

Pontis Element Data Collection Manual



Element Data Collection Manual

January 2008



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Major Manual Changes for 2008

- Pg. 16: Element 245 Concrete Culvert – Major, clarification of when to use element added
- Pg. 17: Element 309 Asphaltic Plug Joint, added
- Pg. 21: Element 393 Concrete Slope Protection, removed
Element 394 Concrete Block Slope Protection, removed
Element 397 Riprap Slope Protection, removed
Element 399 Apron, removed
- Element 395 renamed to Sacked Concrete Wall
- Pg. 29: New Maximo work item for sealing of concrete slope pavement joints.
Instructions for placement/replacement of load posting signs.
- Pg. 50: Corrugated Metal Culvert Inspection Guide added
- Pg. 67-70: Scale factor information added

Introduction

Pontis is a comprehensive bridge management system. Its purpose is to assist DelDOT in allocating resources to protect existing infrastructure investments, ensure safety and maintain mobility. The database stores inventory and inspection information about DelDOT's bridges and culverts, and provides modeling and analysis tools to support project development, budgeting, and program development. It helps DelDOT's Bridge Management Section to formulate network-wide preservation and improvement policies for use in evaluating the needs of each structure in the bridge inventory, and makes recommendations for what projects to include in DelDOT's structure maintenance and bridge design programs.

In order for Pontis to be effective in formulating preservation policies, the quality and consistency of bridge inspection data is of utmost importance. Keeping this in mind, the inspector should try to maintain consistency with element quantity totals from inspection to inspection. The inspector shall correct significant errors in total quantities, which will have an effect on the project estimates created by Pontis. Every effort has been made to create actions within Pontis that correlate well with the type and magnitude of the deficiencies described in the condition state language. The primary determining factor for condition states is the condition state language, however, the recommended actions may be used as a guide in confirming the proper condition states. In all cases, judgment and reason shall be used in assigning condition states to elements. For most elements, the worst condition state includes a recommendation that the element or structure be analyzed for the effects of strength loss or serviceability loss. Whenever such an element has any quantity rated in the worst condition state, the inspector shall immediately notify the Bridge Inspection Engineer or the Bridge Management Engineer in order to determine the proper course of action. In general, any questions pertaining to application of Pontis condition states should be raised through Bridge Management supervision.

ELEMENT DESCRIPTIONS

<u>Element No.</u>	<u>Title and Definition</u>	<u>Units</u>	<u>Page No.</u>
11	<p>AC Overlay This element defines those overlays that exist where no other deck/slab element is present, i.e., adjacent box beams with an overlay. May also be used on a major culvert with no fill.</p>	(EA)	31
12	<p>Concrete Deck – Bare This element defines those concrete bridge decks with no surface protection of any type and constructed with uncoated reinforcement.</p>	(EA)	32
13	<p>Concrete Deck – Unprotected with AC Overlay This element defines those concrete bridge decks with no surface protection of any type. The deck is covered with an asphaltic concrete overlay.</p>	(EA)	33
14	<p>Concrete Deck – Protected with AC Overlay This element defines those concrete bridge decks protected with a membrane. The membrane is covered with an asphaltic concrete overlay.</p>	(EA)	33
18	<p>Concrete Deck – Protected with Thin Overlay This element defines those concrete bridge decks protected with a thin (≤ 1 inch) overlay (Portland cement, polymer, etc.).</p>	(EA)	34
22	<p>Concrete Deck – Protected with Rigid Overlay This element defines those concrete bridge decks protected with a rigid (>1 inch) overlay (low-slump Portland cement, polymer, etc.).</p>	(EA)	34
26	<p>Concrete Deck – Protected with Coated Bars This element defines those concrete bridge decks constructed with (epoxy, galvanized, stainless steel, etc.) coated reinforcement bar. If a thin or rigid overlay is present, element should be coded as such.</p>	(EA)	32
27	<p>Concrete Deck – Protected with Cathodic protection This element defines those concrete bridge decks protected with a cathodic system.</p>	(EA)	32
28	<p>Steel Deck – Open Grid This element defines those bridge decks that are constructed of steel grids that are open and unfilled.</p>	(EA)	35

29	Steel Deck – Concrete Filled Grid This element defines those bridge decks that are constructed of steel grids with either all of the openings or just those in the wheel tracks filled with concrete.	(EA)	36
30	Corrugated/Orthotropic Deck This element defines those bridge decks that are constructed of corrugated metal filled with Portland cement concrete or asphaltic concrete. Orthotropic steel decks are also included. This element does not include stay-in-place forms.	(EA)	37
31	Timber Deck – Bare This element defines those bridge decks that are constructed of timber and are not overlaid.	(EA)	37
32	Timber Deck – with AC Overlay This element defines those bridge decks that are constructed of timber and are overlaid with asphaltic concrete.	(EA)	38
33	Composite Deck/Slab This element defines those bridge decks/slabs that are constructed of fiber-reinforced composites. This element includes all types of overlays.	(EA)	38
37	Reinforced Concrete Deck/Slab Under Fill This element defines only those concrete bridge decks/slabs that are under fill. (e.g. there is fill or GABC beneath the travel lanes. If hot mix rests directly on the deck/slab use deck/slab w/ AC overlay element)	(S.F.)	44
38	Concrete Slab – Bare This element defines those concrete slab bridges with no surface protection of any type and constructed with uncoated reinforcement.	(EA)	32
39	Concrete Slab – Unprotected with AC Overlay This element defines those concrete slab bridges with no surface protection of any type. The deck is covered with an asphaltic concrete overlay.	(EA)	33
40	Concrete Slab – Protected with AC Overlay This element defines those concrete slab bridges protected with a membrane. The membrane is covered with an asphaltic concrete overlay.	(EA)	33

44	Concrete Slab – Protected with Thin Overlay This element defines those concrete slab bridges protected with a thin (<1 inch) overlay (Portland cement, polymer, etc.).	(EA)	34
48	Concrete Slab – Protected with Rigid Overlay This element defines those concrete slab bridges protected with a rigid (>1 inch) overlay (low-slump Portland cement, polymer, etc.).	(EA)	34
52	Concrete Slab – Protected with Coated Bars This element defines those concrete slab bridges constructed with (epoxy, galvanized, stainless steel, etc.) coated reinforcement bar. If a thin or rigid overlay is present, element should be coded as such.	(EA)	32
53	Concrete Slab – Protected with Cathodic System This element defines those concrete slab bridges protected with a cathodic system.	(EA)	32
54	Timber Slab – Bare This element defines those slab span bridges that are constructed of timber and are not overlaid.	(EA)	37
55	Timber Slab – with AC Overlay This element defines those slab span bridges that are constructed of timber and are overlaid with asphaltic concrete.	(EA)	38
56	Reinforced Concrete Sidewalk This element defines those sidewalks on the bridge that are constructed of reinforced concrete. Reinforcement may be coated or uncoated.	(L.F.)	44
57	Timber Sidewalk This element defines those sidewalks on the bridge that are constructed of timber.	(L.F.)	45
58	Other Sidewalk This element defines those sidewalks on the bridge that are constructed of other material types (i.e. stone, brick, etc.)	(L.F.)	46
59	Reinforced Concrete Curb This element defines those curbs on the bridge with a defined joint between the sidewalk and the curb that are constructed of reinforced concrete. Reinforcement may be coated or uncoated.	(L.F.)	44

60	Curbs (Steel) Painted This element defines those curbs on the bridge that are constructed of painted steel.	(L.F.)	42
61	Other Curbs This element defines those curbs on the bridge that are constructed of other material types (i.e. stone, etc.).	(L.F.)	46
62	Median – Reinforced Concrete This element defines those medians on the bridge that are constructed of reinforced concrete. Reinforcement may be coated or uncoated.	(L.F.)	44
63	Steel Median Painted This element defines those medians on the bridge that are constructed of painted steel.	(L.F.)	42
64	Other Median This element defines those medians on the bridge that are constructed of other material types (i.e. stone, brick, etc.).	(L.F.)	46
65	Drains/Downspouts/Scuppers This element defines those drains, downspouts and scuppers on the bridge that are constructed of any material type (painted or unpainted steel, cast iron, formed concrete, plastic, etc.).	(EA)	39
66	Timber Curb This element defines those curbs on the bridge that are constructed of timber.	(L.F.)	45
67	Steel Sidewalk – Open Grid This element defines those sidewalks that are constructed of steel grids that are open and unfilled.	(L.F.)	39
68	Steel Sidewalk - Filled Grid This element defines those sidewalks that are constructed of steel grids with all the openings filled with concrete, including orthotropic sidewalks.	(L.F.)	40
101	Unpainted Steel Closed Web/Box Girder This element defines only those steel closed web/box girder units that are not painted or are constructed of weathering steel.	(L.F.)	41
102	Painted Steel Closed Web/Box Girder This element defines only those steel closed web/box girder units that are painted.	(L.F.)	42

104	Prestressed Concrete Closed Web/Box Girder This element defines only those closed web/box girder units constructed of prestressed concrete.	(L.F.)	43
105	Reinforced Concrete Closed Web/Box Girder This element defines only those closed web/box girder units constructed of reinforced concrete.	(L.F.)	44
106	Unpainted Steel Open Girder/Beam This element defines only those steel open girder units that are not painted or are constructed of weathering steel. This element includes two-girder systems as well as rolled beams on multiple-beam spans. Stiffeners should be included in the rating. Refer to element #213 for Concrete Encased Girders.	(L.F.)	41
107	Painted Steel Open Girder/Beam This element defines only those steel open girder units that are painted. This element includes two-girder systems as well as rolled beams on multiple-beam spans. Stiffeners should be included in the rating. Refer to element #213 for Concrete Encased Girders.	(L.F.)	42
109	Prestressed Concrete Open Girder/Beam This element defines only those open girder units constructed of prestressed concrete. This element includes two-girder systems as well as prestressed concrete beams on multiple-beam spans.	(L.F.)	43
110	Reinforced Concrete Open Girder/Beam This element defines only those open girder units constructed of reinforced concrete. This element includes two-girder systems as well as reinforced concrete beams on multiple-beam spans.	(L.F.)	44
111	Timber Open Girder/Beam This element defines only those open girders of timber construction. These can include either solid timber beams or glue-lam girders.	(L.F.)	45
112	Unpainted Steel Stringer (Stringer-Floor Beam System) This element defines all unpainted steel stringers that support the deck in a stringer-floor beam system.	(L.F.)	41
113	Painted Steel Stringer (Stringer-Floor Beam System) This element defines all painted stringers that support the deck in a stringer-floor beam system.	(L.F.)	42

115	Prestressed Concrete Stringer (Stringer-Floor Beam System) This element defines only those prestressed concrete stringers that support the deck in a stringer-floor beam system.	(L.F.)	43
116	Reinforced Concrete Stringer (Stringer-Floor Beam System) This element defines only those reinforced concrete stringers that support the deck in a stringer-floor beam system.	(L.F.)	44
117	Timber Stringer (Stringer-Floor Beam System) This element defines only those timber stringers that support the deck in a stringer-floor beam system.	(L.F.)	45
120	Unpainted Steel Through Truss (Bottom Chord) This element defines the bottom chord of unpainted steel trusses or those constructed of weathering steel. This element includes through trusses and pony trusses. Truss is measured in a straight line from end to end.	(L.F.)	41
121	Painted Steel Through Truss (Bottom Chord) This element defines the bottom chord of steel trusses that are painted. This element includes through trusses and pony trusses. Truss is measured in a straight line from end to end.	(L.F.)	42
125	Unpainted Steel Through Truss (Excluding Bottom Chord) This element defines all truss elements except the bottom chord of unpainted steel trusses or those constructed of weathering steel. This element includes through trusses and pony trusses. Truss is measured in a straight line from end to end.	(L.F.)	41
126	Painted Steel Through Truss (Excluding Bottom Chord) This element defines all truss elements except the bottom chord of steel trusses that are painted. This element includes through trusses and pony trusses. Truss is measured in a straight line from end to end.	(L.F.)	42
130	Unpainted Steel Deck Truss This element defines all members of unpainted steel deck trusses or those constructed of weathering steel. Truss is measured in a straight line from end to end.	(L.F.)	41
131	Painted Steel Deck Truss This element defines all members of painted steel deck trusses. Truss is measured in a straight line from end to end.	(L.F.)	42
134	Reinforced Concrete Filled Arch This element defines only those concrete arches that are under fill.	(S.F.)	44

135	Timber Truss/Arch This element defines all members of trusses and arches that are constructed of timber. Truss is measured in a straight line from end to end.	(L.F.)	45
140	Unpainted Steel Arch This element defines all members of only those steel arches that are not painted or are constructed of weathering steel. Does not include corrugated metal culverts.	(L.F.)	41
141	Painted Steel Arch This element defines all members of only those steel arches that are painted. Does not include corrugated metal culverts.	(L.F.)	42
143	Prestressed Concrete Arch This element defines only those arches constructed of prestressed concrete. Does not include concrete culverts or arches under fill.	(L.F.)	43
144	Reinforced Concrete Arch This element defines only those arches constructed of reinforced concrete. Does not include concrete culverts or arches under fill.	(L.F.)	44
145	Other Filled Arch This element defines arches made of masonry or any other material except steel, concrete or timber. Does not include culverts.	(S.F.)	46
146	Cable Uncoated (Not Embedded in Concrete) This element defines only those steel cables not embedded in concrete. This element only applies to cable stayed and suspension bridges.	(EA)	47
147	Cable Coated (Not Embedded in Concrete) This element defines only those steel cables not embedded in concrete. This element only applies to cable stayed and suspension bridges.	(EA)	48
151	Unpainted Steel Floor Beam This element defines only those steel floor beams that are not painted or are constructed of weathering steel.	(L.F.)	41
152	Painted Steel Floor Beam This element defines only those steel floor beams that are painted.	(L.F.)	42

