Safety Management During Construction

The agency's top priority is to be aware of the prevention of accidents and protection of employees, the public, and property. The agency should have a safety management plan as a part of the contract documents, which should cover:

- Workplace planning to prevent property damage and personal injury.
- Monitoring the work to identify and address harmful situations and practices as soon as possible.
- Protection of neighboring properties, both public and private, to ensure public safety.
- Offering incentives and education programs for safe behavior.
- Abiding by local, state, and federal occupational health and safety laws.

COMMISSIONING AND CLOSEOUT



Commissioning is a process for validation of building equipment and systems in coordination with operations personnel and third parties. The commissioning phase of a project is covered in this section, along with its roles and responsibilities, commissioning plan, owner-furnished equipment (OFE), integrated testing, safety and security measures, emergency preparedness, operations and maintenance (O&M) manuals, training materials, as-built drawings, and warranty administration. The United States Green Building Council (USGBC) Leadership in Energy and Environmental Design (LEED) requires that fundamental building commissioning be incorporated for LEED certified construction projects. This phase should be described in the PMP followed by the commission plan.

Role of Agency: The project manager should choose a person for the facility commissioning early in the planning and design process. Depending on the project, it can be the project manager, or it can be a member of the operations or engineering team. This person may have prior relevant experience and would be partially, or entirely, freed from their regular responsibilities so they could concentrate on the commissioning task. If necessary, the agency can also hire a commissioning consultant who will perform assignments from safety, security, operations, engineering, maintenance, procurement and warranty administration, customer service, public relations, and other necessary functions.

The Commissioning Plan

All internal and external stakeholders have a considerable say in the commissioning plan's creation, which is done in close consultation with the design and construction teams. The plan will ensure that all needs are correctly incorporated in the design and construction bid documents and carried out during construction and commissioning if it is properly prepared and used as a live document. Appendix A³ depicts a typical commissioning plan for equipment used in a maintenance facility project. Checked items are taken to be necessary for LEED certification.

Owner Furnished Equipment

Owner-furnished equipment (OFE) will be used in almost every operation to some extent, whether it is for the lengthy lead times for equipment acquisition, the high level of specialized work required, or when the equipment requirements are unknown during the engineering process. Any equipment that is not provided and installed by the construction contractors but will need the contractor's installation facilities or is necessary for the project to be fully operational, might be

considered an OFE. The OFE could consist of furnishings, office supplies, phones, technology for audio and video production, operational signage, and fare collection devices. It is the project manager's duty to completely incorporate and account for the OFE with the remainder of the construction project activity. The commissioning manager will be focused on installation and testing. Some things that should be considered are:

- Delivery date, time and location related to project schedule due to sometimes long lead time; and
- Knowing the assembly requirements, as it may delay the schedule or increase the cost of the project.¹¹

Integrated Testing and Startup

Integrated testing confirms that design and construction tests were carried out as intended, ensures that performance standards are being met, coordinates compliance with outside parties, and records results for safety and security certification. Since it frequently involves multiple parties other than the construction contractor, integrated testing is typically not subject to contracts. The commissioning team's integrated testing is under the direction of the project manager. Typically, the project creates an Integrated Test Plan (ITP) to outline the test program to achieve the objective. The ITP helps the efforts to ensure that all new and old components of the system work together. The ITP should include³:

- Organizational roles and responsibilities;
- Testing objectives;
- Test approval process;
- All planned tests and schedule;
- Test procedures;
- Test reports; and
- Documentation requirements.

Project Closeout

The agency's project manager must supervise the final settlement of project contracts, acceptance of contract deliverables, gathering of contract records and documents (such as as-built drawings, operation and maintenance manuals, warranties, etc.), and approval of final payments. Demobilizing the project team and concluding tasks with other stakeholders are among the administrative closeout duties of the project manager. Other duties include arranging for the disposal of project records, concluding funding, financing arrangements, and evaluating the project.

Safety and Security Certification

"Safety" is employed to address risks brought on by unintended behavior, while "security" addresses risks brought on by intentional action. Both are equally important and the standards that apply include: American Society of Heating, Refrigerating, and Air Conditioning Engineers (ASHRAE), Institute of Electrical and Electronics Engineers, and federal, city, and state building

codes. In addition, for bus operations the project manager should consider regulations by the Federal Motor Carrier Safety Administration (FMCSA), Occupational Safety and Health Administration (OSHA), FTA, Drug and Alcohol, and the applicable state's Department of Motor Vehicle regulations.

