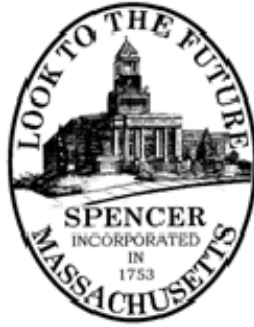
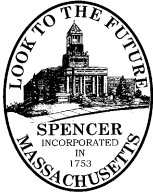


# Town of Spencer



## Culvert Assessment Field Data Form & Guide

Last Updated: 7/21/2015



## TOWN OF SPENCER CULVERT ASSESSMENT FIELD DATA FORM

Date: \_\_\_\_\_ Inspection: \_\_\_\_\_ Weather: \_\_\_\_\_

Road: \_\_\_\_\_ Town: \_\_\_\_\_ GPS Coordinates: \_\_\_\_\_

Other Location Notes: \_\_\_\_\_

**\*NOTE THIS FORM SHOULD BE COMPLETED USING THE CULVERT ASSESSMENT GUIDE AS A REFERENCE\***

	Good (1.00)	Fair (0.67)	Poor (0.33)	Critical (0.00)	Unknown	N/A
Invert Deterioration	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Joints & Seams	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Cracking	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Headwall/Wingwall	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Apron	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Pipe Damage	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Scour	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Cross-section deformation	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Longitudinal alignment	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Footing	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Roadway over Culvert	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Blockage at Inlet	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Embankment	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Culvert Condition Score (Average of Scores Given):

Performance Problems:

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Additional Comments:

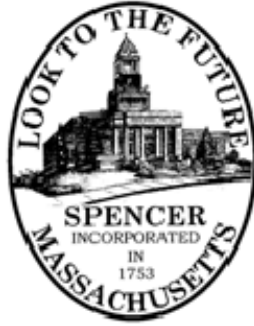
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# Town of Spencer



## Culvert Assessment Guide

Last Updated: 7/21/2015

# Invert Deterioration

Good



No visual damage or only superficial corrosion or scaling of the invert.

Fair



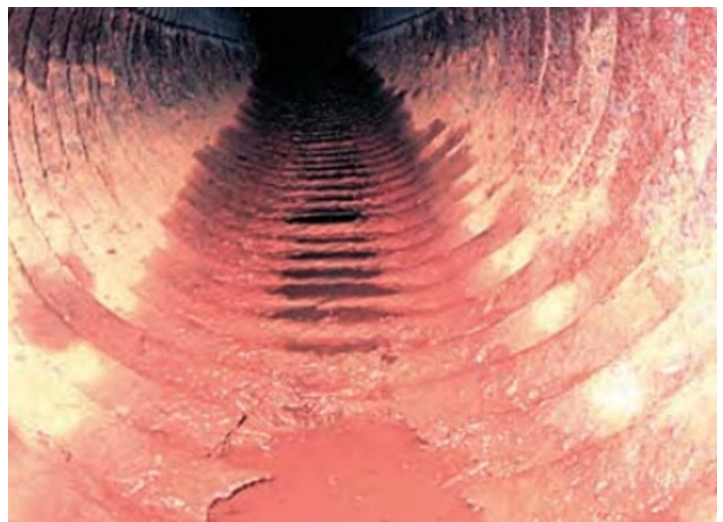
Minor corrosion and pitting, no holes or distortion. Cannot penetrate metal with sharp point of geology hammer. Minor isolated spalls in concrete.

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)

# Joints & Seams

Good



Joints and seams are tight with no openings.

Fair



Minor separation of joints and seams up to 1", minor backfill infiltration.

Poor



Significant separation of joints and seams between 1" to 3"; infiltration of backfill into culvert; voids visible in fill through offset of joints

Critical



Severe separation of joints and seams greater than 3"; infiltration of backfill into culvert; large voids visible in fill through offset of joints

