BSDMS Summary Report

36 Chemung River at S.R. 427 at Chemung, NY

Site Location:

Site ID: 36

Site Name: Chemung River at S.R. 427 at Chemung, NY

County: Chemung

Nearest City: Chemung

State: NY

Contact: Craig Mozrall, NYSDOT hydraulic engineer, Region 6 (607) 324-7580

Latitude: 420012

Longitude: 763812

USGS Station ID: 1531000

Route Number: 427

Route Class: State

Publication:

Service Level: Other

Route Direction: NA

Highway Mile Point:

Stream Name: Chemung River

River Mile:

Site Description:

The site is located at the State Road 427 bridge crossing the Chemung River at Chemung, New York. The bridge, 798 ft long and 47 ft wide with six concrete piers, is about 100 ft downstream from a USGS streamflow gage. A spur dike is located at the left abutment.

Clear-water scour is common at this site. High flow in 1972 undermined piers 2-6 and piles prevented a bridge collapse. Streambed material placed around piers in 1972-73 was eroded by high flow in 1975. It is uncertain whether riprap or bed material was placed at pier 1. Additional scour occurred during high flow in 1979. Riprap was placed at piers 1-2 (main channel) in 1988. Regulation has reduced high flows since 1979, but the scour hole at pier 1 has widened.

The scour data are entered for the date on which they were collected, although the scour and hydraulics are associated with the previous flood (scour measured from the 1980 data is associated with the 1979 flood). The 1979 scour is analyzed separately for the New York study. However, for the USGS national scour study the "total" local scour is the depth of scour that earlier high flows may have produced if the flow duration was sufficient to produce an equilibrium scour depth. Therefore, the local scour listed for 1979 includes the local scour during the 1975 high flow. In clear-water scour conditions, high-flow events leave remnant scour holes that subsequent high-flow events progressively deepen. The local scour reported here is referenced to concurrent ambient-bed level (equilibrium conditions assumed). A separate analysis of the progressive increase in scour from one event to the next is

being made by U.S. Geological Survey personnel in New York.
Significant contraction scour or general scour occurred in 1972, however, measured data are incomplete and are not included in this database. The USGS stage-discharge relation indicated filling of the low-water control followed by a gradual return to pre-flood elevations.
The streambed is armored by gravel. Bed-material samples were collected in a shallow area of the channel near the bridge. The D90 and D95 were not analyzed because of the accuracy of the limited data set.

Elevation Reference

Datum: MSL

MSL (ft):

Description of Reference Elevation:

USSB: RM = USGS tablet, right abutment. ELEVATION = 32.15 ft (gage datum).
gage datum = 778.63 ft.
RP = Wire-weight gage at station 595. ELEVATION = 35.57 ft (gage datum)
Left abutment = station -25
LE pier 6 = station 86
RE pier 6 = station 89
LE pier 5 = station 201
RE pier 5 = station 204
LE pier 4 = station 315
RE pier 4 = station 318
LE pier 3 = station 429
RE pier 3 = station 432
LE pier 2 = station 544
RE pier 2 = station 547
LE pier 1 = station 658
RE pier 1 = station 661
Right abutment= station 773
DSSB: RP = Chiseled square (lower section of slant) at station 630.

Stream Data

Drainage Area (sq mi):	2506	**Floodplain Width:**	Narrow
Slope in Vicinity(ft/ft):	0.00075	**Natural Levees:**	Both
Flow Impact:	Straight	**Apparent Incision:**	Apparent
Channel Evolution	Premodified	**Channel Boundary:**	Alluvial
Armoring:	High	**Banks Tree Cover:**	Medium
Debris Frequency:	Occasional	**Sinuosity:**	Sinuous
Debris Effect:	Unknown	**Braiding:**	Unknown
Stream Size:	Wide	**Anabranching:**	Unknown
Flow Habit:	Flashy	**Bars:**	Unknown

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Bed Material: Gravel

Stream Width Variability: Unknown

Valley Setting: Moderate

Roughness Data

Manning's n Values

	Left Overbank	Channel	Right Overbank
High:			
Typical	0.1	0.035	
Low:			

Bed Material

Measurement Number	Yr	Mo	Dy	Sampler	D95 (mm)	D84 (mm)	D50 (mm)	D16 (mm)	SP	Shape	Cohesion
1	1989	10	25	GRID	89	58	27	11	2.65		Non-Cohesive
2	1989	10	25	SHOVEL		36	15	1.7	2.65		Non-Cohesive

Bed Material Comments

Measurement No: 1

The streambed is armored by gravel. Bed-material samples were collected in a shallow area of the channel near the bridge. The sizes are based on 100 samples using a grid-sampling technique

Measurement No: 2

The streambed is armored by gravel. Bed-material samples were collected in a shallow area of the channel near the bridge. The D90 and D95 were not analyzed because of the accuracy of the limited data set.