To achieve operational readiness through project final certification, the Safety and Security Certification Plan (SSCP) is responsible for specifying the procedure and actions to make sure all safety and security standards have been satisfied and documented. The SSCP helps to manage following activities³:

- Develop a certifiable elements list;
- Develop safety and security design criteria to identify project concerns;
- Develop and complete design checklists to verify contract specifications and safety and security criteria are met;
- Develop and complete construction checklists to verify components, construction, and installation requirements are in accordance with design;
- Identify and monitor integrated tests;
- Provide safety, security, and emergency preparedness training classes to transit operations and maintenance staff;
- Provide or develop operations and maintenance manuals;
- Provide rules and procedures training to operations and maintenance staff;
- Provide training to emergency response personnel and conduct necessary emergency drills; and
- Prepare and transmit the Safety and Security Certification Verification Report (SSCVR) to management and oversight personnel.³

Operational and Maintenance Manuals

The design team of the project addresses what is needed for operations and maintenance. They also define timeframes for submission of the O&M manuals which typically are before the end of construction.

Flint Hills Area Transportation Agency has a well-organized set of O&M manuals containing standard/code compliance, training and safe practices, inspection and installation, control descriptions, inspection maintenance and troubleshooting, authorized factory representative contact information, and warranties.

Training and Transition to Operations

The agency might need to develop a training plan to train the employees in using the new facility. Along with the O&M manuals, the contractor must provide a comprehensive summary of the training program. The material will be examined according to the building standards by the commissioning manager, who will also solicit advice from the group receiving training.

As-Built Documentation

A graphic or 3D data set that shows the building as it was really built is known as as-built documentation. All alterations, augmentations, and other changes performed during construction are included in an as-built data set. The exact measurements and surveyed locations of all building components, such as the facade, doors, windows, and building systems including pipes, ducts, and cables, will also be included. This can be used for the following reasons:

These documents are important, and Anne Smith suggests keeping proper record of them: “Have those on CD and paper. That’s really important.”

- To prove they have completed the contracted work to the required standards, general contractors must maintain current documents.
- Owners and facility managers who require access to the complete history data of the structure, from its conception to its current condition, for maintenance, operational chores, and simulation.
- Future users of the structure, such contractors who will need accurate measurements and schematics to carry out improvements or renovations.¹²

Warranty Administration

A warranty is a promise made in writing to the agency by the manufacturer that they will take responsibility for the equipment's performance for a set time after acceptance.

KEY SUGGESTIONS FROM KANSAS PROFESSIONALS

The following italicized quotes are from interviews with professionals across Kansas that follow this document. In addition, a brief profile of all the professionals interviewed is included. While they do not pertain to any specific section for this document, they provide advice and lessons learned throughout their projects.

Interviewee	Current Role and Organization
<p>Anne Smith</p>	<p>Anne is a native Kansan; she received her BA from Kansas State University in 1987. Anne has worked in the transit industry for over 20 years. She has been the Executive Director of the Flint Hills Area Transportation Agency since 2007. Anne is the current Chair of the Kansas Coordinated Transit District Council (KCTDC). The KCTDC, with assistance from KDOT, conducts the annual procurement of new vehicles for the KDOT Public Transportation projects. Anne is also the current chair of the Kansas Public Transit Association (KPTA) Board of Directors. She was the 2016 recipient of the Willie Murry Award.</p> <p><i>“Inflation is absolutely eating us alive. I mean we factor a 15% coverage into all our budgets, even when I apply for the grants.”</i></p>
<p>Dr. Brian Lines</p>	<p>Dr. Lines is an assistant professor in Construction Management in the Civil, Environmental & Architectural Engineering Department (CEAE) in the School of Engineering at the University of Kansas. He specializes in alternative procurement, competitive proposal preparation, alternative contracting methods, risk management, project delivery, and performance measurement. He has extensive experience on the owner side (procurement & operations) of design/engineering, construction, facilities, and non-construction projects valued at more than \$989 million.</p> <p><i>“It’s important for leadership on the client side to understand the supply chain environment, the workforce environment, and the competitive environment that they are in right now: the only things that truly make a difference and move the needle. In other words, prioritize things that are important.</i></p> <ul style="list-style-type: none"> • <i>Number one is getting the absolute best team you possibly can. Doesn’t mean that they’re amazing, doesn’t mean that they are an all-star, but the best available for the project.</i> • <i>Number two is getting the actual project team individuals involved earlier. Now, that does not mean alternative delivery and pre-construction. That means getting the sales, folks, and executives out of the picture. When the upfront promises are made, and the contract is set as what that means.</i> • <i>Number three is on the back side. After the contract is signed, with whatever party, whether it be the design team, the construction team, the design build team, it’s transparently tracking cost and schedule that really matters. The elements that are a key ingredient for success attract and identify the best possible solution are represented by removing the executives and sales representatives. These are two of the three things that are before project management, before you sign the contract, before any of that has occurred. On the back end, it’s just tracking things rather than saying ‘If we did this step in a different spot, or a different way, or use this template or that tool or this technology.’”</i>
<p>Sarah Frost</p>	<p>Sarah leads TranSystems’ Kansas City-based Planning team. She has 16 years of experience in grant preparation and administration, transit facilities planning and construction, transit system analysis, and transit feasibility analysis and development. TranSystems is providing program</p>

