

# BSDMS Summary Report

46 Scioto River at S.R. 4 near Prospect, OH

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## Site Location:

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**Site ID:** 46

**Site Name:** Scioto River at S.R. 4 near Prospect, OH

**County:** Marion

**Nearest City:** Prospect

**State:** OH

**Latitude:** 402902

**Longitude:** 831128

**USGS Station ID:**

**Route Number:** 4

**Route Class:** State

**Service Level:** Mainline

**Route Direction:** NA

**Highway Mile Point:** 3.45

**Stream Name:** Scioto River

**River Mile:**

**Contact:**  
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or  
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**Publication:**  
Jackson, K.S., 1996, Evaluation of  
bridge-scour data at selected  
sites in Ohio: U.S. Geological  
Survey Water-Resources  
Investigations Report 97-4182.

## Site Description:

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This site was approximately 2 miles north of Prospect, Ohio at the State Route 4 bridge crossing the Scioto River, near the junction of Routes 4 and 203. The bridge was replaced in 1991 with a new structure with T-type (hammerhead) piers. Therefore, scour measurement was discontinued at this site. Bed-material samples were collected during annual low-flow surveys.

Notes: All piers are referenced numerically, increasing from left to right, when viewing the upstream face of the bridge while facing in the downstream direction.  
Slope in Vicinity (reported in Stream Site Data) is estimated from USGS 7.5-minute quadrangle topographic maps.  
Water-surface slope (if reported in Pier Scour Data comments section) is the measured slope between water surfaces at the approach and bridge sections during the scour measurement.

## Elevation Reference

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**Datum:** MSL

**MSL (ft):** 0

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## Description of Reference Elevation:

RM1 - chiseled square on top of left upstream abutment (Destroyed in 1991)  
MSL elevation = 915.27 ft.  
RM3 - Lag bolt 2 ft above ground in power pole on left upstream bank 60 ft  
upstream from the bridge.  
MSL elevation = 903.19 ft.

## Stream Data

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<b>Drainage Area</b> (sq mi):	528	<b>Floodplain Width:</b>	Narrow
<b>Slope in</b> <b>Vicinity(ft/ft):</b>	0.00008	<b>Natural Levees:</b>	Little
<b>Flow Impact:</b>	Straight	<b>Apparent Incision:</b>	None
<b>Channel Evolution</b>	Premodified	<b>Channel Boundary:</b>	Alluvial
<b>Armoring:</b>	None	<b>Banks Tree Cover:</b>	Medium
<b>Debris Frequency:</b>	Frequent	<b>Sinuosity:</b>	Straight
<b>Debris Effect:</b>	Local	<b>Braiding:</b>	None
<b>Stream Size:</b>	Medium	<b>Anabranching:</b>	None
<b>Flow Habit:</b>	Perennial	<b>Bars:</b>	Unknown
<b>Bed Material:</b>	Sand	<b>Stream Width</b> <b>Variability:</b>	Equiwidth
<b>Valley Setting:</b>	Low		

## Roughness Data

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### Manning's n Values

	Left Overbank	Channel	Right Overbank
<b>High:</b>	0.065	0.03	0.055
<b>Typical</b>	0.06	0.028	0.045
<b>Low:</b>	0.055	0.028	0.04

## Bed Material

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Measurement Number	Yr	Mo	Dy	Sampler	D95 (mm)	D84 (mm)	D50 (mm)	D16 (mm)	SP	Shape	Cohesion
BR	1990	9	13	HAND	6.5	3	0.43	0.09	2.65		Cohesive

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P1	1990	9	13	HAND	0.7	0.4	0.17	0.03	2.65	Cohesive
P2	1990	9	13	HAND	8	5.5	1.6	0.06	2.65	Mildly

## Bed Material Comments

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**Measurement No:** BR

Bridge-section composite sample, collected along the upstream bridge face.

**Measurement No:** P1

Sample collected at the upstream face of Pier 1.

**Measurement No:** P2

Sample collected at the upstream face of Pier 2.

## Bridge Data

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**Structure No:** MAR-4-0345

**Length(ft):** 219

**Width(ft):** 28

**Number of Spans:** 3

**Vertical Configuration:** Horizontal

**Low Chord Elev (ft):** 905

**Upper Chord Elev (ft):** 909.8

**Overtopping Elev (ft):** 909.8

**Skew (degrees):** 25

**Guide Banks:** None

**Waterway Classification:** Main

**Year Built:** 1935

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**Avg Daily Traffic:**

**Plans on File:** Yes

**Parallel Bridges** No

**Upstream/Downstream:** Unknown

**Continuous Abutment:** No

**Distance Between Centerlines:**

**Distance Between Pier Faces:**

## **Bridge Description:**

The bridge is of reinforced-concrete, steel-beam construction. The site plans are dated 1933, and it is assumed construction was completed in 1935.

Note: All bridge elevation data in this section was obtained from the 1933 site plans, the msl datum was reported revised by 4.06 feet in 1965.

