

XI. Plans, Specifications, and Estimates (PS&E) Development

Overview. Construction management includes several major steps with sub-stages in each major step, including pre-planning, conceptual design, PS&E development, bidding and awarding contracts, project execution and construction, project monitoring, and project completion.

In the PS&E development, also referred to as Project Development, the process takes a transportation improvement from concept through design. 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 coordination with right-of-way acquisition.

The primary function of design is to designate those standards, policies, and standard specifications that are acceptable for application in the geometric and structural features of highways, roads, bridges, and trails. Key objectives for design should include:

- Improving safety for all users,
- Promoting project design choices that are consistent with Tribal transportation plan and policies,
- Compatibility with the NEPA analysis, environmental consultations and permits for the project,
- Providing facility designed to meet the functional and operational goals established by the project purpose and need in the NEPA process,
- Providing accessibility for people with disabilities,
- Compatibility with other transportation modes, facilities and land uses,
- Cost effectiveness 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 role of the Tribe is to ensure the key objectives for design are met.

A. Statutory/Regulatory Requirements.

23 U.S.C. 202(b)(5) allows an Indian Tribal government to approve plans, specifications, and estimates (PS&Es).

The following requirements must be met by the Tribal government when approving a PS&E package:

1. **Assurances.** The Tribe will provide assurances that the construction will meet or exceed applicable health and safety standards. This can be accomplished by:
 - a. A State-licensed civil engineer must certify (seal) on the plans that the PS&E meets applicable health and safety standard; and
 - b. The Tribe must provide a copy of the certification letter by the State-licensed civil engineer to the Deputy Assistant Secretary for Tribal Government Affairs or to the Assistant Secretary for Indian Affairs (See Appendix A - [Exhibit 11.1 - PS&E Certification Letter](#)).

2. **Public Hearing.** (a) Criteria to determine if a public hearing will be held are listed in 25 CFR 170.435. (b) Requirements for a “Notice of No Public Hearing” are listed in 25 CFR 170.437. (c) Public hearing process is in 25 CFR 170.438 to 170.441.
3. **Environmental and Archeological.** Requirements for archeological and environmental are in 25 CFR 170.450, 25 CFR 170.451, and Appendix A to Subpart D - Cultural Resource and Environmental Requirements for the TTP.
4. **Design Standards.** Design standards are directed by 25 CFR 170.454 - 170.456. Specifically:
 - a. Standards listed in 25 CFR 170, Appendix B to Subpart D – Design Standards for the TTP.
 - b. FHWA-approved State design standards.
 - c. FHWA-approved Tribal road and bridge design standards that are consistent with or exceed applicable Federal standards.
 - d. MUTCD Manual of Uniform Traffic Safety Devices, latest edition
 - e. Standard Specifications for Construction of Roads and Bridges on Federal Highway Projects, latest edition.
 - f. Design standards used must be applied for each construction project consistent with a minimum 20-year design life for highway projects and 75-year design life for highway bridges. The design of TTP projects must take into consideration:
 - i. The existing and planned future use of the TTP transportation facility in a manner that is conducive to safety, durability, and economy of maintenance;
 - ii. The particular needs of each locality, and the environmental, scenic, historic, aesthetic, community, and other cultural values and mobility needs in a cost-effective manner; and
 - iii. Access and accommodation for other modes of transportation.
5. **Design Exceptions.** Design exception requests must be submitted to the FHWA Tribal Coordinator by the Tribe. The State registered Civil Engineer must submit written documentation with appropriate supporting data, sketches, details, and justification based on engineering analysis (See Appendix A - [Exhibit 11.2 - Highway Design Standards Certification](#)). The FHWA may grant design exceptions for:
 - a. Experimental features on projects, and
 - b. Projects where conditions warrant that exceptions be made.

The FHWA can approve a project design exception only after giving due consideration to all project conditions such as:

- a. Maximum service and safety benefits for the dollar invested;
- b. Compatibility with adjacent features; and
- c. Probable time before reconstruction of the project due to changed conditions or transportation demands.

The FHWA has 30 days from receiving the request to approve or decline the design exception (for BIA ownership, the BIA will review, recommend, and concur).

