PS&E Preparation Manual

October 2024

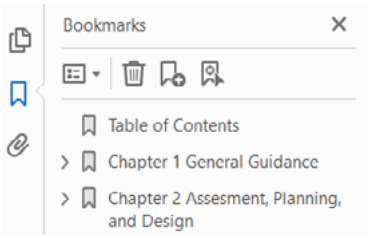
Texas Department of Transportation

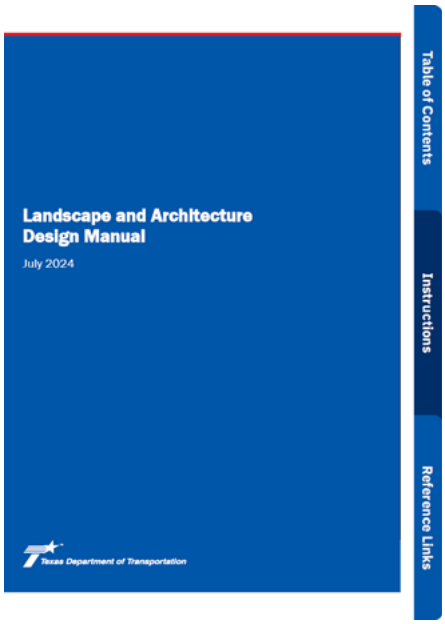
Tips for Using Your eBinder

Quick Navigation

Navigate the ebinder by clicking on the tabs to the right. Jump to each chapter and its subchaptures using the Table of Contents tab.

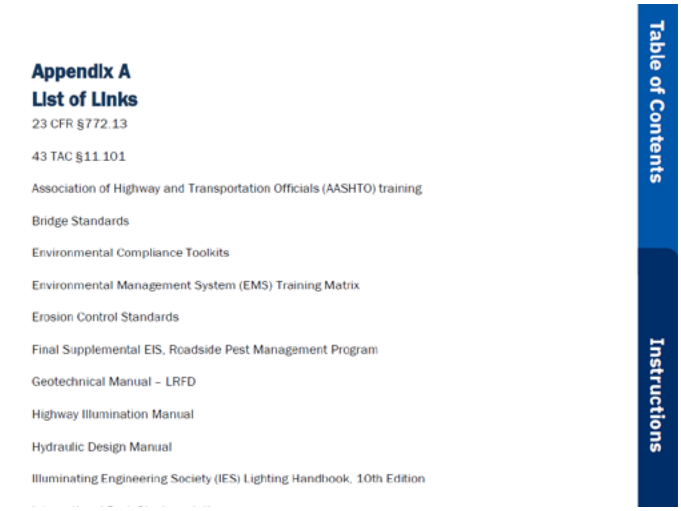
You can also explore the ebinder by clicking on the bookmark icon on the left sidebar to navigate using bookmarks in the manual.





Reference Links

All external links will link to the Reference Appendix in this eBinder. The Reference Appendix houses all external links in order of appearnce. Clicking each link in the Reference Appendix will take you to the external destination.



Manual Notice: **2024-1**

From: Jason Pike, P.E.

Manual: *PS&E Preparation Manual*

Effective Date: October 2024

Purpose

The PS&E Preparation Manual is being revised:

- To reflect improved business practices;
- To reorganize the content in a more logical sequence and to aggregate subject matter together per chapter; and
- To update processes and references to internal and external resources, and to best reflect TxDOT current standards and built projects.

Content

- Chapter 1 has been revised to include general guidance and definition of plan set delivery methods and overall manual organization.
- Chapter 2 has been revised to include pre-assembly activities including the Preliminary Design Concept Conference, development of the geometric schematic, discussion on environmental studies and clearance, activities associated with value engineering and identification of required legal documents.
- Chapter 3 has been revised to provide updated plan set development guidance for traditional plan sheets and standards. The drafting guidelines section has been modified to direct all users to the current ORD workspace.
- Chapter 4 has been revised to provide updated guidance on the use of specifications and development of the specification list through TxDOTCONNECT.
- Chapter 5 has been revised to provide updated guidance on the engineer's estimate development including determination of bid items and description codes, bid item quantities, prices and TxDOTCONNECT estimate input.
- Chapter 6 has been revised to include information on updated PS&E submission, and review and processing procedures. Details concerning engineering reviews and contract reviews have been modified including addition of a suggested milestone submittals table and reference to a new PS&E QC Milestone checklist. The list of supporting documents has been updated and new processes for submission of

Ready to Let PS&E to the Design Division have been included. Guidance for the use of construction management plans and reference to the construction management plan standard operating procedure have been included.

- Chapter 7 has been added to detail the pre-letting activities and this information has been updated for current practices including updates to the addendum process and references to the addendum standard operating procedures.
- Chapter 8 has been added to detail the post-letting activities and this information has been updated for current practices.
- Appendix A has been added to provide a list of links to resource materials.

Supersedes

The revised manual supersedes prior versions of the manual.

Instructions

The PS&E Preparation Manual applies to all projects beginning with the March 2025 Letting. The Districts and Divisions are encouraged to use this manual prior to this date.

Contact

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Archives

Past manual notices are available in a pdf archive.

Contents

Chapter 1
General Guidance

1.1 Overview

The *PS&E Preparation Manual* (PS&E Manual) provides information, guidance and references needed for the development of the plans, specifications and estimate (PS&E) for a transportation construction project at the Texas Department of Transportation (TxDOT). PS&E is prepared during the final design phase of project development as shown in **Figure 1-1**.

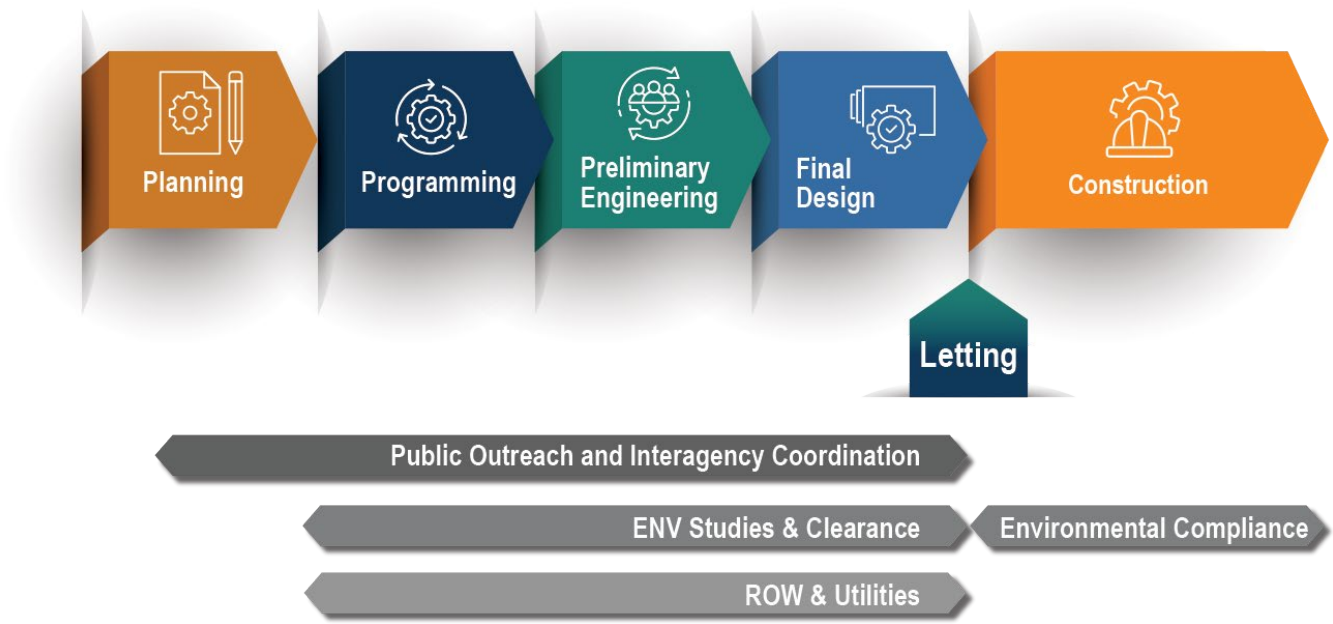

Figure 1-1: TxDOT's Project Development Process

Plans are defined as the drawings approved by the Engineer, including true reproductions of the drawings that show the location, character, dimensions, and details of the work and are a part of the Contract. Documents may include drawings or digital files (definition per the current Standard Specifications).

The three main purposes of the plans are:

- For prospective bidders to prepare a bid as accurately as possible;
- For state construction inspector-contractor teams to oversee and perform construction efficiently and accurately; and
- To provide an accurate record of the construction for future reference.

Accurate and clear plans are essential in obtaining accurate bids, efficient construction, and good permanent records. Unclear and/or incorrect plans usually result in increased costs and more work for TxDOT personnel for the following reasons:

Incomplete or inaccurate plans require additional handling and processing and, therefore, cost the State more time and money due to the following reasons:

- Data that is unclear or interpreted in more than one way can result in higher bid prices by contractors. Unclear data can also result in claims for more compensation and/or more working days by the contractor after award of the contract; and
- Incorrect or incomplete plans can precipitate change-orders which require additional processing, usually increase costs, and cause project delays.

1.2 Plan Set Delivery Methods

Plans at TxDOT are delivered in two ways:

- **Traditional** – plan sheets are the legal controlling document; and
- **Digital** – digital design files and supporting details and forms are the legal controlling document. This is referred to as "Model as the Legal Document" (MALD).

This manual describes **traditional** plan set development processes and methods. For more information concerning the delivery of digital plans, refer to TxDOT's **Digital Delivery webpage**.

1.3 Manual Organization

The PS&E Manual is formatted to present TxDOT's process in a logical and sequential order as shown in **Table 1-1**.

Table 1-1: PS&E Preparation Manual Chapter Contents

Chapter	Chapter Name	Description
1	General Guidance	Gives an overview of TxDOT's process to develop PS&E and the organization of the manual.
2	Pre-Assembly Activities	Discusses the tasks and activities performed in project development prior to the preparation of PS&E.
3	Plan Set Development	Describes the tasks and activities associated with developing a traditional PS&E plan set including plan sheets, standards, drafting guidelines, and engineer's seal and signature requirements.
4	Specifications	Presents information on TxDOT's specifications including types of specifications and provisions, new special specifications and special provisions, how to develop a specification list and development of general notes.
5	Engineer's Estimate	Discusses the development of the engineer's estimate including bid items, quantities, prices and input into TxDOTCONNECT (TxC).
6	PS&E Submission, Review and Processing	Discusses the process for PS&E review and submittal to Design Division (DES) as well as an overview of the addendum process.
7	Pre-letting Activities	Provides general descriptions of project financial authorization and clearances required.
8	Post-letting Guidelines	Discusses processes for providing overrun and underrun justification and details for local participation in projects.
Appendix A	List of Links	Provides links to documents referenced in the PS&E Preparation Manual.

Chapter 2
Pre-Assembly Activities

2.1 Preliminary Engineering Activities

2.1.1 Preliminary Design Concept Conference

The Preliminary Design Concept Conference (PDCC) is a meeting of key individuals used to evaluate and update the project scope and establish additional fundamental aspects of a project. The PDCC facilitates agreement to basic project features by concerned stakeholders and enhances relationships among those parties.

Refer to the **Project Development Process Manual** (PDP Manual) for a complete discussion and expected outcomes of the PDCC.

2.1.2 Geometric Schematic

As part of early project development, a geometric schematic may be prepared to describe the existing and proposed features and location requirements for a project. **An approved geometric schematic is required for new location or added capacity projects and for projects requiring control of access or an Environmental Impact Statement (EIS).**

Geometric layouts for other project types may be developed at the District's discretion. These layouts do not go through the formal geometric schematic approval process, but are to be developed to the same level of detail, and can be submitted as the Initial (30% PS&E design) submission (see **Section 6.2.1**).

A schematic preparation checklist can be found in the **PDP Manual**. The geometric schematic should include basic design information, which is necessary for proper review and evaluation of the proposed improvements.

Refer to the **PDP Manual** for a detailed discussion of the preliminary and final schematic preparation.

2.1.3 Environmental Studies and Clearance

In the early stages of project development of any highway project, consideration must be given to the social, economic, and environmental issues of the project. TxDOT is required to identify any social, economic, or environmental consequences on all projects. This is accomplished in cooperation and coordination with local, state and federal agencies and the public. During this process, decisions relative to public involvement or hearings and environmental requirements are necessary.

The three major categories of environmental study are:

- **Categorical Exclusion** (CE): For projects with a scope of work that is not anticipated to individually or cumulatively have a significant effect on the environment.
- **Environmental Assessment** (EA): For projects in which the significance of the impact on the environment is not clearly established.
- **Environmental Impact Statement** (EIS): For projects anticipated to significantly affect the environment.

Refer to the **PDP Manual** for more information and guidance on the environmental clearance process.

2.1.4 Right of Way and Utility Status

During the schematic preparation process, proposed right of way (ROW) lines are established. The required ROW width should accommodate the roadway typical sections based on required design criteria and utilities, both existing and proposed. Consideration should also be given to maintenance access.

Effective coordination with the utility companies can avoid construction delays and change orders. The locations indicated by the various utility companies should be as close to exact as possible during this phase of project development. Initially the exact locations of utilities may not be needed, however once the preferred alignment is chosen and the final geometric schematic is developed, higher level utility investigations should be performed to determine exact existing utility locations.

Once the final ROW lines have been established, **including temporary construction or permanent drainage easement(s),** the designer should coordinate with the District's ROW Section to verify the proper ROW is acquired and that it is free of encroachments.

Refer to TxDOT's **PDP Manual**, **ROW Acquisition Manual**, and **ROW Utilities Manual** for additional guidance on ROW and utility tasks.

2.1.5 Value Engineering

A Value Engineering (VE) analysis is a systematic process to evaluate a project concept and design by a multidisciplinary team of individuals not directly involved in the project. The study provides recommendations which could potentially reduce the time to complete the project, improve the value and quality of the project, and provide a project which functions safely and efficiently and may result in a cost savings to the Department.

A VE analysis should be conducted prior to the approval of the final geometric schematic (considered as the end of the project's preliminary design). Changes resulting from the VE analysis could result in additional environmental work if incorporated recommendations are not included in the NEPA review and approval phase. Coordinate the changes that may result from the VE analysis with the project team including environmental, ROW and utility staff.

The following project types require a VE analysis:

- Projects on the National Highway System (NHS) that utilize Federal-Aid Highway Program (FAHP) funding with an estimated total project cost of $50 million or more. Total cost threshold considers all project related costs, not just construction cost;
- All bridge projects on the NHS utilizing FAHP funding with an estimated total project cost of $40 million or more;
- Any major project located on or off of the NHS that utilizes FAHP funding in any contract or phase comprising the major project; or
- Any project FHWA considers appropriate and uses FAHP funding.

Projects within $10 million of the Federal threshold amounts should be considered for VE analysis.

The Value Engineering Regulation defines the "project" limits by the logical termini in the environmental document and may consist of several contracts, or phases of a project or contract, which may be implemented over several years. If any have federal-aid funds all shall undergo a VE analysis before any can let.

A VE analysis is not required on design/build projects. If the Project Manager chooses to conduct an analysis, this must be performed before the Request for Proposal (RFP) release.

No exceptions to the federal VE requirement will be granted by FHWA.

Refer to the **PDP Manual** and **23 CFR 627.9(a)** for additional discussion on VE analysis.

2.1.6 Required Legal Documents

Prior to beginning final design, the required agreements and permits should be determined and executed.

Refer to the **PDP Manual** for a detailed discussion of potential agreements and permits.

Chapter 3
Plan Set Development

3.1 Standard Traditional Plan Sheets

The recommended plan sheet sequence shown in **Table 3-1** provides for consistency in traditional plan set development throughout the State.

Not every sheet shown in the table below are required for every project or at each milestone submittal. Refer to the **PS&E QC Milestone Checklist** for direction on milestone deliverable expectations and level of detail needed at Initial (30%), Preliminary Bridge Layout (PBLR), Detailed (60%), Final (90%), and Sealed (100%) and Ready to Let (RTL) milestones.

3.1.1 General Plan Sheets

Refer to the **PS&E QC Milestone Checklist** for information to include on the General Plan Sheets.

3.1.1.1 Title Sheet

The Title Sheet is the first sheet of the plans. It should be neat and contain all the information as described in **Table 3-2**.

Delegation of authority for signatures described below can be made at the District's discretion.

Table 3-1: Traditional Plan Sheet Sequence

I. General	VI. Utilities
Title Sheet Index of Sheets Project Layout Roadway Typical Sections General Notes Estimate and Quantity Sheets Quantity Summary Sheets	Existing Utilities Plan and Profile Layouts Proposed Utilities Plan and Profile Layouts Standards (for each utility type)
II. Traffic Control Plan	**VII. Bridges[1]**
Conflict Layout Sheet Traffic Control Narrative Traffic Control Typical Sections Traffic Control Layouts Advanced Warning Sign Layout Standards	Bridge Hydraulic Data Sheets, Bridge Scour Data Soil Boring Logs Bridge Layout, Detailed Quantity Summary, and Structural Details (grouped together for each bridge) Standards
III. Roadway Details	**VIII. Traffic Items**
Survey Control Sheets Horizontal and Vertical Control Sheets Alignment Data Sheets (Optional) Removal Layouts Roadway Plan and Profile Layouts Intersection Details Driveway Details Miscellaneous Roadway Details Standards	Traffic Signal Layouts Illumination Layouts Signing Layouts Summary of Small Signs Pavement Markings Layouts Traffic Management System (TMS) Layouts ITS Layouts Miscellaneous Traffic Details Standards
IV. Retaining Wall Details	**IX. Railroad**
Retaining Wall Layouts Miscellaneous Wall Details Standards	Railroad Requirements Sheet Railroad Scope of Work Sheet Railroad Plan Sheets
V. Drainage Details	**X. Environmental Issues**
Drainage Area Map Hydrologic and Hydraulic Data Sheets Culvert Layouts Drainage Plan and Profile Layouts Miscellaneous Drainage Details Standards	EPIC Sheet SWP3 Summary Sheet Environmental Layouts (SWP3 sheets, and any avoidance areas and work time restrictions noted) Standards
	XI. Miscellaneous Items
	Landscaping/Irrigation Layouts Standards or District Detail Sheets

Notes:

1. Refer to TxDOT's **Bridge Detailing Guide** for the order of bridge sheets and preferred order of standards.

Table 3-2: Title Sheet Contents

Element	Description
Title block	Located in the upper right-hand corner and identifies the plans by Fed and/or state project number, District designation, county, controlling control-section-job number (CCSJ), and highway name and number. If more than one CSJ is used for the project, use ",etc." to show this in the title block.
Design speed Average Daily Traffic (ADT) Functional Classification Context Classification	Show the design speed of the highway in miles per hour (mph). Show the design year ADT and future ADT of the project. Indicate the functional and context classification of the highway. If the highway has multiple functional classes, this can be shown as "various". If the highway has multiple contexts, show the context classification and target design speed used for each segment from begin station to end station.
Length of project	For each CSJ, show breakdown of the primary roadway and bridge lengths in **feet truncated to two decimal places**. CSJ totals should match total project length. The breakdown should also show the primary roadway and bridge lengths in **miles truncated to three decimal places**. The total length shown should match the length shown in TxDOTCONNECT (TxC). The total length of project should be determined from the difference in the stationing noted on the Location Map. The net length of project should exclude any exceptions and account for equations as noted on the Title Sheet.
Highway name and number County Control-section-job number (CSJ) or Controlling CSJ if multiple CSJs & Project ID Limits	Show the highway name, number and county in large capital letters to facilitate identification and processing. Refer to the **PDP Manual** for a detailed discussion on the use of CSJs. Show limits of proposed construction. This should match the limits shown in TxC. If the limits change after letting, a change order will be required to include the changes.
Project classification	The project classification should match the Project Details page in TxC.
Short description	The short description replaces the Layman's Description and should match the Project Details page in TxC. - This is not needed on the Title Sheet if using the Project Description. A list of short description values is shown in the TxC Reference Manual.
Project description	The long project description should match the Project description page in TxC.
Location Map	Provide a legible map of suitable size showing the location of the project in relation to physical landmarks, other highways, and/or intersections. In addition, the project limits by CSJ(s), county and city boundaries, reference markers, graphic map scale and north arrow should also be shown. The beginning and end of each project should contain the stations, CSJs, and reference markers for each CSJ. Latitude/longitude coordinates can be used in lieu of reference markers. Reference markers should match the information shown in TxC.