## **Abutment Data**

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**Left Station:** 15.3256

**Right Station:** 17.5744

**Left Skew (deg):** 0

**Right Skew (deg)** 0

**Left Abutment Length (ft):** 74.25

**Right Abutment Length (ft)** 74.25

**Left Abutment to Channel Bank (ft):** 30

**Right Abutment to Channel Bank (ft):** 20

**Left Abutment Protection:**

**Right Abutment Protection**

**Contracted Opening Type:** I

**Embankment Skew (deg):** 25

**Embankment Slope (ft/ft):** 2

**Abutment Slope (ft/ft)** 2

**Wingwalls:** No

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Wingwall Angle (deg): 0

## Pier Data

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Pier ID	Bridge Station(ft)	Alignment	Highway Station	PierType	# Of Piles	File Spacing(ft)
1	66.9	25	16.875	Single	0	
2	152	25	16.025	Single	0	

Pier ID	Pier Width(ft)	Pier Shape	Shape Factor	Length(ft)	Protection	Foundation
1	3.75	Sharp		33.4	None	Piles
2	3.75	Sharp		33.4	None	Piles

Pier ID	Top Elevation(ft)	Bottom Elevation(ft)	Foot or Pile Cap Width(ft)	Cap Shape	File Tip Elevation(ft)
1	887.81	884.81	7.4	Square	859.81
2	887.63	884.63	7.4	Square	859.63

## Pier Description

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Pier ID 1

The concrete pier is a solid wall with a segmented, triangular-shaped face. The pier width tapers from 3.75 ft at the footer to 2.75 ft at the top. Note: All bridge elevation data in this section was obtained from the 1933 site plans, the msl datum was revised in 1965 by 4.06 feet.

Pier ID 2

The concrete pier is a solid wall with a segmented, triangular-shaped face. The pier width tapers from 3.75 ft at the footer to 2.75 ft at the top. Note: All bridge elevation data in this section was obtained from the 1933 site plans, the msl datum was revised in 1965 by 4.06 feet.

## Pier Scour Data

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Pier ID	Date	Time	USOrDS
1	5/14/90	16:05	Upstream
1	5/18/90	10:50	Upstream
1	12/31/90	11:55	Upstream

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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	0.7	0.5	6.9	10	1.2	6	3.75	8
1	0.4	0.5	10.2	7	1.6	8.3	3.75	8
1	0.5	0.5	4.8	9	2.5	13.9	3.75	8

PierID	Sediment Transport	Bed Material	BedForm	Trough (ft)	Crest (ft)	Sigma	Debris Effects
1	Clear-water	Non-cohesive	Unknown			3.5	Moderate
1	Clear-water	Non-cohesive	Unknown			3.5	Insignificant
1	Live-bed	Non-cohesive	Unknown			3.5	Insignificant

PierID	D95 (mm)	D84 (mm)	D50 (mm)	D16 (mm)
1	0.7	0.36	0.165	0.03
1	0.7	0.36	0.165	0.03
1	0.7	0.36	0.165	0.03

## Pier Scour Comments

Pier ID 1 Time: 16:05 US/DS: Upstream

Field data indicates the possibility that debris was near the pier during scour measurement. Soundings could be made in the vicinity of pier 1 with effort. Water-surface slope was 0.00018.

Pier ID 1 Time: 10:50 US/DS: Upstream

Water-surface slope was 0.00029.

Pier ID 1 Time: 11:55 US/DS: Upstream

Water-surface slope was 0.00043.

## Abutment Scour

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## ContractionScour

Measurement Number	Contracted Date	Contracted Time	Uncontracted Date	Uncontracted Time	US/DS	Scour Depth(ft)
1	12/31/90	11:00	7/8/92			0.5

Measurement Number	Accuracy	Contracted Avg Vel(ft/s)	Contracted Discharge(cfs)	Contracted Depth(ft)	Contracted Width(ft)
1	0.5	2.52	3220	16.7	67

Measurement Number	Uncontracted Avg Vel(ft/s)	Uncontracted Discharge(cfs)	Uncontracted Depth(ft)	Uncontracted Width(ft)	Channel Contraction Ratio
1	1.88	5470	16.3	120	0.085

Measurement Number	Pier Contraction Ratio	Scour Location	Eccentricity	Sediment Transport	Bed Form	Debris Effects
1	0.035	Floodplain	0	Clear-water	Unknown	Unknown

Measurement Number	D95 (mm)	D84 (mm)	D50 (mm)	D16 (mm)	Sigma Bed Material	Bed Material
1	6.5	3	0.43	0.094	5.6	Cohesive

## Contraction Scour Comments

Measurement No. 1

The data for the contracted section were measured from the bridge deck during the flood event on the specified date. The geometry of the reference uncontracted section was measured during low flow. The hydraulic data for the uncontracted section were estimated using WSPRO to estimate the approach hydraulics for the reference channel geometry and the flood discharge observed on the date of the contracted section measurement.

## Stage and Discharge Data

Peak Discharge					Flow (cfs)	Qacc	Peak Stage					Stage (ft)	Water Temp (C)	Return Period(yr)
year	mo	dy	hr	mi			year	mo	dy	hr	mi			
1990	12	31	11:55	55	7750	10					0	4	2	
1990	5	18	10:50	50	3060	5					0	15.5		
1990	5	14	16:05	5	1810	5					0	13		

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## Hydrograph

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

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