	<p>management to KDOT for their call for eligible projects including facilities. Sarah leads the project selection process, and project implementation, facility planning and NEPA process to ensure that all projects meet FTA requirements.</p> <p><i>“We’re just constantly in communication with [the agency] especially with all the different facilities that we have going right now, it’s a lot. Previously we maybe had like one or two in process and now it’s like a lot and so just keep that communication line open.</i></p> <p><i>We had a project up in the northeast part of Kansas that, unfortunately, had their elected officials changed during the project. It was kind of a storm because their elected officials changed and the architect working on the project got fired from the company he was working for. They did not communicate to us that. So countless emails and phone calls later, months later, I finally get an e-mail or a phone call from them saying ‘oh such and such no longer works here’ but because of that we did not get the construction contract signed. Elected officials changed and they refused to sign the contract and the project went away.”</i></p> <p><i>She added, “Sometimes we think planning can go very quickly. But I can give an example: we fast tracked one in October. We are still waiting for the environment to be clear; it was just all the different. That was one where we did, we had to go back out and do a little bit more sampling. It is important to be flexible and roll with it, but still try to be on top of everything.”</i></p>
<p>Patrick Wallerius</p>	<p>Patrick Wallerius, a Salina native, received a degree in Civil Engineering from Kansas State University. He joined OCCK in 1991, after working for a general contractor early in his career. He currently serves as OCCK's VP/CFO and manages all aspects of their finances. In the early 2000s he developed OCCK's public transportation services, and he has expanded and diversified them in the ensuing years. In addition, he is Facility Manager for all of OCCK’s properties.</p> <p><i>“I was a project estimator as well as project manager for the project. We bid on a lot of projects. I estimated a lot of projects and was involved from start to finish during key projects. I had an advantage because I knew the process, therefore, once we selected an architect, it was pretty easy for us after that.”</i></p>
<p>Kara Reynolds</p>	<p>Kara was the executive director of Coffey County Transportation in Burlington, KS from April 2012 to December 2022. During her tenure, she successfully applied for 5339 Facilities Grant and saw the completion of the facility in 2021.</p> <p><i>Kara reflected on her past projects, specifically her method of planning her funding for the project. She “had already talked to the county about wanting to do this project...so they had already given [her an amount] to apply, which was more than the required match.” This allowed her to collect amounts before the grant process, which helped jumpstart the building payments.</i></p>

CHECKLIST

This checklist can be made use of while constructing new transit facilities. It serves as a reference for transit agencies during the project's planning, design, and construction phases highlighting the most relevant elements of lengthy documentation for each of the stages' tasks. This is a more efficient approach to ensuring that all aspects of the project are done and reviewed in a methodical manner. This checklist can be tailored to the project's size and complexity of deliverables.

A special thanks to Sarah Frost, Assistant Vice President of TranSystems in Kansas City, MO, for providing details for the following checklists.

