

# BSDMS Summary Report

64 Maumee River at U.S. 127 near Sherwood, OH

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## Site Location:

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**Site ID:** 64

**Site Name:** Maumee River at U.S. 127 near Sherwood, OH

**County:** Defiance

**Nearest City:** Sherwood

**State:** OH

**Latitude:** 411536

**Longitude:** 843314

**USGS Station ID:**

**Route Number:** 127

**Route Class:** US

**Service Level:** Mainline

**Route Direction:** North

**Highway Mile Point:** 0.53

**Stream Name:** Maumee River

**River Mile:**

**Contact:**  
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U.S. Geological Survey  
614-469-5553  
75 West Third Ave.  
Columbus, Ohio 43212  
or  
William Krouse  
Ohio Department of Transportation  
614-466-2398  
25 South Front St.  
Columbus, Ohio 43216

**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 is located at the US 127 bridge near Sherwood, Defiance County, Ohio. The site is located approximately 800 feet upstream of Penn Central rail line The Ohio Department of Transportation (ODOT) bridge identification is "DEF-127-0053".

Bed-material samples were collected during an annual low-flow survey.

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):**

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## Description of Reference Elevation:

BM1 - ODOT brass tablet on downstream left wingwall.  
MSL elevation = 703.17

## Stream Data

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|                           |             |                           |            |
|---------------------------|-------------|---------------------------|------------|
| Drainage Area (sq mi):    | 2276        | Floodplain Width:         | Narrow     |
| Slope in Vicinity(ft/ft): | 0.00022     | Natural Levees:           | Little     |
| Flow Impact:              | Straight    | Apparent Incision:        | None       |
| Channel Evolution         | Premodified | Channel Boundary:         | Alluvial   |
| Armoring:                 | Partial     | Banks Tree Cover:         | Medium     |
| Debris Frequency:         | Occasional  | Sinuosity:                | Meandering |
| Debris Effect:            | Local       | Braiding:                 | None       |
| Stream Size:              | Medium      | Anabranching:             | Locally    |
| Flow Habit:               | Perennial   | Bars:                     | Narrow     |
| Bed Material:             | Gravel      | Stream Width Variability: | Equiwidth  |
| Valley Setting:           | Low         |                           |            |

## Roughness Data

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### Manning's n Values

|         | Left Overbank | Channel | Right Overbank |
|---------|---------------|---------|----------------|
| High:   | 0.085         | 0.045   | 0.09           |
| Typical | 0.075         | 0.04    | 0.085          |
| Low:    | 0.07          | 0.038   | 0.075          |

## Bed Material

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| Measurement Number | Yr   | Mo | Dy | Sampler | D95 (mm) | D84 (mm) | D50 (mm) | D16 (mm) | SP   | Shape | Cohesion |
|--------------------|------|----|----|---------|----------|----------|----------|----------|------|-------|----------|
| AP-1               | 1992 | 10 | 7  |         | 45       | 36       | 20.5     | 2.2      | 2.65 |       | Unknown  |
| AP-2               | 1993 | 6  | 17 |         | 23       | 21       | 5.1      | 0.05     | 2.65 |       | Unknown  |

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|      |      |    |    |      |      |      |      |      |         |
|------|------|----|----|------|------|------|------|------|---------|
| AP-3 | 1994 | 7  | 20 | 58   | 31   | 17   | 3.6  | 2.65 | Unknown |
| BR-1 | 1990 | 11 | 21 | 42   | 29   | 9.6  | 0.61 | 2.65 | Unknown |
| BR-2 | 1991 | 9  | 17 | 68   | 52   | 10.3 | 1.6  | 2.65 | Unknown |
| BR-3 | 1992 | 10 | 7  | 26.5 | 20   | 7.6  | 0.85 | 2.65 | Unknown |
| BR-4 | 1993 | 6  | 17 | 40   | 28   | 13   | 0.48 | 2.65 | Unknown |
| BR-5 | 1994 | 7  | 20 | 40   | 26   | 8.5  | 0.2  | 2.65 | Unknown |
| P1-1 | 1990 | 11 | 21 | 69   | 57   | 8.5  | 1.55 | 2.65 | Unknown |
| P1-2 | 1991 | 9  | 17 | 44   | 16   | 1.33 | 0.04 | 2.65 | Unknown |
| P1-3 | 1992 | 10 | 7  | 0.15 | 0.08 | 0.02 |      | 2.65 | Unknown |
| P1-4 | 1993 | 6  | 17 | 42   | 32   | 17   | 2.4  | 2.65 | Unknown |
| P1-5 | 1994 | 7  | 20 | 59   | 38   | 19   | 4.8  | 2.65 | Unknown |
| P2-1 | 1990 | 11 | 21 | 45   | 34   | 18.5 | 4.4  | 2.65 | Unknown |
| P2-2 | 1991 | 9  | 17 | 53   | 44   | 17.3 | 4.1  | 2.65 | Unknown |
| P2-3 | 1992 | 10 | 7  | 24   | 19   | 12   | 2.8  | 2.65 | Unknown |
| P2-4 | 1993 | 6  | 17 | 41   | 32   | 18   | 6    | 2.65 | Unknown |

