BRIDGE SCOUR EVALUATION PROGRAM

PLAN OF ACTION REPORT

for

STAGE II
IN-DEPTH SCOUR EVALUATION
of
STATE BRIDGES

AUGUST 2006

Prepared by

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Mr. James Lane, Manager
Structural Evaluation
New Jersey Department of Transportation
1035 Parkway Avenue, P.O. Box 615
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Attention: Mr. Ayodele Oshilaja

Dear Mr. Lane:

Re: Agreement No. 90 BI 64
Technical Management Contract
Bridge Scour Evaluation Program
Stage II - In-depth Scour Evaluation
Final Plan of Action Report - State Bridges

In accordance with the comments received during our prior discussions and the results of the Phase 4 evaluations, we are pleased to submit three (3) copies of our Final Plan of Action Report for the Stage II In-depth Scour Evaluation of the state owned structures.

This report identifies the bridges that have been determined to be scour critical and provides aspects of a Plan of Action for the installation of scour countermeasures and inspection procedures for there monitoring during flood events. Included is a determination of their prioritization as well as the preliminary determination of the required countermeasures and the associated construction costs.

Should you have any comments or require additional information or copies, please do not hesitate to call.

Very truly yours,

Earth Tech

Paul Wojcik, P.E.
Project Manager

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I

BACKGROUND

I. BACKGROUND

A. INTRODUCTION

Scour is typically defined as the excavation and removal of material from the bed and banks of streams caused by the action of running water. This action can compromise the structural integrity of a bridge by undermining its foundations. The catastrophic collapse of several structures in the late 1980s focused national attention on the issue of the susceptibility of existing structures to damage by scour.

Recognizing the potential impact of scour at highway bridges, the Federal Highway Administration (FHWA) issued a Technical Advisory (T5140.20) and Interim Procedures in 1988. The Advisory and Interim Procedures were subsequently superseded by the issuance of Technical Advisory TA5140.23 and the issuance in 1991 of HEC-18 titled: "Evaluating Scour at Bridges". Although these documents do not establish regulations or formal policies, they provided impetus for state transportation agencies to establish comprehensive programs to deal with scour at existing bridges. The FHWA documents recommended a two-stage process for the evaluation:

- Stage I - Screening and Prioritization
- Stage II - In-depth Bridge Scour Evaluation

The objective of Stage I was to identify those waterway bridges that are most likely to be susceptible to scour damage and to establish a prioritized list for further evaluation. In Stage II, an in-depth bridge scour evaluation study of the priority bridges is performed to determine which structures are scour critical. A final part of the evaluation program is to establish a long-term plan of action for the remediation of the scour critical bridges.

The Plan of Action, which is the subject of this report, involves two parts. The first part consists of developing a program for the installation of countermeasures to reduce their susceptibility to scour damage. Subsequent to the issuance of HEC-18, the FHWA has also issued HEC-23 titled "Bridge Scour and Stream Instability Countermeasures" to provide experience and design guidelines. In some cases where replacement of the bridge has been planned, or is otherwise required, the new structure will be designed to meet the requirements of HEC-18 in accordance with current Department Standards. Since the program for the installation of countermeasures will be over the course of several years the establishment of a monitoring program is also necessary and is the second aspect of the plan of action. This report will provide information on both aspects of the plan.

B. STAGE I – SCREENING AND PRIORITIZATION

In 1990, the New Jersey Department of Transportation initiated a statewide Scour Evaluation Program for existing highway bridges over waterways. This effort began with

the selection of a Technical and Management Consultant to assist the Department in the development and implementation of the program. In addition, 16 other engineering consultants were selected to perform the engineering aspects of the scour screening and evaluation for the nearly 2,400 state and county bridges in the program.

For the Stage I effort, a screening and prioritization process was developed to establish a logical sequence for this stage of the program and help to focus resources on the most critical needs. This process included the use of standard data forms and criteria for coding appraisal factors related to each bridge's potential susceptibility to scour damage. These key scour factors were: Type of Foundation, Bridge Characteristics, Collapse Vulnerability, Waterway Characteristics and History of Scour Problems. In May of 1991, the Department issued the "Bridge Scour Evaluation Program Guidelines Manual for Stage I Screening and Prioritization".

The tasks for the Stage I program included, for each of the bridge sites, the collection of readily available data and field visits by an interdisciplinary team of experienced hydraulic, structural, and in some cases, geotechnical engineers. Based upon these efforts, numerical appraisal ratings were coded for the previously defined key scour factors. The ratings for the key scour factors were used to determine an overall numerical Scour Sufficiency rating (from 0 to 100), which was used to assess the structure's potential sufficiency to resist scour damage. In addition, the scour evaluation consultants coded each bridge with a Prioritization Category rating of 1 to 4, which assessed the necessity for in-depth scour evaluation. This rating was more of a subjective rating by the consultant and provided an independent check of the numerical sufficiency rating results.

The Scour Sufficiency and Prioritization Category ratings were used to identify the bridges that were most susceptible to scour and required an in-depth evaluation to determine whether they were scour critical. In addition, these ratings were used to determine which structures were at a lower risk to scour, and thus would require only condition monitoring during routine biennial inspections. For a more complete discussion of the Stage I program, refer to the "Bridge Scour Evaluation Program Summary Report for Stage I" prepared by TAMS (report dated April 1994 for the state owned bridges and June 1994 for county owned structures). Based upon the results of the Stage I program, a preliminary estimate of 963 bridges (313 state and 650 county) out of the 2,347 evaluated, were determined to be susceptible to scour and would potentially require a Stage II In-depth evaluation. This number, however, has changed over the years based upon modifications to reconstruction programs and changes in the scour conditions at the bridge site.

C. STAGE II – IN-DEPTH SCOUR EVALUATION

The procedure recommended by HEC-18 for conducting a scour evaluation study includes a determination of the waterway characteristics for flood flow conditions and the calculation of potential scour depths at the substructure units, followed by an assessment

of their stability. Those bridges whose foundations are unstable for the calculated scour depths are classified as "scour critical" and appropriate countermeasures are required.

To help provide consistency in the evaluation process, the "Bridge Scour Evaluation Program Guidelines Manual for Stage II In-depth Scour Evaluation" was issued by the Department in June of 1994. This Manual established the procedures and scope of work and provided formats for the project deliverables followed by the Department's scour consultants during the program.

The scope of work for a Stage II In-depth Scour Evaluation in the New Jersey Program includes the following tasks:

- Task 1 Data Collection and Review
- Task 2 Field Investigation
- Task 3 Determination of Scour Analysis Variables
- Task 4 Scour Analysis and Evaluation
- Task 5 Evaluation of Countermeasures
- Task 6 Bridge Scour Evaluation Report

For the New Jersey Program, scour depths at three storm events (50, 100 and 500 year) were evaluated. However, as per the current FHWA criteria, a finding of unstable footings at any of the events (50, 100 and 500 year) would lead to a "scour critical" classification for the structure.

One end product of the Stage II effort is a revised coding for the Structure Inventory and Appraisal (SI&A) for Item No. 113. This item is used to identify the current status of the bridge regarding its vulnerability to scour. Based upon the Stage I effort, all of the scour susceptible bridges had been coded as "6", "U", or "T", which left their status as yet to be determined. As per the FHWA's criteria in the "Recording and Coding Guide for the Structure Inventory and Appraisal of the Nation's Bridges", a rating of 3 or less is indicative of a scour critical coding for the structure. The current coding criteria for this item, is provided in Appendix A.

D. STAGE II – RESULTS

To date, the Stage II In-depth evaluation program has consisted of four phases. The first two phases of the Stage II program dealt primarily with bridges with known foundation types and structures over non-tidal waterways. At the time these two phases were underway studies were being undertaken by the FHWA to develop cost effective procedures to evaluate structures with unknown foundations as well as those over tidal waterways. Phase 3, dealt with some of the more scour susceptible bridges with unknown foundations and/or bridges over tidal waterways. Phase 4, which has recently been completed, will mark the completion of the Stage II program. This Phase included the remaining scour susceptible tidal waterway and unknown foundation bridges. In addition, bridges were also included that have scour susceptible foundations and have

subsequently been shown to be experiencing scour related problems. The determination of the bridges in this category was based upon current NBIS data.

In developing the bridge lists for the various phases of the Stage II evaluation, it was determined that any scour susceptible bridge that had been included on the Capital Program of the Department of Transportation and scheduled for replacement within the next five years would not be evaluated. The rationale is that the replacement structure would be designed to resist scour in accordance with HEC-18 and eliminate the need for any further efforts. It was decided, however, that a monitoring program for these structures was prudent until construction could begin and would be more prudent course of action than an in-depth evaluation.

With all four phases of the Stage II program now complete, the bridges can be classified and the coding of Item 113 can be finalized. A complete list of the state owned waterway bridges and the recommended coding for SI&A Item 113 is included in the Appendix B. The bridges can be classified according to the following general categories:

Classification	**No. of Bridges**
Scour Critical	170*
Scour Susceptible	
Unknown Foundations	6**
Tidal	0
Evaluated Low Risk	
Stage II Evaluation	75
New Bridges (after HEC-18)	70
HEC-23 Countermeasures	10
Low Risk	
State I Evaluation	364
Other Countermeasures	3
Culverts	137
Total	835

Notes:
* 5 bridges currently under construction
** All 6 bridges currently under construction

As noted earlier, the installation of countermeasures or replacement of the scour critical structures will be done over an extended period of time. It is therefore necessary to prepare a list of bridges that will require monitoring during significant storms. The Flood Watch List would be comprised of the bridges classified as either scour critical or scour susceptible. In determining the bridges to include on the Flood Watch List it was decided not to include those structures that are currently under construction. The rationale is that

these structures would have an on-site resident engineer who would be readily aware of any changes that are occurring at the bridge during the construction period. Table I-1 is a list of the 165 bridges that are currently classified as being on the Department's Flood Watch List. A list of the Flood Watch List bridges categorized by Maintenance Region is provided in Appendix C.

As will be discussed in the next section, the plan of action for the structures on the Scour Flood Watch List (Table I-1) will include the implementation of a program to install properly designed scour countermeasures, or in some cases complete bridge replacement. All of the structures on the Flood Watch List will receive regular NBIS inspections to evaluate their current conditions. In addition, they will also receive additional monitoring during and where necessary after significant storms. The procedures for that monitoring will be discussed in Section III of this document.

SCOUR CRITICAL STATE WATCH LIST BRIDGES

Table I-1

Rte	Number	Name	Phase	Item 113	Channel Findings
1B	1102150	US 1B OVER SHABAKUNK CREEK	3	3	Restricted Flow
1+9	0201151	US 1&9(BROAD AVENUE) OVER WOLF CREEK	2	3	Minor Scour
3	1601157	NJ ROUTE 3 OVER THIRD RIVER	1	3	Embankment Degredation
3	1601160	NJ RT 3 OVER UPPER POND SPILLWAY	1	3	Minor Scour
4	0206166	NJ 4 / HACKENSACK RIVER & ACCESS ROAD	1	3	Minor Undermining
4	0206181	NJ 4 OVER FLAT ROCK BROOK	3	3	Minor Scour
4	0206189	KINDERKAMACK RD OVER COLES BROOK	4	3	Minor Scour
9	1303155	US RT 9 OVER MILFORD BROOK	2	3	Heavy Scour
9	1502153	US 9 OVER OYSTER CREEK	3	3	Minor Scour
9	1502154	US 9 OVER S. BRANCH OF FORKED RIVER	---	3	Minor Scour
9	1502157	US 9 OVER CEDAR CREEK	2	3	Minor Scour
10	0709150	RT 10 OVER WILLOW MEADOW BROOK	2	3	Heavy Sedimentation
10	0711150	NJ ROUTE 10 OVER CANOE BROOK	3	3	Restricted Flow
10	1401156	RT 10 OVER MILL BROOK	2	3	Heavy Scour
10	1402150	NJ ROUTE 10 OVER MALAPARDIS BROOK	2	3	Heavy Scour
15	1403150	NJ RT 15 OVER BRNT MDW(GRN PD) BROOK	2	3	Restricted Flow
15	1404155	GOVRNMNT RD(PARKER RD) WB/GREEN POND	1	3	Heavy Scour
15	1404158	NJ ROUTE 15 SB / ROCKAWAY RIVER	3	3	
15	1404159	NJ RT 15 RAMP A OVER HURDTOWN BROOK	2	3	Heavy Scour
15	1424150	NJ 15 NB OVER LAKE SHAWNEE	4	3	Minor Scour
15	1922150	NJ ROUTE 15 OVER BEAVER RUN	3	3	Minor Scour
15	1922151	NJ.RTE.15 OVER PAULINS KILL CREEK	2	3	
17	0216150	RT 17 OVER SPROUT BROOK	1	3	Heavy Scour
17	0216157	NJ RT 17 OVER SADDLE RIVER.	2	3	Embankment Degredation
17	0218161	N.J 17 NB/US 202 & RAMAPO RIVER	1	3	Minor Scour
17	0218162	NJ RT 17 SB OVER US 202 & RAMAPO RVR	2	3	Minor Scour
21	0716156	MAIN ST OVER SECOND RIVER	1	3	Inadequate Waterway Opening
22	1005153	RT US 22 OVER BR ROCKAWAY CREEK	2	3	Heavy Scour
22	1005162	US 22 EB OVER S BR ROCKAWAY CREEK	1	3	Restricted Flow
22	1005163	RT US 22 WB OVER S BR ROCKAWAY CREEK	---	3	Restricted Flow
22	1801153	US 22 EB OVER N BR RARITAN RIVER	1	3	Restricted Flow
22	1801154	US 22 WB OVER N BR RARITAN RIVER	1	3	Heavy Scour
22	1803156	RT US 22 OVER STONY BROOK	1	3	Debris on Bridge Seats
22	2003157	US22 OVER ECHO LAKE	1	3	Restricted Flow
22	2003161	US 22 EB OVER RAHWAY RIVER	3	3	Heavy Scour
22	2003162	US 22 WB OVER RAHWAY RIVER	4	3	Minor Scour
22	2004151	US 22 OVER ELIZABETH RIVER	1	3	Minor Scour
22	2102154	US 22 OVER LOPATCONG CREEK	2	3	Heavy Sedimentation
23	0719151	RT 23 OVER PECKMANS BROOK	2	3	Heavy Scour
23	1405156	RT23/PEQUANNOCK R,HAMBURG TPK SB, RR	3	3	Minor Sedimentation
23	1604150	ROUTE NJ 23/PASSAIC RIVER	3	3	Minor Sedimentation
23	1605153	NJ RTE 23 SB OVER PEQUANNOCK RIV.	3	3	Minor Undermining
23	1605156	NJ RT 23 SB OVER PEQUANNOCK RIVER	2	3	Heavy Scour
23	1605158	NJ ROUTE 23 NB/MACOPIN RIVER	2	3	
23	1605162	RTE 23SB OVER PEQUANNOCK RV	3	3	Minor Scour
23	1605167	ROUTE 23 SB OVER PEQUANNOCK RIVER	2	3	
23	1605175	RT 23 NB OVER PEQUANNOCK RIVER	2	3	
23	1619151	N.J 23 OVER POMPTON RIVER	1	3	Minor Scour
23	1903152	23/BR OF PACOCK BRK & DEL-OSTEGO R.R.	4	3	Minor Scour
23	1903153	RT 23 OVER BRANCH OF FRANKLIN LAKE	2	3	Damage to rip-rap/piling
23	1904152	NJ 23 OVER WALLKILL RIVER	1	3	Minor Scour
23	1904153	NJ RT 23/ BR OF WALLKILL RIVER	1	3	
23	1905151	ROUTE NJ 23/BRANCH OF CLOVE RIVER	1	3	Minor Undermining
27	1105152	RT NJ 27 OVER MILLSTONE RIVER	2	3	Minor Scour
27	1218158	NJ RT 27 OVER S BRANCH RAHWAY RIVER	3	3	Heavy Sedimentation
27	2006151	RT 27 OVER ROBINSON BRNCH RAHWAY RVR	3	3	Restricted Flow
27	2006152	NJ RT 27/RAHWAY RIVER	3	3	Heavy Scour/Undermining

SCOUR CRITICAL STATE WATCH LIST BRIDGES

Table I-1

Rte	Number	Name	Phase	Item 113	Channel Findings
29	1006151	ROUTE 29 OVER SWAN CREEK	3	3	Minor Scour
29	1009150	ROUTE 29 OVER COPPER CREEK	3	3	Heavy Scour
29	1110158	NJ 29 OVER MOORES CREEK	3	3	Embankment Degredation
30	0405153	US RTS 30 & 130 OVER COOPER RIVER	3	3	
31	1013152	ROUTE NJ 31 OVER WILLOUGHBY BROOK	1	3	Minor Scour
31	2111151	RT 31 OVER POHATCONG CREEK	2	3	
31	2111155	NJ RT 31 OVER PEQUEST RIVER	2	3	
33	1304151	OLD ROAD(NJ 33) OVER MILLSTONE RIVER	3	3	Debris on Bridge Seats
33	1304156	ROUTE 33 OVER MANALAPAN BROOK	1	3	Heavy Sedimentation
34	1308154	N.J.ROUTE 34 OVER BIG BROOK	2	3	Minor Scour
35	1222150	ROUTE 35/CHEESEQUAKE CREEK & RAMP	1	3	Minor Scour
36	1315157	NJ 36 OVER FLAT CREEK	3	3	Restricted Flow
38	0408160	MILL ROAD/SO BR PENNSAUKEN CREEK	3	3	Restricted Flow
40	1703152	U.S.RTE 40 OVER BRANCH SALEM CRK.	3	3	Minor Scour
45	0807152	RT45 OVER RACCOON CREEK	3	3	Minor Scour
45	0808151	ROUTE 45 OVER EDWARDS RUN	3	3	Minor Scour
45	0810150	RT 45 OVER WOODBURY CREEK	3	3	
45	1705150	NJ RT 45 & US RT 40/SALEM RIVER	1	3	
46	0220157	U.S.ROUTE 46 OVER SADDLE RIVER	2	3	Heavy Scour
46	0722157	US ROUTE 46 EB OVER PASSAIC RIVER	1	3	Debris on Bridge Seats
46	0722158	U.S. ROUTE 46 WB /PASSAIC RIVER	2	3	Minor Sedimentation
46	1407152	ROUTE US 46 WB OVER MINE BROOK	2	3	Restricted Flow
46	1407153	RTE US 46EB OVER BRANCH MINE BRK.	1	3	Restricted Flow
46	1407156	US 46 OVER SOUTH BR RARITAN RIVER	2	3	Restricted Flow
46	1409154	US ROUTE 46 OVER GRANNEYS BROOK	2	3	Minor Scour
46	1410159	ROUTE 46 OVER PASSAIC RIVER	2	3	Minor Scour
46	2107154	US 46 WB OVER BEAVER BROOK	---	3	
46	2107155	US 46 EB OVER BEAVER BROOK	2	3	
46	2107156	US ROUTE 46 OVER PAULINS KILL	1	3	Minor Scour
46	2108162	RTE US 46 OVER MUSCONETCONG RIVER	3	3	Restricted Flow
47	0601150	RT 47 OVER MUSKEE CREEK	3	3	
47	0601151	N.J.ROUTE 47 OVER MANUMUSKIN RIV.	3	3	Restricted Flow
47	0815152	NJ 47 OVER BIG TIMBER CREEK	3	3	Minor Scour
49	0509150	RT 49 OVER MILL CREEK	1	3	Inadequate Waterway Opening
49	0606150	NJ RT 49 OVER MANANTICO CREEK	1	3	Heavy Scour/Undermining
50	0510152	ROUTE 50 OVER TUCKAHOE RIVER	3	3	Minor Scour
53	1411152	RT 53 OVER DEN BROOK	4	3	Minor Scour
55	0609151	ROUTE 55 NB OVER MANANTICO CREEK	3	3	Minor Undermining
55	0609152	RT 55 SB OVER MANANTICO CREEK	3	3	
56	1716151	NJ ROUTE 56 OVER MAURICE RIVER	3	3	Minor Scour
57	2105164	RT 57 OVER POHATCONG CREEK	2	3	Minor Scour
57	2106164	NJ 57 OVER HANCES BROOK	2	3	Restricted Flow
71	1320152	ROUTE 71 OVER WRECK POND	3	3	
71	1321150	ROUTE 71 OVER SHARK RIVER	1	3	Minor Scour
78	1015157	I-78EB SERV.RD / MULHOCKAWAY CREEK	2	3	Heavy Scour
78	1016156	I-78 EB OVER SO BR. RARITAN RIVER	---	3	Restricted Flow
78	1016157	I-78 WB OVER SO BR. RARITAN RIVER	2	3	Restricted Flow
78	2113160	I78WB/ASBURY RD(CR632)&MUSCONETCONG R	4	3	Heavy Scour/Undermining
80	0225166	I-80/MRKT.MAIN,FAIRVIEW STS.&SADL RIV	1	3	
80	1413155	RAMP C OVER BURNT MEADOW BROOK	2	3	Restricted Flow
82	2012150	NJ ROUTE 82 OVER RAHWAY RIVER	3	3	Inadequate Waterway Opening
87	0115150	RT.87/ABSECON INLET&RAMPS J&H	4	3	Minor Scour
94	1923150	NJ RT.94 OVER WALLKILL RIVER	2	3	Minor Scour
94	2117157	NJ 94 OVER JACKSONBURG CREEK	1	3	Heavy Scour
94	2117159	NJ ROUTE 94 OVER BLAIR CREEK.	1	3	Heavy Scour
94	2117160	ROUTE 94 OVER PAULINS KILL	1	3	Minor Scour
130	0316150	RT US 130 OVER POMPESTON CREEK	1	3	Minor Scour

SCOUR CRITICAL STATE WATCH LIST BRIDGES

Table I-1

Rte	Number	Name	Phase	Item 113	Channel Findings
130	0317150	US 130 NB OVER ASSISCUNK CREEK	---	3	
130	0317152	US 130 SB OVER ASSISCUNK CREEK	3	3	Minor Scour
130	0319152	US RT. 130 OVER CROSSWICKS CREEK	4	3	Minor Scour
130	0817150	US RT 130 OVER BIG BIRCH CREEK	3	3	
130	0817151	RT US 130 OVER RACCOON CREEK	1	3	Restricted Flow
130	0818151	RT US 130 /BIG TIMBER CREEK	3	3	Minor Scour
130	1122150	US 130 OVER DOCTORS CREEK	2	3	Restricted Flow
130	1123152	US ROUTE 130 OVER ROCKY BROOK	2	3	Minor Scour
130	1123153	RT 130 OVER MILLSTONE RIVER	1	3	Minor Sedimentation
130	1227159	US 130 OVER OAKEYS BROOK	1	3	
154	0424151	RT 154 OVER NO BR COOPER RIVER	3	3	Minor Scour
166	1516151	RT NJ166 OVER S.CHANNEL OF TOMS RIVER	3	3	
166	1516152	RT NJ 166 OVER NO. CHANNEL OF TOMS R.	1	3	Heavy Scour
173	2103152	RT 173 OVER POHATCONG CREEK	2	3	Minor Sedimentation
173	2103153	NJ 173 OVER MUSCONETCONG RIVER	2	3	Debris on Bridge Seats
202	1416152	US 202 OVER WHIPPANY RIVER	4	3	Minor Scour
202	1807155	US 202 OVER N BR RARITAN RIVER	2	3	Heavy Sedimentation
202	1809150	US202 OVER N BR RARITAN RIVER	4	3	Restricted Flow
202	1809153	RT 202 OVER BR MINE BROOK	1	3	
202	1809158	US RT 202 OVER PASSAIC RIVER	1	3	Heavy Scour
206	0118150	US 206 OVER CEDAR BRANCH	1	3	Restricted Flow
206	0118152	US 206 OVER GREAT SWAMP BRANCH	1	3	Minor Scour
206	0118153	RT 206 OVER ALBERTSONS BROOK	1	3	
206	0324152	U.S ROUTE 206 OVER SPRINGERS BROOK	3	3	Restricted Flow
206	0324153	US 206 OVER MUSKINGUM CREEK	3	3	Heavy Sedimentation
206	0324155	US 206 OVER SO BR OF RANCOCAS CREEK	3	3	Minor Scour
206	0324156	ROUTE US 206 OVER JADE RUN	4	3	Heavy Scour
206	0324160	US RT 206 OVER BARKERS CREEK	1	3	Minor Sedimentation
206	0324162	US206 OVER ASSISCUNK CREEK	1	3	Heavy Sedimentation
206	0326152	US 206 NB OVER CROSSWICKS CREEK	3	3	Minor Scour
206	0326153	US206 SB OVER CROSSWICKS CREEK	3	3	Minor Scour
206	1417156	RT 206/SOUTH BR OF RARITAN RIVER	1	3	Heavy Scour/Undermining
206	1417157	US 206 OVER TRIB TO DRAKES BROOK	1	3	Minor Scour
206	1417159	US RT 206/S BRANCH RARITAN RIVER	2	3	Minor Scour
206	1810153	US 206 OVER BACK BROOK	2	3	
206	1810155	RT US 206 OVER CRUSERS BROOK	3	3	Restricted Flow
206	1810158	ROUTE US 206 OVER PIKE RUN	2	3	Debris on Bridge Seats
206	1810164	US206 OVER BR OF ROYCES BROOK	4	3	Heavy Scour
206	1810165	US206 OVER BR OF ROYCES BROOK	4	3	Minor Scour
206	1911151	US206 OVER LUBBERS RUN	2	3	Minor Scour
206	1911159	US206 OVER PEQUEST RIVER	2	3	Restricted Flow
206	1912158	US ROUTE 206 OVER KITTATINY BROOK	1	3	Heavy Scour
206	1912160	US 206 OVER BIG FLAT BROOK	1	3	Minor Scour
208	1612154	ROUTE 208 RAMP A OVER GOFFLE BROOK	2	3	Heavy Sedimentation
280	1418154	RT.I-280 EB OVER PASSAIC RIVER	2	3	
284	1907152	NJ RT284/BR OF WALLKILL RIVER	2	3	Restricted Flow
284	1907157	NJ 284 OVER BR OF WALLKILL RIVER	2	3	Heavy Sedimentation
322	0119151	US 322 OVER HOSPITALITY BROOK	2	3	Minor Scour
322	0119156	US 322 OVER BIG DITCH	2	3	Restricted Flow
322	0825150	US 322 OVER RACCOON CREEK	3	3	Heavy Scour
322	0826150	US ROUTE 322 OVER SCOTLAND RUN	1	3	Minor Sedimentation

II

SCOUR COUNTERMEASURES AND CONSTRUCTION COSTS

II. SCOUR COUNTERMEASURES AND CONSTRUCTION COSTS

A. TYPES OF COUNTERMEASURES

Scour countermeasures are defined by HEC-18 as "those features incorporated after the initial construction of a bridge to make it less vulnerable to damage or failure by scour." In general, the countermeasure approach typically used is to provide some form of revetment adjacent to the substructure elements, or often, over the full width of the waterway opening. This rigid, or flexible, armoring layer is used to inhibit the scour/erosion of the finer soil materials that comprise the channel bed. If designed in accordance with HEC-23, this revetment can protect the bridge from most flow conditions. In other cases, however, this approach may be used to provide a temporary measure of protection and other longer-term (and more costly) solutions may be required to eliminate the bridge's vulnerability to scour. In addition, the specific nature of the scour problem at each individual bridge needs to be addressed. Sometimes the size of the opening may not be adequate, or lateral stability of the waterway may be a controlling issue. These considerations, as well as any recommended monitoring, will need to be evaluated and defined in the design process as part of the individual remediation plan for each structure.

The types of countermeasures typically recommended for the protection of the individual substructure elements of a bridge include:

- Stone Riprap
- Rock-and-Wire (Gabion) Mattress
- Concrete Slabs

In addition to these traditional forms of revetment materials, articulated concrete block has also recently become a material that can be used in some situations. It typically will have a thinner profile than stone riprap and may be easier to construct than a gabion mattress. Environmental implications of any of these options as well as site constraints will be important in determining the countermeasure ultimately chosen.

Some information on the more traditional forms of these countermeasure types follows:

1. Stone Riprap

The FHWA's HEC-20 titled "Stream Stability at Highway Structures", provides the following discussion on stone riprap:

"Dumped rock riprap is the most widely used revetment in the United States. Its effectiveness has been well established where it is of adequate size, of suitable size gradation, and properly installed."

The main advantage to using stone riprap is that, where it is available in sufficient size, it is usually the most economical form of protection. Another advantage is that since the blanket is flexible, it is neither impaired nor weakened by slight

movements due to settlement or other minor adjustments. In addition, localized damage or loss of the revetment is easily repaired by the placement of more rock. Construction of this countermeasure is not complicated and no special equipment or specialized training is required.

The disadvantages in its use will often be related to economics when a large stone size and deep layer are required due to a high channel velocity. This deep layer will require extensive excavation of the channel, since the top level of the riprap, for permit and inspection reasons, typically needs to be at either the same elevation or below the surface of the streambed. In addition, due to the magnitude of the flow turbulence and velocities around a pier, the FHWA recommends in HEC-18 that the riprap layer at a pier be monitored for stability after each high-flow event.

2. Rock-and-Wire (Gabion) Mattress

A rock-and-wire (or gabion) mattress is another flexible type of revetment that is often utilized as a scour countermeasure. It is comprised of cobble-size rocks placed in wire mesh mats or baskets made of galvanized fencing, and tied together to form a mattress. Their flexibility also allows them to respond to soil movements without significant structural problems.

They can be an economical solution in many cases since they can resist fairly significant channel velocities, but only require the use of relatively small size stones. In addition, they are typically one foot, or less, in depth which helps minimize the amount of channel excavation. They also have the advantage of being permeable, which permits the natural movement of groundwater and helps promote siltation and the growth of native plants. These features often make this countermeasure a more environmentally acceptable solution in trout-associated waters particularly when covered with a layer of native streambed material.

A potential disadvantage of this countermeasure is that localized failures of the wire mesh have been observed, particularly due to corrosion of the metal, or in some cases, due to abrasion especially in streams that naturally transport cobble and rocks. The mattresses are usually most cost effective in smaller width channels. In addition, there is little literature to show their performance when launched or constructed for use in deep water.

3. Concrete Slab

The use of a concrete slab is a more rigid countermeasure that may be required when channel velocities become significant. This approach is usually only economical for short-span structures over narrow streams and will result in a concrete box culvert type configuration. Similar to a box culvert, scour will tend to occur at the downstream outlet and this condition needs to be addressed to

prevent erosion, undermining, and possibly, localized failures of the concrete slab. In many cases, this countermeasure may present additional environmental permitting concerns for fish passage particularly in trout-associated streams. It will normally be necessary to bury the slab under the streambed materials.

4. Others

At some bridges, none of the previously discussed items will be an acceptable, or economical, countermeasure solution. In these cases, it may be necessary to reconstruct, or lengthen the structure or underpin the existing substructure units. Until these countermeasures are constructed, installation of monitoring devices, combined with provisions for closure during periods of extensive scour, may be warranted. Decisions related to these types of countermeasures will be based upon a site-specific evaluation of the bridge.

B. CONSTRUCTION COSTS

To help plan for the long term installation of scour countermeasures, realistic estimates are required for the individual scour critical bridges. While the individual in-depth scour reports provided estimated costs for each bridge, there were some discrepancies in these values. This appeared to be a result of differences in the unit cost values used, as well as the inclusion of various items, such as excavation, in some, but not all, of the estimates prepared by the various consultants. In addition, the estimates appeared to be lower than what was found when contracts were put out to bid for countermeasure installation.

The countermeasures recommended in the consultant's reports were reviewed and it was determined that the variations of the types of scour countermeasures discussed above appeared most often. These variations include:

- **Stone Riprap**
  - 24 inches deep with a D_{50} of 1.2 feet
  - 36 inches deep with a D_{50} of 1.8 feet

- **Rock-and-Wire Mattress**
  - 9-inch deep Gabions
  - 12-inch deep Gabions

- **Concrete Slab**

To determine a realistic estimate for the installation of the countermeasures, a methodology is required to utilize the limited data available at each bridge (countermeasure type and area) and determine a total cost of the installation. Unit prices for the individual countermeasure elements were identified, where available, from the Department's "Bid Price Report for Standard Items". However, in evaluating the estimated total construction cost from a recent contract for the installation of scour

countermeasures (Contract 2005-1), it became clear that the use of a cubic yard cost for the countermeasures materials is not representative of the total cost required for their installation. The evaluation made of this contract is based upon the total costs for the individual bridges and all costs are only for the installation of the countermeasures. These costs were taken from the Department's CPS Estimate of the contract. Although the low bid for this contract was less than the CPS estimate, the estimate was roughly in middle of the bids received. See Appendix D for the bid values, the CPS Estimate and the Bid Tabulation Sheet for this Contract). It was therefore determined to be a reasonably conservative estimate for the countermeasure construction. For example, the countermeasure materials in this contract estimate were an average of $692/CY (See Table II-2) yet the total cost on a CY basis varies from $1,086 to $4,127. This is due to items such as access to the site as well as dewatering and cofferdams, which can add significantly to the total cost, but are not necessarily representative of the cost on a cubic yard basis. These costs are for the construction cost only and do not include engineering, construction inspection or right-of-way acquisition, which can add to the total cost.

ANALYSIS OF ESTIMATED COSTS FROM CONTRACT 2005-1
Table II-1

Individual Bridge Totals	Estimated Cost	Percent	New Total	CY of Gabions	Estimated Cost/CY
Struct. No. 1413-174	$684,845	48%	$808,749	745	$1,086
Struct. No. 1419-151	$248,374	18%	$293,310	217	$1,352
Struct. No. 1308-153	$169,634	12%	$200,325	86	$2,329
Struct. No. 1310-155	$157,789	11%	$186,337	56	$3,327
Struct. No. 1317-150	$153,764	11%	$181,583	44	$4,127
Subtotal 1	$1,414,406	100%	$1,670,304	1,148	$1,456
Roadway	$210,848				
Construction Engg	$45,050				
Subtotal 2	$255,898				
TOTAL	$1,670,304				

From the data in Table II-1, it became obvious that the total cost of the countermeasure installation will vary greatly on a bridge-by-bridge basis and the use of a typical cost/CY could over or under estimate the cost of any individual bridge. It appeared that the cost/CY may be proportional to the volume of the countermeasure required. It was then decided to evaluate the estimated cost of the countermeasure material to determine if there was a relationship that could be used for the estimation process. In Table II-2, the estimated cost of the countermeasure material was removed from the total cost of the installation. The remaining cost is reasonably consistent at four of the five bridges in the contract. In reviewing the contract documents for the fifth bridge (Structure No. 1413-174) it was determined that there were extenuating circumstances related to construction

access that played a role in its higher estimated cost. The non-gabion cost for the four bridges has an average value of approximately $150,000 and is reasonably consistent.

BREAKDOWN OF CONSTRUCTION COSTS
CONTRACT 2005-1
Table II-2

Individual Bridge Totals	Estimated Cost	CY of Gabions	Cost of Gabions	Other Costs
Struct. No. 1413-174	$808,749	745	$528,950	$279,799
Struct. No. 1419-151	$293,310	217	$151,900	$141,410
Struct. No. 1308-153	$200,325	86	$52,460	$147,865
Struct. No. 1310-155	$186,337	56	$34,160	$152,177
Struct. No. 1317-150	$181,583	44	$26,840	$154,743
Total	$1,670,304	1,148	$794,310	$875,994
Average	$334,061	230	$692/CY	$175,199

It was therefore determined that a more realistic estimate of the construction cost could be determined by using an initial cost of $150,000 at each bridge and adding to it the cost of the countermeasure materials. This approach is based upon a limited sample of data and is sufficient to determine an approximate total construction cost required for the entire program. Better estimates on an individual bridge basis can be obtained as the countermeasures go into the design process. At that time the need for right-of-way or utility relocation will be determined and their approximate cost as well as any other bridge specific costs that may be required.

The unit construction costs calculated for the typically recommended countermeasure materials were also developed using the NJDOT's Bid Price Report and other estimating materials and are as follows:

- **Stone Riprap** **$300/CY**
- **Rock-and-Wire Mattress** **$700/CY**
- **Concrete Slab** **$ 900/CY**

C. INDIVIDUAL BRIDGE AND TOTAL COSTS

The unit prices, and approach determined in the prior section, were combined with the estimated area and conceptual type of countermeasure determined by the Consultant as part of the Stage II Evaluation. Table II-3, located toward the end of this section, provides a summary of the preliminary construction cost for 158 of the 170 State owned scour critical bridges. The remaining 12 structures were not included since they are

either currently being replaced or are anticipated to be under construction in the near future in accordance with the Statewide Transportation Improvement Program.

In evaluating the cost of the recommended scour countermeasures, it is important to remember that actual site conditions can have a significant impact on the actual cost estimate for a particular bridge. As noted earlier, access to the site can have a significant impact on the cost of the in-place countermeasures. The values included in the table are based upon an initial conceptual evaluation, and the differences in the amounts on an overall basis may be more accurate than those determined for any individual bridge. In addition, the individual bridge cost estimates could change depending upon the type and extent of countermeasures determined during final design. In addition, right-of-way acquisition may also be necessary and would impact the cost.

In addition to the costs for the individual bridges, Table II-4 provides an estimate of the total estimated cost for the construction of countermeasures at the 158 bridges, as well as individual total costs by State Maintenance Region. A breakdown of the bridge costs by State Maintenance Region is included in Appendix E.

COUNTERMEASURE CONSTRUCTION COSTS
Table II-4

Bridge Location	Total Number of Bridges	Total Construction Cost (Thousands)	Average Cost Per Bridge (Thousands)
Northern Region	78	$22,165	$284
Central Region	43	$14,613	$340
Southern Region	37	$10,241	$277
Totals	**158**	***$47,019***	***$298***

D. IMPLEMENTATION OF COUNTERMEASURES

New Jersey has initiated work on the implementation of countermeasures at their scour critical bridges. To date, two contracts have been completion of the remediation of eight bridges. Countermeasures were installed at two other structures as part of other rehabilitation efforts. As noted earlier, other bridges have been eliminated from the scour critical list due to their ongoing reconstruction as part of the efforts of the Department's bridge program. The two remediation contracts have been used to help identify some of the environmental and constructability issues related to countermeasure installation. Two

of the major hurdles to the process have been the acquisition of environmental permits and the necessity of right-of-way or easement acquisition. Since the countermeasures will typically need to extend beyond the bridge limits, right-of-way acquisition is required in locations where the existing property line is at the edge of the parapet. Temporary easements are more typical to allow construction access to the streambed during construction. Environmental permit issues have been related to concerns with reducing disturbance to the stream during construction activities and the passage of fish both on a short term and long range perspective. The environmental concerns have been a particularly critical issue at streams that are associated with trout.

The Department has in-place contracts with four consulting firms to develop contract documents for the remediation of scour critical bridges. In addition to developing contract documents for their remediation these efforts have also led to eliminating a number of bridges based upon a more detailed look at the long-term scour conditions at the site.

Table II-5, located at the end of this section, provides a list of the scour critical bridges with their current Capital Program Status. In general the bridges will be coded for the installation of scour countermeasures or in some cases reconstruction.

BRIDGE SCOUR EVALUTAION PROGRAM
STAGE II - STATE BRIDGES

CONSTRUCTION COSTS FOR SCOUR COUNTERMEASURES
TABLE II-3

Route No.	Structure No.	Structure Name	Construction Cost Information					NJDOT Maintenance Region
			Recommended Countermeasure Type	Req'd Thk (FT)	Req'd Area (SY)	Req'd Volume (CY)	Estimated Construction Cost	
1B	1102150	US ROUTE 1B OVER SHABAKUNK CREEK	Gabion Mattress	1	1,563	521	$514.7	Central
1&9	0201151	RT 1&9 OVER WOLF CREEK	Stone Riprap	2	575	383	$265.0	North
3	1601157	RT 3 OVER THIRD RIVER	Stone Riprap	3	625	625	$337.6	North
3	1601160	RT 3 OVER UPPER POND SPILLWAY	Stone Riprap	3	1,230	1,230	$519.0	North
4	0206166	RT 4 OVER HACKENSACK RIVER & ROAD	Stone Riprap	2	5,192	3,461	$1,188.4	North
4	0206181	RT 4 OVER FLAT ROCK BROOK	Concrete Slab	0.67	258	58	$201.9	North
4	0206189	KINDERKAMACK RD OVER COLES BROOK	Gabion Mattress	1	348	116	$254.4	North
9	1303155	RT 9 OVER MILFORD BROOK	Gabion Mattress	1	380	127	$238.7	Central
9	1502153	RT 9 OVER OYSTER CREEK	Stone Riprap	2	412	275	$232.4	Central
9	1502154	US 9 OVER S. BRANCH OF FORKED RIVER	Stone Riprap	2	100	67	$170.0	Central
9	1502157	RT 9 OVER CEDAR CREEK	Stone Riprap	2	400	267	$230.0	Central
10	0709150	RT 10 OVER WILLOW MEADOW BROOK	Gabion Mattress	0.75	602	151	$255.4	North
10	0711150	RT 10 OVER CANOE BROOK	Concrete Slab	0.67	226	50	$195.4	North
10	1401156	RT 10 OVER MILL BROOK	Gabion Mattress	0.75	486	122	$235.1	North
10	1402150	RT 10 OVER MALAPARDIS BROOK	Gabion Mattress	1	402	134	$243.9	North
15	1403150	RT 15/BURNT MEADOW (GRN PD) BROOK	Gabion Mattress	1	496	165	$265.8	North
15	1404155	GOVERNMENT RD OVER GREEN POND BROOK	Gabion Mattress	1	322	107	$225.2	North
15	1404158	RT 15 SB OVER ROCKAWAY CREEK	Stone Riprap	3	471	471	$291.3	North
15	1404159	RT 15 RAMP A OVER HURDTOWN BROOK	Gabion Mattress	0.75	156	39	$177.3	North
15	1424150	NJ 15 NB OVER LAKE SHAWNEE	Gabion Mattress	0.75	269	67	$197.1	North
15	1922150	RT 15 OVER BEAVER RUN	Stone Riprap	2	200	133	$190.0	North
15	1922151	RT 15 OVER PAULINS KILL	Gabion Mattress	1	373	124	$237.1	North
17	0216150	RT 17 OVER SPROUT BROOK	Stone Riprap	3	296	296	$238.8	North
17	0216157	RT 17 OVER SADDLE RIVER	Concrete Slab	0.67	1,271	284	$405.5	North
17	0218161	RT 17 NB OVER RT 202 & RAMAPO RIVER	Stone Riprap	3	1,804	1,804	$691.2	North
17	0218162	RT 17 SB/RT 202 & RAMAPO RIVER	Stone Riprap	3	751	751	$375.4	North
21	0716156	MAIN ST OVER SECOND RIVER	Gabion Mattress	1	470	157	$259.7	North
22	1005153	RT 22 OVER BR ROCKAWAY CREEK	Gabion Mattress	1	192	64	$194.8	Central
22	1005162	RT 22 EB OVER S BR ROCKAWAY CREEK	Gabion Mattress	1	180	60	$192.0	Central
22	1005163	RT 22 WB OVER S BR ROCKAWAY CREEK	Gabion Mattress	1	106	35	$174.7	Central
22	1801153	RT 22 EB OVER N BR RARITAN RIVER	Gabion Mattress	1	1,017	339	$387.4	Central

BRIDGE SCOUR EVALUTAION PROGRAM
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CONSTRUCTION COSTS FOR SCOUR COUNTERMEASURES
TABLE II-3

Route No.	Structure No.	Structure Name	Construction Cost Information					NJDOT Maintenance Region
			Recommended Countermeasure Type	Req'd Thk (FT)	Req'd Area (SY)	Req'd Volume (CY)	Estimated Construction Cost	
22	1801154	RT 22 WB OVER N BR RARITAN RIVER	Gabion Mattress	1	1,017	339	$387.3	Central
22	1803156	RT 22 OVER STONY BROOK	Gabion Mattress	1	560	187	$280.6	Central
22	2003157	RT 22 OVER ECHO LAKE	Stone Riprap	3	439	439	$281.7	North
22	2003161	RT 22 EB OVER RAHWAY RIVER	Gabion Mattress	0.75	681	170	$269.2	North
22	2003162	US 22 WB OVER RAHWAY RIVER	Gabion Mattress	0.75	133	33	$173.3	North
22	2004151	RT 22 OVER ELIZABETH RIVER	Stone Riprap	3	344	344	$253.3	North
22	2102154	RT 22 OVER LOPATCONG CREEK	Stone Riprap	2	696	464	$289.2	North
23	0719151	RT 23 OVER PECKMANS BROOK	Stone Riprap	2	828	552	$315.5	North
23	1405156	RT 23/PEQUANNOCK RV HAMBURG TPK RR	Stone Riprap	3	919	919	$425.7	North
23	1604150	RT 23 OVER PASSAIC RIVER	Stone Riprap	3	445	445	$283.5	North
23	1605153	RT 23 SB OVER PEQUANNOCK RIVER	Gabion Mattress	0.75	965	241	$318.9	North
23	1605156	RT 23 SB OVER PEQUANNOCK RIVER	Gabion Mattress	1	1,921	640	$598.3	North
23	1605158	RT 23 NB OVER MACOPIN RIVER	Gabion Mattress	1	540	180	$275.9	North
23	1605162	RT 23 SB OVER PEQUANNOCK RIVER	Gabion Mattress	0.75	742	186	$279.9	North
23	1605167	RT 23 SB OVER PEQUANNOCK RIVER	Gabion Mattress	0.75	172	43	$180.1	North
23	1605175	RT 23 NB OVER PEQUANNOCK RIVER	Stone Riprap	2	252	168	$200.4	North
23	1619151	RT 23 OVER POMPTON RIVER & WATER SUPPLY	Stone Riprap	2	1,576	1,051	$465.2	North
23	1903152	23/BR OF PACOCK BRK & DEL-OSTEGO R.R.	Stone Riprap	3	43	43	$162.9	North
23	1903153	RT 23 OVER BR FRANKLIN LAKE	Stone Riprap	3	84	84	$175.1	North
23	1904152	RT 23 OVER WALKILL RIVER	Gabion Mattress	0.75	465	116	$231.4	North
23	1904153	RT 23 OVER BR WALKILL RIVER	Gabion Mattress	0.75	109	27	$169.1	North
23	1905151	RT 23 OVER BR CLOVE RIVER	Gabion Mattress	1	156	52	$186.3	North
27	1105152	RT 27 OVER MILLSTONE RIVER	Stone Riprap	2	1,211	807	$392.1	Central
27	1218158	RT 27 OVER S BR RAHWAY RIVER	Stone Riprap	2	246	164	$199.2	Central
27	2006151	RT 27 OVER ROBINSON BRANCH	Stone Riprap	3	633	633	$339.9	North
27	2006152	RT 27 OVER RAHWAY RIVER	Gabion Mattress	0.75	965	241	$318.9	North
29	1006151	RT 29 OVER SWAN CREEK	Stone Riprap	3	253	253	$225.9	Central
29	1009150	RT 29 OVER COPPER CREEK	Stone Riprap	3	517	517	$305.1	Central
29	1110158	RT 29 OVER MOORES CREEK	Concrete Slab	0.67	774	173	$305.6	Central
30	0405153	RT 30 & 130 OVER COOPER RIVER	Gabion Mattress	1	975	325	$377.5	South
31	1013152	RT 31 OVER WILLOUGHBY BROOK	Gabion Mattress	0.75	253	63	$194.3	Central
31	2111151	RT 31 OVER POHATCONG CREEK	Gabion Mattress	1	378	126	$238.3	North

BRIDGE SCOUR EVALUTAION PROGRAM
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CONSTRUCTION COSTS FOR SCOUR COUNTERMEASURES
TABLE II-3

Route No.	Structure No.	Structure Name	Construction Cost Information					NJDOT Maintenance Region
			Recommended Countermeasure Type	Req'd Thk (FT)	Req'd Area (SY)	Req'd Volume (CY)	Estimated Construction Cost	
31	2111155	RT 31 OVER PEQUEST RIVER & RR	Stone Riprap	3	297	297	$239.1	North
33	1304151	RT 33 OVER MILLSTONE RIVER	Gabion Mattress	1	453	151	$255.7	Central
33	1304156	RT 33 OVER BR MANALAPAN BROOK	Gabion Mattress	0.75	502	126	$237.9	Central
34	1308154	RT 34 OVER BIG BROOK	Gabion Mattress	0.75	417	104	$223.0	Central
35	1222150	RT 35 OVER CHEESEQUAKE CREEK	Stone Riprap	3	3,867	3,867	$1,310.0	Central
38	0408160	MILLROAD/ S BR PENNSAUKEN CREEK	Gabion Mattress	1	113	38	$176.4	South
40	1703152	RT 40 OVER BR SALEM CREEK	Stone Riprap	2	97	65	$169.4	South
45	0807152	RT 45 OVER RACCOON CREEK	Gabion Mattress	1	72	24	$166.8	South
45	0808151	RT 45 OVER EDWARDS RUN	Gabion Mattress	1	72	24	$166.8	South
45	0810150	RT 45 OVER WOODBURY CREEK	Gabion Mattress	1	240	80	$206.0	South
45	1705150	RTS 45 & 40 OVER SALEM RIVER	Stone Riprap	3	501	501	$300.3	South
46	0722157	RT 46 EB OVER PASSAIC RIVER	Stone Riprap	3	994	994	$448.2	North
46	0722158	RT 46 WB OVER PASSAIC RIVER	Stone Riprap	2	1,087	725	$367.4	North
46	1407152	RT 46 WB OVER MINE BROOK	Stone Riprap	3	242	242	$222.6	North
46	1407153	RT 46 EB OVER BR MINE BROOK	Gabion Mattress	1	233	78	$204.4	North
46	1407156	RT 46 OVER S BR RARITAN RIVER	Stone Riprap	2	271	180	$204.1	North
46	1409154	RT 46 OVER GRANNEYS BROOK	Stone Riprap	2	514	343	$252.9	North
46	1410159	RT 46 OVER PASSAIC RIVER	Stone Riprap	2	2,293	1,529	$608.7	North
46	2107154	US 46 WB OVER BEAVER BROOK	Stone Riprap	2	180	120	$186.0	North
46	2107155	RT 46 EB OVER BEAVER BROOK	Stone Riprap	2	286	191	$207.2	North
46	2107156	RT 46 OVER PAULINS KILL	Gabion Mattress	1	2,200	733	$663.3	North
46	2108162	RT 46 OVER MUSCONETCONG RIVER	Stone Riprap	3	132	132	$189.6	North
47	0601150	RT 47 OVER MUSKEE CREEK	Stone Riprap	3	192	192	$207.6	South
47	0601151	RT 47 OVER MANUMUSKIN RIVER	Stone Riprap	3	833	833	$399.9	South
47	0815152	RT 47 OVER BIG TIMBER CREEK	Stone Riprap	2	560	373	$262.0	South
49	0509150	RT 49 OVER MILL CREEK	Gabion Mattress	0.75	220	55	$188.5	South
49	0606150	RT 49 OVER MANANTICO CREEK	Gabion Mattress	1	220	73	$201.3	South
53	1411152	RT 53 OVER DEN BROOK	Gabion Mattress	0.75	315	79	$205.1	North
55	0609151	RT 55 NB OVER MANANTICO CREEK	Stone Riprap	2	214	143	$192.8	South
55	0609152	RT 55 SB OVER MANANTICO CREEK	Stone Riprap	2	214	143	$192.8	South
57	2105164	RT 57 OVER POHATCONG CREEK	Gabion Mattress	1	547	182	$277.6	North
57	2106164	RT 57 OVER HANCES BROOK	Gabion Mattress	1	100	33	$173.3	North

BRIDGE SCOUR EVALUTAION PROGRAM
STAGE II - STATE BRIDGES

CONSTRUCTION COSTS FOR SCOUR COUNTERMEASURES
TABLE II-3

Route No.	Structure No.	Structure Name	Construction Cost Information					NJDOT Maintenance Region
			Recommended Countermeasure Type	Req'd Thk (FT)	Req'd Area (SY)	Req'd Volume (CY)	Estimated Construction Cost	
71	1320152	RT 71 OVER WRECK POND	Stone Riprap	2	300	200	$210.0	Central
71	1321150	RT 71 OVER SHARK RIVER	Stone Riprap	3	7,360	7,360	$2,358.0	Central
78	1015157	I-78 EB SERV RD OVER MULHOCKAWAY CK	Gabion Mattress	0.75	244	61	$192.7	Central
78	1016156	I-78 EB OVER SO BR RARITAN RIVER	Stone Riprap	3	350	350	$255.0	Central
78	1016157	I-78 WB OVER SO BR RARITAN RIVER	Stone Riprap	3	514	514	$379.2	Central
78	2113160	I78WB/ASBURY RD(CR632)&MUSCONETCONG R	Stone Riprap	2	133	89	$251.6	Central
80	0225166	I-80 / MARKET ST MAIN ST & SADDLE RV	Stone Riprap	3	123	123	$186.9	North
80	1413155	RAMP C OVER BURNT MEADOW BROOK	Stone Riprap	2	185	123	$186.9	North
82	2012150	RT 82 OVER RAHWAY RIVER	Stone Riprap	3	378	378	$263.4	North
87	0115150	RT.87/ABSECON INLET&RAMPS J&H	Stone Riprap	2	1,889	1,259	$527.8	South
94	1923150	RT 94 OVER WALLKILL RIVER	Stone Riprap	2	204	136	$190.9	North
94	2117157	RT 94 OVER JACKSONBURG CREEK	Gabion Mattress	0.75	607	152	$256.2	North
94	2117159	RT 94 OVER BLAIR CREEK	Gabion Mattress	1	176	59	$191.1	North
94	2117160	RT 94 OVER PAULINS KILL	Gabion Mattress	0.75	919	230	$310.9	North
130	0316150	RT 130 OVER POMPESTON CREEK	Gabion Mattress	1	542	181	$276.5	South
130	0317150	US 130 NB OVER ASSISCUNK CREEK	Gabion Mattress	1	844	281	$346.9	South
130	0317152	RT 130 SB OVER ASSISCUNK CREEK	Gabion Mattress	1	1,652	551	$535.5	South
130	0319152	US RT. 130 OVER CROSSWICKS CREEK	Gabion Mattress	0.75	517	129	$240.5	South
130	0817150	RT 130 OVER BIG BIRCH CREEK	Gabion Mattress	1	290	97	$217.7	South
130	0817151	RT 130 OVER RACOON CREEK	Stone Riprap	3	1,067	1,067	$470.0	South
130	0818151	RT 130 OVER BIG TIMBER CREEK	Stone Riprap	2	1,419	946	$433.8	South
130	1122150	RT 130 OVER DOCTORS CREEK	Gabion Mattress	0.75	389	97	$218.1	Central
130	1123152	RT 130 OVER ROCKY BROOK	Gabion Mattress	0.75	433	108	$225.8	Central
130	1123153	RT 130 OVER MILLSTONE RIVER	Gabion Mattress	0.75	347	87	$210.7	Central
130	1227159	RT 130 OVER OAKEYS BROOK	Gabion Mattress	1	280	93	$215.3	Central
154	0424151	RT 154 OVER N BR COOPER RIVER	Gabion Mattress	1	185	62	$193.2	South
166	1516151	RT 166 OVER S CHANNEL TOMS RIVER	Gabion Mattress	1	2,375	792	$704.2	Central
166	1516152	RT 166/N CHANNEL TOMS RIVER	Gabion Mattress	0.75	480	120	$234.0	Central
173	2103152	RT 173 OVER POHATCONG CREEK	Gabion Mattress	1	400	133	$243.3	Central
173	2103153	RT 173 OVER MUSCONETCONG RIVER	Stone Riprap	2	656	437	$281.1	Central
202	1416152	US 202 OVER WHIPPANY RIVER	Gabion Mattress	0.75	424	106	$181.8	North
202	1807155	RT 202 OVER N BR RARITAN RIVER	Stone Riprap	3	2,238	2,238	$821.3	Central

BRIDGE SCOUR EVALUTAION PROGRAM
STAGE II - STATE BRIDGES

CONSTRUCTION COSTS FOR SCOUR COUNTERMEASURES
TABLE II-3

Route No.	Structure No.	Structure Name	Construction Cost Information					NJDOT Maintenance Region
			Recommended Countermeasure Type	Req'd Thk (FT)	Req'd Area (SY)	Req'd Volume (CY)	Estimated Construction Cost	
202	1809150	US202 OVER N BR RARITAN RIVER	Gabion Mattress	1	345	115	$184.5	Central
202	1809158	RT 202 OVER PASSAIC RIVER	Gabion Mattress	1	308	103	$221.9	Central
206	0118150	RT 206 OVER CEDAR BRANCH	Gabion Mattress	0.75	167	42	$179.2	South
206	0118152	RT 206 OVER GREAT SWAMP BRANCH	Gabion Mattress	0.75	200	50	$185.0	South
206	0118153	RT 206 OVER ALBERTSON BROOK	Gabion Mattress	0.75	245	61	$192.9	South
206	0324152	RT 206 OVER SPRINGERS BROOK	Stone Riprap	3	300	300	$240.0	South
206	0324153	RT 206 OVER MUSKINGUM CREEK	Stone Riprap	2	94	63	$168.8	South
206	0324155	RT 206 OVER S BR RANCOCAS CREEK	Stone Riprap	3	135	135	$190.5	South
206	0324156	ROUTE US 206 OVER JADE RUN	Gabion Mattress	0.75	201	50	$165.1	South
206	0324160	RT 206 OVER BARKERS CREEK	Gabion Mattress	0.75	360	90	$213.0	South
206	0326152	RT 206 NB OVER CROSSWICKS CREEK	Gabion Mattress	1	2,401	800	$710.2	South
206	0326153	RT 206 SB OVER CROSSWICKS CREEK	Gabion Mattress	1	2,433	811	$717.7	South
206	1417156	RT 206 OVER S BR RARITAN RIVER	Concrete Slab	0.67	97	22	$169.4	North
206	1417157	RT 206 OVER TRIB TO DRAKES BROOK	Gabion Mattress	0.75	111	28	$169.4	North
206	1417159	RT 206 OVER S BR RARITAN RIVER	Gabion Mattress	1	151	50	$185.3	North
206	1810153	RT 206 OVER BACK BROOK	Gabion Mattress	0.75	210	53	$186.8	Central
206	1810158	ROUTE US 206 OVER PIKE RUN	Gabion Mattress	0.75	280	70	$199.0	Central
206	1810164	US206 OVER BR OF ROYCES BROOK	Gabion Mattress	0.75	160	40	$178.0	Central
206	1810165	US206 OVER BR OF ROYCES BROOK	Gabion Mattress	0.75	232	58	$190.6	Central
206	1911151	RT 206 OVER LUBBERS RUN	Gabion Mattress	1	231	77	$203.9	North
206	1911159	RT 206 OVER PEQUEST RIVER	Stone Riprap	2	237	158	$197.4	North
206	1912158	RT 206 OVER BR BIG FLAT BROOK	Concrete Slab	0.67	131	29	$176.3	North
206	1912160	RT 206 OVER BIG FLAT BROOK	Gabion Mattress	0.75	358	89	$212.6	North
208	1612154	RT 208 RAMP A OVER GOFFLE BROOK	Stone Riprap	2	381	254	$226.2	North
280	1418154	I-280 EB OVER PASSAIC RIVER	Stone Riprap	2	1,059	706	$361.9	North
284	1907152	RT 284 OVER BR WALLKILL RIVER	Gabion Mattress	1	167	56	$189.1	North
284	1907157	RT 284 OVER BR WALLKILL RIVER	Gabion Mattress	0.75	136	34	$173.8	North
322	0119151	RT 322 OVER HOSPITALITY BROOK	Gabion Mattress	0.75	485	121	$234.9	South
322	0119156	RT 322 OVER BIG DITCH	Gabion Mattress	0.75	435	109	$226.1	South
322	0825150	RT 322 OVER RACCOON CREEK	Gabion Mattress	1	106	35	$174.7	South
322	0826150	RT 322 OVER SCOTLAND RUN	Gabion Mattress	0.75	247	62	$193.2	South

CURRENT PROGRAM STATUS

Of

SCOUR CRITICAL STATE WATCH LIST BRIDGES

Table II-5

Rte	Number	Name	Stage II	Phase	Countermeasures or Reconstruction	Program Status
1B	1102150	US 1B OVER SHABAKUNK CREEK	Yes	3	Countermeasures	Under Design (Earth Tech)
1+9	0201151	US 1&9(BROAD AVENUE) OVER WOLF CREEK	Yes	2	Countermeasures	*To be Determined*
3	1601157	NJ ROUTE 3 OVER THIRD RIVER	Yes	1	Countermeasures	Under Design (Arora)
3	1601160	NJ RT 3 OVER UPPER POND SPILLWAY	Yes	1	Countermeasures	Under Design (Arora)
4	0206166	NJ 4 / HACKENSACK RIVER & ACCESS ROAD	Yes	1	Countermeasures	Under Design (Arora)
4	0206181	NJ 4 OVER FLAT ROCK BROOK	Yes	3	Countermeasures	Under Design (Dewberry)
4	0206189	KINDERKAMACK RD OVER COLES BROOK	No	4	Countermeasures	*To be Determined*
9	1303155	US RT 9 OVER MILFORD BROOK	Yes	2	Countermeasures	Under Design (Earth Tech)
9	1502153	US 9 OVER OYSTER CREEK	Yes	3	Countermeasures	Under Design (Arora)
9	1502154	US 9 OVER S. BRANCH OF FORKED RIVER	No	---	Countermeasures	*To be Determined*
9	1502157	US 9 OVER CEDAR CREEK	Yes	2	Countermeasures	Under Design (Earth Tech)
10	0709150	RT 10 OVER WILLOW MEADOW BROOK	Yes	2	Countermeasures	Under Design (Dewberry)
10	0711150	NJ ROUTE 10 OVER CANOE BROOK	Yes	3	Countermeasures	Under Design (Dewberry)
10	1401156	RT 10 OVER MILL BROOK	Yes	2	Countermeasures	Under Design (Dewberry)
10	1402150	NJ ROUTE 10 OVER MALAPARDIS BROOK	Yes	2	Countermeasures	Under Design (Dewberry)
15	1403150	NJ RT 15 OVER BRNT MDW(GRN PD) BROOK	Yes	2	Countermeasures	Under Design (Dewberry)
15	1404155	GOVRNMNT RD(PARKER RD) WB/GREEN POND	Yes	1	Countermeasures	Under Design (Arora)
15	1404158	NJ ROUTE 15 SB / ROCKAWAY RIVER	Yes	3	Countermeasures	Under Design (Dewberry)
15	1404159	NJ RT 15 RAMP A OVER HURDTOWN BROOK	Yes	2	Countermeasures	Under Design (Arora)
15	1424150	NJ 15 NB OVER LAKE SHAWNEE	Yes	4	Countermeasures	*To be Determined*
15	1922150	NJ ROUTE 15 OVER BEAVER RUN	Yes	3	Countermeasures	Under Design (Dewberry)
15	1922151	NJ.RTE.15 OVER PAULINS KILL CREEK	Yes	2	Countermeasures	Under Design (Arora)
17	0216150	RT 17 OVER SPROUT BROOK	Yes	1	Countermeasures	Under Design (Arora)
17	0216157	NJ RT 17 OVER SADDLE RIVER.	Yes	2	Countermeasures	Under Design (Arora)
17	0218161	N.J 17 NB/US 202 & RAMAPO RIVER	Yes	1	Countermeasures	Under Design (Arora)
17	0218162	NJ RT 17 SB OVER US 202 & RAMAPO RVR	Yes	2	Countermeasures	Under Design (Arora)
21	0716156	MAIN ST OVER SECOND RIVER	Yes	1	Countermeasures	Under Design (Dewberry)
22	1005153	RT US 22 OVER BR ROCKAWAY CREEK	Yes	2	Countermeasures	Under Design (Earth Tech)
22	1005162	US 22 EB OVER S BR ROCKAWAY CREEK	Yes	1	Countermeasures	Under Design (Earth Tech)
22	1005163	RT US 22 WB OVER S BR ROCKAWAY CREEK	No	---	Countermeasures	*To be Determined*
22	1801153	US 22 EB OVER N BR RARITAN RIVER	Yes	1	Countermeasures	Under Design (Earth Tech)
22	1801154	US 22 WB OVER N BR RARITAN RIVER	Yes	1	Countermeasures	Under Design (Earth Tech)
22	1803156	RT US 22 OVER STONY BROOK	Yes	1	Countermeasures	Under Design (Earth Tech)
22	2003157	US22 OVER ECHO LAKE	Yes	1	Countermeasures	*To be Determined*
22	2003161	US 22 EB OVER RAHWAY RIVER	Yes	3	Countermeasures	Under Design (Dewberry)
22	2003162	US 22 WB OVER RAHWAY RIVER	Yes	4	Countermeasures	*To be Determined*
22	2004151	US 22 OVER ELIZABETH RIVER	Yes	1	Countermeasures	Under Design (Dewberry)
22	2102154	US 22 OVER LOPATCONG CREEK	Yes	2	Countermeasures	Under Design (Dewberry)
23	0719151	RT 23 OVER PECKMANS BROOK	Yes	2	Countermeasures	Under Design (Dewberry)
23	1405156	RT23/PEQUANNOCK R,HAMBURG TPK SB, RR	Yes	3	Countermeasures	Under Design (Dewberry)
23	1604150	ROUTE NJ 23/PASSAIC RIVER	Yes	3	Countermeasures	Under Design (Dewberry)
23	1605153	NJ RTE 23 SB OVER PEQUANNOCK RIV.	Yes	3	Countermeasures	Under Design (Dewberry)
23	1605156	NJ RT 23 SB OVER PEQUANNOCK RIVER	Yes	2	Countermeasures	Under Design (Arora)
23	1605158	NJ ROUTE 23 NB/MACOPIN RIVER	Yes	2	Countermeasures	Under Design (Arora)
23	1605162	RTE 23SB OVER PEQUANNOCK RV	Yes	3	Countermeasures	Under Design (Dewberry)
23	1605167	ROUTE 23 SB OVER PEQUANNOCK RIVER	Yes	2	Countermeasures	Under Design (Arora)
23	1605175	RT 23 NB OVER PEQUANNOCK RIVER	Yes	2	Countermeasures	Under Design (Arora)
23	1619151	N.J 23 OVER POMPTON RIVER	Yes	1	Countermeasures	Under Design (Arora)
23	1903152	23/BR OF PACOCK BRK & DEL-OSTEGO R.R.	Yes	4	Countermeasures	*To be Determined*
23	1903153	RT 23 OVER BRANCH OF FRANKLIN LAKE	Yes	2	Countermeasures	*To be Determined*
23	1904152	NJ 23 OVER WALLKILL RIVER	Yes	1	Countermeasures	Under Design (Arora)
23	1904153	NJ RT 23/ BR OF WALLKILL RIVER	Yes	1	Countermeasures	Under Design (Arora)
23	1905151	ROUTE NJ 23/BRANCH OF CLOVE RIVER	Yes	1	Countermeasures	Under Design (Arora)
27	1105152	RT NJ 27 OVER MILLSTONE RIVER	Yes	2	Countermeasures	Under Design (Earth Tech)
27	1218158	NJ RT 27 OVER S BRANCH RAHWAY RIVER	Yes	3	Countermeasures	Under Design (Earth Tech)
27	2006151	RT 27 OVER ROBINSON BRNCH RAHWAY RVR	Yes	3	Countermeasures	Under Design (Earth Tech)
27	2006152	NJ RT 27/RAHWAY RIVER.	Yes	3	Countermeasures	Under Design (Earth Tech)
29	1006151	ROUTE 29 OVER SWAN CREEK	Yes	3	Countermeasures	Under Design (Parsons)
29	1009150	ROUTE 29 OVER COPPER CREEK	Yes	3	Countermeasures	Under Design (Earth Tech)