154	Prestressed Concrete Floor Beam This element defines only those floor beams constructed of prestressed concrete.	(L.F.)	43
155	Reinforced Concrete Floor Beam This element defines only those floor beams constructed of reinforced concrete.	(L.F.)	44
156	Timber Floor Beam This element defines only those floor beams constructed of timber.	(L.F.)	45
160	Unpainted Steel Pin and/or Pin and Hanger Assembly This element defines only those steel pin and hanger assemblies that are either not painted or are constructed of weathering steel.	(EA)	41
161	Painted Steel Pin and/or Pin and Hanger Assembly This element defines only those steel pin and hanger assemblies that are painted.	(EA)	42
201	Unpainted Steel Column or Pile This element defines only those columns or piles, including monotubes or steel pipe that are unpainted or are constructed of weathering steel. Piles may be submerged or un-submerged.	(L.F.)	41
202	Painted Steel Column or Pile This element defines only those columns or piles, including monotubes or steel pipe, that are painted. Piles may be submerged or un-submerged.	(L.F.)	42
204	Prestressed Concrete Column or Pile This element defines only those columns or piles that are constructed of prestressed concrete. Piles may be submerged or un-submerged.	(L.F.)	43
205	Reinforced Concrete Column or Pile This element defines only those columns or piles that are constructed of reinforced concrete. Piles may be submerged or un-submerged.	(L.F.)	44
206	Timber Column or Pile This element defines only those columns or piles that are constructed of timber. Piles may be submerged or un-submerged.	(L.F.)	45
207	Jacketed Pile This element defines only those piles or portions thereof that are fitted with a protective jacket/encasement. Jacketed piles may be submerged or un-submerged.	(EA)	48

210	Reinforced Concrete Pier Wall This element defines only those pier walls (shafts) constructed of reinforced concrete.	(L.F.)	44
211	Other Pier Wall This element defines only those pier walls (shafts) constructed of stone or a combination of materials, i.e., reinforced concrete with facing.	(L.F.)	46
213	Concrete Encased Open Girder This element defines only those girders, which are protected by concrete encasement. This element is to be coded as if the concrete encasement is the protective coating, similar to paint.	(L.F.)	42
215	Reinforced Concrete Abutment This element defines only those abutments constructed of reinforced concrete. Deficiencies in the header / backwall are noted in the appropriate joint element.	(L.F.)	44
216	Timber Abutment This element defines only those abutment caps constructed of timber.	(L.F.)	45
217	Other Abutment This element defines only those abutments constructed of stone or a combination of materials, i.e., reinforced concrete with facing.	(L.F.)	46
218	Mechanically Stabilized Earth (MSE) Wall This element defines those walls retaining soil through the use of a concrete facing material with metallic or geo-synthetic tensile reinforcement.	(L.F.)	49
220	Reinforced Concrete Submerged Pile Cap This element defines only those reinforced concrete pile caps that are submerged and are visible for inspection. Element is to be used if water submerges the element fully or partially on a daily basis, even if completely dry at other times during the day.	(EA)	44
230	Unpainted Steel Pier Cap This element defines only those steel pier caps that are not painted or are constructed of weathering steel.	(L.F.)	41
231	Painted Steel Pier Cap This element defines only those steel pier caps that are painted.	(L.F.)	42

233	Prestressed Concrete Pier Cap This element defines only those pier caps that are constructed of prestressed concrete.	(L.F.)	43
234	Reinforced Concrete Pier Cap This element defines only those pier caps that are constructed of reinforced concrete.	(L.F.)	44
235	Timber Pier Cap This element defines only those pier caps that are constructed of timber.	(L.F.)	45
236	Reinforced Concrete Struts This element defines only those struts constructed of reinforced concrete.	(L.F.)	44
237	Timber Struts This element defines only those struts constructed of timber. Also includes column cross bracing.	(EA)	45
240	Steel Culvert – Minor (along length of barrel) This element defines all metal (steel, aluminum, galvanized) pipe culverts that are not of structural plate construction.	(L.F.)	50
241	Concrete Culvert –Minor (along length of barrel) This element defines all precast and cast-in-place (conventional or prestressed) pipes.	(L.F.)	51
242	Timber Culvert (along length of barrel) This element defines all timber box culverts.	(L.F.)	51
243	Other Culvert (along length of barrel) This element defines all culverts not included under steel, concrete or timber culverts. It includes masonry and combinations of other materials.	(L.F.)	52
244	Steel Culvert - Major (along length of barrel) This element defines all metal (steel, aluminum, galvanized) culverts that are constructed of structural plate, including arches, round or elliptical pipes and boxes.	(L.F.)	50
245	Concrete Culvert - Major This element defines all those reinforced concrete box culverts and rigid frames, regardless of span length or amount of fill. Culverts that are “mitered” to the slope will have two elements, culvert for the portion with top slab and wingwall for portion without a top slab.	(L.F.)	52

260	Unpainted Steel Sheeting This element defines only those steel sheet piles that are not painted or are constructed of weathering steel.	(L.F.)	41
261	Painted Steel Sheeting This element defines only those steel sheet piles that are painted.	(L.F.)	42
262	Prestressed Concrete Sheeting This element defines only those sheet piles that are constructed of prestressed concrete.	(L.F.)	43
264	Timber Sheeting This element defines only those sheet piles that are constructed of timber.	(L.F.)	45
300	Strip Seal Expansion Joint This element defines only those expansion joint devices that utilize a neoprene-type waterproof gland with steel extrusion to anchor the gland.	(L.F.)	53
301	Pourable Joint Seal This element defines only those joints filled with a pourable seal. This element includes sections of the joint between the deck and backwall, approach slab and backwall and parapet and approach slab.	(L.F.)	53
302	Compression Joint Seal This element defines only those joints filled with a performed compression-type seal.	(L.F.)	54
303	Assembly Joint Seal (modular) This element defines only those joints filled with an assembly mechanism, which may or may not have a seal.	(L.F.)	55
304	Open Expansion Joint This element defines only those joints that are open and not sealed. Includes finger joints, with or without a trough, and sliding plates.	(L.F.)	55
309	Asphaltic Plug Joint This element defines only those joints that are constructed of an elastomeric asphalt without the use of a gland or seal.	(L.F.)	54
310	Elastomeric Bearing This element defines only those bridges bearings that are constructed primarily of elastomers with fabric or metal reinforcement	(EA)	56

311	Movable Bearing (roller, sliding, etc.) This element defines only those bridge bearings that provide for both deflection and longitudinal movement by means of roller, rocker or sliding mechanisms.	(EA)	56
312	Enclosed/Concealed Bearing This element defines only those bridge bearings that are enclosed so that they are not open for detailed inspection.	(EA)	57
313	Fixed Bearing This element defines only those bridge bearings that provide for deflection only.	(EA)	57
314	Pot Bearing This element defines those high-load bearings with confined elastomer. The bearing may be fixed against horizontal movement, guided to allow movement in one direction, or floating to allow sliding in any direction.	(EA)	58
315	Disk Bearing This element defines those high-load bearings with a hard plastic disk. The bearing may be fixed against horizontal movement, guided to allow movement in one direction, or floating to allow sliding in any direction.	(EA)	58
320	Prestressed Concrete Approach Slab with or without AC Overlay This element defines those structural sections, with or without an asphalt overlay, between the abutment and the approach pavement that are constructed of prestressed concrete.	(EA)	59
321	Reinforced Concrete Approach Slab with or without AC Overlay This element defines those structural sections, with or without an asphalt overlay, between the abutment and approach pavement that are constructed of reinforced concrete.	(EA)	59
330	Bridge Railing Metal Uncoated This element defines all types and shapes of metal bridge railing. Steel, aluminum, metal beam, rolled shapes, etc., are all considered part of this element. The element is neither coated nor painted.	(L.F.)	60
331	Bridge Railing Reinforced Concrete This element defines all types and shapes of reinforced concrete bridge railing. All elements of the railing must be concrete.	(L.F.)	60

332	Bridge Railing Timber This element defines all types and shapes of timber bridge railing.	(L.F.)	61
333	Bridge Railing Other This element defines only those bridge railings constructed of stone or a combination of materials, i.e., reinforced concrete with facing.	(L.F.)	61
334	Bridge Railing Metal Coated This element defines all types and shapes of metal bridge railing. Steel, aluminum metal beam rolled shapes, etc., are all considered part of this element. The element may be coated with paint or protected with galvanizing or some other coating. Includes chain link fence on top of parapets.	(L.F.)	62
356	Steel Fatigue This condition state language addresses only those bridges with steel elements that are already showing fatigue damage. It should not be applied to steel bridges before fatigue damage becomes apparent.	(EA)	63
357	Pack Rust This condition state language addresses only those connections (including shapes in contact in built-up members) of steel bridges that are already showing signs of rust packing between steel plates. This element does not apply to bearings. This element should only be used for built up members and splices/connections.	(EA)	63
358	Deck Cracking This condition state language addresses cracking on the top surface of concrete decks/slabs.	(EA)	63
359	Soffit (or under surface) of Concrete Deck or Slab This condition state language addresses deck distresses through visual inspection of the deck soffit (undersurface). It is extremely valuable when the top surface of the deck is covered with an overlay. Should be used for overhang sections when stay-in-place forms are present.	(EA)	64
360	Settlement This condition state language addresses substructure settlement distresses that are evident during visual inspection. Its primary purpose is to identify bridges that are experiencing settlement and to provide some measure of the magnitude of that settlement. The normal CoRe condition state language for substructure elements does not address settlement.	(EA)	64

361	<p>Scour This condition state language addresses scour distresses that are evident during visual inspections. Its primary purpose is to identify bridges that are experiencing scour and to provide some measure of the magnitude of the scour. Item 113 should only be changed by the Scour Engineer. The scour Smart Flag should not be removed unless permanent countermeasures are placed.</p>	(EA)	64
362	<p>Traffic Impact This condition state language addresses distress of any superstructure (not parapets) elements due to traffic impact damage.</p>	(EA)	65
363	<p>Section Loss This condition state language addresses section loss in areas of steel members that warrant analysis (e.g. beam/girder web in high shear areas, beam/girder flanges in high moment areas, bottom chord of through truss, etc.). This Smart Flag should be used when a steel element reaches condition state 4 for unpainted steel and state 5 for painted steel, or for those elements that have section loss but have been cleaned and painted over. This element should only be removed if section loss has been repaired.</p>	(EA)	65
364	<p>Erosion This condition state language addresses erosion distresses that are evident during visual inspections. Its primary purpose is to identify bridges that are experiencing erosion and to provide some measure of the magnitude of the erosion. Only applies to deterioration outside the limits of the stream, if a stream is present.</p>	(EA)	65
380	<p>Unpainted Steel Diaphragm This element defines only those diaphragms that are not painted or are constructed of weathering steel.</p>	(EA)	41
381	<p>Painted Steel Diaphragm This element defines only those steel diaphragms that are painted.</p>	(EA)	42
382	<p>Reinforced Concrete Diaphragm This element defines only those diaphragms that are constructed of reinforced concrete. Does not include haunches at the ends of concrete decks.</p>	(EA)	44
383	<p>Timber Diaphragm This element defines only those diaphragms or cross bracing units that are constructed of timber.</p>	(EA)	45

385	Timber Wingwall / Retaining Wall Cap This element defines those wingwall caps constructed of timber.	(L.F.)	45
386	Reinforced Concrete Wingwall / Retaining Wall Cap This element defines those MSE wall or wingwall / retaining wall caps constructed of reinforced concrete that are not monolithic with the wall. Applicable to walls constructed of any material.	(L.F.)	44
390	Reinforced Concrete Wingwall / Retaining Wall This element defines only those wingwall or retaining wall units constructed of reinforced concrete.	(L.F.)	44
392	Other Wingwall / Retaining Wall This element defines only those wingwalls or retaining walls constructed of stone or a combination of materials, i.e., reinforced concrete with facing.	(L.F.)	46
393	Concrete Slope Protection Removed in 2008, deficiencies shall be addressed with the scour or erosion smart flags and Maximo work orders	No Longer Used	
394	Concrete Block Slope Protection Removed in 2008, deficiencies shall be addressed with the scour or erosion smart flags and Maximo work orders	No Longer Used	
395	Sacked Concrete Wall This element defines walls constructed of sacked concrete riprap. This element only applies to headwalls, wingwalls, and retaining walls constructed of sacked concrete riprap. Walls may have a slight batter.	(S.F.)	49
397	Riprap Slope Protection Removed in 2008, deficiencies shall be addressed with the scour or erosion smart flags and Maximo work orders	No longer Used	
398	Reinforced Concrete Headwall This element defines only those headwall units constructed of reinforced concrete and retaining fill.	(L.F.)	44
399	Apron Removed in 2008, deficiencies shall be addressed with the scour or erosion smart flags and Maximo work orders	No longer Used	

400

Other Headwall

This element defines only those headwall units constructed of stone or a combination of materials, i.e., reinforced concrete with facing, and retaining fill.

(L.F.)

46

Commentary

Estimating Total Quantities

Partial unit measurements are not permitted. Quantities should be entered utilizing the nearest whole foot within MSPE and Pontis. Quantities should not be changed from inspection to inspection unless construction/rehab has been performed or current quantity is in obvious error. Quantities are not to be re-measured at every inspection.

Conventions for Quantities

- Quantity for **decks** and **slabs** shall be measured on a square foot basis from out to out and backwall to backwall.
 - Quantity for **joints** is measured in feet along the length of the joint unless joint is measured as each.
 - Quantity for **approach slabs** is measured on an each basis, not square feet.
 - Quantity for **culverts** is measured in feet along the centerline length of the bottom of the barrel times the number of barrels.
 - Quantity for **abutments** is measured in feet along their face.
 - Quantity for **bridge railing, medians, curbs and sidewalks** is measured in feet from backwall to backwall or to the end of the wingwalls or approach slabs when element is attached to either the wingwalls or approach slab.
 - Quantity of **bridge railing** (parapets) for structures with bridge decks divided by a median parapet such as a jersey barrier type or structure with a traffic barrier protecting a sidewalk area shall be measured in feet along the face of the barrier, i.e., 30 ft bridge with a parapet on each side and a double face parapet in the median, quantity = 120 ft.
 - Quantity for **pier walls** and **caps** is measured in feet from outside edge to outside edge. Use the pier wall element anytime the pier-supporting member is not round or square.
 - Quantity for **arch** is measured in feet along the span length from spring line to spring line.
 - Quantity for **filled arch** is measured in square feet of the exposed intrados surface (ground line to ground line). **Filled arches typically should not have an abutment element.**
 - Quantity for **sheeting** is measured in feet on a horizontal basis, not vertical.
 - Quantity for **piles and columns** is measured in feet along the exposed length of the pile or column. If there is a pile jacket, the pile length is measured along to non-jacketed portion of the pile.
 - Bridges that include both **painted** and **unpainted steel elements**, should have quantities for each type.
 - Quantity for **partially concealed** elements (i.e. wingwalls or beams) should be taken from plans. If no plans are available, measure the exposed quantity. Any quantity that is uninspectable shall be placed in CS-1. This does not apply to piles or columns.
- Any **totally concealed** element, except enclosed bearings, is considered uninspectable and should not be included.

