Guidance for the Preparation of Wastewater Project Engineering Feasibility Reports

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 for wastewater related projects 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 (PDF) option are required to submit a **Preliminary Engineering Feasibility Report (PEFR)** as detailed in D1 of the application. During the planning phase of the project these applicants must provide the material in the TWDB-0556 or a report that contains similar details. Note: applicants that have already completed detailed planning can submit a complete TWDB-0556 with the application in lieu of a PEFR.
- Applications not proceeding under the PDF option must provide the material in the 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 (need, alternatives discussion) with the requirements for a Final Engineering Design Report, FEDR as required in 30 TAC 217.10, Final Engineering Design Report. For new facilities such as a new 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 briefer discussion of the needs, alternatives considered, and proposed project will be adequate. 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:

- 30 TAC Chapter 210 – Use of Reclaimed water
- 30 TAC Chapter 213 – Edwards Aquifer
- 30 TAC Chapter 217 – Design Criteria for Sewerage Systems
- 30 TAC Chapter 285 – On-Site Sewerage Facilities
- 30 TAC Chapter 308 – Criteria and Standards for the National Pollutant Discharge Elimination System
- 30 TAC Chapter 309 – Domestic Wastewater Effluent Limitation and Plant Siting
- 30 TAC Chapter 312 – Sludge Use, Disposal and Transportation
- 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, “View the current TAC”.

Use of this guidance will assist applicants to address all relevant issues concerning the planning of all projects, except EDAP 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 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.

Please submit 4 copies of the Engineering Feasibility Report with the application for financial assistance.

Table of Contents

(Chapters may be accessed by placing the cursor over the chapter heading and pressing Ctrl+Click.)

I. General Description

A. Identify entities to be served and current and future population **(31 TAC 375. 80).**

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. 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.

5. Project Description
   a. Provide a description of the proposed project - The project description should also include an explanation of any proposed phasing of construction.
   b. Provide maps and drawings as necessary to locate and describe the project area to be served such as:
   - geographic limits,
   - general location of proposed improvements,
   - water and wastewater treatment plant sites,
   - existing and proposed streets, parks, drainage ditches, creeks, streams, and water mains,
   - drainage area should be clearly defined by contour map at intervals of not more than ten *(10)* feet.

6. For CWSRF projects - provide sufficient detail to document that the project will remedy the issues and problems that were evaluated for rating on the IUP.

7. Provide the following water related information:
   a. sources, ownership, and adequacy of water supply for the planning period.

II. 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 treatment system 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 Instructions for preparing an Environmental Information Document* SRF-099*)*.

3. Examples of alternatives to be considered could be those involving innovative and non-conventional methods of treatment such as rock reed, root zone, ponding, irrigation and other technologies. Also, the alternatives could be 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. TWDB has information available for reference to some innovative technologies. If alternatives for reusing effluent have been evaluated in compliance with TCEQ rules, include a description of the alternatives considered.

4. A suggested method of outlining alternative project costs is the Present Worth Method. Present worth is the sum which, if invested now at a given interest rate (CWSRF projects utilize EPA's discount 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. In some cases where new systems or major expansions are proposed, a detailed Present Worth Analysis may be required.

A. Proposed Collection System

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

1. present area served and future areas to be served,

2. terrain data in sufficient detail to establish general topographical features of present and future areas to be served,
3. lift stations existing and/or proposed,

4. effect of proposed system expansion on existing system capacity, and

5. amount of infiltration/inflow existing and anticipated, and how it is to be addressed in the collection system design.

B. On-site Systems

For on-site systems, demonstrate compliance with On-Site Wastewater Treatment Standards 30 TAC 285.

C. Proposed treatment plant

The following information is required in the preliminary engineering report.

1. 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.

2. 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.

3. 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. When site-specific data is unavailable, the instantaneous two-hour peak flow must be estimated by multiplying 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:

   a. domestic base flow,
   b. industrial flow,

c. infiltration based on flow data from a 7-14 day average dry weather high groundwater period,
d. inflow based on flow data resulting from a 2-year 24-hour storm for the area,
e. infiltration and inflow reduction not exceeding 50 percent resulting from proposed line repairs, and
f. proposed flow reduction measures projected from the existing or proposed water conservation plan.

4. Type of treatment plant proposed and effluent quality expected. The information should include basis of design, flow, organic loading, infiltration allowance, and treatment efficiencies.
   a. Describe the existing permit and parameters, and
   b. discuss the proposed permit status and parameters.

5. 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.

6. 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:

   a. 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).

   b. Buffer zone analysis. Demonstrate that the location of each proposed treatment unit is consistent with the buffer zone criteria specified in 30 TAC 309.13 of this title (relating to Unsuitable Site Characteristics).

D. 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:

1. estimated quantity of sludge that must be handled which includes future sludge loads based on flow projections,

2. quality and sludge treatment requirements for ultimate disposal,

3. sludge storage requirements for each alternative considering normal operating requirements and contingencies,

4. transportation of sludge,

5. land use and land availability,

6. reliability of the various alternatives, contingencies and mitigation plans to ensure reliable capacity and operational flexibility,

7. other applicable information conforming with 30 TAC 309, Subchapter D Operational Standards for Municipal Solid Waste Landfill Facilities; 30 TAC 312, Sludge Use, Disposal and Transportation; and 30 TAC 330, Municipal Solid Waste such as pathogen reduction level, proximity to airports, and groundwater contamination potential, and

8. status of any permits or authorization required for ultimate disposal of sludge.