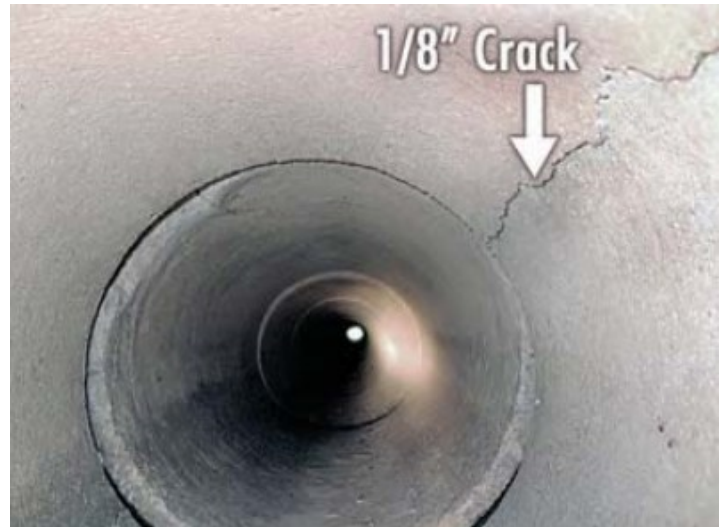
# Cracking (Concrete)

Good



No visual evidence of cracking, or only minor hairline cracking at isolated locations, or minor scaling of invert

Fair



Longitudinal cracks less than 1/8" in width, spalls up to 1/4" deep

Poor



Longitudinal cracks between 1/8"-1/4" in width, spalls larger than 1/2" deep, and spalls have exposed rebar

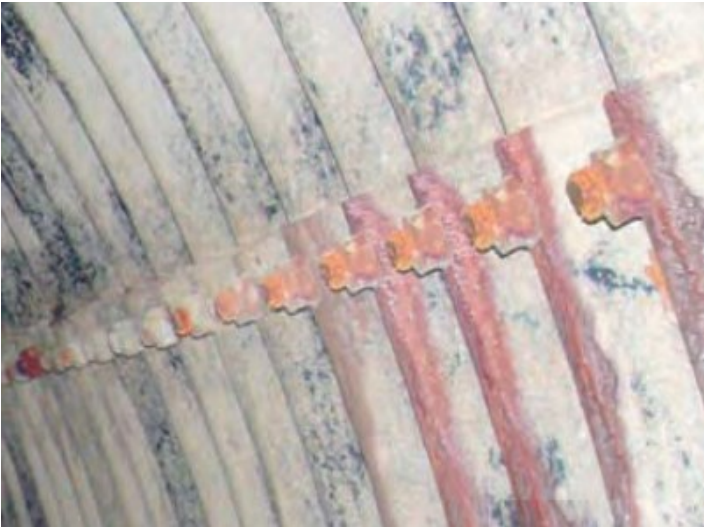
Critical



Severe cracking and spalls greater than 1/2" on culvert walls, sections of culvert are partially collapsed, major corrosion of rebar

# Cracking (Metal)

Good



No visual evidence of cracking along bolt holes or seams

Fair



Minor cracking around bolt holes or seams at isolated sections

Poor



Significant cracking and/or deterioration along bolt holes and isolated seams of plates

Critical



Severe cracking and or deterioration along bolt holes and along seams of plates

# Cracking (Plastic)

Good



No visual evidence of damage, cracking, or rips in the culvert material

Fair



Minor isolated rip or tear caused by debris less than 6" in length and 1/2" in width. Minor cuts or gouges to end sections from maintenance or construction activities

Poor



Cracking, splits or tears over 6" in length and up to 3/4" in width. Openings in pipe causing loss of backfill material

Critical



Cracking, splits, punctures, or tears over 6" in length and over 1" in width. Openings in pipe causing loss of backfill material.

# Headwall/Wingwall

Good



No visual evidence of damage to structure. No offsets, no changes in vertical or horizontal alignment

Fair



Minor spalls and cracks less than 1/8" in width. No exposed rebar or surface evidence of rebar corrosion. Minor differential or rotation settlement

Poor



Significant spalls and cracks between 1/8" to 1/4" in width. Exposed rebar with corrosion. Significant differential or rotational settlement.

Critical



Extensive deterioration with loss of concrete. Corrosion of rebar and extensive section loss. Extensive settlement of the wall

# Apron

Good



No evidence of culvert undermining and very small scour hole. Little to no deterioration of joint between apron and headwall.

Fair



Some minor undermining of culvert and small scour hole. Some deterioration of joint between apron and headwall.

Poor



Significant undermining of culvert and evidence of scour hole. Significant deterioration of joint between apron and headwall.

Critical



Extensive undermining of culvert and large scour hole. Substantial deterioration of joint between apron and headwall.

