

**Guidance for the Preparation of Wastewater  
Engineering Feasibility Reports**

**Applies to all funding programs, except EDAP**

Form TWDB-0556  
Revised: 03/2016

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# Guidance for the Preparation of Wastewater Project Engineering Feasibility Reports

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## Overview

This guidance was prepared to assist applicants in providing engineering data needed in support of the financial assistance application to the Texas Water Development Board (TWDB) for wastewater related projects in all programs except for Economically Distressed Areas Program (EDAP) projects. EDAP applicants must follow directives from the EDAP Facility Engineering Plan/Scope of Services.

- Applicants under the Pre-design Funding option are required to submit Preliminary Engineering Feasibility Data (PEFD) as described in Part D of the application. During the planning phase of the project these applicants must provide the material in this document or a report that contains similar details. Note: applicants that have already completed detailed planning can submit a complete Engineering Feasibility Report with the application in lieu of PEFD.
- Applications not proceeding under the Pre-design Funding option must provide the material in this document TWDB-0556 or a report that contains similar details as part of the application.

Note: The applicant may create one Engineering report combining the aspects of the Engineering Feasibility Report (EFR) with the requirements for a Final Engineering Design Report (FEDR) as required in **30 TAC 217.10**. For new facilities such as a new Wastewater Treatment Plant (WWTP) or expansion of a WWTP, a complete FEDR will be required with submittal of the plans and specifications (P&S). In some instances such as facilities rehabilitation, a more brief discussion of the needs, alternatives considered, and proposed project will be adequate. Keep in mind that creating a combination report EFR/FEDR may not be practical as design funds cannot be released until the planning documents are approved.

This guidance is consistent with the following Texas Administrative Code (TAC) rules including applicable Texas Commission on Environmental Quality (TCEQ) rules pertaining to wastewater collection, treatment, and disposal:

1. 30 TAC Chapter 210 – Use of Reclaimed water
2. 30 TAC Chapter 213 – Edwards Aquifer
3. 30 TAC Chapter 217 – Design Criteria for Domestic Wastewater Systems
4. 30 TAC Chapter 285 – On-Site Sewage Facilities
5. 30 TAC Chapter 308 – Criteria and Standards for the National Pollutant Discharge Elimination System
6. 30 TAC Chapter 309 – Domestic Wastewater Effluent Limitation and Plant Siting
7. 30 TAC Chapter 312 – Sludge Use, Disposal and Transportation
8. 30 TAC Chapter 332 – Composting

To obtain information on these or any other rules see the TAC rules on line at: <http://www.sos.state.tx.us/tac/index.shtml> Open the link, select “View the current Texas Administrative Code”.

With the exception of EDAP, the use of this guidance will assist applicants to address all relevant issues concerning the planning of all projects, in the planning period. However, TWDB approval does not negate the need for permits required by the TCEQ or any other agencies.

The Engineering Feasibility Report (EFR) should form the conceptual basis for the wastewater collection, treatment, and/or disposal system proposed. Smaller systems proposing substantial improvements to a system should address all of the outlined issues as applicable. Larger systems addressing a particular portion of the system should provide enough information to provide a sufficient description of the need and proposed solution within the context of the larger system. The Engineering Feasibility Report shall bear the signed and dated seal of the registered professional engineer responsible for the design. The EFR shall also include the firm’s Registration Number.

Please submit one hard copy and an electronic copy of the Engineering Feasibility Report with the application for financial assistance.

## General Description

1. List the project’s sponsoring political subdivision, address, telephone number and legal owner.
2. List the consulting engineer’s name, address, and telephone number.
3. Identify the program(s) from which financial assistance is sought.
4. Identify entities to be served and current and future population (*31 TAC 363.13 and 31 TAC 375.81*)

