**Culvert Assessment Reference Chart**

### Culvert Shape & Dimensions

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<th>Diagram</th>
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<td>Pipe Arch/Elliptical Culvert</td>
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<td>Open Bottom Arch Bridge/Culvert</td>
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<td>Box Culvert</td>
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<td>Bridge with Side Slopes</td>
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<td>Box/Bridge with Abutments and Side Slopes</td>
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### Culvert Condition Reference

#### Structural (Longitudinal) Alignment

**Poor:** Significant horizontal or vertical misalignment of the pipe (Note: do not confuse this with constructed pipe bends).

**Critical:** Significant misalignment resulting in deformation of pipe or embankment/roadway damage.

#### Channel Alignment

**Poor:** The stream channel approaches the crossing at an angle of 45-70 degrees from the centerline of the structure.

**Critical:** The stream channel approaches the crossing at an angle of 70-90 degrees from the centerline of the structure.

#### Level of Blockage

**Poor:** Debris/sediment/vegetation blocks 1/3 of more of the inlet/outlet opening.

**Critical:** Sediment blocks more than ½ the inlet/outlet opening (and not designed that way for aquatic organism passage).

#### Flared End Section

**Poor:** Significant cracks, piping or undermining affects >50% of section. End crushed or separated from barrel.

**Critical:** Deterioration is significantly affecting performance and/or causing embankment/roadway damage.

#### Invert Deterioration

**Poor:** Perforations visible and/or connection hardware failing (metal). Heavy abrasion and scaling with exposed steel reinforcement (concrete). Heavy abrasion or scour damage (plastic). Displaced mortar and/or blocks, holes in invert area (masonry).

**Critical:** Holes or section loss with extensive voids beneath invert and/or embankment/roadway damage. Holes and gaps with extensive infiltration of soil, bedding or backfill material (masonry).

#### Bouyancy or Crushing

**Poor:** Light to moderate denting or deformation of inlet and/or outlet end of flexible pipe culvert. The invert of the inlet is at the streambed elevation (no uplift).

**Critical:** Invert of inlet bent upward above streambed or mitered edges crumpled inward.

#### Cross-Section Deformation

**Poor:** Significant perceptible deformation. Deformation with accompanying longitudinal cracking (concrete).

**Critical:** Excessive deformation resulting in significant reduction of available flow area, and/or extensive infiltration of soil, voids, structural failure or embankment/roadway damage.

#### Structural Integrity of Barrel

**Poor:** Concrete: Open cracks >1/8” wide with voids and significant infiltration of soil and/or leakage of water. Heavy rust staining and/or exposed steel reinforcement in sides and top of barrel. Masonry: Missing and/or displaced blocks Plastic: Several splits, tears and cracks >6” long. Significant deformation of liner or wall buckling.

**Critical:** Cracks, tears, splits, bulges, holes or section loss have led to extensive infiltration of soil, structural failure, voids and embankment/roadway damage.

#### Joints and Seams

**Poor:** Open or displaced with significant infiltration of soil and/or leakage of water and voids visible. Missing mortar or displaced blocks (masonry).

**Critical:** Open or displaced with significant infiltration of soil and accompanying embankment/roadway damage.

#### Footings

**Poor:** Top portion of footing exposed, but no cracking or breaking off of flakes or chips.

**Critical:** Footing exposed with signs of cracking or breaking off of flakes or chips. Bottom of footing exposed and/or undercut.

#### Embankment Piping

**Poor:** Slight pavement cracking above the culvert, perhaps with a noticeable bump/depression when driving, but no evidence of holes in the embankment or soil infiltration in the culvert barrel.

**Critical:** Partially or totally failed, significantly affecting performance and/or causing embankment/roadway damage or undermining of the culvert barrel or footings.

#### Armoring

**Poor:** Significant cracking affects >50% of apron. Significant piping or undermining.

**Critical:** Partially or totally collapsed, significantly affecting performance and/or causing embankment/roadway damage.

#### Embankment Piping

**Poor:** Cracking or breaking off of flakes or chips affecting >50% of area and/or exposed steel reinforcement. Gap >4” between barrel and wall. Footing exposed and undermined.

**Critical:** Partially or totally collapsed with damage to embankment/roadway.