UNITED STATES DEPARTMENT OF AGRICULTURE

Rural Utilities Service

BULLETIN 1780-2

SUBJECT: **Preliminary Engineering Reports for the Water and Waste Disposal Program**

TO: Rural Development State Directors, Community Program Directors, and State Engineers

EFFECTIVE DATE: Date of approval.

OFFICE OF PRIMARY INTEREST: Engineering Branch, Water and Environmental Programs

INSTRUCTIONS: This bulletin replaces existing RUS Bulletin 1780-2 (April 4, 2013) .

AVAILABILITY: This bulletin and all the exhibits, as well as any Rural Development instruction or Rural Utilities Service bulletins, regulations, or forms referenced in this bulletin are available at any Rural Development State Office. The State Office staff is familiar with the use of the documents in their States and can answer specific questions on Agency requirements.

This bulletin is available on the Rural Utilities Service website at http://www.rurdev.usda.gov/RDU_Bulletins_Water_and_Environmental.html.

PURPOSE: This bulletin assists applicants and their consultants with instructions on how to prepare a Preliminary Engineering Report as part of an application for funding as required by 7 CFR 1780.37(d) and 7 CFR 1780.65(a).

MODIFICATIONS: Rural Development State Offices may modify this guidance when appropriate to comply with State statutes and regulations in accordance with the procedures outlined at Rural Development Instruction 2006-B (2006.55).

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ABBREVIATIONS

CDBG – Community Development Block Grant
CFR – Code of Federal Regulations
EDU – Equivalent Dwelling Unit
EPA – Environmental Protection Agency
GAO – Government Accountability Office
GPCD – Gallons per Capita per Day
HUD – Department of Housing and Urban Development
O & M – Operations and Maintenance
PER – Preliminary Engineering Report
RD – Rural Development
RUS – Rural Utilities Service
SRF – State Revolving Fund
STEP – Septic Tank Effluent System
USDA – United States Department of Agriculture
WEP – Water and Environmental Programs
WWD – Water and Waste Disposal

1. BACKGROUND

A Preliminary Engineering Report (PER) is a planning document required by many state and federal agencies as part of the process of obtaining financial assistance for development of drinking water, wastewater, solid waste, and stormwater projects. An applicant for funding from the Water and Waste Disposal (WWD) program must submit a PER as required by 7 CFR 1780.33(c) and 1780.55. The PER describes the proposed project from an engineering perspective, analyzes alternatives to the proposal, defines project costs, and provides information critical to the underwriting process. A PER submitted to USDA Rural Development must be sealed by an engineer licensed in the jurisdiction where the project will be constructed.

2. GENERAL

This bulletin provides information and guidance for applicants and professional consultants in developing a PER for submittal with an application for WWD funding. RD State Offices should provide a copy of the Bulletin to applicants and consulting engineers upon request or refer them to the website listed on the Bulletin's cover sheet for an electronic copy.

Content of a PER: The PER Templates describe the content of a PER for the given application and should be used without modification, except when noted otherwise. Often an applicant will initially consider only a single funding source and later determine that an application to additional funding agencies is necessary. To avoid having to revise the PER to meet the additional agencies' needs, the consulting engineer should consider using the Interagency PER template. Otherwise, one of the other templates may suffice, depending on the specifics of a project.

The PER should be a clearly written, concise report that provides the pertinent information needed to support a funding decision. Length should generally be 30 pages or less for smaller projects or 50 pages or less for larger projects. Extraneous information will prolong the review process. Similarly, attaching voluminous documents or reports in the appendices should be avoided, as overly large appendices can hamper the goal of conveying necessary information for project acceptance. When appendices are needed, please facilitate review with the use of tabs or other navigation aids. Table of contents should include the page numbers associated with each appendix provided.

Alternatives Analyses: Alternatives analyses help determine if a project is modest in size, design and cost. The number of analyses required will vary depending on the specifics and complexity of the project. Appendix A includes a list of standard alternatives that should be considered for common project elements funded by the WWD program. Only projects allowed under the Streamlined PER criteria may have a PER without an alternatives analysis (see Section 3.4 and Appendix B).

Short-Lived Assets: Short-lived assets (SLA) are items that require periodic replacement prior to the end of a project's useful life. They do not include items covered by O&M or items that are usually funded with long-term capital financing. The short-lived asset table in Appendix A of the Interagency Memorandum contains a list of examples of short-lived assets. Depending on local practices and applicants, some of these items may not be considered short-lived assets if they are considered part of O&M or long-term capital financing. Consulting engineers and applicants should coordinate with each other and with the Agency to determine which items should be considered short-lived assets for specific projects. For Rural Development underwriting purposes, only assets with life spans of 15 years or less will be considered SLAs. Note that the list of SLAs provided for underwriting purposes may differ from the SLA list provided for the alternatives analysis. A list of SLAs for the entire system are needed for funding underwriting whereas only a list of SLAs relevant to project is needed for the alternatives analysis.

Cyber Security: The projected operation and maintenance (O&M) budget must include a line item for cyber security costs (see Appendix C), even if it is zero, but applicants are encouraged to enter into a cyber security contract.

Collaborative Delivery Methods: The PER guidance within this Bulletin assumes the use of standard design-bid-build method of project delivery. If collaborative methods are used (such as design build – stipulated price) the PER should be written and developed with this method in mind. Cost opinions will likely have different cost breakouts, particularly for engineering and construction related services. In some situations, an alternatives analysis may not be necessary if a project includes a request for proposals allowing competing design builders to present alternative designs. Use of collaborate delivery methods requires approval of the Agency and the Agency's Office of General Counsel. Project schedules should account for this effort.

Sole Sourcing Equipment: Sole sourcing equipment and materials is generally not allowed by 2 CFR 200.319. Projects wishing to sole source equipment must obtain Agency approval. Sole sourced equipment must conform with applicable domestic preference requirements.

Amendments: In certain situations, a previously concurred with PER may require modification due to unforeseen circumstances that affect the scope of work needed to complete the project objectives. In such cases, an amendment to the PER, that clearly demonstrates the PER modifications, may be submitted for agency review, consideration and concurrence. This amendment will be an official document, stamped and signed by the engineer of record.

The PER is not finalized until the agency has concurred with the document. Any modifications made to the PER prior to agency concurrence should be made within the original document.

PER amendments are rare after funding obligation and cannot be accepted after bids are opened for all contracts within the original project scope.

3. PRELIMINARY ENGINEERING REPORT OPTIONS

The four PER template options available for WEP funded projects are described below. Not every template is suitable for every situation or project. Please read the details below to see which templates are allowed for a particular project in consideration. Irrespective of the template used, the PER must be sealed by an engineer licensed in the state where the project will be constructed.

3.1 OPTION 1 - INTERAGENCY PER TEMPLATE

Government at both state and federal levels endeavor to improve coordination between funding agencies in the processes involved in applications for infrastructure funding. A GAO report, "Rural Water Infrastructure: Additional Coordination Can Help Avoid Potentially Duplicative Application Requirements" (GAO-13-111), released October 16, 2012, called the effort of the working group led by USDA to develop the attached Interagency PER Template "encouraging" and stated that it would "help communities".

In 2012 the USDA, Rural Development (RD), Rural Utilities Service (RUS), Water and Environmental Programs (WEP) formed a working group to develop an interagency template for PERs for use by both federal agencies and state administering agencies. The USDA-led working group included 36 individuals representing 4 federal agencies, 16 state agencies, the Border Environment Cooperation Commission, and the North Carolina Rural Center. Also, the effort was supported by the Small Community Water Infrastructure Exchange. On January 16, 2013, the principals of the federal participants executed an interagency memorandum supporting use of the interagency template, attached as Exhibit One.

Content of an Interagency PER: The attached Interagency PER Template describes the content of a PER and should be used without modification, unless noted otherwise. Often an applicant will initially consider only a single funding source and later determine that an application to additional funding agencies is necessary. To avoid having to revise the PER to meet the additional agencies' needs, the consulting engineer should provide responses to all sections of the PER outline, unless specific sections do not apply to a proposed project.

Requirements for providing funding decision (financial) data are integrated within the body of this template. The PER preparer may elect to provide this data within the body of the report or use Appendix C.