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|------|------|----|----|------|------|-------|-------|------|---------|
| P2-5 | 1994 | 7  | 20 |      | 27   | 8.8   | 2.65  |      | Unknown |
| P3-1 | 1990 | 11 | 21 | 23.5 | 15   | 2.85  | 0.8   | 2.65 | Unknown |
| P3-2 | 1991 | 9  | 17 | 6.6  | 3    | 1.3   | 0.34  | 2.65 | Unknown |
| P3-3 | 1992 | 10 | 7  | 14   | 8.8  | 2.85  | 0.18  | 2.65 | Unknown |
| P3-4 | 1993 | 6  | 17 | 7.9  | 1.8  | 1     | 0.4   | 2.65 | Unknown |
| P3-5 | 1994 | 7  | 20 | 18   | 13   | 6.2   | 0.5   | 2.65 | Unknown |
| P4-1 | 1990 | 11 | 21 | 0.25 | 0.1  | 0.28  |       | 2.65 | Unknown |
| P4-2 | 1991 | 9  | 17 | 0.27 | 0.06 | 0.008 |       | 2.65 | Unknown |
| P4-3 | 1992 | 10 | 7  | 0.08 | 0.06 | 0.01  |       | 2.65 | Unknown |
| P4-4 | 1993 | 6  | 17 | 0.19 | 0.5  | 0.03  |       | 2.65 | Unknown |
| P4-5 | 1994 | 7  | 20 | 0.36 | 0.1  | 0.02  | 0.004 | 2.65 | Unknown |

## Bed Material Comments

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Measurement No: AP-1

Approach-section composite sample

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**Measurement No:** AP-2

Approach-section composite sample

**Measurement No:** AP-3

Approach-section composite sample

**Measurement No:** BR-1

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

**Measurement No:** BR-2

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

**Measurement No:** BR-3

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

**Measurement No:** BR-4

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

**Measurement No:** BR-5

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

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**Measurement No:** P1-1

Sample collected at the upstream face of pier 1

**Measurement No:** P1-2

Sample collected at the upstream face of pier 1

**Measurement No:** P1-3

Sample collected at the upstream face of pier 1

**Measurement No:** P1-4

Sample collected at the upstream face of pier 1

**Measurement No:** P1-5

Sample collected at the upstream face of pier 1

**Measurement No:** P2-1

Sample collected at the upstream face of pier 2

**Measurement No:** P2-2

Sample collected at the upstream face of pier 2

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**Measurement No:** P2-3

Sample collected at the upstream face of pier 2

**Measurement No:** P2-4

Sample collected at the upstream face of pier 2

**Measurement No:** P2-5

Sample collected at the upstream face of pier 2

**Measurement No:** P3-1

Sample collected at the upstream face of pier 3

**Measurement No:** P3-2

Sample collected at the upstream face of pier 3

**Measurement No:** P3-3

Sample collected at the upstream face of pier 3

**Measurement No:** P3-4

Sample collected at the upstream face of pier 3

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**Measurement No:** P3-5

Sample collected at the upstream face of pier 3

**Measurement No:** P4-1

Sample collected at the upstream face of pier 4

**Measurement No:** P4-2

Sample collected at the upstream face of pier 4

**Measurement No:** P4-3

Sample collected at the upstream face of pier 4

**Measurement No:** P4-4

Sample collected at the upstream face of pier 4

**Measurement No:** P4-5

Sample collected at the upstream face of pier 4

## Bridge Data

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**Structure No:** DEF-127-0053

**Length(ft):** 513.3

**Width(ft):** 37

**Number of Spans:** 5

**Vertical Configuration:** Horizontal

**Low Chord Elev (ft):** 697.5



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Upper Chord Elev (ft): 702.5

Overtopping Elev (ft): 706

Skew (degrees): 45

Guide Banks: None

Waterway Classification: Main

Year Built: 1946

Avg Daily Traffic: 4155

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 constructed of concrete and steel I-beams, and it has solid-wall sharp-nose piers. The site plans are dated 1941. The piers are referenced from the left to right abutments when looking downstream

