

## Ecosystem Restoration Program Project Design Terminology and Guidance

### Introduction

The Ecosystem Restoration Program (ERP) Project Design Terminology and Guidance standardizes the project design process, provides clarity in terminology, and helps applicants demonstrate project quality and success. This guidance is meant to be a reference and is intended to be scalable based on the complexity and scope of a project. For example, small-scale riparian restoration projects can likely be assessed, designed and constructed with minimal project planning, design, and construction oversight. As a result, very few of the steps below will be required. Large-scale stormwater projects, however, often require in-depth project planning, detailed design consistent with the Vermont Stormwater Management Manual, ([volume 1](#) and [volume 2](#)), significant oversight and permitting. At their most complex, these projects will require the majority, if not all, of the steps outlined in this document.

See below for a quick summary of the typical route projects follow when seeking ERP funding.

**Simple** – Simple projects involve very little in terms of feasibility and design, and as a result, the steps outlined below will generally not apply. Costs are fairly predictable and there is not much deviation between what is recommended and what is installed. Given this, such projects are often accomplished with only one round of ERP grant funding. Projects in this category may include riparian buffer plantings and residential rain garden installations.

**Intermediate** – Intermediate projects involve a fair bit of feasibility and design before proceeding to construction but are not quite complex enough to require a full set of engineering steps (10% and 30% steps may be combined and or 60% and 90% steps may be combined). Applicants will often seek two rounds of ERP funding to complete these projects as denoted below. In either case, a well-prepared and accurate cost estimate is essential to securing a second round of funding.

	<b>Option 1</b>	<b>Option 2</b>
<b>Round 1</b>	Feasibility through 100% design	Feasibility through 30% design
<b>Round 2</b>	Construction	From 30% design through construction

**Complex** – Complex projects are large in scope and require a full range of engineering services. Costs for such projects can easily exceed \$150,000. As such, ERP funds very few of these types of projects outright unless they are identified as very high priority. Generally, these projects are phased across three funding rounds as denoted below. Depending on the project, the Clean Water State Revolving Fund (CWSRF) or other funding sources might be more appropriate than ERP.

<b>Round 1</b>	Feasibility through 30% design
<b>Round 2</b>	From 30% design through 100% design
<b>Round 3</b>	Construction

Determining the route that a project will seek for funding will involve a conversation between the project sponsor, contractor/consultant, and Agency staff. In the end, specific criteria and agreed upon elements will be used in developing a project application and identifying specific deliverables within a scope of work.

## 1. **Feasibility Analysis**

Feasibility analysis, sometimes referred to as a preliminary engineering report, provides the basis and justification for further design work. It is based on a design professional's site evaluation, a process in which multiple options are considered, and it may result in a recommendation that the project is not feasible or that other options should be considered. A preliminary engineering report typically includes all of the following components:

- Cover page
- Executive summary
- Project need and objective(s)
  - References to reports or planning documents documenting the problem or impairment
  - Watershed description
- Project planning and existing conditions
  - Project location/address (including nearest cross street)
  - Current land use
  - USGS soil classification
  - Site topography
  - Stormwater flowpath (also consider adjacent sites)
  - Nearest/receiving waterbody
  - Other site considerations (wetlands, hotspots, brownfield remediation, etc.)
- Identification and conceptual design of alternatives
  - Description
  - Plan view drawing (including but not limited to)
    - Location map
    - Land ownership
    - Roads and other infrastructure
    - Drainage area
    - Site grading
    - Stormwater flowpath (also consider adjacent sites)
    - Design considerations and calculations
    - Practice sizing, hydrology/hydraulics, volume reduction, and water quality volume estimates
    - Name any design standards to be used and any variations required
- Evaluation of alternatives
  - Cost
  - Feasibility
  - Stakeholder comments
  - Pros and cons
  - Sustainability
    - Use of native and climate adapted species
    - Use of green infrastructure
    - Water efficiency
    - Planned for climate change impacts
    - Life of project/expected lifespan
    - Low carbon footprint
    - Affordable
  - Estimate of environmental improvement

- Quantitative
  - Qualitative
- Rough construction cost estimate, O&M cost estimate, and Net Present Value Calculations, stamped by a professional engineer or otherwise conforming to CWNS requirements
- Selection of alternative
  - Conceptual site plan (including but not limited to)
    - Engineer name, date and project title
    - North arrow/legend
    - Graphical scale (1 " = 10', 20', 30', 40', 50', 60' or 100')
    - Site features (wetlands, nearest waterbody, streets, buildings, etc.)
    - Practice location/layout w/ flowpath and preliminary grading
    - Location map
- Permitting considerations
- Funding considerations
- Stakeholder/public involvement summary
  - Description of current and future stakeholder involvement
  - Description of current and future public involvement

If Vermont Clean Water State Revolving Fund (CWSRF) or other federal funding might be desired for the project, use the jointly accepted USEPA/USDA RD/HUD Preliminary Engineering Report Format and follow the Environmental Review Procedures to complete an Environmental Information Document for use in NEPA review. This includes review of hazardous waste sites, archeological and cultural effects with sign off from the State Historic Preservation Office, and other considerations.

