

Appendix D: Design and Restoration Project Deliverables

How Appendix D is Organized

This appendix guides sponsors through the typical stages of site-specific, restoration project development: conceptual design, preliminary design, final design, and construction. It is anchored by the Project Deliverables Table, which outlines the full suite of deliverables included in the design and construction process, how they are connected to a particular project stage, and when each deliverable must be provided to RCO. The Project Deliverables Table is followed by a description of each deliverable.

The goal of this appendix is to allow sponsors to tailor restoration efforts to their projects' needs, complexity, risk, and funding, while maintaining technical rigor, ensuring a consistent approach to project review, and encouraging best practices in the field.

Technical Expectations

While each project is unique, there are certain foundational requirements and analytical approaches common to all restoration projects that will help ensure a smooth technical review and timely completion of deliverables. **All sponsors are expected to meet the project design expectations below; failure to do so likely will have significant implications for technical review at application and during the funded projects.**

Incorporate a Qualified Design Team

Salmon habitat restoration projects require a designer or team with a balance of knowledge and experience in fisheries biology, civil engineering, geomorphology, and other technical fields. The person or team completing the project design should include at least one licensed professional engineer with experience in salmon habitat restoration.

A project with straightforward design and minimal sponsor liability concerns may not require a licensed professional engineer and people with applicable experience and technical knowledge may design the project.

If a licensed engineer will not design the project, indicate this in the application and describe the qualifications and experience of the team that will design the project. The SRFB Review Panel will use this information during its review.

Use a Standard Design Approach

The SRFB has supported the development of a series of technical guidance documents through the Washington Department of Fish and Wildlife's Aquatic Habitat Guidelines program, including *Stream Habitat Restoration Guidelines* (2012), *Water Crossing Design Guidelines* (2013), *Marine Shoreline Design Guidelines* (2014), and *Incorporating Climate Change into the Design of Water Crossing Structures* (2017). The Project Deliverables Table below was derived from the standards in these guidance documents, and sponsors are encouraged to use these design resources in developing projects.

Provide Analysis and Evaluation

Engineering design and technical evaluation must be focused on achieving the project's goals and objectives. Sponsors are encouraged to ensure that their data gathering and analyses, planning, and design efforts are focused specifically on achieving the projects' goals and objectives throughout the processes. Consult chapters 4 and 5 of the *Stream Habitat Restoration Guidelines*, which provide guidance on developing goals and objectives, restoration strategies, and designing and implementing restoration techniques.

RCO has incorporated examples of, and guidance for, common restoration project goals and objectives in the online application. PRISM also contains many examples of project design deliverables for projects ranging from straightforward fish passage projects to complex, multi-phase, reach-level restoration projects, all of which can help sponsors plan appropriate design efforts.

Submit a Basis of Design Report

A Basis of Design Report (or design report) is a required deliverable of all RCO-funded design stages and provides a record of the technical analyses and decisions that support the design. The report should provide the detail necessary for the SRFB Review Panel, grants managers, permitting authorities, stakeholders, and other funders to understand how a project meets its goals and objectives. The Project Deliverables Table below outlines report chapters or sections that follow the standard design development process. The level of completion and detail of each chapter are dependent upon the design stages (conceptual, preliminary, final, field fit).

To understand the report deliverable, RCO has published some [sample design reports](#) on its website to help illustrate expectations for the level of detail and layout of a design report.

Design Stages and Project Scoping

To ensure consistent technical standards and project documentation for the public record across all funded projects, planning and restoration projects follow four standard project development stages, as described below. Multiple design stages may be completed within the scope of a single grant agreement or phased sequentially across multiple projects. For either approach, the sponsor must complete the deliverables of the previous stage before beginning work on the next stage. If the sponsor proposes to fund the design in separate sequential stages, the completed deliverables from the previous stage are required with the final application to fund the next phase. Ideally, the completed deliverables from previous stages would be submitted before the next scheduled lead entity application site visit.

