Ontario

Ministry of Transportation

Highway Planning and Design Process Guideline

September 2016

Highway Planning and Design Process Guideline

Enquiries regarding amendments, suggestions, or comments should be directed to:

Manager
Design and Contracts Standards Office
Highway Standards Branch
Ontario Ministry of Transportation
2nd Floor, 301 St. Paul Street
St. Catharines, Ontario L2R 7R4
Tel: (905) 704-2293; Fax: (905) 704-2051

Written (including parts of previous Ministry of Transportation documents) by:

Wilf Roy, Head, Design Innovation Section, Design and Contract Standards Office

Contributors and Technical Reviewers:

Mike de Lugt, Senior Project Manager, Planning and Design Section, Eastern Region
Heather Hamel, Engineer in Training
Ken Huen, Senior Project Engineer, Planning and Design Section, Northeastern Region
Clarissa Luo, Engineer in Training
Chuck Organ, Senior Project Manager, Planning and Design Section, West Region
Riyaz Sheikh, Project Engineer, Planning and Design Section, Central Region
John Slobodzian, Team Lead, Environmental Policy Office

Table of Contents

Forward

The purpose of this guideline is to provide a reference for Project Managers and Project Teams for the Highway Planning and Design Process requirements for capital projects administered by the Ontario Ministry of Transportation (ministry).

This Highway Planning and Design Process Guideline replaces the ministry's Regional Planning and Design Project Management Manual, 1992.

This guideline is principally for use by ministry staff involved in the management and design of highway capital projects. Service Providers are required to meet the requirements in their contract with the ministry.

This guideline forms part of the requirements for the project management of capital projects and does not provide a complete record of all the processes, responsibilities and authorizations required in managing the delivery of a highway capital project.

The information presented in this guideline is based on current recommended practices and pertinent documents. However, no warranty is made on the accuracy of the contents or their extraction from reference publications and other documents.

The process for the management of Service Providers is not in scope for this guideline.

There is the potential for current events to have an impact on the project management of provincial highway projects; such as any re-organization and any changes to environmental process. Project Managers should ensure that any current events that influence a project are properly incorporated into work plans and project scheduling.

The Provincial Highway Management (PHM) *Project Management Best Practices (PBMP)* website has substantial references that apply to highway capital project completion.

Acronyms and Abbreviations used in this guideline are in Appendix A.

References discussed in this guideline are in italics and are listed in Appendix B where links are provided to the documents.

1. Overview of the Highway Planning and Design Process

Note to Project Team and Supervisors

The underlying objective of capital projects is the actual construction, repair or rehabilitation of provincial highway infrastructure. The amount of work to be completed to achieve this end objective and subsequently included in reports and documents should be carefully considered to ensure that overall ministry resources are used effectively to achieve maximum benefit. Requirements are defined in various documents (i.e. guidelines, directives, reports, manuals, etc.) and describe what is necessary to prepare the various reports. For example, the *Class Environmental Assessment for Provincial Transportation Facilities, as Amended July 14, 2000, Ontario Ministry of Transportation (Class EA)* document, the *Preliminary Design Report Guideline* and the *Design Criteria Guideline*.

All Project Team members should ensure that requirements are met through effective use of resources without the completion of more work and documentation than is necessary to meet the requirements. The Project Manager and supervisory staff should critically examine the level of detail and extent of work expended on each project to determine and then ensure that only the required work is being undertaken.

Reports and documents should be brief and concise.

1.1 INTRODUCTION

The preservation of and improvements to the provincial highway system involves the engineering, construction, and maintenance functions. Highway planning and design is completed within the engineering function.

The Project Manager is responsible for the project delivery and the coordination of Project Team members from all contributing engineering disciplines and offices involved in the project.

Included within the Highway Planning and Design Process are the Environmental Assessment (EA) requirements. Projects and activities are classified into groups for EA purposes. The process to be used for a project is directly related to the EA classification of the project. Refer to Section 2 of this guideline for information on EA requirements and the project classifications.

The *Class Environmental Assessment for Provincial Transportation Facilities, as Amended July 14, 2000, Ontario Ministry of Transportation (Class EA)* document sets out the guiding principles and components of the ministry's EA process and it should be studied as it is integral to the Highway Planning and Design Process.

Notes:

1. The typical process for a project is outlined, however, it must be recognized that all projects are unique and may not follow the exact process as outlined in this guideline. The process is flexible and may be adjusted to address project specific needs.
2. Major projects follow a two stage design process consisting of a Preliminary Design stage and a Detail Design stage. These stages follow a progression of design development, from deficiencies and needs identification through to preparation of final construction documents.
3. Minor projects having minimal technical matters for investigation and minimal environmental impacts may follow a condensed design process, with the Preliminary Design stage steps being undertaken early in the Detail Design stage if a formal Preliminary Design stage is not completed.
4. The Head, Planning and Design Section, in conjunction with regional management, determines the project delivery strategy and if stages are to be combined.
5. The design process provides for securing the required internal and external approvals for the project.

1.2 HIGHWAY PLANNING AND DESIGN PROJECT STAGES

The Highway Planning and Design Process for Class Environmental Assessment (Class EA) Group A, B and C projects has the following five stages:

- Network Planning and Transportation Needs Assessment:
  - Identify deficiencies and needs.
  - Determine what is needed.
  - Project Initiation.
- Planning:
  - Develop the transportation plan to a concept level of detail.
  - Develop a plan for how the project should be done.
  - Project justification.
  - Project programming (prioritization, funding, scheduling).
- Preliminary Design:
  - Develop the transportation plan to the Design Criteria level of detail.

    (The project is developed sufficiently to be fully defined within the requirements of the *Design Criteria Guideline*.)
  - Focus on the "roughing out" of a design.
- Detail Design:
  - Develop the transportation plan to a design implementation (construction) level of detail.
  - Develop the construction documents (contract drawings, tendering documents, specifications, schedule and cost estimates).
- Construction:
  - Project implementation.

Within each of the stages, there may be a number of phases for:

- Generation and assessment of alternatives.

- Evaluation and selection of the Preferred Alternative.
- Development of the plan/design.

As each stage is completed, the alternatives are reduced and refined to ultimately complete the final design for the Preferred Alternative.

The objectives of dividing a project into stages are to offer opportunities, before proceeding to construction commitments in order to:

- Assess the engineering feasibility.
- Evaluate the financial implication.
- Determine the priority setting in the delivery program.
- Process appropriate and timely legal actions, when applicable.
- Provide integration of environmental assessment in the project planning and development.
- Obtain support and endorsement from affected parties.

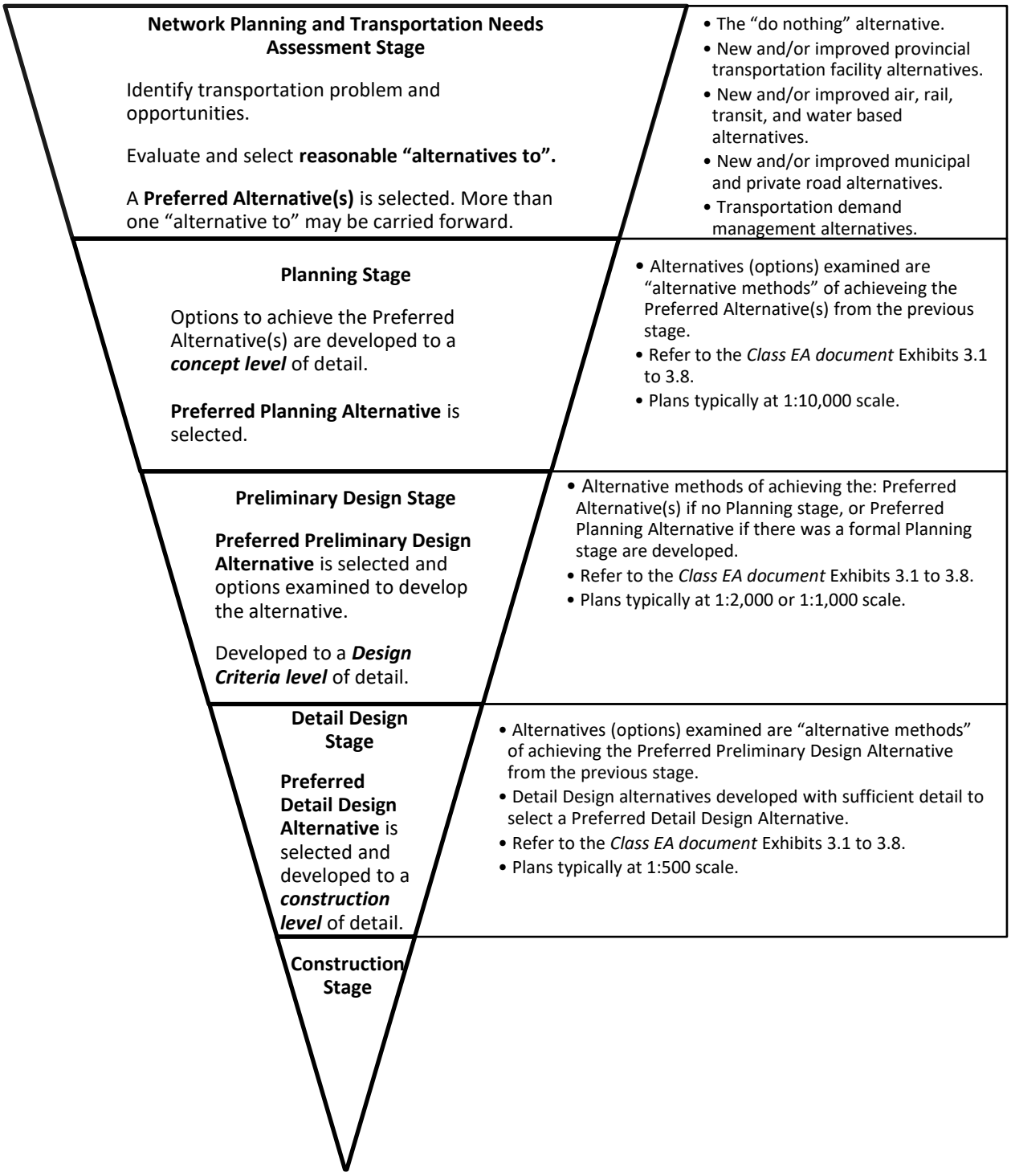
The environmental group classification and complexity screening provides assistance in determining the appropriate study stages and activities for the project. Depending on the complexity and the environmental sensitivity, the sequential stages are not mandatory for all projects. For some projects, the sequential stages may be maintained with some of the suggested activities and/or documentation requirements omitted. For some projects, it is appropriate to complete the project stages concurrently.

For Group A new freeway projects, the planning is conducted under the individual EA process, and the Class EA process may commence at the beginning of the Preliminary Design stage.

For Group A, B and C projects the process involves an increasing level of detail as the study progresses through these stages. As the project progresses, the stages provide for structured transportation engineering and environmental protection decision-making and consultation as the available information becomes more substantial.

1.2.1 SUMMARY OF STAGES AND ALTERNATIVES

Each stage reduces the alternatives. Subsequent stages further refine the alternative from the previous stage to ultimately complete the final design for the Preferred Alternative.



1.3 PRINCIPLES FOR ORGANIZING AND COMBINING STAGES

There are a number of options for organizing and combining study stages, particularly with lower complexity projects. However, the study principles for transportation engineering, environmental protection, consultation, evaluation, documentation and bump-up must all be realized through, in part, application of the following conditions (Bump-Up: The act of requesting that an environmental assessment initiated as a Class EA be required to follow the individual EA process. It is also referred to as a Part II order under section 16 (1) of the *EA Act*):

- When stages are combined, the essential elements of each stage must still be performed. For example, the combination of the Preliminary Design stage and the Detail Design stage of a low complexity Group B or C project does not eliminate the need to consider reasonable transportation engineering and environmental protection alternatives.
- When stages are combined, the most rigorous consultation and documentation requirements of the combined stages apply.
- The Detail Design stage processes and Construction implementation processes cannot be combined (although they may be performed by a single design-build consortium). This is because there must be the opportunity for environmental clearance to be completed prior to the commencement of Construction.
- In addition, for some Group A, B and C projects the phases within the Preliminary Design stage and the Detail Design stage can be effectively combined, particularly for lower complexity projects.

As a project (study) proceeds, there is the option of dividing it into distinct projects as follows:

- Each Planning Study may be split into a number of Preliminary Design studies.
- Each Preliminary Design Study may be further split into a number of Detail Design studies.

- Each Detail Design Study may be implemented by a number of Construction projects.

There may be projects that are combined for the Preliminary Design stage and/or Detail Design stage.

1.4 SCHEDULING - WORK PLAN AND SCHEDULE TASK LIST FOR THE PLANNING AND DESIGN PROCESS

A work plan and a schedule are required for each stage of a project.

For each project stage a decision on how the project stage is to be delivered (in-house or outsourced) is required. The work plan and schedule then incorporate the selected delivery method in their development.

A generic master Schedule List for the Planning and Design Process is on the *Project Management Best Practices (PMBP)* website. These are the typical activities/tasks that are scheduled for projects (as applicable). Within each scheduled activity/task, there are usually sub-activities/tasks that are required to be completed. These sub-activities/tasks are scheduled, as required, and are determined on a project specific basis.

Master Task Lists for each stage have additional information on activities/tasks required to accomplish the typical scheduled tasks. They are in Appendix C and on the *Project Management Best Practices (PMBP)* website. The website should be referenced for the current versions of the list.

Note: Not all of the activities/tasks will be required for all projects. For example, a resurfacing project will not have the same need and requirements as a highway expansion project.

The activities/tasks discussed in this guideline are not to be considered as “all inclusive”; nor will they all be applicable to every project. The order of the activities/tasks may be altered to suit the need of the project and some activities may be undertaken in parallel.

Note: The schedule activities/tasks that are reported for regional scheduling purposes will be greatly reduced from those that are usually scheduled and used by the Project Team.

1.5 POLICY DOCUMENTS

Unless otherwise specified, ministry manuals, directives, memoranda and standards represent "POLICY" and are to be followed for all activities undertaken on a project.

Deviations from policy are to be identified and approved. Some deviations will be approved by the Manager, Engineering and some will require approval by the Highway Standards Branch. The Manager, Engineering, will decide if Highway Standards Branch is to be involved in the approval process.

When there is a need to deviate from policy, the justification and associated approval is an integral part of the project documentation.

Regional Offices may prepare Regional Directives and/or Memoranda to provide Project Managers with additional guidance. These Regional Directives and/or Memoranda should only be used when provincially issued policy documents, manuals, memoranda, etc. do not address a matter.

1.5.1 MTO MANUALS AND DOCUMENTS

The ministry's *Request for Proposals Total Project Management* master document, under Technical Standards and Specifications and the *Project Management Best Practices (PMBP)* website, lists manuals and documents used for highway planning and design. Other documents not listed may also be required, although efforts are made to keep the above locations updated and complete.

1.5.2 DIRECTIVES AND MEMORANDA

The ministry issues various directives and memoranda. The content could change or clarify the way certain tasks are carried out.

Prior to relying on the information in a directive, confirm if the directive and the content is still current/active.

Directives are available on the intranet site: *Directives, PHM*. Selected directives are also available in the Contract Preparation System (CPS) application.

Memoranda are available on the website: *Project Management Best Practices (PMBP)* under Reference Materials.

1.6 QUALITY MANAGEMENT

Quality Management is the process used to ensure the project will satisfy the needs for which it was undertaken. It consists of quality planning (QP), quality assurance (QA) and quality control (QC) and is completed throughout the project life cycle.

For each project a Quality Management Plan should be developed for each stage. Refer to ministry quality management documents for guidance.

The purpose of Quality Management is to**:**

- Ensure quality in the highway planning and design deliverables.
- Ensure adherence to ministry standards and best practices.
- Ensure the project satisfies the needs for which it was undertaken.

The QA and QC processes are different and each is unique, however, they do interact with each other. Therefore, it is important to understand the concepts and what is involved in each.

For highway planning and design the concepts are defined as:

Quality Planning is the identification of the quality standards that are relevant to the project and determining how to ensure they are achieved.

Quality Assurance is the monitoring and checking to evaluate the overall design in order to provide confidence that the highway design is in general conformance with accepted design practices and project requirements and will

meet its intended purpose. Quality Assurance is done independently from the design work team or organization.

Quality Control is the process of monitoring and checking to determine if the design work is technically sound, accurate and fiscally sound. If a problem is identified, the quality control team or manager is expected to take action to solve the problem. Quality Control is done by the organization that does the design work.

1.7 COST MANAGEMENT

Cost Management is required to ensure the project is completed within the approved budget. It consists of resource planning, cost estimating, cost budgeting and cost control.

The Project Manager:

- In consultation with the ministry Project Team, determines what physical resources (people, equipment, and materials) are required to complete the project.
- Prepares program values and fiscal estimates throughout the various stages of the project (Planning, Preliminary Design, and Detail Design).
- Provides cost estimates for total program value (construction cost, utility relocation cost, property cost and contract administration cost).
- Ensures the design achieves value.
- Identifies and assesses design and construction cost changes due to scope changes.
- Obtains management approval for scope changes.
- Prepares the project schedule.
- Completes cost estimates, tracking and fiscal forecasting of Service Provider costs.
- Expeditiously provides the Program Planning Office with updated cost and scope information.

1.8 PROJECT SCOPE MANAGEMENT

Project scope management consists of scope planning, scope definition, scope verification and scope change control throughout the life span of the project. Project scope management is essential to ensure appropriate highway improvements are designed.

Effective scope management may reduce costs and schedule time for design and construction.

The initial project scope is determined in the Planning stage. For all projects, the scope must be approved by regional management. The scope is documented in the Scope and Cost Report. Subsequent scope changes must be approved by regional management as they become known.

1.8.1 SCOPE AND COST REPORT

The Scope and Cost Report (SCR) is used to justify and track the project scope, risks, schedule, and cost estimates for all capital projects throughout the life of the project.

The requirements and process for the Scope and Cost Report are provided in the *Scope and Cost Report Guideline.*

Mandatory Requirements:

An approved Scope and Cost Report is required for all capital projects.

A Scope and Cost Report shall be revised as outlined in the *Scope and Cost Report Guideline.*

Cost Estimate Methodology:

The cost estimation method is usually dependent upon the stage of the project and information known at the time:

- Parametric Cost and Risk - usually done at the Planning stage.
- Basic Unit Cost and Risk (may combine with some parametric estimates) - usually done in Preliminary Design stage and early Detail Design stage.
- Defined Unit Cost & Risk - done in the latter part of the Detail Design stage.

The *Parametric Estimating Guide (for Construction Costs)* provides guidance for parametric estimating of construction costs.

1.9 PROJECT TEAM MEMBERS AND FUNCTIONAL AREAS

Projects usually involve multiple engineering functional areas (disciplines). The following engineering functional areas and specialty offices are on the Project Team, when their area has work on or an interest in the project:

- Corridor Management
- Drainage and Hydrology
- Electrical
- Environmental
- Foundations
- Geomatics
- Geotechnical
- Operations
- Planning and Design
- Program Planning
- Property
- Road User Safety
- Structural
- Traffic
- Others

There are important interfaces between the various functional areas such as, but not limited to:

Planning and Design/Drainage/Hydrology:

Coordination is required in the analysis and design of the drainage structures such as culverts and stormwater management facilities required for the drainage designer to establish design parameters and sizing, while it is the responsibility of the highway designer to incorporate those facilities such that they match the highway grading requirements.

Planning and Design/Electrical:

Coordination is required to check that electrical underground ducts, manholes and poles for illumination and traffic signals are compatible with civil aspects such as guide rails, signs, culverts, storm sewers and sidewalks.

Planning and Design/Environmental:

Coordination is required so that environmental impacts are minimized and appropriate mitigation measures, such as erosion and sedimentation control, are incorporated into the civil design features. Specific environmental design requirements may be necessary to obtain environmental approvals and authorizations.

Planning and Design/Geomatics:

Coordination is required in coordinating an internal review to verify that sufficient survey information is available and is in the correct format.

Planning and Design/Geotechnical:

Coordination is required in coordinating investigation activities to address design modifications for geotechnical recommendations and to make sure the proposed Pavement design will be feasible with the roadway cross-section.

Planning and Design/Structural:

Coordination is required in determining each structure cross-section as it must meet both the highway geometric needs and the structural needs.

Planning and Design/Structural/Traffic:
Coordination is required in managing the traffic staging necessary for roadway widening with that required for structural works in order to minimize impacts to traffic.

Planning and Design/Traffic:
Coordination is required when developing traffic staging/detouring strategies and the physical and time constraints, which impact those strategies (cross-sectional elements, construction schedules, etc.).

Drainage Design/Environmental/Structural:
These disciplines work closely together due to the intrinsic link between the corridor's fisheries and surface water resources at rivers, creeks and adjacent to lake shore areas.

Electrical/Traffic:
These disciplines work closely together in applying traffic and collision data in the analysis of illumination and traffic signal warrants and in developing recommendations for traffic signals at intersections.

Geotechnical/Foundations:
Coordination is required due to the intrinsic link between the investigation activities to address design requirements for both the geotechnical and foundation recommendations.

1.10 MEETING PROTOCOL

Throughout the design there are various meetings. The purpose of various meetings is included in this guideline. Additional information for some meetings is in the *Meeting Protocol* on the *Project Management Best Practices (PMBP)* website.

1.11 COMPUTER APPLICATIONS FOR DESIGN

Computer applications are used to assist with and complete design work. Applications are used for preparing drawings, quantity calculations and preparation of the construction tendering documents.

Ministry employees are to use the current ministry approved versions of the computer applications.

Service Providers shall comply with the requirements in their contract with the ministry.

1.12 PROJECT FILES STORAGE

The standardized filing order and names for each ministry section and office is to be used for hard copy and electronic files.

Project files are managed, retained and stored in compliance with the appropriate Records Retention Schedule. Office administration staff should have the current schedule for each ministry section and office.

For all regional Planning and Design Sections, the records retention schedule is *Records Retention Schedule #MTO-175 All Regional Planning and Design Sections*.

When organizing and purging files, it is important to follow the Records Retention Schedule requirements and to be careful not to dispose of documents that need to be retained or may be useful in the future.

Information on file and records management is in the *Guideline on the Care, Handling and Storage of Active and Semi-Active Records, Archives of Ontario*.

The above guideline has been developed by the Information, Privacy and Archives (IPA) division in order to provide advice to ministry staff on the proper care, handling and storage of active and semi-active records. Under the Corporate Policy on

Recordkeeping, 2011, IPA has corporate-wide responsibility for establishing policies, standards and best practices on the management of government records.

Proper care, handling and storage procedures are necessary for effective information/records management, the preservation of corporate memory and government accountability. The above guideline describes the practices that can be followed by ministry employees in order to ensure the ongoing accessibility of operational records for as long as the ministry needs them, and for the long-term preservation of records scheduled to be transferred to the Archives of Ontario.

1.13 REQUIRED REPORTS AND DOCUMENTS

The reports and documents required during the Highway Planning and Design Process are determined based on the needs of the project and therefore are not all produced for each project. Some reports are mandatory and there is discussion on required reports and documents in this guideline.

Other reports, permits, orders, legal agreements, and documents will be required based on the project needs. The list of others is always in a state of change as processes evolve and thus, may not all be discussed in this guideline.

2. Environmental Assessment

The *Class Environmental Assessment for Provincial Transportation Facilities, as Amended July 14, 2000, Ontario Ministry of Transportation (Class EA)* document sets out the guiding principles and components of the ministry's EA process and it should be studied as it is integral to the Highway Planning and Design Process.

Some parts of the *Class EA document* have been included and/or referenced in this guideline to provide context and requirements for the Highway Planning and Design Process.

2.1 ENVIRONMENTAL ASSESSMENT AND PROJECT CLASSIFCATION

The Highway Planning and Design Process to be used for a project is directly related to the Environmental Assessment (EA) classification of the project.

To ensure Government objectives, regarding assessment of environmental impacts and remedial actions to identified impacts, are incorporated into the entire design process, Ontario has enacted the *Environmental Assessment Act R.S.O. 1990, as amended* (EA Act).

The *EA Act* requires that proponents do not proceed with the implementation of an undertaking until it is approved under the *EA Act.* When a project is done by the ministry, the ministry is the proponent.

The *EA Act* provides for the preparation of Class Environmental Assessments (Class EA) for approval by the Minister of the Environment. A Class EA is an approved planning document that defines groups of projects and activities and the environmental assessment processes which the proponent commits to following for each of these undertakings. Provided the process is followed, projects and activities included under the Class EA do not require formal review and approval under the *EA Act.*

The *EA Act* provides for the issuing of project exemptions so that the *EA Act* does not apply, where significant justification can be made that the project exemption is in the

public interest. Thus, when it is clear to the Government of Ontario that time is of the essence and the project must not be delayed, an exemption can be provided.

The *Class EA document* sets out the guiding principles and components of the ministry's EA process. Projects that are carried out in compliance with the Class EA may receive clearance to proceed.

The Class EA process offers significant efficiencies and cost savings while achieving standards of environmental protection, accountability and consultation. The Class EA is designed to take advantage of the efficiencies offered by similarities while ensuring that the specific differences are addressed appropriately.

The projects and activities conducted under the terms of the Class EA include the following:

- Provincial transportation facility projects involving provincial highways and freeways, provincial transitways and provincial ferryboats.
- Service, maintenance and operations facility projects to support provincial transportation facilities.
- Operation, maintenance, administration and miscellaneous activities or provincial transportation facilities.

These projects and activities are classified into project and activity groups under the Class EA. This is primarily for purposes of consultation, environmental documentation, and opportunities for a formal EA challenge (bump-up). The project and activity groups are as follows:

- Group A: New facilities (includes new freeways).
- Group B: Major improvements to existing facilities.
- Group C: Minor improvements to existing facilities.
- Group D: Activities which involve operation, maintenance, administration, and miscellaneous work for provincial transportation facilities.

For Group A, new freeway projects, planning must be conducted under the individual EA process. However, the Class EA process may be applied to all subsequent stages of Group A new freeway projects. For all other Group A projects, for Group B and C projects, and for Group D activities, the Class EA applies in its entirety.

Any proponent of work on the provincial transportation system may use the Class EA.

The goal of all projects and activities covered by the Class EA is to provide a safe and effective transportation system while avoiding, minimizing or compensating for negative environmental effects.

To achieve this goal the *Class EA document* is *principle-based* rather than prescriptive in nature. This means that the Class EA defines *what must be achieved*, rather than defining precisely *how* it should be done.

The *Environmental Reference for Highway Design (ERD), Ministry of Transportation* addresses the EA issues and needs relating to the Preliminary Design and the Detail Design of transportation projects. This document has been developed in co-operation with the various Ministry of Transportation Regional Environmental Sections and Environmental Regulatory Agencies/other levels of government.