Inspection Guidance

General

The inspector shall review prior PONTIS bridge inspection reports to verify that all Pontis element numbers and quantities are accurate according to previously stated guidelines. Current underwater inspections shall be reviewed and utilized when rating substructure elements.

Inspection Orientation

Orientation shall be stations ahead (from any existing plans) with left elements, such as girders, being numbered 1. If plans are not available, match the previous inspection orientation. If no previous inspection or plans are available, inspection orientation shall be west to east or south to north.

Element Documentation for multi-span bridges on span-by-span basis

Span #1 should include:

1. The deck element and any smart flags.
2. Superstructure elements including the bearings supporting that span.
3. The substructure elements including the abutment and first pier.

Span #2 and remaining spans should include:

1. Superstructure elements including the bearings supporting that span.
2. Substructure elements including the next pier or abutment if last span.

Element Documentation for multi-span bridges, with buried spans, on a span-by-span basis

First span should include:

1. The deck element (whole deck quantity) and any smart flags.
2. Any visible elements in the format as documented above.

Subsequent spans should include:

1. Any visible elements in the format documented above.

Note: For bridges with buried spans, the abutment may be placed in the span in which it is visible. A substructure element is considered a pier if it can be inspected on all sides otherwise it is an abutment.

Example: 3-span bridge, first two spans buried, third span visible with pier visible on one side only and an abutment.

MSPE Span 1 elements: Deck, Smart Flags, Railing, Joints, other visible elements

MSPE Span 2 elements: Railing, Joints, other visible elements

MSPE Span 3 elements: Two Abutments, Bearings, Beams, Railing, Joints, other visible elements

Element Selection

If plans are available, all applicable elements should be determined for the bridge based on those plans. The inspector shall actually rate only those elements that can be seen by the inspector.

Bridge Railing

Bridge railings with multiple rail systems (concrete w/ aluminum handrail) will be recorded as per each material type, i.e., #330, Metal Bridge Railing and #331, Concrete Bridge Rail.

Galvanized railing elements shall be recorded as #334, Coated Metal Rail.

When recording guardrail as bridge rail, only guardrail attached to the structure will be considered bridge rail. Guardrail posts driven in fill over culverts is not considered bridge rail and should not be recorded as a Pontis element. This condition should be coded in NBI Item #36.

Curbs & Sidewalks

The sidewalk element should be used when the width is greater than 24" and not monolithic with the deck, i.e., raised. The curb element may also be used in conjunction with a sidewalk element in accordance with the element descriptions.

If the width is $\leq 24"$, only the curb element should be used.

Truss Elements

If there is deterioration of a vertical member, code the foot quantity of deterioration equal to a minimum of one panel length, i.e., the distance between vertical members.

Substructure Elements

Hammerhead Piers consisting of square or round shafts with a tapered pier cap shall be coded as #205 - Column and #234 - Pier Cap. If the hammerhead pier has a rectangular shaft with definitive joint or change of dimension at the cap, the pier shall be coded as #210 - Pier Wall and #234 - Pier Cap.

Substructures constructed of a combination of elements shall be separated into their respective elements (abutment, sheeting and piles). For example:

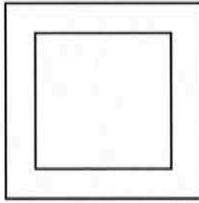
Timber abutments shall be separated into elements #264 – Timber Sheeting, #216 – Timber Abutment and #206 – Timber Piles.

Timber wingwalls shall be separated into elements #264 – Timber Sheeting, #206 – Timber Piles, and #285 – Timber Wingwall / Retaining Wall Cap.

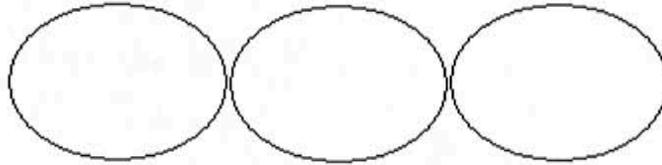
Examples

Culverts

The quantity for culverts will be the length of the barrel multiplied by the number of barrels.



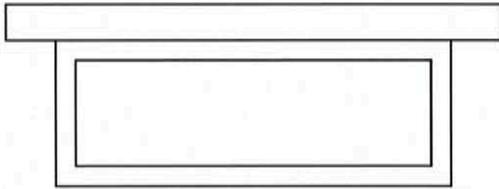
Qty = 1 x barrel length



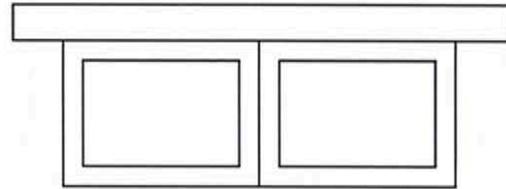
Qty = 3 x barrel length

Box Girders

The quantity for box girders will be the number of girders multiplied by the span length.



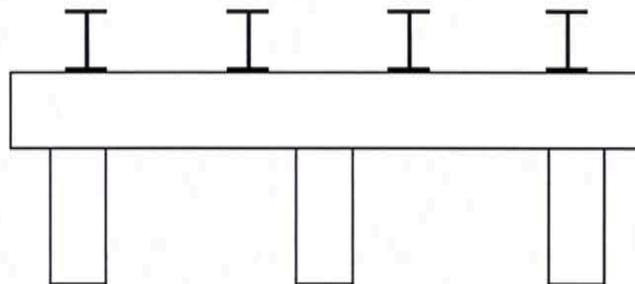
Qty = 1 x span length



Qty = 2 x span length

Pile Bent Pier

These piers will have two elements, a cap and columns.

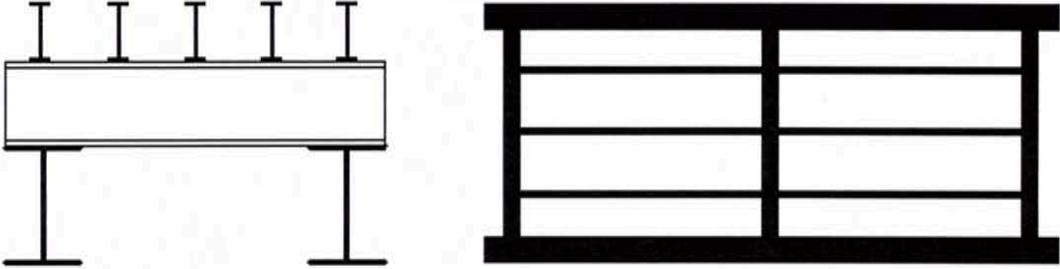


Qty: Columns = 3, Cap = 1 x length

Stringers/Floor Beams/Girders

Stringers are the small elements running longitudinally supporting the deck and distributing the load from the deck

to the floor beams. Floor beams run transverse to the deck and carry the stringer load out to the truss or girders. Girders are the main longitudinal superstructure members carrying the loads to the substructure.



Qty: Girders = 2 x length, Floor Beams = 3 x length, Stringers = 5 x length

Crack Size Definitions

Reinforced Concrete			Prestressed Concrete		
Superficial	-	< 1/16 "	Superficial	-	< .004 "
Minor	-	1/16 " – 1/8 "	Minor	-	.004 " - .009 "
Moderate	-	>1/8 " – 1/4 "	Moderate	-	.01 " - .03 "
Advanced	-	> 1/4 "	Advanced	-	> .03 "

Note: Crack dimensions for prestressed concrete apply to cracks that are perpendicular to prestressing. For cracks that are parallel to prestressing, refer to crack dimensions for reinforced concrete.

Maximo Maintenance Requests

For each bridge inspected the following maintenance items shall be requested by the bridge inspector where applicable. The maintenance shall be entered into Maximo with the appropriate priority.

Maximo Priority 3 Maintenance:

Removal of vegetation and debris when affecting the bridge. (See NBI Item #61) (BMS code B055-V1A) (Function Code 11105.5)

Repair of erosion and placement of erosion control measures when the bridge is affected (CS2 or worse). (Element #364) (BMS code B054-S6D) (Function Code 11105.4)

Maximo Priority 2 Maintenance:

Repair of deck, slab, and approach slab spalls. (Condition State 2 and top surfaces only) (BMS code B025-P1A or B022-S1D) (Function Code 11102.5)

Repair of AC overlay (CS 2 only) or repair of hot mix over; culvert, slab under fill, filled arch or approach slab, (BMS code B022-S1D) (Function Code 11102.2) or hot mix wedge placement to account for settlement at the ends of bridges.

Clean out scuppers and/or drains (BMS code B002-S1G) (Function Code 11100.2)

Maximo Priority 1 Maintenance:

Cleaning/clearing weepholes in P.S. conc. box beams. (Function Code 11107.1)

Clean/flush bearings/bearing seat (use when debris may cause deterioration of bearing or bearing seat) (BMS code B003-S2J) (Function Code 11100.3)

Apply protective coating – deck (when element #358 is CS 2 or worse), parapets, sidewalk, or approach slab. (used to seal minor cracks, specify coating material to be used) (BMS code B060-A1C) (Function Code 11106.0)

Seal joints in concrete slope paving and/or between the slope paving and the abutment or wingwall. (BMS code B007-S1H) (Function Code 11100.7)

Critical maintenance needs shall be brought to the attention of the Bridge Inspection Engineer and will be addressed on a case by case basis. Scour smart flag (element # 361) condition state 2 or 3 shall be brought to the attention of the Bridge Inspection Engineer who will determine if a Maximo maintenance request is required.

Replacement / Placement of Load Posting Signs: Check Item 41, if coded as “P” and no sign is present, consult Bridge Management Engineer to verify the need for placement of posting sign. If an existing sign needs replacement (damaged/missing), bring it to the attention of the Bridge Management Engineer.

Replacement / Placement of Vertical Clearance Signs: Check Item 53 and 54B, if underclearance is less than 14’-6” and no sign is present, consult Bridge Management Engineer to verify the need for placement of clearance sign. If an existing sign needs replacement (damaged/missing), bring it to the attention of the Bridge Management Engineer.

Under the “NOTES” tab card in the space provided for Inspection Notes, the inspector shall enter the requested maintenance, maintenance code and the Maximo work order number.

In Maximo, (in the description box immediately to the right of the work order number box) enter the work description in the following format: **Bridge # / Work code (e.g. BR: 1-001-279 / Work: B055-V1A)**. The source code of BR MGMT shall be used for all work orders.

In addition; the inspector shall list in the inspection report, but do not enter into Maximo, other maintenance not covered by Pontis elements and/or actions (e.g. siding repairs needed on a covered bridge).

Maximo work orders shall be sent to the following supervisors:

North District – Jeff Trent (Area 48)

Canal District – John Barczak (Area 45)

Central District – Dale Cook (Area 21) Assign to Mike Stachecki

South District – Ronnie Tyndall (Area 20)

Element Condition State Descriptions

Deck and Slab Elements

11 AC Overlay (EA)

<u>Condition State</u>	<u>Description</u>
	<ol style="list-style-type: none">1. There are no potholes, impending potholes, or cracks in the surfacing. <i>~No distress</i><ul style="list-style-type: none">- Do nothing2. Potholes, impending potholes or cracks exist. Their combined area is 2% or less of the total overlay area. <i>~ Distress \leq 2%</i><ul style="list-style-type: none">- Do nothing3. Potholes, impending potholes or cracks exist. Their combined area is more than 2% but 10% or less of the total overlay area. <i>~2 to 10% distress</i><ul style="list-style-type: none">- Do nothing- Repair potholes and seal cracks- Replace overlay4. Potholes, impending potholes or cracks exist. Their combined area is more than 10% but less than 25% of the total overlay area. <i>10 to 25% distress</i><ul style="list-style-type: none">- Do nothing- Repair potholes and seal cracks- Replace overlay5. Potholes, impending potholes or cracks exist. Their combined area is 25% or more of the total overlay area. <i>~Distress \geq 25%</i><ul style="list-style-type: none">- Do nothing- Replace overlay

Note: This element is to be used when there no other deck/slab element exists, i.e., adjacent box beams with an AC overlay. May also be used on a major culvert with no fill.

- 12 Concrete Deck – Bare (EA)
- 26 Concrete Deck – Protected w/ Coated Bars (EA)
- 27 Concrete Deck – Protected w/ Cathodic Protection (EA)
- 38 Concrete Slab – Bare (EA)
- 52 Concrete Slab – Protected w/ Coated Bars (EA)
- 53 Concrete Slab – Protected w/ Cathodic Protection (EA)

Condition
State

Description

1. The surface of the deck has no spalls/delaminations. *~No damage*
 - Do nothing
2. Spalls/delaminations exist in the deck surface. The combined distressed area is 2% or less of the total deck area. *~Distress \leq 2%*
 - Do nothing
3. Spalls/delaminations exist in the deck surface. The combined area of distress is more than 2% but 10% or less of the total deck area. *~2 to 10% distress*
 - Do nothing
 - Repair spalled/delam areas
 - Repair spalled/delam areas & overlay
4. Spalls/delaminations exist in the deck surface. The combined area of distress is more than 10% but less than 25% of the total deck area. *~10 to 25% distress*
 - Do nothing
 - Repair spalled/delam areas
 - Repair spalled/delam areas & overlay
5. Spalls/delaminations exist in the deck surface. The combined area of distress is 25% or more of the total deck area. *~Distress \geq 25%*
 - Do nothing
 - Repair spalled/delam areas & overlay
 - Replace

Note: Use deck cracking smart flag (#358) to document cracks on top. Use soffit smart flag (#359) to document deficiencies on the underside. This element is used to document spalls/delaminations on the topside only.

