Chapter 2

Project Development
Project Development

*Project Development* is the process that takes a transportation improvement from *concept* through *construction*. There are several goals for this process:

- To ensure context sensitivity though an open, consensus-building dialog among project proponents, reviewers, the public, and other parties.
- To foster thinking beyond the roadway pavement to achieve the optimum accommodation for all modes.
- To encourage early planning, public outreach, and evaluation so that project needs, goals and objectives, issues, and impacts can be identified before significant resources are expended.
- To achieve consistent expectations and understanding between project proponents and those entities who evaluate, prioritize, and fund projects.
- To ensure allocation of resources to projects that address local, regional, and statewide priorities and needs.

Project delays and escalating costs are discouraging to everyone involved. Projects that are ultimately built but do not meet expectations in addressing needs are also frustrating. This project development framework, and the principles that it embraces, will:

- Help carry out projects effectively;
- Ensure good project planning, design, and implementation; and,
- Set the stage for long-term success.

Effective partnerships on projects are important throughout project development and require strong commitment and action from all Individuals involved, whether they be MassHighway or Federal Highway Administration (FHWA) staff, elected officials, local planning
and public works professionals, citizens, or consultants. Real partnerships require ongoing relationships of trust and collaboration.

The project development process is one of a set of tools needed to achieve context-sensitive design. The process is structured to encourage public outreach throughout planning, design, environmental review, and construction so that those affected by transportation projects are in general agreement regarding the project’s need, the selected approach to meet this need, and the refinements to the project that result as the process evolves. Section 2.9 of this chapter overviews public outreach approaches and tools to assist in establishing an effective project development process.

This project development process is complemented by the inclusion of the project’s context as a basic design control. Flexibility for determining specific design elements that satisfy the project need, and are responsive to the context of the project, is inherent in the subsequent chapters of this Guidebook.

Applicable Projects

Project proponents are required to follow the process described in this chapter whenever MassHighway is involved in the decision-making process. The project development procedures are, therefore, applicable to any of the following situations:

- When MassHighway is the proponent; or
- When MassHighway is responsible for project funding (state or federal-aid projects); or
- When MassHighway controls the infrastructure (projects on state highways).

In addition to MassHighway, many other agencies and organizations may be involved in a project. These procedures are written to be a useful resource for projects that are locally sponsored, funded, and reviewed, as well as for those which fall under the jurisdiction of other Massachusetts authorities. Projects with local jurisdiction and local funding sources are not required to go through this review process unless the project is located on the National Highway or Federal-Aid Systems. Proponents designing projects on local roads, however, may benefit from the project development steps outlined in this chapter and the design guidance found in subsequent chapters.
Project Development Process Overview

The project development process is initiated in response to an identified need in the transportation system. It covers a range of activities extending from identification of a project need to a finished set of contract plans, and to construction.

The identified transportation need might include one or more of the following: a congestion problem, a safety concern, facility condition deterioration, a need for better multi-modal accommodation, an environmental enhancement, or an economic improvement opportunity. The development of solutions to address these needs often involves input from transportation planners, community leaders, citizens, environmental specialists, landscape architects, natural resource agencies, local public works officials, permitting agencies, design engineers, financial managers, and agency executives. Solutions might target a single mode of transportation, or address the range of road users including pedestrians, bicyclists, transit operators, automobile drivers, and truckers moving freight and goods. It is important to engage the right team of people on the project from the beginning.

The sequence of decisions made through the project development process progressively narrows the project focus and, ultimately, leads to a project that addresses the identified needs. There should be ample opportunities for public participation throughout the process.

Transportation decision-making is complex and can be influenced by legislative mandates, environmental regulations, financial limitations, agency programmatic commitments, and partnering opportunities. Decision-makers and reviewing agencies, when consulted early and often throughout the project development process, can ensure that all participants understand the potential impact these factors can have on project implementation. An eight-step project development process is defined to move a project from problem identification to completion, as illustrated in Exhibit 2-1.
Exhibit 2-1
Overview of Project Development

**PROCESS**

**STEP I**
- Problem/Need/Opportunity Identification

**STEP II**
- Planning

**STEP III**
- Project Initiation

**STEP IV**
- Environmental/Design/ROW Process

**STEP V**
- Programming

**STEP VI**
- Procurement

**STEP VII**
- Construction

**STEP VIII**
- Project Assessment

**OUTCOMES**

1. Project Need Form (PNF)

2. Project Planning Report (If necessary)

3. Project Initiation Form (PIF)
   - Identification of Appropriate Funding
   - Definition of Appropriate Next Steps
   - Project Review Committee Action

4. Plans, Specs and Estimates (PS&E)
   - Environmental Studies and Permits
   - Right-of-Way Plans
   - Permits

5. Regional and State TIP
   - Programming of Funds

6. Construction Bids and Contractor Selection

7. Built Project

Source: MassHighway

These eight steps are described in detail in the subsequent sections of this chapter.
2.1 Step I: Problem/Need/Opportunity Identification

Projects begin with the identification of a problem, need, or opportunity. This can result from a regularly maintained asset or performance management system, such as MassHighway’s bridge management system, the top 1,000 intersections safety list, or a recent corridor or area planning process. Problem, need or opportunity identification can also occur through the regional planning initiatives of a Metropolitan Planning Organization or arise from community, legislative, or citizen input. Communities and state transportation agencies are responsible for providing a wide range of transportation services. A number of on-going system management and planning processes are often where projects begin. These include:

- Long-Range Transportation Plans
- Statewide, Regional, and Metropolitan Area Plans
- Corridor Studies and Plans
- Asset Management Systems
  - Bridge
  - Pavement
- Performance Management Systems
  - Congestion Management
  - Safety Management
- Operational Plans and Initiatives
- Road Safety Audits
- Local/Community Plans
- Americans with Disabilities Act (ADA) Program Access. (These improvements must be incorporated in all transportation improvement projects or may be proposed as separate barrier removal projects.)

Road safety audits, noted above, are a relatively new activity in the United States with more emphasis on crash prevention—designing safer new roads and modifying existing roads before crash statistics reveal a problem. Road safety audits foster safer road projects by promoting elimination or mitigation of safety hazards (such as dangerous intersection layouts) and encouraging incorporation of crash-reducing features (such as traffic control devices, delineation, etc.) during the planning and design stages of project development.
2.1.1 Problem/Need/Opportunity Definition
As problems, needs, or opportunities for improvements arise they can be simple and straightforward, or complex in nature without an obvious solution at the start.

Most issues are addressed through the development of a discrete project, specifically tailored to solve the identified need or problem. These projects could include, as examples: geometric improvements at an intersection, or increased parking and improved bicycle and pedestrian access at a transit station where parking demand clearly exceeds supply, or traffic control enhancements. These types of projects often proceed relatively quickly from issue identification into actual design.

Other more significant needs require a robust multi-modal planning effort to identify possible solutions and analyze various alternatives. For example, with a corridor whose roadway network is overly congested, or whose transit service is overcrowded, there may be a need for a corridor- or location-specific planning study. These studies may require an extensive public participation process to identify the problems and examine a wide range of possible solutions through an alternatives analysis.

As a first step in the project development process, the proponent would lead an effort to:

- Define the problem, need, or opportunity based on objective criteria;
- Establish preliminary project goals and objectives; and,
- Define the scope of planning and public outreach needed.

2.1.2 Project Need Form
This step in the project development process leads to completion of a Project Need Form (PNF). The problem/need/opportunity identification and PNF process is illustrated in Exhibit 2-2. The PNF provides sufficient material to understand the transportation need(s), and results in one of the following three outcomes:

- Verification of the problem, need, or opportunity to enable it to move forward into design;
- Determination of the level of further project planning warranted; or,
- Dismissal of a project from further consideration.
Exhibit 2-2  
Step I: Problem/Need/Opportunity Identification

Problem/Need/Opportunity

Project Definition

Project Need Form (PNF)

Define problem, need, or opportunity

Define goals and objectives

Define context

Identify Project Constituents

Define and initiate public outreach for the planning process

PNF Evaluation

Suggested Revisions

MassHighway District Review, Advisory Opinion and Guidance

Proceed with Project Planning / No Go

Source: MassHighway

A copy of the Project Need Form is provided in Appendix 2-A-1 of this chapter. Electronic versions of this form and instructions for completion can be found on MassHighway’s website (www.mass.gov/mhd).

At the beginning of this process, the proponent should meet with potential participants, such as MassHighway District staff, the MPO, regional planning agencies, environmental agencies, local boards and officials, and community
members. This proactive, informal review and consultation can help ensure the project will develop with fewer problems in future phases.

The Project Need Form is important to define the condition, deficiency, or situation that indicates the need for action — the project need. The statement should be supported by facts, statistics, or even by plans or photographs to the extent that information is available.

The project need is not a project description (such as “replace a bridge” or “reconstruct a road”). That approach “decides” the project outcome too early in the process. A goal of the PNF is to state, in general terms, the deficiencies or needs related to the transportation facility (such as “the bridge is structurally deficient” or “the pavement is in poor condition”). The Project Need Form should document the problems and explain why corrective action is needed. An example of a need could be:

*The intersection is hazardous. The high-crash rate at the intersection illustrates this problem.*

Other examples might be:

*There is significant congestion at the intersection. During peak periods, traffic from the side street has difficulty exiting onto the main street and long queues develop.*

Or:

*There is no formal accommodation for bicycles or pedestrians between the elementary school and the large residential neighborhood to the north where a significant portion of the student body live.*

The purpose of a project is driven by these needs. As examples, the purpose might be to improve safety, to enhance mobility, to enhance commercial development, to improve structural capacity, to enhance pedestrian and bicycle movement, etc., or some combination of these.

### 2.1.3 Transportation Evaluation Criteria

The MPOs and MassHighway use transportation evaluation criteria (TEC) to assess whether proposed transportation projects should be supported with state or federal funding. The criteria are organized by two basic project purposes: preserving the current transportation
system; and improving or expanding the transportation system. A discussion of these criteria are provided as Appendix 2-A-2 to this chapter. These are useful in the preparation of a Project Need Form and should be submitted as an attachment, if available.

2.1.4 Identify Project Constituents and Public Outreach Plan
When defining the project need, the proponent should also think about public support of the project. To achieve this, the Project Need Form should:

- Identify interested parties;
- Document public outreach and feedback to date (if any); and
- Outline a public participation process for moving forward.

More information on the types of project constituents and elements of an outreach plan are found in Section 2.9.

2.1.5 Project Planning Scope
With the preliminary elements of a project defined (need, goals and objectives, project constituents, etc.) in the Project Need Form, the planning scope necessary to move the project forward requires definition.

The proponent may need to conduct planning activities appropriate to the extent and complexity of the type of project under consideration to ensure that all project benefits, impacts, and costs are objectively estimated:

- For a straightforward project (examples might include a sidewalk project, roadway resurfacing, or a traffic signal equipment upgrade), the proponent can seek approval to advance the project to design from the Project Need Form. In this case, the proponent defines the actions proposed to address the project need(s), describes the alternatives considered (if necessary), and documents any anticipated impacts as part of the Project Need Form. (This may also be the best approach where detailed planning for the project has already occurred and is documented).
- For more complex projects (as examples, if there are several alternatives to consider, if there are contextual constraints which add complexity to the solution, or if there is keen public interest), the project proponent should define the range of actions to be
considered and suggest a planning scope for a Project Planning Report. Guidance on the scope of this effort is provided in the next section of this chapter.

2.1.6 Project Need Form Review

Once the Project Need Form is prepared, it is submitted to the MassHighway District Office and Metropolitan Planning Organization staff for initial review. MassHighway typically develops a multi-disciplinary team to review project requests.

The intent of the Project Need Form review process is to allow the proponent to propose a project at its most basic level to the MassHighway District Office and MPO staff. Through this process, MassHighway and MPO staff can provide guidance for project scoping and planning considerations, in addition to suggestions for likely steps needed for project approvals. This guidance can be very valuable, especially if given before the proponent invests significant time and resources in the project design. The MassHighway and MPO staff suggestions at this stage can go a long way in ensuring the project’s success.

Through this review, the proponent may be asked to answer questions that arise from the PNF review, to provide further documentation on the alternatives considered, and/or to complete (additional) public outreach.

After the Project Need Form has been reviewed and evaluated by the MassHighway District Office, a project requiring further planning would move into Planning (Step II). Some projects that are straightforward, or are supported by prior planning studies, are expected to move directly to Project Initiation (Step III).
Step I Outcomes:
The following are potential outcomes from Step I of the development process:

- Agreement by the project proponent and the District on the problem and project definition (extent and magnitude) to enable it to move forward into design (no further planning required); or
- Determination that there is a problem, need, or opportunity to address but further project planning is warranted to better define the project; or
- Advice on alternatives to consider and the planning process; or
- A recommendation that the project be dismissed from further consideration. (For example, the proponent’s analysis may reveal that the projected negative impacts outweigh the expected benefits, thus reducing the project’s likelihood for approval in the subsequent review and programming phase).
2.2  Step II: Planning

In this phase, the proponent identifies issues, impacts, and potential approvals required so that subsequent design and permitting processes are understood. Project planning also helps to define project responsibilities and benefits through a simultaneous public outreach process to obtain input and feedback on planning and design considerations. Providing public outreach opportunities throughout the entire project development process makes project success more likely.

The Project Need Form and its review will outline the scope of issues to be considered in the planning phase. The level of planning needed will vary widely based on the complexity of the project (from streamlined to more involved and complex). A more involved alternatives analysis is integrated as part of the planning process for all new facilities. It is also required for improvement or expansion projects where the feasibility of achieving the desired enhancements with acceptable impacts and reasonable investment is unclear at the outset. During the review of the Project Need Form, the necessary level of effort and responsibilities for planning will be determined. Typical planning requirements for different project types are illustrated in Exhibit 2-3.

2.2.1  Project Planning Report

Projects that require further planning will result in the preparation of a Project Planning Report. Many traditional planning studies such as corridor studies, functional design reports, and location studies can serve as a project planning report if done in a fashion that is consistent with the principles of this Guidebook and completed with public participation.