For specific information on environmental matters, contact should be made with staff from the Regional Environmental Sections and the Environmental Policy Office.

2.2 TRANSPORTATION ENGINEERING AND ENVIROMENTAL PROTECTION

The Highway Planning and Design Process is completed with the transportation engineering principles, environmental protection principles, evaluation principles and processes, consultation principles and processes, documentation and bump-up principles and process, and project stages and phases principles, as discussed in the *Class EA document*.

Overviews of the *transportation engineering and environmental protection process,* as they apply to Planning, Preliminary Design and Detail Design stages of different groups of projects, are in the *Class EA document*, Section 3.4.

The scope of the project will help to determine the appropriate "Class" designation of the project. The "Class" of a project is determined using the criteria established in the *Class EA document*. This is done in consultation with the environmental staff assigned to the project.

Note: <u>Ministry Policy for Highway Rehabilitation Program as Group C Projects</u>

All highway rehabilitation projects will follow the MTO Class EA Group C process.

Should the need for a project to follow the Group B process in the Class EA be identified, the Manager of Engineering will seek approval from the Highway Standards Team (HST) before proceeding with the Group B process. For the purpose of this policy, "highway rehabilitation" refers to all activities that are not included in MTO's "highway expansion" budget (refer to *HSBM Director's Office 2016-04 February 8, 2016 EA Group C Rehabilitation*).

2.3 CONSULTATION PRINCIPLES AND PROCESSES - GROUP A, B AND C PROJECTS

Consultation principles and processes are discussed in the *Class EA document*, Chapter 5 and it should be reviewed for additional information.

Consultation is an integral component of the Highway Planning and Design Process for Group A, B and C projects. Consultation involving external agencies/other levels of government and the public, is an essential component of the Class EA process.

Note: <u>Ministry Policy for Public Information Centres</u>

A Public Information Centre (PIC) will only be used with the written endorsement of the Manager of Engineering (refer to *HSBM Director's Office 2016-03 February 8, 2016 Public Information Centres*.)

2.4 DOCUMENTATION

Documentation is discussed in the *Class EA document*, Chapter 6, and it should be reviewed for additional information.

For many projects, the highway engineering and environmental documentation are contained in the same document and a separate Preliminary Design Report is not prepared.

Overview

The preparation of environmental documentation is a key element of the Group A and B study process. Documentation is also prepared for some Group C projects. Documentation also outlines the application of the transportation engineering, environmental protection, evaluation and consultation principles and processes, as outlined in the *Class EA document,* Chapters 4 and 5.

Types of Environmental Documentation

Environmental documentation type and requirement varies with project type and the time of submission.

There are four basic types of environmental documentation for projects within the Class EA:

- Study Design Report (SDR), (see *Class EA document*, Section 6.3).
- Transportation Environmental Study Report (TESR), may also have an Addendum (see *Class EA document*, Section 6.4).
- Design and Construction Report (DCR), may also have an Addendum (see *Class EA document*, Section 6.5).
- Environmental Screening Document (see *Class EA document*, Section 6.6).

These types of documentation and mandatory requirements are summarized in the *Class EA document*, Exhibit 6.1.

There is a wide range of time permitted for report submission as shown in the *Class EA document*, Exhibits 3.5, 3.6 and 3.7 and is discussed in the *Class EA document*, Chapter 6.

Environmental Documentation Principles Group A, B and C Projects

For Group A and Group B projects, the following documentation principles apply:

- The document **content requirements will be fulfilled**.
- Documentation will deal with **project-specific details and issues**. Information presented in the Class EA will not be repeated.
- Documentation will cover the **results of the study to date**.
- A TESR and DCR must cover **full phases**.
- Where a Study Design Report, TESR or DCR is required, an **opportunity to review the documentation and provide comments will be provided**.
- The **review period** for Study Design Reports, TESRs and DCRs will be at least 30 days.

Document Content Requirements

The content requirement for TESRs and DCRs are as follows:

- **Study objectives.**
- Project-specific **earlier and related work.**
- Significant **transportation engineering issues.**
- Significant **environmental issues.**
- Transportation engineering and environmental protection **alternatives developed and evaluated.**
- Project-specific external **consultation.**
- **Changes made** as a result of external consultation.
- **Recommended plan** (selected transportation alternative incorporating environmental protection measures).

- Commitments to **future action**, including external approvals known to be required.

Relationship between the TESR and DCR

The TESR is typically used for documenting Preliminary Design (when a TESR is required) and the development of the transportation plan to the Design Criteria level of detail.

The DCR (when a DCR is required) is typically used for documenting Detail Design and the development of the transportation plan to the design implementation level of detail.

2.4.1 STUDY DESIGN REPORT - GROUP A AND B PROJECTS

The Study Design Report is for documentation of the study process that will lead to a Transportation Environmental Study Report (TESR) submission for Group A and complex Group B Projects.

The Study Design Report is mandatory for Group A projects, other than for new freeways (for which it does not apply). The Study Design is optional for Group B projects, but it is likely to be prepared only for the largest, most complex Group B projects (e.g. the twinning of a major highway that has the potential to affect a wide range of diverse environmental features). The Study Design Report does not apply to Group C projects.

The Study Design Report is prepared early in the Planning stage, in consultation with government agencies/other levels of government and other potentially affected parties. It outlines project need and justification, defines the Study Area, and discusses Alternatives to the Undertaking. In addition, the Study Design Report documents EA process commitments leading to TESR submission. These typically include project specific application of Class EA principles, the consultation process which will be used during the study, and the type of documentation which will be provided.

The Study Design may be useful to:

- Assist in defining the amount and extent of work required in the study.

- Provide a project-specific commitment to external agencies, other levels of government, Indigenous peoples and the public, regarding the amount and extent of work that will be done.
- Assist in meeting the requirement of the Environmental Assessment Act for preparation of a Terms of Reference, if a project bump-up request is successful.

2.4.2 TRANSPORTATION ENVIRONMENTAL STUDY REPORT AND ADDENDUM - GROUP A AND B PROJECTS

Note: The Transportation Environmental Study Report (TESR) includes both highway engineering and environmental documentation for the project.

The Transportation Environmental Study Report (TESR) is prepared for Group A and Group B projects only.

The TESR is typically submitted to document:

- Preliminary Design, which is the development of the transportation plan to the Design Criteria level of detail.

The TESR submission may be done before the Preliminary Design stage to document:

- Planning, which is the development of the transportation plan to design concept level of detail (this option applies only to Group A projects other than new freeways).

The TESR submission may be delayed to document:

- Detail Design, which is the development of the transportation plan to the design implementation level of detail;

and may include elements of:

- Construction documentation.

This range of submission timing is shown in the *Class EA document*, Exhibits 3.5, 3.6, and 3.7.

The *Class EA document*, Chapter 6, has additional information on the TESR need, contents, bump-up, addendum, submission and review process. The TESR content varies depending on when it is completed. The format and content vary with the specific nature of the project or conditions in the study area.

Sample Tables of Contents for TESRs for Group A and Group B projects presented for illustrative purposes in the *Class EA document*, Appendix #3, are:

- TESR Submitted at the Completion of Planning.
- TESR Submitted at the Completion of Preliminary Design.

2.4.2.1 TESR SAMPLE TABLE OF CONTENTS FOR GROUP A PROJECT SUBMITTED AT COMPLETION OF PLANNING

The content below is from the *Class EA document*, Appendix #3.

1.0 Overview of Undertaking
- 1.1 Summary Description of the Undertaking
- 1.2 Purpose of Report

2.0 Outline of Environmental Assessment Process
- 2.1 Project-Specific Study Process
- 2.2 Consultation Process

3.0 Transportation Needs Assessment
- 3.1 Problem and Opportunity
- 3.2 Rational, Description, and Assessment of Alternatives to the Undertaking
- 3.3 Rationale and Description of Alternative Methods
- 3.4 Description and Rationale for Study Area Boundaries

4.0 Corridor Planning and Route Planning

4.1 Description of Study Area Features and Constraints

4.2 Corridor Planning

4.2.1 Description and Rationale for Route Generation Criteria

4.2.2 Generation of Corridor Alternatives

4.3 Route Planning

4.3.1 Description and Rationale for Route Generation Criteria

4.3.2 Generation and Assessment of Route Alternatives

4.3.3 Evaluation and Selection of Preferred Route Alternative ("The Recommended Plan")

5.0 Detailed Description of The Recommended Plan

5.1 Major Features of The Recommended Plan

5.2 Environmental Issues and Commitments

5.3 Future Consultation

5.4 Summary of Environmental Effects, Proposed Mitigation, Commitments to Further Work

2.4.2.2 TESR SAMPLE TABLE OF CONTENTS FOR GROUP B PROJECT SUBMITTED AT COMPLETION OF PRELIMINARY DESIGN

Note: The order of the typical table of contents for the Transportation Environmental Study Report (TESR) for a Group B project is the same as the typical table of contents for a Preliminary Design Report. This is for consistency.

The content below is from the *Class EA document*, Appendix #3.

1.0 Overview of Undertaking

1.1 Summary Description of the Undertaking

1.2 Purpose of Report

2.0 Outline of Environmental Assessment Process

- 2.1 Project-Specific Study Process
- 2.2 Consultation Process

3.0 Transportation Needs Assessment

- 3.1 Problem and Opportunity
- 3.2 Alternatives to the Undertaking – brief discussion

4.0 Preliminary Design

- 4.1 Description of Study Area Constraints
- 4.2 Generation and Assessment of Preliminary Design Alternatives
- 4.3 Evaluation and Selection of Preferred Alternative - ("The Recommended Plan")

5.0 Detailed Description of The Recommended Plan

- 5.1 Major Features of The Recommended Plan
- 5.2 Environmental Issues and Commitments
- 5.3 Future Consultation
- 5.4 Summary of Environmental Effects, Proposed Mitigation, Commitments to Further Work

2.4.3 DESIGN AND CONSTRUCTION REPORT - GROUP A AND B PROJECTS

The Design and Construction Report (DCR) is prepared for Group A and Group B projects only.

The DCR is typically prepared and submitted to document:

- Detail Design, which is the development of the transportation plan to the design implementation level of detail;

and may include elements of:

- Construction documentation.

For Group A projects only (except new freeways), the DCR preparation and submission may be done before the Detail Design stage to document:

- Preliminary Design, which is the development of the transportation plan to the Design Criteria level of detail.

The Class EA document, Chapter 6, has additional information on the DCR need, contents, bump-up, addendum, submission and review process.

A sample Table of Contents is in the *Class EA document*, Appendix 3. The format and content may change, depending on the specific nature of the project or conditions in the study area.

2.4.4 ENVIRONMENTAL SCREENING DOCUMENT - GROUP C PROJECTS

The Environmental Screening Document is prepared for Group C projects only and is normally prepared for internal reference rather than for formal submission. It is prepared if environmental impacts are anticipated and mitigation will be considered and/or provided.

The earliest that the Environmental Screening Document may be prepared, is at the commencement of the generation and assessment of Preliminary Design alternatives and the latest is at completion of Detail Design.

Depending upon the time of submission, the Environmental Screening Document may guide designers and contractors. In other cases, the Environmental Screening Document will report the results of investigations and the mitigation measures which have been selected. The amount and extent of this internal documentation and follow-up work will vary depending on the environmental requirements and sensitivities identified.

The *Class EA document*, Chapter 6, has additional information.

A sample Table of Contents is in the *Class EA document*, Appendix 3.

2.5 ENVIRONMENTAL CLEARANCE PROCESS

Environmental Clearance for ministry projects is the ministry's internal process of ensuring that the environmental assessment requirements have been met, before construction begins. Environmental clearance is required for all Group A and B projects. Environmental Clearance for Group C projects is required only where an Environmental Screening Document has been prepared.

There are four possible types of environmental clearance:

- Environmental Clearance - Utility Relocation.
- Environmental Clearance - Right-of-Way Designation.
- Environmental Clearance - Property Expropriation.
- Environmental Clearance - Construction Start.

The work, for which the clearance applies, may not take place until the environmental clearance has been issued.

The *Class EA document*, Chapter 8, has information on the clearance process including conditions under which the clearance is provided.

3. Network Planning and Transportation Needs Assessment Stage

3.1 PURPOSE

The purpose of the Network Planning and Transportation Needs Assessment stage is to:

- Identify deficiencies and needs.
- Determine what is needed.
- Project Initiation.

Note: The Network Planning and Transportation Needs Assessment stage and the Planning stage (see Section 4 of this guideline) are different project stages, with different activities.

The activities during the Network Planning and Transportation Needs Assessment stage are:

- Establishing the Quality Management Plan for the Network Planning and Needs Assessment stage.
- Network Planning.
- Transportation Needs Assessment.
- Pre-Design Study (optional).
- Pre-Design Study Synopsis Report (optional).
- Project Initiation.
- Group Work Project Numbers and Work Project Numbers Issued.
- Scope and Cost Report.
- Quality Management.

3.2 NETWORK PLANNING

For some projects, high level planning activities are conducted prior to starting the Planning, Preliminary Design or Detail Design stages. The purpose of this is to:

- Determine existing and forecast future network needs, including long term needs, based on a review of characteristics, deficiencies and opportunities of a specific area, corridor or route.
- Develop a strategy or plan to address the required needs.
- Identify the justification and purpose for specific projects.
- Define the process to complete the necessary work (i.e. Class Environmental Assessment or Individual Environmental Assessment).
- Scope future Planning, Preliminary Design and Detail Design work.

To provide information for the network needs, a variety of on-going activities are conducted within each region and in some cases in conjunction with the Investment Strategies Branch and Policy and Planning Division. Sometimes these activities are completed with the Planning stage. These include:

- Corridor Planning Studies.
- Highway Assessment Report (HAR).
- Investment Plans.
- Passing Lane/Truck Climbing Lane Assessment Reports/Studies.
- Project Appraisal Reports (PAR).
- Regional/Area System Assessment Studies.
- Study Design.
- Transportation Needs Assessment.
- Travel Operations Assessment.
- Travel Pattern Study/Origin-Destination Survey.
- Review of population and employment growth data and plans from outside sources.
- Others, as appropriate.

3.3 TRANSPORTATION NEEDS ASSESSMENT

The Transportation Needs Assessment process is part of the ministry's ongoing management and administration of the transportation system. It may result in a number of recommendations, including, but not restricted to, the recommendation to initiate a transportation study, to initiate major improvements, to initiate minor improvements, to initiate routine maintenance, to monitor the situation, or to do nothing. Because of this range of potential outcomes, the following applies:

- The Transportation Needs Assessment process is considered "research" and/or "feasibility study" work under the *EA Act*, and therefore is not subject to the EA process/public consultation requirements of the *EA Act* at the time it is conducted.
- Where the process results in the decision to pursue Group A and/or Group B transportation studies, the *EA Act* and public consultation processes of those studies are initiated through a review of the Transportation Needs Assessment findings (typically reviewed in the Preliminary Design stage), which then becomes a formal part of the study process done under the Class EA, or in the case of new freeway planning is conducted under the individual EA process.
- Where this process results in the decision to pursue a Group C transportation study, the Transportation Needs Assessment is typically not subject to public consultation, since minor improvements to existing provincial transportation facilities tend to be directly implemented and, through the Class EA, approved under the *EA Act* subject to environmental screening.

Since the ministry is involved in work related to transportation needs assessment on an ongoing basis, the Transportation Needs Assessment process is not formally organized into phases. However, where a Group A, B or C study is subsequently pursued, the Transportation Needs Assessment serves to:

- Identify transportation problems and opportunities.
- Evaluate and select reasonable "alternatives to".
- Develop provincial transportation facility study objectives – "the purpose of

the undertaking".

- Initiate the study process of the Group A, B or C project.

Transportation problems and opportunities are identified from one or more of the following sources:

- Transportation network plans.
- Inventories of the provincial transportation system.
- Traffic, accident, service and maintenance data.
- Modelling/projection of future transportation demands and desires based upon planned future conditions, as articulated in official plans, etc.
- Federal, provincial, and municipal agency liaison.
- Private industry initiatives.
- Other information sources and initiatives (see list under Network Planning above).

Alternatives examined during the Transportation Needs Assessment are "alternatives to" (see the *Class EA document*, Section 4.4.2). An evaluation of "alternatives to" is completed to select the preferred transportation undertaking.

Additional Information on the Transportation Needs Assessment process is in the *Class EA document*, Section 4.4 and in Section 4.4.2. There is information on evaluation of "alternatives to" and selection of the preferred transportation undertaking.

Types of "alternatives to" that may be considered during the Transportation Needs Assessment are:

- The "do nothing" alternative.
- New and/or improved provincial transportation facility alternatives.
- New and/or improved air, rail, transit, and water based alternatives.
- New and/or improved municipal and private road alternatives.
- Transportation demand management alternatives.

A Preferred Alternative(s) is selected based on an analysis of the "alternatives to". More than one "alternative to" may be carried forward.

Where it is determined that a reasonable "alternative to" meets the definition of a Group A, B or C project under the Class EA, it may be carried forward for study within the terms of the Class EA, or in the case of new freeway planning, the study would proceed as an individual EA.

The transportation needs assessment information is incorporated into a statement of objectives which becomes the basis and focus of subsequent study. This statement constitutes "the purpose of the undertaking" under the *EA Act*.

3.4 PRE-DESIGN STUDY

The Pre-Design Study is optional. The format and content of the Pre-Design Study Report is optional.

For some projects a Pre-Design Study is completed. The Pre-Design Study may take place before the Planning, Preliminary Design, or Detail Design stage. The Pre-Design Study is most often carried out after the completion of the Preliminary Design from which the need of an additional design study is identified.

A Pre-Design Study or other additional design studies and reports, may be required to identify additional engineering and environmental information, property acquisition, project implementation stages, contract types, etc.

The study is usually prepared to document the project implementation stages, construction contract types, construction staging options, program cost estimates and annual investment.

A formal Pre-Design Study is generally undertaken for staged projects, multi-year projects, multi-year phased projects and complex projects, when necessary.

Staged projects are those improvements implemented in stages with an extended time

lapse between the stages of improvements. For example, a new freeway implemented under an initial, intermediate and ultimate scheme.

Multi-year projects are those where improvements are implemented under a multi-year annual construction program. For example, construction or reconstruction of a highway facility where each interchange is constructed, in total, in progression.

Multi-year phased projects are those improvements implemented under a multi-year annual construction program where each section is partially implemented. For example, construction and paving of only one half of a divided highway and parts of the interchange to be open to traffic in that phase.

3.5 PRE-DESIGN STUDY SYNOPSIS REPORT

The Pre-Design Study Synopsis Report is optional. The format and content of the Pre-Design Study Synopsis Report is optional.

A Pre-Design Synopsis Report is prepared to document design alternatives and the selection of the “preferred” option.

The report documents the terms of reference for design and the options investigated.

3.6 PROJECT INITIATION

Once it has been decided to move forward with a project, the overall program priorities and funding will determine when a project is carried forward and programmed for further work.

When a project is put on the rolling 5-year program and funded, the Group Work Project Numbers and Work Project Numbers are issued and an initial Scope and Cost Report is completed.

3.6.1 GROUP WORK PROJECT NUMBERS AND WORK PROJECT NUMBERS ISSUED

A Group Work Project (GWP) number is assigned to all capital construction projects to describe the project and provide a means of internal tracking from inception to completion. A GWP is an “umbrella” number for a project.

An individual Work Project (WP) number is assigned to every major treatment to each asset being improved or added within a GWP. A minimum of one WP must be identified for each project.

Example of GWP/WPs:

GWP 5001-11-00

WP 5001-11-01

WP 5000-11-02

The Program Planning Office has the primary responsibility for the creation of major capital GWP and WP numbers.

The information required by the Program Planning Office to issue a GWP is:

- Highway number.
- Project limits (from West to East, South to North, Chainage).
- Type of project (resurfacing, reconstruction, widening, new alignment, etc.).
- LHRS limits (from and to, including offsets, if applicable).
- Length of the project.
- Project description.
- Program value (is revised as required during the project).
- Proposed program year.
- Anticipated capital program (Expansion, Rehabilitation, Work by Others, etc.).

The information required by the Program Planning Office to issue a WP is:

- Type of work (structure rehabilitation, resurfacing, etc.).
- Program value.
- Additional information may be required (structure site numbers, etc.).
- Other information as required by the Program Planning Office.

3.6.2 SCOPE AND COST REPORT

An initial Scope and Cost Report is completed and approved in accordance with the *Scope and Cost Report Guideline.* A general project scoping discussion and information on the Scope and Cost Report is in Section 1.8 of this guideline.

3.7 QUALITY MANAGEMENT

Quality management processes are completed and documented.

4. Planning Stage

4.1 PURPOSE

The purpose of the Planning stage is to:

- Develop the transportation plan to a concept level of detail.
- Develop a plan for how the project should be done.
- Project justification.
- Project programming (prioritization, funding, scheduling).

Notes:
1. The Planning stage and Network Planning and Transportation Needs Assessment stage (see Section 3 of this guideline) are different project stages with different activities.
2. Route location is part of the Planning stage for Group A projects.

Every project has a Planning stage. The Planning stage is frequently combined with the Preliminary Design stage and, for very simple projects, is combined with the Detail Design stage.

When a project entails considerable public consultation and/or negotiations with stakeholders, a formal Planning Study may be preferable to moving directly to the Preliminary Design stage.

For some projects, Network Planning activities are conducted prior to starting the Planning stage. Refer to Section 3.2 of this guideline for additional information.

The Planning stage is preceded by a Transportation Needs Assessment that is part of the ministry's ongoing activities as discussed in Section 3.3 of this guideline. The Planning stage includes a review of the Transportation Needs Assessment.

4.2 TRANSPORTATION ENGINEERING AND ENVIRONMENTAL PROTECTION IN PLANNING

Environmental requirements are integrated into the Planning process.

The planning of Group A new freeway projects is carried out under the individual EA process. The Class EA process may commence at the beginning of Preliminary Design.

The planning of all other Group A projects and for Group B and C projects is carried out under the terms of the Class EA.

The *Class EA document*, Section 3.4, presents:

- Overviews of the transportation and environmental decisions and consultation, as they apply to the Planning, Preliminary Design and Detail Design stages for different groups of projects.
- Overviews of the Class EA process for Group A, B and C projects, showing the linkage between transportation engineering, environmental protection, consultation, documentation and bump-up.

Notes: 1. Alternatives examined during the Transportation Needs Assessment process are “alternatives to” and a Preferred Alternative(s) is identified.

2. Alternatives examined during the Planning, Preliminary Design, Detail Design, and Construction stages are “alternative methods” of achieving the Preferred Alternative (see the *Class EA document*, Exhibits 3.1, 3.2, and 3.3).

In the *Class EA document*, Section 4.5, there is detailed information on decisions and alternatives in the Planning process. Extracts are below:

Planning for Group A Projects

For Group A projects, because of the need to consider corridor and route alternatives, Planning is a detailed and comprehensive exercise which typically involves the following:

- Review Transportation Needs Assessment.

- Generate and assess Planning alternatives.
- Evaluate and select the Preferred Planning Alternative.
- Develop the Preferred Planning Alternative.

Planning for Complex Group B Projects

For complex Group B projects (e.g. twinning of an existing highway), there are usually a number of alternatives to consider in order to address the project objectives. Planning is less comprehensive than that of a Group A project, but still typically requires the following:

- Review Transportation Needs Assessment.
- Generate, assess, evaluate and select the Preferred Planning Alternative (these four steps may be separated into discrete phases – that essentially follow the same process as Preliminary Design).

Planning for Low-Complexity Group B Projects and for Group C Projects

For low-complexity Group B projects (e.g. a new freeway median barrier, reconstruction with minor improvements, passing lanes in rural locations) or for Group C projects, there are typically just a few or only one Planning alternative that can be considered to address the project objectives.

Where these projects are initiated immediately after the Transportation Needs Assessment stage, Planning may simply take place during the latter part of the Transportation Needs Assessment. Otherwise, Planning may simply consist of a review of Transportation Needs Assessment at the beginning of the Preliminary Design stage.

In general, Planning is conducted for only the portion(s) of such projects for which there are meaningful Planning alternatives.

Additional information is contained in Section 2 of this guideline.

4.2.1 ENVIRONMENTAL DOCUMENTATION

Environmental documentation is discussed in Section 2 of this guideline and in the *Class EA document*, Chapter 6.

4.3 PLANNING PROCESS

The Planning stage follows a "step by step" process with the following activities:

- Establishing the Quality Management Plan for the Planning stage.
- Staff Project.
- Review Transportation Needs Assessment.
- Start-up and Scoping Meeting.
- Scope Approval Meeting.
- Scope and Cost Report Revision.
- Study Design Report (optional).
- Planning Alternatives and Selection of Preferred Alternative.
- Planning Package Documents Complete.
- Designation of Right-of-Way.
- Pre-Design Study (optional).
- Quality Management.

Note: Not all of the activities will be required for all projects. For example, a resurfacing project will not have the same need and requirements as a highway expansion project.

4.3.1 WORK PLAN AND SCHEDULE

A work plan and a schedule are required for each stage. Refer to Section 1.4 of this guideline for additional information.

4.3.2 WORK ACTIVITIES BY ENGINEERING FUNCTIONAL AREAS

The completion of the Planning stage involves work by the engineering functional areas. There should be discussions with each functional area/specialty offices to fully understand what they are required to contribute to the project and what their requirements are from other sections.

There are many project specific work tasks and issues relating to the different engineering specialities and those activities are completed by the functional areas.

4.4 STAFF PROJECT

At the start of the Planning stage, the ministry Project Manager determines which ministry sections and offices require representation on the Project Team. Each functional area/specialty office assigns staff as required to the project.

4.5 REVIEW TRANSPORTATION NEEDS ASSESSMENT

At the initiation of the Planning stage, the Transportation Needs Assessment work is reviewed to identify and assess the following information:

- Transportation problems and opportunities.
- Study objectives.
- Reasonable “alternatives to” selected.
- Preliminary study area and corridors (where appropriate to the study).

This review may result in the Transportation Needs Assessment work being rejected, modified, refined, or confirmed.

In addition, the review of the Transportation Needs Assessment stage involves:

- Preliminary data gathering (sufficient to scope the project, see Preliminary Design stage for a list of potential data and sources that could be required depending upon the project).

- Analysis of environmental and transportation engineering existing conditions.
- Initial identification of environmental and transportation engineering constraints.

4.6 START-UP AND SCOPING MEETING

A project Start-up and Scoping Meeting is required in the Planning stage for every project. The meeting is usually arranged and chaired by the ministry Project Manager.

The ministry Project Manager determines which ministry sections and offices require representation on the Project Team. Each functional area/specialty office assigns staff as required to the project. It is very important to have functional area/specialty office representation at the meeting.

