I-69 CORRIDOR TIER 2 STUDIES

Evansville to Indianapolis

Stream Assessment Report

Section 3, US 50 to US 231

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SECTION 3 STREAM ASSESSMENT REPORT

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1.0 Introduction

In March of 2004 the Tier 1 Record of Decision for I-69 was issued identifying Alternative 3C as the preferred corridor for I-69 paving the way for the initiation of Tier 2 Studies for I-69. The 142-mile I-69 project corridor (approximately 2,000 feet wide) from Evansville to Indianapolis was divided into six sections for these studies. Each of the six Tier 2 section study teams will determine the final alignment of the interstate within the approved corridor. Environmental studies and engineering assessments by Corradino, LLC will culminate in a recommendation of a preferred Interstate alignment within Section 3 of the approved Alternative 3C corridor.

The Section 3 corridor begins immediately north of Section 2's I-69/US 50 interchange east of Washington in Daviess County. After leaving US 50, Section 3 proceeds north towards Elnora then east and ending with Section 3's I-69/US 231 interchange near Scotland, a distance of approximately 25 miles.

Purpose of Report

Section 404 of the Clean Water Act established a program to regulate the discharge of dredged or fill material into waters of the United States. Activities in waters of the United States regulated under this program include fill for development, water resource projects, infrastructure development (such as Interstate 69) and mining projects. Section 404 requires a permit before dredged or fill material may be discharged into waters of the United States, unless the activity is exempt.

This report is one of several technical reports being prepared to support the Section 3 Tier 2, I-69 Environmental Impact Statement. The purpose of the assessment was to identify streams potentially affected by the project alternatives, to assess their quality, and make a jurisdictional determination. The results of the assessment were used in the evaluation of alternatives, selection of "Alternatives Carried Forward for Detailed Analysis" and the "Preferred Alternative" with the intent to avoid and minimize stream impacts, if practicable, and mitigate for all unavoidable stream impacts caused by the project.

Description of Watersheds and Drainages

Section 3 is located in the White River basin, Watershed HUC08 of 05120202. The basin spans nearly the entire width of south-central Indiana and includes the areas from the headwaters of the White River in Randolph County to the confluence with the Wabash River in Knox County, and includes the basin of the East Fork White River. The White River drains 11,349 mi^2 of central and southern Indiana and joins the Wabash River in southwestern Indiana (Hoggatt, 1975). Most of the basin is divided into two nearly equal sub-basins—the East Fork White River and the White River upstream from its confluence with the east fork. All of the streams of Section 3 flow into the White River, which drains a total of 5,372 mi^2 upstream from its confluence with the East Fork White River. Only 2 percent (231 mi^2) of the drainage area of the White River Basin is downstream from the confluence of the east and west forks (Schnoebelen et al, 1999). The 14-digit

watersheds affected by the project include South Fork Prairie Creek-Eagan Ditch, North Fork Prairie Creek-Bethel Creek, Smothers Creek-Cutoff, White River-Weaver/Vertrees Ditches, First Creek-Rocky Branch, and Doans Creek-Headwaters.

2.0 Regulatory Definitions

Waters of the United States

Section 404 of the 1990 Clean Water Act regulates the discharge of fill or dredged material into "Waters of the United States". These activities are administered by the United States Army Corps of Engineers (USACE). "Waters of the United States" is a broad term that includes waters that are used or could be used for interstate commerce. It includes wetlands, ponds, lakes, territorial seas, rivers, tributary streams including any intermittent waterways, and some ditches below the "ordinary high water mark." "Waters of the United States" also includes manmade water bodies such as quarries and ponds, which are no longer being mined or constructed. Wetlands, mudflats, vegetated shallows, riffle and pool complexes, coral reefs, sanctuaries and refuges are all considered special aquatic sites, which involve more rigorous regulatory permitting requirements. The definition of "Waters of the United States" was taken from the Federal Register (33 CFR 328.3). These waters would be regulated by the U.S. Army Corps of Engineers under Section 404 and/or Section10 of the Clear Water Act and they would also be regulated by the Indiana Department of Environmental Management under the 401 Water Quality Certification program.

Types of Streams

Ephemeral Streams: An ephemeral stream is a stream that flows only during and for short periods following precipitation (less than 30% of the time) and flows in low areas that may or may not have a well-defined channel. Some commonly used names for ephemeral streams include: stormwater channel, drain, swale, gully, hollow, or saddle. Since ephemeral streams are often headwater streams, it is typically recommended that roads, site-prep, and other soil-disturbing activities be minimized in ephemeral streams to avoid erosion and sedimentation of stormwater runoff that will flow downstream into larger streams or waterbodies. All streams identified in the field that were not represented on the USGS maps were classified as ephemeral streams for this study.

Intermittent Streams: An intermittent stream is a stream that flows only during wet periods of the year (30% - 90% of the time) and flows in a continuous well-defined channel. During dry periods, especially in summer months, intermittent streams may go down to a trickle of water and appear dry when, in fact, there is water flowing through the stream bottom or "substrate." All streams that were identified on the USGS maps by a broken blue line were considered intermittent streams for this report.

Perennial Streams: Perennial streams are streams that flow throughout the majority of the year (greater than 90% of the time) and flow in a well-defined channel. However, perennial streams can "dry up," particularly during extended periods of drought. All

streams that were identified on the USGS maps by a solid blue line were considered perennial streams for this report.

3.0 Background Information

Background information assisted in the identification of the Section 3 streams. The following sources were utilized: United States Geological Survey (USGS) topographic maps, 2003 and 2005 Indiana Department of Transportation (INDOT) aerial photography, Daviess County Soil Survey, Greene County Soil Survey, 1958 and 1966 Daviess County Natural Resource Conservation Service (NRCS) aerial photography, 1958 and 1975 Greene County NRCS aerial photography, Water Delineation Program by Jin-Yong Choi and Bernard A. Engel of Agricultural & Biological Engineering Department, Purdue University, Qualitative Habitat Evaluation Index (QHEI, Ohio EPA 1989), and 'Field Evaluation Manual for Ohio's Primary Headwater Habitat Streams' (HHEI, Ohio EPA 2002).

Methodology

The sources above and accompanying field work in 2005, 2006, and 2009 were used to develop the mapping and information database needed to analyze the streams in the Section 3 corridor. USGS topographic maps were first used to locate the perennial and intermittent streams in the area. High resolution INDOT aerial photographs and drainage patterns gathered from the USGS maps and county soil surveys aided in the addition of tributary streams. Walking and driving surveys along with existing knowledge of the project area helped complete the stream mapping. All of the streams in the corridor were named according to a uniform system and identified as a perennial, intermittent, or ephemeral stream. The alternatives screening process resulted in the selection of a range of alternatives carried forward for detailed analysis to be studied in the Draft Environmental Impact Statement. Additional analyses were completed for all streams located within the rights-of-way of the alternatives carried forward for detail analysis. Wherever an alternative crossed a stream, field work was necessary to analyze the impact. If the drainage area was above 1 square mile or pool depths greater than 40 cm, the IDEM Office of Water Quality Biological Studies QHEI field sheet (adapted from the Ohio EPA) and procedure manual was used to conduct a rapid evaluation of stream habitat quality. A HHEI was generated following the methods and procedures of *Field Evaluation Manual for Ohio's Primary Headwater Habitat Streams* for those streams with drainage areas smaller than 1 square mile or pool depths greater than 40 cm. Purdue University's watershed delineator was used to determine the drainage area at the specific stream crossings. Photographs were taken upstream, downstream, and perpendicular to each waterway in both directions.

QHEI/HHEI

Qualitative Habitat Evaluation Index (QHEI): Streams possessing drainage areas larger than one square mile or with maximum pool depths greater than 40 centimeters (cm) (15.75 inches) were evaluated using the IDEM Qualitative Habitat Evaluation Index

(QHEI) protocol (IDEM, 2002). While the Ohio Environmental Protection Agency (Ohio EPA) originally developed the QHEI to evaluate fish habitat in streams, the IDEM and other agencies routinely utilize the QHEI as a measure of general habitat health. Various attributes of habitat within the survey reach were scored based on the overall importance of each to the maintenance of viable, diverse, and functional aquatic faunas. The type(s) and quality of substrate; amount and quality of in-stream cover; channel morphology; extent and quality of riparian vegetation; pool, riffle, run development and quality; and gradient are the metrics used to determine the QHEI score. Each metric was scored individually then summed to provide the total QHEI score that typically ranges from 20 to 100.

The QHEI is used to evaluate the characteristics of a stream segment (reach), as opposed to the characteristics of a single sampling site. As such, individual sites may have poorer physical habitat due to a localized disturbance yet still support aquatic communities closely resembling those sampled at adjacent sites with better habitat, provided water quality conditions are similar. IDEM indicates that QHEI scores above 64 suggest that the habitat is capable of supporting a balanced warm water community; scores between 51 and 64 suggest the streams are partially supportive of a stream's aquatic life use designation; and scores less than 51 suggest the streams are non-supporting for aquatic life use (IDEM, 2002).

Headwater Habitat Evaluation Index (HHEI): Primary headwater streams were assessed using the Ohio EPA's Headwaters Habitat Evaluation Index (HHEI). Each stream with a drainage area <u>less than one square mile</u> and pool depth of <u>less than 40 cm</u> identified within the right-of-way of the alternatives carried forward for detailed analysis was inspected for its ability to provide headwaters habitat (HHEI). Habitat stations represent the entirety of the habitat available along a representative 200-foot reach of stream. Each time the habitat changed along the length of the tributary within the right-of-way another assessment was completed. Each segment and tributary of each stream was assessed individually.

The HHEI method of stream habitat assessment classifies streams as Class I, II, or III, and also categorizes them according to whether their channels have been modified (Modified Class I, II, or III). Class I streams are the lowest quality stream habitats, meaning that they have the lowest potential to support a diverse array of flora and fauna typically found in stream environments. For natural channels HHEI scores typically of higher quality Class III streams will range between 60 and 80 out of a maximum of 100 points. Class II streams will range between 40 and 60, and Class I streams will range between 20 and 40, or even lower. For modified channels, HHEI scores for Modified Class II streams range between 30 and 60, and Modified Class I streams range between 0 and 30. One of the criteria for a Class III stream is that its channel be in its "natural" state; therefore no modified primary headwater streams may be classified as a Class III stream.

Table 1. Section 3 Stream Impacts

Stream ID#	Stream Name	Drainage Area (square miles)	IDEM 303d Listed	Stream Classification			Length of Stream Impacted by Alternative (feet)				
				USGS Stream Type	HHEI Score / Class*	QHEI Score	Revised Preferred	Alternative 1	Alternative 2	Alternative 3	Alternative 4
Sec3-S1	Tributary of Eagan Ditch	0.34	No	Intermittent	52 / Mod II		0.0	0.0	0.0	454.6	454.6
Sec3-S2	Tributary of Eagan Ditch	0.43	No	Ephemeral	21 / Mod I		480.0	480.0	480.0	0.0	0.0
Sec3-S2A	Tributary of Eagan Ditch	0.01	No	Intermittent	39/ Mod II		106.6	56.0	56.0	56.0	56.0
Sec3-S3	Tributary of Eagan Ditch	0.45	No	Intermittent	32 / Mod II		1466.9	1,393.0	1,393.0	107.4	107.4
Sec3-S3A	Tributary of Eagan Ditch	0.82	No	Intermittent	59/ Mod II		203.5	0.0	0.0	0.0	0.0
Sec3-S3B	Tributary of Eagan Ditch	0.55	No	Intermittent	49/ Mod II		1370.0	2081.7	2081.7	2081.7	2081.7
Sec3-S3C	Tributary of Eagan Ditch	0.82	No	Intermittent	34/ Mod II		377.0	0.0	0.0	0.0	0.0
Sec3-S4	Tributary of Eagan Ditch	0.48	No	Intermittent	28 / Mod I		403.9	360.0	360.0	1,114.0	1,114.0
Sec3-S5	Tributary of Eagan Ditch	0.09	No	Ephemeral	6 / Mod I		393.0	370.0	370.0	484.9	484.9
Sec3-S6	Tributary of Eagan Ditch	0.15	No	Ephemeral	28 / Mod I		1337.0	1,292.0	1,292.0	1,282.0	1,282.0
Sec3-S6A	Eagan Ditch	3.47	Yes	Perennial		37/ Mod	208.4	0.0	0.0	0.0	0.0
Sec3-S7	Tributary of Eagan Ditch	0.09	No	Ephemeral	10 / Mod I		0.0	415.2	303.4	0.0	415.2
Sec3-S8	Tributary of Eagan Ditch	1.57	No	Intermittent		39.5 / Mod	674.7	727.2	184.7	563.6	727.2
Sec3-S9	Tributary of Eagan Ditch	1.64	No	Intermittent		35.5 / Mod	0.0	0.0	404.8	0.0	0.0
Sec3-S10	Eagan Ditch	5.78	Yes	Perennial		45 / Mod	0.0	0.0	849.5	0.0	0.0
Sec3-S11	Tributary of Eagan Ditch	0.13	No	Ephemeral	20 / Mod I		331.3	367.0	50.2	0.0	367.0
Sec3-S12	Oberts Ditch	2.01	Yes	Perennial		42 / Mod	0.0	0.0	474.3	0.0	0.0
Sec3-S13	Tributary of Eagan Ditch	0.14	No	Ephemeral	10 / Mod I		407.7	406.3	0.0	0.0	406.3
Sec3-S14	Eagan Ditch	8.10	Yes	Perennial		40 / Mod	470.6	463.8	0.0	0.0	463.8
Sec3-S15	Tributary of Eagan Ditch	0.44	No	Intermittent	21 / Mod I		529.6	486.9	0.0	0.0	486.9
Sec3-S16	Tributary of Eagan Ditch	0.20	No	Intermittent	35 / Mod II		0.0	0.0	648.7	0.0	0.0
Sec3-S17	Tributary of Eagan Ditch	0.10	No	Ephemeral	16 / Mod I		0.0	0.0	0.0	433.7	0.0
Sec3-S18	Eagan Ditch	8.70	Yes	Perennial		33 / Mod	0.0	0.0	0.0	279.5	0.0
Sec3-S19	Eagan Ditch	8.97	Yes	Perennial		34 / Mod	0.0	0.0	0.0	505.0	0.0
Sec3-S20	Antioch Creek	1.36	No	Perennial		38 / Mod	0.0	0.0	456.6	0.0	0.0
Sec3-S21	Antioch Creek	1.90	No	Perennial		39 / Mod	0.0	0.0	0.0	400.2	0.0
Sec3-S21A	Tributary of Antioch Creek	0.34	No	Ephemeral	50 / Mod I		0.0	0.0	0.0	90.9	0.0
Sec3-S22	Tributary of S.F.P.C.	0.36	No	Ephemeral	23 / Mod I		0.0	0.0	385.7	0.0	0.0
Sec3-S23	Tributary of S.F.P.C.	0.36	No	Ephemeral	15 / Mod I		0.0	0.0	392.7	1,240.1	0.0
Sec3-S24	South Fork Prairie Creek	40.5	No	Perennial		41.5 / Mod	461.1	475.4	0.0	0.0	475.4
Sec3-S25	South Fork Prairie Creek	37.3	No	Perennial		32 / Mod	0.0	0.0	428.9	934.2	0.0
Sec3-S25B	Tributary of S.F.P.C.	0.07	No	Ephemeral	25 / Mod I		0.0	0.0	173.4	100.8	0.0
Sec3-S26	Tributary of N.F.P.C.	0.37	No	Intermittent	17 / Mod I		361.9	360.0	0.0	0.0	360.0
Sec3-S27	Tributary of N.F.P.C.	0.12	No	Intermittent	16 / Mod I		360.4	367.5	0.0	0.0	367.5
Sec3-S28	North Fork Prairie Creek	46.5	Yes	Perennial		46 / Mod	418.6	426.0	0.0	0.0	426.0
Sec3-S29	North Fork Prairie Creek	46.2	Yes	Perennial		44 / Mod	0.0	0.0	428.2	448.4	0.0
Sec3-S29A	Tributary of N.F.P.C.	0.2	No	Intermittent	18 / Mod I		0.0	0.0	1,642.0	471.1	0.0
Sec3-S30	Tributary of N.F.P.C.	0.4	No	Intermittent	50 / Mod II		367.3	366.6	0.0	0.0	366.6
Sec3-S31	Bethel Ditch	5.5	No	Perennial		39.25 / Mod	0.0	0.0	3,497.0	3,497.0	0.0
Sec3-S32	Bethel Ditch	4.80	No	Perennial		32 / Mod	519.1	377.8	0.0	0.0	377.8
Sec3-S33	Tributary of N.F.P.C.	0.30	No	Intermittent	27 / Mod I		229.9	261.1	1,025.0	1,024.0	261.1
Sec3-S34	Tributary of Bethel Ditch	0.10	No	Ephemeral	27 / Mod I		369.7	346.3	346.3	346.3	346.3
Sec3-S35	Tributary of Bethel Ditch	0.20	No	Intermittent	16 / Mod I		97.8	186.9	186.9	186.9	186.9
Sec3-S36	Tributary of Epsom Lateral	0.50	No	Intermittent	19 / Mod I		379.3	378.8	378.8	378.8	378.8
Sec3-S37	Tributary of Epsom Lateral	0.13	No	Ephemeral	22 / Mod I		1717.4	2,751.0	2,751.0	2,751.0	2,751.0
Sec3-37A	Tributary of Epsom Lateral	1.01	No	Intermittent		59.75/Mod	0.0	255.6	255.6	255.6	255.6
Sec3-S38	Epsom Lateral	4.00	No	Intermittent		24 / Mod	353.5	347.0	347.0	347.0	347.0
Sec3-S38A	Tributary of Epsom Lateral	0.20	No	Intermittent	34 / Mod II		2040.2	2,904.0	2,904.0	2,904.0	2,904.0
Sec3-S39	Tributary of Epsom Lateral	0.10	No	Ephemeral	13 / Mod I		464.9	464.9	464.9	464.9	464.9
Sec3-S40	Smothers Creek	18.40	No	Perennial		42 / Mod	637.4	637.4	637.4	637.4	637.4
Sec3-S40A	Trib. of Smothers Creek	0.10	No	Ephemeral	29 / Mod I		407.2	402.7	402.7	402.7	402.7
Sec3-S41	Trib. of Findley Lateral	0.37	No	Ephemeral	19 / Mod I		387.4	387.4	387.4	387.4	387.4
Sec3-S42	Trib. of Findley Lateral	0.37	No	Intermittent	58 / Mod II		1957.6	1957.6	1957.6	1957.6	1957.6
Sec3-S42A	Trib. of Findley Lateral	1.00	No	Intermittent		26/ Mod	170.2	0.0	0.0	0.0	0.0
Sec3-S43	Trib. of Findley Lateral	0.10	No	Intermittent	29 / Mod I		0.0	482.7	482.7	482.7	482.7
Sec3-S44	Tributary of Vertrees Ditch	0.18	No	Ephemeral	16 / Mod I		402.2	452.2	452.2	452.2	452.2
Sec3-S45	Vertrees Ditch	3.26	No	Perennial		34 / Mod	0.0	0.0	433.4	0.0	433.4
Sec3-S46	Vertrees Ditch	3.21	No	Perennial		44 / Mod	484.9	355.2	0.0	355.2	0.0
Sec3-S47	Weaver Ditch	3.10	No	Perennial		44 / Mod	388.4	371.8	0.0	371.8	0.0
Sec3-S48	Weaver Ditch	4.12	No	Perennial		47 / Mod	0.0	0.0	396.4	0.0	396.4
Sec3-S49	Tributary of Weaver Ditch	0.91	No	Ephemeral	29 / Mod I		0.0	0.0	283.2	0.0	283.2
Sec3-S50	Tributary of Weaver Ditch	0.49	No	Ephemeral	39 / Mod II		421.1	381.9	0.0	381.9	0.0
Sec3-S51	Tributary of Weaver Ditch	0.09	No	Ephemeral	39 / Mod II		0.0	0.0	369.3	0.0	369.3
Sec3-S52	Tributary of Weaver Ditch	0.13	No	Ephemeral	17 / Class I		0.0	134.8	134.8	134.8	134.8
Sec3-S53	Tributary of First Creek	0.16	No	Ephemeral	19 / Class I		1298.8	1,279.6	1,260.2	1,279.6	1,260.2
Sec3-S54	Tributary of First Creek	0.13	No	Ephemeral	22 / Class I		244.3	256.0	249.7	256.0	249.7
Sec3-S55	Tributary of First Creek	0.10	No	Ephemeral	20 / Class I		0.0	745.3	825.9	745.3	825.9
Sec3-S55A	Tributary of First Creek	0.80	No	Intermittent	18 / Mod I		0.0	189.6	189.6	189.6	189.6
Sec3-S56	First Creek	42.40	No	Perennial		58	594.6	539.7	598.8	539.7	598.8
Sec3-S57	Tributary of First Creek	0.10	No	Ephemeral	14 / Mod I		503.0	474.8	474.8	474.8	474.8
Sec3-S58	Tributary of First Creek	0.36	No	Ephemeral	13 / Mod I		383.0	431.6	379.5	431.6	379.5
Sec3-S59	Branch of First Creek	2.20	No	Perennial		53	430.8	476.7	476.7	476.7	476.7
Sec3-S60	Tributary of First Creek	0.27	No	Ephemeral	26 / Mod I		594.9	141.1	141.1	141.1	141.1
Sec3-S61	Tributary of Doans Creek	0.21	No	Intermittent	17 / Mod I		678.4	661.6	661.6	661.6	661.6
Sec3-S62	Tributary of Doans Creek	0.59	No	Intermittent	17 / Mod I		740.9	728.0	728.0	728.0	728.0
Sec3-S63	Tributary of Doans Creek	0.24	No	Ephemeral	67 / Class III		453.9	489.3	489.3	489.3	489.3
Sec3-S64	Tributary of Doans Creek	0.10	No	Ephemeral	39 / Class II		277.5	299.7	299.7	299.7	299.7
Sec3-S65	Tributary of Doans Creek	0.64	No	Intermittent	42 / Class II		821.1	932.3	932.3	932.3	932.3
Sec3-S66	Tributary of Doans Creek	0.32	No	Intermittent	63 / Class II		901.7	1,082.1	1,082.1	1,082.1	1,082.1
Sec3-S67	Tributary of Doans Creek	0.10	No	Ephemeral	19 / Mod I		394.7	989.8	989.8	989.8	989.8
Sec3-S68	Tributary of Doans Creek	0.13	No	Ephemeral	26 / Class I		1026.5	1,262.0	1,262.0	1,262.0	1,262.0
Sec3-S69	Doans Creek	11.70	No	Perennial		58	280.4	1,247.1	1,247.1	1,247.1	1,247.1
Sec3-S70	Doans Creek	10.50	No	Perennial		58	1513.7	2,061.2	2,061.2	2,061.2	2,061.2
Sec3-S71	Tributary of Doans Creek	0.10	No	Ephemeral	44 / Class II		253.9	322.4	322.4	322.4	322.4
Sec3-S72	Tributary of Doans Creek	0.13	No	Ephemeral	35 / Mod I		179.9	548.1	548.1	548.1	548.1
Sec3-S72A	Tributary of Doans Creek	0.91	No	Intermittent		91.5 / Mod	0.0	285.0	285.0	285.0	285.0
Sec3-S72B	Tributary of Doans Creek	0.01	No	Intermittent	54/ Mod I		253.2	0.0	0.0	0.0	0.0
Sec3-S73	Tributary of Doans Creek	0.10	No	Ephemeral	39 / Class II		637.0	637.0	637.0	637.0	637.0

* 'Mod I' indicates a Modified Class I stream, and 'Mod II' indicates a Modified Class II stream

4.0 Site Investigation and Description

Each individual stream crossing being impacted by the Alternatives Carried Forward for Detailed Analysis was given a specific identification number, starting with Sec3-S1 and ending with Sec3-S73. Some streams are impacted in more than one location, and each location was given a unique ID. The impacts are summarized in Table 1: Section 3 Stream Table and a description of each individual stream impact may be found on the site forms in Appendix A. The following is a brief description of the perennial streams impacted in Section 3.

Eagan Ditch
Sec3-S6A: The Refined Preferred Alternative 1 will impact approximately 208.4 linear feet of this stream. The area of impact to Eagan Ditch below the OHWM is 0.095 acres. Alternatives 1, 2, 3, and 4 impact Eagan Ditch to the north and are documented in Sec2-S10, Sec3-S14, Sec3-S18 and Sec3-S19. Eagan Ditch flows north and discharges into South Fork of Prairie Creek. The substrate of Eagan Ditch is sand, gravel and silt. The banks contain old field vegetation. There is no riparian corridor in the area where The Refined Preferred Alternative 1 crosses this stream. This stream is classified as Modified Warm Water with a QHEI score of 37.

Eagan Ditch
Sec3-S10: Alternative 2 will impact approximately 849.5 linear feet of this stream. The area of impact to Eagan Ditch below the OHWM is 0.096 acres for Alternative 2. Alternatives 1, 3, 4, and the Refined Preferred Alternative 1 impact Eagan Ditch to the north and are documented in Sec3-S6A, Sec3-S14, Sec3-S18 and Sec3-S19. Eagan Ditch flows north and discharges into South Fork of Prairie Creek. The substrate of Eagan Ditch is clay, gravel and silt. The banks contain old field vegetation. There is no riparian corridor in the area where Alternative 2 crosses this stream. This stream is classified as Modified Warm Water with a QHEI score of 45.

Oberts Ditch
Sec3-S12: Alternative 2 will impact approximately 474.3 linear feet of this stream. The area of impact to Oberts Ditch below the OHWM is 0.050 acres for Alternative 2. Oberts Ditch flows west and discharges into Eagan Ditch. The substrate is clay with some detritus and artificial rip-rap near a concrete culvert. The banks contain old field vegetation and there is no riparian corridor. Row crops exist beyond both banks. This stream is classified as Modified Warm Water with a QHEI score of 42.

Eagan Ditch
Sec3-S14: Alternatives 1 and 4 will impact approximately 463.8 linear feet of this stream. The area of impact to Eagan Ditch below the OHWM is 0.052 acres for Alternatives 1 and 4. For the Refined Preferred Alternative 1, there will be 470.6 linear feet and 0.053 acres of impact below the OHWM. Eagan Ditch flows north and discharges into South Fork Prairie Creek. The substrate of Eagan Ditch is clay, silt and gravel and the banks consist of old field vegetation. There is no riparian corridor in the

area where the alternatives cross this stream. This stream is classified as Modified Warm Water with a QHEI score of 40.

Eagan Ditch

Sec3-S18: The Daviess County Road 350 North grade separation associated with Alternative 3 will impact approximately 279.5 linear feet of this stream. The area of impact to Eagan Ditch below the OHWM is 0.032 acres for Alternative 3. Alternative 3's mainline impact to Eagan Ditch is documented as Sec3-S19. Eagan Ditch flows north and discharges into South Fork Prairie Creek. The substrate of Eagan Ditch is clay, silt and gravel and the banks consist of old field vegetation. A berm with mowed grass is located on both sides of the banks between the stream and row crops. A forested wetland exists on the east side of the berm near this stream crossing. This stream is classified as Modified Warm Water with a QHEI score of 33.

Eagan Ditch

Sec3-S19: Alternative 3 will impact approximately 505.0 linear feet of this stream. The area of impact to Eagan Ditch below the OHWM is 0.057 acres for Alternative 3. The impact associated with the Alternative 3 Daviess County Road 350 North grade separation is documented as Sec3-S18. Alternatives 1, 2, 4, and the Refined Preferred Alternative impact Eagan Ditch to the south and are documented as Sec3-S6A, Sec3-S10 and Sec3-S14. Eagan Ditch flows north and discharges into South Fork Prairie Creek. The substrate of Eagan Ditch is clay, silt and gravel and the banks consist of old field vegetation. A berm with mowed grass is located on both sides of the banks between the stream and row crops. This stream is classified as Modified Warm Water with a QHEI score of 34.

Antioch Creek

Sec3-S20: Alternative 2 will impact approximately 456.6 linear feet of this stream. The area of impact to Antioch Creek below the OHWM is 0.031 acres for Alternative 2. Alternative 3 impacts Antioch Creek to the north and is documented as Sec3-S21. Antioch Creek flows north and discharges into South Fork Prairie Creek. The substrate of Antioch Creek is clay and silt and the banks consist of old field vegetation. A berm is located on both sides of the banks between the stream and row crops. This stream is classified as Modified Warm Water with a QHEI score of 38.

Antioch Creek

Sec3-S21: Alternative 3 will impact approximately 400.2 linear feet of this stream. The area of impact to Antioch Creek below the OHWM is 0.028 acres for Alternative 3. Alternative 2 impacts Antioch Creek to the south and is documented as Sec3-S20. Antioch Creek flows north and discharges into South Fork Prairie Creek. The substrate of Antioch Creek is clay and silt and the banks consist of old field vegetation. A berm is located on both sides of the banks between the stream and row crops. This stream is classified as Modified Warm Water with a QHEI score of 39.

South Fork Prairie Creek

Sec3-S24: Alternatives 1 and 4 will impact approximately 475.4 linear feet of this stream and the Refined Preferred Alternative 1 will impact approximately 461.1 linear feet. The area of impact to South Fork Prairie Creek below the OHWM is 0.189 acres for Alternatives 1 and 4 and 0.184 for the Refined Preferred Alternative 1. Alternatives 2 and 3 impact this stream to the east and are documented in Sec3-S25. South Fork Prairie Creek flows west and connects with North Fork Prairie Creek to form Prairie Creek. The substrate is predominately silt and gravel with some sand and clay. The banks consist of old field vegetation and a berm is located on both sides of the banks between the stream and row crops. South Fork Prairie Creek is identified as a legal drain in Daviess County and is maintained in the area of the proposed crossing. This stream is classified as Modified Warm Water with a QHEI score of 41.5.

South Fork Prairie Creek

Sec3-S25: Alternative 2 will impact approximately 428.9 linear feet of this stream. The area of impact to South Fork Prairie Creek below the OHWM is 0.196 acres for Alternative 2. Alternative 3 and its associated Daviess County Road 450 East grade separation will impact approximately 934.2 linear feet of this stream. The area of impact below the OHWM is 0.429 acres for Alternative 3. Alternatives 1, 4, and the Refined Preferred Alternative impact this stream to the west and are documented in Sec3-S24. South Fork Prairie Creek flows west and connects with North Fork Prairie Creek to form Prairie Creek. The substrate is predominately silt with some sand, clay and gravel. The banks consist of old field vegetation and a berm is located on both sides of the banks between the stream and row crops. No riparian zone exists at this stream crossing. South Fork Prairie Creek is identified as a legal drain in Daviess County and is maintained in the area of the proposed crossing. This stream is classified as Modified Warm Water with a QHEI score of 32.

North Fork Prairie Creek

Sec3-S28: Alternatives 1 and 4 will impact approximately 426.0 linear feet of this stream and the Refined Preferred Alternative will impact 418.6 linear feet. The area of impact to North Fork Prairie Creek below the OHWM is 0.273 acres for Alternatives 1 and 4, and 0.268 acres for the Refined Preferred Alternative. Alternatives 2 and 3 impact this stream to the east and are documented in Sec3-S29. North Fork Prairie Creek flows west and connects with South Fork Prairie Creek to form Prairie Creek. The substrate is predominately sand and gravel with some silt. The banks consist of old field vegetation and a berm is located on both sides of the banks between the stream and row crops. North Fork Prairie Creek is identified as a legal drain in Daviess County and is maintained in the area of the proposed crossing. This stream is classified as Modified Warm Water with a QHEI score of 46.5.

North Fork Prairie Creek

Sec3-S29: Alternative 2 will impact approximately 428.2 linear feet of this stream and Alternative 3 will impact approximately 448.4 linear feet. The area of impact to North Fork Prairie Creek below the OHWM is 0.245 acres for Alternative 2 and 0.256 acres for Alternative 3. Alternatives 1, 4, and the Refined Preferred Alternative 1 impact this

stream to the west and are documented in Sec3-S28. North Fork Prairie Creek flows west and connects with South Fork Prairie Creek to form Prairie Creek. The substrate is predominately sand and gravel with some silt. The banks consist of old field vegetation and a berm is located on both sides of the banks between the stream and row crops. Bethel Ditch flows into North Fork Prairie Creek from the north within the area of the proposed Alternatives 2 and 3. North Fork Prairie Creek is identified as a legal drain in Daviess County and is maintained in the area of the proposed crossing. This stream is classified as Modified Warm Water with a QHEI score of 44.

Bethel Ditch

Sec3-S31: Alternatives 2 and 3 will impact approximately 3,497.0 linear feet of this stream. The area of impact on Bethel Ditch below the OHWM is 0.714 acres for Alternatives 2 and 3. Alternatives 1 and 4 impact the stream to the north and are documented in Sec3-S32. Bethel Ditch flows south and discharges into North Fork Prairie Creek. The old channel used to turn west ½ miles north of where it now meetings North Fork Prairie Creek, but a new channel was likely constructed to reduce agricultural point rows. The substrate is silt and muck and the banks contain old field vegetation. A berm is located on both sides of the banks between the stream and row crops or forest. There is no riparian corridor in the area where Alternatives 2 and 3 cross this stream. This stream is classified as Modified Warm Water with a QHEI score of 39.25.

Bethel Ditch

Sec3-S32: Alternatives 1 and 4 will impact approximately 377.8 linear feet of this stream and the Refined Preferred Alternative will impact approximately 519.1 linear feet. The area of impact on Bethel Ditch below the OHWM is 0.069 acres for Alternatives 1 and 4 and 0.094 acres for the Refined Preferred Alternative. Alternatives 2 and 3 impact the stream to the south and are documented in Sec3-S31. Bethel Ditch flows south and discharges into North Fork Prairie Creek. The old channel used to turn west ½ miles north of where it now meetings North Fork Prairie Creek, but a new channel was likely constructed to reduce agricultural point rows. The substrate is silt and detritus and the banks contain old field vegetation. A berm is located on both sides of the banks between the stream and row crops. There is no riparian corridor in the area where the alternatives cross this stream. This stream is classified as Modified Warm Water with a QHEI score of 32.

Smothers Creek

Sec3-S40: Alternatives 1, 2, 3 and 4 and the Refined Preferred Alternative 1 will impact approximately 637.4 linear feet. The area of impact to Smothers Creek below the OHWM for Alternatives 1, 2, 3 and 4 and for the Refined Preferred Alternative 1 is 0.115 acres. Smothers Creek is identified as a legal drain in Daviess County and is maintained in the area of the proposed crossing. Smothers Creek flows southwest and meets with Epsom Lateral. The substrate is predominately clay and the banks contain old field vegetation. Row crops exist beyond the banks. There is no riparian corridor in the area where the alternatives cross this creek. This stream is classified as Modified Warm Water with a QHEI score of 42.

Vertrees Ditch
Sec3-S45: Alternatives 2 and 4 will impact approximately 443.4 linear feet of this stream. The area of impact to Vertrees Ditch below the OHWM is 0.020 acres for Alternatives 2 and 4. Alternatives 1, 3 and the Refined Preferred Alternative 1 impact the stream to the east and are documented in Sec3-S46. Vertrees Ditch is identified as a legal drain in Daviess County and is maintained in the area of the proposed Alternatives 2 and 4 crossings. The stream flows west to the White River. The substrate is predominately sand and the banks contain old field vegetation. Daviess County Road 1600 North exists beyond the north bank and row crops exist beyond the south bank. There is no riparian corridor in the area where Alternatives 2 and 4 cross this stream. This stream is classified as Modified Warm Water with a QHEI score of 34.

Vertrees Ditch
Sec3-S46: Alternatives 1 and 3 will impact approximately 355.2 linear feet of this stream and the Refined Preferred Alternative will impact approximately 484.9 linear feet. The area of impact to Vertrees Ditch below the OHWM is 0.029 acres for Alternatives 1 and 3 and 0.040 acres for the Refined Preferred Alternative. Alternatives 2 and 4 impact the stream to the west and are documented in Sec3-S45. Vertrees Ditch is identified as a legal drain in Daviess County and is maintained in the area of the proposed Alternatives 1 and 3 crossings. The stream flows west to the White River. The substrate is predominately sand and the banks contain old field vegetation. Row crops exist beyond both banks. There is no riparian corridor in the area where Alternatives 1 and 3 cross this stream. This stream is classified as Modified Warm Water with a QHEI score of 44.

Weaver Ditch
Sec3-S47: Alternatives 1 and 3 will impact approximately 371.8 linear feet of this stream and the Refined Preferred Alternative will impact approximately 388.4 linear feet. The area of impact to Weaver Ditch below the OHWM is 0.033 acres for Alternatives 1 and 3 and 0.035 acres for the Refined Preferred Alternative. Alternatives 2 and 4 impact the stream to the northwest and are documented in Sec3-S48. Weaver Ditch is identified as a legal drain in Daviess County and is maintained in the area of the proposed Alternatives 1 and 3 crossings. The stream flows west to the White River. The substrate is predominately sand and the banks contain old field vegetation. Row crops exist beyond both banks. There is no riparian corridor in the area where the alternatives cross this stream. This stream is classified as Modified Warm Water with a QHEI score of 44.

Weaver Ditch
Sec3-S48: Alternatives 2 and 4 will impact approximately 396.4 linear feet of this stream. The area of impact to Weaver Ditch below the OHWM is 0.051 acres for Alternatives 2 and 4. Alternatives 1, 3, and the Refined Preferred Alternative 1 impact the stream to the southeast and are documented in Sec3-S47. Weaver Ditch is identified as a legal drain in Daviess County and is maintained in the area of the proposed Alternatives 2 and 4 crossings. The stream flows west to the White River. The substrate is predominately sand and the banks contain old field vegetation. Row crops exist beyond both banks. There is no riparian corridor in the area where Alternatives 2 and 4

cross this stream. This stream is classified as Modified Warm Water with a QHEI score of 47.

First Creek

Sec3-S56: Alternatives 1 and 3 will impact approximately 539.7 linear feet of this stream and 0.423 acres below the OHWM. Alternatives 2 and 4 will impact approximately 598.8 linear feet of this stream and 0.382 acres below the OHWM. The Refined Preferred Alternative 1 will impact approximately 594.6 linear feet and 0.420 acres below the OHWM. First Creek flows northwest to the White River. The substrate is predominately sand. The riparian corridor is approximately 40 feet wide on both sides of the stream. The riparian zone widens when the stream flows through a woodlot on the south side of the alternatives. Row crops exist beyond the riparian zone. This stream is classified as Warm Water with a QHEI score of 58.

Branch of First Creek

Sec3-S59: Alternatives 1, 2, 3 and 4 will impacts approximately 476.7 linear feet of this stream and the Refined Preferred Alternative 1 will impact approximately 430.8 linear feet. The area of impact below the OHWM is 0.050 acres for Alternatives 1, 2, 3 and 4 and 0.045 acres for the Refined Preferred Alternative 1. This branch of First Creek flows west and discharges into First Creek. The substrate is predominately sand and the banks contain old field vegetation. Row crops exist beyond the north bank, and a 25 feet wide riparian zone exists on the south side of the stream. This stream is classified as Warm Water with a QHEI score of 53.

Doans Creek

Sec3-S69: The proposed I-69/US 231 interchange associated with Alternatives 1, 2, 3 and 4 will impact approximately 1,247.1 linear feet of this stream and the Refined Preferred Alternative 1 will impact approximately 280.4 linear feet. The area of impact to Doans Creek below the OHWM is 0.713 acres for Alternatives 1, 2, 3 and 4 and 0.160 acres for the Refined Preferred Alternative 1. Sec3-S69 describes the impact west of the existing US 231 bridge. Sec3-S70 describes the impact east of the existing US 231 bridge. Doans Creek flows west towards the White River. The substrate is predominately sand with some gravel, silt, and detritus and the banks are upland forest vegetation. An approximate 60 feet wide riparian zone exists to the south of the stream, and the riparian forest to the north is over 1000 feet wide. This stream is classified as Warm Water with a QHEI score of 58.

Doans Creek

Sec3-S70: The proposed I-69/US 231 interchange associated with Alternatives 1, 2, 3 and 4 will impact approximately 2,061.2 linear feet of this stream and the Refined Preferred Alternative 1 will impact approximately 1513.7 linear feet. The area of impact to Doans Creek below the OHWM is 1.178 acres for Alternatives 1, 2, 3 and 4 and 0.865 acres for the Refined Preferred Alternative 1. Sec3-S70 describes the impact east of the existing US 231 bridge. Sec3-S69 describes the impact west of the existing US 231 bridge. Doans Creek flows west towards the White River. The substrate is predominately sand with some gravel, silt, and detritus and the banks are upland forest vegetation. An

approximate 40 feet wide riparian zone exists to the south of the stream, and the riparian forest to the north is over 240 feet wide. This stream is classified as Warm Water with a QHEI score of 58.

Comparison of Stream Impacts for Alternatives Carried Forward for Detailed Analysis

Table 2: Stream Types Impacted (Linear Feet) by Each Alternative

USGS Stream Type	Refined Preferred Alternative 1	Alternative 1	Alternative 2	Alternative 3	Alternative 4
Perennial	6,408	7,433	11,987	11,754	7,595
Intermittent	14,846	16,850	18,965	17,503	16,773
Ephemeral	13,366	16,529	16,140	15,590	16,427
TOTAL	34,620	40,812	47,092	44,847	40,795

Table 2 shows the amount of linear feet of each stream type (perennial, intermittent, ephemeral) that would be impacted by each Alternative. Table 3 shows the amount of linear feet broken down by habitat classification that would be impacted by each Alternative.

Table 3: Stream Habitat Impacts (Linear Feet) by Each Alternative

Habitat Classification	Refined Preferred Alternative 1	Alternative 1	Alternative 2	Alternative 3	Alternative 4
Class I PHWH	2,570	3,678	3,733	3,677	3,733
Class II PHWH	2,891	3,274	3,274	3,274	3,274
Class III PHWH	454	489	489	489	489
Modified Class I PHWH	12,789	15,469	17,008	16,544	16,079
Modified Class II PHWH	8,310	9,142	9,410	7,943	8,297
Modified Class III PHWH	0	0	0	0	0
Modified Warm Water Habitat	4,787	4,437	8,794	8,595	4,540
Warm Water Habitat	2,820	4,325	4,384	4,325	4,384

PHWM – Primary Headwater Habitat

5.0 Jurisdictional Analysis

The streams in Section 3 identified in this report are classified as "Waters of the United States" and regulated by the United States Army Corp of Engineers (USACE) and the Indiana Department of Environmental Management (IDEM). These include the blue line perennial and intermittent streams identified by solid blue lines and broken blue lines on the USGS maps. The perennial streams impacted by the project include Eagan Ditch, Oberts Ditch, Antioch Creek, South Fork Prairie Creek, North Fork Prairie Creek, Bethel Ditch, Smothers Creek, Vertrees Ditch, Weaver Ditch, First Creek, Branch of First Creek, and Doans Creek.

The ephemeral streams impacted by Section 3 Alternatives Carried Forward for Detailed Analysis are also classified as "Waters of the U.S." Most have been channelized but fall under this jurisdiction because they replaced a natural stream channel. In other cases, the ephemeral stream still contains its natural channel or connects a wetland upstream to a "Waters of the U.S." downstream.

6.0 Summary

Section 3 is predominately agricultural land. As a result, most of the streams in the corridor are channelized. With the exception of stream impacts Sec3-S52, Sec3-S53, Sec3-S54, Sec3-S55, Sec3-S56, Sec3-S59, Sec3-S63, Sec3-S64, Sec3-S65, Sec3-S66, Sec3-S69, Sec3-S70, Sec3-S71, Sec2-S72B and Sec3-S73, all of the potential impacts are channelized streams. First Creek and Doans Creek are the only two natural perennial streams in the Section 3 project area. As identified in Table 3: Stream Habitat Impacts by Each Alternative, the majority of the streams are modified and of lower class when scored through QHEI and HHEI. This indicates that most streams in the project area have a low potential to support a diverse array of flora and fauna typically found in stream environments. The northern portion of the corridor contains more rolling terrain with some ravines and valleys. Some higher quality areas do exist in this segment, such as the natural streams found south of Greene County Road 710 South on Figure 2, page 11 of 11. Sec3-S63, Sec3-64, Sec3-65, and Sec3-S66 are higher quality streams with riparian corridors. These streams may have the ability to support the flora and fauna not characteristic of most Section 3 streams.

Overall, the Refined Preferred Alternative 1 has the least amount of linear feet of stream impacts. Alternative 4 impacts the next lowest amount, followed by Alternative 1 and Alternative 3, then Alternative 2. Alternatives 1, 4, and the Refined Preferred Alternative 1 avoid a significant amount of perennial stream impacts in comparison with Alternatives 2 and 3. The intermittent and ephemeral stream impacts are similar for all alternatives.

7.0 References

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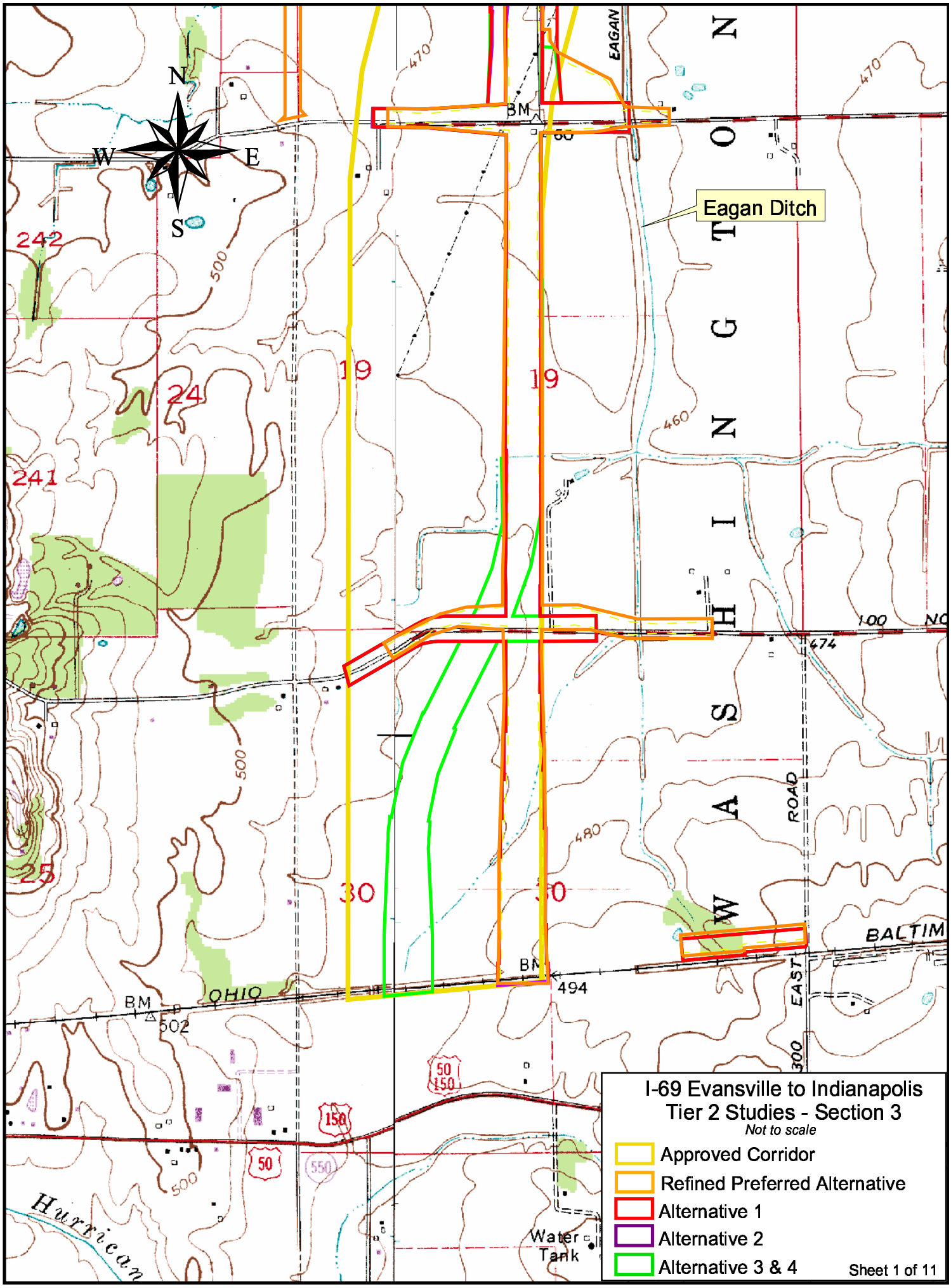
FIGURE 1

USGS Topographic Maps
(Sheets 1 to 11)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I-69 Evansville to Indianapolis
Tier 2 Studies - Section 3
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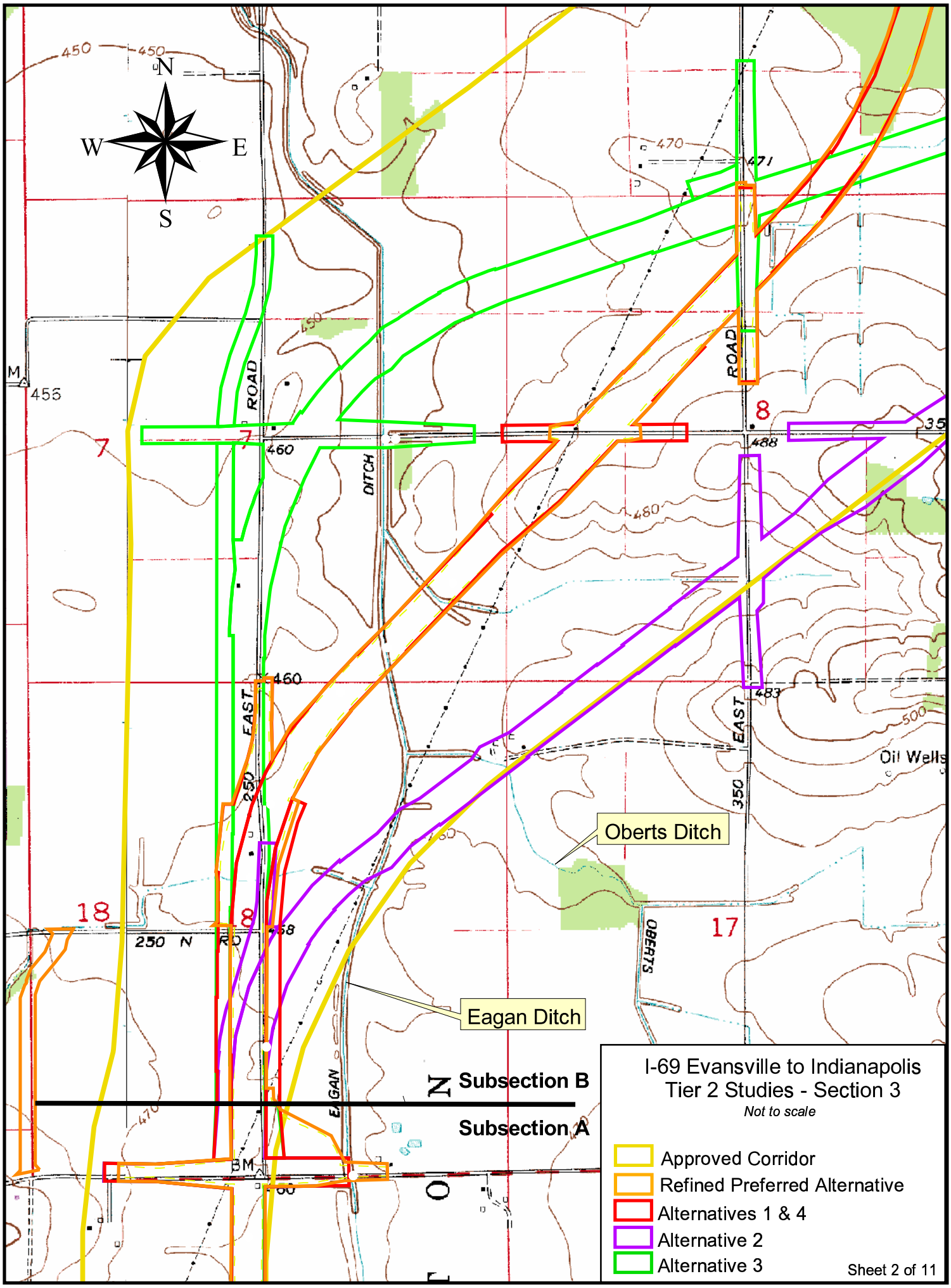
Approved Corridor
Refined Preferred Alternative
Alternative 1
Alternative 2
Alternative 3 & 4
Sheet 1 of 11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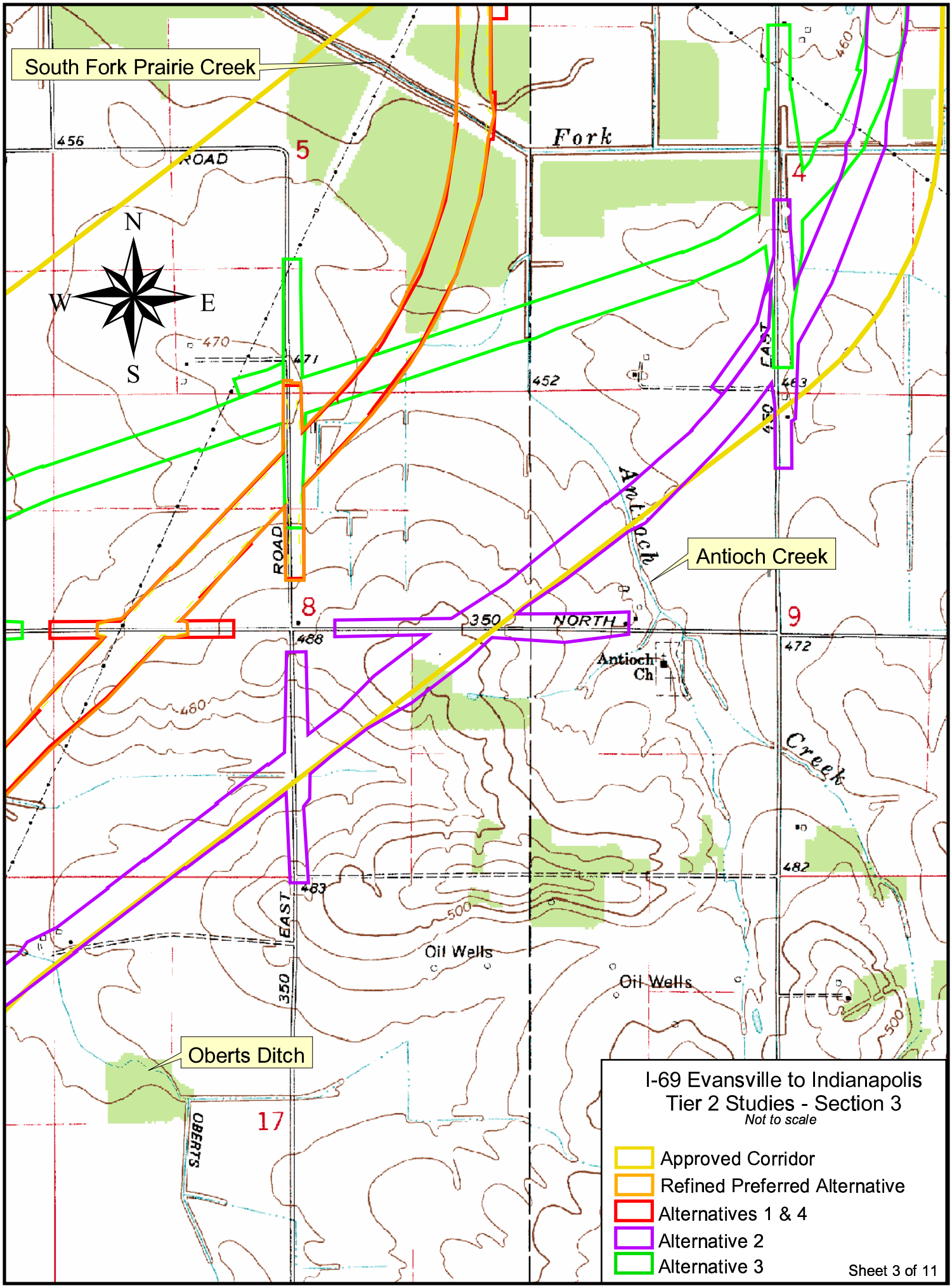
Refined Preferred Alternative
Alternatives 1 & 4
Alternative 2
Alternative 3
Sheet 2 of 11


South Fork Prairie Creek
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I-69 Evansville to Indianapolis
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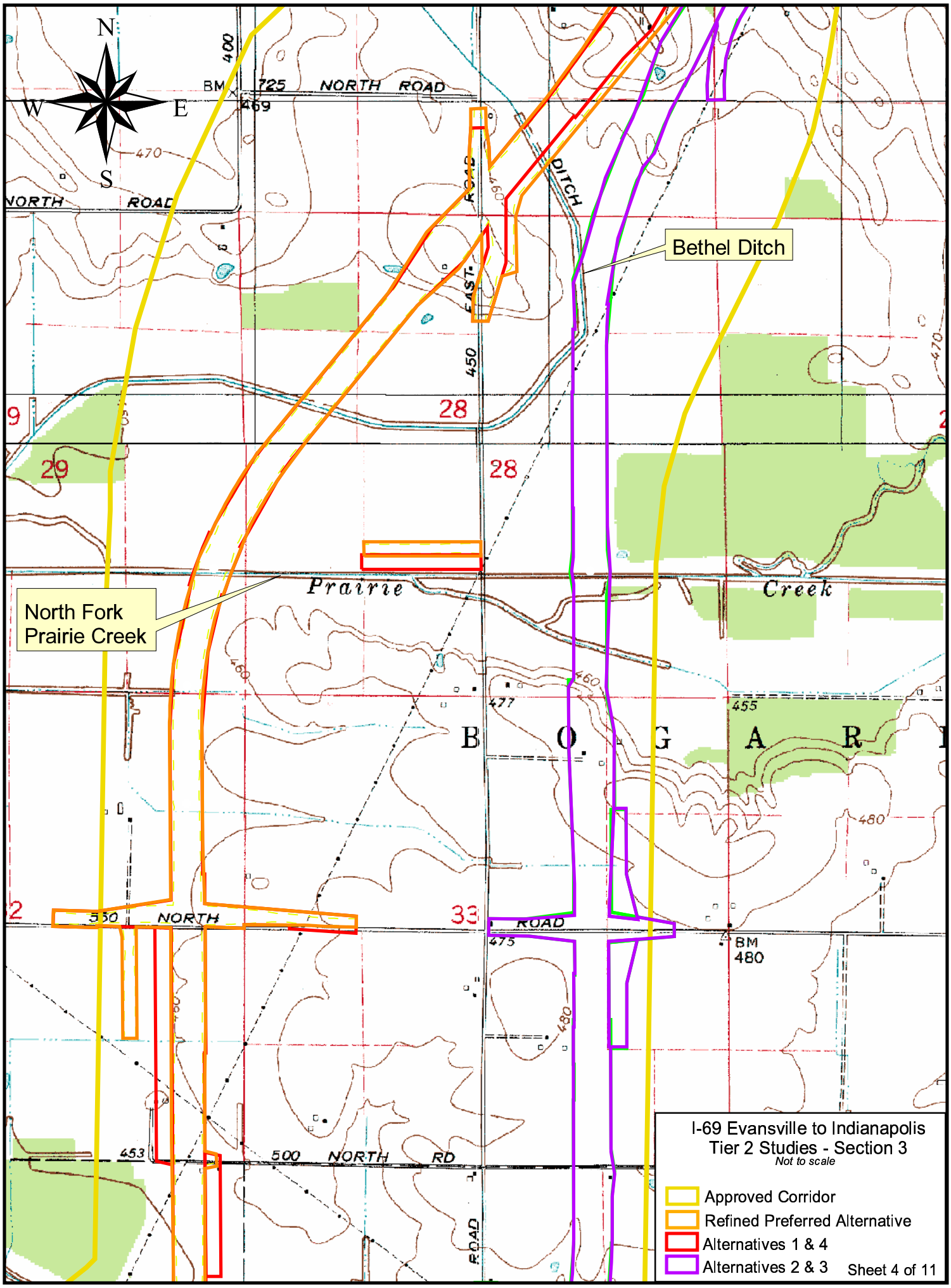
Refined Preferred Alternative
Alternatives 1 & 4
Alternative 2
Alternative 3
Sheet 3 of 11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Alternatives 1 & 4
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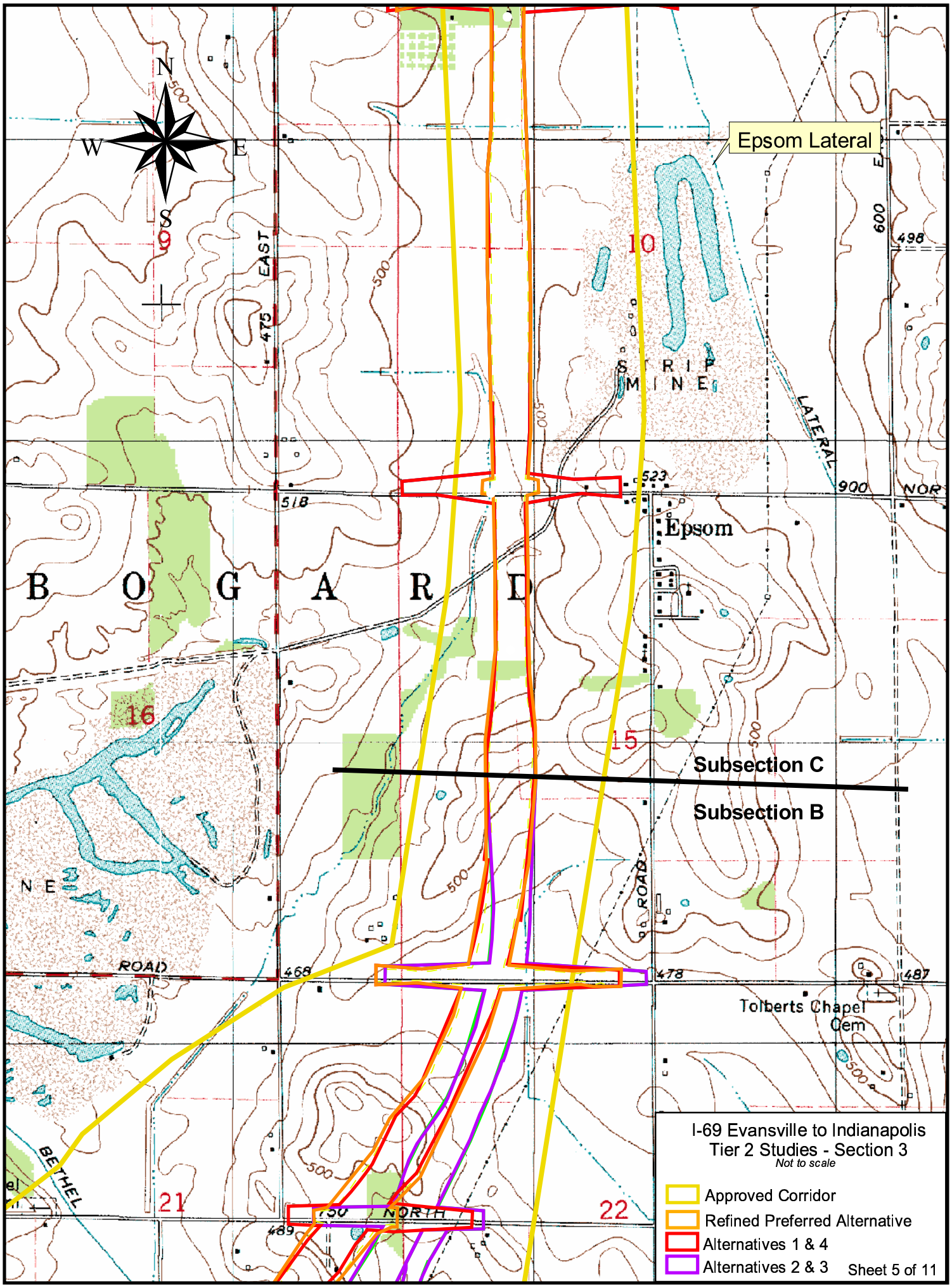
Sheet 4 of 11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I-69 Evansville to Indianapolis
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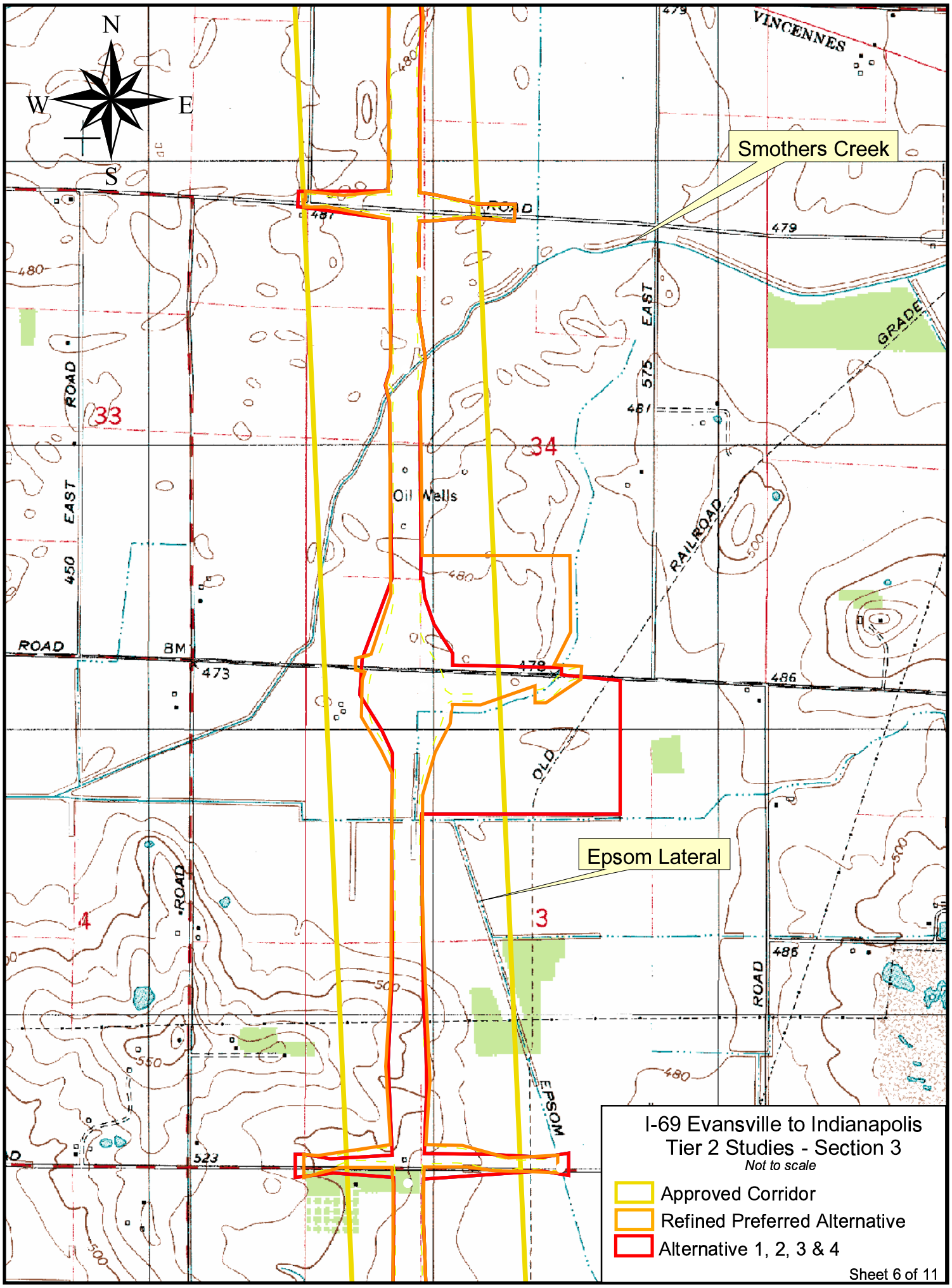
Refined Preferred Alternative
Alternatives 1 & 4
Alternatives 2 & 3
Sheet 5 of 11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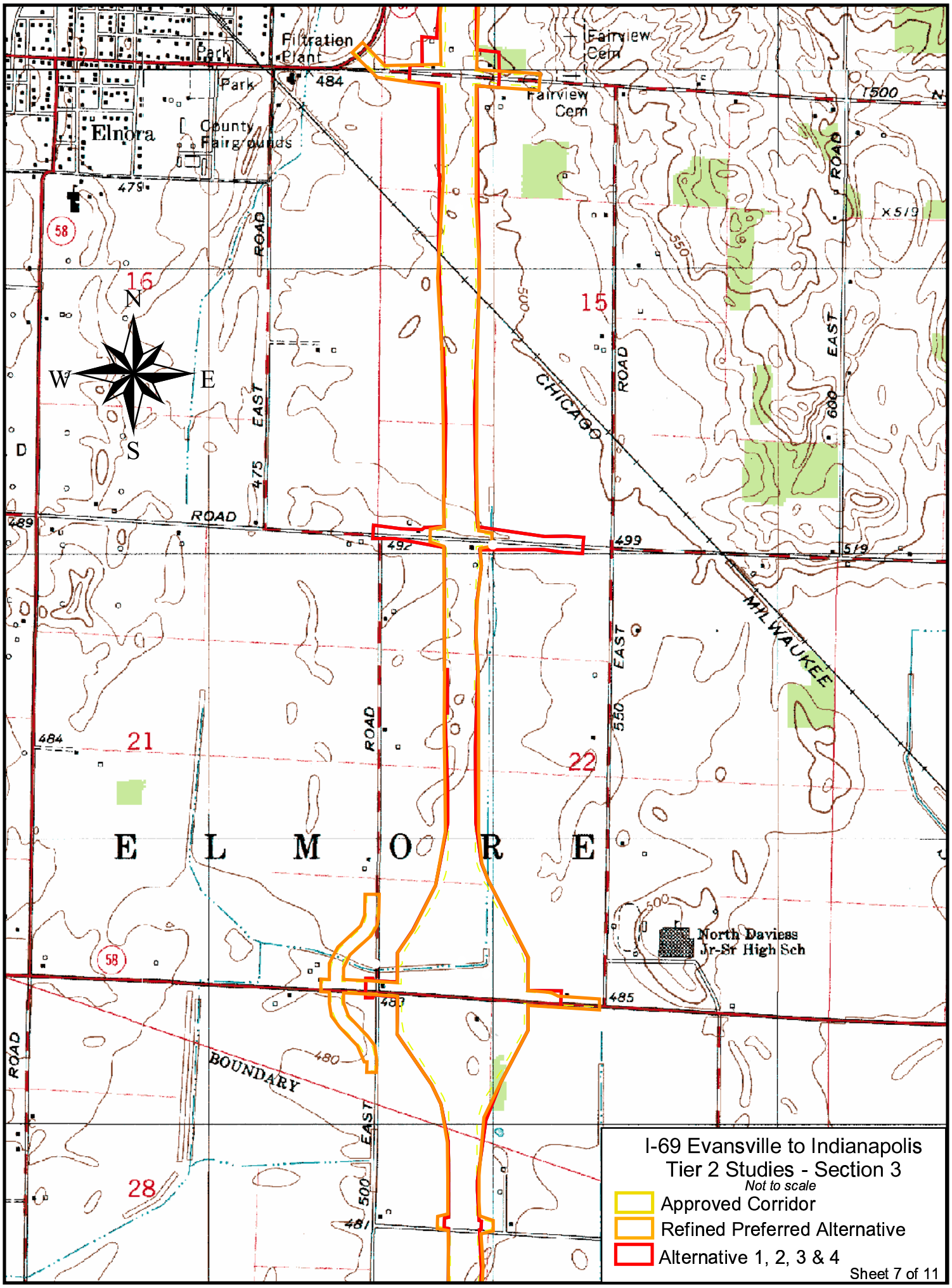
Refined Preferred Alternative
Alternative 1, 2, 3 & 4
Sheet 6 of 11



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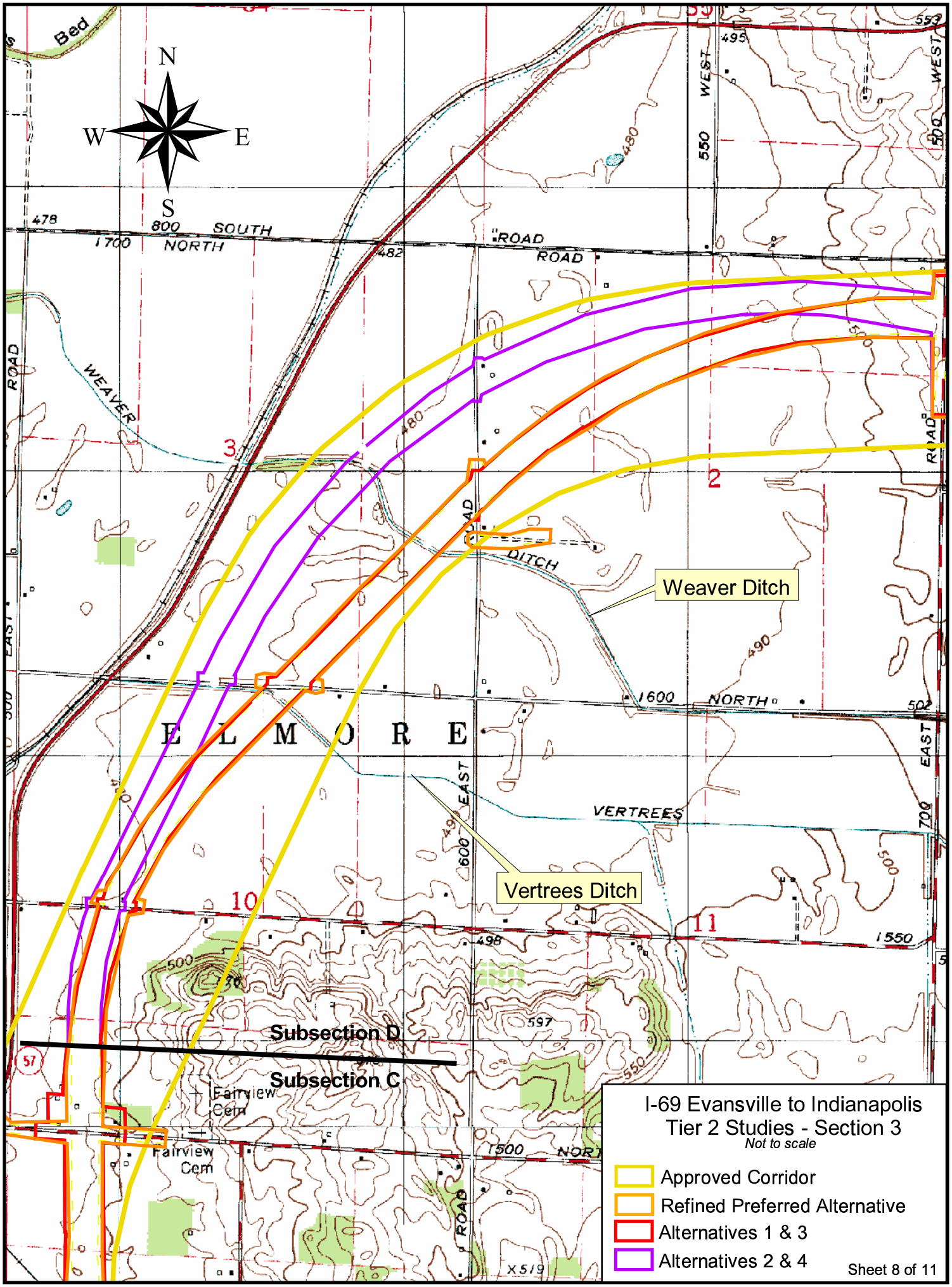
Refined Preferred Alternative
Alternative 1, 2, 3 & 4

Sheet 7 of 11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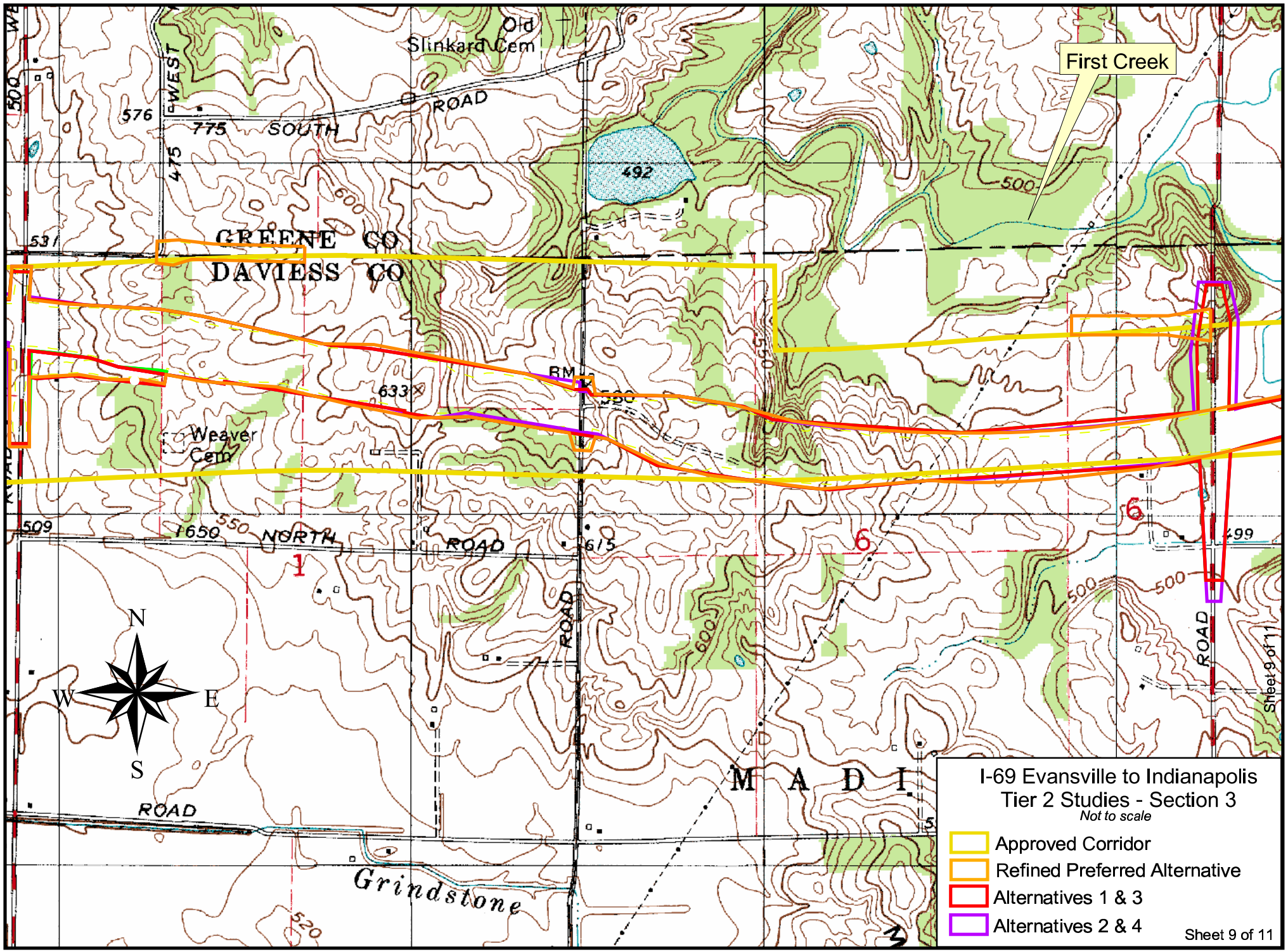
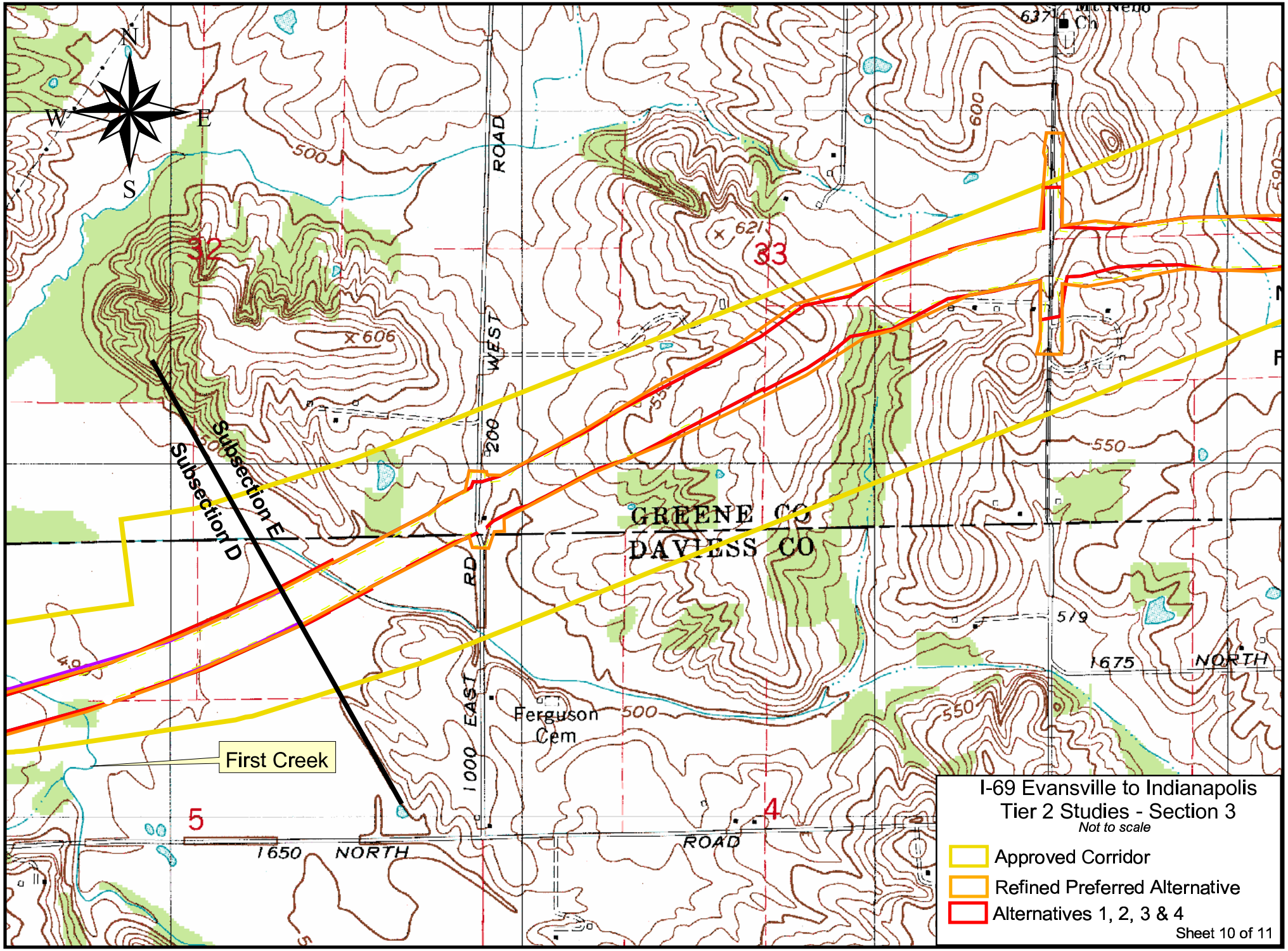
Refined Preferred Alternative
Alternatives 1 & 3
Alternatives 2 & 4
Sheet 8 of 11


First Creek
Old Slinkard Cem
WEST
ROAD
775
SOUTH
576
475
492
500
600
531
GREENE CO
DAVIESS CO
BM
633
590
Weaver Cem
509
1650
550
NORTH
ROAD
615
665
1
6
499
ROAD
ROAD
ROAD
Grindstone
520
M A D I
N
S
E
W
I-69 Evansville to Indianapolis
Tier 2 Studies - Section 3
Not to scale
Approved Corridor
Refined Preferred Alternative
Alternatives 1 & 3
Alternatives 2 & 4
Sheet 9 of 11


N
W
E
S
Subsection D
Subsection E
First Creek
GREENE CO
DAVIESS CO
WEST ROAD 200
EAST RD 1000
Ferguson Cem
1650 NORTH ROAD
1675 NORTH
Mt Nebo
32
33
5
4
500
550
600
621
606
519
I-69 Evansville to Indianapolis
Tier 2 Studies - Section 3
Not to scale
Approved Corridor
Refined Preferred Alternative
Alternatives 1, 2, 3 & 4
Sheet 10 of 11

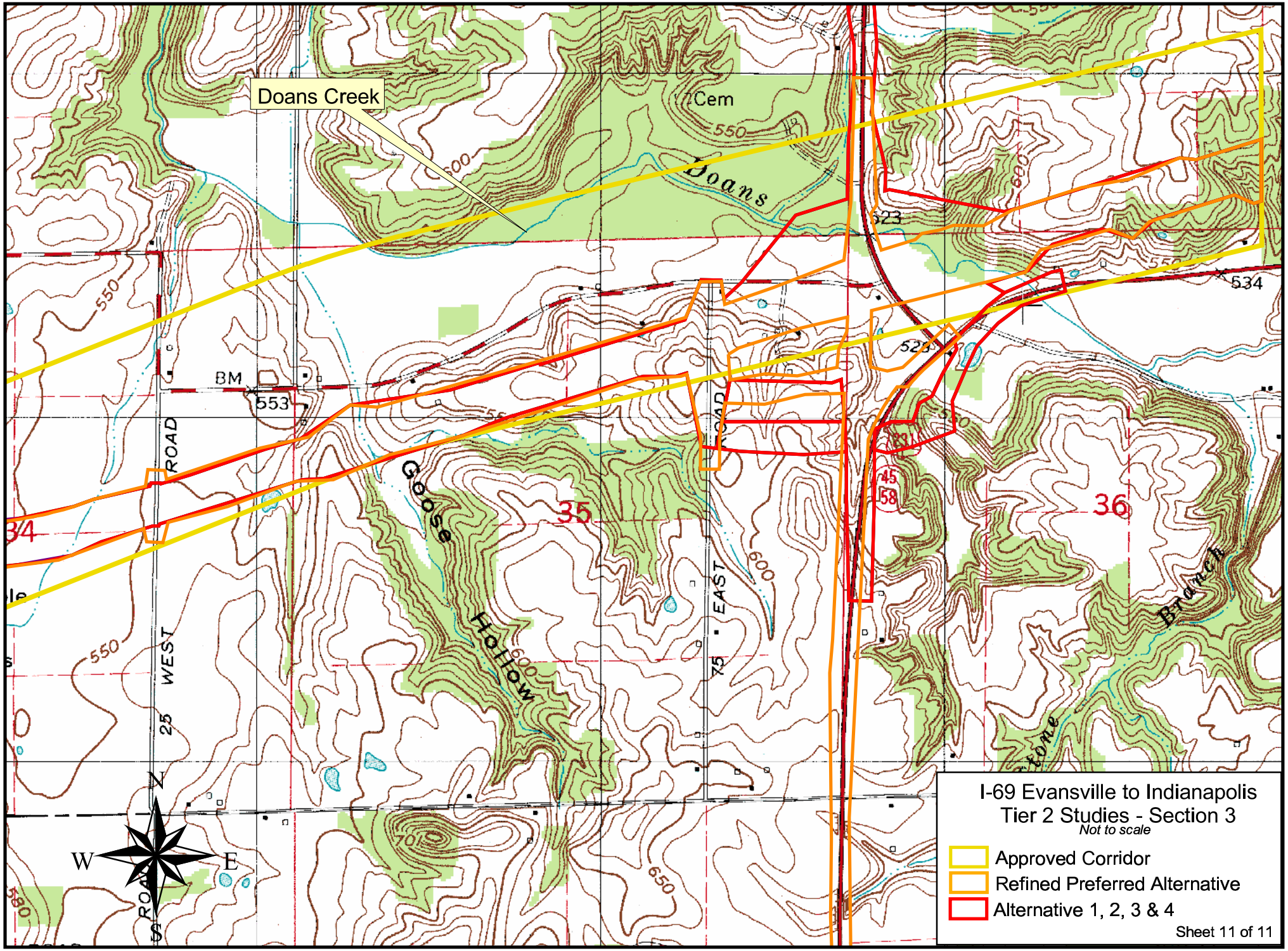
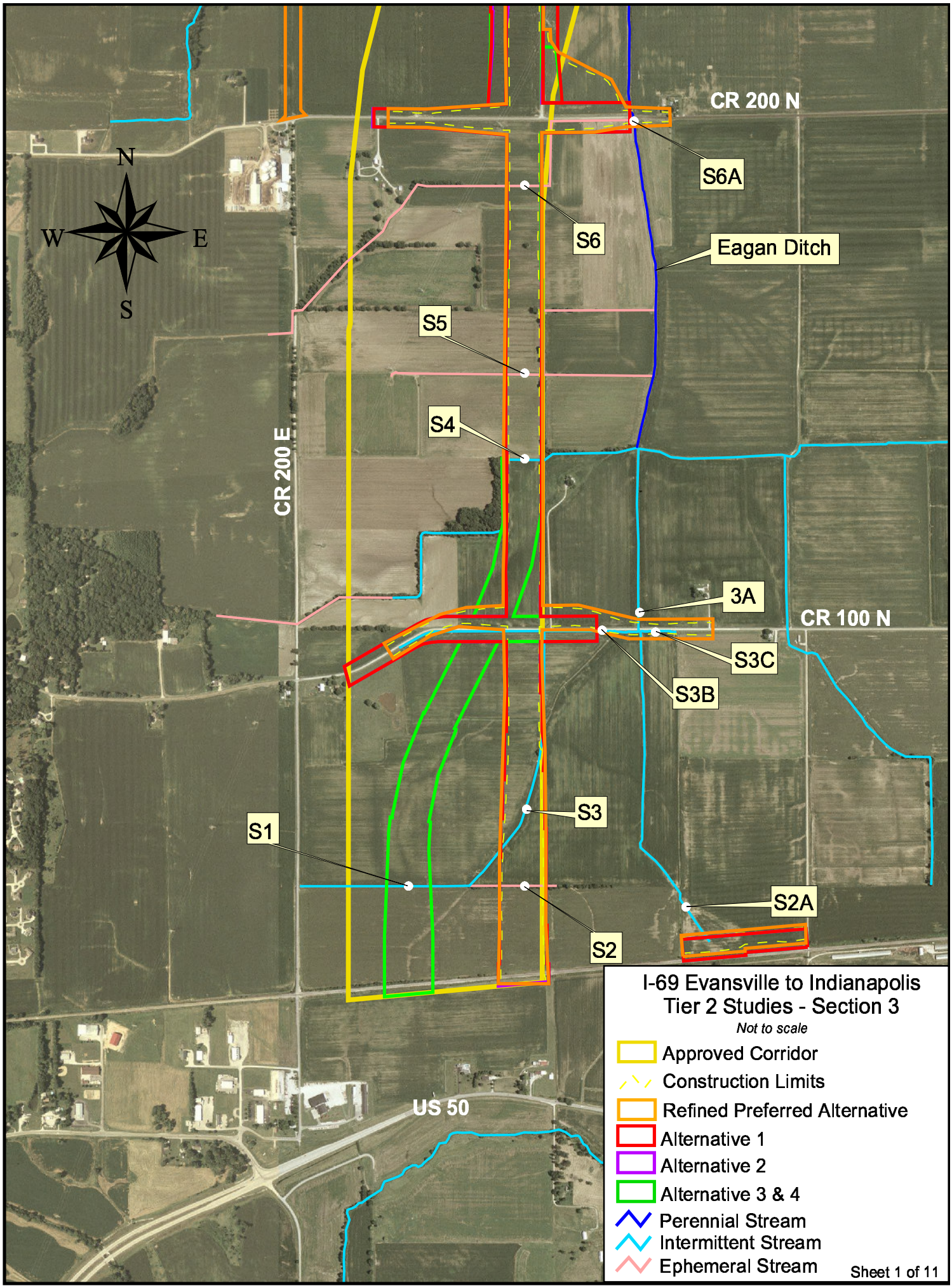
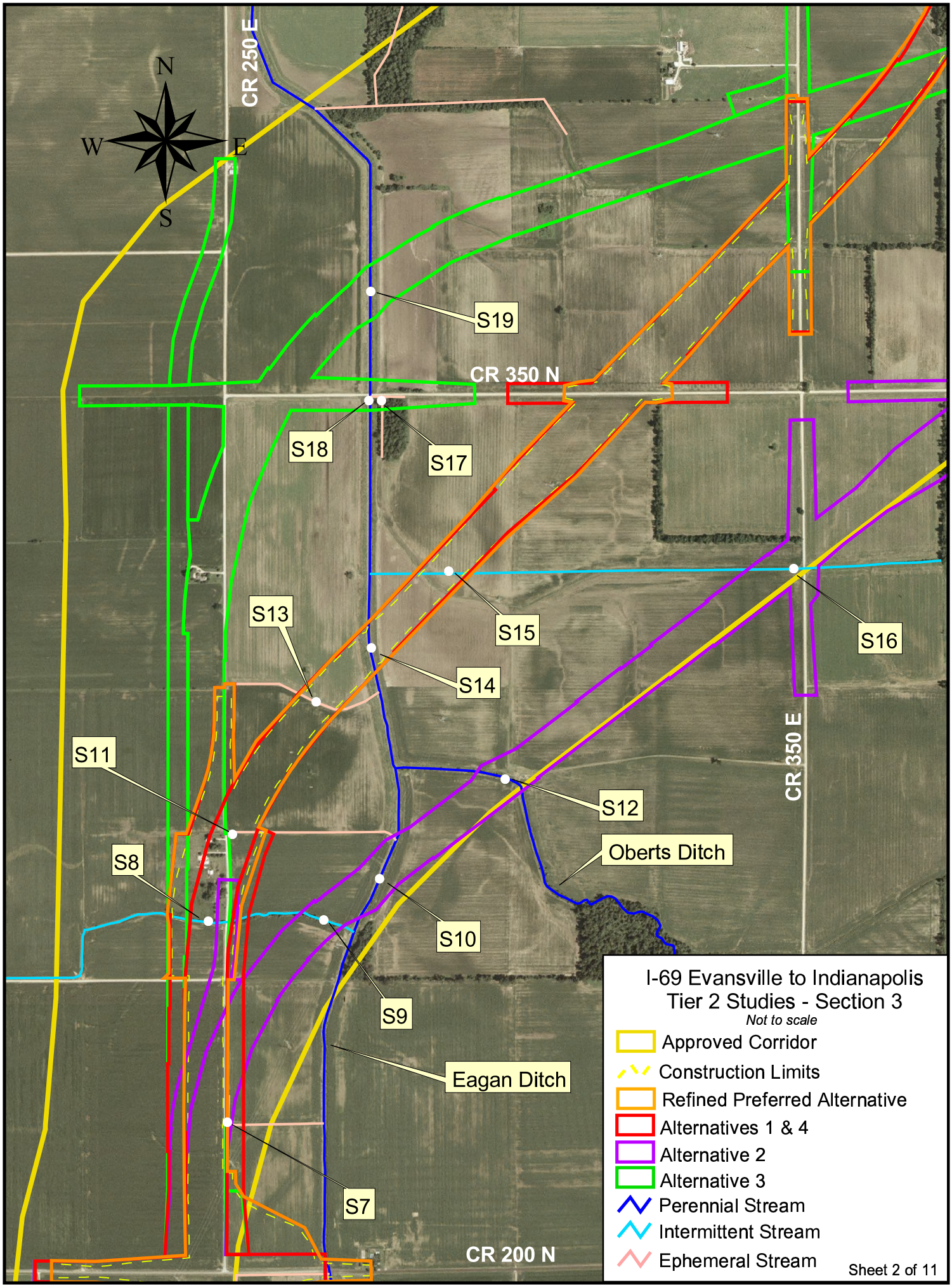
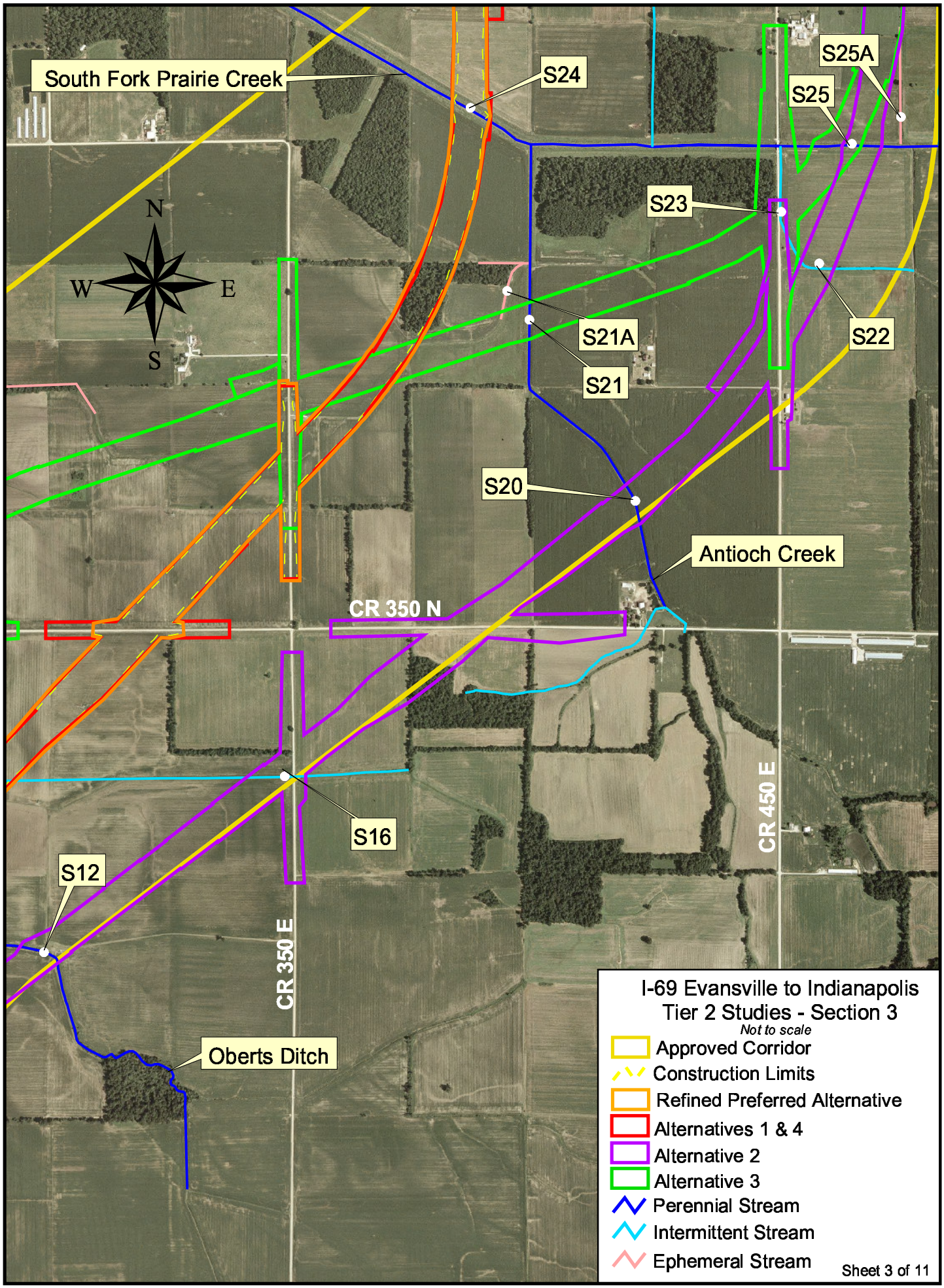

Doans Creek
Cem
Doans
550
600
523
534
BM
553
ROAD
Goose
Hollow
35
36
34
EAST
25 WEST
75
45
58
Branch
650
700
580
N
W
E
S
I-69 Evansville to Indianapolis
Tier 2 Studies - Section 3
Not to scale
Approved Corridor
Refined Preferred Alternative
Alternative 1, 2, 3 & 4
Sheet 11 of 11

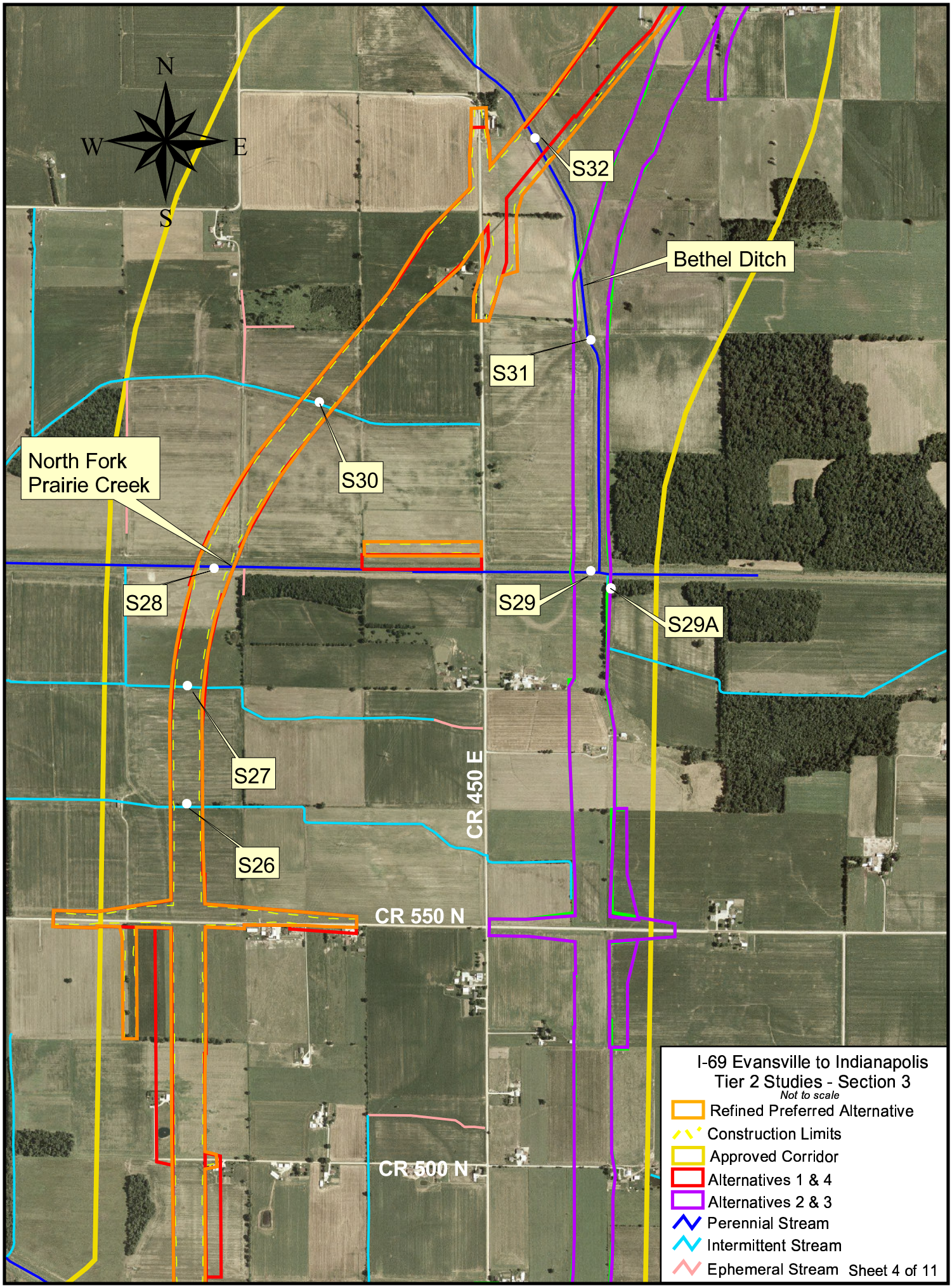
FIGURE 2

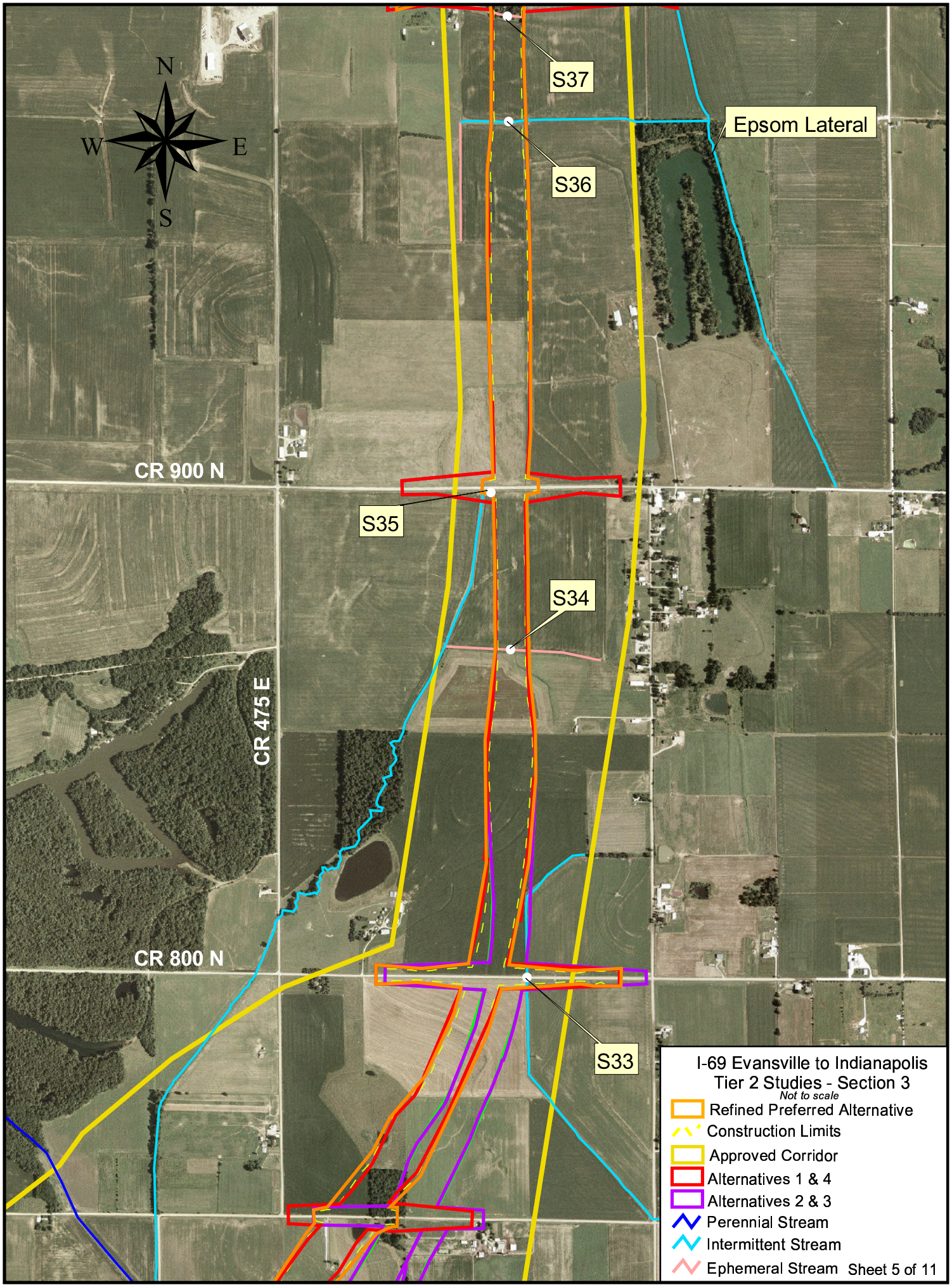
Aerial Photograph Maps
(Sheets 1 to 11)

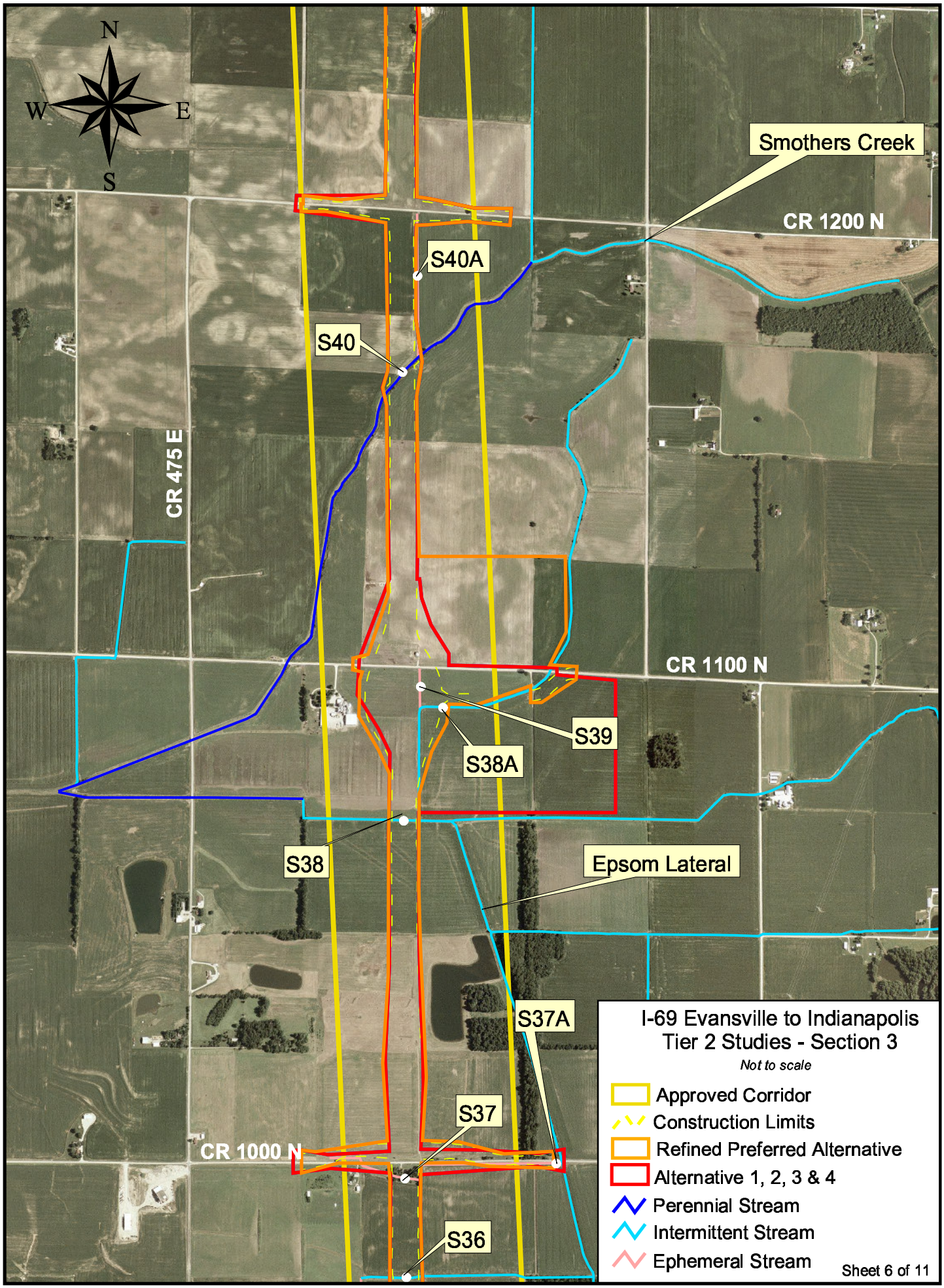

CR 200 N
S6A
S6
Eagan Ditch
N
W
E
S
S5
S4
CR 200 E
3A
CR 100 N
S3C
S3B
S3
S1
S2A
S2
US 50
I-69 Evansville to Indianapolis
Tier 2 Studies - Section 3
Not to scale
Approved Corridor
Construction Limits
Refined Preferred Alternative
Alternative 1
Alternative 2
Alternative 3 & 4
Perennial Stream
Intermittent Stream
Ephemeral Stream
Sheet 1 of 11

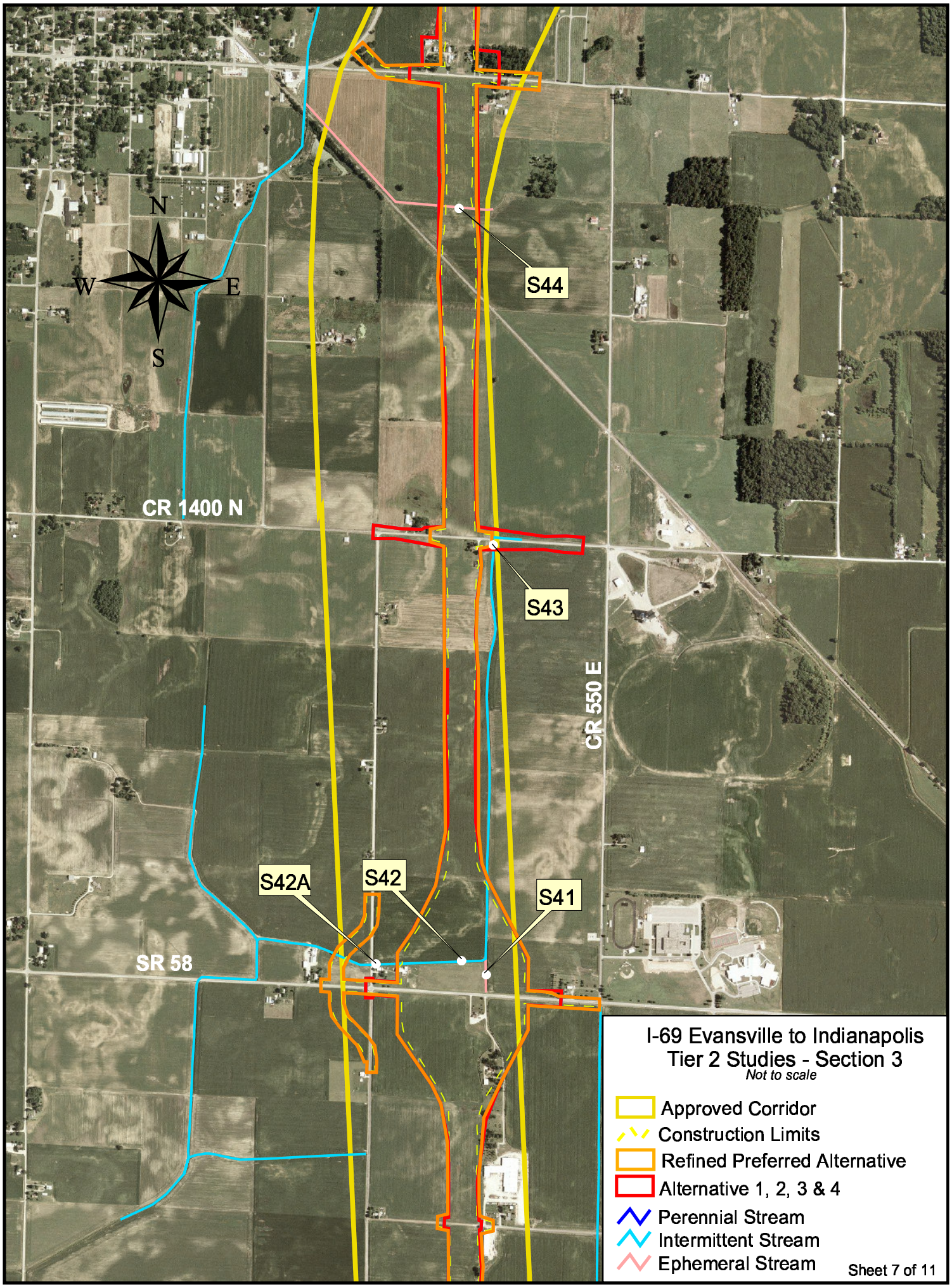

N
W
E
S
CR 250 E
CR 350 N
CR 350 E
CR 200 N
S19
S18
S17
S15
S16
S13
S14
S11
S12
S8
Oberts Ditch
S10
S9
Eagan Ditch
S7
I-69 Evansville to Indianapolis
Tier 2 Studies - Section 3
Not to scale
Approved Corridor
Construction Limits
Refined Preferred Alternative
Alternatives 1 & 4
Alternative 2
Alternative 3
Perennial Stream
Intermittent Stream
Ephemeral Stream
Sheet 2 of 11

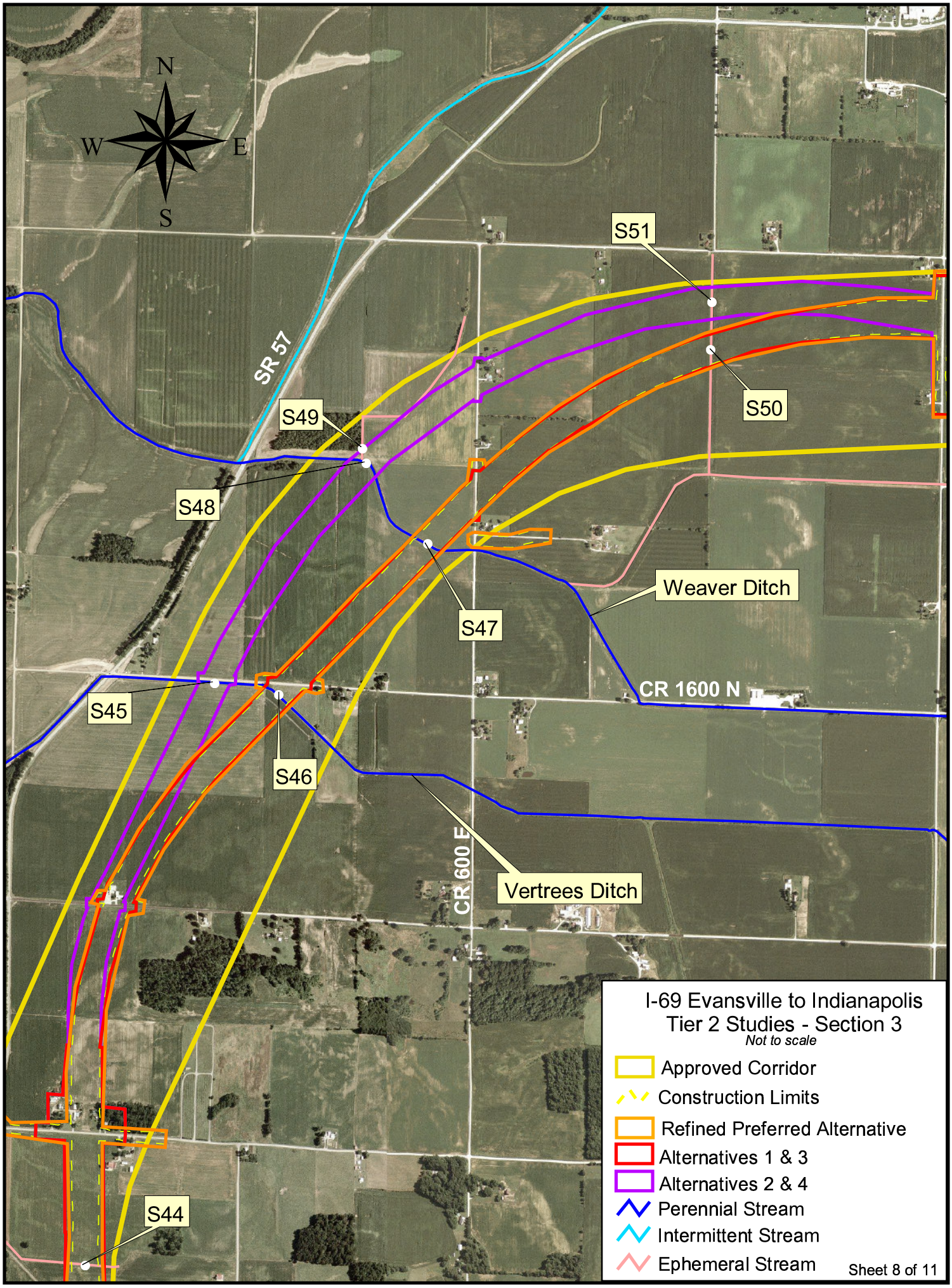

South Fork Prairie Creek
S24
S25A
S25
S23
S22
S21A
S21
S20
Antioch Creek
CR 350 N
S16
S12
CR 350 E
CR 450 E
Oberts Ditch
N
W
E
S
I-69 Evansville to Indianapolis
Tier 2 Studies - Section 3
Not to scale
Approved Corridor
Construction Limits
Refined Preferred Alternative
Alternatives 1 & 4
Alternative 2
Alternative 3
Perennial Stream
Intermittent Stream
Ephemeral Stream
Sheet 3 of 11

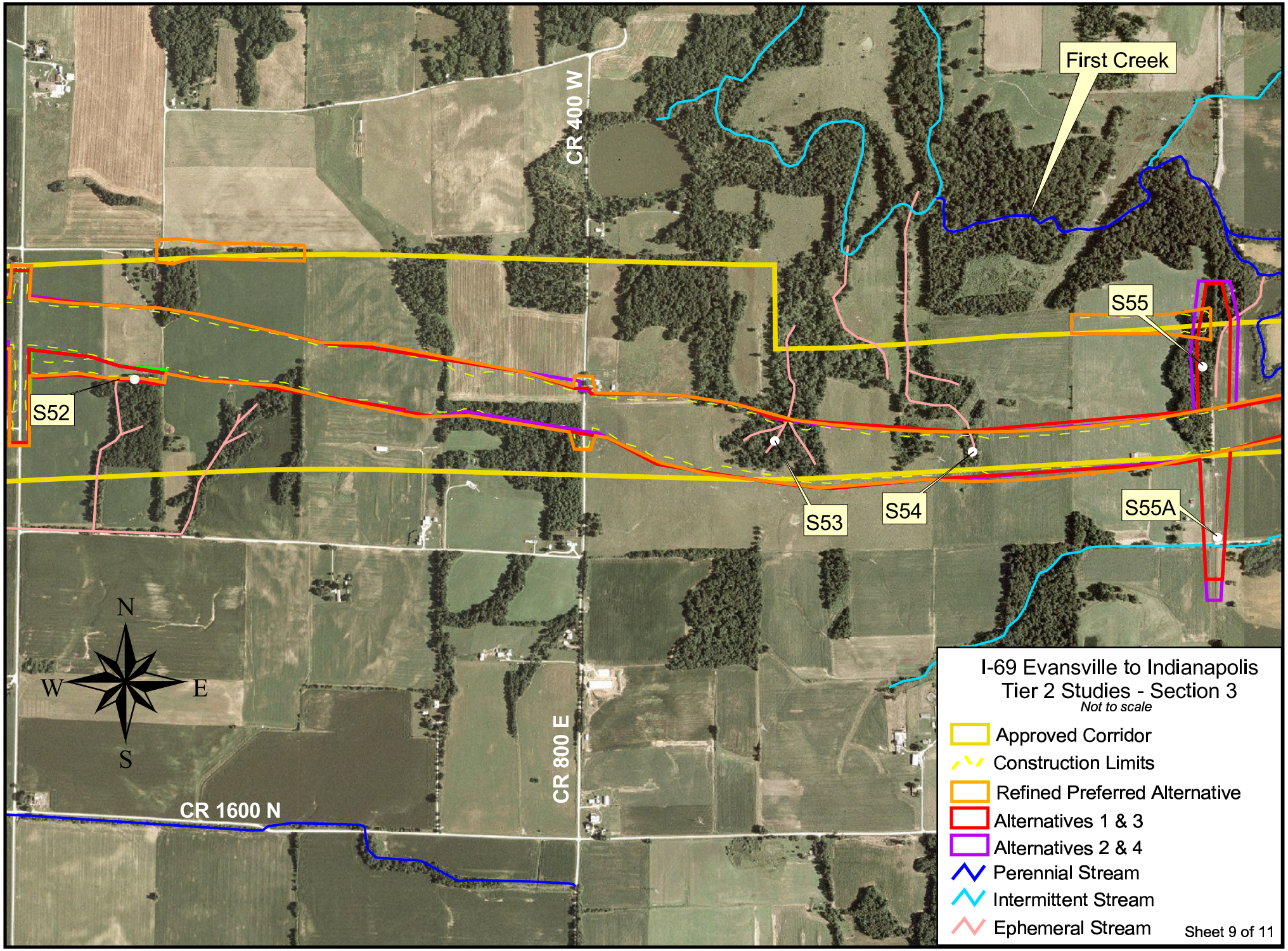

N
W
E
S
S32
Bethel Ditch
S31
S30
North Fork
Prairie Creek
S28
S29
S29A
S27
S26
CR 450 E
CR 550 N
CR 500 N
I-69 Evansville to Indianapolis
Tier 2 Studies - Section 3
Not to scale
Refined Preferred Alternative
Construction Limits
Approved Corridor
Alternatives 1 & 4
Alternatives 2 & 3
Perennial Stream
Intermittent Stream
Ephemeral Stream
Sheet 4 of 11

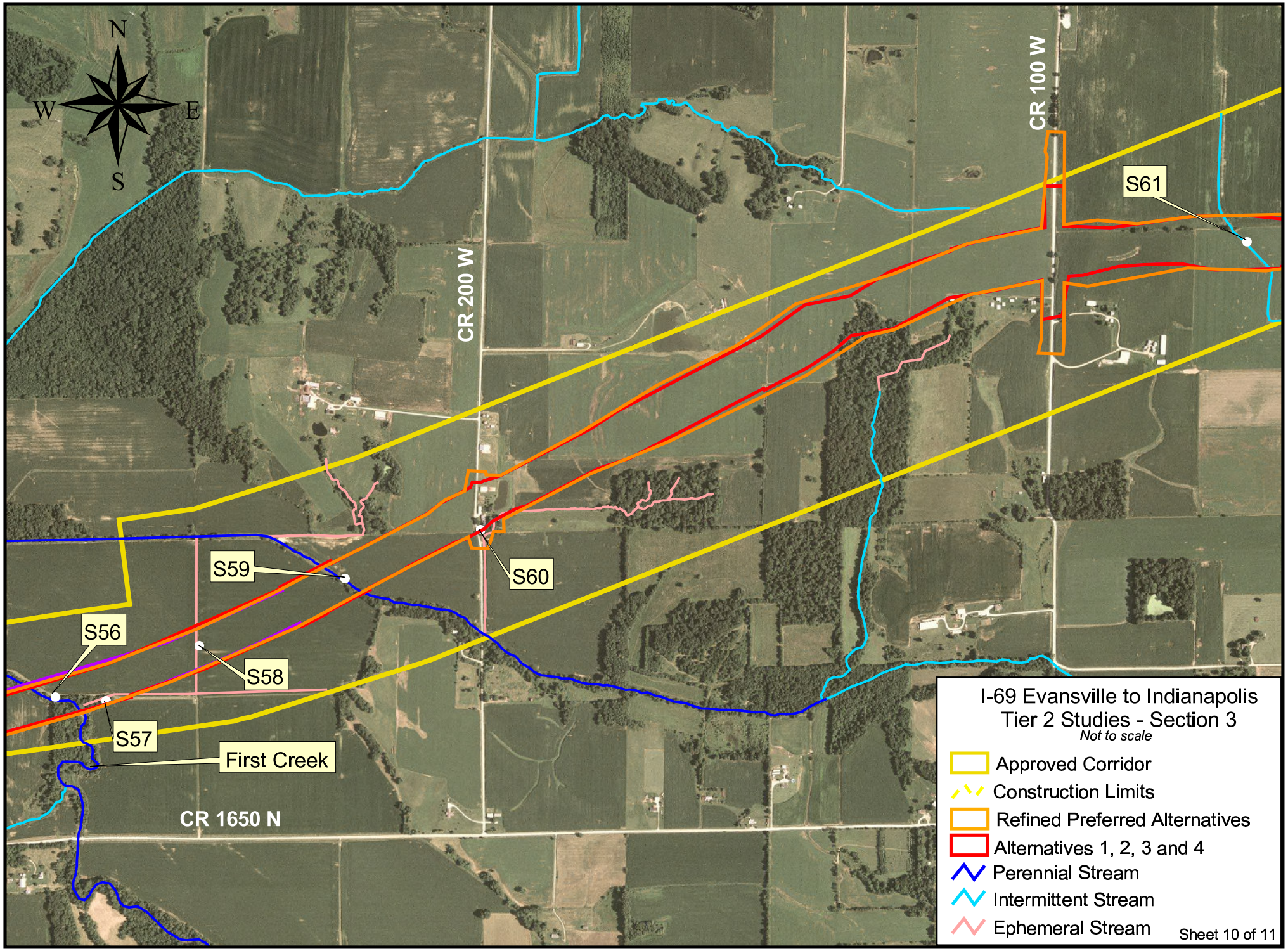

N
W
E
S
S37
Epsom Lateral
S36
CR 900 N
S35
S34
CR 475 E
CR 800 N
S33
I-69 Evansville to Indianapolis
Tier 2 Studies - Section 3
Not to scale
Refined Preferred Alternative
Construction Limits
Approved Corridor
Alternatives 1 & 4
Alternatives 2 & 3
Perennial Stream
Intermittent Stream
Ephemeral Stream
Sheet 5 of 11

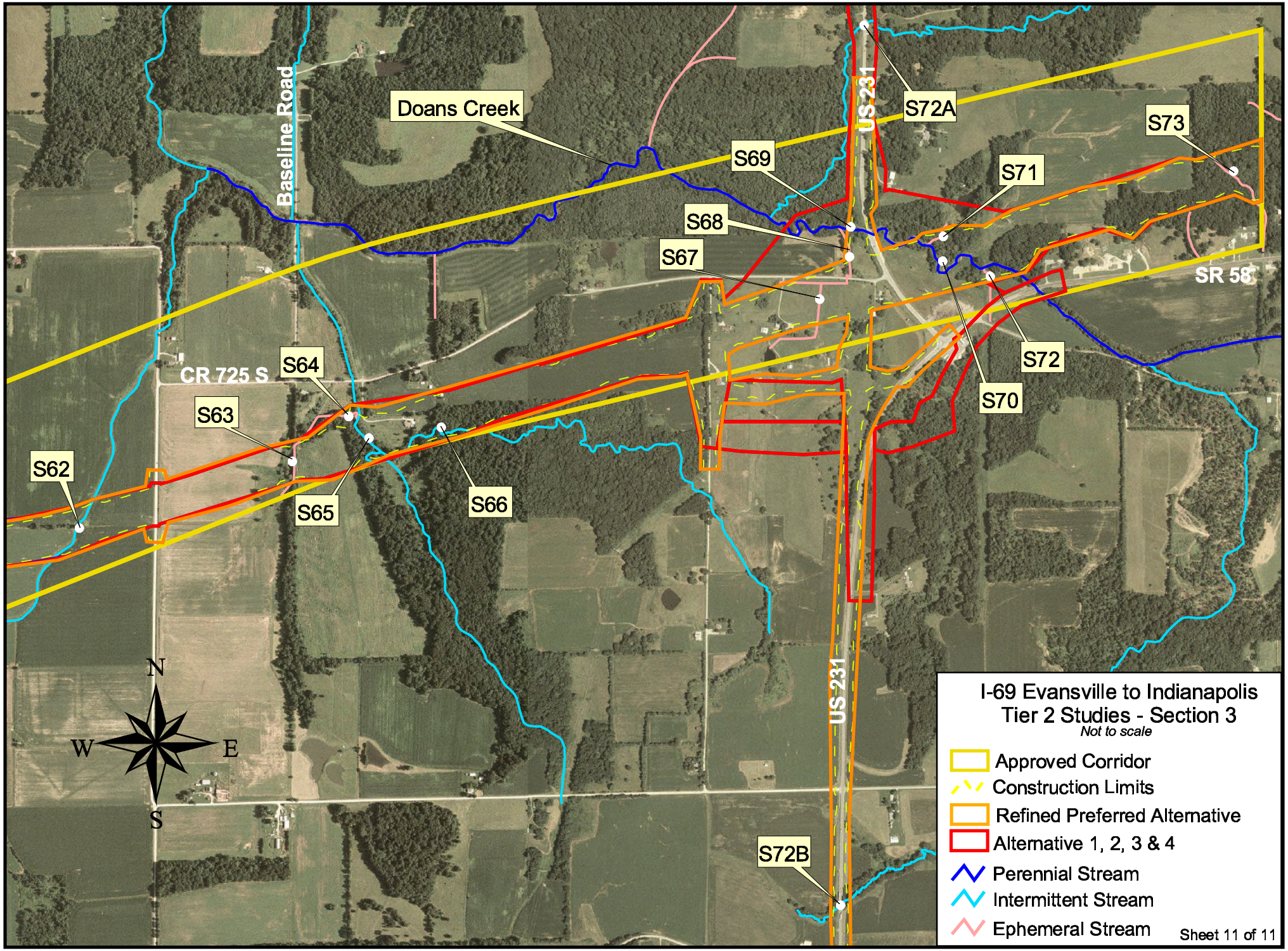

N
W
E
S
Smothers Creek
CR 1200 N
S40A
S40
CR 475 E
CR 1100 N
S39
S38A
S38
Epsom Lateral
S37A
S37
CR 1000 N
S36
I-69 Evansville to Indianapolis
Tier 2 Studies - Section 3
Not to scale
Approved Corridor
Construction Limits
Refined Preferred Alternative
Alternative 1, 2, 3 & 4
Perennial Stream
Intermittent Stream
Ephemeral Stream
Sheet 6 of 11


N
W
E
S
S44
CR 1400 N
S43
CR 550 E
S42A
S42
S41
SR 58
I-69 Evansville to Indianapolis
Tier 2 Studies - Section 3
Not to scale
Approved Corridor
Construction Limits
Refined Preferred Alternative
Alternative 1, 2, 3 & 4
Perennial Stream
Intermittent Stream
Ephemeral Stream
Sheet 7 of 11


N
W
E
S
S51
S50
SR 57
S49
S48
S47
Weaver Ditch
CR 1600 N
S45
S46
CR 600 E
Vertrees Ditch
S44
I-69 Evansville to Indianapolis
Tier 2 Studies - Section 3
Not to scale
Approved Corridor
Construction Limits
Refined Preferred Alternative
Alternatives 1 & 3
Alternatives 2 & 4
Perennial Stream
Intermittent Stream
Ephemeral Stream
Sheet 8 of 11


First Creek
CR 400 W
S55
S52
S53
S54
S55A
N
W
E
S
CR 800 E
CR 1600 N
I-69 Evansville to Indianapolis
Tier 2 Studies - Section 3
Not to scale
Approved Corridor
Construction Limits
Refined Preferred Alternative
Alternatives 1 & 3
Alternatives 2 & 4
Perennial Stream
Intermittent Stream
Ephemeral Stream
Sheet 9 of 11

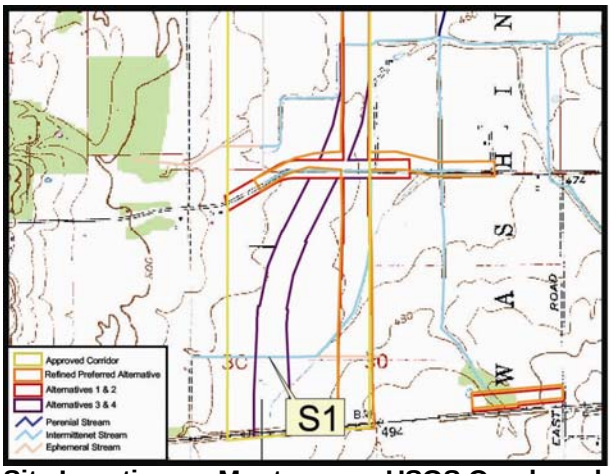

N
W
E
S
CR 100 W
CR 200 W
CR 1650 N
S61
S60
S59
S58
S57
S56
First Creek
I-69 Evansville to Indianapolis
Tier 2 Studies - Section 3
Not to scale
Approved Corridor
Construction Limits
Refined Preferred Alternatives
Alternatives 1, 2, 3 and 4
Perennial Stream
Intermittent Stream
Ephemeral Stream
Sheet 10 of 11


Doans Creek
Baseline Road
US 231
S72A
S73
S69
S71
S68
S67
SR 58
S72
S70
CR 725 S
S64
S63
S62
S65
S66
N
W
E
S
S72B
I-69 Evansville to Indianapolis
Tier 2 Studies - Section 3
Not to scale
Approved Corridor
Construction Limits
Refined Preferred Alternative
Alternative 1, 2, 3 & 4
Perennial Stream
Intermittent Stream
Ephemeral Stream
Sheet 11 of 11

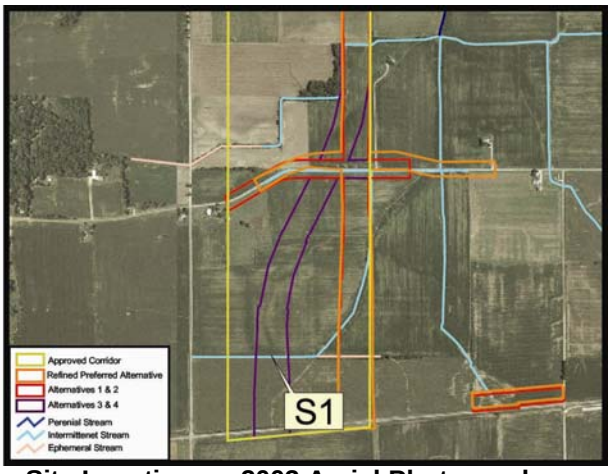
APPENDIX A

Stream Site Forms

Stream Sec3-S1



Site Location on Montgomery USGS Quadrangle



Site Location on 2003 Aerial Photograph

Aquatic Resource:	Stream	**USGS Quadrangle:**	Montgomery
Stream Name:	Unnamed	**Section:**	30
Quarter:	NW/SW border	**Township:**	T3N
Range:	R6W	**IDEM 303(d) List:**	No
Watershed:	S.F. Prairie Creek-Eagan Ditch	**OHWM Width:**	3.6 feet
Channelized:	Yes	**USCOE Jurisdiction:**	Yes
		IDEM Jurisdiction:	Yes

Stream Sec3-S1

Stream Name	Length of Impact	Area Impacted	Alternative	Stream Habitat Assessment
Tributary of Eagan Ditch	454.6 feet	0.038 acres	3 and 4	HHEI 52 /Modified Class II

Description of Potential Impact: Alternatives 3 and 4 will impact approximately 454.4 linear feet of this stream. The area of impact below the ordinary high water mark (OHWM) is 0.038 acres for Alternatives 3 and 4. The intermittent stream is a tributary of Eagan Ditch. It flows northeast and becomes a roadside ditch along Daviess County Road 100 North before discharging into Eagan Ditch. The substrate is predominately clay and gravel. Old field vegetation grows along the banks above the OHWM. Row crops are present on the north and south sides of the banks. Photographs taken in the area where the proposed Alternatives 3 and 4 cross this unnamed tributary of Eagan Ditch are on the back of this form.