# Pipe Damage

Good



No signs of flow through embankment on outside of culvert barrel

Fair



Embankment moist only in areas surrounding culvert barrel. No evidence of flow or sediment transport observed

Poor



Evidence of seepage through the embankment along the outside of the culvert barrel, sediment transport not observed

Critical



Evidence of flow through embankment along the outside of culvert barrel. Evidence of sediment transport observed

# Scour

Good



No visual evidence of culvert undermining or exposed footings. Only minor scour hole is present. Culvert span to scour hole depth ratio is greater than 10.

Fair



Minor undermining of the culvert barrel or top of footing is exposed. Culvert span to scour hole depth ratio is between 5 to 10.

Poor



Significant undermining of the culvert barrel or undermining of the footing. Culvert span to scour hole depth ratio is between 2 to 5.

Critical



Extensive undermining of the culvert barrel or footing. Culvert span to scour hole depth ratio is less than 2.

# Cross-Section Deformation (Concrete)

CONCRETE	CULVERT SIZES						
	12"	24"	36"	48"	60"	72"	84"
GOOD	$< 12^{1/8}$	$< 24^{1/4}$	$< 36^{3/8}$	$< 48^{1/2}$	$< 60^{3/4}$	$< 72^{3/4}$	$< 85$
FAIR (1% - 5%)	$12^{1/8} - 12^{1/2}$	$24^{1/4} - 25^{3/16}$	$36^{3/8} - 37^{3/4}$	$48^{1/2} - 50^{1/4}$	$60^{3/4} - 63$	$72^{3/4} - 75^{1/2}$	$85 - 88^{1/4}$
POOR (5% - 10%)	$12^{1/2} - 13^{1/4}$	$25^{3/16} - 26^{3/8}$	$37^{3/4} - 39^{1/2}$	$50^{1/4} - 52^{3/4}$	$63 - 66$	$75^{1/2} - 79^{1/4}$	$88^{1/4} - 92^{1/2}$
CRITICAL ( $>10\%$ )	$> 13^{1/4}$	$> 26^{3/8}$	$> 39^{1/2}$	$> 52^{3/4}$	$> 66$	$> 79^{1/4}$	$> 92^{1/2}$

Good	No visual evidence of flattening of invert and/or crown. Barrel has smooth symmetrical curvature
Fair	Minor distortions isolated within the pipe resulting in flattening of invert and/or crown. Isolated sections are slightly non-symmetrical. Span dimension is within 1-5% of design
Poor	Significant distortions within the pipe resulting in flattening of invert and/or crown of pipe. Span dimension is within 5-10% of design
Critical	Severe distortions and deflection within the pipe; flattening of the crown or invert; structure is partially collapsed. Span dimension is greater than 10% of design

# Cross-Section Deformation (Metal)

METAL	CULVERT SIZES						
	12"	24"	36"	48"	60"	72"	84"
GOOD	$< 12^{1/2}$	$< 25^{3/16}$	$< 37^{3/4}$	$< 50^{1/4}$	$< 63$	$< 75^{1/2}$	$< 88^{1/4}$
FAIR (5% - 15%)	$12^{1/2} - 13^{3/4}$	$25^{3/16} - 27^{1/2}$	$37^{3/4} - 41^{1/2}$	$50^{1/4} - 55^{1/4}$	63 - 69	$75^{1/2} - 82^{3/4}$	$88^{1/4} - 96^{1/2}$
POOR (15% - 20%)	$13^{3/4} - 14^{1/2}$	$27^{1/2} - 28^{3/4}$	$41^{1/2} - 43^{1/4}$	$55^{1/4} - 57^{1/2}$	69 - 72	$82^{3/4} - 86^{1/2}$	$96^{1/2} - 101$
CRITICAL ( $> 20\%$ )	$> 14^{1/2}$	$> 28^{3/4}$	$> 43^{1/4}$	$> 57^{1/2}$	$> 72$	$> 86^{1/2}$	$> 100$

Good	No visual evidence of flattening of invert and/or crown. Barrel has smooth symmetrical curvature
Fair	Minor distortions isolated within the pipe resulting in flattening of invert and/or crown. Isolated sections are slightly non-symmetrical. Span dimension is within 5-15% of design
Poor	Significant distortions within the pipe resulting in flattening of invert and/or crown of pipe. Span dimension is within 15-20% of design
Critical	Severe distortions and deflection within the pipe; flattening of the crown or invert; structure is partially collapsed. Span dimension is greater than 20% of design