Element	Description
Adoption date of governing specifications	**State projects:** **"Special Labor Provisions for State Projects. (000-XXX)"** Where XXX is the current Special Provision number. **Federal-Aid projects:** Show title and date of appropriate required contract provisions. Form FHWA 1273, Date of current provision
Exceptions, equations, and railroad crossings	**Exceptions** are the station number limits and lengths where work is excluded from a project. List by station numbers and lengths. Show as: **"NONE"** if not applicable. **Equations** are used to show the transition of the project from one set of station numbers to a different set. **Equations** are used when the stationing of an existing alignment changes. This can be the meeting of two different station systems or an adjustment in the centerline from the existing. Equations should be shown as: **STA XX+XX.XX BK = STA XX+XX.XX AHD** **Railroad crossing** should be displayed on the title sheet and show DOT number along with the crossing location. Railroad information may be on TxC, but this information should be coordinated with the District railroad coordinator, or Railroad Division.
Signature Blocks	Signature/date blocks are required for: • District Design Engineer or Transportation Engineer overseeing design – Submitted for Letting • Area Engineer or Assistant Area Engineer overseeing construction – Recommended for Letting • District Engineer, Deputy District Engineer or Direct of Transportation Planning and Development – Approved for Letting Projects that require additional signature blocks are as follows: • Projects designed by consultants: consultant engineer signature/date only • Projects involving cities, counties, irrigation or water districts, Corps of Engineers, etc.: appropriate official signature/date
Copyright Requirement Guidelines	Minute Order 107306 adopted administrative rules allowing the department to protect copyrights for intellectual property. Engineering designs contained in construction and routine maintenance plans are included in the definition of intellectual property. The TxDOT's Office of General Counsel has advised that the following notation be placed on the Title Sheet of all plans produced by or for TxDOT: **"©XXXX by Texas Department of Transportation; all rights reserved."**

Element	Description
Copyright Requirement Guidelines (continued)	where XXXX denotes the year of letting. If the project letting is delayed, the year will need to be updated throughout the plan set. **For all other plan sheets**, the copyright symbol with year of letting and TxDOT logo is used. If space does not permit this notation, an abbreviated notation of: **"©XXXX TxDOT"** may be used. The year shown in the notation will depend on when the plans are produced. The copyright notation shown above for Title Sheet must also be placed on schematic layouts. For plans not produced under contract to or by TxDOT, these copyright notations are not required.
Registered Accessibility Specialist (RAS) Inspection (if needed)	For projects which contain more than $50,000 in pedestrian elements, a review of the construction plans prior to letting and a final inspection by a Registered Accessibility Specialist (RAS) is required. For these projects, the following note should appear on the Title Sheet: **"Registered Accessibility Specialist inspection required** **TABS# _____ "** TABS = Texas Architectural Barriers online System The TABS number will be added to the title sheet once the project is registered, and the number is assigned. For more information on RAS inspection refer to the Construction Division's document **TDLR Construction Accessibility Requirements.** TDLR = Texas Department of Licensing and Regulation TABS number should be requested early to include on the Title Sheet.
TDLR inspection required	For projects which require inspection by the TDLR during the construction phase, include this note: **"TDLR INSPECTION REQUIRED"** This serves as a reminder to construction personnel to inform the TDLR staff and coordinate an appropriate time for them to visit the project site and inspect pedestrian-related elements. For PS&E submission requirements and policy on TDLR, refer to the Construction Division's document **TDLR Construction Accessibility Requirements**.

If updates to project information on TxC need to be made to match current project data, contact the District planning and programming staff.

Reference the **TxC Project Information – Reference Guide** for additional information on items shown on the Title Sheet.

3.1.1.2 Index of sheets

The index should show sheet numbers and title or abbreviations as they appear on the plan sheets – **sheet titles on the index sheet should match exactly with the corresponding plan sheet title and the sheet file name**. All sheets are to be listed, including **OMITTED** and supplemental sheet numbers.

All standard sheets listed will bear the asterisk symbol (or other symbol) to identify them as standard sheets and can use the abbreviated sheet reference if needed.

Modified standard sheets will bear the (MOD) designation after the standard sheet title and must be signed, sealed and dated.

The index of sheets is accompanied by the responsible engineer's approval note for use of standard sheets included in the plans, signed and sealed.

If multiple engineers sign, seal and date different plan sheets (i.e., roadway engineer, drainage engineer, bridge engineer, traffic engineer, etc.), an approval note for each engineer is required indicating which specific standards were approved by them. Different symbols (e.g., *, **, ***, or #, $, &) should be used to designate their specific standard selection.

3.1.1.3 Project Layout

The Project Layout, used at the District's discretion, is intended to provide an overview of the project. This sheet should clearly show the beginning and ending stations and CSJ's. This sheet is typically printed at a much larger scale (1" =500' or 1" =1000' depending on the length of the project. A larger scale may be used). It is usually one sheet but can be multiple sheets depending on the project length.

The Project Layout may be shown on a roll plot for the Initial (30%) milestone submittal.

3.1.1.4 Roadway Typical Sections

Roadway typical sections provide a general representation of the nature of construction in each portion of the project, but a multitude of details can be confusing. The purpose is to show all the components and dimensions of the roadway within the ROW perpendicular to the centerline for each change of existing features or proposed roadway.

Existing typical sections should be shown to reflect the existing roadway information and pavement structure. These are assembled with information gathered from as-built plans, site visits, and road coring.

Proposed typical sections show dimensions, depths, and station limits for each type of material in the proposed pavement structure. A typical section is necessary for all features including mainlanes, frontage roads, ramps, detours, crossroads, etc. Barrier and metal beam guard fence should be shown if applicable.

3.1.1.5 General Notes

General Notes are created as described in **Section 4.5** of this manual. They should be placed on plan sheets prior to final PS&E submission. The District office typically generates the Sealed (100%) milestone General Notes sheets to be included in the plans. Refer to the TxDOT.gov **100% PS&E Pre-submittal Preparation webpage** for further guidance on General Notes.

Each District maintains their own Master General Notes file. Request the District specific general notes at the beginning of the PS&E to guide the design.

3.1.1.6 Estimate and Quantity Sheet

The purpose of the Estimate and Quantity (E&Q) Sheet is to provide a list of all the pay items and estimated quantities in the contract and for each specific CSJ. This sheet also provides a space for final quantities once a project has been completed. Item numbers, descriptive codes, item descriptions, units of measurement, force account and bid alternates are also shown.

The E&Q sheet summarizes the work to be done if there is more than one CSJ or project in the plans or if local participation is involved. It also provides an overview of the proposed work by showing the total quantities of each item of work involved in the construction of the roadway.

The Sealed (100%) milestone E&Q Sheet is generated in the District office and included in the plans prior to the Ready to Let (RTL) milestone PS&E submission to DES. Refer to the **TxC Reference Guide – Engineer's Estimate** for further guidance on generating the Sealed milestone E&Q Sheet.

Ensure the E&Q sheet matches the quantity summary tables and the Engineer's estimate output from TxC.

3.1.1.7 Quantity Summary Sheets

The purpose of the Quantity Summary Sheets is to show all items of work, split up by CSJ, and their estimated quantities, with like items grouped together for ease of locating and tracking.

Quantity Summary Sheets are NOT to be signed and sealed.

The Quantity Summary Sheets are generally broken out by the **work type, location, and quantity of work** for individual pay items of the proposed project. Typical work types shown together include:

- Work Zone Quantity Summary (or Traffic Control Quantity Summary);
- Removal Quantity Summary;
- Earthwork Quantity Summary;
- Roadway Quantity Summary;
- Driveway and Intersection Quantity Summary;
- MBGF Quantity Summary;
- Retaining Wall Quantity Summary;
- Drainage Quantity Summary;
- Traffic Signals Quantity Summary;
- Illumination Quantity Summary;
- Signing Quantity Summary;
- ITS Quantity Summary;
- Pavement Markings Quantity Summary;
- Erosion Control Quantity Summary (or SWP3 Quantity Summary);
- Landscape Quantity Summary;
- Utilities Quantity Summary; and
- Miscellaneous Items Quantity Summary.

Quantities which are considered subsidiary to pertinent items can be a useful tool to provide the contractor as much information as possible and should result in a better bid price. These quantities, shown on the Summary Sheet(s), should be noted as "*For Contractor's Information Only*" and should not include item numbers/bid codes.

TxDOT's **Estimate Quantity Summary Bulk Upload spreadsheet** can be used to create quantity summary sheets. Contact DES for more information on the spreadsheet.

3.1.2 Traffic Control Plan Sheets

Refer to the **PS&E QC Milestone Checklist** for information to include on the Traffic Control Plan Sheets.

Traffic Control Plan (TCP) sheets, appropriate for the complexity of the project, provide direction to the contractor and construction staff on the required configuration of TCP measures to move traffic through or around the construction work zone in a safe, expeditious, and clear manner. TCP sheets provide a plan for using traffic control devices to protect the traveling public, work forces, pedestrians, and construction equipment from accidents.

On minor projects, the TCP can usually be described by single Traffic Control Narrative sheet as opposed to a full, phased traffic control plan. Plans for minor projects should include, at a minimum, the Traffic Control Standards and Barricade Construction (BC) Standard Sheets for advance signage requirements.

When practical, TCP Standard Sheets developed by the Divisions or Districts should be used. Each work zone is different and the existing standard sheets may not cover all situations. In these cases, the standard plan sheets can be used as a starting point from which the traffic control plan can be developed and tailored to the project's needs. If the existing standard sheet is not used, the TCP sheet must be signed, sealed and dated accordingly.

3.1.2.1 Conflict Layout Sheet

The Conflict Layout Sheets, if used, provide information for conflicts that are not certified to be cleared before letting. This can include, but is not limited to, State-Owned or Non-State-Owned utility conflicts, ROW conflicts, ROW encroachments, ROW relocations, Environmental Conflicts, etc. It should be evident from the layouts the location of conflicts and type of conflict relative to proposed and temporary work.

3.1.2.2 Traffic Control Plan Narrative

The TCP Narrative describes the sequence of work to be performed as shown in subsequent TCP sheets. The sequence of phased construction should be described in detail if the proposed work causes complicated traffic movements or construction procedures within the project limits. Phased construction is broken out into phases and steps (e.g., Phase 1 – Step 2, Phase 3 - Step 1, etc.).

3.1.2.3 Traffic Control Plan Typical Sections

TCP Typical Sections of different construction phases are included in the plans to illustrate the TCP Narrative sheets. The typical sections are helpful in detailing the width of work

zones and the method of traffic handling. Explanatory narrative can be included on these sheets, in the General Notes (under Item 502), or in a triple-zero Special Provision.

Show locations of work zone pavement markings, barriers and channelizing devices on typical section sheets as well as lane widths, buffer widths and construction zone widths.

3.1.2.4 Traffic Control Plan Layouts

TCP Layouts, if used to provide additional information, should be divided by construction phase. TCP Layouts identify where construction is occurring in each phase/step and what measures are in place to safely handle traffic in the vicinity of the construction work. It should be evident from the layouts what arrangement of construction signs, pavement markings, work zone pavement markings, traffic control devices, lane widths, etc., are needed to control traffic at all locations in every phase of work. The TCP Layouts reflect the projects' construction staging including taper lengths and locations of traffic shifts (include STA and offset for constructability review).

Include any covering of existing pavement markings at the begin/end of the project TCP phases in the limits of the TCP – additional survey may be needed to include this extra length.

This is considered "incidental construction" and is not included in the project limits.

TCP Layouts may be shown on a roll plot for the Initial (30%) milestone submittal.

3.1.2.5 Traffic Control Plan Miscellaneous Details

Miscellaneous TCP layouts and details are included in the plan set to depict items such as temporary ramp details, temporary retaining wall/shoring details, detours, etc. Refer to District go-by plans for example miscellaneous TCP plan sheets and details.

3.1.2.6 Traffic Standards

Work zone traffic control standard plan sheets are available on TxDOT's **Traffic Standards webpage**.

3.1.3 Roadway Plan Sheets

Refer to the **PS&E QC Milestone Checklist** for information to include on the Roadway Plan Sheets.

3.1.3.1 Survey Control Sheets

The purpose of the Survey Control plan sheet is to show an overall view of the project and the relationship of primary monumentation, and survey control used in preparation of the project. This sheet should be used in conjunction with the Horizontal and Vertical Control Sheets (see **Section 3.1.3.2**).

This sheet is provided for all 4R projects. In addition, **this sheet should be provided for 3R projects** that involve substantial changes (> 10% of the total project length) to the vertical grade and/or horizontal alignment of an existing facility and/or ROW acquisition.

The control points shown on the Survey Control Sheet should correspond with the information shown on the Horizontal and Vertical Control Sheets. The Survey Control Sheet must be signed and sealed by the registered professional land surveyor (RPLS) directly responsible for the surveying.

3.1.3.2 Horizontal and Vertical Control Sheets

The purpose of the Horizontal and Vertical Control Sheets is to identify the primary survey control and the survey control monumentation used in preparation of the project plans. These sheets should be used in conjunction with the Survey Control Index Sheet (see **Section 3.1.3.1**).

Provide Horizontal and Vertical Control sheets for all 4R projects. In addition, **this sheet should be provided for 3R projects** that involve substantial changes (> 10% of the total project length) to the vertical grade and/or horizontal alignment of an existing facility and/or ROW acquisition.

The Horizontal and Vertical Control Sheet must be signed and sealed by the registered professional land surveyor (RPLS) directly responsible for the surveying. Control point location maps should be drawn to scale and provide sufficient information so that the point can be located.

3.1.3.3 Removal Layouts

Removal Layouts are typically included on major reconstruction projects when the ROW is cluttered with many existing features. The sheets consist of roadway plan views showing the items and call-outs for contractor removal, such as structures, pavements, guard rails, and other existing appurtenances.

Removal Layouts may be shown on a roll plot for the Initial (30%) milestone submittal.

3.1.3.4 Alignment Data Sheets

Alignment Data Sheets must be provided for all 3R & 4R projects. 3R projects that do not involve substantial alignment changes (< 10% of the total project length) can use data from previously completed plans to evaluate criteria.

3.1.3.5 Roadway Plan and Profile Layouts

The purpose of the Plan and Profile (P&P) Layouts is to show the horizontal and vertical alignments and may describe other work to be done. These sheets also show existing roadway and utility features which are typically obtained by survey and/or aerial photography.

The plan and profile views are normally shown on the same sheet but may be shown on separate sheets where plan views take up a great deal of space and it would be impractical to show the profile view on the same sheet. **Table 3-3** shows the recommended scales used for P&P Layouts.

Table 3-3: Plan and Profile Graphic Scales

Plan (Horizontal)	Profile (Vertical)
1" = 100'	1" = 10'
1" = 50'	1" = 5'

Plan view descriptions. **Table 3-4** lists the descriptions of the elements to be shown in the plan view portion of the P&P Layouts.

Table 3-4: Plan View Element Descriptions

Element	Description
Beginning and ending of project	Show station number and CSJ with arrow leader for each control break. Stations should increase from left to right on the plan sheets.
Centerline stationing, tangent bearings, and equations	Station numbers should be indicated at 500-ft intervals with tick marks every 100-ft depending on sheet scale. As a rule of thumb, show at least two station numbers on each sheet.
Horizontal curves	Show points of curvature (PC), and points of tangency (PT) on centerline. Show the points of intersection (POI). List the delta, D(degree of curve), E(external distance), radius, tangent, and length identifying each curve with the point of intersection station.

Element	Description
Superelevation	Show a table with stationing of transitions from normal crown to full superelevation and from full superelevation to normal crown. Indicate e-max used. Show super-elevation direction, rates, and beginning and ending transition stations, and indicate axis of rotation.
Intersecting roads and driveways	Show centerline station, intersecting road name, proposed radii (if not detailed elsewhere), parallel culverts. Show limits of construction (usually to the ROW line of the main roadway).
Existing and proposed culverts	For cross drainage structures show stationing and description, and for parallel drainage structures show the stationing and offset.
Location features	Show north arrow, ROW lines, utility and channel easements, ROW markers, county lines, city limit lines and stations, section corners, survey lines, and control-of-access lines.
Miscellaneous items	• Show bridges and their beginning/ending stations. • Show ROW widths and roadway widths at each break. • Reference roadway miscellaneous detail sheets if applicable for details that cannot be shown on plan sheets. • Show retaining wall locations. • Show ditch blocks and alignment of special ditches and channels. In lieu of the plan sheets, this information can be shown on other drainage layout sheets. • Show railroad crossings, cross fences, and channels with direction of flow arrows. • Illustration of toes and tops of slopes is sometimes beneficial. • Bicycle and pedestrian accommodations. • Landscape features that are to be protected. • Existing/proposed utilities.

Profile view descriptions. Table 3-5 lists the descriptions of the elements to be shown in the profile view portion of the P&P Layouts.

Table 3-5: Profile View Element Descriptions

Element	Description
Proposed grade lines(PGL)	Use a heavy solid line. Show points of vertical intersection (VPI) as a small circle. Show points of vertical curvature (VPC) and points of vertical tangency (VPT) with small circles and give curve data near point of vertical intersection. Show percent grade on tangents to 3 decimal places. Give description for profile grade line (e.g., Alignment A, Rt. Gutter, Left Frontage Road).

Element	Description
Existing Ground	Use a light dashed line and give description (e.g., Existing Centerline FM 76).
Elevations	Show proposed and existing elevations at 50-ft intervals.
Utilities	Show below and in line with plan view and give elevations, if known, or give depth dimensions, if known.
Stationing and elevations	Show station numbers along bottom and datum elevations along sides of sheet.
Structures/cross drainage culverts	Show plan view of structures/cross drainage culverts below and in line with plan view. Include culvert type and upstream and downstream flowlines in profile view.

A pdf roll plot may be used in lieu of the traditional P&P Layouts for submission as the Initial (30%) milestone deliverable.

The final approved Geometric Schematic as discussed in the PDP Manual may also serve as the Initial (30%) milestone deliverable.

3.1.3.6 Crash Cushion Summary Sheet

A Crash Cushion Summary Sheet should be included if any new attenuators are proposed in the project. At least **two** (2) attenuator systems must be included for each description type specified for use on the project (from different producers) unless a specific location dictates that only one system is available meeting the size and functionality requirements. The decision to specify one attenuator system must be documented in the project files.

Information describing the attenuator's details (i.e., direction of traffic, design speed, foundation, backup support, backup width, and/or transition options) is required at each location.

A Crash Cushion Summary Sheet must be included in the PS&E if attenuators are proposed. A Crash Cushion Summary Sheet .dgn file can be found on the Roadway Standards webpage.

Refer to TxDOT's **Roadway Standards webpage** for more details and more information on the types of crash cushions available for use.

3.1.3.7 Other Roadway Plan Sheets

For larger projects, some of the information which might normally be located on P&P Layouts can be located on other plan sheets such as the roadway and bridge layout sheets to improve clarity and completeness.

- **Intersection Details**. Used to show pavement contours, sidewalks, pedestrian ramps, and any details requiring a larger scale (for clarity) than the main P&P Layouts.
- **Driveway Details**. Used to provide pertinent construction details such as the driveway pavement structure, grades, limits of construction, parallel culverts, radii, etc.

Driveway details are often shown in plan/profile view to provide specific construction dimensions and designed profile grades.

3.1.3.8 Miscellaneous Roadway Details

Miscellaneous detail sheets may be prepared for items such as curb types, traffic barrier modifications, sidewalk details, curb ramp details, etc.

3.1.3.9 Roadway Standards

These include standards such as for metal beam guardrail, crash cushion attenuators, concrete pavement, etc. Roadway standard sheets can be found on TxDOT's **Roadway Standards webpage**.

3.1.4 Retaining/Sound Wall Plan Sheets

Refer to the **PS&E QC Milestone Checklist** for information to include on the Retaining/Sound Wall Plan Sheets.

3.1.4.1 Retaining/Sound Wall Layouts

Refer to TxDOT's **Geotechnical Manual - LRFD** for specific requirements on Retaining Wall Layouts and foundation design.

3.1.4.2 Retaining/Sound Wall Standards

These include standards for wall types such as cast-in-place wall, mechanically stabilized earth (MSE) wall, special traffic rail, etc. Retaining wall standard sheets can be found on TxDOT's **Bridge Standards webpage**.

3.1.5 Drainage Plan Sheets – for culverts, storm sewer and inlets

Refer to the **PS&E QC Milestone Checklist** for information to include on the Drainage Plan Sheets.

Refer to TxDOT's **Hydraulic Design Manual** for information on drainage design details.

3.1.5.1 Drainage Area Maps

Drainage area maps are drawn at an appropriate scale to include all the drainage areas of the project. The purpose of this sheet is to document the size and location of the watersheds used to size each of the culvert, storm sewer and inlet drainage structures and/or appurtenances.

Refer to **DES – Hydrology and Hydraulics Section** for example drainage area maps.

3.1.5.2 Hydraulic Calculations

Hydraulic calculations for culverts, storm sewer systems and inlets are documented in a runoff computation table and a hydraulic calculation table if those appurtenances are included in the plans. These tables are included on the Hydraulic Calculations Sheets to verify structure design and to document calculations.