Stream Sec3-S1

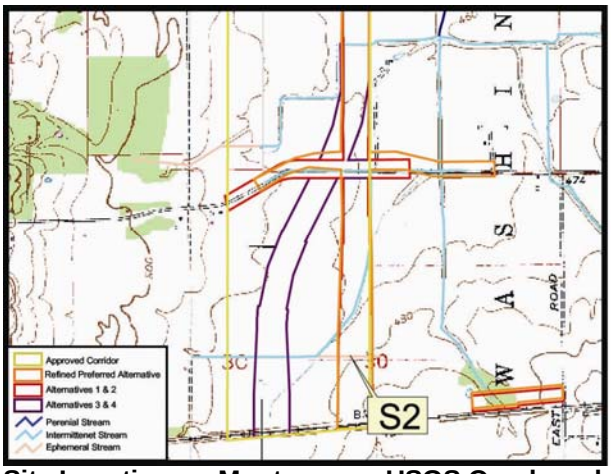
Photograph Taken Downstream

Photograph Taken Looking North

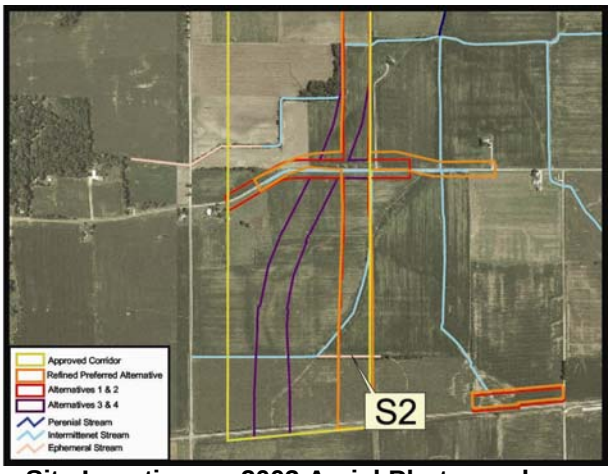
Photograph Taken Upstream

Photograph Taken Looking South

Stream Sec3-S2



Site Location on Montgomery USGS Quadrangle



Site Location on 2003 Aerial Photograph

Aquatic Resource:	Stream	**USGS Quadrangle:**	Montgomery
Stream Name:	Unnamed	**Section:**	30
Quarter:	NW/SW border	**Township:**	T3N
Range:	R6W	**IDEM 303(d) List:**	No
Watershed:	S.F. Prairie Creek-Eagan Ditch	**OHWM Width:**	3.6 feet
Channelized	Yes	**USCOE Jurisdiction:**	Yes
		IDEM Jurisdiction:	Yes

Stream Sec3-S2

Stream Name	Length of Impact	Area Impacted	Alternative	Stream Habitat Assessment
Tributary of Eagan Ditch	480.1 feet	0.040 acres	1, 2, and Refined Preferred	HHEI 21 / Modified Class I

Description of Potential Impact: Alternatives 1 and 2 and the Refined Preferred Alternative will impact approximately 480.1 linear feet of this stream. The area of impact below the ordinary high water mark (OHWM) is 0.040 acres for Alternatives 1 and 2 and the Refined Preferred Alternative. The ephemeral stream is a tributary of Eagan Ditch. It flows west and discharges into an intermittent stream that flows northeast towards Eagan Ditch. The substrate is predominately clay, silt, leaf pack, and woody debris. A riparian zone of approximately 5 feet on each side exists in the area where the alternatives cross this stream. Photographs taken in the area where the proposed Alternatives 1 and 2 cross this unnamed tributary of Eagan Ditch are on the back of this form.

Stream Sec3-S2

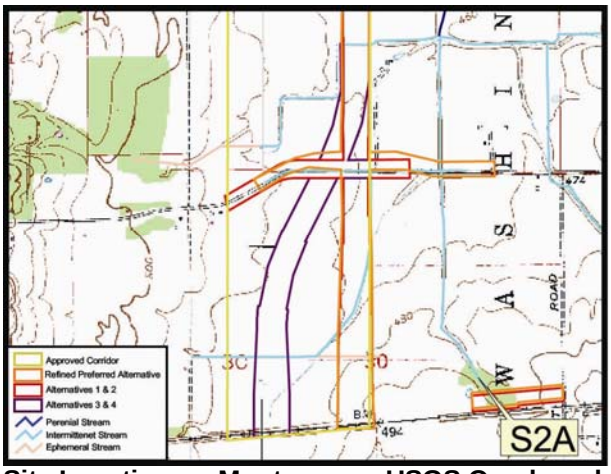
Photograph Taken Downstream

Photograph Taken Looking North

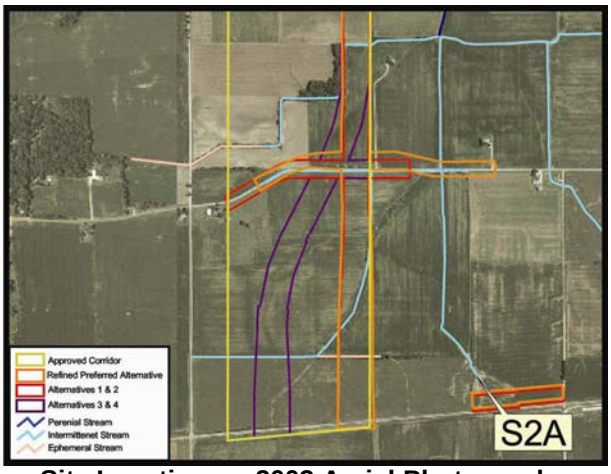
Photograph Taken Upstream

Photograph Taken Looking South

Stream Sec3-S2A



Site Location on Montgomery USGS Quadrangle



Site Location on 2003 Aerial Photograph

Aquatic Resource:	Stream	**USGS Quadrangle:**	Montgomery
Stream Name:	Unnamed	**Section:**	30
Quarter:	NW	**Township:**	T3N
Range:	R6W	**IDEM 303(d) List:**	No
Watershed:	S.F. Prairie Creek-Eagan Ditch	**OHWM Width:**	6.6 feet
Channelized:	Yes	**USCOE Jurisdiction:**	Yes
		IDEM Jurisdiction:	Yes

Stream Sec3-S2A

Stream Name	Length of Impact	Area Impacted	Alternative	Stream Habitat Assessment
Tributary of Eagan Ditch	106.6 feet	0.016 Acres	Refined Preferred	HHEI 39/Modified Class II
Tributary of Eagan Ditch	56.0 feet	0.008 Acres	1, 2, 3, 4	HHEI 39/Modified Class II

Description of Potential Impact: The Refined Preferred Alternative will impact approximately 106.6 linear feet of this stream. The area of impact below the ordinary high water mark (OHWM) is 0.016 acres. Alternatives 1, 2, 3, and 4 impact approximately 56.0 linear feet and 0.008 acres below the OHWM. The substrate is predominately clay and sand. The stream drains an agricultural field and row crops exist beyond the banks. The stream will be impacted by an access road. Photographs taken where the proposed Refined Preferred Alternative crosses the stream in the agricultural field are on the back of this form.

Stream Sec3-S2A

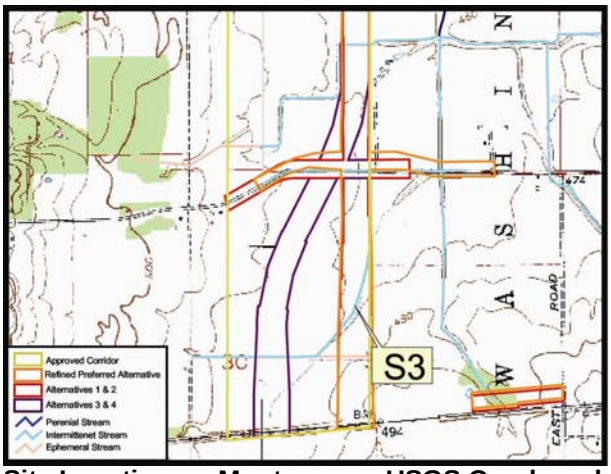
Photograph Taken Downstream

Photograph Taken Looking East

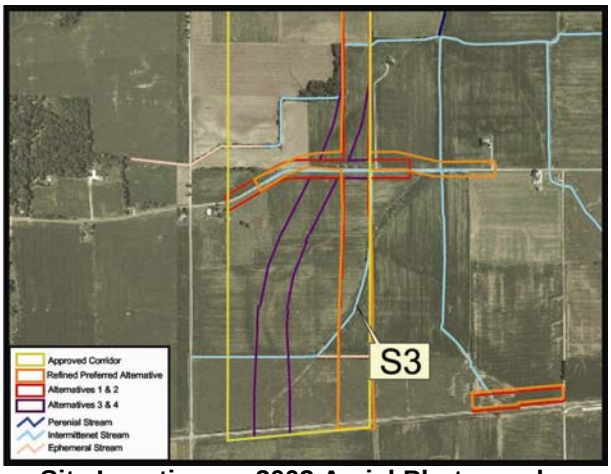
Photograph Taken Upstream

Photograph Taken Looking West

Stream Sec3-S3



Site Location on Montgomery USGS Quadrangle



Site Location on 2003 Aerial Photograph

Aquatic Resource:	Stream	**USGS Quadrangle:**	Montgomery
Stream Name:	Unnamed	**Section:**	30
Quarter:	NW	**Township:**	T3N
Range:	R6W	**IDEM 303(d) List:**	No
Watershed:	S.F. Prairie Creek-Eagan Ditch	**OHWM Width:**	5.9 feet
Channelized:	Yes	**USCOE Jurisdiction:**	Yes
		IDEM Jurisdiction:	Yes

Stream Sec3-S3

Stream Name	Length of Impact	Area Impacted	Alternative	Stream Habitat Assessment
Tributary of Eagan Ditch	1466.9 feet	0.202 acres	Refined Preferred	HHEI 32/ Modified Class II
Tributary of Eagan Ditch	1393.0 feet	0.189 acres	1 and 2	HHEI 32 / Modified Class II
Tributary of Eagan Ditch	107.4 feet	0.015 acres	3 and 4	HHEI 32 / Modified Class II

Description of Potential Impact: The Refined Preferred Alternative will impact approximately 1466.9 linear feet of this stream and 0.202 acres below the ordinary high water mark (OHWM). Alternatives 1 and 2 will impact approximately 1393.0 linear feet of this stream. The area of impact below the ordinary high water mark (OHWM) is 0.189 acres for Alternatives 1 and 2. Alternatives 3 and 4 will impact approximately 107.4 linear feet of this stream. The area of impact below the ordinary high water mark (OHWM) is 0.015 acres for Alternatives 3 and 4. The impact of Alternatives 3 and 4 will take place due to the Daviess County Road 100 North grade separation and will affect the stream segment that is currently a roadside ditch. Alternatives 1 and 2 affect this stream segment and an additional segment south in an agricultural field south of the county road. The substrate is predominately clay and silt. The banks contain old field vegetation, and row crops exist beyond the banks. The stream flows north to Daviess County Road 100 North and then east along its south side until discharging into Eagan Ditch. Photographs taken where the proposed Alternatives 1 and 2 cross the stream in the agricultural field are on the back of this form.

Stream Sec3-S3

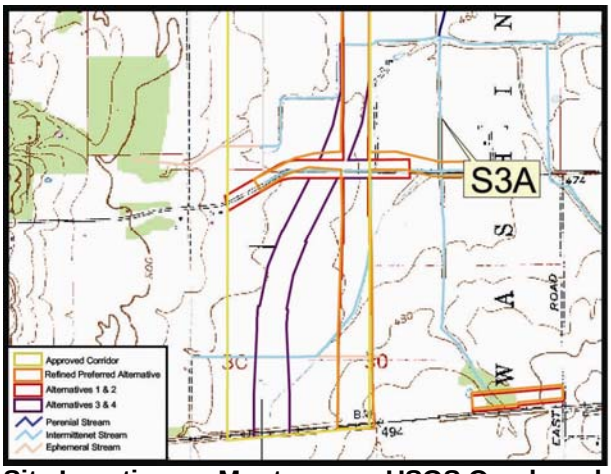
Photograph Taken Downstream

Photograph Taken Looking North

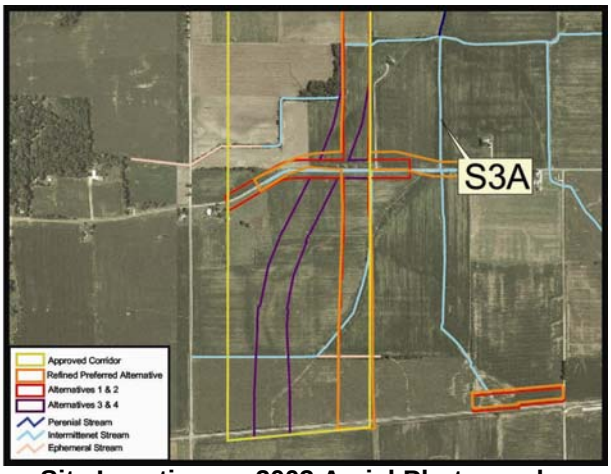
Photograph Taken Upstream

Photograph Taken Looking South

Stream Sec3-S3A



Site Location on Montgomery USGS Quadrangle



Site Location on 2003 Aerial Photograph

Aquatic Resource:	Stream	**USGS Quadrangle:**	Montgomery
Stream Name:	Unnamed	**Section:**	30
Quarter:	NW	**Township:**	T3N
Range:	R6W	**IDEM 303(d) List:**	No
Watershed:	S.F. Prairie Creek-Eagan Ditch	**OHWM Width:**	6.6 feet
Channelized:	Yes	**USCOE Jurisdiction:**	Yes
		IDEM Jurisdiction:	Yes

Stream Sec3-S3A				
Stream Name	**Length of Impact**	**Area Impacted**	**Alternative**	**Stream Habitat Assessment**
Tributary of Eagan Ditch	203.5 feet	0.030 acres	Refined Preferred	HHEI 59 / Modified Class II

Description of Potential Impact: The Refined Preferred Alternative will impact approximately 203.5 linear feet of this stream and the area of impact below the OHWM is 0.030 acres. The impact will take place due to the Daviess County Road 100 North grade separation and will affect the stream segment that is currently a roadside ditch. The substrate is predominately clay and silt. The banks contain old field vegetation, and row crops exist beyond the banks. The stream flows north to Daviess County Road 100 North and then east along its south side until discharging into Eagan Ditch. Photographs taken where the proposed Alternatives 1 and 2 cross the stream in the agricultural field are on the back of this form.

Stream Sec3-S3A

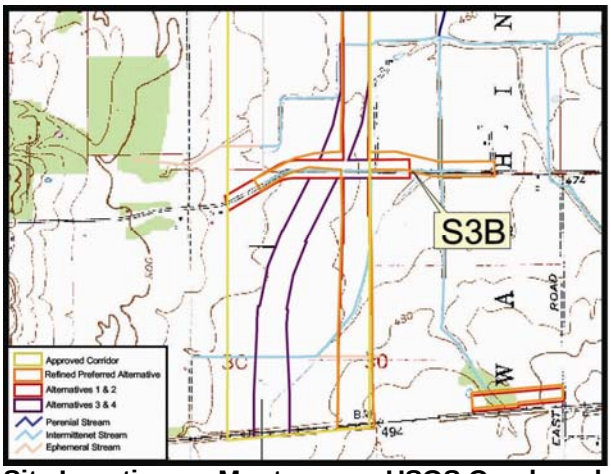
Photograph Taken Downstream

Photograph Taken Looking East

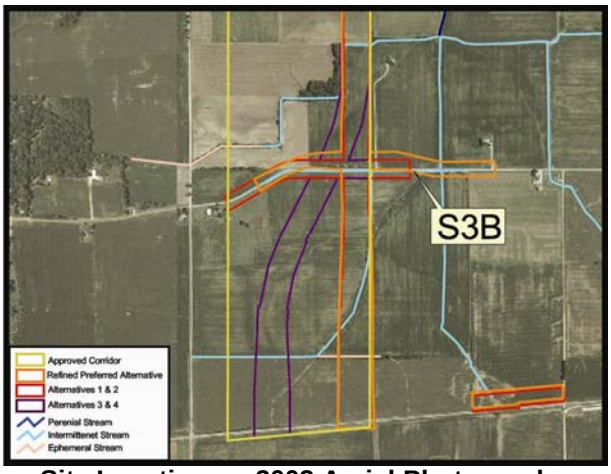
Photograph Taken Upstream

Photograph Taken Looking West

Stream Sec3-S3B



Site Location on Montgomery USGS Quadrangle



Site Location on 2003 Aerial Photograph

Aquatic Resource:	Stream	**USGS Quadrangle:**	Montgomery
Stream Name:	Unnamed	**Section:**	30
Quarter:	NW	**Township:**	T3N
Range:	R6W	**IDEM 303(d) List:**	No
Watershed:	S.F. Prairie Creek-Eagan Ditch	**OHWM Width:**	4.9 feet
Channelized:	Yes	**USCOE Jurisdiction:**	Yes
		IDEM Jurisdiction:	Yes

Stream Sec3-S3B

Stream Name	Length of Impact	Area Impacted	Alternative	Stream Habitat Assessment
Tributary of Eagan Ditch	1370.0 Feet	0.160 Acres	Refined Preferred	HHEI 49 / Modified Class II
Tributary of Eagan Ditch	2081.7 Feet	0.234 Acres	1, 2, 3, 4	HHEI 49 / Modified Class II

Description of Potential Impact: The Refined Preferred Alternative will impact approximately 1370.0 linear feet of this stream. The area of impact below the ordinary high water mark (OHWM) is 0.16 acres. Alternatives 1, 2, 3, and 4 will impact approximately 2081.7 linear feet and 0.23 acres below the OHWM. The impact of will take place due to the Daviess County Road 100 North grade separation and will affect the stream segment that is currently a roadside ditch. The substrate is predominately sand and silt. The banks contain old field vegetation, and row crops exist beyond the banks. The stream flows north to Daviess County Road 100 North and then east along its south side until discharging into Eagan Ditch. Photographs taken where the proposed Refined Preferred Alternative crosses the stream near the agricultural field are on the back of this form.

Stream Sec3-S3B

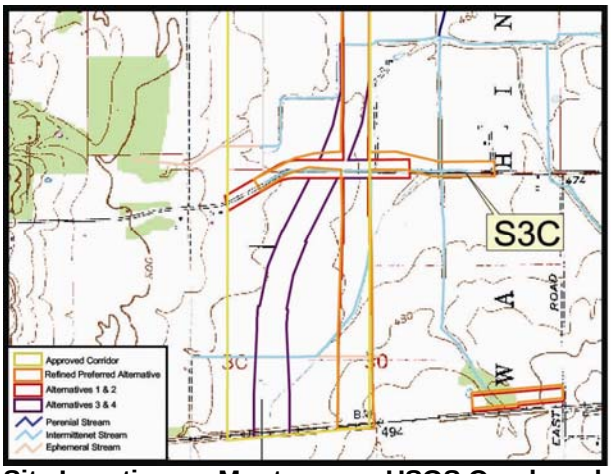
Photograph Taken Downstream

Photograph Taken Looking North

Photograph Taken Upstream

Photograph Taken Looking South

Stream Sec3-S3C



Site Location on Montgomery USGS Quadrangle

Site Location on 2003 Aerial Photograph

Aquatic Resource:	Stream	**USGS Quadrangle:**	Montgomery
Stream Name:	Unnamed	**Section:**	30
Quarter:	NW	**Township:**	T3N
Range:	R6W	**IDEM 303(d) List:**	No
Watershed:	S.F. Prairie Creek-Eagan Ditch	**OHWM Width:**	6.0 feet
Channelized:	Yes	**USCOE Jurisdiction:**	Yes
		IDEM Jurisdiction:	Yes

Stream Sec3-S3C

Stream Name	Length of Impact	Area Impacted	Alternative	Stream Habitat Assessment
Tributary of Eagan Ditch	377.0 Feet	0.052 Acres	Refined Preferred	HHEI 34 / Modified Class II

Description of Potential Impact: The Refined Preferred Alternative will impact approximately 377.0 linear feet of this stream. The area of impact below the ordinary high water mark (OHWM) is 0.16 acres. The impact of will take place due to the Daviess County Road 100 North grade separation and will affect the stream segment that is currently a roadside ditch. The substrate is predominately sand and silt. The banks contain old field vegetation, and row crops exist beyond the banks. The stream flows north to Daviess County Road 100 North and then east along its south side until discharging into Eagan Ditch. Photographs taken where the proposed Refined Preferred Alternative crosses the stream near the agricultural field are on the back of this form.

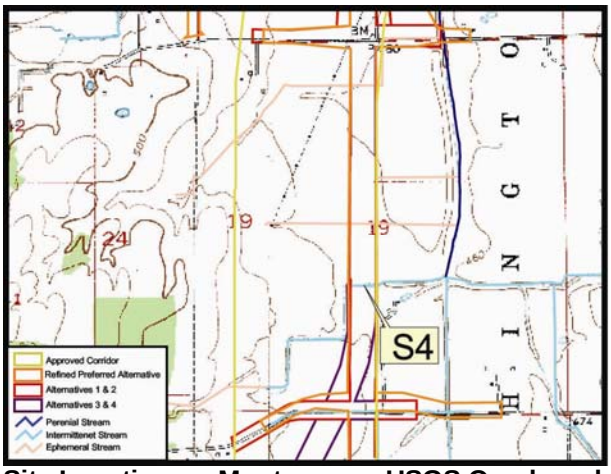
Stream Sec3-S3C

Photograph Taken Downstream

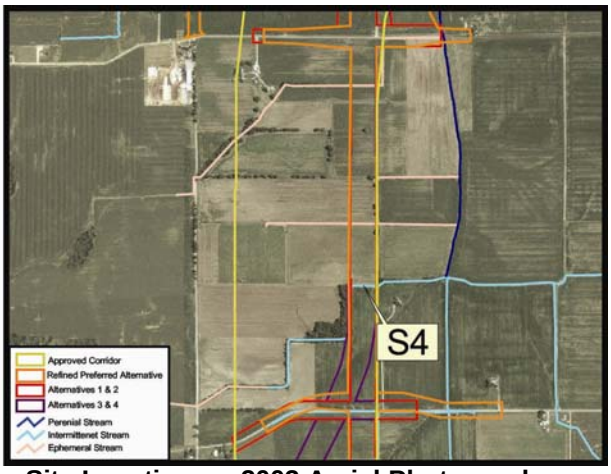
Photograph Taken Looking North

Photograph Taken Upstream

Stream Sec3-S4



Site Location on Montgomery USGS Quadrangle



Site Location on 2003 Aerial Photograph

Aquatic Resource:	Stream	**USGS Quadrangle:**	Montgomery
Stream Name:	Unnamed	**Section:**	19
Quarter:	SW	**Township:**	T3N
Range:	R6W	**IDEM 303(d) List:**	No
Watershed:	S.F. Prairie Creek-Eagan Ditch	**OHWM Width:**	3.6 feet
Channelized:	Yes	**USCOE Jurisdiction:**	Yes
		IDEM Jurisdiction:	Yes

Stream Sec3-S4

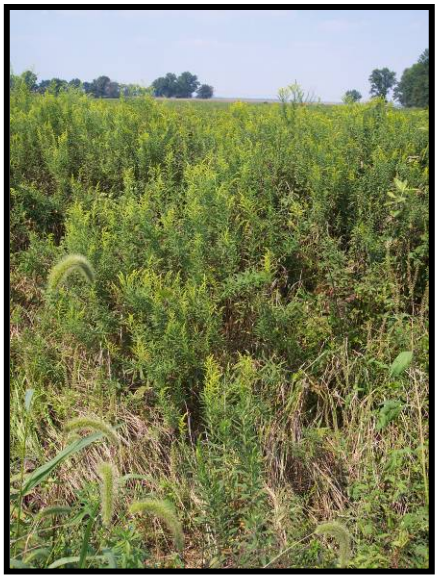
Stream Name	Length of Impact	Area Impacted	Alternative	Stream Habitat Assessment
Tributary of Eagan Ditch	360.0 feet	0.030 acres	1, 2	HHEI 28 / Modified Class I
Tributary of Eagan Ditch	1,114.0 feet	0.092 acres	3, 4	HHEI 28 / Modified Class I
Tributary of Eagan Ditch	403.9 feet	0.033 acres	Refined Preferred	HHEI 28 / Modified Class I

Description of Potential Impact: Alternatives 1 and 2 will impact approximately 360.0 linear feet of this stream. The area of impact below the ordinary high water mark (OHWM) is 0.030 acres for Alternatives 1 and 2. Alternatives 3 and 4 will impact approximately 1,114.0 linear feet and 0.092 acres below the OHWM. The Refined Preferred Alternative will impact approximately 403.9 linear feet and 0.033 acres below the OHWM. The intermittent stream is a tributary of Eagan Ditch. It flows east and discharges into Eagan Ditch. The stream flows through a small woodlot west of the alternatives. The substrate is predominately clay with some sand. The banks contain old field vegetation, and row crops exist beyond the banks. Photographs taken where the proposed alternatives cross the stream in the agricultural field are on the back of this form.

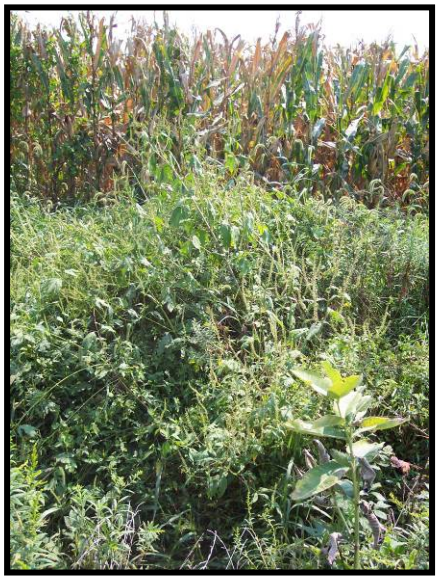
Stream Sec3-S4

Photograph Taken Upstream

Photograph Taken Downstream

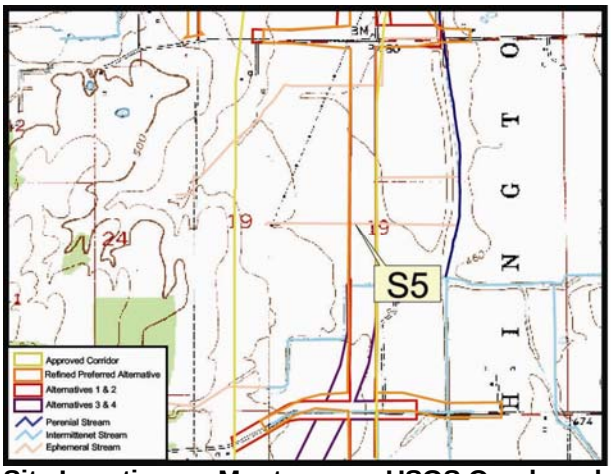


Photograph Taken Looking North

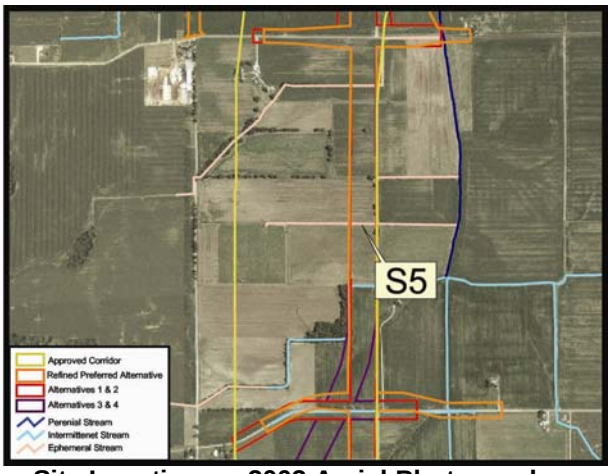


Photograph Taken Looking South

Stream Sec3-S5



Site Location on Montgomery USGS Quadrangle



Site Location on 2003 Aerial Photograph

Aquatic Resource:	Stream	**USGS Quadrangle:**	Montgomery
Stream Name:	Unnamed	**Section:**	19
Quarter:	NW/SW Border	**Township:**	T3N
Range:	R6W	**IDEM 303(d) List:**	No
Watershed:	S.F. Prairie Creek-Eagan Ditch	**OHWM Width:**	2.0 feet
Channelized:	Yes	**USCOE Jurisdiction:**	Yes
		IDEM Jurisdiction:	Yes

Stream Sec3-S5

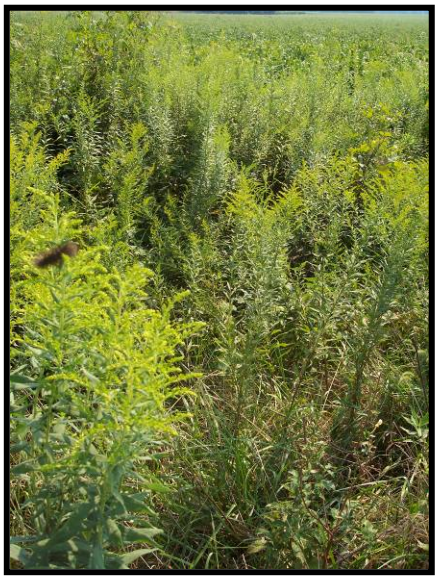
Stream Name	Length of Impact	Area Impacted	Alternative	Stream Habitat Assessment
Tributary of Eagan Ditch	370.0 feet	0.017 acres	1, 2	HHEI 6 / Modified Class I
Tributary of Eagan Ditch	484.9 feet	0.022 acres	3, 4	HHEI 6 / Modified Class I
Tributary of Eagan Ditch	393.0 feet	0.018 acres	Refined Preferred	HHEI 6 / Modified Class I

Description of Potential Impact: Alternatives 1 and 2 will impact approximately 370.0 linear feet of this stream. The area of impact below the ordinary high water mark (OHWM) is 0.017 acres for Alternatives 1 and 2. Alternatives 3 and 4 will impact approximately 484.9 linear feet and 0.022 acres below the OHWM. The Refined Preferred Alternative will impact approximately 393.0 linear feet and 0.018 acres below the OHWM. The ephemeral stream is a tributary of Eagan Ditch. It flows east and discharges into Eagan Ditch. The substrate is clay. The banks contain old field vegetation, and row crops exist beyond the banks. Photographs taken where the proposed alternatives cross the stream in the agricultural field are on the back of this form.

Stream Sec3-S5

Photograph Taken Looking North

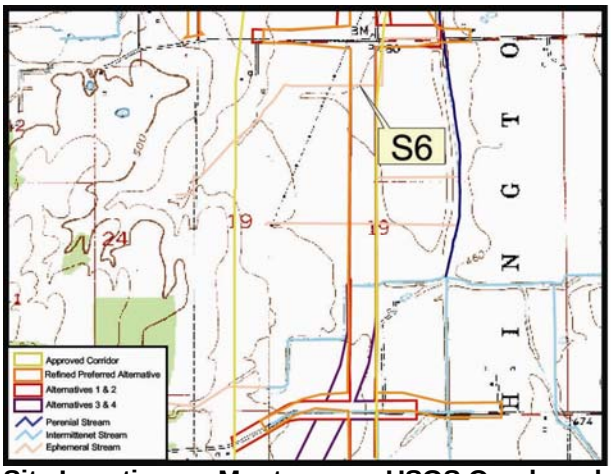
Photograph Taken Looking Down into Stream



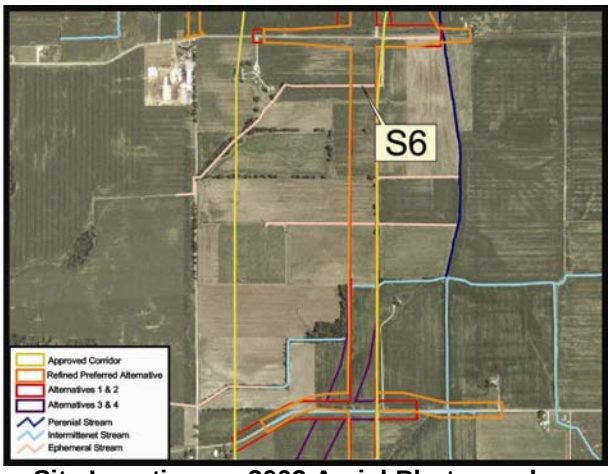
Photograph Taken Upstream

Photograph Taken Downstream

Stream Sec3-S6



Site Location on Montgomery USGS Quadrangle



Site Location on 2003 Aerial Photograph

Aquatic Resource:	Stream	**USGS Quadrangle:**	Montgomery
Stream Name:	Unnamed	**Section:**	19
Quarter:	NW	**Township:**	T3N
Range:	R6W	**IDEM 303(d) List:**	No
Watershed:	S.F. Prairie Creek-Eagan Ditch	**OHWM Width:**	4.9 feet
Channelized:	Yes	**USCOE Jurisdiction:**	Yes
		IDEM Jurisdiction:	Yes

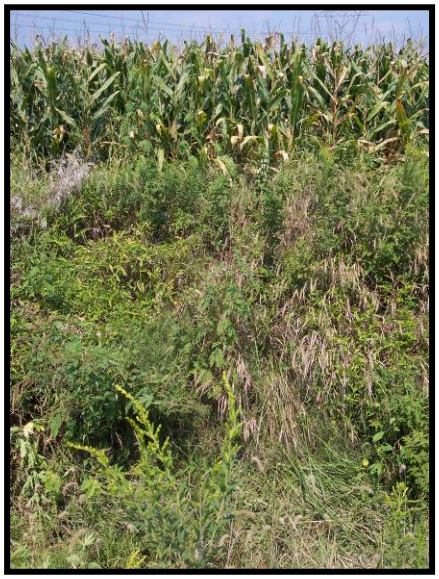
Stream Sec3-S6

Stream Name	Length of Impact	Area Impacted	Alternative	Stream Habitat Assessment
Tributary of Eagan Ditch	1292.0 feet	0.145 acres	1, 2	HHEI 28 / Modified Class I
Tributary of Eagan Ditch	1282.0 feet	0.144 acres	3, 4	HHEI 28 / Modified Class I
Tributary of Eagan Ditch	1337.0 feet	0.150 acres	Refined Preferred	HHEI 28 / Modified Class I

Description of Potential Impact: Alternatives 1 and 2 will impact approximately 1292.0 linear feet of this stream and 0.145 acres below the ordinary high water mark (OHWM). Alternatives 3 and 4 will impact approximately 1282.0 linear feet and 0.144 acres below the OHWM. The Refined Preferred Alternative will impact approximately 1337.0 linear feet and 0.150 acres below the OHWM. The ephemeral stream is a tributary of Eagan Ditch. It flows east and turns north to Daviess County Road 200 North. There, it turns east in a roadside ditch and discharges into Eagan Ditch. The roadside ditch segment will be impacted by the county road grade separation. The substrate of the stream is clay and sand. The banks contain old field vegetation, and row crops exist beyond the banks. Photographs taken where the proposed alternatives cross the stream in the agricultural field are on the back of this form.

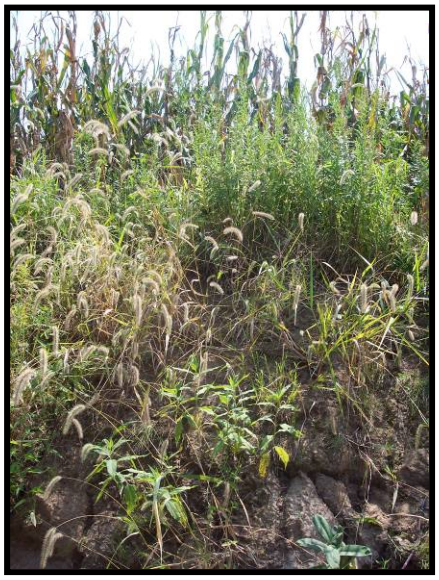
Stream Sec3-S6

Photograph Taken Upstream



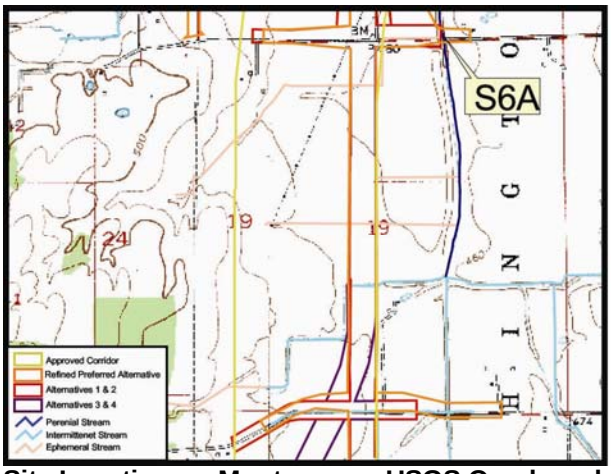
Photograph Taken Looking North

Photograph Taken Downstream

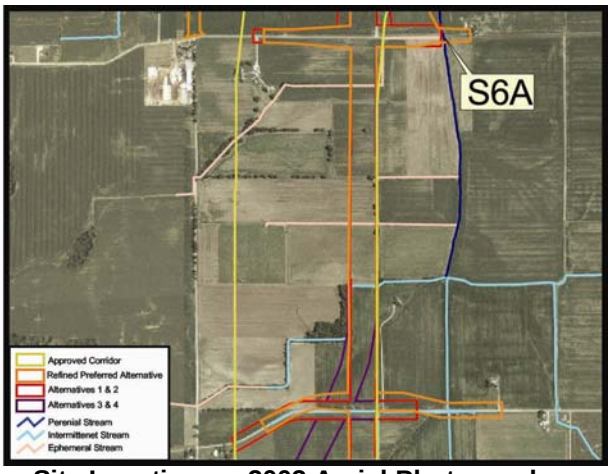


Photograph Taken Looking South

Stream Sec3-S6A



Site Location on Montgomery USGS Quadrangle



Site Location on 2003 Aerial Photograph

Aquatic Resource:	Stream	**USGS Quadrangle:**	Montgomery
Stream Name:	Unnamed	**Section:**	19
Quarter:	NW	**Township:**	T3N
Range:	R6W	**IDEM 303(d) List:**	Yes
Watershed:	Eagan Ditch	**OHWM Width:**	20.0 feet
Channelized:	Yes	**USCOE Jurisdiction:**	Yes
		IDEM Jurisdiction:	Yes

Stream Sec3-S6A

Stream Name	Length of Impact	Area Impacted	Alternative	Stream Habitat Assessment
Eagan Ditch	208.4 feet	0.095 acres	Refined Preferred	QHEI 37 / Modified

Description of Potential Impact: The Refined Preferred Alternative will impact approximately 208.4 linear feet of this stream. The area of impact below the ordinary high water mark (OHWM) is 0.095 acres for all alternatives. The perennial stream is Eagan Ditch and will be impacted by the county road grade separation. The substrate of the stream is silt and sand. The banks contain old field vegetation, and row crops exist beyond the banks. Photographs taken where the proposed alternative crosses the stream are on the back of this form.

Stream Sec3-S6A

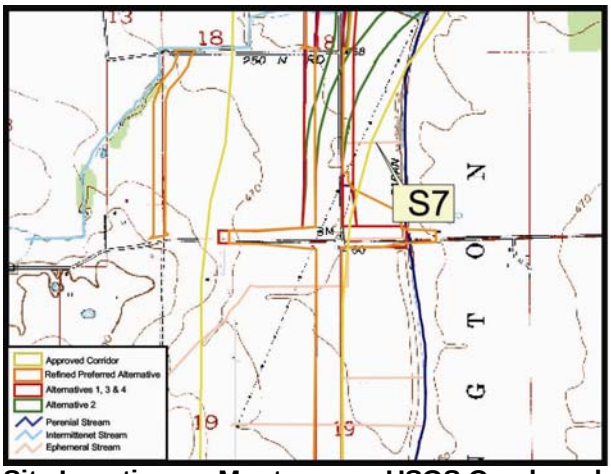
Photograph Taken Upstream

Photograph Taken Looking North

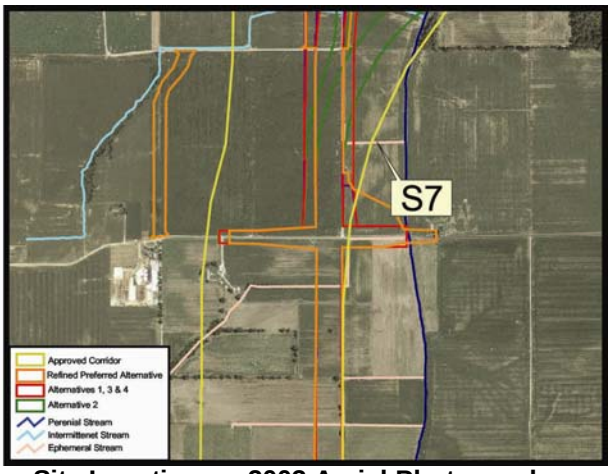
Photograph Taken Downstream

Photograph Taken Looking South

Stream Sec3-S7



Site Location on Montgomery USGS Quadrangle



Site Location on 2003 Aerial Photograph

Aquatic Resource:	Stream	**USGS Quadrangle:**	Montgomery
Stream Name:	Unnamed	**Section:**	18
Quarter:	SE	**Township:**	T3N
Range:	R6W	**IDEM 303(d) List:**	No
Watershed:	S.F. Prairie Creek-Eagan Ditch	**OHWM Width:**	3 feet
Channelized:	Yes	**USCOE Jurisdiction:**	Yes
		IDEM Jurisdiction:	Yes

Stream Sec3-S7

Stream Name	Length of Impact	Area Impacted	Alternative	Stream Habitat Assessment
Tributary of Eagan Ditch	415.2 feet	0.029 acres	1, 4	HHEI 10 / Modified Class I
Tributary of Eagan Ditch	303.4 feet	0.021 acres	2	HHEI 10 / Modified Class I

Description of Potential Impact: Alternatives 1 and 4 will impact approximately 415.2 linear feet of this stream. The area of impact below the ordinary high water mark (OHWM) is 0.029 acres for Alternatives 1 and 4. Alternative 2 will impact approximately 303.4 linear feet of this stream. The area of impact below the OHWM is 0.021 acres for Alternative 2. Alternative 3 and the Refined Preferred Alternative do not impact the stream. The ephemeral stream is a tributary of Eagan Ditch. It flows east and discharges into Eagan Ditch. Some of the water comes from the Daviess County Road 250 East roadside ditch north of the stream. The substrate of the stream is clay and silt. The banks contain a small buffer of old field vegetation, and row crops exist beyond the banks. Photographs taken where the proposed alternatives cross the stream in the agricultural field are on the back of this form.

Stream Sec3-S7

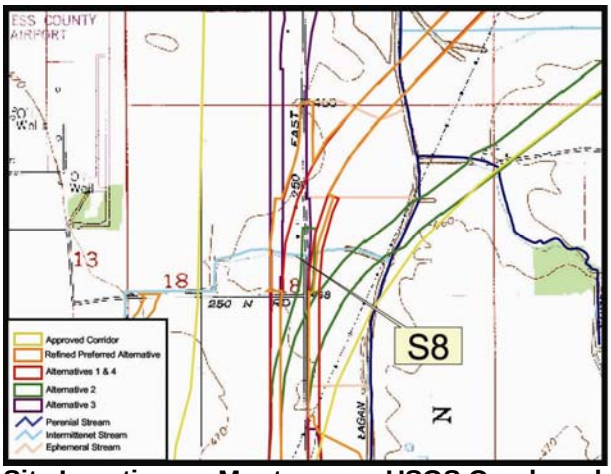
Photograph Taken Looking North

Photograph Taken Looking South

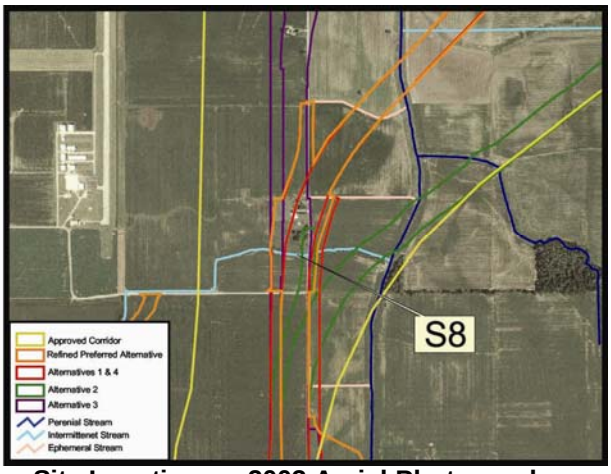
Photograph Taken Downstream

Photograph Taken Upstream

Stream Sec3-S8



Site Location on Montgomery USGS Quadrangle



Site Location on 2003 Aerial Photograph

Aquatic Resource:	Stream	**USGS Quadrangle:**	Montgomery
Stream Name:	Unnamed	**Section:**	18
Quarter:	NW	**Township:**	T3N
Range:	R6W	**IDEM 303(d) List:**	No
Watershed:	S.F. Prairie Creek-Eagan Ditch	**OHWM Width:**	3 feet
Channelized:	Yes	**USCOE Jurisdiction:**	Yes
		IDEM Jurisdiction:	Yes

Stream Sec3-S8

Stream Name	Length of Impact	Area Impacted	Alternative	Stream Habitat Assessment
Tributary of Eagan Ditch	727.2 feet	0.050 acres	1 and 4	QHEI 39.5 / Mod Warm Water
Tributary of Eagan Ditch	184.7 feet	0.013 acres	2	QHEI 39.5 / Mod Warm Water
Tributary of Eagan Ditch	563.6 feet	0.039 acres	3	QHEI 39.5 / Mod Warm Water
Tributary of Eagan Ditch	674.7 feet	0.046 acres	Refined Preferred	QHEI 39.5 / Mod Warm Water

Description of Potential Impact: Alternatives 1 and 4 will impact approximately 727.2 linear feet of this stream. The area of impact below the ordinary high water mark (OHWM) is 0.050 acres for Alternatives 1 and 4. An access road associated with Alternative 2 will impact approximately 184.7 linear feet of this stream. The area of impact below the OHWM is 0.013 acres for Alternative 2. The mainline of Alternative 2 also impacts the stream to the east and is documented as Sec3-S9. Alternative 3 will impact approximately 563.6 linear feet of this stream. The area of impact below the OHWM is 0.039 acres for Alternative 3. The Refined Preferred Alternative will impact 674.7 linear feet and 0.046 acres below the OHWM. The intermittent stream is a tributary of Eagan Ditch. It flows east under Daviess County Road 250 East and discharges into Eagan Ditch. The substrate of the stream is predominately silt with some clay and gravel. The banks contain a small buffer of old field vegetation with a few scattered trees. Row crops and a small amount of residential lawn exist beyond the banks. Photographs taken near Daviess County Road 250 East where the proposed alternatives cross the stream are on the back of this form.

Stream Sec3-S8

Photograph Taken Looking North,
on east side of bridge

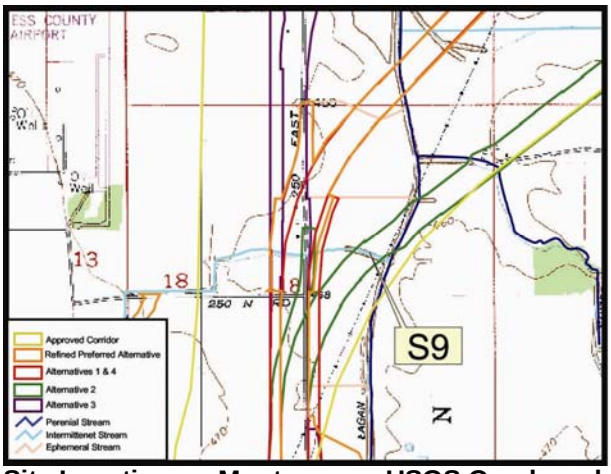
Photograph Taken Looking West
on east side of bridge

Photograph Taken Looking East,
on east side of bridge

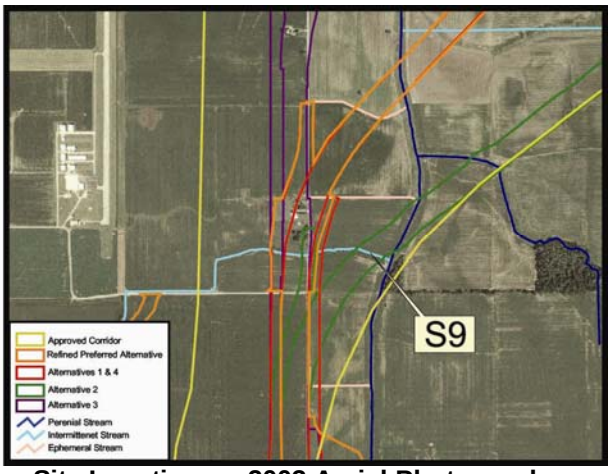
Photograph Taken Looking West
on west side of bridge

Photograph Taken Looking South,
on east side of bridge

Stream Sec3-S9



Site Location on Montgomery USGS Quadrangle



Site Location on 2003 Aerial Photograph

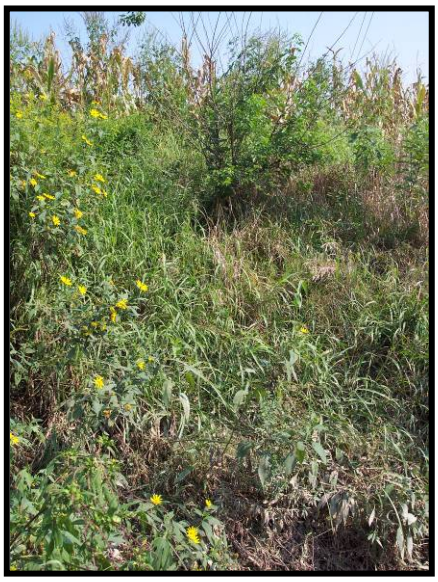
Aquatic Resource:	Stream	**USGS Quadrangle:**	Montgomery
Stream Name:	Unnamed	**Section:**	18
Quarter:	NE	**Township:**	T3N
Range:	R6W	**IDEM 303(d) List:**	No
Watershed:	S.F. Prairie Creek-Eagan Ditch	**OHWM Width:**	3.0 feet
Channelized:	Yes	**USCOE Jurisdiction:**	Yes
		IDEM Jurisdiction:	Yes

Stream Sec3-S9				
Stream Name	**Length of Impact**	**Area Impacted**	**Alternative**	**Stream Habitat Assessment**
Tributary of Eagan Ditch	404.8 feet	0.028 acres	2	QHEI 35.5 / Mod Warm Water

Description of Potential Impact: Alternative 2 will impact approximately 404.8 linear feet of this stream. The area of impact below the ordinary high water mark (OHWM) is 0.028 acres for Alternative 2. Alternatives 1, 3 and 4 and the Refined Preferred Alternative impact this stream to the west and are documented as Sec3-S8. The intermittent stream is a tributary of Eagan Ditch. It flows east and discharges into Eagan Ditch. The substrate is silt with some clay, detritus and gravel. The banks contain old field vegetation and scattered trees, and row crops exist beyond the banks. The riparian zone is approximately 5 feet wide on both the north and south sides of the stream. Photographs taken where the proposed Alternative 2 crosses the stream are on the back of this form.

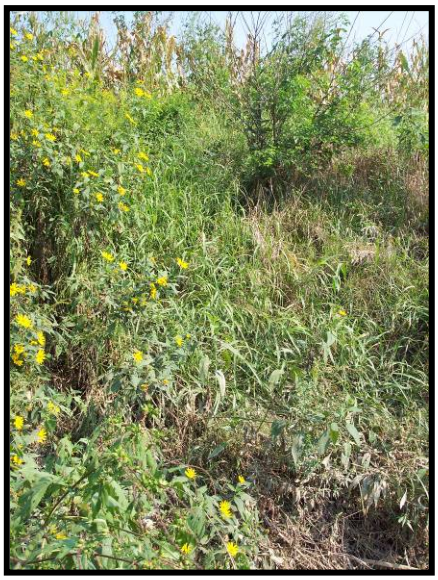
Stream Sec3-S9

Photograph Taken Upstream



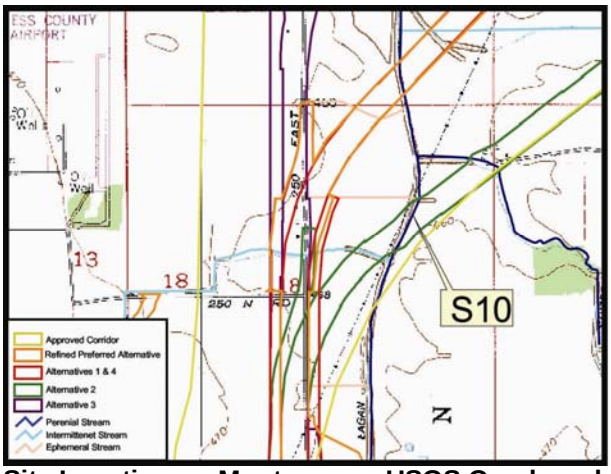
Photograph Taken Looking North

Photograph Taken Downstream



Photograph Taken Looking South

Stream Sec3-S10



Site Location on Montgomery USGS Quadrangle

Site Location on 2003 Aerial Photograph

Aquatic Resource:	Stream	**USGS Quadrangle:**	Montgomery
Stream Name:	Eagan Ditch	**Section:**	18
Quarter:	NE	**Township:**	T3N
Range:	R6W	**IDEM 303(d) List:**	Yes
Watershed:	S.F. Prairie Creek-Eagan Ditch	**OHWM Width:**	4.9 feet
Channelized:	Yes	**USCOE Jurisdiction:**	Yes
		IDEM Jurisdiction:	Yes

Stream Sec3-S10

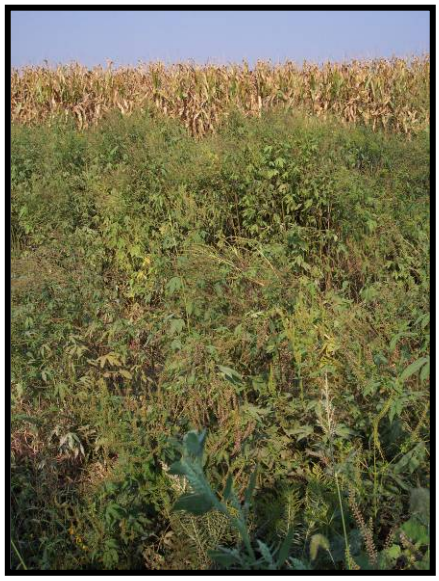
Stream Name	Length of Impact	Area Impacted	Alternative	Stream Habitat Assessment
Eagan Ditch	849.5 feet	0.096 acres	2	QHEI 45 / Mod Warm Water

Description of Potential Impact: Alternative 2 will impact approximately 849.5 linear feet of this stream. The area of impact to Eagan Ditch below the ordinary high water mark (OHWM) is 0.096 acres for Alternative 2. Alternatives 1, 3 and 4 impact Eagan Ditch to the north and are documented in Sec3-S14, Sec3-S18 and Sec3-S19. Eagan Ditch flows north and discharges into South Fork of Prairie Creek. The substrate of Eagan Ditch is clay, gravel and silt. The banks contain old field vegetation. There is no riparian corridor in the area where Alternative 2 crosses this stream. Photographs taken where the proposed Alternative 2 crosses Eagan Ditch are on the back of this form.

Stream Sec3-S10

Photograph Taken Upstream

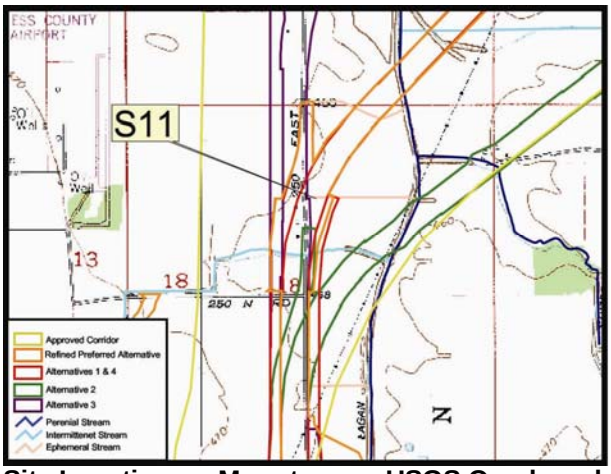
Photograph Taken Downstream



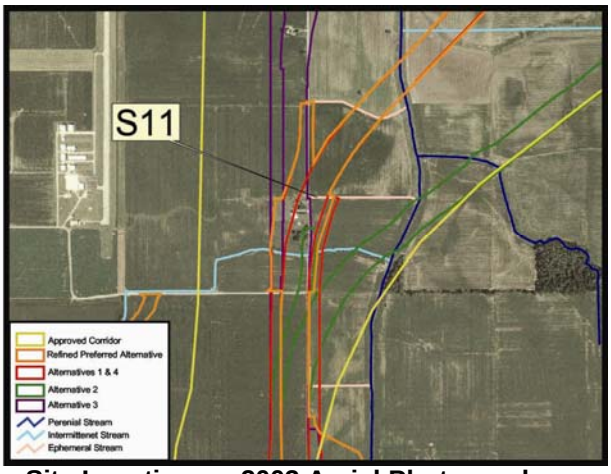
Photograph Taken Looking East

Photograph Taken Looking West

Stream Sec3-S11



Site Location on Mongtomery USGS Quadrangle



Site Location on 2003 Aerial Photograph

Aquatic Resource:	Stream	**USGS Quadrangle:**	Montgomery
Stream Name:	Unnamed	**Section:**	18
Quarter:	NE	**Township:**	T3N
Range:	R6W	**IDEM 303(d) List:**	No
Watershed:	S.F. Prairie Creek-Eagan Ditch	**OHWM Width:**	3.9 feet
Channelized:	Yes	**USCOE Jurisdiction:**	Yes
		IDEM Jurisdiction:	Yes

Stream Sec3-S11

Stream Name	Length of Impact	Area Impacted	Alternative	Stream Habitat Assessment
Tributary of Eagan Ditch	367.0 feet	0.033 acres	1, 4	HHEI 20 / Modified Class I
Tributary of Eagan Ditch	50.2 feet	0.005 acres	2	HHEI 20 / Modified Class I
Tributary of Eagan Ditch	331.3 feet	0.030 acres	Refined Preferred	HHEI 20 / Modified Class I

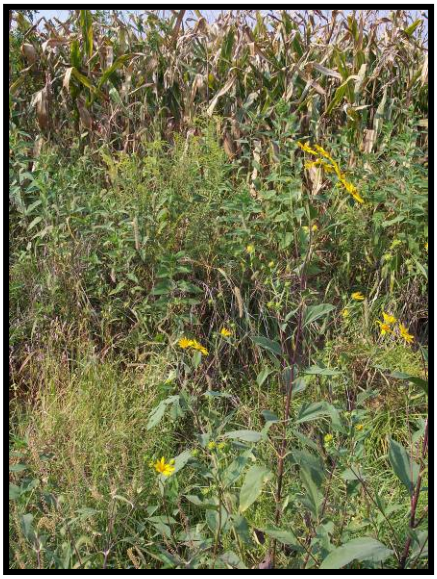
Description of Potential Impact: Alternatives 1 and 4 will impact approximately 367.0 linear feet of this stream. The area of impact below the ordinary high water mark (OHWM) is 0.033 acres for Alternatives 1 and 4. Alternative 2 will impact approximately 50.2 feet and 0.005 acres below the OHWM. The Refined Preferred Alternative will impact approximately 331.3 linear feet and 0.030 acres below the OHWM. This stream flows east and discharges into Eagan Ditch. The substrate is clay and silt and the banks consist of old field vegetation. There is no riparian corridor in the area where Alternatives 1 and 4 cross this stream. Photographs taken where the proposed Alternatives 1 and 4 cross this unnamed tributary of Eagan Ditch are on the back of this form.

Stream Sec3-S11

Photograph Taken Upstream

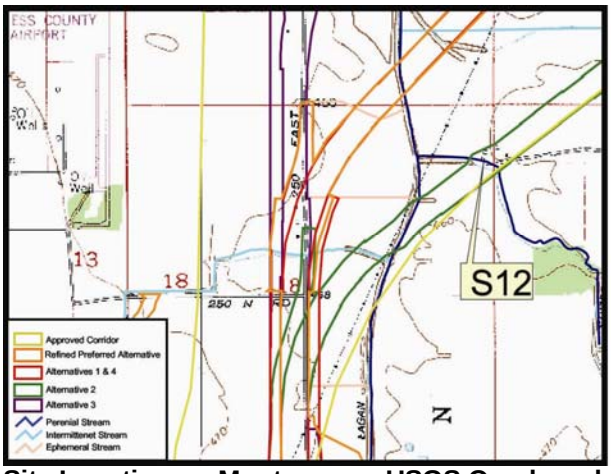
Photograph Taken Looking North

Photograph Taken Downstream

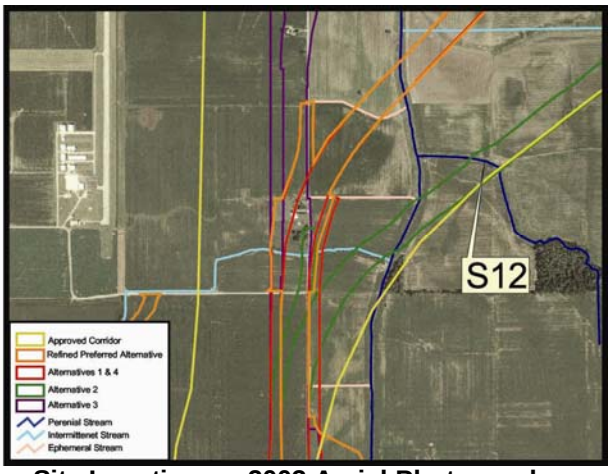


Photograph Taken Looking South

Stream Sec3-S12



Site Location on Montgomery USGS Quadrangle



Site Location on 2003 Aerial Photograph

Aquatic Resource:	Stream	**USGS Quadrangle:**	Montgomery
Stream Name:	Oberts Ditch	**Section:**	18
Quarter:	NE	**Township:**	T3N
Range:	R6W	**IDEM 303(d) List:**	No
Watershed:	S.F. Prairie Creek-Eagan Ditch	**OHWM Width:**	4.6 feet
Channelized:	Yes	**USCOE Jurisdiction:**	Yes
		IDEM Jurisdiction:	Yes

Stream Sec3-S12

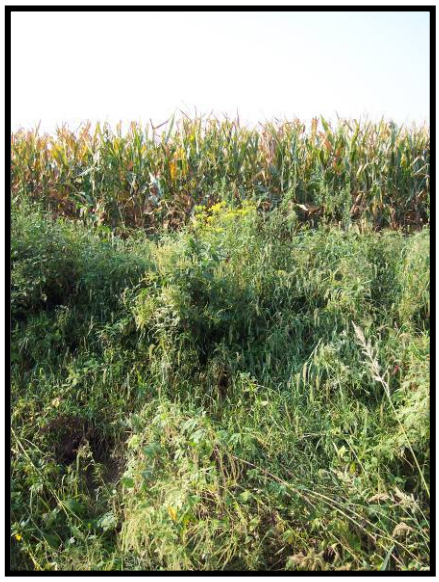
Stream Name	Length of Impact	Area Impacted	Alternative	Stream Habitat Assessment
Oberts Ditch	474.3 feet	0.050 acres	2	QHEI 42 / Mod Warm Water

Description of Potential Impact: Alternative 2 will impact approximately 474.3 linear feet of this stream. The area of impact to Oberts Ditch below the ordinary high water mark (OHWM) is 0.050 acres for Alternative 2. Oberts Ditch flows west and discharges into Eagan Ditch. The substrate is clay with some detritus and artificial rip-rap near a concrete culvert. The banks contain old field vegetation and there is no riparian corridor. Row crops exist beyond both banks. Photographs taken in the area where the proposed Alternative 2 crosses Oberts Ditch are on the back of this form.

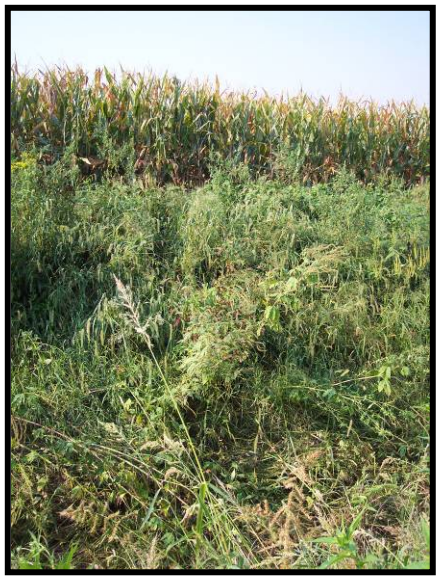
Stream Sec3-S12

Photograph Taken Downstream

Photograph Taken Upstream

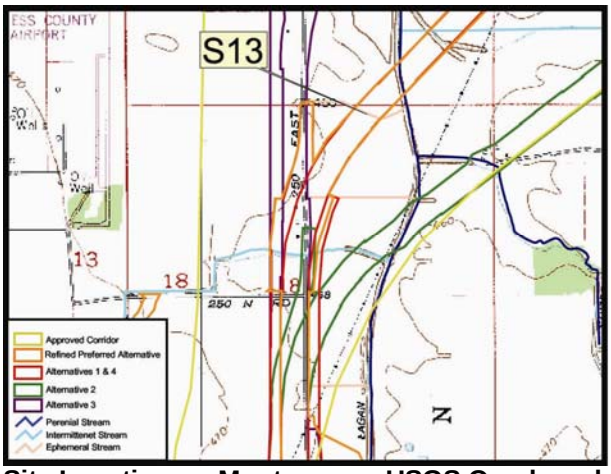


Photograph Taken Looking North



Photograph Taken Looking South

Stream Sec3-S13



Site Location on Montgomery USGS Quadrangle

Site Location on 2003 Aerial Photograph

Aquatic Resource:	Stream	**USGS Quadrangle:**	Montgomery
Stream Name:	Unnamed	**Section:**	18
Quarter:	NE	**Township:**	T3N
Range:	R6W	**IDEM 303(d) List:**	No
Watershed:	S.F. Prairie Creek-Eagan Ditch	**OHWM Width:**	2.0 feet
Channelized:	Yes	**USCOE Jurisdiction:**	Yes
		IDEM Jurisdiction:	Yes

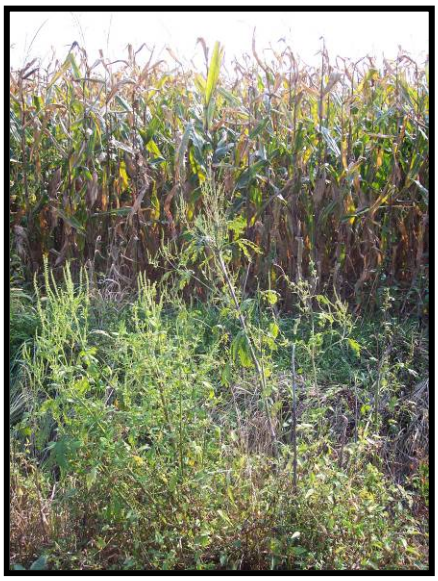
Stream Sec3-S13

Stream Name	Length of Impact	Area Impacted	Alternative	Stream Habitat Assessment
Tributary of Eagan Ditch	406.3 feet	0.019 acres	1 and 4	HHEI 10 / Modified Class I
Tributary of Eagan Ditch	407.7 feet	0.019 acres	Refined Preferred	HHEI 10 / Modified Class I

Description of Potential Impact: Alternatives 1 and 4 will impact approximately 406.3 linear feet of this stream. The area of impact below the ordinary high water mark (OHWM) is 0.019 acres for Alternatives 1 and 4. The Refined Preferred Alternative will impact approximately 407.7 linear feet and 0.019 acres below the OHWM. This stream flows east and discharges into Eagan Ditch. The substrate is clay and silt and the banks contain old field vegetation. Row crops exist beyond the both banks. There is no riparian corridor in the area where the alternatives cross this stream. Photographs taken where the proposed Alternatives 1 and 4 cross this tributary of Eagan Ditch are on the back of this form.

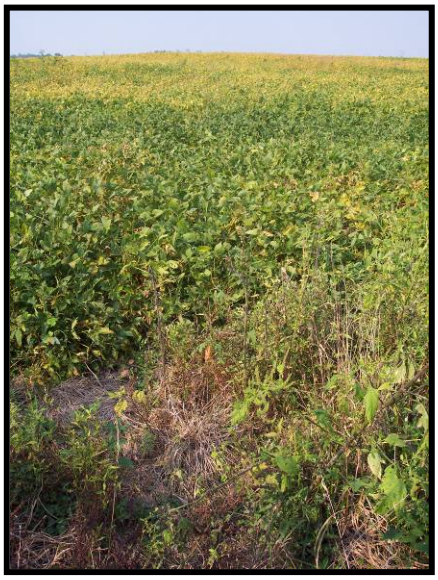
Stream Sec3-S13

Photograph Taken Upstream



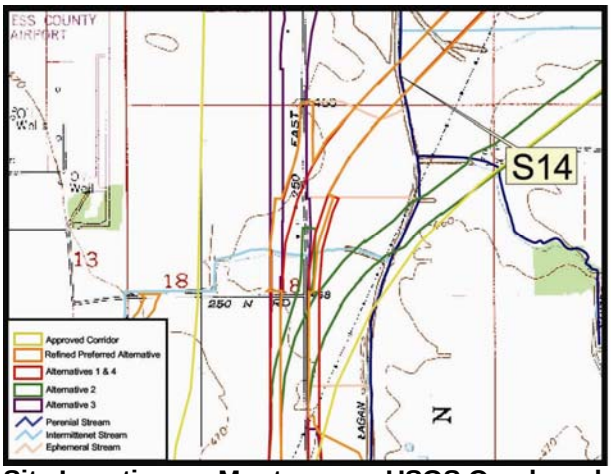
Photograph Taken Looking South

Photograph Taken Downstream

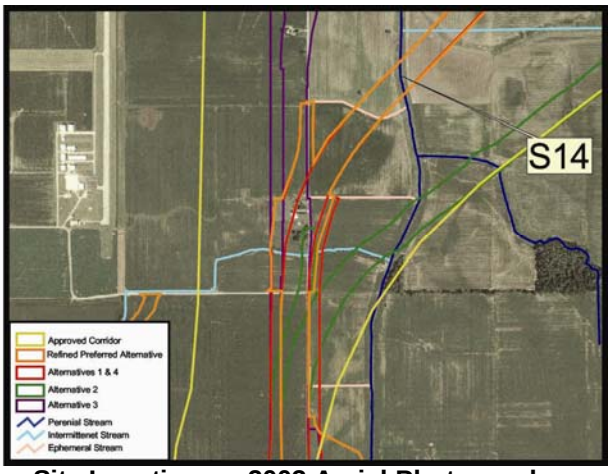


Photograph Taken Looking North

Stream Sec3-S14



Site Location on Montgomery USGS Quadrangle



Site Location on 2003 Aerial Photograph

Aquatic Resource:	Stream	**USGS Quadrangle:**	Montgomery
Stream Name:	Eagan	**Section:**	7
Quarter:	SE	**Township:**	T3N
Range:	R6W	**IDEM 303(d) List:**	Yes
Watershed:	S.F. Prairie Creek-Eagan Ditch	**OHWM Width:**	4.9 feet
Channelized:	Yes	**USCOE Jurisdiction:**	Yes
		IDEM Jurisdiction:	Yes

Stream Sec3-S14

Stream Name	Length of Impact	Area Impacted	Alternative	Stream Habitat Assessment
Eagan Ditch	463.8 feet	0.052 acres	1 and 4	QHEI 40 / Mod Warm Water
Eagan Ditch	470.6 feet	0.053 acres	Refined Preferred	QHEI 40 / Mod Warm Water

Description of Potential Impact: Alternatives 1 and 4 will impacts approximately 463.8 linear feet of this stream. The area of impact to Eagan Ditch below the ordinary high water mark (OHWM) is 0.052 acres for Alternatives 1 and 4. The Refined Preferred Alternative will impact approximately 470.6 linear feet and 0.053 acres below the OHWM. Alternatives 2 and 3 cross the stream in different locations and are documented in Sec3-S10, Sec3-S18 and Sec3-S19. Eagan Ditch flows north and discharges into South Fork Prairie Creek. The substrate of Eagan Ditch is clay, silt and gravel and the banks consist of old field vegetation. There is no riparian corridor in the area where Alternatives 1 and 4 cross this stream. Photographs taken in the area where the proposed Alternatives 1 and 4 cross Eagan Ditch are on the back of this form.

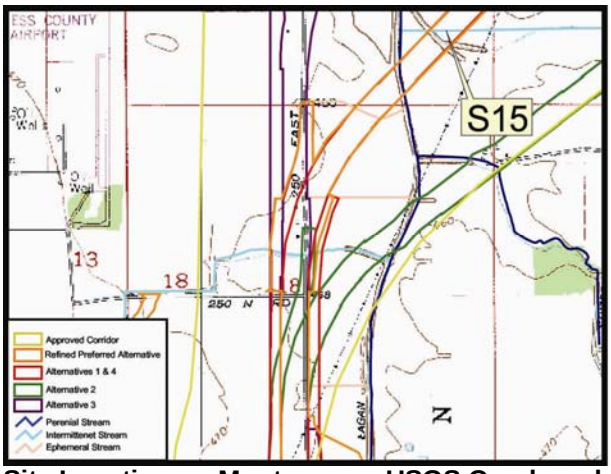
Stream Sec3-S14

Photograph Taken Upstream

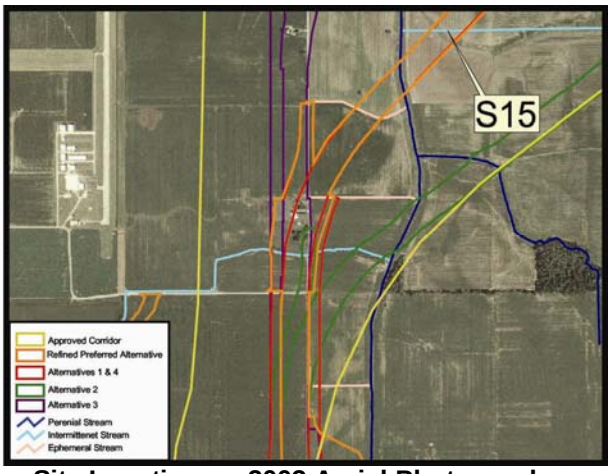
Photograph Taken Downstream

Photograph Taken Looking West

Stream Sec3-S15



Site Location on Montgomery USGS Quadrangle



Site Location on 2003 Aerial Photograph

Aquatic Resource:	Stream	**USGS Quadrangle:**	Montgomery
Stream Name:	Unnamed	**Section:**	7
Quarter:	SE	**Township:**	T3N
Range:	R6W	**IDEM 303(d) List:**	No
Watershed:	S.F. Prairie Creek-Eagan Ditch	**OHWM Width:**	5.9 feet
Channelized:	Yes	**USCOE Jurisdiction:**	Yes
		IDEM Jurisdiction:	Yes

Stream Sec3-S15

Stream Name	Length of Impact	Area Impacted	Alternative	Stream Habitat Assessment
Tributary of Eagan Ditch	486.9 feet	0.066 acres	1 and 4	HHEI 21 / Modified Class I
Tributary of Eagan Ditch	529.6 feet	0.072 acres	Refined Preferred	HHEI 21 / Modified Class I

Description of Potential Impact: Alternatives 1 and 4 will impact approximately 486.9 linear feet of this stream. The area of impact below the ordinary high water mark (OHWM) is 0.066 acres for Alternatives 1 and 4. The Refined Preferred Alternative will impact approximately 529.6 linear feet and 0.072 acres below the OHWM. Alternative 2 crosses this stream to the east and is documented in Sec3-S16. Alternative 3 has no impact. This stream flows west and discharges into Eagan Ditch. The substrate is clay and the banks consist of old field vegetation. Row crops exist beyond both banks. The there is no riparian corridor in the area where the alternatives cross this stream. Photographs taken in the area where the proposed Alternatives 1 and 4 cross this tributary of Eagan Ditch are on the back of this form.

Stream Sec3-S15

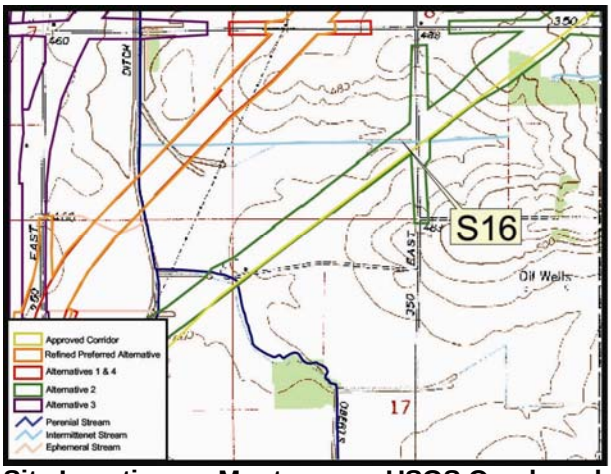
Photograph Taken Upstream

Photograph Taken Downstream

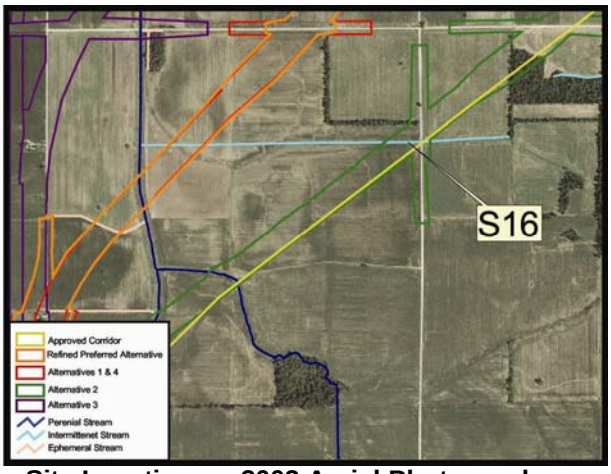
Photograph Taken Looking North

Photograph Taken Looking South

Stream Sec3-S16



Site Location on Montgomery USGS Quadrangle



Site Location on 2003 Aerial Photograph

Aquatic Resource:	Stream	**USGS Quadrangle:**	Montgomery
Stream Name:	Unnamed	**Section:**	8
Quarter:	SW	**Township:**	T3N
Range:	R6W	**IDEM 303(d) List:**	No
Watershed:	S.F. Prairie Creek-Eagan Ditch	**OHWM Width:**	3.9 feet
Channelized:	Yes	**USCOE Jurisdiction:**	Yes
		IDEM Jurisdiction:	Yes

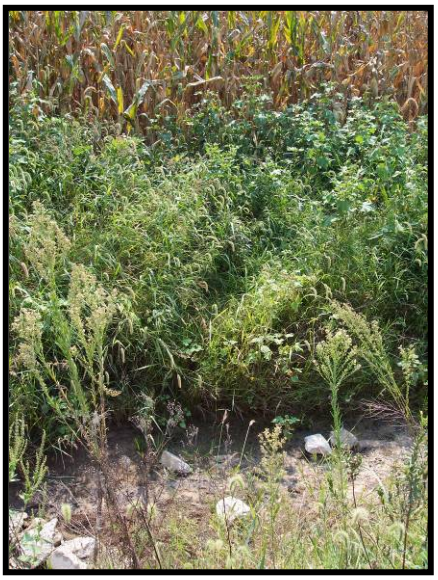
Stream Sec3-S16

Stream Name	Length of Impact	Area Impacted	Alternative	Stream Habitat Assessment
Tributary of Eagan Ditch	648.7 feet	0.058 acres	2	HHEI 35 / Modified Class II

Description of Potential Impact: Alternative 2 will impact approximately 648.7 linear feet of this stream. The area of impact below the ordinary high water mark (OHWM) is 0.058 acres for Alternative 2. Alternatives 1 and 4 cross this stream to the west and are document in Sec3-S15. Alternative 3 has no impact. This stream flows west and discharges into Eagan Ditch. The substrate is clay with some silt, sand, gravel and boulders associated with the existing Daviess County Road 350 East bridge. The banks consist of old field vegetation, and row crops exist beyond both banks. The there is no riparian corridor in the area where Alternative 2 crosses this stream. Photographs taken in the area where the proposed Alternative 2 crosses this tributary of Eagan Ditch are on the back of this form.

Stream Sec3-S16

Photograph Taken Upstream

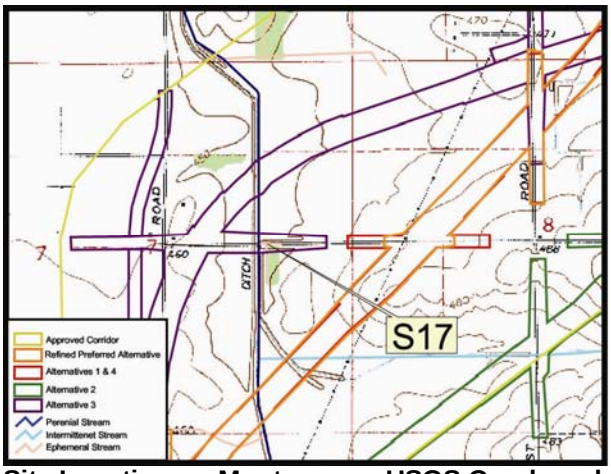


Photograph Taken Looking North

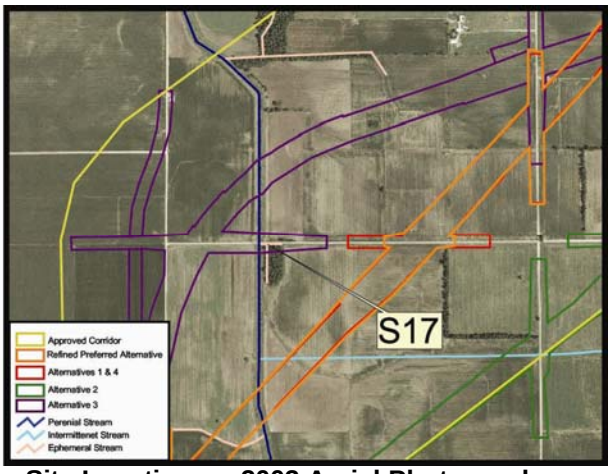
Photograph Taken Downstream

Photograph Taken Looking South

Stream Sec3-S17



Site Location on Montgomery USGS Quadrangle



Site Location on 2003 Aerial Photograph

Aquatic Resource:	Stream	**USGS Quadrangle:**	Montgomery
Stream Name:	Unnamed	**Section:**	7
Quarter:	SE	**Township:**	T3N
Range:	R6W	**IDEM 303(d) List:**	No
Watershed:	S.F. Prairie Creek-Eagan Ditch	**OHWM Width:**	2.3 feet
Channelized:	Yes	**USCOE Jurisdiction:**	Yes
		IDEM Jurisdiction:	Yes

Stream Sec3-S17				
Stream Name	**Length of Impact**	**Area Impacted**	**Alternative**	**Stream Habitat Assessment**
Tributary of Eagan Ditch	433.7 feet	0.023 acres	3	HHEI 16 / Modified Class I

Description of Potential Impact: The Daviess County Road 350 North grade separation associated with Alternative 3 will impact approximately 433.7 linear feet of this stream. The area of impact below the ordinary high water mark (OHWM) is 0.023 acres for Alternative 3. The stream is an artificial ditch on the north and west sides of a forested wetland. Daviess County Road 350 North is north of the stream. A berm is located west of the stream, separating it from Eagan Ditch. The small artificial ephemeral stream discharges on the northwest corner of the wetland to Eagan Ditch. The substrate is predominately silt and clay with some gravel. The 2.2 acre forested wetland creates a riparian zone on the south and east sides of the stream system. Photographs taken in the area where the proposed Alternative 3 crosses the tributary of Eagan Ditch are on the back of this form.

Stream Sec3-S17

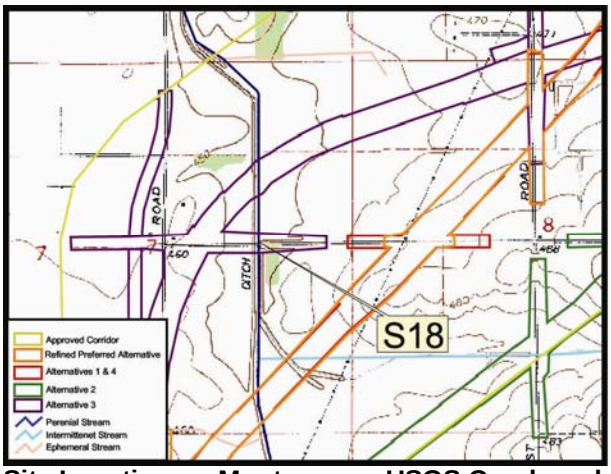
Photograph Taken Looking South

Photograph Taken Looking West

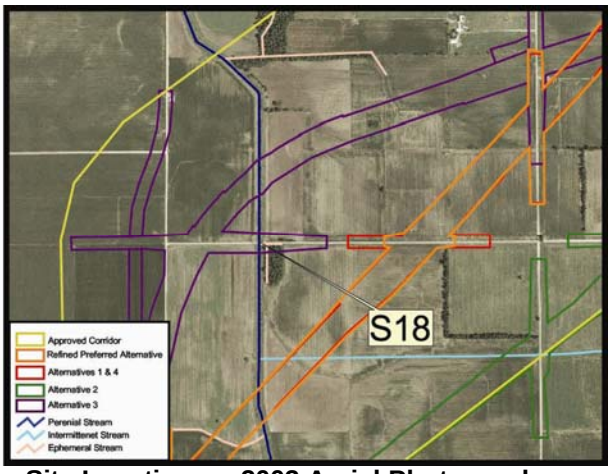
Photograph Taken Looking South
On East Side of Wetland

Photograph Taken Looking North

Stream Sec3-S18



Site Location on Montgomery USGS Quadrangle



Site Location on 2003 Aerial Photograph

Aquatic Resource:	Stream	**USGS Quadrangle:**	Montgomery
Stream Name:	Eagan Ditch	**Section:**	7
Quarter:	SE/NE	**Township:**	T3N
Range:	R6W	**IDEM 303(d) List:**	Yes
Watershed:	S.F. Prairie Creek-Eagan Ditch	**OHWM Width:**	4.9 feet
Channelized:	Yes	**USCOE Jurisdiction:**	Yes
		IDEM Jurisdiction:	Yes

Stream Sec3-S18				
Stream Name	**Length of Impact**	**Area Impacted**	**Alternative**	**Stream Habitat Assessment**
Eagan Ditch	279.5 feet	0.032 acres	3	QHEI 33 / Mod Warm Water

Description of Potential Impact: The Daviess County Road 350 North grade separation associated with Alternative 3 will impact approximately 279.5 linear feet of this stream. The area of impact to Eagan Ditch below the ordinary high water mark (OHWM) is 0.032 acres for Alternative 3. Alternative 3's mainline impact to Eagan Ditch is documented as Sec3-S18. Eagan Ditch flows north and discharges into South Fork Prairie Creek. The substrate of Eagan Ditch is clay, silt and gravel and the banks consist of old field vegetation. A berm with mowed grass is located on both sides of the banks between the stream and row crops. A forested wetland exists on the east side of the berm near this stream crossing. Photographs taken in the area where the proposed Alternative 3 crosses Eagan Ditch are on the back of this form.

Stream Sec3-S18

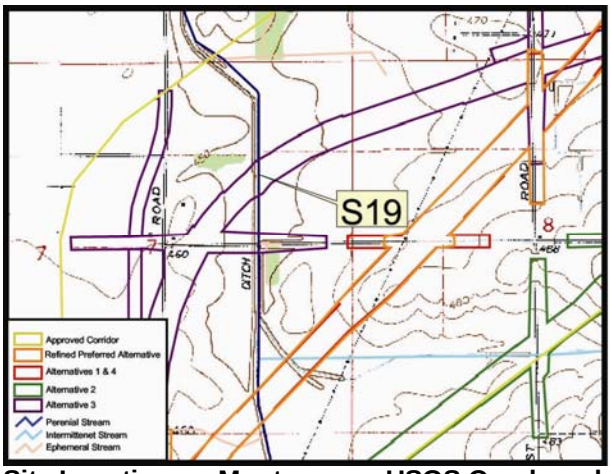
Photograph Taken Upstream

Photograph Taken Looking West

Photograph Taken Downstream

Photograph Taken Looking East

Stream Sec3-S19



Site Location on Montgomery USGS Quadrangle

Site Location on 2003 Aerial Photograph

Aquatic Resource:	Stream	**USGS Quadrangle:**	Montgomery
Stream Name:	Eagan Ditch	**Section:**	7
Quarter:	NE	**Township:**	T3N
Range:	R6W	**IDEM 303(d) List:**	Yes
Watershed:	S.F. Prairie Creek-Eagan Ditch	**OHWM Width:**	4.9 feet
Channelized:	Yes	**USCOE Jurisdiction:**	Yes
		IDEM Jurisdiction:	Yes

Stream Sec3-S19				
Stream Name	**Length of Impact**	**Area Impacted**	**Alternative**	**Stream Habitat Assessment**
Eagan Ditch	505.0 feet	0.057 acres	3	QHEI 34 / Mod Warm Water

Description of Potential Impact: Alternative 3 will impact approximately 505.0 linear feet of this stream. The area of impact to Eagan Ditch below the ordinary high water mark (OHWM) is 0.057 acres for Alternative 3. The impact is associated with the Daviess County Road 350 North grade separation is documented as Sec3-S18. Alternatives 1, 2 and 4 impact Eagan Ditch to the south and are documented as Sec3-S10 and Sec3-S14. Eagan Ditch flows north and discharges into South Fork Prairie Creek. The substrate of Eagan Ditch is clay, silt and gravel and the banks consist of old field vegetation. A berm with mowed grass is located on both sides of the banks between the stream and row crops. Photographs taken in the area where the proposed Alternative 3 crosses Eagan Ditch are on the back of this form.

Stream Sec3-S19

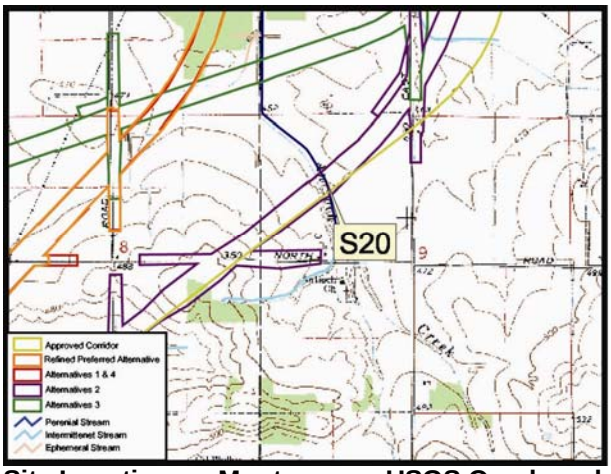
Photograph Taken Upstream

Photograph Taken Looking North

Photograph Taken Downstream

Photograph Taken Looking South

Stream Sec3-S20



Site Location on Montgomery USGS Quadrangle

Site Location on 2003 Aerial Photograph

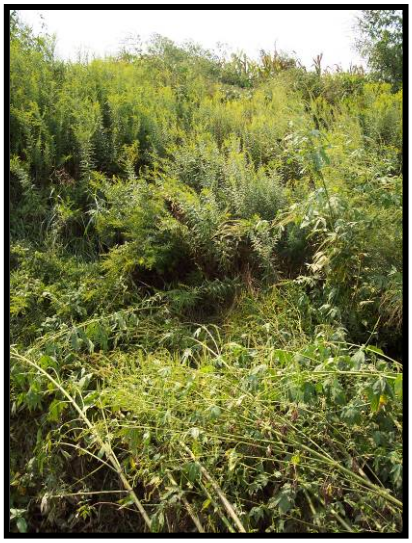
Aquatic Resource:	Stream	**USGS Quadrangle:**	Montgomery
Stream Name:	Antioch Creek	**Section:**	9
Quarter:	NW	**Township:**	T3N
Range:	R6W	**IDEM 303(d) List:**	No
Watershed:	S.F. Prairie Creek-Eagan Ditch	**OHWM Width:**	3.0 feet
Channelized:	Yes	**USCOE Jurisdiction:**	Yes
		IDEM Jurisdiction:	Yes

Stream Sec3-S20

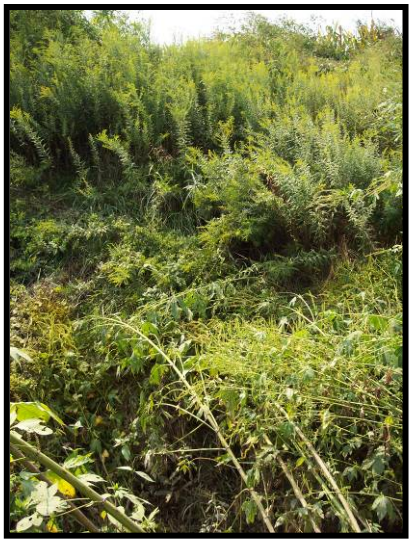
Stream Name	Length of Impact	Area Impacted	Alternative	Stream Habitat Assessment
Antioch Creek	456.6 feet	0.031 acres	2	QHEI 38 / Mod Warm Water

Description of Potential Impact: Alternative 2 will impact approximately 456.6 linear feet of this stream. The area of impact to Antioch Creek below the ordinary high water mark (OHWM) is 0.031 acres for Alternative 2. Alternative 3 impacts Antioch Creek to the north and is documented as Sec3-S21. Antioch Creek flows north and discharges into South Fork Prairie Creek. The substrate of Antioch Creek is clay and silt and the banks consist of old field vegetation. A berm is located on both sides of the banks between the stream and row crops. Photographs taken in the area where the proposed Alternative 2 crosses Antioch Creek are on the back of this form.

Stream Sec3-S20

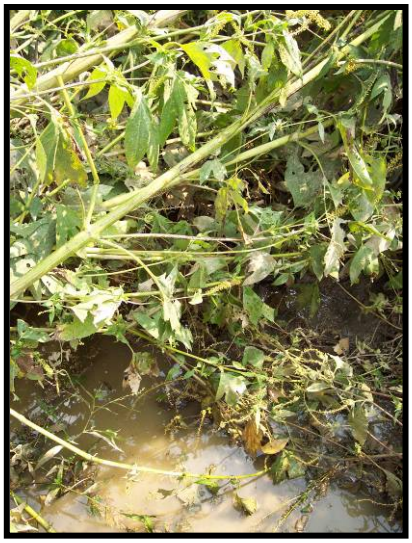


Photograph Taken Looking East



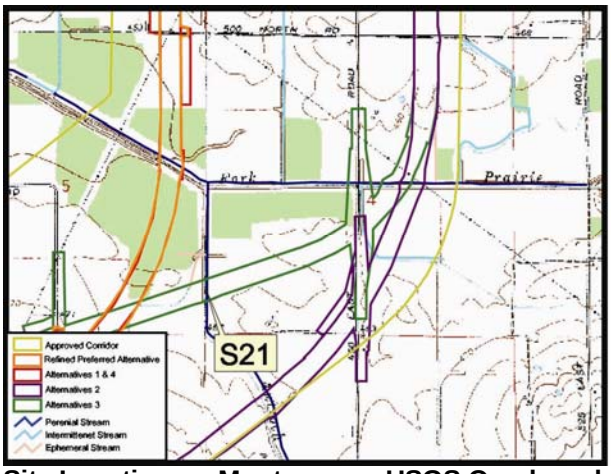
Photograph Taken Looking West

Photograph Taken Upstream

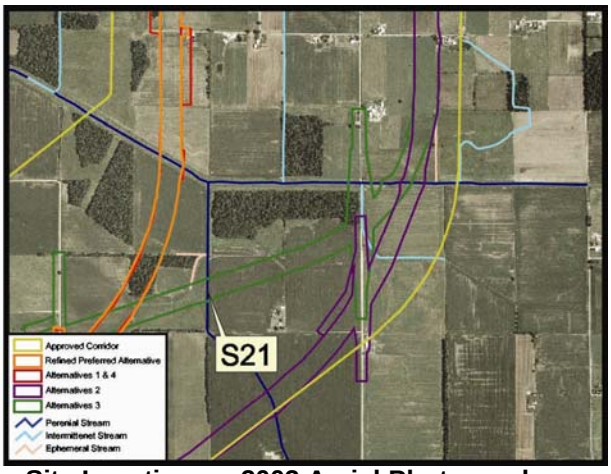


Photograph Taken Downstream

Stream Sec3-S21



Site Location on Montgomery USGS Quadrangle



Site Location on 2003 Aerial Photograph

Aquatic Resource:	Stream	**USGS Quadrangle:**	Montgomery
Stream Name:	Antioch Creek	**Section:**	4
Quarter:	SW	**Township:**	T3N
Range:	R6W	**IDEM 303(d) List:**	No
Watershed:	S.F. Prairie Creek-Eagan Ditch	**OHWM Width:**	3.0 feet
Channelized:	Yes	**USCOE Jurisdiction:**	Yes
		IDEM Jurisdiction:	Yes

Stream Sec3-S21

Stream Name	Length of Impact	Area Impacted	Alternative	Stream Habitat Assessment
Antioch Creek	400.2 feet	0.028 acres	3	QHEI 39 / Mod Warm Water

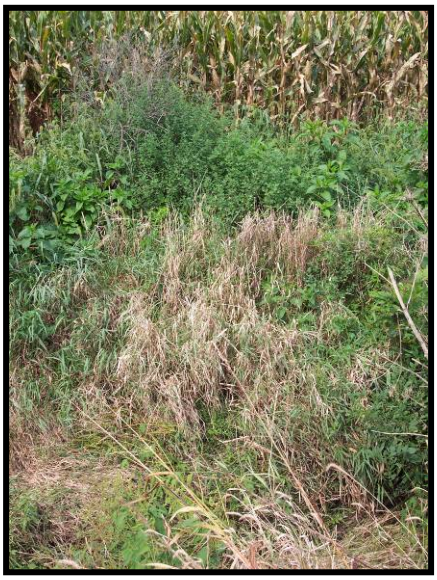
Description of Potential Impact: Alternative 3 will impact approximately 400.2 linear feet of this stream. The area of impact to Antioch Creek below the ordinary high water mark (OHWM) is 0.028 acres for Alternative 3. Alternative 2 impacts Antioch Creek to the south and is documented as Sec3-S20. Antioch Creek flows north and discharges into South Fork Prairie Creek. The substrate of Antioch Creek is clay and silt and the banks consist of old field vegetation. A berm is located on both sides of the banks between the stream and row crops. Photographs taken in the area where the proposed Alternative 3 crosses Antioch Creek are on the back of this form.

Stream Sec3-S21

Photograph Taken Upstream

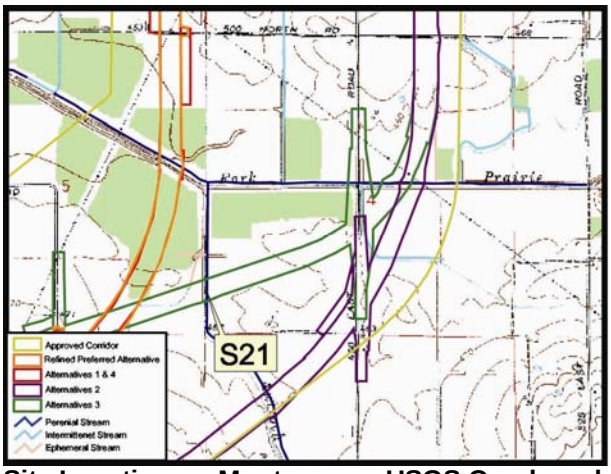
Photograph Taken Downstream

Photograph Taken Looking East

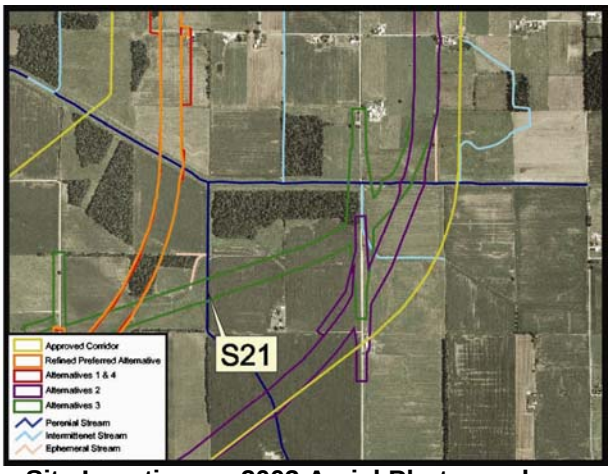


Photograph Taken Looking West

Stream Sec3-S21A



Site Location on Montgomery USGS Quadrangle



Site Location on 2003 Aerial Photograph

Aquatic Resource:	Stream	**USGS Quadrangle:**	Montgomery
Stream Name:	Antioch Creek	**Section:**	4
Quarter:	SW	**Township:**	T3N
Range:	R6W	**IDEM 303(d) List:**	No
Watershed:	S.F. Prairie Creek-Eagan Ditch	**OHWM Width:**	5.0 feet
Channelized:	Yes	**USCOE Jurisdiction:**	Yes
		IDEM Jurisdiction:	Yes

Stream Sec3-S21A

Stream Name	Length of Impact	Area Impacted	Alternative	Stream Habitat Assessment
Tributary of Antioch Creek	90.9 feet	0.010 acres	3	HHEI 50 / Class I Modified

Description of Potential Impact: Alternative 3 will impact approximately 90.9 linear feet of this stream. The area of impact to Antioch Creek below the ordinary high water mark (OHWM) is 0.010 acres for Alternative 3. No other alternative impacts this tributary. The substrate of this tributary is clay and silt and the banks consist of old field vegetation. A berm is located on both sides of the banks between the stream and row crops. Photographs taken in the area where the proposed Alternative 3 crosses the tributary are on the back of this form.

Stream Sec3-S21A

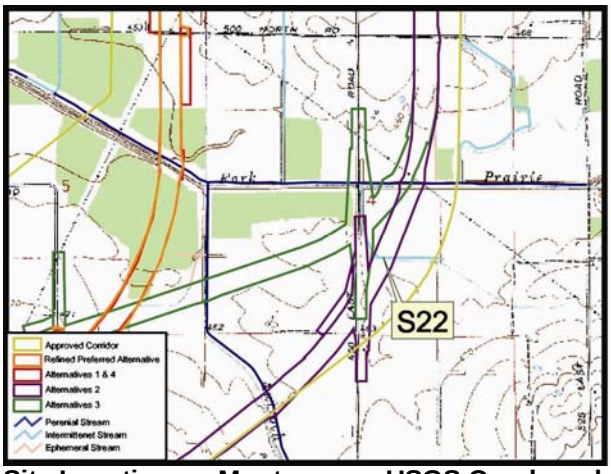
Photograph Taken Upstream

Photograph Taken Downstream

Photograph Taken Looking East

Photograph Taken Looking West

Stream Sec3-S22



Site Location on Montgomery USGS Quadrangle

Site Location on 2003 Aerial Photograph

Aquatic Resource:	Stream	**USGS Quadrangle:**	Montgomery
Stream Name:	Unnamed	**Section:**	4
Quarter:	SE	**Township:**	T3N
Range:	R6W	**IDEM 303(d) List:**	No
Watershed:	S.F. Prairie Creek-Eagan Ditch	**OHWM Width:**	2.0 feet
Channelized:	Yes	**USCOE Jurisdiction:**	Yes
		IDEM Jurisdiction:	Yes

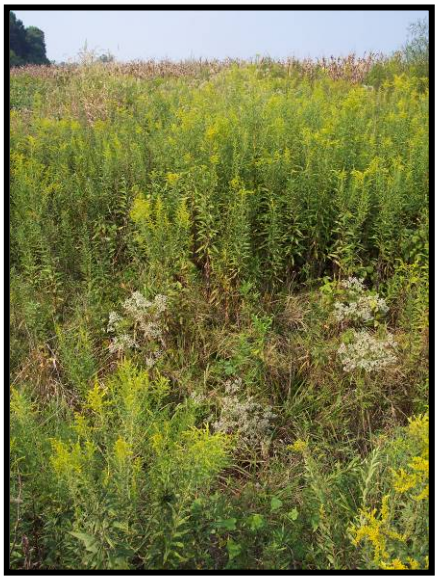
Stream Sec3-S22				
Stream Name	**Length of Impact**	**Area Impacted**	**Alternative**	**Stream Habitat Assessment**
Tributary of S.F.P.C	385.7 feet	0.018 acres	2	HHEI 23 / Modified Class I

Description of Potential Impact: Alternative 2 will impact approximately 385.7 linear feet of this stream. The area of impact below the ordinary high water mark (OHWM) is 0.018 acres for Alternative 2. The impacts associated with Alternative 3 and the Alternative 2 Daviess County Road 450 East grade separation are documented in Sec3-S23. This intermittent stream flows northwest to the 450 East roadside ditch and north until discharging South Fork Prairie Creek. The substrate is sand and gravel with some clay and the bank and streambed consist of some wetland vegetation. Row crops exist beyond the banks. There is no riparian corridor in the area where Alternative 2 crosses this stream. Photographs taken in the area where the proposed Alternative 2 crosses the stream are on the back of this form.

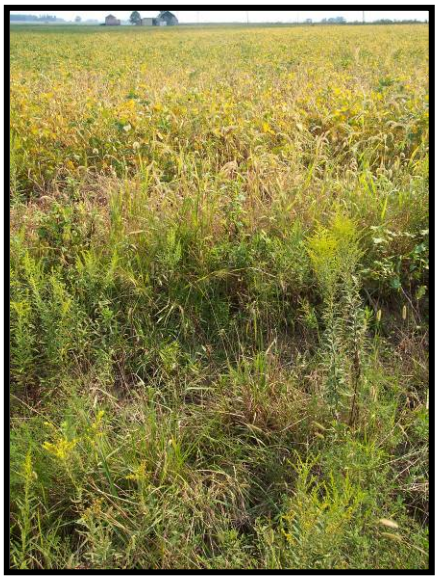
Stream Sec3-S22

Photograph Taken Upstream

Photograph Taken Downstream

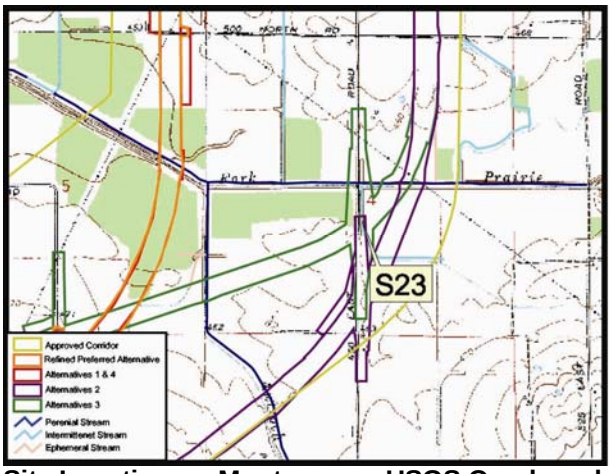


Photograph Taken Looking North

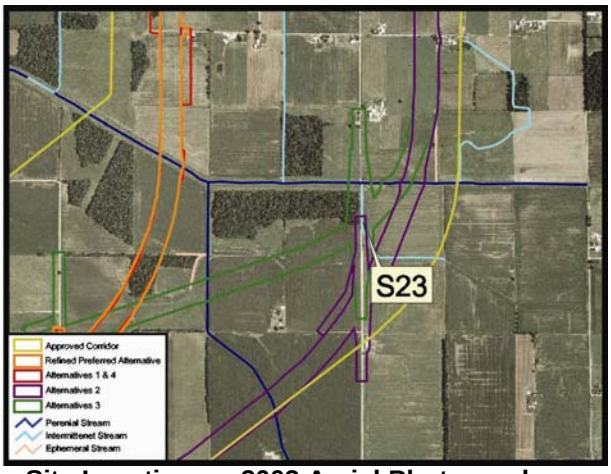


Photograph Taken Looking South

Stream Sec3-S23



Site Location on Montgomery USGS Quadrangle



Site Location on 2003 Aerial Photograph

Aquatic Resource:	Stream	**USGS Quadrangle:**	Montgomery
Stream Name:	Unnamed	**Section:**	4
Quarter:	SE	**Township:**	T3N
Range:	R6W	**IDEM 303(d) List:**	No
Watershed:	S.F. Prairie Creek-Eagan Ditch	**OHWM Width:**	2.0 feet
Channelized:	Yes	**USCOE Jurisdiction:**	Yes
		IDEM Jurisdiction:	Yes

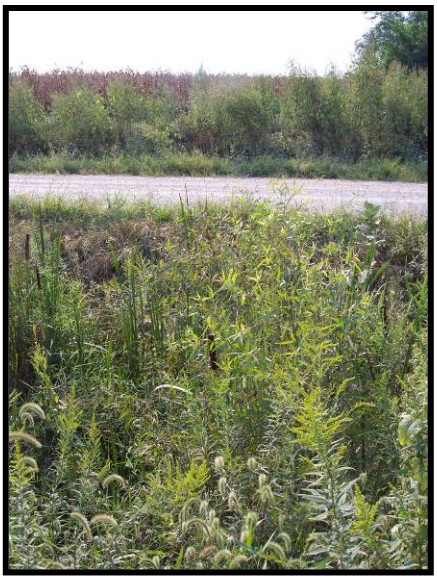
Stream Sec3-S23

Stream Name	Length of Impact	Area Impacted	Alternative	Stream Habitat Assessment
Tributary of S.F.P.C.	392.7 feet	0.018 acres	2	HHEI 15 / Modified Class I
Tributary of S.F.P.C.	1240.1 feet	0.057 acres	3	HHEI 15 / Modified Class I

Description of Potential Impact: The Daviess County Road 450 East grade separation associated with Alternative 2 will impact approximately 392.7 linear feet of this stream. The area of impact below the ordinary high water mark (OHWM) is 0.018 acres for Alternative 2. Alternative 3 and its grade separation will impact approximately 1240.1 linear feet of this stream. The area of impact below the ordinary high water mark (OHWM) is 0.057 acres for Alternative 3. The intermittent stream flows north in a roadside ditch and discharges into South Fork Prairie Creek. The substrate is silt and clay and the bank and streambed consist of some wetland vegetation. Row crops exist beyond the east bank. The county road exists beyond the west bank. There is no riparian corridor in the area where Alternative 3 crosses this stream. Photographs taken in the area where the proposed Alternatives 2 and 3 cross the stream are on the back of this form.

Stream Sec3-S23

Photograph Taken Upstream

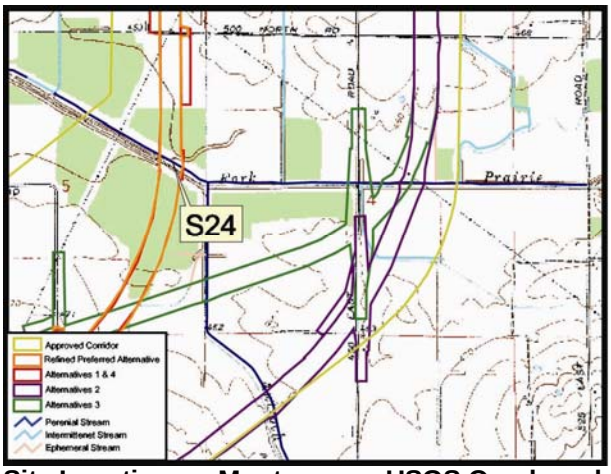


Photograph Taken Looking West

Photograph Taken Downstream

Photograph Taken Looking West

Stream Sec3-S24



Site Location on Montgomery USGS Quadrangle

Site Location on 2003 Aerial Photograph

Aquatic Resource:	Stream	**USGS Quadrangle:**	Montgomery
Stream Name:	South Fork Prairie Creek	**Section:**	5
Quarter:	NE	**Township:**	T3N
Range:	R6W	**IDEM 303(d) List:**	No
Watershed:	S.F. Prairie Creek-Eagan Ditch	**OHWM Width:**	17.4 feet
Channelized:	Yes	**USCOE Jurisdiction:**	Yes
		IDEM Jurisdiction:	Yes

Stream Sec3-S24

Stream Name	Length of Impact	Area Impacted	Alternative	Stream Habitat Assessment
South Fork Prairie Creek	475.4 feet	0.189 acres	1 and 4	QHEI 41.5 / Mod Warm Water
South Fork Prairie Creek	461.1 feet	0.184 acres	Refined Preferred	QHEI 41.5 / Mod Warm Water

Description of Potential Impact: Alternatives 1 and 4 will impact approximately 475.4 linear feet of this stream. The area of impact to South Fork Prairie Creek below the ordinary high water mark (OHWM) is 0.189 acres for Alternatives 1 and 4. The Refined Preferred Alternative will impact approximately 461.1 linear feet and 0.184 acres below the OHWM. Alternatives 2 and 3 impact this stream to the east and are documented in Sec3-S25. South Fork Prairie Creek flows west and connects with North Fork Prairie Creek to form Prairie Creek. The substrate is predominately silt and gravel with some sand and clay. The banks consist of old field vegetation and a berm is located on both sides of the banks between the stream and row crops. South Fork Prairie Creek is identified as a legal drain in Daviess County and is maintained in the area of the proposed crossing. Photographs taken in the area where the proposed Alternatives 1 and 4 cross South Fork Prairie Creek are on the back of this form.

Stream Sec3-S24

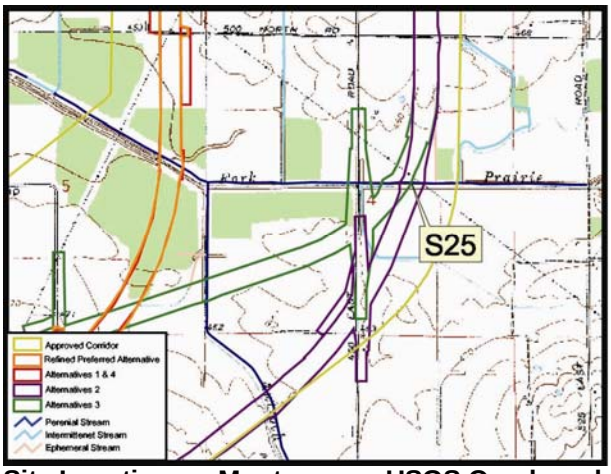
Photograph Taken Looking North

Photograph Taken Looking South

Photograph Taken Upstream

Photograph Taken Downstream

Stream Sec3-S25



Site Location on Montgomery USGS Quadrangle

Site Location on 2003 Aerial Photograph

Aquatic Resource:	Stream	**USGS Quadrangle:**	Montgomery
Stream Name:	South Fork Prairie Creek	**Section:**	4
Quarter:	NE/SE border	**Township:**	T3N
Range:	R6W	**IDEM 303(d) List:**	No
Watershed:	S.F. Prairie Creek-Eagan Ditch	**OHWM Width:**	20.0 feet
Channelized:	Yes	**USCOE Jurisdiction:**	Yes
		IDEM Jurisdiction:	Yes

Stream Sec3-S25

Stream Name	Length of Impact	Area Impacted	Alternative	Stream Habitat Assessment
South Fork Prairie Creek	428.9 feet	0.196 acres	2	QHEI 32 / Mod Warm Water
South Fork Prairie Creek	934.2 feet	0.429 acres	3	QHEI 32 / Mod Warm Water

Description of Potential Impact: Alternative 2 will impact approximately 428.9 linear feet of this stream. The area of impact to South Fork Prairie Creek below the ordinary high water mark (OHWM) is 0.196 acres for Alternative 2. Alternative 3 and its associated Daviess County Road 450 East grade separation will impact approximately 934.2 linear feet of this stream. The area of impact below the OHWM is 0.429 acres for Alternative 3. Alternatives 1 and 4 and the Refined Preferred Alternative impact this stream to the west and are documented in Sec3-S24. South Fork Prairie Creek flows west and connects with North Fork Prairie Creek to form Prairie Creek. The substrate is predominately silt with some sand, clay and gravel. The banks consist of old field vegetation and a berm is located on both sides of the banks between the stream and row crops. No riparian zone exists at this stream crossing. South Fork Prairie Creek is identified as a legal drain in Daviess County and is maintained in the area of the proposed crossing. Photographs taken in the area where the proposed Alternatives 2 and 3 cross South Fork Prairie Creek are on the back of this form.

Stream Sec3-S25

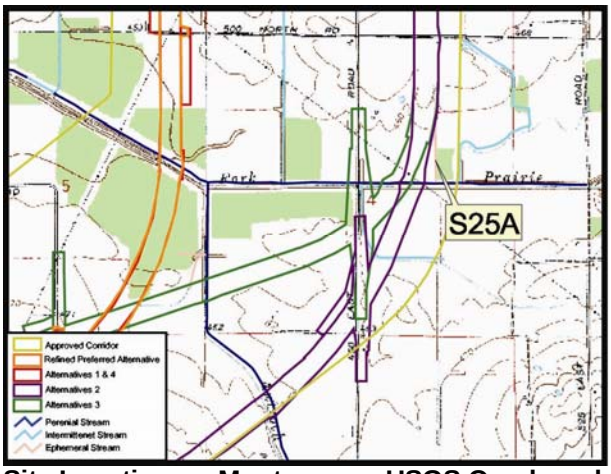
Photograph Taken Upstream

Photograph Taken Downstream

Photograph Taken Looking North

Photograph Taken Looking South

Stream Sec3-S25A



Site Location on Montgomery USGS Quadrangle

Site Location on 2003 Aerial Photograph

Aquatic Resource:	Stream	**USGS Quadrangle:**	Montgomery
Stream Name:	South Fork Prairie Creek	**Section:**	4
Quarter:	NE/SE border	**Township:**	T3N
Range:	R6W	**IDEM 303(d) List:**	No
Watershed:	S.F. Prairie Creek-Eagan Ditch	**OHWM Width:**	5.0 feet
Channelized:	Yes	**USCOE Jurisdiction:**	Yes
		IDEM Jurisdiction:	Yes

Stream Sec3-S25A

Stream Name	Length of Impact	Area Impacted	Alternative	Stream Habitat Assessment
Tributary of South Fork Prairie Creek	173.4 feet	0.020 acres	2	HHEI 25 / Mod Class I
Tributary of South Fork Prairie Creek	100.8 feet	0.012 acres	3	HHEI 25 / Mod Class I

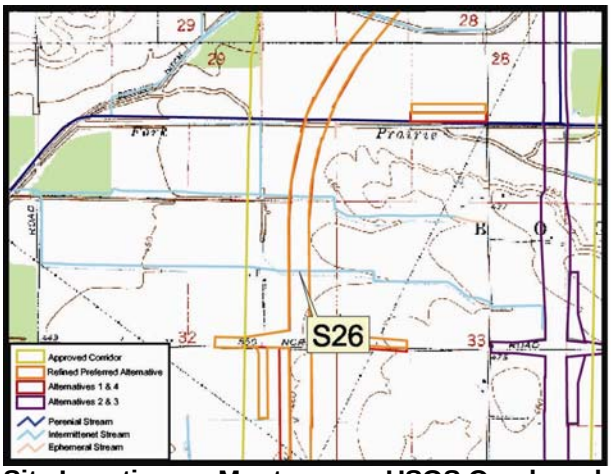
Description of Potential Impact: Alternative 2 will impact approximately 173.4 linear feet of this stream. The area of impact to this tributary of South Fork Prairie Creek below the ordinary high water mark (OHWM) is 0.020 acres for Alternative 2. Alternative 3 and will impact approximately 100.8 linear feet of this stream. The area of impact below the OHWM is 0.012 acres for Alternative 3. Alternatives 1 and 4 and the Refined Preferred Alternative do not impact this stream. The substrate is predominately silt and clay. The banks consist of old field. No riparian zone exists at this stream crossing. Photographs taken in the area where the proposed Alternatives 2 and 3 cross the tributary are on the back of this form.

Stream Sec3-S25A

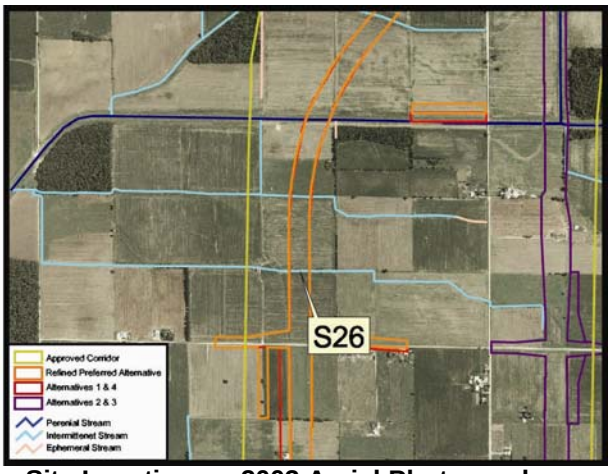
Photograph Taken Upstream

Photograph Taken Downstream

Stream Sec3-S26



Site Location on Montgomery USGS Quadrangle



Site Location on 2003 Aerial Photograph

Aquatic Resource:	Stream	**USGS Quadrangle:**	Montgomery
Stream Name:	Unnamed	**Section:**	32
Quarter:	NE	**Township:**	T4N
Range:	R6W	**IDEM 303(d) List:**	No
Watershed:	N.F. Prairie Creek-Bethel Creek	**OHWM Width:**	4.6 feet
Channelized:	Yes	**USCOE Jurisdiction:**	Yes
		IDEM Jurisdiction:	Yes

Stream Sec3-S26

Stream Name	Length of Impact	Area Impacted	Alternative	Stream Habitat Assessment
Tributary of N.F.P.C.	360.0 feet	0.038 acres	1 and 4	HHEI 17 / Modified Class I
Tributary of N.F.P.C.	361.9 feet	0.038 acres	Refined Preferred	HHEI 17 / Modified Class I

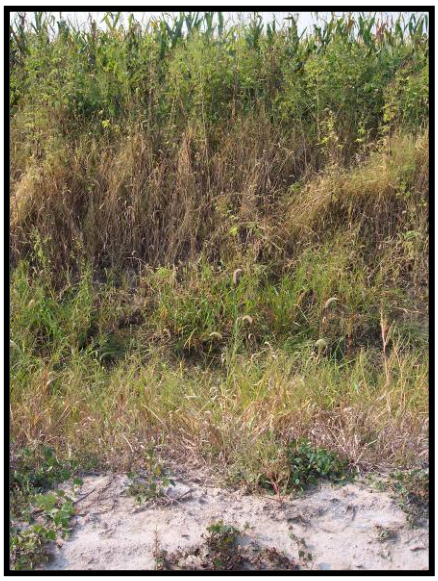
Description of Potential Impact: Alternatives 1 and 4 will impact approximately 360.0 linear feet of this stream. The area of impact below the ordinary high water mark (OHWM) is 0.038 acres for Alternatives 1 and 4. The Refined Preferred Alternative will impact approximately 361.9 linear feet and 0.038 acres below the OHWM. This intermittent stream flows west and discharges into North Fork Prairie Creek. The substrate is predominately clay with some silt and the banks and streambed consist of old field vegetation. Row crops exist beyond both banks. There is no riparian corridor in the area where Alternatives 1 and 4 cross this stream. Photographs taken upstream and downstream in the area where the proposed Alternatives 1 and 4 cross this tributary of North Fork Prairie Creek are on the back of this form.

Stream Sec3-S26

Photograph Taken Upstream

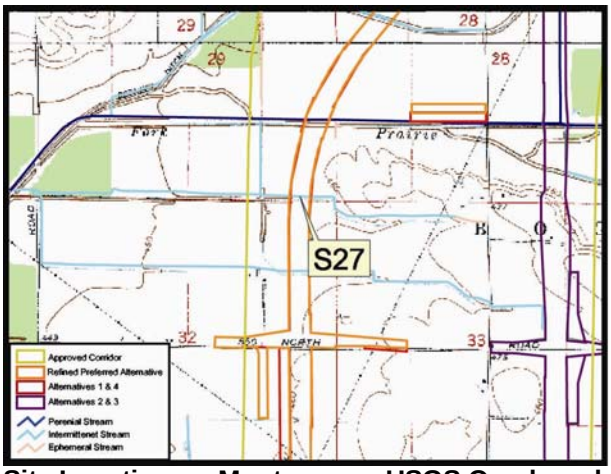
Photograph Taken Downstream

Photograph Taken Looking North

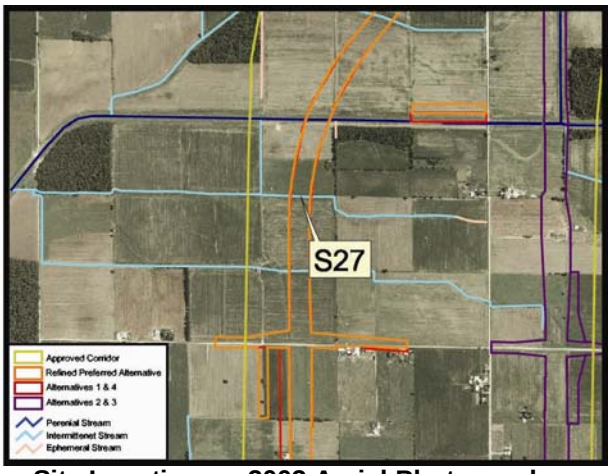


Photograph Taken Looking South

Stream Sec3-S27



Site Location on Montgomery USGS Quadrangle



Site Location on 2003 Aerial Photograph

Aquatic Resource:	Stream	**USGS Quadrangle:**	Montgomery
Stream Name:	Unnamed	**Section:**	32
Quarter:	NE	**Township:**	T4N
Range:	R6W	**IDEM 303(d) List:**	No
Watershed:	N.F. Prairie Creek-Bethel Creek	**OHWM Width:**	4.6 feet
Channelized:	Yes	**USCOE Jurisdiction:**	Yes
		IDEM Jurisdiction:	Yes

Stream Sec3-W27

Stream Name	Length of Impact	Area Impacted	Alternative	Stream Habitat Assessment
Tributary of N.F.P.C.	367.5 feet	0.039 acres	1 and 4	HHEI 16 / Modified Class I
Tributary of N.F.P.C.	360.4 feet	0.038 acres	Refined Preferred	HHEI 16 / Modified Class I

Description of Potential Impact: Alternatives 1 and 4 will impact approximately 367.5 linear feet of this stream. The area of impact below the ordinary high water mark (OHWM) is 0.039 acres for Alternatives 1 and 4. The Refined Preferred Alternative will impact approximately 360.4 linear feet and 0.038 acres below the OHWM. This intermittent stream flows west and discharges into North Fork Prairie Creek. The substrate is predominately clay and the banks and streambed consist of old field vegetation. Row crops exist beyond both banks. There is no riparian corridor in the area where Alternatives 1 and 4 cross this stream. Photographs taken upstream and downstream in the area where the proposed Alternatives 1 and 4 cross this tributary of North Fork Prairie Creek are on the back of this form.

Stream Sec3-S27

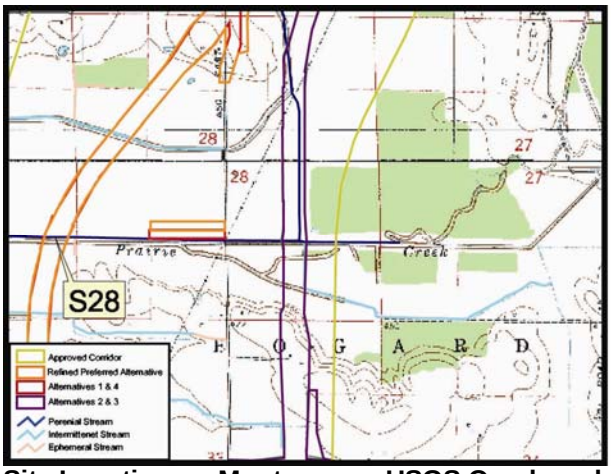
Photograph Taken Upstream

Photograph Taken Downstream

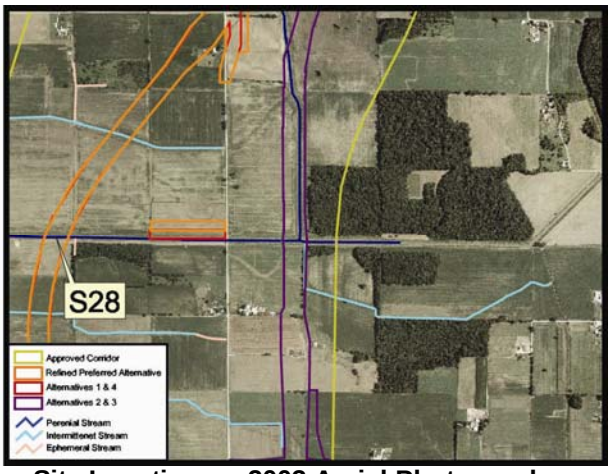
Photograph Taken Looking North

Photograph Taken Looking North

Stream Sec3-S28



Site Location on Montgomery USGS Quadrangle



Site Location on 2003 Aerial Photograph

Aquatic Resource:	Stream	**USGS Quadrangle:**	Montgomery
Stream Name:	North Fork Prairie Creek	**Section:**	29
Quarter:	SE	**Township:**	T4N
Range:	R6W	**IDEM 303(d) List:**	Yes
Watershed:	N.F. Prairie Creek-Bethel Creek	**OHWM Width:**	27.9 feet
Channelized:	Yes	**USCOE Jurisdiction:**	Yes
		IDEM Jurisdiction:	Yes

Stream Sec3-S28

Stream Name	Length of Impact	Area Impacted	Alternative	Stream Habitat Assessment
North Fork Prairie Creek	426.0 feet	0.273 acres	1 and 4	QHEI 46 / Mod Warm Water
North Fork Prairie Creek	418.6 feet	0.268 acres	Refined Preferred	QHEI 46 / Mod Warm Water

Description of Potential Impact: Alternatives 1 and 4 will impact approximately 426.0 linear feet of this stream. The area of impact to North Fork Prairie Creek below the ordinary high water mark (OHWM) is 0.273 acres for Alternatives 1 and 4. The Refined Preferred Alternative will impact approximately 418.6 linear feet and 0.268 acres below the OHWM. Alternatives 2 and 3 impact this stream to the east and are documented in Sec3-S29. North Fork Prairie Creek flows west and connects with South Fork Prairie Creek to form Prairie Creek. The substrate is predominately sand and gravel with some silt. The banks consist of old field vegetation and a berm is located on both sides of the banks between the stream and row crops. North Fork Prairie Creek is identified as a legal drain in Daviess County and is maintained in the area of the proposed crossing. Photographs taken in the area where the proposed Alternatives 1 and 4 cross North Fork Prairie Creek are on the back of this form.