E. 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.

F. 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 executive administrator will provide written guidance regarding modifications of the type of financial assistance, and the review, approval and release of funds processes for alternative delivery projects.

(*) Contact your TWDB Review Engineer for the current EPA discount rate to be utilized in a Present Worth Analysis for CWSRF projects

The Project Budget form (TWDB-1201) below is available to complete or download online at:
http://www.twdb.state.tx.us/assistance/financial/resources/index.asp
(Use Ctrl+F on your keyboard to find TWDB-1201)

III. Cost of the Project (31 TAC 363.13)

1. Provide the total project cost for each project or project phase in the following format:

PROJECT BUDGET (TWDB-1201)						
Uses	**TWDB Funds Series 1**	**TWDB Funds Series 2**	**TWDB Funds Series 3**	**Total TWDB Cost**	**Other Funds**	**Total Cost**
Construction						
Construction	$1,000	$1,000	$1,000	$3,000	$1,000	$4,000
Subtotal Construction	**$1,000**	**$1,000**	**$1,000**	**$3,000**	**$1,000**	**$4,000**
Basic Engineering Fees						
Planning +	$1,000	$1,000	$1,000	$3,000	$1,000	$4,000
Design	$0	$0	$0	$0	$0	$0
Construction Engineering	$0	$0	$0	$0	$0	$0
Basic Engineering Other ** _____	$0	$0	$0	$0	$0	$0
Subtotal Basic Engineering Fees	**$1,000**	**$1,000**	**$1,000**	**$3,000**	**$1,000**	**$4,000**
Special Services						
Application	$1,000	$1,000	$1,000	$3,000	$1,000	$4,000
Environmental	$0	$0	$0	$0	$0	$0
Water Conservation Plan	$0	$0	$0	$0	$0	$0
I/I Studies/Sewer Evaluation	$0	$0	$0	$0	$0	$0
Surveying	$0	$0	$0	$0	$0	$0
Geotechnical	$0	$0	$0	$0	$0	$0
Testing	$0	$0	$0	$0	$0	$0
Permits	$0	$0	$0	$0	$0	$0
Inspection	$0	$0	$0	$0	$0	$0
O&M Manual	$0	$0	$0	$0	$0	$0
Project Management (by engineer)	$0	$0	$0	$0	$0	$0
Pilot Testing	$0	$0	$0	$0	$0	$0
Water Distribution Modeling	$0	$0	$0	$0	$0	$0
Special Services Other ** _____	$0	$0	$0	$0	$0	$0
Subtotal Special Services	**$1,000**	**$1,000**	**$1,000**	**$3,000**	**$1,000**	**$4,000**
Other						
Administration	$1,000	$1,000	$1,000	$3,000	$1,000	$4,000
Land/Easements Acquisition	$0	$0	$0	$0	$0	$0
Water Rights Purchase (If Applicable)	$1,000	$1,000	$1,000	$3,000	$1,000	$4,000
Capacity Buy-In (If Applicable)	$0	$0	$0	$0	$0	$0
Project Legal Expenses	$0	$0	$0	$0	$0	$0
Other **	$0	$0	$0	$0	$0	$0
Subtotal Other Services	**$1,000**	**$1,000**	**$1,000**	**$3,000**	**$1,000**	**$4,000**

Fiscal Services						
Financial Advisor	$1,000	$1,000	$1,000	$3,000	$1,000	$4,000
Bond Counsel	$0	$0	$0	$0	$0	$0
Issuance Cost	$0	$0	$0	$0	$0	$0
Bond Insurance/Surety	$0	$0	$0	$0	$0	$0
Fiscal/Legal	$0	$0	$0	$0	$0	$0
Capitalized Interest	$0	$0	$0	$0	$0	$0
Bond Reserve Fund	$0	$0	$0	$0	$0	$0
Loan Origination Fee	$0	$0	$0	$0	$0	$0
Other ** _____	$0	$0	$0	$0	$0	$0
Subtotal Fiscal Services	**$1,000**	**$1,000**	**$1,000**	**$3,000**	**$1,000**	**$4,000**
Contingency						
Contingency	$20	$20	$20	$20	$20	$20
Subtotal Contingency	**$20**	**$20**	**$20**	**$20**	**$20**	**$20**
TOTAL COSTS	**$5,020**	**$5,020**	**$5,020**	**$15,020**	**$5,020**	**$20,020**

Other ** description must be entered

+ For Planning applications under the EDAP Program, please break down Planning costs as follows:

Category A			0
Category B			0
Category C			0
Category D			0
Total Planning Costs	0	0	0

(The Project Budget, TWDB-1201, may be downloaded, complete with formulas, through the TWDB website, http://www.twdb.state.tx.us/assistance/financial/resources/index.asp.

2. Provide a project schedule outlining projected target dates including but not limited to the following:
   a. submit application for a Board loan commitment,
   b. submit plans and specifications for TWDB approval,
   c. advertise for bids on contract(s),
   d. open bids and contingently execute contract(s), and
   e. include time, as necessary, for unforeseen delays to obtain easements for land, buffer zones, or right-of-way easements.

3. Provide an estimate of the total cost of the project per connection, including debt retirement and operation and maintenance costs. Include a comparison of existing costs per connection to the projected cost per connection.

IV. Environmental Assessment

If the Environmental Assessment is to be included within the Engineering Feasibility Report, provide the information required in the *Guidelines for the Preparation of Environmental Assessments, ED-001.*

References:

Rules as listed on page 1 of this guidance.
Guidelines for the Preparation of Environmental Assessments, ED-001.