Tidal Crossing Summary Sheet

New Hampshire's Tidal Crossing Assessment Protocol

Crossing ID: 1

Observer(s) & Organization:	TS, JB (NHDES Coastal)
Municipality:	SEABROOK
Stream Name:	Blackwater River
Road Name:	Route 286

Date:	8/13/2018
Start Time:	7:45:00 AM
End Time:	12:00:00 AM

Tide Prediction	**High**	**Low**
Time:	1:34 PM	7:37 AM
Elevation:	9.7	-1.5
Tide Chart Location:	Hampton Harbor	

Crossing Condition Evaluation	Score*
Crossing Condition	1
Tidal Restriction Evaluation	
Tidal Range Ratio	1
Crossing Ratio	5
Erosion Classification	3
Tidal Restriction Overall Score	3
Tidal Aquatic Organism Passage	
Tidal Range Ratio	1
Salt Marsh Migration Evaluation	
Salt Marsh Migration Potential (Eval. Unit)	3
Salt Marsh Migration Potential (Wshed.)	5
Vegetation Evaluation	
Vegetation Comparison Matrix	1
Infrastructure Risk Evaluation	
Inundation Risk to the Roadway (US, DS)	2,4
Inun. Risk to the Crossing Structure (US, DS)	2,3
Adverse Impacts Evaluation**	
Inundation Risk to Low-Lying Development	2
Overall Scores	
Infrastructure	4
Ecological	3
Combined	3

DS view toward structure

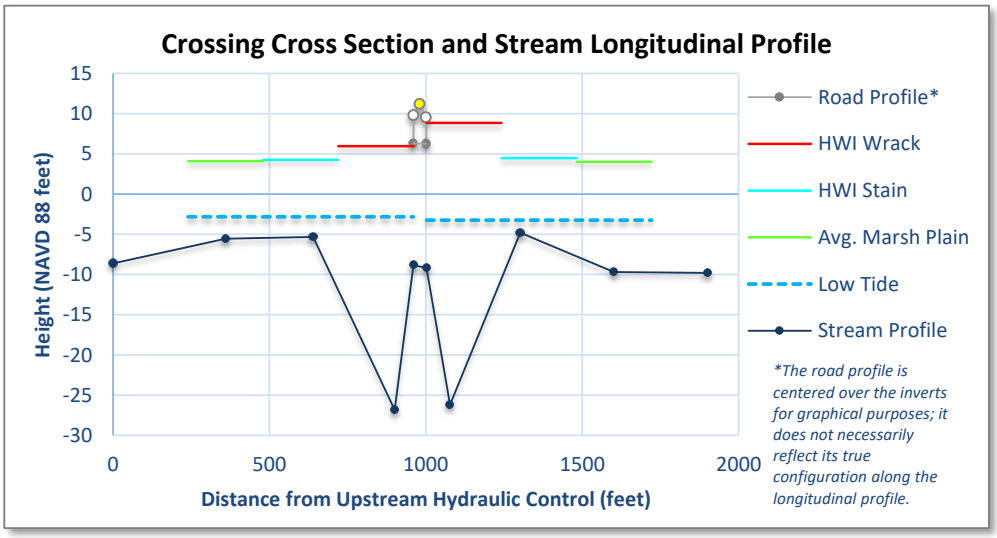
US view above structure

US view toward structure

DS view above structure

* Scoring system ranges from 1 to 5, where 1 = lowest replacement priority and 5 = highest replacement priority

**Adverse Impacts Evaluation scores range from 1 to 5, where 1 = high risk and 5 = low risk



Long. Profile

Dist.	Hght.	Feat.	Sub.
0	-8.6323	CB	S
360	-5.5323	CB	S
640	-5.3323	HC	S
900	-26.832	P	S
960	-8.8423	I	B
1002	-9.1923	I	B
1077	-26.202	P	G
1302	-4.8023	HC	C
1602	-9.7023	P	G
1902	-9.8023	CB	C/S

Crossing Context:

N/A

Structure Characteristics:

Structure Type:	Bridge with Side Slopes and Abutments	**Date of Last Known Replacement:**	N/A
Structure Material:	Concrete		
Tide Gate Present:	No		

Crossing Dimensions (ft):	Upstream	Downstream
Dimension A (width):	90	90
Dimension B[CB](height):	15.16	15.45
Crossing Length (Invert to Invert):	42	

Crossing Condition:	**Headwall Material**	**Headwall Condition**	**Wingwall Material**	**Wingwall Condition**	**Scour at Structure**	**Scour Severity**
Upstream	None	N/A	Rip Rap	Good	Armoring	Medium
Downstream	None	N/A	Rip Rap	Good	Armoring	Medium

Scour in Structure	**Scour Severity in Structure**	**Road Surface Condition**	**Utilities at Crossing**	**Structure Condition Overall**
None	None	Good	Gas pipeline, overhead electric, tel poles in marsh	Good

Structure Condition Comments:	N/A

Ecological Assessment:	Upstream	Downstream
Natural Community Classification:	High Salt Marsh	High Salt Marsh
Upstream Salt Marsh Migration Potential (acres):	79.35	

Flood Hazard & Emergency Access

Site Identified in Hazard Mitigation Plan:	Yes
Emergency Access or Evacuation Route:	Yes
History of Flooding:	1.4.2018 Road Closed due to flooding

Tidal Crossing Summary Sheet

New Hampshire's Tidal Crossing Assessment Protocol

Crossing ID: 3

Observer(s) & Organization:	JB (NHDES Coastal)
Municipality:	SEABROOK
Stream Name:	N/A
Road Name:	Route 286

Date:	8/10/2018
Start Time:	4:00:00 PM
End Time:	5:30:00 PM

Tide Prediction	**High**	**Low**
Time:	10:11 PM	4:10 PM
Elevation:	10.2	0.0
Tide Chart Location:	Hampton Harbor	

Crossing Condition Evaluation	Score*
Crossing Condition	1
Tidal Restriction Evaluation	
Tidal Range Ratio	1
Crossing Ratio	4
Erosion Classification	4
Tidal Restriction Overall Score	3
Tidal Aquatic Organism Passage	
Tidal Range Ratio	1
Salt Marsh Migration Evaluation	
Salt Marsh Migration Potential (Eval. Unit)	1
Salt Marsh Migration Potential (Wshed.)	5
Vegetation Evaluation	
Vegetation Comparison Matrix	3
Infrastructure Risk Evaluation	
Inundation Risk to the Roadway (US, DS)	2,3
Inun. Risk to the Crossing Structure (US, DS)	5,5
Adverse Impacts Evaluation**	
Inundation Risk to Low-Lying Development	4
Overall Scores	
Infrastructure	3
Ecological	3
Combined	3

DS view toward structure

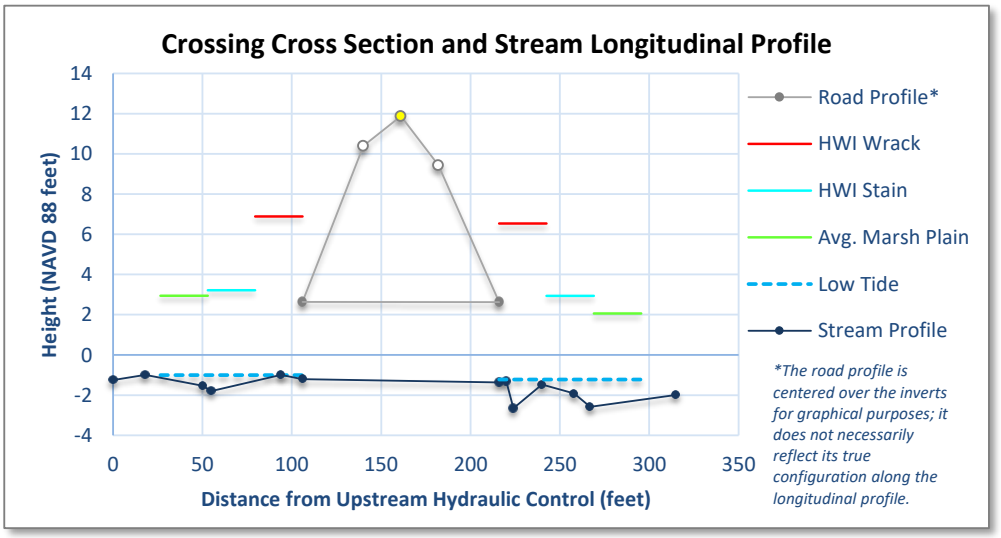
US view above structure

US view toward structure

DS view above structure

* Scoring system ranges from 1 to 5, where 1 = lowest replacement priority and 5 = highest replacement priority

**Adverse Impacts Evaluation scores range from 1 to 5, where 1 = high risk and 5 = low risk



Long. Profile

Dist.	Hght.	Feat.	Sub.
0	-1.2434	HC	G
18	-0.9934	CB	G
50	-1.5334	CB	C/S
55	-1.8034	P	C/S
94	-0.9934	HC	G
106	-1.2034	I	S
216	-1.3634	I	G
220	-1.3034	GC	B
224	-2.6534	P	G
240	-1.4734	HC	C
258	-1.9234	CB	G
267	-2.5834	P	G
315	-1.9934	HC	G

Crossing Context:

N/A

Structure Characteristics:

Structure Type:	Box Culvert	**Date of Last Known Replacement:**	N/A
Structure Material:	Concrete		
Tide Gate Present:	No		

Crossing Dimensions (ft):	Upstream	Downstream
Dimension A (width):	5	4
Dimension B^{CB}(height):	3.95	4
Crossing Length (Invert to Invert):	110	

Crossing Condition:	**Headwall Material**	**Headwall Condition**	**Wingwall Material**	**Wingwall Condition**	**Scour at Structure**	**Scour Severity**
Upstream	Concrete	Good	Concrete	Fair	Wingwalls	Low
Downstream	Concrete	Good	Concrete	Good	Wingwalls	Low

Scour in Structure	**Scour Severity in Structure**	**Road Surface Condition**	**Utilities at Crossing**	**Structure Condition Overall**
Culvert	Low	Good	OHE	Good

Structure Condition Comments:	N/A

Ecological Assessment:	Upstream	Downstream
Natural Community Classification:	High Salt Marsh	High Salt Marsh
Upstream Salt Marsh Migration Potential (acres):	15.81	

Flood Hazard & Emergency Access

Site Identified in Hazard Mitigation Plan:	No
Emergency Access or Evacuation Route:	Yes
History of Flooding:	Unknown

Tidal Crossing Summary Sheet

New Hampshire's Tidal Crossing Assessment Protocol

Crossing ID: 4

Observer(s) & Organization:	TS, KL (NHDES Coastal)
Municipality:	SEABROOK
Stream Name:	N/A
Road Name:	South Main St

Date:	8/9/2018
Start Time:	3:30:00 PM
End Time:	4:45:00 AM

Tide Prediction	**High**	**Low**
Time:	10:11 PM	4:10 PM
Elevation:	10.2	0.0
Tide Chart Location:	Hampton Harbor	

Crossing Condition Evaluation	Score*
Crossing Condition	4
Tidal Restriction Evaluation	
Tidal Range Ratio	5
Crossing Ratio	5
Erosion Classification	4
Tidal Restriction Overall Score	5
Tidal Aquatic Organism Passage	
Tidal Range Ratio	5
Salt Marsh Migration Evaluation	
Salt Marsh Migration Potential (Eval. Unit)	5
Salt Marsh Migration Potential (Wshed.)	5
Vegetation Evaluation	
Vegetation Comparison Matrix	1
Infrastructure Risk Evaluation	
Inundation Risk to the Roadway (US, DS)	4,5
Inun. Risk to the Crossing Structure (US, DS)	4,5
Adverse Impacts Evaluation**	
Inundation Risk to Low-Lying Development	4
Overall Scores	
Infrastructure	5
Ecological	5
Combined	5

DS view toward structure

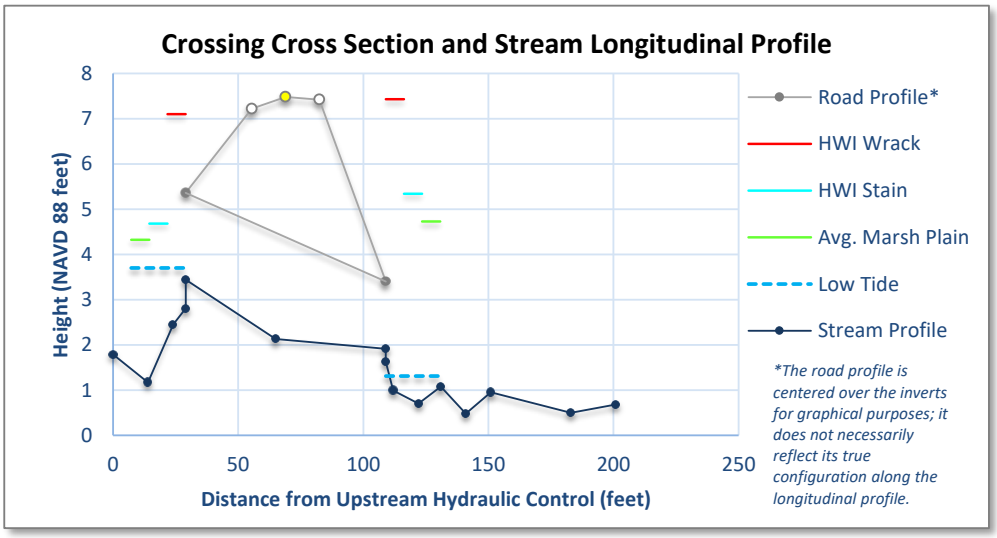
US view above structure

US view toward structure

DS view above structure

* Scoring system ranges from 1 to 5, where 1 = lowest replacement priority and 5 = highest replacement priority

**Adverse Impacts Evaluation scores range from 1 to 5, where 1 = high risk and 5 = low risk



Long. Profile

Dist.	Hght.	Feat.	Sub.
0	1.7903	CB	C/S
14	1.1703	P	G
24	2.4503	CB	G
29	2.8103	CB	S
29	3.4403	I	S
65	2.1303	CB	S
109	1.9103	I	B
109	1.6303	GC	B
112	0.9903	CB	G
122	0.7003	P	G
131	1.0803	HC	G
141	0.4803	P	G
151	0.9503	HC	G
183	0.5003	CB	G
201	0.6803	HC	G

Crossing Context:

A pipe running under South Main Street in Seabrook conducts very limited tides to a small square marsh surrounded by a moat dredged at its edge which in turn is surrounded by a berm. The marsh was used to pasture horses without need for any fencing (moat) according to Sue Foote, long-time resident. The undersized crossing shows erosion, poor opportunity for organism passage and poses some risk to flooding the roadway, with an overall combined score of 5: highest priority for restoration.

Structure Characteristics:

Structure Type:	Round Culvert	**Date of Last Known Replacement:**	N/A
Structure Material:	Plastic - Smooth		
Tide Gate Present:	No		

Crossing Dimensions (ft):	Upstream	Downstream
Dimension A (width):	2	1.5
Dimension B^{CB}(height):	2	1.5
Crossing Length (Invert to Invert):	80	

Crossing Condition:	**Headwall Material**	**Headwall Condition**	**Wingwall Material**	**Wingwall Condition**	**Scour at Structure**	**Scour Severity**
Upstream	Rip Rap	Poor	Rip Rap	Poor	Wingwalls	Medium
Downstream	None	N/A	Rip Rap	Fair	Culvert	Medium

Scour in Structure	**Scour Severity in Structure**	**Road Surface Condition**	**Utilities at Crossing**	**Structure Condition Overall**
None	None	Good	Overhead electric, tel pole in marsh	Fair

Structure Condition Comments:	Two separate structures connected in sewer

Ecological Assessment:	Upstream	Downstream
Natural Community Classification:	High Salt Marsh	High Salt Marsh
Upstream Salt Marsh Migration Potential (acres):	15.20	

Flood Hazard & Emergency Access

Site Identified in Hazard Mitigation Plan:	No
Emergency Access or Evacuation Route:	N/A
History of Flooding:	Unknown

Tidal Crossing Summary Sheet

New Hampshire's Tidal Crossing Assessment Protocol

Crossing ID: 5

Observer(s) & Organization:	TS, JB (NHDES Coastal)
Municipality:	SEABROOK
Stream Name:	N/A
Road Name:	Cross Beach Rd

Date:	8/6/2018
Start Time:	1:00:00 PM
End Time:	1:35:00 PM

Tide Prediction	**High**	**Low**
Time:	7:10 PM	1:08 PM
Elevation:	9.1	0.6
Tide Chart Location:	Hampton Harbor	

Crossing Condition Evaluation	Score*
Crossing Condition	2
Tidal Restriction Evaluation	
Tidal Range Ratio	1
Crossing Ratio	5
Erosion Classification	1
Tidal Restriction Overall Score	2
Tidal Aquatic Organism Passage	
Tidal Range Ratio	1
Salt Marsh Migration Evaluation	
Salt Marsh Migration Potential (Eval. Unit)	1
Salt Marsh Migration Potential (Wshed.)	1
Vegetation Evaluation	
Vegetation Comparison Matrix	1
Infrastructure Risk Evaluation	
Inundation Risk to the Roadway (US, DS)	3,4
Inun. Risk to the Crossing Structure (US, DS)	3,3
Adverse Impacts Evaluation**	
Inundation Risk to Low-Lying Development	5
Overall Scores	
Infrastructure	4
Ecological	1
Combined	3

DS view toward structure

US view above structure

US view toward structure

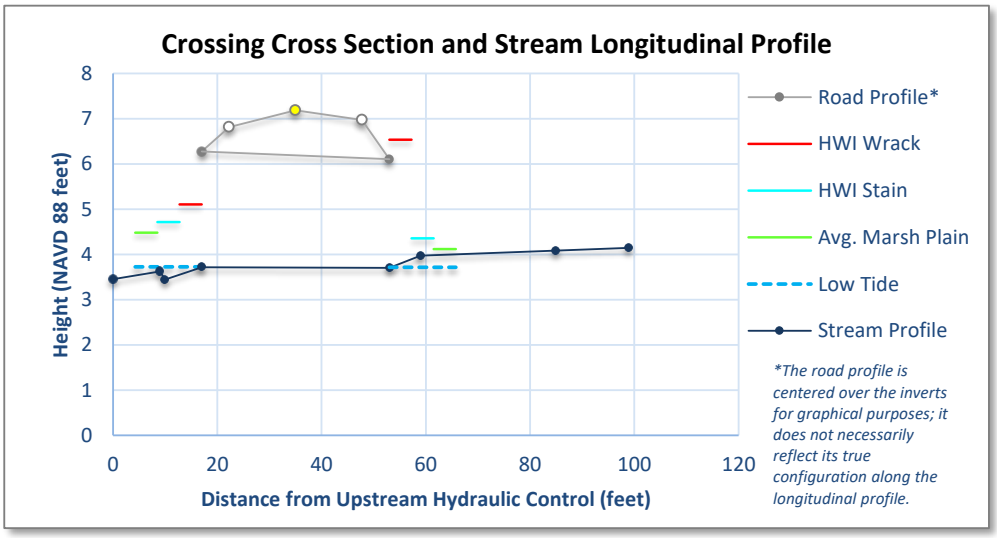
DS view above structure

* Scoring system ranges from 1 to 5, where 1 = lowest replacement priority and 5 = highest replacement priority

**Adverse Impacts Evaluation scores range from 1 to 5, where 1 = high risk and 5 = low risk

Long. Profile

Dist.	Hght.	Feat.	Sub.
0	3.455	HC	S
9	3.625	HC	C/S
10	3.445	CB	G
17	3.715	I	G
53	3.705	I	G
59	3.975	HC	G
85	4.085	CB	C/S
99	4.145	HC	C/S



Crossing Context:

N/A

Structure Characteristics:

Structure Type:	Round Culvert	**Date of Last Known Replacement:**	N/A
Structure Material:	Plastic - Smooth		
Tide Gate Present:	No		

Crossing Dimensions (ft):	Upstream	Downstream
Dimension A (width):	2.5	2.5
Dimension B^{CB}(height):	2.5	2.5
Crossing Length (Invert to Invert):	36	

Crossing Condition:	**Headwall Material**	**Headwall Condition**	**Wingwall Material**	**Wingwall Condition**	**Scour at Structure**	**Scour Severity**
Upstream	None	N/A	Rip Rap	Fair	None	None
Downstream	None	N/A	Rip Rap	Fair	Wingwalls	Low

Scour in Structure	**Scour Severity in Structure**	**Road Surface Condition**	**Utilities at Crossing**	**Structure Condition Overall**
None	None	Fair	Overhead electric	Fair

Structure Condition Comments:	N/A

Ecological Assessment:	Upstream	Downstream
Natural Community Classification:	High Salt Marsh	High Salt Marsh
Upstream Salt Marsh Migration Potential (acres):	0.40	

Flood Hazard & Emergency Access

Site Identified in Hazard Mitigation Plan:	Yes
Emergency Access or Evacuation Route:	N/A
History of Flooding:	Road floods during storm tides

Tidal Crossing Summary Sheet

New Hampshire's Tidal Crossing Assessment Protocol

Crossing ID: 6

Observer(s) & Organization:	JB TS (NHDES Coastal)
Municipality:	SEABROOK
Stream Name:	Cains Brook
Road Name:	Causeway St

Date:	8/15/2018
Start Time:	10:45:00 AM
End Time:	12:00:00 PM

Tide Prediction	**High**	**Low**
Time:	4:19 PM	9:20 AM
Elevation:	9.5	-0.9
Tide Chart Location:	Hampton Harbor	

Crossing Condition Evaluation	Score*
Crossing Condition	2
Tidal Restriction Evaluation	
Tidal Range Ratio	1
Crossing Ratio	3
Erosion Classification	3
Tidal Restriction Overall Score	2
Tidal Aquatic Organism Passage	
Tidal Range Ratio	1
Salt Marsh Migration Evaluation	
Salt Marsh Migration Potential (Eval. Unit)	4
Salt Marsh Migration Potential (Wshed.)	4
Vegetation Evaluation	
Vegetation Comparison Matrix	3
Infrastructure Risk Evaluation	
Inundation Risk to the Roadway (US, DS)	3,4
Inun. Risk to the Crossing Structure (US, DS)	2,2
Adverse Impacts Evaluation**	
Inundation Risk to Low-Lying Development	5
Overall Scores	
Infrastructure	4
Ecological	3
Combined	3

DS view toward structure

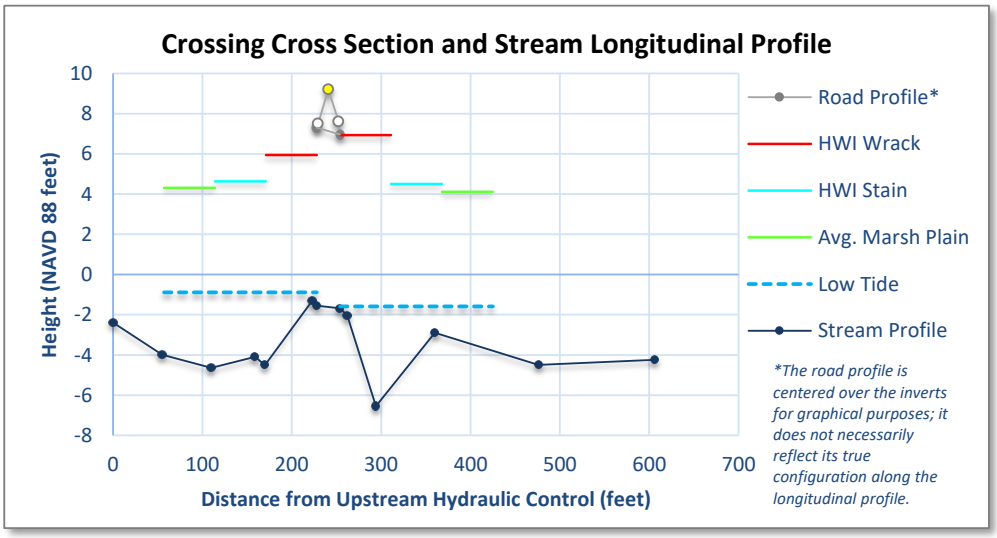
US view above structure

US view toward structure

DS view above structure

* Scoring system ranges from 1 to 5, where 1 = lowest replacement priority and 5 = highest replacement priority

**Adverse Impacts Evaluation scores range from 1 to 5, where 1 = high risk and 5 = low risk



Long. Profile

Dist.	Hght.	Feat.	Sub.
0	-2.3972	HC	C/S
55	-3.9972	P	S
110	-4.6372	CB	C/S
159	-4.0972	HC	G
170	-4.5172	P	C
223	-1.3072	GC	B
228	-1.5472	I	C
254	-1.6772	I	C
262	-2.0472	GC	B
294	-6.5472	P	C
360	-2.8972	HC	G
476	-4.4972	P	C/S
606	-4.2472	HC	S

Crossing Context:

Cains Brook has two tidally influenced road crossings (crossing ID #6 and #7). The lower one is a bridge at Causeway Street where a dredged channel under the current bridge replaced a sinuous tidal creek to the south. The overall restriction score is 3, moderate priority. A combination of soil disturbance, restrictions and freshwater sources allowed common reed (*Phragmites australis* , an invasive weedy grass) to colonize the marsh on both sides of the crossing and the upstream marsh was the site of a long-term *Phragmites* control project that did not use herbicide.

Structure Characteristics:

Structure Type:	Bridge with Side Slopes and Abutments	**Date of Last Known Replacement:**	N/A
Structure Material:	Concrete		
Tide Gate Present:	No		

Crossing Dimensions (ft):	Upstream	Downstream
Dimension A (width):	40	40
Dimension B^{CB}(height):	8.75	8.6
Crossing Length (Invert to Invert):	26	

Crossing Condition:	**Headwall Material**	**Headwall Condition**	**Wingwall Material**	**Wingwall Condition**	**Scour at Structure**	**Scour Severity**
Upstream	None	N/A	Rip Rap	Fair	Wingwalls	Low
Downstream	None	N/A	Rip Rap	Fair	Wingwalls	Low

Scour in Structure	**Scour Severity in Structure**	**Road Surface Condition**	**Utilities at Crossing**	**Structure Condition Overall**
None	None	Good	Sewer line parallel to rd US & DS	Fair

Structure Condition Comments:	N/A

Ecological Assessment:	Upstream	Downstream
Natural Community Classification:	High Salt Marsh	High Salt Marsh
Upstream Salt Marsh Migration Potential (acres):	8.00	

Flood Hazard & Emergency Access

Site Identified in Hazard Mitigation Plan:	No
Emergency Access or Evacuation Route:	N/A
History of Flooding:	Unknown

Tidal Crossing Summary Sheet

New Hampshire's Tidal Crossing Assessment Protocol

Crossing ID: 7

Observer(s) & Organization:	TS, KL (NHDES Coastal)
Municipality:	SEABROOK
Stream Name:	Cains Brook
Road Name:	N/A

Date:	8/8/2018
Start Time:	3:50:00 PM
End Time:	5:00:00 PM

Tide Prediction	**High**	**Low**
Time:	9:11 PM	3:10 PM
Elevation:	9.8	0.3
Tide Chart Location:	Portsmouth Harbor	

Crossing Condition Evaluation	Score*
Crossing Condition	1
Tidal Restriction Evaluation	
Tidal Range Ratio	4
Crossing Ratio	3
Erosion Classification	4
Tidal Restriction Overall Score	4
Tidal Aquatic Organism Passage	
Tidal Range Ratio	4
Salt Marsh Migration Evaluation	
Salt Marsh Migration Potential (Eval. Unit)	2
Salt Marsh Migration Potential (Wshed.)	2
Vegetation Evaluation	
Vegetation Comparison Matrix	0
Infrastructure Risk Evaluation	
Inundation Risk to the Roadway (US, DS)	2,3
Inun. Risk to the Crossing Structure (US, DS)	2,3
Adverse Impacts Evaluation**	
Inundation Risk to Low-Lying Development	5
Overall Scores	
Infrastructure	3
Ecological	4
Combined	3

DS view toward structure

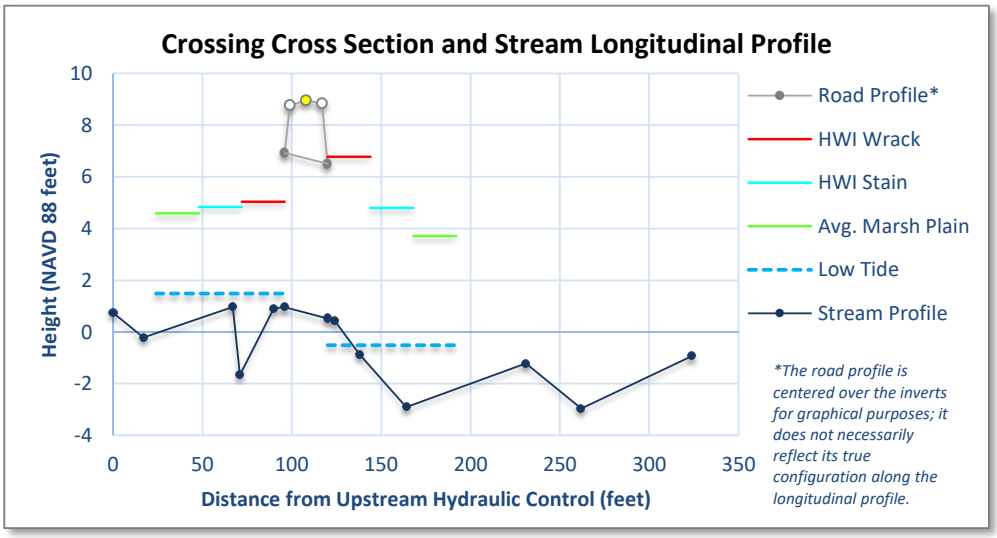
US view above structure

US view toward structure

DS view above structure

* Scoring system ranges from 1 to 5, where 1 = lowest replacement priority and 5 = highest replacement priority

**Adverse Impacts Evaluation scores range from 1 to 5, where 1 = high risk and 5 = low risk



Long. Profile

Dist.	Hght.	Feat.	Sub.
0	0.7367	HC	S
17	-0.2133	P	S
67	0.9667	HC	S
71	-1.6633	P	S
90	0.9167	GC	B
96	0.9567	I	B
120	0.5267	I	B
124	0.4367	GC	B
138	-0.8833	CB	C
164	-2.9133	P	C
231	-1.2133	HC	C/S
262	-2.9633	P	C/S
324	-0.9333	HC	C/S

Crossing Context:

The upper tidal crossing at Cains Brook was restored in the mid 1990s by adding a concrete box culvert alongside the existing perched pipe, which still exists. The overall combined score is 3, moderate priority, because tides and organism passage appear to be partially restricted, there are signs of erosion and inundation risk to the structure is moderate. Above this crossing the marsh is brackish with cattail dominant and soon becomes fresh, but *Phragmites* has begun to invade this marsh (two colonies in 2016).

Structure Characteristics:

Structure Type:	Box Culvert	**Date of Last Known Replacement:**	N/A
Structure Material:	Concrete		
Tide Gate Present:	No		

Crossing Dimensions (ft):	Upstream	Downstream
Dimension A (width):	10	10
Dimension B^{CB}(height):	6	6
Crossing Length (Invert to Invert):	24	

Crossing Condition:	**Headwall Material**	**Headwall Condition**	**Wingwall Material**	**Wingwall Condition**	**Scour at Structure**	**Scour Severity**
Upstream	Concrete	Good	Rip Rap	Fair	Wingwalls	Medium
Downstream	Concrete	Good	None	N/A	Armoring	Medium

Scour in Structure	**Scour Severity in Structure**	**Road Surface Condition**	**Utilities at Crossing**	**Structure Condition Overall**
None	None	Fair	Overhead electric. Smells of sewer.	Good

Structure Condition Comments:	N/A

Ecological Assessment:	Upstream	Downstream
Natural Community Classification:	High Salt Marsh	High Salt Marsh
Upstream Salt Marsh Migration Potential (acres):	1.64	

Flood Hazard & Emergency Access

Site Identified in Hazard Mitigation Plan:	No
Emergency Access or Evacuation Route:	N/A
History of Flooding:	Unknown

Tidal Crossing Summary Sheet

New Hampshire's Tidal Crossing Assessment Protocol

Crossing ID: 8

Observer(s) & Organization:	TS, JB (NHDES Coastal)
Municipality:	HAMPTON
Stream Name:	N/A
Road Name:	Brown Ave

Date:	7/30/2018
Start Time:	8:00:00 AM
End Time:	9:00:00 AM

Tide Prediction	**High**	**Low**
Time:	2:00 PM	8:00 AM
Elevation:	8.0	0.2
Tide Chart Location:	Hampton Harbor	

Crossing Condition Evaluation	Score*
Crossing Condition	5
Tidal Restriction Evaluation	
Tidal Range Ratio	1
Crossing Ratio	5
Erosion Classification	3
Tidal Restriction Overall Score	3
Tidal Aquatic Organism Passage	
Tidal Range Ratio	1
Salt Marsh Migration Evaluation	
Salt Marsh Migration Potential (Eval. Unit)	1
Salt Marsh Migration Potential (Wshed.)	1
Vegetation Evaluation	
Vegetation Comparison Matrix	1
Infrastructure Risk Evaluation	
Inundation Risk to the Roadway (US, DS)	3,2
Inun. Risk to the Crossing Structure (US, DS)	5,5
Adverse Impacts Evaluation**	
Inundation Risk to Low-Lying Development	1
Overall Scores	
Infrastructure	5
Ecological	3
Combined	4

DS view toward structure

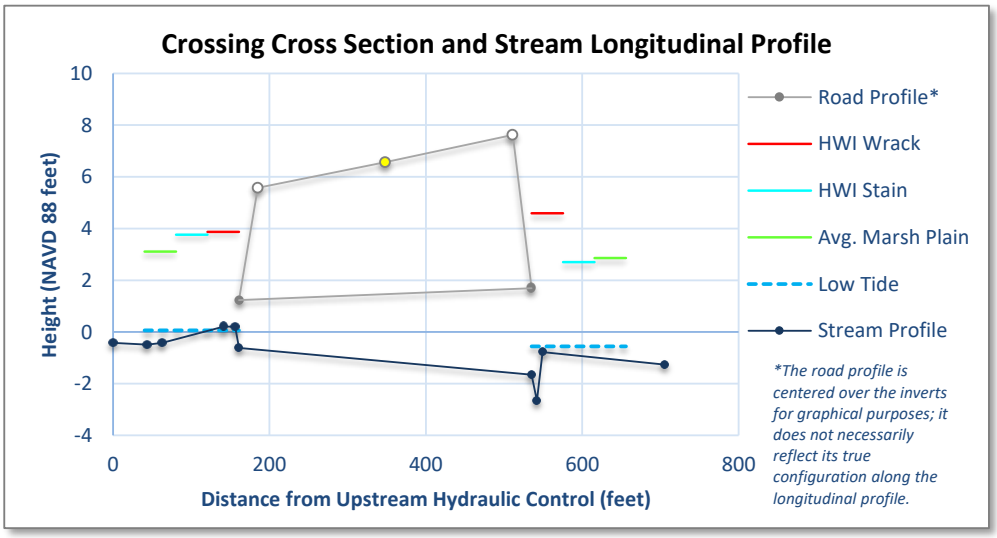
US view above structure

US view toward structure

DS view above structure

* Scoring system ranges from 1 to 5, where 1 = lowest replacement priority and 5 = highest replacement priority

**Adverse Impacts Evaluation scores range from 1 to 5, where 1 = high risk and 5 = low risk

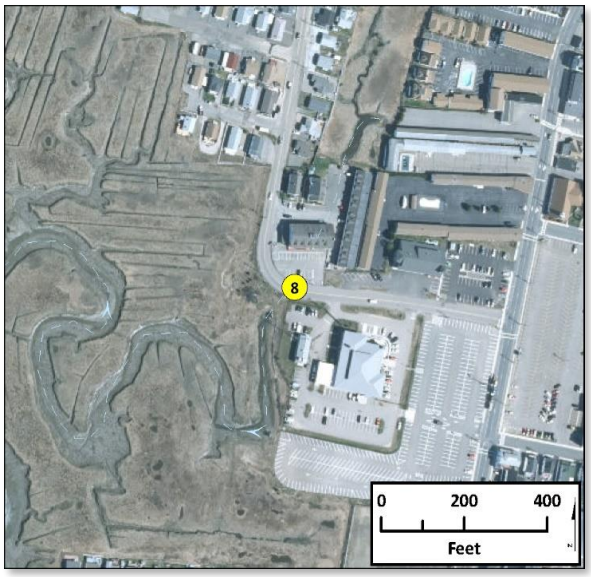


Long. Profile

Dist.	Hght.	Feat.	Sub.
0	-0.4183	HC	C/S
44	-0.4883	HC	C/S
63	-0.4183	HC	C/S
142	0.2117	HC	G
156	0.2017	GC	B
161	-0.6183	I	C
535.2	-1.6483	I	C
542.2	-2.6583	P	C
549.2	-0.7783	HC	C
705.2	-1.2583	HC	G

Crossing Context:

Brown Avenue crosses three tidal creeks (#8, 9, 10) providing tides to small marsh areas surrounded by development in Hampton. This crossing leads to the largest of the marsh areas where the upper portion has been filled for a parking lot. The tide is conducted by a 4-foot round culvert, which operates at a much lower capacity since the upstream side is crushed. The crossing condition is poor, and the culvert constricts the channel. The overall combined score is a 4, high priority for replacement.



Structure Characteristics:

Structure Type:	Round Culvert	**Date of Last Known Replacement:**	N/A
Structure Material:	Plastic - Corrugated		
Tide Gate Present:	No		

Crossing Dimensions (ft):	Upstream	Downstream
Dimension A (width):	4.1	3.9
Dimension B[CB](height):	1.9	3.1
Crossing Length (Invert to Invert):	374.2	

Crossing Condition:	**Headwall Material**	**Headwall Condition**	**Wingwall Material**	**Wingwall Condition**	**Scour at Structure**	**Scour Severity**
Upstream	Concrete	Poor	None	N/A	Headwall	High
Downstream	Rip Rap	Fair	None	N/A	Headwall	Medium

Scour in Structure	**Scour Severity in Structure**	**Road Surface Condition**	**Utilities at Crossing**	**Structure Condition Overall**
None	None	Fair	Overhead electric	Poor

Structure Condition Comments:	Tide gate next to DS structure, see photo. US metal corrugated pipe.

Ecological Assessment:	Upstream	Downstream
Natural Community Classification:	Low Salt Marsh	High Salt Marsh
Upstream Salt Marsh Migration Potential (acres):	0.83	

Flood Hazard & Emergency Access

Site Identified in Hazard Mitigation Plan:	Yes
Emergency Access or Evacuation Route:	N/A
History of Flooding:	Flooded up to 1/2 foot water at time of high tide

Tidal Crossing Summary Sheet

New Hampshire's Tidal Crossing Assessment Protocol

Crossing ID: 9

Observer(s) & Organization:	TS, JB (NHDES Coastal)
Municipality:	HAMPTON
Stream Name:	N/A
Road Name:	Brown Ave

Date:	7/19/2018
Start Time:	11:45:00 AM
End Time:	12:28:00 PM

Tide Prediction	**High**	**Low**
Time:	5:40 PM	11:36 AM
Elevation:	9.1	-0.2
Tide Chart Location:	Hampton Harbor	

Crossing Condition Evaluation	Score*
Crossing Condition	5
Tidal Restriction Evaluation	
Tidal Range Ratio	3
Crossing Ratio	5
Erosion Classification	3
Tidal Restriction Overall Score	4
Tidal Aquatic Organism Passage	
Tidal Range Ratio	3
Salt Marsh Migration Evaluation	
Salt Marsh Migration Potential (Eval. Unit)	2
Salt Marsh Migration Potential (Wshed.)	2
Vegetation Evaluation	
Vegetation Comparison Matrix	1
Infrastructure Risk Evaluation	
Inundation Risk to the Roadway (US, DS)	3,4
Inun. Risk to the Crossing Structure (US, DS)	5,5
Adverse Impacts Evaluation**	
Inundation Risk to Low-Lying Development	1
Overall Scores	
Infrastructure	5
Ecological	3
Combined	4

DS view toward structure

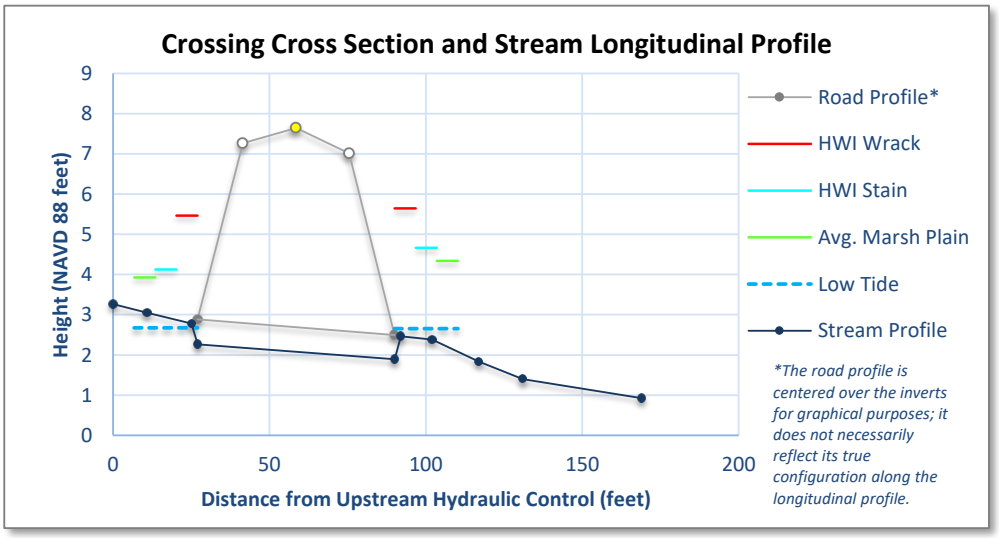
US view above structure

US view toward structure

DS view above structure

* Scoring system ranges from 1 to 5, where 1 = lowest replacement priority and 5 = highest replacement priority

**Adverse Impacts Evaluation scores range from 1 to 5, where 1 = high risk and 5 = low risk



Long. Profile

Dist.	Hght.	Feat.	Sub.
0	3.2644	HC	C
11	3.0444	HC	C
25	2.7844	HC	G
27	2.2644	I	C
90	1.8944	I	C
92	2.4644	CB	G
102	2.3844	GC	G
117	1.8344	HC	G
131	1.3944	CB	G
169	0.9244	HC	G

Crossing Context:

Brown Avenue crosses three tidal creeks (#8, 9, 10) providing tides to small marsh areas surrounded by development in Hampton. This crossing leads to the smallest of the marsh areas. The crossing condition is poor, the channel is severely restricted, and the 2-foot round culvert is largely buried by sediment, further restricting the tide. The upstream marsh plain appears to have subsided about 0.4 feet. The overall combined score is 4, high priority for replacement.

Structure Characteristics:

Structure Type:	Round Culvert	**Date of Last Known Replacement:**	N/A
Structure Material:	Steel - Corrugated		
Tide Gate Present:	No		

Crossing Dimensions (ft):	Upstream	Downstream
Dimension A (width):	0.8	2
Dimension B^{CB} (height):	0.4	0.4
Crossing Length (Invert to Invert):	63	

Crossing Condition:	**Headwall Material**	**Headwall Condition**	**Wingwall Material**	**Wingwall Condition**	**Scour at Structure**	**Scour Severity**
Upstream	Rip Rap	Poor	None	N/A	Headwall	Medium
Downstream	Rip Rap	Poor	None	N/A	Headwall	High

Scour in Structure	**Scour Severity in Structure**	**Road Surface Condition**	**Utilities at Crossing**	**Structure Condition Overall**
None	None	Fair	Overhead electric, telephone pole near bank	Poor

Structure Condition Comments:	Collapsed inlet and outlet, completely submerged

Ecological Assessment:	Upstream	Downstream
Natural Community Classification:	High Salt Marsh	High Salt Marsh
Upstream Salt Marsh Migration Potential (acres):	1.30	

Flood Hazard & Emergency Access

Site Identified in Hazard Mitigation Plan:	Yes
Emergency Access or Evacuation Route:	N/A
History of Flooding:	Flooded up to 1/2 foot water at time of high tide

Tidal Crossing Summary Sheet

New Hampshire's Tidal Crossing Assessment Protocol

Crossing ID: 10

Observer(s) & Organization:	JB, TS (NHDES Coastal)
Municipality:	HAMPTON
Stream Name:	N/A
Road Name:	Brown Ave

Date:	7/17/2018
Start Time:	9:40:00 AM
End Time:	10:36:00 AM

Tide Prediction	**High**	**Low**
Time:	3:46 PM	9:45 AM
Elevation:	9.4	-1.1
Tide Chart Location:	Hampton Harbor	

Crossing Condition Evaluation	Score*
Crossing Condition	1
Tidal Restriction Evaluation	
Tidal Range Ratio	2
Crossing Ratio	5
Erosion Classification	3
Tidal Restriction Overall Score	3
Tidal Aquatic Organism Passage	
Tidal Range Ratio	2
Salt Marsh Migration Evaluation	
Salt Marsh Migration Potential (Eval. Unit)	2
Salt Marsh Migration Potential (Wshed.)	3
Vegetation Evaluation	
Vegetation Comparison Matrix	1
Infrastructure Risk Evaluation	
Inundation Risk to the Roadway (US, DS)	3,3
Inun. Risk to the Crossing Structure (US, DS)	5,5
Adverse Impacts Evaluation**	
Inundation Risk to Low-Lying Development	1
Overall Scores	
Infrastructure	3
Ecological	3
Combined	3

DS view toward structure

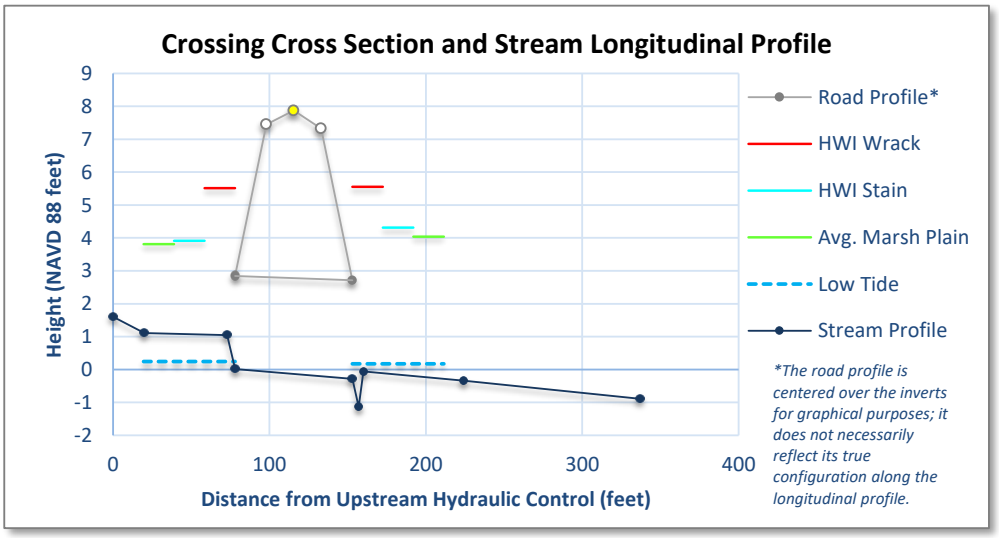
US view above structure

US view toward structure

DS view above structure

* Scoring system ranges from 1 to 5, where 1 = lowest replacement priority and 5 = highest replacement priority

**Adverse Impacts Evaluation scores range from 1 to 5, where 1 = high risk and 5 = low risk

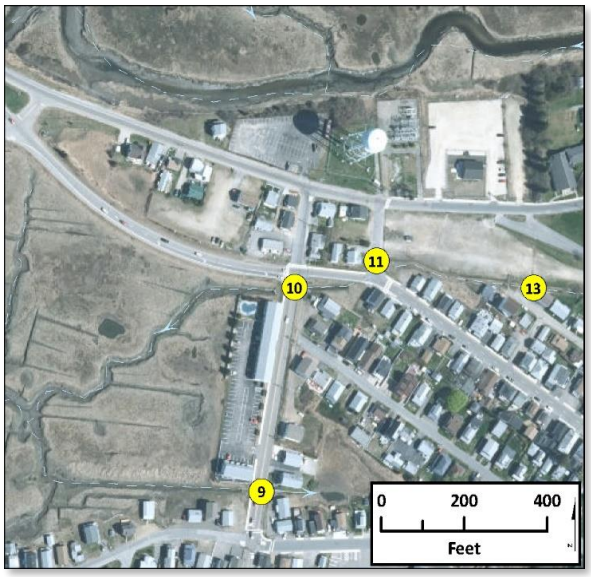


Long. Profile

Dist.	Hght.	Feat.	Sub.
0	1.604	HC	G
20	1.114	CB	G
73	1.044	GC	C
78	0.014	I	G
153	-0.286	I	G
157	-1.136	P	G
160	-0.056	HC	G
224	-0.336	HC	G
337	-0.886	HC	C/S

Crossing Context:

N/A



Structure Characteristics:

Structure Type:	Round Culvert	**Date of Last Known Replacement:**	N/A
Structure Material:	Steel - Smooth		
Tide Gate Present:	Yes		

Crossing Dimensions (ft):	Upstream	Downstream
Dimension A (width):	3	3
Dimension B^{CB}(height):	3	2.8
Crossing Length (Invert to Invert):	75	

Crossing Condition:	**Headwall Material**	**Headwall Condition**	**Wingwall Material**	**Wingwall Condition**	**Scour at Structure**	**Scour Severity**
Upstream	Concrete	Good	None	N/A	Headwall	Medium
Downstream	Concrete	Good	None	N/A	Culvert	Low

Scour in Structure	**Scour Severity in Structure**	**Road Surface Condition**	**Utilities at Crossing**	**Structure Condition Overall**
None	None	Fair	OHE US	Good

Structure Condition Comments:	N/A

Ecological Assessment:	Upstream	Downstream
Natural Community Classification:	High Salt Marsh	High Salt Marsh
Upstream Salt Marsh Migration Potential (acres):	4.73	

Flood Hazard & Emergency Access

Site Identified in Hazard Mitigation Plan:	Yes
Emergency Access or Evacuation Route:	N/A
History of Flooding:	Has experienced flooding during high tide events.

Tidal Crossing Summary Sheet

New Hampshire's Tidal Crossing Assessment Protocol

Crossing ID: 11

Observer(s) & Organization:	JB TS (NHDES Coastal)
Municipality:	HAMPTON
Stream Name:	N/A
Road Name:	Highland Ave

Date:	7/17/2018
Start Time:	10:46:00 AM
End Time:	11:30:00 AM

Tide Prediction	**High**	**Low**
Time:	3:46 PM	9:45 AM
Elevation:	9.4	-1.1
Tide Chart Location:	Hampton Harbor	

Crossing Condition Evaluation	Score*
Crossing Condition	5
Tidal Restriction Evaluation	
Tidal Range Ratio	1
Crossing Ratio	4
Erosion Classification	4
Tidal Restriction Overall Score	3
Tidal Aquatic Organism Passage	
Tidal Range Ratio	1
Salt Marsh Migration Evaluation	
Salt Marsh Migration Potential (Eval. Unit)	3
Salt Marsh Migration Potential (Wshed.)	3
Vegetation Evaluation	
Vegetation Comparison Matrix	5
Infrastructure Risk Evaluation	
Inundation Risk to the Roadway (US, DS)	4,4
Inun. Risk to the Crossing Structure (US, DS)	4,5
Adverse Impacts Evaluation**	
Inundation Risk to Low-Lying Development	1
Overall Scores	
Infrastructure	5
Ecological	4
Combined	4

DS view toward structure

US view above structure

US view toward structure

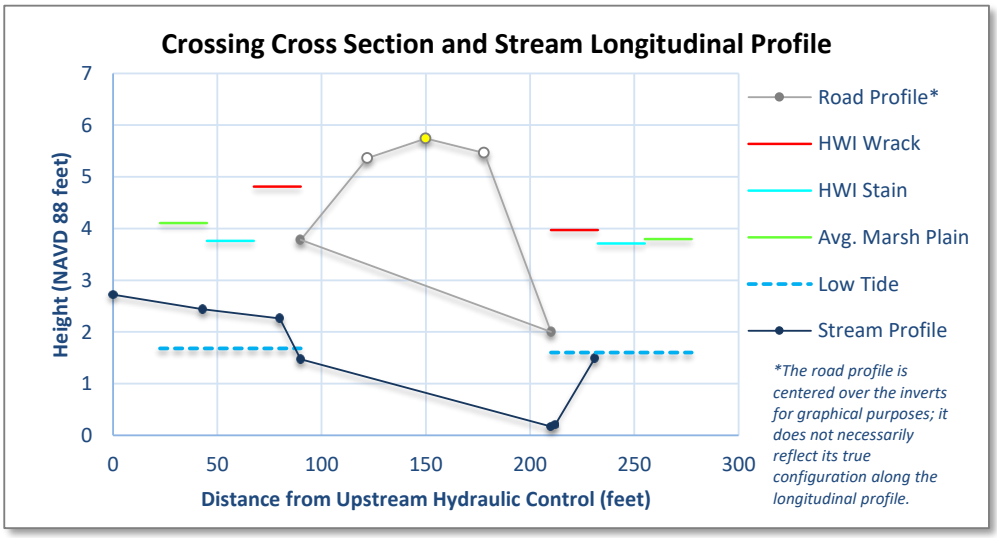
DS view above structure

* Scoring system ranges from 1 to 5, where 1 = lowest replacement priority and 5 = highest replacement priority

**Adverse Impacts Evaluation scores range from 1 to 5, where 1 = high risk and 5 = low risk

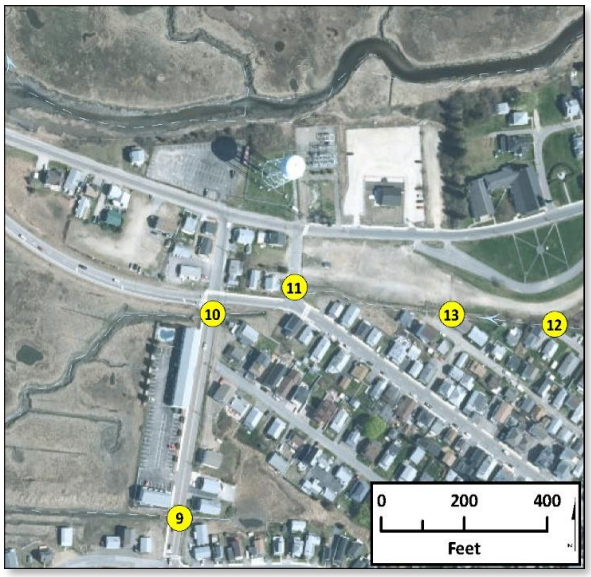
Long. Profile

Dist.	Hght.	Feat.	Sub.
0	2.7215	HC	C/S
43	2.4415	HC	C/S
80	2.2615	GC	C
90	1.4715	I	C
210	0.1715	I	C
212	0.2015	P	C
231	1.4915	HC	G



Crossing Context:

One of the small marshes in Hampton surrounded by development depends on the culvert under Highland Avenue in Hampton for its tides. The culvert is a round pipe about 3 feet in diameter, but its capacity is reduced by sediment. The crossing condition is poor, the channel is constrained with signs of erosion at the culvert. The original marsh is mostly filled by development. The overall combined score is 4, high priority for replacement.



Structure Characteristics:

Structure Type:	Round Culvert	**Date of Last Known Replacement:**	N/A
Structure Material:	Steel - Corrugated		
Tide Gate Present:	No		

Crossing Dimensions (ft):	Upstream	Downstream
Dimension A (width):	3.2	3.2
Dimension B^{CB}(height):	2.5	1.8
Crossing Length (Invert to Invert):	120	

Crossing Condition:	**Headwall Material**	**Headwall Condition**	**Wingwall Material**	**Wingwall Condition**	**Scour at Structure**	**Scour Severity**
Upstream	Masonry	Poor	None	N/A	Culvert	Low
Downstream	Masonry	Poor	None	N/A	Headwall	Medium

Scour in Structure	**Scour Severity in Structure**	**Road Surface Condition**	**Utilities at Crossing**	**Structure Condition Overall**
None	None	Good	OHE. Electric meter US RR	Poor

Structure Condition Comments:	N/A

Ecological Assessment:	Upstream	Downstream
Natural Community Classification:	High Salt Marsh	High Salt Marsh
Upstream Salt Marsh Migration Potential (acres):	3.66	

Flood Hazard & Emergency Access

Site Identified in Hazard Mitigation Plan:	Yes
Emergency Access or Evacuation Route:	N/A
History of Flooding:	Flooded up to 1/2 foot water at time of high tide

Tidal Crossing Summary Sheet

New Hampshire's Tidal Crossing Assessment Protocol

Crossing ID: 12

Observer(s) & Organization:	TS, KL (NHDES Coastal)
Municipality:	HAMPTON
Stream Name:	N/A
Road Name:	Ross Ave

Date:	8/8/2018
Start Time:	2:00:00 PM
End Time:	2:55:00 PM

Tide Prediction	**High**	**Low**
Time:	9:11 PM	3:10 PM
Elevation:	9.8	0.3
Tide Chart Location:	Hampton Harbor	

Crossing Condition Evaluation	Score*
Crossing Condition	2
Tidal Restriction Evaluation	
Tidal Range Ratio	3
Crossing Ratio	3
Erosion Classification	4
Tidal Restriction Overall Score	3
Tidal Aquatic Organism Passage	
Tidal Range Ratio	3
Salt Marsh Migration Evaluation	
Salt Marsh Migration Potential (Eval. Unit)	1
Salt Marsh Migration Potential (Wshed.)	1
Vegetation Evaluation	
Vegetation Comparison Matrix	3
Infrastructure Risk Evaluation	
Inundation Risk to the Roadway (US, DS)	4,4
Inun. Risk to the Crossing Structure (US, DS)	4,4
Adverse Impacts Evaluation**	
Inundation Risk to Low-Lying Development	1
Overall Scores	
Infrastructure	4
Ecological	3
Combined	3

DS view toward structure

US view above structure

US view toward structure

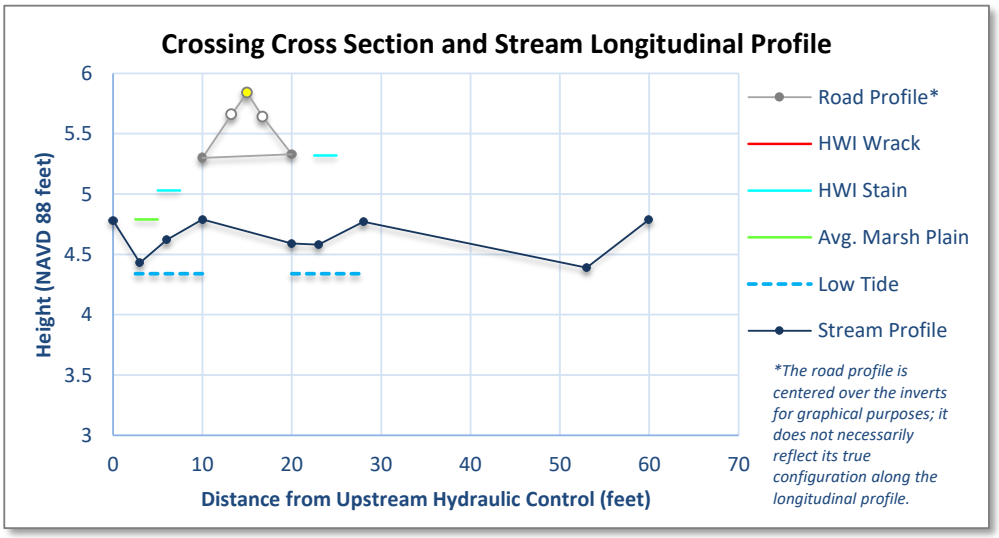
DS view above structure

* Scoring system ranges from 1 to 5, where 1 = lowest replacement priority and 5 = highest replacement priority

**Adverse Impacts Evaluation scores range from 1 to 5, where 1 = high risk and 5 = low risk

Long. Profile

Dist.	Hght.	Feat.	Sub.
0	4.7799	HC	C/S
3	4.4299	P	G
6	4.6199	HC	G
10	4.7899	I	G
20	4.5899	I	G
23	4.5799	CB	G
28	4.7699	HC	C/S
53	4.3899	CB	C/S
60	4.7899	HC	C/S



Crossing Context:

N/A

Structure Characteristics:

Structure Type:	Round Culvert	**Date of Last Known Replacement:**	N/A
Structure Material:	Other		
Tide Gate Present:	No		

Crossing Dimensions (ft):	Upstream	Downstream
Dimension A (width):	1.9	1.9
Dimension B^{CB}(height):	1.5	1.9
Crossing Length (Invert to Invert):	10	

Crossing Condition:	**Headwall Material**	**Headwall Condition**	**Wingwall Material**	**Wingwall Condition**	**Scour at Structure**	**Scour Severity**
Upstream	None	N/A	None	N/A	None	None
Downstream	None	N/A	None	N/A	None	None

Scour in Structure	**Scour Severity in Structure**	**Road Surface Condition**	**Utilities at Crossing**	**Structure Condition Overall**
None	None	N/A	Overhead electric	Fair

Structure Condition Comments:	Clay culvert

Ecological Assessment:	Upstream	Downstream
Natural Community Classification:	High Salt Marsh	High Salt Marsh
Upstream Salt Marsh Migration Potential (acres):	0.71	

Flood Hazard & Emergency Access

Site Identified in Hazard Mitigation Plan:	No
Emergency Access or Evacuation Route:	N/A
History of Flooding:	Area experienced 6""""""""" flooding in March 2018.

Tidal Crossing Summary Sheet

New Hampshire's Tidal Crossing Assessment Protocol

Crossing ID: 13

Observer(s) & Organization:	JB TS (NHDES Coastal)
Municipality:	HAMPTON
Stream Name:	N/A
Road Name:	Church St

Date:	8/6/2018
Start Time:	2:15:00 PM
End Time:	3:00:00 PM

Tide Prediction	**High**	**Low**
Time:	7:10 PM	1:08 PM
Elevation:	9.1	0.7
Tide Chart Location:	Hampton Harbor	

Crossing Condition Evaluation	Score*
Crossing Condition	4
Tidal Restriction Evaluation	
Tidal Range Ratio	3
Crossing Ratio	3
Erosion Classification	3
Tidal Restriction Overall Score	3
Tidal Aquatic Organism Passage	
Tidal Range Ratio	3
Salt Marsh Migration Evaluation	
Salt Marsh Migration Potential (Eval. Unit)	1
Salt Marsh Migration Potential (Wshed.)	2
Vegetation Evaluation	
Vegetation Comparison Matrix	3
Infrastructure Risk Evaluation	
Inundation Risk to the Roadway (US, DS)	5,4
Inun. Risk to the Crossing Structure (US, DS)	4,4
Adverse Impacts Evaluation**	
Inundation Risk to Low-Lying Development	1
Overall Scores	
Infrastructure	5
Ecological	3
Combined	4

DS view toward structure

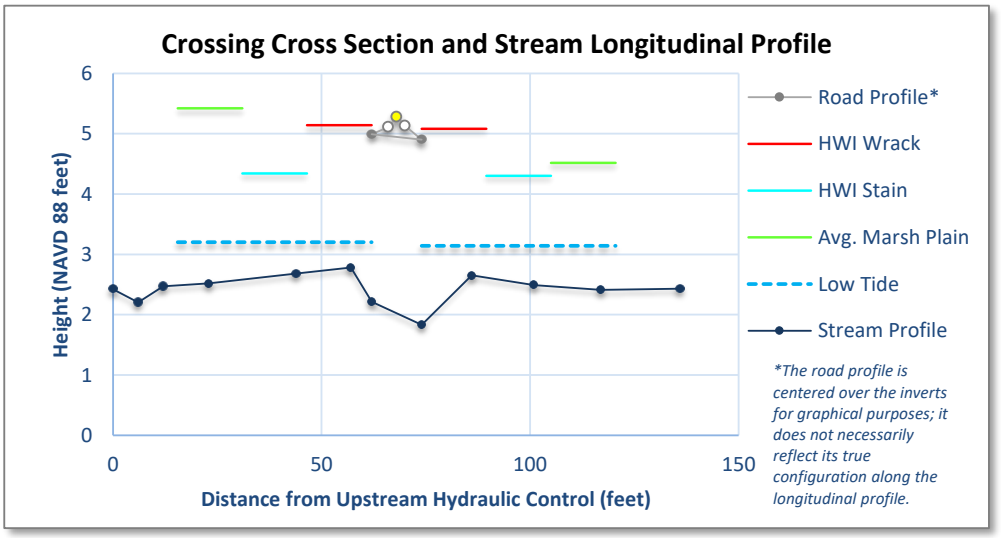
US view above structure

US view toward structure

DS view above structure

* Scoring system ranges from 1 to 5, where 1 = lowest replacement priority and 5 = highest replacement priority

**Adverse Impacts Evaluation scores range from 1 to 5, where 1 = high risk and 5 = low risk



Long. Profile

Dist.	Hght.	Feat.	Sub.
0	2.4222	HC	C/S
6	2.2022	P	C/S
12	2.4722	HC	C/S
23	2.5222	CB	S
44	2.6822	HC	C/S
57	2.7822	HC	C/S
62	2.2122	I	S
74	1.8322	I	C/S
86	2.6522	HC	C/S
101	2.4922	CB	C/S
117	2.4122	CB	C/S
136	2.4322	HC	C/S

Crossing Context:

Church Street in Hampton crosses a tidal creek, providing tidal flow with a 2.5-foot round culvert. The crossing condition is fair and inundation risk to the road is high. Exotic Phragmites appears to increase above the crossing. The overall combined score is 4, high priority for replacement.

Structure Characteristics:

Structure Type:	Round Culvert	**Date of Last Known Replacement:**	N/A
Structure Material:	Other		
Tide Gate Present:	No		

Crossing Dimensions (ft):	Upstream	Downstream
Dimension A (width):	2.5	2.5
Dimension B^{CB}(height):	1.5	2.3
Crossing Length (Invert to Invert):	12	

Crossing Condition:	**Headwall Material**	**Headwall Condition**	**Wingwall Material**	**Wingwall Condition**	**Scour at Structure**	**Scour Severity**
Upstream	None	N/A	Rip Rap	Poor	None	None
Downstream	None	N/A	None	N/A	None	None

Scour in Structure	**Scour Severity in Structure**	**Road Surface Condition**	**Utilities at Crossing**	**Structure Condition Overall**
None	None	N/A	US OHE	Poor

Structure Condition Comments:	Clay culvert

Ecological Assessment:	Upstream	Downstream
Natural Community Classification:	Brackish Riverbank Marsh	Brackish Riverbank Marsh
Upstream Salt Marsh Migration Potential (acres):	1.04	

Flood Hazard & Emergency Access

Site Identified in Hazard Mitigation Plan:	No
Emergency Access or Evacuation Route:	N/A
History of Flooding:	Area experienced 6""""""""" flooding during March 2018.

Tidal Crossing Summary Sheet

New Hampshire's Tidal Crossing Assessment Protocol

Crossing ID: 14

Observer(s) & Organization:	JB TS (NHDES Coastal)
Municipality:	HAMPTON
Stream Name:	Tide Mill Creek
Road Name:	Winnacunnet Rd

Date:	7/10/2018
Start Time:	2:50:00 PM
End Time:	4:45:00 PM

Tide Prediction	**High**	**Low**
Time:	9:33 PM	3:33 PM
Elevation:	9.8	0.3
Tide Chart Location:	Hampton Harbor	

Crossing Condition Evaluation	Score*
Crossing Condition	2
Tidal Restriction Evaluation	
Tidal Range Ratio	1
Crossing Ratio	3
Erosion Classification	4
Tidal Restriction Overall Score	3
Tidal Aquatic Organism Passage	
Tidal Range Ratio	1
Salt Marsh Migration Evaluation	
Salt Marsh Migration Potential (Eval. Unit)	5
Salt Marsh Migration Potential (Wshed.)	5
Vegetation Evaluation	
Vegetation Comparison Matrix	1
Infrastructure Risk Evaluation	
Inundation Risk to the Roadway (US, DS)	3,3
Inun. Risk to the Crossing Structure (US, DS)	3,2
Adverse Impacts Evaluation**	
Inundation Risk to Low-Lying Development	1
Overall Scores	
Infrastructure	2
Ecological	1
Combined	3

DS view toward structure

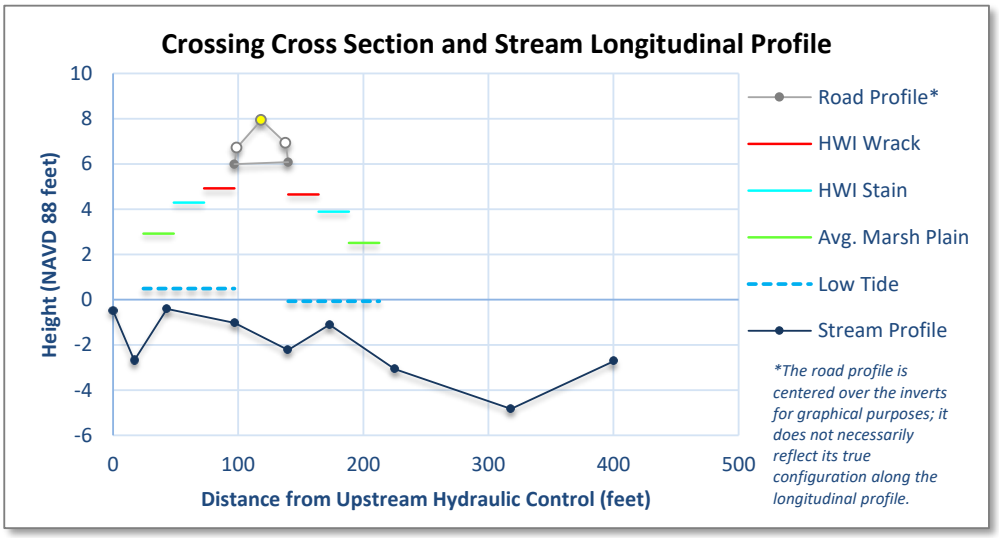
US view above structure

US view toward structure

DS view above structure

* Scoring system ranges from 1 to 5, where 1 = lowest replacement priority and 5 = highest replacement priority

**Adverse Impacts Evaluation scores range from 1 to 5, where 1 = high risk and 5 = low risk



Long. Profile

Dist.	Hght.	Feat.	Sub.
0	-0.4904	HC	C
17	-2.6904	P	C/S
43	-0.4104	HC	C/S
97	-1.0304	I	C
140	-2.2204	I	C
173	-1.1104	HC	B
225	-3.0704	CB	G
318	-4.8304	P	G
400	-2.7304	HC	S

Crossing Context:

N/A

Structure Characteristics:

Structure Type:	Arch Bridge	**Date of Last Known Replacement:**	1996
Structure Material:	Concrete		
Tide Gate Present:	No		

Crossing Dimensions (ft):	Upstream	Downstream
Dimension A (width):	24	24
Dimension B^{CB}(height):	7	6.4
Crossing Length (Invert to Invert):	43	

Crossing Condition:	**Headwall Material**	**Headwall Condition**	**Wingwall Material**	**Wingwall Condition**	**Scour at Structure**	**Scour Severity**
Upstream	None	N/A	Concrete	Fair	None	None
Downstream	None	N/A	Concrete	Fair	Wingwalls	Low

Scour in Structure	**Scour Severity in Structure**	**Road Surface Condition**	**Utilities at Crossing**	**Structure Condition Overall**
None	None	Good	Overhead electric	Good

Structure Condition Comments:	Center of DS arch not in the thalwag

Ecological Assessment:	Upstream	Downstream
Natural Community Classification:	High Salt Marsh	Low Salt Marsh
Upstream Salt Marsh Migration Potential (acres):	83.39	

Flood Hazard & Emergency Access

Site Identified in Hazard Mitigation Plan:	Yes
Emergency Access or Evacuation Route:	Yes
History of Flooding:	Upstream 3+' during hightide/storm events.

Tidal Crossing Summary Sheet

New Hampshire's Tidal Crossing Assessment Protocol

Crossing ID: 15

Observer(s) & Organization:	JB TS (NHDES Coastal)
Municipality:	HAMPTON
Stream Name:	N/A
Road Name:	High St

Date:	9/11/2018
Start Time:	9:30:00 AM
End Time:	10:15:00 AM

Tide Prediction	**High**	**Low**
Time:	1:11 PM	7:15 AM
Elevation:	9.9	-1.2
Tide Chart Location:	Hampton Harbor	

Crossing Condition Evaluation	Score*
Crossing Condition	5
Tidal Restriction Evaluation	
Tidal Range Ratio	1
Crossing Ratio	4
Erosion Classification	0
Tidal Restriction Overall Score	3
Tidal Aquatic Organism Passage	
Tidal Range Ratio	1
Salt Marsh Migration Evaluation	
Salt Marsh Migration Potential (Eval. Unit)	5
Salt Marsh Migration Potential (Wshed.)	5
Vegetation Evaluation	
Vegetation Comparison Matrix	5
Infrastructure Risk Evaluation	
Inundation Risk to the Roadway (US, DS)	5,4
Inun. Risk to the Crossing Structure (US, DS)	5,5
Adverse Impacts Evaluation**	
Inundation Risk to Low-Lying Development	1
Overall Scores	
Infrastructure	5
Ecological	4
Combined	5

DS view toward structure

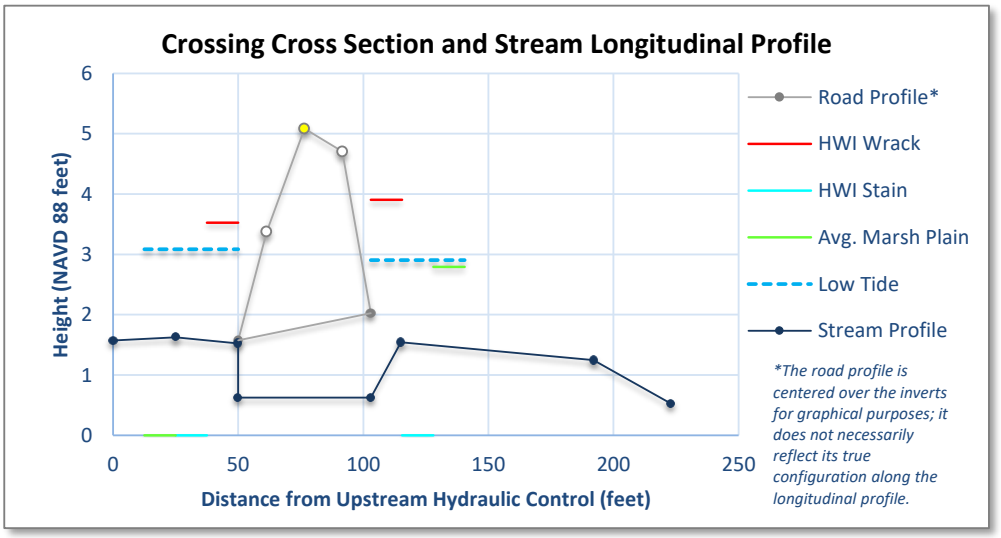
US view above structure

US view toward structure

DS view above structure

* Scoring system ranges from 1 to 5, where 1 = lowest replacement priority and 5 = highest replacement priority

**Adverse Impacts Evaluation scores range from 1 to 5, where 1 = high risk and 5 = low risk

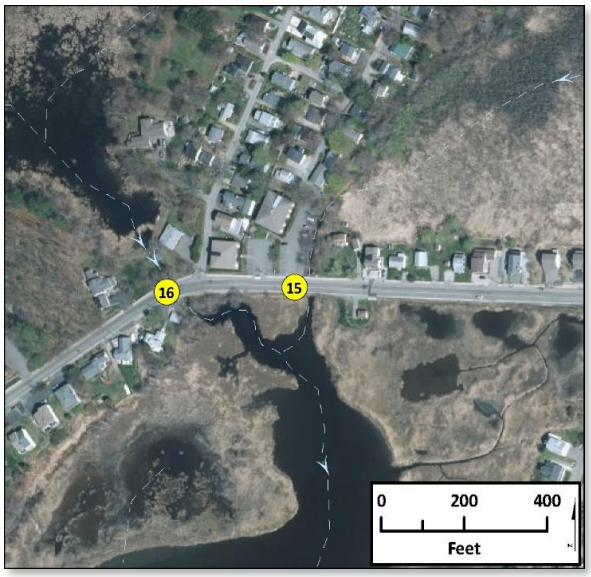


Long. Profile

Dist.	Hght.	Feat.	Sub.
0	1.5753	CB	C/S
25	1.6253	CB	C/S
50	1.5253	CB	C/S
50	0.6253	I	C/S
103	0.6253	I	C/S
115	1.5453	HC	C/S
192	1.2453	CB	C/S
223	0.5253	CB	C/S

Crossing Context:

Fresh water from wetlands to the north drain into Meadow Pond under High Street in Hampton. The undersized culvert and low-lying roadway leave the crossing underwater at low tide and make it vulnerable to flooding. The crossing condition is poor and the potential for salt marsh expansion upstream is high, leading to an overall combined score of 5, highest priority for replacement.



