

BSDMS Summary Report

16 Assawoman Bay at S.R. 54 near Fenwick Island, DE

Site Location:

Site ID: 16

Site Name: Assawoman Bay at S.R. 54 near Fenwick Island, DE

County: Sussex

Nearest City: Fenwick Island

State: DE

Latitude: 382720

Longitude: 750400

USGS Station ID: 1484702

Route Number: 54

Route Class: State

Service Level: Mainline

Route Direction: NA

Highway Mile Point:

Stream Name: Assawoman Bay

River Mile:

Contact:
USGS
3600 West Broad Street Suite 606
Richmond, VA 23230
(804) 771-2427

Publication:
Hayes, Donald C., 1993, Site
Selection and Collection of Bridge-
Scour Data in Delaware, Maryland,
and Virginia: U.S. Geological
Survey Water-Resources
Investigations Report 93-4017, 23
p.

Site Description:

This site is located at the State Highway 54 bridge crossing the waterway connecting Assawoman Bay and Little Assawoman Bay near Fenwick Island, Delaware. The waterway is connected to the Atlantic Ocean 10 miles to the north and 8 miles to the south. The bridge connects the mainland to the island. The bridge is 440 ft long and is supported by 10 pile bents spaced 40 ft apart. The piles extend from the silt and sand below the mud line, through a concrete strut--located approximately at the high-water line--to pile caps located just under the bridge structure. (Pile bents J and K do not have struts.) Both abutments have riprap protection. The flow is tide affected and may reverse directions, but the predominant flow tends to be from south to north. The flow may not reverse when strong winds are coming from the southeast. (The west side of the channel is always considered the left edge, regardless of the direction of flow.) The bridge is arched and should not be overtopped. A large number of small boats use the waterway.

Elevation Reference

Datum: MSL

MSL (ft):

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Description of Reference Elevation:

The elevations entered here are values from the bridge plans adjusted to mean sea level (MSL). Surveys tying the bridge to MSL indicated that the plan elevations are not MSL elevations.

Stream Data

Drainage Area (sq mi):		Floodplain Width:	Little
Slope in Vicinity(ft/ft):		Natural Levees:	Little
Flow Impact:	Straight	Apparent Incision:	None
Channel Evolution	Unknown	Channel Boundary:	Alluvial
Armoring:	None	Banks Tree Cover:	Low
Debris Frequency:	None	Sinuosity:	Straight
Debris Effect:	None	Braiding:	None
Stream Size:	Medium	Anabranching:	None
Flow Habit:	Perennial	Bars:	Narrow
Bed Material:	Sand	Stream Width Variability:	Equiwidth
Valley Setting:	None		

Roughness Data

Manning's n Values

	Left Overbank	Channel	Right Overbank
High:		0.03	
Typical		0.03	
Low:		0.03	

Bed Material

Measurement Number	Yr	Mo	Dy	Sampler	D95 (mm)	D84 (mm)	D50 (mm)	D16 (mm)	SP	Shape	Cohesion
1	1992	8	20	BMH-60	0.65	0.4	0.18	0.09	2.65		Non-Cohesive

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Bed Material Comments

Measurement No: 1

Bridge Data

Structure No: 437
Length(ft): 440
Width(ft): 39
Number of Spans: 11
Vertical Configuration: Unknown
Low Chord Elev (ft): 11.24
Upper Chord Elev (ft): 13.62
Overtopping Elev (ft): 14.24
Skew (degrees): 0
Guide Banks: None
Waterway Classification: Main
Year Built: 1957
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:

The bridge is 440 ft long and is supported by 10 pile bents spaced 40 ft apart. The piles extend from the silt and sand below the mud line, through a concrete strut--located approximately at the high-water line--to pile caps located just under the bridge structure. (Pile bents J and K do not have struts.) Both abutments have riprap protection.

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Abutment Data

Left Station: 0
Right Station: 440
Left Skew (deg): 0
Right Skew (deg) 0
Left Abutment Length (ft): 44
Right Abutment Length (ft) 44
Left Abutment to Channel Bank (ft): 10
Right Abutment to Channel Bank (ft): 25
Left Abutment Protection:
Right Abutment Protection
Contracted Opening Type: IV
Embankment Skew (deg): 0
Embankment Slope (ft/ft): 1
Abutment Slope (ft/ft)
Wingwalls: Yes
Wingwall Angle (deg): 30