Refer to **DES – Hydrology and Hydraulics Section** for example plan sheets, standard calculation tables for the culvert, storm sewer, and inlet computation that may be used in the plans.

Each bridge classification stream crossing (including bridge class culverts) will have its own Bridge Hydraulic Data Sheets.

See Section 3.1.7.1 for further information on Bridge Hydraulic Data Sheets.

3.1.5.3 Cross Drainage Culvert Layouts

Each cross-drainage culvert included in the proposed work should have a plan and cross section which shows the work to be done, and the description of the culvert. Bridge class culvert layouts should be developed according to TxDOT's **Bridge Detailing Guide**.

3.1.5.4 Storm Drain Plan and Profile Layouts

When storm drain and inlets are part of the proposed project, plan and profile layouts should be developed to indicate the location, type and construction of the appurtenances.

3.1.5.5 Miscellaneous Drainage Details

Include Miscellaneous Drainage Details for items such as:

- Inlet modifications;
- Pipe bedding details;
- Rebar layout and cross sections for non-standard designs;

- Support slab layouts;
- Concrete collar details;
- RC pipe connections; and
- Flume or channel details.

3.1.5.6 Drainage Standards

These include standards such as for single and multiple box culverts, wingwalls, headwalls for pipe culverts, safety end treatments, etc. Drainage standard sheets can be found on TxDOT's **Bridge Standards webpage**.

3.1.6 Utility Plan Sheets

Refer to the **PS&E QC Milestone Checklist** for information to include on the Utility Plan Sheets.

3.1.6.1 Existing Utility Layout

Existing utilities (if available) should be included in the plan set and are **required on the bridge layout sheets**. Existing utilities should also be shown on the proposed utility layouts for joint bid work but can be provided separately if the sheets are too crowded. Utilities that will not clear prior to the start of construction are to be shown on a Utility Conflict plan sheet (to match the Construction Management Plan SOP – See **Section 6.4.1.1**)

3.1.6.2 Proposed Utility Plan and Profile Layouts

Proposed utility layouts must be provided for joint bid utilities when the work is to be done by the contractor as part of the construction contract. The proposed utility layout sheets should be signed, sealed and dated if provided.

3.1.6.3 Utility Standards

Include utility standards if applicable.

3.1.7 Bridge Plan Sheets

Refer to the **PS&E QC Milestone Checklist** for information to include on the Bridge Plan Sheets. For detailed information on structural detailing refer to TxDOT's **Bridge Detailing Guide**.

Permanent Structure Number (PSN)

Every bridge and bridge class culvert throughout the nation is assigned a PSN. The PSN is comprised of the following:

- The first two digits are the **District** number (e.g., Abilene District = 08);
- The next three digits are the **county** number (e.g., Haskell County = 105);
- The next digit is always 0;
- The next four digits are the **control number** (e.g., 0360);
- The next two digits are the **section number** (e.g., 04); and
- The last three digits are the **structure number** (e.g., 016).

PSNs must be unique to each structure; they cannot be changed after a bridge is added to the inventory, nor can they be reused when a bridge is replaced. Bridges that are being widened or rehabilitated retain their PSNs.

Refer to TxDOT's **Bridge Project Development Manual** for more information on obtaining a new PSN for on-system and off-system bridges.

3.1.7.1 Bridge Hydraulic Data Sheet

Each bridge and bridge class culvert should have its own Bridge Hydraulic Data Sheet to convey delineated drainage areas, floodplain cross sections used in hydraulic modeling, run-off calculations used, and other elements to document the hydrology and hydraulic design for these structures.

Refer to TxDOT's **Hydraulic Design Manual** for information on drainage design for bridges and bridge class culverts.

Refer to **DES – Hydrology and Hydraulics Section** for examples of hydraulic data sheets.

3.1.7.2 Bridge Layout

Each bridge and bridge class culvert to be constructed or widened should have its own Bridge Layout which clearly illustrates the proposed work and the location of any boring logs. Preliminary and Final Bridge Layouts have plan and profile views drawn at the same scale (horizontally and vertically) of:

- 1" = 40'; or
- 1" = 20'.

Horizonal and verticals scales must not be mixed.

Boring logs can be shown on the bridge layout or on separate sheets as indicated in TxDOT's **Bridge Detailing Guide**.

Refer to TxDOT's **Bridge Detailing Guide** for other specific requirements for bridge and bridge class culvert layout sheets.

3.1.7.3 Estimated Quantities Sheet (Bridge E&Q Sheet)

The Bridge E&Q sheet is a summary of the bid items for all bridges, also including PSN identification and bearing seat elevations (if applicable for the bridge type).

3.1.7.4 Structural Details

Structural details sheets cover all the details and plan sheets that convey the construction of bridge superstructure elements (i.e., rail, slab, and girders), and substructure elements (i.e., bent caps, columns, and foundations).

3.1.7.5 Bridge Standards

These include standards such as for miscellaneous standards, bridge rail standards, prestressed concrete beams, steel beams, etc. Bridge standard sheets can be found on TxDOT's **Bridge Standards webpage**.

3.1.7.6 United States Coast Guard Bridge Permit

Bridges that require a United States Coast Guard (USCG) Bridge Permit must adhere to bridge permit requirements outlined in the USCG Bridge Permit Application Guide. The Environmental Affairs Division (ENV) has put together the TxDOT.gov **US Coast Guard Coordination webpage** that designers should reference for all applicable information needed to assemble plans in accordance with USCG requirements.

3.1.8 Traffic Plan Sheets

Refer to the **PS&E QC Milestone Checklist** for information to include on the Traffic Plan Sheets.

Standard sheets associated with each subsection below should be listed under each traffic item independently.

3.1.8.1 Traffic Signal Layout

Basic intersection layout showing signal pole/mast arm locations, conduit runs, loop detectors, lanes, and signal head arrangements, etc. Summary tables including all signal bid items should be shown for each signalized intersection.

3.1.8.2 Electrical and Illumination

Layouts showing lighting, pole-mounted luminaire, electrical service, and conduit run locations, etc.

3.1.8.3 Signing and Delineation Layout

Sheets which might be included are:

- Signing and Delineation Layout Sheets - shows locations of all signs and delineators;
- Overhead sign bridge details – shows elevation view of sign and support;
- Sign details - shows sign face dimensions and text;
- Summary of Large Signs Sheets; and
- Summary of Small Signs Sheets.

Summary of Large Signs Sheets and Summary of Small Signs Sheets should be included with the other Traffic Sheets and not in the Quantity of Summary Sheets.

3.1.8.4 Pavement Markings Layout

Roadway plan views should be provided showing all proposed markings, denoting type, color, width, etc. Include standard pavement markings and raised pavement markers.

3.1.8.5 Traffic Management System Details

Traffic Management System details may be needed on large (typically freeway) projects to denote surveillance and control systems items, such as traffic cameras, changeable message signs, vehicle detection, conduit runs, and other details for smart highways type features.

3.1.8.6 Traffic Standards

These include standards such as for sign standards, sign mounting details, roadway illumination, etc. Traffic standard sheets can be found on TxDOT's **Traffic Standards webpage**.

3.1.9 Railroad Plan Sheets

Refer to the **PS&E QC Milestone Checklist** for information to include on the Railroad Plan Sheets.

3.1.9.1 Railroad Requirements Sheets

TxDOT's Traffic Safety (TRF), Bridge (BRG), Rail (RRD), and Construction (CST) Divisions, along with the Class 1 railroad companies, have developed Railroad Requirements General Note sheets that are required by the railroad companies to be included as part of both:

- Exhibit A and Construction & Maintenance agreements; and
- PS&E/Exhibit B package.

These sheets assist in ensuring that all bidding contractors will be made aware of UP Railroad (UPRR), BNSF Railroad, & KCS Railroad requirements. Although these sheets were developed with the Class 1 railroads, they are also required on projects with shortline railroads due to the generic requirements shown when working on railroad ROWs.

There are two versions of the Railroad Requirements sheets shown on the TxDOT.gov **Plans, Specifications & Estimate Requirements on Projects with Railroads webpage** for:

- Bridge Construction Projects; and
- Non-Bridge Construction Projects.

Both versions contain generic, non-project specific information such as Right of Entry, insurance, safety certification requirements, etc. For Bridge Construction Projects, demolition guidelines, construction window constraints, and railroad submittal requirements information are also included.

Sheet 1 of the **Railroad Requirements for Bridge Construction sheets** is to be modified by the designer for project specific details (rail survey and fencing) and signed, sealed, and dated. All other sheets (Bridge Construction and Non-Bridge Construction Projects) do not require a P.E. seal.

Additional information for specific railroad lines can be found on the TxDOT.gov **Railroad Design Guidelines webpage**.

3.1.9.2 Railroad Scope of Work Sheets

The **Railroad Scope of Work sheets** identifies project specific work and requirements. It describes the scope of work at the crossing location(s), other project work in railroad ROW, the flagging requirements, any construction work to be performed by the railroad, the railroad insurance requirements, the right of entry agreement, any railroad coordination meeting requirements, and the emergency contact information. Railroad Scope of Work sheets must be initialed and dated per RRD review.

Additional information and a copy of the Railroad Scope of Work sheet can be found on the TxDOT.gov **Plans, Specifications & Estimate Requirements on Projects with Railroads webpage**.

3.1.9.3 Railroad Plan and Profile Layout (Exhibit A)

If railroad work is included in the project, necessary plans may include plan and profile of new track, grade crossing layouts (planking, signal location, delineation of TxDOT/RR work responsibilities), track typical section, and track details, etc. If a bridge overpass or underpass is included, a railroad Bridge Layout Sheet would be included with other project bridge layouts, if any.

The railroad plan and profile layouts are not labeled as Exhibit A in the final plan set.

Refer to TxDOT's **Bridge Detailing Guide** for specific requirements for railroad bridge layout sheets. Also refer to TxDOT's **Rail Highway Operations Manual** for additional information concerning railroad plans and the Exhibit A.

3.1.10 Environmental Plan Sheets

Refer to the **PS&E QC Milestone Checklist** for information to include on the Environmental Plan Sheets.

3.1.10.1 Environmental Permits, Issues and Commitments (EPIC) Sheet

The EPIC sheet is a summary of all the environmental requirements the Contractor must meet during the life of the construction activities. The EPIC sheet must be completed by the District and list all environmental permits, issues, commitments, conditional requirements affecting the contractor and their work on that specific project. **The EPIC sheet is a communication tool to the contractor and should not include EPICs that are for TxDOT to resolve** - language on the EPIC sheet must be clear and actionable to the Contractor.

The EPIC sheet can be supplemented by specific details shown on other plan sheets, but the areas of concern should be called out on the EPIC for the Contractor's information. Include everything from conditional requirements from resource agencies to environmental commitments made to landowners and other entities (e.g., tree preservation) on the EPIC sheets.

Late changes to commitments that affect contractor work requirements are to be included in the PS&E by an addendum (see **Section 7.1**). Changes in commitments after letting will require either a written notice to the Contractor (e.g., for identifying a restricted area) or a change order for added or reduced work.

The EPIC sheet does not require an engineer's sign and seal. It can be modified electronically on a project-by-project basis.

Refer to EPIC Standard Sheet on the **Roadway Standards webpage** for a template of the EPIC sheet and the EPIC sheet Guidance document for detailed information on completing the EPIC sheet.

3.1.10.2 Stormwater Pollution Prevention Plan (SWP3) Summary Sheet and Environmental Layouts

The SWP3 outlines erosion control, sediment control and behavioral best management practices (BMPs) to prevent or minimize sediment and other pollutants originating from construction sites from reaching surface waters of the state during those construction activities. Pollutants can enter waters of the state through direct discharges to water bodies or municipal separate storm sewer systems or can be carried in stormwater as it flows over a construction site. Refer to the TxDOT.gov **Stormwater Pollution Prevention Plan (SWP3) Guidance Document webpage** for more information on the SWP3 requirements including the SWP3 Summary Sheet and required contents of the Environmental Layout sheets.

SWP3 requirements apply to both Construction and Maintenance projects **disturbing 1 acre or more of soil** that meet the definition of a construction activity per the Texas Pollutant Discharge Elimination System Construction General Permit (TXR150000) (CGP), and for projects that disturb less than one acre of soil but have Environmental Permits, Issues, and Commitments (EPICs) dependent on stormwater quality controls and water quality measures (such as US Army Corps of Engineers permits and Best Management Practices (BMPs) for aquatic species). More information about these requirements in discussed in Section 1 of the TxDOT.gov **Stormwater Pollution Prevention Plan (SWP3) Guidance Document webpage**.

For jobs which disturb no soil (seal coats, overlays, etc.), a **SWP3 Standardized General Note** will serve as the SWP3 and the SWP3 Summary Sheet is not required for the plans. An environmental layout sheet may still be required if there are other resource areas that have information that needs to be conveyed on a layout sheet and described in the next sections.

The Temporary Erosion Control Item 506 is required on all projects and refers to a SWP3 in the project. This is the only item that can be included in an estimate without a quantity and price.

Refer to TxDOT's **SWP3 Guidance Manual Section 2** for more information on how to fill out the SWP3 Summary Sheet and the **Roadway Standards webpage** for templates to be used in the plans.

Refer to TxDOT's **SWP3 Guidance Manual Section 1** for additional guidance on projects of different sizes.

3.1.10.3 Water Resources

Water resources include rivers, streams, wetlands, lakes, coastal areas, aquifers, and a wide variety of other similar aquatic features. Many water resources are regulated by both the state and federal government and require identification in the plans.

The following content should be shown in plan view on the environmental layout sheets, and any other sheets as appropriate:

- Locations of vegetation to be preserved (see **Section 3.1.10.2**);
- Locations of water features to be avoided or protected;
- Locations of temporary crossings;
- Locations of dewatering areas;
- Locations of aquatic passage elements;
- Locations of non-structural water quality controls (e.g. vegetated swales);
- Locations and design of structural water quality controls;
- Locations of any sensitive aquifer features, and their construction exclusion zones; and
- Closure plans for any sensitive aquifer features.

Refer to the **PDP Manual** for more discussion on water resources requirements for project development.

3.1.10.4 Biological Resources

Biological resources include species listed as threatened or endangered by the U.S Fish and Wildlife Services (USFWS) or the Texas Parks and Wildlife Department (TWPD). Biological resources also include species of greatest conservation need (SGCNs) listed by TPWD. Each SGCN has BMPs and different forms of mitigation and avoidance measures. The engineer will need to coordinate with the District environmental staff and in some cases the ENV SME to determine the appropriate measures to incorporate into the plans. Use “wildlife friendly” erosion control products from the Erosion Control Approved Products List when project BMPs require these products to be used, especially when near sensitive habitats. Include in the General Notes notation of any work time restrictions related to biological resources (e.g. migratory bird nesting season, prairie chicken work restrictions, etc.)

The following content should be shown in plan view on the environmental layout sheets:

- Locations of vegetation to be preserved (see **Section 3.1.10.2**);
- Locations of critical habitat within and adjacent to the project area;
- Locations of amphibian and reptile exclusion fence;
- Locations of any sensitive features and their construction exclusion zones;
- Locations of aquatic passage elements;
- Locations of bat houses;
- Locations of bat exclusion systems; and
- Locations of bird exclusion systems.

Refer to the **PDP Manual** for more discussion on biological resources requirements for project development.

3.1.10.5 Wildlife Crossing Structure Plan

The wildlife crossing structure plan will consist of the detail design of each wildlife crossing, wildlife guard, fencing, exits/ramps, and gate requirements for the wildlife crossing structures on the proposed project. Additionally, reference the wildlife crossing structure plan on the EPIC sheet.

The following content should be shown in plan view on the environmental layout sheets or sheets where wildlife crossings are shown:

- Locations and start/end points of wildlife exclusion fencing;
- Locations of any wildlife exits/ramps, wildlife guards, and gates associated with fencing;
- Locations of plantings to screen wildlife crossing structures. The plantings provide protective cover for wildlife movement;
- For bridges with concrete or stone riprap, the locations of any wildlife ledges; and
- For culverts, indicate if a wildlife ledge/step is provided

3.1.10.6 Historical Resources

Historical resources can be impacted during project construction if not carefully considered during the preliminary engineering phase of project development. Projects with the most potential to impact historic resources include sidewalk projects, projects with culvert work, and projects in historic downtown areas. Historic resources need to be clearly shown on the plans and include appropriate protection notes in the General Notes and on the plan sheets. Special specifications and special provisions can also be implemented to address historic resources.

The following content should be shown in plan view on the environmental layout sheets:

- Historic markers to be relocated;
- Historic markers to be left in place, and required protection measures (such as orange fencing);
- Historic bridges if not being removed by project (identify/call out if being altered such as adding sidewalk, fixing channel, or widening);
- Historic culverts if not being removed by project (identify/call out if being altered such as adding sidewalk, fixing channel, or widening);
- Historic roadside parks (for instance do not allow equipment and material staging at them, too many resources that might have to be avoided by equipment);

- Historic brick streets (as a note, not all brick streets are historic, you will need to verify with environmental staff on whether the brick street is historic);
- Historic retaining walls (identify/ call out if being altered or impacted); and
- For sidewalk projects and urban areas:
  - Historic building walls
  - Historic curb tile (generally blue and white)
  - Historic pavers such as limestone
  - Tile entrance pavers
  - Glass block in sidewalk (provide light for basements)

3.1.10.7 Archeological Resources

Protected archeological resources need to be captured in the plans to avoid unpermitted impacts to them. In general, no ground-disturbing activities can occur within the areas of these sites, unless the plans explicitly note an acceptable depth of construction impacts in the site area. Some sites will be buried sufficiently deep that typical construction impacts will not affect them. Depth of excavation needs to be discussed with District environmental staff as part of the environmental clearance process and include a note in the plans indicating the acceptable depth of impacts in the site area.

Archeological information is sensitive and cannot be disclosed to the public. Explicit information about archeological resources, especially location, should never be disclosed on the plans. Use language such as "environmental avoidance area" or generic "environmental resources" when making plan notes about archeological resources.

The following content should be shown in plan view on the environmental layout sheets:

- Avoidance areas labeled as "environmental avoidance area". It is important not to disclose archeological information on the plan sheets but need to be aware of avoidance areas.
  - Avoidance areas might be temporary or permanent. Incorporate into the project phasing when applicable.
  - In most cases, the description of the avoidance area should note that no ground-disturbing activities should occur within it. When a site is deeply buried and some ground disturbance is permissible, include plan notes that denote the acceptable depth of excavation to avoid unintended impacts to those archeological resources. This depth was considered during the environmental evaluation of the project. Coordinate with District environmental staff.

3.1.10.8 Sound Walls and Noise Abatement

During the environmental review for a project a noise study may occur. This study might occur during preliminary engineering or early final design phase. Based on the study, noise abatement for traffic noise impacts may be proposed if reasonable and feasible. Noise abatement locations need to be refined during the final design phase of project development. Design staff should assist environmental staff with performing a constructability assessment on the proposed noise abatement and provide design information for noise workshops with affected property owners.

Engineers should be in communication with environmental staff and be aware if noise abatement is being considered. Refer to the TxDOT study "**A Guide for Sequencing and Placement of Noise Walls and Retaining Walls on TxDOT Projects**" for additional detail.

- Design staff should coordinate with environmental staff about wall locations and heights proposed in the noise study as soon as feasible (as early in process as possible); and
- Design staff should look at the proposed locations for constructability issues and if possible, begin preliminary design:
  - If there are constructability issues (utilities, drainage, site concerns), design staff needs to coordinate with environmental staff to:
    - Verify location of proposed walls and/or relocate walls and check that new location still meets abatement criteria;
    - Provide cost estimates for wall-specific construction elements (e.g., utility relocates, drainage, retaining walls, etc.); and
    - Document that walls are or are not constructable in a Constructability Assessment if analysis has determined that walls are not reasonable and feasible.
- Design staff may need to provide draft design information (proposed layout, aesthetic design, renderings, etc.) for environmental staff to use for the noise workshop.

Approval of walls (and subsequent incorporation into preliminary plan sets) will not be known until after the noise workshop is held. This workshop should be held when enough information is available to present a plan to adjacent property owners and residents. This may be during later phases of final design. This means that changes to the plans could occur as late as the Final (90%/95%) milestone based on the results of the noise workshop.

Design staff should have early and frequent communication with District environmental staff to plan for noise abatement.

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Instructions
Reference Links

See **Section 3.1.4** for more information on Retaining/Sound Walls.

3.1.10.9 Hazardous Materials

Due to the nature and location of TxDOT projects, there is potential for encountering hazardous materials and wastes before and during construction. Hazardous materials and wastes can be found in existing, adjacent, and proposed ROW. Studies are conducted during the project planning phases to identify potentially hazardous material sources and locations.

