

# **Project Definition Process Guidebook for Highway Division Projects**

**Vermont Agency of Transportation – Highway Division**

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If corrections or modifications to this guidebook are needed, please contact the Project Initiation and Innovation Team in the Project Delivery Bureau.

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# Table of Contents

<b>Executive Summary</b> .....	<b>1</b>
Purpose of This Guidebook.....	1
When Is This Guidebook Applicable? .....	1
What Is Project Definition? .....	1
What Are Best Practices in Project Definition? .....	2
What Is the Outcome of the Project Definition Process? .....	3
<b>1.0 Introduction</b> .....	<b>1-1</b>
1.1 Purpose of This Guidebook .....	1-1
1.2 Scope .....	1-1
1.3 Related Resources .....	1-2
1.4 Summary of Best Practices for Project Definition .....	1-3
<b>2.0 What Is Project Definition?</b> .....	<b>2-1</b>
2.1 Terminology Used in This Guidebook.....	2-1
2.2 How Project Definition Relates to Other Project Development Activities .....	2-2
2.3 When is Project Definition Needed? .....	2-3
2.4 State Managed versus Locally Managed Projects .....	2-5
2.5 The Project Definition Process .....	2-5
<b>3.0 Engaging Stakeholders</b> .....	<b>3-1</b>
3.1 Why Stakeholder Engagement? .....	3-1
3.2 When Should I Reach Out? .....	3-1
3.3 To Whom Should I Reach Out? .....	3-4
3.4 How Should I Reach Out? .....	3-6
3.5 Keys to Outreach Success .....	3-8
<b>4.0 Creating a Purpose and Need Statement</b> .....	<b>4-1</b>
4.1 What Is a Purpose and Need Statement? .....	4-1
4.2 Why Create a Purpose and Need Statement? .....	4-1
4.3 What Should the Statement Contain? .....	4-1
4.4 Gathering Background Information .....	4-2
4.5 Stakeholder Input.....	4-2
4.6 Purpose and Need Acceptance .....	4-3
<b>5.0 Understanding the Project Context</b> .....	<b>5-1</b>
5.1 Data on the Facility and Right-of-Way Elements .....	5-3
5.2 Data on Facility Use and Operations .....	5-4

5.3	Environmental Data .....	5-5
5.4	Land Use and Community Context.....	5-5
5.5	Data and Information Collection .....	5-6
<b>6.0</b>	<b>Defining Alternatives .....</b>	<b>6-1</b>
6.1	What Range of Alternatives Might Be Considered? .....	6-1
6.2	Generating Alternatives .....	6-1
6.3	Developing Alternatives .....	6-1
6.4	Stakeholder Input.....	6-2
<b>7.0</b>	<b>Evaluating Alternatives.....</b>	<b>7-1</b>
7.1	Evaluation Process .....	7-1
7.2	Evaluation Criteria.....	7-2
<b>8.0</b>	<b>Selecting and Approving a Preferred Alternative .....</b>	<b>8-1</b>
8.1	Selection of a Preferred Alternative .....	8-1
8.2	Assemble Initial Project Definition Report and Presentation Materials .....	8-1
8.3	Preferred Alternative Meeting .....	8-1
8.4	Alternatives Presentation Summary .....	8-3
8.5	Preferred Alternative Acceptance .....	8-3
<b>9.0</b>	<b>Creating a Final Project Definition Report.....</b>	<b>9-1</b>
<b>Appendix A.</b>	<b>Links to Sample Project Scoping Reports .....</b>	<b>A-1</b>
<b>Appendix B.</b>	<b>Sample Purpose and Need Statements.....</b>	<b>B-1</b>
<b>Appendix C.</b>	<b>Sample Scoping Input Questionnaires.....</b>	<b>C-1</b>
<b>Appendix D.</b>	<b>Sample Project Design Criteria .....</b>	<b>D-1</b>
<b>Appendix E.</b>	<b>Sample Project Fact Sheet .....</b>	<b>E-1</b>
<b>Appendix F.</b>	<b>Sample Cost Estimation Template.....</b>	<b>F-1</b>
<b>Appendix G.</b>	<b>Sample Evaluation Matrices .....</b>	<b>G-1</b>
<b>Appendix H.</b>	<b>Sample Management Approval of Scope .....</b>	<b>H-1</b>

## List of Tables

Table 3.1	Potential Stakeholders.....	3-4
Table 3.2	Outreach Tools and How and When to Use Them <sup>a</sup> .....	3-7
Table 5.1	Potential Data Needs for Existing and Future Conditions .....	5-1
Table 7.1	Examples of Evaluation Factors and Considerations.....	7-2

## List of Figures

Figure ES.1	Project Definition Process .....	2
Figure 1.1	Project Life-cycle .....	1-1
Figure 2.1	Project Life-cycle and Project Definition Process.....	2-7
Figure 3.1	Typical Project Definition Process with Stakeholder Input Opportunities.....	3-3
Figure 9.1	Project Definition Report <i>Sample Table of Contents</i> .....	9-1





## List of Acronyms

ADA	Americans with Disabilities Act
ANR	Agency of Natural Resources
CE	Categorical Exclusion
DTA	District Transportation Administrator
EA	Environmental Assessment
EIS	Environmental Impact Statement
FHWA	Federal Highway Administration
MOB	Maintenance and Operations Bureau
NEPA	National Environmental Policy Act
P&N	Purpose and Need
PDRT	Project Definition Review Team
PE	Preliminary Engineering
PIO	Project Information Officer
PoDI	Project of Division Interest
ROW	Right-of-Way
RPC	Regional Planning Commission
STIP	Statewide Transportation Improvement Program
STP	Surface Transportation Program
TSMO	Traffic Systems Management and Operations



## Executive Summary

### Purpose of This Guidebook

This Project Definition Process Guidebook for Highway Division Projects was created to provide direction on how to undertake the project definition process for Vermont Agency of Transportation (VTrans) projects undertaken through the Highway Division. The process applies to Highway Division projects receiving state and/or Federal funding administered through VTrans. Other VTrans divisions, regional planning commissions (RPCs), and municipalities may find the process described in the guidebook helpful and may choose to adapt it for their own projects.

The guidebook is intended primarily as a resource for staff and consultants of VTrans, Vermont's RPCs, and municipalities. It also provides information to assist other stakeholders in understanding and participating in VTrans' project definition process. Examples of stakeholders with an interest in project definition may include the traveling public; abutters; businesses; interest groups; elected and appointed officials; and other Federal, state, and regional agencies.

### When Is This Guidebook Applicable?

VTrans funds a wide variety of projects to maintain and improve Vermont's transportation infrastructure, ranging from simple and low-cost projects to more complex and costly projects. This guidebook addresses how project definition may be applied in different situations, rather than prescribing a "one-size-fits-all" approach to every project. The guidebook also provides room for flexibility to apply innovative methods and adapt to changing needs.

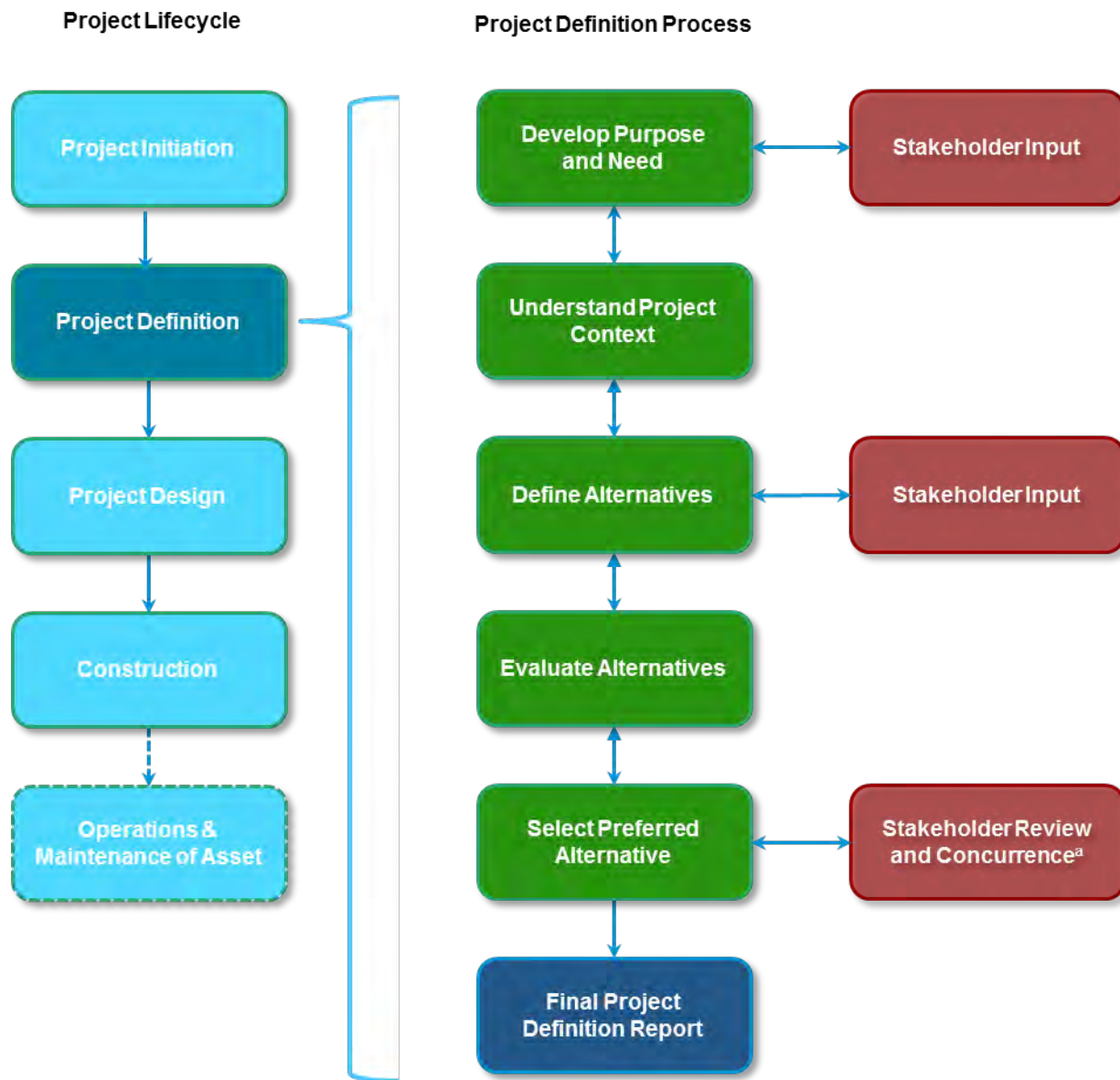
Certain types of activities with minimal scope and/or impacts may not require formal project definition. Section 2.0 discusses which types of projects may or may not be subject to the process described in this guidebook. This guide is primarily intended for Categorical Exclusion projects and does not address any additional environmental documentation activities that may be required under the National Environmental Policy Act.

### What Is Project Definition?

Project definition begins after a need has been identified and a project to meet that need has been programmed. It ends when a decision has been made on how to proceed, as expressed through the definition of a preferred alternative (which may be the no-action alternative). Project definition occurs *after* project identification and *before* project design. A typical process for project definition is shown in Figure ES.1. Sections 4.0 to 9.0 of this guidebook describe this process in more detail.

A Project Definition Review Team, comprised primarily of internal (VTrans) stakeholders, assists the Project Manager in guiding the process. A local expert or representative also may participate. At key decision points, such as those identified in Figure ES.1, input also should be solicited from a broader set of stakeholders and the general public. The level of stakeholder and public involvement should be appropriate to the scale and nature of the project. The Project Definition Review Team is scalable from just two or three peers for the simplest projects to perhaps a dozen for larger, more complex projects.

Figure ES.1 Project Definition Process



<sup>a</sup> “Stakeholder review and concurrence” means that stakeholders have been presented with a description of the preferred alternative and why it was selected; have been provided the opportunity to comment on the selection; and that VTrans has considered any stakeholder concerns and addressed them to the extent practical. The final determination of the preferred alternative is made by VTrans considering all stakeholder input.

## What Are Best Practices in Project Definition?

In the process of developing the guidebook, a number of best practices were identified:

- **Engage stakeholders.** Getting the input of interested parties as early as possible leads to projects that better meet the needs of the community while minimizing delays at later stages of project development. It also saves time and effort by avoiding the need for last-minute changes to address unrecognized

stakeholder concerns. The VTrans Project Manager should identify key stakeholders for the project and solicit input at appropriate decision points.

- **Give careful consideration to the project's purpose and need.** A purpose and need statement should be developed that clearly explains why the project is needed. The purpose and need statement should guide the scope of alternatives considered, evaluation of alternatives, and the final project definition.
- **Follow a consistent approach.** A consistent, but scalable (based on the size or complexity of the project), approach to the project definition process, applied for all VTrans Highway Division and RPC highway projects, will help stakeholders and the public know what to expect and how to engage in the process.
- **Apply methods consistent with the scope and extent of the project.** Time and resources are often limited when developing a highway project. Stakeholder engagement and alternatives analysis should be carried out with a level of effort consistent with overall project requirements.
- **Apply best design practices.** The project alternatives should incorporate best practice design considerations to address safety, multimodal user needs, community and environmental impacts, and maintenance and operations considerations.
- **Clearly document process and decisions.** From the start, stakeholders should be clear on who makes the final decision on the preferred alternative, and when the final decision will be made. The process and basis for the decision should be documented in a Project Definition Report.

## What Is the Outcome of the Project Definition Process?

The process and outcomes for defining the project are documented in a Project Definition Report. The report documents the key information and basis for decisions made in the process, including:

- The project purpose and need;
- The project context;
- Alternatives considered;
- Evaluation criteria and process;
- Preferred alternative and rationale for its selection; and
- Stakeholder involvement in the process.

The Highway Division Management Team, or its designee, makes the final determination regarding the alternative identified as the preferred alternative in the Project Definition Report.



# 1.0 Introduction

## 1.1 Purpose of This Guidebook

This Project Definition Process Guidebook was created to provide direction on how to undertake project definition within the Vermont Agency of Transportation (VTrans) Highway Division’s project development process. The process applies to Highway Division projects receiving state and/or Federal funding administered through VTrans. Other VTrans divisions, regional planning commissions (RPCs), and municipalities may find the process described in the guidebook helpful and may choose to adapt it for their own projects.

The guidebook is intended primarily as a resource for staff and consultants of VTrans, Vermont’s RPCs, and municipalities. It also provides information to assist other stakeholders in understanding and participating in VTrans’ project definition process. Examples of stakeholders with an interest in project definition may include the traveling public, abutters, businesses, interest groups, elected and appointed officials and other Federal, state, and regional agencies.

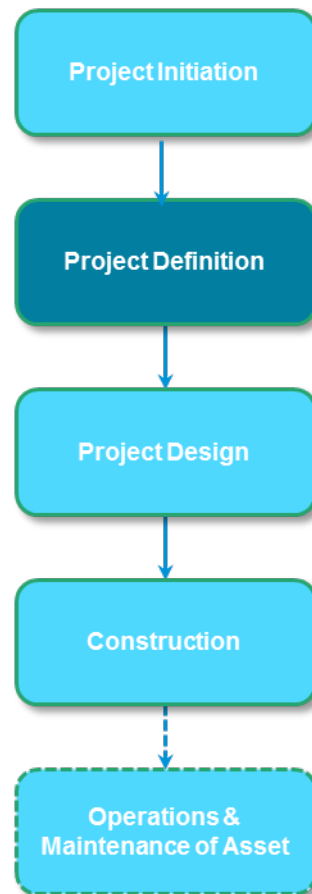
VTrans funds a wide variety of projects to maintain and improve Vermont’s transportation infrastructure, ranging from simple and low-cost projects to more complex and costly projects. This guidebook addresses how project definition may be applied in different situations, rather than prescribing a “one-size-fits-all” approach to every project. The guidebook also provides room for flexibility to apply innovative methods and adapt to changing needs. Safety should always be considered a primary goal of any transportation project. Other common goals include mobility, access, congestion, resiliency, sustainability, asset condition, system and intermodal linkages, emergency evacuation, economic development, and environmental protection.

## 1.2 Scope

The Project Definition Process Guidebook was written specifically for Highway Division projects. However, it includes procedures and resources that may be useful for other projects.

Project definition is just one phase of the overall process of developing and delivering a transportation project (Figure 1.1). Project definition begins after a need has been identified and a project to meet that need has been programmed.<sup>1</sup> It ends when a decision has been made on how to proceed, as expressed through the definition of a preferred alternative (which may be the no-action alternative). Project definition occurs *after* project initiation and *before* project design. Section 2.0 of this guidebook provides a

**Figure 1.1 Project Life-cycle**



<sup>1</sup> “Programmed” in this context means that VTrans has assigned the project an internal budget and project number.

more detailed explanation of project definition and how it relates to other steps in the project development and delivery process.

Certain types of activities with minimal scope and/or impacts and grant-funded projects may not require formal project definition. Section 2.0 discusses which types of projects may or may not be subject to the process described in this guidebook.