Planning		
Project Phase	Tasks and Subtasks	Additional Notes
Planning	Project Identified in TIP & STIP	In order to obtain funding from the FTA, a Transportation Improvement Program (TIP) or Statewide Transportation Improvement Program (STIP) must be created. These programs must include public-private partnerships and offer a capital improvement plan that is financially sound. (PPP). The TIP/STIP is not only a document, but also a completely integrated method for selecting transportation projects and for planning transportation. To make sure that initiatives are identified, chosen, and given priority, the TIP is updated yearly and closely adheres to this planning cycle. The facility should be mentioned in the TIP/STIP and updated as needed to reflect changes in financing.
	<i>Rural Project in STIP by _____</i>	Based on transit demographics, ridership, and funding, agencies may have a five-year or ten-year plan that outlines service requirements, improvements, and capital needs. The master plan or feasibility study may contain this data.
	Funds earmarked and appropriated by Congress for Project KDOT Construction/Facility Guidance Letter sent to sub-recipient	Coordinate with the Federal Transit Administration (FTA), Kansas Department of Transportation (KDOT), and metropolitan planning group (MPO).
Feasibility/Environmental Studies	Decide if Feasibility Study/NEPA Analysis is going to be completed in-house or contracted out	Environmental analysis checklist: • land use and zoning • Land acquisitions and displacements • socioeconomic, community disruption and environmental justice • air quality • noise and vibration • water quality and wetlands • floodplains • ecologically sensitive areas and endangered species • traffic and parking • historic properties • parklands • Section 4(f) • hazardous materials • safety and security
	<i>KDOT reviews documents prior to solicitation of services for facility feasibility study /NEPA Analysis</i>	A feasibility study, also known as a feasibility analysis or a feasibility report, is a means to determine whether or not a project plan has a chance of being successful. A feasibility study assesses the viability of your project plan to see whether you can proceed with the project.
	<i>If Fed. Funds involved, did sub-recipient follow Best Practices Procurement Manual</i>	As stated in section 1.3.3.9 of the FTA's Best Practices Procurement Manual, ascertain whether the project is exclusively for public transit, a shared-use facility, or one that includes joint development, including PPP.
	<i>Procedures and Third party contracting requirements (FTA C Assure info required by FTA for CE/EA will be obtained</i>	Evaluating third-party agreement processes and current status of agreements.
	<i>Solicitation for Architecture and Engineering (A&E) services conducted for feasibility study, or study to be conducted by Regional Planning Commission (RPC)</i>	Feasibility study checklist: Ensure consistency with local plans . • Verify land use and zoning. • Determine land acquisitions and relocations required. • Determine public transit needs. • Determine the characteristics of a fixed facility that will meet those needs. • Determine the financial feasibility of such a facility. • Identify initial sites to be evaluated, and conduct the site analyses. • Evaluate the final sites and recommend a preferred location. • Conduct an environmental analysis of the preferred site.
	<i>KDOT Reviews responses prior to selection and award of contract for feasibility study/NEPA Analysis</i>	
	Fully Executed contract for services to conduct facility feasibility study/NEPA Analysis placed in grant file <i>Determine who is reviewing work</i>	Identify the key individuals who will be involved in the project and also figure out if a project manager (PM) needs to be hired
Environmental Clearance and Permitting	KDOT reviews draft facility feasibility study/NEPA analysis prior to submission to FTA Region VII	
	<i>KDOT will provide comments to sub-recipient after initial review of draft feasibility study/NEPA Analysis</i>	
	<i>Sub-recipient will respond in writing to KDOT comments regarding feasibility study/NEPA Analysis</i>	
	<i>Once all comments have been responded/revised, KDOT will submit the completed feasibility study/NEPA analysis to FTA</i>	
	<i>FTA will review and submit comments to KDOT</i>	
	<i>KDOT will respond to FTA comments</i>	
	<i>Feasibility study submitted to FTA Region VII for approval</i> <i>FTA makes NEPA finding</i>	
Grant	Notify KDOT if costs will be incurred before grant award <i>KDOT will then notify FTA to ensure pre-award requirements have been met</i> <i>(i.e. inclusion in STIP, NEPA finding, appraisals)</i>	
	Develop grant application in TEAM for project	
	Place copy of approved study in TEAM grant application	
	Submit grant application in TEAM for project funding	
	FTA Reviews and approves grant application <i>Date of Award _____</i>	
	KDOT Executes grant award in TEAM	
	Executed grant agreement with sub-recipient for FTA funds	