The Interagency PER Template may be used for **all WEP-funded projects** and may be particularly helpful when other federal funding programs are contributing to the project financing.

3.2 OPTION 2 – WEP-SPECIFIC PER TEMPLATE

The WEP-Specific PER Template may be used for **all WEP-funded projects but might not be appropriate when other federal programs are utilized for project funding** (depending on the planning document requirements of the other funding agencies.) Complete but concise PERs should be developed when utilizing this template. The WEP-Specific PER Template is provided in Exhibit Two.

3.3 OPTION 3 – OTHER ENGINEERING REPORT WITH CROSS-REFERENCES

Capital improvement plans and engineering reports prepared for other agencies may be used if those reports include the information described in the Option 1 or Option 2 templates, described above. To use this option, the location of the necessary information must be identified. Three methods to do this cross-reference are: a) Writing the page numbers from the other engineering report onto the Option 1 or Option 2 table of contents to identify the locations of the respective information; b) Providing a letter that explains where the required information can be found within the other engineering report. A cross-reference table should be attached to this letter; c) Providing a copy of the table of contents from the other engineering report and notating upon it where the necessary information required by the Option 1 or Option 2 templates can be found.

Required information not furnished in the other engineering report may be provided in a separate document, sealed by an engineer licensed in the state where the project will be constructed.

3.4 OPTION 4 – STREAMLINED PER TEMPLATE (LIMITED USE)

The Streamlined PER Template may be used for **simple projects when there are no technical alternatives to the proposed action**. Appendix B provides a list of such projects for which this PER template may be used. Projects that apply for only loan funding (no grant) may also qualify for the Streamlined PER. Projects not fitting in one of these categories must use one of the other template alternatives. In rare circumstances, the State Engineer might request analysis of an alternative for projects listed in Appendix B. The Streamlined PER Template is provided in Exhibit Three.

EXHIBIT ONE
INTERAGENCY PRELIMINARY ENGINEERING REPORT TEMPLATE

January 16, 2013

INTERAGENCY MEMORANDUM

Attached is a document explaining recommended best practice for the development of Preliminary Engineering Reports in support of funding applications for development of drinking water, wastewater, stormwater, and solid waste systems.

The best practice document was developed cooperatively by:

- US Department of Agriculture, Rural Development, Rural Utilities Service, Water and Environmental Programs;
- US Environmental Protection Agency (EPA), Office of Water, Office of Ground Water and Drinking Water and Office of Wastewater Management;
- US Department of Housing and Urban Development (HUD), Office of Community Planning and Development;
- US Department of Health and Human Services, Indian Health Service (IHS);
- Small Communities Water Infrastructure Exchange;

Extensive input from participating state administering agencies was also very important to the development of this document.

Federal agencies that cooperatively developed this document strongly encourage its use by funding agencies as part of the application process or project development. State administered programs are encouraged to adopt this document but are not required to do so, as it is up to a state administering agency's discretion to adopt it, based on the needs of the state administering agency.

A Preliminary Engineering Report (Report) is a planning document required by many state and federal funding agencies as part of the process of obtaining financial assistance for development of drinking water, wastewater, solid waste, and stormwater facilities. The attached Report outline details the requirements that funding agencies have adopted when a Report is required.

In general, the Report should include a description of existing facilities and a description of the issues addressed by the proposed project. It should identify alternatives, present a life cycle cost analysis of technically feasible alternatives and propose a specific course of action. The Report should also include a detailed current cost estimate of the recommended alternative. The attached outline describes these and other sections to be included in the Report.

Projects utilizing direct federal funding also require an environmental review in accordance with the National Environmental Policy Act (NEPA). The Report should indicate that environmental issues were considered as part of the engineering planning and include environmental information pertinent to engineering planning.

For state administered funding programs, a determination of whether the outline applies to a given program or project is made by the state administering agency. When a program or agency adopts this outline, it may adopt a portion or the entire outline as applicable to the program or project in question at the discretion of the agency. Some state and federal funding agencies will not require the Report for every project or may waive portions of the Report that do not apply to their application process, however a Report thoroughly addressing all of the contents of this outline will meet the requirements of most agencies that have adopted this outline.

The detailed outline provides information on what to include in a Report. The level of detail required may also vary according to the complexity of the specific project. Reports should conform substantially to this detailed outline and otherwise be prepared and presented in a professional manner. Many funding agencies require that the document be developed by a Professional Engineer registered in the state or other jurisdiction where the project is to be constructed unless exempt from this requirement. Please check with applicable funding agencies to determine if the agencies require supplementary information beyond the scope of this outline.

Any preliminary design information must be written in accordance with the regulatory requirements of the state or territory where the project will be built.

Information provided in the Report may be used to process requests for funding. Completeness and accuracy are therefore essential for timely processing of an application. Please contact the appropriate state or federal funding agencies with any questions about development of the Report and applications for funding as early in the process as practicable.

Questions about this document should be referred to the applicable state administering agency, regional office of the applicable federal agency, or to the following federal contacts:

Agency	Contact	Email Address	Phone
USDA/RUS			
EPA/DWSRF			
EPA/CWSRF			
HUD			
IHS			

Sincerely,

1/16/13

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Attachment

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ABBREVIATIONS

NEPA – National Environmental Policy Act
NPV – Net Present Value
O&M – Operations and Maintenance
OMB – Office of Management and Budget
Report – Preliminary Engineering Report
SPPW – Single Payment Present Worth
USPW – Uniform Series Present Worth

GENERAL OUTLINE OF A PRELIMINARY ENGINEERING REPORT

1) PROJECT PLANNING
   a) Location
   b) Environmental Resources Present
   c) Population Trends
   d) Community Engagement

2) EXISTING FACILITIES
   a) Location Map
   b) History
   c) Condition of Existing Facilities
   d) Financial Status of any Existing Facilities
   e) Water/Energy/Waste Audits

3) NEED FOR PROJECT
   a) Health, Sanitation, and Security
   b) Aging Infrastructure
   c) Reasonable Growth

4) ALTERNATIVES CONSIDERED
   a) Description
   b) Design Criteria
   c) Map
   d) Environmental Impacts
   e) Land Requirements
   f) Potential Construction Problems
   g) Sustainability Considerations
      i) Water and Energy Efficiency
      ii) Green Infrastructure
      iii) Other
   h) Cost Estimates

5) SELECTION OF AN ALTERNATIVE
   a) Life Cycle Cost Analysis
   b) Non-Monetary Factors

6) PROPOSED PROJECT (RECOMMENDED ALTERNATIVE)
   a) Preliminary Project Design
   b) Project Schedule
   c) Permit Requirements
   d) Sustainability Considerations
      i) Water and Energy Efficiency
      ii) Green Infrastructure

iii) Other

e) Total Project Cost Estimate (Engineer's Opinion of Probable Cost)

f) Annual Operating Budget
   i) Income
   ii) Annual O&M Costs
   iii) Debt Repayments
   iv) Reserves

7) CONCLUSIONS AND RECOMMENDATIONS

DETAILED OUTLINE OF A PRELIMINARY ENGINEERING REPORT

1) PROJECT PLANNING

Describe the area under consideration. Service may be provided by a combination of central, cluster, and/or centrally managed individual facilities. The description should include information on the following:

a) Location. Provide scale maps and photographs of the project planning area and any existing service areas. Include legal and natural boundaries and a topographical map of the service area.

b) Environmental Resources Present. Provide maps, photographs, and/or a narrative description of environmental resources present in the project planning area that affect design of the project. Environmental review information that has already been developed to meet requirements of NEPA or a state equivalent review process can be used here.

c) Population Trends. Provide U.S. Census or other population data (including references) for the service area for at least the past two decades if available. Population projections for the project planning area and concentrated growth areas should be provided for the project design period. Base projections on historical records with justification from recognized sources.

d) Community Engagement. Describe the utility's approach used (or proposed for use) to engage the community in the project planning process. The project planning process should help the community develop an understanding of the need for the project, the utility operational service levels required, funding and revenue strategies to meet these requirements, along with other considerations.