When appropriate for the situation and sequence of construction, show the following in the plan view on the environmental layout sheets:

- Locations of asbestos containing materials and structures;
- Locations of lead-based paint containing materials and structures;
- Locations of leaking underground storage tanks;
- Locations of known waste materials that the Contractor will need to mitigate (if that is included in the contract); and
- Locations where soil and groundwater management plans apply.

Additional information about hazardous materials is recorded on the EPIC sheet and in the General Notes.

Refer to the **PDP Manual** for more information on hazardous materials.

3.1.10.10 Human Environment

Human environment impacts evaluated during the environmental phase of the project come in different forms. Some may require specific considerations during PS&E, and others are incorporated into other TxDOT processes, such as public involvement.

In Limited English Proficiency (LEP) cases, certain portions of the plans may need to be translated to meet community language needs. Any questions relating to Human Environment should be directed to District environmental staff and the ENV SME when appropriate.

The following is a general list of elements impacting the human environment:

- Consider design changes and aesthetic features to address public comments when such suggestions are feasible;
- Commitments made to communities, neighborhoods, etc., regarding access, ROW use, or other special commitments made as part of the public involvement process;
- Sequencing/phasing of construction that interrupt access to community activities, like accessing the local community center in a small town or interrupt daily habits such as loud construction activities occurring at night adjacent to a neighborhood; and

- Construction methods that cause nuisance situations or damage properties, such as air quality considerations from construction dust or vibration issues on residential developments caused by construction methodologies.

There is no one location to address human environment impacts in the plans. Depending on the issue or concern the appropriate solution might fall in the sequencing of construction, additional design considerations (like sound walls), additional outreach during public involvement, or restrictions on the type of equipment that can be used. Information might need to be documented in the General Notes, plan sheets, EPIC sheet, pay items, or a combination of PS&E elements to ensure the Contractor is adequately aware of the commitments made to the public.

3.1.10.11 Environmental Standards

Environmental standards such as rock filter dams, sediment control fence, construction exits, erosion control logs, etc. can be found on the **Roadway Standards webpage**.

3.1.11 Miscellaneous Plan Sheets

Refer to the **PS&E QC Milestone Checklist** for information to include on the Miscellaneous Plan Sheets.

3.1.11.1 Landscaping/Irrigation

Landscape and irrigation sheets include appropriate layouts and details if such aesthetics treatments are included in the project.

Refer to TxDOT's **Landscape and Aesthetics Design Manual** for more information.

3.2 Standards

3.2.1 Standard Drawing Reliability

Plan sheets of TxDOT standard drawings are considered a product of the department which have evolved and been developed by many people over a considerable number of years, and, in the case of existing standards, the details shown on the drawings have proven to be reliable through their years of use. These drawings are not required to be signed and sealed by the responsible professional **unless modified** during the PS&E preparation for a specific project application.

The responsible engineer will identify, in the Index of Sheets, those standard drawings that they issue with the plans and is to add the following note, or similar note, with signature, seal, and date in the proximity of the section of the Index of Sheets the engineer is responsible for:

"The standard sheets specifically identified above by (symbol shown), plus sheets ____, ____, ____, ____, ____, have been issued by me, or under my responsible/direct supervision and are applicable to this project."

3.2.2 Standard Drawing Modification

When "Standard" drawings are modified, the engineer is to identify the components on the drawing that are modified, sign, seal, and date the drawing. The engineer is also responsible for communicating the changes, plus the effect of any design relationship between the revised and the original components on all other plan sheets.

When a standard is modified, "**(MOD)**" should be placed in the title block, as well as on the index sheet next to the name of the standard.

A note like the following listing the modified standard should be included in the **General Notes**:

The following standard detail sheets have been modified:
C-RAIL-R(MOD)

3.3 Drafting Guidelines

Accurate, clear, and consistent plans are essential in obtaining accurate bids, efficient construction, and reliable permanent records. The consistent use of uniform drafting guidelines will increase the efficiency in which the plans are reviewed by the contractors prior to bidding and improve their understanding of the contract's intent. It is highly recommended that designers and technicians use uniform drafting standards regardless of whether the plan sheets or details are prepared using the provided Named Boundaries, Annotation Groups, Text Favorites and Text Styles within the current TxDOT OpenRoads Designer (ORD) Workspace or developed independent of these tools. The intent is to produce consistent, accurate, and legible plan sets that are not cluttered with unnecessary information.

Refer to TxDOT's **Digital Delivery webpage** for the current TxDOT ORD Workspace.

3.3.1 Plan Sheets Created using Civil Production Tools

Plan Sheets should be created using Civil Production Tools. TxDOT has developed a Workspace with Named Boundaries, Annotation Groups, Text Favorites and Text Styles covering most sheet types and scenarios needed for plan sheet development. These should be used so the desired consistency and desired look of the plan sheets can be achieved. Note the Normal Text Styles in the Workspace use font type Engineering.

For further information on the details of these standards, refer to the civil tools Help menus within the software applications.

3.3.2 Plan Sheets Created Independent of Civil Production Tools

Plan sheets created independent of the Civil Production Tools (e.g., special, or miscellaneous details) should use the appropriate Feature Definitions defined in the current TxDOT Workspace.

Refer to TxDOT's **Digital Delivery webpage** for the current TxDOT Workspace.

3.3.3 Annotation Best Practices

- All text displays should be automatically programmed within the TxDOT Workspace for Open Roads Designer (ORD). If that is not the case, display all text with the applicable Text Style from the Text Style library within the TxDOT Workspace. Note the Normal Text Styles in the Workspace use font type Engineering. **Exception: special fonts on Title Sheet as discussed in Section 3.1.1.1.**

- Show all text with a line style of solid.
- Use the Annotation Scale to proportion text size to the scale of the sheet using civil production tools. For information only – **Table 3-6** and **Table 3-7** show sheet text sizes and sheet dimensions.
- Avoid clutter; pull annotation away from the picture.
- Line up annotation and avoid unclear abbreviations.
- Break leader lines at conflicts only where readability would be improved.
- Employ uniform leader lines at the same angle for neatness (i.e., 15°, 30°, etc.).
- Use a circular arc for curved leaders.
- Minimize mixing of curved and straight leaders on the same page.
- Include only the annotation required for construction. **Exception: hydraulic calculations.**
- Additional designer's notes may be placed outside the sheet boundary in CADD files.
- Place annotation in the "Default Model" or "Drawing Model," not the "Sheet Model." An "Annotation DGN" can also be used to place annotations.
- Minimize clip masking by employing better text location.

Table 3-6: Sheet Text Sizes

Text Usage	Size	WT	1"=20	1"=40	1 50	1"=60	1"=80	1"=100	1"=200
Normal	60	0 – 1	1.2	2.4	3.0	3.6	4.8	6	12
Emphasized	78	2 – 3	1.56	3.12	3.9	4.68	6.24	7.8	15.6
Sheet SubTitle/Title	96/120	3 – 4	1.92/2.4	3.84/4.8	4.8/6.0	5.76/7.2	7.68/9.6	9.6/12	19.2/24

Table 3-7: Sheet Dimensions

Scale	Heavy border line	Left margin	Top, Bottom, Right margins
Plotted	**16" x 10.5" 15.15" x 10.50"**	**1"**	**¼ "**
1" = 20'	210’ x 320’	20’	5’
1" = 40'	420’ x 620’	40’	10’
1” = 50’	525’ x 800’	50’	12.5’
1" = 60'	630’ x 960’	60’	15’
1" = 80'	840’ x 1280’	80’	20’
1" = 100'	1050’ x 1600’	100’	25’
1" = 200'	2100’ x 3200’	200’	50’

3.3.4 Design File Best Practices

- Complete all design in one or more master design files, instead of individual sheets. Attach master design file(s) to a “Container File” that is used to populate named boundaries to create sheets. To avoid problems, do not copy files. This enables drafting modifications and/or updates to be performed in a single file rather than multiple sheet files. **Avoid attaching reference file with save full path.**
- All master design files should be delivered unrotated and full scale. All mapping products should be referenced to two standard coordinate systems: the North American Datum of 1983 (NAD 83) for horizontal positions and ellipsoid heights, and the North American Vertical Datum of 1988 (NAVD 88) for orthometric heights. Surveys are referenced to these datums through measurements to control points of the National Spatial Reference System (NSRS). All control coordinates will be provided in surface using surface adjustment factors posted in the TxDOT Surveyors’ Toolkit. An adjustment was done in Texas using Global Positioning System (GPS), which resulted in the 1993 High Accuracy Reference Network (HARN). The network was extended to nearly all old, conventionally surveyed federal monumentation. Projects should be referenced to the published HARN coordinates of NGS monumentation.
- Multiple master design files (for TOPO, ROADWAY, DRAINAGE, BRIDGE, etc.) allow several designers to work on different parts of the project at the same time while referencing each other's work.
- In keeping with Bentley’s file separation Best Practices, save all geometric linework in a separate file from the Corridor Models.

- Place all features at exact coordinates using Civil AccuDraw. Since some features may be used by designers for other calculations or details, features should be placed by exact coordinates to avoid errors and not approximated.
- Avoid working in Survey base files due to the hazard of overwriting or corrupting the original file. Always keep good backups.
- Attach PE's seal to sheet border as a reference file. Do not place a cell. This will provide better control of the PE's seal. **Consider having a reference file for the preliminary seal and a different reference file for the final seal. This best practice allows the designer to change the name of the reference file instead of detaching and reattaching it.**
- Feature Definitions and level names from the TxDOT DGN Libraries will be used to differentiate features within the overall design.
- The TxDOT DGN libraries are supplied to establish a standard drafting scheme. This scheme should be used as delivered without modification.
- Use File Symbology Overrides for reference files when referenced into individual sheets. This will allow the user to change the look of the linework in specific sheet files without changing the original base files.
- Scale of each drawing/sheet should be clearly shown, including not-to-scale (NTS) items.

3.3.5 File Management Best Practices

- Keep all files (graphics, notes, PS&E, etc.) for a project in subfolders of a single folder tree.
- Avoid using long path names.
- Share (do not copy) files for more than one person to work on; this prevents duplicate file conflicts.
- When a project is completed, archive all files/data according to TxDOT's **Record Management Manual**.

All project files are to be stored in ProjectWise using standard TxDOT file structure.

3.3.6 Plotting Best Practices

- Using the current TxDOT workspace, select the desired pre-loaded driver (e.g., "TxDOT PDF-BW").
- The scale of the sheets is applied during the creation of the sheet, thus when printing the "Sheet Model," the scale will say 0.08333:1. This is normal.

3.4 Engineer's Seal and Signature Requirements

The **Texas Engineering Practice Act (TEPA)** and **Texas Engineering and Land Surveying Practice Acts and Rules Concerning Practice and Licensure (TBPELS)** provide guidance on signing and sealing regulations. The TEPA and TBPELS regulations apply to individuals and firms that engage in the practice of engineering. The Texas Board of Professional Engineers authority, in the case of department employees, is with individual engineers.

For this section, the following acronyms are defined:

- **SSD** - Signed, sealed and dated.
- **SD** - Signed and dated with P. E. designation and printed name.

3.4.1 Signing and Sealing Regulations

Signing and sealing requirements in the TEPA and the TBPELS apply in accordance with Section 19 of the TEPA. If the **final** (*emphasis added*) document is directly tied to a project that is a public facility or an engineering decision is made for a public facility, **construction or maintenance**, the engineering **signing and sealing regulations apply**. When TxDOT provides an engineering service for a third party, the regulations apply as well.

Examples include:

- **Before final plans for Letting Memorandum and correspondence (internal documents)** - Routine communications require SSD only when they are part of the final product for the PS&E. The final product for PS&E includes the proposal and plans. Draft or preliminary documents under the engineer's control do not require SSD. **Released preliminary or incomplete documents should not be sealed or signed**. They should be dated and identify the authoring professional(s) and registration number(s). They should contain statements clearly identifying them as preliminary or incomplete.
- **Changes during construction or maintenance work** - Changes by memorandum and notes without SSD are permissible as long as a final change is made to the document in accordance with signing and sealing regulations. For example, changes are sometimes made to traffic control requirements on the plans through sketches and markings on sheets. As long as the engineer maintains control or has direct supervision over those changes, and there is a follow-up sheet or document that is properly SSD, it is permissible to withhold the SSD until the final document for the change is complete. Timely completion of the final document is needed in order for the engineer to maintain control over engineering decisions. There are instances where a TxDOT engineer not directly involved in a project provides advice to a TxDOT project or field engineer who is directly involved in making decisions on a project. Advice or opinions do not require SSD

when the project or field engineer makes the decision for implementing a change. In these cases, the project or field engineer takes direct responsibility for the decision, and SSD requirements apply to the project or field engineer.

When an engineer outside of the project office provides exact details and instructions and those details and instructions are implemented with no further engineering decision, SSD requirements will apply to the engineer responsible for the details and instructions implemented. An SSD record document needs to be kept with the project files.

Email communications may be used to quickly deliver an engineering decision that is directly tied to a project. Later plan sheet changes, change orders and specifications can be finalized to incorporate the change with SSD. Again, timely completion of the final document is needed for the engineer to maintain control over engineering decisions.

The regulations apply to maintenance work as well. Changes to copies of standard sheets, such as traffic control standard sheets used for maintenance work in the field, will require an SSD.

An engineer's verbal direction in the field does not require any documentation to be in compliance with the TBPER. Department procedures may, however, require documentation of changes and therefore, SSD requirements must be met for the documented change.

3.4.2 Using Signatures or Signatures and Seal

SSD applies to the documents that are directly tied to a project, construction or maintenance. The following guidance is provided for whether a document should be considered an engineering document tied directly to public works.

Use SD for formal engineering recommendations, evaluations, opinions and analysis released to the public or for department distribution. Signed originals may be kept in pertinent files to comply with rules and regulations. Examples are as follows:

- Claims reports;
- Foundation reports;
- Laboratory studies;
- Pavement designs;
- Soil classifications;
- Construction time analysis; and
- Traffic analysis.

3.4.3 Traffic Control for State Force Maintenance

Engineers can meet the requirements for direct supervision for implementation of traffic control for state force maintenance projects through training of maintenance staff and District operating procedures. District operating procedures can vary from training

maintenance staff in the proper selection of standards and placement of devices in accordance with the standard, to developing modified standard or new project specific traffic control plans SSD by the responsible engineer. Any markings to modify a standard or sketch used for a traffic control layout must be done under the direct supervision of the responsible engineer and must be SSD.

3.4.4 Sealing and Dating Construction Documents

Licensed professional engineers must affix their seal and original signature or electronic seal and signature with the date on the final version of their engineering work before such work is released from their control.

3.4.5 Electronic Seals and Signature Requirements

Licensed professional engineers must maintain the security of their electronic seals and electronic signatures. The following methods are allowed:

- Licensed professional engineers may electronically copy their original hard copy work that bears their seal, original signature, and date and transmit this work in a secure electronic format; or
- An engineer may create an electronic seal and digital signature for use in transmitting electronically formatted engineering work, regardless of whether the work was originally in hard copy or electronic format.

DES strongly recommends using electronic signatures whenever possible. Utilize digital signature applications such as DocuSign and Adobe, rather than attempting to print/sign/scan documents.

Further guidance on digital signatures can be found on the TxDOT.gov **Electronic Plan Set Guidance webpage**.

The **TBPELS** is the authority for licensed professional engineers. Chapter 137, Subchapter B: Sealing Requirements, §137.31 through §137.37 outline the requirements for signing, sealing, and dating of engineering documents.

Chapter 4
Specifications

4.1 Overview

TxDOT has established standards and specifications for the construction and maintenance of highways, streets, and bridges.

Refer to the TxDOT.gov **TxDOT Specifications webpage** for additional information and resources regarding the information covered in this chapter.

4.2 Types of Specifications and Provisions

The types of specifications and provisions that are described in this chapter include:

- Standard Specifications;
- Special Specifications; and
- Special Provisions.

4.2.1 Standard Specifications

The Standard Specifications are listed in the department's current specifications book entitled **Standard Specifications for Construction and Maintenance of Highways, Streets, and Bridges**. All Standard Specifications are assigned a **three-digit Item Number** for organizational and reference purposes (e.g., Item 110 - Excavation). Each Specification is outlined by six basic articles:

- Description;
- Materials;
- Equipment;
- Construction or Work Methods;
- Measurement; and
- Payment.

The Standard Specifications must be used unless alternative Special Specifications or Special Provisions have been approved for use.

The General Requirements and Covenants (Items 1–9) of the **Standard Specifications for Construction and Maintenance of Highways, Streets and Bridges** are required for **all construction contracts**. Modifications to Standard Items 1-9 require the approval of TxDOT Administration and the approval of a Special Provision (See **Section 4.2.3** for additional information on Special Provisions).

4.2.2 Special Specifications

Special Specifications are methods and/or items of work that are not covered by Standard Specifications. All Special Specifications are assigned a **four-digit Special Specification number**, preceded by the prefix "SS," for organizational and reference purposes (e.g., SS1004 Tree Protection). Special Specifications may introduce a new article, may be completely new specifications, or may be modifications of Standard Specifications. The three types of Special Specifications are shown in **Table 4-1**.

Table 4-1: Types of Special Specifications

Type	Description
Statewide Special Specifications	Approved for statewide use
Districtwide Special Specifications[1]	Approved for use in a specific District(s). These Special Specifications may be used on projects outside the originally approved District(s) but must be **resubmitted** for approval to be used in other Districts.
One-time use Special Specifications	Approved for one-time use on a specific project(s). These may be used on projects other than the originally approved project but must be **resubmitted** for approval to be used on the additional project(s)[1].
Notes: 1. See **Section 4.3** regarding submission and approval process.	

For an index of all previously approved Special Specifications, and the Special Specifications themselves, refer to the TxDOT.gov **TxDOT Specifications webpage**.

4.2.3 Special Provisions

Special Provisions modify Standard Specifications or Special Specifications, directly related to work items in the contract, and may be optional or required for use. The three types of Special Provisions are shown in **Table 4-2**.

Table 4-2: Types of Special Provisions

Type	Description
Statewide Special Provisions	Approved for statewide use
Districtwide Special Provisions[1]	Approved for use in a specific District(s). These Special Provisions may be used on projects outside the originally approved District(s) but must be **resubmitted** for approval to be used in other Districts.
One-time use Special Provisions	Approved for one-time use on a specific project(s). These may be used on projects other than the originally approved project but must be **resubmitted** for approval to be used on the additional project(s)[1].
Notes: 1. See **Section 4.3** regarding submission and approval process.	

4.2.3.1 Triple Zero Special Provisions

Triple Zero Special Provisions (000 SPs) are those which do not relate directly to a work item specification but describe additional conditions included in a contract. Different 000 SPs are used on federal aided and non-federal aided contracts.

A **000 SP "Important Notice to Contractor"** is required if any of the certification items (ROW Acquisition, Relocation Assistance, Encroachments, State and Non-State-Owned Utilities, Environmental, District approved Construction Management Plan (CMP), and Railroads) are not estimated to be clear as of the project letting date. This 000 SP must list all unclear items and their approximate location, utility impacted either by ROW or Environmental constraint, estimated clearance date, and the effect on construction, including phases impacted.

For a list of required Special Provisions, on each type of contract, refer to TxDOT's **Required Specifications Checklist webpage**.

Refer to the **Construction Management Plan SOP** for additional information on the use of 000 SP for Item 8 Delayed Start Provision in Construction Contracts. Contact DES – FPP section for additional support.

4.3 New Special Specification and Special Provision Submission Requirements

In the early stages of design, the basic nature and character of work should be established, so that bid items may be selected. Also, this allows the designer to establish if any special circumstances may require Special Specifications or Special Provisions.

New Special Specifications and Special Provisions should be submitted only when it has been determined that construction under the Standard Specifications will not achieve the desired results or will not prove to be economical. If new Special Specifications or Special Provisions are needed, the early identification will allow time for them to be reviewed and approved prior to the submission of the PS&E.

4.3.1 General Guidelines

Special Provisions should modify the Standard Specification only to the extent necessary to accomplish the desired results. When voiding portions of an article, void only the sentences requiring removal/replacement and the remainder of the Article should remain exactly as it appears in the Standard Specification. While condensing and simplifying an article may result in what appears to be a more concise Special Provision, this practice has often resulted in misinterpretation and the unintentional omission of important Standard Specification requirements.

The same general format and wording used in the Standard Specifications should be followed in preparing Special Specifications. This can most readily be accomplished by using a similar standard item as a guide and substituting the desired wording where appropriate. In particular, the measurement and payment paragraphs should be essentially the same as similar standard items. This is necessary since conflicts or vagueness in these paragraphs are often the basis for claims against the department.

During the preparation of both Special Provisions and Special Specifications, considerable thought should be given toward requirements and wording which will permit the use of the Special Provisions or Special Specifications on other projects having slightly different conditions. This can be achieved by relegating certain features, such as density and gradation requirements, to the plans and exercising foresight in preparing the measurement and payment paragraphs. The repeated use of desirable Special Provisions and Special Specifications is most beneficial in that it results in progress in construction methods and materials, and uniform interpretation of specification requirements.