Proposed projects are evaluated for the need to provide environmental documentation pursuant to the National Environmental Policy Act (NEPA). A determination of whether the project is a Categorical Exclusion (CE) or requires an Environmental Assessment (EA) or Environmental Impact Statement (EIS) may be made during the project definition process or after the process is complete. The guidance provided in this document does not address any additional environmental documentation activities that may be required under NEPA if an EA or EIS is required.

### 1.3 Related Resources

VTrans has published a number of other resources that are relevant to project definition. This guidebook supersedes past guidance specifically on the project definition process. At the time of this writing, other relevant resources include:<sup>2</sup>

- **Project Development Process Manual (1995).** This document includes guidance for Project Selection, Design, and Construction. The project definition process described in the 1995 document is superseded by the current guidance.
- **Project Scoping Manual (1995).** This document provides guidance for scoping a project, including identifying a transportation problem, defining the purpose and need, identifying resources in the area, and developing and recommending solutions to the problem. This document is superseded by the current guidance.
- **Vermont State Standards (1997, anticipated revision in 2017).** Vermont State Standards provide technical direction on the design of Vermont's roads and bridges. New standards, anticipated to be adapted in 2017, will be consistent with a multimodal project development and delivery approach. The Vermont State Standards take precedence over all other design specifications and guidelines.
- **Roadway Design Manual (1998).** This manual provides detailed information on project development, preparation of plans, design controls, alignment, cross-section elements, geometric design criteria, safety, pavement, and other issues including cost estimation. The section on project definition is superseded by the current guidance.
- **Public Involvement Guidebook (2017).** While this Project Definition Guidebook addresses public input during project definition, the Public Involvement Guidebook provides more detailed guidance on undertaking public involvement in all phases of a project including project definition.

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<sup>2</sup> Referenced publications are available at <http://vtrans.vermont.gov/docs>.



## 1.4 Summary of Best Practices for Project Definition

This guidebook was developed with extensive input from advisory committees, which included VTrans staff, RPCs, and FHWA. In the process of developing the guidebook, a number of best practices were identified. These are described in more detail in subsequent sections of the guidebook.

- **Engage stakeholders.** Getting the input of interested parties as early as possible leads to better projects. It also saves time and effort by avoiding the need for last-minute changes to address unrecognized stakeholder concerns. The VTrans Project Manager should identify key stakeholders for the project and solicit input at appropriate decision points. Examples of stakeholders may include Agency staff involved in planning, designing, building, funding, permitting (including natural and cultural resources), and maintaining the project; staff of other agencies, such as state and Federal resource agencies or economic development agencies; RPCs; members of the public who will use and/or be affected by the project; and their representatives – elected and appointed officials.
- **Give careful consideration to the project’s purpose and need.** A purpose and need (P&N) statement should be developed that clearly explains the need for the project. The P&N should guide the scope of alternatives considered and the final project definition. The P&N statement provides the basis for evaluating the project and selecting the preferred alternative.
- **Follow a consistent approach.** A consistent, but scalable, approach to the project definition process, applied for all VTrans Highway Division projects, will help stakeholders and the public know what to expect and how to engage in the process. This guidebook is intended to help VTrans staff in applying a consistent approach.
- **Apply methods consistent with the scope and extent of the project.** Time and resources are often limited when developing a highway project. Stakeholder engagement and alternatives analysis should be carried out with a level of effort consistent with overall project requirements. Smaller projects may require more limited stakeholder involvement and analysis than larger projects with potentially greater impacts.
- **Apply best design practices.** The project alternatives should incorporate, to the extent practical, best practice design considerations to address multimodal user needs, community and environmental impacts, and maintenance and operations considerations. Other VTrans resources, such as the Vermont State Standards, can assist in identifying best practices, as can input from stakeholders, such as VTrans’ maintenance and operations staff and the affected public.
- **Clearly document process and decisions.** From the start, stakeholders should be clear on who makes the final decision on the preferred alternative, and when a final decision has been made. The decision is made by VTrans or by VTrans with municipal input for municipally owned assets. The VTrans Project Manager should document the project definition process, including purpose and need, stakeholder involvement conducted, analysis, and final decision, in a Project Definition Report.

The remainder of this guidebook includes:

- **Section 2.0** – An overview of the project definition process;
- **Section 3.0** – A discussion of opportunities for stakeholder and public involvement;
- **Sections 4.0 to 9.0** – A discussion of each step of the project definition process; and
- **Appendices** – Additional examples and supporting materials.



## 2.0 What Is Project Definition?

### 2.1 Terminology Used in This Guidebook

Some common terms used in this guidebook are defined below.

- **Project.** A project is an *undertaking* or *activity* on a transportation asset – it is not the asset itself.<sup>3</sup>
- **Project definition.** The process of defining and evaluating alternatives and selecting a preferred alternative to provide a solution to a transportation need. Project definition begins after a need has been identified and a project to meet that need has been programmed internally by VTrans. It ends when a decision has been made on how to proceed, as expressed through the definition of a preferred alternative (which may be the no-action alternative).
- **Project Manager.** The Project Manager is a VTrans, municipal, or RPC staff person assigned responsibility for following this guide and shepherding a project concept through the definition process.
- **Project Definition Review Team.** The Project Definition Review Team (PDRT) is an ad hoc advisory group, assembled by the Project Manager, which consists of other VTrans staff providing input into project definition. The makeup of the team will depend upon the type of project, and also may vary by the stage of the project definition process. The team should at least include representation from the Asset Management and Performance Bureau (AMP) and/or the Program that will fund the project. VTrans staff from Safety, Structures, Traffic Systems Management and Operations (TSMO), Maintenance, Policy and Planning, Environmental, and/or other divisions also may be included as appropriate for the project. The team also may include one or two external stakeholders from the RPC and/or municipality in which the project is located. The PDRT is scalable from just two or three peers to perhaps a dozen for larger, more complex projects at key stages of project definition.
- **Highway Division Management Team.** This team includes the Highway Division Bureau Directors, Chief Engineer, and Deputy Director. Members of this team or its designee make the final determination regarding the alternative identified as the preferred alternative in the Project Definition Report.
- **Project development.** The full cycle of creating a project, beginning with project initiation, proceeding with project definition and design, and ending with construction.
- **Scoping.** NEPA defines scoping as an early and open process for determining the scope of issues to be addressed, and for identifying the significant issues related to a proposed action.<sup>4</sup> The word “scoping” has often been used in Vermont to refer to the process of project definition.<sup>5</sup> However, it is *not* used in this guidebook in order to avoid confusion with its use in circumstances where NEPA environmental

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<sup>3</sup> Some undertakings – such as maintenance – may be considered projects, but are typically not subject to the requirements of this guidebook because they are routine and/or low-impact. See Section 2.3.

<sup>4</sup> 40 CFR Section 1501.7.

<sup>5</sup> For example, according to the Chittenden County RPC, “Scoping is a process that develops safe and effective alternatives based on documented rationale that meet the stated purpose and need while minimizing environmental impacts. The Scoping process results in the recommendation of a preferred alternative, which has local, regional, and VTrans support.” Source: “Scoping and Project Development,” <http://www.ccrpcvt.org/transportation/scoping/>, accessed July 2015.

documentation requirements apply. Scoping also is a project development phase, as defined by FHWA, which can be accomplished before Preliminary Engineering (PE) is programmed.

- **Stakeholders.** Stakeholders can include others within VTrans; other state, Federal, local, or regional agencies or officials; special interest groups; travelers of all types/modes; abutting or nearby property owners; local businesses; various community groups; and the general public.
- **Conceptual design.** An initial design with line, grade, and typical(s), but without detailed design or quantities. While the project definition process will include a design concept for each alternative, the conceptual design is often developed more fully after project definition is complete, during the project design phase (see below).

## 2.2 How Project Definition Relates to Other Project Development Activities

Project **definition** is one step in the development of a VTrans project, as shown in Figure 1.1 and again in Figure 2.1. Project **development** includes the first four steps of Figure 1.1 – from project initiation through construction. For new projects, after construction is complete, the resulting infrastructure element becomes an “asset.” Many projects that go through the project definition process are replacing or rehabilitating an existing asset. Ongoing operations and maintenance of the asset are shown because they are an important consideration in project development and asset management.

- **Project initiation** is how a project is selected to enter the definition process. A project may be initiated through a statewide or regional long-range plan, corridor plan, management system (e.g., pavement, bridge, congestion, safety); State Highway Safety Plan or Highway Safety Improvement Program; grant program selection process (e.g., Bicycle and Pedestrian Program); the Legislature; or it may be nominated by agency staff or stakeholders, such as an RPC.
- **Project definition** begins after a need has been identified, and a project to meet that need has been programmed. It ends when a decision has been made on how to proceed, as expressed through the definition of a preferred alternative.
- **Project design** can take place after project definition is complete, and approval and funding to proceed are obtained. Project design encompasses a number of activities, including detailed engineering design, right-of-way acquisition and utility relocation, schedule and cost estimates, public outreach, environmental documentation, and permitting if needed. Project design is finished when a complete set of final plans is produced to a level that it can be advertised or issued for construction.
- **Construction** takes place after project design is complete and pending approvals and funding. Construction is the physical transformation of material resources into a transportation asset.
- **Operations and maintenance** of state-owned assets are undertaken by VTrans on an ongoing basis, after the project development process is complete.

## 2.3 When is Project Definition Needed?

A “project,” as defined above, is subject to VTrans’ project definition process if it:

- Involves a state or Federally funded highway infrastructure or operational action where there is not a single, obvious best course of action (i.e., choices need to be made in how the action is implemented); and
- These choices may have potentially nontrivial effects on other VTrans divisions, transportation system users, the human built or natural environment, and/or other stakeholders.

Some projects already may have been defined by an RPC or a municipality. If such a project meets the above criteria and already was not subject to the VTrans project definition process, the VTrans Project Manager, in collaboration with the AMP, should revisit the project definition to ensure consistency with VTrans policies and objectives, including the guidance set forth in this document. The project definition also may need to be revisited if during the project design, the scope is expanded beyond the original intent of the purpose and need.

### 2.3.1 Project Definition Not Needed

Actions that do not meet these criteria include routine maintenance, preventative maintenance, operational actions, and projects funded through VTrans grant programs. For example, roadway and bridge maintenance actions that are selected from a management system and have minimal impact on system users and the environment would not be subject to the process. Examples of actions where **the project definition process is not needed** include:

- Crack sealing;
- Repainting worn pavement markings;
- Replacing traffic signal heads or street lights;
- Retiming traffic signals;
- Replacing signs;
- Cleaning ditches and culverts;
- Trimming vegetation;
- Other preventive maintenance activities;
- Town Highway grant projects; and
- Projects competitively funded through the Transportation Alternatives Program or its successor the Surface Transportation Block Grant Program (STP) Set-Aside.

### 2.3.2 Project Definition May Be Needed

Some projects may warrant a project definition process depending upon the circumstances. For example, there may be cases where the default action (e.g., replacing a worn component in-kind) will have no impacts, yet there is an alternative action that could improve the functioning of the transportation system element. Examples of project types where a **project definition process may be warranted** include:

- **Resurfacing.** This may sometimes be considered as routine maintenance with minimal impacts. However, if resurfacing provides opportunities to expand the scope beyond routine maintenance, these opportunities should be considered.
- **Culvert replacement.** Decisions may be needed about appropriate sizing and design of culverts to withstand potential extreme weather events, or to provide aquatic or terrestrial passage. Excavation may result in significant traffic disruptions, which could warrant application of the project definition process.
- **Bridge rehabilitation.** Most bridge-rehabilitation projects are large enough to warrant a definition process to determine the optimal cost-benefit/life-cycle approach. A definition process is also likely to be warranted if the work could have meaningful resource, traffic, or community impacts.
- **Improvements to a rail-highway grade crossing.** These improvements may warrant project definition if they affect traffic flow or have community or environmental impacts.

### 2.3.3 Project Definition is Needed

Actions where the **project definition process is needed** include:

- Roadway reconstruction or reconfiguration within existing pavement limits;
- Widening or geometric realignment (including intersection widening or roundabout);
- New roadway;
- New shared-use path;
- Traffic calming, new lighting, and pedestrian or transit enhancements;
- Major bridge rehabilitation or replacement (including widening);
- New or expanded traffic management system, including coordinated or adaptive signal control systems that may affect areawide traffic patterns; and
- New or expanded park-and-ride lot.

VTrans occasionally undertakes projects of such scope and potential environmental impact that additional environmental analysis (EA or EIS) requirements are triggered under NEPA (if Federal funding is to be requested or Federal permits required). Such projects typically involve roadway work outside the existing footprint (e.g., a new roadway, lane additions, or major realignment). In such cases, **additional project definition actions consistent with NEPA requirements will be required beyond those described in this guidebook.**

## 2.4 State Managed versus Locally Managed Projects

The processes outlined in this guidebook must be applied to projects on applicable VTrans-owned and managed assets, including projects developed by VTrans as well as locally developed and managed projects. These processes also may be applied to projects on local transportation assets receiving state financial assistance.

Cities and towns are encouraged to use the guidebook for locally funded projects on locally owned assets, but are not required to do so. They do not need to use this guidebook for local projects funded through VTrans or other state competitive grant programs. Table 2.1 provides an overview of the conditions under which the use of the guidebook is required versus encouraged.

**Table 2.1 Application of Guidebook by Project Characteristics**

Project Characteristics			Guidebook Application	
Asset Owner/Manager	Project Developer	Funding Includes	Required	Encouraged
VTrans	VTrans	Any type	✓	
VTrans	Municipality or RPC	Any type	✓	
Municipality	Municipality or RPC	State/Federal (except competitive grants)	✓	
Municipality	Municipality or RPC	Competitive grants		✓
Municipality	Municipality or RPC	Municipal only		✓
Municipality	VTrans	Any type	✓	

For projects developed and/or owned by a municipality or RPC and receiving state assistance, VTrans personnel should be included throughout the project definition process. A VTrans program representative should be identified for the project and copied on all key correspondence and at PDRT points of input.

During the project definition process, the project may be identified as a Federal Highway Administration (FHWA) Project of Division Interest (PoDI) in accordance with the established PoDI selection process. Procedures have been developed in order to systematically select PoDIs as part of the partnership between FHWA and VTrans. Meetings will be held in October and April each year between FHWA and VTrans’ Highway Division Bureaus to select PoDIs. If a project in the project definition process is selected as a PoDI, then additional FHWA oversight will be required through completion of the project definition process. The specific additional oversight will be determined by FHWA and the VTrans Project Manager on a project-by-project basis.

## 2.5 The Project Definition Process

Project definition begins after a need has been identified and a project to meet that need has been programmed. It ends when a decision has been made on how to proceed, as expressed through the definition of a preferred alternative (which may be the no-action alternative). A determination of whether the project is a CE or requires an EA or EIS can be made at any time during the project definition process. Project definition is similar to what is sometimes referred to as scoping (see Section 2.1). A VTrans Project Manager oversees the project through the life of the project definition process.

Project definition typically includes the following steps, as illustrated in Figure 2.1:

- **Develop Purpose and Need.** Create an initial statement explaining the need for the project as proposed. This statement may be revised based on new information introduced during the project definition process.<sup>6</sup>
- **Understand the Project Context.** This step includes gathering information to help develop the P&N statement and define alternatives. Therefore, it will involve some overlap with the prior and subsequent steps of the process.
- **Define Alternatives.** Create a set of possible solutions to address the problems stated in the P&N. Each alternative also should consider maintenance of traffic during construction if applicable.
- **Evaluate Alternatives.** Consider the effects of each alternative on various performance criteria. The results of the evaluation are reviewed by stakeholders and, if an acceptable alternative is not identified, there may be a need to define additional alternatives.
- **Select Preferred Alternative.** This step includes creating an initial Project Definition Report; obtaining initial approval of the preferred alternative from the program manager; holding a public meeting to present the alternatives considered and the recommended alternative; and obtaining final management approval. The final recommendation of the preferred alternative should consider public, internal, and external stakeholder input.
- **Final Project Definition Report.** A Project Definition Report is finalized that describes the process and outcome, the input that was sought, and the final P&N statement.

Based on the size and complexity of a project, stakeholders are consulted at appropriate times. Stakeholder input may be appropriate when developing the P&N statement, defining alternatives, and selecting the preferred alternative. Typically, a PDRT may advise the Project Manager on key decisions along the way, particularly for those steps in which stakeholder input is solicited. The PDRT can comprise various representatives from different VTrans divisions and potentially other key stakeholders, such as an RPC or municipality with a substantial interest in the project.