CURRENT PROGRAM STATUS

Of

SCOUR CRITICAL STATE WATCH LIST BRIDGES

Table II-5

Rte	Number	Name	Stage II	Phase	Countermeasures or Reconstruction	Program Status
29	1110158	NJ 29 OVER MOORES CREEK	Yes	3	Countermeasures	Under Design (Earth Tech)
30	0405153	US RTS 30 & 130 OVER COOPER RIVER	Yes	3	Countermeasures	*To be Determined*
31	1013152	ROUTE NJ 31 OVER WILLOUGHBY BROOK	Yes	1	Countermeasures	Under Design (Earth Tech)
31	2111151	RT 31 OVER POHATCONG CREEK	Yes	2	Countermeasures	Under Design (Dewberry)
31	2111155	NJ RT 31 OVER PEQUEST RIVER	Yes	2	Countermeasures	Under Design (Dewberry)
33	1304151	OLD ROAD(NJ 33) OVER MILLSTONE RIVER	Yes	3	Countermeasures	Under Design (Arora)
33	1304156	ROUTE 33 OVER MANALAPAN BROOK	Yes	1	Countermeasures	Under Design (Earth Tech)
34	1308154	N.J.ROUTE 34 OVER BIG BROOK	Yes	2	Countermeasures	Under Design (Earth Tech)
35	1222150	ROUTE 35/CHEESEQUAKE CREEK & RAMP	Yes	1	Countermeasures	Under Design (Earth Tech)
36	1315157	NJ 36 OVER FLAT CREEK	Yes	3	Replacement	In STIP Construction in 2008
38	0408160	MILL ROAD/SO BR PENNSAUKEN CREEK	Yes	3	Countermeasures	Under Design (Arora)
40	1703152	U.S.RTE 40 OVER BRANCH SALEM CRK.	Yes	3	Countermeasures	Under Design (Parsons)
45	0807152	RT45 OVER RACCOON CREEK	Yes	3	Countermeasures	Under Design (Parsons)
45	0808151	ROUTE 45 OVER EDWARDS RUN	Yes	3	Countermeasures	Under Design (Parsons)
45	0810150	RT 45 OVER WOODBURY CREEK	Yes	3	Countermeasures	Under Design (Parsons)
45	1705150	NJ RT 45 & US RT 40/SALEM RIVER	Yes	1	Countermeasures	Under Design (Parsons)
46	0220157	U.S.ROUTE 46 OVER SADDLE RIVER	Yes	2	Replacement	In STIP Construction in 2008
46	0722157	US ROUTE 46 EB OVER PASSAIC RIVER	Yes	1	Countermeasures	*To be Determined*
46	0722158	U.S. ROUTE 46 WB /PASSAIC RIVER	Yes	2	Countermeasures	Continuum Dynamics
46	1407152	ROUTE US 46 WB OVER MINE BROOK	Yes	2	Countermeasures	Under Design (Dewberry)
46	1407153	RTE US 46EB OVER BRANCH MINE BRK.	Yes	1	Countermeasures	Under Design (Dewberry)
46	1407156	US 46 OVER SOUTH BR RARITAN RIVER	Yes	2	Countermeasures	*To be Determined*
46	1409154	US ROUTE 46 OVER GRANNEYS BROOK	Yes	2	Countermeasures	*To be Determined*
46	1410159	ROUTE 46 OVER PASSAIC RIVER	Yes	2	Countermeasures	Under Design (Dewberry)
46	2107154	US 46 WB OVER BEAVER BROOK	No	---	Countermeasures	*To be Determined*
46	2107155	US 46 EB OVER BEAVER BROOK	Yes	2	Countermeasures	*To be Determined*
46	2107156	US ROUTE 46 OVER PAULINS KILL	Yes	1	Countermeasures	Under Design (Dewberry)
46	2108162	RTE US 46 OVER MUSCONETCONG RIVER	Yes	3	Countermeasures	Under Design (Dewberry)
47	0601150	RT 47 OVER MUSKEE CREEK	Yes	3	Countermeasures	Under Design (Parsons)
47	0601151	N.J.ROUTE 47 OVER MANUMUSKIN RIV.	Yes	3	Countermeasures	Under Design (Parsons)
47	0815152	NJ 47 OVER BIG TIMBER CREEK	Yes	3	Countermeasures	Under Design (Arora)
49	0509150	RT 49 OVER MILL CREEK	Yes	1	Countermeasures	Under Design (Parsons)
49	0606150	NJ RT 49 OVER MANANTICO CREEK	Yes	1	Countermeasures	Under Design (Parsons)
50	0510152	ROUTE 50 OVER TUCKAHOE RIVER	Yes	3	Replacemet	In STIP Construction in 2008
53	1411152	RT 53 OVER DEN BROOK	Yes	4	Countermeasures	*To be Determined*
55	0609151	ROUTE 55 NB OVER MANANTICO CREEK	Yes	3	Countermeasures	Under Design (Parsons)
55	0609152	RT 55 SB OVER MANANTICO CREEK	Yes	3	Countermeasures	Under Design (Parsons)
56	1716151	NJ ROUTE 56 OVER MAURICE RIVER	Yes	3	Replacement	In STIP Construction in 2007
57	2105164	RT 57 OVER POHATCONG CREEK	Yes	2	Countermeasures	*To be Determined*
57	2106164	NJ 57 OVER HANCES BROOK	Yes	2	Countermeasures	Under Design (Dewberry)
71	1320152	ROUTE 71 OVER WRECK POND	Yes	3	Countermeasures	Under Design (Arora)
71	1321150	ROUTE 71 OVER SHARK RIVER	Yes	1	Countermeasures	Under Design (Earth Tech)
78	1015157	I-78EB SERV.RD / MULHOCKAWAY CREEK	Yes	2	Countermeasures	Under Design (Earth Tech)
78	1016156	I-78 EB OVER SO BR. RARITAN RIVER	No	---	Countermeasures	*To be Determined*
78	1016157	I-78 WB OVER SO BR. RARITAN RIVER	Yes	2	Countermeasures	Under Design (Earth Tech)
78	2113160	I78WB/ASBURY RD(CR632)&MUSCONETCONG R	Yes	4	Countermeasures	*To be Determined*
80	0225166	I-80/MRKT.MAIN,FAIRVIEW STS.&SADL RIV	Yes	1	Countermeasures	Under Design (Arora)
80	1413155	RAMP C OVER BURNT MEADOW BROOK	Yes	2	Countermeasures	Under Design (Arora)
82	2012150	NJ ROUTE 82 OVER RAHWAY RIVER	Yes	3	Countermeasures	Under Design (Dewberry)
87	0115150	RT.87/ABSECON INLET&RAMPS J&H	Yes	4	Countermeasures	*To be Determined*
94	1923150	NJ RT.94 OVER WALLKILL RIVER	Yes	2	Countermeasures	Under Design (Dewberry)
94	2117157	NJ 94 OVER JACKSONBURG CREEK	Yes	1	Countermeasures	Under Design (Dewberry)
94	2117159	NJ ROUTE 94 OVER BLAIR CREEK.	Yes	1	Countermeasures	Under Design (Dewberry)
94	2117160	ROUTE 94 OVER PAULINS KILL	Yes	1	Countermeasures	Under Design (Dewberry)
130	0316150	RT US 130 OVER POMPESTON CREEK	Yes	1	Countermeasures	Under Design (Parsons)
130	0317150	US 130 NB OVER ASSISCUNK CREEK	No	---	Countermeasures	*To be Determined*
130	0317152	US 130 SB OVER ASSISCUNK CREEK	Yes	3	Countermeasures	*To be Determined*
130	0319152	US RT. 130 OVER CROSSWICKS CREEK	Yes	4	Countermeasures	*To be Determined*
130	0817150	US RT 130 OVER BIG BIRCH CREEK	Yes	3	Countermeasures	Under Design (Parsons)

CURRENT PROGRAM STATUS

Of

SCOUR CRITICAL STATE WATCH LIST BRIDGES

Table II-5

Rte	Number	Name	Stage II	Phase	Countermeasures or Reconstruction	Program Status
130	0817151	RT US 130 OVER RACCOON CREEK	Yes	1	Countermeasures	*To be Determined*
130	0818151	RT US 130 /BIG TIMBER CREEK	Yes	3	Countermeasures	Under Design (Arora)
130	1122150	US 130 OVER DOCTORS CREEK	Yes	2	Countermeasures	Under Design (Earth Tech)
130	1123152	US ROUTE 130 OVER ROCKY BROOK	Yes	2	Countermeasures	Under Design (Earth Tech)
130	1123153	RT 130 OVER MILLSTONE RIVER	Yes	1	Countermeasures	Under Design (Earth Tech)
130	1227159	US 130 OVER OAKEYS BROOK	Yes	1	Countermeasures	Under Design (Earth Tech)
154	0424151	RT 154 OVER NO BR COOPER RIVER	Yes	3	Countermeasures	Under Design (Arora)
166	1516151	RT NJ166 OVER S.CHANNEL OF TOMS RIVER	Yes	3	Countermeasures	Under Design (Arora)
166	1516152	RT NJ 166 OVER NO. CHANNEL OF TOMS R.	Yes	1	Countermeasures	Under Design (Earth Tech)
173	2103152	RT 173 OVER POHATCONG CREEK	Yes	2	Countermeasures	Under Design (Dewberry)
173	2103153	NJ 173 OVER MUSCONETCONG RIVER	Yes	2	Countermeasures	Under Design (Dewberry)
202	1416152	US 202 OVER WHIPPANY RIVER	Yes	4	Countermeasures	*To be Determined*
202	1807155	US 202 OVER N BR RARITAN RIVER	Yes	2	Countermeasures	Under Design (Earth Tech)
202	1809150	US202 OVER N BR RARITAN RIVER	Yes	4	Countermeasures	*To be Determined*
202	1809153	RT 202 OVER BR MINE BROOK	Yes	1	Replacement	In STIP Construction in 2006
202	1809158	US RT 202 OVER PASSAIC RIVER	Yes	1	Countermeasures	Under Design (Earth Tech)
206	0118150	US 206 OVER CEDAR BRANCH	Yes	1	Countermeasures	Under Design (Parsons)
206	0118152	US 206 OVER GREAT SWAMP BRANCH	Yes	1	Countermeasures	Under Design (Parsons)
206	0118153	RT 206 OVER ALBERTSONS BROOK	Yes	1	Countermeasures	Under Design (Parsons)
206	0324152	U.S ROUTE 206 OVER SPRINGERS BROOK	Yes	3	Countermeasures	Under Design (Arora)
206	0324153	US 206 OVER MUSKINGUM CREEK	Yes	3	Countermeasures	Under Design (Arora)
206	0324155	US 206 OVER SO BR OF RANCOCAS CREEK	Yes	3	Countermeasures	Under Design (Arora)
206	0324156	ROUTE US 206 OVER JADE RUN	Yes	4	Countermeasures	*To be Determined*
206	0324160	US RT 206 OVER BARKERS CREEK	Yes	1	Countermeasures	Under Design (Parsons)
206	0324162	US206 OVER ASSISCUNK CREEK	Yes	1	Replacement	In STIP Construction in 2009
206	0326152	US 206 NB OVER CROSSWICKS CREEK	Yes	3	Countermeasures	Under Design (Earth Tech)
206	0326153	US206 SB OVER CROSSWICKS CREEK	Yes	3	Countermeasures	Under Design (Earth Tech)
206	1417156	RT 206/SOUTH BR OF RARITAN RIVER	Yes	1	Countermeasures	Under Design (Dewberry)
206	1417157	US 206 OVER TRIB TO DRAKES BROOK	Yes	1	Countermeasures	Under Design (Dewberry)
206	1417159	US RT 206/S BRANCH RARITAN RIVER	Yes	2	Countermeasures	Under Design (Dewberry)
206	1810153	US 206 OVER BACK BROOK	Yes	2	Countermeasures	Under Design (Earth Tech)
206	1810155	RT US 206 OVER CRUSERS BROOK	Yes	3	Replacement	In STIP Construction in 2008
206	1810158	ROUTE US 206 OVER PIKE RUN	Yes	2	Countermeasures	Under Design (Earth Tech)
206	1810164	US206 OVER BR OF ROYCES BROOK	Yes	4	Countermeasures	*To be Determined*
206	1810165	US206 OVER BR OF ROYCES BROOK	Yes	4	Countermeasures	*To be Determined*
206	1911151	US206 OVER LUBBERS RUN	Yes	2	Countermeasures	Under Design (Arora)
206	1911159	US206 OVER PEQUEST RIVER	Yes	2	Countermeasures	Under Design (Arora)
206	1912158	US ROUTE 206 OVER KITTATINY BROOK	Yes	1	Countermeasures	Under Design (Arora)
206	1912160	US 206 OVER BIG FLAT BROOK	Yes	1	Countermeasures	Under Design (Arora)
208	1612154	ROUTE 208 RAMP A OVER GOFFLE BROOK	Yes	2	Countermeasures	Under Design (Arora)
280	1418154	RT.I-280 EB OVER PASSAIC RIVER	Yes	2	Countermeasures	Under Design (Dewberry)
284	1907152	NJ RT284/BR OF WALLKILL RIVER	Yes	2	Countermeasures	Under Design (Arora)
284	1907157	NJ 284 OVER BR OF WALLKILL RIVER	Yes	2	Countermeasures	Under Design (Arora)
322	0119151	US 322 OVER HOSPITALITY BROOK	Yes	2	Countermeasures	Under Design (Parsons)
322	0119156	US 322 OVER BIG DITCH	Yes	2	Countermeasures	Under Design (Parsons)
322	0825150	US 322 OVER RACCOON CREEK	Yes	3	Countermeasures	Under Design (Parsons)
322	0826150	US ROUTE 322 OVER SCOTLAND RUN	Yes	1	Countermeasures	Under Design (Parsons)

III

MONITORING PROGRAM

III. MONITORING PROGRAM

A. INTRODUCTION

The long term goal of this Plan of Action is to eliminate the vulnerability of the state owned bridges to scour through either the replacement of the bridge with one that is more resistant to scour or the installation of properly designed scour countermeasures. However, as can be seen from the information contained in the previous section, this will involve a significant expenditure of construction and design monies and require a number of years to complete. The susceptibility of damage to the scour critical bridges requires a monitoring program with elements that are in addition to the routine NBIS program. Most notable is developing a procedure for monitoring the bridges during significant storms or periods of high water. This monitoring program also needs to establish procedures for closing structures when they appear to be under stress from a scour condition and subsequently reopened, when the danger period has passed.

The initial aspect of monitoring for scour is to establish a trigger mechanism to know when a bridge site needs to be monitored. Scour at bridges is nearly always tied to a significant storm or flooding event. Therefore, the monitoring program will require a methodology to evaluate real-time data for streams and watersheds and determining threshold values when site monitoring is required. This type of data is collected and readily available from the United States Geological Survey (USGS). In addition, the National Weather Service (NWS) has the overall responsibility for monitoring and forecasting flood situations throughout the nation and typically will issue flood watches and warnings when flood conditions are imminent. However, to more readily use this data a general understanding of the watersheds and how the state is subdivided is important. This will help to focus the monitoring activities where it is most critically needed. Finally, when monitoring is required, consistent procedures need to be defined and implemented to help safeguard the traveling public

B. WATERSHED MANAGEMENT AREAS

A watershed is defined as the area of land that drains into a body of water such as a river, lake, stream, or bay. It is usually separated from other watersheds by high points in the area such as hills or slopes. Watersheds may be defined on various scales, such as all of the Mississippi River Basin that drains to the Gulf of Mexico, or that portion of a hillside which drains to a small brook.

Starting in the early 1990s, a work group began discussions on how to orient the New Jersey Department of Environmental Protection's (NJDEP) approach to managing and regulating environmental decisions. It was decided that a watershed-based approach, where all decisions relating to a specific watershed area would be coordinated by one group of people, would ensure better coordination among the various groups in the NJDEP who were currently making these decisions. As part of these efforts, 20 watershed management areas (WMAs) were set up. These were then grouped into 5

water regions. The boundaries of the WMAs were based on natural watershed boundaries and on areas of similar environmental characteristics and concerns. As noted earlier, New Jersey is broken down into twenty individual Watershed Management Areas (See Table III-1). The WMAs are then further grouped into five water regions (See Table III-2).

NAMES AND NUMBERS
OF
WATERSHED MANAGEMENT AREAS

Table III-1

#	Name
01	Upper Delaware
02	Wallkill
03	Pompton, Pequannock, Wanaque, Ramapo
04	Lower Passaic, Saddle
05	Hackensack, Hudson, Pascack
06	Upper and Mid-Passaic, Whippany, Rockaway
07	Arthur Kill
08	North and South Branch Raritan
09	Lower Raritan, South River, Lawrence
10	Millstone
11	Central Delaware
12	Monmouth
13	Barnegat Bay
14	Mullica
15	Great Egg Harbor
16	Cape May
17	Maurice, Salem, Cohansey
18	Lower Delaware
19	Rancocas
20	Assiscunk, Crosswicks, Doctors

WATER REGIONS
AND
WATERSHED MANAGEMENT AREAS

Table III-2

Water Region		Watershed Management Areas
#	Name	#
1	Northeast	03, 04, 05, 06
2	Raritan	07, 08, 09, 10
3	Atlantic	12, 13, 14, 15, 16
4	Northwest	01, 02, 11
5	Lower Delaware	17, 18, 19, 20

WMAs exist to provide the best possible tools to enable the DEP, in conjunction with local watershed groups, to protect and manage the environment of New Jersey. For this reason, WMA boundaries may be changed from time to time as the watershed-based approach evolves. Since they were first established in 1996, the WMA boundaries have undergone slight modifications. One modification was done in conjunction with a significant reevaluation of watershed boundaries throughout the state by the United States Geological Survey (USGS). These changes were made, in part to ensure that a stream-monitoring station is at the downstream end of the WMA and to make WMA boundaries match federally-defined watersheds more effectively. A WMA can also be used to help identify the location of a waterway within the state and isolate a localized flooding situation. This can be beneficial in the monitoring effort since it can help readily locate bridges that may be experiencing a flood condition.

Appendix F contains individual maps of each of New Jersey's twenty WMAs together with a brief description of its key features. In addition, Appendix G contains a list of the Floodwatch List bridges that are categorized by Watershed Management Areas and Water Regions as well as by Route and Maintenance Region. The smaller area drainage basin for the bridge is also provided in these tables.

C. SURFACE-WATER MONITORING

A network of gauging stations that provide surface-water stage, flow (discharge), and tide-level data on a "real-time" basis through satellite, radio, and telephone telemetry is operating in New Jersey through a cooperative effort of the US Geological Survey (USGS) and other agencies. The stream data from these stations is transmitted every 1 to 4 hours and then immediately posted on the USGS internet site. Most continuous recording gauging stations are located on large streams with drainage areas of 10 square miles or more. The "real-time" statewide networks of gauging stations are part of several

existing networks established for stream flood warning, coastal tide and storm-surge flood monitoring, and drought warning.

The stream stage (the level of the stream typically measured in feet above a datum point) or tide level at each station in the network is automatically measured at 6 or 15 minute intervals, and the value is stored by a data collection platform (DCP) located on the site. Every 1 to 4 hours, a burst of data is broadcast from the site to the National Oceanic and Atmospheric Administration's (NOAA) Geostationary Operational Environmental Satellite (GOES) and relayed to a ground station. The data then are retransmitted by the DOMSAT (commercial) satellite to a USGS ground station, decoded and automatically posted to the USGS, New Jersey District, webpage for viewing. Radio and telephone telemetry at some of the surface-water stations provides either an alternate pathway or, for some more critical stations, a more direct pathway for the transmission of "real-time" information. The stage data for most of the stream-gauging stations are used to compute the stream discharge (the flow of the stream, typically measured in cubic feet per second) using an established relation between stage and flow, referred to as a rating curve. The daily mean flow statistics monitored by a gauging station are provided on the website to put the stage and discharge data in a historical context. The maximum, mean, and minimum flows (discharge) for the period of record are indicated.

Appendix H contains information from the USGS internet site including the introduction page, a list of the Streamflow gauge sites (sorted by County) and the real-time data available for one typical gauge site. In addition, Appendix I contains a table of the gauge sites that are categorized by the previously defined Watershed Management Areas as well as by County and Maintenance Region.

D. FLOOD WARNING SYSTEM

The National Weather Service (NWS) has the overall responsibility for monitoring and forecasting flood situations throughout the nation. NWS forecasters rely on the network of stream gauges to monitor the height of rivers and streams. This information provides the NWS with present river conditions and is the initial information needed to develop a river forecast. When flood conditions are determined to exist, key officials and emergency personnel are warned by methods including audio alarms, voice dial-out systems, or beeper systems. Mass dissemination techniques then come into play to warn the affected public. These techniques may include the use of public radio and television or special portable NOAA weather radios. Door-to-door warning dissemination can be used as well as sirens and public address systems. The typical warnings are as follows:

> COASTAL FLOOD WARNING – issued by the local NWS Forecast Office when moderate or worse tidal flooding or storm induced flooding is occurring, imminent, or highly likely along coastal areas within approximately the next 12 hours.

COASTAL FLOOD WATCH – issued by the local NWS Forecast Office when conditions are favorable for moderate or worse tidal flooding or storm induced flooding along coastal areas within approximately 12 to 36 hours.

FLASH FLOOD WARNING – issued by the local NWS Forecast Office when flooding will create an immediate threat to life and/or property. Generally occurring in a time period of less than 6 hours.

FLOOD WARNING – issued by the local NWS Forecast Office when flooding will occur in a time period generally greater than 6 hours.

FLOOD WATCH – issued by the local NWS Forecast Office when the potential for flooding exists.

The most critical use of "real-time" data is for flood monitoring and the timely evacuation of residents and the general public from flood-prone areas. These warnings can also act as a trigger to monitor bridges when flood conditions may or are likely to occur. Although gauge stations are not present at each individual bridge or even on every stream, there are a number of them located within each watershed area to give a general indication of the potential presence of flood conditions within the waterways of the WMA. As previously noted, Appendix I contains a list of the gauging stations which are listed by both watershed area as well as by County and Maintenance Region.

E. CORRELATION BETWEEN FLOOD WARNINGS AND EXISTING HYDRAULIC STUDIES

An investigation was performed to determine whether there was a direct correlation between the water levels found at a USGS flood stage and those calculated to be critical and contained within the Stage II In-depth Scour Evaluation reports. A review of the location of the stream flow gauges determined that seven were adjacent to state bridges where a Stage II evaluation had been performed. Comparing the data helps to provide a correlation between the "flood elevation" as determined by the USGS at their gauging stations and the 50-year and 100-year floods as determined in Stage II (See Table III-3).

In evaluating this data it appears that the USGS flood elevation is typically one to two feet below the elevation of the calculated 50-year storm. This is significant since most bridges were calculated to be "scour critical" at this stage. Thus when the USGS flood elevation is reached, the waterway would be approaching a critical stage and this can be used as a trigger for monitoring being required at the structure. As noted earlier, stream gauges are not present at each individual bridge or waterway but are scattered throughout the watershed. However, it can be reasonably assumed that the characteristics of a storm or other event that would create a flood of this magnitude would affect the entire watershed and be indicative of the conditions at other waterways within it. As data is collected during the monitoring of storms it should become more apparent which stream gauges are the best indicators of flood conditions for individual scour critical bridges

within a region. In addition, as data is collected from the monitoring it may be necessary to adjust or fine tune the use of the flood elevations as a trigger mechanism.

FLOOD ELEVATION CORRELATION

Table III-3

Structure Number	Watershed Region	Flood Elevation (USGS)	50-Year Storm Elevation	100-Year Storm Elevation	Low Chord Elevation	Distance Below 50-Year Storm	Distance Below Low Chord
0114-157	Atlantic Coastal	59.3	59.7	60.1	60.7	0.4	1.4
1502-157	Atlantic Coastal	4.0	5.7	6.2	6.8	1.7	2.8
1013-155	Raritan	395.1	397.3	398.1	396.0	2.2	0.9
2006-152	Raritan	14.8	15.5	17.4	19.7	0.7	4.9
0216-157	Northeast	77.7	77.6	80.2	82.6	-0.1	4.9
1410-159	Northeast	168.3	172.5	173.6	172.8	4.2	4.5
2117-160	Northeast	340.9	343.8	344.4	347.4	2.9	6.5
					Average	1.7	3.7

Since reaching the "flood elevation" is proposed as a trigger mechanism for monitoring of the conditions at a bridge site, an important factor is the frequency that these flood conditions occur. The USGS data available for these same sites was also reviewed to determine the number of times that the flood elevation has been reached or exceeded. As can be seen in Table III-4, the frequency of occurrence varies widely for the sites. Based upon the data collected by the USGS at these gauges for the last 30 years (in most cases), the frequency varies between just under two years and thirty years. However, on an average, the frequency of occurrence is approximately every three years.

FREQUENCY OF FLOOD ELEVATION OCCURANCE

Table III-4

Structure Number	Watershed Region	Flood Stage Occurrences	Years of Records	Frequency (years)
0114-157	Atlantic Coastal	7	30	4.3
1502-157	Atlantic Coastal	1	30	30.0
1013-155	Raritan	7	25	3.6
2006-152	Raritan	6	30	5.0
0216-157	Northeast	11	30	2.7
1410-159	Northeast	16	30	1.9
2117-160	Northeast	17	30	1.8
			Average	3.2

Therefore, if the USGS flood elevation is used as a trigger mechanism it would result in performing a monitoring visit to each scour critical bridge on the average of every three years. As discussed previously, this frequency can be refined in the future based upon the results of the monitoring.

In evaluating the use of flow depth as a monitoring trigger it is important to remember that the calculation of scour depth at a bridge element is typically dependent on a combination of the velocity and depth of flow present. One would anticipate that the velocity that corresponds to the depth of flow measured for a particular flood would be comparative to the velocity calculated for a similar flow depth condition and used in the scour calculations. This can be evaluated by reviewing the discharges that were associated with the depths found during a flood stage occurrence. As noted earlier, discharge (Q) has also been measured at these stream gauges and the values measured for the flood stage depths have been documented. Since discharge is a product of the area of the flow and the velocity, for a comparable area (or one based upon a flow for a specified flood depth), you would anticipate generating discharge values that compare to those calculated in Stage II. However, a review of the data at these sites shows that while the depth value was reached during these flood stage occurrences, the discharge values typically are variable and usually less than what would be anticipated based upon the Stage II flow calculations. A possible explanation for this is that the backwater effects downstream of the bridge can not always be accurately modeled and thus the hydraulic model represents more of a critical free flow condition that will not always occur naturally during every storm. This reduced discharge will result in a velocity lower than would be expected. Therefore, even though the bridge is experiencing a flood of a critical magnitude in depth, it may not be experiencing the same combination of flow depth and velocity used in the scour depth calculations. However, other factors that can have an adverse impact on scour depth such as the buildup of debris or the effects of pressure flow were typically not accounted for in the original scour calculations. Thus, while the nature of scour is dependent on various flow and site conditions, one of the main ones (flow depth) can be more easily determined than others.

Trying to employ a number of these factors as a triggering mechanism would be a complex and difficult approach. In addition, the use of the flood stage depth appears to be conservative as an initial approach. As noted earlier, fine tuning of the flood depth value used as a scour trigger mechanism may need to be reviewed on a bridge-by-bridge basis after additional data has been collected during several monitoring visits. Therefore, it is essential that data be collected in a consistent manner during scour monitoring and stored for evaluation of the scour conditions at a bridge site. It is important to remember that the scour calculations have been shown in many cases to be conservative in nature and may not provide a true picture of the susceptibility of the bridge to scour damage. This is in part due to the soil conditions at a site that can include stones and other materials that can act to armor the channel. A potential use of this monitoring data, therefore, could be to remove the bridge from the scour critical list based upon the bridge's actual response to flood or critical flow conditions.

F. FLOOD MONITORING INSPECTION PROCEDURES

The Plan of Action for the state owned bridges requires procedures to be established in the event of a significant storm or other flooding condition. These procedures will need to include a strategy be established for before, during and after these events. This strategy includes defining which groups will be responsible and what activities and procedures are required to be performed.

1. Pre-Event Procedures

The pre-event period begins when a significant storm has been forecast or flood warnings have been issued. The activities within this period will generally be performed by and be the responsibility of the Department's Structural Evaluation Group. However, Structural Evaluation may need to alert others during this period when it begins to become apparent that the severity of the event will require it to move to the next phase.

When a flood warning has been issued for a particular watershed, the scour critical bridges within that watershed could potentially be subjected to flows that could result in a scour condition. When this occurs, monitoring of the USGS stream gauges within the watershed should begin. This office activity can be accomplished using their USGS web site. The Manager of the Structural Evaluation Group, together with two other senior members of the staff, will be responsible for monitoring the site and evaluating the severity of the event and the need for field monitoring of individual bridges.

To assist in this matter an evaluation was performed related to the location of the stream gauges together with the bridges on the flood watch list. The intent was to match each bridge with a gauge that could be used to trigger when monitoring would be necessary. The ideal case would be to have a gauge at or just upstream of the impacted bridge to allow ample warning time for determining the potential for a flood condition and the need to perform scour monitoring activities. While this only occurred in a couple of instances, typically each bridge was matched with a stream gauge that was in the immediate area or at least within the same watershed area. Thus when any of these stream gauges reach flood stage it would trigger the need to monitor an individual or group of associated bridges. Table III-5 provides the results of this evaluation and defines the stream gauges to be used and their associated bridge or bridge group.

The web site data (shown in Appendix H for a typical gauge site) includes the results of stream gauge readings within the watershed and provides a graphical picture of the conditions at the various waterways. Real time readings are available for each location for gauge height and discharge values. It should be noted that the gauge height readings are measured in feet above the height of the datum set at the site. This will not correlate directly to the flood elevations shown in the Stage II report, which are typically based upon NGVD. A height of the

estimated flood stage is also provided at each gauge location together with historical data for that particular day. A graph of the stream elevation and discharge readings is also provided on the site for the previous seven day period. This graph can be beneficial in evaluating whether the water surface elevation is continuing to rise.

The procedures in this section pertain to typical storm events. When major hurricanes or other significant events are forecast, these activities will need to be part of the development of a larger contingency planning stage involving other groups within the Department or other agencies within the State. For example, this may be required when the scope of the storm is such that significant evacuation of residents or other similar activities may be determined to be necessary.

2. Procedures for the Event Period

The procedures for the period during the flood or storm event will begin once the Structural Evaluation Group has made the determination that a particular stream gauge or possibly an entire watershed has reached a critical flood stage. At this point, the bridges in a defined group associated with that gauge are likely to be subjected to flows that could result in a scour condition and a field evaluation of these individual bridge sites will be required. As noted earlier, initially, this will be triggered when the stream gauge readings show that the waterway is rising to flood stage levels. However, as data is collected for the various bridge sites over a period of time, it may be prudent to review whether specific bridges may need to be reviewed on a more frequent or less frequent basis.

The major activities during this period will then be transferred to the Department's Operations group. The rationale for this approach is that this group has more personnel located throughout the state and, therefore, will be closer to the bridge sites. In addition, they are generally involved in other field activities during these types of events and can get to the sites in an expedited manner. The potential drawback is that their qualifications and experience base is not the same as those in Structural Evaluation. Thus the monitoring procedures need to be developed with this in mind.

The Structural Evaluation Group will provide Operations with a list of individual or groups of bridges that need to be field monitored. Since this list may be extensive during some severe storms, prioritization of the bridges on the list is recommended. An approach to accomplish this will be discussed in the next section. When this list has been provided, flood inspection monitoring of the scour critical bridges within the flood prone area should be initiated.

Flood inspection monitoring will consist of a field evaluation of the bridge site and completion of a standard inspection monitoring form. The format and content of this form will be discussed in a subsequent part of this section. In general,

various items are required to be observed at the bridge sites, which are broken down into "critical" and "non-critical" items on the form. Observed changes in items designated as "critical" would normally be cause for the closure of the bridge. Observations of a change in a "non-critical" item should also be noted and if judged to be significant, could also be cause for the closure of the bridge. Continuous monitoring of a site is not required, unless in the judgment of the inspectors, conditions are critical or are rapidly changing.

To aide in the monitoring, the Structural Evaluation staff prepared individual data sheets for each of the flood watch list bridges to provide the monitoring crew with available data related to scour. As illustrated on the sample data sheet, which is included at the end of this section as Figure 1, information is provided on the bridge's location and waterway as well as the following:

- Substructure and foundation type
- History of scour problems
- History of debris
- Streambed material
- Substructure redundancy

When a condition is such that it appears that closure of the bridge may be required, the approach in the Department's Bureau of Structural Engineering Emergency Condition Procedures should be followed. This will involve the monitoring crew contacting the required decision making personnel, including the Manager of Structural Evaluation and the Regional Maintenance Engineer. Once the closure is determined to be required, state or local law officials should also be contacted and the closure will typically be performed by these individuals. The monitoring crew should remain at the bridge site until the appropriate bridge closure or law enforcement agency has arrived at the scene. If, in the opinion of the monitoring crew, the bridge becomes unsafe for traffic while the monitoring crew is waiting for a formal bridge closure, the crew should, if possible, perform an emergency closure of the bridge. The monitoring crew should have the ability to contact staff with the necessary signage and temporary traffic barriers to perform an emergency closure.

Detouring of traffic will be necessary once a bridge closure is required. The detour route will typically be established by the local authorities in conjunction with Department staff. Since this is often dictated by conditions present at other adjacent state, county and agency bridges, it is not possible to define specific detour routes for each individual structure.

Once a structure has been closed it should remain so until it is determined by the Structural Evaluation staff that it can be safely reopened. In addition, the monitoring of bridges that are not required to be closed should continue until the conditions causing the flood stage have passed. This will generally be when the water recedes to below the flood stage level. However, if "non-critical" item

conditions are present, such as a significant build-up of debris or other signs of distress, the monitoring crew may determine it necessary to continue monitoring until these conditions are no longer present.

3. Post-Event Procedures

As noted earlier, the Structural Evaluation staff will be responsible for determining when a bridge can be safely reopened to traffic. This will include any inspection efforts required to determine the condition of any countermeasures and the substructure elements. They will be responsible for determining if a diver or some other form of underwater inspection is required. They also will be responsible for determining if any repairs or scour countermeasures are required before the bridge can be put in service.

For any bridges closed to traffic, a post event inspection of the structure will be required. This inspection should follow the Department's normal NBIS procedures. Particular attention should be paid to probing of the soil adjacent to the substructure units. A streambed profile of the post flood conditions should also be performed. However, it is important to remember that the conditions found after the event are not necessarily the same as those that were present during the event. Filling of a scour hole at the end of a storm is a common occurrence and probing is necessary to help identify loose pockets of material where a scour hole could have been present. It is important to identify these locations since loose material and sediment would be more easily removed during a subsequent storm and result in a stability issue for the foundation. Where a diving inspection is also normally required, that also should be undertaken.

Copies of field notes from the Flood Monitoring Inspection as well as the Post Flood Inspection should be placed in the Department's Structural Evaluation files. The Structural Evaluation group will be responsible for maintaining these files and evaluating whether any changes are required to bridge lists or monitoring procedures.

G. FLOOD INSPECTION FORMS

As noted earlier, flood inspection monitoring will consist of a field evaluation of the bridge site and completion of a standard inspection monitoring form. This monitoring form, provided at the end of this section as Figure 2, includes various items to be observed at the site. As illustrated on the form, the observed elements are broken down into "critical" and "non-critical" items. Observed changes in items designated as "critical" would normally be cause for the closure of the bridge. Observations of a change in a "non-critical" item should also be noted. If the change in a non-critical item is significant in the judgment of the field crew, it could also be cause for the closure of the bridge.

Safety of the traveling public and the monitoring crew is of critical importance. If observed changes in the designated critical items are present they could indicate an active scour condition and a bridge that is in distress. Should these or any other signs of structural distress be apparent at the bridge, the monitoring crew should call for a bridge closure, as per the previously discussed procedures, and avoid getting on the bridge.

The following provides a discussion of the various items shown on the Flood Monitoring Inspection form, which are required to be observed during a flood monitoring inspection:

Critical Items

Alignment: The monitoring crew should sight along the fascia, curb line, joints, center line strip, main members, etc. Excessive horizontal or vertical separation at bridge deck joints is important. Any noticeable change would typically be cause for closure of the bridge.

Tilt: The monitoring crew should visually check abutments and piers for a change in plumbness and check bearings for a change in inclination. Any noticeable change or vertical or lateral displacement of the superstructure would typically be cause for closure of the bridge.

Vibration: With no traffic on the bridge, the monitoring crew should check each span for vibration or swaying motion from stream flow. Any noticeable change would typically be cause for closure of the bridge.

Freeboard: Freeboard is the distance from the lowest point of a bridge's superstructure to the water surface. An approximate measurement should be entered by the monitoring crew (to the nearest ½ foot) and the point of measurement noted in the comment section. Zero freeboard or overtopping of the bridge would typically be cause for closure of the bridge. Overtopping of the approach roadway is also important and may be considered as critical.

Snagging Debris: Any heavy debris and/or ice snagging on the superstructure or piers and abutments should be noted. Massive amounts of debris that causes a negative freeboard situation or structure movement would typically be cause for closure of the bridge.

Bridge Noise: The monitoring crew should listen for cracks, groans, snapping or popping noises coming from the bridge. These noises can be indicative of a potentially serious problem and would typically be cause for closure of the bridge.

Superstructure Distress:	The monitoring crew should look for visible damage or cracks in the structure's curbs, parapets and bridge deck

Non-Critical Items

Length:	If any increase or decrease in bridge length, as observed at the deck, railing, parapet or curb joints should be noted. Any measurements made should be to the nearest ½ inch.
Erosion:	The monitoring crew should look for erosion around substructures, stream banks, highway embankments or pavement and shoulders. .
Settlement:	The monitoring crew should observe if any settlement is apparent on approach roadways and embankment slopes. Any sinkholes in the roadway behind the abutments may be considered as critical
Cracking:	The monitoring crew should look for cracking in pavement, shoulder areas and embankment slopes.
Debris	The monitoring crew should observe the quantity of debris and/or ice carried by the stream. The box on the form should be completed with either: N – None, L – Light, M – Medium or H - Heavy
Impacting Debris:	The monitoring crew should note if any debris is impacting the superstructure.
Flow Characteristics:	The monitoring crew should note whether the location, strength and/or direction of the current has changed. Any changes should be noted in the comment section.
Stream Noises:	The monitoring crew should note if there is an audible sound of rocks or other objects rolling or scraping in the stream.

The majority of the form should be completed with a "yes" or "no" response for the various items. Where "yes" has been used the inspector should note the specific changes or observations in the comment section of the form. The inspector may also add any other comments on other items that they may feel are significant in the comment section. One form should be used for each structure. Multiple entries may be required for a specific event, the time the observations were made and the weather should also be noted in the columns provided.

STATE SCOUR WATCH LIST BRIDGES

Table III-5

Bridge Group	Stream Gauge No.	Stream Gauge Location	Flood Elev	Rte	Number	Name	Mile Point	Drainage Basin
BRIDGES IN NORTH MAINTENANCE REGION								
Stream Gauges in Bergen County								
N1	01378500	Hackensack River at New Milford, NJ	6.0	1+9	0201151	US 1&9(BROAD AVENUE) OVER WOLF CREEK	61.32	Hackensack River
				4	0206166	NJ 4 / HACKENSACK RIVER & ACCESS ROAD	4.59	Hackensack River
				4	0206181	NJ 4 OVER FLAT ROCK BROOK	9.54	Hackensack River
				4	0206189	KINDERKAMACK RD OVER COLES BROOK	5.39	Hackensack River
N2	01387500	Ramapo River near Mahwah, NJ	8.0	17	0218161	N.J 17 NB/US 202 & RAMAPO RIVER	26.04	Ramapo River
				17	0218162	NJ RT 17 SB OVER US 202 & RAMAPO RVR	26.04	Ramapo River
N3	01390500	Saddle River at Ridgewood, NJ	6.0	17	0216150	RT 17 OVER SPROUT BROOK	13.97	Saddle River
				17	0216157	NJ RT 17 OVER SADDLE RIVER.	17.04	Saddle River
N4	01391500	Saddle River at Lodi, NJ	6.0	46	0220157	U.S.ROUTE 46 OVER SADDLE RIVER	66.51	Saddle River
				80	0225166	I-80/MRKT.MAIN,FAIRVIEW STS.&SADL RIV	63.65	Saddle River
Stream Gauge in Essex County								
N5	01392170	Third River at Bloomfield, NJ	6.0	3	1601157	NJ ROUTE 3 OVER THIRD RIVER	3.91	Lower Passaic
				3	1601160	NJ RT 3 OVER UPPER POND SPILLWAY	4.39	Lower Passaic
				21	0716156	MAIN ST OVER SECOND RIVER	5.68	Lower Passaic
Stream Gauges in Morris County								
N6	01379773	Green Pond Brook at Picatinny Arsenal, NJ	3.0	15	1403150	NJ RT 15 OVER BRNT MDW(GRN PD) BROOK	1.65	Rockaway River
				15	1404155	GOVRNMNT RD(PARKER RD) WB/GREEN POND	2.78	Rockaway River
				15	1404158	NJ ROUTE 15 SB / ROCKAWAY RIVER	4.20	Rockaway River
				80	1413155	RAMP C OVER BURNT MEADOW BROOK	34.31	Rockaway River
N7	01380500	Rockaway River above Reservoir at Boonton, NJ	5.0	10	1401156	RT 10 OVER MILL BROOK	7.16	Rockaway River
				46	1409154	US ROUTE 46 OVER GRANNEYS BROOK	37.72	Rockaway River
				53	1411152	RT 53 OVER DEN BROOK	4.59	Rockaway River
N8	01381500	Whippany River at Morristown, NJ	6.0	10	1402150	NJ ROUTE 10 OVER MALAPARDIS BROOK	13.89	Whippany River
				202	1416152	US 202 OVER WHIPPANY RIVER	45.73	Whippany River
N9	01381800	Whippany River near Pine Brook, NJ	9.0	10	0709150	RT 10 OVER WILLOW MEADOW BROOK	18.65	Upper Passaic
				10	0711150	NJ ROUTE 10 OVER CANOE BROOK	20.50	Upper Passaic
N10	01381900	Passaic River at Pine Brook, NJ	19.0	46	1410159	ROUTE 46 OVER PASSAIC RIVER	51.85	Upper Passaic
				280	1418154	RT.I-280 EB OVER PASSAIC RIVER	3.32	Upper Passaic
N11	01396190	South Branch Raritan River at Four Bridges, NJ	7.0	46	1407156	US 46 OVER SOUTH BR RARITAN RIVER	25.87	South Branch of Raritan River
				206	1417156	RT 206/SOUTH BR OF RARITAN RIVER	92.23	South Branch of Raritan River
				206	1417157	US 206 OVER TRIB TO DRAKES BROOK	92.46	South Branch of Raritan River
				206	1417159	US RT 206/S BRANCH RARITAN RIVER	92.82	South Branch of Raritan River
N12	01455500	Muscanetcong River at Outlet of Lake Hopatcong, NJ	4.0	15	1404159	NJ RT 15 RAMP A OVER HURDTOWN BROOK	6.72	Musconetcong River
				15	1424150	NJ 15 NB OVER LAKE SHAWNEE	6.72	Musconetcong River
				46	1407152	ROUTE US 46 WB OVER MINE BROOK	22.47	Musconetcong River
				46	1407153	RTE US 46EB OVER BRANCH MINE BRK.	22.61	Musconetcong River
				206	1911151	US206 OVER LUBBERS RUN	98.82	Musconetcong River
Stream Gauges in Passaic County								
N13	01382500	Pequannock River at Macopin Intake Dam, NJ	7.0	23	1405156	RT23/PEQUANNOCK R,HAMBURG TPK SB, RR	16.98	Pequannock River
				23	1605153	NJ RTE 23 SB OVER PEQUANNOCK RIV.	18.20	Pequannock River
				23	1605156	NJ RT 23 SB OVER PEQUANNOCK RIVER	19.49	Pequannock River
				23	1605158	NJ ROUTE 23 NB/MACOPIN RIVER	20.26	Pequannock River
				23	1605162	RTE 23SB OVER PEQUANNOCK RV	22.50	Pequannock River
				23	1605167	ROUTE 23 SB OVER PEQUANNOCK RIVER	25.52	Pequannock River
				23	1605175	RT 23 NB OVER PEQUANNOCK RIVER	26.20	Pequannock River
N14	01388500	Pompton River at Pompton Plains, NJ	16.0	23	1619151	N.J 23 OVER POMPTON RIVER	9.64	Pompton River
	01389005	Passaic River below Pompton River at Two Bridges, NJ	9.0	23	1604150	ROUTE NJ 23/PASSAIC RIVER	4.54	Lower Passaic

STATE SCOUR WATCH LIST BRIDGES

Table III-5

Bridge Group	Stream Gauge No.	Stream Gauge Location	Flood Elev	Rte	Number	Name	Mile Point	Drainage Basin
N15				46	0722157	US ROUTE 46 EB OVER PASSAIC RIVER	55.45	Upper Passaic
				46	0722158	U.S. ROUTE 46 WB /PASSAIC RIVER	55.45	Upper Passaic
N16	01389534	Peckman River at Ozone Avenue at Verona, NJ	3.5	23	0719151	RT 23 OVER PECKMANS BROOK	2.09	Lower Passaic
N17	01389765	Molly Ann Brook at North Haledon, NJ	6.0	208	1612154	ROUTE 208 RAMP A OVER GOFFLE BROOK	4.36	Lower Passaic
Stream Gauges in Sussex County								
N18	01367800	Papakating Creek at Pellville, NJ	4.0	23	1903152	23/BR OF PACOCK BRK & DEL-OSTEGO R.R.	30.14	Wallkill River
				23	1903153	RT 23 OVER BRANCH OF FRANKLIN LAKE	30.60	Wallkill River
				23	1904152	NJ 23 OVER WALLKILL RIVER	36.61	Wallkill River
				23	1904153	NJ RT 23/ BR OF WALLKILL RIVER	37.60	Wallkill River
				23	1905151	ROUTE NJ 23/BRANCH OF CLOVE RIVER	42.61	Papatking Creek
				94	1923150	NJ RT.94 OVER WALLKILL RIVER	35.21	Wallkill River
				284	1907152	NJ RT284/BR OF WALLKILL RIVER	3.04	Wallkill River
				284	1907157	NJ 284 OVER BR OF WALLKILL RIVER	6.62	Wallkill River
N19	01440000	Flat Brook near Flatbrookville, NJ	6.0	206	1912158	US ROUTE 206 OVER KITTATINY BROOK	122.51	Flat Brook
				206	1912160	US 206 OVER BIG FLAT BROOK	122.61	Flat Brook
N20	01445000	Pequest River at Huntsville, NJ	4.0	15	1922150	NJ ROUTE 15 OVER BEAVER RUN	17.56	Paulins Kill
				15	1922151	NJ.RTE.15 OVER PAULINS KILL CREEK	18.26	Paulins Kill
				206	1911159	US206 OVER PEQUEST RIVER	105.90	Pequest River
Stream Gauges in Union County								
N21	01394500	Rahway River near Springfield, NJ	5.5	22	2003157	US22 OVER ECHO LAKE	50.74	Rahway River
				22	2003161	US 22 EB OVER RAHWAY RIVER	52.94	Rahway River
				22	2003162	US 22 WB OVER RAHWAY RIVER	52.94	Rahway River
				22	2004151	US 22 OVER ELIZABETH RIVER	56.51	Elizabeth River
				82	2012150	NJ ROUTE 82 OVER RAHWAY RIVER	0.36	Rahway River
N22	01395000	Rahway River at Rahway, NJ	6.0	27	2006151	RT 27 OVER ROBINSON BRNCH RAHWAY RVR	28.44	Rahway River
				27	2006152	NJ RT 27/RAHWAY RIVER.	29.07	Rahway River
Stream Gauges in Warren County								
N23	01443500	Paulins Kill at Blairstown, NJ	5.0	46	2107156	US ROUTE 46 OVER PAULINS KILL	0.74	Paulins Kill
				94	2117157	NJ 94 OVER JACKSONBURG CREEK	7.97	Paulins Kill
				94	2117159	NJ ROUTE 94 OVER BLAIR CREEK.	9.04	Paulins Kill
				94	2117160	ROUTE 94 OVER PAULINS KILL	9.16	Paulins Kill
N24	01445500	Pequest River at Pequest, NJ	4.0	31	2111151	RT 31 OVER POHATCONG CREEK	44.47	Pohatcong Creek
				31	2111155	NJ RT 31 OVER PEQUEST RIVER	48.88	Pequest River
				57	2105164	RT 57 OVER POHATCONG CREEK	9.55	Pohatcong Creek
N25	01446000	Beaver Brook near Belvidere, NJ	4.5	46	2107154	US 46 WB OVER BEAVER BROOK	7.29	Pequest River
				46	2107155	US 46 EB OVER BEAVER BROOK	7.29	Pequest River
N26	01457000	Muscanetcong River near Bloomsbury, NJ	6.0	46	2108162	RTE US 46 OVER MUSCONETCONG RIVER	21.83	Musconetcong River
				57	2106164	NJ 57 OVER HANCES BROOK	18.13	Musconetcong River

STATE SCOUR WATCH LIST BRIDGES

Table III-5

Bridge Group	Stream Gauge No.	Stream Gauge Location	Flood Elev	Rte	Number	Name	Mile Point	Drainage Basin
BRIDGES IN CENTRAL MAINTENANCE REGION								
Stream Gauges in Hunterdon County								
C1	01396500	South Branch Raritan River near High Bridge, NJ	10.0	31	1013152	ROUTE NJ 31 OVER WILLOUGHBY BROOK	35.06	South Branch of Raritan River
C2	01396660	Mulhockaway Creek at Van Syckel, NJ	5.5	78	1015157	I-78EB SERV.RD / MULHOCKAWAY CREEK	12.32	South Branch of Raritan River
C3	01397000	South Branch Raritan River at Stanton, NJ	8.0	78	1016156	I-78 EB OVER SO BR. RARITAN RIVER	16.53	South Branch of Raritan River
				78	1016157	I-78 WB OVER SO BR. RARITAN RIVER	16.53	South Branch of Raritan River
C4	01399670	South Branch Rockaway Creek at Whitehouse Station, NJ	6.0	22	1005153	RT US 22 OVER BR ROCKAWAY CREEK	19.78	North Branch of Raritan River
				22	1005162	US 22 EB OVER S BR ROCKAWAY CREEK	25.67	North Branch of Raritan River
				22	1005163	RT US 22 WB OVER S BR ROCKAWAY CREEK	25.67	North Branch of Raritan River
Stream Gauges in Mercer County								
C5	01401000	Stony Brook at Princeton, NJ	9.0	27	1105152	RT NJ 27 OVER MILLSTONE RIVER	3.02	Millstone River
				33	1304151	OLD ROAD(NJ 33) OVER MILLSTONE RIVER	19.80	Millstone River
				130	1123152	US ROUTE 130 OVER ROCKY BROOK	68.92	Millstone River
				130	1123153	RT 130 OVER MILLSTONE RIVER	70.04	Millstone River
C6	01463620	Assunpink Creek near Clarksville, NJ	8.0	1B	1102150	US 1B OVER SHABAKUNK CREEK	1.51	Assunpink Creek
C7	01464500	Croswicks Creek at Extonville, NJ	12.0	130	1122150	US 130 OVER DOCTORS CREEK	58.52	Crosswicks Creek
Stream Gauges in Middlesex County								
C8	01405400	Manalapan Brook at Spotswood, NJ	19.0	9	1303155	US RT 9 OVER MILFORD BROOK	117.70	South River
				33	1304156	ROUTE 33 OVER MANALAPAN BROOK	25.39	South River
				130	1227159	US 130 OVER OAKEYS BROOK	79.15	Lawrence Brook
C9	01406710	Raritan River at South Amboy, NJ	***11.8***	35	1222150	ROUTE 35/CHEESEQUAKE CREEK & RAMP	47.26	Matawan Creek
Stream Gauges in Monmouth County								
C10	01407080	Waackaack Creek at Keansburg, NJ	***11.8***	36	1315157	NJ 36 OVER FLAT CREEK	22.61	Matawan Creek
C11	01407290	Big Brook at Marlboro, NJ	18.0	34	1308154	N.J.ROUTE 34 OVER BIG BROOK	15.98	Navesink River
C12	01407770	Shark River at Belmar, NJ	***9.0***	71	1321150	ROUTE 71 OVER SHARK RIVER	5.89	Shark River
C13	01408000	Manasquan River at Squankum, NJ	7.0	71	1320152	ROUTE 71 OVER WRECK POND	2.43	Wreck Pond Brook
Stream Gauges in Ocean County								
C14	01408500	Toms River near Toms River, NJ	8.0	166	1516151	RT NJ166 OVER S.CHANNEL OF TOMS RIVER	1.05	Toms River
				166	1516152	RT NJ 166 OVER NO. CHANNEL OF TOMS R.	1.13	Toms River
C15	01409000	Cedar Creek at Lanoka Harbor, NJ	4.0	9	1502153	US 9 OVER OYSTER CREEK	79.56	Forked River
				9	1502154	US 9 OVER S. BRANCH OF FORKED RIVER	80.19	Forked River
				9	1502157	US 9 OVER CEDAR CREEK	84.01	Cedar Creek
Stream Gauges in Somerset County								
C16	01379000	Passaic River near Millington, NJ	8.0	202	1809158	US RT 202 OVER PASSAIC RIVER	39.08	Upper Passaic
C17	01398500	North Branch Raritan River near Far Hills, NJ	5.0	202	1809150	US202 OVER N BR RARITAN RIVER	32.54	North Branch of Raritan River
				202	1809153	RT 202 OVER BR MINE BROOK	35.42	North Branch of Raritan River
C18	01399830	North Branch Raritan River at North Branch, NJ	12.3	22	1801153	US 22 EB OVER N BR RARITAN RIVER	30.83	North Branch of Raritan River
				22	1801154	US 22 WB OVER N BR RARITAN RIVER	30.83	North Branch of Raritan River
C19	01400000	North Branch Raritan River near Raritan, NJ	10.0	202	1807155	US 202 OVER N BR RARITAN RIVER	21.75	North Branch of Raritan River
C20	01400500	Raritan River at Manville, NJ	14.0	206	1810164	US206 OVER BR OF ROYCES BROOK	66.36	Millstone River
				206	1810165	US206 OVER BR OF ROYCES BROOK	67.52	Millstone River
C21	01401750	Millstone River at Griggstown, NJ	9.5	206	1810153	US 206 OVER BACK BROOK	60.27	Millstone River
				206	1810155	RT US 206 OVER CRUSERS BROOK	61.82	Millstone River
				206	1810158	ROUTE US 206 OVER PIKE RUN	63.35	Millstone River
C22	01403540	Stony Brook at Watchung, NJ	14.5	22	1803156	RT US 22 OVER STONY BROOK	44.62	Lower Raritan
Stream Gauge in Union County								
C23	01395000	Rahway River at Rahway, NJ	6.0	27	1218158	NJ RT 27 OVER S BRANCH RAHWAY RIVER	25.85	Rahway River

STATE SCOUR WATCH LIST BRIDGES

Table III-5

Bridge Group	Stream Gauge No.	Stream Gauge Location	Flood Elev	Rte	Number	Name	Mile Point	Drainage Basin
Stream Gauges in Warren County								
C24	01457000	Muscanetcong River near Bloomsbury, NJ	6.0	22	2102154	US 22 OVER LOPATCONG CREEK	2.84	Lopatcong Creek
				78	2113160	I78WB/ASBURY RD(CR632)&MUSCONETCONG R	7.05	Musconetcong River
				173	2103152	RT 173 OVER POHATCONG CREEK	1.50	Pohatcong Creek
				173	2103153	NJ 173 OVER MUSCONETCONG RIVER	3.39	Musconetcong River
C25	01457500	Delaware River at Riegelsville, NJ	22.0	29	1006151	ROUTE 29 OVER SWAN CREEK	18.74	Lockatong Creek
				29	1009150	ROUTE 29 OVER COPPER CREEK	33.19	Lockatong Creek
				29	1110158	NJ 29 OVER MOORES CREEK	15.34	Lockatong Creek

STATE SCOUR WATCH LIST BRIDGES

Table III-5

Bridge Group	Stream Gauge No.	Stream Gauge Location	Flood Elev	Rte	Number	Name	Mile Point	Drainage Basin
BRIDGES IN SOUTH MAINTENANCE REGION								
Stream Gauges in Atlantic County								
S1	01409400	Mullica River near Basto, NJ	5.0	206	0118150	US 206 OVER CEDAR BRANCH	0.75	Mullica River
				206	0118152	US 206 OVER GREAT SWAMP BRANCH	2.88	Mullica River
				206	0118153	RT 206 OVER ALBERTSONS BROOK	3.75	Mullica River
				206	0324152	U.S ROUTE 206 OVER SPRINGERS BROOK	10.13	Basto River
				206	0324153	US 206 OVER MUSKINGUM CREEK	13.16	Basto River
S2	01410600	Absecon Channel at Atlantic City, NJ	***9.8***	87	0115150	RT.87/ABSECON INLET&RAMPS J&H	1.38	Absecon Creek
S3	01411000	Great Egg Harbor River at Folsum, NJ	6.0	322	0119151	US 322 OVER HOSPITALITY BROOK	37.04	Great Egg Harbor River
				322	0119156	US 322 OVER BIG DITCH	43.22	Great Egg Harbor River
S4	01411300	Tuckahoe River at Head of River, NJ	6.0	49	0509150	RT 49 OVER MILL CREEK	52.56	Tuckahoe River
				50	0510152	ROUTE 50 OVER TUCKAHOE RIVER	6.98	Tuckahoe River
Stream Gauges in Burlington County								
S5	01465850	South Branch Rancocas Creek at Vincentown, NJ	7.0	206	0324155	US 206 OVER SO BR OF RANCOCAS CREEK	20.61	South Branch of Rancocas Creek
				206	0324156	ROUTE US 206 OVER JADE RUN	21.08	South Branch of Rancocas Creek
S6	01467000	North Branch Rancocas Creek at Pemberton, NJ	2.5	130	0317150	US 130 NB OVER ASSISCUNK CREEK	46.65	Assiscunk Creek
				130	0317152	US 130 SB OVER ASSISCUNK CREEK	46.65	Assiscunk Creek
				206	0324160	US RT 206 OVER BARKERS CREEK	27.33	Assiscunk Creek
				206	0324162	US206 OVER ASSISCUNK CREEK	29.54	Assiscunk Creek
Stream Gauge in Camden County								
S7	01467150	Cooper River at Haddonfield, NJ	2.8	30	0405153	US RTS 30 & 130 OVER COOPER RIVER	3.62	Cooper River
				38	0408160	MILL ROAD/SO BR PENNSAUKEN CREEK	4.30	Pennsauken Creek
				45	0810150	RT 45 OVER WOODBURY CREEK	26.21	Woodbury Creek
				47	0815152	NJ 47 OVER BIG TIMBER CREEK	75.08	Big Timber Creek
				130	0316150	RT US 130 OVER POMPESTON CREEK	37.84	Pompeston Creek
				130	0818151	RT US 130 /BIG TIMBER CREEK	25.47	Big Timber Creek
				154	0424151	RT 154 OVER NO BR COOPER RIVER	1.22	Cooper River
Stream Gauges in Gloucester County								
S8	01475000	Mantua Creek at Pitman, NJ	5.0	45	0808151	ROUTE 45 OVER EDWARDS RUN	20.82	Mantua Creek
S9	01477120	Raccoon Creek near Swedesboro, NJ	13.0	45	0807152	RT45 OVER RACCOON CREEK	17.73	Raccoon Creek
				130	0817150	US RT 130 OVER BIG BIRCH CREEK	9.95	Maple Swamp
				130	0817151	RT US 130 OVER RACCOON CREEK	11.80	Raccoon Creek
				322	0825150	US 322 OVER RACCOON CREEK	11.27	Raccoon Creek
Stream Gauges in Mercer County								
S10	01464500	Croswicks Creek at Extonville, NJ	12.0	130	0319152	US RT. 130 OVER CROSSWICKS CREEK	58.28	Crosswicks Creek
				206	0326152	US 206 NB OVER CROSSWICKS CREEK	38.46	Crosswicks Creek
				206	0326153	US206 SB OVER CROSSWICKS CREEK	38.46	Crosswicks Creek
Stream Gauges in Salem County								
S11	01411500	Maurice River at Norma, NJ	4.0	47	0601150	RT 47 OVER MUSKEE CREEK	32.78	Maurice River
				47	0601151	N.J.ROUTE 47 OVER MANUMUSKIN RIV.	33.93	Manamuskin River
				49	0606150	NJ RT 49 OVER MANANTICO CREEK	39.08	Manantico Creek
				55	0609151	ROUTE 55 NB OVER MANANTICO CREEK	21.81	Manantico Creek
				55	0609152	RT 55 SB OVER MANANTICO CREEK	21.81	Manantico Creek
				56	1716151	NJ ROUTE 56 OVER MAURICE RIVER	7.47	Maurice River
				322	0826150	US ROUTE 322 OVER SCOTLAND RUN	21.73	Maurice River
S12	01482500	Salem River at Woodstown, NJ	13.0	40	1703152	U.S.RTE 40 OVER BRANCH SALEM CRK.	13.59	Salem River
				45	1705150	NJ RT 45 & US RT 40/SALEM RIVER	10.40	Salem River

Figure 1

Central Region
Group C6

Data Sheet – Bridge No. 1102150

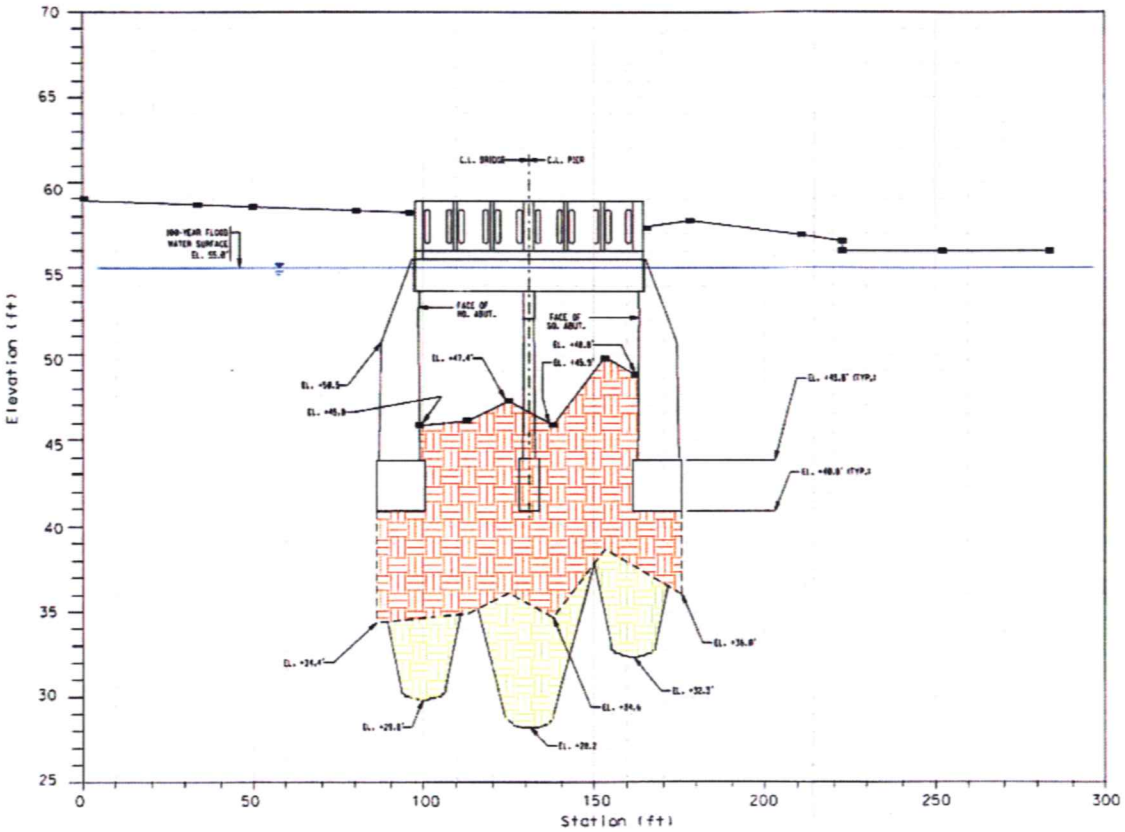
Route: 1B
Community: Lawrence Township
Milepoint: 1.51
County: Mercer

Waterway Name: Shabakunk Creek
Drainage Basin: Assunpink Creek
Watershed Management Area: Central Delaware (11)
Watershed Management Region: Northwest

Superstructure Type: Encased steel stringers
Substructure Type: Vertical wall abutments, solid wall pier
Abutment Foundation Type: Spread footing on soil
Pier Foundation Type: Spread footing on soil

History of Scour Problems: Undermining and settlement of center pier at upstream end of bridge
History of Debris: Woody debris at upstream nose of pier
Streambed Material: Fine to coarse gravel
Substructure Redundancy: Yes

Calculated Scour Depths at 100-year Flood



CROSS-SECTION (LOOKING DOWNSTREAM)

Figure 2

FLOOD MONITORING PROGRAM

ROUTE _____ DATE _____

BRIDGE NO. _____

GENERAL			CRITICAL							NON-CRITICAL								
Freeboard Normal _____ Minimum _____ Date _____ **Substructure Type** Abut. _____ Pier _____			1	2	3	4	5	6	7	1	2	3	4	5	6	7	8	
Time	Weather	Insp. Initials	Alignment (Y, N)	Tilt (Y, N)	Vibration (Y, N)	Approx. Freeboard (Nearest 1/2 ft)	Snagging Debris (Y, N)	Bridge Noise (Y, N)	Superstructure Distress (Y, N)	Length (Chg. Nearest 1/2 inch)	Erosion (Y, N)	Settlement (Y, N)	Cracking (Y, N)	Debris (N, L, M, H)	Impacting Debris (Y, N)	Flow Characteristic Changes (Y, N)	Stream Noise (Y, N)	Remarks (See Below)

REMARKS

IV

VULNERABILITY INDEX FOR SCOUR CRITICAL BRIDGES

IV. VULNERABILITY INDEX FOR OF SCOUR CRITICAL BRIDGES

A. INTRODUCTION

The previous section provided an approach to monitoring scour critical bridges. However, during storms that encompass a large area, it may not be possible to simultaneously monitor all of the bridges that have been identified as potentially scour critical. In addition to the experience of the Department staff that have knowledge of bridges that have a history of problems, it was thought to be beneficial to try and identify those bridges that have factors that would increase their potential vulnerability to scour damage in order to help focus resources on more critical needs. The index presented here only focuses on the aspects of bridges that could make it more vulnerable to scour damage. The relative importance of the structure to the transportation network is another critical factor that also would need to be considered. Items such as functional classification, ADT and bypass detour length are other factors that could be used to develop an alternative list of priority bridges. They have been left out of this index since the focus of the scour evaluation program is to identify bridges that have a susceptibility to scour damage.