A generalized outline for the basic project planning process is provided in Exhibit 2-4. It is expected that this outline will be tailored for each project. The process described is not intended to be overly prescriptive or burdensome. Rather, the project proponent is encouraged to tailor planning activities appropriate to the extent, complexity, and type of project to ensure that all project benefits, impacts, and costs are objectively estimated. As part of this process, the proponent must also conduct a public participation program, provide information regarding the project’s consistency with state and regional policies, and decide, based on all the information gathered in the planning process as well as public input, whether to continue the project development process and submit a Project Initiation Form (PIF) under Step III. Regular check-in meetings with the MassHighway District Office are helpful throughout this process.
Exhibit 2-3
Likely Planning Approaches for Different Types of Projects

<table>
<thead>
<tr>
<th>System Preservation</th>
<th>Likely Planning Approach</th>
</tr>
</thead>
<tbody>
<tr>
<td>Project Need Form</td>
<td>Project Planning Focused on</td>
</tr>
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<td>a Clear and Feasible</td>
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<td></td>
<td>Solution and Minor</td>
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<td></td>
<td>Variants</td>
</tr>
<tr>
<td>Roadways, Sidewalks, and Multiuse Paths</td>
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<td>Maintenance</td>
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<td>Resurfacing</td>
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<td>Reconstruction/Reconfiguration within Existing Pavement</td>
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<td>Bridges</td>
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<td>Maintenance</td>
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<td>Rehabilitation</td>
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<td>Replacement</td>
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<tr>
<td>System Improvement or Expansion</td>
<td></td>
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<tr>
<td>New Roadway or Multipe Path</td>
<td>▲</td>
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<tr>
<td>Widened Roadway, Sidewalk or Addition or Multipe Path Widening</td>
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<tr>
<td>Intersection, Roundabout, or Traffic Signal Modification</td>
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<tr>
<td>New Interchange or Interchange Reconfiguration</td>
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<tr>
<td>Median, Roadside Safety, or Signage Improvements</td>
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</tr>
<tr>
<td>Traffic Calming, Streetscape, Lighting, or Transit Enhancements</td>
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</tr>
<tr>
<td>New or Widened Bridge</td>
<td>▲</td>
</tr>
<tr>
<td>New or Expanded TDM/Park-and-Ride Lot</td>
<td>▲</td>
</tr>
<tr>
<td>New or Expanded Traffic Management System</td>
<td>▲</td>
</tr>
</tbody>
</table>

▲ Required
★ Suggested for projects categories indicated and required for more complex projects with each category

Source: MassHighway

The detailed steps in the planning process, as outlined in Exhibit 2-4, are further described in the following pages.

2.2.1.1 Part A: Define Existing Context, Confirm Project Need(s), Establish Goals and Objectives
The first step is to confirm project need through an inventory of existing conditions. Once the project need is confirmed, the proponent should clearly articulate the goals and objectives for the project. The level of alternatives analysis and detail necessary for developing the Project Planning Report is directly related to the complex or straight-forward nature of the project.

Inventory and Data Collection/Site Walk
A site visit should be the first step in project planning as it provides an opportunity to view the project area with local project constituents and technical specialists familiar with the features or concerns related to the project. Information should be compiled or collected to provide the range of data appropriate for the project.
Exhibit 2-4
Overview of Project Planning Tasks

**Part A: Define Existing Context, Confirm Project Need(s)**
- Establish Goals and Objectives
- Inventory and Data Collection/Site Walk
- Definition of the Community Context
- Definition of Transportation and Land Use Functions
- Project Goals and Objectives

**Part B: Initial Public Outreach**
- Early Local Issues Meeting
- Environmental Agencies Coordination
- Individual Outreach Meetings

**Part C: Project Definition**
- Development of Alternatives (if necessary)
- Establishment of Basic Design Controls and Evaluation Criteria
- Define Future Conditions (if necessary)
- Screening of Alternatives
  - Project benefits
  - Project Impacts
  - Consistency with appropriate policies and plans
  - Cost

**Part D: Project Review and Refinement**
- Project Presentation Meeting
- Resource Agencies Coordination
- Alternative Refinement
- Concept Engineering Plans
- Evaluation Matrices

**Part E: Final Recommendations**
- Project Definition
  - Description of the proposed project and project alternatives considered
- Project Benefits and Impacts
  - Consistent with appropriate state and regional criteria
- Project Consistency with Policies and Local Plans
  - Consistency with appropriate State and Regional policies and plans
- Public Participation Process
  - Documentation of planning public participation process
- Final Recommendations

Source: MassHighway
Key items to investigate during a site visit are described below:

- Context resources (environmental, cultural, historic, and man-made constraints) are mapped for the project area.
- Travel demands (for all modes) and crash data are necessary to identify any capacity and/or safety problems, or potential safety problems.
- Pavement and structure sufficiency and inventory information is helpful in determining the extent of treatment necessary for these features. A pavement management system evaluation and rating is recommended, along with photo documentation of the site.
- An access audit to survey accessibility elements such as: curb ramp locations, slopes, and obstacles; location of crosswalks; audible signals; transportation signage; sidewalk width, slope, and obstacles; connectivity; and driveway/sidewalk intersections.
- Hydraulic analysis to help to determine hydraulic adequacy of the structure or the effect on the floodplain where bridges or structures are involved.
- Right-of-way information helps to identify property owners and property lines.

Utility information is useful in determining any special needs required for utility relocation(s).

A detailed survey of the project area helps to identify the location of various features and resources potentially affected by the proposed improvement (although it is not necessary at this point in the project development process).

**Definition of Community Context**

It is important for the project proponent to understand the planning context, land uses, and character of the project location and surrounding community. Local knowledge or a site visit is important in understanding surrounding land uses and community character. A USGS topographic base map, GIS mapping information, and orthographic photos can be used to identify and document various aspects of the area. These guides can show surrounding land uses and land cover (open fields, forest and forest type if known, agricultural land, town, village, city, or commercial corridors); visually distinct areas such as buildings, land forms, valleys, hilltops, notches, water bodies, rivers, streams, and watercourses; prominent views and vistas.
along the road; public facilities or places; recreational facilities; trees; and the relationship to intersecting roads and activity centers. Some of this information may also be available from the previously completed PNF and Transportation Evaluation Criteria Form. Understanding the project context is further described in Chapter 3 of this Guidebook.

**Definition of Transportation and Land Use Functions**

It is important for the project proponent to understand the multi-modal aspects of the project location. During the site visit, the project proponent must be cognizant of bicycle and pedestrian movements, or the potential for these movements, and public transportation availability. The proponent should also be aware of the proximity of connection points for other modes of freight and passenger transportation.

Any transportation solution must conform with local and regional plans. Pertinent sections of the local and regional land use and transportation plans should be reviewed as part of project planning. This includes transportation and land use, local and regional policies as they relate to the project location, the roadway involved, the city or town, and the region. Designated growth areas, historic districts, designated scenic roads and areas, unique natural areas, agricultural conservation districts, and areas designated for future access management by official city or town maps should be acknowledged in the vicinity of the project location. It is important that future planned land uses be understood and the city or town’s and region’s goals for growth, protection of natural and historic resources, and future transportation facilities be acknowledged. The relationship between transportation facility function and land use is further described in Chapter 3.

**Project Goals and Objectives**

From information obtained during data collection and the input received at the Early Local Issues Meeting (as discussed below), the project proponent will define goals and objectives for the project consistent with the plans and policies of the state and local community. This statement will be the crux of the definition and evaluation of alternatives and the development of the Planning Report.

The project goals and objectives statement is similar in form and function to the purpose and need statement of an environmental document and is suitable for use in these documents if they are required for the project. The problem must be adequately explained, identified, and described. The needs for the project must conclusively show that
the project is justified. The language should be clear and understandable to the layperson.

2.2.1.2 Part B: Initial Public Outreach

Public outreach and input in a project should begin early in project planning and before there is a recommended course of action. This process starts with an early informational meeting and continues at strategic milestones during the planning process. Effort should be made to reach a broad spectrum of interested parties at this early project stage. Planning for larger or more complex projects might also be well served by the establishment of an advisory Task Force or Steering Committee at the outset.

General public outreach guidelines and tools are described in Section 2.9 of this chapter.

Local Issues Meeting

A “Local Issues Meeting” should be held early in the planning process, aimed primarily at gathering local and regional comments. This meeting is not a forum to present proposals or develop solutions. (For larger projects, or for those that cross multiple jurisdictions, more than one Local Issues Meeting may be required.) This meeting should also serve to foster a working relationship with local community members. This is accomplished by listening to issues and ideas and making every attempt to incorporate sound and cost effective suggestions into the analysis of alternatives.

Comments from the Local Issues Meeting need to be documented and made available to all who were present, or to those who request them. The minutes of the Local Issues Meeting should be included in the Planning Report and kept at an accessible central location at the municipal offices. Following the Local Issues Meeting, the project proponent must evaluate the comments received and ensure that appropriate details are integrated into project planning. Once the issues have been identified, one of the project proponent’s biggest challenges is to balance these issues with all of the other project issues and work to incorporate community concerns in project decision-making and design, as appropriate. It is important to give due consideration to all comments expressed through the public process.
Environmental Agencies Coordination

Regulatory agencies that have a role in protecting the state’s resources and a responsibility to issue permits for transportation projects that affect these resources, in coordination with local, regional, and state resource staff, may provide available research information for the Local Issues Meeting. Depending on the complexity of the project and resources present in the project area, these agencies should be invited to the meeting and given an opportunity to present issues or concerns, either in writing before the meeting or in person at the meeting. The agency’s preliminary comments regarding whether resources are present in the problem area and their extent and potential significance is valuable insight at this stage of project development. The resource agencies should be given as much advance notice of the meeting as possible.

Ideally, environmental issues are identified through this process and public response to the issues is sought, as appropriate, at the meeting. However, the formal inter-agency discussion and resolution of regulatory issues occurs during later steps in the Project Development Process (see Section 2.4.2).

Individual Outreach Meetings

There may be key individuals, local officials, agencies, or advocacy groups that may not be at the Local Issues Meeting but who may be worth seeking out for valuable input. These individuals or groups are often identified at the local meeting by a local official or resident saying “you should really speak to so and so…” The project team should allow time to conduct informal outreach meetings to round out its understanding of project issues, opportunities, and constraints. Any significant issues that develop out of the individual meetings should be recounted to the community as the process evolves.

2.2.1.3 Part C: Project Definition

After initial public outreach, the next steps are to refine project goals and objectives, review alternatives, and define the project. These steps should reflect comments received during the public and agency outreach described above.

Development of Alternatives

Several reasonable build alternatives might need to be investigated and considered. Alternatives should be developed using the design
guidance provided in subsequent chapters of this Guidebook. In some cases, only cursory review of alternatives may be required.

Many resources are available to the designer in this Guidebook to support the development of these alternatives. In particular, Chapter 3 presents guidance on the basic design controls that should be considered when establishing alternatives. Chapter 5 of this Guidebook provides insight into the spatial requirements for different user groups and how space might be shared or separated by user group within the right-of-way. Chapters 6 and 7 provide detailed guidance on intersection and interchange treatments. Initial planning concepts should be developed in accordance with the appropriate design guidance provided in this Guidebook to accurately reflect their spatial requirements, impacts, and benefits.

If one or more build alignments are developed, they should include the following information:

- Alternative typical roadway sections addressing the needs of all users.
- Multi-modal accommodation and operational assumptions regarding allocation of right-of-way, traffic controls, and enhancements.
- Accessibility issues, especially slope or cross-slope concerns that may be difficult to resolve.
- Compatibility with adjacent land uses and its associated activity.
- Conceptual roadway or project alignment (existing and proposed), approximate limits of impact, and approximate boundaries of resources. A scale of 100 feet per inch is useful for these concepts. For smaller problem areas such as urban locations, intersections, and bridges, a smaller scale (40 or 50 feet to the inch) should be used. (Profile sheets would only be developed for the areas with proposed grade changes.)
- Critical cross-sections, defined as points where structures and resources are avoided or impacted by the typical section. Structures are defined as buildings, bridges, walls, and culverts (48 inches or larger).
- Cost estimate, in accordance with the MassHighway’s conceptual cost estimate guidelines.
The project proponent must take care to examine multi-modal needs and possibilities for improvements during the alternative development process. These possibilities are to be addressed in the planning report and the feasibility and potential of each option discussed. Transportation Systems Management, Travel Demand Management, Traffic Calming, and Intelligent Transportation Systems may also be reasonable alternatives to evaluate. If the project has any Intelligent Transportation Systems (ITS) elements, it should also be confirmed at an early stage that the project scope and design is consistent with the regional ITS architecture. (Periodic checks regarding continued conformance with the regional ITS architecture should be incorporated into each stage of the design process.)

Establishment of Basic Design Controls and Evaluation Criteria

Basic design controls serve as the foundation for establishing the physical form, safety and functionality of the facility. Some design controls are inherent characteristics of the facility (for example, its context and the existing transportation demands placed upon it). Other basic design controls are selected or determined by the designer, working with the proponent, to address a project’s purpose and need (for example, the level of service provided to pedestrians, bicyclists, and drivers). Selecting appropriate values or characteristics for these basic design controls is essential to achieve a safe, effective, context sensitive design. Chapter 3 illustrates the basic design controls and their influence on the physical characteristics of a roadway:

- Roadway Context, including Area Type, Roadway Type, and Access Control (Section 3.2)
- Roadway Users (Section 3.3)
- Transportation Demand (Section 3.4)
- Measures of Effectiveness (Section 3.5)
- Speed (Section 3.6)
- Sight Distance (Section 3.7)

Each of these basic design controls should be researched and their values established as part of the project planning process. These basic design controls, once established, are carried forward through project design.

Transportation evaluation criteria for assessing each alternative need to be established early in the planning process. The evaluation criteria discussed in Appendix 2-A-2 are useful to compare the effectiveness
and impacts of the various alternatives considered. Appropriate criteria for the project type should be carried through the planning process to assess the transportation benefits, costs, and impacts of proposed alternatives at each stage of their development. The transportation effects of projects are not the only consideration in evaluating projects. Other considerations, including the Commonwealth’s sustainable development principles, community goals, and local partnerships, should be used to evaluate projects. These criteria, as discussed in Section 2.1.3 and provided in the Appendix to this chapter, should be explicitly incorporated into the alternatives evaluation process.

**Define Future Conditions**
Projects that are developed should serve a useful function for some time into the future. Projects that involve significant capital investment are generally assumed to have a 20-year life while projects of lesser investment are generally assumed to have a five-year or ten-year life. This assumption requires the planner to anticipate what is going to happen to transportation demands in the future with and without the project to assess the project’s effectiveness at meeting needs. Chapter 3, Section 3.4, presents important considerations in forecasting transportation demand for projects.

