BSDMS Summary Report

41 Great Miami River at S.R. 128 at Hamilton, OH

Site Location:

Site ID: 41

Site Name: Great Miami River at S.R. 128 at Hamilton, OH

County: Butler

Nearest City: Hamilton

State: OH

Latitude: 392340

Longitude: 843417

USGS Station ID: 3274000

Route Number: 128

Route Class: State

Service Level: Mainline

Route Direction: NA

Highway Mile Point: 8.55

Stream Name: Great Miami River

River Mile:

Contact:

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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:

The site is located at the Columbia Road Bridge (S.R. 128) crossing the Great Miami River at Hamilton, Butler County, Ohio. The Ohio Department of Transportation (ODOT) bridge identification is "BUT-128-0855", but the bridge is maintained by the Butler County Engineers Office (phone 513-867-5744). A USGS streamflow gage, Great Miami River at Hamilton (03274000), is just downstream from the bridge on the right bank. Gage data are available from 1927 (some fragmentary data are available to 1907). The bridge is located in a straight channel.
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

Datum: MSL

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MSL (ft): 0

Description of Reference Elevation:

RM1 - chiseled square in left upstream sloping abutment apron (2nd. set of panels from upstream side) painted orange under bridge near bike path.
Assumed elevation of RM1 = 96.52 ft.
MSL elevation of RM1 = 572.80 ft.

Stream Data

Drainage Area (sq mi):	3630	**Floodplain Width:**	Narrow
Slope in Vicinity(ft/ft):	0.00049	**Natural Levees:**	Little
Flow Impact:	Straight	**Apparent Incision:**	None
Channel Evolution	Constructed	**Channel Boundary:**	Alluvial
Armoring:	Unknown	**Banks Tree Cover:**	Medium
Debris Frequency:	Frequent	**Sinuosity:**	Straight
Debris Effect:	Local	**Braiding:**	None
Stream Size:	Wide	**Anabranching:**	None
Flow Habit:	Perennial	**Bars:**	Unknown
Bed Material:	Gravel	**Stream Width Variability:**	Unknown
Valley Setting:	Moderate		

Roughness Data

Manning's n Values

	Left Overbank	Channel	Right Overbank
High:	0.028	0.035	0.028
Typical	0.028	0.035	0.028
Low:	0.028	0.035	0.028

Bed Material

Measurement Number	Yr	Mo	Dy	Sampler	D95 (mm)	D84 (mm)	D50 (mm)	D16 (mm)	SP	Shape	Cohesion
AP-1	1991	7	31	HAND	23.5	18	4.33	0.1	2.65		Non-Cohesive

AP-2	1993	8	3		37	27	14	1.2	2.65	Unknown
AP-3	1994	7	8		58	38	15.5	0.92	2.65	Unknown
BR-1	1990	9	12	HAND	12	7	1.1	0.1	2.65	Non-Cohesive
BR-2	1991	7	31	HAND	15	7.6	0.13	0.02	2.65	Non-Cohesive
BR-3	1992	10	15		37.5	23	9	1.8	2.65	Unknown
BR-4	1993	8	3		42	30	11	0.8	2.65	Unknown
BR-5	1994	7	8		34	22	9.8	1.1	2.65	Unknown
P1-1	1990	9	12	HAND	17	11	0.15	0.03	2.65	Non-Cohesive
P1-2	1991	7	31	HAND	0.72	0.2	0.1	0.04	2.65	Non-Cohesive
P1-3	1992	10	15		12	1.5	0.16	0.02	2.65	Unknown
P1-4	1993	8	3		0.26	0.1	0.03	0.006	2.65	Unknown
P1-5	1994	7	8		64	48	24	8.1	2.65	Unknown
P2-1	1990	9	12	HAND	8.8	5	1.82	0.75	2.65	Non-Cohesive
P2-2	1992	10	15		11.5	8.2	1.4	0.08	2.65	Unknown
P2-3	1993	8	3		18	14	1.3	0.25	2.65	Unknown

P2-4	1994	7	8		23	20	12	1.6	2.65	Unknown
P3-1	1990	9	12	HAND	1.8	1.6	0.78	0.14	2.65	Non-Cohesive
P3-2	1991	7	31	HAND	2.8	1.6	0.65	0.23	2.65	Non-Cohesive
P3-3	1992	10	15		42	30	13.5	1.35	2.65	Unknown
P3-4	1993	8	3		35	24	9.5	0.75	2.65	Unknown
P3-5	1994	7	8		42	29	13	1.5	2.65	Unknown
P4-1	1990	9	12	HAND	23	19	4.4	0.07	2.65	Non-Cohesive
P4-2	1991	7	31	HAND	45	33	23.9	14.7	2.65	Non-Cohesive
P4-3	1992	10	15		2.9	0.2	0.06	0.01	2.65	Unknown
P4-4	1993	8	3		60	37	8.6	0.67	2.65	Unknown
P4-5	1994	7	8		28	22	13	2	2.65	Unknown

Bed Material Comments

Measurement No: AP-1

Approach-section composite sample

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

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: 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

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

Structure No: BUT-128-0855

Length(ft): 739.5

Width(ft): 82

Number of Spans: 5

Vertical Configuration: Sloping

Low Chord Elev (ft): 590.25

Upper Chord Elev (ft): 599.23

Overtopping Elev (ft): 602

Skew (degrees): 0

Guide Banks: None

Waterway Classification: Main

Year Built: 1965

Avg Daily Traffic: 29750

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 round-nose piers. The site plans are dated 1963. The piers are referenced from the left to right abutments when looking downstream.