Conceptual Design

A conceptual design project involves the selection and high-level design of a preferred, site-specific alternative to achieve desired restoration outcomes that address one or more priorities in a watershed strategy. The conceptual design should be guided by specific desired objectives, collect adequate technical information to evaluate existing conditions and develop alternatives, and result in detailed drawings and a written report sufficient to explain and support the preferred alternative as well as guide the next stages of design. See the Project Deliverables Table and detailed deliverables descriptions below for more information about conceptual design requirements.

Preliminary Design

Preliminary design advances a site-specific alternative into a more detailed understanding and quantification of all the major project elements and results in design drawings and a Basis of Design Report that meet the qualifications for construction permit applications with state and federal agencies. See the Project Deliverables Table and detailed deliverables descriptions below for more information about preliminary design requirements.

Final Design

Final design incorporates technical comments from stakeholders, funders, and permittees into a stand-alone and comprehensive set of final drawings, a Basis of Design report, and technical specifications for project construction. The final design process must address and resolve all substantial issues raised in the permitting and stakeholder review process so that all stakeholders agree on the final plans. See the Project Deliverables Table and

detailed deliverables descriptions below for more information about final design requirements.

Construction

Construction involves implementing and documenting on-the-ground restoration actions as described in approved, permitted designs. Any deviation of the approved design plans during construction should be documented on a revised set of “as-built” drawings using the original design plans as a template. See the Project Deliverables Table and detailed deliverables descriptions below for more information about construction requirements.

Field-Fit Projects

Sponsors are expected to complete all final design project deliverables as specified in the Project Deliverables Table before moving to the construction stage. However, depending on the circumstances and permitting requirements, some projects may be suitable to proceed directly to construction without the full suite of required final design deliverables. Because the elements are adjusted to fit the specifics of the site as part of the construction phase rather than during final design, RCO refers to these projects as “field-fit” projects (formerly design-build).

Field-fit projects are eligible for funding only when the proposed project meets the following criteria:

- If requesting less than \$350,000 from SRFB for restoration and design, conceptual design deliverable requirements have been submitted with the application, including detailed design drawings and written description of a preferred alternative consistent with the standards described in Deliverable 3.c below.
- If requesting more than \$350,000 from SRFB for restoration and design, preliminary design deliverable requirements have been submitted with the application.
- The sponsor and the design team can illustrate they have extensive experience successfully implementing the project type being proposed and can provide a high level of construction oversight.
- The project type is less complicated, with well-established methods and specifications, and a record of successful performance that suggests it can be effectively “fit in the field.”
- Liability and landowner concerns are minimal, with low risk for damaging critical infrastructure (homes, bridges, railroads, nearby unstable slopes, etc.) and existing intact salmon habitat.

- Design is straightforward, requiring less detailed drawings for permitting and construction than typically would be required as part of a final design report.

If funded, all field-fit projects must still, at a minimum, do the following:

- Complete preliminary design requirements.
- Obtain all required permits before construction.
- Result in post-construction deliverables before closing grant agreement, including as-built drawings and an updated Basis of Design Report based on final field implementation.

If requesting funding for a field-fit project based on the above criteria, indicate this on the application and consult with a grants manager about the planning deliverables that will be submitted to RCO before construction.

Depending on the project specifics and SRFB Review Panel recommendations, RCO may determine that the project is not appropriate for the field-fit pathway, require the sponsor to submit additional design deliverables for review before receiving construction funding, or require the sponsor to complete additional design deliverables as part of a stand-alone planning project before applying for construction funding. These requirements will be communicated to the applicant during the application review process and may result in a special condition to the grant agreement.

Cultural Resources Compliance

Real property restored through RCO funding is subject to [Governor's Executive Order 21-02](#) or compliance with section 106 of the National Historic Preservation Act. RCO requires documented compliance with the applicable cultural resources review process before any ground-disturbing activities (including minor disturbances like geotechnical engineering). RCO will begin the initial consultation during the conceptual design stage. If next steps or further review is determined to be necessary, these should be included in subsequent design applications.

For more information on cultural resources review, see section 6.