**Screening of Alternatives**
The alternatives should be fully described with concise and illustrative graphics or plans. To the extent that project design elements (i.e., sidewalks, bike lanes, travel lanes, bridge types, etc.) are known, they should be described.

Alternatives should be developed to comparable levels and presented in an evaluation matrix. The evaluation matrix visually presents the alternatives in a manner that facilitates comparison and helps ensure that the impacts of each alternative are consistently considered for the purposes of screening the best option among all of the alternatives.

The project’s effects should be described to the maximum extent known at this point in the planning process. The analysis that is compiled and summarized should characterize:

- Benefits
- Impacts
- Consistency with local and regional plans and policies
- Costs
The matrix should quantify resource impacts of each alternative, to the extent that they can be identified at this stage of project development. The cost of a project is a significant portion of the transportation-related decision making process and should be justified by improvements in safety, public need and/or asset management, balanced with environmental and other contextual constraints. Therefore, the cost estimate procedure must be unbiased and comprehensive (to include all engineering and permitting, right-of-way, utility relocation costs, mitigation costs, and construction costs). It must place all reasonable alternatives on the same level for fairness in the selection process. An alternative with too high of an estimate might be eliminated, while an alternative with a low estimate could be selected due to misrepresentation.

At this stage of planning, it is also appropriate to start thinking about project funding. This includes an exploration of funding sources, their requirements and restrictions, obligations for local share of project costs, other partnering opportunities, etc. Additional guidance on project estimating and funding issues is provided in Section 2.4.3.1 of this chapter.

Project review team meetings (sometimes called “planning charrettes”) may be beneficial during this phase of the planning process to review the alternative plans, cost estimates, and the evaluation matrix. If the project involves a Task Force or Steering Committee, this is an excellent opportunity to get them involved in the details of the project.

A more detailed alternatives analysis, as described in Section 2.4.2 and Appendix 2-A-3, may be necessary for complex projects, or for locations with a wide range of competing demands and numerous constraints. This process is similar to that required for MEPA or NEPA review (see Section 2.4.2 for more information on these review requirements).

2.2.1.4 Part D: Project Review and Refinement
Once alternatives have been considered and the project better defined, the proponent needs to ensure continued public and agency involvement in the project review and refinement process, as outlined below.
**Project Presentation Meeting**

The project proponent should hold a public meeting and invite the constituents as previously defined to overview the alternatives considered, the proposed project, and to solicit input.

If the project as defined is unacceptable, the project proponent should attempt to resolve any conflicts. Failing this, the project proponent should develop new alternatives and evaluation matrices, and schedule a new Project Presentation Meeting. This process should continue until a preferred alternative is determined.

During these meetings, it is helpful to provide handout materials that present the project and its alternatives so that the participants have a reference to review. A visual depiction of each build alternative is beneficial. The visual representation should be prepared so that a layperson can understand the alternative being presented. An example of how a project might be presented is provided in Exhibit 2-5. The project proponent should facilitate a discussion of how each alternative addresses the needs of the project as well as its drawbacks.

Minutes of the Project Presentation Meeting need to be documented and made available. These minutes are important to document public comments that may be valuable input to the design process and to ensure that there are no misunderstandings concerning overall public consensus on the project as defined. The minutes should be sent to all attendees, local officials, MassHighway, Federal Highway Administration, the regional planning agency, and the regulatory agencies that have project jurisdiction or special expertise, and made available to the public at an accessible municipal location. The recipients of the minutes should have a set time period from the postmarked date to contest them and add clarifications. These minutes will also be included in the planning report.

**Resource Agencies Coordination**

For projects with anticipated impacts to sensitive natural and manmade resources, this is an appropriate time in the process to assess future requirements for project development with affected state and federal regulatory agencies.

The proponent should solicit comments from resource agencies regarding their views on the various alternatives under consideration, the required environmental permits, and the process moving forward. If there are accessibility issues, this may be the time to request a written "Advisory
Opinion” or variance from the Massachusetts Architectural Access Board, if needed. Guidance on environmental permits, the responsible agency, and the anticipated time required to secure is provided in the Appendix to this chapter.

**Alternative Refinement**

Input received from the public or the affected environmental resource agencies may require refinement to the preferred alternative(s). These refinements may involve minor changes to previously developed concepts or the development of a conceptual engineering plan for the preferred action in greater detail. As part of this process, the evaluation matrices should be updated to reflect the project’s anticipated benefits and costs. (It is imperative that the agencies be informed of any project changes that take place during the “Project Planning” and “Project Design” phases of the development process.)

The information developed during this task should be as accurate as possible at this stage of project development as it may be the basis for early environmental documentation (such as an Environmental Notification Form/ENF) or as part of an application for project funding.
Exhibit 2-5
Example of Visual Representation of a Project Alternative

Plan View

Cross-sectional View

Source: King Street Corridor Study, Northampton, MA 2003
2.2.1.5 Part E: Final Recommendations
In this last component of the planning process, the proponent documents the process, public outreach, and decisions made, as described below.

Draft Planning Report
Following public, local, regional, and environmental agency review of the alternatives and proposed project, the planning report can be completed and made ready for review. The planning report documents the need for the project, existing and future conditions, alternatives considered, public outreach outcome, and the solution recommended. It is important that, at a minimum, the Project Planning Report summarize the:

- Project Definition:
  - Description of the proposed project and project alternatives considered
- Project Benefits and Impacts:
  - Consistent with appropriate state and regional criteria
- Project Consistency with Policies and Local Plans
- Public Outreach Process:
  - Documentation of public outreach during planning process
- Final Recommendations

The project proponent may, at their own discretion, distribute the draft planning report to the appropriate local officials, staff, or key project constituents for review.

The project proponent may also elect to have final public review of the planning recommendations by holding an additional public meeting or by notifying past project participants of the availability of the draft planning report at an accessible municipal location for review.

Final Planning Report
Upon receipt of comments and public input (if sought on the draft report), the project proponent will finalize the Project Planning Report.
2.2.2 Detailed Alternatives Analysis
A more complex set of needs may warrant a more detailed planning and conceptual engineering review of alternatives, their impacts and benefits, and implementation issues as part of the Project Planning Report. This is particularly true when it is unclear what actions are “feasible” to address the identified needs. In this case, the proponent should develop base information, document resources, and complete transportation planning analysis and conceptual engineering of the alternatives in more depth to verify “project feasibility” and the preferred action.

This level of alternatives analysis is appropriate for all new facilities and for improvement or expansion projects where the feasibility of achieving the desired enhancements with acceptable impacts and reasonable investment is unclear at the outset. The key objectives of this effort are to assess alternatives to determine their engineering feasibility, environmental impacts and permitability, economic viability, and public acceptance.

Additional details on the conduct of a Detailed Alternatives Analysis are found in Appendix 2-A-3.

2.2.3 Review of Planning Efforts
Upon completion of the project planning effort, the project proponent has essentially two options based on its outcome: delay or drop the project from consideration, or submit the Project Planning Report with a Project Initiation Form and Transportation Evaluation Criteria to the Project Review Committee and the Metropolitan Planning Organization for review, as discussed in the next section. The intent of this process is to allow the proponent to present a project for review and preliminary funding consideration.

Through this review, the PRC and the MPO can provide insight on project design considerations in addition to likely steps needed for project approvals. With this approach, valuable guidance can be provided prior to the proponent investing significant time and resources in project design.

Ideally, at this stage, the project will be well documented, locally reviewed and endorsed, and proceed to Step III: Project Initiation, as outlined in the following section.
Step II Outcomes:

The decisions that are expected at this point in the project development process are:

- Consensus on project definition (or projects, where multiple projects result from the planning process) and decision to submit a Project Initiation Form to enable it to move forward into environmental documentation and/or design; or

- A recommendation that the project be dismissed from further consideration or delayed. (This would reflect a case where the interest in the project may have waned through the Project Planning Report review if, in the sponsor’s analysis, the issues identified counterbalance the expected benefits, thus reducing the project’s likelihood for a favorable outcome in the subsequent review and programming phase.)
2.3 Step III: Project Initiation

If a community or agency is seeking to have their project constructed with state or federal funds, the project needs to be approved by the Project Review Committee, and later programmed by the MPO. The third step in the process formally begins the review and evaluation of the project by the PRC and the MPO (following their own review procedures). This step is illustrated in Exhibit 2-6.

Exhibit 2-6
Step III: Project Initiation

Source: MassHighway
2.3.1 **Project Initiation Form (Project Initiation Form)**

The Project Need Form or Project Planning Report detail the final recommendations for the project resulting from early project planning. The next step in the project development process involves summarizing the findings and direction defined in a Project Initiation Form used by the PRC and the MPO for project review and evaluation. The PIF will include the following information to be documented by the proponent:

- Project Type and Description, including locus map
- Summary of Project Planning Process
- Preliminary identification of the Project Category for review and programming purposes
- Definition of the proposed project management responsibility
- Definition of an interagency (including local boards) coordination plan
- Definition of a public outreach plan for the design process
- Project Need Form or Project Planning Report as an attachment
- Transportation Evaluation Criteria as an attachment

At this stage, the proposed project is well enough defined to be subjected to a formal review. This review will give the project proponent full consideration of the project’s viability as compared to other projects competing for limited funds. It is anticipated that advice and guidance for the next steps in the project development process will also be offered through this review. The Project Initiation Form for use in this process is provided in the Appendix 2-A-4 to this chapter.

The Project Initiation Form and the project planning documentation is reviewed and evaluated to verify needs, the effectiveness of the proposed project approach, and to provide direction on next steps. A two-step process is generally envisioned:

- The Project Review Committee reviews the project in terms of the Executive Office of Transportation’s statewide priorities and criteria, and documents its findings; and,
- The MPO reviews the Project Review Committee findings and makes a preliminary assessment of the project for funding and programming within its regional priorities (the MPO programming process is formalized under Step V: Programming). An assessment of the time frame for the project needs to be made at this point to
give the proponent a sense of when funding might become available.

The Project Review Committee, comprised of staff from MassHighway and chaired by the Chief Engineer, meets regularly to review proposed transportation projects that involve MassHighway. The PRC assesses the merits of each project using the Transportation Evaluation Criteria and within the context of statewide needs. Ultimately, the PRC must approve all projects to be implemented using state or federal funding.

2.3.2 MassHighway Project Review and Evaluation

2.3.2.1 MassHighway District Review
Copies of the PIF and project planning documents are provided for MassHighway District review. The district will identify issues for consideration by the Project Review Committee during their formal consideration of the project.

Preliminary Project Review Committee Screening
The Project Review Committee staff will conduct an initial screening of the Project Initiation Form, TEC, and the PNF or Project Planning Report for the following considerations:

- Determination of Consistency with Policy and Planning Initiatives
  - State Growth Management and Transportation Policies
  - Regional Transportation Plan
  - State and Regional modal plans and Regional ITS Architecture
  - Local Plans, as summarized by the project proponent

- Assessment of Transportation Evaluation Criteria ("Objective Criteria")
  - Condition
  - Usage
  - Mobility
  - Safety
  - Cost Effectiveness
  - Community Effects and Support
  - Land Use and Economic Development
  - Environmental Effects
2.3.2.2 Project Review Committee Review and Comment

After review and recommendation by the Project Review Committee staff, project recommendations are made for formal consideration by the Project Review Committee with respect to project funding and scheduling. The Project Review Committee will meet approximately quarterly to review Project Initiation Forms and recommendations prepared by its staff.

At this point, the Project Review Committee will provide comments to the proponent identifying additional planning needs or provide guidance for the development of the environmental and design documents. Alternatively at this point in the process, the project may be determined to be unlikely with current available funds or undesirable due to its lack of effectiveness in addressing identified needs. The Project Review Committee may also elect to forward the project to the MPO, with its comments and findings, for prioritization and potential programming, or for inclusion in its Long Range Plan. A PRC positive recommendation denotes that a project is eligible for a specific funding category. It does not guarantee that the project has dedicated funding. The most common avenue to secure funding is through the MPO process. Appendix 2-A-5 summarizes the MPO and its role in transportation decision-making and programming.

Step III Outcomes:
The outcomes that are possible at this point in Step III of the project development process are:

- Guidance and support to move the project forward into design and programming review by the MPO; and
- Definition of a Project Management Plan to define roles and responsibilities for the subsequent design, environmental, right-of-way and construction steps in the process; or
- A recommendation that the project be dismissed from further consideration.
2.3.3 MPO Review and Comment

After approval by the Project Review Committee, projects to be programmed by the MPO are forwarded for review and assessment for future regional transportation resource allocations. It is expected that the MPO (and its Regional Planning Agency) will review project planning documentation and the Project Review Committee comments to start their effort. The MPO will review and assess the project in comparison to other projects under consideration in its region and determine the potential year for funding in the TIP.

The MPO will also be able to review projects that are not approved by the Project Review Committee and can provide additional comments to the proponent so that future submissions can be streamlined.

At this stage in the process it is possible but unlikely that the project would get fully programmed by the MPO. For projects given favorable review, this most often happens later during or after the design phase (see Step V).

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Step III Outcomes:

Likely outcomes from the MPO review of the Project Initiation Form and TEC in Step III of the project development process are:

- Project Transportation Evaluation Criteria Score
- Possible TIP Year
- Tentative Project Category
- Tentative Funding Category
2.4 Step IV: Environmental, Design and ROW Process

Step IV begins the process of environmental review, project design, and right-of-way (ROW) acquisition (if necessary) so that the project can be constructed. As illustrated in Exhibit 2-7, the process involves four distinct, but tightly integrated, elements:

- Public Outreach (Section 2.4.1)
- Environmental Documentation and Permitting (Section 2.4.2)
- Project Design (Section 2.4.3)
- Right-of-way confirmation/acquisition (Section 2.4.4)

Public outreach activities and requirements are integrated within each of the technical tasks. This continual involvement will help to ensure the project’s ultimate success.