Real Estate Acquisition & Design		
Project Phase	Tasks and Subtasks	Additional Notes
Real estate acquisition	Appraisal and review of appraisal	The Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970 (Uniform Act), as amended (42 U.S.C. 61), requires assurances from grant applicants that they will comply with the Uniform Act, DOT implementing regulations (49 CFR part 24), and FTA Circular 5010.1 if they plan to use federal funding for a project that considers for the purchase of real property.
	Relocation assessments as of (date) _____ initiation of negotiation	
	Offer of fair market value (49 CFR Part 24)	
	Title insurance recommended	
Architectural Concepts and basis for design	Consultant fee proposal, negotiations and contract signing	
	Sustainability	
	Site Master Plan	The site master plan is a basic blueprint that depicts overall growth based on a conceptual study that specifies the initial needs for building spaces, flows, connections between buildings, logistics, urban design, infrastructures, and additional facilities, among others.
	Building conceptual design	
	Project budget and funding	
	Conceptual plan finalization	
	Conceptual design review complete	
	Funding for construction	
Architecture & Engineering	Jurisdictional reviews/approval	
	Review (RFQ) solicitation for A&E services for facility design, and optionally project management and construction	
	Advertise solicitation for qualifications by sub-recipient for A&E design (+project management) services	
	KDOT reviews A&E qualification submittals and attends presentations, if required	
	KDOT sets DBE Goal	
	KDOT reviews proposed contract for A&E Services	
	Copy of fully executed A&E design (+ project management) contract in grant file	
	Design quality assurance and control	KDOT reviews draft design documents to include
<i>Specifications, especially functional and accessibility (ADA) features</i>		
<i>Project budget</i>		
<i>Master schedule</i>		
<i>Mitigation plan, if required</i>		
<i>Construction plan</i>		
<i>QA/QC plans</i>		
<i>Final design documents</i>		
<i>Bid documents</i>		
<i>Mandated energy efficiency review</i>		
FTA Reviews draft design documentation (at significant stages of design 30% 60% & 100%)		
projects may require fewer reviews - coordinate with regional engineer		
Obtain Davis-Bacon Wage rates		The Davis-Bacon Act (40 U.S.C. 3141 et seq.) sets local prevailing pay for construction employees on federally sponsored projects.

Construction		
Project Phase	Tasks and Subtasks	Additional Notes
Preconstruction	Attend Pre-Construction meeting	Before a construction project ever starts, pre-construction services are preliminary planning and engineering services provided by construction businesses. During this pre-construction planning phase, the project will be defined along with any potential concerns, planning and scheduling, the project's scope, cost projections, and a needs analysis.
	Review, prior to issuance, bid addendums as a result of pre-construction meeting	
	Review bids and bid tabulations prior to award	A construction bid is a step in the proposal-submission process for a construction project. The construction bid demonstrates to potential clients that your business is the best contractor for the job.
	Review of complete construction contract prior to execution	
	Award of construction and/or equipment contract in accordance with BPPM and FTA C 4220.1E	
	Pre-Construction/facility project meeting held with KDOT, Contractor, A&E firm and sub-recipient	
	<i>Review project management roles and responsibilities</i>	
	<i>Determine type and frequency of reports and communications</i>	
	<i>Determine frequency of project meetings</i>	
	<i>Identify mitigation measures, if any</i>	
	<i>Review project budget</i>	
	<i>Review project master schedule</i>	
	<i>Review final design documents</i>	
	<i>Discuss construction plan</i>	
	<i>Discuss safety plan and activities</i>	
	<i>Review QA/QC plan</i>	
	Construction and quality control	<i>Discuss invoicing procedures</i>
<i>Discuss payrolls and wage rates</i>		
<i>Discuss tracking of DBE participation</i>		
<i>Discuss change procedures</i>		
<i>Review dispute resolution procedures</i>		
<i>Determine testing and final acceptance procedures</i>		
<i>Review buy America Certifications for Iron and Steel components</i>		
Review progress reports, as submitted; take action, as needed		
Periodically review reports on project schedule and project budget		
Review quality reports		
Review change orders prior to approval for time, scope, profit and budget		
Review invoices and draw-down requests prior to payment		
Spot check payrolls for compliance with Davis-Bacon requirements		
Periodically make site visits to confirm progress and observe issues identified (including safety) and Davis-Bacon spot interviews		
Review DBE progress payments and prompt payment of subcontractors		

Commissioning & Closeout		
Project Phase	Taks and Subtasks	Additional Notes
Records management	Assure sub-recipient has obtained operations and maintenance manuals and training	
	Assure sub-recipient has obtained all plans or "as-built" drawings for project	
	Develop punch list in cooperation with A&E firm and sub-recipient	A construction punch list is simply the list of things that need to get completed before the project is finished. It doesn't cover the project's main work; rather, it focuses on the smaller, less important activities that are the last to be completed.
	Sub-recipient/owner makes final inspection of project from developed punch list	
	Obtain final report from contractor with	
	<i>Final costs</i>	
	<i>As-built schedule</i> <i>Lessons learned</i>	
Final Payments	Sub-recipient makes final payment to construction contractor	
	KDOT makes final draw-down payment to sub-recipient	

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