Bridge Data

Structure No: 1061330

Length(ft): 798

Width(ft): 47

Number of Spans: 7

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Vertical Configuration: Horizontal

Low Chord Elev (ft): 808

Upper Chord Elev (ft):

Overtopping Elev (ft):

Skew (degrees): 0

Guide Banks: None

Waterway Classification: Main

Year Built: 1967

Avg Daily Traffic:

Plans on File: Yes

Parallel Bridges No

Upstream/Downstream: N/A

Continuous Abutment: No

Distance Between Centerlines:

Distance Between Pier Faces:

Bridge Description:

A major flood in 1972 undermined 5 of 6 piers. Pilings prevented a bridge collapse. Crews placed material (streambed) around the piers after the flood, but high flow in 1975 removed material. Riprap was placed at the main-
channel piers in 1988.

Abutment Data

Left Station: -25

Right Station: 773

Left Skew (deg): 0

Right Skew (deg) 0

Left Abutment Length (ft): 48

Right Abutment Length (ft) 48

Left Abutment to Channel Bank (ft): 450

Right Abutment to Channel Bank (ft): 50

Left Abutment Protection:

Right Abutment Protection

Contracted Opening Type: III

Embankment Skew (deg): 0

Embankment Slope (ft/ft): 2

Abutment Slope (ft/ft) 2

Wingwalls: No

Wingwall Angle (deg): 0

Pier Data

Pier ID	Bridge Station(ft)	Alignment	Highway Station	PierType	# Of Piles	Pile Spacing(ft)
1	660	0	660	Single	0	
2	545	0	545	Single	0	
3	430	0	430	Single	0	
4	316	0	316	Single	0	
5	202	0	202	Single	0	
6	87	0	87	Single	0	

Pier ID	Pier Width(ft)	Pier Shape	Shape Factor	Length(ft)	Protection	Foundation
1	5	Round		48	Riprap	Piles
2	5	Round		48	Riprap	Piles
3	5	Round		48	None	Piles
4	5	Round		48	None	Piles
5	5	Round		48	None	Piles
6	5	Round		48	None	Piles

Pier ID	Top Elevation(ft)	Bottom Elevation(ft)	Foot or Pile Cap Width(ft)	Cap Shape	Pile Tip Elevation(ft)
1	780.5			Unknown	

2	779.5	Unknown
3	778.5	Unknown
4	777.5	Unknown
5	776.5	Unknown
6	770.5	Unknown

Pier Description

Pier ID 1

Same as pier 6.

Pier ID 2

Same as pier 6.

Pier ID 3

Same as pier 6.

Pier ID 4

Same as pier 6.

Pier ID 5

Same as pier 6.

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Pier ID 6

This is a concrete pier with a 9-ft-wide, 3.5-ft-thick footing.

Pier Scour Data

Pier ID	Date	Time	USOrDS
1	10/23/70	0:00	Upstream
1	6/24/72	0:00	Upstream
2	10/23/70	0:00	Upstream
2	6/24/72	0:00	Upstream
2	3/25/80	0:00	Upstream
3	10/23/70	0:00	Upstream
3	6/24/72	0:00	Upstream
3	9/28/75	0:00	Upstream
3	3/25/80	0:00	Upstream
4	10/23/70	0:00	Upstream
4	6/24/72	0:00	Upstream
4	9/28/75	0:00	Upstream
4	3/25/80	0:00	Upstream
5	10/23/70	0:00	Upstream
5	6/24/72	0:00	Upstream
5	9/28/75	0:00	Upstream
5	3/25/80	0:00	Upstream
6	10/23/70	0:00	Upstream
6	6/24/72	0:00	Upstream
6	9/28/75	0:00	Upstream
6	3/25/80	0:00	Upstream