Ensure that new Special Specifications and Special Provisions do not contradict the other articles of the specifications and provisions in the contract.

All articles of the newly prepared Special Specifications and Special Provisions should be reviewed and compared to those of the other specifications and provisions in the contract.

4.3.2 Requesting New Special Specifications, Special Provisions, or Bid Codes

To request a new Special Specification, Special Provision, or Bid Item, a Specification Request Form must be completed and submitted through TxDOTCONNECT (TxC).

For additional information on accessing and submitting the Specification Request Form, refer to the **TxC Reference Guide – Engineer's Estimate**.

For all projects, when a Special Provision or Special Specification has been used three (3) or more times in a District, the status of districtwide use is encouraged. When the District determines they want a proposed Special Provision or Special Specification for districtwide use, the District must submit a Specification Request Form in TxC.

4.3.3 Specification Templates

Templates have been developed and must be used to develop new Specifications and Provisions. Special Specifications and Special Provisions will not be accepted for submittal and review unless they are in the correct format.

These templates are found on the TxDOT.gov **TxDOT Specifications webpage**.

The templates open with a .docx extension and must be saved with an .rtf extension prior to uploading to TxC with a Specification Request Form. Once the document is opened and the information has been entered and ready to be saved, click on File > Save As > Browse, and under "Save as Type" select Rich Text Format (*.rtf).

4.3.4 Approval Procedure

Once a Specifications Request Form has been submitted through TxC, it is routed through an automated workflow. The workflow differs for each Form type.

Refer to the **TxC Reference Guide – Engineer's Estimate** for additional information on the workflows, including review and approvals.

4.4 Specification List

Each Standard Specification item, Special Provision, and Special Specification proposed for a project must be listed using a standard format. This listing is called the List of Governing Specifications and Special Provisions, more commonly referred to as the "Specification List" or "Spec List." The Specification List is used to assemble the bidding proposal through automated computer programs. Special Provisions and Special Specifications contained in the Specification List are assembled in the bidding proposal. The proposal is a legal document on which the contractor bases bids for a project. Hence, the completeness and accuracy of the Specification List is important.

Modification of Specifications by General Note is not allowed.

Refer to the TxDOT.gov **100% PS&E Pre-submittal Preparation webpage** for additional information on developing the Specification List.

4.4.1 Specification List Components

Components of the Specification List are:

4.4.1.1 Standard Specifications

This portion of the Specification List always contains Items 1 through 9, which are "General Requirements and Covenants." It always contains the items "Mobilization," "Barricades, Signs, and Traffic Handling" and "Temporary Erosion, Sedimentation, and Environmental Controls." The Specification List provides a listing of the items shown in the Engineer's Estimate (see **Section 5.2**).

4.4.1.2 Special Specifications

All Special Specifications under which payment is to be made or which are used as reference items must be listed by number and title. Particular attention should be given to ensure that any standard items or other Special Specifications referred to in the Special Specifications are indicated as reference items.

4.4.1.3 Special Provisions

This section of the Specification List will contain all the required and optional provisions. Under the present system, only one Special Provision to any bid item can be used, with the following exception: **An alternate bid item description may have different Special Provisions from its base bid item.**

To use more than one Special Provision on a bid item, enter a request for a new one-time use Special Provision, which incorporates all the desired specification revisions, using the submission process described in **Section 4.3**. **Care must be taken to ensure that the new Special Provision does not contradict the other articles of the specifications and provisions in the contract.**

4.4.1.4 Reference Items

Reference items are Standard or Special Specifications used to supplement other specifications. They are noted, mentioned, or referenced in the specification itself or in a plan or general note or by plan note/reference Special Provision. Reference items must be referred to in the Specification List to verify that subsidiary work is performed in accordance with the reference items. Reference items are shown adjacent to their respective Standard and Special Specifications, as applicable.

Special Specifications used as reference items will be listed under the Special Specifications, so a copy of the Special Specification will be included in the proposal. For a non-pay item to be included in the executed contract, it must be shown as a reference to one of the plans quantity items.

Refer to the TxDOT.gov **TxDOT Specifications webpage** for a list of all items referenced in the Specifications Book.

4.4.2 Specification List Creation

Each District is responsible for the creation of the Specification List in TxC. The TxC Specification List is partially prepared as the Engineer's Estimate is input into TxC. Some sections populate automatically based on the bid items entered in the Engineer's Estimate grid.

For additional information on creating the Specification List, refer to the **TxC Reference Guide – Engineer's Estimate**.

After completing the Specification List, a detailed examination should be performed to verify that all necessary items have been included.

For additional information on reviewing and editing the Specification List, refer to the **TxC Reference Guide – Engineer's Estimate**.

In general, the Specification List must include the following:

- The items contained in the plans, estimate, and General Notes must be shown on the Specification List;

- Items 1 through 9, Mobilization (Item 500), Barricades, Signs, and Traffic Handling (Item 502), and Temporary Erosion, Sedimentation, and Environmental Controls (Item 506) must always be included;
- If a field laboratory or field office is desired, Item 504 Facilities for Field Office and Laboratory, must be included on the Specification List along with a note in the General Notes specifying the type of structure required; and
- The appropriate Special Provisions should be included.
    - For a list of required Special Provisions, on Federal and Non-Federal funded contracts, refer to TxDOT's **Required Specifications Checklist webpage**. Use this list to confirm that all required Special Provisions are included. Those which are not on the Specification List must be added manually in TxC. Ensure the applicable Special Provision for the reference items are included as well.

The automatic Specification List system will generate most of the required Specification List items.
Specifications and Special Provisions may need to be added or removed as applicable to the project.

A check of reference items should be made. Reference items are included in the Specification List to inform the contractor that other subsidiary items of work are performed in compliance to the referenced item.

If reference items are the result of a reference in the Standard Specifications, no additional note needs to be added to the PS&E. However, if the reference item is specified by the designer and not specified in the appropriate specification, it should be the result of a note in the General Notes or the plans.

Refer to TxDOT's **TxC Reference Guide – Engineer's Estimate** for details on the creation and modification of Specification Lists.

4.4.3 Specification List Checklist

Refer to the **PS&E QC Milestone Checklist** for the Specification QC checklist.

4.5 General Notes

The purpose of the General Notes is to provide, in one section of the plans, the various supplemental data required by the specifications. This can consist of information such as base material requirements, gradation requirements, density requirements, and surface treatment data. General Notes also provide information and direction to the contractor by clarifying design details or construction practices. General Notes are included in bidding proposals for reference by contractors, materials suppliers, etc.

The General Notes are also intended for general design notes such as:

- Concrete surface finish;
- Paint color;
- Concrete pattern;
- Protection system for structures;
- Closed season dates for the application of asphaltic materials; and
- Minor modification of gradation requirements which are available in acceptable usage.

Each District is required to maintain a Master General Notes file.

4.5.1 Basis of Estimate

The General Notes include the Basis of Estimate. The Basis of Estimate is necessary for plans preparation and review, for basis of bid preparation, and for control of construction. It should show the basis for estimating each of the pay quantities of the contract, which cannot be directly measured from the plans. These include such items as sprinkling, rolling, blading, lime, fertilizer, asphalt, aggregate, etc., and should include compaction factors and unit weight for flexible base and embankment items when this information is needed for estimating purposes. Sometimes these items are subsidiary and should be indicated as such.

If Basis of Estimate information is shown in the Quantities Summaries sheets at the discretion of the District, then the Best Practice is to not repeat the same information in the Basis of Estimate.

4.5.2 Key Points Regarding General Notes

Refer to the TxDOT.gov **100% PS&E Pre-submittal Preparation webpage** for specific best practices in developing General Notes.

The General Notes are project specific. The contents should be adapted to each project based on the scope of work, bid items and specifications such as:

- Call out modified standard plan sheets at the beginning of the General Notes;
- Add District contact info for contractor questions - name, email, phone;
- Include specific notes as required including Traffic Generator Events, Safety Contingency, and Erosion Control; and
- Include project-specific general notes as needed.

Avoid use of notes furnishing quantities that are subject to change because of sequence of construction operations (e.g., designating portions of unclassified road excavation as rock excavation or foundation course) has resulted in confusion in interpretation and in some cases litigation in which the department has been successfully contested.

Where quantities for subsidiary items are available and are accurate, they should be shown but should be labeled "**FOR CONTRACTOR'S INFORMATION ONLY**" .

Word all proposed plan notes so that they are clear, concise and can have only one meaning.

Per Standard Specification Item 7, Section 2.3, a safety contingency force account is required for all projects and the following note must be used:

> **"The Contractor Force Account 'Safety Contingency' that has been established for this project is intended to be utilized for work zone enhancements, to improve the effectiveness of the Traffic Control Plan, which could not be foreseen in the project planning and design stage. These enhancements will be mutually agreed upon by the Engineer and the Contractor's Responsible Person based on weekly or more frequent traffic management reviews on the project. The Engineer may choose to use existing bid items if it does not slow the implementation of the enhancement."**

4.5.3 Implementation of Additional Project-Specific Liquidated Damages

Texas Transportation Code §223.012 and **43 Texas Administrative Code (TAC) §9.22** requires TxDOT to provide additional disincentives to help ensure the timely completion of projects identified as having a significant impact on the traveling public. These required disincentives are included in the contract in the form of Additional Project-Specific Liquidated Damages (APSLDs).

Form 2699, which includes criteria for District staff to consider during PS&E development to determine whether APSLDs are necessary for a project, and a road user cost (RUC) calculator are available to determine the dollar amount of the additional disincentives. In

addition, **Form 1002** records the amount of the APSLDs for each qualifying project, which is included in the contract's General Notes (Item 8) when applicable.

Refer to the TxDOT.gov **Road User Cost webpage** for additional information including:

- APSLD Handbook;
- Road User Cost Calculator;
- Form 2699; and
- Sample memo template: Request for Concurrence – Reduced Rate of APSLD.

Refer to the TxDOT.gov **100% PS&E Pre-submittal Preparation webpage** to access Form 1002.

4.5.4 Calculating Road User Costs and Value of Delay Time

Road user costs are the values used in A + B bidding, incentives/disincentives for milestones, final substantial complete, lane rentals, and Additional Project-Specific Liquidated Damages (APSLD) and are indicated in the General Notes.

Road user costs should be considered for the following types of projects:

- Projects that add capacity (may include grade separations);
- Projects where construction activities are expected to have an economic impact to local communities and businesses; and
- Rehabilitation projects in very high traffic volume areas.

In addition to meeting at least one of the above, a secondary evaluation should be made considering the following:

- Conflicting utilities will be cleared prior to construction and the ROW is clear;
- There is an adequate inspection force available; and
- 25% of the estimated road user cost is greater than the contract administrator liquidated damages.

If the secondary criteria are not met, the District should reevaluate the proposed use of road user cost liquidated damages before making the decision.

When the decision has been made to use road user costs, **Districts should include incentives with the disincentive.** There may be occasions when the potential for discovery of unknown utilities during construction make it prudent to include road user costs as disincentives only.

When including incentives, **a maximum bonus (number of days) must be included** in the project proposal. Further, only 25% of the calculated road user cost should be used for the rates shown in the plans. **Calendar definitions** should also be used for all A + B and incentive projects and may be used on road user cost projects without incentives.

The daily rate for road user costs may only be applied to the point of completion (end phase) stated in the plans for each phase or substantial completion for the total project.

Substantial completion is defined as occurring when all project work requiring lane or shoulder closures or obstructions is completed, and traffic is following the lane arrangement as shown on the plans for the finished roadway, or phase.

Each year TxDOT adjusts the value of time used in calculations to determine road user costs. The adjustment is based on the annual Consumer Price Index for the previous year.

Refer to the TxDOT.gov **Road User Cost webpage** for additional details and information.

4.5.5 Paying for Truck Mounted Attenuators (TMA)

The Standard Specification 505 - Truck Mounted Attenuators (TMA) ensures that all TMAs are paid for directly and are no longer subsidiary to Item 502. The total number of required TMAs for a project should be clarified in the General Notes with a note in this format:

> **In addition to the shadow vehicles with truck mounted attenuator (TMA) that are specified as being required on the traffic control plan for this project, provide ____ additional shadow vehicle(s) with TMA for TCP (___-___) -___ as detailed on General Note ____ of this standard sheet.**
>
> **Therefore, ____ total shadow vehicles with TMA will be required for this type of work. The Contractor will be responsible for determine if one or more of the operations will be ongoing at the same time to determine the total number of TMAs needed for the project.**

4.5.6 Requirement for Highway Closures during Certain Periods

Texas Administrative Code (TAC) § 22.12 states that if a proposed improvement of the state highway system requires the closing of a highway, the department will, before entering into a contract for the proposed improvement, coordinate the highway closure by communicating in person or by telephone, e-mail, or other direct method of communication with public offices from municipalities affected by the closure to avoid any adverse economic impact on the municipality during:

- Periods of increased travel on the state highway system, including major state and federal holidays and school holidays; and
- Other periods of high commercial activity in the State, including limited periods in which certain items are exempted from the sales tax holidays.

During the **development of the final PS&E** of each project, the following should be completed:

Include Special Provisions to Item 7 on the Spec List for projects as required.

Add one of the following notes to Item 7 of the General Notes:

- If the project's proposed timeline does not include any key dates / special events, whether there are road closures anticipated or not, then the following note is required under Item 7 of the General Notes, **"No significant traffic generator events identified".**
- If the project's proposed timeline includes key dates / special events, regardless of whether the project's traffic control design proposes roadway closures, the District should confirm the key dates / special events in the area. In addition, the following note is required to be included under Item 7 of the General Notes, **"Roadway closures during the following key dates and/or special events are prohibited:"**, with a list of events and/or dates.
- If a road closure during key dates / special events is unavoidable, an Economic Analysis is required and will be performed by Texas A&M Transportation Institute (TTI), through TPP. Begin coordination with **TPP – Systems Planning Section** to provide the following information so that TTI can proceed with the economic analysis:
  - Description of the project;
  - Description of the road closure;
  - Dates of the closure location; and
  - Information on the key dates/special events

4.5.7 Specification Modifications

Modification of Specifications by General Note is not allowed. General Notes are to be used to give information when allowed by the specification using terms such as "as shown on the plans," "as directed by the Engineer," or others. General Notes may be used to supplement information - noted in the specification (e.g., the closed season for asphaltic materials and curing required for base materials, etc.).

Special Provisions are necessary for revisions to Standard Specifications or Special Specifications. All notes should reference the specification to which they apply. Special

Provisions take precedence over the plans and General Notes in accordance with Item 5.4 of the Standard Specifications. **The General Notes should not be used to repeat what is already covered in the Standard Specifications, Special Provisions and/or Special Specifications**. The use of the notes should be minimized.

Each of the Standard Specifications, Special Provisions and Special Specifications used in a project as direct pay items or reference items must be examined carefully. Those specifications that require "as shown on the plans" information **must be completed by plan notes in the General Notes**. There are some instances where such terms are in the specifications to allow flexibility, but there are also those that must be shown in the General Notes to have the complete information. This may consist of material specifications, design criteria, gradation requirements, density requirements and surface treatment data.

4.5.8 Hierarchy of PS&E Elements

In the PS&E, certain elements have precedence over others in the case of conflicting information. This hierarchy is discussed below:

- Numerical dimensions govern over scaled dimensions;
- Special provisions govern over plans (including general notes);
- Plans (including general notes) govern over standard specifications and special specifications; and
- Job-specific plan sheets govern over standard plan sheets.

However, in the case of conflict between plans (including general notes) and specifications regarding responsibilities for hazardous materials and traffic control in Items 1 through 9, "General Requirements and Conditions" and Item 502, "Barricades, Signs, and Traffic Handling," **special provisions govern over standard specifications and special specifications, which govern over the plans**.

4.5.9 Processing General Notes for 100% PS&E

Refer to the TxDOT.gov **100% PS&E Pre-submittal Preparation webpage** for details on processing the General Notes.

4.5.10 General Notes Checklist

Refer to the **PS&E QC Milestone Checklist** for the General Notes QC checklist.

Chapter 5
Engineer's Estimate

5.1 Overview

The Engineer's Estimate is a tabulated listing of construction bid items that documents the project's total estimated construction cost. The listing includes the description, unit bid price and quantity of each bid item for the major categories of work. The major categories of work are further defined in the **TxC Reference Guide – Engineer's Estimate**.

A properly prepared Engineer's Estimate also identifies all different types of work that are to be included in the contract. This includes work to be performed by state or other forces, work eligible or ineligible for federal participation, and joint bid work such as utility work, drainage, bridge, pedestrian, landscaping, etc., that may be desired to be let in the project. The designer needs to carefully consider all aspects of design requirements, project agreement obligations, and federal requirements in identifying and composing the item of work in a construction contract. It is better to invest the time in clearly defining all anticipated aspects of work before the letting than to negotiate a dispute or item of work with a contractor that is not prepared to perform an overlooked aspect of work after signing the contract.

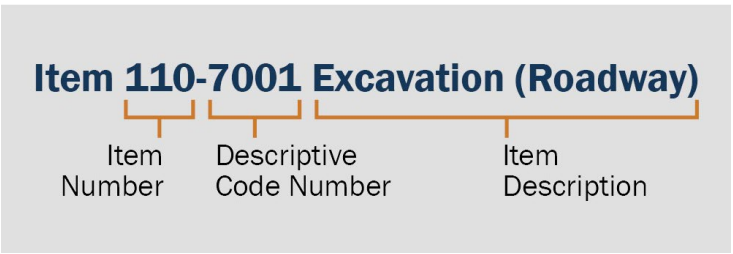
The preparation of an Engineer's Estimate is a constantly evolving process that begins with plan preparation and continues throughout the course of project development. The following sections provide the process for the preparation of an Engineer's Estimate.

Refer to TxDOT's **Construction Cost Estimating Guide** for further guidance on developing an Engineer's Estimate.

5.2 Determination of Bid Items

The work to be performed by the contractor and to be paid for directly are identified as construction bid items. The bid items used must correspond to either a Standard Specification or a Special Specification. It is important to evaluate the specifications for each bid item before choosing one so the work performed by the contractor will achieve the results intended by the designer. The selection of the bid item and the method of measurement and payment is not based only on the actual work called for in the specification but should also account for the nature of the project and its location, the experience, and resources of the local contractors likely to bid on the project, and area engineer's preferences.

All bid items are comprised of the following:



5.2.1 Item Number

As explained in **Chapter 4**, all Standard Specifications are assigned a three-digit Item Number (e.g., Item 110 Excavation) that is further used to identify the standard bid items associated with the category of work to be performed by the contractor. Similarly, all Special Specifications are assigned a four-digit Special Specification number, preceded by the prefix "SS" (e.g., SS1004 Tree Protection).

See **Chapter 4** for additional information regarding specifications.

5.2.2 Descriptive Code Number

Each Item Number is further subdivided by four-digit Descriptive Code Numbers (e.g., "7001 EXCAVATION (ROADWAY)" continuing the example of Item 110 Excavation), representing different ways to bid an item; whether it be different units of measurement, different sizes of the item, different types of the item, etc. It is important that the correct Descriptive Code Number be selected. Bid Items are reflected in the Estimate and Quantity (E&Q) sheet in the project plans and bid inserts in the proposal (see **Section 3.1.1.6** for additional information regarding the E&Q). **Contractors use the bid inserts to prepare their bids, thus an**

incorrectly selected descriptive code can result in costly change orders and negotiations with the contractor.

Descriptive code example. See the following example explaining the difference between the 2024 Specification Bid Items 247-7136 and 247-7052. Item 247 designates Flexible Base. The descriptive codes, 7136 and 7052, call for identical material to be delivered to the project site; however, the methods of measurement and payment are different for each item.

Item 247-7136 Flexible Base (Complete in Place) (Type A GR 1-2) (In VEH)

Measurement and payment by the loose Cubic Yards in vehicles delivered to the job site

Item 247-7052 Flexible Base (Complete in Place) (Type A GR 1-2) (6")

Measurement and payment by the Square Yard at the specific 6" depth of surface area in the completed final position

It is important that the designer evaluate each situation before selecting the desired descriptive code, because one item may require more personnel and material or place unnecessary restrictions on the contractor that will result in higher bid prices.

For a listing of all current Bid Items refer to the TxDOT.gov **Bid Items and Index webpage**.

5.2.2.1 Requesting New Descriptive Code Numbers

If there is no suitable Descriptive Code Number that accurately describes the work needed to be performed by the contractor (e.g., a specific depth of base and asphalt pavement removal under Item 105), the designer may submit a new Bid Code request through the TxC Specification Request Form. **The designer should submit the form for new codes as early as possible in the PS&E development.**

The work associated with a new Descriptive Code Number must be in conformance with the existing specification for that item. If any substantive change to the work to be performed is required a New Special Specification or Special Provision must be requested. Refer to Chapter 3 for additional information regarding Special Specifications, Special Provisions, and submission requirements.