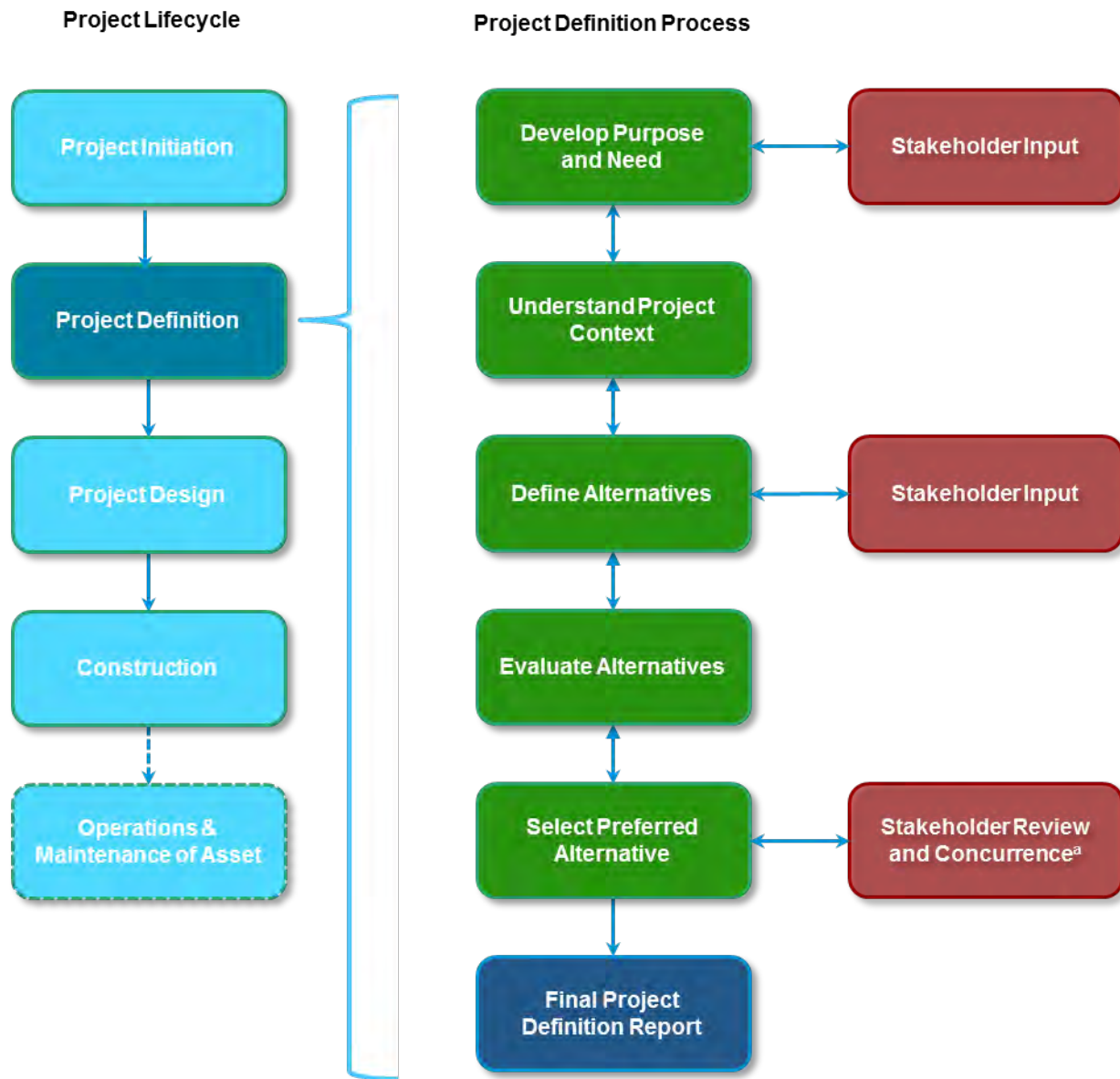
The process may be iterative and generally is not linear. For example, the P&N statement may be revised after receiving stakeholder input on the alternatives. Additional alternatives may be developed if the initial evaluation fails to find an alternative that adequately addresses the P&N, or new, more promising ideas are proposed by stakeholders. If the preferred alternative is not approved, there may be a need to revisit the evaluation, consider additional alternatives, or even reconsider the purpose and need (if new issues have been introduced), depending upon the reasons for disapproval.

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<sup>6</sup> An example might be a bridge rehabilitation project where inputs indicate that the addition of sidewalks is needed as part of the project definition.



**Figure 2.1 Project Life-cycle and Project Definition Process**



<sup>a</sup> “Stakeholder review and concurrence” means that stakeholders have been presented with a description of the preferred alternative and why it was selected; have been provided the opportunity to comment on the selection; and that VTrans has considered any stakeholder concerns and addressed them to the extent practical. The final determination of the preferred alternative is made by VTrans considering all stakeholder input.

The remainder of this manual describes how the project definition process should be carried out. Section 3.0 focuses on identifying and engaging stakeholders throughout all steps of the process, while Sections 4.0 to 9.0 provide details on each step of the process.



## 3.0 Engaging Stakeholders

### 3.1 Why Stakeholder Engagement?

Who are the stakeholders and why are they so critical in “getting to the right project?” Anyone with an interest in the project is a stakeholder, whether or not they are yet aware of the project. Stakeholders include VTrans; other state, Federal, local, or regional agencies or officials; special interest groups; travelers of all types/modes; abutting or nearby property owners; local businesses; various community groups; and the general public.

It is important, and sometimes required, to engage stakeholders as early in the process as possible to ensure that their considerations and concerns are understood and factored into the project. This ensures that the right people are at the table to contribute to the process of defining an appropriate and supportable project. It also will reduce the risk of costly backtracking later, which can occur if some key stakeholders are omitted from early project planning.

VTrans firmly believes that the people of Vermont have a right to have input into the transportation projects that occur within their communities. VTrans can learn more about project circumstances and improve project outcomes by engaging stakeholders and incorporating what is heard into the project as appropriate. Simply put, stakeholder involvement works! When carried out with the right tools and with openness to what the public has to say, involvement can shorten a project’s timeframe, lower project costs, alleviate delays, reduce frustration, and other unforeseen problems.

Project resources are often constrained, so it is necessary to be as efficient and effective as possible in the outreach process. On larger or more complex projects, a Project Information Officer (PIO) may be retained to coordinate outreach activities. The PIO would be responsible for ensuring that a comprehensive and appropriate program of public involvement is developed and carried out, and that outreach input is fully integrated into the project definition process. Even without a PIO, an appropriately robust outreach program should be developed and incorporated into the process. The public outreach program should be consistent with any requirements for public consultation under NEPA and/or Section 106 of the National Historic Preservation Act if applicable.

**Much more information about public involvement is available in the VTrans Public Involvement Guide (2017).<sup>7</sup>**

### 3.2 When Should I Reach Out?

The cardinal rule for effective outreach is “early and often.” Yet, the type and level of outreach can vary considerably from project to project depending on many factors, such as:

- Size/complexity of project;
- Potential for impact; and
- Level of concern/controversy.

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<sup>7</sup> The Public Involvement Guide can be found at <http://vtrans.vermont.gov/docs#outreach>.

What does “early and often” mean? What is most important is to get the right people for that particular project to the table early enough in the process to ensure that there is sufficient outreach before each key decision point. In that way, the project can continue to move forward toward an outcome that is acceptable and supported by the majority of stakeholders, and that the concerns of stakeholders have been addressed to the extent possible or appropriate.

The importance of “early” cannot be overemphasized. Early activities before any public meetings are important, as they help the project planners and engineers become acquainted with the project and project area. These activities may include a local concerns survey; contact/interviews with RPC transportation planner(s); interviews with elected or appointed municipal officials and/or municipal planning/engineering staff; internal questionnaires (e.g., for VTrans maintenance and operations staff); and a site visit or “site walk” that, ideally, should include local representatives.

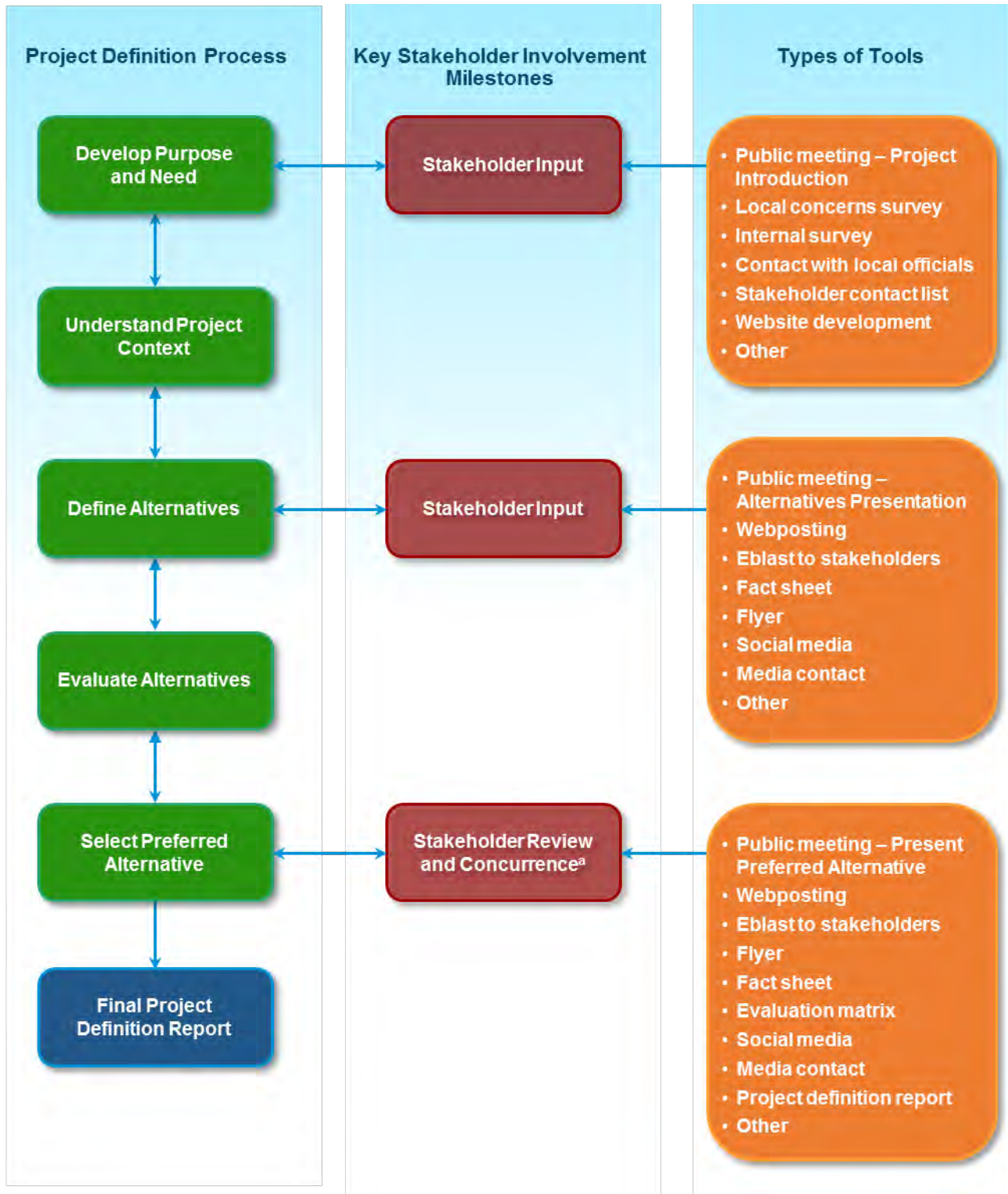
Figure 3.1 shows the flow of a typical project definition process as shown earlier in Figure 2.1, but with added information about input and outreach tools that may be appropriate at each of the key points at which stakeholder input should be sought. Three public meetings are typical for the most complex projects, although this can vary considerably depending upon the nature and scale of the project:

1. A **project introduction meeting** (sometimes referred to as a “local concerns” meeting) to gather input for the development of the purpose and need statement;
2. An **alternatives presentation meeting** to share background information gathered and obtain input to the alternatives proposed for further evaluation; and
3. A **preferred alternative meeting** to present the proposed alternative and its justification, and obtain input for the final alternative selection/approval process.

Many of the less complex projects subject to the project definition process may warrant fewer meetings. For example, one meeting may be held to introduce the project, and another to present the preferred alternative. Fewer than two meetings may be warranted if the decision on a project alternative is anticipated to have minimal community impacts. For smaller-scale projects, sending a local concerns questionnaire to the affected town(s) may be appropriate in lieu of a formal project introduction meeting.

As noted earlier, this process is not always linear. New information or strong local concerns can result in a rethinking of the purpose and need, viability of alternatives, or which alternative is selected. Major revisions to an alternative previously presented to the public may be need to be brought to the public again before final approval. Simpler projects, with minimal implications for community and environmental impacts, may be driven mainly by the needs of the asset and require less public involvement. The most appropriate types and application of outreach tools will depend on the size, complexity, and level of community interest in each individual project.

Figure 3.1 Typical Project Definition Process with Stakeholder Input Opportunities



<sup>a</sup> “Stakeholder review and concurrence” means that stakeholders have been presented with a description of the preferred alternative and why it was selected; have been provided the opportunity to comment on the selection; and that VTrans has considered any stakeholder concerns and addressed them to the extent practical. The final determination of the preferred alternative is made by VTrans considering all stakeholder input.

### 3.3 To Whom Should I Reach Out?

Both the extent and type of involvement during project definition will vary depending on the specific project need and on the context and potential impacts of the project alternatives. For example, a bridge rehabilitation could be a relatively minor project with few impacts or could be a much more complex project, depending on such factors as the type of work proposed, the surroundings of the project, the historic nature of the bridge, traffic management, etc.

On any given project, who needs to be “brought to the table” as part of an effective project definition process? The most important criteria for who to reach out to on any *specific* project involves consideration of who will be affected by or otherwise have an interest in that project, such as:

- Local officials;
- Abutters and nearby residents/businesses;
- Project users (motorists, transit riders, pedestrians, bicyclists);
- State and Federal regulatory officials and agencies;
- State, local, and regional emergency services personnel;
- Maintenance personnel; and
- Specific interest groups (e.g., environmental, bicyclists).

Table 3.1 provides a guide to the various types of stakeholders who might have an interest in a project and examples of the interests that they might have.

**Table 3.1 Potential Stakeholders**

Type of Stakeholder	Stakeholder	Considerations May Include...
Internal (VTrans)	<ul style="list-style-type: none"> <li>• Policy and Planning.</li> <li>• Rail, Aviation, and Transit.</li> <li>• Asset Management and Performance.</li> <li>• Project Delivery.</li> <li>• Construction and Materials.</li> <li>• Maintenance and Operations.</li> <li>• Municipal Assistance.</li> <li>• Department of Motor Vehicles.</li> <li>• Office of Highway Safety.</li> <li>• Right-of-Way.</li> <li>• Utilities Section.</li> <li>• Development Review and Permitting Services.</li> <li>• Risk Management Engineer.</li> <li>• Bicycle and Pedestrian Program Manager.</li> <li>• Environmental Permit and Resource Specialists.</li> </ul>	<ul style="list-style-type: none"> <li>• Project benefits and costs.</li> <li>• Consistency with statewide plans (policy, modal).</li> <li>• Environmental resource identification.</li> <li>• Consistency with asset management plans, corridor plans, or level of service requirements.</li> <li>• Compliance with design standards.</li> <li>• Maintenance requirements.</li> <li>• Complete streets/context-sensitive review.</li> <li>• Traffic management.</li> <li>• Permitting considerations.</li> <li>• Risk identification and evaluation.</li> </ul>

Type of Stakeholder	Stakeholder	Considerations May Include...
Federal	<ul style="list-style-type: none"> <li>• FHWA.</li> <li>• Federal Railroad Administration.</li> <li>• Federal Transit Administration.</li> <li>• Federal Aviation Administration.</li> <li>• U.S. Fish and Wildlife Service.</li> <li>• U.S. Forest Service.</li> <li>• Immigration and Customs Enforcement.</li> <li>• U.S. Army Corps of Engineers.</li> <li>• Environmental Protection Agency.</li> <li>• Coast Guard.</li> </ul>	<ul style="list-style-type: none"> <li>• Project benefits and costs.</li> <li>• Compliance with Federal planning and environmental regulations:                             <ul style="list-style-type: none"> <li>– Equity/environmental justice.</li> <li>– Brownfields.</li> </ul> </li> </ul>
State	<ul style="list-style-type: none"> <li>• Agency of Natural Resources.</li> <li>• Agency of Commerce and Community Development.</li> <li>• Buildings and General Services.</li> <li>• Agency of Agriculture.</li> <li>• Department of Public Safety, including State Police and Division of Emergency Management and Homeland Security.</li> </ul>	<ul style="list-style-type: none"> <li>• Compliance with state regulations.</li> <li>• Support of other state initiatives/programs (housing, economic development, safety, telecommunications, etc.).</li> </ul>
Regional	<ul style="list-style-type: none"> <li>• RPCs.</li> <li>• Transit operator(s).</li> <li>• Regional Development Corporations.</li> <li>• County Sheriff.</li> </ul>	<ul style="list-style-type: none"> <li>• Project benefits, costs, and impacts.</li> <li>• Consistency/coordination with regional plans and services.</li> </ul>
Municipal	<ul style="list-style-type: none"> <li>• Municipal planners and engineers, town administrator/manager, emergency services providers, public works staff, police department.</li> <li>• Municipal elected and appointed officials.</li> <li>• School officials.</li> </ul>	<ul style="list-style-type: none"> <li>• Project benefits, costs, and impacts.</li> <li>• Consistency with local plans.</li> <li>• Local context.</li> <li>• Traffic management.</li> </ul>
Businesses and Institutions	<ul style="list-style-type: none"> <li>• Businesses and institutions in project vicinity.</li> <li>• Businesses whose customers use the facility.</li> <li>• Freight/goods shippers.</li> <li>• Chambers of Commerce and business organizations.</li> <li>• Rail operators.</li> <li>• Private transit service providers.</li> <li>• Major employers.</li> </ul>	<ul style="list-style-type: none"> <li>• Project benefits, costs, and impacts.</li> <li>• Future construction disruptions.</li> <li>• Business access.</li> <li>• Local context.</li> <li>• Traffic management.</li> </ul>
General Public and Interest Groups	<ul style="list-style-type: none"> <li>• Abutters.</li> <li>• Other residents in project vicinity.</li> <li>• Travelers using roadway.</li> <li>• Local and statewide pedestrian and bicycle groups.</li> <li>• Community groups.</li> <li>• Transit riders.</li> <li>• Environmental groups.</li> <li>• Local and regional newspapers.</li> <li>• Airport Fixed Base Operators</li> </ul>	<ul style="list-style-type: none"> <li>• Project benefits, costs, and impacts.</li> <li>• Special interests (e.g., bicycle or pedestrian features, environmental impact).</li> <li>• Traffic management.</li> </ul>