Although the technical requirements for environmental, design, and ROW efforts are presented sequentially in this Guidebook, these activities are conducted concurrently and in a coordinated process to ensure that the ultimate project is acceptable, constructible, permittable, and addresses the customer’s needs. All these activities are keyed to the design process schedule. The fundamental design steps are outlined in Exhibit 2-8 and may vary somewhat depending upon project characteristics. Ideally, this work should immediately follow the planning effort to take advantage of both existing conditions research and public support/consensus about the need for action.
Exhibit 2-7
Environmental, Design and ROW Processes

PROJECT DESIGN, ENVIRONMENTAL AND RIGHT-OF-WAY PROCESSES

Design

25% Plans

75% Plans

100% Plans

Environmental Documentation and Permitting

Local Agency Coordination MEPA/NEPA Documentation

Prepare Preliminary Resource Area Permit Applications

Submit Permit Applications

Right-of-Way

Preliminary R-O-W Plans

Revised R-O-W Plans

Secure Permits

Final Plans/Acquisition

Public: Outreach

Early Coordination

Local & State Processes for Preliminary Permit Applications

Review of 25%

Review of 75% Plans, Permit Approval Process, Begin ROW Negotiation

Review of 100% Plans, Permit Decisions, Purchase and Sale or Taking

To Step V-Programming

Source: MassHighway
2.4.1 Public Outreach Plan and Requirements for the Environmental, Design, and Right-of-Way Process

Continued public outreach in the design and environmental process is essential to maintain public support for the project and to seek meaningful input on the design elements. This public outreach is often in the form of required public hearings, but can also include less formal dialogues with those interested in and affected by a proposed project.

A public hearing, or opportunity for a public hearing, is required by state law for all highway projects as part of a process that also encourages a variety of citizen involvement techniques such as informal public meetings, briefings, workshops, or charrettes. Public hearings are legally recognized formal meetings held at particular times during the project development and design phases. A Public Hearing is required for any project that:

- Requires additional right-of-way;
- Substantially changes the layout or functions of connecting roadways or of the facility being improved;
- Has a substantial adverse impact on abutting property; or
- Has a significant environmental, social or economic, or other effect.

An additional public hearing will be provided when there has been:

- A significant change in the proposed project (or design details);
- Identification of significant environmental, social, or economic effects not considered at earlier Public Hearings;
- Substantial unanticipated development in the project area; and,
- An unusually long time lapse (for example, more than two years) since the last public hearing.
Exhibit 2-8
Design Process Flowchart

**STEP I - Problem, Need, Opportunity Identification**

**STEP II - Planning**

**STEP III - Project Initiation/PRC Approval**

**STEP IV - DESIGN, ENVIRONMENTAL, AND RIGHT-OF-WAY PROCESSES**

**ENVIRONMENTAL**

- Begin Early Interagency Coordination
- Determine MEPA and NEPA Project Category
- Determine Other Applicable Federal, State & Local Environmental Laws & Regulation
- Determine Public Hearing Requirements
- Collect/Map/Resources
- Process Environmental Documents
- Mail Permit Process
- Review Project Changes for MEPA Purposes
- Interagency Coordination
- Review Project Changes for NEPA Purposes

**DESIGN**

- Develop Cross-Sections
- Develop Construction Plans
- Develop Traffic Management Plan
- Refine Preliminary Right-of-Way Plans
- Develop Freeway Design
- Develop Final Drainage Design
- Develop Special Provisions
- Finalize Cost Estimates
- Complete Permit Processes / Obtain Permits
- Submit Construction Plans to Utilities Engineer

**RIGHT-OF-WAY**

- Review Project Planning Repackaging Project Data
- Order Necessary Survey Data
- Review Necessary Survey Data
- Coordination with Bridge Designer
- Coordination with Landscape Designer
- Develop Preliminary Design Plans
- Develop Traffic Signal Plan (if required)
- Submit 25% Package
- Conduct 25% Project Review
- Hold 25% Design Public Hearing
- Obtain 25% Project Approval
- Refine Horizontal & Vertical Geometry
- Develop Traffic Management Plan
- Through Construction Zones
- Develop Final Drainage Design
- Coordinate Utility Relocations
- Finalize Cost Estimates
- Finalize Special Provisions
- Prepare Layout Plans and Order of Taking
- Complete Constructability Review
- Finalize Construction Plans
- Finalize Cost Estimates
- Submit Construction Plans to Utilities Engineer

- Preliminary Engineering

- Begin of 75% Design Phase
- Begin of 100% Design Phase
- Final Design
- Highway Design Complete
In addition to the mandated published and posted legal notices of the hearing, the project proponent should consider using other outreach methods to attract all interested parties. If a federal Environmental Assessment or Impact Statement or state Environmental Impact Report is required, a public hearing should be held during the period of the public review. The public would then have the opportunity to comment on the impacts of the project as well as the project design.

Early coordination and public information is particularly important for projects requiring the filing of a Coast Guard Permit. The requirement for securing a Coast Guard Bridge Permit should be identified early in the design process prior to the 25 Percent stage. The appropriate level of information should be provided to the Coast Guard to allow them to advertise the Public Notice to Mariners. The 25 Percent Design Public Hearing can then be held as a joint hearing with the United States Coast Guard. The Design Public Hearing Notice should also include a statement that the project will require a Coast Guard Permit and that the Design Public Hearing will serve as a public forum to comment on the Coast Guard Permit process.

There are many opportunities for public meetings or hearings on the project throughout the project development process as described in Section 2.9 of this chapter. All meetings should be held in accessible locations with materials relevant to the meeting made available in alternative formats upon request. Key public meetings during the environmental/design/ROW process are discussed below:

- **Location/Design Public Hearing** — A Location/Design Public Hearing signals a decision point for major projects and is held after an environmental document is circulated, but before MassHighway is committed to a specific alternative from among the reasonable and feasible alternatives under consideration, including the No-Build alternative. The hearing(s) is usually held during the planning process but can also be held during preliminary engineering.

  This Public Hearing provides the public the opportunity to provide input into the determination of the need for, and the location and design of, a proposed project. It also serves as a means of summarizing any previous comments and concerns relative to the alternatives under consideration, and provides a formal review of the major points being addressed in the environmental document.
- **Design Public Hearing** — A Design Public Hearing is held for all projects subsequent to the review and acceptance of the 25 Percent Design Plans by MassHighway.

- **Permit or Clearance Hearings** — Many of the specific environmental review requirements for projects have their own public outreach requirements. These requirements must also be satisfied to obtain the necessary environmental permits and clearances.

Public meetings, open houses, briefings or workshops or other informal gatherings of MassHighway officials, public officials, and local citizens to share and discuss proposed actions are encouraged. These alternative outreach approaches are discussed in Section 2.2 of this chapter.

### 2.4.2 Environmental Documentation and Permitting

Early involvement by the project proponent to understand and develop a plan of action to address the anticipated environmental consequences of the project is essential. This effort can also shape a more environmentally responsive and sustainable design. This section describes some standard procedures which help to identify initial project design parameters, initiate early coordination with the community to identify issues specific to the project, and define essential information to incorporate into the 25 Percent Design to initiate early environmental reviews.

#### 2.4.2.1 Early Coordination

Early coordination requirements by the project proponent are described on the following pages (some of this may already have been completed as part of project planning):

- The designer must initiate early coordination with the local environmental boards and commissions to review the project area and identify any specific issues or concerns.
- The designer should initiate early coordination with the appropriate local historical commission(s) by requesting their review and comment on the proposed scope of work and/or a locus plan showing project limits and should copy the State Historic Preservation Officer (a standardized letter is included in Appendix 2-A-6 of this chapter).
The designer should consult with the MassHighway Cultural Resources Unit for early coordination with the Tribal Historical Preservation Officer (THPO), if necessary.

The designer will send copies of the proposed scope of work and a locus plan showing project limits to other environmental agencies to initiate early coordination.

For projects affecting rivers and streams, the proponent should consult with the Massachusetts Department of Fish and Game (Riverways Program), Division of Marine Fisheries (marine resources, especially diadromous fish), National Heritage and Endangered Species Program (Biomap and Living Waters Analyses), and the National Park Service (Wild and Scenic Rivers System).

All correspondence from the early coordination tasks should be documented, copied to key project participants, including MassHighway’s Project Manager, the District Office, and the MassHighway Environmental Section, and made part of the project’s permanent record.

2.4.2.2 Determine MEPA and NEPA Project Category

MEPA Determination
The designer, in coordination with the MassHighway Environmental Section, will be responsible for determining the MEPA and NEPA project category. The designer should obtain or develop the necessary information to enable this determination to be made. The type of information needed is discussed with the MassHighway Environmental Section. All environmental review and permit submissions and coordination with the agencies will be made through the MassHighway Environmental Section. Copies of all applications, submissions, and permits will also be sent to the District Environmental Engineer.

A determination should be made, in compliance with the MEPA regulations, whether the project: (1) does not trigger MEPA jurisdiction, (2) exceeds the ENF review thresholds, or (3) is a categorical inclusion and requires an EIR. MEPA Review Thresholds are provided as an attachment to this chapter.

Some of the ENF review thresholds are based on the amount of wetland impact proposed. Therefore it is critical for the designer to know the
square footage or number of acres of wetland alteration at the time of the
determination of MEPA project category. This information will help the
designer to determine whether (a) a variance from the Wetland
Protection Act is needed or (b) a Superseding Order of Conditions is
needed. If a variance or Superseding Order of Conditions is needed, then
MEPA review is required.

If it is determined that the project exceeds the MEPA review
thresholds, the designer should prepare an Environmental Notification
Form (ENF) and submit it to the MassHighway Environmental Section
for processing at the Executive Office of Environmental Affairs (MEPA
Unit). After the consultation and scoping period, EOEA will determine
whether an Environmental Impact Report (EIR) is required. If, prior to
filing, it is determined that the project is a categorical inclusion, an
ENF and an EIR are required. A mutual decision will be made at that
time if the designer or the Environmental Section will be responsible
for the preparation of the ENF and EIR. Classification of a project in
accordance with the MEPA review thresholds should be discussed with
the MassHighway Environmental Section.

**NEPA Determination**

If the project involves federal funds or other federal action, a
determination should also be made regarding compliance with the
National Environmental Policy Act. A determination should be made in
accordance with the regulators of the lead federal agency regulations
(in most cases, FHWA) whether the project:

1. is a categorical exclusion (CE) (Class II action) and does
   not require federal agency approval,
2. is a CE (Class II action) but requires additional
documentation and FHWA approval,
3. requires preparation of an Environmental Assessment
   (EA) (Class III action), or
4. requires preparation of an EIS.

As indicated in the "Begin Interagency Coordination Section," an
agreement should be reached with the appropriate federal agencies on
the NEPA project category. The MassHighway Environmental Section
will facilitate such an agreement.
The designer is responsible for the preparation of the necessary CE documentation. The scope and details about CE documentation, EAs, EISs, and the NEPA process must be coordinated with the MassHighway Environmental Section.

2.4.2.3 Determine Other Applicable Federal, State and Local Environmental Laws and Requirements
The proponent, or their designated designer, in coordination with the MassHighway Environmental Section, will be responsible for identifying and complying with all other applicable federal, state and local environmental laws and requirements. A list of potential environmental permits/clearances based on project funding is provided in the Appendix to this chapter.

The project proponent should develop a checklist of the anticipated environmental documentation and permits and schedule a coordination meeting to review these assumptions and their requirements with the MassHighway Environmental Section. A brief description of the Federal and State Laws and Requirements, their common regulatory thresholds, and environmental clearance timelines are provided in Appendix 2-A-6.

2.4.2.4 Process Environmental Documents
The project proponent is responsible for the environmental documentation needed for the MEPA and NEPA processes and other required permits and clearances. Preparing and processing this environmental documentation should occur concurrent with the development of the 25 Percent Design plans.

For the MEPA process, the environmental documentation may include (1) an Environmental Notification Form and (2) A Draft Environmental Impact Report and a Final Environmental Impact Report. For the NEPA Process, the environmental documentation may be (1) documentation for a categorical exclusion, (2) an Environmental Assessment, or (3) a Draft Environmental Impact Statement and a Final Environmental Impact Statement. A determination of the environmental documentation required is described above. Additional details about the MEPA and NEPA processes can be found on the internet (for MEPA, see www.mass.gov.envir/mepa; for NEPA, see http://environment.fhwa-dot.gov/projdev).
Interagency Coordination

Project delays can be minimized by early and on-going coordination with Federal, state, and local agencies with jurisdiction by law or special expertise. Proponents should consult the MassHighway Environmental Section, or its website, regarding this effort. If, for some reason, coordination with resource agencies did not take place in the planning process, the early steps of the design phase offer another key opportunity to perform necessary interagency coordination with resource agencies to:

- Use their technical expertise
- Reach agreement on the determination of NEPA project category
- Perform field investigations
- Discuss existing environmental deficiencies
- Determine which issues and concerns are most important
- Discuss avoidance alternatives and minimization measures
- Discuss need for wild life accommodation (see Chapter 14 and Exhibit 14-1)
- Determine which appropriate mitigation measures should be evaluated
- Determine the likelihood of obtaining any necessary permits

For projects involving Environmental Impact Statements, the appropriate time to initiate interagency coordination is during scoping. Scoping is the required process of determining the range of alternatives and impacts that will be considered in that document.

For other projects, a consultation meeting scheduled with the MEPA Office of EOEA is a good time to begin interagency coordination. All interagency coordination should be documented. In all cases, coordination with environmental resource agencies and boards should take place before completion of the preliminary (25 Percent) design.

2.4.2.5 Environmental Requirements for the Preliminary (25 Percent) Design Submission

Appendix 2-A-7 provides detailed information concerning environmental elements of the project to be included with the 25 Percent Design Submission to assist in the identification of project impacts and to expedite environmental clearances. Also included in Appendix 2-A-7 is a 25 Percent Design Submission Checklist.
The designer should also consult MassHighway’s website for additional useful information (www.mass.gov/mhd/). Copies of all correspondence during information gathering should be made part of the project’s permanent record.

2.4.2.6 25 Percent Submission Environmental Review
MassHighway’s Environmental Section will evaluate the data collected during the 25 Percent Design process and the plans submitted. They will determine whether the project can be designed to desired design criteria, or if design changes or mitigation plans will be required to resolve environmental issues and community concerns.

If the 25 Percent Design package is a resubmission for a project that has already been reviewed, the designer will also distribute to the MassHighway Environmental Section a summary of any proposed design changes to any previous submissions for the project.

Review Project Changes for MEPA Purposes
After the initial MEPA project category determination and MEPA processing, the designer, in coordination with the MassHighway Environmental Section, will have responsibility to periodically review changes to the highway project during the design phase to determine whether future MEPA review is needed. If there have been changes to the original project and the project was statutorily exempt or categorically excluded from the MEPA regulations then the designer must determine whether the changed project is still statutorily exempt or categorically excluded. If so, then no further MEPA review is necessary at that time. If the changes are such that the project now exceeds the review thresholds, or is now a categorical inclusion, then further MEPA review is necessary. The designer should refer to the Determine MEPA and NEPA Project Category (described above), discuss with the MassHighway Environmental Section, and take the appropriate action.