Stream Sec3-S28

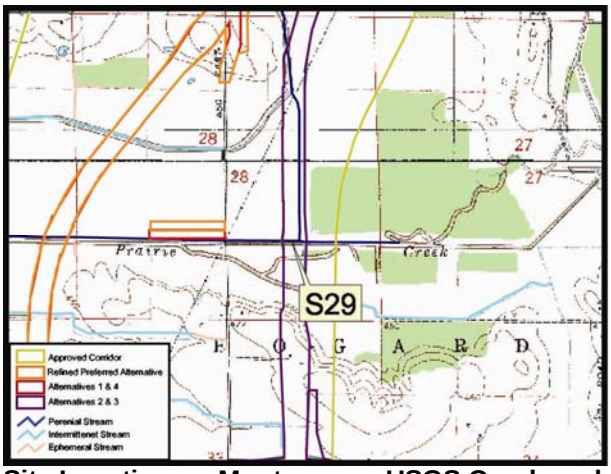
Photograph Taken Downstream

Photograph Taken Upstream

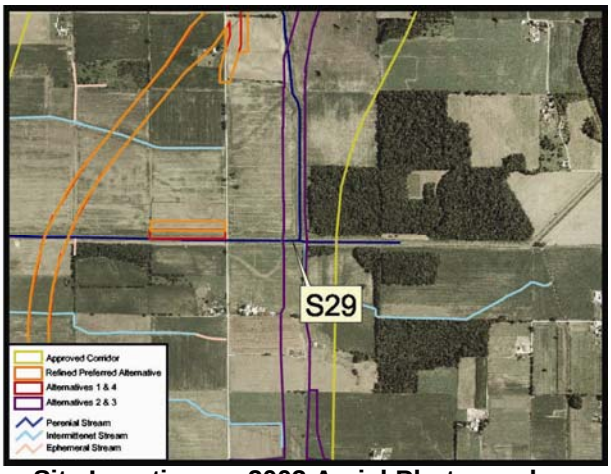
Photograph Taken Looking South

Photograph Taken Looking North

Stream Sec3-S29



Site Location on Montgomery USGS Quadrangle



Site Location on 2003 Aerial Photograph

Aquatic Resource:	Stream	**USGS Quadrangle:**	Montgomery
Stream Name:	North Fork Prairie Creek	**Section:**	28
Quarter:	SE	**Township:**	T4N
Range:	R6W	**IDEM 303(d) List:**	Yes
Watershed:	N.F. Prairie Creek-Bethel Creek	**OHWM Width:**	24.9 feet
Channelized:	Yes	**USCOE Jurisdiction:**	Yes
		IDEM Jurisdiction:	Yes

Stream Sec3-S29

Stream Name	Length of Impact	Area Impacted	Alternative	Stream Habitat Assessment
North Fork Prairie Creek	428.2 feet	0.245 acres	2	QHEI 44 / Mod Warm Water
North Fork Prairie Creek	448.4 feet	0.256 acres	3	QHEI 44 / Mod Warm Water

Description of Potential Impact: Alternative 2 will impact approximately 428.2 linear feet of this stream. The area of impact to North Fork Prairie Creek below the ordinary high water mark (OHWM) is 0.245 acres for Alternative 2. Alternative 3 will impact approximately 448.4 linear feet of this stream and 0.256 acres below the OHWM. Alternatives 1, 4, and the Refined Preferred Alternative impact this stream to the west and are documented in Sec3-S28. North Fork Prairie Creek flows west and connects with South Fork Prairie Creek to form Prairie Creek. The substrate is predominately sand and gravel with some silt. The banks consist of old field vegetation and a berm is located on both sides of the banks between the stream and row crops. Bethel Ditch flows into North Fork Prairie Creek from the north within area of the proposed Alternatives 2 and 3. North Fork Prairie Creek is identified as a legal drain in Daviess County and is maintained in the area of the proposed crossing. Photographs taken in the area where the proposed Alternatives 2 and 3 cross North Fork Prairie Creek are on the back of this form.

Stream Sec3-S29

Photograph Taken Upstream

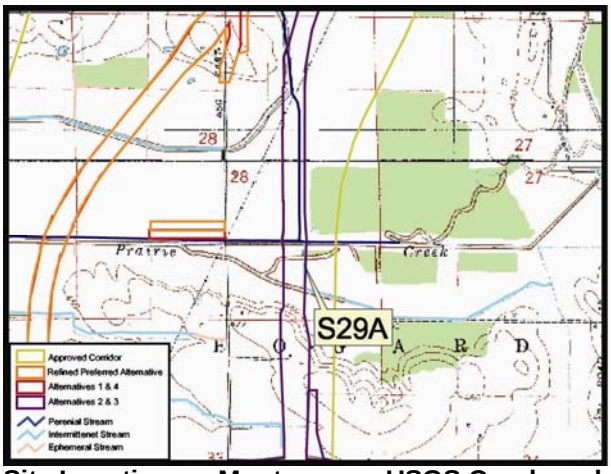
Photograph Taken Downstream

Photograph Taken Looking South

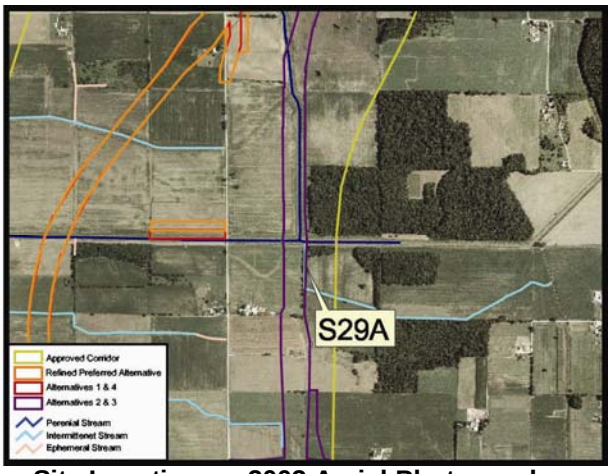
Photograph Taken Looking North

Photograph Taken Looking North at Bethel Ditch (Not at time of stream analysis)

Stream Sec3-S29A



Site Location on Montgomery USGS Quadrangle



Site Location on 2003 Aerial Photograph

Aquatic Resource:	Stream	**USGS Quadrangle:**	Montgomery
Stream Name:	Unnamed	**Section:**	28
Quarter:	SE	**Township:**	T4N
Range:	R6W	**IDEM 303(d) List:**	No
Watershed:	N.F. Prairie Creek-Bethel Creek	**OHWM Width:**	3 feet
Channelized:	Yes	**USCOE Jurisdiction:**	Yes
		IDEM Jurisdiction:	Yes

Stream Sec3-S29A

Stream Name	Length of Impact	Area Impacted	Alternative	Stream Habitat Assessment
Tributary of N.F.P.C	1642.0 feet	0.113 acres	2	HHEI 18 / Modified Class I
Tributary of N.F.P.C	471.1 feet	0.032 acres	3	HHEI 18 / Modified Class I

Description of Potential Impact: Alternative 2 will impact approximately 1642.0 linear feet of this stream. The area of impact below the ordinary high water mark (OHWM) is 0.113 acres for Alternative 2. Alternative 3 will impact approximately 471.1 linear feet and 0.032 acres below the OHWM. Alternatives 1, 4. and the Refined Preferred Alternative have no impact to this stream. This intermittent stream flows north and discharges into North Fork Prairie Creek. The substrate is predominately silt and leaf pack. An approximate 20 feet wide riparian zone exists on the west side of the stream. The east side is 20 feet of grass vegetation. Beyond this strip is a forested wetland. Photographs taken in the area where the proposed Alternatives 2 and 3 cross the stream are on the back of this form.

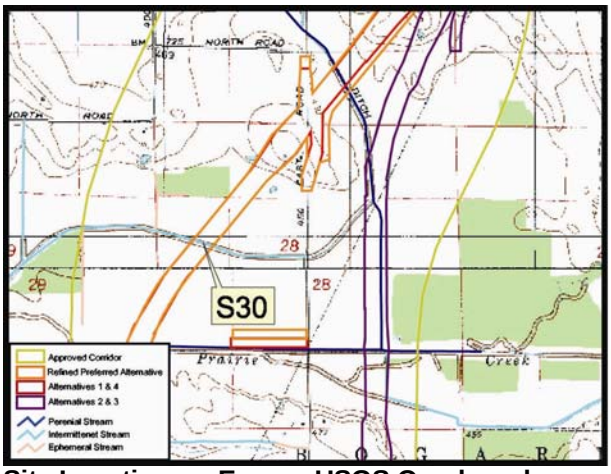
Stream Sec3-S29A

Photograph Taken Upstream

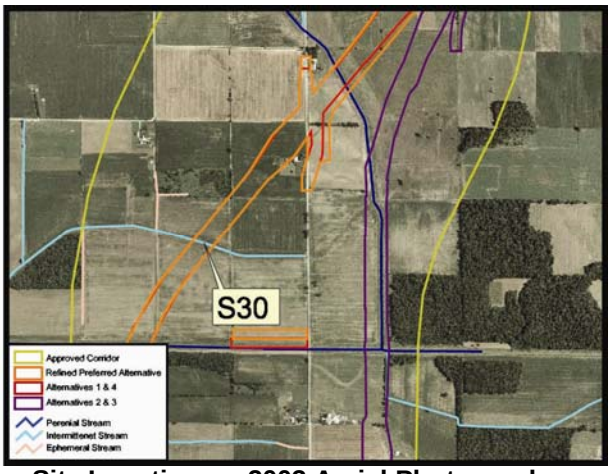
Photograph Taken Downstream

Photograph Taken Looking East

Stream Sec3-S30



Site Location on Epsom USGS Quadrangle



Site Location on 2003 Aerial Photograph

Aquatic Resource:	Stream	**USGS Quadrangle:**	Epsom
Stream Name:	Unnamed	**Section:**	28
Quarter:	NW	**Township:**	T4N
Range:	R6W	**IDEM 303(d) List:**	No
Watershed:	N.F. Prairie Creek-Bethel Creek	**OHWM Width:**	12.8 feet
Channelized:	Yes	**USCOE Jurisdiction:**	Yes
		IDEM Jurisdiction:	Yes

Stream Sec3-S30

Stream Name	Length of Impact	Area Impacted	Alternative	Stream Habitat Assessment
Tributary of N.F.P.C.	367.3 feet	0.108 acres	Refined Preferred	HHEI 50 / Modified Class II
Tributary of N.F.P.C.	366.6 feet	0.108 acres	1, 4	HHEI 50 / Modified Class II

Description of Potential Impact: The Refined Preferred Alternative will impact approximately 367.3 linear feet of this stream. Alternatives 1 and 4 will impact approximately 366.6 feet. The area of impact below the ordinary high water mark (OHWM) is 0.108 acres for these alternatives. Alternatives 2 and 3 have no impact to this stream. This intermittent stream flows west and discharges into North Fork Prairie Creek. The substrate is silt and muck and the banks contain old field vegetation. Row crops exist beyond the banks. There is no riparian corridor in the area where the alternatives cross this stream. Photographs taken in the area where the proposed Alternatives 1 and 4 cross the tributary of North Fork Prairie Creek are on the back of this form.

Stream Sec3-S30

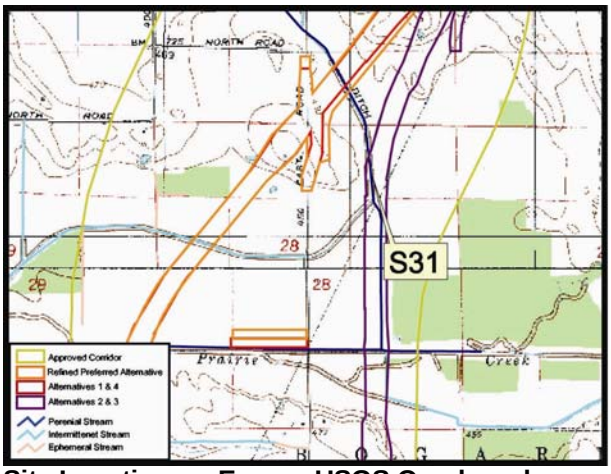
Photograph Taken Upstream

Photograph Taken Looking South

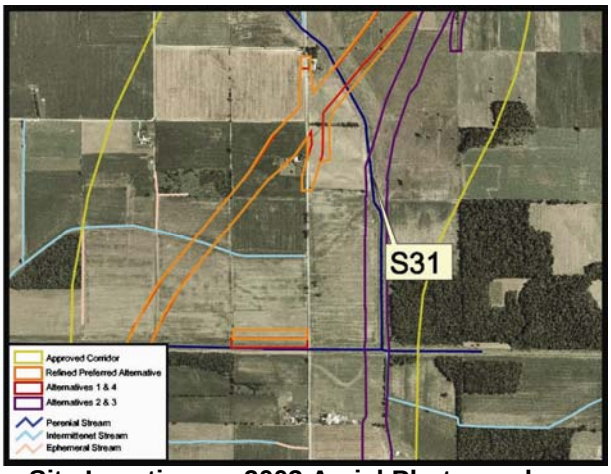
Photograph Taken Downstream

Photograph Taken Looking North

Stream Sec3-S31



Site Location on Epsom USGS Quadrangle



Site Location on 2003 Aerial Photograph

Aquatic Resource:	Stream	**USGS Quadrangle:**	Epsom
Stream Name:	Bethel Ditch	**Section:**	28
Quarter:	NE	**Township:**	T4N
Range:	R6W	**IDEM 303(d) List:**	No
Watershed:	N.F. Prairie Creek-Bethel Creek	**OHWM Width:**	8.9 feet
Channelized:	Yes	**USCOE Jurisdiction:**	Yes
		IDEM Jurisdiction:	Yes

Stream Sec3-S31

Stream Name	Length of Impact	Area Impacted	Alternative	Stream Habitat Assessment
Bethel Ditch	3,497.0 feet	0.714 acres	2 and 3	QHEI 39.25 / Mod Warm Water

Description of Potential Impact: Alternatives 2 and 3 will impact approximately 3,497.0 linear feet of this stream. The area of impact on Bethel Ditch below the ordinary high water mark (OHWM) is 0.714 acres for Alternative 3. Alternatives 1, 4, and the Refined Preferred Alternative impact the stream to the north and are documented in Sec3-S32. Bethel Ditch flows south and discharges into North Fork Prairie Creek. The old channel used to turn west ½ miles north of where it now meetings North Fork Prairie Creek, but a new channel was likely constructed to reduce agricultural point rows. The substrate is silt and muck and the banks contain old field vegetation. A berm is located on both sides of the banks between the stream and row crops or forest. There is no riparian corridor in the area where Alternatives 2 and 3 cross this stream. Photographs taken in the area where the proposed Alternatives 2 and 3 cross Bethel Ditch are on the back of this form.

Stream Sec3-S31

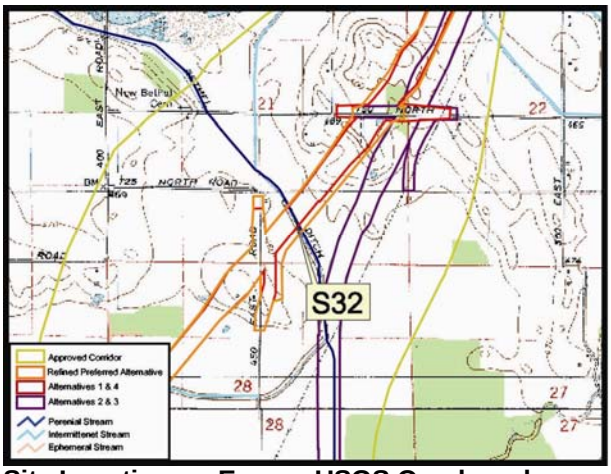
Photograph Taken Upstream

Photograph Taken Downstream

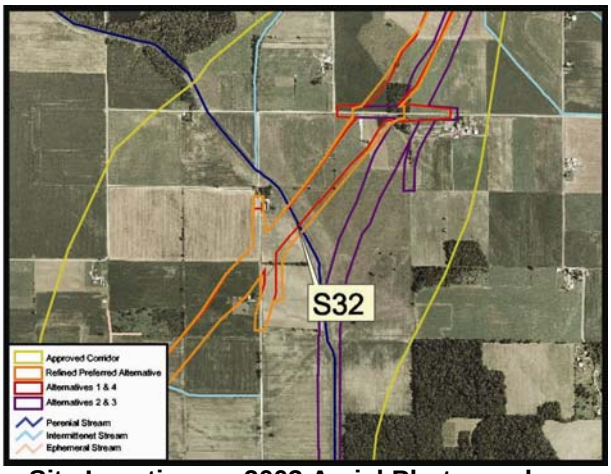
Photograph Taken Looking West

Photograph Taken Looking East

Stream Sec3-S32



Site Location on Epsom USGS Quadrangle



Site Location on 2003 Aerial Photograph

Aquatic Resource:	Stream	**USGS Quadrangle:**	Epsom
Stream Name:	Bethel Ditch	**Section:**	21
Quarter:	SE	**Township:**	T4N
Range:	R6W	**IDEM 303(d) List:**	No
Watershed:	N.F. Prairie Creek-Bethel Creek	**OHWM Width:**	7.9 feet
Channelized:	Yes	**USCOE Jurisdiction:**	Yes
		IDEM Jurisdiction:	Yes

Stream Sec3-S32

Stream Name	Length of Impact	Area Impacted	Alternative	Stream Habitat Assessment
Bethel Ditch	377.8 feet	0.069 acres	1 and 4	QHEI 32 / Mod Warm Water
Bethel Ditch	519.1 feet	0.094 acres	Refined Preferred	QHEI 32 / Mod Warm Water

Description of Potential Impact: Alternatives 1 and 4 will impact approximately 377.8 linear feet of this stream. The area of impact on Bethel Ditch below the ordinary high water mark (OHWM) is 0.069 acres for Alternatives 1 and 4. The Refined Preferred Alternative will impact approximately 519.1 linear feet and 0.094 acres below the OHWM. Alternatives 2 and 3 impact the stream to the south and are documented in Sec3-S31. Bethel Ditch flows south and discharges into North Fork Prairie Creek. The old channel used to turn west ½ miles north of where it now meetings North Fork Prairie Creek, but a new channel was likely constructed to reduce agricultural point rows. The substrate is silt and detritus and the banks contain old field vegetation. A berm is located on both sides of the banks between the stream and row crops. There is no riparian corridor in the area where the alternatives cross this stream. Photographs taken in the area where the proposed Alternatives 1 and 4 cross Bethel Ditch are on the back of this form.

Stream Sec3-S32

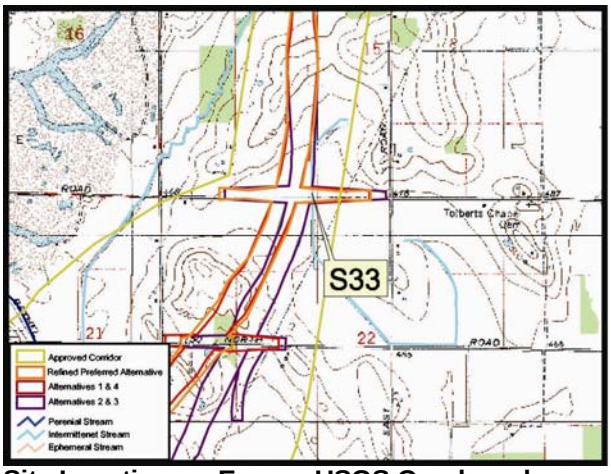
Photograph Taken Upstream

Photograph Taken Downstream

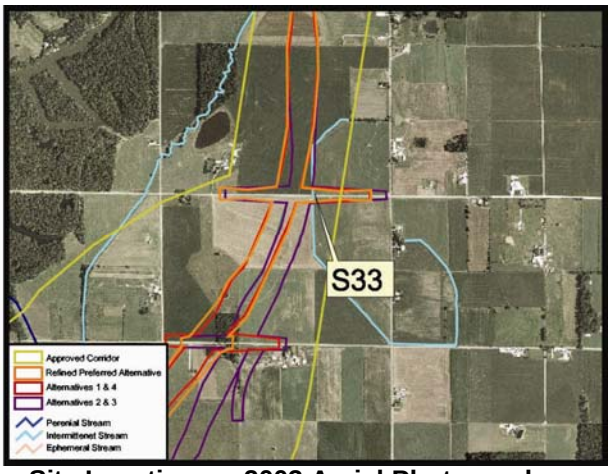
Photograph Taken Looking West

Photograph Taken Looking East

Stream Sec3-S33



Site Location on Epsom USGS Quadrangle



Site Location on 2003 Aerial Photograph

Aquatic Resource:	Stream	**USGS Quadrangle:**	Epsom
Stream Name:	Unnamed	**Section:**	22
Quarter:	NW	**Township:**	T4N
Range:	R6W	**IDEM 303(d) List:**	No
Watershed:	N.F. Prairie Creek-Bethel Creek	**OHWM Width:**	1.6 feet
Channelized:	Yes	**USCOE Jurisdiction:**	Yes
		IDEM Jurisdiction:	Yes

Stream Sec3-S33

Stream Name	Length of Impact	Area Impacted	Alternative	Stream Habitat Assessment
Tributary of N.F.P.C.	261.1 feet	0.010 acres	1 and 4	HHEI 27 / Modified Class I
Tributary of N.F.P.C.	229.9 feet	0.008 acres	Refined Preferred	HHEI 27 / Modified Class I
Tributary of N.F.P.C.	1,025.0 feet	0.038 acres	2	HHEI 27 / Modified Class I
Tributary of N.F.P.C.	1,024.0 feet	0.038 acres	3	HHEI 27 / Modified Class I

Description of Potential Impact: Alternatives 1 and 4 and their associated Daviess County Road 800 North grade separation will impact approximately 261.1 linear feet of this stream. The area of impact below the ordinary high water mark (OHWM) is 0.010 acres for Alternatives 1 and 4. The Refined Preferred Alternative will impact approximately 229.9 linear feet and 0.008 acres below the OHWM. Alternative 2 will impact approximately 1,025.0 linear feet of this stream and Alternative 3 will impact 1,024.0 linear feet. The area of impact below the OHWM is 0.038 acres for Alternatives 2 and 3. This intermittent stream flows south and discharges into North Fork Prairie Creek. The substrate is silt and the banks contain old field vegetation. Row crops exist on both sides of the banks. There is no riparian corridor in the area where the alternatives cross this stream. Photographs taken in the area where the proposed alternatives cross this tributary of North Fork Prairie Creek are on the back of this form.

Stream Sec3-S33

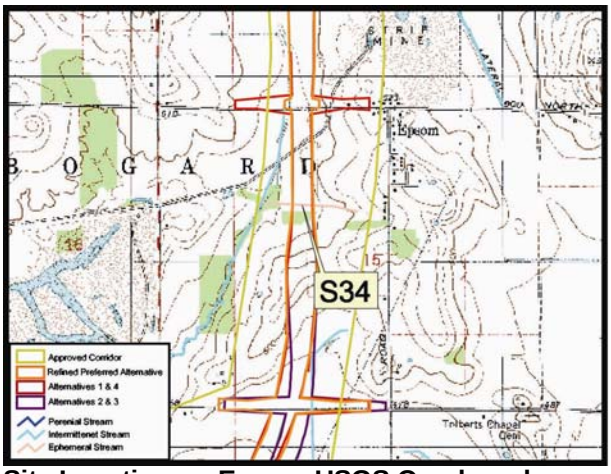
Photograph Taken Upstream

Photograph Taken Downstream

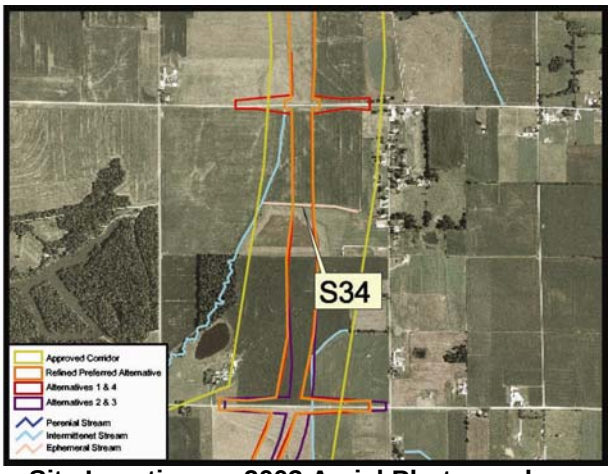
Photograph Taken Looking East

Photograph Taken Looking West

Stream Sec3-S34



Site Location on Epsom USGS Quadrangle



Site Location on 2003 Aerial Photograph

Aquatic Resource:	Stream	**USGS Quadrangle:**	Epsom
Stream Name:	Unnamed	**Section:**	15
Quarter:	NW	**Township:**	T4N
Range:	R6W	**IDEM 303(d) List:**	No
Watershed:	N.F. Prairie Creek-Bethel Creek	**OHWM Width:**	2 feet
Channelized:	Yes	**USCOE Jurisdiction:**	Yes
		IDEM Jurisdiction:	Yes

Stream Sec3-S34				
Stream Name	**Length of Impact**	**Area Impacted**	**Alternative**	**Stream Habitat Assessment**
Tributary of Bethel Ditch	346.3 feet	0.016 acres	1, 2, 3, 4	HHEI 27 / Modified Class I
Tributary of Bethel Ditch	369.7 feet	0.017 acres	Refined Preferred	HHEI 27 / Modified Class I

Description of Potential Impact: Alternatives 1, 2, 3 and 4 will impact approximately 346.3 linear feet of this stream. The area of impact below the ordinary high water mark (OHWM) is 0.016 acres for these alternatives. The Refined Preferred Alternative will impact approximately 369.7 linear feet and 0.017 acres below the OHWM. This ephemeral stream flows west and discharges into an intermittent tributary of Bethel Ditch. The substrate is mostly silt with some cobble and the thin banks are grassy. Row crops exist beyond the banks. There is no riparian corridor in the area where the alternatives cross this stream. Photographs taken where the proposed alternatives cross this stream are on the back of this form.

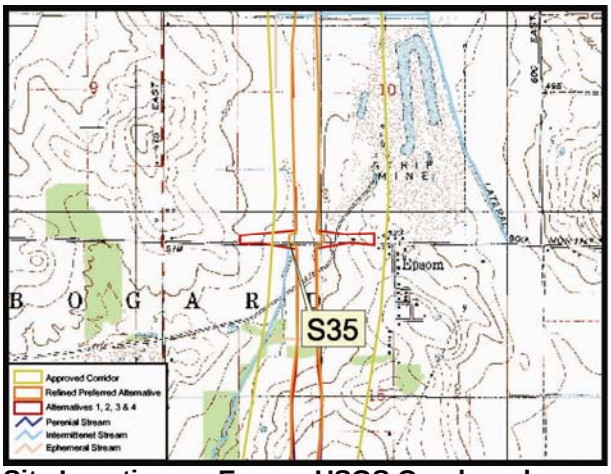
Stream Sec3-S34

Photograph Taken Upstream (East)

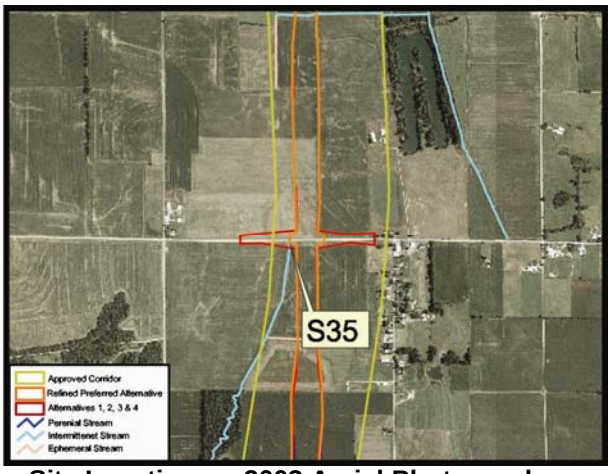
Photograph Taken Downstream (West)

Photograph Taken From Side

Stream Sec3-S35



Site Location on Epsom USGS Quadrangle



Site Location on 2003 Aerial Photograph

Aquatic Resource:	Stream	**USGS Quadrangle:**	Epsom
Stream Name:	Unnamed	**Section:**	15
Quarter:	NW	**Township:**	T4N
Range:	R6W	**IDEM 303(d) List:**	No
Watershed:	N.F. Prairie Creek-Bethel Creek	**OHWM Width:**	2 feet
Channelized:	Yes	**USCOE Jurisdiction:**	Yes
		IDEM Jurisdiction:	Yes

Stream Sec3-S35

Stream Name	Length of Impact	Area Impacted	Alternative	Stream Habitat Assessment
Tributary of Bethel Ditch	186.9 feet	0.009 acres	1, 2, 3, 4	HHEI 16 / Modified Class I
Tributary of Bethel Ditch	97.8 feet	0.004 acres	Refined Preferred	HHEI 16 / Modified Class I

Description of Potential Impact: Alternatives 1, 2, 3 and 4 will impact approximately 186.9 linear feet of this stream. The area of impact below the ordinary high water mark (OHWM) is 0.009 acres for these alternatives. The Refined Preferred Alternative will impact approximately 97.8 linear feet and 0.004 acres below the OHWM. This intermittent stream flows west and discharges into Bethel Ditch. The substrate is mostly silt with some detritus and muck and the banks contain some wetland vegetation. Row crops exist beyond the banks. The there is no riparian corridor in the area where the alternatives cross this stream. Photographs taken where the proposed alternatives cross this stream are on the back of this form.

Stream Sec3-S35

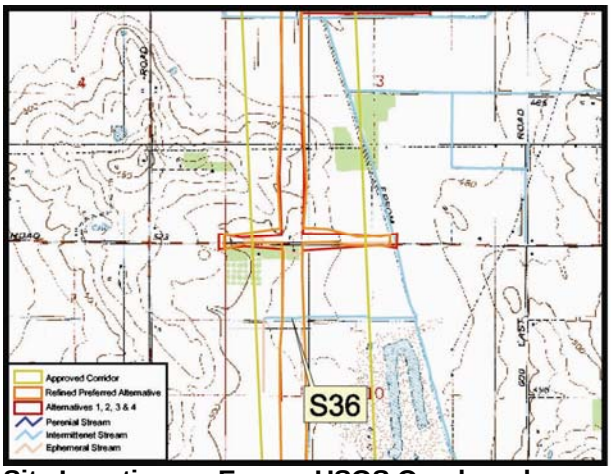
Photograph Taken Downstream

Photograph Taken Upstream

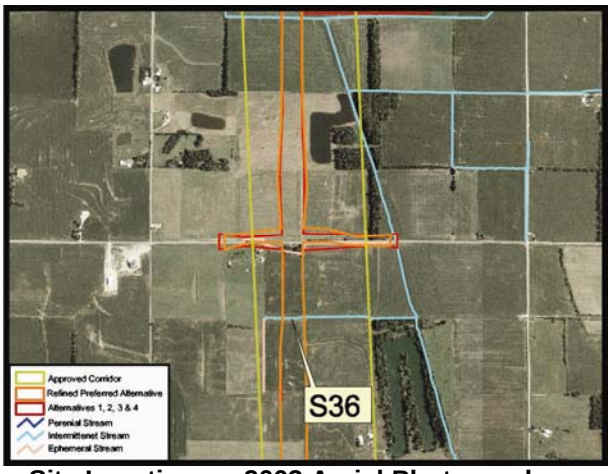
Photograph Taken Looking West

Photograph Taken Looking East

Stream Sec3-S36



Site Location on Epsom USGS Quadrangle



Site Location on 2003 Aerial Photograph

Aquatic Resource:	Stream	**USGS Quadrangle:**	Epsom
Stream Name:	Unnamed	**Section:**	10
Quarter:	NW	**Township:**	T4N
Range:	R6W	**IDEM 303(d) List:**	No
Watershed:	Smothers Creek-Cutoff	**OHWM Width:**	1.5 feet
Channelized:	Yes	**USCOE Jurisdiction:**	Yes
		IDEM Jurisdiction:	Yes

Stream Sec3-S36

Stream Name	Length of Impact	Area Impacted	Alternative	Stream Habitat Assessment
Tributary of Epsom Lateral	378.8 feet	0.013 acres	1, 2, 3, 4	HHEI 19 / Modified Class I
Tributary of Epsom Lateral	379.3 feet	0.013 acres	Refined Preferred	HHEI 19 / Modified Class I

Description of Potential Impact: Alternatives 1, 2, 3 and 4 will impact approximately 378.8 linear feet of this stream. The Refined Preferred Alternative will impact approximately 379.3 linear feet. The area of impact below the ordinary high water mark (OHWM) is 0.013 acres for all alternatives. This intermittent stream flows east and discharges into the Epsom Lateral. The substrate is predominately silt and the banks are small grassy strips. The streambed contains cat-tails. Row crops exist beyond the banks. There is no riparian corridor in the area where the alternatives cross this stream. Photographs taken in the area where the proposed alternatives cross this stream are on the back of this form.

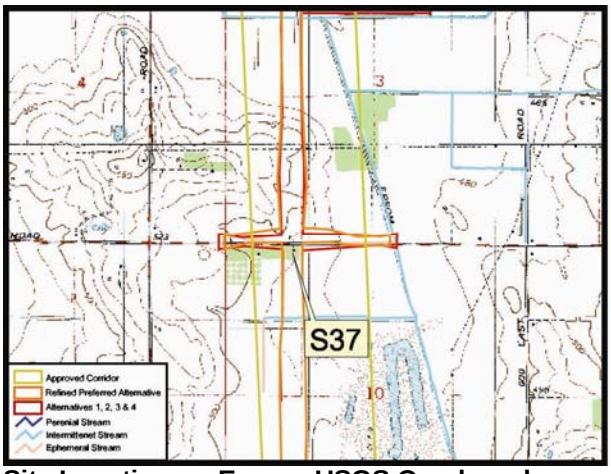
Stream Sec3-S36

Photograph Taken Upstream

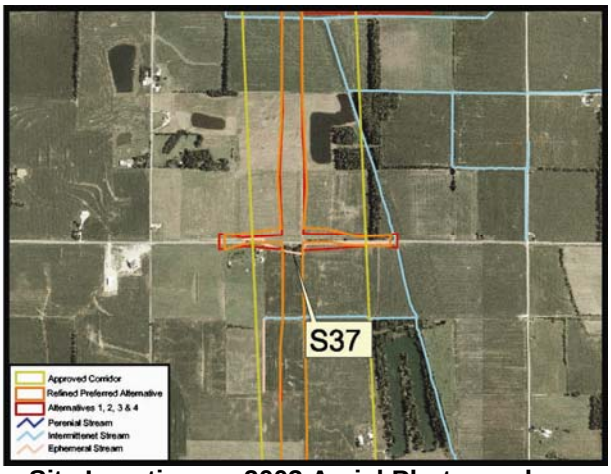
Photograph Taken Downstream

Photograph Taken Looking North

Stream Sec3-S37



Site Location on Epsom USGS Quadrangle



Site Location on 2003 Aerial Photograph

Aquatic Resource:	Stream	**USGS Quadrangle:**	Epsom
Stream Name:	Unnamed	**Section:**	10
Quarter:	NW	**Township:**	T4N
Range:	R6W	**IDEM 303(d) List:**	No
Watershed:	Smothers Creek-Cutoff	**OHWM Width:**	5.6 feet
Channelized:	Yes	**USCOE Jurisdiction:**	Yes
		IDEM Jurisdiction:	Yes

Stream Sec3-S37

Stream Name	Length of Impact	Area Impacted	Alternative	Stream Habitat Assessment
Tributary of Epsom Lateral	2,751.0 feet	0.354 acres	1, 2, 3, 4	HHEI 22 / Modified Class I
Tributary of Epsom Lateral	1,717.4 feet	0.221 acres	Refined Preferred	HHEI 22 / Modified Class I

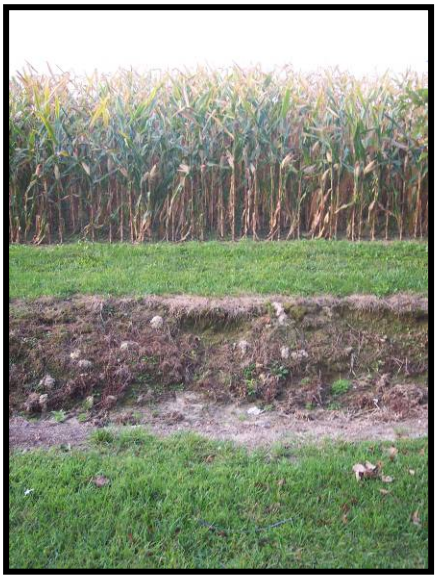
Description of Potential Impact: Alternatives 1, 2, 3 and 4 will impact approximately 2,751.0 linear feet of this stream. The area of impact below the ordinary high water mark (OHWM) is 0.354 acres for these alternatives. The Refined Preferred Alternative will impact approximately 1717.4 linear feet and 0.221 acres below the OHWM. This ephemeral stream flows east and discharges into Epsom Lateral. The substrate is predominately clay with some leaf pack and the banks are dirt. Beyond the banks is residential lawn. Row crops exist beyond the lawn south of the stream. There is a small amount of wooded area on the north side of the stream where the alternatives cross. Photographs taken in the area where the proposed alternatives cross this stream are on the back of this form.

Stream Sec3-S37

Photograph Taken Upstream

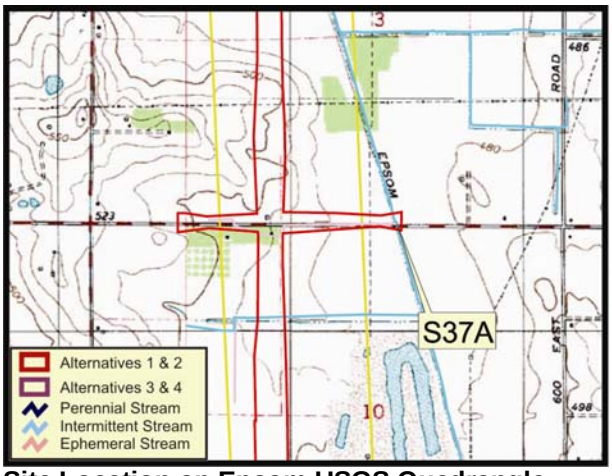
Photograph Taken Downstream

Photograph Taken Looking North

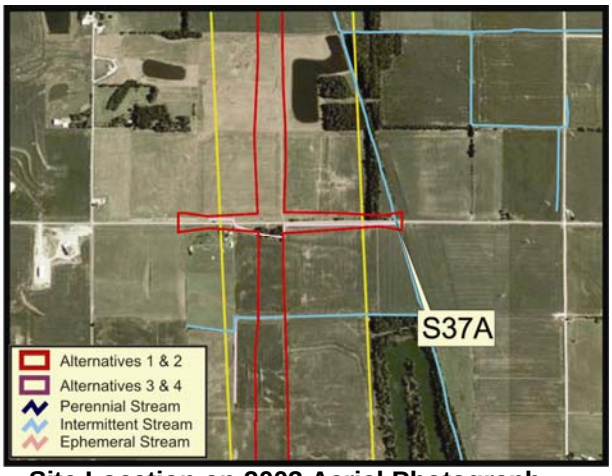


Photograph Taken Looking South

Stream Sec3-S37A



Site Location on Epsom USGS Quadrangle



Site Location on 2003 Aerial Photograph

Aquatic Resource:	Stream	**USGS Quadrangle:**	Epsom
Stream Name:	Unnamed	**Section:**	10
Quarter:	NW	**Township:**	T4N
Range:	R6W	**IDEM 303(d) List:**	No
Watershed:	Tributary of Epsom Lateral	**OHWM Width:**	20.0 feet
Channelized:	Yes	**USCOE Jurisdiction:**	Yes
		IDEM Jurisdiction:	Yes

Stream Sec3-S37A

Stream Name	Length of Impact	Area Impacted	Alternative	Stream Habitat Assessment
Tributary of Epsom Lateral	255.6 feet	0.117 acres	1, 2, 3, 4	QHEI 59.75 / Modified

Description of Potential Impact: Alternatives 1, 2, 3 and 4 will impact approximately 255.6 linear feet of this stream. The area of impact below the ordinary high water mark (OHWM) is 0.117 acres for all alternatives. This intermittent stream flows east and discharges into the Epsom Lateral. The substrate is predominately silt and the banks are small grassy strips. The streambed contains cattails. Row crops exist beyond the banks. There is no riparian corridor in the area where the alternatives cross this stream. Photographs taken in the area where the proposed alternatives cross this stream are on the back of this form.

Stream Sec3-S37A

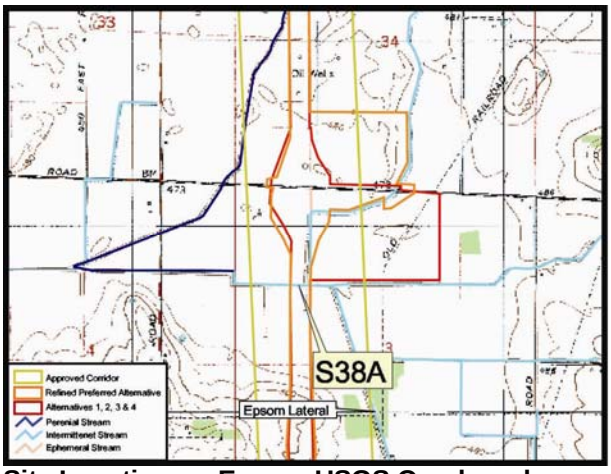
Photograph Taken Upstream

Photograph Taken Downstream

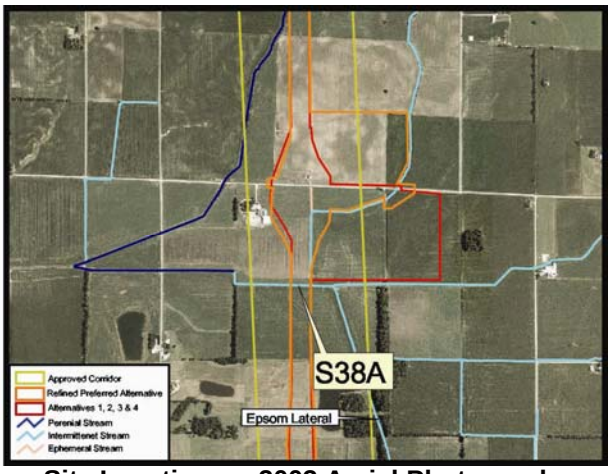
Photograph Taken Looking West

Photograph Taken Looking East

Stream Sec3-S38



Site Location on Epsom USGS Quadrangle



Site Location on 2003 Aerial Photograph

Aquatic Resource:	Stream	**USGS Quadrangle:**	Epsom
Stream Name:	Epsom Lateral	**Section:**	3
Quarter:	NW	**Township:**	T4N
Range:	R6W	**IDEM 303(d) List:**	No
Watershed:	Smothers Creek-Cutoff	**OHWM Width:**	5.6 feet
Channelized:	Yes	**USCOE Jurisdiction:**	Yes
		IDEM Jurisdiction:	Yes

Stream Sec3-S38

Stream Name	Length of Impact	Area Impacted	Alternative	Stream Habitat Assessment
Epsom Lateral	347.0 feet	0.045 acres	1, 2, 3, 4	QHEI 24 / Mod Warm Water
Epsom Lateral	353.5 feet	0.045 acres	Refined Preferred	QHEI 24 / Mod Warm Water

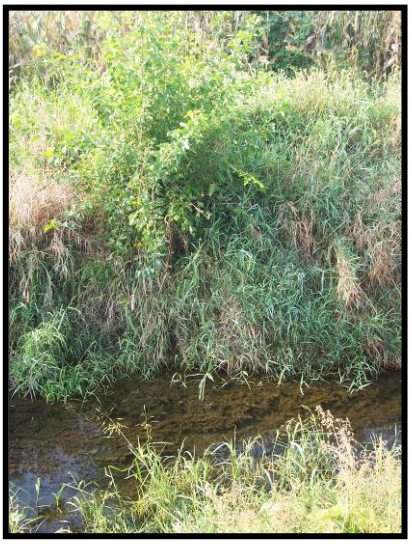
Description of Potential Impact: Alternatives 1, 2, 3 and 4 will impact approximately 347.0 linear feet of this stream. The area of impact to Epsom Lateral below the ordinary high water mark (OHWM) is 0.045 acres for Alternatives 1, 2, 3 and 4. The Refined Preferred Alternative will impact approximately 353.5 linear feet and 0.045 acres below the OHWM. This Epsom Lateral flows west and meets Smothers Creek. The substrate is silt and the banks contain old field vegetation. Row crops exist beyond the banks and there is no riparian corridor in the area where the alternatives cross this stream. Photographs taken in the area where the proposed Alternatives 1, 2, 3 and 4 cross Epsom Lateral are on the back of this form.

Stream Sec3-S38

Photograph Taken Upstream

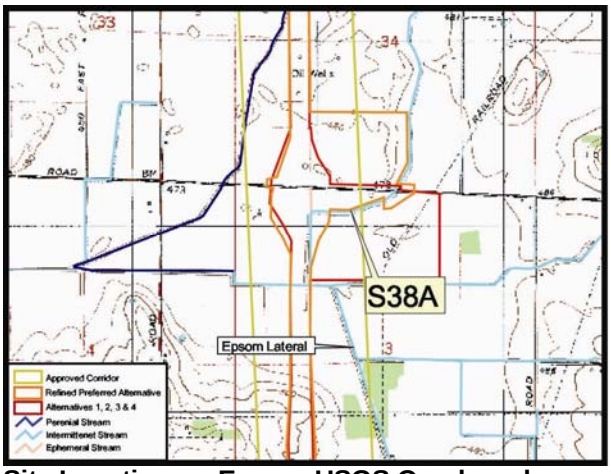
Photograph Taken Downstream

Photograph Taken Looking North

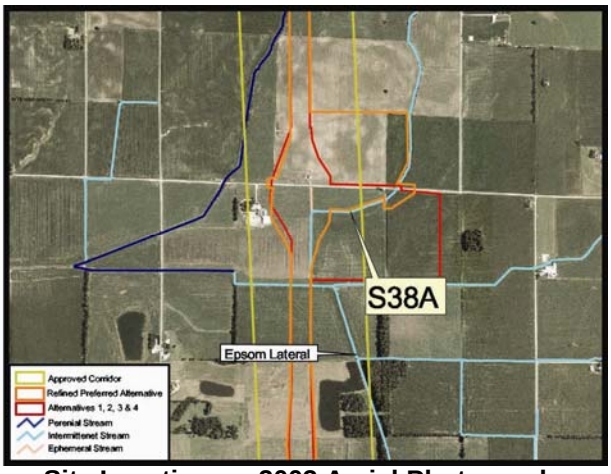


Photograph Taken Looking South

Stream Sec3-S38A



Site Location on Epsom USGS Quadrangle



Site Location on 2003 Aerial Photograph

Aquatic Resource:	Stream	**USGS Quadrangle:**	Epsom
Stream Name:	Epsom Lateral	**Section:**	3
Quarter:	NW	**Township:**	T4N
Range:	R6W	**IDEM 303(d) List:**	No
Watershed:	Smothers Creek-Cutoff	**OHWM Width:**	4.1 feet
Channelized:	Yes	**USCOE Jurisdiction:**	Yes
		IDEM Jurisdiction:	Yes

Stream Sec3-S38A

Stream Name	Length of Impact	Area Impacted	Alternative	Stream Habitat Assessment
Trib. of Epsom Lateral	2,904.0 feet	0.273 acres	1, 2, 3, 4	HHEI 34 / Modified Class II
Trib. of Epsom Lateral	2,040.2 feet	0.192 acres	Refined Preferred	HHEI 34 / Modified Class II

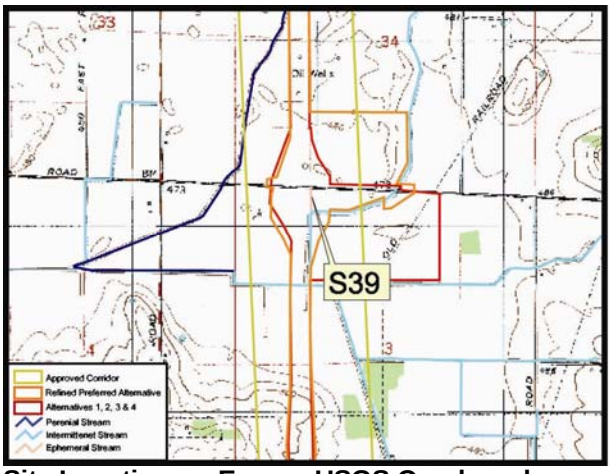
Description of Potential Impact: The rest area associated with Alternatives 1, 2, 3 and 4 will impact approximately 2,904.0 linear feet of this stream. The area of impact below the ordinary high water mark (OHWM) is 0.273 acres for Alternatives 1, 2, 3 and 4. The Refined Preferred Alternative will impact approximately 2040.2 linear feet and 0.192 acres below the OHWM. This intermittent stream flows south and discharges into Epsom Lateral. The substrate is silt with some gravel and the banks contain old field vegetation. Row crops exist beyond the banks and there is no riparian corridor in the area where the alternatives cross this stream. Photographs taken in the area where the proposed Alternatives 1, 2, 3 and 4 cross this stream are on the back of this form.

Stream Sec3-S38A

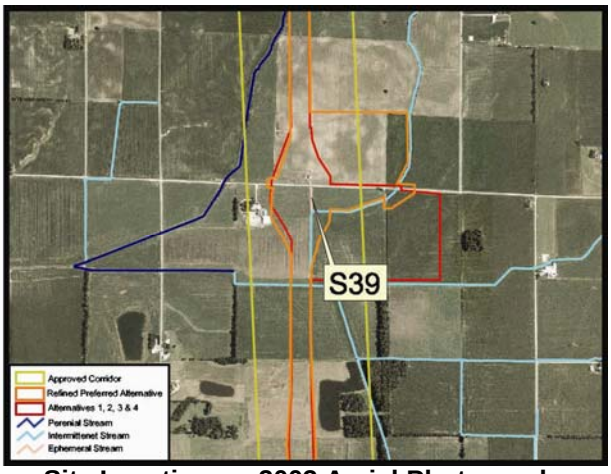
Photograph Taken Upstream

Photograph Taken Downstream

Stream Sec3-S39



Site Location on Epsom USGS Quadrangle



Site Location on 2003 Aerial Photograph

Aquatic Resource:	Stream	**USGS Quadrangle:**	Epsom
Stream Name:	Epsom Lateral	**Section:**	3
Quarter:	NW	**Township:**	T4N
Range:	R6W	**IDEM 303(d) List:**	No
Watershed:	Smothers Creek-Cutoff	**OHWM Width:**	1.3 feet
Channelized:	Yes	**USCOE Jurisdiction:**	Yes
		IDEM Jurisdiction:	Yes

Stream Sec3-S39

Stream Name	Length of Impact	Area Impacted	Alternative	Stream Habitat Assessment
Epsom Lateral	464.9 feet	0.014 acres	1, 2, 3, 4, Refined Preferred	HHEI 13 / Modified Class I

Description of Potential Impact: The Refined Preferred Alternative and Alternatives 1, 2, 3, and 4 will impact approximately 464.9 linear feet. The area of impact below the ordinary high water mark (OHWM) is 0.014 acres for all alternatives. This ephemeral stream flows south and discharges into an intermittent tributary of Epsom Lateral. The substrate is silt and the banks are grassy. Row crops exist beyond the banks and there is no riparian corridor in the area where the alternatives cross this stream. Photographs taken in the area where the proposed Alternatives 1, 2, 3 and 4 cross this stream are on the back of this form.

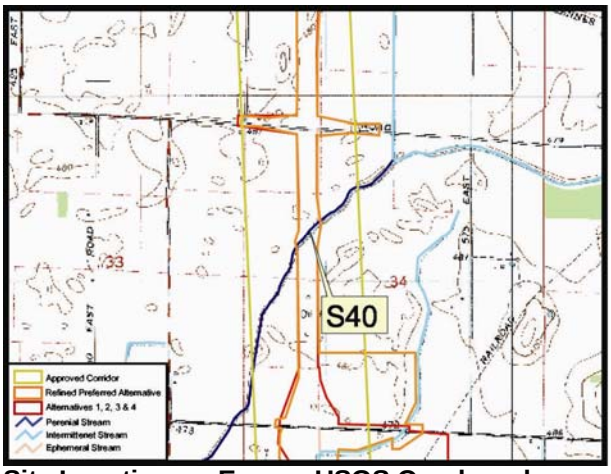
Stream Sec3-S39

Photograph Taken Downstream

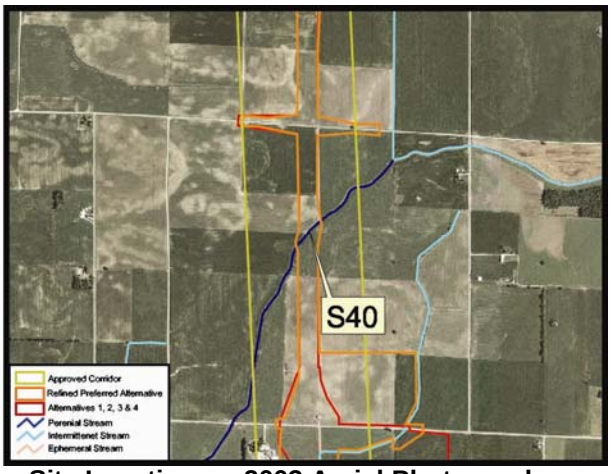
Photograph Taken Upstream

Photograph Taken Looking West

Stream Sec3-S40



Site Location on Epsom USGS Quadrangle



Site Location on 2003 Aerial Photograph

Aquatic Resource:	Stream	**USGS Quadrangle:**	Epsom
Stream Name:	Smothers Creek	**Section:**	34
Quarter:	NW	**Township:**	T5N
Range:	R6W	**IDEM 303(d) List:**	No
Watershed:	Smothers Creek-Cutoff	**OHWM Width:**	7.9 feet
Channelized:	Yes	**USCOE Jurisdiction:**	Yes
		IDEM Jurisdiction:	Yes

Stream Sec3-S40

Stream Name	Length of Impact	Area Impacted	Alternative	Stream Habitat Assessment
Smothers Creek	637.4 feet	0.115 acres	1, 2, 3, 4, Refined Preferred	QHEI 42 / Mod Warm Water

Description of Potential Impact: Alternatives 1, 2, 3 and 4 and the Refined Preferred Alternative will impact approximately 637.4 linear feet of this stream. The area of impact to Smothers Creek below the ordinary high water mark (OHWM) is 0.115 acres. Smothers Creek is identified as a legal drain in Daviess County and is maintained in the area of the proposed crossing. Smothers Creek flows southwest and meets with Epsom Lateral. The substrate is predominately clay and the banks contain old field vegetation. Row crops exist beyond the banks. There is no riparian corridor in the area where Alternatives 1, 2, 3 and 4 cross this creek. Photographs taken in the area where the proposed alternatives cross Smothers Creek are on the back of this form.

Stream Sec3-S40

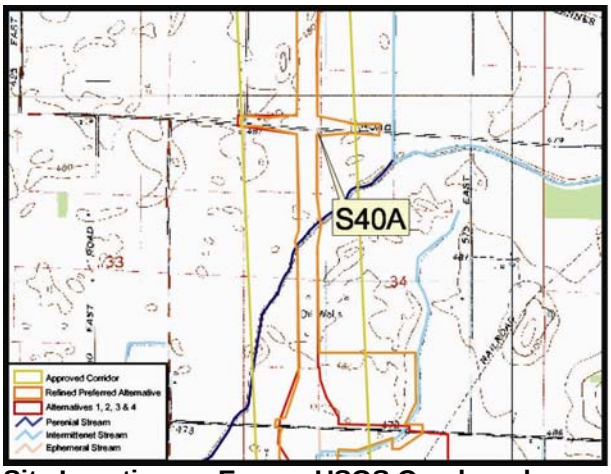
Photograph Taken Upstream

Photograph Taken Downstream

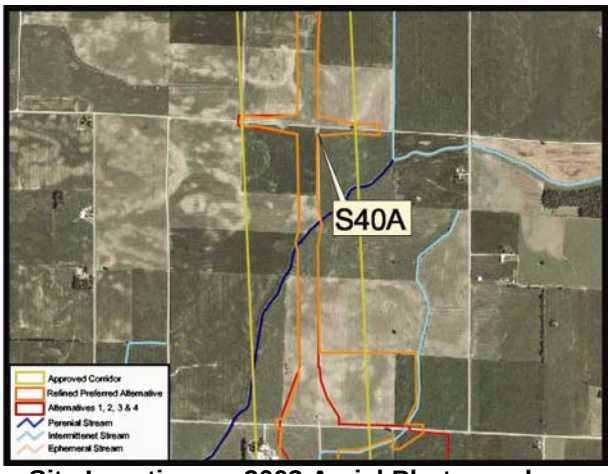
Photograph Taken Looking North

Photograph Taken Looking South

Stream Sec3-S40A



Site Location on Epsom USGS Quadrangle



Site Location on 2003 Aerial Photograph

Aquatic Resource:	Stream	**USGS Quadrangle:**	Epsom
Stream Name:	Unnamed	**Section:**	34
Quarter:	NW	**Township:**	T5N
Range:	R6W	**IDEM 303(d) List:**	No
Watershed:	Smothers Creek-Cutoff	**OHWM Width:**	4 feet
Channelized:	Yes	**USCOE Jurisdiction:**	Yes
		IDEM Jurisdiction:	Yes

Stream Sec3-S40A

Stream Name	Length of Impact	Area Impacted	Alternative	Stream Habitat Assessment
Smothers Creek	407.2 feet	0.037 acres	Refined Preferred	HHEI 29 / Modified Class I
Smothers Creek	402.7 feet	0.037 acres	1, 2, 3, 4,	HHEI 29 / Modified Class I

Description of Potential Impact: The Refined Preferred Alternative will impact approximately 407.2 linear feet of this stream and 0.037 acres below the ordinary high water mark (OHWM). Alternatives 1, 2, 3, and 4 will impact approximately 402.7 linear feet and 0.037 acres below the OHWM. This ephemeral stream flows south from Daviess County Road 1200 North and discharges into Smothers Creek. The substrate is predominately silt and the banks contain old field vegetation. The streambed contains cattails. Row crops exist beyond the banks. There is no riparian corridor in the area where the alternatives cross this stream. Photographs taken in the area where the proposed alternatives cross this tributary of Smothers Creek are on the back of this form.

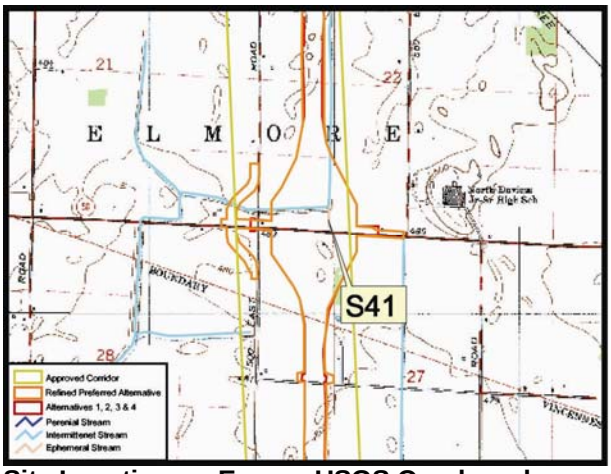
Stream Sec3-S40A

Photograph Taken Upstream

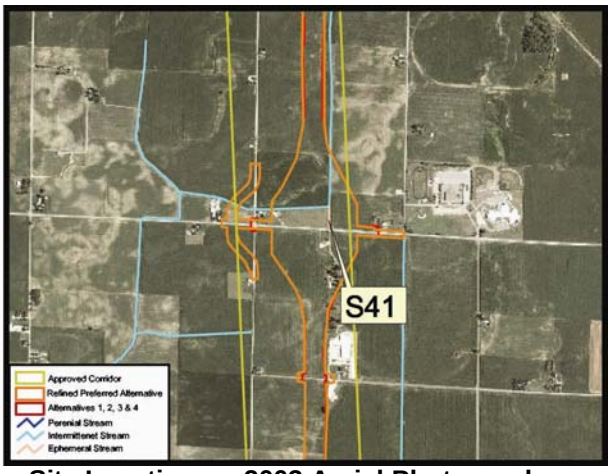
Photograph Taken Downstream

Photograph Taken Looking East

Stream Sec3-S41



Site Location on Epsom USGS Quadrangle



Site Location on 2003 Aerial Photograph

Aquatic Resource:	Stream	**USGS Quadrangle:**	Epsom
Stream Name:	Unnamed	**Section:**	22
Quarter:	SW	**Township:**	T5N
Range:	R6W	**IDEM 303(d) List:**	No
Watershed:	Smothers Creek-Cutoff	**OHWM Width:**	3.6 feet
Channelized:	Yes	**USCOE Jurisdiction:**	Yes
		IDEM Jurisdiction:	Yes

Stream Sec3-S41

Stream Name	Length of Impact	Area Impacted	Alternative	Stream Habitat Assessment
Tributary of Findley Lateral	387.4 feet	0.032 acres	1, 2, 3, 4, Refined Preferred	HHEI 19 / Modified Class I

Description of Potential Impact: Alternatives 1, 2, 3 and 4 and the Refined Preferred Alternative will impact approximately 387.4 linear feet of this stream. The area of impact to this stream below the ordinary high water mark (OHWM) is 0.032 acres for all alternatives. This ephemeral stream flows north and discharges into an intermittent tributary of Findley Lateral. The substrate is silt and the banks are small strips of old field. Row crops exist beyond the east bank and pasture exists beyond the west bank. There is no riparian corridor in the area where Alternatives 1, 2, 3 and 4 cross this stream. Photographs taken in the area where the proposed Alternatives 1, 2, 3 and 4 cross this stream are on the back of this form.

Stream Sec3-S41

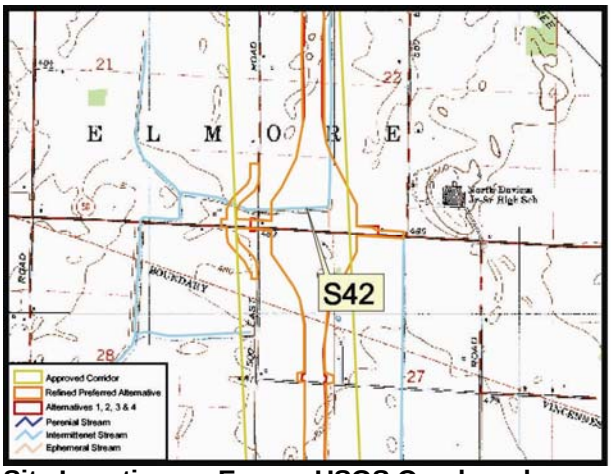
Photograph Taken Downstream

Photograph Taken Upstream

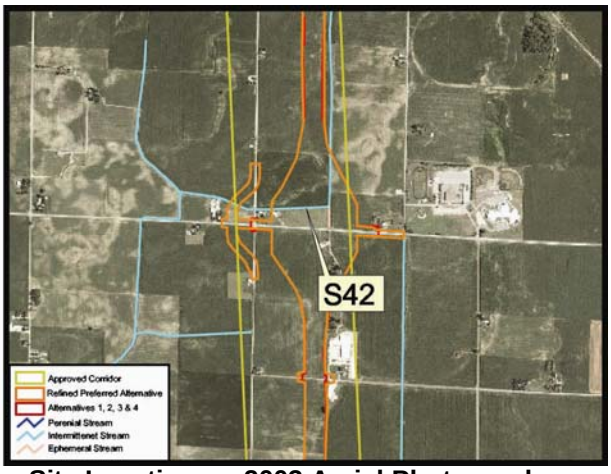
Photograph Taken Looking West

Photograph Taken Looking East

Stream Sec3-S42



Site Location on Epsom USGS Quadrangle



Site Location on 2003 Aerial Photograph

Aquatic Resource:	Stream	**USGS Quadrangle:**	Epsom
Stream Name:	Unnamed	**Section:**	22
Quarter:	SW	**Township:**	T5N
Range:	R6W	**IDEM 303(d) List:**	No
Watershed:	Smothers Creek-Cutoff	**OHWM Width:**	5.0 feet
Channelized:	Yes	**USCOE Jurisdiction:**	Yes
		IDEM Jurisdiction:	Yes

Stream Sec3-S42

Stream Name	Length of Impact	Area Impacted	Alternative	Stream Habitat Assessment
Tributary of Findley Lateral	1,957.6 feet	0.225 acres	1, 2, 3, 4, Refined Preferred	HHEI 58 / Modified Class II

Description of Potential Impact: The proposed I-69/SR 58 interchange associated with Alternatives 1, 2, 3 and 4 and the Refined Preferred Alternative will impact approximately 1957.6 linear feet of this stream and 0.225 acres below the OHWM. This intermittent stream flows west and discharges into the Findley Lateral. The substrate is silt with some gravel and the banks contain old field vegetation. Row crops exist beyond the north bank and pasture exists beyond the south bank. There is no riparian corridor in the area where the alternatives cross this stream. Photographs taken in the area where the proposed Alternatives 1, 2, 3 and 4 cross this stream are on the back of this form.

Stream Sec3-S42

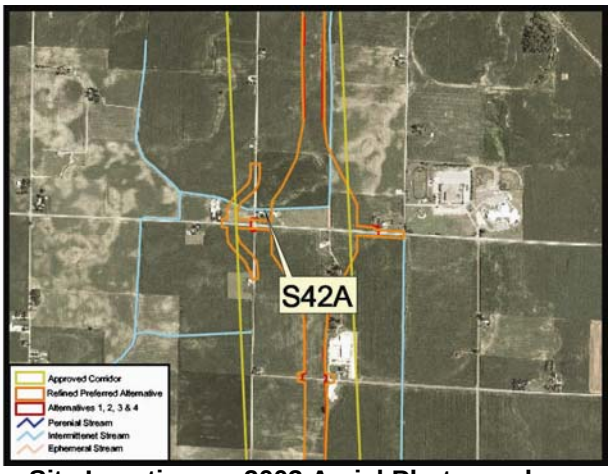
Photograph Taken Upstream

Photograph Taken Downstream

Photograph Taken Looking West Across the North/South Stream Segment

Stream Sec3-S42A

Site Location on Epsom USGS Quadrangle



Site Location on 2003 Aerial Photograph

Aquatic Resource:	Stream	**USGS Quadrangle:**	Epsom
Stream Name:	Unnamed	**Section:**	22
Quarter:	SW	**Township:**	T5N
Range:	R6W	**IDEM 303(d) List:**	No
Watershed:	Smothers Creek-Cutoff	**OHWM Width:**	5.0 feet
Channelized:	Yes	**USCOE Jurisdiction:**	Yes
		IDEM Jurisdiction:	Yes

Stream Sec3-S42A

Stream Name	Length of Impact	Area Impacted	Alternative	Stream Habitat Assessment
Tributary of Findley Lateral	170.2	0.020 acres	Refined Preferred	QHEI 26 / Modified

Description of Potential Impact: The access road associated with the proposed I-69/SR 58 interchange will impact approximately 170.2 linear feet of this stream under the Refined Preferred Alternative. The area of impact below the ordinary high water mark (OHWM) is 0.020 acres. This intermittent stream flows west and discharges into the Findley Lateral. The substrate is primarily silt and the banks contain old field vegetation. Row crops exist beyond the north bank and pasture exists beyond the south bank. Photographs taken in the area where the proposed Refined Preferred Alternative cross this stream are on the back of this form.

Stream Sec3-S42A

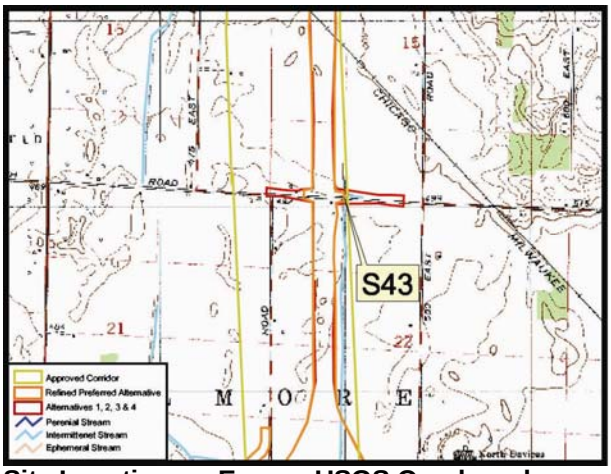
Photograph Taken Upstream

Photograph Taken Downstream

Photograph Taken Looking West

Photograph Taken Looking East

Stream Sec3-S43



Site Location on Epsom USGS Quadrangle

Site Location on 2003 Aerial Photograph

Aquatic Resource:	Stream	**USGS Quadrangle:**	Epsom
Stream Name:	Unnamed	**Section:**	22
Quarter:	NW	**Township:**	T5N
Range:	R6W	**IDEM 303(d) List:**	No
Watershed:	Smothers Creek-Cutoff	**OHWM Width:**	4.6 feet
Channelized:	Yes	**USCOE Jurisdiction:**	Yes
		IDEM Jurisdiction:	Yes

Stream Sec3-S43

Stream Name	Length of Impact	Area Impacted	Alternative	Stream Habitat Assessment
Tributary of Findley Lateral	482.7 feet	0.051 acres	1, 2, 3, 4	HHEI 29 / Modified Class I

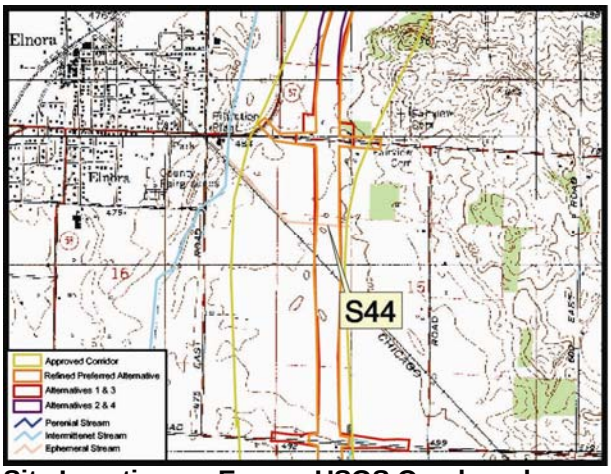
Description of Potential Impact: The Daviess County Road 1400 North grade separation associated with Alternatives 1, 2, 3 and 4 will impact approximately 482.7 linear feet of this stream. The area of impact below the ordinary high water mark (OHWM) is 0.051 acres for Alternatives 1, 2, 3 and 4. This intermittent stream crosses 1400 North and flows south and then west to Findley Lateral. The substrate is silt with some leaf pack and the banks and streambed contain cattails. Row crops exist beyond the banks. There is no riparian corridor in the area where Alternatives 1, 2, 3 and 4 cross this stream. Photographs taken in the area where the proposed Alternatives 1, 2, 3 and 4 cross this stream are on the back of this form.

Stream Sec3-S43

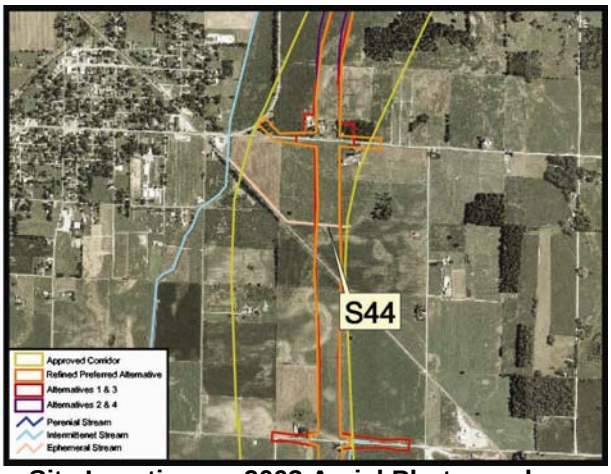
Photograph Taken Looking Southwest

Photograph Taken Downstream

Stream Sec3-S44



Site Location on Epsom USGS Quadrangle



Site Location on 2003 Aerial Photograph

Aquatic Resource:	Stream	**USGS Quadrangle:**	Epsom
Stream Name:	Unnamed	**Section:**	15
Quarter:	NW	**Township:**	T5N
Range:	R6W	**IDEM 303(d) List:**	No
Watershed:	White River-Weaver/Vertrees	**OHWM Width:**	1 feet
Channelized:	Yes	**USCOE Jurisdiction:**	Yes
		IDEM Jurisdiction:	Yes

Stream Sec3-S44

Stream Name	Length of Impact	Area Impacted	Alternative	Stream Habitat Assessment
Tributary of Vertrees Ditch	452.2 feet	0.010 acres	1, 2, 3, 4	HHEI 16 / Modified Class I
Tributary of Vertrees Ditch	402.2 feet	0.009 acres	Refined Preferred	HHEI 16 / Modified Class I

Description of Potential Impact: Alternatives 1, 2, 3 and 4 will impact approximately 452.2 linear feet of this stream. The area of impact below the ordinary high water mark (OHWM) is 0.010 acres for Alternatives 1, 2, 3 and 4. The Refined Preferred Alternative will impact approximately 402.2 linear feet and 0.009 acres below the OHWM. This ephemeral stream flows west into a ditch that runs northwest along the railroad to Vertrees Ditch. The substrate is sand with some silt and the banks are grassy. Row crops exist beyond both banks. There is no riparian corridor in the area where the alternatives cross this stream. Photographs taken in the area where the proposed Alternatives 1, 2, 3 and 4 cross this stream are on the back of this form.

Stream Sec3-S44

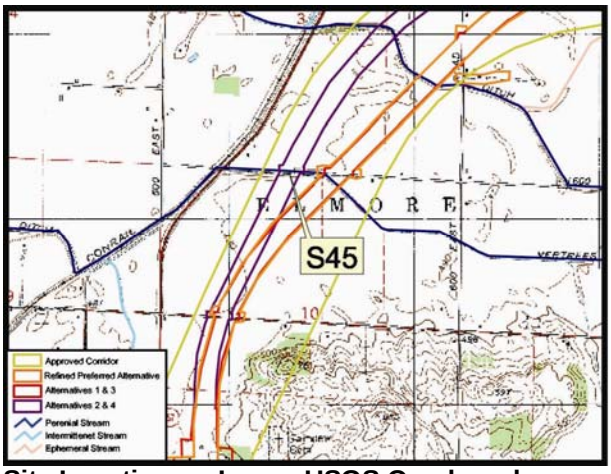
Photograph Taken Downstream

Photograph Taken Upstream

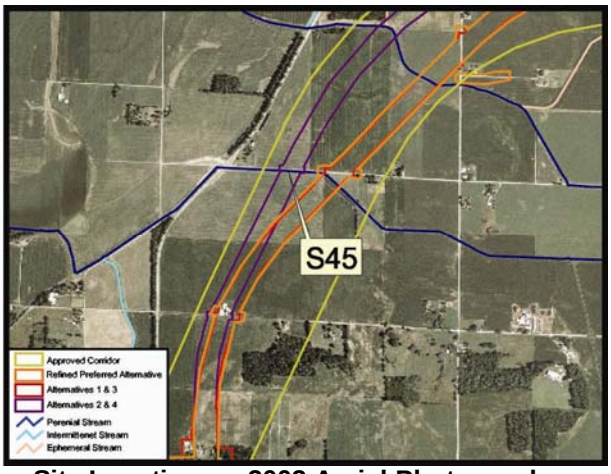
Photograph Taken Looking North

Photograph Taken Looking South

Stream Sec3-S45



Site Location on Lyons USGS Quadrangle



Site Location on 2003 Aerial Photograph

Aquatic Resource:	Stream	**USGS Quadrangle:**	Lyons
Stream Name:	Vertrees Ditch	**Section:**	10
Quarter:	NW	**Township:**	T5N
Range:	R6W	**IDEM 303(d) List:**	No
Watershed:	White River-Weaver/Vertrees	**OHWM Width:**	2.0 feet
Channelized:	Yes	**USCOE Jurisdiction:**	Yes
		IDEM Jurisdiction:	Yes

Wetland Sec3-S45

Stream Name	Length of Impact	Area Impacted	Alternative	Stream Habitat Assessment
Vertrees Ditch	433.4 feet	0.020 acres	2 and 4	QHEI 34 / Mod Warm Water

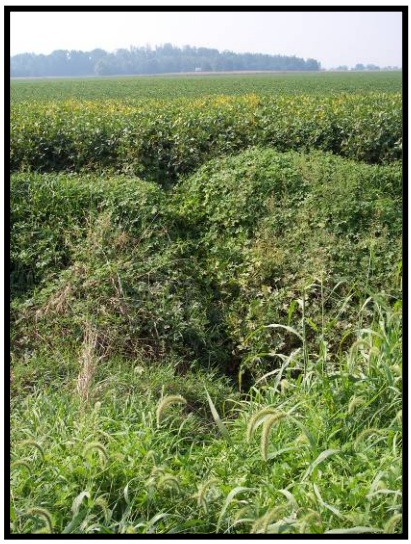
Description of Potential Impact: Alternatives 2 and 4 will impact approximately 433.4 linear feet of this stream. The area of impact to Vertrees Ditch below the ordinary high water mark (OHWM) is 0.020 acres for Alternatives 2 and 4. Alternatives 1, 3, and the Refined Preferred Alternative impact the stream to the east and are documented in Sec3-S46. Vertrees Ditch is identified as a legal drain in Daviess County and is maintained in the area of the proposed Alternatives 2 and 4 crossings. The stream flows west to the White River. The substrate is predominately sand and the banks contain old field vegetation. Daviess County Road 1600 North exists beyond the north bank and row crops exist beyond the south bank. There is no riparian corridor in the area where Alternatives 2 and 4 cross this stream. Photographs taken in the area where the proposed Alternatives 2 and 4 cross Vertrees Ditch are on the back of this form.

Stream Sec3-S45

Photograph Taken Upstream

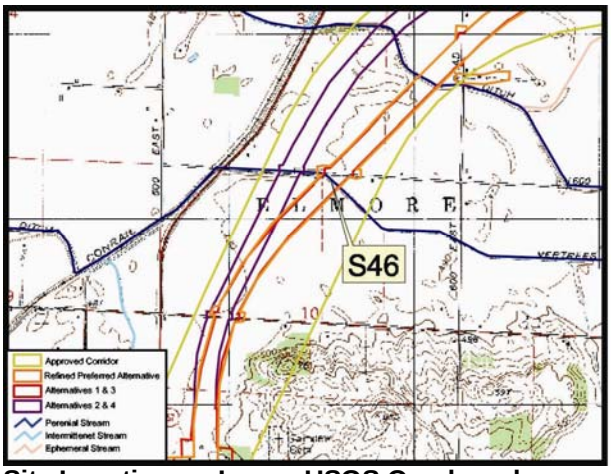
Photograph Taken Downstream

Photograph Taken Looking North

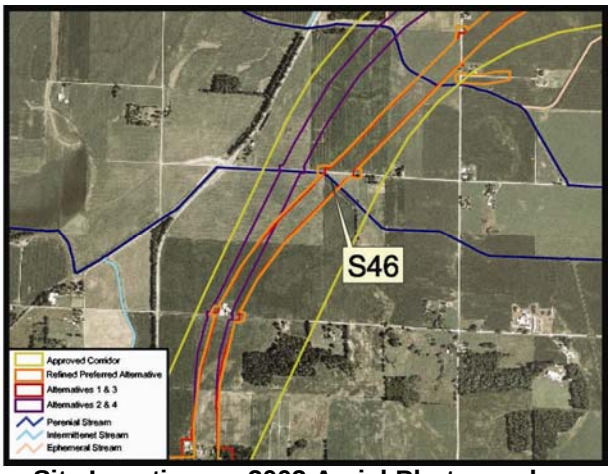


Photograph Taken Looking South

Stream Sec3-S46



Site Location on Lyons USGS Quadrangle



Site Location on 2003 Aerial Photograph

Aquatic Resource:	Stream	**USGS Quadrangle:**	Lyons
Stream Name:	Vertrees Ditch	**Section:**	10
Quarter:	NE	**Township:**	T5N
Range:	R6W	**IDEM 303(d) List:**	No
Watershed:	White River-Weaver/Vertrees	**OHWM Width:**	3.6 feet
Channelized:	Yes	**USCOE Jurisdiction:**	Yes
		IDEM Jurisdiction:	Yes

Stream Sec3-S46

Stream Name	Length of Impact	Area Impacted	Alternative	Stream Habitat Assessment
Vertrees Ditch	355.2 feet	0.029 acres	1 and 3	QHEI 44 / Mod Warm Water
Vertrees Ditch	484.9 feet	0.040 acres	Refined Preferred	QHEI 44 / Mod Warm Water

Description of Potential Impact: Alternatives 1 and 3 will impact approximately 355.2 linear feet of this stream. The area of impact to Vertrees Ditch below the ordinary high water mark (OHWM) is 0.029 acres for Alternatives 1 and 3. The Refined Preferred Alternative will impact approximately 484.9 linear feet and 0.040 acres below the OHWM. Alternatives 2 and 4 impact the stream to the west and are documented in Sec3-S45. Vertrees Ditch is identified as a legal drain in Daviess County and is maintained in the area of the proposed Alternatives 1 and 3 crossings. The stream flows west to the White River. The substrate is predominately sand and the banks contain old field vegetation. Row crops exist beyond both banks. There is no riparian corridor in the area where the alternatives cross this stream. Photographs taken in the area where the proposed Alternatives 1 and 3 cross Vertrees Ditch are on the back of this form.

Stream Sec3-S46

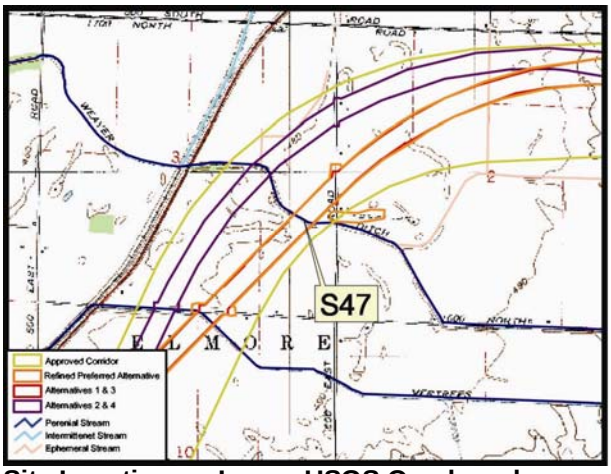
Photograph Taken Upstream

Photograph Taken Downstream

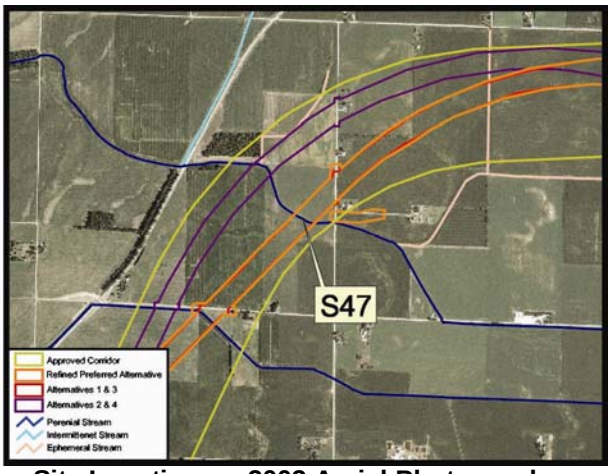
Photograph Taken Looking North

Photograph Taken Looking South

Stream Sec3-S47



Site Location on Lyons USGS Quadrangle



Site Location on 2003 Aerial Photograph

Aquatic Resource:	Stream	**USGS Quadrangle:**	Lyons
Stream Name:	Weaver Ditch	**Section:**	3
Quarter:	SE	**Township:**	T5N
Range:	R6W	**IDEM 303(d) List:**	No
Watershed:	White River-Weaver/Vertrees	**OHWM Width:**	3.9 feet
Channelized:	Yes	**USCOE Jurisdiction:**	Yes
		IDEM Jurisdiction:	Yes

Stream Sec3-S47

Stream Name	Length of Impact	Area Impacted	Alternative	Stream Habitat Assessment
Weaver Ditch	371.8 feet	0.033 acres	1 and 3	QHEI 44 / Mod Warm Water
Weaver Ditch	388.4 feet	0.035 acres	Refined Preferred	QHEI 44 / Mod Warm Water

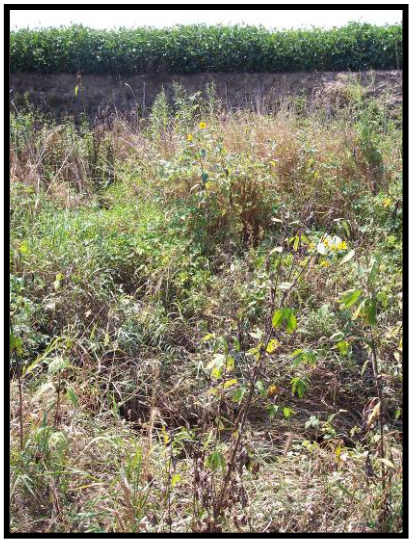
Description of Potential Impact: Alternatives 1 and 3 will impact approximately 371.8 linear feet of this stream. The area of impact to Weaver Ditch below the ordinary high water mark (OHWM) is 0.033 acres for Alternatives 1 and 3. The Refined Preferred Alternative will impact approximately 388.4 linear feet and 0.035 acres below the OHWM. Alternatives 2 and 4 impact the stream to the northwest and are documented in Sec3-S48. Weaver Ditch is identified as a legal drain in Daviess County and is maintained in the area of the proposed Alternatives 1 and 3 crossings. The stream flows west to the White River. The substrate is predominately sand and the banks contain old field vegetation. Row crops exist beyond both banks. There is no riparian corridor in the area where the alternatives cross this stream. Photographs taken in the area where the proposed Alternatives 1 and 3 cross Weaver Ditch are on the back of this form.

Stream Sec3-S47

Photograph Taken Upstream

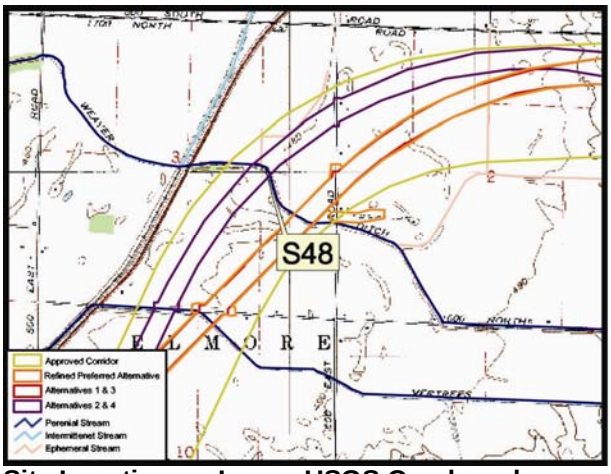
Photograph Taken Downstream

Photograph Taken Looking North

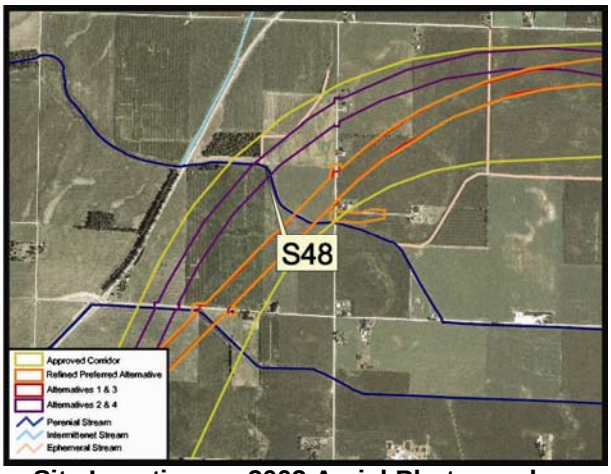


Photograph Taken Looking South

Stream Sec3-S48



Site Location on Lyons USGS Quadrangle



Site Location on 2003 Aerial Photograph

Aquatic Resource:	Stream	**USGS Quadrangle:**	Lyons
Stream Name:	Weaver Ditch	**Section:**	3
Quarter:	NE/SE	**Township:**	T5N
Range:	R6W	**IDEM 303(d) List:**	No
Watershed:	White River-Weaver/Vertrees	**OHWM Width:**	5.6 feet
Channelized:	Yes	**USCOE Jurisdiction:**	Yes
		IDEM Jurisdiction:	Yes

Stream Sec3-S48

Stream Name	Length of Impact	Area Impacted	Alternative	Stream Habitat Assessment
Weaver Ditch	396.4 feet	0.051 acres	2 and 4	QHEI 47 / Mod Warm Water

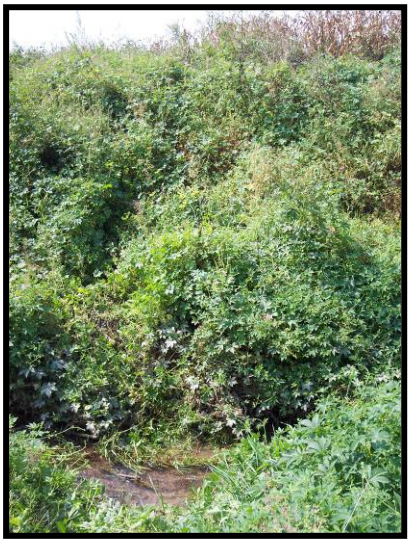
Description of Potential Impact: Alternatives 2 and 4 will impact approximately 396.4 linear feet of this stream. The area of impact to Weaver Ditch below the ordinary high water mark (OHWM) is 0.051 acres for Alternatives 2 and 4. Alternatives 1 and 3 impact the stream to the southeast and are documented in Sec3-S47. Weaver Ditch is identified as a legal drain in Daviess County and is maintained in the area of the proposed Alternatives 2 and 4 crossings. The stream flows west to the White River. The substrate is predominately sand and the banks contain old field vegetation. Row crops exist beyond both banks. There is no riparian corridor in the area where Alternatives 2 and 4 cross this stream. Photographs taken in the area where the proposed Alternatives 2 and 4 cross Weaver Ditch are on the back of this form.

Stream Sec3-S48

Photograph Taken Downstream

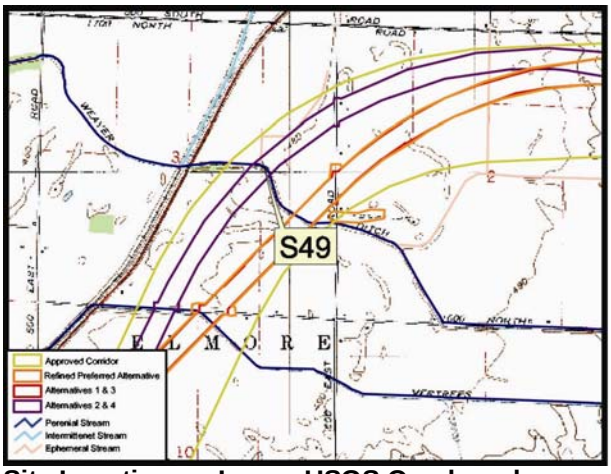
Photograph Taken Upstream

Photograph Taken Looking North

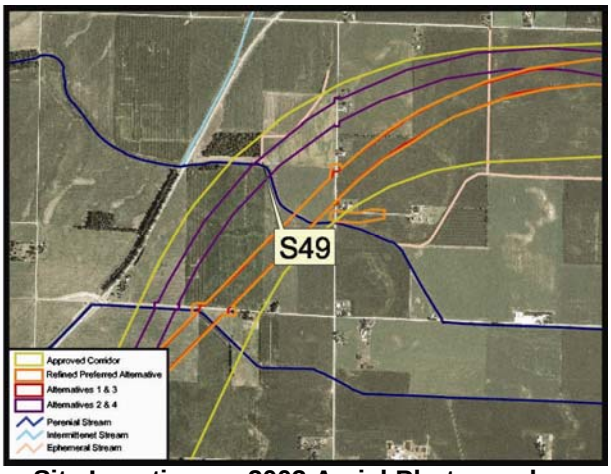


Photograph Taken Looking South

Stream Sec3-S49



Site Location on Lyons USGS Quadrangle



Site Location on 2003 Aerial Photograph

Aquatic Resource:	Stream	**USGS Quadrangle:**	Lyons
Stream Name:	Unnamed	**Section:**	3
Quarter:	NE	**Township:**	T5N
Range:	R6W	**IDEM 303(d) List:**	No
Watershed:	White River-Weaver/Vertrees	**OHWM Width:**	3.9 feet
Channelized:	Yes	**USCOE Jurisdiction:**	Yes
		IDEM Jurisdiction:	Yes

Stream Sec3-S49

Stream Name	Length of Impact	Area Impacted	Alternative	Stream Habitat Assessment
Tributary of Weaver Ditch	283.2 feet	0.025 acres	2 and 4	HHEI 29 / Modified Class I

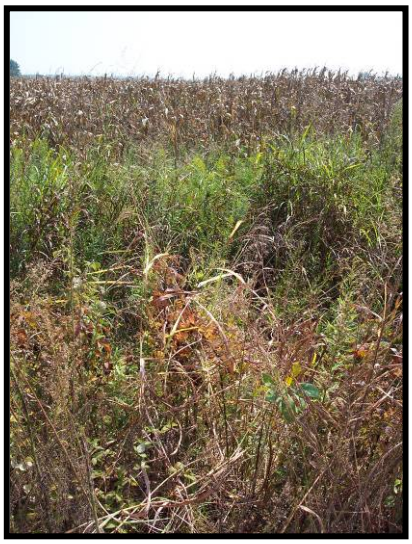
Description of Potential Impact: Alternatives 2 and 4 will impact approximately 283.2 linear feet of this stream. The area of impact below the ordinary high water mark (OHWM) is 0.025 acres for Alternatives 2 and 4. Alternatives 1 and 3 have no impact to this stream. This ephemeral stream flows south and discharges into Weaver Ditch. The substrate is predominately sand and the banks consist of old field vegetation. Row crops exist beyond the east bank and a recently cleared woodlot exists to the west. There is no riparian corridor in the area where Alternatives 2 and 4 cross this creek. Photographs taken in the area where the proposed Alternatives 2 and 4 cross this tributary of Weaver Ditch are on the back of this form.

Stream Sec3-S49

Photograph Taken Upstream

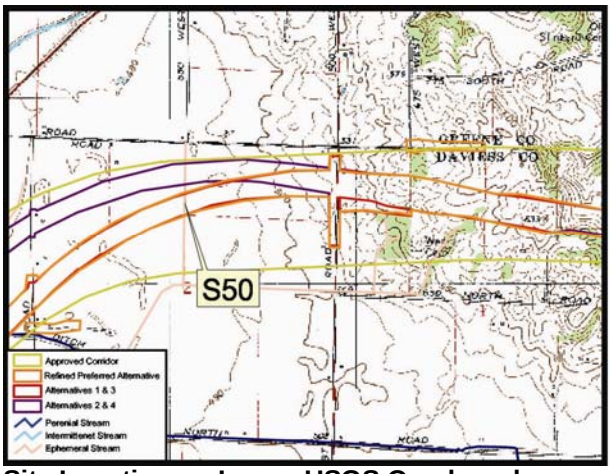
Photograph Taken Downstream

Photograph Taken Looking West

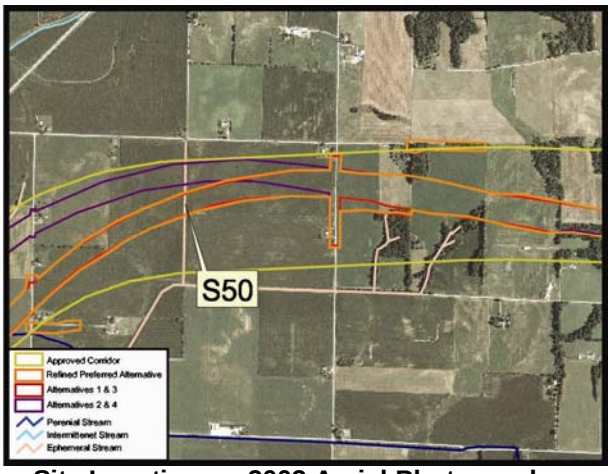


Photograph Taken Looking East

Stream Sec3-S50



Site Location on Lyons USGS Quadrangle



Site Location on 2003 Aerial Photograph

Aquatic Resource:	Stream	**USGS Quadrangle:**	Lyons
Stream Name:	Unnamed	**Section:**	2
Quarter:	NE	**Township:**	T5N
Range:	R6W	**IDEM 303(d) List:**	No
Watershed:	White River-Weaver/Vertrees	**OHWM Width:**	3.5 feet
Channelized:	Yes	**USCOE Jurisdiction:**	Yes
		IDEM Jurisdiction:	Yes

Stream Sec3-S50

Stream Name	Length of Impact	Area Impacted	Alternative	Stream Habitat Assessment
Tributary of Weaver Ditch	381.9 feet	0.031 acres	1 and 3	HHEI 39 / Modified Class II
Tributary of Weaver Ditch	421.1 feet	0.034 acres	Refined Preferred	HHEI 39 / Modified Class II

Description of Potential Impact: Alternatives 1 and 3 will impact approximately 381.9 linear feet of this stream. The area of impact below the ordinary high water mark (OHWM) is 0.031 acres for Alternatives 1 and 3. The Refined Preferred Alternative will impact approximately 421.1 linear feet and 0.034 acres below the OHWM. Alternatives 2 and 4 impact the stream to the north and are documented as Sec3-S51. This ephemeral stream flows south and then southwest and discharges into Weaver Ditch. The substrate is predominately sand and the banks and streambed contain some wetland vegetation. Row crops exist beyond the banks. There is no riparian corridor in the area the alternatives cross this stream. Photographs taken in the area where the proposed Alternatives 1 and 3 cross this tributary of Weaver Ditch are on the back of this form.

Stream Sec3-S50

Photograph Taken Upstream

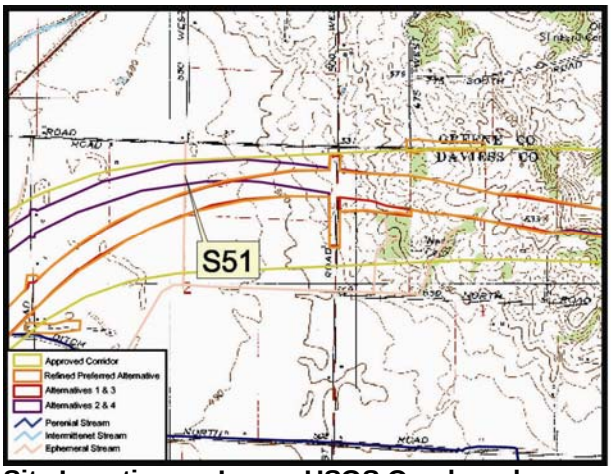
Photograph Taken Downstream

Photograph Taken Looking East

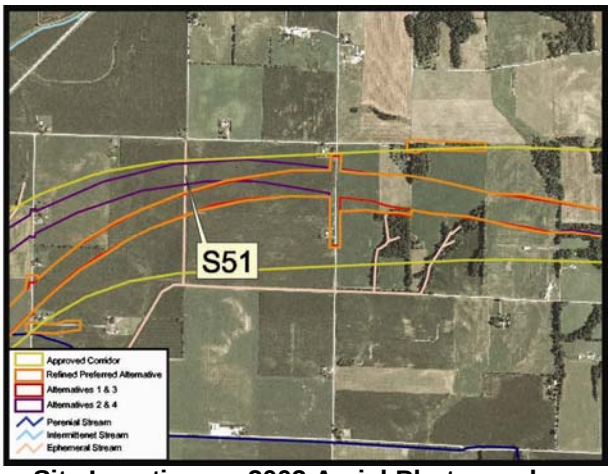
Photograph Taken Looking West

Pictures for S50 were taken at the S51 stream crossing. Both locations displayed the same properties.

Stream Sec3-S51



Site Location on Lyons USGS Quadrangle



Site Location on 2003 Aerial Photograph

Aquatic Resource:	Stream	**USGS Quadrangle:**	Lyons
Stream Name:	Unnamed	**Section:**	2
Quarter:	NE	**Township:**	T5N
Range:	R6W	**IDEM 303(d) List:**	No
Watershed:	White River-Weaver/Vertrees	**OHWM Width:**	3.5 feet
Channelized:	Yes	**USCOE Jurisdiction:**	Yes
		IDEM Jurisdiction:	Yes

Stream Sec3-S51				
Stream Name	**Length of Impact**	**Area Impacted**	**Alternative**	**Stream Habitat Assessment**
Tributary of Weaver Ditch	369.3 feet	0.030 acres	2 and 4	HHEI 39 / Modified Class II

Description of Potential Impact: Alternatives 2 and 4 will impact approximately 369.3 linear feet of this stream. The area of impact below the ordinary high water mark (OHWM) is 0.030 acres for Alternatives 2 and 4. Alternatives 1 and 3 impact the stream to the south and are documented as Sec3-S50. This ephemeral stream flows south and then southwest and discharges into Weaver Ditch. The substrate is predominately sand and the banks and streambed contain some wetland vegetation. Row crops exist beyond the banks. There is no riparian corridor in the area where Alternatives 2 and 4 cross this stream. Photographs taken in the area where the proposed Alternatives 2 and 4 cross this tributary of Weaver Ditch are on the back of this form.

Stream Sec3-S51

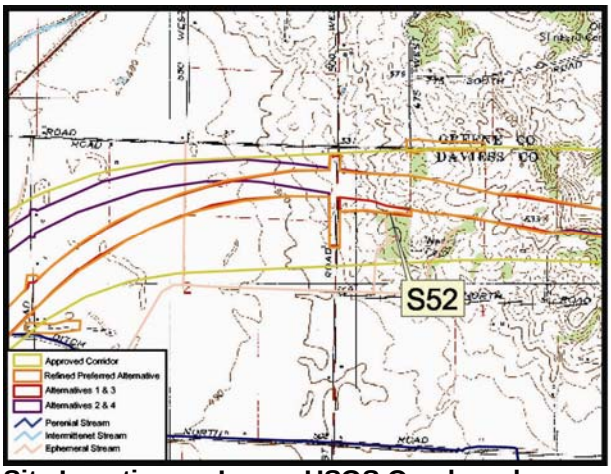
Photograph Taken Upstream

Photograph Taken Downstream

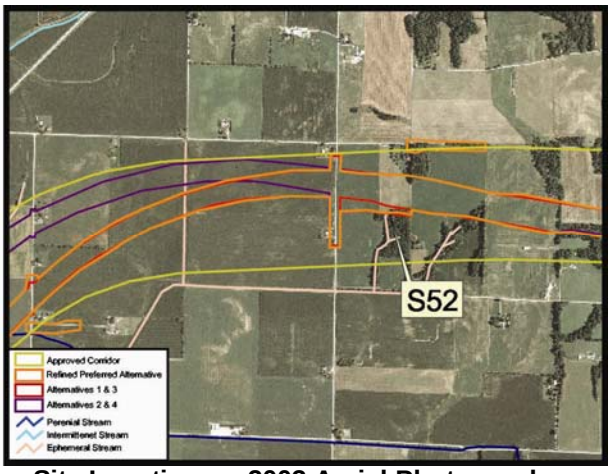
Photograph Taken Looking East

Photograph Taken Looking West

Stream Sec3-S52



Site Location on Lyons USGS Quadrangle



Site Location on 2003 Aerial Photograph

Aquatic Resource:	Stream	**USGS Quadrangle:**	Lyons
Stream Name:	Unnamed	**Section:**	1
Quarter:	NW	**Township:**	T5N
Range:	R6W	**IDEM 303(d) List:**	No
Watershed:	White River-Weaver/Vertrees	**OHWM Width:**	2.5 feet
Channelized:	No	**USCOE Jurisdiction:**	Yes
		IDEM Jurisdiction:	Yes

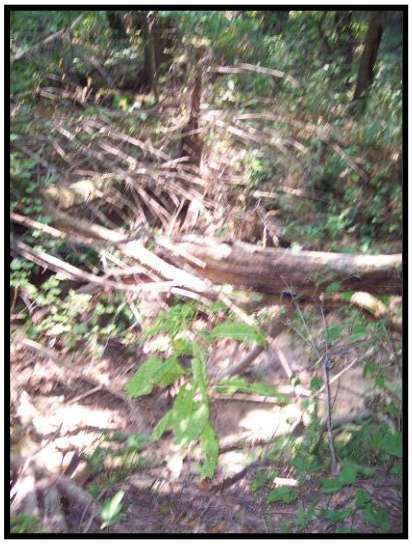
Stream Sec3-S52

Stream Name	Length of Impact	Area Impacted	Alternative	Stream Habitat Assessment
Tributary of Weaver Ditch	134.8 feet	0.008 acres	1, 2, 3, 4	HHEI 17 / Class I PHWH

Description of Potential Impact: Alternatives 1, 2, 3 and 4 will impacts approximately 134.8 linear feet of this stream. The area of impact below the ordinary high water mark (OHWM) is 0.008 acres for Alternatives 1, 2, 3 and 4. This ephemeral stream flows west through a woodlot to a roadside ditch along Daviess County Road 1650 North, then west to Weaver Ditch. The substrate is sand and leaf pack and the banks are dirt and upland forest vegetation. A riparian corridor exists for this stream. Its width to the north is approximately 40 feet. Its width to the south extends through the woodlot and is greater than 100 feet. Photographs taken in the area where the proposed Alternatives 1, 2, 3 and 4 cross this stream are on the back of this form.

Stream Sec3-S52

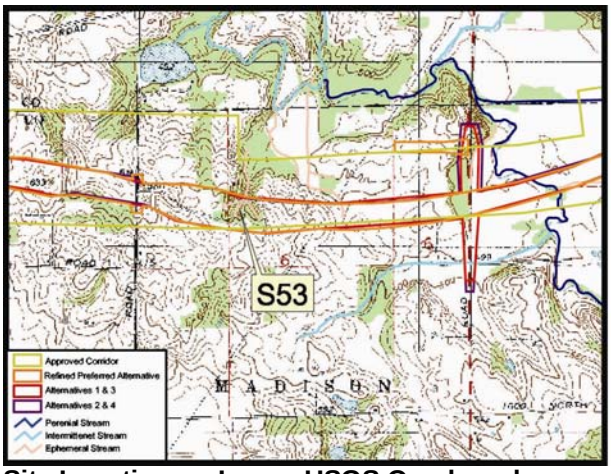
Photograph Taken Looking East



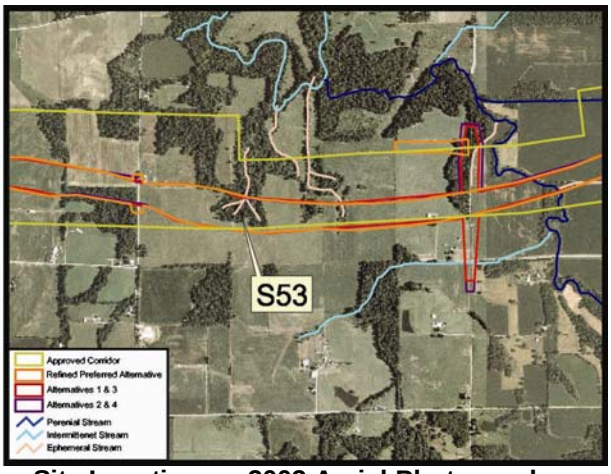
Photograph Taken Looking West

Photograph Taken Downstream

Stream Sec3-S53



Site Location on Lyons USGS Quadrangle



Site Location on 2003 Aerial Photograph

Aquatic Resource:	Stream	**USGS Quadrangle:**	Lyons
Stream Name:	Unnamed	**Section:**	6
Quarter:	NW	**Township:**	T5N
Range:	R5W	**IDEM 303(d) List:**	No
Watershed:	First Creek-Rocky Branch	**OHWM Width:**	3 feet
Channelized:	No	**USCOE Jurisdiction:**	Yes
		IDEM Jurisdiction:	Yes

Stream Sec3-S53

Stream Name	Length of Impact	Area Impacted	Alternative	Stream Habitat Assessment
Tributary of First Creek	1,260.2 feet	0.086 acres	2, 4	HHEI 19 / Modified Class I
Tributary of First Creek	1,279.6 feet	0.088 acres	1, 3	HHEI 19 / Modified Class I
Tributary of First Creek	1,298.8 feet	0.089 acres	Refined Preferred	HHEI 19 / Modified Class I

Description of Potential Impact: Alternatives 1 and 3 will impact approximately 1,279.6 linear feet of this stream. The area of impact below the ordinary high water mark (OHWM) is 0.088 acres for Alternatives 1 and 3. Alternatives 2 and 4 will impact approximately 1,260.2 linear feet and 0.086 acres below the OHWM. The Refined Preferred Alternative will impact approximately 1298.8 linear feet and 0.089 acres below the OHWM. This stream begins in three steep ravines and flows north until it loses a defined bed and bank to an alluvial sand deposit. The substrate is sand and the banks are dirt and upland forest vegetation. The average riparian width is approximately 60 feet. The ravines contain large amounts of trash. Photographs taken in the area where the proposed Alternatives 1, 2, 3 and 4 cross this stream system are on the back of this form.

Stream Sec3-S53

Photograph Taken Upstream

Photograph Taken Downstream

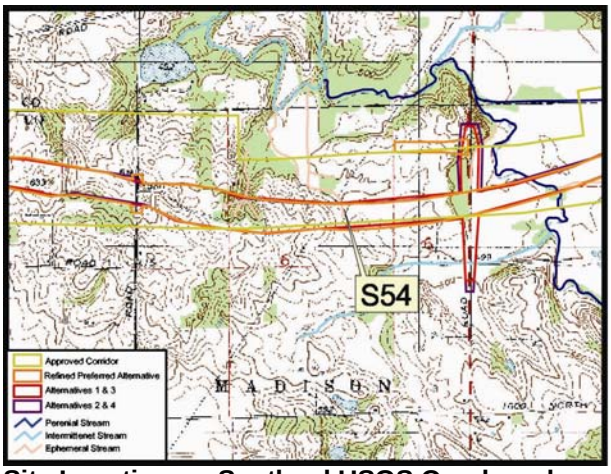
Photograph Taken Looking East

Photograph Taken Looking West

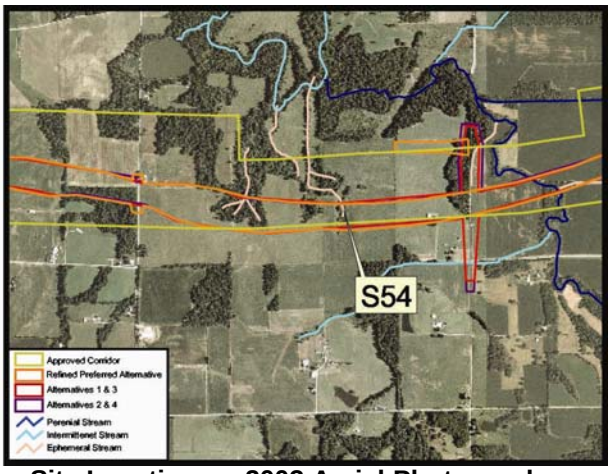
Photograph Taken Downstream (West finger)

Photograph Taken Upstream (West Finger)

Stream Sec3-S54



Site Location on Scotland USGS Quadrangle



Site Location on 2003 Aerial Photograph

Aquatic Resource:	Stream	**USGS Quadrangle:**	Scotland
Stream Name:	Unnamed	**Section:**	6
Quarter:	NE	**Township:**	T5N
Range:	R5W	**IDEM 303(d) List:**	No
Watershed:	First Creek-Rocky Branch	**OHWM Width:**	3.0 feet
Channelized:	No	**USCOE Jurisdiction:**	Yes
		IDEM Jurisdiction:	Yes

Stream Sec3-S54

Stream Name	Length of Impact	Area Impacted	Alternative	Stream Habitat Assessment
Tributary of First Creek	256.0 feet	0.018 acres	1, 3	HHEI 22 / Class I PHWH
Tributary of First Creek	249.7 feet	0.018 acres	2, 4	HHEI 22 / Class I PHWH
Tributary of First Creek	244.3 feet	0.016 acres	Refined Preferred	HHEI 22 / Class I PHWH

Description of Potential Impact: Alternatives 1 and 3 will impact approximately 256.0 linear feet of this stream. The area of impact below the ordinary high water mark (OHWM) is 0.018 acres for Alternatives 1, and 3. Alternatives 2 and 4 will impact approximately 249.7 linear feet of this stream. The area of impact below the OHWM is 0.018 acres for Alternatives 2 and 4.The Refined Preferred Alternative will impact approximately 244.3 linear feet and 0.016 acres below the OHWM. This ephemeral stream flows north through a wetland complex to First Creek. The substrate is predominately silt and the banks contain wetland vegetation. The riparian corridor is approximately 50 feet on each side of the stream. Photographs taken in the area where the proposed Alternatives 1, 2, 3 and 4 cross this tributary of First Creek are on the back of this form.

Stream Sec3-S54

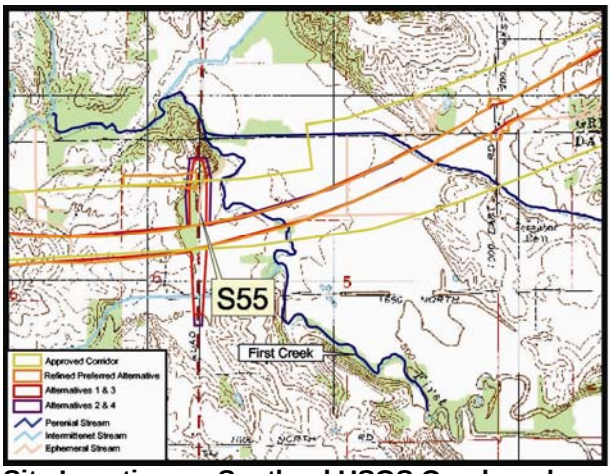
Photograph Taken Upstream

Photograph Taken Downstream

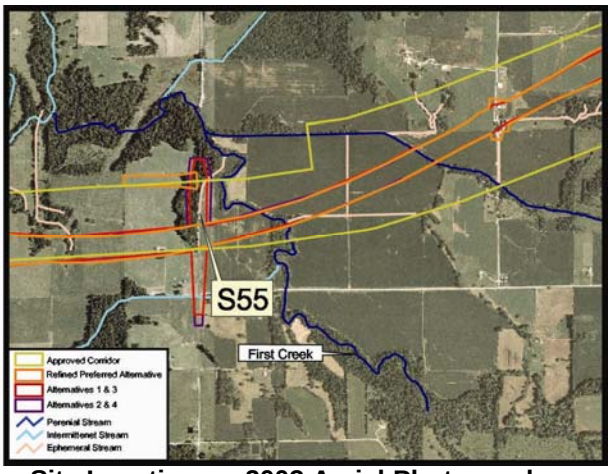
Photograph Taken Looking North

Photograph Taken Looking South

Stream Sec3-S55



Site Location on Scotland USGS Quadrangle



Site Location on 2003 Aerial Photograph

Aquatic Resource:	Stream	**USGS Quadrangle:**	Scotland
Stream Name:	Unnamed	**Section:**	6
Quarter:	NE	**Township:**	T5N
Range:	R5W	**IDEM 303(d) List:**	No
Watershed:	First Creek-Rocky Branch	**OHWM Width:**	2 feet
Channelized:	No	**USCOE Jurisdiction:**	Yes
		IDEM Jurisdiction:	Yes

Stream Sec3-S55

Stream Name	Length of Impact	Area Impacted	Alternative	Stream Habitat Assessment
Tributary of First Creek	745.3 feet	0.034 acres	1 and 3	HHEI 20 / Class I PHWH
Tributary of First Creek	825.9 feet	0.038 acres	2 and 4	HHEI 20 / Class I PHWH

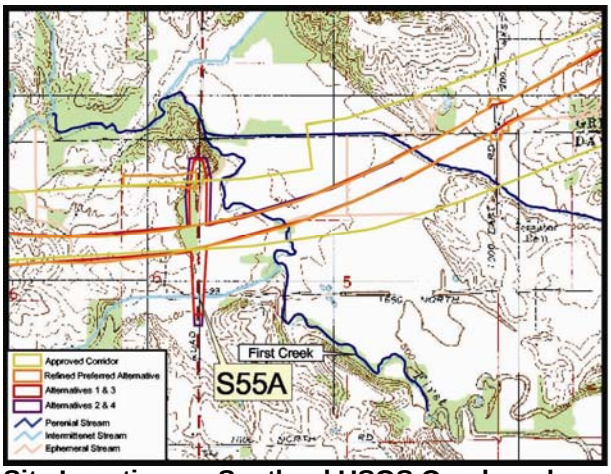
Description of Potential Impact: The Daviess County Road 900 East grade separation associated with Alternatives 1 and 3 will impact approximately 745.3 linear feet of this stream. Alternatives 2 and 4 will impact approximately 825.9 linear feet of this stream. The area of impact below the ordinary high water mark (OHWM) is 0.034 acres for Alternatives 1 and 3 and 0.038 acres for Alternatives 2 and 4. This ephemeral stream begins in a seepage zone at the bottom of an east-facing slope in a forested wetland. It flows east until crossing Daviess County Road 900 East and then turns north in a roadside ditch and then northeast through a forested woodlot to First Creek. The substrate is silt and muck and the banks contain wetland forest vegetation. The average approximate riparian zone on the northwest side of the stream is 200 feet. The average approximate riparian zone on the southeast side of the stream is 30 feet. Photographs taken in the area where the proposed Alternatives 1, 2, 3 and 4 cross this tributary of First Creek are on the back of this form.

Stream Sec3-S55

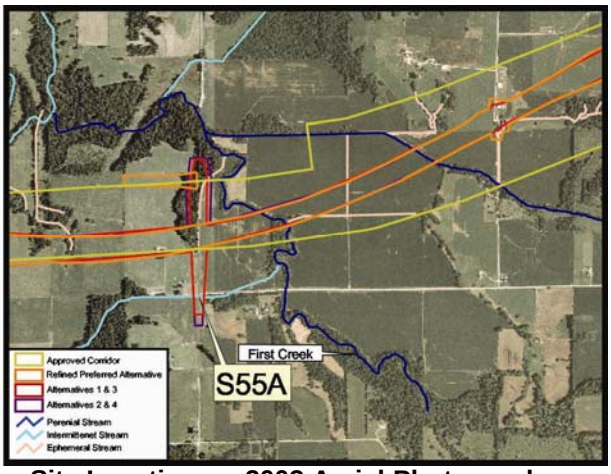
Photograph Taken Downstream along Road

Photograph Taken Upstream in Wetland Forest

Stream Sec3-S55A



Site Location on Scotland USGS Quadrangle



Site Location on 2003 Aerial Photograph

Aquatic Resource:	Stream	**USGS Quadrangle:**	Scotland
Stream Name:	Unnamed	**Section:**	6
Quarter:	NE	**Township:**	T5N
Range:	R5W	**IDEM 303(d) List:**	No
Watershed:	First Creek-Rocky Branch	**OHWM Width:**	2 feet
Channelized:	No	**USCOE Jurisdiction:**	Yes
		IDEM Jurisdiction:	Yes

Stream Sec3-S55A

Stream Name	Length of Impact	Area Impacted	Alternative	Stream Habitat Assessment
Tributary of First Creek	189.6 feet	0.009 acres	1, 2, 3, 4	HHEI 18 / Modified Class I

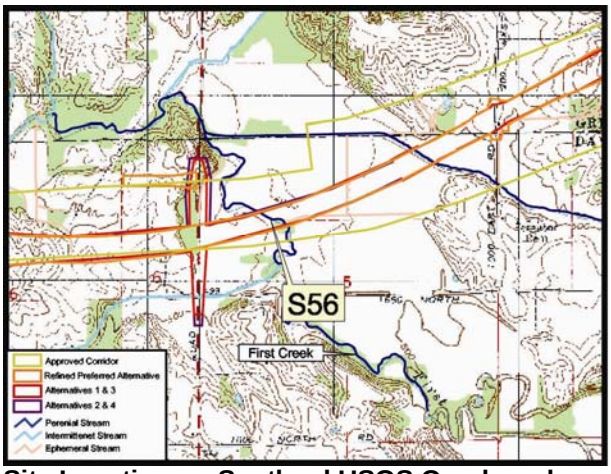
Description of Potential Impact: The Daviess County Road 900 East grade separation associated with Alternatives 1, 2, 3 and 4 will impact approximately 189.6 linear feet of this stream. The area of impact below the ordinary high water mark (OHWM) is 0.009 acres for Alternatives 1, 2, 3 and 4. This intermittent stream flows east and discharges into First Creek. The substrate is predominately silt with some leaf pack and the banks contain old field vegetation. This stream becomes a roadside ditch along Daviess County Road 1650 North east of Daviess County Road 900 East. There is no riparian corridor in the area where Alternatives 1, 2, 3 and 4 cross this creek. Photographs taken in the area where the proposed Alternatives 1, 2, 3 and 4 cross this tributary of First Creek are on the back of this form.

Stream Sec3-S55A

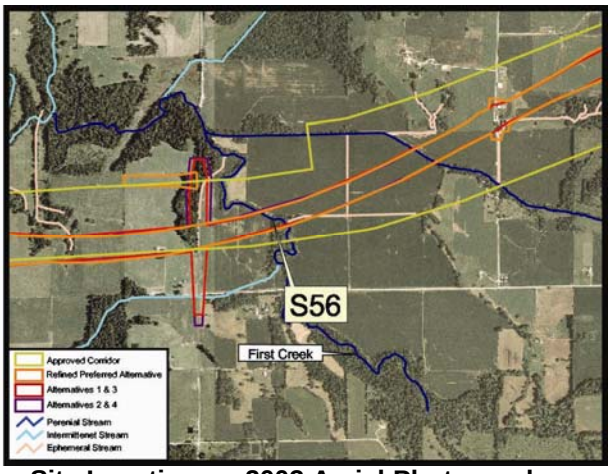
Photograph Taken Upstream

Photograph Taken Downstream

Stream Sec3-S56



Site Location on Scotland USGS Quadrangle



Site Location on 2003 Aerial Photograph

Aquatic Resource:	Stream	**USGS Quadrangle:**	Scotland
Stream Name:	First Creek	**Section:**	5
Quarter:	NW	**Township:**	T5N
Range:	R5W	**IDEM 303(d) List:**	No
Watershed:	First Creek-Rocky Branch	**OHWM Width:**	30.8 feet
Channelized:	No	**USCOE Jurisdiction:**	Yes
		IDEM Jurisdiction:	Yes

Stream Sec3-S56

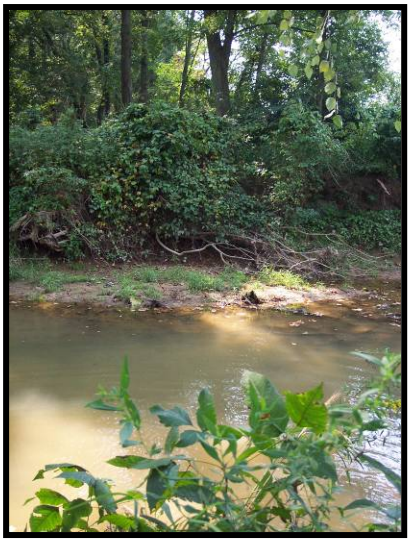
Stream Name	Length of Impact	Area Impacted	Alternative	Stream Habitat Assessment
First Creek	539.7 feet	0.382 acres	2, 4	QHEI 58 / Warm Water
First Creek	598.8 feet	0.423 acres	1, 3	QHEI 58 / Warm Water
First Creek	594.6 feet	0.420 acres	Refined Preferred	QHEI 58 / Warm Water

Description of Potential Impact: Alternatives 1 and 3 will impact approximately 539.7 linear feet of this stream and 0.423 acres below the OHWM. Alternatives 2 and 4 will impact approximately 598.8 linear feet of this stream and the Refined Preferred Alternative 1 will impact approximately 594.6 linear feet. The area of impact to First Creek below the OHWM is 0.382 acres for Alternatives 2 and 4 and 0.420 acres for the Refined Preferred Alternative 1. First Creek flows northwest to the White River. The substrate is predominately sand. The riparian corridor is approximately 40 feet wide on both sides of the stream. The riparian zone widens when the stream flows through a woodlot on the south side of the alternatives. Row crops exist beyond the riparian zone. Photographs taken in the area where the proposed Alternatives 1, 2, 3 and 4 cross First Creek are on the back of this form.

Stream Sec3-S56

Photograph Taken Upstream

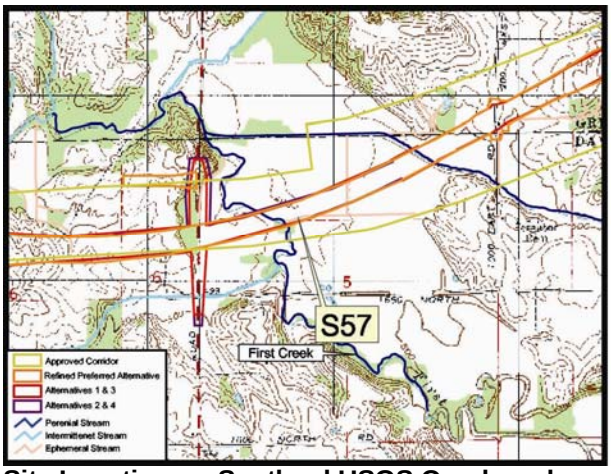
Photograph Taken Downstream



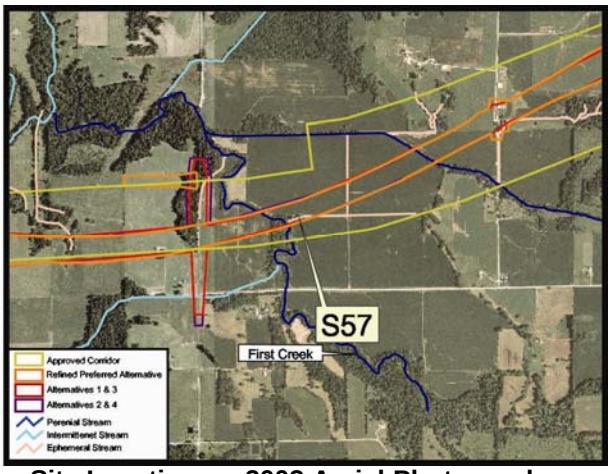
Photograph Taken Looking South

Photograph Taken Looking North

Stream Sec-S57



Site Location on Scotland USGS Quadrangle



Site Location on 2003 Aerial Photograph

Aquatic Resource:	Stream	**USGS Quadrangle:**	Scotland
Stream Name:	Unnamed	**Section:**	5
Quarter:	NW border	**Township:**	T5N
Range:	R5W	**IDEM 303(d) List:**	No
Watershed:	First Creek-Rocky Branch	**OHWM Width:**	2.5 feet
Channelized:	Yes	**USCOE Jurisdiction:**	Yes
		IDEM Jurisdiction:	Yes

Stream Sec3-S57

Stream Name	Length of Impact	Area Impacted	Alternative	Stream Habitat Assessment
Tributary of First Creek	474.8 feet	0.027 acres	1, 2, 3, 4	HHEI 14 / Modified Class I
Tributary of First Creek	503.0 feet	0.029 acres	Refined Preferred	HHEI 14 / Modified Class I

Description of Potential Impact: Alternatives 1, 2, 3 and 4 will impacts approximately 474.8 linear feet of this stream. The area of impact below the ordinary high water mark (OHWM) is 0.027 acres for Alternatives 1, 2, 3 and 4. The Refined Preferred Alternative will impact approximately 503.0 linear feet and 0.029 acres below the OHWM. This ephemeral stream flows west and discharges into First Creek. The substrate is silt and leaf pack and the banks are grassy. The alternatives impact this stream as it enters a woodlot. Half of the area impacted is bordered by row crops. The western half is bordered on the south by row crops and on the north by a 40 feet wide riparian zone. Photographs taken in the area where the proposed Alternatives 1, 2, 3 and 4 cross this tributary of First Creek are on the back of this form.

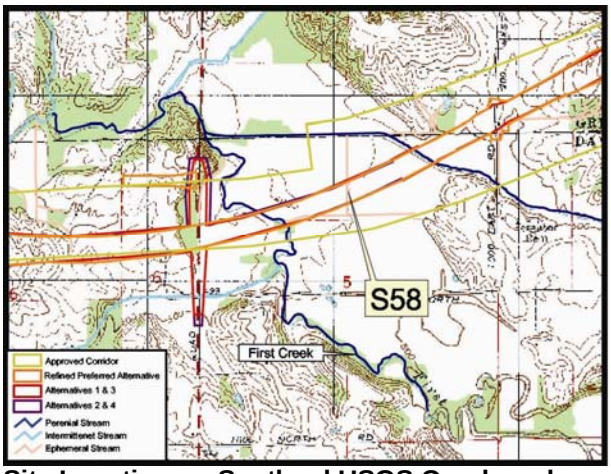
Stream Sec-S57

Photograph Taken Looking North

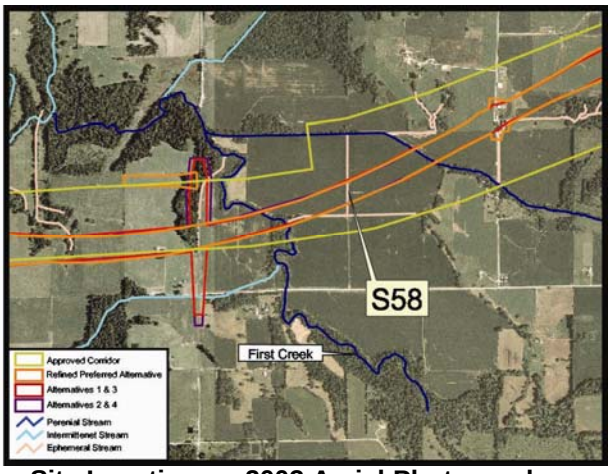
Photograph Taken Looking South

Photograph Taken Downstream

Stream Sec-S58



Site Location on Scotland USGS Quadrangle



Site Location on 2003 Aerial Photograph

Aquatic Resource:	Stream	**USGS Quadrangle:**	Scotland
Stream Name:	Unnamed	**Section:**	5
Quarter:	NW/NE border	**Township:**	T5N
Range:	R5W	**IDEM 303(d) List:**	No
Watershed:	First Creek-Rocky Branch	**OHWM Width:**	3.0 feet
Channelized:	Yes	**USCOE Jurisdiction:**	Yes
		IDEM Jurisdiction:	Yes

Stream Sec3-S58

Stream Name	Length of Impact	Area Impacted	Alternative	Stream Habitat Assessment
Tributary of First Creek	431.6 feet	0.030 acres	1, 3	HHEI 13 / Class I
Tributary of First Creek	379.5 feet	0.026 acres	2, 4	HHEI 13 / Class I
Tributary of First Creek	383.0 feet	0.026 acres	Refined Preferred	HHEI 13 / Class I

Description of Potential Impact: Alternatives 1 and 3 will impact approximately 431.6 linear feet of this stream. The area of impact below the ordinary high water mark (OHWM) is 0.030 acres for Alternatives 1, and 3. Alternatives 2 and 4 will impact approximately 379.5 linear feet and 0.026 acres below the OHWM. The Refined Preferred Alternative will impact approximately 383.0 linear feet and 0.026 acres below the OHWM. This stream flows south and then west to First Creek. The substrate is predominately leaf pack and the banks are grassy. Row crops exist beyond the banks. There is no riparian corridor in the area where the alternatives cross this stream. Photographs taken in the area where the proposed Alternatives 1, 2, 3 and 4 cross this stream are on the back of this form.