The project scope is based on the work previously done and/or on new information available.

Note: Prior to this meeting it is recommended that a site field review be completed by the Project Team.

Locations of buried utilities must be determined prior to engaging in any field work activity where the field work could impact a buried utility.

The purpose of the meeting is to:

- Introduce the project to the ministry Project Team.
- Ensure the ministry Project Team understands the project concept and the scope of the project (review the approved Scope and Cost Report).
- Discuss the needs of all functional areas/specialty offices with respect to the scope.
- Discuss what should be “In Scope” and what should be “Out of Scope” for the project.

- Discuss if the approved project scope is still appropriate.
- Confirm the potential EA Class for the project.
- Discuss costs, risks, schedule and data requirements.
- Confirm duties and responsibilities between the Project Manager and all Project Team members.
- Discuss the project work plan and what each person will do.
- Reach agreement on Service Provider acquisition requirements and schedule (when required).

A general project scoping discussion that applies to all stages is in Section 1.8 of this guideline.

4.7 SCOPE APPROVAL MEETING

A Scope Approval Meeting is usually held prior to proceeding with the project further than the Planning stage.

A meeting may not take place as a formal meeting. However the approval of the scope for a project is to be secured from regional management.

The purpose of the Scope Approval Meeting is to:

- Ensure all functional areas/specialty offices have a common understanding of the purpose and scope of the project.
- Verify the needs and wants of the functional areas/specialty offices with respect to scope.
- Verify what should be “In Scope” and what should be “Out of Scope” for the project.
- Verify that the schedule is realistic considering the scope.
- Confirm the project delivery method.

- Verify that the Service Provider fees and project cost estimates are realistic, considering the scope and current market factors.

After the meeting, any action required by the *Scope and Cost Report Guideline* is completed.

The ministry Project Manager will then proceed with the Service Provider acquisition process for outsourced projects.

4.8 SCOPE AND COST REPORT REVISON

A general project scoping discussion and information on the Scope and Cost Report is in Section 1.8 of this guideline.

In the Planning stage, a Scope and Cost Report revision is typically prepared, using:

- Parametric Cost and Risk.

4.9 STUDY DESIGN REPORT

The Study Design Report is:

- Mandatory for Group A projects other than new freeways (for which it does not apply).
- Optional for Group B projects, but it is likely to be prepared only for the largest, most complex Group B projects (e.g. the twinning of a major highway that has the potential to affect a wide range of diverse environmental features).
- Not applicable to Group C projects.

Refer to Section 2 of this guideline for additional information.

The Study Design Report is for documentation of the study process that will lead to a Transportation Environmental Study Report submission for Group A and complex Group B Projects.

4.10 PLANNING ALTERNATIVES AND SELECTION OF PREFERRED PLANNING ALTERNATIVE

This activity is for the generation and evaluation of alternatives and the selection of the Preferred Planning Alternative (method) to address the needs of the project (objectives of the study).

Alternatives determined in the Planning stage are "alternative methods" under the *EA Act.*

In the *Class EA document*, Section 4.5, there is information on how to:

- Generate and assess Planning alternatives.
- Evaluate Planning alternatives and select the Preferred Planning Alternative.
- Environmental protection in Planning.

For formal **Planning Studies, the activities required will be similar to the Preliminary Design stage** and they are not repeated in this Section of this guideline. (Essentially follows the Preliminary Design stage process. Refer to Section 5 of this guideline and the *Class EA document*, Section 4.5).

Refer to Section 4.2 Transportation Engineering and Environmental Protection in Planning of this guideline for information on Planning requirements to determine the Preferred Planning Alternative for addressing the project needs.

4.11 PLANNING PACKAGE DOCUMENTS COMPLETE

The Planning Package documents should have sufficient detail to carry out the project without significant conceptual scope changes being required in the Preliminary Design or Detail Design stages.

The Planning Package documents have a variable content depending upon the engineering and Class EA requirements for each project. Pre-Design studies and/or a Study Design Report could be part of the package. For Group A projects there is specific discussion on the Planning Package requirements in the *Class EA document*, Section 4.5.

Plans to a design concept level of detail are typically at 1:10,000 scale.

The content of the Planning Package (Planning Report) documents typically includes information on:

- Review Transportation Needs Assessment.
- Generating Planning alternatives.
- Assessing Planning alternatives.
- Evaluating Planning alternatives.
- Selecting the Technically Preferred Planning Alternative.
- Development of the Preferred Planning Alternative. (The word Technically is dropped, as the final Planning alternative may not always be exactly the same as the Technically Preferred Planning Alternative, as other factors may have an influence.)

Environmental documentation requirements are integrated into the Highway Planning and Design Process and are discussed in Section 2 of this guideline and in the *Class EA document*, Chapter 6.

For Group A projects other than new freeways, the Transportation Environmental Study Report submission may be advanced in order to document:

- Planning, which is the development of the transportation plan to design concept level of detail.

4.12 POST PLANNING DOCUMENTS COMPLETE ACTIVITIES

After the Planning stage there may be some additional work activities required that take place before or during the Preliminary Design or Detail Design stage. For example, commitments for mitigation and future consultation to deal with outstanding issues including:

- Permits/approvals from external agencies/other levels of government.
- Detailed environmental investigations regarding impacts and mitigation.

- Engineering investigations to confirm some design features.
- Etc.

4.12.1 DESIGNATION OF RIGHT-OF-WAY

The designation of the Right-of-Way is completed as soon as possible and may be completed after environmental clearance for Right-of-Way Designation. It may involve a new Right-of-Way, or modifications to an existing Right-of-Way.

Environmental clearance for Right-of-Way designation may be provided as follows:

- Group A – TESR cleared.
- Group B – TESR cleared.
- Group C – Completion of Preliminary Design or design concept.

The lead section within the Engineering Office for Designation Request(s) varies by region.

4.12.2 PROPERTY REQUEST

The property request is completed as soon as possible and may be completed after environmental clearance for Property Expropriation.

Environmental clearance for Property Expropriation may be provided as follows:

- Group A – TESR cleared.
- Group B – TESR cleared.
- Group C – Completion of Preliminary Design or design concept.

4.12.3 PRE-DESIGN STUDY

For some projects, a Pre-Design Study is completed before the formal start of the Preliminary Design stage. Refer to Section 3.4 Pre-Design Study of this guideline.

4.13 QUALITY MANAGEMENT

Quality management processes are completed and documented.

5. Preliminary Design Stage

Importance of Preliminary Design

All steps in the Preliminary Design stage are important, since the final product forms the basis for the Detail Design stage. This requires clear and accurate information in the Preliminary Design, so that the scope of the Detail Design work can be determined. A good Preliminary Design ensures that:

- There are minimal changes to the scope of the project during the Detail Design stage.
- The cost and schedule are realistic.
- The recommended plan has the rationale explained.
- The scope of the Detail Design work can be accurately defined.

5.1 PURPOSE

The purpose of the Preliminary Design stage is to:

- Develop the transportation plan to the Design Criteria level of detail.

  (The project is developed sufficiently to be fully defined within the requirements of the *Design Criteria Guideline*.)
- Focus on the "roughing out" of a design.

This is achieved by thoroughly and systematically determining all of the conditions of and reasonable alternatives for improvement to the area where need has been identified.

If a Planning Study was carried out for the project, a Preliminary Design involves the refinement and further development of that work.

The Preliminary Design stage is where a graphical design is developed, evaluated, finalized and approved. Before a preferred scheme is identified, a wide selection of alternatives will be considered to determine whether the proposals are

environmentally, technically and economically feasible to proceed to the Detail Design and Construction stages.

Transportation engineering and environmental constraints must be addressed at a level of detail that is specific enough to ensure that the selected design is environmentally, technically and economically feasible to construct.

At the end of the Preliminary Design stage there will be:

- A single, clear plan to carry forward to the Detail Design stage of the project.
- Environmental clearance for property expropriation, utility relocation and Right-of-Way designation secured by the ministry. (A TESR clearance may be required depending on the project.)
- Approvals or "approvals in principle" for required permits/approvals.

Combining of Stages

The Planning stage and the Preliminary Design stage may be completed together and a single document prepared to document the study process, findings and recommendations for a project.

If a Planning Study or a Preliminary Design Study is not completed for the project, the essential elements are completed in the Detail Design stage.

The Head, Planning and Design Section approves the project delivery strategy and if stages are to be combined.

5.2 TRANSPORTATION ENGINEERING AND ENVIRONMENTAL PROTECTION IN PRELIMINARY DESIGN

Environmental requirements are integrated into the Preliminary Design process.

The *Class EA document*, Section 3.4, presents:

- Overviews of the transportation and environmental decisions and consultation, as they apply to the Planning, Preliminary Design and Detail Design stages for different groups of projects.
- Overviews of the Class EA process for Group A, B and C projects, showing the linkage between transportation engineering, environmental protection, consultation, documentation and bump-up.

Notes: 1. Alternatives examined during the Transportation Needs Assessment process are “alternatives to” and a Preferred Alternative(s) is identified.
2. Alternatives examined during the Planning, Preliminary Design, Detail Design, and Construction stages are “alternative methods” of achieving the Preferred Alternative (see the *Class EA document*, Exhibits 3.1, 3.2, and 3.3).

In the *Class EA document*, Section 4.6, there is detailed information on decisions and alternatives in the Preliminary Design process. Extracts are below:

Preliminary Design for Group A Projects and Complex Group B Projects

For Group A projects and complex Group B projects, Preliminary Design is a detailed and comprehensive exercise which typically involves the following:

- Generate and assess Preliminary Design alternatives.
- Evaluate and select the Preferred Preliminary Design Alternative.
- Develop the Preferred Preliminary Design Alternative.

Preliminary Design for Low-Complexity Group B Projects and for Group C Projects

For low-complexity Group B projects or for Group C projects, there may be just a few or only one Preliminary Design alternative that can be considered to address the project objectives. Where these projects are initiated immediately after the Planning stage, Preliminary Design may simply take place during the latter part of Planning. Otherwise, Preliminary Design may simply be a component of the generation of alternatives at the beginning of Detail Design.

In general, Preliminary Design is conducted for only the portion(s) of such projects for which there are meaningful Preliminary Design alternatives.

Additional information is contained in Section 2 of this guideline.

5.2.1 ENVIRONMENTAL DOCUMENTATION

Environmental documentation is discussed in Section 2 of this guideline and in the *Class EA document*, Chapter 6.

5.3 PRELIMINARY DESIGN PROCESS

The Preliminary Design stage follows a “step by step” process that provides:

- A defined process.
- Environmental Assessment process integration.
- Progression from need identification to the selection of the Preferred Preliminary Design Alternative.
- External consultation.
- Milestone reviews at key stages in design development, to ensure project objectives are satisfied and approved.
- Quality Management.

For some projects a Pre-Design Study is completed before the formal start of the Preliminary Design stage. Refer to Section 3.4 Pre-Design Study of this guideline.

The Preliminary Design process is the same whether a Preliminary Design Report and/or a Transportation Environmental Study Report is being completed.

The Preliminary Design stage activities are completed in four phases that integrate the highway engineering and environmental assessment processes:

Phase 1: Generate and Assess Preliminary Design Alternatives

Phase 2: Evaluate Alternatives and Select the Preferred Preliminary Design Alternative

Phase 3: Develop the Preferred Preliminary Design Alternative

Phase 4: Documentation

The main activities and milestones within each phase are shown in Section 5.3.3 Preliminary Design Process Work Flow Chart of this guideline.

The activities discussed in subsequent Sections are not to be considered as "all inclusive". The order of the activities could be altered to suit the need of the project and some activities may be undertaken in parallel. **Not all of the activities will be required for all projects. For example, a resurfacing project will not have the same need and requirements as a highway expansion project.**

5.3.1 WORK PLAN AND SCHEDULE

A work plan and a schedule are required for each stage. Refer to Section 1.4 of this guideline for additional information.

5.3.2 WORK ACTIVITIES BY ENGINEERING FUNCTIONAL AREAS

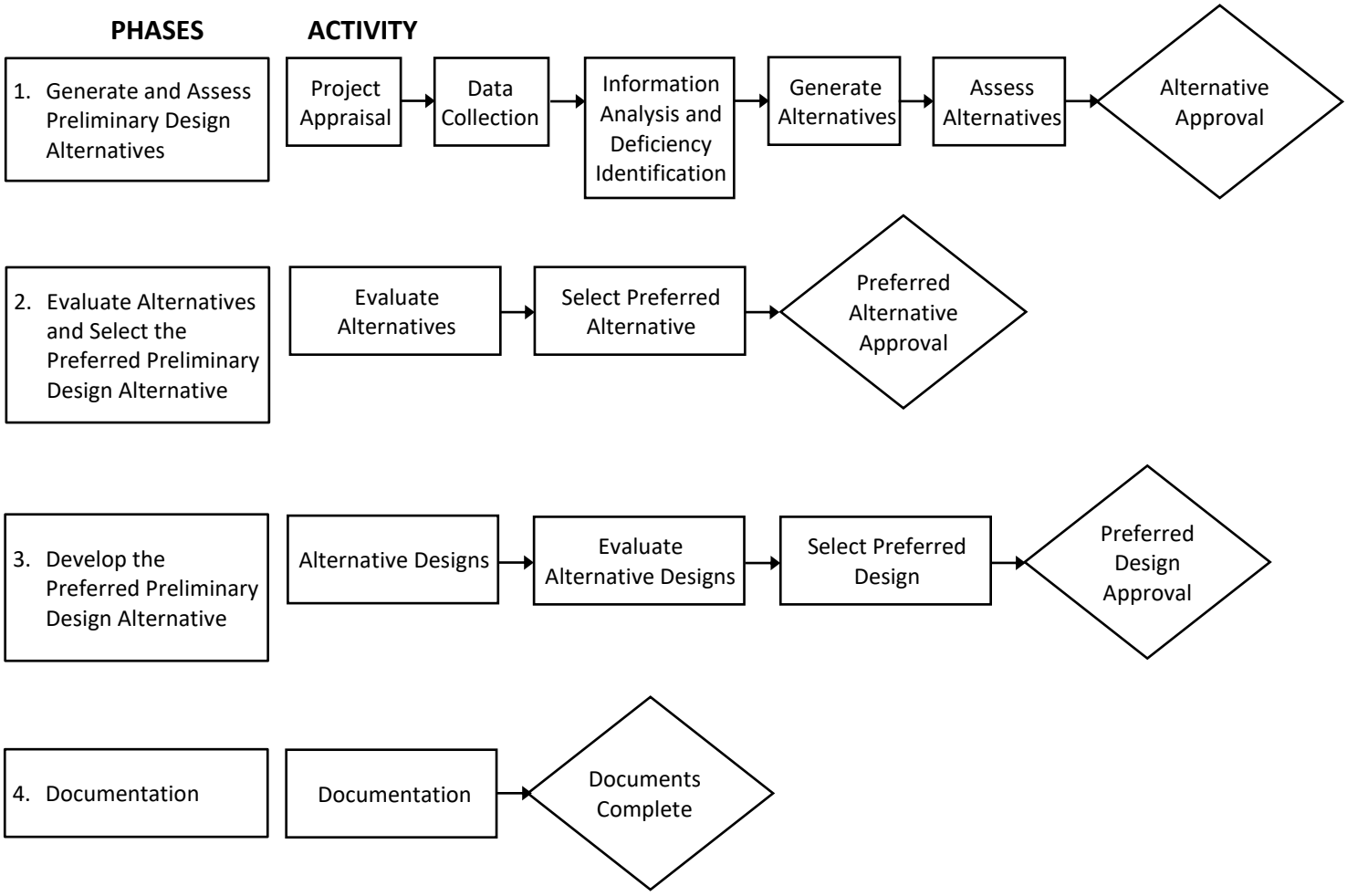
The completion of the Preliminary Design stage involves work by the engineering functional areas. There should be discussions with each functional area/specialty office to fully understand what they are required to contribute to the project and what their requirements are from other sections.

There are many project specific work tasks and issues relating to the different engineering specialities and those activities are completed by the functional areas.

5.3.3 PRELIMINARY DESIGN PROCESS WORK FLOW CHART

Preliminary Design Process Work Flow Chart

Notes: For some projects a Pre-Design Study is completed before the start of Phase 1.
Phase 1 examines "alternative methods" of completing the Preferred Alternative.
Phase 2 examines "alternative methods" for completing the Preliminary Design alternative approved in Phase 1.



5.3.4 KEY ACTIVITIES IN PRELIMINARY DESIGN

The key activities in the Preliminary Design stage include the following:

Occurs in All Phases — Quality Management

Quality Management processes are completed in all phases and are essential to completion of the project.

Occurs in All Phases — Consultation and Review

Ministry offices, other ministries, agencies/other levels of government and the public are consulted, as appropriate, for their input and concurrence with the Preliminary Design alternatives. This consultation is ongoing through the Preliminary Design stage with most occurring in Phases 1, 2 and 3.

Occurs in Phase 1 and 2 — Generate, Assess and Evaluate Preliminary Design Alternatives

The generation and evaluation of "alternative methods" is typically carried out in six steps that are part of Phases 1 and 2:

1. A reasonable number of alternative methods are generated for comparison.
2. Information on each alternative method is assembled in an evaluation matrix.
3. Evaluation criteria (natural environment, socio-economic environment, cultural environment, transportation engineering, etc.) are developed to compare alternatives.
4. Rankings/weights are assigned to the evaluation criteria to reflect their relative importance.
5. A multi-criteria evaluation method is used to compare the alternative methods to one another and to select the Preferred Preliminary Design Alternative.

6. Sensitivity tests are performed to determine the influence of the criteria ranks/weights on the selection of the Preferred Preliminary Design Alternative.

Occurs in Phase 2 Select the Preferred Preliminary Design Alternative

The Preliminary Design alternatives generated are analyzed and evaluated by determining their engineering and environmental advantages and disadvantages. One such advantage or disadvantage is relative cost. Cost is only one factor used to assess the alternatives. Key elements in the evaluation of the design alternatives involve mitigation of environmental impacts, upgrading to current standards and optimizing the cost-benefit of the work.

Occurs in Phase 3 Develop the Preferred Preliminary Design Alternative

The Preferred Preliminary Design Alternative is developed and endorsed/approved by senior ministry management. There may also be required sign-off letters from agencies/other levels of government, agreement with environmental compensation plans, or council resolutions supporting the design proposal.

Occurs in Phase 4 Documentation and Approvals

After the Preferred Preliminary Design Alternative is approved, the Preliminary Design documentation is completed:

- Report prepared and reviewed by the Project Team.
- Report is accepted/approved by the regional management.
- Ministry approvals are required for the Design Criteria, Cost Sharing Agreements, Property Requests and Legal Agreements.
- External approval may be required, such as from Federal and/or Provincial authorities.

5.4 PHASE 1: GENERATE AND ASSESS PRELIMINARY DESIGN ALTERNATIVES

This phase is the start of the Preliminary Design stage.

Note: Design Alternatives generated are “alternative methods” of accomplishing the Preferred Alternative(s) that has previously been determined. Design Alternatives are not “alternatives to” as discussed in Section 3.3 of this guideline.

This phase is for:

- Establishing the Quality Management Plan for the Preliminary Design stage.
- Establishing the Project Team for the Preliminary Design stage.
- Confirming the scope of work (project objectives).
- Establishing a detailed schedule and work plan.
- Notifying project stakeholders of project initiation and solicit input.
- Data collection (review and document existing conditions).
- Generating alternatives – “alternative methods”.
- Assessing alternatives.
- Consultation, as appropriate.
- Preparation of draft and/or final reports (as applicable to the project).

The meetings held during this phase are:

- Start-up and Scoping Meeting for Preliminary Design.
- Scope Approval Meeting (optional).
- Alternatives Team Review Meeting.
- Alternatives Approval Meeting (optional).
- Progress Meetings: frequency determined for each project.
- Additional meetings depending upon the project needs.

5.4.1 PROJECT APPRAISAL

The Project Appraisal activity is the first step in the Preliminary Design process and is where the Project Manager begins to investigate the project and undertakes project management work on the project.

The project appraisal activities are:

- Quality Management Plan established for the Preliminary Design stage.
- Staff the project.
- Start-up and Scoping Meeting.
- Scope approval.
- Schedule developed.
- Work plan.
- Data requirements determined.
- Environmental and Consultation Plan.
- Project Start-up Notices and Contact Letters.

5.4.1.1 START-UP AND SCOPING MEETING

A Start-up and Scoping Meeting is required in the Preliminary Design stage for every project. The meeting is usually arranged and chaired by the ministry Project Manager.

The ministry Project Manager determines which ministry sections and offices require representation on the Project Team. Each functional area/specialty office assigns staff as required to the project. It is very important to have functional area/specialty office representation at the meeting.

The project scope is based on the work done in the Planning stage (if it was done) and/or on new information available.

Note: Prior to this meeting it is recommended that a site field review be completed by the Project Team.

Locations of buried utilities must be determined prior to engaging in any field work activity where the field work could impact a buried utility.

The purpose of the meeting is to:

- Introduce the project to the ministry Project Team.
- Ensure the ministry Project Team understands the project concept and the scope of the project (review the approved Scope and Cost Report).
- Discuss the needs of all functional areas/specialty offices with respect to the scope.
- Discuss what should be “In Scope” and what should be “Out of Scope” for the project.
- Discuss if the approved project scope is still appropriate.
- Confirm the potential EA Class for the project.
- Discuss costs, risks, schedule and data requirements.
- Confirm duties and responsibilities between the Project Manager and all Project Team members.
- Discuss the project work plan and what each person will do.
- Reach agreement on Service Provider acquisition requirements and schedule (when required).

A general project scoping discussion that applies to all stages is in Section 1.8 of this guideline.

5.4.1.2 SCOPE APPROVAL MEETING

A Scope Approval Meeting may be required, depending on if the project scope is changing significantly from the previous approval.

A meeting may not take place as a formal meeting. However the approval of the scope for a project is to be secured from regional management.

The purpose of the meeting is to:

- Ensure all functional areas/specialty offices have a common understanding of the purpose and scope of the project.
- Verify the needs and wants of the functional areas/specialty offices with respect to scope.
- Verify what should be “In Scope” and what should be “Out of Scope” for the project.
- Verify that the schedule is realistic considering the scope.
- Confirm the project delivery method.
- Verify that the Service Provider fees and project cost estimates are realistic, considering the scope and current market factors.

After the meeting, any action required by the *Scope and Cost Report Guideline* is completed.

The ministry Project Manager will then proceed with the Service Provider acquisition process for outsourced projects.

5.4.1.3 SCHEDULE AND WORK PLAN

A project schedule and work plan for the activities is developed to meet the assigned project delivery date.

Once the project scope is verified with the ministry Project Team, a work plan is prepared setting out the scope of work, work activity schedule, staff requirements, frequency of progress meetings and the financial reporting schedule.

Monitoring the progress of all project tasks and taking action when it appears tasks may not achieve the scheduled dates, is critical to achieving the required project delivery date for tendering.

5.4.1.4 ENVIRONMENTAL AND CONSULTATION PLAN, START-UP NOTICES AND CONTACT LETTERS

The project Environmental and Consultation Plan is developed. Project Start-up Notices and Contact Letters are completed and sent to notify others about the project and to seek initial input.

5.4.2 DATA COLLECTION

The data and information needed to generate and assess Preliminary Design alternatives is typically obtained from the following sources:

- Transportation Needs Assessment documentation.
- Planning stage documentation.
- Transportation and environmental secondary source documentation, including the sources identified in the *Class EA document*, Sections 4.4.1 and 4.4.2 respectively.
- Transportation and environmental input through consultation with stakeholders (agencies/other levels of government, the public, special interest groups, etc.).
- Field inspections/investigations, transportation studies and environmental studies, as may be necessary to verify information, fill in information gaps, update information, and enhance information level of detail.

Typically, the study area “existing conditions” are gathered at a level that is detailed enough to permit transportation engineering opportunities, and transportation engineering and environmental constraints to be incorporated into the Preliminary Design. The transportation information gathered may include transportation demand, network deficiencies, and infrastructure condition/deficiencies/requirements covering elements such as roadway surface, bridges and culverts, lighting and electrical systems, drainage, traffic safety and control systems, and service/maintenance/operations facilities. The environmental information gathered covers the natural, social, economic and cultural environmental factors that are applicable to the project and study area.

Access to private property may be required and the Property Section may be involved in arranging permission to enter.

Note: Data requirements depend on the type of project and not all data will be required for all projects. For example, a resurfacing project will not have the same data need and requirements as a highway expansion project.

The data to be obtained is determined on a project specific basis and it is to be limited to what will be sufficient for the design to be completed.

The information and data required may include, but may not be limited to:

- Aerial photography.
- Advanced Traffic Management Systems (ATMS):
    - Assess existing systems including ownership, age and condition.
- Corridor Control:
    - Legal easements.
    - Entrances issues.
- Corridor Investment Plans.
- Concerns of others:
    - External agency and public concerns.
    - Internal concerns (Operations, Traffic, etc.).
- Design Criteria:
    - Preliminary/final.
    - For past projects for the project location and adjacent.
- Drainage and Hydrology:
    - Condition of drainage infrastructure (ditches, culverts, sewers, etc.).
    - Drainage and hydraulic data.
    - Environmental chemistry - pH, resistivity, concentration of sulphates, chlorides, solvents, chemicals, and petroleum products.

  - Watercourse topographic mapping and aerial photographs.
  - Floodplain mapping.
  - Municipal Drain Reports.
  - Culvert Inspection Report (including culvert recommendations).
  - Preliminary Drainage Report (includes stormwater management).
  - Preliminary Hydrology Report.
  - Drainage Mosaic.
  - Assessment of water taking requirements and required approvals (Environmental Activity and Sector Registration/Permit to Take Water).
- Electrical:
  - Assess existing systems (illumination, traffic signals, flashers, etc.) including ownership, age and condition.
- Environmental:
  - Transportation Environmental Study Report (TESR).
  - Conditions or Environmental Approvals or commitments to future work in the PDR/TESR/other.
  - Environmental information on the natural, social, economic and cultural environment (wetlands, vegetation, wildlife, fisheries, watercourses, groundwater, noise abatement, community/ recreational facilities, archaeology, heritage features and site contamination).
  - Previous environmental reports.
  - Designated substances present.
- Existing highway conditions (lane widths, shoulder widths, roadside safety, ditches, culverts, curbs, sidewalks, etc.).
- Existing land use and development plans.
- Foundations:
  - Foundation Investigation Reports.

- Foundation Investigation and Design Reports.
- Previous reports and studies.
- Boreholes and site investigations.
- Foundation recommendations required for:
  - Widening and/or replacement of a structures.
  - Culverts with a span greater than 3 meters.
  - New overhead signs.
  - Large cuts.
  - Deep fills.
  - Cantilever signs.
  - Sensitive soil areas.
  - High mast light poles.