Pier ID	Scour Depth	Accuracy (ft)	Side Slope (ft/ft)	TopWidth (ft)	Apprch Vel (ft/s)	Apprch Depth(ft)	Effective Pier Width	Skew to Flow(deg)
1	1.7	0.5	9.5	38	6.5	12.5	5	0
1	5.1	0.5	7.9	64	13.4	27.3	5	0
2	0.9	0.5	31.2	75	6	12	5	0
2	4.1	0.5	12.9	109	12.9	31.1	5	0
2	3	0.5	7.3	79	8	16.2	5	0
3	0	0.5			5	11.2	5	0
3	3.9	0.5	7.6	61	12.3	31.4	5	0
3	2.3	0.5	14	70	10.4	19	5	0

3	3.3	0.5			7.6	12.6	5	0
4	0	0.5			3.3	7.8	5	0
4	4.3	1	10.5	95	11.2	31.9	5	0
4	1.9	0.5	17	85	9.5	18.7	5	0
4	0	0.5			7	12.3	5	0
5	0	0.5			2.5	6.7	5	0
5	3.9	0.5	7.8	60	10.5	26.5	5	0
5	1.9	0.5	20.5	86	8.9	17.8	5	0
5	0	0.5			6.5	11.8	5	0
6	0	0.5			1.6	5.7	5	0
6	2	0.5	11.4	112	8.7	19	5	0
6	0.9	0.5	16.6	30	7.4	12.4	5	0
6	0	0.5			5.4	8.5	5	0

PierID	Sediment Transport	Bed Material	BedForm	Trough (ft)	Crest (ft)	Sigma	Debris Effects
1	Unknown	Non-cohesive	Unknown			2.3	Unknown
1	Unknown	Non-cohesive	Unknown			2.3	Unknown
2	Unknown	Non-cohesive	Unknown			2.3	Unknown
2	Unknown	Non-cohesive	Unknown			2.3	Unknown
2	Clear-water	Non-cohesive	Unknown			2.3	Unknown
3	Unknown	Non-cohesive	Unknown			2.3	Unknown
3	Unknown	Non-cohesive	Unknown			2.3	Unknown
3	Unknown	Non-cohesive	Unknown			2.3	Unknown
3	Clear-water	Non-cohesive	Unknown			2.3	Unknown
4	Unknown	Non-cohesive	Unknown			2.3	Unknown
4	Unknown	Non-cohesive	Unknown			2.3	Unknown
4	Unknown	Non-cohesive	Unknown			2.3	Unknown
4	Clear-water	Non-cohesive	Unknown			2.3	Unknown
5	Unknown	Non-cohesive	Unknown			2.3	Unknown
5	Unknown	Non-cohesive	Unknown			2.3	Unknown
5	Unknown	Non-cohesive	Unknown			2.3	Unknown
5	Clear-water	Non-cohesive	Unknown			2.3	Unknown

6	Unknown	Non-cohesive	Unknown	2.3	Unknown
6	Unknown	Non-cohesive	Unknown	2.3	Unknown
6	Unknown	Non-cohesive	Unknown	2.3	Unknown
6	Clear-water	Non-cohesive	Unknown	2.3	Unknown

PierID	D95 (mm)	D84 (mm)	D50 (mm)	D16 (mm)
1	89	58	27	11
1	89	58	27	11
2	89	58	27	11
2	89	58	27	11
2	89	58	27	11
3	89	58	27	11
3	89	58	27	11
3	89	58	27	11
3	89	58	27	11
4	89	58	27	11
4	89	58	27	11
4	89	58	27	11
4	89	58	27	11
5	89	58	27	11
5	89	58	27	11
5	89	58	27	11
5	89	58	27	11
6	89	58	27	11
6	89	58	27	11
6	89	58	27	11
6	89	58	27	11

Pier Scour Comments

Pier ID 1 **Time:** 0:00 **US/DS:** Upstream

USGS measurement #653, 10-23-70. Scour based on ambient bed from station 640.

Pier ID 1 **Time:** 0:00 **US/DS:** Upstream

USGS measurement #675, 06-24-72. Scour based on ambient bed from station 603 and ambient bed from station 600-640 of measurement #653 (1970).

