

VIII. Preliminary Engineering – Project Package

- A. Overview.** Preliminary Engineering begins after the project has been identified in the Tribe’s Long Range Transportation Plan (LRTP) and the FHWA-approved Tribal Transportation Improvement Program (TTIP) (see [Chapter VI - Transportation Planning](#)).

Preliminary Engineering for a project includes completion of the NEPA document, environmental review, and environmental permits (see [Chapter VII - Preliminary Engineering - NEPA and Other Environmental Requirements](#)), development of the **project package**, acquisition of right-of-way (see [Chapter IX - Preliminary Engineering - Right-of-Way \(ROW\)](#)), and advertisement and procurement of the project’s construction contract (see [Chapter X- Procurement, Construction Bid Advertisement and Award](#)).

The Tribe is responsible for developing and compiling **project packages** (25 CFR § 170.111), except when a Tribe/Consortium has transferred this responsibility to the BIA through a Direct Services MOU, to the BIA through an RSA, or to an agency through a Project Agreement. A project package includes all the construction details, provisions, permits, agreements, conditions, and certifications required to administer a construction project. Included in the project package are the **Plans, Specifications, and Estimate (PS&E)**, approved by the Tribe, and any FHWA-approved design exceptions. Approval of design exceptions and ensuring complete project packages are part of FHWA’s stewardship and oversight responsibilities under the TTP. Additionally, Tribes may request FHWA’s technical assistance during development of the project package.

- B. Ice Roads.** Ice roads may be placed on the National Tribal Transportation Facility Inventory (NTTFI) pursuant to 25 CFR §§ 170.5 and 170.117.

Developing and operating an ice road has inherent risks. To minimize and mitigate the risks, Tribes should follow the best available references. Appendix C - [Exhibit 8.1 - Ice Road Information](#) can be used as an available reference when preparing to develop and operate an ice road. It contains information compiled from three different sources:

- [BEST PRACTICE for Building and Working Safely on Ice Covers in Alberta, January 2013](#)
- [GUIDELINES FOR SAFE ICE CONSTRUCTION 2015, Northwest Territories Transportation](#)
- [U.S. Army Cold Regions Research & Engineering Laboratory - Safety on Floating Ice Sheets](#)

It is incumbent upon the Tribe to review and apply the best available references before opening an ice road to the public. Records of ice thickness and condition should be maintained in the tribal files. The tribal files should also identify the NTTFI numbers and sections that make up the ice road.

An example **Ice Inspection Form** that Tribes may use to record ice thicknesses and condition is located on the last two pages of [Exhibit 8.1 - Ice Road Information](#) in Appendix C.

- C. Plans, Specifications, and Estimate (PS&E).** Development of the PS&E includes design of the facility, and may also include performing a topographic and right-of-way (land ownership) survey of the project corridor, geotechnical and hydraulic field reconnaissance and analysis, coordination with utility companies, and acquiring right-of-way. The PS&E is also called the “PS&E package” in 25 CFR Part 170 and the TTPA.
- 1. Resources to develop the PS&E.** A Tribe can develop the PS&E in-house, or contract the service out to an engineering consultant, or use the services of a Federal, State or local agency or

governments through a Project Agreement (see [Chapter V – Request for Services and Project Agreements](#)).

The TC should provide information to the Tribe to help the Tribe decide which resources are available and appropriate to use for developing the PS&E.

If the Tribe decides to contract a consultant to develop the PS&E, it is important that the Tribe writes a good Statement of Work (SOW) which defines in detail what the consultant must design and submit to the Tribe, including deliverables, due dates and period of performance. The SOW is written prior to solicitation in hiring a consultant, and becomes an important part of the contract with the consultant. A well written, specific SOW will help save the Tribe time and money.

2. **Design Standards.** TTP funded projects are required to follow the design standards listed in [25 CFR Part 170 Appendix B to Subpart D](#). Other design standards may be used if submitted to and approved by FHWA. See 25 CFR §170.454.

This design standards requirement applies to seasonal as well as non-seasonal transportation routes (see 25 CFR § 170.117). A “Seasonal Transportation Route” is defined in 25 CFR § 170.5, and includes snowmobile trails, ice roads, and overland winter roads.

The **Manual on Uniform Traffic Control Devices (MUTCD)** is included in the design standards listed in [25 CFR Part 170 Appendix B to Subpart D](#). The MUTCD 2009 Edition is located at <http://mutcd.fhwa.dot.gov/>

Here are some important questions and answers (**Q** and **As**) on the **MUTCD**:

Q: Are dual language signs permitted on public roads?

A: No. The MUTCD does not include provisions permitting dual language signs on public roads.

Q: What is the MUTCD?

A: The MUTCD contains the national standards governing all traffic control devices. All public agencies, Tribes, and owners of private roads that are open to public travel across the nation rely on the MUTCD to bring uniformity to the roadway. The MUTCD plays a critical role in improving safety and mobility of all road users.

