NYSDOT Culvert Inspection Field Guide
This guide is a supplement to the Culvert Inventory and Inspection Manual. It is designed to promote uniformity of culvert item ratings by providing culvert inspectors with examples of inspection items in various conditions and corresponding recommended ratings.

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**Inspection Rating Scale for Individual Items**

The following rating scale is used for individual items:

9  Condition and/or existence unknown.

8  Not applicable. Used to rate an item the culvert does not have.

7  New condition. No deterioration.

6  Used to shade between ratings of 5 and 7.

5  Minor deterioration but functioning as originally designed.

4  Used to shade between ratings of 3 and 5. Functioning as originally designed.

3  Serious deterioration or **not** functioning as originally designed.

2  Used to shade between ratings of 1 and 3.

1  Totally deteriorated or in failed condition. Potentially hazardous.
General Recommendation Descriptions for Entire Structure

The General Recommendation is the rating given to the culvert as a whole.

Keep in mind that the individual item ratings of more important culvert elements, such as those in the Structure Items section, should have a greater influence in determining the General Recommendation than individual item ratings of less important culvert elements such as those in the Roadway Items and Channel Items sections.

It is important that the General Recommendation rating not be lower than the lowest rating given to any individual item.

The General Recommendation rating does not have to match the lowest rating given for any individual item unless that item is of major consequence in comparison to the other items.

In addition to considering the relative importance of the items to determine the General Recommendation, consult the following narrative descriptions:

7  Like new condition. No repairs required.

6  May require very minor repairs to pavement, guiderail, shoulders, etc.

5  May require minor repairs to the headwalls or wingwalls. May require removal of light vegetation growth around culvert openings.

4  Pavement may require replacement with the addition of backfill material to correct minor roadway settlement problems yet the structure shows no signs of deformation or settlement. Wingwalls and headwalls may require significant repair work. Some minor work to the channel may be required.

3  Significant repairs to the pavement are required due to settlement. Slight deformation and settlement of the structure exists. Significant deterioration of wingwalls and/or headwalls exists. Extensive work on the culvert is required. Replacement could be considered a better long term option.

2  Replacement of the structure is necessary due to serious deformation and settlement of the structure. Short-term, remedial action such as pavement replacement or installation of additional backfill material is required. Temporary shoring may be needed or already exist. A vehicle load restriction is probably posted. Replacement of wingwalls and/or headwalls is required. Alignment of waterway is such that significant, measurable and progressive, general and/or localized scour is occurring. Constriction or obstruction of the culvert opening greatly restricts water flow.

1  Pavement has settled as a result of significant structure deformation or settlement. Structure has collapsed or collapse is likely. Culvert opening is closed or nearly closed due to embankment soil failure, structure deformation, channel sedimentation, debris accumulation, or vegetation growth. Roadway should have traffic restrictions or be closed to traffic entirely.
Photos and Inspection Ratings

Roadway Item: Pavement

New asphalt overlay. Rate pavement 7.

Asphalt has transverse and longitudinal cracking over 25% of surface area. Rate pavement 5.
Roadway Item: Pavement

Asphalt has transverse and longitudinal cracking over 50% of surface area. Rate pavement 4.

Concrete surface is mapcracked throughout. Rate pavement 4.
Roadway Item: Pavement

Longitudinal crack in concrete surface with area of spalling. Rate pavement 4.

Asphalt surface cracked throughout and heavily raveled at joint with concrete slab. Rate pavement 3.
Roadway Item: Shoulders

No deterioration. Rate shoulder 7.

Longitudinal crack in asphalt shoulder at drainage inlet. Rate shoulder 5.
Roadway Item: Shoulders

Asphalt in shoulder has settled with respect to concrete slab. Rate shoulder 4.
Roadway Item: Guide Railing

Box beam rail in good condition. No deterioration or misalignment. Rate railing 7.

Some slack in cables. Rate railing 5.
Roadway Item: Guide Railing

Cables slack. Posts leaning away from roadway. Rate railing 4.

Impact damage at guide rail terminus. Several posts bent to the ground. Section of rail is unsupported. Rate railing 3.
Roadway Item: Guide Railing

Heavy spalling at base of box beam rail post. Anchor rods exposed. Rate railing 3.

Impact damage. W-sections separated from posts and lying on ground. Rate railing 1.
Roadway Item: Settlement

Smooth pavement. Rate settlement 7.

Asphalt pavement settled 3 inches with respect to concrete slab. Rate settlement 4.
Roadway Item: Settlement

Shoulder settled 2” in area of drop inlet. Rate settlement 4.