## 3.4 How Should I Reach Out?

A few principles of effective outreach include:

- Reach out as “early and often” as circumstances dictate and resources allow. This might include early contact with local officials and road foremen, RPCs, District Transportation Administrators (DTA), and TSMO; development of a comprehensive list of project contacts; issuance of a local concerns survey; holding a local concerns meeting; and continuing contact as necessary, especially before key milestone decisions.
- Provide timely, clear, and transparent information on issues, developments, and alternatives. Be sure to always include contact information so that people know where to direct their comments or concerns. Develop a project fact sheet near the beginning of the project definition to summarize key information about purpose and need, alternatives, and how to stay informed. Regular project updates and meetings may be necessary, depending on the size and complexity of the project. It is important that people understand what the project is, why it is needed, and how the project delivery process works.
- Get the word out about meetings, events, and input opportunities. It is not enough to just hold a meeting or develop a project web site and outreach materials; it is important to be proactive to ensure that notification about these meetings and materials is made available to interested parties. This often requires creative methods to ensure that people are kept informed, such as flyers in coffee shops, social media sharing, direct mailings to the contact list, or posting on local social media, such as the Front Porch Forum.
- Genuinely consider and be responsive to stakeholder input. Do not just listen, but remain open to the idea that there may be a better solution than that originally proposed.
- Be inclusive in reaching out, being sure to include those groups that are traditionally underserved (e.g., low-income, minority, or limited English proficiency populations).

Outreach to stakeholders during project definition is particularly important as it represents the “early” part of early and often. Being a good listener early in project definition can lead the project in the right direction and identify supportable alternatives. This can reduce time and cost to the project, and build trust on the part of stakeholders. Table 3.2 provides examples of outreach tools and when to use them. If a PIO has been hired for the project, that person also can help define the best tools to use. Appendix C provides examples of questionnaires that can be used to gather internal and external input, including an Operations Input Questionnaire and a Local and Regional Input Questionnaire. More detailed information and examples are provided in the VTrans Public Outreach Guidebook.



**Table 3.2 Outreach Tools and How and When to Use Them<sup>a</sup>**

Type of Tool	Examples of Tools	When and How to Use Them
Meetings	<ul style="list-style-type: none"> <li>• Local concerns meeting.</li> <li>• Local official briefings.</li> <li>• Community public meetings.</li> <li>• Facilitated workshops.</li> <li>• Small group sessions.</li> <li>• Public advisory committees.</li> <li>• Individual interviews/conversations.</li> <li>• Audience response “polling” systems, such as Turning Point technology.</li> </ul>	Meetings are used to acquire local information and feedback, foster project relationships, and develop trust with the community. While electronic tools are extremely useful, there is no substitute for face-to-face contact with interested parties, which builds relationships and trust.
Electronic communication	<ul style="list-style-type: none"> <li>• Contact list.</li> <li>• Web site.</li> <li>• E-blasts/emails.</li> <li>• Social media (Facebook, Twitter, Front Porch Forum, etc.).</li> <li>• Local concerns survey.</li> <li>• Other surveys and questionnaires.</li> </ul>	Electronic communication is a very efficient tool and can be used creatively to communicate effectively at relatively low cost.
Project materials	<ul style="list-style-type: none"> <li>• Fact sheets.</li> <li>• Newsletters.</li> <li>• Risk management analyses.</li> <li>• Life-cycle cost analyses/comparisons.</li> <li>• Flyers.</li> <li>• PowerPoint presentations.</li> <li>• Visualization (maps, 3-D renderings).</li> </ul>	The public needs to be able to understand the project context and purpose and need; and project material must be developed to ensure clarity of understanding. They can be distributed in hard copy, electronically, or both.
On-the-street	<ul style="list-style-type: none"> <li>• Posting flyers where people gather.</li> <li>• Participating in street fairs/other public gatherings.</li> <li>• Depositing information in public libraries, town halls/community centers.</li> <li>• Variable message signs.</li> </ul>	To be used as necessary to ensure that the public has the opportunity to know what the project is all about and when/how to share their input.
Media outreach	<ul style="list-style-type: none"> <li>• Press releases.</li> <li>• Local newspapers.</li> <li>• Local public access television or radio.</li> <li>• Highway advisory radio.</li> </ul>	To ensure that accurate information is disseminated about the project and that all who need to hear about the project are kept informed.

<sup>a</sup> The list of outreach tools is illustrative; not every tool should be used on every project. The Project Manager should develop a public outreach approach that is appropriate to the nature and scale of the project.

## 3.5 Keys to Outreach Success

There is no magic to stakeholder involvement. Effective outreach is based on the foundations of mutual trust, ample input opportunities, and truly listening to what stakeholders have to say. It is not enough to go through the motions. It is necessary to actively seek out input and listen to what stakeholders have to say. While doing so, keep the following in mind:

- During the early phases of project definition, especially at the project introduction meeting, the focus should be on receiving public input, not providing answers or preconceived thoughts on alternatives. This is the time to provide particular focus on the concerns of local stakeholders.
- A project needs to adequately consider local context. Local stakeholders can help define and explain the context.
- Some stakeholders may come forth; most will need to be actively sought out, including environmental justice populations.
- Trust is earned through respectful communications, competence, and honest consideration of input.
- Multiple methods of disseminating project information will maximize the number of stakeholders reached, and maximizing stakeholder involvement resulting in a better and more supportable project.
- The more clearly the project's purpose, need, and alternative concepts are defined, the more useful stakeholder feedback will be.
- Be prepared to make adjustments to alternatives if warranted or consider new ones.
- Document the outreach process, including major themes and agency response, as part of the Project Definition Report (see Section 9.0).

## 4.0 Creating a Purpose and Need Statement

### 4.1 What Is a Purpose and Need Statement?

The purpose and need statement is a problem statement used to define the reasons for the project and its goals, or what it hopes to accomplish or correct. It includes:

The **purpose** defines the transportation problem to be solved, and the **need** provides data to support the purpose.

- **The purpose (of the project).** Defines the transportation problem to be solved, and outlines the goals and the objectives of a specific project. The purpose:
  - States concisely and clearly why the undertaking is being proposed; and
  - Articulates intended positive outcomes.
- **The need (of the asset or location).** Provides data to support the problem statement (the purpose). The need:
  - Identifies the transportation problem(s) to be addressed;
  - Defines causes of existing problems; and
  - Uses factual, quantifiable data to the extent possible to explain the asset or system need.

### 4.2 Why Create a Purpose and Need Statement?

A clear and concise P&N statement plays a key role in limiting the range of alternatives to be considered. Planners can dismiss, without detailed study, any alternative that fails to meet the project's P&N. For example, a P&N can be used to constrain a project scope to just the rehabilitation of the asset, rather than opening up geometric design issues.

The P&N statement also provides a basis for evaluating alternatives. Alternatives should be evaluated based on the extent to which they address the specific needs identified in the statement and the extent to which they accomplish the goals.

### 4.3 What Should the Statement Contain?

A P&N statement **should** contain:

- **A purpose statement.** A concise statement, often just one or two sentences in length, which summarizes the positive outcomes that are expected as a result of the project. It should state what the project will accomplish.
- **A statement of need.** Statements of need often reference one or more of the following issues or risks:
  - Safety;
  - Mobility;
  - Access;
  - Congestion;
  - Resiliency;
  - Sustainability;
  - Asset condition (facility deficiencies);

- System linkage/connectivity (i.e., system redundancy);
- Modal interrelationships;
- Emergency evacuation;
- Economic development/growth; and
- Environmental protection.

Needs can be expressed in terms of the current state and the desired state. Quantifiable values, such as level of service, live load capacity, substandard geometry, or crash data, should be included whenever possible.

The P&N statement should be specific enough that a range of alternatives can be developed offering solutions to the transportation problem. The statement should:

- Include language that is clear and understandable to the general public;
- Present a shared understanding of the transportation problems and objectives;
- Reflect other priorities, risks, and limitations in the transportation corridor (e.g., environmental resources, growth management, land use, economic development) as relevant;
- Assist in defining the project scope; and
- Guide the development and evaluation of alternatives.

A purpose and need statement **should not** contain:

- Discussion of solutions or alternatives; or
- Subjective or undefined descriptors such as “significant,” “minor”...

Care should be taken to ensure the statement is not so narrow as to unreasonably point to a single solution.

Appendix B provides examples of P&N statements for different types of projects.

## 4.4 Gathering Background Information

Some initial knowledge of the P&N for the project is likely to be available already through the project initiation phase. For example, the project may have emerged from an asset management system or Highway Safety Improvement Program, or been proposed in a regional or municipal transportation plan. However, additional information gathering may be needed to fully support the development of the P&N statement. This may include a site visit and/or other basic data collection, as described in Section 5.0.

## 4.5 Stakeholder Input

The VTrans Project Manager will lead the drafting of the P&N statement considering materials provided by AMP and in consultation with the PDRT. Stakeholder input is critical to development and finalization of the P&N statement. After an initial statement has been drafted, the Project Manager may have it reviewed internally by the PDRT, and then distribute it to identified stakeholders (see Section 3.3) for review and comment. Following review and input by internal and external stakeholders, it may be necessary to revise the P&N statement to be more consistent with local concerns and issues. The revised version also should be reviewed by stakeholders.

A public project introduction meeting may be held at this time to present the project concept and background information and obtain input to the P&N statement. Agenda items may include:

- Description of the project concept;
- Initial understanding of the purpose and need addressed by the project;
- Background information on the project area and need;
- Public comment on purpose and need; and
- Public suggestions of potential alternatives and evaluation considerations.

## 4.6 Purpose and Need Acceptance

After gathering basic background information and obtaining stakeholder input, the P&N statement should be reviewed by the PDRT. It may occasionally be necessary to revisit the P&N statement during the alternatives analysis process, as it sometimes becomes clear during this process that a different direction is possible or even necessary. As the project definition process moves closer toward completion, however, the P&N should only be reconsidered based on a change in factual information rather than opinions or wants.



## 5.0 Understanding the Project Context

A solid understanding of the existing and potential future conditions of the project area is required in order to develop realistic alternatives and evaluate these alternatives against performance criteria. An understanding of conditions will help either validate and support the P&N statement, or will make it apparent that it needs to be refined. Insufficient research of the project conditions may result in an incomplete statement, consideration of alternatives that are not feasible, selection of an alternative that does not adequately solve problems or address local concerns, and/or cost estimates that do not adequately reflect actual construction costs.

When studying options for improvements, future conditions should be considered. For example, an intersection improvement that currently functions with an all-way stop may require a traffic signal or other intersection treatment in ten years when traffic growth is taken into consideration. Designs should be readily adaptable to future needs, as well as meeting existing needs.

The specific data that is collected will depend upon the type of the project, location/context, its scale, and the established P&N.<sup>8</sup> Larger-scale or urban projects may warrant more extensive data collection efforts. Some data may be readily available while others may require more effort. In addition to “hard” data, knowledge of public perceptions and the local experience also is critical to understanding the project context. The P&N statement should help focus data collection efforts on key issues to be addressed by the project.

Data and information should not be collected just for their own sake. The Project Manager should think carefully about which data is most relevant to the project. Often, scarce resources are used up collecting data that does not end up being useful. An incremental approach starting with the most important data items to support P&N development and adding others, as needed, to assist in defining and evaluating alternatives can help to limit and focus efforts.

Examples of data that might be needed are provided in Table 5.1 and discussed further below.

**Table 5.1 Potential Data Needs for Existing and Future Conditions**

Type of Data	Examples	Sources
<b>Facility and Right-of-Way Elements</b>		
Facility	<ul style="list-style-type: none"> <li>Lane widths, shoulders, bicycle and pedestrian facility dimensions, intersection characteristics.</li> </ul>	<ul style="list-style-type: none"> <li>Route logs.</li> </ul>
Right-of-Way	<ul style="list-style-type: none"> <li>Right-of-way width, property lines, town boundaries, access (19 VSA 1111) permits.</li> </ul>	<ul style="list-style-type: none"> <li>Vermont GIS, municipalities, VTrans.</li> </ul>
Utilities	<ul style="list-style-type: none"> <li>Location of telecommunications, gas, electric, sewer, and water lines.</li> </ul>	<ul style="list-style-type: none"> <li>VTrans, utility companies.</li> </ul>
Roadway and Structures	<ul style="list-style-type: none"> <li>Geometrics and topography.</li> </ul>	<ul style="list-style-type: none"> <li>Route logs, as-built plans, mapping, survey, LiDAR.</li> </ul>

<sup>8</sup> “Data” here refers to everything from traffic statistics to information gleaned from surveys and interviews.

Type of Data	Examples	Sources
<b>Facility and Right-of-Way Elements</b>		
Maintenance	<ul style="list-style-type: none"> <li>Maintenance and operations issues.</li> <li>Drainage and stormwater management.</li> </ul>	<ul style="list-style-type: none"> <li>VTrans data and district personnel, municipal personnel.</li> <li>MOB Environmental Program Water Quality Unit.</li> <li>VTrans' Corridor Needs Tool.</li> </ul>
Planned or Proposed Infrastructure	<ul style="list-style-type: none"> <li>Roadway widening or realignment.</li> <li>Access management controls.</li> <li>Intersection improvements.</li> <li>Park-and-ride facilities.</li> <li>Pedestrian and bicycle facilities.</li> <li>Corridor needs.</li> <li>Paving.</li> </ul>	<ul style="list-style-type: none"> <li>Corridor management plans.</li> <li>Pedestrian and bicycle studies, including Bicycle Corridor Priority Map.</li> <li>Regional transportation plan.</li> <li>Local capital improvement plans.</li> <li>TSMO.</li> <li>District Transportation Administrators.</li> <li>Asset management systems.</li> <li>State Transportation Improvement Program (STIP) or VTrans Capital Program.</li> <li>VTransparency.</li> </ul>
Asset Information	<ul style="list-style-type: none"> <li>Asset condition.</li> <li>Asset location.</li> <li>Maintenance costs.</li> <li>Maintenance asset activity history.</li> </ul>	<ul style="list-style-type: none"> <li>Asset management systems.</li> <li>VTransparency.</li> <li>GIS-based applications, databases, and maps.</li> </ul>
Performance Data	<ul style="list-style-type: none"> <li>Transportation goals and objectives.</li> <li>Performance history (trends) and performance measures.</li> </ul>	<ul style="list-style-type: none"> <li>VTrans performance reports.</li> </ul>
<b>Facility Use and Operations</b>		
Traffic	<ul style="list-style-type: none"> <li>Average Annual Daily Traffic, K values, turning movement counts, bicycle and pedestrian usage, forecast volumes.</li> </ul>	<ul style="list-style-type: none"> <li>VTrans, RPCs, local officials, and businesses.</li> <li>Statewide model.</li> </ul>
Public Transportation	<ul style="list-style-type: none"> <li>Bus routes, service frequency, and stop locations.</li> <li>Planned service changes.</li> </ul>	<ul style="list-style-type: none"> <li>Local transit and/or intercity bus operator schedules.</li> <li>Consultation with local operator or VTrans.</li> </ul>
Safety	<ul style="list-style-type: none"> <li>Crash listings, maps, high-crash determination, crash frequency, crash rates, crash patterns, contributing factors (human and geometric), speed studies, crash forecasts.</li> </ul>	<ul style="list-style-type: none"> <li>VTrans Public Query Tool.</li> <li>Highway Safety Manual, Interactive Highway Design Manual software.</li> </ul>
<b>Land Use and Community Context</b>		
Existing and Planned Land Use	<ul style="list-style-type: none"> <li>Existing land use, property ownership, zoning, and bylaw considerations.</li> <li>Planned land use and zoning or bylaw changes.</li> <li>Development proposals.</li> </ul>	<ul style="list-style-type: none"> <li>Local town and municipal plans, zoning, and bylaws.</li> <li>Municipal planning or community/economic development department.</li> <li>RPC.</li> <li>Site visit.</li> </ul>
Other Community Context Issues	<ul style="list-style-type: none"> <li>Planned Growth Area designation.</li> <li>Demographic characteristics.</li> <li>Context-sensitive design/solutions.</li> </ul>	<ul style="list-style-type: none"> <li>RPC and municipal officials.</li> <li>Municipal plans.</li> <li>Census.</li> <li>Project designers/engineers.</li> </ul>



Type of Data	Examples	Sources
<b>Environmental</b>		
Drainage and Stormwater Management	<ul style="list-style-type: none"> <li>Discharge permits and requirements.</li> </ul>	<ul style="list-style-type: none"> <li>VTrans Environmental Permit and Resource Specialists, Vermont Agency of Natural Resources (VANR).</li> <li>MOB Environmental Program Water Quality Unit.</li> </ul>
Natural, Historic, and Archeological Resources	<ul style="list-style-type: none"> <li>Wetlands, archaeological and historic resources, 6(f), existing ACT 250 properties, unique flora and fauna, river corridors, flood hazards, hazardous waste, and wildlife connectivity.</li> </ul>	<ul style="list-style-type: none"> <li>VTrans Environmental Permit and Resource Specialists, Vermont ANR Atlas.</li> </ul>

## 5.1 Data on the Facility and Right-of-Way Elements

**Survey.** The typical first step in data collection is a field survey of the project area. The Project Manager should involve team members as needed to review the project site and develop a geometric survey request.

