



State of New Jersey
NEW JERSEY DEPARTMENT OF TRANSPORTATION
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TRENTON, NEW JERSEY 08625-0600

UNDERWATER BRIDGE EVALUATION SURVEY REPORT

STRUCTURE NO.: 0802-151

**ROUTE NJ 41 OVER
SOUTH BRANCH TIMBER CREEK
TOWNSHIP OF DEPTFORD
GLOUCESTER COUNTY**

September 27, 2007

PREPARED BY

ABC Consultant

TABLE OF CONTENTS

	<u>Page No.</u>
1 Structural Data	12-1
2 Summary	12-1
3 Conclusions and Recommendations	12-3
4 Soundings and Photographs	12-4
5 Field Notes	12-8

**N.J.D.O.T. - STRUCTURAL EVALUATION
UNDERWATER BRIDGE EVALUATION SURVEY REPORT**

STRUCTURAL DATA:

Bridge No.:	0802-151	Year Built:	1958	Widened/ Rehab:	1999
Route No.:	41	Length:	42.0'	Width:	56.5'
Mile Point:	4.120	Date of this Evaluation:	9/27/2007		
Name:	Route NJ 41 over South Branch Timber Creek		By:	ABC Consultant	
Structure Type:	Two Spans, Concrete Encased Steel Girder Floorbeam System		Date of Previous Evaluation:	10/16/2003	
			By:	XYZ Consultant	
Equipment Used:	SCUBA, KMB-28 mask, 2-way communication, wet suit, hand tools, divers light and an 8' boat.				

OVERALL CONDITION: Fair

WORK DONE: Several spalls along both abutments have been repaired (Photo No.UW-02).

SUMMARY:

Number of Substructure Units in Water:	Abutments: 2	Piers: 1
Type of Underwater Inspection:	NJDOT Type-2	
Underwater Inspection Equipment Used:	8' boat, SCUBA, KMB-28 mask, 2-way communications, wetsuit, hand tools and diver's light.	
Substructure Elements Cleaned:	10% of underwater portions of pier and both abutments at various locations.	
Water Flow Velocity:	Tidal (Moderate)	Soil Type: Silt, sand and gravel.
Diving Mode:	SCUBA	Dive Team Members: 3
Diving Hazard Analysis / Assessment:	NH- None	
Reference Information:	The previous inspection report was available for review prior to the inspection. Marine growth was light consisting of algae up to 1/16" thick throughout the tidal zone. Visibility was good up to 2 feet.	

Structure No.: 0802-151 Route: Route NJ 41 Cycle No.: 12
 Name: Route NJ 41 over South Branch Timber Creek Insp. Date: 9/27/07

COMPONENT / MATERIAL	GENERAL REMARKS
<p>ABUTMENTS (Concrete)</p>	<p><u>North Abutment:</u> Light to moderate scaling with exposed aggregate throughout the tidal zone up to 1/2" deep. The west construction joint exhibits severe scaling/spalling extending thru the tidal zone to the mud line, 12" wide x up to 6" deep (6 SF). Severe scaling under both weep holes, 6" wide x 3' high x up to 2" deep below east and 12" wide x 3' high x up to 2 1/2" deep at west (5 SF). The east construction joint exhibits severe scaling below the low waterline to the mud line, 2" wide x up to 3" deep. West construction joint exhibits severe scaling/spalling extending thru the tidal zone, 12" wide x 6" deep (6 SF). Concrete repair on the east end of the abutment exhibits hollow sounding areas within the tidal zone. Many concrete repair patches throughout the abutment.</p> <p><u>Northwest wingwall:</u> Moderate scaling with exposed aggregate throughout the tidal zone up to 1/2" deep.</p> <p><u>Northeast wingwall:</u> Moderate to heavy scaling throughout the tidal zone up to 1" deep. 1/16" to 1/8" wide full height vertical crack 4' from corner (8 LF). Wide diagonal crack up to 1/8" wide with efflorescence, 10' from corner (8 LF).</p> <p><u>South Abutment:</u> Light to moderate scaling throughout the tidal zone up to 3/8" deep. 1/8" wide vertical crack (7 LF) located 8' east of the centerline exhibits a delaminated previous repair. 1" wide vertical to diagonal crack (12 LF) located 10' from the west end of the abutment with 3/4" lateral displacement. Many concrete repair patches were observed throughout the abutment.</p> <p><u>Southwest wingwall:</u> Light to moderate scaling throughout the tidal zone up to 3/8" deep at both wingwalls.</p> <p><u>Southeast wingwall:</u> Light to moderate scaling throughout the tidal zone up to 3/8" deep at both wingwalls and a few fine to medium vertical and diagonal cracks with efflorescence.</p>
<p>PIER (Solid Concrete Wall)</p>	<p><u>Center Pier:</u> Band of severe scaling and spalling with exposed aggregate throughout the tidal zone varies from 3" to 4" deep and extends approximately 20' from both the east and west ends (140 SF). The east nose exhibits severe spalling full width of the shaft throughout the tidal zone with a max depth of 6" at the base of the steel nosing angle (50 SF). Concrete is soft and chips away when struck. The west nose exhibits severe spalling full width of shaft with exposed and loose aggregate throughout the tidal zone. The spalling is approximately 7' high x full width of shaft x up to 10" deep (60 SF). Concrete is soft and chips away when struck. No reinforcing is present.</p>
<p>COUNTERMEASURES</p>	<p>No scour countermeasures were detected.</p>
<p>FENDERS/ BULKHEADS</p>	<p>None.</p>