Pier Data

Pier ID	Bridge Station(ft)	Alignment	Highway Station	PierType	# Of Piles	Pile Spacing(ft)
B	38.6	0	360	Group	8	5.2
C	78.5	0	400	Group	8	5.2
D	118.5	0	440	Group	8	5.2
E	158.5	0	480	Group	8	5.2
F	198.5	0	520	Group	8	5.2
G	238.5	0	560	Group	8	5.2

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H	278.5	0	600	Group	8	5.2
I	318.5	0	640	Group	8	5.2
J	358.5	0	680	Group	8	5.2
K	398.5	0	720	Group	8	5.2

Pier ID	Pier Width(ft)	Pier Shape	Shape Factor	Length(ft)	Protection	Foundation
B	2.5	Cylindrical		43	Other	Piles
C	2.5	Cylindrical		43	Other	Piles
D	2.5	Cylindrical		43	Other	Piles
E	2.5	Cylindrical		43	Other	Piles
F	2.5	Cylindrical		43	Other	Piles
G	2.5	Cylindrical		43	Other	Piles
H	2.5	Cylindrical		43	Other	Piles
I	2.5	Cylindrical		43	Other	Piles
J	2.5	Cylindrical		43	Other	Piles
K	2.5	Cylindrical		43	Other	Piles

Pier ID	Top Elevation(ft)	Bottom Elevation(ft)	Foot or Pile Cap Width(ft)	Cap Shape	Pile Tip Elevation(ft)
B	12.02	9.02	3	Square	-10
C	12.66	9.66	3	Square	-9.5
D	13.14	10.14	3	Square	-9
E	13.46	10.46	3	Square	-8.5
F	13.62	10.62	3	Square	-8.5
G	13.62	10.62	3	Square	-8.5
H	13.46	10.46	3	Square	-8.5
I	13.14	10.14	3	Square	-9
J	12.66	9.66	3	Square	-9.5
K	12.02	9.02	3	Square	-10

Pier Description

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Pier ID B

The pile bent has eight 18-inch-wide piles. The first and last piles are battered at an angle of one horizontal to 4 vertical. A 3 by 2.5-ft concrete strut is just above the high-water line. A grout-filled nylon bag with minimum thickness of 6 inches covers the piles from the strut to the mud line.

Pier ID C

The pile bent has eight 18-inch-wide piles. The first and last piles are battered at an angle of one horizontal to 4 vertical. A 3 by 2.5-ft concrete strut is just above the high-water line. A grout-filled nylon bag with minimum thickness of 6 inches covers the piles from the strut to the mud line.

Pier ID D

The pile bent has eight 18-inch-wide piles. The first and last piles are battered at an angle of one horizontal to 4 vertical. A 3 by 2.5-ft concrete strut is just above the high-water line. A grout-filled nylon bag with minimum thickness of 6 inches covers the piles from the strut to the mud line. The pile bent has eight 18-inch-wide piles.

Pier ID E

The pile bent has eight 18-inch-wide piles. The first and last piles are battered at an angle of one horizontal to 4 vertical. A 3 by 2.5-ft concrete strut is just above the high-water line. A grout-filled nylon bag with minimum thickness of 6 inches covers the piles from the strut to the mud line.

Pier ID F

The pile bent has eight 18-inch-wide piles. The first and last piles are battered at an angle of one horizontal to 4 vertical. A 3 by 2.5-ft concrete strut is just above the high-water line. A grout-filled nylon bag with minimum thickness of 6 inches covers the piles from the strut to the mud line.

Pier ID G

The pile bent has eight 18-inch-wide piles. The first and last piles are battered at an angle of one horizontal to 4 vertical. A 3 by 2.5-ft concrete strut is just above the high-water line. A grout-filled nylon bag with minimum thickness of 6 inches covers the piles from the strut to the mud line.

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Pier ID H

The pile bent has eight 18-inch-wide piles. The first and last piles are battered at an angle of one horizontal to 4 vertical. A 3 by 2.5-ft concrete strut is just above the high-water line. A grout-filled nylon bag with minimum thickness of 6 inches covers the piles from the strut to the mud line.

Pier ID I

The pile bent has eight 18-inch-wide piles. The first and last piles are battered at an angle of one horizontal to 4 vertical. A 3 by 2.5-ft concrete strut is just above the high-water line. A grout-filled nylon bag with minimum thickness of 6 inches covers the piles from the strut to the mud line.

Pier ID J

The pile bent has eight 18-inch-wide piles. The first and last piles are battered at an angle of one horizontal to 4 vertical. This pile bent does not have a strut. A grout-filled nylon bag with minimum thickness of 6 inches covers the piles from the mud line upward 3.8 ft.

