



## Water Crossing Structure Drawing Checklist

The primary form of communication between the designer and the biologist are the construction drawings. Misunderstandings often arise when construction drawings lack detail or contain inaccurate information, and misunderstandings almost always may result in permit delay.

A drawing set should include both existing and proposed features of a site so the biologist knows what is to be built and in what setting. Complete plans help the biologist quickly obtain a clear understanding of what is proposed and how fish habitat will be affected. Components of a complete set of construction drawings include a vicinity map, plan view, design details, profile views, cross sections and notes.

### General Guidelines

- Use clear black lettering and the fewest number of pages necessary
- Even if drawings are created by hand please use a graphic scale. The graphic scale should be in feet
- Vicinity maps and plan drawings must include an accurate North Arrow
- Show the existing water features overlaid with the pre-project and the proposed project changes

### Title Block

- Each page should have a title block with the applicants name, project name, location, date and the page number

### Vicinity Map

- Show and label location of each project area (e.g. circle the perimeter, use an arrow, etc.)
- Show and label location of each mitigation site, if applicable
- List latitude and longitude expressed in terms of decimal degrees and the section, township, and range and parcel numbers
- Show and label all waterways (e.g. wetlands, ponds, streams, rivers, lakes, inlets, oceans, etc.)
- For a river and stream project, show the bankfull width or the channel migration zone, whichever is greater, and the 100-year flood level if a floodplain exists at the project location
- Show roads, streets, and/or mileage to nearest town or city limits

### Site View

- Property lines and easements
- Project limits
- Clearing limits and areas not to be disturbed
- Significant vegetation
- Existing and proposed elevations (contour lines)
- Existing and proposed roads, parking areas, buildings and so on
- Existing utilities
- Road drainage details, such as cross drains, sedimentation ponds and outfalls into the channel
- Existing and proposed stream channel alignment (thalweg and channel width)
- Important geomorphic features such as slope failures, bedrock outcrops, log jams

**Long Profile** of the stream thalweg showing the reach-level behavior of the stream. Always show existing and proposed changes on the same drawing.

- A minimum of 20 channel widths upstream and 20 channel widths downstream of the culvert, or 150 feet, whichever is larger. This may not be long enough in some instances, where culverts have a high outfall drop or the culvert is elevated above the natural grade.
- Thalweg, water surface (at the time of survey) and top of bank on profile
- Relevant channel features such as riffles, steps, pools, rocky outcrops, nearby culverts, etc. Water surface profile should be taken at one flow.
- Any proposed changes in channel elevation are to be shown on the same drawing as the existing channel profile.

These include: regrade upstream, grade control structures or other profile adjustments. Attach elevations to all of these features.

- Features of new channel alignments, such as pools, riffles, steps, and woody debris placement and so on

**Short Profile** in the vicinity of the culvert (may be included in the same drawing as the long profile if it is still readable at that scale). Always show existing and proposed changes on the same drawing.

- Proposed culvert type, dimensions and slope
- Inlet and outlet invert elevations
- Proposed slope and elevation of the bed inside the culvert
- Size gradation of culvert bed directly on the plans
- Elevation and spacing of channel features inside and adjacent to the culvert
- Depth of riprap end treatments or bank protection
- The filling of the existing plunge pool, if applicable

**Plan View** that shows existing and proposed changes on the same drawing

- Alignment of stream, culvert and road
- Skew of stream to culvert
- New channel alignment features, such as pools, riffles, steps, woody debris placement, etc.

**Cross Section View** inside the culvert or under the bridge to show the relationship between the constructed channel and the crossing structure

**Cross Section View** of a representative natural channel upstream reach out of the influence of the culvert

- Channel width
- Existing and proposed side slopes
- Location and composition of bed materials
- Location of habitat and channel morphology features

**Diversion Plan** - may be included in plan and profile above.

- Show location, height and width of diversion dam
- Show the bypass pipe, size, length and coupling method
- Show the sump location and sump capacity
- Show backwater prevention method
- Show and sediment treatment method, release point and extent

**Construction Erosion Control Plan**

- Show temporary best management practices to control erosion and sediment during construction

**Long- term Erosion Control Plan**

- Slope stabilization and restoration details
- Planting plan including plant types and locations
- Maintenance plan, if necessary
- Inspection plan, if necessary

**Bed Material Specifications**

**Other Design Details**

- Large wood dimensions, orientation, burial depth and anchorage
- Boulder dimensions and burial depth