Asphalt settled 1 to 2 inches along full length of joint angle. Rate settlement 3.
Roadway Item: Embankment

Hillside rip-rap protection in place. Rate embankment 7.

Roadway Item: Embankment

Structure Item: Abutment and Pier

Spalling along bottom of abutment. Rate abutment 5.

Heavy spalling at top of abutment under beams. Rate abutment 3.
Abutment very deeply spalled full height. Rate abutment 2.
Structure Item: Span Barrel

Corrugated steel pipe has no corrosion, no leakage. Like new condition. Rate span barrel 7.

Concrete box is in good condition. No deterioration. Rate span barrel 6.
Structure Item: Span Barrel

Efflorescence at mid-height bolt line full length of corrugated steel pipe. Rate span barrel 5.

Concrete box has moderate efflorescence on the abutment stem and transverse cracking in the ceiling. Rate span barrel 5.
Structure Item: Span Barrel

Corrugated steel pipe has minor corrosion with delaminating at the spring line for the full length of the pipe. Rate span barrel 4.

Concrete box has ceiling cracks with efflorescence and an isolated spalled area with exposed rebar. Rate span barrel 4.
The web and bottom flange of the steel I-beam are heavily corroded with moderate section loss. Rate span barrel 3.

The invert of this corrugated steel pipe is heavily corroded with areas of 100% section loss over the full length of the pipe. Rate span barrel 2.
Structure Item: Span Barrel

The web and bottom flange of the steel I-beam are very heavily corroded and delaminating in sheets. There is significant section loss. Rate span barrel 2.

The web and bottom flange of the steel I-beam have disintegrated. Section of web is completely gone. Bottom flange near the end of the beam is nearly gone. Rate span barrel 1.
Structure Item: Headwall

Concrete headwall is in like new condition. Rate headwall 7.

Headwall has some spalling and some loss of mortar between stones. Rate headwall 4.
Structure Item: Headwall

Headwall is cracked and leaning away from the roadway. Rate headwall 3.

Headwall has completely disintegrated. Rebar exposed. Rate headwall 1.
Structure Item: Wingwall

Wingwall is in good condition. No deterioration. Rate wingwall 7.

Erosion at the end of the wingwall. No wingwall movement. Rate wingwall 5.
Structure Item: Wingwall

Wingwall is heavily spalled. Rate wingwall 3.

Wingwall is cracked and deeply spalled full height. Section of wall is leaning away from embankment. Rate wingwall 2.
Channel Item: Opening

Opening is clear, no debris. Rate opening 7.

Debris piled up at inlet. Rate opening 4.
Channel Item: Opening

Approximately 50% of tube opening is restricted by sediment. Rate opening 3.

The opening of one of the tubes is almost completely blocked by debris. Rate opening 2.
Channel Item: Alignment

Channel is aligned with center of opening. Rate alignment 7.

Stream bends just upstream of culvert. Rate alignment 5.
Channel Item: Alignment

Channel is aligned almost parallel to structure causing the flow to be directed at the abutment. Rate alignment 4.
Channel Item: Scour/Erosion

Section of rip-rap bank protection has sloughed into stream. Rate channel erosion 5.

Channel scouring along abutment and wingwall. Vertical face of footing exposed. Rate channel erosion 4.
Channel Item: Scour/Erosion

End section at inlet is slightly undermined. Rate channel erosion 4.

Deep scour pocket under end section at outlet. Rate channel erosion 3.
Channel Item: Scour/Erosion

Channel bed deeply eroded. Footings undermined. Rate channel erosion 1.
Channel Item: Silt, Debris, Vegetative Growth

Debris has piled up against pier at inlet. Rate debris/vegetation 4.

An island of vegetation has formed in the upstream channel restricting the flow into span 1. Rate debris/vegetation 3.
Channel Item: Silt, Debris, Vegetative Growth

Heavy vegetation build-up has obscured more than 75% of opening at inlet. Rate debris/vegetation 2.
Inventory Code Values/Descriptions (CIIS Manual: Appendix A)

**TMS (Type Maximum Span) Material:**
1 – STEEL
2 – WEATHERING STEEL
3 – SPECIAL STEEL
4 – HYBRID STEEL SECTION
5 – CORRUGATED STEEL
6 – WROUGHT OR CAST IRON
7 – ALUMINUM
8 – TIMBER
9 - MASONRY
A – CONCRETE, UN-REINFORCED
B – CONCRETE, REINFORCED
C – CONCRETE, UNKNOWN
D – PRESTRESSED CONCRETE, POST-TENSIONED
E – PRESTRESSED CONCRETE, PRE-TENSIONED
F – PRESTRESSED CONCRETE, UNKNOWN
G – POLYETHYLENE – SMOOTH INTERIOR
H – POLYETHYLENE – CORRUGATED INTERIOR
I – POLYVINYL CHLORIDE
X – OTHERS
? – NEEDS TO BE DEFINED