2) EXISTING FACILITIES

Describe each part (e.g. processing unit) of the existing facility and include the following information:

a) Location Map. Provide a map and a schematic process layout of all existing facilities. Identify facilities that are no longer in use or abandoned. Include photographs of existing facilities.

b) History. Indicate when major system components were constructed, renovated, expanded, or removed from service. Discuss any component failures and the cause for the failure. Provide a history of any applicable violations of regulatory requirements.

c) Condition of Existing Facilities. Describe present condition; suitability for continued use; adequacy of current facilities; and their conveyance, treatment, storage, and disposal capabilities. Describe the existing capacity of each component. Describe and reference compliance with applicable federal, state, and local laws. Include a brief analysis of overall current energy consumption. Reference an asset management plan if applicable.

d) Financial Status of any Existing Facilities. (Note: Some agencies require the owner to submit the most recent audit or financial statement as part of the application package.) Provide information regarding current rate schedules, annual O&M cost (with a breakout of current energy costs), other capital improvement programs, and tabulation of users by monthly usage categories for the most recent typical fiscal year. Give status of existing debts and required reserve accounts.

e) Water/Energy/Waste Audits. If applicable to the project, discuss any water, energy, and/or waste audits which have been conducted and the main outcomes.

3) NEED FOR PROJECT

Describe the needs in the following order of priority:

a) Health, Sanitation, and Security. Describe concerns and include relevant regulations and correspondence from/to federal and state regulatory agencies. Include copies of such correspondence as an attachment to the Report.

b) Aging Infrastructure. Describe the concerns and indicate those with the greatest impact. Describe water loss, inflow and infiltration, treatment or storage needs, management adequacy, inefficient designs, and other problems. Describe any safety concerns.

c) Reasonable Growth. Describe the reasonable growth capacity that is necessary to meet needs during the planning period. Facilities proposed to be constructed to meet future growth needs should generally be supported by additional revenues. Consideration should be given to designing for phased capacity increases. Provide number of new customers committed to this project.

4) ALTERNATIVES CONSIDERED

This section should contain a description of the alternatives that were considered in planning a solution to meet the identified needs. Documentation of alternatives considered is often a Report weakness. Alternative approaches to ownership and management, system design (including resource efficient or green alternatives), and sharing of services, including various forms of partnerships, should be considered. In addition, the following alternatives should be considered, if practicable: building new centralized facilities, optimizing the current facilities (no construction), developing centrally managed decentralized systems, including small cluster or individual systems, and developing an optimum combination of centralized and decentralized systems. Alternatives should be consistent with those considered in the NEPA, or state equivalent, environmental review. Technically infeasible alternatives that were considered should be mentioned briefly along with an explanation of why they are infeasible, but do not require full analysis. For each technically feasible alternative, the description should include the following information:

a) Description. Describe the facilities associated with every technically feasible alternative. Describe source, conveyance, treatment, storage and distribution

facilities for each alternative. A feasible system may include a combination of centralized and decentralized (on-site or cluster) facilities.

b) Design Criteria. State the design parameters used for evaluation purposes. These parameters should comply with federal, state, and agency design policies and regulatory requirements.

c) Map. Provide a schematic layout map to scale and a process diagram if applicable. If applicable, include future expansion of the facility.

d) Environmental Impacts. Provide information about how the specific alternative may impact the environment. Describe only those unique direct and indirect impacts on floodplains, wetlands, other important land resources, endangered species, historical and archaeological properties, etc., as they relate to each specific alternative evaluated. Include generation and management of residuals and wastes.

e) Land Requirements. Identify sites and easements required. Further specify whether these properties are currently owned, to be acquired, leased, or have access agreements.

f) Potential Construction Problems. Discuss concerns such as subsurface rock, high water table, limited access, existing resource or site impairment, or other conditions which may affect cost of construction or operation of facility.

g) Sustainability Considerations. Sustainable utility management practices include environmental, social, and economic benefits that aid in creating a resilient utility.

   i) Water and Energy Efficiency. Discuss water reuse, water efficiency, water conservation, energy efficient design (i.e., reduction in electrical demand), and/or renewable generation of energy, and/or minimization of carbon footprint, if applicable to the alternative. Alternatively, discuss the water and energy usage for this option as compared to other alternatives.

   ii) Green Infrastructure. Discuss aspects of project that preserve or mimic natural processes to manage stormwater, if applicable to the alternative. Address management of runoff volume and peak flows through infiltration, evapotranspiration, and/or harvest and use, if applicable.

   iii) Other. Discuss any other aspects of sustainability (such as resiliency or operational simplicity) that are incorporated into the alternative, if applicable.

h) Cost Estimates. Provide cost estimates for each alternative, including a breakdown of the following costs associated with the project: construction, non-construction, and annual O&M costs. A construction contingency should be included as a non-construction cost. Cost estimates should be included with the descriptions of each technically feasible alternative. O&M costs should include a rough breakdown by O&M category (see example below) and not just a value for each alternative. Information from other sources, such as the recipient's accountant or other known technical service providers, can be incorporated to assist in the development of this section. The cost derived will be used in the life cycle cost analysis described in Section 5 a.

Example O&M Cost Estimate	
Personnel (i.e., Salary, Benefits, Payroll Tax, Insurance, Training)	
Administrative Costs (e.g. office supplies, printing, etc.)	
Water Purchase or Waste Treatment Costs	
Insurance	
Energy Cost (Fuel and/or Electrical)	
Process Chemical	
Monitoring & Testing	
Short Lived Asset Maintenance/Replacement*	
Professional Services	
Residuals Disposal	
Miscellaneous	
Total	

* See Appendix A for example list

5) SELECTION OF AN ALTERNATIVE

Selection of an alternative is the process by which data from the previous section, "Alternatives Considered" is analyzed in a systematic manner to identify a recommended alternative. The analysis should include consideration of both life cycle costs and non-monetary factors (i.e., triple bottom line analysis: financial, social, and environmental). If water reuse or conservation, energy efficient design, and/or renewable generation of energy components are included in the proposal provide an explanation of their cost effectiveness in this section.

a) Life Cycle Cost Analysis. A life cycle present worth cost analysis (an engineering economics technique to evaluate present and future costs for comparison of alternatives) should be completed to compare the technically feasible alternatives. Do not leave out alternatives because of anticipated costs; let the life cycle cost analysis show whether an alternative may have an acceptable cost. This analysis should meet the following requirements and should be repeated for each technically feasible alternative. Several analyses may be required if the project has different aspects, such as one analysis for different types of collection systems and another for different types of treatment.

1. The analysis should convert all costs to present day dollars;
2. The planning period to be used is recommended to be 20 years, but may be any period determined reasonable by the engineer and concurred on by the state or federal agency;
3. The discount rate to be used should be the "real" discount rate taken from Appendix C of OMB circular A-94 and found at (www.whitehouse.gov/omb/circulars/a094/a94_appx-c.html);
4. The total capital cost (construction plus non-construction costs) should be included;

5. Annual O&M costs should be converted to present day dollars using a uniform series present worth (USPW) calculation;
6. The salvage value of the constructed project should be estimated using the anticipated life expectancy of the constructed items using straight line depreciation calculated at the end of the planning period and converted to present day dollars;
7. The present worth of the salvage value should be subtracted from the present worth costs;
8. The net present value (NPV) is then calculated for each technically feasible alternative as the sum of the capital cost (C) plus the present worth of the uniform series of annual O&M (USPW (O&M)) costs minus the single payment present worth of the salvage value (SPPW(S)):

$$NPV = C + USPW\ (O\&M) - SPPW\ (S)$$

9. A table showing the capital cost, annual O&M cost, salvage value, present worth of each of these values, and the NPV should be developed for state or federal agency review. All factors (major and minor components), discount rates, and planning periods used should be shown within the table;
10. Short lived asset costs (See Appendix A for examples) should also be included in the life cycle cost analysis if determined appropriate by the consulting engineer or agency. Life cycles of short lived assets should be tailored to the facilities being constructed and be based on generally accepted design life. Different features in the system may have varied life cycles.

b) Non-Monetary Factors. Non-monetary factors, including social and environmental aspects (e.g. sustainability considerations, operator training requirements, permit issues, community objections, reduction of greenhouse gas emissions, wetland relocation) should also be considered in determining which alternative is recommended and may be factored into the calculations.