Structure Characteristics:

Structure Type:	Round Culvert	**Date of Last Known Replacement:**	N/A
Structure Material:	Aluminum - Corrugated		
Tide Gate Present:	No		

Crossing Dimensions (ft):	Upstream	Downstream
Dimension A (width):	4	4
Dimension B^{CB}(height):	2	2
Crossing Length (Invert to Invert):	53	

Crossing Condition:	**Headwall Material**	**Headwall Condition**	**Wingwall Material**	**Wingwall Condition**	**Scour at Structure**	**Scour Severity**
Upstream	None	N/A	None	N/A	None	None
Downstream	None	N/A	None	N/A	None	None

Scour in Structure	**Scour Severity in Structure**	**Road Surface Condition**	**Utilities at Crossing**	**Structure Condition Overall**
None	None	Good	OHE US	Poor

Structure Condition Comments:	Totally submerged and partially clogged. Two twin pipes

Ecological Assessment:	Upstream	Downstream
Natural Community Classification:	Invasive Dominant	Brackish Marsh
Upstream Salt Marsh Migration Potential (acres):	30.32	

Flood Hazard & Emergency Access

Site Identified in Hazard Mitigation Plan:	Yes
Emergency Access or Evacuation Route:	Yes
History of Flooding:	floods at any high tide w/ above avg rain event

Tidal Crossing Summary Sheet

New Hampshire's Tidal Crossing Assessment Protocol

Crossing ID: 16

Observer(s) & Organization:	JB ts (NHDES Coastal)
Municipality:	HAMPTON
Stream Name:	N/A
Road Name:	High St

Date:	9/11/2018
Start Time:	8:30:00 AM
End Time:	9:20:00 AM

Tide Prediction	**High**	**Low**
Time:	1:11 PM	7:15 AM
Elevation:	9.9	-1.2
Tide Chart Location:	Hampton Harbor	

Crossing Condition Evaluation	Score*
Crossing Condition	3
Tidal Restriction Evaluation	
Tidal Range Ratio	5
Crossing Ratio	3
Erosion Classification	5
Tidal Restriction Overall Score	4
Tidal Aquatic Organism Passage	
Tidal Range Ratio	5
Salt Marsh Migration Evaluation	
Salt Marsh Migration Potential (Eval. Unit)	1
Salt Marsh Migration Potential (Wshed.)	1
Vegetation Evaluation	
Vegetation Comparison Matrix	0
Infrastructure Risk Evaluation	
Inundation Risk to the Roadway (US, DS)	3,2
Inun. Risk to the Crossing Structure (US, DS)	3,3
Adverse Impacts Evaluation**	
Inundation Risk to Low-Lying Development	5
Overall Scores	
Infrastructure	3
Ecological	5
Combined	3

DS view toward structure

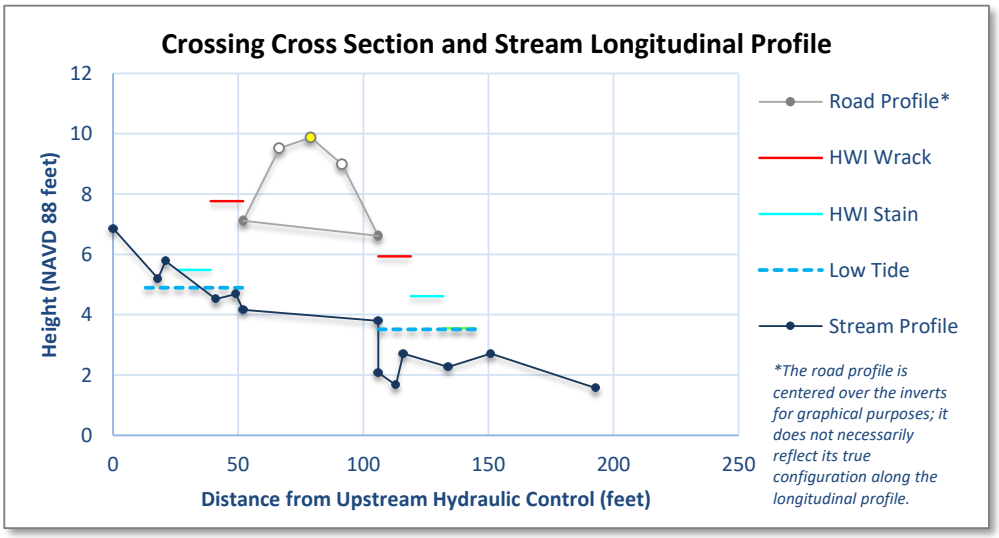
US view above structure

US view toward structure

DS view above structure

* Scoring system ranges from 1 to 5, where 1 = lowest replacement priority and 5 = highest replacement priority

**Adverse Impacts Evaluation scores range from 1 to 5, where 1 = high risk and 5 = low risk



Long. Profile

Dist.	Hght.	Feat.	Sub.
0	6.8653	HC	B
18	5.1953	P	B
21	5.7853	HC	B
41	4.5153	CB	B
49	4.6853	GC	B
52	4.1653	I	B
106	3.7953	I	B
106	2.0753	CB	B
113	1.6653	P	B
116	2.7153	GC	B
134	2.2653	CB	C
151	2.7153	HC	C
193	1.5653	P	C/S

Crossing Context:

N/A

Structure Characteristics:

Structure Type:	Round Culvert	**Date of Last Known Replacement:**	N/A
Structure Material:	Plastic - Smooth		
Tide Gate Present:	No		

Crossing Dimensions (ft):	Upstream	Downstream
Dimension A (width):	6	6
Dimension B^{CB}(height):	3	3
Crossing Length (Invert to Invert):	54	

Crossing Condition:	**Headwall Material**	**Headwall Condition**	**Wingwall Material**	**Wingwall Condition**	**Scour at Structure**	**Scour Severity**
Upstream	Dry Fit Stone	Fair	Dry Fit Stone	Fair	Wingwalls	Medium
Downstream	Dry Fit Stone	Poor	Dry Fit Stone	Fair	Wingwalls	Medium

Scour in Structure	**Scour Severity in Structure**	**Road Surface Condition**	**Utilities at Crossing**	**Structure Condition Overall**
None	None	Good	OHE diagonal over road	Fair

Structure Condition Comments:	Two twin culverts

Ecological Assessment:	Upstream	Downstream
Natural Community Classification:	Freshwater Stream	Brackish Marsh
Upstream Salt Marsh Migration Potential (acres):	0.00	

Flood Hazard & Emergency Access

Site Identified in Hazard Mitigation Plan:	Yes
Emergency Access or Evacuation Route:	Yes
History of Flooding:	floods at any high tide w/ above avg rain event

Tidal Crossing Summary Sheet

New Hampshire's Tidal Crossing Assessment Protocol

Crossing ID: 17

Observer(s) & Organization:	TS, JB (NHDES Coastal)
Municipality:	HAMPTON
Stream Name:	N/A
Road Name:	Cusack Rd

Date:	7/25/2018
Start Time:	2:40:00 PM
End Time:	3:30:00 PM

Tide Prediction	**High**	**Low**
Time:	10:57 PM	5:00 PM
Elevation:	8.8	1.1
Tide Chart Location:	Hampton Harbor	

Crossing Condition Evaluation	Score*
Crossing Condition	2
Tidal Restriction Evaluation	
Tidal Range Ratio	1
Crossing Ratio	1
Erosion Classification	1
Tidal Restriction Overall Score	1
Tidal Aquatic Organism Passage	
Tidal Range Ratio	1
Salt Marsh Migration Evaluation	
Salt Marsh Migration Potential (Eval. Unit)	5
Salt Marsh Migration Potential (Wshed.)	5
Vegetation Evaluation	
Vegetation Comparison Matrix	0
Infrastructure Risk Evaluation	
Inundation Risk to the Roadway (US, DS)	3,3
Inun. Risk to the Crossing Structure (US, DS)	4,5
Adverse Impacts Evaluation**	
Inundation Risk to Low-Lying Development	4
Overall Scores	
Infrastructure	2
Ecological	4
Combined	3

DS view toward structure

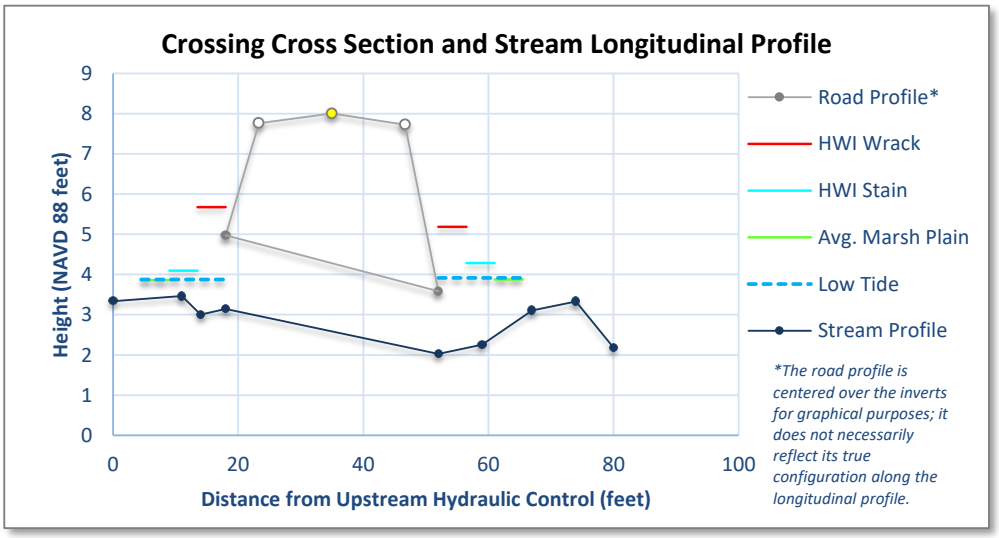
US view above structure

US view toward structure

DS view above structure

* Scoring system ranges from 1 to 5, where 1 = lowest replacement priority and 5 = highest replacement priority

**Adverse Impacts Evaluation scores range from 1 to 5, where 1 = high risk and 5 = low risk

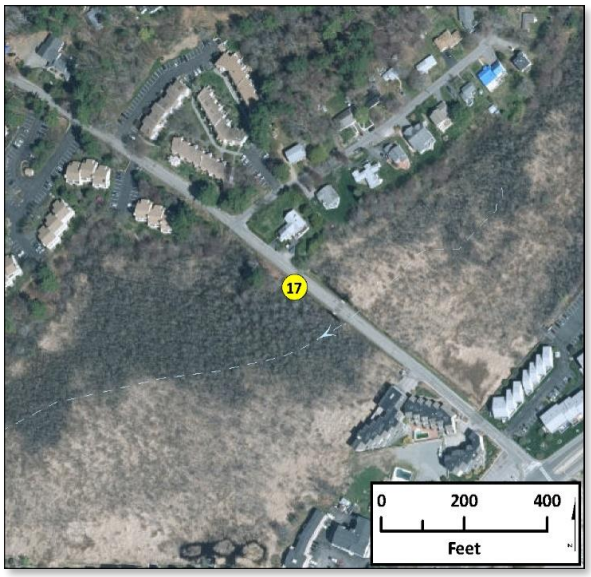


Long. Profile

Dist.	Hght.	Feat.	Sub.
0	3.3352	CB	C/S
11	3.4652	CB	C/S
14	3.0052	P	C/S
18	3.1452	I	C/S
52	2.0252	I	G
59	2.2552	P	C/S
67	3.1052	CB	C/S
74	3.3252	CB	C/S
80	2.1852	P	C/S

Crossing Context:

N/A



Structure Characteristics:

Structure Type:	Round Culvert	**Date of Last Known Replacement:**	N/A
Structure Material:	Plastic - Corrugated		
Tide Gate Present:	No		

Crossing Dimensions (ft):	Upstream	Downstream
Dimension A (width):	3	3
Dimension B[CB](height):	1.5	1.5
Crossing Length (Invert to Invert):	34	

Crossing Condition:	**Headwall Material**	**Headwall Condition**	**Wingwall Material**	**Wingwall Condition**	**Scour at Structure**	**Scour Severity**
Upstream	Concrete	Fair	None	N/A	None	None
Downstream	Concrete	Fair	None	N/A	None	None

Scour in Structure	**Scour Severity in Structure**	**Road Surface Condition**	**Utilities at Crossing**	**Structure Condition Overall**
None	None	Good	Overhead electric	Fair

Structure Condition Comments:	Twin culverts surveyed as one structure, completely submerged downstream

Ecological Assessment:	Upstream	Downstream
Natural Community Classification:	Freshwater Marsh	Freshwater Marsh
Upstream Salt Marsh Migration Potential (acres):	15.25	

Flood Hazard & Emergency Access

Site Identified in Hazard Mitigation Plan:	Yes
Emergency Access or Evacuation Route:	N/A
History of Flooding:	Culvert washed out; replaced - prone to high flows

Tidal Crossing Summary Sheet

New Hampshire's Tidal Crossing Assessment Protocol

Crossing ID: 18

Observer(s) & Organization:	TS, JB (NHDES Coastal)
Municipality:	HAMPTON
Stream Name:	Tide Mill Creek
Road Name:	NH Rt 101

Date:	8/17/2018
Start Time:	10:00:00 AM
End Time:	11:02:00 AM

Tide Prediction	**High**	**Low**
Time:	5:07 PM	11:05 AM
Elevation:	9.0	0.1
Tide Chart Location:	Hampton Harbor	

Crossing Condition Evaluation	Score*
Crossing Condition	1
Tidal Restriction Evaluation	
Tidal Range Ratio	1
Crossing Ratio	4
Erosion Classification	3
Tidal Restriction Overall Score	3
Tidal Aquatic Organism Passage	
Tidal Range Ratio	1
Salt Marsh Migration Evaluation	
Salt Marsh Migration Potential (Eval. Unit)	5
Salt Marsh Migration Potential (Wshed.)	5
Vegetation Evaluation	
Vegetation Comparison Matrix	3
Infrastructure Risk Evaluation	
Inundation Risk to the Roadway (US, DS)	1,1
Inun. Risk to the Crossing Structure (US, DS)	1,1
Adverse Impacts Evaluation**	
Inundation Risk to Low-Lying Development	1
Overall Scores	
Infrastructure	1
Ecological	3
Combined	2

DS view toward structure

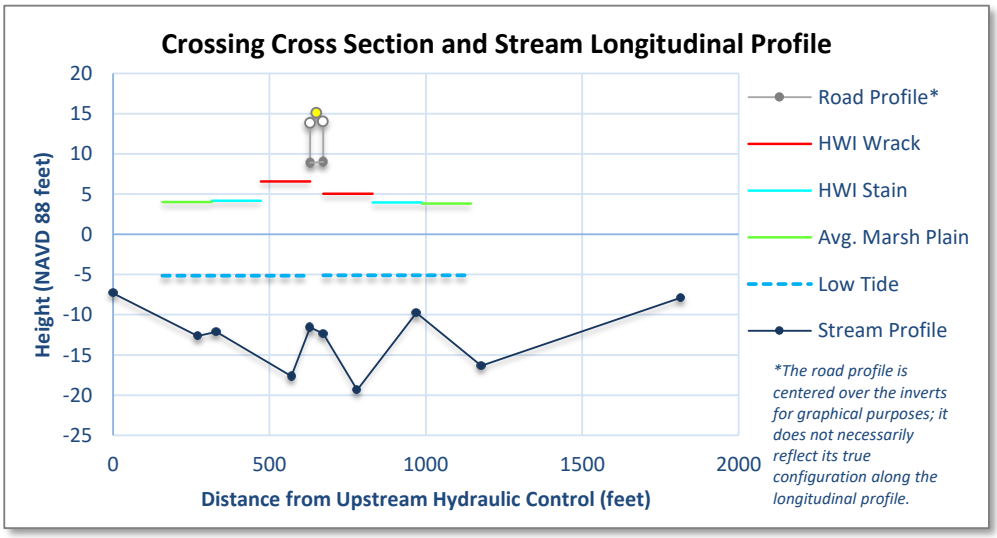
US view above structure

US view toward structure

DS view above structure

* Scoring system ranges from 1 to 5, where 1 = lowest replacement priority and 5 = highest replacement priority

**Adverse Impacts Evaluation scores range from 1 to 5, where 1 = high risk and 5 = low risk



Long. Profile

Dist.	Hght.	Feat.	Sub.
0	-7.3381	HC	S
270	-12.638	P	G
330	-12.138	HC	C
570	-17.638	P	S
630	-11.558	I	B
672	-12.358	I	B
780	-19.358	P	S
970	-9.7581	HC	G
1177	-16.358	P	C/S
1816	-7.8581	HC	S

Crossing Context:

N/A

Structure Characteristics:

Structure Type:	Bridge with Side Slopes and Abutments	**Date of Last Known Replacement:**	N/A
Structure Material:	Concrete		
Tide Gate Present:	No		

Crossing Dimensions (ft):	Upstream	Downstream
Dimension A (width):	117	117
Dimension B^{CB}(height):	20.45	21.36
Crossing Length (Invert to Invert):	42	

Crossing Condition:	**Headwall Material**	**Headwall Condition**	**Wingwall Material**	**Wingwall Condition**	**Scour at Structure**	**Scour Severity**
Upstream	None	N/A	Concrete	Good	None	None
Downstream	None	N/A	Concrete	Good	None	None

Scour in Structure	**Scour Severity in Structure**	**Road Surface Condition**	**Utilities at Crossing**	**Structure Condition Overall**
None	None	Fair	Overhead electric, sewer running along bridge	Good

Structure Condition Comments:	N/A

Ecological Assessment:	Upstream	Downstream
Natural Community Classification:	High Salt Marsh	High Salt Marsh
Upstream Salt Marsh Migration Potential (acres):	110.26	

Flood Hazard & Emergency Access

Site Identified in Hazard Mitigation Plan:	No
Emergency Access or Evacuation Route:	Yes
History of Flooding:	No

Tidal Crossing Summary Sheet

New Hampshire's Tidal Crossing Assessment Protocol

Crossing ID: 19

Observer(s) & Organization:	JB TS (NHDES Coastal)
Municipality:	HAMPTON
Stream Name:	N/A
Road Name:	Nh Rt 101

Date:	7/31/2018
Start Time:	9:50:00 AM
End Time:	11:00:00 AM

Tide Prediction	**High**	**Low**
Time:	2:35 PM	8:39 AM
Elevation:	8.1	0.3
Tide Chart Location:	Hampton Harbor	

Crossing Condition Evaluation	Score*
Crossing Condition	5
Tidal Restriction Evaluation	
Tidal Range Ratio	4
Crossing Ratio	4
Erosion Classification	4
Tidal Restriction Overall Score	4
Tidal Aquatic Organism Passage	
Tidal Range Ratio	4
Salt Marsh Migration Evaluation	
Salt Marsh Migration Potential (Eval. Unit)	1
Salt Marsh Migration Potential (Wshed.)	1
Vegetation Evaluation	
Vegetation Comparison Matrix	4
Infrastructure Risk Evaluation	
Inundation Risk to the Roadway (US, DS)	3,3
Inun. Risk to the Crossing Structure (US, DS)	4,4
Adverse Impacts Evaluation**	
Inundation Risk to Low-Lying Development	5
Overall Scores	
Infrastructure	5
Ecological	4
Combined	4

DS view toward structure

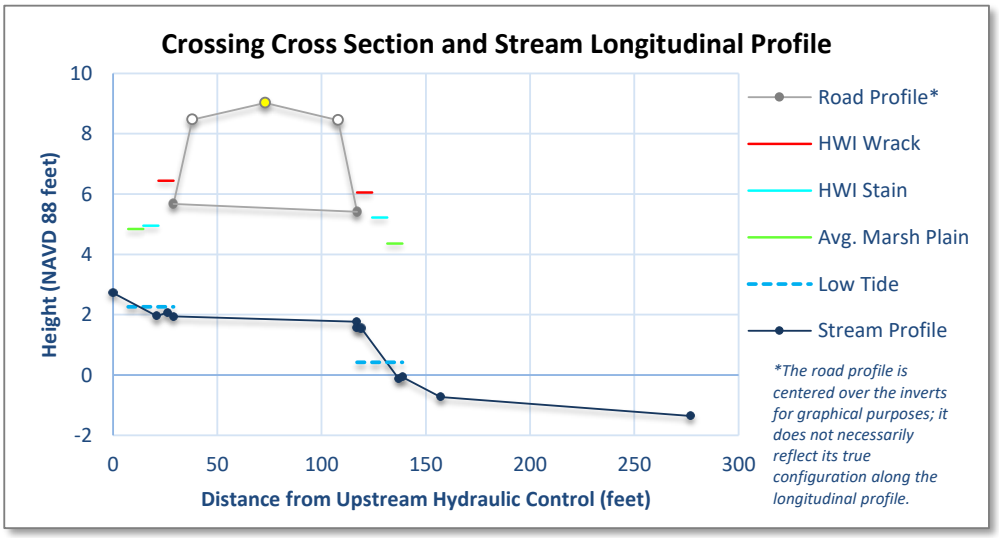
US view above structure

US view toward structure

DS view above structure

* Scoring system ranges from 1 to 5, where 1 = lowest replacement priority and 5 = highest replacement priority

**Adverse Impacts Evaluation scores range from 1 to 5, where 1 = high risk and 5 = low risk



Long. Profile

Dist.	Hght.	Feat.	Sub.
0	2.7223	HC	C
21	1.9523	CB	G
26	2.0723	GC	B
29	1.9423	I	B
117	1.7723	I	B
117	1.5723	CB	B
119	1.5523	GC	B
137	-0.1277	CB	C
139	-0.0777	HC	C
157	-0.7277	P	G
277	-1.3577	HC	S

Crossing Context:

Route 101 was built at the edge of the Hampton Seabrook Estuary and a small marsh that was left upstream of the highway was provided with a 3.5-foot round concrete culvert to supply tidal flow and drainage. The crossing condition is poor, and the tidal range is muted, leading to fresher vegetation upstream of the crossing. The overall combined score is 4, a high priority for replacement of this crossing.

Structure Characteristics:

Structure Type:	Round Culvert	**Date of Last Known Replacement:**	N/A
Structure Material:	Concrete		
Tide Gate Present:	No		

Crossing Dimensions (ft):	Upstream	Downstream
Dimension A (width):	3.5	3.5
Dimension B^{CB}(height):	3.5	3.5
Crossing Length (Invert to Invert):	88	

Crossing Condition:	**Headwall Material**	**Headwall Condition**	**Wingwall Material**	**Wingwall Condition**	**Scour at Structure**	**Scour Severity**
Upstream	Masonry	Poor	Masonry	Poor	Wingwalls	High
Downstream	Masonry	Poor	Rip Rap	Poor	Wingwalls	High

Scour in Structure	**Scour Severity in Structure**	**Road Surface Condition**	**Utilities at Crossing**	**Structure Condition Overall**
None	None	Good	None	Poor

Structure Condition Comments:	N/A

Ecological Assessment:	Upstream	Downstream
Natural Community Classification:	Brackish Marsh	High Salt Marsh
Upstream Salt Marsh Migration Potential (acres):	0.23	

Flood Hazard & Emergency Access

Site Identified in Hazard Mitigation Plan:	No
Emergency Access or Evacuation Route:	Yes
History of Flooding:	unknown

Tidal Crossing Summary Sheet

New Hampshire's Tidal Crossing Assessment Protocol

Crossing ID: 20

Observer(s) & Organization:	JB TS (NHDES Coastal)
Municipality:	HAMPTON
Stream Name:	N/A
Road Name:	Landing Rd

Date:	8/1/2018
Start Time:	10:00:00 AM
End Time:	11:00:00 AM

Tide Prediction	**High**	**Low**
Time:	3:12 PM	9:15 AM
Elevation:	8.2	0.3
Tide Chart Location:	Hampton Harbor	

Crossing Condition Evaluation	Score*
Crossing Condition	4
Tidal Restriction Evaluation	
Tidal Range Ratio	4
Crossing Ratio	4
Erosion Classification	5
Tidal Restriction Overall Score	4
Tidal Aquatic Organism Passage	
Tidal Range Ratio	4
Salt Marsh Migration Evaluation	
Salt Marsh Migration Potential (Eval. Unit)	4
Salt Marsh Migration Potential (Wshed.)	4
Vegetation Evaluation	
Vegetation Comparison Matrix	1
Infrastructure Risk Evaluation	
Inundation Risk to the Roadway (US, DS)	5,5
Inun. Risk to the Crossing Structure (US, DS)	5,5
Adverse Impacts Evaluation**	
Inundation Risk to Low-Lying Development	5
Overall Scores	
Infrastructure	5
Ecological	4
Combined	4

DS view toward structure

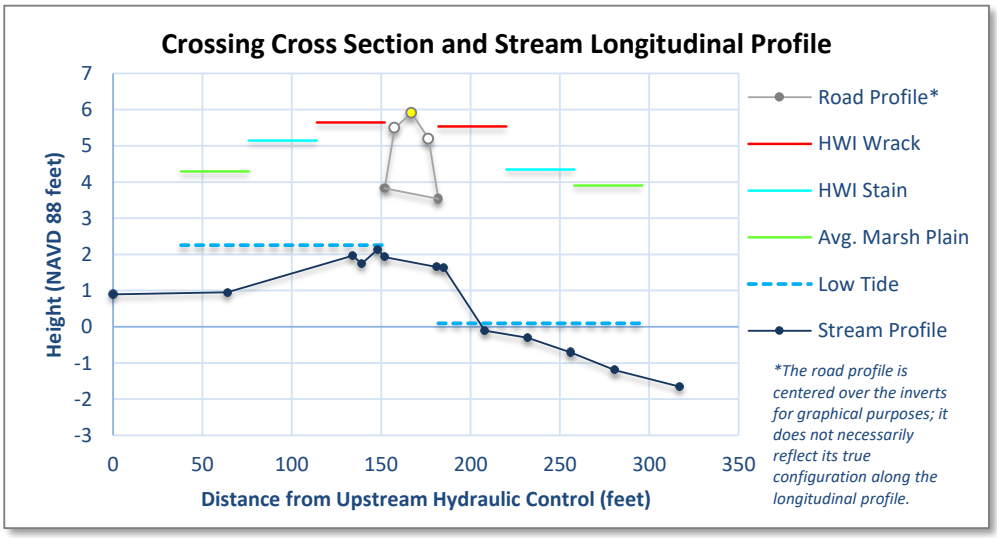
US view above structure

US view toward structure

DS view above structure

* Scoring system ranges from 1 to 5, where 1 = lowest replacement priority and 5 = highest replacement priority

**Adverse Impacts Evaluation scores range from 1 to 5, where 1 = high risk and 5 = low risk



Long. Profile

Dist.	Hght.	Feat.	Sub.
0	0.8955	HC	C/S
64	0.9555	P	C/S
134	1.9655	HC	G
139	1.7455	P	G
148	2.1355	GC	C
152	1.9255	I	C
181	1.6555	I	C
185	1.6255	GC	C
208	-0.1045	CB	G
232	-0.3045	HC	G
256	-0.7045	HC	G
281	-1.2045	CB	G
317	-1.6545	HC	G

Crossing Context:

Landing Road in Hampton crosses an unnamed tidal creek with a 4 by 2-foot concrete box culvert that was installed as a tidal restoration in 2010. Tides regularly fill the undersized culvert and threaten to flood the road (and do flood the road during storms). The crossing condition is fair, inundation risk is very high and erosion is evident. In addition, the structure is perched. The overall combined score of 4 indicates this is a high priority for replacement.

Structure Characteristics:

Structure Type:	Box Culvert	**Date of Last Known Replacement:**	2010
Structure Material:	Concrete		
Tide Gate Present:	No		

Crossing Dimensions (ft):	Upstream	Downstream
Dimension A (width):	4	4
Dimension B^{CB}(height):	2	2
Crossing Length (Invert to Invert):	30	

Crossing Condition:	**Headwall Material**	**Headwall Condition**	**Wingwall Material**	**Wingwall Condition**	**Scour at Structure**	**Scour Severity**
Upstream	Rip Rap	Fair	Rip Rap	Fair	Wingwalls	Medium
Downstream	Rip Rap	Poor	Rip Rap	Poor	Headwall	Medium

Scour in Structure	**Scour Severity in Structure**	**Road Surface Condition**	**Utilities at Crossing**	**Structure Condition Overall**
Culvert	Low	Good	OHE DS and US in marsh	Fair

Structure Condition Comments:	N/A

Ecological Assessment:	Upstream	Downstream
Natural Community Classification:	High Salt Marsh	High Salt Marsh
Upstream Salt Marsh Migration Potential (acres):	5.67	

Flood Hazard & Emergency Access

Site Identified in Hazard Mitigation Plan:	No
Emergency Access or Evacuation Route:	N/A
History of Flooding:	unknown

Tidal Crossing Summary Sheet

New Hampshire's Tidal Crossing Assessment Protocol

Crossing ID: 21

Observer(s) & Organization:	JB TS (NHDES Coastal)
Municipality:	HAMPTON
Stream Name:	N/A
Road Name:	Drakeside Rd

Date:	7/19/2018
Start Time:	12:45:00 PM
End Time:	1:40:00 PM

Tide Prediction	**High**	**Low**
Time:	5:40 PM	11:36 AM
Elevation:	9.1	-0.2
Tide Chart Location:	Hampton Harbor	

Crossing Condition Evaluation	Score*
Crossing Condition	2
Tidal Restriction Evaluation	
Tidal Range Ratio	5
Crossing Ratio	4
Erosion Classification	3
Tidal Restriction Overall Score	4
Tidal Aquatic Organism Passage	
Tidal Range Ratio	5
Salt Marsh Migration Evaluation	
Salt Marsh Migration Potential (Eval. Unit)	1
Salt Marsh Migration Potential (Wshed.)	1
Vegetation Evaluation	
Vegetation Comparison Matrix	4
Infrastructure Risk Evaluation	
Inundation Risk to the Roadway (US, DS)	1,1
Inun. Risk to the Crossing Structure (US, DS)	2,2
Adverse Impacts Evaluation**	
Inundation Risk to Low-Lying Development	5
Overall Scores	
Infrastructure	2
Ecological	5
Combined	4

DS view toward structure

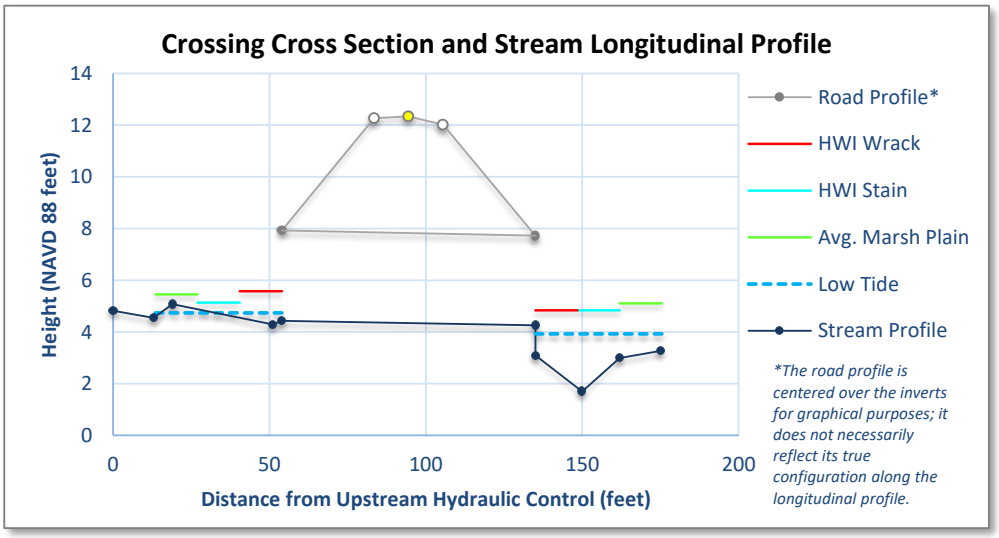
US view above structure

US view toward structure

DS view above structure

* Scoring system ranges from 1 to 5, where 1 = lowest replacement priority and 5 = highest replacement priority

**Adverse Impacts Evaluation scores range from 1 to 5, where 1 = high risk and 5 = low risk

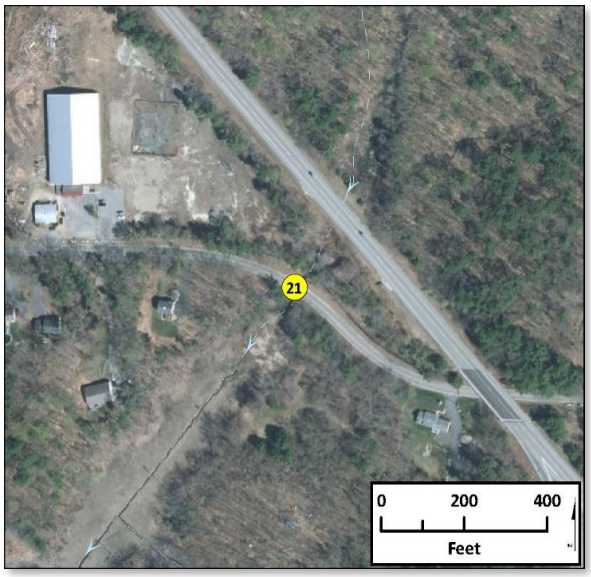


Long. Profile

Dist.	Hght.	Feat.	Sub.
0	4.826	HC	C
13	4.546	P	C
19	5.076	HC	G
51	4.296	P	G
54	4.426	I	C
135	4.256	I	C
135	3.096	CB	C
150	1.696	P	C/S
162	2.986	HC	C/S
175	3.266	HC	C/S

Crossing Context:

A 3.5-foot round concrete culvert under Drakeside Road drains a small wetland and its freshwater sources that were disrupted by the construction of Route 101. The longitudinal profile and water height indicators show the system is perched, impounding water upstream and preventing all but the highest tides from passing upstream, interfering with organism passage and influencing the upstream vegetation. The overall combined score is 4 for this culvert, indicating a high priority for replacement.



Structure Characteristics:

Structure Type:	Round Culvert	**Date of Last Known Replacement:**	N/A
Structure Material:	Concrete		
Tide Gate Present:	No		

Crossing Dimensions (ft):	Upstream	Downstream
Dimension A (width):	3.5	3.5
Dimension B^{CB} (height):	3.5	3.5
Crossing Length (Invert to Invert):	81	

Crossing Condition:	**Headwall Material**	**Headwall Condition**	**Wingwall Material**	**Wingwall Condition**	**Scour at Structure**	**Scour Severity**
Upstream	Masonry	Fair	Masonry	Fair	Wingwalls	Low
Downstream	Masonry	Good	Masonry	Fair	Culvert	Low

Scour in Structure	**Scour Severity in Structure**	**Road Surface Condition**	**Utilities at Crossing**	**Structure Condition Overall**
None	None	Good	OHE US	Good

Structure Condition Comments:	N/A

Ecological Assessment:	Upstream	Downstream
Natural Community Classification:	Freshwater Stream	Brackish Riverbank Marsh
Upstream Salt Marsh Migration Potential (acres):	0.00	

Flood Hazard & Emergency Access

Site Identified in Hazard Mitigation Plan:	No
Emergency Access or Evacuation Route:	N/A
History of Flooding:	Unknown

Tidal Crossing Summary Sheet

New Hampshire's Tidal Crossing Assessment Protocol

Crossing ID: 22

Observer(s) & Organization:	JB TS (NHDES Coastal)
Municipality:	HAMPTON
Stream Name:	Taylor River
Road Name:	Lafayette Rd

Date:	8/16/2018
Start Time:	9:45:00 AM
End Time:	10:46:00 AM

Tide Prediction	**High**	**Low**
Time:	4:12 PM	10:12 AM
Elevation:	9.3	-0.4
Tide Chart Location:	Hampton Harbor	

Crossing Condition Evaluation	Score*
Crossing Condition	2
Tidal Restriction Evaluation	
Tidal Range Ratio	1
Crossing Ratio	4
Erosion Classification	4
Tidal Restriction Overall Score	3
Tidal Aquatic Organism Passage	
Tidal Range Ratio	1
Salt Marsh Migration Evaluation	
Salt Marsh Migration Potential (Eval. Unit)	5
Salt Marsh Migration Potential (Wshed.)	5
Vegetation Evaluation	
Vegetation Comparison Matrix	1
Infrastructure Risk Evaluation	
Inundation Risk to the Roadway (US, DS)	3,4
Inun. Risk to the Crossing Structure (US, DS)	2,1
Adverse Impacts Evaluation**	
Inundation Risk to Low-Lying Development	5
Overall Scores	
Infrastructure	4
Ecological	3
Combined	3

DS view toward structure

US view above structure

US view toward structure

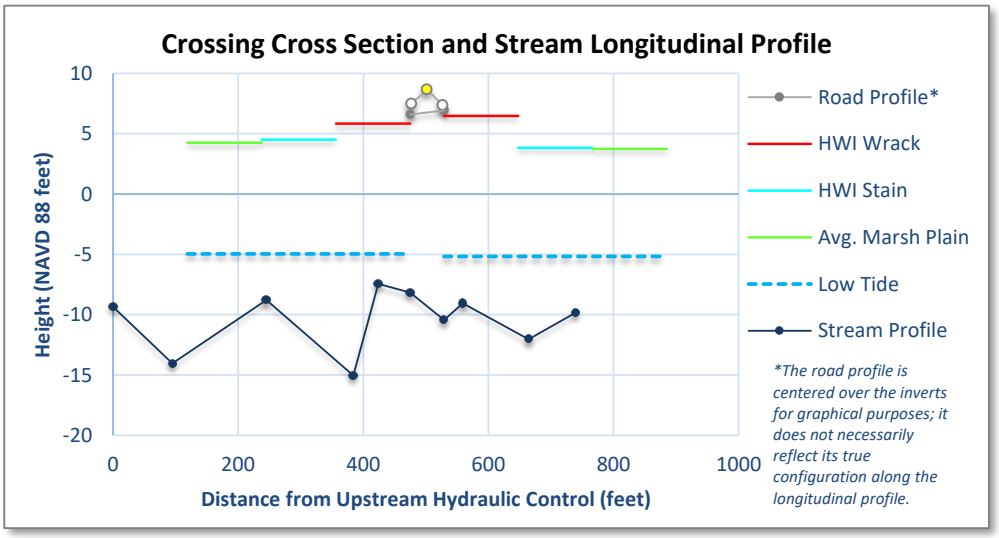
DS view above structure

* Scoring system ranges from 1 to 5, where 1 = lowest replacement priority and 5 = highest replacement priority

**Adverse Impacts Evaluation scores range from 1 to 5, where 1 = high risk and 5 = low risk

Long. Profile

Dist.	Hght.	Feat.	Sub.
0	-9.3386	HC	C/S
95	-14.039	P	C/S
245	-8.7886	HC	G
384	-15.039	P	C
424	-7.4386	GC	G
475	-8.1686	I	B
529	-10.439	I	B
559	-9.0586	HC	C
664	-12.039	P	C
739	-9.8386	HC	G



Crossing Context:

N/A

Structure Characteristics:

Structure Type:	Bridge with Abutments	**Date of Last Known Replacement:**	N/A
Structure Material:	Concrete		
Tide Gate Present:	No		

Crossing Dimensions (ft):	Upstream	Downstream
Dimension A (width):	30	30
Dimension B^{CB}(height):	15	16.7
Crossing Length (Invert to Invert):	54	

Crossing Condition:	**Headwall Material**	**Headwall Condition**	**Wingwall Material**	**Wingwall Condition**	**Scour at Structure**	**Scour Severity**
Upstream	None	N/A	Concrete	Fair	Wingwalls	Low
Downstream	None	N/A	Rip Rap	Good	Wingwalls	Low

Scour in Structure	**Scour Severity in Structure**	**Road Surface Condition**	**Utilities at Crossing**	**Structure Condition Overall**
Abutment	Medium	Good	DS OHE	Fair

Structure Condition Comments:	Some cracks inside structure RL

Ecological Assessment:	Upstream	Downstream
Natural Community Classification:	High Salt Marsh	High Salt Marsh
Upstream Salt Marsh Migration Potential (acres):	137.43	

Flood Hazard & Emergency Access

Site Identified in Hazard Mitigation Plan:	Yes
Emergency Access or Evacuation Route:	Yes
History of Flooding:	Water rises from very high/storm tides

Tidal Crossing Summary Sheet

New Hampshire's Tidal Crossing Assessment Protocol

Crossing ID: 23

Observer(s) & Organization:	TS, JB (NHDES Coastal)
Municipality:	HAMPTON
Stream Name:	N/A
Road Name:	Merrill Industrial Dr

Date:	7/9/2018
Start Time:	4:00:00 PM
End Time:	5:24:00 PM

Tide Prediction	**High**	**Low**
Time:	8:38 PM	2:36 PM
Elevation:	9.4	0.5
Tide Chart Location:	Hampton Harbor	

Crossing Condition Evaluation	Score*
Crossing Condition	3
Tidal Restriction Evaluation	
Tidal Range Ratio	3
Crossing Ratio	1
Erosion Classification	4
Tidal Restriction Overall Score	3
Tidal Aquatic Organism Passage	
Tidal Range Ratio	3
Salt Marsh Migration Evaluation	
Salt Marsh Migration Potential (Eval. Unit)	1
Salt Marsh Migration Potential (Wshed.)	1
Vegetation Evaluation	
Vegetation Comparison Matrix	3
Infrastructure Risk Evaluation	
Inundation Risk to the Roadway (US, DS)	2,2
Inun. Risk to the Crossing Structure (US, DS)	3,3
Adverse Impacts Evaluation**	
Inundation Risk to Low-Lying Development	5
Overall Scores	
Infrastructure	3
Ecological	3
Combined	3

DS view toward structure

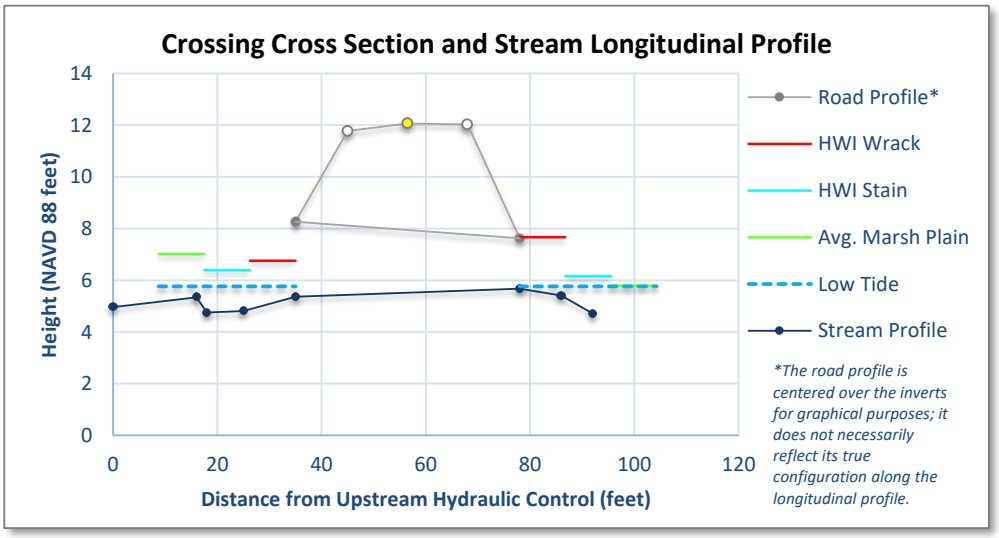
US view above structure

US view toward structure

DS view above structure

* Scoring system ranges from 1 to 5, where 1 = lowest replacement priority and 5 = highest replacement priority

**Adverse Impacts Evaluation scores range from 1 to 5, where 1 = high risk and 5 = low risk

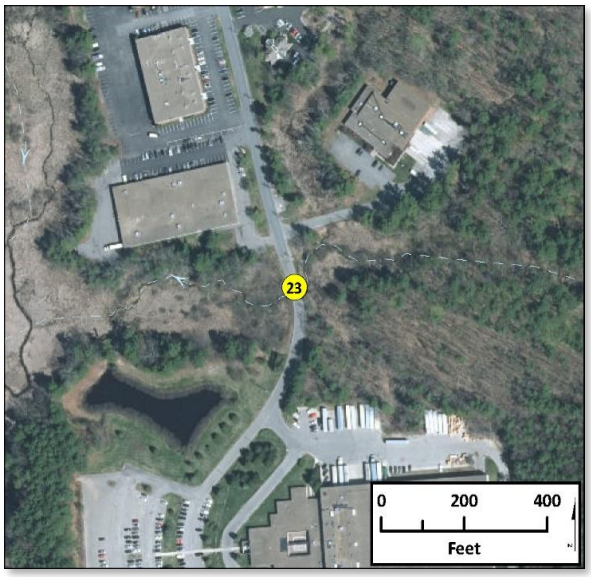


Long. Profile

Dist.	Hght.	Feat.	Sub.
0	4.9536	HC	S
16	5.3436	CB	S
18	4.7536	P	S
25	4.8136	HC	S
35	5.3636	I	C
78	5.6736	I	S
86	5.4036	HC	S
92	4.7136	HC	S

Crossing Context:

N/A



Structure Characteristics:

Structure Type:	Embedded Round Culvert	**Date of Last Known Replacement:**	N/A
Structure Material:	Concrete		
Tide Gate Present:	No		

Crossing Dimensions (ft):	Upstream	Downstream
Dimension A (width):	6.8	6.6
Dimension B^{CB}(height):	3.1	1.9
Crossing Length (Invert to Invert):	43	

Crossing Condition:	**Headwall Material**	**Headwall Condition**	**Wingwall Material**	**Wingwall Condition**	**Scour at Structure**	**Scour Severity**
Upstream	Rip Rap	Poor	None	N/A	Culvert	Low
Downstream	None	N/A	None	N/A	Culvert	Low

Scour in Structure	**Scour Severity in Structure**	**Road Surface Condition**	**Utilities at Crossing**	**Structure Condition Overall**
Channel	Medium	Good		Good

Structure Condition Comments:	Two twin culverts, measured as one

Ecological Assessment:	Upstream	Downstream
Natural Community Classification:	Freshwater Stream	Freshwater Stream
Upstream Salt Marsh Migration Potential (acres):	0.00	

Flood Hazard & Emergency Access

Site Identified in Hazard Mitigation Plan:	No
Emergency Access or Evacuation Route:	N/A
History of Flooding:	unknown

Tidal Crossing Summary Sheet

New Hampshire's Tidal Crossing Assessment Protocol

Crossing ID: 24

Observer(s) & Organization:	JB TS (NHDES Coastal)
Municipality:	HAMPTON
Stream Name:	Drakes River
Road Name:	Nh Rt 101

Date:	7/30/2018
Start Time:	9:20:00 AM
End Time:	10:45:00 AM

Tide Prediction	**High**	**Low**
Time:	2:00 PM	8:05 AM
Elevation:	8.0	0.2
Tide Chart Location:	Hampton Harbor	

Crossing Condition Evaluation	Score*
Crossing Condition	1
Tidal Restriction Evaluation	
Tidal Range Ratio	4
Crossing Ratio	3
Erosion Classification	5
Tidal Restriction Overall Score	4
Tidal Aquatic Organism Passage	
Tidal Range Ratio	4
Salt Marsh Migration Evaluation	
Salt Marsh Migration Potential (Eval. Unit)	5
Salt Marsh Migration Potential (Wshed.)	5
Vegetation Evaluation	
Vegetation Comparison Matrix	0
Infrastructure Risk Evaluation	
Inundation Risk to the Roadway (US, DS)	1,1
Inun. Risk to the Crossing Structure (US, DS)	3,3
Adverse Impacts Evaluation**	
Inundation Risk to Low-Lying Development	5
Overall Scores	
Infrastructure	1
Ecological	5
Combined	5

DS view toward structure

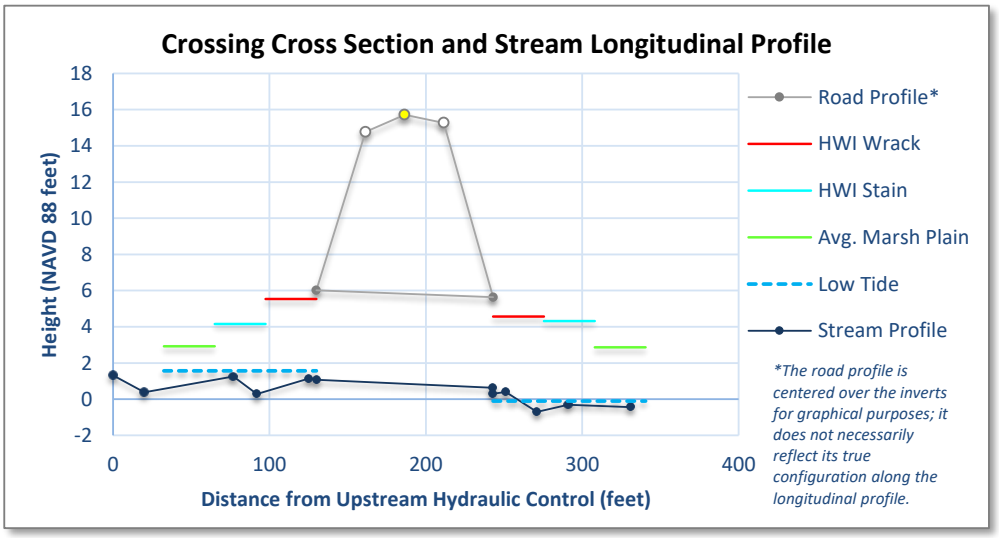
US view above structure

US view toward structure

DS view above structure

* Scoring system ranges from 1 to 5, where 1 = lowest replacement priority and 5 = highest replacement priority

**Adverse Impacts Evaluation scores range from 1 to 5, where 1 = high risk and 5 = low risk



Long. Profile

Dist.	Hght.	Feat.	Sub.
0	1.3152	HC	G
20	0.3752	P	G
77	1.2552	HC	G
92	0.2752	P	G
125	1.1452	GC	C
130	1.0752	I	C
243	0.6352	I	C
243.1	0.3052	CB	C
251	0.4052	GC	C
271	-0.7048	P	C
291	-0.3148	HC	G
331	-0.4348	HC	G

Crossing Context:

The upper crossing of Drakes River passes under Route 101 for over 100 feet and is a large concrete pipe alongside a rectangular culvert encased as a pair in concrete. The high water stain on the culvert structure indicates there is some tidal restriction and the culvert slope is about a foot and the low tide is more than 18 inches higher upstream, indicating impoundment. Along with high erosion, the perch (improperly high elevation of the culvert) leads to an overall combined score of 5: highest priority for replacement.

Structure Characteristics:

Structure Type:	Round Culvert	**Date of Last Known Replacement:**	N/A
Structure Material:	Concrete		
Tide Gate Present:	No		

Crossing Dimensions (ft):	Upstream	Downstream
Dimension A (width):	10	10
Dimension B^{CB}(height):	5	5
Crossing Length (Invert to Invert):	113	

Crossing Condition:	**Headwall Material**	**Headwall Condition**	**Wingwall Material**	**Wingwall Condition**	**Scour at Structure**	**Scour Severity**
Upstream	Concrete	Good	Concrete	Good	None	None
Downstream	Concrete	Good	Concrete	Good	None	None

Scour in Structure	**Scour Severity in Structure**	**Road Surface Condition**	**Utilities at Crossing**	**Structure Condition Overall**
None	None	Good	None	Good

Structure Condition Comments:	Twin culverts surveyed as one structure. Box at inlet/outlet converts to round culvert

Ecological Assessment:	Upstream	Downstream
Natural Community Classification:	Brackish Riverbank Marsh	High Salt Marsh
Upstream Salt Marsh Migration Potential (acres):	11.66	

Flood Hazard & Emergency Access

Site Identified in Hazard Mitigation Plan:	No
Emergency Access or Evacuation Route:	Yes
History of Flooding:	unknown

Tidal Crossing Summary Sheet

New Hampshire's Tidal Crossing Assessment Protocol

Crossing ID: 25

Observer(s) & Organization:	Burdick, Steckler, Flanagan, Lucey, Glode (TNC)
Municipality:	HAMPTON
Stream Name:	Drakes River
Road Name:	Drakeside Rd

Date:	5/30/2017
Start Time:	9:36:00 AM
End Time:	1:00:00 PM

Tide Prediction	**High**	**Low**
Time:	4:10 PM	10:07 AM
Elevation:	9.0	-1.0
Tide Chart Location:	Hampton Harbor	

Crossing Condition Evaluation	Score*
Crossing Condition	5
Tidal Restriction Evaluation	
Tidal Range Ratio	3
Crossing Ratio	4
Erosion Classification	4
Tidal Restriction Overall Score	4
Tidal Aquatic Organism Passage	
Tidal Range Ratio	3
Salt Marsh Migration Evaluation	
Salt Marsh Migration Potential (Eval. Unit)	4
Salt Marsh Migration Potential (Wshed.)	5
Vegetation Evaluation	
Vegetation Comparison Matrix	3
Infrastructure Risk Evaluation	
Inundation Risk to the Roadway (US, DS)	3,4
Inun. Risk to the Crossing Structure (US, DS)	5,5
Adverse Impacts Evaluation**	
Inundation Risk to Low-Lying Development	5
Overall Scores	
Infrastructure	5
Ecological	3
Combined	4

DS view toward structure

US view above structure

US view toward structure

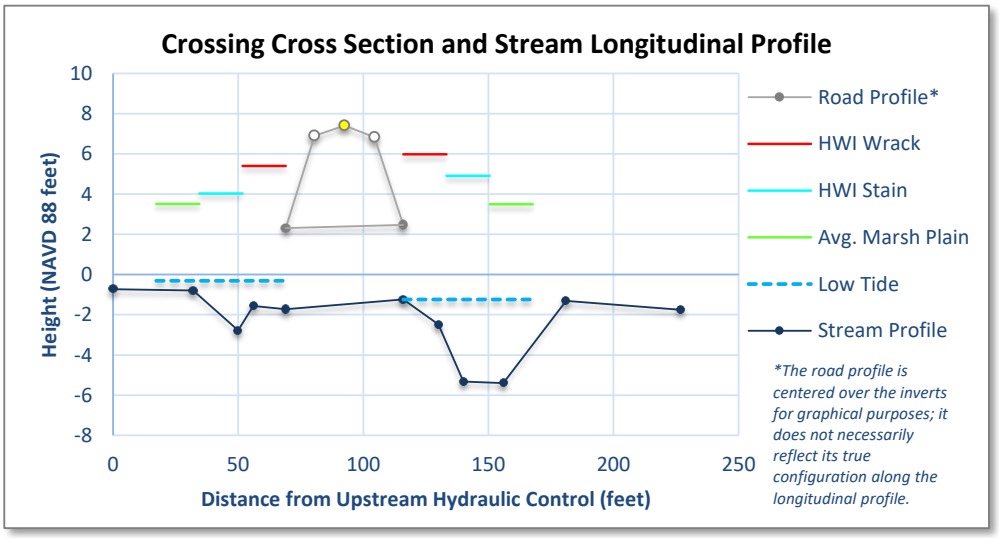
DS view above structure

* Scoring system ranges from 1 to 5, where 1 = lowest replacement priority and 5 = highest replacement priority

**Adverse Impacts Evaluation scores range from 1 to 5, where 1 = high risk and 5 = low risk

Long. Profile

Dist.	Hght.	Feat.	Sub.
0	-0.7319	HC	G
32	-0.7919	HC	C
50	-2.7819	P	C
56	-1.5619	GC	C
69	-1.7319	I	B
116	-1.2319	I	B
130	-2.4819	GC	B
140	-5.3219	P	C
156	-5.4019	P	G
181	-1.3119	HC	C
227	-1.7519	HC	G



Crossing Context:

The lower tidal crossing of Drakes River passes under Drakeside Road through a 4 by 8 concrete culvert in Hampton. Despite restoration in 1996 tides are still restricted, with an overall combined score of 4 (high priority for replacement). This is due to reduced tidal range, interference with organism passage and poor crossing condition. *Phragmites* , which was overrunning the site in the mid-1990s, remains a visible feature in the marsh.

Structure Characteristics:

Structure Type:	Box Culvert	**Date of Last Known Replacement:**	1996
Structure Material:	Concrete		
Tide Gate Present:	Yes		

Crossing Dimensions (ft):	Upstream	Downstream
Dimension A (width):	8	8
Dimension B^{CB}(height):	4	3.7
Crossing Length (Invert to Invert):	47	

Crossing Condition:	**Headwall Material**	**Headwall Condition**	**Wingwall Material**	**Wingwall Condition**	**Scour at Structure**	**Scour Severity**
Upstream	Other	Poor	Rip Rap	Fair	Headwall	High
Downstream	Other	Fair	Rip Rap	Fair	Headwall	High

Scour in Structure	**Scour Severity in Structure**	**Road Surface Condition**	**Utilities at Crossing**	**Structure Condition Overall**
None	None	Poor	Telephone pole on US side	Fair

Structure Condition Comments:	N/A

Ecological Assessment:	Upstream	Downstream
Natural Community Classification:	Low Salt Marsh	Low Salt Marsh
Upstream Salt Marsh Migration Potential (acres):	21.48	

Flood Hazard & Emergency Access

Site Identified in Hazard Mitigation Plan:	No
Emergency Access or Evacuation Route:	N/A
History of Flooding:	Uknown

Tidal Crossing Summary Sheet

New Hampshire's Tidal Crossing Assessment Protocol

Crossing ID: 26

Observer(s) & Organization:	TS, JB (NHDES Coastal)
Municipality:	HAMPTON
Stream Name:	Taylor River
Road Name:	N/A

Date:	8/15/2018
Start Time:	9:20:00 AM
End Time:	10:00:00 AM

Tide Prediction	**High**	**Low**
Time:	4:19 PM	9:20 AM
Elevation:	9.5	-0.9
Tide Chart Location:	Hampton Harbor	

Crossing Condition Evaluation	Score*
Crossing Condition	5
Tidal Restriction Evaluation	
Tidal Range Ratio	1
Crossing Ratio	4
Erosion Classification	4
Tidal Restriction Overall Score	3
Tidal Aquatic Organism Passage	
Tidal Range Ratio	1
Salt Marsh Migration Evaluation	
Salt Marsh Migration Potential (Eval. Unit)	5
Salt Marsh Migration Potential (Wshed.)	5
Vegetation Evaluation	
Vegetation Comparison Matrix	1
Infrastructure Risk Evaluation	
Inundation Risk to the Roadway (US, DS)	2,3
Inun. Risk to the Crossing Structure (US, DS)	3,3
Adverse Impacts Evaluation**	
Inundation Risk to Low-Lying Development	4
Overall Scores	
Infrastructure	5
Ecological	3
Combined	4

DS view toward structure

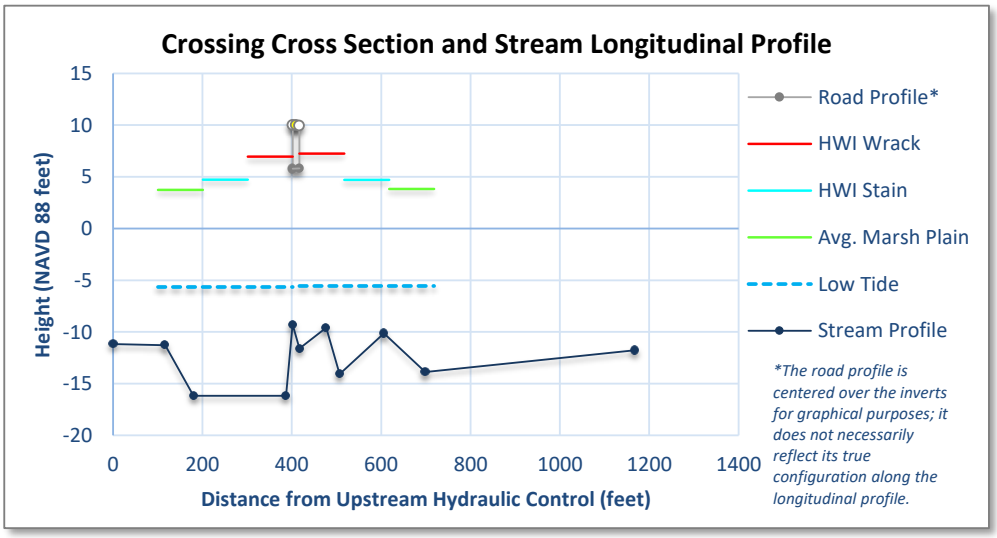
US view above structure

US view toward structure

DS view above structure

* Scoring system ranges from 1 to 5, where 1 = lowest replacement priority and 5 = highest replacement priority

**Adverse Impacts Evaluation scores range from 1 to 5, where 1 = high risk and 5 = low risk



Long. Profile

Dist.	Hght.	Feat.	Sub.
0	-11.173	HC	S
117	-11.273	HC	C/S
180	-16.173	P	C/S
387	-16.173	CB	C
402	-9.2734	I	B
417	-11.613	I	S
477	-9.5734	CB	C
507	-14.073	P	C
606	-10.123	HC	C
699	-13.873	P	C/S
1167	-11.773	HC	C/S

Crossing Context:

A railroad trestle crossing the Taylor River creates a constriction, approximately 60 by 16 feet in size, in the largest tributary to the Estuary. This is one of four tidal river crossings by the abandoned railroad bed that bisect Hampton Seabrook Estuary (the others are 28, 29 and 30) where tides are large (> 10 feet) and flows are huge. The crossing condition is rated poor and the potential for salt marsh migration in the upstream watershed is high. With an overall combined score of 4, this ranking indicates high priority for replacement or removal.

Structure Characteristics:

Structure Type:	Bridge with Side Slopes and Abutments	**Date of Last Known Replacement:**	N/A
Structure Material:	Steel - Smooth		
Tide Gate Present:	No		

Crossing Dimensions (ft):	Upstream	Downstream
Dimension A (width):	58	59
Dimension B^{CB}(height):	15.4	16.8
Crossing Length (Invert to Invert):	15	

Crossing Condition:	**Headwall Material**	**Headwall Condition**	**Wingwall Material**	**Wingwall Condition**	**Scour at Structure**	**Scour Severity**
Upstream	None	N/A	Dry Fit Stone	Poor	Wingwalls	Medium
Downstream	None	N/A	Dry Fit Stone	Poor	Wingwalls	None

Scour in Structure	**Scour Severity in Structure**	**Road Surface Condition**	**Utilities at Crossing**	**Structure Condition Overall**
None	None	N/A	Overhead electric, tel poles in marsh	Poor

Structure Condition Comments:	Bridge is rusting out, rail logs rotted

Ecological Assessment:	Upstream	Downstream
Natural Community Classification:	High Salt Marsh	High Salt Marsh
Upstream Salt Marsh Migration Potential (acres):	149.30	

Flood Hazard & Emergency Access

Site Identified in Hazard Mitigation Plan:	Yes
Emergency Access or Evacuation Route:	N/A
History of Flooding:	Water rises as a result of very high/ storm tides

Tidal Crossing Summary Sheet

New Hampshire's Tidal Crossing Assessment Protocol

Crossing ID: 28

Observer(s) & Organization:	JB TS (NHDES Coastal)
Municipality:	HAMPTON FALLS
Stream Name:	Hampton Falls River
Road Name:	N/A

Date:	8/17/2018
Start Time:	11:00:00 AM
End Time:	12:00:00 PM

Tide Prediction	**High**	**Low**
Time:	5:07 PM	11:05 AM
Elevation:	9.0	0.1
Tide Chart Location:	Hampton Harbor	

Crossing Condition Evaluation	Score*
Crossing Condition	5
Tidal Restriction Evaluation	
Tidal Range Ratio	2
Crossing Ratio	5
Erosion Classification	3
Tidal Restriction Overall Score	3
Tidal Aquatic Organism Passage	
Tidal Range Ratio	2
Salt Marsh Migration Evaluation	
Salt Marsh Migration Potential (Eval. Unit)	5
Salt Marsh Migration Potential (Wshed.)	5
Vegetation Evaluation	
Vegetation Comparison Matrix	1
Infrastructure Risk Evaluation	
Inundation Risk to the Roadway (US, DS)	5,4
Inun. Risk to the Crossing Structure (US, DS)	5,4
Adverse Impacts Evaluation**	
Inundation Risk to Low-Lying Development	4
Overall Scores	
Infrastructure	5
Ecological	3
Combined	5

DS view toward structure

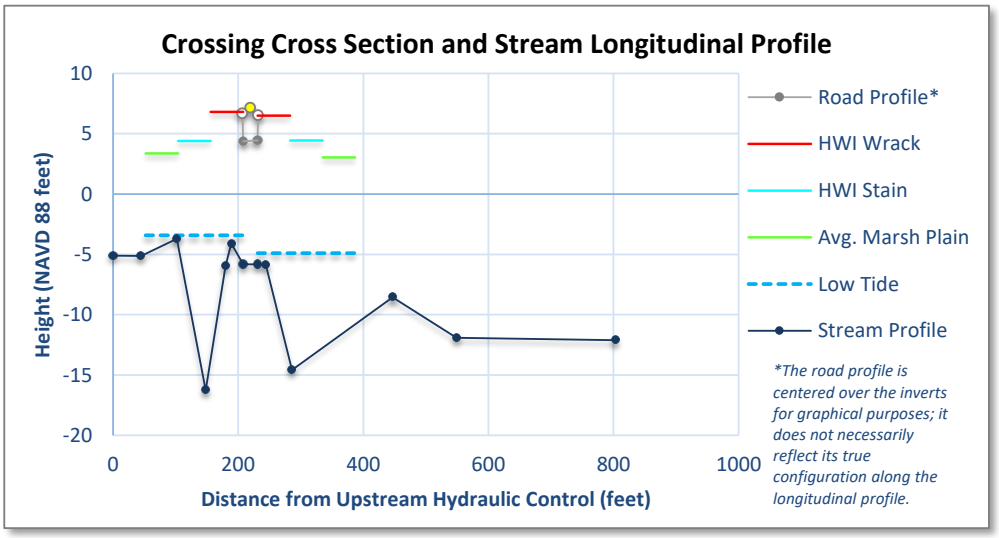
US view above structure

US view toward structure

DS view above structure

* Scoring system ranges from 1 to 5, where 1 = lowest replacement priority and 5 = highest replacement priority

**Adverse Impacts Evaluation scores range from 1 to 5, where 1 = high risk and 5 = low risk



Long. Profile

Dist.	Hght.	Feat.	Sub.
0	-5.0978	HC	G
45	-5.1378	CB	G
102	-3.7078	HC	Shell
148	-16.268	P	S
180	-5.9178	CB	C
189	-4.0978	GC	C
208	-5.8178	I	C
231	-5.8178	I	B
244	-5.8678	CB	B
286	-14.568	P	C/S
447	-8.5678	HC	S
549	-11.918	P	S
803	-12.118	CB	C/S

Crossing Context:

One of four tidal river crossings by the abandoned railroad bed that bisect Hampton Seabrook Estuary, this old granite bridge carries the flow of a major tidal creek. Despite its large size (16 feet by 10 feet), it constricts flow as shown by the very large plunge pools on either side of the crossing. The crossing condition is poor with high inundation risk and salt marsh migration potential in the upstream watershed, leading to an overall combined score of 5: highest priority for replacement (or removal).

Structure Characteristics:

Structure Type:	Bridge with Abutments	**Date of Last Known Replacement:**	N/A
Structure Material:	Stone		
Tide Gate Present:	No		

Crossing Dimensions (ft):	Upstream	Downstream
Dimension A (width):	16.5	15.7
Dimension B^{CB}(height):	11	10.2
Crossing Length (Invert to Invert):	23	

Crossing Condition:	**Headwall Material**	**Headwall Condition**	**Wingwall Material**	**Wingwall Condition**	**Scour at Structure**	**Scour Severity**
Upstream	None	N/A	Dry Fit Stone	Poor	Wingwalls	High
Downstream	None	N/A	Dry Fit Stone	Fair	Abutment	High

Scour in Structure	**Scour Severity in Structure**	**Road Surface Condition**	**Utilities at Crossing**	**Structure Condition Overall**
Abutment	High	N/A	OHE wires from power plant.	Poor

Structure Condition Comments:	Rusting out I beams. Stones falling out of structure

Ecological Assessment:	Upstream	Downstream
Natural Community Classification:	High Salt Marsh	High Salt Marsh
Upstream Salt Marsh Migration Potential (acres):	26.46	

Flood Hazard & Emergency Access

Site Identified in Hazard Mitigation Plan:	No
Emergency Access or Evacuation Route:	N/A
History of Flooding:	Unknown

Tidal Crossing Summary Sheet

New Hampshire's Tidal Crossing Assessment Protocol

Crossing ID: 29

Observer(s) & Organization:	JB TS (NHDES Coastal)
Municipality:	HAMPTON FALLS
Stream Name:	Hampton Falls River
Road Name:	N/A

Date:	7/3/2018
Start Time:	9:33:00 AM
End Time:	11:06:00 AM

Tide Prediction	**High**	**Low**
Time:	3:48 PM	9:49 AM
Elevation:	7.9	0.5
Tide Chart Location:	Hampton Harbor	

Crossing Condition Evaluation	Score*
Crossing Condition	5
Tidal Restriction Evaluation	
Tidal Range Ratio	2
Crossing Ratio	3
Erosion Classification	4
Tidal Restriction Overall Score	3
Tidal Aquatic Organism Passage	
Tidal Range Ratio	2
Salt Marsh Migration Evaluation	
Salt Marsh Migration Potential (Eval. Unit)	4
Salt Marsh Migration Potential (Wshed.)	5
Vegetation Evaluation	
Vegetation Comparison Matrix	1
Infrastructure Risk Evaluation	
Inundation Risk to the Roadway (US, DS)	4,3
Inun. Risk to the Crossing Structure (US, DS)	2,2
Adverse Impacts Evaluation**	
Inundation Risk to Low-Lying Development	5
Overall Scores	
Infrastructure	5
Ecological	3
Combined	4

DS view toward structure

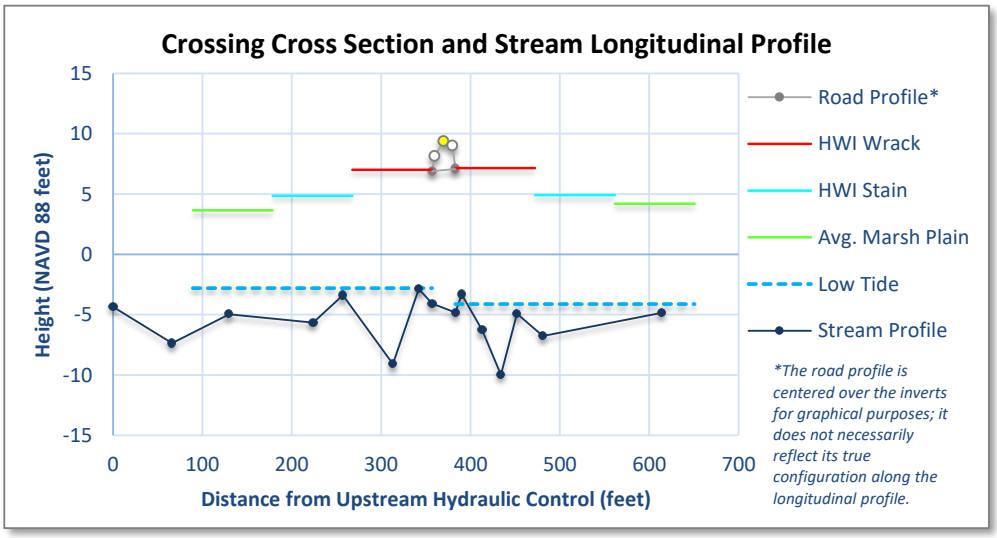
US view above structure

US view toward structure

DS view above structure

* Scoring system ranges from 1 to 5, where 1 = lowest replacement priority and 5 = highest replacement priority

**Adverse Impacts Evaluation scores range from 1 to 5, where 1 = high risk and 5 = low risk



Long. Profile

Dist.	Hght.	Feat.	Sub.
0	-4.3468	HC	S
66	-7.3468	P	S
130	-4.9768	HC	S
224	-5.6468	CB	S
257	-3.3968	HC	S
313	-9.0768	P	S
342	-2.8668	GC	B
357	-4.0868	I	C
383	-4.8168	I	C
390	-3.3168	GC	B
413	-6.2668	CB	C
434	-9.9768	P	C
452	-4.9068	HC	C
481	-6.7568	P	G
614	-4.8468	HC	G

Crossing Context:

The granite structure conducts the Hampton Falls River, one of four tidal river crossings by the abandoned railroad bed that bisect Hampton Seabrook Estuary. The high water wrack line indicates tides in excess of 10 feet are not uncommon here and the large 27 foot by 11.5-foot structure is still shown to restrict tides by the 5 to 7-foot-deep plunge pools and over six inches of subsidence of the upstream marsh plain. The overall combined score of 4, high priority, is largely due to the poor structural condition of the crossing. Like crossings 26 and 28, this supports an abandoned railroad and could be removed.

Structure Characteristics:

Structure Type:	Bridge with Abutments	**Date of Last Known Replacement:**	N/A
Structure Material:	Stone		
Tide Gate Present:	No		

Crossing Dimensions (ft):	Upstream	Downstream
Dimension A (width):	27	27
Dimension B^{CB}(height):	11.45	11.57
Crossing Length (Invert to Invert):	26	

Crossing Condition:	**Headwall Material**	**Headwall Condition**	**Wingwall Material**	**Wingwall Condition**	**Scour at Structure**	**Scour Severity**
Upstream	None	N/A	Masonry	Fair	Abutment	High
Downstream	None	N/A	Masonry	Poor	Culvert	High

Scour in Structure	**Scour Severity in Structure**	**Road Surface Condition**	**Utilities at Crossing**	**Structure Condition Overall**
Culvert	High	N/A	OHE	Poor

Structure Condition Comments:	Masonry missing mortar. Shifting stones. Support stumps exposed underneath structure

Ecological Assessment:	Upstream	Downstream
Natural Community Classification:	High Salt Marsh	High Salt Marsh
Upstream Salt Marsh Migration Potential (acres):	19.43	

Flood Hazard & Emergency Access

Site Identified in Hazard Mitigation Plan:	No
Emergency Access or Evacuation Route:	N/A
History of Flooding:	Unknown

Tidal Crossing Summary Sheet

New Hampshire's Tidal Crossing Assessment Protocol

Crossing ID: 30

Observer(s) & Organization:	TS, JB (NHDES Coastal)
Municipality:	HAMPTON FALLS
Stream Name:	Browns River
Road Name:	N/A

Date:	8/16/2018
Start Time:	11:10:00 AM
End Time:	1:00:00 PM

Tide Prediction	**High**	**Low**
Time:	4:12 PM	10:12 AM
Elevation:	9.3	-0.4
Tide Chart Location:	Hampton Harbor	

Crossing Condition Evaluation	Score*
Crossing Condition	5
Tidal Restriction Evaluation	
Tidal Range Ratio	2
Crossing Ratio	5
Erosion Classification	1
Tidal Restriction Overall Score	3
Tidal Aquatic Organism Passage	
Tidal Range Ratio	2
Salt Marsh Migration Evaluation	
Salt Marsh Migration Potential (Eval. Unit)	5
Salt Marsh Migration Potential (Wshed.)	5
Vegetation Evaluation	
Vegetation Comparison Matrix	1
Infrastructure Risk Evaluation	
Inundation Risk to the Roadway (US, DS)	1,1
Inun. Risk to the Crossing Structure (US, DS)	5,5
Adverse Impacts Evaluation**	
Inundation Risk to Low-Lying Development	5
Overall Scores	
Infrastructure	5
Ecological	1
Combined	4

DS view toward structure

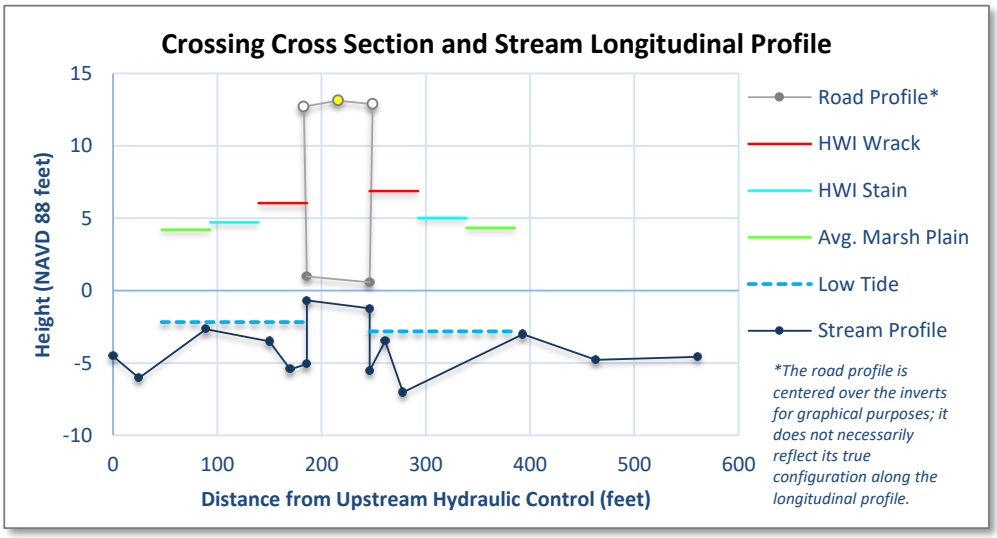
US view above structure

US view toward structure

DS view above structure

* Scoring system ranges from 1 to 5, where 1 = lowest replacement priority and 5 = highest replacement priority

**Adverse Impacts Evaluation scores range from 1 to 5, where 1 = high risk and 5 = low risk



Long. Profile

Dist.	Hght.	Feat.	Sub.
0	-4.5266	HC	C/S
25	-6.0466	P	C/S
89	-2.6666	HC	G
150	-3.5066	CB	S
170	-5.4466	P	S
186	-5.0766	I	B
186	-0.6766	I	C
246	-1.2166	I	B
246	-5.5166	I	B
261	-3.4966	GC	B
278	-7.0266	P	G
393	-3.0066	HC	G
463	-4.7866	P	C/S
561	-4.5766	HC	C/S

Crossing Context:

The crossing at Brown's River was under an inactive rail line and the 48-inch dimeter culvert was too small and perched too high, leading to tidal restriction and upstream marsh subsidence (about 5 inches) and invasion of exotic Phragmites. In addition, the ebb flow led to a greatly eroded channel, which is still evident (high crossing ratio score). In 2005, tidal flow was enhanced by the addition of a 4 by 6-foot culvert placed lower in the intertidal zone to support organism passage and reduce the tidal restriction. Although the marsh surface measurements were limited, the survey team found that the subsidence had decreased to only 1.5 inches in 2018. Despite the added benefits from the additional culvert, the crossing condition is poor, and the entire structure is regularly overfilled by tides, leading to an overall combined score of 4: high priority for replacement.

Structure Characteristics:

Structure Type:	Box Culvert	**Date of Last Known Replacement:**	2005
Structure Material:	Concrete		
Tide Gate Present:	No		

Crossing Dimensions (ft):	Upstream	Downstream
Dimension A (width):	8	8
Dimension B^{CB} (height):	6	6
Crossing Length (Invert to Invert):	60	

Crossing Condition:	**Headwall Material**	**Headwall Condition**	**Wingwall Material**	**Wingwall Condition**	**Scour at Structure**	**Scour Severity**
Upstream	Concrete	Good	Rip Rap	Fair	None	None
Downstream	Concrete	Fair	Rip Rap	Good	Headwall	Medium

Scour in Structure	**Scour Severity in Structure**	**Road Surface Condition**	**Utilities at Crossing**	**Structure Condition Overall**
Culvert	Low	N/A	Nuclear plant	Fair

Structure Condition Comments:	Cracking at headwall/wingwall DS

Ecological Assessment:	Upstream	Downstream
Natural Community Classification:	High Salt Marsh	High Salt Marsh
Upstream Salt Marsh Migration Potential (acres):	15.81	

Flood Hazard & Emergency Access

Site Identified in Hazard Mitigation Plan:	No
Emergency Access or Evacuation Route:	N/A
History of Flooding:	Unknown

Tidal Crossing Summary Sheet

New Hampshire's Tidal Crossing Assessment Protocol

Crossing ID: 31

Observer(s) & Organization:	JB, KL (NHDES Coastal)
Municipality:	HAMPTON
Stream Name:	Taylor River
Road Name:	Interstate 95 N

Date:	10/1/2018
Start Time:	9:30:00 AM
End Time:	12:00:00 PM

Tide Prediction	**High**	**Low**
Time:	4:26 PM	10:29 AM
Elevation:	9.1	0.7
Tide Chart Location:	Portsmouth Harbor	

Crossing Condition Evaluation	Score*
Crossing Condition	1
Tidal Restriction Evaluation	
Tidal Range Ratio	1
Crossing Ratio	1
Erosion Classification	3
Tidal Restriction Overall Score	2
Tidal Aquatic Organism Passage	
Tidal Range Ratio	1
Salt Marsh Migration Evaluation	
Salt Marsh Migration Potential (Eval. Unit)	5
Salt Marsh Migration Potential (Wshed.)	5
Vegetation Evaluation	
Vegetation Comparison Matrix	5
Infrastructure Risk Evaluation	
Inundation Risk to the Roadway (US, DS)	0,1
Inun. Risk to the Crossing Structure (US, DS)	1,1
Adverse Impacts Evaluation**	
Inundation Risk to Low-Lying Development	5
Overall Scores	
Infrastructure	1
Ecological	4
Combined	2

DS view toward structure

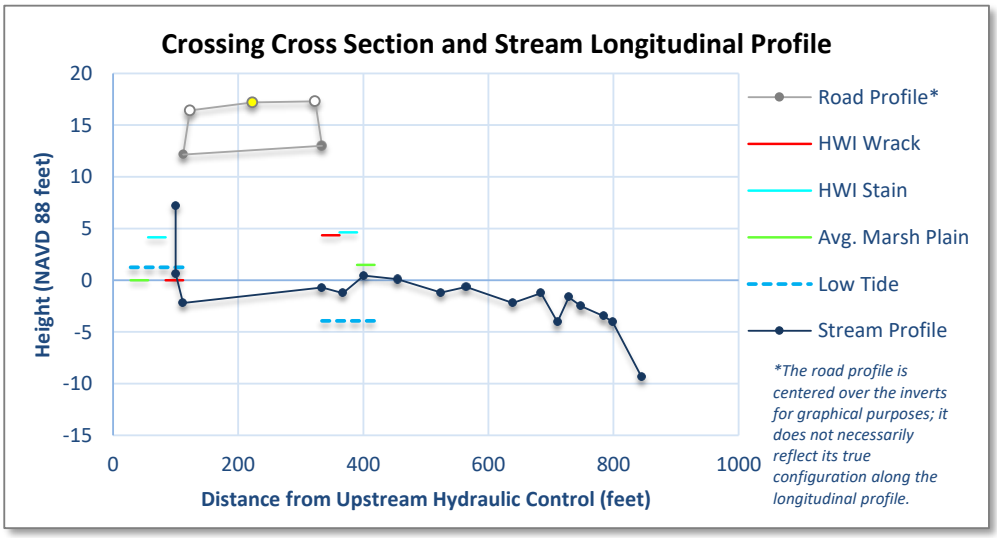
US view above structure

US view toward structure

DS view above structure

* Scoring system ranges from 1 to 5, where 1 = lowest replacement priority and 5 = highest replacement priority

**Adverse Impacts Evaluation scores range from 1 to 5, where 1 = high risk and 5 = low risk

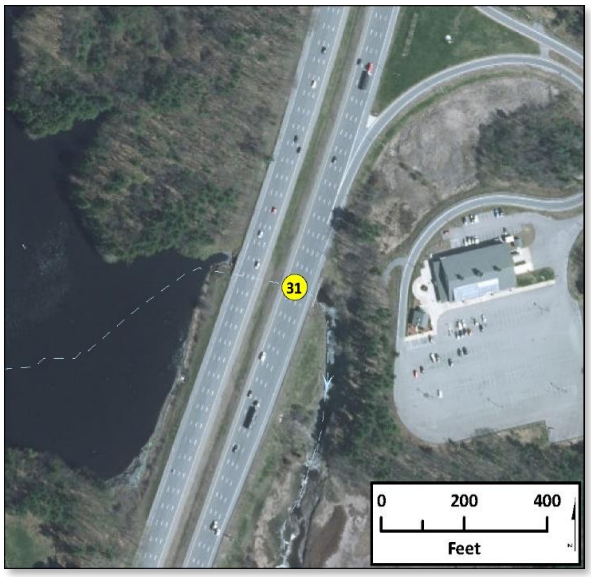


Long. Profile

Dist.	Hght.	Feat.	Sub.
100	7.2116	HC	N/A
100	0.6516	CB	B
112	-2.1984	I	B
334.24	-0.6884	I	C/S
367.24	-1.2484	P	C/S
401.24	0.4516	HC	C
454.24	0.1016	HC	G
524.24	-1.1984	P	C
564.24	-0.6484	HC	G
639.24	-2.1984	P	G
684.24	-1.2484	HC	C
710.24	-4.0484	P	B
728.24	-1.6584	HC	B
748.24	-2.5284	HC	B
784.24	-3.4784	HC	S
798.24	-4.0184	CB	C/S
845.24	-9.3984	CB	C/S

Crossing Context:

N/A



Structure Characteristics:

Structure Type:	Bridge with Side Slopes and Abutments	**Date of Last Known Replacement:**	N/A
Structure Material:	Concrete		
Tide Gate Present:	No		

Crossing Dimensions (ft):	Upstream	Downstream
Dimension A (width):	72	72
Dimension B^{CB}(height):	14.11	13.73
Crossing Length (Invert to Invert):	222	

Crossing Condition:	**Headwall Material**	**Headwall Condition**	**Wingwall Material**	**Wingwall Condition**	**Scour at Structure**	**Scour Severity**
Upstream	None	N/A	None	N/A	None	None
Downstream	None	N/A	None	N/A	None	None

Scour in Structure	**Scour Severity in Structure**	**Road Surface Condition**	**Utilities at Crossing**	**Structure Condition Overall**
None	None	Good	None	Good

Structure Condition Comments:	N/A

Ecological Assessment:	Upstream	Downstream
Natural Community Classification:	Freshwater Marsh	Brackish Riverbank Marsh
Upstream Salt Marsh Migration Potential (acres):	46.47	

Flood Hazard & Emergency Access

Site Identified in Hazard Mitigation Plan:	Yes
Emergency Access or Evacuation Route:	Yes
History of Flooding:	US flooding in '06 and '09 prior to being updated

Tidal Crossing Summary Sheet

New Hampshire's Tidal Crossing Assessment Protocol

Crossing ID: 32

Observer(s) & Organization:	JB (NHDES Coastal)
Municipality:	HAMPTON FALLS
Stream Name:	N/A
Road Name:	Interstate 95 N

Date:	10/16/2018
Start Time:	10:05:00 AM
End Time:	12:00:00 PM

Tide Prediction	**High**	**Low**
Time:	5:28 AM	11:42 AM
Elevation:	7.5	1.7
Tide Chart Location:	Hampton Harbor	

Crossing Condition Evaluation	Score*
Crossing Condition	2
Tidal Restriction Evaluation	
Tidal Range Ratio	1
Crossing Ratio	1
Erosion Classification	5
Tidal Restriction Overall Score	2
Tidal Aquatic Organism Passage	
Tidal Range Ratio	1
Salt Marsh Migration Evaluation	
Salt Marsh Migration Potential (Eval. Unit)	1
Salt Marsh Migration Potential (Wshed.)	1
Vegetation Evaluation	
Vegetation Comparison Matrix	3
Infrastructure Risk Evaluation	
Inundation Risk to the Roadway (US, DS)	1,1
Inun. Risk to the Crossing Structure (US, DS)	5,5
Adverse Impacts Evaluation**	
Inundation Risk to Low-Lying Development	0
Overall Scores	
Infrastructure	2
Ecological	3
Combined	2

DS view toward structure

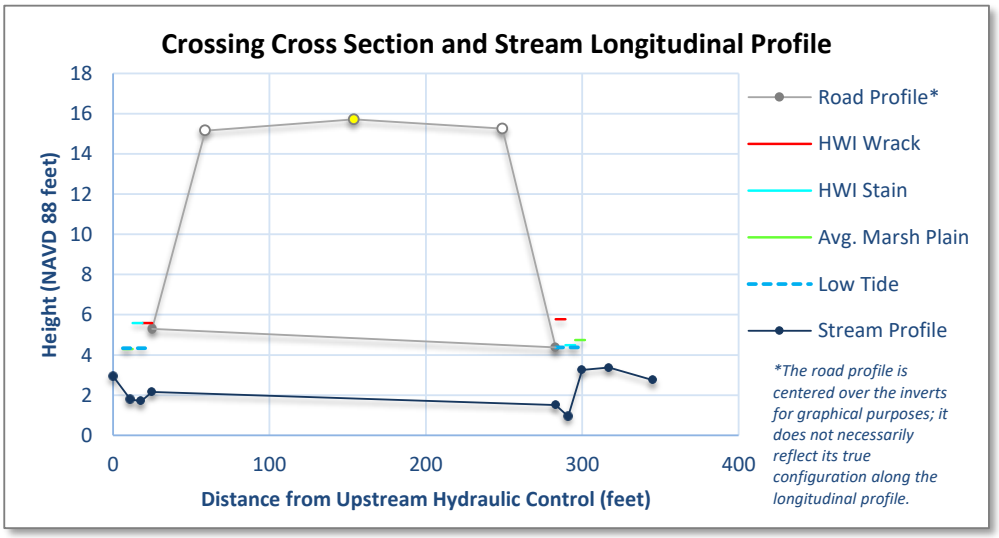
US view above structure

US view toward structure

DS view above structure

* Scoring system ranges from 1 to 5, where 1 = lowest replacement priority and 5 = highest replacement priority

**Adverse Impacts Evaluation scores range from 1 to 5, where 1 = high risk and 5 = low risk

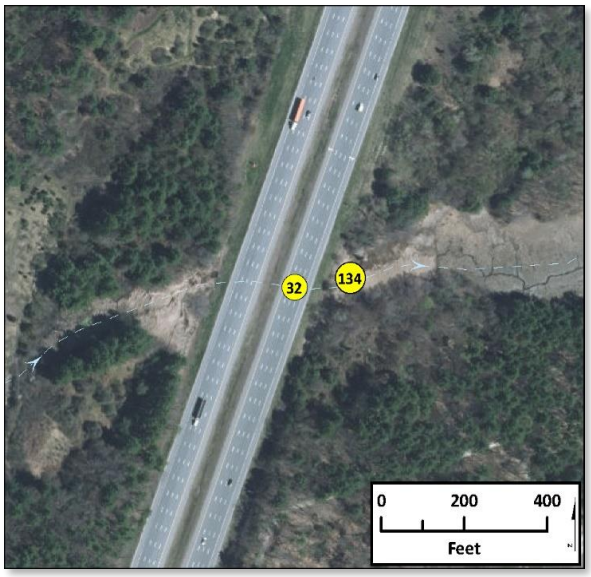


Long. Profile

Dist.	Hght.	Feat.	Sub.
0	2.9452	CB	C/S
11	1.7852	HC	C/S
18	1.7052	CB	B
25	2.1552	I	B
283	1.5052	I	C/S
291	0.9452	P	C/S
300	3.2552	HC	C/S
317	3.3752	CB	C/S
345	2.7452	I	C/S

Crossing Context:

N/A



Structure Characteristics:

Structure Type:	Round Culvert	**Date of Last Known Replacement:**	N/A
Structure Material:	Concrete		
Tide Gate Present:	No		

Crossing Dimensions (ft):	Upstream	Downstream
Dimension A (width):	5.8	5.8
Dimension B^{CB}(height):	2.9	2.9
Crossing Length (Invert to Invert):	258	

Crossing Condition:	**Headwall Material**	**Headwall Condition**	**Wingwall Material**	**Wingwall Condition**	**Scour at Structure**	**Scour Severity**
Upstream	Masonry	Fair	Masonry	Fair	Wingwalls	Low
Downstream	Masonry	Fair	Masonry	Fair	None	None

Scour in Structure	**Scour Severity in Structure**	**Road Surface Condition**	**Utilities at Crossing**	**Structure Condition Overall**
None	None	Good	None	Fair

Structure Condition Comments:	N/A

Ecological Assessment:	Upstream	Downstream
Natural Community Classification:	Invasive Dominant	Invasive Dominant
Upstream Salt Marsh Migration Potential (acres):	0.00	

Flood Hazard & Emergency Access

Site Identified in Hazard Mitigation Plan:	No
Emergency Access or Evacuation Route:	Yes
History of Flooding:	unknown

Tidal Crossing Summary Sheet

New Hampshire's Tidal Crossing Assessment Protocol

Crossing ID: 33

Observer(s) & Organization:	TS, TM (NHDES Coastal)
Municipality:	HAMPTON
Stream Name:	N/A
Road Name:	Huckleberry Ln

Date:	7/16/2018
Start Time:	8:00:00 AM
End Time:	9:40:00 AM

Tide Prediction	**High**	**Low**
Time:	2:50 PM	8:50 AM
Elevation:	9.5	-1.4
Tide Chart Location:	Hampton Harbor	

Crossing Condition Evaluation	Score*
Crossing Condition	5
Tidal Restriction Evaluation	
Tidal Range Ratio	1
Crossing Ratio	5
Erosion Classification	5
Tidal Restriction Overall Score	4
Tidal Aquatic Organism Passage	
Tidal Range Ratio	1
Salt Marsh Migration Evaluation	
Salt Marsh Migration Potential (Eval. Unit)	4
Salt Marsh Migration Potential (Wshed.)	4
Vegetation Evaluation	
Vegetation Comparison Matrix	3
Infrastructure Risk Evaluation	
Inundation Risk to the Roadway (US, DS)	2,2
Inun. Risk to the Crossing Structure (US, DS)	5,5
Adverse Impacts Evaluation**	
Inundation Risk to Low-Lying Development	5
Overall Scores	
Infrastructure	5
Ecological	3
Combined	4

DS view toward structure

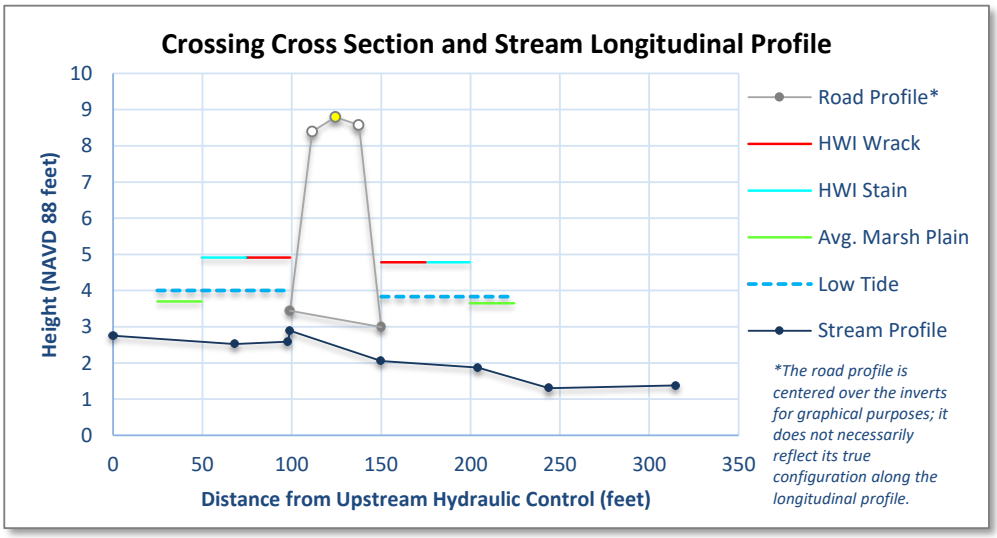
US view above structure

US view toward structure

DS view above structure

* Scoring system ranges from 1 to 5, where 1 = lowest replacement priority and 5 = highest replacement priority

**Adverse Impacts Evaluation scores range from 1 to 5, where 1 = high risk and 5 = low risk



Long. Profile

Dist.	Hght.	Feat.	Sub.
0	2.7527	HC	S
68	2.5227	HC	C/S
98	2.5927	P	C/S
99	2.8927	I	C/S
150	2.0527	I	G
204	1.8727	P	C/S
244	1.3027	HC	C/S
315	1.3827	HC	C/S

Crossing Context:

Huckleberry Lane crosses an unnamed tributary to the Little River and the tidal flow is supported by three small pipes that are underwater most of the time. The downstream area is eroded to a wider creek and erosion classification at the crossing is high for both upstream and downstream, leading to an overall combined score of 4, high priority for replacement.