B. FACTORS FOR VULNERABILITY INDEX

As previously noted, the prioritization process combines a number of factors that can have an influence on a bridge's potential vulnerability to scour damage. In this regard, ten factors were selected for this process and each given a relative weight of 0 to 20. This results in an overall score for each bridge between 0 and 100. The greater the total score for a structure, the higher is its relative vulnerability to scour damage. It should be noted that the index is only an approximate approach. Site conditions could make any one of these factors (such as the presence of debris) more critical than the others. Also as noted earlier, the index does not take into account the relative importance of the structure to the transportation network. Therefore, even though a bridge has a lower rating, its location on an interstate highway could make it more critical to the overall transportation system of the state. The ten factors used in the vulnerability index and the percent used for each factor are as follows:

1. Type of Foundation	20%
2. Existing Scour Related Problems	20%
3. Streambed Material	10%
4. History of Debris	10%
5. Substructure Redundancy	10%
6. Scour Critical Pier	10%
7. Angle of Attack	5%
8. Amount of Contraction Scour	5%
9. Superstructure Redundancy	5%
10. Scour Critical Flow Rate	5%

1. Type of Foundations (20%)

As identified during the Stage I screening, the type of foundations supporting a bridge can have a direct bearing on its potential vulnerability to scour damage. In general, spread footings on soil are more vulnerable to scour since they provide support at a shallower elevation than a pile foundation. In addition, the amount of flow blocked by a spread footing can often be greater than a pile foundation, which can have a direct effect on the resulting depth of scour. The relative rating criteria for this item are as follows:

Coding Criteria	Rating
Pile foundations and lengths greater than 20 feet	+6
Pile foundations and lengths unknown or less than 20 feet	+14
Bridge with spread footing foundation on soil	+20

2. Existing Scour-Related Problems (20%)

The history of scour problems at a bridge site is one of the best indicators of the potential vulnerability of a bridge to scour. In addition, an existing scour hole would reduce the amount of additional scour necessary to create instability of the substructure units. The relative rating criteria for this item are as follows:

Coding Criteria	Rating
Bridge with no, or very minor, scour	+0
Bridge with exposed spread footing, or minor amount of pile length (<10%) exposed	+12
Bridge with undermined spread footing, or greater than 10% of pile length exposed	+20

3. Streambed Material (10%)

The streambed material in the channel is an important consideration in evaluating a bridge's potential vulnerability to scour. Material that is finer in nature will more easily be removed from the streambed. It is also more likely to be removed by a lower velocity flow rate. The determination of the coding will be based upon the average D50 particle size determined during the Stage II Evaluation. The relative rating criteria for this item are as follows:

Coding Criteria	Rating
Channel with cobble or greater (> 76 mm)	+0
Channel with fine and course gravel (4.76mm to 75 mm)	+4
Channel with medium and course sand (0.426mm to 4.75 mm)	+6
Channel with silt or fine sand (0.005 mm to 0.425mm)	+10

4. History of Debris (10%)

Debris lodged on a pier can result in an increase in local scour. The debris increases the width of the obstruction at the pier, which increases the transport of sediment out of a deeper and more extensive scour hole. The information currently used for determining the rating of this structure is based upon actual observations made during the Stage I and II programs. In addition, it was also based upon the identification of a debris problem during the most recent NBIS inspection. This is not a perfect solution since debris buildup may have occurred at other times. The relative rating criteria for this item are as follows:

Coding Criteria	Rating
Bridge with history of no, or very minor, debris related issues	+0
Bridge with history of moderate debris related issues	+5
Bridge with history of significant debris related issues	+10

5. Substructure Redundancy (10%)

A bridge with non-redundant substructure elements is more likely to suffer damage before one that has a redundant load path. In addition, these types of bridges can often fail in a more sudden and catastrophic manner. Therefore the purpose of this item is to give a higher vulnerability rating to those structures that have non-redundant substructure elements. The rating criteria for this item are as follows:

Coding Criteria	Rating
Bridge that has a redundant substructure	+0
Bridge that has a non-redundant substructure	+10

6. Scour-Critical Pier (10%)

The conservative nature of the current abutment scour equations is a factor in the determination of a bridge's potential vulnerability. Therefore, a bridge that has a pier that is scour-critical would generally be more vulnerable than those structures that have only scour-critical abutments. This item would also typically result in a higher vulnerability rating for those structures that have a greater number of scour-critical elements. The rating criteria for this item are as follows:

Coding Criteria	Rating
Bridge that has no scour critical piers	+0
Bridge that has a scour critical pier	+10

7. Angle of Attack (5%)

The angle between the flow and the substructure unit affects the amount of flow blocked by the unit. Therefore, it is a factor in the calculated local pier and abutment scour. The amount of the influence is not overly significant until the angle becomes fairly large. The relative rating criteria for this item are as follows:

Coding Criteria	Rating
Bridge with attack angle less than 15 degrees	+0
Bridge with attack angle between 16 and 30 degrees	+2
Bridge with attack angle between 31 and 45 degrees	+4
Bridge with attack angle greater than 45 degrees	+5

8. Amount of Contraction Scour (50-year storm event) (5%)

The amount of contraction scour is a direct reflection of the amount of flow the bridge opening can pass, relative to the upstream channel. In addition, it is often a reflection of the velocity of the flow in the stream channel, which can have a significant impact on the potential vulnerability of a bridge to scour. The amount of contraction scour can often have a significant impact on the amount of total scour. In many cases, it was found that the flow of the 50-year storm event produced the maximum contraction scour, often due to the relief provided when the structure or approach roadway is overtopped. For this reason, the scour depth at the 50-year storm event is used for the comparative purposes of this item. The relative rating criteria for this item are as follows:

Coding Criteria	Rating
Bridge with scour depth between 0.0 and 0.9 feet	+0
Bridge with scour depth between 1.0 and 2.0 feet	+2
Bridge with scour depth between 2.1 and 3.9 feet	+4
Bridge with scour depth greater than 4.0 feet	+5

9. Superstructure Redundancy (5%)

Continuity and redundancy in superstructure elements is another element that needs to be considered in evaluating the potential vulnerability of a bridge to scour. Bridges that have a continuous design and redundant load paths are less likely to fail in a catastrophic manner. While it is not believed this factor is as important as redundancy in a substructure element, it is still an element that will relate to the overall vulnerability of the bridge to scour damage. The rating criteria for this item are as follows:

Coding Criteria	Rating
Bridge that is of continuous design and has redundant load path members	+0
Bridge that is of non-continuous design and has redundant load path members	+3
Bridge that is of non-continuous design and has non-redundant load path members	+5

10. Scour-Critical Flow Rate (5%)

The scour event that will result in the bridge receiving a scour critical classification is another consideration in determining the potential vulnerability priority of the structure. For this item, the discharge rate which first produces an unstable substructure element (either pier or abutment) controls the rating of the item. The relative rating criteria for this item are as follows:

Coding Criteria	Rating
Bridge that is stable till the 500 year discharge	+0
Bridge that is stable till the 100 year discharge	+3
Bridge that is unstable at the 50 year discharge	+5

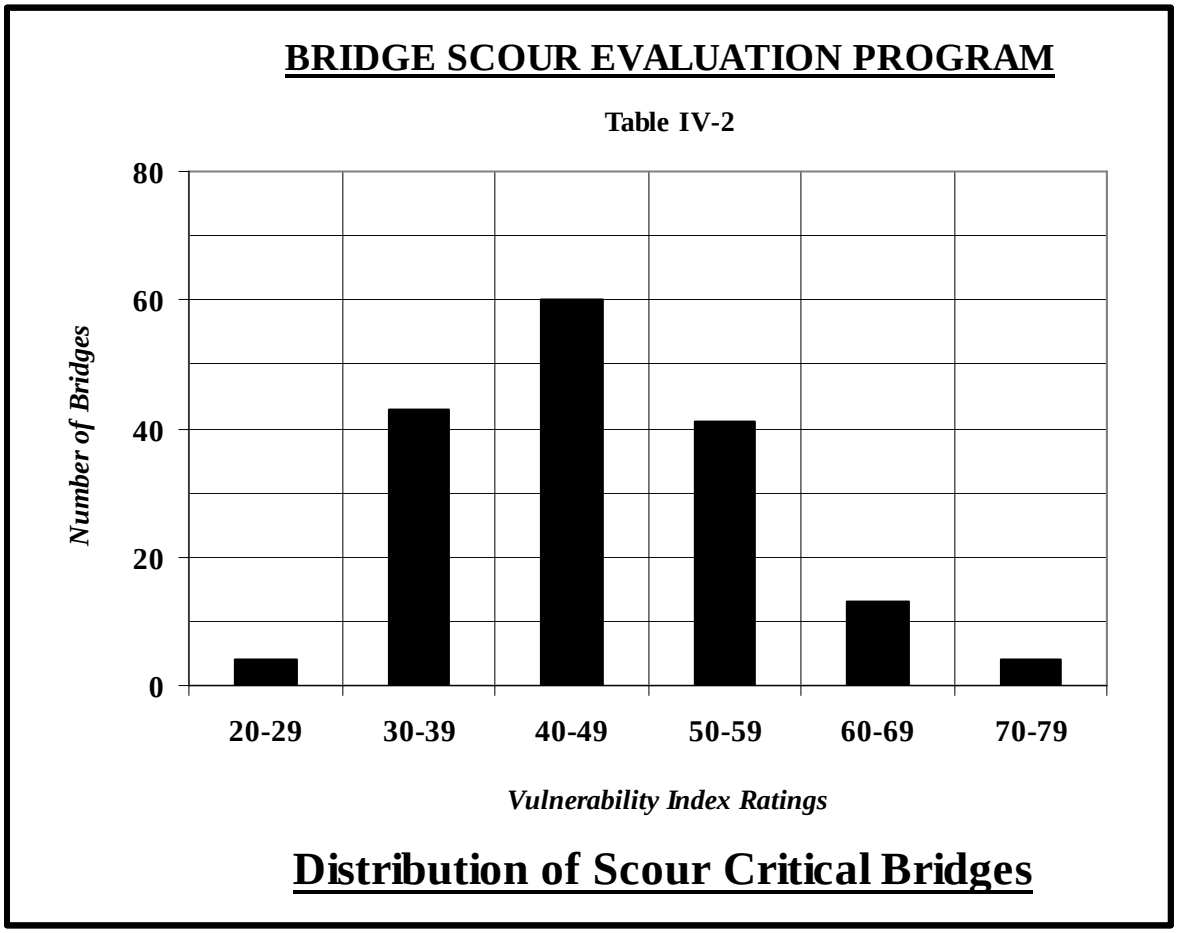
C. VULNERABILITY INDEX RESULTS

The system described in the previous section was used to establish ratings for each individual scour critical state owned bridge. The data used for the ratings was taken from the individual Stage I and II reports as well a list of selected current SI& A data. If the bridges were to be classified by ratings, it would appear that those with ratings greater that 60 would have a high potential vulnerability to scour damage. Those with a rating less than 40 would be the least vulnerable, while the remaining would be moderately vulnerable. A breakdown of the bridges in these categories by State Maintenance Region is provided in Table IV-1.

BRIDGES BY VULNERABILITY RATING
Table IV-1

Potential Scour Vulnerability Ratings	Number of Bridges			
	North	Central	South	Total
High (60-79)	10	6	1	**17**
Moderate (40-59)	42	33	26	**101**
Low (20-39)	27	7	13	**47**
Total	**79**	**46**	**40**	**165**

A more detailed breakdown of the ratings for all of the scour critical bridges is provided in Table IV-2, which groups them according to their rating values. In addition, Table IV-3 at the end of this section provides the ratings for all of the bridges in route number order. In Appendix J are additional lists that breakdown the bridges in terms of index values on an overall statewide basis and by State Maintenance Region.



SCOUR CRITICAL BRIDGE VULNERABILITY INDEX

Table IV-3

Rte	Number	Name	Type of Found	Scour Problems	Streambed Material	History of Debris	Subst Redun	Scour Critical Pier	Angle of Attack	50 YR Cont Scour	Super Redun	Critical Flow Rate	Total
1B	1102150	US 1B OVER SHABAKUNK CREEK	20	20	4	10	0	10	0	5	3	5	77
1&9	0201151	US 1&9(BROAD AVENUE) OVER WOLF CREEK	20	12	6	0	0	0	2	2	3	5	50
3	1601157	NJ ROUTE 3 OVER THIRD RIVER	20	12	4	0	0	0	0	0	3	5	44
3	1601160	NJ RT 3 OVER UPPER POND SPILLWAY	20	0	4	0	0	0	0	0	3	5	32
4	0206166	NJ 4 / HACKENSACK RIVER & ACCESS ROAD	14	12	10	0	10	10	0	2	5	5	68
4	0206181	NJ 4 OVER FLAT ROCK BROOK	20	12	4	0	0	0	0	0	3	5	44
4	0206189	KINDERKAMACK RD OVER COLES BROOK	20	20	10	0	0	0	4	4	3	5	66
9	1303155	US RT 9 OVER MILFORD BROOK	20	12	10	0	0	0	0	2	3	5	52
9	1502153	US 9 OVER OYSTER CREEK	6	0	10	0	0	0	0	2	3	3	24
9	1502154	US 9 OVER S. BRANCH OF FORKED RIVER	14	12	10	0	0	10	0	2	3	3	54
9	1502157	US 9 OVER CEDAR CREEK	20	12	10	0	0	10	0	0	3	3	58
10	0709150	RT 10 OVER WILLOW MEADOW BROOK	20	0	6	0	0	0	2	2	3	5	38
10	0711150	NJ ROUTE 10 OVER CANOE BROOK	20	12	4	0	0	0	0	2	3	5	46
10	1401156	RT 10 OVER MILL BROOK	20	12	6	0	0	0	2	2	3	5	50
10	1402150	NJ ROUTE 10 OVER MALAPARDIS BROOK	20	12	4	0	0	0	2	2	3	5	48
15	1403150	NJ RT 15 OVER BRNT MDW(GRN PD) BROOK	20	0	6	0	0	0	2	2	3	5	38
15	1404155	GOVRNMNT RD(PARKER RD) WB/GREEN POND	20	12	4	0	0	0	0	2	3	5	46
15	1404158	NJ ROUTE 15 SB / ROCKAWAY RIVER	20	0	6	0	0	10	0	0	0	5	41
15	1404159	NJ RT 15 RAMP A OVER HURDTOWN BROOK	20	0	4	0	0	0	0	2	3	5	34
15	1424150	NJ 15 NB OVER LAKE SHAWNEE	20	0	6	0	0	0	0	0	3	5	34
15	1922150	NJ ROUTE 15 OVER BEAVER RUN	20	12	6	0	0	0	0	2	3	5	48
15	1922151	NJ.RTE.15 OVER PAULINS KILL CREEK	20	0	6	0	0	0	2	5	3	5	41
17	0216150	RT 17 OVER SPROUT BROOK	20	12	10	0	0	0	0	2	3	5	52
17	0216157	NJ RT 17 OVER SADDLE RIVER.	20	0	6	0	0	0	0	4	3	5	38
17	0218161	N.J 17 NB/US 202 & RAMAPO RIVER	20	0	10	5	0	10	0	0	3	5	53
17	0218162	NJ RT 17 SB OVER US 202 & RAMAPO RVR	20	0	10	0	0	10	0	2	3	5	50
21	0716156	MAIN ST OVER SECOND RIVER	20	20	4	0	0	0	2	0	3	5	54
22	1005153	RT US 22 OVER BR ROCKAWAY CREEK	20	20	4	0	0	0	4	4	3	5	60
22	1005162	US 22 EB OVER S BR ROCKAWAY CREEK	20	12	6	0	0	10	0	5	3	5	61
22	1005163	RT US 22WB/S BR OF ROCKAWAY CREEK	20	0	6	0	0	10	0	0	3	5	44
22	1801153	US 22 EB OVER N BR RARITAN RIVER	20	12	4	5	0	10	0	0	3	5	59
22	1801154	US 22 WB OVER N BR RARITAN RIVER	20	12	4	5	0	10	0	0	3	5	59
22	1803156	RT US 22 OVER STONY BROOK	20	12	6	5	0	0	2	0	3	5	53
22	2003157	US 22 OVER ECHO LAKE	20	12	4	0	0	0	0	0	3	5	44
22	2003161	US 22 EB OVER RAHWAY RIVER	14	0	6	0	0	0	0	5	3	5	33
22	2003162	US 22 WB OVER RAHWAY RIVER	20	0	6	0	0	0	0	0	0	3	29
22	2004151	US 22 OVER ELIZABETH RIVER	20	12	4	0	0	0	2	0	3	5	46
22	2102154	US 22 OVER LOPATCONG CREEK	20	0	6	5	0	10	0	5	3	5	54
23	0719151	RT 23 OVER PECKMANS BROOK	20	0	4	0	0	0	2	2	3	5	36
23	1405156	RT23/PEQUANNOCK R.HAMBURG TPK SB, RR	20	12	6	5	10	10	4	0	5	5	77
23	1604150	ROUTE NJ 23/PASSAIC RIVER	14	0	10	5	0	10	0	5	3	5	52
23	1605153	NJ RTE 23 SB OVER PEQUANNOCK RIV.	20	12	6	0	0	0	0	0	3	5	46
23	1605156	NJ RT 23 SB OVER PEQUANNOCK RIVER	20	12	4	0	0	0	0	2	3	5	46
23	1605158	NJ ROUTE 23 NB/MACOPIN RIVER	20	12	6	0	0	0	0	2	3	5	48
23	1605162	RTE 23SB OVER PEQUANNOCK RV	14	0	6	5	0	10	0	0	0	5	40
23	1605167	ROUTE 23 SB OVER PEQUANNOCK RIVER	20	0	4	0	0	0	2	0	3	3	32
23	1605175	RT 23 NB OVER PEQUANNOCK RIVER	20	0	6	0	0	0	0	0	3	5	34
23	1619151	N.J 23 OVER POMPTON RIVER	20	12	10	5	0	10	0	0	0	5	62
23	1903152	23/BR OF PACOCK BRK & DEL-OSTEGO R.R.	20	12	6	0	10	10	0	4	5	5	72
23	1903153	RT 23 OVER BRANCH OF FRANKLIN LAKE	20	0	6	0	0	0	2	0	3	5	36

SCOUR CRITICAL BRIDGE VULNERABILITY INDEX

Table IV-3

Rte	Number	Name	Type of Found	Scour Problems	Streambed Material	History of Debris	Subst Redun	Scour Critical Pier	Angle of Attack	50 YR Cont Scour	Super Redun	Critical Flow Rate	Total
23	1904152	NJ 23 OVER WALLKILL RIVER	20	12	10	0	0	0	0	0	3	5	50
23	1904153	NJ RT 23/ BR OF WALLKILL RIVER	20	0	10	0	0	0	0	5	3	5	43
23	1905151	ROUTE NJ 23/BRANCH OF CLOVE RIVER	20	12	4	0	0	0	0	0	3	5	44
27	1105152	RT NJ 27 OVER MILLSTONE RIVER	20	0	4	0	0	10	4	2	3	5	48
27	1218158	NJ RT 27 OVER S BRANCH RAHWAY RIVER	20	12	4	0	0	0	0	0	3	5	44
27	2006151	RT 27 OVER ROBINSON BRNCH RAHWAY RVR	20	20	6	10	0	10	0	4	3	5	78
27	2006152	NJ RT 27/RAHWAY RIVER.	20	20	10	0	0	10	0	0	3	5	68
29	1006151	ROUTE 29 OVER SWAN CREEK	20	20	6	0	0	0	0	0	3	5	54
29	1009150	ROUTE 29 OVER COPPER CREEK	20	12	6	0	0	0	0	0	3	5	46
29	1110158	NJ 29 OVER MOORES CREEK	20	0	6	0	0	10	0	5	3	5	49
30	0405153	US RTS 30 & 130 OVER COOPER RIVER	14	12	10	0	0	10	0	0	3	5	54
31	1013152	ROUTE NJ 31 OVER WILLOUGHBY BROOK	20	0	6	0	0	0	0	0	3	5	34
31	2111151	RT 31 OVER POHATCONG CREEK	20	0	10	0	0	0	0	5	3	5	43
31	2111155	NJ RT 31 OVER PEQUEST RIVER	20	0	6	0	0	10	0	0	3	5	44
33	1304151	OLD ROAD(NJ 33) OVER MILLSTONE RIVER	20	0	6	5	0	0	0	0	5	5	41
33	1304156	ROUTE 33 OVER MANALAPAN BROOK	20	12	6	0	0	0	4	2	3	3	50
34	1308154	N.J.ROUTE 34 OVER BIG BROOK	20	0	10	0	0	0	2	4	3	5	44
35	1222150	ROUTE 35/CHEESEQUAKE CREEK & RAMP	14	20	10	0	0	10	0	5	5	5	69
36	1315157	NJ 36 OVER FLAT CREEK	14	0	10	0	0	0	0	5	3	5	37
38	0408160	MILL ROAD/SO BR PENNSAUKEN CREEK	6	0	10	0	0	0	0	5	3	5	29
40	1703152	U.S.RTE 40 OVER BRANCH SALEM CRK.	14	0	6	0	0	0	0	5	3	5	33
45	0807152	RT45 OVER RACCOON CREEK	14	0	6	0	0	0	0	4	3	5	32
45	0808151	ROUTE 45 OVER EDWARDS RUN	20	12	6	0	0	0	0	2	3	5	48
45	0810150	RT 45 OVER WOODBURY CREEK	20	0	6	0	0	0	0	2	3	5	36
45	1705150	NJ RT 45 & US RT 40/SALEM RIVER	20	12	10	0	0	0	0	2	3	5	52
46	0220157	U.S.ROUTE 46 OVER SADDLE RIVER	20	0	6	10	0	10	0	4	3	5	58
46	0722157	US ROUTE 46 EB OVER PASSAIC RIVER	20	0	4	5	0	10	0	0	5	5	49
46	0722158	U.S. ROUTE 46 WB /PASSAIC RIVER	20	0	6	5	0	10	0	0	0	5	46
46	1407152	ROUTE US 46 WB OVER MINE BROOK	20	0	6	0	0	0	0	2	3	5	36
46	1407153	RTE US 46EB OVER BRANCH MINE BRK.	20	0	6	0	0	0	0	0	3	5	34
46	1407156	US 46 OVER SOUTH BR RARITAN RIVER	20	0	6	0	0	0	0	2	3	5	36
46	1409154	US ROUTE 46 OVER GRANNEYS BROOK	20	0	10	5	0	0	0	2	3	5	45
46	1410159	ROUTE 46 OVER PASSAIC RIVER	20	0	6	5	0	10	0	0	3	5	49
46	2107154	US 46 WB OVER BEAVER BROOK	20	12	4	0	0	0	0	0	5	5	46
46	2107155	US 46 EB OVER BEAVER BROOK	20	0	4	0	0	0	4	0	3	5	36
46	2107156	US ROUTE 46 OVER PAULINS KILL	20	12	6	0	0	10	0	0	3	5	56
46	2108162	RTE US 46 OVER MUSCONETCONG RIVER	20	12	6	0	0	10	0	0	5	5	58
47	0601150	RT 47 OVER MUSKEE CREEK	6	12	10	0	0	0	0	5	3	5	41
47	0601151	N.J.ROUTE 47 OVER MANUMUSKIN RIV.	6	0	6	0	0	10	0	2	5	5	34
47	0815152	NJ 47 OVER BIG TIMBER CREEK	14	12	10	0	0	10	0	4	5	5	60
49	0509150	RT 49 OVER MILL CREEK	20	12	4	0	0	0	2	0	3	5	46
49	0606150	NJ RT 49 OVER MANANTICO CREEK	20	12	6	0	0	0	2	2	3	5	50
50	0510152	ROUTE 50 OVER TUCKAHOE RIVER	6	12	6	0	0	10	0	0	5	5	44
53	1411152	RT 53 OVER DEN BROOK	20	0	6	0	0	0	0	0	3	5	34
55	0609151	ROUTE 55 NB OVER MANANTICO CREEK	6	12	6	0	0	0	0	5	3	5	37
55	0609152	RT 55 SB OVER MANANTICO CREEK	6	12	6	0	0	0	0	5	3	5	37
56	1716151	NJ ROUTE 56 OVER MAURICE RIVER	14	12	10	0	0	10	0	4	3	5	58
57	2105164	RT 57 OVER POHATCONG CREEK	20	0	10	0	0	0	0	4	3	5	42
57	2106164	NJ 57 OVER HANCES BROOK	20	0	6	0	0	0	0	5	3	5	39
71	1320152	ROUTE 71 OVER WRECK POND	14	0	6	0	0	0	0	5	3	5	33

SCOUR CRITICAL BRIDGE VULNERABILITY INDEX

Table IV-3

Rte	Number	Name	Type of Found	Scour Problems	Streambed Material	History of Debris	Subst Redun	Scour Critical Pier	Angle of Attack	50 YR Cont Scour	Super Redun	Critical Flow Rate	Total
71	1321150	ROUTE 71 OVER SHARK RIVER	14	12	10	0	0	10	4	2	3	5	60
78	1015157	I-78EB SERV.RD / MULHOCKAWAY CREEK	20	0	10	0	0	0	2	0	3	5	40
78	1016156	ROUTE I-78 EB OVER S BR RARITAN RIVER	20	0	4	0	0	10	0	0	3	5	42
78	1016157	I-78 WB OVER SO BR. RARITAN RIVER	20	0	4	10	0	10	0	0	3	5	52
78	2113160	I78WB/ASBURY RD(CR632)&MUSCONETCONG R	20	0	6	0	0	10	0	4	3	5	48
80	0225166	I-80/MRKT.MAIN,FAIRVIEW STS.&SADL RIV	20	0	10	0	10	10	0	2	3	5	60
80	1413155	RAMP C OVER BURNT MEADOW BROOK	20	0	6	0	0	0	2	0	3	5	36
80	1413174	I-80 EB OVER ROCKAWAY RIVER	14	0	4	0	0	10	0	0	3	5	36
82	2012150	NJ ROUTE 82 OVER RAHWAY RIVER	20	0	10	5	0	10	0	4	3	5	57
94	1923150	NJ RT.94 OVER WALLKILL RIVER	20	0	6	0	0	0	5	0	5	5	41
94	2117157	NJ 94 OVER JACKSONBURG CREEK	20	12	4	5	0	10	0	0	3	5	59
94	2117159	NJ ROUTE 94 OVER BLAIR CREEK.	20	0	4	0	0	10	0	0	3	5	42
94	2117160	ROUTE 94 OVER PAULINS KILL	20	12	6	5	0	10	0	0	3	5	61
130	0316150	RT US 130 OVER POMPESTON CREEK	20	0	10	0	0	0	0	5	3	5	43
130	0317150	US 130 NB OVER ASSISCUNK CREEK	14	12	6	0	0	0	0	0	3	5	40
130	0317152	US 130 SB OVER ASSISCUNK CREEK	20	0	6	0	0	10	0	0	3	5	44
130	0319152	US RT. 130 OVER CROSSWICKS CREEK	20	0	10	0	0	0	0	4	3	5	42
130	0817150	US RT 130 OVER BIG BIRCH CREEK	6	0	10	0	0	0	0	5	3	5	29
130	0817151	RT US 130 OVER RACCOON CREEK	14	12	4	0	0	10	0	0	5	5	50
130	0818151	RT US 130 /BIG TIMBER CREEK	6	0	10	0	0	10	0	5	5	5	41
130	1122150	US 130 OVER DOCTORS CREEK	20	0	10	0	0	0	2	2	3	5	42
130	1123152	US ROUTE 130 OVER ROCKY BROOK	20	0	10	0	0	0	0	2	3	5	40
130	1123153	RT 130 OVER MILLSTONE RIVER	20	0	6	0	0	0	0	4	3	5	38
130	1227159	US 130 OVER OAKEYS BROOK	20	12	6	0	0	0	4	5	3	5	55
154	0424151	RT 154 OVER NO BR COOPER RIVER	14	0	6	0	0	0	2	5	3	5	35
166	1516151	RT NJ166 OVER S.CHANNEL OF TOMS RIVER	14	0	6	0	0	10	0	5	5	5	45
166	1516152	RT NJ 166 OVER NO. CHANNEL OF TOMS R.	14	12	6	0	0	0	0	4	3	0	39
173	2103152	RT 173 OVER POHATCONG CREEK	20	12	10	0	0	0	0	4	3	5	54
173	2103153	NJ 173 OVER MUSCONETCONG RIVER	20	0	6	5	0	10	0	2	3	5	51
202	1416152	US 202 OVER WHIPPANY RIVER	20	0	6	0	0	0	0	4	0	5	35
202	1807155	US 202 OVER N BR RARITAN RIVER	20	12	4	10	0	10	0	5	3	5	69
202	1809150	US202 OVER N BR RARITAN RIVER	20	12	6	5	0	0	0	4	3	5	55
202	1809153	RT 202 OVER BR MINE BROOK	20	0	4	0	0	0	2	4	3	5	38
202	1809158	US RT 202 OVER PASSAIC RIVER	20	12	6	0	0	0	2	2	5	5	52
206	0118150	US 206 OVER CEDAR BRANCH	20	12	10	0	0	0	5	0	3	5	55
206	0118152	US 206 OVER GREAT SWAMP BRANCH	20	0	10	0	0	0	4	0	3	5	42
206	0118153	RT 206 OVER ALBERTSONS BROOK	20	0	10	0	0	0	0	2	3	5	40
206	0324152	U.S ROUTE 206 OVER SPRINGERS BROOK	14	0	10	0	0	10	0	4	3	5	46
206	0324153	US 206 OVER MUSKINGUM CREEK	14	0	10	0	0	0	0	0	3	3	30
206	0324155	US 206 OVER SO BR OF RANCOCAS CREEK	14	0	10	0	0	0	2	5	3	5	39
206	0324156	ROUTE US 206 OVER JADE RUN	6	12	10	0	0	0	0	2	3	5	38
206	0324160	US RT 206 OVER BARKERS CREEK	14	12	10	0	0	10	0	2	3	5	56
206	0324162	US206 OVER ASSISCUNK CREEK	14	12	10	5	0	10	0	0	3	5	59
206	0326152	US 206 NB OVER CROSSWICKS CREEK	14	0	10	0	0	10	0	5	3	5	47
206	0326153	US206 SB OVER CROSSWICKS CREEK	14	0	10	0	0	10	0	5	5	5	49
206	1417156	RT 206/SOUTH BR OF RARITAN RIVER	20	12	4	0	0	0	0	0	3	5	44
206	1417157	US 206 OVER TRIB TO DRAKES BROOK	20	12	6	0	0	0	0	2	3	5	48
206	1417159	US RT 206/S BRANCH RARITAN RIVER	20	0	6	0	0	0	4	0	3	5	38
206	1810153	US 206 OVER BACK BROOK	20	0	6	0	0	0	4	5	3	5	43
206	1810155	RT US 206 OVER CRUSERS BROOK	20	0	6	0	0	10	2	4	3	5	50

SCOUR CRITICAL BRIDGE VULNERABILITY INDEX

Table IV-3

Rte	Number	Name	Type of Found	Scour Problems	Streambed Material	History of Debris	Subst Redun	Scour Critical Pier	Angle of Attack	50 YR Cont Scour	Super Redun	Critical Flow Rate	Total
206	1810158	ROUTE US 206 OVER PIKE RUN	20	0	4	5	0	0	2	5	3	5	44
206	1810164	US206 OVER BR OF ROYCES BROOK	20	12	6	5	0	0	2	5	3	5	58
206	1810165	US206 OVER BR OF ROYCES BROOK	20	0	6	0	0	0	4	5	3	5	43
206	1911151	US206 OVER LUBBERS RUN	20	0	6	0	0	0	0	4	3	5	38
206	1911159	US206 OVER PEQUEST RIVER	20	0	4	0	0	0	0	0	3	5	32
206	1912158	US ROUTE 206 OVER KITTATINY BROOK	20	12	6	0	0	0	0	0	3	5	46
206	1912160	US 206 OVER BIG FLAT BROOK	20	12	4	5	0	10	0	2	3	5	61
208	1612154	ROUTE 208 RAMP A OVER GOFFLE BROOK	20	0	6	0	0	0	0	2	3	5	36
280	1418154	RT.I-280 EB OVER PASSAIC RIVER	20	0	6	5	0	10	0	2	3	5	51
284	1907152	NJ RT 284/BR OF WALLKILL RIVER	20	0	6	0	0	0	2	2	3	5	38
284	1907157	NJ 284 OVER BR OF WALLKILL RIVER	20	0	6	0	0	0	5	0	3	5	39
322	0119151	US 322 OVER HOSPITALITY BROOK	20	0	6	0	0	0	4	5	3	5	43
322	0119156	US 322 OVER BIG DITCH	14	12	6	0	0	10	2	5	3	5	57
322	0825150	US 322 OVER RACCOON CREEK	14	12	10	0	0	0	5	5	3	5	54
322	0826150	US ROUTE 322 OVER SCOTLAND RUN	20	0	6	0	0	0	0	0	3	5	34

APPENDIX

A. Rating Criteria for SI&A Item No. 113
B. Recommended Coding of Item 113 for State Waterway Bridges
C. State Flood Watch List Bridges by State Maintenance Region
D. Bid Values, CPS Estimate and Bid Tabulation for Contract 2005-1
E. Construction Cost for Scour Countermeasures by State Maintenance Region
F. Maps of Watershed Management Areas
G. List of Flood Watch Bridges by Watershed Region and Route
H. Information from USGS Website
I. List of Gauge Locations by Watershed, County And State Maintenance Region
J. Vulnerability Index by Index Value and State Maintenance Region

Appendix A

Rating Criteria for
SI&A Item No. 113

from

FHWA Recording and Coding Guide

MEMORANDUM

U.S. Department of
Transportation
**Federal Highway
Administration**

Subject: **ACTION:** Revision of Coding Guide, Item 113 - Scour Critical Bridges

Date: April 27, 2001

From: James D. Cooper */s/ original signed by*
Director of Bridge Technology

Reply to
Attn of: HIBT-30

To: Director of Field Services
Division Administrators
Federal Lands Highway Division Engineers

This memorandum implements the revisions to Item 60 - Substructure and Item 113 - Scour Critical Bridges, of the Recording and Coding Guide for the Structure Inventory and Appraisal of the Nation's Bridges (Coding Guide). These revisions have been developed in coordination with the National Bridge Inventory Steering Committee and my staff. The revisions represent new guidance for coding bridges over waterways for the observed and assessed scour condition and for scour and stream instability countermeasures for the protection of bridge foundations. Please add these revisions to the 1995 edition of the Coding Guide.

Attachments A and B show a mark-up version of the revisions to Items 60 and 113, respectively. The final version of Items 60 and 113 are shown in Attachments C and D, respectively. The revision to Item 60 is intended to make the coding of Items 60 and 113 consistent when a rating factor of 2 or below is determined for Item 113. The revisions to Item 113 are intended to expand the description of Codes 1, 2, 4, 5, 7, and 8. In addition, the revisions are intended to encourage bridge owners to develop a plan of action for each scour critical bridge as recommended in the FHWA Technical Advisory T 5140.23 titled "Evaluating Scour at Bridges" and for bridges coded "7" and "U" (unknown foundations).

We believe that these revisions will help to improve communication between the bridge inspector and the engineer and to enhance coding of bridges for the scour and/or stream instability condition. If you have any questions, please contact Mr. Jorge E. Pagán-Ortiz of my staff at (202) 366-4604.

Attachments

Attachment A

Item 60 - Substructure — 1 digit

This item describes the physical condition of piers, abutments, piles, fenders, footings, or other components. Rate and code the condition in accordance with the previously described general condition ratings. Code N for all culverts.

All substructure elements should be inspected for visible signs of distress including evidence of cracking, section loss, settlement, misalignment, scour, collision damage, and corrosion. The rating **factor** given by ~~Item 113 - Scour Critical Bridges, may have a significant effect on Item 60 if scour has substantially affected the overall condition of the substructure~~ **to Item 60 should be consistent with the one given to Item 113 whenever a rating factor of 2 or below is determined for Item 113 - Scour Critical Bridges**.

The substructure condition rating shall be made independent of the deck and superstructure.

Integral-abutment wingwalls to the first construction or expansion joint shall be included in the evaluation. For non-integral superstructure and substructure units, the substructure shall be considered as the portion below the bearings. For structures where the substructure and superstructure are integral, the substructure shall be considered as the portion below the superstructure.

Attachment B

Item 113 - Scour Critical Bridges — 1 digit

Use a single-digit code as indicated below to identify the current status of the bridge regarding its vulnerability to scour. ~~Scour analyses~~ **Evaluations** shall be made by hydraulic/geotechnical/structural engineers. ~~Details~~ **Guidance** on conducting a scour ~~analysis~~ **evaluation** ~~are~~ **is** included in the FHWA Technical Advisory **T** 5140.23 titled, "Evaluating Scour at Bridges."[1] **Detailed engineering guidance is provided in the Hydraulic Engineering Circular 18 titled "Evaluating Scour at Bridges."[2]** Whenever a rating factor of 4 **2** or below is determined for this item, the rating factor for Item 60 -- Substructure **and other affected items (i.e., load ratings, superstructure rating)** ~~may need to~~ **should** be revised to ~~reflect~~ be consistent with the severity of ~~actual~~ **observed** scour and resultant damage to the bridge. **A plan of action should be developed for each scour critical bridge (see FHWA Technical Advisory T 5140.23, HEC 18 and HEC 23[3]).** A scour critical bridge is one with abutment or pier foundation~~s which are~~ rated as unstable due to (1) observed scour at the bridge site **(rating factor of 2, 1, or 0)** or (2) a scour potential as determined from a scour evaluation study **(rating factor of 3)**. **It is assumed that the coding of this item has been based on an engineering evaluation, which includes consultation of the NBIS field inspection findings.**

Code Description

N Bridge not over waterway.

U Bridge with "unknown" foundation that has not been evaluated for scour. ~~Since~~ **Until** risk can~~not~~ be determined, ~~flag for monitoring~~ **a plan of action should be developed and implemented to reduce the risk to users from a bridge failure** during **and immediately after a** flood event~~, and, if appropriate, closure~~ **(see HEC 23).**

T Bridge over "tidal" waters that has not been evaluated for scour, but considered low risk. Bridge will be monitored with regular inspection cycle and with appropriate underwater inspections **until an evaluation is performed** ("Unknown" foundations in "tidal" waters should be coded U.)

9 Bridge foundations (including piles) on dry land well above flood water elevations.

8 Bridge foundations determined to be stable for **the** assessed or calculated scour condition~~s~~**.** ~~calculated~~ ~~s~~Scour **is determined to be** above top of footing (Example A) **by assessment (i.e., bridge foundations are on rock formations that have been determined to resist scour within**

the service life of the bridge[4]), by calculation or by installation of properly designed countermeasures (see HEC 23).

7 Countermeasures have been installed to ~~correct~~ **mitigate a**n ~~previously~~ existing problem with scour and to reduce the risk of bridge failure during a flood event. **Instructions contained in a plan of action have been implemented to reduce the risk to users from a bridge failure during or immediately after a flood event** ~~Bridge is no longer scour critical~~.

6 Scour calculation/evaluation has not been made. (Use only to describe case where bridge has not yet been evaluated for scour potential.)

5 Bridge foundations determined to be stable for **assessed or** calculated scour condition~~s~~**.** ~~s~~**S**cour **is determined to be** within **the** limits of footing or piles (Example B) **by assessment (i.e., bridge foundations are on rock formations that have been determined to resist scour within the service life of the bridge), by calculations or by installation of properly designed countermeasures (see HEC 23).**

4 Bridge foundations determined to be stable for **assessed or** calculated scour conditions; field review indicates action is required to protect exposed foundations ~~from effects of additional erosion and corrosion~~**(see HEC 23).**

3 Bridge is scour critical; bridge foundations determined to be unstable for **assessed or** calculated scour conditions:
- Scour within limits of footing or piles. (Example B)
- Scour below spread-footing base or pile tips. (Example C)

2 Bridge is scour critical; field review indicates that extensive scour has occurred at bridge foundations, **which are determined to be unstable by:** ~~Immediate action is required to provide scour countermeasures.~~
- a comparison of calculated scour and observed scour during the bridge inspection, or
- an engineering evaluation of the observed scour condition reported by the bridge inspector in Item 60.

1 Bridge is scour critical; field review indicates that failure of piers/abutments is imminent. Bridge is closed to traffic. **Failure is imminent based on:**
- a comparison of calculated and observed scour during the bridge inspection, or
- an engineering evaluation of the observed scour condition reported by the bridge inspector in Item 60.

0 Bridge is scour critical. Bridge has failed and is closed to traffic.

[1] FHWA Technical Advisory T 5140.23, Evaluating Scour at Bridges, dated October 28, 1991.
[2] HEC 18, Evaluating Scour at Bridges, Fourth Edition.
[3] HEC 23, Bridge Scour and Stream Instability Countermeasures, Second Edition.
[4] FHWA Memorandum "Scourability of Rock Formations," dated July 19, 1991.

Attachment C

Item 60 - Substructure 1 digit

This item describes the physical condition of piers, abutments, piles, fenders, footings, or other

components. Rate and code the condition in accordance with the previously described general condition ratings. Code N for all culverts.

All substructure elements should be inspected for visible signs of distress including evidence of cracking, section loss, settlement, misalignment, scour, collision damage, and corrosion. The rating factor given to Item 60 should be consistent with the one given to Item 113 whenever a rating factor of 2 or below is determined for Item 113 - Scour Critical Bridges.

The substructure condition rating shall be made independent of the deck and superstructure.

Integral-abutment wingwalls to the first construction or expansion joint shall be included in the evaluation. For non-integral superstructure and substructure units, the substructure shall be considered as the portion below the bearings. For structures where the substructure and superstructure are integral, the substructure shall be considered as the portion below the superstructure.

Attachment D

Item 113 - Scour Critical Bridges — 1 digit

Use a single-digit code as indicated below to identify the current status of the bridge regarding its vulnerability to scour. Evaluations shall be made by hydraulic/geotechnical/structural engineers. Guidance on conducting a scour evaluation is included in the FHWA Technical Advisory T 5140.23 titled, "Evaluating Scour at Bridges."[1] Detailed engineering guidance is provided in the Hydraulic Engineering Circular 18 titled "Evaluating Scour at Bridges."[2] Whenever a rating factor of 2 or below is determined for this item, the rating factor for Item 60 -- Substructure and other affected items (i.e., load ratings, superstructure rating) should be revised to be consistent with the severity of observed scour and resultant damage to the bridge. A plan of action should be developed for each scour critical bridge (see FHWA Technical Advisory T 5140.23, HEC 18 and HEC 23[3]). A scour critical bridge is one with abutment or pier foundation rated as unstable due to (1) observed scour at the bridge site (rating factor of 2, 1, or 0) or (2) a scour potential as determined from a scour evaluation study (rating factor of 3). It is assumed that the coding of this item has been based on an engineering evaluation, which includes consultation of the NBIS field inspection findings.

Code	Description
N	Bridge not over waterway.
U	Bridge with "unknown" foundation that has not been evaluated for scour. Until risk can be determined, a plan of action should be developed and implemented to reduce the risk to users from a bridge failure during and immediately after a flood event (see HEC 23).
T	Bridge over "tidal" waters that has not been evaluated for scour, but considered low risk. Bridge will be monitored with regular inspection cycle and with appropriate underwater inspections until an evaluation is performed ("Unknown" foundations in "tidal" waters should be coded U.)
9	Bridge foundations (including piles) on dry land well above flood water elevations.
8	Bridge foundations determined to be stable for the assessed or calculated scour condition. Scour is determined to be above top of footing (Example A) by assessment (i.e., bridge foundations are on rock formations that have been determined to resist scour within the service life of the bridge[4]), by calculation or by installation of properly designed countermeasures (see HEC 23).

7 Countermeasures have been installed to mitigate an existing problem with scour and to reduce the risk of bridge failure during a flood event. Instructions contained in a plan of action have been implemented to reduce the risk to users from a bridge failure during or immediately after a flood event.

6 Scour calculation/evaluation has not been made. (Use only to describe case where bridge has not yet been evaluated for scour potential.)

5 Bridge foundations determined to be stable for assessed or calculated scour condition. Scour is determined to be within the limits of footing or piles (Example B) by assessment (i.e., bridge foundations are on rock formations that have been determined to resist scour within the service life of the bridge), by calculations or by installation of properly designed countermeasures (see HEC 23).

4 Bridge foundations determined to be stable for assessed or calculated scour conditions; field review indicates action is required to protect exposed foundations (see HEC 23).

3 Bridge is scour critical; bridge foundations determined to be unstable for assessed or calculated scour conditions:
- Scour within limits of footing or piles. (Example B)
- Scour below spread-footing base or pile tips. (Example C)

2 Bridge is scour critical; field review indicates that extensive scour has occurred at bridge foundations, which are determined to be unstable by:
- a comparison of calculated scour and observed scour during the bridge inspection, or
- an engineering evaluation of the observed scour condition reported by the bridge inspector in Item 60.

1 Bridge is scour critical; field review indicates that failure of piers/abutments is imminent. Bridge is closed to traffic. Failure is imminent based on:
- a comparison of calculated and observed scour during the bridge inspection, or
- an engineering evaluation of the observed scour condition reported by the bridge inspector in Item 60.

0 Bridge is scour critical. Bridge has failed and is closed to traffic.

[1] FHWA Technical Advisory T 5140.23, Evaluating Scour at Bridges, dated October 28, 1991.
[2] HEC 18, Evaluating Scour at Bridges, Fourth Edition.
[3] HEC 23, Bridge Scour and Stream Instability Countermeasures, Second Edition.
[4] FHWA Memorandum "Scourability of Rock Formations," dated July 19, 1991.

Appendix B

Recommended Coding of SI&A Item 113

for

State Waterway Bridges

New Jersey Bridge Scour Evaluation Program

8/10/2006

Rte	Number	Name	Stage I	Stage II	Phase	Item 113	Additional Comments
1	1101150	ROUTE US 1 OVER ASSUNPINK CREEK	Yes			8	Culvert
1	1101162	US 1 RAMP/D&R CANAL AND US 1 SB	Yes			8	D&R Canal
1	1103151	ROUTE US 1 OVER SHIPETAUKIN CREEK	Yes	Yes	1	7	Stage II, Some Countermeasures
1	1103152	US 1 OVER D&R CANAL	No			8	D&R Canal
1	1103153	US 1 OVER DUCK POND RUN	Yes			8	No evidence of scour problems
1	1103155	US 1 OVER MILLSTONE RIVER	Yes			8	No evidence of scour problems
1	1126151	ROUTE U.S. 1 OVER D&R CANAL	Yes			8	D&R Canal
1	1126152	US 1 SB RAMP / D&R CANAL & ABAND.RR	Yes			8	D&R Canal
1	1126153	US 1 AND D&R CANAL / SHABAKUNK CREEK	Yes			8	Culvert
1	1126156	US1&1B SB OVER FIVE MILE RUN	Yes			8	No evidence of scour problems
1	1203150	US1NB/RARITAN RIVER & LOCAL ROADS.	Yes			8	Scour resistant foundations
1	1203155	US 1 OVER MILL BROOK BRANCH	Yes			8	Culvert
1	1203156	US 1 SB OVER RARITAN RVR & LOCAL RDS	Yes			8	Scour resistant foundations
1B	1102150	US 1B OVER SHABAKUNK CREEK	Yes	Yes	3	3	Stage II completed
1B	1141150	US 1B NB/FIVE MILE RUN	Yes			8	No evidence of scour problems
3	0204150	ROUTE 3/SERVICE RD,BERRY'S CREEK,RR	Yes			8	Scour resistant foundations
3	0204151	NJ 3WB/HACKENSACK R & MEADOWLAND PKWY	Yes			8	Scour resistant foundations
3	0204152	NJ3EB/HACKENSACK RVR & MEADOWLND PKWY	Yes			8	Scour resistant foundations
3	1601157	NJ ROUTE 3 OVER THIRD RIVER	Yes	Yes	1	3	Stage II completed
3	1601160	NJ RT 3 OVER UPPER POND SPILLWAY	Yes	Yes	1	3	Stage II completed
3	1601164	RT3 OVER PASSAIC RIV & RT21	Yes			8	No evidence of scour problems
4	0205150	NJ 4 / PASSAIC RIVER, NJ 20, & CR 507	Yes			8	Scour resistant foundations
4	0206151	NJ 4 OVER SADDLE RIVER	Yes			8	Scour resistant foundations
4	0206153	ROUTE NJ4 OVER SPROUT BROOK	Yes			8	New Bridge
4	0206163	NJ 4/KINDERKAMACK RD,NJT&COLES BROOK	Yes			8	Recent Rehabilitation
4	0206166	NJ 4 / HACKENSACK RIVER & ACCESS ROAD	Yes	Yes	1	3	Stage II completed
4	0206176	RT 4 OVER OVERPECK CREEK	Yes			8	Scour resistant foundations
4	0206181	NJ 4 OVER FLAT ROCK BROOK	Yes	Yes	3	3	Stage II
4	0206188	JOHNSON AVE OVER COLES BROOK	Yes			8	Scour resistant foundations
4	0206189	KINDERKAMACK RD OVER COLES BROOK	Yes	Yes	4	3	Stage II completed
7	0208150	ROUTE NJ 7 OVER PASSAIC RIVER	Yes			8	New Bridge
7	0909150	WITTPENN-RTE 7 OVER HACKENSACK R	Yes			8	No evidence of scour problems
9	0101150	US 9 OVER ABSECON CREEK	Yes			8	No evidence of scour problems
9	0102151	US 9 OVER NACOTE CREEK	Yes			8	New Bridge
9	0302150	RTE US 9 OVER BASS RIVER	Yes			8	New Bridge
9	0302151	U.S.ROUTE 9 OVER JOBS CREEK	Yes			8	No evidence of scour problems
9	1206151	US 9 OVER DEEP RUN BROOK	Yes	Yes	2	5	Stage II completed, Earth Tech Reevaluation
9	1209155	RT 9 OVER RARITAN RIVER-EDISON BRIDGE	Yes			8	New Bridge

New Jersey Bridge Scour Evaluation Program

8/10/2006

Rte	Number	Name	Stage I	Stage II	Phase	Item 113	Additional Comments
9	1209156	RT US9 SB OVER SMITH ST & RARITAN RV	No			9	New Bridge
9	1301150	RT. 9 OVER MANASQUAN RIVER	Yes	Yes	2	8	Stage II completed
9	1301151	US 9 OVER DEBOIS CREEK	Yes			8	Culvert
9	1303154	US 9 OVER TEPEHEMUS BROOK	Yes			8	Culvert
9	1303155	US RT 9 OVER MILFORD BROOK	Yes	Yes	2	3	Stage II completed
9	1501155	U.S. 9 OVER WESTECUNK CREEK.	Yes			8	No evidence of scour problems
9	1501159	US 9 OVER MILL CREEK	Yes	Yes	1	8	Stage II
9	1502152	US 9 OVER WARETOWN CREEK	Yes			8	No evidence of scour problems
9	1502153	US 9 OVER OYSTER CREEK	Yes	Yes	3	3	Stage II completed
9	1502154	US 9 OVER S. BRANCH OF FORKED RIVER	Yes			3	Evaluation by Earth Tech
9	1502155	US9 OVER MIDDLE BR FORKED RIVER	Yes			8	New Bridge/Culvert
9	1502156	US 9 OVER N. BRANCH OF FORKED RIVER	No			8	New Bridge
9	1502157	US 9 OVER CEDAR CREEK	Yes	Yes	2	3	Stage II completed
9	1504151	US RT 9 OVER WATERING PLACE BROOK	Yes			8	Invert Slab
9	1504152	US9 OVER N BRANCH METEDECONK R	Yes			8	No evidence of scour problems
10	0709150	RT 10 OVER WILLOW MEADOW BROOK	Yes	Yes	2	3	Stage II completed
10	0711150	NJ ROUTE 10 OVER CANOE BROOK	Yes	Yes	3	3	Stage II completed
10	0712150	NJ RT 10 / W BRANCH RAHWAY RIVER	Yes			8	Culvert
10	1401150	NJ ROUTE 10 OVER BLACK RIVER	Yes	Yes	2	5	Stage II
10	1401156	RT 10 OVER MILL BROOK	Yes	Yes	2	3	Stage II
10	1401158	NJ RT. 10 OVER DEN BROOK	Yes			8	No evidence of scour problems
10	1402150	NJ ROUTE 10 OVER MALAPARDIS BROOK	Yes	Yes	2	3	Stage II completed
10	1402152	NJ RT 10 OVER WHIPPANY RIVER	Yes	Yes	1	8	New Bridge, Stage II for old bridge
10	1402153	NJ ROUTE 10 OVER PASSAIC RIVER	Yes			8	No evidence of scour problems
12	1001152	RT 12 OVER LOCKATONG CREEK	Yes	Yes	1	4	Stage II completed, Earth Tech Reevaluation
12	1001154	ROUTE 12 /BR OF WICKECHOEKE CREEK	Yes	Yes	2	4	Stage II completed
12	1001155	ROUTE 12 OVER WICKECHOEKE CREEK	Yes	Yes	4	8	Stage II completed
12	1002150	RT 12 OVER WALNUT (MINE) BROOK	Yes	Yes	4	8	Stage II completed
13	1505150	RT 13 OVER POINT PLEASANT CANAL	Yes			8	No evidence of scour problems
15	1403150	NJ RT 15 OVER BRNT MDW(GRN PD) BROOK	Yes	Yes	2	3	Stage II completed
15	1404155	GOVRNMNT RD(PARKER RD) WB/GREEN POND	Yes	Yes	1	3	Stage II completed
15	1404156	NJ RT 15 NB/GREEN POND BR(BR ROCKAWY)	Yes			8	No evidence of scour problems
15	1404157	NJ ROUTE 15 NB OVER ROCKAWAY RIVER	Yes			8	Earth Tech evaluation
15	1404158	NJ ROUTE 15 SB / ROCKAWAY RIVER	Yes	Yes	3	3	Stage II completed
15	1404159	NJ RT 15 RAMP A OVER HURDTOWN BROOK	Yes	Yes	2	3	Stage II completed
15	1424150	NJ 15 NB OVER LAKE SHAWNEE	Yes	Yes	4	3	Stage II completed
15	1424151	NJ 15 SB OVER LAKE SHAWNEE	Yes	Yes	4	8	Stage II completed
15	1913153	NJ 15 OVER WALLKILL RIVER	Yes			8	Culvert

New Jersey Bridge Scour Evaluation Program

8/10/2006

Rte	Number	Name	Stage I	Stage II	Phase	Item 113	Additional Comments
15	1922150	NJ ROUTE 15 OVER BEAVER RUN	Yes	Yes	3	3	Stage II completed
15	1922151	NJ.RTE.15 OVER PAULINS KILL CREEK	Yes	Yes	2	3	Stage II completed
17	0216150	RT 17 OVER SPROUT BROOK	Yes	Yes	1	3	Stage II completed
17	0216157	NJ RT 17 OVER SADDLE RIVER.	Yes	Yes	2	3	Stage II completed
17	0218158	NJ RT 17 OVER MASONICUS BROOK	Yes	Yes	1	4	Stage II completed
17	0218161	N.J 17 NB/US 202 & RAMAPO RIVER	Yes	Yes	1	3	Stage II completed
17	0218162	NJ RT 17 SB OVER US 202 & RAMAPO RVR	Yes	Yes	2	3	Stage II completed
18	1212150	RT.18/MAIN ST,SOUTH R & CONRAIL	Yes			8	New Bridge
18	1213150	RT 18 NB OVER WESTONS MILL POND	Yes			8	No evidence of scour problems
18	1213154	RTE NJ 18 SB OVER WESTON'S MILL POND	Yes			8	Scour resistant foundations
18	1237155	NJ 18 / RARITAN RVR, PARK RD,& RAMP F	Yes			8	Scour resistant foundations
18	1237160	NJ ROUTE 18 SB, RAMP C OVER METLARS BROOK	No			8	New Bridge
18	1323157	NJ 18F OVER PINE BROOK	Yes			8	Culvert
18	1323160	N.J.RT.18 OVER HOCKHOCKSON BROOK	Yes			8	Culvert
18	1323163	NORMANDY RD & GOVT RR/HOCKHOCKSON BRK	Yes			8	Culvert
18	1324151	NJ ROUTE 18 OVER MINE BROOK	Yes			8	Culvert
18	1324153	NJ RT 18 & RAMPS SE & SW/YELLOW BROOK	Yes			8	Culvert
18	1324154	CR.537(FREE-EATON) RD/YELLOW BROOK	Yes			8	Culvert
18	1324155	SCHOOL RD E(REL WALLING RD)/YELLOW BK	Yes			8	Culvert
18	1327162	NJ ROUTE 18 NB OVER SHARK RIVER	Yes			8	No evidence of scour problems
18	1327163	ROUTE NJ 18 SB OVER SHARK RIVER	Yes			8	No evidence of scour problems
18	1329156	ROUTE NJ 18 OVER CRANBERRY BROOK	No			8	Culvert
18	1329170	NJ 18 CONNECTOR NS OVER NJ RTE 36.	No			9	Not in Stage I, why a 9?
21	0713151	NJ.21(NEWARK VIADUCT)/I-78,RR & DITCH	Yes			8	New Bridge
21	0716156	MAIN ST OVER SECOND RIVER	Yes	Yes	1	3	Stage II completed
21	0716158	NJ 21 SB OVER NJ 21 NB	No			8	Not in Stage I, rehab after HEC-18
21	0716160	ROUTE NJ 21 NB OVER SECOND RIVER	Yes			8	No evidence of scour problems
21	0716161	ROUTE NJ 21 SB OVER SECOND RIVER	Yes	Yes	4	8	Stage II completed
21	0717158	ROUTE NJ 21 OVER THIRD RIVER	Yes			8	No evidence of scour problems
21	1603172	NJ RT 21/PASSAIC ST & WEASEL BROOK	Yes			8	No evidence of scour problems
21	1603182	NJ RT 21 OVER MONROE ST & WEASEL BRK.	No			9	New Bridge
22	0718159	ROUTE US 22 EB OVER QUEEN'S DITCH	Yes			8	Culvert
22	0718161	US22 EB CONN / US1&9 & PEDDIES DITCH	Yes			8	New Bridge
22	1005153	RT US 22 OVER BR ROCKAWAY CREEK	Yes	Yes	2	3	Stage II completed
22	1005156	US ROUTE 22 OVER BR OF ROCKAWAY CREEK	Yes			8	No evidence of scour problems
22	1005162	US 22 EB OVER S BR ROCKAWAY CREEK	Yes	Yes	1	3	Stage II completed
22	1005163	RT US 22WB/S BR OF ROCKAWAY CREEK	Yes			3	Based upon Evaluation of 1005163
22	1005164	COKESBURY RD OVER ROCKAWAY CREEK	Yes			8	No evidence of scour problems