Pier ID K

The pile bent has eight 18-inch-wide piles. The first and last piles are battered at an angle of one horizontal to 4 vertical. This pile bent does not have a strut. A grout-filled nylon bag with minimum thickness of 6 inches covers the piles from the mud line upward 3.8 ft.

Pier Scour Data

Pier ID	Date	Time	USOrDS
C	9/24/91	14:00	Upstream
C	6/8/92	9:00	Upstream
C	6/8/92	10:30	Upstream
E	9/24/91	14:00	Upstream
E	6/8/92	9:00	Upstream
E	6/8/92	10:30	Upstream
F	9/24/91	14:00	Upstream
F	6/8/92	9:00	Upstream
F	6/8/92	10:30	Upstream
G	9/24/91	14:00	Upstream
G	6/8/92	10:30	Upstream
H	6/8/92	9:00	Upstream
H	6/8/92	10:30	Upstream

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I 6/8/92 9:00 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)
C	2.4	1	7	33	0.88	10.4	2.5	0
C	1.7	1	6.5	22	1.08	10.1	2.5	0
C	1.1	1	7.5	17	0.84	10.2	2.5	0
E	5.2	1	4	44	1.13	26.2	2.5	0
E	4.5	1	4.5	41	1.55	25.5	2.5	0
E	4.5	1	5.5	50	1.58	25.5	2.5	0
F	1.5	1	9	27	1.42	23.4	2.5	0
F	4	1	5	39	1.67	25	2.5	0
F	4	1	4.5	35	1.62	24.8	2.5	0
G	1.4	1	2	3	0.92	12.6	2.5	0
G	0.5	1	7	3.5	1.04	12.2	2.5	0
H	1.5	1	7.5	23	0.8	4.9	2.5	0
H	1.5	1	7	21	0.6	4.8	2.5	0
I	0.7	1	15	20	0.72	1	2.5	0

PierID	Sediment Transport	Bed Material	BedForm	Trough (ft)	Crest (ft)	Sigma	Debris Effects
C	Unknown	Unknown	Unknown			2.03	Unknown
C	Unknown	Unknown	Unknown			2.03	Unknown
C	Unknown	Unknown	Unknown			2.03	Unknown
E	Unknown	Unknown	Unknown			2.03	Unknown
E	Unknown	Unknown	Unknown			2.03	Unknown
E	Unknown	Unknown	Unknown			2.03	Unknown
F	Unknown	Unknown	Unknown			2.03	Unknown
F	Unknown	Unknown	Unknown			2.03	Unknown
F	Unknown	Unknown	Unknown			2.03	Unknown
G	Unknown	Unknown	Unknown			2.03	Unknown
G	Unknown	Unknown	Unknown			2.03	Unknown
H	Unknown	Unknown	Unknown			2.03	Unknown
H	Unknown	Unknown	Unknown			2.03	Unknown
I	Unknown	Unknown	Unknown			2.03	Unknown

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PierID	D95 (mm)	D84 (mm)	D50 (mm)	D16 (mm)
C	0.65	0.37	0.18	0.09
C	0.65	0.37	0.18	0.09
C	0.65	0.37	0.18	0.09
E	0.65	0.37	0.18	0.09
E	0.65	0.37	0.18	0.09
E	0.65	0.37	0.18	0.09
F	0.65	0.37	0.18	0.06
F	0.65	0.37	0.18	0.06
F	0.65	0.37	0.18	0.06
G	0.65	0.37	0.18	0.06
G	0.65	0.37	0.18	0.06
H	0.65	0.37	0.18	0.06
H	0.65	0.37	0.18	0.06
I	0.65	0.37	0.18	0.06

Pier Scour Comments

Pier ID	C	Time:	14:00	US/DS:	Upstream
Pier ID	C	Time:	9:00	US/DS:	Upstream
Pier ID	C	Time:	10:30	US/DS:	Upstream
Pier ID	E	Time:	14:00	US/DS:	Upstream
Pier ID	E	Time:	9:00	US/DS:	Upstream

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Pier ID	E	Time:	10:30	US/DS:	Upstream
Pier ID	F	Time:	14:00	US/DS:	Upstream
Pier ID	F	Time:	9:00	US/DS:	Upstream
Pier ID	F	Time:	10:30	US/DS:	Upstream
Pier ID	G	Time:	14:00	US/DS:	Upstream
Pier ID	G	Time:	10:30	US/DS:	Upstream
Pier ID	H	Time:	9:00	US/DS:	Upstream
Pier ID	H	Time:	10:30	US/DS:	Upstream
Pier ID	I	Time:	9:00	US/DS:	Upstream

Abutment Scour

Contraction Scour

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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)

Hydrograph

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