CONCLUSIONS & RECOMMENDATIONS:

The overall condition of the underwater components of the structure is fair due to severe scaling and spalling of the abutments and center pier.

Based upon our probing of the channel bottom material adjacent to the substructure and our review of prior reports and plans, the bridge appears to have minor potential scour problem at this time. There is minor local scour at the east end of the pier approximately 1' deep along the north side.

Since the previous underwater inspection the following significant changes have occurred:

- 1. None

Due to the conditions observed during our underwater inspection, we recommend the following repairs be made to retard further deterioration, preserve the structural integrity of the bridge, improve safety and extend its useful life:

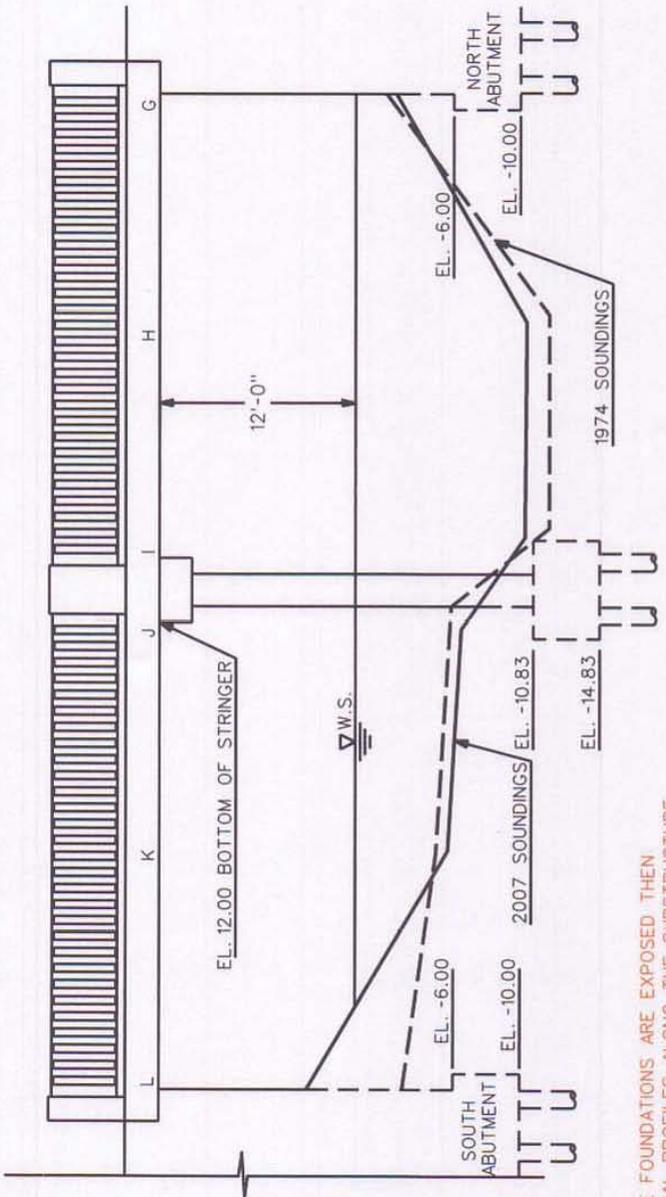
- 1. Clean and repair all remaining areas of severe scaling and spalling at the abutments and the center pier with epoxy concrete. 267 SF
- 2. Seal wide cracks in the wingwalls and the south abutment with epoxy injection. 35 LF
- 3. Remove debris at the west end of pier. 3 CY

In addition, we recommend a Type-2 Underwater Inspection of the bridge be performed on a 4 year interval.