- Geomatics/Surveys:
  - Plans, engineering surveys, field investigations.
  - Confirm and update data from base plans, including hard surfaces.
  - Survey information including horizontal and vertical control, benchmarks, survey detail, co-ordinated highway alignments, centreline staking, references to pavement and foundations test pits and additional detail for supplementary design plan preparation.
  - Digital Terrain Model (DTM), with coverage as appropriate for the work.
  - Topographic surveys or mapping information showing the existing road network and physical topographical features (woodlots, buildings, etc.).
  - ETR Base Plans & Profiles.
  - Horizontal and vertical control plates/sheets and reports.
  - “B” plans (2D).
  - Profile Plans (“C” Plans).

- Bridge Site Plans (“E” Plans).
- Pipeline Crossing Plans (“K” Plans).
- Railway Crossing Plans (“G” Plans).
- Utility information, overhead, utility markers, buried (underground locates may be required).
  - Underground utilities detailed and illustrated on the ETR.
  - Documentation of locates provided by Utility companies.
  - All overhead wires and crossing clearances.
  - Guy wires detailed and illustrated on the ETR plates.
- Culvert sizes and drainage features with locations illustrated on the ETR profiles.
- Digital files for Planning and Design Section in current formats used by the ministry.
- Plans in current formats used by the ministry.
- Hard copy of field notes for drainage details.
- Field Staking as required.

- Geotechnical and Pavements:
  - Pavement Design Report.
  - Pavement condition data including previous reports and studies.
  - Pavement boreholes and site investigations.
  - Soils information.
  - Geotechnical recommendations.
  - Identify poor performing areas, frost heaves, settlement, drainage, or areas prone to flooding.
  - Rock cut information.
- Maintenance/Operations:
  - Concerns/issues/suggestions.

- Previous reports, studies and project files:
    - Preliminary Design Report and documentation.
    - Other studies and reports.
    - Project file information.
    - Past construction contracts for the project location.
    - Any other information available.
- Property:
    - Legal property information and ownership.
    - Property agreements and commitments in the agreements.
    - Permissions to enter.
    - OMB Road Closure locations.
- Railways:
    - Agreements.
    - Plans.
    - Volumes.
- Scope and Cost Reports.
- Structural:
    - Structure site plan information.
    - Condition surveys for bridges and structural culverts.
    - Preliminary general arrangement layouts.

        Note: The cross-section should be agreed to by Head, Planning and Design Section and the Head, Structural Section as the structures and the highway/road must work as one entity. The cross-section across structures in not a Structural Section decision to make without the agreement of the Planning and Design Section.

    - Structure clearances.
    - Structural design reports.

- Traffic:
    - Collision information.
    - Pavement markings.
    - Signing.
    - Speed studies.
    - Volumes and projections (mainline, side road, turning movements, etc.).
- Utility information, mark-ups of existing plant locations and ownership (composite utility plan).

5.4.3 INFORMATION ANALYSIS AND DEFICENCY IDENTIFICATION

Information analysis is completed to provide for the generation of alternative methods and to identify any deficiencies/problem areas/need that may need to be addressed by the project.

Existing and future conditions are considered. Any highway element could be identified as having a need. Typical problems and needs may include:

- Any highway element, such as:
    - Roadway infrastructure: pavement, structures, electrical, Advanced Traffic Management Systems (ATMS), etc.
    - Capacity and operations.
    - Geometrics: alignements, cross-section, sight distances, etc.
    - Safety: clear zone, performance, collision history.
    - Drainage.
    - Etc.
- Need for an improved transportation facility in the corridor.

The "design year" (see *Design Criteria Guideline* for further information) for the project is critical to establish as it is essential for defining the needs (standards) of the

project. For example, a project with a design year of 10 years in the future will have different needs than a project with a design year 20 years in the future. NOTE: The Design Year is not the year the design work is done.

Activities include:

- Review of existing plans.
- Review external contact concerns and document.
- Analysis of existing conditions/design data.
- List of deficiencies from current standards.
- List of deficiencies due to condition.
- Establishing fundamental design elements and requirements. Refer to *Design Criteria Guideline*, policies and manuals for additional information.

5.4.4 GENERATE ALTERNATIVES

The "alternative methods" of accomplishing the Preferred Alternative(s) are generated for comparison. The Preferred Alternative(s) has previously been determined.

Notes: 1. This activity is for "alternative methods" and does not include "alternatives to".

2. Alternatives examined during the Transportation Needs Assessment process are "alternatives to" and a Preferred Alternative(s) is identified.

3. Alternatives examined during the Planning, Preliminary Design, Detail Design, and Construction stages are "alternative methods" of achieving the Preferred Alternative.

The number of Preliminary Design alternatives considered for any given project varies with the nature of the study objectives, the type and complexity of the project and the nature of the study area. Individual Preliminary Design alternatives are typically assembled into a variety of combinations for analysis and subsequent evaluation.

There are two underlying principles for generating Preliminary Design alternatives:

- To capitalize on significant transportation engineering opportunities and avoid significant transportation engineering and environmental constraints.
- To minimize the design-related impacts, caused where significant transportation engineering and environmental constraints cannot be avoided.

Examples of the application of the first principle for both transportation engineering and environmental protection are outlined in the *Class EA document*, Section 4.5.2.

To apply the second principle, it is necessary to consider a number of possible approaches for transportation engineering and environmental protection purposes and examples are outlined in the *Class EA document*, Section 4.6.1.

In some cases, new information becomes available during the generation and assessment of Preliminary Design alternatives that prompts a re-evaluation of the Technically Preferred Planning Alternative.

To generate Preliminary Design alternatives for Group A, B and C facilities, the following factors, may be considered:

- Calculated horizontal and vertical alignment, design speed and typical project cross-section covering elements such as:
    - Typical Right-of-Way requirements.
    - Number of lanes/tracks.
    - Median width and type.
    - Shoulder type.
    - Ditches.
- Need/location/type of elements such as:
    - Interchanges and intersections.
    - Bridges and culverts (including span & width).
    - Stormwater management facilities.

- Electrical: illumination, traffic signals, etc.
- Advanced Traffic Management Systems (ATMS).
- Safety infrastructure.

To generate Preliminary Design alternatives for Service, Maintenance and Operations Facilities refer to the factors in the *Class EA document*, Section 4.6.1.

Environmental protection during the generation of Preliminary Design alternatives is discussed in the *Class EA document*, Section 4.6.3.

Consultation is completed, as appropriate, and is discussed in the *Class EA document*, Chapter 5. Consultation can take several forms such as: meetings, newsletters, formal presentations, mediation, electronic (internet site), and Public Information Centre. A Public Information Centre(s) is held, if appropriate for the project.

5.4.5 ASSESS ALTERNATIVES

The assessment of Preliminary Design alternatives are to comply with the transportation engineering principles outlined in the *Class EA document*, Section 4.1, in conjunction with the environmental protection principles and processes, and consultation principles and process as outlined Sections 4.2 and 4.6.3 and Chapter 5 respectively.

The purpose of the assessment of Preliminary Design alternatives is to:

- Identify significant beneficial and detrimental aspects of each Preliminary Design alternative relative to both transportation engineering and environmental protection.
- Ensure that sufficient transportation engineering and environmental protection information is available to support the subsequent evaluation phase.
- Obtain transportation engineering and environmental protection input through consultation with stakeholders for the subsequent evaluation phase.
- Make any necessary modifications to Preliminary Design alternatives as a result of the above.

- Ensure that **any alternative carried forward will be acceptable to the ministry,** if the evaluation phase determines it to be the Preferred Preliminary Design Alternative (Preferred Alternative).

Tables and a matrix are used to document the assessment of alternatives. The content varies based on the project and thus, a typical sample is not provided.

To determine the optimum alternative, the design alternatives (options) are analysed and evaluated by determining advantages and disadvantages by considering:

- How well they solve the deficiency/concern:
    - Traffic (capacity, operations, safety, etc.):
        - Main line level of service in year “x”.
        - Intersection level of service in year “y”.
        - Access locations.
        - Type of access.
        - Distance and time to access highway network.
        - Number of lanes.
        - Interchange locations.
        - Intersection locations.
        - Route location.
        - Impact on local roads.
    - Geometrics:
        - Horizontal alignment.
        - Vertical alignment.
        - Cross-section.
        - Passing opportunities.
        - Etc.
    - Physical infrastructure.

    - Changes in adjacent and area land uses.
- Compliance with standards and ministry policies.
- Relative cost.
- Optimizing cost-benefit.
- Constructability:
    - Traffic staging:
        - Complexity.
        - Impacts to traffic.
        - Ability to meet traffic demands.
        - Connections to existing highway network.
        - Staging cost.
        - Travel time.
- Construction schedule and constraints.
- Access to businesses/residences during construction.
- Impact to existing utilities.
- Additional Right-of-Way required (area).
- Property required.
- Businesses required.
- Environmental impacts, mitigation and compensation requirements.
- Other appropriate criteria.

5.4.5.1 ALTERNATIVES TEAM REVIEW MEETING

The Alternatives Team Review Meeting is held near the end of Phase 1: Generate and Assess Preliminary Design Alternatives. It should be held after the alternatives have been developed and assessed, but before the consultation on the alternatives is completed.

At the completion of this meeting, the work is approved to proceed further, based on the Preliminary Design alternatives shortlisted and endorsed by the Project Team at the meeting to be carried forward.

The purpose of the meeting is to:

- Review the alternatives and their assessments.
- Confirm with the design Project Team that the Preliminary Design alternatives are acceptable.
- Review consultation materials.

Note: Regional management usually provides approvals for consultation materials and alternatives for consultation prior to moving forward. Process varies by region.

5.4.5.2 ALTERNATIVES CONSULTATION

Conduct consultation with stakeholders as appropriate.

5.4.5.3 MODIFY ALTERNATIVES

The ministry reviews consultation input and decides if modifications are to be made.

5.4.6 ALTERNATIVE APPROVAL - MILESTONE

Alternative Approval is a milestone in the Preliminary Design stage process. The approval is obtained for the alternatives that have been endorsed by the Project Team and are to be carried forward. More than one alternative may be carried forward.

Approval of the alternative(s) is required before proceeding to Phase 2: Evaluate and Select the Preferred Preliminary Design Alternative.

The approval process is determined by the Head, Planning and Design Section. The two options for approval are:

1. Upon the completion of:

- Alternatives Team Review Meeting.

2. Upon the completion of:
    - Alternatives Team Review Meeting, and
    - Alternatives Approval Meeting.

5.4.6.1 ALTERNATIVES APPROVAL MEETING

The Alternatives Approval Meeting is optional. The need is determined on a project-by-project basis by the ministry and, if not held, the design may be proceeding without necessary higher level endorsement. If the direction taken is not ultimately approved, there will be rework, delays, and potential extra costs.

The meeting is held after completion of the Alternatives Team Review Meeting and addressing the concerns raised at that meeting.

The purpose of the meeting is to:

- Present the Preliminary Design alternatives to regional management and to seek endorsement.

5.4.7 QUALITY MANAGEMENT

Quality management processes are completed and documented.

5.5 PHASE 2: EVALUATE ALTERNATIVES AND SELECT THE PREFERRED PRELIMINARY DESIGN ALTERNATIVE

This phase is for:

- Evaluating the alternative methods.
- Assessing the alternatives.
- Selecting the Preferred Preliminary Design Alternative (Preferred Alternative).
- Consultation, as appropriate.

The meetings held during this phase are:

- Technically Preferred Alternative Team Review Meeting.
- Preferred Alternative Approval Meeting (optional).
- Progress Meetings: frequency determined for each project.
- Additional meetings depending upon the project needs.

Evaluation and selection of Preliminary Design alternatives are to comply with the evaluation principles outlined in the *Class EA document*, Section 4.3, in conjunction with the transportation engineering principles, environmental protection principles and processes, consultation principles and process as outlined in Sections 4.1, 4.2 and 4.6.3 and Chapter 5 respectively.

5.5.1 EVALUATE ALTERNATIVES

The Preliminary Design alternatives that have been generated are subjected to a comparative evaluation to provide the basis for selection of a Preferred Preliminary Design Alternative. In some cases, it is determined during the evaluation phase that Preliminary Design alternatives should be modified or discarded, additional Preliminary Design alternatives should be generated, or additional engineering and/or environmental work is necessary to support the evaluation.

An assessment evaluation method and criteria is developed to provide for a structured and reasoned approach to comparing the design alternatives and determining the Preferred Preliminary Design Alternative. Tables and a matrix are used to document the evaluation of alternatives. The evaluation content varies based on the project and thus, a typical sample is not provided.

Evaluating Group A and Complex Group B Preliminary Design Alternatives

The following is an example of a typical evaluation process for Group A projects and complex Group B projects:

- Determine a sequence for evaluation of the Preliminary Design alternatives.
- Develop weightings for transportation and environmental factor groups and factors within those groups.

- Conduct a comparative analysis of transportation benefits and environmental effects for each Preliminary Design alternative based on the factors, the factor weightings, and the factor indicators that were utilized to organize the factor information.
- Conduct a comparative evaluation for each Preliminary Design alternative.

Evaluating Simple Group B and Group C Preliminary Design Alternatives

For simple Group B projects and for Group C projects, the evaluation process for Preliminary Design is typically "subjective" in nature, using professional judgement.

5.5.2 SELECT PREFERRED ALTERNATIVE

Selecting the Technically Preferred Group A, B and C Preliminary Design Alternative

The selection process includes the following steps:

- Preliminary Design alternatives that have significant environmental effects but no significant transportation engineering advantages will be screened out first.
- Remaining alternatives will be assessed to determine their ability to address the study transportation objectives and to identify their environmental impacts after application of reasonable mitigating measures.
- The net environmental effects (i.e. after applying conceptual mitigation measures for significant effects) is to be used as a basis to compare alternatives.

Note: Proposed mitigation and commitments should be carefully determined to ensure that they can be accomplished by the ministry and are justified. The ministry Project Manager is to ensure they are reasonably achievable.

The Technically Preferred Preliminary Design Alternative achieves the **best overall balance** of transportation engineering, individual environmental factor impacts, and overall environmental impact, including any input that has been received through consultation on those issues.

This decision is made by the ministry. However, consultation with stakeholders on transportation engineering and environmental protection issues may result in the modification or even re-examination of the Technically Preferred Preliminary Design Alternative.

Environmental protection during the selection of Preliminary Design alternatives is discussed in the *Class EA document*, Section 4.6.3.

Consultation is completed, as appropriate, and is discussed in the *Class EA document*, Chapter 5. Consultation can take several forms such as: meetings, newsletters, formal presentations, mediation, electronic (internet site), and Public Information Centre. A Public Information Centre(s) is held, if appropriate for the project.

5.5.2.1 TECHNICALLY PREFERRED ALTERNATIVE TEAM REVIEW MEETING

The Technically Preferred Alternative Team Review Meeting is held near the end of Phase 2: Evaluate and Select the Preferred Preliminary Design Alternative. It is held after the preparation of documents and plans to support the selection of the Preferred Alternative are completed. It should be held before final consultation on the alternative is completed and is prior to achieving the Preferred Alternative Approval milestone.

The purpose of the meeting is to:

- Review the evaluation of the alternatives.
- Confirm with the design Project Team the Technically Preferred Alternative. (This now becomes known as the Preferred Preliminary Design Alternative. Also called, Preferred Alternative.)
- Review consultation materials.

At the completion of this meeting, management approval is sought (requirements vary by region/project) to proceed further with the Preliminary Design work, based on the Preferred Preliminary Design Alternative agreed to at the meeting.

5.5.3 PREFERRED ALTERNATIVE APPROVAL - MILESTONE

The Preferred Alternative Approval is a milestone in the Preliminary Design stage process.

Approval of the Preferred Preliminary Design Alternative is required before proceeding to Phase 3: Develop the Preferred Preliminary Design Alternative.

The approval is obtained for the Preferred Preliminary Design Alternative.

The approval process is determined by the Head, Planning and Design Section. The two options for approval are:

1. Upon the completion of:
    - Preferred Alternative Team Review Meeting.
2. Upon the completion of:
    - Preferred Alternative Team Review Meeting, and
    - Preferred Alternative Approval Meeting.

5.5.3.1 PREFERRED ALTERNATIVE APPROVAL MEETING

The Preferred Alternative Approval Meeting is optional. The need is determined on a project-by-project basis by the Head, Planning and Design Section and if not held, the design may be proceeding without necessary higher level endorsement. If the direction taken is not ultimately approved, there will be rework, delays, and potential extra costs.

The meeting is held after completion of the Preferred Alternative Team Review Meeting and addressing the concerns raised at that meeting.

The purpose of the meeting is to:

- Present the Preferred Preliminary Design Alternative to regional management and to seek endorsement on the engineering design to date.

5.5.4 QUALITY MANAGEMENT

Quality management processes are completed and documented.

5.6 PHASE 3: DEVELOP THE PREFERRED PRELIMINARY DESIGN ALTERNATIVE

This phase is for:

- Developing the Preferred Preliminary Design Alternative.
- Evaluating alternative designs for the Preferred Preliminary Design Alternative.
- Approval of the Preferred Preliminary Design Alternative.
- Consultation, as appropriate.

The meetings held during this phase are:

- Preferred Design Team Review Meeting.
- Preferred Design Approval Meeting.
- Progress Meetings: frequency determined for each project.
- Additional meetings depending upon the project needs.

Development of the Preferred Preliminary Design Alternative is to comply with the transportation engineering principles, environmental protection principles and processes, consultation principles and process as outlined in the *Class EA document*, Sections 4.1, 4.2 and 4.6.3 and Chapter 5 respectively.

5.6.1 ALTERNATIVE DESIGNS

Alternative designs are developed for the Preferred Preliminary Design Alternative to a level of detail that provides for reasonable comparisons of the alternatives.

The typical elements of the Preliminary Design from an environmental perspective are outlined in the *Class EA document*, Exhibits 3.1, 3.2, 3.3, and 3.4.

Environmental protection during the development of the Preliminary Design alternative is discussed in the *Class EA document*, Section 4.6.3 and is repeated below:

> During development of the Preferred Preliminary Design Alternative, environmental protection measures include:
>
> - Refining the Preferred Preliminary Design Alternative to prevent or reduce impacts through measures such as horizontal and vertical alignment shifts, modification of interchange design, and refinement of valley, river, and wetland crossings.
> - Identification of environmental work to be conducted during the subsequent Detail Design stage.

The alternative designs should incorporate, but are not limited to:

- Roadway design: geometrics - horizontal and vertical, cross-section, cross-fall and superelevation.
- All lanes, additional lanes, passing lanes, truck climbing lanes.
- Design elements: lane widths, shoulders, curb and gutter, guiderails, entrances, earth slopes, pavement widening on curves, snow treatments, ditches, etc.
- Soils and pavement design.
- Foundations.
- Staging and detours.
- Structures: bridges, structural culverts (span greater than 3m), retaining walls, opening footings concrete culverts, overhead signs.
- Drainage and hydrology, including stormwater management:
  - Design of ditches, culverts, storm sewer and stormwater management facilities for proposed improvements.
- Median width and type.
- Intersections and interchanges.
- Electrical: illumination, traffic signals, etc.

- Advanced Traffic Management Systems (ATMS).
- Safety infrastructure.
- Other highway elements.
- Right-of-Way and property requirements.
- Road assumptions and transfers.
- Utility impacts.
- Rail impacts.

5.6.2 EVALUATE ALTERNATIVE DESIGNS

Alternative designs are compared in order to select the Preferred Preliminary Design Alternative.

Tables and a matrix are used to document the assessment of the alternative designs. The evaluation content varies based on the project and thus, a typical sample is not provided.

Some factors that typically are used to evaluate and compare the alternative designs are:

- How well they solve the deficiency/concern:
    - Traffic (capacity, operations, safety, etc.):
        - Main line level of service in year “x”.
        - Intersection level of service in year “y”.
        - Access locations.
        - Type of access.
        - Distance and time to access highway network.
        - Number of lanes.
        - Interchange locations.
        - Intersection locations.

        - Route location.
        - Impact on local roads.
    - Geometrics:
        - Horizontal alignment.
        - Vertical alignment.
        - Cross-section.
        - Passing opportunities.
        - Etc.
    - Physical infrastructure.
    - Changes in adjacent and area land uses.
- Compliance with standards and ministry policies.
- Relative cost.
- Optimizing cost-benefit.
- Constructability:
    - Traffic staging:
        - Complexity.
        - Impacts to traffic.
        - Ability to meet traffic demands.
        - Connections to existing highway network.
        - Staging cost.
        - Travel time.
- Construction schedule and constraints.
- Access to businesses/residences during construction.
- Impact to existing utilities.
- Additional Right-of-Way required (area).
- Property required.

- Businesses required.
- Environmental impacts, mitigation and compensation requirements.
- Other appropriate criteria.

5.6.3 SELECT PREFERRED DESIGN

The decision on the Preferred Design is made by the ministry.

Consultation is completed, as appropriate, and is discussed in the *Class EA document*, Chapter 5. Consultation can take several forms such as: meetings, newsletters, formal presentations, mediation, electronic (internet site), and Public Information Centre. A Public Information Centre(s) is held, if appropriate for the project.

After approval of the Preferred Design is given, the project proceeds to Phase 4: Documentation.

The selected Preferred Design has:

- Clear, traceable evaluation.
- Integrates input from Ministries, agencies/other levels of government, public.
- Endorsement from the Design Team.
- Approval from regional management (varies by project/region).
- Introduces mitigation measures.

A Value Engineering Study may be done on the design, if required.

5.6.3.1 PREFERRED DESIGN TEAM REVIEW MEETING

The Preferred Design Team Review Meeting is held near the end of Phase 3: Develop the Preferred Preliminary Design Alternative. It is held after the preparation of documents and plans, to support the selection of the Preferred Design. It should be held before final consultation on the design is completed and is prior to achieving the Preferred Design Approval milestone.

The purpose of the meeting is to:

- Review the evaluation of the alternative designs.
- Confirm with the Project Team the Preferred Preliminary Design Alternative.
- Review consultation materials.

At the completion of this meeting, management approval is sought (requirements vary by region/project) to proceed further with the Preliminary Design work, based on the Preferred Design agreed to at the meeting.

5.6.4 PREFERRED DESIGN APPROVAL - MILESTONE

The Preferred Design Approval is a milestone in the Preliminary Design stage process and is required before proceeding to finalize the documentation.

Approval is obtained for the Preferred Design that has been endorsed by the Project Team.

Approval is usually obtained through a Preferred Design Approval Meeting.

5.6.4.1 PREFERRED DESIGN APPROVAL MEETING

The meeting is held after completion of the Preferred Design Team Review Meeting and addressing the concerns raised at that meeting and, if not held, the design may be proceeding without necessary higher level endorsement. If the direction taken is not ultimately approved, there will be rework, delays, and potential extra costs.

The purpose of the meeting is to:

- Present the final Preferred Design to regional management and to seek endorsement (requirements vary by project/region).

5.6.5 QUALITY MANAGEMENT

Quality management processes are completed and documented.

5.7 PHASE 4: DOCUMENTATION

At the start of this phase, the Preferred Design has been approved and final documentation is required to complete the Preliminary Design stage.

The documentation and deliverables completed during the Preliminary Design stage includes what is required from an engineering perspective and from an environmental perspective. The documents may be finalized in the Preliminary Design stage or early in the Detail Design stage.

The required environmental documentation is dependent on the Class EA group of the project.

This phase is for:

- Preparation and acceptance of the Preliminary Design package.
- Securing environmental clearance for property expropriation, utility relocation and Right-of-Way designation.
- Designation of Right-of-Way.
- Scope and Cost Report revision, if necessary.
- Quality control and quality assurance processes completed on all documents.

The meetings held during this phase are:

- Progress Meetings: frequency determined for each project.
- Additional meetings depending upon the project needs.

5.7.1 DOCUMENTATION

The Preliminary Design Package

Depending upon the project needs, the Preliminary Design stage documentation typically includes:

- Design Criteria.

- Environmental Screening Document – for Group C projects only.
- Transportation Environmental Study Report (TESR), when required, typically includes:
    - Engineering drawings of the Preferred Design, typically at the 1:2,000 or 1:1,000 scale.
    - A description of the major transportation engineering and environmental components of the design.
    - A description of how the Preliminary Design has achieved the identified transportation engineering and environmental protection objectives.
    - Recommendations for subsequent Detail Design transportation engineering and environmental protection work, and for splitting the project into appropriate Detail Design projects.
    - Details of the Preliminary Design and Class Environmental Assessment. (Also contains details of Planning when done in/with the Planning stage.)
- Transportation Environmental Study Report Addendum, when required:
    - If a TESR was previously completed and addenda is required.
- Preliminary Design Report (PDR), when required:
    - Addresses the needs and extent of improvements.
    - The content of a PDR is essentially the same as a TESR and thus can support subsequent TESR submission.
    - May also include immediate, interim and long term improvements to address the existing and future operational needs.
    - For simple projects, the environmental and alternative sections of the report may not require a lot of information.
    - A PDR is typically completed as an independent document for:
        - When the project is examining a highway corridor/significant length for immediate, interim and long term improvements to address the existing and future operational needs.

- When the improvements do not all require an approval through the TESR process.
- When a subsequent TESR will be completed.
- Group C projects.

The above reports include the functional area reports/deliverables in the Appendices.

Note: Some regions may use a document that is similar to a PDR that contains less information for simple projects and the document may have a different name that varies by region.

5.7.1.1 TRANSPORTATION ENVIRONMENTAL STUDY REPORT

The Transportation Environmental Study Report (TESR) is typically submitted to document:

- Preliminary Design, which is the development of the transportation plan to the Design Criteria level of detail.

When a TESR is completed, a separate Preliminary Design Report (PDR) is not always completed since the information is included in the TESR.

Additional information on the TESR requirements is in Section 2 of this guideline and also in the *Class EA document*, Chapter 6.

The format and content of the TESR varies with the specific nature and complexity of the project and conditions in the study area.

A Sample Table of Contents for the TESR is in Section 2.4.2.1 of this guideline.

5.7.1.2 PRELIMINARY DESIGN REPORT

The general purpose of a Preliminary Design Report is to document the Planning and Preliminary Design stages and provide sufficient engineering information for the Detail Design stage to commence.

The Preliminary Design Report is an optional report. The need for this document is dependent on the requirements of each Region for the completion of the project.

5.7.1.2.1 PRELIMINARY DESIGN REPORT - GROUP B PROJECTS

For Group B projects, a Preliminary Design Report may be completed and then a Transportation Environmental Study Report is completed. The Transportation Environmental Study Report may be completed early in the Detail Design stage and uses the information from the Preliminary Design Report.

