Culvert Inspection

Inspect approach roadway and embankment

- Defects in the approach roadway and embankment may be indicators of possible structural and hydraulic problems

Check Condition of Roadway or Embankment

- Sag in roadway or embankment
- Cracks in pavement
- Pavement patches or evidence that roadway has been built up
- Erosion or failure of side slope

Check Functional Requirements

- Signing
- Alignment
- Clearances
- Adequate shoulder profile
- Safety features

Inspect waterway

The condition of the stream channel should be inspected for the following:

- Alignment (Horizontal or Vertical)
- Erosion
- scour
- debris
- sediment

Check channel and drainage area for indications of inadequate opening:

- Changes in stream channel alignment which may reduce hydraulic capacity or cause scour
- Changes in ground cover or land use
- Changes in the amount and type of channel erosion
- Changes in high water marks
- Changes in flow from intermittent to continuous
- Channel obstructions such as debris, sediment, mud slides, beaver dams etc

Inspect headwalls and wingwalls

- Movement
- Settlement

- Cracks
- Undermining
- Scour
- Inspect headwalls and wingwalls for movement, settlement, cracks, deterioration and traffic safety
- Ends should be checked for undermining, scour and evidence of piping
- Piping is the removal of soil by water seeping along the outside of the pipe. The process is called piping because a pipe-shaped tube is often formed in the soil

Inspect inside of corrugated metal culverts for:

- shape
- Joint defects
- Seam defects
- Durability – "Wearing away" caused by
    - Corrosion
    - Abrasion
- Localized construction damage
- Misalignment
- Cracking
- Spalling
- Corrosion
- Abrasion
- Durability

Ditch Inspection

Ditch Inspection

- Check ditch line for uniformity and obstructions
- Check side slopes for erosion and possible need for protection of erosion
- Check condition of ditch paving materials
- Check sediment deposits and weed and brush growth in ditch line

Frequency of Inspection

- Routine
- After major storm events
- Emergency
    - Caused by a major storm event
    - Overloaded vehicles

Culverts

- Culverts should be inspected once a year
- Routine inspections should be performed after heavy rains to remove debris and assess any damage
- If snow and ice are problems in your area, perform inspections before and after the winter season

Ditches

- Ditches should be inspected once a year
- Periodic inspections should be made, especially after heavy rains and in the spring after snow and ice melt

Proper Tools and Equipment for Inspection

Measuring Tools
- Tapes
- Rulers
- Hand Tools
- Hammer
- Pick
- Steel Rod
- Flashlight

Debris Removal Tools
- Hand Shovel
- Pick
- Machete

Photographic Equipment
- Camera

Record Keeping Supplies
- Field Book
- Inspection Forms
- Clip Board
- Straight Edge or Ruler
- Pencils

Proper Tools and Equipment for Inspection

Work Zone Traffic Control
- Vests
- Signs
- Cones, Drums or Barricades
- Reference WZTC course for additional information

Personal Protective Equipment
- Gloves
- Hard Hats
- Safety Shoes
- Boots
- Waders
- First Aid Kit
- Reference PPE course for additional information

Safety Precautions

Confined Spaces

- Culvert with inadequate ventilation may develop a lack of oxygen or hazardous concentrations of toxic gases
- If there is any doubt text for oxygen content and presence of hazardous gases before entry

Drowning Hazards

- Scour holes
- Flash floods

Traffic hazards

- Inspection activities or parking along or near roadway may present a hazard
- Follow proper traffic control procedures (MUTCD)

Other hazards

- Steep embankments
    - Hazardous footing caused by high and steep embankments

    - Stumbling caused by branches, vines and underbrush
- Animals
    - Underbrush and accumulations of debris may harbor rodents, snakes and other animals
    - Exercise caution when removing debris or vegetation
- Insects
    - Ticks, wasps or other stinging insects are a hazard
- Poison ivy
    - Leaves of three, leave them be!

Inspection Checklist

- Develop a list of items that must be evaluated or measured and incorporate into a standard form
    - Location
    - Type
    - Condition

Inspection Report

- Standard Prepared Sketches / Field Sketches
    - Convenient and save time
    - Field sketches should depict detailed information of problem areas observed in the field
- Narrative Description
    - Supplement the information recorded on standard forms, sketches and photographs
- Photographs
    - Method to document problems observed during the inspection
- Recommendations
    - Record any maintenance or repairs that are needed to assure structural integrity, ensure public safety or extend the serviceability of the drainage facility