**TMS Protective Coating:**
1 – PAINT, LEAD BASED
2 – PAINTED, NOT LEAD BASED
3 – PAINTED, UNKNOWN
4 – UNPAINTED
5 – GALVANIZED
6 – BITUMINOUS-BASED COATING
7 – CONCRETE COATED
8 – POLYMER
9 – POLYMER WITH PAVED INVERT (BITUMINOUS)
10 – PAVED INVERT (BITUMINOUS)
11 – PAVED INVERT (CONCRETE)
12 – ALLUMINUM COATED
13 – GALVANIZED WITH PAVED INVERT
14 – GALVANIZED AND FULLY PAVED
15 – GALVANIZED AND POLYMER COATED
16 – GALVANIZED AND POLYMER COATED WITH PAVED
X – OTHERS
? – NEEDS TO BE DEFINED
**TMS Design Type:**
01 – SLAB (CAST-IN-PLACE, P/S)
02 – SLAB VOIED (CAST-IN-PLACE, P/S)
09 – ROLLED BEAM, MULTI-GIRDER
10 – ROLLED BEAM – FLOORBEAM SYSTEM, DECK
11- ROLLED BEAM – FLOORBEAM SYSTEM, THRU
12 – ROLLED BEAM JACK ARCH
22 – ARCH, THRU
25 – ARCH, DECK – FILLED SPANDREL
26 – ARCH, METAL PLATE (PIPE)
27 – FRAME (STEEL, CONCRETE NON-ARCH)
28 – FRAME WITH FLOORBEAM SYSTEM
40 – SINGLE BOX CULVERT, WITH FLOOR, NON-CONTINUOUS SLAB
43 – MULTIPLE BOX CULVERT, WITH FLOOR, CONTINUOUS SLAB
45 – CONTINUOUS BOX CULVERT (PER SPAN BASIS)
50 – CIRCULAR PIPE CULVERT
51 – VERTICALLY ELONGATED ELLIPSE PIPE CULVERT
52 – HORIZONTALLY ELONGATED ELLIPSE PIPE CULVERT
53 – UNDERPASS PIPE CULVERT
54 – “PEAR” SHAPE PIPE CULVERT
55 – ARCH, METAL PLATE (NON-PIPE)
56 – HIGH PROFILE ARCH
57 – LOW PROFILE ARCH
UU – UNKNOWN
XX – OTHER
? – NEEDS TO BE DEFINED

**Posted Load:**
N – NO
Y - YES

**End Treatment Type:**
1 – STEEL
2 – WEATHERING STEEL
3 – SPECIAL STEEL
4 – HYBRID STEEL SECTION
5 – CORRUGATED STEEL
6 – WROUGHT OR CAST IRON
7 – ALUMINUM
8 – TIMBER
9 - MASONRY
A – CONCRETE, UN-REINFORCED
B – CONCRETE, REINFORCED
C – CONCRETE, UNKNOWN
D – PRESTRESSED CONCRETE, POST-TENSIONED
| E – PRESTRESSED CONCRETE, PRE-TENSIONED |
| F – PRESTRESSED CONCRETE, UNKNOWN |
| G – POLYETHYLENE – SMOOTH INTERIOR |
| H – POLYETHYLENE – CORRUGATED INTERIOR |
| I – POLYVINYL CHLORIDE |
| N – NONE |
| X – OTHERS |

**Guide Rail:**
- 00 – OTHER
- 01 – NONE
- 02 – STEEL, CONFORMING TO CURRENT AASHTO SPECS
- 03 – STEEL, NOT CONFORMING TO CURRENT AASHTO SPECS
- 04 – ALUMINUM, CONFORMING TO CURRENT AASHTO SPECS
- 05 – ALUMINUM, NO CONFORMING TO CURRENT AASHTO SPECS
- 06 – CABLE
- 07 – CONCRETE (INCLUDING SAFETY SHAPES AND PARAPETS)
- 08 - LINK FENCE
- 09 – STEEL, BALUSTRADE
- 10 – CONCRETE, BALUSTRADE
- 11 – PIPE
- 12 – TIMBER
- 13 – WEATHERING STEEL BOX BEAM
- 14 – WEATHERING STEEL W-BEAM