5. Provide a general description of the existing system.
6. Provide a complete statement explaining the wastewater problems and needs within the planning area, including the following:
  - A. The domestic population of the area to be served (present through 20-year projection) and the design population of the project. We recommend that you plan for the 20-year needs and build for at least the 10-year needs or greater.
  - B. A discussion of any operational problems, at the wastewater treatment plant or within the sewer system.
  - C. A discussion of any applicable EPA or TCEQ enforcement actions.
  - D. A discussion of other service areas or entities being joined into the project.
7. Provide a project description of the proposed project including an explanation of any proposed phasing of construction. Also provide maps and drawings as necessary to locate and describe the project area to be served such as:
  - A. geographic limits
  - B. general location of proposed improvements
  - C. water and wastewater treatment plant sites
  - D. existing and proposed streets, parks, drainage ditches, creeks, streams, and water mains
  - E. drainage area should be clearly defined by contour map at intervals of not more than ten (10) feet
8. For Clean Water State Revolving Fund (CWSRF) projects: provide sufficient detail to document that the project will remedy the issues and problems that were evaluated for rating on the Intended Use Plan (IUP).
9. Provide the following water related information:
  - A. sources, ownership, and adequacy of water supply for the planning period

## Alternatives

Provide a description of the proposed project alternatives considered, and reasons for the selection of the project proposed.

1. The selection of the type of project must be fully described and the reasons for the selection clearly outlined.
2. The selection process should include evaluation of appropriate technologies and full consideration of their costs for the specific project and the environmental compatibility of the project. See Environmental Data Form TWDB-0800 (for State Programs) and Environmental Information Document Form TWDB-0801 (for Federal Programs).

3. Alternatives to be considered could include those involving the reduction of infiltration and inflow (I/I), modifying existing operation and maintenance (O&M) practices, phasing of the project, on-site systems, cluster systems, or various collection system routing alternatives. If alternatives for reusing effluent have been evaluated in compliance with TCEQ rules, include a description of the alternatives considered.
4. Cost and Effectiveness Analysis:
  - A. Alternatives analysis should include information showing the project is cost effective. In addition for projects that implement new systems or significantly alter current systems, a detailed cost-effectiveness analysis, including detailed O&M costs, may be requested.
  - B. The Present Worth Method is a viable alternative to provide a cost effectiveness analysis. The Present Worth is the sum, which if invested now at a given interest rate, would provide exactly the funds required to pay all present and future costs. Total project cost, used to compare alternatives, is the sum of the initial capital cost, plus the present worth of operation, maintenance, and repair (OM&R) costs, minus the present worth of the salvage value at the end of the 20-year planning period. For CWSRF projects, indicate the source of the discount rate to be utilized in the preparation of a Present Worth Analysis.
  - C. For CWSRF Projects: If the application was submitted on or after October 1, 2015, and the applicant is a municipality<sup>1</sup>, the Engineering Feasibility Report must include a certification that states that the recipient:
    - i. has studied and evaluated the cost and effectiveness of the processes, materials, techniques, and technologies for carrying out the proposed project or activity for which financial assistance is being sought
    - ii. has selected, to the maximum extent practicable, a project or activity that maximizes the potential for efficient water use, reuse, recapture, and conservation, and energy conservation
    - iii. The cost effectiveness analysis should take into account:
      - the cost of constructing the project or activity,
      - the cost of operating and maintaining the project or activity over the life of the project or activity, and
      - the cost of replacing the project or activity.

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<sup>1</sup> Municipality includes a city, town, borough, county, parish, district, association, or other public body created by or pursuant to state law, or an Indian tribe or an authorized Indian tribal organization, or a designated and approved management agency under 33 U.S.C. §1288.

NOTE: The certification must be provided prior to the approval of CWSRF assistance for final design or construction. If the applicant receives financial assistance for Planning, Acquisition, Design and Construction (PAD/C), the agreement will be conditioned to read that release of funds for construction will be contingent upon submittal of such certification.

## **Project Specific Requirements**

### **1. Proposed Collection System**

The following information shall be provided in the engineering feasibility report if applicable to the project:

- A. present area served and future areas to be served
- B. general description of existing system
- C. terrain data in sufficient detail to establish general topographical features of present and future areas to be served
- D. lift stations existing and/or proposed
- E. effect of proposed system expansion on existing system capacity
- F. amount of infiltration/inflow existing and anticipated, and how it is to be addressed in the collection system design

### **2. On-site Systems**

For on-site systems, demonstrate compliance with *On-Site Sewage Facilities Standards 30 TAC 285*.

### **3. Proposed Treatment Plant**

The following information is required in the preliminary engineering report.

