

THE CORPORATION OF THE TOWNSHIP OF THE NORTH SHORE

POLICY MANUAL

POLICY TITLE:

SUBJECT:

Culvert Maintenance

POLICY SECTION:

POLICY NO:

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EFFECTIVE DATE:

May 11, 2016

ENACTED BY:

REVIEW DATE:

November 15, 2023

Resolution, By-Law 23-76

The Township of the North Shore recognizes that the key to effective maintenance is a regular schedule of inspections to determine the maintenance needs and to ensure that required maintenance is done. Inspections are done in a regular interval during the service life of the culvert to ensure that satisfactory conditions exist and to evaluate needs for cleanup and repair in advance of the wet season.

Inspections are also made to monitor existing defects that have not been repaired as well as to monitor any defects that had been repaired. Inspections can be divided into the following categories:

General Inspections: is a routine and frequent inspection conducted to culverts located in critical areas, i.e. flooding areas and areas adjacent to third party development. The inspections are undertaken at regular/frequent intervals, as and when required to detect for damaged structure and blockage of waterways at early stages within a visible range.

Periodic Inspection: Is primarily designed to carry out more detailed inspections periodically for culverts on foot by accessing the subject as close as possible. These inspections should determine the current serviceability and structural status of the culverts. The frequencies of inspections are undertaken at intervals of once a year. These inspections may require the use of a camera monitoring system.

Special Inspection: Is the supplementary inspection in addition to the general inspection and periodic inspection, for example, in occasional cases such as storm and heavy rain.

Elements for Inspection:

Check for accumulation of debris, siltation or other flow impediments at inlets and outlets; including beaver activity.

Inspect the culvert barrel, if possible, for tree or other vegetation roots, mineral deposits, trash or silt accumulations and other foreign objects obstructing flow paths.

Examine inlet and outlet areas for evidence of soil erosion, which generally leads to scour, undermining and caving of adjacent soil supporting the culvert. Soil erosion quickly leads to reduced structural and hydraulic performance.

Inspect all visible structures such as sumps, headwalls, wingwalls, culverts and aprons for signs of wear and breakage.

Check upstream for evidence of backup or prolonged surface water presence that indicates reduced inflow. Check downstream for evidence of foreign material that indicates reduced filtration of soil or structural degradation of the drainage system itself.

Inspection of Waterway:

Hydraulic Capacity - *To determine any high-water marks indicating flood or presence of obstruction causing ponding.*

Siltation and Debris in or near Culvert - *To check the severity of siltation and debris within the culvert barrel as well as at inlet and outlet of culvert and its depth shall not be greater than $0.2D$ where D is diameter of pipe culvert or height of box culvert.*

Vegetation - *To check the vegetation growth within the waterway both at inlet or outlet of the culvert and coverage shall not be greater than 20% of waterway section.*

Scouring or Undermining - *To check for scouring and undermining at the ends of culvert or at the edge of apron.*

Inspection of Culvert Structures:

Reinforced Concrete Pipe / Box Culvert / VBC - *To check the culvert barrel for settlement, abrasion of lining cracking/spalling of concrete, and corrosion of reinforcement.*

Corrugated Metal Pipe Culvert (CMP) / High Density Polyethylene (HDPE) - *To check for change of shape of culvert barrel, abrasion of lining, damaged or deterioration to paint or galvanizing, corrosion of metal and loose or corroded bolts.*

Inlet and Outlet Structure for Drainage / RHS and LHS Entrance for VBC - *To check movement (settlement or sideways movement). For concrete structures to check for cracking/spalling of concrete and corrosion of reinforcement. For masonry structures to check for cracking, poor pointing or deterioration of bricks or stone.*

Conclusion

It is vital to ensure the functionality of the culvert is at its optimum condition. Schedule routine maintenance and periodic up-keeping of the condition of the culverts and their surroundings must be programmed and monitored at all times. Any discrepancy in the programme will affect the performance of the culvert and as a result more allocations have to be spent in ensuring that the culverts are in good working condition.

The authority who is maintaining the road or property must have proper schedule and personnel to conduct the inspection activity. A culvert inventory and database must be available as well as the drawing for continuity of the maintenance. A culture of maintenance must be instilled to ensure the culvert life is prolonged and secured.