## Abutment Data

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Left Station: 433.6463

Right Station: 428.5137

Left Skew (deg): 0

Right Skew (deg) 0

Left Abutment Length (ft): 69.9

Right Abutment Length (ft) 70.4

Left Abutment to Channel Bank (ft): 65

Right Abutment to Channel Bank (ft): 45

Left Abutment Protection:

Right Abutment Protection

Contracted Opening Type: III

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Embankment Skew (deg): 45  
Embankment Slope (ft/ft): 2  
Abutment Slope (ft/ft): 2  
Wingwalls: No  
Wingwall Angle (deg): 0

## Pier Data

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| Pier ID | Bridge Station(ft) | Alignment | Highway Station | PierType | # Of Piles | Pile Spacing(ft) |
|---------|--------------------|-----------|-----------------|----------|------------|------------------|
| 1       | 87                 | 45        | 432.7675        | Single   | 0          |                  |
| 2       | 199.5              | 45        | 431.6425        | Single   | 0          |                  |
| 3       | 312                | 45        | 430.5175        | Single   | 0          |                  |
| 4       | 424.5              | 45        | 429.3925        | Single   | 0          |                  |

| Pier ID | Pier Width(ft) | Pier Shape | Shape Factor | Length(ft) | Protection | Foundation |
|---------|----------------|------------|--------------|------------|------------|------------|
| 1       | 4              | Sharp      |              | 53.8       | None       | Poured     |
| 2       | 4              | Sharp      |              | 53.8       | None       | Poured     |
| 3       | 4              | Sharp      |              | 53.8       | None       | Poured     |
| 4       | 4              | Sharp      |              | 53.8       | None       | Poured     |

| Pier ID | Top Elevation(ft) | Bottom Elevation(ft) | Foot or Pile Cap Width(ft) | Cap Shape | Pile Tip Elevation(ft) |
|---------|-------------------|----------------------|----------------------------|-----------|------------------------|
| 1       | 665.19            | 661.19               | 8.8                        | Square    |                        |
| 2       | 664.73            | 660.73               | 9                          | Square    |                        |
| 3       | 665               | 661                  | 10.5                       | Square    |                        |
| 4       | 666               | 662                  | 8.8                        | Square    |                        |

## Pier Description

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Pier ID 1

Concrete solid wall pier, with a sharp face.

Pier ID 2

Concrete solid wall pier, with a sharp face.

Pier ID 3

Concrete solid wall pier, with a sharp face.

Pier ID 4

Concrete solid wall pier, with a sharp face.

## Pier Scour Data

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| Pier ID | Date        | Time          | USOrDS             |               |                   |                  |                      |                   |  |
|---------|-------------|---------------|--------------------|---------------|-------------------|------------------|----------------------|-------------------|--|
| 2       | 7/14/92     | 10:45         | Upstream           |               |                   |                  |                      |                   |  |
| 2       | 7/18/92     | 10:15         | Upstream           |               |                   |                  |                      |                   |  |
| 2       | 1/6/93      | 13:10         | Upstream           |               |                   |                  |                      |                   |  |
| 3       | 7/14/92     | 10:45         | Upstream           |               |                   |                  |                      |                   |  |
| 3       | 7/18/92     | 10:15         | Upstream           |               |                   |                  |                      |                   |  |
| 3       | 1/6/93      | 13:10         | 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) |  |
| 2       | 1.3         | 0.5           | 11.2               | 29            | 2.7               | 5.7              | 3.9                  | 31.8              |  |
| 2       | 1.5         | 0.5           | 22.1               | 60            | 3.7               | 12.5             | 3.8                  | 36.9              |  |
| 2       | 0.7         | 0.5           | 19.6               | 29.7          | 4.8               | 19.8             | 3.9                  | 15.2              |  |
| 3       | 1.1         | 0.5           | 11.7               | 27            | 2.9               | 4.9              | 3.8                  | 35.9              |  |
| 3       | 1.4         | 0.5           | 10.6               | 28            | 2.6               | 11.8             | 3.8                  | 31.8              |  |