If the original project exceeded the MEPA review thresholds or was a categorical inclusion and the project has changed, then the designer may need to prepare a Notice of Project Change (NPC) and submit it to the MassHighway Environmental Section for processing. Additional details about the Notice of Project Change are to be discussed with the MassHighway Environmental Section. Based on information in the Notice of Project Change, EOE will determine whether the change in
the project or change in the ambient environment significantly increases the environmental consequences of the project and warrants resubmission of an ENF, re-scoping, supplementary documentation, or a further EIR.

There are cases where a project involving wetlands originally did not exceed the MEPA review thresholds for highway projects and wetland permits (i.e., it was a categorical exclusion) but now requires further MEPA review because the wetland permit threshold is exceeded. This can happen when (1) the information about wetlands at the time of the determination of MEPA project category was unknown or incorrect (see “Determine MEPA” and “NEPA Determine Project Category” sections) or (2) when the project changes and the wetland impacts change.

Also, even if no changes are made to a project that requires an EIR, further MEPA review may be necessary. If more than three years have elapsed between the filing of a Final ENF and the filing of a Final EIR, or if more than five years have elapsed between the filing of a Final EIR and a substantial commencement of the project, the designer, through the Environmental Section, must notify EOEA. EOEA will consult with MassHighway, agencies, and persons who previously participated in project review and will determine whether the lapse in time or change in the ambient environment significantly increases the environmental consequences of the project and warrants resubmission of an ENF, re-scoping, supplementary documentation or further EIR.

The MEPA process can be time-consuming and result in design changes to the project. It is, therefore, critical that the designer perform this periodic review often, whenever a project change is contemplated. At a minimum, the designer should perform this review at the 25 Percent, 75 Percent, and 100 Percent Design phases.

**Review Project Changes for NEPA Purposes**

After approval of the categorical exclusion determination, FONSI, or Final EIS, the designer, in consultation with the MassHighway Environmental Section and FHWA, will be responsible for periodically reviewing the highway project during the design phase to determine whether or not the approved environmental document or categorical exclusion determination remains valid. The periodic review should be documented when determined necessary by FHWA. This review should occur at the same time as the review of project changes for MEPA purposes and also prior to requesting any major project approvals from
FHWA (i.e., authority to undertake final design, authority to acquire a significant portion of the right-of-way, or approval of plans, specifications, and estimates).

Interagency Coordination
Continual interagency coordination is imperative throughout the design phase to address issues that may affect the processing of permit applications. These issues can be discussed and resolved before they cause a critical disagreement or time delays on a specific project. Follow-up contact with resource agencies will determine whether additional information on the project is needed.

This coordination may also alleviate the need to reopen an environmental issue at the time the permit is applied for, which may be well after this issue was presumed to have been resolved in an environmental document. If interagency coordination is performed properly, there should be no surprises during the permitting process.

2.4.2.7 Define and Initiate Permit Process
Environmental clearances and permits should be secured as early on in the design process as is practicable. When used in this Guidebook, the term "Permit Process" refers to any process or regulatory program that involves obtaining a permit or some other type of sign-off from a federal, state, or local agency. The following are examples:

- Section 4(f) Approval
- Section 404 Permit
- Coast Guard Bridge Permit
- Section 10 Permit
- Section 106 Clearance
- Water Quality Certification
- Coastal Zone Management Concurrence Determination
- Wetlands Order of Conditions/Resource Area Delineation
- Chapter 91 License or Permit
- NPDES Permit

Identification of applicable permits is completed prior to the 25 Percent Design Submission. Initial coordination, data gathering continues throughout the design process. Formal submission of applications to regulatory agencies should be done as soon as the required information is
available, but no later than the 75 Percent Design Submission. The project proponent is responsible for obtaining all required permits.

Each permit process is unique and involves interagency coordination, information submission, possibly special public hearings, and specific forms or applications. Additional details of the permit process are provided as an attachment to this chapter or may be obtained from the MassHighway Environmental Section or on their website. It is critical that the Coast Guard Bridge Permit process start during the development of the 25 Percent Design. When a Bridge Permit is required, the Coast Guard has to publish the Public Notice to mariners and requires the critical elements, as indicated in the Coast Guard Public Notice checklist included in Appendix 2-A-7, be provided. (It is most useful if the Coast Guard Permit hearing be held concurrent with the 25 Percent Design Hearing, as discussed previously).

A good first step in this process is to develop an environmental permit checklist that indicates all environmental permits or clearances required and not required for the project (see also Appendix 2-A-7).

2.4.2.8 Complete Permit Processes
During the period from 25 Percent but no later than 75 Percent Design, the designer will complete and submit all necessary forms or applications to the appropriate agencies for the required permits. Permit applications (including subsequent copies of all completed correspondence, etc.) and permits will be copied to the appropriate District Environmental Engineer.

2.4.3 Project Design
The Project Design Process is fully described in Exhibit 2-8, presented earlier in this section. There are generally three major phases of design, including:

- Preliminary Design (25 Percent Submission)
- Final Design
  - 75 Percent Submission
  - 100 Percent Submission
- Plans, Specifications, and Estimate (PS&E)

If the project is being designed by a municipality, they should consider retaining a MassHighway qualified designer. As the project moves into design, the project defined in the Project Planning phase is developed in
more detail and design documents for the project are produced. It is imperative that the designer is knowledgeable about the context of the project, about the issues raised during planning, and about the desires of the community, MassHighway, and the regulatory agencies concerning project implementation prior to initiating the design.

Title sheets to all plans (with the exception of the final stamped mylars) should be stamped with the design stage (25, 75, 100, PS&E) and date.

2.4.3.1 Preliminary Design Process (25 Percent)
The first step in the design process is referred to as preliminary design and results in the submission of 25 Percent Design plans. The following activities are necessary to develop the preliminary (25 percent) project design.

Order Necessary Survey Data
If existing survey data is not adequate to design the project, the project proponent must obtain additional survey data. This data may be in the form of either a sufficiently detailed aerial or ground survey. If the project proponent is MassHighway, the request is made to the Survey Section, providing as much specific project location data as possible. All survey work, whether completed by the designer or MassHighway, must be in accordance with the MassHighway Survey Manual.

Prepare Base Plans
This activity includes checking field notes, establishing coordinates, determining the scale used in plotting, and plotting the survey on base plans, base profiles, and base (original ground) cross-sections. Work involved in plotting includes computing and adjusting the baseline, traverses and levels. Details on base plan preparation are included in Chapter 18 of this Guidebook.

Request/Compile Necessary Traffic Data
The designer must obtain data on the transportation operational characteristics for the project area. These data are likely available from the Project Planning phase. For more information, please refer to Section 2.2 or Chapter 3, Section 3.4 of this Guidebook and the Traffic Section of MassHighway’s 25 Percent Design phase submission requirements provided in the Appendix to this chapter. Both existing
and projected transportation data is requested for all modes of travel using the facility.

**Develop Horizontal and Vertical Geometrics**

The designer must develop the basic roadway horizontal and vertical geometry. All geometric data must be calculated at this stage (stations, bearings, distances, horizontal and vertical curve data, etc.). The design criteria are discussed in Chapter 4.

**Develop Typical Cross-Sections**

Typical cross-sections are developed based on design requirements. Typical cross-sections show design elements that will predominate throughout the project. For additional detail, the designer should refer to Chapter 5. Particular attention should be paid to multimodal accommodations in the definition of these cross-sections and work completed during the planning phase to address user needs.

The designer should also seek to minimize impacts to utilities, to the extent feasible and without compromising user accommodation, as utility impacts can significantly contribute to project costs and delays.

**Coordination with Bridge Design**

The structural designer (if applicable) should be engaged early on in the development of typical cross-sections and horizontal and vertical alignments to integrate roadway and structural elements of the project.

**Coordination with Landscape Design**

If landscape designers have not been previously involved in the project, they should be consulted at this point to assist integration in the roadside, structures, urban design and scenic consideration into geometric design (horizontal, vertical, and cross-sectional elements). Additional guidance on landscape design is provided in Chapter 13 of this Guidebook.

**Develop Draft Traffic Signal Plan (if required)**

A Draft Traffic Signal Plan is developed based on guidelines provided in the most current version of the *Manual on Uniform Traffic Control Devices*. This plan shows the proposed placement of traffic control devices and is based on traffic counts, turning movements, warrants, and capacity analyses. This is in accordance with the "25 Percent Submission Guidelines" prepared by the MassHighway Traffic Section.
**Develop Bridge Type Studies and Sketch Plans for Bridges, Culverts, and Walls (if required)**

Based on guidelines provided in the *MassHighway Bridge Manual*, bridge type studies must be developed for bridges, culverts and/or walls which are not included in the *MassHighway Construction Standards*. The Type Studies are a preliminary presentation of the overall concept of the proposed structure which shows all pertinent details for the preparation of sketch plans and contract plans. The MassHighway Bridge Section has recently streamlined this process for routine bridge replacement projects. (See the *MassHighway Bridge Manual* for more information.)

The project proponent should also be familiar with the guidelines for Wildlife Accommodation (Chapter 14), if applicable, and the regulatory requirements of the Army Corps of Engineers and U.S. Coast Guard for locations over wetlands and waterways.

**Develop Preliminary Pavement Design**

The pavement design anticipated for the project needs to be developed including determination of rigid or bituminous pavement and a design section. Chapter 9 details the appropriate pavement design to be completed at this stage of design.

**Develop Preliminary Right of Way Plans**

Right-of-way requirements for the project should be estimated at this stage in design. Preliminary 25 Percent plans should include:

- Parcel Numbers
- Dimensions for all proposed acquisitions
- Areas of anticipated takings and easements

**Develop Preliminary Cost Estimate**

The proponent should prepare a preliminary cost estimate based on the latest project information. It is important that this estimate be as complete as possible based on quantity estimates and current unit prices and with contingencies. Refinements are to be expected as the design develops, but this estimate should reflect project costs as accurately as they can be defined at the 25 Percent Design stage.

This cost estimate should itemize the **participating** (costs to be covered by the anticipated funding source) and **non-participating** (costs to be covered by the proponent) items. The determination of
what work elements are eligible for funding should relate back to the project need definition. As an example, a project to install a new traffic signal to address a high crash location would likely not cover costs to install new street trees, unless they replace trees that are impacted by the signal installation. Conversely, if the project’s intent is to restore a blighted downtown area, streetscape, ornamental lighting, and pedestrian amenities would likely be appropriately included in the participating items.

For transportation improvement projects that impact existing landscape or utilities, work to restore these items is generally eligible for state or federal funding. Typical landscape restoration activities are discussed in Chapter 13. Utility costs generally include replacement-in-kind. Improvements (betterments) to municipal sewer and water systems are considered non-participating items. Relocation of overhead utilities to underground is also a non-participating item. Except for certain types of projects, streetscape amenities are generally non-participating items.

Occasionally, project proponents may seek to use materials or treatments on projects that are outside standard practices such as block pavers vs. cement concrete sidewalks, granite vs. bituminous curbing, or traffic signal posts and mast arms. Incremental costs are often calculated and considered as non-participating costs in these situations. Consideration should always be given to how, and by whom, non-standardized items are to be maintained. Early consultation with MassHighway for project-specific guidance on what elements are likely to be participating or non-participating is beneficial. The project proponent should also be aware of unique requirements or restrictions dictated by the anticipated funding category. Information on alternative funding sources which may be available to offset the costs of the non-participating items can be obtained from the Executive Office of Transportation.

**Functional Design Report**

A Functional Design Report (FDR) is a necessary component for all transportation and safety improvement projects submitted to MassHighway for 25 Percent review, including mitigation projects developed through the Massachusetts Environmental Protection Agency (MEPA) process. Roadway resurfacing, and maintenance projects are generally exempt from this requirement. Guidelines for the submission of a FDR are included on MassHighway’s website.
Design Exceptions Report
The design guidance contained in this Guidebook is intended to provide project proponents with sufficient flexibility to address the unique and diverse conditions encountered on the Commonwealth’s streets and highways; however, there may still be occasions when design exceptions are necessary. For these circumstances, the project proponent must complete a Design Exception Report as part of the FDR, as discussed in Section 2.11 of this chapter, and transmit it to MassHighway with the 25 Percent Design. Guidelines for submitting a Design Exceptions Report are included on MassHighway’s website and in Appendix 2-A-11 of this Chapter.

25 Percent Project Submission
Available layout and geometric data and reports developed in previous tasks are assembled for submission and review by MassHighway. A checklist of the 25 Percent Design submission requirements is provided in Appendix 2-A-8 to this chapter.

Submit Plans to Utilities Engineer
Concurrent with the 25 Percent submission, the construction plans should be submitted to the MassHighway Utilities Engineer as indicated in the Submission Guidelines.

25 Percent Project Review
The 25 Percent package is reviewed by FHWA, municipalities, and MassHighway design personnel, as necessary. The review is conducted to identify problems and to ensure that the project is advancing properly. Comments resulting from the review must be addressed prior to proceeding with the Design Public Hearing.

Conduct 25 Percent Design Hearing
A Design Public Hearing is held for projects subsequent to the review and acceptance of the 25 Percent Design plans by MassHighway.

Obtain 25 Percent Project Approval
The 25 Percent Design approval is the first written approval in the highway design process by MassHighway and/or FHWA. The designer must receive the 25 Percent project approval before proceeding with the project into Final Design.
2.4.3.2 Initiate Final Design (75 Percent)

Once the preliminary design has been reviewed and approved by MassHighway, the designer proceeds into the final design process, as outlined below.

*Refine Horizontal and Vertical Geometry*

The designer will refine the horizontal and vertical alignment, if required.

*Prepare Subsurface Exploratory Plan (if required)*

After the alignment, profile, location, and structure types have been defined and approved (25 Percent approval), a subsurface exploratory program is developed for the required design. Before developing the program, the designer should contact the Soils Unit of the Research and Materials Section of MassHighway to discuss the proposed program of investigations. Plans for the program are then developed and submitted to the Research and Materials Section for review and/or implementation. Information required to implement a subsurface exploratory program includes:

- Boring locations plotted on plans, including a schedule showing station, offset, highest bottom elevation, and a column for remarks and boring notes. Borings for proposed structures should also be plotted, including the footing outlines.
- The District Offices will be furnished with a list of all property owners with their mailing addresses so they can be notified.
- A list of all the utilities within the project limits (as well as the name, address, and telephone number of the appropriate utility or public official to contact) will be made available to the MassHighway Research and Materials Section to include in the special provisions of the boring contract.