Structure Characteristics:

Structure Type:	Round Culvert	**Date of Last Known Replacement:**	N/A
Structure Material:	Plastic - Smooth		
Tide Gate Present:	No		

Crossing Dimensions (ft):	Upstream	Downstream
Dimension A (width):	3.6	3.6
Dimension B^{CB}(height):	1.1	1.2
Crossing Length (Invert to Invert):	51	

Crossing Condition:	**Headwall Material**	**Headwall Condition**	**Wingwall Material**	**Wingwall Condition**	**Scour at Structure**	**Scour Severity**
Upstream	Rip Rap	Poor	None	N/A	None	None
Downstream	Rip Rap	Poor	None	N/A	None	None

Scour in Structure	**Scour Severity in Structure**	**Road Surface Condition**	**Utilities at Crossing**	**Structure Condition Overall**
None	None	Fair	Overhead electric	Poor

Structure Condition Comments:	Tree culverts, surveyed as one, completely submerged

Ecological Assessment:	Upstream	Downstream
Natural Community Classification:	Low Salt Marsh	Low Salt Marsh
Upstream Salt Marsh Migration Potential (acres):	7.88	

Flood Hazard & Emergency Access

Site Identified in Hazard Mitigation Plan:	No
Emergency Access or Evacuation Route:	N/A
History of Flooding:	unknown

Tidal Crossing Summary Sheet

New Hampshire's Tidal Crossing Assessment Protocol

Crossing ID: 34

Observer(s) & Organization:	JB TS (NHDES Coastal)
Municipality:	HAMPTON
Stream Name:	N/A
Road Name:	Ocean Blvd

Date:	7/31/2018
Start Time:	8:30:00 AM
End Time:	9:43:00 AM

Tide Prediction	**High**	**Low**
Time:	2:35 PM	8:39 AM
Elevation:	8.1	0.3
Tide Chart Location:	Hampton Harbor	

Crossing Condition Evaluation	Score*
Crossing Condition	1
Tidal Restriction Evaluation	
Tidal Range Ratio	1
Crossing Ratio	1
Erosion Classification	5
Tidal Restriction Overall Score	2
Tidal Aquatic Organism Passage	
Tidal Range Ratio	1
Salt Marsh Migration Evaluation	
Salt Marsh Migration Potential (Eval. Unit)	1
Salt Marsh Migration Potential (Wshed.)	1
Vegetation Evaluation	
Vegetation Comparison Matrix	0
Infrastructure Risk Evaluation	
Inundation Risk to the Roadway (US, DS)	2,2
Inun. Risk to the Crossing Structure (US, DS)	2,2
Adverse Impacts Evaluation**	
Inundation Risk to Low-Lying Development	5
Overall Scores	
Infrastructure	1
Ecological	4
Combined	2

DS view toward structure

US view above structure

US view toward structure

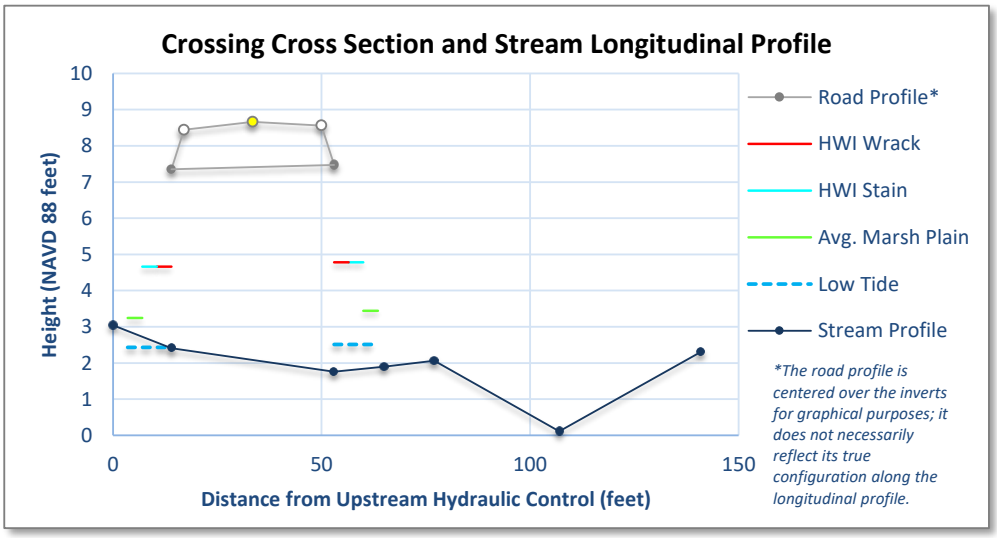
DS view above structure

* Scoring system ranges from 1 to 5, where 1 = lowest replacement priority and 5 = highest replacement priority

**Adverse Impacts Evaluation scores range from 1 to 5, where 1 = high risk and 5 = low risk

Long. Profile

Dist.	Hght.	Feat.	Sub.
0	3.0414	CB	C/S
14	2.4114	I	C/S
53	1.7614	I	C/S
65	1.9014	HC	C/S
77	2.0614	HC	C/S
107	0.1114	P	C/S
141	2.3114	HC	C/S



Crossing Context:

N/A

Structure Characteristics:

Structure Type:	Box Culvert	**Date of Last Known Replacement:**	N/A
Structure Material:	Concrete		
Tide Gate Present:	No		

Crossing Dimensions (ft):	Upstream	Downstream
Dimension A (width):	8.85	8.77
Dimension B^{CB}(height):	4.91	5.71
Crossing Length (Invert to Invert):	39	

Crossing Condition:	**Headwall Material**	**Headwall Condition**	**Wingwall Material**	**Wingwall Condition**	**Scour at Structure**	**Scour Severity**
Upstream	None	N/A	Concrete	Good		
Downstream	None	N/A	Concrete	Good	None	None

Scour in Structure	**Scour Severity in Structure**	**Road Surface Condition**	**Utilities at Crossing**	**Structure Condition Overall**
None	None	Fair	Overhead electric	Good

Structure Condition Comments:	N/A

Ecological Assessment:	Upstream	Downstream
Natural Community Classification:	Invasive Dominant	Low Salt Marsh
Upstream Salt Marsh Migration Potential (acres):	0.00	

Flood Hazard & Emergency Access

Site Identified in Hazard Mitigation Plan:	Yes
Emergency Access or Evacuation Route:	N/A
History of Flooding:	'11 minor flooding. prone to high flows.

Tidal Crossing Summary Sheet

New Hampshire's Tidal Crossing Assessment Protocol

Crossing ID: 35

Observer(s) & Organization:	JB TS (NHDES Coastal)
Municipality:	NORTH HAMPTON
Stream Name:	Little River
Road Name:	Appledore Ave

Date:	7/9/2018
Start Time:	2:24:00 PM
End Time:	3:32:00 PM

Tide Prediction	**High**	**Low**
Time:	8:38 PM	2:36 PM
Elevation:	9.4	0.5
Tide Chart Location:	Hampton Harbor	

Crossing Condition Evaluation	Score*
Crossing Condition	1
Tidal Restriction Evaluation	
Tidal Range Ratio	3
Crossing Ratio	3
Erosion Classification	4
Tidal Restriction Overall Score	3
Tidal Aquatic Organism Passage	
Tidal Range Ratio	3
Salt Marsh Migration Evaluation	
Salt Marsh Migration Potential (Eval. Unit)	5
Salt Marsh Migration Potential (Wshed.)	5
Vegetation Evaluation	
Vegetation Comparison Matrix	0
Infrastructure Risk Evaluation	
Inundation Risk to the Roadway (US, DS)	3,3
Inun. Risk to the Crossing Structure (US, DS)	5,5
Adverse Impacts Evaluation**	
Inundation Risk to Low-Lying Development	5
Overall Scores	
Infrastructure	3
Ecological	4
Combined	3

DS view toward structure

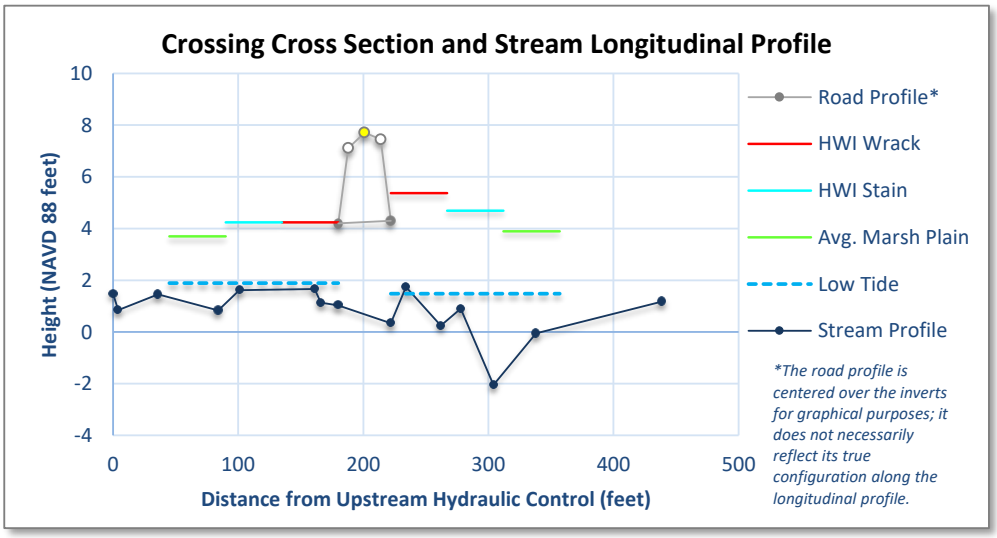
US view above structure

US view toward structure

DS view above structure

* Scoring system ranges from 1 to 5, where 1 = lowest replacement priority and 5 = highest replacement priority

**Adverse Impacts Evaluation scores range from 1 to 5, where 1 = high risk and 5 = low risk



Long. Profile

Dist.	Hght.	Feat.	Sub.
0	1.48	HC	S
4	0.84	P	S
36	1.46	HC	S
84	0.83	P	S
101	1.61	HC	S
161	1.66	HC	S
166	1.13	CB	S
180	1.03	I	G
222	0.34	I	C
234	1.74	GC	C
262	0.25	P	G
278	0.9	HC	G
304	-2.05	P	G
338	-0.05	HC	S
439	1.18	HC	S

Crossing Context:

Appledore Avenue crosses creek running north to the Little River and the original structure was replaced in 1999 with a 4 by 8-foot box culvert to allow unrestricted tides to flow upstream. The overall combined score of 3 shows a moderate priority for replacement, largely based on crossing ratios and signs of erosion, some of which may remain from the previous structure. More information can be found for this and the Little River restoration in 2000 on the NRCS website:

https://www.nrcs.usda.gov/wps/portal/nrcs/detail/nh/technical/?cid=nrcs144p2_015688

Structure Characteristics:

Structure Type:	Box Culvert	**Date of Last Known Replacement:**	2001
Structure Material:	Concrete		
Tide Gate Present:	No		

Crossing Dimensions (ft):	Upstream	Downstream
Dimension A (width):	8	8
Dimension B^{CB}(height):	3.3	4
Crossing Length (Invert to Invert):	42	

Crossing Condition:	**Headwall Material**	**Headwall Condition**	**Wingwall Material**	**Wingwall Condition**	**Scour at Structure**	**Scour Severity**
Upstream	Concrete	Good	Rip Rap	Fair	Wingwalls	Medium
Downstream	Concrete	Good	Rip Rap	Fair	Wingwalls	Medium

Scour in Structure	**Scour Severity in Structure**	**Road Surface Condition**	**Utilities at Crossing**	**Structure Condition Overall**
None	None	Fair	OHE DS	Good

Structure Condition Comments:	N/A

Ecological Assessment:	Upstream	Downstream
Natural Community Classification:	High Salt Marsh	High Salt Marsh
Upstream Salt Marsh Migration Potential (acres):	21.80	

Flood Hazard & Emergency Access

Site Identified in Hazard Mitigation Plan:	No
Emergency Access or Evacuation Route:	N/A
History of Flooding:	Prior to replacement

Tidal Crossing Summary Sheet

New Hampshire's Tidal Crossing Assessment Protocol

Crossing ID: 36

Observer(s) & Organization:	JB TS. (NHDES Coastal)
Municipality:	NORTH HAMPTON
Stream Name:	N/A
Road Name:	Ocean Blvd

Date:	7/11/2018
Start Time:	3:30:00 PM
End Time:	5:10:00 PM

Tide Prediction	**High**	**Low**
Time:	10:28 PM	2:29 PM
Elevation:	10.2	0.0
Tide Chart Location:	Hampton Harbor	

Crossing Condition Evaluation	Score*
Crossing Condition	1
Tidal Restriction Evaluation	
Tidal Range Ratio	5
Crossing Ratio	3
Erosion Classification	4
Tidal Restriction Overall Score	4
Tidal Aquatic Organism Passage	
Tidal Range Ratio	5
Salt Marsh Migration Evaluation	
Salt Marsh Migration Potential (Eval. Unit)	5
Salt Marsh Migration Potential (Wshed.)	5
Vegetation Evaluation	
Vegetation Comparison Matrix	1
Infrastructure Risk Evaluation	
Inundation Risk to the Roadway (US, DS)	4,5
Inun. Risk to the Crossing Structure (US, DS)	5,5
Adverse Impacts Evaluation**	
Inundation Risk to Low-Lying Development	3
Overall Scores	
Infrastructure	5
Ecological	5
Combined	5

DS view toward structure

US view above structure

US view toward structure

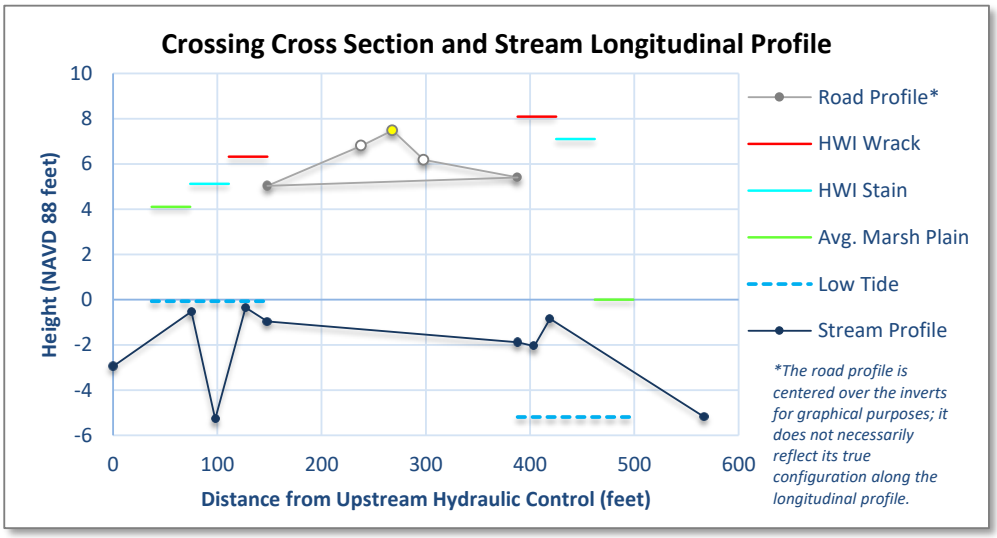
DS view above structure

* Scoring system ranges from 1 to 5, where 1 = lowest replacement priority and 5 = highest replacement priority

**Adverse Impacts Evaluation scores range from 1 to 5, where 1 = high risk and 5 = low risk

Long. Profile

Dist.	Hght.	Feat.	Sub.
0	-2.9497	HC	G
75	-0.5297	HC	G
98	-5.2797	P	S
127	-0.3497	GC	C
148	-0.9597	I	B
388	-1.8897	I	C
404	-2.0497	P	C
419	-0.8397	HC	B
567	-5.1897	HC	C



Crossing Context:

Little River once flowed into the ocean through an inlet south of Appledore Road, but with the construction of Route 1A and the 'trunk' that drained the marsh system (once measured at 193 acres) at its north end, the inlet variably closed which led to dynamic shifts in water levels and marsh degradation. The trunk was drained by a 4-foot round pipe and was woefully inadequate to support tidal flow into the marsh. It was replaced by two 6 by 12-foot culverts, side by side, in 2000. The disparity of the up and downstream highwater stains shows the top two feet of regular high tides are still prevented from flooding the marsh, signs of strong erosion are found upstream and the crossing is likely to be inundated by storms. The overall combined score is 5: highest priority. It should be stated the culvert size chosen in 2000 was recognized not to be able to conduct the full tidal flow but was selected as a more economical solution than a larger bridge. More information can be found for the Little River restoration on the NRCS website:

https://www.nrcs.usda.gov/wps/portal/nrcs/detail/nh/technical/?cid=nrcs144p2_015688

and the NHDES website:

https://www.des.nh.gov/organization/divisions/water/wmb/coastal/restoration/saltmarsh_restoration.htm

Structure Characteristics:

Structure Type:	Box Culvert	**Date of Last Known Replacement:**	2000
Structure Material:	Concrete		
Tide Gate Present:	No		

Crossing Dimensions (ft):	Upstream	Downstream
Dimension A (width):	24	24
Dimension B^{CB} (height):	6	6
Crossing Length (Invert to Invert):	240	

Crossing Condition:	**Headwall Material**	**Headwall Condition**	**Wingwall Material**	**Wingwall Condition**	**Scour at Structure**	**Scour Severity**
Upstream	None	N/A	Rip Rap	Good	None	None
Downstream	None	N/A	Rip Rap	Good	None	None

Scour in Structure	**Scour Severity in Structure**	**Road Surface Condition**	**Utilities at Crossing**	**Structure Condition Overall**
None	None	Good	OHE. Poles in marsh US	Good

Structure Condition Comments:	Two twin box culverts, surveyed as one structure

Ecological Assessment:	Upstream	Downstream
Natural Community Classification:	High Salt Marsh	Sparsely Vegetated Intertidal Habitat
Upstream Salt Marsh Migration Potential (acres):	73.63	

Flood Hazard & Emergency Access

Site Identified in Hazard Mitigation Plan:	Yes
Emergency Access or Evacuation Route:	N/A
History of Flooding:	Past flooding has occurred.

Tidal Crossing Summary Sheet

New Hampshire's Tidal Crossing Assessment Protocol

Crossing ID: 37

Observer(s) & Organization:	TS, JB (NHDES Coastal)
Municipality:	NORTH HAMPTON
Stream Name:	Little River
Road Name:	Atlantic Ave

Date:	6/25/2018
Start Time:	3:58:00 PM
End Time:	6:19:00 PM

Tide Prediction	**High**	**Low**
Time:	10:38 PM	4:40 PM
Elevation:	9.1	0.8
Tide Chart Location:	Hampton Harbor	

Crossing Condition Evaluation	Score*
Crossing Condition	3
Tidal Restriction Evaluation	
Tidal Range Ratio	1
Crossing Ratio	4
Erosion Classification	5
Tidal Restriction Overall Score	3
Tidal Aquatic Organism Passage	
Tidal Range Ratio	1
Salt Marsh Migration Evaluation	
Salt Marsh Migration Potential (Eval. Unit)	1
Salt Marsh Migration Potential (Wshed.)	2
Vegetation Evaluation	
Vegetation Comparison Matrix	0
Infrastructure Risk Evaluation	
Inundation Risk to the Roadway (US, DS)	2,2
Inun. Risk to the Crossing Structure (US, DS)	1,1
Adverse Impacts Evaluation**	
Inundation Risk to Low-Lying Development	4
Overall Scores	
Infrastructure	3
Ecological	4
Combined	3

DS view toward structure

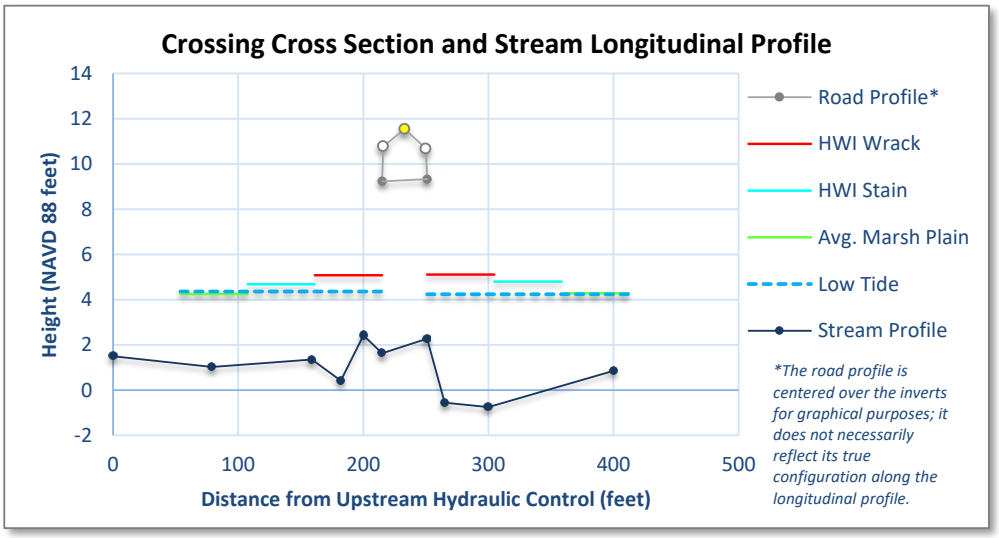
US view above structure

US view toward structure

DS view above structure

* Scoring system ranges from 1 to 5, where 1 = lowest replacement priority and 5 = highest replacement priority

**Adverse Impacts Evaluation scores range from 1 to 5, where 1 = high risk and 5 = low risk



Long. Profile

Dist.	Hght.	Feat.	Sub.
0	1.4986	HC	C/S
79	1.0286	P	C/S
159	1.3486	HC	C/S
182	0.4186	P	G
200	2.4186	GC	C
215	1.6286	I	C
251	2.2786	I	C
265	-0.5514	P	C
300	-0.7514	HC	C/S
400	0.8586	HC	C/S

Crossing Context:

N/A

Structure Characteristics:

Structure Type:	Box Culvert	**Date of Last Known Replacement:**	N/A
Structure Material:	Concrete		
Tide Gate Present:	No		

Crossing Dimensions (ft):	Upstream	Downstream
Dimension A (width):	7.72	8.8
Dimension B^{CB}(height):	7.69	7.2
Crossing Length (Invert to Invert):	36	

Crossing Condition:	**Headwall Material**	**Headwall Condition**	**Wingwall Material**	**Wingwall Condition**	**Scour at Structure**	**Scour Severity**
Upstream	Concrete	Good	Concrete	Fair	Culvert	High
Downstream	Concrete	Good	Concrete	Fair	None	None

Scour in Structure	**Scour Severity in Structure**	**Road Surface Condition**	**Utilities at Crossing**	**Structure Condition Overall**
Culvert	Low	Fair	Overhead electric, sewer line downstream headwall	Fair

Structure Condition Comments:	N/A

Ecological Assessment:	Upstream	Downstream
Natural Community Classification:	Brackish Riverbank Marsh	Brackish Riverbank Marsh
Upstream Salt Marsh Migration Potential (acres):	1.03	

Flood Hazard & Emergency Access

Site Identified in Hazard Mitigation Plan:	No
Emergency Access or Evacuation Route:	Yes
History of Flooding:	Unknown

Tidal Crossing Summary Sheet

New Hampshire's Tidal Crossing Assessment Protocol

Crossing ID: 38

Observer(s) & Organization:	TS, JB (NHDES Coastal)
Municipality:	NORTH HAMPTON
Stream Name:	Little River
Road Name:	Woodland Rd

Date:	7/3/2018
Start Time:	11:45:00 AM
End Time:	1:00:00 PM

Tide Prediction	**High**	**Low**
Time:	3:48 PM	9:49 AM
Elevation:	7.9	0.5
Tide Chart Location:	Hampton Harbor	

Crossing Condition Evaluation	Score*
Crossing Condition	3
Tidal Restriction Evaluation	
Tidal Range Ratio	5
Crossing Ratio	4
Erosion Classification	5
Tidal Restriction Overall Score	5
Tidal Aquatic Organism Passage	
Tidal Range Ratio	5
Salt Marsh Migration Evaluation	
Salt Marsh Migration Potential (Eval. Unit)	2
Salt Marsh Migration Potential (Wshed.)	2
Vegetation Evaluation	
Vegetation Comparison Matrix	1
Infrastructure Risk Evaluation	
Inundation Risk to the Roadway (US, DS)	2,2
Inun. Risk to the Crossing Structure (US, DS)	1,1
Adverse Impacts Evaluation**	
Inundation Risk to Low-Lying Development	4
Overall Scores	
Infrastructure	3
Ecological	5
Combined	3

DS view toward structure

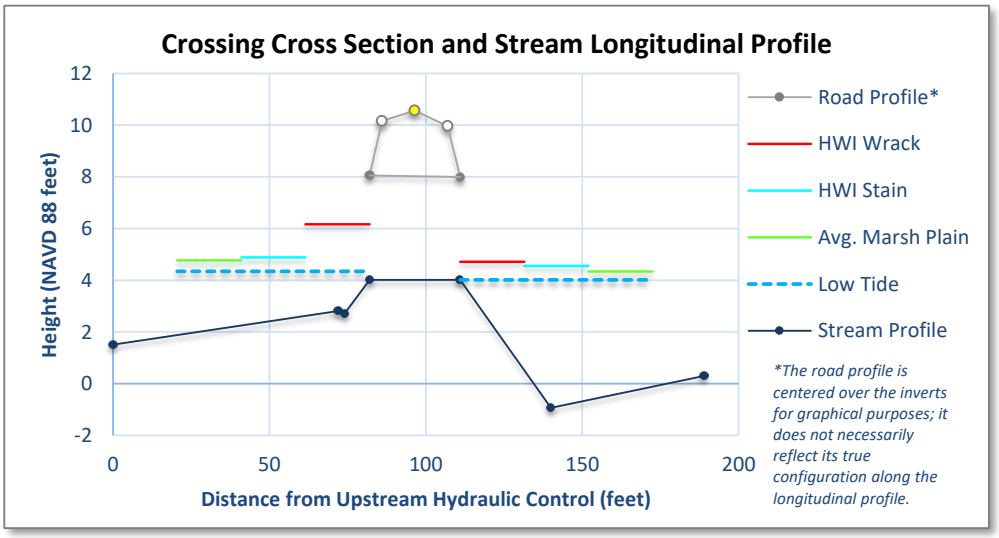
US view above structure

US view toward structure

DS view above structure

* Scoring system ranges from 1 to 5, where 1 = lowest replacement priority and 5 = highest replacement priority

**Adverse Impacts Evaluation scores range from 1 to 5, where 1 = high risk and 5 = low risk



Long. Profile

Dist.	Hght.	Feat.	Sub.
0	1.5143	HC	C/S
72	2.8143	HC	G
74	2.7143	P	G
82	4.0143	I	C
111	4.0143	I	C
140	-0.9357	P	B
189	0.3043	HC	G

Crossing Context:

N/A

Structure Characteristics:

Structure Type:	Box Culvert	**Date of Last Known Replacement:**	N/A
Structure Material:	Concrete		
Tide Gate Present:	No		

Crossing Dimensions (ft):	Upstream	Downstream
Dimension A (width):	8	8
Dimension B^{CB}(height):	4	4
Crossing Length (Invert to Invert):	29	

Crossing Condition:	**Headwall Material**	**Headwall Condition**	**Wingwall Material**	**Wingwall Condition**	**Scour at Structure**	**Scour Severity**
Upstream	Concrete	Good	Rip Rap	Poor	Wingwalls	Medium
Downstream	Concrete	Good	Concrete	Good	Wingwalls	Low

Scour in Structure	**Scour Severity in Structure**	**Road Surface Condition**	**Utilities at Crossing**	**Structure Condition Overall**
None	None	Good	Overhead electric	Good

Structure Condition Comments:	N/A

Ecological Assessment:	Upstream	Downstream
Natural Community Classification:	Freshwater Swamp	Freshwater Swamp
Upstream Salt Marsh Migration Potential (acres):	1.03	

Flood Hazard & Emergency Access

Site Identified in Hazard Mitigation Plan:	Yes
Emergency Access or Evacuation Route:	N/A
History of Flooding:	Past flooding with potential for erosion

Tidal Crossing Summary Sheet

New Hampshire's Tidal Crossing Assessment Protocol

Crossing ID: 39

Observer(s) & Organization:	TS, JB, PS, KL (NHDES Coastal)
Municipality:	NORTH HAMPTON
Stream Name:	Chapel Brook
Road Name:	Ocean Blvd

Date:	7/20/2018
Start Time:	11:45:00 AM
End Time:	1:44:00 PM

Tide Prediction	**High**	**Low**
Time:	6:38 PM	12:34 PM
Elevation:	8.9	0.3
Tide Chart Location:	Hampton Harbor	

Crossing Condition Evaluation	Score*
Crossing Condition	2
Tidal Restriction Evaluation	
Tidal Range Ratio	5
Crossing Ratio	5
Erosion Classification	2
Tidal Restriction Overall Score	4
Tidal Aquatic Organism Passage	
Tidal Range Ratio	5
Salt Marsh Migration Evaluation	
Salt Marsh Migration Potential (Eval. Unit)	3
Salt Marsh Migration Potential (Wshed.)	5
Vegetation Evaluation	
Vegetation Comparison Matrix	1
Infrastructure Risk Evaluation	
Inundation Risk to the Roadway (US, DS)	1,5
Inun. Risk to the Crossing Structure (US, DS)	4,5
Adverse Impacts Evaluation**	
Inundation Risk to Low-Lying Development	2
Overall Scores	
Infrastructure	5
Ecological	5
Combined	5

DS view toward structure

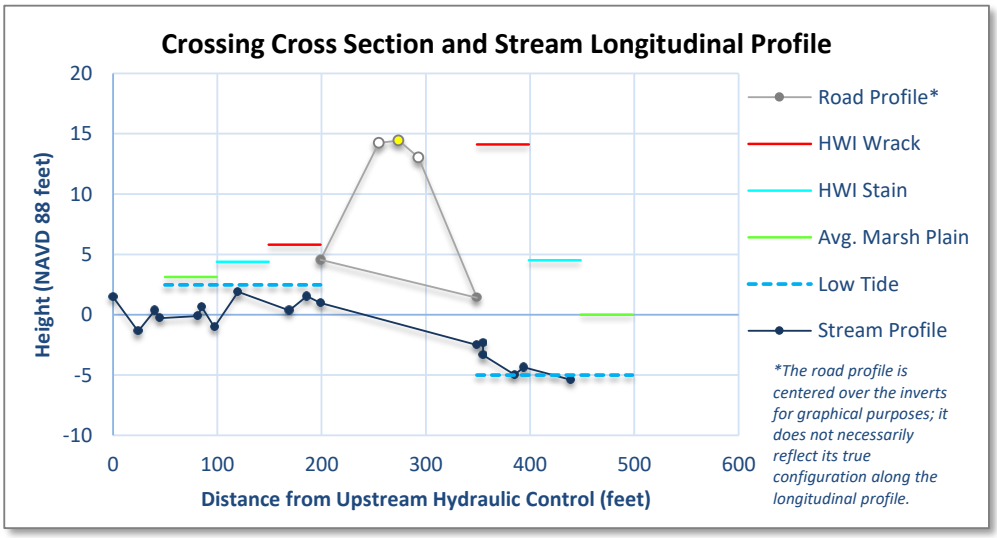
US view above structure

US view toward structure

DS view above structure

* Scoring system ranges from 1 to 5, where 1 = lowest replacement priority and 5 = highest replacement priority

**Adverse Impacts Evaluation scores range from 1 to 5, where 1 = high risk and 5 = low risk



Long. Profile

Dist.	Hght.	Feat.	Sub.
0	1.4657	HC	G
24	-1.3643	P	C
40	0.3657	GC	B
45	-0.2743	I	B
81	-0.1043	I	B
85	0.6357	GC	B
97	-1.0143	P	S
120	1.8957	HC	S
169	0.3557	P	G
186	1.5357	GC	C
199	0.9657	I	C
349	-2.4943	I	B
355	-2.3443	GC	B
355	-3.3443	CB	B
385	-4.9843	P	G
394	-4.3543	HC	B
439	-5.3943	HC	B

Crossing Context:

Tidal flow supporting the salt marsh at Philbrick's Pond has been restricted by the trolley berm of the early 1900s as well as Route 1A (reported here). A recent investigation into the hydrodynamic flows and how they may be restored to rejuvenate the degraded salt marsh showed that the small clay pipe under the trolley berm was intact, but restricted tides, while the culvert under Route 1A was less restrictive (CMA Engineers 2018). The overall combined score of 4 indicates high priority for replacement.

Structure Characteristics:

Structure Type:	Box Culvert	**Date of Last Known Replacement:**	N/A
Structure Material:	Stone		
Tide Gate Present:	No		

Crossing Dimensions (ft):	Upstream	Downstream
Dimension A (width):	5	4
Dimension B^{CB}(height):	4	4
Crossing Length (Invert to Invert):	150	

Crossing Condition:	**Headwall Material**	**Headwall Condition**	**Wingwall Material**	**Wingwall Condition**	**Scour at Structure**	**Scour Severity**
Upstream	Masonry	Fair	Rip Rap	Fair	Wingwalls	Medium
Downstream	Rip Rap	Fair	None	N/A	None	None

Scour in Structure	**Scour Severity in Structure**	**Road Surface Condition**	**Utilities at Crossing**	**Structure Condition Overall**
None	None	Fair	Overhead electric	Fair

Structure Condition Comments:	Converts to concrete pipe halfway downstream

Ecological Assessment:	Upstream	Downstream
Natural Community Classification:	Low Salt Marsh	Sparsely Vegetated Intertidal Habitat
Upstream Salt Marsh Migration Potential (acres):	34.64	

Flood Hazard & Emergency Access

Site Identified in Hazard Mitigation Plan:	No
Emergency Access or Evacuation Route:	Yes
History of Flooding:	flooding due to trolly line restriction

Tidal Crossing Summary Sheet

New Hampshire's Tidal Crossing Assessment Protocol

Crossing ID: 40

Observer(s) & Organization:	JB TS (NHDES Coastal)
Municipality:	RYE
Stream Name:	N/A
Road Name:	Ocean Blvd

Date:	7/24/2018
Start Time:	3:10:00 PM
End Time:	4:00:00 PM

Tide Prediction	**High**	**Low**
Time:	10:13 PM	4:15 PM
Elevation:	8.8	1.2
Tide Chart Location:	Hampton Harbor	

Crossing Condition Evaluation	Score*
Crossing Condition	2
Tidal Restriction Evaluation	
Tidal Range Ratio	5
Crossing Ratio	5
Erosion Classification	3
Tidal Restriction Overall Score	4
Tidal Aquatic Organism Passage	
Tidal Range Ratio	5
Salt Marsh Migration Evaluation	
Salt Marsh Migration Potential (Eval. Unit)	3
Salt Marsh Migration Potential (Wshed.)	5
Vegetation Evaluation	
Vegetation Comparison Matrix	1
Infrastructure Risk Evaluation	
Inundation Risk to the Roadway (US, DS)	1,4
Inun. Risk to the Crossing Structure (US, DS)	5,5
Adverse Impacts Evaluation**	
Inundation Risk to Low-Lying Development	2
Overall Scores	
Infrastructure	4
Ecological	5
Combined	5

DS view toward structure

US view above structure

US view toward structure

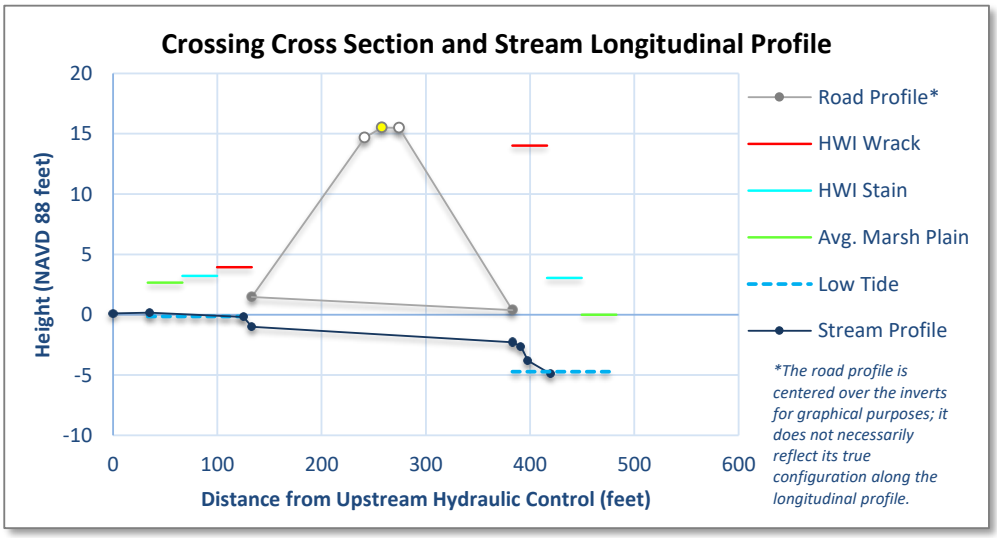
DS view above structure

* Scoring system ranges from 1 to 5, where 1 = lowest replacement priority and 5 = highest replacement priority

**Adverse Impacts Evaluation scores range from 1 to 5, where 1 = high risk and 5 = low risk

Long. Profile

Dist.	Hght.	Feat.	Sub.
0	0.1184	HC	C/S
35	0.1684	HC	G
125	-0.1816	GC	G
133	-1.0116	I	C
383	-2.2816	I	B
391	-2.6316	HC	B
398	-3.8016	CB	B
420	-4.9216	HC	C



Crossing Context:

The inlet to Bass Beach Marsh is crossed by Route 1A (Ocean Boulevard) that uses a 2.4-foot circular culvert that is over 250 feet in length to conduct the tides. Although the marsh is perched about 5 feet above the downstream low tide, the culvert still restricts the upper portion of the tide as evidenced by the high crossing ratio. The marsh is being invaded by exotic common reed. The overall combined score of 5 indicates highest priority for replacement.

Structure Characteristics:

Structure Type:	Round Culvert	**Date of Last Known Replacement:**	N/A
Structure Material:	Plastic - Smooth		
Tide Gate Present:	No		

Crossing Dimensions (ft):	Upstream	Downstream
Dimension A (width):	2.4	2.4
Dimension B^{CB}(height):	2.4	2.4
Crossing Length (Invert to Invert):	250	

Crossing Condition:	**Headwall Material**	**Headwall Condition**	**Wingwall Material**	**Wingwall Condition**	**Scour at Structure**	**Scour Severity**
Upstream	Dry Fit Stone	Fair	None	N/A	Headwall	Medium
Downstream	None	N/A	None	N/A	None	None

Scour in Structure	**Scour Severity in Structure**	**Road Surface Condition**	**Utilities at Crossing**	**Structure Condition Overall**
None	None	Fair	None	Fair

Structure Condition Comments:	Large boulder blocking DS outlet. Restricting flow and AOP.

Ecological Assessment:	Upstream	Downstream
Natural Community Classification:	Low Salt Marsh	Sparsely Vegetated Intertidal Habitat
Upstream Salt Marsh Migration Potential (acres):	11.66	

Flood Hazard & Emergency Access

Site Identified in Hazard Mitigation Plan:	Yes
Emergency Access or Evacuation Route:	Yes
History of Flooding:	culvert gets clogged, floods during heavy rain.

Tidal Crossing Summary Sheet

New Hampshire's Tidal Crossing Assessment Protocol

Crossing ID: 41

Observer(s) & Organization:	JB TS (NHDES Coastal)
Municipality:	RYE
Stream Name:	N/A
Road Name:	Causeway Rd

Date:	7/6/2018
Start Time:	12:30:00 PM
End Time:	1:00:00 PM

Tide Prediction	**High**	**Low**
Time:	6:08 PM	11:42 AM
Elevation:	7.8	0.7
Tide Chart Location:	Portsmouth Harbor	

Crossing Condition Evaluation	Score*
Crossing Condition	3
Tidal Restriction Evaluation	
Tidal Range Ratio	3
Crossing Ratio	5
Erosion Classification	3
Tidal Restriction Overall Score	4
Tidal Aquatic Organism Passage	
Tidal Range Ratio	3
Salt Marsh Migration Evaluation	
Salt Marsh Migration Potential (Eval. Unit)	4
Salt Marsh Migration Potential (Wshed.)	4
Vegetation Evaluation	
Vegetation Comparison Matrix	5
Infrastructure Risk Evaluation	
Inundation Risk to the Roadway (US, DS)	3,3
Inun. Risk to the Crossing Structure (US, DS)	3,3
Adverse Impacts Evaluation**	
Inundation Risk to Low-Lying Development	5
Overall Scores	
Infrastructure	3
Ecological	4
Combined	3

DS view toward structure

US view above structure

US view toward structure

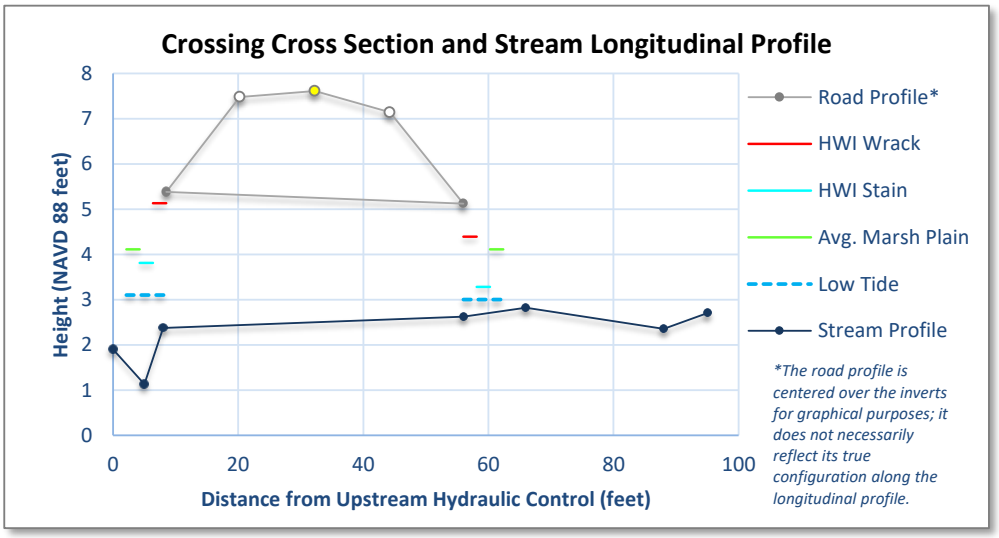
DS view above structure

* Scoring system ranges from 1 to 5, where 1 = lowest replacement priority and 5 = highest replacement priority

**Adverse Impacts Evaluation scores range from 1 to 5, where 1 = high risk and 5 = low risk

Long. Profile

Dist.	Hght.	Feat.	Sub.
0	1.9015	CB	C/S
5	1.1315	P	C/S
8	2.3715	I	C/S
56	2.6215	I	S
66	2.8215	HC	G
88	2.3515	P	C/S
95	2.7015	HC	C/S



Crossing Context:

N/A

Structure Characteristics:

Structure Type:	Round Culvert	**Date of Last Known Replacement:**	N/A
Structure Material:	Plastic - Smooth		
Tide Gate Present:	Yes		

Crossing Dimensions (ft):	Upstream	Downstream
Dimension A (width):	2.7	2.8
Dimension B[CB](height):	2.7	2.5
Crossing Length (Invert to Invert):	47.5	

Crossing Condition:	**Headwall Material**	**Headwall Condition**	**Wingwall Material**	**Wingwall Condition**	**Scour at Structure**	**Scour Severity**
Upstream	Dry Fit Stone	Good	Dry Fit Stone	Good	None	None
Downstream	Masonry	Poor	None	N/A	Headwall	Medium

Scour in Structure	**Scour Severity in Structure**	**Road Surface Condition**	**Utilities at Crossing**	**Structure Condition Overall**
None	None	Good	OHE US	Fair

Structure Condition Comments:	US well taken care of. DS neglected and overrun with invasives. Minimal observed flow likely due to tide gate.

Ecological Assessment:	Upstream	Downstream
Natural Community Classification:	Brackish Marsh	Invasive Dominant
Upstream Salt Marsh Migration Potential (acres):	8.37	

Flood Hazard & Emergency Access

Site Identified in Hazard Mitigation Plan:	No
Emergency Access or Evacuation Route:	N/A
History of Flooding:	unknown

Tidal Crossing Summary Sheet

New Hampshire's Tidal Crossing Assessment Protocol

Crossing ID: 42

Observer(s) & Organization:	TS, JB (NHDES Coastal)
Municipality:	NORTH HAMPTON
Stream Name:	N/A
Road Name:	Old Locke Rd

Date:	7/18/2018
Start Time:	10:45:00 AM
End Time:	11:35:00 AM

Tide Prediction	**High**	**Low**
Time:	4:43 PM	10:40 AM
Elevation:	9.3	-0.7
Tide Chart Location:	Hampton Harbor	

Crossing Condition Evaluation	Score*
Crossing Condition	4
Tidal Restriction Evaluation	
Tidal Range Ratio	1
Crossing Ratio	5
Erosion Classification	4
Tidal Restriction Overall Score	3
Tidal Aquatic Organism Passage	
Tidal Range Ratio	1
Salt Marsh Migration Evaluation	
Salt Marsh Migration Potential (Eval. Unit)	4
Salt Marsh Migration Potential (Wshed.)	4
Vegetation Evaluation	
Vegetation Comparison Matrix	4
Infrastructure Risk Evaluation	
Inundation Risk to the Roadway (US, DS)	4,4
Inun. Risk to the Crossing Structure (US, DS)	5,5
Adverse Impacts Evaluation**	
Inundation Risk to Low-Lying Development	5
Overall Scores	
Infrastructure	4
Ecological	4
Combined	4

DS view toward structure

US view above structure

US view toward structure

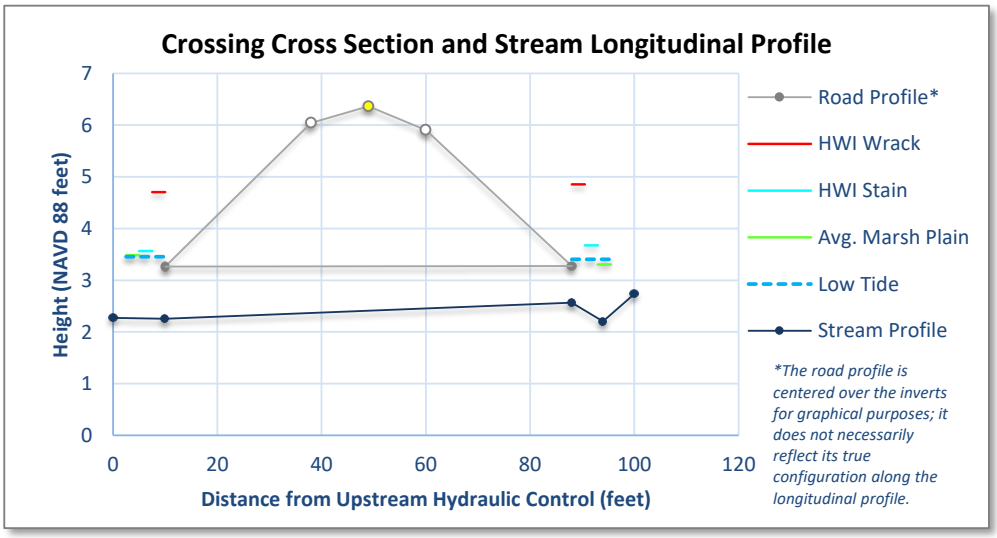
DS view above structure

* Scoring system ranges from 1 to 5, where 1 = lowest replacement priority and 5 = highest replacement priority

**Adverse Impacts Evaluation scores range from 1 to 5, where 1 = high risk and 5 = low risk

Long. Profile

Dist.	Hght.	Feat.	Sub.
0	2.2748	CB	C/S
10	2.2548	I	S
88	2.5648	I	S
94	2.2048	P	G
100	2.7348	CB	S



Crossing Context:

A small culvert (1-foot round pipe) runs from the golf course, under Old Locke Road and into the upper portion of Philbrick's Pond. The overall combined score for restriction is 4, high priority, because of erosion and inundation risk to road and the undersized culvert is submerged even at low tide.

Structure Characteristics:

Structure Type:	Round Culvert	**Date of Last Known Replacement:**	N/A
Structure Material:	Concrete		
Tide Gate Present:	No		

Crossing Dimensions (ft):	Upstream	Downstream
Dimension A (width):	1	2.5
Dimension B^{CB}(height):	1	0.9
Crossing Length (Invert to Invert):	78	

Crossing Condition:	**Headwall Material**	**Headwall Condition**	**Wingwall Material**	**Wingwall Condition**	**Scour at Structure**	**Scour Severity**
Upstream	Dry Fit Stone	Fair	Dry Fit Stone	Fair	None	None
Downstream	Dry Fit Stone	Poor	None	N/A	None	None

Scour in Structure	**Scour Severity in Structure**	**Road Surface Condition**	**Utilities at Crossing**	**Structure Condition Overall**
None	None	Fair	Overhead electric	Poor

Structure Condition Comments:	Culvert flooded both sides, no culvert DS, open "box" where pipe should be

Ecological Assessment:	Upstream	Downstream
Natural Community Classification:	Freshwater Marsh	Brackish Marsh
Upstream Salt Marsh Migration Potential (acres):	5.00	

Flood Hazard & Emergency Access

Site Identified in Hazard Mitigation Plan:	Yes
Emergency Access or Evacuation Route:	N/A
History of Flooding:	flood prone, culvert in need of repair or replace

Tidal Crossing Summary Sheet

New Hampshire's Tidal Crossing Assessment Protocol

Crossing ID: 43

Observer(s) & Organization:	JB TS (NHDES Coastal)
Municipality:	NORTH HAMPTON
Stream Name:	N/A
Road Name:	Old Locke Rd

Date:	7/25/2018
Start Time:	3:44:00 PM
End Time:	4:20:00 PM

Tide Prediction	**High**	**Low**
Time:	10:57 PM	5:00 PM
Elevation:	8.8	1.1
Tide Chart Location:	Hampton Harbor	

Crossing Condition Evaluation	Score*
Crossing Condition	4
Tidal Restriction Evaluation	
Tidal Range Ratio	3
Crossing Ratio	4
Erosion Classification	4
Tidal Restriction Overall Score	4
Tidal Aquatic Organism Passage	
Tidal Range Ratio	3
Salt Marsh Migration Evaluation	
Salt Marsh Migration Potential (Eval. Unit)	3
Salt Marsh Migration Potential (Wshed.)	3
Vegetation Evaluation	
Vegetation Comparison Matrix	3
Infrastructure Risk Evaluation	
Inundation Risk to the Roadway (US, DS)	3,3
Inun. Risk to the Crossing Structure (US, DS)	4,4
Adverse Impacts Evaluation**	
Inundation Risk to Low-Lying Development	5
Overall Scores	
Infrastructure	4
Ecological	3
Combined	3

DS view toward structure

US view above structure

US view toward structure

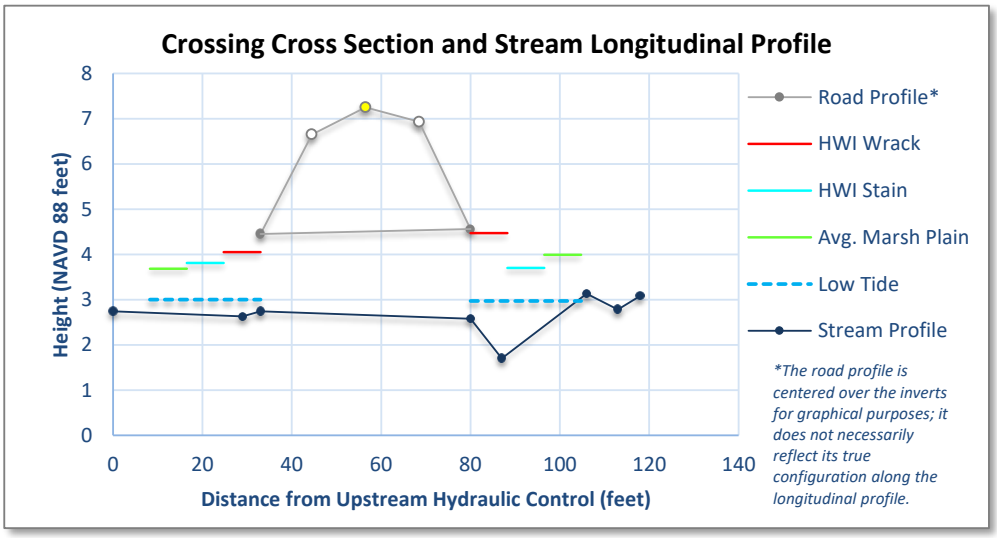
DS view above structure

* Scoring system ranges from 1 to 5, where 1 = lowest replacement priority and 5 = highest replacement priority

**Adverse Impacts Evaluation scores range from 1 to 5, where 1 = high risk and 5 = low risk

Long. Profile

Dist.	Hght.	Feat.	Sub.
0	2.7407	HC	C/S
29	2.6307	CB	C/S
33	2.7407	I	C/S
80	2.5807	I	G
87	1.7007	P	S
106	3.1307	HC	G
113	2.7807	CB	S
118	3.0807	HC	S



Crossing Context:

An unnamed creek under Old Locke Road conducts brackish tides to and from Philbrick's Pond through a 2-foot round culvert, but it serves mostly as upland drainage to the Pond. It has an overall combined score of 3, moderate priority, because of signs of erosion, crossing condition and potential ecological impacts.

Structure Characteristics:

Structure Type:	Round Culvert	**Date of Last Known Replacement:**	N/A
Structure Material:	Stone		
Tide Gate Present:	No		

Crossing Dimensions (ft):	Upstream	Downstream
Dimension A (width):	2.2	2
Dimension B^{CB}(height):	1.6	2
Crossing Length (Invert to Invert):	47	

Crossing Condition:	**Headwall Material**	**Headwall Condition**	**Wingwall Material**	**Wingwall Condition**	**Scour at Structure**	**Scour Severity**
Upstream	Dry Fit Stone	Poor	None	N/A	None	None
Downstream	Dry Fit Stone	Poor	None	N/A	None	None

Scour in Structure	**Scour Severity in Structure**	**Road Surface Condition**	**Utilities at Crossing**	**Structure Condition Overall**
None	None	Good	US OHE	Fair

Structure Condition Comments:	Slightly squashed inlet. Loose granite on US Headwall

Ecological Assessment:	Upstream	Downstream
Natural Community Classification:	Freshwater Swamp	Brackish Riverbank Marsh
Upstream Salt Marsh Migration Potential (acres):	4.59	

Flood Hazard & Emergency Access

Site Identified in Hazard Mitigation Plan:	Yes
Emergency Access or Evacuation Route:	N/A
History of Flooding:	Past flooding reported. culvert damaged.

Tidal Crossing Summary Sheet

New Hampshire's Tidal Crossing Assessment Protocol

Crossing ID: 44

Observer(s) & Organization:	JB PS (NHDES Coastal)
Municipality:	RYE
Stream Name:	Bailey Brook
Road Name:	Ocean Blvd

Date:	6/19/2018
Start Time:	10:00:00 AM
End Time:	12:05:00 PM

Tide Prediction	**High**	**Low**
Time:	12:00 AM	10:49 AM
Elevation:	0.0	0.0
Tide Chart Location:	Portsmouth Harbor	

Crossing Condition Evaluation	Score*
Crossing Condition	2
Tidal Restriction Evaluation	
Tidal Range Ratio	5
Crossing Ratio	5
Erosion Classification	0
Tidal Restriction Overall Score	5
Tidal Aquatic Organism Passage	
Tidal Range Ratio	5
Salt Marsh Migration Evaluation	
Salt Marsh Migration Potential (Eval. Unit)	5
Salt Marsh Migration Potential (Wshed.)	5
Vegetation Evaluation	
Vegetation Comparison Matrix	1
Infrastructure Risk Evaluation	
Inundation Risk to the Roadway (US, DS)	2,5
Inun. Risk to the Crossing Structure (US, DS)	3,3
Adverse Impacts Evaluation**	
Inundation Risk to Low-Lying Development	5
Overall Scores	
Infrastructure	5
Ecological	5
Combined	5

DS view toward structure

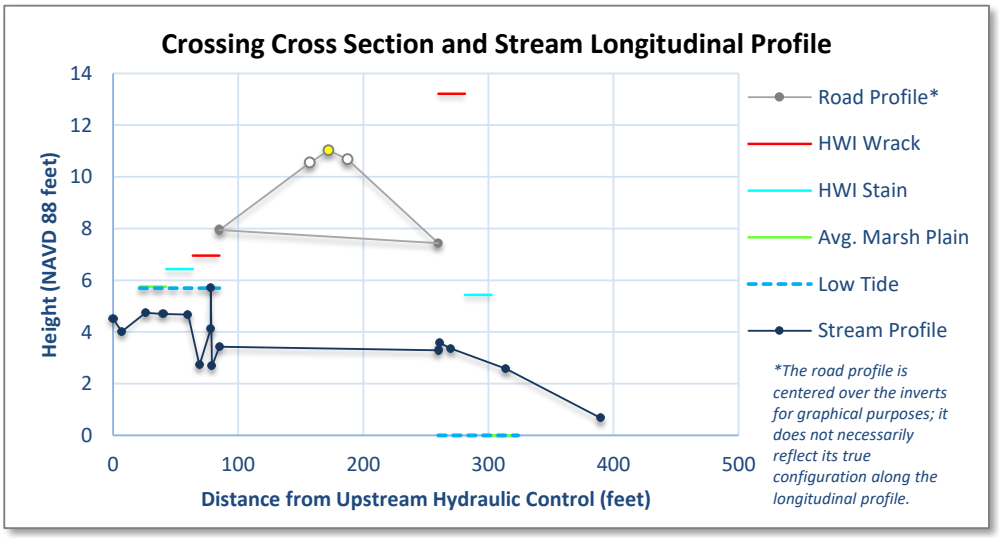
US view above structure

US view toward structure

DS view above structure

* Scoring system ranges from 1 to 5, where 1 = lowest replacement priority and 5 = highest replacement priority

**Adverse Impacts Evaluation scores range from 1 to 5, where 1 = high risk and 5 = low risk



Long. Profile

Dist.	Hght.	Feat.	Sub.
0	4.5136	HC	S
7	4.0136	P	S
26	4.7436	HC	S
40	4.6936	CB	S
60	4.6736	HC	S
69	2.7136	P	G
78	4.1136	CB	G
78	5.7136	GC	N/A
79	2.6836	GC	N/A
85	3.4336	I	G
260	3.2936	I	S
261	3.5736	HC	G
270	3.3536	CB	S
314	2.5736	CB	S
390	0.6636	GC	S

Crossing Context:

The inlet to Eel Pond is controlled by a double 4 by 4-foot cement culvert running under Route 1A in Rye. The tides are prevented from entering by two sets of stop logs at the downstream end, which is perched above a beach facing the Atlantic Ocean. Stoplogs are removed seasonally to release freshwater and a limited flow of salt water enters the pond. Recognizing the current policy of maintaining a low-salinity pond and surrounding marsh, the overall combined score for the crossing is 5, highest priority for consideration of replacement.

Structure Characteristics:

Structure Type:	Round Culvert	**Date of Last Known Replacement:**	N/A
Structure Material:	Concrete		
Tide Gate Present:	Yes		

Crossing Dimensions (ft):	Upstream	Downstream
Dimension A (width):	4	4
Dimension B^{CB}(height):	4	4
Crossing Length (Invert to Invert):	175	

Crossing Condition:	**Headwall Material**	**Headwall Condition**	**Wingwall Material**	**Wingwall Condition**	**Scour at Structure**	**Scour Severity**
Upstream	Concrete	Good	Concrete	Good	None	None
Downstream	Concrete	Fair	Concrete	Fair	None	None

Scour in Structure	**Scour Severity in Structure**	**Road Surface Condition**	**Utilities at Crossing**	**Structure Condition Overall**
None	None	Good	N/A	Fair

Structure Condition Comments:	Twin 48""""" c pipes. DS blocked by stop logs. US one side blocked by sheet. One side grated.

Ecological Assessment:	Upstream	Downstream
Natural Community Classification:	Coastal Salt Pond Marsh/Meadow	Sparsely Vegetated Intertidal Habitat
Upstream Salt Marsh Migration Potential (acres):	43.90	

Flood Hazard & Emergency Access

Site Identified in Hazard Mitigation Plan:	Yes
Emergency Access or Evacuation Route:	Yes
History of Flooding:	floods regularaly under high/king tide condtions

Tidal Crossing Summary Sheet

New Hampshire's Tidal Crossing Assessment Protocol

Crossing ID: 45

Observer(s) & Organization:	KL, ts (NHDES Coastal)
Municipality:	RYE
Stream Name:	N/A
Road Name:	Ocean Blvd

Date:	6/19/2018
Start Time:	9:50:00 AM
End Time:	11:30:00 AM

Tide Prediction	**High**	**Low**
Time:	3:15 PM	10:48 AM
Elevation:	8.5	-0.6
Tide Chart Location:	Portsmouth Harbor	

Crossing Condition Evaluation	Score*
Crossing Condition	1
Tidal Restriction Evaluation	
Tidal Range Ratio	1
Crossing Ratio	1
Erosion Classification	4
Tidal Restriction Overall Score	2
Tidal Aquatic Organism Passage	
Tidal Range Ratio	1
Salt Marsh Migration Evaluation	
Salt Marsh Migration Potential (Eval. Unit)	4
Salt Marsh Migration Potential (Wshed.)	4
Vegetation Evaluation	
Vegetation Comparison Matrix	4
Infrastructure Risk Evaluation	
Inundation Risk to the Roadway (US, DS)	2,2
Inun. Risk to the Crossing Structure (US, DS)	4,4
Adverse Impacts Evaluation**	
Inundation Risk to Low-Lying Development	1
Overall Scores	
Infrastructure	1
Ecological	4
Combined	2

DS view toward structure

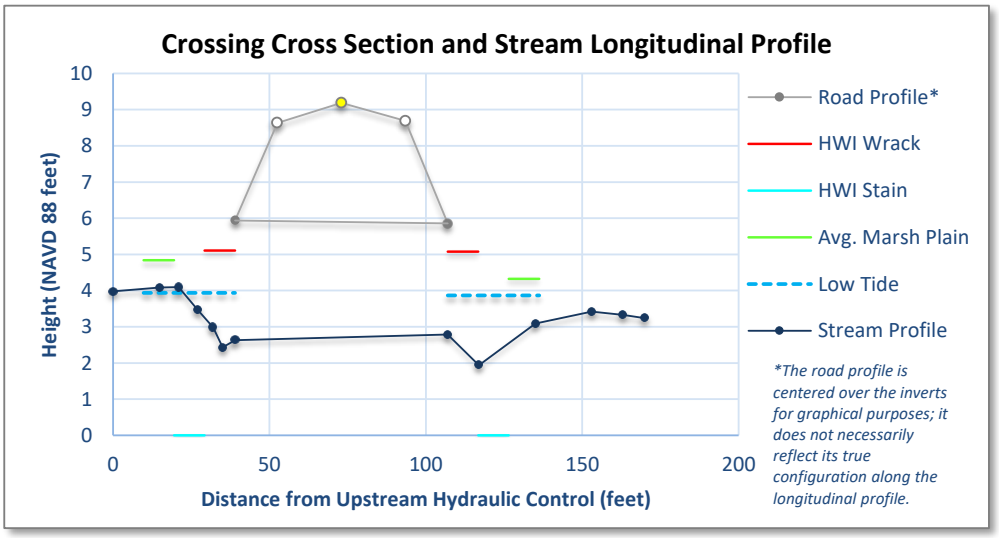
US view above structure

US view toward structure

DS view above structure

* Scoring system ranges from 1 to 5, where 1 = lowest replacement priority and 5 = highest replacement priority

**Adverse Impacts Evaluation scores range from 1 to 5, where 1 = high risk and 5 = low risk



Long. Profile

Dist.	Hght.	Feat.	Sub.
0	3.9764	HC	C/S
15	4.0864	CB	C/S
21	4.0964	HC	C/S
27	3.4664	HC	C/S
32	2.9864	HC	C/S
35	2.4364	P	C/S
39	2.6264	I	C/S
107	2.7864	I	C/S
117	1.9364	P	C/S
135	3.0864	HC	C/S
153	3.4164	HC	C/S
163	3.3264	CB	C/S
170	3.2364	HC	C/S

Crossing Context:

The southernmost upper reach of the salt marsh at Rye Harbor passes back under Route 1A into a brackish marsh surrounded by a residential neighborhood. A pair of 3-foot round culverts recently replaced or fortified conducts the tide. Although erosion is evident upstream and downstream of the culverts, restriction appears minor and the overall combined score is 2: low priority.

Structure Characteristics:

Structure Type:	Round Culvert	**Date of Last Known Replacement:**	N/A
Structure Material:	Plastic - Smooth		
Tide Gate Present:	No		

Crossing Dimensions (ft):	Upstream	Downstream
Dimension A (width):	6	6
Dimension B^{CB}(height):	3	3
Crossing Length (Invert to Invert):	68	

Crossing Condition:	**Headwall Material**	**Headwall Condition**	**Wingwall Material**	**Wingwall Condition**	**Scour at Structure**	**Scour Severity**
Upstream	Rip Rap	Good	Rip Rap	Good	None	None
Downstream	Rip Rap	Good	Rip Rap	Good	None	None

Scour in Structure	**Scour Severity in Structure**	**Road Surface Condition**	**Utilities at Crossing**	**Structure Condition Overall**
None	None	Good	Overhead electric	Good

Structure Condition Comments:	New culvert. Replaced 2018

Ecological Assessment:	Upstream	Downstream
Natural Community Classification:	High Salt Marsh	High Salt Marsh
Upstream Salt Marsh Migration Potential (acres):	9.37	

Flood Hazard & Emergency Access

Site Identified in Hazard Mitigation Plan:	Yes
Emergency Access or Evacuation Route:	Yes
History of Flooding:	flooding in surrounding area prior to replacement

Tidal Crossing Summary Sheet

New Hampshire's Tidal Crossing Assessment Protocol

Crossing ID: 46

Observer(s) & Organization:	JB TS KL (NHDES Coastal)
Municipality:	RYE
Stream Name:	N/A
Road Name:	Ocean Blvd

Date:	5/25/2018
Start Time:	1:30:00 PM
End Time:	4:30:00 AM

Tide Prediction	**High**	**Low**
Time:	9:35 AM	2:47 AM
Elevation:	8.7	0.3
Tide Chart Location:	Portsmouth Harbor	

Crossing Condition Evaluation	Score*
Crossing Condition	4
Tidal Restriction Evaluation	
Tidal Range Ratio	1
Crossing Ratio	4
Erosion Classification	4
Tidal Restriction Overall Score	3
Tidal Aquatic Organism Passage	
Tidal Range Ratio	1
Salt Marsh Migration Evaluation	
Salt Marsh Migration Potential (Eval. Unit)	1
Salt Marsh Migration Potential (Wshed.)	5
Vegetation Evaluation	
Vegetation Comparison Matrix	3
Infrastructure Risk Evaluation	
Inundation Risk to the Roadway (US, DS)	2,2
Inun. Risk to the Crossing Structure (US, DS)	4,3
Adverse Impacts Evaluation**	
Inundation Risk to Low-Lying Development	1
Overall Scores	
Infrastructure	4
Ecological	3
Combined	3

DS view toward structure

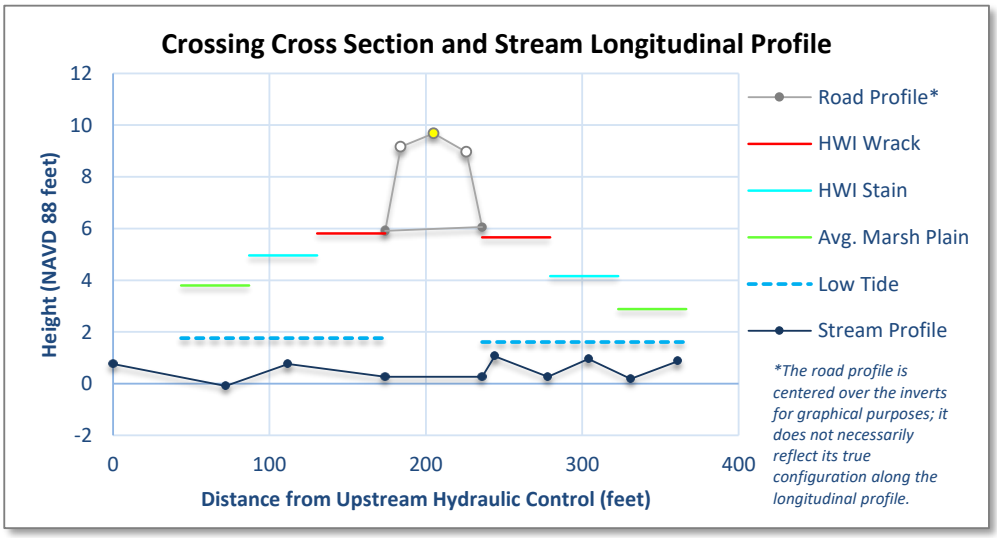
US view above structure

US view toward structure

DS view above structure

* Scoring system ranges from 1 to 5, where 1 = lowest replacement priority and 5 = highest replacement priority

**Adverse Impacts Evaluation scores range from 1 to 5, where 1 = high risk and 5 = low risk

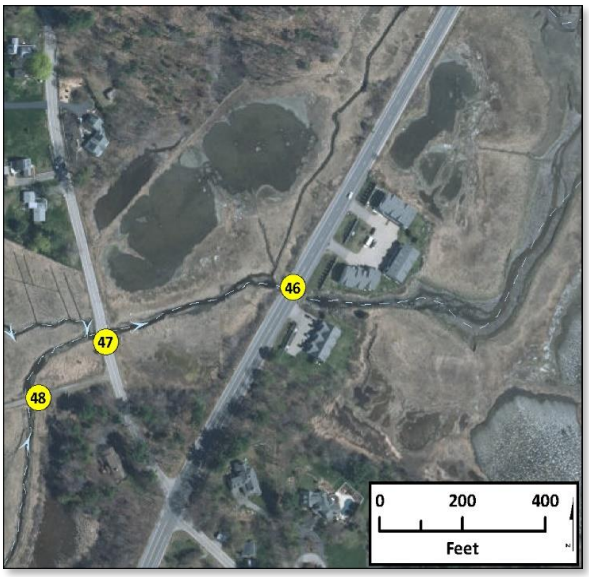


Long. Profile

Dist.	Hght.	Feat.	Sub.
0	0.76	HC	C/S
72	-0.09	P	C/S
112	0.76	HC	S
174	0.26	I	G
236	0.26	I	G
244	1.06	GC	C
278	0.26	P	G
304	0.96	HC	G
331	0.19	P	G
361	0.86	HC	G

Crossing Context:

One of two crossings of Rye Harbor Marsh as it passes across Route 1A from east to west, this branch conducts the tide to the Locke Road area through an old granite structure capped by concrete. The unfavorable crossing ratio and high erosion indicators lead to a moderate priority for replacement, with an overall combined score of 3. Tidal restriction here influences three more crossings upstream that limit flow to a significant marsh area.



Structure Characteristics:

Structure Type:	Bridge with Abutments	**Date of Last Known Replacement:**	N/A
Structure Material:	Stone		
Tide Gate Present:	No		

Crossing Dimensions (ft):	Upstream	Downstream
Dimension A (width):	3.9	4
Dimension B^{CB}(height):	5.35	5.9
Crossing Length (Invert to Invert):	62	

Crossing Condition:	**Headwall Material**	**Headwall Condition**	**Wingwall Material**	**Wingwall Condition**	**Scour at Structure**	**Scour Severity**
Upstream	Concrete	Good	Masonry	Good	Wingwalls	Medium
Downstream	Concrete	Good	Masonry	Poor	Wingwalls	Medium

Scour in Structure	**Scour Severity in Structure**	**Road Surface Condition**	**Utilities at Crossing**	**Structure Condition Overall**
None	None	Good	Ohe US	Poor

Structure Condition Comments:	20 inch section of masonry collapse in structure

Ecological Assessment:	Upstream	Downstream
Natural Community Classification:	High Salt Marsh	Low Salt Marsh
Upstream Salt Marsh Migration Potential (acres):	36.40	

Flood Hazard & Emergency Access

Site Identified in Hazard Mitigation Plan:	Yes
Emergency Access or Evacuation Route:	Yes
History of Flooding:	higher tides flood US Marsh. 6" harbor rd 1/4/18

Tidal Crossing Summary Sheet

New Hampshire's Tidal Crossing Assessment Protocol

Crossing ID: 47

Observer(s) & Organization:	PS KL JB TS DB JG (NHDES Coastal)
Municipality:	RYE
Stream Name:	N/A
Road Name:	Locke Rd

Date:	5/31/2018
Start Time:	7:30:00 AM
End Time:	11:22:00 AM

Tide Prediction	**High**	**Low**
Time:	1:47 PM	7:28 AM
Elevation:	7.7	-0.1
Tide Chart Location:	Portsmouth Harbor	

Crossing Condition Evaluation	Score*
Crossing Condition	1
Tidal Restriction Evaluation	
Tidal Range Ratio	1
Crossing Ratio	2
Erosion Classification	4
Tidal Restriction Overall Score	2
Tidal Aquatic Organism Passage	
Tidal Range Ratio	1
Salt Marsh Migration Evaluation	
Salt Marsh Migration Potential (Eval. Unit)	5
Salt Marsh Migration Potential (Wshed.)	5
Vegetation Evaluation	
Vegetation Comparison Matrix	1
Infrastructure Risk Evaluation	
Inundation Risk to the Roadway (US, DS)	4,4
Inun. Risk to the Crossing Structure (US, DS)	4,4
Adverse Impacts Evaluation**	
Inundation Risk to Low-Lying Development	1
Overall Scores	
Infrastructure	4
Ecological	1
Combined	3

DS view toward structure

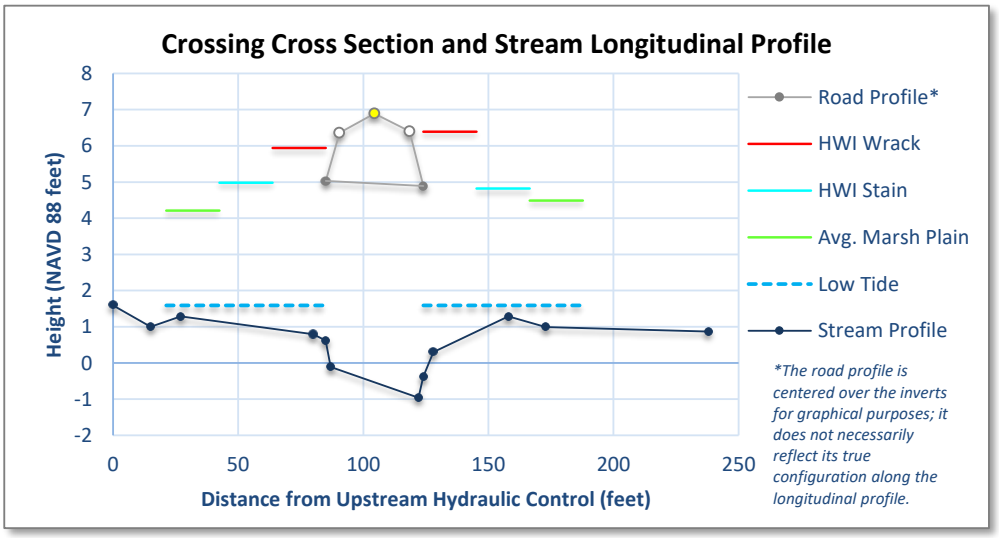
US view above structure

US view toward structure

DS view above structure

* Scoring system ranges from 1 to 5, where 1 = lowest replacement priority and 5 = highest replacement priority

**Adverse Impacts Evaluation scores range from 1 to 5, where 1 = high risk and 5 = low risk

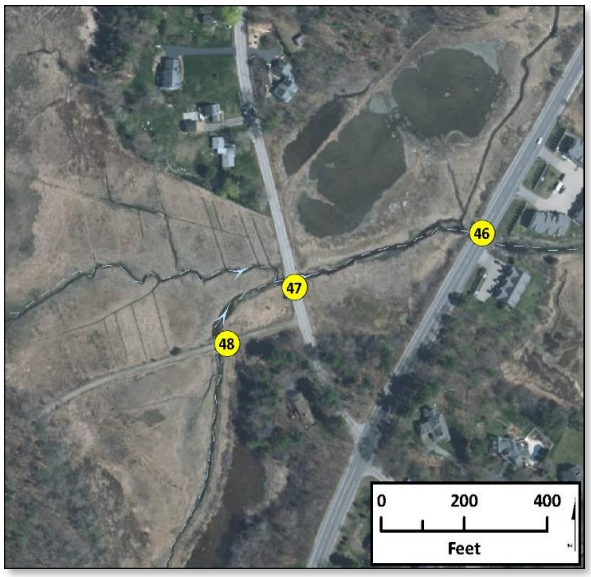


Long. Profile

Dist.	Hght.	Feat.	Sub.
0	1.5901	US HC	S
15	1.0001	US HC	S
27	1.2901	US HC	S
80	0.7901	US P	S
85	0.6201	US I	S
87	-0.1099	US P	G
122	-0.9599	DS P	S
124	-0.3799	DS I	S
128	0.3001	DS P	S
158	1.2901	DS HC	S
173	0.9901	DS P	S
238	0.8701	DS HC	G

Crossing Context:

The main tidal creek that conducts the tides to all marsh areas west of Locke Road passes through a 5 by 9 foot box culvert. In 1996 the Town of Rye replaced a smaller culvert here and on the upstream drive (#48, private). however, the high water stain indicates the culvert capacity is regularly exceeded, signs of erosion were evident and the flooding risk to the structure and roadway is high. The overall score for this crossing is 3, indicating moderate priority for replacement.



Structure Characteristics:

Structure Type:	Box Culvert	**Date of Last Known Replacement:**	1997
Structure Material:	Concrete		
Tide Gate Present:	No		

Crossing Dimensions (ft):	Upstream	Downstream
Dimension A (width):	9	9
Dimension B^{CB} (height):	4.86	5.94
Crossing Length (Invert to Invert):	39	

Crossing Condition:	**Headwall Material**	**Headwall Condition**	**Wingwall Material**	**Wingwall Condition**	**Scour at Structure**	**Scour Severity**
Upstream	Concrete	Good	Rip Rap	Fair	None	None
Downstream	Concrete	Good	Rip Rap	Good	Wingwalls	Medium

Scour in Structure	**Scour Severity in Structure**	**Road Surface Condition**	**Utilities at Crossing**	**Structure Condition Overall**
None	None	Fair	Overhead electric	Fair

Structure Condition Comments:	N/A

Ecological Assessment:	Upstream	Downstream
Natural Community Classification:	High Salt Marsh	High Salt Marsh
Upstream Salt Marsh Migration Potential (acres):	35.71	

Flood Hazard & Emergency Access

Site Identified in Hazard Mitigation Plan:	Yes
Emergency Access or Evacuation Route:	N/A
History of Flooding:	prone during very high tides when marsh floods.

Tidal Crossing Summary Sheet

New Hampshire's Tidal Crossing Assessment Protocol

Crossing ID: 48

Observer(s) & Organization:	JB TS (NHDES Coastal)
Municipality:	RYE
Stream Name:	N/A
Road Name:	DRIVEWAY

Date:	6/18/2018
Start Time:	9:31:00 AM
End Time:	10:30:00 AM

Tide Prediction	**High**	**Low**
Time:	4:15 PM	9:49 AM
Elevation:	8.7	-1.0
Tide Chart Location:	Portsmouth Harbor	

Crossing Condition Evaluation	Score*
Crossing Condition	5
Tidal Restriction Evaluation	
Tidal Range Ratio	5
Crossing Ratio	4
Erosion Classification	4
Tidal Restriction Overall Score	4
Tidal Aquatic Organism Passage	
Tidal Range Ratio	5
Salt Marsh Migration Evaluation	
Salt Marsh Migration Potential (Eval. Unit)	5
Salt Marsh Migration Potential (Wshed.)	5
Vegetation Evaluation	
Vegetation Comparison Matrix	1
Infrastructure Risk Evaluation	
Inundation Risk to the Roadway (US, DS)	4,4
Inun. Risk to the Crossing Structure (US, DS)	3,4
Adverse Impacts Evaluation**	
Inundation Risk to Low-Lying Development	1
Overall Scores	
Infrastructure	5
Ecological	5
Combined	5

DS view toward structure

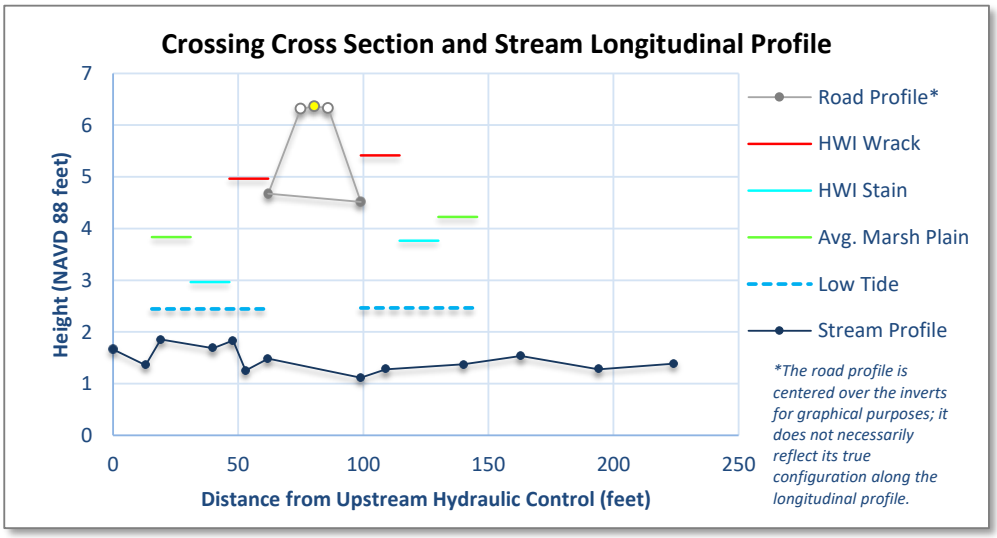
US view above structure

US view toward structure

DS view above structure

* Scoring system ranges from 1 to 5, where 1 = lowest replacement priority and 5 = highest replacement priority

**Adverse Impacts Evaluation scores range from 1 to 5, where 1 = high risk and 5 = low risk

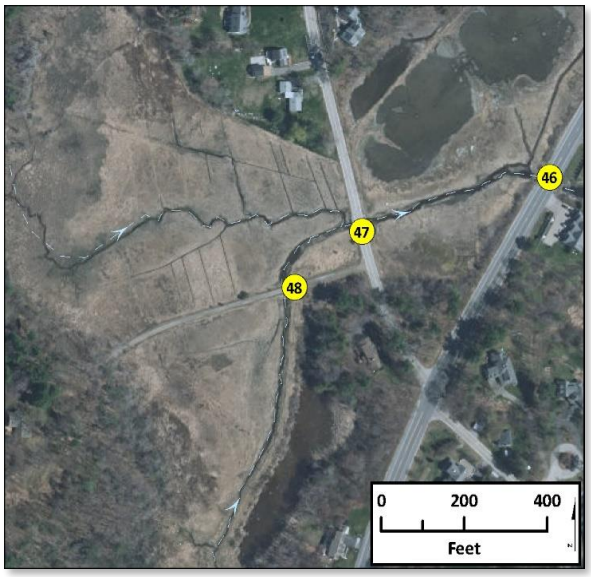


Long. Profile

Dist.	Hght.	Feat.	Sub.
0	1.6648	HC	C/S
13	1.3548	P	S
19	1.8548	HC	C/S
40	1.6848	CB	C/S
48	1.8348	HC	G
53	1.2548	P	G
62	1.4848	I	G
99	1.1148	I	G
109	1.2748	P	G
140	1.3748	HC	C/S
163	1.5348	P	C/S
194	1.2748	HC	C/S
224	1.3848	HC	S

Crossing Context:

The culvert under this private drive was replaced circa 1996, with a round 4-foot culvert, but the effective cross-sectional area has been reduced by sediment fill or crushing. The observations of poor crossing condition, erosion, flood risk and high water stain all suggest this crossing severely restricts tidal flow and is in need of an upgrade. The overall combined score is 5, highest priority for replacement.