Stream Sec-S58

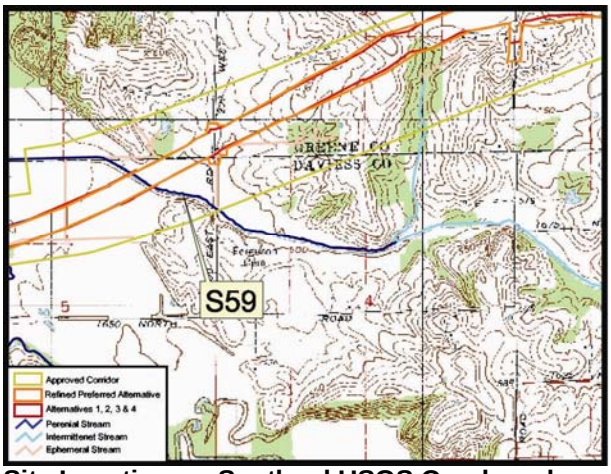
Photograph Taken Upstream

Photograph Taken Downstream

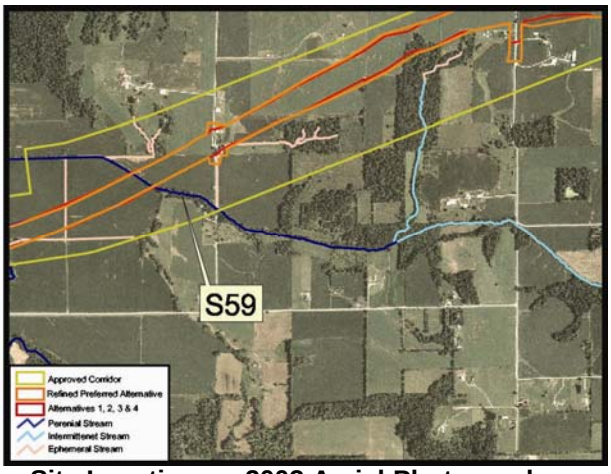
Photograph Taken Looking West

Photograph Taken Looking East

Stream Sec3-S59



Site Location on Scotland USGS Quadrangle



Site Location on 2003 Aerial Photograph

Aquatic Resource:	Stream	**USGS Quadrangle:**	Scotland
Stream Name:	Unnamed	**Section:**	5
Quarter:	NE	**Township:**	T5N
Range:	R5W	**IDEM 303(d) List:**	No
Watershed:	First Creek-Rocky Branch	**OHWM Width:**	4.6 feet
Channelized:	Yes	**USCOE Jurisdiction:**	Yes
		IDEM Jurisdiction:	Yes

Stream Sec3-S59

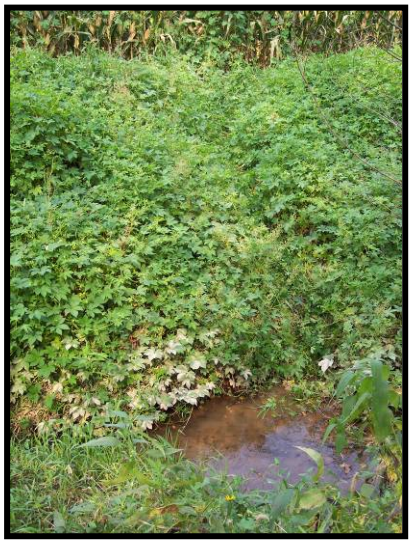
Stream Name	Length of Impact	Area Impacted	Alternative	Stream Habitat Assessment
Branch of First Creek	476.7 feet	0.050 acres	1, 2, 3, 4	QHEI 53 / Mod Warm Water
Branch of First Creek	430.8 feet	0.045 acres	Refined Preferred	QHEI 53 / Mod Warm Water

Description of Potential Impact: Alternatives 1, 2, 3 and 4 will impacts approximately 476.7 linear feet of this stream. The area of impact below the ordinary high water mark (OHWM) is 0.050 acres for Alternatives 1, 2, 3 and 4. The Refined Preferred Alternative will impact approximately 430.8 linear feet and 0.045 acres below the OHWM. This branch of First Creek flows west and discharges into First Creek. The substrate is predominately sand and the banks contain old field vegetation. Row crops exist beyond the north bank, and a 25 feet wide riparian zone exists on the south side of the stream. Photographs taken in the area where the proposed Alternatives 1, 2, 3 and 4 cross this branch of First Creek are on the back of this form.

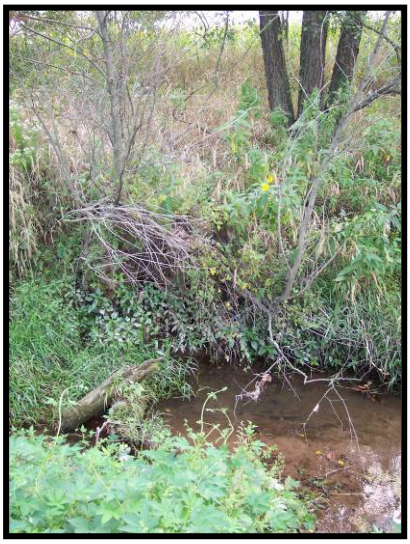
Stream Sec3-S59

Photograph Taken Downstream

Photograph Taken Upstream

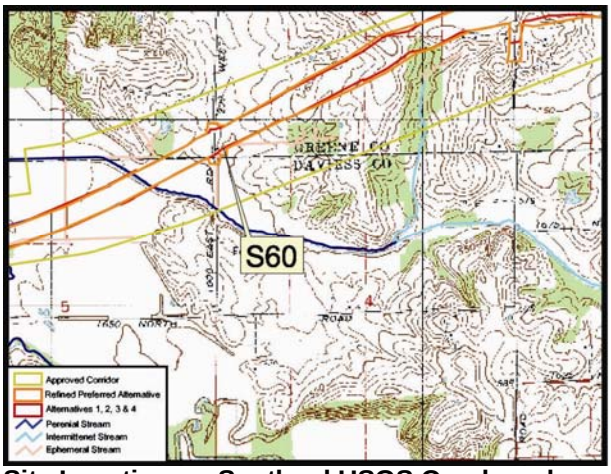


Photograph Taken Looking North

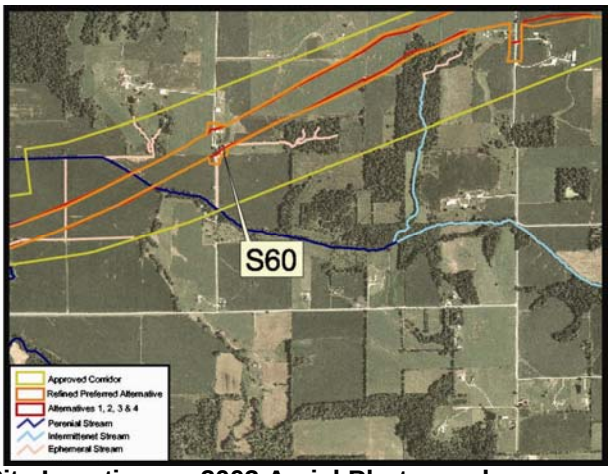


Photograph Taken Looking South

Stream Sec3-S60



Site Location on Scotland USGS Quadrangle



Site Location on 2003 Aerial Photograph

Aquatic Resource:	Stream	**USGS Quadrangle:**	Scotland
Stream Name:	Unnamed	**Section:**	33
Quarter:	SW	**Township:**	T6N
Range:	R5W	**IDEM 303(d) List:**	No
Watershed:	First Creek-Rocky Branch	**OHWM Width:**	3.9 feet
Channelized:	Yes	**USCOE Jurisdiction:**	Yes
		IDEM Jurisdiction:	Yes

Stream Sec3-S60

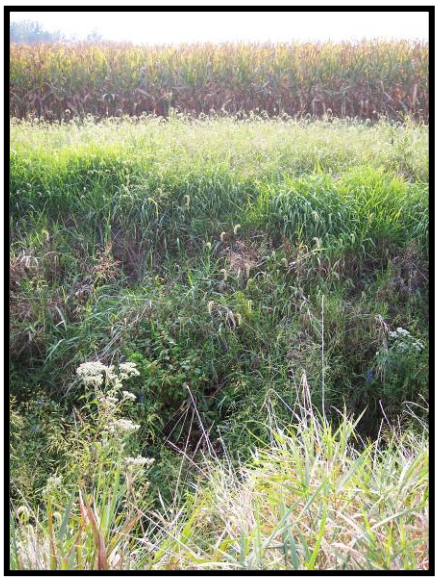
Stream Name	Length of Impact	Area Impacted	Alternative	Stream Habitat Assessment
Tributary of First Creek	141.1 feet	0.013 acres	1, 2, 3, 4	HHEI 26 / Modified Class I
Tributary of First Creek	594.9 feet	0.053 acres	Refined Preferred	HHEI 26 / Modified Class I

Description of Potential Impact: Alternatives 1, 2, 3 and 4 will impact approximately 141.1 linear feet of this stream. The area of impact below the ordinary high water mark (OHWM) is 0.013 acres for Alternatives 1, 2, 3 and 4. The Refined Preferred Alternative will impact approximately 594.9 linear feet and 0.053 acres below the OHWM. This ephemeral stream flows south to a perennial tributary of First Creek. The substrate is sand and some leaf pack and the banks contain old field vegetation. Within the area of impact, row crops, residential lawn, and Greene County Road 200 West border the banks. There is no riparian corridor in the area where the alternatives cross this creek. Photographs taken in the area where the proposed Alternatives 1, 2, 3 and 4 cross this stream are on the back of this form.

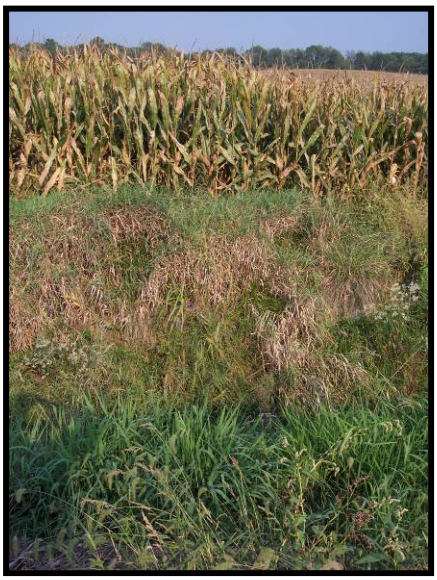
Stream Sec3-S60

Photograph Taken Downstream

Photograph Taken Upstream

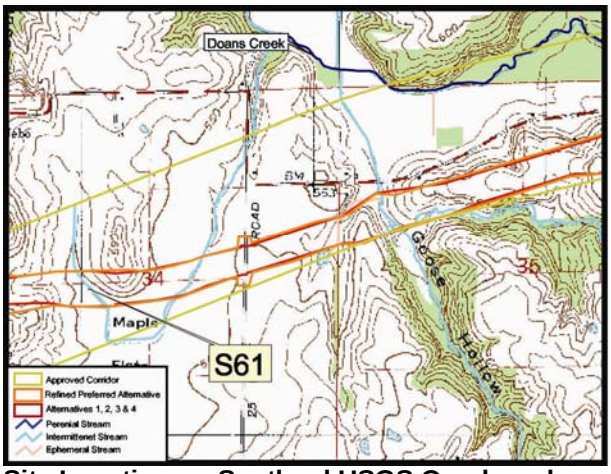


Photograph Taken Looking West

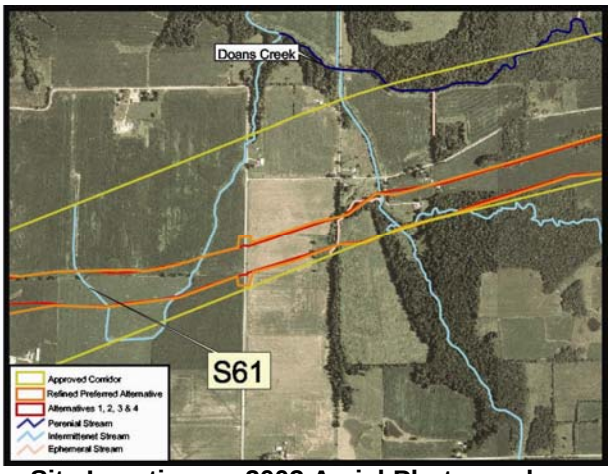


Photograph Taken Looking East

Stream Sec3-S61



Site Location on Scotland USGS Quadrangle



Site Location on 2003 Aerial Photograph

Aquatic Resource:	Stream	**USGS Quadrangle:**	Scotland
Stream Name:	Unnamed	**Section:**	34
Quarter:	SW	**Township:**	T6N
Range:	R5W	**IDEM 303(d) List:**	No
Watershed:	Doans Creek-Headwaters	**OHWM Width:**	2.6 feet
Channelized:	Yes	**USCOE Jurisdiction:**	Yes
		IDEM Jurisdiction:	Yes

Stream Sec3-S61

Stream Name	Length of Impact	Area Impacted	Alternative	Stream Habitat Assessment
Tributary of Doans Creek	661.6 feet	0.039 acres	1, 2, 3, 4	HHEI 17 / Modified Class I
Tributary of Doans Creek	678.4 feet	0.040 acres	Refined Preferred	HHEI 17 / Modified Class I

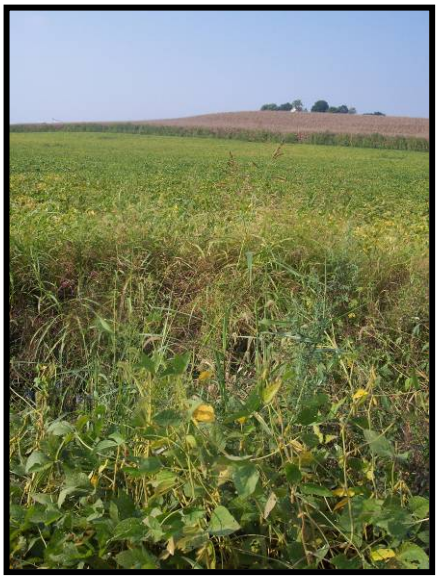
Description of Potential Impact: Alternatives 1, 2, 3 and 4 will impact approximately 661.6 linear feet of this stream. The area of impact below the ordinary high water mark (OHWM) is 0.039 acres for Alternatives 1, 2, 3 and 4. The Refined Preferred Alternative will impact approximately 678.4 linear feet and 0.040 acres below the OHWM. All alternatives cross the stream again as documented in Sec3-S62. This stream flows south, then east, then north towards Doans Creek. The substrate is predominately sand and the banks. Row crops exist beyond both banks. There is no riparian corridor in the area where the alternatives cross this creek. Photographs taken upstream and downstream in the area where the proposed Alternatives 1, 2, 3 and 4 cross this tributary of Doans Creek are on the back of this form.

Stream Sec3-S61

Photograph Taken Upstream

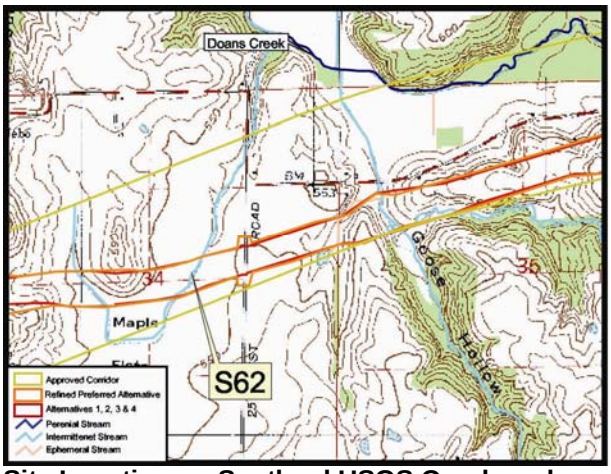
Photograph Taken Downstream

Photograph Taken Looking East

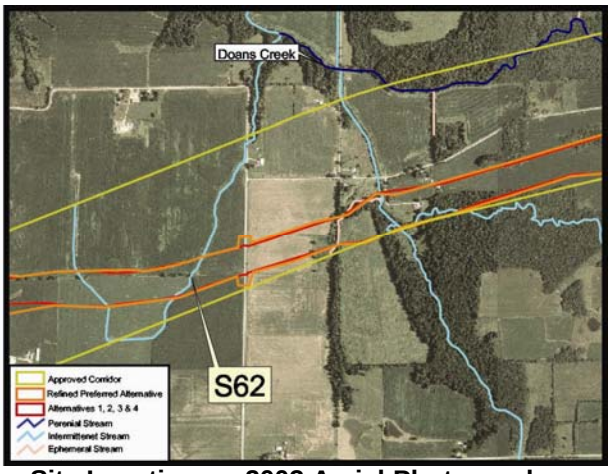


Photograph Taken Looking West

Stream Sec3-S62



Site Location on Scotland USGS Quadrangle



Site Location on 2003 Aerial Photograph

Aquatic Resource:	Stream	**USGS Quadrangle:**	Scotland
Stream Name:	Unnamed	**Section:**	34
Quarter:	NE	**Township:**	T6N
Range:	R5W	**IDEM 303(d) List:**	No
Watershed:	Doans Creek-Headwaters	**OHWM Width:**	2.6 feet
Channelized:	Yes	**USCOE Jurisdiction:**	Yes
		IDEM Jurisdiction:	Yes

Stream Sec3-S62

Stream Name	Length of Impact	Area Impacted	Alternative	Stream Habitat Assessment
Tributary of Doans Creek	728.0 feet	0.043 acres	1, 2, 3, 4	HHEI 17 / Modified Class I
Tributary of Doans Creek	740.9 feet	0.044 acres	Refined Preferred	HHEI 17 / Modified Class I

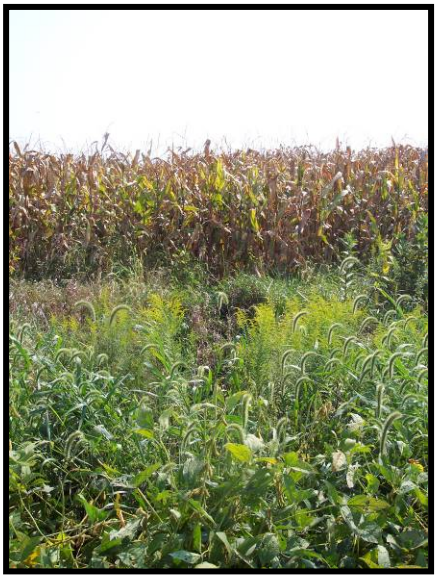
Description of Potential Impact: Alternatives 1, 2, 3 and 4 will impact approximately 728.0 linear feet of this stream. The area of impact below the ordinary high water mark (OHWM) is 0.043 acres for Alternatives 1, 2, 3 and 4. The Refined Preferred Alternative will impact approximately 740.9 linear feet and 0.044 acres below the OHWM. All alternatives cross the stream again as documented in Sec3-S61. This stream flows north towards Doans Creek. The substrate is predominately sand and the banks. Row crops exist beyond both banks. There is no riparian corridor in the area where the alternatives cross this creek. Photographs taken upstream and downstream in the area where the proposed Alternatives 1, 2, 3 and 4 cross this tributary of Doans Creek are on the back of this form.

Stream Sec3-S62

Photograph Taken Upstream

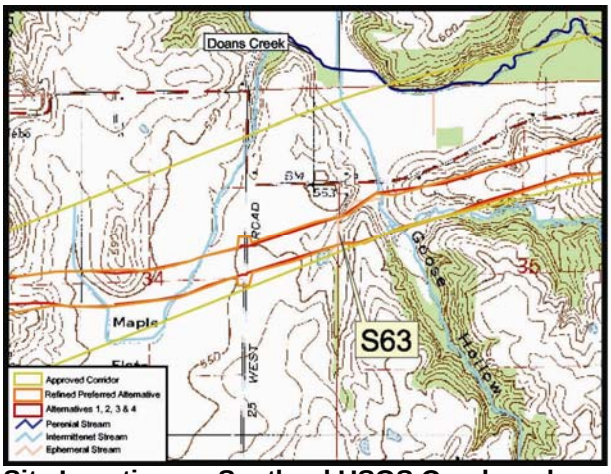
Photograph Taken Downstream

Photograph Taken Looking West

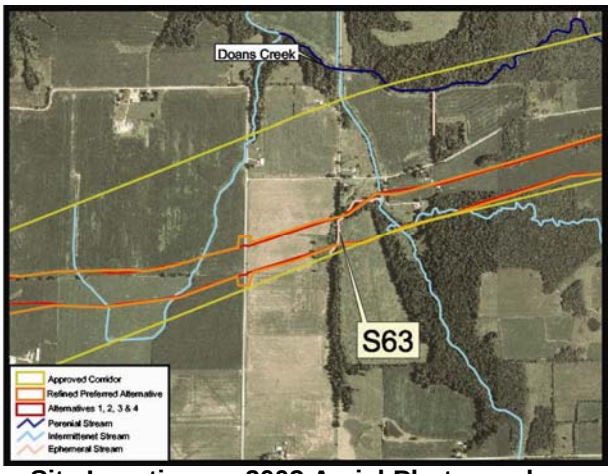


Photograph Taken Looking East

Stream Sec3-S63



Site Location on Scotland USGS Quadrangle



Site Location on 2003 Aerial Photograph

Aquatic Resource:	Stream	**USGS Quadrangle:**	Scotland
Stream Name:	Unnamed	**Section:**	35
Quarter:	NW	**Township:**	T6N
Range:	R5W	**IDEM 303(d) List:**	No
Watershed:	Doans Creek-Headwaters	**OHWM Width:**	5.9 feet
Channelized:	No	**USCOE Jurisdiction:**	Yes
		IDEM Jurisdiction:	Yes

Stream Sec3-S63

Stream Name	Length of Impact	Area Impacted	Alternative	Stream Habitat Assessment
Tributary of Doans Creek	489.3 feet	0.066 acres	1, 2, 3, 4	HHEI 67 / Class III PHWH
Tributary of Doans Creek	453.9 feet	0.061 acres	Refined Preferred	HHEI 67 / Class III PHWH

Description of Potential Impact: Alternatives 1, 2, 3 and 4 will impact approximately 489.3 linear feet of this stream. The area of impact below the ordinary high water mark (OHWM) is 0.066 acres for Alternatives 1, 2, 3 and 4. The Refined Preferred Alternative impacts approximately 453.9 linear feet and 0.061 acres below the OHWM. This ephemeral stream originates from a pond outlet on top of a hill. The water flows east down into the stream channel and then northeast towards an intermittent tributary of Doans Creek. The alternatives impact the stream again toward its intersection with the intermittent tributary as documented in Sec3-S64. The substrate is sand, cobble, gravel and leaf pack and the banks consist of dirt and upland forest vegetation. There is an approximate 30 feet wide riparian zone on both sides of the stream. Photographs taken in the area where the proposed Alternatives 1, 2, 3 and 4 cross this stream are on the back of this form.

Stream Sec3-S63

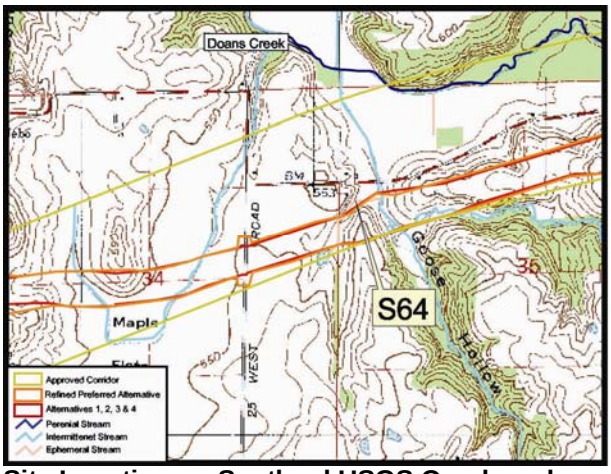
Photograph Taken Upstream

Photograph Taken Downstream

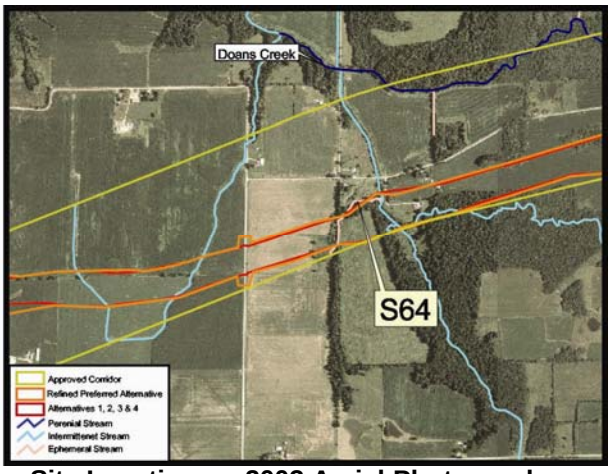
Photograph Taken Looking West

Photograph Taken Looking West

Stream Sec3-S64



Site Location on Scotland USGS Quadrangle



Site Location on 2003 Aerial Photograph

Aquatic Resource:	Stream	**USGS Quadrangle:**	Scotland
Stream Name:	Unnamed	**Section:**	35
Quarter:	NW	**Township:**	T6N
Range:	R5W	**IDEM 303(d) List:**	No
Watershed:	Doans Creek-Headwaters	**OHWM Width:**	4.9 feet
Channelized:	No	**USCOE Jurisdiction:**	Yes
		IDEM Jurisdiction:	Yes

Stream Sec3-S64

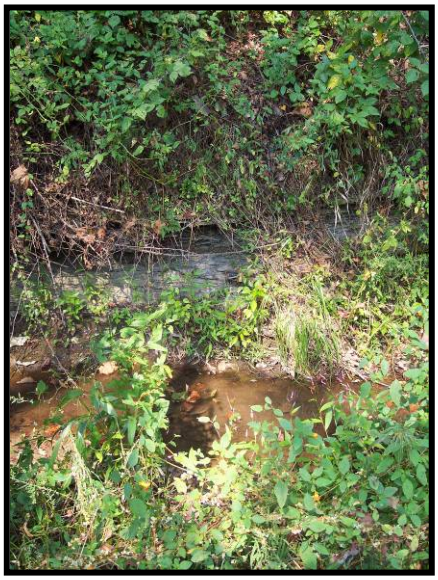
Stream Name	Length of Impact	Area Impacted	Alternative	Stream Habitat Assessment
Tributary of Doans Creek	299.7 feet	0.034 acres	1, 2, 3, 4	HHEI 39 / Class II PHWH
Tributary of Doans Creek	277.5 feet	0.031 acres	Refined Preferred	HHEI 39 / Class II PHWH

Description of Potential Impact: Alternatives 1, 2, 3 and 4 will impact approximately 299.7 linear feet of this stream. The area of impact below the ordinary high water mark (OHWM) is 0.034 acres for Alternatives 1, 2, 3 and 4. The Refined Preferred Alternative will impact approximately 277.5 linear feet and 0.031 acres below the OHWM. This ephemeral stream originates from a pond outlet on top of a hill. The water flows east down into the stream channel and then northeast towards an intermittent tributary of Doans Creek. The alternatives impact the stream again closer to the pond as documented in Sec3-S63. The substrate is sand, bedrock, and gravel with some boulder slabs and the banks consist of dirt and upland forest vegetation. There is an approximate 75 feet wide riparian zone on both sides of the stream. Photographs taken in the area where the proposed Alternatives 1, 2, 3 and 4 cross this stream are on the back of this form.

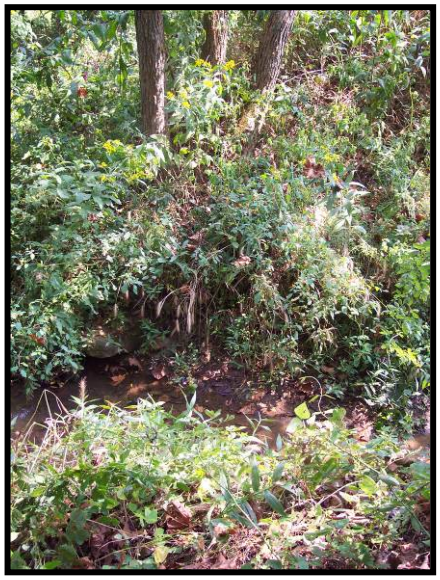
Stream Sec3-S64

Photograph Taken Upstream

Photograph Taken Downstream

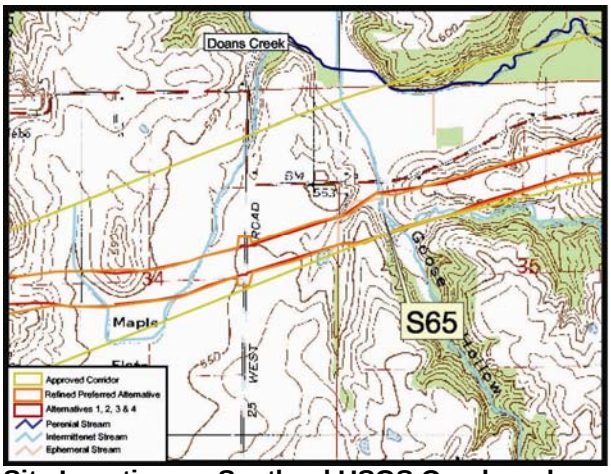


Photograph Taken Looking North

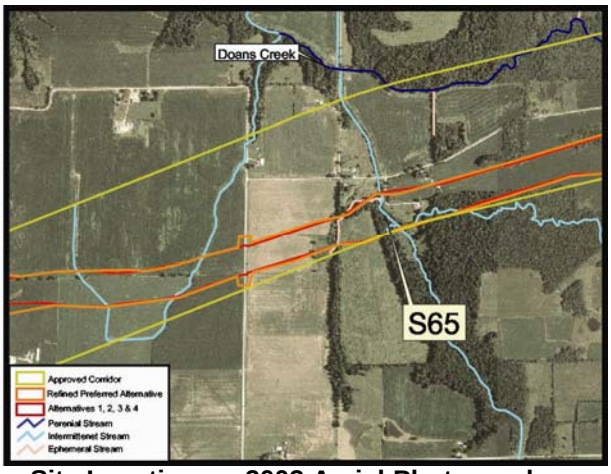


Photograph Taken Looking South

Stream Sec3-S65



Site Location on Scotland USGS Quadrangle



Site Location on 2003 Aerial Photograph

Aquatic Resource:	Stream	**USGS Quadrangle:**	Scotland
Stream Name:	Unnamed	**Section:**	35
Quarter:	NW	**Township:**	T6N
Range:	R5W	**IDEM 303(d) List:**	No
Watershed:	Doans Creek-Headwaters	**OHWM Width:**	5.9 feet
Channelized:	No	**USCOE Jurisdiction:**	Yes
		IDEM Jurisdiction:	Yes

Stream Sec3-S65

Stream Name	Length of Impact	Area Impacted	Alternative	Stream Habitat Assessment
Tributary of Doans Creek	932.3 feet	0.126 acres	1, 2, 3, 4	HHEI 42 / Class II PHWH
Tributary of Doans Creek	821.1 feet	0.111 acres	Refined Preferred	HHEI 42 / Class II PHWH

Description of Potential Impact: Alternatives 1, 2, 3 and 4 will impact approximately 932.3 linear feet of this stream. The area of impact below the ordinary high water mark (OHWM) is 0.126 acres for Alternatives 1, 2, 3 and 4. The Refined Preferred Alternative will impact approximately 821.1 linear feet and 0.111 acres below the OHWM. This intermittent stream flows north and discharges into Doans Creek. The substrate is predominately gravel and sand and the banks contain some wetland vegetation. A 50 feet wide riparian zone exists on the west side of the stream, and a 30 feet wide riparian zone exists on the east side. Photographs taken in the area where the proposed Alternatives 1, 2, 3 and 4 cross this tributary of Doans Creek are on the back of this form.

Stream Sec3-S65

Photograph Taken Upstream

Photograph Taken Downstream

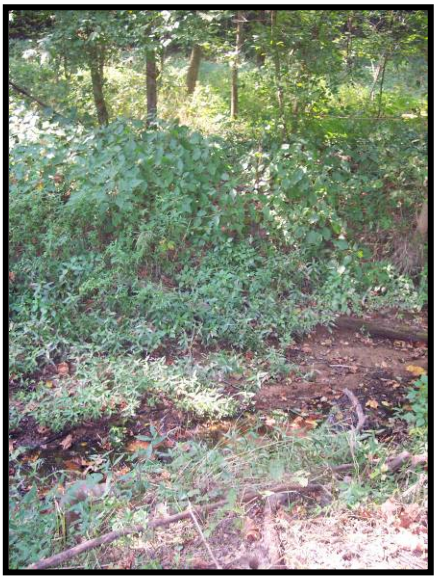
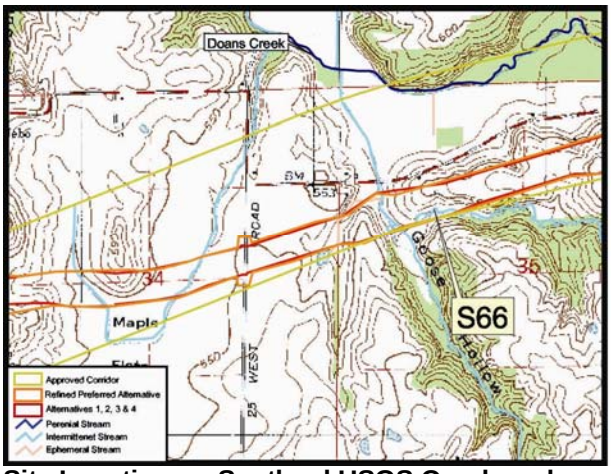


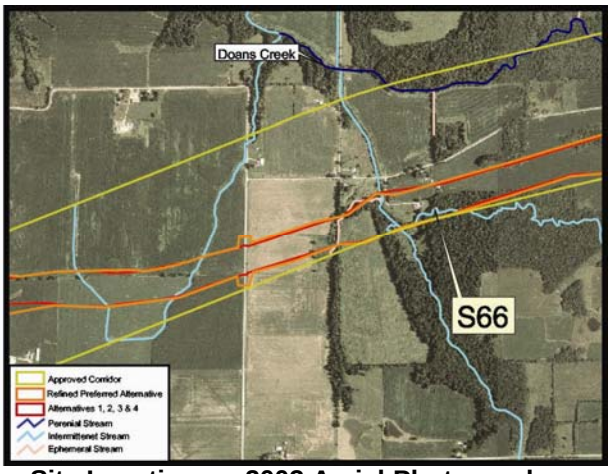
Photo Taken Looking North

Photo Taken Looking South

Stream Sec3-S66



Site Location on Scotland USGS Quadrangle



Site Location on 2003 Aerial Photograph

Aquatic Resource:	Stream	**USGS Quadrangle:**	Scotland
Stream Name:	Unnamed	**Section:**	35
Quarter:	NW	**Township:**	T6N
Range:	R5W	**IDEM 303(d) List:**	No
Watershed:	Doans Creek-Headwaters	**OHWM Width:**	5.9 feet
Channelized:	No	**USCOE Jurisdiction:**	Yes
		IDEM Jurisdiction:	Yes

Stream Sec3-S66

Stream Name	Length of Impact	Area Impacted	Alternative	Stream Habitat Assessment
Tributary of Doans Creek	1,082.1 feet	0.147 acres	1, 2, 3, 4	HHEI 63 / Class II PHWH
Tributary of Doans Creek	901.7 feet	0.122 acres	Refined Preferred	HHEI 63 / Class II PHWH

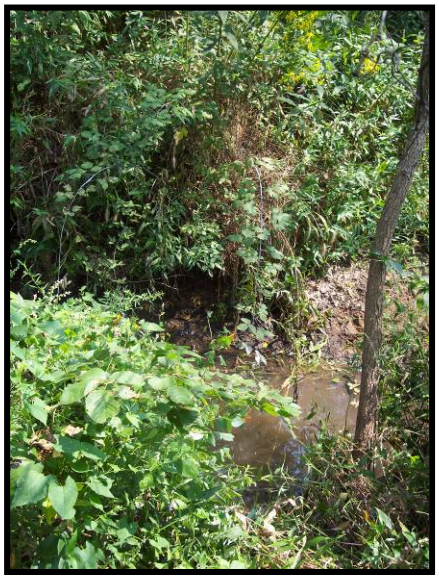
Description of Potential Impact: Alternatives 1, 2, 3 and 4 will impact approximately 1,082.1 linear feet of this stream. The area of impact below the ordinary high water mark (OHWM) is 0.147 acres for Alternatives 1, 2, 3 and 4. The Refined Preferred Alternative will impact approximately 901.7 linear feet and 0.122 acres below the OHWM. This intermittent stream flows west and discharges into another intermittent tributary of Doans Creek. The substrate is predominately gravel and sand and the banks contain dirt and upland forest vegetation. An approximate 200 feet wide riparian zone exists on the north side of the stream. An approximate 1000 feet wide forest exists on the south side. Photographs taken in the area where the proposed Alternatives 1, 2, 3 and 4 cross this tributary of Doans Creek are on the back of this form.

Stream Sec3-S66

Photograph Taken Upstream

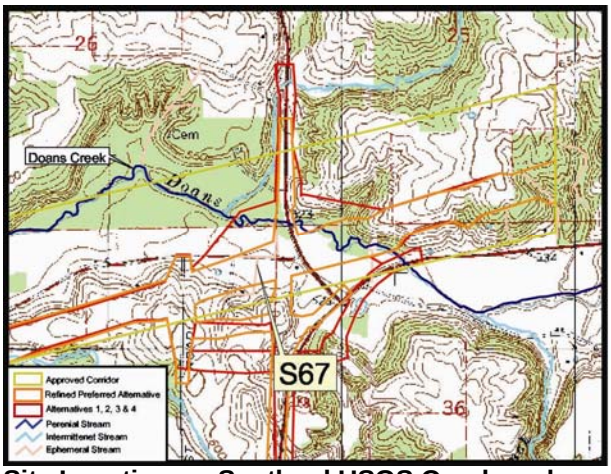
Photograph Taken Downstream

Photograph Taken Looking North

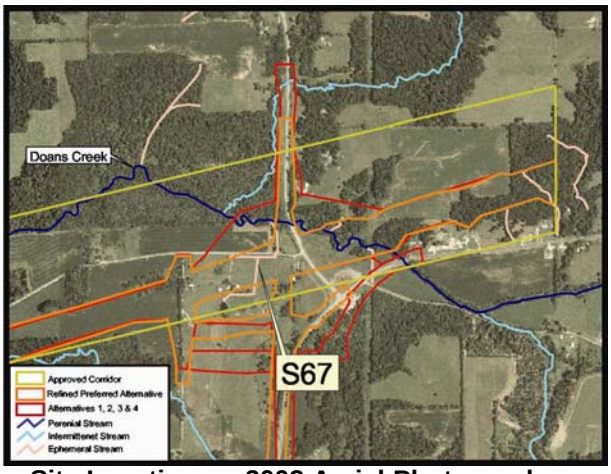


Photograph Taken Looking South

Stream Sec3-S67



Site Location on Scotland USGS Quadrangle



Site Location on 2003 Aerial Photograph

Aquatic Resource:	Stream	**USGS Quadrangle:**	Scotland
Stream Name:	Unnamed	**Section:**	35
Quarter:	NE	**Township:**	T6N
Range:	R5W	**IDEM 303(d) List:**	No
Watershed:	Doans Creek-Headwaters	**OHWM Width:**	3.0 feet
Channelized:	Yes	**USCOE Jurisdiction:**	Yes
		IDEM Jurisdiction:	Yes

Stream Sec3-S67

Stream Name	Length of Impact	Area Impacted	Alternative	Stream Habitat Assessment
Tributary of Doans Creek	989.8 feet	0.068 acres	1, 2, 3, 4	HHEI 19 / Modified Class I
Tributary of Doans Creek	394.7 feet	0.027 acres	Refined Preferred	HHEI 19 / Modified Class I

Description of Potential Impact: The proposed I-69/US 231 interchange area associated with Alternatives 1, 2, 3 and 4 will impact approximately 989.8 linear feet of this stream. The area of impact below the ordinary high water mark (OHWM) is 0.068 acres for Alternatives 1, 2, 3 and 4. The Refined Preferred Alternative will impact approximately 394.7 linear feet and 0.027 acres below the OHWM. This ephemeral stream flows from a pond outlet north across Greene County Road 710 South to Doans Creek. The substrate is predominately silt and the banks are grassy. There is no riparian corridor in the area where these alternatives cross this creek. Photographs taken in the area where the proposed Alternatives 1, 2, 3 and 4 cross this tributary of Doans Creek are on the back of this form.

Stream Sec3-S67

Photograph Taken Upstream

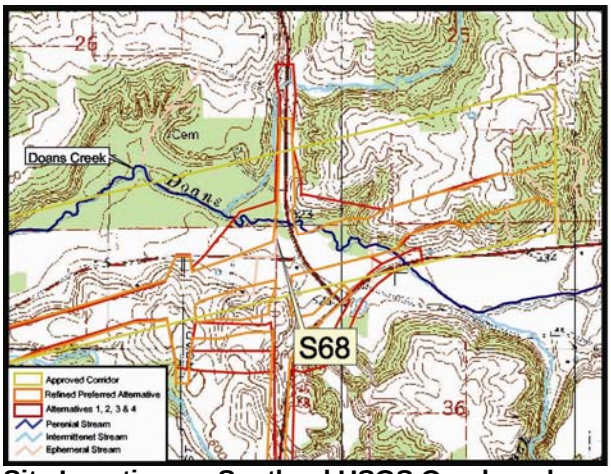
Photograph Taken Looking West

Photograph Taken Downstream

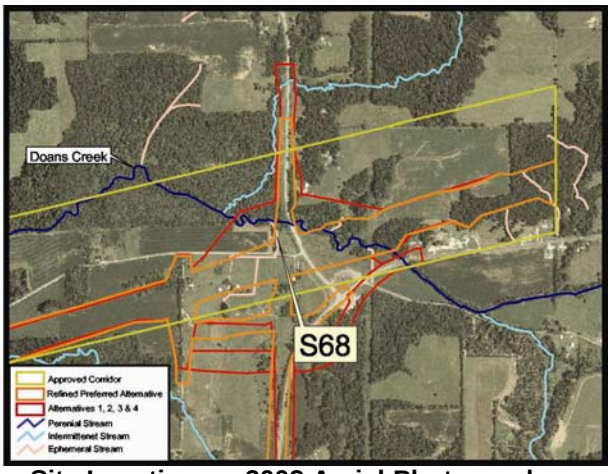
Photograph Taken Looking East

Photograph Taken Where Stream Turns North

Stream Sec3-S68



Site Location on Scotland USGS Quadrangle



Site Location on 2003 Aerial Photograph

Aquatic Resource:	Stream	**USGS Quadrangle:**	Scotland
Stream Name:	Unnamed	**Section:**	35
Quarter:	NE	**Township:**	T6N
Range:	R5W	**IDEM 303(d) List:**	No
Watershed:	Doans Creek-Headwaters	**OHWM Width:**	3.0 feet
Channelized:	No	**USCOE Jurisdiction:**	Yes
		IDEM Jurisdiction:	Yes

Stream Sec3-S68

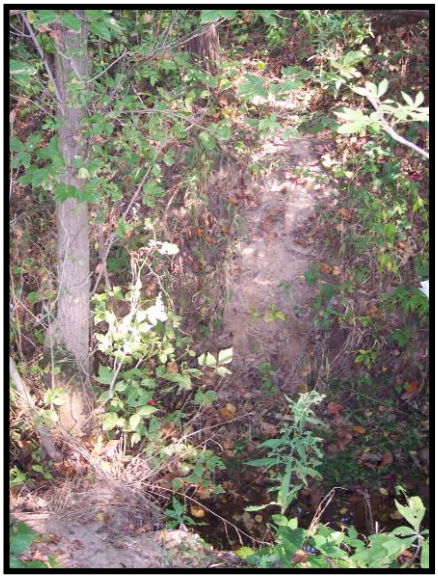
Stream Name	Length of Impact	Area Impacted	Alternative	Stream Habitat Assessment
Tributary of Doans Creek	1,262.0 feet	0.087 acres	1, 2, 3, 4	HHEI 26 / Class I PHWH
Tributary of Doans Creek	1,026.5 feet	0.071 acres	Refined Preferred	HHEI 26 / Class I PHWH

Description of Potential Impact: The proposed I-69/US 231 interchange associated with Alternatives 1, 2, 3 and 4 will impacts approximately 1,262.0 linear feet of this stream. The area of impact to Tributary of Doans Creek below the ordinary high water mark (OHWM) is 0.087 acres for Alternatives 1, 2, 3 and 4. The Refined Preferred Alternative will impact approximately 1026.5 linear feet and 0.071 acres below the OHWM. This ephemeral stream flows north to Doans Creek. The substrate is silt and gravel and the banks are dirt and upland forest vegetation. There is a 25 feet wide riparian zone on each side of the stream. Photographs taken in the area where the proposed Alternatives 1, 2, 3 and 4 cross this tributary of Doans Creek are on the back of this form.

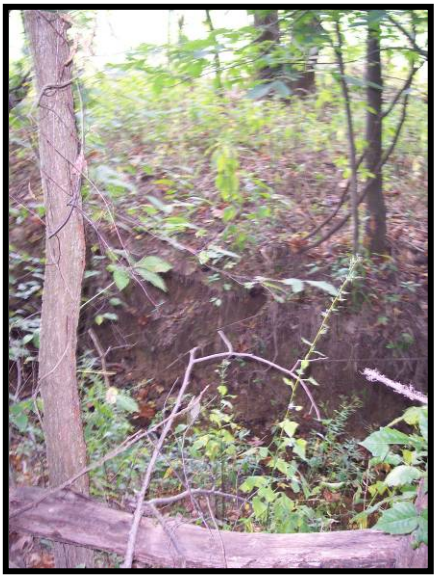
Stream Sec3-S68

Photograph Taken Upstream

Photograph Taken Downstream

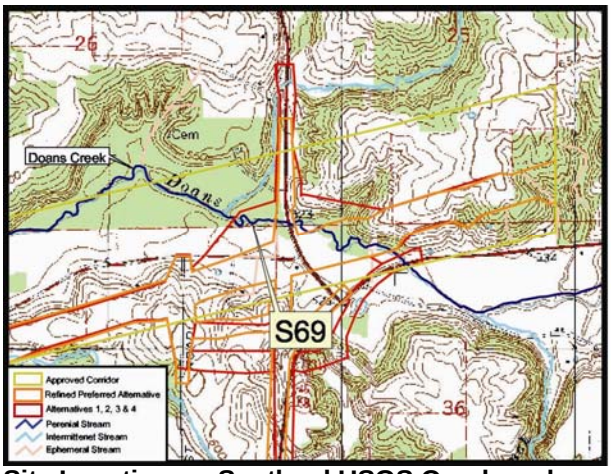


Photograph Taken Looking North

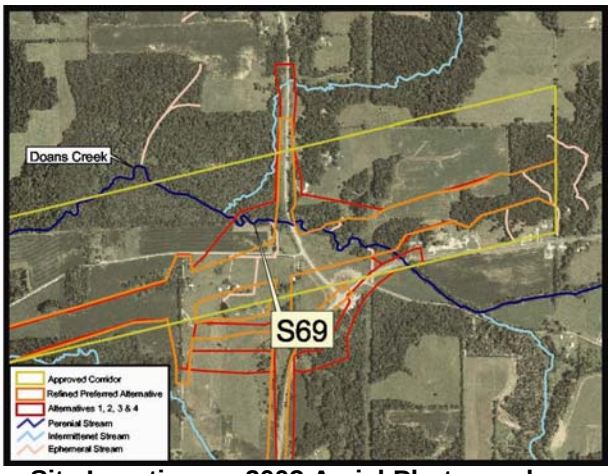


Photograph Taken Looking South

Stream Sec3-S69



Site Location on Scotland USGS Quadrangle



Site Location on 2003 Aerial Photograph

Aquatic Resource:	Stream	**USGS Quadrangle:**	Scotland
Stream Name:	Doans Creek	**Section:**	26
Quarter:	SE	**Township:**	T6N
Range:	R5W	**IDEM 303(d) List:**	No
Watershed:	Doans Creek-Headwaters	**OHWM Width:**	24.9 feet
Channelized:	No	**USCOE Jurisdiction:**	Yes
		IDEM Jurisdiction:	Yes

Stream Sec3-S69

Stream Name	Length of Impact	Area Impacted	Alternative	Stream Habitat Assessment
Doans Creek	1,247.1 feet	0.713 acres	1, 2, 3, 4	QHEI 58 / Warm Water
Doans Creek	280.4 feet	0.160 acres	Refined Preferred	QHEI 58 / Warm Water

Description of Potential Impact: The proposed I-69/US 231 interchange associated with Alternatives 1, 2, 3 and 4 will impact approximately 1,247.1 linear feet of this stream. The area of impact to Doans Creek below the ordinary high water mark (OHWM) is 0.713 acres for Alternatives 1, 2, 3 and 4. The Refined Preferred Alternative impacts approximately 280.4 linear feet and 0.160 acres below the OHWM. Sec3-S69 describes the impact west of the existing US 231 bridge. Sec3-S70 describes the impact east of the existing US 231 bridge. Doans Creek flows west towards the White River. The substrate is predominately sand with some gravel, silt, and detritus and the banks are upland forest vegetation. An approximate 60 feet wide riparian zone exists to the south of the stream, and the riparian forest to the north is over 1000 feet wide. Photographs taken in the area where the proposed Alternatives 1, 2, 3 and 4 cross Doans Creek are on the back of this form.

Stream Sec3-S69

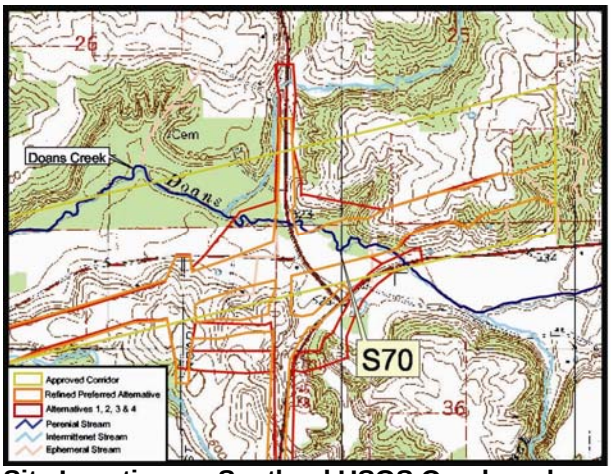
Photograph Taken Upstream

Photograph Taken Downstream

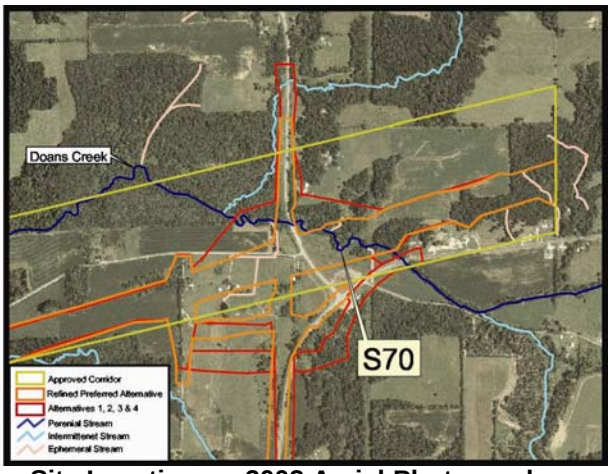
Photograph Taken Looking South

Photograph Taken Looking North

Stream Sec3-S70



Site Location on Scotland USGS Quadrangle



Site Location on 2003 Aerial Photograph

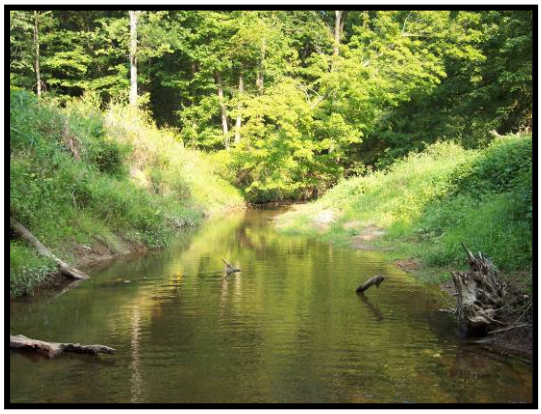
Aquatic Resource:	Stream	**USGS Quadrangle:**	Scotland
Stream Name:	Doans Creek	**Section:**	36
Quarter:	NW	**Township:**	T6N
Range:	R5W	**IDEM 303(d) List:**	No
Watershed:	Doans Creek-Headwaters	**OHWM Width:**	24.9 feet
Channelized:	No	**USCOE Jurisdiction:**	Yes
		IDEM Jurisdiction:	Yes

Stream Sec3-S70

Stream Name	Length of Impact	Area Impacted	Alternative	Stream Habitat Assessment
Doans Creek	2,061.2 feet	1.178 acres	1, 2, 3, 4	QHEI 58 / Warm Water
Doans Creek	1,513.7 feet	0.865 acres	Refined Preferred	QHEI 58 / Warm Water

Description of Potential Impact: The proposed I-69/US 231 interchange associated with Alternatives 1, 2, 3 and 4 will impact approximately 2,061.2 linear feet of this stream. The area of impact to Doans Creek below the ordinary high water mark (OHWM) is 1.178 acres for Alternatives 1, 2, 3 and 4. The Refined Preferred Alternative will impact approximately 1,513.7 linear feet and 0.865 acres below the OHWM. Sec3-S70 describes the impact east of the existing US 231 bridge. Sec3-S69 describes the impact west of the existing US 231 bridge. Doans Creek flows west towards the White River. The substrate is predominately sand with some gravel, silt, and detritus and the banks are upland forest vegetation. An approximate 40 feet wide riparian zone exists to the south of the stream, and the riparian forest to the north is over 240 feet wide. Photographs taken in the area where the proposed Alternatives 1, 2, 3 and 4 cross Doans Creek are on the back of this form.

Stream Sec3-S70



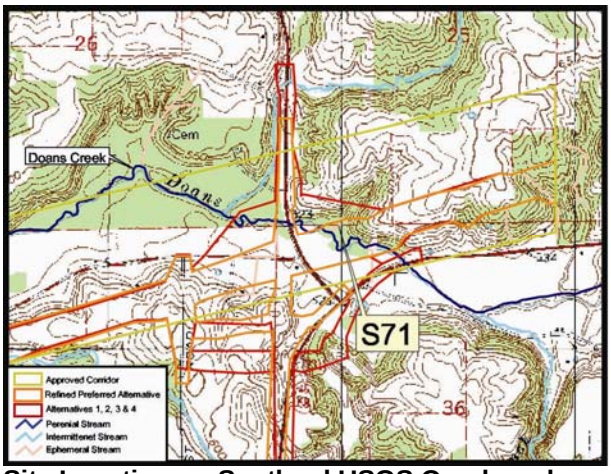
Photograph Taken Upstream

Photograph Taken Downstream

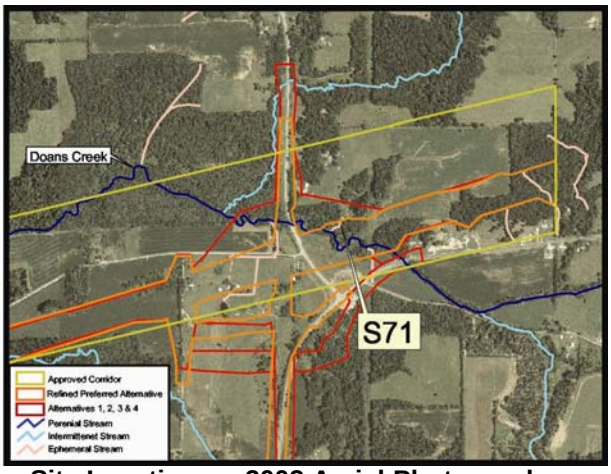
Photograph Taken Looking North

Photograph Taken Looking South

Stream Sec3-S71



Site Location on Scotland USGS Quadrangle



Site Location on 2003 Aerial Photograph

Aquatic Resource:	Stream	**USGS Quadrangle:**	Scotland
Stream Name:	Unnamed	**Section:**	36
Quarter:	NW	**Township:**	T6N
Range:	R5W	**IDEM 303(d) List:**	No
Watershed:	Doans Creek-Headwaters	**OHWM Width:**	3.6 feet
Channelized:	No	**USCOE Jurisdiction:**	Yes
		IDEM Jurisdiction:	Yes

Stream Sec3-S71

Stream Name	Length of Impact	Area Impacted	Alternative	Stream Habitat Assessment
Tributary of Doans Creek	322.4 feet	0.027 acres	1, 2, 3, 4	HHEI 44 / Class II PHWH
Tributary of Doans Creek	253.9 feet	0.021 acres	Refined Preferred	HHEI 44 / Class II PHWH

Description of Potential Impact: The proposed I-69/US 231 interchange associated with Alternatives 1, 2, 3 and 4 will impact approximately 322.4 linear feet of this stream. The area of impact below the ordinary high water mark (OHWM) is 0.027 acres for Alternatives 1, 2, 3 and 4. The Refined Preferred Alternative will impact approximately 253.9 linear feet and 0.021 acres below the OHWM. This stream flows from a pond outlet south through a forest to Doans Creek. The substrate is cobble with some gravel and sand and the banks consist of forest vegetation. An approximate 325 feet riparian zone exists on both sides of the stream. Photographs taken in the area where the proposed Alternatives 1, 2, 3 and 4 cross this tributary of Doans Creek are on the back of this form.

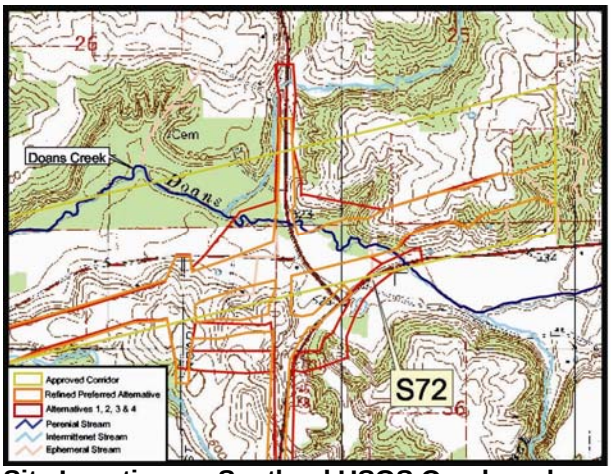
Stream Sec3-S71

Photograph Taken Downstream

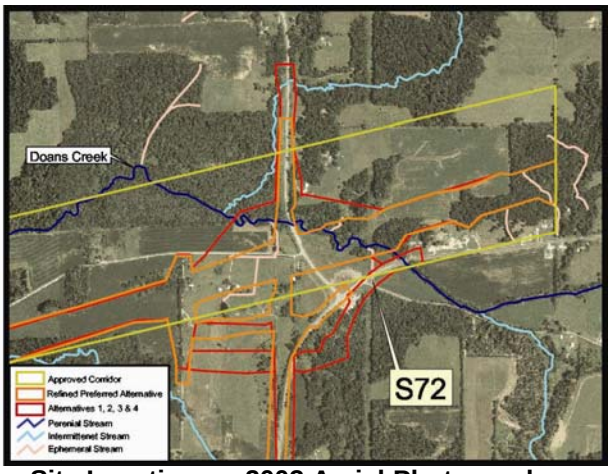
Photograph Taken Looking Down Pond Dam

Photograph Taken of Pond Outlet

Stream Sec3-S72



Site Location on Scotland USGS Quadrangle



Site Location on 2003 Aerial Photograph

Aquatic Resource:	Stream	**USGS Quadrangle:**	Scotland
Stream Name:	Unnamed	**Section:**	36
Quarter:	NW	**Township:**	T6N
Range:	R5W	**IDEM 303(d) List:**	No
Watershed:	Doans Creek-Headwaters	**OHWM Width:**	3.5 feet
Channelized:	Yes	**USCOE Jurisdiction:**	Yes
		IDEM Jurisdiction:	Yes

Stream Sec3-S72

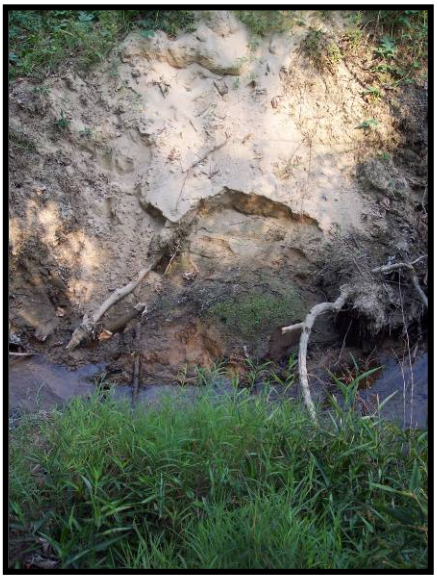
Stream Name	Length of Impact	Area Impacted	Alternative	Stream Habitat Assessment
Tributary of Doans Creek	548.1 feet	0.044 acres	1, 2, 3, 4	HHEI 35 / Modified Class I
Tributary of Doans Creek	179.9 feet	0.014 acres	Refined Preferred	HHEI 35 / Modified Class I

Description of Potential Impact: The proposed I-69/US 231 interchange associated with Alternatives 1, 2, 3 and 4 will impact approximately 548.1linear feet of this stream. The area of impact below the ordinary high water mark (OHWM) is 0.044 acres for Alternatives 1, 2, 3 and 4. The Refined Preferred Alternative will impact approximately 179.9 linear feet and 0.014 acres below the OHWM. This ephemeral stream flows north, crosses State Road 58, and discharges into Doans Creek. The substrate is sand and the banks are sandy with some upland forest vegetation. There is no immediate riparian corridor in the area where the alternatives cross this stream. Forests are nearby on both sides of the stream. Photographs taken in the area where the proposed Alternatives 1, 2, 3 and 4 cross this tributary of Doans Creek are on the back of this form.

Stream Sec3-S72

Photograph Taken Upstream

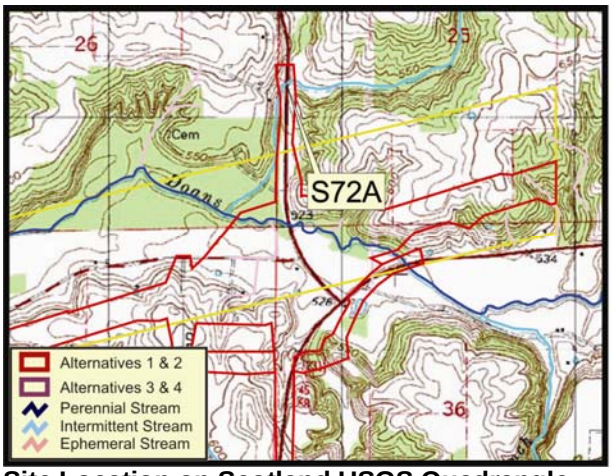
Photograph Taken Downstream



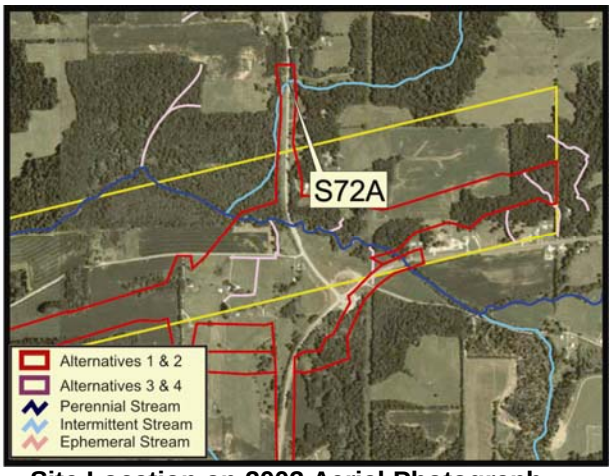
Photograph Taken Looking North

Photograph Taken Looking South

Stream Sec3-S72A



Site Location on Scotland USGS Quadrangle



Site Location on 2003 Aerial Photograph

Aquatic Resource:	Stream	**USGS Quadrangle:**	Scotland
Stream Name:	Doans Creek	**Section:**	26
Quarter:	SE	**Township:**	T6N
Range:	R5W	**IDEM 303(d) List:**	No
Watershed:	Doans Creek-Headwaters	**OHWM Width:**	6.0 feet
Channelized:	No	**USCOE Jurisdiction:**	Yes
		IDEM Jurisdiction:	Yes

Stream Sec3-S72A

Stream Name	Length of Impact	Area Impacted	Alternative	Stream Habitat Assessment
Tributary of Doans Creek	285.0 feet	0.039 acres	1, 2, 3, 4	QHEI 91.5 / Class I Modified

Description of Potential Impact: The proposed I-69/US 231 interchange will impact approximately 285.0 linear feet of this stream under Alternatives 1, 2, 3, and 4. The area of impact below the ordinary high water mark (OHWM) is 0.039 acres. The substrate is predominately sand with some gravel, silt, and cobbles and the banks are upland forest vegetation. An approximate 60 feet wide riparian zone exists to the south of the stream, and the riparian forest to the south is over 1000 feet wide. Photographs taken in the area where the alternatives cross the stream are on the back of this form.

Stream Sec3-S72A

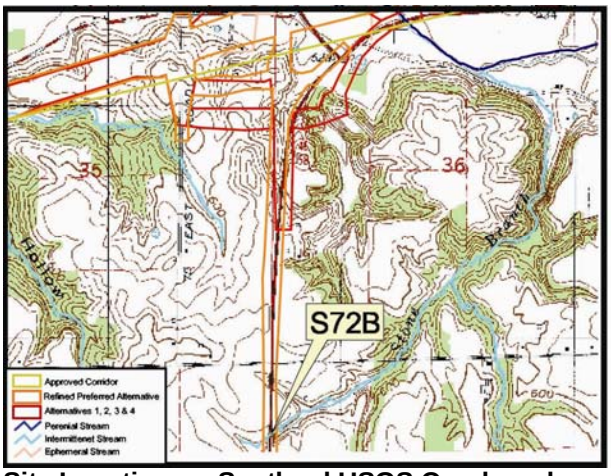
Photograph Taken Upstream

Photograph Taken Downstream

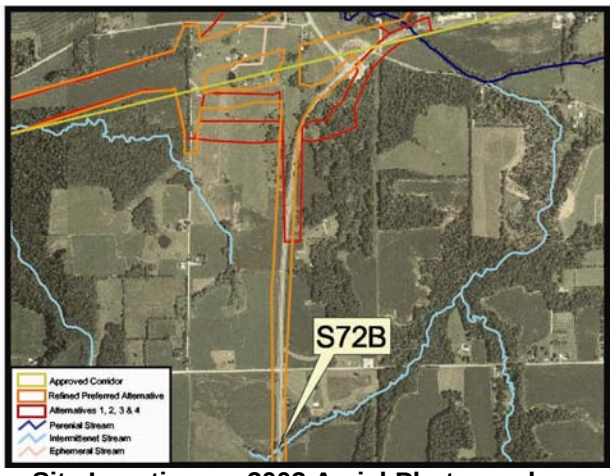
Photograph Taken Looking South

Photograph Taken Looking North

Stream Sec3-S72B



Site Location on Scotland USGS Quadrangle



Site Location on 2003 Aerial Photograph

Aquatic Resource:	Stream	**USGS Quadrangle:**	Scotland
Stream Name:	Doans Creek	**Section:**	26
Quarter:	SE	**Township:**	T6N
Range:	R5W	**IDEM 303(d) List:**	No
Watershed:	Doans Creek-Headwaters	**OHWM Width:**	6.0 feet
Channelized:	No	**USCOE Jurisdiction:**	Yes
		IDEM Jurisdiction:	Yes

Stream Sec3-S72A

Stream Name	Length of Impact	Area Impacted	Alternative	Stream Habitat Assessment
Tributary of Doans Creek	253.2 feet	0.035 acres	Refined Preferred	HHEI 54 / Class I Modified

Description of Potential Impact: The truck lane associated with the proposed I-69/US 231 interchange will impact approximately 253.2 linear feet of this stream under the Refined Preferred Alternative. The area of impact below the ordinary high water mark (OHWM) is 0.035 acres. The substrate is predominately sand with some gravel, silt, and cobbles and the banks are upland forest vegetation. An approximate 60 feet wide riparian zone exists to the south of the stream, and the riparian forest to the south is over 1000 feet wide. Photographs taken in the area where the proposed Refined Preferred Alternative crosses the stream are on the back of this form.

Stream Sec3-S72B

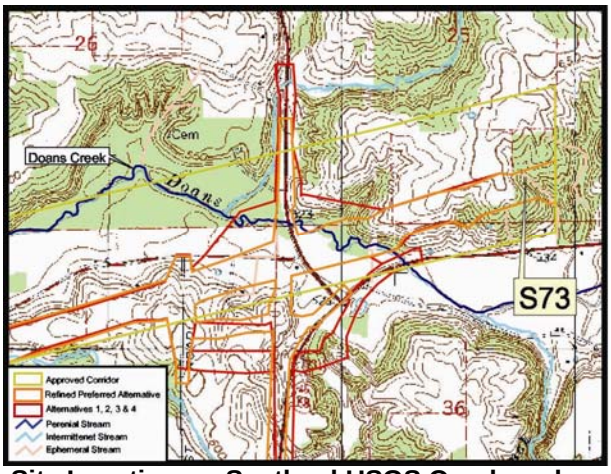
Photograph Taken Upstream

Photograph Taken Downstream

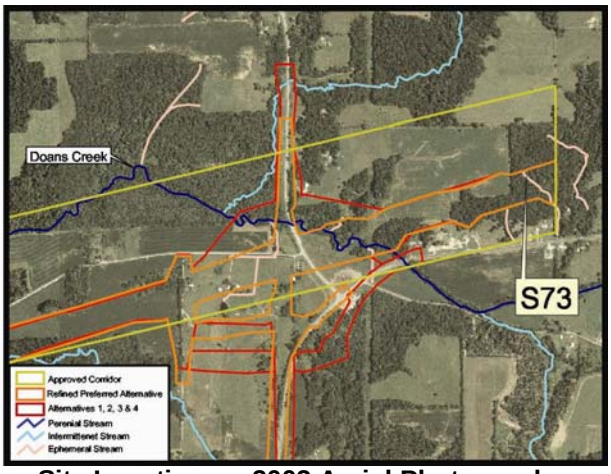
Photograph Taken Looking South

Photograph Taken Looking North

Stream Sec3-S73



.Site Location on Scotland USGS Quadrangle



Site Location on 2003 Aerial Photograph

Aquatic Resource:	Stream	**USGS Quadrangle:**	Scotland
Stream Name:	Unnamed	**Section:**	25
Quarter:	SE	**Township:**	T6N
Range:	R5W	**IDEM 303(d) List:**	No
Watershed:	Doans Creek-Headwaters	**OHWM Width:**	4.3 feet
Channelized:	No	**USCOE Jurisdiction:**	Yes
		IDEM Jurisdiction:	Yes

Stream Sec3-S73

Stream Name	Length of Impact	Area Impacted	Alternative	Stream Habitat Assessment
Tributary of Doans Creek	637.0 feet	0.063 acres	1, 2, 3, 4, Refined Preferred	HHEI 39 / Class II PHWH

Description of Potential Impact: Alternatives 1, 2, 3, 4, and the Refined Preferred Alternative will impact approximately 637.0 linear feet of this stream. The area of impact below the ordinary high water mark (OHWM) is 0.063 acres for all alternatives. This ephemeral stream flows south through a forest to a roadside ditch along State Road 58. The substrate is sand, leaf pack, silt, detritus, cobble and boulders and the banks contain upland forest vegetation. An approximate 300 feet wide riparian zone exists to the southwest of the stream, and the riparian forest to the northeast extends beyond 1,000 feet wide. Photographs taken in the area where the alternatives cross this tributary of Doans Creek are on the back of this form.

Stream Sec3-S73

Photograph Taken Upstream

Photograph Taken Downstream

APPENDIX B

Stream Assessment Data Sheets

Primary Headwater Habitat Evaluation Form

HHEI Score (sum of metrics 1, 2, 3) :

SITE NAME/LOCATION _____

_____ SITE NUMBER _____ RIVER BASIN _____ DRAINAGE AREA (mi²) _____

LENGTH OF STREAM REACH (ft) _____ LAT. _____ LONG. _____ RIVER CODE _____ RIVER MILE _____

DATE _____ SCORER _____ COMMENTS _____

NOTE: Complete All Items On This Form - Refer to "Field Evaluation Manual for Ohio's PHWH Streams" for Instructions

STREAM CHANNEL MODIFICATIONS: ☐ NONE / NATURAL CHANNEL ☐ RECOVERED ☒ RECOVERING ☐ RECENT OR NO RECOVERY

1. SUBSTRATE (Estimate percent of every type of substrate present. Check *ONLY* two predominant substrate *TYPE* boxes (Max of 32). Add total number of significant substrate types found (Max of 8). Final metric score is sum of boxes A & B.

HHEI Metric Points

TYPE		PERCENT	TYPE		PERCENT
☐ ☐	BLDR SLABS [16 pts]		☐ ☐	SILT [3 pt]	
☐ ☐	BOULDER (>256 mm) [16 pts]		☐ ☐	LEAF PACK/WOODY DEBRIS [3 pts]	
☐ ☐	BEDROCK [16 pt]		☐ ☐	FINE DETRITUS [3 pts]	
☐ ☐	COBBLE (65-256 mm) [12 pts]		☒ ☐	CLAY or HARDPAN [0 pt]	
☒ ☐	GRAVEL (2-64 mm) [9 pts]		☐ ☐	MUCK [0 pts]	
☐ ☐	SAND (<2 mm) [6 pts]		☐ ☐	ARTIFICIAL [3 pts]	

Total of Percentages of Bldr Slabs, Boulder, Cobble, Bedrock _____ **(A)** **(B)**

Substrate Max = 40

A + B

SCORE OF TWO MOST PREDOMINATE SUBSTRATE TYPES: _____ **TOTAL NUMBER OF SUBSTRATE TYPES:** _____

2. Maximum Pool Depth ***(Measure the maximum pool depth within the 61 meter (200 ft)*** evaluation reach at the time of evaluation. Avoid plunge pools from road culverts or storm water pipes) (Check *ONLY* one box):

Pool Depth Max = 30

☐ > 30 centimeters [20 pts]
☐ > 22.5 - 30 cm [30 pts]
☒ > 10 - 22.5 cm [25 pts]
☐ > 5 cm - 10 cm [15 pts]
☐ < 5 cm [5 pts]
☐ NO WATER OR MOIST CHANNEL [0 pts]

COMMENTS _____ **MAXIMUM POOL DEPTH (centimeters):** _____

3. BANK FULL WIDTH (Measured as the average of 3-4 measurements) **(Check *ONLY* one box):**

Bankfull Width Max=30

☐ > 4.0 meters [30 pts]
☐ > 3.0 m - 4.0 m [25 pts]
☐ > 1.5 m - 3.0 m [20 pts]
☒ > 1.0 m - 1.5 m [15 pts]
☐ ≤ 1.0 m [5 pts]

COMMENTS _____ **AVERAGE BANKFULL WIDTH (meters):** _____

This information must also be completed

RIPARIAN ZONE AND FLOODPLAIN QUALITY ☆NOTE: River Left (L) and Right (R) as looking downstream☆

L	R	RIPARIAN WIDTH (Per Bank)	L	R	FLOODPLAIN QUALITY (Most Predominant per Bank)	L	R	
☐	☒	Wide >10m	☐	☐	Mature Forest, Wetland	☐	☐	Conservation Tillage
☒	☐	Moderate 5-10m	☒	☒	Immature Forest, Shrub or Old Field	☐	☐	Urban or Industrial
☐	☐	Narrow <5m	☐	☐	Residential, Park, New Field	☐	☐	Open Pasture, Row Crop
☐	☐	None	☐	☐	Fenced Pasture	☐	☐	Mining or Construction

COMMENTS _____

FLOW REGIME *(At Time of Evaluation)* (Check *ONLY* one box):

☐ Stream Flowing
☐ Subsurface flow with isolated pools (Interstitial)
☒ Moist Channel, isolated pools, no flow (Intermittent)
☐ Dry channel, no water (Ephemeral)

COMMENTS _____

SINUOSITY (Number of bends per 61 m (200 ft) of channel) (Check *ONLY* one box):

☐ None ☐ 1.0 ☒ 2.0 ☐ 3.0
☐ 0.5 ☐ 1.5 ☐ 2.5 ☐ >3

STREAM GRADIENT ESTIMATE

☐ Flat (0.5 ft/100 ft) ☒ Flat to Moderate ☐ Moderate (2 ft/100 ft) ☐ Moderate to Severe ☐ Severe (10 ft/100 ft)

ADDITIONAL STREAM INFORMATION (This Information Must Also be Completed):

QHEI PERFORMED? - ☐ Yes ☒ No QHEI Score _____ (If Yes, Attach Completed QHEI Form)

DOWNSTREAM DESIGNATED USE(S)

☐ WWH Name: _____ Distance from Evaluated Stream _____

☐ CWH Name: _____ Distance from Evaluated Stream _____

☐ EWH Name: _____ Distance from Evaluated Stream _____

MAPPING: ATTACH COPIES OF MAPS, INCLUDING THE ENTIRE WATERSHED AREA. CLEARLY MARK THE SITE LOCATION

USGS Quadrangle Name: _____ NRCS Soil Map Page: _____ NRCS Soil Map Stream Order _____

County: _____ Township / City: _____

MISCELLANEOUS

Base Flow Conditions? (Y/N): _____ Date of last precipitation: _____ Quantity: _____

Photograph Information: _____

Elevated Turbidity? (Y/N): _____ Canopy (% open): _____

Were samples collected for water chemistry? (Y/N): _____ (Note lab sample no. or id. and attach results) Lab Number: _____

Field Measures: Temp (°C)_____ Dissolved Oxygen (mg/l) _____ pH (S.U.) _____ Conductivity (µmhos/cm) _____

Is the sampling reach representative of the stream (Y/N)_____ If not, please explain: _____

_____

Additional comments/description of pollution impacts: _____

_____

BIOTIC EVALUATION

Performed? (Y/N): _____ (If Yes, Record all observations. Voucher collections optional. NOTE: all voucher samples must be labeled with the site ID number. Include appropriate field data sheets from the Primary Headwater Habitat Assessment Manual)

Fish Observed? (Y/N)_____ Voucher? (Y/N)_____ Salamanders Observed? (Y/N)_____ Voucher? (Y/N)_____
Frogs or Tadpoles Observed? (Y/N)____ Voucher? (Y/N)____ Aquatic Macroinvertebrates Observed? (Y/N)____ Voucher? (Y/N)____

Comments Regarding Biology: _____

_____

_____

DRAWING AND NARRATIVE DESCRIPTION OF STREAM REACH (This must be completed):

Include important landmarks and other features of interest for site evaluation and a narrative description of the stream's location

FLOW ➜

Primary Headwater Habitat Evaluation Form

HHEI Score (sum of metrics 1, 2, 3) :

SITE NAME/LOCATION _____

_____ SITE NUMBER _____ RIVER BASIN _____ DRAINAGE AREA (mi²) _____

LENGTH OF STREAM REACH (ft) _____ LAT. _____ LONG. _____ RIVER CODE _____ RIVER MILE _____

DATE _____ SCORER _____ COMMENTS _____

NOTE: Complete All Items On This Form - Refer to "Field Evaluation Manual for Ohio's PHWH Streams" for Instructions

STREAM CHANNEL MODIFICATIONS: ☐ NONE / NATURAL CHANNEL ☒ RECOVERED ☐ RECOVERING ☐ RECENT OR NO RECOVERY

1. SUBSTRATE (Estimate percent of every type of substrate present. Check *ONLY* two predominant substrate *TYPE* boxes (Max of 32). Add total number of significant substrate types found (Max of 8). Final metric score is sum of boxes A & B.

HHEI Metric Points

TYPE		PERCENT	TYPE		PERCENT
☐ ☐	BLDR SLABS [16 pts]	_____	☒ ☐	SILT [3 pt]	_____
☐ ☐	BOULDER (>256 mm) [16 pts]	_____	☐ ☐	LEAF PACK/WOODY DEBRIS [3 pts]	_____
☐ ☐	BEDROCK [16 pt]	_____	☐ ☐	FINE DETRITUS [3 pts]	_____
☐ ☐	COBBLE (65-256 mm) [12 pts]	_____	☒ ☐	CLAY or HARDPAN [0 pt]	_____
☐ ☐	GRAVEL (2-64 mm) [9 pts]	_____	☐ ☐	MUCK [0 pts]	_____
☐ ☐	SAND (<2 mm) [6 pts]	_____	☐ ☐	ARTIFICIAL [3 pts]	_____

Total of Percentages of Bldr Slabs, Boulder, Cobble, Bedrock _____ **(A)** **(B)**

Substrate Max = 40

A + B

SCORE OF TWO MOST PREDOMINATE SUBSTRATE TYPES: **TOTAL NUMBER OF SUBSTRATE TYPES:**

2. Maximum Pool Depth ***(Measure the maximum pool depth within the 61 meter (200 ft)*** evaluation reach at the time of evaluation. Avoid plunge pools from road culverts or storm water pipes) (Check *ONLY* one box):

Pool Depth Max = 30

☐ > 30 centimeters [20 pts]
☐ > 22.5 - 30 cm [30 pts]
☐ > 10 - 22.5 cm [25 pts]
☐ > 5 cm - 10 cm [15 pts]
☐ < 5 cm [5 pts]
☐ NO WATER OR MOIST CHANNEL [0 pts]

COMMENTS _____ **MAXIMUM POOL DEPTH (centimeters):**

3. BANK FULL WIDTH (Measured as the average of 3-4 measurements) **(Check *ONLY* one box):**

Bankfull Width Max=30

☐ > 4.0 meters [30 pts]
☐ > 3.0 m - 4.0 m [25 pts]
☐ > 1.5 m - 3.0 m [20 pts]
☒ > 1.0 m - 1.5 m [15 pts]
☐ ≤ 1.0 m [5 pts]

COMMENTS _____ **AVERAGE BANKFULL WIDTH (meters):**

This information must also be completed

RIPARIAN ZONE AND FLOODPLAIN QUALITY ☆NOTE: River Left (L) and Right (R) as looking downstream☆

RIPARIAN WIDTH L	R	(Per Bank)	FLOODPLAIN QUALITY L	R	(Most Predominant per Bank)	L	R	
☒	☐	Wide >10m	☐	☐	Mature Forest, Wetland	☐	☐	Conservation Tillage
☐	☒	Moderate 5-10m	☒	☒	Immature Forest, Shrub or Old Field	☐	☐	Urban or Industrial
☐	☐	Narrow <5m	☐	☐	Residential, Park, New Field	☐	☐	Open Pasture, Row Crop
☐	☐	None	☐	☐	Fenced Pasture	☐	☐	Mining or Construction

COMMENTS _____

FLOW REGIME *(At Time of Evaluation)* (Check *ONLY* one box):

☐ Stream Flowing
☐ Subsurface flow with isolated pools (Interstitial)
☐ Moist Channel, isolated pools, no flow (Intermittent)
☒ Dry channel, no water (Ephemeral)

COMMENTS _____

SINUOSITY (Number of bends per 61 m (200 ft) of channel) (Check *ONLY* one box):

☒ None ☐ 1.0 ☐ 2.0 ☐ 3.0
☐ 0.5 ☐ 1.5 ☐ 2.5 ☐ >3

STREAM GRADIENT ESTIMATE

☐ Flat (0.5 ft/100 ft) ☒ Flat to Moderate ☐ Moderate (2 ft/100 ft) ☐ Moderate to Severe ☐ Severe (10 ft/100 ft)

ADDITIONAL STREAM INFORMATION (This Information Must Also be Completed):

QHEI PERFORMED? - ☐ Yes ☐ No QHEI Score _____ (If Yes, Attach Completed QHEI Form)

DOWNSTREAM DESIGNATED USE(S)

☐ WWH Name: _____ Distance from Evaluated Stream _____

☐ CWH Name: _____ Distance from Evaluated Stream _____

☐ EWH Name: _____ Distance from Evaluated Stream _____

MAPPING: ATTACH COPIES OF MAPS, INCLUDING THE ENTIRE WATERSHED AREA. CLEARLY MARK THE SITE LOCATION

USGS Quadrangle Name: _____ NRCS Soil Map Page: _____ NRCS Soil Map Stream Order _____

County: _____ Township / City: _____

MISCELLANEOUS

Base Flow Conditions? (Y/N): _____ Date of last precipitation: _____ Quantity: _____

Photograph Information: _____

Elevated Turbidity? (Y/N): _____ Canopy (% open): _____

Were samples collected for water chemistry? (Y/N): _____ (Note lab sample no. or id. and attach results) Lab Number: _____

Field Measures: Temp (°C) _____ Dissolved Oxygen (mg/l) _____ pH (S.U.) _____ Conductivity (µmhos/cm) _____

Is the sampling reach representative of the stream (Y/N) _____ If not, please explain: _____

Additional comments/description of pollution impacts: _____

BIOTIC EVALUATION

Performed? (Y/N): _____ (If Yes, Record all observations. Voucher collections optional. NOTE: all voucher samples must be labeled with the site ID number. Include appropriate field data sheets from the Primary Headwater Habitat Assessment Manual)

Fish Observed? (Y/N) _____ Voucher? (Y/N) _____ Salamanders Observed? (Y/N) _____ Voucher? (Y/N) _____

Frogs or Tadpoles Observed? (Y/N) _____ Voucher? (Y/N) _____ Aquatic Macroinvertebrates Observed? (Y/N) _____ Voucher? (Y/N) _____

Comments Regarding Biology: _____

DRAWING AND NARRATIVE DESCRIPTION OF STREAM REACH (This must be completed):

Include important landmarks and other features of interest for site evaluation and a narrative description of the stream's location

FLOW ➔

Primary Headwater Habitat Evaluation Form

HHEI Score (sum of metrics 1, 2, 3) : 39

SITE NAME/LOCATION Tributary of Eagan Ditch

Class II Modified SITE NUMBER Sec3-02A RIVER BASIN _____ DRAINAGE AREA (mi²) 0.150

LENGTH OF STREAM REACH (ft) 200 LAT. _____ LONG. _____ RIVER CODE _____ RIVER MILE _____

DATE Aug 17, 2009 SCORER K. Roth COMMENTS _____

NOTE: Complete All Items On This Form - Refer to "Field Evaluation Manual for Ohio's PHWH Streams" for Instructions

STREAM CHANNEL MODIFICATIONS: ☐ NONE / NATURAL CHANNEL ☐ RECOVERED ☐ RECOVERING ☑ RECENT OR NO RECOVERY

1. SUBSTRATE (Estimate percent of every type of substrate present. Check *ONLY* two predominant substrate *TYPE* boxes (Max of 32). Add total number of significant substrate types found (Max of 8). Final metric score is sum of boxes A & B.

TYPE		PERCENT	TYPE		PERCENT
☐ ☐	BLDR SLABS [16 pts]	0.0%	☐ ☐	SILT [3 pt]	29.0%
☐ ☐	BOULDER (>256 mm) [16 pts]	0.0%	☐ ☐	LEAF PACK/WOODY DEBRIS [3 pts]	0.0%
☐ ☐	BEDROCK [16 pt]	0.0%	☐ ☐	FINE DETRITUS [3 pts]	0.0%
☐ ☐	COBBLE (65-256 mm) [12 pts]	0.0%	☑ ☐	CLAY or HARDPAN [0 pt]	40.0%
☐ ☐	GRAVEL (2-64 mm) [9 pts]	0.0%	☐ ☐	MUCK [0 pts]	0.0%
☐ ☑	SAND (<2 mm) [6 pts]	31.0%	☐ ☐	ARTIFICIAL [3 pts]	0.0%

Total of Percentages of Bldr Slabs, Boulder, Cobble, Bedrock 0.0% (A)

Substrate Percentage Check 100% (B)

SCORE OF TWO MOST PREDOMINATE SUBSTRATE TYPES: 6 **TOTAL NUMBER OF SUBSTRATE TYPES:** 3

HHEI Metric Points

Substrate Max = 40: 9

A + B

2. Maximum Pool Depth ***(Measure the maximum pool depth within the 61 meter (200 ft)*** evaluation reach at the time of evaluation. Avoid plunge pools from road culverts or storm water pipes) (Check *ONLY* one box):

- ☐ > 30 centimeters [20 pts]
- ☐ > 22.5 - 30 cm [30 pts]
- ☐ > 10 - 22.5 cm [25 pts]
- ☐ > 5 cm - 10 cm [15 pts]
- ☐ < 5 cm [5 pts]
- ☑ NO WATER OR MOIST CHANNEL [0 pts]

COMMENTS Muddy Channel **MAXIMUM POOL DEPTH (centimeters):** 0.0

Pool Depth Max = 30: 0

3. BANK FULL WIDTH (Measured as the average of 3-4 measurements) (Check *ONLY* one box):

- ☑ > 4.0 meters [30 pts]
- ☐ > 3.0 m - 4.0 m [25 pts]
- ☐ > 1.5 m - 3.0 m [20 pts]
- ☐ > 1.0 m - 1.5 m [15 pts]
- ☐ ≤ 1.0 m [5 pts]

COMMENTS _____ **AVERAGE BANKFULL WIDTH (meters):** 4.20

Bankfull Width Max=30: 30

This information must also be completed

RIPARIAN ZONE AND FLOODPLAIN QUALITY ☆NOTE: River Left (L) and Right (R) as looking downstream☆

RIPARIAN WIDTH (Per Bank) L	R		FLOODPLAIN QUALITY (Most Predominant per Bank) L	R		L	R	
☐	☐	Wide >10m	☐	☐	Mature Forest, Wetland	☐	☐	Conservation Tillage
☐	☐	Moderate 5-10m	☐	☐	Immature Forest, Shrub or Old Field	☐	☐	Urban or Industrial
☐	☐	Narrow <5m	☐	☐	Residential, Park, New Field	☑	☑	Open Pasture, Row Crop
☑	☑	None	☐	☐	Fenced Pasture	☐	☐	Mining or Construction

COMMENTS _____

FLOW REGIME *(At Time of Evaluation)* (Check *ONLY* one box):

- ☐ Stream Flowing
- ☐ Subsurface flow with isolated pools (Interstitial)
- ☐ Moist Channel, isolated pools, no flow (Intermittent)
- ☑ Dry channel, no water (Ephemeral)

COMMENTS _____

SINUOSITY (Number of bends per 61 m (200 ft) of channel) (Check *ONLY* one box):

- ☑ None
- ☐ 0.5
- ☐ 1.0
- ☐ 1.5
- ☐ 2.0
- ☐ 2.5
- ☐ 3.0
- ☐ >3

STREAM GRADIENT ESTIMATE

☐ Flat (0.5 ft/100 ft) ☑ Flat to Moderate ☐ Moderate (2 ft/100 ft) ☐ Moderate to Severe ☐ Severe (10 ft/100 ft)

Click purple box to save form data

Click in blue box to go to Page 2

ADDITIONAL STREAM INFORMATION (This Information Must Also be Completed):

QHEI PERFORMED? - ☐ Yes ☑ No QHEI Score _____ (If Yes, Attach Completed QHEI Form)

DOWNSTREAM DESIGNATED USE(S)

☐ WWH Name: _____ Distance from Evaluated Stream _____
☐ CWH Name: _____ Distance from Evaluated Stream _____
☐ EWH Name: _____ Distance from Evaluated Stream _____

MAPPING: ATTACH COPIES OF MAPS, INCLUDING THE ENTIRE WATERSHED AREA. CLEARLY MARK THE SITE LOCATION

USGS Quadrangle Name: Montgomery NRCS Soil Map Page:_____ NRCS Soil Map Stream Order 0

County: Daviess Township / City:_____

MISCELLANEOUS

Base Flow Conditions? (Y/N): Y Date of last precipitation: Aug 15, 2009 Quantity: 0.04

Photograph Information: _____

Elevated Turbidity? (Y/N): N Canopy (% open): 100%

Were samples collected for water chemistry? (Y/N): N (Note lab sample no. or id. and attach results) Lab Number:_____

Field Measures: Temp (°C)_____ Dissolved Oxygen (mg/l) _____ pH (S.U.) _____ Conductivity (µmhos/cm) _____

Is the sampling reach representative of the stream (Y/N) Y If not, please explain:_____

_____

Additional comments/description of pollution impacts:_____

_____

BIOTIC EVALUATION

Performed? (Y/N): N (If Yes, Record all observations. Voucher collections optional. NOTE: all voucher samples must be labeled with the site ID number. Include appropriate field data sheets from the Primary Headwater Habitat Assessment Manual)

Fish Observed? (Y/N) N Voucher? (Y/N) N Salamanders Observed? (Y/N) N Voucher? (Y/N) N
Frogs or Tadpoles Observed? (Y/N) N Voucher? (Y/N) N Aquatic Macroinvertebrates Observed? (Y/N) N Voucher? (Y/N) N

Comments Regarding Biology: _____

_____

_____

DRAWING AND NARRATIVE DESCRIPTION OF STREAM REACH (This must be completed):

Include important landmarks and other features of interest for site evaluation and a narrative description of the stream's location

STREAM DRAWING ON ORIGINAL FIELD DATA SHEETS STORED AT LAKE SWCD OFFICE.

FLOW →

OhioEPA Primary Headwater Habitat Evaluation Form

HHEI Score (sum of metrics 1, 2, 3) : [illegible]

SITE NAME/LOCATION [illegible] SITE NUMBER [illegible] RIVER BASIN [illegible] DRAINAGE AREA (mi²) [illegible]

LENGTH OF STREAM REACH (ft) [illegible] LAT. _____ LONG. _____ RIVER CODE _____ RIVER MILE _____

DATE [illegible] SCORER [illegible] COMMENTS _____

NOTE: Complete All Items On This Form - Refer to "Field Evaluation Manual for Ohio's PHWH Streams" for Instructions

STREAM CHANNEL MODIFICATIONS: ☐ NONE / NATURAL CHANNEL ☐ RECOVERED ☐ RECOVERING ☒ RECENT OR NO RECOVERY

1. SUBSTRATE (Estimate percent of every type of substrate present. Check *ONLY* two predominant substrate *TYPE* boxes (Max of 32). Add total number of significant substrate types found (Max of 8). Final metric score is sum of boxes A & B.

HHEI Metric Points

TYPE		PERCENT	TYPE		PERCENT
☐ ☐	BLDR SLABS [16 pts]	_____	☐ ☐	SILT [3 pt]	_____
☐ ☐	BOULDER (>256 mm) [16 pts]	_____	☐ ☐	LEAF PACK/WOODY DEBRIS [3 pts]	_____
☐ ☐	BEDROCK [16 pt]	_____	☐ ☐	FINE DETRITUS [3 pts]	_____
☐ ☐	COBBLE (65-256 mm) [12 pts]	_____	☒ ☐	CLAY or HARDPAN [0 pt]	50%
☒ ☐	GRAVEL (2-64 mm) [9 pts]	40%	☐ ☐	MUCK [0 pts]	_____
☐ ☐	SAND (<2 mm) [6 pts]	10%	☐ ☐	ARTIFICIAL [3 pts]	_____

Total of Percentages of Bldr Slabs, Boulder, Cobble, Bedrock 0% **(A)** **(B)**

Substrate Max = 40 [illegible]

A + B

SCORE OF TWO MOST PREDOMINATE SUBSTRATE TYPES: [illegible] **TOTAL NUMBER OF SUBSTRATE TYPES:** [illegible]

2. Maximum Pool Depth ***(Measure the maximum pool depth within the 61 meter (200 ft)*** evaluation reach at the time of evaluation. Avoid plunge pools from road culverts or storm water pipes) (Check *ONLY* one box):

Pool Depth Max = 30 [illegible]

- ☐ > 30 centimeters [20 pts]
- ☐ > 22.5 - 30 cm [30 pts]
- ☐ > 10 - 22.5 cm [25 pts]
- ☐ > 5 cm - 10 cm [15 pts]
- ☐ < 5 cm [5 pts]
- ☒ NO WATER OR MOIST CHANNEL [0 pts]

COMMENTS _____ **MAXIMUM POOL DEPTH (centimeters):** 0

3. BANK FULL WIDTH (Measured as the average of 3-4 measurements) **(Check *ONLY* one box):**

Bankfull Width Max=30 [illegible]

- ☐ > 4.0 meters [30 pts]
- ☐ > 3.0 m - 4.0 m [25 pts]
- ☒ > 1.5 m - 3.0 m [20 pts]
- ☐ > 1.0 m - 1.5 m [15 pts]
- ☐ ≤ 1.0 m [5 pts]

COMMENTS _____ **AVERAGE BANKFULL WIDTH (meters):** [illegible]

This information must also be completed

RIPARIAN ZONE AND FLOODPLAIN QUALITY ☆NOTE: River Left (L) and Right (R) as looking downstream☆

RIPARIAN WIDTH L R	(Per Bank)	FLOODPLAIN QUALITY L R	(Most Predominant per Bank)	L R	
☐ ☒	Wide >10m	☐ ☐	Mature Forest, Wetland	☐ ☐	Conservation Tillage
☒ ☐	Moderate 5-10m	☐ ☒	Immature Forest, Shrub or Old Field	☐ ☐	Urban or Industrial
☐ ☐	Narrow <5m	☐ ☐	Residential, Park, New Field	☐ ☐	Open Pasture, Row Crop
☐ ☐	None	☐ ☐	Fenced Pasture	☐ ☐	Mining or Construction

COMMENTS [illegible]

FLOW REGIME *(At Time of Evaluation)* (Check *ONLY* one box):

- ☐ Stream Flowing
- ☐ Subsurface flow with isolated pools (Interstitial)
- ☐ Moist Channel, isolated pools, no flow (Intermittent)
- ☒ Dry channel, no water (Ephemeral)

COMMENTS _____

SINUOSITY (Number of bends per 61 m (200 ft) of channel) (Check *ONLY* one box):

☒ None	☐ 1.0	☐ 2.0	☐ 3.0
☐ 0.5	☐ 1.5	☐ 2.5	☐ >3

STREAM GRADIENT ESTIMATE

☐ Flat (0.5 ft/100 ft) ☒ Flat to Moderate ☐ Moderate (2 ft/100 ft) ☐ Moderate to Severe ☐ Severe (10 ft/100 ft)

ADDITIONAL STREAM INFORMATION (This Information Must Also be Completed):

QHEI PERFORMED? - ☐ Yes ☒ No QHEI Score _____ (If Yes, Attach Completed QHEI Form)

DOWNSTREAM DESIGNATED USE(S)

☐ WWH Name: _____ Distance from Evaluated Stream _____

☐ CWH Name: _____ Distance from Evaluated Stream _____

☐ EWH Name: _____ Distance from Evaluated Stream _____

MAPPING: ATTACH COPIES OF MAPS, INCLUDING THE ENTIRE WATERSHED AREA. CLEARLY MARK THE SITE LOCATION

USGS Quadrangle Name: _____ NRCS Soil Map Page: _____ NRCS Soil Map Stream Order 2

County: _____ Township / City: _____

MISCELLANEOUS

Base Flow Conditions? (Y/N): _____ Date of last precipitation: _____ Quantity: _____

Photograph Information: _____

Elevated Turbidity? (Y/N): _____ Canopy (% open): 100%

Were samples collected for water chemistry? (Y/N): _____ (Note lab sample no. or id. and attach results) Lab Number: _____

Field Measures: Temp (°C) _____ Dissolved Oxygen (mg/l) _____ pH (S.U.) _____ Conductivity (µmhos/cm) _____

Is the sampling reach representative of the stream (Y/N) _____ If not, please explain: _____

Additional comments/description of pollution impacts: _____

BIOTIC EVALUATION

Performed? (Y/N): _____ (If Yes, Record all observations. Voucher collections optional. NOTE: all voucher samples must be labeled with the site ID number. Include appropriate field data sheets from the Primary Headwater Habitat Assessment Manual)

Fish Observed? (Y/N) _____ Voucher? (Y/N) _____ Salamanders Observed? (Y/N) _____ Voucher? (Y/N) _____

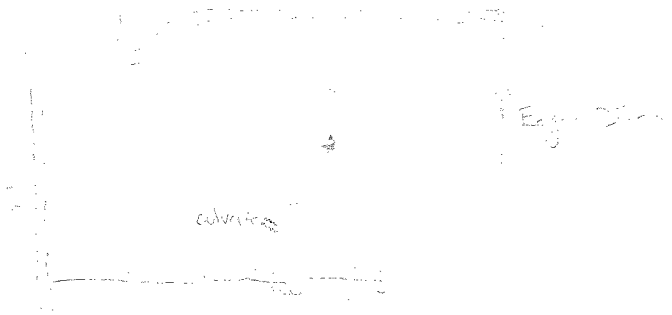
Frogs or Tadpoles Observed? (Y/N) _____ Voucher? (Y/N) _____ Aquatic Macroinvertebrates Observed? (Y/N) _____ Voucher? (Y/N) _____

Comments Regarding Biology: _____

DRAWING AND NARRATIVE DESCRIPTION OF STREAM REACH (This must be completed):

Include important landmarks and other features of interest for site evaluation and a narrative description of the stream's location

FLOW →



Primary Headwater Habitat Evaluation Form

HHEI Score (sum of metrics 1, 2, 3) : 59

SITE NAME/LOCATION: Tributary of Eagan Ditch

Class II Modified | SITE NUMBER: Sec3-S03A | RIVER BASIN: White River | DRAINAGE AREA (mi²): 0.817

LENGTH OF STREAM REACH (ft): 200 | LAT. ____ | LONG. ____ | RIVER CODE ____ | RIVER MILE ____

DATE: Aug 17, 2009 | SCORER: K. Roth | COMMENTS ____

NOTE: Complete All Items On This Form - Refer to "Field Evaluation Manual for Ohio's PHWH Streams" for Instructions

STREAM CHANNEL MODIFICATIONS: ☐ NONE / NATURAL CHANNEL ☐ RECOVERED ☐ RECOVERING ☑ RECENT OR NO RECOVERY

HHEI Metric Points

1. SUBSTRATE (Estimate percent of every type of substrate present. Check *ONLY* two predominant substrate *TYPE* boxes (Max of 32). Add total number of significant substrate types found (Max of 8). Final metric score is sum of boxes A & B.

TYPE		PERCENT	TYPE		PERCENT
☐ ☐	BLDR SLABS [16 pts]	0.0%	☐ ☐	SILT [3 pt]	5.0%
☐ ☐	BOULDER (>256 mm) [16 pts]	5.0%	☐ ☐	LEAF PACK/WOODY DEBRIS [3 pts]	0.0%
☐ ☐	BEDROCK [16 pt]	0.0%	☐ ☐	FINE DETRITUS [3 pts]	0.0%
☐ ☐	COBBLE (65-256 mm) [12 pts]	0.0%	☐ ☐	CLAY or HARDPAN [0 pt]	0.0%
☐ ☑	GRAVEL (2-64 mm) [9 pts]	10.0%	☐ ☐	MUCK [0 pts]	0.0%
☑ ☐	SAND (<2 mm) [6 pts]	80.0%	☐ ☐	ARTIFICIAL [3 pts]	0.0%

Total of Percentages of Bldr Slabs, Boulder, Cobble, Bedrock: 5.0% (A)

Substrate Percentage Check: 100% (B)

SCORE OF TWO MOST PREDOMINATE SUBSTRATE TYPES: 15

TOTAL NUMBER OF SUBSTRATE TYPES: 4

Substrate Max = 40: **19**

A + B

2. Maximum Pool Depth ***(Measure the maximum pool depth within the 61 meter (200 ft)*** evaluation reach at the time of evaluation. Avoid plunge pools from road culverts or storm water pipes) (Check *ONLY* one box):

- ☑ > 30 centimeters [20 pts]
- ☐ > 22.5 - 30 cm [30 pts]
- ☐ > 10 - 22.5 cm [25 pts]
- ☐ > 5 cm - 10 cm [15 pts]
- ☐ < 5 cm [5 pts]
- ☐ NO WATER OR MOIST CHANNEL [0 pts]

COMMENTS ____ **MAXIMUM POOL DEPTH (centimeters):** ____

Pool Depth Max = 30: **20**

3. BANK FULL WIDTH (Measured as the average of 3-4 measurements) (Check *ONLY* one box):

- ☐ > 4.0 meters [30 pts]
- ☐ > 3.0 m - 4.0 m [25 pts]
- ☑ > 1.5 m - 3.0 m [20 pts]
- ☐ > 1.0 m - 1.5 m [15 pts]
- ☐ ≤ 1.0 m [5 pts]

COMMENTS ____ **AVERAGE BANKFULL WIDTH (meters):** 2.00

Bankfull Width Max=30: **20**

This information must also be completed

RIPARIAN ZONE AND FLOODPLAIN QUALITY ☆NOTE: River Left (L) and Right (R) as looking downstream☆

RIPARIAN WIDTH (Per Bank) L	R		FLOODPLAIN QUALITY (Most Predominant per Bank) L	R		L	R	
☐	☐	Wide >10m	☐	☐	Mature Forest, Wetland	☐	☐	Conservation Tillage
☐	☐	Moderate 5-10m	☐	☐	Immature Forest, Shrub or Old Field	☐	☐	Urban or Industrial
☐	☐	Narrow <5m	☐	☐	Residential, Park, New Field	☐	☐	Open Pasture, Row Crop
☑	☑	None	☐	☐	Fenced Pasture	☐	☐	Mining or Construction

COMMENTS ____

FLOW REGIME *(At Time of Evaluation)* (Check *ONLY* one box):

- ☐ Stream Flowing
- ☐ Subsurface flow with isolated pools (Interstitial)
- ☑ Moist Channel, isolated pools, no flow (Intermittent)
- ☐ Dry channel, no water (Ephemeral)

COMMENTS ____

SINUOSITY (Number of bends per 61 m (200 ft) of channel) (Check *ONLY* one box):

- ☐ None
- ☐ 0.5
- ☑ 1.0
- ☐ 1.5
- ☐ 2.0
- ☐ 2.5
- ☐ 3.0
- ☐ >3

STREAM GRADIENT ESTIMATE

☐ Flat (0.5 ft/100 ft) ☐ Flat to Moderate ☑ Moderate (2 ft/100 ft) ☐ Moderate to Severe ☐ Severe (10 ft/100 ft)

Click purple box to save form data

Click in blue box to go to Page 2

ADDITIONAL STREAM INFORMATION (This Information Must Also be Completed):

QHEI PERFORMED? - ☐ Yes ☑ No QHEI Score _____ (If Yes, Attach Completed QHEI Form)

DOWNSTREAM DESIGNATED USE(S)

☐ WWH Name: _____ Distance from Evaluated Stream _____
☐ CWH Name: _____ Distance from Evaluated Stream _____
☐ EWH Name: _____ Distance from Evaluated Stream _____

MAPPING: ATTACH COPIES OF MAPS, INCLUDING THE ENTIRE WATERSHED AREA. CLEARLY MARK THE SITE LOCATION

USGS Quadrangle Name: Montgomery NRCS Soil Map Page: _____ NRCS Soil Map Stream Order 0

County: Daviess Township / City: _____

MISCELLANEOUS

Base Flow Conditions? (Y/N): Y Date of last precipitation: Aug 15, 2009 Quantity: 0.04

Photograph Information: 4 photos

Elevated Turbidity? (Y/N): N Canopy (% open): 100%

Were samples collected for water chemistry? (Y/N): N (Note lab sample no. or id. and attach results) Lab Number: _____

Field Measures: Temp (°C) _____ Dissolved Oxygen (mg/l) _____ pH (S.U.) _____ Conductivity (µmhos/cm) _____

Is the sampling reach representative of the stream (Y/N) Y If not, please explain: _____

Additional comments/description of pollution impacts: _____

BIOTIC EVALUATION

Performed? (Y/N): N (If Yes, Record all observations. Voucher collections optional. NOTE: all voucher samples must be labeled with the site ID number. Include appropriate field data sheets from the Primary Headwater Habitat Assessment Manual)

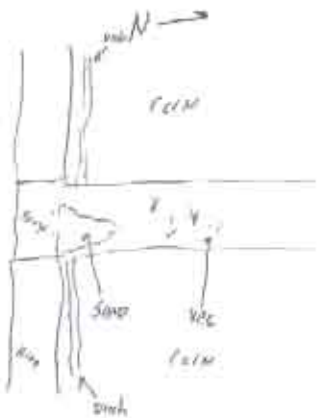
Fish Observed? (Y/N) Y Voucher? (Y/N) N Salamanders Observed? (Y/N) N Voucher? (Y/N) N
Frogs or Tadpoles Observed? (Y/N) N Voucher? (Y/N) N Aquatic Macroinvertebrates Observed? (Y/N) N Voucher? (Y/N) N

Comments Regarding Biology: Silverjaw minnows, aquatic snails, seed shrimp, and clam shrimp were observed.

DRAWING AND NARRATIVE DESCRIPTION OF STREAM REACH (This must be completed):

Include important landmarks and other features of interest for site evaluation and a narrative description of the stream's location

FLOW →



Primary Headwater Habitat Evaluation Form

HHEI Score (sum of metrics 1, 2, 3) : 49

SITE NAME/LOCATION: Tributary of Eagan Ditch

Class II Modified | SITE NUMBER: Sec3-S03B | RIVER BASIN: White River | DRAINAGE AREA (mi²): 0.549

LENGTH OF STREAM REACH (ft): 200 | LAT. ____ | LONG. ____ | RIVER CODE ____ | RIVER MILE ____

DATE: Aug 17, 2009 | SCORER: K. Roth | COMMENTS ____

NOTE: Complete All Items On This Form - Refer to "Field Evaluation Manual for Ohio's PHWH Streams" for Instructions

STREAM CHANNEL MODIFICATIONS: ☐ NONE / NATURAL CHANNEL ☐ RECOVERED ☐ RECOVERING ☑ RECENT OR NO RECOVERY

1. SUBSTRATE (Estimate percent of every type of substrate present. Check *ONLY* two predominant substrate *TYPE* boxes (Max of 32). Add total number of significant substrate types found (Max of 8). Final metric score is sum of boxes A & B.

TYPE		PERCENT	TYPE		PERCENT
☐ ☐	BLDR SLABS [16 pts]	0.0%	☐ ☑	SILT [3 pt]	20.0%
☐ ☐	BOULDER (>256 mm) [16 pts]	5.0%	☐ ☐	LEAF PACK/WOODY DEBRIS [3 pts]	0.0%
☐ ☐	BEDROCK [16 pt]	0.0%	☐ ☐	FINE DETRITUS [3 pts]	0.0%
☐ ☐	COBBLE (65-256 mm) [12 pts]	5.0%	☐ ☐	CLAY or HARDPAN [0 pt]	0.0%
☐ ☐	GRAVEL (2-64 mm) [9 pts]	20.0%	☐ ☐	MUCK [0 pts]	0.0%
☑ ☐	SAND (<2 mm) [6 pts]	50.0%	☐ ☐	ARTIFICIAL [3 pts]	0.0%

Total of Percentages of Bldr Slabs, Boulder, Cobble, Bedrock: 10.0% (A)

Substrate Percentage Check: 100% (B)

SCORE OF TWO MOST PREDOMINATE SUBSTRATE TYPES: 9

TOTAL NUMBER OF SUBSTRATE TYPES: 5

HHEI Metric Points

Substrate Max = 40: 14

A + B

2. Maximum Pool Depth ***(Measure the maximum pool depth within the 61 meter (200 ft)*** evaluation reach at the time of evaluation. Avoid plunge pools from road culverts or storm water pipes) (Check *ONLY* one box):

- ☑ > 30 centimeters [20 pts]
- ☐ > 22.5 - 30 cm [30 pts]
- ☐ > 10 - 22.5 cm [25 pts]
- ☐ > 5 cm - 10 cm [15 pts]
- ☐ < 5 cm [5 pts]
- ☐ NO WATER OR MOIST CHANNEL [0 pts]

COMMENTS ____ **MAXIMUM POOL DEPTH (centimeters):** ____

Pool Depth Max = 30: 20

3. BANK FULL WIDTH (Measured as the average of 3-4 measurements) (Check *ONLY* one box):

- ☐ > 4.0 meters [30 pts]
- ☐ > 3.0 m - 4.0 m [25 pts]
- ☐ > 1.5 m - 3.0 m [20 pts]
- ☑ > 1.0 m - 1.5 m [15 pts]
- ☐ ≤ 1.0 m [5 pts]

COMMENTS ____ **AVERAGE BANKFULL WIDTH (meters):** 1.50

Bankfull Width Max=30: 15

This information must also be completed

RIPARIAN ZONE AND FLOODPLAIN QUALITY ☆NOTE: River Left (L) and Right (R) as looking downstream☆

L	R	RIPARIAN WIDTH (Per Bank)	L	R	FLOODPLAIN QUALITY (Most Predominant per Bank)	L	R	
☐	☐	Wide >10m	☐	☐	Mature Forest, Wetland	☐	☐	Conservation Tillage
☐	☐	Moderate 5-10m	☐	☐	Immature Forest, Shrub or Old Field	☐	☐	Urban or Industrial
☐	☐	Narrow <5m	☐	☐	Residential, Park, New Field	☐	☐	Open Pasture, Row Crop
☑	☑	None	☐	☐	Fenced Pasture	☐	☐	Mining or Construction

COMMENTS ____

FLOW REGIME *(At Time of Evaluation)* (Check *ONLY* one box):

- ☐ Stream Flowing
- ☐ Subsurface flow with isolated pools (Interstitial)
- ☑ Moist Channel, isolated pools, no flow (Intermittent)
- ☐ Dry channel, no water (Ephemeral)

COMMENTS ____

SINUOSITY (Number of bends per 61 m (200 ft) of channel) (Check *ONLY* one box):

- ☑ None
- ☐ 0.5
- ☐ 1.0
- ☐ 1.5
- ☐ 2.0
- ☐ 2.5
- ☐ 3.0
- ☐ >3

STREAM GRADIENT ESTIMATE

☐ Flat (0.5 ft/100 ft) ☐ Flat to Moderate ☑ Moderate (2 ft/100 ft) ☐ Moderate to Severe ☐ Severe (10 ft/100 ft)

Click purple box to save form data

Click in blue box to go to Page 2

ADDITIONAL STREAM INFORMATION (This Information Must Also be Completed):

QHEI PERFORMED? - ☐ Yes ☑ No QHEI Score _____ (If Yes, Attach Completed QHEI Form)

DOWNSTREAM DESIGNATED USE(S)

☐ WWH Name: _____ Distance from Evaluated Stream _____
☐ CWH Name: _____ Distance from Evaluated Stream _____
☐ EWH Name: _____ Distance from Evaluated Stream _____

MAPPING: ATTACH COPIES OF MAPS, INCLUDING THE ENTIRE WATERSHED AREA. CLEARLY MARK THE SITE LOCATION

USGS Quadrangle Name: Montgomery NRCS Soil Map Page: _____ NRCS Soil Map Stream Order 0

County: Daviess Township / City: _____

MISCELLANEOUS

Base Flow Conditions? (Y/N): Y Date of last precipitation: Aug 15, 2009 Quantity: 0.04

Photograph Information: 4 photos

Elevated Turbidity? (Y/N): N Canopy (% open): 100%

Were samples collected for water chemistry? (Y/N): N (Note lab sample no. or id. and attach results) Lab Number: _____

Field Measures: Temp (°C) _____ Dissolved Oxygen (mg/l) _____ pH (S.U.) _____ Conductivity (µmhos/cm) _____

Is the sampling reach representative of the stream (Y/N) Y If not, please explain: _____

Additional comments/description of pollution impacts:

Dead fish in dried pools.

BIOTIC EVALUATION

Performed? (Y/N): N (If Yes, Record all observations. Voucher collections optional. NOTE: all voucher samples must be labeled with the site ID number. Include appropriate field data sheets from the Primary Headwater Habitat Assessment Manual)

Fish Observed? (Y/N) Y Voucher? (Y/N) N Salamanders Observed? (Y/N) N Voucher? (Y/N) N
Frogs or Tadpoles Observed? (Y/N) N Voucher? (Y/N) N Aquatic Macroinvertebrates Observed? (Y/N) N Voucher? (Y/N) N

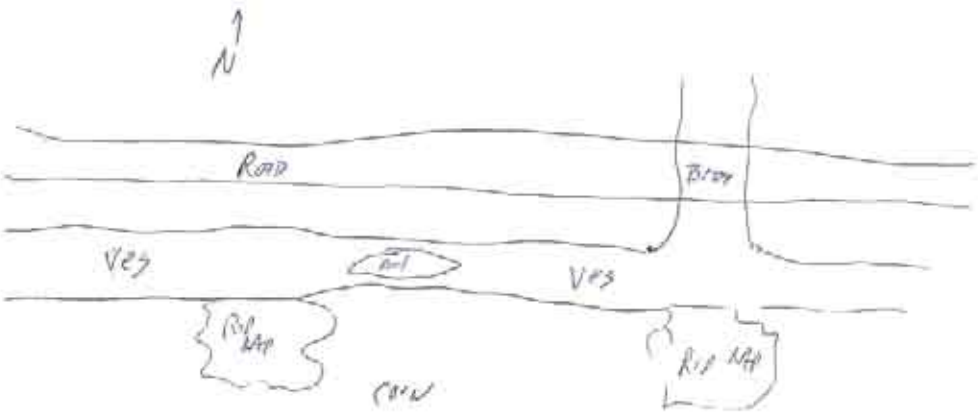
Comments Regarding Biology:

Silverjaw minnows, aquatic snails, seed shrimp, and clam shrimp were observed.

DRAWING AND NARRATIVE DESCRIPTION OF STREAM REACH (This must be completed):

Include important landmarks and other features of interest for site evaluation and a narrative description of the stream's location

FLOW →



April 4, 2002 Revision__

Click in red box to reset form data

Click in blue box to go to Page 1

Primary Headwater Habitat Evaluation Form

HHEI Score (sum of metrics 1, 2, 3) : 34

SITE NAME/LOCATION Tributary of Eagan Ditch

Class II Modified SITE NUMBER Sec3-S3C RIVER BASIN White River DRAINAGE AREA (mi²) 0.820

LENGTH OF STREAM REACH (ft) 200 LAT. ____ LONG. ____ RIVER CODE ____ RIVER MILE ____

DATE Sep 18, 2009 SCORER K. Roth COMMENTS ____

NOTE: Complete All Items On This Form - Refer to "Field Evaluation Manual for Ohio's PHWH Streams" for Instructions

STREAM CHANNEL MODIFICATIONS: ☐ NONE / NATURAL CHANNEL ☐ RECOVERED ☐ RECOVERING ☑ RECENT OR NO RECOVERY

1. SUBSTRATE (Estimate percent of every type of substrate present. Check *ONLY* two predominant substrate *TYPE* boxes (Max of 32). Add total number of significant substrate types found (Max of 8). Final metric score is sum of boxes A & B.

TYPE		PERCENT	TYPE		PERCENT
☐ ☐	BLDR SLABS [16 pts]	0.0%	☐ ☑	SILT [3 pt]	20.0%
☐ ☐	BOULDER (>256 mm) [16 pts]	0.0%	☐ ☐	LEAF PACK/WOODY DEBRIS [3 pts]	0.0%
☐ ☐	BEDROCK [16 pt]	0.0%	☐ ☐	FINE DETRITUS [3 pts]	0.0%
☐ ☐	COBBLE (65-256 mm) [12 pts]	0.0%	☐ ☐	CLAY or HARDPAN [0 pt]	0.0%
☑ ☐	GRAVEL (2-64 mm) [9 pts]	80.0%	☐ ☐	MUCK [0 pts]	0.0%
☐ ☐	SAND (<2 mm) [6 pts]	0.0%	☐ ☐	ARTIFICIAL [3 pts]	0.0%

Total of Percentages of Bldr Slabs, Boulder, Cobble, Bedrock 0.0% (A)

Substrate Percentage Check 100% (B)

SCORE OF TWO MOST PREDOMINATE SUBSTRATE TYPES: 12 **TOTAL NUMBER OF SUBSTRATE TYPES:** 2

HHEI Metric Points

Substrate Max = 40

14

A + B

2. Maximum Pool Depth ***(Measure the maximum pool depth within the 61 meter (200 ft)*** evaluation reach at the time of evaluation. Avoid plunge pools from road culverts or storm water pipes) (Check *ONLY* one box):

☐	> 30 centimeters [20 pts]	☐	> 5 cm - 10 cm [15 pts]
☐	> 22.5 - 30 cm [30 pts]	☐	< 5 cm [5 pts]
☐	> 10 - 22.5 cm [25 pts]	☑	NO WATER OR MOIST CHANNEL [0 pts]

COMMENTS ____ **MAXIMUM POOL DEPTH (centimeters):** 0.0

Pool Depth Max = 30

0

3. BANK FULL WIDTH (Measured as the average of 3-4 measurements) (Check *ONLY* one box):

☐	> 4.0 meters [30 pts]	☐	> 1.0 m - 1.5 m [15 pts]
☐	> 3.0 m - 4.0 m [25 pts]	☐	≤ 1.0 m [5 pts]
☑	> 1.5 m - 3.0 m [20 pts]		

COMMENTS ____ **AVERAGE BANKFULL WIDTH (meters):** 1.80

Bankfull Width Max=30

20

This information must also be completed

RIPARIAN ZONE AND FLOODPLAIN QUALITY ☆NOTE: River Left (L) and Right (R) as looking downstream☆

L	R	RIPARIAN WIDTH (Per Bank)	L	R	FLOODPLAIN QUALITY (Most Predominant per Bank)	L	R	
☐	☐	Wide >10m	☐	☐	Mature Forest, Wetland	☐	☐	Conservation Tillage
☐	☐	Moderate 5-10m	☐	☐	Immature Forest, Shrub or Old Field	☐	☐	Urban or Industrial
☐	☐	Narrow <5m	☐	☐	Residential, Park, New Field	☑	☑	Open Pasture, Row Crop
☑	☑	None	☐	☐	Fenced Pasture	☐	☐	Mining or Construction

COMMENTS ____

FLOW REGIME *(At Time of Evaluation)* (Check *ONLY* one box):

☐	Stream Flowing	☐	Moist Channel, isolated pools, no flow (Intermittent)
☐	Subsurface flow with isolated pools (Interstitial)	☑	Dry channel, no water (Ephemeral)

COMMENTS ____

SINUOSITY (Number of bends per 61 m (200 ft) of channel) (Check *ONLY* one box):

☑	None	☐	1.0	☐	2.0	☐	3.0
☐	0.5	☐	1.5	☐	2.5	☐	>3

STREAM GRADIENT ESTIMATE

☐ Flat (0.5 ft/100 ft) ☐ Flat to Moderate ☑ Moderate (2 ft/100 ft) ☐ Moderate to Severe ☐ Severe (10 ft/100 ft)

Click purple box to save form data

Click in blue box to go to Page 2

ADDITIONAL STREAM INFORMATION (This Information Must Also be Completed):

QHEI PERFORMED? - ☐ Yes ☑ No QHEI Score _____ (If Yes, Attach Completed QHEI Form)

DOWNSTREAM DESIGNATED USE(S)

☐ WWH Name: _____ Distance from Evaluated Stream _____
☐ CWH Name: _____ Distance from Evaluated Stream _____
☐ EWH Name: _____ Distance from Evaluated Stream _____

MAPPING: ATTACH COPIES OF MAPS, INCLUDING THE ENTIRE WATERSHED AREA. CLEARLY MARK THE SITE LOCATION

USGS Quadrangle Name: Montgomery NRCS Soil Map Page:_____ NRCS Soil Map Stream Order 0

County: Daviess Township / City:_____

MISCELLANEOUS

Base Flow Conditions? (Y/N): Y Date of last precipitation:_____ Quantity: 0.00

Photograph Information: 4 Photographs

Elevated Turbidity? (Y/N): N Canopy (% open): 0%

Were samples collected for water chemistry? (Y/N): N (Note lab sample no. or id. and attach results) Lab Number:_____

Field Measures: Temp (°C)_____ Dissolved Oxygen (mg/l) _____ pH (S.U.) _____ Conductivity (µmhos/cm) _____

Is the sampling reach representative of the stream (Y/N) Y If not, please explain:_____

Additional comments/description of pollution impacts:_____

BIOTIC EVALUATION

Performed? (Y/N): N (If Yes, Record all observations. Voucher collections optional. NOTE: all voucher samples must be labeled with the site ID number. Include appropriate field data sheets from the Primary Headwater Habitat Assessment Manual)

Fish Observed? (Y/N) N Voucher? (Y/N) N Salamanders Observed? (Y/N) N Voucher? (Y/N) N
Frogs or Tadpoles Observed? (Y/N) N Voucher? (Y/N) N Aquatic Macroinvertebrates Observed? (Y/N) N Voucher? (Y/N) N

Comments Regarding Biology: _____

DRAWING AND NARRATIVE DESCRIPTION OF STREAM REACH (This must be completed):

Include important landmarks and other features of interest for site evaluation and a narrative description of the stream's location

STREAM DRAWING ON ORIGINAL FIELD DATA SHEETS STORED AT LAKE SWCD OFFICE.

FLOW →

OhioEPA Primary Headwater Habitat Evaluation Form

HHEI Score (sum of metrics 1, 2, 3) : [ ]

SITE NAME/LOCATION _____

_____ SITE NUMBER _____ RIVER BASIN _____ DRAINAGE AREA (mi²) _____

LENGTH OF STREAM REACH (ft) _____ LAT. _____ LONG. _____ RIVER CODE _____ RIVER MILE _____

DATE _____ SCORER _____ COMMENTS _____

NOTE: Complete All Items On This Form - Refer to "Field Evaluation Manual for Ohio's PHWH Streams" for Instructions

STREAM CHANNEL MODIFICATIONS: ☐ NONE / NATURAL CHANNEL ☒ RECOVERED ☐ RECOVERING ☐ RECENT OR NO RECOVERY

1. **SUBSTRATE (Estimate percent of every type of substrate present.** Check *ONLY* two predominant substrate *TYPE* boxes (Max of 32). Add total number of significant substrate types found (Max of 8). Final metric score is sum of boxes A & B.

HHEI Metric Points

TYPE		PERCENT	TYPE		PERCENT
☐ ☐	BLDR SLABS [16 pts]	_____	☐ ☐	SILT [3 pt]	_____
☐ ☐	BOULDER (>256 mm) [16 pts]	_____	☐ ☐	LEAF PACK/WOODY DEBRIS [3 pts]	_____
☐ ☐	BEDROCK [16 pt]	_____	☐ ☐	FINE DETRITUS [3 pts]	_____
☐ ☐	COBBLE (65-256 mm) [12 pts]	_____	☒ ☐	CLAY or HARDPAN [0 pt]	_____
☐ ☐	GRAVEL (2-64 mm) [9 pts]	_____	☐ ☐	MUCK [0 pts]	_____
☒ ☐	SAND (<2 mm) [6 pts]	_____	☐ ☐	ARTIFICIAL [3 pts]	_____

Total of Percentages of Bldr Slabs, Boulder, Cobble, Bedrock _____ **(A)** **(B)**

Substrate Max = 40 [ ]

A + B

SCORE OF TWO MOST PREDOMINATE SUBSTRATE TYPES: **TOTAL NUMBER OF SUBSTRATE TYPES:**

2. **Maximum Pool Depth** ***(Measure the maximum pool depth within the 61 meter (200 ft)*** evaluation reach at the time of evaluation. Avoid plunge pools from road culverts or storm water pipes) (Check *ONLY* one box):

Pool Depth Max = 30 [ ]

- ☐ > 30 centimeters [20 pts]
- ☐ > 22.5 - 30 cm [30 pts]
- ☐ > 10 - 22.5 cm [25 pts]
- ☐ > 5 cm - 10 cm [15 pts]
- ☒ < 5 cm [5 pts]
- ☐ NO WATER OR MOIST CHANNEL [0 pts]

COMMENTS _____ **MAXIMUM POOL DEPTH (centimeters):**

3. **BANK FULL WIDTH (Measured as the average of 3-4 measurements)** **(Check *ONLY* one box):**

Bankfull Width Max=30 [ ]

- ☐ > 4.0 meters [30 pts]
- ☐ > 3.0 m - 4.0 m [25 pts]
- ☐ > 1.5 m - 3.0 m [20 pts]
- ☒ > 1.0 m - 1.5 m [15 pts]
- ☐ ≤ 1.0 m [5 pts]

COMMENTS _____ **AVERAGE BANKFULL WIDTH (meters):**

This information must also be completed

RIPARIAN ZONE AND FLOODPLAIN QUALITY ☆NOTE: River Left (L) and Right (R) as looking downstream☆

L	R	RIPARIAN WIDTH (Per Bank)	L	R	FLOODPLAIN QUALITY (Most Predominant per Bank)	L	R	
☐	☐	Wide >10m	☐	☐	Mature Forest, Wetland	☐	☐	Conservation Tillage
☒	☐	Moderate 5-10m	☒	☒	Immature Forest, Shrub or Old Field	☐	☐	Urban or Industrial
☐	☐	Narrow <5m	☐	☐	Residential, Park, New Field	☐	☐	Open Pasture, Row Crop
☐	☐	None	☐	☐	Fenced Pasture	☐	☐	Mining or Construction

COMMENTS _____

FLOW REGIME *(At Time of Evaluation)* (Check *ONLY* one box):

- ☐ Stream Flowing
- ☐ Subsurface flow with isolated pools (Interstitial)
- ☒ Moist Channel, isolated pools, no flow (Intermittent)
- ☐ Dry channel, no water (Ephemeral)

COMMENTS _____

SINUOSITY (Number of bends per 61 m (200 ft) of channel) (Check *ONLY* one box):

☐ None	☒ 1.0	☐ 2.0	☐ 3.0
☐ 0.5	☐ 1.5	☐ 2.5	☐ >3

STREAM GRADIENT ESTIMATE

☐ Flat (0.5 ft/100 ft) ☒ Flat to Moderate ☐ Moderate (2 ft/100 ft) ☐ Moderate to Severe ☐ Severe (10 ft/100 ft)

ADDITIONAL STREAM INFORMATION (This Information Must Also be Completed):

QHEI PERFORMED? - ☐ Yes ☐ No QHEI Score _____ (If Yes, Attach Completed QHEI Form)

DOWNSTREAM DESIGNATED USE(S)

☐ WWH Name: _____ Distance from Evaluated Stream _____

☐ CWH Name: _____ Distance from Evaluated Stream _____

☐ EWH Name: _____ Distance from Evaluated Stream _____

MAPPING: ATTACH COPIES OF MAPS, INCLUDING THE ENTIRE WATERSHED AREA. CLEARLY MARK THE SITE LOCATION

USGS Quadrangle Name: _____ NRCS Soil Map Page: _____ NRCS Soil Map Stream Order _____

County: _____ Township / City: _____

MISCELLANEOUS

Base Flow Conditions? (Y/N): _____ Date of last precipitation: _____ Quantity: _____

Photograph Information: _____

Elevated Turbidity? (Y/N): _____ Canopy (% open): _____

Were samples collected for water chemistry? (Y/N): _____ (Note lab sample no. or id. and attach results) Lab Number: _____

Field Measures: Temp (°C)_____ Dissolved Oxygen (mg/l) _____ pH (S.U.) _____ Conductivity (µmhos/cm) _____

Is the sampling reach representative of the stream (Y/N)_____ If not, please explain: _____

_____

Additional comments/description of pollution impacts: _____

_____

BIOTIC EVALUATION

Performed? (Y/N): _____ (If Yes, Record all observations. Voucher collections optional. NOTE: all voucher samples must be labeled with the site ID number. Include appropriate field data sheets from the Primary Headwater Habitat Assessment Manual)

Fish Observed? (Y/N)_____ Voucher? (Y/N)_____ Salamanders Observed? (Y/N)_____ Voucher? (Y/N)_____

Frogs or Tadpoles Observed? (Y/N)____ Voucher? (Y/N)____ Aquatic Macroinvertebrates Observed? (Y/N)____ Voucher? (Y/N)____

Comments Regarding Biology: _____

_____

_____

DRAWING AND NARRATIVE DESCRIPTION OF STREAM REACH (This must be completed):

Include important landmarks and other features of interest for site evaluation and a narrative description of the stream's location

FLOW ➔

Primary Headwater Habitat Evaluation Form

HHEI Score (sum of metrics 1, 2, 3) :

SITE NAME/LOCATION _____

_____ SITE NUMBER _____ RIVER BASIN _____ DRAINAGE AREA (mi²) _____

LENGTH OF STREAM REACH (ft) _____ LAT. _____ LONG. _____ RIVER CODE _____ RIVER MILE _____

DATE _____ SCORER _____ COMMENTS _____

NOTE: Complete All Items On This Form - Refer to "Field Evaluation Manual for Ohio's PHWH Streams" for Instructions

STREAM CHANNEL MODIFICATIONS: ☐ NONE / NATURAL CHANNEL ☒ RECOVERED ☐ RECOVERING ☐ RECENT OR NO RECOVERY

1. SUBSTRATE (Estimate percent of every type of substrate present. Check *ONLY* two predominant substrate *TYPE* boxes (Max of 32). Add total number of significant substrate types found (Max of 8). Final metric score is sum of boxes A & B.