- 13 Concrete Deck – Unprotected w/AC Overlay (EA)**
- 14 Concrete Deck – Protected w/AC Overlay (EA)**
- 39 Concrete Slab – Unprotected w AC Overlay (EA)**
- 40 Concrete Slab – Protected w/AC Overlay (EA)**

<u>Condition</u>	<u>Description</u>
<u>State</u>	

- | | |
|----|--|
| 1. | There are no potholes, impending potholes, or cracks in the surfacing. <i>~No distress</i> |
| | - Do nothing |
| 2. | Potholes, impending potholes, and/or cracks exist. Their combined area is 2% or less of the total deck area. <i>~Distress \leq 2%</i> |
| | - Do nothing |
| 3. | Potholes, impending potholes, and/or cracks exist. Their combined area is more than 2% but 10% or less of the total deck area. <i>~2 to 10% distress</i> |
| | - Do nothing |
| | - Repair spalled/delam areas & potholes |
| | - Repair spalled/delam areas and replace overlay |
| 4. | Potholes, impending potholes, and/or cracks exist. Their combined area is more than 10% but less than 25% of the total deck area. <i>~10 to 25% distress</i> |
| | - Do nothing |
| | - Repair spalled/delam areas & potholes |
| | - Repair spalled/delam areas and replace overlay |
| 5. | Potholes, impending potholes, and/or cracks exist. Their combined area is 25% or more of the total deck area. <i>~Distress \geq 25%</i> |
| | - Do nothing |
| | - Repair spalled/delam areas and replace overlay |
| | - Replace |

Note: Use soffit smart flag (#359) to document deficiencies on the underside. This element is used to rate the top or wearing surface. “Protected” indicates presence of a waterproofing membrane. “Unprotected” indicates the absence of a waterproofing membrane.

- 18 Concrete Deck Protected w/ Thin Overlay (EA)**
- 22 Concrete Deck Protected w/ Rigid Overlay (EA)**
- 44 Concrete Slab Protected w/ Thin Overlay (EA)**
- 48 Concrete Slab Protected w/ Rigid Overlay (EA)**

Condition Description
State

1. There are no spalls/delaminations in the deck surface. No wear-out is visible. *~No distress*
 - Do nothing
2. Spalls/delaminations exist in the deck surface. Their combined area of distress is 2% or less of the total deck area. *~Distress ≤ 2%*
 - Do nothing
3. Spalls/delaminations exist in the deck surface. Their combined area of distress is more than 2% but 10% or less of the total deck area. *~2 to 10% distress*
 - Do nothing
 - Repair spalled/delam areas
 - Repair substrate and replace overlay
4. Spalls/delaminations exist in the deck surface. Their combined area of distress is more than 10% but less than 25% of the total deck area. *~10 to 25% distress*
 - Do nothing
 - Repair spalled/delam areas
 - Repair substrate and replace overlay
5. Spalls/delaminations exist in the deck surface. Their combined area of distress is 25% or more of the total deck area. *~Distress ≥ 25%*
 - Do nothing
 - Repair substrate and replace overlay
 - Replace

Note: Use deck cracking smart flag (#358) to document cracks on top. Use soffit smart flag (#359) to document deficiencies on the underside. This element is used to document spalls/delaminations on the topside only. “Thin Overlay” ≤ 1 inch, “Rigid Overlay” > 1 inch.

28 Steel Deck – Open Grid (EA)

<u>Condition State</u>	<u>Description</u>
	<ol style="list-style-type: none">1. There is no corrosion. The paint system, if any, is sound. The connectors (welds, rivets, etc.) are sound. <i>~No corrosion</i><ul style="list-style-type: none">- Do nothing2. There is little or no corrosion. The paint system, if any, may be showing early signs of distress. The connectors are still sound. <i>~Minor deterioration</i><ul style="list-style-type: none">- Do nothing3. Surface or freckled rust has formed. The paint system is no longer fully effective. There is no loss of section. The connectors may be starting to show signs of distress – cracked welds or broken rivets. <i>~Rust formation</i><ul style="list-style-type: none">- Do nothing- Rehab connectors, power wash and restore top coat4. Corrosion is moderate. Surface pitting may be present but any section loss is incidental. Numerous connectors are failing at scattered locations. The strength or serviceability of the section is not yet affected. <i>~Moderate corrosion</i><ul style="list-style-type: none">- Do nothing- Rehab connectors and replace paint system5. Corrosion is advanced. Numerous connectors have failed. Section loss and/or connectivity are sufficient to warrant analysis to ascertain the impact on the ultimate strength and/or serviceability of either the element or the bridge. <i>~Advanced corrosion</i><ul style="list-style-type: none">- Do nothing- Rehab connectors and replace paint system- Replace deck

29 Steel Deck - Concrete Filled Grid (EA)

<u>Condition State</u>	<u>Description</u>
1.	There is no corrosion. The paint system, if any, is sound. The connectors (welds, rivets, etc.) are sound. The concrete filler is sound. <i>~No corrosion</i> <ul style="list-style-type: none">- Do nothing
2.	There is little or no corrosion. The paint system, if any, may be showing early signs of distress. The connectors are still sound. The concrete filler is sound. <i>~Minor deterioration</i> <ul style="list-style-type: none">- Do nothing
3.	Surface or freckled rust has formed. The paint system is no longer fully effective. There is no loss of section. The connectors may be starting to show signs of distress – cracked welds or broken rivets. The concrete filler may have broken out at scattered locations. <i>~Rust formation</i> <ul style="list-style-type: none">- Do nothing- Rehab connectors and filler, power wash and restore top coat
4.	<i>Corrosion is moderate. Surface pitting may be present but any section loss is incidental.</i> Numerous connectors are failing at scattered locations. Small areas of concrete are missing. <i>~Moderate corrosion</i> <ul style="list-style-type: none">- Do nothing- Rehab connectors and filler, replace paint system
5.	Corrosion is advanced. Numerous connectors have failed. Section loss and/or connectivity is sufficient to warrant analysis to ascertain the impact on the ultimate strength and/or serviceability of either the element or the bridge. Much of the concrete filler is missing. <i>~Advanced corrosion</i> <ul style="list-style-type: none">- Do nothing- Rehab connectors and filler, replace paint system- Replace deck

30 Deck - Corrugated/Orthotropic/Etc. (EA)

<u>Condition State</u>	<u>Description</u>
	<ol style="list-style-type: none">1. There is no evidence of active corrosion, and any paint systems are sound and functioning as intended to protect the metal surface. The surfacing, if any, on the deck has no potholes. <i>~No deterioration</i><ul style="list-style-type: none">- Do nothing2. There is little or no active corrosion. Surface of freckled rust has formed or is forming. The paint system may be chalking, peeling, curling, or showing other early evidence of paint system distress, but there is no exposed metal. Minor cracking or potholes may exist in the surfacing. <i>~Minor deterioration</i><ul style="list-style-type: none">- Do nothing3. Surface or freckle rust is prevalent. There may be exposed metal but there is no active corrosion which is causing loss of section. Potholes exist in the surfacing and there may be significant cracking. <i>~Rust formation</i><ul style="list-style-type: none">- Do nothing- Surface clean & restore top coat of paint- Repair potholes and cracks4. Corrosion may be present but any section loss due to active corrosion does not yet warrant structural analysis of either the element or the bridge. Potholes may be large and expose the metal decking. <i>~Moderate deterioration</i><ul style="list-style-type: none">- Do nothing- Power tool clean and paint and/or repair potholes- Replace paint system and/or surfacing5. Corrosion has caused section loss and is sufficient to warrant analysis to ascertain the impact on the ultimate strength and/or serviceability of either the element or the bridge. The surfacing has failed. <i>~Major section loss</i><ul style="list-style-type: none">- Do nothing- Rehab/replace paint system, replace surfacing- Replace

31 Timber Deck (EA)

54 Timber Slab (EA)

<u>Condition State</u>	<u>Description</u>
	<ol style="list-style-type: none">1. Investigation indicates no decay. There may be cracks, splits and checks that have no effect on strength or serviceability. <i>~No decay</i><ul style="list-style-type: none">- Do nothing2. Decay, insect infestation, abrasion, splitting, cracking, or crushing may exist but none is sufficiently advanced to affect strength or serviceability of the element. <i>~Minor decay</i><ul style="list-style-type: none">- Do nothing3. Decay, insect infestation, abrasion, splitting, cracking, or crushing has produced loss of strength or deflection of the element but not of sufficient magnitude to affect the serviceability of the bridge. <i>~Some strength loss</i><ul style="list-style-type: none">- Do nothing- Rehab- Replace4. Deterioration is advanced. Decay, insect infestation, abrasion, splits, cracks, or crushing has produced loss of strength or deflection that affects the serviceability of the bridge. <i>~Major strength loss</i><ul style="list-style-type: none">- Do nothing- Replace

Note: This element is used to rate the top and bottom surfaces. Do not use soffit smart flag (#359).

32 Timber Deck - w/ AC Overlay (EA)

55 Timber Slab - w/ AC Overlay (EA)

<u>Condition State</u>	<u>Description</u>
1.	Investigation indicates no decay. There may be cracks, splits and checks that have no effect on strength or serviceability. There are no potholes in the surfacing. <i>~No deterioration</i> <ul style="list-style-type: none">- Do nothing
2.	Decay, insect infestation, splitting, cracking, or crushing may exist, but none is sufficiently advanced to affect strength or serviceability of the element. There may be minor potholes or impending potholes in the surfacing. <i>~Minor deterioration</i> <ul style="list-style-type: none">- Do nothing
3.	Decay, insect infestation, splitting, cracking, or crushing has produced loss of strength or deflection of the element, but not of sufficient magnitude to affect the serviceability of the bridge. There may be major potholes or impending potholes in the surfacing. <i>~Some strength loss</i> <ul style="list-style-type: none">- Do nothing- Repair potholes and cracks- Replace
4.	Deterioration is advanced. Decay, insect infestation, splits, cracks, or crushing has produced loss of strength or deflection that affects the serviceability of the bridge. <i>~Major strength loss</i> <ul style="list-style-type: none">- Do nothing- Replace

Note: This element is used to rate the top and bottom surfaces. Do not use soffit smart flag (#359).

33 Composite Deck/Slab (EA)

<u>Condition State</u>	<u>Description</u>
1.	The surfacing, if any, has no distressed area. Deck/slab shows no deterioration. <i>~No Damage</i> <ul style="list-style-type: none">- Do nothing
2.	There may be minor potholes or impending potholes in the surfacing. Deck/slab has minor deterioration. <i>~Minor deterioration</i> <ul style="list-style-type: none">- Do nothing
3.	There may be major potholes or impending potholes in the surfacing. Deck/slab has major deterioration, but not of sufficient magnitude to affect the strength and/or serviceability of either the element or the bridge. <i>~Major deterioration</i> <ul style="list-style-type: none">- Do nothing- Repair potholes/rehab- Replace
4.	Deterioration is advanced. Deterioration is sufficient to warrant analysis to ascertain the impact on ultimate strength and/or serviceability of either the element or the bridge. <i>~Analysis warranted</i> <ul style="list-style-type: none">- Major rehab- Replace

Note: This element is used to rate the top and bottom surfaces. Do not use soffit smart flag (#359).

65 Drains/Downspouts/Scuppers (EA)

<u>Condition State</u>	<u>Description</u>
1.	No defects, deficiencies or damage. <i>~No damage</i> <ul style="list-style-type: none">- Do nothing
2.	Drains, downspouts, or scuppers are damaged but still functioning. <i>~Some damage</i> <ul style="list-style-type: none">- Do nothing- Repair drains/downspouts/scuppers
3.	Drains, downspouts or scuppers are clogged or broken. <i>~Not functioning</i> <ul style="list-style-type: none">- Do nothing- Clean and/or repair drains/downspouts/scuppers- Replace drains/downspouts/scuppers

Note: Downspouts are considered to be pipes directly below drains making one unit. If several units merge into one outlet, and outlet is clogged, all connected units are considered clogged. If erosion occurs at any outlet or individual drain, use erosion smart flag (#364).