Refer to the **TxC Reference Guide – Engineer's Estimate** for additional information on accessing and submitting the Specification Request Form.

5.2.3 Alternate Bid Items

An alternate is a bid item that may be substituted for the primary base bid item of work. For example, in some instances the bid item Limestone Rock Asphalt Pavement may be used as an alternate to the bid item Hot Mix Asphaltic Concrete Pavement. Having more than one choice gives the prospective bidders more opportunities to streamline their bids resulting in a more competitive bid. It is the designer's discretion to consider alternate work items and to include such items in the plans estimate when practical.

The designer must make sure that the primary bid item and the alternate are equivalent in quality and performance and that one does not have an inherent advantage over the other. Alternates are shown in the project estimate, and the total estimated construction cost must be the same for the primary bid item and its alternate. Furthermore, if accompanying items (such as structural excavation) are affected, they must also appear in the alternate with the adjusted quantity.

Refer to the **TxC Reference Guide – Engineer's Estimate** for additional information on alternate bid item inclusion in the TxC estimate.

5.3 Bid Item Quantities

The Bid Item Quantities for each item of work are provided for in the Engineer's Estimate, the Quantity Summary Sheets, and the Estimate and Quantity (E&Q) Sheets in the plans. (see **Chapter 3** for additional information regarding the Quantity Summary and E&Q Sheets).

5.3.1 Bid Item Quantity Tolerances (Degree of Accuracy)

Table 5-1 shows the greatest degree of accuracy that should be shown in the estimate for the various items. Quantities should be shown on the Engineer's Estimate to the accuracy given in this table.

Table 5-1: Bid Quantity Tolerances

Item	Show to the nearest	
Earthwork Items (including Structural Excavation & Backfill)	0.01 0.01 1 1 1	STA AC CY SY YH
Watering and Sprinkling	0.1	MG
Blading, Rolling & Traffic Control	1	HR
Base and Base Treatment Items	0.01 1 1 1	STA CY SY TON
Asphalts, Oils and Emulsions	1 0.01	GAL TON
Asphaltic Pavements & Surface Treatment Aggregates/Materials	1 1 1	TON CY SY
Concrete Pavement Items (also to include Riprap & Structure Approach Slabs)	1 1	CY SY
Cleaning, Sealing Joints, Sealed Expansion Joints Preformed Joint Sealers	1 0.01 1 1	LF LM LB GAL
Planning, Texturing, Fabric Underseal & Surface Rehab	1	SY
Trench Excavation	1	LF
Pilings & Drilled Shafts	1	LF

Item	Show to the nearest	
Structural Concrete (including Structural Repairs, Concrete Overlay of Structure Decks, Pre-cast Concrete Pipe, Pipe, Culverts & Drains)	0.1 0.1 1 1	CY SY SF LF
Retaining Wall	1	SF
Reinforced Concrete Slabs & Traffic Signs	1	SF
Pre-stressed Concrete Beams	0.01	LF
Structural Steel (including Armor Joint & Sign Support) (nearest 10 lb or 100 lb if 1% accuracy is maintained)	1	LB
Bridge Railing (including Removal)	0.1	LF
Jacking, Boring or Tunneling	1	LF
Timber Structures	1	MFB
Detours	0.1 1	STA SY
Traffic Barrier & Pavement Markings	1	LF
Curb, Gutter, C&G, Sidewalks, Walkways, Driveways, Medians & Islands	1 1	LF SY
Fencing, Underdrains, Conduit, Conductors, Cable & Detectors	1	LF
MBGF	See Note (1)	
Mobilization [2]	0.01	
Items measured by the Month, Each or Lump Sum	1	

Notes:
1. MBGF quantities should be reported in increments of 12.5 LF, per the Statewide MBGF Standard Details on TxDOT.gov **Roadway Standards webpage**.
2. See **Section 5.5.2** for additional guidance on calculating Mobilization amounts for projects with multiple CSJs.

5.3.2 Subsidiary Items of Work

Occasionally, it may be appropriate to specify work that is not to be paid for directly, these are known as subsidiary or incidental items. Work that is not paid for directly should be insignificant in the scope of the overall project and used minimally. When subsidiary or incidental items of work are specified, it is necessary that the work be explained in sufficient

detail, possibly even including referencing specifications, and a quantity should be shown in the plans but marked with the following statement:

"This item will not be paid for directly but shall be considered subsidiary to Item ____. The quantity is shown for contractors' information only."

This is necessary for contractors to be able to accurately account for this work in their bids.

5.3.3 Requirements for Proprietary/Sole Source Product Procurement and Approval

The Federal Highway Administration (FHWA) revised its guidance on the use of proprietary products and has deferred this approval process to each state agency. Therefore, TxDOT requirements on approval for use of proprietary/sole source products on all construction and maintenance projects are as follows.

All requests for use of proprietary/sole source products must be submitted to the appropriate Engineering Division for review and approval based on subject matter expertise of the product in question. This request should be submitted during the construction/maintenance project's design phase to allow for adequate review time of this request.

This request must include product details (model name, number, etc.) and justification on why this specific product is required. Examples of acceptable justifications include:

- A specific project need justifies the use of a proprietary device or product in which no suitable alternate is available; or
- There is a need for compatibility because of:
  - **Function** (operates with an existing facility) e.g., The city's existing signal control system which contains a significant percentage of intersections is already working with only one brand and model of controller; or
  - **Aesthetics** (match the visual appearance of an existing facility) e.g., A specific light pole in a city historical area or specific light pole designated in the vicinity of previous projects; or
  - **Logistics** (interchangeable with products in an agency's maintenance inventory) e.g., Due to scarce county financial and labor resources, specifying one type of MASH compliant end treatment already in use and maintained by the county which will be responsible for maintenance of this location; or
  - **Safety** (upgrade to higher safety criteria) e.g., Desire to use latest crash test criteria device (e.g., MASH) when there is only one such proprietary device available for that category of device, and the other devices within that category meet a lesser criteria.

For requests initiated by a local government, it is the District's responsibility to verify that the request justification is valid and state District concurrence in the request for approval.

A generic template for this request memo can be found on at **Sole Source Request Form - template**.

The final approval will be by the Division Director, or a designee as delegated by the Division Director. The final approved memo will be retained with the District's project files.

Additional Subject Matter Experts (SMEs) points of contact for the submittals can be contacted:

- DES: Roadway Design Section Director;
- BRG: Bridge Standards Engineer;
- TRF-TM: Engineering Support Branch Manager (ITS & Traffic Signals);
- TRF-TE: Engineering Operations Branch Manager (Signing & Illumination); or
- MNT: Field Engineering Support.

Refer to the **Procedures for Sole Source Procurement – memo** for additional information.

5.3.4 Crash Cushion Attenuators

All attenuators paid for under Item 545, "Crash Cushion Attenuators" require specific competitive bidding for attenuator systems. At least **two (2)** attenuator systems options from different providers must be provided for each location unless the specific location dictates that only one system is available meeting the size and functionality requirements. The decision to specify one attenuator system must be documented in the project files.

See **Section 3.1.3.6** for additional information on selection of crash cushion attenuators for inclusion into the plans.

5.3.5 Participating/Non-participating Items

Bid Items are classified as either Participating or Non-participating on federally funded projects. Participating (Part) refers to Bid Items that the FHWA will participate in the cost of the work and Non-Participating (Non-Part) refers to Bid Items for which the FHWA will not participate in the cost of the work.

On Federal-Aid projects, it is often necessary to distinguish the items that are not eligible for federal funding. Historically, examples of items for which the FHWA will not provide reimbursement are:

- Replacement concrete;
- Traffic barrier hardware; and
- Maintenance activities such as:
  - Mowing;
  - Litter removal;
  - Sweeping; and
  - Cleaning existing culverts.

Refer to the **TxC Reference Guide – Engineer's Estimate** for additional information on how to identify non-participating items in the Engineer's Estimate.

5.3.6 Special Accounts

5.3.6.1 Description of Special Accounts

Special accounts are accounts that are set up to cover costs of various items of work or the supply of materials or labor that are not provided for in the estimate as ordinary bid items. Other special accounts may cover the participation in the contract by other entities for work not funded by TxDOT. Some examples of special accounts are State Force Account Work, Material Furnished by the State, Railroad Force Account, and Contractor Force Account. The project estimate must include the special account number, a brief description of the item of work, and an estimated cost. The unit of a special account is usually lump sum, and the price should be determined by consulting with maintenance personnel, from past experience, or the best available information and method depending on the item of the account.

A Safety Contingency Contractor Force Account is required on all projects. See **Section 4.5.2** for applicable Safety Contingency Force Account notes that must be included in all project's General Notes. Additionally, an **Erosion Control Maintenance Force Account is also required**, and a Law Enforcement Force Account is optional.

5.3.6.2 Participating/Non-participating Special Accounts

Similar to Participating/Non-participating Items, special accounts which are not direct bid items, but which are used to account for certain project costs (such as railroad flagging, state-furnished traffic signal controllers, off duty patrol officer, etc.) may or may not be federally participating.

Those special accounts that are not federally participating must be distinguished from those that are on the Engineer's Estimate.

Refer to the **TxC Reference Guide – Engineer's Estimate** for additional information on how to identify non-participating accounts in the Engineer's Estimate.

5.3.6.3 Force Account Work

Force Accounts are a type of special account. Force account work in general is either additional work over and above the work described by the standard bid items or work that will be done by work forces other than the contractor. This work may be ordered, performed, accepted, and reimbursed on a Force Account basis. If a portion of the project is state funded, then a non-participating Force Account is required.

- **State force account work -** State Force Account Work is work that is to be done by state maintenance forces on the project, such as striping and the removal of temporary sediment control fence. The inclusion of these types of accounts allows the District to charge the costs of the work items to the project and not to their maintenance budget. DES will assist the District with developing the unit cost for the force account.
- **Railroad force account work -** Railroad Force Account Work is work that will be done by a railroad company during the construction of a project. This includes items such as signal relocation, planking work, and flagging at railroad crossings that will be done by railroad personnel. The RRD Division will assist the District with developing the unit cost for the force account based on project-specific information.
- **Contractor force account work -** Contractor Force Account Work is potential work that might be done by the contractor, and which has not been estimated and included as a bid item but might be required on the project. An example is temporary erosion, sediment and water pollution control on a project such as an asphaltic concrete pavement overlay. DES will assist the District with developing the unit cost for the force account.

5.3.6.4 State-Furnished Material

Material furnished by the State is another type of special account that covers materials used on the project but furnished by the State. An example of materials furnished by the State are traffic signal controllers and traffic paint. Materials furnished by the State usually include those materials that are difficult to obtain on the open market, small quantities and expensive, or what the State prefers to use and have in stock. If material is provided on low bid construction, it is required to have a Public Interest Finding. This justification needs to be that it is in the public's best interest to furnish that material rather than low-bid it.

5.3.6.5 Special Account Codes

Special accounts should be established in the Engineer's Estimate so the state maintenance forces, or other agencies can properly account for their work and charge to the project. Special accounts are identified in the Engineer's Estimate by special account code numbers.

Refer to the **TxC Reference Guide – Engineer's Estimate** for additional information on how to add special accounts to the Engineer's Estimate.

5.4 Prices

5.4.1 Estimated Bid Price Determination

Unit prices are usually determined by evaluating previously submitted low bid prices or average low bid prices and adjusting them to fit the project being estimated. All projects are different, and the bid prices for one project can vary substantially between projects.

Previously submitted bid prices or average low bid prices should only be used as a starting point from which a more accurate unit bid price can be derived with good engineering judgment.

Further guidance on developing bid prices can be found in TxDOT's **Construction Cost Estimating Guide**.

5.4.1.1 Bid Tabs

Each month during and after letting, CST inputs all the bids received for every item on every project into the TxDOT.gov **Bid Tabulations Dashboard**. Once the bids have been verified by CST, project bid tabs are made publicly available on the dashboard. An estimator can use a tabulation of bids report for a recent contract similar in scope and location to the project being estimated to derive unit prices.

5.4.1.2 Average Low Bid Unit Prices

After the Commission awards the low bids, TxDOT compiles the bid prices for each bid item into the **Bid Item Averages Dashboard**. An estimator can filter the data to generate a tabulation of average bid unit prices for contracts similar in scope and location to derive unit prices.

The determination of unit bid prices is based on experience and past trends. The designers should gather all the statistical data and information available and evaluate it. Based on their knowledge and experience, the designer can establish the most accurate estimated unit bid price.

5.4.1.3 Factors Affecting Unit Bid Prices

Consider the following rules of thumb when determining the unit bid price:

- **Project size**. Projects with large quantities will tend to have lower unit bid prices than a project with small quantities.
- **Project location**. The location of a project, such as a rural project with long material hauls and no commercial asphaltic concrete hot-mix plants or ready-mix concrete plants

available, most likely will have higher unit bid prices than an urban project where these facilities are readily available.

- **Traffic conditions**. Traffic conditions can have a significant effect on the unit prices bid. Due to delays caused by traffic, contractors will typically raise prices to reflect these conditions. Projects with complex sequences of work and high traffic volumes will command higher prices than uncomplicated projects with low traffic volumes.
- **Construction season**. The time of year that a project is to begin construction and the estimated time required for completion may have an impact on unit bid prices. The contractor may factor in price increases during times of the year when inclement weather may be more prominent, e.g., factoring delay claims or overtime into bid prices if a contractor knows there is not enough time on the construction timeline.
- **Accessibility**. Accessibility to the work area and the existing terrain may impact unit bid prices. For example, construction on an existing rural interchange without easy access may require excessive travel movements by workers and equipment, or an unusual TCP plan. If material hauling must be accomplished under these conditions, it can contribute to higher bid prices. The type of terrain where the project is located may affect the unit bid prices. Work normally easy to accomplish on level terrain or gentle slopes versus the extra labor or equipment needed to accomplish construction on steep slopes or uneven terrain can add to the project's cost.
- **Restrictive conditions**. Restricting the working hours or method of work on a project can have a significant effect on unit bid prices. If the specifications limit work to nighttime or short shifts, unit prices may need to be increased to reflect the higher costs involved.
- **Availability of materials**. The availability of materials also influences unit bid prices. An example is the fluctuation of unit bid prices received for asphalt which is directly related to the availability or use of crude oil.
- **Experimental or research items**. Projects which include experimental or research items usually receive higher bids. Since the bidders cannot foresee all the difficulties associated with these items, they usually increase their bids to allow for contingencies, thus resulting in higher bids.
- **Specifications**. The estimator must also be aware of Special Specifications and Special Provisions which may dictate materials or procedures more costly to the contractor than the conventional items.
- **Construction time**. Projects requiring long periods of construction, a year or longer, will likely reflect higher unit bid prices for items which must be purchased from suppliers in the future, when prices are unknown and may fluctuate. Especially noteworthy are large quantity items or expensive items which will be constructed during the later stages of

the project, since suppliers are usually unwilling to guarantee prices for extended periods of time. The Contractor(s), for protection against any increase in prices, will usually adjust their bid on this type of item, resulting in higher prices than in projects with shorter completion times.

- **Plan clarity**. Plans which are neat, clear, and accurate will usually contribute to lower overall unit bid prices.
- **Bidder competition**. The number of bidders bidding on a project may contribute to the unit bid prices received. The general rule is the greater the number of bidders on a project, the lower the bids received. This is due to the increased competition necessary among bidders in order to be awarded the contract. In determining the unit bid prices, the designer should account for the anticipated amount of bidding competition.

All assumptions and considerations made in selecting the bid item price must be documented in the estimating spreadsheet to provide a history of changes in the price as the project progresses through development.

5.4.1.4 Unbalanced Bidding

Since the TxDOT low bid prices are actual contract bid prices, the estimator must realize that if a contractor has unbalanced a bid, only the estimator's experience and judgment can identify if the prices truly reflect the conventional bid prices for the items. Unbalanced bidding is the practice of a contractor setting higher-than-conventional bid prices on items which will yield large payouts early in the construction process. The front-end loading represented by the higher bid prices are then compensated for by the contractor with lower-than-conventional bid prices for items to be accomplished later in the project. It will be to the estimator's advantage to keep a running record of the unit bid prices received on projects by area office. The concept of unbalanced bidding is most relevant when comparing bid tabs from a specific similar project as opposed to the average unit prices. If using the average low bid unit prices, it will be difficult to identify unbalanced bid items.

5.4.1.5 Project Variations

The estimator can use the average low bid unit prices in arriving at a unit bid price but should keep in mind that every project will differ from all other projects in some way. These variations must be identified by the estimator and considered during the price selection process.

5.4.1.6 Importance of Good Estimating

The consequences of poor estimating can be substantial. No one can predict exactly how the contractors will bid, but by using effective estimating aids and good judgment,

reasonably accurate unit prices can be determined. Each project requires individual consideration, and the estimating aids provide a starting point from which unit prices suitable for a project can be derived.

5.5 TxC Estimate Input

5.5.1 Overview

The project estimate should be entered into TxC and updated with each submittal so that the necessary funding amounts can be identified and tracked. Estimates can be entered into TxC as early as the Initial (30%) PS&E milestone. It is recommended to enter the estimate into TxC no later than the Detailed (60%) PS&E milestone so that modifications to funding amounts can be made well in advance of the project let date. Designers should confirm with the appropriate District/Division personnel what the expectations are for when the estimate should be entered into TxC. Projects with multiple CSJs require a separate Engineer's Estimate for each CSJ.

Refer to the **TxC Reference Guide – Engineer's Estimate** for specific details on entering the Engineer's Estimate into TxC.

5.5.2 Calculating Mobilization for Federal Projects with multiple CSJs

For Federal projects, the total mobilization amount should be calculated based on combined total estimate for all CSJs. The percentage of mobilization applied to each CSJ should be prorated based on the percentage of overall contract cost.

Example calculation:

Example Calculation

CSJ 1 Estimate = **$500,000**

CSJ 2 Estimate = **$200,000**

CSJ 3 Estimate = **$300,000**

Total Estimate for all CSJs =	**$1,000,000**

CSJ 1 Mobilization = **50%**

CSJ 2 Mobilization = **20%**

CSJ 3 Mobilization = **30%**

Total Mobilization % for all CSJs =	**100%**

5.5.3 Calculating Mobilization for State Projects with multiple CSJs

For State projects the mobilization amount may be entered as lump sum amount under the controlling CSJ. However, in most cases it is recommended that the percentage of mobilization be pro-rated based on the percentage of overall contract cost, as outlined in **Section 5.5.2**. An exception to this recommendation is if there is a large number of associated CSJs that would make this calculation complex. For example, a seal coat may include multiple associated CSJs across a District, in which case mobilization can be entered as a lump sum under the controlling CSJ.

Project bid items that are bid with the contract should be included with the mobilization for the project. **Joint bid utility items should be included with the ROW CSJ**. This should be calculated in the ROW CSJ, similar to a different CCSJ. If funding is available in the RCSJ, pay for mobilization in that RCSJ.

5.5.4 Estimate Checklist

Refer to the **PS&E QC Milestone Checklist** for the Estimate QC checklist.

Chapter 6
PS&E Submission, Review and Processing

6.1 Overview

Two types of required reviews have been defined by TxDOT:

- Engineering Reviews (review of PS&E at specific milestones); and
- Contract Reviews (review of all contract documents immediately prior to letting).

Refer to the **Plan Review SOP** for additional information.

6.2 Engineering Reviews

Engineering reviews must be completed and documented for every project. These reviews should be conducted at regularly scheduled milestones throughout the preliminary and final design of the project. Engineering reviews must be completed by staff members with sufficient knowledge and experience in the field they are responsible for reviewing.

Interim review milestones are extremely beneficial and should be identified and completed for every project.

Final engineering reviews are required for every project and must be completed prior to submittal of the Ready to Let (RTL) (100%) PS&E to DES for letting.

Milestone reviews are not mandated for every project but are left to the Districts to determine the frequency and type of review required for different project rigor.

6.2.1 District Review of PS&E

The PS&E milestone reviews for all projects has been delegated to the Districts. The District is responsible for ensuring that projects submitted for letting are complete and in compliance with state law and departmental policies, and that all necessary agreements have been executed.

Division personnel are available to provide assistance and expertise to the Districts throughout the preliminary and final design process. At the request of the District, the DES and BRG Divisions are available to conduct a review of preliminary documents at the Initial(30%), Detailed(60%), Final (90/95%) or Sealed(100%) milestones.

All projects should undergo a thorough District review at specific milestones. Suggested milestone submittals are defined in **Table 6-1**.