Q: Is the MUTCD law?

A: Yes. The MUTCD is the law governing all traffic control devices. Non-compliance with the MUTCD ultimately can result in the loss of Federal-aid funds as well as in a significant increase in tort liability.

Q: Why is compliance with the MUTCD important?

A: Uniformity of traffic control devices is critical in highway safety and mobility, as well as reducing the purchase and maintenance costs of traffic control devices for public agencies, Tribes, and manufacturers. The success of the MUTCD depends on nationwide acceptance and application of the MUTCD, as well as extensive participation by the practitioners in developing and evaluating the content of the MUTCD.

Q: How is the MUTCD updated?

A: The FHWA has established a sound process to include new devices and applications in the MUTCD. The process involves the Federal Register rulemaking activity, which encourages public involvement. Any interested person, Tribe, or organization may provide input to the rulemaking activity by submitting comments to the docket. The process encourages innovation and flexibility while maintaining uniformity. Input from practitioners and all other stakeholders is critical in keeping the MUTCD current and relevant.

3. **Conformance with the project scope and the TTIP.** Development of the PS&E for a transportation project should be based on the project scope defined in pre-project planning, and as shown on the FHWA-approved TTIP (see [Chapter VI - Transportation Planning](#)).
4. **Recommended best practices for project design.** The project design that goes into the PS&E should address these key objectives:
 - Improve safety for all users,
 - Promote project design choices that are consistent with Tribal transportation plan and policies,
 - Compatible with the NEPA analysis, environmental consultations and permits for the project,
 - Provide facility designs that meet the functional and operational goals established by the project purpose and need in the NEPA process,
 - Provide accessibility for people with disabilities,
 - Compatible with other transportation modes, facilities and land uses,
 - Cost effective to ensure value returned, and
 - The project is sensitive to the local context and meets the needs of the people it serves.

The need for early identification of issues and alternatives is important. Before design begins, the Tribe and all stakeholders need to identify and agree on what type of facility is desired and what work will be included in the project. In addition, community values, natural, historic, and cultural resources should be fully considered throughout the design process. The Tribe is responsible for making sure that the key objectives for design, as listed above, are met.

5. **Recommended PS&E design phases.** There is nothing in regulations or law requiring a Tribe to develop the PS&E at intermediate design phases (for example, 30%, 75%), or to submit intermediate PS&Es for review or approval. A Tribe is only required to submit a final PS&E prior to project construction. However, development of, and review of, a PS&E at certain design phases is a good practice that the TC should encourage Tribes to implement.

A good guideline for development and review submittal of PSE packages is at 30/75/100% design phases, but these should remain flexible and negotiable.

The following are the recommended optional design phases.

a. 30% (Preliminary) Design Phase includes the following:

- Conduct research as necessary to identify existing property boundaries and current ownership of all right of way, and all private, native, native corporation and other lands in the proposed project corridor.
- Prior to performing topographical (ground) survey for the project design, request the utility companies to mark on the ground the locations of their existing utilities, so that the topographical survey can pick up these ground markings, and the locations displayed on the project plans and cross-sections.
- Complete the electronic base mapping and topographic survey files prior to beginning roadway line and grade design. Include in the mapping boundary and ownership information, existing utility locations, and environmental features (wetlands, archeological or historical features, etc.).
- Plan and profile design sheets, typical sections, cross-sections (showing existing ground and proposed roadway, and an approximate construction cost estimate.
- A Design narrative highlighting the significant engineering, right-of-way, geotechnical, hydraulic, utility relocation, and environmental issues.

- Send copies of the plans and cross-sections be sent to the utility companies, showing locations of existing utilities, to make them aware of any conflicts with their facilities.
- An on-site meeting with all project development disciplines, and stakeholders to discuss the progress of the project.
- A completed and signed project NEPA document, addressing the design and other information at this phase.

b. 75% (Plan-in-Hand) Design Phase includes the following:

- Revisions to the 35% Intermediate Design based on review comments, environmental requirements from the project NEPA document, environmental consultations and permits, and new information.
- If the NEPA document for the project is completed and signed at this point, the acquisition of right-of-way can begin, including mapping (platting) of the proposed right-of-way, contact and negotiations with the affected landowners, and purchase of the new right-of-way. Project plans including a cover letter with cross sections are at the 75% design phase should be sent to the utilities companies for their input and coordination. The cover letter should list locations where utilities may need to be relocated due to the proposed project design.
- Design details such as major drainage structures, walls, guardrails, subexcavation, temporary erosion control, intersection layouts, and revegetation.
- Complete set of plans representing a draft of all the plan sheets that will be in the 100% plans. Included are complete detail drawings with dimensions.
- Complete quantity tables for all work, including pay items and the non-pay items (information only items).
- The footprint of the designed cuts and fills, to determine right-of-way acquisition needs and environmental effects needed to apply for permits. Ensure that the designed fill and cut banks, and other design features, fall inside the planned ROW boundary.
- Detailed quantity estimate and project pay item listing, and engineer's estimate for all project pay items.
- Standard and supplemental specifications, including anticipated environmental work windows, work shutdowns, and impacts to public traffic.
- After design revisions are made, check to ensure the designed facility is still within the ROW limits.
- Conduct an on-site "plan-in-hand" field review after the 70% PS&E is completed. The field review should be attended by the Tribe, personnel from the consultant or agency performing the design, the stakeholders (any Federal or state land management agencies and local governments in the project area), and others as appropriate.
- Draft NPDES Stormwater Pollution Prevention Plan.
- Apply for environmental and other required permits (once NEPA documents are approved).
- Brief design narrative highlighting the significant engineering and environmental issues identified to date.

c. 100% (Final) Design Phase includes the following:

- Revisions to the Plan-in-Hand (75%) Design based on review comments, the 70% field review, and the requirements of environmental permits and environmental consultations.
- Detailed project design, plans, cross-sections and engineer's estimate.
- All right-of-way needed for the project should be acquired and certified. Send the 100% (final) set of plans to the utility companies for final resolution of utility relocations. The

utility companies, the Tribe and the owner agency (if different than the Tribe) of the road or trail should draft agreements which describe who will be responsible for the utility relocation, estimate of utility relocation cost, the cost share of each party involved, and utility plans approval.

- Conduct a meeting with the project stakeholders to review the final plans. The meeting provides stakeholders an opportunity to ensure that their comments on the previous phases of the PS&E have been addressed in this Final PS&E.

D. Design Exceptions. A design exception is any deviation from the approved design standards for a project. The design exception process is addressed by 25 CFR §§ 170.456 and 170.457.

The Tribe submits a design exception request to the TC. A Tribe should submit design exception requests early on in the development of the PS&E. All design exceptions must be submitted by the Tribe before the licensed civil engineer certifies (seals) the project plans.

The FHWA Program Delivery Manager reviews the design exception request and recommends approval/denial to the FHWA Program Director, within 30 days of the TC's receipt of the design exception request from a Tribe. If the road with the requested design exception is under BIA ownership, BIA will review, recommend, and concur with as appropriate, the design exception request.

Design exception requests submitted by a Tribe shall include the following written documentation from a State registered Civil Engineer: supporting data, sketches, details, and justification based on engineering analysis. Also, it is recommended that the form in Appendix C - [Exhibit 8.2 - Highway Design Standards Certification](#) be completed and submitted with the design exception request.

When deciding whether or not to approve a design exception for a project, FHWA will consider the following project factors:

- The effect the design exception will have on the project's service and safety benefits;
- Any cost savings created by the design exception;
- The compatibility of the design exception with adjacent features on the project; and
- The effect the design exception will have on the time before reconstruction of the project is necessary due to changed conditions or transportation demands.

Design exceptions may be granted for:

- Experimental features on projects, and
- Projects where conditions warrant that exceptions be made.

E. Review of PS&Es by FHWA. FHWA do not approve the PS&E. The TC reviews the project package for completeness and only in enough detail to be sufficiently familiar with the project to conduct meaningful construction reviews during and at completion of construction. The TC informs the Tribe whether the project package is complete or not. If not complete, the TC identifies missing components and Tribe resubmits package.

Although the TC does not conduct a detailed review of the project package, if a design deficiency that may jeopardize public health and safety is identified, the TC will discuss the deficiency with the FHWA Program Delivery Manager, then notify the Tribe of the design deficiency and request that the Tribe promptly resolve the deficiency.

If a Tribe requests FHWA to perform a complete review of a PS&E, FHWA reserves the right to decline the request, or establish a way for the Tribe to provide payment for this service through a contract or project agreement with FHWA.