67 Steel Sidewalk - Open Grid (L.F.)

<u>Condition State</u>	<u>Description</u>
1.	There is no corrosion. The paint system, if any, is sound. The connectors (welds, rivets, etc.) are sound. <i>~No corrosion</i> <ul style="list-style-type: none">- Do nothing
2.	There is little or no corrosion. The paint system, if any, may be showing early signs of distress. The connectors are still sound. <i>~Minor deterioration</i> <ul style="list-style-type: none">- Do nothing
3.	Surface or freckled rust has formed. The paint system is no longer fully effective. There is no loss of section. The connectors may be starting to show signs of distress – cracked welds or broken rivets. <i>~Rust formation</i> <ul style="list-style-type: none">- Do nothing- Rehab connectors, power wash and restore top coat
4.	Corrosion is moderate. Surface pitting may be present but any section loss is incidental. Numerous connectors are failing at scattered locations. The strength or serviceability of the section is not yet affected. <i>~Moderate corrosion</i> <ul style="list-style-type: none">- Do nothing- Rehab connectors and replace paint system
5.	Corrosion is advanced. Numerous connectors have failed. Section loss and/or connectivity are sufficient to warrant analysis to ascertain the impact on the ultimate strength and/or serviceability of either the element or the bridge. <i>~Advanced corrosion</i> <ul style="list-style-type: none">- Do nothing- Rehab connectors and replace paint system- Replace

68 Steel Sidewalk - Filled Grid (L.F.)

<u>Condition State</u>	<u>Description</u>
------------------------	--------------------

- | | |
|----|--|
| 1. | There is no corrosion. The paint system, if any, is sound. The connectors (welds, rivets, etc.) are sound. The concrete filler is sound. <i>~No corrosion</i> <ul style="list-style-type: none">- Do nothing |
| 2. | There is little or no corrosion. The paint system, if any, may be showing early signs of distress. The connectors are still sound. The concrete filler is sound. <i>~Minor deterioration</i> <ul style="list-style-type: none">- Do nothing |
| 3. | Surface or freckled rust has formed. The paint system is no longer fully effective. There is no loss of section. The connectors may be starting to show signs of distress – cracked welds or broken rivets. The concrete filler may have broken out at scattered locations. <i>~Rust formation</i> <ul style="list-style-type: none">- Do nothing- Rehab connectors and filler, power wash and restore top coat |
| 4. | Corrosion is moderate. Surface pitting may be present but any section loss is incidental. The paint system is no longer fully effective. Numerous connectors are failing at scattered locations. Small areas of concrete are missing. <i>~Moderate corrosion</i> <ul style="list-style-type: none">- Do nothing- Rehab connectors and filler, replace paint system |
| 5. | Corrosion is advanced. Numerous connectors have failed. Section loss and/or connectivity is sufficient to warrant analysis to ascertain the impact on the ultimate strength and/or serviceability of either the element or the bridge. Much of the concrete filler is missing. <i>~Advanced corrosion</i> <ul style="list-style-type: none">- Do nothing- Rehab connectors and filler, replace paint system- Replace |

Unpainted Steel Elements

- 101 Closed Web/Box Girder (L.F.)
- 106 Open Girder/Beam (L.F.)
- 112 Stringer (Stringer - Floor Beam System) (L.F.)
- 120 Through Truss (Bottom Chord) (L.F.)
- 125 Through Truss (Excluding Bottom Chord) (L.F.)
- 130 Deck Truss (L.F.)
- 140 Arch (L.F.)
- 151 Floor Beam (L.F.)
- 160 Steel Pin and/or Pin and Hanger Assembly (EA)
- 201 Column or Pile (L.F.)
- 230 Pier Cap (L.F.)
- 260 Sheeting (L.F.)
- 380 Diaphragm (EA)

<u>Condition</u> <u>State</u>	<u>Description</u>
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1. There is little or no corrosion of the unpainted steel. The weathering steel is coated uniformly and remains in excellent condition. Oxide film is tightly adhered. *~No corrosion*
 - Do nothing
2. Surface rust, surface pitting, small ($\leq 1/4$ " diam.) flakes have formed or is forming on the unpainted steel. The weathering steel has not corroded beyond design limits. Oxide film has a dusty to granular texture. *~Minor corrosion*
 - Do nothing
 - Blast clean and paint
3. Steel has large flakes resulting in measurable section loss but does not warrant structural analysis. Oxide film is flaking. *~Some section loss*
 - Do nothing
 - Blast clean and paint
 - Rehab
4. Corrosion is advanced. Oxide film has a laminar texture with thin sheets of rust. Section loss is sufficient to warrant structural analysis to ascertain the impact on the ultimate strength and/or serviceability of either the element or the bridge. *~Severe section loss*
 - Do nothing
 - Rehab
 - Replace

Note: Refer to smart flags for fatigue (#356), pack rust (#357), traffic impact (#362) and section loss (#363) to document defects not listed in CoRe language.

Painted Steel Elements

<p>60 Curb (L.F.)</p> <p>63 Median (L.F.)</p> <p>102 Closed Web/Box Girder (L.F.)</p> <p>107 Open Girder/Beam (L.F.)</p> <p>113 Stringer (stringer-floor beam sys) (L.F.)</p> <p>121 Through Truss (Bottom Chord) (L.F.)</p> <p>126 Through Truss (Excl. Bot. Chord) (L.F.)</p> <p>131 Deck Truss (L.F.)</p> <p>141 Arch (L.F.)</p> <p>152 Floor Beam (L.F.)</p>	<p>161 Steel Pin and/or Pin and Hanger Assembly (EA)</p> <p>202 Column or Pile (L.F.)</p> <p>213 Concrete Encased-Open Girder (L.F.)</p> <p>231 Pier Cap (L.F.)</p> <p>261 Sheeting (L.F.)</p> <p>381 Diaphragm (EA)</p>
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Condition
State

Description

1. There is no evidence of active corrosion, and the paint system is sound and functioning as intended to protect the metal surface. *~No corrosion*
 - Do nothing
2. There is little or no active corrosion. Surface or freckled rust has formed or is forming. The paint system may be chalking, peeling, curling, or showing other early evidence of paint system distress, but there is no exposure of metal. *~Coating distress*
 - Do nothing
3. Surface or freckled rust is prevalent. There may be exposed metal, but there is no active corrosion causing loss of section. *~Rust formation*
 - Do nothing
 - Power tool clean and paint
4. Corrosion may be present, but any section loss due to active corrosion does not yet warrant structural analysis of either the element or the bridge. *~Active corrosion, measurable section loss*
 - Do nothing
 - Power tool clean and paint-
5. Corrosion has caused section loss and is sufficient to warrant structural analysis to ascertain the impact on the ultimate strength and/or serviceability of either the element or the bridge. *~Severe section loss*
 - Do nothing
 - Rehab
 - Replace

Note: Refer to smart flags for fatigue (#356), pack rust (#357), traffic impact (#362) and section loss (#363) to document defects not listed in CoRe language.

For Concrete Encased Girders, the concrete encasement is the coating system.

Prestressed Concrete Elements

- 104 Closed Web/Box Girder (L.F.)
- 109 Open Girder/Beam (L.F.)
- 115 Stringer (Stringer-Floor Beam System) (L.F.)
- 143 Arch (L.F.)
- 154 Floor Beam (L.F.)
- 204 Column or Pile (L.F.)
- 233 Pier Cap (L.F.)
- 262 Sheeting (L.F.)

<u>Condition State</u>	<u>Description</u>
1.	The element shows little or no deterioration. There may be discoloration, efflorescence, and/or superficial cracking ($< 0.004''$) but without effect on strength and/or serviceability. <i>~No deterioration</i> <ul style="list-style-type: none">- Do nothing
2.	Minor cracks ($0.004'' - 0.009''$), delam & spalls may be present, and there may be exposed reinforcing with no evidence of corrosion. There is no exposure of the prestress system. <i>~Minor cracks/Delam/spalls</i> <ul style="list-style-type: none">- Do nothing- Minor patch
3.	Moderate cracks ($0.01'' - 0.03''$) exist. Cracks and/or delaminations with rust staining, and/or spalls with exposed, corroded non-prestress reinforcing exist. Loss of section of non-prestress reinforcing is incidental and does not significantly affect the strength and/or serviceability of either the element or the bridge. There may be minor exposure but no deterioration of the prestress system. <i>~Moderate cracks/Delam/spalls</i> <ul style="list-style-type: none">- Do nothing- Clean rebar and patch (and/or inject cracks)
4.	Major cracks ($> 0.03''$) exist. Cracks and/or delaminations with rust staining, and/or spalls with exposed, corroded non-prestress reinforcing are prevalent. There may also be exposure and deterioration of the prestress system (manifested by loss of bond, broken strands or wire, failed anchorages, etc.). There is sufficient concern to warrant an analysis to ascertain the impact on the strength and/or serviceability of either the element or the bridge. <i>~Analysis warranted</i> <ul style="list-style-type: none">- Do nothing- Rehab- Replace

Note: Crack dimensions apply to cracks that are perpendicular to prestressing. For all other cracks, refer to condition states for reinforced concrete.

Reinforced Concrete Elements

37 Deck/Slab Under Fill (S.F.)	205 Column or Pile (L.F.)
56 Sidewalk (L.F.)	210 Pier Wall (L.F.)
59 Curb (L.F.)	215 Abutment (L.F.)
62 Median (L.F.)	220 Submerged Pile Cap (EA)
105 Closed Web/Box Girder (L.F.)	234 Pier Cap (L.F.)
110 Open Girder/beam (L.F.)	236 Strut (L.F.)
116 Stringer (Stringer-Floor Beam System) (L.F.)	382 Diaphragm (EA)
134 Filled Arch (S.F.)	386 Wingwall / Retaining Wall Cap (L.F.)
144 Arch (L.F.)	390 Wingwall / Retaining Wall (L.F.)
155 Floor Beam (L.F.)	398 Headwall (L.F.)

<u>Condition</u>	<u>Description</u>
<u>State</u>	

1. The element shows little or no deterioration. There may be discoloration, efflorescence and/or superficial cracking (< 1/16") but without affect on strength and/or serviceability. *~No deterioration*
 - Do nothing
2. Minor cracks (1/16" - 1/8"), delaminations, and spalls may be present but there is no exposed reinforcing or surface evidence of rebar corrosion. *~Minor cracks/delam/spalls*
 - Do nothing
 - Minor patch
3. Moderate cracks (>1/8" - 1/4"), cracks and/or delaminations with rust staining, and/or spalls with exposed reinforcing. Corrosion of rebar is present but loss of section is incidental and does not significantly affect the strength and/or serviceability of either the element or the bridge. *~Moderate cracks/delam/spalls*
 - Do nothing
 - Clean rebar and patch (and/or inject cracks)
4. Major cracks (> 1/4"). Deterioration is advanced. Corrosion of reinforcement and/or loss of concrete section are sufficient to warrant analysis to ascertain the impact on the strength and/or serviceability of the element or the bridge. *~Analysis warranted*
 - Do nothing
 - Rehab
 - Replace

Note: Do not use Soffit Smart Flag when using Deck/Slab Under Fill or Filled Arch elements as the soffit is being rated in the use of these elements.

Timber Elements

<p>57 Sidewalk (L.F.)</p> <p>66 Curb (L.F.)</p> <p>111 Timber Open Girder (L.F.)</p> <p>117 Stringer (stringer-floor beam system) (L.F.)</p> <p>135 Truss/Arch (L.F.)</p> <p>156 Floor Beam (L.F.)</p>	<p>206 Column or Pile (L.F.)</p> <p>216 Abutment (L.F.)</p> <p>235 Pier Cap (L.F.)</p> <p>237 Strut (EA)</p> <p>264 Sheeting (L.F.)</p> <p>383 Diaphragm (EA)</p> <p>385 Wingwall / Retaining Wall Cap (L.F.)</p>
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Condition
State

Description

1. Investigation indicates no decay. There may be superficial cracks, splits, and checks having no affect on strength or serviceability. *~No decay*
 - Do nothing
2. Decay, insect/marine borer infestation, abrasion, splitting, cracking, checking, or crushing may exist but none is sufficiently advanced to affect strength or serviceability of the element. *~Minor decay*
 - Do nothing
3. Decay, insect/marine borer infestation, abrasion, splitting, cracking, or crushing has produced loss of strength or deflection of the element but not of a sufficient magnitude to affect the serviceability of the bridge. *~Some strength loss*
 - Do nothing
 - Rehab
4. Deterioration is advanced. Decay, insect/marine borer infestation, abrasion, splits, cracks, or crushing has produced loss of strength or deflection that affects the serviceability of the bridge. *~Major strength loss*
 - Do nothing
 - Rehab
 - Replace

Other Material Elements

58 Sidewalk (L.F.)	211 Pier Wall (L.F.)
61 Curb (L.F.)	217 Abutment (L.F.)
64 Median (L.F.)	392 Wingwall / Retaining Wall (L.F.)
145 Filled Arch (S.F.)	400 Headwall (L.F.)

Condition
State

Description

1. There is little or no deterioration. Only surface defects are in evidence. *~No deterioration*
 - Do nothing
2. There may be minor deterioration, cracking and weathering. Mortar in joints may show minor deterioration. *~Minor deterioration*
 - Do nothing
 - Rehab unit
3. There is moderate to major deterioration and cracking and/or major deterioration of joints. Loose mortar, loose stones, missing mortar, small stones missing, minor sagging of element. *~Moderate deterioration*
 - Do nothing
 - Rehab
4. Major deterioration, splitting, or cracking of materials may be affecting the structural capacity of the element. Large stones missing or many stones missing, excessive sagging. *~Major deterioration*
 - Do nothing
 - Rehab
 - Replace

Note: "Other material" typically refers to stone masonry construction.

Miscellaneous Elements

146 Cable – Uncoated (not embedded in concrete) (EA)

<u>Condition State</u>	<u>Description</u>
1.	There is little or no corrosion of uncoated steel. Strand and anchor sockets show no signs of distress. <i>~No corrosion</i> <ul style="list-style-type: none">- Do nothing
2.	Surface or freckled rust has formed or is forming. Strand and anchor sockets show no signs of distress. <i>~Surface rust</i> <ul style="list-style-type: none">- Do nothing- Clean and coat
3.	Corrosion may be present, but any section loss is incidental and does not affect the strength or serviceability of either the element or the bridge. Cable banding, if any, may show some loosening or slipping. Cable anchor devices may be loosening. <i>~Moderate deterioration</i> <ul style="list-style-type: none">- Do nothing- Clean and coat- Rehab unit
4.	Corrosion is advanced. Cable strands or wires may be broken or severely abraded. Anchors may show signs of slippage. Section loss or other deterioration is sufficient to warrant analysis for strength and/or serviceability of both the element and the bridge. <i>~Analysis warranted</i> <ul style="list-style-type: none">- Do nothing- Rehab unit and paint- Replace unit

Note: This element applies only to cable stayed or suspension bridges

147 Cable - Coated (not embedded in concrete) (EA)

Condition
State

Description

1. There is little or no evidence of active corrosion. Protective coating is sound and functioning as intended to protect the metal surface. Strand and anchor sockets show no signs of distress. *~No corrosion*
 - Do nothing
2. There is little or no evidence of active corrosion. Surface or freckled rust has formed or is forming. The protective coating may be peeling, chalking, curling or showing other early evidence of distress, but there is no exposure of metal. Strand and anchor sockets show no signs of distress. *~Surface rust*
 - Do nothing
 - Clean and restore coating
3. Surface or freckled rust is prevalent. There may be exposed metal, but there is no active corrosion which is causing loss of section. Protective system is no longer effective. Strand and anchor sockets show signs of distress. *~Moderate deterioration*
 - Do nothing
 - Clean and restore coating
4. Corrosion may be present, but any section loss is incidental and does not affect the strength or serviceability of either the element or the bridge. Cable banding, if any, may show some loosening or slippage. Cable anchor devices may be loosening. *~Major deterioration*
 - Do nothing
 - Rehab unit and replace coating system
 - Replace unit
5. Corrosion is advanced. Cable strands or wires may be broken or severely abraded. Anchors may show signs of slippage. Section loss or other deterioration is sufficient to warrant analysis for strength and/or serviceability of both the element and the bridge. *~Analysis warranted*
 - Do nothing
 - Rehab unit and replace coating system
 - Replace unit

207 Jacketed Pile (EA)

Condition
State

Description

1. There is no evidence of deterioration of pile jacket. *~No deterioration*
 - Do nothing
2. Outer layer of jacket is showing signs of deterioration. Inner layer of jacket is intact and functioning as intended. *~Minor deterioration*
 - Do nothing
3. Outer layer of jacket has deteriorated. Inner layer is showing signs of deterioration. *~ Moderate deterioration*
 - Do nothing
4. Inner layer of jacket has failed, exposing sections of pile. *~ Major deterioration*
 - Do nothing
 - Replace pile jacket

Note: Deterioration of outer layer may consist of punctures, tears, cracks, joint separation or areas where outer layer is missing. Deterioration of inner layer may consist of moderate cracks and/or spalls.