Table 6-1: Milestone Submittals

Submittal[1]	Description	Deliverables[2]	TxDOT Review Responsibility
Initial (30)%[3]	Preliminary Engineering Submittal	100% Approved Geometric Schematic or 30% PS&E milestone	• TxDOT PM and others as identified by the District
Detailed (60%)	Detailed Design Submittal	60% PS&E milestone and Supporting Documents	• Full District multi-discipline review
Final (90%/95%)	Final Design Submittal	90/95% PS&E milestone and Supporting Documents	• Full District multi-discipline review
Sealed (100%)	Signed and Sealed Submittal to District	100% PS&E milestone (SSD) and Supporting Documents	• TxDOT PM and others as identified by the District
Ready to Let (RTL)	Project Letting Submittal to DES	100% milestone (SSD) Supporting Documents, and Letting Documents	• TxDOT PM and others as identified by the District • DES-Final PS&E Processing (FPP) Section

Notes:
1. Districts may choose to eliminate or combine milestone submittals as needed based on the project rigor.
2. Refer to the **PS&E QC Milestone Checklist** for deliverable expectation at milestone submittals.
3. Initial (30%) milestone submittal roadway components can be delivered in plan sheets or in a roll plot for review.

Districts should perform a multi-disciplinary review of all project plans early in project development. Ideally this would take place at each milestone submittal, but at minimum should take place at the Detailed (60%) and Final (90/95%) milestone submittal.

Early engagement leads to fewer changes at the latter stages of project development saving time and money.

6.2.2 Review of PS&E by Other Divisions and Agencies

6.2.2.1 Federal Review of TxDIP/PoCI Projects

Under the Stewardship and Oversight Agreement between the FHWA and TxDOT, there are specific projects that have been designated as Texas Division Involved Projects (TxDIP) or Projects of Corporate Interest (PoCI). These projects require Federal coordination and/or approvals of the specific elements of the project designated by the FHWA. If the FHWA has identified that a project requires review of the "Draft Plans, Specification and Estimates (PS&E)", the District should coordinate with the designated FHWA Point of Contact early in the plan development process to arrange for the review.

6.2.2.2 Federal Aviation Administration (FAA) Coordination

During the early phases of project development, consideration must be given to the effect any proposed highway project might have on vicinity airports. Airway-highway clearances are studied to avoid encroaching upon an airfield or establishing a highway location that would be an obstruction to air navigation. Minimum airway-highway clearance requirements must be considered to avoid the creation of a safety hazard for both highway and air traffic.

Any construction or alteration of more than 200-ft in height above the ground level at its site or any construction or alteration of greater height than an imaginary surface extending outward and upward at one of the FAA's reporting slopes must be reported during the early development of construction plans.

These requirements are not limited to illumination towers or poles. Any element of construction may affect the airway-highway clearance requirements. This includes but is not limited to illumination, signing, bridge superstructures, etc., or any mobile object that would normally traverse a roadway or bridge that could be an obstruction to air navigation.

The District is responsible for preparation and submission of the latest version of **FAA Form 7460-1** to the FAA in cases where minimum airway-highway clearance requirements cannot be met. Further guidance on FAA coordination can be found in the **PDP Manual** and on the **FAA website**.

6.2.2.3 BRG and DES Preliminary Reviews and Approvals

The District Design Office is responsible for submitting the following preliminary design elements to the BRG – Bridge Design Section for review and approval. These documents are typically submitted with the Initial (30%) milestone submission or between the Initial and Detailed (60%) milestone submission.

Preliminary design reviews by BRG:

- **Preliminary Bridge Layouts with Scour and Hydraulic Analysis**

Refer to TxDOT's **Bridge Project Development Manual** for additional guidance on submission and review of the Preliminary Bridge Layout (PBLR).

- **Preliminary Retaining/Sound Wall Layouts –** The purpose of the preliminary retaining/sound wall layout is to present the geometric and geotechnical data associated with a proposed retaining/sound wall. This information enables an engineer to design and detail the retaining/sound wall as well as evaluate the wall's stability.

Refer to TxDOT's **Geotechnical Manual - LRFD** for additional guidance on submission and review of retaining/sound wall layouts.

- **Preliminary Storm Drain Layouts -** In cases where the Districts need assistance, the hydrologic and hydraulic calculations of the storm drain system may be submitted to DES – H&H Section for preliminary review and approval.

Preliminary PS&E Design Reviews by DES:

At the District's request, DES will review preliminary roadway PS&Es at the Initial (30%) and Detailed (60%) milestone submissions. Submission should be early in the process to not delay delivery of the project.

- **2R projects** - Submit Page 3 of Form 1002, typical sections, and a crash analysis.
- **3R projects not requiring ROW acquisition** - Submit Page 3 of Form 1002, typical sections and Alignment Data Sheets or P&P sheets.
  - If the geometric information is not required in the PS&E because the scope of work is such that the contractor does not need to reconstruct those areas (scope of work is widening only with no alignment changes) the District may choose to submit the Alignment Data Sheets which show the geometric data for the project so that design criteria can be verified instead of recreating the plan and profile sheets.
- **3R projects which require ROW acquisition and all 4R projects** - Submit Page 3 of Form 1002, Design Summary Report (DSR), approved geometric schematic and Detailed (60%) milestone PS&E.

6.2.2.4 Traffic Safety Division Preliminary Reviews and Approvals

- **Signal Authorizations**
  - **Signal Warrant Process.** All proposed traffic signal installations must conform to the accepted warrants as listed in the **Texas Manual on Uniform Traffic Control Devices (TMUTCD)**. A traffic signal cannot be installed unless at least one of the nine established warrants can be met. The department's policy on highway traffic signals was established with Commission Minute Order No. 85777 (June 29, 1982).

Detailed information concerning the required data for traffic studies can be found in TxDOT's **Traffic Signals Manual**.

- **Traffic Signal Authorization Form.** After determining a signal is warranted and the traffic study is complete, a **Traffic Signal Authorization Form** must be submitted to the District Engineer for approval. A copy of the approved form should be sent to the TRF Division.

- **Agreements**
  - **Railroad Agreements.** When any part of a TxDOT project is within or adjacent to the railroad ROW, execution of an agreement with the railroad company will be required. These agreements will usually require an **Exhibit A**, which is a plan showing the work to be done which affects the railroad, and the responsibilities concerning who (State or railroad) will do this work. Small projects (seal coats, re-planking jobs, etc.) will generally require only a simplified letter-type agreement. Contact the District Railroad Coordinator for assistance.
    The review and approval process takes a considerable amount of time (approximately 1-2 years). The RRD Division recommends that agreement negotiations begin during the early stages of the design.
  - **Signal/Illumination Agreements**. Refer to TxDOT's **Traffic Signals Manual** and TxDOT's **Highway Illumination Manual**, respectively, for detailed explanations and copies of the agreements.

6.2.3 Engineering Review Checklist

The **PS&E QC Milestone Checklist** should be used to review and document all milestone submittals:

- Initial (30%);
- Preliminary Bridge Layout Review (PBLR);
- Detailed (60%);
- Final (90/95%);
- Sealed – (100% submission to the District); and
- RTL – (100% submission to DES-FPP).

At a minimum, the documentation for the last engineering review must be retained until replaced by an updated review. Final engineering reviews must be retained as part of the final project documentation.

During the review process for all projects, these items should be checked and/or verified:

- **Previous approval of:**

- Typical sections;
- Geometrics;
- Pavement design;
- Design exceptions, waivers, variances, deviations;
- Bridge layouts (PBLR);
- Traffic Control Plans; and
- Hydraulic calculations.

- **All required agreements have been executed.**
- **Clarity of information on plan sheets**. Plan Sheets should be checked for clarity of information. All quantities should be checked item by item.
- **Use of correct bid codes and method of measurements**. Estimate should be checked to make sure the correct bid codes and method of measurements are used. All quantities from the plan sheets should be reflected on the estimate. Estimated unit bid prices should reflect carefully determined prices using engineering judgement. Make sure measurements for "contractor information" are clearly labeled, non-pay items.
- **TxDOTCONNECT Estimate**. Estimate must be sealed in TxDOTCONNECT. The proposal cannot be built if estimate is not sealed.
- **Specification List**. Specification List should reflect the latest applicable special provisions, specifications and reference items.
- **General Notes for clarity, redundancy, and conflicts**. General Notes should be reviewed for clarity, redundancy, and conflicts.

Refer to the **PS&E QC Milestone Checklist** for detailed information on engineering milestone reviews.

The PS&E QC Milestone Checklist, or other District approved checklist, should be completed and documented for each milestone review and retained in ProjectWise in the project record.

6.3 Contract Reviews

Once the PS&E is ready for letting, the District submits the Ready to Let (RTL) electronic plans, specifications and estimate (ePS&E) package to DES- Final PS&E Processing (FPP) Section after conducting the suggested engineering and contract reviews.

Contract reviews should consist of a thorough review of the entire PS&E package to ensure that it is ready to advertise for bidding. Contract reviews must be completed and documented for every project. Both District review staff and DES must conduct these reviews – FPP Section staff.

The Project Manager or designer should check the RTL ePS&E to verify which recommendations from the VE analysis (see **Section 2.1.5**) are in the final plan set prior to District leadership signing the updated final **Form 2502 Value Engineering (VE) Study Executive Decision Summary** or **TxDOTCONNECT VE Form** approval. This final signature meets Federal construction funding and documentation regulations and allows future District leaders to answer any future audit.

All PS&E packages and supporting documents are electronically submitted to DES.

Refer to the TxDOT.gov **100% PS&E Pre-submittal Preparation webpage** and **100% PS&E Submittal to DES Division webpage** for requirements for the RTL ePS&E Package submittal including links to all forms and documents.

6.3.1 TxDOTCONNECT

All items in the PS&E should be checked against the information shown in TxDOTCONNECT (TxC) including:

- Project Classification;
- Highway Functional Classification;
- Letting Tab;
- Engineer's Estimate Tab;
- Sealing & Summary Tab;
- Resources Tab;
- Value Engineering – Approval 2 Completed (if applicable);
- Funding Tab; and
- Checklist Tab.

6.3.2 Supporting Documents

Required supporting documents include:

- DSR;
- Form 1002;
- Engineer's Estimate;
- Specification List;
- General Notes;
- Certifications for ROW acquisition, ROW encroachments, ROW relocation, State-Owned and Non-State-Owned utility Adjustments, Environmental, District CMP approval, and railroads;
- Construct time determination schedule;
- Stage Gate Checklists (Form 2442 & 2443); and
- Form 2229.

Other supporting documents as applicable include:

- Form 2699;
- Design Exceptions/Waivers/Deviations;
- Temp Road Closure Request;
- Construction Speed zone Request;
- New SP/SS;
- Frontage Road Briefing Document (FRBD);
- VE Study Form 2502;
- Advance Funding Agreement (AFA);
- IAJR and Response Matrix;
- Copy of Railroad Agreement;
- Copy of Third-Party Agreement;
- Copy of Env Document approval letter; and
- Construction Management Plan.

6.3.2.1 DSR

The **DSR** is the main record of project development and design. The DSR remains with the Project File of Record from creation to eventual archival or destruction to ensure continuity of the project during the entire project development life cycle.

Refer to the **PDP Manual** for a detailed discussion of the DSR.

6.3.2.2 PS&E Transmittal Data (Form 1002)

When PS&E is submitted to the DES for review, it is necessary for the **PS&E Transmittal Data Form 1002** to be sent in with the submission. Form 1002 serves several purposes:

- It is a supporting documents checklist to be used by the designer in preparing the PS&E;
- It provides DES with a record of all necessary supporting documents contained in the submission;
- It gives relevant project information regarding location, type of work, funding and what clearances are required (row, utilities, railroad, env, airway); and
- It shows what design standards and waivers/exceptions were used in the design process.

Form 1002 and instructions for completing the form can be found on the TxDOT.gov **100% PS&E Pre-submittal Preparation webpage**.

6.3.2.3 Engineer's Estimate

See **Chapter 5** for more information in developing the Engineer's Estimate.

6.3.2.4 Specification List

See **Section 4.4** for more information and guidance for specifications.

6.3.2.5 General Notes

See **Section 4.5** for more information and guidance for general notes.

6.3.2.6 Certifications

Certifications for ROW acquisition, ROW encroachments, ROW relocation, State-Owned and Non-State-Owned utility Adjustments, Environmental, District CMP approval, and railroads; must be developed and either shown as clear or include the appropriate Triple Zero Special Provisions.

Templates for Clear and Unclear certifications can be found on the TxDOT.gov **100% PS&E Pre-submittal Preparation webpage**.

6.3.2.7 Contract Time Determination Schedule

This is a logical critical path method schedule including all construction activities in the project used to determine the number of working days included in the contract.

Additional guidance for correctly scheduling the contract time and other information can be found on the TxDOT.gov **100% PS&E Pre-submittal Preparation webpage**.

6.3.2.8 Stage Gate Checklists

Stage Gate Checklists document communication between personnel developing projects and the environmental staff. Three (3) stage gate checklists, listed in the bullets below, are required to be completed prior to the project progressing to the next development stage – two (2) of these (marked with an *) are required to be submitted with the Final, Sealed, and RTL milestone submissions:

- **Form 2442*** – Advance Planning and Development (APD) Stage Gate Checklist (completed during preliminary engineering phase and prior to final design phase of project development);
- **Form 2443*** – Plans, Specifications and Estimates (PSE) Stage Gate Checklist (completed during final design phase of project development and prior to letting); and
- **Form 2448** – Construction Stage Gate Checklist – required during construction.

Stage Gate Checklist forms can be found on the TxDOT.gov **Environmental Management System (EMS) webpage**.

Refer to the **PDP Manual** for detailed information on completion of the Stage Gate Checklist forms.

6.3.2.9 Form 2229 Significant Project Procedures

Form 2229 is used to document the determination of additional project-specific liquidated damages. The form must be submitted to CST for approval of methods to be used. Refer to the form to determine if it is required for the project.

Form 2229 and instructions for completing the form can be found on the TxDOT.gov **100% PS&E Pre-submittal Preparation webpage** .

6.3.2.10 ePS&E Submittal

The ePS&E Submittal is the format that Sealed and RTL plan sets should be delivered in.

Instructions for creating the ePS&E Submittal can be found on the TxDOT.gov **100% PS&E Submittal to DES Division webpage**.

6.3.3 Contract Review Checklist

The contract review checklist consists of two separate checklists to be used by the District reviewer:

- **Project Submittal Checklist** should be filled out by the District reviewer and submitted with the RTL PS&E package to DES-FPP; and
- **Final PS&E Review Checklist** should be reviewed by the District reviewer to ensure that all information that DES-FPP section will review is in the RTL PS&E package to DES-FPP.

Once the contract review is complete by both the District and DES-FPP section, the documentation of the review must be stored in a central file storage location (i.e., ProjectWise) where it will be easily accessible.

At a minimum, the documentation for the last contract review must be retained until replaced by an updated review. Final contract reviews must be retained as part of the final project documentation.

Refer to the **Project Submittal Checklist** and **Final PS&E Review Checklist** for detailed information on documenting the contract review.

These checklists, or other District approved checklist, should be completed and documented for the contract review and retained in ProjectWise in the project record.

6.4 RTL PS&E Submittal to DES

Refer to the **PS&E QC Milestone Checklist** for detailed information on documenting the RTL PS&E submission to DES.

6.4.1 Submission Dates

All RTL PS&E submissions to DES should be made in accordance with the **PS&E Review and Processing Schedule**.

To ensure projects requiring federal authorization are coherent with the Federal Project Authorization and Agreement (FPAA), TxDOT adheres to the PS&E Review and Processing Schedule. FHWA will only accept complete packages for review. Projects that do not have all required documentation will not receive federal authorization. All projects are required to contain the following elements prior to submittal to FHWA for review and authorization:

- Completed PS&E package;
- Completed and signed Form 1002;
  - NEPA clearance date (ensure clearance aligns with ECOS)
  - STIP approval status and date (ensure STIP approval status and date aligns with TxC fields.
- Environmental Clear to Let Date is completed in TxC;
- Signed Certifications for ROW acquisition, ROW encroachments, ROW relocation, State-Owned and Non-State-Owned utility Adjustments, Environmental, District CMP approval, and railroads;
- Signed Railroad Agreements (if required).

The DES-FPP section will hold incomplete PS&E packages until all required elements have been received.

In cases, where a complete package cannot be submitted to FHWA prior to the deadline, the District Engineer must request approval from the Chief Engineer to notify FHWA of the need for a late submittal and request confirmation of FHWA's ability to authorize.

Districts should coordinate with DES-FPP in advance for projects that may be late.

6.4.1.1 Construction Management Plans

According to the **PS&E Review and Processing Schedule** draft certifications for ROW acquisition, ROW encroachments, ROW relocation, State-Owned and Non-State-Owned utility Adjustments, Environmental, District CMP approval, and/or outstanding railroad agreements are due approximately four months prior to the letting date (refer to the schedule for exact

dates). The status of the draft certifications is used to determine the need for a possible **Construction Management Plan (CMP)**.

A CMP is an executive summary of the steps that will be shown in the plans to complete the project while mitigating the risk of delays in construction due to unclear project certifications including ROW acquisition, ROW encroachments, ROW relocation, State-Owned and Non-State-Owned utility Adjustments, Environmental, District CMP approval, and railroads;

A CMP is required on any project with unclear certifications after letting.

A CMP consists of the following elements:

- Request memo;
- Utility Conflict list, ROW acquisition, ROW encroachments, ROW relocation, State-Owned and Non-State-Owned utility Adjustments, Environmental, District CMP approval, and railroads;
- Contract time determination schedule;
- Phase narrative; and
- Conflict Layout Sheets.

Additional information on developing a CMP can be found in the **Construction Management Plan SOP**. The DES - FPP Section can also provide additional guidance.

6.4.2 Proposal

The proposal is the legal project document covering the itemized material quantities to construct the project and the regulations agreements, and specifications under which the contract will be executed. The proposal is composed of Specifications List, Bid Inserts, Special Provisions, Special Specifications, General Notes, Warranty Bond Amount, Working Days, Bid Items, DBE/SBE Goals, and other legal documents for bid submission. Building the proposal should be one of the last steps prior to RTL ePS&E submittal to DES.

Information for building the proposal can be found on the TxDOT.gov **100% PS&E Pre-submittal Preparation webpage**.

6.4.2.1 Sealing the Engineer's Estimate

Sealing the Engineer's Estimate ensures that a professional engineer has reviewed and approved the estimate.

Instructions on inputting and sealing the Engineer's Estimate can be found in the **TxC Reference Guide – Engineer's Estimate**.

6.4.2.2 Proposal copies

The department's copy of the contract will become the official original repository reflecting bid item quantities, Special Specifications, Special Provisions, and General Notes which have been selected by the responsible engineer and applicable to the contract. Security-controlled, computer-generated CADD Seals will be used to generate proposal copies for bidder distribution.

6.4.2.3 Changes after submittal

Changes to the bid proposal information after submittal to the DES will be handled in the same manner as described below in **Section 7.1**.

Chapter 7
Pre-letting Activities

After the RTL ePS&E package is submitted to DES-FPP, several activities occur prior to the project letting including:

- Addendum process;
- Letting schedule modification;
- Provide cross sections and/or 3d models to contractors – for information only – according to direction from DES;
- Publish Plans/Proposals for Contractor Review and Bidding;
- Pre-bid conference;
- Preparation and submission of the Federal Project Authorization and Agreement (FPAA) form (for all projects with federal project numbers);
- Preparation of the State Letter of Authority (SLOA); and
- Project financial clearance.

7.1 Addendum Process

If the Department modifies a proposal or the plans after the 21-day advertising period for letting has begun, an addendum is sent to communicate revisions to each bidder who requested a bidding proposal. The addendum amends the original contract terms.

All Addendum Requests must be submitted and approved through CST. DES reviews and publishes addendums after CST approval.

Refer to the **Addendum Standard Operating Procedure (SOP)** for details on how to prepare and submit an addendum.

7.1.1 Need for Addendum

After the PS&E package has been submitted and processed through the DES – FPP (refer to the **PS&E Review and Processing Schedule** for more information), copies of the assembled contract proposal plans are available electronically and are forwarded to the responsible District and Division offices per the **Addendum Standard Operating Procedure SOP**. Personnel in these offices should re-check these documents to make sure that all necessary changes or corrections have been made. For various reasons, it is sometimes necessary to make changes to the plans or proposal. Any changes to these documents that must be made at this stage must be documented by the responsible office in the form of an addendum notice.

Addenda to be processed for a particular project are performed after the proposal release date as shown on the **PS&E Review and Processing Schedule**.

An addendum should be submitted for processing only when:

- The competitiveness of the bid would be in jeopardy if the changes were not made;
- The quantities are in error to a degree that could place the department at a disadvantage in negotiating significant corrections after contract award;
- The bid documents would not be substantially representative of the project unless the change is made. This could include special design standard sheets, Special Specification, etc.; however, if a regularly used statewide standard sheet was omitted, it would not be considered significant, and an addendum would not be released. A change order should be used to add the missing statewide standard sheet; or
- The project contains technical errors that would jeopardize awarding the contract.