**Underwater Inspection Interval Guidelines: Scour critical Bridge = 24 Months
Non-Scour critical bridge = 48 Months
Low Freeboard = 24 Months**

Note: Header and Page numbers shall be embedded within WORD “Header/Footers”.

ROUTE	STRUCTURE NO.	DATE	CYCLE NO.
41	0802-151	9/27/2007	12



EAST ELEVATION

N.T.S.

LEGEND
 --- 1974 CHANNEL BOTTOM
 ——— 2007 CHANNEL BOTTOM

POINT	LOCATION	UPSTREAM	
		1974	2007
G	NORTH ABUTMENT	WATER CLEAR DIM. 13.9'	WATER CLEAR DIM. 14.5'
H	MID SPAN 2	23.9'	10.5'
I	N. FACE PIER	23.9'	11.0'
J	S. FACE PIER	17.9'	6.5'
K	MID SPAN 1	16.9'	5.5'
L	SOUTH ABUTMENT	14.9'	0.0'

* WATER DEPTH DIMENSIONS ARE NOT AVAILABLE.

IF SUBSTRUCTURE FOUNDATIONS ARE EXPOSED THEN PROVIDE ADDITIONAL PROFILES ALONG THE SUBSTRUCTURE UNITS IN ACCORDANCE WITH THE "UNDERWATER INSPECTION AND EVALUATION GUIDELINES MANUAL"

SOUNDING PLOTS SHALL BE ON A RELATIVE SCALE.

ALL SOUNDINGS SHALL BE TIED TO A PERMANENT BENCH MARK (I.E. UNDERSIDE OF FASCIA BEAM, BRIDGE SEAT ETC.) USE SAME BENCH MARK AS USED FOR BASELINE SOUNDINGS.

NOTES:

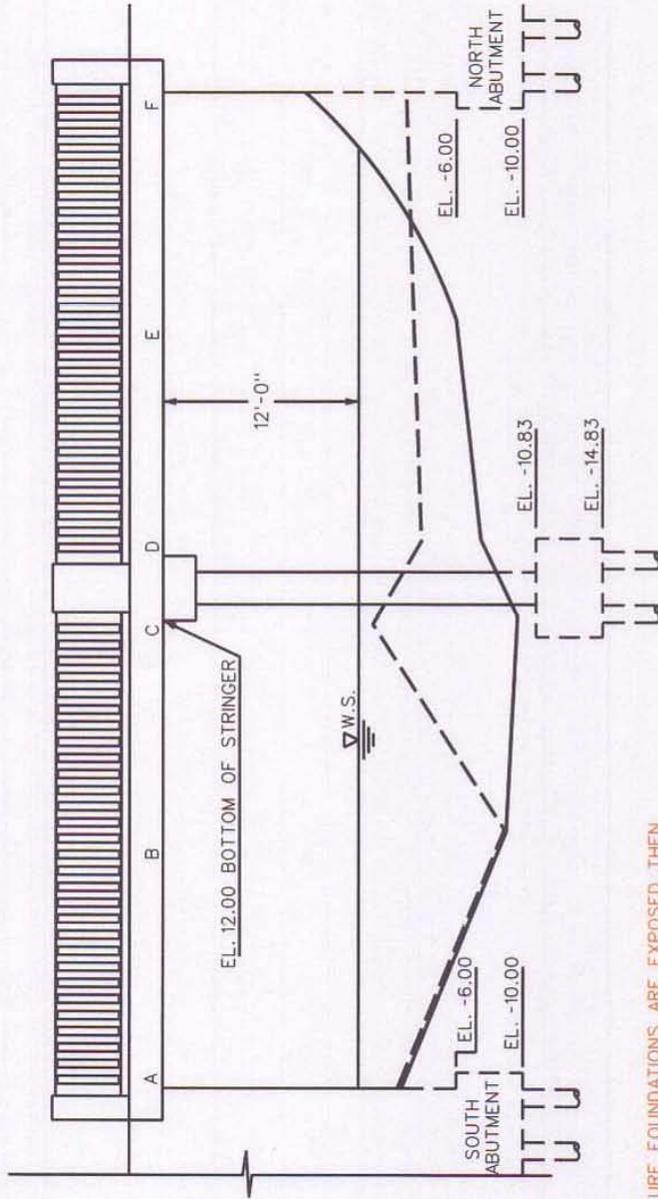
1. THE CLEAR DIMENSIONS ARE MEASURED FROM THE BOTTOM OF THE FASCIA GIRDER TO THE CHANNEL BOTTOM.
2. THE WATER DEPTH DIMENSIONS ARE MEASURED FROM THE WATER SURFACE (AT THE TIME OF THE INSPECTION TO THE CHANNEL BOTTOM).
3. SUPERSTRUCTURE AND SUBSTRUCTURE ELEVATIONS SHOWN ARE TAKEN FROM ORIGINAL DRAWINGS DATED 1927.