HHEI Metric Points

TYPE		PERCENT	TYPE		PERCENT
☐ ☐	BLDR SLABS [16 pts]	_____	☐ ☐	SILT [3 pt]	_____
☐ ☐	BOULDER (>256 mm) [16 pts]	_____	☐ ☐	LEAF PACK/WOODY DEBRIS [3 pts]	_____
☐ ☐	BEDROCK [16 pt]	_____	☐ ☐	FINE DETRITUS [3 pts]	_____
☐ ☐	COBBLE (65-256 mm) [12 pts]	_____	☐ ☐	CLAY or HARDPAN [0 pt]	_____
☐ ☐	GRAVEL (2-64 mm) [9 pts]	_____	☐ ☐	MUCK [0 pts]	_____
☐ ☐	SAND (<2 mm) [6 pts]	_____	☐ ☐	ARTIFICIAL [3 pts]	_____

Total of Percentages of Bldr Slabs, Boulder, Cobble, Bedrock _____ **(A)** **(B)**

Substrate Max = 40

A + B

SCORE OF TWO MOST PREDOMINATE SUBSTRATE TYPES: **TOTAL NUMBER OF SUBSTRATE TYPES:**

2. Maximum Pool Depth ***(Measure the maximum pool depth within the 61 meter (200 ft)*** evaluation reach at the time of evaluation. Avoid plunge pools from road culverts or storm water pipes) (Check *ONLY* one box):

Pool Depth Max = 30

☐ > 30 centimeters [20 pts]
☐ > 22.5 - 30 cm [30 pts]
☐ > 10 - 22.5 cm [25 pts]
☐ > 5 cm - 10 cm [15 pts]
☐ < 5 cm [5 pts]
☒ NO WATER OR MOIST CHANNEL [0 pts]

COMMENTS _____ **MAXIMUM POOL DEPTH (centimeters):**

3. BANK FULL WIDTH (Measured as the average of 3-4 measurements) **(Check *ONLY* one box):**

Bankfull Width Max=30

☐ > 4.0 meters [30 pts]
☐ > 3.0 m - 4.0 m [25 pts]
☐ > 1.5 m - 3.0 m [20 pts]
☐ > 1.0 m - 1.5 m [15 pts]
☒ ≤ 1.0 m [5 pts]

COMMENTS _____ **AVERAGE BANKFULL WIDTH (meters):**

This information must also be completed

RIPARIAN ZONE AND FLOODPLAIN QUALITY ☆NOTE: River Left (L) and Right (R) as looking downstream☆

L	R	RIPARIAN WIDTH (Per Bank)	L	R	FLOODPLAIN QUALITY (Most Predominant per Bank)	L	R	
☒	☒	Wide >10m	☐	☐	Mature Forest, Wetland	☐	☐	Conservation Tillage
☐	☐	Moderate 5-10m	☐	☐	Immature Forest, Shrub or Old Field	☐	☐	Urban or Industrial
☐	☐	Narrow <5m	☐	☐	Residential, Park, New Field	☐	☐	Open Pasture, Row Crop
☐	☐	None	☐	☐	Fenced Pasture	☐	☐	Mining or Construction

COMMENTS _____

FLOW REGIME *(At Time of Evaluation)* (Check *ONLY* one box):

☐ Stream Flowing
☐ Subsurface flow with isolated pools (Interstitial)
☐ Moist Channel, isolated pools, no flow (Intermittent)
☐ Dry channel, no water (Ephemeral)

COMMENTS _____

SINUOSITY (Number of bends per 61 m (200 ft) of channel) (Check *ONLY* one box):

☒ None ☐ 1.0 ☐ 2.0 ☐ 3.0
☐ 0.5 ☐ 1.5 ☐ 2.5 ☐ >3

STREAM GRADIENT ESTIMATE

☐ Flat (0.5 ft/100 ft) ☐ Flat to Moderate ☐ Moderate (2 ft/100 ft) ☐ Moderate to Severe ☐ Severe (10 ft/100 ft)

ADDITIONAL STREAM INFORMATION (This Information Must Also be Completed):

QHEI PERFORMED? - ☐ Yes ☒ No QHEI Score _____ (If Yes, Attach Completed QHEI Form)

DOWNSTREAM DESIGNATED USE(S)

☐ WWH Name: _____ Distance from Evaluated Stream _____

☐ CWH Name: _____ Distance from Evaluated Stream _____

☐ EWH Name: _____ Distance from Evaluated Stream _____

MAPPING: ATTACH COPIES OF MAPS, INCLUDING THE ENTIRE WATERSHED AREA. CLEARLY MARK THE SITE LOCATION

USGS Quadrangle Name: _____ NRCS Soil Map Page: _____ NRCS Soil Map Stream Order _____

County: _____ Township / City: _____

MISCELLANEOUS

Base Flow Conditions? (Y/N): _____ Date of last precipitation: _____ Quantity: _____

Photograph Information: _____

Elevated Turbidity? (Y/N): _____ Canopy (% open): _____

Were samples collected for water chemistry? (Y/N): _____ (Note lab sample no. or id. and attach results) Lab Number: _____

Field Measures: Temp (°C) _____ Dissolved Oxygen (mg/l) _____ pH (S.U.) _____ Conductivity (µmhos/cm) _____

Is the sampling reach representative of the stream (Y/N) _____ If not, please explain: _____

_____

Additional comments/description of pollution impacts: _____

_____

BIOTIC EVALUATION

Performed? (Y/N): _____ (If Yes, Record all observations. Voucher collections optional. NOTE: all voucher samples must be labeled with the site ID number. Include appropriate field data sheets from the Primary Headwater Habitat Assessment Manual)

Fish Observed? (Y/N) _____ Voucher? (Y/N) _____ Salamanders Observed? (Y/N) _____ Voucher? (Y/N) _____

Frogs or Tadpoles Observed? (Y/N) _____ Voucher? (Y/N) _____ Aquatic Macroinvertebrates Observed? (Y/N) _____ Voucher? (Y/N) _____

Comments Regarding Biology: _____

_____

_____

DRAWING AND NARRATIVE DESCRIPTION OF STREAM REACH (This must be completed):

Include important landmarks and other features of interest for site evaluation and a narrative description of the stream's location

FLOW ➔

Primary Headwater Habitat Evaluation Form

HHEI Score (sum of metrics 1, 2, 3) : [illegible]

SITE NAME/LOCATION _____

_____ SITE NUMBER _____ RIVER BASIN _____ DRAINAGE AREA (mi²) _____

LENGTH OF STREAM REACH (ft) _____ LAT. _____ LONG. _____ RIVER CODE _____ RIVER MILE _____

DATE _____ SCORER _____ COMMENTS _____

NOTE: Complete All Items On This Form - Refer to "Field Evaluation Manual for Ohio's PHWH Streams" for Instructions

STREAM CHANNEL MODIFICATIONS: ☐ NONE / NATURAL CHANNEL ☐ RECOVERED ☒ RECOVERING ☐ RECENT OR NO RECOVERY

1. SUBSTRATE (Estimate percent of every type of substrate present. Check *ONLY* two predominant substrate *TYPE* boxes (Max of 32). Add total number of significant substrate types found (Max of 8). Final metric score is sum of boxes A & B.

HHEI Metric Points

TYPE		PERCENT	TYPE		PERCENT
☐ ☐	BLDR SLABS [16 pts]		☐ ☐	SILT [3 pt]	
☐ ☐	BOULDER (>256 mm) [16 pts]		☐ ☐	LEAF PACK/WOODY DEBRIS [3 pts]	
☐ ☐	BEDROCK [16 pt]		☐ ☐	FINE DETRITUS [3 pts]	
☐ ☐	COBBLE (65-256 mm) [12 pts]		☒ ☐	CLAY or HARDPAN [0 pt]	60%
☐ ☐	GRAVEL (2-64 mm) [9 pts]		☐ ☐	MUCK [0 pts]	
☒ ☐	SAND (<2 mm) [6 pts]	40%	☐ ☐	ARTIFICIAL [3 pts]	

Total of Percentages of Bldr Slabs, Boulder, Cobble, Bedrock _____ **(A)** **(B)**

Substrate Max = 40 [8] **A + B**

SCORE OF TWO MOST PREDOMINATE SUBSTRATE TYPES: [illegible] **TOTAL NUMBER OF SUBSTRATE TYPES:** [illegible]

2. Maximum Pool Depth ***(Measure the maximum pool depth within the 61 meter (200 ft)*** evaluation reach at the time of evaluation. Avoid plunge pools from road culverts or storm water pipes) (Check *ONLY* one box):

Pool Depth Max = 30 [illegible]

- ☐ > 30 centimeters [20 pts]
- ☐ > 22.5 - 30 cm [30 pts]
- ☐ > 10 - 22.5 cm [25 pts]
- ☐ > 5 cm - 10 cm [15 pts]
- ☐ < 5 cm [5 pts]
- ☒ NO WATER OR MOIST CHANNEL [0 pts]

COMMENTS _____ **MAXIMUM POOL DEPTH (centimeters):** [illegible]

3. BANK FULL WIDTH (Measured as the average of 3-4 measurements) **(Check *ONLY* one box):**

Bankfull Width Max=30 [illegible]

- ☐ > 4.0 meters [30 pts]
- ☐ > 3.0 m - 4.0 m [25 pts]
- ☒ > 1.5 m - 3.0 m [20 pts]
- ☐ > 1.0 m - 1.5 m [15 pts]
- ☐ ≤ 1.0 m [5 pts]

COMMENTS _____ **AVERAGE BANKFULL WIDTH (meters):** [illegible]

This information must also be completed

RIPARIAN ZONE AND FLOODPLAIN QUALITY ☆NOTE: River Left (L) and Right (R) as looking downstream☆

RIPARIAN WIDTH L R	(Per Bank)	FLOODPLAIN QUALITY L R	(Most Predominant per Bank)	L R	
☐ ☐	Wide >10m	☐ ☐	Mature Forest, Wetland	☐ ☐	Conservation Tillage
☒ ☒	Moderate 5-10m	☒ ☒	Immature Forest, Shrub or Old Field	☐ ☐	Urban or Industrial
☐ ☐	Narrow <5m	☐ ☐	Residential, Park, New Field	☐ ☐	Open Pasture, Row Crop
☐ ☐	None	☐ ☐	Fenced Pasture	☐ ☐	Mining or Construction

COMMENTS _____

FLOW REGIME *(At Time of Evaluation)* (Check *ONLY* one box):

- ☐ Stream Flowing
- ☐ Subsurface flow with isolated pools (Interstitial)
- ☐ Moist Channel, isolated pools, no flow (Intermittent)
- ☒ Dry channel, no water (Ephemeral)

COMMENTS _____

SINUOSITY (Number of bends per 61 m (200 ft) of channel) (Check *ONLY* one box):

☒ None	☐ 1.0	☐ 2.0	☐ 3.0
☐ 0.5	☐ 1.5	☐ 2.5	☐ >3

STREAM GRADIENT ESTIMATE

☐ Flat (0.5 ft/100 ft) ☒ Flat to Moderate ☐ Moderate (2 ft/100 ft) ☐ Moderate to Severe ☐ Severe (10 ft/100 ft)

ADDITIONAL STREAM INFORMATION (This Information Must Also be Completed):

QHEI PERFORMED? - ☐ Yes ☒ No QHEI Score _____ (If Yes, Attach Completed QHEI Form)

DOWNSTREAM DESIGNATED USE(S)

☐ WWH Name: _____ Distance from Evaluated Stream _____

☐ CWH Name: _____ Distance from Evaluated Stream _____

☐ EWH Name: _____ Distance from Evaluated Stream _____

MAPPING: ATTACH COPIES OF MAPS, INCLUDING THE ENTIRE WATERSHED AREA. CLEARLY MARK THE SITE LOCATION

USGS Quadrangle Name: _____ NRCS Soil Map Page: _____ NRCS Soil Map Stream Order 3

County: _____ Township / City: _____

MISCELLANEOUS

Base Flow Conditions? (Y/N): _____ Date of last precipitation: _____ Quantity: _____

Photograph Information: _____

Elevated Turbidity? (Y/N): _____ Canopy (% open): _____

Were samples collected for water chemistry? (Y/N): _____ (Note lab sample no. or id. and attach results) Lab Number: _____

Field Measures: Temp (°C) _____ Dissolved Oxygen (mg/l) _____ pH (S.U.) _____ Conductivity (µmhos/cm) _____

Is the sampling reach representative of the stream (Y/N) _____ If not, please explain: _____

_____

Additional comments/description of pollution impacts: _____

_____

BIOTIC EVALUATION

Performed? (Y/N): _____ (If Yes, Record all observations. Voucher collections optional. NOTE: all voucher samples must be labeled with the site ID number. Include appropriate field data sheets from the Primary Headwater Habitat Assessment Manual)

Fish Observed? (Y/N) _____ Voucher? (Y/N) _____ Salamanders Observed? (Y/N) _____ Voucher? (Y/N) _____

Frogs or Tadpoles Observed? (Y/N) _____ Voucher? (Y/N) _____ Aquatic Macroinvertebrates Observed? (Y/N) _____ Voucher? (Y/N) _____

Comments Regarding Biology: _____

_____

_____

DRAWING AND NARRATIVE DESCRIPTION OF STREAM REACH (This must be completed):

Include important landmarks and other features of interest for site evaluation and a narrative description of the stream's location

FLOW →

Qualitative Habitat Evaluation Index and Use Assessment Field Sheet

QHEI Score: 37

Stream & Location: SOGA - 200N - Eagan Ditch **RM:** ___ **Date:** 8/17/09

Scorers Full Name & Affiliation: _____

River Code: __-___-___ **STORET #:** _____ **Lat./ Long.:** (NAD 83 - decimal °) __.____ /8__.____ Office verified location ☐

1] SUBSTRATE
Check ONLY Two substrate TYPE BOXES; estimate % or note every type present

BEST TYPES	POOL	RIFFLE	OTHER TYPES	POOL	RIFFLE
☐☐ BLDR /SLABS [10]			☐☐ HARDPAN [4]		
☐☐ BOULDER [9]	5		☐☐ DETRITUS [3]		
☐☐ COBBLE [8]	5		☐☐ MUCK [2]		
☐☐ GRAVEL [7]	10		☑☐ SILT [2]	30	
☑☐ SAND [6]	50		☐☐ ARTIFICIAL [0]		
☐☐ BEDROCK [5]			(Score natural substrates; ignore sludge from point-sources)		

NUMBER OF BEST TYPES: ☑ 4 or more [2] ☐ 3 or less [0]

Check ONE (Or 2 & average)

ORIGIN	QUALITY
☐ LIMESTONE [1]	☐ HEAVY [-2]
☑ TILLS [1]	☑ MODERATE [-1]
☐ WETLANDS [0]	☐ NORMAL [0]
☐ HARDPAN [0]	☐ FREE [1]
☐ SANDSTONE [0]	☐ EXTENSIVE [-2]
☐ RIP/RAP [0]	☑ MODERATE [-1]
☐ LACUSTURINE [0]	☐ NORMAL [0]
☐ SHALE [-1]	☐ NONE [1]
☐ COAL FINES [-2]	

SILT

EMBEDDEDNESS

Comments

Substrate: 9 (Maximum 20)

2] INSTREAM COVER
Indicate presence 0 to 3: 0-Absent; 1-Very small amounts or if more common of marginal quality; 2-Moderate amounts, but not of highest quality or in small amounts of highest quality; 3-Highest quality in moderate or greater amounts (e.g., very large boulders in deep or fast water, large diameter log that is stable, well developed rootwad in deep / fast water, or deep, well-defined, functional pools.

___ UNDERCUT BANKS [1]	1 POOLS > 70cm [2]	___ OXBOWS, BACKWATERS [1]
2 OVERHANGING VEGETATION [1]	___ ROOTWADS [1]	___ AQUATIC MACROPHYTES [1]
2 SHALLOWS (IN SLOW WATER) [1]	___ BOULDERS [1]	___ LOGS OR WOODY DEBRIS [1]
1 ROOTMATS [1]		

AMOUNT Check ONE (Or 2 & average)
- ☐ EXTENSIVE >75% [11]
- ☑ MODERATE 25-75% [7]
- ☐ SPARSE 5-<25% [3]
- ☐ NEARLY ABSENT <5% [1]

Comments
"Old Method" of scoring is used for consistency.

Cover: 12 (Maximum 20)

3] CHANNEL MORPHOLOGY
Check ONE in each category (Or 2 & average)

SINUOSITY	DEVELOPMENT	CHANNELIZATION	STABILITY
☐ HIGH [4]	☐ EXCELLENT [7]	☐ NONE [6]	☐ HIGH [3]
☐ MODERATE [3]	☐ GOOD [5]	☐ RECOVERED [4]	☐ MODERATE [2]
☑ LOW [2]	☐ FAIR [3]	☐ RECOVERING [3]	☑ LOW [1]
☐ NONE [1]	☑ POOR [1]	☑ RECENT OR NO RECOVERY [1]	

Comments

Channel: 5 (Maximum 20)

4] BANK EROSION AND RIPARIAN ZONE
Check ONE in each category for EACH BANK (Or 2 per bank & average)

River right looking downstream

EROSION (L R)	RIPARIAN WIDTH (L R)	FLOOD PLAIN QUALITY (L R)	(L R)
☐☐ NONE / LITTLE [3]	☐☐ WIDE > 50m [4]	☐☐ FOREST, SWAMP [3]	☐☐ CONSERVATION TILLAGE [1]
☑☑ MODERATE [2]	☐☐ MODERATE 10-50m [3]	☐☐ SHRUB OR OLD FIELD [2]	☐☐ URBAN OR INDUSTRIAL [0]
☐☐ HEAVY / SEVERE [1]	☐☐ NARROW 5-10m [2]	☐☐ RESIDENTIAL, PARK, NEW FIELD [1]	☐☐ MINING / CONSTRUCTION [0]
	☐☐ VERY NARROW < 5m [1]	☐☐ FENCED PASTURE [1]	
	☑☑ NONE [0]	☑☑ OPEN PASTURE, ROWCROP [0]	

Indicate predominant land use(s) past 100m riparian.

Comments

Riparian: 2 (Maximum 10)

5] POOL / GLIDE AND RIFFLE / RUN QUALITY

MAXIMUM DEPTH (Check ONE (ONLY!))	CHANNEL WIDTH (Check ONE (Or 2 & average))	CURRENT VELOCITY (Check ALL that apply)	
☐ > 1m [6]	☐ POOL WIDTH > RIFFLE WIDTH [2]	☐ TORRENTIAL [-1]	☑ SLOW [1]
☑ 0.7-<1m [4]	☑ POOL WIDTH = RIFFLE WIDTH [1]	☐ VERY FAST [1]	☐ INTERSTITIAL [-1]
☐ 0.4-<0.7m [2]	☐ POOL WIDTH < RIFFLE WIDTH [0]	☐ FAST [1]	☐ INTERMITTENT [-2]
☐ 0.2-<0.4m [1]		☑ MODERATE [1]	☐ EDDIES [1]
☐ < 0.2m [0]		Indicate for reach - pools and riffles.	

Recreation Potential
Primary Contact
Secondary Contact
(circle one and comment on back)

Comments

Pool / Current: 7 (Maximum 12)

Indicate for functional riffles; Best areas must be large enough to support a population of riffle-obligate species: Check ONE (Or 2 & average). ☐ NO RIFFLE [metric=0]

RIFFLE DEPTH	RUN DEPTH	RIFFLE / RUN SUBSTRATE	RIFFLE / RUN EMBEDDEDNESS
☐ BEST AREAS > 10cm [2]	☐ MAXIMUM > 50cm [2]	☐ STABLE (e.g., Cobble, Boulder) [2]	☐ NONE [2]
☑ BEST AREAS 5-10cm [1]	☑ MAXIMUM < 50cm [1]	☐ MOD. STABLE (e.g., Large Gravel) [1]	☐ LOW [1]
☐ BEST AREAS < 5cm [metric=0]		☑ UNSTABLE (e.g., Fine Gravel, Sand) [0]	☑ MODERATE [0]
			☐ EXTENSIVE [-1]

Comments

Riffle / Run: 2 (Maximum 8)

6] GRADIENT
(6.8 ft/mi) ☐ VERY LOW - LOW [2-4] ☑ MODERATE [6-10] ☐ HIGH - VERY HIGH [10-6]

2.3%

DRAINAGE AREA (3.5 mi²)

%POOL: 20 %GLIDE: 35 %RUN: 35 %RIFFLE: 10

Gradient: 6 (Maximum 10)

S06A

A] SAMPLED REACH

Check ALL that apply

Comment RE: Reach consistency/ Is reach typical of steam?, *Recreation/* Observed - Inferred, *Other/* Sampling observations, Concerns, Access directions, etc.

METHOD

- ☐ BOAT
- ☐ WADE
- ☐ L. LINE
- ☐ OTHER

STAGE

1st -sample pass- 2nd

- ☐ HIGH ☐
- ☐ UP ☐
- ☐ NORMAL ☐
- ☐ LOW ☐
- ☐ DRY ☐

DISTANCE

- ☐ 0.5 Km
- ☐ 0.2 Km
- ☐ 0.15 Km
- ☐ 0.12 Km
- ☐ OTHER

_____ meters

CLARITY

1st --sample pass-- 2nd

- ☐ < 20 cm ☐
- ☐ 20-<40 cm ☐
- ☐ 40-70 cm ☐
- ☐ > 70 cm/ CTB ☐
- ☐ SECCHI DEPTH ☐

CANOPY

- ☐ > 85%- OPEN
- ☐ 55%-<85%
- ☐ 30%-<55%
- ☐ 10%-<30%
- ☐ <10%- CLOSED

1st pass _____ cm

2nd _____ cm

B] AESTHETICS

- ☐ NUISANCE ALGAE
- ☐ INVASIVE MACROPHYTES
- ☐ EXCESS TURBIDITY
- ☐ DISCOLORATION
- ☐ FOAM / SCUM
- ☐ OIL SHEEN
- ☐ TRASH / LITTER
- ☐ NUISANCE ODOR
- ☐ SLUDGE DEPOSITS
- ☐ CSOs/SSOs/OUTFALLS

C] RECREATION

AREA DEPTH

POOL: ☐ >100ft² ☐ >3ft

D] MAINTENANCE

Circle some & *COMMENT*

PUBLIC / PRIVATE / BOTH / NA
ACTIVE / HISTORIC / BOTH / NA
YOUNG-SUCCESSION-OLD
SPRAY / SNAG / REMOVED
MODIFIED / DIPPED OUT / NA
LEVEED / ONE SIDED
RELOCATED / CUTOFFS
MOVING-BEDLOAD-STABLE
ARMOURED / SLUMPS
ISLANDS / SCOURED
IMPOUNDED / DESICCATED
FLOOD CONTROL / DRAINAGE

E] ISSUES

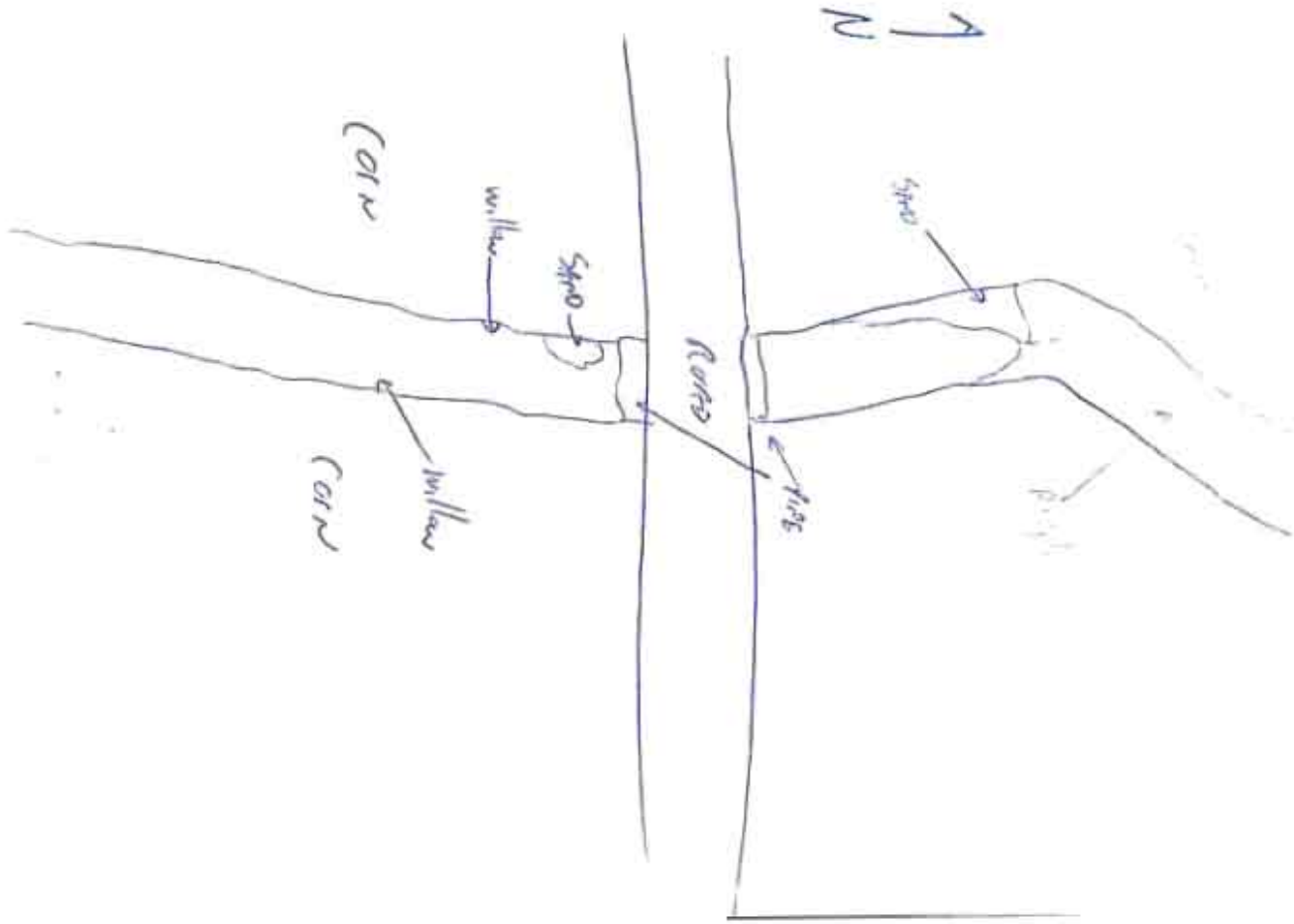
WWTP / CSO / NPDES / INDUSTRY
HARDENED / URBAN / DIRT&GRIME
CONTAMINATED / LANDFILL
BMPs-CONSTRUCTION-SEDIMENT
LOGGING / IRRIGATION / COOLING
BANK / EROSION / SURFACE
FALSE BANK / MANURE / LAGOON
WASH H_2O / TILE / H_2O TABLE
ACID / MINE / QUARRY / FLOW
NATURAL / WETLAND / STAGNANT
PARK / GOLF / LAWN / HOME
ATMOSPHERE / DATA PAUCITY

F] MEASUREMENTS

- $\bar{x}$ width
- $\bar{x}$ depth
- max. depth
- $\bar{x}$ bankfull width
- bankfull $\bar{x}$ depth
- W/D ratio
- bankfull max. depth
- floodprone x^2 width
- entrench. ratio

Legacy Tree:

Stream Drawing:



OhioEPA Primary Headwater Habitat Evaluation Form

HHEI Score (sum of metrics 1, 2, 3) :

SITE NAME/LOCATION _____

_____ SITE NUMBER _____ RIVER BASIN _____ DRAINAGE AREA (mi²) _____

LENGTH OF STREAM REACH (ft) _____ LAT. _____ LONG. _____ RIVER CODE _____ RIVER MILE _____

DATE _____ SCORER _____ COMMENTS _____

NOTE: Complete All Items On This Form - Refer to "Field Evaluation Manual for Ohio's PHWH Streams" for Instructions

STREAM CHANNEL MODIFICATIONS: ☐ NONE / NATURAL CHANNEL ☐ RECOVERED ☐ RECOVERING ☒ RECENT OR NO RECOVERY

1. SUBSTRATE (Estimate percent of every type of substrate present. Check *ONLY* two predominant substrate *TYPE* boxes (Max of 32). Add total number of significant substrate types found (Max of 8). Final metric score is sum of boxes A & B.

HHEI Metric Points

TYPE		PERCENT	TYPE		PERCENT
☐ ☐	BLDR SLABS [16 pts]		☒ ☐	SILT [3 pt]	
☐ ☐	BOULDER (>256 mm) [16 pts]		☐ ☐	LEAF PACK/WOODY DEBRIS [3 pts]	
☐ ☐	BEDROCK [16 pt]		☐ ☐	FINE DETRITUS [3 pts]	
☐ ☐	COBBLE (65-256 mm) [12 pts]		☒ ☐	CLAY or HARDPAN [0 pt]	
☐ ☐	GRAVEL (2-64 mm) [9 pts]		☐ ☐	MUCK [0 pts]	
☐ ☐	SAND (<2 mm) [6 pts]		☐ ☐	ARTIFICIAL [3 pts]	

Total of Percentages of Bldr Slabs, Boulder, Cobble, Bedrock _____ **(A)** **(B)**

Substrate Max = 40

A + B

SCORE OF TWO MOST PREDOMINATE SUBSTRATE TYPES: _____ **TOTAL NUMBER OF SUBSTRATE TYPES:** _____

2. Maximum Pool Depth ***(Measure the maximum pool depth within the 61 meter (200 ft)*** evaluation reach at the time of evaluation. Avoid plunge pools from road culverts or storm water pipes) (Check *ONLY* one box):

Pool Depth Max = 30

☐ > 30 centimeters [20 pts]
☐ > 22.5 - 30 cm [30 pts]
☐ > 10 - 22.5 cm [25 pts]
☐ > 5 cm - 10 cm [15 pts]
☐ < 5 cm [5 pts]
☐ NO WATER OR MOIST CHANNEL [0 pts]

COMMENTS _____ **MAXIMUM POOL DEPTH (centimeters):** _____

3. BANK FULL WIDTH (Measured as the average of 3-4 measurements) **(Check *ONLY* one box):**

Bankfull Width Max=30

☐ > 4.0 meters [30 pts]
☐ > 3.0 m - 4.0 m [25 pts]
☐ > 1.5 m - 3.0 m [20 pts]
☐ > 1.0 m - 1.5 m [15 pts]
☒ ≤ 1.0 m [5 pts]

COMMENTS _____ **AVERAGE BANKFULL WIDTH (meters):** _____

This information must also be completed

RIPARIAN ZONE AND FLOODPLAIN QUALITY ☆NOTE: River Left (L) and Right (R) as looking downstream☆

L R	RIPARIAN WIDTH (Per Bank)	L R	FLOODPLAIN QUALITY (Most Predominant per Bank)	L R	
☐ ☐	Wide >10m	☐ ☐	Mature Forest, Wetland	☐ ☐	Conservation Tillage
☒ ☐	Moderate 5-10m	☒ ☒	Immature Forest, Shrub or Old Field	☐ ☐	Urban or Industrial
☐ ☐	Narrow <5m	☐ ☐	Residential, Park, New Field	☐ ☐	Open Pasture, Row Crop
☐ ☐	None	☐ ☐	Fenced Pasture	☐ ☐	Mining or Construction

COMMENTS _____

FLOW REGIME *(At Time of Evaluation)* (Check *ONLY* one box):

☐ Stream Flowing
☐ Subsurface flow with isolated pools (Interstitial)
☐ Moist Channel, isolated pools, no flow (Intermittent)
☒ Dry channel, no water (Ephemeral)

COMMENTS _____

SINUOSITY (Number of bends per 61 m (200 ft) of channel) (Check *ONLY* one box):

☒ None ☐ 1.0 ☐ 2.0 ☐ 3.0
☐ 0.5 ☐ 1.5 ☐ 2.5 ☐ >3

STREAM GRADIENT ESTIMATE

☐ Flat (0.5 ft/100 ft) ☒ Flat to Moderate ☐ Moderate (2 ft/100 ft) ☐ Moderate to Severe ☐ Severe (10 ft/100 ft)

ADDITIONAL STREAM INFORMATION (This Information Must Also be Completed):

QHEI PERFORMED? - ☐ Yes ☒ No QHEI Score _____ (If Yes, Attach Completed QHEI Form)

DOWNSTREAM DESIGNATED USE(S)

☐ WWH Name: _____ Distance from Evaluated Stream _____

☐ CWH Name: _____ Distance from Evaluated Stream _____

☐ EWH Name: _____ Distance from Evaluated Stream _____

MAPPING: ATTACH COPIES OF MAPS, INCLUDING THE ENTIRE WATERSHED AREA. CLEARLY MARK THE SITE LOCATION

USGS Quadrangle Name: _____ NRCS Soil Map Page: _____ NRCS Soil Map Stream Order _____

County: _____ Township / City: _____

MISCELLANEOUS

Base Flow Conditions? (Y/N): _____ Date of last precipitation: _____ Quantity: _____

Photograph Information: _____

Elevated Turbidity? (Y/N): _____ Canopy (% open): _____

Were samples collected for water chemistry? (Y/N): _____ (Note lab sample no. or id. and attach results) Lab Number: _____

Field Measures: Temp (°C)_____ Dissolved Oxygen (mg/l) _____ pH (S.U.) _____ Conductivity (µmhos/cm) _____

Is the sampling reach representative of the stream (Y/N)_____ If not, please explain: _____

_____

Additional comments/description of pollution impacts: _____

_____

BIOTIC EVALUATION

Performed? (Y/N): _____ (If Yes, Record all observations. Voucher collections optional. NOTE: all voucher samples must be labeled with the site ID number. Include appropriate field data sheets from the Primary Headwater Habitat Assessment Manual)

Fish Observed? (Y/N)_____ Voucher? (Y/N)_____ Salamanders Observed? (Y/N)_____ Voucher? (Y/N)_____
Frogs or Tadpoles Observed? (Y/N)____ Voucher? (Y/N)____ Aquatic Macroinvertebrates Observed? (Y/N)____ Voucher? (Y/N)____

Comments Regarding Biology: _____

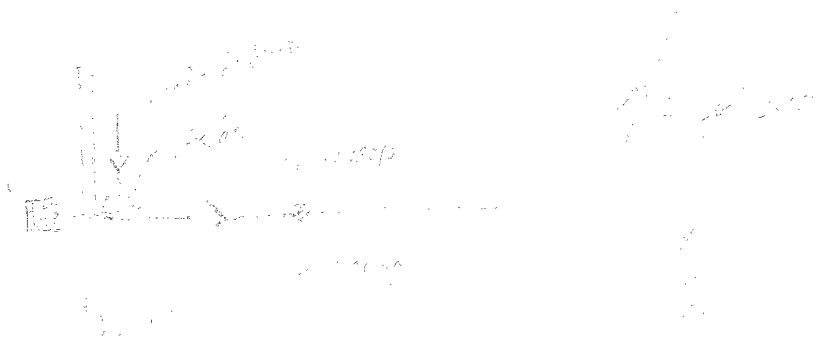
_____

_____

DRAWING AND NARRATIVE DESCRIPTION OF STREAM REACH (This must be completed):

Include important landmarks and other features of interest for site evaluation and a narrative description of the stream's location

FLOW ➜



IDEM — OWQ Biological Studies QHEI (Qualitative Habitat Evaluation Index)

Sample #	bioSample #	Stream Name	Location
		Sec 3-38	Tributary of Eagan Ditch

Surveyor	Sample Date	County	Macro SampleType	Habitat Complete	QHEI Score:
K. Allison	9/6/05	Daviess			~~40~~ 39.5

1-Substrate (20 points maximum)

Substrate Score: ~~4~~ 3.5 KLA

Check 1 Predominant Pool & 1 Predominant Riffle

Check all that are present — P=Pool, R=Riffle

Predominant P	Predominant R	Present P	Present R		Predominant P	Predominant R	Present P	Present R	
☐	☐	☐	☐	Bldrs/Slabs(10)	☐	☐	☐	☐	Hardpan(4)
☐	☐	☐	☐	Boulders(9)	☐	☐	☒	☐	Detritus(3)
☐	☐	☐	☐	Cobble(8)	☐	☐	☐	☐	Muck(2)
☐	☐	☒	☐	Gravel(7)	☒	☒	☒	☐	Silt(2)
☐	☐	☐	☐	Sand(6)	☐	☐	☐	☐	Sludge(1)
☐	☐	☐	☐	Bedrock(5)	☐	☐	☐	☐	Artificial(0)

Substrate Quality (check only 1, or check 2 and AVERAGE)

Substrate Origin

☐ Limestone(1)	☒ Hardpan(0)	☐ Lacustrine(0)
☒ Tills(1)	☐ Sandstone(0)	☐ Shale(-1)
☐ Wetlands(0)	☐ Rip/Rap(0)	☐ Coal fines(-2)

Silt Cover	Embeddedness
☐ Silt heavy(-2)	☐ Extensive(-2)
☒ Silt moderate(-1)	☐ Moderate(-1)
☐ Silt normal(0)	☒ Low/Normal(0)
☐ Silt free(1)	☐ None(1)

NOTE: ignore sludge originating from point sources; score based on natural substrates

☐ >4 substrates present(2)

Comments:

2-Instream Cover (20 points maximum

Instream Cover Score: 10

Type (check ALL that apply)

☒ Undercut banks(1)	☐ Deep pools(2)	☐ Oxbows(1)	
☒ Overhanging vegetation(1)	☐ Rootwads(1)	☐ Aquatic macrophytes(1)	
☒ Shallows(in slow water)(1)	☐ Boulders(1)	☐ Logs and woody debris(1)	
☐ Rootmats(1)			

Amount (check only 1, or 2 and AVERAGE)

☐ Extensive >75% (11)
☒ Moderate 25-75% (7)
☐ Sparse 5-25% (3)
☐ Nearly absent <5% (1)

Comments:

3-Channel Morphology (20) (check only one per category, OR two and AVERAGE)

Channel Score: 10

Sinuosity	Development	Channelization	Stability	Modifications/Other	
☐ High (4)	☐ Excellent (7)	☐ None (6)	☐ High (3)	☐ Snagging	☐ Impound
☐ Moderate (3)	☐ Good (5)	☐ Recovered (4)	☒ Moderate (2)	☐ Relocation	☐ Islands
☒ Low (2)	☒ Fair (3)	☒ Recovering (3)	☐ Low (1)	☐ Canopy Removal	☐ Leveed
☐ None (1)	☐ Poor (1)	☐ Recent or no recovery (1)		☐ Dredging	☐ Bank shaping
				☐ One side channel modifications	

Comments:

4-Riparian Zone & Bank Erosion (10 points maximum)

Riparian Score: 6

Left/Right banks looking downstream (For each category, check only one per bank, OR two per bank and AVERAGE).

Riparian width L	Riparian width R	(per bank)	Erosion/Runoff-Floodplain quality (past 100 ft Riparian) L	R	(most predominant per bank)	L	R		Bank Erosion L	R	(per bank)
☐	☐	Wide >50m (4)	☐	☐	Forest, Swamp (3)	☐	☐	Conservation Tillage (1)	☐	☐	None or little (3)
☒	☒	Moderate 10-50m (3)	☒	☒	Shrub or Old field (2)	☐	☐	Urban or Industrial (0)	☒	☒	Moderate (2)
☐	☐	Narrow 5-10m (2)	☐	☐	Residential, Park, New field (1)	☐	☐	Mining, Construction (0)	☐	☐	Heavy/Severe (1)
☐	☐	Very narrow <5m (1)	☐	☐	Fenced pasture (1)	☒	☒	Open Pasture/Rowcrop (0)			
☐	☐	None (0)									

Comments:

5a-Pool/Glide Quality (12 points maximum

Pool/Glide Score: 4

Max pool depth (check one)	Morphology (check only one, OR check two and AVERAGE)	Pool/Run/Riffle current velocity (check all that apply)	
☐ >1m (6)		☐ Eddies (1)	☐ Torrential (-1)
☐ 0.7-1m (4)	☒ Pool width > riffle width (2)	☐ Fast (1)	☐ Interstitial (-1)
☐ 0.4-0.7m (2)	☐ Pool width = riffle width (1)	☐ Moderate (1)	☐ Intermittent (-2)
☒ 0.2-0.4m (1)	☐ Pool width < riffle width (0)	☒ Slow (1)	☐ No pool (0)
☐ <0.2m (pool=0)			

Comments:

5b-Riffle/Run Quality (8) (check only one per category, OR two and AVERAGE)

Riffle/Run Score: 0

Riffle/run depth (check one)	Riffle/run substrate	Riffle/run embeddedness	
☐ Generally>10cm, Max>50cm (4)	☐ Stable-e.g. cobble, boulder (2)	☐ Extensive (-1)	☐ Normal/Low (1)
☐ Generally>10cm, Max<50cm(3)	☐ Mod. stable-e.g. pea gravel (1)	☐ Moderate (0)	☐ None (2)
☐ Generally 5-10cm (1)	☒ Unstable-e.g. sand, gravel (0)		☒ No riffle (0)
☒ Generally<5cm (riffle=0)			

Comments:

6-Gradient (10 points maximum)

Gradient Score: 6

Average width: .9m Gradient: 6.6 (ft/mile) Drainage Area: 1.57 (square miles)

Comments:

IDEM OWQ Biological Studies QHEI (Qualitative Habitat Evaluation Index)

Sample #	bioSample #	Stream Name	Location

Surveyor	Sample Date	County	Macro SampleType	Habitat Complete	QHEI Score:
				☐	

Impacts/Miscellaneous

Major Suspected Impacts (Check all that apply)

- ☐ None
- ☐ Industrial
- ☐ WWTP
- ☒ Agricultural
- ☐ Livestock
- ☐ Silviculture
- ☐ Construction
- ☐ Urban Runoff
- ☐ Suburban
- ☐ Channelization
- ☐ Riparian Removal
- ☐ Flow Alteration
- ☐ CSOs
- ☐ Mining
- ☐ Landfills
- ☐ Natural

Pollution Impact Comments:

Miscellaneous QHEI Information

Subjective rating (1-10): % Riffle:

Aesthetic rating (1-10): % Run:

Canopy Cover (% Open): % Pool:

% Glide:

Is reach representative of stream?

General QHEI Notes:

IDEM — OWQ Biological Studies QHEI (Qualitative Habitat Evaluation Index)

Sample #	BioSample #	Stream Name	Location
		Sec 3-39	Tributary of Eagan Ditch

Surveyor	Sample Date	County	Macro SampleType	Habitat Complete	QHEI Score:
K. Allison	9/7/05	Daviess			36 (35.5)

1-Substrate (20 points maximum)

Substrate Score: 3 (2.5)

Check 1 Predominant Pool & 1 Predominant Riffle

Check all that are present — P=Pool, R=Riffle

Predominant P	Predominant R		Present P	Present R	Predominant P	Predominant R		Present P	Present R
☐	☐	Bldrs/Slabs(10)	☐	☐	☐	☐	Hardpan(4)	☒	☐
☐	☐	Boulders(9)	☐	☐	☐	☐	Detritus(3)	☒	☐
☐	☐	Cobble(8)	☐	☐	☐	☐	Muck(2)	☐	☐
☐	☐	Gravel(7)	☒	☐	☒	☒	Silt(2)	☒	☐
☐	☐	Sand(6)	☐	☐	☐	☐	Sludge(1)	☐	☐
☐	☐	Bedrock(5)	☐	☐	☐	☐	Artificial(0)	☐	☐

Substrate Quality (check only 1, or check 2 and AVERAGE)

Substrate Origin: ☐ Limestone(1) ☒ Hardpan(0) ☐ Lacustrine(0) ☒ Tills(1) ☐ Sandstone(0) ☐ Shale(-1) ☐ Wetlands(0) ☐ Rip/Rap(0) ☐ Coal fines(-2)

Silt Cover: ☒ Silt heavy(-2) ☐ Silt moderate(-1) ☐ Silt normal(0) ☐ Silt free(1)

Embeddedness: ☐ Extensive(-2) ☐ Moderate(-1) ☒ Low/Normal(0) ☐ None(1)

NOTE: ignore sludge originating from point sources; score based on natural substrates

☐ >4 substrates present(2)

Comments:

2-Instream Cover (20 points maximum

Instream Cover Score: 10

Type (check ALL that apply): ☒ Undercut banks(1) ☒ Overhanging vegetation(1) ☒ Shallows(in slow water)(1) ☐ Rootmats(1) ☐ Deep pools(2) ☐ Rootwads(1) ☐ Boulders(1) ☐ Oxbows(1) ☐ Aquatic macrophytes(1) ☐ Logs and woody debris(1)

Amount (check only 1, or 2 and AVERAGE): ☐ Extensive >75% (11) ☒ Moderate 25-75% (7) ☐ Sparse 5-25% (3) ☐ Nearly absent <5% (1)

Comments:

3-Channel Morphology (20) (check only one per category, OR two and AVERAGE)

Channel Score: 7

Sinuosity	Development	Channelization	Stability	Modifications/Other	
☐ High (4)	☐ Excellent (7)	☐ None (6)	☐ High (3)	☐ Snagging	☐ Impound
☐ Moderate (3)	☐ Good (5)	☐ Recovered (4)	☒ Moderate (2)	☐ Relocation	☐ Islands
☐ Low (2)	☐ Fair (3)	☒ Recovering (3)	☐ Low (1)	☒ Canopy Removal	☐ Leveed
☒ None (1)	☒ Poor (1)	☐ Recent or no recovery (1)		☒ Dredging	☒ Bank shaping
				☐ One side channel modifications	

Comments:

4-Riparian Zone & Bank Erosion (10 points maximum)

Riparian Score: 6

Left/Right banks looking downstream (For each category, check only one per bank, OR two per bank and AVERAGE).

Riparian width L	Riparian width R	(per bank)	Erosion/Runoff-Floodplain quality (past 100 ft Riparian) L	R	(most predominant per bank)	L	R		Bank Erosion L	R	(per bank)
☐	☐	Wide >50m (4)	☐	☐	Forest, Swamp (3)	☐	☐	Conservation Tillage (1)	☐	☐	None or little (3)
☒	☒	Moderate 10-50m (3)	☒	☒	Shrub or Old field (2)	☐	☐	Urban or Industrial (0)	☒	☒	Moderate (2)
☐	☐	Narrow 5-10m (2)	☐	☐	Residential, Park, New field (1)	☐	☐	Mining, Construction (0)	☐	☐	Heavy/Severe (1)
☐	☐	Very narrow <5m (1)	☐	☐	Fenced pasture (1)	☒	☒	Open Pasture/Rowcrop (0)			
☐	☐	None (0)									

Comments:

5a-Pool/Glide Quality (12 points maximum

Pool/Glide Score: 4

Max pool depth (check one): ☐ >1m (6) ☐ 0.7-1m (4) ☐ 0.4-0.7m (2) ☒ 0.2-0.4m (1) ☐ <0.2m (pool=0)

Morphology (check only one, OR check two and AVERAGE): ☒ Pool width > riffle width (2) ☐ Pool width = riffle width (1) ☐ Pool width < riffle width (0)

Pool/Run/Riffle current velocity (check all that apply): ☐ Eddies (1) ☐ Fast (1) ☐ Moderate (1) ☒ Slow (1) ☐ Torrential (-1) ☐ Interstitial (-1) ☐ Intermittent (-2) ☐ No pool (0)

Comments:

5b-Riffle/Run Quality (8) (check only one per category, OR two and AVERAGE)

Riffle/Run Score: 0

Riffle/run depth (check one): ☐ Generally>10cm, Max>50cm (4) ☐ Generally>10cm, Max<50cm(3) ☐ Generally 5-10cm (1) ☒ Generally<5cm (riffle=0)

Riffle/run substrate: ☐ Stable-e.g. cobble, boulder (2) ☐ Mod. stable-e.g. pea gravel (1) ☒ Unstable-e.g. sand, gravel (0)

Riffle/run embeddedness: ☐ Extensive (-1) ☐ Moderate (0) ☐ Normal/Low (1) ☐ None (2) ☒ No riffle (0)

Comments:

6-Gradient (10 points maximum)

Gradient Score: 6

Average width: .9m. Gradient: 6.6 (ft/mile) Drainage Area: 1.64 (square miles)

Comments:

IDEM **OWQ Biological Studies QHEI (Qualitative Habitat Evaluation Index)**

Sample #	*bioSample #*	*Stream Name*	*Location*

Surveyor	*Sample Date*	*County*	*Macro SampleType*	☐ Habitat Complete	**QHEI Score:**

Impacts/Miscellaneous

Major Suspected Impacts (Check all that apply)

- ☐ None
- ☐ Industrial
- ☐ WWTP
- ☐ Agricultural
- ☐ Livestock
- ☐ Silviculture
- ☐ Construction
- ☐ Urban Runoff
- ☐ Suburban
- ☐ Channelization
- ☐ Riparian Removal
- ☐ Flow Alteration
- ☐ CSOs
- ☐ Mining
- ☐ Landfills
- ☐ Natural

Pollution Impact Comments:

Miscellaneous QHEI Information

Subjective rating (1-10):

Aesthetic rating (1-10):

Canopy Cover (% Open):

% Riffle:

% Run:

% Glide:

% Pool:

Is reach representative of stream?

General QHEI Notes:

IDEM — OWQ Biological Studies — QHEI (Qualitative Habitat Evaluation Index)

Sample #	bioSample #	Stream Name	Location
		Sec3-S10	Eagen Ditch

Surveyor	Sample Date	County	Macro SampleType	Habitat Complete	QHEI Score:
K. Allison	9/7/05	Daviess		☐	45

1-Substrate (20 points maximum)

Substrate Score: 12

Check 1 Predominant Pool & 1 Predominant Riffle

Check all that are present — P=Pool, R=Riffle

Predominant P	Predominant R	Present P	Present R		Predominant P	Predominant R	Present P	Present R	
☐	☐	☐	☐	Bldrs/Slabs(10)	☒	☐	☒	☒	Hardpan(4)
☐	☐	☐	☐	Boulders(9)	☐	☐	☒	☐	Detritus(3)
☐	☐	☐	☐	Cobble(8)	☐	☐	☐	☐	Muck(2)
☒	☒	☒	☒	Gravel(7)	☐	☐	☒	☒	Silt(2)
☐	☐	☐	☐	Sand(6)	☐	☐	☐	☐	Sludge(1)
☐	☐	☐	☐	Bedrock(5)	☐	☐	☐	☐	Artificial(0)

Substrate Quality (check only 1, or check 2 and AVERAGE)

Substrate Origin: ☐ Limestone(1) ☒ Hardpan(0) ☐ Lacustrine(0) ☒ Tills(1) ☐ Sandstone(0) ☐ Shale(-1) ☐ Wetlands(0) ☐ Rip/Rap(0) ☐ Coal fines(-2)

Silt Cover: ☐ Silt heavy(-2) ☐ Silt moderate(-1) ☒ Silt normal(0) ☐ Silt free(1)

Embeddedness: ☐ Extensive(-2) ☒ Moderate(-1) ☐ Low/Normal(0) ☐ None(1)

NOTE: Ignore sludge originating from point sources; score based on natural substrates

☐ >4 substrates present(2)

Comments: Predominant Pool Substrate is Averaged

2-Instream Cover (20 points maximum

Instream Cover Score: 10

Type (check ALL that apply): ☐ Undercut banks(1) ☐ Deep pools(2) ☐ Oxbows(1) ☒ Overhanging vegetation(1) ☐ Rootwads(1) ☐ Aquatic macrophytes(1) ☒ Shallows(in slow water)(1) ☐ Boulders(1) ☒ Logs and woody debris(1) ☐ Rootmats(1)

Amount (check only 1, or 2 and AVERAGE): ☐ Extensive >75% (11) ☒ Moderate 25-75% (7) ☐ Sparse 5-25% (3) ☐ Nearly absent <5% (1)

Comments:

3-Channel Morphology (20) (check only one per category, OR two and AVERAGE)

Channel Score: 8

Sinuosity	Development	Channelization	Stability	Modifications/Other	
☐ High (4)	☐ Excellent (7)	☐ None (6)	☐ High (3)	☐ Snagging	☐ Impound
☐ Moderate (3)	☐ Good (5)	☐ Recovered (4)	☒ Moderate (2)	☐ Relocation	☐ Islands
☒ Low (2)	☐ Fair (3)	☒ Recovering (3)	☐ Low (1)	☒ Canopy Removal	☐ Leveed
☐ None (1)	☒ Poor (1)	☐ Recent or no recovery (1)		☒ Dredging	☐ Bank shaping
					☐ One side channel modifications

Comments:

4-Riparian Zone & Bank Erosion (10 points maximum)

Riparian Score: 6

Left/Right banks looking downstream (For each category, check only one per bank, OR two per bank and AVERAGE).

Riparian width (per bank): ☐☐ Wide >50m (4) ☒☒ Moderate 10-50m (3) ☐☐ Narrow 5-10m (2) ☐☐ Very narrow <5m (1) ☐☐ None (0)

Erosion/Runoff-Floodplain quality (past 100 ft Riparian) (most predominant per bank): ☐☐ Forest, Swamp (3) ☒☒ Shrub or Old field (2) ☐☐ Residential, Park, New field (1) ☐☐ Fenced pasture (1) ☐☐ Conservation Tillage (1) ☐☐ Urban or Industrial (0) ☐☐ Mining, Construction (0) ☒☒ Open Pasture/Rowcrop (0)

Bank Erosion (per bank): ☐☐ None or little (3) ☒☒ Moderate (2) ☐☐ Heavy/Severe (1)

Comments:

5a-Pool/Glide Quality (12 points maximum

Pool/Glide Score: 4

Max pool depth (check one): ☐ >1m (6) ☐ 0.7-1m (4) ☐ 0.4-0.7m (2) ☒ 0.2-0.4m (1) ☐ <0.2m (pool=0)

Morphology (check only one, OR check two and AVERAGE): ☒ Pool width > riffle width (2) ☐ Pool width = riffle width (1) ☐ Pool width < riffle width (0)

Pool/Run/Riffle current velocity (check all that apply): ☐ Eddies (1) ☐ Fast (1) ☐ Moderate (1) ☒ Slow (1) ☐ Torrential (-1) ☐ Interstitial (-1) ☐ Intermittent (-2) ☐ No pool (0)

Comments:

5b-Riffle/Run Quality (8) (check only one per category, OR two and AVERAGE)

Riffle/Run Score: 1

Riffle/run depth (check one): ☐ Generally>10cm, Max>50cm (4) ☐ Generally>10cm, Max<50cm(3) ☐ Generally 5-10cm (1) ☒ Generally<5cm (riffle=0)

Riffle/run substrate: ☐ Stable-e.g. cobble, boulder (2) ☐ Mod. stable-e.g. pea gravel (1) ☒ Unstable-e.g. sand, gravel (0)

Riffle/run embeddedness: ☐ Extensive (-1) ☐ Moderate (0) ☒ Normal/Low (1) ☐ None (2) ☐ No riffle (0)

Comments:

6-Gradient (10 points maximum)

Gradient Score: 4

Average width: 1.5m Gradient: 4.4 (ft/mile) Drainage Area: 5.78 (square miles)

Comments:

IDEM OWQ Biological Studies QHEI (Qualitative Habitat Evaluation Index)

Sample #	bioSample #	Stream Name	Location

Surveyor	Sample Date	County	Macro SampleType	☐ Habitat Complete	QHEI Score:

Impacts/Miscellaneous

Major Suspected Impacts (Check all that apply)

- ☐ None
- ☐ Industrial
- ☐ WWTP
- ☒ Agricultural
- ☒ Livestock
- ☐ Silviculture
- ☐ Construction
- ☐ Urban Runoff
- ☐ Suburban
- ☐ Channelization
- ☐ Riparian Removal
- ☐ Flow Alteration
- ☐ CSOs
- ☐ Mining
- ☐ Landfills
- ☐ Natural

Pollution Impact Comments:

Miscellaneous QHEI Information

Subjective rating (1-10):
Aesthetic rating (1-10):
Canopy Cover (% Open):

% Riffle:
% Run:
% Glide:
% Pool:

Is reach representative of stream?

General QHEI Notes:

OhioEPA Primary Headwater Habitat Evaluation Form

HHEI Score (sum of metrics 1, 2, 3) :

SITE NAME/LOCATION _____

_____ SITE NUMBER _____ RIVER BASIN _____ DRAINAGE AREA (mi²) _____

LENGTH OF STREAM REACH (ft) _____ LAT. _____ LONG. _____ RIVER CODE _____ RIVER MILE _____

DATE _____ SCORER _____ COMMENTS _____

NOTE: Complete All Items On This Form - Refer to "Field Evaluation Manual for Ohio's PHWH Streams" for Instructions

STREAM CHANNEL MODIFICATIONS: ☐ NONE / NATURAL CHANNEL ☐ RECOVERED ☐ RECOVERING ☐ RECENT OR NO RECOVERY

1. SUBSTRATE (Estimate percent of every type of substrate present. Check *ONLY* two predominant substrate *TYPE* boxes (Max of 32). Add total number of significant substrate types found (Max of 8). Final metric score is sum of boxes A & B.

HHEI Metric Points

TYPE		PERCENT	TYPE		PERCENT
☐ ☐	BLDR SLABS [16 pts]	_____	☐ ☐	SILT [3 pt]	_____
☐ ☐	BOULDER (>256 mm) [16 pts]	_____	☐ ☐	LEAF PACK/WOODY DEBRIS [3 pts]	_____
☐ ☐	BEDROCK [16 pt]	_____	☐ ☐	FINE DETRITUS [3 pts]	_____
☐ ☐	COBBLE (65-256 mm) [12 pts]	_____	☐ ☐	CLAY or HARDPAN [0 pt]	_____
☐ ☐	GRAVEL (2-64 mm) [9 pts]	_____	☐ ☐	MUCK [0 pts]	_____
☐ ☐	SAND (<2 mm) [6 pts]	_____	☐ ☐	ARTIFICIAL [3 pts]	_____

Total of Percentages of Bldr Slabs, Boulder, Cobble, Bedrock _____ **(A)** **(B)**

Substrate Max = 40

A + B

SCORE OF TWO MOST PREDOMINATE SUBSTRATE TYPES: _____ **TOTAL NUMBER OF SUBSTRATE TYPES:** _____

2. Maximum Pool Depth ***(Measure the maximum pool depth within the 61 meter (200 ft)*** evaluation reach at the time of evaluation. Avoid plunge pools from road culverts or storm water pipes) (Check *ONLY* one box):

Pool Depth Max = 30

- ☐ > 30 centimeters [20 pts]
- ☐ > 22.5 - 30 cm [30 pts]
- ☐ > 10 - 22.5 cm [25 pts]
- ☐ > 5 cm - 10 cm [15 pts]
- ☐ < 5 cm [5 pts]
- ☐ NO WATER OR MOIST CHANNEL [0 pts]

COMMENTS _____ **MAXIMUM POOL DEPTH (centimeters):** _____

3. BANK FULL WIDTH (Measured as the average of 3-4 measurements) **(Check *ONLY* one box):**

Bankfull Width Max=30

- ☐ > 4.0 meters [30 pts]
- ☐ > 3.0 m - 4.0 m [25 pts]
- ☐ > 1.5 m - 3.0 m [20 pts]
- ☐ > 1.0 m - 1.5 m [15 pts]
- ☐ ≤ 1.0 m [5 pts]

COMMENTS _____ **AVERAGE BANKFULL WIDTH (meters):** _____

This information must also be completed

RIPARIAN ZONE AND FLOODPLAIN QUALITY ☆NOTE: River Left (L) and Right (R) as looking downstream☆

L R	RIPARIAN WIDTH (Per Bank)	L R	FLOODPLAIN QUALITY (Most Predominant per Bank)	L R	
☐ ☐	Wide >10m	☐ ☐	Mature Forest, Wetland	☐ ☐	Conservation Tillage
☐ ☐	Moderate 5-10m	☐ ☐	Immature Forest, Shrub or Old Field	☐ ☐	Urban or Industrial
☐ ☐	Narrow <5m	☐ ☐	Residential, Park, New Field	☐ ☐	Open Pasture, Row Crop
☐ ☐	None	☐ ☐	Fenced Pasture	☐ ☐	Mining or Construction

COMMENTS _____

FLOW REGIME *(At Time of Evaluation)* (Check *ONLY* one box):

- ☐ Stream Flowing
- ☐ Subsurface flow with isolated pools (Interstitial)
- ☐ Moist Channel, isolated pools, no flow (Intermittent)
- ☐ Dry channel, no water (Ephemeral)

COMMENTS _____

SINUOSITY (Number of bends per 61 m (200 ft) of channel) (Check *ONLY* one box):

☐ None	☐ 1.0	☐ 2.0	☐ 3.0
☐ 0.5	☐ 1.5	☐ 2.5	☐ >3

STREAM GRADIENT ESTIMATE

☐ Flat (0.5 ft/100 ft) ☐ Flat to Moderate ☐ Moderate (2 ft/100 ft) ☐ Moderate to Severe ☐ Severe (10 ft/100 ft)

ADDITIONAL STREAM INFORMATION (This Information Must Also be Completed):

QHEI PERFORMED? - ☐ Yes ☐ No QHEI Score _____ (If Yes, Attach Completed QHEI Form)

DOWNSTREAM DESIGNATED USE(S)

☐ WWH Name: _____ Distance from Evaluated Stream _____

☐ CWH Name: _____ Distance from Evaluated Stream _____

☐ EWH Name: _____ Distance from Evaluated Stream _____

MAPPING: ATTACH COPIES OF MAPS, INCLUDING THE ENTIRE WATERSHED AREA. CLEARLY MARK THE SITE LOCATION

USGS Quadrangle Name: _____ NRCS Soil Map Page: _____ NRCS Soil Map Stream Order _____

County: _____ Township / City: _____

MISCELLANEOUS

Base Flow Conditions? (Y/N): _____ Date of last precipitation: _____ Quantity: _____

Photograph Information: _____

Elevated Turbidity? (Y/N): _____ Canopy (% open): _____

Were samples collected for water chemistry? (Y/N): _____ (Note lab sample no. or id. and attach results) Lab Number: _____

Field Measures: Temp (°C) _____ Dissolved Oxygen (mg/l) _____ pH (S.U.) _____ Conductivity (µmhos/cm) _____

Is the sampling reach representative of the stream (Y/N) _____ If not, please explain: _____

_____

Additional comments/description of pollution impacts: _____

_____

BIOTIC EVALUATION

Performed? (Y/N): _____ (If Yes, Record all observations. Voucher collections optional. NOTE: all voucher samples must be labeled with the site ID number. Include appropriate field data sheets from the Primary Headwater Habitat Assessment Manual)

Fish Observed? (Y/N) _____ Voucher? (Y/N) _____ Salamanders Observed? (Y/N) _____ Voucher? (Y/N) _____
Frogs or Tadpoles Observed? (Y/N) ____ Voucher? (Y/N) ____ Aquatic Macroinvertebrates Observed? (Y/N) ____ Voucher? (Y/N) ____

Comments Regarding Biology: _____

_____

_____

DRAWING AND NARRATIVE DESCRIPTION OF STREAM REACH (This must be completed):

Include important landmarks and other features of interest for site evaluation and a narrative description of the stream's location

FLOW ➜

IDEM OWQ Biological Studies QHEI (Qualitative Habitat Evaluation Index)

Sample # | bioSample # | Stream Name | Location

Surveyor | Sample Date | County | Macro SampleType | ☐ Habitat Complete | **QHEI Score:**

1-Substrate (20 points maximum)

Substrate Score:

Check 1 Predominant Pool & 1 Predominant Riffle

Check all that are present — P=Pool, R=Riffle

Predominant P	Predominant R	Present P	Present R		Predominant P	Predominant R	Present P	Present R	
☐	☐	☐	☐	Bldrs/Slabs(10)	☒	☒	☒	☐	Hardpan(4)
☐	☐	☐	☐	Boulders(9)	☐	☐	☐	☐	Detritus(3)
☐	☐	☐	☐	Cobble(8)	☐	☐	☐	☐	Muck(2)
☐	☐	☐	☐	Gravel(7)	☐	☐	☒	☒	Silt(2)
☐	☐	☐	☐	Sand(6)	☐	☐	☐	☐	Sludge(1)
☐	☐	☐	☐	Bedrock(5)	☐	☐	☒	☐	Artificial(0)

Substrate Quality (check only 1, or check 2 and AVERAGE)

Substrate Origin: ☐ Limestone(1) ☒ Hardpan(0) ☐ Lacustrine(0) ☐ Tills(1) ☐ Sandstone(0) ☐ Shale(-1) ☐ Wetlands(0) ☐ Rip/Rap(0) ☐ Coal fines(-2)

Silt Cover: ☐ Silt heavy(-2) ☐ Silt moderate(-1) ☐ Silt normal(0) ☒ Silt free(1)

Embeddedness: ☐ Extensive(-2) ☐ Moderate(-1) ☐ Low/Normal(0) ☒ None(1)

NOTE: ignore sludge originating from point sources; score based on natural substrates

☐ >4 substrates present(2)

Comments:

2-Instream Cover (20 points maximum

Instream Cover Score:

Type (check ALL that apply)

☐ Undercut banks(1) ☐ Deep pools(2) ☐ Oxbows(1)
☒ Overhanging vegetation(1) ☐ Rootwads(1) ☐ Aquatic macrophytes(1)
☒ Shallows(in slow water)(1) ☒ Boulders(1) ☐ Logs and woody debris(1)
☐ Rootmats(1)

Amount (check only 1, or 2 and AVERAGE)

☐ Extensive >75% (11)
☐ Moderate 25-75% (7)
☒ Sparse 5-25% (3)
☐ Nearly absent <5% (1)

Comments:

3-Channel Morphology (20) (check only one per category, OR two and AVERAGE)

Channel Score:

Sinuosity	Development	Channelization	Stability	Modifications/Other	
☐ High (4)	☐ Excellent (7)	☐ None (6)	☒ High (3)	☐ Snagging	☐ Impound
☐ Moderate (3)	☐ Good (5)	☐ Recovered (4)	☐ Moderate (2)	☐ Relocation	☐ Islands
☒ Low (2)	☐ Fair (3)	☒ Recovering (3)	☐ Low (1)	☒ Canopy Removal	☐ Leveed
☐ None (1)	☒ Poor (1)	☐ Recent or no recovery (1)		☒ Dredging	☐ Bank shaping
				☐ One side channel modifications	

Comments:

4-Riparian Zone & Bank Erosion (10 points maximum)

Riparian Score:

Left/Right banks looking downstream (For each category, check only one per bank, OR two per bank and AVERAGE).

Riparian width (per bank)

L	R	
☐	☐	Wide >50m (4)
☒	☒	Moderate 10-50m (3)
☐	☐	Narrow 5-10m (2)
☐	☐	Very narrow <5m (1)
☐	☐	None (0)

Erosion/Runoff-Floodplain quality (past 100 ft Riparian) (most predominant per bank)

L	R	
☐	☐	Forest, Swamp (3)
☒	☒	Shrub or Old field (2)
☐	☐	Residential, Park, New field (1)
☐	☐	Fenced pasture (1)
☐	☐	Conservation Tillage (1)
☐	☐	Urban or Industrial (0)
☐	☐	Mining, Construction (0)
☒	☒	Open Pasture/Rowcrop (0)

Bank Erosion (per bank)

L	R	
☐	☒	None or little (3)
☐	☐	Moderate (2)
☐	☐	Heavy/Severe (1)

Comments:

5a-Pool/Glide Quality (12 points maximum

Pool/Glide Score:

Max pool depth (check one)
☐ >1m (6)
☐ 0.7-1m (4)
☒ 0.4-0.7m (2)
☐ 0.2-0.4m (1)
☐ <0.2m (pool=0)

Morphology (check only one, OR check two and AVERAGE)
☒ Pool width > riffle width (2)
☐ Pool width = riffle width (1)
☐ Pool width < riffle width (0)

Pool/Run/Riffle current velocity (check all that apply)
☐ Eddies (1) ☐ Torrential (-1)
☐ Fast (1) ☐ Interstitial (-1)
☐ Moderate (1) ☒ Intermittent (-2)
☐ Slow (1) ☐ No pool (0)

Comments:

5b-Riffle/Run Quality (8) (check only one per category, OR two and AVERAGE)

Riffle/Run Score:

Riffle/run depth (check one)
☐ Generally>10cm, Max>50cm (4)
☐ Generally>10cm, Max<50cm(3)
☐ Generally 5-10cm (1)
☒ Generally<5cm (riffle=0)

Riffle/run substrate
☐ Stable-e.g. cobble, boulder (2)
☐ Mod. stable-e.g. pea gravel (1)
☐ Unstable-e.g. sand, gravel (0)

Riffle/run embeddedness
☐ Extensive (-1) ☐ Normal/Low (1)
☐ Moderate (0) ☐ None (2)
☒ No riffle (0)

Comments:

6-Gradient (10 points maximum)

Gradient Score:

Average width: *Gradient:* *(ft/mile)* *Drainage Area:* *(square miles)*

Comments:

OWQ Biological Studies QHEI (Qualitative Habitat Evaluation Index)

Sample #	bioSample #	Stream Name	Location

Surveyor	Sample Date	County	Macro SampleType	☐ Habitat Complete	QHEI Score:

Impacts/Miscellaneous

Major Suspected Impacts (Check all that apply)

- ☐ None
- ☐ Industrial
- ☐ WWTP
- ☒ Agricultural
- ☐ Livestock
- ☐ Silviculture
- ☐ Construction
- ☐ Urban Runoff
- ☐ Suburban
- ☒ Channelization
- ☐ Riparian Removal
- ☐ Flow Alteration
- ☐ CSOs
- ☐ Mining
- ☐ Landfills
- ☐ Natural

Pollution Impact Comments:

Miscellaneous QHEI Information

Subjective rating (1-10):
Aesthetic rating (1-10):
Canopy Cover (% Open):

% Riffle:
% Run:
% Glide:
% Pool:

Is reach representative of stream?

General QHEI Notes:

Primary Headwater Habitat Evaluation Form

HHEI Score (sum of metrics 1, 2, 3) : 10

SITE NAME/LOCATION _____

_____ SITE NUMBER _____ RIVER BASIN _____ DRAINAGE AREA (mi²) _____

LENGTH OF STREAM REACH (ft) _____ LAT. _____ LONG. _____ RIVER CODE _____ RIVER MILE _____

DATE _____ SCORER _____ COMMENTS _____

NOTE: Complete All Items On This Form - Refer to "Field Evaluation Manual for Ohio's PHWH Streams" for Instructions

STREAM CHANNEL MODIFICATIONS: ☐ NONE / NATURAL CHANNEL ☐ RECOVERED ☒ RECOVERING ☐ RECENT OR NO RECOVERY

1. SUBSTRATE (Estimate percent of every type of substrate present. Check *ONLY* two predominant substrate *TYPE* boxes (Max of 32). Add total number of significant substrate types found (Max of 8). Final metric score is sum of boxes A & B.

HHEI Metric Points

TYPE		PERCENT	TYPE		PERCENT
☐ ☐	BLDR SLABS [16 pts]		☒ ☐	SILT [3 pt]	
☐ ☐	BOULDER (>256 mm) [16 pts]		☐ ☐	LEAF PACK/WOODY DEBRIS [3 pts]	
☐ ☐	BEDROCK [16 pt]		☐ ☐	FINE DETRITUS [3 pts]	
☐ ☐	COBBLE (65-256 mm) [12 pts]		☒ ☐	CLAY or HARDPAN [0 pt]	
☐ ☐	GRAVEL (2-64 mm) [9 pts]		☐ ☐	MUCK [0 pts]	
☐ ☐	SAND (<2 mm) [6 pts]		☐ ☐	ARTIFICIAL [3 pts]	

Total of Percentages of Bldr Slabs, Boulder, Cobble, Bedrock _____ **(A)** **(B)**

SCORE OF TWO MOST PREDOMINATE SUBSTRATE TYPES: 3 **TOTAL NUMBER OF SUBSTRATE TYPES:** 2

Substrate Max = 40 5

A + B

2. Maximum Pool Depth ***(Measure the maximum pool depth within the 61 meter (200 ft)*** evaluation reach at the time of evaluation. Avoid plunge pools from road culverts or storm water pipes) (Check *ONLY* one box):

☐ > 30 centimeters [20 pts]
☐ > 22.5 - 30 cm [30 pts]
☐ > 10 - 22.5 cm [25 pts]
☐ > 5 cm - 10 cm [15 pts]
☐ < 5 cm [5 pts]
☒ NO WATER OR MOIST CHANNEL [0 pts]

COMMENTS _____ **MAXIMUM POOL DEPTH (centimeters):** 0

Pool Depth Max = 30 0

3. BANK FULL WIDTH (Measured as the average of 3-4 measurements) **(Check *ONLY* one box):**

☐ > 4.0 meters [30 pts]
☐ > 3.0 m - 4.0 m [25 pts]
☐ > 1.5 m - 3.0 m [20 pts]
☐ > 1.0 m - 1.5 m [15 pts]
☒ ≤ 1.0 m [5 pts]

COMMENTS _____ **AVERAGE BANKFULL WIDTH (meters):** 0.61

Bankfull Width Max=30 5

This information must also be completed

RIPARIAN ZONE AND FLOODPLAIN QUALITY ☆NOTE: River Left (L) and Right (R) as looking downstream☆

L	R	RIPARIAN WIDTH (Per Bank)	L	R	FLOODPLAIN QUALITY (Most Predominant per Bank)	L	R	
☐	☐	Wide >10m	☐	☐	Mature Forest, Wetland	☐	☐	Conservation Tillage
☐	☐	Moderate 5-10m	☒	☐	Immature Forest, Shrub or Old Field	☐	☐	Urban or Industrial
☒	☒	Narrow <5m	☐	☐	Residential, Park, New Field	☐	☐	Open Pasture, Row Crop
☐	☐	None	☐	☐	Fenced Pasture	☐	☐	Mining or Construction

COMMENTS _____

FLOW REGIME *(At Time of Evaluation)* (Check *ONLY* one box):

☐ Stream Flowing
☐ Subsurface flow with isolated pools (Interstitial)
☐ Moist Channel, isolated pools, no flow (Intermittent)
☒ Dry channel, no water (Ephemeral)

COMMENTS _____

SINUOSITY (Number of bends per 61 m (200 ft) of channel) (Check *ONLY* one box):

☒ None ☐ 1.0 ☐ 2.0 ☐ 3.0
☐ 0.5 ☐ 1.5 ☐ 2.5 ☐ >3

STREAM GRADIENT ESTIMATE

☐ Flat (0.5 ft/100 ft) ☒ Flat to Moderate ☐ Moderate (2 ft/100 ft) ☐ Moderate to Severe ☐ Severe (10 ft/100 ft)

ADDITIONAL STREAM INFORMATION (This Information Must Also be Completed):

QHEI PERFORMED? - ❒ Yes ❒ No QHEI Score _____ (If Yes, Attach Completed QHEI Form)

DOWNSTREAM DESIGNATED USE(S)

❒ WWH Name: _____ Distance from Evaluated Stream _____

❒ CWH Name: _____ Distance from Evaluated Stream _____

❒ EWH Name: _____ Distance from Evaluated Stream _____

MAPPING: ATTACH COPIES OF MAPS, INCLUDING THE ENTIRE WATERSHED AREA. CLEARLY MARK THE SITE LOCATION

USGS Quadrangle Name: _____ NRCS Soil Map Page: _____ NRCS Soil Map Stream Order _____

County: _____ Township / City: _____

MISCELLANEOUS

Base Flow Conditions? (Y/N): _____ Date of last precipitation: _____ Quantity: _____

Photograph Information: _____

Elevated Turbidity? (Y/N): _____ Canopy (% open): _____

Were samples collected for water chemistry? (Y/N): _____ (Note lab sample no. or id. and attach results) Lab Number: _____

Field Measures: Temp (°C)_____ Dissolved Oxygen (mg/l) _____ pH (S.U.) _____ Conductivity (µmhos/cm) _____

Is the sampling reach representative of the stream (Y/N)_____ If not, please explain: _____

Additional comments/description of pollution impacts: _____

BIOTIC EVALUATION

Performed? (Y/N): _____ (If Yes, Record all observations. Voucher collections optional. NOTE: all voucher samples must be labeled with the site ID number. Include appropriate field data sheets from the Primary Headwater Habitat Assessment Manual)

Fish Observed? (Y/N)_____ Voucher? (Y/N)_____ Salamanders Observed? (Y/N)_____ Voucher? (Y/N)_____

Frogs or Tadpoles Observed? (Y/N)____ Voucher? (Y/N)____ Aquatic Macroinvertebrates Observed? (Y/N)____ Voucher? (Y/N)____

Comments Regarding Biology: _____

DRAWING AND NARRATIVE DESCRIPTION OF STREAM REACH (This must be completed):

Include important landmarks and other features of interest for site evaluation and a narrative description of the stream's location

FLOW ➔

IDEM OWQ Biological Studies QHEI (Qualitative Habitat Evaluation Index)

Sample #	bioSample #	Stream Name	Location

Surveyor	Sample Date	County	Macro SampleType	☐ Habitat Complete	QHEI Score:

1-Substrate (20 points maximum)

Substrate Score:

Check 1 Predominant Pool & 1 Predominant Riffle

Check all that are present — P=Pool, R=Riffle

Predominant P	Predominant R	Present P	Present R		Predominant P	Predominant R	Present P	Present R	
☐	☐	☐	☐	Bldrs/Slabs(10)	☒	☒	☒	☐	Hardpan(4)
☐	☐	☐	☐	Boulders(9)	☐	☐	☐	☐	Detritus(3)
☐	☐	☐	☐	Cobble(8)	☐	☐	☐	☐	Muck(2)
☐	☐	☐	☐	Gravel(7)	☐	☐	☐	☐	Silt(2)
☐	☐	☐	☐	Sand(6)	☐	☐	☐	☐	Sludge(1)
☐	☐	☐	☐	Bedrock(5)	☐	☐	☐	☐	Artificial(0)

Substrate Quality (check only 1, or check 2 and AVERAGE)

Substrate Origin: ☐ Limestone(1) ☒ Hardpan(0) ☐ Lacustrine(0) ☐ Tills(1) ☐ Sandstone(0) ☐ Shale(-1) ☐ Wetlands(0) ☐ Rip/Rap(0) ☐ Coal fines(-2)

Silt Cover: ☐ Silt heavy(-2) ☐ Silt moderate(-1) ☒ Silt normal(0) ☐ Silt free(1)

Embeddedness: ☐ Extensive(-2) ☐ Moderate(-1) ☐ Low/Normal(0) ☐ None(1)

NOTE: ignore sludge originating from point sources; score based on natural substrates

☐ >4 substrates present(2)

Comments:

2-Instream Cover (20 points maximum

Instream Cover Score:

Type (check ALL that apply)

☐ Undercut banks(1) ☐ Deep pools(2) ☐ Oxbows(1)
☒ Overhanging vegetation(1) ☐ Rootwads(1) ☐ Aquatic macrophytes(1)
☒ Shallows(in slow water)(1) ☐ Boulders(1) ☒ Logs and woody debris(1)
☐ Rootmats(1)

Comments:

Amount (check only 1, or 2 and AVERAGE)

☐ Extensive >75% (11)
☒ Moderate 25-75% (7)
☐ Sparse 5-25% (3)
☐ Nearly absent <5% (1)

3-Channel Morphology (20) (check only one per category, OR two and AVERAGE)

Channel Score:

Sinuosity	Development	Channelization	Stability	Modifications/Other	
☐ High (4)	☐ Excellent (7)	☐ None (6)	☐ High (3)	☐ Snagging	☐ Impound
☐ Moderate (3)	☐ Good (5)	☐ Recovered (4)	☒ Moderate (2)	☐ Relocation	☐ Islands
☒ Low (2)	☐ Fair (3)	☒ Recovering (3)	☐ Low (1)	☐ Canopy Removal	☐ Leveed
☐ None (1)	☒ Poor (1)	☐ Recent or no recovery (1)		☒ Dredging	☐ Bank shaping
					☐ One side channel modifications

Comments:

4-Riparian Zone & Bank Erosion (10 points maximum)

Riparian Score:

Left/Right banks looking downstream (For each category, check only one per bank, OR two per bank and AVERAGE).

Riparian width L	Riparian width R	(per bank)	Erosion/Runoff-Floodplain quality L	Erosion R	(most predominant per bank)	L	R		Bank Erosion L	Bank Erosion R	(per bank)
☐	☐	Wide >50m (4)	☐	☐	Forest, Swamp (3)	☐	☐	Conservation Tillage (1)	☐	☐	None or little (3)
☒	☒	Moderate 10-50m (3)	☐	☒	Shrub or Old field (2)	☐	☐	Urban or Industrial (0)	☐	☐	Moderate (2)
☐	☐	Narrow 5-10m (2)	☐	☐	Residential, Park, New field (1)	☐	☐	Mining, Construction (0)	☐	☐	Heavy/Severe (1)
☐	☐	Very narrow <5m (1)	☐	☐	Fenced pasture (1)	☒	☒	Open Pasture/Rowcrop (0)			
☐	☐	None (0)									

Comments:

5a-Pool/Glide Quality (12 points maximum

Pool/Glide Score:

Max pool depth (check one)

☐ >1m (6)
☐ 0.7-1m (4)
☐ 0.4-0.7m (2)
☐ 0.2-0.4m (1)
☒ <0.2m (pool=0)

Morphology (check only one, OR check two and AVERAGE)

☒ Pool width > riffle width (2)
☐ Pool width = riffle width (1)
☐ Pool width < riffle width (0)

Pool/Run/Riffle current velocity (check all that apply)

☐ Eddies (1) ☐ Torrential (-1)
☐ Fast (1) ☐ Interstitial (-1)
☐ Moderate (1) ☐ Intermittent (-2)
☒ Slow (1) ☐ No pool (0)

Comments:

5b-Riffle/Run Quality (8) (check only one per category, OR two and AVERAGE)

Riffle/Run Score:

Riffle/run depth (check one)

☐ Generally>10cm, Max>50cm (4)
☐ Generally>10cm, Max<50cm(3)
☐ Generally 5-10cm (1)
☒ Generally<5cm (riffle=0)

Riffle/run substrate

☐ Stable-e.g. cobble, boulder (2)
☐ Mod. stable-e.g. pea gravel (1)
☒ Unstable-e.g. sand, gravel (0)

Riffle/run embeddedness

☐ Extensive (-1) ☒ Normal/Low (1)
☐ Moderate (0) ☐ None (2)
☐ No riffle (0)

Comments:

6-Gradient (10 points maximum)

Gradient Score:

Average width: *Gradient:* *(ft/mile)* *Drainage Area:* *(square miles)*

Comments:

IDEM

OWQ Biological Studies QHEI (Qualitative Habitat Evaluation Index)

Sample #	bioSample #	Stream Name	Location

Surveyor	Sample Date	County	Macro SampleType	☐ Habitat Complete	QHEI Score:

Impacts/Miscellaneous

Major Suspected Impacts (Check all that apply)

- ☐ None
- ☐ Industrial
- ☐ WWTP
- ☒ Agricultural
- ☐ Livestock
- ☐ Silviculture
- ☐ Construction
- ☐ Urban Runoff
- ☐ Suburban
- ☒ Channelization
- ☐ Riparian Removal
- ☐ Flow Alteration
- ☐ CSOs
- ☐ Mining
- ☐ Landfills
- ☐ Natural

Pollution Impact Comments:

Miscellaneous QHEI Information

Subjective rating (1-10): % Riffle:

Aesthetic rating (1-10): % Run:

Canopy Cover (% Open): % Glide:

% Pool:

Is reach representative of stream?

General QHEI Notes:

Primary Headwater Habitat Evaluation Form

HHEI Score (sum of metrics 1, 2, 3) :

SITE NAME/LOCATION _____

_____ SITE NUMBER _____ RIVER BASIN _____ DRAINAGE AREA (mi²) _____

LENGTH OF STREAM REACH (ft) _____ LAT. _____ LONG. _____ RIVER CODE _____ RIVER MILE _____

DATE _____ SCORER _____ COMMENTS _____

NOTE: Complete All Items On This Form - Refer to "Field Evaluation Manual for Ohio's PHWH Streams" for Instructions

STREAM CHANNEL MODIFICATIONS: ☐ NONE / NATURAL CHANNEL ☐ RECOVERED ☐ RECOVERING ☒ RECENT OR NO RECOVERY

1. SUBSTRATE (Estimate percent of every type of substrate present. Check *ONLY* two predominant substrate *TYPE* boxes (Max of 32). Add total number of significant substrate types found (Max of 8). Final metric score is sum of boxes A & B.

HHEI Metric Points

TYPE		PERCENT	TYPE		PERCENT
☐ ☐	BLDR SLABS [16 pts]	_____	☐ ☐	SILT [3 pt]	_____
☐ ☐	BOULDER (>256 mm) [16 pts]	_____	☐ ☐	LEAF PACK/WOODY DEBRIS [3 pts]	_____
☐ ☐	BEDROCK [16 pt]	_____	☐ ☐	FINE DETRITUS [3 pts]	_____
☐ ☐	COBBLE (65-256 mm) [12 pts]	_____	☒ ☐	CLAY or HARDPAN [0 pt]	_____
☐ ☐	GRAVEL (2-64 mm) [9 pts]	_____	☐ ☐	MUCK [0 pts]	_____
☐ ☐	SAND (<2 mm) [6 pts]	_____	☐ ☐	ARTIFICIAL [3 pts]	_____

Total of Percentages of Bldr Slabs, Boulder, Cobble, Bedrock _____ **(A)** **(B)**

Substrate Max = 40

A + B

SCORE OF TWO MOST PREDOMINATE SUBSTRATE TYPES: **TOTAL NUMBER OF SUBSTRATE TYPES:**

2. Maximum Pool Depth ***(Measure the maximum pool depth within the 61 meter (200 ft)*** evaluation reach at the time of evaluation. Avoid plunge pools from road culverts or storm water pipes) (Check *ONLY* one box):

Pool Depth Max = 30

☐ > 30 centimeters [20 pts]
☐ > 22.5 - 30 cm [30 pts]
☐ > 10 - 22.5 cm [25 pts]
☐ > 5 cm - 10 cm [15 pts]
☐ < 5 cm [5 pts]
☒ NO WATER OR MOIST CHANNEL [0 pts]

COMMENTS _____ **MAXIMUM POOL DEPTH (centimeters):**

3. BANK FULL WIDTH (Measured as the average of 3-4 measurements) **(Check *ONLY* one box):**

Bankfull Width Max=30

☐ > 4.0 meters [30 pts]
☐ > 3.0 m - 4.0 m [25 pts]
☒ > 1.5 m - 3.0 m [20 pts]
☐ > 1.0 m - 1.5 m [15 pts]
☐ ≤ 1.0 m [5 pts]

COMMENTS _____ **AVERAGE BANKFULL WIDTH (meters):**

This information must also be completed

RIPARIAN ZONE AND FLOODPLAIN QUALITY ☆NOTE: River Left (L) and Right (R) as looking downstream☆

L	R	RIPARIAN WIDTH (Per Bank)	L	R	FLOODPLAIN QUALITY (Most Predominant per Bank)	L	R	
☒	☒	Wide >10m	☐	☐	Mature Forest, Wetland	☐	☐	Conservation Tillage
☐	☐	Moderate 5-10m	☒	☒	Immature Forest, Shrub or Old Field	☐	☐	Urban or Industrial
☐	☐	Narrow <5m	☐	☐	Residential, Park, New Field	☐	☐	Open Pasture, Row Crop
☐	☐	None	☐	☐	Fenced Pasture	☐	☐	Mining or Construction

COMMENTS _____

FLOW REGIME *(At Time of Evaluation)* (Check *ONLY* one box):

☐ Stream Flowing
☐ Subsurface flow with isolated pools (Interstitial)
☐ Moist Channel, isolated pools, no flow (Intermittent)
☒ Dry channel, no water (Ephemeral)

COMMENTS _____

SINUOSITY (Number of bends per 61 m (200 ft) of channel) (Check *ONLY* one box):

☒ None ☐ 1.0 ☐ 2.0 ☐ 3.0
☐ 0.5 ☐ 1.5 ☐ 2.5 ☐ >3

STREAM GRADIENT ESTIMATE

☐ Flat (0.5 ft/100 ft) ☒ Flat to Moderate ☐ Moderate (2 ft/100 ft) ☐ Moderate to Severe ☐ Severe (10 ft/100 ft)

ADDITIONAL STREAM INFORMATION (This Information Must Also be Completed):

QHEI PERFORMED? - ☐ Yes ☐ No QHEI Score _____ (If Yes, Attach Completed QHEI Form)

DOWNSTREAM DESIGNATED USE(S)

☐ WWH Name: _____ Distance from Evaluated Stream _____

☐ CWH Name: _____ Distance from Evaluated Stream _____

☐ EWH Name: _____ Distance from Evaluated Stream _____

MAPPING: ATTACH COPIES OF MAPS, INCLUDING THE ENTIRE WATERSHED AREA. CLEARLY MARK THE SITE LOCATION

USGS Quadrangle Name: _____ NRCS Soil Map Page: _____ NRCS Soil Map Stream Order _____

County: _____ Township / City: _____

MISCELLANEOUS

Base Flow Conditions? (Y/N): _____ Date of last precipitation: _____ Quantity: _____

Photograph Information: _____

Elevated Turbidity? (Y/N): _____ Canopy (% open): _____

Were samples collected for water chemistry? (Y/N): _____ (Note lab sample no. or id. and attach results) Lab Number: _____

Field Measures: Temp (°C) _____ Dissolved Oxygen (mg/l) _____ pH (S.U.) _____ Conductivity (µmhos/cm) _____

Is the sampling reach representative of the stream (Y/N) _____ If not, please explain: _____

_____

Additional comments/description of pollution impacts: _____

_____

BIOTIC EVALUATION

Performed? (Y/N): _____ (If Yes, Record all observations. Voucher collections optional. NOTE: all voucher samples must be labeled with the site ID number. Include appropriate field data sheets from the Primary Headwater Habitat Assessment Manual)

Fish Observed? (Y/N) _____ Voucher? (Y/N) _____ Salamanders Observed? (Y/N) _____ Voucher? (Y/N) _____

Frogs or Tadpoles Observed? (Y/N) _____ Voucher? (Y/N) _____ Aquatic Macroinvertebrates Observed? (Y/N) _____ Voucher? (Y/N) _____

Comments Regarding Biology: _____

_____

_____

DRAWING AND NARRATIVE DESCRIPTION OF STREAM REACH (This must be completed):

Include important landmarks and other features of interest for site evaluation and a narrative description of the stream's location

FLOW ➜

Primary Headwater Habitat Evaluation Form

HHEI Score (sum of metrics 1, 2, 3) :

SITE NAME/LOCATION _____

SITE NUMBER _____ RIVER BASIN _____ DRAINAGE AREA (mi²) _____

LENGTH OF STREAM REACH (ft) _____ LAT. _____ LONG. _____ RIVER CODE _____ RIVER MILE _____

DATE _____ SCORER _____ COMMENTS _____

NOTE: Complete All Items On This Form - Refer to "Field Evaluation Manual for Ohio's PHWH Streams" for Instructions

STREAM CHANNEL MODIFICATIONS: ☐ NONE / NATURAL CHANNEL ☐ RECOVERED ☒ RECOVERING ☐ RECENT OR NO RECOVERY

HHEI Metric Points

1. SUBSTRATE (Estimate percent of every type of substrate present. Check *ONLY* two predominant substrate *TYPE* boxes (Max of 32). Add total number of significant substrate types found (Max of 8). Final metric score is sum of boxes A & B.

Substrate Max = 40

TYPE		PERCENT	TYPE		PERCENT
☐ ☐	BLDR SLABS [16 pts]		☐ ☐	SILT [3 pt]	
☐ ☐	BOULDER (>256 mm) [16 pts]		☐ ☐	LEAF PACK/WOODY DEBRIS [3 pts]	
☐ ☐	BEDROCK [16 pt]		☐ ☐	FINE DETRITUS [3 pts]	
☐ ☐	COBBLE (65-256 mm) [12 pts]		☒ ☐	CLAY or HARDPAN [0 pt]	
☐ ☐	GRAVEL (2-64 mm) [9 pts]		☐ ☐	MUCK [0 pts]	
☐ ☐	SAND (<2 mm) [6 pts]		☐ ☐	ARTIFICIAL [3 pts]	

Total of Percentages of Bldr Slabs, Boulder, Cobble, Bedrock _____ **(A)** **(B)** **A + B**

SCORE OF TWO MOST PREDOMINATE SUBSTRATE TYPES: **TOTAL NUMBER OF SUBSTRATE TYPES:**

2. Maximum Pool Depth ***(Measure the maximum pool depth within the 61 meter (200 ft)*** evaluation reach at the time of evaluation. Avoid plunge pools from road culverts or storm water pipes) (Check *ONLY* one box):

Pool Depth Max = 30

☐ > 30 centimeters [20 pts]
☐ > 22.5 - 30 cm [30 pts]
☐ > 10 - 22.5 cm [25 pts]
☒ > 5 cm - 10 cm [15 pts]
☐ < 5 cm [5 pts]
☐ NO WATER OR MOIST CHANNEL [0 pts]

COMMENTS _____ **MAXIMUM POOL DEPTH (centimeters):**

3. BANK FULL WIDTH (Measured as the average of 3-4 measurements) **(Check *ONLY* one box):**

Bankfull Width Max=30

☐ > 4.0 meters [30 pts]
☐ > 3.0 m - 4.0 m [25 pts]
☐ > 1.5 m - 3.0 m [20 pts]
☒ > 1.0 m - 1.5 m [15 pts]
☐ ≤ 1.0 m [5 pts]

COMMENTS _____ **AVERAGE BANKFULL WIDTH (meters):**

This information must also be completed

RIPARIAN ZONE AND FLOODPLAIN QUALITY ☆NOTE: River Left (L) and Right (R) as looking downstream☆

L	R	RIPARIAN WIDTH (Per Bank)	L	R	FLOODPLAIN QUALITY (Most Predominant per Bank)	L	R	
☐	☐	Wide >10m	☐	☐	Mature Forest, Wetland	☐	☐	Conservation Tillage
☒	☒	Moderate 5-10m	☐	☐	Immature Forest, Shrub or Old Field	☐	☐	Urban or Industrial
☐	☐	Narrow <5m	☐	☐	Residential, Park, New Field	☐	☐	Open Pasture, Row Crop
☐	☐	None	☐	☐	Fenced Pasture	☐	☐	Mining or Construction

COMMENTS _____

FLOW REGIME *(At Time of Evaluation)* (Check *ONLY* one box):

☐ Stream Flowing
☐ Subsurface flow with isolated pools (Interstitial)
☐ Moist Channel, isolated pools, no flow (Intermittent)
☐ Dry channel, no water (Ephemeral)

COMMENTS _____

SINUOSITY (Number of bends per 61 m (200 ft) of channel) (Check *ONLY* one box):

☒ None ☐ 1.0 ☐ 2.0 ☐ 3.0
☐ 0.5 ☐ 1.5 ☐ 2.5 ☐ >3

STREAM GRADIENT ESTIMATE

☐ Flat (0.5 ft/100 ft) ☒ Flat to Moderate ☐ Moderate (2 ft/100 ft) ☐ Moderate to Severe ☐ Severe (10 ft/100 ft)

ADDITIONAL STREAM INFORMATION (This Information Must Also be Completed):

QHEI PERFORMED? - ☐ Yes ☐ No QHEI Score _____ (If Yes, Attach Completed QHEI Form)

DOWNSTREAM DESIGNATED USE(S)

☐ WWH Name: _____ Distance from Evaluated Stream _____

☐ CWH Name: _____ Distance from Evaluated Stream _____

☐ EWH Name: _____ Distance from Evaluated Stream _____

MAPPING: ATTACH COPIES OF MAPS, INCLUDING THE ENTIRE WATERSHED AREA. CLEARLY MARK THE SITE LOCATION

USGS Quadrangle Name: _____ NRCS Soil Map Page: _____ NRCS Soil Map Stream Order _____

County: _____ Township / City: _____

MISCELLANEOUS

Base Flow Conditions? (Y/N): _____ Date of last precipitation: _____ Quantity: _____

Photograph Information: _____

Elevated Turbidity? (Y/N): _____ Canopy (% open): _____

Were samples collected for water chemistry? (Y/N): _____ (Note lab sample no. or id. and attach results) Lab Number: _____

Field Measures: Temp (°C)_____ Dissolved Oxygen (mg/l) _____ pH (S.U.) _____ Conductivity (µmhos/cm) _____

Is the sampling reach representative of the stream (Y/N)_____ If not, please explain: _____

Additional comments/description of pollution impacts: _____

BIOTIC EVALUATION

Performed? (Y/N): _____ (If Yes, Record all observations. Voucher collections optional. NOTE: all voucher samples must be labeled with the site ID number. Include appropriate field data sheets from the Primary Headwater Habitat Assessment Manual)

Fish Observed? (Y/N)_____ Voucher? (Y/N)_____ Salamanders Observed? (Y/N)_____ Voucher? (Y/N)_____

Frogs or Tadpoles Observed? (Y/N)____ Voucher? (Y/N)____ Aquatic Macroinvertebrates Observed? (Y/N)____ Voucher? (Y/N)____

Comments Regarding Biology: _____

DRAWING AND NARRATIVE DESCRIPTION OF STREAM REACH (This must be completed):

Include important landmarks and other features of interest for site evaluation and a narrative description of the stream's location

FLOW ➔

OhioEPA Primary Headwater Habitat Evaluation Form

HHEI Score (sum of metrics 1, 2, 3) : 16

SITE NAME/LOCATION

Tributary at Eagan Ditch SITE NUMBER Sec 3-S17 RIVER BASIN White River DRAINAGE AREA (mi²) 0.1 mi²

LENGTH OF STREAM REACH (ft) 200ft LAT. ____ LONG. ____ RIVER CODE ____ RIVER MILE ____

DATE 9/17/05 SCORER K. Allison COMMENTS

NOTE: Complete All Items On This Form - Refer to "Field Evaluation Manual for Ohio's PHWH Streams" for Instructions

STREAM CHANNEL MODIFICATIONS: ☐ NONE / NATURAL CHANNEL ☐ RECOVERED ☒ RECOVERING ☐ RECENT OR NO RECOVERY

1. SUBSTRATE (Estimate percent of every type of substrate present. Check *ONLY* two predominant substrate *TYPE* boxes (Max of 32). Add total number of significant substrate types found (Max of 8). Final metric score is sum of boxes A & B.

TYPE		PERCENT	TYPE		PERCENT
☐☐	BLDR SLABS [16 pts]		☒☐	SILT [3 pt]	50
☐☐	BOULDER (>256 mm) [16 pts]		☐☐	LEAF PACK/WOODY DEBRIS [3 pts]	
☐☐	BEDROCK [16 pt]		☐☐	FINE DETRITUS [3 pts]	
☐☐	COBBLE (65-256 mm) [12 pts]		☒☐	CLAY or HARDPAN [0 pt]	45
☒☐	GRAVEL (2-64 mm) [9 pts]	5	☐☐	MUCK [0 pts]	
☐☐	SAND (<2 mm) [6 pts]		☐☐	ARTIFICIAL [3 pts]	

Total of Percentages of Bldr Slabs, Boulder, Cobble, Bedrock ____ (A) (B)

SCORE OF TWO MOST PREDOMINATE SUBSTRATE TYPES: 3 **TOTAL NUMBER OF SUBSTRATE TYPES:** 3

HHEI Metric Points

Substrate Max = 40: 6 (A + B)

2. Maximum Pool Depth ***(Measure the maximum pool depth within the 61 meter (200 ft)*** evaluation reach at the time of evaluation. Avoid plunge pools from road culverts or storm water pipes) (Check *ONLY* one box):

- ☐ > 30 centimeters [20 pts]
- ☐ > 22.5 - 30 cm [30 pts]
- ☐ > 10 - 22.5 cm [25 pts]
- ☐ > 5 cm - 10 cm [15 pts]
- ☒ < 5 cm [5 pts]
- ☐ NO WATER OR MOIST CHANNEL [0 pts]

COMMENTS ____ **MAXIMUM POOL DEPTH (centimeters):** 3

Pool Depth Max = 30: 5

3. BANK FULL WIDTH (Measured as the average of 3-4 measurements) (Check *ONLY* one box):

- ☐ > 4.0 meters [30 pts]
- ☐ > 3.0 m - 4.0 m [25 pts]
- ☐ > 1.5 m - 3.0 m [20 pts]
- ☐ > 1.0 m - 1.5 m [15 pts]
- ☒ ≤ 1.0 m [5 pts]

COMMENTS ____ **AVERAGE BANKFULL WIDTH (meters):** 0.7

Bankfull Width Max=30: 5

This information must also be completed

RIPARIAN ZONE AND FLOODPLAIN QUALITY ☆NOTE: River Left (L) and Right (R) as looking downstream☆

RIPARIAN WIDTH L	R	(Per Bank)	FLOODPLAIN QUALITY L	R	(Most Predominant per Bank)	L	R	
☒	☐	Wide >10m	☒	☐	Mature Forest, Wetland	☐	☐	Conservation Tillage
☐	☐	Moderate 5-10m	☐	☒	Immature Forest, Shrub or Old Field	☐	☐	Urban or Industrial
☐	☒	Narrow <5m	☐	☐	Residential, Park, New Field	☐	☐	Open Pasture, Row Crop
☐	☐	None	☐	☐	Fenced Pasture	☐	☐	Mining or Construction

COMMENTS ____

FLOW REGIME *(At Time of Evaluation)* (Check *ONLY* one box):

- ☐ Stream Flowing
- ☐ Subsurface flow with isolated pools (Interstitial)
- ☒ Moist Channel, isolated pools, no flow (Intermittent)
- ☐ Dry channel, no water (Ephemeral)

COMMENTS ____

SINUOSITY (Number of bends per 61 m (200 ft) of channel) (Check *ONLY* one box):

☒ None	☐ 1.0	☐ 2.0	☐ 3.0
☐ 0.5	☐ 1.5	☐ 2.5	☐ >3

STREAM GRADIENT ESTIMATE

☒ Flat (0.5 ft/100 ft) ☐ Flat to Moderate ☐ Moderate (2 ft/100 ft) ☐ Moderate to Severe ☐ Severe (10 ft/100 ft)

ADDITIONAL STREAM INFORMATION (This Information Must Also be Completed):

QHEI PERFORMED? - ☐ Yes ☐ No QHEI Score _____ (If Yes, Attach Completed QHEI Form)

DOWNSTREAM DESIGNATED USE(S)

☐ WWH Name: _____ Distance from Evaluated Stream _____

☐ CWH Name: _____ Distance from Evaluated Stream _____

☐ EWH Name: _____ Distance from Evaluated Stream _____

MAPPING: ATTACH COPIES OF MAPS, INCLUDING THE ENTIRE WATERSHED AREA. CLEARLY MARK THE SITE LOCATION

USGS Quadrangle Name: _____ NRCS Soil Map Page: _____ NRCS Soil Map Stream Order _____

County: _____ Township / City: _____

MISCELLANEOUS

Base Flow Conditions? (Y/N): _____ Date of last precipitation: _____ Quantity: _____

Photograph Information: _____

Elevated Turbidity? (Y/N): _____ Canopy (% open): _____

Were samples collected for water chemistry? (Y/N): _____ (Note lab sample no. or id. and attach results) Lab Number: _____

Field Measures: Temp (°C) _____ Dissolved Oxygen (mg/l) _____ pH (S.U.) _____ Conductivity (µmhos/cm) _____

Is the sampling reach representative of the stream (Y/N) _____ If not, please explain: _____

_____

Additional comments/description of pollution impacts: _____

_____

BIOTIC EVALUATION

Performed? (Y/N): _____ (If Yes, Record all observations. Voucher collections optional. NOTE: all voucher samples must be labeled with the site ID number. Include appropriate field data sheets from the Primary Headwater Habitat Assessment Manual)

Fish Observed? (Y/N) _____ Voucher? (Y/N) _____ Salamanders Observed? (Y/N) _____ Voucher? (Y/N) _____

Frogs or Tadpoles Observed? (Y/N) _____ Voucher? (Y/N) _____ Aquatic Macroinvertebrates Observed? (Y/N) _____ Voucher? (Y/N) _____

Comments Regarding Biology: _____

_____

_____

DRAWING AND NARRATIVE DESCRIPTION OF STREAM REACH (This must be completed):

Include important landmarks and other features of interest for site evaluation and a narrative description of the stream's location

FLOW →

IDEM OWQ Biological Studies QHEI (Qualitative Habitat Evaluation Index)

Sample # | bioSample # | Stream Name: Sec3-S18 | Location: Eagan Ditch

Surveyor: K. Allison | Sample Date: 9/19/05 | County: Daviess | Macro SampleType | ☐ Habitat Complete | QHEI Score: 33

1-Substrate (20 points maximum)

Substrate Score: 4

Check 1 Predominant Pool & 1 Predominant Riffle

Check all that are present — P=Pool, R=Riffle

Predominant P	Predominant R	Present P	Present R		Predominant P	Predominant R	Present P	Present R	
☐	☐	☐	☐	Bldrs/Slabs(10)	☐	☐	☒	☐	Hardpan(4)
☐	☐	☐	☐	Boulders(9)	☐	☐	☐	☐	Detritus(3)
☐	☐	☐	☐	Cobble(8)	☐	☐	☐	☐	Muck(2)
☐	☐	☒	☐	Gravel(7)	☒	☒	☒	☒	Silt(2)
☐	☐	☐	☐	Sand(6)	☐	☐	☐	☐	Sludge(1)
☐	☐	☐	☐	Bedrock(5)	☐	☐	☐	☐	Artificial(0)

Substrate Quality (check only 1, or check 2 and AVERAGE)

Substrate Origin: ☐ Limestone(1) ☒ Hardpan(0) ☐ Lacustrine(0) ☐ Tills(1) ☐ Sandstone(0) ☐ Shale(-1) ☐ Wetlands(0) ☐ Rip/Rap(0) ☐ Coal fines(-2)

Silt Cover: ☐ Silt heavy(-2) ☐ Silt moderate(-1) ☒ Silt normal(0) ☐ Silt free(1)

Embeddedness: ☐ Extensive(-2) ☐ Moderate(-1) ☒ Low/Normal(0) ☐ None(1)

NOTE: ignore sludge originating from point sources; score based on natural substrates

☐ >4 substrates present(2)

Comments:

2-Instream Cover (20 points maximum

Instream Cover Score: 5

Type (check ALL that apply)

☐ Undercut banks(1) ☐ Deep pools(2) ☐ Oxbows(1)
☐ Overhanging vegetation(1) ☐ Rootwads(1) ☐ Aquatic macrophytes(1)
☒ Shallows(in slow water)(1) ☐ Boulders(1) ☒ Logs and woody debris(1)
☐ Rootmats(1)

Amount (check only 1, or 2 and AVERAGE)

☐ Extensive >75% (11)
☐ Moderate 25-75% (7)
☒ Sparse 5-25% (3)
☐ Nearly absent <5% (1)

Comments:

3-Channel Morphology (20) (check only one per category, OR two and AVERAGE)

Channel Score: 10

Sinuosity	Development	Channelization	Stability	Modifications/Other	
☐ High (4)	☐ Excellent (7)	☐ None (6)	☐ High (3)	☐ Snagging	☐ Impound
☐ Moderate (3)	☐ Good (5)	☐ Recovered (4)	☒ Moderate (2)	☐ Relocation	☐ Islands
☒ Low (2)	☒ Fair (3)	☒ Recovering (3)	☐ Low (1)	☒ Canopy Removal	☐ Leveed
☐ None (1)	☐ Poor (1)	☐ Recent or no recovery (1)		☒ Dredging	☐ Bank shaping
				☐ One side channel modifications	

Comments:

4-Riparian Zone & Bank Erosion (10 points maximum)

Riparian Score: 5.5

Left/Right banks looking downstream (For each category, check only one per bank, OR two per bank and AVERAGE).

Riparian width (per bank)

L	R	
☐	☐	Wide >50m (4)
☒	☒	Moderate 10-50m (3)
☐	☐	Narrow 5-10m (2)
☐	☐	Very narrow <5m (1)
☐	☐	None (0)

Erosion/Runoff-Floodplain quality (past 100 ft Riparian) (most predominant per bank)

L	R	
☐	☐	Forest, Swamp (3)
☒	☒	Shrub or Old field (2)
☒	☒	Residential, Park, New field (1)
☐	☐	Fenced pasture (1)
☐	☐	Conservation Tillage (1)
☐	☐	Urban or Industrial (0)
☐	☐	Mining, Construction (0)
☐	☐	Open Pasture/Rowcrop (0)

Bank Erosion (per bank)

L	R	
☐	☐	None or little (3)
☐	☐	Moderate (2)
☒	☒	Heavy/Severe (1)

Comments:

5a-Pool/Glide Quality (12 points maximum

Pool/Glide Score: 3

Max pool depth (check one)

☐ >1m (6)
☐ 0.7-1m (4)
☐ 0.4-0.7m (2)
☐ 0.2-0.4m (1)
☒ <0.2m (pool=0)

Morphology (check only one, OR check two and AVERAGE)

☒ Pool width > riffle width (2)
☐ Pool width = riffle width (1)
☐ Pool width < riffle width (0)

Pool/Run/Riffle current velocity (check all that apply)

☐ Eddies (1) ☐ Torrential (-1)
☐ Fast (1) ☐ Interstitial (-1)
☐ Moderate (1) ☐ Intermittent (-2)
☒ Slow (1) ☐ No pool (0)

Comments:

5b-Riffle/Run Quality (8) (check only one per category, OR two and AVERAGE)

Riffle/Run Score: 1

Riffle/run depth (check one)

☐ Generally>10cm, Max>50cm (4)
☐ Generally>10cm, Max<50cm(3)
☐ Generally 5-10cm (1)
☒ Generally<5cm (riffle=0)

Riffle/run substrate

☐ Stable-e.g. cobble, boulder (2)
☐ Mod. stable-e.g. pea gravel (1)
☒ Unstable-e.g. sand, gravel (0)

Riffle/run embeddedness

☐ Extensive (-1) ☒ Normal/Low (1)
☐ Moderate (0) ☐ None (2)
☐ No riffle (0)

Comments:

6-Gradient (10 points maximum)

Gradient Score: 4

Average width: 1.5m | Gradient: 3.6 (ft/mile) | Drainage Area: 8.7 (square miles)

Comments:

IDEM **OWQ Biological Studies QHEI (Qualitative Habitat Evaluation Index)**

Sample #	bioSample #	Stream Name	Location

Surveyor	Sample Date	County	Macro SampleType	☐ Habitat Complete	QHEI Score:

Impacts/Miscellaneous

Major Suspected Impacts (Check all that apply)

- ☐ None
- ☐ Industrial
- ☐ WWTP
- ☒ Agricultural
- ☐ Livestock
- ☐ Silviculture
- ☐ Construction
- ☐ Urban Runoff
- ☐ Suburban
- ☐ Channelization
- ☐ Riparian Removal
- ☐ Flow Alteration
- ☐ CSOs
- ☐ Mining
- ☐ Landfills
- ☐ Natural

Pollution Impact Comments:

Miscellaneous QHEI Information

Subjective rating (1-10): 3 % Riffle:
Aesthetic rating (1-10): 2 % Run:
% Glide:
Canopy Cover (% Open): % Pool:

Is reach representative of stream?

General QHEI Notes:

IDEM — OWQ Biological Studies QHEI (Qualitative Habitat Evaluation Index)

Sample #	bioSample #	Stream Name	Location
		Sec 3-S19	Fagan Ditch

Surveyor	Sample Date	County	Macro SampleType	Habitat Complete	QHEI Score:
K. Albson	9/7/05	Daviess		☐	33 (34 RLE)

1-Substrate (20 points maximum)

Substrate Score: 8

Check 1 Predominant Pool & 1 Predominant Rifle

Check all that are present — P=Pool, R=Riffle

Predominant P	Predominant R	Present P	Present R	Predominant P	Predominant R	Present P	Present R
☐	☐ Bldrs/Slabs(10)	☐	☐	☒	☒ Hardpan(4)	☒	☐
☐	☐ Boulders(9)	☐	☐	☐	☐ Detritus(3)	☐	☐
☐	☐ Cobble(8)	☐	☐	☐	☐ Muck(2)	☐	☐
☐	☐ Gravel(7)	☒	☐	☐	☐ Silt(2)	☒	☐
☐	☐ Sand(6)	☐	☐	☐	☐ Sludge(1)	☐	☐
☐	☐ Bedrock(5)	☐	☐	☐	☐ Artificial(0)	☐	☐

Substrate Quality (check only 1, or check 2 and AVERAGE)

Substrate Origin: ☐ Limestone(1) ☒ Hardpan(0) ☐ Lacustrine(0) ☐ Tills(1) ☐ Sandstone(0) ☐ Shale(-1) ☐ Wetlands(0) ☐ Rip/Rap(0) ☐ Coal fines(-2)

Silt Cover: ☐ Silt heavy(-2) ☐ Silt moderate(-1) ☒ Silt normal(0) ☐ Silt free(1)

Embeddedness: ☐ Extensive(-2) ☐ Moderate(-1) ☒ Low/Normal(0) ☐ None(1)

NOTE: Ignore sludge originating from point sources; score based on natural substrates

☐ >4 substrates present(2)

Comments:

2-Instream Cover (20 points maximum

Instream Cover Score: 5

Type (check ALL that apply): ☐ Undercut banks(1) ☐ Deep pools(2) ☐ Oxbows(1) ☐ Overhanging vegetation(1) ☐ Rootwads(1) ☐ Aquatic macrophytes(1) ☒ Shallows(in slow water)(1) ☐ Boulders(1) ☒ Logs and woody debris(1) ☐ Rootmats(1)

Amount (check only 1, or 2 and AVERAGE): ☐ Extensive >75% (11) ☐ Moderate 25-75% (7) ☒ Sparse 5-25% (3) ☐ Nearly absent <5% (1)

Comments:

3-Channel Morphology (20) (check only one per category, OR two and AVERAGE)

Channel Score: 8

Sinuosity	Development	Channelization	Stability	Modifications/Other	
☐ High (4)	☐ Excellent (7)	☐ None (6)	☐ High (3)	☐ Snagging	☐ Impound
☐ Moderate (3)	☐ Good (5)	☐ Recovered (4)	☒ Moderate (2)	☐ Relocation	☐ Islands
☒ Low (2)	☐ Fair (3)	☒ Recovering (3)	☐ Low (1)	☒ Canopy Removal	☐ Leveed
☐ None (1)	☒ Poor (1)	☐ Recent or no recovery (1)		☒ Dredging	☐ Bank shaping
					☐ Orig side channel modifications

Comments:

4-Riparian Zone & Bank Erosion (10 points maximum)

Riparian Score: ~~4~~ 5 (RLE)

Left/Right banks looking downstream (For each category, check only one per bank, OR two per bank and AVERAGE).

Riparian width L	Riparian width R	(per bank)	Erosion/Runoff-Floodplain quality (past 100 ft Riparian) L	R	(most predominant per bank)	L	R	Bank Erosion L	R	(per bank)
☐	☐	Wide >50m (4)	☐	☐	Forest, Swamp (3)	☐	☐	☐	☐	None or little (3)
☒	☒	Moderate 10-50m (3)	☒	☒	Shrub or Old field (2)	☐	☐	☐	☐	Moderate (2)
☐	☐	Narrow 5-10m (2)	☒	☒	Residential, Park, New field (1)	☐	☐	☒	☒	Heavy/Severe (1)
☐	☐	Very narrow <5m (1)	☐	☐	Fenced pasture (1)	☒	☒			
☐	☐	None (0)								

Comments: Row crop ← New field ← old field ← stream → old field → new field → row crop

5a-Pool/Glide Quality (12 points maximum

Pool/Glide Score: 3

Max pool depth (check one): ☐ >1m (6) ☐ 0.7-1m (4) ☐ 0.4-0.7m (2) ☐ 0.2-0.4m (1) ☒ <0.2m (pool=0)

Morphology (check only one, OR check two and AVERAGE): ☒ Pool width > riffle width (2) ☐ Pool width = riffle width (1) ☐ Pool width < riffle width (0)

Pool/Run/Riffle current velocity (check all that apply): ☐ Eddies (1) ☐ Fast (1) ☐ Moderate (1) ☒ Slow (1) ☐ Torrential (-1) ☐ Interstitial (-1) ☐ Intermittent (-2) ☐ No pool (0)

Comments:

5b-Riffle/Run Quality (8) (check only one per category, OR two and AVERAGE)

Riffle/Run Score: 1

Riffle/run depth (check one): ☐ Generally>10cm, Max>50cm (4) ☐ Generally>10cm, Max<50cm(3) ☐ Generally 5-10cm (1) ☒ Generally<5cm (riffle=0)

Riffle/run substrate: ☐ Stable-e.g. cobble, boulder (2) ☐ Mod. stable-e.g. pea gravel (1) ☒ Unstable-e.g. sand, gravel (0)

Riffle/run embeddedness: ☐ Extensive (-1) ☐ Moderate (0) ☒ Normal/Low (1) ☐ None (2) ☐ No riffle (0)

Comments:

6-Gradient (10 points maximum)

Gradient Score: 4

Average width: 1.5m Gradient: 3.6 (ft/mile) Drainage Area: 8.97 (square miles)

Comments:

IDEM

OWQ Biological Studies QHEI (Qualitative Habitat Evaluation Index)

Sample #	bioSample #	Stream Name	Location

Surveyor	Sample Date	County	Macro SampleType	☐ Habitat Complete	QHEI Score:

Impacts/Miscellaneous

Major Suspected Impacts (Check all that apply)

- ☐ None
- ☐ Industrial
- ☐ WWTP
- ☒ Agricultural
- ☐ Livestock
- ☐ Silviculture
- ☐ Construction
- ☐ Urban Runoff
- ☐ Suburban
- ☒ Channelization
- ☐ Riparian Removal
- ☐ Flow Alteration
- ☐ CSOs
- ☐ Mining
- ☐ Landfills
- ☐ Natural

Pollution Impact Comments:

Miscellaneous QHEI Information

Subjective rating (1-10):
Aesthetic rating (1-10):
Canopy Cover (% Open):

% Riffle:
% Run:
% Glide:
% Pool:

Is reach representative of stream?

General QHEI Notes:

IDEM OWQ Biological Studies QHEI (Qualitative Habitat Evaluation Index)

Sample # | bioSample # | Stream Name | Location

Surveyor | Sample Date | County | Macro SampleType | ☐ Habitat Complete | **QHEI Score:**

1-Substrate (20 points maximum)

Substrate Score:

Check 1 Predominant Pool & 1 Predominant Riffle

Check all that are present — P=Pool, R=Riffle

Predominant P	Predominant R	Present P	Present R		Predominant P	Predominant R	Present P	Present R	
☐	☐	☐	☐	Bldrs/Slabs(10)	☒	☐	☒	☐	Hardpan(4)
☐	☐	☐	☐	Boulders(9)	☐	☐	☐	☐	Detritus(3)
☐	☐	☐	☐	Cobble(8)	☐	☐	☐	☐	Muck(2)
☐	☐	☐	☐	Gravel(7)	☐	☐	☒	☐	Silt(2)
☐	☐	☐	☐	Sand(6)	☐	☐	☐	☐	Sludge(1)
☐	☐	☐	☐	Bedrock(5)	☐	☐	☐	☐	Artificial(0)

Substrate Quality (check only 1, or check 2 and AVERAGE)

Substrate Origin: ☐ Limestone(1) ☒ Hardpan(0) ☐ Lacustrine(0) ☐ Tills(1) ☐ Sandstone(0) ☐ Shale(-1) ☐ Wetlands(0) ☐ Rip/Rap(0) ☐ Coal fines(-2)

Silt Cover: ☐ Silt heavy(-2) ☐ Silt moderate(-1) ☒ Silt normal(0) ☐ Silt free(1)

Embeddedness: ☐ Extensive(-2) ☐ Moderate(-1) ☒ Low/Normal(0) ☐ None(1)

NOTE: ignore sludge originating from point sources; score based on natural substrates

☐ >4 substrates present(2)

Comments:

2-Instream Cover (20 points maximum

Instream Cover Score:

Type (check ALL that apply)

☐ Undercut banks(1) ☐ Deep pools(2) ☐ Oxbows(1)
☒ Overhanging vegetation(1) ☐ Rootwads(1) ☐ Aquatic macrophytes(1)
☒ Shallows(in slow water)(1) ☐ Boulders(1) ☐ Logs and woody debris(1)
☐ Rootmats(1)

Comments:

Amount (check only 1, or 2 and AVERAGE)

☐ Extensive >75% (11)
☐ Moderate 25-75% (7)
☒ Sparse 5-25% (3)
☐ Nearly absent <5% (1)

3-Channel Morphology (20) (check only one per category, OR two and AVERAGE)

Channel Score:

Sinuosity	Development	Channelization	Stability	Modifications/Other	
☐ High (4)	☐ Excellent (7)	☐ None (6)	☐ High (3)	☐ Snagging	☐ Impound
☐ Moderate (3)	☐ Good (5)	☐ Recovered (4)	☒ Moderate (2)	☐ Relocation	☐ Islands
☒ Low (2)	☐ Fair (3)	☒ Recovering (3)	☐ Low (1)	☒ Canopy Removal	☐ Leveed
☐ None (1)	☒ Poor (1)	☐ Recent or no recovery (1)		☐ Dredging	☐ Bank shaping

Comments:

☐ One side channel modifications

4-Riparian Zone & Bank Erosion (10 points maximum)

Riparian Score:

Left/Right banks looking downstream (For each category, check only one per bank, OR two per bank and AVERAGE).

Riparian width L	Riparian width R	(per bank)	Erosion/Runoff-Floodplain quality (past 100 ft Riparian) L	R	(most predominant per bank)	L	R		Bank Erosion L	R	(per bank)
☐	☐	Wide >50m (4)	☐	☐	Forest, Swamp (3)	☐	☐	Conservation Tillage (1)	☐	☐	None or little (3)
☒	☒	Moderate 10-50m (3)	☒	☐	Shrub or Old field (2)	☐	☐	Urban or Industrial (0)	☒	☒	Moderate (2)
☐	☐	Narrow 5-10m (2)	☐	☐	Residential, Park, New field (1)	☐	☐	Mining, Construction (0)	☐	☐	Heavy/Severe (1)
☐	☐	Very narrow <5m (1)	☐	☐	Fenced pasture (1)	☒	☒	Open Pasture/Rowcrop (0)			
☐	☐	None (0)									

Comments:

5a-Pool/Glide Quality (12 points maximum

Pool/Glide Score:

Max pool depth (check one)
☐ >1m (6)
☐ 0.7-1m (4)
☐ 0.4-0.7m (2)
☐ 0.2-0.4m (1)
☒ <0.2m (pool=0)

Morphology (check only one, OR check two and AVERAGE)
☒ Pool width > riffle width (2)
☐ Pool width = riffle width (1)
☐ Pool width < riffle width (0)

Pool/Run/Riffle current velocity (check all that apply)
☐ Eddies (1) ☐ Torrential (-1)
☐ Fast (1) ☐ Interstitial (-1)
☐ Moderate (1) ☐ Intermittent (-2)
☒ Slow (1) ☐ No pool (0)

Comments:

5b-Riffle/Run Quality (8) (check only one per category, OR two and AVERAGE)

Riffle/Run Score:

Riffle/run depth (check one)
☐ Generally>10cm, Max>50cm (4)
☐ Generally>10cm, Max<50cm(3)
☐ Generally 5-10cm (1)
☒ Generally<5cm (riffle=0)

Riffle/run substrate
☐ Stable-e.g. cobble, boulder (2)
☐ Mod. stable-e.g. pea gravel (1)
☒ Unstable-e.g. sand, gravel (0)

Riffle/run embeddedness
☐ Extensive (-1) ☐ Normal/Low (1)
☐ Moderate (0) ☐ None (2)
☒ No riffle (0)

Comments:

6-Gradient (10 points maximum)

Gradient Score:

Average width: *Gradient:* *(ft/mile)* *Drainage Area:* *(square miles)*

Comments:

IDEM OWQ Biological Studies QHEI (Qualitative Habitat Evaluation Index)

Sample #	bioSample #	Stream Name	Location

Surveyor	Sample Date	County	Macro SampleType	☐ Habitat Complete	QHEI Score:

Impacts/Miscellaneous

Major Suspected Impacts (Check all that apply)

- ☐ None
- ☐ Industrial
- ☐ WWTP
- ☒ Agricultural
- ☐ Livestock
- ☐ Silviculture
- ☐ Construction
- ☐ Urban Runoff
- ☐ Suburban
- ☒ Channelization
- ☐ Riparian Removal
- ☐ Flow Alteration
- ☐ CSOs
- ☐ Mining
- ☐ Landfills
- ☐ Natural

Pollution Impact Comments:

Miscellaneous QHEI Information

Subjective rating (1-10): 2 % Riffle: Is reach representative of stream?

Aesthetic rating (1-10): 2 % Run:

% Glide:

Canopy Cover (% Open): % Pool:

General QHEI Notes:

IDEM OWQ Biological Studies QHEI (Qualitative Habitat Evaluation Index)

Sample # | bioSample # | Stream Name | Location

Surveyor | Sample Date | County | Macro SampleType | ☐ Habitat Complete | **QHEI Score:**

1-Substrate (20 points maximum)

Substrate Score:

Check 1 Predominant Pool & 1 Predominant Riffle

Check all that are present — P=Pool, R=Riffle

Predominant P	Predominant R		Present P	Present R	Predominant P	Predominant R		Present P	Present R
☐	☐	Bldrs/Slabs(10)	☐	☐	☒	☒	Hardpan(4)	☒	☐
☐	☐	Boulders(9)	☐	☐	☐	☐	Detritus(3)	☐	☐
☐	☐	Cobble(8)	☐	☐	☐	☐	Muck(2)	☐	☐
☐	☐	Gravel(7)	☐	☐	☐	☐	Silt(2)	☐	☐
☐	☐	Sand(6)	☐	☐	☐	☐	Sludge(1)	☐	☐
☐	☐	Bedrock(5)	☐	☐	☐	☐	Artificial(0)	☐	☐

Substrate Quality (check only 1, or check 2 and AVERAGE)

Substrate Origin

☐ Limestone(1)	☒ Hardpan(0)	☐ Lacustrine(0)
☐ Tills(1)	☐ Sandstone(0)	☐ Shale(-1)
☐ Wetlands(0)	☐ Rip/Rap(0)	☐ Coal fines(-2)

Silt Cover	Embeddedness
☐ Silt heavy(-2)	☐ Extensive(-2)
☐ Silt moderate(-1)	☐ Moderate(-1)
☒ Silt normal(0)	☒ Low/Normal(0)
☐ Silt free(1)	☐ None(1)

NOTE: ignore sludge originating from point sources; score based on natural substrates

☐ >4 substrates present(2)

Comments:

2-Instream Cover (20 points maximum

Instream Cover Score:

Type (check ALL that apply)

☐ Undercut banks(1)	☐ Deep pools(2)	☐ Oxbows(1)	
☒ Overhanging vegetation(1)	☐ Rootwads(1)	☐ Aquatic macrophytes(1)	
☒ Shallows(in slow water)(1)	☐ Boulders(1)	☐ Logs and woody debris(1)	
☐ Rootmats(1)			

Amount (check only 1, or 2 and AVERAGE)

☐ Extensive >75% (11)
☐ Moderate 25-75% (7)
☒ Sparse 5-25% (3)
☐ Nearly absent <5% (1)

Comments:

3-Channel Morphology (20) (check only one per category, OR two and AVERAGE)

Channel Score:

Sinuosity	Development	Channelization	Stability	Modifications/Other	
☐ High (4)	☐ Excellent (7)	☐ None (6)	☐ High (3)	☐ Snagging	☐ Impound
☐ Moderate (3)	☐ Good (5)	☐ Recovered (4)	☒ Moderate (2)	☐ Relocation	☐ Islands
☒ Low (2)	☐ Fair (3)	☒ Recovering (3)	☐ Low (1)	☒ Canopy Removal	☐ Leveed
☐ None (1)	☐ Poor (1)	☐ Recent or no recovery (1)		☐ Dredging	☒ Bank shaping
					☐ One side channel modifications

Comments:

4-Riparian Zone & Bank Erosion (10 points maximum)

Riparian Score:

Left/Right banks looking downstream (For each category, check only one per bank, OR two per bank and AVERAGE).

Riparian width L	Riparian width R	(per bank)	Erosion/Runoff-Floodplain quality (past 100 ft Riparian) L	R	(most predominant per bank)	L	R		Bank Erosion L	R	(per bank)
☐	☐	Wide >50m (4)	☐	☐	Forest, Swamp (3)	☐	☐	Conservation Tillage (1)	☐	☐	None or little (3)
☒	☒	Moderate 10-50m (3)	☒	☒	Shrub or Old field (2)	☐	☐	Urban or Industrial (0)	☐	☐	Moderate (2)
☐	☐	Narrow 5-10m (2)	☐	☐	Residential, Park, New field (1)	☐	☐	Mining, Construction (0)	☐	☐	Heavy/Severe (1)
☐	☐	Very narrow <5m (1)	☐	☐	Fenced pasture (1)	☒	☒	Open Pasture/Rowcrop (0)			
☐	☐	None (0)									

Comments:

5a-Pool/Glide Quality (12 points maximum

Pool/Glide Score:

Max pool depth (check one)	Morphology (check only one, OR check two and AVERAGE)	Pool/Run/Riffle current velocity (check all that apply)	
☐ >1m (6)		☐ Eddies (1)	☐ Torrential (-1)
☐ 0.7-1m (4)	☒ Pool width > riffle width (2)	☐ Fast (1)	☐ Interstitial (-1)
☐ 0.4-0.7m (2)	☐ Pool width = riffle width (1)	☐ Moderate (1)	☐ Intermittent (-2)
☒ 0.2-0.4m (1)	☐ Pool width < riffle width (0)	☒ Slow (1)	☐ No pool (0)
☐ <0.2m (pool=0)			

Comments:

5b-Riffle/Run Quality (8) (check only one per category, OR two and AVERAGE)

Riffle/Run Score:

Riffle/run depth (check one)	Riffle/run substrate	Riffle/run embeddedness	
☐ Generally>10cm, Max>50cm (4)	☐ Stable-e.g. cobble, boulder (2)	☐ Extensive (-1)	☐ Normal/Low (1)
☐ Generally>10cm, Max<50cm(3)	☐ Mod. stable-e.g. pea gravel (1)	☐ Moderate (0)	☐ None (2)
☐ Generally 5-10cm (1)	☒ Unstable-e.g. sand, gravel (0)		☒ No riffle (0)
☒ Generally<5cm (riffle=0)			

Comments:

6-Gradient (10 points maximum)

Gradient Score:

Average width: | *Gradient:* *(ft/mile)* | *Drainage Area:* *(square miles)*

Comments:

IDEM OWQ Biological Studies QHEI (Qualitative Habitat Evaluation Index)

Sample #	bioSample #	Stream Name	Location

Surveyor	Sample Date	County	Macro SampleType	☐ Habitat Complete	QHEI Score:

Impacts/Miscellaneous

Major Suspected Impacts (Check all that apply)

- ☐ None
- ☐ Industrial
- ☐ WWTP
- ☒ Agricultural
- ☐ Livestock
- ☐ Silviculture
- ☐ Construction
- ☐ Urban Runoff
- ☐ Suburban
- ☐ Channelization
- ☐ Riparian Removal
- ☐ Flow Alteration
- ☐ CSOs
- ☐ Mining
- ☐ Landfills
- ☐ Natural

Pollution Impact Comments:

Miscellaneous QHEI Information

Subjective rating (1-10):
Aesthetic rating (1-10):
Canopy Cover (% Open):

% Riffle:
% Run:
% Glide:
% Pool:

Is reach representative of stream?

General QHEI Notes:

Primary Headwater Habitat Evaluation Form

HHEI Score (sum of metrics 1, 2, 3) : 50

SITE NAME/LOCATION: Tributary of Antioch Creek

Class I Modified | SITE NUMBER: Sec3-S21A | RIVER BASIN: White River | DRAINAGE AREA (mi²): 0.342

LENGTH OF STREAM REACH (ft): 200 | LAT. ____ | LONG. ____ | RIVER CODE ____ | RIVER MILE ____

DATE: Oct 12, 2009 | SCORER: K. Roth | COMMENTS ____

NOTE: Complete All Items On This Form - Refer to "Field Evaluation Manual for Ohio's PHWH Streams" for Instructions

STREAM CHANNEL MODIFICATIONS: ☐ NONE / NATURAL CHANNEL ☐ RECOVERED ☐ RECOVERING ☑ RECENT OR NO RECOVERY

1. SUBSTRATE (Estimate percent of every type of substrate present. Check *ONLY* two predominant substrate *TYPE* boxes (Max of 32). Add total number of significant substrate types found (Max of 8). Final metric score is sum of boxes A & B.