The Preliminary Design Report may be completed prior to addressing all concerns related to environmental and engineering factors. It will therefore be necessary that the report indicates under the appropriate sections, that additional information is required which could not be ascertained during the Preliminary Design stage. The Preliminary Design Report would then for all intents, be a complete report and Detail Design stage could commence. It rests with the Detail Design Project Team, when preparing the Transportation Environmental Study Report for submission to provide the additions or changes as a result of information made available during the Detail Design stage.

5.7.1.2.2 PRELIMINARY DESIGN REPORT - GROUP C PROJECTS

For Group C projects a Preliminary Design Report is optional and particulars are:

1. A Preliminary Design Report is not formally completed and any required work is documented in the project file either before or early in the Detail Design stage.

2. Complete a Preliminary Design Report. The report would usually not be combined with a Transportation Environmental Assessment Report as Group C projects do not require filing a Transportation Environmental Assessment Report. The inclusion or exclusion of the Environmental components is to be decided on a project by project basis.

5.7.1.2.3 PRELIMINARY DESIGN REPORT SAMPLE TABLE OF CONTENTS

The *Preliminary Design Report Guideline* has a sample table of contents and additional information for the completion of a Preliminary Design Report.

5.7.1.3 ENVIRONMENTAL SCREENING DOCUMENT - GROUP C PROJECTS

The Environmental Screening Document is prepared for Group C projects only. The earliest that the Environmental Screening Document may be prepared is at the commencement of generation and assessment of Preliminary Design alternatives and the latest is at completion of Detail Design.

Section 2 of this guideline has additional information.

5.7.2 DOCUMENTS COMPLETE - MILESTONE

The documents complete milestone is achieved when either of the following two options has been completed:

1. When a Transportation Environmental Study Report has been prepared:
    - Report accepted by the Manager, Engineering, and
    - 30 day public review period for the Transportation Environmental Study Report has been successfully completed, and
    - Environmental clearance obtained for property expropriation, utility relocation and Right-of-Way designation.
2. When only a Preliminary Design Report has been prepared:
    - Report accepted by the Manager, Engineering

5.7.3 POST PRELIMINARY DESIGN DOCUMENT COMPLETE ACTIVITIES

After the Preliminary Design stage there may be some additional work activities required that take place before or during the Detail Design stage. For example, commitments for mitigation and future consultation in the Detail Design stage to deal with outstanding issues including:

- Permits/approvals from external agencies/other levels of government.
- Detailed environmental investigations regarding impacts and mitigation.
- Engineering investigations to confirm some design features.
- Etc.

5.7.3.1 DESIGNATION OF RIGHT-OF-WAY

The designation of the Right-of-Way is completed as soon as possible and may be completed after environmental clearance for Right-of-Way Designation. It may involve a new Right-of-Way, or modifications to an existing Right-of-Way.

Environmental clearance for Right-of-Way designation may be provided as follows:

- Group A – TESR cleared.
- Group B – TESR cleared.
- Group C – Completion of Preliminary Design or design concept.

The lead section within the Engineering Office for Designation Request(s) varies by region.

5.7.3.2 PROPERTY REQUEST

The property request is completed as soon as possible and may be completed after environmental clearance for Property Expropriation.

Environmental clearance for Property Expropriation may be provided as follows:

- Group A – TESR cleared.
- Group B – TESR cleared.
- Group C – Completion of Preliminary Design or design concept.

5.7.3.3 PRE-DESIGN STUDY

For some projects, a Pre-Design Study is completed before the formal start of the Detail Design stage. Refer to Section 3.4 Pre-Design Study of this guideline.

5.7.4 QUALITY MANAGEMENT

Quality management processes are completed and documented.

6. Detail Design Stage

Importance of Detail Design

All steps in the Detail Design stage process are important since the final product forms a legal contract between the ministry and a Contractor to construct the work as designed. This requires that the Contractor be given clear and accurate information so that a construction tender bid can be prepared. It is important that the Detail Design work be complete so that work can be constructed as designed with minimal changes in total cost or construction scope.

6.1 PURPOSE

The purpose of the Detail Design stage is to:

- Develop the transportation plan to a design implementation (construction) level of detail.
- Develop the construction documents (contract drawings, tendering documents, specifications, schedule and cost estimates). Plans are typically at 1:500 scale.

The selected Detail Design is that which is considered to be most technically, environmentally and economically suitable for addressing the project objectives.

If a Preliminary Design Study/work was completed for the project, the Detail Design is the refinement and development of that work.

If a Planning Study or a Preliminary Design Study was not completed for the project, the essential elements are completed early in the Detail Design stage. This is more easily done for lower complexity projects.

For the design-bid-build model of delivery, at the end of the Detail Design stage there will be:

- A completed Contract Package (contract drawings, tendering documents, specifications, schedule and cost estimates) that is used for the calling of

tenders and construction of the project.

- All property required.
- All utility relocations completed.
- All permits and approvals required for construction to proceed.

For the design-build model and other alternative models of delivery:

- The Detail Design stage work is completed only to the level of detail that the delivery model requires.
- Specifics of how much of the standard Detail Design process is required for these models is established for each delivery model and is not discussed in this guideline.
- The models are evolving and current requirements are to be used.
- Contact the Contract Innovations Office for current procedures and models.

Detail Design Stage Documentation for Design-Bid-Build Model

The Detail Design stage required documentation is:

- Contract Package.
- Other design documentation, (refer to the ministry's *Request for Proposals Total Project Management* master document for additional information).
- Environmental:
  - Transportation Environmental Study Report, when it is completed in this stage.
  - Design and Construction Report, when required.
  - Environmental Screening Document, for Group C projects.
- Functional Area deliverables (refer to the functional area for specifics).

6.2 TRANSPORTATION ENGINEERING AND ENVIRONMENTAL PROTECTION IN DETAIL DESIGN

Environmental requirements are integrated into the Detail Design process.

The *Class EA document*, Section 3.4, presents:

- Overviews of the transportation and environmental decisions and consultation, as they apply to the Planning, Preliminary Design and Detail Design stages for different groups of projects.
- Overviews of the Class EA process for Group A, B and C projects, showing the linkage between transportation engineering, environmental protection, consultation, documentation and bump-up.

Notes: 1. Alternatives examined during the Transportation Needs Assessment process are “alternatives to” and a Preferred Alternative(s) is identified.

2. Alternatives examined during the Planning, Preliminary Design, Detail Design, and Construction stages are “alternative methods” of achieving the Preferred Alternative (see the *Class EA document,* Exhibits 3.1, 3.2, and 3.3).

In the *Class EA document*, Section 4.7, there is detailed information on decisions and alternatives in the Detail Design. Extracts are below:

Preparing the Detail Design for Group A, B and C Projects

Detail Design for Group A, B and C projects may involve the following:

- Generate and assess Detail Design alternatives.
- Evaluate and select the Preferred Detail Design Alternative.
- Develop the Preferred Detail Design Alternative.

For low-complexity Group B and Group C projects where there are few Detail Design alternatives, Detail Design may simply consist of developing the Detail Design.

Additional information is contained in Section 2 of this guideline.

6.2.1 ENVIRONMENTAL DOCUMENTATION

Environmental documentation is discussed in Section 2 of this guideline and in the *Class EA document,* Chapter 6.

6.3 DETAIL DESIGN PROCESS

The Detail Design stage follows a “step by step” process that provides:

- A defined process.
- External consultation.
- Milestone reviews at key stages in design development to ensure project objectives are satisfied and approved.
- Quality Management.

For some projects an optional Pre-Design Study is completed before the formal start of the Detail Design stage. Refer to Section 3.4 Pre-Design Study of this guideline.

The Detail Design stage activities are completed in five phases that integrate the highway engineering and environmental assessment processes:

Phase 1: Initial Design (to 30% completion)

Phase 2: Final Design (30% to 60% completion)

Phase 3: Contract Preparation (60% to contract documents complete)

Phase 4: Contract Review and Approval

Phase 5: Tendering

The main activities and milestones within each phase are shown in Section 6.3.3 Detail Design Process Work Flow Chart of this guideline.

The activities discussed in subsequent Sections are not to be considered as “all inclusive”. The order of the activities could be altered to suit the need of the project and some activities may be undertaken in parallel. **Not all of the activities will be required**

for all projects. For example, a resurfacing project will not have the same need and requirements as a highway expansion project.

6.3.1 WORK PLAN AND SCHEDULE

A work plan and a schedule are required for each stage. Refer to Section 1.4 of this guideline for additional information.

6.3.2 WORK ACTIVITIES BY ENGINEERING FUNCTIONAL AREAS

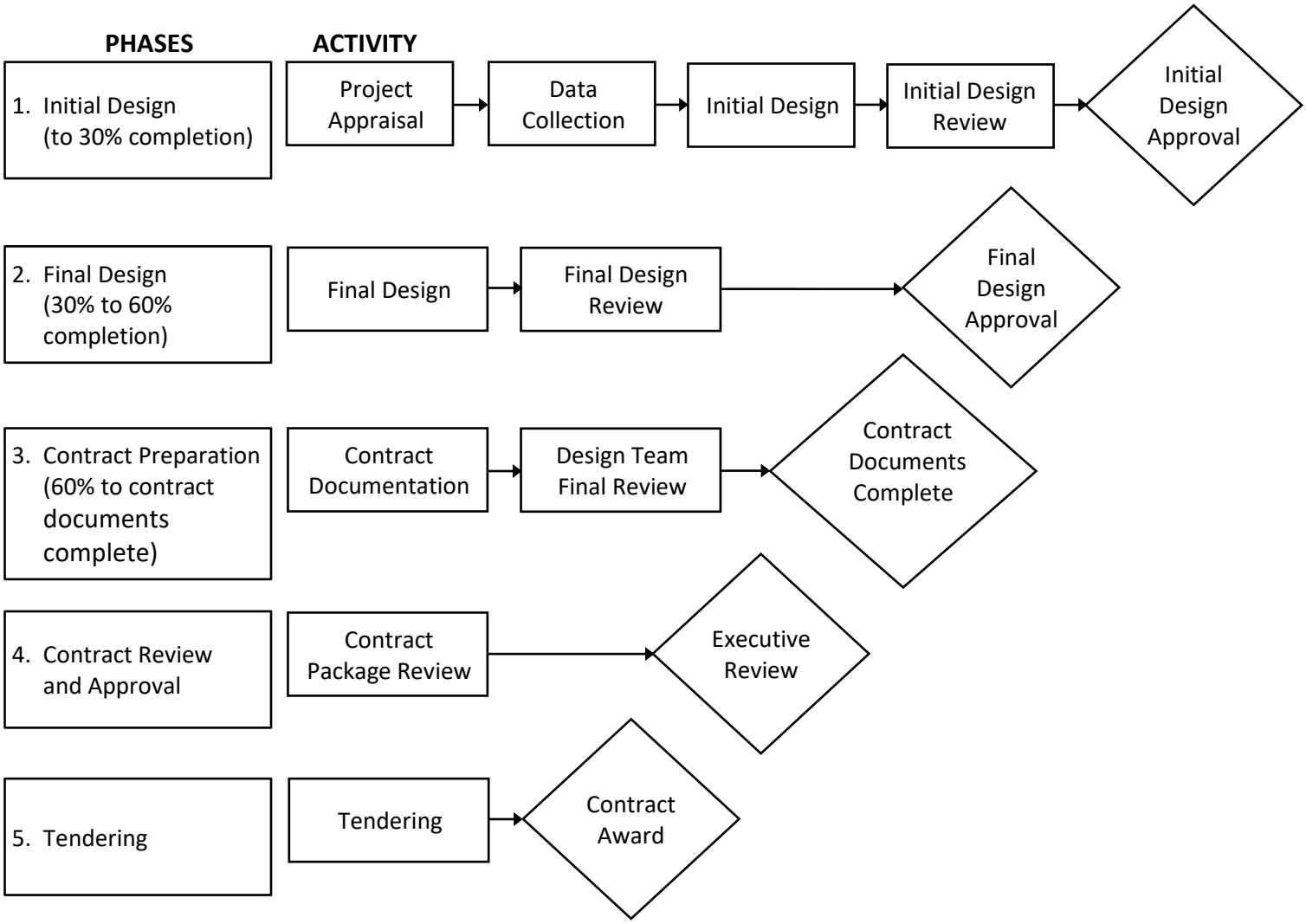
The completion of the Detail Design stage involves work by the engineering functional areas. There should be discussions with each functional area/specialty office to fully understand what they are required to contribute to the project and what their requirements are from other sections.

There are many project specific work tasks and issues relating to the different engineering specialties and those activities are completed by the functional areas.

6.3.3 DETAIL DESIGN PROCESS WORK FLOW CHART

Detail Design Process Work Flow Chart

Note: For some projects a Pre-Design Study is completed before the start of Phase 1.



6.3.4 KEY ACTIVITIES IN DETAIL DESIGN

The key activities in the Detail Design stage complete the following:

Occurs in All Phases Quality Management

Quality Management processes are completed in all phases and are essential to completion of the project.

Occurs in All Phases Consultation and Review

Ministry offices, other ministries, agencies/other levels of government and the public are consulted, as appropriate, for their input and concurrence with the Detail Design alternatives. This consultation is ongoing through the Detail Design stage with most in occurring in Phases 1 and 2.

Occurs in Phase 1 Initial Design – Generate and Assess Detail Design Alternatives

Initial design alternatives are prepared. Typically these are prepared on roll plans. The alternatives involve a review of the Preliminary Design and development of additional design alternatives not covered in the Preliminary Design, if appropriate. In the *Class EA document*, Section 4.7.1, there is detailed information on how to generate and assess alternatives.

Occurs in Phase 1 Initial Design – Evaluate Detail Design Alternatives and Select the Preferred Detail Design Alternative

The Detail Design alternatives generated are analyzed and evaluated by determining their engineering and environmental advantages and disadvantages. One such advantage or disadvantage is relative cost. Cost is only one factor used to assess the alternatives. Key elements in the evaluation of the design alternatives involve resolution of the commitments to future work from the Preliminary Design Report, mitigation of environmental impacts, upgrading to current standards and optimizing the cost-benefit of the work. The decision is made by the ministry for the selection of the Preferred Detail Design Alternative.

Occurs in Phase 2 Final Design – Develop the Preferred Detail Design Alternative

The Preferred Detail Design Alternative is developed and endorsed/approved by senior ministry management. There may also be required sign-off letters from agencies/other levels of government, agreement to environmental compensation plans, and/or council resolutions supporting the design proposal.

Occurs in Phase 3 Contract Preparation

After the Preferred Detail Design Alternative is approved, the design documentation for construction is prepared to form a Contract Package (contract drawings, tendering documents, specifications, schedule and cost estimates).

Occurs in Phase 4 Contract Review

The Contract Package is reviewed by the Project Team with final comments due when the fully completed design and documentation is presented.

Occurs in Phase 4 Regional Executive Approval

The Contract Package is reviewed and approved at a meeting(s) attended by the regional management staff and Regional Director.

Occurs in Any Phase Other Topics

Legal Requirements (statutory requirements)

Legal or statutory requirements may include an Ontario Municipal Board order for closing of a municipal road, environmental approvals and permits, Council Resolutions for a municipal road closing by-law, a Canadian Transportation Agency Order for permission to construct or reconstruct at a railway, and National Energy Board Order for crossing of pipeline.

Internal Ministry Approvals

Internal ministry approvals are required for the Design Criteria, Cost Sharing Agreements, Property Requests and Legal agreements.

External Approvals

External approval may be required, such as from Federal and/or Provincial authorities.

Environmental Approval Addenda

An Environmental Approval Addenda may be identified anytime during the Detail Design stage, but is usually identified during Phase 1: Initial Design. The triggers for an Environmental Approval Addenda may depend on what was included in the original Transportation Environmental Study Report.

An addendum may be required when:

- Original Environment Assessment expired (good for 5 years, otherwise a review is required).
- Significant changes to the project from the original approved design.
- Full long-term closures required to do the work not previously identified.
- Additional property/business impacts.
- Changes to environmental impacts/modifications.

6.4 PHASE 1: INITIAL DESIGN (TO 30% COMPLETION)

This phase is the start of the Detail Design stage.

This phase is for:

- Establishing the Quality Management Plan for the Detail Design stage.
- Establishing the Project Team for the Detail Design stage.

- Confirming the scope of work (project objectives).
- Establishing a detailed schedule and work plan.
- Notifying project stakeholders of project initiation and solicit input.
- Data collection (review and document existing conditions).
- Establishing fundamental design elements and requirements.
- Generating and assessing Detail Design alternatives.
- Evaluate Detail Design alternatives.
- Selection of the Preferred Detail Design Alternative.
- Initial development of the Preferred Detail Design Alternative.
- Preliminary Property Needs identified.
- Preliminary Utility Relocations identified.
- Consultation, as appropriate.
- Preparation of draft and/or final reports (as applicable to the project).
- Preparation of preliminary drawings.
- Preparation of preliminary documentation.
- Design Criteria approval (if not already completed).
- Scope and Cost Report revision, if required.

The meetings held during this phase are:

- Start-up and Scoping Meeting for Detail Design.
- Scope Approval Meeting (optional).
- Pavement Engineering Design Meeting.
- 30% Design Team Review Meeting.
- 30% Engineering Review Meeting (optional).
- Progress Meetings: frequency determined for each project.
- Additional meetings depending upon the project needs.

6.4.1 PROJECT APPRAISAL

The Project Appraisal activity is the first step in the Detail Design process and is where the Project Manager begins to investigate the project and undertakes project management work on the project.

The project appraisal activities are:

- Quality Management Plan established for the Detail Design stage.
- Staff the project.
- Start-up and Scoping Meeting.
- Scope approval.
- Schedule developed.
- Work plan.
- Data requirements determined.
- Environmental and Consultation Plan.
- Project Start-up Notices and Contact Letters.

6.4.1.1 START-UP AND SCOPING MEETING

A Start-up and Scoping Meeting is required in the Detail Design stage for every project. The meeting is usually arranged and chaired by the ministry Project Manager.

The ministry Project Manager determines which ministry sections and offices require representation on the Project Team. Each functional area/specialty office assigns staff as required to the project. It is very important to have functional area/specialty office representation at the meeting.

The project scope is based on the work done in the Planning stage and in the Preliminary Design stage (if Preliminary Design was done) and/or new information available.

Note: Prior to this meeting it is recommended that a site field review be completed by the Project Team.

Locations of buried utilities must be determined prior to engaging in any field work activity where the field work could impact a buried utility.

The purpose of the meeting is to:

- Ensure the ministry Project Team understands the project concept and approved scope of the project (review the approved Scope and Cost Report).
- Discuss if the approved project scope is still appropriate.
- Confirm the EA Class for the project.
- Clearly define the design parameters based on:
    - Roadside conditions such as safety, pavement condition and geometric design standards.
    - Property restrictions, utility impacts, corridor issues.
    - Construction and staging alternatives.
    - Construction schedule and constraints.
- Provide estimated construction schedule and cost estimates for construction planning purposes.
- Review and further develop the project schedule and work plan.
- Discuss and determine the data requirements.
- Confirm duties and responsibilities between the Project Manager and all Project Team members.
- Reach agreement on Service Provider acquisition requirements and schedule (when required).

A general project scoping discussion that applies to all stages is in Section 1.8 of this guideline.

6.4.1.2 SCOPE APPROVAL MEETING

A Scope Approval Meeting may be required, depending on if the project scope is changing significantly from the previous approval.

The meeting may not take place as a formal meeting. However the approval of the scope for a project is to be secured from regional management.

The purpose of the meeting is to:

- Ensure all functional areas/specialty offices have a common understanding of the purpose and scope of the project.
- Verify the needs and wants of the functional areas/specialty offices with respect to scope.
- Verify what should be “In Scope” and what should be “Out of Scope” for the project.
- Verify that the schedule is realistic considering the scope.
- Confirm the project delivery method.
- Verify that the Service Provider fees and project cost estimates are realistic, considering the scope and current market factors.

After the meeting, any action required by the *Scope and Cost Report Guideline* is completed.

The ministry Project Manager will then proceed with the Service Provider acquisition process for outsourced projects.

6.4.1.3 SCHEDULE AND WORK PLAN

A project schedule and work plan for the activities is developed to meet the assigned project delivery date.

Once the project scope is verified with the ministry Project Team, a work plan is prepared setting out the scope of work, work activity schedule, staff requirements, frequency of progress meetings and the financial reporting schedule.

Monitoring the progress of all project tasks and taking action when it appears tasks may not achieve scheduled dates, is critical to achieving the required project delivery date for tendering.

6.4.1.4 ENVIRONMENTAL AND CONSULTATION PLAN, START-UP NOTICES AND CONTACT LETTERS

The project Environmental and Consultation Plan is developed. Project Start-up Notices and Contact Letters are completed and sent to notify others about the project and to seek input.

6.4.2 DATA COLLECTION

The data and information needed to generate and assess Detail Design alternatives is typically obtained from the following sources:

- Transportation Needs Assessment, Planning and Preliminary Design documentation.
- Transportation and environmental secondary source documentation, including the sources identified in the *Class EA document*, Sections 4.4.1 and 4.2 respectively.
- Transportation and environmental input through consultation with stakeholders (agencies/other levels of government, the public, special interest groups, etc.).
- Field inspections/investigations, transportation studies and environmental studies, as may be necessary to verify information, fill in information gaps, update information, and enhance information level of detail.

Typically, the study area “existing conditions” are gathered so that transportation engineering opportunities and transportation engineering and environmental constraints can be detailed at a level to be incorporated into the Detail Design. The

transportation information gathered may include infrastructure condition/deficiencies/requirements covering elements such as roadway surface, bridges and culverts, lighting and electrical systems, drainage, traffic safety and control systems. The environmental information gathered covers the natural, social, economic and cultural environmental factors that are applicable to the project and study area.

The project files from the Planning stage and the Preliminary Design stage provide background information and document previous decisions.

Access to private property may be required and the Property Section may be involved in arranging permission to enter.

Note: Data requirements depend on the type of project and not all data will be required for all projects. For example, a resurfacing project will not have the same data need and requirements as a highway expansion project.

The data to be obtained is determined on a project specific basis and it is to be limited to what will be sufficient for the design to be completed.

The information and data required may include, but may not be limited to:

- Aerial photography.
- Advanced Traffic Management Systems (ATMS):
    - Assess existing systems including ownership, age and condition.
- Corridor Control:
    - Legal easements.
    - Entrances issues.
- Corridor Investment Plans.
- Concerns of others:
    - External agency and public concerns.
    - Internal concerns (Operations, Traffic, etc.).
- Design Criteria:

- Preliminary/final.
- For past projects for the project location and adjacent.

- Drainage and Hydrology:
  - Condition of drainage infrastructure (ditches, culverts, sewers, etc.).
  - Drainage and hydraulic data.
  - Environmental chemistry - pH, resistivity, concentration of sulphates, chlorides, solvents, chemicals, and petroleum products.
  - Watercourse topographic mapping and aerial photographs.
  - Floodplain mapping.
  - Municipal Drain Reports.
  - Culvert Inspection Report (including culvert recommendations).
  - Preliminary Drainage Report (includes stormwater management).
  - Preliminary Hydrology Report.
  - Drainage Mosaic.
  - Assessment of water taking requirements and required approvals (Environmental Activity and Sector Registration/Permit to Take Water).
- Electrical:
  - Assess existing systems (illumination, traffic signals, flashers, etc.) including ownership, age and condition.
- Environmental:
  - Transportation Environmental Study Report (TESR).
  - Conditions or Environmental Approvals or commitments to future work in the PDR/TESR/other.
  - Environmental information on the natural, social, economic and cultural environment (wetlands, vegetation, wildlife, fisheries, watercourses, groundwater, noise abatement, community/ recreational facilities, archaeology, heritage features and site contamination).

  - Previous environmental reports.
  - Designated substances present.
- Existing highway conditions (lane widths, shoulder widths, roadside safety, ditches, culverts, curbs, sidewalks, etc.).
- Existing land use and development plans.
- Foundations:
  - Foundation Investigation Reports.
  - Foundation Investigation and Design Reports.
  - Previous reports and studies.
  - Boreholes and site investigations.
  - Foundation recommendations required for:
    - Widening and/or replacement of a structures.
    - Culverts with a span greater than 3 meters.
    - New overhead signs.
    - Large cuts.
    - Deep fills.
    - Cantilever signs.
    - Sensitive soil areas.
    - High mast light poles.
- Geomatics/Surveys:
  - Plans, engineering surveys, field investigations.
  - Confirm and update data from base plans, including hard surfaces.
  - Survey information including horizontal and vertical control, benchmarks, survey detail, co-ordinated highway alignments, centreline staking, references to pavement and foundations test pits and additional detail for supplementary design plan preparation.
  - Digital Terrain Model (DTM), with coverage as appropriate for the work.

- Topographic surveys or mapping information showing the existing road network and physical topographical features (woodlots, buildings, etc.).
- ETR Base Plans & Profiles.
- Horizontal and vertical control plates/sheets and reports.
- “B” plans (2D).
- Profile Plans (“C” Plans).
- Bridge Site Plans (“E” Plans).
- Pipeline Crossing Plans (“K” Plans).
- Railway Crossing Plans (“G” Plans).
- Utility information, overhead, utility markers, buried (underground locates may be required).
    - Underground utilities detailed and illustrated on the ETR.
    - Documentation of locates provided by Utility companies.
    - All overhead wires and crossing clearances.
    - Guy wires detailed and illustrated on the ETR plates.
- Culvert sizes and drainage features with locations illustrated on the ETR profiles.
- Digital files for Planning and Design Section in current formats used by the ministry.
- Plans in current formats used by the ministry.
- Hard copy of field notes for drainage details.
- Field Staking as required.

- Geotechnical and Pavements:
    - Pavement Design Report.
    - Pavement condition data including previous reports and studies.
    - Pavement boreholes and site investigations.
    - Soils information.

  - Geotechnical recommendations.
  - Identify poor performing areas, frost heaves, settlement, drainage, or areas prone to flooding.
  - Rock cut information.
- Maintenance/Operations:
  - Concerns/issues/suggestions.
- Previous reports, studies and project files:
  - Preliminary Design Report and documentation.
  - Other studies and reports.
  - Project file information.
  - Past construction contracts for the project location.
  - Any other information available.
- Property:
  - Legal property information and ownership.
  - Property agreements and commitments in the agreements.
  - Permissions to enter.
  - OMB Road Closure locations.
- Railways:
  - Agreements.
  - Plans.
  - Volumes.
- Scope and Cost Reports.
- Structural:
  - Structure site plan information.
  - Condition surveys for bridges and structural culverts.
  - Preliminary general arrangement layouts.