**Facility.** The cross-section of the facility should be identified, including number of lanes; lane widths; shoulders; and any nonmotorized facilities (including bicycle lanes, shared-use paths, and sidewalks) in the right-of-way (ROW). Transit stops and shelters also should be identified. Intersections should be characterized by the number of lanes, movements served, and any traffic controls. Facility dimensions should be compared against Vermont State Standards. Appendix D provides an example of a project design criteria evaluation, comparing existing conditions against minimum standards identified in the current edition of the standards.

**Right-of-Way.** Existing ROW is important to know prior to shaping project alternatives. Approximate GIS-based ROW and parcel lines are often available as a starting point, but should not be relied upon as accurate. An incorrect assumption of ROW widths can set a project up for lengthy project delays and costly overruns during the project development phase. The VTrans ROW Section should be consulted early in the process to obtain available information. Deed research also may be necessary to determine ROW width. The owner of the highway ROW also should be identified as the process for ROW land and easement acquisitions through a municipality is often quite different than through the State. There also may be dedications for roadway widening that have been secured by municipalities from property owners during local land development processes.

**Utilities.** Aerial and underground utilities are located within the ROW of many highways throughout the State. VTrans' Utilities and Permits will have information on ownership and permitted utility routes in the project area, but there may be others that exist as well. Local water and sewer lines may reside within the project area, along with gas, power, and communication lines. Utility companies/owners should be identified, if possible.

**Roadway and Structure.** Projects may have structures within the project limits, such as culverts, manholes, catch basins, vaults, box culverts, or bridges. The owner of these structures should be contacted at this stage to help determine their condition, and help to evaluate impacts to them for various proposed alternatives. Reviewing the route logs and as-built plans can be an effective way of obtaining information.

**Geotechnical.** In situ materials can be influential when considering design alternatives. If ledges are present in the project area and needs to be removed for a certain alternative, direct and indirect impacts may not make certain options feasible. Performing borings may prove a worthwhile expense at this stage in the process. This should be discussed early as scheduling of this work is likely to be on the critical path affecting the schedule for project completion.

**Maintenance.** DTAs and the Maintenance and Operations Bureau (MOB) Environmental Program Water Quality Unit should be consulted early regarding any potential maintenance concerns related to the project. District personnel also can provide information on current or past maintenance issues for the facility, if any, as well as other project/issues nearby and often even property owners and their receptivity to agency work. Consider using an operations and maintenance questionnaire to obtain this information. Municipalities should be reminded that sidewalk maintenance, including snow removal, is always the responsibility of the municipality, with the exception of facilities that have Finance and Maintenance agreements with VTrans stating otherwise.

**Planned or Proposed Infrastructure.** It is important to consider any planned changes to infrastructure in or connecting to the study area that could influence the choice of project alternatives. For example, a corridor management plan may have identified proposed changes to better manage access, or a safety plan may have identified desired intersection improvements or geometric realignment. The VTrans On-Road Bicycle Corridor Priority Map should be consulted to help identify facilities where bicycle improvements should be considered. Corridor or access management plans should be consulted to determine proposed changes to facility access points. State, regional, and local long-range plans and capital improvement programs should be consulted, along with other local or mode-specific studies.

## 5.2 Data on Facility Use and Operations

**Traffic.** Traffic data should be researched for the project area. VTrans TSMO is a first stop to determine available information, and RPCs routinely conduct traffic counts as well. Consideration should be given to the type of traffic through the area; for example, it may not be practical to design for a peak ski season day. If there are large special events that affect traffic on the facility and that occur often enough to warrant influencing design considerations, the availability of data on event-generated traffic should be researched. Turning movements may be available to evaluate existing intersection capacity and peaking patterns. The percentage of truck traffic and availability of pedestrian or bicycle counts also should be researched. The availability of forecasted traffic information, including growth factors from TSMO, forecasts from the VTrans statewide or regional (Chittenden County RPC) model, or forecasts generated for a specific study in the area, also should be researched.

**Transit.** Existing or planned bus routes using the facility should be identified, including both local transit and intercity routes. The frequency of service and location of stops in the study area also should be identified.

**Safety Data.** Safety data should be obtained for the project area. The VTrans Office of Highway Safety is the primary source for safety data. Crash data also can be obtained directly by using the on-line Public Crash Query Tool, which permits users to search, print or extract, and map crashes for an area.

The types of crashes that are occurring within the limits of a project should be reviewed. Crash history should be assessed to look for obvious crash patterns that the project should address, and to determine whether crashes are occurring due to certain roadway characteristics. Mapping crashes at an intersection or

along a corridor can help determine clusters of crashes of a specific type and make a connection to contributing factors related to roadway or traffic factors.

Risk elements also should be inventoried that are commonly associated with crashes at other locations that have similar features. Examples include three-way intersections that have an angle of 75 degrees or less where realignment could be beneficial; combinations of downhill and left horizontal curves where widening of the outside of the curve could be beneficial; or access points and turning movements where a left-turn lane or a two-way, left-turn lane could be beneficial.

### 5.3 Environmental Data

**Drainage, Stormwater Management, and Structure Hydraulics.** The existing storm runoff conveyance from the project area or off-site development may influence the design of alternatives developed. An understanding of the on-site drainage pattern, as well as any off-site areas that currently might be conveyed through the project site, is important. Existing practices also may be compared with best management practices. The VTrans Hydraulics Unit, Environmental Permit and Resource Specialists, and MOB Environmental Program Water Quality Unit Technicians should be contacted to see if they have any information regarding the project area, available bridge and culvert hydraulics, need for stormwater retrofits, and if existing stormwater permits inside the project area or on adjacent-developed lands may influence project design and alternatives.

**Natural, Historic, and Archeological Resources.** It is likely that most transportation projects will need to undergo some level of environmental impact evaluation. VTrans and the Vermont ANR have a keen interest in protecting the natural environment by avoiding, minimizing, and/or mitigating potential impacts. A resource identification request should be made to the VTrans Environmental section.

Existing bodies of water; streams; floodplains; impaired waterways; riparian buffers; wetlands; hazardous materials; historical, archeological, and cultural resources; and endangered species are all types of environmental considerations that may help shape the design alternatives developed. The ANR and VTrans Environmental Units within Project Delivery and Operations have a variety of information available on their web site pertaining to the natural and cultural resources that may be present on a specific site. The ANR Wildlife Connectivity Map should be reviewed to identify potential habitat connectivity issues and opportunities.

Archeological and historic properties may be within or adjacent to the project area, but are not always obvious when conducting a site visit. Existing or pending Act 250 permits also should be identified, as any disturbance to properties with Act 250 permits may require an amendment to be processed.

### 5.4 Land Use and Community Context

**Existing and Planned Land Use.** Check with the Town Manager/Administrator, municipal planner, and RPC to obtain existing land use and zoning or development plan information in order to understand existing and potential future land use while evaluating alternatives for a project. This includes current zoning/development regulations; any expected future zoning or bylaw changes applying to the project area; current type of development; any permitted or planned development; anticipated development patterns based upon municipal plans and bylaws; build-out analysis, if appropriate; and consideration for how planned development may change the nature of a project area.

**Other Community Context Issues.** Other issues specific to the community context should be noted. For example, a Planned Growth Area (as identified in a regional plan) is a policy designation representing a shared goal to plan development in order to maintain the historic settlement pattern of compact village and urban centers separated by rural countryside. The area may have unique demographic characteristics, such as a high-student population, high proportion of zero-vehicle households, or a high concentration of low-income or minority populations. Past studies of the corridor may have proposed context-sensitive solutions to reflect community or regional values. Designations via the Vermont Downtown Program also should be noted. State designated centers, including downtowns, village centers, new town centers, growth centers, and neighborhood development areas should be noted and considered.<sup>9</sup> State designated centers are identified on the State of Vermont Smart Growth Mapper.<sup>10</sup>

Regardless of whether or not a project is in a state-designated center, the general characteristics of the surrounding area should be considered in the design of highway and other transportation projects. For example, is the potential project located in a rural area with agricultural or other land-based activities, a winter or summer recreational area, a small village with a mix of residential and small businesses, a suburban arterial with larger-scale commercial uses, or in a downtown with on-street parking and larger buildings in close proximity to the street? In developed areas, the physical, operational, and aesthetic characteristics and constraints of buildings, streetscapes, landscaping, and other infrastructure associated with the built environment should be considered.

## 5.5 Data and Information Collection

Much of the above data and information may be collected via VTrans resource identification requests, web sites, or databases or reports obtained from state, regional, or local agency staff. In addition, a site visit and/or community questionnaire are critical to understanding community context. A site visit is beneficial early in the process (while the P&N is being developed) to start to grasp the potential issues that will need to be taken into consideration when developing design alternatives. Including key stakeholders on the site walk (such as local elected officials, town administrators/managers, or town engineers or road foremen) who are very familiar with the project area and associated issues will greatly facilitate an understanding of local conditions. Observing the presence and actions of motorists, cyclists, pedestrians, and others will help site visit participants to more fully understand the deficiencies of the project site and reinforce the project needs. Other issues may be noted during a site visit that may help shape design alternatives, such as:

- Posted speed limits;
- Parking – marked and unmarked;
- Public transit;
- Rail-highway grade crossings in the vicinity;
- Roadway alignment (vertical and horizontal);
- Sight distances, including side roads and drives;

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<sup>9</sup> <http://accd.vermont.gov/community-development/designation-programs>.

<sup>10</sup> <http://smartgrowth.vermont.gov/>.

- Ledge outcroppings;
- Pedestrian and bicycle facilities/usage;
- Americans with Disabilities Act (ADA) accessibility compliance issues;
- Aerial utilities;
- Evidence of underground utilities, such as manhole covers and utility pedestals;
- Stormwater systems and treatment facilities;
- Roadway or structure cross section (number and width of lanes, shoulders, sidewalks, green strips, and roadside barriers);
- School zones;
- Truck routes;
- Availability of on-site or off-site detours and their appropriateness for the added detour traffic;
- Roadway setting (e.g., urban, rural, residential, commercial, transitional);
- Roadway or structure observed conditions; and
- Natural and cultural resources.



## 6.0 Defining Alternatives

Once a P&N statement is developed and project context is understood, alternatives must be developed and their engineering feasibility, environmental impacts and permitability, economic viability, and public acceptance determined. As part of this process, an assessment should be made of whether the alternative is likely to be a Categorical Exclusion, or if it will require a higher level of environmental review.

### 6.1 What Range of Alternatives Might Be Considered?

The number and ranges of alternatives that should be considered will depend on the type and complexity of the project. Most projects should consider a few to several “build” alternatives. All alternatives analysis should include a “no-action” or “no-build” alternative.

In order to define the appropriate range of alternatives that should be considered, it is useful to define the logical termini for project limits. These logical termini will vary based on the type of project being considered. A bridge improvement, localized roadway improvement, or pedestrian improvement project should have logical termini near the limits of the proposed work. In the project definition stage, the termini can be specified in conceptual terms rather than with a detailed measurement.

If a corridor management plan exists, alternatives should consider the strategies outlined in the corridor management plan.

### 6.2 Generating Alternatives

Alternative concepts might be suggested by the party initially identifying the problem; other internal or external stakeholders; an existing plan (corridor, municipal, regional); and/or by a management system.

The idea for the project may implicitly suggest a particular alternative (e.g., a park-and-ride lot is needed to serve rideshare and public transportation commuters). The Project Manager can work with the PDRT, along with other stakeholders, to ensure that a range of potentially feasible and practical alternatives is considered so that the best possible solution can be identified. These alternatives might include variations on one approach (e.g., new park-and-ride lot at location X versus location Y); a different approach (e.g., an agreement to use an existing underutilized parking lot); or the no-build or do-nothing alternative.

In some cases, a management system may point to a specific solution; for example, the VTrans safety management process produces a recommended solution based on benefit-cost analysis. However, at a minimum this solution should be considered in comparison to the “no-build” or “do-nothing” alternative; and it may be desirable to consider other solutions if they involve significant tradeoffs not captured in the benefit-cost evaluation.

### 6.3 Developing Alternatives

Alternatives should be developed using established VTrans design guidance. The following issues should be considered when developing alternatives:

- Conceptual project alignment (existing and proposed), approximate limits of impacts, and approximate boundaries of resources.

- Avoidance or minimization of natural and cultural resources and ROW impacts.
- Typical roadway/structure sections addressing the needs of all users to the extent practical.
- Multimodal accommodation in facility design and operations.
- How traffic will be managed during construction (e.g., road closure, phased construction, temporary detour or temporary bridge).
- Accessibility issues and ADA accommodations, especially slope or cross-slope concerns that may be difficult to resolve.
- Compatibility with adjacent land uses and associated activity.
- 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).
- Desired design life.
- Cost estimates, in accordance with the VTrans cost-estimate guidelines. A planning-level cost estimate can be made using a template with a breakdown of unit prices and quantities for major items. The cost estimate should be a life-cycle estimate that considers design/engineering, ROW, construction costs, and maintenance and operations as applicable. An example of a conceptual cost estimate is included in Appendix F.

### *6.3.1 Use of Established Design Guidance*

Basic design guidance serves as the foundation for establishing the physical form, safety, and functionality of the facility. Design guidance is selected or determined by the designer to address a project's P&N (for example, the level of service provided to pedestrians, bicyclists, and drivers). Selecting appropriate values or characteristics for the basic design guidance is essential to achieve a safe, effective, and context-sensitive design. The basic design guidance should be researched and values of design controls established. Once established, they are carried forward through project design.

## **6.4 Stakeholder Input**

It is important to consider stakeholder input at this stage to ensure that a full range of alternatives is being considered. Stakeholders may suggest alternatives that were not previously considered, or may provide input that leads to quickly eliminating a particular alternative from further evaluation.

Stakeholder input at this stage may include review by the PDRT. Depending upon the nature and scale of the project, a public meeting also may be called to seek input on a range of alternatives. Key stakeholders (e.g., abutters, key interest groups, municipal officials) should be issued invitations, and the meeting also should be announced publicly. Publicity tools may include the project web site; an email to the stakeholder list; press releases/media contact; social media (including Front Porch Forum); and fact sheets distributed through local channels, such as libraries, coffee shops, and the town hall. Appendix E provides an example of a project fact sheet.



If a public alternatives presentation meeting is held, agenda items should include:

- Why the project is needed, including review of P&N statement and how it is used in developing and evaluating alternatives;
- Input on proposed evaluation criteria;
- Review of information collected on project context (existing and future conditions);
- Summary of the proposed alternatives;
- Preliminary evaluation of the proposed alternatives (e.g., consistency with P&N, fatal flaws); and
- Discussion with stakeholders about alternatives, including any possible new options that fit the P&N.

Meeting notes should be taken to summarize and document input.



## 7.0 Evaluating Alternatives

### 7.1 Evaluation Process

The alternatives that have been defined must be put through an evaluation process. The goal of the process is to evaluate each alternative against common criteria to determine how well it meets the purpose and need of the project, and to assist in identifying the best alternative. Alternatives may be eliminated before going through a more rigorous evaluation process if they fail basic checks, such as viability or practicality or otherwise have “fatal flaws.”