6) PROPOSED PROJECT (RECOMMENDED ALTERNATIVE)

The engineer should include a recommendation for which alternative(s) should be implemented. This section should contain a fully developed description of the proposed project based on the preliminary description under the evaluation of alternatives. Include a schematic for any treatment processes, a layout of the system, and a location map of the proposed facilities. At least the following information should be included as applicable to the specific project:

a) Preliminary Project Design.

i) Drinking Water:

Water Supply. Include requirements for quality and quantity. Describe recommended source, including site and allocation allowed.

Treatment. Describe process in detail (including whether adding, replacing, or rehabilitating a process) and identify location of plant and site of any process discharges. Identify capacity of treatment plant (i.e., Maximum Daily Demand).

Storage. Identify size, type and location.

Pumping Stations. Identify size, type, location and any special power requirements. For rehabilitation projects, include description of components upgraded.

Distribution Layout. Identify general location of new pipe, replacement, or rehabilitation: lengths, sizes and key components.

ii) Wastewater/Reuse:

Collection System/Reclaimed Water System Layout. Identify general location of new pipe, replacement or rehabilitation: lengths, sizes, and key components.

Pumping Stations. Identify size, type, site location, and any special power requirements. For rehabilitation projects, include description of components upgraded.

Storage. Identify size, type, location and frequency of operation.

Treatment. Describe process in detail (including whether adding, replacing, or rehabilitating a process) and identify location of any treatment units and site of any discharges (end use for reclaimed water). Identify capacity of treatment plant (i.e., Average Daily Flow).

iii) Solid Waste:

Collection. Describe process in detail and identify quantities of material (in both volume and weight), length of transport, location and type of transfer facilities, and any special handling requirements.

Storage. If any, describe capacity, type, and site location.

Processing. If any, describe capacity, type, and site location.

Disposal. Describe process in detail and identify permit requirements, quantities of material, recycling processes, location of plant, and site of any process discharges.

iv) Stormwater:

Collection System Layout. Identify general location of new pipe, replacement or rehabilitation: lengths, sizes, and key components.

Pumping Stations. Identify size, type, location, and any special power requirements.

Treatment. Describe treatment process in detail. Identify location of treatment facilities and process discharges. Capacity of treatment process should also be addressed.

Storage. Identify size, type, location and frequency of operation.

Disposal. Describe type of disposal facilities and location.

Green Infrastructure. Provide the following information for green infrastructure alternatives:

- Control Measures Selected. Identify types of control measures selected (e.g., vegetated areas, planter boxes, permeable pavement, rainwater cisterns).
- Layout: Identify placement of green infrastructure control measures, flow paths, and drainage area for each control measure.
- Sizing: Identify surface area and water storage volume for each green infrastructure control measure. Where applicable, soil infiltration rate, evapotranspiration rate, and use rate (for rainwater harvesting) should also be addressed.
- Overflow: Describe overflow structures and locations for conveyance of larger precipitation events.

b) Project Schedule. Identify proposed dates for submittal and anticipated approval of all required documents, land and easement acquisition, permit applications, advertisement for bids, loan closing, contract award, initiation of construction, substantial completion, final completion, and initiation of operation.

c) Permit Requirements. Identify any construction, discharge and capacity permits that will/may be required as a result of the project.

d) Sustainability Considerations (if applicable).

i) Water and Energy Efficiency. Describe aspects of the proposed project addressing water reuse, water efficiency, and water conservation, energy efficient design, and/or renewable generation of energy, if incorporated into the selected alternative.

ii) Green Infrastructure. Describe aspects of project that preserve or mimic natural processes to manage stormwater, if applicable to the selected alternative. Address management of runoff volume and peak flows through infiltration, evapotranspiration, and/or harvest and use, if applicable.

iii) Other. Describe other aspects of sustainability (such as resiliency or operational simplicity) that are incorporated into the selected alternative, if incorporated into the selected alternative.

e) Total Project Cost Estimate (Engineer's Opinion of Probable Cost). Provide an itemized estimate of the project cost based on the stated period of construction. Include construction, land and rights-of-way, legal, engineering, construction program management, funds administration, interest, equipment, construction contingency, refinancing, and other costs associated with the proposed project. The construction subtotal should be separated out from the non-construction costs. The non-construction subtotal should be included and added to the

construction subtotal to establish the total project cost. An appropriate construction contingency should be added as part of the non-construction subtotal. For projects containing both water and waste disposal systems, provide a separate cost estimate for each system as well as a grand total. If applicable, the cost estimate should be itemized to reflect cost sharing including apportionment between funding sources. The engineer may rely on the owner for estimates of cost for items other than construction, equipment, and engineering.

f) Annual Operating Budget. Provide itemized annual operating budget information. The owner has primary responsibility for the annual operating budget, however, there are other parties that may provide technical assistance. This information will be used to evaluate the financial capacity of the system. The engineer will incorporate information from the owner's accountant and other known technical service providers.

i) Income. Provide information about all sources of income for the system including a proposed rate schedule. Project income realistically for existing and proposed new users separately, based on existing user billings, water treatment contracts, and other sources of income. In the absence of historic data or other reliable information, for budget purposes, base water use on 100 gallons per capita per day. Water use per residential connection may then be calculated based on the most recent U.S. Census, American Community Survey, or other data for the state or county of the average household size. When large agricultural or commercial users are projected, the Report should identify those users and include facts to substantiate such projections and evaluate the impact of such users on the economic viability of the project.

ii) Annual O&M Costs. Provide an itemized list by expense category and project costs realistically. Provide projected costs for operating the system as improved. In the absence of other reliable data, base on actual costs of other existing facilities of similar size and complexity. Include facts in the Report to substantiate O&M cost estimates. Include personnel costs, administrative costs, water purchase or treatment costs, accounting and auditing fees, legal fees, interest, utilities, energy costs, insurance, annual repairs and maintenance, monitoring and testing, supplies, chemicals, residuals disposal, office supplies, printing, professional services, and miscellaneous as applicable. Any income from renewable energy generation which is sold back to the electric utility should also be included, if applicable. If applicable, note the operator grade needed.

iii) Debt Repayments. Describe existing and proposed financing with the estimated amount of annual debt repayments from all sources. All estimates of funding should be based on loans, not grants.

iv) Reserves. Describe the existing and proposed loan obligation reserve requirements for the following:

Debt Service Reserve – For specific debt service reserve requirements consult with individual funding sources. If General Obligation bonds are proposed to be used as loan security, this section may be omitted, but this should be clearly stated if it is the case.

Short-Lived Asset Reserve – A table of short lived assets should be included for the system (See Appendix A for examples). The table should include the asset, the expected year of replacement, and the anticipated cost of each. Prepare a recommended annual reserve deposit to fund replacement of short-lived assets, such as pumps, paint, and small equipment. Short-lived assets include those items not covered under O&M, however, this does not include facilities such as a water tank or treatment facility replacement that are usually funded with long-term capital financing.

7. CONCLUSIONS AND RECOMMENDATIONS

Provide any additional findings and recommendations that should be considered in development of the project. This may include recommendations for special studies, highlighting of the need for special coordination, a recommended plan of action to expedite project development, and any other necessary considerations.