NEW JERSEY DEPARTMENT OF TRANSPORTATION
 STRUCTURAL EVALUATION

ROUTE NJ 41 OVER
 SOUTH BRANCH BIG TIMBER CREEK
 STRUCTURE NO. 0802-151
 TOWNSHIP: DEPTFORD COUNTY: GLOUCESTER

ABC CONSULTANT
 CREW CHIEF: _____
 NAME _____

ROUTE	STRUCTURE NO.	DATE	CYCLE NO.
41	0802-151	9/27/2007	12



IF SUBSTRUCTURE FOUNDATIONS ARE EXPOSED THEN PROVIDE ADDITIONAL PROFILES ALONG THE SUBSTRUCTURE UNITS IN ACCORDANCE WITH THE "UNDERWATER INSPECTION AND EVALUATION GUIDELINES MANUAL"

SOUNDING PLOTS SHALL BE ON A RELATIVE SCALE.

ALL SOUNDINGS SHALL BE TIED TO A PERMANENT BENCH MARK (I.E. UNDERSIDE OF FASCIA BEAM, BRIDGE SEAT ETC.) USE SAME BENCH MARK AS USED FOR BASELINE SOUNDINGS.

NOTES:

1. THE CLEAR DIMENSIONS ARE MEASURED FROM THE BOTTOM OF THE FASCIA GIRDER TO THE CHANNEL BOTTOM.
2. THE WATER DEPTH DIMENSIONS ARE MEASURED FROM THE WATER SURFACE (AT THE TIME OF THE INSPECTION TO THE CHANNEL BOTTOM).
3. SUPERSTRUCTURE AND SUBSTRUCTURE ELEVATIONS SHOWN ARE TAKEN FROM ORIGINAL DRAWINGS DATED 1927.

WEST ELEVATION

N.T.S.

LEGEND

- 1974 CHANNEL BOTTOM
- 2007 CHANNEL BOTTOM

POINT	LOCATION	DOWNSTREAM	
		1974	2007
A	NORTH ABUTMENT	WATER DEPTH * 14.4'	CLEAR DIM. 14.5'
B	MID SPAN 2	WATER DEPTH * 20.9'	CLEAR DIM. 21.0'
C	N. FACE PIER	WATER DEPTH * 12.9'	CLEAR DIM. 10.0'
D	S. FACE PIER	WATER DEPTH * 15.9'	CLEAR DIM. 7.5'
E	MID SPAN 1	WATER DEPTH * 15.4'	CLEAR DIM. 6.0'
F	SOUTH ABUTMENT	WATER DEPTH * 14.9'	CLEAR DIM. 0.0'

* WATER DEPTH DIMENSIONS ARE NOT AVAILABLE.

NEW JERSEY DEPARTMENT OF TRANSPORTATION
STRUCTURAL EVALUATION

ROUTE NJ 41 OVER
SOUTH BRANCH BIG TIMBER CREEK
STRUCTURE NO. 0802-151

TOWNSHIP: DEPTFORD COUNTY: GLOUCESTER

ABC CONSULTANT

CREW CHIEF:
NAME

Structure No.: 0802-151 Route: 41 Cycle No.: 12
 Name: Route NJ 41 over South Branch Timber Creek Insp. Date: 9/27/07