Note: The cross-section should be agreed to by Head, Planning and Design Section and the Head, Structural Section as the structures and the highway/road must work as one entity. The cross-section across structures in not a Structural Section decision to make without the agreement of the Planning and Design Section.

  - Structure clearances.
  - Structural design reports.

- Traffic:
  - Collision information.
  - Pavement markings.
  - Signing.
  - Speed studies.
  - Volumes and projections (mainline, side road, turning movements, etc.).
- Utility information, mark-ups of existing plant locations and ownership (composite utility plan).

6.4.3 INITIAL DESIGN

The Initial Design establishes the project's fundamental design elements and requirements. The Design Criteria elements should be fully determined. Refer to *Design Criteria Guideline* for additional information.

The "design year" (refer to *Design Criteria Guideline* for further information) for the project is critical to establish as it is essential for defining the needs of the project. For example, a project with a design year of 10 years in the future will have different needs than a project with a design year 20 years in the future. NOTE: The Design Year is not the year the design work is done.

Establishing fundamental design elements and requirements is a critical activity as the generation of alternatives to meet the requirements is completed in the initial design. Design policies are very important to fully understand as they greatly influence the requirements.

To determine the initial design, all of the elements of the project are reviewed and alternative design options developed for many of the elements.

Technical requirements are established for:

- Design year (see above).
- Horizontal and vertical alignments.
- Typical cross section(s): lane and shoulder widths, paved shoulders, rounding.
- Additional lanes.
- Pavement.
- Cross-fall.
- Superelevation.
- Drainage.
- Roadside safety.
- Signing.
- Illumination.
- Traffic signals.
- Entrances: commercial, residential.
- Intersections.
- Structures.
- Pavement widening on curves.
- Fencing.
- Active transportation infrastructure.

- Additional subjects, as appropriate.

The Initial Design activities include:

- Review of Preliminary Design plans.
- Review and document external contact concerns.
- Analysis of existing conditions/design data.
- List of deficiencies from current standards.
- List of deficiencies due to condition.
- Establishing fundamental design elements and requirements.
- Generating and assessing Detail Design alternatives:
    - Evaluate Detail Design alternatives.
    - Select the Preferred Detail Design Alternative.
- Initial development of the Preferred Detail Design Alternative, typically roll plan format for presentation, including:
    - Pavement structure selection.
    - Preliminary Horizontal and Vertical Alignments, including interchanges, intersections, side roads, etc.
    - Preliminary Grading Design and Mass Haul (refer to *Contract Design Estimating and Documentation (CDED) Manual)*.
    - Preliminary Intersection Design and Lane Configurations.
    - Typical Cross-sections.
    - Preliminary Roadway Drainage Concepts, including stormwater management and drainage and hydrology design.
    - Preliminary Electrical Drawings.
    - Preliminary Power Supply Locations.
    - Preliminary Advanced Traffic Management Systems (ATMS) Layouts.
    - Preliminary PHM-125 Drawings.
    - Preliminary Landscaping Layouts and Concepts.

- Preliminary General Arrangement Drawings for the structures and structural culverts (span greater than 3m).

  Note: The cross-section should be agreed to by Head, Planning and Design Section and the Head, Structural Section as the structures and the highway/road must work as one entity. The cross-section across structures in not a Structural Section decision to make without the agreement of the Planning and Design Section.

- Preliminary Construction Staging/Detours/Access/Egress.
- Preliminary Traffic Management Plans.
- Draft Communication Plan.
- Preliminary Constructability Review.
- Preliminary Construction Cost Estimate.
- Preliminary Working Day Estimate.
- Preliminary Utility Relocations Identified.
- Preliminary Property Requirements Identified.
- Draft Environmental Conditions Report and Mitigating Measures.
- Approval Requirements Established.
- Preliminary Drawings Completed.
- Preliminary Design Documentation Completed.
- Compatibility of Design Elements Confirmed.
- Value Engineering Study, when appropriate (if this is done, there is flexibility as to when it is done).

- Preparation of Design Criteria (if not already done).
- Preparation of Design Criteria Revision (if required).
- Functional Area Final Reports (if not already completed, as applicable to the project).
- Engineering Survey Deliverables Completed.

- Submission for 30% Design Team Review Meeting.
- Scope and Cost Report revision, if necessary.
- Quality Management.

6.4.3.1 GENERATE ALTERNATIVES

The number of Detail Design alternatives considered for any given project varies with the nature of the study objectives, the type and complexity of the project, and the nature of the study area. Individual Detail Design alternatives are typically assembled into a variety of combinations for analysis and subsequent evaluation.

There are three underlying principles for generating Detail Design alternatives:

- To capitalize on significant transportation engineering opportunities and avoid significant transportation engineering and environmental constraints (this typically would be largely accomplished during the Planning and Preliminary Design stages).
- To minimize the design-related impacts caused where significant transportation engineering and environmental constraints cannot be avoided (as is the case with Preliminary Design).
- To minimize anticipated construction-related impacts caused where significant transportation engineering and environmental constraints cannot be avoided.

Examples of how these three principles are applied for both transportation engineering and environmental protection are outlined in in the *Class EA document*, Sections 4.5.2, 4.6.1, and 4.8.3 respectively.

In some cases, new information becomes available during the generation and assessment of Detail Design alternatives that prompts a re-evaluation of the Preferred Alternative from the Preliminary Design stage.

Generating Detail Design Alternatives

In generating Detail Design alternatives for Group A, B and C linear facilities, the following factors may be considered:

- Cross-section details covering elements such as:
    - Roadway, including shoulders, median, ramps.
    - Pavement structure.
    - Drainage/Ditches.
    - Construction staging, detours and construction access.
- Surveyed structure and culvert location/span/width.
- Details of illumination, traffic signals and safety infrastructure.
- Application of project-specific standards, and calculation of quantities for all of the above items.

To generate Detail Design alternatives for Service, Maintenance and Operations Facilities refer to the factors in the *Class EA document*, Section 4.7.1.

Environmental protection during the generation of Detail Design alternatives is discussed in the *Class EA document*, Section 4.7.3.

Consultation is completed, as appropriate, and is discussed in the *Class EA document*, Chapter 5. Consultation can take several forms such as: meetings, newsletters, formal presentations, mediation, electronic (internet site), and Public Information Centre. A Public Information Centre(s) is held, if appropriate for the project.

6.4.3.2 ASSESS ALTERNATIVES

The assessment of Detail Design alternatives are to comply with the transportation engineering principles outlined in the *Class EA document*, Section 4.1, in conjunction with the environmental protection principles and process, and consultation principles and process as outlined in Sections 4.2 and 4.7.3 and Chapter 5 respectively.

The purpose of assessing Detail Design alternatives is to:

- Identify significant beneficial and detrimental aspects of each Detail Design alternative relative to both transportation engineering and environmental protection.
- Ensure that sufficient transportation engineering and environmental protection information is available to support the subsequent evaluation phase.
- Obtain transportation engineering and environmental protection input through consultation with stakeholders for the subsequent evaluation phase.
- Make any necessary modifications to Detail Design alternatives as a result of the above.
- Ensure that any alternative carried forward will be acceptable to the ministry if the evaluation phase determines it to be the Preferred Detail Design Alternative.

To determine the optimum alternative, the design alternatives (options) are analysed and evaluated by determining advantages and disadvantages by considering:

- How well they solve the deficiency/concern.
- Compliance with current standards and ministry policies.
- Relative cost.
- Optimizing cost-benefit.
- Constructability.
- Environmental impacts.
- Other appropriate criteria.

6.4.3.3 EVALUTE ALTERNATIVES

The Detail Design alternatives that have been generated are subjected to a comparative evaluation to provide the basis for selection of a Preferred Detail Design Alternative (Preferred Alternative). In some cases, it is determined during the evaluation phase that Detail Design alternatives should be modified or discarded, that additional Detail Design

alternatives should be generated, or that additional engineering and/or environmental work is necessary to support the evaluation. The evaluation process for Detail Design is typically “subjective” in nature, using professional judgement.

6.4.3.4 SELECT PREFERRED ALTERNATIVE

The selection process for the Technically Preferred Group A, B and C Detail Design Alternative includes the following steps:

- Detail Design alternatives that have significant environmental effects but no significant transportation engineering advantages will be screened out first.
- The remaining alternatives will be assessed to determine their ability to address the study transportation objectives and to identify their environmental impacts after application of reasonable mitigating measures.
- The net environmental effects (i.e. after applying conceptual mitigation measures for significant effects) will be used as a basis to compare alternatives.

The Technically Preferred Detail Design Alternative selected is the alternative that achieves the **best overall balance** of transportation engineering, individual environmental factor impacts, and overall environmental impact, including input that has been received through consultation on those issues. This decision is made by the ministry. However, consultation with stakeholders on transportation engineering and environmental protection issues may result in the modification or even re-examination of the Technically Preferred Detail Design Alternative.

Environmental protection during the selection of Detail Design alternatives is discussed in the *Class EA document*, Section 4.7.3.

Consultation is completed, as appropriate, and is discussed in the *Class EA document*, Chapter 5. Consultation can take several forms such as: meetings, newsletters, formal presentations, mediation, electronic (internet site), and Public Information Centre. A Public Information Centre(s) is held, if appropriate for the project.

6.4.3.5 INITIAL DEVELOPMENT OF PREFERRED DESIGN ALTERNATIVE

Initial development of the Technically Preferred Detail Design Alternative is completed to confirm the design and that there is sufficient information for the design to be approved for further work.

Refer to the 30% Design Team Review Meeting for information that is usually developed for the Technically Preferred Detail Design Alternative.

6.4.3.5.1 PAVEMENT ENGINEERING DESIGN MEETING

The purpose of the meeting is to review the recommendations for the pavement structure and determine the pavement structure to be used on the project. Sometimes the meeting is combined with another meeting.

It is critical to decide the pavement structure as it is required to complete the highway design work (i.e. vertical alignment, cross-sections, drainage, quantities, etc.).

There should be no changes to the pavement strategy following this meeting to avoid additional design work.

Geotechnical Section to confirm the pavement design before the Final Design phase grading design work is started.

Attendance at the meeting and the process for pavement structure approval varies by region.

6.4.4 INITIAL DESIGN REVIEW

6.4.4.1 30% DESIGN TEAM REVIEW MEETING

The 30% Design Team Review Meeting is held near the end of Phase 1: Initial Design and is completed prior to achieving the Initial Design Approval milestone. It is held after the preparation of the preliminary plans.

At the completion of this meeting, work is approved to proceed further based on the design alternative confirmed at the meeting.

The purpose of the meeting is to:

- Present the Technically Preferred Detail Design Alternative.
- Confirm with the design Project Team the concepts for the project.
- Review the preliminary plans (alignment, typicals, staging, utility conflicts, etc.).
- Confirm the scope, design schedule, construction cost and working day estimates.
- Review the final draft Design Criteria/Design Criteria revision.
- Discuss the results of the field investigations and confirm sufficient information is available for further design work.

The following is presented at this meeting:

- Draft Design Criteria/Design Criteria revision.
- Selected design alternative and the other alternatives considered for each specific design element.
- Final co-ordinated horizontal and vertical Alignments.
- Final surveys, topographic plans, H&V sheets, project control and plans.
- Typical cross sections for major cross-section elements.
- Preliminary Grading Design and Mass Haul (refer to *Contract Design Estimating and Documentation (CDED) Manual)*.
- Preliminary intersection functional design including traffic recommendations and lane configurations.
- Preliminary working days and project cost estimates.
- Preliminary roadway drainage concepts, including:
    - Draft Hydrology/Drainage reports outlining the recommended Drainage Plan and the Sedimentation/Erosion Control Plan.

- Draft Stormwater Management Requirements.

- Preliminary construction staging and detour concept.
- Construction schedule and constraints.
- Preliminary property requirements based on preliminary grading design.
- Preliminary utility relocation requirements.
- Pavement recommendations and selection.
- Draft Structural Design Report(s) indicating the alternatives and recommended design for the structure(s) including Site Plan and Draft General Arrangement Drawings for the recommended alternative.
- Bridge Condition Surveys.
- Electrical:
  - Preliminary Traffic signals drawings.
  - Preliminary illumination layouts for both the final condition and during staging/detours.
  - Preliminary PHM-125 drawings.
  - Preliminary power supply locations.
- Preliminary Advanced Traffic Management Systems (ATMS) layouts.
- Preliminary Foundation Investigation and Design Report(s) outlining alternative designs and recommendations.
- Preliminary Landscaping Layouts.
- Draft Environmental Conditions Report and Mitigating Measures.

6.4.5 INITIAL DESIGN APPROVAL - MILESTONE

The Initial Design Approval is a milestone in the Detail Design stage process. Approval is obtained for a Preferred Detail Design Alternative. It may be the Technically Preferred Detail Design Alternative that has been endorsed by the Project Team, or it may be the alternative modified during the approval process.

Approval of the initial design is required before proceeding to Phase 2: Final Design.

The approval process is determined by the Head, Planning and Design Section. The two options for approval are:

1. Upon the completion of:
    - 30% Design Team Review Meeting, and
    - Approval (signing) of the Design Criteria by the Manager, Engineering.
2. Upon the completion of:
    - 30% Design Team Review Meeting, and
    - 30% Engineering Review Meeting, and
    - Approval (signing) of the Design Criteria by the Manager, Engineering.

6.4.5.1 30% ENGINEERING REVIEW MEETING

The 30% Engineering Review Meeting is optional. The need is determined on a project-by-project basis by the ministry and, if not held, the design may be proceeding without necessary higher level endorsement. If the direction taken is not ultimately approved, there will be rework, delays, and potential extra costs.

The meeting is held after completion of the 30% Design Team Review Meeting and addressing the concerns raised at that meeting.

The purpose of the meeting is to:

- Present the Technically Preferred Detail Design Alternative (included are geometrics, Design Criteria, staging concepts, construction dates and constraints, and preliminary plans) to regional management and to seek endorsement.

6.4.5.2 DESIGN CRITERIA APPROVAL

The Design Criteria document is to be approved no later than 30% Detail Design being completed.

The Design Criteria represents a statement of ministry policy and design standards for the project.

Directive PHM-B-021 Design Criteria Requirements and Procedure for Processing states:

> The Design Criteria shall be completed and have the final approval signature as soon as possible and no later than 30% of the Detail Design being completed. For clarity, preliminary or draft design criteria completion does not meet this requirement.

Design Criteria Sign-off Meeting

The Design Criteria Sign-off Meeting is optional. The need is determined on a project-by-project basis by the region.

The purpose of the meeting is to:

- Present the Design Criteria to Manager, Engineering for approval.

After the Design Criteria is approved it is distributed as required in Directive PHM-*Directive PHM-B-021 Design Criteria Requirements and Procedure for Processing*.

6.4.6 QUALITY MANAGEMENT

Quality management processes are completed and documented.

6.5 PHASE 2: FINAL DESIGN (30% TO 60% COMPLETION)

This phase is for:

- Completion of all engineering drawings (typically 1:500 scale) for the Preferred Design, with all design details, such as, but not limited to:
    - Removals and demolition.
    - Grading.
    - Drainage, including stormwater management.
    - Roadside safety and barriers.

  - Entrances and sideroads.
  - Structures.
  - Electrical.
  - Advanced Traffic Management Systems (ATMS).
  - Signage and pavement markings – temporary and final.
  - Landscaping.
  - Staging and detours.
  - Others, as appropriate.
- Final Property Request.
- Final Utility Relocation Plan and Utility Move Order (Notice to Take-Up, Remove or Change the Location of Appliances or Works).
- Final Consultation (public, Municipal, others).
- Design Criteria addenda (if required).
- Update working days.
- Update project cost estimates.
- Update project schedule.
- Scope and Cost Report revision, if necessary.
- Progress on:
  - External approvals.
  - Legal agreements and requirements (OMB road closings, etc.).
  - Property acquisition.
  - Utility relocation.

The meetings held during this phase are:

- Electrical Review Meeting (if required).
- Traffic Management Meeting (includes staging and detours).
- 60% Design Team Review Meeting.

- 60% Engineering Review Meeting (optional).
- Progress Meetings: frequency determined for each project.
- Additional meetings depending upon the project needs.

6.5.1 FINAL DESIGN

Note: At the end of this phase, all of the engineering drawings should be completed and only minor changes should be required.

The development of the Preferred Detail Design Alternative is to comply with the transportation engineering principles, environmental protection principles and processes, and consultation principles and process as outlined in the *Class EA document*, Sections 4.1, 4.2 and 4.7.3 and Chapter 5 respectively. During the development of the Preferred Detail Design alternative, the transportation engineering and environmental protection elements are refined with stakeholder input through consultation, as appropriate.

In some cases, it is determined that additional engineering and/or environmental work is necessary to complete the development of the Preferred Detail Design Alternative.

The Final Design activities include:

- Develop the Preferred Detail Design Alternative:
    - Refinement of the Preferred Detail Design Alternative.
    - Environmental protection incorporated into the Preferred Detail Design Alternative.
- Public Information Centre(s), when required.
    - Prepare display material for Public Information Centre(s) (PIC).
    - Conduct a dry-run meeting.
    - Prepare Questions and Answers for the PIC and circulate for approvals.
    - Senior Management Review Pre-PIC.
    - Public Information Centre(s) held, when required.
    - Public Information Center (PIC) Summary Report, after the PIC.

- Present the proposed design to municipal technical staff and municipal Councils (usually day of/day before PIC if possible).
- Federal/provincial applications for approvals.
- Municipal bylaw exemptions.
- If required, develop fisheries compensation plan.
    - If required, application package for Ministry of Natural Resources and Forestry and Department of Fisheries and Oceans for fisheries compensation plan.
    - If required, overall benefit and offsetting plan and application.
- If required, application package for Transport Canada for Navigable Waters.
- Final reports (if not already completed, as applicable to the project):
    - Advanced Traffic Management Systems (ATMS).
    - Drainage (stormwater management, sewer, culverts).
    - Electrical (illumination/traffic signals).
    - Environmental Reports.
    - Foundation Investigation Reports.
    - Foundation Investigation and Design Reports.
    - Geotechnical and Pavement Reports (name varies by Region).
    - Highway Engineering (Planning and Design) – reports/summaries as required.
    - Hydrology.
    - Structural.
    - Traffic.
    - Other reports, as appropriate.
- Transportation Environmental Study Report, if done in Detail Design and not already completed and submitted.
- Transportation Environmental Study Report Addendum, if required.
- Draft Design and Construction Report.

- Final Environmental Screening Document (Class EA Group C).
- General Arrangement Drawings for the structures and structural culverts (span greater than 3m).

  Note: The cross-section should be agreed to by Head, Planning and Design Section and the Head, Structural Section as the structures and the highway/road must work as one entity. The cross-section across structures in not a Structural Section decision to make without the agreement of the Planning and Design Section.
- All final engineering drawings for all functional areas.
- Final PHM-125 drawings for permanent and temporary traffic signals.
- Final power supply locations.
- Commercial/private entrance drawings.
- Traffic Management Plan.
- Communication Plan.
- Grading Design and Mass Haul (refer to *Contract Design Estimating and Documentation (CDED) Manual)*.
- Final Constructability Review (unless a formal Constructability Review process is followed).
- Formal Constructability Review process, when required, see policy.
- Final Utility Relocation Plan.
- Utility Move Order (Notice to Take-Up, Remove or Change the Location of Appliances or Works).
- Final Property Request, including temporary limited interests.
- Environmental Conditions Report and Mitigating Measures.
- Confirm the compatibility of design elements.
- Design Criteria addenda, if required.
- Update working days.
- Update project cost estimates.

- Update project schedule.
- Scope and Cost Report revision, if necessary.
- Draft Cost Sharing Agreements.
- Application for water taking requirements and required approvals (Environmental Activity and Sector Registration or Permit to Take Water).
- Electrical Review Meeting (when required).
- Traffic Management Meeting (Management Review of Staging and Traffic Management (Operations, Traffic)).
- Submission package for 60% Design Team Review Meeting.
- **Design Reviewed in Field (review with 60% Design Package).**
- Quality Management (including quality control and quality assurance checks).

Selected Topics for Comments

General

- Design to conform to Design Criteria.
- Design compatibility between the functional areas to be checked very carefully. For example, ensure electrical and structural designs are fully compatible with roadway design elements.
- Surplus material management included in the design.
- Culverts – consider carefully the sizing and materials under high embankments.
- Positive drainage outlets.
- **Geotechnical Section to confirm the pavement design before the Final Design phase grading design work is started.**
- PHM-125 Drawings signed off before tendering.
- Confirm future needs are addressed.
- Start process to obtain agreement from others as soon as possible.

Structures

- General Arrangement Drawing for structures: The cross-section should be agreed to by Head, Planning and Design Section and the Head, Structural Section as the structures and the highway/road must work as one entity. The cross-section across structures in not a Structural Section decision to make without the agreement of the Planning and Design Section.
- Navigable Water plan (W-Plan) may need to be prepared for bridges crossing navigable water.
- Confirm the geometric alignments across structures are appropriate.
- Confirm structure/bridge clearances are appropriate.

Environmental

- Obtain required approval(s) to take water (Environmental Activity and Sector Registration or Permit to Take Water), sediment control plan agreement and obtain noise by law exemption(s) before tendering.
- TESR or TESR Addenda could be required.

Operations Office

- Obtain agreement from the Operations Office on staging, construction schedule and constraints, and constructability (separate meeting may be required, sooner the better).

Property Request

- Issue early - 18 months typically required to obtain property.
- Include permanent, temporary limited interest (TLI), permission to enter.
- Consult with Operations Office staff regarding property needs for construction access.
- Ensure property is adequate for grading, uncertainties and required buffer past limit of grading.

Cost Sharing Agreements

- Obtain signed agreements for cost-sharing before tendering.
- Provide copy of agreements to the Operations Office.

Project Costs and Schedule

- Provide updated costs and schedule to the Program Planning Office.

Reviews and Approvals

- Senior Management Review Pre-PIC.
- Management Review of Staging and Traffic Management (Operations, Traffic).
- Consult with Senior Management on major decisions.
- Ensure quality management processes completed.

6.5.1.1 TRAFFIC MANAGEMENT MEETING

The purpose of the meeting is to review the Traffic Management Plan (including staging and detours) and to obtain agreement. Sometimes the meeting is combined with another meeting.

It is critical to obtain agreement to the Traffic Management Plan as it must be incorporated into the design and the subsequent Contract Package. Delays to the project may occur if the Traffic Management Plan is changed late in the Detail Design stage.

Attendance at the meeting and the process for approval of the Traffic Management Plan varies by region.

It is suggested that the meeting occur before the 60% Design Team Review Meeting.

6.5.2 FINAL DESIGN REVIEW

6.5.2.1 60% DESIGN TEAM REVIEW MEETING

The 60% Design Team Review Meeting is held near the end of Phase 2: Final Design and is completed prior to achieving the Final Design Approval milestone. It is held after the preparation of all of the engineering drawings and quality management processes have been completed.

A separate electrical review is usually held prior to this meeting.

The ministry's Project Team will review the design drawings at this meeting. After the meeting, revisions are made to the design drawings as per the ministry's review comments. The revisions are usually/should be minor changes to the overall design, if the previous work on the design has been thoroughly completed.

Prior to the meeting the design should be reviewed in field (review with 60% Package).

The purpose of the meeting is to:

- Review and resolve the ministry Project Team's concerns with the design drawings and obtain endorsement from the Project Team.
- Review the staging and discuss the required special provisions.
- Review all 60% deliverables.
- Ensure there is compatibility of design elements among disciplines.

The following is presented at this meeting:

- Complete engineering drawings.
- Other documents as appropriate.

6.5.3 FINAL DESIGN APPROVAL - MILESTONE

The Final Design Approval is a milestone in the Detail Design stage process.

Approval of the design is required before proceeding to Phase 3: Contract Preparation.

The approval is obtained for the design drawings that have been endorsed by the Project Team.

The approval process is determined by the Head, Planning and Design Section. The two options for approval are:

1. Upon the completion of:
    - 60% Design Team Review Meeting.

2. Or upon the completion of:
    - 60% Design Team Review Meeting, and
    - 60% Engineering Review Meeting (optional).

6.5.3.1 60% ENGINEERING REVIEW MEETING

The 60% Engineering Review Meeting is optional. The need is determined on a project-by-project basis by the ministry and, if not held, the design may be proceeding without necessary higher level endorsement. If the direction taken is not ultimately approved, there will be rework, delays, and potential extra costs.

The meeting is held after completion of the 60% Design Team Review Meeting and addressing the concerns raised at that meeting.

The purpose of the meeting is to:

- Present the overall design and staging drawings to regional management and to seek approval.
- Present the Traffic Management Plan to regional management and to seek approval (if not previously approved).

6.5.4 QUALITY MANAGEMENT

Quality management processes are completed and documented.

6.6 PHASE 3: CONTRACT PREPARATION (60% TO CONTRACT DOCUMENTS COMPLETE)

This phase is after the Phase 2: Final Design Approval milestone has been completed and is for completion of the Contract Package and Design Documentation.

<u>Note:</u> After this phase, only minor changes are acceptable.

The Contract Preparation activities include:

- Prepare the Contract Package (tender documents, contract drawings, quantities and other documents). Refer to the ministry's *Request for*

Proposals Total Project Management master document for the complete list of documents and requirements.

- Formal Constructability Review process when required, see policy.
- Contract Package revised after Formal Constructability Review process to incorporate accepted recommendations.
- Final Constructability Review Report (when formal review done).
- Prepare final construction cost estimate.
- Prepare final working day/completion date estimate.
- Earth Management Plan/Erosion and Sediment Overview Assessment/ Erosion and Sediment Control Plan.
- Summary of Environmental Concerns and Commitments.
- Final Design and Construction Report (needs 30 day public review period).
- Environmental Synopsis.
- Prepare Class Environmental Assessment (EA) process monitoring questionnaire for environmental monitoring program.
- Federal/Provincial Applications Approvals.
- Municipal Bylaw Exemptions Approvals.
- Environmental Clearance for Utility Relocation.
- Environmental Clearance for Right-of-Way Designation.
- Environmental Clearance for Property Expropriation.
- Confirm Utility relocations started.
- Assist Property Section with acquisitions.
- Hearing of Necessity.
- Entrance agreements secured.
- Aggregate Sources List, if required.
- Complete Design Criteria revision (if required)/confirm design complies with the signed and approved Design Criteria.

- Prepare Design Synopsis Report.
- Prepare Communication Synopsis.
- Scope and Cost Report revision, if necessary.
- Design Reviewed in Field (review with Contract Package).
- Design Team final review of Contract Package and provide comments.
- Revise the Contract Package to incorporate comments and confirm changes correctly incorporated.
- Submission for Design Complete Presentation Meeting.
- Quality Management.