For additional details, the designer is referred to the *MassHighway Materials Manual* and the *MassHighway Bridge Manual*.

*Develop Construction Cross-sections*

The proposed roadway cross-sections, based on the horizontal and vertical geometry, and the typical sections, are drawn on the base (original ground) cross-sections. These cross-sections are included as part of the contract documents.
**Develop Construction Plans**
The horizontal and vertical geometry, including the location lines, developed in the preceding activities are refined. The plans should include all drawings and data necessary for construction of the proposed project. Chapter 17 of this Guidebook provides details on construction plan requirements.

**Develop Traffic Management Plan (TMP) Through Construction Zones**
A Traffic Management Plan is required for any project which disrupts existing travel patterns during construction (this includes pedestrians, people with disabilities, bicyclists, and motor vehicles). If a project is on a local road or uses a local road for a detour, the municipality must review and approve the TMP. The MassHighway Traffic Engineer or District Highway Director reviews and approves TMPs as appropriate. Chapter 10 discusses traffic control through construction zones.

**Develop Traffic-related PS&E Data**
For projects involving lighting, traffic signals, signs, pavement markings, and traffic controls for construction operations, plans, special provisions and estimates are submitted to the Traffic Engineer for review and approval.

**Develop Pavement Design**
The designer will conduct the pavement design analysis. All pavement designs will be reviewed and approved by the MassHighway Pavement Design Engineer. The design must conform to approved MassHighway methods and must include the documentation of all background data as detailed in Chapter 9 of this Guidebook.

**Develop Drainage Design**
The designer is responsible for developing a comprehensive drainage plan that will adequately drain the roadway. In addition, the drainage plan must also protect the adjacent landowners, wetlands, and public water supplies from drainage related problems. The designer determines the sizes, types, locations, and construction details for each drainage appurtenance based on hydraulic calculations and environmental considerations. When a bridge or major culvert is involved, the MassHighway Hydraulics Section, Bridge Section and Environmental Section should be consulted. Chapter 8 of this Guidebook and the MassHighway Storm Water Handbook should be consulted prior to initiating drainage design.
Coordinate Utility Relocations
Although the Utilities Engineer provides direct MassHighway contact with the utilities, the designer may be involved in the process to ensure that the relocations are appropriate. The designer's level of effort for this activity varies with the project, the utility involved, and the type of relocation. In addition, the designer may also be involved in coordinating Force Account and Betterment Agreements.

Update Construction Plans
In addition to all of the known existing details, the plans should include the following proposed details.

- road surface
- roadway width
- centerline
- drives and walks
- traffic control devices
- edging, curbing, and berms
- drainage appurtenances
- ditches
- bicycle accommodations
- landscaping
- sub-drains
- water supply
- roadside barriers
- demolitions
- bridges
- slopes
- fences
- curb cut ramps
- pedestrian access/accessible route for people with disabilities
- wetland resource areas
- vernal pools

Chapter 18 discusses the content of the construction plans.

Develop Special Provisions
The designer develops special provisions for the project. Special provisions are used to explain conditions or special construction practices not covered in the current edition of the Massachusetts Standard Specifications for Highways and Bridges or Supplemental Specifications to the Standard Specifications for Highways and Bridges. In the preparation of special provisions, refer to Standard Nomenclature and Designation of Items. A draft copy of the special provisions must be provided at the 75 Percent submission.

Special provisions will include but not be limited to:

- Scope of Work (including locus map, project limits, and project length)
- Provisions for Travel and Prosecution of Work
- Work schedule
- List of Utility owners (with name and address, of contact person)
- List of Items which have material options
- Individual contract items not covered in Standard Specifications, or if deviations to the Standard Specifications are made. The MassHighway Standard Nomenclature booklet identifies those items specifically requiring a Special Provision
- Special Precautions (other facilities such as structural foundations, ponds, streams, etc.)
- Special permission or construction methods stipulated in the environmental permits
- Copies of Permits, Licenses, Certificates, or Orders of Conditions (when available)
- Scheduling requirements (milestones, completion dates)

The Specification Section will provide standard inserts ("boiler-plate") into the special provisions booklet.

**Update Cost Estimate**
Definitive costs for some items previously uncertain (because they depend on design features impossible to specify earlier) can now be calculated. All costs should be consolidated so that the 75 Percent estimate reflects total costs as accurately as the latest project data will allow. An update of all non-participating and participating items must be included as part of this submission.

**75 Percent Project Submission**
All materials developed for the project are compiled and submitted at this time. This includes a written response to comments received on the 25 Percent submission. A checklist of the 75 Percent submission requirements is provided in Appendix 2-A-9 to this chapter. It is also helpful in the review process if all significant changes in the design that have occurred since the 25 percent approval are summarized and explained in the transmittal letter.

**Submit 75 Percent Plans to Utilities Engineer**
The 75 Percent plans are transmitted to MassHighway’s Utilities Engineer for distribution to the affected utilities for their review. All betterments and special utility considerations are noted.
75 Percent Project Review
The 75 Percent Design Package is reviewed by the FHWA, various MassHighway sections, and municipalities, as appropriate. A coordinated on-site review with representatives of affected groups should be considered at this time, including MassHighway District construction personnel.

75 Percent Project Approval
The 75 Percent approval is granted when the plans are approximately 90 Percent complete, and all the steps between the 25 Percent and 75 Percent stages in the Submission Guidelines have been properly addressed. After 75 Percent approval, the designer can proceed with the preparation of the 100 Percent/PS&E for the project.

2.4.3.3 100 Percent and PS&E Design Package
After review of the 75 Percent Design, the designer needs to complete the following steps to complete the design process.

Develop Traffic Control Agreement with Municipality (if required)
A Traffic Control Agreement is prepared for city or town roads, if necessary. It is not required for state highway projects or non-Federal-aid projects. The agreement will define the permanent traffic control, regulations, and devices needed to ensure the system will be operated and maintained as designed. The agreement will be signed by the highest elected local authority, by the Town or City Council, by the municipal legal counsel, and by MassHighway. Copies are distributed to the FHWA, City/Town, MassHighway Commissioner, Traffic Section, and the District Highway Director.

Finalize Construction Plans
Construction plans are finalized and assembled during this activity. Final construction plan requirements are further discussed in Chapter 18.

Finalize Cost Estimates
Project quantity estimates are prepared based on a list of items compiled for the project. The designer must use a computer spreadsheet to enter the quantities and unit prices for each item. The designer must prepare a cost summary sheet. Chapter 18 describes MassHighway estimating procedures.

Submit Construction Plans to Utilities Engineer
The completed construction plans are transmitted to the Utilities Engineer for distribution to the affected utilities. All betterments and
special utility considerations are noted. For additional information, refer to the MassHighway Utility Accommodations Policy and the 100 Percent Submission Guidelines.

**100 Percent Plans, Specifications, and Estimate (100 Percent PS&E) Submittal**

The designer completes the project, checking to ensure that all information necessary to construct the project is complete and is in the proper format. All items in the 100 Percent Submission Guidelines must be submitted at this time. A checklist of the 100 Percent/PS&E requirements is provided in Appendix 2-A-10 to this chapter. Necessary copies are made and the plan is sent to the appropriate section manager for final processing.

MassHighway’s Project Manager is responsible for forwarding the specifications and estimate to the Capitol Expenditure Program Office (CEPO) for processing and then to the Specifications Section for construction advertising.

### 2.4.4 Right-of-Way

Layout plans, descriptions, and orders of taking are required to establish highway right of way for all projects which involve land acquisitions. The proposed layouts may result in changes to existing state highway layouts or to existing county, city, or town layouts, or may revise existing limited access provisions. All proposed layouts must be accurately computed. Where a project involves more than one municipality, separate layouts are required for each. Railroad baselines should be tied to the state highway layout.

The process for acquiring right of way or easements needs to be progressed as the design progresses.

#### 2.4.4.1 Preliminary Right-of-Way Plans (25 Percent Design)

When land acquisition or easements are involved, the designer must identify existing and proposed layout (locations) lines, easements, property lines, corner markings, names of property owners, access points, and the dimensions and areas of estimated takings and easements as part of the 25 Percent Design.

When land acquisitions are made by MassHighway, ROW plans are required. Specific requirements for developing Preliminary Right-of-Way Plans are provided in Chapter 18 of this Guidebook.

Preliminary ROW and/or layout plans will be prepared at 25 Percent Design to produce legible reproductions. Each sheet will be labeled “Preliminary Right of Way.”
As required by state law, when land acquisitions are made by the state or a municipality, the process should be followed in accordance with The Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1978 as amended. Certification of this layout procedure by the MassHighway Right of Way Bureau is required (MGL Chapter 81). It is advisable that the municipality work closely with the Right-of-Way Bureau during the entire acquisition process to facilitate the necessary acquisition and ensure that Federal and State requirements are met. At the initiation of the process, the municipality must designate a coordinator/liaison to work with the Community Compliance section of MassHighway.

Guidance documents for municipalities involved in property acquisition for Federal-Aid and Non-Federal-Aid projects are available on MassHighway’s website.

*Preliminary Right-of-Way Plans (75 Percent Design)*
The designer will confirm the acquisitions in the 25 Percent ROW submittal are adequate for the 75 Percent Design, or provide revised ROW Plans. ROW acquisition information will be posted on the preliminary ROW plan by the designer when the designer obtains the information.

2.4.4.2 *Final Right-of-Way Plans (100 Percent/PS&E Design)*
After the Layout or Taking documents are recorded, the preliminary ROW plan will become the final ROW plan. Each sheet of the plan will be labeled "Final Right-of-Way Plan," and the plan will be subject to any additions and revisions that may be required later. Any additions and revisions with dates will be noted. Specific requirements for the Final Right-of-Way Plans are presented in Chapter 18 of this Guidebook.

*Finalize Layout Plans and Order of Taking*
As soon as feasible after the 75 Percent project approval, Layout Plans and the Order of Taking are finalized by the designer. This involves checking the plans for completeness and preparing the Order of Taking. Layout Plans are discussed in Chapter 18.

2.4.5 *Completion of Environmental Permitting/Design/Right-of-Way Process*
The conditions under which the project design and environmental permitting are complete and approved is when all documents necessary to publish the bid documents are complete, unless otherwise directed by the Deputy Chief Engineer of the MassHighway
Projects Section, the Chief Engineer of MassHighway, or the MassHighway Commissioner.

The recommended format for submitting the final Federal Aid and Non-Federal Aid Plans, Special Provisions & Estimate are described in Chapter 18 of the Highway Guidebook and the *Standard Specifications for Highways & Bridges*.

### 2.4.5.1 PS&E Completeness Review

Upon receipt of a PS&E submittal, MassHighway will review the submittal for completeness as follows:

- Three completed copies of the PS&E.
- Bridge Section approval of the Bridge Plans, Special Provisions & Estimate.
- No proprietary items in the Special Provisions & Estimate unless they are justified as an overriding public interest. (Federal oversight projects require FHWA approval.)
- The PS&E satisfies all the latest Engineering Directives/Policies/ Codes/Manuals.
- Hazardous Materials Special Provisions & Estimate are included.
- Environmental Permits, Licenses and their conditions (if any) are included.
- Project ITS elements conform to the regional architecture.
- The Right-of-Way Certificate and its conditions (if any) are included.
- Commitment letter from the Municipality for Non-Participating funding is included.
- If Federal Aid, the project is in the current year STIP and the estimated cost is within the approved STIP amount. (For projects under $5 million, the total cost must be within $500,000 of the STIP amount; for projects costing more than $5 million, the total cost must be within 10 percent of the amount programmed on the STIP.)
- Special provisions are provided for the asterisked items in the Preliminary Estimate Proof Sheet. Care should be taken not to duplicate the standard specifications.
- Items mentioned in the Special Provisions are also in the Estimate.
The names, addresses, and phone numbers of the utilities owners, municipalities’ officials and other contact persons are in the contract.

2.4.5.2 Submission of Plans, Specifications, and Estimate for Procurement
MassHighway is responsible for submitting the final PS&E package to the Capital Expenditure Program Office (CEPO) and the Construction Contracts Section. The final PS&E is distributed when the project design is complete and all documents necessary to publish the project advertisement are in order, unless otherwise directed by the Deputy Chief Engineer of the Projects Section, the Chief Engineer of MassHighway, or the MassHighway Commissioner.

2.4.5.3 Environmental Permit Checklist Review
In addition to ensuring completeness of the design and right-of-way process, the proponent needs to ensure that all necessary environmental permits and clearances are complete.

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**Step IV Outcomes:**
A designed and permitted project ready for construction.

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Depending upon whether or not a project has been programmed, the next step in the project development process is either Step V, Programming, or Step VI, Procurement.
2.5 Step V: Programming

The programming of transportation improvements can be a complex and sometimes lengthy process involving local, state, and federal agency approvals, depending on the scope of the project. Programming, which typically begins during design, can occur at any time during the process from planning to design. Public support for the project is critical and can significantly alter the implementation process and schedule.

Once the proposed project is approved by the Project Review Committee, in Step III described previously, the PRC should notify the District and the MPO. The Metropolitan Planning Organization will consider the project’s programming schedule during its annual Transportation Improvement Program (TIP) development process. Funding for the project can be allocated once the project is placed on the TIP and the project is ready to move forward.

When a new TIP is being developed, all of the communities in the Metropolitan Planning Organization region are notified and asked to submit those projects they would like included on the TIP. This annual solicitation for projects takes place during the first three months of the calendar year. The list of projects submitted by the communities is compiled with those submitted by the MPO member agencies (the Planning Agency, MassHighway, EOT and the Regional Transit Authority), and projects that remain from the previous TIP. Regional TIPs are also amended from time to time, depending upon local needs and the status of individual projects.

The following process should be followed by the community for those projects proposed on federal-aid eligible, locally maintained roadways:

- The MassHighway District Office notifies the community and the MPO in writing if the project is approved by the Project Review Committee. (The District Office will notify the community if the project is not considered viable as a MassHighway-sponsored project and that it is more suitable as a Chapter 90 project.)
- Following MassHighway project approval, the community should contact their MPO to request that the project be placed on the TIP.
- The MPO considers the project in terms of regional needs, evaluation criteria and compliance with the Regional Transportation Plan.
The MPO votes on approving the project for inclusion in the Draft Regional TIP, which is presented to the public for review.