- A. Quantity and quality of existing sewage influent and changes in the characteristics anticipated in the future. If adequate records are not available, analyses shall be made for the existing conditions and such information included in the report.
- B. Provide the names of industries contributing any significant wastes, types of industry (standard industry codes), volume of wastes, characteristics and strength of wastes, population equivalent, and other pertinent information. It should be emphasized that if significant amounts of wastes other than normal domestic sewage are to be treated at the wastewater treatment plant, sufficient data on such wastes must be presented to allow an evaluation of the effect on the treatment process. This would include but not be limited to heavy metals and toxic materials such as polychlorinated biphenyls, organic chemicals, and pesticides.

- C. Design flow is defined as the average daily flow for a treatment facility permitted by the TCEQ. For a facility equal to or greater than 1.0 million gallons per day (MGD), the design flow is determined according to the data and method by TCEQ 217.32(1). For a facility less than 1.0 MGD, the design flow is the maximum 30-day average flow estimated by multiplying the average annual flow by a factor of at least 1.5.

Peak flow is defined as the highest two-hour flow expected under any operational conditions, including times of high rainfall based on a 2-year 24-hour storm or a prolonged period of wet weather. Peak flow is determined according to TCEQ 217.32(2). When site-specific data is unavailable, the instantaneous two-hour peak flow must be estimated by multiplying the permitted flow by a factor of 4.0. If a facility experiences unusual periodic flow variations, a higher multiplier may be used to calculate the peak flow. In a facility with flow equalization, the facility may be designed for a lower estimated peak flow, if the supporting data included in the report supports the estimate.

If the wet weather maximum 30-day average flow rate exceeds 125 gpcd, or bypasses and/or overflows occur, consideration should be given to examining the collection system for areas where infiltration/inflow can be controlled.

It is important to verify the accuracy of flow and rainfall records used to make flow determinations. If the flow measuring device appears to be inaccurate or contributing flows exceed the above referenced amount, further guidance from the TWDB staff should be requested before proceeding.

Therefore, when determining design and peak flow rates, consideration should be given to parameters such as:

- i. domestic base flow
- ii. industrial flow
- iii. infiltration based on flow data from a 7-14 day average dry weather high groundwater period
- iv. inflow based on flow data resulting from a 2-year 24-hour storm for the area
- v. infiltration and inflow reduction not exceeding 50 percent resulting from proposed line repairs
- vi. proposed flow reduction measures projected from the existing or proposed water conservation plan

- D. Type of treatment plant proposed and effluent quality expected. The information should include basis of design, flow, organic loading, infiltration allowance, and treatment efficiencies.
- i. describe the existing permit and parameters
  - ii. discuss the proposed permit status and parameters
- E. Type of units proposed and their capacities, considering the *Design Criteria for Domestic Wastewater Systems, 30 TAC 217*. The information should include detention times, surface loadings, weir loadings, flow diagram, and other pertinent information regarding the design of the plant, including sludge processing units required for the selected ultimate sludge disposal.



- F. Treatment plant site information and the siting analysis. The location of the plant, the area included in the plant site, dedicated buffer zone, and a description of the surrounding area including a map or a sketch of the area.
- Particular reference should be made as to the plant's proximity to present and future housing developments, industrial sites, prevailing winds, highways and/or public thoroughfares, water plants, water supply wells, parks, schools, recreational areas, and shopping centers. If the effluent is to be discharged to the waters of the State, the immediate receiving stream, canal, major water course, etc., shall be designated.

The siting analysis shall include:

- i. flood hazard analysis; provide the one hundred year flood plain elevation. Proposed treatment units which are to be located within the one hundred year flood plain will require protective measures satisfactory to the TCEQ (such as levees or elevation of the treatment units)
- ii. buffer zone analysis; demonstrate that the location of each proposed treatment unit is consistent with the buffer zone criteria specified in 30 TAC 309

#### ***4. Sludge Management***

The preliminary engineering report shall include a discussion of the method of sludge disposal to be utilized. The report shall assess the following factors:

- A. estimated quantity of sludge that must be handled which includes future sludge loads based on flow projections
- B. quality and sludge treatment requirements for ultimate disposal
- C. sludge storage requirements for each alternative considering normal operating requirements and contingencies
- D. transportation of sludge
- E. land use and land availability
- F. reliability of the various alternatives, contingencies and mitigation plans to ensure reliable capacity and operational flexibility
- G. other applicable information such as pathogen reduction level, proximity to airports, and groundwater contamination potential; conforming with *30 TAC 309, Domestic Wastewater Effluent Limitations and Plant Siting*; *30 TAC 312, Sludge Use, Disposal and Transportation*; and *30 TAC 330, Municipal Solid Waste*
- H. status of any permits or authorization required for ultimate disposal of sludge

#### ***5. Control of Bypassing***

Units or equipment which are needed to provide standby capability, provide flexibility of operation, or prevent discharges of partially treated or untreated wastewater during construction are eligible for TWDB funding. Provide a description of such units or equipment and include the costs in the cost estimate.

## Alternative Methods for Project Delivery

If during the planning process the community is interested in utilizing an alternative delivery method, the EFR should discuss this. Design build, construction manager at risk and other alternative methods of project delivery are eligible for available financial assistance, including combinations of planning, design and construction funding, in accordance with programmatic requirements. The TWDB will provide written guidance regarding modifications of the type of financial assistance, the review, approval, and release of funds processes for alternative delivery projects.

## American Iron & Steel or U.S. Iron & Steel Requirements

Federally funded projects will have to comply with the American Iron & Steel requirements as described in TWDB-1106. State funded projects, with the exception of SWIFT and State Participation, will have to comply with the U.S. Iron & Steel requirements as described in TWDB-1105. Please provide a discussion of any known issues or special considerations that may affect the design or construction as a result of the applicable iron and steel requirements. Also, include a discussion of any potential waivers that are being considered.

## Cost of the Project (31 TAC 363.13)

Provide the total project cost for each project or project phase. Include all sources of funding. The *Project Budget Form (TWDB-1201)* is available to complete or download online at: <http://www.twdb.texas.gov/financial/instructions/index.asp>. Enter TWDB-1201 (or the number 1201) in the search box found under **Finance and Construction Assistance Guidance and Forms Library**

PROJECT BUDGET - Entity Name _____						
Uses	TWDB Funds Series 1	TWDB Funds Series 2	TWDB Funds Series 3	Total TWDB Cost	Other Funds	Total Cost
<b>Construction</b>						
Construction	\$0	\$0	\$0	\$0	\$0	\$0
<b>Subtotal Construction</b>	<b>\$0</b>	<b>\$0</b>	<b>\$0</b>	<b>\$0</b>	<b>\$0</b>	<b>\$0</b>
<b>Basic Engineering Fees</b>						
Planning +	\$0	\$0	\$0	\$0	\$0	\$0
Design	\$0	\$0	\$0	\$0	\$0	\$0
Construction Engineering	\$0	\$0	\$0	\$0	\$0	\$0
<b>Basic Engineering Other</b>						
**	\$0	\$0	\$0	\$0	\$0	\$0
<b>Subtotal Basic Engineering Fees</b>	<b>\$0</b>	<b>\$0</b>	<b>\$0</b>	<b>\$0</b>	<b>\$0</b>	<b>\$0</b>
<b>Special Services</b>						
Application	\$0	\$0	\$0	\$0	\$0	\$0
Environmental	\$0	\$0	\$0	\$0	\$0	\$0
Water Conservation Plan	\$0	\$0	\$0	\$0	\$0	\$0

## Project Schedule

Include a detailed project schedule with timelines for each phase of the project (as applicable). The projected target dates should include, but are not limited to the following:

1. requested loan closing date
2. completion of planning activities (EFR approval)
3. submit plans and specifications for TWDB approval
4. advertise for bids on contract(s)
5. open bids and contingently execute contract(s)
6. final project completion

As necessary, include time for unforeseen delays to obtain easements for land, buffer zones, or right-of-way easements.

## Environmental Assessment

If the Environmental Assessment is to be included within the EFR, provide the information required in the *Environmental Data Form TWDB-0800 (for State Programs)* and *Environmental Information Document Form TWDB-0801 (for Federal Programs)*.

## References

Rules as listed on page four (4) of this guidance.

Guidelines for the Preparation of Environmental Assessments, TWDB-0800 & TWDB-0801.