Meetings held during this phase are:

- Design Complete Team Review Meeting (optional).
- Progress Meetings: frequency determined for each project.
- Additional meetings depending upon the project needs.

6.6.1 CONTRACT DOCUMENTATION

The documentation is to be completed according to requirements in the *Contract Design Estimating and Documentation (CDED) Manual.*

Refer to the ministry's *Request for Proposals Total Project Management* master document for additional information on documents and requirements.

The final Detail Design stage Contract Package should have sufficient detail to carry out construction without any changes being required.

6.6.1.1 WORKING DAY SCHEDULE

The Working Day Schedule is used to determine the construction completion date and it assists to decide if the project will be a fixed completion date or by working days. Considerations in completion are:

- Time for restrictions due to natural environmental considerations (for example: in-water works, bird migration/nesting, turtles, clearing, grubbing) and other factors.
- Time for restrictions due to other factors.
- Construction staging, including construction schedule and constraints.
- Ministry's annual funding allocation.
- Key construction operations which are weather dependent.
- Fabrication time.

6.6.2 DESIGN TEAM FINAL REVIEW

6.6.2.1 DESIGN COMPLETE TEAM REVIEW MEETING

The Design Complete Team Review Meeting is optional. It is held after the completion of the Contract Package and Design Documentation and prior to starting the Phase 4: Contract Review and Approval.

Prior to the meeting the design should be reviewed in field (review with Contract Package).

The purpose of the meeting is for the Project Team to:

- Review the Contract Package and Design Documentation and provide comments.
- Confirm the design and documentation has been completed to meet requirements and conforms to prior design approvals.
- Confirm the design has been completed in compliance with the approved Design Criteria.
- Confirm design compatibility among the disciplines.

After the meeting, the Contract Package and Design Documentation are revised to incorporate any agreed upon changes and other necessary changes. A quality check is then completed to confirm changes have been correctly incorporated.

6.6.3 CONTRACT DOCUMENTS COMPLETE - MILESTONE

The Contract Documents Complete is a milestone in the Detail Design stage process.

Approval of the Contract Package is required before proceeding to Phase 4: Contract Review and Approval.

The approval process is determined by the Head, Planning and Design Section. The two options for approval are:

1. Upon the completion of:
    - Design Complete Team Meeting and the required changes have been made to the Contract Package and Design Documentation.
2. Or upon the completion of:
    - The Contract Package and Design Documentation.

6.6.4 QUALITY MANAGEMENT

Quality management processes are completed and documented.

6.7 PHASE 4: CONTRACT REVIEW AND APPROVAL

This phase is after the Contract Documents Complete milestone has been completed.

At the start of this phase, the Contract Package is expected to be totally complete and all drawings, documentation and special provisions are in final form.

This phase is for:

- Reviewing and approving the fully completed Contract Package (design).
- Environmental Approval for Construction Start.
- Confirming all clearances required for construction to proceed have been obtained.
- Completing the Final Contract Package ready for Phase 5: Tendering.

- Scope and Cost Report revision, if required.

The meetings held during this phase are:

- Design Complete Presentation Meeting.
- Executive Presentation Meeting.
- Regional Director Information Session/Presentation Meeting (as determined by each region).

Prior to meetings confirm:

- All design reports have been completed and submitted to the ministry's Project Manager.
- Quality Management processes (Quality Assurance and Quality Control) have been completed on the Contract Package and all other documents.
- Required clearances and their status.

After all meetings:

- Revise the Contract Package to incorporate comments from the meeting and confirm changes correctly incorporated.
- Complete Quality Management processes.

6.7.1 CONTRACT PACKAGE REVIEW

6.7.1.1 DESIGN COMPLETE PRESENTATION MEETING

For outsourced projects the Design Complete Presentation Meeting should not involve a thorough review of the design work by ministry staff, as the Service Provider is responsible for the completeness and accuracy of the design work and the design package.

For in-house projects the Design Complete Presentation Meeting is a thorough review.

It is expected that only minor changes will be required to address the concerns expressed in this meeting.

The Project Team should have previously approved/accepted concepts and other documents; however, there could be previously unidentified concerns that arise when the complete Contract Package is presented.

The documentation will be a key focus of the meeting as it may not have been seen in its' entirely by the Project Team prior to the Contract Package completion.

Prior to the meeting the design should be reviewed in field (review with Contract Package), if this was not done before the Design Complete Team Review Meeting.

A separate electrical review is usually held prior to this meeting.

The purpose of the meeting is to:

- Present a fully completed Contract Package (design) that has the contract documentation and drawings in final form.
- Receive comments and clarify.
- Seek approval to proceed to the Executive Presentation Meeting.

After the meeting:

- The Contract Package is revised to incorporate any agreed upon changes and other necessary changes.
- Any significant changes not discussed at the Design Complete Presentation Meeting require approval of the ministry's Project Manager. The ministry's Project Manager will obtain higher level approval as appropriate.
- Quality control check is completed to confirm changes have been correctly incorporated (if there is a Service Provider this is done by the Service Provider).
- Quality assurance check is completed by the ministry's Project Manager.

6.7.2 EXECUTIVE REVIEW - MILESTONE

Executive Review is a milestone in the Detail Design stage process.

Approval of the Contract Package is required before proceeding to the Phase 5: Tendering.

The approval is obtained at an Executive Presentation Meeting (for some regions) and a Regional Director Information Session/Presentation Meeting (for some regions).

6.7.2.1 EXECUTIVE PRESENTATION MEETING

The purpose of the Executive Presentation Meeting is to present the final Contract Package (design) to Senior Management and to seek approval to proceed to tendering and construction.

The Executive Presentation Meeting is not a Team Review Meeting. Therefore, previously unidentified concerns should not be raised at this meeting by those that have been involved with the project. The ministry Project Team should be supportive of the Contract Package. Other forums exist to resolve concerns (Issue Meetings) and they can be addressed after the meeting.

It is essential that the ministry Project Manager and the Service Provider are fully prepared to answer pointed probing questions on the design.

After the meeting:

- Any significant changes not discussed at the Executive Review Meeting require approval of the Manager, Engineering.
- Any minor changes not discussed at the Executive Review Meeting require the approval of the ministry's Project Manager.
- The Contract Package is revised to incorporate any agreed upon changes.
- Quality Management - quality control and quality assurance checks are completed to confirm changes have been correctly incorporated.

- Confirm Legal Agreements have been executed.
- Confirm all Clearances have been obtained (i.e. Environmental Assessment, Utilities, Property, others).
- Confirm there are no outstanding issues that need to be addressed prior to tendering.

6.7.2.2 REGIONAL DIRECTOR INFORMATION SESSION/PRESENTATION MEETING

The purpose of the Regional Director Information Session/Presentation is to present the final Contract Package (design) to the Regional Director and to seek approval to proceed to tendering and construction.

The need for the meeting and the particulars of the meeting are determined by each region.

6.7.3 QUALITY MANAGEMENT

Quality management processes are completed and documented.

6.8 PHASE 5: TENDERING

This phase is after the Executive Review milestone has been completed.

Tendering is the transition of the project from design to construction and is completed when the construction Contract is awarded.

For tendering to occur, the Contract Package has been completed, all required clearances (i.e. property, utilities, environmental, etc.) have been obtained, and the project is going to be constructed.

This phase is for:

- Design Documentation submittal. Refer to the ministry's *Request for Proposals Total Project Management* master document for complete list of documents and requirements.
- Preparing Contract Package Submission Form.
- Submitting the Contract Package - for tendering in accordance with the Contract Package Submission Guidelines.
- Responding to questions from Contract Tendering Section prior to advertising.
- Responding to contractor bid enquiries.
- Preparing Contract Addenda during bidding, if required.
- Providing information requested by the bidders during tendering. Refer to *Highway Design Bulletin 2010-01 Providing Digital Information to Contractors and Special Provision SP 199F61*.
- Contract Award (milestone).
- Quality Management.

The meeting held during this phase is:

- Design Package Handover Meeting.

6.8.1 CHANGES TO THE SUBMITTED CONTRACT PACKAGE

Changes may be required to the submitted Contract Package. Any changes that affect the bid price significantly should be incorporated into the Contract Package, even after submission for tendering.

The MTO Project Manager is responsible to ensure that any changes are reviewed and approved as follows:

- Reviewed and endorsed by:
    - Functional area involved.

- Contract Review Officer.

- Approved by:
  - Area Manager, Planning and Design.
  - Head, Planning and Design (when appropriate).
  - Manager, Engineering (when appropriate).
  - Manager, Operations (when appropriate).

The Area Manager, Planning and Design will decide when others need to approve a change and could consult with others to make this determination.

Any drawings or documents that are revised should be sent to tendering staff to be incorporated in the yet to be tendered Contract, with copies to the affected ministry offices.

When changes are submitted with sufficient lead time to meet the scheduled advertising date, they can be incorporated into the advertised Contract.

When changes are submitted after Contract advertising, a Contract Addendum will be required.

6.8.2 DESIGN PACKAGE HANDOVER MEETING

MTO Operations Office will schedule and lead the Design Package Handover Meeting. The design information to be provided to the Operations Office is discussed in *Directive Provincial Highways C-47 Design Package Handover Meeting.*

Additional requirements for information on Design Documentation for the Contractor and the Construction Contract Administrator are listed in the ministry's *Request for Proposals Total Project Management* master document.

The purpose of the meeting is to provide the opportunity:

- For the design Project Manager to give the Operations Office staff the relevant background information which will assist them in understanding the project and administering the contract.
- For the Operations Office staff to ensure that they have received all the pre-contract documentation, which they need to administer the contract, and to obtain any clarification they may require with respect to this documentation.

6.8.3 CONTRACT AWARD - MILESTONE

Contract Award is a milestone in the Detail Design stage process and is completed with the execution of the construction contract.

6.8.4 QUALITY MANAGEMENT

Quality management processes are completed and documented.

7. Construction Stage

7.1 PURPOSE

The Construction stage is the implementation of the project.

The design Project Manager and Project Team remains involved in the project after the Detail Design stage to:

- Assist during construction by providing information and resolving problems which may arise.
- Complete post construction activities.

7.2 TRANSPORTATION ENGINEERING AND ENVIRONMENTAL PROTECTION IN CONSTRUCTION

Environmental requirements are integrated into the construction process.

In the *Class EA document*, Section 4.8, there is detailed information on requirements for environmental protection during construction.

7.3 DURING CONSTRUCTION

Activities during construction are:

- Establishing the Quality Management Plan for the Construction stage.
- Cost Sharing Agreements (payment action after Contract award).
- Construction Liaison.
- Cost Recovery for Faulty Design.
- Contractor Change Proposals.
- Construction Site Meetings.
- Highway Commissioning.

When an issue is brought forward, it should first be determined whether it is Construction Liaison, Cost Recovery for Faulty Design, or Contractor Change Proposal, as this determines the action to be taken.

7.3.1 COST SHARING AGREEMENTS

After the construction Contract has been awarded, the item costs will be known and final cost sharing costs are known. Action to complete the agreement requirements is taken for cost sharing and cost payment.

7.3.2 CONSTRUCTION LIAISON

Construction liaison occurs during the Construction stage.

It provides a mechanism to resolve unanticipated issues quickly, effectively, and proactively, and thereby minimizes the potential for contractor claims associated with delays or changes required to do the work.

Construction liaison typically involves work to:

- Provide additional design documentation, details, and design philosophy.
- Respond to new information and conditions that may require a change in the design.
- Participate in issues affecting construction critical path scheduling, traffic control, staging, change proposals, payment and quantity changes, etc.
- Comment on construction shop drawings, if required.
- Conduct site visits during construction.
- Review of minutes of site meetings.
- Assist with answering public concerns related to construction.
- Assist with claims compensation for personal and business losses during construction.
- Assist with drainage and property related claims (including wells).

- Assist with entrance concerns.
- Clarify legal agreement related matters.

7.3.3 COST RECOVERY FOR FAULTY DESIGN

Cost recovery for faulty designs (errors and omissions) is done as provided for in the Legal Agreement with Service Providers.

The procedures are described in the Legal Agreement with the Service Provider and in the ministry's current *Cost-Recovery Guidelines and Process for Faulty Designs*.

Faulty design may be associated with any of the work that the Service Provider is responsible to produce. When there is faulty design that results in additional costs or a premium beyond what would have been paid had the work been properly designed, the cost may be recoverable.

7.3.4 CONTRACTOR CHANGE PROPOSALS

The Contractor may propose cost-reducing Change Proposals after Contract Award. The Change Proposal must be acceptable to the ministry, as determined by the ministry's Change Proposal review team. The process to be followed is in the Contract with the Contractor and in the ministry's current *Change Proposals During Construction* (Contractor Financial Savings Rewards) – Guidelines/Summary.

7.3.5 HIGHWAY COMMISSIONING

Highway commissioning is completed using the regional specific process. For new highways a standard checklist is typically followed.

7.4 POST CONSTRUCTION

Post construction activities are:

- Project Construction Report.
- Design Package Evaluation Meeting.

- Post Construction Engineering Appraisal.
- Designation of Right-of-Way.
- Surplus Property Identification.
- Post Construction Environmental Monitoring.
- Quality Management.
- Project File Retention and Storage.

7.4.1 PROJECT CONSTRUCTION REPORT

After construction a Project Construction Report (PCR) is prepared by Operations to provide feedback to the offices involved in the preparation of the Contract Package.

This report is prepared in compliance with the current *Project Construction Report Guideline*.

The PCR provides a summary of experiences and expenditures on the project for review by management and to provide feedback for improvement of the contract documents on future projects. The PCR can also be utilized by MTO Engineering staff for the preparation of the Post Construction Engineering Appraisal.

The PCR should focus on the aspects of the contract package and construction activities that had significant positive or negative impacts on design quality, contract administration, constructability issues, construction costs, schedule, safety or the environment.

Upon completion of the Draft PCR the Operations Office, Contract Administrator arranges a Project Debriefing Meeting (PDM). The Draft PCR forms the agenda. An attendee list is in the PCR Guideline. The purpose of the PDM is to review the PCR, discuss both the positive and negative experiences on the Contract and come to a consensus on the lessons learned in an effort to improve the quality of future contract packages. The Operations Office has the final approval on the content of the report.

An Engineering Office PCR review meeting is arranged, if needed, to discuss the final report. This is a way to provide feedback to the design Project Team.

The design Project Manager prepares the draft response to any issues and recommendations in the PCR, if required. Not all PCRs will have a design response. Discussion with Operations and Engineering staff may be required to prepare the response. The response is usually approved by the Manager, Engineering.

The review process should take no more than four weeks to complete.

7.4.2 DESIGN PACKAGE EVALUATION MEETING

The Design Package Evaluation part of the Project Construction Report can be utilized by MTO Engineering staff to assess the effectiveness of design work done by in-house or Service Provider staff.

A Design Package Evaluation Meeting is held to discuss the effectiveness of the design from the construction perspective. It is arranged and chaired by Operations.

7.4.3 POST CONTRUCTION ENGINEERING APPRAISAL

A Post Construction Engineering Appraisal is completed in conformance with current requirements for Service Provider designed projects.

7.4.4 DESIGNATION OF RIGHT-OF-WAY

The final designation of the Right-of-Way is completed after the completion of construction to ensure that all changes to the highway and adjacent property have been accounted for and documented. There should be a previous designation that may need to be changed due to the construction completed.

The lead section within the Engineering Office for Designation Request(s) varies by region.

7.4.5 SURPLUS PROPERTY IDENTIFICATION

When property is acquired for a project there could be surplus property at the completion of construction. A review should be completed to identify property adjacent to the project that is not required for future highway needs and action taken to start the disposal process for the surplus property.

7.4.6 POST CONSTRUCTION ENVIRONMENTAL MONITORING

Environmental monitoring after a project is completed may involve follow-up monitoring of significant measures and/or significant concerns or scientific environmental monitoring to address new technologies, specific mitigating measures and/or significant concerns.

MTO undertakes an ongoing evaluation of mitigating measures. The purpose of this evaluation is to determine their overall effectiveness, conditions that affect their performance, potential for technical improvements and warrants for their use. The end result is a constantly evolving knowledge base for improving the type and application of environmental mitigation used by MTO.

7.4.7 QUALITY MANAGEMENT

Quality management processes are completed and documented.

7.4.8 PROJECT FILE RETENTION AND STORAGE

At the completion of all post-construction activities the project files are retained and stored in compliance with the appropriate Records Retention Schedule.

Appendix A: Acronyms and Abbreviations

ATMS	Advanced Traffic Management Systems
CDED Manual	Contract Design Estimating and Documentation Manual
Class EA	Class Environmental Assessment
Class EA document	Class Environmental Assessment for Provincial Transportation Facilities, as Amended July 14, 2000, Ontario Ministry of Transportation
CPS	Contract Preparation System
DCR	Design and Construction Report
DTM	Digital Terrain Model
EA	Environmental Assessment
EA Act	Environmental Assessment Act R.S.O. 1990, as amended
ERD	Environmental Reference for Highway Design
Group	Class EA Group within the meaning of the Class EA document
GWP	Group Work Project
HAR	Highway Assessment Report
HST	Highway Standards Team
IPA	Information, Privacy and Archives
ministry	Ontario Ministry of Transportation
PAR	Project Appraisal Report
PCR	Project Construction Report
PDM	Project Debriefing Meeting
PDR	Preliminary Design Report
PHM	Provincial Highways Management
PIC	Public Information Centre
PMBP	Project Management Best Practices (Provincial Highway Management website)

QA	Quality Assurance
QC	Quality Control
QP	Quality Planning
SCR	Scope and Cost Report
SDR	Study Design Report
TESR	Transportation Environmental Study Report
TLI	Temporary Limited Interest
WP	Work Project

Appendix B: References

Note: Links are subject to change and the electronic version of this guideline on the PMBP website will have the links checked and updated periodically.

Links to documents on the *Project Management Best Practices (PBMP)* website may work, if a link in this guideline is not working.

1. Change Proposals During Construction (Contractor Financial Savings Rewards) – Guidelines/Summary
2. Class Environmental Assessment for Provincial Transportation Facilities, as Amended July 14, 2000, Ontario Ministry of Transportation
3. Contract Design Estimating and Documentation (CDED) Manual
4. Cost-Recovery Guidelines and Process for Faulty Designs
5. Design Criteria Guideline
6. Directives, PHM intranet site
7. Directives, PMBP site
8. Directive PHM-B-021 Design Criteria Requirements and Procedure for Processing
9. Directive Provincial Highways C-47 Design Package Handover Meeting
10. Environmental Assessment Act R.S.O. 1990, as amended (EA Act)
11. Environmental Reference for Highway Design, Ministry of Transportation
12. Guideline on the Care, Handling and Storage of Active and Semi-Active Records, Archives of Ontario.
13. Highway Design Bulletin 2010-01 Providing Digital Information to Contractors and Special Provision SP 199F61
14. HSBM Director's Office 2016-03 February 8, 2016 Public Information Centres
15. HSBM Director's Office 2016-04 February 8, 2016 EA Group C Rehabilitation
16. Meeting Protocol
17. Parametric Estimating Guide (for Construction Costs)
18. Preliminary Design Report Guideline

19. Project Construction Report Guideline
20. Project Management Best Practices (PMBP)
21. Records Retention Schedule #MTO-175 All Regional Planning and Design Sections
22. Request for Proposals Total Project Management (master)
23. Scope and Cost Report Guideline

Appendix C: Master Task Lists Planning and Design Process

The master task lists are available in Word format on the *Project Management Best Practices (PMBP)* website under Reference Materials then under Project Management.

Appendix C1: Master Task List Service Provider Acquisition and Management

Master Task List - Service Provider Acquisition and Management - September 2016							
GWP: Highway:		Description:					
Task Number	Tasks (Expand/Contract List as Appropriate)	Required		Start Date	Original Completion Date	Current Planned Completion Date	Actual Completion Date
		Yes	No				
SP	**Service Provider Acquisition and Management** – for Outsourced Work (Activities Could Apply to Any Stage)						
SP 1	Section Heads Staff Project						
SP 2	Scoping Meeting for the EOI/RFP/RFQ						
SP 3	Service Provider Acquisition						
SP 3.1	EOI/RFP Process						
SP 3.1.1	MBS Procurement Number						
SP 3.1.2	Approval to Advertise						
SP 3.1.3	EOI and RFP Preparation						
SP 3.1.4	EOI and RFP Posting						
SP 3.1.5	EOI Evaluation						
SP 3.1.6	RFP Evaluation						
SP 3.1.7	Approval to Award						
SP 3.1.8	Contract Executed						
SP 3.2	RFQ Process						
SP 3.2.1	MBS Procurement Number						
SP 3.2.2	Approval to Advertise						
SP 3.2.3	RFQ Preparation						
SP 3.2.4	RFQ Posting						
SP 3.2.5	RFQ Evaluation						

Master Task List - Service Provider Acquisition and Management - September 2016							
GWP:		Description:					
Highway:							
Task Number	Tasks (Expand/Contract List as Appropriate)	Required		Start Date	Original Completion Date	Current Planned Completion Date	Actual Completion Date
		Yes	No				
SP 3.2.6	Approval to Award						
SP 3.2.7	Contract Executed						
SP 3.3	Retainer Task Order Process						
SP 3.3.1	Approval to Issue a Task Order						
SP 3.3.2	Task Order Preparation						
SP 3.3.3	Task Order Executed						
SP 4	Service Provider Final Quality Control Reports						
SP 5	Service Provider Appraisal						
SP 6	Assignment Close-off						

Appendix C2: Master Task List Network Planning and Transportation Needs Assessment Stage

Master Task List - Network Planning and Transportation Needs Assessment Stage - September 2016							
GWP: Highway:		Description:					
Task Number	Tasks (Expand/Contract List as Appropriate)	Required		Start Date	Original Completion Date	Current Planned Completion Date	Actual Completion Date
		Yes	No				
NPTNA	**Network Planning and Transportation Needs Assessment Stage**						
	Progress Meetings						
	Additional Meetings: Depending on the Project Needs						
NPTNA 1	Quality Management Plan Established for NPTNA Stage						
NPTNA 2	Network Planning						
NPTNA 3	Transportation Needs Assessment						
NPTNA 4	Pre-Design Study (Optional)						
NPTNA 5	Pre-Design Synopsis Report (Optional)						
NPTNA 6	Project Initiation						
NPTNA 6.1	GWP Number and WP's Numbers Issued						
NPTNA 6.2	Scope and Cost Report Completed						
NPTNA 7	Quality Control Check						
NPTNA 8	Quality Assurance Check						
NPTNA 9	Quality Management Documented						

Appendix C3: Master Task List Planning Stage

Master Task List - Planning Stage - September 2016							
GWP:		Description:					
Highway:							
Task Number	Tasks (Expand/Contract List as Appropriate)	Required		Start Date	Original Completion Date	Current Planned Completion Date	Actual Completion Date
		Yes	No				
P	**Planning Stage**						
	Progress Meetings						
	Additional Meetings: Depending on the Project Needs						
P 1	Quality Management Plan Established for Planning Stage						
P 2	Staff Project						
P 3	Review Transportation Needs Assessment						
P 3.1	Preliminary Data Gathering						
P 3.2	Analysis of Existing Conditions						
P 3.3	Initial Identification of Environmental and Engineering Constraints						
P 4	Start-up and Scoping Meeting						
P 4.1	Locations of Buried Utilities (for Field Work)						
P 4.2	Site Review by Project Team						
P 4.3	Scope of Work Confirmed						
P 4.4	Schedule Developed						
P 4.5	Work Plan Completed						
P 4.6	Data Requirements Determined						
P 5	Scope Approval Meeting						
P 6	Scope and Cost Report Revision Completed						
P 7	Study Design Report (Optional)						

Master Task List - Planning Stage - September 2016							
GWP:		Description:					
Highway:							
Task Number	Tasks (Expand/Contract List as Appropriate)	Required		Start Date	Original Completion Date	Current Planned Completion Date	Actual Completion Date
		Yes	No				
P 8	Planning Alternatives and Selection of Preferred Alternative (for Formal Planning Studies that Produce a TESR, this List is Expanded to be Similar to the Preliminary Design Stage List)						
P 8.1	Field Work by Project Team						
P 8.2	Planning Alternatives Developed						
P 8.3	Alternatives Evaluated and Selection Preferred Alternative						
P 9	Planning Package Documents Complete						
P 10	Environmental Clearance for Right-of-Way Designation						
P 11	Environmental Clearance for Property Expropriation						
P 12	Designation of Right-of-Way						
P 13	Property Request						
P 14	Pre-Design Study/Other Work (Optional)						
P 15	Quality Control Check						
P 16	Quality Assurance Check						
P 17	Quality Management Documented						

Appendix C4: Master Task List Preliminary Design Stage

Master Task List - Preliminary Design Stage - September 2016							
GWP:		Description:					
Highway:							
Task Number	Tasks (Expand/Contract List as Appropriate)	Required		Start Date	Original Completion Date	Current Planned Completion Date	Actual Completion Date
		Yes	No				
PD	**Preliminary Design Stage**						
	Progress Meetings						
	Additional Meetings: Depending on the Project Needs						
PD 1	**Preliminary Design Stage - Phase 1: Generate and Assess Preliminary Design Alternatives**						
	Project Appraisal						
PD 1.1	Delivery Method Confirmed (In-House or Out-Sourced and RFP, RFQ, Retainer)						
PD 1.2	Quality Management Plan Established for Preliminary Design Stage						
PD 1.3	Staff Project						
PD 1.4	Start-up and Scoping Meeting						
PD 1.4.1	Locations of Buried Utilities (for Field Work)						
PD 1.4.2	Site Review by Project Team						
PD 1.4.3	Scope of Work Confirmed						
PD 1.4.4	Schedule Developed						
PD 1.4.5	Work Plan Completed						
PD 1.4.6	Data Requirements Determined						
PD 1.5	Scope Approval Meeting (Optional)						
PD 1.6	Scope and Cost Report Revision, if Necessary						
PD 1.7	Environmental and Consultation Plan						
PD 1.8	Project Start-up Notices and Contact Letters						
	Data Collection						

Master Task List - Preliminary Design Stage - September 2016							
GWP:		Description:					
Highway:							
Task Number	Tasks (Expand/Contract List as Appropriate)	Required		Start Date	Original Completion Date	Current Planned Completion Date	Actual Completion Date
		Yes	No				
PD 1.9	Information from Files Distributed to Project Team and Reviewed						
PD 1.10	Field Review by Project Team						
PD 1.11	Project Manager Field Review with Maintenance						
PD 1.12	Concerns of Others Documented						
PD 1.13	Traffic Data Obtained						
PD 1.14	Roadside Safety Review, Analysis and Recommendations						
PD 1.15	Engineering Survey Draft Deliverables						
PD 1.16	Property						
PD 1.16.1	Legal Ownership and Information						
PD 1.16.2	Permissions to Enter						
PD 1.16.3	Copies of Agreements (as Available)						
PD 1.17	Functional Area Investigations and Draft Reports						
PD 1.17.1	Advanced Traffic Management Systems (ATMS)						
PD 1.17.2	Drainage (water Management, Sewer, Culverts)						
PD 1.17.3	Electrical (Illumination/Traffic Signals)						
PD 1.17.4	Environmental Investigations						
PD 1.17.5	Foundation						
PD 1.17.6	Geotechnical and Pavement						
PD 1.17.7	Highway Engineering (Planning and Design)						
PD 1.17.8	Hydrology						
PD 1.17.9	Structural						
PD 1.17.10	Traffic						
PD 1.18	Composite Utility Plan						