Appendix A: Example List of Short-Lived Asset Infrastructure

Estimated Repair, Rehab, Replacement Expenses by Item within up to 20 Years from Installation)	
Drinking Water Utilities	**Wastewater Utilities**
Source Related	**Treatment Related**
Pumps	Pump
Pump Controls	Pump Controls
Pump Motors	Pump Motors
Telemetry	Chemical feed pumps
Intake/ Well screens	Membrane Filters Fibers
Water Level Sensors	Field & Process Instrumentation Equipment
Pressure Transducers	UV lamps
Treatment Related	Centrifuges
Chemical feed pumps	Aeration blowers
Altitude Valves	Aeration diffusers and nozzles
Valve Actuators	Trickling filters, RBCs, etc.
Field & Process Instrumentation Equipment	Belt presses & driers
Granular filter media	Sludge Collecting and Dewatering Equipment
Air compressors & control units	Level Sensors
Pumps	Pressure Transducers
Pump Motors	Pump Controls
Pump Controls	Back-up power generator
Water Level Sensors	Chemical Leak Detection Equipment
Pressure Transducers	Flow meters
Sludge Collection & Dewatering	SCADA Systems
UV Lamps	**Collection System Related**
Membranes	Pump
Back-up power generators	Pump Controls
Chemical Leak Detection Equipment	Pump Motors
Flow meters	Trash racks/bar screens
SCADA Systems	Sewer line rodding equipment
Distribution System Related	Air compressors
Residential and Small Commercial Meters	Vaults, lids, and access hatches
Meter boxes	Security devices and fencing
Hydrants & Blow offs	Alarms & Telemetry
Pressure reducing valves	Chemical Leak Detection Equipment
Cross connection control devices	
Altitude valves	
Alarms & Telemetry	
Vaults, lids, and access hatches	
Security devices and fencing	
Storage reservoir painting/patching	

EXHIBIT TWO
WEP-SPECIFIC PRELIMINARY ENGINEERING REPORT TEMPLATE

EXHIBIT TWO
GENERAL OUTLINE OF A WEP-SPECIFIC PRELIMINARY ENGINEERING REPORT

1) PROJECT PLANNING
   a) Location
   b) Environmental Drivers and Considerations
   c) Population Trends

2) EXISTING FACILITIES
   a) Location Map
   b) Condition of Existing Facilities
   c) Water/Energy/Waste Audits

3) NEED FOR PROJECT

4) ALTERNATIVES CONSIDERED
   a) Description
   b) Design Criteria
   c) Map
   d) Environmental Impacts
   e) Land Requirements
   f) Potential Construction Problems
   g) Resilience and Sustainability Considerations
      i) Resilience
      ii) Sustainability
   h) Cost Estimates

5) SELECTION OF AN ALTERNATIVE
   a) Life Cycle Cost Analysis
   b) Non-Monetary Factors

6) PROPOSED PROJECT (RECOMMENDED ALTERNATIVE)
   a) Preliminary Project Design
      i) Drinking Water Projects
      ii) Wastewater/Reuse Projects
      iii) Solid Waste Projects
      iv) Stormwater Projects
   b) Project Schedule
   c) Permit Requirements
   d) Community Engagement
   e) Total Project Cost Estimate (Engineer's Opinion of Probable Cost)
   f) Funding Decision Data

7) CONCLUSIONS AND RECOMMENDATIONS

DETAILED OUTLINE OF A WEP-SPECIFIC PRELIMINARY ENGINEERING REPORT

1) PROJECT PLANNING

Describe the area under consideration. Service may be provided by a combination of central, cluster, and/or centrally managed individual facilities. The description should include information on the following:

a) Location. Provide scale maps and photographs of the project planning area and any existing service areas. Include legal and natural boundaries.

b) Environmental Drivers and Considerations. As applicable, provide any critical information on environmental resources that may affect the project or that are driving decisions regarding alternatives selected or design methodology. Do not copy and paste the NEPA documentation in this section, as this section is concerned with impacts environmental factors are having on the existing system and the proposed project. For example, if wetlands are present, provide the extent and nature of the wetlands and how they complicate or limit actions. Also, if suitable habitat for threatened or endangered species is present within the project site(s), provide information about these species and any challenges that may come to pass because of their presence. If the project includes water storage or other potentially tall structures, provide discussion on how visibility of the structure may affect historic properties, if such historic sites/properties are present in the area. If topographic features complicate or facilitate a project, provide a narrative to this matter along with relevant topographic mapping.

c) Population Trends. Provide U.S. Census or other population data (including references) for the service area for at least the past two decades if available. Population projections for the project planning area and concentrated growth areas should be provided for the project design period. Base projections on historical records with justification from recognized sources. This section may be omitted for rehabilitation projects that do not include system expansion.

2) EXISTING FACILITIES

Describe each part (e.g., processing unit) of the existing facility and include the following information:

a) Location Map. For all projects, provide a map or plan view layout of all existing facilities. Provide a schematic process diagram for projects involving work to treatment facilities. Identify facilities that are no longer in use or abandoned. Include photographs of existing facilities.

b) Condition of Existing Facilities. Describe present condition; suitability for continued use; adequacy of current facilities; and their conveyance, treatment, storage, and disposal capabilities. Describe the existing capacity of each component. Describe and reference compliance with applicable federal, state, and local laws. Include a brief analysis of current energy consumption, relevant to the project. Reference an asset management plan if applicable. Provide a water loss or inflow and infiltration analysis for projects proposing an increase to system capacity.

c) Water/Energy/Waste Audits. If applicable to the project, summarize or discuss any water, energy, and/or waste audits which have been conducted and the main outcomes.

3) NEED FOR PROJECT

Describe why the project is needed. This section is vitally important, because without clear justification, the project cannot be funded by Rural Development. The project need may fall in one or more of the following categories: health or sanitary problems, security concerns, aging infrastructure nearing the end of useful life, system operations or operational efficiency, resilience, or reasonable growth. Projects whose primary purpose is to upgrade existing facilities or construct new facilities required to meet applicable health or sanitary standards may qualify for additional financial assistance under 7 CFR 1780.10(c)(1) and 7 CFR 1780.13(b). See Appendix E for the required documentation.

4) ALTERNATIVES CONSIDERED

This section should contain a description of the alternatives that were considered in planning a solution to meet the identified needs. Documentation of alternatives considered is often a Report weakness. Alternative approaches to ownership and management, system design (including resource efficient or green alternatives), and sharing of services, including various forms of partnerships, should be considered. In addition, the following alternatives should be considered, if practicable: building new centralized facilities, optimizing the current facilities (no construction), developing centrally managed decentralized systems, including small cluster or individual systems, and developing an optimum combination of centralized and decentralized systems. The level of detail provided should be appropriate for the complexity of the project. Technically infeasible alternatives that were considered should be mentioned briefly along with an explanation of why they are infeasible but do not require full analysis. Financially infeasible is not the same as technically infeasible. For each technically feasible alternative, the description should include the following information:

a) Description. Describe the facilities associated with every technically feasible alternative. Describe source, conveyance, treatment, storage and distribution facilities for each alternative, as applicable. A feasible system may include a combination of centralized and decentralized (on-site or cluster) facilities.

b) Design Criteria. State the design parameters used for evaluation purposes. These parameters should comply with federal, state, and agency design policies and regulatory requirements.

c) Map. Provide a schematic layout map to scale and a process diagram if applicable. If applicable, include future expansion of the facility.

d) Environmental Impacts. If environmental impacts are relevant to project selection, provide a brief description of how protection of environmental resources may affect implementing the specific alternative being considered

e) Land Requirements. Identify sites and easements required. Further specify whether these properties are currently owned, to be acquired, leased, or have access agreements. For projects that require routine maintenance of assets on private property such as Septic Tank Effluent System (STEP) or grinder pump systems, permanent easements and/or agreements will be required.

f) Potential Construction Problems. Discuss concerns such as subsurface rock, high water table, limited access, existing resource or site impairment, or other conditions which may affect cost of construction or operation of facility.

g) Resilience and Sustainability Considerations. As it applies to alternative selection, briefly describe how the alternative improves the system's long-term resilience and sustainability.

i) Resilience. Resilience measures enhance an infrastructure asset's or utility's ability to withstand and recover from natural or man-made hazards, including flooding, high winds, wildfire, drought, earthquake, cyberattack, electrical power outage, and supply chain disruptions. Modern building codes provide a baseline level of resilience to several hazards, but actions taken to exceed minimum requirements or other project attributes that enhance resilience should be discussed here. Many resilience measures, such as hardening or elevating infrastructure, may incur additional capital expense during construction See section 5(a) for guidance on how to capture the benefits in a lifecycle cost analysis.