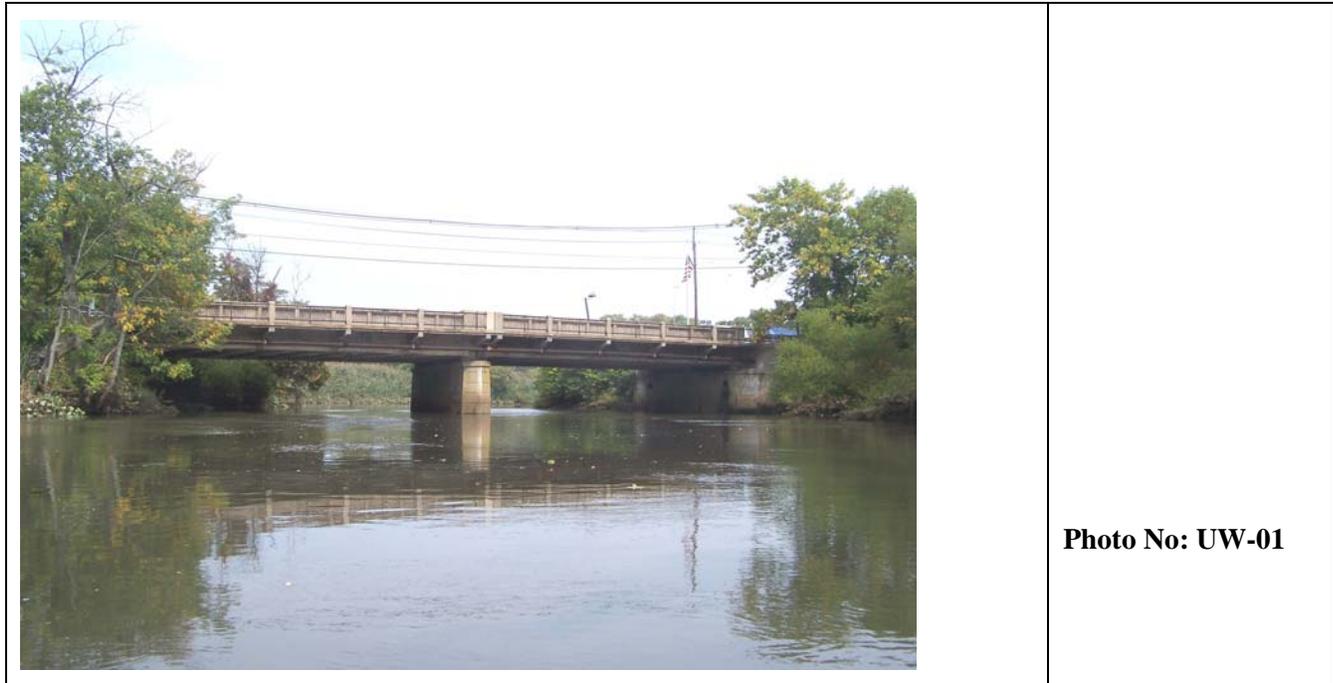


Photo No: UW-01

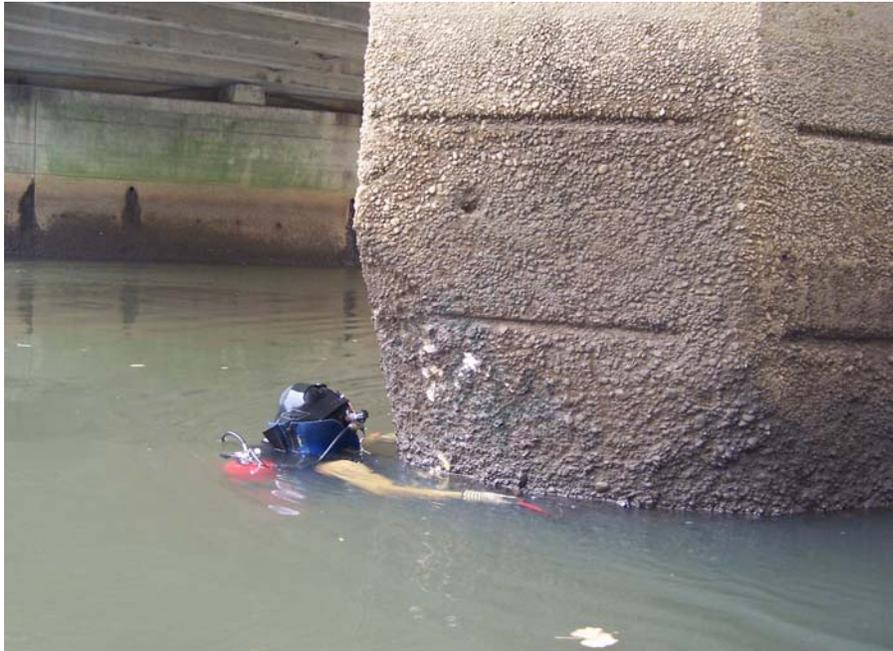
Location:	East elevation, looking west
Description:	General view.