Evaluation criteria may be weighted depending on the relative importance of each component, based on the priorities established in the P&N statement. For example, a project with a primary need to address pedestrian access, secondary need to improve bicycle deficiencies, and thirdly a need to decrease traffic delays should reward the alternatives that provide the most benefit to these priorities. The Project Manager should consider working with the PDRT if a weighting system is to be applied. In the above example, the consensus may assign a 40 percent weight to the score for pedestrian enhancements, 40 percent weight to bicycle improvements, and the final 20 percent to vehicles. A weighting system can help direct the results in favor of the most important project goals. Alternatively, the evaluation team may consider the various criteria based on their judgment rather than on specific weights. If a weighting system is not used, it is critical that the rationale for the final selection be clearly documented in the Project Definition Report.

A common approach to alternatives evaluation is to array the project alternatives and evaluation factors in a multicriteria matrix. Examples of evaluation matrices are provided in Appendix G. Different methods can be used to assign a value to each cell in the matrix to show how the alternative is expected to perform on that criterion. These can include, for example:

- Assigning a quantitative estimate of the impact (e.g., cost);
- Assigning a rating on a scale (e.g., high/medium/low or 5-point scale from -2 to +2) based on a qualitative and/or quantitative assessment, and translating this rating into a visual presentation, such as check marks, plus signs, or “Consumer Reports” style circles;
- Assigning a number of points (out of a possible total, which may vary for each criterion is considered weighting) for each alternative, again based on a qualitative or quantitative evaluation depending upon the factor; or
- Ranking each alternative from best to worst on each criterion.

An iterative approach to evaluation may be helpful. An initial evaluation of alternatives may allow for discarding of some alternatives that are clearly inferior to others, or to combine similar alternatives. A smaller number of alternatives can then be subject to more in-depth evaluation, which may include a more quantitative evaluation of some factors.

Even a quantitative matrix has qualitative considerations and judgments are made in assigning numbers. Thus, the process is fallible. It is necessary to weigh the outcome of the evaluation matrix against stakeholder opinion, and to factor that into the selection of the preferred alternative.

## 7.2 Evaluation Criteria

The Project Manager should work with the PDRT to establish a set of evaluation criteria prior to, or concurrent with, defining alternatives. These criteria should relate directly to the need for the project and desired outcomes, as established in the P&N statement. Other criteria also may be included, such as costs, environmental impact, etc. Local as well as state goals should be considered.

Examples of common evaluation factors and specific considerations are shown in Table 7.1. The specific evaluation criterion may be the evaluation factor, or it may be broken down into specific considerations within this factor depending on the complexity of the project’s objectives. Whenever possible, try to quantify the considerations (e.g., number, square feet, acreage, or cost).

**Table 7.1 Examples of Evaluation Factors and Considerations**

Evaluation Factor	Example Considerations
<b>Benefits and Impacts</b>	
Mobility	<ul style="list-style-type: none"> <li>• Travel times and reliability.</li> <li>• Accessibility.</li> <li>• Access management.</li> <li>• By mode (auto, pedestrian, bicycle, truck, bus, rail).</li> </ul>
Safety	<ul style="list-style-type: none"> <li>• Crash reduction.</li> <li>• Reduction in severity of crashes.</li> <li>• By mode (e.g., “improve pedestrian safety”).</li> <li>• Access by emergency vehicles.</li> <li>• Resilience to flooding events.</li> </ul>
Economic	<ul style="list-style-type: none"> <li>• Customer or freight access improvement for existing businesses or planned development areas.</li> <li>• Local economy and businesses.</li> <li>• State-level economic development.</li> </ul>
Community	<ul style="list-style-type: none"> <li>• Land takings.</li> <li>• Connectivity.</li> <li>• Aesthetics, including landscaping, viewsheds, etc.</li> <li>• Noise.</li> <li>• Land use.</li> <li>• Environmental justice – benefits or impacts to low-income and minority populations.</li> <li>• Historic, cultural, and archeological resources.</li> <li>• Community acceptability.</li> </ul>
Environmental	<ul style="list-style-type: none"> <li>• Air quality – change in emissions.</li> <li>• Surface water quality – stormwater runoff.</li> <li>• Sensitive habitat and wildlife connectivity.</li> <li>• Wetlands impacts (acreage).</li> <li>• Cultural/historical/archaeological.</li> </ul>

Evaluation Factor	Example Considerations
<b>Benefits and Impacts</b>	
Consistency with adopted policies and plans	<ul style="list-style-type: none"> <li>• Consistency with a corridor plan, transportation asset management plan, municipal plan, regional plan, and/or modal plan (including the Bicycle Corridor Priority Map).</li> <li>• Conformance to design standards and criteria, including Complete Streets.</li> <li>• Consistency with VTrans Strategic Plan and Long Range Transportation Plan.</li> </ul>
<b>Feasibility Considerations</b>	
Life-cycle project cost	<ul style="list-style-type: none"> <li>• Design and engineering cost.</li> <li>• Construction cost.</li> <li>• Maintenance and operations costs.</li> <li>• Consideration of potential future inflation.</li> <li>• Mitigation of risks due to future climate and weather conditions.</li> </ul>
Construction impacts	<ul style="list-style-type: none"> <li>• Restricted business access.</li> <li>• Restricted mobility (road closures/detours).</li> <li>• Duration of construction.</li> <li>• Utility impacts.</li> </ul>

Evaluation criteria should be established early in the project definition process. Appropriate criteria for the type of project should be carried through the process to assess the benefits, costs, and impacts of proposed alternatives at each stage of their development.

### 7.2.1 *Mobility, Safety, Resilience, and Economic Benefits*

Mobility, safety, resilience, and economic benefits often represent the primary justification for undertaking a project. This is true for projects that improve conditions for travelers, as well as for those that ensure the system is maintained in an adequate state of repair to continue serving the public in the future. Negative impacts of the alternative on any of these outcomes also should be considered. It may be possible to develop quantitative benefit measures for some impacts; for example, delay reductions due to a traffic control improvement. In other cases, proxy information may be used to infer benefits (e.g., safety project addresses a high-crash location, or volume of traffic as a proxy for mobility impacts). Some assessments also may be qualitative; for example, the extent to which a project facilitates economic development by improving access to designated growth centers. Benefits and impacts should be considered for all modes, including pedestrian, bicycle, and transit travelers, personal vehicles, and freight movement. The asset and project-level risks relating to redundancy and detour lengths should be part of resiliency considerations.

### 7.2.2 *Natural and Cultural Resources and Community Impacts*

Environmental and community impacts are critical when evaluating alternatives. For example, if a project does not consider likely stormwater treatment criteria for permitting, the cost of the alternative could be significantly underestimated. Another example is if the impacts to a popular community event are not considered, public support for the continuation of the project into final design could be jeopardized. Consideration should be given to sustainability issues, as well as to environmental justice, specifically to consider whether a project might disproportionately impact low-income, minority, or other disadvantaged

population groups. Positive impacts – such as employing best management practices for stormwater control or reducing noise impacts – also should be considered and, in some cases, may be part of the primary justification for the project.

### *7.2.3 Cost Estimation*

Costs that should be considered include construction cost, ROW acquisition, design engineering, construction engineering, and maintenance. To the extent possible, the alternatives should be evaluated on true life-cycle cost, including cost to purchase, own, operate, maintain, and dispose. Costs typically are based on previous year(s) dollars, and include an anticipated percentage of inflation per year into the future. It is not uncommon for a project to go through the definition process, but not secure funding for design and construction for many years in the future. The cost estimate should include a contingency amount because it is so early in the development process; 20 to 40 percent is typical depending upon the level of risk and uncertainty. An example of a conceptual cost estimate is included in Appendix F.

Cost estimation also should include evaluation of the project's life-cycle cost, including maintenance and operations costs. Life-cycle costs may include consideration of risks, such as damage due to extreme weather events. Alternatives that have higher upfront costs, but increase the resiliency of the transportation system to expected or plausible future conditions, should be considered.

### *7.2.4 Construction Impacts*

The expected duration of construction period for each alternative should be considered. Businesses and residential areas are typically inconvenienced by construction activities; and local individuals may experience a decrease in their quality of life due to noise, air, and water pollution, traffic congestion, etc. Alternatives with shorter construction durations are typically more desirable. Utilities also may need to be temporarily or permanently relocated.

The traveling public is often affected by delays due to construction activities. The degree of which they are affected may be an important topic of analysis. For example, a bridge replacement project that closes the road and creates a 30 minute detour for a period of six months may be more or less acceptable to stakeholders than providing an on-site temporary bridge for a construction period that lasts for two years and costs more.

### *7.2.5 Maintenance and Operations Impacts*

All state-owned roadway facilities, except for most sidewalks, are maintained by the VTrans Maintenance and Operations Bureau. Once a project is constructed, it is this group's responsibility to maintain and operate the facility. M&O should be consulted early in the process for input, and provided the opportunity to offer comment during the project definition process. For example, a new technology could extend the service life of a facility dependent on certain field conditions. M&O could weigh in on their experience regarding these conditions and the expected benefits of the technology. Examples of other M&O issues that might be considered include snow removal for pedestrian and bicycle facilities, maintenance of stormwater facilities, or previous permits and associated M&O responsibilities on the facility.

### **7.2.6 Stakeholder Input**

VTrans has a mission to develop and maintain assets, while also strongly considering local and other stakeholder desires. It is important that stakeholder input be considered in the evaluation process. While VTrans must build and maintain its assets, the public also has a right to have a strong voice in what happens in their communities. There will be times when VTrans' objectives and stakeholder objectives do not line up neatly. For example, sometimes a community prefers to "live with" some traffic congestion rather than "improve" an intersection in a way that will not meet local aesthetics. Those are possible times for negotiation; for rethinking or reweighting the evaluation factors; and for creative thinking about solving problems and creating win-win solutions.





## 8.0 Selecting and Approving a Preferred Alternative

At this point, the selected alternatives have been evaluated as previously described in this guidebook. The next steps are to present the alternatives and solicit and document comments from stakeholders and the public, and then to affirm a preferred alternative for further project development.

The key milestone of evaluating alternatives to arrive at a best option cannot be undertaken without stakeholder input. This is where local understanding and local input are critical. An alternative that “looks good on paper” could have a deal breaker element that is simply not acceptable locally. The important thing to remember is that a successful project needs to have buy-in to be implementable. If stakeholder buy-in is not achieved, either 1) a project modification may be necessary; or 2) an increase in the quality or frequency of communication may be necessary to ensure that stakeholders have a better understanding of what is proposed.

### 8.1 Selection of a Preferred Alternative

The Project Manager in consultation with the PDRT should select a preferred alternative based on the outcomes of the evaluation process described in Section 7.0. Preliminary management approval should be solicited at this point, via the Highway Division Management Team or its designee, to ensure there is management support before presenting the preferred alternative to the public. The preferred alternative should provide a solution consistent with the purpose and need for the project. Selection of the preferred alternative should consider previously provided stakeholder input. The preferred alternative selection for locally owned projects should be determined in agreement with municipal officials.

### 8.2 Assemble Initial Project Definition Report and Presentation Materials

The information produced to date should be assembled into an initial Project Definition Report. The report should include the location and boundaries of the project; the P&N statement; and information on the project context, evaluation criteria, alternatives evaluated, and evaluation results. The justification for selecting the preferred alternative should be documented and included in the initial Project Definition Report. This may include identifying the relative rankings or prioritization of the various alternatives.

Materials should be created to present the alternatives considered and preferred alternative to the public and stakeholders. Graphic aids, such as maps, orthophotos, Google Earth, PowerPoint presentations, and visualizations and simulations, can aid in the understanding of the alternatives for stakeholders. A clear and concise evaluation matrix, for example using symbols to represent positive or negative degrees of impact, should be prepared for presentation. This matrix can be a summary of a full detailed matrix.

The PDRT should review the initial report, presentation materials, and evaluation matrix before presenting them to a larger group of stakeholders and the public.

### 8.3 Preferred Alternative Meeting

A meeting should be held to present the preferred alternative, and to obtain stakeholder concurrence with the decision. The initial Project Definition Report should be made available approximately two weeks or more prior to the meeting so that it can be reviewed and commented on during the meeting. A hard copy of the

report should be sent to the Town office along with the meeting notification. A link to the report also should be included in newspaper ads, Front Porch Forum postings, and other public notices.

Generally, the preferred alternative meeting is led by the Project Manager. If possible, the Design Project Manager (the staff person who is to be responsible for project development, if not the same as the Project Manager responsible for project definition) should be in attendance to be introduced to the stakeholders to facilitate a smoother transition to the next phase of project development. Key meeting objectives include the following:

- Describe the alternatives evaluated.
- Present and explain the evaluation matrix.
- Present the preferred alternative and reasons for its selection.
- Solicit comments on the alternatives for inclusion in the Project Definition Report.
- Review the process for endorsement of a preferred alternative, including who the endorsing authority is for the project. Examples may include city councils or select boards (for town projects) in addition to VTrans staff, as described below.

In addition to specific invitees, the meeting should be publicly noticed in a variety of ways to ensure maximum attendance and input. It also is a good idea to provide other ways of getting input for those unable to attend (e.g., web or written comments, social media). The local project stakeholders are generally the best resource for determining the most effective way to notice the meeting.

The meeting agenda should include all information pertinent to stakeholders to reach consensus on the selected preferred alternative. A typical agenda might include the following elements:

- **Introduction:**
  - Introduce the VTrans Project Manager and Designer;
  - Circulate a sign-in sheet to include email addresses; and
  - Review the purpose and goals of the meeting.
- **Topics for Review:**
  - The project definition process, including schedule;
  - Review major concerns and/or issues noted by stakeholders;
  - The P&N statement; and
  - Project-related resources that may be affected (environmental, archeological, historic, etc.).
- **Present Alternatives:**
  - Discuss each alternative with respect to its ability to meet the project's P&N, outline the impacts of each alternative, and present the evaluation matrix. Identify the preferred alternative in comparison to the others reviewed;

- Present the anticipated need for ROW easements or takings for each alternative (quantified in the evaluation matrix);
  - Present proposed detours, closings, and accommodations for all modes during construction;
  - Explain how and why the selected alternative was determined; and
  - Solicit input from the attendees on the preferred alternative by comment at the meeting, phone, email, and/or other methods offered to stakeholders.
- **Summary:**
    - Discuss process for selection of the preferred alternative; and
    - Highlight suggestions and comments received during the meeting.
  - **Closing Remarks:**
    - Encourage stakeholders to submit written comments within a set timeframe;
    - Outline what is next for the project, including stakeholder contact; and
    - Remind attendees that meeting notes will be available to all participants.

Much more information about public involvement is available in the 2017 VTrans Public Involvement Guide.

## 8.4 Alternatives Presentation Summary

An accurate documentation of comments received and the details leading to consensus or general agreement on a preferred alternative is critical. This process should be recorded in the Project Definition Report. This documentation should include:

- Meeting agenda, notes, and presentation materials; and
- A record of concerns received at or after the meeting.

## 8.5 Preferred Alternative Acceptance

The final decision for VTrans-funded projects is made by VTrans, considering stakeholder input. For town-owned projects, the input of the town's governing body will be considered before VTrans makes the final decision. The preferred alternative may not meet all stakeholders' desires and compromises may be needed.

With the documentation from the preferred alternative meeting, the Project Manager will work with the PDRT to review all information collected from the meeting and any follow-up, and develop a recommendation for any refinements to the preferred alternative. This may be done in collaboration with stakeholders (mostly internal, possibly some external) to ensure there is broad agreement on the preferred final alternative.

The justification for selection of the preferred alternative must be provided in the Project Definition Report (see Section 9.0).

The report is then submitted and/or presented to the Highway Division Management Team (see Section 2.1). Members of this team make the final decision regarding the alternative identified as the preferred alternative

in the Project Definition Report. If it is contested, it would go up to the next level of management, if necessary. The Highway Division Management Team may delegate approving authority to the Program Manager for simpler or noncontroversial projects. Appendix H provides a sample form documenting management approval.

If the Project Definition Report is not approved, the Project Manager and PDRT will need to revisit the project to address the reasons that the project was not approved. This may include revisiting the decision criteria, alternatives evaluated, or even the purpose and need statement.

## 9.0 Creating a Final Project Definition Report

The Project Manager documents the process and outcomes for defining the project in a Project Definition Report. The report can be developed concurrently with the project definition process to ensure that key information (P&N statement, alternatives considered, evaluation criteria, etc.) is documented. The communication between the stakeholders and public leading to a preferred alternative is a critical component of the report.

While the Project Definition Report can be populated as project definition progresses, beginning with the P&N statement, a full initial report should be prepared prior to the preferred alternative meeting. The initial and final report should include an executive summary and identify the Project Manager and members of the PDRT.

Figure 9.1 provides a sample high-level outline of a Project Definition Report. Appendix A includes links to sample reports. The information documented in the report is dependent on the data gathered and developed as the steps described in Sections 3.0 through 8.0 are executed. Therefore, each report's contents will be project specific and may vary from the examples provided.