New Jersey Bridge Scour Evaluation Program

8/10/2006

Rte	Number	Name	Stage I	Stage II	Phase	Item 113	Additional Comments
22	1801153	US 22 EB OVER N BR RARITAN RIVER	Yes	Yes	1	3	Stage II completed
22	1801154	US 22 WB OVER N BR RARITAN RIVER	Yes	Yes	1	3	Stage II completed
22	1801160	US RT 22 OVER BR OF PETERS BROOK	Yes			4	Recent rehabilitation
22	1801161	US 22 OVER PETERS BROOK	Yes	Yes	2	8	HEC-23 Countermeasures installed
22	1802153	US 22 WB OVER BR RARITAN RIVER	Yes			8	No evidence of scour problems
22	1803150	US 22 OVER MIDDLE BROOK	Yes			8	No evidence of scour problems
22	1803156	RT US 22 OVER STONY BROOK	Yes	Yes	1	3	Stage II completed
22	1803159	US 22 OVER GREEN BROOK	Yes			8	New Bridge
22	2003151	PARK AVENUE OVER GREEN BROOK	Yes			8	No evidence of scour problems
22	2003157	US22 OVER ECHO LAKE	Yes	Yes	1	3	Stage II completed
22	2003161	US 22 EB OVER RAHWAY RIVER	Yes	Yes	3	3	Stage II completed
22	2003162	US 22 WB OVER RAHWAY RIVER	Yes	Yes	4	3	Stage II completed
22	2004151	US 22 OVER ELIZABETH RIVER	Yes	Yes	1	3	Stage II completed
22	2102154	US 22 OVER LOPATCONG CREEK	Yes	Yes	2	3	Stage II completed
23	0719151	RT23 OVER PECKMANS BROOK	Yes	Yes	2	3	Stage II completed
23	1405153	NJ 23 OVER KIKEOUT BROOK	Yes			8	Culvert
23	1405156	RT23/PEQUANNOCK R,HAMBURG TPK SB, RR	Yes	Yes	3	3	Stage II completed
23	1604150	ROUTE NJ 23/PASSAIC RIVER	Yes	Yes	3	3	Stage II completed
23	1604165	NJ 23 NB & RAMP A OVER SINGAC BROOK	Yes			8	Culvert
23	1604166	RT NJ 23 SB AND RAMPS B&C/SINGAC BRK	Yes			8	Culvert
23	1605153	NJ RTE 23 SB OVER PEQUANNOCK RIV.	Yes	Yes	3	3	Stage II completed
23	1605155	NJ RT.23 U-TURN/PEQUANNOCK RIVER	Yes			8	Culvert
23	1605156	NJ RT 23 SB OVER PEQUANNOCK RIVER	Yes	Yes	2	3	Stage II completed
23	1605158	NJ ROUTE 23 NB/MACOPIN RIVER	Yes	Yes	2	3	Stage II completed
23	1605161	N.J.RTE 23 SB/PEQUANNOCK RIVER	Yes			8	New Bridge
23	1605162	RTE23SB OVER PEQUANNOCK RV	Yes	Yes	3	3	Stage II completed
23	1605166	NJ RT.23 OVER PEQUANNOCK RIVER	Yes			8	Culvert
23	1605167	ROUTE 23 SB OVER PEQUANNOCK RIVER	Yes	Yes	2	3	Stage II completed
23	1605168	ROUTE 23 SB OVER PEQUANNOCK RIVER	Yes			8	No evidence of scour problems
23	1605169	LARUE ROAD OVER PEQUANNOCK RIVER	Yes			8	No evidence of scour problems
23	1605170	NJ ROUTE 23 NB OVER CLINTON BROOK	Yes			8	No evidence of scour problems
23	1605171	RTE 23 SB OVER KANOUSE BROOK	Yes			8	Culvert
23	1605174	N.J 23 NB OVER PEQUANNOCK RIVER	Yes			8	Scour resistant foundations
23	1605175	RT 23 NB OVER PEQUANNOCK RIVER	Yes	Yes	2	3	Stage II completed
23	1619151	N.J 23 OVER POMPTON RIVER	Yes	Yes	1	3	Stage II completed
23	1903152	23/BR OF PACOCK BRK & DEL-OSTEGO R.R.	Yes	Yes	4	3	Stage II completed
23	1903153	RT 23 OVER BRANCH OF FRANKLIN LAKE	Yes	Yes	2	3	Stage II completed
23	1903154	NJ RT 23 OVER BRANCH OF FRANKLIN LAKE	Yes			8	No evidence of scour problems

New Jersey Bridge Scour Evaluation Program

8/10/2006

Rte	Number	Name	Stage I	Stage II	Phase	Item 113	Additional Comments
23	1904152	NJ 23 OVER WALLKILL RIVER	Yes	Yes	1	3	Stage II completed
23	1904153	NJ RT 23/ BR OF WALLKILL RIVER	Yes	Yes	1	3	Stage II completed
23	1904154	RT 23/PAPAKATING CREEK&ABAND CONRAIL	Yes			8	No evidence of scour problems
23	1905150	RTE23 OVER CLOVE RV	Yes			8	No evidence of scour problems
23	1905151	ROUTE NJ 23/BRANCH OF CLOVE RIVER	Yes	Yes	1	3	Stage II completed
23	1905152	NJ RT 23/ CLOVE BROOK	Yes			8	Scour resistant foundations
23	1905153	ROUTE 23 OVER CLOVE RIVER	Yes			8	Scour resistant foundations
23	1905161	NJ 23 OVER MILL BROOK	Yes			8	No evidence of scour problems
24	0733153	RT.24 EB OVER PASSAIC RIVER	Yes			8	No evidence of scour problems
24	0733154	RT.24 WB OVER PASSAIC RIVER	Yes			8	No evidence of scour problems
24	1422152	ROUTE NJ 24 OVER BLACK BROOK TRIB.	No			8	Culvert
24	1422153	RT.24 OVER W. BRANCH OF BLACK BROOK.	Yes			8	No evidence of scour problems
24	1422154	NJ 24 FRWY OVER BLACK BROOK(E BRANCH)	Yes			8	No evidence of scour problems
24	1422156	NJ RT 24 FREEWAY/SPRING GARDEN BROOK	Yes			8	No evidence of scour problems
24	1422161	ROUTE NJ 24 OVER BR OF PASSAIC RIVER	No			8	Culvert
27	1105150	RT 27 OVER HARRY'S BROOK	No			8	New Bridge
27	1105151	OLD RT 27 OVER MILLSTONE RIVER	Yes			8	No evidence of scour problems
27	1105152	RT NJ 27 OVER MILLSTONE RIVER	Yes	Yes	2	3	Stage II completed
27	1216150	OLD RT 27 OVER HEATHCOTE BROOK	Yes			8	No evidence of scour problems
27	1216158	NJ ROUTE 27 OVER SIX MILE RUN	Yes			8	No evidence of scour problems
27	1217150	ROUTE 27 OVER RARITAN RIVER	Yes			8	Scour resistant foundations
27	1218158	NJ RT 27 OVER S BRANCH RAHWAY RIVER	Yes	Yes	3	3	Stage II completed
27	1821151	NJ RT 27 OVER D&R CANAL	Yes			8	D&R Canal
27	2006151	RT 27 OVER ROBINSON BRNCH RAHWAY RVR	Yes	Yes	3	3	Stage II completed
27	2006152	NJ RT 27/RAHWAY RIVER.	Yes	Yes	3	3	Stage II completed
27	2006153	ROUTE 27 OVER WEST BROOK	No			8	Culvert
27	2007150	ROUTE 27 OVER ELIZABETH RIVER	Yes			8	Scour resistant foundations
28	1219150	ROUTE 28 OVER BOUND BROOK	Yes			8	No evidence of scour problems
28	1219151	NJ 28(BOUND BROOK RD)/BONYGUTT BROOK	No			8	Culvert
28	1805150	RT 28 OVER PETERS BROOK	Yes	Yes	2	4	Stage II completed
28	1806152	ROUTE NJ 28/CUCKLES BROOK	Yes			8	No evidence of scour problems
28	1806154	NJ ROUTE 28 OVER MIDDLE BROOK	Yes	Yes	2	4	Stage II completed
28	1806156	NJ 28 OVER GREEN BROOK	Yes	Yes	2	4	Stage II completed
28	2008156	ROUTE 28 OVER RAHWAY RIVER	Yes	Yes	2	4	Stage II completed
29	1006151	ROUTE 29 OVER SWAN CREEK	Yes	Yes	3	3	Stage II completed
29	1007153	NJ RT 29 OVER ALEXAUKEN CREEK	Yes			8	Scour resistant foundations
29	1007159	ROUTE NJ 29 OVER WICKECHEOKE CREEK	Yes	Yes	4	5	Stage II completed
29	1008150	NJ ROUTE 29 OVER LOCKATONG CREEK	Yes			8	No evidence of scour problems

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Rte	Number	Name	Stage I	Stage II	Phase	Item 113	Additional Comments
29	1009150	ROUTE 29 OVER COPPER CREEK	Yes	Yes	3	3	Stage II completed
29	1109151	NJ 29/RT NJ 175, D&R CANAL FEEDER	Yes			8	D&R Canal
29	1110152	ROUTE NJ 29 OVER JACOBS CREEK	Yes	Yes	4	8	Stage II completed
29	1110158	NJ 29 OVER MOORES CREEK	Yes	Yes	3	3	Stage II completed
29	1130150	RT NJ 29 NORTHBOUND OVER WETLANDS	No			8	New Bridge
29	1130151	ROUTE NJ 29 SOUTHBOUND OVER WETLANDS	No			8	New Bridge
29	1130152	ROUTE NJ 29 NB OVER WATSON'S CREEK	No			8	New Bridge
29	1130153	ROUTE NJ 29 SB OVER WATSON'S CREEK	No			8	New Bridge
29	1131153	RT29 SERVICE RO/ASSUNPINK CREEK	Yes			8	Scour resistant foundations
29	1131154	RTE29 RAMP'B'OVER ASSUNPINK CK	Yes			8	Scour resistant foundations
29	1131155	RTE29NB OVER ASSUNPINK CK	Yes			8	Scour resistant foundations
29	1131156	NJ 29 SB OVER ASSUNPINK CK	Yes			8	Scour resistant foundations
29	1131157	RTE29 RAMP'A'OVER ASSUNPINK CK	Yes			8	Scour resistant foundations
29	1131158	MEMORIAL DRIVE/ASSUNPINK CREEK	Yes			8	No evidence of scour problems
30	0103150	U.S.ROUTE 30 OVER PENROSE CANAL	Yes			8	Scour resistant foundations
30	0103151	US 30 OVER VENICE LAGOON	Yes			8	Scour resistant foundations
30	0103152	US 30 OVER BEACH THOROFARE	Yes			8	Scour resistant foundations
30	0103153	U.S.ROUTE 30 OVER DUCK THOROFARE	Yes			8	No evidence of scour problems
30	0103154	U.S.ROUTE 30 / NEWFOUND THOROFARE	Yes			8	Scour resistant foundations
30	0103155	US 30 OVER JONATHANS THOROFARE	Yes			8	Scour resistant foundations
30	0103157	US ROUTE 30 OVER WEAVERS DITCH	No			8	No evidence of scour problems
30	0103158	ROUTE US 30 OVER GARRETT'S DITCH	Yes			8	New Bridge
30	0103160	US RT 30 & CR 585 / ABSECON CREEK	Yes	Yes	3	4	Stage II completed
30	0404150	U.S.ROUTE 30 OVER NEWTON CREEK	Yes			8	Scour resistant foundations
30	0405153	US RTS 30 & 130 OVER COOPER RIVER	Yes	Yes	3	3	Stage II completed
30	0406154	US30 OVER CHANDLERS RUN	Yes			8	No evidence of scour problems
30	0406158	US 30 OVER COOPER RIVER	Yes			8	New Bridge
31	1010151	RT 31 OVER PETERS BROOK	Yes			8	Scour resistant foundations
31	1012152	NJ 31 OVER BUSHKILL CREEK	Yes			8	New Bridge
31	1012154	RT 31 OVER ASSISCONG CREEK	Yes			8	New Bridge
31	1012156	NJ 31 OVER S BRANCH RARITAN R	Yes	Yes	3	8	New Bridge
31	1012159	RT NJ 31 OVER PRESCOTT BROOK	Yes			8	New Bridge
31	1013151	RT31 OVER S BR RARITAN RIVER	Yes			8	New Bridge
31	1013152	ROUTE NJ 31 OVER WILLOUGHBY BROOK	Yes	Yes	1	3	Stage II completed
31	1013154	NJ 31 OVER SPRUCE RUN	Yes	Yes	1	8	HEC-23 Countermeasures installed
31	1013155	SANATORIUM RD OVER SPRUCE RUN	Yes	Yes	2	8	Stage II completed, On rock
31	1013159	ROUTE 31 OVER MUSCONETCONG RIVER	Yes			8	No evidence of scour problems
31	1118150	NJ RTE 31 OVER W.BRANCH SHABAKUNK CRK	Yes			8	No evidence of scour problems

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Rte	Number	Name	Stage I	Stage II	Phase	Item 113	Additional Comments
31	1119156	NJ 31 OVER BRANCH OF STONY BROOK	Yes			8	No evidence of scour problems
31	2110155	ROUTE 31 OVER SHABBECONG CREEK	Yes			8	No evidence of scour problems
31	2111151	RT 31 OVER POHATCONG CREEK	Yes	Yes	2	3	Stage II completed
31	2111154	NJ 31 OVER FURNACE BROOK	Yes			8	No evidence of scour problems
31	2111155	NJ RT 31 OVER PEQUEST RIVER	Yes	Yes	2	3	Stage II completed
33	1114151	NJ 33 & US 130/ ASSUNPINK CREEK	Yes			8	No evidence of scour problems
33	1115150	NJ 33 OVER ROCKY BROOK	Yes			8	No evidence of scour problems
33	1220150	NJ 33 OVER BENTLEY BROOK	Yes			8	No evidence of scour problems
33	1304151	OLD ROAD(NJ 33) OVER MILLSTONE RIVER	Yes	Yes	3	3	Stage II completed
33	1304156	ROUTE 33 OVER MANALAPAN BROOK	Yes	Yes	1	3	Stage II completed
33	1304160	NJ 33 OVER MILLSTONE RIVER	Yes			8	No evidence of scour problems
33	1305164	ROUTE NJ 33 OVER LONG BROOK CREEK	No			8	New Bridge
33	1305166	ROUTE NJ 33 OVER BURKES CREEK	No			8	New Bridge
34	1308152	NJ 34 OVER MINE BROOK	Yes	Yes	2	8	HEC-23 Countermeasures installed
34	1308153	NJ 34 OVER YELLOW BROOK	Yes	Yes	2	8	HEC-23 Countermeasures installed
34	1308154	N.J.ROUTE 34 OVER BIG BROOK	Yes	Yes	2	3	Stage II completed
34	1309150	NJ 34 OVER GRAVELLY BROOK	Yes			8	No evidence of scour problems
34	1309152	NJ ROUTE 34/LEFFERTS LAKE	Yes			8	No evidence of scour problems
35	1222150	ROUTE 35/CHEESEQUAKE CREEK & RAMP	Yes	Yes	1	3	Stage II completed
35	1223150	NJ35(VICTORY BR)/RARITAN R & ACCES RD	Yes			8	New Bridge
35	1310155	NJ RT 35/N BRANCH WRECK POND	Yes	Yes	1	8	HEC-23 Countermeasures installed
35	1311150	NJ ROUTE 35 OVER SHARK RIVER	Yes			8	New Bridge
35	1311151	NJ 35 OVER N CHANNEL SHARK RIVER	Yes			8	New Bridge
35	1311155	ROUTE N.J.35 OVER WHALE POND BROOK	Yes			6	Culvert
35	1312154	NJ 35 OVER NAVESINK RIVER	Yes			8	New Bridge
35	1313151	NJ RT 35 OVER MAHORAS BROOK	Yes	Yes	2	5	Stage II completed
35	1313155	NJ 35 OVER LUPPATATONG CREEK	Yes			8	Scour resistant foundations
35	1313161	RT 35 SB OVER MATAWAN CREEK	Yes	Yes	4	5	Stage II completed
35	1313162	RT 35 NB OVER MATAWAN CREEK	Yes			8	No evidence of scour problems
35	1506151	NJ 35/WILLS HOLE MANASQUAN RIVER	Yes	Yes	4	5	Stage II completed
35	1506152	RTE NJ 35 OVER MANASQUAN RIVER	Yes	Yes	4	5	Stage II completed
35	2022150	NJ 35 OVER S BRANCH RAHWAY RIVER	Yes			8	No evidence of scour problems
36	1314154	ROUTE 36 OVER TROUTMANS CREEK	Yes	Yes	3	4	Stage II completed
36	1315150	NJ 36 / SHREWSBURY RIVER & BAY AVENUE	Yes			8	Earth Tech evaluation, Capital Program
36	1315152	NJ RT 36 OVER COMPTONS CREEK	Yes			8	No evidence of scour problems
36	1315154	ROUTE 36 OVER WAACKAACK CREEK	Yes			8	No evidence of scour problems
36	1315156	NJ ROUTE 36 OVER EAST CREEK	Yes			8	No evidence of scour problems
36	1315157	NJ 36 OVER FLAT CREEK	Yes	Yes	3	3	Stage II completed

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Rte	Number	Name	Stage I	Stage II	Phase	Item 113	Additional Comments
36	1315159	ROUTE 36 OVER MANY MIND CREEK	Yes			8	Culvert
36	1315160	NJ ROUTE 36 OVER WAGNER CREEK	Yes			8	Culvert
37	1507150	RT. NJ 37 OVER UNION BRANCH OF TOMS R	Yes			8	No evidence of scour problems
37	1507151	RT. NJ 37 OVER N BRANCH OF TOMS RIVER	Yes			8	No evidence of scour problems
37	1508150	NJ 37EB/BARNEGAT BAY(MATHIS BRIDGE)	Yes	Yes	4	5	Stage II completed
37	1508151	ROUTE NJ 37 OVER BARNEGAT BAY	Yes	Yes	4	5	Stage II completed
37	1508154	NJ 37 WB OVER BARNEGAT BAY	Yes			8	No evidence of scour problems
38	0304151	RT 38 OVER N. BR OF PENNSAUKEN CREEK	Yes			8	No evidence of scour problems
38	0305152	RT 38 OVER SO BR RANCOCAS CK	Yes			8	No evidence of scour problems
38	0407153	RAMP D & E OVER CHANDLER RUN	No			8	Culvert
38	0408160	MILL ROAD/SO BR PENNSAUKEN CREEK	Yes	Yes	3	3	Stage II completed
38	0408161	RT.NJ38 OVER SO BR PENNSAUKEN CREEK	Yes			8	No evidence of scour problems
40	0107150	U.S.ROUTE 40 OVER BABCOCK CREEK	Yes			8	New Bridge
40	0107151	ROUTE US40 &NJ50 OVER GR EGG HARBOR R	Yes			8	No evidence of scour problems
40	0109153	U.S. 40 OVER GREAT THOROFARE	Yes			8	Scour resistant foundations
40	0109154	U.S. 40 OVER BEACH THOROFARE	Yes			8	Scour resistant foundations
40	0109155	ROUTE 40 OVER INSIDE THOROFARE	Yes			8	Scour resistant foundations
40	0801150	ROUTE U.S.40 OVER STILL RUN	Yes			8	No evidence of scour problems
40	0801151	ROUTE 40 OVER MALAGA LAKE	Yes			8	Invert Slab
40	1701150	RT 40 EB OVER W BRANCH OF GAME CREEK	Yes			8	No evidence of scour problems
40	1701151	ROUTE 40 WB OVER W BRANCH GAME CREEK	Yes			8	No evidence of scour problems
40	1702154	US ROUTE 40 OVER SALEM RIVER	Yes			8	New Bridge
40	1703152	U.S.RTE 40 OVER BRANCH SALEM CRK.	Yes	Yes	3	3	Stage II completed
40	1703156	ROUTE 40 OVER ELMER LAKE	Yes			U	Capital Program, under construction
41	0410150	RTE 41 RAMP/ SO.BR.PENNSAUKEN CR.	Yes			8	Scour resistant foundations
41	0410151	NJ RT 41/S.BRANCH PENNSAUKEN CR	Yes			8	Culvert
41	0802151	RT 41 OVER SOUTH BR BIG TIMBER CREEK	Yes			8	No evidence of scour problems
42	0411165	RT 42 NB OVER S BR OF BIG TIMBER CRK	Yes			8	Scour resistant foundations
42	0411166	RT 42 SB OVER S BR OF BIG TIMBER CRK	Yes			8	Scour resistant foundations
42	0803150	RT 42 OVER S.BR BIG TIMBER CK	Yes			8	Culvert
42	0804152	N.J 42 OVER ALMONESSON CREEK	Yes			8	Culvert
42	0804153	NJ 42 OVER BIG TIMBER CREEK	Yes			8	Recent rehabilitation
44	0806151	NJ RT 44 OVER MANTUA CREEK	Yes	Yes	3	3	Stage II completed, under construction
45	0807151	N.J.ROUTE 45 / SO.BR.RACCOON CRK.	Yes			8	No evidence of scour problems
45	0807152	RT45 OVER RACCOON CREEK	Yes	Yes	3	3	Stage II completed
45	0808151	ROUTE 45 OVER EDWARDS RUN	Yes	Yes	3	3	Stage II completed
45	0808153	N.J. ROUTE 45 OVER MANTUA CREEK	Yes			8	Scour resistant foundations
45	0810150	RT 45 OVER WOODBURY CREEK	Yes	Yes	3	3	Stage II completed

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Rte	Number	Name	Stage I	Stage II	Phase	Item 113	Additional Comments
45	1704150	RT45 OVER FENWICK CREEK	Yes			8	New Bridge
45	1704151	NJ ROUTE 45 OVER MANNINGTON CREEK	Yes			8	New Bridge
45	1704152	ROUTE 45 OVER CULLIERS RUN	Yes			8	New Bridge
45	1705150	NJ RT 45 & US RT 40/SALEM RIVER	Yes	Yes	1	3	Stage II completed
45	1705154	RT45 OVER OLDMANS CREEK	Yes			8	No evidence of scour problems
46	0220152	US46 OVER BR OF PASSAIC RIVER	Yes			8	Culvert
46	0220157	U.S.ROUTE 46 OVER SADDLE RIVER	Yes	Yes	2	3	Stage II completed
46	0221155	US 46 / HACKENSACK R, HMSTD PL, & RR	Yes			8	No evidence of scour problems
46	0222150	US 46 OVER OVERPECK CREEK	Yes			8	No evidence of scour problems
46	0722157	US ROUTE 46 EB OVER PASSAIC RIVER	Yes	Yes	1	3	Stage II completed
46	0722158	U.S. ROUTE 46 WB /PASSAIC RIVER	Yes	Yes	2	3	Stage II completed
46	1407150	U.S. ROUTE 46 OVER MILL RACE	Yes			8	No evidence of scour problems
46	1407151	ROUTE US 46 EB OVER MINE BROOK	Yes			8	No evidence of scour problems
46	1407152	ROUTE US 46 WB OVER MINE BROOK	Yes	Yes	2	3	Stage II completed
46	1407153	RTE US 46EB OVER BRANCH MINE BRK.	Yes	Yes	1	3	Stage II completed
46	1407154	US46 EB OVER BRANCH OF MINE BROOK	Yes			8	No evidence of scour problems
46	1407156	US 46 OVER SOUTH BR RARITAN RIVER	Yes	Yes	2	3	Stage II completed
46	1409151	US ROUTE 46 OVER BLACK RIVER	Yes			8	No evidence of scour problems
46	1409154	US ROUTE 46 OVER GRANNEYS BROOK	Yes	Yes	2	3	Stage II completed
46	1409155	US46 OVER DL&WRR, W.BLKWL.ST&RIVR	Yes			8	No evidence of scour problems
46	1409157	RT US 46 OVER ROCKAWAY RIVER&CONRAIL	Yes			8	No evidence of scour problems
46	1410151	US RT 46 OVER DEN BROOK	Yes			8	Recent Rehabilitation
46	1410156	US46 OVER BR OF TROY BROOK	Yes			8	No evidence of scour problems
46	1410157	ROUTE 46 OVER ROCKAWAY RIVER	Yes			8	No evidence of scour problems
46	1410158	US RTE 46 / BRANCH OF PASSAIC RIVER.	Yes			8	No evidence of scour problems
46	1410159	ROUTE 46 OVER PASSAIC RIVER	Yes	Yes	2	3	Stage II completed
46	1606158	US 46/PASIC RIV & RIVRVIW DR (CR640).	Yes			8	No evidence of scour problems
46	1606160	US RTE 46 / PECKMAN'S BROOK	Yes	Yes	1	3	Stage II completed, under construction
46	1607168	US RTE 46/PASSAIC RIVER	Yes			8	No evidence of scour problems
46	2107154	US 46 WB OVER BEAVER BROOK	Yes			3	Evaluation by Earth Tech
46	2107155	US 46 EB OVER BEAVER BROOK	Yes	Yes	2	3	Stage II completed
46	2107156	US ROUTE 46 OVER PAULINS KILL	Yes	Yes	1	3	Stage II completed
46	2108151	US 46 OVER CREEK TO PEQUEST RIVER	Yes			8	New Bridge
46	2108157	ROUTE US 46 / PEQUEST RIVER	Yes			7	Countermeasures Installed
46	2108162	RTE US 46 OVER MUSCONETCONG RIVER	Yes	Yes	3	3	Stage II completed
47	0506150	ROUTE NJ 47 OVER GRASSY SOUND	Yes			8	New Bridge
47	0507152	N.J. ROUTE 47 OVER BIDWELLS CREEK	Yes			8	No evidence of scour problems
47	0507153	N.J.ROUTE 47 OVER SLUICE CREEK	Yes			8	No evidence of scour problems

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Rte	Number	Name	Stage I	Stage II	Phase	Item 113	Additional Comments
47	0508150	N.J.ROUTE 47 OVER DENNIS CREEK	Yes			8	No evidence of scour problems
47	0508151	NJ 47 OVER BRANCH OF DENNIS CREEK	Yes			8	Invert Slab
47	0508154	N.J. ROUTE 47 OVER WEST CREEK	Yes			8	New Bridge
47	0601150	RT47 OVER MUSKEE CREEK	Yes	Yes	3	3	Stage II completed
47	0601151	N.J.ROUTE 47 OVER MANUMUSKIN RIV.	Yes	Yes	3	3	Stage II completed
47	0601152	N.J.RTE.47 OVER MANANTICO CREEK	Yes			8	No evidence of scour problems
47	0813150	NJ ROUTE 47 OVER MANTUA CREEK	Yes			8	No evidence of scour problems
47	0815152	NJ 47 OVER BIG TIMBER CREEK	Yes	Yes	3	3	Stage II completed
47	0837152	NJ 47 OVER SCOTLAND RUN	Yes			8	No evidence of scour problems
47	0837153	RT47 OVER LITTLE EASE RUN	Yes	Yes	2	4	Stage II completed
48	1706152	NJ RT 48 OVER TWO PENNY RUN	Yes	Yes	1	4	Stage II completed
49	0110150	NJ 49 OVER TUCKAHOE RIVER	Yes			8	Culvert
49	0509150	RT 49 OVER MILL CREEK	Yes	Yes	1	3	Stage II completed
49	0604150	ROUTE NJ 49 OVER BARRETT RUN	No			8	Culvert
49	0604152	ROUTE 49 OVER COHANSEY RIVER	Yes			8	No evidence of scour problems
49	0605150	RT49 OVER MILL CREEK-JACKSON RUN	Yes			8	Culvert
49	0605151	NJ 49 OVER MAURICE RIVER	Yes			8	No evidence of scour problems
49	0606150	NJ RT 49 OVER MANANTICO CREEK	Yes	Yes	1	3	Stage II completed
49	1707150	RT NJ 49 OVER SALEM RIVER	Yes			8	New Bridge
49	1708151	RT 49 OVER ALLOWAYS CREEK	Yes			8	New Bridge
50	0111152	NJ 50 OVER SOUTH RIVER	Yes	Yes	1	3	Stage II completed, under construction
50	0112152	NJ 50 OVER WATERING RACE	Yes			8	New Bridge
50	0510150	NJ 50 OVER CEDAR SWAMP CREEK	Yes			8	Scour resistant foundations
50	0510152	ROUTE 50 OVER TUCKAHOE RIVER	Yes	Yes	3	3	Stage II completed
52	0511150	RT52 OVER BEACH THOROFARE	Yes			U	Capital Program, under construction
52	0511151	RT52 OVER RAINBOW THOROFARE	Yes			U	Capital Program, under construction
52	0511152	RT 52 BRIDGE OVER ELBOW THOROFARE	Yes			U	Capital Program, under construction
52	0511153	ROUTE N.J. 52 OVER SHIP CHANNEL	Yes			U	Capital Program, under construction
53	1411152	RT 53 OVER DEN BROOK	Yes	Yes	4	3	Stage II completed
54	0114154	RT 54 OVER NJ TRANSIT & HOSP BROOK	Yes	Yes	1	8	Stage II completed
54	0114157	NJ 54/GREAT EGG HARBOR RIVER	Yes	Yes	2	4	Stage II completed
54	0114159	NJ ROUTE 54 OVER PENNYPOT STREAM.	Yes	Yes	2	4	Stage II completed
55	0609151	ROUTE 55 NB OVER MANANTICO CREEK	Yes	Yes	3	3	Stage II completed
55	0609152	RT 55 SB OVER MANANTICO CREEK	Yes	Yes	3	3	Stage II completed
55	0610151	RT 55 NB/PARVIN BR. MAURICE RIVER	Yes			8	Culvert
55	0610152	RT 55 SB/PARVIN BR. MAURICE RIVER	Yes			8	Culvert
55	0610155	ROUTE 55 NB OVER LITTLE ROBIN BR	Yes			8	Culvert
55	0610156	RT 55F SB OVER LITTLE ROBIN BR.	Yes			8	Culvert

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Rte	Number	Name	Stage I	Stage II	Phase	Item 113	Additional Comments
55	0610164	RT.55NB/BLACKWATER BR OF MAURICE RIV.	Yes			8	No evidence of scour problems
55	0610165	RT 55SB/BLK WTR BR OF MAURICE RV	Yes			8	No evidence of scour problems
55	0610167	RT 55 NB/MANAWAY BR OF MAURICE RIVER	Yes			8	Culvert
55	0610168	RT 55 SB/MANAWAY BR MAURICE RIVER	Yes			8	Culvert
55	0610171	ROUTE NJ 55 NB OVER SCOTLAND RUN	Yes			8	No evidence of scour problems
55	0610172	ROUTE NJ 55 SB OVER SCOTLAND RUN	Yes			8	No evidence of scour problems
55	0828155	ROUTE 55 OVER LITTLE EASE RUN	Yes			8	Culvert
55	0828159	ROYAL AVENUE OVER STILL RUN	Yes			8	Culvert
55	0828162	COUNTY RT.538 OVER STILL RUN	Yes			8	Culvert
55	0828166	LITTLE MILL RD OVER STILL RUN	Yes			8	Culvert
55	0828167	RT 55 NB OVER STILL RUN	Yes	Yes	2	4	Stage II completed
55	0828168	ROUTE 55 SOUTHBOUND OVER STILL RUN	Yes	Yes	2	5	Stage II completed
55	0828171	ROUTE 55 RAMP BB/WEST CLAYTON BRANCH	Yes			8	Culvert
55	0828183	ROUTE 55 OVER HIGGINS BRANCH	Yes			8	Culvert
55	0828189	RT 55NB OVER CHESTNUT BRANCH	Yes			8	Scour resistant foundations
55	0828190	RT 55 SB OVER CHESTNUT BRANCH	Yes			8	Scour resistant foundations
55	0832153	RT 55 NB/RT 42&ALMONESSON CR.	Yes			8	Scour resistant foundations
55	0832156	ROUTE 55 NB OVER MANTUA CREEK	Yes	Yes	2	4	Stage II completed
55	0832157	ROUTE 55 SB OVER MANTUA CREEK	Yes	Yes	2	4	Stage II completed
55	0832163	ROUTE NJ 55 OVER ALMONESSON CREEK	Yes			8	Culvert
56	1716150	NJ ROUTE 56 OVER RAINBOW LAKE	Yes			8	Invert Slab
56	1716151	NJ ROUTE 56 OVER MAURICE RIVER	Yes	Yes	3	3	Stage II completed
57	2105152	NJ 57 OVER LOPATCONG CREEK	Yes			8	No evidence of scour problems
57	2105153	NJ RTE 57 OVER BRANCH POHATCONG CREEK	No			8	Culvert
57	2105154	ROUTE NJ 57 OVER MERRILL CREEK	Yes			8	No evidence of scour problems
57	2105159	NJ 57 OVER BRANCH POHATCONG CREEK	Yes			8	No evidence of scour problems
57	2105163	NJ 57 OVER BRASS CASTLE CREEK	Yes	Yes	2	4	Stage II completed
57	2105164	RT57 OVER POHATCONG CREEK	Yes	Yes	2	3	Stage II completed
57	2106151	RT 57 OVER SHABBACONG CREEK	Yes			8	Culvert
57	2106156	NJ 57 / BRANCH OF MUSCONETCONG RIVER	Yes			8	No evidence of scour problems
57	2106158	NJ 57 OVER BR MUSCONETCONG RIVER	Yes			8	No evidence of scour problems
57	2106164	NJ 57 OVER HANCES BROOK	Yes	Yes	2	3	Stage II completed
57	2106165	ROUTE 57 OVER TROUT BROOK	Yes			8	No evidence of scour problems
63	0223151	ROUTE 63 OVER ROUTE 5 & WOLF CRK	Yes	Yes	1	4	Stage II completed
70	0310153	NJ ROUTE 70 / BEAR SWAMP RIVER	Yes	Yes	1	4	Stage II completed
70	0310154	NJ ROUTE 70 OVER FRIENDSHIP CREEK	Yes	Yes	2	8	New Bridge
70	0310156	N.J. 70 OVER HAYNES CREEK	Yes			8	No evidence of scour problems
70	0311150	NJ RT 70 OVER BISPHAMS MILL CREEK	Yes			8	No evidence of scour problems

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Rte	Number	Name	Stage I	Stage II	Phase	Item 113	Additional Comments
70	0311151	NJ ROUTE 70 OVER MOUNT MISERY BROOK	Yes			8	No evidence of scour problems
70	0311153	NJ 70 OVER POLE BRIDGE BRANCH	Yes	Yes	1	5	Stage II complete, PBQD Reevaluation
70	0413153	NJ RT 70&CUTHBERT BLVD./TRIB.COOPER R	Yes			8	Culvert
70	1509150	N.J.RTE 70 OVER HURRICANE BROOK	Yes			8	No evidence of scour problems
70	1509151	N.J. ROUTE 70 OVER BLACK'S BRANCH	Yes	Yes	2	5	Stage II completed
70	1510151	NJ RT 70 OVER RIDGEWAY BRANCH	Yes	Yes	4	5	Stage II completed
70	1510152	ROUTE NJ70/NORTH BRANCH OF TOMS RIVER	Yes			8	No evidence of scour problems
70	1510155	NJ 70/SO.BR METEDECONK RIVER	Yes			8	No evidence of scour problems
70	1510156	RT NJ 70 OVER NO BR METEDECONK RIVER	Yes			8	No evidence of scour problems
70	1511150	NJ 70 OVER MANASQUAN RIVER	Yes			U	Capital Program, under construction
71	1320152	ROUTE 71 OVER WRECK POND	Yes	Yes	3	3	Stage II completed
71	1321150	ROUTE 71 OVER SHARK RIVER	Yes	Yes	1	3	Stage II completed
71	1321152	N.J 71(NORWOOD AV) OVER DEAL LAKE.	Yes			8	New Bridge
71	1321155	ROUTE 71 OVER WHALE POND BROOK	Yes			8	No evidence of scour problems
72	1512152	RT 72 OVER MILL CREEK	Yes			8	No evidence of scour problems
72	1512153	COUNTY ROUTE 680 OVER MILL CREEK	Yes			8	No evidence of scour problems
72	1513151	RT 72 OVER HILLIARDS THOROFARE	Yes			8	No evidence of scour problems
72	1513152	RT 72 OVER MANAHAWKIN BAY	Yes			8	No evidence of scour problems
72	1513153	RT 72 OVER WEST THOROFARE & U TURN	Yes	Yes	3	4	Stage II completed
72	1513154	RT 72 OVER EAST THOROFARE	Yes	Yes	3	4	Stage II completed
72	1519152	ROUTE 72 OVER MILL CREEK	Yes			8	Culvert
72	1519153	N.J. RT 72 OVER FOX ISLAND CREEK	Yes			8	Culvert
73	0314153	RT 73/SOUTH BRANCH PENNSAUKEN CREEK	Yes			8	No evidence of scour problems
73	0416152	RT 73 OVER PENNSAUKEN CREEK	Yes	Yes	1	5	Stage II complete, PBQD Reevaluation
73	0431152	ROUTE NJ 73 OVER PUMP BRANCH	No			8	Culvert
76	0417150	I-76,RAMPS/ LITTLE TIMBER CREEK.	Yes			8	Culvert
76	0417158	I-76/NEWTON CRK,KLEMM AVE&CONRAIL	Yes	Yes	4	8	Stage II completed
78	0724150	I-78/FRELNGHYSN AV, WAVERLY YD, DITCH	Yes			8	No evidence of scour problems
78	0725153	RT I-78 CONNECTOR OVER PEDDIES DITCH	Yes			8	Culvert
78	1015150	I-78 WB OVER MULHOCKAWAY CREEK	Yes			8	No evidence of scour problems
78	1015157	I-78EB SERV.RD / MULHOCKAWAY CREEK	Yes	Yes	2	3	Stage II completed
78	1015158	I-78 EB OVER MULHOCKAWAY CREEK	Yes			8	No evidence of scour problems
78	1016156	ROUTE I-78 EB OVER S BR RARITAN RIVER	Yes			3	Evaluation by Earth Tech
78	1016157	I-78 WB OVER SO BR. RARITAN RIVER	Yes	Yes	2	3	Stage II completed
78	1016160	I-78 EB OVER BEAVER BROOK	Yes			8	No evidence of scour problems
78	1016161	I78 WB OVER BEAVER BROOK	Yes			8	No evidence of scour problems
78	1017154	I-78RAMPS B&D & 31SB/BEAVER BROOK	Yes	Yes	4	8	Stage II completed
78	1017155	I78 EB OVER BEAVER BROOK	Yes			8	No evidence of scour problems

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Rte	Number	Name	Stage I	Stage II	Phase	Item 113	Additional Comments
78	1017156	I-78 W.B. OVER BEAVER BROOK	Yes			8	No evidence of scour problems
78	1017159	RT31 NB OVER BEAVER BROOK	Yes			8	Scour resistant foundations
78	1017160	I-78 & RAMP R/BEAVER BROOK	Yes			8	Scour resistant foundations
78	1017163	I78 OVER BEAVER BROOK	Yes			8	Scour resistant foundations
78	1018151	RAMP-A (I-78) OVER BEAVER BROOK	Yes			8	Scour resistant foundations
78	1018152	I-78 RAMP C OVER BEAVER BROOK	Yes			8	Scour resistant foundations
78	1018158	I-78 OVER BRANCH ROCKAWAY CREEK	Yes			8	Culvert
78	1018166	I-78 EB OVER N BR OF ROCKAWAY CREEK	Yes			8	Scour resistant foundations
78	1018167	I-78 WB / N BR.ROCKAWAY CREEK	Yes			8	Scour resistant foundations
78	1018175	I78 EB OVER LAMINGTON RIVER	Yes			8	Scour resistant foundations
78	1018176	I78 WB OVER LAMINGTON RIVER	Yes			8	Scour resistant foundations
78	1816154	I-78 EB OVER NO BR RARITAN RIVER	Yes			8	Scour resistant foundations
78	1816155	I78 WB OVER N BR RARITAN RIVER	Yes			8	Scour resistant foundations
78	1817163	I78 EB OVER TRIB TO DEAD RIVER	Yes			8	Scour resistant foundations
78	1817164	I78 WB OVER TRIB TO DEAD RIVER	Yes			8	Scour resistant foundations
78	1817166	I-78 EB OVER TRIB.DEAD RIVER	Yes			8	Scour resistant foundations
78	1817167	I-78 WB OVER TRIB.DEAD RIVER	Yes			8	Scour resistant foundations
78	1817171	I-78 OVER CORYS BROOK	Yes			8	Culvert
78	1817179	I-78 EB/PLAINFIELD AV & GREEN BRK	Yes			8	Scour resistant foundations
78	1817180	I-78 WB / PLNFLD AVE(CO 663)& GRN BRK	Yes			8	Scour resistant foundations
78	2010168	I-78 OVER VAN WINKLE BROOK	Yes			8	Culvert
78	2010170	ROUTE I-78EB OUTER RDWAY/RAHWAY RIVER	Yes			8	Culvert
78	2010171	ROUTE I-78 EB INNER OVER RAHWAY RIVER	Yes			8	Culvert
78	2010172	RT I-78 WB INNER&RAMP O/RAHWAY RIVER	Yes			8	Culvert
78	2010173	I-78 WB OUTER&RAMP P/W BR RAHWAY RIV	Yes			8	Culvert
78	2010174	I78 WB OUTER&RAMP P/E BR RAHWAY RIVER	Yes			8	Culvert
78	2011159	I-78 OVER ELIZABETH RIVER	Yes			8	Scour resistant foundations
78	2113155	I-78EB/STEWARTSVILLE RD&POHATCONG CRK	Yes			8	No evidence of scour problems
78	2113156	I-78WB/STEWARTSVILLE RD&POHATCONG CRK	Yes			8	No evidence of scour problems
78	2113159	I78EB/ASBURY RD(CR632)&MUSCONETCONG R	Yes			8	No evidence of scour problems
78	2113160	I78WB/ASBURY RD(CR632)&MUSCONETCONG R	Yes	Yes	4	3	Stage II completed
79	1322152	ROUTE 79 OVER BIG BROOK	Yes	Yes	2	5	Stage II completed
79	1322153	ROUTE 79 OVER BIG BROOK	No			8	Culvert
80	0225158	I-80 & MOLNAR DR./FLEISCHER BROOK	Yes			8	Culvert
80	0225166	I-80/MRKT.MAIN,FAIRVIEW STS.&SADL RIV	Yes	Yes	1	3	Stage II completed
80	0226157	I80 EB OVER GREEN ST & NJ TRANSIT	Yes	Yes	2	8	HEC-23 Countermeasures installed
80	0226158	I80 EXP/GREEN ST & NJ TRANSIT	Yes	Yes	2	8	HEC-23 Countermeasures installed
80	0226164	I-80 OVER HACK RIV,RIV ST,RR AVRR	Yes			8	Scour resistant foundations

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Rte	Number	Name	Stage I	Stage II	Phase	Item 113	Additional Comments
80	0726155	I80EB OVER PASSAIC RV & FRFLD RD	Yes			8	No evidence of scour problems
80	0726156	I80WB OVER PASSAIC RV & FRFLD RD	Yes	Yes	4	5	Stage II completed
80	1412174	RT I-80 EB OVER ROCKAWAY RIVER.	Yes			8	No evidence of scour problems
80	1412175	RT I-80 WB OVER ROCKAWAY RIVER	Yes			8	No evidence of scour problems
80	1413155	RAMP C OVER BURNT MEADOW BROOK	Yes	Yes	2	3	Stage II completed
80	1413156	I-80 EB OVER BURNT MEADOW BROOK	Yes			8	No evidence of scour problems
80	1413157	RT 80 WB OVER GREEN POND BROOK	Yes			8	No evidence of scour problems
80	1413158	I-80 RAMPS D,E OVER BURNT MEADOW BRK.	Yes			8	No evidence of scour problems
80	1413170	VANDERHOOF AVE OVER BEAVER BROOK	Yes			8	No evidence of scour problems
80	1413171	I-80 E.B. OVER BEAVER BROOK	Yes			8	No evidence of scour problems
80	1413172	I-80 WESTBOUND OVER BEAVER BROOK	Yes			8	No evidence of scour problems
80	1413174	I-80 EB OVER ROCKAWAY RIVER	Yes	Yes	2	8	HEC-23 Countermeasures installed
80	1413175	RT I-80WB&RAMP K OVER ROCKAWAY RIVER	Yes			8	No evidence of scour problems
80	1414152	RTE I 80 EB OVER DEN BROOK	Yes			8	Scour resistant foundations
80	1414153	ROUTE I80 WB,RAMP A OVER DEN BRK	Yes			8	Scour resistant foundations
80	1414174	I80,I280&RAMPS B&F OVER TROY BROOK BR	Yes			8	Culvert
80	1414182	I-80 AND RAMPS E&N OVER TROY BROOK	Yes			8	Culvert
80	1414183	I-80 RAMP M(LITTLETON RD)/TROY BK	Yes			8	Culvert
80	1415152	I-80EB OVER ROCKAWAY RIVER	Yes			8	Scour resistant foundations
80	1415153	I-80 WB OVER ROCKAWAY RIVER	Yes			8	Scour resistant foundations
80	1415157	I-80 EB OVER PASSAIC RIVER.	Yes			8	No evidence of scour problems
80	1415158	I80WB OVER PASSAIC RV	Yes			8	No evidence of scour problems
80	1427151	WATERLOO ROAD OVER WILLS BROOK	Yes			8	Culvert
80	1427152	I-80,RAMP A OVER WILLIS BROOK	Yes			8	Culvert
80	1609150	I80 OVER SINGAC BROOK	Yes			8	Culvert
80	1609154	I-80 RAMP "B" OVER SINGAC BROOK	Yes			8	Culvert
80	1610152	I-80 OVER RT.20,PASS.RIV&SLG. RD.	Yes			8	No evidence of scour problems
80	1610153	RT80/PAS.RIV,RIV.VIEW DR.&MCBR.AV	Yes			8	Scour resistant foundations
80	1906152	I80 OVER MUSCONETCONG RV	Yes			8	No evidence of scour problems
80	2114150	I-80 & SERVICE RD/DUNNFIELD CREEK.	Yes			8	Culvert
80	2114157	I-80 & SERVICE RD OVER STONEY BROOK	Yes			8	Scour resistant foundations
80	2115154	ROUTE I-80EB OVER PAULINS KILL	Yes			8	No evidence of scour problems
80	2115155	RT I-80 WB OVER PAULINS KILL	Yes			8	No evidence of scour problems
80	2115158	I-80,LINBERRY RD & RAMP/ DELAWANNA CK	Yes			8	Culvert
80	2115170	I80 OVER BEAVER BROOK	Yes			8	Culvert
80	2115171	CR 521(HOPE-BLAIRSTOWN RD)/BEAVER BRK	Yes			8	Culvert
80	2116152	I80 OVER TROUT BROOK	Yes			8	Culvert
80	2116156	I-80 OVER BEAR CREEK	Yes			8	Culvert

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Rte	Number	Name	Stage I	Stage II	Phase	Item 113	Additional Comments
80	2116160	I 80 OVER PEQUEST RIVER	Yes			8	Culvert
82	2012150	NJ ROUTE 82 OVER RAHWAY RIVER	Yes	Yes	3	3	Stage II completed
87	0115150	RT.87/ABSECON INLET&RAMPS J&H	Yes	Yes	4	3	Stage II completed
88	1514150	RT88 OVER N BR OF METEDECONK RVR	Yes			8	No evidence of scour problems
88	1515150	RT88 OVER BEAVER DAM CREEK	Yes	Yes	1	5	Stage II completed, Earth Tech Reevaluation
88	1515151	RT88 OVER PT PLEASANT CANAL	Yes			8	No evidence of scour problems
90	0433155	NJ 90/FK.LND RD & SO.BR.OF PENN.CREEK	Yes			8	No evidence of scour problems
94	1909151	RT. 94 OVER PAULINS KILL	Yes			8	No evidence of scour problems
94	1923150	NJ RT.94 OVER WALLKILL RIVER	Yes	Yes	2	3	Stage II completed
94	2117154	NJ RT. 94 OVER YARD'S CREEK	Yes			8	No evidence of scour problems
94	2117157	NJ 94 OVER JACKSONBURG CREEK	Yes	Yes	1	3	Stage II completed
94	2117159	NJ ROUTE 94 OVER BLAIR CREEK.	Yes	Yes	1	3	Stage II completed
94	2117160	ROUTE 94 OVER PAULINS KILL	Yes	Yes	1	3	Stage II completed
95	0229157	I-95 RAMP B OVER TEANECK CREEK	Yes			8	No evidence of scour problems
95	1120150	I-95 OVER D&R CANAL,NJ29NB&NJ175	Yes			8	D&R Canal
95	1120152	I-95 OVER EWING CREEK	Yes			8	Scour resistant foundations
95	1120154	SCOTCH ROAD OVER EWING CREEK	Yes			8	Culvert
95	1120164	I-95 NB OVER SHABAKUNK CREEK BRANCH	Yes			8	Culvert
1+9	0201150	US ROUTE 1&9 OVER FORM. NYS&W RR & ST	Yes			8	Scour resistant foundations
1+9	0201151	US 1&9(BROAD AVENUE) OVER WOLF CREEK	Yes	Yes	2	3	Stage II completed
1+9	0701153	US 1&9 OVER PEDDIE DITCH	Yes			8	Culvert
1+9	0704150	PULASKI SKYWAY OVER PASSAIC RIVER	Yes			8	Scour resistant foundations
1+9	0901150	PULASKI SKYWAY OVER HACKENSACK R.	Yes			8	Scour resistant foundations
1+9	2001150	US 1+9 OVER RAHWAY R & HAZELWD AV	Yes	Yes	1	3	Stage II completed, under construction
1+9	2001154	US.1&9 OVER MORSES CREEK	Yes			8	No evidence of scour problems
1+9	2001155	US 1+9 OVER BR OF MORSES CREEK	Yes			8	Scour resistant foundations
1+9	2002150	ELIZABETH RIVER VIADUCT	Yes			8	New Bridge
1+9T	0705151	US 1&9T OVER PASSAIC RVR & LOCAL RDS	Yes			8	Scour resistant foundations
1+9T	0905152	US 1&9T OVER HACKENSACK RIVER	Yes			8	Scour resistant foundations
109	0501150	RT 109 OVER CAPE MAY CNL & SER RD	Yes			8	No evidence of scour problems
120	0238150	NJ 120(PAT.PLANK RD)/BERRY'S CREEK	Yes			8	No evidence of scour problems
124	1406157	ROUTE NJ 124 EB OVER PASSAIC RIVER	Yes			8	No evidence of scour problems
124	1406158	ROUTE NJ 124 WB OVER PASSAIC RIVER	Yes			8	No evidence of scour problems
124	2005150	NJ RTE 124 OVER RAHWAY RIVER	Yes			8	Culvert
124	2005152	RT 124 OVER VAN WINKLE CREEK	Yes			8	No evidence of scour problems
130	0316150	RT US 130 OVER POMPESTON CREEK	Yes	Yes	1	3	Stage II completed
130	0316152	US RT 130 OVER RANCOCAS CREEK	Yes			8	No evidence of scour problems
130	0317150	RT US 130 NB OVER ASSISCUNK CREEK	Yes			3	Evaluation by Earth Tech

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Rte	Number	Name	Stage I	Stage II	Phase	Item 113	Additional Comments
130	0317152	US 130 SB OVER ASSISCUNK CREEK	Yes	Yes	3	3	Stage II completed
130	0317155	US RT.130 OVER CRAFTS CREEK	Yes			8	No evidence of scour problems
130	0317160	U.S.ROUTE 130 OVER BLACK'S CREEK	Yes			8	Culvert
130	0319152	US RT. 130 OVER CROSS WICKS CREEK	Yes	Yes	4	3	Stage II completed
130	0419151	US RT 130 / LITTLE TIMBER CREEK	Yes			8	New Bridge
130	0420150	US 130/SOUTH BRANCH OF NEWTON CK	Yes			8	New Bridge
130	0420151	US 130/MAIN BRANCH NEWTON CREEK	Yes			8	No evidence of scour problems
130	0422156	US RTE 130 / NO.BR.PENNSAUKEN CRK	Yes			8	No evidence of scour problems
130	0817150	US RT 130 OVER BIG BIRCH CREEK	Yes	Yes	3	3	Stage II completed
130	0817151	RT US 130 OVER RACCOON CREEK	Yes	Yes	1	3	Stage II completed
130	0818151	RT US 130 /BIG TIMBER CREEK	Yes	Yes	3	3	Stage II completed
130	1122150	US 130 OVER DOCTORS CREEK	Yes	Yes	2	3	Stage II completed
130	1122153	US 130 OVER BACK BROOK	Yes			8	No evidence of scour problems
130	1123152	US ROUTE 130 OVER ROCKY BROOK	Yes	Yes	2	3	Stage II completed
130	1123153	RT 130 OVER MILLSTONE RIVER	Yes	Yes	1	3	Stage II completed
130	1227151	US 130 OVER BRAINERD LAKE	Yes			8	No evidence of scour problems
130	1227157	US130 OVER BRANCH LAWRENCE BROOK	Yes			8	No evidence of scour problems
130	1227158	US130 OVER LAWRENCE BROOK RES.	Yes			8	No evidence of scour problems
130	1227159	US 130 OVER OAKLEYS BROOK	Yes	Yes	1	3	Stage II completed
130	1710150	U.S.ROUTE 130 OVER SALEM CANAL	Yes			8	No evidence of scour problems
130	1710152	US130 OVER OLDMANS CREEK	Yes			8	No evidence of scour problems
133	1143165	NJ RT 133 OVER TRIBUTARY TO MILLSTONE RIVER	No			8	New Bridge
133	1143168	ROUTE 133 EB OVER ROCKY BROOK	No			8	New Bridge
133	1143169	ROUTE 133 WB OVER ROCKY BROOK	No			8	New Bridge
138	1317150	NJ 138 OVER N.BR OF WRECK POND	Yes	Yes	1	8	HEC-23 Countermeasures installed
147	0517150	NJ ROUTE 147 OVER MILL TRAIL CREEK	Yes			8	New Bridge
147	0517151	RT N.J. 147 OVER GRASSY SOUND	Yes			8	New Bridge
147	0517152	NJ ROUTE 147 OVER BEACH CREEK	Yes			8	Scour resistant foundations
152	0122152	RT 152/DOLES CREEK	Yes			8	No evidence of scour problems
152	0122155	RT 152 OVER BROAD THOROFARE	Yes			8	Scour resistant foundations
152	0122156	N.J.ROUTE 152 / CREEK AT STA. 91	Yes			8	No evidence of scour problems
152	0122157	NJ ROUTE 152 BRIDGE AT STA 61+49	Yes			8	Scour resistant foundations
152	0122158	RT 152 OVER SOMERS CREEK	Yes			8	Scour resistant foundations
152	0122159	N.J.ROUTE 152 OVER BASS HARBOR	Yes			8	Scour resistant foundations
154	0424151	RT 154 OVER NO BR COOPER RIVER	Yes	Yes	3	3	Stage II completed
156	1125150	N.J. ROUTE 156 OVER DOCTOR'S CREEK	Yes			8	New Bridge
159	1430151	N.J RT.159 OVER BRANCH OF PASSAIC RIV	Yes			8	No evidence of scour problems
159	1430152	RT 159 EB OVER THE PASSAIC RIVER	Yes			8	No evidence of scour problems

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Rte	Number	Name	Stage I	Stage II	Phase	Item 113	Additional Comments
159	1430153	ROUTE 159 WB OVER PASSAIC RIVER	Yes			8	No evidence of scour problems
162	0513150	RT 162 OVER CAPE MAY CANAL	Yes			8	No evidence of scour problems
165	1019150	RT165 OVER SWAN CREEK	Yes	Yes	1	5	Stage II completed
166	1516150	ROUTE NJ 166 OVER JAKES BRANCH	Yes			8	New Bridge
166	1516151	RT NJ166 OVER S.CHANNEL OF TOMS RIVER	Yes	Yes	3	3	Stage II completed
166	1516152	RT NJ 166 OVER NO. CHANNEL OF TOMS R.	Yes	Yes	1	3	Stage II completed
168	0426153	ROUTE 168 OVER NEWTON CREEK	Yes			8	Invert Slab
168	0819150	N.J RT 168 OVER GRENLOCH LAKE	Yes			8	No evidence of scour problems
173	1004151	NJ RT.173/ SO. BR. RARITAN RIVER	Yes	Yes	1	3	Stage II completed, under construction
173	1024151	NJ ROUTE 173 OVER MULHOCKAWAY CREEK	Yes	Yes	2	5	Stage II completed
173	2103152	RT 173 OVER POHATCONG CREEK	Yes	Yes	2	3	Stage II completed
173	2103153	NJ 173 OVER MUSCONETCONG RIVER	Yes	Yes	2	3	Stage II completed
179	1020150	ROUTE NJ 179 OVER ALEXAUKEN CREEK	Yes	Yes	2	8	Stage II completed, On rock
179	1022150	ROUTE NJ 179 OVER BACK BROOK	Yes	Yes	2	5	Stage II completed
183	1426151	ROUTE 183 OVER MUSCONETCONG LAKE	Yes			8	No evidence of scour problems
195	1134152	I-195 RAMP C OVER CROSSWICKS CREEK	Yes			8	No evidence of scour problems
195	1136151	RT I-295 RAMP ES OVER WETLANDS	No			8	New Bridge
195	1333162	I-195 EB OVER MANASQUAN RIVER	Yes	Yes	2	5	Stage II completed
195	1333163	I-195 WB OVER MANASQUAN RIVER	Yes	Yes	2	8	Stage II completed
195	1333164	I-195 EB OVER MARSH BOG BROOK	Yes	Yes	2	8	Stage II completed
195	1333165	I-195 WB OVER MARSH BOG BROOK	Yes	Yes	2	8	Stage II completed
195	1333169	I-195 EB OVER MINGAMAHONE BROOK	Yes	Yes	1	8	Stage II completed
195	1333170	I-195 WB OVER MINGAMAHONE BROOK	Yes	Yes	2	8	Stage II completed
195	1333171	I-195 WB / ALLAIRE PRK TOWPATH&CANAL	Yes			8	No evidence of scour problems
195	1333172	I-195EB OVER ALLAIRE PARK TOWPATH	Yes			8	No evidence of scour problems
195	1333175	CTY RT 547SB OVER MANASQUAN RIVER	Yes	Yes	2	7	Stage II completed, Earth Tech Reevaluation
195	1333176	CO RT 547 NB OVER MANASQUAN RIVER	Yes			8	No evidence of scour problems
195	1517151	I-195 OVER TOMS RIVER	Yes			8	Culvert
195	1517152	I-195 OVER BRANCH OF TOMS RIVER	Yes			8	Culvert
195	1517159	I-195 WB/S BRNCH METEDECONK RIVER	Yes			8	No evidence of scour problems
195	1517160	I-195 EB OVER SO BR METEDECONK RV	Yes			8	No evidence of scour problems
195	1517169	I-195 EB OVER N BR METEDECONK RIV	Yes	Yes	1	8	Stage II completed
195	1517170	I-195 WB/NO. BR. METEDECONK RIVER	Yes	Yes	1	8	Stage II completed
202	1011153	ACCESS RD OVER 3RD NESHANIC R	Yes			8	Scour resistant foundations
202	1011154	RTS 31 & 202 OVER 3RD NESHANIC RIVER	Yes			8	Scour resistant foundations
202	1011155	NJ 31 & US 202 OVER 2ND NESHANIC	Yes			8	No evidence of scour problems
202	1011156	US202-NJ31 OVER 1ST NESHANIC RIVER	Yes			8	No evidence of scour problems
202	1021150	US202 NB OVER SO BR RARITAN RIV	Yes	Yes	4	5	Stage II completed

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Rte	Number	Name	Stage I	Stage II	Phase	Item 113	Additional Comments
202	1021151	US 202 SB OVER SO BR RARITAN RIV	Yes	Yes	4	5	Stage II completed
202	1021157	US202 OVER PLEASANT RUN	Yes			8	No evidence of scour problems
202	1023151	US 202 NB/ALX CK RD,HQ RD,CR & BLK RV	Yes			8	Scour resistant foundations
202	1023152	US.202 SB/ALEX CRK RD,ALEX CRK&HDQ RD	Yes			8	Scour resistant foundations
202	1023153	US 202/CR 605(QUEENS RD)&ALEXAUKEN CR	Yes			8	Scour resistant foundations
202	1023154	RT 202 RAMP D OVER ALEXAUKEN CRK.	Yes			8	Culvert
202	1023155	QUEENS RD (CO.605) OVER ALEXAUKEN CRK	Yes			8	Culvert
202	1416150	US202 OVER PRIMROSE BROOK	Yes			8	No evidence of scour problems
202	1416152	US 202 OVER WHIPPANY RIVER	Yes	Yes	4	3	Stage II completed
202	1807153	US 202 OVER HOLLAND BROOK	Yes			8	No evidence of scour problems
202	1807155	US 202 OVER N BR RARITAN RIVER	Yes	Yes	2	3	Stage II completed
202	1808150	US 202&206 OVER PETER'S BROOK	Yes			8	Scour resistant foundations
202	1808163	US 202/206 OVER CHAMBERS BROOK	Yes	Yes	4	8	Stage II completed
202	1808167	US RT 202-206 OVER N BR RARITAN R	Yes			8	No evidence of scour problems
202	1809150	US202 OVER N BR RARITAN RIVER	Yes	Yes	4	3	Stage II completed
202	1809153	RT202 OVER BR MINE BROOK	Yes	Yes	1	3	Stage II completed
202	1809158	US RT 202 OVER PASSAIC RIVER	Yes	Yes	1	3	Stage II completed
206	0118150	US 206 OVER CEDAR BRANCH	Yes	Yes	1	3	Stage II completed
206	0118152	US 206 OVER GREAT SWAMP BRANCH	Yes	Yes	1	3	Stage II completed
206	0118153	RT 206 OVER ALBERTSONS BROOK	Yes	Yes	1	3	Stage II completed
206	0118154	US 206 OVER CLARKS CREEK	Yes			8	No evidence of scour problems
206	0118155	US 206 OVER SLEEPERS BROOK	Yes			8	Invert Slab
206	0324150	US 206 OVER ATSION LAKE	Yes			8	No evidence of scour problems
206	0324152	U.S ROUTE 206 OVER SPRINGERS BROOK	Yes	Yes	3	3	Stage II completed
206	0324153	US 206 OVER MUSKINGUM CREEK	Yes	Yes	3	3	Stage II completed
206	0324155	US 206 OVER SO BR OF RANCOCAS CREEK	Yes	Yes	3	3	Stage II completed
206	0324156	ROUTE US 206 OVER JADE RUN	Yes	Yes	4	3	Stage II completed
206	0324158	US206 OVER N BR RANCOCAS CREEK	Yes	Yes	4	5	Stage II completed
206	0324160	US RT 206 OVER BARKERS CREEK	Yes	Yes	1	3	Stage II completed
206	0324162	US206 OVER ASSISCUNK CREEK	Yes	Yes	1	3	Stage II completed
206	0325150	US 206 OVER BLACKS CREEK	Yes			8	No evidence of scour problems
206	0326152	US 206 NB OVER CROSSWICKS CREEK	Yes	Yes	3	3	Stage II completed
206	0326153	US206 SB OVER CROSSWICKS CREEK	Yes	Yes	3	3	Stage II completed
206	1129150	US 206 (LAWRENCE AV.) /SHABAKUNK CRK	Yes			8	No evidence of scour problems
206	1129151	US206 OVER LITTLE SHABAKUNK CREEK	Yes			8	New Bridge
206	1129153	RT U.S.206 OVER SHIPETAUKIN CREEK	Yes			8	No evidence of scour problems
206	1129154	U.S 206/STONEY BROOK FLOOD CHANNEL.	Yes			8	Scour resistant foundations
206	1129155	US 206 OVER STONY BROOK	Yes			8	Scour resistant foundations

New Jersey Bridge Scour Evaluation Program

Rte	Number	Name	Stage I	Stage II	Phase	Item 113	Additional Comments
206	1417152	US 206 OVER BLACK RIVER	Yes			8	No evidence of scour problems
206	1417153	US 206 OVER DRAKES BROOK	Yes			8	No evidence of scour problems
206	1417156	RT 206/SOUTH BR OF RARITAN RIVER	Yes	Yes	1	3	Stage II completed
206	1417157	US 206 OVER TRIB TO DRAKES BROOK	Yes	Yes	1	3	Stage II completed
206	1417158	U S 206/S.BR. OF RARITAN RIVER	Yes	Yes	1	4	Stage II completed
206	1417159	US RT 206/S BRANCH RARITAN RIVER	Yes	Yes	2	3	Stage II completed
206	1428150	CONTINENTAL DR NORTH/MUSCONETCONG RVR	Yes			8	No evidence of scour problems
206	1428155	US 206 CONN./MUSCONETCONG RIVER	Yes			8	No evidence of scour problems
206	1810152	U.S. RT 206 OVER BEDENS BROOK	Yes			8	No evidence of scour problems
206	1810153	US206 OVER BACK BROOK	Yes	Yes	2	3	Stage II completed
206	1810155	RT US 206 OVER CRUSERS BROOK	Yes	Yes	3	3	Stage II completed
206	1810158	ROUTE US 206 OVER PIKE RUN	Yes	Yes	2	3	Stage II completed
206	1810160	US206 OVER BR OF ROYCES BROOK	Yes	Yes	1	4	Stage II completed, Earth Tech Reevaluation
206	1810164	US206 OVER BR OF ROYCES BROOK	Yes	Yes	4	3	Stage II completed
206	1810165	US206 OVER BR OF ROYCES BROOK	Yes	Yes	4	3	Stage II completed
206	1810169	RT 206 /BRANCH OF RARITAN RIVER	Yes			8	New Bridge
206	1810170	U.S.ROUTE 206 OVER RARITAN RIVER	Yes			8	New Bridge
206	1911151	US206 OVER LUBBERS RUN	Yes	Yes	2	3	Stage II completed
206	1911154	ROUTE 206 OVER BRANCH PEQUEST RIV	Yes			8	Culvert
206	1911159	US206 OVER PEQUEST RIVER	Yes	Yes	2	3	Stage II completed
206	1911160	US206 OVER BR OF PEQUEST RIVER	Yes			8	No evidence of scour problems
206	1912150	US 206/DRY BROOK&ABANDONED RAILROAD	Yes			8	No evidence of scour problems
206	1912151	US ROUTE 206 OVER CULVERS BROOK	Yes	Yes	1	5	Stage II completed
206	1912158	US ROUTE 206 OVER KITTATINY BROOK	Yes	Yes	1	3	Stage II completed
206	1912160	US 206 OVER BIG FLAT BROOK	Yes	Yes	1	3	Stage II completed
206	1912163	US 206 OVER LITTLE FLAT BROOK	Yes			8	No evidence of scour problems
206	1920151	US ROUTE 206 OVER PAULINS KILL	Yes			8	No evidence of scour problems
208	0232158	RT208/NJ TRANSIT,BLVD AVE&DEBOER DR	Yes			8	No evidence of scour problems
208	0233163	NJ208&RAMPK/POND BROOK	Yes			8	Culvert
208	0233165	NJ 208 OVER POND BROOK	Yes			8	Culvert
208	1612153	RTE NJ 208 OVER GOFFLE BROOK	Yes			5	No evidence of scour problems
208	1612154	ROUTE 208 RAMP A OVER GOFFLE BROOK	Yes	Yes	2	3	Stage II completed
208	1612155	RTE NJ 208 RAMP B OVER GOFFLE BROOK	Yes			8	No evidence of scour problems
280	0731161	WILLIAM A. STICKEL MEMORIAL BR	Yes			8	No evidence of scour problems
280	0914152	RT I-280/FRANK'S CREEK	Yes			8	Culvert
280	1418151	RT.I-280 EB OVER WHIPPANY RIVER	Yes			8	No evidence of scour problems
280	1418152	RT I-280 WB OVER WHIPPANY RIVER	Yes			8	No evidence of scour problems
280	1418154	RT.I-280 EB OVER PASSAIC RIVER	Yes	Yes	2	3	Stage II completed