Structure Characteristics:

Structure Type:	Round Culvert	**Date of Last Known Replacement:**	1995
Structure Material:	Steel - Corrugated		
Tide Gate Present:	No		

Crossing Dimensions (ft):	Upstream	Downstream
Dimension A (width):	4	4.2
Dimension B^{CB}(height):	3.3	3.4
Crossing Length (Invert to Invert):	37	

Crossing Condition:	**Headwall Material**	**Headwall Condition**	**Wingwall Material**	**Wingwall Condition**	**Scour at Structure**	**Scour Severity**
Upstream	Rip Rap	Poor	Rip Rap	Fair	Culvert	High
Downstream	Rip Rap	Poor	Rip Rap	Fair	Culvert	High

Scour in Structure	**Scour Severity in Structure**	**Road Surface Condition**	**Utilities at Crossing**	**Structure Condition Overall**
Culvert	High	Good	OHE	Poor

Structure Condition Comments:	US Severe wing wall scour, DS moderate wing wall scour

Ecological Assessment:	Upstream	Downstream
Natural Community Classification:	High Salt Marsh	High Salt Marsh
Upstream Salt Marsh Migration Potential (acres):	24.28	

Flood Hazard & Emergency Access

Site Identified in Hazard Mitigation Plan:	Yes
Emergency Access or Evacuation Route:	N/A
History of Flooding:	Prone during high tide events when DS marsh floods

Tidal Crossing Summary Sheet

New Hampshire's Tidal Crossing Assessment Protocol

Crossing ID: 49

Observer(s) & Organization:	Lucey, Burdick, Becker, Flanagan (TNC)
Municipality:	RYE
Stream Name:	N/A
Road Name:	Harbor Rd

Date:	8/11/2016
Start Time:	12:30:00 PM
End Time:	3:20:00 PM

Tide Prediction	**High**	**Low**
Time:	12:00 AM	12:27 PM
Elevation:	0.0	0.0
Tide Chart Location:	Hampton Harbor	

Crossing Condition Evaluation	Score*
Crossing Condition	2
Tidal Restriction Evaluation	
Tidal Range Ratio	1
Crossing Ratio	4
Erosion Classification	4
Tidal Restriction Overall Score	3
Tidal Aquatic Organism Passage	
Tidal Range Ratio	1
Salt Marsh Migration Evaluation	
Salt Marsh Migration Potential (Eval. Unit)	5
Salt Marsh Migration Potential (Wshed.)	5
Vegetation Evaluation	
Vegetation Comparison Matrix	1
Infrastructure Risk Evaluation	
Inundation Risk to the Roadway (US, DS)	2,4
Inun. Risk to the Crossing Structure (US, DS)	1,1
Adverse Impacts Evaluation**	
Inundation Risk to Low-Lying Development	1
Overall Scores	
Infrastructure	4
Ecological	3
Combined	3

DS view toward structure

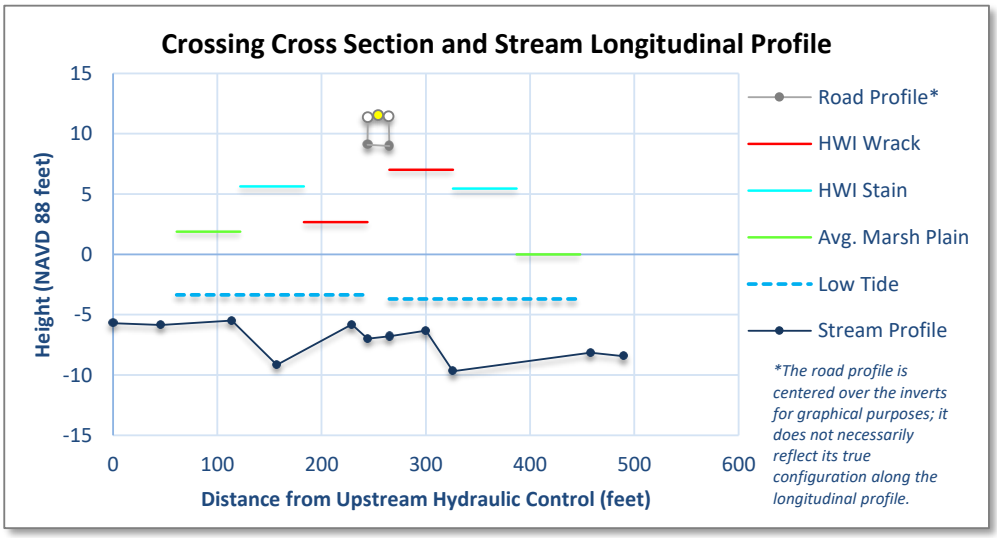
US view above structure

US view toward structure

DS view above structure

* Scoring system ranges from 1 to 5, where 1 = lowest replacement priority and 5 = highest replacement priority

**Adverse Impacts Evaluation scores range from 1 to 5, where 1 = high risk and 5 = low risk

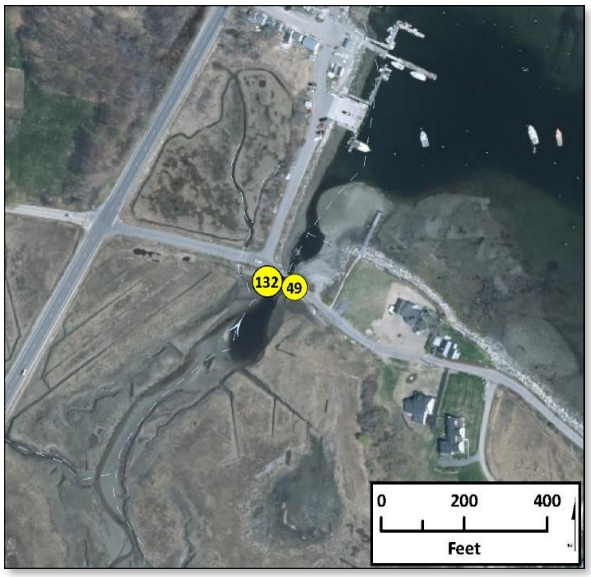


Long. Profile

Dist.	Hght.	Feat.	Sub.
0	-5.7043	HC	S
46	-5.8543	P	S
114	-5.4843	HC	S
157	-9.1543	P	S
229	-5.8043	GC	Shell
244	-6.9943	I	B
265	-6.7943	I	B
300	-6.3143	GC	B
326	-9.6843	P	C
458	-8.1543	HC	C
490	-8.4543	CB	C

Crossing Context:

The bridge on Harbor Road conducts all the tidal waters into Rye Harbor Marsh, which is extensive. It is wide (19 feet) and tall (13 feet) and does not appear to restrict the tide, though there is a large erosional pool on the upstream side. It has an overall combined priority of 3 (moderate) for replacement.



Structure Characteristics:

Structure Type:	Bridge with Abutments	**Date of Last Known Replacement:**	N/A
Structure Material:	Steel - Corrugated		
Tide Gate Present:	Yes		

Crossing Dimensions (ft):	Upstream	Downstream
Dimension A (width):	18.8	18.9
Dimension B^{CB} (height):	0	0
Crossing Length (Invert to Invert):	21	

Crossing Condition:	**Headwall Material**	**Headwall Condition**	**Wingwall Material**	**Wingwall Condition**	**Scour at Structure**	**Scour Severity**
Upstream	None	N/A			None	None
Downstream	None	N/A			None	None

Scour in Structure	**Scour Severity in Structure**	**Road Surface Condition**	**Utilities at Crossing**	**Structure Condition Overall**
			None	

Structure Condition Comments:	Underside of bridge deck spalling, road surface jo

Ecological Assessment:	Upstream	Downstream
Natural Community Classification:	High Salt Marsh	
Upstream Salt Marsh Migration Potential (acres):	61.01	

Flood Hazard & Emergency Access

Site Identified in Hazard Mitigation Plan:	Yes
Emergency Access or Evacuation Route:	N/A
History of Flooding:	6" over road on 1/4/18

Tidal Crossing Summary Sheet

New Hampshire's Tidal Crossing Assessment Protocol

Crossing ID: 50

Observer(s) & Organization:	JB TS (NHDES Coastal)
Municipality:	RYE
Stream Name:	N/A
Road Name:	Ocean Blvd

Date:	8/2/2018
Start Time:	8:50:00 AM
End Time:	10:35:00 AM

Tide Prediction	**High**	**Low**
Time:	3:39 PM	9:38 AM
Elevation:	7.8	0.4
Tide Chart Location:	Portsmouth Harbor	

Crossing Condition Evaluation	Score*
Crossing Condition	1
Tidal Restriction Evaluation	
Tidal Range Ratio	1
Crossing Ratio	3
Erosion Classification	4
Tidal Restriction Overall Score	3
Tidal Aquatic Organism Passage	
Tidal Range Ratio	1
Salt Marsh Migration Evaluation	
Salt Marsh Migration Potential (Eval. Unit)	5
Salt Marsh Migration Potential (Wshed.)	5
Vegetation Evaluation	
Vegetation Comparison Matrix	1
Infrastructure Risk Evaluation	
Inundation Risk to the Roadway (US, DS)	3,2
Inun. Risk to the Crossing Structure (US, DS)	1,1
Adverse Impacts Evaluation**	
Inundation Risk to Low-Lying Development	2
Overall Scores	
Infrastructure	3
Ecological	1
Combined	3

DS view toward structure

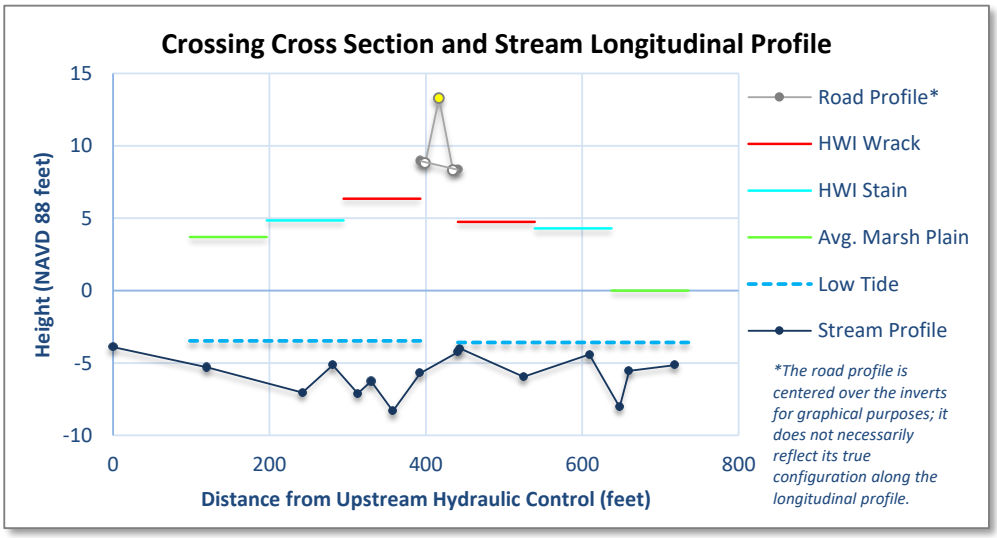
US view above structure

US view toward structure

DS view above structure

* Scoring system ranges from 1 to 5, where 1 = lowest replacement priority and 5 = highest replacement priority

**Adverse Impacts Evaluation scores range from 1 to 5, where 1 = high risk and 5 = low risk



Long. Profile

Dist.	Hght.	Feat.	Sub.
0	-3.9026	HC	S
120	-5.3026	CB	G
242	-7.0526	P	C/S
281	-5.1526	HC	C
313	-7.1026	P	S
330	-6.2526	CB	C
358	-8.3226	P	C
393	-5.7026	I	C
441	-4.2526	I	G
444	-4.0026	GC	B
525	-5.9526	P	C
609	-4.4026	HC	B
648	-8.0526	P	G
660	-5.5526	CB	G
718	-5.1526	HC	G

Crossing Context:

This crossing is a large bridge on Route 1A over a man-made inlet that supplies all of Awcomin Marsh with tides. The original inlet along with large portions of the marsh was filled in 1941 and 1962 when Rye Harbor was dredged. In the 1990s and 2000s several projects were undertaken to remove dredge spoil and restore hydrology to the marsh, which had been overrun with common reed. The overall combined score is 3, indicating moderate priority for replacement because of erosion on the upstream side. Information on the restoration actions can be found at: https://www.des.nh.gov/organization/divisions/water/wmb/coastal/restoration/saltmarsh_restoration.htm

Structure Characteristics:

Structure Type:	Bridge with Side Slopes and Abutments	**Date of Last Known Replacement:**	N/A
Structure Material:	Concrete		
Tide Gate Present:	No		

Crossing Dimensions (ft):	Upstream	Downstream
Dimension A (width):	88	88
Dimension B^{CB} (height):	14.05	12.9
Crossing Length (Invert to Invert):	48	

Crossing Condition:	**Headwall Material**	**Headwall Condition**	**Wingwall Material**	**Wingwall Condition**	**Scour at Structure**	**Scour Severity**
Upstream	None	N/A	Concrete	Good	None	None
Downstream	None	N/A	Concrete	Good	None	None

Scour in Structure	**Scour Severity in Structure**	**Road Surface Condition**	**Utilities at Crossing**	**Structure Condition Overall**
None	None	Good	OHE US	Good

Structure Condition Comments:	N/A

Ecological Assessment:	Upstream	Downstream
Natural Community Classification:	High Salt Marsh	Sparsely Vegetated Intertidal Habitat
Upstream Salt Marsh Migration Potential (acres):	38.71	

Flood Hazard & Emergency Access

Site Identified in Hazard Mitigation Plan:	Yes
Emergency Access or Evacuation Route:	Yes
History of Flooding:	Flooding in harbour and some in US marsh

Tidal Crossing Summary Sheet

New Hampshire's Tidal Crossing Assessment Protocol

Crossing ID: 51

Observer(s) & Organization:	JB SS (NHDES Coastal)
Municipality:	RYE
Stream Name:	N/A
Road Name:	Ocean Blvd

Date:	8/22/2018
Start Time:	3:00:00 PM
End Time:	5:05:00 PM

Tide Prediction	**High**	**Low**
Time:	9:53 PM	3:32 PM
Elevation:	8.0	1.3
Tide Chart Location:	Portsmouth Harbor	

Crossing Condition Evaluation	Score*
Crossing Condition	1
Tidal Restriction Evaluation	
Tidal Range Ratio	1
Crossing Ratio	2
Erosion Classification	1
Tidal Restriction Overall Score	1
Tidal Aquatic Organism Passage	
Tidal Range Ratio	1
Salt Marsh Migration Evaluation	
Salt Marsh Migration Potential (Eval. Unit)	5
Salt Marsh Migration Potential (Wshed.)	5
Vegetation Evaluation	
Vegetation Comparison Matrix	1
Infrastructure Risk Evaluation	
Inundation Risk to the Roadway (US, DS)	3,2
Inun. Risk to the Crossing Structure (US, DS)	1,1
Adverse Impacts Evaluation**	
Inundation Risk to Low-Lying Development	1
Overall Scores	
Infrastructure	3
Ecological	1
Combined	3

DS view toward structure

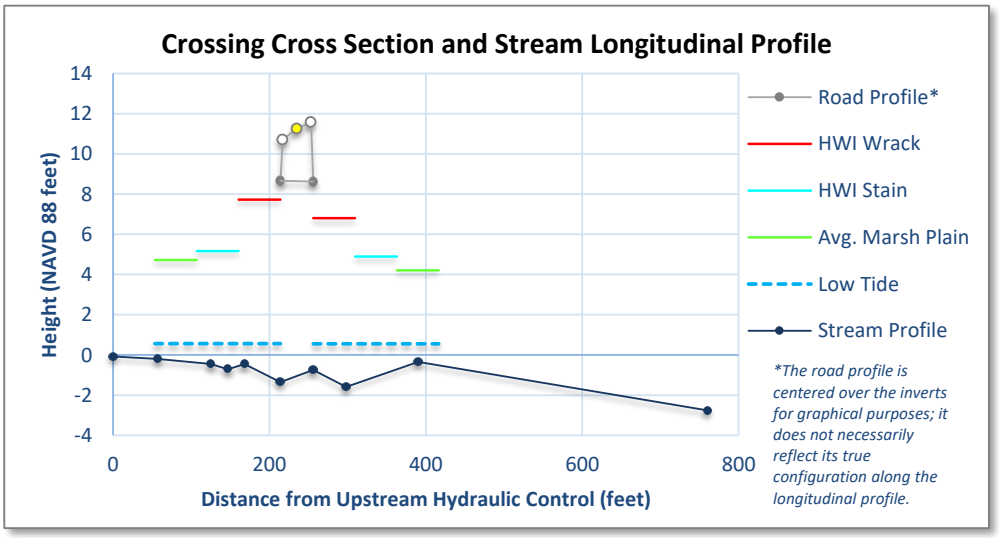
US view above structure

US view toward structure

DS view above structure

* Scoring system ranges from 1 to 5, where 1 = lowest replacement priority and 5 = highest replacement priority

**Adverse Impacts Evaluation scores range from 1 to 5, where 1 = high risk and 5 = low risk



Long. Profile

Dist.	Hght.	Feat.	Sub.
0	-0.0767	HC	S
57	-0.1967	CB	S
125	-0.4467	HC	S
147	-0.7167	P	S
168	-0.4567	HC	S
214	-1.3567	I	S
256	-0.7467	I	B
298	-1.5967	P	C
390	-0.3467	HC	G
760	-2.7567	HC	G

Crossing Context:

N/A

Structure Characteristics:

Structure Type:	Bridge with Abutments	**Date of Last Known Replacement:**	N/A
Structure Material:	Stone		
Tide Gate Present:	No		

Crossing Dimensions (ft):	Upstream	Downstream
Dimension A (width):	40	40
Dimension B^{CB}(height):	10	9.6
Crossing Length (Invert to Invert):	42	

Crossing Condition:	**Headwall Material**	**Headwall Condition**	**Wingwall Material**	**Wingwall Condition**	**Scour at Structure**	**Scour Severity**
Upstream	None	N/A	None	N/A	None	None
Downstream	None	N/A	None	N/A	None	None

Scour in Structure	**Scour Severity in Structure**	**Road Surface Condition**	**Utilities at Crossing**	**Structure Condition Overall**
Abutment	Low	Good	OHE RR	Good

Structure Condition Comments:	N/A

Ecological Assessment:	Upstream	Downstream
Natural Community Classification:	High Salt Marsh	Low Salt Marsh
Upstream Salt Marsh Migration Potential (acres):	166.05	

Flood Hazard & Emergency Access

Site Identified in Hazard Mitigation Plan:	No
Emergency Access or Evacuation Route:	Yes
History of Flooding:	unknown

Tidal Crossing Summary Sheet

New Hampshire's Tidal Crossing Assessment Protocol

Crossing ID: 52

Observer(s) & Organization:	TS, JB (NHDES Coastal)
Municipality:	RYE
Stream Name:	N/A
Road Name:	Brackett Rd

Date:	6/15/2018
Start Time:	6:34:00 AM
End Time:	7:28:00 AM

Tide Prediction	**High**	**Low**
Time:	1:25 PM	7:07 AM
Elevation:	8.7	-1.4
Tide Chart Location:	Portsmouth Harbor	

Crossing Condition Evaluation	Score*
Crossing Condition	1
Tidal Restriction Evaluation	
Tidal Range Ratio	1
Crossing Ratio	1
Erosion Classification	4
Tidal Restriction Overall Score	2
Tidal Aquatic Organism Passage	
Tidal Range Ratio	1
Salt Marsh Migration Evaluation	
Salt Marsh Migration Potential (Eval. Unit)	4
Salt Marsh Migration Potential (Wshed.)	4
Vegetation Evaluation	
Vegetation Comparison Matrix	3
Infrastructure Risk Evaluation	
Inundation Risk to the Roadway (US, DS)	4,4
Inun. Risk to the Crossing Structure (US, DS)	4,4
Adverse Impacts Evaluation**	
Inundation Risk to Low-Lying Development	5
Overall Scores	
Infrastructure	4
Ecological	3
Combined	3

DS view toward structure

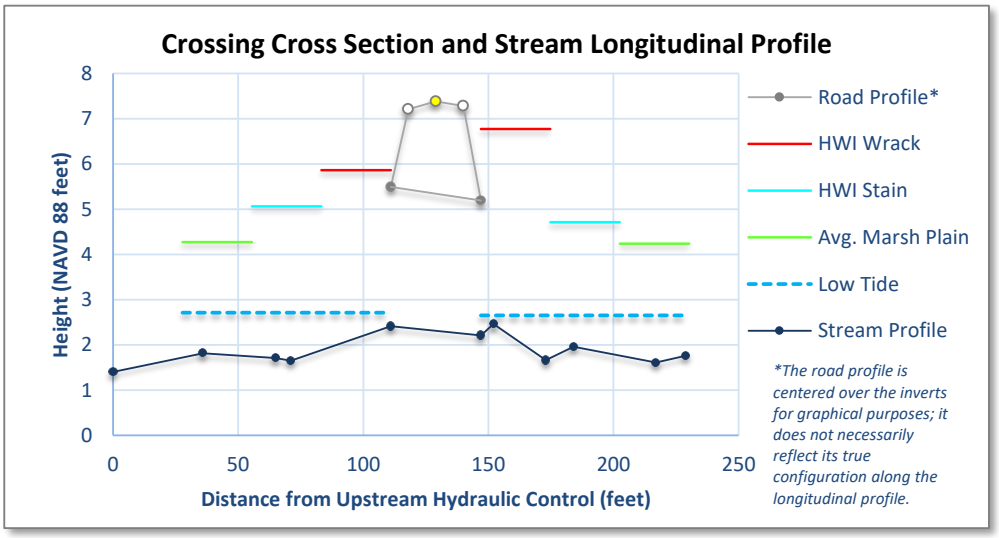
US view above structure

US view toward structure

DS view above structure

* Scoring system ranges from 1 to 5, where 1 = lowest replacement priority and 5 = highest replacement priority

**Adverse Impacts Evaluation scores range from 1 to 5, where 1 = high risk and 5 = low risk

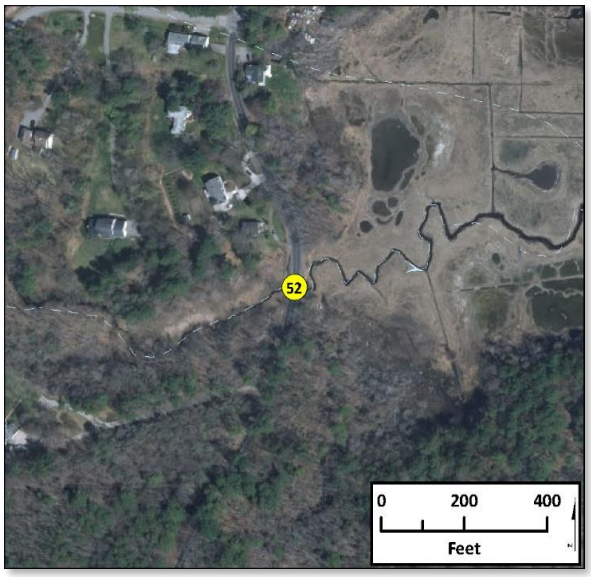


Long. Profile

Dist.	Hght.	Feat.	Sub.
0	1.4019	HC	C/S
36	1.8119	CB	C/S
65	1.7119	HC	S
71	1.6519	P	S
111	2.4119	I	G
147	2.2119	I	S
152	2.4619	GC	C
173	1.6619	P	C
184	1.9619	HC	G
217	1.6119	P	C
229	1.7619	HC	C

Crossing Context:

N/A



Structure Characteristics:

Structure Type:	Box Culvert	**Date of Last Known Replacement:**	N/A
Structure Material:	Concrete		
Tide Gate Present:	No		

Crossing Dimensions (ft):	Upstream	Downstream
Dimension A (width):	6	6
Dimension B^{CB}(height):	3	3
Crossing Length (Invert to Invert):	36	

Crossing Condition:	**Headwall Material**	**Headwall Condition**	**Wingwall Material**	**Wingwall Condition**	**Scour at Structure**	**Scour Severity**
Upstream	Concrete	Good	Rip Rap	Good	Wingwalls	Low
Downstream	Concrete	Good	Rip Rap	Good	Wingwalls	Low

Scour in Structure	**Scour Severity in Structure**	**Road Surface Condition**	**Utilities at Crossing**	**Structure Condition Overall**
None	None	Good	Overhead electric	Good

Structure Condition Comments:	N/A

Ecological Assessment:	Upstream	Downstream
Natural Community Classification:	High Salt Marsh	High Salt Marsh
Upstream Salt Marsh Migration Potential (acres):	5.04	

Flood Hazard & Emergency Access

Site Identified in Hazard Mitigation Plan:	Yes
Emergency Access or Evacuation Route:	N/A
History of Flooding:	Road sometimes flooded from tidal influence

Tidal Crossing Summary Sheet

New Hampshire's Tidal Crossing Assessment Protocol

Crossing ID: 53

Observer(s) & Organization:	TS, NY TNC (NHDES Coastal)
Municipality:	RYE
Stream Name:	N/A
Road Name:	Wallis Rd

Date:	6/6/2018
Start Time:	10:28:00 AM
End Time:	1:31:00 PM

Tide Prediction	**High**	**Low**
Time:	6:05 PM	11:38 AM
Elevation:	7.3	0.9
Tide Chart Location:	Portsmouth Harbor	

Crossing Condition Evaluation	Score*
Crossing Condition	1
Tidal Restriction Evaluation	
Tidal Range Ratio	1
Crossing Ratio	2
Erosion Classification	5
Tidal Restriction Overall Score	3
Tidal Aquatic Organism Passage	
Tidal Range Ratio	1
Salt Marsh Migration Evaluation	
Salt Marsh Migration Potential (Eval. Unit)	0
Salt Marsh Migration Potential (Wshed.)	5
Vegetation Evaluation	
Vegetation Comparison Matrix	1
Infrastructure Risk Evaluation	
Inundation Risk to the Roadway (US, DS)	4,5
Inun. Risk to the Crossing Structure (US, DS)	4,3
Adverse Impacts Evaluation**	
Inundation Risk to Low-Lying Development	1
Overall Scores	
Infrastructure	5
Ecological	1
Combined	3

DS view toward structure

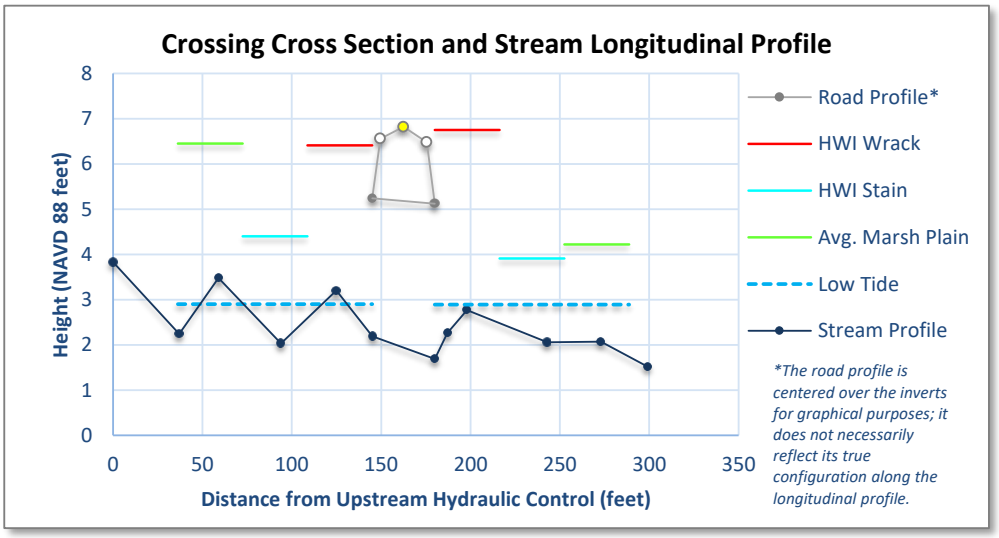
US view above structure

US view toward structure

DS view above structure

* Scoring system ranges from 1 to 5, where 1 = lowest replacement priority and 5 = highest replacement priority

**Adverse Impacts Evaluation scores range from 1 to 5, where 1 = high risk and 5 = low risk



Long. Profile

Dist.	Hght.	Feat.	Sub.
0	3.8302	HC	C/S
37	2.2402	P	C/S
59	3.4802	HC	C/S
94	2.0302	P	C/S
125	3.2002	GC	C
145	2.1902	I	C
180	1.6902	I	G
187	2.2602	P	G
198	2.7702	HC	C/S
243	2.0602	P	C/S
273	2.0702	HC	C/S
299	1.5202	P	C/S

Crossing Context:

The Parsons Creek Marsh has an inlet under Route 1A and the north branch of the main tidal creek passes under Wallis Road where a 4 by 10-foot box culvert was installed by the Town of Rye in 1998 to relieve the previous tidal restriction. This eastern crossing (western crossing is #54) conducts minor amounts of tidal flow and is partially filled with sediment but becomes important for higher and storm tides. It has an overall combined score replacement priority of moderate: 3, mostly due to high flooding risk. Information on restoration can be found at: https://www.des.nh.gov/organization/divisions/water/wmb/coastal/restoration/saltmarsh_restoration.htm

Structure Characteristics:

Structure Type:	Box Culvert	**Date of Last Known Replacement:**	N/A
Structure Material:	Concrete		
Tide Gate Present:	No		

Crossing Dimensions (ft):	Upstream	Downstream
Dimension A (width):	9.17	9.91
Dimension B^{CB}(height):	3.14	3.43
Crossing Length (Invert to Invert):	35	

Crossing Condition:	**Headwall Material**	**Headwall Condition**	**Wingwall Material**	**Wingwall Condition**	**Scour at Structure**	**Scour Severity**
Upstream	Concrete	Good	Rip Rap	Good	None	None
Downstream	Concrete	Good	Rip Rap	Good	None	None

Scour in Structure	**Scour Severity in Structure**	**Road Surface Condition**	**Utilities at Crossing**	**Structure Condition Overall**
None	None	Good	Powerlines	Good

Structure Condition Comments:	N/A

Ecological Assessment:	Upstream	Downstream
Natural Community Classification:	High Salt Marsh	High Salt Marsh
Upstream Salt Marsh Migration Potential (acres):	128.43	

Flood Hazard & Emergency Access

Site Identified in Hazard Mitigation Plan:	Yes
Emergency Access or Evacuation Route:	Yes
History of Flooding:	king tide causes prolonged highwater. flood 1/4/18

Tidal Crossing Summary Sheet

New Hampshire's Tidal Crossing Assessment Protocol

Crossing ID: 54

Observer(s) & Organization:	JB PS SM (NHDES Coastal)
Municipality:	RYE
Stream Name:	N/A
Road Name:	Wallis Rd

Date:	6/6/2018	
Start Time:	10:30:00 AM	
End Time:	1:36:00 AM	
Tide Prediction	**High**	**Low**
Time:	12:00 AM	11:38 AM
Elevation:	7.3	0.9
Tide Chart Location:	Portsmouth Harbor	

Crossing Condition Evaluation	Score*
Crossing Condition	1
Tidal Restriction Evaluation	
Tidal Range Ratio	1
Crossing Ratio	1
Erosion Classification	2
Tidal Restriction Overall Score	1
Tidal Aquatic Organism Passage	
Tidal Range Ratio	1
Salt Marsh Migration Evaluation	
Salt Marsh Migration Potential (Eval. Unit)	5
Salt Marsh Migration Potential (Wshed.)	5
Vegetation Evaluation	
Vegetation Comparison Matrix	1
Infrastructure Risk Evaluation	
Inundation Risk to the Roadway (US, DS)	4,4
Inun. Risk to the Crossing Structure (US, DS)	3,4
Adverse Impacts Evaluation**	
Inundation Risk to Low-Lying Development	1
Overall Scores	
Infrastructure	4
Ecological	1
Combined	3

DS view toward structure

US view above structure

US view toward structure

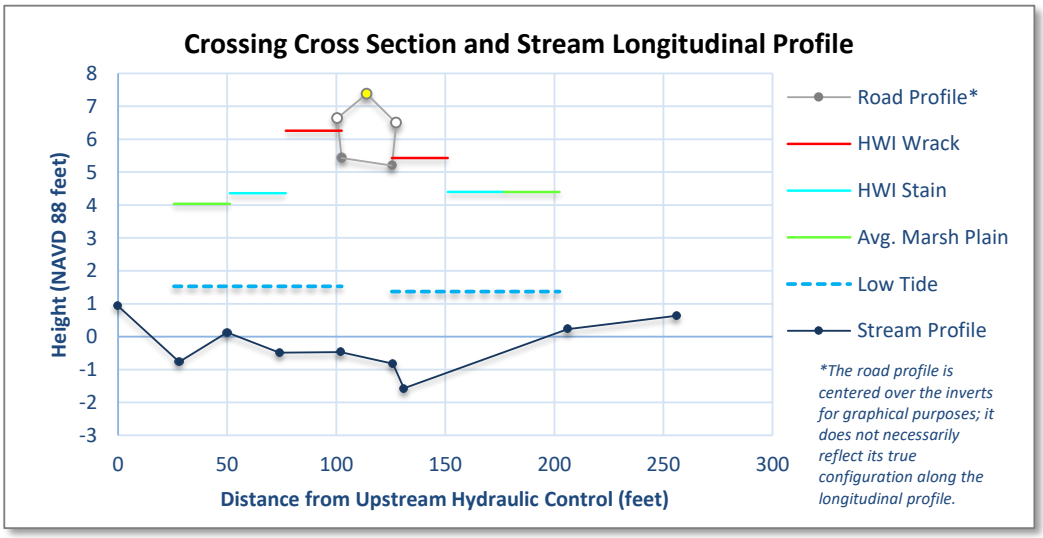
DS view above structure

* Scoring system ranges from 1 to 5, where 1 = lowest replacement priority and 5 = highest replacement priority

**Adverse Impacts Evaluation scores range from 1 to 5, where 1 = high risk and 5 = low risk

Long. Profile

Dist.	Hght.	Feat.	Sub.
0	0.9299	HC	S
28	-0.7701	P	S
50	0.1299	HC	G
74	-0.4901	P	S
102	-0.4701	I	C
126	-0.8201	I	S
131	-1.5701	P	S
206	0.2299	HC	S
256	0.6299	HC	S



Crossing Context:

The Parsons Creek Marsh has an inlet under Route 1A and the north branch of the main tidal creek passes under Wallis Road where two 6 by 12-foot box culverts were installed by the Town of Rye in 1998 to relieve the previous tidal restriction. This is the western crossing (eastern crossing is #53) that conducts most of the tidal flow, but it shows little evidence of erosion. It has an overall combined score of 3, indicating moderate replacement priority, only because the road is vulnerable to inundation.Information on restoration can be found at: https://www.des.nh.gov/organization/divisions/water/wmb/coastal/restoration/saltmarsh_restoration.htm

Structure Characteristics:

Structure Type:	Box Culvert	**Date of Last Known Replacement:**	1998
Structure Material:	Concrete		
Tide Gate Present:	No		

Crossing Dimensions (ft):	Upstream	Downstream
Dimension A (width):	24	24
Dimension B^{CB}(height):	6	6
Crossing Length (Invert to Invert):	23	

Crossing Condition:	**Headwall Material**	**Headwall Condition**	**Wingwall Material**	**Wingwall Condition**	**Scour at Structure**	**Scour Severity**
Upstream	Concrete	Good	Rip Rap	Good	None	None
Downstream	Concrete	Good	Rip Rap	Good	None	None

Scour in Structure	**Scour Severity in Structure**	**Road Surface Condition**	**Utilities at Crossing**	**Structure Condition Overall**
None	None	Fair	OHE	Good

Structure Condition Comments:	Twin 12 ft box culverts assessed as one structure

Ecological Assessment:	Upstream	Downstream
Natural Community Classification:	High Salt Marsh	High Salt Marsh
Upstream Salt Marsh Migration Potential (acres):	128.43	

Flood Hazard & Emergency Access

Site Identified in Hazard Mitigation Plan:	Yes
Emergency Access or Evacuation Route:	Yes
History of Flooding:	king tide causes prolonged highwater. flood 1/4/18

Tidal Crossing Summary Sheet

New Hampshire's Tidal Crossing Assessment Protocol

Crossing ID: 55

Observer(s) & Organization:	JB TS (NHDES Coastal)
Municipality:	RYE
Stream Name:	N/A
Road Name:	Ocean Blvd

Date:	6/11/2018
Start Time:	2:04:00 PM
End Time:	4:07:00 PM

Tide Prediction	**High**	**Low**
Time:	10:11 PM	3:49 PM
Elevation:	9.1	0.3
Tide Chart Location:	Portsmouth Harbor	

Crossing Condition Evaluation	Score*
Crossing Condition	1
Tidal Restriction Evaluation	
Tidal Range Ratio	1
Crossing Ratio	3
Erosion Classification	3
Tidal Restriction Overall Score	2
Tidal Aquatic Organism Passage	
Tidal Range Ratio	1
Salt Marsh Migration Evaluation	
Salt Marsh Migration Potential (Eval. Unit)	1
Salt Marsh Migration Potential (Wshed.)	1
Vegetation Evaluation	
Vegetation Comparison Matrix	1
Infrastructure Risk Evaluation	
Inundation Risk to the Roadway (US, DS)	3,2
Inun. Risk to the Crossing Structure (US, DS)	3,4
Adverse Impacts Evaluation**	
Inundation Risk to Low-Lying Development	2
Overall Scores	
Infrastructure	3
Ecological	1
Combined	3

DS view toward structure

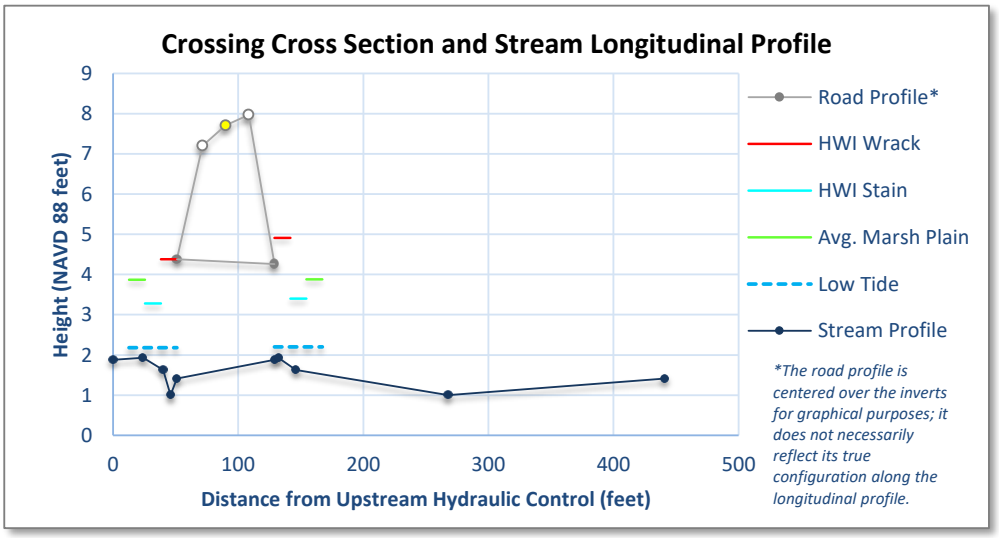
US view above structure

US view toward structure

DS view above structure

* Scoring system ranges from 1 to 5, where 1 = lowest replacement priority and 5 = highest replacement priority

**Adverse Impacts Evaluation scores range from 1 to 5, where 1 = high risk and 5 = low risk



Long. Profile

Dist.	Hght.	Feat.	Sub.
0	1.88	HC	C/S
24	1.93	HC	C/S
40	1.63	CB	C/S
46	1	P	C/S
51	1.41	I	C/S
129	1.88	HC	C/S
132	1.93	HC	C/S
146	1.63	CB	C/S
268	1	P	C/S
441	1.41	I	C/S

Crossing Context:

A small portion of the Parsons Creek Marsh is crossed again by Route 1A and extends eastward up to the private residences on the barrier beach. In 1999 a 3 foot round corrugated metal pipe was replaced with a 3 by 6-foot concrete box culvert by the Town of Rye. The current restriction, if any, appears to be minor and the overall combined score is 3, moderate priority for replacement. Information on the 1999 restoration can be found at: https://www.des.nh.gov/organization/divisions/water/wmb/coastal/restoration/saltmarsh_restoration.htm

Structure Characteristics:

Structure Type:	Box Culvert	**Date of Last Known Replacement:**	1999
Structure Material:	Concrete		
Tide Gate Present:	No		

Crossing Dimensions (ft):	Upstream	Downstream
Dimension A (width):	6	6
Dimension B^{CB} (height):	3.1	3.1
Crossing Length (Invert to Invert):	78	

Crossing Condition:	**Headwall Material**	**Headwall Condition**	**Wingwall Material**	**Wingwall Condition**	**Scour at Structure**	**Scour Severity**
Upstream	Concrete	Good	None	N/A	None	None
Downstream	Concrete	Good	Rip Rap	Good	None	None

Scour in Structure	**Scour Severity in Structure**	**Road Surface Condition**	**Utilities at Crossing**	**Structure Condition Overall**
None	None	Good	None	Good

Structure Condition Comments:	N/A

Ecological Assessment:	Upstream	Downstream
Natural Community Classification:	High Salt Marsh	High Salt Marsh
Upstream Salt Marsh Migration Potential (acres):	0.44	

Flood Hazard & Emergency Access

Site Identified in Hazard Mitigation Plan:	No
Emergency Access or Evacuation Route:	Yes
History of Flooding:	Flooding along this portion of 1A

Tidal Crossing Summary Sheet

New Hampshire's Tidal Crossing Assessment Protocol

Crossing ID: 56

Observer(s) & Organization:	TS,JB (NHDES Coastal)
Municipality:	RYE
Stream Name:	N/A
Road Name:	Marsh Rd

Date:	6/8/2018
Start Time:	12:01:00 PM
End Time:	1:48:00 PM

Tide Prediction	**High**	**Low**
Time:	7:44 PM	1:17 AM
Elevation:	7.8	1.4
Tide Chart Location:	Portsmouth Harbor	

Crossing Condition Evaluation	Score*
Crossing Condition	1
Tidal Restriction Evaluation	
Tidal Range Ratio	1
Crossing Ratio	3
Erosion Classification	4
Tidal Restriction Overall Score	3
Tidal Aquatic Organism Passage	
Tidal Range Ratio	1
Salt Marsh Migration Evaluation	
Salt Marsh Migration Potential (Eval. Unit)	3
Salt Marsh Migration Potential (Wshed.)	3
Vegetation Evaluation	
Vegetation Comparison Matrix	3
Infrastructure Risk Evaluation	
Inundation Risk to the Roadway (US, DS)	4,4
Inun. Risk to the Crossing Structure (US, DS)	4,4
Adverse Impacts Evaluation**	
Inundation Risk to Low-Lying Development	2
Overall Scores	
Infrastructure	4
Ecological	3
Combined	3

DS view toward structure

US view above structure

US view toward structure

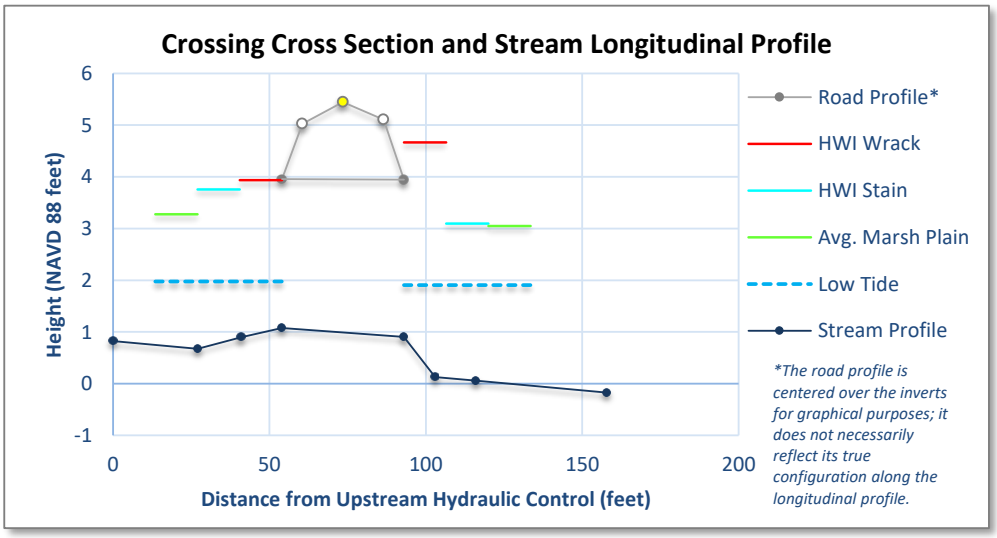
DS view above structure

* Scoring system ranges from 1 to 5, where 1 = lowest replacement priority and 5 = highest replacement priority

**Adverse Impacts Evaluation scores range from 1 to 5, where 1 = high risk and 5 = low risk

Long. Profile

Dist.	Hght.	Feat.	Sub.
0	0.8262	HC	C/S
27	0.6762	CB	C/S
41	0.8962	P	C/S
54	1.0762	I	G
93	0.9062	I	G
103	0.1262	P	C/S
116	0.0562	CB	C/S
158	-0.1738	CB	C/S



Crossing Context:

N/A

Structure Characteristics:

Structure Type:	Box Culvert	**Date of Last Known Replacement:**	N/A
Structure Material:	Concrete		
Tide Gate Present:	No		

Crossing Dimensions (ft):	Upstream	Downstream
Dimension A (width):	5	5
Dimension B^{CB}(height):	3	3
Crossing Length (Invert to Invert):	39	

Crossing Condition:	**Headwall Material**	**Headwall Condition**	**Wingwall Material**	**Wingwall Condition**	**Scour at Structure**	**Scour Severity**
Upstream	Concrete	Good	Dry Fit Stone	Good	Wingwalls	Low
Downstream	Concrete	Good	Rip Rap	Good	None	None

Scour in Structure	**Scour Severity in Structure**	**Road Surface Condition**	**Utilities at Crossing**	**Structure Condition Overall**
None	None	Good	Overhead electric	Good

Structure Condition Comments:	N/A

Ecological Assessment:	Upstream	Downstream
Natural Community Classification:	High Salt Marsh	High Salt Marsh
Upstream Salt Marsh Migration Potential (acres):	3.73	

Flood Hazard & Emergency Access

Site Identified in Hazard Mitigation Plan:	No
Emergency Access or Evacuation Route:	Yes
History of Flooding:	unknown

Tidal Crossing Summary Sheet

New Hampshire's Tidal Crossing Assessment Protocol

Crossing ID: 57

Observer(s) & Organization:	JB TS (NHDES Coastal)
Municipality:	RYE
Stream Name:	N/A
Road Name:	Parsons Rd

Date:	6/7/2018
Start Time:	11:30:00 AM
End Time:	1:26:00 PM

Tide Prediction	**High**	**Low**
Time:	6:54 PM	12:26 PM
Elevation:	7.5	0.9
Tide Chart Location:	Portsmouth Harbor	

Crossing Condition Evaluation	Score*
Crossing Condition	2
Tidal Restriction Evaluation	
Tidal Range Ratio	5
Crossing Ratio	5
Erosion Classification	2
Tidal Restriction Overall Score	4
Tidal Aquatic Organism Passage	
Tidal Range Ratio	5
Salt Marsh Migration Evaluation	
Salt Marsh Migration Potential (Eval. Unit)	5
Salt Marsh Migration Potential (Wshed.)	5
Vegetation Evaluation	
Vegetation Comparison Matrix	5
Infrastructure Risk Evaluation	
Inundation Risk to the Roadway (US, DS)	4,3
Inun. Risk to the Crossing Structure (US, DS)	4,3
Adverse Impacts Evaluation**	
Inundation Risk to Low-Lying Development	5
Overall Scores	
Infrastructure	4
Ecological	5
Combined	5

DS view toward structure

US view above structure

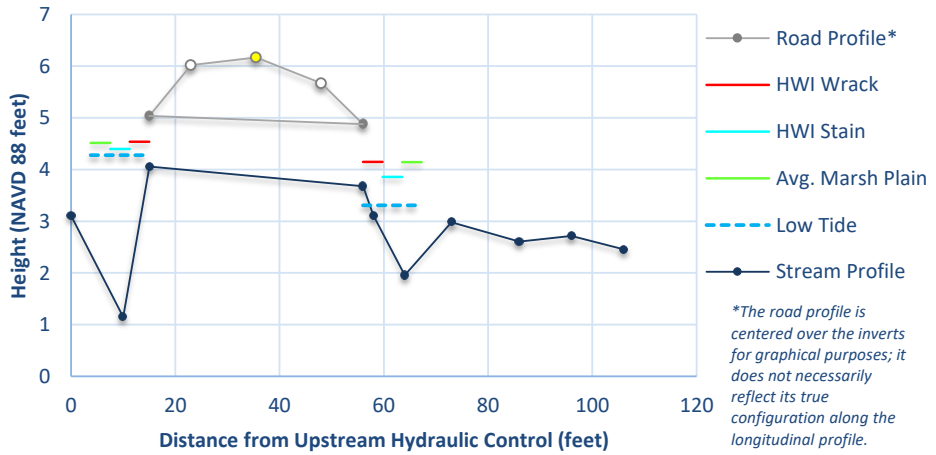
US view toward structure

DS view above structure

* Scoring system ranges from 1 to 5, where 1 = lowest replacement priority and 5 = highest replacement priority

**Adverse Impacts Evaluation scores range from 1 to 5, where 1 = high risk and 5 = low risk

Crossing Cross Section and Stream Longitudinal Profile



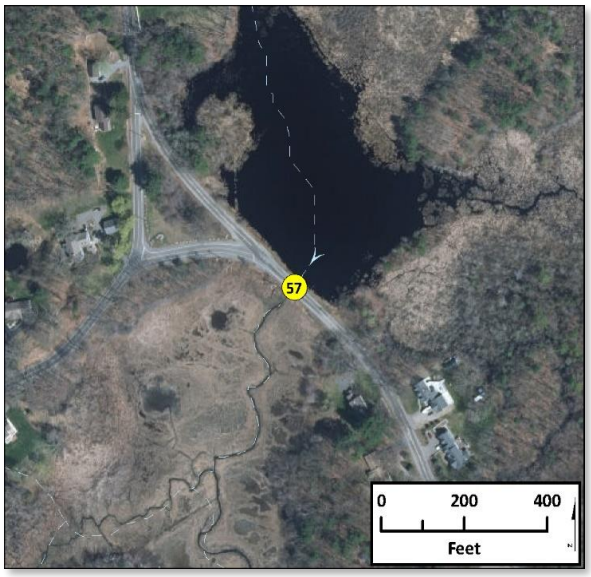
**The road profile is centered over the inverts for graphical purposes; it does not necessarily reflect its true configuration along the longitudinal profile.*

Long. Profile

Dist.	Hght.	Feat.	Sub.
0	3.108	CB	C/S
10	1.148	P	C/S
15	4.058	I	C/S
56	3.678	I	C
58	3.108	GC	C
64	1.958	P	G
73	2.978	HC	C/S
86	2.608	P	C/S
96	2.718	HC	S
106	2.458	CB	S

Crossing Context:

The upper section of Parsons Creek Marsh drains from a freshwater impoundment caused by an undersized crossing (1-foot diameter pipe) running under Parsons Road in Rye. Although the crossing condition is good, the undersized pipe results in a poor crossing ratio, restricted tidal range, poor organism passage and an impediment to salt marsh migration. The result is a fresh to brackish pond rather than a continuation of the salt marsh that is found below Parsons Road. The overall combined score is a 5, indicating highest priority for replacement.



Structure Characteristics:

Structure Type:	Round Culvert	**Date of Last Known Replacement:**	N/A
Structure Material:	Plastic - Corrugated		
Tide Gate Present:	No		

Crossing Dimensions (ft):	Upstream	Downstream
Dimension A (width):	1	1
Dimension B^{CB}(height):	1	1
Crossing Length (Invert to Invert):	41	

Crossing Condition:	**Headwall Material**	**Headwall Condition**	**Wingwall Material**	**Wingwall Condition**	**Scour at Structure**	**Scour Severity**
Upstream	None	N/A	None	N/A	None	None
Downstream	None	N/A	Rip Rap	Fair	Culvert	Medium

Scour in Structure	**Scour Severity in Structure**	**Road Surface Condition**	**Utilities at Crossing**	**Structure Condition Overall**
None	None	Good	OHE. Utility box DS RR	Fair

Structure Condition Comments:	Scour at wingwalls

Ecological Assessment:	Upstream	Downstream
Natural Community Classification:	Brackish Marsh	High Salt Marsh
Upstream Salt Marsh Migration Potential (acres):	100.68	

Flood Hazard & Emergency Access

Site Identified in Hazard Mitigation Plan:	No
Emergency Access or Evacuation Route:	Yes
History of Flooding:	unknown

Tidal Crossing Summary Sheet

New Hampshire's Tidal Crossing Assessment Protocol

Crossing ID: 59

Observer(s) & Organization:	JB TS (NHDES Coastal)
Municipality:	RYE
Stream Name:	Berrys Brook
Road Name:	Pioneer Rd

Date:	7/5/2018
Start Time:	10:40:00 AM
End Time:	12:30:00 PM

Tide Prediction	**High**	**Low**
Time:	5:21 PM	10:56 AM
Elevation:	7.6	0.6
Tide Chart Location:	Portsmouth Harbor	

Crossing Condition Evaluation	Score*
Crossing Condition	1
Tidal Restriction Evaluation	
Tidal Range Ratio	1
Crossing Ratio	1
Erosion Classification	3
Tidal Restriction Overall Score	2
Tidal Aquatic Organism Passage	
Tidal Range Ratio	1
Salt Marsh Migration Evaluation	
Salt Marsh Migration Potential (Eval. Unit)	3
Salt Marsh Migration Potential (Wshed.)	5
Vegetation Evaluation	
Vegetation Comparison Matrix	1
Infrastructure Risk Evaluation	
Inundation Risk to the Roadway (US, DS)	4,4
Inun. Risk to the Crossing Structure (US, DS)	1,1
Adverse Impacts Evaluation**	
Inundation Risk to Low-Lying Development	4
Overall Scores	
Infrastructure	4
Ecological	1
Combined	3

DS view toward structure

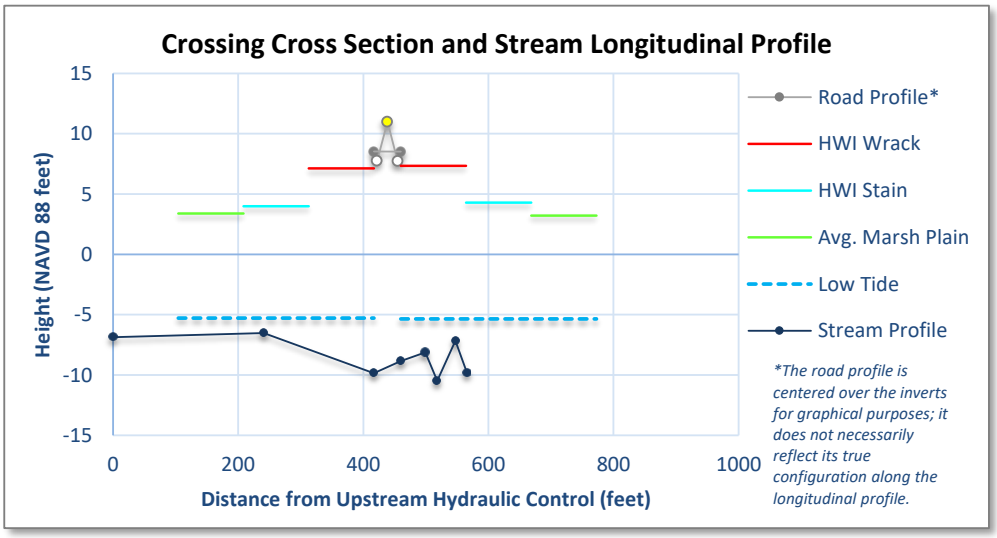
US view above structure

US view toward structure

DS view above structure

* Scoring system ranges from 1 to 5, where 1 = lowest replacement priority and 5 = highest replacement priority

**Adverse Impacts Evaluation scores range from 1 to 5, where 1 = high risk and 5 = low risk



Long. Profile

Dist.	Hght.	Feat.	Sub.
0	-6.8592	HC	S
241	-6.5192	HC	S
417	-9.8492	I	S
460	-8.8392	I	G
499	-8.1292	HC	C
518	-10.479	P	G
547	-7.1492	HC	C
566	-9.8492	CB	C

Crossing Context:

N/A

Structure Characteristics:

Structure Type:	Bridge with Abutments	**Date of Last Known Replacement:**	N/A
Structure Material:	Wood		
Tide Gate Present:	No		

Crossing Dimensions (ft):	Upstream	Downstream
Dimension A (width):	153	153
Dimension B^{CB}(height):	19.02	17.84
Crossing Length (Invert to Invert):	43	

Crossing Condition:	**Headwall Material**	**Headwall Condition**	**Wingwall Material**	**Wingwall Condition**	**Scour at Structure**	**Scour Severity**
Upstream	None	N/A	None	N/A	None	None
Downstream	None	N/A	None	N/A	None	None

Scour in Structure	**Scour Severity in Structure**	**Road Surface Condition**	**Utilities at Crossing**	**Structure Condition Overall**
None	None	Good	OHE DS	Good

Structure Condition Comments:	Wood ceiling. Concrete abutments. Metal pillars.

Ecological Assessment:	Upstream	Downstream
Natural Community Classification:	High Salt Marsh	High Salt Marsh
Upstream Salt Marsh Migration Potential (acres):	153.86	

Flood Hazard & Emergency Access

Site Identified in Hazard Mitigation Plan:	No
Emergency Access or Evacuation Route:	Yes
History of Flooding:	No

Tidal Crossing Summary Sheet

New Hampshire's Tidal Crossing Assessment Protocol

Crossing ID: 60

Observer(s) & Organization:	TS, JB (NHDES Coastal)
Municipality:	RYE
Stream Name:	Berrys Brook
Road Name:	Brackett Rd

Date:	6/12/2018
Start Time:	3:30:00 PM
End Time:	5:12:00 PM

Tide Prediction	**High**	**Low**
Time:	12:00 AM	12:00 AM
Elevation:	0.0	0.0
Tide Chart Location:	Portsmouth Harbor	

Crossing Condition Evaluation	Score*
Crossing Condition	1
Tidal Restriction Evaluation	
Tidal Range Ratio	1
Crossing Ratio	4
Erosion Classification	3
Tidal Restriction Overall Score	3
Tidal Aquatic Organism Passage	
Tidal Range Ratio	1
Salt Marsh Migration Evaluation	
Salt Marsh Migration Potential (Eval. Unit)	5
Salt Marsh Migration Potential (Wshed.)	5
Vegetation Evaluation	
Vegetation Comparison Matrix	1
Infrastructure Risk Evaluation	
Inundation Risk to the Roadway (US, DS)	2,2
Inun. Risk to the Crossing Structure (US, DS)	1,1
Adverse Impacts Evaluation**	
Inundation Risk to Low-Lying Development	5
Overall Scores	
Infrastructure	1
Ecological	1
Combined	2

DS view toward structure

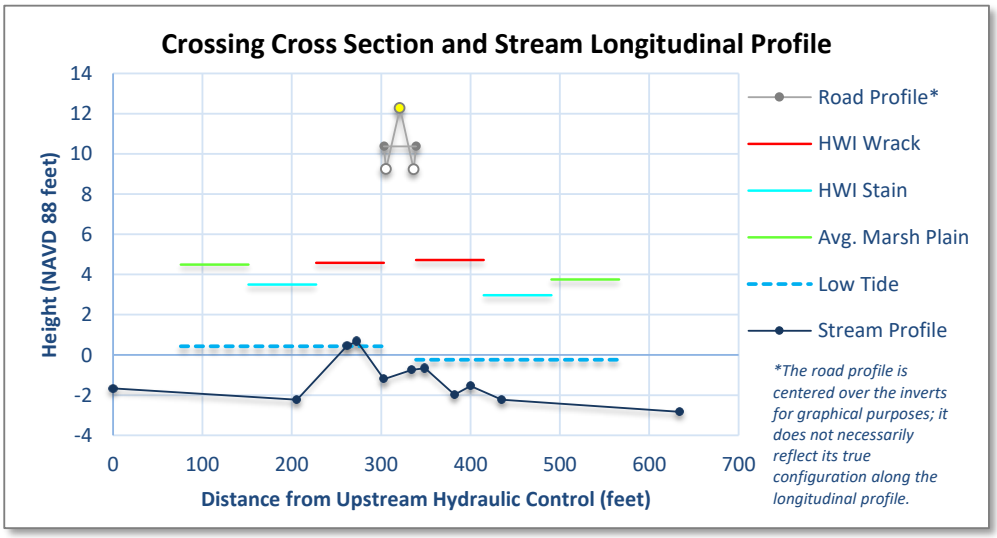
US view above structure

US view toward structure

DS view above structure

* Scoring system ranges from 1 to 5, where 1 = lowest replacement priority and 5 = highest replacement priority

**Adverse Impacts Evaluation scores range from 1 to 5, where 1 = high risk and 5 = low risk



Long. Profile

Dist.	Hght.	Feat.	Sub.
0	-1.6597	HC	C/S
206	-2.2297	P	G
262	0.4703	CB	C
273	0.6703	GC	B
303	-1.1997	I	C
334	-0.7497	I	G
349	-0.6597	GC	G
382	-1.9697	P	G
400	-1.5497	HC	G
435	-2.2197	P	G
634	-2.8297	HC	G

Crossing Context:

N/A

Structure Characteristics:

Structure Type:	Bridge with Abutments	**Date of Last Known Replacement:**	N/A
Structure Material:	Concrete		
Tide Gate Present:	No		

Crossing Dimensions (ft):	Upstream	Downstream
Dimension A (width):	31.35	31.5
Dimension B^{CB}(height):	11.5	11.75
Crossing Length (Invert to Invert):	36	

Crossing Condition:	**Headwall Material**	**Headwall Condition**	**Wingwall Material**	**Wingwall Condition**	**Scour at Structure**	**Scour Severity**
Upstream	None	N/A	Rip Rap	Good	None	None
Downstream	None	N/A	Rip Rap	Good	None	None

Scour in Structure	**Scour Severity in Structure**	**Road Surface Condition**	**Utilities at Crossing**	**Structure Condition Overall**
None	None	Good	Overhead electric	Good

Structure Condition Comments:	N/A

Ecological Assessment:	Upstream	Downstream
Natural Community Classification:	High Salt Marsh	High Salt Marsh
Upstream Salt Marsh Migration Potential (acres):	21.97	

Flood Hazard & Emergency Access

Site Identified in Hazard Mitigation Plan:	Yes
Emergency Access or Evacuation Route:	Yes
History of Flooding:	Flooding on Brackett Rd and 1A

Tidal Crossing Summary Sheet

New Hampshire's Tidal Crossing Assessment Protocol

Crossing ID: 61

Observer(s) & Organization:	TS, JB (NHDES Coastal)
Municipality:	NEW CASTLE
Stream Name:	N/A
Road Name:	Wild Rose Ln

Date:	6/1/2018
Start Time:	8:00:00 AM
End Time:	9:31:00 AM

Tide Prediction	**High**	**Low**
Time:	2:26 PM	8:07 AM
Elevation:	7.6	1.2
Tide Chart Location:	Portsmouth Harbor	

Crossing Condition Evaluation	Score*
Crossing Condition	2
Tidal Restriction Evaluation	
Tidal Range Ratio	1
Crossing Ratio	5
Erosion Classification	4
Tidal Restriction Overall Score	3
Tidal Aquatic Organism Passage	
Tidal Range Ratio	1
Salt Marsh Migration Evaluation	
Salt Marsh Migration Potential (Eval. Unit)	5
Salt Marsh Migration Potential (Wshed.)	5
Vegetation Evaluation	
Vegetation Comparison Matrix	0
Infrastructure Risk Evaluation	
Inundation Risk to the Roadway (US, DS)	3,3
Inun. Risk to the Crossing Structure (US, DS)	5,5
Adverse Impacts Evaluation**	
Inundation Risk to Low-Lying Development	5
Overall Scores	
Infrastructure	2
Ecological	4
Combined	3

DS view toward structure

US view above structure

US view toward structure

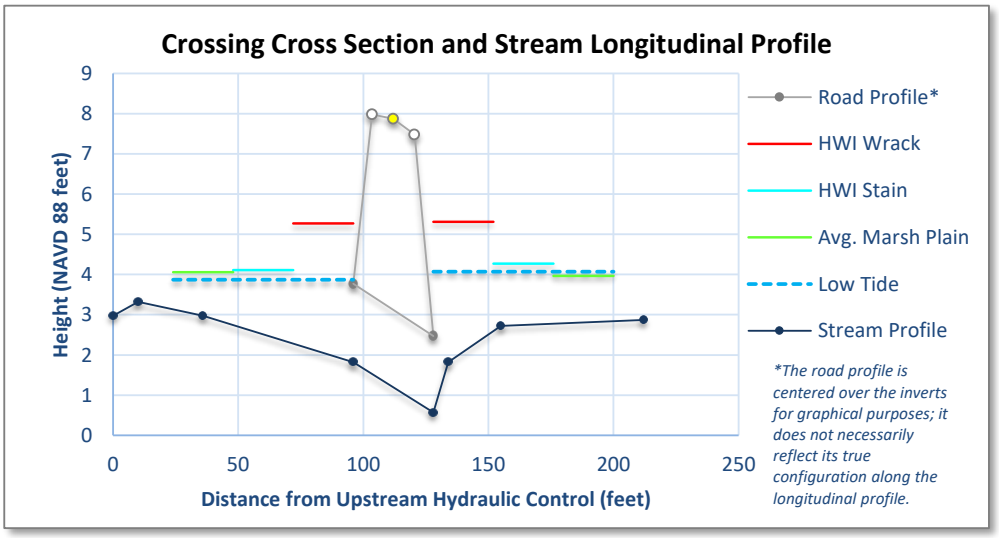
DS view above structure

* Scoring system ranges from 1 to 5, where 1 = lowest replacement priority and 5 = highest replacement priority

**Adverse Impacts Evaluation scores range from 1 to 5, where 1 = high risk and 5 = low risk

Long. Profile

Dist.	Hght.	Feat.	Sub.
0	2.9701	US HC	C/S
10	3.3201	US HC	C/S
36	2.9701	US P	C/S
96	1.8201	US I	C/S
128	0.5701	DS I	C/S
134	1.8201	DS P	C/S
155	2.7201	DS HC	C/S
212	2.8701	DS HC	C/S



Crossing Context:

A small back-barrier wetland landward of Fort Stark has a central ditch that is crossed by Wild Rose Lane and has a 3-foot round culvert. The wetland appears fresh to brackish, with exotic common reed and cattail, and is cut off from tidal flooding by gravel barrier beaches to the east and south. The crossing is an undersized culvert that is continually and entirely under water. It has an overall combined score of 3, indicating moderate priority for replacement.

Structure Characteristics:

Structure Type:	Round Culvert	**Date of Last Known Replacement:**	N/A
Structure Material:	Concrete		
Tide Gate Present:	No		

Crossing Dimensions (ft):	Upstream	Downstream
Dimension A (width):	3	3
Dimension B^{CB}(height):	3	3
Crossing Length (Invert to Invert):	32	

Crossing Condition:	**Headwall Material**	**Headwall Condition**	**Wingwall Material**	**Wingwall Condition**	**Scour at Structure**	**Scour Severity**
Upstream	Masonry	Fair	Masonry	Fair	None	None
Downstream	Masonry	Fair	Masonry	Fair	None	None

Scour in Structure	**Scour Severity in Structure**	**Road Surface Condition**	**Utilities at Crossing**	**Structure Condition Overall**
None	None	Fair	Overhead electric	Fair

Structure Condition Comments:	Structure completely flooded. Difficult to get structure measurements

Ecological Assessment:	Upstream	Downstream
Natural Community Classification:	Invasive Dominant	Invasive Dominant
Upstream Salt Marsh Migration Potential (acres):	13.66	

Flood Hazard & Emergency Access

Site Identified in Hazard Mitigation Plan:	No
Emergency Access or Evacuation Route:	N/A
History of Flooding:	unknown

Tidal Crossing Summary Sheet

New Hampshire's Tidal Crossing Assessment Protocol

Crossing ID: 63

Observer(s) & Organization:	JB TS (NHDES Coastal)
Municipality:	NEW CASTLE
Stream Name:	N/A
Road Name:	Pit Ln

Date:	6/5/2018
Start Time:	9:26:00 AM
End Time:	10:17:00 AM

Tide Prediction	**High**	**Low**
Time:	5:18 PM	10:52 AM
Elevation:	7.2	1.6
Tide Chart Location:	Portsmouth Harbor	

Crossing Condition Evaluation	Score*
Crossing Condition	4
Tidal Restriction Evaluation	
Tidal Range Ratio	3
Crossing Ratio	3
Erosion Classification	3
Tidal Restriction Overall Score	3
Tidal Aquatic Organism Passage	
Tidal Range Ratio	3
Salt Marsh Migration Evaluation	
Salt Marsh Migration Potential (Eval. Unit)	3
Salt Marsh Migration Potential (Wshed.)	3
Vegetation Evaluation	
Vegetation Comparison Matrix	0
Infrastructure Risk Evaluation	
Inundation Risk to the Roadway (US, DS)	3,3
Inun. Risk to the Crossing Structure (US, DS)	4,4
Adverse Impacts Evaluation**	
Inundation Risk to Low-Lying Development	4
Overall Scores	
Infrastructure	4
Ecological	4
Combined	3

DS view toward structure

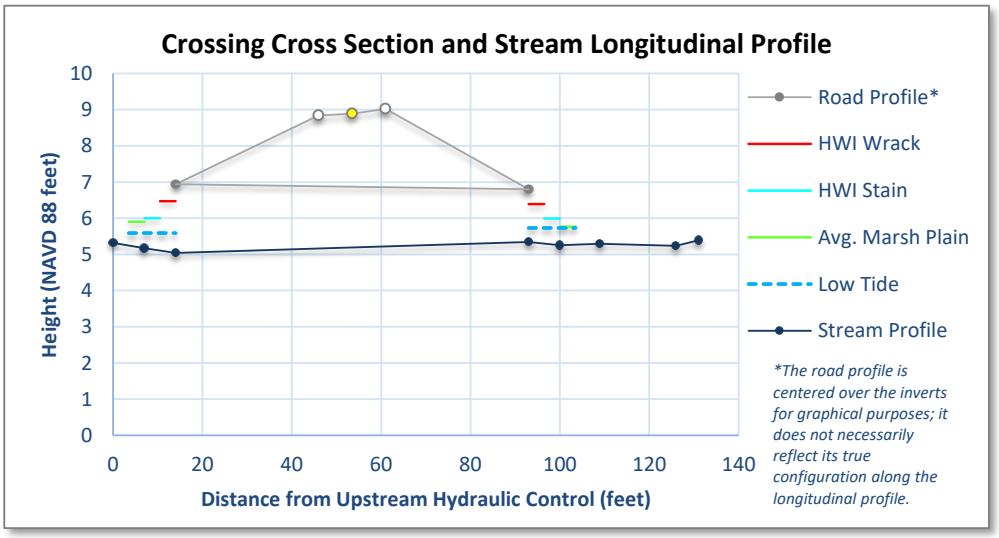
US view above structure

US view toward structure

DS view above structure

* Scoring system ranges from 1 to 5, where 1 = lowest replacement priority and 5 = highest replacement priority

**Adverse Impacts Evaluation scores range from 1 to 5, where 1 = high risk and 5 = low risk



Long. Profile

Dist.	Hght.	Feat.	Sub.
0	5.3201	HC	C/S
7	5.1701	P	C/S
14	5.0401	I	C/S
93	5.3401	I	C/S
100	5.2501	P	C/S
109	5.2901	HC	C/S
126	5.2401	P	C/S
131	5.3901	HC	C/S

Crossing Context:

N/A

Structure Characteristics:

Structure Type:	Round Culvert	**Date of Last Known Replacement:**	N/A
Structure Material:	Steel - Corrugated		
Tide Gate Present:	No		

Crossing Dimensions (ft):	Upstream	Downstream
Dimension A (width):	2	2
Dimension B^{CB}(height):	1.9	1.7
Crossing Length (Invert to Invert):	79	

Crossing Condition:	**Headwall Material**	**Headwall Condition**	**Wingwall Material**	**Wingwall Condition**	**Scour at Structure**	**Scour Severity**
Upstream	None	N/A	None	N/A	None	None
Downstream	Dry Fit Stone	Fair	None	N/A	None	None

Scour in Structure	**Scour Severity in Structure**	**Road Surface Condition**	**Utilities at Crossing**	**Structure Condition Overall**
None	None	Good	Utility box and OHE DS	Poor

Structure Condition Comments:	Bottom of culvert rusted out. Water flow under culvert. No observed flow during assessment.

Ecological Assessment:	Upstream	Downstream
Natural Community Classification:	Freshwater Marsh	Freshwater Marsh
Upstream Salt Marsh Migration Potential (acres):	4.82	

Flood Hazard & Emergency Access

Site Identified in Hazard Mitigation Plan:	No
Emergency Access or Evacuation Route:	N/A
History of Flooding:	unknown

Tidal Crossing Summary Sheet

New Hampshire's Tidal Crossing Assessment Protocol

Crossing ID: 64

Observer(s) & Organization:	TS, JB (NHDES Coastal)
Municipality:	NEW CASTLE
Stream Name:	N/A
Road Name:	Quarterdeck Ln

Date:	6/5/2018
Start Time:	10:36:00 AM
End Time:	11:50:00 AM

Tide Prediction	**High**	**Low**
Time:	5:18 PM	10:52 AM
Elevation:	7.2	1.6
Tide Chart Location:	Portsmouth Harbor	

Crossing Condition Evaluation	Score*
Crossing Condition	1
Tidal Restriction Evaluation	
Tidal Range Ratio	3
Crossing Ratio	2
Erosion Classification	5
Tidal Restriction Overall Score	3
Tidal Aquatic Organism Passage	
Tidal Range Ratio	3
Salt Marsh Migration Evaluation	
Salt Marsh Migration Potential (Eval. Unit)	4
Salt Marsh Migration Potential (Wshed.)	4
Vegetation Evaluation	
Vegetation Comparison Matrix	4
Infrastructure Risk Evaluation	
Inundation Risk to the Roadway (US, DS)	2,3
Inun. Risk to the Crossing Structure (US, DS)	5,4
Adverse Impacts Evaluation**	
Inundation Risk to Low-Lying Development	3
Overall Scores	
Infrastructure	3
Ecological	4
Combined	3

DS view toward structure

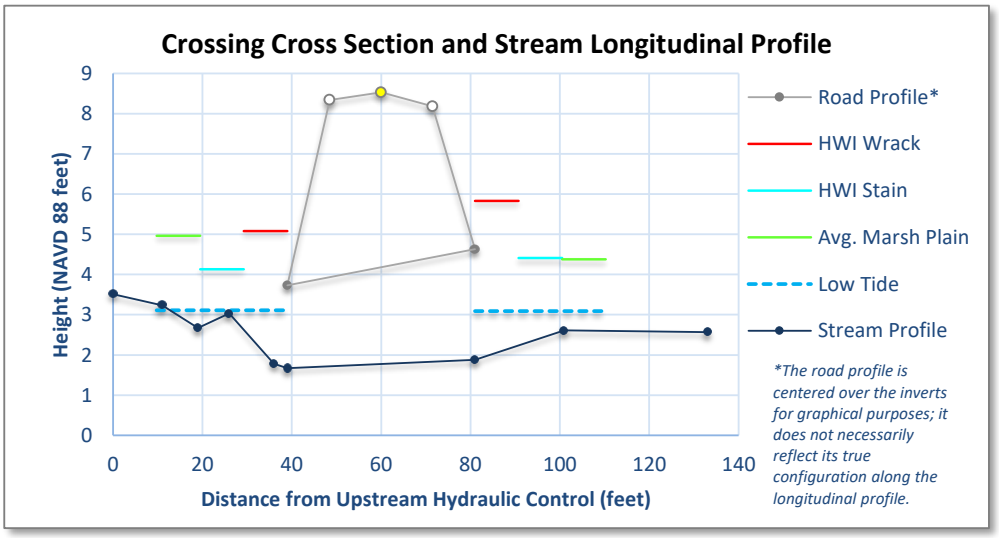
US view above structure

US view toward structure

DS view above structure

* Scoring system ranges from 1 to 5, where 1 = lowest replacement priority and 5 = highest replacement priority

**Adverse Impacts Evaluation scores range from 1 to 5, where 1 = high risk and 5 = low risk



Long. Profile

Dist.	Hght.	Feat.	Sub.
0	3.5102	HC	C/S
11	3.2302	HC	C/S
19	2.6702	P	C/S
26	3.0302	HC	C/S
36	1.7802	P	C/S
39	1.6702	I	C/S
81	1.8802	I	C/S
101	2.6102	HC	C/S
133	2.5702	HC	C/S

Crossing Context:

A small marsh extends west of Lavenger Creek in New Castle and its tidal creek runs under Quarterdeck Lane through a concrete box culvert 4 feet wide by 3 feet tall. This culvert replaced a 3-foot pipe in 2008 that was restricting flow and impounding water. Although the crossing condition is very good, erosion is evident, the tidal flow appear restricted and tides regularly overfill the culvert. The upstream marsh is cattail while the downstream marsh is dominated by salt marsh grasses. The overall combined score is 3, indicating moderate priority for replacement.

Structure Characteristics:

Structure Type:	Box Culvert	**Date of Last Known Replacement:**	2008
Structure Material:	Concrete		
Tide Gate Present:	No		

Crossing Dimensions (ft):	Upstream	Downstream
Dimension A (width):	4	4
Dimension B^{CB}(height):	3	3
Crossing Length (Invert to Invert):	42	

Crossing Condition:	**Headwall Material**	**Headwall Condition**	**Wingwall Material**	**Wingwall Condition**	**Scour at Structure**	**Scour Severity**
Upstream	Dry Fit Stone	Good	Dry Fit Stone	Good	None	None
Downstream	Dry Fit Stone	Good	Dry Fit Stone	Good	None	None

Scour in Structure	**Scour Severity in Structure**	**Road Surface Condition**	**Utilities at Crossing**	**Structure Condition Overall**
None	None	Good	Sewer, overhead electric	Good

Structure Condition Comments:	N/A

Ecological Assessment:	Upstream	Downstream
Natural Community Classification:	Freshwater Marsh	High Salt Marsh
Upstream Salt Marsh Migration Potential (acres):	8.51	

Flood Hazard & Emergency Access

Site Identified in Hazard Mitigation Plan:	Yes
Emergency Access or Evacuation Route:	N/A
History of Flooding:	flooding from heavyrain/storm surge

Tidal Crossing Summary Sheet

New Hampshire's Tidal Crossing Assessment Protocol

Crossing ID: 65

Observer(s) & Organization:	TS, JB (NHDES Coastal)
Municipality:	RYE
Stream Name:	N/A
Road Name:	N/A

Date:	6/20/2018
Start Time:	11:10:00 AM
End Time:	11:52:00 AM

Tide Prediction	**High**	**Low**
Time:	6:16 PM	11:47 AM
Elevation:	8.5	-0.3
Tide Chart Location:	Portsmouth Harbor	

Crossing Condition Evaluation	Score*
Crossing Condition	4
Tidal Restriction Evaluation	
Tidal Range Ratio	5
Crossing Ratio	4
Erosion Classification	3
Tidal Restriction Overall Score	4
Tidal Aquatic Organism Passage	
Tidal Range Ratio	5
Salt Marsh Migration Evaluation	
Salt Marsh Migration Potential (Eval. Unit)	2
Salt Marsh Migration Potential (Wshed.)	2
Vegetation Evaluation	
Vegetation Comparison Matrix	5
Infrastructure Risk Evaluation	
Inundation Risk to the Roadway (US, DS)	2,2
Inun. Risk to the Crossing Structure (US, DS)	5,5
Adverse Impacts Evaluation**	
Inundation Risk to Low-Lying Development	5
Overall Scores	
Infrastructure	4
Ecological	5
Combined	5

DS view toward structure

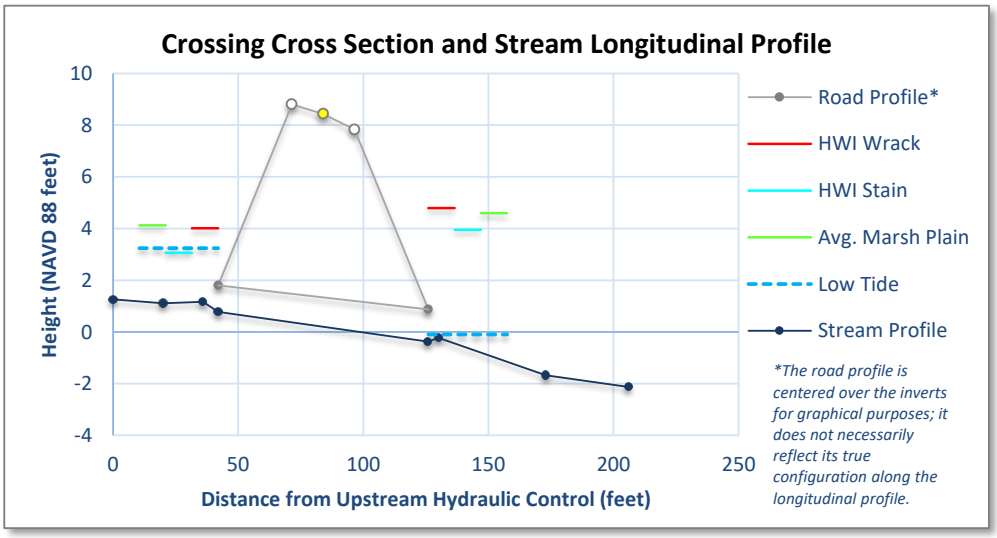
US view above structure

US view toward structure

DS view above structure

* Scoring system ranges from 1 to 5, where 1 = lowest replacement priority and 5 = highest replacement priority

**Adverse Impacts Evaluation scores range from 1 to 5, where 1 = high risk and 5 = low risk



Long. Profile

Dist.	Hght.	Feat.	Sub.
0	1.2618	HC	S
20	1.1118	HC	G
36	1.1718	GC	G
42	0.7718	I	G
126	-0.3782	I	G
130	-0.2282	HC	G
173	-1.6782	HC	G
206	-2.1282	HC	G

Crossing Context:

The tiny culvert that runs under Route 1B is a 1-foot diameter pipe that restricts tides from Sagamore Creek to a small upstream marsh. The tidal range is restricted and erosion occurs on the upstream side, but an intensive study found that mummichogs (salt marsh minnows) regularly navigated the culvert (Eberhardt et al. 2011). It has an overall combined score of 5, indicating highest priority for replacement. The high water stain suggests that an immediate expansion of salt marsh would be supported by a larger culvert. The link for cited text can be found below:
https://scholars.unh.edu/jel/36/

Structure Characteristics:

Structure Type:	Round Culvert	**Date of Last Known Replacement:**	N/A
Structure Material:	Concrete		
Tide Gate Present:	No		

Crossing Dimensions (ft):	Upstream	Downstream
Dimension A (width):	1	1
Dimension B^{CB}(height):	1	1
Crossing Length (Invert to Invert):	84	

Crossing Condition:	**Headwall Material**	**Headwall Condition**	**Wingwall Material**	**Wingwall Condition**	**Scour at Structure**	**Scour Severity**
Upstream	None	Poor	None	N/A	Culvert	Medium
Downstream	None	N/A	None	N/A	Culvert	Low

Scour in Structure	**Scour Severity in Structure**	**Road Surface Condition**	**Utilities at Crossing**	**Structure Condition Overall**
None	None	Good	OHE at crossing US and utility pole DS RR	Poor

Structure Condition Comments:	Culvert chipped at invert both sides.