Project Deliverables Table

The table below outlines standard stages for site-specific restoration projects. This table specifies which deliverables are required for each stage of project development and when each deliverable must be provided to RCO.

This appendix should serve as a key resource in developing a design or construction project application, and scopes of work for the design and engineering teams. For applicants proposing multiple design stages as part of a single application, the earliest stage of the project forms the basis for required deliverables at application. The most

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advanced design stage proposed forms the basis for required deliverables at the end of the project.

Ask questions in advance about a particular design element and don't assume an element can be left out. The grant agreement ultimately will include the specific design deliverables required based on project type, application, local evaluation, SRFB Review Panel recommendations, and the sponsor's experience.

Deliverables	Project Stage				
	Conceptual Design	Preliminary Design	Final Design	Construction	Field-Fit Projects
1 Design Drawings	Due by closing	Conceptual due at application; Permit ready designs due by closing	Conceptual or preliminary due at application; Final due by closing	Due at application	Due at application
2a Basis of Design Report: Introduction, Goals, and Objectives	Due by closing	Due at application	Due at application	Due at application	Due at application
2b Basis of Design Report: Site Characterization	Due by closing	Due at application	Due at application	Due at application	Due at application
2c Basis of Design Report: Alternatives Assessment and Selection	Due by closing	Due at application	Due at application	Due at application	Due at application
2d Basis of Design Report: Cost Estimate	Estimate Due by closing	Updates due by closing	Updates due by closing	Due at application	Estimate due at application
2e Basis of Design Report: Design Considerations, Evaluations, and Analyses	—	Due by closing	Updates due by closing	Due at application	May be required before construction
2f Basis of Design Report: Permitter and Stakeholder Consultation	—	Due by closing	Updates due by closing	Due before construction	May be required before construction
3 Landownership Certification Form	—	Due before agreement	Due before agreement	Due before agreement	Due before agreement

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Deliverables	Project Stage				
	Conceptual Design	Preliminary Design	Final Design	Construction	Field-Fit Projects
4 Construction Permits	—	Optional	Optional	Due before construction	Due before construction
5 Construction Quantities	—	—	Due by closing	Due before construction	May be required before construction
6 Final Design Technical Specifications	—	—	Due by closing	Due before construction	May be required before construction
7 Contract Bidding Documents and Conditions	—	—	Optional	Due before construction	Due before construction
8 Landowner Agreement	—	—	—	Due before construction if land not owned by sponsor	Due before construction if land not owned by sponsor
9 As-Built Drawings and Documentation	—	—	—	Due by closing	Due by closing
10 Stewardship Plan	—	—	—	Due by closing if land not owned by sponsor	Due by closing if land not owned by sponsor

Project Deliverables Table Descriptions

1. Design Drawings

The preparation of design drawings is key to completing a successful habitat restoration project. All design and restoration projects require design drawings in digital format (e.g., AutoCAD). Each drawing should be to scale, with vertical and horizontal scales on the drawings being kept the same when possible.

For the preferred alternative, minimum drawing requirements are the depiction of all elements of the project in sufficient detail to support project permitting and include at least the following:

- Existing site plan showing area/location map; property boundaries; landownership; road, utilities, or other infrastructure as appropriate; scale;

north arrow; water bodies and direction of flow; and bank-full width or mean low and high water (marine waters).

- Project site plan view drawing(s) showing proposed actions overlaid on the site plan (above). The site plan should include all project elements including installation and removal of fill, wood, rock, culverts, and infrastructure; clearing and staging; dewatering, etc. Additional structural design details should be included as needed.
- Longitudinal profile and multiple cross-sections at important project locations showing water surface elevations relevant to the design (e.g., ordinary high water, maximum design flow, tidal elevations, flood elevations.)
- LiDAR (Light Detection and Ranging) layer with location of all major project elements, if available.

Additional design drawings should be included where available for complex projects or projects with multiple features or multiple sites.

2. Basis of Design Report

The Basis of Design Report is a detailed record of a project design process that accompanies visual plans and drawings. The following steps or chapters outline the full suite of information that should be considered and documented if appropriate for the project type. Pay most attention to ensuring the project provides the content outlined in these chapters, rather than adhering to the layout.