TYPE		PERCENT	TYPE		PERCENT
☐ ☐	BLDR SLABS [16 pts]	0.0%	☐ ☑	SILT [3 pt]	50.0%
☐ ☐	BOULDER (>256 mm) [16 pts]	0.0%	☐ ☐	LEAF PACK/WOODY DEBRIS [3 pts]	0.0%
☐ ☐	BEDROCK [16 pt]	0.0%	☐ ☐	FINE DETRITUS [3 pts]	0.0%
☐ ☐	COBBLE (65-256 mm) [12 pts]	0.0%	☑ ☐	CLAY or HARDPAN [0 pt]	50.0%
☐ ☐	GRAVEL (2-64 mm) [9 pts]	0.0%	☐ ☐	MUCK [0 pts]	0.0%
☐ ☐	SAND (<2 mm) [6 pts]	0.0%	☐ ☐	ARTIFICIAL [3 pts]	0.0%

Total of Percentages of Bldr Slabs, Boulder, Cobble, Bedrock: 0.0% (A)

Substrate Percentage Check: 100% (B)

SCORE OF TWO MOST PREDOMINATE SUBSTRATE TYPES: 3

TOTAL NUMBER OF SUBSTRATE TYPES: 2

HHEI Metric Points

Substrate Max = 40: 5

A + B

2. Maximum Pool Depth ***(Measure the maximum pool depth within the 61 meter (200 ft)*** evaluation reach at the time of evaluation. Avoid plunge pools from road culverts or storm water pipes) (Check *ONLY* one box):

- ☐ > 30 centimeters [20 pts]
- ☐ > 22.5 - 30 cm [30 pts]
- ☑ > 10 - 22.5 cm [25 pts]
- ☐ > 5 cm - 10 cm [15 pts]
- ☐ < 5 cm [5 pts]
- ☐ NO WATER OR MOIST CHANNEL [0 pts]

COMMENTS ____ **MAXIMUM POOL DEPTH (centimeters):** 15.0

Pool Depth Max = 30: 25

3. BANK FULL WIDTH (Measured as the average of 3-4 measurements) (Check *ONLY* one box):

- ☐ > 4.0 meters [30 pts]
- ☐ > 3.0 m - 4.0 m [25 pts]
- ☑ > 1.5 m - 3.0 m [20 pts]
- ☐ > 1.0 m - 1.5 m [15 pts]
- ☐ ≤ 1.0 m [5 pts]

COMMENTS ____ **AVERAGE BANKFULL WIDTH (meters):** 1.54

Bankfull Width Max=30: 20

This information must also be completed

RIPARIAN ZONE AND FLOODPLAIN QUALITY ☆NOTE: River Left (L) and Right (R) as looking downstream☆

L	R	RIPARIAN WIDTH (Per Bank)	L	R	FLOODPLAIN QUALITY (Most Predominant per Bank)	L	R	
☐	☐	Wide >10m	☐	☐	Mature Forest, Wetland	☐	☐	Conservation Tillage
☐	☐	Moderate 5-10m	☐	☐	Immature Forest, Shrub or Old Field	☐	☐	Urban or Industrial
☐	☐	Narrow <5m	☐	☐	Residential, Park, New Field	☑	☑	Open Pasture, Row Crop
☑	☑	None	☐	☐	Fenced Pasture	☐	☐	Mining or Construction

COMMENTS ____

FLOW REGIME *(At Time of Evaluation)* (Check *ONLY* one box):

- ☐ Stream Flowing
- ☐ Subsurface flow with isolated pools (Interstitial)
- ☑ Moist Channel, isolated pools, no flow (Intermittent)
- ☐ Dry channel, no water (Ephemeral)

COMMENTS ____

SINUOSITY (Number of bends per 61 m (200 ft) of channel) (Check *ONLY* one box):

- ☐ None
- ☑ 0.5
- ☐ 1.0
- ☐ 1.5
- ☐ 2.0
- ☐ 2.5
- ☐ 3.0
- ☐ >3

STREAM GRADIENT ESTIMATE

☐ Flat (0.5 ft/100 ft) ☑ Flat to Moderate ☐ Moderate (2 ft/100 ft) ☐ Moderate to Severe ☐ Severe (10 ft/100 ft)

ADDITIONAL STREAM INFORMATION (This Information Must Also be Completed):

QHEI PERFORMED? - ☐ Yes ☑ No QHEI Score _____ (If Yes, Attach Completed QHEI Form)

DOWNSTREAM DESIGNATED USE(S)

☐ WWH Name: _____ Distance from Evaluated Stream _____
☐ CWH Name: _____ Distance from Evaluated Stream _____
☐ EWH Name: _____ Distance from Evaluated Stream _____

MAPPING: ATTACH COPIES OF MAPS, INCLUDING THE ENTIRE WATERSHED AREA. CLEARLY MARK THE SITE LOCATION

USGS Quadrangle Name:_____ NRCS Soil Map Page:_____ NRCS Soil Map Stream Order 0

County: Daviess Township / City:_____

MISCELLANEOUS

Base Flow Conditions? (Y/N): Y Date of last precipitation: Oct 9, 2009 Quantity: 2.00

Photograph Information: Photographs

Elevated Turbidity? (Y/N): N Canopy (% open): 0%

Were samples collected for water chemistry? (Y/N): N (Note lab sample no. or id. and attach results) Lab Number:_____

Field Measures: Temp (°C)_____ Dissolved Oxygen (mg/l) _____ pH (S.U.) _____ Conductivity (µmhos/cm) _____

Is the sampling reach representative of the stream (Y/N) Y If not, please explain:_____

Additional comments/description of pollution impacts:_____

BIOTIC EVALUATION

Performed? (Y/N): N (If Yes, Record all observations. Voucher collections optional. NOTE: all voucher samples must be labeled with the site ID number. Include appropriate field data sheets from the Primary Headwater Habitat Assessment Manual)

Fish Observed? (Y/N) N Voucher? (Y/N) N Salamanders Observed? (Y/N) N Voucher? (Y/N) N
Frogs or Tadpoles Observed? (Y/N) N Voucher? (Y/N) N Aquatic Macroinvertebrates Observed? (Y/N) N Voucher? (Y/N) N

Comments Regarding Biology: _____

DRAWING AND NARRATIVE DESCRIPTION OF STREAM REACH (This must be completed):

Include important landmarks and other features of interest for site evaluation and a narrative description of the stream's location

STREAM DRAWING ON ORIGINAL FIELD DATA SHEETS STORED AT LAKE SWCD OFFICE.

FLOW →

OhioEPA Primary Headwater Habitat Evaluation Form

HHEI Score (sum of metrics 1, 2, 3) :

SITE NAME/LOCATION _____

_____ SITE NUMBER _____ RIVER BASIN _____ DRAINAGE AREA (mi²) _____

LENGTH OF STREAM REACH (ft) _____ LAT. _____ LONG. _____ RIVER CODE _____ RIVER MILE _____

DATE _____ SCORER _____ COMMENTS _____

NOTE: Complete All Items On This Form - Refer to "Field Evaluation Manual for Ohio's PHWH Streams" for Instructions

STREAM CHANNEL MODIFICATIONS: ☐ NONE / NATURAL CHANNEL ☐ RECOVERED ☐ RECOVERING ☐ RECENT OR NO RECOVERY

1. **SUBSTRATE (Estimate percent of every type of substrate present.** Check *ONLY* two predominant substrate *TYPE* boxes (Max of 32). Add total number of significant substrate types found (Max of 8). Final metric score is sum of boxes A & B.

HHEI Metric Points

TYPE		PERCENT	TYPE		PERCENT
☐ ☐	BLDR SLABS [16 pts]		☐ ☐	SILT [3 pt]	
☐ ☐	BOULDER (>256 mm) [16 pts]		☐ ☐	LEAF PACK/WOODY DEBRIS [3 pts]	
☐ ☐	BEDROCK [16 pt]		☐ ☐	FINE DETRITUS [3 pts]	
☐ ☐	COBBLE (65-256 mm) [12 pts]		☐ ☐	CLAY or HARDPAN [0 pt]	
☐ ☐	GRAVEL (2-64 mm) [9 pts]		☐ ☐	MUCK [0 pts]	
☐ ☐	SAND (<2 mm) [6 pts]		☐ ☐	ARTIFICIAL [3 pts]	

Total of Percentages of Bldr Slabs, Boulder, Cobble, Bedrock _____ **(A)** **(B)**

Substrate Max = 40

A + B

SCORE OF TWO MOST PREDOMINATE SUBSTRATE TYPES: **TOTAL NUMBER OF SUBSTRATE TYPES:**

2. **Maximum Pool Depth *(Measure the maximum pool depth within the 61 meter (200 ft)*** evaluation reach at the time of evaluation. Avoid plunge pools from road culverts or storm water pipes) (Check *ONLY* one box):

Pool Depth Max = 30

☐ > 30 centimeters [20 pts]
☐ > 22.5 - 30 cm [30 pts]
☐ > 10 - 22.5 cm [25 pts]
☐ > 5 cm - 10 cm [15 pts]
☐ < 5 cm [5 pts]
☒ NO WATER OR MOIST CHANNEL [0 pts]

COMMENTS _____ **MAXIMUM POOL DEPTH (centimeters):**

3. **BANK FULL WIDTH (Measured as the average of 3-4 measurements)** **(Check *ONLY* one box):**

Bankfull Width Max=30

☐ > 4.0 meters [30 pts]
☐ > 3.0 m - 4.0 m [25 pts]
☐ > 1.5 m - 3.0 m [20 pts]
☐ > 1.0 m - 1.5 m [15 pts]
☒ ≤ 1.0 m [5 pts]

COMMENTS _____ **AVERAGE BANKFULL WIDTH (meters):**

This information must also be completed

RIPARIAN ZONE AND FLOODPLAIN QUALITY ☆NOTE: River Left (L) and Right (R) as looking downstream☆

L R	RIPARIAN WIDTH (Per Bank)	L R	FLOODPLAIN QUALITY (Most Predominant per Bank)	L R	
☐ ☐	Wide >10m	☐ ☐	Mature Forest, Wetland	☐ ☐	Conservation Tillage
☐ ☐	Moderate 5-10m	☐ ☐	Immature Forest, Shrub or Old Field	☐ ☐	Urban or Industrial
☐ ☐	Narrow <5m	☐ ☐	Residential, Park, New Field	☒ ☒	Open Pasture, Row Crop
☐ ☐	None	☐ ☐	Fenced Pasture	☐ ☐	Mining or Construction

COMMENTS _____

FLOW REGIME *(At Time of Evaluation)* (Check *ONLY* one box):

☐ Stream Flowing
☐ Subsurface flow with isolated pools (Interstitial)
☐ Moist Channel, isolated pools, no flow (Intermittent)
☒ Dry channel, no water (Ephemeral)

COMMENTS _____

SINUOSITY (Number of bends per 61 m (200 ft) of channel) (Check *ONLY* one box):

☒ None ☐ 1.0 ☐ 2.0 ☐ 3.0
☐ 0.5 ☐ 1.5 ☐ 2.5 ☐ >3

STREAM GRADIENT ESTIMATE

☐ Flat (0.5 ft/100 ft) ☒ Flat to Moderate ☐ Moderate (2 ft/100 ft) ☐ Moderate to Severe ☐ Severe (10 ft/100 ft)

ADDITIONAL STREAM INFORMATION (This Information Must Also be Completed):

QHEI PERFORMED? - ☐ Yes ☐ No QHEI Score _____ (If Yes, Attach Completed QHEI Form)

DOWNSTREAM DESIGNATED USE(S)

☐ WWH Name: _____ Distance from Evaluated Stream _____

☐ CWH Name: _____ Distance from Evaluated Stream _____

☐ EWH Name: _____ Distance from Evaluated Stream _____

MAPPING: ATTACH COPIES OF MAPS, INCLUDING THE ENTIRE WATERSHED AREA. CLEARLY MARK THE SITE LOCATION

USGS Quadrangle Name: _____ NRCS Soil Map Page: _____ NRCS Soil Map Stream Order _____

County: _____ Township / City: _____

MISCELLANEOUS

Base Flow Conditions? (Y/N): _____ Date of last precipitation: _____ Quantity: _____

Photograph Information: _____

Elevated Turbidity? (Y/N): _____ Canopy (% open): _____

Were samples collected for water chemistry? (Y/N): _____ (Note lab sample no. or id. and attach results) Lab Number: _____

Field Measures: Temp (°C)_____ Dissolved Oxygen (mg/l) _____ pH (S.U.) _____ Conductivity (µmhos/cm) _____

Is the sampling reach representative of the stream (Y/N)_____ If not, please explain: _____

Additional comments/description of pollution impacts: _____

BIOTIC EVALUATION

Performed? (Y/N): _____ (If Yes, Record all observations. Voucher collections optional. NOTE: all voucher samples must be labeled with the site ID number. Include appropriate field data sheets from the Primary Headwater Habitat Assessment Manual)

Fish Observed? (Y/N)_____ Voucher? (Y/N)_____ Salamanders Observed? (Y/N)_____ Voucher? (Y/N)_____

Frogs or Tadpoles Observed? (Y/N)____ Voucher? (Y/N)____ Aquatic Macroinvertebrates Observed? (Y/N)____ Voucher? (Y/N)____

Comments Regarding Biology: _____

DRAWING AND NARRATIVE DESCRIPTION OF STREAM REACH (This must be completed):

Include important landmarks and other features of interest for site evaluation and a narrative description of the stream's location

FLOW ➜

OhioEPA Primary Headwater Habitat Evaluation Form

HHEI Score (sum of metrics 1, 2, 3) :

SITE NAME/LOCATION _____

_____ SITE NUMBER _____ RIVER BASIN _____ DRAINAGE AREA (mi^2) _____

LENGTH OF STREAM REACH (ft) _____ LAT. _____ LONG. _____ RIVER CODE _____ RIVER MILE _____

DATE _____ SCORER _____ COMMENTS _____

NOTE: Complete All Items On This Form - Refer to "Field Evaluation Manual for Ohio's PHWH Streams" for Instructions

STREAM CHANNEL MODIFICATIONS: ☐ NONE / NATURAL CHANNEL ☐ RECOVERED ☐ RECOVERING ☐ RECENT OR NO RECOVERY

1. **SUBSTRATE (Estimate percent of every type of substrate present.** Check *ONLY* two predominant substrate *TYPE* boxes (Max of 32). Add total number of significant substrate types found (Max of 8). Final metric score is sum of boxes A & B.

TYPE		PERCENT	TYPE		PERCENT
☐ ☐	BLDR SLABS [16 pts]	_____	☐ ☐	SILT [3 pt]	_____
☐ ☐	BOULDER (>256 mm) [16 pts]	_____	☐ ☐	LEAF PACK/WOODY DEBRIS [3 pts]	_____
☐ ☐	BEDROCK [16 pt]	_____	☐ ☐	FINE DETRITUS [3 pts]	_____
☐ ☐	COBBLE (65-256 mm) [12 pts]	_____	☐ ☐	CLAY or HARDPAN [0 pt]	_____
☐ ☐	GRAVEL (2-64 mm) [9 pts]	_____	☐ ☐	MUCK [0 pts]	_____
☐ ☐	SAND (<2 mm) [6 pts]	_____	☐ ☐	ARTIFICIAL [3 pts]	_____

Total of Percentages of Bldr Slabs, Boulder, Cobble, Bedrock _____ **(A)** **(B)**

SCORE OF TWO MOST PREDOMINATE SUBSTRATE TYPES: _____ **TOTAL NUMBER OF SUBSTRATE TYPES:** _____

HHEI Metric Points

Substrate Max = 40 _____

A + B

2. **Maximum Pool Depth** ***(Measure the maximum pool depth within the 61 meter (200 ft)*** evaluation reach at the time of evaluation. Avoid plunge pools from road culverts or storm water pipes) (Check *ONLY* one box):

☐ > 30 centimeters [20 pts]
☐ > 22.5 - 30 cm [30 pts]
☐ > 10 - 22.5 cm [25 pts]
☐ > 5 cm - 10 cm [15 pts]
☐ < 5 cm [5 pts]
☐ NO WATER OR MOIST CHANNEL [0 pts]

COMMENTS _____ **MAXIMUM POOL DEPTH (centimeters):** _____

Pool Depth Max = 30 _____

3. **BANK FULL WIDTH (Measured as the average of 3-4 measurements)** **(Check *ONLY* one box):**

☐ > 4.0 meters [30 pts]
☐ > 3.0 m - 4.0 m [25 pts]
☐ > 1.5 m - 3.0 m [20 pts]
☐ > 1.0 m - 1.5 m [15 pts]
☐ ≤ 1.0 m [5 pts]

COMMENTS _____ **AVERAGE BANKFULL WIDTH (meters):** _____

Bankfull Width Max=30 _____

This information must also be completed

RIPARIAN ZONE AND FLOODPLAIN QUALITY ☆NOTE: River Left (L) and Right (R) as looking downstream☆

RIPARIAN WIDTH L	R	(Per Bank)	FLOODPLAIN QUALITY L	R	(Most Predominant per Bank)	L	R	
☐	☐	Wide >10m	☐	☐	Mature Forest, Wetland	☐	☐	Conservation Tillage
☐	☐	Moderate 5-10m	☐	☐	Immature Forest, Shrub or Old Field	☐	☐	Urban or Industrial
☐	☐	Narrow <5m	☐	☐	Residential, Park, New Field	☐	☐	Open Pasture, Row Crop
☐	☐	None	☐	☐	Fenced Pasture	☐	☐	Mining or Construction

COMMENTS _____

FLOW REGIME *(At Time of Evaluation)* (Check *ONLY* one box):

☐ Stream Flowing
☐ Subsurface flow with isolated pools (Interstitial)
☐ Moist Channel, isolated pools, no flow (Intermittent)
☐ Dry channel, no water (Ephemeral)

COMMENTS _____

SINUOSITY (Number of bends per 61 m (200 ft) of channel) (Check *ONLY* one box):

☐ None ☐ 1.0 ☐ 2.0 ☐ 3.0
☐ 0.5 ☐ 1.5 ☐ 2.5 ☐ >3

STREAM GRADIENT ESTIMATE

☐ Flat (0.5 ft/100 ft) ☐ Flat to Moderate ☐ Moderate (2 ft/100 ft) ☐ Moderate to Severe ☐ Severe (10 ft/100 ft)

ADDITIONAL STREAM INFORMATION (This Information Must Also be Completed):

QHEI PERFORMED? - ☐ Yes ☒ No QHEI Score _____ (If Yes, Attach Completed QHEI Form)

DOWNSTREAM DESIGNATED USE(S)

☐ WWH Name: _____ Distance from Evaluated Stream _____

☐ CWH Name: _____ Distance from Evaluated Stream _____

☐ EWH Name: _____ Distance from Evaluated Stream _____

MAPPING: ATTACH COPIES OF MAPS, INCLUDING THE ENTIRE WATERSHED AREA. CLEARLY MARK THE SITE LOCATION

USGS Quadrangle Name: _____ NRCS Soil Map Page: _____ NRCS Soil Map Stream Order _____

County: _____ Township / City: _____

MISCELLANEOUS

Base Flow Conditions? (Y/N): _____ Date of last precipitation: _____ Quantity: _____

Photograph Information: _____

Elevated Turbidity? (Y/N): _____ Canopy (% open): _____

Were samples collected for water chemistry? (Y/N): _____ (Note lab sample no. or id. and attach results) Lab Number: _____

Field Measures: Temp (°C) _____ Dissolved Oxygen (mg/l) _____ pH (S.U.) _____ Conductivity (µmhos/cm) _____

Is the sampling reach representative of the stream (Y/N) _____ If not, please explain: _____

Additional comments/description of pollution impacts: _____

BIOTIC EVALUATION

Performed? (Y/N): _____ (If Yes, Record all observations. Voucher collections optional. NOTE: all voucher samples must be labeled with the site ID number. Include appropriate field data sheets from the Primary Headwater Habitat Assessment Manual)

Fish Observed? (Y/N) _____ Voucher? (Y/N) _____ Salamanders Observed? (Y/N) _____ Voucher? (Y/N) _____

Frogs or Tadpoles Observed? (Y/N) ____ Voucher? (Y/N) ____ Aquatic Macroinvertebrates Observed? (Y/N) ____ Voucher? (Y/N) ____

Comments Regarding Biology: _____

DRAWING AND NARRATIVE DESCRIPTION OF STREAM REACH (This must be completed):

Include important landmarks and other features of interest for site evaluation and a narrative description of the stream's location

FLOW →

IDEM — OWQ Biological Studies: QHEI (Qualitative Habitat Evaluation Index)

Sample #	bioSample #	Stream Name	Location
		Sec 3-524	South Fork Prairie Creek

Surveyor	Sample Date	County	Macro SampleType	Habitat Complete	QHEI Score: 42
K. Allison	9/7/05	Daviess			

41.5
9.5 (KLK)

1-Substrate (20 points maximum)

Substrate Score: 10

Check 1 Predominant Pool & 1 Predominant Riffle

Check all that are present — P=Pool, R=Riffle

Predominant P	Predominant R	Present P	Present R		Predominant P	Predominant R	Present P	Present R	
☐	☐			Bldrs/Slabs(10)	☐	☐			Hardpan(4)
☐	☐			Boulders(9)	☐	☐			Detritus(3)
☐	☐			Cobble(8)	☐	☐			Muck(2)
☐	☒	☒	☒	Gravel(7)	☒	☐	☒	☒	Silt(2)
☐	☐	☒	☒	Sand(6)	☐	☐			Sludge(1)
☐	☐			Bedrock(5)	☐	☐			Artificial(0)

Substrate Quality (check only 1, or check 2 and AVERAGE)

Substrate Origin: ☐ Limestone(1) ☒ Hardpan(0) ☐ Lacustrine(0) ☒ Tills(1) ☐ Sandstone(0) ☐ Shale(-1) ☐ Wetlands(0) ☐ Rip/Rap(0) ☐ Coal fines(-2)

Silt Cover: ☐ Silt heavy(-2) ☐ Silt moderate(-1) ☒ Silt normal(0) ☐ Silt free(1)

Embeddedness: ☐ Extensive(-2) ☐ Moderate(-1) ☒ Low/Normal(0) ☐ None(1)

NOTE: ignore sludge originating from point sources; score based on natural substrates

☐ >4 substrates present(2)

Comments:

2-Instream Cover (20 points maximum

Instream Cover Score: 7

Type (check ALL that apply)

☐ Undercut banks(1) ☒ Deep pools(2) ☐ Oxbows(1)
☐ Overhanging vegetation(1) ☐ Rootwads(1) ☒ Aquatic macrophytes(1)
☒ Shallows(in slow water)(1) ☐ Boulders(1) ☐ Logs and woody debris(1)
☐ Rootmats(1)

Amount (check only 1, or 2 and AVERAGE)

☐ Extensive >75% (11)
☐ Moderate 25-75% (7)
☒ Sparse 5-25% (3)
☐ Nearly absent <5% (1)

Comments:

3-Channel Morphology (20) (check only one per category, OR two and AVERAGE)

Channel Score: 10

Sinuosity	Development	Channelization	Stability	Modifications/Other	
☐ High (4)	☐ Excellent (7)	☐ None (6)	☐ High (3)	☐ Snagging	☐ Impound
☐ Moderate (3)	☐ Good (5)	☐ Recovered (4)	☒ Moderate (2)	☐ Relocation	☐ Islands
☒ Low (2)	☒ Fair (3)	☒ Recovering (3)	☐ Low (1)	☒ Canopy Removal	☒ Leveed
☐ None (1)	☐ Poor (1)	☐ Recent or no recovery (1)		☒ Dredging	☐ Bank shaping
				☐ One side channel modifications	

Comments:

4-Riparian Zone & Bank Erosion (10 points maximum)

Riparian Score: 6

Left/Right banks looking downstream (For each category, check only one per bank, OR two per bank and AVERAGE).

Riparian width L	Riparian width R	(per bank)	Erosion/Runoff-Floodplain quality (past 100 ft Riparian) L	R	(most predominant per bank)	L	R	Bank Erosion L	R	(per bank)
☐	☐	Wide >50m (4)	☐	☐	Forest, Swamp (3)	☐	☐	☐	☐	None or little (3)
☒	☒	Moderate 10-50m (3)	☒	☒	Shrub or Old field (2)	☐	☐	☒	☒	Moderate (2)
☐	☐	Narrow 5-10m (2)	☐	☐	Residential, Park, New field (1)	☐	☐	☐	☐	Heavy/Severe (1)
☐	☐	Very narrow <5m (1)	☐	☐	Fenced pasture (1)	☒	☒			
☐	☐	None (0)								

Comments: Small old field strip between stream & rowcrop

5a-Pool/Glide Quality (12 points maximum

Pool/Glide Score: 4

Max pool depth (check one)

☐ >1m (6)
☐ 0.7-1m (4)
☐ 0.4-0.7m (2)
☒ 0.2-0.4m (1)
☐ <0.2m (pool=0)

Morphology (check only one, OR check two and AVERAGE)

☒ Pool width > riffle width (2)
☐ Pool width = riffle width (1)
☐ Pool width < riffle width (0)

Pool/Run/Riffle current velocity (check all that apply)

☐ Eddies (1) ☐ Torrential (-1)
☐ Fast (1) ☐ Interstitial (-1)
☒ Moderate (1) ☐ Intermittent (-2)
☐ Slow (1) ☐ No pool (0)

Comments:

5b-Riffle/Run Quality (8) (check only one per category, OR two and AVERAGE)

Riffle/Run Score: 1

Riffle/run depth (check one)

☐ Generally>10cm, Max>50cm (4)
☐ Generally>10cm, Max<50cm(3)
☐ Generally 5-10cm (1)
☒ Generally<5cm (riffle=0)

Riffle/run substrate

☐ Stable-e.g. cobble, boulder (2)
☐ Mod. stable-e.g. pea gravel (1)
☒ Unstable-e.g. sand, gravel (0)

Riffle/run embeddedness

☐ Extensive (-1) ☒ Normal/Low (1)
☐ Moderate (0) ☐ None (2)
☐ No riffle (0)

Comments:

6-Gradient (10 points maximum)

Gradient Score: 4

Average width: 5.3m Gradient: 2.9 (ft/mile) Drainage Area: 40.5 (square miles)

Comments:

IDEM **OWQ Biological Studies QHEI (Qualitative Habitat Evaluation Index)**

Sample #	bioSample #	Stream Name	Location

Surveyor	Sample Date	County	Macro SampleType	☐ Habitat Complete	QHEI Score:

Impacts/Miscellaneous

Major Suspected Impacts (Check all that apply)

- ☐ None
- ☐ Industrial
- ☐ WWTP
- ☒ Agricultural
- ☐ Livestock
- ☐ Silviculture
- ☐ Construction
- ☐ Urban Runoff
- ☐ Suburban
- ☐ Channelization
- ☐ Riparian Removal
- ☐ Flow Alteration
- ☐ CSOs
- ☐ Mining
- ☐ Landfills
- ☐ Natural

Pollution Impact Comments:

Miscellaneous QHEI Information

Subjective rating (1-10): % Riffle:

Aesthetic rating (1-10): % Run:

Canopy Cover (% Open): % Glide:

% Pool:

Is reach representative of stream?

General QHEI Notes:

IDEM OWQ Biological Studies QHEI (Qualitative Habitat Evaluation Index)

Sample #	bioSample #	Stream Name	Location

Surveyor	Sample Date	County	Macro SampleType	☐ Habitat Complete	QHEI Score:

1-Substrate (20 points maximum)

Substrate Score:

Check 1 Predominant Pool & 1 Predominant Riffle

Check all that are present — P=Pool, R=Riffle

Predominant P	Predominant R	Present P	Present R		Predominant P	Predominant R	Present P	Present R	
☐	☐	☐	☐	Bldrs/Slabs(10)	☐	☐	☐	☐	Hardpan(4)
☐	☐	☐	☐	Boulders(9)	☐	☐	☐	☐	Detritus(3)
☐	☐	☐	☐	Cobble(8)	☐	☐	☐	☐	Muck(2)
☐	☐	☐	☐	Gravel(7)	☐	☐	☐	☐	Silt(2)
☐	☐	☐	☐	Sand(6)	☐	☐	☐	☐	Sludge(1)
☐	☐	☐	☐	Bedrock(5)	☐	☐	☐	☐	Artificial(0)

Substrate Quality (check only 1, or check 2 and AVERAGE)

Substrate Origin

☐ Limestone(1) ☐ Hardpan(0) ☐ Lacustrine(0)
☐ Tills(1) ☐ Sandstone(0) ☐ Shale(-1)
☐ Wetlands(0) ☐ Rip/Rap(0) ☐ Coal fines(-2)

Silt Cover
☐ Silt heavy(-2)
☐ Silt moderate(-1)
☐ Silt normal(0)
☐ Silt free(1)

Embeddedness
☐ Extensive(-2)
☐ Moderate(-1)
☐ Low/Normal(0)
☐ None(1)

NOTE: ignore sludge originating from point sources; score based on natural substrates

☐ >4 substrates present(2)

Comments:

2-Instream Cover (20 points maximum

Instream Cover Score:

Type (check ALL that apply)

☐ Undercut banks(1) ☐ Deep pools(2) ☐ Oxbows(1)
☐ Overhanging vegetation(1) ☐ Rootwads(1) ☐ Aquatic macrophytes(1)
☐ Shallows(in slow water)(1) ☐ Boulders(1) ☐ Logs and woody debris(1)
☐ Rootmats(1)

Amount (check only 1, or 2 and AVERAGE)

☐ Extensive >75% (11)
☐ Moderate 25-75% (7)
☐ Sparse 5-25% (3)
☐ Nearly absent <5% (1)

Comments:

3-Channel Morphology (20) (check only one per category, OR two and AVERAGE)

Channel Score:

Sinuosity	Development	Channelization	Stability	Modifications/Other	
☐ High (4)	☐ Excellent (7)	☐ None (6)	☐ High (3)	☐ Snagging	☐ Impound
☐ Moderate (3)	☐ Good (5)	☐ Recovered (4)	☐ Moderate (2)	☐ Relocation	☐ Islands
☐ Low (2)	☐ Fair (3)	☐ Recovering (3)	☐ Low (1)	☐ Canopy Removal	☐ Leveed
☐ None (1)	☐ Poor (1)	☐ Recent or no recovery (1)		☐ Dredging	☐ Bank shaping
				☐ One side channel modifications	

Comments:

4-Riparian Zone & Bank Erosion (10 points maximum)

Riparian Score:

Left/Right banks looking downstream (For each category, check only one per bank, OR two per bank and AVERAGE).

Riparian width L	Riparian width R	(per bank)	Erosion/Runoff-Floodplain quality (past 100 ft Riparian) L	R	(most predominant per bank)	L	R	Bank Erosion L	R	(per bank)
☐	☐	Wide >50m (4)	☐	☐	Forest, Swamp (3)	☐	☐	☐	☐	None or little (3)
☐	☐	Moderate 10-50m (3)	☐	☐	Shrub or Old field (2)	☐	☐	☐	☐	Moderate (2)
☐	☐	Narrow 5-10m (2)	☐	☐	Residential, Park, New field (1)	☐	☐	☐	☐	Heavy/Severe (1)
☐	☐	Very narrow <5m (1)	☐	☐	Fenced pasture (1)	☐	☐			
☐	☐	None (0)				☐	☐			

Comments:

5a-Pool/Glide Quality (12 points maximum

Pool/Glide Score:

Max pool depth (check one)
☐ >1m (6)
☐ 0.7-1m (4)
☐ 0.4-0.7m (2)
☐ 0.2-0.4m (1)
☐ <0.2m (pool=0)

Morphology (check only one, OR check two and AVERAGE)
☐ Pool width > riffle width (2)
☐ Pool width = riffle width (1)
☐ Pool width < riffle width (0)

Pool/Run/Riffle current velocity (check all that apply)
☐ Eddies (1) ☐ Torrential (-1)
☐ Fast (1) ☐ Interstitial (-1)
☐ Moderate (1) ☐ Intermittent (-2)
☐ Slow (1) ☐ No pool (0)

Comments:

5b-Riffle/Run Quality (8) (check only one per category, OR two and AVERAGE)

Riffle/Run Score:

Riffle/run depth (check one)
☐ Generally>10cm, Max>50cm (4)
☐ Generally>10cm, Max<50cm(3)
☐ Generally 5-10cm (1)
☐ Generally<5cm (riffle=0)

Riffle/run substrate
☐ Stable-e.g. cobble, boulder (2)
☐ Mod. stable-e.g. pea gravel (1)
☐ Unstable-e.g. sand, gravel (0)

Riffle/run embeddedness
☐ Extensive (-1) ☐ Normal/Low (1)
☐ Moderate (0) ☐ None (2)
☐ No riffle (0)

Comments:

6-Gradient (10 points maximum)

Gradient Score:

Average width: *Gradient:* *(ft/mile)* *Drainage Area:* *(square miles)*

Comments:

IDEM OWQ Biological Studies QHEI (Qualitative Habitat Evaluation Index)

Sample #	bioSample #	Stream Name	Location

Surveyor	Sample Date	County	Macro SampleType	☐ Habitat Complete	QHEI Score:

Impacts/Miscellaneous

Major Suspected Impacts (Check all that apply)

- ☐ None
- ☐ Industrial
- ☐ WWTP
- ☒ Agricultural
- ☐ Livestock
- ☐ Silviculture
- ☐ Construction
- ☐ Urban Runoff
- ☐ Suburban
- ☐ Channelization
- ☐ Riparian Removal
- ☐ Flow Alteration
- ☐ CSOs
- ☐ Mining
- ☐ Landfills
- ☐ Natural

Pollution Impact Comments:

Miscellaneous QHEI Information

Subjective rating (1-10):
Aesthetic rating (1-10):
Canopy Cover (% Open):

% Riffle:
% Run:
% Glide:
% Pool:

Is reach representative of stream?

General QHEI Notes:

Primary Headwater Habitat Evaluation Form

HHEI Score (sum of metrics 1, 2, 3) : 25

SITE NAME/LOCATION: Tributary of South Fork Prairie Creek

Class I Modified — SITE NUMBER: Sec3-S25A — RIVER BASIN: White River — DRAINAGE AREA (mi²): 0.066

LENGTH OF STREAM REACH (ft): 200 — LAT. ____ — LONG. ____ — RIVER CODE ____ — RIVER MILE ____

DATE: Oct 12, 2009 — SCORER: K. Roth — COMMENTS ____

NOTE: Complete All Items On This Form - Refer to "Field Evaluation Manual for Ohio's PHWH Streams" for Instructions

STREAM CHANNEL MODIFICATIONS: ☐ NONE / NATURAL CHANNEL ☐ RECOVERED ☐ RECOVERING ☑ RECENT OR NO RECOVERY

1. SUBSTRATE (Estimate percent of every type of substrate present. Check *ONLY* two predominant substrate *TYPE* boxes (Max of 32). Add total number of significant substrate types found (Max of 8). Final metric score is sum of boxes A & B.

TYPE		PERCENT	TYPE		PERCENT
☐ ☐	BLDR SLABS [16 pts]	0.0%	☐ ☑	SILT [3 pt]	50.0%
☐ ☐	BOULDER (>256 mm) [16 pts]	0.0%	☐ ☐	LEAF PACK/WOODY DEBRIS [3 pts]	0.0%
☐ ☐	BEDROCK [16 pt]	0.0%	☐ ☐	FINE DETRITUS [3 pts]	0.0%
☐ ☐	COBBLE (65-256 mm) [12 pts]	0.0%	☑ ☐	CLAY or HARDPAN [0 pt]	50.0%
☐ ☐	GRAVEL (2-64 mm) [9 pts]	0.0%	☐ ☐	MUCK [0 pts]	0.0%
☐ ☐	SAND (<2 mm) [6 pts]	0.0%	☐ ☐	ARTIFICIAL [3 pts]	0.0%

Total of Percentages of Bldr Slabs, Boulder, Cobble, Bedrock: 0.0% (A)

Substrate Percentage Check: 100% (B)

SCORE OF TWO MOST PREDOMINATE SUBSTRATE TYPES: 3 **TOTAL NUMBER OF SUBSTRATE TYPES:** 2

HHEI Metric Points

Substrate Max = 40: 5

A + B

2. Maximum Pool Depth ***(Measure the maximum pool depth within the 61 meter (200 ft)*** evaluation reach at the time of evaluation. Avoid plunge pools from road culverts or storm water pipes) (Check *ONLY* one box):

- ☐ > 30 centimeters [20 pts]
- ☐ > 22.5 - 30 cm [30 pts]
- ☐ > 10 - 22.5 cm [25 pts]
- ☐ > 5 cm - 10 cm [15 pts]
- ☐ < 5 cm [5 pts]
- ☑ NO WATER OR MOIST CHANNEL [0 pts]

COMMENTS Weedy channel **MAXIMUM POOL DEPTH (centimeters):** 0.0

Pool Depth Max = 30: 0

3. BANK FULL WIDTH (Measured as the average of 3-4 measurements) (Check *ONLY* one box):

- ☐ > 4.0 meters [30 pts]
- ☐ > 3.0 m - 4.0 m [25 pts]
- ☑ > 1.5 m - 3.0 m [20 pts]
- ☐ > 1.0 m - 1.5 m [15 pts]
- ☐ ≤ 1.0 m [5 pts]

COMMENTS ____ **AVERAGE BANKFULL WIDTH (meters):** 1.54

Bankfull Width Max=30: 20

This information must also be completed

RIPARIAN ZONE AND FLOODPLAIN QUALITY ☆NOTE: River Left (L) and Right (R) as looking downstream☆

RIPARIAN WIDTH (Per Bank) L	R		FLOODPLAIN QUALITY (Most Predominant per Bank) L	R		L	R	
☐	☐	Wide >10m	☐	☐	Mature Forest, Wetland	☐	☐	Conservation Tillage
☐	☐	Moderate 5-10m	☐	☐	Immature Forest, Shrub or Old Field	☐	☐	Urban or Industrial
☐	☐	Narrow <5m	☐	☐	Residential, Park, New Field	☑	☑	Open Pasture, Row Crop
☑	☑	None	☐	☐	Fenced Pasture	☐	☐	Mining or Construction

COMMENTS ____

FLOW REGIME *(At Time of Evaluation)* (Check *ONLY* one box):

- ☐ Stream Flowing
- ☐ Subsurface flow with isolated pools (Interstitial)
- ☑ Moist Channel, isolated pools, no flow (Intermittent)
- ☐ Dry channel, no water (Ephemeral)

COMMENTS ____

SINUOSITY (Number of bends per 61 m (200 ft) of channel) (Check *ONLY* one box):

- ☑ None
- ☐ 0.5
- ☐ 1.0
- ☐ 1.5
- ☐ 2.0
- ☐ 2.5
- ☐ 3.0
- ☐ >3

STREAM GRADIENT ESTIMATE

☐ Flat (0.5 ft/100 ft) ☑ Flat to Moderate ☐ Moderate (2 ft/100 ft) ☐ Moderate to Severe ☐ Severe (10 ft/100 ft)

Click purple box to save form data

Click in blue box to go to Page 2

ADDITIONAL STREAM INFORMATION (This Information Must Also be Completed):

QHEI PERFORMED? - ☐ Yes ☑ No QHEI Score _____ (If Yes, Attach Completed QHEI Form)

DOWNSTREAM DESIGNATED USE(S)

☐ WWH Name: _____ Distance from Evaluated Stream _____
☐ CWH Name: _____ Distance from Evaluated Stream _____
☐ EWH Name: _____ Distance from Evaluated Stream _____

MAPPING: ATTACH COPIES OF MAPS, INCLUDING THE ENTIRE WATERSHED AREA. CLEARLY MARK THE SITE LOCATION

USGS Quadrangle Name:_____ NRCS Soil Map Page:_____ NRCS Soil Map Stream Order 0

County: Daviess Township / City:_____

MISCELLANEOUS

Base Flow Conditions? (Y/N): Y Date of last precipitation: Oct 9, 2009 Quantity: 2.00

Photograph Information: Photographs

Elevated Turbidity? (Y/N): N Canopy (% open): 0%

Were samples collected for water chemistry? (Y/N): N (Note lab sample no. or id. and attach results) Lab Number:_____

Field Measures: Temp (°C)_____ Dissolved Oxygen (mg/l) _____ pH (S.U.) _____ Conductivity (µmhos/cm) _____

Is the sampling reach representative of the stream (Y/N) Y If not, please explain:_____

Additional comments/description of pollution impacts:_____

BIOTIC EVALUATION

Performed? (Y/N): N (If Yes, Record all observations. Voucher collections optional. NOTE: all voucher samples must be labeled with the site ID number. Include appropriate field data sheets from the Primary Headwater Habitat Assessment Manual)

Fish Observed? (Y/N) N Voucher? (Y/N) N Salamanders Observed? (Y/N) N Voucher? (Y/N) N
Frogs or Tadpoles Observed? (Y/N) N Voucher? (Y/N) N Aquatic Macroinvertebrates Observed? (Y/N) N Voucher? (Y/N) N

Comments Regarding Biology: _____

DRAWING AND NARRATIVE DESCRIPTION OF STREAM REACH (This must be completed):

Include important landmarks and other features of interest for site evaluation and a narrative description of the stream's location

STREAM DRAWING ON ORIGINAL FIELD DATA SHEETS STORED AT LAKE SWCD OFFICE.

FLOW →

OhioEPA Primary Headwater Habitat Evaluation Form

HHEI Score (sum of metrics 1, 2, 3) : [ ]

SITE NAME/LOCATION _____

_____ SITE NUMBER _____ RIVER BASIN _____ DRAINAGE AREA (mi²) _____

LENGTH OF STREAM REACH (ft) _____ LAT. _____ LONG. _____ RIVER CODE _____ RIVER MILE _____

DATE _____ SCORER _____ COMMENTS _____

NOTE: Complete All Items On This Form - Refer to "Field Evaluation Manual for Ohio's PHWH Streams" for Instructions

STREAM CHANNEL MODIFICATIONS: ☐ NONE / NATURAL CHANNEL ☐ RECOVERED ☐ RECOVERING ☐ RECENT OR NO RECOVERY

1. SUBSTRATE (Estimate percent of every type of substrate present. Check *ONLY* two predominant substrate *TYPE* boxes (Max of 32). Add total number of significant substrate types found (Max of 8). Final metric score is sum of boxes A & B.

HHEI Metric Points

Substrate Max = 40

TYPE		PERCENT	TYPE		PERCENT
☐ ☐	BLDR SLABS [16 pts]	_____	☐ ☐	SILT [3 pt]	_____
☐ ☐	BOULDER (>256 mm) [16 pts]	_____	☐ ☐	LEAF PACK/WOODY DEBRIS [3 pts]	_____
☐ ☐	BEDROCK [16 pt]	_____	☐ ☐	FINE DETRITUS [3 pts]	_____
☐ ☐	COBBLE (65-256 mm) [12 pts]	_____	☐ ☐	CLAY or HARDPAN [0 pt]	_____
☐ ☐	GRAVEL (2-64 mm) [9 pts]	_____	☐ ☐	MUCK [0 pts]	_____
☐ ☐	SAND (<2 mm) [6 pts]	_____	☐ ☐	ARTIFICIAL [3 pts]	_____

Total of Percentages of Bldr Slabs, Boulder, Cobble, Bedrock _____ **(A)** **(B)** **A + B**

SCORE OF TWO MOST PREDOMINATE SUBSTRATE TYPES: _____ **TOTAL NUMBER OF SUBSTRATE TYPES:** _____

2. Maximum Pool Depth ***(Measure the maximum pool depth within the 61 meter (200 ft)*** evaluation reach at the time of evaluation. Avoid plunge pools from road culverts or storm water pipes) (Check *ONLY* one box):

Pool Depth Max = 30

☐ > 30 centimeters [20 pts]
☐ > 22.5 - 30 cm [30 pts]
☐ > 10 - 22.5 cm [25 pts]
☐ > 5 cm - 10 cm [15 pts]
☐ < 5 cm [5 pts]
☐ NO WATER OR MOIST CHANNEL [0 pts]

COMMENTS _____ **MAXIMUM POOL DEPTH (centimeters):** _____

3. BANK FULL WIDTH (Measured as the average of 3-4 measurements) **(Check *ONLY* one box):**

Bankfull Width Max=30

☐ > 4.0 meters [30 pts]
☐ > 3.0 m - 4.0 m [25 pts]
☐ > 1.5 m - 3.0 m [20 pts]
☐ > 1.0 m - 1.5 m [15 pts]
☐ ≤ 1.0 m [5 pts]

COMMENTS _____ **AVERAGE BANKFULL WIDTH (meters):** _____

This information must also be completed

RIPARIAN ZONE AND FLOODPLAIN QUALITY ☆NOTE: River Left (L) and Right (R) as looking downstream☆

RIPARIAN WIDTH L R	(Per Bank)	FLOODPLAIN QUALITY L R	(Most Predominant per Bank)	L R	
☐ ☐	Wide >10m	☐ ☐	Mature Forest, Wetland	☐ ☐	Conservation Tillage
☐ ☐	Moderate 5-10m	☐ ☐	Immature Forest, Shrub or Old Field	☐ ☐	Urban or Industrial
☐ ☐	Narrow <5m	☐ ☐	Residential, Park, New Field	☐ ☐	Open Pasture, Row Crop
☐ ☐	None	☐ ☐	Fenced Pasture	☐ ☐	Mining or Construction

COMMENTS _____

FLOW REGIME *(At Time of Evaluation)* (Check *ONLY* one box):

☐ Stream Flowing
☐ Subsurface flow with isolated pools (Interstitial)
☐ Moist Channel, isolated pools, no flow (Intermittent)
☐ Dry channel, no water (Ephemeral)

COMMENTS _____

SINUOSITY (Number of bends per 61 m (200 ft) of channel) (Check *ONLY* one box):

☐ None ☐ 1.0 ☐ 2.0 ☐ 3.0
☐ 0.5 ☐ 1.5 ☐ 2.5 ☐ >3

STREAM GRADIENT ESTIMATE

☐ Flat (0.5 ft/100 ft) ☐ Flat to Moderate ☐ Moderate (2 ft/100 ft) ☐ Moderate to Severe ☐ Severe (10 ft/100 ft)

ADDITIONAL STREAM INFORMATION (This Information Must Also be Completed):

QHEI PERFORMED? - ☐ Yes ☐ No QHEI Score _____ (If Yes, Attach Completed QHEI Form)

DOWNSTREAM DESIGNATED USE(S)

☐ WWH Name: _____ Distance from Evaluated Stream _____

☐ CWH Name: _____ Distance from Evaluated Stream _____

☐ EWH Name: _____ Distance from Evaluated Stream _____

MAPPING: ATTACH COPIES OF MAPS, INCLUDING THE ENTIRE WATERSHED AREA. CLEARLY MARK THE SITE LOCATION

USGS Quadrangle Name: _____ NRCS Soil Map Page: _____ NRCS Soil Map Stream Order _____

County: _____ Township / City: _____

MISCELLANEOUS

Base Flow Conditions? (Y/N): _____ Date of last precipitation: _____ Quantity: _____

Photograph Information: _____

Elevated Turbidity? (Y/N): _____ Canopy (% open): _____

Were samples collected for water chemistry? (Y/N): _____ (Note lab sample no. or id. and attach results) Lab Number: _____

Field Measures: Temp (°C) _____ Dissolved Oxygen (mg/l) _____ pH (S.U.) _____ Conductivity (µmhos/cm) _____

Is the sampling reach representative of the stream (Y/N) _____ If not, please explain: _____

_____

Additional comments/description of pollution impacts: _____

_____

BIOTIC EVALUATION

Performed? (Y/N): _____ (If Yes, Record all observations. Voucher collections optional. NOTE: all voucher samples must be labeled with the site ID number. Include appropriate field data sheets from the Primary Headwater Habitat Assessment Manual)

Fish Observed? (Y/N) _____ Voucher? (Y/N) _____ Salamanders Observed? (Y/N) _____ Voucher? (Y/N) _____
Frogs or Tadpoles Observed? (Y/N) _____ Voucher? (Y/N) _____ Aquatic Macroinvertebrates Observed? (Y/N) _____ Voucher? (Y/N) _____

Comments Regarding Biology: _____

_____

_____

DRAWING AND NARRATIVE DESCRIPTION OF STREAM REACH (This must be completed):

Include important landmarks and other features of interest for site evaluation and a narrative description of the stream's location

FLOW ➜

OhioEPA Primary Headwater Habitat Evaluation Form

HHEI Score (sum of metrics 1, 2, 3) : [ ]

SITE NAME/LOCATION _____

_____ SITE NUMBER _____ RIVER BASIN _____ DRAINAGE AREA (mi²) _____

LENGTH OF STREAM REACH (ft) _____ LAT. _____ LONG. _____ RIVER CODE _____ RIVER MILE _____

DATE _____ SCORER _____ COMMENTS _____

NOTE: Complete All Items On This Form - Refer to "Field Evaluation Manual for Ohio's PHWH Streams" for Instructions

STREAM CHANNEL MODIFICATIONS: ☐ NONE / NATURAL CHANNEL ☐ RECOVERED ☐ RECOVERING ☐ RECENT OR NO RECOVERY

1. **SUBSTRATE (Estimate percent of every type of substrate present.** Check *ONLY* two predominant substrate *TYPE* boxes (Max of 32). Add total number of significant substrate types found (Max of 8). Final metric score is sum of boxes A & B.

HHEI Metric Points

TYPE		PERCENT	TYPE		PERCENT
☐ ☐	BLDR SLABS [16 pts]	_____	☐ ☐	SILT [3 pt]	_____
☐ ☐	BOULDER (>256 mm) [16 pts]	_____	☐ ☐	LEAF PACK/WOODY DEBRIS [3 pts]	_____
☐ ☐	BEDROCK [16 pt]	_____	☐ ☐	FINE DETRITUS [3 pts]	_____
☐ ☐	COBBLE (65-256 mm) [12 pts]	_____	☐ ☐	CLAY or HARDPAN [0 pt]	_____
☐ ☐	GRAVEL (2-64 mm) [9 pts]	_____	☐ ☐	MUCK [0 pts]	_____
☐ ☐	SAND (<2 mm) [6 pts]	_____	☐ ☐	ARTIFICIAL [3 pts]	_____

Total of Percentages of Bldr Slabs, Boulder, Cobble, Bedrock _____ **(A)** **(B)**

Substrate Max = 40 [ ]

A + B

SCORE OF TWO MOST PREDOMINATE SUBSTRATE TYPES: **TOTAL NUMBER OF SUBSTRATE TYPES:**

2. **Maximum Pool Depth** ***(Measure the maximum pool depth within the 61 meter (200 ft)*** evaluation reach at the time of evaluation. Avoid plunge pools from road culverts or storm water pipes) (Check *ONLY* one box):

Pool Depth Max = 30 [ ]

- ☐ > 30 centimeters [20 pts]
- ☐ > 22.5 - 30 cm [30 pts]
- ☐ > 10 - 22.5 cm [25 pts]
- ☐ > 5 cm - 10 cm [15 pts]
- ☐ < 5 cm [5 pts]
- ☐ NO WATER OR MOIST CHANNEL [0 pts]

COMMENTS _____ **MAXIMUM POOL DEPTH (centimeters):**

3. **BANK FULL WIDTH (Measured as the average of 3-4 measurements)** **(Check *ONLY* one box):**

Bankfull Width Max=30 [ ]

- ☐ > 4.0 meters [30 pts]
- ☐ > 3.0 m - 4.0 m [25 pts]
- ☐ > 1.5 m - 3.0 m [20 pts]
- ☐ > 1.0 m - 1.5 m [15 pts]
- ☐ ≤ 1.0 m [5 pts]

COMMENTS _____ **AVERAGE BANKFULL WIDTH (meters):**

This information must also be completed

RIPARIAN ZONE AND FLOODPLAIN QUALITY ☆NOTE: River Left (L) and Right (R) as looking downstream☆

RIPARIAN WIDTH L R	(Per Bank)	FLOODPLAIN QUALITY L R	(Most Predominant per Bank)	L R	
☐ ☐	Wide >10m	☐ ☐	Mature Forest, Wetland	☐ ☐	Conservation Tillage
☐ ☐	Moderate 5-10m	☐ ☐	Immature Forest, Shrub or Old Field	☐ ☐	Urban or Industrial
☐ ☐	Narrow <5m	☐ ☐	Residential, Park, New Field	☐ ☐	Open Pasture, Row Crop
☐ ☐	None	☐ ☐	Fenced Pasture	☐ ☐	Mining or Construction

COMMENTS _____

FLOW REGIME *(At Time of Evaluation)* (Check *ONLY* one box):

- ☐ Stream Flowing
- ☐ Subsurface flow with isolated pools (Interstitial)
- ☐ Moist Channel, isolated pools, no flow (Intermittent)
- ☐ Dry channel, no water (Ephemeral)

COMMENTS _____

SINUOSITY (Number of bends per 61 m (200 ft) of channel) (Check *ONLY* one box):

☐ None	☐ 1.0	☐ 2.0	☐ 3.0
☐ 0.5	☐ 1.5	☐ 2.5	☐ >3

STREAM GRADIENT ESTIMATE

☐ Flat (0.5 ft/100 ft) ☐ Flat to Moderate ☐ Moderate (2 ft/100 ft) ☐ Moderate to Severe ☐ Severe (10 ft/100 ft)

ADDITIONAL STREAM INFORMATION (This Information Must Also be Completed):

QHEI PERFORMED? - ☐ Yes ☐ No QHEI Score _____ (If Yes, Attach Completed QHEI Form)

DOWNSTREAM DESIGNATED USE(S)

☐ WWH Name: _____ Distance from Evaluated Stream _____

☐ CWH Name: _____ Distance from Evaluated Stream _____

☐ EWH Name: _____ Distance from Evaluated Stream _____

MAPPING: ATTACH COPIES OF MAPS, INCLUDING THE ENTIRE WATERSHED AREA. CLEARLY MARK THE SITE LOCATION

USGS Quadrangle Name: _____ NRCS Soil Map Page: _____ NRCS Soil Map Stream Order _____

County: _____ Township / City: _____

MISCELLANEOUS

Base Flow Conditions? (Y/N): _____ Date of last precipitation: _____ Quantity: _____

Photograph Information: _____

Elevated Turbidity? (Y/N): _____ Canopy (% open): _____

Were samples collected for water chemistry? (Y/N): _____ (Note lab sample no. or id. and attach results) Lab Number: _____

Field Measures: Temp (°C) _____ Dissolved Oxygen (mg/l) _____ pH (S.U.) _____ Conductivity (µmhos/cm) _____

Is the sampling reach representative of the stream (Y/N) _____ If not, please explain: _____

Additional comments/description of pollution impacts: _____

BIOTIC EVALUATION

Performed? (Y/N): _____ (If Yes, Record all observations. Voucher collections optional. NOTE: all voucher samples must be labeled with the site ID number. Include appropriate field data sheets from the Primary Headwater Habitat Assessment Manual)

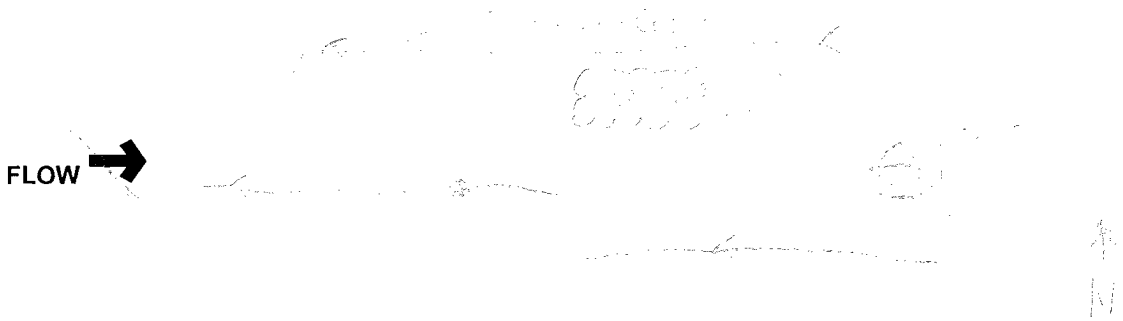
Fish Observed? (Y/N) _____ Voucher? (Y/N) _____ Salamanders Observed? (Y/N) _____ Voucher? (Y/N) _____

Frogs or Tadpoles Observed? (Y/N) _____ Voucher? (Y/N) _____ Aquatic Macroinvertebrates Observed? (Y/N) _____ Voucher? (Y/N) _____

Comments Regarding Biology: _____

DRAWING AND NARRATIVE DESCRIPTION OF STREAM REACH (This must be completed):

Include important landmarks and other features of interest for site evaluation and a narrative description of the stream's location



IDEM OWQ Biological Studies QHEI (Qualitative Habitat Evaluation Index)

Sample # | bioSample # | Stream Name | Location

Surveyor | Sample Date | County | Macro SampleType | ☐ Habitat Complete | QHEI Score:

1-Substrate (20 points maximum)

Substrate Score:

Check 1 Predominant Pool & 1 Predominant Riffle

Check all that are present — P=Pool, R=Riffle

Predominant P	Predominant R		Present P	Present R	Predominant P	Predominant R		Present P	Present R
☐	☐	Bldrs/Slabs(10)	☐	☐	☐	☐	Hardpan(4)	☐	☐
☐	☐	Boulders(9)	☐	☐	☐	☐	Detritus(3)	☐	☐
☐	☐	Cobble(8)	☐	☐	☐	☐	Muck(2)	☐	☐
☐	☒	Gravel(7)	☒	☐	☐	☐	Silt(2)	☒	☒
☐	☐	Sand(6)	☒	☒	☐	☐	Sludge(1)	☐	☐
☐	☐	Bedrock(5)	☐	☐	☐	☐	Artificial(0)	☐	☐

Substrate Quality (check only 1, or check 2 and AVERAGE)

Substrate Origin: ☐ Limestone(1) ☒ Hardpan(0) ☐ Lacustrine(0) ☒ Tills(1) ☐ Sandstone(0) ☐ Shale(-1) ☐ Wetlands(0) ☐ Rip/Rap(0) ☐ Coal fines(-2)

Silt Cover: ☐ Silt heavy(-2) ☐ Silt moderate(-1) ☐ Silt normal(0) ☐ Silt free(1)

Embeddedness: ☐ Extensive(-2) ☐ Moderate(-1) ☐ Low/Normal(0) ☐ None(1)

NOTE: ignore sludge originating from point sources; score based on natural substrates

☐ >4 substrates present(2)

Comments:

2-Instream Cover (20 points maximum

Instream Cover Score:

Type (check ALL that apply)

☐ Undercut banks(1) ☐ Deep pools(2) ☐ Oxbows(1)
☒ Overhanging vegetation(1) ☐ Rootwads(1) ☒ Aquatic macrophytes(1)
☒ Shallows(in slow water)(1) ☐ Boulders(1) ☒ Logs and woody debris(1)
☐ Rootmats(1)

Amount (check only 1, or 2 and AVERAGE)

☐ Extensive >75% (11)
☐ Moderate 25-75% (7)
☐ Sparse 5-25% (3)
☐ Nearly absent <5% (1)

Comments:

3-Channel Morphology (20) (check only one per category, OR two and AVERAGE)

Channel Score:

Sinuosity	Development	Channelization	Stability	Modifications/Other	
☐ High (4)	☐ Excellent (7)	☐ None (6)	☐ High (3)	☐ Snagging	☐ Impound
☐ Moderate (3)	☐ Good (5)	☐ Recovered (4)	☒ Moderate (2)	☐ Relocation	☐ Islands
☒ Low (2)	☒ Fair (3)	☒ Recovering (3)	☐ Low (1)	☐ Canopy Removal	☒ Leveed
☐ None (1)	☐ Poor (1)	☐ Recent or no recovery (1)		☐ Dredging	☐ Bank shaping
				☐ One side channel modifications	

Comments:

4-Riparian Zone & Bank Erosion (10 points maximum)

Riparian Score:

Left/Right banks looking downstream (For each category, check only one per bank, OR two per bank and AVERAGE).

Riparian width L	R	(per bank)	Erosion/Runoff-Floodplain quality (past 100 ft Riparian) L	R	(most predominant per bank)	L	R		Bank Erosion L	R	(per bank)
☐	☐	Wide >50m (4)	☐	☐	Forest, Swamp (3)	☐	☐	Conservation Tillage (1)	☐	☐	None or little (3)
☒	☒	Moderate 10-50m (3)	☒	☐	Shrub or Old field (2)	☐	☐	Urban or Industrial (0)	☐	☒	Moderate (2)
☐	☐	Narrow 5-10m (2)	☐	☐	Residential, Park, New field (1)	☐	☐	Mining, Construction (0)	☐	☐	Heavy/Severe (1)
☐	☐	Very narrow <5m (1)	☐	☐	Fenced pasture (1)	☒	☐	Open Pasture/Rowcrop (0)			
☐	☐	None (0)									

Comments:

5a-Pool/Glide Quality (12 points maximum

Pool/Glide Score:

Max pool depth (check one)

☐ >1m (6)
☐ 0.7-1m (4)
☐ 0.4-0.7m (2)
☒ 0.2-0.4m (1)
☐ <0.2m (pool=0)

Morphology (check only one, OR check two and AVERAGE)

☐ Pool width > riffle width (2)
☒ Pool width = riffle width (1)
☐ Pool width < riffle width (0)

Pool/Run/Riffle current velocity (check all that apply)

☐ Eddies (1) ☐ Torrential (-1)
☐ Fast (1) ☐ Interstitial (-1)
☒ Moderate (1) ☐ Intermittent (-2)
☐ Slow (1) ☐ No pool (0)

Comments:

5b-Riffle/Run Quality (8) (check only one per category, OR two and AVERAGE)

Riffle/Run Score:

Riffle/run depth (check one)

☐ Generally>10cm, Max>50cm (4)
☐ Generally>10cm, Max<50cm(3)
☐ Generally 5-10cm (1)
☒ Generally<5cm (riffle=0)

Riffle/run substrate

☐ Stable-e.g. cobble, boulder (2)
☐ Mod. stable-e.g. pea gravel (1)
☒ Unstable-e.g. sand, gravel (0)

Riffle/run embeddedness

☐ Extensive (-1) ☒ Normal/Low (1)
☐ Moderate (0) ☐ None (2)
☐ No riffle (0)

Comments:

6-Gradient (10 points maximum)

Gradient Score:

Average width: *Gradient:* *(ft/mile)* *Drainage Area:* *(square miles)*

Comments:

OWQ Biological Studies QHEI (Qualitative Habitat Evaluation Index)

Sample #	bioSample #	Stream Name	Location

Surveyor	Sample Date	County	Macro SampleType	Habitat Complete	QHEI Score:
				☐	

Impacts/Miscellaneous

Major Suspected Impacts (Check all that apply)

- ☐ None
- ☐ Industrial
- ☐ WWTP
- ☑ Agricultural
- ☒ Livestock
- ☐ Silviculture
- ☐ Construction
- ☐ Urban Runoff
- ☐ Suburban
- ☑ Channelization
- ☐ Riparian Removal
- ☐ Flow Alteration
- ☐ CSOs
- ☐ Mining
- ☐ Landfills
- ☐ Natural

Pollution Impact Comments:

Miscellaneous QHEI Information

Subjective rating (1-10):

Aesthetic rating (1-10):

Canopy Cover (% Open):

% Riffle:

% Run:

% Glide:

% Pool:

Is reach representative of stream?

General QHEI Notes:

OWQ Biological Studies QHEI (Qualitative Habitat Evaluation Index)

Sample # | bioSample # | Stream Name | Location

Surveyor | Sample Date | County | Macro SampleType | ☐ Habitat Complete | QHEI Score:

1-Substrate (20 points maximum)

Substrate Score:

Check 1 Predominant Pool & 1 Predominant Riffle

Check all that are present — P=Pool, R=Riffle

Predominant P	Predominant R		Present P	Present R		Predominant P	Predominant R		Present P	Present R	
☐	☐	Bldrs/Slabs(10)	☐	☐		☐	☐	Hardpan(4)	☐	☐	
☐	☐	Boulders(9)	☐	☐		☐	☐	Detritus(3)	☐	☐	
☐	☐	Cobble(8)	☐	☐		☐	☐	Muck(2)	☐	☐	
☐	☒	Gravel(7)	☐	☐		☐	☐	Silt(2)	☐	☐	
☒	☐	Sand(6)	☐	☐		☐	☐	Sludge(1)	☐	☐	
☐	☐	Bedrock(5)	☐	☐		☐	☐	Artificial(0)	☐	☐	

Substrate Quality (check only 1, or check 2 and AVERAGE)

Substrate Origin: ☐ Limestone(1) ☒ Hardpan(0) ☐ Lacustrine(0) ☒ Tills(1) ☐ Sandstone(0) ☐ Shale(-1) ☐ Wetlands(0) ☐ Rip/Rap(0) ☐ Coal fines(-2)

Silt Cover: ☐ Silt heavy(-2) ☐ Silt moderate(-1) ☐ Silt normal(0) ☐ Silt free(1)

Embeddedness: ☐ Extensive(-2) ☐ Moderate(-1) ☒ Low/Normal(0) ☐ None(1)

NOTE: ignore sludge originating from point sources; score based on natural substrates

☐ >4 substrates present(2)

Comments:

2-Instream Cover (20 points maximum

Instream Cover Score:

Type (check ALL that apply): ☐ Undercut banks(1) ☐ Deep pools(2) ☐ Oxbows(1) ☒ Overhanging vegetation(1) ☐ Rootwads(1) ☒ Aquatic macrophytes(1) ☒ Shallows(in slow water)(1) ☐ Boulders(1) ☐ Logs and woody debris(1) ☐ Rootmats(1)

Amount (check only 1, or 2 and AVERAGE): ☐ Extensive >75% (11) ☐ Moderate 25-75% (7) ☒ Sparse 5-25% (3) ☐ Nearly absent <5% (1)

Comments:

3-Channel Morphology (20) (check only one per category, OR two and AVERAGE)

Channel Score:

Sinuosity	Development	Channelization	Stability	Modifications/Other	
☐ High (4)	☐ Excellent (7)	☐ None (6)	☐ High (3)	☐ Snagging	☐ Impound
☐ Moderate (3)	☐ Good (5)	☐ Recovered (4)	☐ Moderate (2)	☐ Relocation	☐ Islands
☒ Low (2)	☒ Fair (3)	☒ Recovering (3)	☐ Low (1)	☒ Canopy Removal	☒ Leveed
☐ None (1)	☐ Poor (1)	☐ Recent or no recovery (1)		☐ Dredging	☐ Bank shaping
				☐ One side channel modifications	

Comments:

4-Riparian Zone & Bank Erosion (10 points maximum)

Riparian Score:

Left/Right banks looking downstream (For each category, check only one per bank, OR two per bank and AVERAGE).

Riparian width L	R	(per bank)	Erosion/Runoff-Floodplain quality (past 100 ft Riparian) L	R	(most predominant per bank)	L	R		Bank Erosion L	R	(per bank)
☐	☐	Wide >50m (4)	☐	☐	Forest, Swamp (3)	☐	☐	Conservation Tillage (1)	☐	☐	None or little (3)
☒	☐	Moderate 10-50m (3)	☐	☒	Shrub or Old field (2)	☐	☐	Urban or Industrial (0)	☒	☒	Moderate (2)
☐	☐	Narrow 5-10m (2)	☐	☐	Residential, Park, New field (1)	☐	☐	Mining, Construction (0)	☐	☐	Heavy/Severe (1)
☐	☐	Very narrow <5m (1)	☐	☐	Fenced pasture (1)	☒	☒	Open Pasture/Rowcrop (0)			
☐	☐	None (0)									

Comments:

5a-Pool/Glide Quality (12 points maximum

Pool/Glide Score:

Max pool depth (check one): ☐ >1m (6) ☐ 0.7-1m (4) ☐ 0.4-0.7m (2) ☐ 0.2-0.4m (1) ☒ <0.2m (pool=0)

Morphology (check only one, OR check two and AVERAGE): ☐ Pool width > riffle width (2) ☒ Pool width = riffle width (1) ☐ Pool width < riffle width (0)

Pool/Run/Riffle current velocity (check all that apply): ☐ Eddies (1) ☐ Fast (1) ☒ Moderate (1) ☐ Slow (1) ☐ Torrential (-1) ☐ Interstitial (-1) ☐ Intermittent (-2) ☐ No pool (0)

Comments:

5b-Riffle/Run Quality (8) (check only one per category, OR two and AVERAGE)

Riffle/Run Score:

Riffle/run depth (check one): ☐ Generally>10cm, Max>50cm (4) ☐ Generally>10cm, Max<50cm(3) ☐ Generally 5-10cm (1) ☒ Generally<5cm (riffle=0)

Riffle/run substrate: ☐ Stable-e.g. cobble, boulder (2) ☐ Mod. stable-e.g. pea gravel (1) ☐ Unstable-e.g. sand, gravel (0)

Riffle/run embeddedness: ☐ Extensive (-1) ☐ Moderate (0) ☒ Normal/Low (1) ☐ None (2) ☐ No riffle (0)

Comments:

6-Gradient (10 points maximum)

Gradient Score:

Average width: *Gradient:* *(ft/mile)* *Drainage Area:* *(square miles)*

Comments:

IDEM OWQ Biological Studies QHEI (Qualitative Habitat Evaluation Index)

Sample #	bioSample #	Stream Name	Location

Surveyor	Sample Date	County	Macro SampleType	☐ Habitat Complete	QHEI Score:

Impacts/Miscellaneous

Major Suspected Impacts (Check all that apply)

- ☐ None
- ☐ Industrial
- ☐ WWTP
- ☒ Agricultural
- ☒ Livestock
- ☐ Silviculture
- ☐ Construction
- ☐ Urban Runoff
- ☐ Suburban
- ☒ Channelization
- ☒ Riparian Removal
- ☐ Flow Alteration
- ☐ CSOs
- ☐ Mining
- ☐ Landfills
- ☐ Natural

Pollution Impact Comments:

Miscellaneous QHEI Information

Subjective rating (1-10): % Riffle: *Is reach representative of stream?*

Aesthetic rating (1-10): % Run:

% Glide:

Canopy Cover (% Open): % Pool:

General QHEI Notes:

OhioEPA Primary Headwater Habitat Evaluation Form

HHEI Score (sum of metrics 1, 2, 3) : 18

SITE NAME/LOCATION Trib. of North Fork Prairie Ck. SITE NUMBER Sec3-529A RIVER BASIN White River DRAINAGE AREA (mi²) 0.2 mi²

LENGTH OF STREAM REACH (ft) 200 ft LAT. _____ LONG. _____ RIVER CODE _____ RIVER MILE _____

DATE 10/18/2006 SCORER K. Allison COMMENTS _____

NOTE: Complete All Items On This Form - Refer to "Field Evaluation Manual for Ohio's PHWH Streams" for Instructions

STREAM CHANNEL MODIFICATIONS: ☐ NONE / NATURAL CHANNEL ☐ RECOVERED ☒ RECOVERING ☐ RECENT OR NO RECOVERY

1. SUBSTRATE (Estimate percent of every type of substrate present. Check *ONLY* two predominant substrate *TYPE* boxes (Max of 32). Add total number of significant substrate types found (Max of 8). Final metric score is sum of boxes A & B.

TYPE		PERCENT	TYPE		PERCENT
☐ ☐	BLDR SLABS [16 pts]		☐ ☒	SILT [3 pt]	70
☐ ☐	BOULDER (>256 mm) [16 pts]		☒ ☐	LEAF PACK/WOODY DEBRIS [3 pts]	30
☐ ☐	BEDROCK [16 pt]		☐ ☐	FINE DETRITUS [3 pts]	
☐ ☐	COBBLE (65-256 mm) [12 pts]		☐ ☐	CLAY or HARDPAN [0 pt]	
☐ ☐	GRAVEL (2-64 mm) [9 pts]		☐ ☐	MUCK [0 pts]	
☐ ☐	SAND (<2 mm) [6 pts]		☐ ☐	ARTIFICIAL [3 pts]	

Total of Percentages of Bldr Slabs, Boulder, Cobble, Bedrock 0% (A) (B)

SCORE OF TWO MOST PREDOMINATE SUBSTRATE TYPES: 6 **TOTAL NUMBER OF SUBSTRATE TYPES:** 2

HHEI Metric Points

Substrate Max = 40: 8

A + B

2. Maximum Pool Depth ***(Measure the maximum pool depth within the 61 meter (200 ft)*** evaluation reach at the time of evaluation. Avoid plunge pools from road culverts or storm water pipes) (Check *ONLY* one box):

- ☐ > 30 centimeters [20 pts]
- ☐ > 22.5 - 30 cm [30 pts]
- ☐ > 10 - 22.5 cm [25 pts]
- ☐ > 5 cm - 10 cm [15 pts]
- ☒ < 5 cm [5 pts]
- ☐ NO WATER OR MOIST CHANNEL [0 pts]

COMMENTS _____ **MAXIMUM POOL DEPTH (centimeters):** 3

Pool Depth Max = 30: 5

3. BANK FULL WIDTH (Measured as the average of 3-4 measurements) (Check *ONLY* one box):

- ☐ > 4.0 meters [30 pts]
- ☐ > 3.0 m - 4.0 m [25 pts]
- ☐ > 1.5 m - 3.0 m [20 pts]
- ☐ > 1.0 m - 1.5 m [15 pts]
- ☒ ≤ 1.0 m [5 pts]

COMMENTS _____ **AVERAGE BANKFULL WIDTH (meters):** .9

Bankfull Width Max=30: 5

This information must also be completed

RIPARIAN ZONE AND FLOODPLAIN QUALITY ☆NOTE: River Left (L) and Right (R) as looking downstream☆

RIPARIAN WIDTH L	R	(Per Bank)	FLOODPLAIN QUALITY L	R	(Most Predominant per Bank)	L	R	
☐	☐	Wide >10m	☒	☐	Mature Forest, Wetland	☐	☐	Conservation Tillage
☒	☐	Moderate 5-10m	☐	☒	Immature Forest, Shrub or Old Field	☐	☐	Urban or Industrial
☐	☒	Narrow <5m	☐	☐	Residential, Park, New Field	☐	☒	Open Pasture, Row Crop
☐	☐	None	☐	☐	Fenced Pasture	☐	☐	Mining or Construction

COMMENTS _____

FLOW REGIME *(At Time of Evaluation)* (Check *ONLY* one box):

- ☐ Stream Flowing
- ☐ Subsurface flow with isolated pools (Interstitial)
- ☒ Moist Channel, isolated pools, no flow (Intermittent)
- ☐ Dry channel, no water (Ephemeral)

COMMENTS _____

SINUOSITY (Number of bends per 61 m (200 ft) of channel) (Check *ONLY* one box):

☐ None	☐ 1.0	☐ 2.0	☐ 3.0
☒ 0.5	☐ 1.5	☐ 2.5	☐ >3

STREAM GRADIENT ESTIMATE

☐ Flat (0.5 ft/100 ft) ☒ Flat to Moderate ☐ Moderate (2 ft/100 ft) ☐ Moderate to Severe ☐ Severe (10 ft/100 ft)

ADDITIONAL STREAM INFORMATION (This Information Must Also be Completed):

QHEI PERFORMED? - ☐ Yes ☒ No QHEI Score _____ (If Yes, Attach Completed QHEI Form)

DOWNSTREAM DESIGNATED USE(S)

☐ WWH Name: _____ Distance from Evaluated Stream _____

☐ CWH Name: _____ Distance from Evaluated Stream _____

☐ EWH Name: _____ Distance from Evaluated Stream _____

MAPPING: ATTACH COPIES OF MAPS, INCLUDING THE ENTIRE WATERSHED AREA. CLEARLY MARK THE SITE LOCATION

USGS Quadrangle Name: _____ NRCS Soil Map Page: _____ NRCS Soil Map Stream Order _____

County: _____ Township / City: _____

MISCELLANEOUS

Base Flow Conditions? (Y/N): _____ Date of last precipitation: _____ Quantity: _____

Photograph Information: _____

Elevated Turbidity? (Y/N): _____ Canopy (% open): _____

Were samples collected for water chemistry? (Y/N): _____ (Note lab sample no. or id. and attach results) Lab Number: _____

Field Measures: Temp (°C) _____ Dissolved Oxygen (mg/l) _____ pH (S.U.) _____ Conductivity (µmhos/cm) _____

Is the sampling reach representative of the stream (Y/N) _____ If not, please explain: _____

Additional comments/description of pollution impacts: _____

BIOTIC EVALUATION

Performed? (Y/N): _____ (If Yes, Record all observations. Voucher collections optional. NOTE: all voucher samples must be labeled with the site ID number. Include appropriate field data sheets from the Primary Headwater Habitat Assessment Manual)

Fish Observed? (Y/N) _____ Voucher? (Y/N) _____ Salamanders Observed? (Y/N) _____ Voucher? (Y/N) _____

Frogs or Tadpoles Observed? (Y/N) _____ Voucher? (Y/N) _____ Aquatic Macroinvertebrates Observed? (Y/N) _____ Voucher? (Y/N) _____

Comments Regarding Biology: _____

DRAWING AND NARRATIVE DESCRIPTION OF STREAM REACH (This must be completed):

Include important landmarks and other features of interest for site evaluation and a narrative description of the stream's location

FLOW →

OhioEPA Primary Headwater Habitat Evaluation Form

HHEI Score (sum of metrics 1, 2, 3) : [illegible]

SITE NAME/LOCATION _____

[illegible] SITE NUMBER [illegible] RIVER BASIN [illegible] DRAINAGE AREA (mi²) [illegible]

LENGTH OF STREAM REACH (ft) [illegible] LAT. _____ LONG. _____ RIVER CODE _____ RIVER MILE _____

DATE [illegible] SCORER [illegible] COMMENTS _____

NOTE: Complete All Items On This Form - Refer to "Field Evaluation Manual for Ohio's PHWH Streams" for Instructions

STREAM CHANNEL MODIFICATIONS: ☐ NONE / NATURAL CHANNEL ☐ RECOVERED ☒ RECOVERING ☐ RECENT OR NO RECOVERY

1. SUBSTRATE (Estimate percent of every type of substrate present. Check *ONLY* two predominant substrate *TYPE* boxes (Max of 32). Add total number of significant substrate types found (Max of 8). Final metric score is sum of boxes A & B.

HHEI Metric Points

TYPE		PERCENT	TYPE		PERCENT
☐ ☐	BLDR SLABS [16 pts]		☒ ☐	SILT [3 pt]	[illegible]
☐ ☐	BOULDER (>256 mm) [16 pts]		☐ ☐	LEAF PACK/WOODY DEBRIS [3 pts]	
☐ ☐	BEDROCK [16 pt]		☐ ☐	FINE DETRITUS [3 pts]	
☐ ☐	COBBLE (65-256 mm) [12 pts]		☐ ☐	CLAY or HARDPAN [0 pt]	
☐ ☐	GRAVEL (2-64 mm) [9 pts]		☒ ☐	MUCK [0 pts]	[illegible]
☐ ☐	SAND (<2 mm) [6 pts]		☐ ☐	ARTIFICIAL [3 pts]	

Total of Percentages of Bldr Slabs, Boulder, Cobble, Bedrock _____ **(A)** **(B)**

Substrate Max = 40: [illegible]

A + B

SCORE OF TWO MOST PREDOMINATE SUBSTRATE TYPES: [illegible] **TOTAL NUMBER OF SUBSTRATE TYPES:** [illegible]

2. Maximum Pool Depth ***(Measure the maximum pool depth within the 61 meter (200 ft)*** evaluation reach at the time of evaluation. Avoid plunge pools from road culverts or storm water pipes) (Check *ONLY* one box):

Pool Depth Max = 30: [illegible]

☒ > 30 centimeters [20 pts]
☐ > 22.5 - 30 cm [30 pts]
☐ > 10 - 22.5 cm [25 pts]
☐ > 5 cm - 10 cm [15 pts]
☐ < 5 cm [5 pts]
☐ NO WATER OR MOIST CHANNEL [0 pts]

COMMENTS _____ **MAXIMUM POOL DEPTH (centimeters):** [illegible]

3. BANK FULL WIDTH (Measured as the average of 3-4 measurements) **(Check *ONLY* one box):**

Bankfull Width Max=30: [illegible]

☐ > 4.0 meters [30 pts]
☒ > 3.0 m - 4.0 m [25 pts]
☐ > 1.5 m - 3.0 m [20 pts]
☐ > 1.0 m - 1.5 m [15 pts]
☐ ≤ 1.0 m [5 pts]

COMMENTS _____ **AVERAGE BANKFULL WIDTH (meters):** [illegible]

This information must also be completed

RIPARIAN ZONE AND FLOODPLAIN QUALITY ☆NOTE: River Left (L) and Right (R) as looking downstream☆

L R	RIPARIAN WIDTH (Per Bank)	L R	FLOODPLAIN QUALITY (Most Predominant per Bank)	L R	
☐ ☐	Wide >10m	☐ ☐	Mature Forest, Wetland	☐ ☐	Conservation Tillage
☒ ☒	Moderate 5-10m	☒ ☒	Immature Forest, Shrub or Old Field	☐ ☐	Urban or Industrial
☐ ☐	Narrow <5m	☐ ☐	Residential, Park, New Field	☒ ☒	Open Pasture, Row Crop
☐ ☐	None	☐ ☐	Fenced Pasture	☐ ☐	Mining or Construction

COMMENTS _____

FLOW REGIME *(At Time of Evaluation)* (Check *ONLY* one box):

☐ Stream Flowing
☐ Subsurface flow with isolated pools (Interstitial)
☐ Moist Channel, isolated pools, no flow (Intermittent)
☐ Dry channel, no water (Ephemeral)

COMMENTS _____

SINUOSITY (Number of bends per 61 m (200 ft) of channel) (Check *ONLY* one box):

☒ None ☐ 1.0 ☐ 2.0 ☐ 3.0
☐ 0.5 ☐ 1.5 ☐ 2.5 ☐ >3

STREAM GRADIENT ESTIMATE

☐ Flat (0.5 ft/100 ft) ☒ Flat to Moderate ☐ Moderate (2 ft/100 ft) ☐ Moderate to Severe ☐ Severe (10 ft/100 ft)

ADDITIONAL STREAM INFORMATION (This Information Must Also be Completed):

QHEI PERFORMED? - ☐ Yes ☒ No QHEI Score _____ (If Yes, Attach Completed QHEI Form)

DOWNSTREAM DESIGNATED USE(S)

☐ WWH Name: _____ Distance from Evaluated Stream _____

☐ CWH Name: _____ Distance from Evaluated Stream _____

☐ EWH Name: _____ Distance from Evaluated Stream _____

MAPPING: ATTACH COPIES OF MAPS, INCLUDING THE ENTIRE WATERSHED AREA. CLEARLY MARK THE SITE LOCATION

USGS Quadrangle Name: _____ NRCS Soil Map Page: _____ NRCS Soil Map Stream Order N/A

County: _____ Township / City: _____

MISCELLANEOUS

Base Flow Conditions? (Y/N): _____ Date of last precipitation: _____ Quantity: _____

Photograph Information: _____

Elevated Turbidity? (Y/N): _____ Canopy (% open): _____

Were samples collected for water chemistry? (Y/N): _____ (Note lab sample no. or id. and attach results) Lab Number: _____

Field Measures: Temp (°C) _____ Dissolved Oxygen (mg/l) _____ pH (S.U.) _____ Conductivity (µmhos/cm) _____

Is the sampling reach representative of the stream (Y/N) _____ If not, please explain: _____

Additional comments/description of pollution impacts: _____

BIOTIC EVALUATION

Performed? (Y/N): _____ (If Yes, Record all observations. Voucher collections optional. NOTE: all voucher samples must be labeled with the site ID number. Include appropriate field data sheets from the Primary Headwater Habitat Assessment Manual)

Fish Observed? (Y/N) _____ Voucher? (Y/N) _____ Salamanders Observed? (Y/N) _____ Voucher? (Y/N) _____

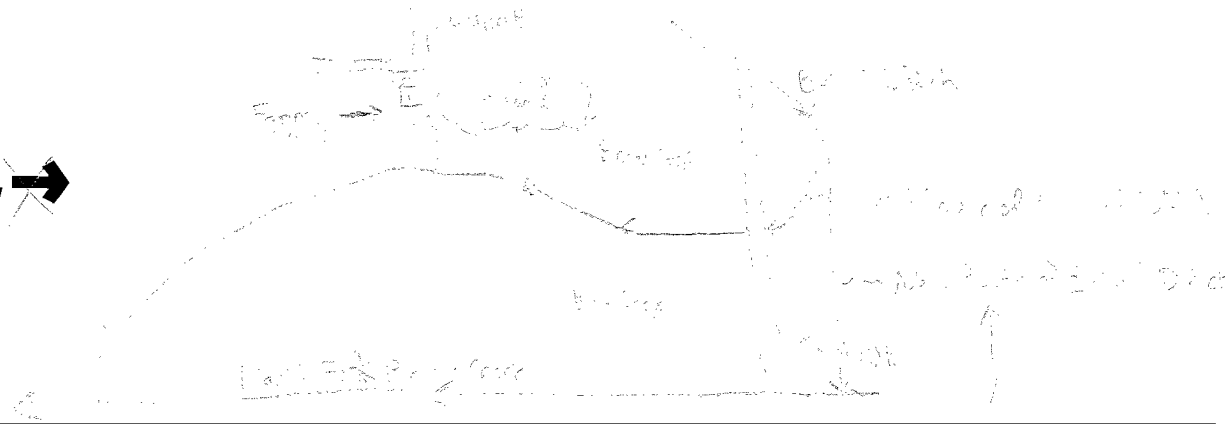
Frogs or Tadpoles Observed? (Y/N) _____ Voucher? (Y/N) _____ Aquatic Macroinvertebrates Observed? (Y/N) _____ Voucher? (Y/N) _____

Comments Regarding Biology: _____

DRAWING AND NARRATIVE DESCRIPTION OF STREAM REACH (This must be completed):

Include important landmarks and other features of interest for site evaluation and a narrative description of the stream's location

FLOW



IDEM — OWQ Biological Studies QHEI (Qualitative Habitat Evaluation Index)

Sample #	bioSample #	Stream Name	Location
		Sec 3-S31	Bethel Ditch

Surveyor	Sample Date	County	Macro SampleType	Habitat Complete	QHEI Score:
K. Allison	9/9/05	Daviess		☐	44 (KLC) 39.25

1-Substrate (20 points maximum)

Substrate Score: 2

Check 1 Predominant Pool & 1 Predominant Riffle

Check all that are present — P=Pool, R=Riffle

Predominant P	Predominant R	Present P	Present R		Predominant P	Predominant R	Present P	Present R	
☐	☐	☐	☐	Bldrs/Slabs(10)	☐	☐	☐	☐	Hardpan(4)
☐	☐	☐	☐	Boulders(9)	☐	☐	☐	☐	Detritus(3)
☐	☐	☐	☐	Cobble(8)	☒	☐	☒	☒	Muck(2)
☐	☐	☐	☐	Gravel(7)	☐	☒	☒	☒	Silt(2)
☐	☐	☐	☐	Sand(6)	☐	☐	☐	☐	Sludge(1)
☐	☐	☐	☐	Bedrock(5)	☐	☐	☐	☐	Artificial(0)

Substrate Quality (check only 1, or check 2 and AVERAGE)

Substrate Origin: ☐ Limestone(1) ☒ Hardpan(0) ☐ Lacustrine(0) ☐ Tills(1) ☐ Sandstone(0) ☐ Shale(-1) ☐ Wetlands(0) ☐ Rip/Rap(0) ☐ Coal fines(-2)

Silt Cover: ☒ Silt heavy(-2) ☐ Silt moderate(-1) ☐ Silt normal(0) ☐ Silt free(1)

Embeddedness: ☐ Extensive(-2) ☐ Moderate(-1) ☒ Low/Normal(0) ☐ None(1)

NOTE: ignore sludge originating from point sources; score based on natural substrates

☐ >4 substrates present(2)

Comments:

2-Instream Cover (20 points maximum

Instream Cover Score: 14

Type (check ALL that apply): ☐ Undercut banks(1) ☐ Deep pools(2) ☐ Oxbows(1) ☐ Overhanging vegetation(1) ☐ Rootwads(1) ☒ Aquatic macrophytes(1) ☒ Shallows(in slow water)(1) ☐ Boulders(1) ☐ Logs and woody debris(1) ☒ Rootmats(1)

Amount (check only 1, or 2 and AVERAGE): ☒ Extensive >75% (11) ☐ Moderate 25-75% (7) ☐ Sparse 5-25% (3) ☐ Nearly absent <5% (1)

Comments:

3-Channel Morphology (20) (check only one per category, OR two and AVERAGE)

Channel Score: 10

Sinuosity	Development	Channelization	Stability	Modifications/Other	
☐ High (4)	☐ Excellent (7)	☐ None (6)	☐ High (3)	☐ Snagging	☐ Impound
☐ Moderate (3)	☐ Good (5)	☐ Recovered (4)	☒ Moderate (2)	☐ Relocation	☐ Islands
☒ Low (2)	☒ Fair (3)	☒ Recovering (3)	☐ Low (1)	☒ Canopy Removal	☐ Leveed
☐ None (1)	☐ Poor (1)	☐ Recent or no recovery (1)		☐ Dredging	☐ Bank shaping
				☐ One side channel modifications	

Comments:

4-Riparian Zone & Bank Erosion (10 points maximum)

Riparian Score: 8 (KLC) 6.75

Left/Right banks looking downstream (For each category, check only one per bank, OR two per bank and AVERAGE).

Riparian width L	Riparian width R	(per bank)	Erosion/Runoff-Floodplain quality (past 100 ft Riparian) L	R	(most predominant per bank)	L	R		Bank Erosion L	R	(per bank)
☐	☐	Wide >50m (4)	☒	☐	Forest, Swamp (3)	☐	☐	Conservation Tillage (1)	☐	☐	None or little (3)
☒	☒	Moderate 10-50m (3)	☒	☒	Shrub or Old field (2)	☐	☐	Urban or Industrial (0)	☒	☒	Moderate (2)
☐	☐	Narrow 5-10m (2)	☐	☐	Residential, Park, New field (1)	☐	☐	Mining, Construction (0)	☐	☐	Heavy/Severe (1)
☐	☐	Very narrow <5m (1)	☐	☐	Fenced pasture (1)	☐	☒	Open Pasture/Rowcrop (0)			
☐	☐	None (0)									

Comments:

5a-Pool/Glide Quality (12 points maximum

Pool/Glide Score: 1

Max pool depth (check one): ☐ >1m (8) ☐ 0.7-1m (4) ☐ 0.4-0.7m (2) ☐ 0.2-0.4m (1) ☒ <0.2m (pool=0)

Morphology (check only one, OR check two and AVERAGE): ☐ Pool width > riffle width (2) ☐ Pool width = riffle width (1) ☒ Pool width < riffle width (0)

Pool/Run/Riffle current velocity (check all that apply): ☐ Eddies (1) ☐ Fast (1) ☒ Moderate (1) ☐ Slow (1) ☐ Torrential (-1) ☐ Interstitial (-1) ☐ Intermittent (-2) ☐ No pool (0)

Comments:

5b-Riffle/Run Quality (8) (check only one per category, OR two and AVERAGE)

Riffle/Run Score: 1

Riffle/run depth (check one): ☐ Generally>10cm, Max>50cm (4) ☐ Generally>10cm, Max<50cm(3) ☐ Generally 5-10cm (1) ☒ Generally<5cm (riffle=0)

Riffle/run substrate: ☐ Stable-e.g. cobble, boulder (2) ☐ Mod. stable-e.g. pea gravel (1) ☒ Unstable-e.g. sand, gravel (0)

Riffle/run embeddedness: ☐ Extensive (-1) ☐ Moderate (0) ☒ Normal/Low (1) ☐ None (2) ☐ No riffle (0)

Comments:

6-Gradient (10 points maximum)

Gradient Score: 4

Average width: 2.7m Gradient: 3.2 (ft/mile) Drainage Area: 5.5 (square miles)

Comments:

IDEM OWQ Biological Studies QHEI (Qualitative Habitat Evaluation Index)

Sample #	bioSample #	Stream Name	Location

Surveyor	Sample Date	County	Macro SampleType	☐ Habitat Complete	QHEI Score:

Impacts/Miscellaneous

Major Suspected Impacts (Check all that apply)

- ☐ None
- ☐ Industrial
- ☐ WWTP
- ☒ Agricultural
- ☐ Livestock
- ☐ Silviculture
- ☐ Construction
- ☐ Urban Runoff
- ☐ Suburban
- ☒ Channelization
- ☒ Riparian Removal
- ☐ Flow Alteration
- ☐ CSOs
- ☐ Mining
- ☐ Landfills
- ☐ Natural

Pollution Impact Comments:

Miscellaneous QHEI Information

Subjective rating (1-10):
Aesthetic rating (1-10):
Canopy Cover (% Open):

% Riffle:
% Run:
% Glide:
% Pool:

Is reach representative of stream?

General QHEI Notes:

IDEM OWQ Biological Studies QHEI (Qualitative Habitat Evaluation Index)

Sample # | bioSample # | Stream Name | Location

Surveyor | Sample Date | County | Macro SampleType | ☐ Habitat Complete | QHEI Score:

1-Substrate (20 points maximum)

Substrate Score:

Check 1 Predominant Pool & 1 Predominant Riffle

Check all that are present — P=Pool, R=Riffle

Predominant P	Predominant R		Present P	Present R	Predominant P	Predominant R		Present P	Present R
☐	☐	Bldrs/Slabs(10)	☐	☐	☐	☐	Hardpan(4)	☐	☐
☐	☐	Boulders(9)	☐	☐	☐	☐	Detritus(3)	☒	☐
☐	☐	Cobble(8)	☐	☐	☐	☐	Muck(2)	☐	☐
☐	☐	Gravel(7)	☐	☐	☒	☒	Silt(2)	☑	☐
☐	☐	Sand(6)	☐	☐	☐	☐	Sludge(1)	☐	☐
☐	☐	Bedrock(5)	☐	☐	☐	☐	Artificial(0)	☐	☐

Substrate Quality (check only 1, or check 2 and AVERAGE)

Substrate Origin: ☐ Limestone(1) ☒ Hardpan(0) ☐ Lacustrine(0) ☐ Tills(1) ☐ Sandstone(0) ☐ Shale(-1) ☐ Wetlands(0) ☐ Rip/Rap(0) ☐ Coal fines(-2)

Silt Cover: ☒ Silt heavy(-2) ☐ Silt moderate(-1) ☐ Silt normal(0) ☐ Silt free(1)

Embeddedness: ☐ Extensive(-2) ☐ Moderate(-1) ☐ Low/Normal(0) ☒ None(1)

NOTE: ignore sludge originating from point sources; score based on natural substrates

☐ >4 substrates present(2)

Comments:

2-Instream Cover (20 points maximum

Instream Cover Score:

Type (check ALL that apply)

☐ Undercut banks(1) ☐ Deep pools(2) ☐ Oxbows(1)
☒ Overhanging vegetation(1) ☐ Rootwads(1) ☐ Aquatic macrophytes(1)
☒ Shallows(in slow water)(1) ☐ Boulders(1) ☐ Logs and woody debris(1)
☒ Rootmats(1)

Amount (check only 1, or 2 and AVERAGE)

☐ Extensive >75% (11)
☐ Moderate 25-75% (7)
☒ Sparse 5-25% (3)
☐ Nearly absent <5% (1)

Comments:

3-Channel Morphology (20) (check only one per category, OR two and AVERAGE)

Channel Score:

Sinuosity	Development	Channelization	Stability	Modifications/Other	
☐ High (4)	☐ Excellent (7)	☐ None (6)	☐ High (3)	☐ Snagging	☐ Impound
☐ Moderate (3)	☐ Good (5)	☐ Recovered (4)	☒ Moderate (2)	☐ Relocation	☐ Islands
☐ Low (2)	☒ Fair (3)	☒ Recovering (3)	☐ Low (1)	☒ Canopy Removal	☐ Leveed
☒ None (1)	☐ Poor (1)	☐ Recent or no recovery (1)		☐ Dredging	☒ Bank shaping
				☐ One side channel modifications	

Comments:

4-Riparian Zone & Bank Erosion (10 points maximum)

Riparian Score:

Left/Right banks looking downstream (For each category, check only one per bank, OR two per bank and AVERAGE).

Riparian width L	R	(per bank)	Erosion/Runoff-Floodplain quality (past 100 ft Riparian) L	R	(most predominant per bank)	L	R		Bank Erosion L	R	(per bank)
☐	☐	Wide >50m (4)	☐	☐	Forest, Swamp (3)	☐	☐	Conservation Tillage (1)	☐	☐	None or little (3)
☒	☐	Moderate 10-50m (3)	☒	☐	Shrub or Old field (2)	☐	☐	Urban or Industrial (0)	☒	☒	Moderate (2)
☐	☒	Narrow 5-10m (2)	☐	☐	Residential, Park, New field (1)	☐	☐	Mining, Construction (0)	☐	☐	Heavy/Severe (1)
☐	☐	Very narrow <5m (1)	☐	☐	Fenced pasture (1)	☒	☒	Open Pasture/Rowcrop (0)			
☐	☐	None (0)									

Comments:

5a-Pool/Glide Quality (12 points maximum

Pool/Glide Score:

Max pool depth (check one)

☐ >1m (6)
☐ 0.7-1m (4)
☐ 0.4-0.7m (2)
☐ 0.2-0.4m (1)
☒ <0.2m (pool=0)

Morphology (check only one, OR check two and AVERAGE)

☒ Pool width > riffle width (2)
☐ Pool width = riffle width (1)
☐ Pool width < riffle width (0)

Pool/Run/Riffle current velocity (check all that apply)

☐ Eddies (1) ☐ Torrential (-1)
☐ Fast (1) ☐ Interstitial (-1)
☐ Moderate (1) ☐ Intermittent (-2)
☒ Slow (1) ☐ No pool (0)

Comments:

5b-Riffle/Run Quality (8) (check only one per category, OR two and AVERAGE)

Riffle/Run Score:

Riffle/run depth (check one)

☐ Generally>10cm, Max>50cm (4)
☐ Generally>10cm, Max<50cm(3)
☐ Generally 5-10cm (1)
☒ Generally<5cm (riffle=0)

Riffle/run substrate

☐ Stable-e.g. cobble, boulder (2)
☐ Mod. stable-e.g. pea gravel (1)
☒ Unstable-e.g. sand, gravel (0)

Riffle/run embeddedness

☐ Extensive (-1) ☐ Normal/Low (1)
☐ Moderate (0) ☐ None (2)
☒ No riffle (0)

Comments:

6-Gradient (10 points maximum)

Gradient Score:

Average width: Gradient: (ft/mile) Drainage Area: (square miles)

Comments:

IDEM OWQ Biological Studies QHEI (Qualitative Habitat Evaluation Index)

Sample #	bioSample #	Stream Name	Location

Surveyor	Sample Date	County	Macro SampleType	☐ Habitat Complete	QHEI Score:

Impacts/Miscellaneous

Major Suspected Impacts (Check all that apply)

- ☐ None
- ☐ Industrial
- ☐ WWTP
- ☐ Agricultural
- ☐ Livestock
- ☐ Silviculture
- ☐ Construction
- ☐ Urban Runoff
- ☐ Suburban
- ☐ Channelization
- ☐ Riparian Removal
- ☐ Flow Alteration
- ☐ CSOs
- ☐ Mining
- ☐ Landfills
- ☐ Natural

Pollution Impact Comments:

Miscellaneous QHEI Information

Subjective rating (1-10): % Riffle:

Aesthetic rating (1-10): % Run:

Canopy Cover (% Open): % Glide:

% Pool:

Is reach representative of stream?

General QHEI Notes:

OhioEPA Primary Headwater Habitat Evaluation Form

HHEI Score (sum of metrics 1, 2, 3) : [illegible]

SITE NAME/LOCATION _____

[illegible] SITE NUMBER [illegible] RIVER BASIN [illegible] DRAINAGE AREA (mi²) [illegible]

LENGTH OF STREAM REACH (ft) [illegible] LAT. _____ LONG. _____ RIVER CODE _____ RIVER MILE _____

DATE 9/[illegible] SCORER [illegible] COMMENTS _____

NOTE: Complete All Items On This Form - Refer to "Field Evaluation Manual for Ohio's PHWH Streams" for Instructions

STREAM CHANNEL MODIFICATIONS: ☐ NONE / NATURAL CHANNEL ☐ RECOVERED ☐ RECOVERING ☐ RECENT OR NO RECOVERY

1. SUBSTRATE (Estimate percent of every type of substrate present. Check *ONLY* two predominant substrate *TYPE* boxes (Max of 32). Add total number of significant substrate types found (Max of 8). Final metric score is sum of boxes A & B.

HHEI Metric Points

TYPE		PERCENT	TYPE		PERCENT
☐ ☐	BLDR SLABS [16 pts]	_____	☒ ☒	SILT [3 pt]	[illegible]
☐ ☐	BOULDER (>256 mm) [16 pts]	_____	☐ ☐	LEAF PACK/WOODY DEBRIS [3 pts]	_____
☐ ☐	BEDROCK [16 pt]	_____	☐ ☐	FINE DETRITUS [3 pts]	_____
☐ ☐	COBBLE (65-256 mm) [12 pts]	_____	☐ ☐	CLAY or HARDPAN [0 pt]	_____
☐ ☐	GRAVEL (2-64 mm) [9 pts]	_____	☐ ☐	MUCK [0 pts]	_____
☐ ☐	SAND (<2 mm) [6 pts]	_____	☐ ☐	ARTIFICIAL [3 pts]	_____

Total of Percentages of Bldr Slabs, Boulder, Cobble, Bedrock _____ **(A)** **(B)**

Substrate Max = 40 [illegible]

A + B

SCORE OF TWO MOST PREDOMINATE SUBSTRATE TYPES: [illegible] **TOTAL NUMBER OF SUBSTRATE TYPES:** [illegible]

2. Maximum Pool Depth ***(Measure the maximum pool depth within the 61 meter (200 ft)*** evaluation reach at the time of evaluation. Avoid plunge pools from road culverts or storm water pipes) (Check *ONLY* one box):

Pool Depth Max = 30 [illegible]

☐ > 30 centimeters [20 pts]
☐ > 22.5 - 30 cm [30 pts]
☐ > 10 - 22.5 cm [25 pts]
☒ > 5 cm - 10 cm [15 pts]
☐ < 5 cm [5 pts]
☐ NO WATER OR MOIST CHANNEL [0 pts]

COMMENTS _____ **MAXIMUM POOL DEPTH (centimeters):** [illegible]

3. BANK FULL WIDTH (Measured as the average of 3-4 measurements) **(Check *ONLY* one box):**

Bankfull Width Max=30 [illegible]

☐ > 4.0 meters [30 pts]
☐ > 3.0 m - 4.0 m [25 pts]
☐ > 1.5 m - 3.0 m [20 pts]
☐ > 1.0 m - 1.5 m [15 pts]
☒ ≤ 1.0 m [5 pts]

COMMENTS _____ **AVERAGE BANKFULL WIDTH (meters):** 0.5

This information must also be completed

RIPARIAN ZONE AND FLOODPLAIN QUALITY ☆NOTE: River Left (L) and Right (R) as looking downstream☆

RIPARIAN WIDTH L R	(Per Bank)	FLOODPLAIN QUALITY L R	(Most Predominant per Bank)	L R	
☐ ☐	Wide >10m	☐ ☐	Mature Forest, Wetland	☐ ☐	Conservation Tillage
☐ ☐	Moderate 5-10m	☐ ☒	Immature Forest, Shrub or Old Field	☐ ☐	Urban or Industrial
☒ ☒	Narrow <5m	☐ ☐	Residential, Park, New Field	☒ ☐	Open Pasture, Row Crop
☐ ☐	None	☐ ☐	Fenced Pasture	☐ ☐	Mining or Construction

COMMENTS _____

FLOW REGIME *(At Time of Evaluation)* (Check *ONLY* one box):

☐ Stream Flowing
☐ Subsurface flow with isolated pools (Interstitial)
☐ Moist Channel, isolated pools, no flow (Intermittent)
☐ Dry channel, no water (Ephemeral)

COMMENTS _____

SINUOSITY (Number of bends per 61 m (200 ft) of channel) (Check *ONLY* one box):

☐ None ☐ 1.0 ☒ 2.0 ☐ 3.0
☐ 0.5 ☐ 1.5 ☐ 2.5 ☐ >3

STREAM GRADIENT ESTIMATE

☐ Flat (0.5 ft/100 ft) ☒ Flat to Moderate ☐ Moderate (2 ft/100 ft) ☐ Moderate to Severe ☐ Severe (10 ft/100 ft)

ADDITIONAL STREAM INFORMATION (This Information Must Also be Completed):

QHEI PERFORMED? - ☐ Yes ☒ No QHEI Score _____ (If Yes, Attach Completed QHEI Form)

DOWNSTREAM DESIGNATED USE(S)

☐ WWH Name: _____ Distance from Evaluated Stream _____

☐ CWH Name: _____ Distance from Evaluated Stream _____

☐ EWH Name: _____ Distance from Evaluated Stream _____

MAPPING: ATTACH COPIES OF MAPS, INCLUDING THE ENTIRE WATERSHED AREA. CLEARLY MARK THE SITE LOCATION

USGS Quadrangle Name: _____ NRCS Soil Map Page: _____ NRCS Soil Map Stream Order _____

County: _____ Township / City: _____

MISCELLANEOUS

Base Flow Conditions? (Y/N): _____ Date of last precipitation: _____ Quantity: _____

Photograph Information: _____

Elevated Turbidity? (Y/N): _____ Canopy (% open): _____

Were samples collected for water chemistry? (Y/N): _____ (Note lab sample no. or id. and attach results) Lab Number: _____

Field Measures: Temp (°C) _____ Dissolved Oxygen (mg/l) _____ pH (S.U.) _____ Conductivity (µmhos/cm) _____

Is the sampling reach representative of the stream (Y/N) _____ If not, please explain: _____

_____

Additional comments/description of pollution impacts: _____

_____

BIOTIC EVALUATION

Performed? (Y/N): _____ (If Yes, Record all observations. Voucher collections optional. NOTE: all voucher samples must be labeled with the site ID number. Include appropriate field data sheets from the Primary Headwater Habitat Assessment Manual)

Fish Observed? (Y/N) _____ Voucher? (Y/N) _____ Salamanders Observed? (Y/N) _____ Voucher? (Y/N) _____
Frogs or Tadpoles Observed? (Y/N) _____ Voucher? (Y/N) _____ Aquatic Macroinvertebrates Observed? (Y/N) _____ Voucher? (Y/N) _____

Comments Regarding Biology: _____

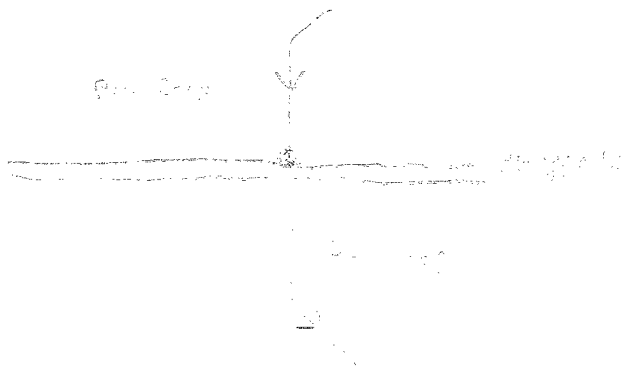
_____

_____

DRAWING AND NARRATIVE DESCRIPTION OF STREAM REACH (This must be completed):

Include important landmarks and other features of interest for site evaluation and a narrative description of the stream's location

FLOW →



OhioEPA Primary Headwater Habitat Evaluation Form

HHEI Score (sum of metrics 1, 2, 3) : 27

SITE NAME/LOCATION _____

SITE NUMBER _____ RIVER BASIN _____ DRAINAGE AREA (mi²) _____

LENGTH OF STREAM REACH (ft) _____ LAT. _____ LONG. _____ RIVER CODE _____ RIVER MILE _____

DATE 3/7/06 SCORER _____ COMMENTS _____

NOTE: Complete All Items On This Form - Refer to "Field Evaluation Manual for Ohio's PHWH Streams" for Instructions

STREAM CHANNEL MODIFICATIONS: ☐ NONE / NATURAL CHANNEL ☐ RECOVERED ☒ RECOVERING ☐ RECENT OR NO RECOVERY

1. SUBSTRATE (Estimate percent of every type of substrate present. Check *ONLY* two predominant substrate *TYPE* boxes (Max of 32). Add total number of significant substrate types found (Max of 8). Final metric score is sum of boxes A & B.

HHEI Metric Points

TYPE		PERCENT	TYPE		PERCENT
☐ ☐	BLDR SLABS [16 pts]		☒ ☐	SILT [3 pt]	90
☐ ☐	BOULDER (>256 mm) [16 pts]		☐ ☐	LEAF PACK/WOODY DEBRIS [3 pts]	
☐ ☐	BEDROCK [16 pt]		☐ ☐	FINE DETRITUS [3 pts]	
☒ ☐	COBBLE (65-256 mm) [12 pts]	10	☐ ☐	CLAY or HARDPAN [0 pt]	
☐ ☐	GRAVEL (2-64 mm) [9 pts]		☐ ☐	MUCK [0 pts]	
☐ ☐	SAND (<2 mm) [6 pts]		☐ ☐	ARTIFICIAL [3 pts]	

Total of Percentages of Bldr Slabs, Boulder, Cobble, Bedrock 10 **(A)** **(B)**

SCORE OF TWO MOST PREDOMINATE SUBSTRATE TYPES: 15 **TOTAL NUMBER OF SUBSTRATE TYPES:** 2

Substrate Max = 40 7

A + B

2. Maximum Pool Depth ***(Measure the maximum pool depth within the 61 meter (200 ft)*** evaluation reach at the time of evaluation. Avoid plunge pools from road culverts or storm water pipes) (Check *ONLY* one box):

☐ > 30 centimeters [20 pts]
☐ > 22.5 - 30 cm [30 pts]
☐ > 10 - 22.5 cm [25 pts]
☐ > 5 cm - 10 cm [15 pts]
☒ < 5 cm [5 pts]
☐ NO WATER OR MOIST CHANNEL [0 pts]

COMMENTS _____ **MAXIMUM POOL DEPTH (centimeters):**

Pool Depth Max = 30 5

3. BANK FULL WIDTH (Measured as the average of 3-4 measurements) **(Check *ONLY* one box):**

☐ > 4.0 meters [30 pts]
☐ > 3.0 m - 4.0 m [25 pts]
☐ > 1.5 m - 3.0 m [20 pts]
☐ > 1.0 m - 1.5 m [15 pts]
☒ ≤ 1.0 m [5 pts]

COMMENTS _____ **AVERAGE BANKFULL WIDTH (meters):** 0.6

Bankfull Width Max=30 5

This information must also be completed

RIPARIAN ZONE AND FLOODPLAIN QUALITY ☆NOTE: River Left (L) and Right (R) as looking downstream☆

RIPARIAN WIDTH (Per Bank) L	R		FLOODPLAIN QUALITY (Most Predominant per Bank) L	R		L	R	
☐	☐	Wide >10m	☐	☐	Mature Forest, Wetland	☐	☐	Conservation Tillage
☐	☐	Moderate 5-10m	☒	☒	Immature Forest, Shrub or Old Field	☐	☐	Urban or Industrial
☒	☐	Narrow <5m	☐	☐	Residential, Park, New Field	☒	☒	Open Pasture, Row Crop
☐	☐	None	☐	☐	Fenced Pasture	☐	☐	Mining or Construction

COMMENTS _____

FLOW REGIME *(At Time of Evaluation)* (Check *ONLY* one box):

☐ Stream Flowing
☐ Subsurface flow with isolated pools (Interstitial)
☒ Moist Channel, isolated pools, no flow (Intermittent)
☐ Dry channel, no water (Ephemeral)

COMMENTS _____

SINUOSITY (Number of bends per 61 m (200 ft) of channel) (Check *ONLY* one box):

☒ None ☐ 1.0 ☐ 2.0 ☐ 3.0
☐ 0.5 ☐ 1.5 ☐ 2.5 ☐ >3

STREAM GRADIENT ESTIMATE

☐ Flat (0.5 ft/100 ft) ☒ Flat to Moderate ☐ Moderate (2 ft/100 ft) ☐ Moderate to Severe ☐ Severe (10 ft/100 ft)

ADDITIONAL STREAM INFORMATION (This Information Must Also be Completed):

QHEI PERFORMED? - ☐ Yes ☒ No QHEI Score _____ (If Yes, Attach Completed QHEI Form)

DOWNSTREAM DESIGNATED USE(S)

☐ WWH Name: _____ Distance from Evaluated Stream _____

☐ CWH Name: _____ Distance from Evaluated Stream _____

☐ EWH Name: _____ Distance from Evaluated Stream _____

MAPPING: ATTACH COPIES OF MAPS, INCLUDING THE ENTIRE WATERSHED AREA. CLEARLY MARK THE SITE LOCATION

USGS Quadrangle Name: _____ NRCS Soil Map Page: _____ NRCS Soil Map Stream Order _____

County: _____ Township / City: _____

MISCELLANEOUS

Base Flow Conditions? (Y/N): _____ Date of last precipitation: _____ Quantity: _____

Photograph Information: _____

Elevated Turbidity? (Y/N): _____ Canopy (% open): _____

Were samples collected for water chemistry? (Y/N): _____ (Note lab sample no. or id. and attach results) Lab Number: _____

Field Measures: Temp (°C) _____ Dissolved Oxygen (mg/l) _____ pH (S.U.) _____ Conductivity (µmhos/cm) _____

Is the sampling reach representative of the stream (Y/N) _____ If not, please explain: _____

Additional comments/description of pollution impacts: _____

BIOTIC EVALUATION

Performed? (Y/N): _____ (If Yes, Record all observations. Voucher collections optional. NOTE: all voucher samples must be labeled with the site ID number. Include appropriate field data sheets from the Primary Headwater Habitat Assessment Manual)

Fish Observed? (Y/N) _____ Voucher? (Y/N) _____ Salamanders Observed? (Y/N) _____ Voucher? (Y/N) _____

Frogs or Tadpoles Observed? (Y/N) _____ Voucher? (Y/N) _____ Aquatic Macroinvertebrates Observed? (Y/N) _____ Voucher? (Y/N) _____

Comments Regarding Biology: _____

DRAWING AND NARRATIVE DESCRIPTION OF STREAM REACH (This must be completed):

Include important landmarks and other features of interest for site evaluation and a narrative description of the stream's location

FLOW ➜

OhioEPA Primary Headwater Habitat Evaluation Form

HHEI Score (sum of metrics 1, 2, 3) : 16

SITE NAME/LOCATION _____

_____ SITE NUMBER _____ RIVER BASIN _____ DRAINAGE AREA (mi²) _____

LENGTH OF STREAM REACH (ft) _____ LAT. _____ LONG. _____ RIVER CODE _____ RIVER MILE _____

DATE _____ SCORER _____ COMMENTS _____

NOTE: Complete All Items On This Form - Refer to "Field Evaluation Manual for Ohio's PHWH Streams" for Instructions

STREAM CHANNEL MODIFICATIONS: ☐ NONE / NATURAL CHANNEL ☐ RECOVERED ☐ RECOVERING ☐ RECENT OR NO RECOVERY

1. SUBSTRATE (Estimate percent of every type of substrate present. Check *ONLY* two predominant substrate *TYPE* boxes (Max of 32). Add total number of significant substrate types found (Max of 8). Final metric score is sum of boxes A & B.

HHEI Metric Points

TYPE		PERCENT	TYPE		PERCENT
☐ ☐	BLDR SLABS [16 pts]		☒ ☐	SILT [3 pt]	
☐ ☐	BOULDER (>256 mm) [16 pts]		☐ ☐	LEAF PACK/WOODY DEBRIS [3 pts]	
☐ ☐	BEDROCK [16 pt]		☐ ☐	FINE DETRITUS [3 pts]	
☐ ☐	COBBLE (65-256 mm) [12 pts]		☒ ☐	CLAY or HARDPAN [0 pt]	
☐ ☐	GRAVEL (2-64 mm) [9 pts]		☐ ☐	MUCK [0 pts]	
☐ ☐	SAND (<2 mm) [6 pts]		☐ ☐	ARTIFICIAL [3 pts]	

Total of Percentages of Bldr Slabs, Boulder, Cobble, Bedrock _____ **(A)** **(B)**

SCORE OF TWO MOST PREDOMINATE SUBSTRATE TYPES: _____ **TOTAL NUMBER OF SUBSTRATE TYPES:** _____

Substrate Max = 40 _____ **A + B**

2. Maximum Pool Depth ***(Measure the maximum pool depth within the 61 meter (200 ft)*** evaluation reach at the time of evaluation. Avoid plunge pools from road culverts or storm water pipes) (Check *ONLY* one box):

☐ > 30 centimeters [20 pts]
☐ > 22.5 - 30 cm [30 pts]
☐ > 10 - 22.5 cm [25 pts]
☐ > 5 cm - 10 cm [15 pts]
☒ < 5 cm [5 pts]
☐ NO WATER OR MOIST CHANNEL [0 pts]

COMMENTS _____ **MAXIMUM POOL DEPTH (centimeters):** _____

Pool Depth Max = 30 _____

3. BANK FULL WIDTH (Measured as the average of 3-4 measurements) **(Check *ONLY* one box):**

☐ > 4.0 meters [30 pts]
☐ > 3.0 m - 4.0 m [25 pts]
☐ > 1.5 m - 3.0 m [20 pts]
☐ > 1.0 m - 1.5 m [15 pts]
☒ ≤ 1.0 m [5 pts]

COMMENTS _____ **AVERAGE BANKFULL WIDTH (meters):** _____

Bankfull Width Max=30 5

This information must also be completed

RIPARIAN ZONE AND FLOODPLAIN QUALITY ☆NOTE: River Left (L) and Right (R) as looking downstream☆

RIPARIAN WIDTH L	R	(Per Bank)	FLOODPLAIN QUALITY L	R	(Most Predominant per Bank)	L	R	
☐	☐	Wide >10m	☐	☐	Mature Forest, Wetland	☐	☐	Conservation Tillage
☐	☐	Moderate 5-10m	☐	☐	Immature Forest, Shrub or Old Field	☐	☐	Urban or Industrial
☐	☐	Narrow <5m	☐	☐	Residential, Park, New Field	☐	☐	Open Pasture, Row Crop
☐	☐	None	☐	☐	Fenced Pasture	☐	☐	Mining or Construction

COMMENTS _____

FLOW REGIME *(At Time of Evaluation)* (Check *ONLY* one box):

☐ Stream Flowing
☐ Subsurface flow with isolated pools (Interstitial)
☒ Moist Channel, isolated pools, no flow (Intermittent)
☐ Dry channel, no water (Ephemeral)

COMMENTS _____

SINUOSITY (Number of bends per 61 m (200 ft) of channel) (Check *ONLY* one box):

☒ None ☐ 1.0 ☐ 2.0 ☐ 3.0
☐ 0.5 ☐ 1.5 ☐ 2.5 ☐ >3

STREAM GRADIENT ESTIMATE

☐ Flat (0.5 ft/100 ft) ☒ Flat to Moderate ☐ Moderate (2 ft/100 ft) ☐ Moderate to Severe ☐ Severe (10 ft/100 ft)

ADDITIONAL STREAM INFORMATION (This Information Must Also be Completed):

QHEI PERFORMED? - ☐ Yes ☒ No QHEI Score _____ (If Yes, Attach Completed QHEI Form)

DOWNSTREAM DESIGNATED USE(S)

☐ WWH Name: _____ Distance from Evaluated Stream _____

☐ CWH Name: _____ Distance from Evaluated Stream _____

☐ EWH Name: _____ Distance from Evaluated Stream _____

MAPPING: ATTACH COPIES OF MAPS, INCLUDING THE ENTIRE WATERSHED AREA. CLEARLY MARK THE SITE LOCATION

USGS Quadrangle Name: _____ NRCS Soil Map Page: _____ NRCS Soil Map Stream Order _____

County: _____ Township / City: _____

MISCELLANEOUS

Base Flow Conditions? (Y/N): _____ Date of last precipitation: _____ Quantity: _____

Photograph Information: _____

Elevated Turbidity? (Y/N): _____ Canopy (% open): _____

Were samples collected for water chemistry? (Y/N): _____ (Note lab sample no. or id. and attach results) Lab Number: _____

Field Measures: Temp (°C)_____ Dissolved Oxygen (mg/l) _____ pH (S.U.) _____ Conductivity (µmhos/cm) _____

Is the sampling reach representative of the stream (Y/N)_____ If not, please explain: _____

_____

Additional comments/description of pollution impacts: _____

_____

BIOTIC EVALUATION

Performed? (Y/N): _____ (If Yes, Record all observations. Voucher collections optional. NOTE: all voucher samples must be labeled with the site ID number. Include appropriate field data sheets from the Primary Headwater Habitat Assessment Manual)

Fish Observed? (Y/N)_____ Voucher? (Y/N)_____ Salamanders Observed? (Y/N)_____ Voucher? (Y/N)_____
Frogs or Tadpoles Observed? (Y/N)____ Voucher? (Y/N)____ Aquatic Macroinvertebrates Observed? (Y/N)____ Voucher? (Y/N)____

Comments Regarding Biology: _____

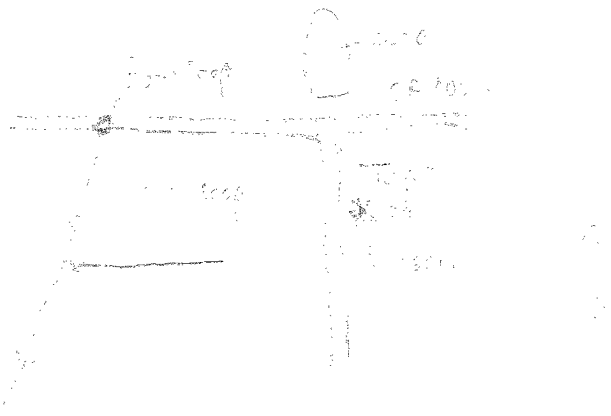
_____

_____

DRAWING AND NARRATIVE DESCRIPTION OF STREAM REACH (This must be completed):

Include important landmarks and other features of interest for site evaluation and a narrative description of the stream's location

FLOW →



OhioEPA Primary Headwater Habitat Evaluation Form

HHEI Score (sum of metrics 1, 2, 3) : ~~16~~ 19 (RLC)

SITE NAME/LOCATION _____

Trib. of Epson Lateral SITE NUMBER Sec3-S36 RIVER BASIN White River DRAINAGE AREA (mi²) 0.5 mi²

LENGTH OF STREAM REACH (ft) 200ft LAT. _____ LONG. _____ RIVER CODE _____ RIVER MILE _____

DATE 9/9/05 SCORER K. Allison COMMENTS _____

NOTE: Complete All Items On This Form - Refer to "Field Evaluation Manual for Ohio's PHWH Streams" for Instructions

STREAM CHANNEL MODIFICATIONS: ☐ NONE / NATURAL CHANNEL ☐ RECOVERED ☒ RECOVERING ☐ RECENT OR NO RECOVERY

1. SUBSTRATE (Estimate percent of every type of substrate present. Check *ONLY* two predominant substrate *TYPE* boxes (Max of 32). Add total number of significant substrate types found (Max of 8). Final metric score is sum of boxes A & B.

TYPE		PERCENT	TYPE		PERCENT
☐☐	BLDR SLABS [16 pts]		☒☒	SILT [3 pt]	90
☐☐	BOULDER (>256 mm) [16 pts]		☐☐	LEAF PACK/WOODY DEBRIS [3 pts]	
☐☐	BEDROCK [16 pt]		☐☐	FINE DETRITUS [3 pts]	5
☐☐	COBBLE (65-256 mm) [12 pts]		☐☐	CLAY or HARDPAN [0 pt]	
☐☐	GRAVEL (2-64 mm) [9 pts]		☐☐	MUCK [0 pts]	5
☐☐	SAND (<2 mm) [6 pts]		☐☐	ARTIFICIAL [3 pts]	

Total of Percentages of Bldr Slabs, Boulder, Cobble, Bedrock _____ (A) (B)

SCORE OF TWO MOST PREDOMINATE SUBSTRATE TYPES: ~~8~~ 6 (RLC) **TOTAL NUMBER OF SUBSTRATE TYPES:** 3

HHEI Metric Points

Substrate Max = 40: ~~18~~ 9 (RLC) A + B

2. Maximum Pool Depth ***(Measure the maximum pool depth within the 61 meter (200 ft)*** evaluation reach at the time of evaluation. Avoid plunge pools from road culverts or storm water pipes) (Check *ONLY* one box):

- ☐ > 30 centimeters [20 pts]
- ☐ > 22.5 - 30 cm [30 pts]
- ☐ > 10 - 22.5 cm [25 pts]
- ☐ > 5 cm - 10 cm [15 pts]
- ☒ < 5 cm [5 pts]
- ☐ NO WATER OR MOIST CHANNEL [0 pts]

COMMENTS _____ **MAXIMUM POOL DEPTH (centimeters):** 4

Pool Depth Max = 30: 5

3. BANK FULL WIDTH (Measured as the average of 3-4 measurements) (Check *ONLY* one box):

- ☐ > 4.0 meters [30 pts]
- ☐ > 3.0 m - 4.0 m [25 pts]
- ☐ > 1.5 m - 3.0 m [20 pts]
- ☐ > 1.0 m - 1.5 m [15 pts]
- ☒ ≤ 1.0 m [5 pts]

COMMENTS _____ **AVERAGE BANKFULL WIDTH (meters):** .5

Bankfull Width Max=30: 5

This information must also be completed

RIPARIAN ZONE AND FLOODPLAIN QUALITY ☆NOTE: River Left (L) and Right (R) as looking downstream☆

RIPARIAN WIDTH L	R	(Per Bank)	FLOODPLAIN QUALITY L	R	(Most Predominant per Bank)	L	R	
☐	☐	Wide >10m	☐	☐	Mature Forest, Wetland	☐	☐	Conservation Tillage
☐	☐	Moderate 5-10m	☒	☒	Immature Forest, Shrub or Old Field	☐	☐	Urban or Industrial
☒	☒	Narrow <5m	☐	☐	Residential, Park, New Field	☒	☒	Open Pasture, Row Crop
☐	☐	None	☐	☐	Fenced Pasture	☐	☐	Mining or Construction

COMMENTS _____

FLOW REGIME *(At Time of Evaluation)* (Check *ONLY* one box):

- ☐ Stream Flowing
- ☐ Subsurface flow with isolated pools (Interstitial)
- ☒ Moist Channel, isolated pools, no flow (Intermittent)
- ☐ Dry channel, no water (Ephemeral)

COMMENTS _____

SINUOSITY (Number of bends per 61 m (200 ft) of channel) (Check *ONLY* one box):

- ☒ None
- ☐ 0.5
- ☐ 1.0
- ☐ 1.5
- ☐ 2.0
- ☐ 2.5
- ☐ 3.0
- ☐ >3

STREAM GRADIENT ESTIMATE

☒ Flat (0.5 ft/100 ft) ☐ Flat to Moderate ☐ Moderate (2 ft/100 ft) ☐ Moderate to Severe ☐ Severe (10 ft/100 ft)

ADDITIONAL STREAM INFORMATION (This Information Must Also be Completed):

QHEI PERFORMED? - ☐ Yes ☒ No QHEI Score _____ (If Yes, Attach Completed QHEI Form)

DOWNSTREAM DESIGNATED USE(S)

☐ WWH Name: _____ Distance from Evaluated Stream _____

☐ CWH Name: _____ Distance from Evaluated Stream _____

☐ EWH Name: _____ Distance from Evaluated Stream _____

MAPPING: ATTACH COPIES OF MAPS, INCLUDING THE ENTIRE WATERSHED AREA. CLEARLY MARK THE SITE LOCATION

USGS Quadrangle Name: _____ NRCS Soil Map Page: _____ NRCS Soil Map Stream Order _____

County: _____ Township / City: _____

MISCELLANEOUS

Base Flow Conditions? (Y/N): _____ Date of last precipitation: _____ Quantity: _____

Photograph Information: _____

Elevated Turbidity? (Y/N): _____ Canopy (% open): _____

Were samples collected for water chemistry? (Y/N): _____ (Note lab sample no. or id. and attach results) Lab Number: _____

Field Measures: Temp (°C) _____ Dissolved Oxygen (mg/l) _____ pH (S.U.) _____ Conductivity (µmhos/cm) _____

Is the sampling reach representative of the stream (Y/N) _____ If not, please explain: _____

_____

Additional comments/description of pollution impacts: _____

_____

BIOTIC EVALUATION

Performed? (Y/N): _____ (If Yes, Record all observations. Voucher collections optional. NOTE: all voucher samples must be labeled with the site ID number. Include appropriate field data sheets from the Primary Headwater Habitat Assessment Manual)

Fish Observed? (Y/N) _____ Voucher? (Y/N) _____ Salamanders Observed? (Y/N) _____ Voucher? (Y/N) _____

Frogs or Tadpoles Observed? (Y/N) _____ Voucher? (Y/N) _____ Aquatic Macroinvertebrates Observed? (Y/N) _____ Voucher? (Y/N) _____

Comments Regarding Biology: _____

_____

_____

DRAWING AND NARRATIVE DESCRIPTION OF STREAM REACH (This must be completed):

Include important landmarks and other features of interest for site evaluation and a narrative description of the stream's location

FLOW →

OhioEPA Primary Headwater Habitat Evaluation Form

HHEI Score (sum of metrics 1, 2, 3) : [illegible]

SITE NAME/LOCATION _____

[illegible] SITE NUMBER [illegible] RIVER BASIN [illegible] DRAINAGE AREA (mi²) [illegible]

LENGTH OF STREAM REACH (ft) [illegible] LAT. _____ LONG. _____ RIVER CODE _____ RIVER MILE _____

DATE [illegible] SCORER [illegible] COMMENTS _____

NOTE: Complete All Items On This Form - Refer to "Field Evaluation Manual for Ohio's PHWH Streams" for Instructions

STREAM CHANNEL MODIFICATIONS: ☐ NONE / NATURAL CHANNEL ☐ RECOVERED ☐ RECOVERING ☒ RECENT OR NO RECOVERY

1. SUBSTRATE (Estimate percent of every type of substrate present. Check *ONLY* two predominant substrate *TYPE* boxes (Max of 32). Add total number of significant substrate types found (Max of 8). Final metric score is sum of boxes A & B.

HHEI Metric Points

TYPE		PERCENT	TYPE		PERCENT
☐ ☐	BLDR SLABS [16 pts]	_____	☐ ☐	SILT [3 pt]	_____
☐ ☐	BOULDER (>256 mm) [16 pts]	_____	☐ ☐	LEAF PACK/WOODY DEBRIS [3 pts]	[illegible]
☐ ☐	BEDROCK [16 pt]	_____	☐ ☐	FINE DETRITUS [3 pts]	_____
☐ ☐	COBBLE (65-256 mm) [12 pts]	_____	☒ ☒	CLAY or HARDPAN [0 pt]	[illegible]
☐ ☐	GRAVEL (2-64 mm) [9 pts]	_____	☐ ☐	MUCK [0 pts]	_____
☐ ☐	SAND (<2 mm) [6 pts]	_____	☐ ☐	ARTIFICIAL [3 pts]	_____

Total of Percentages of Bldr Slabs, Boulder, Cobble, Bedrock [illegible] **(A)** **(B)**

Substrate Max = 40 [illegible]

A + B

SCORE OF TWO MOST PREDOMINATE SUBSTRATE TYPES: [illegible] **TOTAL NUMBER OF SUBSTRATE TYPES:** [illegible]

2. Maximum Pool Depth ***(Measure the maximum pool depth within the 61 meter (200 ft)*** evaluation reach at the time of evaluation. Avoid plunge pools from road culverts or storm water pipes) (Check *ONLY* one box):

Pool Depth Max = 30 [illegible]

☐ > 30 centimeters [20 pts]
☐ > 22.5 - 30 cm [30 pts]
☐ > 10 - 22.5 cm [25 pts]
☐ > 5 cm - 10 cm [15 pts]
☐ < 5 cm [5 pts]
☒ NO WATER OR MOIST CHANNEL [0 pts]

COMMENTS _____ **MAXIMUM POOL DEPTH (centimeters):** [illegible]

3. BANK FULL WIDTH (Measured as the average of 3-4 measurements) **(Check *ONLY* one box):**

Bankfull Width Max=30 [illegible]

☐ > 4.0 meters [30 pts]
☐ > 3.0 m - 4.0 m [25 pts]
☒ > 1.5 m - 3.0 m [20 pts]
☐ > 1.0 m - 1.5 m [15 pts]
☐ ≤ 1.0 m [5 pts]

COMMENTS _____ **AVERAGE BANKFULL WIDTH (meters):** [illegible]

This information must also be completed

RIPARIAN ZONE AND FLOODPLAIN QUALITY ☆NOTE: River Left (L) and Right (R) as looking downstream☆

RIPARIAN WIDTH L R	(Per Bank)	FLOODPLAIN QUALITY L R	(Most Predominant per Bank)	L R	
☐ ☐	Wide >10m	☐ ☐	Mature Forest, Wetland	☐ ☐	Conservation Tillage
☐ ☐	Moderate 5-10m	☐ ☐	Immature Forest, Shrub or Old Field	☐ ☐	Urban or Industrial
☐ ☐	Narrow <5m	☐ ☐	Residential, Park, New Field	☐ ☒	Open Pasture, Row Crop
☒ ☒	None	☐ ☐	Fenced Pasture	☐ ☐	Mining or Construction

COMMENTS [illegible]

FLOW REGIME *(At Time of Evaluation)* (Check *ONLY* one box):

☐ Stream Flowing
☐ Subsurface flow with isolated pools (Interstitial)
☐ Moist Channel, isolated pools, no flow (Intermittent)
☒ Dry channel, no water (Ephemeral)

COMMENTS _____

SINUOSITY (Number of bends per 61 m (200 ft) of channel) (Check *ONLY* one box):

☐ None ☐ 1.0 ☒ 2.0 ☐ 3.0
☐ 0.5 ☐ 1.5 ☐ 2.5 ☐ >3

STREAM GRADIENT ESTIMATE

☐ Flat (0.5 ft/100 ft) ☒ Flat to Moderate ☐ Moderate (2 ft/100 ft) ☐ Moderate to Severe ☐ Severe (10 ft/100 ft)

ADDITIONAL STREAM INFORMATION (This Information Must Also be Completed):

QHEI PERFORMED? - ☐ Yes ☐ No QHEI Score _____ (If Yes, Attach Completed QHEI Form)

DOWNSTREAM DESIGNATED USE(S)

☐ WWH Name: _____ Distance from Evaluated Stream _____

☐ CWH Name: _____ Distance from Evaluated Stream _____

☐ EWH Name: _____ Distance from Evaluated Stream _____

MAPPING: ATTACH COPIES OF MAPS, INCLUDING THE ENTIRE WATERSHED AREA. CLEARLY MARK THE SITE LOCATION

USGS Quadrangle Name: _____ NRCS Soil Map Page: _____ NRCS Soil Map Stream Order _____

County: _____ Township / City: _____

MISCELLANEOUS

Base Flow Conditions? (Y/N): _____ Date of last precipitation: _____ Quantity: _____

Photograph Information: _____

Elevated Turbidity? (Y/N): _____ Canopy (% open): _____

Were samples collected for water chemistry? (Y/N): _____ (Note lab sample no. or id. and attach results) Lab Number: _____

Field Measures: Temp (°C) _____ Dissolved Oxygen (mg/l) _____ pH (S.U.) _____ Conductivity (µmhos/cm) _____

Is the sampling reach representative of the stream (Y/N) _____ If not, please explain: _____

Additional comments/description of pollution impacts: _____

BIOTIC EVALUATION

Performed? (Y/N): _____ (If Yes, Record all observations. Voucher collections optional. NOTE: all voucher samples must be labeled with the site ID number. Include appropriate field data sheets from the Primary Headwater Habitat Assessment Manual)

Fish Observed? (Y/N) _____ Voucher? (Y/N) _____ Salamanders Observed? (Y/N) _____ Voucher? (Y/N) _____

Frogs or Tadpoles Observed? (Y/N) _____ Voucher? (Y/N) _____ Aquatic Macroinvertebrates Observed? (Y/N) _____ Voucher? (Y/N) _____

Comments Regarding Biology: _____

DRAWING AND NARRATIVE DESCRIPTION OF STREAM REACH (This must be completed):

Include important landmarks and other features of interest for site evaluation and a narrative description of the stream's location

FLOW →

OhioEPA Qualitative Habitat Evaluation Index and Use Assessment Field Sheet

QHEI Score: 59.75

Stream & Location: S 37A RM: ___.___ Date: 8/17/09

Scorers Full Name & Affiliation: Kirk Roth, Cardno ENTRIX LLC

River Code: ___-___-___ STORET #: _____ Lat./Long.: (NAD 83 - decimal °) __.____ /8__.____ Office verified location ☐

1] SUBSTRATE

Check ONLY Two substrate TYPE BOXES; estimate % or note every type present

BEST TYPES	POOL	RIFFLE	OTHER TYPES	POOL	RIFFLE
☐☐ BLDR /SLABS [10]			☐☐ HARDPAN [4]		
☐☐ BOULDER [9]	1		☐☐ DETRITUS [3]		
☐☐ COBBLE [8]	1		☐☐ MUCK [2]		
☐☐ GRAVEL [7]	1		☑☐ SILT [2]	40	
☑☐ SAND [6]	20		☐☐ ARTIFICIAL [0]		
☐☐ BEDROCK [5]			(Score natural substrates; ignore sludge from point-sources)		

NUMBER OF BEST TYPES: ☑ 4 or more [2] ☐ 3 or less [0]

Comments

Check ONE (Or 2 & average)

ORIGIN: ☑ LIMESTONE [1] ☐ TILLS [1] ☐ WETLANDS [0] ☐ HARDPAN [0] ☐ SANDSTONE [0] ☐ RIP/RAP [0] ☐ LACUSTURINE [0] ☐ SHALE [-1] ☐ COAL FINES [-2]

QUALITY: SILT: ☐ HEAVY [-2] ☐ MODERATE [-1] ☑ NORMAL [0] ☐ FREE [1]; EMBEDDEDNESS: ☐ EXTENSIVE [-2] ☐ MODERATE [-1] ☑ NORMAL [0] ☐ NONE [1]

Substrate: 11 (Maximum 20)

2] INSTREAM COVER

Indicate presence 0 to 3: 0-Absent; 1-Very small amounts or if more common of marginal quality; 2-Moderate amounts, but not of highest quality or in small amounts of highest quality; 3-Highest quality in moderate or greater amounts (e.g., very large boulders in deep or fast water, large diameter log that is stable, well developed rootwad in deep / fast water, or deep, well-defined, functional pools.