6. **Review, Content, and Approval of PS&E Package.** Criteria governing review and approval of PS&E packages are in 25 CFR 170.460 through 25 CFR 170.463. The content of the PS&E package includes, at a minimum, the following:

- a. Certified stamped plans by a State licensed professional engineer that the plan meet or exceed design, health, and safety standards.
- b. A copy of the PS&E certification letter (See Appendix A - [Exhibit 11.1 – PS&E Certification Letter](#)) by a State-licensed civil engineer that certifies the PS&E meets applicable health and safety standards, as outlined in 25 CFR 107 Appendix B to subpart D.
- c. Specifications that ensure that materials and construction techniques will meet acceptable standards.
- d. Estimates that reasonably anticipate the project cost.
- e. A Tribal resolution or other authorized document supporting the project.
- f. Certification that right-of-way clearances have been obtained.
- g. Certification that required environmental, archeological, and cultural clearances have been obtained.
- h. Design exceptions have been identified and approved (if used in the plans).
- i. Public hearing requirements have been met.
- j. Any utility agreements.

B. Guidelines / Procedures.

- 1. Development of the PS&E Package.** A Tribe can develop the PS&E package in house, contract the service out to an engineering consultant, or use the services of a Federal agency.

Under the authority prescribed in 23 U.S.C. 202, a Tribal government may request a Federal agency, such as BIA, FHWA Federal Lands Highway (FLH) and others, to perform all or parts of TTP project planning, preliminary engineering, and construction management. If so requested, a Federal agency may execute individual Project Agreements with Tribal governments to develop the PS&E if TTP funds are used. The Tribe fills out a Tribal Request for Services form as the first step (See Appendix A - [Exhibit 11.4 - Tribal Request for Services form](#)).

If the Tribe is 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 before a consultant is hired, and it becomes an important part of the contract with the consultant. A well written, specific SOW will help save the Tribe time and money.

- 2. PS&E Development Process for a BIA or Tribally Owned Facility.**

- a. Engage the services of a licensed professional engineer to supervise design and approval of the PS&E package.
- b. Ensure that the licensed professional engineer has certified that the PS&E meets or exceeds the design, health, and safety standards in Appendix B to subpart D of 25 CFR 170.
- c. Before soliciting bids for the project, provide a copy of the certification and approved PS&E package to the Deputy Assistant Secretary for Tribal Government Affairs with a copy to the BIA Regional Director and the FLH Associate Administrator.

- 3. PS&E Development Process for a Facility Maintained by a Public Authority Other Than the BIA or a Tribe.**

- a. Engage the services of a licensed professional engineer to supervise design and approval of the PS&E package.
- b. Ensure that the licensed professional engineer has certified that the PS&E meets or exceeds the design, health, and safety standards in Appendix B to subpart D of 25 CFR 170.

- c. Before soliciting bids for the project, provide a copy of the State-licensed civil engineer's certification and the approved PS&E package to the Deputy Assistant Secretary for Tribal Government Affairs with a copy to the BIA Regional Director and the FLH Associate Administrator.
- d. Develop 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.
- e. Perform the following according to the Program Agreement Article III, Section 1.C(2):
 - i. Provide the public authority the opportunity to review and comment on the Tribe's PS&E package when it is between 75% and 95% complete, unless an agreement between the Tribe and the public authority states otherwise.
 - ii. Allow the public authority at least 30 days for review and comment unless the Tribe and the public authority agree upon a longer period of time.
 - iii. Before soliciting bids for the project, certify in writing to the FHWA Administrator that it afforded the public authority an opportunity to review and comment on the PS&E package, addressed all comments, and received no written comments from the public authority that prevent the Tribe from proceeding with the project.

4. Right-of-way (ROW) and Utility Coordination. Right-of-way research, mapping and acquisition needs to occur during the proper design phases, as shown below, to keep the project development and construction on schedule. See **Chapter X. Right-of-Way (ROW)** for additional information on right-of-way.

For projects where there are existing utilities present, it is essential that the utility companies be advised early on and during the project development process, as shown below, of any developments that will affect their facilities. 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.

- **30% (Preliminary) Design Phase.** 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 adjoining the right of way. Include this boundary and ownership information onto the electronic mapping performed for the project.

Identify and map existing utilities in the project corridor. At this 30% (preliminary) design phase, it is recommended that 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.

- **50% (Intermediate) Design Phase.** 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. When the project plans are at the 50% design phase, a set of the plans and cross-sections, along with a cover letter, should be sent to the utilities companies for them. The cover letter should list locations where utilities may need to be relocated due to the proposed project design.
- **95% (Final) Design Phase.** By this time, all right-of-way needed for the project should be acquired and certified. Send the 95% (final) set of plans to the utility companies for final resolution of utility relocations. At this time, 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.

- 5. Permits and Clearances.** All required permits and clearances must be obtained prior to constructing the project. Permits are usually obtained during the 50% or 70% Design Phases after the NEPA document is approved, and the design is developed enough to provide the information needed for the permit. Required permits include, but are not limited to:
- wetland, hydraulic, other environmental,
 - railroads,
 - airports,
 - approaches onto State, county or borough roads, and
 - utilities.
- 6. Project Design Phases.** The following design phases represent key project development milestones that need to be met to produce a complete PS&E and effectively deliver the project.