Ecological Assessment:	Upstream	Downstream
Natural Community Classification:	High Salt Marsh	Sparsely Vegetated Intertidal Habitat
Upstream Salt Marsh Migration Potential (acres):	1.03	

Flood Hazard & Emergency Access

Site Identified in Hazard Mitigation Plan:	No
Emergency Access or Evacuation Route:	Yes
History of Flooding:	unknown

Tidal Crossing Summary Sheet

New Hampshire's Tidal Crossing Assessment Protocol

Crossing ID: 67

Observer(s) & Organization:	TS, JB (NHDES Coastal)
Municipality:	PORTSMOUTH
Stream Name:	Sagamore Creek
Road Name:	Lafayette Rd

Date:	7/2/2018
Start Time:	8:45:00 AM
End Time:	10:30:00 AM

Tide Prediction	**High**	**Low**
Time:	3:17 PM	8:56 AM
Elevation:	7.4	0.4
Tide Chart Location:	Portsmouth Harbor	

Crossing Condition Evaluation	Score*
Crossing Condition	1
Tidal Restriction Evaluation	
Tidal Range Ratio	3
Crossing Ratio	3
Erosion Classification	3
Tidal Restriction Overall Score	3
Tidal Aquatic Organism Passage	
Tidal Range Ratio	3
Salt Marsh Migration Evaluation	
Salt Marsh Migration Potential (Eval. Unit)	5
Salt Marsh Migration Potential (Wshed.)	5
Vegetation Evaluation	
Vegetation Comparison Matrix	1
Infrastructure Risk Evaluation	
Inundation Risk to the Roadway (US, DS)	2,2
Inun. Risk to the Crossing Structure (US, DS)	1,1
Adverse Impacts Evaluation**	
Inundation Risk to Low-Lying Development	3
Overall Scores	
Infrastructure	1
Ecological	3
Combined	3

DS view toward structure

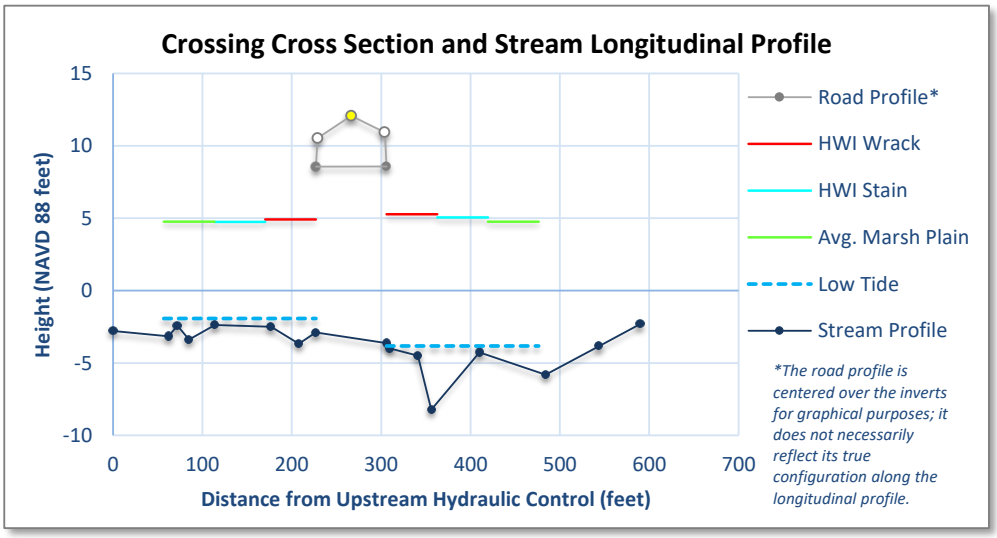
US view above structure

US view toward structure

DS view above structure

* Scoring system ranges from 1 to 5, where 1 = lowest replacement priority and 5 = highest replacement priority

**Adverse Impacts Evaluation scores range from 1 to 5, where 1 = high risk and 5 = low risk



Long. Profile

Dist.	Hght.	Feat.	Sub.
0	-2.7965	HC	C
62	-3.1665	P	C
72	-2.4265	HC	C
85	-3.3765	P	C
114	-2.3765	HC	C
177	-2.4965	CB	G
208	-3.6765	P	G
227	-2.8865	I	C
306	-3.6365	I	C
310	-4.0065	CB	S
341	-4.4865	CB	C
356	-8.2265	P	G
410	-4.2765	HC	G
484	-5.8165	P	G
544	-3.8465	HC	G
590	-2.3065	CB	C

Crossing Context:

N/A

Structure Characteristics:

Structure Type:	Bridge with Abutments	**Date of Last Known Replacement:**	N/A
Structure Material:	Concrete		
Tide Gate Present:	No		

Crossing Dimensions (ft):	Upstream	Downstream
Dimension A (width):	39.2	39.3
Dimension B^{CB}(height):	11.03	11.93
Crossing Length (Invert to Invert):	79	

Crossing Condition:	**Headwall Material**	**Headwall Condition**	**Wingwall Material**	**Wingwall Condition**	**Scour at Structure**	**Scour Severity**
Upstream	None	N/A	Rip Rap	Good	None	None
Downstream	None	N/A	Rip Rap	Good	None	None

Scour in Structure	**Scour Severity in Structure**	**Road Surface Condition**	**Utilities at Crossing**	**Structure Condition Overall**
None	None	Good	Overhead electric	Good

Structure Condition Comments:	May be bridge with abutments and side slopes, took C and D measurement (see photo 5)

Ecological Assessment:	Upstream	Downstream
Natural Community Classification:	High Salt Marsh	High Salt Marsh
Upstream Salt Marsh Migration Potential (acres):	13.37	

Flood Hazard & Emergency Access

Site Identified in Hazard Mitigation Plan:	Yes
Emergency Access or Evacuation Route:	Yes
History of Flooding:	flooding of adjacent business parking lot

Tidal Crossing Summary Sheet

New Hampshire's Tidal Crossing Assessment Protocol

Crossing ID: 68

Observer(s) & Organization:	TS, JB, KL (NHDES Coastal)
Municipality:	PORTSMOUTH
Stream Name:	0
Road Name:	Belle Isle Rd

Date:	9/13/2018
Start Time:	8:57:00 AM
End Time:	10:30:00 AM

Tide Prediction	**High**	**Low**
Time:	2:56 AM	8:36 AM
Elevation:	9.0	-0.5
Tide Chart Location:	Portsmouth Harbor	

Crossing Condition Evaluation	Score*
Crossing Condition	4
Tidal Restriction Evaluation	
Tidal Range Ratio	1
Crossing Ratio	1
Erosion Classification	1
Tidal Restriction Overall Score	1
Tidal Aquatic Organism Passage	
Tidal Range Ratio	1
Salt Marsh Migration Evaluation	
Salt Marsh Migration Potential (Eval. Unit)	4
Salt Marsh Migration Potential (Wshed.)	4
Vegetation Evaluation	
Vegetation Comparison Matrix	1
Infrastructure Risk Evaluation	
Inundation Risk to the Roadway (US, DS)	Null,Null
Inun. Risk to the Crossing Structure (US, DS)	3,2
Adverse Impacts Evaluation**	
Inundation Risk to Low-Lying Development	5
Overall Scores	
Infrastructure	4
Ecological	1
Combined	3

DS view toward structure

US view above structure

US view toward structure

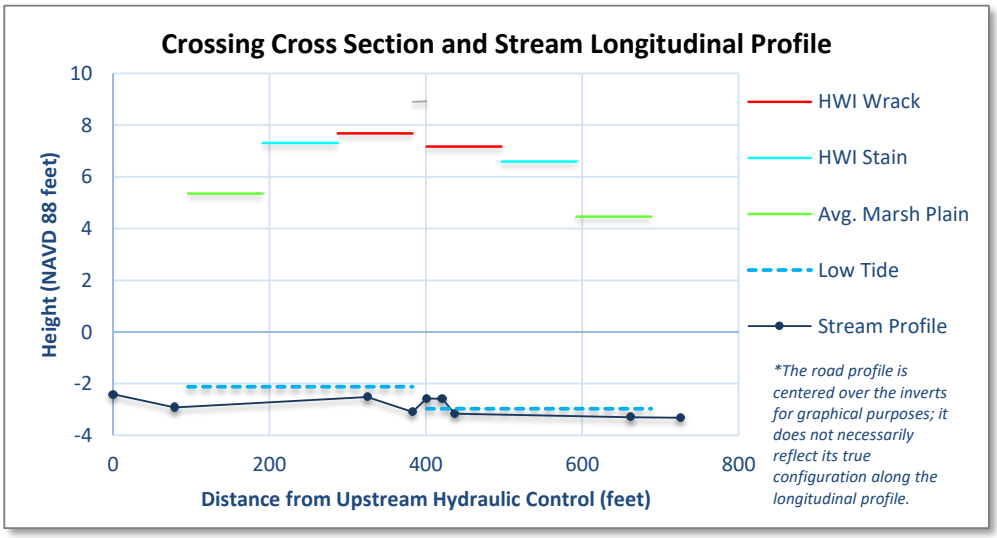
DS view above structure

* Scoring system ranges from 1 to 5, where 1 = lowest replacement priority and 5 = highest replacement priority

**Adverse Impacts Evaluation scores range from 1 to 5, where 1 = high risk and 5 = low risk

Long. Profile

Dist.	Hght.	Feat.	Sub.
0	-2.4086	HC	C/S
79	-2.9186	CB	Shell
325	-2.5186	GC	Shell
383	-3.0986	I	Shell
401	-2.5786	I	Shell
421	-2.5886	GC	Shell
437	-3.1586	CB	Shell
662	-3.2986	HC	S
726	-3.3186	CB	S



Crossing Context:

N/A

Structure Characteristics:

Structure Type:	Bridge with Side Slopes and Abutments	**Date of Last Known Replacement:**	N/A
Structure Material:	Steel - Smooth		
Tide Gate Present:	Yes		

Crossing Dimensions (ft):	Upstream	Downstream
Dimension A (width):	91	91
Dimension B^{CB}(height):	12	11.5
Crossing Length (Invert to Invert):	18	

Crossing Condition:	**Headwall Material**	**Headwall Condition**	**Wingwall Material**	**Wingwall Condition**	**Scour at Structure**	**Scour Severity**
Upstream	None	N/A	Concrete	Poor	Wingwalls	Medium
Downstream	None	N/A	Concrete	Poor	Wingwalls	Medium

Scour in Structure	**Scour Severity in Structure**	**Road Surface Condition**	**Utilities at Crossing**	**Structure Condition Overall**
Abutment	Medium	N/A	None	Fair

Structure Condition Comments:	N/A

Ecological Assessment:	Upstream	Downstream
Natural Community Classification:	Sparsely Vegetated Intertidal Habitat	Sparsely Vegetated Intertidal Habitat
Upstream Salt Marsh Migration Potential (acres):	9.35	

Flood Hazard & Emergency Access

Site Identified in Hazard Mitigation Plan:	No
Emergency Access or Evacuation Route:	N/A
History of Flooding:	unknown

Tidal Crossing Summary Sheet

New Hampshire's Tidal Crossing Assessment Protocol

Crossing ID: 69

Observer(s) & Organization:	JB TS (NHDES Coastal)
Municipality:	PORTSMOUTH
Stream Name:	South mill pond
Road Name:	Marcy St

Date:	9/4/2018
Start Time:	12:30:00 PM
End Time:	1:40:00 PM

Tide Prediction	**High**	**Low**
Time:	6:55 PM	12:31 PM
Elevation:	8.6	0.7
Tide Chart Location:	Portsmouth Harbor	

Crossing Condition Evaluation	Score*
Crossing Condition	3
Tidal Restriction Evaluation	
Tidal Range Ratio	1
Crossing Ratio	5
Erosion Classification	1
Tidal Restriction Overall Score	2
Tidal Aquatic Organism Passage	
Tidal Range Ratio	1
Salt Marsh Migration Evaluation	
Salt Marsh Migration Potential (Eval. Unit)	4
Salt Marsh Migration Potential (Wshed.)	5
Vegetation Evaluation	
Vegetation Comparison Matrix	1
Infrastructure Risk Evaluation	
Inundation Risk to the Roadway (US, DS)	2,3
Inun. Risk to the Crossing Structure (US, DS)	1,1
Adverse Impacts Evaluation**	
Inundation Risk to Low-Lying Development	1
Overall Scores	
Infrastructure	3
Ecological	1
Combined	3

DS view toward structure

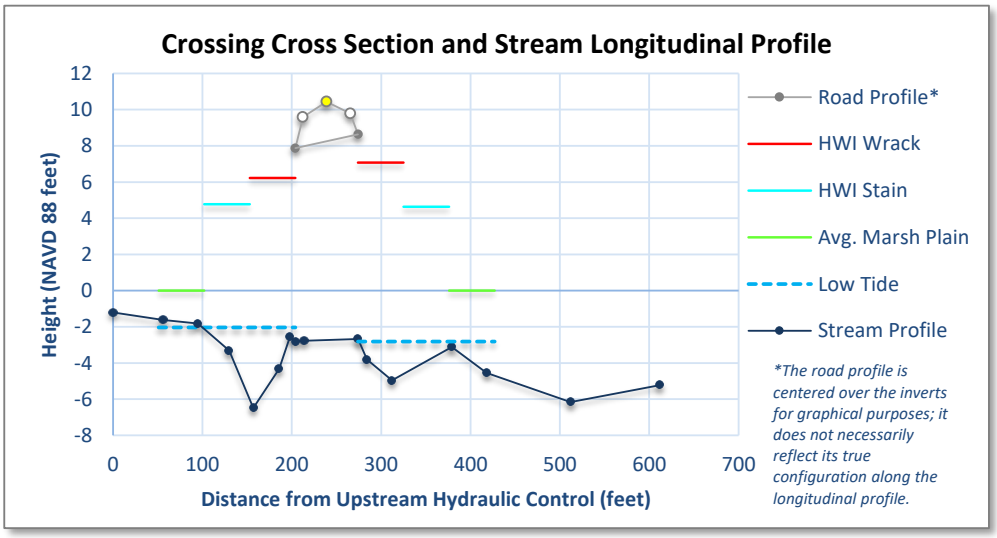
US view above structure

US view toward structure

DS view above structure

* Scoring system ranges from 1 to 5, where 1 = lowest replacement priority and 5 = highest replacement priority

**Adverse Impacts Evaluation scores range from 1 to 5, where 1 = high risk and 5 = low risk



Long. Profile

Dist.	Hght.	Feat.	Sub.
0	-1.2069	HC	G
56	-1.6269	CB	G
95	-1.8169	HC	G
130	-3.3169	CB	C
157	-6.4869	P	C
186	-4.3169	CB	B
198	-2.5669	GC	B
204	-2.8169	I	B
214	-2.7669	CB	Shell
274	-2.6669	I	Shell
284	-3.8069	CB	Shell
312	-4.9669	P	G
379	-3.1169	HC	C
418	-4.5469	CB	G
512	-6.1669	P	G
612	-5.2169	HC	C

Crossing Context:

The crossing over the inlet to South Mill Pond at Marcy Street is a tide gate that was regularly closed before 2000 on occasions when combined sewer overflows (CSO) produced a stench. The closures resulted anoxia in the water and death of aquatic animals, but policy change with restoration of shellfish and salt marsh coupled with sewer upgrades and reductions in CSO events has allowed the gate to remain open (McDermott et al. 2005). This crossing has an overall combined score of 3, indicating moderate priority for replacement. The link for cited text can be found below:
https://scholars.unh.edu/jel/33/

Structure Characteristics:

Structure Type:	Box Culvert	**Date of Last Known Replacement:**	N/A
Structure Material:	Concrete		
Tide Gate Present:	Yes		

Crossing Dimensions (ft):	Upstream	Downstream
Dimension A (width):	20	20
Dimension B^{CB} (height):	10.95	11.35
Crossing Length (Invert to Invert):	70	

Crossing Condition:	**Headwall Material**	**Headwall Condition**	**Wingwall Material**	**Wingwall Condition**	**Scour at Structure**	**Scour Severity**
Upstream	Concrete	Good	Concrete	Good	None	None
Downstream	Concrete	Good	Concrete	Good	None	None

Scour in Structure	**Scour Severity in Structure**	**Road Surface Condition**	**Utilities at Crossing**	**Structure Condition Overall**
None	None	Fair	Gas line, sewer line, other pipes. E mtr, OHE	Good

Structure Condition Comments:	US Dim C is tide gate opening.

Ecological Assessment:	Upstream	Downstream
Natural Community Classification:	Sparsely Vegetated Intertidal Habitat	Sparsely Vegetated Intertidal Habitat
Upstream Salt Marsh Migration Potential (acres):	27.82	

Flood Hazard & Emergency Access

Site Identified in Hazard Mitigation Plan:	Yes
Emergency Access or Evacuation Route:	Yes
History of Flooding:	identified as past, present, and future hazard

Tidal Crossing Summary Sheet

New Hampshire's Tidal Crossing Assessment Protocol

Crossing ID: 70

Observer(s) & Organization:	JB TS (NHDES Coastal)
Municipality:	PORTSMOUTH
Stream Name:	N/A
Road Name:	Junkins Ave

Date:	6/21/2018
Start Time:	12:14:00 PM
End Time:	1:00:00 PM

Tide Prediction	**High**	**Low**
Time:	5:16 PM	12:48 PM
Elevation:	8.5	0.0
Tide Chart Location:	Portsmouth Harbor	

Crossing Condition Evaluation	Score*
Crossing Condition	5
Tidal Restriction Evaluation	
Tidal Range Ratio	2
Crossing Ratio	5
Erosion Classification	4
Tidal Restriction Overall Score	4
Tidal Aquatic Organism Passage	
Tidal Range Ratio	2
Salt Marsh Migration Evaluation	
Salt Marsh Migration Potential (Eval. Unit)	5
Salt Marsh Migration Potential (Wshed.)	5
Vegetation Evaluation	
Vegetation Comparison Matrix	1
Infrastructure Risk Evaluation	
Inundation Risk to the Roadway (US, DS)	2,2
Inun. Risk to the Crossing Structure (US, DS)	5,5
Adverse Impacts Evaluation**	
Inundation Risk to Low-Lying Development	5
Overall Scores	
Infrastructure	5
Ecological	3
Combined	4

DS view toward structure

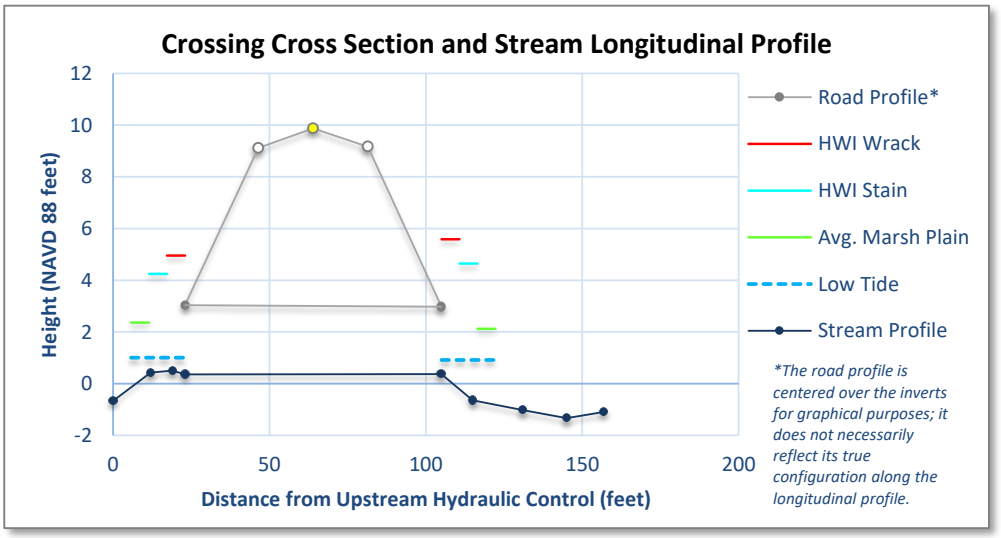
US view above structure

US view toward structure

DS view above structure

* Scoring system ranges from 1 to 5, where 1 = lowest replacement priority and 5 = highest replacement priority

**Adverse Impacts Evaluation scores range from 1 to 5, where 1 = high risk and 5 = low risk

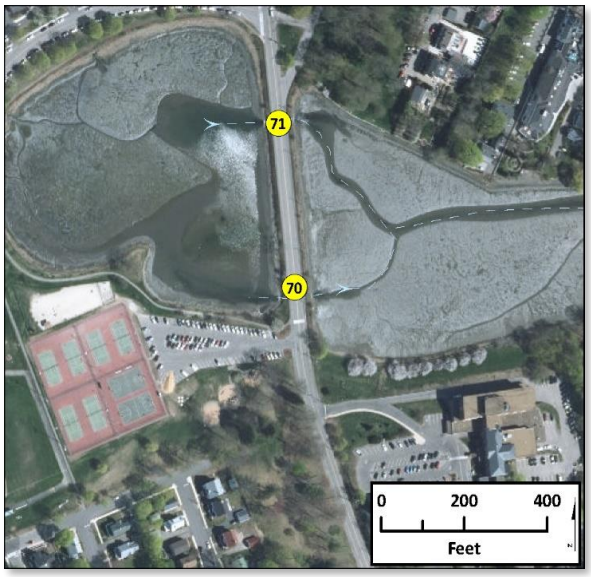


Long. Profile

Dist.	Hght.	Feat.	Sub.
0	-0.6647	P	G
12	0.4253	CB	C
19	0.5053	HC	C
23	0.3553	I	C
105	0.3653	I	Shell
115	-0.6447	CB	G
131	-1.0247	HC	G
145	-1.3347	P	G
157	-1.0947	HC	C/S

Crossing Context:

The crossing on Junkins Avenue provides tides to the inner portion of South Mill Pond through a pair of 3 by 8-foot concrete box culverts (#71 is the other culvert). Salt marsh and shellfish have been restored in parts of the pond following opening of the tide gate (see crossing #69), but erosion and tidal restriction indicate replacement is needed. The crossing has an overall combined score of 4, indicating high priority for replacement.



Structure Characteristics:

Structure Type:	Box Culvert	**Date of Last Known Replacement:**	N/A
Structure Material:	Concrete		
Tide Gate Present:	No		

Crossing Dimensions (ft):	Upstream	Downstream
Dimension A (width):	8	8
Dimension B^{CB} (height):	2.8	2.6
Crossing Length (Invert to Invert):	82	

Crossing Condition:	**Headwall Material**	**Headwall Condition**	**Wingwall Material**	**Wingwall Condition**	**Scour at Structure**	**Scour Severity**
Upstream	None	N/A	None	N/A	Culvert	Medium
Downstream	None	N/A	None	N/A	Culvert	Medium

Scour in Structure	**Scour Severity in Structure**	**Road Surface Condition**	**Utilities at Crossing**	**Structure Condition Overall**
Culvert	Medium	Fair	OHE	Poor

Structure Condition Comments:	Concrete falling off structure. Exposed rebar DS

Ecological Assessment:	Upstream	Downstream
Natural Community Classification:	Sparsely Vegetated Intertidal Habitat	Sparsely Vegetated Intertidal Habitat
Upstream Salt Marsh Migration Potential (acres):	18.93	

Flood Hazard & Emergency Access

Site Identified in Hazard Mitigation Plan:	Yes
Emergency Access or Evacuation Route:	N/A
History of Flooding:	Past and future hazard

Tidal Crossing Summary Sheet

New Hampshire's Tidal Crossing Assessment Protocol

Crossing ID: 71

Observer(s) & Organization:	TS, JB (NHDES Coastal)
Municipality:	PORTSMOUTH
Stream Name:	N/A
Road Name:	Junkins Ave

Date:	6/21/2018
Start Time:	1:22:00 PM
End Time:	2:30:00 PM

Tide Prediction	**High**	**Low**
Time:	7:16 PM	12:48 PM
Elevation:	8.5	0.0
Tide Chart Location:	Portsmouth Harbor	

Crossing Condition Evaluation	Score*
Crossing Condition	5
Tidal Restriction Evaluation	
Tidal Range Ratio	4
Crossing Ratio	5
Erosion Classification	4
Tidal Restriction Overall Score	4
Tidal Aquatic Organism Passage	
Tidal Range Ratio	4
Salt Marsh Migration Evaluation	
Salt Marsh Migration Potential (Eval. Unit)	5
Salt Marsh Migration Potential (Wshed.)	5
Vegetation Evaluation	
Vegetation Comparison Matrix	1
Infrastructure Risk Evaluation	
Inundation Risk to the Roadway (US, DS)	3,3
Inun. Risk to the Crossing Structure (US, DS)	5,5
Adverse Impacts Evaluation**	
Inundation Risk to Low-Lying Development	5
Overall Scores	
Infrastructure	5
Ecological	5
Combined	5

DS view toward structure

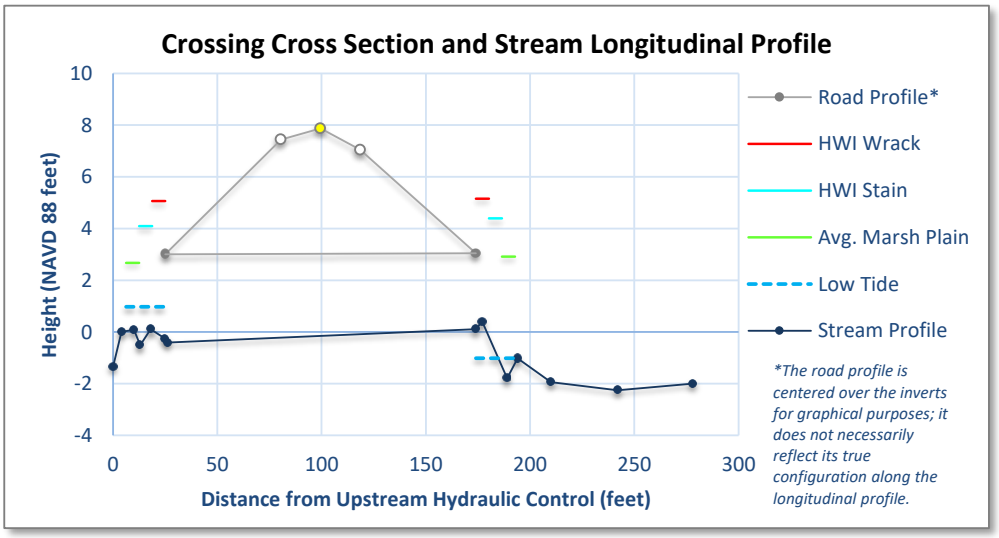
US view above structure

US view toward structure

DS view above structure

* Scoring system ranges from 1 to 5, where 1 = lowest replacement priority and 5 = highest replacement priority

**Adverse Impacts Evaluation scores range from 1 to 5, where 1 = high risk and 5 = low risk

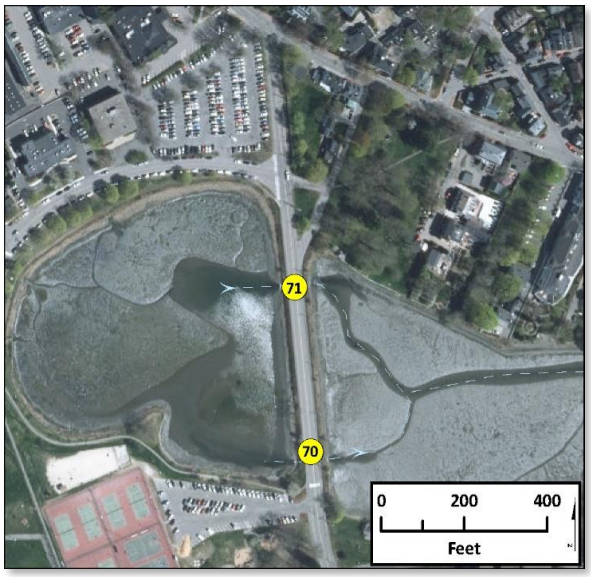


Long. Profile

Dist.	Hght.	Feat.	Sub.
0	-1.346	P	S
4	0.004	HC	G
10	0.084	CB	C
13	-0.516	P	G
18	0.104	HC	G
25	-0.266	I	C
26	-0.406	CB	G
174	0.104	I	Shell
177	0.404	GC	B
189	-1.796	P	G
194	-1.016	HC	B
210	-1.946	CB	G
242	-2.256	P	G
278	-1.996	HC	C/S

Crossing Context:

The crossing on Junkins Avenue provides tides to the inner portion of South Mill Pond through a pair of 3 by 8-foot concrete box culverts (#70 is the other culvert). This culvert appears to be partially filled with sediment (cobble sized). Salt marsh and shellfish have been restored in parts of the pond following opening of the tide gate (see crossing #69), but erosion and tidal restriction indicate replacement is needed. The crossing has an overall combined score of 5, indicating highest priority for replacement.



Structure Characteristics:

Structure Type:	Box Culvert	**Date of Last Known Replacement:**	N/A
Structure Material:	Concrete		
Tide Gate Present:	No		

Crossing Dimensions (ft):	Upstream	Downstream
Dimension A (width):	8	8
Dimension B^{CB} (height):	3.2	2.85
Crossing Length (Invert to Invert):	149	

Crossing Condition:	**Headwall Material**	**Headwall Condition**	**Wingwall Material**	**Wingwall Condition**	**Scour at Structure**	**Scour Severity**
Upstream	None	N/A	None	N/A	Culvert	Medium
Downstream	None	N/A	None	N/A	Culvert	Low

Scour in Structure	**Scour Severity in Structure**	**Road Surface Condition**	**Utilities at Crossing**	**Structure Condition Overall**
Culvert	Medium	Fair	Overhead electric	Poor

Structure Condition Comments:	N/A

Ecological Assessment:	Upstream	Downstream
Natural Community Classification:	Sparsely Vegetated Intertidal Habitat	Sparsely Vegetated Intertidal Habitat
Upstream Salt Marsh Migration Potential (acres):	18.93	

Flood Hazard & Emergency Access

Site Identified in Hazard Mitigation Plan:	Yes
Emergency Access or Evacuation Route:	N/A
History of Flooding:	past and future hazard

Tidal Crossing Summary Sheet

New Hampshire's Tidal Crossing Assessment Protocol

Crossing ID: 72

Observer(s) & Organization:	JB TS (NHDES Coastal)
Municipality:	PORTSMOUTH
Stream Name:	Hodgson Brook
Road Name:	Bartlett St

Date:	7/23/2018
Start Time:	1:30:00 PM
End Time:	3:22:00 PM

Tide Prediction	**High**	**Low**
Time:	9:33 PM	3:09 PM
Elevation:	8.3	1.0
Tide Chart Location:	Portsmouth Harbor	

Crossing Condition Evaluation	Score*
Crossing Condition	2
Tidal Restriction Evaluation	
Tidal Range Ratio	5
Crossing Ratio	4
Erosion Classification	3
Tidal Restriction Overall Score	4
Tidal Aquatic Organism Passage	
Tidal Range Ratio	5
Salt Marsh Migration Evaluation	
Salt Marsh Migration Potential (Eval. Unit)	1
Salt Marsh Migration Potential (Wshed.)	1
Vegetation Evaluation	
Vegetation Comparison Matrix	5
Infrastructure Risk Evaluation	
Inundation Risk to the Roadway (US, DS)	2,2
Inun. Risk to the Crossing Structure (US, DS)	1,3
Adverse Impacts Evaluation**	
Inundation Risk to Low-Lying Development	5
Overall Scores	
Infrastructure	2
Ecological	5
Combined	5

DS view toward structure

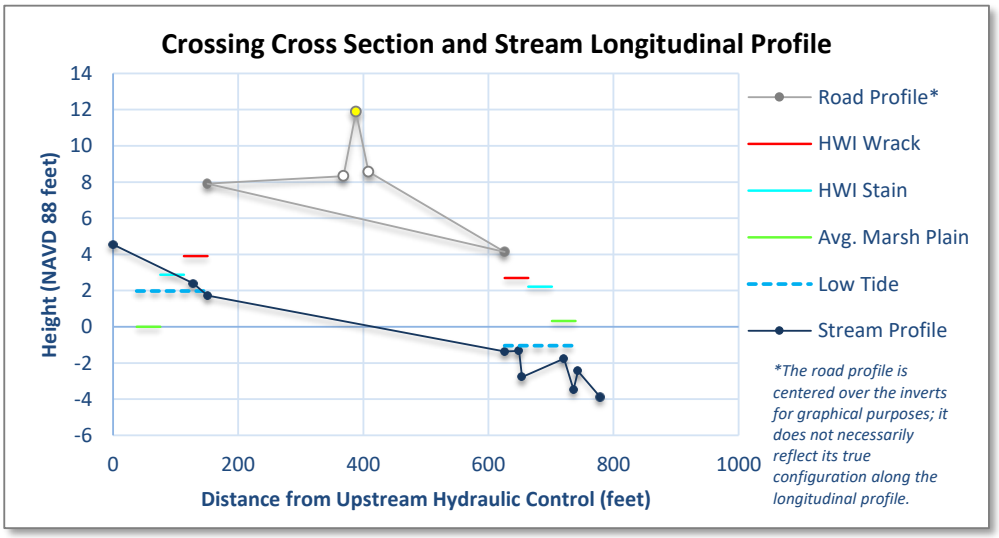
US view above structure

US view toward structure

DS view above structure

* Scoring system ranges from 1 to 5, where 1 = lowest replacement priority and 5 = highest replacement priority

**Adverse Impacts Evaluation scores range from 1 to 5, where 1 = high risk and 5 = low risk

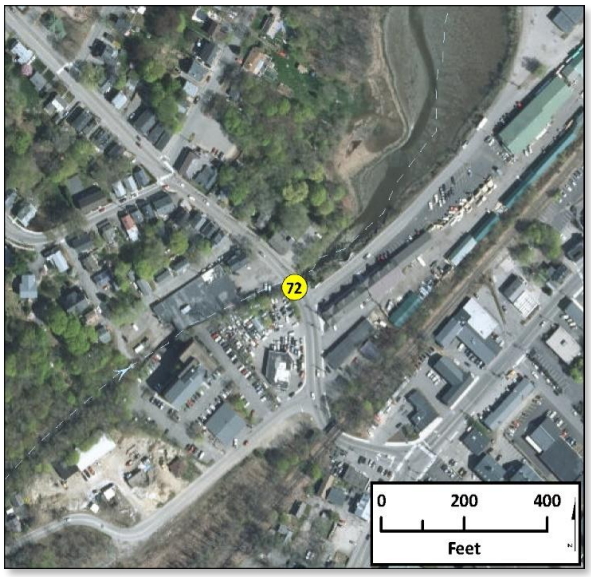


Long. Profile

Dist.	Hght.	Feat.	Sub.
0	4.5466	HC	B
128	2.4066	HC	B
151	1.7266	I	B
626	-1.3634	I	B
649	-1.3334	GC	B
654	-2.7734	P	C
721	-1.7634	HC	C
736	-3.4634	P	C
743	-2.4534	HC	C
779	-3.8934	CB	C

Crossing Context:

Bartlett Street and upstream development covers Hodgson Brook almost 500 linear feet: from an artificially straightened freshwater stream to the southern terminus of North Mill Pond, which is a salt water pond. Spring tides can push salt water into the stream, but the gradient rises more than three feet over the length of the structure and upstream tides are, for the most part, fresh. The overall combined score for replacement is 5, highest priority, due to restriction in tidal range, stream width and erosion.



Structure Characteristics:

Structure Type:	Box Culvert	**Date of Last Known Replacement:**	N/A
Structure Material:	Concrete		
Tide Gate Present:	No		

Crossing Dimensions (ft):	Upstream	Downstream
Dimension A (width):	11.28	9
Dimension B^{CB} (height):	6.4	5.45
Crossing Length (Invert to Invert):	475	

Crossing Condition:	**Headwall Material**	**Headwall Condition**	**Wingwall Material**	**Wingwall Condition**	**Scour at Structure**	**Scour Severity**
Upstream	Concrete	Good	Metal	Fair	Wingwalls	Low
Downstream	Dry Fit Stone	Fair	Dry Fit Stone	Fair	Wingwalls	Low

Scour in Structure	**Scour Severity in Structure**	**Road Surface Condition**	**Utilities at Crossing**	**Structure Condition Overall**
Culvert	Low	Good	DS sewer line parallel to road. DS OHE	Good

Structure Condition Comments:	N/A

Ecological Assessment:	Upstream	Downstream
Natural Community Classification:	Freshwater Stream	Sparsely Vegetated Intertidal Habitat
Upstream Salt Marsh Migration Potential (acres):	0.00	

Flood Hazard & Emergency Access

Site Identified in Hazard Mitigation Plan:	Yes
Emergency Access or Evacuation Route:	Yes
History of Flooding:	River right area prone to flooding

Tidal Crossing Summary Sheet

New Hampshire's Tidal Crossing Assessment Protocol

Crossing ID: 73

Observer(s) & Organization:	TS, JB (NHDES Coastal)
Municipality:	PORTSMOUTH
Stream Name:	N/A
Road Name:	Maplewood Ave

Date:	9/5/2018
Start Time:	1:24:00 PM
End Time:	2:30:00 PM

Tide Prediction	**High**	**Low**
Time:	2:07 PM	7:48 AM
Elevation:	9.3	-0.9
Tide Chart Location:	Portsmouth Harbor	

Crossing Condition Evaluation	Score*
Crossing Condition	5
Tidal Restriction Evaluation	
Tidal Range Ratio	3
Crossing Ratio	5
Erosion Classification	0
Tidal Restriction Overall Score	4
Tidal Aquatic Organism Passage	
Tidal Range Ratio	3
Salt Marsh Migration Evaluation	
Salt Marsh Migration Potential (Eval. Unit)	5
Salt Marsh Migration Potential (Wshed.)	5
Vegetation Evaluation	
Vegetation Comparison Matrix	1
Infrastructure Risk Evaluation	
Inundation Risk to the Roadway (US, DS)	2,2
Inun. Risk to the Crossing Structure (US, DS)	2,2
Adverse Impacts Evaluation**	
Inundation Risk to Low-Lying Development	1
Overall Scores	
Infrastructure	5
Ecological	5
Combined	5

DS view toward structure

US view above structure

US view toward structure

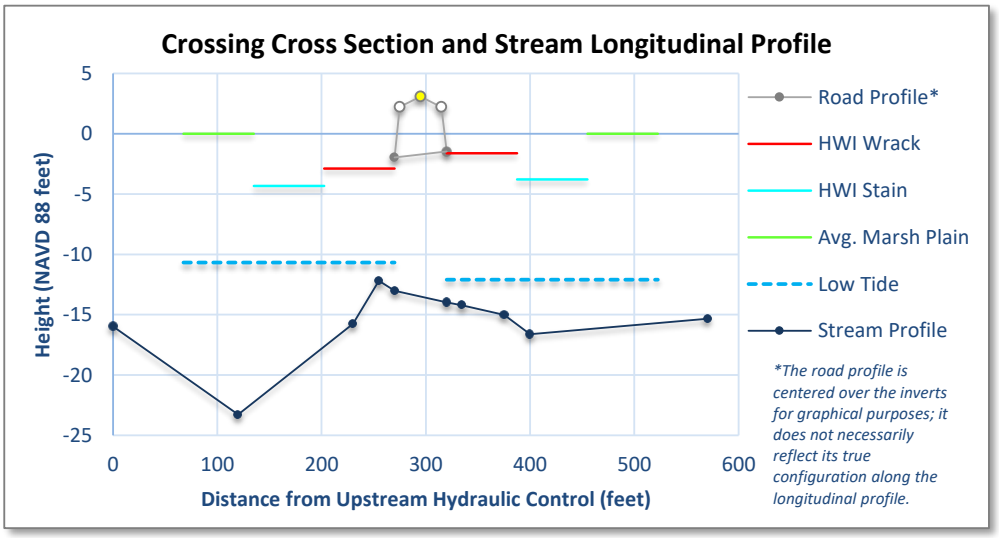
DS view above structure

* Scoring system ranges from 1 to 5, where 1 = lowest replacement priority and 5 = highest replacement priority

**Adverse Impacts Evaluation scores range from 1 to 5, where 1 = high risk and 5 = low risk

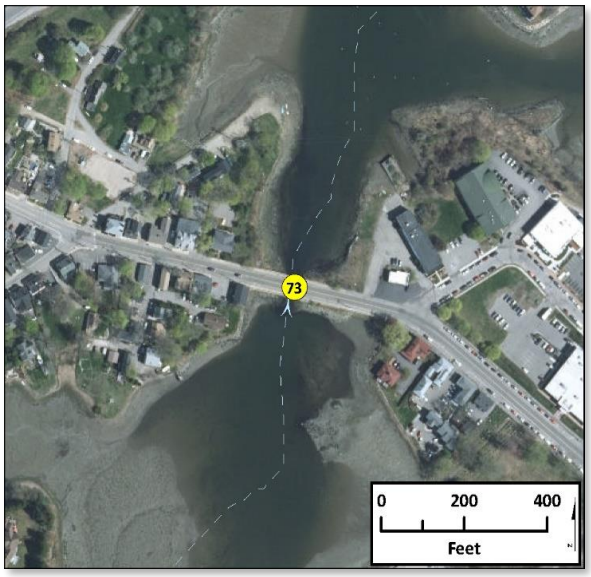
Long. Profile

Dist.	Hght.	Feat.	Sub.
0	-15.966	HC	G
120	-23.276	P	C
230	-15.766	CB	B
255	-12.186	GC	B
270	-13.006	I	B
320	-13.966	I	B
335	-14.226	GC	B
375	-15.026	CB	C
400	-16.626	P	C
570	-15.326	CB	C



Crossing Context:

The bridge on Maplewood Avenue conducts all the tides to the North Mill Pond through a large arch (about 12 by 25 feet) supported by courses of granite blocks. A tide gate that resulted in a non-tidal fresh pond was destroyed in a truck accident on the road in the 1950s. The crossing is very old and is in need of repair; it restricts larger tides. Although almost all of the shoreline has been filled, little in the way of new structures or infrastructure has been built so inundation risk to development is small. The overall combined score is a 5: highest priority for replacement.



Structure Characteristics:

Structure Type:	Arch Bridge	**Date of Last Known Replacement:**	N/A
Structure Material:	Steel - Corrugated		
Tide Gate Present:	No		

Crossing Dimensions (ft):	Upstream	Downstream
Dimension A (width):	25	25
Dimension B^{CB}(height):	11.3	13
Crossing Length (Invert to Invert):	50	

Crossing Condition:	**Headwall Material**	**Headwall Condition**	**Wingwall Material**	**Wingwall Condition**	**Scour at Structure**	**Scour Severity**
Upstream	None	N/A	Masonry	Fair	Wingwalls	Medium
Downstream	None	N/A	Masonry	Poor	Wingwalls	High

Scour in Structure	**Scour Severity in Structure**	**Road Surface Condition**	**Utilities at Crossing**	**Structure Condition Overall**
Abutment	Medium	Fair	Overhead electric, sewer/water through crossing	Poor

Structure Condition Comments:	Sewer pipe running under crossing, severe spalling and loss of material for DS wingwall

Ecological Assessment:	Upstream	Downstream
Natural Community Classification:	Sparsely Vegetated Intertidal Habitat	Sparsely Vegetated Intertidal Habitat
Upstream Salt Marsh Migration Potential (acres):	37.76	

Flood Hazard & Emergency Access

Site Identified in Hazard Mitigation Plan:	Yes
Emergency Access or Evacuation Route:	Yes
History of Flooding:	No

Tidal Crossing Summary Sheet

New Hampshire's Tidal Crossing Assessment Protocol

Crossing ID: 74

Observer(s) & Organization:	JB TS (NHDES Coastal)
Municipality:	PORTSMOUTH
Stream Name:	N/A
Road Name:	N/A

Date:	8/14/2018
Start Time:	8:35:00 AM
End Time:	10:00:00 AM

Tide Prediction	**High**	**Low**
Time:	2:35 PM	8:13 AM
Elevation:	9.1	-1.2
Tide Chart Location:	Portsmouth Harbor	

Crossing Condition Evaluation	Score*
Crossing Condition	2
Tidal Restriction Evaluation	
Tidal Range Ratio	1
Crossing Ratio	2
Erosion Classification	3
Tidal Restriction Overall Score	2
Tidal Aquatic Organism Passage	
Tidal Range Ratio	1
Salt Marsh Migration Evaluation	
Salt Marsh Migration Potential (Eval. Unit)	3
Salt Marsh Migration Potential (Wshed.)	3
Vegetation Evaluation	
Vegetation Comparison Matrix	1
Infrastructure Risk Evaluation	
Inundation Risk to the Roadway (US, DS)	2,2
Inun. Risk to the Crossing Structure (US, DS)	2,2
Adverse Impacts Evaluation**	
Inundation Risk to Low-Lying Development	5
Overall Scores	
Infrastructure	2
Ecological	3
Combined	2

DS view toward structure

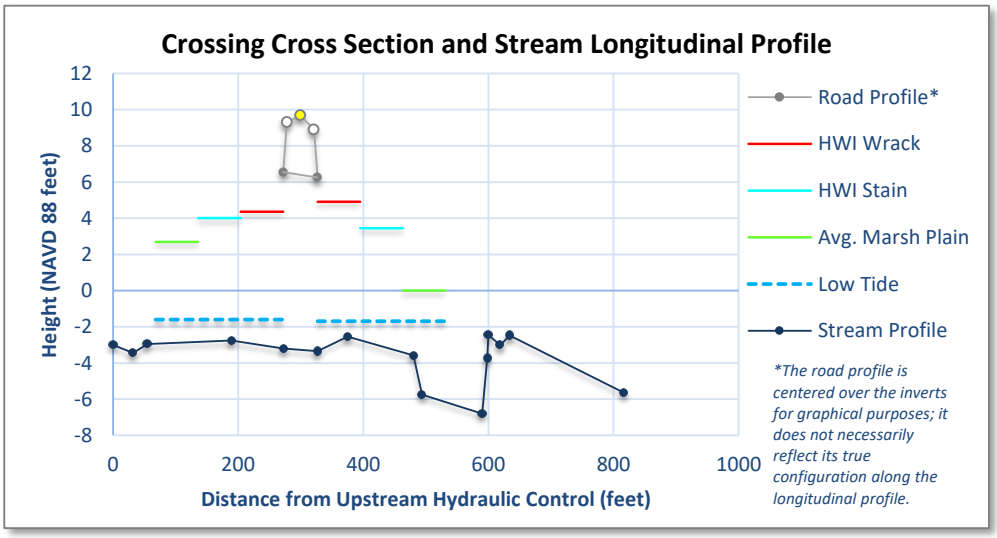
US view above structure

US view toward structure

DS view above structure

* Scoring system ranges from 1 to 5, where 1 = lowest replacement priority and 5 = highest replacement priority

**Adverse Impacts Evaluation scores range from 1 to 5, where 1 = high risk and 5 = low risk

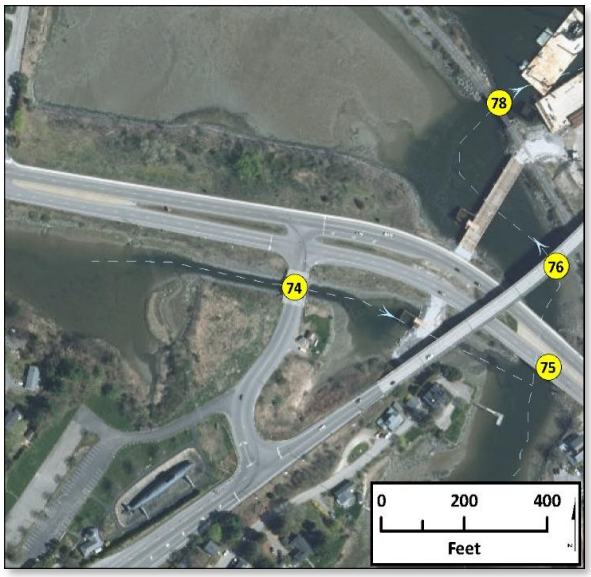


Long. Profile

Dist.	Hght.	Feat.	Sub.
0	-3.0015	HC	G
32	-3.4515	P	G
55	-2.9515	HC	G
189	-2.7515	HC	G
272	-3.2015	I	C
327	-3.3515	I	C
375	-2.5515	HC	G
480	-3.5815	CB	C
494	-5.7515	P	C/S
590	-6.8015	CB	C
598	-3.7515	CB	C
600	-2.4515	HC	C
619	-3.0215	CB	C
634	-2.4815	HC	G
817	-5.6515	HC	C

Crossing Context:

This crossing was built for access to the Albacore Sub Museum and conducts tides through a rip-rap canal into a small intertidal embayment formed by the construction of Market Street Extension. The canal had a sill that created a subtidal salt pond with the intention to reduce odors from undocumented sewage. In the 1990s the sill was removed and sewage sources were identified and corrected. The crossing does not impede flow and the structure is in good shape, leading to an overall combined score of 2, indicating low priority for replacement.



Structure Characteristics:

Structure Type:	Bridge with Side Slopes and Abutments	**Date of Last Known Replacement:**	N/A
Structure Material:	Concrete		
Tide Gate Present:	No		

Crossing Dimensions (ft):	Upstream	Downstream
Dimension A (width):	42	42
Dimension B^{CB}(height):	9.4	9.5
Crossing Length (Invert to Invert):	55	

Crossing Condition:	**Headwall Material**	**Headwall Condition**	**Wingwall Material**	**Wingwall Condition**	**Scour at Structure**	**Scour Severity**
Upstream	None	N/A	Concrete	Fair	None	None
Downstream	None	N/A	Concrete	Fair	None	None

Scour in Structure	**Scour Severity in Structure**	**Road Surface Condition**	**Utilities at Crossing**	**Structure Condition Overall**
None	None	Good	OHE. Pump station	Good

Structure Condition Comments:	Old retaining wall/dam coming into DS channel from banks

Ecological Assessment:	Upstream	Downstream
Natural Community Classification:	Sparsely Vegetated Intertidal Habitat	Sparsely Vegetated Intertidal Habitat
Upstream Salt Marsh Migration Potential (acres):	4.31	

Flood Hazard & Emergency Access

Site Identified in Hazard Mitigation Plan:	No
Emergency Access or Evacuation Route:	N/A
History of Flooding:	No

Tidal Crossing Summary Sheet

New Hampshire's Tidal Crossing Assessment Protocol

Crossing ID: 75

Observer(s) & Organization:	TS, JB (NHDES Coastal)
Municipality:	PORTSMOUTH
Stream Name:	N/A
Road Name:	Market St

Date:	8/7/2018
Start Time:	2:10:00 PM
End Time:	2:45:00 PM

Tide Prediction	**High**	**Low**
Time:	8:18 PM	1:53 PM
Elevation:	8.9	0.5
Tide Chart Location:	Portsmouth Harbor	

Crossing Condition Evaluation	Score*
Crossing Condition	1
Tidal Restriction Evaluation	
Tidal Range Ratio	1
Crossing Ratio	3
Erosion Classification	3
Tidal Restriction Overall Score	2
Tidal Aquatic Organism Passage	
Tidal Range Ratio	1
Salt Marsh Migration Evaluation	
Salt Marsh Migration Potential (Eval. Unit)	5
Salt Marsh Migration Potential (Wshed.)	5
Vegetation Evaluation	
Vegetation Comparison Matrix	1
Infrastructure Risk Evaluation	
Inundation Risk to the Roadway (US, DS)	1,1
Inun. Risk to the Crossing Structure (US, DS)	1,1
Adverse Impacts Evaluation**	
Inundation Risk to Low-Lying Development	1
Overall Scores	
Infrastructure	1
Ecological	1
Combined	2

DS view toward structure

US view above structure

US view toward structure

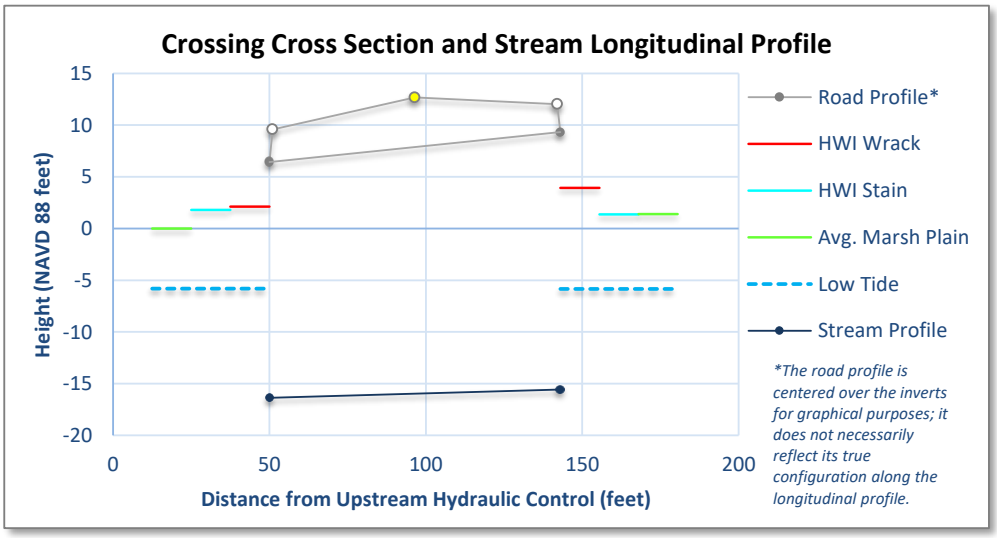
DS view above structure

* Scoring system ranges from 1 to 5, where 1 = lowest replacement priority and 5 = highest replacement priority

**Adverse Impacts Evaluation scores range from 1 to 5, where 1 = high risk and 5 = low risk

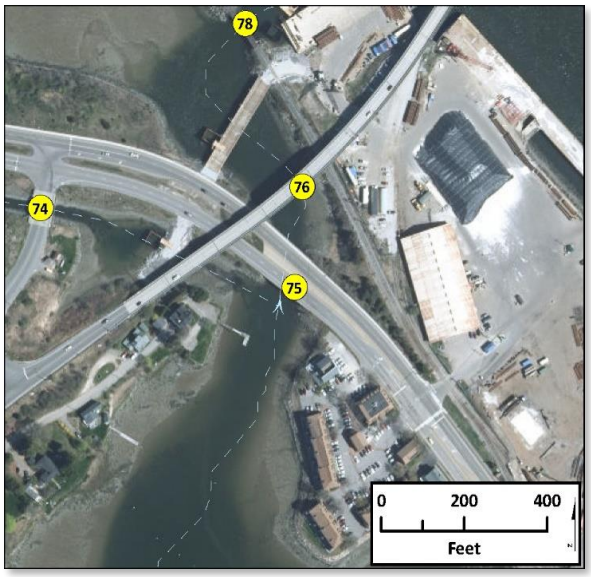
Long. Profile

Dist.	Hght.	Feat.	Sub.
50	-16.37	I	B
143	-15.57	I	B



Crossing Context:

Market Street Extension is built over the inlet to the North Mill Pond system and the crossing is very large (23 by 130 feet) that carries the tides without restriction. The structure is in very good shape and the overall combined score is 2, low priority for replacement.



Structure Characteristics:

Structure Type:	Bridge with Side Slopes and Abutments	**Date of Last Known Replacement:**	N/A
Structure Material:	Concrete		
Tide Gate Present:	No		

Crossing Dimensions (ft):	Upstream	Downstream
Dimension A (width):	129	132
Dimension B^{CB}(height):	22.8	24.9
Crossing Length (Invert to Invert):	93	

Crossing Condition:	**Headwall Material**	**Headwall Condition**	**Wingwall Material**	**Wingwall Condition**	**Scour at Structure**	**Scour Severity**
Upstream	None	N/A	Rip Rap	Good	None	None
Downstream	None	N/A	Rip Rap	Good	None	None

Scour in Structure	**Scour Severity in Structure**	**Road Surface Condition**	**Utilities at Crossing**	**Structure Condition Overall**
None	None	Good	Overhead electric	Good

Structure Condition Comments:	N/A

Ecological Assessment:	Upstream	Downstream
Natural Community Classification:	Sparsely Vegetated Intertidal Habitat	Sparsely Vegetated Intertidal Habitat
Upstream Salt Marsh Migration Potential (acres):	53.01	

Flood Hazard & Emergency Access

Site Identified in Hazard Mitigation Plan:	No
Emergency Access or Evacuation Route:	Yes
History of Flooding:	No

Tidal Crossing Summary Sheet

New Hampshire's Tidal Crossing Assessment Protocol

Crossing ID: 78

Observer(s) & Organization:	TS, JB (NHDES Coastal)
Municipality:	PORTSMOUTH
Stream Name:	N/A
Road Name:	N/A

Date:	8/7/2018
Start Time:	1:30:00 PM
End Time:	2:00:00 PM

Tide Prediction	**High**	**Low**
Time:	8:18 PM	1:53 PM
Elevation:	8.9	0.5
Tide Chart Location:	Portsmouth Harbor	

Crossing Condition Evaluation	Score*
Crossing Condition	2
Tidal Restriction Evaluation	
Tidal Range Ratio	1
Crossing Ratio	3
Erosion Classification	3
Tidal Restriction Overall Score	2
Tidal Aquatic Organism Passage	
Tidal Range Ratio	1
Salt Marsh Migration Evaluation	
Salt Marsh Migration Potential (Eval. Unit)	5
Salt Marsh Migration Potential (Wshed.)	5
Vegetation Evaluation	
Vegetation Comparison Matrix	1
Infrastructure Risk Evaluation	
Inundation Risk to the Roadway (US, DS)	1,1
Inun. Risk to the Crossing Structure (US, DS)	1,1
Adverse Impacts Evaluation**	
Inundation Risk to Low-Lying Development	1
Overall Scores	
Infrastructure	2
Ecological	1
Combined	2

DS view toward structure

US view above structure

US view toward structure

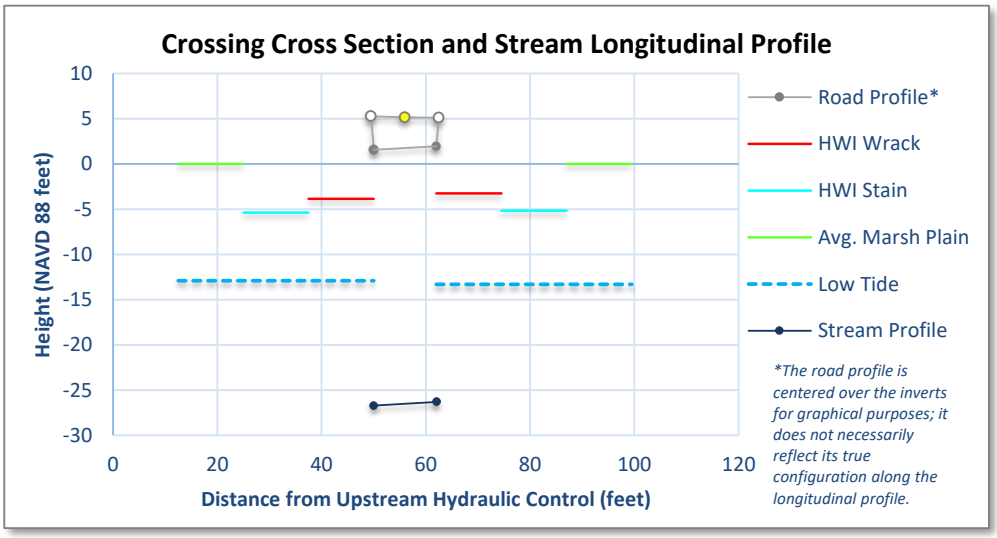
DS view above structure

* Scoring system ranges from 1 to 5, where 1 = lowest replacement priority and 5 = highest replacement priority

**Adverse Impacts Evaluation scores range from 1 to 5, where 1 = high risk and 5 = low risk

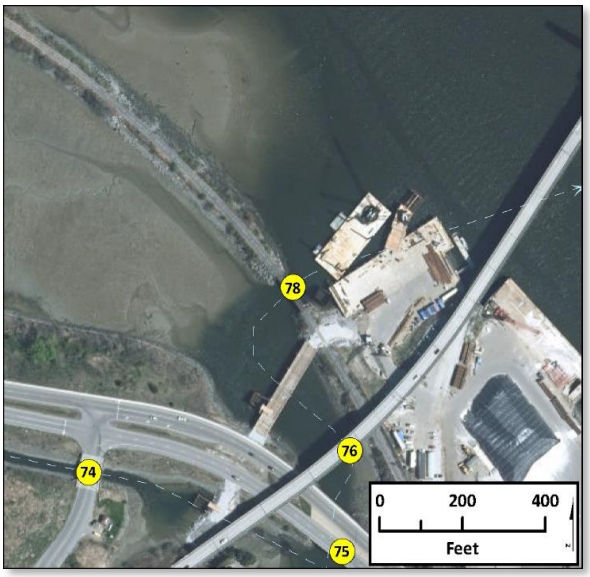
Long. Profile

Dist.	Hght.	Feat.	Sub.
50	-26.709	I	B
62	-26.309	I	B



Crossing Context:

This is the railroad bridge for a spur line that was built out upon Cutts Cove to connect a gypsum plant that makes wallboard. The crossing is somewhat restrictive in that it increases current speed through the opening, but it likely doesn't affect high tides upstream of the 96-foot span. The overall combined score is 2, indicating low priority for replacement.



Structure Characteristics:

Structure Type:	Bridge with Side Slopes	**Date of Last Known Replacement:**	N/A
Structure Material:	Wood		
Tide Gate Present:	No		

Crossing Dimensions (ft):	Upstream	Downstream
Dimension A (width):	96	96
Dimension B^{CB}(height):	28.25	28
Crossing Length (Invert to Invert):	12	

Crossing Condition:	**Headwall Material**	**Headwall Condition**	**Wingwall Material**	**Wingwall Condition**	**Scour at Structure**	**Scour Severity**
Upstream	None	N/A	Rip Rap	Fair	None	None
Downstream	None	N/A	Rip Rap	Fair	None	None

Scour in Structure	**Scour Severity in Structure**	**Road Surface Condition**	**Utilities at Crossing**	**Structure Condition Overall**
None	None	N/A	None	Fair

Structure Condition Comments:	N/A

Ecological Assessment:	Upstream	Downstream
Natural Community Classification:	Sparsely Vegetated Intertidal Habitat	Sparsely Vegetated Intertidal Habitat
Upstream Salt Marsh Migration Potential (acres):	66.26	

Flood Hazard & Emergency Access

Site Identified in Hazard Mitigation Plan:	No
Emergency Access or Evacuation Route:	N/A
History of Flooding:	Unknown

Tidal Crossing Summary Sheet

New Hampshire's Tidal Crossing Assessment Protocol

Crossing ID: 81

Observer(s) & Organization:	JB kl (NHDES Coastal)
Municipality:	NEWINGTON
Stream Name:	N/A
Road Name:	N/A

Date:	10/15/2018
Start Time:	12:04:00 PM
End Time:	1:30:00 PM

Tide Prediction	**High**	**Low**
Time:	4:49 PM	10:31 AM
Elevation:	7.8	1.3
Tide Chart Location:	Portsmouth Harbor	

Crossing Condition Evaluation	Score*
Crossing Condition	5
Tidal Restriction Evaluation	
Tidal Range Ratio	2
Crossing Ratio	3
Erosion Classification	5
Tidal Restriction Overall Score	3
Tidal Aquatic Organism Passage	
Tidal Range Ratio	2
Salt Marsh Migration Evaluation	
Salt Marsh Migration Potential (Eval. Unit)	1
Salt Marsh Migration Potential (Wshed.)	1
Vegetation Evaluation	
Vegetation Comparison Matrix	5
Infrastructure Risk Evaluation	
Inundation Risk to the Roadway (US, DS)	0,1
Inun. Risk to the Crossing Structure (US, DS)	5,5
Adverse Impacts Evaluation**	
Inundation Risk to Low-Lying Development	5
Overall Scores	
Infrastructure	5
Ecological	4
Combined	4

DS view toward structure

US view above structure

US view toward structure

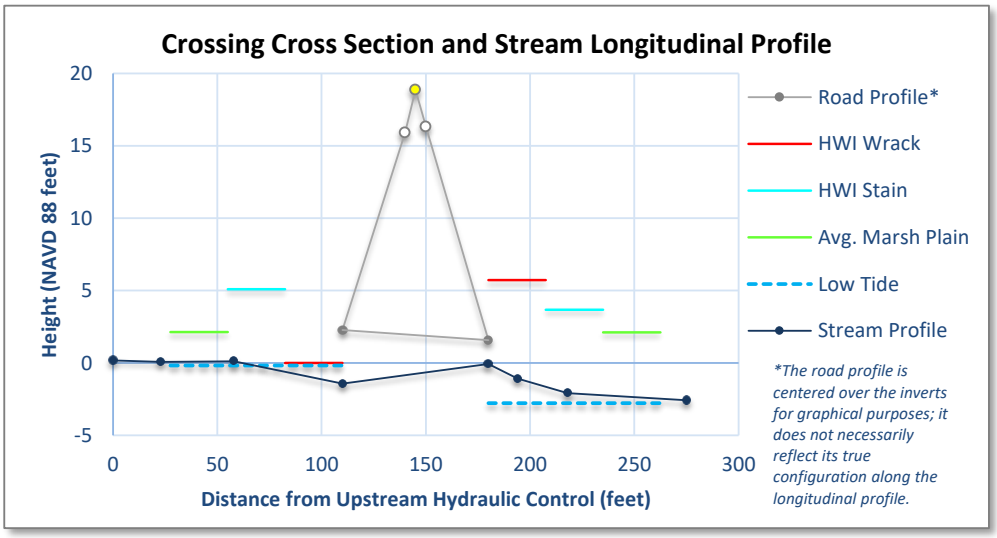
DS view above structure

* Scoring system ranges from 1 to 5, where 1 = lowest replacement priority and 5 = highest replacement priority

**Adverse Impacts Evaluation scores range from 1 to 5, where 1 = high risk and 5 = low risk

Long. Profile

Dist.	Hght.	Feat.	Sub.
0	0.1748	HC	C/S
23	0.0748	P	C/S
58	0.1248	HC	C/S
110	-1.4252	I	C/S
180	-0.0752	I	C/S
194	-1.0752	HC	C
218	-2.0752	CB	G
275	-2.5752	CB	C/S



Crossing Context:

An unnamed tidal creek supplying a salt marsh with tidal flow is crossed by Boston and Maine Corporation rail line by a 3-foot-wide by 4-foot-tall granite culvert that connects the wetland to the Piscataqua River. The crossing condition is poor, erosion is evident, and the entire culvert is underwater on a daily basis. In addition, the culvert is perched and the upstream plant community is different. All these deficiencies and vulnerabilities make this a high priority for replacement with an overall combined score of 4.

Structure Characteristics:

Structure Type:	Box Culvert	**Date of Last Known Replacement:**	N/A
Structure Material:	Stone		
Tide Gate Present:	No		

Crossing Dimensions (ft):	Upstream	Downstream
Dimension A (width):	3	3
Dimension B^{CB}(height):	3.7	2.2
Crossing Length (Invert to Invert):	70	

Crossing Condition:	**Headwall Material**	**Headwall Condition**	**Wingwall Material**	**Wingwall Condition**	**Scour at Structure**	**Scour Severity**
Upstream	Dry Fit Stone	Poor	None	N/A	Headwall	High
Downstream	Dry Fit Stone	Poor	None	N/A	Culvert	High

Scour in Structure	**Scour Severity in Structure**	**Road Surface Condition**	**Utilities at Crossing**	**Structure Condition Overall**
Culvert	High	N/A	None	Poor

Structure Condition Comments:	Highly scoured. DS structure destroyed

Ecological Assessment:	Upstream	Downstream
Natural Community Classification:	Low Salt Marsh	Sparsely Vegetated Intertidal Habitat
Upstream Salt Marsh Migration Potential (acres):	0.02	

Flood Hazard & Emergency Access

Site Identified in Hazard Mitigation Plan:	No
Emergency Access or Evacuation Route:	N/A
History of Flooding:	damaged culvert

Tidal Crossing Summary Sheet

New Hampshire's Tidal Crossing Assessment Protocol

Crossing ID: 84

Observer(s) & Organization:	TS, JB ()
Municipality:	ROLLINSFORD
Stream Name:	Sligo Brook
Road Name:	Sligo Rd

Date:	6/7/2018
Start Time:	2:20:00 PM
End Time:	4:24:00 PM

Tide Prediction	**High**	**Low**
Time:	8:26 PM	2:07 PM
Elevation:	6.7	1.2
Tide Chart Location:	Salmon Falls River	

Crossing Condition Evaluation	Score*
Crossing Condition	5
Tidal Restriction Evaluation	
Tidal Range Ratio	3
Crossing Ratio	3
Erosion Classification	3
Tidal Restriction Overall Score	3
Tidal Aquatic Organism Passage	
Tidal Range Ratio	3
Salt Marsh Migration Evaluation	
Salt Marsh Migration Potential (Eval. Unit)	1
Salt Marsh Migration Potential (Wshed.)	1
Vegetation Evaluation	
Vegetation Comparison Matrix	0
Infrastructure Risk Evaluation	
Inundation Risk to the Roadway (US, DS)	1,1
Inun. Risk to the Crossing Structure (US, DS)	1,1
Adverse Impacts Evaluation**	
Inundation Risk to Low-Lying Development	5
Overall Scores	
Infrastructure	5
Ecological	4
Combined	4

DS view toward structure

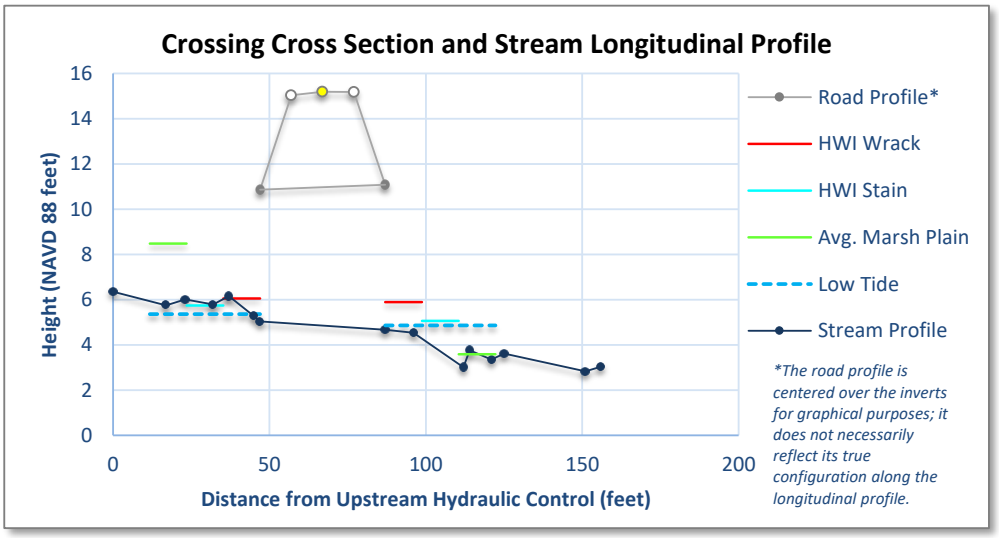
US view above structure

US view toward structure

DS view above structure

* Scoring system ranges from 1 to 5, where 1 = lowest replacement priority and 5 = highest replacement priority

**Adverse Impacts Evaluation scores range from 1 to 5, where 1 = high risk and 5 = low risk



Long. Profile

Dist.	Hght.	Feat.	Sub.
0	6.3503	HC	S
17	5.7403	P	S
23	6.0103	HC	S
32	5.7903	P	C
37	6.1503	HC	C
45	5.2703	GC	C
47	5.0403	I	C
87	4.6703	I	S
96	4.5403	HC	C
112	3.0103	P	S
114	3.7603	GC	B
121	3.3503	P	S
125	3.6203	HC	C
151	2.8303	P	S
156	3.0303	GC	C

Crossing Context:

Sligo Road in Rollinsford crosses the Sligo Brook and provides drainage through a 6 by 6-foot stone culvert with a crossing condition rated as poor. The potential for tidal flow through a restored culvert is low until sea level rise occurs because the crossing is perched at the head of tide. The overall combined score is 4: high priority for replacement.

Structure Characteristics:

Structure Type:	Box Culvert	**Date of Last Known Replacement:**	N/A
Structure Material:	Stone		
Tide Gate Present:	No		

Crossing Dimensions (ft):	Upstream	Downstream
Dimension A (width):	6.4	6.11
Dimension B^{CB}(height):	6.11	5.9
Crossing Length (Invert to Invert):	40	

Crossing Condition:	**Headwall Material**	**Headwall Condition**	**Wingwall Material**	**Wingwall Condition**	**Scour at Structure**	**Scour Severity**
Upstream	Dry Fit Stone	Poor	Rip Rap	Poor	Wingwalls	High
Downstream	Dry Fit Stone	Fair	Dry Fit Stone	Fair	Wingwalls	Medium

Scour in Structure	**Scour Severity in Structure**	**Road Surface Condition**	**Utilities at Crossing**	**Structure Condition Overall**
Culvert	High	Fair	OHE	Poor

Structure Condition Comments:	N/A

Ecological Assessment:	Upstream	Downstream
Natural Community Classification:	Freshwater Stream	Freshwater Stream
Upstream Salt Marsh Migration Potential (acres):	0.00	

Flood Hazard & Emergency Access

Site Identified in Hazard Mitigation Plan:	No
Emergency Access or Evacuation Route:	N/A
History of Flooding:	Unknown

Tidal Crossing Summary Sheet

New Hampshire's Tidal Crossing Assessment Protocol

Crossing ID: 85

Observer(s) & Organization:	TS, JB (NHDES Coastal)
Municipality:	ROLLINSFORD
Stream Name:	N/A
Road Name:	Sligo Rd

Date:	6/1/2018
Start Time:	10:10:00 AM
End Time:	12:00:00 PM

Tide Prediction	**High**	**Low**
Time:	3:37 PM	9:17 AM
Elevation:	6.1	1.0
Tide Chart Location:	Dover Point	

Crossing Condition Evaluation	Score*
Crossing Condition	5
Tidal Restriction Evaluation	
Tidal Range Ratio	3
Crossing Ratio	5
Erosion Classification	4
Tidal Restriction Overall Score	4
Tidal Aquatic Organism Passage	
Tidal Range Ratio	3
Salt Marsh Migration Evaluation	
Salt Marsh Migration Potential (Eval. Unit)	1
Salt Marsh Migration Potential (Wshed.)	1
Vegetation Evaluation	
Vegetation Comparison Matrix	0
Infrastructure Risk Evaluation	
Inundation Risk to the Roadway (US, DS)	1,1
Inun. Risk to the Crossing Structure (US, DS)	3,4
Adverse Impacts Evaluation**	
Inundation Risk to Low-Lying Development	5
Overall Scores	
Infrastructure	5
Ecological	4
Combined	4

DS view toward structure

US view above structure

US view toward structure

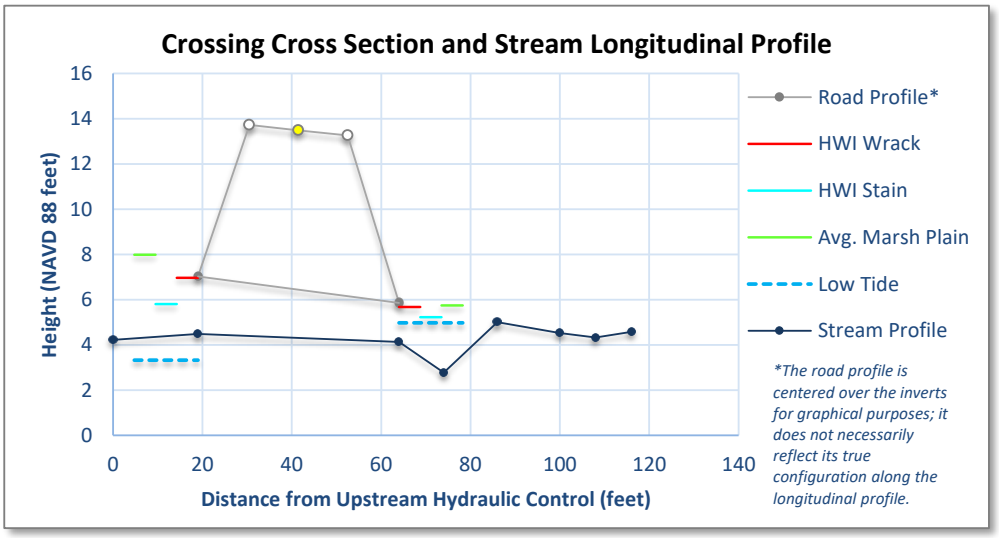
DS view above structure

* Scoring system ranges from 1 to 5, where 1 = lowest replacement priority and 5 = highest replacement priority

**Adverse Impacts Evaluation scores range from 1 to 5, where 1 = high risk and 5 = low risk

Long. Profile

Dist.	Hght.	Feat.	Sub.
0	4.2243	US HC	C/S
19	4.4843	US I	G
64	4.1243	DS I	G
74	2.7743	DS P	G
86	5.0043	DS HC	S
100	4.5243	DS HC	S
108	4.3243	DS P	S
116	4.5743	DS HC	S



Crossing Context:

Sligo Road crosses an unnamed creek just north of crossing #84 through a 6 by 2-foot stone culvert. The crossing condition is poor with erosion and tidal restriction observed, including a plunge pool downstream and an impoundment upstream. The overall combined score is 4: high priority for replacement. The roadway was washed out in 2011 and a pipe was added above the failing culvert to prevent another washout, highlighting the need for replacement.

Structure Characteristics:

Structure Type:	Box Culvert	**Date of Last Known Replacement:**	N/A
Structure Material:	Stone		
Tide Gate Present:	No		

Crossing Dimensions (ft):	Upstream	Downstream
Dimension A (width):	6	3.5
Dimension B^{CB}(height):	2	1.8
Crossing Length (Invert to Invert):	45	

Crossing Condition:	**Headwall Material**	**Headwall Condition**	**Wingwall Material**	**Wingwall Condition**	**Scour at Structure**	**Scour Severity**
Upstream	Dry Fit Stone	Poor	Dry Fit Stone	Fair	None	None
Downstream	Dry Fit Stone	Poor	None	N/A	None	None

Scour in Structure	**Scour Severity in Structure**	**Road Surface Condition**	**Utilities at Crossing**	**Structure Condition Overall**
None	None	Fair	OHE	Poor

Structure Condition Comments:	N/A

Ecological Assessment:	Upstream	Downstream
Natural Community Classification:	Freshwater Marsh	Freshwater Marsh
Upstream Salt Marsh Migration Potential (acres):	0.00	

Flood Hazard & Emergency Access

Site Identified in Hazard Mitigation Plan:	Yes
Emergency Access or Evacuation Route:	N/A
History of Flooding:	culvert washed out in '11. Since been upgraded.

Tidal Crossing Summary Sheet

New Hampshire's Tidal Crossing Assessment Protocol

Crossing ID: 86

Observer(s) & Organization:	TS, Jab (NHDES Coastal)
Municipality:	DOVER
Stream Name:	Fresh Creek
Road Name:	Atlantic Ave

Date:	6/5/2018
Start Time:	12:20:00 PM
End Time:	3:50:00 PM

Tide Prediction	**High**	**Low**
Time:	6:42 PM	12:26 PM
Elevation:	6.4	0.6
Tide Chart Location:	Salmon Falls River	

Crossing Condition Evaluation	Score*
Crossing Condition	1
Tidal Restriction Evaluation	
Tidal Range Ratio	5
Crossing Ratio	5
Erosion Classification	0
Tidal Restriction Overall Score	5
Tidal Aquatic Organism Passage	
Tidal Range Ratio	5
Salt Marsh Migration Evaluation	
Salt Marsh Migration Potential (Eval. Unit)	5
Salt Marsh Migration Potential (Wshed.)	5
Vegetation Evaluation	
Vegetation Comparison Matrix	5
Infrastructure Risk Evaluation	
Inundation Risk to the Roadway (US, DS)	1,1
Inun. Risk to the Crossing Structure (US, DS)	1,1
Adverse Impacts Evaluation**	
Inundation Risk to Low-Lying Development	5
Overall Scores	
Infrastructure	1
Ecological	5
Combined	5

DS view toward structure

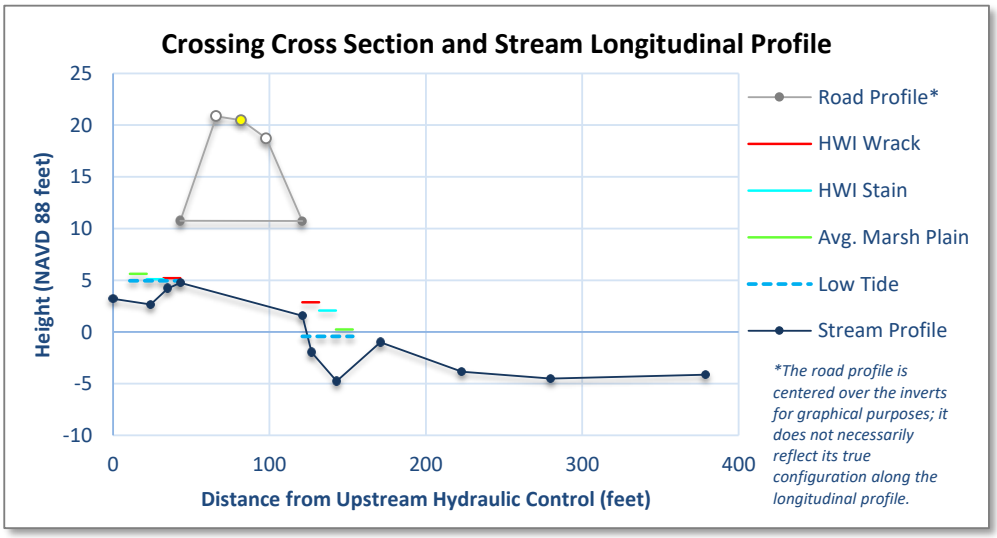
US view above structure

US view toward structure

DS view above structure

* Scoring system ranges from 1 to 5, where 1 = lowest replacement priority and 5 = highest replacement priority

**Adverse Impacts Evaluation scores range from 1 to 5, where 1 = high risk and 5 = low risk



Long. Profile

Dist.	Hght.	Feat.	Sub.
0	3.2002	HC	G
24	2.6702	P	G
35	4.2102	GC	B
43	4.7502	I	B
121	1.5702	I	B
127	-1.9798	GC	B
143	-4.7598	P	B
171	-0.9898	GC	B
223	-3.8598	HC	B
280	-4.5098	P	B
379	-4.1298	HC	C/S

Crossing Context:

The crossing over Fresh Creek is a 6 by 20-foot culvert that is relatively new and in good shape, but it is perched just above the high water line. The overall combined score is a 5, highest priority for replacement because it cuts off the entire watershed from tidal waters and prevents organism passage, including anadromous fish. It has been considered as a possible restoration site.