# Cross-Section Deformation (Plastic)

PLASTIC	CULVERT SIZES						
	12"	24"	36"	48"	60"	72"	84"
GOOD	$< 12^{1/2}$	$< 25^{3/16}$	$< 37^{3/4}$	$< 50^{1/4}$	$< 63$	$< 75^{1/2}$	$< 88^{1/4}$
FAIR (5% - 10%)	$12^{1/2} - 13^{1/4}$	$25^{3/16} - 26^{3/8}$	$37^{3/4} - 39^{1/2}$	$50^{1/4} - 52^{3/4}$	63 - 66	$75^{1/2} - 79^{1/4}$	$88^{1/4} - 92^{1/2}$
POOR (10% - 15%)	$13^{1/4} - 13^{3/4}$	$26^{3/8} - 27^{1/2}$	$39^{1/2} - 41^{1/2}$	$52^{3/4} - 55^{1/4}$	66 - 69	$79^{1/4} - 82^{3/4}$	$92^{1/2} - 96^{1/2}$
CRITICAL ( $> 15\%$ )	$> 13^{3/4}$	$> 27^{1/2}$	$> 41^{1/2}$	$> 55^{1/4}$	$> 69$	$> 82^{3/4}$	$> 96^{1/2}$

Good	No visual evidence of distortions within the pipe. Barrel has smooth symmetrical curvature. Pipe deflection up to 5% from original shape.
Fair	Minor isolated distortions and dimpling within the pipe. Pipe deflection 5-10% from original shape.
Poor	Significant distortions; wall buckling; flattening of invert/crown throughout the pipe. Pipe deflection 10-15% from original shape.
Critical	Severe distortions; wall buckling; flattening of invert/crown throughout the pipe; cracking/tearing present. Pipe deflection greater than 20% of original shape.

# Longitudinal Alignment

Good



Angle measured from upstream channel to centerline of culvert barrel is from 0-15 degrees

Fair



Angle measured from upstream channel to centerline of culvert barrel is from 15-45 degrees

Poor



Angle measured from upstream channel to centerline of culvert barrel is from 45-75 degrees

Critical



Angle measures from upstream channel to centerline of culvert barrel is larger than 75 degrees

# Footing

Good



Little or no deterioration. Concrete - minor cracking, leaching, or scaling. Masonry - minor weathering (joints are sound).

No footing exposed.

Fair



Minor to moderate deterioration. Concrete - moderate cracking, scaling or leaching (minor delamination or spalling). Masonry - moderate weathering (minor joint deterioration). Slight settlement or undermining. Minor footing exposure.

Poor



Extensive deterioration. Concrete - extensive cracking, scaling or leaching (delamination or spalling may be prevalent). Masonry - extensive weathering (significant joint deterioration). Significant settlement or undermining. Footing exposed and undermined.

Critical



Severe or critical deterioration. Function or structural capacity of the culvert has been severely impacted - immediate repairs or structural analysis may be required. Concrete - severe cracking, scaling, delamination, or spalling. Masonry - severe weathering (failed joints or displaced masonry blocks) Severe settlement or undermining.

# Roadway Over Culvert

Good



Pavement has no visible defects, small cracks, or maintenance patches

Fair



Minor isolated cracking and spalled areas

Poor



Significant cracking, spalling, potholes, or maintenance patches affecting up to 20% of any single travel lane or shoulder

Critical



Extensive cracking, spalling, potholes, or maintenance patches affecting 20% or more of any single travel lane or shoulder

# Blockage at Inlet

Good



Blockage is less than 10% of opening

Fair



Blockage is 10-30% of opening

Poor



Blockage is 30-75% of opening

Critical



Blockage is >75% of opening

# Embankment

Good



No noteworthy deficiencies which affect the condition of the embankment protection

Fair



Riprap starting to wash away, minor erosion, and embankment protection is in need of minor repairs

Poor



Embankment protection is severely undermined causing significant erosion of embankment and in need of immediate repairs

Critical



Embankment protection has failed causing severe scour of embankment and threatening the stability of the roadway embankment