New Jersey Bridge Scour Evaluation Program

Rte	Number	Name	Stage I	Stage II	Phase	Item 113	Additional Comments
280	1418155	ROUTE I-280 WB OVER PASSAIC RIVER	Yes			8	No evidence of scour problems
284	1907152	NJ RT284/BR OF WALLKILL RIVER	Yes	Yes	2	3	Stage II completed
284	1907157	NJ 284 OVER BR OF WALLKILL RIVER	Yes	Yes	2	3	Stage II completed
287	0235150	RT I-287 OVER RAMAPO RIVER	Yes			8	No evidence of scour problems
287	0235162	I-287 AND NJ 208 OVER POND BROOK	Yes			8	Culvert
287	0235165	RAMP B OVER NYS.& WR.RLY.& POND BROOK	Yes			8	No evidence of scour problems
287	0235166	RAMP A/I-287,NJ208,D & O RR & PND BRK	Yes			8	No evidence of scour problems
287	0235170	ROUTE 287 OVER POND BROOK	No			8	Culvert
287	0235173	ROUTE I287 SB / RAMAPO R&STAGHILL RD	No			8	New Bridge
287	0235176	RAMP A/COLONIAL ROAD & POND BROOK	Yes			8	No evidence of scour problems
287	0235178	RT I-287 SB/DARLINGTON AVE & BROOK	Yes			8	No evidence of scour problems
287	0235179	RT I-287NB/DARLINGTON AVE & BROOK	Yes			8	No evidence of scour problems
287	0235180	I-287 NB./RAMAPO RIVER&STAG HILL ROAD	Yes			8	No evidence of scour problems
287	1231165	I-287 OVER AMBROSE BROOK	Yes			8	Culvert
287	1231169	I-287/RARITAN R.,D&R CANAL &EASTON AV	Yes			8	D&R Canal
287	1419150	I-287 OVER MALAPARDIS BROOK.	Yes			8	No evidence of scour problems
287	1419151	I-287 RAMP 'NE'OVER MALAPARDIS BK	Yes	Yes	1	8	HEC-23 Countermeasures installed
287	1419162	I287 NB OVER STREAM AT STA. 267+97	Yes			8	Culvert
287	1419163	I-287 SB OVER STREAM AT STA. 268	Yes			8	Culvert
287	1419183	I-287 OVER WHIPPANY RIVER	Yes			8	No evidence of scour problems
287	1419184	I-287 OVER WHIPPANY RIVER	Yes			8	Culvert
287	1419186	ACCESS RD OVER WHIPPANY RIVER	Yes			8	No evidence of scour problems
287	1419187	CEDAR KNOLLS RD/I-287&WHIPPANY RIVER	Yes			8	No evidence of scour problems
287	1419188	I287/EDEN LN,BR.OF WHIPPANY RV&RR	Yes			8	No evidence of scour problems
287	1419195	I-287 RAMP Y OVER MALAPARDIS BROOK	Yes			8	Culvert
287	1420156	I287 OVER TROY BROOK	Yes			8	Culvert
287	1420160	I287 NB OVER ROCKAWAY RIVER	Yes			8	No evidence of scour problems
287	1420161	I287 SB OVER ROCKAWAY RIVER	Yes			8	No evidence of scour problems
287	1420162	MYRTLE AVENUE OVER ROCKAWAY RIVER	Yes			8	No evidence of scour problems
287	1420170	I287 NB OVER MAIN RD & CROOKED BR	Yes			8	No evidence of scour problems
287	1420171	I287 SB OVER MAIN RD & CROOKED BR	Yes			8	No evidence of scour problems
287	1420172	I-287 RAMP P & S OVER CROOKED BROOK	Yes			8	Culvert
287	1420186	I-287/ PAT-HAM TPK, PEQ RI & RAIL RD	Yes			8	No evidence of scour problems
287	1615151	RT.I-287/MAIN BRANCH OF POST BROOK	No			8	Culvert
287	1615156	I-287 OVER WANAQUE RIVER (LAKE INEZ)	Yes			8	No evidence of scour problems
287	1615157	UNION AVE (CR511) OVER POST BROOK	No			8	New Bridge
287	1812154	I-287 OVER SUY BROOK	Yes			8	Scour resistant foundations
287	1812158	I-287/CANAL RD,D&R CANAL,RARITAN R&RR	Yes			8	Scour resistant foundations

New Jersey Bridge Scour Evaluation Program

Rte	Number	Name	Stage I	Stage II	Phase	Item 113	Additional Comments
287	1813157	I287 NB OVER ROSS BROOK	Yes			8	Culvert
287	1813158	I287 SB OVER ROSS BROOK	Yes			8	Culvert
287	1814162	I-287NB & RAMP A OVER CHAMBERS BK	Yes			8	Culvert
287	1814163	I287 SB & RAMP B OVER CHAMBERS BR	Yes			8	Culvert
287	1815182	I-287 NB OVER PASSAIC RIVER	Yes			8	Culvert
287	1815183	I-287SB OVER PASSAIC RIVER	Yes			8	Culvert
295	0327154	FLLWSHP RD (CO 673)/N BR PNNSK CK	Yes			8	Culvert
295	0327155	I295 OVER N BRANCH PENNSAUKEN CK	Yes			8	Culvert
295	0327165	I-295 OVER PARKERS CREEK	Yes			8	Culvert
295	0327167	I-295 NB OVER RANCOCAS CREEK	Yes			8	No evidence of scour problems
295	0327168	I295 SB OVER RANCOCAS CREEK	Yes			8	No evidence of scour problems
295	0328154	I295 NB OVER ASSISCUNK CREEK	Yes			8	No evidence of scour problems
295	0328155	I295 SB OVER ASSISCUNK CREEK	Yes			8	No evidence of scour problems
295	0328158	I295 OVER CRAFTS CREEK	Yes			8	Culvert
295	0328175	ROUTE I-295 NB OVER CROSSWICKS CREEK	No			5	New Bridge
295	0328176	ROUTE I-295 SB OVER CROSSWICKS CREEK	No			5	New Bridge
295	0428152	I295 RAMP C OVER LITTLE TIMBER CR	Yes			8	Culvert
295	0428153	I-295 RAMP C OVER LITTLE TIMBER CREEK	Yes			8	Culvert
295	0428155	BELL ROAD(CR 658)/LITTLE TIMBER CREEK	Yes			8	Culvert
295	0429152	I-295 & RAMPS A & D/COOPER RIVER	Yes			8	Culvert
295	0429158	I295 OVER NORTH BRANCH COOPER RIV	Yes			8	Culvert
295	0429162	RT I-295/S BRANCH OF PENNSAUKEN CREEK	Yes			8	Culvert
295	0429163	I295 RAMPS A&B OVER COOPER RIVER	Yes			4	Scour resistant foundations
295	0429164	I-295 RAMPS A & B OVER COOPER RIV	Yes			8	Culvert
295	0820155	I 295 NB OVER RACCOON CREEK	Yes	Yes	2	5	Stage II complete, PBQD Reevaluation
295	0820156	I 295 SB OVER RACCOON CREEK	Yes	Yes	2	5	Stage II complete, PBQD Reevaluation
295	0820166	I-295 OVER LITTLE TIMBER CREEK	Yes			8	Culvert
295	0821154	I-295 & US 130 OVER PURGEY BROOK	Yes			8	Culvert
295	0821157	I-295 & US 130 OVER STILL RUN CREEK	Yes			8	Culvert
295	0821158	SWEDESBORO RD-CO 653 / STILL RUN	Yes			8	Culvert
295	0821166	I-295 NB & US 130 NB OVER MANTUA CRK	Yes			8	Scour resistant foundations
295	0821167	I-295 SB & US 130 SB OVER MANTUA CRK	Yes			8	Scour resistant foundations
295	0821170	I-295 & US 130 OVER LITTLE MANTUA CRK	Yes	Yes	2	5	Stage II completed
295	0821177	I-295 OVER WOODBURY CREEK	Yes			8	Scour resistant foundations
295	0821179	I-295 OVER HESSIAN RUN	Yes			8	Culvert
295	0823157	I-295 NB OVER BIG TIMBER CREEK	Yes			8	Scour resistant foundations
295	0823158	I-295 SB OVER BIG TIMBER CREEK	Yes			8	Scour resistant foundations
295	1136152	ROUTE I-295 RAMP C OVER WETLANDS	No			8	New Bridge

New Jersey Bridge Scour Evaluation Program

Rte	Number	Name	Stage I	Stage II	Phase	Item 113	Additional Comments
295	1136176	I-295 NB OVER WATSONS CK,NJ TRANS,D&R	No			8	New Bridge
295	1136177	I-295 SB OVER WATSONS CK,NJ TRANS,D&R	No			8	New Bridge
295	1136178	ROUTE I-295 NB OVER DUCK CREEK	No			8	New Bridge
295	1136180	ROUTE I-295 SB OVER DUCK CREEK	No			8	New Bridge
295	1137167	I-295 OVER POND RUN	Yes			8	Culvert
295	1138152	I-295 OVER MIRY RUN	Yes			8	Culvert
295	1138158	I295 OVER ASSUNPINK CREEK	Yes			8	Culvert
295	1138159	I-295 OVER SAND RUN	Yes			8	Culvert
295	1138167	I-295NB RAMP F/D&R CANAL,SHIPETAUKIN	Yes			8	Scour resistant foundations
295	1138168	I295 NB/D&R CANAL & SHIPETAUKIN CREEK	Yes			8	Scour resistant foundations
295	1138169	I295 SB / D&R CANAL & SHPTKN CREK	Yes			8	Scour resistant foundations
295	1138170	I295 RAMPS G&C/D&R CAL.& SHIP CK.	Yes			8	Scour resistant foundations
295	1711150	I-295 NB/NJTPK(US 40).SALEM CANAL	Yes			8	Scour resistant foundations
295	1711151	I295 SB OVER SALEM CANAL	Yes			8	No evidence of scour problems
295	1711155	I 295 RAMP K / NJTP & SALEM CANAL	Yes			8	Culvert
295	1712154	I295 NB OVER GAME BRANCH	Yes			8	Culvert
295	1712155	I-295 SB OVER GAME BRANCH	Yes			8	Culvert
295	1712158	I295 NB OVER BEAVER CREEK	Yes			8	Culvert
295	1712159	I-295 SB OVER BEAVER CREEK	Yes			8	Culvert
295	1712164	I295 NB OVER OLDMANS CREEK	Yes	Yes	1	5	Stage II complete, PBQD Reevaluation
295	1712165	I295 SB OVER OLDMANS CREEK	Yes	Yes	1	5	Stage II complete, PBQD Reevaluation
322	0119151	US 322 OVER HOSPITALITY BROOK	Yes	Yes	2	3	Stage II completed
322	0119154	US 322 OVER GREAT EGG HARBOR RIV	Yes	Yes	2	5	Stage II complete, PBQD Reevaluation
322	0119155	US 322 OVER LITTLE MILL CREEK	Yes			8	No evidence of scour problems
322	0119156	US 322 OVER BIG DITCH	Yes	Yes	2	3	Stage II completed
322	0119159	US RTE 322 OVER WATERING RACE BRANCH	Yes			8	New Bridge
322	0119161	US 322 OVER BABCOCK CREEK	Yes			8	No evidence of scour problems
322	0825150	US 322 OVER RACCOON CREEK	Yes	Yes	3	3	Stage II completed
322	0825151	US RT. 322 OVER BRANCH OF RACOON CREEK	No			8	No evidence of scour problems
322	0825152	US322 OVER BR OF RACCOON CREEK	Yes			8	Invert Slab
322	0826150	US ROUTE 322 OVER SCOTLAND RUN	Yes	Yes	1	3	Stage II completed
439	2013154	NJ 439 OVER ELIZABETH RIVER	Yes	Yes	2	5	Stage II completed
524	1116150	S. BROAD ST.(C.R.524) OVER GROPP LAKE	Yes			8	No evidence of scour problems
676	0418153	I-676 NB OVER N BR NEWTON CREEK	Yes			8	No evidence of scour problems
676	0418154	I-676 SB OVER NO.BR OF NEWTON CREEK.	Yes			8	No evidence of scour problems
676	0418162	I-676 & RAMP FN OVER NEWTON CREEK	Yes			8	No evidence of scour problems
676	0418163	RT I-676 SB OVER NEWTON CREEK	Yes			8	No evidence of scour problems

Appendix C

State Flood Watch List Bridges

by

State Maintenance Region

SCOUR CRITICAL STATE WATCH LIST BRIDGES

Listed by Maintenance Region

Rte	Number	Name	Phase	Item 113	Channel Findings
Northern Maintenance Region					
1+9	0201151	US 1&9(BROAD AVENUE) OVER WOLF CREEK	2	3	Minor Scour
3	1601157	NJ ROUTE 3 OVER THIRD RIVER	1	3	Embankment Degredation
3	1601160	NJ RT 3 OVER UPPER POND SPILLWAY	1	3	Minor Scour
4	0206166	NJ 4 / HACKENSACK RIVER & ACCESS ROAD	1	3	Minor Undermining
4	0206181	NJ 4 OVER FLAT ROCK BROOK	3	3	Minor Scour
4	0206189	KINDERKAMACK RD OVER COLES BROOK	4	3	Minor Scour
10	0709150	RT 10 OVER WILLOW MEADOW BROOK	2	3	Heavy Sedimentation
10	0711150	NJ ROUTE 10 OVER CANOE BROOK	3	3	Restricted Flow
10	1401156	RT 10 OVER MILL BROOK	2	3	Heavy Scour
10	1402150	NJ ROUTE 10 OVER MALAPARDIS BROOK	2	3	Heavy Scour
15	1403150	NJ RT 15 OVER BRNT MDW(GRN PD) BROOK	2	3	Restricted Flow
15	1404155	GOVRNMNT RD(PARKER RD) WB/GREEN POND	1	3	Heavy Scour
15	1404158	NJ ROUTE 15 SB / ROCKAWAY RIVER	3	3	
15	1404159	NJ RT 15 RAMP A OVER HURDTOWN BROOK	2	3	Heavy Scour
15	1424150	NJ 15 NB OVER LAKE SHAWNEE	4	3	Minor Scour
15	1922150	NJ ROUTE 15 OVER BEAVER RUN	3	3	Minor Scour
15	1922151	NJ.RTE.15 OVER PAULINS KILL CREEK	2	3	
17	0216150	RT 17 OVER SPROUT BROOK	1	3	Heavy Scour
17	0216157	NJ RT 17 OVER SADDLE RIVER.	2	3	Embankment Degredation
17	0218161	N.J 17 NB/US 202 & RAMAPO RIVER	1	3	Minor Scour
17	0218162	NJ RT 17 SB OVER US 202 & RAMAPO RVR	2	3	Minor Scour
21	0716156	MAIN ST OVER SECOND RIVER	1	3	Inadequate Waterway Opening
22	2003157	US22 OVER ECHO LAKE	1	3	Restricted Flow
22	2003161	US 22 EB OVER RAHWAY RIVER	3	3	Heavy Scour
22	2003162	US 22 WB OVER RAHWAY RIVER	4	3	Minor Scour
22	2004151	US 22 OVER ELIZABETH RIVER	1	3	Minor Scour
23	0719151	RT 23 OVER PECKMANS BROOK	2	3	Heavy Scour
23	1405156	RT23/PEQUANNOCK R,HAMBURG TPK SB, RR	3	3	Minor Sedimentation
23	1604150	ROUTE NJ 23/PASSAIC RIVER	3	3	Minor Sedimentation
23	1605153	NJ RTE 23 SB OVER PEQUANNOCK RIV.	3	3	Minor Undermining
23	1605156	NJ RT 23 SB OVER PEQUANNOCK RIVER	2	3	Heavy Scour
23	1605158	NJ ROUTE 23 NB/MACOPIN RIVER	2	3	
23	1605162	RTE 23SB OVER PEQUANNOCK RV	3	3	Minor Scour
23	1605167	ROUTE 23 SB OVER PEQUANNOCK RIVER	2	3	
23	1605175	RT 23 NB OVER PEQUANNOCK RIVER	2	3	
23	1619151	N.J 23 OVER POMPTON RIVER	1	3	Minor Scour
23	1903152	23/BR OF PACOCK BRK & DEL-OSTEGO R.R.	4	3	Minor Scour
23	1903153	RT 23 OVER BRANCH OF FRANKLIN LAKE	2	3	Damage to rip-rap/piling
23	1904152	NJ 23 OVER WALLKILL RIVER	1	3	Minor Scour
23	1904153	NJ RT 23/ BR OF WALLKILL RIVER	1	3	
23	1905151	ROUTE NJ 23/BRANCH OF CLOVE RIVER	1	3	Minor Undermining
27	2006151	RT 27 OVER ROBINSON BRNCH RAHWAY RVR	3	3	Restricted Flow
27	2006152	NJ RT 27/RAHWAY RIVER	3	3	Heavy Scour/Undermining
31	2111151	RT 31 OVER POHATCONG CREEK	2	3	
31	2111155	NJ RT 31 OVER PEQUEST RIVER	2	3	
46	0220157	U.S.ROUTE 46 OVER SADDLE RIVER	2	3	Heavy Scour
46	0722157	US ROUTE 46 EB OVER PASSAIC RIVER	1	3	Debris on Bridge Seats
46	0722158	U.S. ROUTE 46 WB /PASSAIC RIVER	2	3	Minor Sedimentation
46	1407152	ROUTE US 46 WB OVER MINE BROOK	2	3	Restricted Flow
46	1407153	RTE US 46EB OVER BRANCH MINE BRK.	1	3	Restricted Flow
46	1407156	US 46 OVER SOUTH BR RARITAN RIVER	2	3	Restricted Flow
46	1409154	US ROUTE 46 OVER GRANNEYS BROOK	2	3	Minor Scour
46	1410159	ROUTE 46 OVER PASSAIC RIVER	2	3	Minor Scour
46	2107154	US 46 WB OVER BEAVER BROOK	---	3	
46	2107155	US 46 EB OVER BEAVER BROOK	2	3	

SCOUR CRITICAL STATE WATCH LIST BRIDGES

Listed by Maintenance Region

Rte	Number	Name	Phase	Item 113	Channel Findings
46	2107156	US ROUTE 46 OVER PAULINS KILL	1	3	Minor Scour
46	2108162	RTE US 46 OVER MUSCONETCONG RIVER	3	3	Restricted Flow
53	1411152	RT 53 OVER DEN BROOK	4	3	Minor Scour
57	2105164	RT 57 OVER POHATCONG CREEK	2	3	Minor Scour
57	2106164	NJ 57 OVER HANCES BROOK	2	3	Restricted Flow
80	0225166	I-80/MRKT.MAIN,FAIRVIEW STS.&SADL RIV	1	3	
80	1413155	RAMP C OVER BURNT MEADOW BROOK	2	3	Restricted Flow
82	2012150	NJ ROUTE 82 OVER RAHWAY RIVER	3	3	Inadequate Waterway Opening
94	1923150	NJ RT.94 OVER WALLKILL RIVER	2	3	Minor Scour
94	2117157	NJ 94 OVER JACKSONBURG CREEK	1	3	Heavy Scour
94	2117159	NJ ROUTE 94 OVER BLAIR CREEK.	1	3	Heavy Scour
94	2117160	ROUTE 94 OVER PAULINS KILL	1	3	Minor Scour
202	1416152	US 202 OVER WHIPPANY RIVER	4	3	Minor Scour
206	1417156	RT 206/SOUTH BR OF RARITAN RIVER	1	3	Heavy Scour/Undermining
206	1417157	US 206 OVER TRIB TO DRAKES BROOK	1	3	Minor Scour
206	1417159	US RT 206/S BRANCH RARITAN RIVER	2	3	Minor Scour
206	1911151	US206 OVER LUBBERS RUN	2	3	Minor Scour
206	1911159	US206 OVER PEQUEST RIVER	2	3	Restricted Flow
206	1912158	US ROUTE 206 OVER KITTATINY BROOK	1	3	Heavy Scour
206	1912160	US 206 OVER BIG FLAT BROOK	1	3	Minor Scour
208	1612154	ROUTE 208 RAMP A OVER GOFFLE BROOK	2	3	Heavy Sedimentation
280	1418154	RT.I-280 EB OVER PASSAIC RIVER	2	3	
284	1907152	NJ RT284/BR OF WALLKILL RIVER	2	3	Restricted Flow
284	1907157	NJ 284 OVER BR OF WALLKILL RIVER	2	3	Heavy Sedimentation

SCOUR CRITICAL STATE WATCH LIST BRIDGES

Listed by Maintenance Region

Rte	Number	Name	Phase	Item 113	Channel Findings
Central Maintenance Region					
1B	1102150	US 1B OVER SHABAKUNK CREEK	3	3	Restricted Flow
9	1303155	US RT 9 OVER MILFORD BROOK	2	3	Heavy Scour
9	1502153	US 9 OVER OYSTER CREEK	3	3	Minor Scour
9	1502154	US 9 OVER S. BRANCH OF FORKED RIVER	---	3	Minor Scour
9	1502157	US 9 OVER CEDAR CREEK	2	3	Minor Scour
22	1005153	RT US 22 OVER BR ROCKAWAY CREEK	2	3	Heavy Scour
22	1005162	US 22 EB OVER S BR ROCKAWAY CREEK	1	3	Restricted Flow
22	1005163	RT US 22 WB OVER S BR ROCKAWAY CREEK	---	3	Restricted Flow
22	1801153	US 22 EB OVER N BR RARITAN RIVER	1	3	Restricted Flow
22	1801154	US 22 WB OVER N BR RARITAN RIVER	1	3	Heavy Scour
22	1803156	RT US 22 OVER STONY BROOK	1	3	Debris on Bridge Seats
22	2102154	US 22 OVER LOPATCONG CREEK	2	3	Heavy Sedimentation
27	1105152	RT NJ 27 OVER MILLSTONE RIVER	2	3	Minor Scour
27	1218158	NJ RT 27 OVER S BRANCH RAHWAY RIVER	3	3	Heavy Sedimentation
29	1006151	ROUTE 29 OVER SWAN CREEK	3	3	Minor Scour
29	1009150	ROUTE 29 OVER COPPER CREEK	3	3	Heavy Scour
29	1110158	NJ 29 OVER MOORES CREEK	3	3	Embankment Degredation
31	1013152	ROUTE NJ 31 OVER WILLOUGHBY BROOK	1	3	Minor Scour
33	1304151	OLD ROAD(NJ 33) OVER MILLSTONE RIVER	3	3	Debris on Bridge Seats
33	1304156	ROUTE 33 OVER MANALAPAN BROOK	1	3	Heavy Sedimentation
34	1308154	N.J.ROUTE 34 OVER BIG BROOK	2	3	Minor Scour
35	1222150	ROUTE 35/CHEESEQUAKE CREEK & RAMP	1	3	Minor Scour
36	1315157	NJ 36 OVER FLAT CREEK	3	3	Restricted Flow
71	1320152	ROUTE 71 OVER WRECK POND	3	3	
71	1321150	ROUTE 71 OVER SHARK RIVER	1	3	Minor Scour
78	1015157	I-78EB SERV.RD / MULHOCKAWAY CREEK	2	3	Heavy Scour
78	1016156	I-78 EB OVER SO BR. RARITAN RIVER	---	3	Restricted Flow
78	1016157	I-78 WB OVER SO BR. RARITAN RIVER	2	3	Restricted Flow
78	2113160	I78WB/ASBURY RD(CR632)&MUSCONETCONG R	4	3	Heavy Scour/Undermining
130	1122150	US 130 OVER DOCTORS CREEK	2	3	Restricted Flow
130	1123152	US ROUTE 130 OVER ROCKY BROOK	2	3	Minor Scour
130	1123153	RT 130 OVER MILLSTONE RIVER	1	3	Minor Sedimentation
130	1227159	US 130 OVER OAKEYS BROOK	1	3	
166	1516151	RT NJ166 OVER S.CHANNEL OF TOMS RIVER	3	3	
166	1516152	RT NJ 166 OVER NO. CHANNEL OF TOMS R.	1	3	Heavy Scour
173	2103152	RT 173 OVER POHATCONG CREEK	2	3	Minor Sedimentation
173	2103153	NJ 173 OVER MUSCONETCONG RIVER	2	3	Debris on Bridge Seats
202	1807155	US 202 OVER N BR RARITAN RIVER	2	3	Heavy Sedimentation
202	1809150	US202 OVER N BR RARITAN RIVER	4	3	Restricted Flow
202	1809153	RT 202 OVER BR MINE BROOK	1	3	
202	1809158	US RT 202 OVER PASSAIC RIVER	1	3	Heavy Scour
206	1810153	US 206 OVER BACK BROOK	2	3	
206	1810155	RT US 206 OVER CRUSERS BROOK	3	3	Restricted Flow
206	1810158	ROUTE US 206 OVER PIKE RUN	2	3	Debris on Bridge Seats
206	1810164	US206 OVER BR OF ROYCES BROOK	4	3	Heavy Scour
206	1810165	US206 OVER BR OF ROYCES BROOK	4	3	Minor Scour

SCOUR CRITICAL STATE WATCH LIST BRIDGES

Listed by Maintenance Region

Rte	Number	Name	Phase	Item 113	Channel Findings
Southern Maintenance Region					
30	0405153	US RTS 30 & 130 OVER COOPER RIVER	3	3	
38	0408160	MILL ROAD/SO BR PENNSAUKEN CREEK	3	3	Restricted Flow
40	1703152	U.S.RTE 40 OVER BRANCH SALEM CRK.	3	3	Minor Scour
45	0807152	RT45 OVER RACCOON CREEK	3	3	Minor Scour
45	0808151	ROUTE 45 OVER EDWARDS RUN	3	3	Minor Scour
45	0810150	RT 45 OVER WOODBURY CREEK	3	3	
45	1705150	NJ RT 45 & US RT 40/SALEM RIVER	1	3	
47	0601150	RT 47 OVER MUSKEE CREEK	3	3	
47	0601151	N.J.ROUTE 47 OVER MANUMUSKIN RIV.	3	3	Restricted Flow
47	0815152	NJ 47 OVER BIG TIMBER CREEK	3	3	Minor Scour
49	0509150	RT 49 OVER MILL CREEK	1	3	Inadequate Waterway Opening
49	0606150	NJ RT 49 OVER MANANTICO CREEK	1	3	Heavy Scour/Undermining
50	0510152	ROUTE 50 OVER TUCKAHOE RIVER	3	3	Minor Scour
55	0609151	ROUTE 55 NB OVER MANANTICO CREEK	3	3	Minor Undermining
55	0609152	RT 55 SB OVER MANANTICO CREEK	3	3	
56	1716151	NJ ROUTE 56 OVER MAURICE RIVER	3	3	Minor Scour
87	0115150	RT.87/ABSECON INLET&RAMPS J&H	4	3	Minor Scour
130	0316150	RT US 130 OVER POMPESTON CREEK	1	3	Minor Scour
130	0317150	US 130 NB OVER ASSISCUNK CREEK	---	3	
130	0317152	US 130 SB OVER ASSISCUNK CREEK	3	3	Minor Scour
130	0319152	US RT. 130 OVER CROSSWICKS CREEK	4	3	Minor Scour
130	0817150	US RT 130 OVER BIG BIRCH CREEK	3	3	
130	0817151	RT US 130 OVER RACCOON CREEK	1	3	Restricted Flow
130	0818151	RT US 130 /BIG TIMBER CREEK	3	3	Minor Scour
154	0424151	RT 154 OVER NO BR COOPER RIVER	3	3	Minor Scour
206	0118150	US 206 OVER CEDAR BRANCH	1	3	Restricted Flow
206	0118152	US 206 OVER GREAT SWAMP BRANCH	1	3	Minor Scour
206	0118153	RT 206 OVER ALBERTSONS BROOK	1	3	
206	0324152	U.S ROUTE 206 OVER SPRINGERS BROOK	3	3	Restricted Flow
206	0324153	US 206 OVER MUSKINGUM CREEK	3	3	Heavy Sedimentation
206	0324155	US 206 OVER SO BR OF RANCOCAS CREEK	3	3	Minor Scour
206	0324156	ROUTE US 206 OVER JADE RUN	4	3	Heavy Scour
206	0324160	US RT 206 OVER BARKERS CREEK	1	3	Minor Sedimentation
206	0324162	US206 OVER ASSISCUNK CREEK	1	3	Heavy Sedimentation
206	0326152	US 206 NB OVER CROSSWICKS CREEK	3	3	Minor Scour
206	0326153	US206 SB OVER CROSSWICKS CREEK	3	3	Minor Scour
322	0119151	US 322 OVER HOSPITALITY BROOK	2	3	Minor Scour
322	0119156	US 322 OVER BIG DITCH	2	3	Restricted Flow
322	0825150	US 322 OVER RACCOON CREEK	3	3	Heavy Scour
322	0826150	US ROUTE 322 OVER SCOTLAND RUN	1	3	Minor Sedimentation

Appendix D

Bid Values, CPS Estimate
And Bid Tabulation

for

Contract 2005-1

BID OPENING 03-31-2005

Bridge Scour Countermeasures, Contract 2005-1, Rt.I-80,I 287,34,35 and 138, Twp. Of Colts Neck & Wall, Monmouth County;Twp. Of Denville & Hanover,Morris County,Contract 013021030;Federal Project BRM-A00S(997), PE2203522, CE2204098, DP05106.

Contractor		Bid Amount
IEW Construction Group Inc. Trenton, NJ	(2)	$1,622,874.76
Ritacco Construction Inc. Belleville, NJ		$1,721,182.15
Marbro Inc. Montclair, NJ.		$2,347,117.00
Merco Inc. T/A Merco Inc. of NJ South Lebanon, NJ	(1)	$1,339,909.00

Note: Bids and bidders are subject to examination. Amounts and ranking may change in accord with NJDOT Sstandard Specifications—section 102"Bidding Requirements and Conditions" and section 103 "Award and Execution of Contract."

(1) Apparent lowest bid
Division of Procurement

(2) Apparent second lowest bid
Bureau of Construction Services

Changes and awards will be posted on our website: www.State.NJ.US/Transportation/Procurement/Constrserv/. Unit prices will be posted after awards.

AVERAGE OF 4 BIDS = $1,757,771

NJDOT CPS ESTIMATE = $1,670,304

DP Number: 20051 Route: Section: Region: North Spec Year: 2001

Project: BRIDGE SCOUR COUNTERMEASURES, CONTRACT 2005-1
ROUTES I-80, I-287, 34, 35, & 138
TOWNSHIPS OF DENVILLE & HANOVER, MORRIS COUNTY
TOWNSHIPS OF COLTS NECK & WALL, MONMOUTH COUNTY
CONTRACT NO. 013021030

Current Bid Price File: 02/06/2004

Federal Project Number: BRM-A00S(997)

Item No.	Cat Code	S.I. No.	Description	Unit	R/B Code	Alt Item Code	Quantity	Price	Extended Amounts	Not Carry Prop
			ROADWAY							
0001	01	1C21E	PERFORMANCE BOND AND PAYMENT BOND	LS	R		1.00	12,000.0000	12,000.00	
0002	01	1D21C	FINAL CLEANUP	LS	R		1.00	2,500.0000	2,500.00	
0003	01	1E21C	CONSTRUCTION LAYOUT	LS	R		1.00	7,500.0000	7,500.00	
0007	01	1G21C	TRAINEES	HRS	R		2,000.00	1.0000	2,000.00	
0009	01	1H21C	PROGRESS SCHEDULE	LS	R		1.00	3,000.0000	3,000.00	
0010	01	1H21D	MOBILIZATION	LS	R		1.00	75,000.0000	75,000.00	
0011	01	2G02E	EARTH EXCAVATION FOR TEST PITS	CY	R		10.00	50.0000	500.00	
0012	01	6Q22B	BREAKAWAY BARRICADES	U	R		24.00	40.0000	960.00	
0013	01	6Q44C	PRECAST CONCRETE CURB, CONSTRUCTION BARRIER, TYPE 4	LF	R		360.00	40.8000	14,688.00	
0014	01	6Q21D	DRUMS	U	R		80.00	40.0000	3,200.00	
0015	01	6Q24E	CONSTRUCTION IDENTIFICATION SIGNS, 4' X 8'	U	R		10.00	1,400.0000	14,000.00	
0016	01	6Q10F	CONSTRUCTION SIGNS	SF	R		1,020.00	25.0000	25,500.00	
0017	01	6Q24I	ILLUMINATED FLASHING ARROWS, 4' X 8'	U	R		3.00	3,000.0000	9,000.00	
0018	01	6Q20K	TRAFFIC CONTROL TRUCKS WITH MOUNTED CRASH CUSHIONS	U	R		3.00	10,000.0000	30,000.00	
0019	01	6Q06T	TRAFFIC DIRECTORS, FLAGGERS	HRS	R		100.00	50.0000	5,000.00	
0020	01	9Z99Z	NO ITEM	U	R		0.00	0.0000	0.00	
0021	01	9Z99Z	NO ITEM	U	R		0.00	0.0000	0.00	
							Category 01 Total:		204,848.00	
			CONSTRUCTION ENGINEERING							
0004	02	1E31E	FIELD OFFICE TYPE B SET-UP	U	R		1.00	17,000.0000	17,000.00	
0005	02	1E31F	FIELD OFFICE TYPE B MAINTENANCE	MO	R		17.00	1,400.0000	23,800.00	
0006	02	1E31G	TELEPHONE SERVICE	LS	R		1.00	4,250.0000	4,250.00	
							Category 02 Total:		45,050.00	
			NON-PARTICIPATING (ROADWAY)							
0008	03	1G13I	OWNER'S AND CONTRACTOR'S PROTECTIVE LIABILITY INSURANCE	LS	R		1.00	6,000.0000	6,000.00	
							Category 03 Total:		6,000.00	
			I-80 EB RAMP "L" OVER ROCKAWAY RIVER (STR 1413-174)							
0022	04	2A21C	CLEARING SITE	LS	R		1.00	25,000.0000	25,000.00	

Note:Extended amounts marked with "*" and items Not Carry to Proposal are not included in totals

DP Number: 20051 Route: Section: Region: North Spec Year: 2001

Project: BRIDGE SCOUR COUNTERMEASURES, CONTRACT 2005-1
ROUTES I-80, I-287, 34, 35, & 138
TOWNSHIPS OF DENVILLE & HANOVER, MORRIS COUNTY
TOWNSHIPS OF COLTS NECK & WALL, MONMOUTH COUNTY
CONTRACT NO. 013021030

Current Bid Price File: 02/06/2004

Federal Project Number: BRM-A00S(997)

Item No.	Cat Code	S.I. No.	Description	Unit	R/B	Alt Item Code	Quantity	Price	Extended Amounts	Not Carry Prop
0023	04	2F21F	COFFERDAMS	LS	R		1.00	50,000.0000	50,000.00	
0024	04	2L05A	SILT FENCE	LF	R		1,030.00	3.0000	3,090.00	
0025	04	2L22C	INLET FILTERS	U	R		2.00	150.0000	300.00	
0026	04	2L18D	FLOATING TURBIDITY BARRIER	LF	R		360.00	40.0000	14,400.00	
0027	04	2L01E	DEWATERING BASINS	U	R		1.00	2,500.0000	2,500.00	
0028	04	2L03H	HAYBALES	U	R		40.00	17.5000	700.00	
0029	04		CONSTRUCTION DRIVEWAY, WOOD MATS	SY	R		480.00	46.0000	22,080.00	
0030	04		TURBIDITY DAM	U	R		1.00	2,800.0000	2,800.00	
0031	04	6N16S	SNOW FENCE, PLASTIC	LF	R		1,030.00	2.6000	2,678.00	
0032	04		GABIONS, SCOUR PROTECTION	CY	R		745.00	710.0000	528,950.00	
0033	04		PREPARATION OF EXISTING SOIL - 6 INCHES	SY	R		2,535.00	2.0000	5,070.00	
0034	04	8F04C	TOPSOILING, 4" THICK	SY	R		634.00	2.0000	1,268.00	
0035	04	8H20C	FERTILIZING AND SEEDING, TYPE A	SY	R		3,155.00	0.6000	1,893.00	
0036	04	8H60C	FERTILIZING AND SEEDING, TYPE F	SY	R		316.00	0.4500	142.20	
0037	04		WILDFLOWER AND WETLAND SEEDING	SY	R		14.00	2.5000	35.00	
0038	04	8I21C	TOPSOIL STABILIZATION MATTING	SY	R		2,535.00	4.7500	12,041.25	
0039	04	8K31C	STRAW MULCHING	SY	R		3,485.00	0.4500	1,568.25	
0040	04	8M21A	ACER RUBRUM, B&B, 2"-2 1/2" CALIPER, 12' TO 14' HIGH	U	R		8.00	250.0000	2,000.00	
0041	04	8M32F	FRAXINUS AMERICANA, B&B, 2"-2 1/2" CALIPER, 12'-14' HIGH	U	R		27.00	250.0000	6,750.00	
0042	04		CORNUS AMOMUM, #3 CONTAINER, 3' - 4' HIGH	U	R		36.00	25.0000	900.00	
0043	04		VIBURNUM DENTATUM, #3 CONTAINER, 3' - 4' HIGH	U	R		34.00	20.0000	680.00	
0044	04	9Z99Z	NO ITEM	U	R		0.00	0.0000	0.00	
0045	04	9Z99Z	NO ITEM	U	R		0.00	0.0000	0.00	
0046	04	9Z99Z	NO ITEM	U	R		0.00	0.0000	0.00	
							Category 04	Total:	684,845.70	
			I-287 RAMP "NE"OVER MALAPARDIS BROOK (STR 1419-151)							
0047	05	2A21C	CLEARING SITE	LS	R		1.00	20,000.0000	20,000.00	
0048	05	2F21F	COFFERDAMS	LS	R		1.00	50,000.0000	50,000.00	

Note:Extended amounts marked with "*" and items Not Carry to Proposal are not included in totals

DP Number: 20051 Route: Section: Region: North Spec Year: 2001

Project: BRIDGE SCOUR COUNTERMEASURES, CONTRACT 2005-1
ROUTES I-80, I-287, 34, 35, & 138
TOWNSHIPS OF DENVILLE & HANOVER, MORRIS COUNTY
TOWNSHIPS OF COLTS NECK & WALL, MONMOUTH COUNTY
CONTRACT NO. 013021030

Current Bid Price File: 02/06/2004

Federal Project Number: BRM-A00S(997)

Item No.	Cat Code	S.I. No.	Description	Unit	Alt R/B Code	Item Code	Quantity	Price	Extended Amounts	Not Carry Prop
0049	05	2L05A	SILT FENCE	LF	R		400.00	3.0000	1,200.00	
0050	05	2L22C	INLET FILTERS	U	R		1.00	150.0000	150.00	
0051	05	2L18D	FLOATING TURBIDITY BARRIER	LF	R		140.00	40.0000	5,600.00	
0052	05	2L01E	DEWATERING BASINS	U	R		1.00	2,500.0000	2,500.00	
0053	05	2L03H	HAYBALES	U	R		40.00	17.5000	700.00	
0054	05		CONSTRUCTION DRIVEWAY, WOOD MATS	SY	R		150.00	46.0000	6,900.00	
0055	05		TURBIDITY DAM	U	R		1.00	2,800.0000	2,800.00	
0056	05	6N16S	SNOW FENCE, PLASTIC	LF	R		400.00	2.6000	1,040.00	
0057	05		GABIONS, SCOUR PROTECTION	CY	R		217.00	700.0000	151,900.00	
0058	05		PREPARATION OF EXISTING SOIL - 6 INCHES	SY	R		220.00	2.0000	440.00	
0059	05	8F04C	TOPSOILING, 4" THICK	SY	R		55.00	2.0000	110.00	
0060	05	8H20C	FERTILIZING AND SEEDING, TYPE A	SY	R		200.00	0.6000	120.00	
0061	05	8H60C	FERTILIZING AND SEEDING, TYPE F	SY	R		20.00	0.4500	9.00	
0062	05		WILDFLOWER AND WETLAND SEEDING	SY	R		75.00	2.5000	187.50	
0063	05	8I21C	TOPSOIL STABILIZATION MATTING	SY	R		220.00	4.7500	1,045.00	
0064	05	8K31C	STRAW MULCHING	SY	R		295.00	0.4500	132.75	
0065	05	8M32F	FRAXINUS AMERICANA, B&B, 2"-2 1/2" CALIPER, 12'-14' HIGH	U	R		6.00	250.0000	1,500.00	
0066	05	8M53F	FRAXINUS PENNSYLVANICA, B&B, 2"-2 1/2" CALIPER, 12'-14' HIGH	U	R		6.00	250.0000	1,500.00	
0067	05		CORNUS AMOMUM, #3 CONTAINER, 3' - 4' HIGH	U	R		12.00	25.0000	300.00	
0068	05		VIBURNUM DENTATUM, #3 CONTAINER, 3' - 4' HIGH	U	R		12.00	20.0000	240.00	
0069	05	9Z99Z	NO ITEM	U	R		0.00	0.0000	0.00	
0070	05	9Z99Z	NO ITEM	U	R		0.00	0.0000	0.00	
0071	05	9Z99Z	NO ITEM	U	R		0.00	0.0000	0.00	
							Category 05 Total:		248,374.25	
			RT 34 OVER YELLOW BROOK (STR 1308-153)							
0072	06	2A21C	CLEARING SITE	LS	R		1.00	42,000.0000	42,000.00	
0073	06		LABORATORY TESTING FOR PRESENCE OF HIGH ACID PRODUCING SOIL	U	R		3.00	530.0000	1,590.00	

Note:Extended amounts marked with "*" and items Not Carry to Proposal are not included in totals

DP Number: 20051 Route: Section: Region: North Spec Year: 2001

Project: BRIDGE SCOUR COUNTERMEASURES, CONTRACT 2005-1
ROUTES I-80, I-287, 34, 35, & 138
TOWNSHIPS OF DENVILLE & HANOVER, MORRIS COUNTY
TOWNSHIPS OF COLTS NECK & WALL, MONMOUTH COUNTY
CONTRACT NO. 013021030

Current Bid Price File: 02/06/2004

Federal Project Number: BRM-A00S(997)

Item No.	Cat Code	S.I. No.	Description	Unit	R/B Code	Alt Item Code	Quantity	Price	Extended Amounts	Not Carry Prop
0074	06		OFF-SITE DISPOSAL OF HIGH ACID PRODUCING SOIL	CY	R		57.00	21.0000	1,197.00	
0075	06	2D03A	BORROW EXCAVATION, ZONE 3	CY	R		57.00	50.0000	2,850.00	
0076	06	2F21F	COFFERDAMS	LS	R		1.00	39,000.0000	39,000.00	
0077	06	2L05A	SILT FENCE	LF	R		610.00	2.6000	1,586.00	
0078	06	2L18D	FLOATING TURBIDITY BARRIER	LF	R		20.00	12.5000	250.00	
0079	06	2L01E	DEWATERING BASINS	U	R		1.00	800.0000	800.00	
0080	06	2L25E	ROADWAY EXCAVATION, TEMPORARY EROSION CONTROL	CY	R		50.00	40.0000	2,000.00	
0081	06	2L23G	TEMPORARY RIPRAP	CY	R		16.00	90.0000	1,440.00	
0082	06	2L25G	GEOTEXTILE	SY	R		99.00	2.0000	198.00	
0083	06	2L03H	HAYBALES	U	R		25.00	15.0000	375.00	
0084	06		CONSTRUCTION DRIVEWAY, WOOD MATS	SY	R		170.00	3.5000	595.00	
0085	06		TURBIDITY DAM	U	R		1.00	2,700.0000	2,700.00	
0086	06	9Z99Z	NO ITEM	U	R		0.00	0.0000	0.00	
0087	06	9Z99Z	NO ITEM	U	R		0.00	0.0000	0.00	
0088	06	6N16S	SNOW FENCE, PLASTIC	LF	R		400.00	4.0000	1,600.00	
0089	06	6P30I	RIPRAP STONE SLOPE PROTECTION, 16" THICK (D50=8")	SY	R		10.00	50.0000	500.00	
0090	06		GABIONS, SCOUR PROTECTION	CY	R		86.00	610.0000	52,460.00	
0091	06	6Q13M	TEMPORARY CRASH CUSHIONS, INERTIAL BARRIER SYSTEM, 13 MODULES	U	R		2.00	6,000.0000	12,000.00	
0092	06	9Z99Z	NO ITEM	U	R		0.00	0.0000	0.00	
0093	06		PREPARATION OF EXISTING SOIL - 6 INCHES	SY	R		170.00	2.0000	340.00	
0094	06	8F04C	TOPSOILING, 4" THICK	SY	R		148.00	15.0000	2,220.00	
0095	06	8F08F	BORROW TOPSOIL	CY	R		20.00	30.0000	600.00	
0096	06	8H20C	FERTILIZING AND SEEDING, TYPE A	SY	R		265.00	0.6000	159.00	
0097	06	8H60C	FERTILIZING AND SEEDING, TYPE F	SY	R		20.00	0.4500	9.00	
0098	06		WILDFLOWER AND WETLAND SEEDING	SY	R		53.00	2.2500	119.25	
0099	06	8I21C	TOPSOIL STABILIZATION MATTING	SY	R		148.00	4.5000	666.00	
0100	06	8K31C	STRAW MULCHING	SY	R		466.00	0.4500	209.70	
0101	06	8M53F	FRAXINUS PENNSYLVANICA, B&B, 2"-2 1/2" CALIPER, 12'-14' HIGH	U	R		7.00	250.0000	1,750.00	

Note:Extended amounts marked with "*" and items Not Carry to Proposal are not included in totals

DP Number: 20051 Route: Section: Region: North Spec Year: 2001

Project: BRIDGE SCOUR COUNTERMEASURES, CONTRACT 2005-1
ROUTES I-80, I-287, 34, 35, & 138
TOWNSHIPS OF DENVILLE & HANOVER, MORRIS COUNTY
TOWNSHIPS OF COLTS NECK & WALL, MONMOUTH COUNTY
CONTRACT NO. 013021030

Current Bid Price File: 02/06/2004

Federal Project Number: BRM-A00S(997)

Item No.	Cat Code	S.I. No.	Description	Unit	Alt R/B Code	Item Code	Quantity	Price	Extended Amounts	Not Carry Prop
0102	06		CLETHRA ALNIFOLIA, #3 CONTAINER, 3' - 4' HIGH	U	R		14.00	30.0000	420.00	
0103	06	9Z99Z	NO ITEM	U	R		0.00	0.0000	0.00	
0104	06	9Z99Z	NO ITEM	U	R		0.00	0.0000	0.00	
							Category 06 Total:		169,633.95	
			RT 35 OVER NORTH BRANCH OF WRECK POND BROOK (STR 1310-155)							
0105	07		MONITORING BOG TURTLE, ROUTE 35 OVER NORTH BRANCH OF WRECK POND BROOK	LS	R		1.00	10,000.0000	10,000.00	
0106	07	2A21C	CLEARING SITE	LS	R		1.00	42,000.0000	42,000.00	
0107	07		LABOATORY TESTING FOR PRESENCE OF HIGH ACID PRODUCING SOIL	U	R		3.00	530.0000	1,590.00	
0108	07		OFF-SITE DISPOSAL OF HIGH ACID PRODUCING SOIL	CY	R		62.00	21.0000	1,302.00	
0109	07	2D03A	BORROW EXCAVATION, ZONE 3	CY	R		62.00	50.0000	3,100.00	
0110	07	2F21F	COFFERDAMS	LS	R		1.00	39,000.0000	39,000.00	
0111	07	2L05A	SILT FENCE	LF	R		660.00	2.6000	1,716.00	
0112	07	2L18D	FLOATING TURBIDITY BARRIER	LF	R		21.00	12.5000	262.50	
0113	07	2L01E	DEWATERING BASINS	U	R		1.00	800.0000	800.00	
0114	07	2L25E	ROADWAY EXCAVATION, TEMPORARY EROSION CONTROL	CY	R		60.00	40.0000	2,400.00	
0115	07	2L23G	TEMPORARY RIPRAP	CY	R		14.00	90.0000	1,260.00	
0116	07	2L25G	GEOTEXTILE	SY	R		77.00	2.0000	154.00	
0117	07	2L03H	HAYBALES	U	R		25.00	15.0000	375.00	
0118	07		CONSTRUCTION DRIVEWAY, WOOD MATS	SY	R		187.00	3.5000	654.50	
0119	07		TURBIDITY DAM	U	R		1.00	2,700.0000	2,700.00	
0120	07	9Z99Z	NO ITEM	U	R		0.00	0.0000	0.00	
0121	07	9Z99Z	NO ITEM	U	R		0.00	0.0000	0.00	
0122	07	6N16S	SNOW FENCE, PLASTIC	LF	R		350.00	4.0000	1,400.00	
0123	07	6P30I	RIPRAP STONE SLOPE PROTECTION, 16" THICK (D50=8")	SY	R		10.00	50.0000	500.00	
0124	07		GABIONS, SCOUR PROTECTION	CY	R		56.00	610.0000	34,160.00	
0125	07	6Q10M	TEMPORARY CRASH CUSHIONS, INERTIAL BARRIER SYSTEM, 10 MODULES	U	R		2.00	3,500.0000	7,000.00	

Note:Extended amounts marked with "*" and items Not Carry to Proposal are not included in totals

DP Number: 20051 Route: Section: Region: North Spec Year: 2001

Project: BRIDGE SCOUR COUNTERMEASURES, CONTRACT 2005-1
ROUTES I-80, I-287, 34, 35, & 138
TOWNSHIPS OF DENVILLE & HANOVER, MORRIS COUNTY
TOWNSHIPS OF COLTS NECK & WALL, MONMOUTH COUNTY
CONTRACT NO. 013021030

Current Bid Price File: 02/06/2004

Federal Project Number: BRM-A00S(997)

Item No.	Cat Code	S.I. No.	Description	Unit	R/B Code	Alt Item Code	Quantity	Price	Extended Amounts	Not Carry Prop
0126	07	9Z99Z	NO ITEM	U	R		0.00	0.0000	0.00	
0127	07		PREPARATION OF EXISTING SOIL - 6 INCHES	SY	R		187.00	2,0000	374.00	
0128	07	8F04C	TOPSOILING, 4" THICK	SY	R		180.00	15.0000	2,700.00	
0129	07	8F08F	BORROW TOPSOIL	CY	R		20.00	30.0000	600.00	
0130	07	8H20C	FERTILIZING AND SEEDING, TYPE A	SY	R		342.00	0.6000	205.20	
0131	07	8H60C	FERTILIZING AND SEEDING, TYPE F	SY	R		20.00	0.4500	9.00	
0132	07		WILDFLOWER AND WETLAND SEEDING	SY	R		25.00	2.5000	62.50	
0133	07	8I21C	TOPSOIL STABILIZATION MATTING	SY	R		180.00	4.5000	810.00	
0134	07	8K31C	STRAW MULCHING	SY	R		387.00	0.4500	174.15	
0135	07	8M53F	FRAXINUS PENNSYLVANICA, B&B, 2"-2 1/2" CALIPER, 12'-14' HIGH	U	R		8.00	250.0000	2,000.00	
0136	07		CLETHRA ALNIFOLIA, #3 CONTAINER, 3' - 4' HIGH	U	R		16.00	30.0000	480.00	
0137	07	9Z99Z	NO ITEM	U	R		0.00	0.0000	0.00	
0138	07	9Z99Z	NO ITEM	U	R		0.00	0.0000	0.00	
							Category 07 Total:		157,788.85	
			RT 138 OVER NORTH BRANCH OF WRECK POND BROOK (STR 1317-150)							
0139	08		MONITORING BOG TURTLE, ROUTE 138 OVER NORTH BRANCH OF WRECK POND BROOK	LS	R		1.00	10,000.0000	10,000.00	
0140	08	2A21C	CLEARING SITE	LS	R		1.00	42,000.0000	42,000.00	
0141	08		LABORATORY TESTING FOR PRESENCE OF HIGH ACID PRODUCING SOIL	U	R		3.00	530.0000	1,590.00	
0142	08		OFF-SITE DISPOSAL OF HIGH ACID PRODUCING SOIL	CY	R		61.00	21.0000	1,281.00	
0143	08	2D03A	BORROW EXCAVATION, ZONE 3	CY	R		61.00	50.0000	3,050.00	
0144	08	2D11C	BORROW EXCAVATION, SELECTED MATERIAL	CY	R		10.00	100.0000	1,000.00	
0145	08	2F21F	COFFERDAMS	LS	R		1.00	39,000.0000	39,000.00	
0146	08	2L05A	SILT FENCE	LF	R		338.00	2.6000	878.80	
0147	08	2L18D	FLOATING TURBIDITY BARRIER	LF	R		33.00	12.5000	412.50	
0148	08	2L01E	DEWATERING BASINS	U	R		1.00	800.0000	800.00	
0149	08	2L25E	ROADWAY EXCAVATION, TEMPORARY EROSION CONTROL	CY	R		33.00	40.0000	1,320.00	
0150	08	2L23G	TEMPORARY RIPRAP	CY	R		9.00	90.0000	810.00	

Note:Extended amounts marked with "*" and items Not Carry to Proposal are not included in totals

DP Number: 20051 Route: Section: Region: North Spec Year: 2001

Project: BRIDGE SCOUR COUNTERMEASURES, CONTRACT 2005-1
ROUTES I-80, I-287, 34, 35, & 138
TOWNSHIPS OF DENVILLE & HANOVER, MORRIS COUNTY
TOWNSHIPS OF COLTS NECK & WALL, MONMOUTH COUNTY
CONTRACT NO. 013021030

Current Bid Price File: 02/06/2004

Federal Project Number: BRM-A00S(997)

Item No.	Cat Code	S.I. No.	Description	Unit	R/B Code	Alt Item Code	Quantity	Price	Extended Amounts	Not Carry Prop
0151	08	2L25G	GEOTEXTILE	SY	R		54.00	2.0000	108.00	
0152	08	2L03H	HAYBALES	U	R		25.00	15.0000	375.00	
0153	08		CONSTRUCTION DRIVEWAY, WOOD MATS	SY	R		184.00	3.5000	644.00	
0154	08		TURBIDITY DAM	U	R		1.00	2,700.0000	2,700.00	
0155	08	9Z99Z	NO ITEM	U	R		0.00	0.0000	0.00	
0156	08	9Z99Z	NO ITEM	U	R		0.00	0.0000	0.00	
0157	08	6N16S	SNOW FENCE, PLASTIC	LF	R		325.00	4.0000	1,300.00	
0158	08	6P30I	RIPRAP STONE SLOPE PROTECTION, 16" THICK (D50=8")	SY	R		10.00	50.0000	500.00	
0159	08		GABIONS, SCOUR PROTECTION	CY	R		44.00	610.0000	26,840.00	
0160	08	6Q14M	TEMPORARY CRASH CUSHIONS, INERTIAL BARRIER SYSTEM, 14 MODULES	U	R		2.00	6,000.0000	12,000.00	
0161	08	9Z99Z	NO ITEM	U	R		0.00	0.0000	0.00	
0162	08		PREPARATION OF EXISTING SOIL - 6 INCHES	SY	R		184.00	2.0000	368.00	
0163	08	8F04C	TOPSOILING, 4" THICK	SY	R		140.00	15.0000	2,100.00	
0164	08	8F08F	BORROW TOPSOIL	CY	R		18.00	30.0000	540.00	
0165	08	8H20C	FERTILIZING AND SEEDING, TYPE A	SY	R		288.00	0.6000	172.80	
0166	08	8H60C	FERTILIZING AND SEEDING, TYPE F	SY	R		20.00	0.4500	9.00	
0167	08		WILDFLOWER AND WETLAND SEEDING	SY	R		36.00	2.2500	81.00	
0168	08	8I21C	TOPSOIL STABILIZATION MATTING	SY	R		140.00	4.5000	630.00	
0169	08	8K31C	STRAW MULCHING	SY	R		344.00	0.4500	154.80	
0170	08	8M53F	FRAXINUS PENNSYLVANICA, B&B, 2"-2 1/2" CALIPER, 12'-14' HIGH	U	R		10.00	250.0000	2,500.00	
0171	08		CLETHRA ALNIFOLIA, #3 CONTAINER, 3' - 4' HIGH	U	R		20.00	30.0000	600.00	
0172	08	9Z99Z	NO ITEM	U	R		0.00	0.0000	0.00	
0173	08	9Z99Z	NO ITEM	U	R		0.00	0.0000	0.00	

Category 08 Total: 153,764.90

Road Total : 1,670,305.65

Grand Total: 1,670,305.65

Note:Extended amounts marked with "*" and items Not Carry to Proposal are not included in totals

CPSBIDFM-1

DEPARTMENT OF TRANSPORTATION
CONSTRUCTION SERVICES/PROCUREMENT DIVISION
TRENTON, NEW JERSEY

TABULATION OF BIDS AND UNIT PRICES

BRIDGE SCOUR COUNTERMEASURES, CONTRACT 2005-1
ROUTES I-80, I-287, 34, 35, AND 138, TOWNSHIPS OF COLTS NECK
& WALL, MONMOUTH COUNTY , TOWNSHIPS OF DENVILLE &
HANOVER, MORRIS COUNTY, CONTRACT NO.013021030
FEDERAL PROJECT NO. BRM-A00S(997)
D.P. NO. 05106

BIDS RECEIVED MARCH 31, 2005

CONTRACT AWARD DATE MAY 11, 2005

BIDDERS				TOTAL PRICE BID
1 . MERCO INC	T/A MERCO INC OF NJ			$ 1,339,909.00
1117 RT#31 S	LEBANON		NJ08833	
2 . IEW CONSTR GP				$ 1,622,874.76
PO#8008	TRENTON		NJ08650	
3 . RITACCO CONSTRUCTION INC				$ 1,721,182.15
10 LAWRENCE STREET	BELLEVILLE		NJ07109	
4 . MARBRO INC				$ 2,347,117.00
127 PINE STREET	MONTCLAIR		NJ07042	

ITEM NO.	DESCRIPTION	UNIT	CONTRACT QUANTITY	LOW BIDDER UNIT PRICE	LOW BIDDER DOLLAR AMT.
1	PERFORMANCE BOND AND PAYMENT BOND	LS	1	13,500.00	13,500.00
2	FINAL CLEANUP	LS	1	15,000.00	15,000.00
3	CONSTRUCTION LAYOUT	LS	1	15,400.00	15,400.00
4	FIELD OFFICE TYPE B SET-UP	U	1	22,000.00	22,000.00
5	FIELD OFFICE TYPE B MAINTENANCE	MO	17	1,050.00	17,850.00
6	TELEPHONE SERVICE	LS	1	5,000.00	5,000.00
7	NO ITEM	U	0	.00	0.00
8	OWNER'S AND CONTRACTOR'S PROTECTIVE LIABILITY INSURANCE	LS	1	9,000.00	9,000.00
9	PROGRESS SCHEDULE	LS	1	4,000.00	4,000.00
10	MOBILIZATION	LS	1	132,299.00	132,299.00
11	EARTH EXCAVATION FOR TEST PITS	CY	10	160.00	1,600.00
12	NO ITEM	U	0	.00	0.00
13	BREAKAWAY BARRICADES	U	24	175.00	4,200.00
14	DRUMS	U	65	110.00	7,150.00
15	CONSTRUCTION IDENTIFICATION SIGNS, 4' X 8'	U	10	550.00	5,500.00
16	CONSTRUCTION SIGNS	SF	1,000	8.00	8,000.00
17	ILLUMINATED FLASHING ARROWS, 4' X 8'	U	3	3,500.00	10,500.00
18	TRAFFIC CONTROL TRUCKS WITH MOUNTED CRASH CUSHIONS	U	3	10,700.00	32,100.00
19	TRAFFIC DIRECTORS, FLAGGERS	HRS	100	70.00	7,000.00
20	NO ITEM	U	0	.00	0.00
21	NO ITEM	U	0	.00	0.00
22	CLEARING SITE	LS	1	25,000.00	25,000.00
23	COFFERDAMS	LS	1	55,000.00	55,000.00
24	SILT FENCE	LF	1,030	7.00	7,210.00
25	INLET FILTERS	U	2	60.00	120.00
26	FLOATING TURBIDITY BARRIER	LF	65	10.00	650.00
27	DEWATERING BASINS	U	1	1,975.00	1,975.00
28	HAYBALES	U	40	15.00	600.00
29	CONSTRUCTION DRIVEWAY, WOOD MATS	SY	480	150.00	72,000.00
30	TURBIDITY DAM	U	1	900.00	900.00
31	SNOW FENCE, PLASTIC	LF	1,030	5.00	5,150.00

32	GABIONS, SCOUR PROTECTION	CY	745	275.00	204,875.00
33	PRECAST CONCRETE CURB, CONSTRUCTION BARRIER, TYPE 4	LF	340	51.00	17,340.00
34	TEMPORARY CRASH CUSHIONS, INERTIAL BARRIER SYSTEM, 15 MODULES	U	1	6,300.00	6,300.00
35	PREPARATION OF EXISTING SOIL - 6 INCHES	SY	640	2.00	1,280.00
36	TOPSOILING, 4" THICK	SY	480	2.00	960.00
37	BORROW TOPSOIL	CY	53	35.00	1,855.00
38	FERTILIZING AND SEEDING, TYPE A	SY	626	1.00	626.00
39	FERTILIZING AND SEEDING, TYPE F	SY	63	1.00	63.00
40	WILDFLOWER AND WETLAND SEEDING	SY	14	5.00	70.00
41	TOPSOIL STABILIZATION MATTING	SY	640	5.00	3,200.00
42	STRAW MULCHING	SY	703	1.00	703.00
43	ACER RUBRUM, B&B, 2"-2 1/2" CALIPER, 12' TO 14' HIGH	U	8	250.00	2,000.00
44	FRAXINUS AMERICANA, B&B, 2"-2 1/2" CALIPER, 12'-14' HIGH	U	27	250.00	6,750.00
45	CORNUS AMOMUM, #3 CONTAINER, 3' - 4' HIGH	U	36	35.00	1,260.00
46	VIBURNUM DENTATUM, #3 CONTAINER, 3' - 4' HIGH	U	34	40.00	1,360.00
47	CLEARING SITE	LS	1	20,000.00	20,000.00
48	COFFERDAMS	LS	1	40,000.00	40,000.00
49	SILT FENCE	LF	400	7.00	2,800.00
50	INLET FILTERS	U	1	60.00	60.00
51	FLOATING TURBIDITY BARRIER	LF	80	10.00	800.00
52	DEWATERING BASINS	U	1	1,975.00	1,975.00
53	HAYBALES	U	40	15.00	600.00
54	CONSTRUCTION DRIVEWAY, WOOD MATS	SY	150	45.00	6,750.00
55	TURBIDITY DAM	U	2	900.00	1,800.00
56	SNOW FENCE, PLASTIC	LF	400	5.00	2,000.00
57	GABIONS, SCOUR PROTECTION	CY	217	280.00	60,760.00
58	PREPARATION OF EXISTING SOIL - 6 INCHES	SY	200	2.00	400.00
59	TOPSOILING, 4" THICK	SY	150	2.00	300.00
60	BORROW TOPSOIL	CY	17	35.00	595.00
61	FERTILIZING AND SEEDING, TYPE A	SY	125	1.00	125.00
62	FERTILIZING AND SEEDING, TYPE F	SY	13	1.00	13.00
63	WILDFLOWER AND WETLAND SEEDING	SY	75	5.00	375.00
64	TOPSOIL STABILIZATION MATTING	SY	200	5.00	1,000.00
65	STRAW MULCHING	SY	213	1.00	213.00
66	FRAXINUS AMERICANA, B&B, 2"-2 1/2" CALIPER, 12'-14' HIGH	U	6	250.00	1,500.00
67	FRAXINUS PENNSYLVANICA, B&B, 2"-2 1/2" CALIPER, 12'-14' HIGH	U	6	250.00	1,500.00
68	CORNUS AMOMUM, #3 CONTAINER, 3' - 4' HIGH	U	12	35.00	420.00
69	VIBURNUM DENTATUM, #3 CONTAINER, 3' - 4' HIGH	U	12	40.00	480.00
70	NO ITEM	U	0	.00	0.00
71	NO ITEM	U	0	.00	0.00
72	CLEARING SITE	LS	1	40,000.00	40,000.00
73	LABORATORY TESTING FOR PRESENCE OF HIGH ACID PRODUCING SOIL	U	3	250.00	750.00
74	OFF-SITE DISPOSAL OF HIGH ACID PRODUCING SOIL	CY	57	100.00	5,700.00
75	BORROW EXCAVATION, ZONE 3	CY	57	65.00	3,705.00
76	COFFERDAMS	LS	1	40,000.00	40,000.00
77	SILT FENCE	LF	610	7.00	4,270.00
78	FLOATING TURBIDITY BARRIER	LF	20	10.00	200.00
79	DEWATERING BASINS	U	1	1,975.00	1,975.00
80	ROADWAY EXCAVATION, TEMPORARY EROSION CONTROL	CY	50	20.00	1,000.00
81	TEMPORARY RIPRAP	CY	16	70.00	1,120.00
82	GEOTEXTILE	SY	99	3.00	297.00
83	HAYBALES	U	25	15.00	375.00
84	CONSTRUCTION DRIVEWAY, WOOD MATS	SY	170	45.00	7,650.00
85	TURBIDITY DAM	U	1	900.00	900.00
86	NO ITEM	U	0	.00	0.00
87	NO ITEM	U	0	.00	0.00
88	SNOW FENCE, PLASTIC	LF	400	5.00	2,000.00