218 Mechanically Stabilized Earth (MSE) Wall (L.F.)

<u>Condition State</u>	<u>Description</u>
1.	Superficial cracks & spalls may be present, but there is no exposed reinforcing or evidence of rebar corrosion. There is little or no deterioration or separation of joints. <i>~No deterioration</i> <ul style="list-style-type: none">- Do nothing
2.	Deterioration, minor cracking and/or minor chloride contamination may have begun. There may be deterioration and separation of panel joints. <i>~Minor deterioration</i> <ul style="list-style-type: none">- Do nothing- Rehab
3.	There may be moderate to major deterioration, spalling, extensive cracking and/or leaching and large areas of spalls. There may be considerable deterioration and separation of panel joints. <i>~Moderate deterioration</i> <ul style="list-style-type: none">- Do nothing- Rehab
4.	Major deterioration, spalling, and cracking. Major deterioration and separation of panel joints. Loss of fill and/or settlement of roadway may be present. <i>~Major deterioration</i> <ul style="list-style-type: none">- Do nothing- Rehab- Replace

Note: This element is to be used for any MSE wall that retains fill. The total quantity for this element includes all wingwalls and walls in front of abutments.

395 Sacked Concrete Wall (S.F.)

<u>Condition State</u>	<u>Description</u>
1.	There is little or no deterioration. Surface defects only are in evidence. There are no undermining or misalignment problems. <i>~No deterioration</i> <ul style="list-style-type: none">- Do nothing
2.	There may be minor deterioration, cracking or misalignment. <i>~Minor deterioration</i> <ul style="list-style-type: none">- Do nothing- Rehab slope protection
3.	Moderate to major deterioration, cracking and/or minor to moderate undermining. <i>~Moderate deterioration</i> <ul style="list-style-type: none">- Do nothing- Rehab slope protection
4.	Major distortion, settlement or misalignment and/or major deterioration affecting structural integrity may have occurred. <i>~Major deterioration</i> <ul style="list-style-type: none">- Do nothing- Rehab slope protection- Replace slope protection

Culvert Elements

240 Steel Culvert (L.F.)

244 Steel Culvert - Major (L.F.)

<u>Condition State</u>	<u>Description</u>
1.	The element shows little or no deterioration. Some discoloration or surface corrosion may exist but there is no metal pitting. There is little or no deterioration or separation of seams. ~ Surface Corrosion <ul style="list-style-type: none"> - Do nothing
2.	There may be minor to moderate corrosion and pitting. Cannot easily perforate with hammer. Little or no distortion exists. There may be minor deterioration and/or separation of seams. ~ <i>Minor corrosion</i> <ul style="list-style-type: none"> - Do nothing
3.	Significant corrosion, deep pitting, or flaking exists. Can easily perforate with hammer. Minor to moderate distortion and deflection may exist. Minor cracking or abrasion of the metal may exist. There may be considerable deterioration and/or separation of seams. ~ <i>Moderate corrosion</i> <ul style="list-style-type: none"> - Do nothing
4.	Major corrosion, perforations and/or holes exist. Major distortion, deflection, or settlement may be evident. Major cracking or abrasion of the metal may exist. Major separation of seams may have occurred. ~ <i>Major corrosion</i> <ul style="list-style-type: none"> - Do nothing - Replace

Note: Concrete footings are not part of this element, any necessary repair actions should be noted in the inspection report. **If 30% or more of the culvert is in Condition State 4, or if 75% or more is in CS 3 and CS 4 combined, then the bridge is Structurally Deficient. See Corrugated Metal Culvert Inspection Guide for further guidance.**

Corrugated Metal Culvert Inspection Guide					
NBI Rating	Pontis Condition State				
	CS1	CS2	CS3	CS4	Load Posting
9	100% (new)				N/A
8	100% (w/ no corrosion)				N/A
7	100% (w/ surface corrosion)				N/A
6		> 0%		0%	N/A
5				> 0%	N/A
4				> 75%	N/A
3				> 30%	15 Tons
2				> 30% (w/ loss of fill, or kinking)	3 Tons
1				> 30% (w/ separation)	Road Closure
0					Road Closure

241 Concrete Culvert (L.F.)

<u>Condition State</u>	<u>Description</u>
1.	Superficial cracks & spalls may be present, but there is no exposed reinforcing or evidence of rebar corrosion. There is little or no deterioration or separation of joints. <i>~No deterioration</i> <ul style="list-style-type: none">- Do nothing
2.	Deterioration, minor chloride contamination, minor abrasion, and minor cracking and/or leaching may have begun. There may be deterioration and separation of joints. <i>~Minor deterioration</i> <ul style="list-style-type: none">- Do nothing- Rehab culvert
3.	There may be moderate to major deterioration, abrasion, extensive cracking and/or leaching and large areas of spalls. Minor to moderate distortion, settlement or misalignment may have occurred. There may be considerable deterioration and separation of joints. <i>~Moderate deterioration</i> <ul style="list-style-type: none">- Do nothing- Rehab culvert
4.	Major deterioration, abrasion, spalling, cracking, major distortion, deflection settlement or misalignment of the barrel may be in evidence. Major separation of joints may have occurred. Holes may exist in floors and walls. <i>~Major deterioration</i> <ul style="list-style-type: none">- Do nothing- Rehab culvert- Replace culvert

Note: If 30% or more of the culvert is in Condition State 4 then the bridge is Structurally Deficient.

242 Timber Culvert (L.F.)

<u>Condition State</u>	<u>Description</u>
1.	The timber and fasteners are in sound condition. <i>~Sound condition</i> <ul style="list-style-type: none">- Do nothing
2.	There may be minor decay and weathering. Corrosion at fasteners and connections may have begun. There is little or no distortion and/or deflection. <i>~Minor decay</i> <ul style="list-style-type: none">- Do nothing- Rehab unit
3.	There may be significant decay, weathered and warped or broken timbers. Significant decay and corrosion at the fasteners and connections may be evident. Minor to moderate distortion of the culvert may exist. <i>~Moderate deterioration</i> <ul style="list-style-type: none">- Do nothing- Rehab unit
4.	There may be major decay and many warped, broken or missing timbers. There is major decay and corrosion at fasteners and connections. Major distortion or deflection of the culvert may exist. <i>~Major deterioration</i> <ul style="list-style-type: none">- Do nothing- Rehab unit- Replace unit

243 Other Culvert (L.F.)

<u>Condition State</u>	<u>Description</u>
1.	There is little or no deterioration. Surface defects only are in evidence. There are no misalignment problems. <i>~No deterioration</i> <ul style="list-style-type: none">- Do nothing
2.	There may be minor deterioration, abrasion, cracking and misalignment. <i>~Minor deterioration</i> <ul style="list-style-type: none">- Do nothing- Repoint
3.	Moderate to major deterioration, abrasion, cracking and/or minor to moderate distortion or deflection has occurred. Loose mortar, loose stones, missing mortar, small stones missing. <i>~Moderate deterioration</i> <ul style="list-style-type: none">- Do nothing- Repoint
4.	Major cracking, abrasion, distortion, deflection, settlement or misalignment and/or major deterioration affecting structural integrity may have occurred. Large stones missing or many stones missing. <i>~Major deterioration</i> <ul style="list-style-type: none">- Do nothing- Rehab- Replace

Note: "Other Material" may consist of stone masonry or combination of materials. If 30% or more of the culvert is in Condition State 4 then the bridge is Structurally Deficient.

245 Concrete Culvert - Major (L.F.)

<u>Condition State</u>	<u>Description</u>
1.	The element shows little or no deterioration. There may be discoloration, efflorescence and/or superficial cracking ($< 1/16''$) but without affect on strength and/or serviceability. There is little or no deterioration or separation of joints. <i>~No deterioration</i> <ul style="list-style-type: none">- Do nothing
2.	Minor cracks ($< 1/8''$), delaminations and spalls may be present but there is no exposed reinforcing or surface evidence of rebar corrosion. There may be deterioration and separation of joints. <i>~Minor cracks/delam/spalls</i> <ul style="list-style-type: none">- Do nothing- Minor patch
3.	Moderate cracks ($1/8'' - 1/4''$), cracks and/or delaminations with rust staining, and/or spalls with exposed reinforcing. Corrosion of rebar is present but loss of section is incidental and does not significantly affect the strength and/or serviceability of either the element or the bridge. Minor to moderate distortion, settlement or misalignment may have occurred. There may be considerable deterioration and separation of joints. <i>~Moderate cracks/delam/spalls</i> <ul style="list-style-type: none">- Do nothing- Clean rebar and patch (and/or inject cracks)
4.	Major cracks ($> 1/4''$). Major deterioration, abrasion, spalling, cracking, major distortion, deflection settlement or misalignment of the barrel may be in evidence. Major separation of joints may have occurred. Holes may exist in floors and walls. Corrosion of reinforcement and/or loss of concrete section are sufficient to warrant analysis to ascertain the impact on the strength and/or serviceability of the element or the bridge. <i>~Analysis warranted</i> <ul style="list-style-type: none">- Do nothing- Major rehab- Replace

Joint Elements

300 Strip Seal Expansion Joint (L.F.)

<u>Condition State</u>	<u>Description</u>
1.	The element shows minimal deterioration. There is no leakage at any point along the joint. Gland is secure and has no defects. Debris in joint is not causing any problems. The adjacent deck and/or header are sound. <i>~No leakage</i> <ul style="list-style-type: none">- Do nothing
2.	Signs of seepage along the joint may be present. The gland may be punctured, ripped or partially pulled out of the extrusion. Minor spalls in the deck and/or header may be present adjacent to the joint. <i>~Minor leakage</i> <ul style="list-style-type: none">- Do nothing- Replace gland and/or patch concrete
3.	Signs or observance of leaking along the joint may be present. The gland may have failed from abrasion or tearing. The gland has pulled out of the extrusion. Major spalls may be present in the deck and/or header adjacent to the joint. <i>~Major leakage</i> <ul style="list-style-type: none">- Do nothing- Replace joint

Note: The entire quantity per individual joint shall be coded as the most severe condition state observed in that joint.

301 Pourable Joint Seal (L.F.)

<u>Condition State</u>	<u>Description</u>
1.	The element shows minimal deterioration. Adhesion is sound with no signs of leakage. There are no cohesion cracks. The adjacent deck and/or header are sound. <i>~No deterioration</i> <ul style="list-style-type: none">- Do nothing
2.	Minor adhesion and/or cohesion failures may be present. Signs of seepage along the joint may be present. Joint may be slightly impacted with debris. Minor spalls in deck and/or headers may be present adjacent to joint. <i>~Minor leakage</i> <ul style="list-style-type: none">- Do nothing- Clean joint and replace seal
3.	Major adhesion and/or cohesion failures may be present. Signs or observance of leakage along the joint may be present. Joint may be heavily impacted with debris and/or stones. Major spalls may be present in the deck and/or header adjacent to the joint. <i>~Leakage problems</i> <ul style="list-style-type: none">- Do nothing- Clean joint, Patch spalls, and replace seal

Note: Shall only be used for joints on bridge decks and backwalls.

302 Compression Joint Seal (L.F.)

Condition
State

Description

1. The element shows minimal deterioration. Adhesion is sound with no signs of leakage. There are no cohesion cracks. The adjacent deck and/or header is sound. If joint is armored, there are no signs of anchorage looseness. *~No deterioration*
 - Do nothing
2. Signs of seepage along joint may be present. There may be small adhesion failures. The gland may show signs of abrasion or minor tearing. Significant debris is in all or part of the joint. Minor spalls in the deck and/or headers may be present adjacent to the joint. If joint is armored, the anchorage may be loose. *~Minor deterioration*
 - Do nothing
 - Replace gland and/or patch concrete
3. Major adhesion failures may be present. The gland may have failed from abrasion and tearing. Signs or observance of leakage along the joint may be present. Major spalls may be present in the deck and/or header adjacent to the joint. If joint is armored, the anchorage has failed. *~Major deterioration*
 - Do nothing
 - Replace joint

Note: The entire quantity per individual joint shall be coded as the most severe condition state observed in that joint.