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| PierID | Sediment Transport | Bed Material | BedForm | Trough (ft) | Crest (ft) | Sigma | Debris Effects |
|--------|--------------------|--------------|---------|-------------|------------|-------|----------------|
| 3      | 0.6                | 0.5          | 10      | 17          | 2.8        | 19.1  | 3.8 9.9        |
| 2      | Clear-water        | Non-cohesive | Unknown |             |            | 3.28  | Insignificant  |
| 2      | Clear-water        | Non-cohesive | Unknown |             |            | 3.28  | Insignificant  |
| 2      | Clear-water        | Non-cohesive | Unknown |             |            | 2.57  | Insignificant  |
| 3      | Clear-water        | Non-cohesive | Unknown |             |            | 2.97  | Insignificant  |
| 3      | Clear-water        | Non-cohesive | Unknown |             |            | 2.97  | Substantial    |
| 3      | Clear-water        | Non-cohesive | Unknown |             |            | 6.99  | Moderate       |

| PierID | D95 (mm) | D84 (mm) | D50 (mm) | D16 (mm) |
|--------|----------|----------|----------|----------|
| 2      | 53       | 44       | 17.3     | 4.1      |
| 2      | 53       | 44       | 17.3     | 4.1      |
| 2      | 53       | 44       | 12       | 4.1      |
| 3      | 6.6      | 3        | 1.3      | 0.34     |
| 3      | 6.6      | 3        | 1.3      | 0.34     |
| 3      | 14       | 8.8      | 2.85     | 0.18     |

## Pier Scour Comments

**Pier ID** 2 **Time:** 10:45 **US/DS:** Upstream

Bed-material sample collected during low flow 9/17/91.

**Pier ID** 2 **Time:** 10:15 **US/DS:** Upstream

Bed-material sample collected during low flow 9/17/91

**Pier ID** 2 **Time:** 13:10 **US/DS:** Upstream

Bed-material sample collected during low flow 10/7/92.

**Pier ID** 3 **Time:** 10:45 **US/DS:** Upstream

Bed-material sample collected during low flow 9/17/91.

**Pier ID** 3 **Time:** 10:15 **US/DS:** Upstream

Bed-material sample collected during low flow 9/17/91.

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Pier ID 3                                      Time: 13:10                                      US/DS: Upstream

Bed-material sample collected during low flow 10/7/92.

## Abutment Scour

### Contraction Scour

| Measurement Number | Contracted Date | Contracted Time | Uncontracted Date | Uncontracted Time | US/DS | Scour Depth(ft) |
|--------------------|-----------------|-----------------|-------------------|-------------------|-------|-----------------|
| 1                  | 1/6/93          | 13:00           | 8/16/93           |                   |       | 0.5             |

| Measurement Number | Accuracy | Contracted Avg Vel(ft/s) | Contracted Discharge(cfs) | Contracted Depth(ft) | Contracted Width(ft) |
|--------------------|----------|--------------------------|---------------------------|----------------------|----------------------|
| 1                  | 0.5      | 3.28                     | 19500                     | 19.2                 | 285                  |

| Measurement Number | Uncontracted Avg Vel(ft/s) | Uncontracted Discharge(cfs) | Uncontracted Depth(ft) | Uncontracted Width(ft) | Channel Contraction Ratio |
|--------------------|----------------------------|-----------------------------|------------------------|------------------------|---------------------------|
| 1                  | 3                          | 15100                       | 19.2                   | 150                    | 0.075                     |

| Measurement Number | Pier Contraction Ratio | Scour Location | Eccentricity | Sediment Transport | Bed Form | Debris Effects |
|--------------------|------------------------|----------------|--------------|--------------------|----------|----------------|
| 1                  | 0.038                  | Floodplain     | 0.06         | Clear-water        | Unknown  | Unknown        |

| Measurement Number | D95 (mm) | D84 (mm) | D50 (mm) | D16 (mm) | Sigma Bed Material | Bed Material |
|--------------------|----------|----------|----------|----------|--------------------|--------------|
| 1                  | 26.5     | 20       | 7.6      | 0.85     | 4.85               | Non-cohesive |

### Contraction Scour Comments

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## 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

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| Peak Discharge |    |    |       |    | Flow<br>(cfs) | Qacc | Peak Stage |    |    |    |    | Stage<br>(ft) | Water<br>Temp (C) | Return<br>Period(yr) |
|----------------|----|----|-------|----|---------------|------|------------|----|----|----|----|---------------|-------------------|----------------------|
| year           | mo | dy | hr    | mi |               |      | year       | mo | dy | hr | mi |               |                   |                      |
| 1993           | 1  | 6  | 12:10 |    | 24100         |      |            |    |    |    |    | 4             | 10                |                      |
| 1992           | 7  | 18 | 10:15 |    | 11400         |      |            |    |    |    |    | 24            | 1                 |                      |
| 1992           | 7  | 14 | 10:45 |    | 3100          |      |            |    |    |    |    | 24.5          | 1                 |                      |

## Hydrograph

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## Supporting Files

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