89	RIPRAP STONE SLOPE PROTECTION, 16" THICK (D50=8")	SY	10	150.00	1,500.00
90	GABIONS, SCOUR PROTECTION	CY	86	415.00	35,690.00
91	TEMPORARY CRASH CUSHIONS, INERTIAL BARRIER SYSTEM, 13 MODULES	U	2	5,200.00	10,400.00
92	NO ITEM	U	0	.00	0.00
93	PREPARATION OF EXISTING SOIL - 6 INCHES	SY	205	2.00	410.00
94	TOPSOILING, 4" THICK	SY	148	2.00	296.00
95	BORROW TOPSOIL	CY	17	35.00	595.00
96	FERTILIZING AND SEEDING, TYPE A	SY	300	1.00	300.00
97	FERTILIZING AND SEEDING, TYPE F	SY	30	1.00	30.00
98	WILDFLOWER AND WETLAND SEEDING	SY	53	5.00	265.00
99	TOPSOIL STABILIZATION MATTING	SY	205	5.00	1,025.00
100	STRAW MULCHING	SY	383	1.00	383.00
101	FRAXINUS PENNSYLVANICA, B&B, 2"-2 1/2" CALIPER, 12'-14' HIGH	U	7	250.00	1,750.00
102	CLETHRA ALNIFOLIA, #3 CONTAINER, 3' - 4' HIGH	U	14	40.00	560.00
103	NO ITEM	U	0	.00	0.00
104	NO ITEM	U	0	.00	0.00
105	CLEARING SITE	LS	1	40,000.00	40,000.00
106	MONITORING BOG TURTLE, ROUTE 35 OVER NORTH BRANCH OF WRECK POND BROOK	LS	1	5,000.00	5,000.00
107	LABORATORY TESTING FOR PRESENCE OF HIGH ACID PRODUCING SOIL	U	3	250.00	750.00
108	OFF-SITE DISPOSAL OF HIGH ACID PRODUCING SOIL	CY	62	100.00	6,200.00
109	BORROW EXCAVATION, ZONE 3	CY	62	65.00	4,030.00
110	COFFERDAMS	LS	1	40,000.00	40,000.00
111	SILT FENCE	LF	660	7.00	4,620.00
112	FLOATING TURBIDITY BARRIER	LF	21	10.00	210.00
113	DEWATERING BASINS	U	1	1,975.00	1,975.00
114	ROADWAY EXCAVATION, TEMPORARY EROSION CONTROL	CY	50	20.00	1,000.00
115	TEMPORARY RIPRAP	CY	14	70.00	980.00
116	GEOTEXTILE	SY	77	3.00	231.00
117	HAYBALES	U	25	15.00	375.00
118	CONSTRUCTION DRIVEWAY, WOOD MATS	SY	187	45.00	8,415.00
119	TURBIDITY DAM	U	1	900.00	900.00
120	NO ITEM	U	0	.00	0.00
121	NO ITEM	U	0	.00	0.00
122	SNOW FENCE, PLASTIC	LF	350	5.00	1,750.00
123	RIPRAP STONE SLOPE PROTECTION, 16" THICK (D50=8")	SY	10	150.00	1,500.00
124	GABIONS, SCOUR PROTECTION	CY	56	385.00	21,560.00
125	TEMPORARY CRASH CUSHIONS, INERTIAL BARRIER SYSTEM, 10 MODULES	U	2	4,500.00	9,000.00
126	NO ITEM	U	0	.00	0.00
127	PREPARATION OF EXISTING SOIL - 6 INCHES	SY	240	2.00	480.00
128	TOPSOILING, 4" THICK	SY	180	2.00	360.00
129	BORROW TOPSOIL	CY	20	35.00	700.00
130	FERTILIZING AND SEEDING, TYPE A	SY	395	1.00	395.00
131	FERTILIZING AND SEEDING, TYPE F	SY	40	1.00	40.00
132	WILDFLOWER AND WETLAND SEEDING	SY	25	5.00	125.00
133	TOPSOIL STABILIZATION MATTING	SY	240	5.00	1,200.00
134	STRAW MULCHING	SY	460	1.00	460.00
135	FRAXINUS PENNSYLVANICA, B&B, 2"-2 1/2" CALIPER, 12'-14' HIGH	U	8	250.00	2,000.00
136	CLETHRA ALNIFOLIA, #3 CONTAINER, 3' - 4' HIGH	U	16	40.00	640.00
137	NO ITEM	U	0	.00	0.00
138	NO ITEM	U	0	.00	0.00
139	CLEARING SITE	LS	1	40,000.00	40,000.00
140	MONITORING BOG TURTLE, ROUTE 138 OVER NORTH BRANCH OF WRECK POND BROOK	LS	1	5,000.00	5,000.00
141	LABORATORY TESTING FOR PRESENCE OF HIGH ACID PRODUCING SOIL	U	3	250.00	750.00
142	OFF-SITE DISPOSAL OF HIGH ACID PRODUCING SOIL	CY	61	75.00	4,575.00

143	BORROW EXCAVATION, ZONE 3	CY	61	65.00	3,965.00
144	BORROW EXCAVATION, SELECTED MATERIAL	CY	10	100.00	1,000.00
145	COFFERDAMS	LS	1	40,000.00	40,000.00
146	SILT FENCE	LF	450	7.00	3,150.00
147	FLOATING TURBIDITY BARRIER	LF	33	10.00	330.00
148	DEWATERING BASINS	U	1	1,975.00	1,975.00
149	ROADWAY EXCAVATION, TEMPORARY EROSION CONTROL	CY	30	20.00	600.00
150	TEMPORARY RIPRAP	CY	9	75.00	675.00
151	GEOTEXTILE	SY	54	3.00	162.00
152	HAYBALES	U	25	15.00	375.00
153	CONSTRUCTION DRIVEWAY, WOOD MATS	SY	201	45.00	9,045.00
154	TURBIDITY DAM	U	1	900.00	900.00
155	NO ITEM	U	0	.00	0.00
156	NO ITEM	U	0	.00	0.00
157	SNOW FENCE, PLASTIC	LF	325	5.00	1,625.00
158	RIPRAP STONE SLOPE PROTECTION, 16" THICK (D50=8")	SY	10	150.00	1,500.00
159	GABIONS, SCOUR PROTECTION	CY	44	380.00	16,720.00
160	TEMPORARY CRASH CUSHIONS, INERTIAL BARRIER SYSTEM, 14 MODULES	U	2	5,300.00	10,600.00
161	NO ITEM	U	0	.00	0.00
162	PREPARATION OF EXISTING SOIL - 6 INCHES	SY	250	2.00	500.00
163	TOPSOILING, 4" THICK	SY	160	2.00	320.00
164	BORROW TOPSOIL	CY	20	35.00	700.00
165	FERTILIZING AND SEEDING, TYPE A	SY	374	1.00	374.00
166	FERTILIZING AND SEEDING, TYPE F	SY	37	1.00	37.00
167	WILDFLOWER AND WETLAND SEEDING	SY	36	5.00	180.00
168	TOPSOIL STABILIZATION MATTING	SY	250	5.00	1,250.00
169	STRAW MULCHING	SY	447	1.00	447.00
170	FRAXINUS PENNSYLVANICA, B&B, 2"-2 1/2" CALIPER, 12'-14' HIGH	U	10	250.00	2,500.00
171	CLETHRA ALNIFOLIA, #3 CONTAINER, 3' - 4' HIGH	U	20	40.00	800.00
172	NO ITEM	U	0	.00	0.00
173	NO ITEM	U	0	.00	0.00

SUMMARY OF AMOUNTS

ROAD ITEMS	$ 1,339,909.00	$
BRIDGE ITEMS		0.00

SUB-TOTAL AMOUNTS FOR BRIDGE WORK

	AGREE		AGREE
(HEADER) LOW BID =$	1,339,909.00	(HEADER) 2ND LOW BID =$	1,622,874.76
COMPUTED LOW BID =$	1,339,909.00	COMPUTED 2ND LOW BID =$	1,622,874.76
COMPUTED LOW BID =$	1,339,909.00	COMPUTED 2ND LOW BID =$	1,622,874.76

Appendix E

Construction Cost for Scour Countermeasures

by

State Maintenance Region

BRIDGE SCOUR EVALUTAION PROGRAM
STAGE II - STATE BRIDGES

CONSTRUCTION COSTS FOR SCOUR COUNTERMEASURES

Listed by Maintenance Region

Route No.	Structure No.	Structure Name	Construction Cost Information					NJDOT Maintenance Region
			Recommended Countermeasure Type	Req'd Thk (FT)	Req'd Area (SY)	Req'd Volume (CY)	Estimated Construction Cost	
Northern Maintenance Region								
1&9	0201151	RT 1&9 OVER WOLF CREEK	Stone Riprap	2	575	383	$265.0	North
3	1601157	RT 3 OVER THIRD RIVER	Stone Riprap	3	625	625	$337.6	North
3	1601160	RT 3 OVER UPPER POND SPILLWAY	Stone Riprap	3	1,230	1,230	$519.0	North
4	0206166	RT 4 OVER HACKENSACK RIVER & ROAD	Stone Riprap	2	5,192	3,461	$1,188.4	North
4	0206181	RT 4 OVER FLAT ROCK BROOK	Concrete Slab	0.67	258	58	$201.9	North
4	0206189	KINDERKAMACK RD OVER COLES BROOK	Gabion Mattress	1	348	116	$254.4	North
10	0709150	RT 10 OVER WILLOW MEADOW BROOK	Gabion Mattress	0.75	602	151	$255.4	North
10	0711150	RT 10 OVER CANOE BROOK	Concrete Slab	0.67	226	50	$195.4	North
10	1401156	RT 10 OVER MILL BROOK	Gabion Mattress	0.75	486	122	$235.1	North
10	1402150	RT 10 OVER MALAPARDIS BROOK	Gabion Mattress	1	402	134	$243.9	North
15	1403150	RT 15/BURNT MEADOW (GRN PD) BROOK	Gabion Mattress	1	496	165	$265.8	North
15	1404155	GOVERNMENT RD OVER GREEN POND BROOK	Gabion Mattress	1	322	107	$225.2	North
15	1404158	RT 15 SB OVER ROCKAWAY CREEK	Stone Riprap	3	471	471	$291.3	North
15	1404159	RT 15 RAMP A OVER HURDTOWN BROOK	Gabion Mattress	0.75	156	39	$177.3	North
15	1424150	NJ 15 NB OVER LAKE SHAWNEE	Gabion Mattress	0.75	269	67	$197.1	North
15	1922150	RT 15 OVER BEAVER RUN	Stone Riprap	2	200	133	$190.0	North
15	1922151	RT 15 OVER PAULINS KILL	Gabion Mattress	1	373	124	$237.1	North
17	0216150	RT 17 OVER SPROUT BROOK	Stone Riprap	3	296	296	$238.8	North
17	0216157	RT 17 OVER SADDLE RIVER	Concrete Slab	0.67	1,271	284	$405.5	North
17	0218161	RT 17 NB OVER RT 202 & RAMAPO RIVER	Stone Riprap	3	1,804	1,804	$691.2	North
17	0218162	RT 17 SB/RT 202 & RAMAPO RIVER	Stone Riprap	3	751	751	$375.4	North
21	0716156	MAIN ST OVER SECOND RIVER	Gabion Mattress	1	470	157	$259.7	North
22	2003157	RT 22 OVER ECHO LAKE	Stone Riprap	3	439	439	$281.7	North
22	2003161	RT 22 EB OVER RAHWAY RIVER	Gabion Mattress	0.75	681	170	$269.2	North
22	2003162	US 22 WB OVER RAHWAY RIVER	Gabion Mattress	0.75	133	33	$173.3	North
22	2004151	RT 22 OVER ELIZABETH RIVER	Stone Riprap	3	344	344	$253.3	North
22	2102154	RT 22 OVER LOPATCONG CREEK	Stone Riprap	2	696	464	$289.2	North
23	0719151	RT 23 OVER PECKMANS BROOK	Stone Riprap	2	828	552	$315.5	North
23	1405156	RT 23/PEQUANNOCK RV HAMBURG TPK RR	Stone Riprap	3	919	919	$425.7	North
23	1604150	RT 23 OVER PASSAIC RIVER	Stone Riprap	3	445	445	$283.5	North

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			Recommended Countermeasure Type	Req'd Thk (FT)	Req'd Area (SY)	Req'd Volume (CY)	Estimated Construction Cost	
23	1605153	RT 23 SB OVER PEQUANNOCK RIVER	Gabion Mattress	0.75	965	241	$318.9	North
23	1605156	RT 23 SB OVER PEQUANNOCK RIVER	Gabion Mattress	1	1,921	640	$598.3	North
23	1605158	RT 23 NB OVER MACOPIN RIVER	Gabion Mattress	1	540	180	$275.9	North
23	1605162	RT 23 SB OVER PEQUANNOCK RIVER	Gabion Mattress	0.75	742	186	$279.9	North
23	1605167	RT 23 SB OVER PEQUANNOCK RIVER	Gabion Mattress	0.75	172	43	$180.1	North
23	1605175	RT 23 NB OVER PEQUANNOCK RIVER	Stone Riprap	2	252	168	$200.4	North
23	1619151	RT 23 OVER POMPTON RIVER & WATER SUPPLY	Stone Riprap	2	1,576	1,051	$465.2	North
23	1903152	23/BR OF PACOCK BRK & DEL-OSTEGO R.R.	Stone Riprap	3	43	43	$162.9	North
23	1903153	RT 23 OVER BR FRANKLIN LAKE	Stone Riprap	3	84	84	$175.1	North
23	1904152	RT 23 OVER WALKILL RIVER	Gabion Mattress	0.75	465	116	$231.4	North
23	1904153	RT 23 OVER BR WALKILL RIVER	Gabion Mattress	0.75	109	27	$169.1	North
23	1905151	RT 23 OVER BR CLOVE RIVER	Gabion Mattress	1	156	52	$186.3	North
27	2006151	RT 27 OVER ROBINSON BRANCH	Stone Riprap	3	633	633	$339.9	North
27	2006152	RT 27 OVER RAHWAY RIVER	Gabion Mattress	0.75	965	241	$318.9	North
31	2111151	RT 31 OVER POHATCONG CREEK	Gabion Mattress	1	378	126	$238.3	North
31	2111155	RT 31 OVER PEQUEST RIVER & RR	Stone Riprap	3	297	297	$239.1	North
46	0722157	RT 46 EB OVER PASSAIC RIVER	Stone Riprap	3	994	994	$448.2	North
46	0722158	RT 46 WB OVER PASSAIC RIVER	Stone Riprap	2	1,087	725	$367.4	North
46	1407152	RT 46 WB OVER MINE BROOK	Stone Riprap	3	242	242	$222.6	North
46	1407153	RT 46 EB OVER BR MINE BROOK	Gabion Mattress	1	233	78	$204.4	North
46	1407156	RT 46 OVER S BR RARITAN RIVER	Stone Riprap	2	271	180	$204.1	North
46	1409154	RT 46 OVER GRANNEYS BROOK	Stone Riprap	2	514	343	$252.9	North
46	1410159	RT 46 OVER PASSAIC RIVER	Stone Riprap	2	2,293	1,529	$608.7	North
46	2107154	US 46 WB OVER BEAVER BROOK	Stone Riprap	2	180	120	$186.0	North
46	2107155	RT 46 EB OVER BEAVER BROOK	Stone Riprap	2	286	191	$207.2	North
46	2107156	RT 46 OVER PAULINS KILL	Gabion Mattress	1	2,200	733	$663.3	North
46	2108162	RT 46 OVER MUSCONETCONG RIVER	Stone Riprap	3	132	132	$189.6	North
53	1411152	RT 53 OVER DEN BROOK	Gabion Mattress	0.75	315	79	$205.1	North
57	2105164	RT 57 OVER POHATCONG CREEK	Gabion Mattress	1	547	182	$277.6	North
57	2106164	RT 57 OVER HANCES BROOK	Gabion Mattress	1	100	33	$173.3	North
80	0225166	I-80 / MARKET ST MAIN ST & SADDLE RV	Stone Riprap	3	123	123	$186.9	North
80	1413155	RAMP C OVER BURNT MEADOW BROOK	Stone Riprap	2	185	123	$186.9	North

BRIDGE SCOUR EVALUTAION PROGRAM
STAGE II - STATE BRIDGES

CONSTRUCTION COSTS FOR SCOUR COUNTERMEASURES

Listed by Maintenance Region

Route No.	Structure No.	Structure Name	Construction Cost Information					NJDOT Maintenance Region
			Recommended Countermeasure Type	Req'd Thk (FT)	Req'd Area (SY)	Req'd Volume (CY)	Estimated Construction Cost	
82	2012150	RT 82 OVER RAHWAY RIVER	Stone Riprap	3	378	378	$263.4	North
94	1923150	RT 94 OVER WALLKILL RIVER	Stone Riprap	2	204	136	$190.9	North
94	2117157	RT 94 OVER JACKSONBURG CREEK	Gabion Mattress	0.75	607	152	$256.2	North
94	2117159	RT 94 OVER BLAIR CREEK	Gabion Mattress	1	176	59	$191.1	North
94	2117160	RT 94 OVER PAULINS KILL	Gabion Mattress	0.75	919	230	$310.9	North
202	1416152	US 202 OVER WHIPPANY RIVER	Gabion Mattress	0.75	424	106	$181.8	North
206	1417156	RT 206 OVER S BR RARITAN RIVER	Concrete Slab	0.67	97	22	$169.4	North
206	1417157	RT 206 OVER TRIB TO DRAKES BROOK	Gabion Mattress	0.75	111	28	$169.4	North
206	1417159	RT 206 OVER S BR RARITAN RIVER	Gabion Mattress	1	151	50	$185.3	North
206	1911151	RT 206 OVER LUBBERS RUN	Gabion Mattress	1	231	77	$203.9	North
206	1911159	RT 206 OVER PEQUEST RIVER	Stone Riprap	2	237	158	$197.4	North
206	1912158	RT 206 OVER BR BIG FLAT BROOK	Concrete Slab	0.67	131	29	$176.3	North
206	1912160	RT 206 OVER BIG FLAT BROOK	Gabion Mattress	0.75	358	89	$212.6	North
208	1612154	RT 208 RAMP A OVER GOFFLE BROOK	Stone Riprap	2	381	254	$226.2	North
280	1418154	I-280 EB OVER PASSAIC RIVER	Stone Riprap	2	1,059	706	$361.9	North
284	1907152	RT 284 OVER BR WALLKILL RIVER	Gabion Mattress	1	167	56	$189.1	North
284	1907157	RT 284 OVER BR WALLKILL RIVER	Gabion Mattress	0.75	136	34	$173.8	North

BRIDGE SCOUR EVALUTAION PROGRAM
STAGE II - STATE BRIDGES

CONSTRUCTION COSTS FOR SCOUR COUNTERMEASURES

Listed by Maintenance Region

Route No.	Structure No.	Structure Name	Construction Cost Information					NJDOT Maintenance Region
			Recommended Countermeasure Type	Req'd Thk (FT)	Req'd Area (SY)	Req'd Volume (CY)	Estimated Construction Cost	
Central Maintenance Region								
1B	1102150	US ROUTE 1B OVER SHABAKUNK CREEK	Gabion Mattress	1	1,563	521	$514.7	Central
9	1303155	RT 9 OVER MILFORD BROOK	Gabion Mattress	1	380	127	$238.7	Central
9	1502153	RT 9 OVER OYSTER CREEK	Stone Riprap	2	412	275	$232.4	Central
9	1502154	US 9 OVER S. BRANCH OF FORKED RIVER	Stone Riprap	2	100	67	$170.0	Central
9	1502157	RT 9 OVER CEDAR CREEK	Stone Riprap	2	400	267	$230.0	Central
22	1005153	RT 22 OVER BR ROCKAWAY CREEK	Gabion Mattress	1	192	64	$194.8	Central
22	1005162	RT 22 EB OVER S BR ROCKAWAY CREEK	Gabion Mattress	1	180	60	$192.0	Central
22	1005163	RT 22 WB OVER S BR ROCKAWAY CREEK	Gabion Mattress	1	106	35	$174.7	Central
22	1801153	RT 22 EB OVER N BR RARITAN RIVER	Gabion Mattress	1	1,017	339	$387.4	Central
22	1801154	RT 22 WB OVER N BR RARITAN RIVER	Gabion Mattress	1	1,017	339	$387.3	Central
22	1803156	RT 22 OVER STONY BROOK	Gabion Mattress	1	560	187	$280.6	Central
27	1105152	RT 27 OVER MILLSTONE RIVER	Stone Riprap	2	1,211	807	$392.1	Central
27	1218158	RT 27 OVER S BR RAHWAY RIVER	Stone Riprap	2	246	164	$199.2	Central
29	1006151	RT 29 OVER SWAN CREEK	Stone Riprap	3	253	253	$225.9	Central
29	1009150	RT 29 OVER COPPER CREEK	Stone Riprap	3	517	517	$305.1	Central
29	1110158	RT 29 OVER MOORES CREEK	Concrete Slab	0.67	774	173	$305.6	Central
31	1013152	RT 31 OVER WILLOUGHBY BROOK	Gabion Mattress	0.75	253	63	$194.3	Central
33	1304151	RT 33 OVER MILLSTONE RIVER	Gabion Mattress	1	453	151	$255.7	Central
33	1304156	RT 33 OVER BR MANALAPAN BROOK	Gabion Mattress	0.75	502	126	$237.9	Central
34	1308154	RT 34 OVER BIG BROOK	Gabion Mattress	0.75	417	104	$223.0	Central
35	1222150	RT 35 OVER CHEESEQUAKE CREEK	Stone Riprap	3	3,867	3,867	$1,310.0	Central
71	1320152	RT 71 OVER WRECK POND	Stone Riprap	2	300	200	$210.0	Central
71	1321150	RT 71 OVER SHARK RIVER	Stone Riprap	3	7,360	7,360	$2,358.0	Central
78	1015157	I-78 EB SERV RD OVER MULHOCKAWAY CK	Gabion Mattress	0.75	244	61	$192.7	Central
78	1016156	I-78 EB OVER SO BR RARITAN RIVER	Stone Riprap	3	350	350	$255.0	Central
78	1016157	I-78 WB OVER SO BR RARITAN RIVER	Stone Riprap	3	514	514	$379.2	Central
78	2113160	I78WB/ASBURY RD(CR632)&MUSCONETCONG R	Stone Riprap	2	133	89	$251.6	Central
130	1122150	RT 130 OVER DOCTORS CREEK	Gabion Mattress	0.75	389	97	$218.1	Central
130	1123152	RT 130 OVER ROCKY BROOK	Gabion Mattress	0.75	433	108	$225.8	Central
130	1123153	RT 130 OVER MILLSTONE RIVER	Gabion Mattress	0.75	347	87	$210.7	Central

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130	1227159	RT 130 OVER OAKEYS BROOK	Gabion Mattress	1	280	93	$215.3	Central
166	1516151	RT 166 OVER S CHANNEL TOMS RIVER	Gabion Mattress	1	2,375	792	$704.2	Central
166	1516152	RT 166/N CHANNEL TOMS RIVER	Gabion Mattress	0.75	480	120	$234.0	Central
173	2103152	RT 173 OVER POHATCONG CREEK	Gabion Mattress	1	400	133	$243.3	Central
173	2103153	RT 173 OVER MUSCONETCONG RIVER	Stone Riprap	2	656	437	$281.1	Central
202	1807155	RT 202 OVER N BR RARITAN RIVER	Stone Riprap	3	2,238	2,238	$821.3	Central
202	1809150	US202 OVER N BR RARITAN RIVER	Gabion Mattress	1	345	115	$184.5	Central
202	1809158	RT 202 OVER PASSAIC RIVER	Gabion Mattress	1	308	103	$221.9	Central
206	1810153	RT 206 OVER BACK BROOK	Gabion Mattress	0.75	210	53	$186.8	Central
206	1810158	ROUTE US 206 OVER PIKE RUN	Gabion Mattress	0.75	280	70	$199.0	Central
206	1810164	US206 OVER BR OF ROYCES BROOK	Gabion Mattress	0.75	160	40	$178.0	Central
206	1810165	US206 OVER BR OF ROYCES BROOK	Gabion Mattress	0.75	232	58	$190.6	Central

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			Recommended Countermeasure Type	Req'd Thk (FT)	Req'd Area (SY)	Req'd Volume (CY)	Estimated Construction Cost	
Southern Maintenance Region								
30	0405153	RT 30 & 130 OVER COOPER RIVER	Gabion Mattress	1	975	325	$377.5	South
38	0408160	MILLROAD/ S BR PENNSAUKEN CREEK	Gabion Mattress	1	113	38	$176.4	South
40	1703152	RT 40 OVER BR SALEM CREEK	Stone Riprap	2	97	65	$169.4	South
45	0807152	RT 45 OVER RACCOON CREEK	Gabion Mattress	1	72	24	$166.8	South
45	0808151	RT 45 OVER EDWARDS RUN	Gabion Mattress	1	72	24	$166.8	South
45	0810150	RT 45 OVER WOODBURY CREEK	Gabion Mattress	1	240	80	$206.0	South
45	1705150	RTS 45 & 40 OVER SALEM RIVER	Stone Riprap	3	501	501	$300.3	South
47	0601150	RT 47 OVER MUSKEE CREEK	Stone Riprap	3	192	192	$207.6	South
47	0601151	RT 47 OVER MANUMUSKIN RIVER	Stone Riprap	3	833	833	$399.9	South
47	0815152	RT 47 OVER BIG TIMBER CREEK	Stone Riprap	2	560	373	$262.0	South
49	0509150	RT 49 OVER MILL CREEK	Gabion Mattress	0.75	220	55	$188.5	South
49	0606150	RT 49 OVER MANANTICO CREEK	Gabion Mattress	1	220	73	$201.3	South
55	0609151	RT 55 NB OVER MANANTICO CREEK	Stone Riprap	2	214	143	$192.8	South
55	0609152	RT 55 SB OVER MANANTICO CREEK	Stone Riprap	2	214	143	$192.8	South
87	0115150	RT.87/ABSECON INLET&RAMPS J&H	Stone Riprap	2	1,889	1,259	$527.8	South
130	0316150	RT 130 OVER POMPESTON CREEK	Gabion Mattress	1	542	181	$276.5	South
130	0317150	US 130 NB OVER ASSISCUNK CREEK	Gabion Mattress	1	844	281	$346.9	South
130	0317152	RT 130 SB OVER ASSISCUNK CREEK	Gabion Mattress	1	1,652	551	$535.5	South
130	0319152	US RT. 130 OVER CROSSWICKS CREEK	Gabion Mattress	0.75	517	129	$240.5	South
130	0817150	RT 130 OVER BIG BIRCH CREEK	Gabion Mattress	1	290	97	$217.7	South
130	0817151	RT 130 OVER RACOON CREEK	Stone Riprap	3	1,067	1,067	$470.0	South
130	0818151	RT 130 OVER BIG TIMBER CREEK	Stone Riprap	2	1,419	946	$433.8	South
154	0424151	RT 154 OVER N BR COOPER RIVER	Gabion Mattress	1	185	62	$193.2	South
206	0118150	RT 206 OVER CEDAR BRANCH	Gabion Mattress	0.75	167	42	$179.2	South
206	0118152	RT 206 OVER GREAT SWAMP BRANCH	Gabion Mattress	0.75	200	50	$185.0	South
206	0118153	RT 206 OVER ALBERTSON BROOK	Gabion Mattress	0.75	245	61	$192.9	South
206	0324152	RT 206 OVER SPRINGERS BROOK	Stone Riprap	3	300	300	$240.0	South
206	0324153	RT 206 OVER MUSKINGUM CREEK	Stone Riprap	2	94	63	$168.8	South
206	0324155	RT 206 OVER S BR RANCOCAS CREEK	Stone Riprap	3	135	135	$190.5	South
206	0324156	ROUTE US 206 OVER JADE RUN	Gabion Mattress	0.75	201	50	$165.1	South

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206	0324160	RT 206 OVER BARKERS CREEK	Gabion Mattress	0.75	360	90	$213.0	South
206	0326152	RT 206 NB OVER CROSSWICKS CREEK	Gabion Mattress	1	2,401	800	$710.2	South
206	0326153	RT 206 SB OVER CROSSWICKS CREEK	Gabion Mattress	1	2,433	811	$717.7	South
322	0119151	RT 322 OVER HOSPITALITY BROOK	Gabion Mattress	0.75	485	121	$234.9	South
322	0119156	RT 322 OVER BIG DITCH	Gabion Mattress	0.75	435	109	$226.1	South
322	0825150	RT 322 OVER RACCOON CREEK	Gabion Mattress	1	106	35	$174.7	South
322	0826150	RT 322 OVER SCOTLAND RUN	Gabion Mattress	0.75	247	62	$193.2	South

Appendix F

Maps of New Jersey
Watershed Management Areas

from

NJ Dept. of Environmental
Protection Website

New Jersey's 5 Watershed Regions and 20 Watershed Management Areas

Northeast Region

3. Pompton, Pequannock, Wanaque, Ramapo
4. Lower Passaic, Saddle
5. Hackensack, Hudson, Pascack
6. Upper and Mid-Passaic, Whippany, Rockaway

Raritan Region

7. Arthur Kill
8. North and South Branch Raritan
9. Lower Raritan, South River, Lawrence
10. Millstone

Atlantic Region

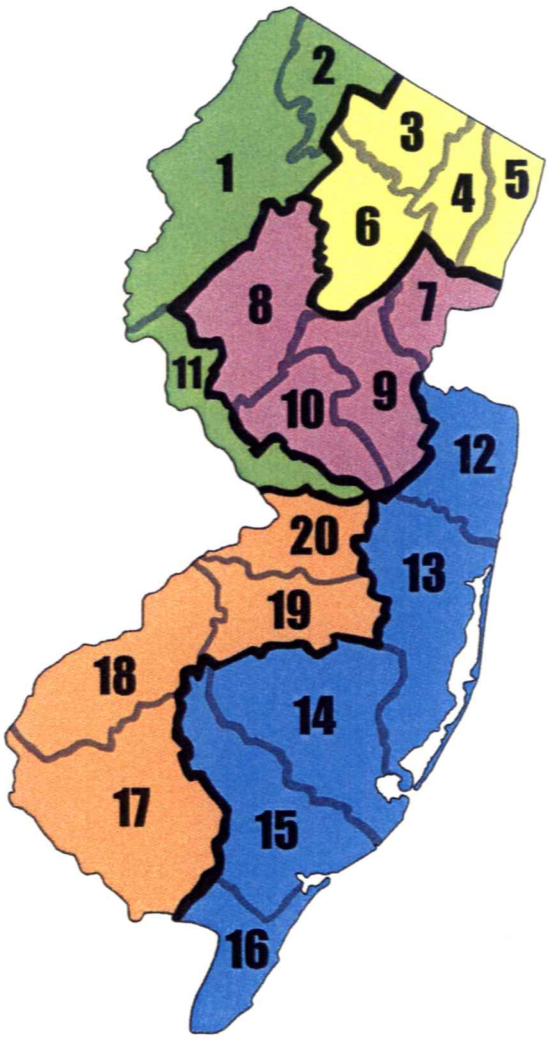
12. Monmouth
13. Barnegat Bay
14. Mullica
15. Great Egg Harbor
16. Cape May

Northwest Region

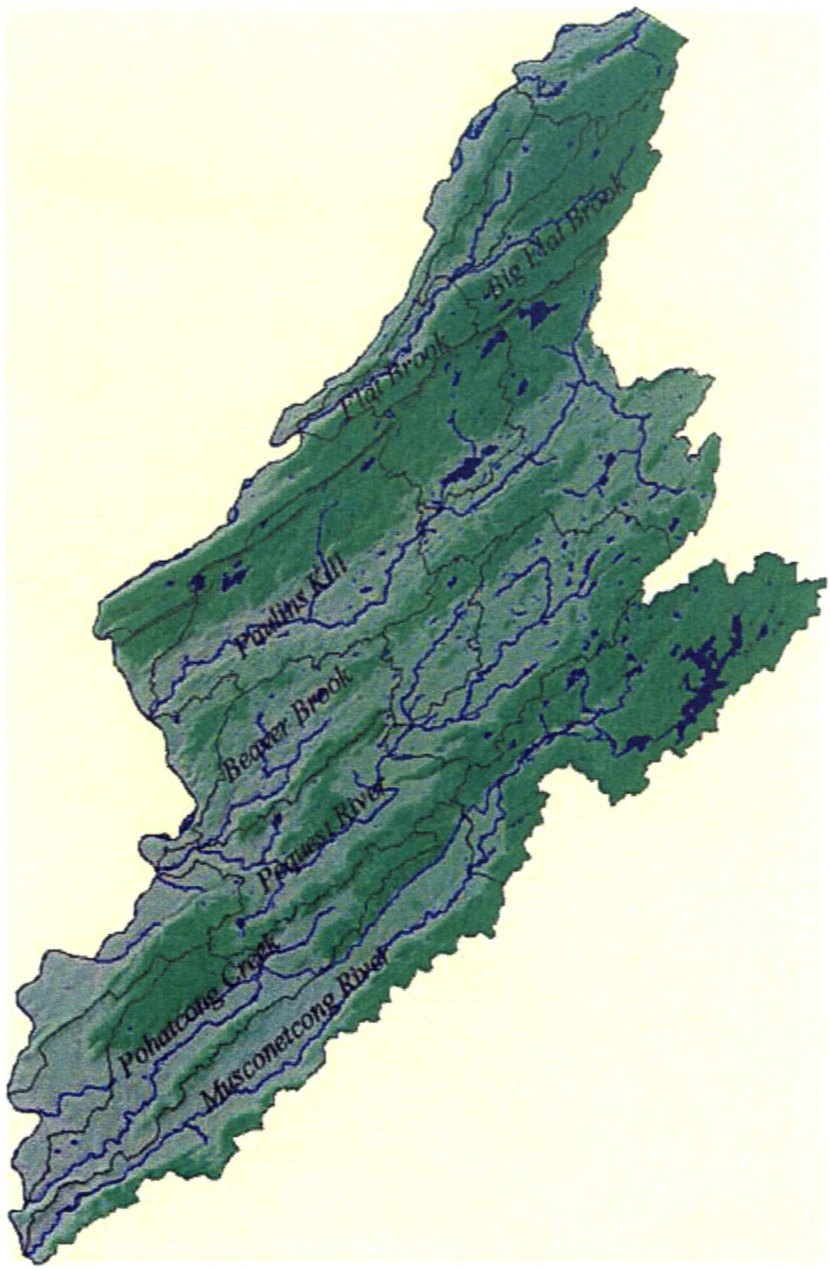
1. Upper Delaware
2. Wallkill
11. Central Delaware

Lower Delaware Region

17. Maurice, Salem, Cohansey
18. Lower Delaware
19. Rancocas
20. Assiscunk, Crosswicks, Doctors

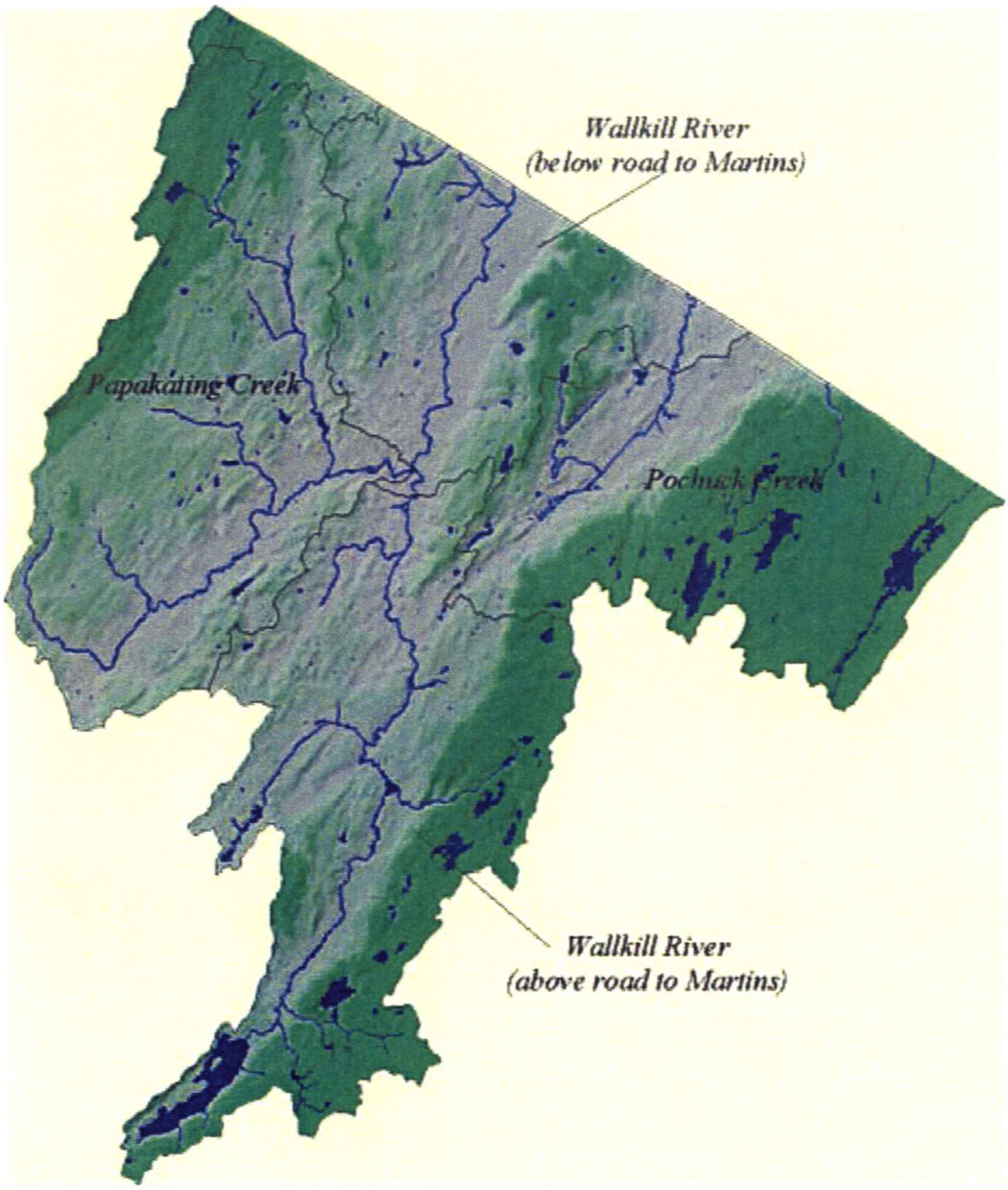


Watershed Management Area 1
Upper Delaware



Watershed Management Area 1 includes portions of Sussex, Morris, Hunterdon, and all of Warren counties. It contains 54 municipalities. This area, also known as the Upper Delaware River Watershed, encompasses 746 square miles in the mountainous northwestern corner of the state. Within Area 1 there are six major drainage basins: Delaware River, Flat Brook, Paulins Kill, Pequest River, Lopatcong and Pohatcong River Drainage, and the Musconetcong River.

Watershed Management Area 2
Wallkill

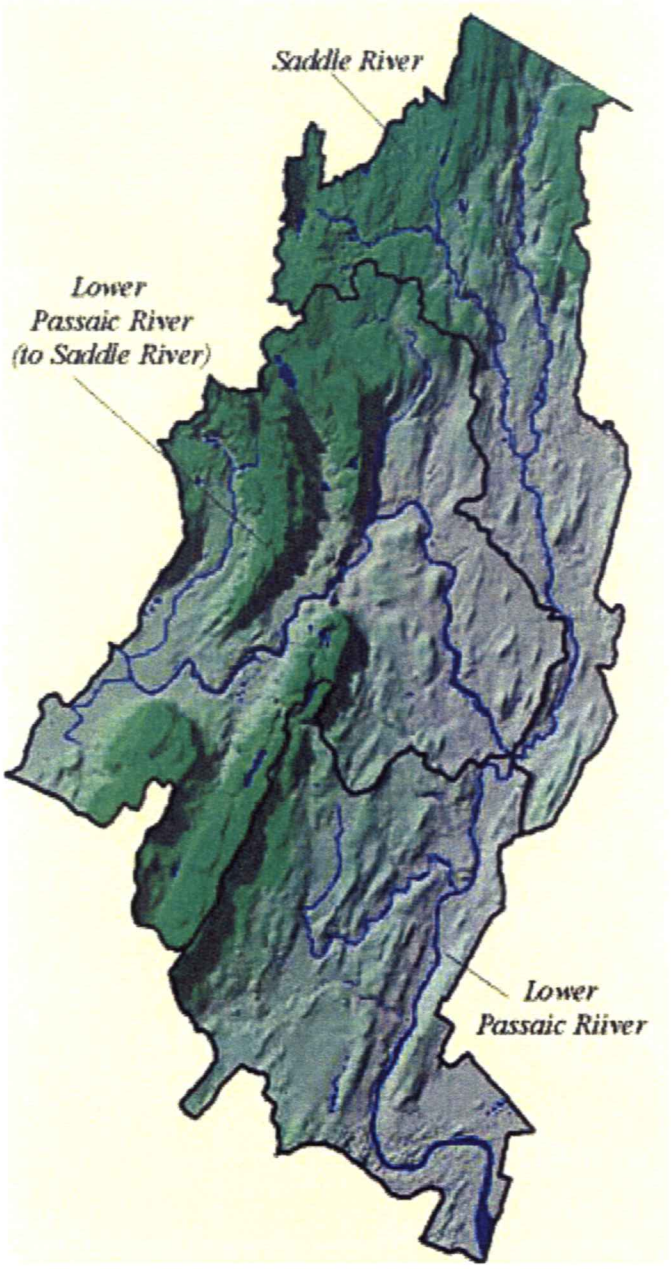


Watershed Management Area 2 is also known as the Wallkill River Watershed and includes 11 townships in Sussex County. The Wallkill River Watershed is unique in that its headwaters begin at Lake Mohawk in Sparta Township and then flows north in New York, eventually emptying into the Hudson River. Within Area 2 there are four sub-watersheds that include the Wallkill River, Pochuck Creek, Papakating Creek, and Rutgers Creek Tributaries.

Watershed Management Area 3
Pompton, Pequannock, Wanaque, Ramapo

Watershed Management Area 3 includes watersheds that receive water from the Highlands portion of New Jersey. The Pequannock, Wanaque, and Ramapo Rivers all flow into the Pompton River. The Pompton River is, in turn, a major tributary to the Upper Passaic River. There are four watersheds in WMA 3: the Pompton, Ramapo, Pequannock, and Wanaque River Watersheds. WMA 3 lies mostly in Passaic County but also includes parts of Bergen, Morris, and Sussex Counties.

Watershed Management Area 4
Lower Passaic, Saddle



Watershed Management Area 4 includes the Lower Passaic River (from the Pompton River confluence downstream to the Newark Bay) and its tributaries, including the Saddle River. The WMA 4 drainage area is approximately 180 square miles and lies within portions of Passaic, Essex, Hudson, Morris, and Bergen Counties. WMA 4 is composed of two watersheds: the Lower Passaic River Watershed and the Saddle River Watershed.

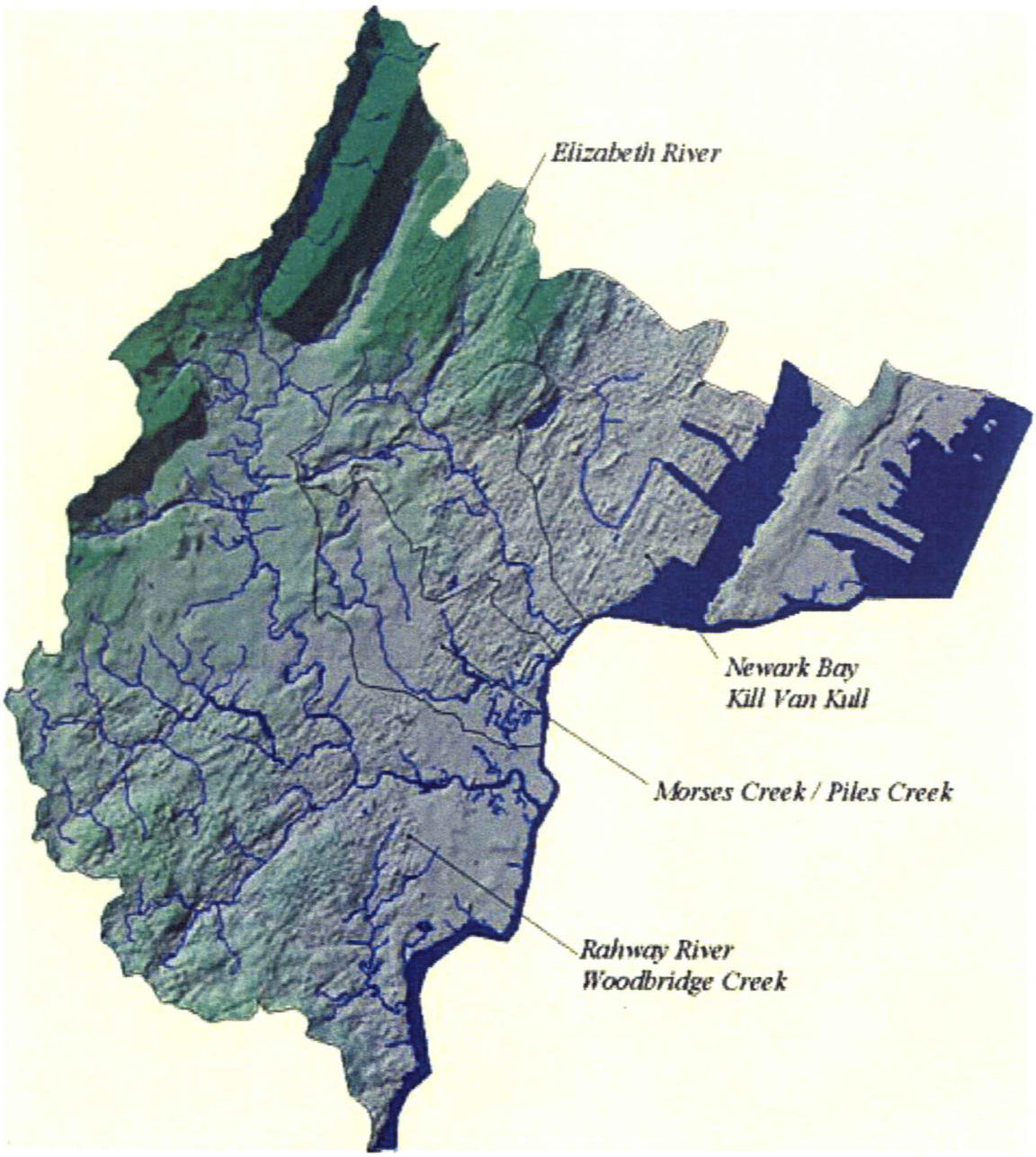
Watershed Management Area 5
Hackensack, Hudson, Pascack

Watershed Management Area 5 has a drainage area of approximately 165 square miles, which includes parts of Hudson and Bergen Counties. WMA 5 is comprised of three watersheds: Hackensack River Watershed, Hudson River Watershed, and Pascack Brook Watershed.

Watershed Management Area 6
Upper and Mid Passaic, Whippany, Rockaway

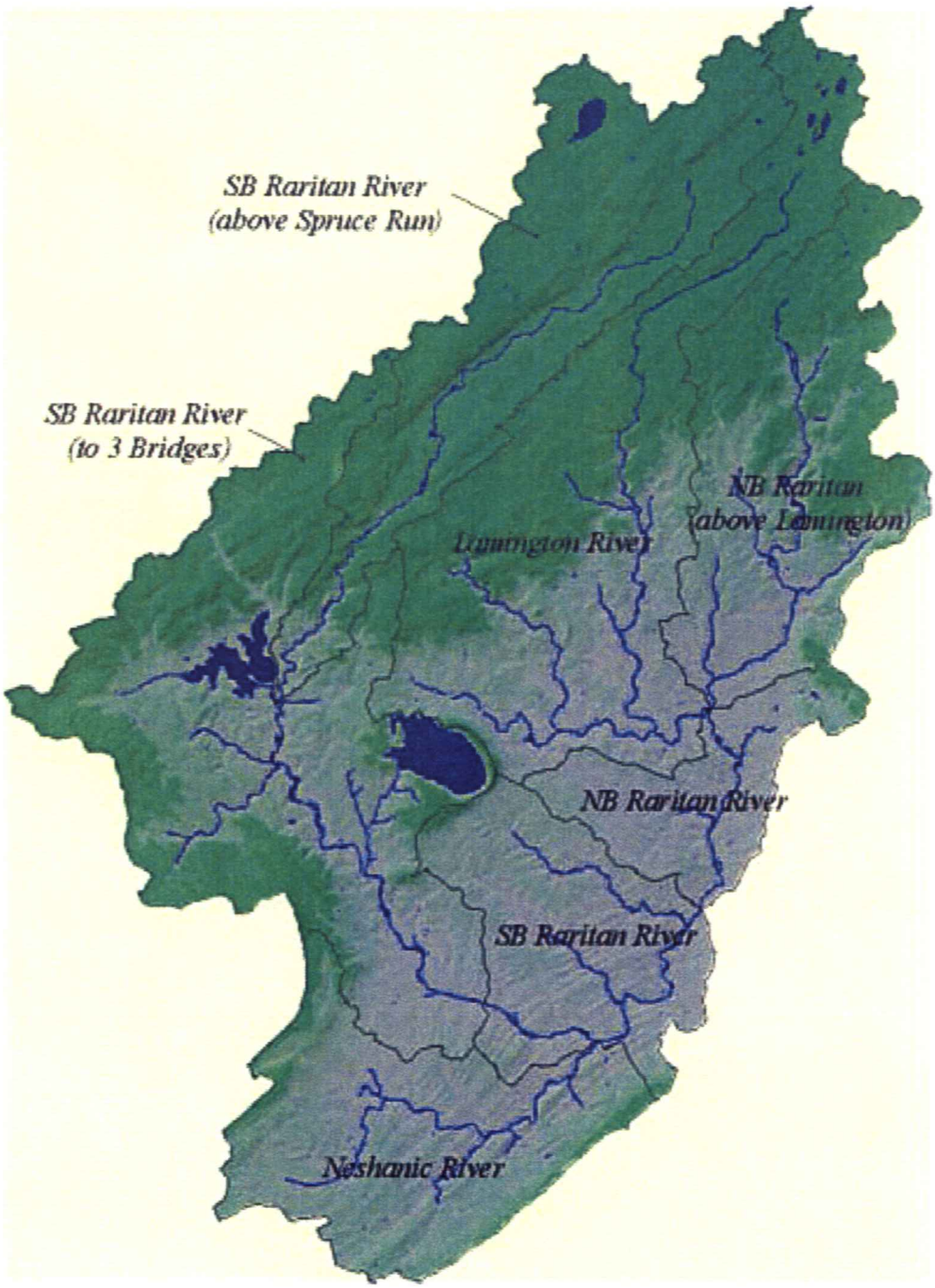
Watershed Management Area 6 represents the area drained from the upper reaches of the Passaic River Basin including the Passaic River from its headwaters in Morris County to the confluence of the Pompton River. It lies in portions of Morris, Somerset, Sussex, and Essex Counties and includes the Upper and Middle Passaic River, Whippany River, and Rockaway River Watersheds.

Watershed Management Area 7
Arthur Kill



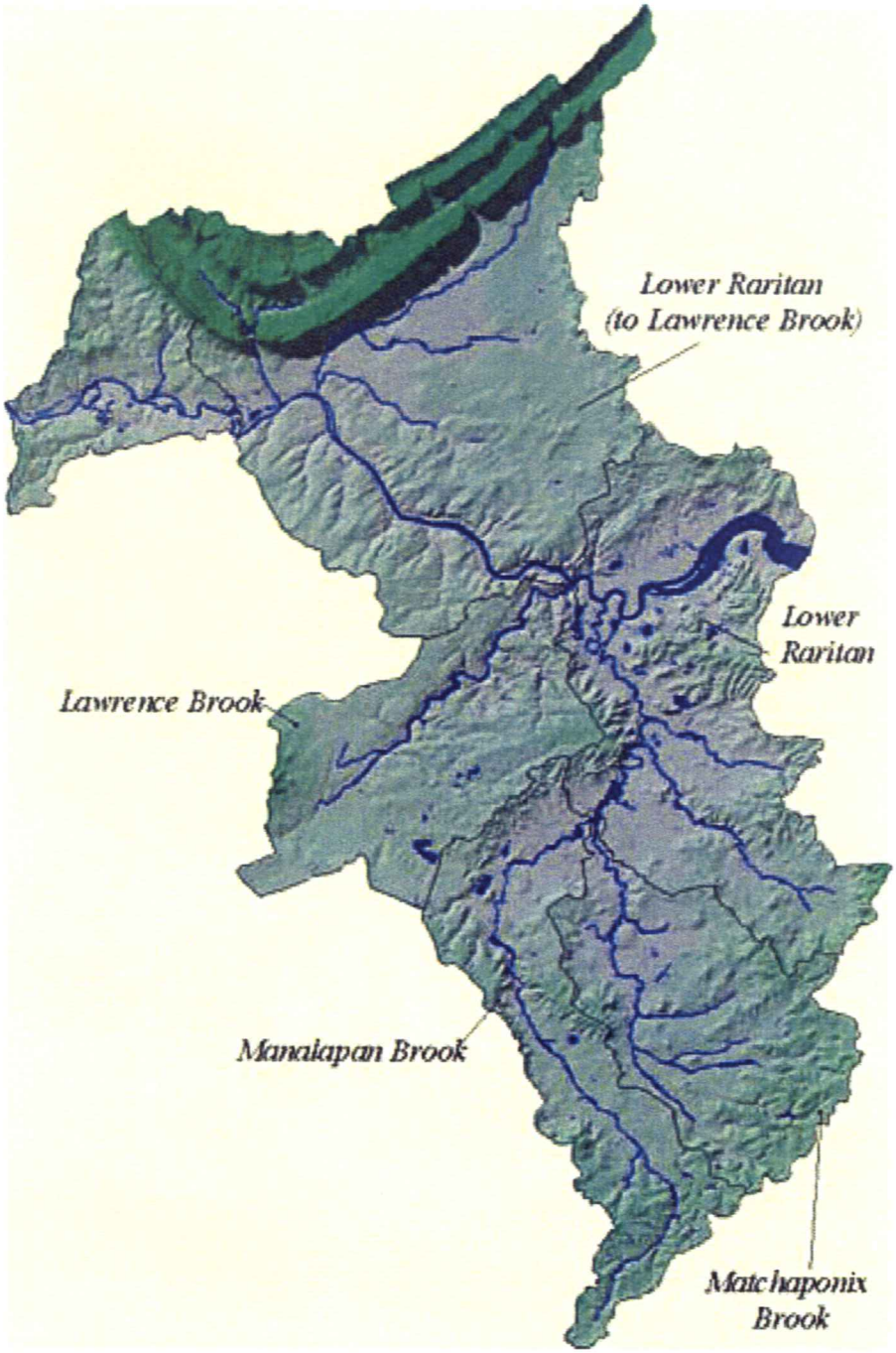
Watershed Management Area 7 includes large portions of Essex, Union, and Middlesex Counties.

Watershed Management Area 8
North and South Branch Raritan



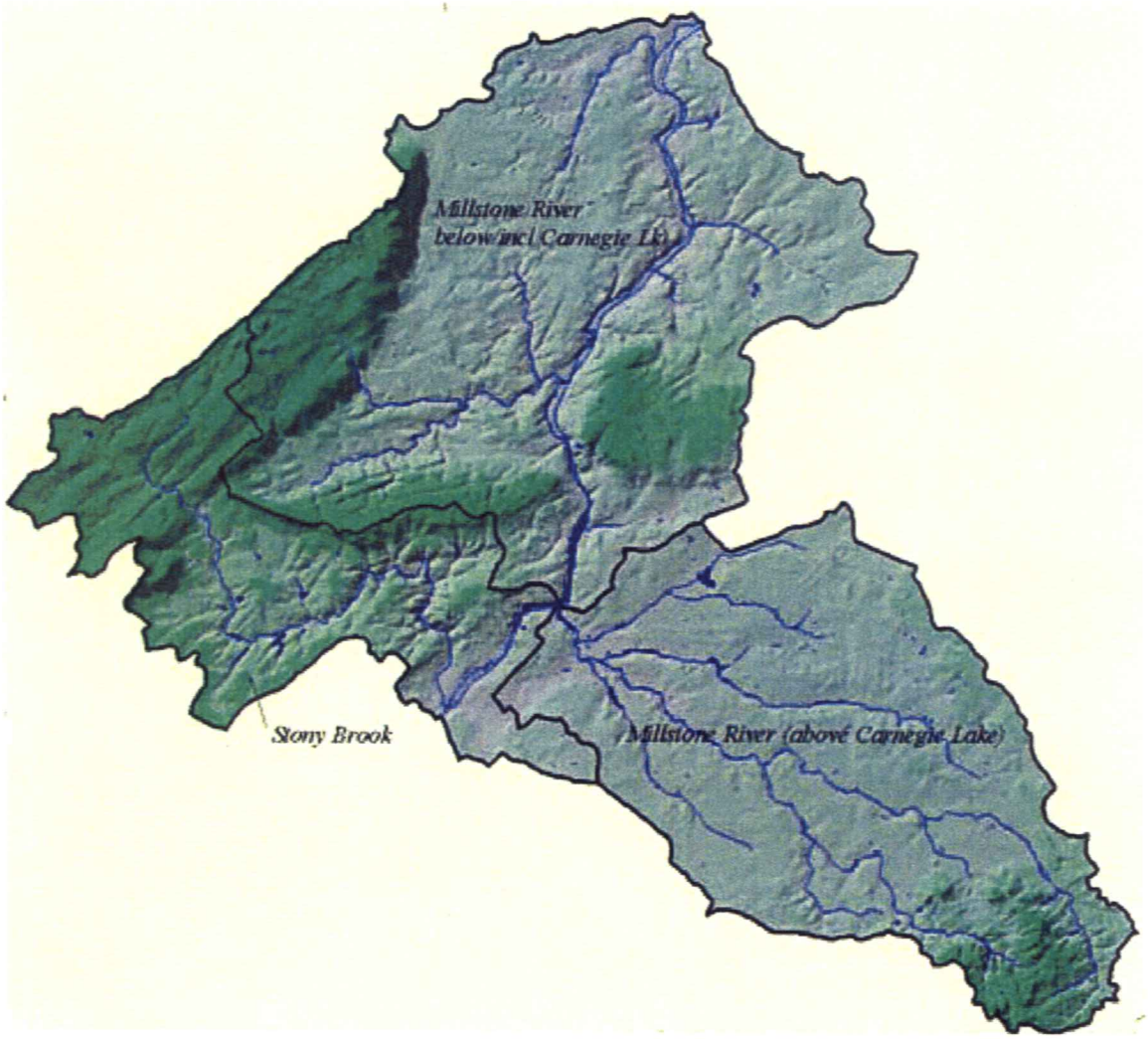
Watershed Management Area 8 includes the North and South branches of the Raritan River and their tributaries. Large portions of Somerset, Hunterdon, and Morris Counties are included in this land area.

Watershed Management Area 9
Lower Raritan, South River, Lawrence



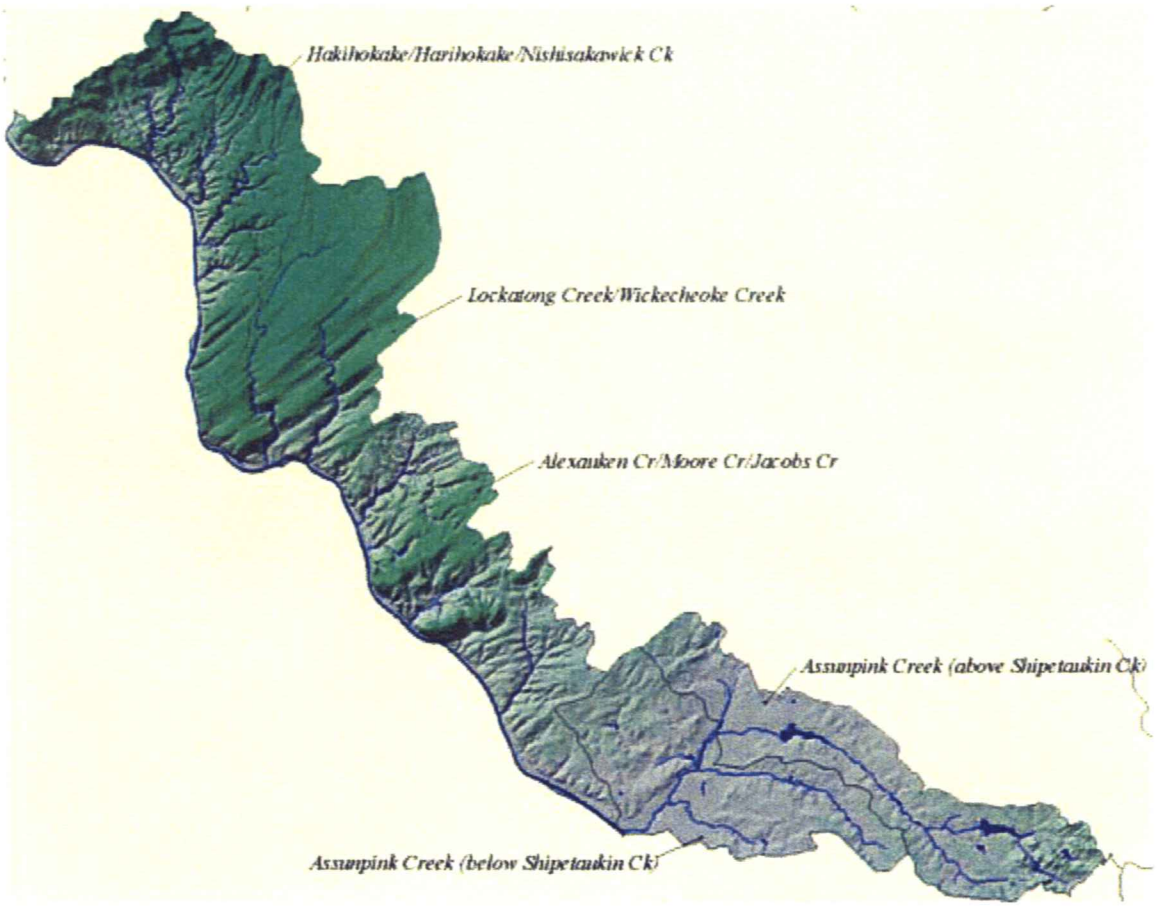
Watershed Management Area 9 includes the mainstem of the Raritan River, the South River, and Lawrence Brook. Middlesex, Somerset, and Monmouth Counties make up most of the geography of this WMA.

Watershed Management Area 10
Millstone



Watershed Management Area 10 includes the Millstone River and its tributaries. The Millstone River itself is a tributary to the Raritan River. This watershed lies in parts of Hunterdon, Somerset, Middlesex, Mercer, and Monmouth Counties.

Watershed Management Area 11
Central Delaware



Watershed Management Area 11, known as the Central Delaware Tributaries, affects the drainage in 24 municipalities within the counties of Hunterdon, Mercer, and Monmouth. The predominant drainage funnels to the Delaware River or the D&R Canal. WMA 11 covers approximately 272 square miles and is dominated by the Assunpink Creek and its tributaries to the south and much smaller creeks in the northern portions. There are four sub-watersheds in Area 11 that include the Lockatong Creek / Wickecheoke Creek, Hakihokake / Harihokake / Nishisakawick Creek, Alexauken Creek / Moore Creek / Jacobs Creek, and Assunpink Creek.

Watershed Management Area 12
Monmouth

Watershed Management Area 12 extends from Perth Amboy to Point Pleasant Beach and includes portions of Middlesex, Monmouth, and Ocean Counties.