**Figure 9.1 Project Definition Report**  
*Sample Table of Contents*

<b>Executive Summary</b> .....	<b>X-X</b>
<b>1.0 Introduction</b> .....	<b>X-X</b>
<b>2.0 Stakeholder Involvement</b> .....	<b>X-X</b>
<b>2.0 Project Context</b> .....	<b>X-X</b>
<b>3.0 Project Purpose and Need</b> .....	<b>X-X</b>
<b>4.0 Design Criteria</b> .....	<b>X-X</b>
<b>5.0 Alternatives</b> .....	<b>X-X</b>
<b>6.0 Evaluation</b> .....	<b>X-X</b>
<b>7.0 Preferred Alternative</b> .....	<b>X-X</b>
<b>8.0 Approval Form</b> .....	<b>X-X</b>
<b>Appendices</b> .....	<b>X-X</b>

The section of the report describing the preferred alternative should include information on issues, including the following:

- Type of work (e.g., rehabilitation or replacement);
- The logical termini for project limits (conceptual);
- Design concept;
- Rationale or justification for selection;
- Planning-level cost estimates;
- Planning-level time/schedule estimates for design and construction;
- Provisions for maintaining traffic during construction; and
- Other effects that may require mitigation.

# Appendix A

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*Links to Sample Project Scoping Reports*





## Appendix A. Links to Sample Project Scoping Reports

- U.S. 2-I/89 Southbound On-Ramp Scoping Report, [http://ccrpcvt-public.sharepoint.com/Studies%20and%20Reports/US2\\_I89\\_sb\\_onramp\\_20090626.pdf](http://ccrpcvt-public.sharepoint.com/Studies%20and%20Reports/US2_I89_sb_onramp_20090626.pdf).
- Scoping Report for Woodstock Village BF 020-2(43), U.S. Route 4, Bridge 51 Over the Kedron Brook, [https://outside.vermont.gov/agency/vtrans/external/Projects/Structures/13J280/Scoping%20Report%20-%20Woodstock%20Village%20\(43\).pdf](https://outside.vermont.gov/agency/vtrans/external/Projects/Structures/13J280/Scoping%20Report%20-%20Woodstock%20Village%20(43).pdf).



# Appendix B

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*Sample Purpose and Need Statements*

## Daft Appendix xx

### Purpose and need Examples

#### Example Purpose and Need Historic Truss Bridge Alternatives Study:

Through working with the Town's Bridge Committee and soliciting input at the Local Concerns meeting, the following project Purpose and Need statement was developed:

**Purpose:** The purpose of the Bridge Street Bridge project is to provide a safe crossing of the Winooski River for the traveling public, including pedestrians and bicyclists and to address the current structural deficiencies and ongoing deterioration of the bridge.

**Need:** Recognizing the importance of this route in the transportation system for the Town of Richmond and the surrounding communities, the following needs for the project have been identified:

- The existing superstructure is heavily deteriorated. This has resulted in limiting the bridge to one lane of traffic and restricting the live load carrying capacity. The current one lane operation causes vehicle delays, which contribute to air quality degradation. This load reduction results in a six mile (+/-) detour for trucks and some agricultural equipment.
- The paint system on the superstructure has failed, allowing corrosion of the members to occur. As the corrosion continues, it will result in additional loss of structural capacity and further reduction of the live load carrying capacity of the bridge.
- The continuing deterioration of the truss increases the cost for potential rehabilitation and preservation of the bridge.
- The backwall and bridge bearings are in poor to failing condition and both bridge approaches have settled. The backwall on the expansion end is cracked and rotating, and the expansion joint is no longer functioning.
- The approach railing and bridge rail do not meet the current standard.
- The south approach to this bridge has limited sight distance.
- Horizontal and vertical geometry at the south approach is not adequate for the posted speed limit.
- While the existing 20 foot curb-to-curb width meets the Vermont State Standards for historic bridges, this limited road width makes it difficult for wide trucks and town snow removal equipment to safely use the facility.
- The existing 20 foot curb-to-curb width is substandard for shared bicycle and traffic use. Given the length of the bridge, limited site distance and high volume of bicycle use, this is a potential safety hazard.

## **1.0 Project Purpose and Need**

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### **1.1 PROJECT PURPOSE**

To provide a safe and convenient parking facility to encourage the consolidation of travelers and the reduction of single occupancy vehicles on the roads.

### **1.2 PROJECT NEED**

Currently there is an informal existing park-and-ride facility in this location, which, at times, commuters have used for this purpose. This location is a gravel unimproved site. The deficiency of safe, adequate and dedicated parking at this location defines the need for a park-and-ride facility. This facility will:

- Provide adequate parking capacity to meet current and future needs.
- Provide accommodations for public transit and transit riders, such as bus access and shelter.
- Locate facilities for visibility and for safe and efficient access by bus and I89 commuting traffic.
- Provide a safe and secure environment by considering lighting, location near activity and providing landscaping that discourages crime.
- Provide expansion capabilities for potential future user growth.
- Minimize environmental impacts including grading, stormwater runoff, wetlands, floodplains and cultural resources.

## **1.0 EXIT 12 SCOPING PROJECT – FINAL PURPOSE & NEED STATEMENT**

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The definition of Purpose and Need of a project is essential for establishing a basis for the development and screening of alternatives and eventual selection of a preferred alternative.

### **PURPOSE**

The purpose of the Exit 12 Project is to develop transportation system improvements that enhance safety for all users; reduce traffic congestion and facilitate mobility for people and goods; improve bicycle and pedestrian network connectivity; and accommodate economic growth in the Exit 12 interchange area and VT 2A corridor (in the vicinity of the exit).

### **NEEDS**

#### **Improve safety for all users in the project area.**

- *There is a need to address the High Crash Locations in the project area.* Based on the most recent VTrans High Crash Location (HCL) report, there are two identified HCL segments within the project area located along VT 2A at Marshall Avenue and adjacent to the I-89 southbound ramps. Also, analysis of forecasted traffic demand shows extensive off-ramp queuing leading to standing queues spilling back into the mainline of I-89, creating significant safety concerns.
- *There is a need to provide for safe and efficient bicycle and pedestrian travel through the interchange area.* The missing VT 2A bicycle/pedestrian link between the State Police Barracks and Hurricane Lane creates significant safety concerns as pedestrians and bicyclists are currently using the unmaintained area behind the overpass bridge piers, and cross the interchange ramps at unmarked and unsignalized crossings. Experienced bicyclists that choose to travel on VT 2A, through the interchange area, are sharing the road with high volumes of cars and trucks due to the lack of adequate shoulders or designated lanes.

#### **Reduce traffic congestion and enhance mobility for all users in the project area.**

- *There is a need for roadway improvements to reduce congestion and improve efficiency of the highway system in the project area.* Currently, traffic at the intersections of VT 2A with the Exit 12 ramps and Marshall Ave is experiencing long delays, especially during the evening peak hour of travel. In addition, long vehicle queues are formed during peak hours of travel at certain intersection approaches that negatively impact traffic flows on VT 2A and Marshall Ave. Based on projected population and employment growth for the area (including the adjacent Williston Growth Center), traffic congestion is expected to worsen considerably by 2035.
- *There is a need to develop bicycle and pedestrian facilities that would connect the existing shared use paths and sidewalks north of Exit 12 with destinations south of the interchange.* Despite the fairly robust sidewalk and shared use path networks north of the State Police Barracks, there are currently no formal facilities through the interchange area to connect bicyclists and pedestrians to the various destinations located along Hurricane Lane (including hotels and offices) and the future Park & Ride location southwest of the interchange. Also, the existing I-89 overpass piers and adjacent Jersey barriers currently limit the available width of the VT 2A shoulders to approximately 1 foot through the interchange area which is not sufficient for safe on-road bicycle travel.

**Accommodate Economic Growth in the project area**

- *There is a need to provide the necessary infrastructure to support Williston's plan for dense mixed-use development in the Designated Growth Center and other high density parcels in the project area. The Town of Williston was granted Growth Center status for the Taft's Corners area in 2007 and has made a concerted effort to focus the majority of future residential and commercial development in this area. Further, the Williston Comprehensive Plan calls for design conscious, pedestrian-friendly, mixed-use development and redevelopment patterns for the Growth Center with reasonable transportation facilities to accommodate future mobility needs.*

## **Purpose and Need of Railyard Enterprise Project**

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### **Purpose**

The purpose of the Railyard Enterprise Project is to develop a network of multimodal transportation infrastructure improvements in the Pine Street and Battery Street area, which incorporate the principles of Complete Streets, and to: 1) support economic development in the area; 2) improve Livability of the surrounding neighborhoods; 3) enhance multimodal travel connectivity between the Pine Street corridor and Battery Street in the Burlington Waterfront South area; and 4) improve intermodal connections to the Burlington Railyard, a National Highway System (NHS)-designated intermodal facility.

### **Need**

**1) Develop supporting infrastructure to be consistent with the long term vision of PlanBTV (Downtown and Waterfront part of the municipal plan) associated with the Railyard Enterprise Project area, that supports economic development in the area and enhances Railyard operations.** There is a need for a new street network between Pine Street and Battery Street and related infrastructure to support economic development in the area. PlanBTV has identified the Railyard Enterprise Project area as prime for infill, mixed use development to increase economic activity and to provide accessibility to underutilized lands adjacent to the Railyard.

**2) Improve Livability and connectivity in the Railyard Enterprise Project area.** There is a need to improve the livability of residential areas and emerging mixed-use districts in the Railyard Enterprise Project area. Livability can be enhanced by dispersing traffic and reducing vehicle queues at neighborhood intersections, including the intersections of Pine Street with King and Maple Streets. Additional transportation connections between Pine Street and Battery Street, that do not involve Maple or King Street, will help improve Livability and travel conditions for all users in the Railyard Enterprise Project area.

**3) Enhance multimodal travel connections and choices in the Railyard Enterprise Project area.** There is a need for additional multimodal connections in the Railyard Enterprise Project area to support transit system performance, enhance bicycle and pedestrian connectivity and accessibility and facilitate travel from existing neighborhoods to Battery Street, the Waterfront, and Lake Champlain. There is also a need to create safe, efficient, and dedicated pedestrian and bicycle connections from Pine Street neighborhoods between Maple Street and Lakeside Avenue to the Waterfront, the Burlington Bike Path, and Lake Champlain and improve access from the King Street neighborhood.

**4. Improve connectivity and access between nearby streets, including Pine Street and Battery Street, and the Burlington Railyard, a NHS-designated intermodal facility, while reducing the impacts of freight operations on adjacent neighborhoods.** There is a need to improve connections to the Railyard in a way that enhances its operations while also reducing the impact of freight operations on adjacent neighborhoods. PlanBTV recognizes the importance of the Burlington Railyard to the City's economy and environment.



# Appendix C

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*Sample Scoping Input Questionnaires*

## Bridge Scoping Project XXXXXXXXXX Operations Input Questionnaire

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### ATTACH INSPECTION REPORT

The Structures Section has begun the scoping process for BF XXXXX (X), Bridge XX, over the XXXX River. This is a rolled beam/deck, precast, etc. bridge constructed in 19XX. The Structure Inspection, Inventory, and Appraisal Sheet (attached) rates the deck as 4 (fair), the superstructure as 5 (fair), and the substructures as 5 (fair). We are interested in hearing your thoughts regarding the items listed below. Leave it blank if you don't wish to comment on a particular item.

1. What are your thoughts on the general condition of this bridge and the general maintenance effort required to keep it in service?
2. What are your comments on the current geometry and alignment of the bridge (curve, sag, banking, sight distance)?
3. Do you feel that the posted speed limit is appropriate?
4. Is the current bridge and approach roadway width adequate for winter maintenance including snow plowing?
5. Are the joints salvageable or would you recommend replacement?
6. Are the railings constantly in need of repair or replacement? What type of railing works best for your district? (We are recommending more and more box beam guardrail on our bridges because of crash-worthiness and compatibility with accelerated projects).
7. Are you aware of any unpermitted driveways within close proximity to the bridge? We frequently encounter driveways that prevent us from meeting railing and safety standards.

**Bridge Scoping Project XXXXXXXXXXXX**  
**Operations Input Questionnaire**

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8. Are you aware of abutting property owners that are likely to need special attention during the planning and construction phases? These could be people with disabilities, elderly, or simply folks who feel they have been unfairly treated in the past.
  
9. Do you find that extra effort is required to keep the slopes and river banks around the bridge in a stable condition? Is there frequent flood damage that requires repair?
  
10. Does this bridge seem to catch an unusual amount of debris from the waterway?
  
11. Are you familiar with traffic volumes in the area of this project?
  
12. Do you think a closure with off-site detour and accelerated construction would be appropriate? Do you have any opinion about a possible detour route, assuming that we use State route for State projects and any route for Town projects? Are there locations on a potential detour that are already congested that we should consider avoiding?
  
13. Please describe any larger projects that you have completed that may not be reflected on the attached Appraisal sheet, such as deck patches, paving patches, railing replacement with new type, steel coating, etc.
  
14. If there is a sidewalk on this bridge, how effective are the Town's efforts to keep it free of snow and ice?
  
15. Are there any drainage issues that we should address on this project?
  
16. Are you aware of any complaints that the public has about issues that we can address on this project?
  
17. Is there anything else we should be aware of?

## Local & Regional Input Questionnaire

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### **Project Summary – Modify for each project**

This project, BF 032-6(13), focuses on a culvert on VT Route 9 in Mendon, Vermont. The culvert is deteriorating and is in need of either a major maintenance action or replacement. Potential options being considered for this project include a new liner applied to the interior of the existing culvert pipe, removal of the existing pipe and replacement with a new culvert placed in the same location, or removal of the existing pipe and replacement in a new location. It is possible that VTrans will recommend a road closure and detour traffic away from the project site for the duration of the work. Efforts will be made to limit the detour to State roads.

### **Community Considerations**

1. Are there regularly scheduled public events in the community that will generate increased traffic (e.g. vehicular, bicycles and/or pedestrians), or may be difficult to stage if the bridge is closed during construction? Examples include annual bike races, festivals, parades, cultural events, weekly farmers market, concerts, etc. that could be impacted? If yes, please provide approximate date, location and event organizers' contact info.
2. Is there a "slow season" or period of time from May through October where traffic is less or no events are scheduled?
3. Please describe the location of the Town garage, emergency responders (fire, police, ambulance) and **emergency response routes that might be affected by the closure of the bridge, one-way traffic, or lane closures** and provide contact information (names, address, email addresses, and phone numbers).
4. Are there businesses (including agricultural operations and industrial parks) or delivery services (fuel or **goods**) that would be adversely impacted either by a detour or due to work zone proximity?
5. Are there important public buildings (town hall, community center, senior center, library) or community facilities (recreational fields, town green, etc.) close to the project?
6. What other municipal operations could be adversely affected by a road/bridge closure or detour?
7. Are there any town highways that might be adversely impacted by traffic bypassing the construction on other local roads? Please indicate which roads may be affected and their condition (paved/unpaved, narrow, weight-limited bridges, etc.), including those that may be or go into other towns.

## **Local & Regional Input Questionnaire**

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8. Is there a local business association, chamber of commerce, regional development corporation, or other downtown group that we should be working with? If known, please provide name, organization, email, and phone number.
9. Are there any public transit services or stops that use the bridge or transit routes in the vicinity that may be affected if they become the detour route?

### **Schools**

1. Where are the schools in your community and what are their schedules?
2. Is this project on specific routes that school buses or students use to walk to and from school?
3. Are there recreational facilities associated with the schools nearby (other than at the school)?

### **Pedestrians and Bicyclists**

1. What is the current level of bicycle and pedestrian use on the bridge?
2. Are the current lane and shoulder widths adequate for pedestrian and bicycle use?
3. Does the community feel there is a need for a sidewalk or bike lane on the bridge?
4. Is pedestrian and bicycle traffic heavy enough that it should be accommodated during construction?
5. Does the Town have plans to construct either pedestrian or bicycle facilities leading up to the bridge? Please provide any planning documents demonstrating this (scoping study, master plan, corridor study, town or regional plan).
6. In the vicinity of the bridge, is there a land use pattern, existing generators of pedestrian and/or bicycle traffic, or zoning that will support development that is likely to lead to significant levels of walking and bicycling?

### **Communications**

1. Please identify any local communication channels that are available for us to use in communicating with the local population. Include weekly or daily newspapers, blogs, radio, public access TV, Front Porch Forum, etc. Also include any unconventional means such as local low-power FM.

### **Design Considerations**

1. Are there any concerns with the alignment of the existing bridge? For example, if the bridge is located on a curve, has this created any problems that we should be aware of?
2. Are there any concerns with the width of the existing bridge?

## Local & Regional Input Questionnaire

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3. Are there any special aesthetic considerations we should be aware of?
4. Does the location have a history of flooding? If yes, please explain.
5. Are there any known Hazardous Material Sites near the project site?
6. Are there any known historic, archeological and/or other environmental resource issues near the project site?
7. Are there any utilities (water, sewer, communications, power) attached to the existing bridge? Please provide any available documentation.
8. Are there any existing, pending, or planned municipal utility projects (communications, lighting, drainage, water, wastewater, etc. near the project that should be considered?
9. Are there any other issues that are important for us to understand and consider?