**Abutment Type:**
- 0 – OTHER
- 1 – NONE
- 2 – STUB, CANTILEVER
- 3 – INTEGRAL
- 4 – SOLID, CANTILEVER
- 5 – JOINTLESS
- 6 – SOLID, CANTILEVER
- 7 – SOLID, COUNTERFORT
- 8 – ABUTMENTLESS
- 9 – STUB ON REINFORCED EARTH WALL

**Stream Bed Material:**
- 0 – OTHER
- 1 – NO WATERWAY
- 2 – BED ROCK
- 3 – LARGE STONE
- 4 – GRAVEL
- 5 – SAND
- 6 – SILT
- 7 – CLAY
**Bank Protection:**
00 – OTHER
01 – NO BANK PROTECTION
02 – RIP-RAP, DRY
03 – RIP-RAP, GROUTED
04 – BLOCK
05 – TIMBER
06 – GRANULAR FILL
07 – CRIBBING, CONCRETE
08 – CRIBBING, STEEL
09 – STEEL SHEETING
10 – SOD
11 – GABIONS
12 – STONE FILLING
13 – CONCRETE

**Maint Resp/Owner:**
STATE DEPARTMENT OF TRANSPORTATION
ALLEGANY STATE PARK AUTHORITY
AUTHORITY OR COMMISSION
BUFFALO AND FT. ERIE PUBLIC BRIDGE AUTHORITY
BUREAU OF INDIAN AFFAIRS
BUREAU OF LAND MANAGEMENT
BUREAU OF RECLAMATION
CAPITAL DISTRICT STATE PARK COMMISSION
CENTRAL NY STATE PARK COMMISSION
CITY
CITY OF NY STATE PARK COMMISSION
CONRAIL (FORMER PENN CENTRAL)
COUNTY
EAST HUDSON PARKWAY AUTHORITY
FEDERAL (OTHER THAN THOSE LISTED BELOW)
FINGER LAKES PARKS AND RECREATION COMMISSION
GENESEE STATE PARKS AND RECREATION COMMISSION
INTERSTATE BRIDGE COMMISSION
LAKE CHAMPLAIN BRIDGE COMMISSION
LAKE GEORGE PARK COMMISSION
LONG ISLAND RAILROAD
LONG ISLAND STATE PARKS AND REC COMMISSION
METROPOLITAN TRANSPORATION AUTHORITY
MILITARY RESERVATION/CORPS OF ENGINEERS
MONROE COUNTY WATER AUTHORITY
NASSAU COUNTY BRIDGE AUTHORITY
NATIONAL PARK SERVICE
NEW YORK STATE BRIDGE AUTHORITY
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<tr>
<td>NEW YORK STATE THRUWAY AUTHORITY</td>
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<td>NIAGARA FRONTIER STATE PARK COMMISSION</td>
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<td>NY CITY DEPT OF WATER SUPPLY, GAS AND ELECTRIC</td>
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<tr>
<td>OGDENSBURG BRIDGE AND PORT AUTHORITY</td>
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<tr>
<td>ONE AGENCY - LISTED IN FIRST SUB-FIELD</td>
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<td>OTHER OTHER STATE DEPARTMENT</td>
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<td>PALISADES INTERSTATE PARK COMMISSION</td>
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<td>PORT AUTHORITY OF NEW YORK AND NEW JERSEY</td>
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<td>TRANSIT AUTHORITY</td>
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<td>VILLAGE</td>
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**SPDES (State Pollutant Discharge Elimination System) Outfall:**

<table>
<thead>
<tr>
<th>Code</th>
<th>Description</th>
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<tbody>
<tr>
<td>N</td>
<td>DOES NOT FALL UNDER EAB SCOPE</td>
</tr>
<tr>
<td>Y</td>
<td>EAB GUIDELINES APPLY</td>
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**Max Span**: The length of longest span (largest opening) in the culvert. For single span pipe culverts, the max span is the diameter of the pipe. Box culverts are measured from inside wall to inside wall. Elliptical pipes are measured at the widest opening. Arches are measured at the spring line. For multi-span culverts structures, this is the largest horizontal dimension. The span is measured perpendicular to the centerline of the culvert. Max Span is a required field.

**Total Span**: This value represents the “A” dimension of qualifying multiple culverts (see below)

**Large Culverts**: Defined as a single culvert with multiple spans.

**QUALIFYING MULTIPLE CULVERTS AS LARGE CULVERTS**

![Diagram of culvert dimensions](image)

A multiple pipe culvert qualifies as a single large culvert if (1) “A” is greater than 5 feet and (2) “C” is less than ½ of “B”. “A”, “B”, and “C” are measured at the greatest opening perpendicular to the centerline of the culvert. Measurement “A” is the Total Span. Measurement “D” is the maximum span. Total Span is a required field.