Structure Characteristics:

Structure Type:	Box Culvert	**Date of Last Known Replacement:**	N/A
Structure Material:	Concrete		
Tide Gate Present:	No		

Crossing Dimensions (ft):	Upstream	Downstream
Dimension A (width):	20	20
Dimension B^{CB}(height):	6	6
Crossing Length (Invert to Invert):	78	

Crossing Condition:	**Headwall Material**	**Headwall Condition**	**Wingwall Material**	**Wingwall Condition**	**Scour at Structure**	**Scour Severity**
Upstream	Concrete	Good	Rip Rap	Fair	Culvert	Low
Downstream	Concrete	Good	Rip Rap	Good	Culvert	Low

Scour in Structure	**Scour Severity in Structure**	**Road Surface Condition**	**Utilities at Crossing**	**Structure Condition Overall**
Culvert	Low	Good	OHE	Good

Structure Condition Comments:	Good shape

Ecological Assessment:	Upstream	Downstream
Natural Community Classification:	Freshwater Stream	Sparsely Vegetated Intertidal Habitat
Upstream Salt Marsh Migration Potential (acres):	18.73	

Flood Hazard & Emergency Access

Site Identified in Hazard Mitigation Plan:	No
Emergency Access or Evacuation Route:	N/A
History of Flooding:	post replacement flooding unknown

Tidal Crossing Summary Sheet

New Hampshire's Tidal Crossing Assessment Protocol

Crossing ID: 89

Observer(s) & Organization:	TS, JB (NHDES Coastal)
Municipality:	DOVER
Stream Name:	Varney Brook
Road Name:	Spur Rd

Date:	6/8/2018
Start Time:	2:20:00 PM
End Time:	4:10:00 PM

Tide Prediction	**High**	**Low**
Time:	8:55 PM	2:27 PM
Elevation:	6.4	0.7
Tide Chart Location:	Dover Point	

Crossing Condition Evaluation	Score*
Crossing Condition	4
Tidal Restriction Evaluation	
Tidal Range Ratio	5
Crossing Ratio	4
Erosion Classification	4
Tidal Restriction Overall Score	4
Tidal Aquatic Organism Passage	
Tidal Range Ratio	5
Salt Marsh Migration Evaluation	
Salt Marsh Migration Potential (Eval. Unit)	1
Salt Marsh Migration Potential (Wshed.)	3
Vegetation Evaluation	
Vegetation Comparison Matrix	5
Infrastructure Risk Evaluation	
Inundation Risk to the Roadway (US, DS)	1,1
Inun. Risk to the Crossing Structure (US, DS)	1,1
Adverse Impacts Evaluation**	
Inundation Risk to Low-Lying Development	5
Overall Scores	
Infrastructure	4
Ecological	5
Combined	5

DS view toward structure

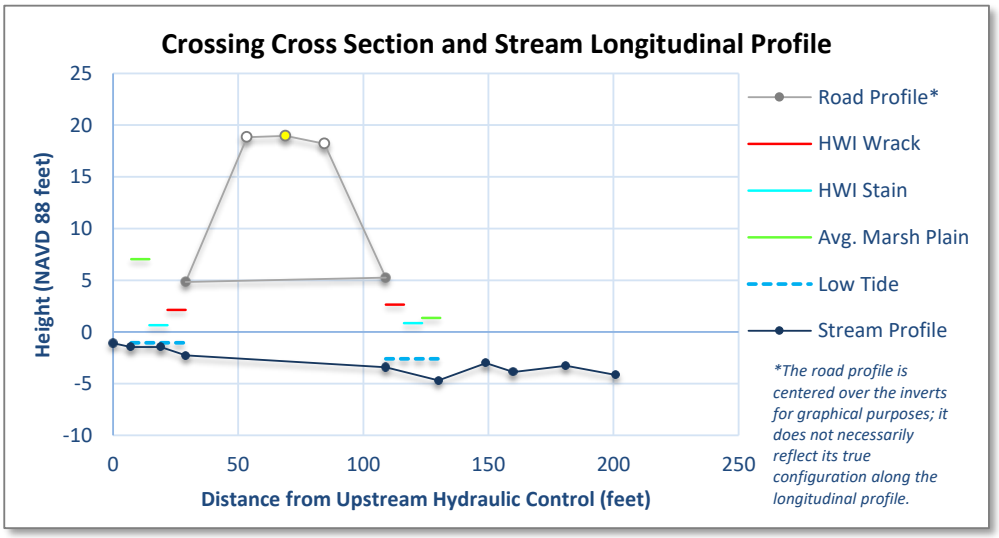
US view above structure

US view toward structure

DS view above structure

* Scoring system ranges from 1 to 5, where 1 = lowest replacement priority and 5 = highest replacement priority

**Adverse Impacts Evaluation scores range from 1 to 5, where 1 = high risk and 5 = low risk



Long. Profile

Dist.	Hght.	Feat.	Sub.
0	-1.0867	HC	G
7	-1.4667	P	G
19	-1.4467	GC	C
29	-2.2667	I	C
109	-3.4067	I	C
130	-4.6867	P	C
149	-3.0167	CB	C
160	-3.8667	P	C
181	-3.2767	HC	G
201	-4.1567	P	C/S
237	-3.8067	CB	C/S

Crossing Context:

Spur road in Dover crosses Varney Brook with a 7 by 8-foot granite culvert. Just 80 feet upstream of this crossing Route 16 crosses the Brook (#90) with double 6-foot diameter round culverts. The upstream area is heavily shaded and is not likely to support tidal marsh plants. The overall combined score for this crossing is 5, highest priority for replacement based upon crossing conditions, erosion and tidal restriction.

Structure Characteristics:

Structure Type:	Bridge with Abutments	**Date of Last Known Replacement:**	N/A
Structure Material:	Stone		
Tide Gate Present:	No		

Crossing Dimensions (ft):	Upstream	Downstream
Dimension A (width):	7.2	7.1
Dimension B^{CB}(height):	7.03	8.65
Crossing Length (Invert to Invert):	80	

Crossing Condition:	**Headwall Material**	**Headwall Condition**	**Wingwall Material**	**Wingwall Condition**	**Scour at Structure**	**Scour Severity**
Upstream	Dry Fit Stone	Good	Dry Fit Stone	Poor	Wingwalls	Low
Downstream	Dry Fit Stone	Fair	Dry Fit Stone	Poor	Wingwalls	Medium

Scour in Structure	**Scour Severity in Structure**	**Road Surface Condition**	**Utilities at Crossing**	**Structure Condition Overall**
Abutment	Medium	Fair	OHE and US sewer line	Fair

Structure Condition Comments:	Overall not bad. Collapsing wing walls.

Ecological Assessment:	Upstream	Downstream
Natural Community Classification:	Brackish Riverbank Marsh	Sparsely Vegetated Intertidal Habitat
Upstream Salt Marsh Migration Potential (acres):	4.59	

Flood Hazard & Emergency Access

Site Identified in Hazard Mitigation Plan:	Yes
Emergency Access or Evacuation Route:	N/A
History of Flooding:	Past flooding has occurred

Tidal Crossing Summary Sheet

New Hampshire's Tidal Crossing Assessment Protocol

Crossing ID: 90

Observer(s) & Organization:	TS, JB (NHDES Coastal)
Municipality:	DOVER
Stream Name:	Varney Brook
Road Name:	Spaulding Tpke N

Date:	8/2/2018
Start Time:	11:15:00 AM
End Time:	1:05:00 PM

Tide Prediction	**High**	**Low**
Time:	5:10 PM	10:48 AM
Elevation:	6.4	0.3
Tide Chart Location:	Dover Point	

Crossing Condition Evaluation	Score*
Crossing Condition	2
Tidal Restriction Evaluation	
Tidal Range Ratio	3
Crossing Ratio	3
Erosion Classification	4
Tidal Restriction Overall Score	3
Tidal Aquatic Organism Passage	
Tidal Range Ratio	3
Salt Marsh Migration Evaluation	
Salt Marsh Migration Potential (Eval. Unit)	1
Salt Marsh Migration Potential (Wshed.)	3
Vegetation Evaluation	
Vegetation Comparison Matrix	0
Infrastructure Risk Evaluation	
Inundation Risk to the Roadway (US, DS)	1,1
Inun. Risk to the Crossing Structure (US, DS)	2,3
Adverse Impacts Evaluation**	
Inundation Risk to Low-Lying Development	5
Overall Scores	
Infrastructure	2
Ecological	4
Combined	3

DS view toward structure

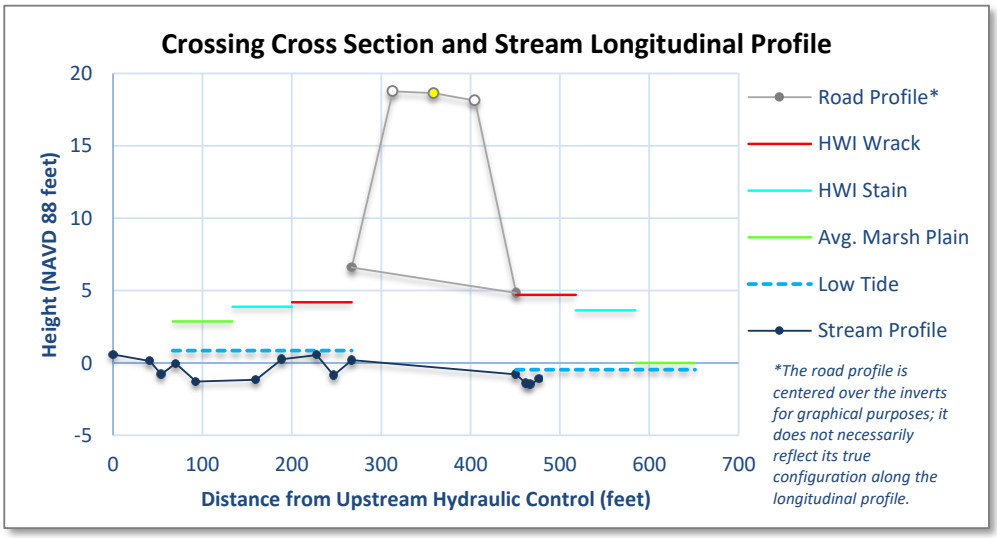
US view above structure

US view toward structure

DS view above structure

* Scoring system ranges from 1 to 5, where 1 = lowest replacement priority and 5 = highest replacement priority

**Adverse Impacts Evaluation scores range from 1 to 5, where 1 = high risk and 5 = low risk



Long. Profile

Dist.	Hght.	Feat.	Sub.
0	0.5852	HC	C/S
41	0.1452	CB	C/S
54	-0.7948	P	G
70	-0.0248	HC	B
93	-1.2848	P	G
160	-1.1548	CB	S
189	0.2652	HC	G
228	0.5552	HC	B
247	-0.8448	P	G
267	0.2052	I	C
451	-0.7948	I	B
462	-1.4148	P	C
467	-1.4748	HC	B
477	-1.1048	HC	B

Crossing Context:

N/A

Structure Characteristics:

Structure Type:	Round Culvert	**Date of Last Known Replacement:**	N/A
Structure Material:	Plastic - Smooth		
Tide Gate Present:	No		

Crossing Dimensions (ft):	Upstream	Downstream
Dimension A (width):	5.85	6
Dimension B[CB](height):	6.02	5.58
Crossing Length (Invert to Invert):	184	

Crossing Condition:	**Headwall Material**	**Headwall Condition**	**Wingwall Material**	**Wingwall Condition**	**Scour at Structure**	**Scour Severity**
Upstream	Dry Fit Stone	Fair	Dry Fit Stone	Fair	Armoring	Medium
Downstream	Dry Fit Stone	Fair	Dry Fit Stone	Fair	Armoring	Medium

Scour in Structure	**Scour Severity in Structure**	**Road Surface Condition**	**Utilities at Crossing**	**Structure Condition Overall**
None	None	Good	Sewer, runs through crossing	Fair

Structure Condition Comments:	Outer/old structure rotting, inner new culvert okay

Ecological Assessment:	Upstream	Downstream
Natural Community Classification:	Low Salt Marsh	Sparsely Vegetated Intertidal Habitat
Upstream Salt Marsh Migration Potential (acres):	4.59	

Flood Hazard & Emergency Access

Site Identified in Hazard Mitigation Plan:	Yes
Emergency Access or Evacuation Route:	N/A
History of Flooding:	Past flooding has occurred

Tidal Crossing Summary Sheet

New Hampshire's Tidal Crossing Assessment Protocol

Crossing ID: 91

Observer(s) & Organization:	TS, JB (NHDES Coastal)
Municipality:	DOVER
Stream Name:	Varney Brook
Road Name:	Dover Point Rd

Date:	6/18/2018
Start Time:	11:15:00 AM
End Time:	12:30:00 PM

Tide Prediction	**High**	**Low**
Time:	5:26 PM	10:59 AM
Elevation:	7.0	-0.8
Tide Chart Location:	Dover Point	

Crossing Condition Evaluation	Score*
Crossing Condition	2
Tidal Restriction Evaluation	
Tidal Range Ratio	1
Crossing Ratio	5
Erosion Classification	3
Tidal Restriction Overall Score	3
Tidal Aquatic Organism Passage	
Tidal Range Ratio	1
Salt Marsh Migration Evaluation	
Salt Marsh Migration Potential (Eval. Unit)	3
Salt Marsh Migration Potential (Wshed.)	3
Vegetation Evaluation	
Vegetation Comparison Matrix	0
Infrastructure Risk Evaluation	
Inundation Risk to the Roadway (US, DS)	2,2
Inun. Risk to the Crossing Structure (US, DS)	1,2
Adverse Impacts Evaluation**	
Inundation Risk to Low-Lying Development	5
Overall Scores	
Infrastructure	2
Ecological	4
Combined	2

DS view toward structure

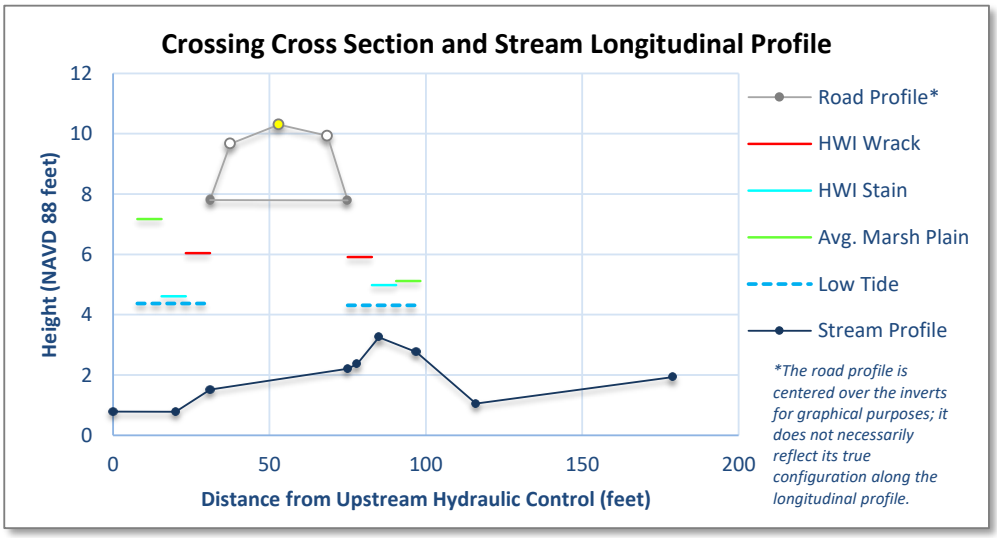
US view above structure

US view toward structure

DS view above structure

* Scoring system ranges from 1 to 5, where 1 = lowest replacement priority and 5 = highest replacement priority

**Adverse Impacts Evaluation scores range from 1 to 5, where 1 = high risk and 5 = low risk

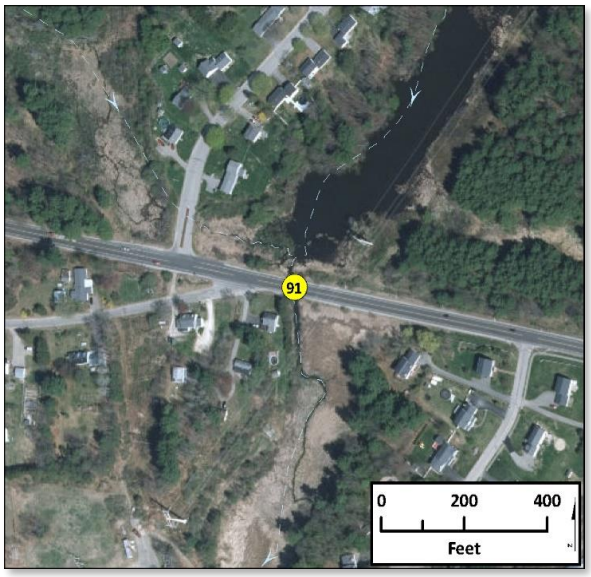


Long. Profile

Dist.	Hght.	Feat.	Sub.
0	0.7918	HC	G
20	0.7818	P	C
31	1.5218	I	G
75	2.2118	I	C
78	2.3618	P	G
85	3.2518	CB	C
97	2.7618	HC	C
116	1.0518	P	G
179	1.9318	HC	S

Crossing Context:

N/A



Structure Characteristics:

Structure Type:	Bridge with Abutments	**Date of Last Known Replacement:**	N/A
Structure Material:	Concrete		
Tide Gate Present:	No		

Crossing Dimensions (ft):	Upstream	Downstream
Dimension A (width):	9.35	8.8
Dimension B^{CB}(height):	6.5	5.55
Crossing Length (Invert to Invert):	44	

Crossing Condition:	**Headwall Material**	**Headwall Condition**	**Wingwall Material**	**Wingwall Condition**	**Scour at Structure**	**Scour Severity**
Upstream	None	N/A	Dry Fit Stone	Fair	Footer	Low
Downstream	None	N/A	Concrete	Good	Footer	Low

Scour in Structure	**Scour Severity in Structure**	**Road Surface Condition**	**Utilities at Crossing**	**Structure Condition Overall**
Footer	Medium	Fair	Overhead electric, pipe upstream over crossing	Fair

Structure Condition Comments:	N/A

Ecological Assessment:	Upstream	Downstream
Natural Community Classification:	Freshwater Marsh	Brackish Riverbank Marsh
Upstream Salt Marsh Migration Potential (acres):	3.99	

Flood Hazard & Emergency Access

Site Identified in Hazard Mitigation Plan:	Yes
Emergency Access or Evacuation Route:	N/A
History of Flooding:	Past flooding has occurred.

Tidal Crossing Summary Sheet

New Hampshire's Tidal Crossing Assessment Protocol

Crossing ID: 92

Observer(s) & Organization:	TS (NHDES Coastal)
Municipality:	MADBURY
Stream Name:	N/A
Road Name:	Piscataqua Bridge Rd

Date:	7/16/2018
Start Time:	10:20:00 AM
End Time:	11:26:00 AM

Tide Prediction	**High**	**Low**
Time:	4:09 PM	9:45 AM
Elevation:	7.3	-1.1
Tide Chart Location:	Dover Point	

Crossing Condition Evaluation	Score*
Crossing Condition	5
Tidal Restriction Evaluation	
Tidal Range Ratio	5
Crossing Ratio	4
Erosion Classification	5
Tidal Restriction Overall Score	5
Tidal Aquatic Organism Passage	
Tidal Range Ratio	5
Salt Marsh Migration Evaluation	
Salt Marsh Migration Potential (Eval. Unit)	1
Salt Marsh Migration Potential (Wshed.)	1
Vegetation Evaluation	
Vegetation Comparison Matrix	1
Infrastructure Risk Evaluation	
Inundation Risk to the Roadway (US, DS)	1,1
Inun. Risk to the Crossing Structure (US, DS)	1,1
Adverse Impacts Evaluation**	
Inundation Risk to Low-Lying Development	5
Overall Scores	
Infrastructure	5
Ecological	5
Combined	4

DS view toward structure

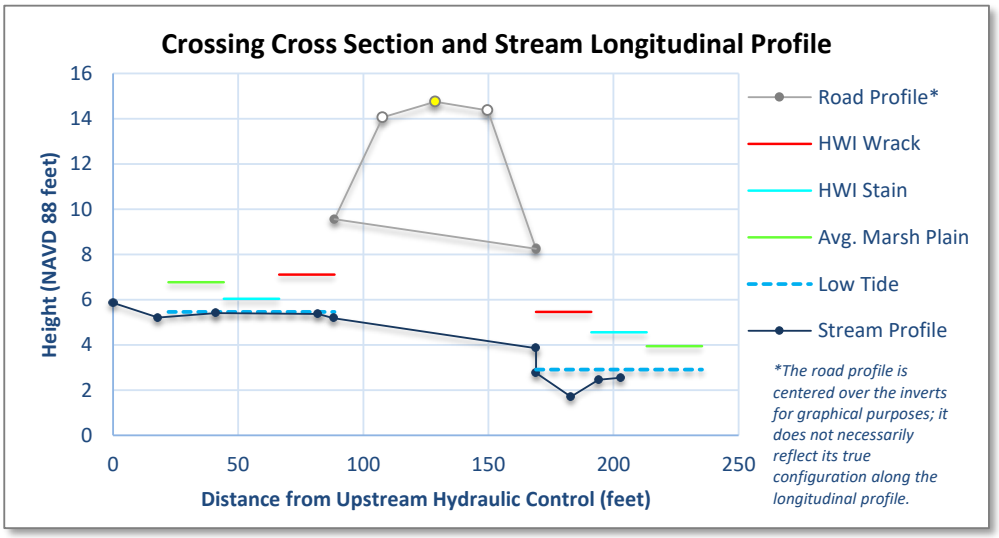
US view above structure

US view toward structure

DS view above structure

* Scoring system ranges from 1 to 5, where 1 = lowest replacement priority and 5 = highest replacement priority

**Adverse Impacts Evaluation scores range from 1 to 5, where 1 = high risk and 5 = low risk



Long. Profile

Dist.	Hght.	Feat.	Sub.
0	5.8574	HC	G
18	5.2074	P	C/S
41	5.4074	HC	S
82	5.3674	GC	C
88	5.1874	I	G
169	3.8574	I	C
169	2.7574	CB	C
183	1.7074	P	S
194	2.4574	HC	C
203	2.5474	HC	C
214	1.8574	P	C
242	2.3274	HC	C

Crossing Context:

N/A

Structure Characteristics:

Structure Type:	Round Culvert	**Date of Last Known Replacement:**	N/A
Structure Material:	Steel - Corrugated		
Tide Gate Present:	No		

Crossing Dimensions (ft):	Upstream	Downstream
Dimension A (width):	4.4	4.5
Dimension B^{CB}(height):	4.4	4.3
Crossing Length (Invert to Invert):	80.5	

Crossing Condition:	**Headwall Material**	**Headwall Condition**	**Wingwall Material**	**Wingwall Condition**	**Scour at Structure**	**Scour Severity**
Upstream	None	N/A	Concrete	Poor	Culvert	Low
Downstream	Dry Fit Stone	Poor	Dry Fit Stone	Poor	Culvert	Low

Scour in Structure	**Scour Severity in Structure**	**Road Surface Condition**	**Utilities at Crossing**	**Structure Condition Overall**
None	None	Good	Overhead electric	Fair

Structure Condition Comments:	N/A

Ecological Assessment:	Upstream	Downstream
Natural Community Classification:	Freshwater Stream	Freshwater Stream
Upstream Salt Marsh Migration Potential (acres):	0.00	

Flood Hazard & Emergency Access

Site Identified in Hazard Mitigation Plan:	No
Emergency Access or Evacuation Route:	N/A
History of Flooding:	Unknown

Tidal Crossing Summary Sheet

New Hampshire's Tidal Crossing Assessment Protocol

Crossing ID: 93

Observer(s) & Organization:	TS,JB (NHDES Coastal)
Municipality:	DURHAM
Stream Name:	Bunker Creek
Road Name:	Piscataqua Rd

Date:	8/3/2018
Start Time:	10:00:00 AM
End Time:	11:45:00 AM

Tide Prediction	**High**	**Low**
Time:	5:53 PM	11:29 AM
Elevation:	6.5	0.4
Tide Chart Location:	Dover Point	

Crossing Condition Evaluation	Score*
Crossing Condition	5
Tidal Restriction Evaluation	
Tidal Range Ratio	1
Crossing Ratio	2
Erosion Classification	5
Tidal Restriction Overall Score	3
Tidal Aquatic Organism Passage	
Tidal Range Ratio	1
Salt Marsh Migration Evaluation	
Salt Marsh Migration Potential (Eval. Unit)	4
Salt Marsh Migration Potential (Wshed.)	4
Vegetation Evaluation	
Vegetation Comparison Matrix	5
Infrastructure Risk Evaluation	
Inundation Risk to the Roadway (US, DS)	3,3
Inun. Risk to the Crossing Structure (US, DS)	1,2
Adverse Impacts Evaluation**	
Inundation Risk to Low-Lying Development	5
Overall Scores	
Infrastructure	5
Ecological	4
Combined	4

DS view toward structure

US view above structure

US view toward structure

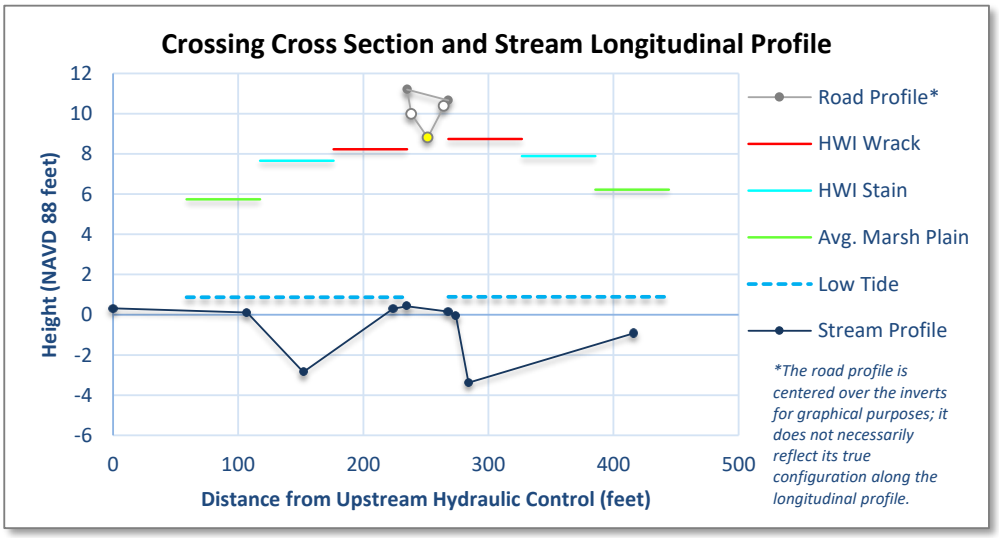
DS view above structure

* Scoring system ranges from 1 to 5, where 1 = lowest replacement priority and 5 = highest replacement priority

**Adverse Impacts Evaluation scores range from 1 to 5, where 1 = high risk and 5 = low risk

Long. Profile

Dist.	Hght.	Feat.	Sub.
0	0.3191	HC	C/S
107	0.1091	HC	C/S
152	-2.8509	P	G
224	0.2991	GC	Shell
235	0.4191	I	Shell
268	0.1491	I	Shell
274	-0.0709	GC	Shell
284	-3.3809	P	G
416	-0.9309	HC	C/S



Crossing Context:

The crossing of Bunker Creek at Route 4 in Durham is a 10.5 by 13-foot concrete structure showing multiple signs of wear and erosion. It features plunge pools on either side and restricts tidal flow to an upstream marsh that is largely tall form cordgrass (in contrast, almost all marshes in the State are dominated by salt hay). The upstream marsh is managed by NH Fish and Game and is a sentinel site with long term monitoring for the Great Bay National Estuarine Research Reserve. The combined overall combined score is 4, a high priority for replacement.

Structure Characteristics:

Structure Type:	Bridge with Abutments	**Date of Last Known Replacement:**	N/A
Structure Material:	Concrete		
Tide Gate Present:	No		

Crossing Dimensions (ft):	Upstream	Downstream
Dimension A (width):	13.88	12.7
Dimension B^{CB}(height):	10.54	10.46
Crossing Length (Invert to Invert):	33	

Crossing Condition:	**Headwall Material**	**Headwall Condition**	**Wingwall Material**	**Wingwall Condition**	**Scour at Structure**	**Scour Severity**
Upstream	None	N/A	Concrete	Poor	Wingwalls	Medium
Downstream	None	N/A	Concrete	Poor	Wingwalls	Medium

Scour in Structure	**Scour Severity in Structure**	**Road Surface Condition**	**Utilities at Crossing**	**Structure Condition Overall**
Abutment	Medium	Fair	Overhead electric	Poor

Structure Condition Comments:	N/A

Ecological Assessment:	Upstream	Downstream
Natural Community Classification:	Low Salt Marsh	Sparsely Vegetated Intertidal Habitat
Upstream Salt Marsh Migration Potential (acres):	6.29	

Flood Hazard & Emergency Access

Site Identified in Hazard Mitigation Plan:	No
Emergency Access or Evacuation Route:	N/A
History of Flooding:	Unknown

Tidal Crossing Summary Sheet

New Hampshire's Tidal Crossing Assessment Protocol

Crossing ID: 95

Observer(s) & Organization:	TS, SL (NHDES Coastal)
Municipality:	DURHAM
Stream Name:	Johnson Creek
Road Name:	Piscataqua Rd

Date:	7/27/2018
Start Time:	7:40:00 AM
End Time:	9:37:00 AM

Tide Prediction	**High**	**Low**
Time:	1:33 PM	7:16 AM
Elevation:	6.1	0.2
Tide Chart Location:	Dover Point	

Crossing Condition Evaluation	Score*
Crossing Condition	1
Tidal Restriction Evaluation	
Tidal Range Ratio	1
Crossing Ratio	3
Erosion Classification	4
Tidal Restriction Overall Score	3
Tidal Aquatic Organism Passage	
Tidal Range Ratio	1
Salt Marsh Migration Evaluation	
Salt Marsh Migration Potential (Eval. Unit)	4
Salt Marsh Migration Potential (Wshed.)	5
Vegetation Evaluation	
Vegetation Comparison Matrix	1
Infrastructure Risk Evaluation	
Inundation Risk to the Roadway (US, DS)	1,1
Inun. Risk to the Crossing Structure (US, DS)	1,1
Adverse Impacts Evaluation**	
Inundation Risk to Low-Lying Development	5
Overall Scores	
Infrastructure	1
Ecological	1
Combined	2

DS view toward structure

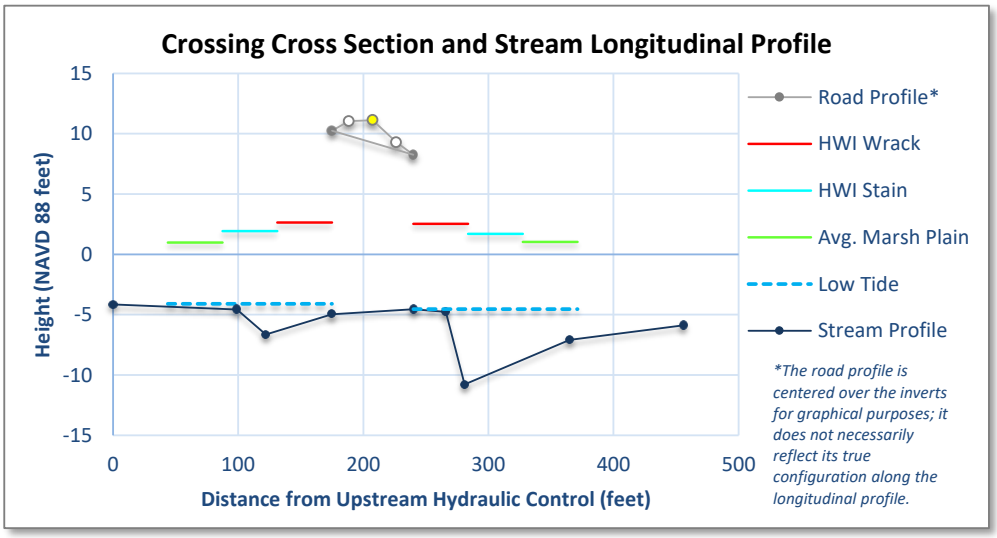
US view above structure

US view toward structure

DS view above structure

* Scoring system ranges from 1 to 5, where 1 = lowest replacement priority and 5 = highest replacement priority

**Adverse Impacts Evaluation scores range from 1 to 5, where 1 = high risk and 5 = low risk



Long. Profile

Dist.	Hght.	Feat.	Sub.
0	-4.148	HC	C/S
99	-4.578	HC	C/S
122	-6.648	P	C/S
175	-4.958	I	G
240	-4.538	I	B
266	-4.778	GC	B
281	-10.778	P	C/S
365	-7.098	HC	C/S
456	-5.868	HC	G

Crossing Context:

N/A

Structure Characteristics:

Structure Type:	Bridge with Abutments	**Date of Last Known Replacement:**	N/A
Structure Material:	Concrete		
Tide Gate Present:	No		

Crossing Dimensions (ft):	Upstream	Downstream
Dimension A (width):	16	15.5
Dimension B^{CB}(height):	16.1	13.5
Crossing Length (Invert to Invert):	65	

Crossing Condition:	**Headwall Material**	**Headwall Condition**	**Wingwall Material**	**Wingwall Condition**	**Scour at Structure**	**Scour Severity**
Upstream	None	N/A	Concrete	Good	None	None
Downstream	None	N/A	Concrete	Good	Abutment	Medium

Scour in Structure	**Scour Severity in Structure**	**Road Surface Condition**	**Utilities at Crossing**	**Structure Condition Overall**
Abutment	Low	Fair	Overhead electric	Good

Structure Condition Comments:	Good overall so spalling/scour inside exposing rebar

Ecological Assessment:	Upstream	Downstream
Natural Community Classification:	Low Salt Marsh	Low Salt Marsh
Upstream Salt Marsh Migration Potential (acres):	10.97	

Flood Hazard & Emergency Access

Site Identified in Hazard Mitigation Plan:	No
Emergency Access or Evacuation Route:	N/A
History of Flooding:	unknown

Tidal Crossing Summary Sheet

New Hampshire's Tidal Crossing Assessment Protocol

Crossing ID: 96

Observer(s) & Organization:	JB TS (NHDES Coastal)
Municipality:	MADBURY
Stream Name:	Johnson Creek
Road Name:	Creek Rd

Date:	7/18/2018
Start Time:	12:30:00 PM
End Time:	2:00:00 PM

Tide Prediction	**High**	**Low**
Time:	6:02 PM	11:35 AM
Elevation:	7.1	-0.5
Tide Chart Location:	Salmon Falls River	

Crossing Condition Evaluation	Score*
Crossing Condition	5
Tidal Restriction Evaluation	
Tidal Range Ratio	1
Crossing Ratio	5
Erosion Classification	4
Tidal Restriction Overall Score	3
Tidal Aquatic Organism Passage	
Tidal Range Ratio	1
Salt Marsh Migration Evaluation	
Salt Marsh Migration Potential (Eval. Unit)	2
Salt Marsh Migration Potential (Wshed.)	2
Vegetation Evaluation	
Vegetation Comparison Matrix	4
Infrastructure Risk Evaluation	
Inundation Risk to the Roadway (US, DS)	5,4
Inun. Risk to the Crossing Structure (US, DS)	1,1
Adverse Impacts Evaluation**	
Inundation Risk to Low-Lying Development	5
Overall Scores	
Infrastructure	5
Ecological	4
Combined	5

DS view toward structure

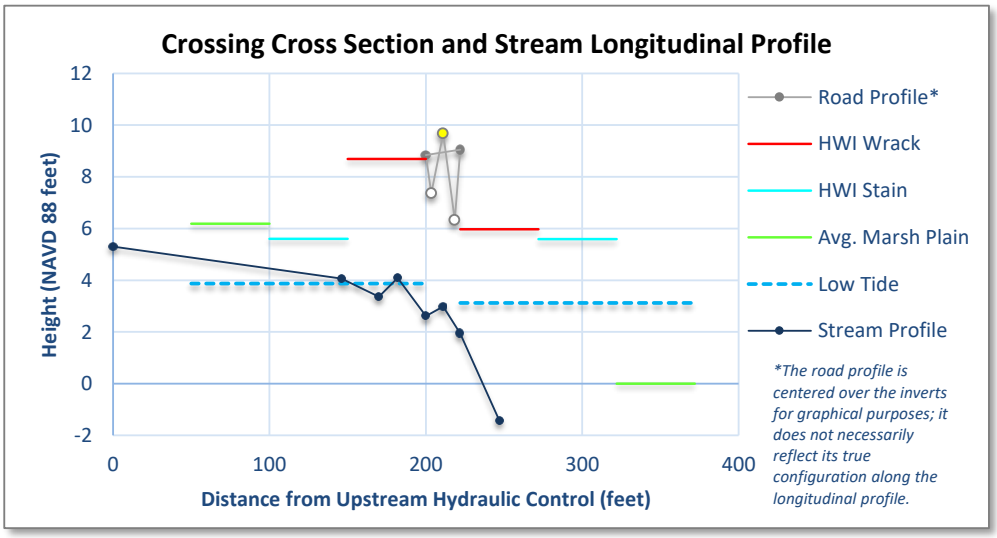
US view above structure

US view toward structure

DS view above structure

* Scoring system ranges from 1 to 5, where 1 = lowest replacement priority and 5 = highest replacement priority

**Adverse Impacts Evaluation scores range from 1 to 5, where 1 = high risk and 5 = low risk



Long. Profile

Dist.	Hght.	Feat.	Sub.
0	5.3019	HC	C/S
146	4.0619	HC	C/S
170	3.3619	P	C/S
182	4.0819	HC	C/S
200	2.6119	I	B
211	2.9819	HC	B
222	1.9519	I	B
247	-1.4281	P	B

Crossing Context:

Johnson Creek is a long narrow tidal creek that reaches into Madbury as it becomes brackish and fresh. Creek Road crosses the waterway with a 9.3 feet wide by 6.8 feet tall stone bridge. The crossing condition is poor, crossing ratio is poor and erosion is evident. The overall combined score is 5, highest priority for replacement.

Structure Characteristics:

Structure Type:	Bridge with Abutments	**Date of Last Known Replacement:**	N/A
Structure Material:	Stone		
Tide Gate Present:	No		

Crossing Dimensions (ft):	Upstream	Downstream
Dimension A (width):	9.3	9.3
Dimension B^{CB}(height):	6.9	6.7
Crossing Length (Invert to Invert):	22	

Crossing Condition:	**Headwall Material**	**Headwall Condition**	**Wingwall Material**	**Wingwall Condition**	**Scour at Structure**	**Scour Severity**
Upstream	None	N/A	None	N/A	Abutment	High
Downstream	None	N/A	None	N/A	Abutment	Medium

Scour in Structure	**Scour Severity in Structure**	**Road Surface Condition**	**Utilities at Crossing**	**Structure Condition Overall**
Culvert	High	N/A	None	Poor

Structure Condition Comments:	Stone abutments with 3 boards over it. Otherwise open

Ecological Assessment:	Upstream	Downstream
Natural Community Classification:	Freshwater Marsh	Brackish Riverbank Marsh
Upstream Salt Marsh Migration Potential (acres):	1.30	

Flood Hazard & Emergency Access

Site Identified in Hazard Mitigation Plan:	No
Emergency Access or Evacuation Route:	N/A
History of Flooding:	unknown

Tidal Crossing Summary Sheet

New Hampshire's Tidal Crossing Assessment Protocol

Crossing ID: 97

Observer(s) & Organization:	JB TS (NHDES Coastal)
Municipality:	DURHAM
Stream Name:	Beards Creek
Road Name:	Dover Rd

Date:	8/3/2018
Start Time:	12:00:00 PM
End Time:	1:25:00 PM

Tide Prediction	**High**	**Low**
Time:	5:53 PM	11:29 AM
Elevation:	6.5	0.4
Tide Chart Location:	Dover Point	

Crossing Condition Evaluation	Score*
Crossing Condition	2
Tidal Restriction Evaluation	
Tidal Range Ratio	5
Crossing Ratio	5
Erosion Classification	0
Tidal Restriction Overall Score	5
Tidal Aquatic Organism Passage	
Tidal Range Ratio	5
Salt Marsh Migration Evaluation	
Salt Marsh Migration Potential (Eval. Unit)	5
Salt Marsh Migration Potential (Wshed.)	5
Vegetation Evaluation	
Vegetation Comparison Matrix	0
Infrastructure Risk Evaluation	
Inundation Risk to the Roadway (US, DS)	1,1
Inun. Risk to the Crossing Structure (US, DS)	5,4
Adverse Impacts Evaluation**	
Inundation Risk to Low-Lying Development	5
Overall Scores	
Infrastructure	2
Ecological	5
Combined	5

DS view toward structure

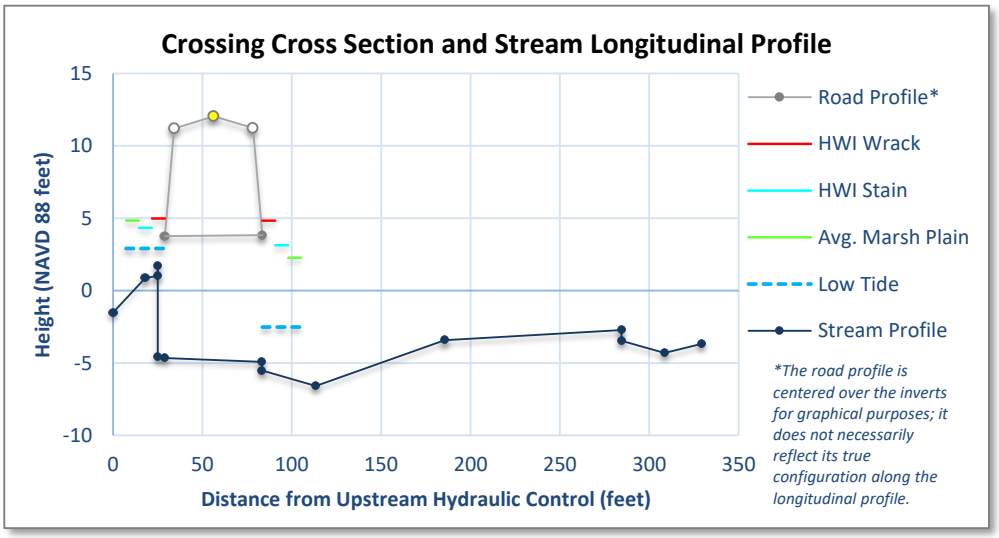
US view above structure

US view toward structure

DS view above structure

* Scoring system ranges from 1 to 5, where 1 = lowest replacement priority and 5 = highest replacement priority

**Adverse Impacts Evaluation scores range from 1 to 5, where 1 = high risk and 5 = low risk



Long. Profile

Dist.	Hght.	Feat.	Sub.
0	-1.5193	P	G
18	0.8607	CB	C
25	1.0107	CB	C
25	1.7107	CB	N/A
25	-4.5893	GC	N/A
29	-4.6693	I	N/A
83.5	-4.9193	I	C/S
83.5	-5.5193	CB	C/S
113.5	-6.5893	P	B
185.5	-3.4193	CB	G
284.5	-2.7193	GC	N/A
284.5	-3.4693	CB	C
308.5	-4.3193	P	S
329.5	-3.6693	HC	G

Crossing Context:

The entrance to the town center of Durham on Route 108 (Dover Road) passes over Beards Creek which drains through an 8.5 high by 7.5-foot-wide concrete box culvert. Stop logs had kept the upstream wetland an open freshwater pond with no tidal exchange. The crossing is in good shape but has severe ecological impacts to the upstream wetlands and will prevent future marsh migration. The overall combined score is a 5, highest priority for replacement due to the ecological impacts. The main sewage line leading to the treatment plant to the south crosses the mouth of the culvert, below the stop logs, so that tidal restoration would require reconfiguration of the sewer line.

Structure Characteristics:

Structure Type:	Box Culvert	**Date of Last Known Replacement:**	N/A
Structure Material:	Concrete		
Tide Gate Present:	No		

Crossing Dimensions (ft):	Upstream	Downstream
Dimension A (width):	7.5	7.5
Dimension B^{CB} (height):	8.6	8.5
Crossing Length (Invert to Invert):	54.5	

Crossing Condition:	**Headwall Material**	**Headwall Condition**	**Wingwall Material**	**Wingwall Condition**	**Scour at Structure**	**Scour Severity**
Upstream	Concrete	Fair	Metal	Fair	None	None
Downstream	Concrete	Good	Metal	Good	None	None

Scour in Structure	**Scour Severity in Structure**	**Road Surface Condition**	**Utilities at Crossing**	**Structure Condition Overall**
None	None	Good	OHE DS. pump house	Fair

Structure Condition Comments:	Dam condition is poor.

Ecological Assessment:	Upstream	Downstream
Natural Community Classification:	Freshwater Marsh	Sparsely Vegetated Intertidal Habitat
Upstream Salt Marsh Migration Potential (acres):	13.45	

Flood Hazard & Emergency Access

Site Identified in Hazard Mitigation Plan:	No
Emergency Access or Evacuation Route:	N/A
History of Flooding:	No

Tidal Crossing Summary Sheet

New Hampshire's Tidal Crossing Assessment Protocol

Crossing ID: 98

Observer(s) & Organization:	TS, JB (NHDES Coastal)
Municipality:	DURHAM
Stream Name:	Oyster River
Road Name:	Newmarket Rd

Date:	7/12/2018
Start Time:	7:52:00 AM
End Time:	9:30:00 AM

Tide Prediction	**High**	**Low**
Time:	12:29 PM	6:10 AM
Elevation:	6.8	-0.2
Tide Chart Location:	Dover Point	

Crossing Condition Evaluation	Score*
Crossing Condition	2
Tidal Restriction Evaluation	
Tidal Range Ratio	3
Crossing Ratio	3
Erosion Classification	4
Tidal Restriction Overall Score	3
Tidal Aquatic Organism Passage	
Tidal Range Ratio	3
Salt Marsh Migration Evaluation	
Salt Marsh Migration Potential (Eval. Unit)	1
Salt Marsh Migration Potential (Wshed.)	1
Vegetation Evaluation	
Vegetation Comparison Matrix	1
Infrastructure Risk Evaluation	
Inundation Risk to the Roadway (US, DS)	1,1
Inun. Risk to the Crossing Structure (US, DS)	1,1
Adverse Impacts Evaluation**	
Inundation Risk to Low-Lying Development	5
Overall Scores	
Infrastructure	2
Ecological	3
Combined	3

DS view toward structure

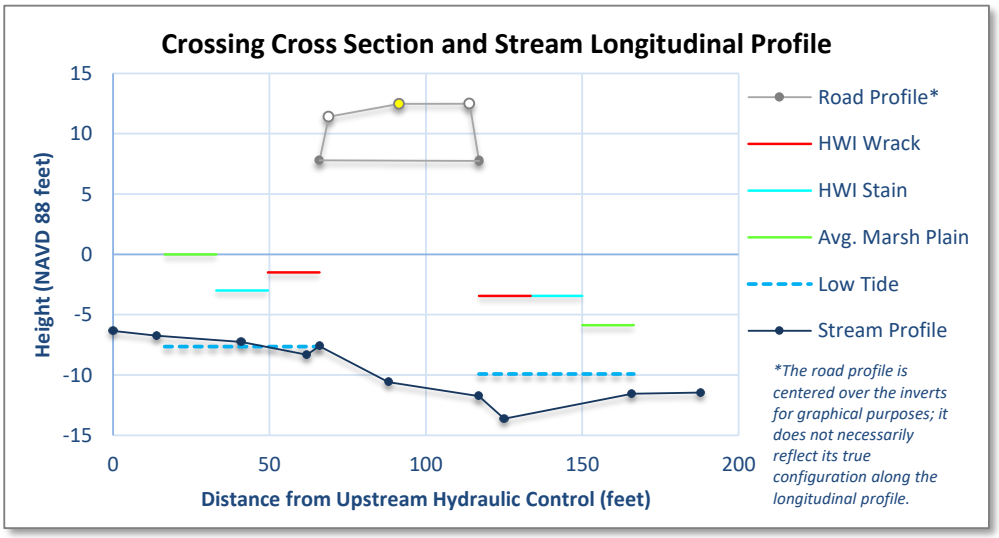
US view above structure

US view toward structure

DS view above structure

* Scoring system ranges from 1 to 5, where 1 = lowest replacement priority and 5 = highest replacement priority

**Adverse Impacts Evaluation scores range from 1 to 5, where 1 = high risk and 5 = low risk



Long. Profile

Dist.	Hght.	Feat.	Sub.
0	-6.3428	HC	C
14	-6.7428	CB	C
41	-7.2628	HC	B
62	-8.3128	P	B
66	-7.5928	I	B
88	-10.593	CB	B
117	-11.743	I	S
125	-13.623	P	B
166	-11.543	HC	B
188	-11.443	HC	B

Crossing Context:

N/A

Structure Characteristics:

Structure Type:	Bridge with Abutments	**Date of Last Known Replacement:**	N/A
Structure Material:	Stone		
Tide Gate Present:	No		

Crossing Dimensions (ft):	Upstream	Downstream
Dimension A (width):	25	25
Dimension B[CB](height):	15.09	19.07
Crossing Length (Invert to Invert):	51	

Crossing Condition:	**Headwall Material**	**Headwall Condition**	**Wingwall Material**	**Wingwall Condition**	**Scour at Structure**	**Scour Severity**
Upstream	None	N/A	Rip Rap	Fair	Wingwalls	Low
Downstream	None	N/A	Rip Rap	Fair	Wingwalls	Low

Scour in Structure	**Scour Severity in Structure**	**Road Surface Condition**	**Utilities at Crossing**	**Structure Condition Overall**
None	None	Fair		Good

Structure Condition Comments:	N/A

Ecological Assessment:	Upstream	Downstream
Natural Community Classification:	Sparsely Vegetated Intertidal Habitat	Sparsely Vegetated Intertidal Habitat
Upstream Salt Marsh Migration Potential (acres):	0.13	

Flood Hazard & Emergency Access

Site Identified in Hazard Mitigation Plan:	No
Emergency Access or Evacuation Route:	N/A
History of Flooding:	No

Tidal Crossing Summary Sheet

New Hampshire's Tidal Crossing Assessment Protocol

Crossing ID: 99

Observer(s) & Organization:	JB & KL (NHDES Coastal)
Municipality:	DURHAM
Stream Name:	N/A
Road Name:	Bay Rd

Date:	5/3/2018
Start Time:	10:02:00 AM
End Time:	1:30:00 AM

Tide Prediction	**High**	**Low**
Time:	2:50 PM	8:31 AM
Elevation:	7.7	-0.1
Tide Chart Location:	Swamscott River	

Crossing Condition Evaluation	Score*
Crossing Condition	1
Tidal Restriction Evaluation	
Tidal Range Ratio	1
Crossing Ratio	4
Erosion Classification	1
Tidal Restriction Overall Score	2
Tidal Aquatic Organism Passage	
Tidal Range Ratio	1
Salt Marsh Migration Evaluation	
Salt Marsh Migration Potential (Eval. Unit)	4
Salt Marsh Migration Potential (Wshed.)	4
Vegetation Evaluation	
Vegetation Comparison Matrix	3
Infrastructure Risk Evaluation	
Inundation Risk to the Roadway (US, DS)	2,2
Inun. Risk to the Crossing Structure (US, DS)	1,1
Adverse Impacts Evaluation**	
Inundation Risk to Low-Lying Development	2
Overall Scores	
Infrastructure	1
Ecological	3
Combined	2

DS view toward structure

US view above structure

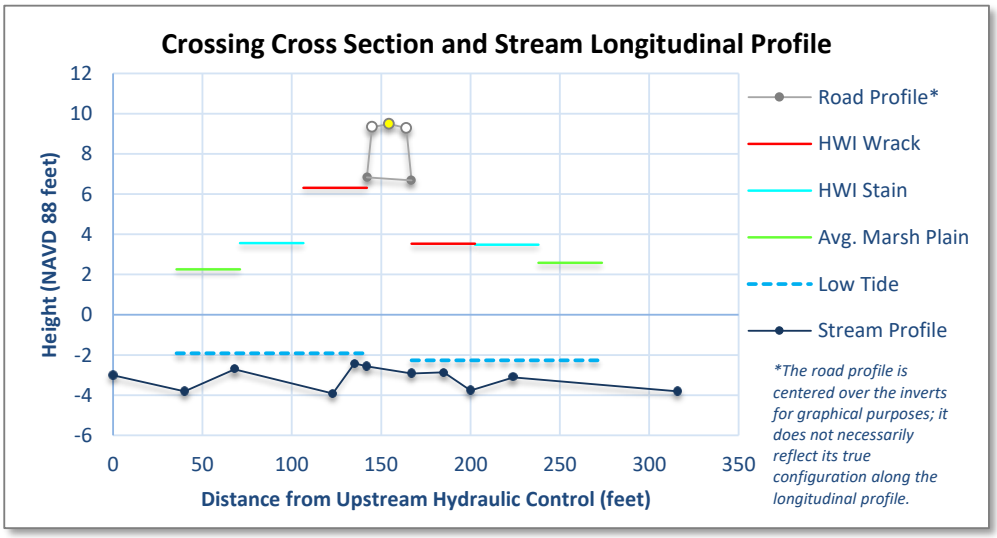
US view toward structure

DS view above structure

* Scoring system ranges from 1 to 5, where 1 = lowest replacement priority and 5 = highest replacement priority

**Adverse Impacts Evaluation scores range from 1 to 5, where 1 = high risk and 5 = low risk

Crossing Cross Section and Stream Longitudinal Profile



**The road profile is centered over the inverts for graphical purposes; it does not necessarily reflect its true configuration along the longitudinal profile.*

Long. Profile

Dist.	Hght.	Feat.	Sub.
0	-3.0184	HC	C/S
40	-3.8184	P	G
68	-2.7184	HC	G
123	-3.9184	P	G
135	-2.4184	GC	G
142	-2.5684	I	G
167	-2.9184	I	G
185	-2.8684	GC	G
200	-3.7684	P	C/S
224	-3.1184	HC	G
316	-3.8184	HC	C/S

Crossing Context:

N/A

Structure Characteristics:

Structure Type:	Bridge with Abutments	**Date of Last Known Replacement:**	N/A
Structure Material:	Stone		
Tide Gate Present:	No		

Crossing Dimensions (ft):	Upstream	Downstream
Dimension A (width):	16	16
Dimension B[CB](height):	9.4	6.65
Crossing Length (Invert to Invert):	25	

Crossing Condition:	**Headwall Material**	**Headwall Condition**	**Wingwall Material**	**Wingwall Condition**	**Scour at Structure**	**Scour Severity**
Upstream	None	N/A	Concrete	Fair	None	None
Downstream	None	N/A	Other	Good	None	None

Scour in Structure	**Scour Severity in Structure**	**Road Surface Condition**	**Utilities at Crossing**	**Structure Condition Overall**
None	None	Good	Over head electric	Good

Structure Condition Comments:	N/A

Ecological Assessment:	Upstream	Downstream
Natural Community Classification:	Low Salt Marsh	Sparsely Vegetated Intertidal Habitat
Upstream Salt Marsh Migration Potential (acres):	7.09	

Flood Hazard & Emergency Access

Site Identified in Hazard Mitigation Plan:	No
Emergency Access or Evacuation Route:	N/A
History of Flooding:	No flooding documented

Tidal Crossing Summary Sheet

New Hampshire's Tidal Crossing Assessment Protocol

Crossing ID: 100

Observer(s) & Organization:	TS, JB, SG (NHDES Coastal)
Municipality:	NEWMARKET
Stream Name:	Lubberland Creek
Road Name:	Bay Rd

Date:	7/13/2018
Start Time:	8:00:00 AM
End Time:	9:49:00 AM

Tide Prediction	**High**	**Low**
Time:	2:11 PM	8:18 AM
Elevation:	7.5	-1.1
Tide Chart Location:	Squamscott River	

Crossing Condition Evaluation	Score*
Crossing Condition	5
Tidal Restriction Evaluation	
Tidal Range Ratio	5
Crossing Ratio	5
Erosion Classification	5
Tidal Restriction Overall Score	5
Tidal Aquatic Organism Passage	
Tidal Range Ratio	5
Salt Marsh Migration Evaluation	
Salt Marsh Migration Potential (Eval. Unit)	1
Salt Marsh Migration Potential (Wshed.)	1
Vegetation Evaluation	
Vegetation Comparison Matrix	5
Infrastructure Risk Evaluation	
Inundation Risk to the Roadway (US, DS)	3,2
Inun. Risk to the Crossing Structure (US, DS)	3,3
Adverse Impacts Evaluation**	
Inundation Risk to Low-Lying Development	5
Overall Scores	
Infrastructure	5
Ecological	5
Combined	5

DS view toward structure

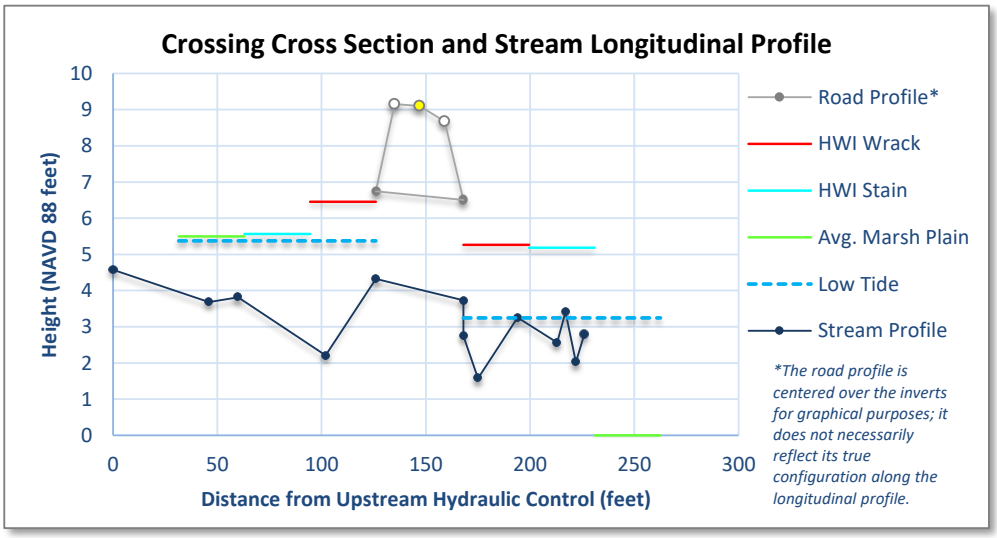
US view above structure

US view toward structure

DS view above structure

* Scoring system ranges from 1 to 5, where 1 = lowest replacement priority and 5 = highest replacement priority

**Adverse Impacts Evaluation scores range from 1 to 5, where 1 = high risk and 5 = low risk



Long. Profile

Dist.	Hght.	Feat.	Sub.
0	4.5743	HC	C/S
46	3.6843	CB	C/S
60	3.8143	HC	C/S
102	2.2143	P	C/S
126	4.3243	I	C/S
168	3.7343	I	N/A
168	2.7443	CB	G
175	1.5743	P	G
194	3.2543	HC	C
213	2.5643	CB	C/S
217	3.4143	HC	C/S
222	2.0243	P	G
226	2.7943	HC	G

Crossing Context:

The crossing at Lubberland Creek, where it crosses Bay Road in Newmarket is effectively at the head of tide. The restrictive crossing is in poor condition; it contributes to the inundation risk from stormwater flooding, and is undersized, leading to severe scour, strongly restricting tides and prevention of organism passage. The overall combined score is 5 indicating highest priority for restoration. The culvert is slated to be restored in 2019 and the project champion and abutting landowner is The Nature Conservancy.

Structure Characteristics:

Structure Type:	Elliptical Culvert	**Date of Last Known Replacement:**	N/A
Structure Material:	Steel - Corrugated		
Tide Gate Present:	No		

Crossing Dimensions (ft):	Upstream	Downstream
Dimension A (width):	3.5	4.2
Dimension B^{CB}(height):	2.2	2.8
Crossing Length (Invert to Invert):	42	

Crossing Condition:	**Headwall Material**	**Headwall Condition**	**Wingwall Material**	**Wingwall Condition**	**Scour at Structure**	**Scour Severity**
Upstream	Dry Fit Stone	Poor	Dry Fit Stone	Poor	Wingwalls	High
Downstream	Dry Fit Stone	Poor	Dry Fit Stone	Poor	Wingwalls	High

Scour in Structure	**Scour Severity in Structure**	**Road Surface Condition**	**Utilities at Crossing**	**Structure Condition Overall**
None	None	Fair	Overhead electric	Poor

Structure Condition Comments:	Upstream opening clogged with sediment and veg due to Beaver gate.

Ecological Assessment:	Upstream	Downstream
Natural Community Classification:	Freshwater Marsh	Freshwater Stream
Upstream Salt Marsh Migration Potential (acres):	0.00	

Flood Hazard & Emergency Access

Site Identified in Hazard Mitigation Plan:	Yes
Emergency Access or Evacuation Route:	N/A
History of Flooding:	historical flooding at crossing.

Tidal Crossing Summary Sheet

New Hampshire's Tidal Crossing Assessment Protocol

Crossing ID: 101

Observer(s) & Organization:	JB TS (NHDES Coastal)
Municipality:	NEWINGTON
Stream Name:	N/A
Road Name:	No Name

Date:	7/26/2018
Start Time:	8:30:00 AM
End Time:	9:55:00 AM

Tide Prediction	**High**	**Low**
Time:	12:53 PM	6:37 AM
Elevation:	6.0	0.2
Tide Chart Location:	Dover Point	

Crossing Condition Evaluation	Score*
Crossing Condition	1
Tidal Restriction Evaluation	
Tidal Range Ratio	1
Crossing Ratio	5
Erosion Classification	5
Tidal Restriction Overall Score	4
Tidal Aquatic Organism Passage	
Tidal Range Ratio	1
Salt Marsh Migration Evaluation	
Salt Marsh Migration Potential (Eval. Unit)	1
Salt Marsh Migration Potential (Wshed.)	1
Vegetation Evaluation	
Vegetation Comparison Matrix	0
Infrastructure Risk Evaluation	
Inundation Risk to the Roadway (US, DS)	0,2
Inun. Risk to the Crossing Structure (US, DS)	0,5
Adverse Impacts Evaluation**	
Inundation Risk to Low-Lying Development	5
Overall Scores	
Infrastructure	1
Ecological	4
Combined	2

DS view toward structure

US view above structure

US view toward structure

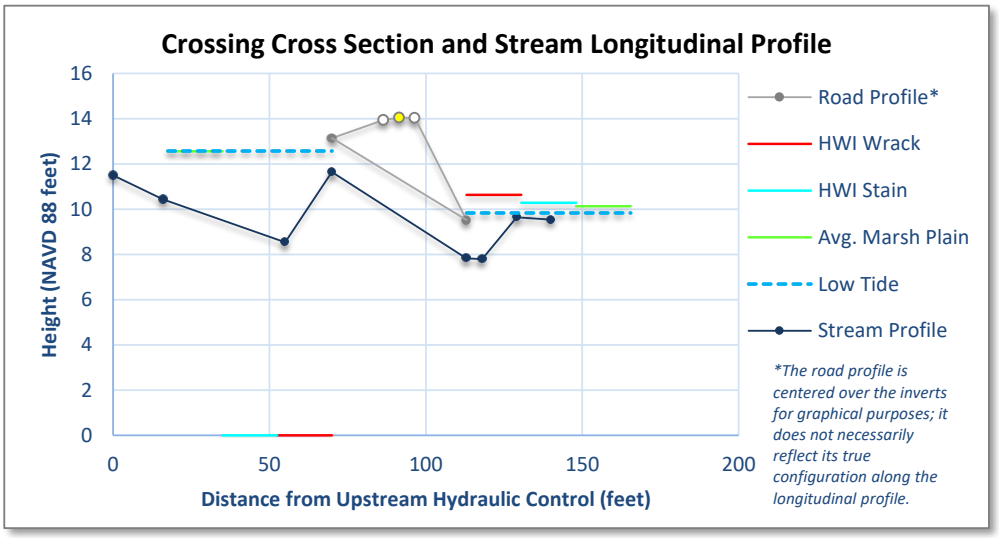
DS view above structure

* Scoring system ranges from 1 to 5, where 1 = lowest replacement priority and 5 = highest replacement priority

**Adverse Impacts Evaluation scores range from 1 to 5, where 1 = high risk and 5 = low risk

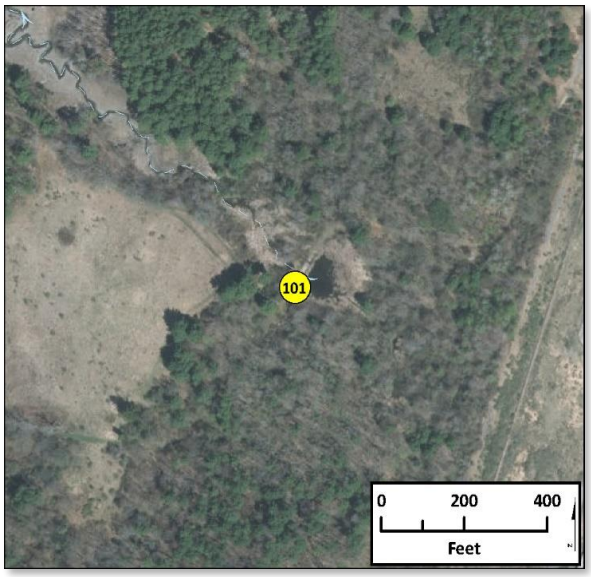
Long. Profile

Dist.	Hght.	Feat.	Sub.
0	11.492	HC	C/S
16	10.432	CB	C/S
55	8.532	P	C/S
70	11.642	I	C/S
113	7.832	I	C
118	7.792	P	C
129	9.642	HC	G
140	9.542	CB	S



Crossing Context:

N/A



Structure Characteristics:

Structure Type:	Round Culvert	**Date of Last Known Replacement:**	N/A
Structure Material:	Steel - Corrugated		
Tide Gate Present:	Yes		

Crossing Dimensions (ft):	Upstream	Downstream
Dimension A (width):	1.5	1.5
Dimension B^{CB}(height):	1.5	1.5
Crossing Length (Invert to Invert):	43	

Crossing Condition:	**Headwall Material**	**Headwall Condition**	**Wingwall Material**	**Wingwall Condition**	**Scour at Structure**	**Scour Severity**
Upstream	None	N/A	None	N/A	None	None
Downstream	None	N/A	None	N/A	None	None

Scour in Structure	**Scour Severity in Structure**	**Road Surface Condition**	**Utilities at Crossing**	**Structure Condition Overall**
None	None	N/A	None	Good

Structure Condition Comments:	Vertical structure covering inlet. Barrier to two directional flow. Water trickling in from US pond.

Ecological Assessment:	Upstream	Downstream
Natural Community Classification:	Freshwater Marsh	Brackish Marsh
Upstream Salt Marsh Migration Potential (acres):	0.00	

Flood Hazard & Emergency Access

Site Identified in Hazard Mitigation Plan:	No
Emergency Access or Evacuation Route:	N/A
History of Flooding:	unknown

Tidal Crossing Summary Sheet

New Hampshire's Tidal Crossing Assessment Protocol

Crossing ID: 102

Observer(s) & Organization:	TS, JB (NHDES Coastal)
Municipality:	NEWINGTON
Stream Name:	N/A
Road Name:	Newington Rd

Date:	6/20/2018
Start Time:	1:10:00 PM
End Time:	2:20:00 PM

Tide Prediction	**High**	**Low**
Time:	8:13 PM	2:11 PM
Elevation:	7.4	-0.3
Tide Chart Location:	Squamscott River	

Crossing Condition Evaluation	Score*
Crossing Condition	1
Tidal Restriction Evaluation	
Tidal Range Ratio	2
Crossing Ratio	4
Erosion Classification	4
Tidal Restriction Overall Score	3
Tidal Aquatic Organism Passage	
Tidal Range Ratio	2
Salt Marsh Migration Evaluation	
Salt Marsh Migration Potential (Eval. Unit)	1
Salt Marsh Migration Potential (Wshed.)	1
Vegetation Evaluation	
Vegetation Comparison Matrix	4
Infrastructure Risk Evaluation	
Inundation Risk to the Roadway (US, DS)	1,1
Inun. Risk to the Crossing Structure (US, DS)	1,1
Adverse Impacts Evaluation**	
Inundation Risk to Low-Lying Development	5
Overall Scores	
Infrastructure	1
Ecological	4
Combined	3

DS view toward structure

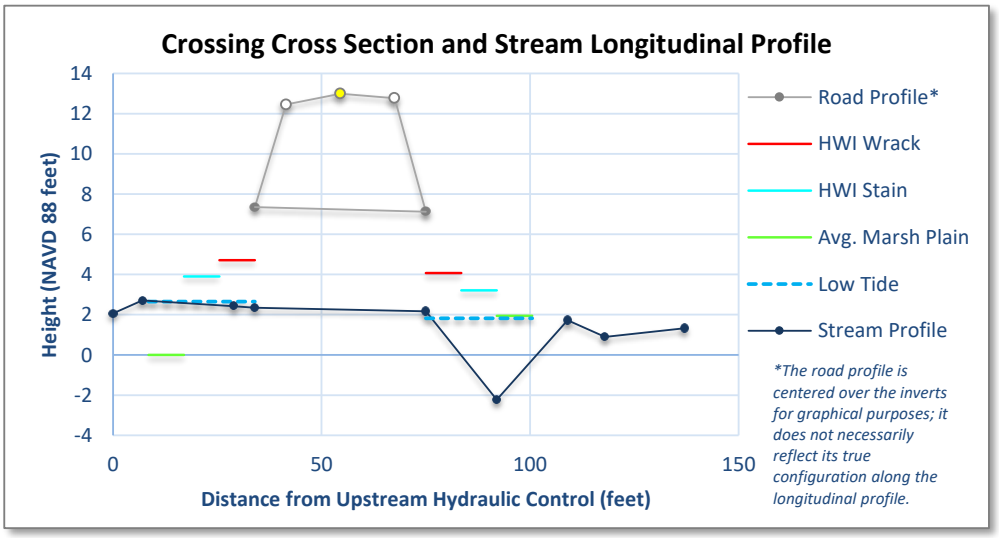
US view above structure

US view toward structure

DS view above structure

* Scoring system ranges from 1 to 5, where 1 = lowest replacement priority and 5 = highest replacement priority

**Adverse Impacts Evaluation scores range from 1 to 5, where 1 = high risk and 5 = low risk

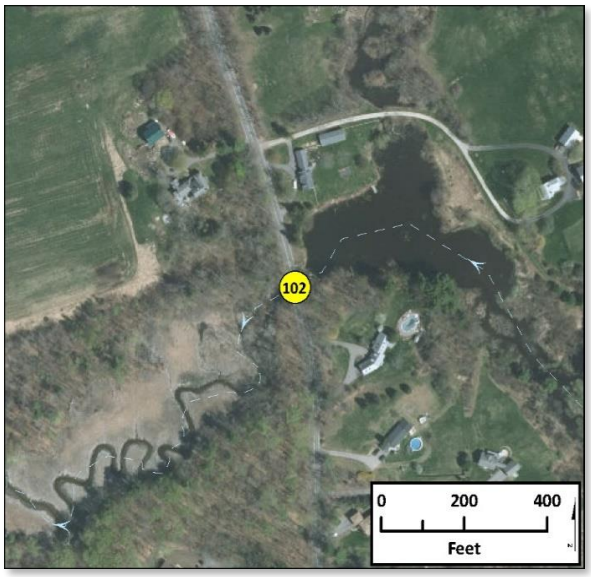


Long. Profile

Dist.	Hght.	Feat.	Sub.
0	2.0621	HC	C
7	2.7121	HC	C
29	2.4221	CB	G
34	2.3421	I	C
75	2.1721	I	C
92	-2.2279	P	C
109	1.7221	HC	G
118	0.9021	P	C
137	1.3221	HC	C

Crossing Context:

N/A



Structure Characteristics:

Structure Type:	Box Culvert	**Date of Last Known Replacement:**	N/A
Structure Material:	Concrete		
Tide Gate Present:	No		

Crossing Dimensions (ft):	Upstream	Downstream
Dimension A (width):	5	5
Dimension B^{CB}(height):	5	5
Crossing Length (Invert to Invert):	41	

Crossing Condition:	**Headwall Material**	**Headwall Condition**	**Wingwall Material**	**Wingwall Condition**	**Scour at Structure**	**Scour Severity**
Upstream	Concrete	Good	Concrete	Good	Wingwalls	Low
Downstream	Concrete	Good	Rip Rap	Good	None	None

Scour in Structure	**Scour Severity in Structure**	**Road Surface Condition**	**Utilities at Crossing**	**Structure Condition Overall**
Culvert	Low	Fair	Overhead electric	Good

Structure Condition Comments:	N/A

Ecological Assessment:	Upstream	Downstream
Natural Community Classification:	Freshwater Swamp	High Salt Marsh
Upstream Salt Marsh Migration Potential (acres):	0.00	

Flood Hazard & Emergency Access

Site Identified in Hazard Mitigation Plan:	Yes
Emergency Access or Evacuation Route:	N/A
History of Flooding:	road has washed out in the past.

Tidal Crossing Summary Sheet

New Hampshire's Tidal Crossing Assessment Protocol

Crossing ID: 103

Observer(s) & Organization:	TS, Copro (NHDES Coastal)
Municipality:	GREENLAND
Stream Name:	Foss Brook
Road Name:	N/A

Date:	6/27/2018
Start Time:	7:53:00 AM
End Time:	9:40:00 AM

Tide Prediction	**High**	**Low**
Time:	2:03 PM	8:13 AM
Elevation:	6.7	0.0
Tide Chart Location:	Squamscott River	

Crossing Condition Evaluation	Score*
Crossing Condition	4
Tidal Restriction Evaluation	
Tidal Range Ratio	3
Crossing Ratio	4
Erosion Classification	5
Tidal Restriction Overall Score	4
Tidal Aquatic Organism Passage	
Tidal Range Ratio	3
Salt Marsh Migration Evaluation	
Salt Marsh Migration Potential (Eval. Unit)	2
Salt Marsh Migration Potential (Wshed.)	2
Vegetation Evaluation	
Vegetation Comparison Matrix	1
Infrastructure Risk Evaluation	
Inundation Risk to the Roadway (US, DS)	2,2
Inun. Risk to the Crossing Structure (US, DS)	2,3
Adverse Impacts Evaluation**	
Inundation Risk to Low-Lying Development	5
Overall Scores	
Infrastructure	4
Ecological	3
Combined	3

DS view toward structure

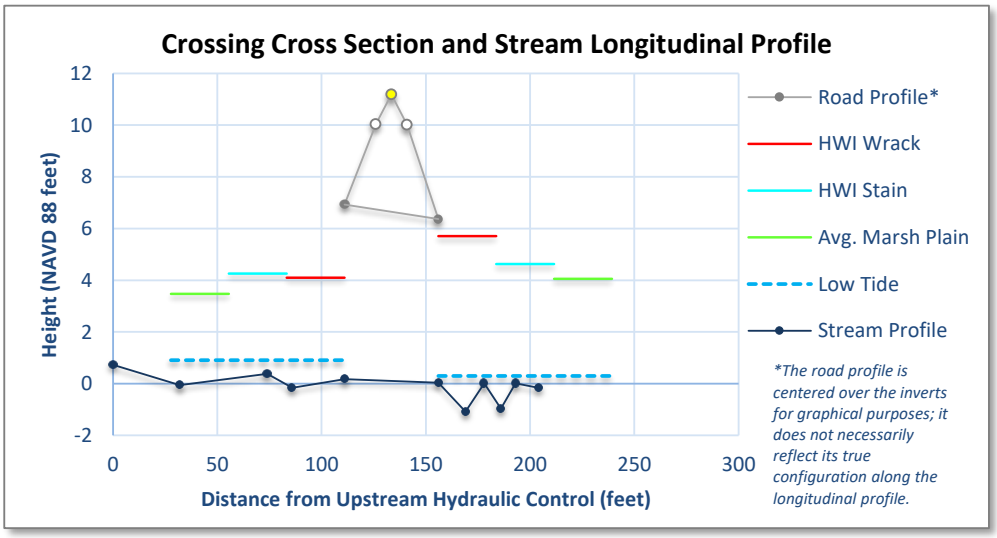
US view above structure

US view toward structure

DS view above structure

* Scoring system ranges from 1 to 5, where 1 = lowest replacement priority and 5 = highest replacement priority

**Adverse Impacts Evaluation scores range from 1 to 5, where 1 = high risk and 5 = low risk

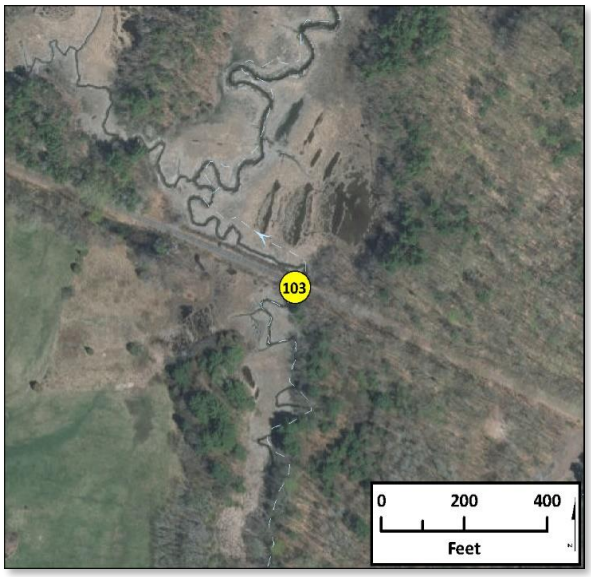


Long. Profile

Dist.	Hght.	Feat.	Sub.
0	0.7277	HC	C/S
32	-0.0623	P	C/S
74	0.3777	HC	C/S
86	-0.1623	P	C/S
111	0.1777	I	C/S
156	0.0377	I	G
169	-1.0823	P	G
178	0.0077	HC	G
186	-0.9623	P	G
193	0.0177	HC	S
204	-0.1623	CB	C/S

Crossing Context:

N/A



Structure Characteristics:

Structure Type:	Bridge with Abutments	**Date of Last Known Replacement:**	N/A
Structure Material:	Stone		
Tide Gate Present:	No		

Crossing Dimensions (ft):	Upstream	Downstream
Dimension A (width):	2.9	2.65
Dimension B^{CB}(height):	7	6.15
Crossing Length (Invert to Invert):	45	

Crossing Condition:	**Headwall Material**	**Headwall Condition**	**Wingwall Material**	**Wingwall Condition**	**Scour at Structure**	**Scour Severity**
Upstream	None	N/A	Dry Fit Stone	Fair	Wingwalls	Low
Downstream	None	N/A	Dry Fit Stone	Poor	Wingwalls	High

Scour in Structure	**Scour Severity in Structure**	**Road Surface Condition**	**Utilities at Crossing**	**Structure Condition Overall**
Abutment	Low	Fair		Fair

Structure Condition Comments:	N/A

Ecological Assessment:	Upstream	Downstream
Natural Community Classification:	High Salt Marsh	High Salt Marsh
Upstream Salt Marsh Migration Potential (acres):	1.33	

Flood Hazard & Emergency Access

Site Identified in Hazard Mitigation Plan:	Yes
Emergency Access or Evacuation Route:	N/A
History of Flooding:	unknown

Tidal Crossing Summary Sheet

New Hampshire's Tidal Crossing Assessment Protocol

Crossing ID: 104

Observer(s) & Organization:	JB, Copro (NHDES Coastal)
Municipality:	GREENLAND
Stream Name:	Shaw Brook
Road Name:	N/A

Date:	6/27/2018
Start Time:	7:45:00 AM
End Time:	9:15:00 AM

Tide Prediction	**High**	**Low**
Time:	2:03 PM	8:13 AM
Elevation:	6.6	0.0
Tide Chart Location:	Squamscott River	

Crossing Condition Evaluation	Score*
Crossing Condition	5
Tidal Restriction Evaluation	
Tidal Range Ratio	2
Crossing Ratio	5
Erosion Classification	5
Tidal Restriction Overall Score	4
Tidal Aquatic Organism Passage	
Tidal Range Ratio	2
Salt Marsh Migration Evaluation	
Salt Marsh Migration Potential (Eval. Unit)	1
Salt Marsh Migration Potential (Wshed.)	1
Vegetation Evaluation	
Vegetation Comparison Matrix	3
Infrastructure Risk Evaluation	
Inundation Risk to the Roadway (US, DS)	2,1
Inun. Risk to the Crossing Structure (US, DS)	3,4
Adverse Impacts Evaluation**	
Inundation Risk to Low-Lying Development	5
Overall Scores	
Infrastructure	5
Ecological	3
Combined	4

DS view toward structure

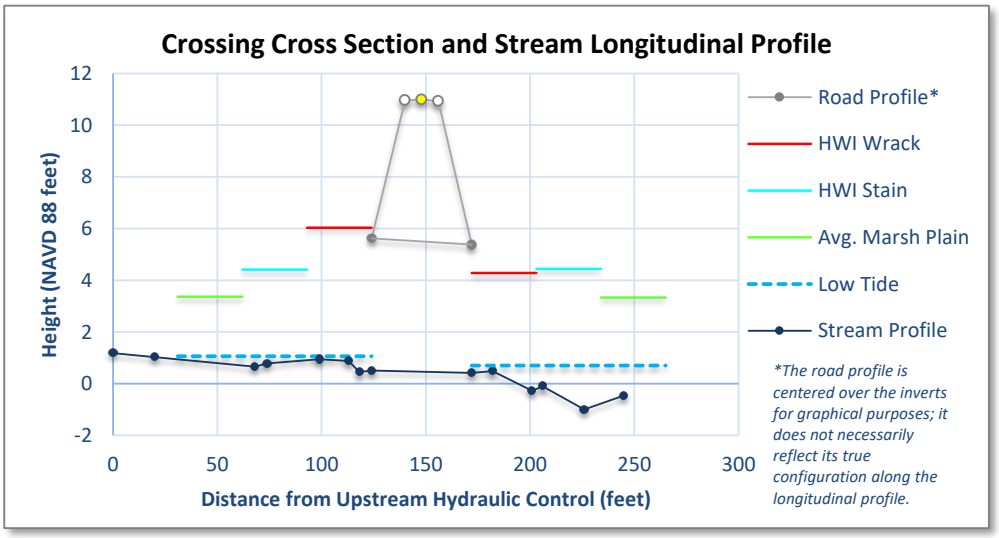
US view above structure

US view toward structure

DS view above structure

* Scoring system ranges from 1 to 5, where 1 = lowest replacement priority and 5 = highest replacement priority

**Adverse Impacts Evaluation scores range from 1 to 5, where 1 = high risk and 5 = low risk

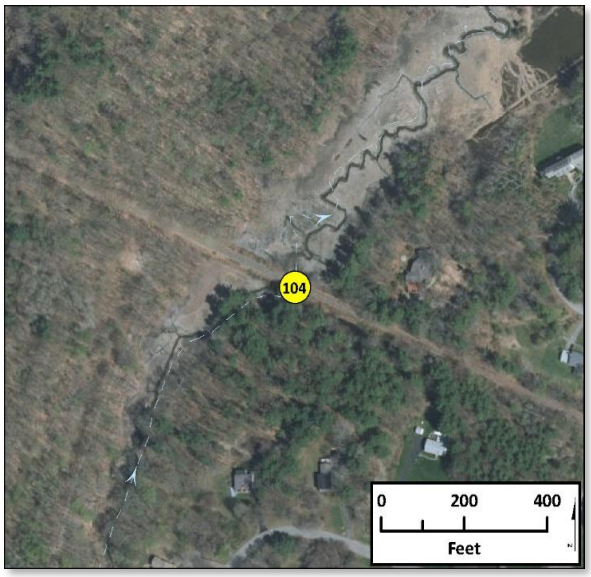


Long. Profile

Dist.	Hght.	Feat.	Sub.
0	1.1808	HC	C/S
20	1.0208	HC	C/S
68	0.6608	P	C/S
74	0.7808	HC	C/S
99	0.9408	CB	S
113	0.8708	CB	C/S
118	0.4508	P	C/S
124	0.5108	I	G
172	0.4108	I	C
182	0.4808	GC	C
201	-0.2792	CB	C
206	-0.0992	HC	G
226	-0.9992	P	C/S
245	-0.4592	HC	C/S

Crossing Context:

The railroad line that traverses the southeast corner of Great Bay crosses several small valleys of salt marsh (#103, 104, 106) and the Winnicut River (#105). This crossing is a granite culvert, about 1.5 feet wide and 5 feet tall, over a small tributary called Shaw Brook. With poor crossing condition, erosion and poor crossing ratio the overall combined score is 4, high priority for replacement.