### **Land Use & Zoning**

1. Please provide a copy of your existing and future land use map or zoning map, if applicable.
2. Are there any existing, pending or planned development proposal that would impact future transportation patterns near the bridge? If so, please explain.
3. Is there any planned expansion of public transit or intercity transit service in the project area? Please provide the name and contact information for the relevant public transit provider.

### **Communications**

1. Please identify any local communication outlets that are available for us to use in communicating with the local population. Include weekly or daily newspapers, blogs, radio, public access TV, Facebook, Front Page Forum, etc. Also include any unconventional means such as local low-power FM.
2. Other than people/organizations already referenced in this questionnaire, are there any others who should be kept in the loop as the project moves forward?

# Appendix D

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*Sample Project Design Criteria*





# Appendix E

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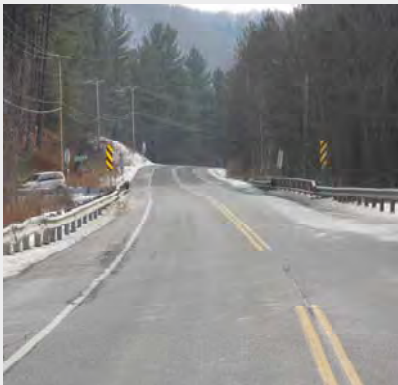
*Sample Project Fact Sheet*



*Looking west*

#### PROJECT MILESTONES

Permitting	Fall 2016
Final Design Complete	Winter 2016
Right-of-Way Complete	Not Applicable
Bid Advertisement	Fall 2017
Contract Award	Fall 2017
Target Construction Schedule	Summer 2018



*Looking East*

# Killington

## US Route 4 Bridge 33

### Killington BF 020-2(42)

**Project Location: Town of Killington in Rutland County on US Route 4 over the Ottauquechee River. The bridge is located approximately 1.0 mile west of the intersection of US Route 4 and VT Route 100 in the Town of Bridgewater.**

The Killington BF 020-2(42) Bridge 33 project will replace the existing bridge, which has substandard shoulder widths, non-crash-tested approach and bridge railing, and is considered structurally deficient with a new bridge that meets current design standards. The existing bridge structure is a single span cast-in-place deck on rolled beams constructed in 1956. It is approximately 69-feet in length and 29.8-feet wide. The bridge deck is in poor condition. There are concerns with full depth holes occurring in the near future.

VTrans evaluated alternatives for replacement of Bridge 33 in an engineering study completed in November 2014. The study assessed the proposed design criteria for the bridge and roadway alignment, right-of-way impacts, hydraulic capacity, and environmental and cultural resources. Several alternatives were examined including bridge rehabilitation and replacement along with several traffic maintenance options including a short term bridge closure, phased construction and a temporary bridge. The Scoping Report recommended replacing the entire bridge structure with traffic maintained on an offsite detour during a 10 day short term road closure. This innovative approach minimizes impacts to the adjacent wetlands, essential wildlife habitat, and archeological resources as well as minimizes traffic disruptions while increasing the safety of the traveling public and construction workers.

The new bridge will be constructed of prefabricated bridge components founded on internal abutments to facilitate rapid replacement. The new bridge will be 73 feet in length and 40 feet wide including two 12-foot travel lanes and two 8-foot shoulders. The new bridge will feature a 3 rail box beam bridge rail with a box beam approach rails terminating beyond the bridge.



**Target Construction Schedule:** The bridge will be replaced during the 2018 construction season.

**Contractor:** TBD

**Cost:** TBD

**VTrans Project Manager:** Jennifer Fitch, P.E., Structures Project Manager

**Detour Route:** Head south on VT 100 from the intersection of VT 100 and US 4. Turn right onto VT 103 in Ludlow. Follow VT 103 west to US 7 in Clarendon. Follow US 7 north and turn right onto US 4 in Rutland. Follow US 4 to VT 100 in Killington. Turn left onto VT 100.



Detour Map



Deck Deterioration



Looking Southwest



Deck Fascia Deterioration



<https://www.facebook.com>



<https://twitter.com/511VT>



# Appendix F

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*Sample Cost Estimation Template*

# EXPLANATION OF FACTORS

## 1. Roadway Factors

The total roadway cost, as derived using the factors given below, includes costs for utilities and erosion control. This cost does not include so called "special" items or items not common to most projects. The lump sum costs of these items must be estimated and included in the total cost separately. A few examples of these special items are given below. The roadway factors to be used are:

- new construction	= 1.75
- rural reconstruction	= 1.72
- urban reconstruction	= 2.35
- roadway/approach constr @ bridge replacement/rehab	= 2.25

## Special Roadway Items

Special roadway items would include, but are not limited to the following:

- PCC pavement costs (all factors based on AC pavement)
- Interchanges
- Noise or Glare Barriers
- Major utility items (eg. Sewage pumping station)

## 2. Bridge Factors

Use the factors below to calculate bridge costs:

- Welded plate girder bridges	= 130 / sf
- Rolled beam or composite plate/girder bridges	= 135 / sf
- Concrete rigid frame of light weight concrete slab	= 240 / sf
- Bridge rehab	= 100 / sf

**Note:** The first three cost factors as noted above are set up as the cost of removing an existing structure and replacing it with new. The designer may wish to modify (decrease) these values slightly when dealing with the installation of a new structure only.

## Special Structure Items

Special structure items would include but are not limited to the following:

- Major channel excavation
- Tunnels
- Retaining walls
- Bridge lighting
- Cofferdams
- Railroad costs

## 3. Traffic and Safety Factors

The costs per lineal foot as given below account for signs and lines only. They do not include the costs of "special" items such as traffic control signals and associated hardware, flashing beacons, street lighting, traffic control, or temporary traffic barrier.

Use \$3.00 / lf if on projects that involve only signs and lines and that do not include intersections or traffic control signals. (Usually longer, rural / semi-rural projects)

Use \$20.00 / lf for signs and lines on projects that include intersections and add the lump sum costs of all "special" items as given below.

Note that shorter, urban projects result in higher lineal costs.

## Special T&S Items

Use \$50 000 / traffic control system. (Includes lights, conduits, detector loops, pull boxes, etc.)

Use \$25 000 /flashing beacon system.

## 4. Miscellaneous Special Items

There may be miscellaneous cost on some projects perhaps due to unique construction methods, unique items, or due to environmental conditions under which construction must take place.

# Conceptual Plans Estimate (English Units)

**Project:** LUNENBURG  
**Project #:** HES 028-4(19)S

**Date:**  
**By:** J Gruchacz (Squad A)

### Earthworks

- Common excavation	29500 cy	\$	4.75 /cy	\$	140,125
- Earth borrow	1700 cy	\$	6.75 /cy	\$	11,475
- Solid rock excavation	750 cy	\$	14.00 /cy	\$	10,500

### Earthworks Cost

\$ 162,100

### Pavement Structure

- Bituminous pavement	3500 ton	\$	30.00 /ton	\$	105,000
- Gravel base	10400 cy	\$	10.50 /cy	\$	109,200
- Sand subbase	8050 cy	\$	6.50 /cy	\$	52,325

### Pavement Structure Cost

\$ 266,525

### Earthworks and Pavement Cost

\$ 428,625

- Roadway Factor 1.75

### Roadway Cost

\$ 750,094

- "Special" roadway items \$ 10,000  
 - Explanation

### TOTAL ROADWAY COST

\$ 760,094

### Bridge Data

- Bridge width (fascia-fascia)	30 lf
- Bridge length (abut.-abut.)	100 lf
- Bridge area	3000 sf
- Bridge Factor	1.00

### Factored bridge area

3000 sf    \$    100 /sf    \$ 300,000

### Bridge Cost

\$ 300,000

- Special structure items \$ 14,100  
 - Explanation

### TOTAL STRUCTURE COST

\$ 314,100





# Appendix G

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*Sample Evaluation Matrices*

## VII. Bridge 76 Cost Matrix

Colchester IM 089-3(69): Bridges 76 N&S		Alt 1a		Alt 1b		Alt 2a		Alt 2b		Alt 3a		Alt 3b		Alt 4		
		Rehabilitation		Deck Replacement		Superstructure Replacement		Temp Bridge		Offsite Detour		Temp Bridge		Complete Replacement		
		Offsite Detour	Temp Bridge	Offsite Detour	Temp Bridge	Offsite Detour	Temp Bridge	Offsite Detour	Temp Bridge	Offsite Detour	Temp Bridge	Offsite Detour	Temp Bridge	Offsite Detour	Temp Bridge	Complete Replacement
COST <sup>1</sup>	Bridge Cost	\$0	\$572,000	\$0	\$572,000	\$2,162,000	\$330,000	\$1,962,000	\$330,000	\$2,583,000	\$330,000	\$2,547,000	\$5,489,000	\$484,000		
	Removal of Structure	\$0	\$0	\$0	\$0	\$330,000	\$532,000	\$567,000	\$574,000	\$629,000	\$1,352,000	\$730,000	\$450,000			
	Roadway	\$0	\$133,000	\$187,000	\$187,000	\$180,000	\$630,000	\$730,000	\$180,000	\$730,000	\$180,000	\$730,000	\$450,000			
	Maintenance of Traffic	\$0	\$90,000	\$630,000	\$630,000	\$1,389,000	\$3,204,000	\$3,589,000	\$3,667,000	\$4,269,000	\$7,775,000	\$4,269,000	\$7,775,000			
	Construction Costs	\$0	\$795,000	\$1,389,000	\$1,389,000	\$3,204,000	\$3,589,000	\$3,667,000	\$4,269,000	\$4,269,000	\$7,775,000	\$4,269,000	\$7,775,000			
	Construction Engineering + Contingencies	\$0	\$238,500	\$416,700	\$416,700	\$961,600	\$1,076,700	\$1,076,700	\$1,076,700	\$1,280,700	\$1,280,700	\$1,280,700	\$1,280,700	\$2,332,500		
	Total Construction Costs w CEC	\$0	\$1,033,500	\$1,805,700	\$1,805,700	\$4,165,200	\$4,665,700	\$4,665,700	\$4,767,100	\$5,549,700	\$10,107,500	\$5,549,700	\$10,107,500			
	Preliminary Engineering <sup>2</sup>	\$0	\$198,8000	\$347,300	\$347,300	\$801,000	\$897,300	\$897,300	\$916,800	\$1,067,300	\$1,943,800	\$1,067,300	\$1,943,800			
	Right of Way	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0		
	Total Project Costs	\$0	\$1,232,300	\$2,153,000	\$2,153,000	\$4,966,200	\$5,563,000	\$5,563,000	\$5,617,600	\$6,617,600	\$12,051,300	\$6,617,600	\$12,051,300			
SCHEDULING	Project Development Duration <sup>3</sup>	N/A	2 years	2 years	2 years	2 years	2 years	2 years	2 years	2 years	2 years	2 years	2 years	2 years	4 years	
	Construction Duration	N/A	6 months	18 months	18 months	9 months	12 ~ nights	18 months	18 months	18 months	18 months	24 months	30 months			
ENGINEERING	Closure Duration (If Applicable)	N/A	N/A	N/A	N/A	12 ~ nights	N/A	N/A	N/A	4 ~ 3 day periods	N/A	N/A	N/A			
	Typical Section - Roadway (feet)	4-12-12-10	4-12-12-10	4-12-12-10	4-12-12-10	4-12-12-10	4-12-12-10	4-12-12-10	4-12-12-10	4-12-12-10	4-12-12-10	4-12-12-10	4-12-12-10			
	Typical Section - Bridge (feet)	3-12-12-3	3-12-12-3	3-12-12-3	3-12-12-3	4-12-12-4	4-12-12-4	4-12-12-4	4-12-12-4	4-12-12-4	4-12-12-4	4-12-12-4	16-12-12-10			
	Geometric Design Criteria	No Change	No Change	No Change	No Change	No Change	No Change	No Change	No Change	No Change	No Change	No Change	No Change	No Change		
	Traffic Safety	No Change	No Change	No Change	No Change	Slightly Improved	Slightly Improved	Slightly Improved	Slightly Improved	Slightly Improved	Slightly Improved	Slightly Improved	Slightly Improved	Improved		
	Alignment Change	No	No	No	No	No	No	No	No	No	No	No	No	No		
	Bicycle Access	No Change	No Change	No Change	No Change	No Change	No Change	No Change	No Change	No Change	No Change	No Change	No Change	No Change	No Change	
	Hydraulic Performance	No Change	No Change	No Change	No Change	No Change	No Change	No Change	No Change	No Change	No Change	No Change	No Change	No Change	No Change	
	Pedestrian Access	No Change	No Change	No Change	No Change	No Change	No Change	No Change	No Change	No Change	No Change	No Change	No Change	No Change	No Change	
	Utility	No	No	No	No	No	No	No	No	No	No	No	No	Yes		
OTHER	ROW Acquisition	No	No	No	No	No	No	No	No	No	No	No	No	No		
	Road Closure	No	No	No	No	Yes	Yes	No	No	Yes	No	No	No	No		
	Design Life	<10 years	15 years	15 years	15 years	40 years	40 years	40 years	40 years	40 years	40 years	40 years	40 years	100 years		

<sup>1</sup> Costs are estimates only, used for comparison purposes.

<sup>2</sup> Preliminary Engineering Costs are estimated starting from the end of the Project Definition Phase.

<sup>3</sup> Project Development Durations start from the end of the Project Definition Phase.

Berlin Park and Ride CMG PARK (46)

EVALUATION MATRIX

Item / Criteria	Max. Points	ALTERNATIVES				
		Do Nothing	1	2	3	4
Location	---	---	Southwest	Southeast	Northeast	Northwest
Property Owner	---	---	Knippling	Knippling	Blow	Masonic Charities of VT Inc
Ease of Acquisition	20		10	10	20	10
Site Development Cost	20		10	20	15	10
<b>Total Points - Economic Considerations</b>	<b>40</b>	<b>0</b>	<b>20</b>	<b>30</b>	<b>35</b>	<b>20</b>
Proximity to I-89	20		20	20	20	20
Transit Service Access	10		10	10	10	10
Visibility / Security	10		10	10	10	10
Access Convenience/Safety/Congestion	20		20	20	20	20
<b>Total Points - Location Considerations</b>	<b>60</b>	<b>0</b>	<b>60</b>	<b>60</b>	<b>60</b>	<b>60</b>
Minimize Impacts to Resources	20		15	15	20	5
Compatibility/Affects to Adjacent Property	10		5	5	10	5
Number of Spaces & Expansion	20		20	10	20	20
<b>Total Points - Site Considerations</b>	<b>50</b>	<b>0</b>	<b>40</b>	<b>30</b>	<b>50</b>	<b>30</b>
<b>Total Points - All Considerations</b>	<b>150</b>	<b>0</b>	<b>120</b>	<b>120</b>	<b>145</b>	<b>110</b>
<b>Weighted Ave% of Maximum</b>		<b>0.0</b>	<b>77%</b>	<b>78%</b>	<b>96%</b>	<b>70%</b>



# Appendix H

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*Sample Management Approval of Scope*

# Initial Management Approval Of Scope

## Month Day, Year

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Project: **[Project Name] [Project Number] [Route], [Asset Number over {Waterway Name} if applicable]**

Project Manager: [Project Manager]

Project Briefing: After evaluating various alternatives for this project, we have concluded that [Proposed scope] is appropriate.

Maintenance of Traffic: Traffic will be maintained on [Proposed Maintenance of Traffic – if there is a separate bicycle, pedestrian, or truck detour – mention it here].

Scope Approval Decision:

- [Program] Management approves the project scope.
- [Program] Management will require more information before making a decision.
- [Program] Management recommends getting higher-level approval for the proposed scope.
- [Program] Management does not recommend the project scope.
- [Program] Management approves the project scope with modifications (comment below).

Comments: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

\_\_\_\_\_  
[Program] Program Manager

\_\_\_\_\_  
Date

\_\_\_\_\_  
Director as necessary

\_\_\_\_\_  
Date

Asset Ownership:

- State Owned Asset
- Municipally Owned Asset

# Final Management Approval Of Scope

## Month Day, Year

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Project: **[Project Name] [Project Number] [Route], [Asset Number over {Waterway Name} if applicable]**

Project Manager: [Project Manager]

Was there a scope change following the public Alternatives Presentation Meeting?

- Yes – Complete the rest of this form
- No – No additional approval necessary – stop HERE

Project Briefing: Following the alternative’s presentation meeting for this project the scope changed to [Proposed scope and Maintenance of Traffic]

Reason(s) for Scope Change: [Scope change reason(s)]

Scope Approval Decision:

- [Program] Management approves the revised project scope.
- [Program] Management will require more information before making a decision.
- [Program] Management recommends getting higher-level approval for the revised proposed scope.
- [Program] Management does not recommend the revised project scope.
- [Program] Management approves the revised project scope with the following modifications (comment below).

Comments: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

\_\_\_\_\_  
[Program] Program Manager

\_\_\_\_\_  
Date

\_\_\_\_\_  
Director (as necessary)

\_\_\_\_\_  
Date