ii) Sustainability. Sustainable utility management practices include environmental, social, and economic benefits that aid in creating a resilient utility. Note that, per 7 CFR 1780.10(a)(1), projects must be modest, and alternatives must be compared on a lifecycle cost basis; however, sustainability is a "non-monetary factor" that can be part of project selection. Sustainability considerations may not apply to every alternative or every project, but every PER should include this section, if only to say, "not applicable."
(1) Environmental benefits might include decreased emissions or reduced consumption of natural resources during construction or over the project's lifecycle or environmental improvements beyond the minimum required by NEPA or other laws.
(2) Social benefits may involve opportunities for recreation, education, or other functions of life not directly tied to water or wastewater. Community acceptance and enthusiasm for an infrastructure project helps to ensure the project will have the support needed to thrive long-term. Robust and extensive community engagement is essential.
(3) Financial sustainability of funding recipients (utilities) is one of WEP's primary goals. In practice, it means that the entity has the funds operate indefinitely without undue hardship. WEP attempts to achieve this by selecting the most appropriate, modest project, and through underwriting of the award. This section of the PER may discuss aspects of the project that provide the community additional financial benefits.
(4) Other factors that may affect sustainability, including workforce issues. For example, a remote system requiring a high grade of operator may have

difficulty staffing the position. Other examples include operability issues, familiarity of existing staff with the technology, robustness of the system in case of changing demand, staff shortages (pandemics, hunting season), or electrical outages (if common).

h) Cost Estimates. Provide cost estimates for each alternative, including a breakdown of the following costs associated with the project: construction, non-construction, and annual O&M costs. A construction contingency should be included as a non-construction cost. Cost estimates should be included with the descriptions of each technically feasible alternative and should reflect domestic preference requirements associated with the funding. O&M costs should include a rough breakdown by O&M category (see example below) and not just a value for each alternative. However, O&M costs can be limited to those categories that will increase or decrease in value depending on the alternative. Information from other sources, such as the recipient's accountant or other known technical service providers, can be incorporated to assist in the development of this section. The cost derived will be used in the life cycle cost analysis described in Section 5 a.

Example O&M Cost Estimate for Alternative _____

Personnel (i.e., Salary, Benefits, Payroll Tax, Insurance, Training)	
Administrative Costs (e.g. office supplies, printing, etc.)	
Water Purchase or Waste Treatment Costs	
Insurance	
Energy Cost (Fuel and/or Electrical)	
Process Chemical	
Monitoring & Testing	
Short Lived Asset Maintenance/Replacement*	
Professional Services	
Residuals Disposal	
Miscellaneous	
Security and Cyber Security	
Maintenance of Assets on Private Property	
Total	

* Appendix A of Exhibit 1, the Interagency PER template, provides a list of examples

5) SELECTION OF AN ALTERNATIVE

Selection of an alternative is the process by which data from the previous section, "Alternatives Considered," is analyzed in a systematic manner to identify a recommended alternative. The analysis must consider life cycle costs and may also consider non-monetary factors (i.e., triple bottom line analysis: financial, social, and environmental). Generally monetary factors utilizing a life cycle cost analysis should be used for project selection. When non-monetary factors are used for selection, a compelling argument explaining why non-monetary factors outweigh monetary factors must be provided.

a) Life Cycle Cost Analysis. A life cycle present worth cost analysis (an engineering economics technique to evaluate present and future costs for comparison of alternatives) should be completed to compare the technically feasible alternatives. Do not leave out alternatives because of anticipated costs; let the life cycle cost analysis show whether an alternative may have an acceptable cost. This analysis should meet the following requirements and should be repeated for each technically feasible alternative. Several analyses may be required if the project has different aspects, such as one analysis for different types of collection systems and another for different types of treatment.

1. The analysis should convert all costs to present day dollars;
2. The planning period to be used is recommended to be 20 years, the lifespan of the shortest-lived alternative, or any period determined reasonable by the engineer and concurred on by the Agency;
Different features in the system may have varied life cycles;
3. The discount rate to be used should be the "real" discount rate taken from the latest Appendix C of OMB circular A-94. Contact the State Engineer for assistance.

4. The total capital cost (construction plus non-construction costs) should be included;
5. Annual O&M costs should be converted to present day dollars using a uniform series present worth (USPW) calculation;
6. Short-lived assets (SLA) (See Appendix A of Exhibit 1 for examples) should be included. The lifespans of SLAs should be based on generally accepted design life. For each instance during the planning period a SLA needs replacement, the present value (PV) should be calculated. Alternatively, the SLA cost may be annualized and the present value calculated using the USPW. Note that SLAs are treated differently in the financial assistance underwriting process.
7. Using a salvage value (S) of zero at the end of the alternative's design life, calculate S for the end of the planning period by straight-line interpolation and convert to present day dollars. Alternative means of determining salvage value may be used if described and justified.;
8. The present worth of the salvage value should be subtracted from the present worth costs;
9. The net present value (NPV) is then calculated for each technically feasible alternative as the sum of the capital cost (C) plus the present value of the annual O&M and SLA, minus the present value of the salvage value:

$$NPV = C + USPW\ (O\&M) - PV(S) + PV(SLA1) + PV(SLA2) + \ldots$$

$$PV = FV\ \frac{1}{(1+r)^n}$$

$$USPW = A\left[\frac{(1+r)^n - 1}{r(1+r)^n}\right]$$

r = Real discount rate
n = Planning period in years
FV = Future value
A = Annual cost

10. A table showing the capital cost, annual O&M cost, SLAs, salvage value, present worth of each of these values, and the NPV should be developed for agency review. All factors, costs, discount rates, and planning periods used should be shown within the table;
11. Resilience and hardening measures may add up-front costs to a project but provide benefits that pay off as costs avoided after a natural disaster. These benefits can be difficult to capture in a LCCA, thus may be considered as non-monetary factors (see below). However, several Federal Agencies have developed tools and guidance to monetize the expected value of avoided costs due to certain resilience measures. PER writers are encouraged to utilize the resources below to monetize the benefits of proposed resilience measures and enter that as a negative cost in the NPV calculation.

- https://www.epa.gov/crwu/climate-resilience-evaluation-and-awareness-tool-creat-risk-assessment-application-water
- https://www.nibs.org/projects/natural-hazard-mitigation-saves-2019-report
- https://www.fema.gov/grants/guidance-tools/benefit-cost-analysis/resources
- https://www.nist.gov/services-resources/software/edge-economic-decision-guide-software-online-tool

b) Non-Monetary Factors. Non-monetary factors, including sustainability considerations, non-monetizable resilience benefits, operator training requirements, permit issues, community objections, reduction of greenhouse gas emissions, wetland relocation, and funding agency domestic preference requirements may be considered in determining which alternative is recommended and may be factored into the decision-making process.

6) PROPOSED PROJECT (RECOMMENDED ALTERNATIVE)

Include a recommendation for which alternative(s) should be implemented. This section should contain a fully developed description of the proposed project based on the preliminary description under the evaluation of alternatives. Include a schematic for any treatment processes, a layout of the system, and a location map of the proposed facilities. At least the following information should be included as applicable to the specific project:

a) Preliminary Project Design. Only components that are part of the project need to be discussed.

i) Drinking Water Projects:

If water loss in the distribution system exceeds reasonable levels, the loss must be addressed to the extent economically feasible.

Water Supply. Include requirements for quality and quantity. Describe recommended source, including site and allocation allowed.

Treatment. Describe process in detail (including whether adding, replacing, or rehabilitating a process) and identify location of plant and site of any process discharges. Identify capacity of treatment plant (i.e., Maximum Daily Demand).

Storage. Identify size, type and location.

Pumping Stations. Identify size, type, location and any special power requirements. For rehabilitation projects, include description of components upgraded.

Distribution Layout. Identify general location of new pipe, replacement, or rehabilitation: lengths, sizes and key components.

Security. Identify physical and cyber security systems.

ii) Wastewater/Reuse Projects:

Projects increasing wastewater treatment and or collection system capacity or facilities experiencing sanitary sewer overflows or combined sewer overflows must address excessive inflow and infiltration to the extent economically feasible.

Collection System/Reclaimed Water System Layout. Identify general location of new pipe, replacement or rehabilitation: lengths, sizes, and key components.

Pumping Stations. Identify size, type, site location, and any special power requirements. For rehabilitation projects, include description of components upgraded.

Storage. Identify size, type, location and frequency of operation.

Treatment. Describe process in detail (including whether adding, replacing, or rehabilitating a process) and identify location of any treatment units and site of any discharges (end use for reclaimed water). Identify capacity of treatment plant (i.e., Average Daily Flow).

Security. Identify physical and cyber security systems.

iii) Solid Waste Projects:

Collection. Describe process in detail and identify quantities of material (in both volume and weight), length of transport, location and type of transfer facilities, and any special handling requirements.