Photo No: UW-02

Location:	South abutment, east side, looking south.
Description:	Work done: Concrete patched areas; typical at both abutments.

Structure No.: 0802-151 Route: 41 Cycle No.: 12
 Name: Route NJ 41 over South Branch Timber Creek Insp. Date: 9/27/07

		<p>Photo No: UW-03</p>
Location:	Center pier, east nose, looking south.	
Description:	Diver in the water	

Note: Minimum Photo Resolution is 1280 x 960 Pixels

Structure No.: 0802-151 Route: 41 Cycle No.: 12
Name: Route NJ 41 over South Branch Timber Creek Insp. Date: 9/27/07

**NEW JERSEY DEPARTMENT OF TRANSPORTATION
STRUCTURAL EVALUATION
UNDERWATER DIVING INSPECTION
(FIELD NOTES)**

Name: Route NJ 41 over South Branch Timber Creek
Diver: XXX, XXXXX (First name, Last name)
Company: ABC Consultant
Team leader: XXXX, XXXX (First name, Last name)
Company: XYZ Consultant
Temperature: 85° F Weather: Sunny
Equipment Used: SCUBA, KMB-28 mask, 2-way communication, wet suit, hand tools, divers light and an 8' boat.

RATINGS:

- N Not applicable
- 9 Excellent Condition
- 8 Very Good Condition – no problems noted.
- 7 Good Condition – some minor problems.
- 6 Satisfactory Condition – some minor deterioration of structural elements.
- 5 Fair Condition – minor section loss of primary structural elements.**
- 4 Poor Condition – advance section loss of primary structural elements.
- 3 Serious Condition – seriously deteriorated primary structural elements.
- 2 Critical Condition – facility should be closed until repairs are made.
- 1 Imminent Failure Condition – facility closed. Study of repairs is feasible.
- 0 Failed Condition – facility is closed and beyond repair.

GENERAL

Type of Bridge: Two Spans, Concrete Encased Steel Girder Floorbeam System
Type of Substructure: Concrete abutments and concrete pier
No. of Lanes: On 2 Under Waterway
Number of substructure units in water: Abutments: 2 Piers: 1
Overall condition of substructure: Fair due to the condition of substructure.

WATERWAY:

Type: Tidal waterway Velocity: Moderate-Fast
Streambed material: Silt, sand and gravel

*** Cycle number(e.g. 12-8) shall coincide with the Routine Bridge Evaluation Report.**

Structure No.: 0802-151 Route: 41 Cycle No.: 12
 Name: Route NJ 41 over South Branch Timber Creek Insp. Date: 9/27/07

UNDERWATER DIVING INSPECTION

SUBSTRUCTURE

SI&A Item 60 Condition Rating: 5

ABUTMENT NORTH

RATING	COMPONENT	REMARKS
5	Breastwall (Concrete)	Light to moderate scaling with exposed aggregate throughout the tidal zone up to 1/2" deep. The west construction joint exhibits severe scaling/spalling extending thru the tidal zone to the mud line, 12" wide x up to 6" deep (6 SF). Severe scaling under both weep holes, 6" wide x 3' high x up to 2" deep below east and 12" wide x 3' high x up to 2½" deep at west (5 SF). The east construction joint exhibits severe scaling below the low waterline to the mud line, 2" wide x up to 3" deep. West construction joint exhibits severe scaling/spalling extending thru the tidal zone, 12" wide x 6" deep (6 SF). Concrete repair on the east end of the abutment exhibits hollow sounding areas within the tidal zone. Many new concrete repair patches throughout the abutment.
N	Backwall	
N	Bridge Seat	
5	Wingwalls/ Retaining Walls (Concrete)	<u>Northwest wingwall:</u> Moderate scaling with exposed aggregate throughout the tidal zone up to 1/2" deep. <u>Northeast wingwall:</u> Moderate to heavy scaling throughout the tidal zone up to 1" deep. 1/16" to 1/8" wide full height vertical crack 4' from corner (8 LF). Wide diagonal crack up to 1/8" wide with efflorescence, 10' from corner (8 LF).
N	Embankment / Slope Protection	
N	Others / Footings / Waterway Probing	Footing is not exposed.