Abutment Data

Left Station: 28.2425

Right Station: 20.8475

Left Skew (deg): 0

Right Skew (deg) 0

Left Abutment Length (ft): 81.8

Right Abutment Length (ft) 81.8

Left Abutment to Channel Bank (ft): 145

Right Abutment to Channel Bank (ft): 135

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	147	0	26.75	Single	0	
2	294	0	25.28	Single	0	
3	441	0	23.81	Single	0	
4	588	0	22.34	Single	0	

Pier ID	Pier Width(ft)	Pier Shape	Shape Factor	Length(ft)	Protection	Foundation
1	3.5	Round		81.8	None	Piles
2	3.5	Round		81.8	None	Piles
3	3.5	Round		81.8	None	Piles
4	3.5	Round		81.8	None	Poured

Pier ID	Top Elevation(ft)	Bottom Elevation(ft)	Foot or Pile Cap Width(ft)	Cap Shape	Pile Tip Elevation(ft)
1	551.5	548	14	Square	518
2	551.5	548	14	Square	518
3	551.5	548	14	Square	518
4	545	541.5	14	Square	

Pier Description

Pier ID 1

The concrete pier is a solid wall with round nose.

Pier ID 2

The concrete pier is a solid wall with round nose.

Pier ID 3

The concrete pier is a solid wall with round nose.

Pier ID 4

The concrete pier is a solid wall with round nose.

Pier Scour Data

Pier ID	Date	Time	USOrDS
2	5/16/90	10:00	Upstream
2	7/18/92	12:45	Upstream
2	1/29/94	9:10	Upstream
3	5/16/90	10:00	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)
2	1.6	0.5	15.5	50	4.5	12.7	3.5	0
2	1.3	0.5	16.8	40	4.8	12.1	3.5	8.1
2	0.9	0.5	11.4	22	5.8	13.5	3.5	0
3	1	0.5	5.7	11	4.5	13.4	3.5	0

PierID	Sediment Transport	Bed Material	BedForm	Trough (ft)	Crest (ft)	Sigma	Debris Effects
2	Live-bed	Non-cohesive	Unknown			2.6	Insignificant
2	Live-bed	Non-cohesive	Unknown			2.6	Insignificant
2	Clear-water	Non-cohesive	Unknown			7.5	Insignificant
3	Live-bed	Non-cohesive	Unknown			3.4	Insignificant

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PierID	D95 (mm)	D84 (mm)	D50 (mm)	D16 (mm)
2	8.8	5	1.82	0.75
2	8.8	5	1.82	0.75
2	18	14	1.3	0.25
3	1.8	1.6	0.78	0.14

Pier Scour Comments

Pier ID 2 **Time:** 10:00 **US/DS:** Upstream

Bed-material samples were collected during low-flow on 9/12/90.

Pier ID 2 **Time:** 12:45 **US/DS:** Upstream

The bed-material sample was collected after the scour measurement on 10/15/92.

Pier ID 2 **Time:** 9:10 **US/DS:** Upstream

need 1993 sample data

Pier ID 3 **Time:** 10:00 **US/DS:** Upstream

Bed-material samples were collected during low-flow on 9/12/90.

Abutment Scour

ContractionScour

Measurement Number	Contracted Date	Contracted Time	Uncontracted Date	Uncontracted Time	US/DS	Scour Depth(ft)
1	5/16/90	10:00	9/11/90			0.7
2	7/18/92	12:00	10/15/92			2.3

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Measurement Number	Accuracy	Contracted Avg Vel(ft/s)	Contracted Discharge(cfs)	Contracted Depth(ft)	Contracted Width(ft)
1	0.5	3.84	21000	13.6	370
2	0.5	3.88	21700	13.8	390

Measurement Number	Uncontracted Avg Vel(ft/s)	Uncontracted Discharge(cfs)	Uncontracted Depth(ft)	Uncontracted Width(ft)	Channel Contraction Ratio
1	4.15	20300	13	350	0
2	4.86	20600	11.6	350	0

Measurement Number	Pier Contraction Ratio	Scour Location	Eccent-ricity	Sediment Transport	Bed Form	Debris Effects
1	0.027	Main Channel	0	Live-bed	Unknown	Unknown
2	0.025	Main Channel	0	Live-bed	Unknown	Unknown

Measurement Number	D95 (mm)	D84 (mm)	D50 (mm)	D16 (mm)	Sigma Bed Material	Bed Material
1	12	7	1.1	0.097	8.5	Non-cohesive
2	15	7.6	0.133	0.015	22.5	Non-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.

Measurement No. 2

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.

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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)
1994	1	29	9:10		34100								2.2	2
1992	7	18	12:45		24200								22	2
1990	5	16	10:00	0	24300	5					0		18	2

Hydrograph

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

Supporting Files