Storage. If any, describe capacity, type, and site location.

Processing. If any, describe capacity, type, and site location.

Disposal. Describe process in detail and identify permit requirements, quantities of material, recycling processes, location of plant, and site of any process discharges.

iv) Stormwater Projects:

Collection System Layout. Identify general location of new pipe, replacement or rehabilitation: lengths, sizes, and key components.

Pumping Stations. Identify size, type, location, and any special power requirements.

Treatment. Describe treatment process in detail. Identify location of treatment facilities and process discharges. Capacity of treatment process should also be addressed.

Storage. Identify size, type, location and frequency of operation.

Disposal. Describe type of disposal facilities and location.

Green Infrastructure. Describe aspects of project that preserve or mimic natural processes to manage stormwater, if applicable to the selected alternative.

b) Project Schedule. Identify proposed dates for submittal and anticipated approval of all required documents, land and easement acquisition, permit applications, advertisement for bids, loan closing, contract award, initiation of construction, substantial completion, final completion, and initiation of operation.

c) Permit Requirements. Identify any construction, discharge and capacity permits that will/may be required as a result of the project.

d) Community Engagement. Briefly describe the utility's approach (or proposed approach) for engaging the community in the project planning process. It should help the community develop an understanding of the project need, the operational service levels required, funding and revenue strategies and the efforts needed to meet those requirements, along with other considerations. As applicable, describe how the project will contribute to community and financial sustainability. Projects that are unwanted for social reasons may erode confidence in the utility enterprise itself. Community engagement and acceptance help support financial sustainability by keeping users connected to the utility system.

e) Total Project Cost Estimate (Engineer's Opinion of Probable Cost). Provide an itemized estimate of the project cost based on the stated period of construction. Include construction broken down by work elements, land and rights-of-way, legal, engineering, construction program management, funds administration, interest, equipment, construction contingency, refinancing, and other costs associated with the proposed project. The construction subtotal should be separated out from the non-construction costs. Construction costs should reflect domestic preference requirements required by funding sources. The non-construction subtotal should be included and added to the construction subtotal to establish the total project cost. A reasonable and uninflated construction contingency should be added as part of the non-construction subtotal. Contingency greater than 10% of construction cost must be justified based on project-specific issues. For projects containing both water and waste disposal systems, provide a separate cost estimate for each system as well as a grand total. The engineer may rely on the owner for estimates of cost for items other than construction, equipment, and engineering. Appendix D includes a suggested format for providing estimated costs.

f) Funding Decision Data. Suggested formats for providing financial and other data used for funding decisions are included in Appendix C.

7. CONCLUSIONS AND RECOMMENDATIONS

Provide any additional findings and recommendations that should be considered in development of the project. This may include recommendations for special studies, highlighting of the need for special coordination, a recommended plan of action to expedite project development, and any other necessary considerations.

EXHIBIT THREE
STREAMLINED PRELIMINARY ENGINEERING REPORT TEMPLATE

STREAMLINED PRELIMINARY ENGINEERING REPORT

The Streamlined Preliminary Engineering Report may only be used for the project types listed in Appendix B or projects that are applying for only loan funding (no grant).

1) EXECUTIVE SUMMARY

Briefly describe the location of the proposed project, proposed project improvements, including total project costs with reference to project costs breakdown in the appropriate section, etc.

2) PROJECT PLANNING AREA/LOCATION

Provide a brief discussion regarding the proposed planning area. Include existing service area(s) and proposed project service area(s). Include legal and natural boundaries of the service area.

3) EXISTING FACILITIES

Provide a brief discussion regarding the condition and adequacy of the existing facilities. Describe major system components. Include any current violations and other technical challenges experienced by the system.

4) NEED FOR PROJECT

Provide a brief discussion regarding the project need. Project need may be based on health/sanitary problems, security issues, aging infrastructure, operational efficiency problems, resilience, or reasonable growth. Projects whose primary purpose is to upgrade existing facilities or construct new facilities required to meet applicable health or sanitary standards may qualify for additional financial assistance under 7 CFR 1780.10(c)(1) and 7 CFR 1780.13(b). See Appendix D for the required documentation.

5) PROPOSED PROJECT / SCOPE OF WORK

Describe the project including preliminary project design, project schedule, permit requirements, possible construction problems, land requirements, resilience/sustainability considerations, and project costs. If there is multi-agency coordination involved, please include information for scheduling, costs, etc.

APPENDICES

Project Maps including location map, layout of existing system, layout of proposed improvements
Health & Sanitary Documentation (if applicable)
Overall Project Schedule
Engineer's Opinion of Probable Cost (Proposed Project)
Funding Decision Data for Loan and Grant Determination (See Appendix C)

APPENDIX A
SUGGESTED ALTERNATIVES

Below is a listing of common project types that utilize WWD funds. Next to each project type is a list of alternatives that could be considered for such projects. The suggested alternatives for consideration listed below do not include all possibilities, and some of these alternatives may require permanent access to private property. When more practical or technologically better alternatives are available, such alternatives should be included in the analysis.

Project or project component	**Suggested alternatives for consideration[1]**
New well	Connection to neighboring system, different well placement locations, expanding a current well, other water source, water reuse
New water storage tank	Elevated storage tanks, ground storage tanks
New water distribution system	Alternative system layouts (including alternative sources)
New wastewater collection system	Gravity, low pressure, vacuum, STEP systems
Collection system replacement	Component replacement, lining
New centralized system	Connection to neighboring system, cluster systems
New treatment system	Alternative treatment methods
Wastewater sludge dewatering	Sludge drying beds, dewatering boxes, filter press, screw press, centrifuge systems
Wastewater effluent disposal	Alternative disposal methods, sprayfields, rapid infiltration basins, surficial waters

[1.] Applicants will need to obtain the necessary permanent easements for access to assets installed on private property and will be required to operate and maintain those assets.

APPENDIX B
PROJECTS THAT MAY USE STREAMLINED PRELIMINARY ENGINEERING REPORT TEMPLATE

Below is a listing of systems, subsystems, or project types which usually do not have feasible alternatives. If a project consists predominately of these items, a Streamlined PER will be suitable for WEP funding consideration. However, if a repair project costs more than 50% of the cost of replacement, an alternatives analysis is required and the Streamlined PER cannot be used.

- SCADA (new or replacement)
- Meters (new or replacement)
- Metering equipment
- Replacement of pump(s)
- Replacement of valve(s)
- Replacement of Fire Hydrant(s)
- Non-Treatment process equipment (HVAC air conditioner, etc)
- Purchase of office equipment or laboratory equipment
- Purchase of vehicles
- Purchase of existing water rights
- Building structural repairs
- Minimal modifications or replacement in kind of non-treatment process related items
- Modification/repairs to an existing water supply well (as long as it is not increasing the capacity)
- In situ replacement of an existing well or tank if the capacity or storage is not being increased
- Tank repaint and repairs
- Replacement or rehabilitation of existing water distribution or transmission lines
- Rehabilitation (including lining) of existing wastewater collection system (not including replacement of collection lines)
- Expansion of less than 5 miles or a 75% increase (whichever is smaller) in a water distribution system or wastewater collection system.
- Replacement of pump stations within general area of existing station
- New utility service connections to individual users
- Sludge removal from a lagoon
- Rehabilitation of a lagoon / detention pond
- Projects where the funding source clearly identifies the alternative to be built
- Projects that do not have alternatives due to state regulatory authority mandates

APPENDIX C
FUNDING DECISION DATA

This information will be used to evaluate the financial capacity of the system. Consulting engineers helping applicants with the application process may choose to consult with the owner's accountant or fiscal agent for support in developing this data. Accounting and fiscal agent cost are eligible for WWD funding. Use of this Appendix formatting is optional.

Current Rate Schedules

Current rate schedules for the system should be provided. Since schedules will vary widely from applicant to applicant, no format is suggested.

Other Capital Improvement Programs

The following suggested format may be used to provide any anticipated capital improvement projects expected within the foreseeable future.

Future Capital Improvement Project	Description	Estimated Cost (if known)
_____ Project		$ ___ __
_____ Project		$_____
_____ Project		$_____
_____Project		$_____
_____Project		$_____

Tabulation of Water Use

The following suggested format may be used to provide water use data needed for underwriting loan and grant applications. If actual meter readings are not available or reliable, please provide detailed information explaining the method / standard used to report the volumes listed above. If the system provides their service to more than one town/city /service area, please provide a separate table for each entity.