2a. Introduction, Goals, and Objectives

The project introduction should include a clear explanation of the fundamental purpose of the project, description of the site-specific limiting factors for specific Endangered Species Act-listed salmonids and applicable life stages, and the specific habitat restoration goals and objectives of the project. Identifying goals and objectives for each project is a critical technical framework that demonstrates a project's certainty of success and benefits for salmon recovery. The goal of the project should be to remedy observed problems by addressing the problems' root causes.

Goals—Goals should articulate desired biological outcomes (i.e., desired future conditions) and what salmonid species, life stages, and/or seasonal needs will benefit from those outcomes.

Objectives—Objectives define the specific project outputs that will be produced to achieve the stated project goals. As described in the grant application, each objective should be SMART (Specific, Measurable, Achievable, Relevant, and Time-bound). Note that project objectives are not the same as work tasks in a project's scope of work.

The PRISM grant application contains links to examples of goals and objectives that are appropriate for the various types of funded projects (e.g., acquisition, assessment, design, and restoration projects). Sponsors are encouraged to review these examples and consult with experienced design professionals, the SRFB Review Panel, and grants managers to help frame clear goals and objectives for their projects.

2b. Site Characterization

A detailed characterization of the existing conditions relevant to project design, in the context of established goals and objectives. The level of information will vary from project to project, but typically includes the following elements when available:

- A summary of site, reach, and watershed conditions
- Site history leading to the observed problems
- Biological and water quality factors as they relate to the project conditions
- Topographic, geomorphic, and vegetative survey information
- Surrounding habitat types and land uses
- Landowner and community expectations
- Water velocities, depths, and flow rates applicable to species and life stages being targeted by restoration practices
- Groundwater or hyporheic flow ranges
- Tidal elevation and ranges
- Available sediment sampling information
- Site constraints and maintenance requirements that may present challenges to natural process-based restoration

2c Alternatives Assessment and Selection

A core element of the restoration planning process is the identification of multiple alternative approaches to meet the project's goals and objectives. This section should include identification, description, and evaluation of design alternatives considered to achieve the project goals and objectives culminating in selection of a preferred alternative.

Include a written comparison of each of the alternatives through a thorough evaluation process based on consistent criteria. The applicant is highly encouraged to include visual depictions (maps with design elements applied to the specific site) or typical-style drawings to show a comparison of alternatives. When assessing

alternatives, the applicant should consider the following evaluation criteria, at a minimum:

- Connection to project goals and objectives
- Tangible benefit to all targeted species and life stages
- Stakeholder comments and community support
- Economic feasibility (appropriate cost-to-benefit ratio)
- Likelihood of success
- Ongoing maintenance requirements
- Project sustainability and resilience

The sponsor must clearly identify and justify selection of a preferred design alternative to achieve project objectives, which will form the basis of all subsequent design stages.

The preferred alternative should include a detailed written description of all proposed design elements. To meet conceptual design requirements, the preferred alternative should be depicted in an accurately scaled site plan view drawing of existing conditions and project elements. Specifically, the drawings for the preferred alternative must include, at a minimum, the following:

- An area/location map
- Property boundaries and land ownership (either surveyed or approximated)
- Roads and other existing infrastructure
- Scale and north arrow
- Water bodies and direction of flow
- Bank-full width (freshwater), mean high water line (marine)
- Approximate location and appropriately scaled dimensions of proposed design elements

2d. Cost Estimate

The level of detail and accuracy of a cost estimate for construction is driven by the stage of design. Conceptual design-level construction cost estimates are rough calculations often not based on thorough quantification of all project costs but rather professional opinion of similar project costs. They are intended to be an initial estimate to inform evaluation of differences between project alternatives.