F. Preparation and Submittal of the Final Project Package

1. **Tribal certification of the PS&E.** 23 U.S.C. § 202(b)(5) allows an Indian Tribal government to certify (approve) plans, specifications, and estimates (PS&Es). The following requirement must be met by the Tribal government when approving a PS&E.
 - A licensed civil engineer (licensed in the State where the project is located) must certify (seal) on the project plans and specifications that these meet applicable health and safety standards according to 25 CFR § 170.461.
2. **Submittal of the Final Project Package.** The Tribe shall submit the project package to the TC before the start of project construction (25 CFR § 170.461). The final project package shall include the following (25 CFR §§ 170.460 and 170.461):
 - Approved PS&E (Approval means stamped by a professional engineer registered in the state where the project is located.)
 - Assurance that the construction will meet or exceed applicable health and safety standards
 - A tribal resolution or other authorized document supporting the project.
 - Certification of the required right-of-way, easement, or public taking documentation clearances.
 - Required environmental, archeological, and cultural clearances.
 - FHWA-approved Design Exceptions, if used in the plans.
 - **Tribe's Certification on Public Authority Review** (see 25 CFR § 170.5 for definition of public authority). The Tribe must certify in writing to the FHWA Administrator, prior to soliciting bids for a project, that the Tribe gave the public authority an opportunity for a 30 day review and comment on the PS&E (when the PS&E was between 75% and 95% complete), the Tribe addressed all comments, and the Tribe did not receive any written comments from the public authority that prevent the Tribe from proceeding with the project (see the TTPA - Article III). This is required on those facilities owned or maintained by a public authority other than the Tribe or the BIA. A template of the letter that Tribes may use is shown in Appendix C - [Exhibit 10.1 - Tribe Certification Letter for Soliciting Bids.](#)

Recommended additional items include:

- The PS&E Certification Checklist (See Appendix C - [Exhibit 8.3.](#))
- Utility agreements.
- If the project includes a facility maintained by a Public Authority other than the BIA or a Tribe, then the Tribe should include an agreement between the public authority and the Tribe that delineates the roles and responsibilities of the two entities for the development, construction, and continued maintenance of the project after construction.

G. PS&E Resources.

- Federal Lands Highway's "*Project Development and Design Manual*" (PDDM) at <https://flh.fhwa.dot.gov/resources/design/pddm/>
- FHWA standard specifications "*Standard Specifications for Construction of Roads and Bridges on Federal Highway Projects, FP-14* (FP-14) at <https://flh.fhwa.dot.gov/resources/specs/>
- FLH supplemental specifications at <https://flh.fhwa.dot.gov/resources/specs/>

- *A Policy on Geometric Design of Highways and Streets, 6th Edition 2011 AASHTO* (the “Green Book”).
- *Guidelines for Geometric Design of Very Low-Volume Roads (ADT \leq 400), 2001 AASHTO.*
- *AASHTO Roadside Design Guide, 4th Edition, 2011.*
- *AASHTO A Guide for Transportation Landscape and Environmental Design.*
- *AASHTO Guide for Selecting, Locating and Designing Traffic Barriers*, latest edition.
- *AASHTO Standard Specifications for Highway Bridges*, latest edition.
- *Manual on Uniform Traffic Control Devices (MUTCD) 2009 Edition*, DOT, FHWA, 2009 at <http://mutcd.fhwa.dot.gov/>
- FHWA Utilities Guidelines at https://www.fhwa.dot.gov/real_estate/right-of-way/utility_rights-of-way/index.cfm
- FHWA Right-Of-Way Guidelines at https://www.fhwa.dot.gov/real_estate/index.cfm
- FLH Right-Of-Way and Utilities web site at <https://flh.fhwa.dot.gov/resources/row/index.htm>
- FHWA *Flexibility in Highway Design* at <http://www.fhwa.dot.gov/environment/publications/flexibility/flexibility.pdf>
- FHWA *Roadside Improvements for Local Roads and Streets* at <http://www.fhwa.dot.gov/publications/research/safety/00002/00002.pdf>
- 23 CFR § 625, Design Standards for Highways at <http://www.fhwa.dot.gov/legsregs/directives/fapg/cfr0625.htm>
- 23 CFR § 630, Preconstruction Procedures at <http://www.fhwa.dot.gov/legsregs/directives/fapg/cfr0630c.htm>
- 23 CFR § 633, Required Contract Provisions at <http://www.fhwa.dot.gov/legsregs/directives/fapg/cfr0633a.htm>
- 23 CFR § 635, Construction and Maintenance at <http://www.fhwa.dot.gov/construction/contracts/930721.cfm>
- 23 CFR § 645, Utilities at <http://www.fhwa.dot.gov/legsregs/directives/fapg/cfr0645a.htm>
- 23 CFR § 646, Railroads at <http://www.fhwa.dot.gov/legsregs/directives/fapg/cfr0646a.htm>
- 23 U.S.C. § 106, PS&E at <http://www.fhwa.dot.gov/map21/docs/title23usc.pdf>
- 23 U.S.C. § 109, Standards at <http://www.fhwa.dot.gov/map21/docs/title23usc.pdf>
- *FHWA Hydraulic Design Series (HDS-5), "Hydraulic Design of Highway Culverts, 3rd Edition"* at http://www.fhwa.dot.gov/engineering/hydraulics/library_arc.cfm?pub_number=7&id=13
- FLH Standard Drawings and Detail Drawings at <http://flh.fhwa.dot.gov/resources/pse/standard/>
- Geopak and Microstation information at <https://flh.fhwa.dot.gov/resources/cadd/>
- FHWA-approved State standards.