For multifamily residences, if a master meter is used to record all water use within the complex, the complex will be considered a commercial user. If there are individual meters for each unit on the property those individual units will be considered residential users.

Type of User	Number of Users	Actual Usage last 12 months (gallons)	Projected Users	Projected Annual Usage (gallons)
Residential				
Residential (Seasonal)				
Commercial				
Industrial				
Governmental				

Annual Operation and Maintenance Costs

Itemized annual operation and maintenance costs must be provided for both the current system and for the system after the proposed improvements are made and the project is complete. In the absence of other reliable data, base O&M on actual costs of other existing facilities of similar size and complexity. Explain any significant differences between current and projected O&M costs. Include personnel costs, administrative costs, water purchase or treatment costs, accounting and auditing fees, legal fees, utilities, energy costs, insurance, annual repairs and maintenance, monitoring and testing, supplies, chemicals, residuals disposal, office supplies, printing, professional services, cybersecurity, and miscellaneous as applicable. Any income from renewable energy generation which is sold back to the electric utility should also be included, if applicable. If applicable, note the operator grade needed to run the system.

The following suggested format may be used to provide the current and proposed operation and maintenance expenses for the system as whole. The projected O&M costs should represent a typical post-construction year, incorporating any operational changes (increases or decreases) expected upon project completion. For instance, if the project consists of system expansion, additional O&M cost is expected. Conversely, if the project improves efficiency or reduces the water loss or inflow and infiltration, then a reduction in O&M cost is expected.

	Current O&M based on Most Recent Audit (year)	Projected Amount (first typical year after construction)
Salaries		
Benefits (Health Ins., Pension, & Etc.)		
Accounting / Auditing		
Legal		
Utilities		
Insurance		
Misc. Office Expenses		

Repairs / Maintenance		
Testing / Monitoring		
Water Purchase / Treatment Cost		
Chemicals		
Supplies		
Professional / Contract Services		
Cyber Security Contract(s)		
Maintenance of Assets on Private Property		
Sludge Disposal		
Other		
Total O&M Costs	**$_____**	**$_____**

Income Projection

Provide information about all sources of income for the system including a proposed rate schedule. Income should be realistically projected for existing and proposed new users separately, based on existing user billings, water treatment contracts, and other sources of income. In the absence of historic data or other reliable information, for budget purposes, base water use on 67 gallons per capita per day. Water use per residential connection may then be calculated based on the most recent U.S. Census, American Community Survey, or other data for the state or county of the average household size. When large agricultural or commercial users are projected, the Report should identify those users and include facts to substantiate such projections and evaluate the impact of such users on the economic viability of the project.

	Most Recent Audit (year)	Projected Amount (first typical year after construction)
Annual User Fees (metered)		
Annual User Fees (unmetered)		
Fire Protection		
Connection/Tap Fees		
Interest		
Readiness to Serve /Debt Service Charge		
Other		
Total Income	**$_____**	**$_____**

Debt Repayments

Describe existing and proposed financing with the estimated amount of annual debt repayments from all sources. All estimates of funding should be based on loans. Any inclusion of grant funding estimates should be done in consultation with local Rural Development staff. Since debt terms can vary widely, no format is suggested. Please collaborate with Rural Development staff to ensure all necessary information is included.

Reserves

Short Lived Assets:

A table of short-lived assets should be included for the system. The table should include the asset, the expected useful life, and the anticipated cost of each. Prepare a recommended annual reserve deposit to fund replacement of short-lived assets, such as pumps, paint, and small equipment. Short-lived assets include those items not covered under O&M but does not include facilities such as a water tank or treatment facility replacement that are usually funded with long-term capital financing

The following suggested format may be used to provide short-lived assets associated with the entire (water or wastewater) system. Only include items not covered under the O&M costs listed above or costs that will be coved by a planned capital improvement project. Annual reserves listed should be fully funded by the borrower and utilized for future equipment/asset replacement. Expected useful life is for the entire life of the asset, not the remaining life of that asset.

	Expected Useful Life (in years)	Estimated Replacement Cost	Annual Reserve
Asset description	1 to 5	$	$
Asset description	1 to 5	$	$
Asset description	1 to 5	$	$
Asset description	1 to 5	$	$
Asset description	1 to 5	$	$
Asset description	1 to 5	$	$
Asset description	1 to 5	$	$
		Subtotal 5 year assets	$
Asset description	5 to 10	$	$
Asset description	5 to 10	$	$
Asset description	5 to 10	$	$
Asset description	5 to 10	$	$

Asset description	5 to 10	$	$
Asset description	5 to 10	$	$
Asset description	5 to 10	$	$
		Subtotal 10 year assets	$
Asset description	10 to 15	$	$
Asset description	10 to 15	$	$
Asset description	10 to 15	$	$
Asset description	10 to 15	$	$
Asset description	10 to 15	$	$
Asset description	10 to 15	$	$
Asset description	10 to 15	$	$
		Subtotal 15 year assets	$
		Total Annual Reserve	**$**

Debt Service Reserves:

A 10% debt service reserve is required when using loan security other than general obligation or special assessment bonds. Reserve requirements for WWD loans are set forth in 7 CFR 1780.

APPENDIX D
ESTIMATE OF PROJECT COST
SUGGESTED FORMAT

An itemized estimate of the project cost is required for all PERs. The following table may be used by the report preparer when presenting the total project costs. Use of this table is optional. This table includes suggested cost items for funding consideration that may be skipped otherwise.

Construction Costs		
	[work element]	$
	[work element]	$
	[work element]	$
	[work element]	$
	[work element]	$
	[work element]	$
	…	…
Construction Subtotal		**$**
Construction Contingency		$
Study & Report Services (PER, environmental, etc.)		$
Engineering Design		$
Engineering Bid and Construction Services		$
Resident Project Representative		$
Legal Costs		$
Land Acquisition		$
Obtaining rights-of-way / Easements		$
Funds Administration		$
Interest on Interim Financing		$
Equipment		$
Refinancing		$
Other Costs		$
Total Project Costs		**$**

APPENDIX E
HEALTH AND SANITATION

In addition to service area, median household income requirements, before the poverty interest rate and/or grant above 45% may be considered, a health and sanitary determination will be made by the Agency in accordance with 7 CFR 1780.10(c)(1) and 7 CFR 1780.13(b)(1). The goals of this process are to determine whether a health or sanitary problem exists, document the standards that are being addressed by the proposed project and ensure that the primary purpose of the project is to address these standards.

A health or sanitary problem is defined herein as an existing situation facing an applicant that could threaten human health or the environment, while a health or sanitary standard is any governmental requirement or published industry-recommended practice that is for the purpose of protection of human health or the environment. In some cases, a standard may be a requirement of State law, the Ten State Standards (www.10statesstandards.com), or published industry standards. It does not have to be actually enforced or enforceable. In cases where a Federal, State, or local law or regulation is enacted, not yet in effect but with a specified effective date, projects seeking to construct or modify systems to meet the new standard are considered to have a health or sanitary problem.

Federal, state, or local health advisory levels may be considered health standards for health and sanitary determinations in the case of emerging contaminants that currently do not have health-based standards, such as per- and polyfluoroalkyl substances (PFAS). In addition, replacing any lead components of a drinking water distribution system, especially lead service lines, can be considered to be addressing a health standard, even if an exceedance of the lead action level has not been documented in the water. Secondary drinking water standards may be considered a sanitary standard if they affect the ability of rural residents to use rural water to drink, wash their clothing, bathe, or cook.

Projects that will help alleviate overcrowding can qualify as addressing a health or sanitary condition under this section, provided that the applicant provides adequate plans that reasonably demonstrate that the new housing development will be fully financed and will be completed once the infrastructure project is completed.

Examples of documentation the Agency may accept include, but are not limited to: letters from regulators, newspaper articles, letters or reports from engineers or scientists, photographs of sewage on the ground surface, documentation from technical assistance providers, or uploaded information from public health or environmental databases, such as the EPA website http://echo.epa.gov/.