To help identify changes to PS&E that should and should not be addenda, following are a few examples of addenda that **should not** be pursued:

- To renumber sheets on the title sheet or index of sheets, or to add sheet numbers that were omitted. This is not critical to bidders;
- To change the title sheet to include one now signed by local officials in all released copies (having the original is adequate). It is not critical to the bidders to have that signature;
- If a sheet in the plans that was released was not signed and sealed, it is necessary to get the original corrected, but it is not critical to the bidders to release an addendum; or
- To change the quantity of riprap or add a few feet of curb and gutter is generally not critical to risk the project by issuing an addendum.

Consider the risk to a project by issuing an addendum - it must be critical to the bidders that they have this information. Otherwise, those changes should be handled after the project is awarded.

There are also concerns when a potential error in the plans is brought to the attention of TxDOT by a potential bidder/contractor/supplier. When this occurs, there should not be any indication that **this will be changed prior to letting or by a change order**. If this is stated to anyone and not to all, then the potential exists that all bids may be thrown out. TxDOT should issue a thank you to the potential bidder/contractor/supplier for notification of the error and state that it **will be investigated and if a change is required, an addendum will be issued**. Otherwise, they are to bid the project just as they see it presented in the PS&E bid package.

No addenda will be processed prior to the proposal release date. Refer to the PS&E Review and Processing Schedule for specific dates.

Refer to TxDOT's **Construction Contract Administration Manual** for more discussion on the use of addendums.

7.1.2 Addendum Request Form

If an addendum is deemed necessary, use the **Addendum Request Form** to submit all required documentation to the District Engineer for approval. Once the DE has signed the request form, forward the form and all required attachments to CST for review and approval. Once CST approves the addendum, coordinate with DES-FPP Section for review and publishing of the addendum.

A late addendum request will require approval form the Chief Engineer. Refer to the **PS&E Review and Processing Schedule** for specific dates for submitting an addendum.

Any changes to the estimate, contract days, General Notes, and Specification List must also be included in the documentation. The District should coordinate with DES - FPP Section for TxC changes to the estimate and specifications list.

Refer to the **Addendum Request, Approval, and Processing webpage** (TxDOT intranet only) for additional information on the addendum process.

7.1.3 Federal Oversight Project Addendum

7.1.3.1 Addendum Best Practices

- Addendums result in prospective bidders having to reevaluate their bid packet; therefore, any large amendments must be made as early as possible.
- Very minor changes to the contract (minor quantity errors, misspelled words, renumbered sheets, etc.), which are not anticipated to impact bid prices, must not be made, unless combined with other essential changes.
- Filenames for amended plan sheets need to retain the same filename and format as the original file they are replacing; the amended files replace the originals. Filename errors can cause additional problems, such as unintentional overwritten plan documents or duplicate titled sheets (revised and its original).
- All revised PDF plan sheets must have the revision/addendum number and the addendum release date on the lower right corner. This information ensures the contractor is using the correct construction information.
- When subsequent changes are made to the same PDF plan sheet, retain previous revision numbers on the drawing, but remove any clouds around the previous changes. All revisions must be identified on the drawing as well as the list of revision dates.
- An addendum must be issued only when plans or proposal errors may affect the competitiveness of the letting, there are significant quantity errors, or a contract material issue.

7.2 Letting Schedule Modification

A Letting Schedule Modification (LSM) request is a formal process used to adjust the timing of project lettings. It allows for changes in the scheduled letting date for a project. An LSM request must be processed and approved no later than the monthly advertising date – proposal release day. Otherwise, the project will be advertised for the current letting.

The LSM request is made in TxC. To expedite approval for any requests to move a project to **within the next 4 months of lettings**, add information to the LSM request in TxC regarding the status of Utilities, ROW, Railroad, STIP and NEPA. Requests to move projects outside of the 4-month window do not require this extra information.

Refer to the TxDOT.gov **100% PS&E Submittal to DES Division webpage** for additional information on the LSM.

Refer to **TxC Project Information – Reference Guide** for submitting the LSM request in TxC.

7.3 Provide Cross Sections and/or 3D Models to Contractors – For Information only

Contractor access to construction cross sections and/or 3D models in electronic format allows the contractor to prepare more accurate and concise bids, particularly on projects with significant earthwork items.

Provide cross sections and/or 3D models online for contractor information for all geometric projects as directed by the department. Cross sections and/or 3D models produced from current design software are to be posted online for early contractor review, without modification.

Cross sections do not need to be signed and sealed.

The TxDOT project manager is responsible for ensuring the cross-sections and/or 3D models are posted by the appropriate time on the District's centralized ftp site in the project folder with other pre-letting documentation. The files should be labeled as directed by the department.

Consultant engineering firms involved in TxDOT design projects must include this data as part of their deliverable to the District.

The following disclaimer must be included in the transmittal of the cross section data:

"The following data is for non-construction purposes, only. It is the responsibility of prospective bidder to validate the data."

"Texas Department of Transportation"

If construction cross section data is provided directly in the plans, that data must also be clearly labeled "FOR INFORMATION PURPOSES, ONLY".

For each monthly cycle, cross sections and/or 3D models are to be posted on or before the date advertisements are published in the Electronic State Business Daily (ESBD) according to the **PS&E Review and Processing Schedule**.

7.3.1 Process for Requesting Pre-Letting Hard Copies of Plan Sets

Districts are responsible for submitting print tickets to Reprographics to continue receiving hard copies of plan sets for review in advance of letting.

Refer to the **Process for Requesting Pre-Letting Hard Copies of Plan Sets** whitepaper on the TxDOT.gov **100% PS&E Submittal to DES Division** webpage.

7.4 Publish Plans/Proposals for Contractor Review and Bidding

7.4.1 Contractor Review

DES-FPP uploads the plans and proposals for access by contractors for TxDOT's bid lettings. The plans/proposal are uploaded to Plans Online. Plans/Proposals are posted 21 days prior to the first day of letting.

Districts should be aware that it can take 1 – 2 weeks for DES-FPP to upload project plans/proposal depending on the number of projects in the month's letting schedule. Submit the RTL plan set as early as possible.

Refer to the TxDOT.gov **Plans Online webpage** for additional information on its use.

7.4.2 Contractor Bidding

The Electronic State Business Daily (ESBD), the Electronic Bidding System (iCX), and the project proposal are the official sources of advertisement and bidding information for the State and Local Lettings.

7.5 Pre-Bid Conference

The District may conduct pre-bid conferences to provide specific project information, explain any unusual aspects of the project, and address any potential bidder questions. Schedule pre-bid conferences approximately two weeks prior to letting to allow sufficient time to prepare and issue any needed addenda. Provide prospective bidders adequate notification of a scheduled pre-bid conference.

A minimum of seven days is required between the pre-bid conference and bid opening dates.

Maintain minutes for all pre-bid conferences, both mandatory and optional meetings; minutes may be written or recorded. Provide a copy of these minutes to all conference attendees and bidders on the TxDOT.gov **Plans Online webpage** Pre-Bid Q&A FTP site. Include all pre-bid conference information (such as type, date, time, location, etc.) in the Notice to Contractors.

Refer to TxDOT's **Construction Contract Administration Manual** for more discussion on requirements for pre-bid conferences.

7.6 Federal Project Authorization and Agreements

This section covers the following Federal Project Authorization and Agreement (FPAA) and State Letter of Authority (SLOA) topics:

- Function of FPAA;
- Respective FPAA duties; and
- FPAA detailed reporting instructions.

More information on the FPAA can be found in the **PDP Manual**.

7.6.1 Function of FPAA

The FPAA form is required for each federally funded project. The primary function of this form is to obligate federal funds for the project by phases. By completion of the FPAA, federal funds are authorized through an agreement between FHWA and TxDOT for reimbursement of eligible costs. The FPAA is required prior to TxDOT issuing a State Letter of Authority (SLOA) (see **Section 7.7**) for each phase of a project that includes federal funds.

7.6.2 FIN - Letting and Project Funding Section FPAA Duties

The Letting and Project Funding Section of the Finance Division (FIN) is responsible for completing and submitting the FPAA to the FHWA. The forms are submitted no later than the date established on the **PS&E Review and Processing Schedule** for the applicable letting. The District will submit the requests for FPAA to FIN for Local Government (LG) Projects (along with the Engineers Estimate of Probable Construction Phase Cost form).

7.6.3 FPAA Detailed Reporting Instructions

The Detailed Reporting Instructions packet for inputting data into a FPAA form can be obtained from the Letting and Project Funding Section of FIN. The packet includes:

- Step-by-step instructions;
- Copy of the FPAA form; and
- Federal apportionment code listings which are not currently published in manual format.

7.7 State Letter of Authority (SLOA)

This section discusses:

- Function of the State Letter of Authority (SLOA);
- Letting Management Office SLOA Duties; and
- SLOA Form Field Completion Procedure.

Refer to TxDOT's **Local Government Projects Policy Manual** and **Local Government Project Management Guide** for additional discussion on the SLOA.

7.7.1 Function of SLOA

The SLOA is a form that is issued for all federally funded projects let by Local Governments (LG). The LG must request and obtain authorization to proceed with the project work, authorization is in the form of a SLOA. FIN provides a signed FPAA to the District on all federally funded projects let by an LG. **The LG must have a SLOA with the approved environmental clearance and a FPAA signed by FHWA prior to advertising projects with federal funding**. The Districts generate the SLOA and obtain all required signatures.

For LG-performed transportation projects that include construction involving state or federal funding, up to three SLOAs (and FPAAs, if federal funding is involved) may be required by TxDOT and issued during the course of the project. The first SLOA (and FPAA, as appropriate) is required prior to the preliminary engineering phase, the second SLOA (and FPAA, as appropriate) is required prior to the acquisition of ROW or the accommodation of utilities and the third is required prior to initiation of advertising for construction.

7.7.2 FIN - Letting and Project Funding Section LOA Duties

Approximately one week after the letting schedule has been approved for any given letting, the District prints all necessary SLOAs and coordinates with ENV for signature. The forms include all identifying information such as District, county, highway, CSJ, project number, functional classification, work program, limits, and type of work from the corresponding information from TxC.

The Letting and Project Funding Section prints out a form for all CSJs that are to be locally let by an LG or for projects to be constructed by LGs. The Letting and Project Funding Section will indicate on the form if a FPAA is required and the responsible section. The forms are then sent to ENV. The SLOA form is then sent back to the District for further handling.

7.8 Project Financial Clearance

For projects with Local Government (LG) participation and Advanced Funding Agreements (AFA) a **Notice of Financial Clearance** is needed prior to the bid process. This section contains the following pre-letting information:

- Other participation field;
- Additional payments; and
- Financial clearance reference.

7.8.1 Other Participation Field

The funding for any project involving participation by another agency, county, city, etc., must be checked prior to and after letting. Most funding agreements require the entity to pay their share of the costs **45 days prior to the proposed letting date**.

The District personnel who coordinated the agreement with the entity normally receive these payments. Once the total estimated payments are received, the District must prepare and submit a **Notice of Financial Clearance for Bid Opening and Award** form. This form certifies that all the necessary estimated payments from the entity have been received.

7.8.2 Additional Payments

After letting, the entity's participation needs to be recalculated based on the apparent low bidder's unit prices. If the entity's participation increases based on the apparent low bid, the District must contact the entity to request payment of the additional costs. The project is conditionally awarded, pending receipt of any additional funds from the participating entities. Once the District has received the additional payments, the District should prepare and submit the financial clearance form to the Contract Services Division (CSD). This office verifies that the necessary funds have been received and has CST issue a letter of award of contracts to the contractor. Once the contract is executed the work order by which construction can commence is issued. This entire process should be initiated and completed as soon as possible so that construction is not delayed. Long delays have resulted in the apparent low bidder electing to withdraw from the contract, and in some instances, filing claims against the department to recover financial losses resulting from the delay.

7.8.3 Financial Clearance Reference

Projects with outside funds are conditionally awarded, and contracts are released only after all terms as outlined in the project's AFA have been met. The responsibility for the financial clearance function has been delegated to the District Engineer (DE).

The Notice of Financial Clearance for Bid Opening and Award form signed by the DE needs to be sent to CSD once **30 days prior to bid opening and once prior to award.** If a project overruns after letting, the District needs to discuss the bid prices with the LG participating in the funding of the project and ensure that the outside entity concurs with the acceptance of the higher costs. If they do not concur, the contract is not to be recommended to Administration for award.

Refer to TxDOT's **Negotiated Contracts Procedures Manual** for more information about the financial clearance process. Contact the CSO for additional information.

Chapter 8
Post-letting Guidelines

Bid openings are held in Austin and are conducted by CST personnel. CST prints a bid sheet for each project to let. The bid sheet is a list, by project, of bidders who have obtained proposals. All conditions of bid acceptance must be reviewed at the opening of each bid.

These conditions include any of the following:

- Mandatory pre-bid conference attendance;
- Proposal Addenda Acknowledgment page "checked;"
- Proper presentation of bids;
- Proposal guaranty check, etc.; and
- Signatures are complete.

Refer to TxDOT's **Letting Manual** for more discussion on bid openings.
Refer to the TxDOT.gov **Letting and Bids webpage** for additional information on bid openings.

This chapter includes the following **post-letting guidelines**:

- CST tabulate and review bids;
- Letting overrun/underrun justification;
- Award contract; and
- Build contract set and load Site Manager.

8.1 CST Tabulate and Review Bids

After the bid opening, CST tabulates and reviews the bids. Bids are checked for accuracy, reasonable conformance to the engineer's estimate, and for mathematical or material imbalance. Bids determined to be irregular may be rejected.

8.1.1 Unbalanced Bids

- A **mathematically unbalanced bid is** one that contains lump sum or unit bid items based on nominal prices and other work uses inflated prices, which do not reflect reasonable actual costs plus a reasonable, proportionate share of the bidder's anticipated profit, overhead costs, and other indirect costs. Each bid item must carry a proportional share of total cost of work plus profit. The Transportation Commission may still award these projects.
- **A materially unbalanced bid** is one that generates reasonable doubt that a mathematically unbalanced bid will result in the lowest, ultimate cost to the State. The Texas Transportation Commission must reject a materially unbalanced bid. Although there are other unbalancing methods, unbalanced bids generally result from two situations:
  - Maximize profits. Quantity errors (too low) in the estimate; the contractor bids a high price on these items. Conversely, the contractor may underprice items that will be used in significantly lesser quantities. In this case, the apparent low bidder might not be the actual low bidder once the quantity errors are corrected; and
  - "Front loading." The contractor's bid prices are high on items of work occurring early in the project. This is similar to an advanced payment. In this case, the apparent low bidder might not be the actual low bidder when the State's financial loss of potential interest income is calculated.

CST tabulates bids in increasing amounts and verifies the low bidder.

Refer to TXDOT's **Letting Manual** for more discussion on bid tabulation and review.

8.2 Letting Overrun/Underrun Justification

8.2.1 Overrun Justification Memorandum Guidelines

Accurate estimating is essential in determining the validity of bids. The following are the latest guidelines for overrun/underrun justification memorandums for federal aid and state-funded construction projects.

Letting overrun/underrun justification memorandums are required for all types of projects where the apparent low bid is 20% or more over or under the engineer's estimate and there are two or more bidders, regardless of project cost.

Projects with only one bidder require justification when the apparent low bid varies from the Engineer's Estimate by more than +/-10%.

These memorandums are prepared by the District and submitted to CST/LMO for further handling and coordination with the FIN - LMO. This office submits all memorandums to the CST Director for ultimate approval of the recommended bid award or rejection by the Texas Transportation Commission.

Use **Form 2195 Letting Overrun/Underrun Justification Memorandum** submitted to CST for review.

8.2.2 CST's Determination of Bid Validity

The aforementioned letting overrun/underrun justification memorandums are used by CST to determine the validity of the bids. The following items are checked:

- Errors in plans or engineering estimate;
- Adequate competition;
- Indications of collusion among bidders; and
- Unbalanced bidding.

Once these points have been considered, CST recommends award or rejection of the bid overruns/underruns to be acted on by the Texas Transportation Commission (Commission) during the same month's scheduled Commission meeting.

Refer to TxDOT's **Letting Manual** for more discussion letting overrun/underrun justifications.

8.3 Award Contract

Construction contracts let by the State require award by the Commission before execution of the contract. CST makes a contract award recommendation to the Commission after all bids are tabulated and reviewed, and after all letting and procedural requirements are checked.

- For Federal-aid projects, FHWA concurrence in award is a prerequisite to Federal participation. Concurrence will be given only after receipt and review of the tabulated bids.
- Concurrence from a Metropolitan Planning Organization (MPO) must be obtained for cost overruns on projects selected by the MPO in compliance with the MPO's policy.
- If an LG is involved in funding a portion of a project, their concurrence is also required if the project overruns the cost estimate.
- For federally funded projects let by LGs, concurrence in award must be obtained from TxDOT Assistant Executive Director for Engineering Operations before the LG awards the project. Contact the Transportation Programs Division (TPD) - Local Government Projects section for additional information.
- A cost justification memorandum is required for all projects when either of the following occurs:
  - Multiple bidders and the low bid deviation is ±20% or more from the estimate; or
  - One bidder and the low bid deviation is ±10% or more from the estimate.

Justification memoranda are prepared and explained by the District. The districts submits the memo to the CST Director for approval. The memo information is used to explain the bid deviation to the Commission. The Commission officially accepts or rejects bids at their monthly meetings. CST notifies successful bidders of the contract award.

The contractor must obtain the Notice to Proceed from the State before construction activities may begin on a project. Upon contract award, DES-FPP will build the contract set and load Site Manager with project details.

Refer to TxDOT's **Letting Manual** for more discussion letting overrun/underrun justifications.

Appendix A

List of Links

100% PS&E Pre-submittal Preparation webpage

100% PS&E Submittal to Design Division webpage

23 CFR 627.9(a)

A Guide for Sequencing and Placement of Noise Walls and Retaining Walls on TxDOT Projects

Addendum Request Form (TxDOT intranet only)

Addendum Standard Operating Procedure (SOP) (TxDOT intranet only)

Addendum Request, Approval, and Processing webpage (TxDOT intranet only)

Bid Item Averages Dashboard

Bid Items and Index webpage

Bid Tabulations Dashboard

Bridge Detailing Guide

Bridge Project Development Manual

Bridge Standards webpage

Construction Contract Administration Manual

Construction Cost Estimating Guide

Construction Management Plan SOP (TxDOT intranet only)

Digital Delivery webpage

Electronic Plan Set Guidance webpage

Environmental Management System (EMS) webpage

Estimate Quantity Summary Bulk Upload spreadsheet

FAA Form 7460-1

FAA website

Final PS&E Review Checklist

Form FHWA 1273

Form 2195 – Letting Overrun/Underrun Justification Memorandum (TxDOT intranet only)

Geotechnical Manual - LRFD

Highway Illumination Manual

Hydraulic Design Manual

Landscape and Aesthetics Design Manual

Letting and Bids webpage

Letting Manual (TxDOT intranet only)

Local Government Project Management Guide

Local Government Projects Policy Manual

Negotiated Contracts Procedures Manual

Plan Review SOP

Plans Online webpage

Plans, Specifications & Estimate Requirements on Projects with Railroads webpage

Procedures for Sole Source Procurement – memo

Process for Requesting Pre-Letting Hard Copies of Plan Sets

Project Development Process Manual

Project Submittal Checklist

PS&E QC Milestone Checklist

PS&E Review and Processing Schedule (TxDOT intranet only)

Rail-Highway Operations Manual

Railroad Design Guidelines webpage

Railroad Requirements for Bridge Construction sheets

Railroad Scope of Work sheets

Record Management Manual.

Required Specifications Checklist webpage

Road User Cost webpage

Roadway Standards webpage

ROW Acquisition Manual

ROW Utilities Manual

Sole Source Request Form – template

TxDOT Specifications webpage

Standard Specifications for Construction and Maintenance of Highways, Streets and Bridges

Stormwater Pollution Prevention Plan (SWP3) Guidance Document webpage

SWP3 Guidance Manual – Section 1

SWP3 Guidance Manual – Section 2

SWP3 Standardized General Note

TDLR Construction Accessibility Requirements

Texas Administrative Code (TAC) § 22.12

Texas Transportation Code §223.012

Texas Administrative Code (TAC) §9.22

Texas Engineering and Land Surveying Practice Acts and Rules Concerning Practice and Licensure

Texas Engineering Practice Act

Texas Manual on Uniform Traffic Control Devices (TMUTCD)

Traffic Standards

Traffic Signal Authorization Form

Traffic Signals Manual

TxC Project Information – Reference Guide

TxC Reference Guide – Engineer's Estimate

US Coast Guard Coordination webpage