Structure Characteristics:

Structure Type:	Box Culvert	**Date of Last Known Replacement:**	N/A
Structure Material:	Stone		
Tide Gate Present:	No		

Crossing Dimensions (ft):	Upstream	Downstream
Dimension A (width):	1.7	1.35
Dimension B^{CB} (height):	5.2	5.05
Crossing Length (Invert to Invert):	48	

Crossing Condition:	**Headwall Material**	**Headwall Condition**	**Wingwall Material**	**Wingwall Condition**	**Scour at Structure**	**Scour Severity**
Upstream	None	N/A	None	N/A	Culvert	Medium
Downstream	None	N/A	None	N/A	Culvert	Medium

Scour in Structure	**Scour Severity in Structure**	**Road Surface Condition**	**Utilities at Crossing**	**Structure Condition Overall**
Culvert	Medium	N/A	None	Poor

Structure Condition Comments:	N/A

Ecological Assessment:	Upstream	Downstream
Natural Community Classification:	High Salt Marsh	High Salt Marsh
Upstream Salt Marsh Migration Potential (acres):	0.10	

Flood Hazard & Emergency Access

Site Identified in Hazard Mitigation Plan:	No
Emergency Access or Evacuation Route:	N/A
History of Flooding:	unknown

Tidal Crossing Summary Sheet

New Hampshire's Tidal Crossing Assessment Protocol

Crossing ID: 105

Observer(s) & Organization:	TS, JB, KL, PS (NHDES Coastal)
Municipality:	GREENLAND
Stream Name:	Winnicut River
Road Name:	N/A

Date:	6/19/2018
Start Time:	12:50:00 PM
End Time:	3:00:00 AM

Tide Prediction	**High**	**Low**
Time:	7:12 PM	1:12 PM
Elevation:	7.5	-0.6
Tide Chart Location:	Squamscott River	

Crossing Condition Evaluation	Score*
Crossing Condition	5
Tidal Restriction Evaluation	
Tidal Range Ratio	1
Crossing Ratio	3
Erosion Classification	3
Tidal Restriction Overall Score	2
Tidal Aquatic Organism Passage	
Tidal Range Ratio	1
Salt Marsh Migration Evaluation	
Salt Marsh Migration Potential (Eval. Unit)	4
Salt Marsh Migration Potential (Wshed.)	4
Vegetation Evaluation	
Vegetation Comparison Matrix	3
Infrastructure Risk Evaluation	
Inundation Risk to the Roadway (US, DS)	1,1
Inun. Risk to the Crossing Structure (US, DS)	1,1
Adverse Impacts Evaluation**	
Inundation Risk to Low-Lying Development	5
Overall Scores	
Infrastructure	5
Ecological	3
Combined	4

DS view toward structure

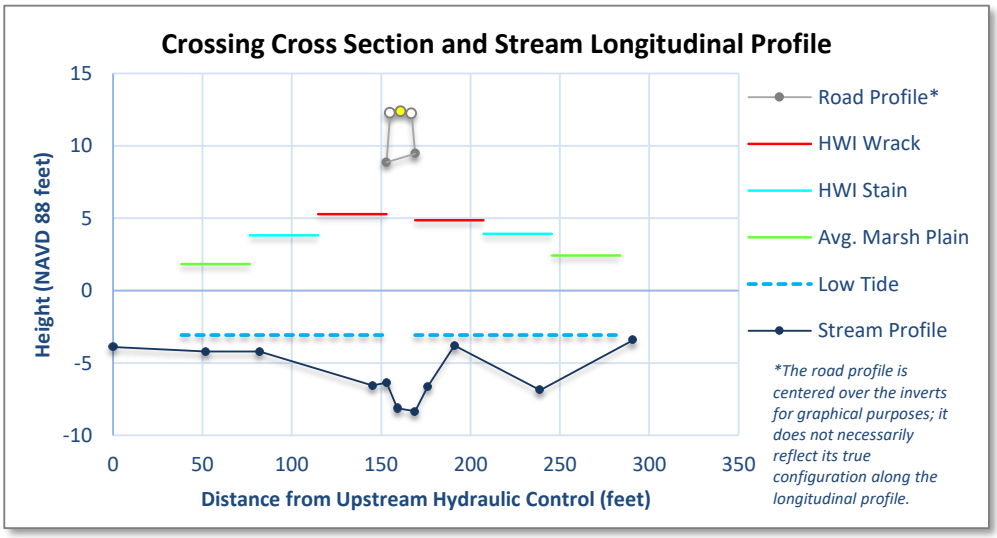
US view above structure

US view toward structure

DS view above structure

* Scoring system ranges from 1 to 5, where 1 = lowest replacement priority and 5 = highest replacement priority

**Adverse Impacts Evaluation scores range from 1 to 5, where 1 = high risk and 5 = low risk



Long. Profile

Dist.	Hght.	Feat.	Sub.
0	-3.8912	HC	S
52	-4.2012	P	C/S
82	-4.2012	HC	S
145	-6.5412	P	S
153	-6.3612	I	S
159	-8.1412	P	S
169	-8.3312	I	S
176	-6.6312	P	S
191	-3.8012	HC	C
239	-6.8712	P	C/S
291	-3.4212	HC	G

Crossing Context:

The railroad line that traverses the southeast corner of Great Bay crosses several small valleys of salt marsh (#103, 104, 106) and the Winnicut River (#105). The Winnicut River is bridged by the railroad (about 19 feet wide and 18 feet tall) with granite abutments. The crossing condition is poor and exhibits some erosion and minor tidal restriction. The vegetation upstream becomes brackish and is more shaded by large trees and the marsh plain was measured more than 0.5 foot lower, an indicator of peat subsidence. The overall combined score is 4, high priority for replacement.

Structure Characteristics:

Structure Type:	Bridge with Abutments	**Date of Last Known Replacement:**	N/A
Structure Material:	Stone		
Tide Gate Present:	No		

Crossing Dimensions (ft):	Upstream	Downstream
Dimension A (width):	18.8	18.8
Dimension B^{CB}(height):	18.6	16.7
Crossing Length (Invert to Invert):	16	

Crossing Condition:	**Headwall Material**	**Headwall Condition**	**Wingwall Material**	**Wingwall Condition**	**Scour at Structure**	**Scour Severity**
Upstream	None	N/A	Masonry	Poor	Wingwalls	Medium
Downstream	None	N/A	Masonry	Poor	Wingwalls	Medium

Scour in Structure	**Scour Severity in Structure**	**Road Surface Condition**	**Utilities at Crossing**	**Structure Condition Overall**
Abutment	Medium	N/A		Poor

Structure Condition Comments:	Sink hole rail surface river left

Ecological Assessment:	Upstream	Downstream
Natural Community Classification:	Low Salt Marsh	Low Salt Marsh
Upstream Salt Marsh Migration Potential (acres):	9.67	

Flood Hazard & Emergency Access

Site Identified in Hazard Mitigation Plan:	No
Emergency Access or Evacuation Route:	N/A
History of Flooding:	flooding from dam breach prior to dam removal.

Tidal Crossing Summary Sheet

New Hampshire's Tidal Crossing Assessment Protocol

Crossing ID: 106

Observer(s) & Organization:	TS, JB (NHDES Coastal)
Municipality:	GREENLAND
Stream Name:	Winnicut River
Road Name:	N/A

Date:	7/6/2018
Start Time:	1:45:00 PM
End Time:	3:00:00 PM

Tide Prediction	**High**	**Low**
Time:	8:05 PM	2:06 PM
Elevation:	6.8	0.6
Tide Chart Location:	Squamscott River	

Crossing Condition Evaluation	Score*
Crossing Condition	5
Tidal Restriction Evaluation	
Tidal Range Ratio	1
Crossing Ratio	4
Erosion Classification	3
Tidal Restriction Overall Score	3
Tidal Aquatic Organism Passage	
Tidal Range Ratio	1
Salt Marsh Migration Evaluation	
Salt Marsh Migration Potential (Eval. Unit)	1
Salt Marsh Migration Potential (Wshed.)	1
Vegetation Evaluation	
Vegetation Comparison Matrix	3
Infrastructure Risk Evaluation	
Inundation Risk to the Roadway (US, DS)	1,1
Inun. Risk to the Crossing Structure (US, DS)	5,4
Adverse Impacts Evaluation**	
Inundation Risk to Low-Lying Development	5
Overall Scores	
Infrastructure	5
Ecological	3
Combined	4

DS view toward structure

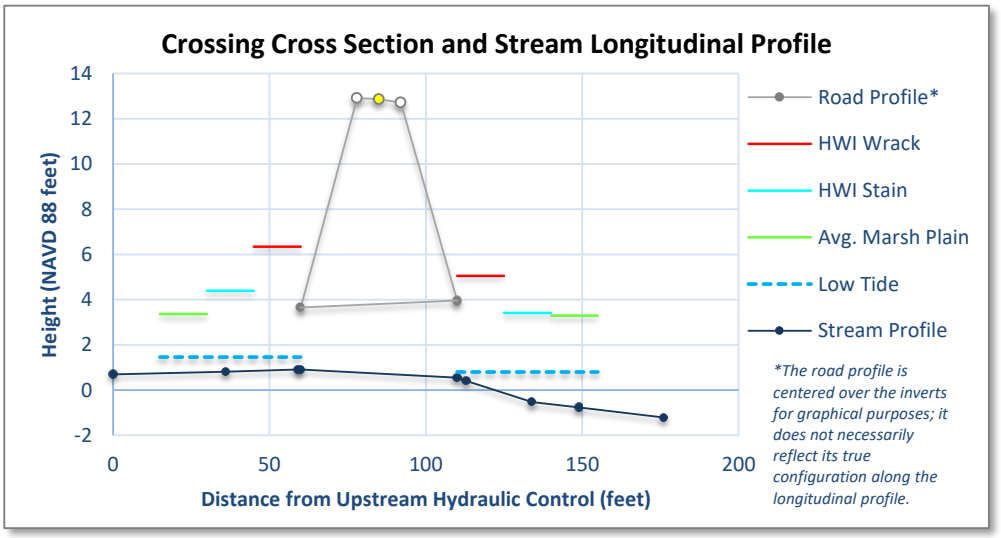
US view above structure

US view toward structure

DS view above structure

* Scoring system ranges from 1 to 5, where 1 = lowest replacement priority and 5 = highest replacement priority

**Adverse Impacts Evaluation scores range from 1 to 5, where 1 = high risk and 5 = low risk



Long. Profile

Dist.	Hght.	Feat.	Sub.
0	0.6909	HC	S
36	0.8109	HC	B
59	0.9109	CB	B
60	0.9109	I	B
110	0.5509	I	C
113	0.4009	GC	C
134	-0.5291	HC	G
149	-0.7691	HC	G
176	-1.2091	CB	C/S

Crossing Context:

The railroad line that traverses the southeast corner of Great Bay crosses several small valleys of salt marsh (#103, 104, 106) and the Winnicut River (#105). This easternmost crossing is over a tributary to the Winnicut River, a 3 by 3 (approximately) granite culvert. The crossing condition is poor and moderate erosion was observed as well as a change in plant community. The culvert is slightly perched, and high tides often overtop the culvert. The overall combined score is 4, high priority for replacement.

Structure Characteristics:

Structure Type:	Box Culvert	**Date of Last Known Replacement:**	N/A
Structure Material:	Stone		
Tide Gate Present:	No		

Crossing Dimensions (ft):	Upstream	Downstream
Dimension A (width):	3.4	2.4
Dimension B^{CB} (height):	2.7	3.4
Crossing Length (Invert to Invert):	50	

Crossing Condition:	**Headwall Material**	**Headwall Condition**	**Wingwall Material**	**Wingwall Condition**	**Scour at Structure**	**Scour Severity**
Upstream	None	N/A	None	N/A	Culvert	Medium
Downstream	None	N/A	None	N/A	Culvert	None

Scour in Structure	**Scour Severity in Structure**	**Road Surface Condition**	**Utilities at Crossing**	**Structure Condition Overall**
Culvert	Medium	N/A	None	Poor

Structure Condition Comments:	N/A

Ecological Assessment:	Upstream	Downstream
Natural Community Classification:	High Salt Marsh	High Salt Marsh
Upstream Salt Marsh Migration Potential (acres):	0.39	

Flood Hazard & Emergency Access

Site Identified in Hazard Mitigation Plan:	No
Emergency Access or Evacuation Route:	N/A
History of Flooding:	unknown

Tidal Crossing Summary Sheet

New Hampshire's Tidal Crossing Assessment Protocol

Crossing ID: 107

Observer(s) & Organization:	JB TS (NHDES Coastal)
Municipality:	GREENLAND
Stream Name:	Winnicut River
Road Name:	Portsmouth Ave

Date:	8/24/2018
Start Time:	7:21:00 AM
End Time:	9:03:00 AM

Tide Prediction	**High**	**Low**
Time:	1:10 PM	7:22 AM
Elevation:	6.4	0.4
Tide Chart Location:	Squamscott River	

Crossing Condition Evaluation	Score*
Crossing Condition	1
Tidal Restriction Evaluation	
Tidal Range Ratio	1
Crossing Ratio	1
Erosion Classification	4
Tidal Restriction Overall Score	2
Tidal Aquatic Organism Passage	
Tidal Range Ratio	1
Salt Marsh Migration Evaluation	
Salt Marsh Migration Potential (Eval. Unit)	3
Salt Marsh Migration Potential (Wshed.)	3
Vegetation Evaluation	
Vegetation Comparison Matrix	4
Infrastructure Risk Evaluation	
Inundation Risk to the Roadway (US, DS)	1,1
Inun. Risk to the Crossing Structure (US, DS)	1,1
Adverse Impacts Evaluation**	
Inundation Risk to Low-Lying Development	5
Overall Scores	
Infrastructure	1
Ecological	4
Combined	2

DS view toward structure

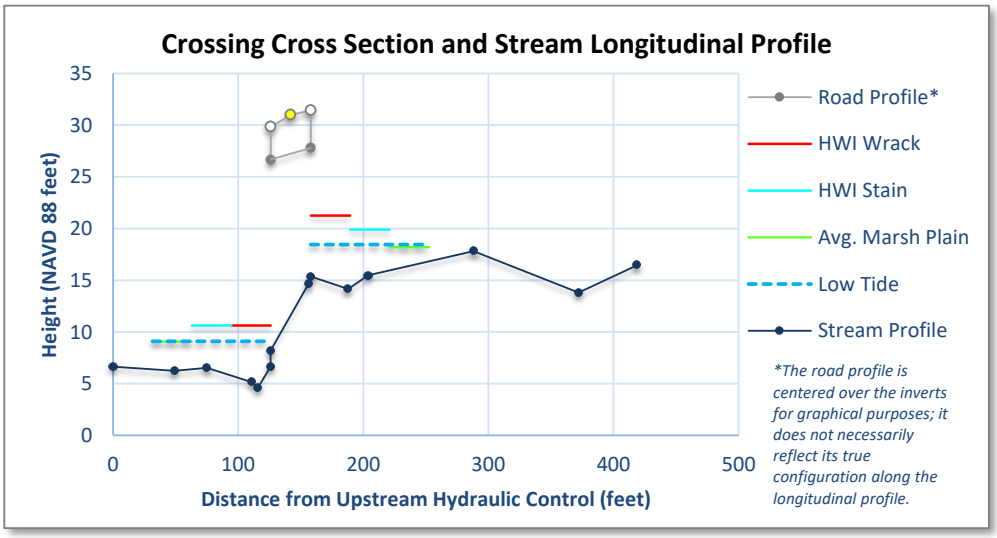
US view above structure

US view toward structure

DS view above structure

* Scoring system ranges from 1 to 5, where 1 = lowest replacement priority and 5 = highest replacement priority

**Adverse Impacts Evaluation scores range from 1 to 5, where 1 = high risk and 5 = low risk



Long. Profile

Dist.	Hght.	Feat.	Sub.
0	6.6339	HC	C/S
49	6.2339	P	C/S
75	6.5339	HC	C/S
111	5.1339	CB	G
116	4.6339	P	G
126	6.6339	CB	G
126	8.1839	I	G
156	14.614	CB	B
158	15.364	I	B
188	14.164	P	B
204	15.464	CB	B
288	17.814	HC	C
372	13.814	HC	C
419	16.464	HC	B

Crossing Context:

N/A

Structure Characteristics:

Structure Type:	Bridge with Side Slopes and Abutments	**Date of Last Known Replacement:**	N/A
Structure Material:	Concrete		
Tide Gate Present:	No		

Crossing Dimensions (ft):	Upstream	Downstream
Dimension A (width):	54	54
Dimension B^{CB}(height):	21.67	26.3
Crossing Length (Invert to Invert):	32	

Crossing Condition:	**Headwall Material**	**Headwall Condition**	**Wingwall Material**	**Wingwall Condition**	**Scour at Structure**	**Scour Severity**
Upstream	None	N/A	Concrete	Good	None	None
Downstream	None	N/A	Concrete	Good	None	None

Scour in Structure	**Scour Severity in Structure**	**Road Surface Condition**	**Utilities at Crossing**	**Structure Condition Overall**
None	None	Good	Small pipe DS side of bridge. Electrical conduit?	Good

Structure Condition Comments:	Multiple fish weirs in armored channel under bridge

Ecological Assessment:	Upstream	Downstream
Natural Community Classification:	Freshwater Stream	Brackish Riverbank Marsh
Upstream Salt Marsh Migration Potential (acres):	3.67	

Flood Hazard & Emergency Access

Site Identified in Hazard Mitigation Plan:	No
Emergency Access or Evacuation Route:	Yes
History of Flooding:	None documented

Tidal Crossing Summary Sheet

New Hampshire's Tidal Crossing Assessment Protocol

Crossing ID: 108

Observer(s) & Organization:	JB KL (NHDES Coastal)
Municipality:	NEWMARKET
Stream Name:	N/A
Road Name:	New Rd

Date:	5/17/2018
Start Time:	9:15:00 AM
End Time:	11:30:00 AM

Tide Prediction	**High**	**Low**
Time:	4:38 PM	9:45 AM
Elevation:	7.5	-1.0
Tide Chart Location:	Swamscott River	

Crossing Condition Evaluation	Score*
Crossing Condition	5
Tidal Restriction Evaluation	
Tidal Range Ratio	3
Crossing Ratio	5
Erosion Classification	5
Tidal Restriction Overall Score	4
Tidal Aquatic Organism Passage	
Tidal Range Ratio	3
Salt Marsh Migration Evaluation	
Salt Marsh Migration Potential (Eval. Unit)	1
Salt Marsh Migration Potential (Wshed.)	1
Vegetation Evaluation	
Vegetation Comparison Matrix	3
Infrastructure Risk Evaluation	
Inundation Risk to the Roadway (US, DS)	1,1
Inun. Risk to the Crossing Structure (US, DS)	4,0
Adverse Impacts Evaluation**	
Inundation Risk to Low-Lying Development	5
Overall Scores	
Infrastructure	5
Ecological	4
Combined	4

DS view toward structure

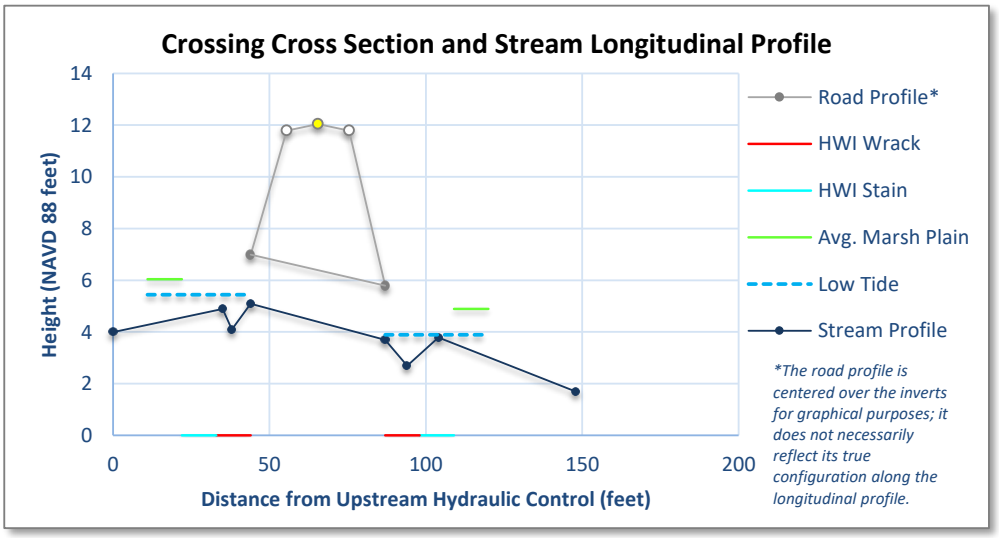
US view above structure

US view toward structure

DS view above structure

* Scoring system ranges from 1 to 5, where 1 = lowest replacement priority and 5 = highest replacement priority

**Adverse Impacts Evaluation scores range from 1 to 5, where 1 = high risk and 5 = low risk

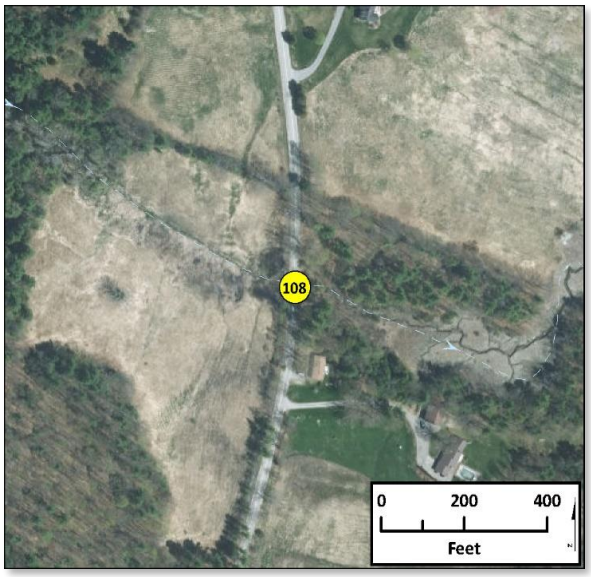


Long. Profile

Dist.	Hght.	Feat.	Sub.
0	3.9907	HC	C/S
35	4.8907	HC	C/S
38	4.0907	P	C/S
44	5.0907	I	C/S
87	3.6907	I	G
94	2.6907	P	G
104	3.7907	HC	C
148	1.6907	HC	S

Crossing Context:

This crossing under New Road in Newmarket conducts water to a wetland high in the intertidal zone with little potential for migration. However, its crossing condition is poor, it is restrictive, and it exhibits high erosion. The overall combined score is 4, indicating high priority for replacement.



Structure Characteristics:

Structure Type:	Round Culvert	**Date of Last Known Replacement:**	N/A
Structure Material:	Concrete		
Tide Gate Present:	No		

Crossing Dimensions (ft):	Upstream	Downstream
Dimension A (width):	2	2
Dimension B^{CB}(height):	2	2
Crossing Length (Invert to Invert):	43	

Crossing Condition:	**Headwall Material**	**Headwall Condition**	**Wingwall Material**	**Wingwall Condition**	**Scour at Structure**	**Scour Severity**
Upstream	Masonry	Poor	Masonry	Poor	Headwall	High
Downstream	Masonry	Poor	None	N/A	None	None

Scour in Structure	**Scour Severity in Structure**	**Road Surface Condition**	**Utilities at Crossing**	**Structure Condition Overall**
None	None	Good	Over head electric	Poor

Structure Condition Comments:	N/A

Ecological Assessment:	Upstream	Downstream
Natural Community Classification:	Freshwater Marsh	Freshwater Stream
Upstream Salt Marsh Migration Potential (acres):	0.00	

Flood Hazard & Emergency Access

Site Identified in Hazard Mitigation Plan:	No
Emergency Access or Evacuation Route:	N/A
History of Flooding:	No

Tidal Crossing Summary Sheet

New Hampshire's Tidal Crossing Assessment Protocol

Crossing ID: 109

Observer(s) & Organization:	JB, TS (NHDES Coastal)
Municipality:	STRATHAM
Stream Name:	N/A
Road Name:	N/A

Date:	7/2/2018
Start Time:	11:30:00 AM
End Time:	12:30:00 PM

Tide Prediction	**High**	**Low**
Time:	5:14 PM	11:20 AM
Elevation:	6.5	0.3
Tide Chart Location:	Squamscott River	

Crossing Condition Evaluation	Score*
Crossing Condition	2
Tidal Restriction Evaluation	
Tidal Range Ratio	1
Crossing Ratio	5
Erosion Classification	0
Tidal Restriction Overall Score	3
Tidal Aquatic Organism Passage	
Tidal Range Ratio	1
Salt Marsh Migration Evaluation	
Salt Marsh Migration Potential (Eval. Unit)	5
Salt Marsh Migration Potential (Wshed.)	5
Vegetation Evaluation	
Vegetation Comparison Matrix	4
Infrastructure Risk Evaluation	
Inundation Risk to the Roadway (US, DS)	3,3
Inun. Risk to the Crossing Structure (US, DS)	4,4
Adverse Impacts Evaluation**	
Inundation Risk to Low-Lying Development	5
Overall Scores	
Infrastructure	2
Ecological	4
Combined	3

DS view toward structure

US view above structure

US view toward structure

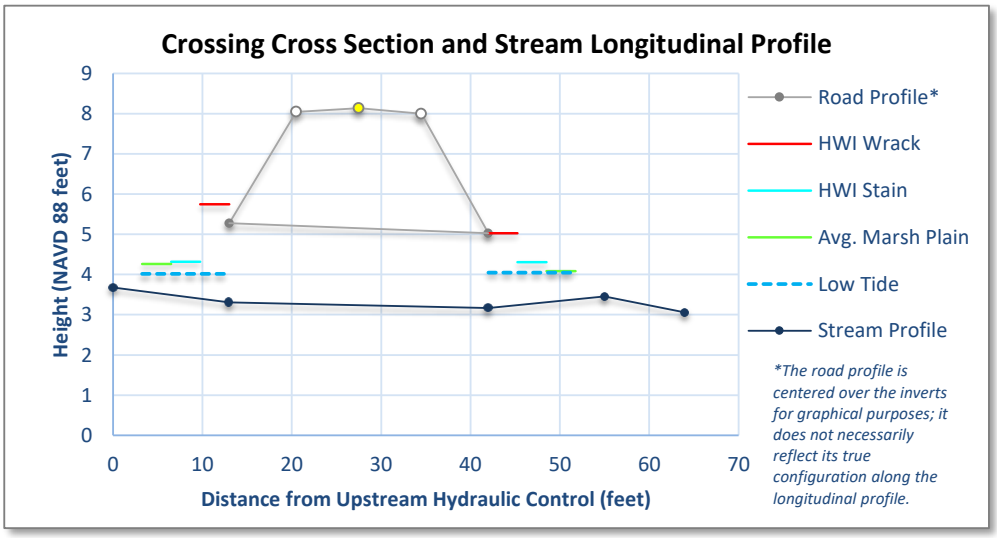
DS view above structure

* Scoring system ranges from 1 to 5, where 1 = lowest replacement priority and 5 = highest replacement priority

**Adverse Impacts Evaluation scores range from 1 to 5, where 1 = high risk and 5 = low risk

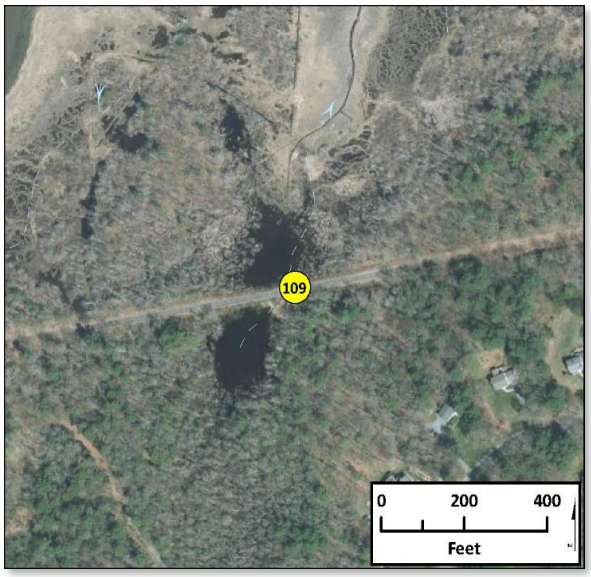
Long. Profile

Dist.	Hght.	Feat.	Sub.
0	3.6765	CB	C/S
13	3.3065	I	C/S
42	3.1665	I	G
55	3.4565	CB	C/S
64	3.0565	P	C/S



Crossing Context:

This is a railroad crossing of a small upper tidal reach with a 2 by 2-foot granite culvert. Ponding on either side of the structure suggests an artificial condition of the wetlands (perhaps a borrow site for fill for the railroad bed). The vegetation appears to be largely salt marsh downstream and fresh upstream. This crossing has an overall combined score of 3, indicating moderate priority for replacement, which may rank higher for marsh migration as sea levels rise.



Structure Characteristics:

Structure Type:	Box Culvert	**Date of Last Known Replacement:**	N/A
Structure Material:	Stone		
Tide Gate Present:	No		

Crossing Dimensions (ft):	Upstream	Downstream
Dimension A (width):	2	2.3
Dimension B^{CB}(height):	1.9	2.3
Crossing Length (Invert to Invert):	29	

Crossing Condition:	**Headwall Material**	**Headwall Condition**	**Wingwall Material**	**Wingwall Condition**	**Scour at Structure**	**Scour Severity**
Upstream	None	N/A	None	N/A	None	None
Downstream	None	N/A	None	N/A	Culvert	None

Scour in Structure	**Scour Severity in Structure**	**Road Surface Condition**	**Utilities at Crossing**	**Structure Condition Overall**
Culvert	Low	N/A	None	Fair

Structure Condition Comments:	N/A

Ecological Assessment:	Upstream	Downstream
Natural Community Classification:	Freshwater Swamp	High Salt Marsh
Upstream Salt Marsh Migration Potential (acres):	11.86	

Flood Hazard & Emergency Access

Site Identified in Hazard Mitigation Plan:	Yes
Emergency Access or Evacuation Route:	N/A
History of Flooding:	unknown

Tidal Crossing Summary Sheet

New Hampshire's Tidal Crossing Assessment Protocol

Crossing ID: 111

Observer(s) & Organization:	JB TS (NHDES Coastal)
Municipality:	NEWFIELDS
Stream Name:	N/A
Road Name:	N/A

Date:	6/26/2018
Start Time:	7:50:00 AM
End Time:	9:15:00 AM

Tide Prediction	**High**	**Low**
Time:	1:20 PM	7:30 AM
Elevation:	6.7	0.1
Tide Chart Location:	Squamscott River	

Crossing Condition Evaluation	Score*
Crossing Condition	5
Tidal Restriction Evaluation	
Tidal Range Ratio	3
Crossing Ratio	5
Erosion Classification	4
Tidal Restriction Overall Score	4
Tidal Aquatic Organism Passage	
Tidal Range Ratio	3
Salt Marsh Migration Evaluation	
Salt Marsh Migration Potential (Eval. Unit)	1
Salt Marsh Migration Potential (Wshed.)	1
Vegetation Evaluation	
Vegetation Comparison Matrix	1
Infrastructure Risk Evaluation	
Inundation Risk to the Roadway (US, DS)	1,1
Inun. Risk to the Crossing Structure (US, DS)	3,3
Adverse Impacts Evaluation**	
Inundation Risk to Low-Lying Development	5
Overall Scores	
Infrastructure	5
Ecological	3
Combined	4

DS view toward structure

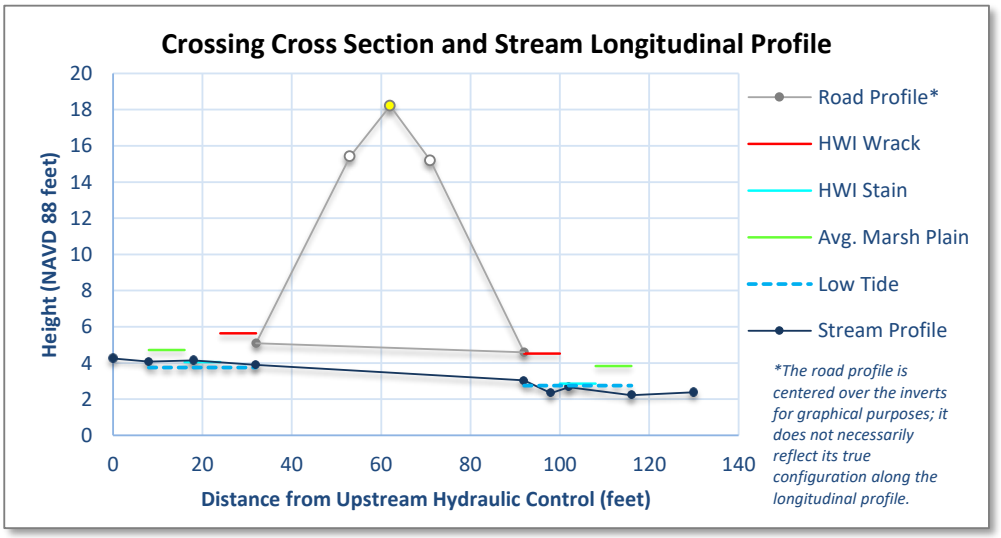
US view above structure

US view toward structure

DS view above structure

* Scoring system ranges from 1 to 5, where 1 = lowest replacement priority and 5 = highest replacement priority

**Adverse Impacts Evaluation scores range from 1 to 5, where 1 = high risk and 5 = low risk

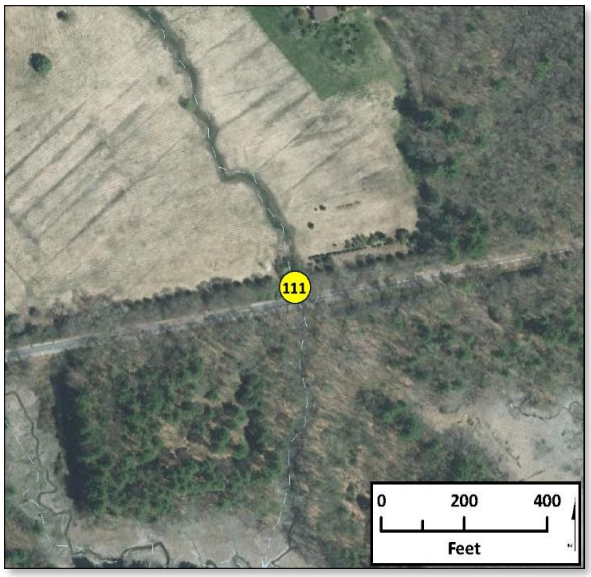


Long. Profile

Dist.	Hght.	Feat.	Sub.
0	4.2487	HC	C/S
8	4.0687	P	C/S
18	4.1387	HC	C/S
32	3.8887	I	C
92	3.0387	I	G
98	2.3387	P	C
102	2.6687	HC	C
116	2.2187	P	S
130	2.3787	HC	C/S

Crossing Context:

This crossing is over a branch of an unnamed brook and marsh and supports the rail line through Newington. It is terribly undersized (1.2 by 1.4 feet granite box culvert), has a poor crossing condition and exhibits high erosion. The crossing has an overall combined score of 4, indicating high priority for replacement.



Structure Characteristics:

Structure Type:	Box Culvert	**Date of Last Known Replacement:**	N/A
Structure Material:	Stone		
Tide Gate Present:	No		

Crossing Dimensions (ft):	Upstream	Downstream
Dimension A (width):	1.4	2.4
Dimension B^{CB}(height):	1.2	2.2
Crossing Length (Invert to Invert):	60	

Crossing Condition:	**Headwall Material**	**Headwall Condition**	**Wingwall Material**	**Wingwall Condition**	**Scour at Structure**	**Scour Severity**
Upstream	None	N/A	Rip Rap	Poor	Wingwalls	Medium
Downstream	None	N/A	Rip Rap	Poor	Wingwalls	Medium

Scour in Structure	**Scour Severity in Structure**	**Road Surface Condition**	**Utilities at Crossing**	**Structure Condition Overall**
Culvert	Medium	N/A	None	Poor

Structure Condition Comments:	Stones collapsing at structure.

Ecological Assessment:	Upstream	Downstream
Natural Community Classification:	Freshwater Marsh	Freshwater Marsh
Upstream Salt Marsh Migration Potential (acres):	0.00	

Flood Hazard & Emergency Access

Site Identified in Hazard Mitigation Plan:	No
Emergency Access or Evacuation Route:	N/A
History of Flooding:	Unknown

Tidal Crossing Summary Sheet

New Hampshire's Tidal Crossing Assessment Protocol

Crossing ID: 112

Observer(s) & Organization:	TS, JB (NHDES Coastal)
Municipality:	NEWFIELDS
Stream Name:	N/A
Road Name:	N/A

Date:	6/28/2018
Start Time:	9:30:00 AM
End Time:	1:22:00 PM

Tide Prediction	**High**	**Low**
Time:	12:00 AM	12:00 AM
Elevation:	0.0	0.0
Tide Chart Location:	Squamscott River	

Crossing Condition Evaluation	Score*
Crossing Condition	4
Tidal Restriction Evaluation	
Tidal Range Ratio	3
Crossing Ratio	5
Erosion Classification	5
Tidal Restriction Overall Score	4
Tidal Aquatic Organism Passage	
Tidal Range Ratio	3
Salt Marsh Migration Evaluation	
Salt Marsh Migration Potential (Eval. Unit)	1
Salt Marsh Migration Potential (Wshed.)	1
Vegetation Evaluation	
Vegetation Comparison Matrix	5
Infrastructure Risk Evaluation	
Inundation Risk to the Roadway (US, DS)	1,1
Inun. Risk to the Crossing Structure (US, DS)	4,3
Adverse Impacts Evaluation**	
Inundation Risk to Low-Lying Development	5
Overall Scores	
Infrastructure	4
Ecological	5
Combined	5

DS view toward structure

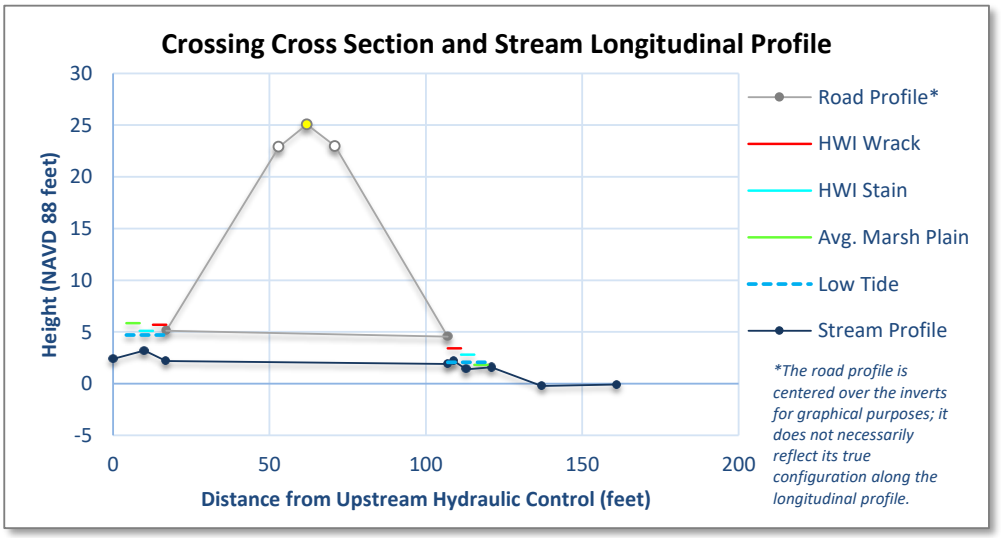
US view above structure

US view toward structure

DS view above structure

* Scoring system ranges from 1 to 5, where 1 = lowest replacement priority and 5 = highest replacement priority

**Adverse Impacts Evaluation scores range from 1 to 5, where 1 = high risk and 5 = low risk

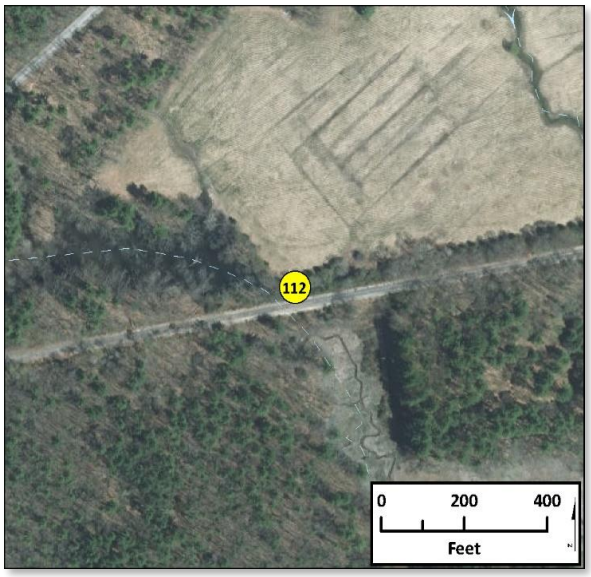


Long. Profile

Dist.	Hght.	Feat.	Sub.
0	2.3856	P	C/S
10	3.2056	CB	C/S
17	2.1856	I	C/S
107	1.9156	I	B
109	2.1856	GC	B
113	1.3756	P	B
121	1.5856	HC	B
137	-0.2244	CB	S
161	-0.0944	HC	B

Crossing Context:

The crossing is a railroad line over the upper reaches of a small drainage to the Squamscott River. It is a stone box culvert about 2 feet wide and 3 feet tall that shows constriction of the channel, erosion and potential impacts to the plant community. The overall combined score is a 5, highest priority for replacement.



Structure Characteristics:

Structure Type:	Box Culvert	**Date of Last Known Replacement:**	N/A
Structure Material:	Stone		
Tide Gate Present:	Yes		

Crossing Dimensions (ft):	Upstream	Downstream
Dimension A (width):	3	2
Dimension B^{CB}(height):	3	2.7
Crossing Length (Invert to Invert):	90	

Crossing Condition:	**Headwall Material**	**Headwall Condition**	**Wingwall Material**	**Wingwall Condition**	**Scour at Structure**	**Scour Severity**
Upstream	Dry Fit Stone	Poor	Dry Fit Stone	Fair	Wingwalls	Low
Downstream	None	N/A	Dry Fit Stone	Fair	Wingwalls	Medium

Scour in Structure	**Scour Severity in Structure**	**Road Surface Condition**	**Utilities at Crossing**	**Structure Condition Overall**
Culvert	Low	Fair	None	Poor

Structure Condition Comments:	R clogged DS

Ecological Assessment:	Upstream	Downstream
Natural Community Classification:	Freshwater Marsh	Freshwater Stream
Upstream Salt Marsh Migration Potential (acres):	0.00	

Flood Hazard & Emergency Access

Site Identified in Hazard Mitigation Plan:	No
Emergency Access or Evacuation Route:	N/A
History of Flooding:	Unknown

Tidal Crossing Summary Sheet

New Hampshire's Tidal Crossing Assessment Protocol

Crossing ID: 113

Observer(s) & Organization:	TS, JB (NHDES Coastal)
Municipality:	STRATHAM
Stream Name:	N/A
Road Name:	N/A

Date:	7/5/2018
Start Time:	1:00:00 PM
End Time:	2:09:00 PM

Tide Prediction	**High**	**Low**
Time:	7:18 PM	1:20 PM
Elevation:	6.7	0.6
Tide Chart Location:	Squamscott River	

Crossing Condition Evaluation	Score*
Crossing Condition	5
Tidal Restriction Evaluation	
Tidal Range Ratio	1
Crossing Ratio	5
Erosion Classification	5
Tidal Restriction Overall Score	4
Tidal Aquatic Organism Passage	
Tidal Range Ratio	1
Salt Marsh Migration Evaluation	
Salt Marsh Migration Potential (Eval. Unit)	3
Salt Marsh Migration Potential (Wshed.)	3
Vegetation Evaluation	
Vegetation Comparison Matrix	4
Infrastructure Risk Evaluation	
Inundation Risk to the Roadway (US, DS)	4,2
Inun. Risk to the Crossing Structure (US, DS)	5,5
Adverse Impacts Evaluation**	
Inundation Risk to Low-Lying Development	5
Overall Scores	
Infrastructure	5
Ecological	4
Combined	4

DS view toward structure

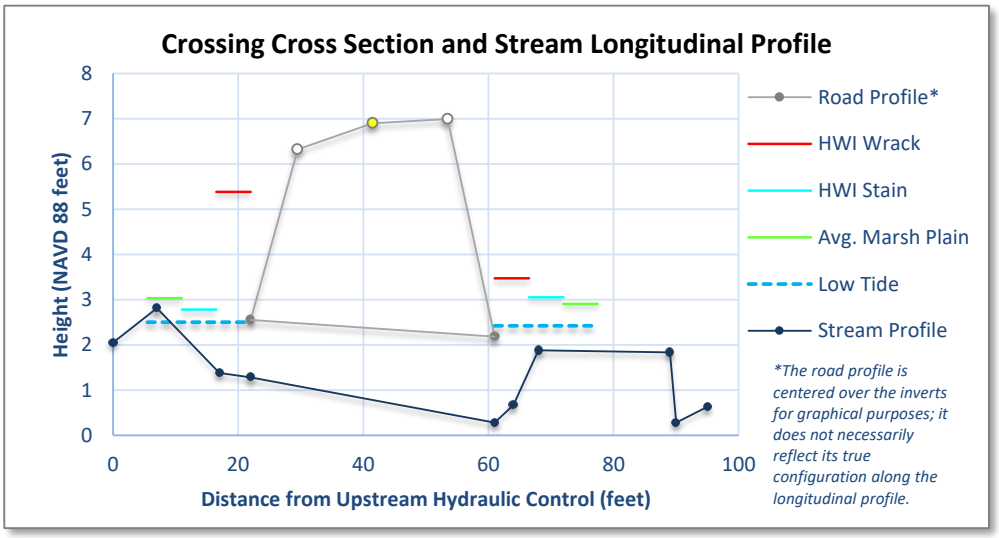
US view above structure

US view toward structure

DS view above structure

* Scoring system ranges from 1 to 5, where 1 = lowest replacement priority and 5 = highest replacement priority

**Adverse Impacts Evaluation scores range from 1 to 5, where 1 = high risk and 5 = low risk

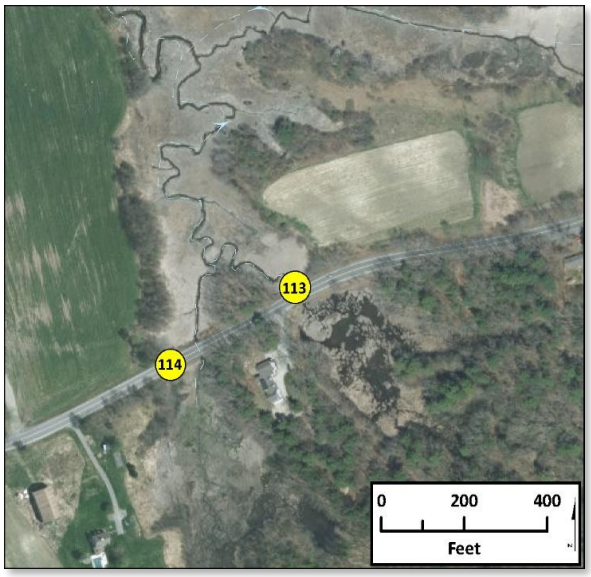


Long. Profile

Dist.	Hght.	Feat.	Sub.
0	2.0516	HC	C/S
7	2.8116	HC	G
17	1.3816	CB	B
22	1.2816	I	B
61	0.2816	I	S
64	0.6716	P	S
68	1.8816	HC	C/S
89	1.8316	HC	C/S
90	0.2816	CB	C/S
95	0.6316	CB	C/S

Crossing Context:

The crossing is on Squamscott Road over one of the unnamed upper marshes in Stratham and is rated an overall combined score of 4: high priority for replacement, due to tidal restriction and erosion associated with the 18-inch round culvert. The tidal creek fills the height of the culvert, even at low tide. Cattails are seen on both sides, but there is extensive marsh loss through ponding on the upstream side.



Structure Characteristics:

Structure Type:	Round Culvert	**Date of Last Known Replacement:**	N/A
Structure Material:	Concrete		
Tide Gate Present:	No		

Crossing Dimensions (ft):	Upstream	Downstream
Dimension A (width):	1.5	1.5
Dimension B^{CB}(height):	1.5	1.5
Crossing Length (Invert to Invert):	39	

Crossing Condition:	**Headwall Material**	**Headwall Condition**	**Wingwall Material**	**Wingwall Condition**	**Scour at Structure**	**Scour Severity**
Upstream	Dry Fit Stone	Poor	None	N/A	Headwall	Low
Downstream	None	Poor	None	N/A	Wingwalls	Low

Scour in Structure	**Scour Severity in Structure**	**Road Surface Condition**	**Utilities at Crossing**	**Structure Condition Overall**
None	None	Good	None	Poor

Structure Condition Comments:	Structure submerged

Ecological Assessment:	Upstream	Downstream
Natural Community Classification:	Invasive Dominant	Brackish Marsh
Upstream Salt Marsh Migration Potential (acres):	4.31	

Flood Hazard & Emergency Access

Site Identified in Hazard Mitigation Plan:	Yes
Emergency Access or Evacuation Route:	Yes
History of Flooding:	flooding has occurred with 2+ inches of rain

Tidal Crossing Summary Sheet

New Hampshire's Tidal Crossing Assessment Protocol

Crossing ID: 114

Observer(s) & Organization:	TS, JB (NHDES Coastal)
Municipality:	STRATHAM
Stream Name:	N/A
Road Name:	Squamscott Rd

Date:	6/11/2018
Start Time:	4:45:00 PM
End Time:	5:51:00 PM

Tide Prediction	**High**	**Low**
Time:	11:51 AM	6:13 PM
Elevation:	6.9	0.3
Tide Chart Location:	Squamscott River	

Crossing Condition Evaluation	Score*
Crossing Condition	2
Tidal Restriction Evaluation	
Tidal Range Ratio	1
Crossing Ratio	4
Erosion Classification	5
Tidal Restriction Overall Score	3
Tidal Aquatic Organism Passage	
Tidal Range Ratio	1
Salt Marsh Migration Evaluation	
Salt Marsh Migration Potential (Eval. Unit)	4
Salt Marsh Migration Potential (Wshed.)	4
Vegetation Evaluation	
Vegetation Comparison Matrix	3
Infrastructure Risk Evaluation	
Inundation Risk to the Roadway (US, DS)	2,2
Inun. Risk to the Crossing Structure (US, DS)	5,5
Adverse Impacts Evaluation**	
Inundation Risk to Low-Lying Development	5
Overall Scores	
Infrastructure	2
Ecological	3
Combined	3

DS view toward structure

US view above structure

US view toward structure

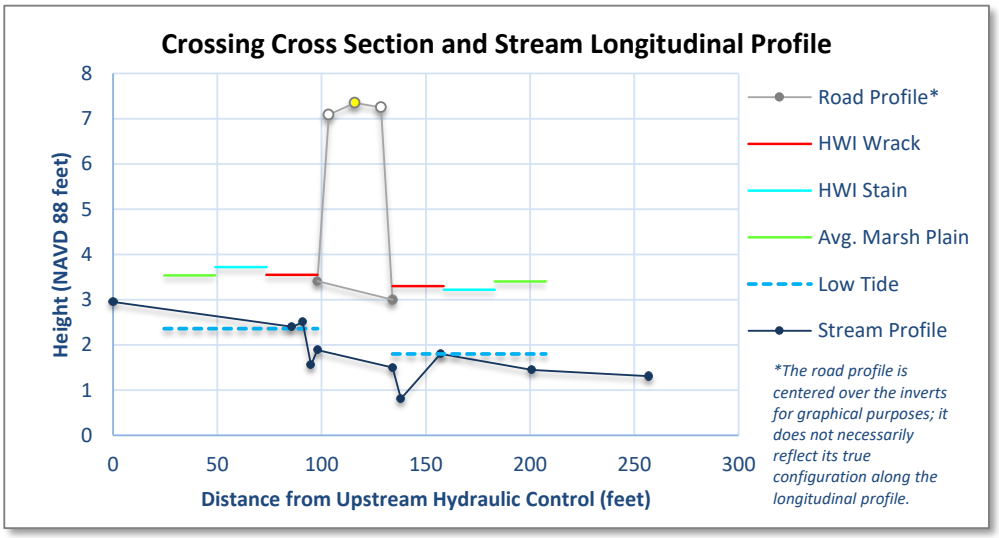
DS view above structure

* Scoring system ranges from 1 to 5, where 1 = lowest replacement priority and 5 = highest replacement priority

**Adverse Impacts Evaluation scores range from 1 to 5, where 1 = high risk and 5 = low risk

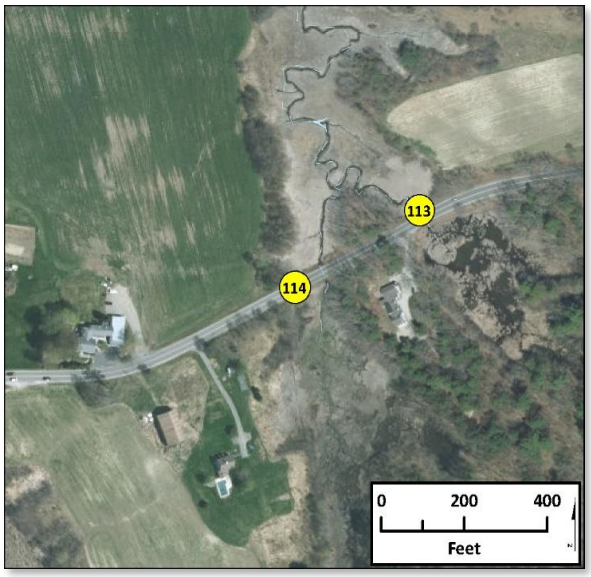
Long. Profile

Dist.	Hght.	Feat.	Sub.
0	2.9491	HC	C/S
86	2.3991	HC	G
91	2.4991	HC	G
95	1.5491	P	C/S
98	1.8891	I	C/S
134	1.4991	I	G
138	0.8091	P	C
157	1.7991	HC	G
201	1.4491	HC	G
257	1.3091	HC	G



Crossing Context:

N/A



Structure Characteristics:

Structure Type:	Round Culvert	**Date of Last Known Replacement:**	N/A
Structure Material:	Concrete		
Tide Gate Present:	No		

Crossing Dimensions (ft):	Upstream	Downstream
Dimension A (width):	1.5	1.5
Dimension B^{CB}(height):	1.5	1.5
Crossing Length (Invert to Invert):	36	

Crossing Condition:	**Headwall Material**	**Headwall Condition**	**Wingwall Material**	**Wingwall Condition**	**Scour at Structure**	**Scour Severity**
Upstream	Masonry	Fair	None	N/A	Headwall	Low
Downstream	Concrete	Fair	None	N/A	Headwall	Low

Scour in Structure	**Scour Severity in Structure**	**Road Surface Condition**	**Utilities at Crossing**	**Structure Condition Overall**
None	None	Good	Overhead electric	Fair

Structure Condition Comments:	N/A

Ecological Assessment:	Upstream	Downstream
Natural Community Classification:	High Salt Marsh	High Salt Marsh
Upstream Salt Marsh Migration Potential (acres):	7.06	

Flood Hazard & Emergency Access

Site Identified in Hazard Mitigation Plan:	Yes
Emergency Access or Evacuation Route:	Yes
History of Flooding:	flooding has occurred with 2+" of rain

Tidal Crossing Summary Sheet

New Hampshire's Tidal Crossing Assessment Protocol

Crossing ID: 115

Observer(s) & Organization:	TS,JB,KL (NHDES Coastal)
Municipality:	STRATHAM
Stream Name:	Jewell Hill Brook
Road Name:	Squamscott Rd

Date:	5/31/2018
Start Time:	12:20:00 PM
End Time:	2:30:00 AM

Tide Prediction	**High**	**Low**
Time:	3:44 PM	9:52 AM
Elevation:	6.7	-0.1
Tide Chart Location:	Squamscott River	

Crossing Condition Evaluation	Score*
Crossing Condition	4
Tidal Restriction Evaluation	
Tidal Range Ratio	1
Crossing Ratio	3
Erosion Classification	4
Tidal Restriction Overall Score	3
Tidal Aquatic Organism Passage	
Tidal Range Ratio	1
Salt Marsh Migration Evaluation	
Salt Marsh Migration Potential (Eval. Unit)	5
Salt Marsh Migration Potential (Wshed.)	5
Vegetation Evaluation	
Vegetation Comparison Matrix	3
Infrastructure Risk Evaluation	
Inundation Risk to the Roadway (US, DS)	3,4
Inun. Risk to the Crossing Structure (US, DS)	3,4
Adverse Impacts Evaluation**	
Inundation Risk to Low-Lying Development	5
Overall Scores	
Infrastructure	4
Ecological	3
Combined	4

DS view toward structure

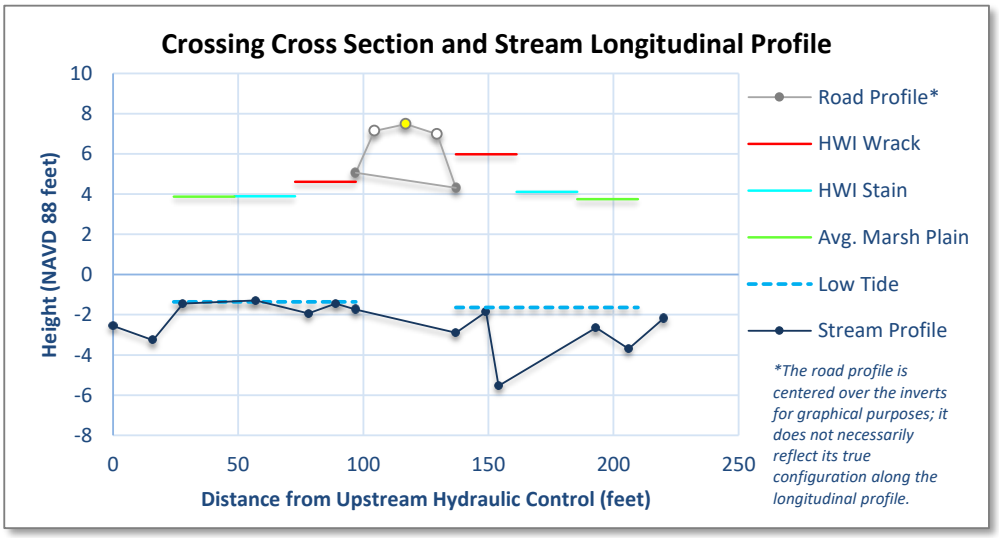
US view above structure

US view toward structure

DS view above structure

* Scoring system ranges from 1 to 5, where 1 = lowest replacement priority and 5 = highest replacement priority

**Adverse Impacts Evaluation scores range from 1 to 5, where 1 = high risk and 5 = low risk



Long. Profile

Dist.	Hght.	Feat.	Sub.
0	-2.5597	HC	G
16	-3.2597	P	G
28	-1.4397	HC	C/S
57	-1.2897	HC	G
78	-1.9397	P	G
89	-1.4397	GC	C
97	-1.7397	I	C
137	-2.8897	I	G
149	-1.8597	GC	C
154	-5.5397	P	C/S
193	-2.6397	HC	G
206	-3.6997	P	C/S
220	-2.1897	HC	G

Crossing Context:

Jewel Hill Creek carries tides through a fairly significant salt marsh and is crossed by Squamscott Road through an arched culvert, 8 feet wide and about 7 feet high. Although it appears to have been recently replaced, the structure condition was poor. The culvert constricted the channel and may have a negative impact on the plant community upstream. The overall combined score is 4, high priority for replacement.

Structure Characteristics:

Structure Type:	Embedded Pipe Arch Culvert	**Date of Last Known Replacement:**	N/A
Structure Material:	Plastic - Smooth		
Tide Gate Present:	No		

Crossing Dimensions (ft):	Upstream	Downstream
Dimension A (width):	8	8.1
Dimension B[CB](height):	7	7.35
Crossing Length (Invert to Invert):	40	

Crossing Condition:	**Headwall Material**	**Headwall Condition**	**Wingwall Material**	**Wingwall Condition**	**Scour at Structure**	**Scour Severity**
Upstream	Concrete	Fair	Rip Rap	Good	Headwall	Medium
Downstream	Concrete	Fair	Rip Rap	Good	Headwall	Medium

Scour in Structure	**Scour Severity in Structure**	**Road Surface Condition**	**Utilities at Crossing**	**Structure Condition Overall**
None	None	Good	Overhead electric	Poor

Structure Condition Comments:	Slanting headwall

Ecological Assessment:	Upstream	Downstream
Natural Community Classification:	High Salt Marsh	High Salt Marsh
Upstream Salt Marsh Migration Potential (acres):	11.41	

Flood Hazard & Emergency Access

Site Identified in Hazard Mitigation Plan:	Yes
Emergency Access or Evacuation Route:	Yes
History of Flooding:	flooding has occurred with 2+ inches of rain

Tidal Crossing Summary Sheet

New Hampshire's Tidal Crossing Assessment Protocol

Crossing ID: 116

Observer(s) & Organization:	JB TS CP (NHDES Coastal)
Municipality:	STRATHAM
Stream Name:	Mill Brook
Road Name:	No Name

Date:	8/27/2018
Start Time:	9:13:00 AM
End Time:	10:45:00 AM

Tide Prediction	**High**	**Low**
Time:	2:58 PM	9:09 AM
Elevation:	6.8	0.2
Tide Chart Location:	Squamscott River	

Crossing Condition Evaluation	Score*
Crossing Condition	1
Tidal Restriction Evaluation	
Tidal Range Ratio	2
Crossing Ratio	3
Erosion Classification	2
Tidal Restriction Overall Score	2
Tidal Aquatic Organism Passage	
Tidal Range Ratio	2
Salt Marsh Migration Evaluation	
Salt Marsh Migration Potential (Eval. Unit)	1
Salt Marsh Migration Potential (Wshed.)	1
Vegetation Evaluation	
Vegetation Comparison Matrix	0
Infrastructure Risk Evaluation	
Inundation Risk to the Roadway (US, DS)	2,2
Inun. Risk to the Crossing Structure (US, DS)	1,2
Adverse Impacts Evaluation**	
Inundation Risk to Low-Lying Development	5
Overall Scores	
Infrastructure	1
Ecological	4
Combined	2

DS view toward structure

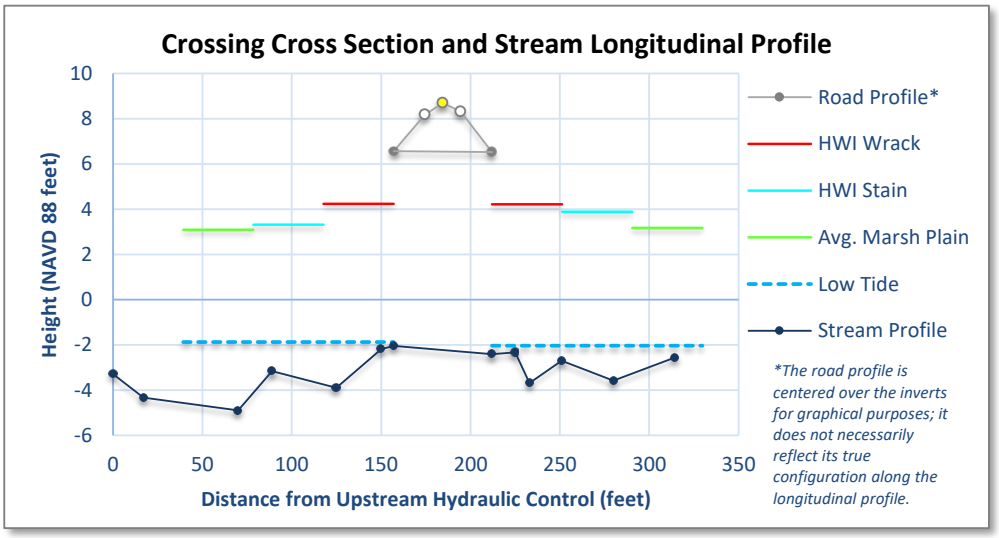
US view above structure

US view toward structure

DS view above structure

* Scoring system ranges from 1 to 5, where 1 = lowest replacement priority and 5 = highest replacement priority

**Adverse Impacts Evaluation scores range from 1 to 5, where 1 = high risk and 5 = low risk



Long. Profile

Dist.	Hght.	Feat.	Sub.
0	-3.2958	HC	C/S
17	-4.3358	P	C/S
70	-4.8958	CB	C/S
89	-3.1558	HC	C/S
125	-3.8958	P	C/S
150	-2.1858	GC	B
157	-2.0458	I	B
212	-2.4158	I	B
225	-2.3358	GC	B
233	-3.6858	P	G
251	-2.6958	HC	G
280	-3.5758	P	G
314	-2.5658	HC	G

Crossing Context:

The tidal crossing at Mill Creek is on the drive to Stuart Farm. In 1993 a tide gate was removed and replaced by a large arched culvert. This was one of the first tidal restorations in the State. See link below for more information:

https://www.nrcs.usda.gov/wps/portal/nrcs/detail/nh/technical/?cid=nrcs144p2_015690#Stuart%20Farm

The upstream side had subsided by 1 foot and the vegetation included purple loosestrife and common reed (exotic variety). Purple loosestrife was almost all eliminated, but some common reed remains, and the elevation of the marsh was found to build rapidly (0.12 feet per year in the 1990s). Today the elevation difference of the marsh is only 0.08 feet lower upstream than downstream. The metal pipe corroded and had to be replaced by a 9.5-foot round culvert in 2010. The crossing has an overall combined score of 2, indicating low priority for replacement. See the link below for more information on habitat change after tidal restoration:

https://scholars.unh.edu/jel/21/

Structure Characteristics:

Structure Type:	Round Culvert	**Date of Last Known Replacement:**	N/A
Structure Material:	Plastic - Corrugated		
Tide Gate Present:	No		

Crossing Dimensions (ft):	Upstream	Downstream
Dimension A (width):	9.5	9.5
Dimension B^{CB}(height):	9.6	9
Crossing Length (Invert to Invert):	55	

Crossing Condition:	**Headwall Material**	**Headwall Condition**	**Wingwall Material**	**Wingwall Condition**	**Scour at Structure**	**Scour Severity**
Upstream	Rip Rap	Good	None	N/A	Armoring	Low
Downstream	Rip Rap	Good	None	N/A	Armoring	Medium

Scour in Structure	**Scour Severity in Structure**	**Road Surface Condition**	**Utilities at Crossing**	**Structure Condition Overall**
None	None	Good	None	Good

Structure Condition Comments:	N/A

Ecological Assessment:	Upstream	Downstream
Natural Community Classification:	High Salt Marsh	High Salt Marsh
Upstream Salt Marsh Migration Potential (acres):	0.35	

Flood Hazard & Emergency Access

Site Identified in Hazard Mitigation Plan:	No
Emergency Access or Evacuation Route:	N/A
History of Flooding:	Prior to replacement

Tidal Crossing Summary Sheet

New Hampshire's Tidal Crossing Assessment Protocol

Crossing ID: 117

Observer(s) & Organization:	JB TS KL (NHDES Coastal)
Municipality:	NEWFIELDS
Stream Name:	Parting Brook
Road Name:	N/A

Date:	8/30/2018
Start Time:	11:00:00 AM
End Time:	12:00:00 PM

Tide Prediction	**High**	**Low**
Time:	4:41 PM	10:50 AM
Elevation:	7.1	0.2
Tide Chart Location:	Squamscott River	

Crossing Condition Evaluation	Score*
Crossing Condition	4
Tidal Restriction Evaluation	
Tidal Range Ratio	2
Crossing Ratio	4
Erosion Classification	4
Tidal Restriction Overall Score	3
Tidal Aquatic Organism Passage	
Tidal Range Ratio	2
Salt Marsh Migration Evaluation	
Salt Marsh Migration Potential (Eval. Unit)	3
Salt Marsh Migration Potential (Wshed.)	3
Vegetation Evaluation	
Vegetation Comparison Matrix	3
Infrastructure Risk Evaluation	
Inundation Risk to the Roadway (US, DS)	2,2
Inun. Risk to the Crossing Structure (US, DS)	3,3
Adverse Impacts Evaluation**	
Inundation Risk to Low-Lying Development	5
Overall Scores	
Infrastructure	4
Ecological	3
Combined	3

DS view toward structure

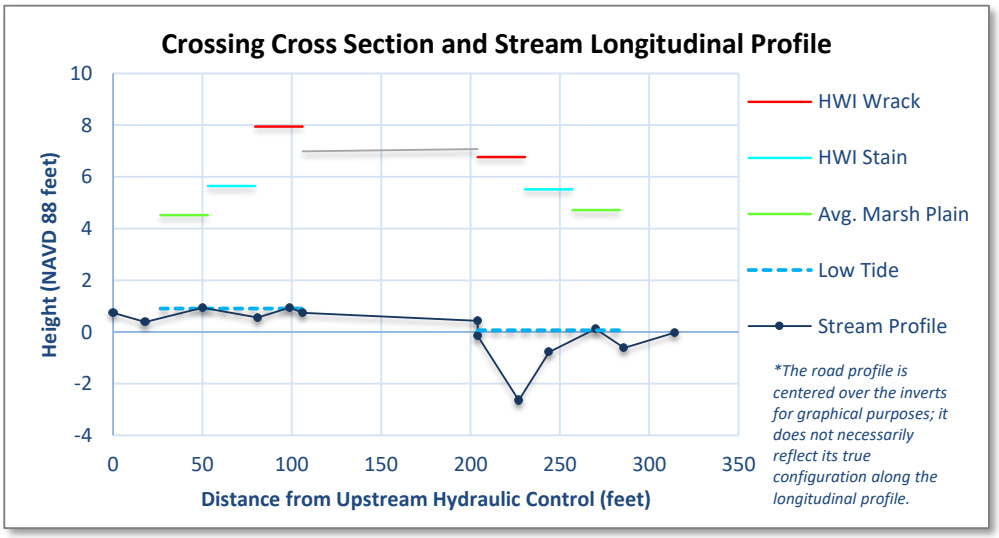
US view above structure

US view toward structure

DS view above structure

* Scoring system ranges from 1 to 5, where 1 = lowest replacement priority and 5 = highest replacement priority

**Adverse Impacts Evaluation scores range from 1 to 5, where 1 = high risk and 5 = low risk



Long. Profile

Dist.	Hght.	Feat.	Sub.
0	0.7453	HC	S
18	0.3853	P	S
50	0.9353	HC	S
81	0.5553	P	C/S
99	0.9453	HC	C
106	0.7353	I	C
204	0.4353	I	B
204	-0.1547	CB	B
227	-2.6447	P	S
244	-0.7747	CB	C/S
270	0.1153	HC	S
286	-0.6147	P	C/S
314	-0.0347	HC	S

Crossing Context:

N/A

Structure Characteristics:

Structure Type:	Box Culvert	**Date of Last Known Replacement:**	N/A
Structure Material:	Stone		
Tide Gate Present:	No		

Crossing Dimensions (ft):	Upstream	Downstream
Dimension A (width):	4	3.8
Dimension B^{CB}(height):	6.22	6.2
Crossing Length (Invert to Invert):	98	

Crossing Condition:	**Headwall Material**	**Headwall Condition**	**Wingwall Material**	**Wingwall Condition**	**Scour at Structure**	**Scour Severity**
Upstream	Dry Fit Stone	Fair	Dry Fit Stone	Fair	None	None
Downstream	Dry Fit Stone	Fair	Dry Fit Stone	Poor	Headwall	High

Scour in Structure	**Scour Severity in Structure**	**Road Surface Condition**	**Utilities at Crossing**	**Structure Condition Overall**
Culvert	Low	N/A	None	Fair

Structure Condition Comments:	US side is solid. Some spawling but good shape. Massive scour behind DS headwall. Water flowing under wood in structure.

Ecological Assessment:	Upstream	Downstream
Natural Community Classification:	High Salt Marsh	High Salt Marsh
Upstream Salt Marsh Migration Potential (acres):	2.47	

Flood Hazard & Emergency Access

Site Identified in Hazard Mitigation Plan:	Yes
Emergency Access or Evacuation Route:	N/A
History of Flooding:	unknown

Tidal Crossing Summary Sheet

New Hampshire's Tidal Crossing Assessment Protocol

Crossing ID: 118

Observer(s) & Organization:	JB TS kl (NHDES Coastal)
Municipality:	EXETER
Stream Name:	N/A
Road Name:	N/A

Date:	8/29/2018
Start Time:	8:30:00 AM
End Time:	9:44:00 AM

Tide Prediction	**High**	**Low**
Time:	4:05 PM	10:15 AM
Elevation:	7.0	0.2
Tide Chart Location:	Squamscott River	

Crossing Condition Evaluation	Score*
Crossing Condition	2
Tidal Restriction Evaluation	
Tidal Range Ratio	2
Crossing Ratio	4
Erosion Classification	3
Tidal Restriction Overall Score	3
Tidal Aquatic Organism Passage	
Tidal Range Ratio	2
Salt Marsh Migration Evaluation	
Salt Marsh Migration Potential (Eval. Unit)	1
Salt Marsh Migration Potential (Wshed.)	1
Vegetation Evaluation	
Vegetation Comparison Matrix	5
Infrastructure Risk Evaluation	
Inundation Risk to the Roadway (US, DS)	1,1
Inun. Risk to the Crossing Structure (US, DS)	4,3
Adverse Impacts Evaluation**	
Inundation Risk to Low-Lying Development	5
Overall Scores	
Infrastructure	2
Ecological	4
Combined	2

DS view toward structure

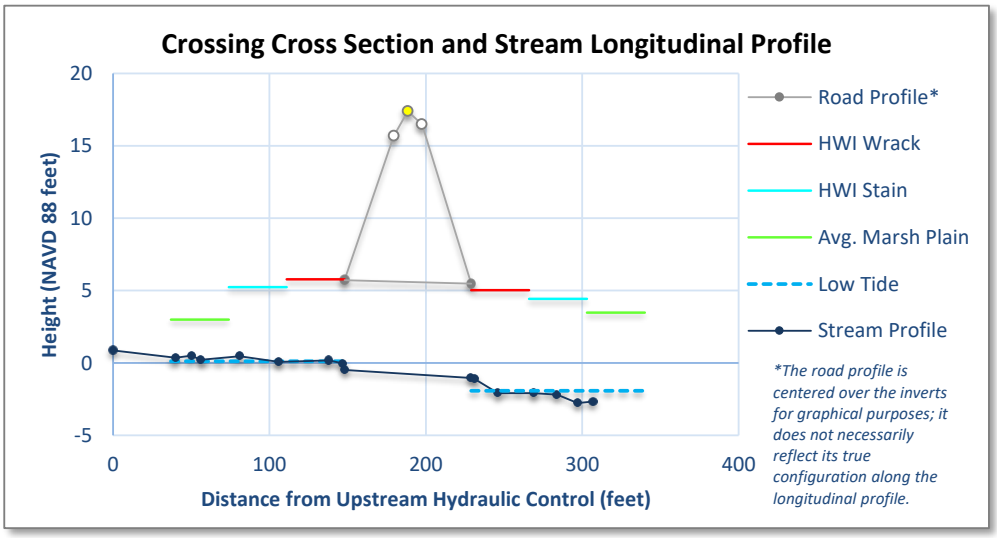
US view above structure

US view toward structure

DS view above structure

* Scoring system ranges from 1 to 5, where 1 = lowest replacement priority and 5 = highest replacement priority

**Adverse Impacts Evaluation scores range from 1 to 5, where 1 = high risk and 5 = low risk

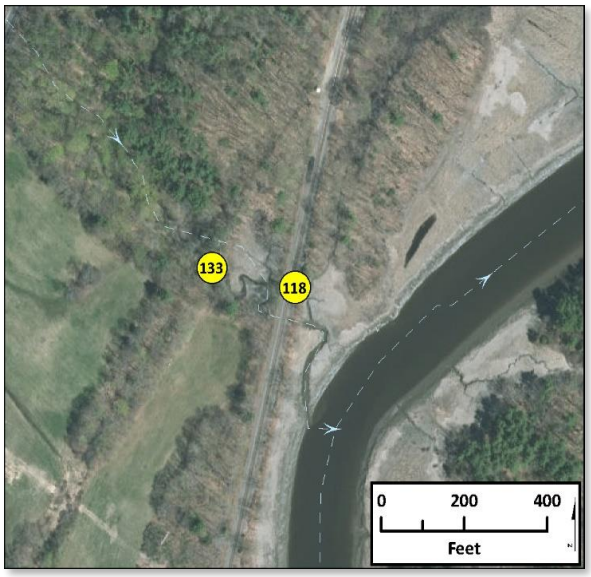


Long. Profile

Dist.	Hght.	Feat.	Sub.
0	0.8685	HC	C
40	0.3585	P	C/S
50	0.5085	HC	G
56	0.2185	P	C/S
81	0.4685	HC	G
106	0.0785	CB	C/S
138	0.1685	HC	C
147	-0.0215	HC	C/S
148	-0.4815	I	C
229	-1.0415	I	B
231	-1.1015	GC	B
246	-2.0915	CB	S
269	-2.0915	HC	G
284	-2.1815	HC	G
297	-2.7715	P	G
307	-2.6515	HC	C/S

Crossing Context:

N/A



Structure Characteristics:

Structure Type:	Box Culvert	**Date of Last Known Replacement:**	N/A
Structure Material:	Stone		
Tide Gate Present:	No		

Crossing Dimensions (ft):	Upstream	Downstream
Dimension A (width):	3.7	4
Dimension B^{CB}(height):	6.3	6.5
Crossing Length (Invert to Invert):	81	

Crossing Condition:	**Headwall Material**	**Headwall Condition**	**Wingwall Material**	**Wingwall Condition**	**Scour at Structure**	**Scour Severity**
Upstream	Dry Fit Stone	Fair	Dry Fit Stone	Fair	Wingwalls	Medium
Downstream	Dry Fit Stone	Fair	Dry Fit Stone	Fair	Wingwalls	Medium

Scour in Structure	**Scour Severity in Structure**	**Road Surface Condition**	**Utilities at Crossing**	**Structure Condition Overall**
Culvert	Medium	N/A	Tracks	Fair

Structure Condition Comments:	N/A

Ecological Assessment:	Upstream	Downstream
Natural Community Classification:	Brackish Riverbank Marsh	High Salt Marsh
Upstream Salt Marsh Migration Potential (acres):	0.17	

Flood Hazard & Emergency Access

Site Identified in Hazard Mitigation Plan:	No
Emergency Access or Evacuation Route:	N/A
History of Flooding:	Unknown

Tidal Crossing Summary Sheet

New Hampshire's Tidal Crossing Assessment Protocol

Crossing ID: 119

Observer(s) & Organization:	TS (NHDES Coastal)
Municipality:	EXETER
Stream Name:	N/A
Road Name:	N/A

Date:	8/30/2018
Start Time:	9:00:00 AM
End Time:	10:11:00 AM

Tide Prediction	**High**	**Low**
Time:	4:41 PM	10:50 AM
Elevation:	7.1	0.2
Tide Chart Location:	Squamscott River	

Crossing Condition Evaluation	Score*
Crossing Condition	5
Tidal Restriction Evaluation	
Tidal Range Ratio	3
Crossing Ratio	4
Erosion Classification	3
Tidal Restriction Overall Score	3
Tidal Aquatic Organism Passage	
Tidal Range Ratio	3
Salt Marsh Migration Evaluation	
Salt Marsh Migration Potential (Eval. Unit)	1
Salt Marsh Migration Potential (Wshed.)	1
Vegetation Evaluation	
Vegetation Comparison Matrix	0
Infrastructure Risk Evaluation	
Inundation Risk to the Roadway (US, DS)	1,1
Inun. Risk to the Crossing Structure (US, DS)	5,5
Adverse Impacts Evaluation**	
Inundation Risk to Low-Lying Development	5
Overall Scores	
Infrastructure	5
Ecological	4
Combined	4

DS view toward structure

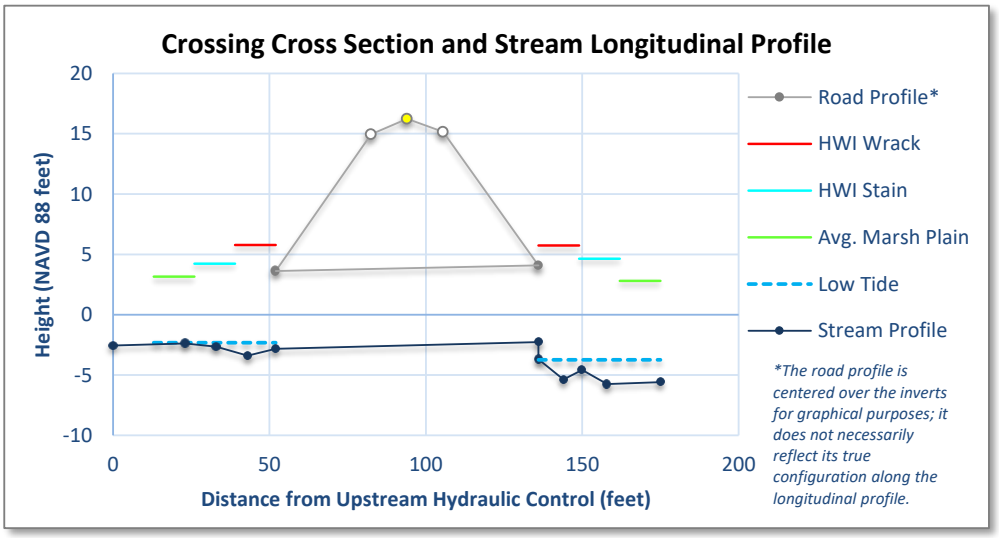
US view above structure

US view toward structure

DS view above structure

* Scoring system ranges from 1 to 5, where 1 = lowest replacement priority and 5 = highest replacement priority

**Adverse Impacts Evaluation scores range from 1 to 5, where 1 = high risk and 5 = low risk

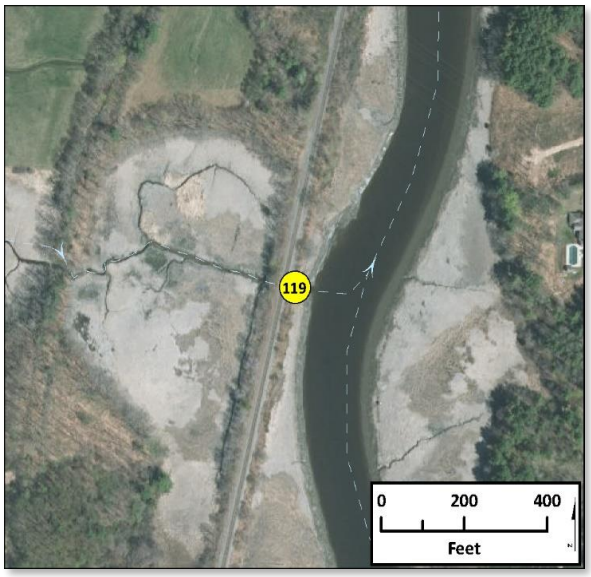


Long. Profile

Dist.	Hght.	Feat.	Sub.
0	-2.5598	HC	C/S
23	-2.3798	HC	C/S
33	-2.6498	CB	S
43	-3.3998	P	C/S
52	-2.8298	I	C
136	-2.2698	I	G
136	-3.6798	CB	G
144	-5.3598	P	G
150	-4.5698	HC	B
158	-5.7498	P	G
175	-5.5898	CB	G

Crossing Context:

The railroad bed traveling north and south on the west side of Great Bay has several crossings of tidal marsh and creeks (117, 118, 119, 121). The granite culvert for this crossing is about 7 feet high by 4 feet wide and conducts water of an unnamed tidal creek to about 10 acres of tidal marsh. The crossing condition is poor, it constricts the channel width, restricts the tidal range and has a perch at low tide. The culvert fills during high tide on a regular basis. The overall combined score is 4, high priority for replacement.