- 1 UNDERCUT BANKS [1]
- 2 OVERHANGING VEGETATION [1]
- 3 SHALLOWS (IN SLOW WATER) [1]
- ___ ROOTMATS [1]
- 2 POOLS > 70cm [2]
- ___ ROOTWADS [1]
- 2 BOULDERS [1]
- ___ OXBOWS, BACKWATERS [1]
- 1 AQUATIC MACROPHYTES [1]
- 1 LOGS OR WOODY DEBRIS [1]

AMOUNT Check ONE (Or 2 & average): ☐ EXTENSIVE >75% [11] ☑ MODERATE 25-75% [7] ☐ SPARSE 5-<25% [3] ☐ NEARLY ABSENT <5% [1]

Comments

"Old Method" of Scoring is used for consistency

Cover: 15 (Maximum 20)

3] CHANNEL MORPHOLOGY

Check ONE in each category (Or 2 & average)

SINUOSITY	DEVELOPMENT	CHANNELIZATION	STABILITY
☐ HIGH [4]	☐ EXCELLENT [7]	☐ NONE [6]	☐ HIGH [3]
☐ MODERATE [3]	☐ GOOD [5]	☐ RECOVERED [4]	☑ MODERATE [2]
☑ LOW [2]	☑ FAIR [3]	☑ RECOVERING [3]	☐ LOW [1]
☐ NONE [1]	☐ POOR [1]	☐ RECENT OR NO RECOVERY [1]	

Comments

Channel: 10 (Maximum 20)

4] BANK EROSION AND RIPARIAN ZONE

Check ONE in each category for EACH BANK (Or 2 per bank & average)

River right looking downstream

EROSION (L R)	RIPARIAN WIDTH (L R)	FLOOD PLAIN QUALITY (L R)	(L R)
☐☐ NONE / LITTLE [3]	☐☐ WIDE > 50m [4]	☑☐ FOREST, SWAMP [3]	☐☐ CONSERVATION TILLAGE [1]
☑☑ MODERATE [2]	☑☐ MODERATE 10-50m [3]	☑☐ SHRUB OR OLD FIELD [2]	☐☐ URBAN OR INDUSTRIAL [0]
☐☐ HEAVY / SEVERE [1]	☐☐ NARROW 5-10m [2]	☐☐ RESIDENTIAL, PARK, NEW FIELD [1]	☐☐ MINING / CONSTRUCTION [0]
	☐☐ VERY NARROW < 5m [1]	☐☐ FENCED PASTURE [1]	
	☐☑ NONE [0]	☐☑ OPEN PASTURE, ROWCROP [0]	

Indicate predominant land use(s) past 100m riparian.

Comments

Riparian: 4.75 (Maximum 10)

5] POOL / GLIDE AND RIFFLE / RUN QUALITY

MAXIMUM DEPTH Check ONE (ONLY!): ☐ > 1m [6] ☑ 0.7-<1m [4] ☐ 0.4-<0.7m [2] ☐ 0.2-<0.4m [1] ☐ < 0.2m [0]

CHANNEL WIDTH Check ONE (Or 2 & average): ☑ POOL WIDTH > RIFFLE WIDTH [2] ☐ POOL WIDTH = RIFFLE WIDTH [1] ☐ POOL WIDTH < RIFFLE WIDTH [0]

CURRENT VELOCITY Check ALL that apply: ☐ TORRENTIAL [-1] ☐ VERY FAST [1] ☑ FAST [1] ☑ MODERATE [1] ☑ SLOW [1] ☐ INTERSTITIAL [-1] ☐ INTERMITTENT [-2] ☐ EDDIES [1]

Indicate for reach - pools and riffles.

Recreation Potential
Primary Contact
Secondary Contact
(circle one and comment on back)

Comments

Pool / Current: 9 (Maximum 12)

Indicate for functional riffles; Best areas must be large enough to support a population of riffle-obligate species: Check ONE (Or 2 & average). ☐ NO RIFFLE [metric=0]

RIFFLE DEPTH	RUN DEPTH	RIFFLE / RUN SUBSTRATE	RIFFLE / RUN EMBEDDEDNESS
☐ BEST AREAS > 10cm [2]	☐ MAXIMUM > 50cm [2]	☐ STABLE (e.g., Cobble, Boulder) [2]	☐ NONE [2]
☑ BEST AREAS 5-10cm [1]	☑ MAXIMUM < 50cm [1]	☑ MOD. STABLE (e.g., Large Gravel) [1]	☑ LOW [1]
☐ BEST AREAS < 5cm [metric=0]		☐ UNSTABLE (e.g., Fine Gravel, Sand) [0]	☐ MODERATE [0]
			☐ EXTENSIVE [-1]

Comments

Riffle / Run: 4 (Maximum 8)

6] GRADIENT

(5.7 ft/mi) ☐ VERY LOW - LOW [2-4] ☑ MODERATE [6-10] ☐ HIGH - VERY HIGH [10-6]

DRAINAGE AREA (1.1 mi²)

%POOL: 20 %GLIDE: 50 %RUN: 15 %RIFFLE: 15

Gradient: 6 (Maximum 10)

A] SAMPLED REACH

Check ALL that apply

Comment RE: Reach consistency/ Is reach typical of steam?, *Recreation/* Observed - Inferred, *Other/* Sampling observations, Concerns, Access directions, etc.

METHOD

- ☐ BOAT
- ☐ WADE
- ☐ L. LINE
- ☐ OTHER

STAGE

1st -sample pass- 2nd

- ☐ HIGH ☐
- ☐ UP ☐
- ☐ NORMAL ☐
- ☐ LOW ☐
- ☐ DRY ☐

DISTANCE

- ☐ 0.5 Km
- ☐ 0.2 Km
- ☐ 0.15 Km
- ☐ 0.12 Km
- ☐ OTHER

_____ meters

CLARITY

1st —sample pass— 2nd

- ☐ < 20 cm ☐
- ☐ 20-<40 cm ☐
- ☐ 40-70 cm ☐
- ☐ > 70 cm/ CTB ☐
- ☐ SECCHI DEPTH ☐

CANOPY

- ☐ > 85%- OPEN
- ☐ 55%-<85%
- ☐ 30%-<55%
- ☐ 10%-<30%
- ☐ <10%- CLOSED

1st pass _____ cm

2nd _____ cm

B] AESTHETICS

- ☐ NUISANCE ALGAE
- ☐ INVASIVE MACROPHYTES
- ☐ EXCESS TURBIDITY
- ☐ DISCOLORATION
- ☐ FOAM / SCUM
- ☐ OIL SHEEN
- ☐ TRASH / LITTER
- ☐ NUISANCE ODOR
- ☐ SLUDGE DEPOSITS
- ☐ CSOs/SSOs/OUTFALLS

C] RECREATION

AREA DEPTH

POOL: ☐ >100ft² ☐ >3ft

D] MAINTENANCE

Circle some & *COMMENT*

PUBLIC / PRIVATE / BOTH / NA
ACTIVE / HISTORIC / BOTH / NA
YOUNG-SUCCESSION-OLD
SPRAY / SNAG / REMOVED
MODIFIED / DIPPED OUT / NA
LEVEED / ONE SIDED
RELOCATED / CUTOFFS
MOVING-BEDLOAD-STABLE
ARMOURED / SLUMPS
ISLANDS / SCOURED
IMPOUNDED / DESICCATED
FLOOD CONTROL / DRAINAGE

E] ISSUES

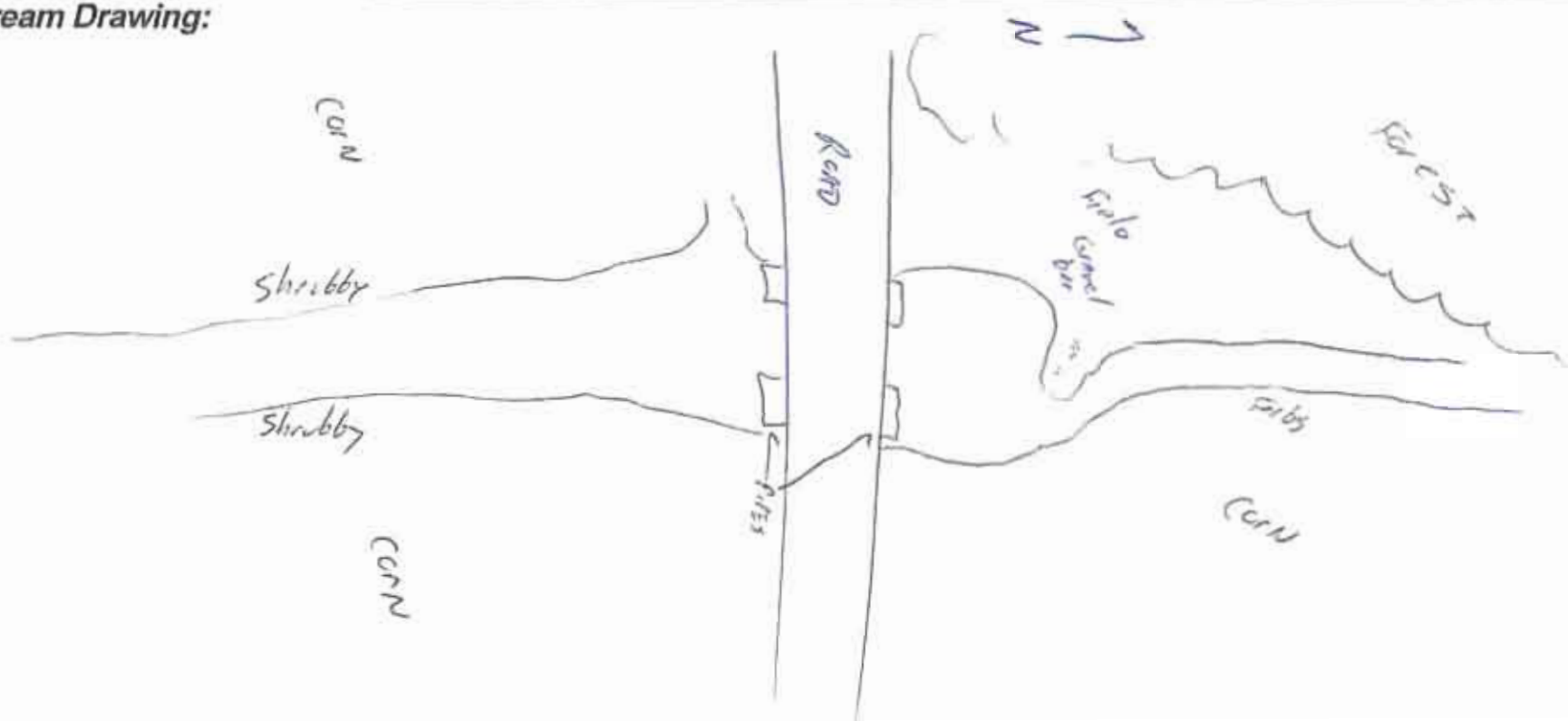
WWTP / CSO / NPDES / INDUSTRY
HARDENED / URBAN / DIRT&GRIME
CONTAMINATED / LANDFILL
BMPs-CONSTRUCTION-SEDIMENT
LOGGING / IRRIGATION / COOLING
BANK / EROSION / SURFACE
FALSE BANK / MANURE / LAGOON
WASH H_20 / TILE / H_20 TABLE
ACID / MINE / QUARRY / FLOW
NATURAL / WETLAND / STAGNANT
PARK / GOLF / LAWN / HOME
ATMOSPHERE / DATA PAUCITY

F] MEASUREMENTS

- $\bar{x}$ width
- $\bar{x}$ depth
- max. depth
- $\bar{x}$ bankfull width
- bankfull $\bar{x}$ depth
- W/D ratio
- bankfull max. depth
- floodprone x^2 width
- entrench. ratio

Legacy Tree:

Stream Drawing:



OWQ Biological Studies QHEI (Qualitative Habitat Evaluation Index)

Sample # | bioSample # | Stream Name | Location

Surveyor | Sample Date | County | Macro SampleType | ☐ Habitat Complete | QHEI Score:

1-Substrate (20 points maximum)

Substrate Score:

Check 1 Predominant Pool & 1 Predominant Riffle

Check all that are present — P=Pool, R=Riffle

Predominant P	Predominant R		Present P	Present R	Predominant P	Predominant R		Present P	Present R
☐	☐	Bldrs/Slabs(10)	☐	☐	☐	☐	Hardpan(4)	☐	☐
☐	☐	Boulders(9)	☐	☐	☐	☐	Detritus(3)	☐	☐
☐	☐	Cobble(8)	☐	☐	☐	☐	Muck(2)	☒	☐
☐	☐	Gravel(7)	☐	☐	☒	☒	Silt(2)	☐	☐
☐	☐	Sand(6)	☐	☐	☐	☐	Sludge(1)	☐	☐
☐	☐	Bedrock(5)	☐	☐	☐	☐	Artificial(0)	☐	☐

Substrate Quality (check only 1, or check 2 and AVERAGE)

Substrate Origin: ☐ Limestone(1) ☐ Hardpan(0) ☐ Lacustrine(0) ☐ Tills(1) ☐ Sandstone(0) ☐ Shale(-1) ☐ Wetlands(0) ☐ Rip/Rap(0) ☐ Coal fines(-2)

Silt Cover: ☒ Silt heavy(-2) ☐ Silt moderate(-1) ☐ Silt normal(0) ☐ Silt free(1)

Embeddedness: ☐ Extensive(-2) ☐ Moderate(-1) ☐ Low/Normal(0) ☐ None(1)

NOTE: ignore sludge originating from point sources; score based on natural substrates

☐ >4 substrates present(2)

Comments:

2-Instream Cover (20 points maximum

Instream Cover Score:

Type (check ALL that apply)

☐ Undercut banks(1) ☐ Deep pools(2) ☐ Oxbows(1)
☐ Overhanging vegetation(1) ☐ Rootwads(1) ☒ Aquatic macrophytes(1)
☐ Shallows(in slow water)(1) ☐ Boulders(1) ☐ Logs and woody debris(1)
☐ Rootmats(1)

Amount (check only 1, or 2 and AVERAGE)

☐ Extensive >75% (11)
☐ Moderate 25-75% (7)
☐ Sparse 5-25% (3)
☒ Nearly absent <5% (1)

Comments:

3-Channel Morphology (20) (check only one per category, OR two and AVERAGE)

Channel Score:

Sinuosity	Development	Channelization	Stability	Modifications/Other	
☐ High (4)	☐ Excellent (7)	☐ None (6)	☐ High (3)	☐ Snagging	☐ Impound
☐ Moderate (3)	☐ Good (5)	☐ Recovered (4)	☒ Moderate (2)	☐ Relocation	☐ Islands
☐ Low (2)	☐ Fair (3)	☒ Recovering (3)	☐ Low (1)	☒ Canopy Removal	☐ Leveed
☒ None (1)	☐ Poor (1)	☐ Recent or no recovery (1)		☒ Dredging	☒ Bank shaping

Comments: ☐ One side channel modifications

4-Riparian Zone & Bank Erosion (10 points maximum)

Riparian Score:

Left/Right banks looking downstream (For each category, check only one per bank, OR two per bank and AVERAGE).

Riparian width L	R	(per bank)	Erosion/Runoff-Floodplain quality (past 100 ft Riparian) L	R	(most predominant per bank)	L	R		Bank Erosion L	R	(per bank)
☐	☐	Wide >50m (4)	☐	☐	Forest, Swamp (3)	☐	☐	Conservation Tillage (1)	☐	☐	None or little (3)
☐	☐	Moderate 10-50m (3)	☐	☐	Shrub or Old field (2)	☐	☐	Urban or Industrial (0)	☐	☐	Moderate (2)
☒	☒	Narrow 5-10m (2)	☐	☐	Residential, Park, New field (1)	☐	☐	Mining, Construction (0)	☐	☐	Heavy/Severe (1)
☐	☐	Very narrow <5m (1)	☐	☐	Fenced pasture (1)	☐	☐	Open Pasture/Rowcrop (0)			
☐	☐	None (0)									

Comments:

5a-Pool/Glide Quality (12 points maximum

Pool/Glide Score:

Max pool depth (check one)	Morphology (check only one, OR check two and AVERAGE)	Pool/Run/Riffle current velocity (check all that apply)	
☐ >1m (6)	☐ Pool width > riffle width (2)	☐ Eddies (1)	☐ Torrential (-1)
☐ 0.7-1m (4)	☒ Pool width = riffle width (1)	☐ Fast (1)	☐ Interstitial (-1)
☐ 0.4-0.7m (2)	☐ Pool width < riffle width (0)	☐ Moderate (1)	☐ Intermittent (-2)
☒ 0.2-0.4m (1)		☒ Slow (1)	☐ No pool (0)
☐ <0.2m (pool=0)			

Comments:

5b-Riffle/Run Quality (8) (check only one per category, OR two and AVERAGE)

Riffle/Run Score:

Riffle/run depth (check one)	Riffle/run substrate	Riffle/run embeddedness	
☐ Generally>10cm, Max>50cm (4)	☐ Stable-e.g. cobble, boulder (2)	☐ Extensive (-1)	☐ Normal/Low (1)
☐ Generally>10cm, Max<50cm(3)	☐ Mod. stable-e.g. pea gravel (1)	☐ Moderate (0)	☐ None (2)
☐ Generally 5-10cm (1)	☒ Unstable-e.g. sand, gravel (0)		☒ No riffle (0)
☒ Generally<5cm (riffle=0)			

Comments:

6-Gradient (10 points maximum)

Gradient Score:

Average width: *Gradient:* *(ft/mile)* *Drainage Area:* *(square miles)*

Comments:

OWQ Biological Studies QHEI (Qualitative Habitat Evaluation Index)

Sample #	bioSample #	Stream Name	Location

Surveyor	Sample Date	County	Macro SampleType	☐ Habitat Complete	QHEI Score:

Impacts/Miscellaneous

Major Suspected Impacts (Check all that apply)

- ☐ None
- ☐ Industrial
- ☐ WWTP
- ☒ Agricultural
- ☐ Livestock
- ☐ Silviculture
- ☐ Construction
- ☐ Urban Runoff
- ☐ Suburban
- ☒ Channelization
- ☐ Riparian Removal
- ☐ Flow Alteration
- ☐ CSOs
- ☐ Mining
- ☐ Landfills
- ☐ Natural

Pollution Impact Comments:

Miscellaneous QHEI Information

Subjective rating (1-10):

Aesthetic rating (1-10):

Canopy Cover (% Open):

% Riffle:

% Run:

% Glide:

% Pool:

Is reach representative of stream?

General QHEI Notes:

OhioEPA Primary Headwater Habitat Evaluation Form

HHEI Score (sum of metrics 1, 2, 3) : 34

SITE NAME/LOCATION _____

_____ SITE NUMBER _____ RIVER BASIN _____ DRAINAGE AREA (mi²) _____

LENGTH OF STREAM REACH (ft) _____ LAT. _____ LONG. _____ RIVER CODE _____ RIVER MILE _____

DATE _____ SCORER _____ COMMENTS _____

NOTE: Complete All Items On This Form - Refer to "Field Evaluation Manual for Ohio's PHWH Streams" for Instructions

STREAM CHANNEL MODIFICATIONS: ☐ NONE / NATURAL CHANNEL ☐ RECOVERED ☒ RECOVERING ☐ RECENT OR NO RECOVERY

1. SUBSTRATE (Estimate percent of every type of substrate present. Check *ONLY* two predominant substrate *TYPE* boxes (Max of 32). Add total number of significant substrate types found (Max of 8). Final metric score is sum of boxes A & B.

HHEI Metric Points

TYPE		PERCENT	TYPE		PERCENT
☐ ☐	BLDR SLABS [16 pts]		☒ ☐	SILT [3 pt]	50%
☐ ☐	BOULDER (>256 mm) [16 pts]		☐ ☐	LEAF PACK/WOODY DEBRIS [3 pts]	
☐ ☐	BEDROCK [16 pt]		☐ ☐	FINE DETRITUS [3 pts]	
☐ ☐	COBBLE (65-256 mm) [12 pts]		☐ ☐	CLAY or HARDPAN [0 pt]	
☒ ☐	GRAVEL (2-64 mm) [9 pts]	50	☐ ☐	MUCK [0 pts]	
☐ ☐	SAND (<2 mm) [6 pts]		☐ ☐	ARTIFICIAL [3 pts]	

Total of Percentages of Bldr Slabs, Boulder, Cobble, Bedrock _____ **(A)** **(B)**

SCORE OF TWO MOST PREDOMINATE SUBSTRATE TYPES: 12 **TOTAL NUMBER OF SUBSTRATE TYPES:** 2

Substrate Max = 40 _____ **A + B**

2. Maximum Pool Depth ***(Measure the maximum pool depth within the 61 meter (200 ft)*** evaluation reach at the time of evaluation. Avoid plunge pools from road culverts or storm water pipes) (Check *ONLY* one box):

☐ > 30 centimeters [20 pts]
☐ > 22.5 - 30 cm [30 pts]
☐ > 10 - 22.5 cm [25 pts]
☐ > 5 cm - 10 cm [15 pts]
☒ < 5 cm [5 pts]
☐ NO WATER OR MOIST CHANNEL [0 pts]

COMMENTS _____ **MAXIMUM POOL DEPTH (centimeters):** 1

Pool Depth Max = 30 5

3. BANK FULL WIDTH (Measured as the average of 3-4 measurements) **(Check *ONLY* one box):**

☐ > 4.0 meters [30 pts]
☐ > 3.0 m - 4.0 m [25 pts]
☐ > 1.5 m - 3.0 m [20 pts]
☒ > 1.0 m - 1.5 m [15 pts]
☐ ≤ 1.0 m [5 pts]

COMMENTS _____ **AVERAGE BANKFULL WIDTH (meters):** 1.25

Bankfull Width Max=30 15

This information must also be completed

RIPARIAN ZONE AND FLOODPLAIN QUALITY ☆NOTE: River Left (L) and Right (R) as looking downstream☆

L R	RIPARIAN WIDTH (Per Bank)	L R	FLOODPLAIN QUALITY (Most Predominant per Bank)	L R	
☐ ☐	Wide >10m	☐ ☐	Mature Forest, Wetland	☐ ☐	Conservation Tillage
☐ ☐	Moderate 5-10m	☒ ☒	Immature Forest, Shrub or Old Field	☐ ☐	Urban or Industrial
☒ ☒	Narrow <5m	☐ ☐	Residential, Park, New Field	☒ ☒	Open Pasture, Row Crop
☐ ☐	None	☐ ☐	Fenced Pasture	☐ ☐	Mining or Construction

COMMENTS _____

FLOW REGIME *(At Time of Evaluation)* (Check *ONLY* one box):

☐ Stream Flowing
☐ Subsurface flow with isolated pools (Interstitial)
☒ Moist Channel, isolated pools, no flow (Intermittent)
☐ Dry channel, no water (Ephemeral)

COMMENTS _____

SINUOSITY (Number of bends per 61 m (200 ft) of channel) (Check *ONLY* one box):

☐ None ☒ 1.0 ☐ 2.0 ☐ 3.0
☐ 0.5 ☐ 1.5 ☐ 2.5 ☐ >3

STREAM GRADIENT ESTIMATE

☐ Flat (0.5 ft/100 ft) ☒ Flat to Moderate ☐ Moderate (2 ft/100 ft) ☐ Moderate to Severe ☐ Severe (10 ft/100 ft)

ADDITIONAL STREAM INFORMATION (This Information Must Also be Completed):

QHEI PERFORMED? - ☐ Yes ☐ No QHEI Score _____ (If Yes, Attach Completed QHEI Form)

DOWNSTREAM DESIGNATED USE(S)

☐ WWH Name: _____ Distance from Evaluated Stream _____

☐ CWH Name: _____ Distance from Evaluated Stream _____

☐ EWH Name: _____ Distance from Evaluated Stream _____

MAPPING: ATTACH COPIES OF MAPS, INCLUDING THE ENTIRE WATERSHED AREA. CLEARLY MARK THE SITE LOCATION

USGS Quadrangle Name: _____ NRCS Soil Map Page: _____ NRCS Soil Map Stream Order _____

County: _____ Township / City: _____

MISCELLANEOUS

Base Flow Conditions? (Y/N): _____ Date of last precipitation: _____ Quantity: _____

Photograph Information: _____

Elevated Turbidity? (Y/N): _____ Canopy (% open): _____

Were samples collected for water chemistry? (Y/N): _____ (Note lab sample no. or id. and attach results) Lab Number: _____

Field Measures: Temp (°C)_____ Dissolved Oxygen (mg/l) _____ pH (S.U.) _____ Conductivity (µmhos/cm) _____

Is the sampling reach representative of the stream (Y/N)_____ If not, please explain: _____

Additional comments/description of pollution impacts: _____

BIOTIC EVALUATION

Performed? (Y/N): _____ (If Yes, Record all observations. Voucher collections optional. NOTE: all voucher samples must be labeled with the site ID number. Include appropriate field data sheets from the Primary Headwater Habitat Assessment Manual)

Fish Observed? (Y/N)_____ Voucher? (Y/N)_____ Salamanders Observed? (Y/N)_____ Voucher? (Y/N)_____

Frogs or Tadpoles Observed? (Y/N)____ Voucher? (Y/N)____ Aquatic Macroinvertebrates Observed? (Y/N)____ Voucher? (Y/N)____

Comments Regarding Biology: _____

DRAWING AND NARRATIVE DESCRIPTION OF STREAM REACH (This must be completed):

Include important landmarks and other features of interest for site evaluation and a narrative description of the stream's location

FLOW ➔

Primary Headwater Habitat Evaluation Form

HHEI Score (sum of metrics 1, 2, 3) : 15

SITE NAME/LOCATION _____

_____ SITE NUMBER _____ RIVER BASIN _____ DRAINAGE AREA (mi²) _____

LENGTH OF STREAM REACH (ft) 150 LAT. _____ LONG. _____ RIVER CODE _____ RIVER MILE _____

DATE _____ SCORER _____ COMMENTS _____

NOTE: Complete All Items On This Form - Refer to "Field Evaluation Manual for Ohio's PHWH Streams" for Instructions

STREAM CHANNEL MODIFICATIONS: ☐ NONE / NATURAL CHANNEL ☐ RECOVERED ☒ RECOVERING ☐ RECENT OR NO RECOVERY

1. SUBSTRATE (Estimate percent of every type of substrate present. Check *ONLY* two predominant substrate *TYPE* boxes (Max of 32). Add total number of significant substrate types found (Max of 8). Final metric score is sum of boxes A & B.

HHEI Metric Points

TYPE		PERCENT	TYPE		PERCENT
☐ ☐	BLDR SLABS [16 pts]		☒ ☐	SILT [3 pt]	70%
☐ ☐	BOULDER (>256 mm) [16 pts]		☒ ☐	LEAF PACK/WOODY DEBRIS [3 pts]	10%
☐ ☐	BEDROCK [16 pt]		☐ ☐	FINE DETRITUS [3 pts]	
☐ ☐	COBBLE (65-256 mm) [12 pts]		☐ ☐	CLAY or HARDPAN [0 pt]	
☐ ☐	GRAVEL (2-64 mm) [9 pts]		☐ ☐	MUCK [0 pts]	
☐ ☐	SAND (<2 mm) [6 pts]		☐ ☐	ARTIFICIAL [3 pts]	

Total of Percentages of Bldr Slabs, Boulder, Cobble, Bedrock _____ **(A)** **(B)**

Substrate Max = 40 32

A + B

SCORE OF TWO MOST PREDOMINATE SUBSTRATE TYPES: 6 **TOTAL NUMBER OF SUBSTRATE TYPES:** 3

2. Maximum Pool Depth *(Measure the maximum pool depth within the 61 meter (200 ft)* evaluation reach at the time of evaluation. Avoid plunge pools from road culverts or storm water pipes) (Check *ONLY* one box):

Pool Depth Max = 30 0

☐ > 30 centimeters [20 pts]
☐ > 22.5 - 30 cm [30 pts]
☐ > 10 - 22.5 cm [25 pts]
☐ > 5 cm - 10 cm [15 pts]
☐ < 5 cm [5 pts]
☒ NO WATER OR MOIST CHANNEL [0 pts]

COMMENTS _____ **MAXIMUM POOL DEPTH (centimeters):** 0

3. BANK FULL WIDTH (Measured as the average of 3-4 measurements) **(Check *ONLY* one box):**

Bankfull Width Max=30 5

☐ > 4.0 meters [30 pts]
☐ > 3.0 m - 4.0 m [25 pts]
☐ > 1.5 m - 3.0 m [20 pts]
☐ > 1.0 m - 1.5 m [15 pts]
☒ ≤ 1.0 m [5 pts]

COMMENTS _____ **AVERAGE BANKFULL WIDTH (meters):** 3

This information must also be completed

RIPARIAN ZONE AND FLOODPLAIN QUALITY ☆NOTE: River Left (L) and Right (R) as looking downstream☆

RIPARIAN WIDTH L	R	(Per Bank)	FLOODPLAIN QUALITY L	R	(Most Predominant per Bank)	L	R	
☐	☐	Wide >10m	☐	☐	Mature Forest, Wetland	☐	☐	Conservation Tillage
☐	☐	Moderate 5-10m	☒	☒	Immature Forest, Shrub or Old Field	☐	☐	Urban or Industrial
☒	☒	Narrow <5m	☐	☐	Residential, Park, New Field	☒	☒	Open Pasture, Row Crop
☐	☐	None	☐	☐	Fenced Pasture	☐	☐	Mining or Construction

COMMENTS _____

FLOW REGIME *(At Time of Evaluation)* (Check *ONLY* one box):

☐ Stream Flowing
☐ Subsurface flow with isolated pools (Interstitial)
☐ Moist Channel, isolated pools, no flow (Intermittent)
☒ Dry channel, no water (Ephemeral)

COMMENTS _____

SINUOSITY (Number of bends per 61 m (200 ft) of channel) (Check *ONLY* one box):

☒ None ☐ 1.0 ☐ 2.0 ☐ 3.0
☐ 0.5 ☐ 1.5 ☐ 2.5 ☐ >3

STREAM GRADIENT ESTIMATE

☐ Flat (0.5 ft/100 ft) ☒ Flat to Moderate ☐ Moderate (2 ft/100 ft) ☐ Moderate to Severe ☐ Severe (10 ft/100 ft)

ADDITIONAL STREAM INFORMATION (This Information Must Also be Completed):

QHEI PERFORMED? - ☐ Yes ☐ No QHEI Score _____ (If Yes, Attach Completed QHEI Form)

DOWNSTREAM DESIGNATED USE(S)

☐ WWH Name: _____ Distance from Evaluated Stream _____

☐ CWH Name: _____ Distance from Evaluated Stream _____

☐ EWH Name: _____ Distance from Evaluated Stream _____

MAPPING: ATTACH COPIES OF MAPS, INCLUDING THE ENTIRE WATERSHED AREA. CLEARLY MARK THE SITE LOCATION

USGS Quadrangle Name: _____ NRCS Soil Map Page: _____ NRCS Soil Map Stream Order _____

County: _____ Township / City: _____

MISCELLANEOUS

Base Flow Conditions? (Y/N): _____ Date of last precipitation: _____ Quantity: _____

Photograph Information: _____

Elevated Turbidity? (Y/N): _____ Canopy (% open): _____

Were samples collected for water chemistry? (Y/N): _____ (Note lab sample no. or id. and attach results) Lab Number: _____

Field Measures: Temp (°C)_____ Dissolved Oxygen (mg/l) _____ pH (S.U.) _____ Conductivity (µmhos/cm) _____

Is the sampling reach representative of the stream (Y/N)_____ If not, please explain: _____

_____

Additional comments/description of pollution impacts: _____

_____

BIOTIC EVALUATION

Performed? (Y/N): _____ (If Yes, Record all observations. Voucher collections optional. NOTE: all voucher samples must be labeled with the site ID number. Include appropriate field data sheets from the Primary Headwater Habitat Assessment Manual)

Fish Observed? (Y/N)_____ Voucher? (Y/N)_____ Salamanders Observed? (Y/N)_____ Voucher? (Y/N)_____
Frogs or Tadpoles Observed? (Y/N)____ Voucher? (Y/N)____ Aquatic Macroinvertebrates Observed? (Y/N)____ Voucher? (Y/N)____

Comments Regarding Biology: _____

_____

_____

DRAWING AND NARRATIVE DESCRIPTION OF STREAM REACH (This must be completed):

Include important landmarks and other features of interest for site evaluation and a narrative description of the stream's location

FLOW ➜

OWQ Biological Studies QHEI (Qualitative Habitat Evaluation Index)

Sample # | bioSample # | Stream Name | Location

Surveyor | Sample Date | County | Macro SampleType | ☐ Habitat Complete | **QHEI Score:**

1-Substrate (20 points maximum)

Substrate Score:

Check 1 Predominant Pool & 1 Predominant Riffle

Check all that are present — P=Pool, R=Riffle

Predominant P	Predominant R		Present P	Present R	Predominant P	Predominant R		Present P	Present R
☐	☐	Bldrs/Slabs(10)	☐	☐	☐	☐	Hardpan(4)	☐	☐
☐	☐	Boulders(9)	☐	☐	☐	☐	Detritus(3)	☐	☐
☐	☐	Cobble(8)	☐	☐	☐	☐	Muck(2)	☐	☐
☐	☐	Gravel(7)	☐	☐	☐	☐	Silt(2)	☐	☐
☐	☐	Sand(6)	☐	☐	☐	☐	Sludge(1)	☐	☐
☐	☐	Bedrock(5)	☐	☐	☐	☐	Artificial(0)	☐	☐

Substrate Quality (check only 1, or check 2 and AVERAGE)

Substrate Origin: ☐ Limestone(1) ☒ Hardpan(0) ☐ Lacustrine(0) ☐ Tills(1) ☐ Sandstone(0) ☐ Shale(-1) ☐ Wetlands(0) ☐ Rip/Rap(0) ☐ Coal fines(-2)

Silt Cover: ☐ Silt heavy(-2) ☐ Silt moderate(-1) ☐ Silt normal(0) ☒ Silt free(1)

Embeddedness: ☐ Extensive(-2) ☐ Moderate(-1) ☒ Low/Normal(0) ☐ None(1)

NOTE: ignore sludge originating from point sources; score based on natural substrates

☐ >4 substrates present(2)

Comments:

2-Instream Cover (20 points maximum

Instream Cover Score:

Type (check ALL that apply)

☐ Undercut banks(1) ☐ Deep pools(2) ☐ Oxbows(1)
☐ Overhanging vegetation(1) ☐ Rootwads(1) ☒ Aquatic macrophytes(1)
☒ Shallows(in slow water)(1) ☐ Boulders(1) ☒ Logs and woody debris(1)
☒ Rootmats(1)

Amount (check only 1, or 2 and AVERAGE)

☐ Extensive >75% (11)
☐ Moderate 25-75% (7)
☐ Sparse 5-25% (3)
☒ Nearly absent <5% (1)

Comments:

3-Channel Morphology (20) (check only one per category, OR two and AVERAGE)

Channel Score:

Sinuosity	Development	Channelization	Stability	Modifications/Other	
☐ High (4)	☐ Excellent (7)	☐ None (6)	☐ High (3)	☐ Snagging	☐ Impound
☒ Moderate (3)	☐ Good (5)	☐ Recovered (4)	☒ Moderate (2)	☐ Relocation	☐ Islands
☐ Low (2)	☐ Fair (3)	☒ Recovering (3)	☐ Low (1)	☐ Canopy Removal	☐ Leveed
☐ None (1)	☐ Poor (1)	☐ Recent or no recovery (1)		☐ Dredging	☐ Bank shaping
				☐ One side channel modifications	

Comments:

4-Riparian Zone & Bank Erosion (10 points maximum)

Riparian Score:

Left/Right banks looking downstream (For each category, check only one per bank, OR two per bank and AVERAGE).

Riparian width L	R	(per bank)	Erosion/Runoff-Floodplain quality (past 100 ft Riparian) L	R	(most predominant per bank)	L	R		Bank Erosion L	R	(per bank)
☐	☐	Wide >50m (4)	☐	☐	Forest, Swamp (3)	☐	☐	Conservation Tillage (1)	☐	☐	None or little (3)
☒	☒	Moderate 10-50m (3)	☒	☒	Shrub or Old field (2)	☐	☐	Urban or Industrial (0)	☒	☒	Moderate (2)
☐	☐	Narrow 5-10m (2)	☐	☐	Residential, Park, New field (1)	☐	☐	Mining, Construction (0)	☐	☐	Heavy/Severe (1)
☐	☐	Very narrow <5m (1)	☐	☐	Fenced pasture (1)	☒	☒	Open Pasture/Rowcrop (0)			
☐	☐	None (0)									

Comments:

5a-Pool/Glide Quality (12 points maximum

Pool/Glide Score:

Max pool depth (check one)

☐ >1m (6)
☐ 0.7-1m (4)
☐ 0.4-0.7m (2)
☒ 0.2-0.4m (1)
☐ <0.2m (pool=0)

Morphology (check only one, OR check two and AVERAGE)

☐ Pool width > riffle width (2)
☒ Pool width = riffle width (1)
☐ Pool width < riffle width (0)

Pool/Run/Riffle current velocity (check all that apply)

☐ Eddies (1) ☐ Torrential (-1)
☐ Fast (1) ☐ Interstitial (-1)
☐ Moderate (1) ☐ Intermittent (-2)
☐ Slow (1) ☐ No pool (0)

Comments:

5b-Riffle/Run Quality (8) (check only one per category, OR two and AVERAGE)

Riffle/Run Score:

Riffle/run depth (check one)

☐ Generally>10cm, Max>50cm (4)
☐ Generally>10cm, Max<50cm(3)
☐ Generally 5-10cm (1)
☒ Generally<5cm (riffle=0)

Riffle/run substrate

☐ Stable-e.g. cobble, boulder (2)
☐ Mod. stable-e.g. pea gravel (1)
☒ Unstable-e.g. sand, gravel (0)

Riffle/run embeddedness

☐ Extensive (-1) ☐ Normal/Low (1)
☐ Moderate (0) ☐ None (2)
☒ No riffle (0)

Comments:

6-Gradient (10 points maximum)

Gradient Score:

Average width: *Gradient:* *(ft/mile)* *Drainage Area:* *(square miles)*

Comments:

OWQ Biological Studies QHEI (Qualitative Habitat Evaluation Index)

Sample #	bioSample #	Stream Name	Location

Surveyor	Sample Date	County	Macro SampleType	Habitat Complete	QHEI Score:
				☐	

Impacts/Miscellaneous

Major Suspected Impacts (Check all that apply)

- ☐ None
- ☐ Industrial
- ☐ WWTP
- ☐ Agricultural
- ☐ Livestock
- ☐ Silviculture
- ☐ Construction
- ☐ Urban Runoff
- ☐ Suburban
- ☐ Channelization
- ☒ Riparian Removal
- ☐ Flow Alteration
- ☐ CSOs
- ☐ Mining
- ☐ Landfills
- ☐ Natural

Pollution Impact Comments:

Miscellaneous QHEI Information

Subjective rating (1-10):

Aesthetic rating (1-10):

Canopy Cover (% Open):

% Riffle:

% Run:

% Glide:

% Pool:

Is reach representative of stream?

General QHEI Notes:

Primary Headwater Habitat Evaluation Form

HHEI Score (sum of metrics 1, 2, 3) :

SITE NAME/LOCATION _____

_____ SITE NUMBER _____ RIVER BASIN _____ DRAINAGE AREA (mi²) _____

LENGTH OF STREAM REACH (ft) _____ LAT. _____ LONG. _____ RIVER CODE _____ RIVER MILE _____

DATE _____ SCORER _____ COMMENTS _____

NOTE: Complete All Items On This Form - Refer to "Field Evaluation Manual for Ohio's PHWH Streams" for Instructions

STREAM CHANNEL MODIFICATIONS: ☐ NONE / NATURAL CHANNEL ☐ RECOVERED ☐ RECOVERING ☐ RECENT OR NO RECOVERY

1. **SUBSTRATE (Estimate percent of every type of substrate present.** Check *ONLY* two predominant substrate *TYPE* boxes (Max of 32). Add total number of significant substrate types found (Max of 8). Final metric score is sum of boxes A & B.

HHEI Metric Points

TYPE		PERCENT	TYPE		PERCENT
☐ ☐	BLDR SLABS [16 pts]	_____	☐ ☐	SILT [3 pt]	_____
☐ ☐	BOULDER (>256 mm) [16 pts]	_____	☐ ☐	LEAF PACK/WOODY DEBRIS [3 pts]	_____
☐ ☐	BEDROCK [16 pt]	_____	☐ ☐	FINE DETRITUS [3 pts]	_____
☐ ☐	COBBLE (65-256 mm) [12 pts]	_____	☐ ☐	CLAY or HARDPAN [0 pt]	_____
☐ ☐	GRAVEL (2-64 mm) [9 pts]	_____	☐ ☐	MUCK [0 pts]	_____
☐ ☐	SAND (<2 mm) [6 pts]	_____	☐ ☐	ARTIFICIAL [3 pts]	_____

Total of Percentages of Bldr Slabs, Boulder, Cobble, Bedrock _____ **(A)** **(B)**

Substrate Max = 40 **A + B**

SCORE OF TWO MOST PREDOMINATE SUBSTRATE TYPES: **TOTAL NUMBER OF SUBSTRATE TYPES:**

2. **Maximum Pool Depth *(Measure the maximum pool depth within the 61 meter (200 ft)*** evaluation reach at the time of evaluation. Avoid plunge pools from road culverts or storm water pipes) (Check *ONLY* one box):

Pool Depth Max = 30

- ☐ > 30 centimeters [20 pts]
- ☐ > 22.5 - 30 cm [30 pts]
- ☐ > 10 - 22.5 cm [25 pts]
- ☐ > 5 cm - 10 cm [15 pts]
- ☐ < 5 cm [5 pts]
- ☐ NO WATER OR MOIST CHANNEL [0 pts]

COMMENTS _____ **MAXIMUM POOL DEPTH (centimeters):**

3. **BANK FULL WIDTH (Measured as the average of 3-4 measurements)** **(Check *ONLY* one box):**

Bankfull Width Max=30

- ☐ > 4.0 meters [30 pts]
- ☐ > 3.0 m - 4.0 m [25 pts]
- ☐ > 1.5 m - 3.0 m [20 pts]
- ☐ > 1.0 m - 1.5 m [15 pts]
- ☐ ≤ 1.0 m [5 pts]

COMMENTS _____ **AVERAGE BANKFULL WIDTH (meters):**

This information must also be completed

RIPARIAN ZONE AND FLOODPLAIN QUALITY ☆NOTE: River Left (L) and Right (R) as looking downstream☆

L R	RIPARIAN WIDTH (Per Bank)	L R	FLOODPLAIN QUALITY (Most Predominant per Bank)	L R	
☐ ☐	Wide >10m	☐ ☐	Mature Forest, Wetland	☐ ☐	Conservation Tillage
☐ ☐	Moderate 5-10m	☐ ☐	Immature Forest, Shrub or Old Field	☐ ☐	Urban or Industrial
☐ ☐	Narrow <5m	☐ ☐	Residential, Park, New Field	☐ ☐	Open Pasture, Row Crop
☐ ☐	None	☐ ☐	Fenced Pasture	☐ ☐	Mining or Construction

COMMENTS _____

FLOW REGIME *(At Time of Evaluation)* (Check *ONLY* one box):

- ☐ Stream Flowing
- ☐ Subsurface flow with isolated pools (Interstitial)
- ☐ Moist Channel, isolated pools, no flow (Intermittent)
- ☐ Dry channel, no water (Ephemeral)

COMMENTS _____

SINUOSITY (Number of bends per 61 m (200 ft) of channel) (Check *ONLY* one box):

☐ None	☐ 1.0	☐ 2.0	☐ 3.0
☐ 0.5	☐ 1.5	☐ 2.5	☐ >3

STREAM GRADIENT ESTIMATE

☐ Flat (0.5 ft/100 ft) ☐ Flat to Moderate ☐ Moderate (2 ft/100 ft) ☐ Moderate to Severe ☐ Severe (10 ft/100 ft)

ADDITIONAL STREAM INFORMATION (This Information Must Also be Completed):

QHEI PERFORMED? - ☐ Yes ☐ No QHEI Score _____ (If Yes, Attach Completed QHEI Form)

DOWNSTREAM DESIGNATED USE(S)

☐ WWH Name: _____ Distance from Evaluated Stream _____

☐ CWH Name: _____ Distance from Evaluated Stream _____

☐ EWH Name: _____ Distance from Evaluated Stream _____

MAPPING: ATTACH COPIES OF MAPS, INCLUDING THE ENTIRE WATERSHED AREA. CLEARLY MARK THE SITE LOCATION

USGS Quadrangle Name: [illegible] NRCS Soil Map Page: 7 NRCS Soil Map Stream Order 1

County: [illegible] Township / City: [illegible]

MISCELLANEOUS

Base Flow Conditions? (Y/N): _____ Date of last precipitation: [illegible] Quantity: [illegible]

Photograph Information: [illegible]

Elevated Turbidity? (Y/N): _____ Canopy (% open): [illegible]

Were samples collected for water chemistry? (Y/N): _____ (Note lab sample no. or id. and attach results) Lab Number: _____

Field Measures: Temp (°C)_____ Dissolved Oxygen (mg/l) _____ pH (S.U.) _____ Conductivity (µmhos/cm) _____

Is the sampling reach representative of the stream (Y/N) Y If not, please explain: _____

Additional comments/description of pollution impacts: _____

BIOTIC EVALUATION

Performed? (Y/N): _____ (If Yes, Record all observations. Voucher collections optional. NOTE: all voucher samples must be labeled with the site ID number. Include appropriate field data sheets from the Primary Headwater Habitat Assessment Manual)

Fish Observed? (Y/N)_____ Voucher? (Y/N)_____ Salamanders Observed? (Y/N)_____ Voucher? (Y/N)_____

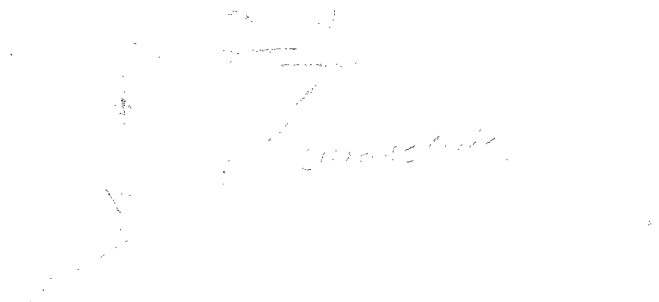
Frogs or Tadpoles Observed? (Y/N)____ Voucher? (Y/N)____ Aquatic Macroinvertebrates Observed? (Y/N)____ Voucher? (Y/N)____

Comments Regarding Biology: _____

DRAWING AND NARRATIVE DESCRIPTION OF STREAM REACH (This must be completed):

Include important landmarks and other features of interest for site evaluation and a narrative description of the stream's location

FLOW ➔



Primary Headwater Habitat Evaluation Form

HHEI Score (sum of metrics 1, 2, 3) :

SITE NAME/LOCATION _____

_____ SITE NUMBER _____ RIVER BASIN _____ DRAINAGE AREA (mi²) _____

LENGTH OF STREAM REACH (ft) _____ LAT. _____ LONG. _____ RIVER CODE _____ RIVER MILE _____

DATE _____ SCORER _____ COMMENTS _____

NOTE: Complete All Items On This Form - Refer to "Field Evaluation Manual for Ohio's PHWH Streams" for Instructions

STREAM CHANNEL MODIFICATIONS: ☐ NONE / NATURAL CHANNEL ☐ RECOVERED ☐ RECOVERING ☐ RECENT OR NO RECOVERY

1. **SUBSTRATE (Estimate percent of every type of substrate present.** Check *ONLY* two predominant substrate *TYPE* boxes (Max of 32). Add total number of significant substrate types found (Max of 8). Final metric score is sum of boxes A & B.

HHEI Metric Points

TYPE		PERCENT	TYPE		PERCENT
☐ ☐	BLDR SLABS [16 pts]		☒ ☒	SILT [3 pt]	
☐ ☐	BOULDER (>256 mm) [16 pts]		☐ ☐	LEAF PACK/WOODY DEBRIS [3 pts]	
☐ ☐	BEDROCK [16 pt]		☐ ☐	FINE DETRITUS [3 pts]	
☐ ☐	COBBLE (65-256 mm) [12 pts]		☐ ☐	CLAY or HARDPAN [0 pt]	
☐ ☐	GRAVEL (2-64 mm) [9 pts]		☐ ☐	MUCK [0 pts]	
☐ ☐	SAND (<2 mm) [6 pts]		☐ ☐	ARTIFICIAL [3 pts]	

Total of Percentages of Bldr Slabs, Boulder, Cobble, Bedrock _____ **(A)** **(B)**

Substrate Max = 40

A + B

SCORE OF TWO MOST PREDOMINATE SUBSTRATE TYPES: **TOTAL NUMBER OF SUBSTRATE TYPES:**

2. **Maximum Pool Depth** ***(Measure the maximum pool depth within the 61 meter (200 ft)*** evaluation reach at the time of evaluation. Avoid plunge pools from road culverts or storm water pipes) (Check *ONLY* one box):

Pool Depth Max = 30

☐ > 30 centimeters [20 pts]
☐ > 22.5 - 30 cm [30 pts]
☐ > 10 - 22.5 cm [25 pts]
☐ > 5 cm - 10 cm [15 pts]
☐ < 5 cm [5 pts]
☒ NO WATER OR MOIST CHANNEL [0 pts]

COMMENTS _____ **MAXIMUM POOL DEPTH (centimeters):**

3. **BANK FULL WIDTH (Measured as the average of 3-4 measurements)** **(Check *ONLY* one box):**

Bankfull Width Max=30

☐ > 4.0 meters [30 pts]
☐ > 3.0 m - 4.0 m [25 pts]
☐ > 1.5 m - 3.0 m [20 pts]
☒ > 1.0 m - 1.5 m [15 pts]
☐ ≤ 1.0 m [5 pts]

COMMENTS _____ **AVERAGE BANKFULL WIDTH (meters):**

This information must also be completed

RIPARIAN ZONE AND FLOODPLAIN QUALITY ☆NOTE: River Left (L) and Right (R) as looking downstream☆

L R	RIPARIAN WIDTH (Per Bank)	L R	FLOODPLAIN QUALITY (Most Predominant per Bank)	L R	
☐ ☐	Wide >10m	☐ ☐	Mature Forest, Wetland	☐ ☐	Conservation Tillage
☐ ☐	Moderate 5-10m	☐ ☐	Immature Forest, Shrub or Old Field	☐ ☐	Urban or Industrial
☐ ☐	Narrow <5m	☐ ☐	Residential, Park, New Field	☐ ☐	Open Pasture, Row Crop
☐ ☐	None	☒ ☐	Fenced Pasture	☐ ☐	Mining or Construction

COMMENTS _____

FLOW REGIME *(At Time of Evaluation)* (Check *ONLY* one box):

☐ Stream Flowing
☐ Subsurface flow with isolated pools (Interstitial)
☐ Moist Channel, isolated pools, no flow (Intermittent)
☒ Dry channel, no water (Ephemeral)

COMMENTS _____

SINUOSITY (Number of bends per 61 m (200 ft) of channel) (Check *ONLY* one box):

☒ None ☐ 1.0 ☐ 2.0 ☐ 3.0
☐ 0.5 ☐ 1.5 ☐ 2.5 ☐ >3

STREAM GRADIENT ESTIMATE

☐ Flat (0.5 ft/100 ft) ☒ Flat to Moderate ☐ Moderate (2 ft/100 ft) ☐ Moderate to Severe ☐ Severe (10 ft/100 ft)

ADDITIONAL STREAM INFORMATION (This Information Must Also be Completed):

QHEI PERFORMED? - ☐ Yes ☐ No QHEI Score _____ (If Yes, Attach Completed QHEI Form)

DOWNSTREAM DESIGNATED USE(S)

☐ WWH Name: _____ Distance from Evaluated Stream _____

☐ CWH Name: _____ Distance from Evaluated Stream _____

☐ EWH Name: _____ Distance from Evaluated Stream _____

MAPPING: ATTACH COPIES OF MAPS, INCLUDING THE ENTIRE WATERSHED AREA. CLEARLY MARK THE SITE LOCATION

USGS Quadrangle Name: _____ NRCS Soil Map Page: _____ NRCS Soil Map Stream Order _____

County: _____ Township / City: _____

MISCELLANEOUS

Base Flow Conditions? (Y/N): _____ Date of last precipitation: _____ Quantity: _____

Photograph Information: _____

Elevated Turbidity? (Y/N): _____ Canopy (% open): _____

Were samples collected for water chemistry? (Y/N): _____ (Note lab sample no. or id. and attach results) Lab Number: _____

Field Measures: Temp (°C) _____ Dissolved Oxygen (mg/l) _____ pH (S.U.) _____ Conductivity (µmhos/cm) _____

Is the sampling reach representative of the stream (Y/N) _____ If not, please explain: _____

_____

Additional comments/description of pollution impacts: _____

_____

BIOTIC EVALUATION

Performed? (Y/N): _____ (If Yes, Record all observations. Voucher collections optional. NOTE: all voucher samples must be labeled with the site ID number. Include appropriate field data sheets from the Primary Headwater Habitat Assessment Manual)

Fish Observed? (Y/N) _____ Voucher? (Y/N) _____ Salamanders Observed? (Y/N) _____ Voucher? (Y/N) _____

Frogs or Tadpoles Observed? (Y/N) ____ Voucher? (Y/N) ____ Aquatic Macroinvertebrates Observed? (Y/N) ____ Voucher? (Y/N) ____

Comments Regarding Biology: _____

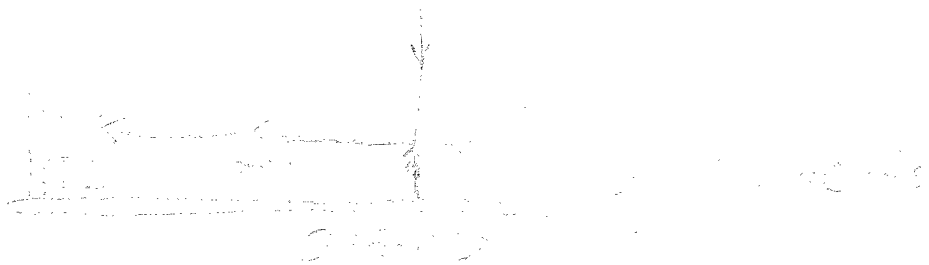
_____

_____

DRAWING AND NARRATIVE DESCRIPTION OF STREAM REACH (This must be completed):

Include important landmarks and other features of interest for site evaluation and a narrative description of the stream's location

FLOW →



OhioEPA Primary Headwater Habitat Evaluation Form

HHEI Score (sum of metrics 1, 2, 3) : ~~55~~ 58

SITE NAME/LOCATION Trib of Findley Lateral SITE NUMBER Sec 3-542 RIVER BASIN White River DRAINAGE AREA (mi²) 0.37 mi²

LENGTH OF STREAM REACH (ft) 200ft LAT. ____ LONG. ____ RIVER CODE ____ RIVER MILE ____

DATE 9/12/05 SCORER K Allison COMMENTS ____

NOTE: Complete All Items On This Form - Refer to "Field Evaluation Manual for Ohio's PHWH Streams" for Instructions

STREAM CHANNEL MODIFICATIONS: ☐ NONE / NATURAL CHANNEL ☐ RECOVERED ☒ RECOVERING ☐ RECENT OR NO RECOVERY

1. SUBSTRATE (Estimate percent of every type of substrate present. Check *ONLY* two predominant substrate *TYPE* boxes (Max of 32). Add total number of significant substrate types found (Max of 8). Final metric score is sum of boxes A & B.

TYPE		PERCENT	TYPE		PERCENT
☐ ☐	BLDR SLABS [16 pts]		☒ ☒	SILT [3 pt]	95%
☐ ☐	BOULDER (>256 mm) [16 pts]		☐ ☐	LEAF PACK/WOODY DEBRIS [3 pts]	
☐ ☐	BEDROCK [16 pt]		☐ ☐	FINE DETRITUS [3 pts]	
☐ ☐	COBBLE (65-256 mm) [12 pts]		☐ ☐	CLAY or HARDPAN [0 pt]	
☐ ☐	GRAVEL (2-64 mm) [9 pts]	5%	☐ ☐	MUCK [0 pts]	
☐ ☐	SAND (<2 mm) [6 pts]		☐ ☐	ARTIFICIAL [3 pts]	

Total of Percentages of Bldr Slabs, Boulder, Cobble, Bedrock ____ (A) (B)

SCORE OF TWO MOST PREDOMINATE SUBSTRATE TYPES: ~~8~~ 6 TOTAL NUMBER OF SUBSTRATE TYPES: 2

HHEI Metric Points

Substrate Max = 40: ~~7~~ 8

A + B

2. Maximum Pool Depth ***(Measure the maximum pool depth within the 61 meter (200 ft)*** evaluation reach at the time of evaluation. Avoid plunge pools from road culverts or storm water pipes) (Check *ONLY* one box):

- ☐ > 30 centimeters [20 pts]
- ☒ > 22.5 - 30 cm [30 pts]
- ☐ > 10 - 22.5 cm [25 pts]
- ☐ > 5 cm - 10 cm [15 pts]
- ☐ < 5 cm [5 pts]
- ☐ NO WATER OR MOIST CHANNEL [0 pts]

COMMENTS ____ MAXIMUM POOL DEPTH (centimeters): 28

Pool Depth Max = 30: 30

3. BANK FULL WIDTH (Measured as the average of 3-4 measurements) (Check *ONLY* one box):

- ☐ > 4.0 meters [30 pts]
- ☐ > 3.0 m - 4.0 m [25 pts]
- ☒ > 1.5 m - 3.0 m [20 pts]
- ☐ > 1.0 m - 1.5 m [15 pts]
- ☐ ≤ 1.0 m [5 pts]

COMMENTS ____ AVERAGE BANKFULL WIDTH (meters): 1.5

Bankfull Width Max=30: 20

This information must also be completed

RIPARIAN ZONE AND FLOODPLAIN QUALITY ☆NOTE: River Left (L) and Right (R) as looking downstream☆

RIPARIAN WIDTH L R	(Per Bank)	FLOODPLAIN QUALITY L R	(Most Predominant per Bank)	L R	
☐ ☐	Wide >10m	☐ ☐	Mature Forest, Wetland	☐ ☐	Conservation Tillage
☐ ☐	Moderate 5-10m	☒ ☒	Immature Forest, Shrub or Old Field	☐ ☐	Urban or Industrial
☒ ☒	Narrow <5m	☐ ☐	Residential, Park, New Field	☒ ☒	Open Pasture, Row Crop
☐ ☐	None	☐ ☐	Fenced Pasture	☐ ☐	Mining or Construction

COMMENTS ____

FLOW REGIME *(At Time of Evaluation)* (Check *ONLY* one box):

- ☒ Stream Flowing
- ☐ Subsurface flow with isolated pools (Interstitial)
- ☐ Moist Channel, isolated pools, no flow (Intermittent)
- ☐ Dry channel, no water (Ephemeral)

COMMENTS ____

SINUOSITY (Number of bends per 61 m (200 ft) of channel) (Check *ONLY* one box):

☐ None	☒ 1.0	☐ 2.0	☐ 3.0
☐ 0.5	☐ 1.5	☐ 2.5	☐ >3

STREAM GRADIENT ESTIMATE

☐ Flat (0.5 ft/100 ft) ☒ Flat to Moderate ☐ Moderate (2 ft/100 ft) ☐ Moderate to Severe ☐ Severe (10 ft/100 ft)

ADDITIONAL STREAM INFORMATION (This Information Must Also be Completed):

QHEI PERFORMED? - ☐ Yes ☒ No QHEI Score _____ (If Yes, Attach Completed QHEI Form)

DOWNSTREAM DESIGNATED USE(S)

☐ WWH Name: _____ Distance from Evaluated Stream _____

☐ CWH Name: _____ Distance from Evaluated Stream _____

☐ EWH Name: _____ Distance from Evaluated Stream _____

MAPPING: ATTACH COPIES OF MAPS, INCLUDING THE ENTIRE WATERSHED AREA. CLEARLY MARK THE SITE LOCATION

USGS Quadrangle Name: [illegible] NRCS Soil Map Page: 7 NRCS Soil Map Stream Order 1

County: [illegible] Township / City: [illegible]

MISCELLANEOUS

Base Flow Conditions? (Y/N): Y Date of last precipitation: [illegible] Quantity: [illegible]

Photograph Information: [illegible]

Elevated Turbidity? (Y/N): N Canopy (% open): [illegible]

Were samples collected for water chemistry? (Y/N): N (Note lab sample no. or id. and attach results) Lab Number: _____

Field Measures: Temp (°C)_____ Dissolved Oxygen (mg/l) _____ pH (S.U.) _____ Conductivity (µmhos/cm) _____

Is the sampling reach representative of the stream (Y/N) Y If not, please explain: _____

Additional comments/description of pollution impacts: _____

BIOTIC EVALUATION

Performed? (Y/N): N (If Yes, Record all observations. Voucher collections optional. NOTE: all voucher samples must be labeled with the site ID number. Include appropriate field data sheets from the Primary Headwater Habitat Assessment Manual)

Fish Observed? (Y/N)____ Voucher? (Y/N)____ Salamanders Observed? (Y/N)____ Voucher? (Y/N)____

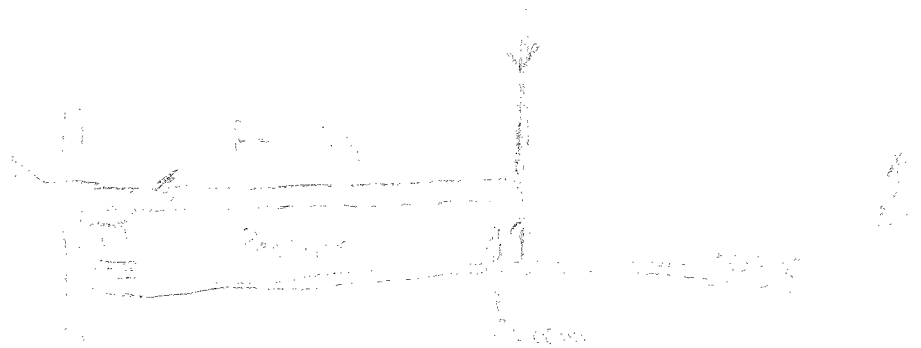
Frogs or Tadpoles Observed? (Y/N)____ Voucher? (Y/N)____ Aquatic Macroinvertebrates Observed? (Y/N)____ Voucher? (Y/N)____

Comments Regarding Biology: _____

DRAWING AND NARRATIVE DESCRIPTION OF STREAM REACH (This must be completed):

Include important landmarks and other features of interest for site evaluation and a narrative description of the stream's location

FLOW →



Ohio EPA — Qualitative Habitat Evaluation Index and Use Assessment Field Sheet

QHEI Score: 26

Stream & Location: 542A - 500E Access Rd **RM:** ____ **Date:** 8/17/09

Scorers Full Name & Affiliation: Kirk Roth, Carrollton WC

River Code: - - **STORET #:** **Lat./Long.:** (NAD 83 - decimal °) . 18 . Office verified location ☐

1] SUBSTRATE
Check ONLY Two substrate TYPE BOXES; estimate % or note every type present

BEST TYPES	POOL	RIFFLE	OTHER TYPES	POOL	RIFFLE
☐☐ BLDR /SLABS [10]			☐☐ HARDPAN [4]		
☐☐ BOULDER [9]			☐☐ DETRITUS [3]		
☐☐ COBBLE [8]			☐☐ MUCK [2]		
☐☐ GRAVEL [7]	10		☑☐ SILT [2]	50	
☐☑ SAND [6]	40		☐☐ ARTIFICIAL [0]		
☐☐ BEDROCK [5]					

(Score natural substrates; ignore sludge from point-sources)

NUMBER OF BEST TYPES: ☐ 4 or more [2] ☑ 3 or less [0]

Check ONE (Or 2 & average)

ORIGIN	QUALITY
☑ LIMESTONE [1]	☐ HEAVY [-2]
☐ TILLS [1]	☑ MODERATE [-1]
☐ WETLANDS [0]	☐ NORMAL [0]
☐ HARDPAN [0]	☐ FREE [1]
☐ SANDSTONE [0]	☐ EXTENSIVE [-2]
☐ RIP/RAP [0]	☑ MODERATE [-1]
☐ LACUSTURINE [0]	☐ NORMAL [0]
☐ SHALE [-1]	☐ NONE [1]
☐ COAL FINES [-2]	

SILT / EMBEDDEDNESS

Comments

Substrate: 7 (Maximum 20)

2] INSTREAM COVER
Indicate presence 0 to 3: 0-Absent; 1-Very small amounts or if more common of marginal quality; 2-Moderate amounts, but not of highest quality or in small amounts of highest quality; 3-Highest quality in moderate or greater amounts (e.g., very large boulders in deep or fast water, large diameter log that is stable, well developed rootwad in deep / fast water, or deep, well-defined, functional pools.

____ UNDERCUT BANKS [1]
1 OVERHANGING VEGETATION [1]
____ SHALLOWS (IN SLOW WATER) [1]
____ ROOTMATS [1]
____ POOLS > 70cm [2]
____ ROOTWADS [1]
____ BOULDERS [1]
____ OXBOWS, BACKWATERS [1]
____ AQUATIC MACROPHYTES [1]
____ LOGS OR WOODY DEBRIS [1]

AMOUNT Check ONE (Or 2 & average)
☐ EXTENSIVE >75% [11]
☐ MODERATE 25-75% [7]
☐ SPARSE 5-<25% [3]
☑ NEARLY ABSENT <5% [1]

Comments

Cover: 2 (Maximum 20)

3] CHANNEL MORPHOLOGY
Check ONE in each category (Or 2 & average)

SINUOSITY	DEVELOPMENT	CHANNELIZATION	STABILITY
☐ HIGH [4]	☐ EXCELLENT [7]	☐ NONE [6]	☐ HIGH [3]
☐ MODERATE [3]	☐ GOOD [5]	☐ RECOVERED [4]	☐ MODERATE [2]
☑ LOW [2]	☐ FAIR [3]	☐ RECOVERING [3]	☑ LOW [1]
☐ NONE [1]	☑ POOR [1]	☑ RECENT OR NO RECOVERY [1]	

Comments

Channel: 5 (Maximum 20)

4] BANK EROSION AND RIPARIAN ZONE
Check ONE in each category for EACH BANK (Or 2 per bank & average)

River right looking downstream

EROSION (L R)	RIPARIAN WIDTH (L R)	FLOOD PLAIN QUALITY (L R)	(L R)
☐☐ NONE / LITTLE [3]	☐☐ WIDE > 50m [4]	☐☐ FOREST, SWAMP [3]	☐☐ CONSERVATION TILLAGE [1]
☑☑ MODERATE [2]	☐☐ MODERATE 10-50m [3]	☐☐ SHRUB OR OLD FIELD [2]	☐☐ URBAN OR INDUSTRIAL [0]
☐☐ HEAVY / SEVERE [1]	☐☐ NARROW 5-10m [2]	☐☐ RESIDENTIAL, PARK, NEW FIELD [1]	☐☐ MINING / CONSTRUCTION [0]
	☐☐ VERY NARROW < 5m [1]	☐☐ FENCED PASTURE [1]	
	☑☑ NONE [0]	☑☑ OPEN PASTURE, ROWCROP [0]	

Indicate predominant land use(s) past 100m riparian.

Comments

Riparian: 2 (Maximum 10)

5] POOL / GLIDE AND RIFFLE / RUN QUALITY

MAXIMUM DEPTH Check ONE (ONLY!)
☐ > 1m [6]
☐ 0.7-<1m [4]
☐ 0.4-<0.7m [2]
☐ 0.2-<0.4m [1]
☑ < 0.2m [0]

CHANNEL WIDTH Check ONE (Or 2 & average)
☐ POOL WIDTH > RIFFLE WIDTH [2]
☑ POOL WIDTH = RIFFLE WIDTH [1]
☐ POOL WIDTH < RIFFLE WIDTH [0]

CURRENT VELOCITY Check ALL that apply
☐ TORRENTIAL [-1] ☑ SLOW [1]
☐ VERY FAST [1] ☐ INTERSTITIAL [-1]
☐ FAST [1] ☐ INTERMITTENT [-2]
☑ MODERATE [1] ☐ EDDIES [1]
Indicate for reach - pools and riffles.

Recreation Potential
Primary Contact
Secondary Contact
(circle one and comment on back)

Comments

Pool / Current: 3 (Maximum 12)

Indicate for functional riffles; Best areas must be large enough to support a population of riffle-obligate species: Check ONE (Or 2 & average). ☐ NO RIFFLE [metric=0]

RIFFLE DEPTH	RUN DEPTH	RIFFLE / RUN SUBSTRATE	RIFFLE / RUN EMBEDDEDNESS
☐ BEST AREAS > 10cm [2]	☐ MAXIMUM > 50cm [2]	☐ STABLE (e.g., Cobble, Boulder) [2]	☐ NONE [2]
☐ BEST AREAS 5-10cm [1]	☑ MAXIMUM < 50cm [1]	☐ MOD. STABLE (e.g., Large Gravel) [1]	☐ LOW [1]
☑ BEST AREAS < 5cm [metric=0]		☑ UNSTABLE (e.g., Fine Gravel, Sand) [0]	☑ MODERATE [0]
			☐ EXTENSIVE [-1]

Comments

Riffle / Run: 1 (Maximum 8)

6] GRADIENT
(5.7 ft/mi) ☐ VERY LOW - LOW [2-4] ☒ MODERATE [6-10] ☐ HIGH - VERY HIGH [10-6]

DRAINAGE AREA (1.0 mi²)

%POOL: 5 %GLIDE: 45
%RUN: 45 %RIFFLE: 5

Gradient: 6 (Maximum 10)

A] SAMPLED REACH

Check ALL that apply

Comment RE: Reach consistency/ Is reach typical of steam?, *Recreation/* Observed - Inferred, *Other/* Sampling observations, Concerns, Access directions, etc.

METHOD

- ☐ BOAT
- ☐ WADE
- ☐ L. LINE
- ☐ OTHER

DISTANCE

- ☐ 0.5 Km
- ☐ 0.2 Km
- ☐ 0.15 Km
- ☐ 0.12 Km
- ☐ OTHER

_____ meters

STAGE

1st -sample pass- 2nd

- ☐ HIGH ☐
- ☐ UP ☐
- ☐ NORMAL ☐
- ☐ LOW ☐
- ☐ DRY ☐

CLARITY

1st -sample pass- 2nd

- ☐ < 20 cm ☐
- ☐ 20-<40 cm ☐
- ☐ 40-70 cm ☐
- ☐ > 70 cm/ CTB ☐
- ☐ SECCHI DEPTH ☐

CANOPY

- ☐ > 85%- OPEN
- ☐ 55%-<85%
- ☐ 30%-<55%
- ☐ 10%-<30%
- ☐ <10%- CLOSED

1st pass _____ cm

2nd pass _____ cm

B] AESTHETICS

- ☐ NUISANCE ALGAE
- ☐ INVASIVE MACROPHYTES
- ☐ EXCESS TURBIDITY
- ☐ DISCOLORATION
- ☐ FOAM / SCUM
- ☐ OIL SHEEN
- ☐ TRASH / LITTER
- ☐ NUISANCE ODOR
- ☐ SLUDGE DEPOSITS
- ☐ CSOs/SSOs/OUTFALLS

C] RECREATION

AREA DEPTH

POOL: ☐ >100ft² ☐ >3ft

D] MAINTENANCE

Circle same & *COMMENT*

PUBLIC / PRIVATE / BOTH / NA
ACTIVE / HISTORIC / BOTH / NA
YOUNG-SUCCESSION-OLD
SPRAY / SNAG / REMOVED
MODIFIED / DIPPED OUT / NA
LEVEED / ONE SIDED
RELOCATED / CUTOFFS
MOVING-BEDLOAD-STABLE
ARMOURED / SLUMPS
ISLANDS / SCOURED
IMPOUNDED / DESICCATED
FLOOD CONTROL / DRAINAGE

E] ISSUES

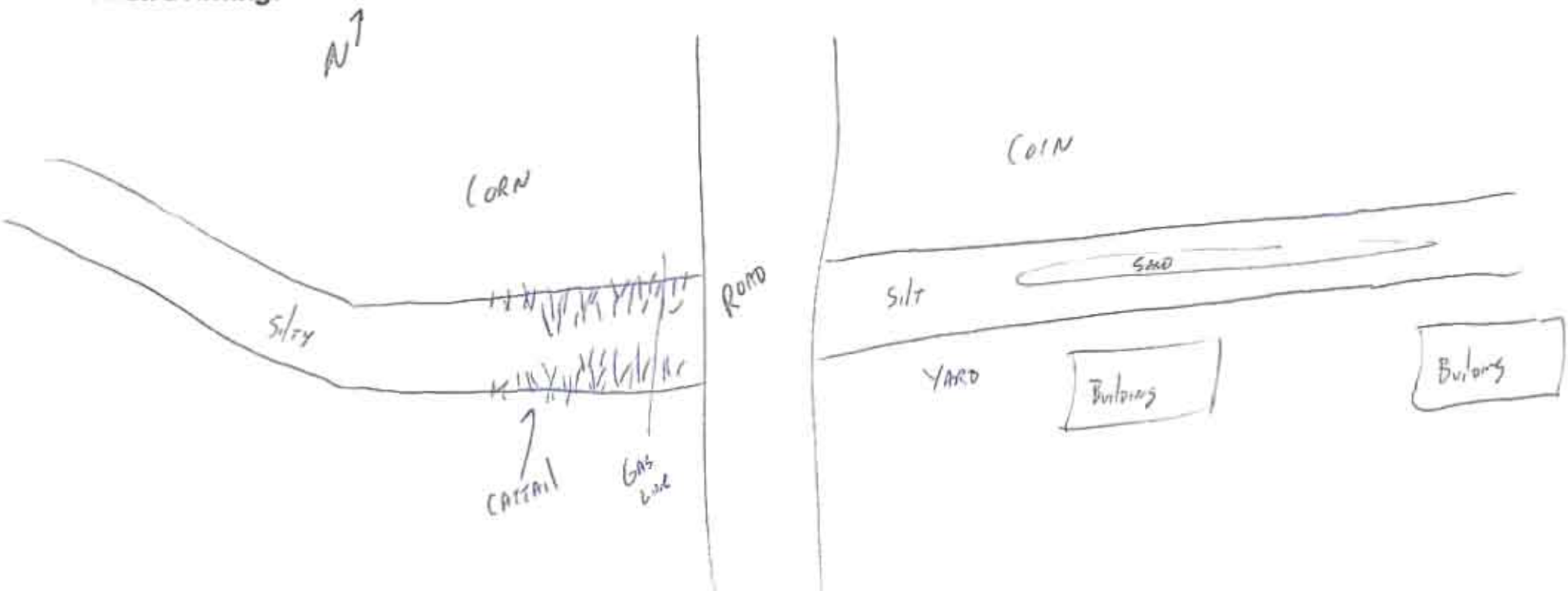
WWTP / CSO / NPDES / INDUSTRY
HARDENED / URBAN / DIRT&GRIME
CONTAMINATED / LANDFILL
BMPs-CONSTRUCTION-SEDIMENT
LOGGING / IRRIGATION / COOLING
BANK / EROSION / SURFACE
FALSE BANK / MANURE / LAGOON
WASH H_2O / TILE / H_2O TABLE
ACID / MINE / QUARRY / FLOW
NATURAL / WETLAND / STAGNANT
PARK / GOLF / LAWN / HOME
ATMOSPHERE / DATA PAUCITY

F] MEASUREMENTS

- $\bar{x}$ width
- $\bar{x}$ depth
- max. depth
- $\bar{x}$ bankfull width
- bankfull $\bar{x}$ depth
- W/D ratio
- bankfull max. depth
- floodprone x^2 width
- entrench. ratio

Legacy Tree:

Stream Drawing:



Primary Headwater Habitat Evaluation Form

HHEI Score (sum of metrics 1, 2, 3) :

SITE NAME/LOCATION _____

_____ SITE NUMBER _____ RIVER BASIN _____ DRAINAGE AREA (mi²) _____

LENGTH OF STREAM REACH (ft) _____ LAT. _____ LONG. _____ RIVER CODE _____ RIVER MILE _____

DATE _____ SCORER _____ COMMENTS _____

NOTE: Complete All Items On This Form - Refer to "Field Evaluation Manual for Ohio's PHWH Streams" for Instructions

STREAM CHANNEL MODIFICATIONS: ☐ NONE / NATURAL CHANNEL ☐ RECOVERED ☐ RECOVERING ☐ RECENT OR NO RECOVERY

1. **SUBSTRATE (Estimate percent of every type of substrate present.** Check *ONLY* two predominant substrate *TYPE* boxes (Max of 32). Add total number of significant substrate types found (Max of 8). Final metric score is sum of boxes A & B.

TYPE		PERCENT	TYPE		PERCENT
☐ ☐	BLDR SLABS [16 pts]	_____	☐ ☐	SILT [3 pt]	_____
☐ ☐	BOULDER (>256 mm) [16 pts]	_____	☐ ☐	LEAF PACK/WOODY DEBRIS [3 pts]	_____
☐ ☐	BEDROCK [16 pt]	_____	☐ ☐	FINE DETRITUS [3 pts]	_____
☐ ☐	COBBLE (65-256 mm) [12 pts]	_____	☐ ☐	CLAY or HARDPAN [0 pt]	_____
☐ ☐	GRAVEL (2-64 mm) [9 pts]	_____	☐ ☐	MUCK [0 pts]	_____
☐ ☐	SAND (<2 mm) [6 pts]	_____	☐ ☐	ARTIFICIAL [3 pts]	_____

Total of Percentages of Bldr Slabs, Boulder, Cobble, Bedrock _____ **(A)** **(B)**

SCORE OF TWO MOST PREDOMINATE SUBSTRATE TYPES: **TOTAL NUMBER OF SUBSTRATE TYPES:**

HHEI Metric Points

Substrate Max = 40

A + B

2. **Maximum Pool Depth** ***(Measure the maximum pool depth within the 61 meter (200 ft)*** evaluation reach at the time of evaluation. Avoid plunge pools from road culverts or storm water pipes) (Check *ONLY* one box):

☐ > 30 centimeters [20 pts]
☐ > 22.5 - 30 cm [30 pts]
☐ > 10 - 22.5 cm [25 pts]
☐ > 5 cm - 10 cm [15 pts]
☐ < 5 cm [5 pts]
☐ NO WATER OR MOIST CHANNEL [0 pts]

COMMENTS _____ **MAXIMUM POOL DEPTH (centimeters):**

Pool Depth Max = 30

3. **BANK FULL WIDTH (Measured as the average of 3-4 measurements)** **(Check *ONLY* one box):**

☐ > 4.0 meters [30 pts]
☐ > 3.0 m - 4.0 m [25 pts]
☐ > 1.5 m - 3.0 m [20 pts]
☐ > 1.0 m - 1.5 m [15 pts]
☐ ≤ 1.0 m [5 pts]

COMMENTS _____ **AVERAGE BANKFULL WIDTH (meters):**

Bankfull Width Max=30

This information must also be completed

RIPARIAN ZONE AND FLOODPLAIN QUALITY ☆NOTE: River Left (L) and Right (R) as looking downstream☆

RIPARIAN WIDTH L R	(Per Bank)	FLOODPLAIN QUALITY L R	(Most Predominant per Bank)	L R	
☐ ☐	Wide >10m	☐ ☐	Mature Forest, Wetland	☐ ☐	Conservation Tillage
☐ ☐	Moderate 5-10m	☐ ☐	Immature Forest, Shrub or Old Field	☐ ☐	Urban or Industrial
☐ ☐	Narrow <5m	☐ ☐	Residential, Park, New Field	☐ ☐	Open Pasture, Row Crop
☐ ☐	None	☐ ☐	Fenced Pasture	☐ ☐	Mining or Construction

COMMENTS _____

FLOW REGIME *(At Time of Evaluation)* (Check *ONLY* one box):

☐ Stream Flowing
☐ Subsurface flow with isolated pools (Interstitial)
☐ Moist Channel, isolated pools, no flow (Intermittent)
☐ Dry channel, no water (Ephemeral)

COMMENTS _____

SINUOSITY (Number of bends per 61 m (200 ft) of channel) (Check *ONLY* one box):

☐ None ☐ 1.0 ☐ 2.0 ☐ 3.0
☐ 0.5 ☐ 1.5 ☐ 2.5 ☐ >3

STREAM GRADIENT ESTIMATE

☐ Flat (0 5 ft/100 ft) ☐ Flat to Moderate ☐ Moderate (2 ft/100 ft) ☐ Moderate to Severe ☐ Severe (10 ft/100 ft)

ADDITIONAL STREAM INFORMATION (This Information Must Also be Completed):

QHEI PERFORMED? - ☐ Yes ☐ No QHEI Score _____ (If Yes, Attach Completed QHEI Form)

DOWNSTREAM DESIGNATED USE(S)

☐ WWH Name: _____ Distance from Evaluated Stream _____

☐ CWH Name: _____ Distance from Evaluated Stream _____

☐ EWH Name: _____ Distance from Evaluated Stream _____

MAPPING: ATTACH COPIES OF MAPS, INCLUDING THE ENTIRE WATERSHED AREA. CLEARLY MARK THE SITE LOCATION

USGS Quadrangle Name: _____ NRCS Soil Map Page: _____ NRCS Soil Map Stream Order _____

County: _____ Township / City: _____

MISCELLANEOUS

Base Flow Conditions? (Y/N): _____ Date of last precipitation: _____ Quantity: _____

Photograph Information: _____

Elevated Turbidity? (Y/N): _____ Canopy (% open): _____

Were samples collected for water chemistry? (Y/N): _____ (Note lab sample no. or id. and attach results) Lab Number: _____

Field Measures: Temp (°C) _____ Dissolved Oxygen (mg/l) _____ pH (S.U.) _____ Conductivity (µmhos/cm) _____

Is the sampling reach representative of the stream (Y/N) _____ If not, please explain: _____

_____

Additional comments/description of pollution impacts: _____

_____

BIOTIC EVALUATION

Performed? (Y/N): _____ (If Yes, Record all observations. Voucher collections optional. NOTE: all voucher samples must be labeled with the site ID number. Include appropriate field data sheets from the Primary Headwater Habitat Assessment Manual)

Fish Observed? (Y/N) _____ Voucher? (Y/N) _____ Salamanders Observed? (Y/N) _____ Voucher? (Y/N) _____

Frogs or Tadpoles Observed? (Y/N) _____ Voucher? (Y/N) _____ Aquatic Macroinvertebrates Observed? (Y/N) _____ Voucher? (Y/N) _____

Comments Regarding Biology: _____

_____

_____

DRAWING AND NARRATIVE DESCRIPTION OF STREAM REACH (This must be completed):

Include important landmarks and other features of interest for site evaluation and a narrative description of the stream's location

FLOW →

Primary Headwater Habitat Evaluation Form

HHEI Score (sum of metrics 1, 2, 3) : 16

SITE NAME/LOCATION _____

_____ SITE NUMBER _____ RIVER BASIN _____ DRAINAGE AREA (mi²) _____

LENGTH OF STREAM REACH (ft) _____ LAT. _____ LONG. _____ RIVER CODE _____ RIVER MILE _____

DATE _____ SCORER _____ COMMENTS _____

NOTE: Complete All Items On This Form - Refer to "Field Evaluation Manual for Ohio's PHWH Streams" for Instructions

STREAM CHANNEL MODIFICATIONS: ☐ NONE / NATURAL CHANNEL ☐ RECOVERED ☐ RECOVERING ☐ RECENT OR NO RECOVERY

1. SUBSTRATE (Estimate percent of every type of substrate present. Check *ONLY* two predominant substrate *TYPE* boxes (Max of 32). Add total number of significant substrate types found (Max of 8). Final metric score is sum of boxes A & B.

HHEI Metric Points

TYPE		PERCENT	TYPE		PERCENT
☐ ☐	BLDR SLABS [16 pts]		☒ ☐	SILT [3 pt]	
☐ ☐	BOULDER (>256 mm) [16 pts]		☐ ☐	LEAF PACK/WOODY DEBRIS [3 pts]	
☐ ☐	BEDROCK [16 pt]		☐ ☐	FINE DETRITUS [3 pts]	
☐ ☐	COBBLE (65-256 mm) [12 pts]		☐ ☐	CLAY or HARDPAN [0 pt]	
☐ ☐	GRAVEL (2-64 mm) [9 pts]		☐ ☐	MUCK [0 pts]	
☒ ☐	SAND (<2 mm) [6 pts]	60	☐ ☐	ARTIFICIAL [3 pts]	

Total of Percentages of Bldr Slabs, Boulder, Cobble, Bedrock _____ **(A)** **(B)**

Substrate Max = 40

A + B

SCORE OF TWO MOST PREDOMINATE SUBSTRATE TYPES: **TOTAL NUMBER OF SUBSTRATE TYPES:**

2. Maximum Pool Depth ***(Measure the maximum pool depth within the 61 meter (200 ft)*** evaluation reach at the time of evaluation. Avoid plunge pools from road culverts or storm water pipes) (Check *ONLY* one box):

Pool Depth Max = 30

- ☐ > 30 centimeters [20 pts]
- ☐ > 22.5 - 30 cm [30 pts]
- ☐ > 10 - 22.5 cm [25 pts]
- ☐ > 5 cm - 10 cm [15 pts]
- ☐ < 5 cm [5 pts]
- ☒ NO WATER OR MOIST CHANNEL [0 pts]

COMMENTS _____ **MAXIMUM POOL DEPTH (centimeters):**

3. BANK FULL WIDTH (Measured as the average of 3-4 measurements) **(Check *ONLY* one box):**

Bankfull Width Max=30

- ☐ > 4.0 meters [30 pts]
- ☐ > 3.0 m - 4.0 m [25 pts]
- ☐ > 1.5 m - 3.0 m [20 pts]
- ☐ > 1.0 m - 1.5 m [15 pts]
- ☐ ≤ 1.0 m [5 pts]

COMMENTS _____ **AVERAGE BANKFULL WIDTH (meters):**

This information must also be completed

RIPARIAN ZONE AND FLOODPLAIN QUALITY ☆NOTE: River Left (L) and Right (R) as looking downstream☆

L R	RIPARIAN WIDTH (Per Bank)	L R	FLOODPLAIN QUALITY (Most Predominant per Bank)	L R	
☐ ☐	Wide >10m	☐ ☐	Mature Forest, Wetland	☐ ☐	Conservation Tillage
☐ ☐	Moderate 5-10m	☒ ☐	Immature Forest, Shrub or Old Field	☐ ☐	Urban or Industrial
☐ ☐	Narrow <5m	☐ ☐	Residential, Park, New Field	☒ ☒	Open Pasture, Row Crop
☐ ☐	None	☐ ☐	Fenced Pasture	☐ ☐	Mining or Construction

COMMENTS _____

FLOW REGIME *(At Time of Evaluation)* (Check *ONLY* one box):

- ☐ Stream Flowing
- ☐ Subsurface flow with isolated pools (Interstitial)
- ☐ Moist Channel, isolated pools, no flow (Intermittent)
- ☒ Dry channel, no water (Ephemeral)

COMMENTS _____

SINUOSITY (Number of bends per 61 m (200 ft) of channel) (Check *ONLY* one box):

☒ None	☐ 1.0	☐ 2.0	☐ 3.0
☐ 0.5	☐ 1.5	☐ 2.5	☐ >3

STREAM GRADIENT ESTIMATE

☒ Flat (0.5 ft/100 ft) ☐ Flat to Moderate ☐ Moderate (2 ft/100 ft) ☐ Moderate to Severe ☐ Severe (10 ft/100 ft)

ADDITIONAL STREAM INFORMATION (This Information Must Also be Completed):

QHEI PERFORMED? - ☐ Yes ☐ No QHEI Score _____ (If Yes, Attach Completed QHEI Form)

DOWNSTREAM DESIGNATED USE(S)

☐ WWH Name: _____ Distance from Evaluated Stream _____

☐ CWH Name: _____ Distance from Evaluated Stream _____

☐ EWH Name: _____ Distance from Evaluated Stream _____

MAPPING: ATTACH COPIES OF MAPS, INCLUDING THE ENTIRE WATERSHED AREA. CLEARLY MARK THE SITE LOCATION

USGS Quadrangle Name: _____ NRCS Soil Map Page: _____ NRCS Soil Map Stream Order _____

County: _____ Township / City: _____

MISCELLANEOUS

Base Flow Conditions? (Y/N): _____ Date of last precipitation: _____ Quantity: _____

Photograph Information: _____

Elevated Turbidity? (Y/N): _____ Canopy (% open): _____

Were samples collected for water chemistry? (Y/N): _____ (Note lab sample no. or id. and attach results) Lab Number: _____

Field Measures: Temp (°C) _____ Dissolved Oxygen (mg/l) _____ pH (S.U.) _____ Conductivity (µmhos/cm) _____

Is the sampling reach representative of the stream (Y/N) _____ If not, please explain: _____

_____

Additional comments/description of pollution impacts: _____

_____

BIOTIC EVALUATION

Performed? (Y/N): _____ (If Yes, Record all observations. Voucher collections optional. NOTE: all voucher samples must be labeled with the site ID number. Include appropriate field data sheets from the Primary Headwater Habitat Assessment Manual)

Fish Observed? (Y/N) _____ Voucher? (Y/N) _____ Salamanders Observed? (Y/N) _____ Voucher? (Y/N) _____

Frogs or Tadpoles Observed? (Y/N) _____ Voucher? (Y/N) _____ Aquatic Macroinvertebrates Observed? (Y/N) _____ Voucher? (Y/N) _____

Comments Regarding Biology: _____

_____

_____

DRAWING AND NARRATIVE DESCRIPTION OF STREAM REACH (This must be completed):

Include important landmarks and other features of interest for site evaluation and a narrative description of the stream's location

IDEM — OWQ Biological Studies QHEI (Qualitative Habitat Evaluation Index)

Sample #	bioSample #	Stream Name	Location
		Sec 3-S45	Vertrees Ditch

Surveyor	Sample Date	County	Macro SampleType	☐ Habitat Complete	QHEI Score: ~~33~~ 34
K. Allison	9/12/05	Daviess			

KLC

1-Substrate (20 points maximum)

Substrate Score: 12

Check 1 Predominant Pool & 1 Predominant Riffle

Check all that are present — P=Pool, R=Riffle

Predominant P	Predominant R	Present P	Present R		Predominant P	Predominant R	Present P	Present R	
☐	☐	☐	☐	Bldrs/Slabs(10)	☐	☐	☐	☐	Hardpan(4)
☐	☐	☐	☐	Boulders(9)	☐	☐	☒	☐	Detritus(3)
☐	☐	☐	☐	Cobble(8)	☐	☐	☐	☐	Muck(2)
☐	☐	☐	☐	Gravel(7)	☐	☐	☒	☐	Silt(2)
☒	☒	☒	☐	Sand(6)	☐	☐	☐	☐	Sludge(1)
☐	☐	☐	☐	Bedrock(5)	☐	☐	☐	☐	Artificial(0)

Substrate Quality (check only 1, or check 2 and AVERAGE)

Substrate Origin

☐ Limestone(1)	☒ Hardpan(0)	☐ Lacustrine(0)
☐ Tills(1)	☐ Sandstone(0)	☐ Shale(-1)
☐ Wetlands(0)	☐ Rip/Rap(0)	☐ Coal fines(-2)

Silt Cover	Embeddedness
☐ Silt heavy(-2)	☐ Extensive(-2)
☐ Silt moderate(-1)	☐ Moderate(-1)
☒ Silt normal(0)	☒ Low/Normal(0)
☐ Silt free(1)	☐ None(1)

NOTE: ignore sludge originating from point sources; score based on natural substrates

☐ >4 substrates present(2)

Comments:

2-Instream Cover (20 points maximum

Instream Cover Score: 4

Type (check ALL that apply)

☐ Undercut banks(1)	☐ Deep pools(2)	☐ Oxbows(1)	
☐ Overhanging vegetation(1)	☐ Rootwads(1)	☐ Aquatic macrophytes(1)	
☒ Shallows(in slow water)(1)	☐ Boulders(1)	☐ Logs and woody debris(1)	
☐ Rootmats(1)			

Amount (check only 1, or 2 and AVERAGE)

☐ Extensive >75% (11)
☐ Moderate 25-75% (7)
☒ Sparse 5-25% (3)
☐ Nearly absent <5% (1)

Comments:

3-Channel Morphology (20) (check only one per category, OR two and AVERAGE)

Channel Score: 5

Sinuosity	Development	Channelization	Stability	Modifications/Other	
☐ High (4)	☐ Excellent (7)	☐ None (6)	☐ High (3)	☐ Snagging	☐ Impound
☐ Moderate (3)	☐ Good (5)	☐ Recovered (4)	☒ Moderate (2)	☐ Relocation	☐ Islands
☐ Low (2)	☐ Fair (3)	☐ Recovering (3)	☐ Low (1)	☒ Canopy Removal	☐ Leveed
☒ None (1)	☒ Poor (1)	☒ Recent or no recovery (1)		☒ Dredging	☒ Bank shaping

Comments:

☐ One side channel modifications

4-Riparian Zone & Bank Erosion (10 points maximum)

Riparian Score: ~~4~~ 5

KLC

Left/Right banks looking downstream (For each category, check only one per bank, OR two per bank and AVERAGE).

Riparian width L	Riparian width R	(per bank)	Erosion/Runoff-Floodplain quality (past 100 ft Riparian) L	R	(most predominant per bank)	L	R		Bank Erosion L	R	(per bank)
☐	☐	Wide >50m (4)	☐	☐	Forest, Swamp (3)	☐	☐	Conservation Tillage (1)	☐	☐	None or little (3)
☐	☐	Moderate 10-50m (3)	☒	☒	Shrub or Old field (2)	☐	☐	Urban or Industrial (0)	☒	☒	Moderate (2)
☒	☒	Narrow 5-10m (2)	☐	☐	Residential, Park, New field (1)	☐	☐	Mining, Construction (0)	☐	☐	Heavy/Severe (1)
☐	☐	Very narrow <5m (1)	☐	☐	Fenced pasture (1)	☒	☒	Open Pasture/Rowcrop (0)			
☐	☐	None (0)									

Comments:

5a-Pool/Glide Quality (12 points maximum

Pool/Glide Score: 0

Max pool depth (check one)	Morphology (check only one, OR check two and AVERAGE)	Pool/Run/Riffle current velocity (check all that apply)	
☐ >1m (6)		☐ Eddies (1)	☐ Torrential (-1)
☐ 0.7-1m (4)	☒ Pool width > riffle width (2)	☐ Fast (1)	☐ Interstitial (-1)
☐ 0.4-0.7m (2)	☐ Pool width = riffle width (1)	☐ Moderate (1)	☒ Intermittent (-2)
☐ 0.2-0.4m (1)	☐ Pool width < riffle width (0)	☐ Slow (1)	☐ No pool (0)
☒ <0.2m (pool=0)			

Comments:

5b-Riffle/Run Quality (8) (check only one per category, OR two and AVERAGE)

Riffle/Run Score: 0

Riffle/run depth (check one)	Riffle/run substrate	Riffle/run embeddedness	
☐ Generally>10cm, Max>50cm (4)	☐ Stable-e.g. cobble, boulder (2)	☐ Extensive (-1)	☐ Normal/Low (1)
☐ Generally>10cm, Max<50cm(3)	☐ Mod. stable-e.g. pea gravel (1)	☐ Moderate (0)	☐ None (2)
☐ Generally 5-10cm (1)	☒ Unstable-e.g. sand, gravel (0)		☒ No riffle (0)
☒ Generally<5cm (riffle=0)			

Comments:

6-Gradient (10 points maximum)

Gradient Score: 8

Average width: 0.6 m Gradient: 14.8 (ft/mile) Drainage Area: 3.3 (square miles)

Comments:

IDEM OWQ Biological Studies QHEI (Qualitative Habitat Evaluation Index)

Sample #	bioSample #	Stream Name	Location

Surveyor	Sample Date	County	Macro SampleType	☐ Habitat Complete	QHEI Score:

Impacts/Miscellaneous

Major Suspected Impacts (Check all that apply)

- ☐ None
- ☐ Industrial
- ☐ WWTP
- ☐ Agricultural
- ☐ Livestock
- ☐ Silviculture
- ☐ Construction
- ☐ Urban Runoff
- ☐ Suburban
- ☐ Channelization
- ☐ Riparian Removal
- ☐ Flow Alteration
- ☐ CSOs
- ☐ Mining
- ☐ Landfills
- ☐ Natural

Pollution Impact Comments:

Miscellaneous QHEI Information

Subjective rating (1-10):
Aesthetic rating (1-10):
Canopy Cover (% Open):

% Riffle:
% Run:
% Glide:
% Pool:

Is reach representative of stream?

General QHEI Notes:

OWQ Biological Studies QHEI (Qualitative Habitat Evaluation Index)

Sample # | bioSample # | Stream Name | Location

Surveyor | Sample Date | County | Macro SampleType | ☐ Habitat Complete | QHEI Score:

1-Substrate (20 points maximum)

Substrate Score:

Check 1 Predominant Pool & 1 Predominant Riffle

Check all that are present — P=Pool, R=Riffle

Predominant P	Predominant R		Present P	Present R		Predominant P	Predominant R		Present P	Present R	
☐	☐	Bldrs/Slabs(10)	☐	☐		☐	☐	Hardpan(4)	☐	☐	
☐	☐	Boulders(9)	☐	☐		☐	☐	Detritus(3)	☐	☐	
☐	☐	Cobble(8)	☐	☐		☐	☐	Muck(2)	☐	☐	
☐	☐	Gravel(7)	☐	☐		☐	☐	Silt(2)	☐	☐	
☒	☒	Sand(6)	☒	☐		☐	☐	Sludge(1)	☐	☐	
☐	☐	Bedrock(5)	☐	☐		☐	☐	Artificial(0)	☐	☐	

Substrate Quality (check only 1, or check 2 and AVERAGE)

Substrate Origin: ☐ Limestone(1) ☐ Hardpan(0) ☐ Lacustrine(0) ☐ Tills(1) ☐ Sandstone(0) ☐ Shale(-1) ☐ Wetlands(0) ☐ Rip/Rap(0) ☐ Coal fines(-2)

Silt Cover: ☐ Silt heavy(-2) ☐ Silt moderate(-1) ☒ Silt normal(0) ☐ Silt free(1)

Embeddedness: ☐ Extensive(-2) ☐ Moderate(-1) ☒ Low/Normal(0) ☐ None(1)

NOTE: ignore sludge originating from point sources; score based on natural substrates

☐ >4 substrates present(2)

Comments:

2-Instream Cover (20 points maximum

Instream Cover Score:

Type (check ALL that apply)

☐ Undercut banks(1) ☐ Deep pools(2) ☐ Oxbows(1)
☒ Overhanging vegetation(1) ☐ Rootwads(1) ☐ Aquatic macrophytes(1)
☒ Shallows(in slow water)(1) ☐ Boulders(1) ☐ Logs and woody debris(1)
☐ Rootmats(1)

Amount (check only 1, or 2 and AVERAGE)

☐ Extensive >75% (11)
☒ Moderate 25-75% (7)
☐ Sparse 5-25% (3)
☐ Nearly absent <5% (1)

Comments:

3-Channel Morphology (20) (check only one per category, OR two and AVERAGE)

Channel Score:

Sinuosity	Development	Channelization	Stability	Modifications/Other	
☐ High (4)	☐ Excellent (7)	☐ None (6)	☐ High (3)	☐ Snagging	☐ Impound
☐ Moderate (3)	☐ Good (5)	☐ Recovered (4)	☐ Moderate (2)	☐ Relocation	☐ Islands
☒ Low (2)	☒ Fair (3)	☐ Recovering (3)	☐ Low (1)	☐ Canopy Removal	☐ Leveed
☐ None (1)	☐ Poor (1)	☐ Recent or no recovery (1)		☐ Dredging	☐ Bank shaping
				☐ One side channel modifications	

Comments:

4-Riparian Zone & Bank Erosion (10 points maximum)

Riparian Score:

Left/Right banks looking downstream (For each category, check only one per bank, OR two per bank and AVERAGE).

Riparian width L	R	(per bank)	Erosion/Runoff-Floodplain quality (past 100 ft Riparian) L	R	(most predominant per bank)	L	R	Bank Erosion	L	R	(per bank)
☐	☐	Wide >50m (4)	☐	☐	Forest, Swamp (3)	☐	☐	Conservation Tillage (1)	☐	☐	None or little (3)
☐	☐	Moderate 10-50m (3)	☐	☐	Shrub or Old field (2)	☐	☐	Urban or Industrial (0)	☒	☐	Moderate (2)
☐	☐	Narrow 5-10m (2)	☐	☐	Residential, Park, New field (1)	☐	☐	Mining, Construction (0)	☐	☐	Heavy/Severe (1)
☐	☒	Very narrow <5m (1)	☐	☐	Fenced pasture (1)	☒	☒	Open Pasture/Rowcrop (0)			
☐	☐	None (0)									

Comments:

5a-Pool/Glide Quality (12 points maximum

Pool/Glide Score:

Max pool depth (check one)

☐ >1m (6)
☐ 0.7-1m (4)
☐ 0.4-0.7m (2)
☐ 0.2-0.4m (1)
☒ <0.2m (pool=0)

Morphology (check only one, OR check two and AVERAGE)

☐ Pool width > riffle width (2)
☒ Pool width = riffle width (1)
☐ Pool width < riffle width (0)

Pool/Run/Riffle current velocity (check all that apply)

☐ Eddies (1) ☐ Torrential (-1)
☐ Fast (1) ☐ Interstitial (-1)
☐ Moderate (1) ☐ Intermittent (-2)
☒ Slow (1) ☐ No pool (0)

Comments:

5b-Riffle/Run Quality (8) (check only one per category, OR two and AVERAGE)

Riffle/Run Score:

Riffle/run depth (check one)

☐ Generally>10cm, Max>50cm (4)
☐ Generally>10cm, Max<50cm(3)
☐ Generally 5-10cm (1)
☒ Generally<5cm (riffle=0)

Riffle/run substrate

☐ Stable-e.g. cobble, boulder (2)
☐ Mod. stable-e.g. pea gravel (1)
☐ Unstable-e.g. sand, gravel (0)

Riffle/run embeddedness

☐ Extensive (-1) ☐ Normal/Low (1)
☐ Moderate (0) ☐ None (2)
☐ No riffle (0)

Comments:

6-Gradient (10 points maximum)

Gradient Score:

Average width: *Gradient:* *(ft/mile)* *Drainage Area:* 3.2 *(square miles)*

Comments:

OWQ Biological Studies QHEI (Qualitative Habitat Evaluation Index)

Sample #	bioSample #	Stream Name	Location

Surveyor	Sample Date	County	Macro SampleType	☐ Habitat Complete	QHEI Score:

Impacts/Miscellaneous

Major Suspected Impacts (Check all that apply)

- ☐ None
- ☐ Industrial
- ☐ WWTP
- ☒ Agricultural
- ☐ Livestock
- ☐ Silviculture
- ☐ Construction
- ☐ Urban Runoff
- ☐ Suburban
- ☑ Channelization
- ☐ Riparian Removal
- ☐ Flow Alteration
- ☐ CSOs
- ☐ Mining
- ☐ Landfills
- ☐ Natural

Pollution Impact Comments:

Miscellaneous QHEI Information

Subjective rating (1-10):
Aesthetic rating (1-10):
Canopy Cover (% Open):

% Riffle:
% Run:
% Glide:
% Pool:

Is reach representative of stream?

General QHEI Notes:

IDEM OWQ Biological Studies QHEI (Qualitative Habitat Evaluation Index)

Sample # | bioSample # | Stream Name: Sec3-547 | Location: Weaver Ditch

Surveyor: K. Allison | Sample Date: 9/12/05 | County: Daviess | Macro SampleType | ☐ Habitat Complete

QHEI Score: ~~45~~ 44 (KAC)

1-Substrate (20 points maximum)

Substrate Score: 12.5

Check 1 Predominant Pool & 1 Predominant Riffle

Check all that are present — P=Pool, R=Riffle

Predominant P	Predominant R		Present P	Present R		Predominant P	Predominant R		Present P	Present R	
☐	☐	Bldrs/Slabs(10)	☐	☐		☐	☐	Hardpan(4)	☐	☐	
☐	☐	Boulders(9)	☐	☐		☐	☐	Detritus(3)	☐	☐	
☐	☐	Cobble(8)	☐	☐		☐	☐	Muck(2)	☐	☐	
☐	☐	Gravel(7)	☒	☒		☐	☐	Silt(2)	☒	☐	
☒	☒	Sand(6)	☒	☒		☐	☐	Sludge(1)	☐	☐	
☐	☐	Bedrock(5)	☐	☐		☐	☐	Artificial(0)	☐	☐	

Substrate Quality (check only 1, or check 2 and AVERAGE)

Substrate Origin: ☐ Limestone(1) ☒ Hardpan(0) ☐ Lacustrine(0) ☒ Tills(1) ☐ Sandstone(0) ☐ Shale(-1) ☐ Wetlands(0) ☐ Rip/Rap(0) ☐ Coal fines(-2)

Silt Cover: ☐ Silt heavy(-2) ☐ Silt moderate(-1) ☒ Silt normal(0) ☐ Silt free(1)

Embeddedness: ☐ Extensive(-2) ☐ Moderate(-1) ☒ Low/Normal(0) ☐ None(1)

NOTE: Ignore sludge originating from point sources; score based on natural substrates

☐ >4 substrates present(2)

Comments:

2-Instream Cover (20 points maximum

Instream Cover Score: 6

Type (check ALL that apply)

☐ Undercut banks(1) ☐ Deep pools(2) ☐ Oxbows(1)
☒ Overhanging vegetation(1) ☐ Rootwads(1) ☐ Aquatic macrophytes(1)
☒ Shallows(in slow water)(1) ☐ Boulders(1) ☐ Logs and woody debris(1)
☒ Rootmats(1)

Amount (check only 1, or 2 and AVERAGE)

☐ Extensive >75% (11)
☐ Moderate 25-75% (7)
☒ Sparse 5-25% (3)
☐ Nearly absent <5% (1)

Comments:

3-Channel Morphology (20) (check only one per category, OR two and AVERAGE)

Channel Score: 11

Sinuosity	Development	Channelization	Stability	Modifications/Other	
☐ High (4)	☐ Excellent (7)	☐ None (6)	☐ High (3)	☐ Snagging	☐ Impound
☒ Moderate (3)	☐ Good (5)	☐ Recovered (4)	☒ Moderate (2)	☐ Relocation	☐ Islands
☐ Low (2)	☒ Fair (3)	☒ Recovering (3)	☐ Low (1)	☒ Canopy Removal	☐ Leveed
☐ None (1)	☐ Poor (1)	☐ Recent or no recovery (1)		☒ Dredging	☐ Bank shaping
				☐ One side channel modifications	

Comments:

4-Riparian Zone & Bank Erosion (10 points maximum)

Riparian Score: 5

Left/Right banks looking downstream (For each category, check only one per bank, OR two per bank and AVERAGE).

Riparian width L	R	(per bank)	Erosion/Runoff-Floodplain quality (past 100 ft Riparian) L	R	(most predominant per bank)	L	R		Bank Erosion L	R	(per bank)
☐	☐	Wide >50m (4)	☐	☐	Forest, Swamp (3)	☐	☐	Conservation Tillage (1)	☐	☐	None or little (3)
☐	☐	Moderate 10-50m (3)	☒	☒	Shrub or Old field (2)	☐	☐	Urban or Industrial (0)	☒	☒	Moderate (2)
☒	☒	Narrow 5-10m (2)	☐	☐	Residential, Park, New field (1)	☐	☐	Mining, Construction (0)	☐	☐	Heavy/Severe (1)
☐	☐	Very narrow <5m (1)	☐	☐	Fenced pasture (1)	☒	☒	Open Pasture/Rowcrop (0)			
☐	☐	None (0)									

Comments:

5a-Pool/Glide Quality (12 points maximum

Pool/Glide Score: ~~1~~ 2 (KAC)

Max pool depth (check one)

☐ >1m (6)
☐ 0.7-1m (4)
☐ 0.4-0.7m (2)
☐ 0.2-0.4m (1)
☒ <0.2m (pool=0)

Morphology (check only one, OR check two and AVERAGE)

☐ Pool width > riffle width (2)
☐ Pool width = riffle width (1)
☒ Pool width < riffle width (0)

Pool/Run/Riffle current velocity (check all that apply)

☐ Eddies (1) ☐ Torrential (-1)
☒ Fast (1) ☐ Interstitial (-1)
☒ Moderate (1) ☐ Intermittent (-2)
☐ Slow (1) ☐ No pool (0)

Comments:

5b-Riffle/Run Quality (8) (check only one per category, OR two and AVERAGE)

Riffle/Run Score: 1

Riffle/run depth (check one)

☐ Generally>10cm, Max>50cm (4)
☐ Generally>10cm, Max<50cm(3)
☐ Generally 5-10cm (1)
☒ Generally<5cm (riffle=0)

Riffle/run substrate

☐ Stable-e.g. cobble, boulder (2)
☐ Mod. stable-e.g. pea gravel (1)
☒ Unstable-e.g. sand, gravel (0)

Riffle/run embeddedness

☐ Extensive (-1) ☒ Normal/Low (1)
☐ Moderate (0) ☐ None (2)
☐ No riffle (0)

Comments:

6-Gradient (10 points maximum)

Gradient Score: 6

Average width: 1.2m | Gradient: 6.7 (ft/mile) | Drainage Area: 3.1 (square miles)

Comments:

IDEM OWQ Biological Studies QHEI (Qualitative Habitat Evaluation Index)

Sample #	bioSample #	Stream Name	Location

Surveyor	Sample Date	County	Macro SampleType	Habitat Complete	QHEI Score:
				☐	

Impacts/Miscellaneous

Major Suspected Impacts (Check all that apply)

- ☐ None
- ☐ Industrial
- ☐ WWTP
- ☐ Agricultural
- ☐ Livestock
- ☐ Silviculture
- ☐ Construction
- ☐ Urban Runoff
- ☐ Suburban
- ☐ Channelization
- ☐ Riparian Removal
- ☐ Flow Alteration
- ☐ CSOs
- ☐ Mining
- ☐ Landfills
- ☐ Natural

Pollution Impact Comments:

Miscellaneous QHEI Information

Subjective rating (1-10): % Riffle:

Aesthetic rating (1-10): % Run:

% Glide:

Canopy Cover (% Open): % Pool:

Is reach representative of stream?

General QHEI Notes:

OWQ Biological Studies QHEI (Qualitative Habitat Evaluation Index)

Sample # | bioSample # | Stream Name | Location

Surveyor | Sample Date | County | Macro SampleType | ☐ Habitat Complete | **QHEI Score:**

1-Substrate (20 points maximum)

Substrate Score:

Check 1 Predominant Pool & 1 Predominant Riffle

Check all that are present — P=Pool, R=Riffle

Predominant P	Predominant R		Present P	Present R	Predominant P	Predominant R		Present P	Present R
☐	☐	Bldrs/Slabs(10)	☐	☐	☐	☐	Hardpan(4)	☐	☐
☐	☐	Boulders(9)	☐	☐	☐	☐	Detritus(3)	☐	☐
☐	☐	Cobble(8)	☐	☐	☐	☐	Muck(2)	☐	☐
☐	☐	Gravel(7)	☐	☐	☐	☐	Silt(2)	☐	☐
☐	☐	Sand(6)	☐	☐	☐	☐	Sludge(1)	☐	☐
☐	☐	Bedrock(5)	☐	☐	☐	☐	Artificial(0)	☐	☐

NOTE: ignore sludge originating from point sources; score based on natural substrates

☐ >4 substrates present(2)

Comments:

Substrate Quality (check only 1, or check 2 and AVERAGE)

Substrate Origin

☐ Limestone(1) ☐ Hardpan(0) ☐ Lacustrine(0)
☐ Tills(1) ☐ Sandstone(0) ☐ Shale(-1)
☐ Wetlands(0) ☐ Rip/Rap(0) ☐ Coal fines(-2)

Silt Cover

☐ Silt heavy(-2)
☐ Silt moderate(-1)
☐ Silt normal(0)
☐ Silt free(1)

Embeddedness

☐ Extensive(-2)
☐ Moderate(-1)
☐ Low/Normal(0)
☐ None(1)

2-Instream Cover (20 points maximum

Instream Cover Score:

Type (check ALL that apply)

☐ Undercut banks(1) ☐ Deep pools(2) ☐ Oxbows(1)
☐ Overhanging vegetation(1) ☐ Rootwads(1) ☐ Aquatic macrophytes(1)
☐ Shallows(in slow water)(1) ☐ Boulders(1) ☐ Logs and woody debris(1)
☐ Rootmats(1)

Comments:

Amount (check only 1, or 2 and AVERAGE)

☐ Extensive >75% (11)
☐ Moderate 25-75% (7)
☐ Sparse 5-25% (3)
☐ Nearly absent <5% (1)

3-Channel Morphology (20) (check only one per category, OR two and AVERAGE)

Channel Score:

Sinuosity	Development	Channelization	Stability	Modifications/Other	
☐ High (4)	☐ Excellent (7)	☐ None (6)	☐ High (3)	☐ Snagging	☐ Impound
☐ Moderate (3)	☐ Good (5)	☐ Recovered (4)	☐ Moderate (2)	☐ Relocation	☐ Islands
☐ Low (2)	☐ Fair (3)	☐ Recovering (3)	☐ Low (1)	☐ Canopy Removal	☐ Leveed
☐ None (1)	☐ Poor (1)	☐ Recent or no recovery (1)		☐ Dredging	☐ Bank shaping
				☐ One side channel modifications	

Comments:

4-Riparian Zone & Bank Erosion (10 points maximum)

Riparian Score:

Left/Right banks looking downstream (For each category, check only one per bank, OR two per bank and AVERAGE).

Riparian width

L	R	(per bank)
☐	☐	Wide >50m (4)
☐	☐	Moderate 10-50m (3)
☐	☐	Narrow 5-10m (2)
☐	☐	Very narrow <5m (1)
☐	☐	None (0)

Erosion/Runoff-Floodplain quality (past 100 ft Riparian)

L	R	(most predominant per bank)
☐	☐	Forest, Swamp (3)
☐	☐	Shrub or Old field (2)
☐	☐	Residential, Park, New field (1)
☐	☐	Fenced pasture (1)
☐	☐	Conservation Tillage (1)
☐	☐	Urban or Industrial (0)
☐	☐	Mining, Construction (0)
☐	☐	Open Pasture/Rowcrop (0)

Bank Erosion

L	R	(per bank)
☐	☐	None or little (3)
☐	☐	Moderate (2)
☐	☐	Heavy/Severe (1)

Comments:

5a-Pool/Glide Quality (12 points maximum

Pool/Glide Score:

Max pool depth (check one)

☐ >1m (6)
☐ 0.7-1m (4)
☐ 0.4-0.7m (2)
☐ 0.2-0.4m (1)
☐ <0.2m (pool=0)

Morphology (check only one, OR check two and AVERAGE)

☐ Pool width > riffle width (2)
☐ Pool width = riffle width (1)
☐ Pool width < riffle width (0)

Pool/Run/Riffle current velocity (check all that apply)

☐ Eddies (1) ☐ Torrential (-1)
☐ Fast (1) ☐ Interstitial (-1)
☐ Moderate (1) ☐ Intermittent (-2)
☐ Slow (1) ☐ No pool (0)

Comments:

5b-Riffle/Run Quality (8) (check only one per category, OR two and AVERAGE)

Riffle/Run Score:

Riffle/run depth (check one)

☐ Generally>10cm, Max>50cm (4)
☐ Generally>10cm, Max<50cm(3)
☐ Generally 5-10cm (1)
☐ Generally<5cm (riffle=0)

Riffle/run substrate

☐ Stable-e.g. cobble, boulder (2)
☐ Mod. stable-e.g. pea gravel (1)
☐ Unstable-e.g. sand, gravel (0)

Riffle/run embeddedness

☐ Extensive (-1) ☐ Normal/Low (1)
☐ Moderate (0) ☐ None (2)
☐ No riffle (0)

Comments:

6-Gradient (10 points maximum)

Gradient Score:

Average width: | *Gradient:* | *(ft/mile)* | *Drainage Area:* | *(square miles)*

Comments:

OWQ Biological Studies QHEI (Qualitative Habitat Evaluation Index)

Sample #	bioSample #	Stream Name	Location

Surveyor	Sample Date	County	Macro SampleType	☐ Habitat Complete	QHEI Score:

Impacts/Miscellaneous

Major Suspected Impacts (Check all that apply)

- ☐ None
- ☐ Industrial
- ☐ WWTP
- ☒ Agricultural
- ☐ Livestock
- ☐ Silviculture
- ☐ Construction
- ☐ Urban Runoff
- ☐ Suburban
- ☐ Channelization
- ☐ Riparian Removal
- ☐ Flow Alteration
- ☐ CSOs
- ☐ Mining
- ☐ Landfills
- ☐ Natural

Pollution Impact Comments:

Miscellaneous QHEI Information

Subjective rating (1-10):
Aesthetic rating (1-10):
Canopy Cover (% Open):

% Riffle:
% Run:
% Glide:
% Pool:

Is reach representative of stream?

General QHEI Notes:

OhioEPA Primary Headwater Habitat Evaluation Form

HHEI Score (sum of metrics 1, 2, 3) : [ ]

SITE NAME/LOCATION _____

_____ SITE NUMBER _____ RIVER BASIN _____ DRAINAGE AREA (mi²) _____

LENGTH OF STREAM REACH (ft) _____ LAT. _____ LONG. _____ RIVER CODE _____ RIVER MILE _____

DATE _____ SCORER _____ COMMENTS _____

NOTE: Complete All Items On This Form - Refer to "Field Evaluation Manual for Ohio's PHWH Streams" for Instructions

STREAM CHANNEL MODIFICATIONS: ☐ NONE / NATURAL CHANNEL ☐ RECOVERED ☒ RECOVERING ☐ RECENT OR NO RECOVERY

1. **SUBSTRATE (Estimate percent of every type of substrate present.** Check *ONLY* two predominant substrate *TYPE* boxes (Max of 32). Add total number of significant substrate types found (Max of 8). Final metric score is sum of boxes A & B.

HHEI Metric Points

TYPE		PERCENT	TYPE		PERCENT
☐☐	BLDR SLABS [16 pts]	_____	☐☐	SILT [3 pt]	_____
☐☐	BOULDER (>256 mm) [16 pts]	_____	☐☐	LEAF PACK/WOODY DEBRIS [3 pts]	_____
☐☐	BEDROCK [16 pt]	_____	☐☐	FINE DETRITUS [3 pts]	_____
☐☐	COBBLE (65-256 mm) [12 pts]	_____	☒☐	CLAY or HARDPAN [0 pt]	_____
☐☐	GRAVEL (2-64 mm) [9 pts]	_____	☐☐	MUCK [0 pts]	_____
☐☐	SAND (<2 mm) [6 pts]	_____	☐☐	ARTIFICIAL [3 pts]	_____

Total of Percentages of Bldr Slabs, Boulder, Cobble, Bedrock _____ **(A)** **(B)**

Substrate Max = 40 [ ]

A + B

SCORE OF TWO MOST PREDOMINATE SUBSTRATE TYPES: _____ **TOTAL NUMBER OF SUBSTRATE TYPES:** _____

2. **Maximum Pool Depth** ***(Measure the maximum pool depth within the 61 meter (200 ft)*** evaluation reach at the time of evaluation. Avoid plunge pools from road culverts or storm water pipes) (Check *ONLY* one box):

Pool Depth Max = 30 [ ]

- ☐ > 30 centimeters [20 pts]
- ☐ > 22.5 - 30 cm [30 pts]
- ☐ > 10 - 22.5 cm [25 pts]
- ☐ > 5 cm - 10 cm [15 pts]
- ☒ < 5 cm [5 pts]
- ☐ NO WATER OR MOIST CHANNEL [0 pts]

COMMENTS _____ **MAXIMUM POOL DEPTH (centimeters):** _____

3. **BANK FULL WIDTH (Measured as the average of 3-4 measurements)** **(Check *ONLY* one box):**

Bankfull Width Max=30 [ ]

- ☐ > 4.0 meters [30 pts]
- ☐ > 3.0 m - 4.0 m [25 pts]
- ☐ > 1.5 m - 3.0 m [20 pts]
- ☒ > 1.0 m - 1.5 m [15 pts]
- ☐ ≤ 1.0 m [5 pts]

COMMENTS _____ **AVERAGE BANKFULL WIDTH (meters):** _____

This information must also be completed

RIPARIAN ZONE AND FLOODPLAIN QUALITY ☆NOTE: River Left (L) and Right (R) as looking downstream☆

RIPARIAN WIDTH L R	(Per Bank)	FLOODPLAIN QUALITY L R	(Most Predominant per Bank)	L R	
☐☐	Wide >10m	☐☐	Mature Forest, Wetland	☐☐	Conservation Tillage
☐☐	Moderate 5-10m	☒☐	Immature Forest, Shrub or Old Field	☐☐	Urban or Industrial
☐☐	Narrow <5m	☐☐	Residential, Park, New Field	☐☐	Open Pasture, Row Crop
☐☐	None	☐☐	Fenced Pasture	☐☐	Mining or Construction

COMMENTS _____

FLOW REGIME *(At Time of Evaluation)* (Check *ONLY* one box):

- ☐ Stream Flowing
- ☐ Subsurface flow with isolated pools (Interstitial)
- ☒ Moist Channel, isolated pools, no flow (Intermittent)
- ☐ Dry channel, no water (Ephemeral)

COMMENTS _____

SINUOSITY (Number of bends per 61 m (200 ft) of channel) (Check *ONLY* one box):

☒ None	☐ 1.0	☐ 2.0	☐ 3.0
☐ 0.5	☐ 1.5	☐ 2.5	☐ >3

STREAM GRADIENT ESTIMATE

☐ Flat (0.5 ft/100 ft) ☒ Flat to Moderate ☐ Moderate (2 ft/100 ft) ☐ Moderate to Severe ☐ Severe (10 ft/100 ft)

ADDITIONAL STREAM INFORMATION (This Information Must Also be Completed):

QHEI PERFORMED? - ☐ Yes ☐ No QHEI Score _____ (If Yes, Attach Completed QHEI Form)

DOWNSTREAM DESIGNATED USE(S)

☐ WWH Name: _____ Distance from Evaluated Stream _____

☐ CWH Name: _____ Distance from Evaluated Stream _____

☐ EWH Name: _____ Distance from Evaluated Stream _____

MAPPING: ATTACH COPIES OF MAPS, INCLUDING THE ENTIRE WATERSHED AREA. CLEARLY MARK THE SITE LOCATION

USGS Quadrangle Name: _____ NRCS Soil Map Page: _____ NRCS Soil Map Stream Order _____

County: _____ Township / City: _____

MISCELLANEOUS

Base Flow Conditions? (Y/N): _____ Date of last precipitation: _____ Quantity: _____

Photograph Information: _____

Elevated Turbidity? (Y/N): _____ Canopy (% open): _____

Were samples collected for water chemistry? (Y/N): _____ (Note lab sample no. or id. and attach results) Lab Number: _____

Field Measures: Temp (°C) _____ Dissolved Oxygen (mg/l) _____ pH (S.U.) _____ Conductivity (µmhos/cm) _____

Is the sampling reach representative of the stream (Y/N) _____ If not, please explain: _____

_____

Additional comments/description of pollution impacts: _____

_____

BIOTIC EVALUATION

Performed? (Y/N): _____ (If Yes, Record all observations. Voucher collections optional. NOTE: all voucher samples must be labeled with the site ID number. Include appropriate field data sheets from the Primary Headwater Habitat Assessment Manual)

Fish Observed? (Y/N) _____ Voucher? (Y/N) _____ Salamanders Observed? (Y/N) _____ Voucher? (Y/N) _____

Frogs or Tadpoles Observed? (Y/N) _____ Voucher? (Y/N) _____ Aquatic Macroinvertebrates Observed? (Y/N) _____ Voucher? (Y/N) _____

Comments Regarding Biology: _____

_____

_____

DRAWING AND NARRATIVE DESCRIPTION OF STREAM REACH (This must be completed):

Include important landmarks and other features of interest for site evaluation and a narrative description of the stream's location

FLOW →

OhioEPA Primary Headwater Habitat Evaluation Form

HHEI Score (sum of metrics 1, 2, 3) : 35

SITE NAME/LOCATION _____

SITE NUMBER Sec 3-350 RIVER BASIN _____ DRAINAGE AREA (mi²) _____

LENGTH OF STREAM REACH (ft) _____ LAT. _____ LONG. _____ RIVER CODE _____ RIVER MILE _____

DATE _____ SCORER _____ COMMENTS _____

NOTE: Complete All Items On This Form - Refer to "Field Evaluation Manual for Ohio's PHWH Streams" for Instructions

STREAM CHANNEL MODIFICATIONS: ☐ NONE / NATURAL CHANNEL ☐ RECOVERED ☒ RECOVERING ☐ RECENT OR NO RECOVERY

1. SUBSTRATE (Estimate percent of every type of substrate present. Check *ONLY* two predominant substrate *TYPE* boxes (Max of 32). Add total number of significant substrate types found (Max of 8). Final metric score is sum of boxes A & B.

HHEI Metric Points

TYPE		PERCENT	TYPE		PERCENT
☐ ☐	BLDR SLABS [16 pts]		☐ ☐	SILT [3 pt]	10%
☐ ☐	BOULDER (>256 mm) [16 pts]		☐ ☐	LEAF PACK/WOODY DEBRIS [3 pts]	
☐ ☐	BEDROCK [16 pt]		☐ ☐	FINE DETRITUS [3 pts]	
☐ ☐	COBBLE (65-256 mm) [12 pts]		☒ ☐	CLAY or HARDPAN [0 pt]	90%
☐ ☐	GRAVEL (2-64 mm) [9 pts]		☐ ☐	MUCK [0 pts]	
☒ ☐	SAND (<2 mm) [6 pts]	100%	☐ ☐	ARTIFICIAL [3 pts]	

Total of Percentages of Bldr Slabs, Boulder, Cobble, Bedrock _____ **(A)** **(B)**

SCORE OF TWO MOST PREDOMINATE SUBSTRATE TYPES: 6 **TOTAL NUMBER OF SUBSTRATE TYPES:** 3

Substrate Max = 40 9

A + B

2. Maximum Pool Depth ***(Measure the maximum pool depth within the 61 meter (200 ft)*** evaluation reach at the time of evaluation. Avoid plunge pools from road culverts or storm water pipes) (Check *ONLY* one box):

☐ > 30 centimeters [20 pts]
☐ > 22.5 - 30 cm [30 pts]
☐ > 10 - 22.5 cm [25 pts]
☒ > 5 cm - 10 cm [15 pts]
☐ < 5 cm [5 pts]
☐ NO WATER OR MOIST CHANNEL [0 pts]

Pool Depth Max = 30 15

COMMENTS _____ **MAXIMUM POOL DEPTH (centimeters):** 7

3. BANK FULL WIDTH (Measured as the average of 3-4 measurements) **(Check *ONLY* one box):**

☐ > 4.0 meters [30 pts]
☐ > 3.0 m - 4.0 m [25 pts]
☐ > 1.5 m - 3.0 m [20 pts]
☒ > 1.0 m - 1.5 m [15 pts]
☐ ≤ 1.0 m [5 pts]

Bankfull Width Max=30 15

COMMENTS _____ **AVERAGE BANKFULL WIDTH (meters):** 1.4

This information must also be completed

RIPARIAN ZONE AND FLOODPLAIN QUALITY ☆NOTE: River Left (L) and Right (R) as looking downstream☆

L	R	RIPARIAN WIDTH (Per Bank)	L	R	FLOODPLAIN QUALITY (Most Predominant per Bank)	L	R	
☐	☐	Wide >10m	☐	☐	Mature Forest, Wetland	☐	☐	Conservation Tillage
☒	☒	Moderate 5-10m	☒	☒	Immature Forest, Shrub or Old Field	☐	☐	Urban or Industrial
☐	☐	Narrow <5m	☐	☐	Residential, Park, New Field	☒	☒	Open Pasture, Row Crop
☐	☐	None	☐	☐	Fenced Pasture	☐	☐	Mining or Construction

COMMENTS _____

FLOW REGIME *(At Time of Evaluation)* (Check *ONLY* one box):

☒ Stream Flowing
☐ Subsurface flow with isolated pools (Interstitial)
☐ Moist Channel, isolated pools, no flow (Intermittent)
☐ Dry channel, no water (Ephemeral)

COMMENTS _____

SINUOSITY (Number of bends per 61 m (200 ft) of channel) (Check *ONLY* one box):

☒ None ☐ 1.0 ☐ 2.0 ☐ 3.0
☐ 0.5 ☐ 1.5 ☐ 2.5 ☐ >3

STREAM GRADIENT ESTIMATE

☐ Flat (0.5 ft/100 ft) ☒ Flat to Moderate ☐ Moderate (2 ft/100 ft) ☐ Moderate to Severe ☐ Severe (10 ft/100 ft)

ADDITIONAL STREAM INFORMATION (This Information Must Also be Completed):

QHEI PERFORMED? - ☐ Yes ☒ No QHEI Score _____ (If Yes, Attach Completed QHEI Form)

DOWNSTREAM DESIGNATED USE(S)

☐ WWH Name: _____ Distance from Evaluated Stream _____

☐ CWH Name: _____ Distance from Evaluated Stream _____

☐ EWH Name: _____ Distance from Evaluated Stream _____

MAPPING: ATTACH COPIES OF MAPS, INCLUDING THE ENTIRE WATERSHED AREA. CLEARLY MARK THE SITE LOCATION

USGS Quadrangle Name: _____ NRCS Soil Map Page: _____ NRCS Soil Map Stream Order _____

County: _____ Township / City: _____

MISCELLANEOUS

Base Flow Conditions? (Y/N): _____ Date of last precipitation: _____ Quantity: _____

Photograph Information: _____

Elevated Turbidity? (Y/N): _____ Canopy (% open): _____

Were samples collected for water chemistry? (Y/N): _____ (Note lab sample no. or id. and attach results) Lab Number: _____

Field Measures: Temp (°C) _____ Dissolved Oxygen (mg/l) _____ pH (S.U.) _____ Conductivity (µmhos/cm) _____

Is the sampling reach representative of the stream (Y/N) _____ If not, please explain: _____

Additional comments/description of pollution impacts: _____

BIOTIC EVALUATION

Performed? (Y/N): _____ (If Yes, Record all observations. Voucher collections optional. NOTE: all voucher samples must be labeled with the site ID number. Include appropriate field data sheets from the Primary Headwater Habitat Assessment Manual)

Fish Observed? (Y/N) _____ Voucher? (Y/N) _____ Salamanders Observed? (Y/N) _____ Voucher? (Y/N) _____

Frogs or Tadpoles Observed? (Y/N) _____ Voucher? (Y/N) _____ Aquatic Macroinvertebrates Observed? (Y/N) _____ Voucher? (Y/N) _____

Comments Regarding Biology: _____

DRAWING AND NARRATIVE DESCRIPTION OF STREAM REACH (This must be completed):

Include important landmarks and other features of interest for site evaluation and a narrative description of the stream's location

OhioEPA Primary Headwater Habitat Evaluation Form

HHEI Score (sum of metrics 1, 2, 3) : [ ]

SITE NAME/LOCATION _____

_____ SITE NUMBER _____ RIVER BASIN _____ DRAINAGE AREA (mi²) _____

LENGTH OF STREAM REACH (ft) _____ LAT. _____ LONG. _____ RIVER CODE _____ RIVER MILE _____

DATE _____ SCORER _____ COMMENTS _____

NOTE: Complete All Items On This Form - Refer to "Field Evaluation Manual for Ohio's PHWH Streams" for Instructions

STREAM CHANNEL MODIFICATIONS: ☐ NONE / NATURAL CHANNEL ☐ RECOVERED ☒ RECOVERING ☐ RECENT OR NO RECOVERY

1. SUBSTRATE (Estimate percent of every type of substrate present. Check *ONLY* two predominant substrate *TYPE* boxes (Max of 32). Add total number of significant substrate types found (Max of 8). Final metric score is sum of boxes A & B.