309 Asphaltic Plug Joint (L.F.)

Condition
State

Description

1. The element shows minimal deterioration. Adhesion is sound with no signs of leakage. There are no cohesion cracks. The adjacent deck and/or header are sound. *~No deterioration*
 - Do nothing
2. Minor adhesion and/or cohesion failures may be present. Signs of seepage along the joint may be present. Joint may have rutting or heaving of joint material. Minor spalls in deck and/or headers may be present adjacent to joint. *~Seepage*
 - Do nothing
 - Reseal Joint
3. Major adhesion and/or cohesion failures may be present. Signs or observance of leakage along the joint are present. Major spalls may be present in the deck and/or header adjacent to the joint. *~Leakage problems*
 - Do nothing
 - Replace Joint

Assembly Joint/Seal Elements

303 Assembly Joint Seal (L.F.)

<u>Condition State</u>	<u>Description</u>
	<ol style="list-style-type: none">1. The element shows little or no deterioration or damage. The anchors are tight. There are no broken welds or fingers. The adjacent deck and/or header are sound. The paint system, if present, is sound and functioning as intended to protect the metal. <i>~No deterioration</i><ul style="list-style-type: none">- Do nothing2. The element shows minor deterioration or damage. The paint system, if present, may show some corrosion with slight pitting. There may be minor weld cracking. The anchorage system may be loose. Minor spalls in the deck and/or header may be present adjacent to the joint. Signs of seepage along the joint may be present. <i>~Minor deterioration</i><ul style="list-style-type: none">- Do nothing- Rehab unit3. The element shows major deterioration or damage. Corrosion is advanced. The joint anchorage system has failed. Major spalls may be present in the deck and/or header adjacent to the joint. Signs or observance of leakage along the joint may be present. <i>~Advanced corrosion</i><ul style="list-style-type: none">- Do nothing- Replace unit

Note: The entire quantity per individual joint shall be coded as the most severe condition state observed in that joint.

304 Open Expansion Joint (L.F.)

<u>Condition State</u>	<u>Description</u>
	<ol style="list-style-type: none">1. The element shows minimal deterioration. Joint armor, if present is secure and there are no bent, misaligned, or broken fingers. The adjacent deck and/or header are sound. Trough, if present, functions as intended and does not leak. <i>~No deterioration</i><ul style="list-style-type: none">- Do nothing2. There may be deck cracking indicating armor anchor loosening. Minor spalls in the deck and/or header may be present adjacent to the joint. There may be corrosion on joint armor steel plates. Bent or misaligned fingers are observed. Trough, if present, leaks or no longer functions as intended. <i>~Minor deterioration</i><ul style="list-style-type: none">- Do nothing- Rehab unit3. There may be advanced corrosion of joint armor or steel plates. Major spalls may be present in the deck and/or header adjacent to the joint. Armor anchors have failed. There are missing or broken fingers. <i>~Advanced corrosion</i><ul style="list-style-type: none">- Do nothing- Replace unit

Note: The entire quantity per individual joint shall be coded as the most severe condition state observed in that joint.

Bearing Elements

310 Elastomeric Bearings (EA)

<u>Condition State</u>	<u>Description</u>
1.	The element shows little or no deterioration. Shear deformations are correct for existing temperatures. <i>~No deterioration</i> <ul style="list-style-type: none">- Do nothing
2.	Minor cracking, splitting or other deterioration may be present. Shear deformation may be slightly excessive. Strength and/or serviceability are not affected. <i>~Minor deterioration</i> <ul style="list-style-type: none">- Do nothing- Replace bearings
3.	Deterioration is advanced. Shear deformations may be excessive. Top and bottom surfaces may no longer be parallel. Loss of bearing may be imminent. <i>~Major deterioration</i> <ul style="list-style-type: none">- Do nothing- Replace bearings

311 Moveable Bearing (roller, sliding, etc.) (EA)

<u>Condition State</u>	<u>Description</u>
1.	The element shows little or no deterioration. The paint system, if present, is sound and functioning as intended to protect the metal. The bearing has minimal debris and corrosion. Vertical and horizontal alignments are within limits. Bearing support member is sound. Any lubrication is functioning properly. <i>~No deterioration</i> <ul style="list-style-type: none">- Do nothing
2.	The paint system, if present, may show moderate to heavy corrosion with some pitting but still functions as intended. The assemblies may have moved enough to cause minor cracking in the supporting concrete. Anchor bolts may be bent, broken, or missing. Debris buildup is affecting bearing movement. Bearing alignment is still tolerable. <i>~Minor deterioration</i> <ul style="list-style-type: none">- Do nothing- Clean, paint, and grease
3.	There is advanced corrosion with section loss. There may be loss of section of the supporting member sufficient to warrant supplemental supports or load restrictions. Bearing alignment may be beyond tolerable limits. Shear keys may have failed. The lubrication system, if any, may have failed. <i>~Advanced corrosion</i> <ul style="list-style-type: none">- Do nothing- Rehab supports & clean, paint and grease- Replace

312 Enclosed/Concealed Bearing or Bearing System (EA)

<u>Condition State</u>	<u>Description</u>
	<ol style="list-style-type: none">1. The element shows little or no deterioration. There are no vertical or horizontal offsets. There is no cracking of support members. The supported member is stable under traffic. <i>~No deterioration</i><ul style="list-style-type: none">- Do nothing2. Both vertical and horizontal offsets are within the capability of the bearings and are not yet significant. The supported member may exhibit minimal vertical movement under traffic. Cracking of support members is not yet significant. Anchor bolts may be bent, broken, or missing. There may be insignificant reduction of bearing due to superstructure shortening. <i>~Minor deterioration</i><ul style="list-style-type: none">- Do nothing- Clean, paint and grease3. Vertical and/or horizontal offsets are significant, indicating bearing failures. There may be significant vertical movement under traffic. Cracking of the support members may be significant. There may be significant reduction of bearing due to superstructure shortening. <i>~Bearing failures</i><ul style="list-style-type: none">- Do nothing- Rehab supports & clean, paint and grease- Replace Bearing

313 Fixed Bearing (EA)

<u>Condition State</u>	<u>Description</u>
	<ol style="list-style-type: none">1. The element shows little or no deterioration. The paint system, if present, is sound and functioning as intended to protect the metal. Vertical and horizontal alignment is within limits. Bearing support member is sound. <i>~No deterioration</i><ul style="list-style-type: none">- Do nothing2. The paint system, if present, may show moderate to heavy corrosion with pitting but still functions as intended. The assemblies may have moved enough to cause minor cracking in the supporting concrete. Anchor bolts may be bent, broken, or missing. <i>~Minor deterioration</i><ul style="list-style-type: none">- Do nothing- Clean, paint and grease3. There is advanced corrosion with section loss. There may be loss of section of the supporting member sufficient to warrant supplemental supports or load restrictions. Shear keys may have failed. <i>~Advanced corrosion</i><ul style="list-style-type: none">- Do nothing- Rehab supports & clean, paint and grease- Replace Bearing

314 Pot Bearing (EA)

Condition
State

Description

1. The element shows minimal deterioration. The paint or other anti-corrosion system is sound and functioning as intended to protect the metal. The bearing has minimal debris and corrosion. Vertical and horizontal alignment is within limits. Bearing support member is sound. Any lubrication system is functioning properly. *~No deterioration*
 - Do nothing
2. The anti-corrosion system may show some corrosion with minor pitting. Debris build-up is affecting bearing movement. Bearing alignment and load carrying capacity is still tolerable. **The assemblies may have moved enough to cause minor cracking in the supporting concrete. Anchor bolts may be bent, broken, or missing.** *~Minor deterioration*
 - Do nothing
 - Clean, paint and grease
3. Corrosion is advanced. Bearing alignment and load carrying capacity may be beyond limits. Shear keys and the lubrication system, if any, may have failed. Elastomer may be actively extruding from the device. *~Advanced corrosion*
 - Do nothing
 - Rehab supports & clean, paint and grease
 - Replace Bearing

315 Disk Bearing (EA)

Condition
State

Description

1. The element shows minimal deterioration. The paint or other anti-corrosion system is sound and functioning as intended to protect the metal. The bearing has minimal debris and corrosion. Vertical and horizontal alignment is within limits. Bearing support member is sound. The lubrication system, if any, is functioning properly. *~No deterioration*
 - Do nothing
2. The anti-corrosion system may show some corrosion with minor pitting. Debris buildup is affecting bearing movement. Bearing alignment and load carrying capacity is still tolerable. **The assemblies may have moved enough to cause minor cracking in the supporting concrete. Anchor bolts may be bent, broken, or missing.** *~Minor deterioration*
 - Do nothing
 - Clean, paint and grease
3. Corrosion is advanced. Bearing alignment and load carrying capacity may be beyond limits. Shear keys and the lubrication system, if any, may have failed. *~Advanced corrosion*
 - Do nothing
 - Rehab supports & clean, paint and grease
 - Replace Bearing

Approach Slab Elements

320 P/S Concrete Approach Slab w/wo AC Overlay (EA)

321 Reinforced Concrete Approach Slab w/wo AC Overlay (EA)

<u>Condition State</u>	<u>Description</u>
1.	The slab has not settled and shows no sign of deterioration other than superficial surface cracks. <i>~No deterioration</i> <ul style="list-style-type: none">- Do nothing
2.	Minor cracking and spalls may be present but they do not affect ability of the slab to carry traffic. Settlement may be occurring which increases the traffic impact on the bridge. <i>~Minor cracks/spalls</i> <ul style="list-style-type: none">- Do nothing- Minor patch and waterproof
3.	Cracks may extend completely through the slab cross-section, but the slab does not act as if it is broken. Spalls may be heavy but they do not affect the structural integrity of the slab. Settlement may be occurring which increases the traffic impact on the bridge. <i>~Major cracks/spalls</i> <ul style="list-style-type: none">- Do nothing- Clean rebar and patch (and/or inject cracks) and place overlay- Replace unit
4.	The slab is broken or rocks under traffic loads. Settlement is excessive and cannot be corrected without replacing the slab. <i>~Broken/unstable</i> <ul style="list-style-type: none">- Do nothing- Replace unit

Note: The condition of the AC overlay is not addressed by this element, any defects in the AC overlay shall be addressed by MAXIMO work order (see pg 27).

Bridge Railing Elements

330 Bridge Railing Metal Uncoated (EA)

<u>Condition State</u>	<u>Description</u>
	<ol style="list-style-type: none">1. There is no evidence of active corrosion of the uncoated metal. <i>~No corrosion</i><ul style="list-style-type: none">- Do nothing2. Surface or freckled rust has formed or is forming on the uncoated metal. May be missing nuts or bolts. <i>~Rust formation</i><ul style="list-style-type: none">- Do nothing- Blast clean and paint3. Corrosion may be present but any section loss due to active corrosion is measurable and does not affect the strength or serviceability of the element. May have some broken connections or bent members. <i>~Active corrosion</i><ul style="list-style-type: none">- Do nothing- Blast clean and paint- Rehab4. Corrosion is advanced. Section loss is sufficient to warrant analysis to ascertain the impact on the ultimate strength and/or serviceability of the element. May be missing sections of railing. <i>~Section loss</i><ul style="list-style-type: none">- Do nothing- Rehab- Replace

331 Bridge Railing Reinforced Concrete (L.F.)

<u>Condition State</u>	<u>Description</u>
	<ol style="list-style-type: none">1. The element shows little or no deterioration. There may be discoloration, efflorescence and/or superficial cracking but without affect on strength and/or serviceability. <i>~No deterioration</i><ul style="list-style-type: none">- Do nothing2. Minor cracks, surface scaling, or spalls may be present but there is no exposed reinforcing or surface evidence of rebar corrosion. <i>~Minor cracks/spalls</i><ul style="list-style-type: none">- Do nothing- Minor patching, Seal cracks3. Some delaminations and/or spalls may be present, and some reinforcing may be exposed. Corrosion of rebar may be present, but loss of section is incidental and does not significantly affect the strength and/or serviceability of either the element or the bridge. <i>~Moderate cracks/spalls</i><ul style="list-style-type: none">- Do nothing- Clean rebar and patch (and/or inject cracks) & waterproof4. Deterioration is advanced. Corrosion of reinforcement and/or loss of concrete section are sufficient to warrant analysis to ascertain the impact on the strength and/or serviceability of either the element or the bridge. <i>~Analysis warranted</i><ul style="list-style-type: none">- Do nothing- Rehab unit- Replace unit

332 Bridge Railing Timber (L.F.)

Condition
State

Description

1. There is no decay. There may be minor cracks, splits and/or checks. *~No decay*
 - Do nothing
2. There may be decay with or without splitting, cracking, checking or crushing, but none is sufficiently advanced to affect serviceability. *~Minor decay*
 - Do nothing
 - Rehab and/or apply surface treatment
3. Deterioration is advanced. Decay, splitting, cracking, checking or crushing has produced loss of strength that may affect the serviceability of the element. *~Some strength loss*
 - Do nothing
 - Replace unit

333 Bridge Railing Other (L.F.)

Condition
State

Description

1. The element shows little or no deterioration. There may be minor cracking, corrosion and/or other minor deterioration having no affect on strength or serviceability. *~No deterioration*
 - Do nothing
2. Minor cracking, spalls, decay of timber portions or corrosion of metal may be present. *~Minor deterioration*
 - Do nothing
 - Repoint
3. Deterioration is advanced. Corrosion, decay or loss of section is sufficient to warrant analysis to ascertain the impact on the serviceability or strength of the element. *~Major deterioration*
 - Do nothing
 - Repoint
 - Replace

334 Bridge Railing Metal Coated (L.F.)

<u>Condition State</u>	<u>Description</u>
1.	There is no evidence of active corrosion. Protective coating is sound and functioning as intended to protect the element. <i>~No corrosion</i> <ul style="list-style-type: none">- Do nothing
2.	There is little or no active corrosion. Surface or freckled rust has formed or is forming. Protective coating may have minor areas of deterioration. May be missing nuts or bolts. <i>~Coating distress</i> <ul style="list-style-type: none">- Do nothing- Clean and restore coating
3.	Surface or freckled rust is prevalent. Protective coating is no longer effective. There may be exposed metal but there is no active corrosion causing loss of section. May have some broken connections or bent members. <i>~Rust formation</i> <ul style="list-style-type: none">- Do nothing- Clean and restore coating
4.	Corrosion may be present but any section loss due to active corrosion is measurable and does not affect the strength or serviceability of the element. May have some broken connections or bent members. <i>~Active corrosion</i> <ul style="list-style-type: none">- Do nothing- Replace paint- Replace
5.	Corrosion is advanced. Section loss is sufficient to warrant analysis to ascertain the impact on the ultimate strength and/or serviceability of the element. May be missing sections of railing. <i>~Section loss</i> <ul style="list-style-type: none">- Do nothing- Rehab- Replace

Smart Flags

356 Steel – Fatigue

Condition
State

Description

1. Fatigue damage exists which is arrested and has been determined to not adversely affect the strength and/or serviceability of either the element or the bridge. *~Fatigue damage*
2. Fatigue damage exists and has not been arrested. The fatigue warrants analysis of the element to ascertain the strength and/or serviceability of the element or the bridge. *~Analysis warranted*
3. Fatigue damage has affected the load carrying capacity or serviceability of the bridge. (Code this condition state only after a structural analysis). *~Severe fatigue damage*

Note: This element should initially be coded as a CS-2 until analysis has been performed. This element should only be removed if fatigue damage to element has been repaired or replaced.

