Mississippi Valley Conservation Authority

Culvert/Bridge Installation Checklist

Permit applications for culvert/water crossing renewal/replacement must demonstrate that:

- Flood risk upstream and downstream is not increased and the flow regime in the watercourse is not altered
- No degradation to the river upstream or downstream (erosion/scour, sediment deposition)

If the watercourse is morphologically active or adjacent to unstable soil/slope, site-specific study must confirm that there are no outstanding slope stability or structural protection issues. Minimum requirements for like-for-like replacement and a new or any deviation from the existing water crossing structure are provided below.

Like-for-like replacement:

- Dimensions, elevations (upstream and downstream inverts), are to be maintained.
- Road profile should be the same as existing or higher (not overtopped during the 100-year flood event).
- Inlet and outlet details (headwall, wing wall/projections, etc.) should be the same as existing conditions or hydraulically more efficient.

If there are any deviations from the existing structure, or a new culvert/water crossing structure is being proposed, the following must be provided:

Supporting Technical Requirements	
Hydrologic & Hydraulic Analyses	- Drainage area, channel geometry, and topographic survey - Design flow for sizing the structure* to assess the impacts of the proposed design on adjacent lands, structure and relief flow on the roadway - Headwater/tailwater elevations for inlet and outlet control conditions, including maximum allowable headwater elevation and freeboard - Flow velocities for all floods up to and including regulatory flood (specifying inlet and outlet flow velocity, velocity within the culvert, and maximum allowable velocity)
Design Considerations	- Proposed crossing location, width, and alignment should be aligned with existing stream morphology - Duration of work, details of installation and sequencing, dewatering/maintaining the flow Design should address any issues related to the degradation of the watercourse, wetland, etc., and include mitigation measures - Design should maintain or enhance fish passage where possible - Department of Fisheries and Oceans and Ontario Ministry of Natural Resources should be consulted in regard to impacts to fish and fish habitat
Engineering Drawings	- Site plan with the location of the proposed works and relevant dimensions, including culvert size and length, stream width, etc. - Dimensions of the existing and proposed structure (size, shape, length, and slope) - Inlet or outlet-controlled structure details (tailwater elevation at the design flow for outlet-controlled structure), road profile, etc.) - Detailed plan and profile of the proposed design (soffit/low chord elevation, upstream and downstream invert elevations) - Existing and proposed road profiles and development regulation limit - Dewatering and flow diversion plan including coffer dam details, bypass pumping locations - Erosion and sediment control (both temporary and permanent measures) including discharge of dewatered area downstream, site stabilization/restoration, monitoring, etc.
Qualified Persons	- Signed and stamped by a qualified professional engineer licensed in the Province of Ontario

* refer to MTO's Drainage Design Manual (1998), Highway Drainage Design Standards (2008), and Design Flood Criteria (Directive B-100)