Additional Repair remaining scaling & spalling 17 SF.
Remarks: Seal Wide Cracks 16 LF

Structure No.: 0802-151 Route: 41 Cycle No.: 12
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UNDERWATER DIVING INSPECTION

SUBSTRUCTURE

SI&A Item 60 Condition Rating: 5

ABUTMENT SOUTH

RATING	COMPONENT	REMARKS
5	Breastwall (Concrete)	Light to moderate scaling throughout the tidal zone up to 3/8" deep. 1/8" wide vertical crack located 8' east of the centerline (7 LF) exhibits a delaminated previous repair. 1" wide vertical to diagonal crack (12 LF) located 10' from the west end of the abutment with 3/4" lateral displacement (west side behind the east).
N	Backwall	
N	Bridge Seat	
5	Wingwalls/ Retaining Walls (Concrete)	Light to moderate scaling throughout the tidal zone up to 3/8" deep at both wingwalls. <u>Southeast wingwall:</u> Few fine to medium vertical & diagonal cracks with efflorescence.
N	Embankment / Slope Protection	
N	Others / Footings / Waterway Probing	Footing is not exposed.

Additional Seal wide cracks 19 LF
Remarks:

Structure No.: 0802-151 Route: 41 Cycle No.: 12
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UNDERWATER DIVING INSPECTION

SUBSTRUCTURE

SI&A Item 60 Condition Rating: 5

PIER CENTER

RATING	COMPONENT	REMARKS
5	Columns/ Stem Crashwall (Solid Concrete Wall)	Light to moderate scaling throughout the tidal zone up to 3/8" deep. 1/8" wide vertical crack located 8' east of the centerline (7 LF) exhibits a delaminated previous repair. 1" wide vertical to diagonal crack (12 LF) located 10' from the west end of the abutment with 3/4" lateral displacement (west side behind the east).
7	Pier Cap (Concrete)	Out of water.
N	Bridge Seat	
N	Others/Fender Comment on Probing	Footing is not exposed.

Additional Patch spalls at both ends 110 SF
Remarks: Patch deep scaling at both ends 140 SF

Structure No.: 0802-151 Route: 41 Cycle No.: 12
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UNDERWATER DIVING INSPECTION

SUBSTRUCTURE/SCOUR

SI&A Item 60 Condition Rating: 5

ABUTMENT EAST

RATING	COMPONENT	REMARKS
COUNTERMEASURES		

	Description	None
N	Condition	

PROBING/SCOUR

6	Findings	Soft mud, Silt and some sand with up to 6" to 12" penetration. No observed scour. Footings are not exposed.
	Changes Since Prior Inspection	None
	Debris	None

Repair Quantities: _____

ABUTMENT WEST

RATING	COMPONENT	REMARKS
COUNTERMEASURES		

	Description	None
N	Condition	

PROBING/SCOUR

8	Findings	Soft mud, Silt and some sand with up to 6" to 12" penetration. No observed scour. Footings are not exposed.
	Changes Since Prior Inspection	None
	Debris	None

Repair Quantities: _____

Structure No.: 0802-151 Route: 41 Cycle No.: 12
 Name: Route NJ 41 over South Branch Timber Creek Insp. Date: 9/27/07

UNDERWATER DIVING INSPECTION

SUBSTRUCTURE/SCOUR

SI&A Item 60 Condition Rating: 5

PIERS CENTER

RATING	COMPONENT	REMARKS
COUNTERMEASURES		
	Description	None
N	Condition	
PROBING/SCOUR		
6	Findings	Sand and gravel mix with up to 6" penetration. Minor local scour hole at the east nose 12" deep. Footing is not exposed.
	Changes Since Prior Inspection	Minor local scour hole at the northeast corner at nose 12" deep.
	Debris	The west end exhibits a large accumulation of timber debris, trash, shopping cart and a sign. Large accumulation of timber debris (tree trunks and limbs) along the south side approximately 3' from the pier shaft (3 CY).

Repair Quantities: Remove debris 3 CY