Watershed Management Area 13
Barnegat Bay

Watershed Management Area 13 includes the watersheds draining the Central Atlantic Coastal Region of New Jersey. The area lies mostly in Ocean County and includes Barnegat Bay as well as the following sub-watersheds: Metedeconk River, Toms River, Forked River, and Cedar Creek.

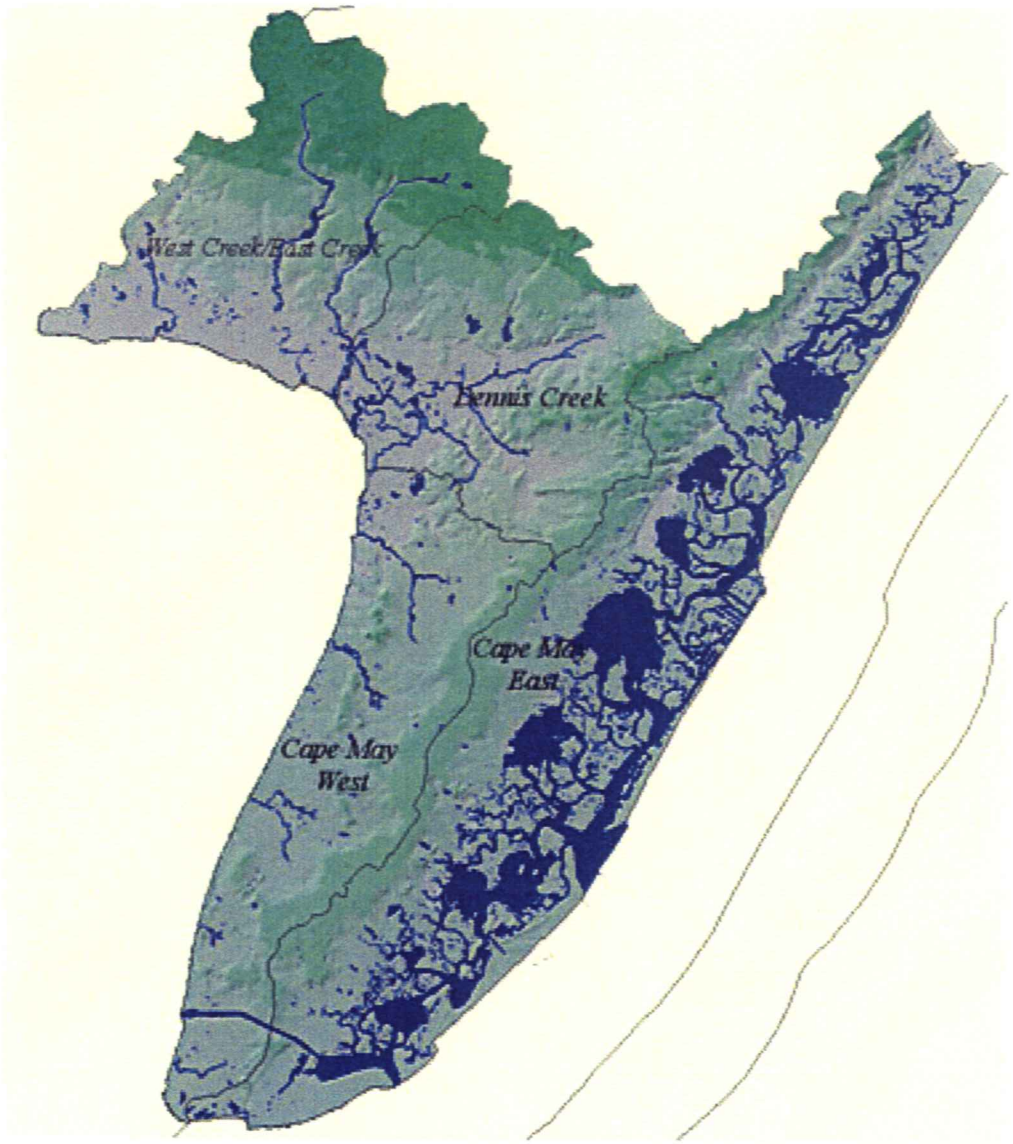
Watershed Management Area 14
Mullica

Watershed Management Area 14 includes watersheds draining portions of the Pinelands of New Jersey. Major rivers include the Mullica, the Wading River, Nochescatauxin Brook, Atsion Creek, the Bass River, Batsto River, Nescochaque Creek, Landing Creek, Hammonton Creek, and the Oswego River. The area lies in Burlington, Atlantic, and Ocean counties and includes the following watersheds: Mullica River, Mechesactauxin Creek, Wading River, Atsion Creek, Batsto River, and Doughty Creek.

Watershed Management Area 15
Great Egg Harbor

Watershed Management Area 15 includes watersheds draining to Great Egg Harbor Bay in Atlantic County. The Management Area encompasses waters draining eastern Gloucester and Camden Counties. The area includes the following watersheds: Great Egg Harbor River, Tuckahoe River, Absecon Creek, and Patcong Creek.

Watershed Management Area 16
Cape May



Watershed Management Area 16 includes watersheds draining the Cape May portion of New Jersey. The region includes Cape May County south and east of the Tuckahoe River Watershed. The area includes the following watersheds: Dennis Creek, Delaware Bay Coastal Drainage, and Cape May Atlantic Coastal Drainage.

Watershed Management Area 17
Maurice, Salem, Cohansey

Watershed Management Area 17 includes the Cohansey River, Maurice River, Salem River and Alloway, Dividing, manatico, Manusmuskin, Miles, Mill, Stow, and Whooping Creeks. This area includes portions of Atlantic, Cumberland, Gloucester, and Salem counties, over 39 municipalities, and encompasses 885 square miles.

Watershed Management Area 18
Lower Delaware

Watershed Management Area 18 has been recently revised to include Cooper River, Big Timber, Mantua, Newton, Oldmans, Pennsauken, Pompeston, Raccoon, Repaupo, and Woodbury Creeks, as well as Baldwin Run, Swede Run, and Maple Swamp. This management area covers all or parts of Burlington, Camden, and Gloucester counties, including 68 municipalities encompassing 391 square miles.

Watershed Management Area 19
Rancocas

Watershed Management Area 19 is the largest watershed in south central New Jersey, and is comprised of the North Branch, South Branch, and Main Stem of Rancocas Creek, including Mill Creek. Portions of Burlington, Camden, and Ocean Counties and approximately 33 municipalities are included in this management area which covers 360 square miles and reaches deep into the Pinelands.

Watershed Management Area 20
Assiscunk, Crosswicks, Doctors

Watershed Management Area 20 includes the Assiscunk, Blacks, Crafts, Crosswicks, Doctors, Duck, and Mill Creeks. This management area encompasses 253 square miles and includes 26 municipalities spanning four counties: Burlington, Mercer, Monmouth, and Ocean.

Appendix G

List of Flood Watch Bridges

by

Watershed Region
and Route

SCOUR CRITICAL STATE WATCH LIST BRIDGES

Listed by Watershed Region

Rte	Number	Name	Drainage Basin	Watershed Region	Watershed Management Area
Northwest Region					
15	1404159	NJ RT 15 RAMP A OVER HURDTOWN BROOK	Musconetcong River	Northwest	1
15	1424150	NJ 15 NB OVER LAKE SHAWNEE	Musconetcong River	Northwest	1
15	1922150	NJ ROUTE 15 OVER BEAVER RUN	Paulins Kill	Northwest	1
15	1922151	NJ.RTE.15 OVER PAULINS KILL CREEK	Paulins Kill	Northwest	1
22	2102154	US 22 OVER LOPATCONG CREEK	Lopatcong Creek	Northwest	1
31	2111151	RT 31 OVER POHATCONG CREEK	Pohatcong Creek	Northwest	1
31	2111155	NJ RT 31 OVER PEQUEST RIVER	Pequest River	Northwest	1
46	1407152	ROUTE US 46 WB OVER MINE BROOK	Musconetcong River	Northwest	1
46	1407153	RTE US 46EB OVER BRANCH MINE BRK.	Musconetcong River	Northwest	1
46	2107154	US 46 WB OVER BEAVER BROOK	Pequest River	Northwest	1
46	2107155	US 46 EB OVER BEAVER BROOK	Pequest River	Northwest	1
46	2107156	US ROUTE 46 OVER PAULINS KILL	Paulins Kill	Northwest	1
46	2108162	RTE US 46 OVER MUSCONETCONG RIVER	Musconetcong River	Northwest	1
57	2105164	RT 57 OVER POHATCONG CREEK	Pohatcong Creek	Northwest	1
57	2106164	NJ 57 OVER HANCES BROOK	Musconetcong River	Northwest	1
78	2113160	I78WB/ASBURY RD(CR632)&MUSCONETCONG R	Musconetcong River	Northwest	1
94	2117157	NJ 94 OVER JACKSONBURG CREEK	Paulins Kill	Northwest	1
94	2117159	NJ ROUTE 94 OVER BLAIR CREEK.	Paulins Kill	Northwest	1
94	2117160	ROUTE 94 OVER PAULINS KILL	Paulins Kill	Northwest	1
173	2103152	RT 173 OVER POHATCONG CREEK	Pohatcong Creek	Northwest	1
173	2103153	NJ 173 OVER MUSCONETCONG RIVER	Musconetcong River	Northwest	1
206	1911151	US206 OVER LUBBERS RUN	Musconetcong River	Northwest	1
206	1911159	US206 OVER PEQUEST RIVER	Pequest River	Northwest	1
206	1912158	US ROUTE 206 OVER KITTATINY BROOK	Flat Brook	Northwest	1
206	1912160	US 206 OVER BIG FLAT BROOK	Flat Brook	Northwest	1
23	1903152	23/BR OF PACOCK BRK & DEL-OSTEGO R.R.	Wallkill River	Northwest	2
23	1903153	RT 23 OVER BRANCH OF FRANKLIN LAKE	Wallkill River	Northwest	2
23	1904152	NJ 23 OVER WALLKILL RIVER	Wallkill River	Northwest	2
23	1904153	NJ RT 23/ BR OF WALLKILL RIVER	Wallkill River	Northwest	2
23	1905151	ROUTE NJ 23/BRANCH OF CLOVE RIVER	Papatking Creek	Northwest	2
94	1923150	NJ RT.94 OVER WALLKILL RIVER	Wallkill River	Northwest	2
284	1907152	NJ RT284/BR OF WALLKILL RIVER	Wallkill River	Northwest	2
284	1907157	NJ 284 OVER BR OF WALLKILL RIVER	Wallkill River	Northwest	2
29	1006151	ROUTE 29 OVER SWAN CREEK	Lockatong Creek	Northwest	11
29	1009150	ROUTE 29 OVER COPPER CREEK	Lockatong Creek	Northwest	11
29	1110158	NJ 29 OVER MOORES CREEK	Lockatong Creek	Northwest	11
1B	1102150	US 1B OVER SHABAKUNK CREEK	Assunpink Creek	Northwest	11

SCOUR CRITICAL STATE WATCH LIST BRIDGES

Listed by Watershed Region

Rte	Number	Name	Drainage Basin	Watershed Region	Watershed Management Area
Northeast Region					
17	0218161	N.J 17 NB/US 202 & RAMAPO RIVER	Ramapo River	Northeast	3
17	0218162	NJ RT 17 SB OVER US 202 & RAMAPO RVR	Ramapo River	Northeast	3
23	1405156	RT23/PEQUANNOCK R,HAMBURG TPK SB, RR	Pequannock River	Northeast	3
23	1605153	NJ RTE 23 SB OVER PEQUANNOCK RIV.	Pequannock River	Northeast	3
23	1605156	NJ RT 23 SB OVER PEQUANNOCK RIVER	Pequannock River	Northeast	3
23	1605158	NJ ROUTE 23 NB/MACOPIN RIVER	Pequannock River	Northeast	3
23	1605162	RTE 23SB OVER PEQUANNOCK RV	Pequannock River	Northeast	3
23	1605167	ROUTE 23 SB OVER PEQUANNOCK RIVER	Pequannock River	Northeast	3
23	1605175	RT 23 NB OVER PEQUANNOCK RIVER	Pequannock River	Northeast	3
23	1619151	N.J 23 OVER POMPTON RIVER	Pompton River	Northeast	3
3	1601157	NJ ROUTE 3 OVER THIRD RIVER	Lower Passaic	Northeast	4
3	1601160	NJ RT 3 OVER UPPER POND SPILLWAY	Lower Passaic	Northeast	4
17	0216150	RT 17 OVER SPROUT BROOK	Saddle River	Northeast	4
17	0216157	NJ RT 17 OVER SADDLE RIVER.	Saddle River	Northeast	4
21	0716156	MAIN ST OVER SECOND RIVER	Lower Passaic	Northeast	4
23	0719151	RT 23 OVER PECKMANS BROOK	Lower Passaic	Northeast	4
23	1604150	ROUTE NJ 23/PASSAIC RIVER	Lower Passaic	Northeast	4
46	0220157	U.S.ROUTE 46 OVER SADDLE RIVER	Saddle River	Northeast	4
80	0225166	I-80/MRKT.MAIN,FAIRVIEW STS.&SADL RIV	Saddle River	Northeast	4
208	1612154	ROUTE 208 RAMP A OVER GOFFLE BROOK	Lower Passaic	Northeast	4
280	1418154	RT.I-280 EB OVER PASSAIC RIVER	Lower Passaic	Northeast	4
4	0206166	NJ 4 / HACKENSACK RIVER & ACCESS ROAD	Hackensack River	Northeast	5
4	0206181	NJ 4 OVER FLAT ROCK BROOK	Hackensack River	Northeast	5
4	0206189	KINDERKAMACK RD OVER COLES BROOK	Hackensack River	Northeast	5
1+9	0201151	US 1&9(BROAD AVENUE) OVER WOLF CREEK	Hackensack River	Northeast	5
10	0709150	RT 10 OVER WILLOW MEADOW BROOK	Upper Passaic	Northeast	6
10	0711150	NJ ROUTE 10 OVER CANOE BROOK	Upper Passaic	Northeast	6
10	1401156	RT 10 OVER MILL BROOK	Rockaway River	Northeast	6
10	1402150	NJ ROUTE 10 OVER MALAPARDIS BROOK	Whippany River	Northeast	6
15	1403150	NJ RT 15 OVER BRNT MDW(GRN PD) BROOK	Rockaway River	Northeast	6
15	1404155	GOVRNMNT RD(PARKER RD) WB/GREEN POND	Rockaway River	Northeast	6
15	1404158	NJ ROUTE 15 SB / ROCKAWAY RIVER	Rockaway River	Northeast	6
46	0722157	US ROUTE 46 EB OVER PASSAIC RIVER	Upper Passaic	Northeast	6
46	0722158	U.S. ROUTE 46 WB /PASSAIC RIVER	Upper Passaic	Northeast	6
46	1409154	US ROUTE 46 OVER GRANNEYS BROOK	Rockaway River	Northeast	6
46	1410159	ROUTE 46 OVER PASSAIC RIVER	Upper Passaic	Northeast	6
53	1411152	RT 53 OVER DEN BROOK	Rockaway River	Northeast	6
80	1413155	RAMP C OVER BURNT MEADOW BROOK	Rockaway River	Northeast	6
202	1416152	US 202 OVER WHIPPANY RIVER	Whippany River	Northeast	6
202	1809158	US RT 202 OVER PASSAIC RIVER	Upper Passaic	Northeast	6

SCOUR CRITICAL STATE WATCH LIST BRIDGES

Listed by Watershed Region

Rte	Number	Name	Drainage Basin	Watershed Region	Watershed Management Area
Raritan Region					
22	2003157	US22 OVER ECHO LAKE	Rahway River	Raritan	7
22	2003161	US 22 EB OVER RAHWAY RIVER	Rahway River	Raritan	7
22	2003162	US 22 WB OVER RAHWAY RIVER	Rahway River	Raritan	7
22	2004151	US 22 OVER ELIZABETH RIVER	Elizabeth River	Raritan	7
27	1218158	NJ RT 27 OVER S BRANCH RAHWAY RIVER	Rahway River	Raritan	7
27	2006151	RT 27 OVER ROBINSON BRNCH RAHWAY RVR	Rahway River	Raritan	7
27	2006152	NJ RT 27/RAHWAY RIVER	Rahway River	Raritan	7
82	2012150	NJ ROUTE 82 OVER RAHWAY RIVER	Rahway River	Raritan	7
22	1005153	RT US 22 OVER BR ROCKAWAY CREEK	North Branch of Raritan River	Raritan	8
22	1005162	US 22 EB OVER S BR ROCKAWAY CREEK	North Branch of Raritan River	Raritan	8
22	1005163	RT US 22 WB OVER S BR ROCKAWAY CREEK	North Branch of Raritan River	Raritan	8
22	1801153	US 22 EB OVER N BR RARITAN RIVER	North Branch of Raritan River	Raritan	8
22	1801154	US 22 WB OVER N BR RARITAN RIVER	North Branch of Raritan River	Raritan	8
31	1013152	ROUTE NJ 31 OVER WILLOUGHBY BROOK	South Branch of Raritan River	Raritan	8
46	1407156	US 46 OVER SOUTH BR RARITAN RIVER	South Branch of Raritan River	Raritan	8
78	1015157	I-78EB SERV.RD / MULHOCKAWAY CREEK	South Branch of Raritan River	Raritan	8
78	1016156	I-78 EB OVER SO BR. RARITAN RIVER	South Branch of Raritan River	Raritan	8
78	1016157	I-78 WB OVER SO BR. RARITAN RIVER	South Branch of Raritan River	Raritan	8
202	1807155	US 202 OVER N BR RARITAN RIVER	North Branch of Raritan River	Raritan	8
202	1809150	US202 OVER N BR RARITAN RIVER	North Branch of Raritan River	Raritan	8
202	1809153	RT 202 OVER BR MINE BROOK	North Branch of Raritan River	Raritan	8
206	1417156	RT 206/SOUTH BR OF RARITAN RIVER	South Branch of Raritan River	Raritan	8
206	1417157	US 206 OVER TRIB TO DRAKES BROOK	South Branch of Raritan River	Raritan	8
206	1417159	US RT 206/S BRANCH RARITAN RIVER	South Branch of Raritan River	Raritan	8
9	1303155	US RT 9 OVER MILFORD BROOK	South River	Raritan	9
22	1803156	RT US 22 OVER STONY BROOK	Lower Raritan	Raritan	9
33	1304156	ROUTE 33 OVER MANALAPAN BROOK	South River	Raritan	9
130	1227159	US 130 OVER OAKEYS BROOK	Lawrence Brook	Raritan	9
27	1105152	RT NJ 27 OVER MILLSTONE RIVER	Millstone River	Raritan	10
33	1304151	OLD ROAD(NJ 33) OVER MILLSTONE RIVER	Millstone River	Raritan	10
130	1123152	US ROUTE 130 OVER ROCKY BROOK	Millstone River	Raritan	10
130	1123153	RT 130 OVER MILLSTONE RIVER	Millstone River	Raritan	10
206	1810153	US 206 OVER BACK BROOK	Millstone River	Raritan	10
206	1810155	RT US 206 OVER CRUSERS BROOK	Millstone River	Raritan	10
206	1810158	ROUTE US 206 OVER PIKE RUN	Millstone River	Raritan	10
206	1810164	US206 OVER BR OF ROYCES BROOK	Millstone River	Raritan	10
206	1810165	US206 OVER BR OF ROYCES BROOK	Millstone River	Raritan	10

SCOUR CRITICAL STATE WATCH LIST BRIDGES

Listed by Watershed Region

Rte	Number	Name	Drainage Basin	Watershed Region	Watershed Management Area
Atlantic Coastal Region					
34	1308154	N.J.ROUTE 34 OVER BIG BROOK	Navesink River	Atlantic Coastal	12
35	1222150	ROUTE 35/CHEESEQUAKE CREEK & RAMP	Matawan Creek	Atlantic Coastal	12
36	1315157	NJ 36 OVER FLAT CREEK	Matawan Creek	Atlantic Coastal	12
71	1320152	ROUTE 71 OVER WRECK POND	Wreck Pond Brook	Atlantic Coastal	12
71	1321150	ROUTE 71 OVER SHARK RIVER	Shark River	Atlantic Coastal	12
9	1502153	US 9 OVER OYSTER CREEK	Forked River	Atlantic Coastal	13
9	1502154	US 9 OVER S. BRANCH OF FORKED RIVER	Forked River	Atlantic Coastal	13
9	1502157	US 9 OVER CEDAR CREEK	Cedar Creek	Atlantic Coastal	13
166	1516151	RT NJ166 OVER S.CHANNEL OF TOMS RIVER	Toms River	Atlantic Coastal	13
166	1516152	RT NJ 166 OVER NO. CHANNEL OF TOMS R.	Toms River	Atlantic Coastal	13
206	0118150	US 206 OVER CEDAR BRANCH	Mullica River	Atlantic Coastal	14
206	0118152	US 206 OVER GREAT SWAMP BRANCH	Mullica River	Atlantic Coastal	14
206	0118153	RT 206 OVER ALBERTSONS BROOK	Mullica River	Atlantic Coastal	14
206	0324152	U.S ROUTE 206 OVER SPRINGERS BROOK	Basto River	Atlantic Coastal	14
206	0324153	US 206 OVER MUSKINGUM CREEK	Basto River	Atlantic Coastal	14
49	0509150	RT 49 OVER MILL CREEK	Tuckahoe River	Atlantic Coastal	15
50	0510152	ROUTE 50 OVER TUCKAHOE RIVER	Tuckahoe River	Atlantic Coastal	15
87	0115150	RT.87/ABSECON INLET&RAMPS J&H	Absecon Creek	Atlantic Coastal	15
322	0119151	US 322 OVER HOSPITALITY BROOK	Great Egg Harbor River	Atlantic Coastal	15
322	0119156	US 322 OVER BIG DITCH	Great Egg Harbor River	Atlantic Coastal	15

SCOUR CRITICAL STATE WATCH LIST BRIDGES

Listed by Watershed Region

Rte	Number	Name	Drainage Basin	Watershed Region	Watershed Management Area
Lower Delaware Region					
40	1703152	U.S.RTE 40 OVER BRANCH SALEM CRK.	Salem River	Lower Delaware	17
45	0807152	RT45 OVER RACCOON CREEK	Salem River	Lower Delaware	17
47	0601150	RT 47 OVER MUSKEE CREEK	Maurice River	Lower Delaware	17
47	0601151	N.J.ROUTE 47 OVER MANUMUSKIN RIV.	Manamuskin River	Lower Delaware	17
49	0606150	NJ RT 49 OVER MANANTICO CREEK	Manantico Creek	Lower Delaware	17
55	0609151	ROUTE 55 NB OVER MANANTICO CREEK	Manantico Creek	Lower Delaware	17
55	0609152	RT 55 SB OVER MANANTICO CREEK	Manantico Creek	Lower Delaware	17
56	1716151	NJ ROUTE 56 OVER MAURICE RIVER	Maurice River	Lower Delaware	17
322	0826150	US ROUTE 322 OVER SCOTLAND RUN	Maurice River	Lower Delaware	17
30	0405153	US RTS 30 & 130 OVER COOPER RIVER	Cooper River	Lower Delaware	18
38	0408160	MILL ROAD/SO BR PENNSAUKEN CREEK	Pennsauken Creek	Lower Delaware	18
45	0808151	ROUTE 45 OVER EDWARDS RUN	Raccoon Creek	Lower Delaware	18
45	0810150	RT 45 OVER WOODBURY CREEK	Mantua Creek	Lower Delaware	18
45	1705150	NJ RT 45 & US RT 40/SALEM RIVER	Woodbury Creek	Lower Delaware	18
47	0815152	NJ 47 OVER BIG TIMBER CREEK	Big Timber Creek	Lower Delaware	18
130	0316150	RT US 130 OVER POMPESTON CREEK	Pompeston Creek	Lower Delaware	18
130	0817150	US RT 130 OVER BIG BIRCH CREEK	Maple Swamp	Lower Delaware	18
130	0817151	RT US 130 OVER RACCOON CREEK	Raccoon Creek	Lower Delaware	18
130	0818151	RT US 130 /BIG TIMBER CREEK	Big Timber Creek	Lower Delaware	18
154	0424151	RT 154 OVER NO BR COOPER RIVER	Cooper River	Lower Delaware	18
322	0825150	US 322 OVER RACCOON CREEK	Raccoon Creek	Lower Delaware	18
206	0324155	US 206 OVER SO BR OF RANCOCAS CREEK	South Branch of Rancocas Creek	Lower Delaware	19
206	0324156	ROUTE US 206 OVER JADE RUN	South Branch of Rancocas Creek	Lower Delaware	19
130	0317150	US 130 NB OVER ASSISCUNK CREEK	Assiscunk Creek	Lower Delaware	20
130	0317152	US 130 SB OVER ASSISCUNK CREEK	Assiscunk Creek	Lower Delaware	20
130	0319152	US RT. 130 OVER CROSSWICKS CREEK	Crosswicks Creek	Lower Delaware	20
130	1122150	US 130 OVER DOCTORS CREEK	Crosswicks Creek	Lower Delaware	20
206	0324160	US RT 206 OVER BARKERS CREEK	Assiscunk Creek	Lower Delaware	20
206	0324162	US206 OVER ASSISCUNK CREEK	Assiscunk Creek	Lower Delaware	20
206	0326152	US 206 NB OVER CROSSWICKS CREEK	Crosswicks Creek	Lower Delaware	20
206	0326153	US206 SB OVER CROSSWICKS CREEK	Crosswicks Creek	Lower Delaware	20

SCOUR CRITICAL STATE WATCH LIST BRIDGES

Listed by Route

Rte	Number	Name	Drainage Basin	Watershed Region	Watershed Management Area
1B	1102150	US 1B OVER SHABAKUNK CREEK	Assunpink Creek	Northwest	11
1+9	0201151	US 1&9(BROAD AVENUE) OVER WOLF CREEK	Hackensack River	Northeast	5
3	1601157	NJ ROUTE 3 OVER THIRD RIVER	Lower Passaic	Northeast	4
3	1601160	NJ RT 3 OVER UPPER POND SPILLWAY	Lower Passaic	Northeast	4
4	0206166	NJ 4 / HACKENSACK RIVER & ACCESS ROAD	Hackensack River	Northeast	5
4	0206181	NJ 4 OVER FLAT ROCK BROOK	Hackensack River	Northeast	5
4	0206189	KINDERKAMACK RD OVER COLES BROOK	Hackensack River	Northeast	5
9	1303155	US RT 9 OVER MILFORD BROOK	South River	Raritan	9
9	1502153	US 9 OVER OYSTER CREEK	Forked River	Atlantic Coastal	13
9	1502154	US 9 OVER S. BRANCH OF FORKED RIVER	Forked River	Atlantic Coastal	13
9	1502157	US 9 OVER CEDAR CREEK	Cedar Creek	Atlantic Coastal	13
10	0709150	RT 10 OVER WILLOW MEADOW BROOK	Upper Passaic	Northeast	6
10	0711150	NJ ROUTE 10 OVER CANOE BROOK	Upper Passaic	Northeast	6
10	1401156	RT 10 OVER MILL BROOK	Rockaway River	Northeast	6
10	1402150	NJ ROUTE 10 OVER MALAPARDIS BROOK	Whippany River	Northeast	6
15	1403150	NJ RT 15 OVER BRNT MDW(GRN PD) BROOK	Rockaway River	Northeast	6
15	1404155	GOVRNMNT RD(PARKER RD) WB/GREEN POND	Rockaway River	Northeast	6
15	1404158	NJ ROUTE 15 SB / ROCKAWAY RIVER	Rockaway River	Northeast	6
15	1404159	NJ RT 15 RAMP A OVER HURDTOWN BROOK	Musconetcong River	Northwest	1
15	1424150	NJ 15 NB OVER LAKE SHAWNEE	Musconetcong River	Northwest	1
15	1922150	NJ ROUTE 15 OVER BEAVER RUN	Paulins Kill	Northwest	1
15	1922151	NJ.RTE.15 OVER PAULINS KILL CREEK	Paulins Kill	Northwest	1
17	0216150	RT 17 OVER SPROUT BROOK	Saddle River	Northeast	4
17	0216157	NJ RT 17 OVER SADDLE RIVER.	Saddle River	Northeast	4
17	0218161	N.J 17 NB/US 202 & RAMAPO RIVER	Ramapo River	Northeast	3
17	0218162	NJ RT 17 SB OVER US 202 & RAMAPO RVR	Ramapo River	Northeast	3
21	0716156	MAIN ST OVER SECOND RIVER	Lower Passaic	Northeast	4
22	1005153	RT US 22 OVER BR ROCKAWAY CREEK	North Branch of Raritan River	Raritan	8
22	1005162	US 22 EB OVER S BR ROCKAWAY CREEK	North Branch of Raritan River	Raritan	8
22	1005163	RT US 22 WB OVER S BR ROCKAWAY CREEK	North Branch of Raritan River	Raritan	8
22	1801153	US 22 EB OVER N BR RARITAN RIVER	North Branch of Raritan River	Raritan	8
22	1801154	US 22 WB OVER N BR RARITAN RIVER	North Branch of Raritan River	Raritan	8
22	1803156	RT US 22 OVER STONY BROOK	Lower Raritan	Raritan	9
22	2003157	US22 OVER ECHO LAKE	Rahway River	Raritan	7
22	2003161	US 22 EB OVER RAHWAY RIVER	Rahway River	Raritan	7
22	2003162	US 22 WB OVER RAHWAY RIVER	Rahway River	Raritan	7
22	2004151	US 22 OVER ELIZABETH RIVER	Elizabeth River	Raritan	7
22	2102154	US 22 OVER LOPATCONG CREEK	Lopatcong Creek	Northwest	1
23	0719151	RT 23 OVER PECKMANS BROOK	Lower Passaic	Northeast	4
23	1405156	RT23/PEQUANNOCK R,HAMBURG TPK SB, RR	Pequannock River	Northeast	3
23	1604150	ROUTE NJ 23/PASSAIC RIVER	Lower Passaic	Northeast	4
23	1605153	NJ RTE 23 SB OVER PEQUANNOCK RIV.	Pequannock River	Northeast	3
23	1605156	NJ RT 23 SB OVER PEQUANNOCK RIVER	Pequannock River	Northeast	3
23	1605158	NJ ROUTE 23 NB/MACOPIN RIVER	Pequannock River	Northeast	3
23	1605162	RTE 23SB OVER PEQUANNOCK RV	Pequannock River	Northeast	3
23	1605167	ROUTE 23 SB OVER PEQUANNOCK RIVER	Pequannock River	Northeast	3
23	1605175	RT 23 NB OVER PEQUANNOCK RIVER	Pequannock River	Northeast	3
23	1619151	N.J 23 OVER POMPTON RIVER	Pompton River	Northeast	3
23	1903152	23/BR OF PACOCK BRK & DEL-OSTEGO R.R.	Wallkill River	Northwest	2
23	1903153	RT 23 OVER BRANCH OF FRANKLIN LAKE	Wallkill River	Northwest	2
23	1904152	NJ 23 OVER WALLKILL RIVER	Wallkill River	Northwest	2
23	1904153	NJ RT 23/ BR OF WALLKILL RIVER	Wallkill River	Northwest	2
23	1905151	ROUTE NJ 23/BRANCH OF CLOVE RIVER	Papatking Creek	Northwest	2
27	1105152	RT NJ 27 OVER MILLSTONE RIVER	Millstone River	Raritan	10
27	1218158	NJ RT 27 OVER S BRANCH RAHWAY RIVER	Rahway River	Raritan	7
27	2006151	RT 27 OVER ROBINSON BRNCH RAHWAY RVR	Rahway River	Raritan	7
27	2006152	NJ RT 27/RAHWAY RIVER	Rahway River	Raritan	7

SCOUR CRITICAL STATE WATCH LIST BRIDGES

Listed by Route

Rte	Number	Name	Drainage Basin	Watershed Region	Watershed Management Area
29	1006151	ROUTE 29 OVER SWAN CREEK	Lockatong Creek	Northwest	11
29	1009150	ROUTE 29 OVER COPPER CREEK	Lockatong Creek	Northwest	11
29	1110158	NJ 29 OVER MOORES CREEK	Lockatong Creek	Northwest	11
30	0405153	US RTS 30 & 130 OVER COOPER RIVER	Cooper River	Lower Delaware	18
31	1013152	ROUTE NJ 31 OVER WILLOUGHBY BROOK	South Branch of Raritan River	Raritan	8
31	2111151	RT 31 OVER POHATCONG CREEK	Pohatcong Creek	Northwest	1
31	2111155	NJ RT 31 OVER PEQUEST RIVER	Pequest River	Northwest	1
33	1304151	OLD ROAD(NJ 33) OVER MILLSTONE RIVER	Millstone River	Raritan	10
33	1304156	ROUTE 33 OVER MANALAPAN BROOK	South River	Raritan	9
34	1308154	N.J.ROUTE 34 OVER BIG BROOK	Navesink River	Atlantic Coastal	12
35	1222150	ROUTE 35/CHEESEQUAKE CREEK & RAMP	Matawan Creek	Atlantic Coastal	12
36	1315157	NJ 36 OVER FLAT CREEK	Matawan Creek	Atlantic Coastal	12
38	0408160	MILL ROAD/SO BR PENNSAUKEN CREEK	Pennsauken Creek	Lower Delaware	18
40	1703152	U.S.RTE 40 OVER BRANCH SALEM CRK.	Salem River	Lower Delaware	17
45	0807152	RT45 OVER RACCOON CREEK	Salem River	Lower Delaware	17
45	0808151	ROUTE 45 OVER EDWARDS RUN	Raccoon Creek	Lower Delaware	18
45	0810150	RT 45 OVER WOODBURY CREEK	Mantua Creek	Lower Delaware	18
45	1705150	NJ RT 45 & US RT 40/SALEM RIVER	Woodbury Creek	Lower Delaware	18
46	0220157	U.S.ROUTE 46 OVER SADDLE RIVER	Saddle River	Northeast	4
46	0722157	US ROUTE 46 EB OVER PASSAIC RIVER	Upper Passaic	Northeast	6
46	0722158	U.S. ROUTE 46 WB /PASSAIC RIVER	Upper Passaic	Northeast	6
46	1407152	ROUTE US 46 WB OVER MINE BROOK	Musconetcong River	Northwest	1
46	1407153	RTE US 46EB OVER BRANCH MINE BRK.	Musconetcong River	Northwest	1
46	1407156	US 46 OVER SOUTH BR RARITAN RIVER	South Branch of Raritan River	Raritan	8
46	1409154	US ROUTE 46 OVER GRANNEYS BROOK	Rockaway River	Northeast	6
46	1410159	ROUTE 46 OVER PASSAIC RIVER	Upper Passaic	Northeast	6
46	2107154	US 46 WB OVER BEAVER BROOK	Pequest River	Northwest	1
46	2107155	US 46 EB OVER BEAVER BROOK	Pequest River	Northwest	1
46	2107156	US ROUTE 46 OVER PAULINS KILL	Paulins Kill	Northwest	1
46	2108162	RTE US 46 OVER MUSCONETCONG RIVER	Musconetcong River	Northwest	1
47	0601150	RT 47 OVER MUSKEE CREEK	Maurice River	Lower Delaware	17
47	0601151	N.J.ROUTE 47 OVER MANUMUSKIN RIV.	Manamuskin River	Lower Delaware	17
47	0815152	NJ 47 OVER BIG TIMBER CREEK	Big Timber Creek	Lower Delaware	18
49	0509150	RT 49 OVER MILL CREEK	Tuckahoe River	Atlantic Coastal	15
49	0606150	NJ RT 49 OVER MANANTICO CREEK	Manantico Creek	Lower Delaware	17
50	0510152	ROUTE 50 OVER TUCKAHOE RIVER	Tuckahoe River	Atlantic Coastal	15
53	1411152	RT 53 OVER DEN BROOK	Rockaway River	Northeast	6
55	0609151	ROUTE 55 NB OVER MANANTICO CREEK	Manantico Creek	Lower Delaware	17
55	0609152	RT 55 SB OVER MANANTICO CREEK	Manantico Creek	Lower Delaware	17
56	1716151	NJ ROUTE 56 OVER MAURICE RIVER	Maurice River	Lower Delaware	17
57	2105164	RT 57 OVER POHATCONG CREEK	Pohatcong Creek	Northwest	1
57	2106164	NJ 57 OVER HANCES BROOK	Musconetcong River	Northwest	1
71	1320152	ROUTE 71 OVER WRECK POND	Wreck Pond Brook	Atlantic Coastal	12
71	1321150	ROUTE 71 OVER SHARK RIVER	Shark River	Atlantic Coastal	12
78	1015157	I-78EB SERV.RD / MULHOCKAWAY CREEK	South Branch of Raritan River	Raritan	8
78	1016156	I-78 EB OVER SO BR. RARITAN RIVER	South Branch of Raritan River	Raritan	8
78	1016157	I-78 WB OVER SO BR. RARITAN RIVER	South Branch of Raritan River	Raritan	8
78	2113160	I78WB/ASBURY RD(CR632)&MUSCONETCONG R	Musconetcong River	Northwest	1
80	0225166	I-80/MRKT.MAIN,FAIRVIEW STS.&SADL RIV	Saddle River	Northeast	4
80	1413155	RAMP C OVER BURNT MEADOW BROOK	Rockaway River	Northeast	6
82	2012150	NJ ROUTE 82 OVER RAHWAY RIVER	Rahway River	Raritan	7
87	0115150	RT.87/ABSECON INLET&RAMPS J&H	Absecon Creek	Atlantic Coastal	15
94	1923150	NJ RT.94 OVER WALLKILL RIVER	Wallkill River	Northwest	2
94	2117157	NJ 94 OVER JACKSONBURG CREEK	Paulins Kill	Northwest	1
94	2117159	NJ ROUTE 94 OVER BLAIR CREEK.	Paulins Kill	Northwest	1
94	2117160	ROUTE 94 OVER PAULINS KILL	Paulins Kill	Northwest	1
130	0316150	RT US 130 OVER POMPESTON CREEK	Pompeston Creek	Lower Delaware	18

SCOUR CRITICAL STATE WATCH LIST BRIDGES

Listed by Route

Rte	Number	Name	Drainage Basin	Watershed Region	Watershed Management Area
130	0317150	US 130 NB OVER ASSISCUNK CREEK	Assiscunk Creek	Lower Delaware	20
130	0317152	US 130 SB OVER ASSISCUNK CREEK	Assiscunk Creek	Lower Delaware	20
130	0319152	US RT. 130 OVER CROSSWICKS CREEK	Crosswicks Creek	Lower Delaware	20
130	0817150	US RT 130 OVER BIG BIRCH CREEK	Maple Swamp	Lower Delaware	18
130	0817151	RT US 130 OVER RACCOON CREEK	Raccoon Creek	Lower Delaware	18
130	0818151	RT US 130 /BIG TIMBER CREEK	Big Timber Creek	Lower Delaware	18
130	1122150	US 130 OVER DOCTORS CREEK	Crosswicks Creek	Lower Delaware	20
130	1123152	US ROUTE 130 OVER ROCKY BROOK	Millstone River	Raritan	10
130	1123153	RT 130 OVER MILLSTONE RIVER	Millstone River	Raritan	10
130	1227159	US 130 OVER OAKEYS BROOK	Lawrence Brook	Raritan	9
154	0424151	RT 154 OVER NO BR COOPER RIVER	Cooper River	Lower Delaware	18
166	1516151	RT NJ166 OVER S.CHANNEL OF TOMS RIVER	Toms River	Atlantic Coastal	13
166	1516152	RT NJ 166 OVER NO. CHANNEL OF TOMS R.	Toms River	Atlantic Coastal	13
173	2103152	RT 173 OVER POHATCONG CREEK	Pohatcong Creek	Northwest	1
173	2103153	NJ 173 OVER MUSCONETCONG RIVER	Musconetcong River	Northwest	1
202	1416152	US 202 OVER WHIPPANY RIVER	Whippany River	Northeast	6
202	1807155	US 202 OVER N BR RARITAN RIVER	North Branch of Raritan River	Raritan	8
202	1809150	US202 OVER N BR RARITAN RIVER	North Branch of Raritan River	Raritan	8
202	1809153	RT 202 OVER BR MINE BROOK	North Branch of Raritan River	Raritan	8
202	1809158	US RT 202 OVER PASSAIC RIVER	Upper Passaic	Northeast	6
206	0118150	US 206 OVER CEDAR BRANCH	Mullica River	Atlantic Coastal	14
206	0118152	US 206 OVER GREAT SWAMP BRANCH	Mullica River	Atlantic Coastal	14
206	0118153	RT 206 OVER ALBERTSONS BROOK	Mullica River	Atlantic Coastal	14
206	0324152	U.S ROUTE 206 OVER SPRINGERS BROOK	Basto River	Atlantic Coastal	14
206	0324153	US 206 OVER MUSKINGUM CREEK	Basto River	Atlantic Coastal	14
206	0324155	US 206 OVER SO BR OF RANCOCAS CREEK	South Branch of Rancocas Creek	Lower Delaware	19
206	0324156	ROUTE US 206 OVER JADE RUN	South Branch of Rancocas Creek	Lower Delaware	19
206	0324160	US RT 206 OVER BARKERS CREEK	Assiscunk Creek	Lower Delaware	20
206	0324162	US206 OVER ASSISCUNK CREEK	Assiscunk Creek	Lower Delaware	20
206	0326152	US 206 NB OVER CROSSWICKS CREEK	Crosswicks Creek	Lower Delaware	20
206	0326153	US206 SB OVER CROSSWICKS CREEK	Crosswicks Creek	Lower Delaware	20
206	1417156	RT 206/SOUTH BR OF RARITAN RIVER	South Branch of Raritan River	Raritan	8
206	1417157	US 206 OVER TRIB TO DRAKES BROOK	South Branch of Raritan River	Raritan	8
206	1417159	US RT 206/S BRANCH RARITAN RIVER	South Branch of Raritan River	Raritan	8
206	1810153	US 206 OVER BACK BROOK	Millstone River	Raritan	10
206	1810155	RT US 206 OVER CRUSERS BROOK	Millstone River	Raritan	10
206	1810158	ROUTE US 206 OVER PIKE RUN	Millstone River	Raritan	10
206	1810164	US206 OVER BR OF ROYCES BROOK	Millstone River	Raritan	10
206	1810165	US206 OVER BR OF ROYCES BROOK	Millstone River	Raritan	10
206	1911151	US206 OVER LUBBERS RUN	Musconetcong River	Northwest	1
206	1911159	US206 OVER PEQUEST RIVER	Pequest River	Northwest	1
206	1912158	US ROUTE 206 OVER KITTATINY BROOK	Flat Brook	Northwest	1
206	1912160	US 206 OVER BIG FLAT BROOK	Flat Brook	Northwest	1
208	1612154	ROUTE 208 RAMP A OVER GOFFLE BROOK	Lower Passaic	Northeast	4
280	1418154	RT.I-280 EB OVER PASSAIC RIVER	Lower Passaic	Northeast	4
284	1907152	NJ RT284/BR OF WALLKILL RIVER	Wallkill River	Northwest	2
284	1907157	NJ 284 OVER BR OF WALLKILL RIVER	Wallkill River	Northwest	2
322	0119151	US 322 OVER HOSPITALITY BROOK	Great Egg Harbor River	Atlantic Coastal	15
322	0119156	US 322 OVER BIG DITCH	Great Egg Harbor River	Atlantic Coastal	15
322	0825150	US 322 OVER RACCOON CREEK	Raccoon Creek	Lower Delaware	18
322	0826150	US ROUTE 322 OVER SCOTLAND RUN	Maurice River	Lower Delaware	17

Appendix H

Sample of Available Information

from

U.S. Geological Survey Website

USGS
science for a changing world

Water Resources

Data Category: Real-time | Geographic Area: New Jersey | go

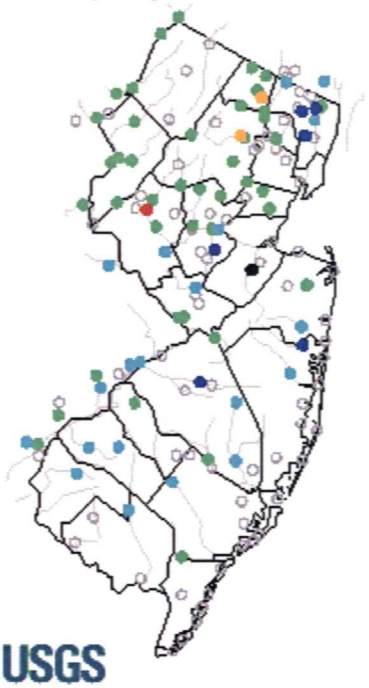
Real-Time Data for New Jersey

--- Predefined displays ---	Group table by	Select sites by number or name
Introduction	-- no grouping --	go

Daily Streamflow Conditions

Select a site to retrieve data and station information.

Tuesday, July 19, 2005 07:20ET



Explanation

- High
- ≥ 90th percentile
- 75th - 89th percentile
- 25th - 74th percentile

The colored dots on this map depict streamflow conditions as a percentile, which is computed from the period of record for the current day of the year. Only stations with at least 30 years of record are used. The **gray circles** indicate other

Streamflow Table

Ground Water Table

Water Quality Table

Weather Table

Real-time data typically are recorded at 6-60 minute intervals, stored onsite, and then transmitted to USGS offices every 1 to 4 hours, depending on the data relay technique used. Transmission times may be more frequent during critical events. Data from real-time sites are relayed to USGS offices via satellite, telephone, and/or radio and are available for viewing within minutes of arrival.

All real-time data are **provisional and subject to revision**.

Build Table	Build a custom summary table for one or more stations.
Build Sequence	Build a custom sequence of graphical or tabular data for one or more stations.

- 10th - 24th percentile
- < 10th percentile
- Low
- Not ranked

stations that were not ranked in percentiles either because they have fewer than 30 years of record or because they report parameters other than streamflow. Some stations, for example, measure stage only.

Questions about data New Jersey NWISWeb Data Inquiries
Feedback on this website New Jersey NWISWeb Maintainer

Top
Explanation of terms

Real-Time Data for New Jersey
http://waterdata.usgs.gov/nj/nwis/rt?

Retrieved on 2005-07-19 08:56:44 EDT
Department of the Interior, U.S. Geological Survey
USGS Water Resources of New Jersey
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1.91 1.22 ca

Water Resources

Data Category: Real-time | Geographic Area: New Jersey | go

Real-Time Data for New Jersey: Streamflow -- 146 site(s) found

PROVISIONAL DATA SUBJECT TO REVISION

Updated 2005-07-19 08:57:32 US/Eastern

--- Predefined displays --- : New Jersey Streamflow Table | Group table by: County | Select sites by number or name: go

Station number	Station name	Date/time	Gage height, feet	Stream-flow (ft^3/s)	Long-term median flow 7/19
New Castle County, Delaware					
01481602	DELAWARE RIV BELOW CHRISTINA RIV AT WILMINGTON, DE	07/19 06:00	.33	--	---
Atlantic County					
01409400	MULLICA RIVER NEAR BATSTO NJ	07/19 06:45	1.09	77	48.0
01409410	ALBERTSON BROOK NEAR HAMMONTON NJ	07/19 08:45	4.89	28	---
01410225	MORSES MILL STREAM AT PORT REPUBLIC NJ	07/19 08:15	7.98	7.6	---
01410510	ABSECON CREEK AT US ROUTE 30 AT ABSECON NJ	07/19 07:54	1.38	--	---
01410560	INSIDE THOROFARE AT US RT 40 AT ATLANTIC CITY NJ	07/19 07:54	1.27	--	---
01410600	ABSECON CHANNEL AT ATLANTIC CITY NJ	07/19 08:36	.36	--	---
01411000	GREAT EGG HARBOR RIVER AT FOLSOM NJ	07/19 08:30	3.92	89	48.0
01411300	TUCKAHOE RIVER AT HEAD OF RIVER NJ	07/19 08:15	4.05	18	21.0
01411330	BEACH THOROFARE AT MARGATE NJ	07/19 07:48	1.14	--	---
Bergen County					
01377000	HACKENSACK RIVER AT RIVERVALE NJ	07/19 08:15	1.81	50	63.0
01377370	PASCACK BROOK AT PARK RIDGE NJ	07/19 08:00	2.99	36	14.0
01377500	PASCACK BROOK AT WESTWOOD NJ	07/19 06:45	3.12	357	33.5
01378500	HACKENSACK RIVER AT NEW MILFORD NJ	07/19 08:15	1.59	21	1.00

01378570	HACKENSACK RIVER AT HACKENSACK NJ	07/19 07:54	2.72	--	---
01387500	RAMAPO RIVER NEAR MAHWAH NJ	07/19 08:30	2.86	88	48.0
01390450	SADDLE RIVER AT UPPER SADDLE RIVER NJ	07/19 08:15	2.21	20	---
01390500	SADDLE RIVER AT RIDGEWOOD NJ	07/19 08:30	1.74	42	11.0
01391000	HOHOKUS BROOK AT HO-HO-KUS NJ	07/19 08:30	1.50	--	17.0
01391500	SADDLE RIVER AT LODI NJ	07/19 08:30	2.42	134	43.0
Burlington County					
01409500	BATSTO RIVER AT BATSTO NJ	07/19 08:15	2.07	Rat	68.0
01410000	OSWEGO RIVER AT HARRISVILLE NJ	07/19 05:45	3.04	79	49.0
01410150	EAST BRANCH BASS RIVER NEAR NEW GRETNA NJ	07/19 08:15	3.88	14	11.0
01464598	DELAWARE RIVER AT BURLINGTON NJ	07/19 05:45	.26	--	---
01465850	SOUTH BRANCH RANCOCAS CREEK AT VINCENTOWN NJ	07/19 08:15	1.62	59	35.0
01466500	MCDONALDS BRANCH IN BYRNE STATE FOREST NJ	07/19 07:15	1.35	2.3	1.50
01466900	GREENWOOD BRANCH AT NEW LISBON NJ	07/19 08:00	2.36	125	40.0
01467000	NORTH BRANCH RANCOCAS CREEK AT PEMBERTON NJ	07/19 05:30	1.88	220	84.0
Camden County					
0140940810	PUMP BRANCH NEAR ELM NJ	07/19 08:15	2.92	46	---
01467150	COOPER RIVER AT HADDONFIELD NJ	07/19 06:30	1.59	27	19.0
Cape May County					
01411318	PECK BAY AT OCEAN CITY NJ	07/19 08:36	.87	--	---
01411350	LUDLAM THOROFARE AT SEA ISLE CITY NJ	07/19 08:36	.66	--	---
01411355	INGRAM THOROFARE AT AVALON NJ	07/19 08:36	.37	--	---
01411360	GREAT CHANNEL AT STONE HARBOR NJ	07/19 08:36	.83	--	---
01411382	GRASSY SOUND CHANNEL AT WILDWOOD NJ	07/19 08:36	.84	--	---
01411390	CAPE MAY HARBOR AT CAPE MAY NJ	07/19 06:24	1.38	--	---
01411435	SLUICE CREEK NEAR SOUTH DENNIS NJ	07/19 07:48	1.93	--	---
Cumberland County					
01412150	MAURICE RIVER AT BIVALVE NJ	07/19 07:54	2.22	--	---
01412800	COHANSEY RIVER AT SEELEY NJ	07/19 08:15	2.94	43	23.0
01413038	COHANSEY RIVER AT GREENWICH NJ	07/19 08:36	1.82	--	---
Essex County					
01392170	THIRD RIVER AT BLOOMFIELD NJ	07/19 08:00	1.49	--	---
01392650	PASSAIC RIVER AT PVSC AT NEWARK NJ	07/19 07:54	2.14	--	---
Gloucester County					
01475000	MANTUA CREEK AT PITMAN NJ	07/19 08:15	--	12	8.50

01477120	RACCOON CREEK NEAR SWEDESBORO NJ	07/19 08:30	7.98	36	16.0
Hunterdon County					
01396500	SOUTH BRANCH RARITAN RIVER NEAR HIGH BRIDGE NJ	07/19 07:30	5.91	43	52.0
01396580	SPRUCE RUN AT GLEN GARDNER NJ	07/19 08:15	1.02	6.4	5.65
01396660	MULHOCKAWAY CREEK AT VAN SYCKEL NJ	07/19 08:15	.77	17	6.80
01396800	SPRUCE RUN AT CLINTON NJ	07/19 08:15	1.31	5.2	51.0
01397000	SOUTH BRANCH RARITAN RIVER AT STANTON NJ	07/19 08:15	2.34	83	120
01398000	NESHANIC RIVER AT REAVILLE NJ	07/19 06:15	2.75	18	3.15
01399670	SOUTH B ROCKAWAY CREEK AT WHITEHOUSE STATION NJ	07/19 08:00	1.85	5.2	10.6
Mercer County					
01401000	STONY BROOK AT PRINCETON NJ	07/19 07:45	1.95	31	5.00
01460440	DELAWARE AND RARITAN CANAL AT PORT MERCER NJ	07/19 07:45	54.56	145	146
01463500	DELAWARE RIVER AT TRENTON NJ	07/19 08:15	8.63	5,360	5,094
01463620	ASSUNPINK CREEK NEAR CLARKSVILLE NJ	07/19 06:00	4.11	37	16.5
01464000	ASSUNPINK CREEK AT TRENTON NJ	07/19 08:15	3.00	81	50.0
01464500	CROSSWICKS CREEK AT EXTONVILLE NJ	07/19 08:15	2.73	91	60.0
Middlesex County					
01405400	MANALAPAN BROOK AT SPOTSWOOD NJ	07/19 08:15	18.28	147	31.0
01406050	DEEP RUN AT OLD BRIDGE NJ	07/19 08:15	7.09	29	12.0
01406710	RARITAN RIVER AT SOUTH AMBOY NJ	07/19 07:48	1.59	--	---
Monmouth County					
01407080	WAACKAACK CREEK AT KEANSBURG NJ	07/19 07:54	1.50	--	---
01407081	RARITAN BAY AT KEANSBURG NJ	07/19 06:06	2.03	--	---
01407290	BIG BROOK NEAR MARLBORO NJ	07/19 08:15	9.98	3.9	5.70
01407500	SWIMMING RIVER NEAR RED BANK NJ	07/19 08:15	5.20	44	23.0
01407600	SHREWSBURY RIVER AT SEA BRIGHT NJ	07/19 07:54	1.46	--	---
01407770	SHARK RIVER AT BELMAR NJ	07/19 07:54	1.06	--	---
01408000	MANASQUAN RIVER AT SQUANKUM NJ	07/19 05:00	2.81	66	34.0
01408050	MANASQUAN RIVER AT POINT PLEASANT NJ	07/19 06:12	1.47	--	---
Morris County					
01379500	PASSAIC RIVER NEAR CHATHAM NJ	07/19 08:15	3.59	59	36.0
01379773	GREEN POND BROOK AT PICATINNY ARSENAL NJ	07/19 08:30	1.38	3.4	3.90
01380500	ROCKAWAY RIVER ABOVE RESERVOIR AT BOONTON NJ	07/19 08:15	2.02	38	71.0
01381000	ROCKAWAY RIVER BELOW RESERVOIR AT BOONTON NJ	07/19 08:00	1.65	12	11.0
01381500	WHIPPANY RIVER AT MORRISTOWN NJ	07/19 08:00	1.91	17	24.0

01381800	WHIPPANY RIVER NEAR PINE BROOK NJ	07/19 08:15	1.92	38	51.0
01381900	PASSAIC RIVER AT PINE BROOK NJ	07/19 08:15	11.69	172	174
01396190	SB RARITAN RIVER AT FOUR BRIDGES NJ	07/19 08:30	4.40	13	23.0
01399500	LAMINGTON (BLACK) RIVER NEAR POTTERSVILLE NJ	07/19 08:15	1.68	24	23.0
01455400	LAKE HOPATCONG AT LANDING NJ	07/19 08:15	8.82	--	---
01455500	MUSCONETCONG RIVER AT OUTLET OF LAKE HOPATCONG NJ	07/19 08:15	1.33	14	12.0
Ocean County					
01408120	NORTH BRANCH METEDECONK RIVER NEAR LAKEWOOD NJ	07/19 07:45	3.93	83	30.0
01408168	BARNEGAT BAY AT MANTOLOKING NJ	07/19 07:48	.44	--	---
01408500	TOMS RIVER NEAR TOMS RIVER NJ	07/19 07:30	4.17	193	128
01408750	BARNEGAT BAY AT SEASIDE HEIGHTS NJ	07/19 08:24	.54	--	---
01409000	CEDAR CREEK AT LANOKA HARBOR NJ	07/19 08:15	2.51	107	76.0
01409110	BARNEGAT BAY AT WARETOWN NJ	07/19 07:54	.43	--	---
01409125	BARNEGAT BAY AT BARNEGAT LIGHT NJ	07/19 06:36	1.18	--	---
01409146	EAST THOROFARE AT SHIP BOTTOM NJ	07/19 07:48	11.34	--	---
01409280	WESTECUNK CREEK AT STAFFORD FORGE NJ	07/19 08:15	10.95	58	25.0
01409335	LITTLE EGG INLET NEAR TUCKERTON NJ	07/19 06:18	.83	--	---
Passaic County					
01382500	PEQUANNOCK RIVER AT MACOPIN INTAKE DAM NJ	07/19 08:15	1.98	1.1	.79
01383500	WANAQUE RIVER AT AWOSTING NJ	07/19 08:00	1.92	19	10.5
01384500	RINGWOOD CREEK NEAR WANAQUE NJ	07/19 08:00	10.38	6.2	6.80
01386000	WEST BROOK NEAR WANAQUE NJ	07/19 08:15	.15	1.7	4.10
01386990	WANAQUE RESERVOIR AT WANAQUE NJ	07/19 08:00	292.96	--	---
01387000	WANAQUE RIVER AT WANAQUE NJ	07/19 08:00	1.34	17	17.9
01388000	RAMAPO RIVER AT POMPTON LAKES NJ	07/19 08:15	6.95	--	72.0
01388500	POMPTON RIVER AT POMPTON PLAINS NJ	07/19 08:15	7.75	90	110
01389005	PASSAIC R BELOW POMPTON R AT TWO BRIDGES NJ	07/19 08:15	3.44	--	---
01389492	PASSAIC RIVER ABV BEATTIES DAM AT LITTLE FALLS NJ	07/19 08:00	8.21	--	---
01389500	PASSAIC RIVER AT LITTLE FALLS NJ	07/19 08:30	.85	219	239
01389534	PECKMAN RIVER AT OZONE AVE AT VERONA NJ	07/19 08:30	.04	--	---
01389765	MOLLY ANN BROOK AT NORTH HALEDON NJ	07/19 08:00	3.53	--	---
Salem County					
01411500	MAURICE RIVER AT NORMA NJ	07/19 07:45	2.91	181	94.5
01482500	SALEM RIVER AT WOODSTOWN NJ	07/19 08:15	11.14	12	6.20

Somerset County					
01379000	PASSAIC RIVER NEAR MILLINGTON NJ	07/19 08:30	4.68	20	16.0
01398500	NORTH BRANCH RARITAN RIVER NEAR FAR HILLS NJ	07/19 07:45	1.97	14	17.0
01400000	NORTH BRANCH RARITAN RIVER NEAR RARITAN NJ	07/19 08:15	2.67	91	100
01400010	NORTH BRANCH RARITAN R AT SOUTH BRANCH NJ	07/19 08:00	1.56	--	---
01400500	RARITAN RIVER AT MANVILLE NJ	07/19 08:15	4.27	331	253
01401650	PIKE RUN AT BELLE MEAD NJ	07/19 08:15	3.11	4.0	1.30
01401750	MILLSTONE RIVER AT GRIGGSTOWN NJ	07/19 05:15	5.64	--	---
01402000	MILLSTONE RIVER AT BLACKWELLS MILLS NJ	07/19 07:59	2.85	667	94.0
01403060	RARITAN RIVER BELOW CALCO DAM AT BOUND BROOK NJ	07/19 07:45	18.02	941	291
01403150	WEST BRANCH MIDDLE BROOK NEAR MARTINSVILLE NJ	07/19 06:00	2.37	.81	.31
01403400	GREEN BROOK AT SEELEY MILLS NJ	07/19 07:45	.81	.32	2.60
01403900	BOUND BROOK AT MIDDLESEX NJ	07/19 08:30	2.02	79	24.0
Sussex County					
01367800	PAPAKATING CREEK AT PELLETTOWN NJ	07/19 08:15	1.91	12	20.0
01368000	WALLKILL RIVER NEAR UNIONVILLE NY	07/19 05:45	3.71	--	47.5
01438500	DELAWARE RIVER AT MONTAGUE NJ	07/19 08:15	5.36	2,370	2,320
01440000	FLAT BROOK NEAR FLATBROOKVILLE NJ	07/19 08:00	2.33	79	31.0
01445000	PEQUEST RIVER AT HUNTSVILLE NJ	07/19 08:15	2.40	10	16.0
Union County					
01394500	RAHWAY RIVER NEAR SPRINGFIELD NJ	07/19 07:30	1.34	7.7	8.95
01395000	RAHWAY RIVER AT RAHWAY NJ	07/19 08:15	1.43	12	13.0
Warren County					
01440200	DELAWARE RIVER NEAR DELAWARE WATER GAP PA	07/19 08:15	5.21	--	2,595
01443500	PAULINS KILL AT BLAIRSTOWN NJ	07/19 08:15	1.36	45	61.5
01445500	PEQUEST RIVER AT PEQUEST NJ	07/19 08:15	1.47	62	63.0
01446000	BEAVER BROOK NEAR BELVIDERE NJ	07/19 08:15	1.53	12	14.0
01446500	DELAWARE RIVER AT BELVIDERE NJ	07/19 06:30	3.56	2,440	2,745
01457000	MUSCONETCONG RIVER NEAR BLOOMSBURY NJ	07/19 08:15	1.53	116	112
01457500	DELAWARE RIVER AT RIEGELSVILLE NJ	07/19 05:00	3.28	--	3,905
Rockland County, New York					
01376800	HACKENSACK RIVER AT WEST NYACK NY	07/19 04:45	2.87	41	18.0
01387420	RAMAPO RIVER AT SUFFERN NY	07/19 04:45	1.68	26	21.0
01387450	MAHWAH RIVER NEAR SUFFERN NY	07/19 08:30	1.43	--	4.80
Sullivan County, New York					

01428500	DELAWARE R ABOVE LACKAWAXEN R NR BARRYVILLE NY	07/19 05:30	2.50	801	1,060
01436690	NEVERSINK RIVER AT BRIDGEVILLE NY	07/19 06:15	4.69	133	109
Bucks County, Pennsylvania					
01464645	NB Neshaminy Cr bl Lake Galena nr New Britain, PA	07/19 08:15	1.90	30	17.0
01464720	NB Neshaminy Creek at Chalfont, PA	07/19 05:30	2.89	19	9.30
01465500	Neshaminy Creek near Langhorne, PA	07/19 05:45	1.91	353	60.0
Delaware County, Pennsylvania					
01481000	Brandywine Creek at Chadds Ford, PA	07/19 06:30	2.50	542	210
Lehigh County, Pennsylvania					
01453000	Lehigh River at Bethlehem, PA	07/19 07:00	1.62	1,250	1,130
Monroe County, Pennsylvania					
01439500	Bush Kill at Shoemakers, PA	07/19 05:45	1.35	49	56.0
01442500	Brodhead Creek at Minisink Hills, PA	07/19 06:30	3.70	134	143
Philadelphia County, Pennsylvania					
01474500	Schuylkill River at Philadelphia, PA	07/19 08:00	6.35	2,810	899
Pike County, Pennsylvania					
01434000	DELAWARE RIVER AT PORT JERVIS NY	07/19 07:15	2.82	2,270	1,900
Wayne County, Pennsylvania					
01427510	DELAWARE RIVER AT CALLICOON NY	07/19 07:00	2.98	622	1,040
01431500	Lackawaxen River at Hawley, PA	07/19 08:30	1.42	64	90.0

Data status codes:

-- Parameter not determined

Rat Rating being developed or revised

Questions about data — New Jersey NWISWeb Data Inquiries — Top

Feedback on this website — New Jersey NWISWeb Maintainer — Explanation of terms

USGS Real-Time Water Data for New Jersey
http://waterdata.usgs.gov/nj/nwis/current?group_key=county_cd&PARAmeter_cd=STATION_NM,DATETIME,00065,00060,MEDIAN
Retrieved on 2005-07-19 08:57:44 EDT

Water Resources

Data Category: Real-time | Geographic Area: New Jersey | go

USGS 01381900 PASSAIC RIVER AT PINE BROOK NJ

PROVISIONAL DATA SUBJECT TO REVISION

Available data for this site: Real-time | GO

National Weather Service flood stage for this gage is 19 feet.

Available Parameters	Output format	Days	
All 2 parameters available at this site 00065 Gage height (DD 03) 00060 Discharge (DD 04)	Graph	7 (1-31)	get data

Gage height, feet

Most recent value: 11.69 07-19-2005 08:15

Download a presentation-quality graph

Parameter Code 00065; DD 03

Discharge, cubic feet per second

Most recent value: 172 07-19-2005 08:15

Download a presentation-quality graph Parameter Code 00060; DD 04

Daily mean flow statistics for 7/19 based on 25 years of record in ft^3/sec

Current Flow	Minimum	Mean	Maximum	80 percent exceedance	50 percent exceedance	20 percent exceedance
172	95	330	1,690	118	174	543

Percent exceedance means that 80, 50, or 20 percent of all daily mean flows for 7/19 have been greater than the value shown.