The MPO votes on approving the project for inclusion in the Final Regional TIP, which includes revisions based on public input.

There are several sources of funding for transportation projects. It should be noted that many other projects compete for the same money; therefore, the priority of the project will determine if it is assigned to a funding category and programmed in the TIP. Typical funding categories include:

- **National Highway System (NHS)** – Funds for projects on all National Highway System roadways. NHS roadways include Interstate routes and a large percentage of urban and rural arterials. The funding split for this program is 80 percent federal funds, 20 percent state funds. All projects on NHS roadways are to be designed in conformance with the latest edition of the AASHTO’s *A Policy on Geometric Design of Highways and Streets*.

- **Non–Federal Aid (NFA)** – Funds for construction, reconstruction, and improvement projects on roads and bridges in urban and rural areas at the discretion of the state. The state share is 100 percent of the project costs (Not typically included in TIP, except in the Boston Region).

- **Surface Transportation Program (STP)** – Funds for projects chosen by states and localities on any roads that are not functionally classified as local or as rural minor collectors. These roads are referred to as Federal-aid roads. The funding split for this program is 80 percent federal funds, 20 percent state funds.

- **Congestion Mitigation/Air Quality (CMAQ)** – Funds for projects in the Clean Air Act non-attainment areas for ozone and carbon monoxide. The funding split for this program is 80 percent federal funds, 20 percent state funds.

- **Highway Bridge Replacement/Rehabilitation** – Funds the replacement or repair of bridges based on structural adequacy, safety and serviceability. The funding split for this program is 80 percent federal funds, 20 percent state funds.

- **Interstate Maintenance (IM)** – Funds rehabilitation, restoration, and resurfacing on the interstate highway system. Also funds the reconstruction of bridges, interchanges, and overpasses along existing interstate routes and the acquisition of right-of-way. The
funding split for this program is 90 percent federal funds, 10 percent state funds.

- Federal Aid (FA) – Funding for projects that have specialized or proprietary funding or projects for which the specific federal category has not yet been identified.

There may be other applicable funding categories depending on the type of project under consideration. The project proponent should consult the regional planning agency for current information.
2.6 Step VI: Procurement

Once a design is complete, the project is organized within a construction contract, and an open invitation to bidders is published. Construction contractors may review currently available bids through Comm-PASS, the statewide procurement program maintained by the Operational Services Section.

Bids received by MassHighway are opened and reviewed, and will be awarded to the lowest qualified bidder. A current list of contracts available is maintained on MassHighway’s website (www.mass.gov/mhd.)
2.7 **Step VII: Construction**

After a construction contract is awarded, the proponent and the contractor will need to develop a construction management plan. The permitting agencies, local authorities, and affected members of the general public need to be informed of the plan. These entities should also be notified as changes in construction areas and activities occur throughout the project.

2.7.1 **Public Participation During Construction**

Before construction activities begin, the proponent and construction manager must determine the appropriate type of public notification and participation needed. Different projects result in different types of disruption to transportation and other nearby activities. For simple projects, including resurfacing, a minimal degree of public participation may be needed. For these types of projects, the proponent should, at a minimum, notify abutters of the impending construction activity.

For complex projects, the proponent may need to schedule a construction management plan meeting with abutters and other project participants (local boards, interest groups, business associations, etc.). At this meeting, the proponent can describe the types of construction activity needed, construction phasing, and durations. Issues and concerns associated with the construction period can be identified and adjustments made to the construction management program to minimize community impacts as a result.

2.7.2 **Construction Management and Monitoring**

Careful management and monitoring of construction activities is necessary for most projects to ensure that quality standards are maintained, environmental commitments honored, and community expectations are met.
2.8 **Step VIII: Project Assessment**

Project Assessment can be used as a tool to further improve the project development and delivery processes. Although completion of this process will depend upon the proponent, three important pieces of information can be gathered through this brief, informal process. These include:

- **Constituent input into project development process:**
  - Were the proponent’s expectations for guidance, review, and feedback met?
  - Was the project timeline reasonable?
  - Was the public outreach program for the project appropriate and effective?
  - Were community concerns about the project addressed and community comments incorporated into the planning and design processes?
  - Were appropriate design controls selected for determining the design outcome?
  - Was the project construction effectively managed so that community impacts were minimized?

- **Constituent review of the project design elements**
  - Was the project need addressed?
  - Is the resulting project consistent with its context?
  - What specific design elements are judged to be successful and recommended for future projects?
  - What specific design elements are judged to be unsuccessful and should be reconsidered, and why?

- **Follow-up of Punch List items**
  - Are there project elements that still need to be completed?
  - Has the project resulted in any situations requiring follow-up or adjustment to meet the original or newly-created project needs?
2.9 Public Outreach

Public outreach is anticipated throughout the project development process to ensure that the project continues to meet its intended purpose, benefits from input and feedback from interested citizens, local and regional groups, and elected officials, and maintains strong support. Public outreach is integrated into every step of the project development process defined in this chapter. This active participation will ensure a role for the public to help shape the project that emerges from the process. It is particularly important to provide opportunities for public outreach early in project planning.

2.9.1 Identify Project Constituents

Early in the project development process, the proponent should consider the public support for the project and the constituency that it serves. **Project constituents** are groups and individuals that are involved in, have an interest in, or are affected by a proposed project. They can either be formal participants in the process, or can be represented by other participants in the process. Different types of projects involve different constituents, and different levels of planning and review. Project constituents include some or all of the following entities:

- Federal Highway Administration (FHWA)
- MassHighway
- Metropolitan Planning Organizations
- Regional Planning Agencies
- Regional Transit Authorities
- Transportation Providers
- State and Federal Regulatory Agencies
- National Park Service
- U.S. Coast Guard
- Other State Authorities
- Elected Officials, Public Works Departments, Local Boards, and Commissions, including Conservation Commission
- Facility users (commuters, residents, visitors by all modes)
- Neighbors and citizen groups
- Municipal commission(s) on accessibility
- Regional Independent Living Center(s)
Advocacy and interest groups (such as local pedestrian or bicycling committees, trucking associations, preservation groups, etc.)

- Private area businesses
- Local emergency responders
- Utilities (including railroads)
- Regional watershed or river management councils

At a minimum, the proponent should contact the appropriate local planning and public works staff, planning commission chair, conservation commission chair, select board chair, and major local property owners in the vicinity of the project area to help determine initial concerns and issues. The proponent should confer with municipal officials to determine which property owners may have legitimate issues that should be addressed by the project. This effort will help identify important local groups such as neighborhood associations, business associations, historical societies, recreation and open space committees, transportation providers, and others who should be informed of the project. It is better to be as inclusive as possible early in the Project Development Process to allow the public to participate and be afforded an opportunity to contribute to the decision-making process for the project. (It should also be made clear to all those attending how comments will be treated and how any expected follow-up will be handled).

Identifying the likely parties that may have interest in the project at the beginning of the project development process helps the project proponent tailor the public outreach program appropriately. The project proponent should define a public participation plan at the outset of each step of the project development process. Tools available for this outreach are described in Section 2.9.3.

2.9.2 Public Outreach Approach

The level of interest and role of the public varies widely by project type and complexity. Exhibit 2-9 provides a public outreach matrix by project type to aid the project proponent in determining the scope of this effort at the outset. Different types of projects are likely to elicit different levels of community, resource agency, and local board interest. These project types are grouped into system preservation projects, and system improvement or expansion projects with guidance provided on the appropriate level of public outreach, as explained further in the following paragraphs.
### Necessary and Recommended Public Outreach Approaches

<table>
<thead>
<tr>
<th>System Preservation**</th>
<th>Roadways, Sidewalks, and Shared Use Paths</th>
<th>Bridges</th>
<th>System Improvement or Expansion</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Notify abutters and utilities of construction impacts*</td>
<td>Community notification and involve abutters</td>
<td>Early involvement of Local Boards/Commissions</td>
</tr>
<tr>
<td>Maintenance</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>Resurfacing</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>Reconstruction/Reconfiguration within Existing Layout</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>Maintenance</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>Rehabilitation</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>New Roadway or Shared Use Path</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>Widened Roadway or Shared Use Path Widening</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>Intersection or Roundabout Improvements</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>New Interchange or Interchange Reconfiguration</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>Roadside Safety, Sidewalk or Signage Improvements</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>Traffic Calming, Streetscape, Lighting, or Transit Enhancements</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>New or Widened Bridge</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>New or Expanded TOD/Park &amp; Ride Lot</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>New or Expanded Traffic Management System</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
</tbody>
</table>

* Usually necessary/recommended.

** The Public Works Department and other utilities should also be consulted to determine if there are any planned improvements to subsurface utilities and infrastructure.

Public outreach may not be needed for system preservation activities such as routine maintenance and resurfacing; however, these projects may offer opportunities to enhance the accommodation of bicyclists or pedestrians and it may be useful to reach out to specific constituencies as projects are being planned. Examples of these types of projects include: new crossings, ADA enhancements, or drainage improvements.
The project proponent should carefully consider the best-suited approach to public outreach, depending upon the complexity of the project. Some general approaches to increase awareness of a project and solicit input are described below:

- **Notification of Abutters** — Project proponents for all projects, other than routine maintenance, should, at a minimum, notify abutters of the construction program anticipated and its potential impacts to property and/or operations. This can be informally done through neighborhood flyers or posters, through newspaper notices, or more formally done by certified mail.

- **Notification of Utilities** — Project proponents should notify utilities of the construction program anticipated and its potential impacts to their services or operations. It is important to notify utilities even for routine resurfacing and rehabilitation projects to coordinate any planned utility work. This is especially true for an overlay, since pavement life is shortened considerably following a utility cut.

- **Community Notification** — As projects become more complex, disruptive, and of longer duration, notification should be made to the community as a whole using the public outreach tools discussed in the next section. This community notification helps to increase knowledge of the project and its potential construction-related impacts. Beyond simple notification, the proponent should actively involve abutters, specific local interest groups, and utilities to get a good cross-section of people to participate.

- **Early Involvement of Local Boards and Commissions** — The proponent should consider involving local boards and commissions at the outset of the project. This involvement can help the proponent identify issues the project is likely to face and can help the proponent gauge the type of additional outreach activities that may be most appropriate if the project proceeds. Outreach to local boards and commissions can also be helpful for complex maintenance and resurfacing projects. It is safer to notify all municipal departments/boards of a project’s scope before much design work is started to minimize later concerns or needs for project changes.

- **Early Local Issues Meeting** — An early local issues meeting is important for projects where transportation facilities are being substantially modified, expanded, or replaced. It is recommended that this meeting be widely advertised, as discussed below. This
meeting provides a forum for project constituents to make their concerns known before a course of action is determined. For straightforward projects, this early local meeting, coupled with later opportunities for public hearings during design and permitting, may be sufficient. For more complex projects, or for projects that cover multiple jurisdictions, several early local issues meetings may be necessary.

- **Public Forums or Hearings at Several Stages of Planning and Design** — As project complexity continues to increase, the public participation should include several opportunities for public involvement during the planning and design phases in addition to the early local issues meeting described above. Targeted mailings can be used to generate interest and ensure that concerned parties are contacted. Key milestones where public involvement is especially important include alternatives analysis during the planning process, at key design milestones, or if the project elements change substantially due to increasing refinement of the design. Detailed meeting minutes are recommended for each session. These are discussed in more detail in the Section 2.2.1.2.

- **Active Communication about Project Progress** — In addition to interactive public forums, active communication about project progress is helpful for maintaining consensus and keeping project constituents informed about the project status. One good tool is the ProjectInfo menu on MassHighway’s website (www.mass.gov/mhd). Several additional tools for communicating project progress are highlighted in the following section.

- **Formation of an Advisory Task Force** — An advisory task force of project constituents can be particularly helpful for maintaining involvement from a consistent group of individuals, representing a cross-section of interests in the project. This formalized type of public outreach is generally reserved for more complex projects with a wide range of alternatives, benefits and potential impacts. In almost all cases, formation of an advisory task force does not replace the need for the other public outreach approaches described above. Citizen Advisory Committees may also be established by the Secretary of the Executive Office of Environmental Affairs (EOEA) as part of the Massachusetts Environmental Policy Act (MEPA) process. The charge of an advisory group should be defined at the outset with an unambiguous definition of the limits of their decision-making
authority. Typically, task forces are advisory bodies that offer input to the process and suggest recommendations.

2.9.3 Public Outreach Tools
There are many aspects of public outreach associated with transportation projects including:

- Informing constituents of a potential project;
- Active participation of project constituents in planning and design;
- Formalized public meetings and hearings; and
- Communication about the progress of a project

Within each of these aspects, there are various outreach tools available which serve different purposes and target different audiences. These tools are applicable throughout the project development process.

The first stage in public outreach is to make people aware of a potential project. Legal notices alone are ineffective at informing the community about upcoming project meetings. The project proponent should consider additional ways to communicate the opportunity to participate in the transportation project development process, such as:

- Local newspaper articles or editorial letters
- Notices to local boards, committees, and local or statewide advocacy groups
- Posters at civic buildings or churches, or in neighborhoods
- Local cable television community event calendars
- A community website posting or community-wide mailing
- Press releases to media outlets
- A community-wide meeting notice or newsletter mailing (or email)
- Flyers to project abutters

Public hearings, or opportunities for public hearings, are required by FHWA for Federal-Aid highway projects as part of a process that also encourages a variety of citizen involvement techniques such as informal public meetings, briefings, and workshops. Public hearings are legally recognized formal meetings held at particular stages of the project development process. If a federal or state environmental document is required, the public hearing should not be held until the
document is available for public review. Some environmental or resource agency permits or clearance processes also require public hearings.

All public meetings and hearings should be held in facilities that are fully accessible for people with disabilities, and notices about these meetings should use the International Symbol of Accessibility to indicate that the location is accessible. Handout materials available in alternative formats—Braille, large print, and/or audio cassette—as well as other accommodations (sign language interpreters, CART reporters, etc.) should be indicated in the meeting notices along with specifically how to request these accommodations.

The types of public hearings or meetings that can occur during the project development process are highlighted in Exhibit 2-10. The schedule of these meetings is dependent on project complexity and its permitting requirements.

Formal environmental and design hearings are sometimes ineffective in eliciting community concerns and addressing individual issues. Other ways to communicate with those interested in or affected by projects include:

- **Public Meetings** — informal gatherings of designers, officials, and local citizens to share and discuss proposed actions. These meetings provide an opportunity for informal, less structured conversations about a project, the design elements, and its potential benefits and impacts.