Master Task List - Preliminary Design Stage - September 2016							
GWP:		Description:					
Highway:							
Task Number	Tasks (Expand/Contract List as Appropriate)	Required		Start Date	Original Completion Date	Current Planned Completion Date	Actual Completion Date
		Yes	No				
	Information Analysis and Problem Identification						
PD 1.19	Review Previous Studies, Documents and Plans						
PD 1.20	Review External Contact Concerns and Document						
PD 1.21	Analysis of Existing Conditions						
PD 1.22	List of Deficiencies from Current Standards						
PD 1.23	List of Deficiencies Due to Condition						
PD 1.24	Traffic Information/Study Completed						
PD 1.25	Establish Fundamental Design Elements and Requirements						
	Generate Alternatives						
PD 1.26	Alternatives Methods of Accomplishing the Preferred Alternative(s) are Generated for Comparison						
PD 1.27	Consultation with Stakeholders, as Appropriate						
	Assess Alternatives						
PD 1.28	Develop an Assessment Method and Criteria						
PD 1.29	Confirmation that Sufficient Information is Available to Support the Subsequent Evaluation						
PD 1.30	Beneficial and Detrimental Aspects of Each Alternative Identified						
PD 1.31	Alternatives Team Review Meeting						
PD 1.31.1	Confirmation that any Alternative Carried Forward will be Acceptable						
PD 1.31.2	Review Consultation Materials						

Master Task List - Preliminary Design Stage - September 2016							
GWP:		Description:					
Highway:							
Task Number	Tasks (Expand/Contract List as Appropriate)	Required		Start Date	Original Completion Date	Current Planned Completion Date	Actual Completion Date
		Yes	No				
PD 1.32	Consultation – Alternatives (See DD Phase 2 for Typical Tasks for PICs)						
PD 1.33	Alternatives Modified as Appropriate						
	Alternative Approval						
PD 1.34	Alternatives Approval Meeting (Optional)						
PD 1.35	Alternative Approved						
PD 1.36	Quality Control Check						
PD 1.37	Quality Assurance Check						
PD 2	**Preliminary Design Stage - Phase 2: Evaluate Alternatives and Select the Preferred Preliminary Design Alternative**						
	Evaluate Alternatives						
PD 2.1	Develop Evaluation Criteria for Selecting the Preferred Alternative						
PD 2.2	Comparative Analysis of Transportation Benefits and Environmental Effects for Each Preliminary Design Alternative						
PD 2.3	Comparative Evaluation for Each Preliminary Design Alternative						
	Select Preferred Alternative						
PD 2.4	Technically Preferred Preliminary Design Alternative is Selected						
PD 2.5	Technically Preferred Alternative Team Review Meeting						
PD 2.5.1	Confirmation Preferred Alternative is Acceptable						
PD 2.5.2	Review Consultation Materials						
PD 2.6	Consultation – Preferred Alternative (See DD Phase 2 for Typical Tasks for PICs)						
PD 2.7	Value Engineering Study, when Appropriate						

Master Task List - Preliminary Design Stage - September 2016							
GWP:		Description:					
Highway:							
Task Number	Tasks (Expand/Contract List as Appropriate)	Required		Start Date	Original Completion Date	Current Planned Completion Date	Actual Completion Date
		Yes	No				
PD 2.8	Alternatives Modified as Appropriate						
	Preferred Alternative Approval						
PD 2.9	Preferred Alternative Approval Meeting (Optional)						
PD 2.9.1	Endorsement on the Engineering Design to Date						
PD 2.10	Preferred Alternative Approved						
PD 2.11	Quality Control Check						
PD 2.12	Quality Assurance Check						
PD 3	**Preliminary Design Stage - Phase 3: Develop the Preferred Preliminary Design Alternative**						
	Alternative Designs						
PD 3.1	Develop Alternative Designs for the Preferred Alternative - Level of Detail that Provides for Reasonable Comparisons of the Alternatives						
PD 3.2	Refine Preferred Preliminary Design Alternative to Prevent or Reduce Impacts						
PD 3.3	Identification of Environmental Work to be Done in Detail Design						
	Evaluate Alternative Designs						
PD 3.4	Develop the Evaluation Criteria						
PD 3.5	Comparative Analysis of Transportation Benefits and Environmental Effects for Each Preliminary Design Alternative						
PD 3.6	Comparative Evaluation for Each Preliminary Design Alternative						
	Select Preferred Design						
PD 3.7	Documents and Plans to Support the Selection of the Preferred Design						
PD 3.8	Preferred Design Team Review Meeting						

Master Task List - Preliminary Design Stage - September 2016							
GWP:		Description:					
Highway:							
Task Number	Tasks (Expand/Contract List as Appropriate)	Required		Start Date	Original Completion Date	Current Planned Completion Date	Actual Completion Date
		Yes	No				
PD 3.8.1	Review the Evaluation of the Alternative Designs						
PD 3.8.2	Confirm with the Design Project Team the Preferred Design						
PD 3.8.3	Review Consultation Materials						
	Preferred Design Approval						
PD 3.9	Preferred Design Approval Meeting						
PD 3.9.1	Preferred Design Approved						
PD 3.10	Consultation – Preferred Design (See DD Phase 2 for Typical Tasks for PICs)						
PD 3.11	Value Engineering Study, when Appropriate						
PD 3.12	Alternatives Modified as Appropriate						
PD 3.13	Quality Control Check						
PD 3.14	Quality Assurance Check						
PD 4	**Preliminary Design Stage - Phase 4: Documentation**						
	Documentation						
PD 4.1	Final Functional Area Reports						
PD 4.2	Erosion and Sediment Control Overview Risk Assessment						
PD 4.3	Draft Utilities Relocation Strategy						
PD 4.4	Draft Transportation Environmental Assessment Report Reviewed by Project Team (When One is Completed)						
PD 4.5	Draft Preliminary Design Reviewed by Project Team (When One is Completed)						
PD 4.6	Project Team Confirms Compatibility Among Disciplines						
PD 4.7	Transportation Environmental Study Report						

Master Task List - Preliminary Design Stage - September 2016							
GWP:		Description:					
Highway:							
Task Number	Tasks (Expand/Contract List as Appropriate)	Required		Start Date	Original Completion Date	Current Planned Completion Date	Actual Completion Date
		Yes	No				
PD 4.8	Transportation Environmental Study Report Addenda, if Required						
PD 4.9	Preliminary Design Report						
PD 4.10	Environmental Screening Document (Class EA Group C)						
PD 4.11	Design Criteria Approved						
PD 4.12	Quality Control Check						
PD 4.13	Quality Assurance Check						
	Documents Complete						
PD 4.14	Documents Accepted by Ministry (TESR or PDR)						
PD 4.15	30 Day Review Period for the Transportation Environmental Study Report Successfully Completed						
PD 4.16	Scope and Cost Report Revision, if Necessary						
PD 4.17	Environmental Clearance for Right-of-Way Designation						
PD 4.18	Environmental Clearance for Property Expropriation						
PD 4.19	Environmental Clearance for Utility Relocation						
PD 4.20	Environmental Clearances – Other, as Required						
PD 4.21	Designation of Right-of-Way						
PD 4.22	Property Request						
PD 4.23	Pre-Design Study/Other Work (Optional)						
PD 4.24	Quality Management Documented						

Appendix C5: Master Task List Detail Design Stage

Master Task List - Detail Design Stage - September 2016							
GWP:		Description:					
Highway:							
Task Number	Tasks (Expand/Contract List as Appropriate)	Required		Start Date	Original Completion Date	Current Planned Completion Date	Actual Completion Date
		Yes	No				
DD	**Detail Design Stage**						
	Progress Meetings						
	Additional Meetings: Depending on the Project Needs						
DD 1	**Detail Design Stage - Phase 1: Initial Design (to 30% completion)**						
	Project Appraisal						
DD 1.1	Delivery Method Confirmed (In-House or Out-Sourced and RFP, RFQ, Retainer)						
DD 1.2	Quality Management Plan Established for Detail Design Stage						
DD 1.3	Staff Project						
DD 1.4	Start-up and Scoping Meeting						
DD 1.4.1	Locations of Buried Utilities (for Field Work)						
DD 1.4.2	Site Review by Project Team						
DD 1.4.3	Scope of Work Confirmed						
DD 1.4.4	Schedule Developed						
DD 1.4.5	Work Plan Completed						
DD 1.4.6	Data Requirements Determined						
DD 1.5	Scope Approval Meeting (Optional)						
DD 1.6	Scope and Cost Report Revision, if Necessary						
DD 1.7	Environmental and Consultation Plan						
DD 1.8	Project Start-up Notices and Contact Letters						
	Data Collection						
DD 1.9	Information from Files Distributed to Project Team and Reviewed						

Master Task List - Detail Design Stage - September 2016							
GWP:		Description:					
Highway:							
Task Number	Tasks (Expand/Contract List as Appropriate)	Required		Start Date	Original Completion Date	Current Planned Completion Date	Actual Completion Date
		Yes	No				
DD 1.10	Field Review by Project Team						
DD 1.11	Project Manager Field Review with Maintenance						
DD 1.12	Concerns of Others Documented						
DD 1.13	Traffic Data Obtained						
DD 1.14	Engineering Survey Draft Deliverables						
DD 1.15	Property						
DD 1.15.1	Legal Ownership and Information						
DD 1.15.2	Permissions to Enter						
DD 1.15.3	Copies of Agreements (as Available)						
DD 1.16	Functional Area Investigations and Draft Reports						
DD 1.16.1	Advanced Traffic Management Systems (ATMS)						
DD 1.16.2	Drainage (Stormwater Management, Sewer, Culverts)						
DD 1.16.3	Electrical (Illumination/Traffic Signals)						
DD 1.16.4	Environmental Investigations						
DD 1.16.5	Foundation						
DD 1.16.6	Geotechnical and Pavement						
DD 1.16.7	Highway Engineering (Planning and Design)						
DD 1.16.8	Hydrology						
DD 1.16.9	Structural						
DD 1.16.10	Traffic						
DD 1.17	Composite Utility Plan						
	Initial Design						
DD 1.18	Review Preliminary Design Plans						
DD 1.19	Review External Contact Concerns						

Master Task List - Detail Design Stage - September 2016							
GWP:		Description:					
Highway:							
Task Number	Tasks (Expand/Contract List as Appropriate)	Required		Start Date	Original Completion Date	Current Planned Completion Date	Actual Completion Date
		Yes	No				
	and Document						
DD 1.20	Analysis of Existing Conditions/Design Data						
DD 1.21	List of Deficiencies from Current Standards						
DD 1.22	List of Deficiencies Due to Condition						
DD 1.23	Establish Fundamental Design Elements and Requirements						
DD 1.24	Generate Detail Design Alternatives						
DD 1.25	Assess Detail Design Alternatives						
DD 1.25.1	Consultation with Stakeholders (See DD Phase 2 for Typical Tasks for PICs)						
DD 1.26	Evaluate Detail Design Alternatives						
DD 1.27	Select Preferred Detail Design Alternative						
DD 1.28	Initial Development of Preferred Design						
DD 1.28.1	Pavement Engineering Design Meeting						
DD 1.28.2	Preliminary Horizontal and Vertical Alignments, Including Interchanges, Intersections, Side Roads, Etc.						
DD 1.28.3	Preliminary Grading Design and Mass Haul						
DD 1.28.4	Preliminary Intersection Design and Lane Configurations						
DD 1.28.5	Typical Cross Sections						
DD 1.28.6	Preliminary Roadway Drainage Concepts						
DD 1.28.7	Preliminary Electrical Drawings						
DD 1.28.8	Preliminary Power Supply						

Master Task List - Detail Design Stage - September 2016							
GWP:		Description:					
Highway:							
Task Number	Tasks (Expand/Contract List as Appropriate)	Required		Start Date	Original Completion Date	Current Planned Completion Date	Actual Completion Date
		Yes	No				
	Locations						
DD 1.28.9	Preliminary ATMS Layouts						
DD 1.28.10	Preliminary PHM-125 Drawings						
DD 1.28.11	Preliminary Landscaping Layouts and Concepts						
DD 1.28.12	Preliminary General Arrangement Drawings for the Structures and Structural Culverts (Span Greater than 3m)						
DD 1.28.13	Preliminary Construction Staging/Detours/Access/ Egress						
DD 1.28.14	Preliminary Traffic Management Plan						
DD 1.28.15	Draft Communication Plan						
DD 1.28.16	Preliminary Constructability Review						
DD 1.28.17	Preliminary Construction Cost Estimate						
DD 1.28.18	Preliminary Working Day Estimate						
DD 1.28.19	Preliminary Utility Relocations Identified						
DD 1.28.20	Preliminary Property Requirements Identified						
DD 1.28.21	Draft Environmental Conditions Report and Mitigating Measures						
DD 1.28.22	Approval Requirements Established						
DD 1.28.23	Preliminary Drawings Completed						
DD 1.28.24	Preliminary Design Documentation Completed						
DD 1.28.25	Compatibility of Design Elements Confirmed						

Master Task List - Detail Design Stage - September 2016							
GWP:		Description:					
Highway:							
Task Number	Tasks (Expand/Contract List as Appropriate)	Required		Start Date	Original Completion Date	Current Planned Completion Date	Actual Completion Date
		Yes	No				
DD 1.28.26	Value Engineering Study, when Appropriate						
DD 1.29	Prepare Design Criteria (if not Already Done)						
DD 1.30	Prepare Design Criteria Addenda (if Revision Required)						
DD 1.31	Functional Area Final Reports						
DD 1.31.1	Advanced Traffic Management Systems (ATMS)						
DD 1.31.2	Drainage (Stormwater Management, Sewer, Culverts)						
DD 1.31.3	Electrical (Illumination/Traffic Signals)						
DD 1.31.4	Environmental Reports						
DD 1.31.5	Foundation						
DD 1.31.6	Geotechnical and Pavement						
DD 1.31.7	Highway Engineering (Planning and Design)						
DD 1.31.8	Hydrology						
DD 1.31.9	Structural						
DD 1.31.10	Traffic						
DD 1.32	Engineering Survey Deliverables Completed						
DD 1.33	Submission for 30% Design Team Review Meeting						
	Initial Design Review						
DD 1.34	30% Design Team Review Meeting						
DD 1.35	Address Concerns from 30% Design Team Review Meeting						
DD 1.36	Geotechnical Section to Confirm the Pavement Design						
DD 1.37	Submission for 30% Engineering Review Meeting						
	Initial Design Approval						

Master Task List - Detail Design Stage - September 2016							
GWP:		Description:					
Highway:							
Task Number	Tasks (Expand/Contract List as Appropriate)	Required		Start Date	Original Completion Date	Current Planned Completion Date	Actual Completion Date
		Yes	No				
DD 1.38	30% Engineering Review Meeting (Optional)						
DD 1.39	Design Criteria Sign-off Meeting (Optional in Some Regions)						
DD 1.40	Design Criteria Approval (if not Already Completed)						
DD 1.41	Design Criteria Addenda Approval (if Revision Required)						
DD 1.42	Initial Design Approval						
DD 1.43	Environmental Approval Addenda, if Required						
DD 1.44	Scope and Cost Report Revision, if Necessary						
DD 1.45	Quality Control Check						
DD 1.46	Quality Assurance Check						
DD 2	**Detail Design Stage - Phase 2: Final Design (30% to 60% completion)**						
	Final Design						
DD 2.1	Consultation						
DD 2.1.1	PIC Display Materials						
DD 2.1.2	PIC Questions and Answers Prepared						
DD 2.1.3	Management Approval of PIC Materials						
DD 2.1.4	Design Presentation to Councils						
DD 2.1.5	PIC Held						
DD 2.1.6	PIC Summary Report						
DD 2.2	Fisheries Compensation Plan						
DD 2.3	Federal/Provincial Applications						
DD 2.4	Municipal Bylaw Exemptions						
DD 2.5	Final Functional Area Final Reports (if not Already Completed)						
DD 2.6	Transportation Environmental Study Report, if Done in Detail Design and not Already Completed						

Master Task List - Detail Design Stage - September 2016							
GWP:		Description:					
Highway:							
Task Number	Tasks (Expand/Contract List as Appropriate)	Required		Start Date	Original Completion Date	Current Planned Completion Date	Actual Completion Date
		Yes	No				
	and Submitted						
DD 2.7	Transportation Environmental Study Report Addenda, if Required						
DD 2.8	Draft Design and Construction Report						
DD 2.9	Environmental Screening Document (Class EA Group C)						
DD 2.10	Final General Arrangement Drawings for the Structures and Structural Culverts (Span Greater than 3m)						
DD 2.11	All Final Drawings Completed (Typically 1:500 Scale)						
DD 2.12	Final PHM-125 Drawings						
DD 2.13	Final Power Supply Locations						
DD 2.14	Final Entrance Drawings						
DD 2.15	Final Traffic Management Plan						
DD 2.16	Final Communication Plan						
DD 2.17	Final Grading Design and Mass Haul						
DD 2.18	Constructability Review (Unless a Formal Constructability Review Report Process Followed)						
DD 2.19	Final Utility Relocation Plan						
DD 2.20	Utility Move Order Issued (Notice to Take-Up, Remove or Change the Location of Appliances or Works)						
DD 2.21	Final Property Request Issued						
DD 2.22	Final Environmental Conditions Report and Mitigating Measures						
DD 2.23	Compatibility of Design Elements Confirmed						
DD 2.24	Construction Staging/Detours/Access/Egress						
DD 2.25	Traffic Management Meeting						

Master Task List - Detail Design Stage - September 2016							
GWP:		Description:					
Highway:							
Task Number	Tasks (Expand/Contract List as Appropriate)	Required		Start Date	Original Completion Date	Current Planned Completion Date	Actual Completion Date
		Yes	No				
	(Includes Staging and Detours)						
DD 2.26	Management Approval of Staging and Traffic Management (Engineering, Operations and Traffic)						
DD 2.27	Final Traffic Management Plan						
DD 2.28	Final Public Communications Plan						
DD 2.29	Updated Working Day Estimate						
DD 2.30	Updated Cost Estimate						
DD 2.31	Design Criteria Addenda, if Required						
DD 2.32	Draft Cost Sharing Agreements/Legal Agreements						
DD 2.33	Environmental Activity and Sector Registration or Permit to Take Water) by 60% Detail Design Completion						
DD 2.34	Quality Control Check						
DD 2.35	Quality Assurance Check						
DD 2.36	Electrical Review Meeting						
DD 2.37	Submission Package for 60% Design Team Review Meeting						
	Final Design Review						
DD 2.38	Design Reviewed in Field (Review with 60% Package).						
DD 2.39	Electrical Design Review Meeting						
DD 2.40	60% Design Team Review Meeting						
DD 2.41	Project Team Confirms Compatibility Among Design Elements						
DD 2.42	Address Concerns from 60% Design Team Review Meeting						
DD 2.43	Submission for 60% Engineering Review Meeting						
	Final Design Approval						

Master Task List - Detail Design Stage - September 2016							
GWP:		Description:					
Highway:							
Task Number	Tasks (Expand/Contract List as Appropriate)	Required		Start Date	Original Completion Date	Current Planned Completion Date	Actual Completion Date
		Yes	No				
DD 2.44	60% Engineering Review Meeting (Optional)						
DD 2.45	Approval of Design						
DD 2.46	Design Criteria Addenda Approval (if Revision Required)						
DD 2.47	Scope and Cost Report Revision, if Necessary						
DD 2.48	Quality Control Check						
DD 2.49	Quality Assurance Check						
DD 3	**Detail Design Stage - Phase 3: Contract Preparation (60% to contract documents complete)**						
	Contract Documentation						
DD 3.1	Prepare Contract Package and Documents						
DD 3.2	Formal Constructability Review (when Required)						
DD 3.3	Contract Package Revised After Formal Constructability Review						
DD 3.4	Formal Constructability Review Report						
DD 3.5	Final Construction Cost Estimate						
DD 3.6	Final Working Day/Completion Date Estimate						
DD 3.7	Erosion and Sediment Overview Assessment						
DD 3.8	Erosion and Sediment Control Plan						
DD 3.9	Summary of Environmental Concerns and Commitments						
DD 3.10	Design and Construction Report (Class EA Groups A and B)						
DD 3.11	Environmental Synopsis						
DD 3.12	Class EA Monitoring Questionnaire						
DD 3.13	Federal/Provincial Applications Approvals						
DD 3.14	Municipal Bylaw Exemptions Approvals						

Master Task List - Detail Design Stage - September 2016							
GWP:		Description:					
Highway:							
Task Number	Tasks (Expand/Contract List as Appropriate)	Required		Start Date	Original Completion Date	Current Planned Completion Date	Actual Completion Date
		Yes	No				
DD 3.15	Environmental Clearance for Utility Relocation						
DD 3.16	Environmental Clearance for Right-of-Way Designation						
DD 3.17	Environmental Clearance for Property Expropriation						
DD 3.18	Confirm Utility Relocations Started						
DD 3.19	Assist Property Section with Acquisitions						
DD 3.20	Secure Entrance Agreements						
DD 3.21	Hearing of Necessity						
DD 3.22	Aggregate Sources List, if Required						
DD 3.23	Earth Management Plan						
DD 3.24	Design Criteria Revision/Confirm Design Matches Design Criteria						
DD 3.25	Design Synopsis Report						
DD 3.26	Communication Synopsis						
DD 3.27	Scope and Cost Report Revision, if Necessary						
	Design Team Final Review						
DD 3.28	Submission for Design Team Final Review of Contract Package						
DD 3.29	Design Reviewed in Field (Review with Contract Package).						
DD 3.30	Design Team Final Review of Contract Package and Provide Comments						
DD 3.31	Confirm Design Compatibility Among Disciplines						
DD 3.32	Contract Review Officer Comments						
DD 3.33	Design Complete Team Review Meeting (Optional)						
DD 3.34	Contract Package Revised to Incorporate Changes						
	Contract Documents Complete						

Master Task List - Detail Design Stage - September 2016							
GWP:		Description:					
Highway:							
Task Number	Tasks (Expand/Contract List as Appropriate)	Required		Start Date	Original Completion Date	Current Planned Completion Date	Actual Completion Date
		Yes	No				
DD 3.35	Quality Control Check to Confirm Changes Made						
DD 3.36	Quality Assurance Check by Ministry's Project Manager						
DD 3.37	Submission for Design Complete Presentation Meeting						
DD 4	**Detail Design Stage - Phase 4: Contract Review and Approval**						
	Contract Package Review						
DD 4.1	Design Reviewed in Field (Review with Contract Package) if not Done Before the Design Complete Team Review Meeting						
DD 4.2	Electrical Design Review Meeting						
DD 4.3	Design Complete Presentation Meeting						
DD 4.4	Contract Package Revision Completed						
DD 4.5	Quality Control Check to Confirm Changes						
DD 4.6	Quality Assurance Check to Confirm Changes						
DD 4.7	Scope and Cost Report Revision, if Necessary						
	Executive Review						
DD 4.8	Submission for Executive Presentation Submission						
DD 4.9	Executive Presentation Meeting						
DD 4.10	Contract Package Revision Completed						
DD 4.11	Regional Director Info Session/Presentation Submission						
DD 4.12	Regional Director Info Session/Presentation						
DD 4.13	Contract Package Revision Completed						
DD 4.14	Confirm Cost Sharing/Legal Agreements Executed						

Master Task List - Detail Design Stage - September 2016							
GWP:		Description:					
Highway:							
Task Number	Tasks (Expand/Contract List as Appropriate)	Required		Start Date	Original Completion Date	Current Planned Completion Date	Actual Completion Date
		Yes	No				
DD 4.15	Confirm all Clearances Obtained						
DD 4.16	Environmental Approval for Construction Start						
DD 4.17	Confirm No Outstanding Issues						
DD 4.18	Quality Control Check						
DD 4.19	Quality Assurance Check						
DD 5	**Detail Design Stage - Phase 5: Tendering**						
	Tendering						
DD 5.1	Design Documentation Submitted						
DD 5.2	Contract Package Submission Form Completed						
DD 5.3	Contract Package Submission for Tendering						
DD 5.4	Respond to Questions from Contract Tendering Section/Complete Changes to Submitted Package						
DD 5.5	Contract Advertising						
DD 5.6	Respond to Contractor Bid Enquiries						
DD 5.7	Prepare Contract Addenda During Bidding						
DD 5.8	Provide Information to Bidders During Tendering						
DD 5.9	Design Package Handover Meeting						
DD 5.10	Tender Opening						
DD 5.11	Quality Control Check						
DD 5.12	Quality Assurance Check						
	Contract Award						
DD 5.13	Quality Management Documented						

Appendix C6: Master Task List Construction Stage

Master Task List – Construction Stage - September 2016							
GWP: Highway:		Description:					
Task Number	Tasks (Expand/Contract List as Appropriate)	Required		Start Date	Original Completion Date	Current Planned Completion Date	Actual Completion Date
		Yes	No				
C	**Construction Stage**						
	During Construction						
C 1	Quality Management Plan Established for Construction Stage						
C 2	Construction Start						
C 3	Cost Sharing Agreements (Payment Action After Contract Award)						
C 4	Construction Liaison						
C 5	Cost Recovery for Faulty Design						
C 6	Contractor Change Proposals						
C 7	Construction Site Meetings						
C 8	Highway Commissioning						
C 9	Construction Complete						
	Post Construction						
C 10	Engineering Office Project Construction Report Review Meeting						
C 11	Project Construction Report Reply						
C 12	Design Package Evaluation Meeting						
C 13	Post Construction Engineering Appraisal (as per Current Requirements)						
C 14	Designation of Right-of-Way						
C 15	Surplus Property Identification						
C 16	Post Construction Environmental Monitoring						
C 17	Quality Control Check						
C 18	Quality Assurance Check						

Master Task List – Construction Stage - September 2016							
GWP:		Description:					
Highway:							
Task Number	Tasks (Expand/Contract List as Appropriate)	Required		Start Date	Original Completion Date	Current Planned Completion Date	Actual Completion Date
		Yes	No				
C 19	Quality Management Documented						
C 20	Project File Retention and Storage						