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Appendix I

List of Streamflow Gauge Locations

by

Watershed, County and
State Maintenance Region

USGS Stream Gauge sites

Listed by Watershed Region

Station Number	Station Name	Watershed Area	Type	County
	Northwest Watershed Region			
01440000	Flat Brook near Flatbrookville, NJ	1	River	Sussex
01440200	Delaware River near Delaware River Gap, Pa	1	River	Warren
01443500	Paulins Kill at Blairstown, NJ	1	River	Warren
01445000	Pequest River at Huntsville, NJ	1	River	Sussex
01445500	Pequest River at Pequest, NJ	1	River	Warren
01446000	Beaver Brook near Belvidere, NJ	1	River	Warren
01446500	Delaware River at Belvidere, NJ	1	River	Warren
01446995	Delaware River at US Route 22 at Phillipsburg, NJ	1	River	Warren
01455400	Lake Hopatcong at Landing, NJ	1	River	Morris
01455500	Muscanetcong River at Outlet of Lake Hopatcong, NJ	1	River	Morris
01457000	Muscanetcong River near Bloomsbury, NJ	1	River	Warren
01457500	Delaware River at Riegelsville, NJ	1	River	Warren
01367800	Papakating Creek at Pellville, NJ	2	River	Sussex
01460440	Delaware and Raritan Canal at Port Mercer, NJ	11	River	Mercer
01460880	Lockatong Creek at Raven Rock, NJ	11	River	Hunterdon
01461300	Wickecheoke Creek at Stockton, NJ	11	River	Hunterdon
01463500	Delaware River at Trenton, NJ	11	River	Mercer
01463620	Assunpink Creek near Clarksville, NJ	11	River	Mercer
01464000	Assunpink Creek at Trenton, NJ	11	River	Mercer
	Northeast Watershed Region			
01382500	Pequannock River at Macopin Intake Dam, NJ	3	River	Passaic
01383500	Wanaque River at Awosting, NJ	3	River	Passaic
01384500	Ringwood Creek near Wanaque, NJ	3	River	Passaic
01386000	West Brook near Wanaque, NJ	3	River	Passaic
01386990	Wanaque Reservoir at Wanaque, NJ	3	River	Passaic
01387000	Wanaque River at Wanaque, NJ	3	River	Passaic
01387500	Ramapo River near Mahwah, NJ	3	River	Bergen
01388000	Ramapo River at Pompton Lakes, NJ	3	River	Passaic
01388500	Pompton River at Pompton Plains, NJ	3	River	Passaic
01389005	Passaic River below Pompton River at Two Bridges, NJ	4	River	Passaic
01389492	Passaic River above Beatties Dam at Little Falls, NJ	4	River	Passaic
01389500	Passaic River at Little Falls, NJ	4	River	Passaic
01389534	Peckman River at Ozone Avenue at Verona, NJ	4	River	Passaic
01389765	Molly Ann Brook at North Haledon, NJ	4	River	Passaic
01390450	Saddle River at Upper Saddle River, NJ	4	River	Bergen
01390500	Saddle River at Ridgewood, NJ	4	River	Bergen
01391000	Ho-Ho-Kus Brook at Ho-Ho-Kus, NJ	4	River	Bergen
01391500	Saddle River at Lodi, NJ	4	River	Bergen
01392170	Third River at Bloomfield, NJ	4	River	Essex
01392650	Passaic River at PVSC at Newark, NJ	4	Tidal	Essex
01377000	Hackensack River at Rivervale, NJ	5	River	Bergen
01377370	Pascack Brook at Park Ridge, NJ	5	River	Bergen
01377500	Pascack Brook at Westwood, NJ	5	River	Bergen
01378500	Hackensack River at New Milford, NJ	5	River	Bergen
01378570	Hacensack River at Hackensack, NJ	5	Tidal	Bergen
01379000	Passaic River near Millington, NJ	6	River	Somerset
01379500	Passaic River near Chatham, NJ	6	River	Morris
01379773	Green Pond Brook at Picatinny Arsenal, NJ	6	River	Morris
01380500	Rockaway River above Reservoir at Boonton, NJ	6	River	Morris
01381000	Rockaway River below Reservoir at Boonton, NJ	6	River	Morris
01381500	Whippany River at Morristown, NJ	6	River	Morris
01381800	Whippany River near Pine Brook, NJ	6	River	Morris

USGS Stream Gauge sites

Listed by Watershed Region

Station Number	Station Name	Watershed Area	Type	County
	Northwest Watershed Region			
01381900	Passaic River at Pine Brook, NJ	6	River	Morris
	Raritan Region			
01394500	Rahway River near Springfield, NJ	7	River	Union
01395000	Rahway River at Rahway, NJ	7	River	Union
01396190	South Branch Raritan River at Four Bridges, NJ	8	River	Morris
01396500	South Branch Raritan River near High Bridge, NJ	8	River	Hunterdon
01396582	Spruce Run at Glen Gardner, NJ	8	River	Hunterdon
01396660	Mulhockaway Creek at Van Syckel, NJ	8	River	Hunterdon
01396800	Spruce Run at Clinton, NJ	8	River	Hunterdon
01397000	South Branch Raritan River at Stanton, NJ	8	River	Hunterdon
01398000	Neshanic River at Reville, NJ	8	River	Hunterdon
01398500	North Branch Raritan River near Far Hills, NJ	8	River	Somerset
01399100	Middle Brook at Burnt Mills, NJ	8	River	Somerset
01399500	Lamington (Black) River near Pottersville, NJ	8	River	Morris
01399670	South Branch Rockaway Creek at Whitehouse Station, NJ	8	River	Hunterdon
01399830	North Branch Raritan River at North Branch, NJ	8	River	Somerset
01400000	North Branch Raritan River near Raritan, NJ	8	River	Somerset
01400010	North Branch Raritan River at South Branch, NJ	8	River	Somerset
01400500	Raritan River at Manville, NJ	9	River	Somerset
01403060	Raritan River below Calco Dam at Bound Brook, NJ	9	River	Somerset
01403150	West Branch Middle Brook near Martinsville, NJ	9	River	Somerset
01403400	Green Brook At Seely Mills, NJ	9	River	Somerset
01403900	Bound Brook at Middlesex, NJ	9	River	Somerset
01405400	Manalapan Brook at Spotswood, NJ	9	River	Middlesex
01406050	Deep Run at Old Bridge, NJ	9	River	Middlesex
01406710	Raritan River at South Amboy, NJ	9	Tidal	Middlesex
01401000	Stony Brook at Princeton, NJ	10	River	Mercer
01401650	Pike Run at Belle Mead, NJ	10	River	Somerset
01401750	Millstone River at Griggstown, NJ	10	River	Somerset
01402000	Millstone River at Blackwells Mills, NJ	10	River	Somerset
01403540	Stony Brook at Watchung, NJ	10	River	Somerset
	Atlantic Region			
01407080	Waackaack Creek at Keansburg, NJ	12	Tidal	Monmouth
01407081	Raritan Bay at Keansburg, NJ	12	Tidal	Monmouth
01407290	Big Brook at Marlboro, NJ	12	River	Monmouth
01407500	Swimming River near Red Bank, NJ	12	River	Monmouth
01407600	Shrewsbury River at Sea Bright, NJ	12	Tidal	Monmouth
01407770	Shark River at Belmar, NJ	12	Tidal	Monmouth
01408000	Manasquan River at Squankum, NJ	12	River	Monmouth
01408050	Manasquan River at Point Pleasant, NJ	12	Tidal	Ocean
01408120	North Branch Metedeconk River near Lakewood, NJ	13	River	Ocean
01408168	Barnegat Bay at Mantoloking, NJ	13	Tidal	Ocean
01408500	Toms River near Toms River, NJ	13	River	Ocean
01408750	Barnegat Bay at Seaside Heights, NJ	13	Tidal	Ocean
01409000	Cedar Creek at Lanoka Harbor, NJ	13	River	Ocean
01409110	Barnegat Bay at Waretown, NJ	13	Tidal	Ocean
01409125	Barnegat Bay at Barnegat Light, NJ	13	Tidal	Ocean
01409146	East Thorofareat Ship Bottom, NJ	13	Tidal	Ocean
01409280	Westecunk Creek at Stafford Forge, NJ	13	River	Ocean
01409335	Little Egg Inlet near Tuckerton, NJ	13	Tidal	Ocean
01409400	Mullica River near Basto, NJ	14	River	Atlantic
01409410	Albertson Brook near Hammonton. NJ	14	River	Atlantic

USGS Stream Gauge sites

Listed by Watershed Region

Station Number	Station Name	Watershed Area	Type	County
	Northwest Watershed Region			
01409810	West Branch Wading River near Jenkins, NJ	14	River	Burlington
01410000	Oswego River at Harrisville, NJ	14	River	Burlington
01410150	East Branch Bass River near New Gretna, NJ	14	River	Burlington
01410510	Absecon Creek at US Route 30 at Absecon, NJ	15	Tidal	Atlantic
01410560	Inside Thorofare at US Route 40 at Atlantic City, NJ	15	Tidal	Atlantic
01410600	Absecon Channel at Atlantic City, NJ	15	Tidal	Atlantic
01411000	Great Egg Harbor River at Folsum, NJ	15	River	Atlantic
01411300	Tuckahoe River at Head of River, NJ	15	River	Cape May
01411318	Peck Bay at Ocean City, NJ	15	Tidal	Cape May
01411330	Beach Thorofare at Margate, NJ	15	Tidal	Atlantic
01411350	Ludlum Thorofare at Sea Isle City, NJ	16	Tidal	Cape May
01411355	Ingram Thorofare at Avalon, NJ	16	Tidal	Cape May
01411360	Great Channel at Stone Harbor, NJ	16	Tidal	Cape May
01411382	Grassy Sound Channel at Wildwood, NJ	16	Tidal	Cape May
01411390	Cape May Harbor at Cape May, NJ	16	Tidal	Cape May
01411435	Sluice Creek near South Dennis, NJ	16	Tidal	Cape May
	Lower Delaware Region			
01411500	Maurice River at Norma, NJ	17	River	Salem
01412150	Maurice River at Bivalve, NJ	17	Tidal	Cumberland
01412800	Cohansey River at Seeley, NJ	17	River	Cumberland
01413038	Cohansey River at Greenwich, NJ	17	Tidal	Cumberland
01482500	Salem River at Woodstown, NJ	17	River	Salem
01467150	Cooper River at Haddonfield, NJ	18	River	Camden
01475000	Mantua Creek at Pitman, NJ	18	River	Gloucester
01477120	Raccoon Creek near Swedesboro, NJ	18	River	Gloucester
01465850	South Branch Rancocas Creek at Vincentown, NJ	19	River	Burlington
01465880	Southwest Branch Rancocas Creek at Medford, NJ	19	River	Burlington
01466500	McDonalds Branch in Byrne State Forest, NJ	19	River	Burlington
01466900	Greenwood Branch at New Lisbon, NJ	19	River	Burlington
01467000	North Branch Rancocas Creek at Pemberton, NJ	19	River	Burlington
01464500	Croswicks Creek at Extonville, NJ	20	River	Mercer
01464598	Delaware River at Burlington, NJ	20	Tidal	Burlington

USGS Stream Gauge sites

Listed by Maintenance Region

Station Number	Station Name	Watershed Area	Type	County
North Maintenance Region				
01377000	Hackensack River at Rivervale, NJ	5	River	Bergen
01377370	Pascack Brook at Park Ridge, NJ	5	River	Bergen
01377500	Pascack Brook at Westwood, NJ	5	River	Bergen
01378500	Hackensack River at New Milford, NJ	5	River	Bergen
01378570	Hacensack River at Hackensack, NJ	5	Tidal	Bergen
01387500	Ramapo River near Mahwah, NJ	3	River	Bergen
01390450	Saddle River at Upper Saddle River, NJ	4	River	Bergen
01390500	Saddle River at Ridgewood, NJ	4	River	Bergen
01391000	Ho-Ho-Kus Brook at Ho-Ho-Kus, NJ	4	River	Bergen
01391500	Saddle River at Lodi, NJ	4	River	Bergen
01392170	Third River at Bloomfield, NJ	4	River	Essex
01392650	Passaic River at PVSC at Newark, NJ	4	Tidal	Essex
01379500	Passaic River near Chatham, NJ	6	River	Morris
01379773	Green Pond Brook at Picatinny Arsenal, NJ	6	River	Morris
01380500	Rockaway River above Reservoir at Boonton, NJ	6	River	Morris
01381000	Rockaway River below Reservoir at Boonton, NJ	6	River	Morris
01381500	Whippany River at Morristown, NJ	6	River	Morris
01381800	Whippany River near Pine Brook, NJ	6	River	Morris
01381900	Passaic River at Pine Brook, NJ	6	River	Morris
01396190	South Branch Raritan River at Four Bridges, NJ	8	River	Morris
01399500	Lamington (Black) River near Pottersville, NJ	8	River	Morris
01455400	Lake Hopatcong at Landing, NJ	1	River	Morris
01455500	Muscanetcong River at Outlet of Lake Hopatcong, NJ	1	River	Morris
01382500	Pequannock River at Macopin Intake Dam, NJ	3	River	Passaic
01383500	Wanaque River at Awosting, NJ	3	River	Passaic
01384500	Ringwood Creek near Wanaque, NJ	3	River	Passaic
01386000	West Brook near Wanaque, NJ	3	River	Passaic
01386990	Wanaque Reservoir at Wanaque, NJ	3	River	Passaic
01387000	Wanaque River at Wanaque, NJ	3	River	Passaic
01388000	Ramapo River at Pompton Lakes, NJ	3	River	Passaic
01388500	Pompton River at Pompton Plains, NJ	3	River	Passaic
01389005	Passaic River below Pompton River at Two Bridges, NJ	4	River	Passaic
01389492	Passaic River above Beatties Dam at Little Falls, NJ	4	River	Passaic
01389500	Passaic River at Little Falls, NJ	4	River	Passaic
01389534	Peckman River at Ozone Avenue at Verona, NJ	4	River	Passaic
01389765	Molly Ann Brook at North Haledon, NJ	4	River	Passaic
01367800	Papakating Creek at Pellville, NJ	2	River	Sussex
01440000	Flat Brook near Flatbrookville, NJ	1	River	Sussex
01445000	Pequest River at Huntsville, NJ	1	River	Sussex
01394500	Rahway River near Springfield, NJ	7	River	Union
01395000	Rahway River at Rahway, NJ	7	River	Union
01440200	Delaware River near Delaware River Gap, Pa	1	River	Warren
01443500	Paulins Kill at Blairstown, NJ	1	River	Warren
01445500	Pequest River at Pequest, NJ	1	River	Warren
01446000	Beaver Brook near Belvidere, NJ	1	River	Warren
01446500	Delaware River at Belvidere, NJ	1	River	Warren

USGS Stream Gauge sites

Listed by Maintenance Region

Station Number	Station Name	Watershed Area	Type	County
Central Maintenance Region				
01398000	Neshanic River at Reville, NJ	8	River	Hunterdon
01399670	South Branch Rockaway Creek at Whitehouse Station, NJ	8	River	Hunterdon
01460880	Lockatong Creek at Raven Rock, NJ	11	River	Hunterdon
01461300	Wickecheoke Creek at Stockton, NJ	11	River	Hunterdon
01396500	South Branch Raritan River near High Bridge, NJ	8	River	Hunterdon
01396582	Spruce Run at Glen Gardner, NJ	8	River	Hunterdon
01396660	Mulhockaway Creek at Van Syckel, NJ	8	River	Hunterdon
01396800	Spruce Run at Clinton, NJ	8	River	Hunterdon
01397000	South Branch Raritan River at Stanton, NJ	8	River	Hunterdon
01401000	Stony Brook at Princeton, NJ	10	River	Mercer
01460440	Delaware and Raritan Canal at Port Mercer, NJ	11	River	Mercer
01463500	Delaware River at Trenton, NJ	11	River	Mercer
01463620	Assunpink Creek near Clarksville, NJ	11	River	Mercer
01464000	Assunpink Creek at Trenton, NJ	11	River	Mercer
01464500	Croswicks Creek at Extonville, NJ	20	River	Mercer
01405400	Manalapan Brook at Spotswood, NJ	9	River	Middlesex
01406050	Deep Run at Old Bridge, NJ	9	River	Middlesex
01406710	Raritan River at South Amboy, NJ	9	Tidal	Middlesex
01407080	Waackaack Creek at Keansburg, NJ	12	Tidal	Monmouth
01407081	Raritan Bay at Keansburg, NJ	12	Tidal	Monmouth
01407290	Big Brook at Marlboro, NJ	12	River	Monmouth
01407500	Swimming River near Red Bank, NJ	12	River	Monmouth
01407600	Shrewsbury River at Sea Bright, NJ	12	Tidal	Monmouth
01407770	Shark River at Belmar, NJ	12	Tidal	Monmouth
01408000	Manasquan River at Squankum, NJ	12	River	Monmouth
01408050	Manasquan River at Point Pleasant, NJ	12	Tidal	Ocean
01408120	North Branch Metedeconk River near Lakewood, NJ	13	River	Ocean
01408168	Barnegat Bay at Mantoloking, NJ	13	Tidal	Ocean
01408500	Toms River near Toms River, NJ	13	River	Ocean
01408750	Barnegat Bay at Seaside Heights, NJ	13	Tidal	Ocean
01409000	Cedar Creek at Lanoka Harbor, NJ	13	River	Ocean
01409110	Barnegat Bay at Waretown, NJ	13	Tidal	Ocean
01409125	Barnegat Bay at Barnegat Light, NJ	13	Tidal	Ocean
01409146	East Thorofareat Ship Bottom, NJ	13	Tidal	Ocean
01409280	Westecunk Creek at Stafford Forge, NJ	13	River	Ocean
01409335	Little Egg Inlet near Tuckerton, NJ	13	Tidal	Ocean
01379000	Passaic River near Millington, NJ	6	River	Somerset
01398500	North Branch Raritan River near Far Hills, NJ	8	River	Somerset
01399100	Middle Brook at Burnt Mills, NJ	8	River	Somerset
01399830	North Branch Raritan River at North Branch, NJ	8	River	Somerset
01400000	North Branch Raritan River near Raritan, NJ	8	River	Somerset
01400010	North Branch Raritan River at South Branch, NJ	8	River	Somerset
01400500	Raritan River at Manville, NJ	9	River	Somerset
01401650	Pike Run at Belle Mead, NJ	10	River	Somerset
01401750	Millstone River at Griggstown, NJ	10	River	Somerset
01402000	Millstone River at Blackwells Mills, NJ	10	River	Somerset
01403060	Raritan River below Calco Dam at Bound Brook, NJ	9	River	Somerset
01403150	West Branch Middle Brook near Martinsville, NJ	9	River	Somerset
01403400	Green Brook At Seely Mills, NJ	9	River	Somerset
01403540	Stony Brook at Watchung, NJ	10	River	Somerset

USGS Stream Gauge sites

Listed by Maintenance Region

Station Number	Station Name	Watershed Area	Type	County
01403900	Bound Brook at Middlesex, NJ	9	River	Somerset

USGS Stream Gauge sites

Listed by Maintenance Region

Station Number	Station Name	Watershed Area	Type	County
01446995	Delaware River at US Route 22 at Phillipsburg, NJ	1	River	Warren
01457000	Muscanetcong River near Bloomsbury, NJ	1	River	Warren
01457500	Delaware River at Riegelsville, NJ	1	River	Warren

USGS Stream Gauge sites

Listed by Maintenance Region

Station Number	Station Name	Watershed Area	Type	County
South Maintenance Region				
01409400	Mullica River near Basto, NJ	14	River	Atlantic
01409410	Albertson Brook near Hammonton. NJ	14	River	Atlantic
01410510	Absecon Creek at US Route 30 at Absecon, NJ	15	Tidal	Atlantic
01410560	Inside Thorofare at US Route 40 at Atlantic City, NJ	15	Tidal	Atlantic
01410600	Absecon Channel at Atlantic City, NJ	15	Tidal	Atlantic
01411000	Great Egg Harbor River at Folsum, NJ	15	River	Atlantic
01411330	Beach Thorofare at Margate, NJ	15	Tidal	Atlantic
01409810	West Branch Wading River near Jenkins, NJ	14	River	Burlington
01410000	Oswego River at Harrisville, NJ	14	River	Burlington
01410150	East Branch Bass River near New Gretna, NJ	14	River	Burlington
01464598	Delaware River at Burlington, NJ	20	Tidal	Burlington
01465850	South Branch Rancocas Creek at Vincentown, NJ	19	River	Burlington
01465880	Southwest Branch Rancocas Creek at Medford, NJ	19	River	Burlington
01466500	McDonalds Branch in Byrne State Forest, NJ	19	River	Burlington
01466900	Greenwood Branch at New Lisbon, NJ	19	River	Burlington
01467000	North Branch Rancocas Creek at Pemberton, NJ	19	River	Burlington
01467150	Cooper River at Haddonfield, NJ	18	River	Camden
01411300	Tuckahoe River at Head of River, NJ	15	River	Cape May
01411318	Peck Bay at Ocean City, NJ	15	Tidal	Cape May
01411350	Ludlum Thorofare at Sea Isle City, NJ	16	Tidal	Cape May
01411355	Ingram Thorofare at Avalon, NJ	16	Tidal	Cape May
01411360	Great Channel at Stone Harbor, NJ	16	Tidal	Cape May
01411382	Grassy Sound Channel at Wildwood, NJ	16	Tidal	Cape May
01411390	Cape May Harbor at Cape May, NJ	16	Tidal	Cape May
01411435	Sluice Creek near South Dennis, NJ	16	Tidal	Cape May
01412150	Maurice River at Bivalve, NJ	17	Tidal	Cumberland
01412800	Cohansey River at Seeley, NJ	17	River	Cumberland
01413038	Cohansey River at Greenwich, NJ	17	Tidal	Cumberland
01475000	Mantua Creek at Pitman, NJ	18	River	Gloucester
01477120	Raccoon Creek near Swedesboro, NJ	18	River	Gloucester
01411500	Maurice River at Norma, NJ	17	River	Salem
01482500	Salem River at Woodstown, NJ	17	River	Salem

Appendix J

Vulnerability Index
for Scour Critical Bridges

by

Index Value and
State Maintenance Region

SCOUR CRITICAL BRIDGE VULNERABILITY INDEX

Listed by Index Value

Rte	Number	Name	Type of Found	Scour Problems	Streambed Material	History of Debris	Subst Redun	Scour Critical Pier	Angle of Attack	50 YR Cont Scour	Super Redun	Critical Flow Rate	Total
27	2006151	RT 27 OVER ROBINSON BRNCH RAHWAY RVR	20	20	6	10	0	10	0	4	3	5	78
1B	1102150	US 1B OVER SHABAKUNK CREEK	20	20	4	10	0	10	0	5	3	5	77
23	1405156	RT23/PEQUANNOCK R,HAMBURG TPK SB, RR	20	12	6	5	10	10	4	0	5	5	77
23	1903152	23/BR OF PACOCK BRK & DEL-OSTEGO R.R.	20	12	6	0	10	10	0	4	5	5	72
35	1222150	ROUTE 35/CHEESEQUAKE CREEK & RAMP	14	20	10	0	0	10	0	5	5	5	69
202	1807155	US 202 OVER N BR RARITAN RIVER	20	12	4	10	0	10	0	5	3	5	69
4	0206166	NJ 4 / HACKENSACK RIVER & ACCESS ROAD	14	12	10	0	10	10	0	2	5	5	68
27	2006152	NJ RT 27/RAHWAY RIVER.	20	20	10	0	0	10	0	0	3	5	68
4	0206189	KINDERKAMACK RD OVER COLES BROOK	20	20	10	0	0	0	4	4	3	5	66
23	1619151	N.J 23 OVER POMPTON RIVER	20	12	10	5	0	10	0	0	0	5	62
22	1005162	US 22 EB OVER S BR ROCKAWAY CREEK	20	12	6	0	0	10	0	5	3	5	61
94	2117160	ROUTE 94 OVER PAULINS KILL	20	12	6	5	0	10	0	0	3	5	61
206	1912160	US 206 OVER BIG FLAT BROOK	20	12	4	5	0	10	0	2	3	5	61
22	1005153	RT US 22 OVER BR ROCKAWAY CREEK	20	20	4	0	0	0	4	4	3	5	60
47	0815152	NJ 47 OVER BIG TIMBER CREEK	14	12	10	0	0	10	0	4	5	5	60
71	1321150	ROUTE 71 OVER SHARK RIVER	14	12	10	0	0	10	4	2	3	5	60
80	0225166	I-80/MRKT.MAIN,FAIRVIEW STS.&SADL RIV	20	0	10	0	10	10	0	2	3	5	60
22	1801153	US 22 EB OVER N BR RARITAN RIVER	20	12	4	5	0	10	0	0	3	5	59
22	1801154	US 22 WB OVER N BR RARITAN RIVER	20	12	4	5	0	10	0	0	3	5	59
94	2117157	NJ 94 OVER JACKSONBURG CREEK	20	12	4	5	0	10	0	0	3	5	59
206	0324162	US206 OVER ASSISCUNK CREEK	14	12	10	5	0	10	0	0	3	5	59
9	1502157	US 9 OVER CEDAR CREEK	20	12	10	0	0	10	0	0	3	3	58
46	0220157	U.S.ROUTE 46 OVER SADDLE RIVER	20	0	6	10	0	10	0	4	3	5	58
46	2108162	RTE US 46 OVER MUSCONETCONG RIVER	20	12	6	0	0	10	0	0	5	5	58
56	1716151	NJ ROUTE 56 OVER MAURICE RIVER	14	12	10	0	0	10	0	4	3	5	58
206	1810164	US206 OVER BR OF ROYCES BROOK	20	12	6	5	0	0	2	5	3	5	58
82	2012150	NJ ROUTE 82 OVER RAHWAY RIVER	20	0	10	5	0	10	0	4	3	5	57
322	0119156	US 322 OVER BIG DITCH	14	12	6	0	0	10	2	5	3	5	57
46	2107156	US ROUTE 46 OVER PAULINS KILL	20	12	6	0	0	10	0	0	3	5	56
206	0324160	US RT 206 OVER BARKERS CREEK	14	12	10	0	0	10	0	2	3	5	56
130	1227159	US 130 OVER OAKEYS BROOK	20	12	6	0	0	0	4	5	3	5	55
202	1809150	US202 OVER N BR RARITAN RIVER	20	12	6	5	0	0	0	4	3	5	55
206	0118150	US 206 OVER CEDAR BRANCH	20	12	10	0	0	0	5	0	3	5	55
9	1502154	US 9 OVER S. BRANCH OF FORKED RIVER	14	12	10	0	0	10	0	2	3	3	54
21	0716156	MAIN ST OVER SECOND RIVER	20	20	4	0	0	0	2	0	3	5	54
22	2102154	US 22 OVER LOPATCONG CREEK	20	0	6	5	0	10	0	5	3	5	54
29	1006151	ROUTE 29 OVER SWAN CREEK	20	20	6	0	0	0	0	0	3	5	54
30	0405153	US RTS 30 & 130 OVER COOPER RIVER	14	12	10	0	0	10	0	0	3	5	54
173	2103152	RT 173 OVER POHATCONG CREEK	20	12	10	0	0	0	0	4	3	5	54
322	0825150	US 322 OVER RACCOON CREEK	14	12	10	0	0	0	5	5	3	5	54
17	0218161	N.J 17 NB/US 202 & RAMAPO RIVER	20	0	10	5	0	10	0	0	3	5	53
22	1803156	RT US 22 OVER STONY BROOK	20	12	6	5	0	0	2	0	3	5	53
9	1303155	US RT 9 OVER MILFORD BROOK	20	12	10	0	0	0	0	2	3	5	52
17	0216150	RT 17 OVER SPROUT BROOK	20	12	10	0	0	0	0	2	3	5	52
23	1604150	ROUTE NJ 23/PASSAIC RIVER	14	0	10	5	0	10	0	5	3	5	52
45	1705150	NJ RT 45 & US RT 40/SALEM RIVER	20	12	10	0	0	0	0	2	3	5	52
78	1016157	I-78 WB OVER SO BR. RARITAN RIVER	20	0	4	10	0	10	0	0	3	5	52
202	1809158	US RT 202 OVER PASSAIC RIVER	20	12	6	0	0	0	2	2	5	5	52
173	2103153	NJ 173 OVER MUSCONETCONG RIVER	20	0	6	5	0	10	0	2	3	5	51
280	1418154	RT.I-280 EB OVER PASSAIC RIVER	20	0	6	5	0	10	0	2	3	5	51

SCOUR CRITICAL BRIDGE VULNERABILITY INDEX

Listed by Index Value

Rte	Number	Name	Type of Found	Scour Problems	Streambed Material	History of Debris	Subst Redun	Scour Critical Pier	Angle of Attack	50 YR Cont Scour	Super Redun	Critical Flow Rate	Total
1&9	0201151	US 1&9(BROAD AVENUE) OVER WOLF CREEK	20	12	6	0	0	0	2	2	3	5	50
10	1401156	RT 10 OVER MILL BROOK	20	12	6	0	0	0	2	2	3	5	50
17	0218162	NJ RT 17 SB OVER US 202 & RAMAPO RVR	20	0	10	0	0	10	0	2	3	5	50
23	1904152	NJ 23 OVER WALLKILL RIVER	20	12	10	0	0	0	0	0	3	5	50
33	1304156	ROUTE 33 OVER MANALAPAN BROOK	20	12	6	0	0	0	4	2	3	3	50
49	0606150	NJ RT 49 OVER MANANTICO CREEK	20	12	6	0	0	0	2	2	3	5	50
130	0817151	RT US 130 OVER RACCOON CREEK	14	12	4	0	0	10	0	0	5	5	50
206	1810155	RT US 206 OVER CRUSERS BROOK	20	0	6	0	0	10	2	4	3	5	50
29	1110158	NJ 29 OVER MOORES CREEK	20	0	6	0	0	10	0	5	3	5	49
46	0722157	US ROUTE 46 EB OVER PASSAIC RIVER	20	0	4	5	0	10	0	0	5	5	49
46	1410159	ROUTE 46 OVER PASSAIC RIVER	20	0	6	5	0	10	0	0	3	5	49
206	0326153	US206 SB OVER CROSSWICKS CREEK	14	0	10	0	0	10	0	5	5	5	49
10	1402150	NJ ROUTE 10 OVER MALAPARDIS BROOK	20	12	4	0	0	0	2	2	3	5	48
15	1922150	NJ ROUTE 15 OVER BEAVER RUN	20	12	6	0	0	0	0	2	3	5	48
23	1605158	NJ ROUTE 23 NB/MACOPIN RIVER	20	12	6	0	0	0	0	2	3	5	48
27	1105152	RT NJ 27 OVER MILLSTONE RIVER	20	0	4	0	0	10	4	2	3	5	48
45	0808151	ROUTE 45 OVER EDWARDS RUN	20	12	6	0	0	0	0	2	3	5	48
78	2113160	I78WB/ASBURY RD(CR632)&MUSCONETCONG R	20	0	6	0	0	10	0	4	3	5	48
206	1417157	US 206 OVER TRIB TO DRAKES BROOK	20	12	6	0	0	0	0	2	3	5	48
206	0326152	US 206 NB OVER CROSSWICKS CREEK	14	0	10	0	0	10	0	5	3	5	47
10	0711150	NJ ROUTE 10 OVER CANOE BROOK	20	12	4	0	0	0	0	2	3	5	46
15	1404155	GOVRNMNT RD(PARKER RD) WB/GREEN POND	20	12	4	0	0	0	0	2	3	5	46
22	2004151	US 22 OVER ELIZABETH RIVER	20	12	4	0	0	0	2	0	3	5	46
23	1605153	NJ RTE 23 SB OVER PEQUANNOCK RIV.	20	12	6	0	0	0	0	0	3	5	46
23	1605156	NJ RT 23 SB OVER PEQUANNOCK RIVER	20	12	4	0	0	0	0	2	3	5	46
29	1009150	ROUTE 29 OVER COPPER CREEK	20	12	6	0	0	0	0	0	3	5	46
46	0722158	U.S. ROUTE 46 WB /PASSAIC RIVER	20	0	6	5	0	10	0	0	0	5	46
46	2107154	US 46 WB OVER BEAVER BROOK	20	12	4	0	0	0	0	0	5	5	46
49	0509150	RT 49 OVER MILL CREEK	20	12	4	0	0	0	2	0	3	5	46
206	0324152	U.S ROUTE 206 OVER SPRINGERS BROOK	14	0	10	0	0	10	0	4	3	5	46
206	1912158	US ROUTE 206 OVER KITTATINY BROOK	20	12	6	0	0	0	0	0	3	5	46
46	1409154	US ROUTE 46 OVER GRANNEYS BROOK	20	0	10	5	0	0	0	2	3	5	45
166	1516151	RT NJ166 OVER S.CHANNEL OF TOMS RIVER	14	0	6	0	0	10	0	5	5	5	45
3	1601157	NJ ROUTE 3 OVER THIRD RIVER	20	12	4	0	0	0	0	0	3	5	44
4	0206181	NJ 4 OVER FLAT ROCK BROOK	20	12	4	0	0	0	0	0	3	5	44
22	1005163	RT US 22WB/S BR OF ROCKAWAY CREEK	20	0	6	0	0	10	0	0	3	5	44
22	2003157	US 22 OVER ECHO LAKE	20	12	4	0	0	0	0	0	3	5	44
23	1905151	ROUTE NJ 23/BRANCH OF CLOVE RIVER	20	12	4	0	0	0	0	0	3	5	44
27	1218158	NJ RT 27 OVER S BRANCH RAHWAY RIVER	20	12	4	0	0	0	0	0	3	5	44
31	2111155	NJ RT 31 OVER PEQUEST RIVER	20	0	6	0	0	10	0	0	3	5	44
34	1308154	N.J.ROUTE 34 OVER BIG BROOK	20	0	10	0	0	0	2	4	3	5	44
50	0510152	ROUTE 50 OVER TUCKAHOE RIVER	6	12	6	0	0	10	0	0	5	5	44
130	0317152	US 130 SB OVER ASSISCUNK CREEK	20	0	6	0	0	10	0	0	3	5	44
206	1417156	RT 206/SOUTH BR OF RARITAN RIVER	20	12	4	0	0	0	0	0	3	5	44
206	1810158	ROUTE US 206 OVER PIKE RUN	20	0	4	5	0	0	2	5	3	5	44
23	1904153	NJ RT 23/ BR OF WALLKILL RIVER	20	0	10	0	0	0	0	5	3	5	43
31	2111151	RT 31 OVER POHATCONG CREEK	20	0	10	0	0	0	0	5	3	5	43
130	0316150	RT US 130 OVER POMPESTON CREEK	20	0	10	0	0	0	0	5	3	5	43
206	1810153	US 206 OVER BACK BROOK	20	0	6	0	0	0	4	5	3	5	43
206	1810165	US206 OVER BR OF ROYCES BROOK	20	0	6	0	0	0	4	5	3	5	43

SCOUR CRITICAL BRIDGE VULNERABILITY INDEX

Listed by Index Value

Rte	Number	Name	Type of Found	Scour Problems	Streambed Material	History of Debris	Subst Redun	Scour Critical Pier	Angle of Attack	50 YR Cont Scour	Super Redun	Critical Flow Rate	Total
322	0119151	US 322 OVER HOSPITALITY BROOK	20	0	6	0	0	0	4	5	3	5	43
57	2105164	RT 57 OVER POHATCONG CREEK	20	0	10	0	0	0	0	4	3	5	42
78	1016156	ROUTE I-78 EB OVER S BR RARITAN RIVER	20	0	4	0	0	10	0	0	3	5	42
94	2117159	NJ ROUTE 94 OVER BLAIR CREEK.	20	0	4	0	0	10	0	0	3	5	42
130	0319152	US RT. 130 OVER CROSSWICKS CREEK	20	0	10	0	0	0	0	4	3	5	42
130	1122150	US 130 OVER DOCTORS CREEK	20	0	10	0	0	0	2	2	3	5	42
206	0118152	US 206 OVER GREAT SWAMP BRANCH	20	0	10	0	0	0	4	0	3	5	42
15	1404158	NJ ROUTE 15 SB / ROCKAWAY RIVER	20	0	6	0	0	10	0	0	0	5	41
15	1922151	NJ.RTE.15 OVER PAULINS KILL CREEK	20	0	6	0	0	0	2	5	3	5	41
33	1304151	OLD ROAD(NJ 33) OVER MILLSTONE RIVER	20	0	6	5	0	0	0	0	5	5	41
47	0601150	RT 47 OVER MUSKEE CREEK	6	12	10	0	0	0	0	5	3	5	41
94	1923150	NJ RT.94 OVER WALLKILL RIVER	20	0	6	0	0	0	5	0	5	5	41
130	0818151	RT US 130 /BIG TIMBER CREEK	6	0	10	0	0	10	0	5	5	5	41
23	1605162	RTE 23SB OVER PEQUANNOCK RV	14	0	6	5	0	10	0	0	0	5	40
78	1015157	I-78EB SERV.RD / MULHOCKAWAY CREEK	20	0	10	0	0	0	2	0	3	5	40
130	0317150	US 130 NB OVER ASSISCUNK CREEK	14	12	6	0	0	0	0	0	3	5	40
130	1123152	US ROUTE 130 OVER ROCKY BROOK	20	0	10	0	0	0	0	2	3	5	40
206	0118153	RT 206 OVER ALBERTSONS BROOK	20	0	10	0	0	0	0	2	3	5	40
57	2106164	NJ 57 OVER HANCES BROOK	20	0	6	0	0	0	0	5	3	5	39
166	1516152	RT NJ 166 OVER NO. CHANNEL OF TOMS R.	14	12	6	0	0	0	0	4	3	0	39
206	0324155	US 206 OVER SO BR OF RANCOCAS CREEK	14	0	10	0	0	0	2	5	3	5	39
284	1907157	NJ 284 OVER BR OF WALLKILL RIVER	20	0	6	0	0	0	5	0	3	5	39
10	0709150	RT 10 OVER WILLOW MEADOW BROOK	20	0	6	0	0	0	2	2	3	5	38
15	1403150	NJ RT 15 OVER BRNT MDW(GRN PD) BROOK	20	0	6	0	0	0	2	2	3	5	38
17	0216157	NJ RT 17 OVER SADDLE RIVER.	20	0	6	0	0	0	0	4	3	5	38
130	1123153	RT 130 OVER MILLSTONE RIVER	20	0	6	0	0	0	0	4	3	5	38
202	1809153	RT 202 OVER BR MINE BROOK	20	0	4	0	0	0	2	4	3	5	38
206	0324156	ROUTE US 206 OVER JADE RUN	6	12	10	0	0	0	0	2	3	5	38
206	1417159	US RT 206/S BRANCH RARITAN RIVER	20	0	6	0	0	0	4	0	3	5	38
206	1911151	US206 OVER LUBBERS RUN	20	0	6	0	0	0	0	4	3	5	38
284	1907152	NJ RT 284/BR OF WALLKILL RIVER	20	0	6	0	0	0	2	2	3	5	38
36	1315157	NJ 36 OVER FLAT CREEK	14	0	10	0	0	0	0	5	3	5	37
55	0609151	ROUTE 55 NB OVER MANANTICO CREEK	6	12	6	0	0	0	0	5	3	5	37
55	0609152	RT 55 SB OVER MANANTICO CREEK	6	12	6	0	0	0	0	5	3	5	37
23	0719151	RT 23 OVER PECKMANS BROOK	20	0	4	0	0	0	2	2	3	5	36
23	1903153	RT 23 OVER BRANCH OF FRANKLIN LAKE	20	0	6	0	0	0	2	0	3	5	36
45	0810150	RT 45 OVER WOODBURY CREEK	20	0	6	0	0	0	0	2	3	5	36
46	1407152	ROUTE US 46 WB OVER MINE BROOK	20	0	6	0	0	0	0	2	3	5	36
46	1407156	US 46 OVER SOUTH BR RARITAN RIVER	20	0	6	0	0	0	0	2	3	5	36
46	2107155	US 46 EB OVER BEAVER BROOK	20	0	4	0	0	0	4	0	3	5	36
80	1413155	RAMP C OVER BURNT MEADOW BROOK	20	0	6	0	0	0	2	0	3	5	36
80	1413174	I-80 EB OVER ROCKAWAY RIVER	14	0	4	0	0	10	0	0	3	5	36
208	1612154	ROUTE 208 RAMP A OVER GOFFLE BROOK	20	0	6	0	0	0	0	2	3	5	36
154	0424151	RT 154 OVER NO BR COOPER RIVER	14	0	6	0	0	0	2	5	3	5	35
202	1416152	US 202 OVER WHIPPANY RIVER	20	0	6	0	0	0	0	4	0	5	35
15	1404159	NJ RT 15 RAMP A OVER HURDTOWN BROOK	20	0	4	0	0	0	0	2	3	5	34
15	1424150	NJ 15 NB OVER LAKE SHAWNEE	20	0	6	0	0	0	0	0	3	5	34
23	1605175	RT 23 NB OVER PEQUANNOCK RIVER	20	0	6	0	0	0	0	0	3	5	34
31	1013152	ROUTE NJ 31 OVER WILLOUGHBY BROOK	20	0	6	0	0	0	0	0	3	5	34
46	1407153	RTE US 46EB OVER BRANCH MINE BRK.	20	0	6	0	0	0	0	0	3	5	34

SCOUR CRITICAL BRIDGE VULNERABILITY INDEX

Listed by Index Value

Rte	Number	Name	Type of Found	Scour Problems	Streambed Material	History of Debris	Subst Redun	Scour Critical Pier	Angle of Attack	50 YR Cont Scour	Super Redun	Critical Flow Rate	Total
47	0601151	N.J.ROUTE 47 OVER MANUMUSKIN RIV.	6	0	6	0	0	10	0	2	5	5	34
53	1411152	RT 53 OVER DEN BROOK	20	0	6	0	0	0	0	0	3	5	34
322	0826150	US ROUTE 322 OVER SCOTLAND RUN	20	0	6	0	0	0	0	0	3	5	34
22	2003161	US 22 EB OVER RAHWAY RIVER	14	0	6	0	0	0	0	5	3	5	33
40	1703152	U.S.RTE 40 OVER BRANCH SALEM CRK.	14	0	6	0	0	0	0	5	3	5	33
71	1320152	ROUTE 71 OVER WRECK POND	14	0	6	0	0	0	0	5	3	5	33
3	1601160	NJ RT 3 OVER UPPER POND SPILLWAY	20	0	4	0	0	0	0	0	3	5	32
23	1605167	ROUTE 23 SB OVER PEQUANNOCK RIVER	20	0	4	0	0	0	2	0	3	3	32
45	0807152	RT45 OVER RACCOON CREEK	14	0	6	0	0	0	0	4	3	5	32
206	1911159	US206 OVER PEQUEST RIVER	20	0	4	0	0	0	0	0	3	5	32
206	0324153	US 206 OVER MUSKINGUM CREEK	14	0	10	0	0	0	0	0	3	3	30
22	2003162	US 22 WB OVER RAHWAY RIVER	20	0	6	0	0	0	0	0	0	3	29
38	0408160	MILL ROAD/SO BR PENNSAUKEN CREEK	6	0	10	0	0	0	0	5	3	5	29
130	0817150	US RT 130 OVER BIG BIRCH CREEK	6	0	10	0	0	0	0	5	3	5	29
9	1502153	US 9 OVER OYSTER CREEK	6	0	10	0	0	0	0	2	3	3	24

SCOUR CRITICAL BRIDGE VULNERABILITY INDEX

Grouped by Maintenance Region

Rte	Number	Name	Type of Found	Scour Problems	Streambed Material	History of Debris	Subst Redun	Scour Critical Pier	Angle of Attack	50 YR Cont Scour	Super Redun	Critical Flow Rate	Total
Northern Maintenance Region													
27	2006151	RT 27 OVER ROBINSON BRNCH RAHWAY RVR	20	20	6	10	0	10	0	4	3	5	78
23	1405156	RT23/PEQUANNOCK R,HAMBURG TPK SB, RR	20	12	6	5	10	10	4	0	5	5	77
23	1903152	23/BR OF PACOCK BRK & DEL-OSTEGO R.R.	20	12	6	0	10	10	0	4	5	5	72
4	0206166	NJ 4 / HACKENSACK RIVER & ACCESS ROAD	14	12	10	0	10	10	0	2	5	5	68
27	2006152	NJ RT 27/RAHWAY RIVER.	20	20	10	0	0	10	0	0	3	5	68
4	0206189	KINDERKAMACK RD OVER COLES BROOK	20	20	10	0	0	0	4	4	3	5	66
23	1619151	N.J 23 OVER POMPTON RIVER	20	12	10	5	0	10	0	0	0	5	62
94	2117160	ROUTE 94 OVER PAULINS KILL	20	12	6	5	0	10	0	0	3	5	61
206	1912160	US 206 OVER BIG FLAT BROOK	20	12	4	5	0	10	0	2	3	5	61
80	0225166	I-80/MRKT.MAIN,FAIRVIEW STS.&SADL RIV	20	0	10	0	10	10	0	2	3	5	60
94	2117157	NJ 94 OVER JACKSONBURG CREEK	20	12	4	5	0	10	0	0	3	5	59
46	0220157	U.S.ROUTE 46 OVER SADDLE RIVER	20	0	6	10	0	10	0	4	3	5	58
46	2108162	RTE US 46 OVER MUSCONETCONG RIVER	20	12	6	0	0	10	0	0	5	5	58
46	2107156	US ROUTE 46 OVER PAULINS KILL	20	12	6	0	0	10	0	0	3	5	56
21	0716156	MAIN ST OVER SECOND RIVER	20	20	4	0	0	0	2	0	3	5	54
17	0218161	N.J 17 NB/US 202 & RAMAPO RIVER	20	0	10	5	0	10	0	0	3	5	53
17	0216150	RT 17 OVER SPROUT BROOK	20	12	10	0	0	0	0	2	3	5	52
23	1604150	ROUTE NJ 23/PASSAIC RIVER	14	0	10	5	0	10	0	5	3	5	52
280	1418154	RT.I-280 EB OVER PASSAIC RIVER	20	0	6	5	0	10	0	2	3	5	51
1&9	0201151	US 1&9(BROAD AVENUE) OVER WOLF CREEK	20	12	6	0	0	0	2	2	3	5	50
10	1401156	RT 10 OVER MILL BROOK	20	12	6	0	0	0	2	2	3	5	50
17	0218162	NJ RT 17 SB OVER US 202 & RAMAPO RVR	20	0	10	0	0	10	0	2	3	5	50
23	1904152	NJ 23 OVER WALLKILL RIVER	20	12	10	0	0	0	0	0	3	5	50
46	0722157	US ROUTE 46 EB OVER PASSAIC RIVER	20	0	4	5	0	10	0	0	5	5	49
46	1410159	ROUTE 46 OVER PASSAIC RIVER	20	0	6	5	0	10	0	0	3	5	49
10	1402150	NJ ROUTE 10 OVER MALAPARDIS BROOK	20	12	4	0	0	0	2	2	3	5	48
15	1922150	NJ ROUTE 15 OVER BEAVER RUN	20	12	6	0	0	0	0	2	3	5	48
23	1605158	NJ ROUTE 23 NB/MACOPIN RIVER	20	12	6	0	0	0	0	2	3	5	48
206	1417157	US 206 OVER TRIB TO DRAKES BROOK	20	12	6	0	0	0	0	2	3	5	48
10	0711150	NJ ROUTE 10 OVER CANOE BROOK	20	12	4	0	0	0	0	2	3	5	46
15	1404155	GOVRNMNT RD(PARKER RD) WB/GREEN POND	20	12	4	0	0	0	0	2	3	5	46
22	2004151	US 22 OVER ELIZABETH RIVER	20	12	4	0	0	0	2	0	3	5	46
23	1605153	NJ RTE 23 SB OVER PEQUANNOCK RIV.	20	12	6	0	0	0	0	0	3	5	46
23	1605156	NJ RT 23 SB OVER PEQUANNOCK RIVER	20	12	4	0	0	0	0	2	3	5	46
46	0722158	U.S. ROUTE 46 WB /PASSAIC RIVER	20	0	6	5	0	10	0	0	0	5	46
46	2107154	US 46 WB OVER BEAVER BROOK	20	12	4	0	0	0	0	0	5	5	46
206	1912158	US ROUTE 206 OVER KITTATINY BROOK	20	12	6	0	0	0	0	0	3	5	46
46	1409154	US ROUTE 46 OVER GRANNEYS BROOK	20	0	10	5	0	0	0	2	3	5	45
3	1601157	NJ ROUTE 3 OVER THIRD RIVER	20	12	4	0	0	0	0	0	3	5	44
4	0206181	NJ 4 OVER FLAT ROCK BROOK	20	12	4	0	0	0	0	0	3	5	44
22	2003157	US 22 OVER ECHO LAKE	20	12	4	0	0	0	0	0	3	5	44
23	1905151	ROUTE NJ 23/BRANCH OF CLOVE RIVER	20	12	4	0	0	0	0	0	3	5	44
31	2111155	NJ RT 31 OVER PEQUEST RIVER	20	0	6	0	0	10	0	0	3	5	44
206	1417156	RT 206/SOUTH BR OF RARITAN RIVER	20	12	4	0	0	0	0	0	3	5	44
23	1904153	NJ RT 23/ BR OF WALLKILL RIVER	20	0	10	0	0	0	0	5	3	5	43
31	2111151	RT 31 OVER POHATCONG CREEK	20	0	10	0	0	0	0	5	3	5	43
57	2105164	RT 57 OVER POHATCONG CREEK	20	0	10	0	0	0	0	4	3	5	42
94	2117159	NJ ROUTE 94 OVER BLAIR CREEK.	20	0	4	0	0	10	0	0	3	5	42
15	1404158	NJ ROUTE 15 SB / ROCKAWAY RIVER	20	0	6	0	0	10	0	0	0	5	41

SCOUR CRITICAL BRIDGE VULNERABILITY INDEX

Grouped by Maintenance Region

Rte	Number	Name	Type of Found	Scour Problems	Streambed Material	History of Debris	Subst Redun	Scour Critical Pier	Angle of Attack	50 YR Cont Scour	Super Redun	Critical Flow Rate	Total
15	1922151	NJ.RTE.15 OVER PAULINS KILL CREEK	20	0	6	0	0	0	2	5	3	5	41
94	1923150	NJ RT.94 OVER WALLKILL RIVER	20	0	6	0	0	0	5	0	5	5	41
23	1605162	RTE 23SB OVER PEQUANNOCK RV	14	0	6	5	0	10	0	0	0	5	40
57	2106164	NJ 57 OVER HANCES BROOK	20	0	6	0	0	0	0	5	3	5	39
284	1907157	NJ 284 OVER BR OF WALLKILL RIVER	20	0	6	0	0	0	5	0	3	5	39
10	0709150	RT 10 OVER WILLOW MEADOW BROOK	20	0	6	0	0	0	2	2	3	5	38
15	1403150	NJ RT 15 OVER BRNT MDW(GRN PD) BROOK	20	0	6	0	0	0	2	2	3	5	38
17	0216157	NJ RT 17 OVER SADDLE RIVER.	20	0	6	0	0	0	0	4	3	5	38
206	1417159	US RT 206/S BRANCH RARITAN RIVER	20	0	6	0	0	0	4	0	3	5	38
206	1911151	US206 OVER LUBBERS RUN	20	0	6	0	0	0	0	4	3	5	38
284	1907152	NJ RT 284/BR OF WALLKILL RIVER	20	0	6	0	0	0	2	2	3	5	38
23	0719151	RT 23 OVER PECKMANS BROOK	20	0	4	0	0	0	2	2	3	5	36
23	1903153	RT 23 OVER BRANCH OF FRANKLIN LAKE	20	0	6	0	0	0	2	0	3	5	36
46	1407152	ROUTE US 46 WB OVER MINE BROOK	20	0	6	0	0	0	0	2	3	5	36
46	1407156	US 46 OVER SOUTH BR RARITAN RIVER	20	0	6	0	0	0	0	2	3	5	36
46	2107155	US 46 EB OVER BEAVER BROOK	20	0	4	0	0	0	4	0	3	5	36
80	1413155	RAMP C OVER BURNT MEADOW BROOK	20	0	6	0	0	0	2	0	3	5	36
80	1413174	I-80 EB OVER ROCKAWAY RIVER	14	0	4	0	0	10	0	0	3	5	36
208	1612154	ROUTE 208 RAMP A OVER GOFFLE BROOK	20	0	6	0	0	0	0	2	3	5	36
202	1416152	US 202 OVER WHIPPANY RIVER	20	0	6	0	0	0	0	4	0	5	35
15	1404159	NJ RT 15 RAMP A OVER HURDTOWN BROOK	20	0	4	0	0	0	0	2	3	5	34
15	1424150	NJ 15 NB OVER LAKE SHAWNEE	20	0	6	0	0	0	0	0	3	5	34
23	1605175	RT 23 NB OVER PEQUANNOCK RIVER	20	0	6	0	0	0	0	0	3	5	34
46	1407153	RTE US 46EB OVER BRANCH MINE BRK.	20	0	6	0	0	0	0	0	3	5	34
53	1411152	RT 53 OVER DEN BROOK	20	0	6	0	0	0	0	0	3	5	34
22	2003161	US 22 EB OVER RAHWAY RIVER	14	0	6	0	0	0	0	5	3	5	33
3	1601160	NJ RT 3 OVER UPPER POND SPILLWAY	20	0	4	0	0	0	0	0	3	5	32
23	1605167	ROUTE 23 SB OVER PEQUANNOCK RIVER	20	0	4	0	0	0	2	0	3	3	32
206	1911159	US206 OVER PEQUEST RIVER	20	0	4	0	0	0	0	0	3	5	32
22	2003162	US 22 WB OVER RAHWAY RIVER	20	0	6	0	0	0	0	0	0	3	29

SCOUR CRITICAL BRIDGE VULNERABILITY INDEX

Grouped by Maintenance Region

Rte	Number	Name	Type of Found	Scour Problems	Streambed Material	History of Debris	Subst Redun	Scour Critical Pier	Angle of Attack	50 YR Cont Scour	Super Redun	Critical Flow Rate	Total
Central Maintenance Region													
1B	1102150	US 1B OVER SHABAKUNK CREEK	20	20	4	10	0	10	0	5	3	5	77
35	1222150	ROUTE 35/CHEESEQUAKE CREEK & RAMP	14	20	10	0	0	10	0	5	5	5	69
202	1807155	US 202 OVER N BR RARITAN RIVER	20	12	4	10	0	10	0	5	3	5	69
22	1005162	US 22 EB OVER S BR ROCKAWAY CREEK	20	12	6	0	0	10	0	5	3	5	61
22	1005153	RT US 22 OVER BR ROCKAWAY CREEK	20	20	4	0	0	0	4	4	3	5	60
71	1321150	ROUTE 71 OVER SHARK RIVER	14	12	10	0	0	10	4	2	3	5	60
22	1801153	US 22 EB OVER N BR RARITAN RIVER	20	12	4	5	0	10	0	0	3	5	59
22	1801154	US 22 WB OVER N BR RARITAN RIVER	20	12	4	5	0	10	0	0	3	5	59
9	1502157	US 9 OVER CEDAR CREEK	20	12	10	0	0	10	0	0	3	3	58
206	1810164	US206 OVER BR OF ROYCES BROOK	20	12	6	5	0	0	2	5	3	5	58
130	1227159	US 130 OVER OAKEYS BROOK	20	12	6	0	0	0	4	5	3	5	55
202	1809150	US202 OVER N BR RARITAN RIVER	20	12	6	5	0	0	0	4	3	5	55
9	1502154	US 9 OVER S. BRANCH OF FORKED RIVER	14	12	10	0	0	10	0	2	3	3	54
22	2102154	US 22 OVER LOPATCONG CREEK	20	0	6	5	0	10	0	5	3	5	54
29	1006151	ROUTE 29 OVER SWAN CREEK	20	20	6	0	0	0	0	0	3	5	54
173	2103152	RT 173 OVER POHATCONG CREEK	20	12	10	0	0	0	0	4	3	5	54
22	1803156	RT US 22 OVER STONY BROOK	20	12	6	5	0	0	2	0	3	5	53
9	1303155	US RT 9 OVER MILFORD BROOK	20	12	10	0	0	0	0	2	3	5	52
78	1016157	I-78 WB OVER SO BR. RARITAN RIVER	20	0	4	10	0	10	0	0	3	5	52
202	1809158	US RT 202 OVER PASSAIC RIVER	20	12	6	0	0	0	2	2	5	5	52
173	2103153	NJ 173 OVER MUSCONETCONG RIVER	20	0	6	5	0	10	0	2	3	5	51
33	1304156	ROUTE 33 OVER MANALAPAN BROOK	20	12	6	0	0	0	4	2	3	3	50
206	1810155	RT US 206 OVER CRUSERS BROOK	20	0	6	0	0	10	2	4	3	5	50
29	1110158	NJ 29 OVER MOORES CREEK	20	0	6	0	0	10	0	5	3	5	49
27	1105152	RT NJ 27 OVER MILLSTONE RIVER	20	0	4	0	0	10	4	2	3	5	48
78	2113160	I78WB/ASBURY RD(CR632)&MUSCONETCONG R	20	0	6	0	0	10	0	4	3	5	48
29	1009150	ROUTE 29 OVER COPPER CREEK	20	12	6	0	0	0	0	0	3	5	46
166	1516151	RT NJ166 OVER S.CHANNEL OF TOMS RIVER	14	0	6	0	0	10	0	5	5	5	45
22	1005163	RT US 22WB/S BR OF ROCKAWAY CREEK	20	0	6	0	0	10	0	0	3	5	44
27	1218158	NJ RT 27 OVER S BRANCH RAHWAY RIVER	20	12	4	0	0	0	0	0	3	5	44
34	1308154	N.J.ROUTE 34 OVER BIG BROOK	20	0	10	0	0	0	2	4	3	5	44
206	1810158	ROUTE US 206 OVER PIKE RUN	20	0	4	5	0	0	2	5	3	5	44
206	1810153	US 206 OVER BACK BROOK	20	0	6	0	0	0	4	5	3	5	43
206	1810165	US206 OVER BR OF ROYCES BROOK	20	0	6	0	0	0	4	5	3	5	43
78	1016156	ROUTE I-78 EB OVER S BR RARITAN RIVER	20	0	4	0	0	10	0	0	3	5	42
130	1122150	US 130 OVER DOCTORS CREEK	20	0	10	0	0	0	2	2	3	5	42
33	1304151	OLD ROAD(NJ 33) OVER MILLSTONE RIVER	20	0	6	5	0	0	0	0	5	5	41
78	1015157	I-78EB SERV.RD / MULHOCKAWAY CREEK	20	0	10	0	0	0	2	0	3	5	40
130	1123152	US ROUTE 130 OVER ROCKY BROOK	20	0	10	0	0	0	0	2	3	5	40
166	1516152	RT NJ 166 OVER NO. CHANNEL OF TOMS R.	14	12	6	0	0	0	0	4	3	0	39
130	1123153	RT 130 OVER MILLSTONE RIVER	20	0	6	0	0	0	0	4	3	5	38
202	1809153	RT 202 OVER BR MINE BROOK	20	0	4	0	0	0	2	4	3	5	38
36	1315157	NJ 36 OVER FLAT CREEK	14	0	10	0	0	0	0	5	3	5	37
31	1013152	ROUTE NJ 31 OVER WILLOUGHBY BROOK	20	0	6	0	0	0	0	0	3	5	34
71	1320152	ROUTE 71 OVER WRECK POND	14	0	6	0	0	0	0	5	3	5	33
9	1502153	US 9 OVER OYSTER CREEK	6	0	10	0	0	0	0	2	3	3	24

SCOUR CRITICAL BRIDGE VULNERABILITY INDEX

Grouped by Maintenance Region

Rte	Number	Name	Type of Found	Scour Problems	Streambed Material	History of Debris	Subst Redun	Scour Critical Pier	Angle of Attack	50 YR Cont Scour	Super Redun	Critical Flow Rate	Total
Southern Maintenance Region													
47	0815152	NJ 47 OVER BIG TIMBER CREEK	14	12	10	0	0	10	0	4	5	5	60
206	0324162	US206 OVER ASSISCUNK CREEK	14	12	10	5	0	10	0	0	3	5	59
56	1716151	NJ ROUTE 56 OVER MAURICE RIVER	14	12	10	0	0	10	0	4	3	5	58
82	2012150	NJ ROUTE 82 OVER RAHWAY RIVER	20	0	10	5	0	10	0	4	3	5	57
322	0119156	US 322 OVER BIG DITCH	14	12	6	0	0	10	2	5	3	5	57
206	0324160	US RT 206 OVER BARKERS CREEK	14	12	10	0	0	10	0	2	3	5	56
206	0118150	US 206 OVER CEDAR BRANCH	20	12	10	0	0	0	5	0	3	5	55
30	0405153	US RTS 30 & 130 OVER COOPER RIVER	14	12	10	0	0	10	0	0	3	5	54
322	0825150	US 322 OVER RACCOON CREEK	14	12	10	0	0	0	5	5	3	5	54
45	1705150	NJ RT 45 & US RT 40/SALEM RIVER	20	12	10	0	0	0	0	2	3	5	52
49	0606150	NJ RT 49 OVER MANANTICO CREEK	20	12	6	0	0	0	2	2	3	5	50
130	0817151	RT US 130 OVER RACCOON CREEK	14	12	4	0	0	10	0	0	5	5	50
206	0326153	US206 SB OVER CROSSWICKS CREEK	14	0	10	0	0	10	0	5	5	5	49
45	0808151	ROUTE 45 OVER EDWARDS RUN	20	12	6	0	0	0	0	2	3	5	48
206	0326152	US 206 NB OVER CROSSWICKS CREEK	14	0	10	0	0	10	0	5	3	5	47
49	0509150	RT 49 OVER MILL CREEK	20	12	4	0	0	0	2	0	3	5	46
206	0324152	U.S ROUTE 206 OVER SPRINGERS BROOK	14	0	10	0	0	10	0	4	3	5	46
50	0510152	ROUTE 50 OVER TUCKAHOE RIVER	6	12	6	0	0	10	0	0	5	5	44
130	0317152	US 130 SB OVER ASSISCUNK CREEK	20	0	6	0	0	10	0	0	3	5	44
130	0316150	RT US 130 OVER POMPESTON CREEK	20	0	10	0	0	0	0	5	3	5	43
322	0119151	US 322 OVER HOSPITALITY BROOK	20	0	6	0	0	0	4	5	3	5	43
130	0319152	US RT. 130 OVER CROSSWICKS CREEK	20	0	10	0	0	0	0	4	3	5	42
206	0118152	US 206 OVER GREAT SWAMP BRANCH	20	0	10	0	0	0	4	0	3	5	42
47	0601150	RT 47 OVER MUSKEE CREEK	6	12	10	0	0	0	0	5	3	5	41
130	0818151	RT US 130 /BIG TIMBER CREEK	6	0	10	0	0	10	0	5	5	5	41
130	0317150	US 130 NB OVER ASSISCUNK CREEK	14	12	6	0	0	0	0	0	3	5	40
206	0118153	RT 206 OVER ALBERTSONS BROOK	20	0	10	0	0	0	0	2	3	5	40
206	0324155	US 206 OVER SO BR OF RANCOCAS CREEK	14	0	10	0	0	0	2	5	3	5	39
206	0324156	ROUTE US 206 OVER JADE RUN	6	12	10	0	0	0	0	2	3	5	38
55	0609151	ROUTE 55 NB OVER MANANTICO CREEK	6	12	6	0	0	0	0	5	3	5	37
55	0609152	RT 55 SB OVER MANANTICO CREEK	6	12	6	0	0	0	0	5	3	5	37
45	0810150	RT 45 OVER WOODBURY CREEK	20	0	6	0	0	0	0	2	3	5	36
154	0424151	RT 154 OVER NO BR COOPER RIVER	14	0	6	0	0	0	2	5	3	5	35
47	0601151	N.J.ROUTE 47 OVER MANUMUSKIN RIV.	6	0	6	0	0	10	0	2	5	5	34
322	0826150	US ROUTE 322 OVER SCOTLAND RUN	20	0	6	0	0	0	0	0	3	5	34
40	1703152	U.S.RTE 40 OVER BRANCH SALEM CRK.	14	0	6	0	0	0	0	5	3	5	33
45	0807152	RT45 OVER RACCOON CREEK	14	0	6	0	0	0	0	4	3	5	32
206	0324153	US 206 OVER MUSKINGUM CREEK	14	0	10	0	0	0	0	0	3	3	30
38	0408160	MILL ROAD/SO BR PENNSAUKEN CREEK	6	0	10	0	0	0	0	5	3	5	29
130	0817150	US RT 130 OVER BIG BIRCH CREEK	6	0	10	0	0	0	0	5	3	5	29