- **Open Houses** — mechanisms for interested parties to gather more detailed information on a project. Open houses facilitate the discussion of particular details of interest to individuals more effectively than traditional hearings or public meetings.

- **Workshops or Charrettes** — smaller groups that facilitate problem solving around design issues for which several options are available and the best solution is unclear.
### Exhibit 2-10
**Typical Public Meetings during Project Development**

<table>
<thead>
<tr>
<th>Project Development Stage</th>
<th>Public Meetings/Hearings</th>
</tr>
</thead>
<tbody>
<tr>
<td>I. Problem/Need/Opportunity Identification</td>
<td>Local Meetings (Board of Selectmen, Local Transportation Committee, Neighborhood, etc.)</td>
</tr>
<tr>
<td>II. Planning</td>
<td>Early Local Issues Meeting(s) Alternatives Presentation (if needed) Project Presentation (if needed)</td>
</tr>
<tr>
<td>III. Project Initiation</td>
<td></td>
</tr>
<tr>
<td>IV. Environmental, Design and ROW Process</td>
<td></td>
</tr>
<tr>
<td><strong>Environmental</strong></td>
<td></td>
</tr>
<tr>
<td>Conceptual to 25 Percent Design Phase</td>
<td></td>
</tr>
<tr>
<td>Massachusetts Environmental Policy Act (MEPA) Clearance</td>
<td>Consultation Session Public Informational Meeting (if requested) Citizen Advisory Committee Meetings (if established)</td>
</tr>
<tr>
<td>ENF</td>
<td></td>
</tr>
<tr>
<td>EIR</td>
<td></td>
</tr>
<tr>
<td>Special Review Procedure</td>
<td></td>
</tr>
<tr>
<td>National Environmental Policy Act (NEPA) Clearance</td>
<td>None Public Informational Meeting (if requested) Scoping Hearing Draft EIS Hearing</td>
</tr>
<tr>
<td>CE</td>
<td></td>
</tr>
<tr>
<td>EA</td>
<td></td>
</tr>
<tr>
<td>EIS</td>
<td></td>
</tr>
<tr>
<td>Other Federal Regulations / Permits</td>
<td></td>
</tr>
<tr>
<td>Section 4 (f) of 1966 US DOT Act</td>
<td>Relies on NEPA Process</td>
</tr>
<tr>
<td>Section 106 Historic Properties and Districts</td>
<td>Relies on NEPA Process</td>
</tr>
<tr>
<td>Section 131A Endangered Species</td>
<td>Relies on NEPA Process</td>
</tr>
<tr>
<td>Section 404 of 1972 Clean Water Act</td>
<td></td>
</tr>
<tr>
<td>Category 1 and 2 ACOE PGP</td>
<td>None</td>
</tr>
<tr>
<td>Category 3 (Individual) ACOE PGP</td>
<td>Public Meeting (if requested)</td>
</tr>
<tr>
<td>U.S. Coast Guard Section 10 Bridge Permit</td>
<td>Public Hearing</td>
</tr>
<tr>
<td>Other State Regulations / Permits</td>
<td></td>
</tr>
<tr>
<td>Conceptual to 25 Percent Design Phase</td>
<td></td>
</tr>
<tr>
<td>Chapter 91 Waterways Licensing</td>
<td>Public Hearing for Non-Water Dependent Uses</td>
</tr>
<tr>
<td>Chapter 254 Historic Properties and Districts</td>
<td>Relies on MEPA Process</td>
</tr>
<tr>
<td>75 to 100 Percent Design Phase</td>
<td></td>
</tr>
<tr>
<td>Massachusetts Wetlands Protection Act (WPA)</td>
<td>Public Hearing(s) with Local Conservation Commission</td>
</tr>
<tr>
<td>Construction Phase</td>
<td></td>
</tr>
<tr>
<td>National Pollutant Discharge Elimination System (NPDES)</td>
<td>None</td>
</tr>
<tr>
<td>Design</td>
<td>Location Public Hearing(^1) Special Hearing(^2) Design Public Meeting (25 Percent)</td>
</tr>
<tr>
<td>Right of Way Acquisition</td>
<td>Public Hearing and/or Town Meeting</td>
</tr>
<tr>
<td>V. Programming</td>
<td>TIP Meetings (varies by MPO)</td>
</tr>
<tr>
<td>VI. Procurement</td>
<td>None</td>
</tr>
<tr>
<td>VII. Construction</td>
<td>Community Informational Meeting(s)</td>
</tr>
<tr>
<td>VIII. Project Assessment</td>
<td>None</td>
</tr>
</tbody>
</table>

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1 To seek public input on a major project decision or location.
2 Generally held in response to a community request or to seek additional input for decision-making.

Source: MassHighway
Other Communication Tools that are effective in providing information to the public and soliciting their input include:

- **Newsletters** — provide a forum for meeting notification and periodic updates on project status and decisions. Newsletters can either be traditionally mailed or electronically transmitted.

- **Websites** — allow frequent updates of project status, enabling interested parties to review materials on their own schedule, and facilitate correspondence of questions and responses. Project websites should be designed to meet access standards for electronic media as defined in the Massachusetts Web Accessibility Standards Revision 2.0 available at (www.mass.gov/itd/massgov/publications/workgrouprpt/accessibility_report.htm).

- **MassHighway’s Project Information System** — provides internet-based project status information for active design and construction projects through links to the ProjectInfo system.

- **Project Information Boards** — illustrate project details and provide contact information at the project site facilitating involvement in other forms of outreach.

Successful public meetings require good advance communications and coordination with community leaders, elected officials, the Regional Planning Agencies, and MassHighway beforehand in order to set the agenda and establish the framework for appropriate follow-up and continued communication. The proponent should work closely with local and regional officials on meeting logistics, including location, time, and format.
2.10 **Project Development Schedule**

The project development process involves a range of tasks within these defined steps (from few to many) and extends over varying lengths of time (from less than a year to more than ten) depending on the complexities of the project, funding sources, and permitting requirements. A schematic schedule of the project development process is provided as guidance in Exhibit 2-11. Additional detail on the timelines that may be involved in the environmental permitting aspects of project development are included as an Appendix to this chapter.
### Exhibit 2-11
**Project Development Schematic Timetable**

<table>
<thead>
<tr>
<th>Steps/Description</th>
<th>Schedule Influences</th>
<th>Typical Duration</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Step I: Problem/Need/Opportunity Identification</strong></td>
<td>The Project Need Form has been developed so that it can be prepared quickly by the proponent, including any supporting data that is readily available. The District office shall return comments to the proponent within one month of PNF submission.</td>
<td>1 to 3 months</td>
</tr>
<tr>
<td><strong>Step II: Planning</strong></td>
<td>For some projects, no planning beyond preparation of the Project Need Form is required. Some projects require a planning study centered on specific project issues associated with the proposed solution or a narrow family of alternatives. More complex projects will likely require a detailed alternatives analysis.</td>
<td>Project Planning Report: 3 to 24+ months</td>
</tr>
<tr>
<td><strong>Step III: Project Initiation</strong></td>
<td>The PIF includes refinement of the preliminary information contained in the PNF. Additional information summarizing the results of the planning process, such as the Project Planning Report, are included with the PIF and TEC. The schedule is determined by PRC staff review (dependent on project complexity) and meeting schedule.</td>
<td>1 to 4 months</td>
</tr>
<tr>
<td><strong>Step IV: Design, Environmental, and Right of Way</strong></td>
<td>The schedule for this step is dependent upon the size of the project and the complexity of the design, permitting, and right-of-way issues. Design review by the MassHighway district and appropriate sections is completed in this step.</td>
<td>3 to 48+ months</td>
</tr>
<tr>
<td><strong>Step V: Programming</strong></td>
<td>The schedule for this step is subject to each MPO's programming cycle and meeting schedule. It is also possible that the MPO will not include a project in its Draft TIP based on its review and approval procedures.</td>
<td>3 to 12+ months</td>
</tr>
<tr>
<td><strong>Step VI: Procurement</strong></td>
<td>Administration of competing projects can influence the advertising schedule.</td>
<td>1 to 12 months</td>
</tr>
<tr>
<td><strong>Step VII: Construction</strong></td>
<td>The duration for this step is entirely dependent upon project complexity and phasing.</td>
<td>3 to 60+ months</td>
</tr>
<tr>
<td><strong>Step VIII: Project Assessment</strong></td>
<td>The duration for this step is dependent upon the proponent’s approach to this step and any follow-up required.</td>
<td>1 month</td>
</tr>
</tbody>
</table>

Source: MassHighway
Some projects being pursued as Footprint Roads projects may require design exceptions. The design exception application will be reviewed by MassHighway in this context.

2.11 Design Exceptions

The design guidance contained in this Guidebook is intended to provide project proponents with sufficient flexibility to address the unique and diverse conditions encountered on the Commonwealth’s streets and highways; however, there may still be occasions when design exceptions are necessary. For these circumstances, the project proponent must complete a Design Exception Report and transmit it to MassHighway as part of the Functional Design Report with the 25 Percent Design package.

This Design Guidebook has incorporated AASHTO criteria for Massachusetts’ roadway and bridge design. AASHTO criteria are the recognized standard for design based on years of research and empirical data for safe and efficient movement of traffic. Departure from these guidelines requires documentation to support the decision-making process.

The FHWA and MassHighway recognize 13 controlling criteria from AASHTO policy which, if not met, require formal approval of design exceptions. These criteria are:

**Roadway and Bridge Criteria**
- design speed
- lane width
- shoulder width
- horizontal alignment
- vertical alignment
- grades
- stopping sight distance
- cross slope
- superelevation
- horizontal clearance (other than “clear zone”)

**Bridge (Only) Criteria**
- width
- structural capacity
- vertical clearance
Desirable and minimum standards for most of these controlling criteria are found in various parts of this Guidebook. Structural capacity criteria is found in the MassHighway Bridge Manual. Accessible design standards are found in 521 CMR and in the MassHighway April 2003 M/E Construction Drawing Supplement and online directives for curb cut ramps and sidewalks. Every reasonable effort should be made to design projects within these ranges. When the minimum standards cannot be achieved, documentation and approval of these as design exceptions are required and must be provided in a Functional Design Report. Use of less than minimum standards must be based on sound engineering judgment, weighing relevant contextual constraints, and other relevant factors. The safety and traffic operational goals of the project sill must be met by the facility with the lower standards.

2.11.1 Design Exception Triggers
If minimum controlling criteria cannot be met, documentation of design exceptions is required for all projects, regardless of functional classification or funding, at the 25 Percent Design stage, to demonstrate that sound engineering judgment was used to design the improvements. Documentation for all MassHighway design exceptions should follow the guidelines included in this manual, FHWA procedures from the Federal-Aid Program Guide (FAPG) Transmittal 9 and 23 CFR, Part 625 as revised, and relevant FHWA Policy and Engineering Directives. The FHWA guidance should be followed regardless of project funding because of its relevance to all roadway and bridge projects, and the need for consistency in processing design exceptions.

Any exceptions to full compliance with 521 CMR, The Rules and Regulations of the Massachusetts Architectural Access Board, should be identified at this point so the MassHighway can either modify the design approach, or seek the appropriate variance from the Access Board.

2.11.2 Design Exception Documentation
Documentation of the design exception should include, but not be limited to:

- Executive Summary:
  - A brief description of the proposed project
  - A listing of the controlling criteria for which a design exception is requested
Proposed Improvement:
- Description of proposed project
- Purpose of improvements; safety, capacity, etc.
  - Type of project; reconstruction, rehabilitation, etc.
- State if the improvement is a Footprint Roads project
- Other existing deficiencies to be improved by the project

Description of the Existing Conditions include:
- Functional Classification of the roadway(s)
- Roadway Character and Transportation Demands by All Modes
- Description of Surrounding Area:
  - Developed or undeveloped
  - Scenic
- Speeds:
  - Posted
  - 85 percentile
  - Observed
  - Design speed
- Existing Lane and Shoulder Width (usable shoulder?)
- Right-of-way Layout
- Accident Data
- Environmental Factors:
  - Wetlands
  - Trees
  - Parklands
- Cultural Resources
  - Historic and archaeological areas
- Accessibility:
  - Impracticability or equivalent facilitation

Discussion of Design Exceptions include:
- A separate discussion of each controlling criteria
- MassHighway Desirable and Minimum Standards
- Project proposed values and degree of reduction
- Typical section(s) or other graphical description of the existing and proposed improvement along with other roadway elements
An analysis of the accident data as it relates to the controlling criteria

Discussion of compatibility with adjacent roadway sections and future expectations for corridor improvements

If a design speed exception is requested, a discussion of effects on other controlling criteria

Discussion of right-of-way constraints

Discussion of environmental, cultural resource, or other constraints

Any features that might be used to mitigate the substandard feature such as signing and striping

Where compliance with 521 CMR is technically infeasible, or would result in excessive costs and no substantial benefit to a person with disabilities.

A rough cost estimate of the incremental cost to comply with MassHighway/AASHTO minimum standards. A benefit/cost analysis and/or a Value Engineering assessment may also be included when appropriate data is available.

**Recommendation/Summary**

The designer must document that reasonable engineering judgment was used to justify the proposed design by drawing from the above information.

Additional guidance for completing a Design Exception Request is provided in Appendix 2-A-11.

### 2.11.3 Approval Process

The design exception documentation is normally prepared by the design engineer and forwarded to the District Project Development Engineer. The District Project Development Engineer then coordinates review by the Design Exceptions Committee. All design exceptions must be approved by the Chief Engineer. Design exceptions on all projects which require FHWA review are then forwarded to FHWA for approval.

Upon receipt of all approvals, the documentation and the approval letters must be kept in a permanent

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MassHighway convenes a committee to review design exceptions. This committee typically includes the District Project Development Engineer and representatives from:

- The Chief Engineer’s Office
- Project Management
- Environmental
- Traffic
- Planning
- Right-of-way, and the
- Pedestrian and Bicycle Accommodation Engineer

Other representatives may be included as the circumstances dictate.
project file for future reference. The project submittal to the Capital Expenditures Program Office (CEPO) for construction advertising should include a statement such as “design exceptions have been approved for this project and are on file.”
2.12 For Further Information

- M.G.L. c.30, Section 61 to 62H and 301 CMR 11.00 – Massachusetts Environmental Policy Act.