Preliminary-level design cost estimates should be the result of quantified costs derived from the design process to be further refined and updated at final design. Detail should include estimates of line items such as the following:

- Materials
- Contract labor costs
- Construction supervision
- Special services such as surveys, materials testing, and geotechnical
- Sales taxes

2e. Design Considerations and Analyses

This chapter describes all specific design criteria that define the intent and expectations for each project element. Design criteria are specific, measurable attributes of project features that clarify the purpose of each project element and articulate how each element will contribute to the project's overall goals and objectives. Include justification and documentation of design methods applied, including assumptions that facilitated the design. Provide design output, including analytical results of all technical and design analyses and how these translate to project element designs.

All raw data, computational data, model output, and other reports (geotechnical, hydraulic modeling, topographic survey, wetland delineation, etc.) must be included in the Basis of Design Report, either as appendices or incorporated into the Design Considerations and Analysis chapter.

2f. Permitting and Stakeholder Consultation

A description of regulatory and/or other public consultation activities. Review and address comments from agencies and other stakeholders in the Basis of Design Report, if comments were received. This section is optional based on proposed deliverables in the application or as outreach, feedback, and discussion with stakeholders occurs during the design process.

3. Landowner Certification Form

See Appendix E: Funded Project Forms, for more information about the Landowner Certification Form.

4. Construction Permits

Permitting is an optional step in a design project because it may be more practical during the construction phase. However, feedback from permitting agencies can be

critical to informing the final design. Determining whether permitting is included in the design project scope of work is generally a matter of timing and complexity of the project. Some applicants include developing permit applications in their design scopes and wait until they receive construction funding to submit permit applications. Some applicants include submitting permits in the scope of their final design applications. Sponsors should provide proof of permit receipts (e.g., copies of permits or permit numbers and issue dates) to the RCO grants managers or in PRISM progress reports before starting construction.

5. Construction Quantities

Quantified materials are outlined on drawing plans, report, or separately. The level of detail is dependent upon the stage of design but typically is fully refined at final design to ensure well developed costs estimates and bid packages.

6. Final Design Technical Specifications

Technical specifications may be included in the final design plans, report, or as a separate document. Support all work shown on project drawings with one or more technical specifications to further describe and/or control the work. The construction contractor should know about project materials, technical requirements, project elevations, permit requirements, or any other elements of the proposed project. Clear and detailed technical specifications reduce on-the-ground adjustments and changes that may deviate from the original project objectives.

7. Contract Bidding Documents and Conditions

Developing contract documents is an optional step in a design-only project because it may be more practical during the construction phase.

If the sponsor's construction crew will build the project, then bidding documents and contract conditions are not required; however, the requirements for technical specifications and a detailed list of work items (above) still apply.

Bidding documents should include a bid form, definitions, a proposed agreement (to be between the sponsor and contractor), general conditions, special provisions, technical specifications, and the project drawings (usually bound separately).

Sponsors should select contractors using good business practices, which could include selective negotiations with known contractors, public advertisement for bidding, or competitive bidding using some combination of proposed price and contractor qualifications. The contractor selection process should be objective and defensible in case of contest and follow all applicable state and required federal procurement procedures.

8. Landowner Agreement

Landowner agreements are required for restoration projects on land that the sponsor does not own. See Appendix E: Funded Project Forms for more information about the Landowner Agreement Form.

9. As-Built Drawings and Documentation

Document all changes made during construction. "As-built drawings" is the conventional term applied to project design drawings modified by the engineer after construction to document the completed project. Prepare "as-built drawings" if changes were made to the final design during construction or if the sponsor used a field-fit construction approach. Submit these drawings to the RCO grants manager after project completion. Instead of the conventional "as-built drawings" described above, RCO may allow the sponsor to submit the following as-built documentation:

- Original final designs (if no changes were made during construction).
- Original final designs with a list of change orders describing the construction changes.
- A design memo from the engineer with notations on the final design/construction plans identifying the changed elements of the project with photograph points and photographs showing the project after construction.

10. Restoration Stewardship Plan

If a sponsor completes a restoration project on land owned by someone else, a ten-year stewardship plan must be completed before the close of the project. A plan is necessary to ensure the landowner will maintain the project area at least ten years after completion. Visit the RCO website to download a [Restoration Stewardship Plan Template](#) with recommendation components.