Structure Characteristics:

Structure Type:	Box Culvert	**Date of Last Known Replacement:**	N/A
Structure Material:	Stone		
Tide Gate Present:	No		

Crossing Dimensions (ft):	Upstream	Downstream
Dimension A (width):	3.6	4
Dimension B^{CB} (height):	6.75	6.85
Crossing Length (Invert to Invert):	84	

Crossing Condition:	**Headwall Material**	**Headwall Condition**	**Wingwall Material**	**Wingwall Condition**	**Scour at Structure**	**Scour Severity**
Upstream	Dry Fit Stone	Poor	Dry Fit Stone	Poor	Wingwalls	Medium
Downstream	Dry Fit Stone	Fair	Dry Fit Stone	Fair	Headwall	Medium

Scour in Structure	**Scour Severity in Structure**	**Road Surface Condition**	**Utilities at Crossing**	**Structure Condition Overall**
Culvert	Low	N/A	None	Poor

Structure Condition Comments:	Water runs under wood bottom

Ecological Assessment:	Upstream	Downstream
Natural Community Classification:	High Salt Marsh	High Salt Marsh
Upstream Salt Marsh Migration Potential (acres):	0.08	

Flood Hazard & Emergency Access

Site Identified in Hazard Mitigation Plan:	No
Emergency Access or Evacuation Route:	N/A
History of Flooding:	Unknown

Tidal Crossing Summary Sheet

New Hampshire's Tidal Crossing Assessment Protocol

Crossing ID: 120

Observer(s) & Organization:	JB TS (NHDES Coastal)
Municipality:	EXETER
Stream Name:	Rocky Hill Brook
Road Name:	Newfields Rd

Date:	6/15/2018
Start Time:	8:30:00 AM
End Time:	10:22:00 AM

Tide Prediction	**High**	**Low**
Time:	3:22 PM	9:28 AM
Elevation:	7.6	-1.2
Tide Chart Location:	Squamscott River	

Crossing Condition Evaluation	Score*
Crossing Condition	5
Tidal Restriction Evaluation	
Tidal Range Ratio	3
Crossing Ratio	3
Erosion Classification	5
Tidal Restriction Overall Score	4
Tidal Aquatic Organism Passage	
Tidal Range Ratio	3
Salt Marsh Migration Evaluation	
Salt Marsh Migration Potential (Eval. Unit)	1
Salt Marsh Migration Potential (Wshed.)	1
Vegetation Evaluation	
Vegetation Comparison Matrix	1
Infrastructure Risk Evaluation	
Inundation Risk to the Roadway (US, DS)	1,1
Inun. Risk to the Crossing Structure (US, DS)	2,2
Adverse Impacts Evaluation**	
Inundation Risk to Low-Lying Development	5
Overall Scores	
Infrastructure	5
Ecological	3
Combined	4

DS view toward structure

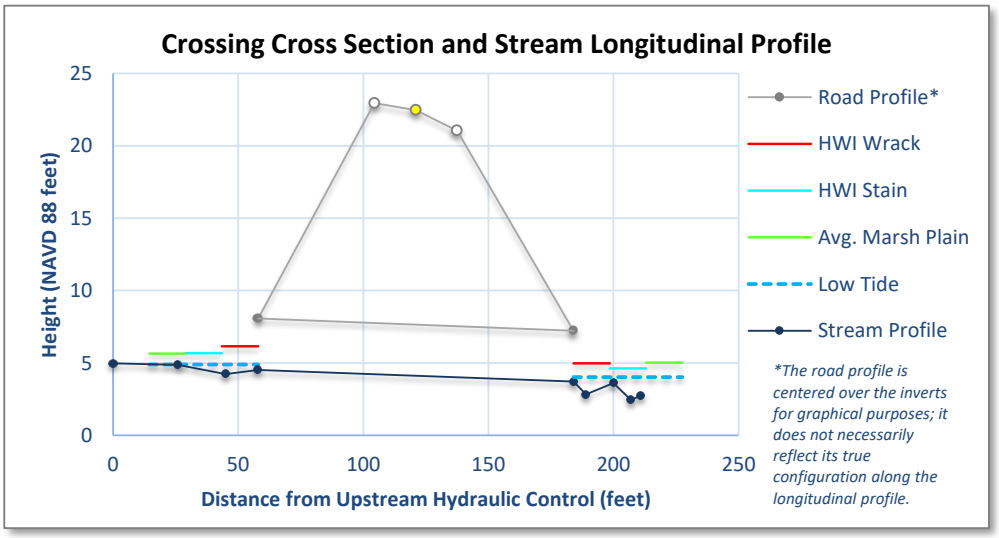
US view above structure

US view toward structure

DS view above structure

* Scoring system ranges from 1 to 5, where 1 = lowest replacement priority and 5 = highest replacement priority

**Adverse Impacts Evaluation scores range from 1 to 5, where 1 = high risk and 5 = low risk

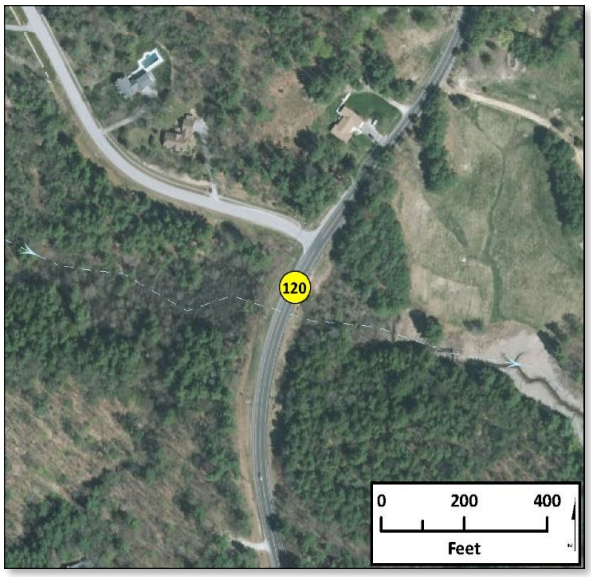


Long. Profile

Dist.	Hght.	Feat.	Sub.
0	4.9738	HC	C/S
26	4.8738	HC	S
45	4.2338	P	C/S
58	4.5138	I	S
184	3.7238	I	C
189	2.8238	P	C
200	3.6238	HC	C
207	2.4438	P	C
211	2.7438	HC	C

Crossing Context:

Newfield's Road crosses Rocky Hill Brook well above the railroad bed and the Brook runs through a 3.5-foot round metal pipe (although the upstream pipe exiting the road bed is partially crushed). The crossing condition is poor, with strong evidence of erosion and the culvert constricts the channel flow. The overall combined score is 4 for this culvert, indicating a high priority for replacement.



Structure Characteristics:

Structure Type:	Round Culvert	**Date of Last Known Replacement:**	N/A
Structure Material:	Steel - Corrugated		
Tide Gate Present:	No		

Crossing Dimensions (ft):	Upstream	Downstream
Dimension A (width):	2.5	3.5
Dimension B^{CB} (height):	3.2	3.5
Crossing Length (Invert to Invert):	126	

Crossing Condition:	**Headwall Material**	**Headwall Condition**	**Wingwall Material**	**Wingwall Condition**	**Scour at Structure**	**Scour Severity**
Upstream	Masonry	Poor	Masonry	Poor	Culvert	High
Downstream	Masonry	Good	Rip Rap	Poor	Culvert	High

Scour in Structure	**Scour Severity in Structure**	**Road Surface Condition**	**Utilities at Crossing**	**Structure Condition Overall**
Culvert	High	Good	OHE	Poor

Structure Condition Comments:	US grate fallen

Ecological Assessment:	Upstream	Downstream
Natural Community Classification:	Freshwater Stream	Freshwater Stream
Upstream Salt Marsh Migration Potential (acres):	0.00	

Flood Hazard & Emergency Access

Site Identified in Hazard Mitigation Plan:	No
Emergency Access or Evacuation Route:	Yes
History of Flooding:	None documented

Tidal Crossing Summary Sheet

New Hampshire's Tidal Crossing Assessment Protocol

Crossing ID: 121

Observer(s) & Organization:	JB KL (NHDES Coastal)
Municipality:	EXETER
Stream Name:	Rocky Hill Brook
Road Name:	N/A

Date:	6/14/2018
Start Time:	8:30:00 AM
End Time:	11:00:00 AM

Tide Prediction	**High**	**Low**
Time:	2:29 PM	8:36 AM
Elevation:	7.5	-1.0
Tide Chart Location:	Squamscott River	

Crossing Condition Evaluation	Score*
Crossing Condition	5
Tidal Restriction Evaluation	
Tidal Range Ratio	1
Crossing Ratio	4
Erosion Classification	5
Tidal Restriction Overall Score	3
Tidal Aquatic Organism Passage	
Tidal Range Ratio	1
Salt Marsh Migration Evaluation	
Salt Marsh Migration Potential (Eval. Unit)	1
Salt Marsh Migration Potential (Wshed.)	1
Vegetation Evaluation	
Vegetation Comparison Matrix	0
Infrastructure Risk Evaluation	
Inundation Risk to the Roadway (US, DS)	1,1
Inun. Risk to the Crossing Structure (US, DS)	5,5
Adverse Impacts Evaluation**	
Inundation Risk to Low-Lying Development	5
Overall Scores	
Infrastructure	5
Ecological	4
Combined	4

DS view toward structure

US view above structure

US view toward structure

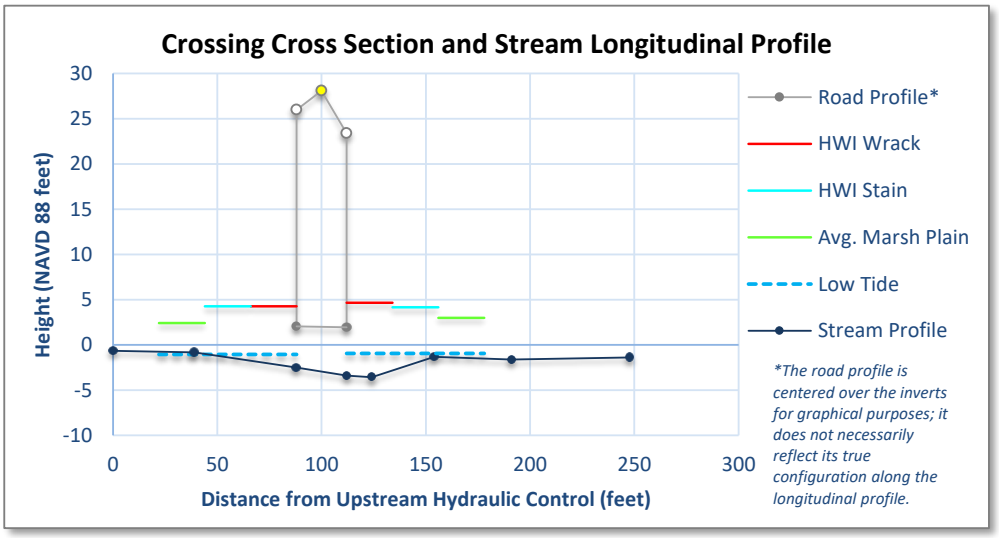
DS view above structure

* Scoring system ranges from 1 to 5, where 1 = lowest replacement priority and 5 = highest replacement priority

**Adverse Impacts Evaluation scores range from 1 to 5, where 1 = high risk and 5 = low risk

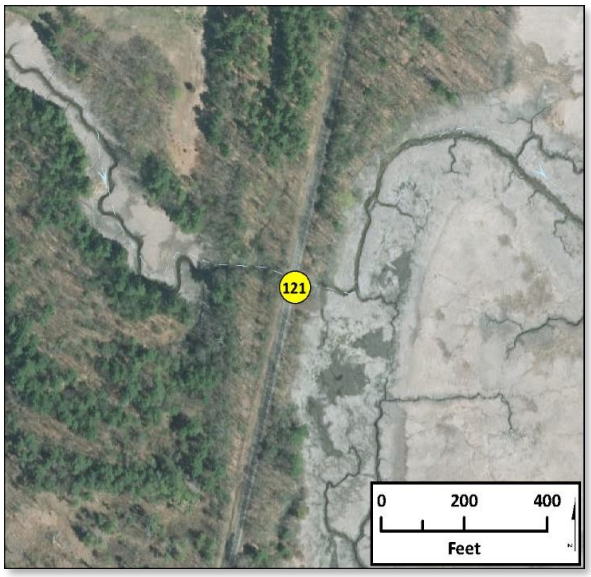
Long. Profile

Dist.	Hght.	Feat.	Sub.
0	-0.656	HC	S
39	-0.846	HC	S
88	-2.516	I	S
112	-3.406	I	C/S
124	-3.576	P	C/S
154	-1.316	HC	S
191	-1.606	P	S
248	-1.376	HC	S



Crossing Context:

The railroad bed traveling north and south on the west side of Great Bay has several crossings of tidal marsh and creeks (117, 118, 119, 121). Rocky hill brook is tidal marsh where it crosses under the railroad through a 4-foot-wide and 5.5-foot-tall stone bridge. The crossing condition is poor showing channel constriction and severe erosion, with high tides overfilling the structure on a daily basis. The upstream marsh is more than 0.5 feet lower than the downstream marsh plain, indicating restriction has led to subsidence. The overall combined score is 4, high priority for replacement.



Structure Characteristics:

Structure Type:	Bridge with Abutments	**Date of Last Known Replacement:**	N/A
Structure Material:	Stone		
Tide Gate Present:	No		

Crossing Dimensions (ft):	Upstream	Downstream
Dimension A (width):	4	3.9
Dimension B^{CB}(height):	5.7	5.5
Crossing Length (Invert to Invert):	24	

Crossing Condition:	**Headwall Material**	**Headwall Condition**	**Wingwall Material**	**Wingwall Condition**	**Scour at Structure**	**Scour Severity**
Upstream	Dry Fit Stone	Poor	None	N/A	Headwall	High
Downstream	Dry Fit Stone	Fair	None	N/A	Headwall	High

Scour in Structure	**Scour Severity in Structure**	**Road Surface Condition**	**Utilities at Crossing**	**Structure Condition Overall**
None	None	N/A	Tracks	Poor

Structure Condition Comments:	Scour from lack of wingwalls

Ecological Assessment:	Upstream	Downstream
Natural Community Classification:	Brackish Marsh	Brackish Riverbank Marsh
Upstream Salt Marsh Migration Potential (acres):	0.00	

Flood Hazard & Emergency Access

Site Identified in Hazard Mitigation Plan:	No
Emergency Access or Evacuation Route:	N/A
History of Flooding:	Unknown

Tidal Crossing Summary Sheet

New Hampshire's Tidal Crossing Assessment Protocol

Crossing ID: 123

Observer(s) & Organization:	JB TS (NHDES Coastal)
Municipality:	EXETER
Stream Name:	Wheelwright Creek
Road Name:	Portsmouth Ave

Date:	6/13/2018
Start Time:	7:45:00 AM
End Time:	9:27:00 AM

Tide Prediction	**High**	**Low**
Time:	1:36 PM	7:45 AM
Elevation:	7.4	-0.7
Tide Chart Location:	Squamscott River	

Crossing Condition Evaluation	Score*
Crossing Condition	1
Tidal Restriction Evaluation	
Tidal Range Ratio	3
Crossing Ratio	2
Erosion Classification	3
Tidal Restriction Overall Score	3
Tidal Aquatic Organism Passage	
Tidal Range Ratio	3
Salt Marsh Migration Evaluation	
Salt Marsh Migration Potential (Eval. Unit)	1
Salt Marsh Migration Potential (Wshed.)	1
Vegetation Evaluation	
Vegetation Comparison Matrix	0
Infrastructure Risk Evaluation	
Inundation Risk to the Roadway (US, DS)	1,1
Inun. Risk to the Crossing Structure (US, DS)	1,1
Adverse Impacts Evaluation**	
Inundation Risk to Low-Lying Development	5
Overall Scores	
Infrastructure	1
Ecological	4
Combined	3

DS view toward structure

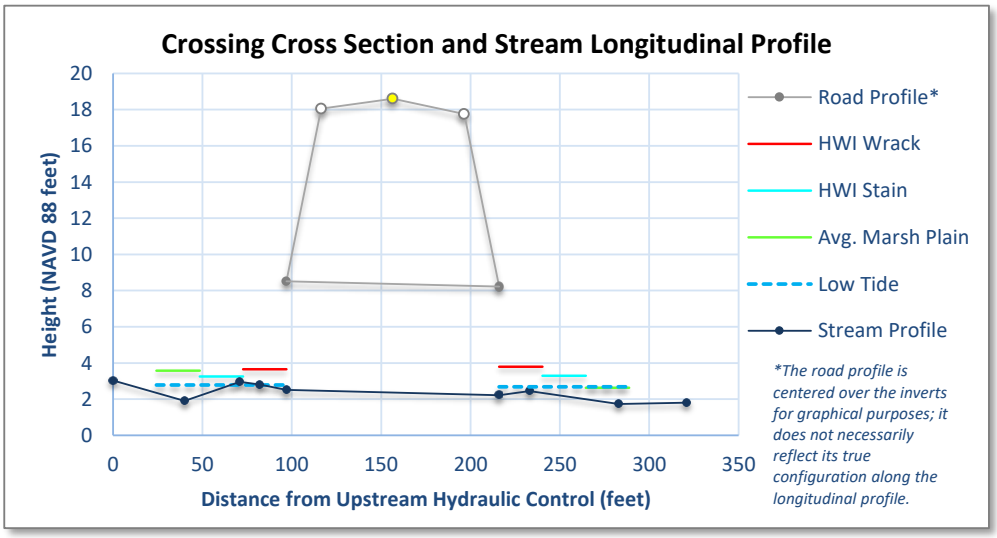
US view above structure

US view toward structure

DS view above structure

* Scoring system ranges from 1 to 5, where 1 = lowest replacement priority and 5 = highest replacement priority

**Adverse Impacts Evaluation scores range from 1 to 5, where 1 = high risk and 5 = low risk

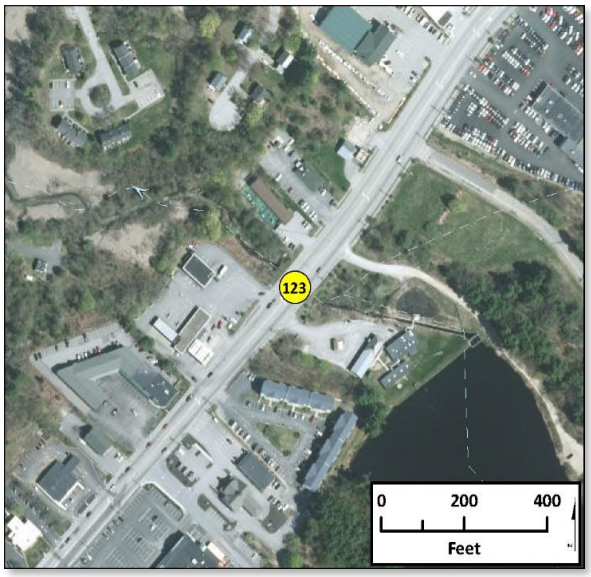


Long. Profile

Dist.	Hght.	Feat.	Sub.
0	3.0324	HC	B
40	1.9024	P	C
71	2.9524	HC	C
82	2.8124	GC	C
97	2.5124	I	C
216	2.2224	I	C
233	2.4524	HC	C
283	1.7324	HC	C
321	1.8024	HC	C

Crossing Context:

N/A



Structure Characteristics:

Structure Type:	Box Culvert	**Date of Last Known Replacement:**	N/A
Structure Material:	Concrete		
Tide Gate Present:	No		

Crossing Dimensions (ft):	Upstream	Downstream
Dimension A (width):	16	16
Dimension B^{CB}(height):	6	6
Crossing Length (Invert to Invert):	119	

Crossing Condition:	**Headwall Material**	**Headwall Condition**	**Wingwall Material**	**Wingwall Condition**	**Scour at Structure**	**Scour Severity**
Upstream	Concrete	Good	Concrete	Good	None	None
Downstream	Concrete	Good	Concrete	Good	None	None

Scour in Structure	**Scour Severity in Structure**	**Road Surface Condition**	**Utilities at Crossing**	**Structure Condition Overall**
None	None	Good	OHE	Good

Structure Condition Comments:	N/A

Ecological Assessment:	Upstream	Downstream
Natural Community Classification:	Freshwater Stream	Brackish Riverbank Marsh
Upstream Salt Marsh Migration Potential (acres):	0.00	

Flood Hazard & Emergency Access

Site Identified in Hazard Mitigation Plan:	Yes
Emergency Access or Evacuation Route:	Yes
History of Flooding:	Chronic reoccurring flooding.

Tidal Crossing Summary Sheet

New Hampshire's Tidal Crossing Assessment Protocol

Crossing ID: 124

Observer(s) & Organization:	TS, JB (NHDES Coastal)
Municipality:	EXETER
Stream Name:	Norris Brook
Road Name:	Swazey Pkwy

Date:	6/29/2018
Start Time:	9:30:00 AM
End Time:	10:30:00 AM

Tide Prediction	**High**	**Low**
Time:	3:21 PM	9:31 AM
Elevation:	6.6	0.1
Tide Chart Location:	Squamscott River	

Crossing Condition Evaluation	Score*
Crossing Condition	1
Tidal Restriction Evaluation	
Tidal Range Ratio	1
Crossing Ratio	4
Erosion Classification	3
Tidal Restriction Overall Score	3
Tidal Aquatic Organism Passage	
Tidal Range Ratio	1
Salt Marsh Migration Evaluation	
Salt Marsh Migration Potential (Eval. Unit)	2
Salt Marsh Migration Potential (Wshed.)	2
Vegetation Evaluation	
Vegetation Comparison Matrix	5
Infrastructure Risk Evaluation	
Inundation Risk to the Roadway (US, DS)	3,3
Inun. Risk to the Crossing Structure (US, DS)	5,5
Adverse Impacts Evaluation**	
Inundation Risk to Low-Lying Development	5
Overall Scores	
Infrastructure	3
Ecological	4
Combined	3

DS view toward structure

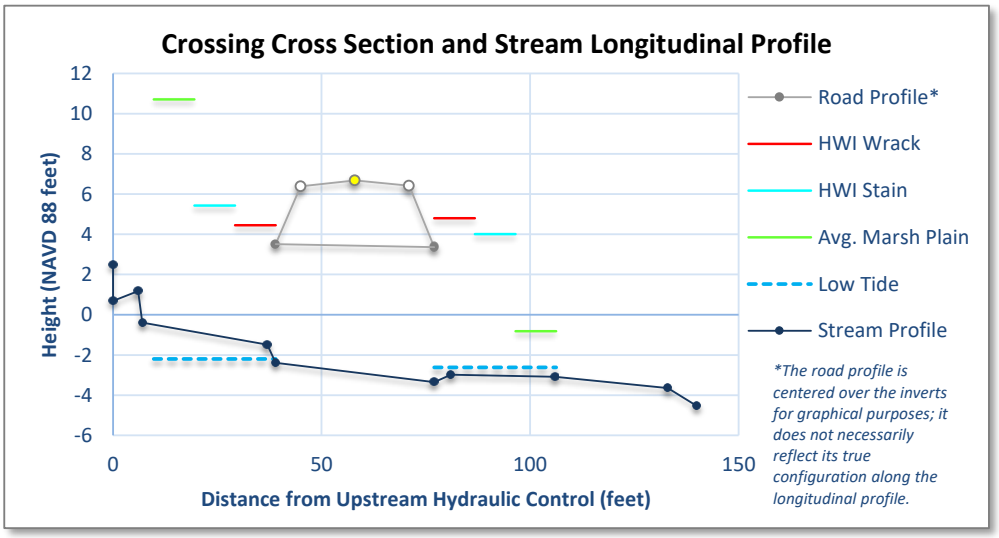
US view above structure

US view toward structure

DS view above structure

* Scoring system ranges from 1 to 5, where 1 = lowest replacement priority and 5 = highest replacement priority

**Adverse Impacts Evaluation scores range from 1 to 5, where 1 = high risk and 5 = low risk

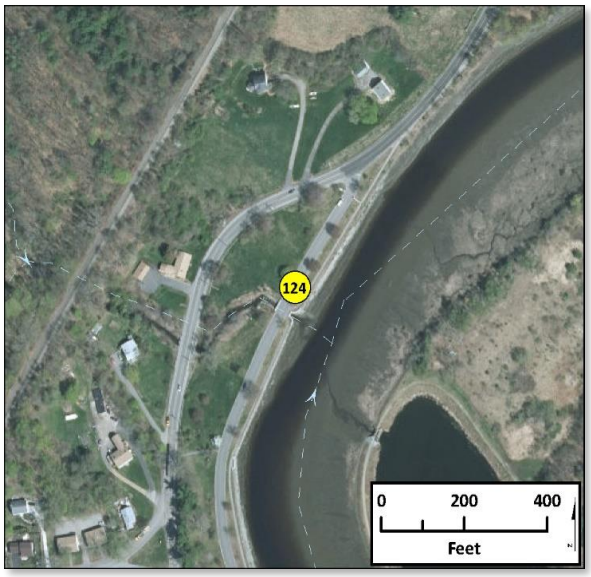


Long. Profile

Dist.	Hght.	Feat.	Sub.
0	2.4798	HC	N/A
0	0.6898	CB	B
6	1.1798	HC	B
7	-0.3902	HC	B
37	-1.4902	GC	B
39	-2.3902	I	B
77	-3.3502	I	C
81	-2.9902	GC	B
106	-3.0902	HC	C
133	-3.6502	HC	C
140	-4.5402	CB	C

Crossing Context:

N/A



Structure Characteristics:

Structure Type:	Box Culvert	**Date of Last Known Replacement:**	N/A
Structure Material:	Concrete		
Tide Gate Present:	No		

Crossing Dimensions (ft):	Upstream	Downstream
Dimension A (width):	5.57	5.5
Dimension B^{CB}(height):	5.85	6.26
Crossing Length (Invert to Invert):	38	

Crossing Condition:	**Headwall Material**	**Headwall Condition**	**Wingwall Material**	**Wingwall Condition**	**Scour at Structure**	**Scour Severity**
Upstream	Masonry	Good	Masonry	Good	Wingwalls	Low
Downstream	Masonry	Good	Masonry	Good	Wingwalls	Low

Scour in Structure	**Scour Severity in Structure**	**Road Surface Condition**	**Utilities at Crossing**	**Structure Condition Overall**
None	None	Good	Water pipe for watering, electric wire running us	Good

Structure Condition Comments:	N/A

Ecological Assessment:	Upstream	Downstream
Natural Community Classification:	Brackish Riverbank Marsh	Sparsely Vegetated Intertidal Habitat
Upstream Salt Marsh Migration Potential (acres):	1.95	

Flood Hazard & Emergency Access

Site Identified in Hazard Mitigation Plan:	Yes
Emergency Access or Evacuation Route:	N/A
History of Flooding:	Chronic flooding. Susceptible to storm surge.

Tidal Crossing Summary Sheet

New Hampshire's Tidal Crossing Assessment Protocol

Crossing ID: 125

Observer(s) & Organization:	JB, TS (NHDES Coastal)
Municipality:	Rye
Stream Name:	N/A
Road Name:	N/A

Date:	8/1/2018
Start Time:	8:55:00 AM
End Time:	9:45:00 AM

Tide Prediction	**High**	**Low**
Time:	3:20 PM	9:00 AM
Elevation:	7.7	0.3
Tide Chart Location:	Portsmouth Harbor	

Crossing Condition Evaluation	Score*
Crossing Condition	4
Tidal Restriction Evaluation	
Tidal Range Ratio	1
Crossing Ratio	4
Erosion Classification	3
Tidal Restriction Overall Score	3
Tidal Aquatic Organism Passage	
Tidal Range Ratio	1
Salt Marsh Migration Evaluation	
Salt Marsh Migration Potential (Eval. Unit)	4
Salt Marsh Migration Potential (Wshed.)	4
Vegetation Evaluation	
Vegetation Comparison Matrix	1
Infrastructure Risk Evaluation	
Inundation Risk to the Roadway (US, DS)	3,4
Inun. Risk to the Crossing Structure (US, DS)	5,5
Adverse Impacts Evaluation**	
Inundation Risk to Low-Lying Development	5
Overall Scores	
Infrastructure	4
Ecological	1
Combined	4

DS view toward structure

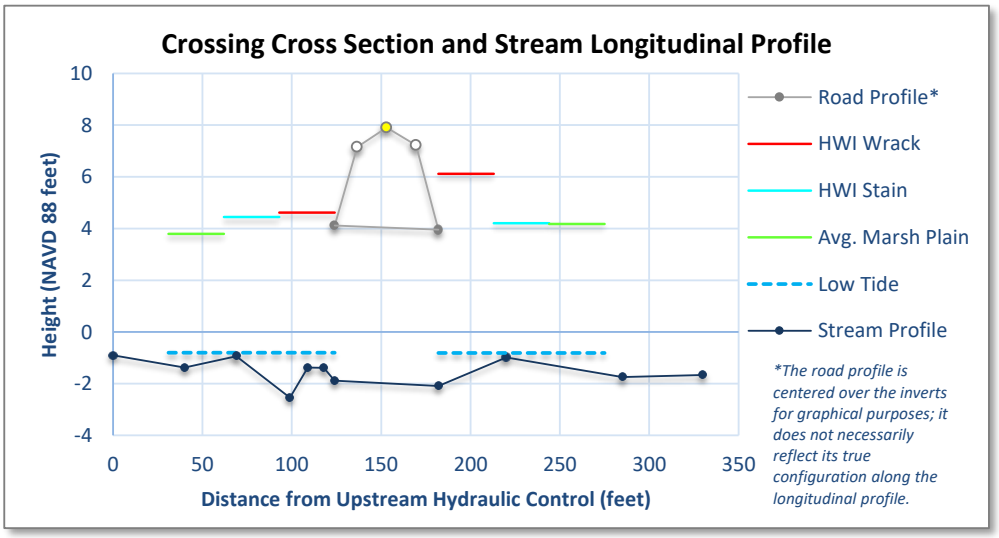
US view above structure

US view toward structure

DS view above structure

* Scoring system ranges from 1 to 5, where 1 = lowest replacement priority and 5 = highest replacement priority

**Adverse Impacts Evaluation scores range from 1 to 5, where 1 = high risk and 5 = low risk



Long. Profile

Dist.	Hght.	Feat.	Sub.
0	-0.9032	HC	G
40	-1.3832	P	G
69	-0.9432	HC	G
99	-2.5432	P	G
109	-1.3732	CB	G
118	-1.3932	GC	C
124	-1.8832	I	C
182	-2.0932	I	B
220	-0.9832	HC	G
285	-1.7432	HC	G
330	-1.6632	HC	G

Crossing Context:

Route 1A crosses an extensive back-barrier salt marsh at Rye Harbor several times and this crossing provides tidal flow to a fragmented marsh that also receives flow through a crossing to the south (#46). Tidal waters are conducted through a 6 by 6-foot concrete culvert installed circa 1997 to restore tidal exchange and halt the spread of exotic *Phragmites* (common reed). The crossing condition is fair, the channel is constricted, and the high tide stain indicates that the culvert overfills regularly. The overall combined score is 4, high priority for replacement.

Structure Characteristics:

Structure Type:	Box Culvert	**Date of Last Known Replacement:**	1998
Structure Material:	Concrete		
Tide Gate Present:	No		

Crossing Dimensions (ft):	Upstream	Downstream
Dimension A (width):	6	6
Dimension B^{CB}(height):	6	6
Crossing Length (Invert to Invert):	58	

Crossing Condition:	**Headwall Material**	**Headwall Condition**	**Wingwall Material**	**Wingwall Condition**	**Scour at Structure**	**Scour Severity**
Upstream	Concrete	Good	Rip Rap	Fair	None	None
Downstream	Concrete	Good	Rip Rap	Poor	Wingwalls	High

Scour in Structure	**Scour Severity in Structure**	**Road Surface Condition**	**Utilities at Crossing**	**Structure Condition Overall**
Culvert	Low	Fair	Overhead electric	Fair

Structure Condition Comments:	N/A

Ecological Assessment:	Upstream	Downstream
Natural Community Classification:	High Salt Marsh	High Salt Marsh
Upstream Salt Marsh Migration Potential (acres):	8.94	

Flood Hazard & Emergency Access

Site Identified in Hazard Mitigation Plan:	Yes
Emergency Access or Evacuation Route:	Yes
History of Flooding:	Prone during high tide events, flooding along 1A

Tidal Crossing Summary Sheet

New Hampshire's Tidal Crossing Assessment Protocol

Crossing ID: 126

Observer(s) & Organization:	TS, JB, PS, KL (NHDES Coastal)
Municipality:	North Hampton
Stream Name:	Chapel Brook
Road Name:	N/A

Date:	7/20/2018
Start Time:	1:49:00 PM
End Time:	2:30:00 PM

Tide Prediction	**High**	**Low**
Time:	6:38 PM	12:34 PM
Elevation:	8.9	0.3
Tide Chart Location:	Hampton Harbor	

Crossing Condition Evaluation	Score*
Crossing Condition	2
Tidal Restriction Evaluation	
Tidal Range Ratio	5
Crossing Ratio	5
Erosion Classification	2
Tidal Restriction Overall Score	4
Tidal Aquatic Organism Passage	
Tidal Range Ratio	5
Salt Marsh Migration Evaluation	
Salt Marsh Migration Potential (Eval. Unit)	5
Salt Marsh Migration Potential (Wshed.)	5
Vegetation Evaluation	
Vegetation Comparison Matrix	1
Infrastructure Risk Evaluation	
Inundation Risk to the Roadway (US, DS)	3,4
Inun. Risk to the Crossing Structure (US, DS)	5,5
Adverse Impacts Evaluation**	
Inundation Risk to Low-Lying Development	2
Overall Scores	
Infrastructure	4
Ecological	5
Combined	5

DS view toward structure

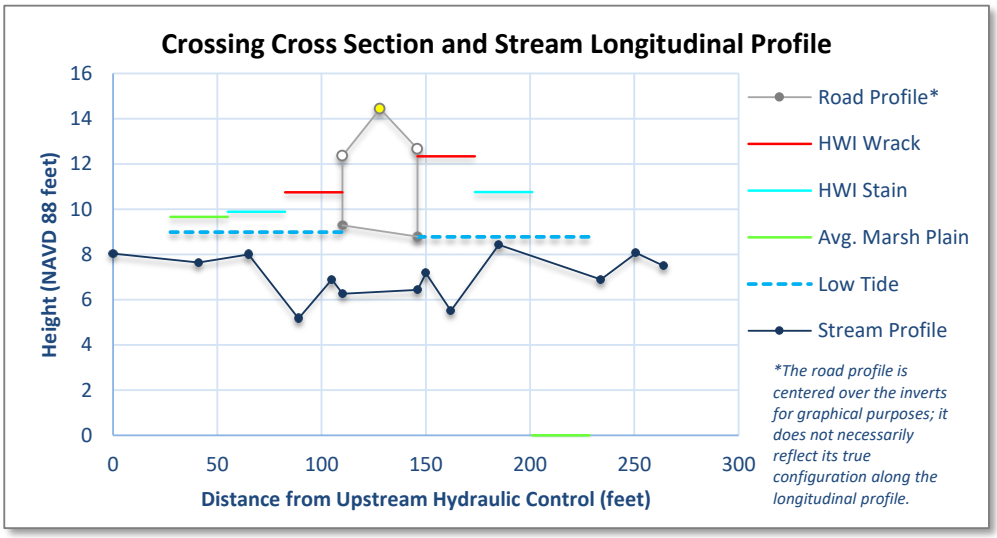
US view above structure

US view toward structure

DS view above structure

* Scoring system ranges from 1 to 5, where 1 = lowest replacement priority and 5 = highest replacement priority

**Adverse Impacts Evaluation scores range from 1 to 5, where 1 = high risk and 5 = low risk



Long. Profile

Dist.	Hght.	Feat.	Sub.
0	8.0357	HC	C/S
41	7.6357	P	S
65	7.9957	HC	G
89	5.1657	P	C
105	6.8957	GC	B
110	6.2557	I	B
146	6.4257	I	B
150	7.1657	GC	B
162	5.5157	P	S
185	8.4257	HC	S
234	6.8857	P	G
251	8.0657	GC	C
264	7.4957	I	C

Crossing Context:

Tidal flow supporting the salt marsh at Philbrick's Pond has been restricted by the trolley berm of the early 1900s as well as Route 1A (crossing #39). A recent investigation into the hydrodynamic flows and how they may be restored to rejuvenate the degraded salt marsh showed that the small clay pipe (2.5 feet in diameter) under the trolley berm was intact, but restricted tides, while the culvert under Route 1A was less restrictive (CMA Engineers 2018). The overall combined score of 5 indicates highest priority for replacement, but it will require landowner permission.

Structure Characteristics:

Structure Type:	Round Culvert	**Date of Last Known Replacement:**	N/A
Structure Material:	Stone		
Tide Gate Present:	No		

Crossing Dimensions (ft):	Upstream	Downstream
Dimension A (width):	2.5	2.5
Dimension B^{CB}(height):	2.5	2.5
Crossing Length (Invert to Invert):	36	

Crossing Condition:	**Headwall Material**	**Headwall Condition**	**Wingwall Material**	**Wingwall Condition**	**Scour at Structure**	**Scour Severity**
Upstream	Dry Fit Stone	Fair	None	N/A	Headwall	Medium
Downstream	Dry Fit Stone	Fair	None	N/A	Headwall	Medium

Scour in Structure	**Scour Severity in Structure**	**Road Surface Condition**	**Utilities at Crossing**	**Structure Condition Overall**
None	None	N/A	N/A	Fair

Structure Condition Comments:	Clay pipe, completely flooded

Ecological Assessment:	Upstream	Downstream
Natural Community Classification:	Low Salt Marsh	Low Salt Marsh
Upstream Salt Marsh Migration Potential (acres):	29.89	

Flood Hazard & Emergency Access

Site Identified in Hazard Mitigation Plan:	No
Emergency Access or Evacuation Route:	N/A
History of Flooding:	undersized culvert, flooded US marsh

Tidal Crossing Summary Sheet

New Hampshire's Tidal Crossing Assessment Protocol

Crossing ID: 127

Observer(s) & Organization:	TS, JB (NHDES Coastal)
Municipality:	New Castle
Stream Name:	N/A
Road Name:	N/A

Date:	8/23/2018
Start Time:	3:45:00 PM
End Time:	4:25:00 PM

Tide Prediction	**High**	**Low**
Time:	10:39 PM	4:19 PM
Elevation:	8.1	1.2
Tide Chart Location:	Portsmouth Harbor	

Crossing Condition Evaluation	Score*
Crossing Condition	2
Tidal Restriction Evaluation	
Tidal Range Ratio	5
Crossing Ratio	3
Erosion Classification	4
Tidal Restriction Overall Score	4
Tidal Aquatic Organism Passage	
Tidal Range Ratio	5
Salt Marsh Migration Evaluation	
Salt Marsh Migration Potential (Eval. Unit)	1
Salt Marsh Migration Potential (Wshed.)	1
Vegetation Evaluation	
Vegetation Comparison Matrix	5
Infrastructure Risk Evaluation	
Inundation Risk to the Roadway (US, DS)	4,4
Inun. Risk to the Crossing Structure (US, DS)	5,5
Adverse Impacts Evaluation**	
Inundation Risk to Low-Lying Development	4
Overall Scores	
Infrastructure	4
Ecological	5
Combined	5

DS view toward structure

US view above structure

US view toward structure

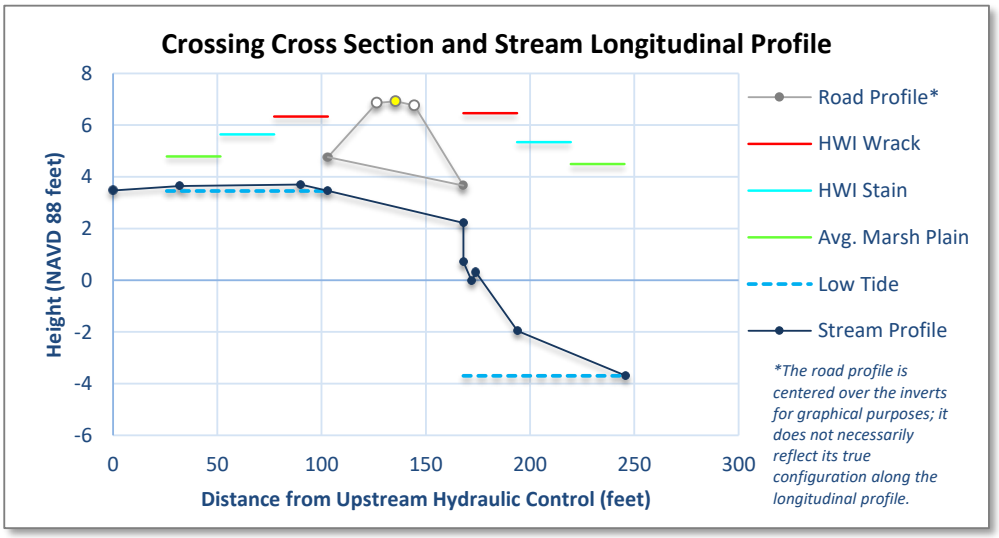
DS view above structure

* Scoring system ranges from 1 to 5, where 1 = lowest replacement priority and 5 = highest replacement priority

**Adverse Impacts Evaluation scores range from 1 to 5, where 1 = high risk and 5 = low risk

Long. Profile

Dist.	Hght.	Feat.	Sub.
0	3.4726	HC	C/S
32	3.6426	HC	C/S
90	3.7026	CB	C/S
103	3.4626	I	G
168	2.2126	I	C
168	0.7126	CB	C
172	-0.0274	P	G
174	0.3026	HC	G
194	-1.9574	CB	C
246	-3.6974	HC	S



Crossing Context:

A small head of tide marsh on New Castle Island is crossed by River Road and a new 1.25-foot round pipe was installed in 2011 to improve tidal flow to the marsh, which was being invaded by weedy species such as a non-native form of common reed (Phragmites). The site has a history of flooding and continues to show signs of restriction. The overall combined score is 5: highest priority for replacement.

Structure Characteristics:

Structure Type:	Round Culvert	**Date of Last Known Replacement:**	N/A
Structure Material:	Concrete		
Tide Gate Present:	No		

Crossing Dimensions (ft):	Upstream	Downstream
Dimension A (width):	1.25	1.25
Dimension B^{CB}(height):	1.25	1.25
Crossing Length (Invert to Invert):	65	

Crossing Condition:	**Headwall Material**	**Headwall Condition**	**Wingwall Material**	**Wingwall Condition**	**Scour at Structure**	**Scour Severity**
Upstream	None	N/A	None	N/A	None	None
Downstream	None	N/A	None	N/A	None	None

Scour in Structure	**Scour Severity in Structure**	**Road Surface Condition**	**Utilities at Crossing**	**Structure Condition Overall**
None	None	Fair	Overhead electric	Fair

Structure Condition Comments:	Metal girdle elevating DS structure

Ecological Assessment:	Upstream	Downstream
Natural Community Classification:	High Salt Marsh	Sparsely Vegetated Intertidal Habitat
Upstream Salt Marsh Migration Potential (acres):	0.20	

Flood Hazard & Emergency Access

Site Identified in Hazard Mitigation Plan:	Yes
Emergency Access or Evacuation Route:	N/A
History of Flooding:	road flooding due to storm surge and heavy rain

Tidal Crossing Summary Sheet

New Hampshire's Tidal Crossing Assessment Protocol

Crossing ID: 128

Observer(s) & Organization:	TS, JB (NHDES Coastal)
Municipality:	Hampton Falls
Stream Name:	N/A
Road Name:	N/A

Date:	8/14/2018
Start Time:	10:20:00 AM
End Time:	11:20:00 AM

Tide Prediction	**High**	**Low**
Time:	2:27 PM	8:28 AM
Elevation:	9.7	-1.3
Tide Chart Location:	Hampton Harbor	

Crossing Condition Evaluation	Score*
Crossing Condition	1
Tidal Restriction Evaluation	
Tidal Range Ratio	5
Crossing Ratio	5
Erosion Classification	3
Tidal Restriction Overall Score	4
Tidal Aquatic Organism Passage	
Tidal Range Ratio	5
Salt Marsh Migration Evaluation	
Salt Marsh Migration Potential (Eval. Unit)	5
Salt Marsh Migration Potential (Wshed.)	5
Vegetation Evaluation	
Vegetation Comparison Matrix	4
Infrastructure Risk Evaluation	
Inundation Risk to the Roadway (US, DS)	2,2
Inun. Risk to the Crossing Structure (US, DS)	3,1
Adverse Impacts Evaluation**	
Inundation Risk to Low-Lying Development	5
Overall Scores	
Infrastructure	1
Ecological	5
Combined	5

DS view toward structure

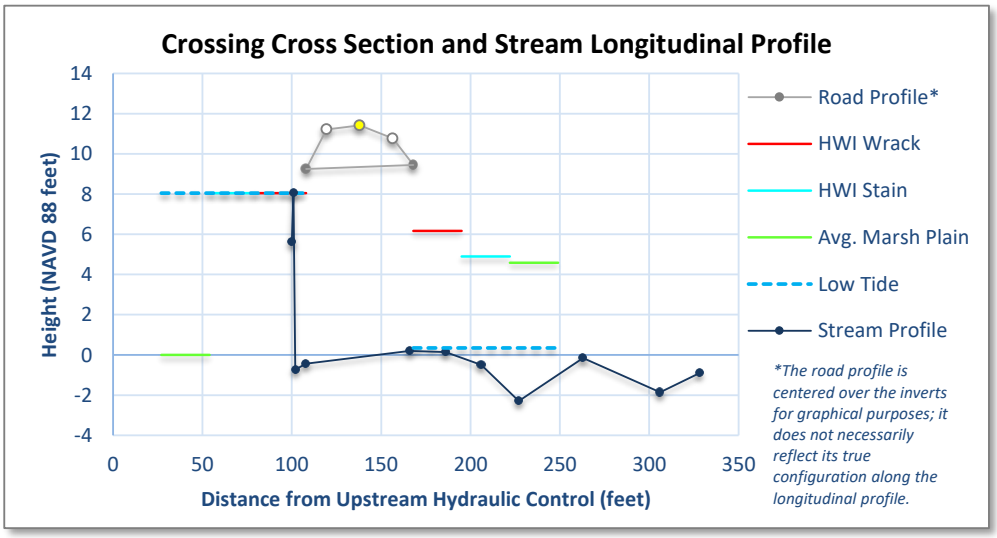
US view above structure

US view toward structure

DS view above structure

* Scoring system ranges from 1 to 5, where 1 = lowest replacement priority and 5 = highest replacement priority

**Adverse Impacts Evaluation scores range from 1 to 5, where 1 = high risk and 5 = low risk

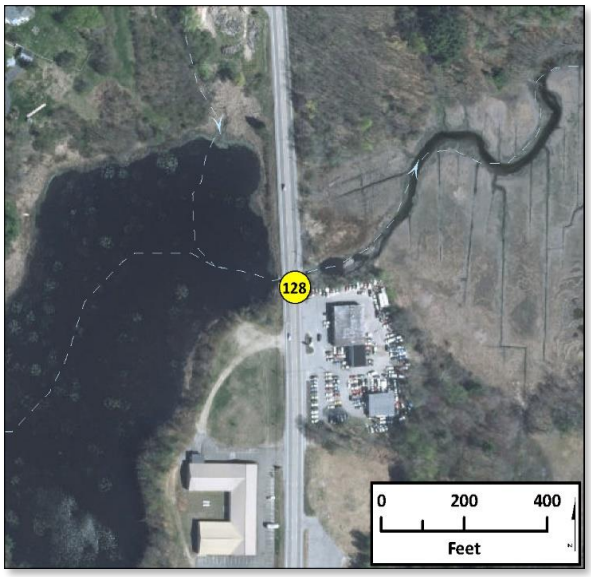


Long. Profile

Dist.	Hght.	Feat.	Sub.
100	5.5973	CB	C/S
101	8.0473	HC	N/A
102	-0.7327	CB	B
108	-0.4327	I	B
166	0.2073	I	B
186	0.1373	GC	B
206	-0.4927	CB	B
227	-2.2927	P	B
263	-0.1527	HC	S
306	-1.8527	P	B
328	-0.9127	HC	G

Crossing Context:

In Hampton Falls the head of tide for a narrow marsh 'finger' ends at the Dodge Ponds Dam just upstream of Route 1. The Route 1 cement culvert over the waterway is approximately 10 by 9 feet with wingwalls and fitted with slots for stoplogs (absent). The tide reaches about 5 feet above the culvert invert but is stopped by the dam, which impounds about 8 feet of water. The crossing condition is very good, but the dam restricts the tides completely, leading to an ecological score of 5 and an overall combined score of 5, highest priority for replacement.



Structure Characteristics:

Structure Type:	Bridge with Abutments	**Date of Last Known Replacement:**	N/A
Structure Material:	Concrete		
Tide Gate Present:	No		

Crossing Dimensions (ft):	Upstream	Downstream
Dimension A (width):	10	10.91
Dimension B^{CB}(height):	9.8	8.96
Crossing Length (Invert to Invert):	60	

Crossing Condition:	**Headwall Material**	**Headwall Condition**	**Wingwall Material**	**Wingwall Condition**	**Scour at Structure**	**Scour Severity**
Upstream	None	N/A	None	N/A	None	None
Downstream	None	N/A	N/A	Poor	None	None

Scour in Structure	**Scour Severity in Structure**	**Road Surface Condition**	**Utilities at Crossing**	**Structure Condition Overall**
None	None	Good	Overhead electric	Good

Structure Condition Comments:	Dam directly upstream from inlet

Ecological Assessment:	Upstream	Downstream
Natural Community Classification:	Freshwater Marsh	High Salt Marsh
Upstream Salt Marsh Migration Potential (acres):	12.32	

Flood Hazard & Emergency Access

Site Identified in Hazard Mitigation Plan:	Yes
Emergency Access or Evacuation Route:	Yes
History of Flooding:	Past local flooding problems.

Tidal Crossing Summary Sheet

New Hampshire's Tidal Crossing Assessment Protocol

Crossing ID: 129

Observer(s) & Organization:	JB, TS (NHDES Coastal)
Municipality:	Seabrook
Stream Name:	N/A
Road Name:	N/A

Date:	9/6/2018
Start Time:	2:15:00 PM
End Time:	2:40:00 PM

Tide Prediction	**High**	**Low**
Time:	8:57 PM	2:56 PM
Elevation:	9.6	0.4
Tide Chart Location:	Hampton Harbor	

Crossing Condition Evaluation	Score*
Crossing Condition	2
Tidal Restriction Evaluation	
Tidal Range Ratio	3
Crossing Ratio	2
Erosion Classification	4
Tidal Restriction Overall Score	3
Tidal Aquatic Organism Passage	
Tidal Range Ratio	3
Salt Marsh Migration Evaluation	
Salt Marsh Migration Potential (Eval. Unit)	5
Salt Marsh Migration Potential (Wshed.)	5
Vegetation Evaluation	
Vegetation Comparison Matrix	1
Infrastructure Risk Evaluation	
Inundation Risk to the Roadway (US, DS)	2,2
Inun. Risk to the Crossing Structure (US, DS)	2,3
Adverse Impacts Evaluation**	
Inundation Risk to Low-Lying Development	3
Overall Scores	
Infrastructure	2
Ecological	3
Combined	3

DS view toward structure

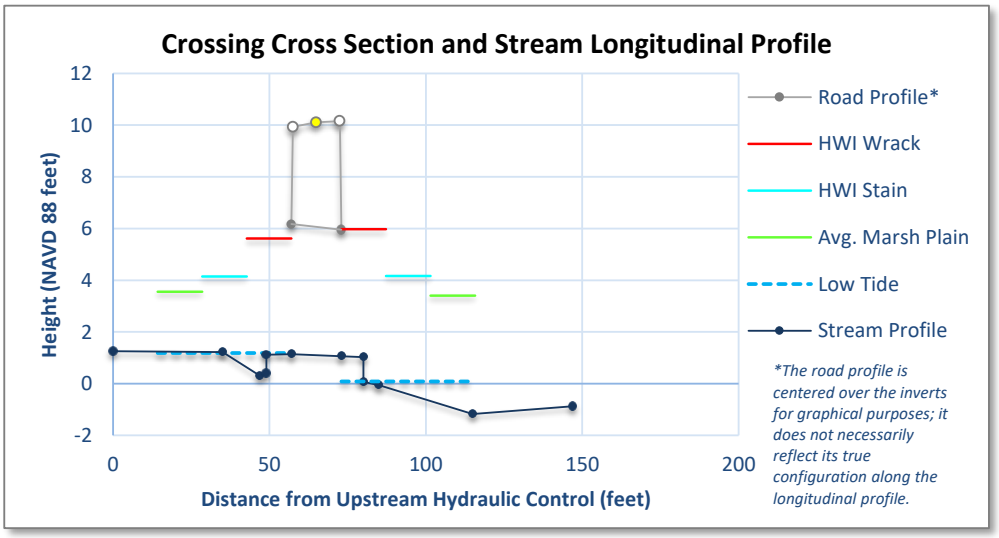
US view above structure

US view toward structure

DS view above structure

* Scoring system ranges from 1 to 5, where 1 = lowest replacement priority and 5 = highest replacement priority

**Adverse Impacts Evaluation scores range from 1 to 5, where 1 = high risk and 5 = low risk

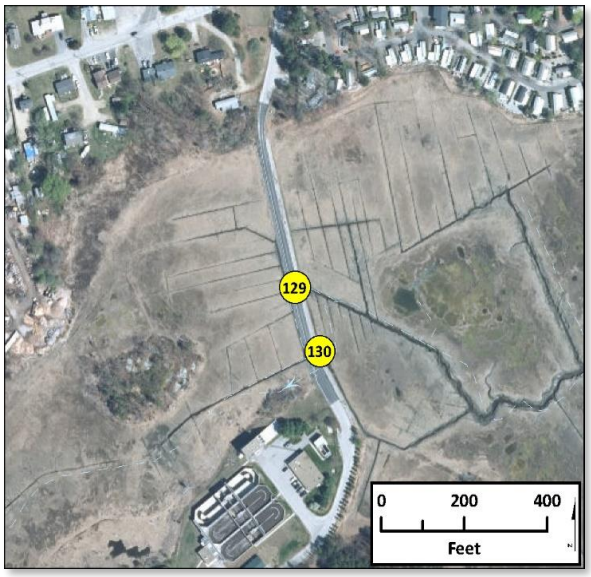


Long. Profile

Dist.	Hght.	Feat.	Sub.
0	1.255	HC	G
35	1.225	HC	C
47	0.305	P	G
49	0.395	CB	G
49	1.115	GC	G
57	1.145	I	C
73	1.055	I	C
80	1.025	GC	C
80	0.075	CB	G
85	-0.055	HC	G
115	-1.175	CB	C/S
147	-0.875	HC	S

Crossing Context:

N/A



Structure Characteristics:

Structure Type:	Box Culvert	**Date of Last Known Replacement:**	N/A
Structure Material:	Concrete		
Tide Gate Present:	No		

Crossing Dimensions (ft):	Upstream	Downstream
Dimension A (width):	8	8
Dimension B^{CB}(height):	5	5
Crossing Length (Invert to Invert):	16	

Crossing Condition:	**Headwall Material**	**Headwall Condition**	**Wingwall Material**	**Wingwall Condition**	**Scour at Structure**	**Scour Severity**
Upstream	Concrete	Fair	Concrete	Fair	Culvert	Low
Downstream	Concrete	Fair	Concrete	Fair	Culvert	Low

Scour in Structure	**Scour Severity in Structure**	**Road Surface Condition**	**Utilities at Crossing**	**Structure Condition Overall**
Culvert	Low	Good	Wastewater treatment facility	Fair

Structure Condition Comments:	Wood support beams inside structure. Skirt causing perch downstream and lip US

Ecological Assessment:	Upstream	Downstream
Natural Community Classification:	High Salt Marsh	High Salt Marsh
Upstream Salt Marsh Migration Potential (acres):	27.34	

Flood Hazard & Emergency Access

Site Identified in Hazard Mitigation Plan:	No
Emergency Access or Evacuation Route:	N/A
History of Flooding:	Unknown

Tidal Crossing Summary Sheet

New Hampshire's Tidal Crossing Assessment Protocol

Crossing ID: 130

Observer(s) & Organization:	TS, JB (NHDES Coastal)
Municipality:	Seabrook
Stream Name:	N/A
Road Name:	N/A

Date:	9/6/2018
Start Time:	2:52:00 PM
End Time:	3:40:00 PM

Tide Prediction	**High**	**Low**
Time:	8:57 PM	2:56 PM
Elevation:	9.6	0.4
Tide Chart Location:		

Crossing Condition Evaluation	Score*
Crossing Condition	2
Tidal Restriction Evaluation	
Tidal Range Ratio	2
Crossing Ratio	1
Erosion Classification	5
Tidal Restriction Overall Score	3
Tidal Aquatic Organism Passage	
Tidal Range Ratio	2
Salt Marsh Migration Evaluation	
Salt Marsh Migration Potential (Eval. Unit)	5
Salt Marsh Migration Potential (Wshed.)	5
Vegetation Evaluation	
Vegetation Comparison Matrix	1
Infrastructure Risk Evaluation	
Inundation Risk to the Roadway (US, DS)	2,2
Inun. Risk to the Crossing Structure (US, DS)	2,3
Adverse Impacts Evaluation**	
Inundation Risk to Low-Lying Development	3
Overall Scores	
Infrastructure	2
Ecological	1
Combined	2

DS view toward structure

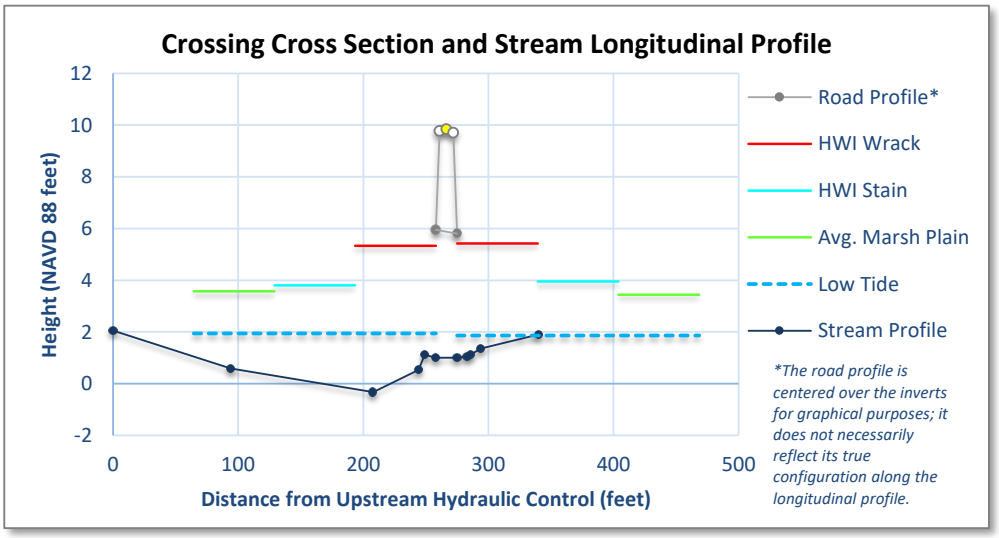
US view above structure

US view toward structure

DS view above structure

* Scoring system ranges from 1 to 5, where 1 = lowest replacement priority and 5 = highest replacement priority

**Adverse Impacts Evaluation scores range from 1 to 5, where 1 = high risk and 5 = low risk

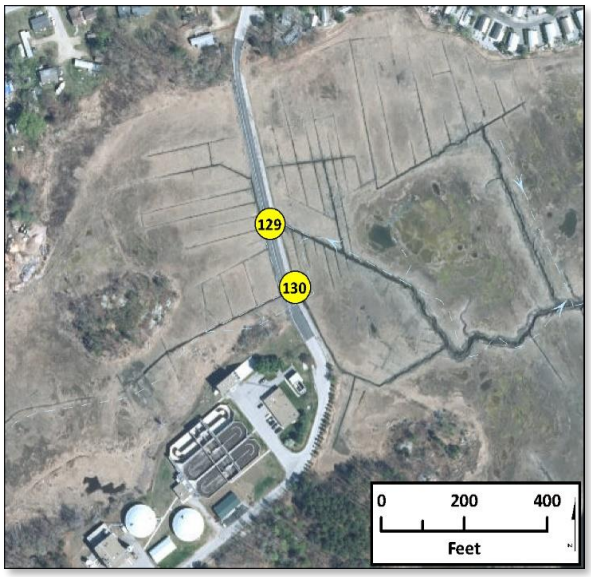


Long. Profile

Dist.	Hght.	Feat.	Sub.
0	2.0525	HC	B
94	0.5825	HC	B
208	-0.3275	P	C/S
244	0.5325	CB	C
249	1.1225	GC	C
258	1.0025	I	C
275	1.0025	I	G
283	1.0425	CB	C
286	1.1325	HC	C
294	1.3625	HC	G
340	1.9025	HC	C

Crossing Context:

N/A



Structure Characteristics:

Structure Type:	Box Culvert	**Date of Last Known Replacement:**	N/A
Structure Material:	Concrete		
Tide Gate Present:	No		

Crossing Dimensions (ft):	Upstream	Downstream
Dimension A (width):	8	8
Dimension B^{CB}(height):	5	5
Crossing Length (Invert to Invert):	17	

Crossing Condition:	**Headwall Material**	**Headwall Condition**	**Wingwall Material**	**Wingwall Condition**	**Scour at Structure**	**Scour Severity**
Upstream	Concrete	Good	Concrete	Good	Wingwalls	Low
Downstream	Concrete	Fair	Concrete	Fair	Wingwalls	Low

Scour in Structure	**Scour Severity in Structure**	**Road Surface Condition**	**Utilities at Crossing**	**Structure Condition Overall**
Culvert	Low	Good	WWTF	Fair

Structure Condition Comments:	N/A

Ecological Assessment:	Upstream	Downstream
Natural Community Classification:	High Salt Marsh	High Salt Marsh
Upstream Salt Marsh Migration Potential (acres):	27.34	

Flood Hazard & Emergency Access

Site Identified in Hazard Mitigation Plan:	No
Emergency Access or Evacuation Route:	N/A
History of Flooding:	Unknown

Tidal Crossing Summary Sheet

New Hampshire's Tidal Crossing Assessment Protocol

Crossing ID: 131

Observer(s) & Organization:	JB TS (NHDES Coastal)
Municipality:	Hampton
Stream Name:	Kenney Brook
Road Name:	N/A

Date:	8/28/2018
Start Time:	9:00:00 AM
End Time:	10:00:00 AM

Tide Prediction	**High**	**Low**
Time:	1:26 PM	7:33 AM
Elevation:	8.4	0.2
Tide Chart Location:	Hampton Harbor	

Crossing Condition Evaluation	Score*
Crossing Condition	2
Tidal Restriction Evaluation	
Tidal Range Ratio	5
Crossing Ratio	3
Erosion Classification	5
Tidal Restriction Overall Score	4
Tidal Aquatic Organism Passage	
Tidal Range Ratio	5
Salt Marsh Migration Evaluation	
Salt Marsh Migration Potential (Eval. Unit)	1
Salt Marsh Migration Potential (Wshed.)	1
Vegetation Evaluation	
Vegetation Comparison Matrix	3
Infrastructure Risk Evaluation	
Inundation Risk to the Roadway (US, DS)	3,3
Inun. Risk to the Crossing Structure (US, DS)	2,3
Adverse Impacts Evaluation**	
Inundation Risk to Low-Lying Development	5
Overall Scores	
Infrastructure	2
Ecological	5
Combined	3

DS view toward structure

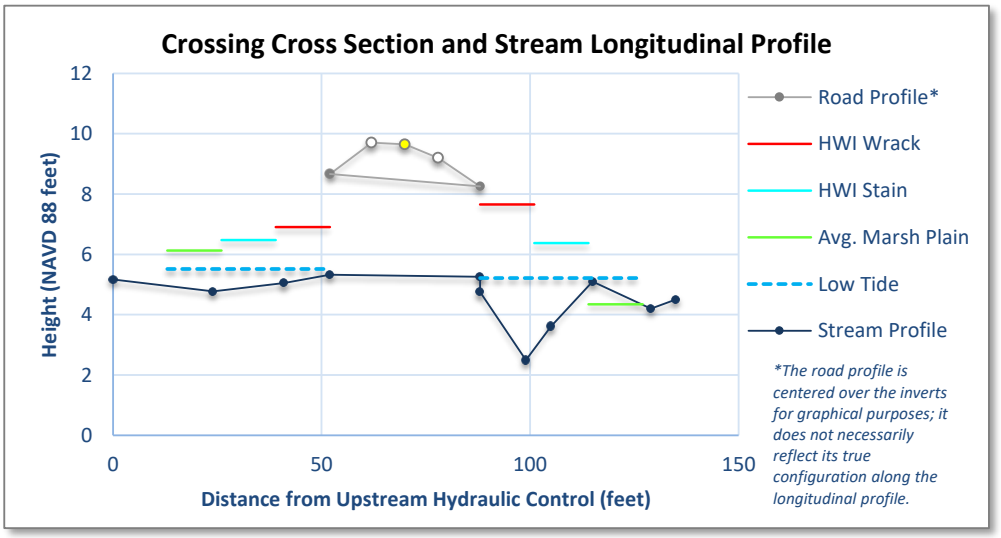
US view above structure

US view toward structure

DS view above structure

* Scoring system ranges from 1 to 5, where 1 = lowest replacement priority and 5 = highest replacement priority

**Adverse Impacts Evaluation scores range from 1 to 5, where 1 = high risk and 5 = low risk

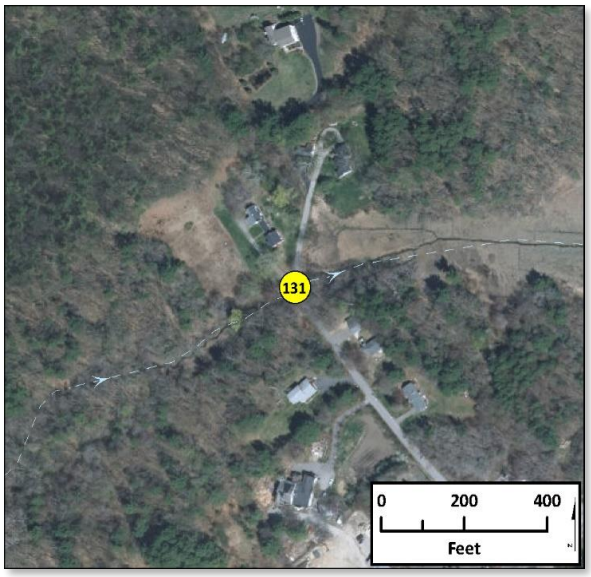


Long. Profile

Dist.	Hght.	Feat.	Sub.
0	5.1657	HC	C/S
24	4.7757	P	C/S
41	5.0457	HC	C/S
52	5.3257	I	C/S
88	5.2557	I	G
88	4.7557	CB	G
99	2.4957	P	C
105	3.6057	CB	G
115	5.0957	HC	C
129	4.2057	P	C/S
135	4.5057	HC	C

Crossing Context:

Marsh Lane crosses Kenney Brook in Hampton and conducts flow through a 3-foot round culvert. It is rated an overall combined score of 3, indicating a moderate priority for replacement due to high scour scores and relatively deep downstream pool. It sits at a high position in the landscape, but improvements may benefit fish passage, especially as sea levels rise.



Structure Characteristics:

Structure Type:	Round Culvert	**Date of Last Known Replacement:**	N/A
Structure Material:	Plastic - Corrugated		
Tide Gate Present:	No		

Crossing Dimensions (ft):	Upstream	Downstream
Dimension A (width):	3	3
Dimension B^{CB}(height):	3	3
Crossing Length (Invert to Invert):	36	

Crossing Condition:	**Headwall Material**	**Headwall Condition**	**Wingwall Material**	**Wingwall Condition**	**Scour at Structure**	**Scour Severity**
Upstream	None	N/A	Rip Rap	Fair	None	None
Downstream	None	N/A	Dry Fit Stone	Fair	Wingwalls	Low

Scour in Structure	**Scour Severity in Structure**	**Road Surface Condition**	**Utilities at Crossing**	**Structure Condition Overall**
None	None	Good	OHE DS	Fair

Structure Condition Comments:	Pipe good. Wingwalls fair and road sinking in over pipe

Ecological Assessment:	Upstream	Downstream
Natural Community Classification:	Freshwater Stream	Brackish Riverbank Marsh
Upstream Salt Marsh Migration Potential (acres):	0.83	

Flood Hazard & Emergency Access

Site Identified in Hazard Mitigation Plan:	Yes
Emergency Access or Evacuation Route:	N/A
History of Flooding:	Known local flooding problems

Tidal Crossing Summary Sheet

New Hampshire's Tidal Crossing Assessment Protocol

Crossing ID: 132

Observer(s) & Organization:	TS, JB (NHDES Coastal)
Municipality:	Rye
Stream Name:	N/A
Road Name:	N/A

Date:	8/28/2018
Start Time:	7:30:00 AM
End Time:	8:22:00 AM

Tide Prediction	**High**	**Low**
Time:	1:34 PM	7:18 AM
Elevation:	7.9	0.2
Tide Chart Location:	Portsmouth Harbor	

Crossing Condition Evaluation	Score*
Crossing Condition	1
Tidal Restriction Evaluation	
Tidal Range Ratio	4
Crossing Ratio	3
Erosion Classification	3
Tidal Restriction Overall Score	3
Tidal Aquatic Organism Passage	
Tidal Range Ratio	4
Salt Marsh Migration Evaluation	
Salt Marsh Migration Potential (Eval. Unit)	2
Salt Marsh Migration Potential (Wshed.)	2
Vegetation Evaluation	
Vegetation Comparison Matrix	1
Infrastructure Risk Evaluation	
Inundation Risk to the Roadway (US, DS)	4,5
Inun. Risk to the Crossing Structure (US, DS)	5,5
Adverse Impacts Evaluation**	
Inundation Risk to Low-Lying Development	5
Overall Scores	
Infrastructure	5
Ecological	4
Combined	3

DS view toward structure

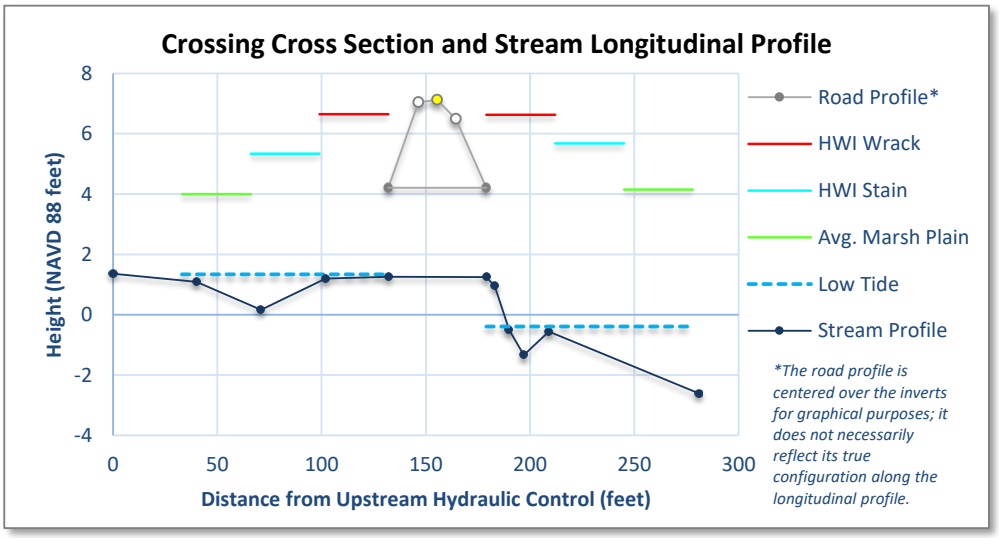
US view above structure

US view toward structure

DS view above structure

* Scoring system ranges from 1 to 5, where 1 = lowest replacement priority and 5 = highest replacement priority

**Adverse Impacts Evaluation scores range from 1 to 5, where 1 = high risk and 5 = low risk

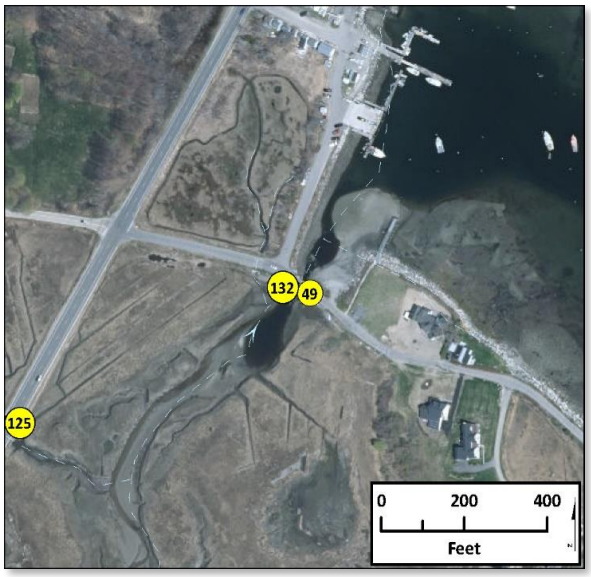


Long. Profile

Dist.	Hght.	Feat.	Sub.
0	1.3594	HC	G
40	1.0894	CB	G
71	0.1594	P	C/S
102	1.1994	HC	C
132	1.2594	I	G
179	1.2494	I	B
183	0.9494	GC	B
190	-0.5106	CB	G
197	-1.3406	P	G
209	-0.5606	HC	G
281	-2.6106	HC	G

Crossing Context:

A small rectangular marsh surrounded by roads and cut off from tides during the development of Rye Harbor was restored to tidal exchange in 1998 by the addition of a 3 by 4-foot concrete culvert that runs under Harbor Road. Common reed covered wetland which had been partially filled with dredge spoil. Restoration included the new culvert and the area had the fill and a small tidal creek excavated. The crossing is in very good condition, but the culvert still restricts some of the tidal flow. It has an overall combined score of 3, a moderate priority for replacement.



Structure Characteristics:

Structure Type:	Box Culvert	**Date of Last Known Replacement:**	1997
Structure Material:	Concrete		
Tide Gate Present:	No		

Crossing Dimensions (ft):	Upstream	Downstream
Dimension A (width):	4	4
Dimension B^{CB}(height):	3	3
Crossing Length (Invert to Invert):	47	

Crossing Condition:	**Headwall Material**	**Headwall Condition**	**Wingwall Material**	**Wingwall Condition**	**Scour at Structure**	**Scour Severity**
Upstream	Concrete	Good	Rip Rap	Fair	Wingwalls	Low
Downstream	Concrete	Good	Rip Rap	Fair	Wingwalls	Low

Scour in Structure	**Scour Severity in Structure**	**Road Surface Condition**	**Utilities at Crossing**	**Structure Condition Overall**
None	None	Fair	Overhead electric	Good

Structure Condition Comments:	N/A

Ecological Assessment:	Upstream	Downstream
Natural Community Classification:	Low Salt Marsh	High Salt Marsh
Upstream Salt Marsh Migration Potential (acres):	1.63	

Flood Hazard & Emergency Access

Site Identified in Hazard Mitigation Plan:	Yes
Emergency Access or Evacuation Route:	N/A
History of Flooding:	6""""""""""" over road on 1/4/18

Tidal Crossing Summary Sheet

New Hampshire's Tidal Crossing Assessment Protocol

Crossing ID: 133

Observer(s) & Organization:	TS, JB (NHDES Coastal)
Municipality:	Newfields
Stream Name:	N/A
Road Name:	N/A

Date:	9/10/2018
Start Time:	8:45:00 AM
End Time:	10:00:00 AM

Tide Prediction	**High**	**Low**
Time:	2:27 PM	8:35 AM
Elevation:	8.1	-1.1
Tide Chart Location:	Squamscott River	

Crossing Condition Evaluation	Score*
Crossing Condition	5
Tidal Restriction Evaluation	
Tidal Range Ratio	5
Crossing Ratio	5
Erosion Classification	3
Tidal Restriction Overall Score	4
Tidal Aquatic Organism Passage	
Tidal Range Ratio	5
Salt Marsh Migration Evaluation	
Salt Marsh Migration Potential (Eval. Unit)	1
Salt Marsh Migration Potential (Wshed.)	1
Vegetation Evaluation	
Vegetation Comparison Matrix	4
Infrastructure Risk Evaluation	
Inundation Risk to the Roadway (US, DS)	1,1
Inun. Risk to the Crossing Structure (US, DS	5,2
Adverse Impacts Evaluation**	
Inundation Risk to Low-Lying Development	5
Overall Scores	
Infrastructure	5
Ecological	5
Combined	4

DS view toward structure

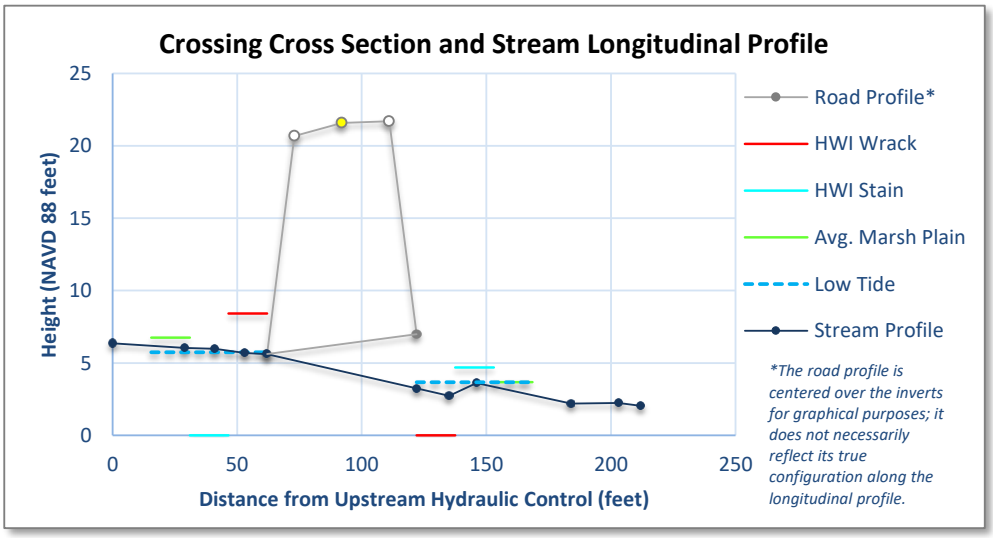
US view above structure

US view toward structure

DS view above structure

* Scoring system ranges from 1 to 5, where 1 = lowest replacement priority and 5 = highest replacement priority

**Adverse Impacts Evaluation scores range from 1 to 5, where 1 = high risk and 5 = low risk

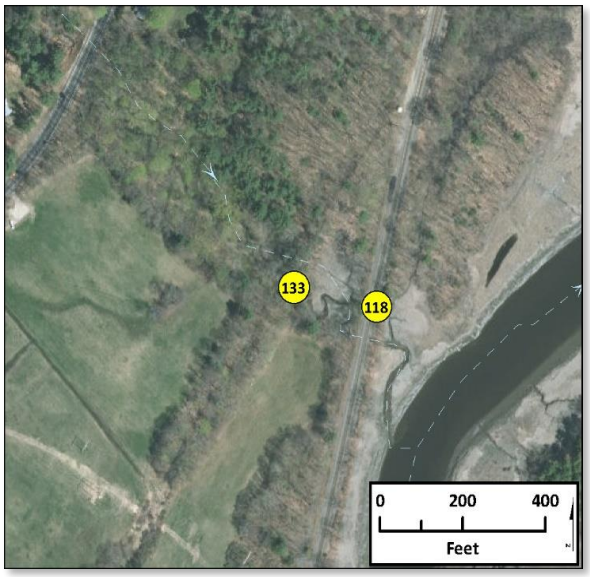


Long. Profile

Dist.	Hght.	Feat.	Sub.
0	6.3579	HC	S
29	6.0379	CB	G
41	5.9779	HC	G
53	5.6979	CB	C
62	5.6179	I	S
122	3.2379	I	G
135	2.7379	P	C/S
146	3.6079	HC	C
184	2.1879	CB	S
203	2.2379	HC	C
212	2.0379	CB	S

Crossing Context:

A small head of tide marsh that extends west from the Squamscott River in Newfields is crossed by an unnamed access road that conducts flow through a granite box culvert that may have been 4 by 4 feet in cross-section when installed. Currently, the upstream inlet appears to be collapsed and blocked by sediment. As might be expected, this culvert is not functional and is at risk for failure. The overall combined score is 4: high priority for replacement.



Structure Characteristics:

Structure Type:	Box Culvert	**Date of Last Known Replacement:**	N/A
Structure Material:	Stone		
Tide Gate Present:	No		

Crossing Dimensions (ft):	Upstream	Downstream
Dimension A (width):	0	3.6
Dimension B^{CB} (height):	0	4
Crossing Length (Invert to Invert):	60	

Crossing Condition:	**Headwall Material**	**Headwall Condition**	**Wingwall Material**	**Wingwall Condition**	**Scour at Structure**	**Scour Severity**
Upstream	None	N/A	None	N/A	Culvert	High
Downstream	Dry Fit Stone	Poor	Dry Fit Stone	Poor	Wingwalls	Medium

Scour in Structure	**Scour Severity in Structure**	**Road Surface Condition**	**Utilities at Crossing**	**Structure Condition Overall**
Culvert	Medium	N/A	None	Poor

Structure Condition Comments:	Collapsed US, no structure to measure, see photo

Ecological Assessment:	Upstream	Downstream
Natural Community Classification:	Freshwater Stream	Low Salt Marsh
Upstream Salt Marsh Migration Potential (acres):	0.00	

Flood Hazard & Emergency Access

Site Identified in Hazard Mitigation Plan:	No
Emergency Access or Evacuation Route:	N/A
History of Flooding:	Unknown

Tidal Crossing Summary Sheet

New Hampshire's Tidal Crossing Assessment Protocol

Crossing ID: 134

Observer(s) & Organization:	JB (NHDES Coastal)
Municipality:	Hampton
Stream Name:	N/A
Road Name:	N/A

Date:	10/16/2018
Start Time:	1:08:00 PM
End Time:	2:25:00 PM

Tide Prediction	**High**	**Low**
Time:	5:28 AM	11:42 AM
Elevation:	7.5	1.7
Tide Chart Location:	Hampton Harbor	

Crossing Condition Evaluation	Score*
Crossing Condition	5
Tidal Restriction Evaluation	
Tidal Range Ratio	3
Crossing Ratio	5
Erosion Classification	5
Tidal Restriction Overall Score	4
Tidal Aquatic Organism Passage	
Tidal Range Ratio	3
Salt Marsh Migration Evaluation	
Salt Marsh Migration Potential (Eval. Unit)	1
Salt Marsh Migration Potential (Wshed.)	1
Vegetation Evaluation	
Vegetation Comparison Matrix	0
Infrastructure Risk Evaluation	
Inundation Risk to the Roadway (US, DS)	3,3
Inun. Risk to the Crossing Structure (US, DS)	0,5
Adverse Impacts Evaluation**	
Inundation Risk to Low-Lying Development	5
Overall Scores	
Infrastructure	5
Ecological	4
Combined	4

DS view toward structure

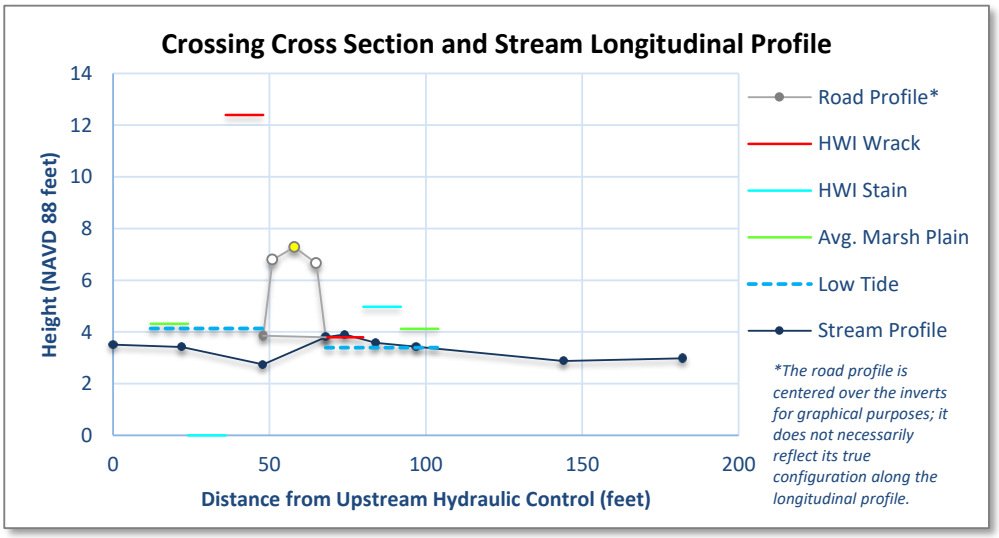
US view above structure

US view toward structure

DS view above structure

* Scoring system ranges from 1 to 5, where 1 = lowest replacement priority and 5 = highest replacement priority

**Adverse Impacts Evaluation scores range from 1 to 5, where 1 = high risk and 5 = low risk

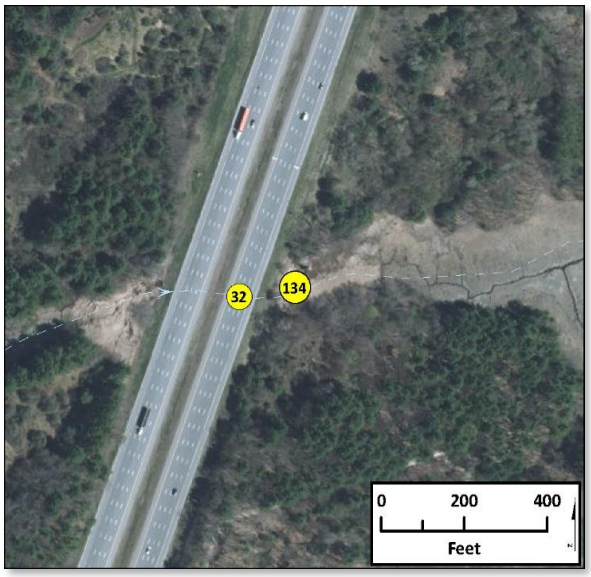


Long. Profile

Dist.	Hght.	Feat.	Sub.
0	3.5135	HC	C/S
22	3.4135	CB	C/S
48	2.7435	I	C/S
68	3.7935	I	G
74	3.9035	HC	G
84	3.5835	CB	S
97	3.4335	P	S
144	2.8735	HC	C/S
182	2.9835	HC	C/S

Crossing Context:

At the head of a tidal creek just south of the Taylor River is a berm barrier to 1-2 feet of tidal flow with a 1-foot metal pipe for drainage that is crushed at the downstream end. Current conditions are poor and prevent tidal flow leading to an overall combined score of 4: high priority for replacement. The culvert should be replaced unless the berm has no current use, in which case it should be removed.



Structure Characteristics:

Structure Type:	Round Culvert	**Date of Last Known Replacement:**	N/A
Structure Material:	Steel - Corrugated		
Tide Gate Present:	No		

Crossing Dimensions (ft):	Upstream	Downstream
Dimension A (width):	1	0
Dimension B^{CB}(height):	1	0
Crossing Length (Invert to Invert):	20	

Crossing Condition:	**Headwall Material**	**Headwall Condition**	**Wingwall Material**	**Wingwall Condition**	**Scour at Structure**	**Scour Severity**
Upstream	None	N/A	None	N/A	Culvert	High
Downstream	None	N/A	None	N/A		

Scour in Structure	**Scour Severity in Structure**	**Road Surface Condition**	**Utilities at Crossing**	**Structure Condition Overall**
Culvert	High	N/A	None	Poor

Structure Condition Comments:	NO DS STRUCTURE. BURIED

Ecological Assessment:	Upstream	Downstream
Natural Community Classification:	Invasive Dominant	Freshwater Stream
Upstream Salt Marsh Migration Potential (acres):	0.58	

Flood Hazard & Emergency Access

Site Identified in Hazard Mitigation Plan:	No
Emergency Access or Evacuation Route:	N/A
History of Flooding:	Culvert washed out and buried upon assessment.