Pier ID 2 **Time:** 0:00 **US/DS:** Upstream

USGS measurement #653, 10-23-70. Scour based on ambient bed from station 520 to 580.

Pier ID 2 **Time:** 0:00 **US/DS:** Upstream

USGS measurement #675, 06-24-72. Scour based on ambient bed from station 470 to 590 of measurement #676 (6-25-72).

Pier ID 2 **Time:** 0:00 **US/DS:** Upstream

USGS measurement #736, 03-25-80. Elevation of scour hole dropped 0.8 ft from measurement #708 (1975) to measurement #736 (1980). Added to the previous local scour of 2.2 ft results in 3.0 ft "total" local scour used in USGS national scour study. Each scour is analyzed separately in the New York study.

Pier ID 3 **Time:** 0:00 **US/DS:** Upstream

USGS measurement #653, 10-23-70. Zero scour was measured.

Pier ID 3 **Time:** 0:00 **US/DS:** Upstream

USGS measurement #675, 06-24-72. Scour based on ambient bed from station 395 to 457.

Pier ID 3 **Time:** 0:00 **US/DS:** Upstream

USGS measurement #708, 09-28-75. Scour based on ambient bed from station 436 of measurement #680, 8-18-72 (streambed material placed around pier).

Pier ID 3 **Time:** 0:00 **US/DS:** Upstream

USGS measurement #736, 03-25-80. Elevation of scour hole dropped 1.0 ft from measurement #708 (1975) to measurement #736 (1980). Added to 2.3 ft previous local scour results in 3.3 ft "total" local scour used in USGS national scour study. The New York study analyzes this scour separately.

Pier ID 4 **Time:** 0:00 **US/DS:** Upstream

USGS measurement #653, 10-23-70. Zero scour was measured.

Pier ID 4 **Time:** 0:00 **US/DS:** Upstream

USGS measurement #675, 06-24-72. Scour based on ambient bed from station 278 to 345. Other supporting data were used to help define the ambient bed.

Pier ID 4 **Time:** 0:00 **US/DS:** Upstream

USGS measurement #708, 09-28-75. Scour based on ambient bed from station 285.

Pier ID 4 **Time:** 0:00 **US/DS:** Upstream

USGS measurement #736, 03-25-80. Zero scour was measured.

Pier ID 5 **Time:** 0:00 **US/DS:** Upstream

USGS measurement # 653, 10-23-70. Zero scour was measured.

Pier ID 5 **Time:** 0:00 **US/DS:** Upstream

USGS measurement #675, 06-24-72. Scour based on ambient bed from station 165 to 228.

Pier ID 5 **Time:** 0:00 **US/DS:** Upstream

USGS measurement # 708, 09-28-75. Scour depth based on ambient bed at station 245.

Pier ID 5 **Time:** 0:00 **US/DS:** Upstream

USGS measurement # 736, 03-25-80. Zero scour was measured.

Pier ID 6 **Time:** 0:00 **US/DS:** Upstream

USGS measurement #653, 10-23-70. Zero scour was measured.

Pier ID 6 **Time:** 0:00 **US/DS:** Upstream

USGS measurement #675, 06-24-72. Scour depth is based on ambient bed from station 70 to 115.

Pier ID 6 **Time:** 0:00 **US/DS:** Upstream

USGS measurement #708, 09-28-75. Scour depth is based on ambient bed from station 90.

Pier ID 6 **Time:** 0:00 **US/DS:** Upstream

USGS measurement #736, 03-25-80. Zero scour was measured.

Abutment Scour

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ContractionScour

Stage and Discharge Data

Peak Discharge					Flow		Peak Stage					Stage	Water	Return
year	mo	dy	hr	mi	(cfs)	Qacc	year	mo	dy	hr	mi	(ft)	Temp (C)	Period(yr)
1972	6	23		0	189000	5	1972	6	23		0	810.25	20	500
1975	9	27		0	125000	5	1975	9	27		0	802.73	17	60
1979	3	6		0	61500	5	1979	3	6		0	796.87	2	4
1970	4	3		0	34600	5	1970	4	3		0	792.78	5	1

Hydrograph

Hydrograph Number	Year	Month	Day	Hr	Min	Sec	Stage(ft)	Discharge (cfs)

Supporting Files