357 Pack Rust

Condition
State

Description

1. The connection is showing signs of rusting between plates. Seams of the connections exhibit rust staining. *~ Rust staining*
2. Rusting between the plates is beginning to distress the connection. Minor swelling exists. *~Minor pack rust*
3. Rusting between plates has caused serious distress to the connection. The plates may be badly distorted; however, all connectors (rivets/bolts) are still functioning. *~Moderate pack rust*
4. Rusting between plates has caused serious distress to the connection, which warrants analysis of the bridge to ascertain the impact on the serviceability of the bridge. Some rivets or other connectors may have popped or are no longer effective. *~Severe pack rust*

Note: This element does not apply to bearings. This element should only be used for built up members and splices/connections.

358 Deck Cracking

Condition
State

Description

1. The surface of the deck is cracked, but the cracks are either filled/sealed or insignificant in size and density to warrant repair activities. *~Superficial cracks*
2. Unsealed cracks exist that are of minor size or moderate density. *~Minor cracks*
3. Unsealed cracks exist in the deck that are of moderate size and density. *~Moderate cracks*
4. Unsealed cracks exist in the deck that are of severe size and/or density. *~Severe cracks*

Note: Moderate density; 3 - 10 ft
Severe density; \leq 3ft

359 Soffit of concrete decks and slabs

Condition
State

Description

1. The under-surface of the deck or slab has no symptoms of distress. Any cracking that is present is only superficial. *~Soffit - No Damage*
2. Distressed area on the undersurface is light. The distressed area is less than 2% of the total underside area. *~Soffit \leq 2%*
3. Distressed area on the undersurface is moderate. The distressed area is more than 2% but 10% or less of the total underside area. *~Soffit - 2% to 10% distress*
4. Distressed area on the undersurface is heavy. The distressed area is more than 10% but less than 25% of the total underside area. *~Soffit - 10% to 25% distress*
5. Distressed area on the undersurface is severe. The distressed area is 25% or more of the total underside area. *~Soffit - Distress \geq 25%*

Note: Distressed area can include cracking, efflorescence, rust staining, delamination or spalls.

360 Settlement

Condition
State

Description

1. Some of the bridges supporting elements are showing signs of visible settlement or rotation, but due to earlier repairs or as indicated by other signs, the settlement appears to have stabilized. *~Settlement stable*
2. Settlement or rotation of the bridge supporting elements show signs of continuing and, if left un-arrested, could cause adverse impacts to the bridge. *~Minor settlement*
3. Settlement or rotation of the bridge supporting elements is significant enough to warrant analysis of the bridge. *~Significant settlement*

Note: This element not to be used for culverts, approach slabs or wingwalls.

361 Scour

Condition
State

Description

1. Scour exists at the structure site but is of little concern to the structural integrity of the bridge. *~Minor scour*
 - Do nothing
2. Scour exists at the structure site and, if left unchecked, could adversely affect the structural integrity of the bridge. *~Moderate scour*
 - Do nothing
 - Place scour countermeasures
3. Scour is significant enough to warrant analysis to ascertain the stability of the structure. *~Major scour*
 - Do nothing
 - Place scour countermeasures

Condition state 2 or 3 shall be brought to the attention of the Bridge Inspection Engineer who will determine if a Maximo maintenance request is required.

362 Traffic Impact Damage

<u>Condition State</u>	<u>Description</u>
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1. Impact damage has occurred and has been repaired. Prestressing system is covered by patch concrete. Steel has been straightened or repaired. *~Damage repaired*
2. Impact damage has occurred. Prestressing system is exposed, but is not impaired. Steel strength does not threaten the serviceability of the bridge. *~Strength O.K.*
3. Impact damage has occurred and the strength of the unit is impaired. Analysis is warranted to ascertain the serviceability of the bridge. *~Analysis warranted*

Note: This element applies only to superstructure elements, i.e., girders or trusses.

363 Section Loss

<u>Condition State</u>	<u>Description</u>
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1. Section loss to the element has been cleaned and painted over. No affect on the strength and/or serviceability of the bridge. *~Corrosion has been arrested*
2. Section loss to the element exhibits active corrosion. No affect on the strength and/or serviceability of the bridge. *~Corrosion has not been arrested*
3. Measurable section loss to the element exists that warrants analysis to determine the serviceability of the element or the bridge. *~Analysis warranted*
4. Section loss has affected the load carrying capacity or serviceability of the bridge. (Code this condition state only after a structural analysis) *~Load capacity or serviceability affected*

Note: This element should initially be coded as a CS-3 until analysis has been performed. This element should only be removed if section loss has been repaired.

364 Erosion

<u>Condition State</u>	<u>Description</u>
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1. Erosion exists at the bridge site, but is of little concern to the structural integrity of the bridge. *~Minor erosion*
 - Do nothing
2. Erosion exists at the bridge site and if left unchecked, could adversely impact the structural integrity of the bridge. *~Moderate erosion*
 - Do nothing
 - Repair erosion & place erosion control measures
3. Erosion is significant enough to warrant analysis to ascertain the stability of the structure. *~Advanced erosion*
 - Do nothing
 - Repair erosion & place erosion control measures

Note: This element only applies to erosion adjacent to the structure. If stream is present, this element applies to erosion outside the limits of the stream banks.

BRIDGE MANAGEMENT SECTION

PONTIS

SCALE FACTOR COMPUTATIONS

Scale Factors are used to specify additional measurements for the element that can be used to adjust project-level cost calculations. (AASHTO Pontis User's Manual pg. 3-13).

All scale factors have been calculated and entered as of 12/31/07. If inspector(s) find scale factors missing, (check past inspection by clicking onto the inspection date and selecting the previous inspection to see if scale factors are entered), if present in the previous inspection, re-enter into the current inspection and notify the Bridge Inspection Engineer.

Scale Factors shall be computed **ONLY** for those PONTIS Elements listed on the **'ELEMENTS FOR SCALE FACTOR COMPUTATION'** sheet (attached). All New Bridge Inventories and all inspection where elements are added or changed and now require a Scale Factor to be computed.

The inspector shall make a note under the **Note Tab, Structure Notes**, stating:

....NOTE: SCALE FACTORS ENTERED BY (inspectors initials) ON 00/00/00 (date of entry), DO NOT CHANGE OR ERASE....

NOTE: The Scale Factors that exist in the PONTIS Database (current and past) are **NOT TO BE CHANGED, ERASED OR RE-CALCULATED.**

To enter Scale Factors, click on the **EDIT ELEMENT** tab; enter the factor where it says Scale Factor to three (3) decimal places and save.

ALL CALCULATED SCALE FACTORS THAT ARE WHOLE NUMBERS i.e. (1.000, 2.000, 6.000 etc.) SHALL BE ENTERED AS 1.001, 2.001, 6.001 etc. The reason for this is that 1.000 is the default value within PONTIS for all Scale Factors and if an element has a value of 1.000 it is assumed that the scale factor was not computed.

Where / when available, **'Standard Dimensions'** shall be taken from the plans as per the **'Standard Dimension Description'**. If plans are not available or do not exist, field measurements must be taken. For elements that are partial under ground (not visible), the maximum height dimension shall be from the ground line to the top of the element at its highest point. Examples: Elements where footings would not normally be visible, Abutments to top of Backwall, Wing Walls, Sheet piling, MSE Walls, etc.

Standard Dimension Values are common or average element dimensions determined by Bridge Management and shall not be changed for any reason.

Where element dimensions vary, a **Weighted Average** dimension for the element shall be used in the computation.

Example: Element #56 – Sidewalk, RC – Width (ft) with sidewalks widths = 5’ and 6’ and the lengths are 100’ and 50’.

The weighted average width = $((5' * 100') + (6' * 50')) / 150' = 5.33'$

Divided by the Standard Dimension Value of 5, Scale Factor = 1.067.

For structural steel elements, calculate the surface area for each girder/beam per span (from the ‘Structural Steel Shapes Manual’). Add the square footage for each span together and divide by the total liner footage of girders/beams to get the weighted average for the element, divide by the Value to get the Scale Factor.

ELEMENTS FOR SCALE FACTOR COMPUTATION

Element	Element Description	Standard Dimension Description	Standard Dimension Value	Unit
56	Sidewalk, RC	Width	5	ft
57	Sidewalk, Timber	Width	5	ft
58	Sidewalk, Other	Width	5	ft
67	Sidewalk, Steel Open Grid	Width	5	ft
68	Sidewalk, Steel Filled Grid	Width	5	ft
62	Median, RC	Width	4	ft
63	Median, Steel Painted	Width	4	ft
64	Median, Other	Width	4	ft
101	Unpainted Steel Closed Web/Box Girder	Paintable Surface Area	16	sf/ft
102	Painted Steel Closed Web/Box Girder	Paintable Surface Area	16	sf/ft
104	Prestressed Conc. Closed Web/Box Girder	Depth of girder in feet	2.25	ft
105	Reinf. Conc. Closed Web/Box Girder	Depth of girder in feet	2.25	ft
106	Unpainted Steel Open Girder / Beam	Paintable Surface Area	10	sf/ft
107	Painted Steel Open Girder / Beam	Paintable Surface Area	10	sf/ft
109	Prestressed Conc. Open Girder / Beam	Girder Depth	3.75	ft
110	Reinf. Conc. Open Girder / Beam	Girder Depth	3.75	ft
111	Timber Open Girder / Beam	Girder Depth	1.17	ft
213	Concrete Encased Girders	Depth of concrete cover in feet	3.25	ft
112	Unpainted Steel Stringer (Str-Flbm-Sys)	Paintable Surface Area	7	sf/ft
113	Painted Steel Stringer (Str-Flbm-Sys)	Paintable Surface Area	7	sf/ft
115	Prestressed Conc. Stringer (Str-Flbm-Sys)	Girder Depth	3.75	ft
116	RC Stringer (Str-Flbm-Sys)	Girder Depth	3.75	ft
117	Timber Stringer (Str-Flbm-Sys)	Depth of Stringer	1.17	ft
120	Unpainted Steel Through Truss (Bot Chd)	Paintable Surface Area	5.66	sf/ft
121	Painted Steel Through Truss (Bot Chd)	Paintable Surface Area	5.66	sf/ft
125	Unpainted Stl Through Truss (Exclude Bot Chd)	Paintable Surface Area	12.20	sf/ft
126	Painted Steel Through Truss	Paintable Surface Area	12.20	sf/ft
144	Reinforced Conc. Arch (1-576 ONLY)	Circumference of the Arch Rib		
151	Unpainted Steel Floor Beam	Paintable Surface Area	7	sf/ft
152	Painted Steel Floor Beam	Paintable Surface Area	7	sf/ft
154	Prestressed Concrete Floor Beam	Girder Depth	3.75	ft
156	Timber Floor Beam	Depth of Beam	1.17	ft
201	Unpainted Steel Column or Pile	Circumference	7.85	ft
202	Painted Steel Column of Pile	Circumference	7.85	ft
204	Prestressed Conc. Column or Pile	Circumference	7.85	ft

Element	Element Description	Standard Dimension Description	Standard Dimension Value	Unit
205	Reinf. Conc. Column or Pile	Circumference	7.85	ft
206	Timber Columns	Circumference	7.85	ft
210	Reinf. Conc. Pier Wall	Max height from top of footing	16	ft
211	Other Pier Wall	Max height from top of footing	16	ft
215	Reinf. Conc. Abutment	Max height from top of footing to top of backwall including the backwall	7	ft
216	Timber Abutment	Depth of Cap	1.33	ft
217	Abutment Other	Max height from top of footing	7	ft
218	MSE Wall	Avg Exposed Height	15	ft
220	Reinf. Conc. Submerged Pile Cap	Length of cap	40	ft
230	Unpainted Steel Pier Cap	Paintable Surface Area	20	sf/ft
231	Painted Steel Pier Cap	Paintable Surface Area	20	sf/ft
233	Prestressed Conc. Pier Cap	Depth of Cap	4	ft
234	Reinf. Conc. Pier Cap	Depth of Cap	4	ft
235	Timber Pier Cap	Depth of Cap	1.33	ft
240	Steel Culvert	Culvert Span	6	ft
241	Conc. Culvert	Culvert Span	6	ft
243	Other Culvert	Culvert Span	6	ft
244	Steel Culvert, Major	Culvert Span	17	ft
245	Conc. Culvert, Major	Culvert Span	17	ft
260	Un-Painted Steel Sheeting	Max Exposed Height	10	ft
261	Painted Steel Sheeting	Max Exposed Height	10	ft
262	Prestressed Conc. Sheeting	Max Exposed Height	10	ft
264	Timber Sheeting	Max Exposed Height	7	ft
321	Reinforced Conc. Approach Slab	Square footage	560	sf
385	Timber Wingwall Cap	Depth of Cap	0.33	ft
386	MSE Wingwall Cap	Depth of Cap	2	ft
389	Painted Steel Wingwall	Max Exposed Height	10	ft
390	Wingwall, RC	Max wall height from top of footing	10	ft
392	Wingwall, Other	Max wall height from top of footing	10	ft
396	Reinf. Conc. Crashwall	Height of wall from top of footing	2.67	ft
398	Headwall , RC	Max Height	2	ft
400	Headwall - Other	Max Height	2	ft