On simpler projects, such as reconstruction of low volume roads, the 70% (Plan-in-Hand) Design Phase may be combined with the 50% (Intermediate) Design Phase.

a. 30% (Preliminary) Design Phase. This milestone includes completion of the following:

- Conduct research as necessary to identify existing property boundaries and current ownership of all right of way, and private, native and native corporation lands adjoining the right of way through the project corridor.
- 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.).
- The 30% Preliminary Design Plan Set should include 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.
- 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. 50% (Intermediate) Design Phase. This milestone includes completion of the following:

- Revisions to the 30% Preliminary Design based on review comments, environmental requirements from the project NEPA document, and any other new information.
- Design details such as major drainage structures, walls, guardrails, subexcavation, temporary erosion control, intersection layouts, and revegetation.
- The footprint of the designed cuts and fills, to determine right-of-way acquisition needs and environmental effects needed to apply for permits. Insure 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.
 - Brief design narrative highlighting the significant engineering and environmental issues identified to date.
- c. 70% (Plan-in-Hand) Design Phase.** This milestone includes completion of the following:
- Revisions to the 70% Intermediate Design based on review comments, environmental consultations and permits, and new information.
 - Complete set of plans representing a draft of all the plan sheets that will be in the final plans. Included are complete detail drawings showing complete dimensions.
 - Complete quantity tables for all work, including pay items and the non-pay items (information only items).
 - Final ROW limits showing areas of right-of-way acquisition. Insure that the designed fill and cut banks, and other design features, are inside the available or planned ROW.
 - A complete set of standard and supplemental specifications.
 - After design revisions are made, check if the designed facility is still in 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, if the NEPA document is approved.
 - Brief design narrative highlighting the significant engineering and environmental issues identified to date.
- d. 95% (Final) Design Phase.** This milestone includes completion of the following:
- Revisions to the Plan-in-Hand (70%) 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.
 - Conduct a meeting with the project stakeholders to review the final plans. The meeting provides stakeholders an opportunity to insure that their comments on the previous phase of the PS&E have been addressed in this Final PS&E.

7. Indian Tribal Government Approval. The Tribe reviews and approves the PS&E package.

8. Submittal of the Approved PS&E Package. Upon completion of the approved plans, the Tribe should provide FHWA and the facility owner with a complete PS&E package. The PS&E Certification Checklist (See Appendix A - [Exhibit 11.3](#)) should be included with the PS&E package.

C. Resources.

- Federal Lands Highway’s “*Project Development and Design Manual*” (PDDM) at (<http://flh.fhwa.dot.gov/resources/manuals/pddm/archives/2008.htm>)
- FHWA standard specifications “*U.S. Customary Units version of the Standard Specifications for Construction of Roads and Bridges on Federal Highway Projects, FP-03* (FP-03) at <http://flh.fhwa.dot.gov/recs/pse/specs/fp-03/>

- FLH supplemental specifications at <http://www.wfl.fhwa.dot.gov/resources/design/specs/> , or <http://www.cflhd.gov/resources/design/constructspecs/sct/>
- *A Policy on Geometric Design of Highways and Streets, 6th Edition 2011* AASHTO.
- *Guidelines for Geometric Design of Very Low-Volume Roads (ADT ≤ 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 <http://www.fhwa.dot.gov/realestate/rowutil1.htm>
- FHWA Right-Of-Way Guidelines at <http://www.fhwa.dot.gov/realestate/index.htm>
- WFL Right-Of-Way and Utilities web site at <http://www.wfl.fhwa.dot.gov/design/row>
- 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 part 625, Design Standards for Highways at <http://www.fhwa.dot.gov/legsregs/directives/fapg/cfr0625.htm>
- 23 CFR part 630, Preconstruction Procedures at <http://www.fhwa.dot.gov/legsregs/directives/fapg/cfr0630c.htm>
- 23 CFR part 633, Required Contract Provisions at <http://www.fhwa.dot.gov/legsregs/directives/fapg/cfr0633a.htm>
- 23 CFR part 635, Construction and Maintenance at <http://www.fhwa.dot.gov/construction/contracts/930721.cfm>
- 23 CFR part 645, Utilities at <http://www.fhwa.dot.gov/legsregs/directives/fapg/cfr0645a.htm>
- 23 CFR part 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/> and <http://www.wfl.fhwa.dot.gov/resources/design/details/>
- Geopak and Microstation information at <http://www.wfl.fhwa.dot.gov/resources/cadd/>
- FHWA-approved State standards.
- FHWA-approved tribal design standards.