## **2. Design**

The development of a final construction level design is a series of steps that further define a solution and its ability to meet stated criteria. For complex projects, these steps provide an opportunity to re-evaluate the design based on changing project assumptions and stakeholder feedback. The majority of design projects funded through ERP will likely not involve this level of detail or many of the five steps outlined below. These steps are provided in full primarily as a reference. If CWSRF funding might be used for construction, please also follow the CWSRF Final Design Process.

### *a. 10% Design*

- Basis for design
  - Project purpose, goals, and objectives
  - Summary of existing conditions
  - Design considerations and preliminary analyses
    - Hydrologic-hydraulic analysis
    - Runoff modeling
    - Depth to bedrock/seasonal high water table from area wells, open test pit or soil cores
    - State any assumptions or variances required for the project

### *b. 30% Design*

- Design concept report
  - Updated conceptual site plan
  - Design criteria for all aspects of the design
  - Construction cost estimates

- Topographic and boundary survey
  - Property lines, right-of-ways, and easements
  - Topographic information and datum, flood elevations if applicable
  - Location of existing structures
  - Site survey
  - Invert elevations
- Geotechnical report
  - Vicinity map of project limits
  - Plot map-showing location of borings and soil tests
  - Detailed descriptions of surface and subsurface conditions, including seasonal high water table and observations of wetness
  - Summary of laboratory tests performed and test results
  - Summary of geotechnical recommendations for backfill and bedding of underground utilities, trench criteria, borrow material gradation requirements, foundation support, bearing capacity, pavement replacement, site development, material stability, slope stability, site preparation, grading procedures, and erosion potential
- Drawings and specifications
  - Cover sheet
  - General notes
  - Site plan
  - Plan view sheets
  - Sections and details of significant features
- c. *60% Design (includes updates to all elements required of a 30% design **plus** the following additional information)*
  - Stakeholder/public involvement summary
    - Description of current and future stakeholder involvement
    - Description of current and future public involvement
  - Overview of environmental and regulatory requirements (permits, etc.)
  - Cost estimate
    - Fees, as applicable, associated with land acquisition, permits and fees, engineering services, consulting services, excavation and grading, paving, utilities, utility relocation, equipment, structures, contingency, applicable allowances and contractor overhead and profit
  - Drawings and specifications (sufficient level of detail of significant project components and systems)
    - General notes including 30% comments and changes made to plans
    - Profile sheets
- d. *90% Design (includes updates to all elements required of a 60% design **plus** the following additional information)*
  - Drawings and specifications (complete and ready for agency and permitting authority review)
    - General notes including 60% comments and changes made to plans
    - Site plan (including site boundaries and construction limits)
  - Contract bidding documents
    - General conditions
    - Supplementary conditions

- Proposed project schedule
- Technical specifications
- Exceptions to standards
- e. *100% Design (includes updates to all elements required of a 90% design **plus** the following additional information)*
  - Actual environmental and regulatory requirements (permits, etc.)
  - Drawings and specifications (complete and ready for agency and permitting authority review)
    - General notes including 90% design review comments and changes made to plans
  - Contract bidding documents
    - Bid form
    - Definitions
    - Proposed agreement
  - Updated cost estimate with reduced contingency

### **3. Construction**

Design professionals/engineers play an important role during the construction phase of a project as they help ensure that installed practices are completed to specification. They also provide guidance when project conditions are different from what was expected or assumed. If CWSRF funding might be used for construction, please also follow the CWSRF Construction Process.

- a. *Pre-construction*
  - Control and tenure documentation
  - Proof of permits
  - Maintenance agreement(s)
  - Photos with a minimum resolution of 1600x1200
  - Easement agreements
- b. *Construction*
  - Construction oversight and inspection with reports
  - Photos with a minimum resolution of 1600x1200
- c. *Post-construction*
  - As-built drawings or original designs with a list of change orders describing construction changes
  - Maintenance checklist
  - Photos with a minimum resolution of 1600x1200
  - Brief project summary