HHEI Metric Points

TYPE		PERCENT	TYPE		PERCENT
☐ ☐	BLDR SLABS [16 pts]		☐ ☐	SILT [3 pt]	
☐ ☐	BOULDER (>256 mm) [16 pts]		☐ ☐	LEAF PACK/WOODY DEBRIS [3 pts]	
☐ ☐	BEDROCK [16 pt]		☐ ☐	FINE DETRITUS [3 pts]	
☐ ☐	COBBLE (65-256 mm) [12 pts]		☐ ☐	CLAY or HARDPAN [0 pt]	
☐ ☐	GRAVEL (2-64 mm) [9 pts]		☐ ☐	MUCK [0 pts]	
☒ ☐	SAND (<2 mm) [6 pts]		☐ ☐	ARTIFICIAL [3 pts]	

Total of Percentages of Bldr Slabs, Boulder, Cobble, Bedrock _____ **(A)** **(B)** **A + B**

SCORE OF TWO MOST PREDOMINATE SUBSTRATE TYPES: **TOTAL NUMBER OF SUBSTRATE TYPES:**

Substrate Max = 40 [ ]

2. Maximum Pool Depth ***(Measure the maximum pool depth within the 61 meter (200 ft)*** evaluation reach at the time of evaluation. Avoid plunge pools from road culverts or storm water pipes) (Check *ONLY* one box):

- ☐ > 30 centimeters [20 pts]
- ☐ > 22.5 - 30 cm [30 pts]
- ☐ > 10 - 22.5 cm [25 pts]
- ☒ > 5 cm - 10 cm [15 pts]
- ☐ < 5 cm [5 pts]
- ☐ NO WATER OR MOIST CHANNEL [0 pts]

COMMENTS _____ **MAXIMUM POOL DEPTH (centimeters):**

Pool Depth Max = 30 [ ]

3. BANK FULL WIDTH (Measured as the average of 3-4 measurements) **(Check *ONLY* one box):**

- ☐ > 4.0 meters [30 pts]
- ☐ > 3.0 m - 4.0 m [25 pts]
- ☐ > 1.5 m - 3.0 m [20 pts]
- ☒ > 1.0 m - 1.5 m [15 pts]
- ☐ ≤ 1.0 m [5 pts]

COMMENTS _____ **AVERAGE BANKFULL WIDTH (meters):**

Bankfull Width Max=30 [ ]

This information must also be completed

RIPARIAN ZONE AND FLOODPLAIN QUALITY ☆NOTE: River Left (L) and Right (R) as looking downstream☆

RIPARIAN WIDTH L	R	(Per Bank)	FLOODPLAIN QUALITY L	R	(Most Predominant per Bank)	L	R	
☐	☐	Wide >10m	☐	☐	Mature Forest, Wetland	☐	☐	Conservation Tillage
☒	☐	Moderate 5-10m	☒	☐	Immature Forest, Shrub or Old Field	☐	☐	Urban or Industrial
☐	☐	Narrow <5m	☐	☐	Residential, Park, New Field	☒	☒	Open Pasture, Row Crop
☐	☐	None	☐	☐	Fenced Pasture	☐	☐	Mining or Construction

COMMENTS _____

FLOW REGIME *(At Time of Evaluation)* (Check *ONLY* one box):

- ☒ Stream Flowing
- ☐ Subsurface flow with isolated pools (Interstitial)
- ☐ Moist Channel, isolated pools, no flow (Intermittent)
- ☐ Dry channel, no water (Ephemeral)

COMMENTS _____

SINUOSITY (Number of bends per 61 m (200 ft) of channel) (Check *ONLY* one box):

☒ None	☐ 1.0	☐ 2.0	☐ 3.0
☐ 0.5	☐ 1.5	☐ 2.5	☐ >3

STREAM GRADIENT ESTIMATE

☐ Flat (0.5 ft/100 ft) ☒ Flat to Moderate ☐ Moderate (2 ft/100 ft) ☐ Moderate to Severe ☐ Severe (10 ft/100 ft)

ADDITIONAL STREAM INFORMATION (This Information Must Also be Completed):

QHEI PERFORMED? - ☐ Yes ☒ No QHEI Score _____ (If Yes, Attach Completed QHEI Form)

DOWNSTREAM DESIGNATED USE(S)

☐ WWH Name: _____ Distance from Evaluated Stream _____

☐ CWH Name: _____ Distance from Evaluated Stream _____

☐ EWH Name: _____ Distance from Evaluated Stream _____

MAPPING: ATTACH COPIES OF MAPS, INCLUDING THE ENTIRE WATERSHED AREA. CLEARLY MARK THE SITE LOCATION

USGS Quadrangle Name: _____ NRCS Soil Map Page: _____ NRCS Soil Map Stream Order _____

County: _____ Township / City: _____

MISCELLANEOUS

Base Flow Conditions? (Y/N): _____ Date of last precipitation: _____ Quantity: _____

Photograph Information: _____

Elevated Turbidity? (Y/N): _____ Canopy (% open): _____

Were samples collected for water chemistry? (Y/N): _____ (Note lab sample no. or id. and attach results) Lab Number: _____

Field Measures: Temp (°C) _____ Dissolved Oxygen (mg/l) _____ pH (S.U.) _____ Conductivity (µmhos/cm) _____

Is the sampling reach representative of the stream (Y/N) _____ If not, please explain: _____

_____

Additional comments/description of pollution impacts: _____

_____

BIOTIC EVALUATION

Performed? (Y/N): _____ (If Yes, Record all observations. Voucher collections optional. NOTE: all voucher samples must be labeled with the site ID number. Include appropriate field data sheets from the Primary Headwater Habitat Assessment Manual)

Fish Observed? (Y/N) _____ Voucher? (Y/N) _____ Salamanders Observed? (Y/N) _____ Voucher? (Y/N) _____

Frogs or Tadpoles Observed? (Y/N) _____ Voucher? (Y/N) _____ Aquatic Macroinvertebrates Observed? (Y/N) _____ Voucher? (Y/N) _____

Comments Regarding Biology: _____

_____

_____

DRAWING AND NARRATIVE DESCRIPTION OF STREAM REACH (This must be completed):

Include important landmarks and other features of interest for site evaluation and a narrative description of the stream's location

FLOW ➜

OhioEPA Primary Headwater Habitat Evaluation Form

HHEI Score (sum of metrics 1, 2, 3) : [illegible]

SITE NAME/LOCATION [illegible]

SITE NUMBER [illegible] RIVER BASIN [illegible] DRAINAGE AREA (mi²) [illegible]

LENGTH OF STREAM REACH (ft) _____ LAT. _____ LONG. _____ RIVER CODE _____ RIVER MILE _____

DATE 9/12/02 SCORER [illegible] COMMENTS _____

NOTE: Complete All Items On This Form - Refer to "Field Evaluation Manual for Ohio's PHWH Streams" for Instructions

STREAM CHANNEL MODIFICATIONS: ☒ NONE / NATURAL CHANNEL ☐ RECOVERED ☐ RECOVERING ☐ RECENT OR NO RECOVERY

1. SUBSTRATE (Estimate percent of every type of substrate present. Check *ONLY* two predominant substrate *TYPE* boxes (Max of 32). Add total number of significant substrate types found (Max of 8). Final metric score is sum of boxes A & B.

HHEI Metric Points

TYPE		PERCENT	TYPE		PERCENT
☐ ☐	BLDR SLABS [16 pts]		☐ ☐	SILT [3 pt]	
☐ ☐	BOULDER (>256 mm) [16 pts]		☒ ☐	LEAF PACK/WOODY DEBRIS [3 pts]	
☐ ☐	BEDROCK [16 pt]		☐ ☐	FINE DETRITUS [3 pts]	
☐ ☐	COBBLE (65-256 mm) [12 pts]		☐ ☐	CLAY or HARDPAN [0 pt]	
☐ ☐	GRAVEL (2-64 mm) [9 pts]		☐ ☐	MUCK [0 pts]	
☒ ☐	SAND (<2 mm) [6 pts]		☐ ☐	ARTIFICIAL [3 pts]	

Total of Percentages of Bldr Slabs, Boulder, Cobble, Bedrock _____ **(A)** **(B)**

SCORE OF TWO MOST PREDOMINATE SUBSTRATE TYPES: [illegible] **TOTAL NUMBER OF SUBSTRATE TYPES:** [illegible]

Substrate Max = 40 [illegible]

A + B

2. Maximum Pool Depth ***(Measure the maximum pool depth within the 61 meter (200 ft)*** evaluation reach at the time of evaluation. Avoid plunge pools from road culverts or storm water pipes) (Check *ONLY* one box):

☐ > 30 centimeters [20 pts]
☐ > 22.5 - 30 cm [30 pts]
☐ > 10 - 22.5 cm [25 pts]
☐ > 5 cm - 10 cm [15 pts]
☐ < 5 cm [5 pts]
☒ NO WATER OR MOIST CHANNEL [0 pts]

COMMENTS _____ **MAXIMUM POOL DEPTH (centimeters):** [illegible]

Pool Depth Max = 30 [illegible]

3. BANK FULL WIDTH (Measured as the average of 3-4 measurements) **(Check *ONLY* one box):**

☐ > 4.0 meters [30 pts]
☐ > 3.0 m - 4.0 m [25 pts]
☐ > 1.5 m - 3.0 m [20 pts]
☐ > 1.0 m - 1.5 m [15 pts]
☒ ≤ 1.0 m [5 pts]

COMMENTS _____ **AVERAGE BANKFULL WIDTH (meters):** [illegible]

Bankfull Width Max=30 [illegible]

This information must also be completed

RIPARIAN ZONE AND FLOODPLAIN QUALITY ☆NOTE: River Left (L) and Right (R) as looking downstream☆

L R	RIPARIAN WIDTH (Per Bank)	L R	FLOODPLAIN QUALITY (Most Predominant per Bank)	L R	
☒ ☒	Wide >10m	☒ ☒	Mature Forest, Wetland	☐ ☐	Conservation Tillage
☐ ☐	Moderate 5-10m	☐ ☐	Immature Forest, Shrub or Old Field	☐ ☐	Urban or Industrial
☐ ☐	Narrow <5m	☐ ☐	Residential, Park, New Field	☐ ☐	Open Pasture, Row Crop
☐ ☐	None	☐ ☐	Fenced Pasture	☐ ☐	Mining or Construction

COMMENTS _____

FLOW REGIME *(At Time of Evaluation)* (Check *ONLY* one box):

☐ Stream Flowing
☐ Subsurface flow with isolated pools (Interstitial)
☐ Moist Channel, isolated pools, no flow (Intermittent)
☒ Dry channel, no water (Ephemeral)

COMMENTS _____

SINUOSITY (Number of bends per 61 m (200 ft) of channel) (Check *ONLY* one box):

☐ None ☐ 1.0 ☐ 2.0 ☐ 3.0
☐ 0.5 ☐ 1.5 ☐ 2.5 ☒ >3

STREAM GRADIENT ESTIMATE

☐ Flat (0.5 ft/100 ft) ☐ Flat to Moderate ☐ Moderate (2 ft/100 ft) ☒ Moderate to Severe ☐ Severe (10 ft/100 ft)

ADDITIONAL STREAM INFORMATION (This Information Must Also be Completed):

QHEI PERFORMED? - ☐ Yes ☐ No QHEI Score _____ (If Yes, Attach Completed QHEI Form)

DOWNSTREAM DESIGNATED USE(S)

☐ WWH Name: _____ Distance from Evaluated Stream _____

☐ CWH Name: _____ Distance from Evaluated Stream _____

☐ EWH Name: _____ Distance from Evaluated Stream _____

MAPPING: ATTACH COPIES OF MAPS, INCLUDING THE ENTIRE WATERSHED AREA. CLEARLY MARK THE SITE LOCATION

USGS Quadrangle Name: _____ NRCS Soil Map Page: _____ NRCS Soil Map Stream Order _____

County: _____ Township / City: _____

MISCELLANEOUS

Base Flow Conditions? (Y/N): _____ Date of last precipitation: _____ Quantity: _____

Photograph Information: _____

Elevated Turbidity? (Y/N): _____ Canopy (% open): _____

Were samples collected for water chemistry? (Y/N): _____ (Note lab sample no. or id. and attach results) Lab Number: _____

Field Measures: Temp (°C) _____ Dissolved Oxygen (mg/l) _____ pH (S.U.) _____ Conductivity (µmhos/cm) _____

Is the sampling reach representative of the stream (Y/N) _____ If not, please explain: _____

Additional comments/description of pollution impacts: _____

BIOTIC EVALUATION

Performed? (Y/N): _____ (If Yes, Record all observations. Voucher collections optional. NOTE: all voucher samples must be labeled with the site ID number. Include appropriate field data sheets from the Primary Headwater Habitat Assessment Manual)

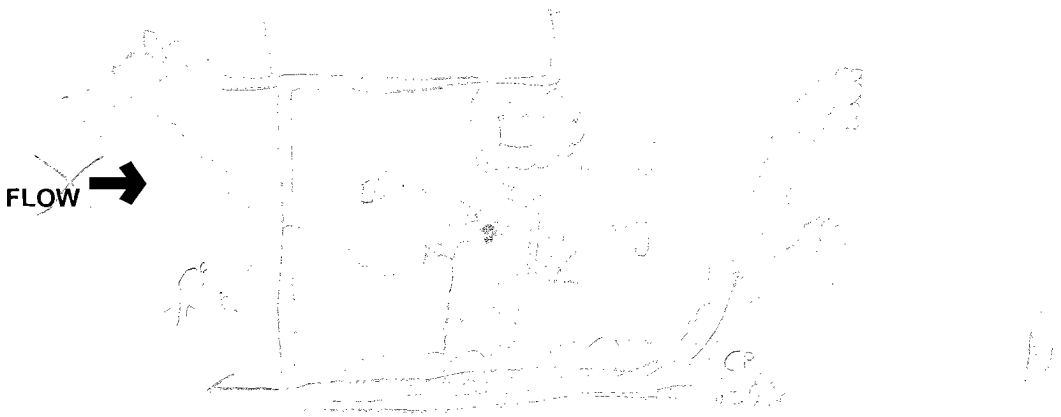
Fish Observed? (Y/N) _____ Voucher? (Y/N) _____ Salamanders Observed? (Y/N) _____ Voucher? (Y/N) _____

Frogs or Tadpoles Observed? (Y/N) _____ Voucher? (Y/N) _____ Aquatic Macroinvertebrates Observed? (Y/N) _____ Voucher? (Y/N) _____

Comments Regarding Biology: _____

DRAWING AND NARRATIVE DESCRIPTION OF STREAM REACH (This must be completed):

Include important landmarks and other features of interest for site evaluation and a narrative description of the stream's location



OhioEPA Primary Headwater Habitat Evaluation Form

HHEI Score (sum of metrics 1, 2, 3) : ~~13~~ 14

SITE NAME/LOCATION _____

Trib of First Creek SITE NUMBER Sec 3-S53 RIVER BASIN White River DRAINAGE AREA (mi²) 0.16 mi²

LENGTH OF STREAM REACH (ft) 200 ft LAT. _____ LONG. _____ RIVER CODE _____ RIVER MILE _____

DATE 9/12/05 SCORER K Allison COMMENTS _____

NOTE: Complete All Items On This Form - Refer to "Field Evaluation Manual for Ohio's PHWH Streams" for Instructions

STREAM CHANNEL MODIFICATIONS: ☒ NONE / NATURAL CHANNEL ☐ RECOVERED ☐ RECOVERING ☐ RECENT OR NO RECOVERY

1. SUBSTRATE (Estimate percent of every type of substrate present. Check *ONLY* two predominant substrate *TYPE* boxes (Max of 32). Add total number of significant substrate types found (Max of 8). Final metric score is sum of boxes A & B.

TYPE		PERCENT	TYPE		PERCENT
☐☐	BLDR SLABS [16 pts]		☐☐	SILT [3 pt]	
☐☐	BOULDER (>256 mm) [16 pts]		☐☐	LEAF PACK/WOODY DEBRIS [3 pts]	5
☐☐	BEDROCK [16 pt]		☐☐	FINE DETRITUS [3 pts]	
☐☐	COBBLE (65-256 mm) [12 pts]		☐☐	CLAY or HARDPAN [0 pt]	
☐☐	GRAVEL (2-64 mm) [9 pts]		☐☐	MUCK [0 pts]	
☒☒	SAND (<2 mm) [6 pts]	95	☐☐	ARTIFICIAL [3 pts]	

Total of Percentages of Bldr Slabs, Boulder, Cobble, Bedrock 0% (A) (B)

SCORE OF TWO MOST PREDOMINATE SUBSTRATE TYPES: ~~6~~ 12 (KLE) TOTAL NUMBER OF SUBSTRATE TYPES: 2

HHEI Metric Points

Substrate Max = 40: ~~8~~ 14 (KLE)

A + B

2. Maximum Pool Depth ***(Measure the maximum pool depth within the 61 meter (200 ft)*** evaluation reach at the time of evaluation. Avoid plunge pools from road culverts or storm water pipes) (Check *ONLY* one box):

- ☐ > 30 centimeters [20 pts]
- ☐ > 22.5 - 30 cm [30 pts]
- ☐ > 10 - 22.5 cm [25 pts]
- ☐ > 5 cm - 10 cm [15 pts]
- ☐ < 5 cm [5 pts]
- ☒ NO WATER OR MOIST CHANNEL [0 pts]

COMMENTS _____ MAXIMUM POOL DEPTH (centimeters): 0

Pool Depth Max = 30: 0

3. BANK FULL WIDTH (Measured as the average of 3-4 measurements) (Check *ONLY* one box):

- ☐ > 4.0 meters [30 pts]
- ☐ > 3.0 m - 4.0 m [25 pts]
- ☐ > 1.5 m - 3.0 m [20 pts]
- ☐ > 1.0 m - 1.5 m [15 pts]
- ☒ ≤ 1.0 m [5 pts]

COMMENTS _____ AVERAGE BANKFULL WIDTH (meters): .9

Bankfull Width Max=30: 5

This information must also be completed

RIPARIAN ZONE AND FLOODPLAIN QUALITY ☆NOTE: River Left (L) and Right (R) as looking downstream☆

RIPARIAN WIDTH (Per Bank) L	R		FLOODPLAIN QUALITY (Most Predominant per Bank) L	R		L	R	
☒	☒	Wide >10m	☒	☒	Mature Forest, Wetland	☐	☐	Conservation Tillage
☐	☐	Moderate 5-10m	☐	☐	Immature Forest, Shrub or Old Field	☐	☐	Urban or Industrial
☐	☐	Narrow <5m	☐	☐	Residential, Park, New Field	☐	☐	Open Pasture, Row Crop
☐	☐	None	☐	☐	Fenced Pasture	☐	☐	Mining or Construction

COMMENTS _____

FLOW REGIME *(At Time of Evaluation)* (Check *ONLY* one box):

- ☐ Stream Flowing
- ☐ Subsurface flow with isolated pools (Interstitial)
- ☐ Moist Channel, isolated pools, no flow (Intermittent)
- ☒ Dry channel, no water (Ephemeral)

COMMENTS _____

SINUOSITY (Number of bends per 61 m (200 ft) of channel) (Check *ONLY* one box):

- ☐ None
- ☐ 0.5
- ☐ 1.0
- ☐ 1.5
- ☐ 2.0
- ☐ 2.5
- ☐ 3.0
- ☒ >3

STREAM GRADIENT ESTIMATE

☐ Flat (0.5 ft/100 ft) ☐ Flat to Moderate ☐ Moderate (2 ft/100 ft) ☐ Moderate to Severe ☒ Severe (10 ft/100 ft)

ADDITIONAL STREAM INFORMATION (This Information Must Also be Completed):

QHEI PERFORMED? - ☐ Yes ☐ No QHEI Score _____ (If Yes, Attach Completed QHEI Form)

DOWNSTREAM DESIGNATED USE(S)

☐ WWH Name: _____ Distance from Evaluated Stream _____

☐ CWH Name: _____ Distance from Evaluated Stream _____

☐ EWH Name: _____ Distance from Evaluated Stream _____

MAPPING: ATTACH COPIES OF MAPS, INCLUDING THE ENTIRE WATERSHED AREA. CLEARLY MARK THE SITE LOCATION

USGS Quadrangle Name: _____ NRCS Soil Map Page: _____ NRCS Soil Map Stream Order _____

County: _____ Township / City: _____

MISCELLANEOUS

Base Flow Conditions? (Y/N): _____ Date of last precipitation: _____ Quantity: _____

Photograph Information: _____

Elevated Turbidity? (Y/N): _____ Canopy (% open): _____

Were samples collected for water chemistry? (Y/N): _____ (Note lab sample no. or id. and attach results) Lab Number: _____

Field Measures: Temp (°C)_____ Dissolved Oxygen (mg/l) _____ pH (S.U.) _____ Conductivity (µmhos/cm) _____

Is the sampling reach representative of the stream (Y/N)_____ If not, please explain: _____

_____

Additional comments/description of pollution impacts: _____

_____

BIOTIC EVALUATION

Performed? (Y/N): _____ (If Yes, Record all observations. Voucher collections optional. NOTE: all voucher samples must be labeled with the site ID number. Include appropriate field data sheets from the Primary Headwater Habitat Assessment Manual)

Fish Observed? (Y/N)_____ Voucher? (Y/N)_____ Salamanders Observed? (Y/N)_____ Voucher? (Y/N)_____
Frogs or Tadpoles Observed? (Y/N)____ Voucher? (Y/N)____ Aquatic Macroinvertebrates Observed? (Y/N)____ Voucher? (Y/N)____

Comments Regarding Biology: _____

_____

_____

DRAWING AND NARRATIVE DESCRIPTION OF STREAM REACH (This must be completed):

Include important landmarks and other features of interest for site evaluation and a narrative description of the stream's location

FLOW ➔

OhioEPA Primary Headwater Habitat Evaluation Form

HHEI Score (sum of metrics 1, 2, 3) : [illegible]

SITE NAME/LOCATION [illegible] SITE NUMBER [illegible] RIVER BASIN [illegible] DRAINAGE AREA (mi²) [illegible]

LENGTH OF STREAM REACH (ft) [illegible] LAT. ____ LONG. ____ RIVER CODE ____ RIVER MILE ____

DATE 9/9/05 SCORER [illegible] COMMENTS ____

NOTE: Complete All Items On This Form - Refer to "Field Evaluation Manual for Ohio's PHWH Streams" for Instructions

STREAM CHANNEL MODIFICATIONS: ☒ NONE / NATURAL CHANNEL ☐ RECOVERED ☐ RECOVERING ☐ RECENT OR NO RECOVERY

1. SUBSTRATE (Estimate percent of every type of substrate present. Check *ONLY* two predominant substrate *TYPE* boxes (Max of 32). Add total number of significant substrate types found (Max of 8). Final metric score is sum of boxes A & B.

HHEI Metric Points

TYPE		PERCENT	TYPE		PERCENT
☐ ☐	BLDR SLABS [16 pts]		☒ ☐	SILT [3 pt]	[illegible]
☐ ☐	BOULDER (>256 mm) [16 pts]		☐ ☐	LEAF PACK/WOODY DEBRIS [3 pts]	[illegible]
☐ ☐	BEDROCK [16 pt]		☐ ☐	FINE DETRITUS [3 pts]	
☐ ☐	COBBLE (65-256 mm) [12 pts]		☐ ☐	CLAY or HARDPAN [0 pt]	
☐ ☐	GRAVEL (2-64 mm) [9 pts]		☐ ☐	MUCK [0 pts]	
☒ ☐	SAND (<2 mm) [6 pts]	[illegible]	☐ ☐	ARTIFICIAL [3 pts]	

Total of Percentages of Bldr Slabs, Boulder, Cobble, Bedrock ____ **(A)** **(B)**

Substrate Max = 40 [illegible]

A + B

SCORE OF TWO MOST PREDOMINATE SUBSTRATE TYPES: [illegible] **TOTAL NUMBER OF SUBSTRATE TYPES:** [illegible]

2. Maximum Pool Depth ***(Measure the maximum pool depth within the 61 meter (200 ft)*** evaluation reach at the time of evaluation. Avoid plunge pools from road culverts or storm water pipes) (Check *ONLY* one box):

Pool Depth Max = 30 [illegible]

- ☐ > 30 centimeters [20 pts]
- ☐ > 22.5 - 30 cm [30 pts]
- ☐ > 10 - 22.5 cm [25 pts]
- ☐ > 5 cm - 10 cm [15 pts]
- ☒ < 5 cm [5 pts]
- ☐ NO WATER OR MOIST CHANNEL [0 pts]

COMMENTS ____ **MAXIMUM POOL DEPTH (centimeters):** [illegible]

3. BANK FULL WIDTH (Measured as the average of 3-4 measurements) **(Check *ONLY* one box):**

Bankfull Width Max=30 [illegible]

- ☐ > 4.0 meters [30 pts]
- ☐ > 3.0 m - 4.0 m [25 pts]
- ☐ > 1.5 m - 3.0 m [20 pts]
- ☐ > 1.0 m - 1.5 m [15 pts]
- ☒ ≤ 1.0 m [5 pts]

COMMENTS ____ **AVERAGE BANKFULL WIDTH (meters):** [illegible]

This information must also be completed

RIPARIAN ZONE AND FLOODPLAIN QUALITY ☆NOTE: River Left (L) and Right (R) as looking downstream☆

RIPARIAN WIDTH (Per Bank) L R	FLOODPLAIN QUALITY (Most Predominant per Bank) L R	L R
☒ ☒ Wide >10m	☒ ☒ Mature Forest, Wetland	☐ ☐ Conservation Tillage
☐ ☐ Moderate 5-10m	☐ ☐ Immature Forest, Shrub or Old Field	☐ ☐ Urban or Industrial
☐ ☐ Narrow <5m	☐ ☐ Residential, Park, New Field	☐ ☐ Open Pasture, Row Crop
☐ ☐ None	☐ ☐ Fenced Pasture	☐ ☐ Mining or Construction

COMMENTS ____

FLOW REGIME *(At Time of Evaluation)* (Check *ONLY* one box):

- ☒ Stream Flowing
- ☐ Subsurface flow with isolated pools (Interstitial)
- ☐ Moist Channel, isolated pools, no flow (Intermittent)
- ☐ Dry channel, no water (Ephemeral)

COMMENTS [illegible]

SINUOSITY (Number of bends per 61 m (200 ft) of channel) (Check *ONLY* one box):

☐ None	☐ 1.0	☐ 2.0	☐ 3.0
☐ 0.5	☐ 1.5	☐ 2.5	☒ >3

STREAM GRADIENT ESTIMATE

☐ Flat (0.5 ft/100 ft) ☒ Flat to Moderate ☐ Moderate (2 ft/100 ft) ☐ Moderate to Severe ☐ Severe (10 ft/100 ft)

ADDITIONAL STREAM INFORMATION (This Information Must Also be Completed):

QHEI PERFORMED? - ☐ Yes ☐ No QHEI Score _____ (If Yes, Attach Completed QHEI Form)

DOWNSTREAM DESIGNATED USE(S)

☐ WWH Name: _____ Distance from Evaluated Stream _____

☐ CWH Name: _____ Distance from Evaluated Stream _____

☐ EWH Name: _____ Distance from Evaluated Stream _____

MAPPING: ATTACH COPIES OF MAPS, INCLUDING THE ENTIRE WATERSHED AREA. CLEARLY MARK THE SITE LOCATION

USGS Quadrangle Name: _____ NRCS Soil Map Page: _____ NRCS Soil Map Stream Order _____

County: _____ Township / City: _____

MISCELLANEOUS

Base Flow Conditions? (Y/N): _____ Date of last precipitation: _____ Quantity: _____

Photograph Information: _____

Elevated Turbidity? (Y/N): N Canopy (% open): 0%

Were samples collected for water chemistry? (Y/N): _____ (Note lab sample no. or id. and attach results) Lab Number: _____

Field Measures: Temp (°C) _____ Dissolved Oxygen (mg/l) _____ pH (S.U.) _____ Conductivity (µmhos/cm) _____

Is the sampling reach representative of the stream (Y/N) _____ If not, please explain: _____

_____

Additional comments/description of pollution impacts: _____

_____

BIOTIC EVALUATION

Performed? (Y/N): N (If Yes, Record all observations. Voucher collections optional. NOTE: all voucher samples must be labeled with the site ID number. Include appropriate field data sheets from the Primary Headwater Habitat Assessment Manual)

Fish Observed? (Y/N) _____ Voucher? (Y/N) _____ Salamanders Observed? (Y/N) _____ Voucher? (Y/N) _____
Frogs or Tadpoles Observed? (Y/N) _____ Voucher? (Y/N) _____ Aquatic Macroinvertebrates Observed? (Y/N) _____ Voucher? (Y/N) _____

Comments Regarding Biology: _____

_____

_____

DRAWING AND NARRATIVE DESCRIPTION OF STREAM REACH (This must be completed):

Include important landmarks and other features of interest for site evaluation and a narrative description of the stream's location

OhioEPA Primary Headwater Habitat Evaluation Form

HHEI Score (sum of metrics 1, 2, 3) : [illegible]

SITE NAME/LOCATION _____

[illegible] SITE NUMBER [illegible] RIVER BASIN _____ DRAINAGE AREA (mi²) [illegible]

LENGTH OF STREAM REACH (ft) [illegible] LAT. _____ LONG. _____ RIVER CODE _____ RIVER MILE _____

DATE [illegible] SCORER [illegible] COMMENTS _____

NOTE: Complete All Items On This Form - Refer to "Field Evaluation Manual for Ohio's PHWH Streams" for Instructions

STREAM CHANNEL MODIFICATIONS: ☒ NONE / NATURAL CHANNEL ☐ RECOVERED ☐ RECOVERING ☐ RECENT OR NO RECOVERY

1. SUBSTRATE (Estimate percent of every type of substrate present. Check *ONLY* two predominant substrate *TYPE* boxes (Max of 32). Add total number of significant substrate types found (Max of 8). Final metric score is sum of boxes A & B.

HHEI Metric Points

TYPE		PERCENT	TYPE		PERCENT
☐ ☐	BLDR SLABS [16 pts]		☒ ☐	SILT [3 pt]	30%
☐ ☐	BOULDER (>256 mm) [16 pts]		☐ ☐	LEAF PACK/WOODY DEBRIS [3 pts]	20%
☐ ☐	BEDROCK [16 pt]		☒ ☐	FINE DETRITUS [3 pts]	30%
☐ ☐	COBBLE (65-256 mm) [12 pts]		☐ ☐	CLAY or HARDPAN [0 pt]	
☐ ☐	GRAVEL (2-64 mm) [9 pts]		☐ ☐	MUCK [0 pts]	20%
☐ ☐	SAND (<2 mm) [6 pts]		☐ ☐	ARTIFICIAL [3 pts]	

Total of Percentages of Bldr Slabs, Boulder, Cobble, Bedrock _____ **(A)** **(B)**

Substrate Max = 40 [illegible]

A + B

SCORE OF TWO MOST PREDOMINATE SUBSTRATE TYPES: 6 **TOTAL NUMBER OF SUBSTRATE TYPES:** [illegible]

2. Maximum Pool Depth ***(Measure the maximum pool depth within the 61 meter (200 ft)*** evaluation reach at the time of evaluation. Avoid plunge pools from road culverts or storm water pipes) (Check *ONLY* one box):

Pool Depth Max = 30 5

- ☐ > 30 centimeters [20 pts]
- ☐ > 22.5 - 30 cm [30 pts]
- ☐ > 10 - 22.5 cm [25 pts]
- ☐ > 5 cm - 10 cm [15 pts]
- ☒ < 5 cm [5 pts]
- ☐ NO WATER OR MOIST CHANNEL [0 pts]

COMMENTS _____ **MAXIMUM POOL DEPTH (centimeters):** 2

3. BANK FULL WIDTH (Measured as the average of 3-4 measurements) **(Check *ONLY* one box):**

Bankfull Width Max=30 5

- ☐ > 4.0 meters [30 pts]
- ☐ > 3.0 m - 4.0 m [25 pts]
- ☐ > 1.5 m - 3.0 m [20 pts]
- ☐ > 1.0 m - 1.5 m [15 pts]
- ☒ ≤ 1.0 m [5 pts]

COMMENTS _____ **AVERAGE BANKFULL WIDTH (meters):** .6

This information must also be completed

RIPARIAN ZONE AND FLOODPLAIN QUALITY ☆NOTE: River Left (L) and Right (R) as looking downstream☆

RIPARIAN WIDTH L	R	(Per Bank)	FLOODPLAIN QUALITY L	R	(Most Predominant per Bank)	L	R	
☒	☒	Wide >10m	☒	☒	Mature Forest, Wetland	☐	☐	Conservation Tillage
☐	☐	Moderate 5-10m	☐	☐	Immature Forest, Shrub or Old Field	☐	☐	Urban or Industrial
☐	☐	Narrow <5m	☐	☐	Residential, Park, New Field	☐	☒	Open Pasture, Row Crop
☐	☐	None	☐	☐	Fenced Pasture	☐	☐	Mining or Construction

COMMENTS _____

FLOW REGIME *(At Time of Evaluation)* (Check *ONLY* one box):

- ☒ Stream Flowing
- ☐ Subsurface flow with isolated pools (Interstitial)
- ☐ Moist Channel, isolated pools, no flow (Intermittent)
- ☐ Dry channel, no water (Ephemeral)

COMMENTS _____

SINUOSITY (Number of bends per 61 m (200 ft) of channel) (Check *ONLY* one box):

☐ None	☐ 1.0	☐ 2.0	☐ 3.0
☐ 0.5	☐ 1.5	☒ 2.5	☐ >3

STREAM GRADIENT ESTIMATE

☐ Flat (0.5 ft/100 ft) ☒ Flat to Moderate ☐ Moderate (2 ft/100 ft) ☐ Moderate to Severe ☐ Severe (10 ft/100 ft)

ADDITIONAL STREAM INFORMATION (This Information Must Also be Completed):

QHEI PERFORMED? - ☐ Yes ☒ No QHEI Score _____ (If Yes, Attach Completed QHEI Form)

DOWNSTREAM DESIGNATED USE(S)

☐ WWH Name: _____ Distance from Evaluated Stream _____

☐ CWH Name: _____ Distance from Evaluated Stream _____

☐ EWH Name: _____ Distance from Evaluated Stream _____

MAPPING: ATTACH COPIES OF MAPS, INCLUDING THE ENTIRE WATERSHED AREA. CLEARLY MARK THE SITE LOCATION

USGS Quadrangle Name: _____ NRCS Soil Map Page: _____ NRCS Soil Map Stream Order _____

County: _____ Township / City: _____

MISCELLANEOUS

Base Flow Conditions? (Y/N): _____ Date of last precipitation: _____ Quantity: _____

Photograph Information: _____

Elevated Turbidity? (Y/N): _____ Canopy (% open): _____

Were samples collected for water chemistry? (Y/N): _____ (Note lab sample no. or id. and attach results) Lab Number: _____

Field Measures: Temp (°C) _____ Dissolved Oxygen (mg/l) _____ pH (S.U.) _____ Conductivity (µmhos/cm) _____

Is the sampling reach representative of the stream (Y/N) _____ If not, please explain: _____

Additional comments/description of pollution impacts: _____

BIOTIC EVALUATION

Performed? (Y/N): _____ (If Yes, Record all observations. Voucher collections optional. NOTE: all voucher samples must be labeled with the site ID number. Include appropriate field data sheets from the Primary Headwater Habitat Assessment Manual)

Fish Observed? (Y/N) _____ Voucher? (Y/N) _____ Salamanders Observed? (Y/N) _____ Voucher? (Y/N) _____

Frogs or Tadpoles Observed? (Y/N) _____ Voucher? (Y/N) _____ Aquatic Macroinvertebrates Observed? (Y/N) _____ Voucher? (Y/N) _____

Comments Regarding Biology: _____

DRAWING AND NARRATIVE DESCRIPTION OF STREAM REACH (This must be completed):

Include important landmarks and other features of interest for site evaluation and a narrative description of the stream's location

FLOW ➔

OhioEPA Primary Headwater Habitat Evaluation Form

HHEI Score (sum of metrics 1, 2, 3) : [illegible]

SITE NAME/LOCATION _____

[illegible] SITE NUMBER [illegible] RIVER BASIN [illegible] DRAINAGE AREA (mi²) [illegible]

LENGTH OF STREAM REACH (ft) [illegible] LAT. _____ LONG. _____ RIVER CODE _____ RIVER MILE _____

DATE [illegible] SCORER [illegible] COMMENTS _____

NOTE: Complete All Items On This Form - Refer to "Field Evaluation Manual for Ohio's PHWH Streams" for Instructions

STREAM CHANNEL MODIFICATIONS: ☐ NONE / NATURAL CHANNEL ☐ RECOVERED ☐ RECOVERING ☒ RECENT OR NO RECOVERY

1. SUBSTRATE (Estimate percent of every type of substrate present. Check *ONLY* two predominant substrate *TYPE* boxes (Max of 32). Add total number of significant substrate types found (Max of 8). Final metric score is sum of boxes A & B.

HHEI Metric Points

TYPE		PERCENT	TYPE		PERCENT
☐ ☐	BLDR SLABS [16 pts]		☐ ☐	SILT [3 pt]	
☐ ☐	BOULDER (>256 mm) [16 pts]		☒ ☐	LEAF PACK/WOODY DEBRIS [3 pts]	
☐ ☐	BEDROCK [16 pt]		☐ ☐	FINE DETRITUS [3 pts]	
☐ ☐	COBBLE (65-256 mm) [12 pts]		☐ ☐	CLAY or HARDPAN [0 pt]	
☐ ☐	GRAVEL (2-64 mm) [9 pts]		☐ ☐	MUCK [0 pts]	
☒ ☐	SAND (<2 mm) [6 pts]		☐ ☐	ARTIFICIAL [3 pts]	

Total of Percentages of Bldr Slabs, Boulder, Cobble, Bedrock _____ **(A)** **(B)**

Substrate Max = 40

A + B

SCORE OF TWO MOST PREDOMINATE SUBSTRATE TYPES: [illegible] **TOTAL NUMBER OF SUBSTRATE TYPES:** [illegible]

2. Maximum Pool Depth ***(Measure the maximum pool depth within the 61 meter (200 ft)*** evaluation reach at the time of evaluation. Avoid plunge pools from road culverts or storm water pipes) (Check *ONLY* one box):

Pool Depth Max = 30

☐ > 30 centimeters [20 pts]
☐ > 22.5 - 30 cm [30 pts]
☐ > 10 - 22.5 cm [25 pts]
☐ > 5 cm - 10 cm [15 pts]
☐ < 5 cm [5 pts]
☒ NO WATER OR MOIST CHANNEL [0 pts]

COMMENTS _____ **MAXIMUM POOL DEPTH (centimeters):** 0

3. BANK FULL WIDTH (Measured as the average of 3-4 measurements) **(Check *ONLY* one box):**

Bankfull Width Max=30

☐ > 4.0 meters [30 pts]
☐ > 3.0 m - 4.0 m [25 pts]
☐ > 1.5 m - 3.0 m [20 pts]
☐ > 1.0 m - 1.5 m [15 pts]
☒ ≤ 1.0 m [5 pts]

COMMENTS _____ **AVERAGE BANKFULL WIDTH (meters):** .6

This information must also be completed

RIPARIAN ZONE AND FLOODPLAIN QUALITY ☆NOTE: River Left (L) and Right (R) as looking downstream☆

RIPARIAN WIDTH L R	(Per Bank)	FLOODPLAIN QUALITY L R	(Most Predominant per Bank)	L R	
☐ ☐	Wide >10m	☐ ☐	Mature Forest, Wetland	☐ ☐	Conservation Tillage
☐ ☐	Moderate 5-10m	☒ ☐	Immature Forest, Shrub or Old Field	☐ ☒	Urban or Industrial
☒ ☐	Narrow <5m	☐ ☐	Residential, Park, New Field	☐ ☐	Open Pasture, Row Crop
☐ ☐	None	☐ ☐	Fenced Pasture	☐ ☐	Mining or Construction

COMMENTS _____

FLOW REGIME *(At Time of Evaluation)* (Check *ONLY* one box):

☐ Stream Flowing
☐ Subsurface flow with isolated pools (Interstitial)
☐ Moist Channel, isolated pools, no flow (Intermittent)
☒ Dry channel, no water (Ephemeral)

COMMENTS _____

SINUOSITY (Number of bends per 61 m (200 ft) of channel) (Check *ONLY* one box):

☒ None ☐ 1.0 ☐ 2.0 ☐ 3.0
☐ 0.5 ☐ 1.5 ☐ 2.5 ☐ >3

STREAM GRADIENT ESTIMATE

☐ Flat (0.5 ft/100 ft) ☒ Flat to Moderate ☐ Moderate (2 ft/100 ft) ☐ Moderate to Severe ☐ Severe (10 ft/100 ft)

ADDITIONAL STREAM INFORMATION (This Information Must Also be Completed):

QHEI PERFORMED? - ☐ Yes ☑ No QHEI Score _____ (If Yes, Attach Completed QHEI Form)

DOWNSTREAM DESIGNATED USE(S)

☐ WWH Name: _____ Distance from Evaluated Stream _____

☐ CWH Name: _____ Distance from Evaluated Stream _____

☐ EWH Name: _____ Distance from Evaluated Stream _____

MAPPING: ATTACH COPIES OF MAPS, INCLUDING THE ENTIRE WATERSHED AREA. CLEARLY MARK THE SITE LOCATION

USGS Quadrangle Name: _____ NRCS Soil Map Page: _____ NRCS Soil Map Stream Order _____

County: _____ Township / City: _____

MISCELLANEOUS

Base Flow Conditions? (Y/N): _____ Date of last precipitation: _____ Quantity: _____

Photograph Information: _____

Elevated Turbidity? (Y/N): _____ Canopy (% open): _____

Were samples collected for water chemistry? (Y/N): _____ (Note lab sample no. or id. and attach results) Lab Number: _____

Field Measures: Temp (°C) _____ Dissolved Oxygen (mg/l) _____ pH (S.U.) _____ Conductivity (µmhos/cm) _____

Is the sampling reach representative of the stream (Y/N) _____ If not, please explain: _____

_____

Additional comments/description of pollution impacts: _____

_____

BIOTIC EVALUATION

Performed? (Y/N): _____ (If Yes, Record all observations. Voucher collections optional. NOTE: all voucher samples must be labeled with the site ID number. Include appropriate field data sheets from the Primary Headwater Habitat Assessment Manual)

Fish Observed? (Y/N) _____ Voucher? (Y/N) _____ Salamanders Observed? (Y/N) _____ Voucher? (Y/N) _____

Frogs or Tadpoles Observed? (Y/N) _____ Voucher? (Y/N) _____ Aquatic Macroinvertebrates Observed? (Y/N) _____ Voucher? (Y/N) _____

Comments Regarding Biology: _____

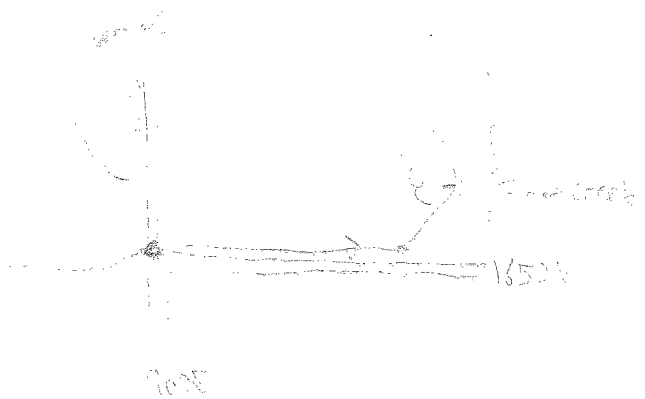
_____

_____

DRAWING AND NARRATIVE DESCRIPTION OF STREAM REACH (This must be completed):

Include important landmarks and other features of interest for site evaluation and a narrative description of the stream's location

FLOW ➔



OWQ Biological Studies QHEI (Qualitative Habitat Evaluation Index)

Sample # | bioSample # | Stream Name | Location

Surveyor | Sample Date | County | Macro SampleType | ☐ Habitat Complete | **QHEI Score:**

1-Substrate (20 points maximum)

Substrate Score:

Check 1 Predominant Pool & 1 Predominant Riffle

Check all that are present — P=Pool, R=Riffle

Predominant P	Predominant R		Present P	Present R	Predominant P	Predominant R		Present P	Present R
☐	☐	Bldrs/Slabs(10)	☐	☐	☐	☐	Hardpan(4)	☐	☐
☐	☐	Boulders(9)	☐	☐	☐	☐	Detritus(3)	☐	☐
☐	☐	Cobble(8)	☐	☐	☐	☐	Muck(2)	☐	☐
☐	☐	Gravel(7)	☐	☐	☐	☐	Silt(2)	☐	☐
☒	☒	Sand(6)	☐	☐	☐	☐	Sludge(1)	☐	☐
☐	☐	Bedrock(5)	☐	☐	☐	☐	Artificial(0)	☐	☐

NOTE: ignore sludge originating from point sources; score based on natural substrates

☐ >4 substrates present(2)

Comments:

Substrate Quality (check only 1, or check 2 and AVERAGE)

Substrate Origin

☐ Limestone(1)	☐ Hardpan(0)	☐ Lacustrine(0)
☒ Tills(1)	☐ Sandstone(0)	☐ Shale(-1)
☐ Wetlands(0)	☐ Rip/Rap(0)	☐ Coal fines(-2)

Silt Cover	Embeddedness
☐ Silt heavy(-2)	☐ Extensive(-2)
☐ Silt moderate(-1)	☒ Moderate(-1)
☒ Silt normal(0)	☐ Low/Normal(0)
☐ Silt free(1)	☐ None(1)

2-Instream Cover (20 points maximum

Instream Cover Score:

Type (check ALL that apply)

☒ Undercut banks(1)	☐ Deep pools(2)	☐ Oxbows(1)
☐ Overhanging vegetation(1)	☒ Rootwads(1)	☐ Aquatic macrophytes(1)
☐ Shallows(in slow water)(1)	☐ Boulders(1)	☐ Logs and woody debris(1)
☐ Rootmats(1)		

Comments:

Amount (check only 1, or 2 and AVERAGE)

☐ Extensive >75% (11)
☐ Moderate 25-75% (7)
☐ Sparse 5-25% (3)
☒ Nearly absent <5% (1)

3-Channel Morphology (20) (check only one per category, OR two and AVERAGE)

Channel Score:

Sinuosity	Development	Channelization	Stability	Modifications/Other	
☐ High (4)	☒ Excellent (7)	☒ None (6)	☐ High (3)	☐ Snagging	☐ Impound
☒ Moderate (3)	☒ Good (5)	☐ Recovered (4)	☒ Moderate (2)	☐ Relocation	☐ Islands
☐ Low (2)	☐ Fair (3)	☐ Recovering (3)	☐ Low (1)	☐ Canopy Removal	☐ Leveed
☐ None (1)	☐ Poor (1)	☐ Recent or no recovery (1)		☐ Dredging	☐ Bank shaping
				☐ One side channel modifications	

Comments:

4-Riparian Zone & Bank Erosion (10 points maximum)

Riparian Score:

Left/Right banks looking downstream (For each category, check only one per bank, OR two per bank and AVERAGE).

Riparian width L	R	(per bank)	Erosion/Runoff-Floodplain quality (past 100 ft Riparian) L	R	(most predominant per bank)	L	R		Bank Erosion L	R	(per bank)
☐	☐	Wide >50m (4)	☐	☐	Forest, Swamp (3)	☐	☐	Conservation Tillage (1)	☐	☐	None or little (3)
☐	☐	Moderate 10-50m (3)	☐	☐	Shrub or Old field (2)	☐	☐	Urban or Industrial (0)	☐	☐	Moderate (2)
☒	☒	Narrow 5-10m (2)	☐	☐	Residential, Park, New field (1)	☐	☐	Mining, Construction (0)	☐	☐	Heavy/Severe (1)
☐	☐	Very narrow <5m (1)	☐	☐	Fenced pasture (1)	☐	☐	Open Pasture/Rowcrop (0)			
☐	☐	None (0)									

Comments:

5a-Pool/Glide Quality (12 points maximum

Pool/Glide Score:

Max pool depth (check one)	Morphology (check only one, OR check two and AVERAGE)	Pool/Run/Riffle current velocity (check all that apply)	
☒ >1m (6)	☒ Pool width > riffle width (2)	☐ Eddies (1)	☐ Torrential (-1)
☐ 0.7-1m (4)	☐ Pool width = riffle width (1)	☐ Fast (1)	☐ Interstitial (-1)
☐ 0.4-0.7m (2)	☐ Pool width < riffle width (0)	☐ Moderate (1)	☐ Intermittent (-2)
☐ 0.2-0.4m (1)		☒ Slow (1)	☐ No pool (0)
☐ <0.2m (pool=0)			

Comments:

5b-Riffle/Run Quality (8) (check only one per category, OR two and AVERAGE)

Riffle/Run Score:

Riffle/run depth (check one)	Riffle/run substrate	Riffle/run embeddedness	
☐ Generally>10cm, Max>50cm (4)	☐ Stable-e.g. cobble, boulder (2)	☐ Extensive (-1)	☐ Normal/Low (1)
☐ Generally>10cm, Max<50cm(3)	☐ Mod. stable-e.g. pea gravel (1)	☐ Moderate (0)	☐ None (2)
☐ Generally 5-10cm (1)	☐ Unstable-e.g. sand, gravel (0)		☐ No riffle (0)
☒ Generally<5cm (riffle=0)			

Comments:

6-Gradient (10 points maximum)

Gradient Score:

Average width: | *Gradient:* | *(ft/mile)* | *Drainage Area:* | *(square miles)*

Comments:

OWQ Biological Studies QHEI (Qualitative Habitat Evaluation Index)

Sample #	bioSample #	Stream Name	Location

Surveyor	Sample Date	County	Macro SampleType	☐ Habitat Complete	QHEI Score:

Impacts/Miscellaneous

Major Suspected Impacts (Check all that apply)

- ☐ None
- ☐ Industrial
- ☐ WWTP
- ☐ Agricultural
- ☐ Livestock
- ☐ Silviculture
- ☐ Construction
- ☐ Urban Runoff
- ☐ Suburban
- ☐ Channelization
- ☐ Riparian Removal
- ☐ Flow Alteration
- ☐ CSOs
- ☐ Mining
- ☐ Landfills
- ☐ Natural

Pollution Impact Comments:

Miscellaneous QHEI Information

Subjective rating (1-10):
Aesthetic rating (1-10):
Canopy Cover (% Open):

% Riffle:
% Run:
% Glide:
% Pool:

Is reach representative of stream?

General QHEI Notes:

Primary Headwater Habitat Evaluation Form

HHEI Score (sum of metrics 1, 2, 3) :

SITE NAME/LOCATION _____

SITE NUMBER _____ RIVER BASIN _____ DRAINAGE AREA (mi²) _____

LENGTH OF STREAM REACH (ft) _____ LAT. _____ LONG. _____ RIVER CODE _____ RIVER MILE _____

DATE _____ SCORER _____ COMMENTS _____

NOTE: Complete All Items On This Form - Refer to "Field Evaluation Manual for Ohio's PHWH Streams" for Instructions

STREAM CHANNEL MODIFICATIONS: ☐ NONE / NATURAL CHANNEL ☐ RECOVERED ☐ RECOVERING ☐ RECENT OR NO RECOVERY

1. SUBSTRATE (Estimate percent of every type of substrate present. Check *ONLY* two predominant substrate *TYPE* boxes (Max of 32). Add total number of significant substrate types found (Max of 8). Final metric score is sum of boxes A & B.

HHEI Metric Points

TYPE		PERCENT	TYPE		PERCENT
☐ ☐	BLDR SLABS [16 pts]	_____	☐ ☐	SILT [3 pt]	_____
☐ ☐	BOULDER (>256 mm) [16 pts]	_____	☐ ☐	LEAF PACK/WOODY DEBRIS [3 pts]	_____
☐ ☐	BEDROCK [16 pt]	_____	☐ ☐	FINE DETRITUS [3 pts]	_____
☐ ☐	COBBLE (65-256 mm) [12 pts]	_____	☐ ☐	CLAY or HARDPAN [0 pt]	_____
☐ ☐	GRAVEL (2-64 mm) [9 pts]	_____	☐ ☐	MUCK [0 pts]	_____
☐ ☐	SAND (<2 mm) [6 pts]	_____	☐ ☐	ARTIFICIAL [3 pts]	_____

Total of Percentages of Bldr Slabs, Boulder, Cobble, Bedrock _____ **(A)** **(B)**

Substrate Max = 40

A + B

SCORE OF TWO MOST PREDOMINATE SUBSTRATE TYPES: **TOTAL NUMBER OF SUBSTRATE TYPES:**

2. Maximum Pool Depth ***(Measure the maximum pool depth within the 61 meter (200 ft)*** evaluation reach at the time of evaluation. Avoid plunge pools from road culverts or storm water pipes) (Check *ONLY* one box):

Pool Depth Max = 30

- ☐ > 30 centimeters [20 pts]
- ☐ > 22.5 - 30 cm [30 pts]
- ☐ > 10 - 22.5 cm [25 pts]
- ☐ > 5 cm - 10 cm [15 pts]
- ☐ < 5 cm [5 pts]
- ☐ NO WATER OR MOIST CHANNEL [0 pts]

COMMENTS _____ **MAXIMUM POOL DEPTH (centimeters):**

3. BANK FULL WIDTH (Measured as the average of 3-4 measurements) **(Check *ONLY* one box):**

Bankfull Width Max=30

- ☐ > 4.0 meters [30 pts]
- ☐ > 3.0 m - 4.0 m [25 pts]
- ☐ > 1.5 m - 3.0 m [20 pts]
- ☐ > 1.0 m - 1.5 m [15 pts]
- ☐ ≤ 1.0 m [5 pts]

COMMENTS _____ **AVERAGE BANKFULL WIDTH (meters):**

This information must also be completed

RIPARIAN ZONE AND FLOODPLAIN QUALITY ☆NOTE: River Left (L) and Right (R) as looking downstream☆

L R	RIPARIAN WIDTH (Per Bank)	L R	FLOODPLAIN QUALITY (Most Predominant per Bank)	L R	
☐ ☐	Wide >10m	☐ ☐	Mature Forest, Wetland	☐ ☐	Conservation Tillage
☐ ☐	Moderate 5-10m	☐ ☐	Immature Forest, Shrub or Old Field	☐ ☐	Urban or Industrial
☐ ☐	Narrow <5m	☐ ☐	Residential, Park, New Field	☐ ☐	Open Pasture, Row Crop
☐ ☐	None	☐ ☐	Fenced Pasture	☐ ☐	Mining or Construction

COMMENTS _____

FLOW REGIME *(At Time of Evaluation)* (Check *ONLY* one box):

- ☐ Stream Flowing
- ☐ Subsurface flow with isolated pools (Interstitial)
- ☐ Moist Channel, isolated pools, no flow (Intermittent)
- ☐ Dry channel, no water (Ephemeral)

COMMENTS _____

SINUOSITY (Number of bends per 61 m (200 ft) of channel) (Check *ONLY* one box):

☐ None	☐ 1.0	☐ 2.0	☐ 3.0
☐ 0.5	☐ 1.5	☐ 2.5	☐ >3

STREAM GRADIENT ESTIMATE

☐ Flat (0.5 ft/100 ft) ☐ Flat to Moderate ☐ Moderate (2 ft/100 ft) ☐ Moderate to Severe ☐ Severe (10 ft/100 ft)

ADDITIONAL STREAM INFORMATION (This Information Must Also be Completed):

QHEI PERFORMED? - ☐ Yes ☐ No QHEI Score _____ (If Yes, Attach Completed QHEI Form)

DOWNSTREAM DESIGNATED USE(S)

☐ WWH Name: _____ Distance from Evaluated Stream _____

☐ CWH Name: _____ Distance from Evaluated Stream _____

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MAPPING: ATTACH COPIES OF MAPS, INCLUDING THE ENTIRE WATERSHED AREA. CLEARLY MARK THE SITE LOCATION

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County: _____ Township / City: _____

MISCELLANEOUS

Base Flow Conditions? (Y/N): _____ Date of last precipitation: _____ Quantity: _____

Photograph Information: _____

Elevated Turbidity? (Y/N): _____ Canopy (% open): _____

Were samples collected for water chemistry? (Y/N): _____ (Note lab sample no. or id. and attach results) Lab Number: _____

Field Measures: Temp (°C) _____ Dissolved Oxygen (mg/l) _____ pH (S.U.) _____ Conductivity (µmhos/cm) _____

Is the sampling reach representative of the stream (Y/N) _____ If not, please explain: _____

_____

Additional comments/description of pollution impacts: _____

_____

BIOTIC EVALUATION

Performed? (Y/N): _____ (If Yes, Record all observations. Voucher collections optional. NOTE: all voucher samples must be labeled with the site ID number. Include appropriate field data sheets from the Primary Headwater Habitat Assessment Manual)

Fish Observed? (Y/N) _____ Voucher? (Y/N) _____ Salamanders Observed? (Y/N) _____ Voucher? (Y/N) _____

Frogs or Tadpoles Observed? (Y/N) _____ Voucher? (Y/N) _____ Aquatic Macroinvertebrates Observed? (Y/N) _____ Voucher? (Y/N) _____

Comments Regarding Biology: _____

_____

_____

DRAWING AND NARRATIVE DESCRIPTION OF STREAM REACH (This must be completed):

Include important landmarks and other features of interest for site evaluation and a narrative description of the stream's location

FLOW ➜

OhioEPA Primary Headwater Habitat Evaluation Form

HHEI Score (sum of metrics 1, 2, 3) : 13

SITE NAME/LOCATION _____

Tributary of First Creek SITE NUMBER Sec3-558 RIVER BASIN White River DRAINAGE AREA (mi²) 0.36 mi²

LENGTH OF STREAM REACH (ft) _____ LAT. _____ LONG. _____ RIVER CODE _____ RIVER MILE _____

DATE 9/12/05 SCORER K. Allison COMMENTS _____

NOTE: Complete All Items On This Form - Refer to "Field Evaluation Manual for Ohio's PHWH Streams" for Instructions

STREAM CHANNEL MODIFICATIONS: ☐ NONE / NATURAL CHANNEL ☐ RECOVERED ☐ RECOVERING ☒ RECENT OR NO RECOVERY

1. SUBSTRATE (Estimate percent of every type of substrate present. Check *ONLY* two predominant substrate *TYPE* boxes (Max of 32). Add total number of significant substrate types found (Max of 8). Final metric score is sum of boxes A & B.

TYPE		PERCENT	TYPE		PERCENT
☐ ☐	BLDR SLABS [16 pts]		☒ ☐	SILT [3 pt]	10%
☐ ☐	BOULDER (>256 mm) [16 pts]		☐ ☒	LEAF PACK/WOODY DEBRIS [3 pts]	90%
☐ ☐	BEDROCK [16 pt]		☐ ☐	FINE DETRITUS [3 pts]	
☐ ☐	COBBLE (65-256 mm) [12 pts]		☐ ☐	CLAY or HARDPAN [0 pt]	
☐ ☐	GRAVEL (2-64 mm) [9 pts]		☐ ☐	MUCK [0 pts]	
☐ ☐	SAND (<2 mm) [6 pts]		☐ ☐	ARTIFICIAL [3 pts]	

Total of Percentages of Bldr Slabs, Boulder, Cobble, Bedrock 0% (A) (B)

SCORE OF TWO MOST PREDOMINATE SUBSTRATE TYPES: 6 **TOTAL NUMBER OF SUBSTRATE TYPES:** 2

HHEI Metric Points

Substrate Max = 40: 8

A + B

2. Maximum Pool Depth ***(Measure the maximum pool depth within the 61 meter (200 ft)*** evaluation reach at the time of evaluation. Avoid plunge pools from road culverts or storm water pipes) (Check *ONLY* one box):

- ☐ > 30 centimeters [20 pts]
- ☐ > 22.5 - 30 cm [30 pts]
- ☐ > 10 - 22.5 cm [25 pts]
- ☐ > 5 cm - 10 cm [15 pts]
- ☐ < 5 cm [5 pts]
- ☒ NO WATER OR MOIST CHANNEL [0 pts]

COMMENTS _____ **MAXIMUM POOL DEPTH (centimeters):** 0

Pool Depth Max = 30: 0

3. BANK FULL WIDTH (Measured as the average of 3-4 measurements) (Check *ONLY* one box):

- ☐ > 4.0 meters [30 pts]
- ☐ > 3.0 m - 4.0 m [25 pts]
- ☐ > 1.5 m - 3.0 m [20 pts]
- ☐ > 1.0 m - 1.5 m [15 pts]
- ☒ ≤ 1.0 m [5 pts]

COMMENTS _____ **AVERAGE BANKFULL WIDTH (meters):** .91

Bankfull Width Max=30: 5

This information must also be completed

RIPARIAN ZONE AND FLOODPLAIN QUALITY ☆NOTE: River Left (L) and Right (R) as looking downstream☆

L R	RIPARIAN WIDTH (Per Bank)	L R	FLOODPLAIN QUALITY (Most Predominant per Bank)	L R	
☐ ☐	Wide >10m	☐ ☐	Mature Forest, Wetland	☐ ☐	Conservation Tillage
☐ ☐	Moderate 5-10m	☐ ☐	Immature Forest, Shrub or Old Field	☐ ☐	Urban or Industrial
☒ ☒	Narrow <5m	☐ ☐	Residential, Park, New Field	☒ ☒	Open Pasture, Row Crop
☐ ☐	None	☐ ☐	Fenced Pasture	☐ ☐	Mining or Construction

COMMENTS _____

FLOW REGIME *(At Time of Evaluation)* (Check *ONLY* one box):

- ☐ Stream Flowing
- ☐ Subsurface flow with isolated pools (Interstitial)
- ☐ Moist Channel, isolated pools, no flow (Intermittent)
- ☒ Dry channel, no water (Ephemeral)

COMMENTS _____

SINUOSITY (Number of bends per 61 m (200 ft) of channel) (Check *ONLY* one box):

☒ None	☐ 1.0	☐ 2.0	☐ 3.0
☐ 0.5	☐ 1.5	☐ 2.5	☐ >3

STREAM GRADIENT ESTIMATE

☐ Flat (0.5 ft/100 ft) ☒ Flat to Moderate ☐ Moderate (2 ft/100 ft) ☐ Moderate to Severe ☐ Severe (10 ft/100 ft)

ADDITIONAL STREAM INFORMATION (This Information Must Also be Completed):

QHEI PERFORMED? - ☐ Yes ☑ No QHEI Score _____ (If Yes, Attach Completed QHEI Form)

DOWNSTREAM DESIGNATED USE(S)

☐ WWH Name: _____ Distance from Evaluated Stream _____

☐ CWH Name: _____ Distance from Evaluated Stream _____

☐ EWH Name: _____ Distance from Evaluated Stream _____

MAPPING: ATTACH COPIES OF MAPS, INCLUDING THE ENTIRE WATERSHED AREA. CLEARLY MARK THE SITE LOCATION

USGS Quadrangle Name: _____ NRCS Soil Map Page: _____ NRCS Soil Map Stream Order _____

County: _____ Township / City: _____

MISCELLANEOUS

Base Flow Conditions? (Y/N): _____ Date of last precipitation: _____ Quantity: _____

Photograph Information: _____

Elevated Turbidity? (Y/N): _____ Canopy (% open): _____

Were samples collected for water chemistry? (Y/N): _____ (Note lab sample no. or id. and attach results) Lab Number: _____

Field Measures: Temp (°C) _____ Dissolved Oxygen (mg/l) _____ pH (S.U.) _____ Conductivity (µmhos/cm) _____

Is the sampling reach representative of the stream (Y/N) _____ If not, please explain: _____

_____

Additional comments/description of pollution impacts: _____

_____

BIOTIC EVALUATION

Performed? (Y/N): _____ (If Yes, Record all observations. Voucher collections optional. NOTE: all voucher samples must be labeled with the site ID number. Include appropriate field data sheets from the Primary Headwater Habitat Assessment Manual)

Fish Observed? (Y/N) _____ Voucher? (Y/N) _____ Salamanders Observed? (Y/N) _____ Voucher? (Y/N) _____

Frogs or Tadpoles Observed? (Y/N) _____ Voucher? (Y/N) _____ Aquatic Macroinvertebrates Observed? (Y/N) _____ Voucher? (Y/N) _____

Comments Regarding Biology: _____

_____

_____

DRAWING AND NARRATIVE DESCRIPTION OF STREAM REACH (This must be completed):

Include important landmarks and other features of interest for site evaluation and a narrative description of the stream's location

IDEM OWQ Biological Studies QHEI (Qualitative Habitat Evaluation Index)

Sample # | bioSample # | Stream Name | Location

Surveyor | Sample Date | County | Macro SampleType | ☐ Habitat Complete | **QHEI Score:**

1-Substrate (20 points maximum)

Substrate Score:

Check 1 Predominant Pool & 1 Predominant Riffle

Check all that are present — P=Pool, R=Riffle

Predominant P	Predominant R		Present P	Present R	Predominant P	Predominant R		Present P	Present R
☐	☐	Bldrs/Slabs(10)	☐	☐	☐	☐	Hardpan(4)	☐	☐
☐	☐	Boulders(9)	☐	☐	☐	☐	Detritus(3)	☐	☐
☐	☐	Cobble(8)	☐	☐	☐	☐	Muck(2)	☐	☐
☐	☐	Gravel(7)	☐	☐	☐	☐	Silt(2)	☐	☐
☒	☒	Sand(6)	☐	☐	☐	☐	Sludge(1)	☐	☐
☐	☐	Bedrock(5)	☐	☐	☐	☐	Artificial(0)	☐	☐

Substrate Quality (check only 1, or check 2 and AVERAGE)

Substrate Origin: ☐ Limestone(1) ☐ Hardpan(0) ☐ Lacustrine(0) ☒ Tills(1) ☐ Sandstone(0) ☐ Shale(-1) ☐ Wetlands(0) ☐ Rip/Rap(0) ☐ Coal fines(-2)

Silt Cover: ☐ Silt heavy(-2) ☐ Silt moderate(-1) ☒ Silt normal(0) ☐ Silt free(1)

Embeddedness: ☐ Extensive(-2) ☒ Moderate(-1) ☐ Low/Normal(0) ☐ None(1)

NOTE: ignore sludge originating from point sources; score based on natural substrates

☒ >4 substrates present(2)

Comments:

2-Instream Cover (20 points maximum

Instream Cover Score:

Type (check ALL that apply)

☐ Undercut banks(1) ☐ Deep pools(2) ☐ Oxbows(1)
☒ Overhanging vegetation(1) ☒ Rootwads(1) ☐ Aquatic macrophytes(1)
☒ Shallows(in slow water)(1) ☐ Boulders(1) ☒ Logs and woody debris(1)
☐ Rootmats(1)

Amount (check only 1, or 2 and AVERAGE)

☐ Extensive >75% (11)
☐ Moderate 25-75% (7)
☒ Sparse 5-25% (3)
☐ Nearly absent <5% (1)

Comments:

3-Channel Morphology (20) (check only one per category, OR two and AVERAGE)

Channel Score:

Sinuosity	Development	Channelization	Stability	Modifications/Other	
☐ High (4)	☐ Excellent (7)	☒ None (6)	☒ High (3)	☐ Snagging	☐ Impound
☒ Moderate (3)	☒ Good (5)	☐ Recovered (4)	☐ Moderate (2)	☐ Relocation	☐ Islands
☒ Low (2)	☐ Fair (3)	☐ Recovering (3)	☐ Low (1)	☒ Canopy Removal	☐ Leveed
☐ None (1)	☐ Poor (1)	☐ Recent or no recovery (1)		☐ Dredging	☐ Bank shaping
				☐ One side channel modifications	

Comments:

4-Riparian Zone & Bank Erosion (10 points maximum)

Riparian Score:

Left/Right banks looking downstream (For each category, check only one per bank, OR two per bank and AVERAGE).

Riparian width (per bank)

L	R	
☐	☐	Wide >50m (4)
☒	☒	Moderate 10-50m (3)
☐	☐	Narrow 5-10m (2)
☐	☐	Very narrow <5m (1)
☐	☐	None (0)

Erosion/Runoff-Floodplain quality (past 100 ft Riparian) (most predominant per bank)

L	R	
☒	☐	Forest, Swamp (3)
☐	☒	Shrub or Old field (2)
☐	☐	Residential, Park, New field (1)
☐	☐	Fenced pasture (1)
☐	☐	Conservation Tillage (1)
☐	☐	Urban or Industrial (0)
☐	☐	Mining, Construction (0)
☐	☐	Open Pasture/Rowcrop (0)

Bank Erosion (per bank)

L	R	
☐	☐	None or little (3)
☐	☐	Moderate (2)
☐	☐	Heavy/Severe (1)

Comments:

5a-Pool/Glide Quality (12 points maximum

Pool/Glide Score:

Max pool depth (check one)

☐ >1m (6)
☐ 0.7-1m (4)
☐ 0.4-0.7m (2)
☒ 0.2-0.4m (1)
☐ <0.2m (pool=0)

Morphology (check only one, OR check two and AVERAGE)

☐ Pool width > riffle width (2)
☒ Pool width = riffle width (1)
☐ Pool width < riffle width (0)

Pool/Run/Riffle current velocity (check all that apply)

☐ Eddies (1) ☐ Torrential (-1)
☐ Fast (1) ☐ Interstitial (-1)
☒ Moderate (1) ☐ Intermittent (-2)
☐ Slow (1) ☐ No pool (0)

Comments:

5b-Riffle/Run Quality (8) (check only one per category, OR two and AVERAGE)

Riffle/Run Score:

Riffle/run depth (check one)

☐ Generally>10cm, Max>50cm (4)
☐ Generally>10cm, Max<50cm(3)
☐ Generally 5-10cm (1)
☒ Generally<5cm (riffle=0)

Riffle/run substrate

☐ Stable-e.g. cobble, boulder (2)
☐ Mod. stable-e.g. pea gravel (1)
☐ Unstable-e.g. sand, gravel (0)

Riffle/run embeddedness

☐ Extensive (-1) ☐ Normal/Low (1)
☐ Moderate (0) ☐ None (2)
☐ No riffle (0)

Comments:

6-Gradient (10 points maximum)

Gradient Score:

Average width: *Gradient:* *(ft/mile)* *Drainage Area:* *(square miles)*

Comments:

OWQ Biological Studies QHEI (Qualitative Habitat Evaluation Index)

Sample #	bioSample #	Stream Name	Location

Surveyor	Sample Date	County	Macro SampleType	☐ Habitat Complete	QHEI Score:

Impacts/Miscellaneous

Major Suspected Impacts (Check all that apply)

- ☐ None
- ☐ Industrial
- ☐ WWTP
- ☐ Agricultural
- ☐ Livestock
- ☐ Silviculture
- ☐ Construction
- ☐ Urban Runoff
- ☐ Suburban
- ☐ Channelization
- ☐ Riparian Removal
- ☐ Flow Alteration
- ☐ CSOs
- ☐ Mining
- ☐ Landfills
- ☐ Natural

Pollution Impact Comments:

Miscellaneous QHEI Information

Subjective rating (1-10):
Aesthetic rating (1-10):
Canopy Cover (% Open):

% Riffle:
% Run:
% Glide:
% Pool:

Is reach representative of stream?

General QHEI Notes:

OhioEPA Primary Headwater Habitat Evaluation Form

HHEI Score (sum of metrics 1, 2, 3) :

SITE NAME/LOCATION _____

_____ SITE NUMBER _____ RIVER BASIN _____ DRAINAGE AREA (mi²) _____

LENGTH OF STREAM REACH (ft) _____ LAT. _____ LONG. _____ RIVER CODE _____ RIVER MILE _____

DATE _____ SCORER _____ COMMENTS _____

NOTE: Complete All Items On This Form - Refer to "Field Evaluation Manual for Ohio's PHWH Streams" for Instructions

STREAM CHANNEL MODIFICATIONS: ☐ NONE / NATURAL CHANNEL ☐ RECOVERED ☐ RECOVERING ☒ RECENT OR NO RECOVERY

1. SUBSTRATE (Estimate percent of every type of substrate present. Check *ONLY* two predominant substrate *TYPE* boxes (Max of 32). Add total number of significant substrate types found (Max of 8). Final metric score is sum of boxes A & B.

HHEI Metric Points

TYPE		PERCENT	TYPE		PERCENT
☐ ☐	BLDR SLABS [16 pts]		☐ ☐	SILT [3 pt]	
☐ ☐	BOULDER (>256 mm) [16 pts]		☐ ☐	LEAF PACK/WOODY DEBRIS [3 pts]	
☐ ☐	BEDROCK [16 pt]		☐ ☐	FINE DETRITUS [3 pts]	
☐ ☐	COBBLE (65-256 mm) [12 pts]		☐ ☐	CLAY or HARDPAN [0 pt]	
☐ ☐	GRAVEL (2-64 mm) [9 pts]		☐ ☐	MUCK [0 pts]	
☐ ☐	SAND (<2 mm) [6 pts]		☐ ☐	ARTIFICIAL [3 pts]	

Total of Percentages of Bldr Slabs, Boulder, Cobble, Bedrock _____ **(A)** **(B)**

Substrate Max = 40

A + B

SCORE OF TWO MOST PREDOMINATE SUBSTRATE TYPES: **TOTAL NUMBER OF SUBSTRATE TYPES:**

2. Maximum Pool Depth *(Measure the maximum pool depth within the 61 meter (200 ft)* evaluation reach at the time of evaluation. Avoid plunge pools from road culverts or storm water pipes) (Check *ONLY* one box):

Pool Depth Max = 30

☐ > 30 centimeters [20 pts]
☐ > 22.5 - 30 cm [30 pts]
☐ > 10 - 22.5 cm [25 pts]
☐ > 5 cm - 10 cm [15 pts]
☐ < 5 cm [5 pts]
☒ NO WATER OR MOIST CHANNEL [0 pts]

COMMENTS _____ **MAXIMUM POOL DEPTH (centimeters):**

3. BANK FULL WIDTH (Measured as the average of 3-4 measurements) (Check *ONLY* one box):

Bankfull Width Max=30

☐ > 4.0 meters [30 pts]
☐ > 3.0 m - 4.0 m [25 pts]
☐ > 1.5 m - 3.0 m [20 pts]
☒ > 1.0 m - 1.5 m [15 pts]
☐ ≤ 1.0 m [5 pts]

COMMENTS _____ **AVERAGE BANKFULL WIDTH (meters):**

This information must also be completed

RIPARIAN ZONE AND FLOODPLAIN QUALITY ☆NOTE: River Left (L) and Right (R) as looking downstream☆

L R	RIPARIAN WIDTH (Per Bank)	L R	FLOODPLAIN QUALITY (Most Predominant per Bank)	L R	
☐ ☐	Wide >10m	☐ ☐	Mature Forest, Wetland	☐ ☐	Conservation Tillage
☐ ☐	Moderate 5-10m	☐ ☐	Immature Forest, Shrub or Old Field	☐ ☐	Urban or Industrial
☒ ☐	Narrow <5m	☐ ☐	Residential, Park, New Field	☒ ☐	Open Pasture, Row Crop
☐ ☐	None	☐ ☐	Fenced Pasture	☐ ☐	Mining or Construction

COMMENTS _____

FLOW REGIME *(At Time of Evaluation)* (Check *ONLY* one box):

☐ Stream Flowing
☐ Subsurface flow with isolated pools (Interstitial)
☒ Moist Channel, isolated pools, no flow (Intermittent)
☐ Dry channel, no water (Ephemeral)

COMMENTS _____

SINUOSITY (Number of bends per 61 m (200 ft) of channel) (Check *ONLY* one box):

☒ None ☐ 1.0 ☐ 2.0 ☐ 3.0
☐ 0.5 ☐ 1.5 ☐ 2.5 ☐ >3

STREAM GRADIENT ESTIMATE

☐ Flat (0.5 ft/100 ft) ☒ Flat to Moderate ☐ Moderate (2 ft/100 ft) ☐ Moderate to Severe ☐ Severe (10 ft/100 ft)

ADDITIONAL STREAM INFORMATION (This Information Must Also be Completed):

QHEI PERFORMED? - ☐ Yes ☐ No QHEI Score _____ (If Yes, Attach Completed QHEI Form)

DOWNSTREAM DESIGNATED USE(S)

☐ WWH Name: _____ Distance from Evaluated Stream _____

☐ CWH Name: _____ Distance from Evaluated Stream _____

☐ EWH Name: _____ Distance from Evaluated Stream _____

MAPPING: ATTACH COPIES OF MAPS, INCLUDING THE ENTIRE WATERSHED AREA. CLEARLY MARK THE SITE LOCATION

USGS Quadrangle Name: _____ NRCS Soil Map Page: 77 NRCS Soil Map Stream Order _____

County: _____ Township / City: _____

MISCELLANEOUS

Base Flow Conditions? (Y/N): _____ Date of last precipitation: _____ Quantity: _____

Photograph Information: _____

Elevated Turbidity? (Y/N): _____ Canopy (% open): _____

Were samples collected for water chemistry? (Y/N): _____ (Note lab sample no. or id. and attach results) Lab Number: _____

Field Measures: Temp (°C) _____ Dissolved Oxygen (mg/l) _____ pH (S.U.) _____ Conductivity (µmhos/cm) _____

Is the sampling reach representative of the stream (Y/N) _____ If not, please explain: _____

Additional comments/description of pollution impacts: _____

BIOTIC EVALUATION

Performed? (Y/N): _____ (If Yes, Record all observations. Voucher collections optional. NOTE: all voucher samples must be labeled with the site ID number. Include appropriate field data sheets from the Primary Headwater Habitat Assessment Manual)

Fish Observed? (Y/N)_____ Voucher? (Y/N)_____ Salamanders Observed? (Y/N)_____ Voucher? (Y/N)_____
Frogs or Tadpoles Observed? (Y/N)____ Voucher? (Y/N)____ Aquatic Macroinvertebrates Observed? (Y/N)____ Voucher? (Y/N)____

Comments Regarding Biology: _____

DRAWING AND NARRATIVE DESCRIPTION OF STREAM REACH (This must be completed):

Include important landmarks and other features of interest for site evaluation and a narrative description of the stream's location

FLOW ➔

Primary Headwater Habitat Evaluation Form

HHEI Score (sum of metrics 1, 2, 3) :

SITE NAME/LOCATION _____

_____ SITE NUMBER _____ RIVER BASIN _____ DRAINAGE AREA (mi²) _____

LENGTH OF STREAM REACH (ft) _____ LAT. _____ LONG. _____ RIVER CODE _____ RIVER MILE _____

DATE _____ SCORER _____ COMMENTS _____

NOTE: Complete All Items On This Form - Refer to "Field Evaluation Manual for Ohio's PHWH Streams" for Instructions

STREAM CHANNEL MODIFICATIONS: ☐ NONE / NATURAL CHANNEL ☐ RECOVERED ☐ RECOVERING ☐ RECENT OR NO RECOVERY

1. SUBSTRATE (Estimate percent of every type of substrate present. Check *ONLY* two predominant substrate *TYPE* boxes (Max of 32). Add total number of significant substrate types found (Max of 8). Final metric score is sum of boxes A & B.

HHEI Metric Points

TYPE		PERCENT	TYPE		PERCENT
☐ ☐	BLDR SLABS [16 pts]		☐ ☐	SILT [3 pt]	
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Total of Percentages of Bldr Slabs, Boulder, Cobble, Bedrock _____ **(A)** **(B)**

Substrate Max = 40

A + B

SCORE OF TWO MOST PREDOMINATE SUBSTRATE TYPES: _____ **TOTAL NUMBER OF SUBSTRATE TYPES:** _____

2. Maximum Pool Depth ***(Measure the maximum pool depth within the 61 meter (200 ft)*** evaluation reach at the time of evaluation. Avoid plunge pools from road culverts or storm water pipes) (Check *ONLY* one box):

Pool Depth Max = 30

- ☐ > 30 centimeters [20 pts]
- ☐ > 22.5 - 30 cm [30 pts]
- ☐ > 10 - 22.5 cm [25 pts]
- ☐ > 5 cm - 10 cm [15 pts]
- ☐ < 5 cm [5 pts]
- ☐ NO WATER OR MOIST CHANNEL [0 pts]

COMMENTS _____ **MAXIMUM POOL DEPTH (centimeters):** _____

3. BANK FULL WIDTH (Measured as the average of 3-4 measurements) **(Check *ONLY* one box):**

Bankfull Width Max=30

- ☐ > 4.0 meters [30 pts]
- ☐ > 3.0 m - 4.0 m [25 pts]
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- ☐ > 1.0 m - 1.5 m [15 pts]
- ☐ ≤ 1.0 m [5 pts]

COMMENTS _____ **AVERAGE BANKFULL WIDTH (meters):** _____

This information must also be completed

RIPARIAN ZONE AND FLOODPLAIN QUALITY ☆NOTE: River Left (L) and Right (R) as looking downstream☆

RIPARIAN WIDTH L R	(Per Bank)	FLOODPLAIN QUALITY L R	(Most Predominant per Bank)	L R	
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COMMENTS _____

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- ☐ Stream Flowing
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- ☐ Dry channel, no water (Ephemeral)

COMMENTS _____

SINUOSITY (Number of bends per 61 m (200 ft) of channel) (Check *ONLY* one box):

☐ None	☐ 1.0	☐ 2.0	☐ 3.0
☐ 0.5	☐ 1.5	☐ 2.5	☐ >3

STREAM GRADIENT ESTIMATE

☐ Flat (0.5 ft/100 ft) ☐ Flat to Moderate ☐ Moderate (2 ft/100 ft) ☐ Moderate to Severe ☐ Severe (10 ft/100 ft)

ADDITIONAL STREAM INFORMATION (This Information Must Also be Completed):

QHEI PERFORMED? - ☐ Yes ☐ No QHEI Score _____ (If Yes, Attach Completed QHEI Form)

DOWNSTREAM DESIGNATED USE(S)

☐ WWH Name: _____ Distance from Evaluated Stream _____

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County: _____ Township / City: _____

MISCELLANEOUS

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Photograph Information: _____

Elevated Turbidity? (Y/N): _____ Canopy (% open): _____

Were samples collected for water chemistry? (Y/N): _____ (Note lab sample no. or id. and attach results) Lab Number: _____

Field Measures: Temp (°C) _____ Dissolved Oxygen (mg/l) _____ pH (S.U.) _____ Conductivity (µmhos/cm) _____

Is the sampling reach representative of the stream (Y/N) _____ If not, please explain: _____

Additional comments/description of pollution impacts: _____

BIOTIC EVALUATION

Performed? (Y/N): _____ (If Yes, Record all observations. Voucher collections optional. NOTE: all voucher samples must be labeled with the site ID number. Include appropriate field data sheets from the Primary Headwater Habitat Assessment Manual)

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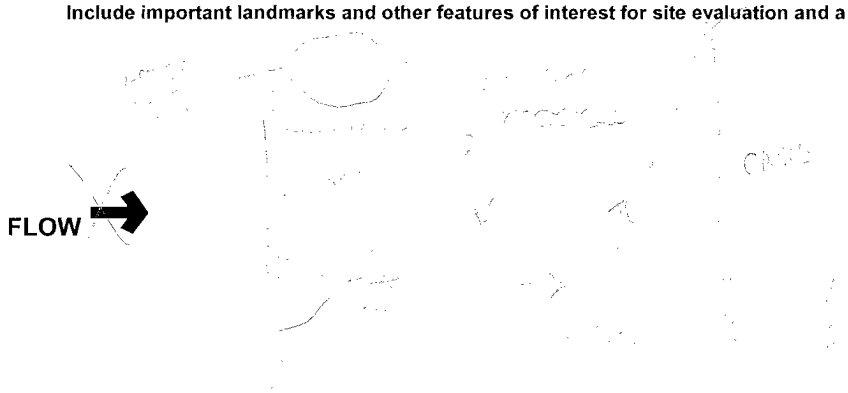
Frogs or Tadpoles Observed? (Y/N) _____ Voucher? (Y/N) _____ Aquatic Macroinvertebrates Observed? (Y/N) _____ Voucher? (Y/N) _____

Comments Regarding Biology: _____

DRAWING AND NARRATIVE DESCRIPTION OF STREAM REACH (This must be completed):

Include important landmarks and other features of interest for site evaluation and a narrative description of the stream's location



OhioEPA Primary Headwater Habitat Evaluation Form

HHEI Score (sum of metrics 1, 2, 3) : [illegible]

SITE NAME/LOCATION _____

[illegible] SITE NUMBER [illegible] RIVER BASIN [illegible] DRAINAGE AREA (mi²) [illegible]

LENGTH OF STREAM REACH (ft) [illegible] LAT. _____ LONG. _____ RIVER CODE _____ RIVER MILE _____

DATE 9/13/05 SCORER [illegible] COMMENTS _____

NOTE: Complete All Items On This Form - Refer to "Field Evaluation Manual for Ohio's PHWH Streams" for Instructions

STREAM CHANNEL MODIFICATIONS: ☐ NONE / NATURAL CHANNEL ☐ RECOVERED ☐ RECOVERING ☒ RECENT OR NO RECOVERY

1. SUBSTRATE (Estimate percent of every type of substrate present. Check *ONLY* two predominant substrate *TYPE* boxes (Max of 32). Add total number of significant substrate types found (Max of 8). Final metric score is sum of boxes A & B.

HHEI Metric Points

TYPE		PERCENT	TYPE		PERCENT
☐ ☐	BLDR SLABS [16 pts]	_____	☒ ☐	SILT [3 pt]	_____
☐ ☐	BOULDER (>256 mm) [16 pts]	_____	☐ ☐	LEAF PACK/WOODY DEBRIS [3 pts]	_____
☐ ☐	BEDROCK [16 pt]	_____	☐ ☐	FINE DETRITUS [3 pts]	_____
☐ ☐	COBBLE (65-256 mm) [12 pts]	_____	☐ ☐	CLAY or HARDPAN [0 pt]	_____
☐ ☐	GRAVEL (2-64 mm) [9 pts]	_____	☐ ☐	MUCK [0 pts]	_____
☐ ☐	SAND (<2 mm) [6 pts]	[illegible]	☐ ☐	ARTIFICIAL [3 pts]	_____

Total of Percentages of Bldr Slabs, Boulder, Cobble, Bedrock _____ **(A)** **(B)**

Substrate Max = 40 [illegible]

A + B

SCORE OF TWO MOST PREDOMINATE SUBSTRATE TYPES: [illegible] **TOTAL NUMBER OF SUBSTRATE TYPES:** [illegible]

2. Maximum Pool Depth *(Measure the maximum pool depth within the 61 meter (200 ft)* evaluation reach at the time of evaluation. Avoid plunge pools from road culverts or storm water pipes) (Check *ONLY* one box):

Pool Depth Max = 30 [illegible]

- ☐ > 30 centimeters [20 pts]
- ☐ > 22.5 - 30 cm [30 pts]
- ☐ > 10 - 22.5 cm [25 pts]
- ☐ > 5 cm - 10 cm [15 pts]
- ☐ < 5 cm [5 pts]
- ☒ NO WATER OR MOIST CHANNEL [0 pts]

COMMENTS _____ **MAXIMUM POOL DEPTH (centimeters):** [illegible]

3. BANK FULL WIDTH (Measured as the average of 3-4 measurements) **(Check *ONLY* one box):**

Bankfull Width Max=30 [illegible]

- ☐ > 4.0 meters [30 pts]
- ☐ > 3.0 m - 4.0 m [25 pts]
- ☐ > 1.5 m - 3.0 m [20 pts]
- ☐ > 1.0 m - 1.5 m [15 pts]
- ☒ ≤ 1.0 m [5 pts]

COMMENTS _____ **AVERAGE BANKFULL WIDTH (meters):** [illegible]

This information must also be completed

RIPARIAN ZONE AND FLOODPLAIN QUALITY ☆NOTE: River Left (L) and Right (R) as looking downstream☆

RIPARIAN WIDTH L R	(Per Bank)	FLOODPLAIN QUALITY L R	(Most Predominant per Bank)	L R	
☐ ☐	Wide >10m	☐ ☐	Mature Forest, Wetland	☐ ☐	Conservation Tillage
☐ ☐	Moderate 5-10m	☒ ☒	Immature Forest, Shrub or Old Field	☐ ☐	Urban or Industrial
☒ ☒	Narrow <5m	☐ ☐	Residential, Park, New Field	☒ ☒	Open Pasture, Row Crop
☐ ☐	None	☐ ☐	Fenced Pasture	☐ ☐	Mining or Construction

COMMENTS [illegible]

FLOW REGIME *(At Time of Evaluation)* (Check *ONLY* one box):

- ☐ Stream Flowing
- ☐ Subsurface flow with isolated pools (Interstitial)
- ☐ Moist Channel, isolated pools, no flow (Intermittent)
- ☒ Dry channel, no water (Ephemeral)

COMMENTS _____

SINUOSITY (Number of bends per 61 m (200 ft) of channel) (Check *ONLY* one box):

☒ None	☐ 1.0	☐ 2.0	☐ 3.0
☐ 0.5	☐ 1.5	☐ 2.5	☐ >3

STREAM GRADIENT ESTIMATE

☐ Flat (0.5 ft/100 ft) ☒ Flat to Moderate ☐ Moderate (2 ft/100 ft) ☐ Moderate to Severe ☐ Severe (10 ft/100 ft)

ADDITIONAL STREAM INFORMATION (This Information Must Also be Completed):

QHEI PERFORMED? - ☐ Yes ☐ No QHEI Score _____ (If Yes, Attach Completed QHEI Form)

DOWNSTREAM DESIGNATED USE(S)

☐ WWH Name: _____ Distance from Evaluated Stream _____

☐ CWH Name: _____ Distance from Evaluated Stream _____

☐ EWH Name: _____ Distance from Evaluated Stream _____

MAPPING: ATTACH COPIES OF MAPS, INCLUDING THE ENTIRE WATERSHED AREA. CLEARLY MARK THE SITE LOCATION

USGS Quadrangle Name: _____ NRCS Soil Map Page: _____ NRCS Soil Map Stream Order _____

County: _____ Township / City: _____

MISCELLANEOUS

Base Flow Conditions? (Y/N): _____ Date of last precipitation: _____ Quantity: _____

Photograph Information: _____

Elevated Turbidity? (Y/N): _____ Canopy (% open): _____

Were samples collected for water chemistry? (Y/N): _____ (Note lab sample no. or id. and attach results) Lab Number: _____

Field Measures: Temp (°C) _____ Dissolved Oxygen (mg/l) _____ pH (S.U.) _____ Conductivity (µmhos/cm) _____

Is the sampling reach representative of the stream (Y/N) _____ If not, please explain: _____

_____

Additional comments/description of pollution impacts: _____

_____

BIOTIC EVALUATION

Performed? (Y/N): _____ (If Yes, Record all observations. Voucher collections optional. NOTE: all voucher samples must be labeled with the site ID number. Include appropriate field data sheets from the Primary Headwater Habitat Assessment Manual)

Fish Observed? (Y/N) _____ Voucher? (Y/N) _____ Salamanders Observed? (Y/N) _____ Voucher? (Y/N) _____

Frogs or Tadpoles Observed? (Y/N) _____ Voucher? (Y/N) _____ Aquatic Macroinvertebrates Observed? (Y/N) _____ Voucher? (Y/N) _____

Comments Regarding Biology: _____

_____

_____

DRAWING AND NARRATIVE DESCRIPTION OF STREAM REACH (This must be completed):

Include important landmarks and other features of interest for site evaluation and a narrative description of the stream's location

FLOW →

Primary Headwater Habitat Evaluation Form

HHEI Score (sum of metrics 1, 2, 3) :

SITE NAME/LOCATION _____

_____ SITE NUMBER _____ RIVER BASIN _____ DRAINAGE AREA (mi²) _____

LENGTH OF STREAM REACH (ft) _____ LAT. _____ LONG. _____ RIVER CODE _____ RIVER MILE _____

DATE _____ SCORER _____ COMMENTS _____

NOTE: Complete All Items On This Form - Refer to "Field Evaluation Manual for Ohio's PHWH Streams" for Instructions

STREAM CHANNEL MODIFICATIONS: ☒ NONE / NATURAL CHANNEL ☐ RECOVERED ☐ RECOVERING ☐ RECENT OR NO RECOVERY

1. SUBSTRATE (Estimate percent of every type of substrate present. Check *ONLY* two predominant substrate *TYPE* boxes (Max of 32). Add total number of significant substrate types found (Max of 8). Final metric score is sum of boxes A & B.

HHEI Metric Points

TYPE		PERCENT	TYPE		PERCENT
☐ ☐	BLDR SLABS [16 pts]		☐ ☐	SILT [3 pt]	
☐ ☐	BOULDER (>256 mm) [16 pts]		☐ ☐	LEAF PACK/WOODY DEBRIS [3 pts]	
☐ ☐	BEDROCK [16 pt]		☐ ☐	FINE DETRITUS [3 pts]	
☐ ☐	COBBLE (65-256 mm) [12 pts]		☐ ☐	CLAY or HARDPAN [0 pt]	
☐ ☐	GRAVEL (2-64 mm) [9 pts]		☐ ☐	MUCK [0 pts]	
☐ ☐	SAND (<2 mm) [6 pts]		☐ ☐	ARTIFICIAL [3 pts]	

Total of Percentages of Bldr Slabs, Boulder, Cobble, Bedrock _____ **(A)** **(B)**

Substrate Max = 40

A + B

SCORE OF TWO MOST PREDOMINATE SUBSTRATE TYPES: **TOTAL NUMBER OF SUBSTRATE TYPES:**

2. Maximum Pool Depth *(Measure the maximum pool depth within the 61 meter (200 ft)* evaluation reach at the time of evaluation. Avoid plunge pools from road culverts or storm water pipes) (Check *ONLY* one box):

Pool Depth Max = 30

- ☐ > 30 centimeters [20 pts]
- ☐ > 22.5 - 30 cm [30 pts]
- ☐ > 10 - 22.5 cm [25 pts]
- ☐ > 5 cm - 10 cm [15 pts]
- ☐ < 5 cm [5 pts]
- ☐ NO WATER OR MOIST CHANNEL [0 pts]

COMMENTS _____ **MAXIMUM POOL DEPTH (centimeters):**

3. BANK FULL WIDTH (Measured as the average of 3-4 measurements) **(Check *ONLY* one box):**

Bankfull Width Max=30

- ☐ > 4.0 meters [30 pts]
- ☐ > 3.0 m - 4.0 m [25 pts]
- ☐ > 1.5 m - 3.0 m [20 pts]
- ☐ > 1.0 m - 1.5 m [15 pts]
- ☐ ≤ 1.0 m [5 pts]

COMMENTS _____ **AVERAGE BANKFULL WIDTH (meters):**

This information must also be completed

RIPARIAN ZONE AND FLOODPLAIN QUALITY ☆NOTE: River Left (L) and Right (R) as looking downstream☆

RIPARIAN WIDTH L	R	(Per Bank)	FLOODPLAIN QUALITY L	R	(Most Predominant per Bank)	L	R	
☒	☒	Wide >10m	☒	☐	Mature Forest, Wetland	☐	☐	Conservation Tillage
☐	☐	Moderate 5-10m	☐	☒	Immature Forest, Shrub or Old Field	☐	☐	Urban or Industrial
☐	☐	Narrow <5m	☐	☐	Residential, Park, New Field	☐	☐	Open Pasture, Row Crop
☐	☐	None	☐	☐	Fenced Pasture	☐	☐	Mining or Construction

COMMENTS _____

FLOW REGIME *(At Time of Evaluation)* (Check *ONLY* one box):

- ☐ Stream Flowing
- ☒ Subsurface flow with isolated pools (Interstitial)
- ☐ Moist Channel, isolated pools, no flow (Intermittent)
- ☐ Dry channel, no water (Ephemeral)

COMMENTS _____

SINUOSITY (Number of bends per 61 m (200 ft) of channel) (Check *ONLY* one box):

☐ None	☐ 1.0	☐ 2.0	☐ 3.0
☐ 0.5	☐ 1.5	☐ 2.5	☒ >3

STREAM GRADIENT ESTIMATE

☐ Flat (0.5 ft/100 ft) ☐ Flat to Moderate ☒ Moderate (2 ft/100 ft) ☐ Moderate to Severe ☐ Severe (10 ft/100 ft)

ADDITIONAL STREAM INFORMATION (This Information Must Also be Completed):

QHEI PERFORMED? - ❒ Yes ❒ No QHEI Score _____ (If Yes, Attach Completed QHEI Form)

DOWNSTREAM DESIGNATED USE(S)

❒ WWH Name: _____ Distance from Evaluated Stream _____

❒ CWH Name: _____ Distance from Evaluated Stream _____

❒ EWH Name: _____ Distance from Evaluated Stream _____

MAPPING: ATTACH COPIES OF MAPS, INCLUDING THE ENTIRE WATERSHED AREA. CLEARLY MARK THE SITE LOCATION

USGS Quadrangle Name: _____ NRCS Soil Map Page: 78 NRCS Soil Map Stream Order _____

County: _____ Township / City: _____

MISCELLANEOUS

Base Flow Conditions? (Y/N): Y Date of last precipitation: _____ Quantity: _____

Photograph Information: _____

Elevated Turbidity? (Y/N): _____ Canopy (% open): 50

Were samples collected for water chemistry? (Y/N): N (Note lab sample no. or id. and attach results) Lab Number: _____

Field Measures: Temp (°C) _____ Dissolved Oxygen (mg/l) _____ pH (S.U.) _____ Conductivity (µmhos/cm) _____

Is the sampling reach representative of the stream (Y/N) Y If not, please explain: _____

Additional comments/description of pollution impacts: _____

BIOTIC EVALUATION

Performed? (Y/N): N (If Yes, Record all observations. Voucher collections optional. NOTE: all voucher samples must be labeled with the site ID number. Include appropriate field data sheets from the Primary Headwater Habitat Assessment Manual)

Fish Observed? (Y/N)_____ Voucher? (Y/N)_____ Salamanders Observed? (Y/N)_____ Voucher? (Y/N)_____

Frogs or Tadpoles Observed? (Y/N)____ Voucher? (Y/N)____ Aquatic Macroinvertebrates Observed? (Y/N)____ Voucher? (Y/N)____

Comments Regarding Biology: _____

DRAWING AND NARRATIVE DESCRIPTION OF STREAM REACH (This must be completed):

Include important landmarks and other features of interest for site evaluation and a narrative description of the stream's location

FLOW ➔

Primary Headwater Habitat Evaluation Form

HHEI Score (sum of metrics 1, 2, 3) : 37

SITE NAME/LOCATION _____

_____ SITE NUMBER _____ RIVER BASIN _____ DRAINAGE AREA (mi²) _____

LENGTH OF STREAM REACH (ft) _____ LAT. _____ LONG. _____ RIVER CODE _____ RIVER MILE _____

DATE _____ SCORER _____ COMMENTS _____

NOTE: Complete All Items On This Form - Refer to "Field Evaluation Manual for Ohio's PHWH Streams" for Instructions

STREAM CHANNEL MODIFICATIONS: ☐ NONE / NATURAL CHANNEL ☐ RECOVERED ☐ RECOVERING ☐ RECENT OR NO RECOVERY

1. SUBSTRATE (Estimate percent of every type of substrate present. Check *ONLY* two predominant substrate *TYPE* boxes (Max of 32). Add total number of significant substrate types found (Max of 8). Final metric score is sum of boxes A & B.

HHEI Metric Points

TYPE		PERCENT	TYPE		PERCENT
☐ ☐	BLDR SLABS [16 pts]		☒ ☐	SILT [3 pt]	
☐ ☐	BOULDER (>256 mm) [16 pts]		☐ ☐	LEAF PACK/WOODY DEBRIS [3 pts]	
☐ ☐	BEDROCK [16 pt]		☐ ☐	FINE DETRITUS [3 pts]	
☐ ☐	COBBLE (65-256 mm) [12 pts]		☐ ☐	CLAY or HARDPAN [0 pt]	
☐ ☐	GRAVEL (2-64 mm) [9 pts]		☐ ☐	MUCK [0 pts]	
☒ ☐	SAND (<2 mm) [6 pts]		☐ ☐	ARTIFICIAL [3 pts]	

Total of Percentages of Bldr Slabs, Boulder, Cobble, Bedrock _____ **(A)** **(B)**

Substrate Max = 40

A + B

SCORE OF TWO MOST PREDOMINATE SUBSTRATE TYPES: _____ **TOTAL NUMBER OF SUBSTRATE TYPES:** _____

2. Maximum Pool Depth ***(Measure the maximum pool depth within the 61 meter (200 ft)*** evaluation reach at the time of evaluation. Avoid plunge pools from road culverts or storm water pipes) (Check *ONLY* one box):

Pool Depth Max = 30

- ☐ > 30 centimeters [20 pts]
- ☐ > 22.5 - 30 cm [30 pts]
- ☐ > 10 - 22.5 cm [25 pts]
- ☐ > 5 cm - 10 cm [15 pts]
- ☒ < 5 cm [5 pts]
- ☐ NO WATER OR MOIST CHANNEL [0 pts]

COMMENTS _____ **MAXIMUM POOL DEPTH (centimeters):** _____

3. BANK FULL WIDTH (Measured as the average of 3-4 measurements) **(Check *ONLY* one box):**

Bankfull Width Max=30

- ☐ > 4.0 meters [30 pts]
- ☐ > 3.0 m - 4.0 m [25 pts]
- ☒ > 1.5 m - 3.0 m [20 pts]
- ☐ > 1.0 m - 1.5 m [15 pts]
- ☐ ≤ 1.0 m [5 pts]

COMMENTS _____ **AVERAGE BANKFULL WIDTH (meters):** _____

This information must also be completed

RIPARIAN ZONE AND FLOODPLAIN QUALITY ☆NOTE: River Left (L) and Right (R) as looking downstream☆

L	R	RIPARIAN WIDTH (Per Bank)	L	R	FLOODPLAIN QUALITY (Most Predominant per Bank)	L	R	
☒	☒	Wide >10m	☒	☒	Mature Forest, Wetland	☐	☐	Conservation Tillage
☐	☐	Moderate 5-10m	☐	☐	Immature Forest, Shrub or Old Field	☐	☐	Urban or Industrial
☐	☐	Narrow <5m	☐	☐	Residential, Park, New Field	☐	☐	Open Pasture, Row Crop
☐	☐	None	☐	☐	Fenced Pasture	☐	☐	Mining or Construction

COMMENTS _____

FLOW REGIME *(At Time of Evaluation)* (Check *ONLY* one box):

- ☒ Stream Flowing
- ☐ Subsurface flow with isolated pools (Interstitial)
- ☐ Moist Channel, isolated pools, no flow (Intermittent)
- ☐ Dry channel, no water (Ephemeral)

COMMENTS _____

SINUOSITY (Number of bends per 61 m (200 ft) of channel) (Check *ONLY* one box):

☐ None	☐ 1.0	☐ 2.0	☐ 3.0
☐ 0.5	☐ 1.5	☐ 2.5	☒ >3

STREAM GRADIENT ESTIMATE

☐ Flat (0.5 ft/100 ft) ☒ Flat to Moderate ☐ Moderate (2 ft/100 ft) ☐ Moderate to Severe ☐ Severe (10 ft/100 ft)

ADDITIONAL STREAM INFORMATION (This Information Must Also be Completed):

QHEI PERFORMED? - ☐ Yes ☐ No QHEI Score _____ (If Yes, Attach Completed QHEI Form)

DOWNSTREAM DESIGNATED USE(S)

☐ WWH Name: _____ Distance from Evaluated Stream _____

☐ CWH Name: _____ Distance from Evaluated Stream _____

☐ EWH Name: _____ Distance from Evaluated Stream _____

MAPPING: ATTACH COPIES OF MAPS, INCLUDING THE ENTIRE WATERSHED AREA. CLEARLY MARK THE SITE LOCATION

USGS Quadrangle Name: _____ NRCS Soil Map Page: _____ NRCS Soil Map Stream Order _____

County: _____ Township / City: _____

MISCELLANEOUS

Base Flow Conditions? (Y/N): _____ Date of last precipitation: _____ Quantity: _____

Photograph Information: _____

Elevated Turbidity? (Y/N): _____ Canopy (% open): _____

Were samples collected for water chemistry? (Y/N): _____ (Note lab sample no. or id. and attach results) Lab Number: _____

Field Measures: Temp (°C) _____ Dissolved Oxygen (mg/l) _____ pH (S.U.) _____ Conductivity (µmhos/cm) _____

Is the sampling reach representative of the stream (Y/N) _____ If not, please explain: _____

_____

Additional comments/description of pollution impacts: _____

_____

BIOTIC EVALUATION

Performed? (Y/N): _____ (If Yes, Record all observations. Voucher collections optional. NOTE: all voucher samples must be labeled with the site ID number. Include appropriate field data sheets from the Primary Headwater Habitat Assessment Manual)

Fish Observed? (Y/N) _____ Voucher? (Y/N) _____ Salamanders Observed? (Y/N) _____ Voucher? (Y/N) _____

Frogs or Tadpoles Observed? (Y/N) _____ Voucher? (Y/N) _____ Aquatic Macroinvertebrates Observed? (Y/N) _____ Voucher? (Y/N) _____

Comments Regarding Biology: _____

_____

_____

DRAWING AND NARRATIVE DESCRIPTION OF STREAM REACH (This must be completed):

Include important landmarks and other features of interest for site evaluation and a narrative description of the stream's location

FLOW ➔

OhioEPA Primary Headwater Habitat Evaluation Form

HHEI Score (sum of metrics 1, 2, 3) : [ ]

SITE NAME/LOCATION _____

_____ SITE NUMBER _____ RIVER BASIN _____ DRAINAGE AREA (mi²) _____

LENGTH OF STREAM REACH (ft) _____ LAT. _____ LONG. _____ RIVER CODE _____ RIVER MILE _____

DATE _____ SCORER _____ COMMENTS _____

NOTE: Complete All Items On This Form - Refer to "Field Evaluation Manual for Ohio's PHWH Streams" for Instructions

STREAM CHANNEL MODIFICATIONS: ☒ NONE / NATURAL CHANNEL ☐ RECOVERED ☐ RECOVERING ☐ RECENT OR NO RECOVERY

1. SUBSTRATE (Estimate percent of every type of substrate present. Check *ONLY* two predominant substrate *TYPE* boxes (Max of 32). Add total number of significant substrate types found (Max of 8). Final metric score is sum of boxes A & B.

HHEI Metric Points

TYPE		PERCENT	TYPE		PERCENT
☐ ☐	BLDR SLABS [16 pts]		☐ ☐	SILT [3 pt]	
☐ ☐	BOULDER (>256 mm) [16 pts]		☐ ☐	LEAF PACK/WOODY DEBRIS [3 pts]	
☐ ☐	BEDROCK [16 pt]		☐ ☐	FINE DETRITUS [3 pts]	
☐ ☐	COBBLE (65-256 mm) [12 pts]		☐ ☐	CLAY or HARDPAN [0 pt]	
☒ ☐	GRAVEL (2-64 mm) [9 pts]		☐ ☐	MUCK [0 pts]	
☐ ☐	SAND (<2 mm) [6 pts]		☐ ☐	ARTIFICIAL [3 pts]	

Total of Percentages of Bldr Slabs, Boulder, Cobble, Bedrock _____ **(A)** **(B)**

SCORE OF TWO MOST PREDOMINATE SUBSTRATE TYPES: [ ] **TOTAL NUMBER OF SUBSTRATE TYPES:** [ ]

Substrate Max = 40 [ ] **A + B**

2. Maximum Pool Depth ***(Measure the maximum pool depth within the 61 meter (200 ft)*** evaluation reach at the time of evaluation. Avoid plunge pools from road culverts or storm water pipes) (Check *ONLY* one box):

☐ > 30 centimeters [20 pts]
☐ > 22.5 - 30 cm [30 pts]
☐ > 10 - 22.5 cm [25 pts]
☐ > 5 cm - 10 cm [15 pts]
☒ < 5 cm [5 pts]
☐ NO WATER OR MOIST CHANNEL [0 pts]

COMMENTS _____ **MAXIMUM POOL DEPTH (centimeters):** [ ]

Pool Depth Max = 30 [ ]

3. BANK FULL WIDTH (Measured as the average of 3-4 measurements) **(Check *ONLY* one box):**

☐ > 4.0 meters [30 pts]
☐ > 3.0 m - 4.0 m [25 pts]
☒ > 1.5 m - 3.0 m [20 pts]
☐ > 1.0 m - 1.5 m [15 pts]
☐ ≤ 1.0 m [5 pts]

COMMENTS _____ **AVERAGE BANKFULL WIDTH (meters):** [ ]

Bankfull Width Max=30 [ ]

This information must also be completed

RIPARIAN ZONE AND FLOODPLAIN QUALITY ☆NOTE: River Left (L) and Right (R) as looking downstream☆

RIPARIAN WIDTH L	R	(Per Bank)	FLOODPLAIN QUALITY L	R	(Most Predominant per Bank)	L	R	
☒	☐	Wide >10m	☒	☒	Mature Forest, Wetland	☐	☐	Conservation Tillage
☐	☐	Moderate 5-10m	☐	☐	Immature Forest, Shrub or Old Field	☐	☐	Urban or Industrial
☐	☒	Narrow <5m	☐	☐	Residential, Park, New Field	☐	☐	Open Pasture, Row Crop
☐	☐	None	☐	☐	Fenced Pasture	☐	☐	Mining or Construction

COMMENTS _____

FLOW REGIME *(At Time of Evaluation)* (Check *ONLY* one box):

☒ Stream Flowing
☐ Subsurface flow with isolated pools (Interstitial)
☐ Moist Channel, isolated pools, no flow (Intermittent)
☐ Dry channel, no water (Ephemeral)

COMMENTS _____

SINUOSITY (Number of bends per 61 m (200 ft) of channel) (Check *ONLY* one box):

☐ None ☐ 1.0 ☒ 2.0 ☐ 3.0
☐ 0.5 ☐ 1.5 ☐ 2.5 ☐ >3

STREAM GRADIENT ESTIMATE

☐ Flat (0.5 ft/100 ft) ☒ Flat to Moderate ☐ Moderate (2 ft/100 ft) ☐ Moderate to Severe ☐ Severe (10 ft/100 ft)

ADDITIONAL STREAM INFORMATION (This Information Must Also be Completed):

QHEI PERFORMED? - ☐ Yes ☐ No QHEI Score _____ (If Yes, Attach Completed QHEI Form)

DOWNSTREAM DESIGNATED USE(S)

☐ WWH Name: _____ Distance from Evaluated Stream _____

☐ CWH Name: _____ Distance from Evaluated Stream _____

☐ EWH Name: _____ Distance from Evaluated Stream _____

MAPPING: ATTACH COPIES OF MAPS, INCLUDING THE ENTIRE WATERSHED AREA. CLEARLY MARK THE SITE LOCATION

USGS Quadrangle Name: _____ NRCS Soil Map Page: _____ NRCS Soil Map Stream Order _____

County: _____ Township / City: _____

MISCELLANEOUS

Base Flow Conditions? (Y/N): _____ Date of last precipitation: _____ Quantity: _____

Photograph Information: _____

Elevated Turbidity? (Y/N): _____ Canopy (% open): _____

Were samples collected for water chemistry? (Y/N): _____ (Note lab sample no. or id. and attach results) Lab Number: _____

Field Measures: Temp (°C) _____ Dissolved Oxygen (mg/l) _____ pH (S.U.) _____ Conductivity (µmhos/cm) _____

Is the sampling reach representative of the stream (Y/N) _____ If not, please explain: _____

_____

Additional comments/description of pollution impacts: _____

_____

BIOTIC EVALUATION

Performed? (Y/N): _____ (If Yes, Record all observations. Voucher collections optional. NOTE: all voucher samples must be labeled with the site ID number. Include appropriate field data sheets from the Primary Headwater Habitat Assessment Manual)

Fish Observed? (Y/N) _____ Voucher? (Y/N) _____ Salamanders Observed? (Y/N) _____ Voucher? (Y/N) _____

Frogs or Tadpoles Observed? (Y/N) _____ Voucher? (Y/N) _____ Aquatic Macroinvertebrates Observed? (Y/N) _____ Voucher? (Y/N) _____

Comments Regarding Biology: _____

_____

_____

DRAWING AND NARRATIVE DESCRIPTION OF STREAM REACH (This must be completed):

Include important landmarks and other features of interest for site evaluation and a narrative description of the stream's location

FLOW →

OhioEPA Primary Headwater Habitat Evaluation Form

HHEI Score (sum of metrics 1, 2, 3) : [illegible]

SITE NAME/LOCATION _____

[illegible] SITE NUMBER [illegible] RIVER BASIN [illegible] DRAINAGE AREA (mi²) [illegible]

LENGTH OF STREAM REACH (ft) _____ LAT. _____ LONG. _____ RIVER CODE _____ RIVER MILE _____

DATE 9/12/05 SCORER [illegible] COMMENTS _____

NOTE: Complete All Items On This Form - Refer to "Field Evaluation Manual for Ohio's PHWH Streams" for Instructions

STREAM CHANNEL MODIFICATIONS: ☒ NONE / NATURAL CHANNEL ☐ RECOVERED ☐ RECOVERING ☐ RECENT OR NO RECOVERY

1. SUBSTRATE (Estimate percent of every type of substrate present. Check *ONLY* two predominant substrate *TYPE* boxes (Max of 32). Add total number of significant substrate types found (Max of 8). Final metric score is sum of boxes A & B.

HHEI Metric Points

TYPE		PERCENT	TYPE		PERCENT
☐ ☐	BLDR SLABS [16 pts]		☐ ☐	SILT [3 pt]	
☐ ☐	BOULDER (>256 mm) [16 pts]		☐ ☐	LEAF PACK/WOODY DEBRIS [3 pts]	[illegible]
☐ ☐	BEDROCK [16 pt]		☐ ☐	FINE DETRITUS [3 pts]	
☐ ☐	COBBLE (65-256 mm) [12 pts]		☐ ☐	CLAY or HARDPAN [0 pt]	
☒ ☐	GRAVEL (2-64 mm) [9 pts]	[illegible]	☐ ☐	MUCK [0 pts]	
☒ ☐	SAND (<2 mm) [6 pts]	[illegible]	☐ ☐	ARTIFICIAL [3 pts]	

Total of Percentages of Bldr Slabs, Boulder, Cobble, Bedrock [illegible] **(A)** **(B)**

Substrate Max = 40 [illegible]

A + B

SCORE OF TWO MOST PREDOMINATE SUBSTRATE TYPES: [illegible] **TOTAL NUMBER OF SUBSTRATE TYPES:** [illegible]

2. Maximum Pool Depth ***(Measure the maximum pool depth within the 61 meter (200 ft)*** evaluation reach at the time of evaluation. Avoid plunge pools from road culverts or storm water pipes) (Check *ONLY* one box):

Pool Depth Max = 30 [illegible]

- ☐ > 30 centimeters [20 pts]
- ☐ > 22.5 - 30 cm [30 pts]
- ☒ > 10 - 22.5 cm [25 pts]
- ☐ > 5 cm - 10 cm [15 pts]
- ☐ < 5 cm [5 pts]
- ☐ NO WATER OR MOIST CHANNEL [0 pts]

COMMENTS _____ **MAXIMUM POOL DEPTH (centimeters):** [illegible]

3. BANK FULL WIDTH (Measured as the average of 3-4 measurements) **(Check *ONLY* one box):**

Bankfull Width Max=30 [illegible]

- ☐ > 4.0 meters [30 pts]
- ☐ > 3.0 m - 4.0 m [25 pts]
- ☒ > 1.5 m - 3.0 m [20 pts]
- ☐ > 1.0 m - 1.5 m [15 pts]
- ☐ ≤ 1.0 m [5 pts]

COMMENTS _____ **AVERAGE BANKFULL WIDTH (meters):** [illegible]

This information must also be completed

RIPARIAN ZONE AND FLOODPLAIN QUALITY ☆NOTE: River Left (L) and Right (R) as looking downstream☆

RIPARIAN WIDTH L R	(Per Bank)	FLOODPLAIN QUALITY L R	(Most Predominant per Bank)	L R	
☒ ☐	Wide >10m	☒ ☒	Mature Forest, Wetland	☐ ☐	Conservation Tillage
☐ ☒	Moderate 5-10m	☐ ☐	Immature Forest, Shrub or Old Field	☐ ☐	Urban or Industrial
☐ ☐	Narrow <5m	☐ ☐	Residential, Park, New Field	☐ ☐	Open Pasture, Row Crop
☐ ☐	None	☐ ☐	Fenced Pasture	☐ ☐	Mining or Construction

COMMENTS _____

FLOW REGIME *(At Time of Evaluation)* (Check *ONLY* one box):

- ☐ Stream Flowing
- ☐ Subsurface flow with isolated pools (Interstitial)
- ☒ Moist Channel, isolated pools, no flow (Intermittent)
- ☐ Dry channel, no water (Ephemeral)

COMMENTS _____

SINUOSITY (Number of bends per 61 m (200 ft) of channel) (Check *ONLY* one box):

☐ None	☐ 1.0	☐ 2.0	☐ 3.0
☐ 0.5	☐ 1.5	☐ 2.5	☒ >3

STREAM GRADIENT ESTIMATE

☐ Flat (0.5 ft/100 ft) ☒ Flat to Moderate ☐ Moderate (2 ft/100 ft) ☐ Moderate to Severe ☐ Severe (10 ft/100 ft)

ADDITIONAL STREAM INFORMATION (This Information Must Also be Completed):

QHEI PERFORMED? - ☐ Yes ☐ No QHEI Score _____ (If Yes, Attach Completed QHEI Form)

DOWNSTREAM DESIGNATED USE(S)

☐ WWH Name: _____ Distance from Evaluated Stream _____

☐ CWH Name: _____ Distance from Evaluated Stream _____

☐ EWH Name: _____ Distance from Evaluated Stream _____

MAPPING: ATTACH COPIES OF MAPS, INCLUDING THE ENTIRE WATERSHED AREA. CLEARLY MARK THE SITE LOCATION

USGS Quadrangle Name: _____ NRCS Soil Map Page: _____ NRCS Soil Map Stream Order _____

County: _____ Township / City: _____

MISCELLANEOUS

Base Flow Conditions? (Y/N): _____ Date of last precipitation: _____ Quantity: _____

Photograph Information: _____

Elevated Turbidity? (Y/N): _____ Canopy (% open): _____

Were samples collected for water chemistry? (Y/N): _____ (Note lab sample no. or id. and attach results) Lab Number: _____

Field Measures: Temp (°C) _____ Dissolved Oxygen (mg/l) _____ pH (S.U.) _____ Conductivity (µmhos/cm) _____

Is the sampling reach representative of the stream (Y/N) _____ If not, please explain: _____

Additional comments/description of pollution impacts: _____

BIOTIC EVALUATION

Performed? (Y/N): _____ (If Yes, Record all observations. Voucher collections optional. NOTE: all voucher samples must be labeled with the site ID number. Include appropriate field data sheets from the Primary Headwater Habitat Assessment Manual)

Fish Observed? (Y/N) _____ Voucher? (Y/N) _____ Salamanders Observed? (Y/N) _____ Voucher? (Y/N) _____
Frogs or Tadpoles Observed? (Y/N) _____ Voucher? (Y/N) _____ Aquatic Macroinvertebrates Observed? (Y/N) _____ Voucher? (Y/N) _____

Comments Regarding Biology: _____

DRAWING AND NARRATIVE DESCRIPTION OF STREAM REACH (This must be completed):

Include important landmarks and other features of interest for site evaluation and a narrative description of the stream's location

Primary Headwater Habitat Evaluation Form

HHEI Score (sum of metrics 1, 2, 3) :

SITE NAME/LOCATION _____

_____ SITE NUMBER _____ RIVER BASIN _____ DRAINAGE AREA (mi²) _____

LENGTH OF STREAM REACH (ft) _____ LAT. _____ LONG. _____ RIVER CODE _____ RIVER MILE _____

DATE _____ SCORER _____ COMMENTS _____

NOTE: Complete All Items On This Form - Refer to "Field Evaluation Manual for Ohio's PHWH Streams" for Instructions

STREAM CHANNEL MODIFICATIONS: ☐ NONE / NATURAL CHANNEL ☐ RECOVERED ☐ RECOVERING ☒ RECENT OR NO RECOVERY

1. SUBSTRATE (Estimate percent of every type of substrate present. Check *ONLY* two predominant substrate *TYPE* boxes (Max of 32). Add total number of significant substrate types found (Max of 8). Final metric score is sum of boxes A & B.

HHEI Metric Points

TYPE		PERCENT	TYPE		PERCENT
☐ ☐	BLDR SLABS [16 pts]		☒ ☐	SILT [3 pt]	
☐ ☐	BOULDER (>256 mm) [16 pts]		☒ ☐	LEAF PACK/WOODY DEBRIS [3 pts]	
☐ ☐	BEDROCK [16 pt]		☐ ☐	FINE DETRITUS [3 pts]	
☐ ☐	COBBLE (65-256 mm) [12 pts]		☐ ☐	CLAY or HARDPAN [0 pt]	
☐ ☐	GRAVEL (2-64 mm) [9 pts]		☐ ☐	MUCK [0 pts]	
☐ ☐	SAND (<2 mm) [6 pts]		☐ ☐	ARTIFICIAL [3 pts]	

Total of Percentages of Bldr Slabs, Boulder, Cobble, Bedrock _____ **(A)** **(B)**

Substrate Max = 40

A + B

SCORE OF TWO MOST PREDOMINATE SUBSTRATE TYPES: _____ **TOTAL NUMBER OF SUBSTRATE TYPES:** _____

2. Maximum Pool Depth ***(Measure the maximum pool depth within the 61 meter (200 ft)*** evaluation reach at the time of evaluation. Avoid plunge pools from road culverts or storm water pipes) (Check *ONLY* one box):

Pool Depth Max = 30

- ☐ > 30 centimeters [20 pts]
- ☐ > 22.5 - 30 cm [30 pts]
- ☐ > 10 - 22.5 cm [25 pts]
- ☐ > 5 cm - 10 cm [15 pts]
- ☒ < 5 cm [5 pts]
- ☐ NO WATER OR MOIST CHANNEL [0 pts]

COMMENTS _____ **MAXIMUM POOL DEPTH (centimeters):** _____

3. BANK FULL WIDTH (Measured as the average of 3-4 measurements) **(Check *ONLY* one box):**

Bankfull Width Max=30

- ☐ > 4.0 meters [30 pts]
- ☐ > 3.0 m - 4.0 m [25 pts]
- ☐ > 1.5 m - 3.0 m [20 pts]
- ☐ > 1.0 m - 1.5 m [15 pts]
- ☒ ≤ 1.0 m [5 pts]

COMMENTS _____ **AVERAGE BANKFULL WIDTH (meters):** _____

This information must also be completed

RIPARIAN ZONE AND FLOODPLAIN QUALITY ☆NOTE: River Left (L) and Right (R) as looking downstream☆

L R	RIPARIAN WIDTH (Per Bank)	L R	FLOODPLAIN QUALITY (Most Predominant per Bank)	L R	
☒ ☒	Wide >10m	☐ ☐	Mature Forest, Wetland	☐ ☐	Conservation Tillage
☐ ☐	Moderate 5-10m	☐ ☐	Immature Forest, Shrub or Old Field	☐ ☐	Urban or Industrial
☐ ☐	Narrow <5m	☒ ☒	Residential, Park, New Field	☐ ☐	Open Pasture, Row Crop
☐ ☐	None	☐ ☐	Fenced Pasture	☐ ☐	Mining or Construction

COMMENTS _____

FLOW REGIME *(At Time of Evaluation)* (Check *ONLY* one box):

- ☒ Stream Flowing
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- ☐ Dry channel, no water (Ephemeral)

COMMENTS _____

SINUOSITY (Number of bends per 61 m (200 ft) of channel) (Check *ONLY* one box):

☒ None	☐ 1.0	☐ 2.0	☐ 3.0
☐ 0.5	☐ 1.5	☐ 2.5	☐ >3

STREAM GRADIENT ESTIMATE

☐ Flat (0.5 ft/100 ft) ☒ Flat to Moderate ☐ Moderate (2 ft/100 ft) ☐ Moderate to Severe ☐ Severe (10 ft/100 ft)

ADDITIONAL STREAM INFORMATION (This Information Must Also be Completed):

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DOWNSTREAM DESIGNATED USE(S)

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USGS Quadrangle Name: _____ NRCS Soil Map Page: _____ NRCS Soil Map Stream Order _____

County: _____ Township / City: _____

MISCELLANEOUS

Base Flow Conditions? (Y/N): _____ Date of last precipitation: _____ Quantity: _____

Photograph Information: _____

Elevated Turbidity? (Y/N): _____ Canopy (% open): _____

Were samples collected for water chemistry? (Y/N): _____ (Note lab sample no. or id. and attach results) Lab Number: _____

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_____

Additional comments/description of pollution impacts: _____

_____

BIOTIC EVALUATION

Performed? (Y/N): _____ (If Yes, Record all observations. Voucher collections optional. NOTE: all voucher samples must be labeled with the site ID number. Include appropriate field data sheets from the Primary Headwater Habitat Assessment Manual)

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Comments Regarding Biology: _____

_____

_____

DRAWING AND NARRATIVE DESCRIPTION OF STREAM REACH (This must be completed):

Include important landmarks and other features of interest for site evaluation and a narrative description of the stream's location

FLOW ➔

N

Primary Headwater Habitat Evaluation Form

HHEI Score (sum of metrics 1, 2, 3) : [illegible]

SITE NAME/LOCATION _____

_____ SITE NUMBER [illegible] RIVER BASIN [illegible] DRAINAGE AREA (mi²) [illegible]

LENGTH OF STREAM REACH (ft) 200 LAT. _____ LONG. _____ RIVER CODE _____ RIVER MILE _____

DATE [illegible] SCORER [illegible] COMMENTS _____

NOTE: Complete All Items On This Form - Refer to "Field Evaluation Manual for Ohio's PHWH Streams" for Instructions

STREAM CHANNEL MODIFICATIONS: ☒ NONE / NATURAL CHANNEL ☐ RECOVERED ☐ RECOVERING ☐ RECENT OR NO RECOVERY

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COMMENTS _____ **MAXIMUM POOL DEPTH (centimeters):** [illegible]

3. **BANK FULL WIDTH (Measured as the average of 3-4 measurements)** **(Check *ONLY* one box):**

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COMMENTS _____ **AVERAGE BANKFULL WIDTH (meters):** [illegible]

This information must also be completed

RIPARIAN ZONE AND FLOODPLAIN QUALITY ☆NOTE: River Left (L) and Right (R) as looking downstream☆

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☐ ☐	Moderate 5-10m	☐ ☐	Immature Forest, Shrub or Old Field	☐ ☐	Urban or Industrial
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☐ ☐	None	☐ ☐	Fenced Pasture	☐ ☐	Mining or Construction

COMMENTS _____

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- ☐ Subsurface flow with isolated pools (Interstitial)
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- ☐ Dry channel, no water (Ephemeral)

COMMENTS _____

SINUOSITY (Number of bends per 61 m (200 ft) of channel) (Check *ONLY* one box):

☐ None	☐ 1.0	☐ 2.0	☐ 3.0
☐ 0.5	☒ 1.5	☐ 2.5	☐ >3

STREAM GRADIENT ESTIMATE

☐ Flat (0.5 ft/100 ft) ☒ Flat to Moderate ☐ Moderate (2 ft/100 ft) ☐ Moderate to Severe ☐ Severe (10 ft/100 ft)

ADDITIONAL STREAM INFORMATION (This Information Must Also be Completed):

QHEI PERFORMED? - ☐ Yes ☐ No QHEI Score _____ (If Yes, Attach Completed QHEI Form)

DOWNSTREAM DESIGNATED USE(S)

☐ WWH Name: _____ Distance from Evaluated Stream _____

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USGS Quadrangle Name: _____ NRCS Soil Map Page: _____ NRCS Soil Map Stream Order _____

County: _____ Township / City: _____

MISCELLANEOUS

Base Flow Conditions? (Y/N): _____ Date of last precipitation: _____ Quantity: _____

Photograph Information: _____

Elevated Turbidity? (Y/N): _____ Canopy (% open): _____

Were samples collected for water chemistry? (Y/N): _____ (Note lab sample no. or id. and attach results) Lab Number: _____

Field Measures: Temp (°C) _____ Dissolved Oxygen (mg/l) _____ pH (S.U.) _____ Conductivity (µmhos/cm) _____

Is the sampling reach representative of the stream (Y/N) _____ If not, please explain: _____

_____

Additional comments/description of pollution impacts: _____

_____

BIOTIC EVALUATION

Performed? (Y/N): _____ (If Yes, Record all observations. Voucher collections optional. NOTE: all voucher samples must be labeled with the site ID number. Include appropriate field data sheets from the Primary Headwater Habitat Assessment Manual)

Fish Observed? (Y/N) _____ Voucher? (Y/N) _____ Salamanders Observed? (Y/N) _____ Voucher? (Y/N) _____

Frogs or Tadpoles Observed? (Y/N) _____ Voucher? (Y/N) _____ Aquatic Macroinvertebrates Observed? (Y/N) _____ Voucher? (Y/N) _____

Comments Regarding Biology: _____

_____

_____

DRAWING AND NARRATIVE DESCRIPTION OF STREAM REACH (This must be completed):

Include important landmarks and other features of interest for site evaluation and a narrative description of the stream's location

FLOW ➜

OWQ Biological Studies QHEI (Qualitative Habitat Evaluation Index)

Sample #	bioSample #	Stream Name	Location

Surveyor	Sample Date	County	Macro SampleType	☐ Habitat Complete	QHEI Score:

1-Substrate (20 points maximum)

Substrate Score:

Check 1 Predominant Pool & 1 Predominant Riffle

Check all that are present — P=Pool, R=Riffle

Predominant P	Predominant R		Present P	Present R	Predominant P	Predominant R		Present P	Present R
☐	☐	Bldrs/Slabs(10)	☐	☐	☐	☐	Hardpan(4)	☐	☐
☐	☐	Boulders(9)	☐	☐	☐	☐	Detritus(3)	☐	☐
☐	☐	Cobble(8)	☐	☐	☐	☐	Muck(2)	☐	☐
☐	☐	Gravel(7)	☐	☐	☐	☐	Silt(2)	☐	☐
☐	☐	Sand(6)	☐	☐	☐	☐	Sludge(1)	☐	☐
☐	☐	Bedrock(5)	☐	☐	☐	☐	Artificial(0)	☐	☐

Substrate Quality (check only 1, or check 2 and AVERAGE)

Substrate Origin: ☐ Limestone(1) ☐ Hardpan(0) ☐ Lacustrine(0) ☐ Tills(1) ☐ Sandstone(0) ☐ Shale(-1) ☐ Wetlands(0) ☐ Rip/Rap(0) ☐ Coal fines(-2)

Silt Cover: ☐ Silt heavy(-2) ☐ Silt moderate(-1) ☐ Silt normal(0) ☐ Silt free(1)

Embeddedness: ☐ Extensive(-2) ☐ Moderate(-1) ☐ Low/Normal(0) ☐ None(1)

NOTE: ignore sludge originating from point sources; score based on natural substrates

☐ >4 substrates present(2)

Comments:

2-Instream Cover (20 points maximum

Instream Cover Score:

Type (check ALL that apply)

☐ Undercut banks(1) ☐ Deep pools(2) ☐ Oxbows(1)
☐ Overhanging vegetation(1) ☐ Rootwads(1) ☐ Aquatic macrophytes(1)
☐ Shallows(in slow water)(1) ☐ Boulders(1) ☐ Logs and woody debris(1)
☐ Rootmats(1)

Amount (check only 1, or 2 and AVERAGE)

☐ Extensive >75% (11)
☐ Moderate 25-75% (7)
☐ Sparse 5-25% (3)
☐ Nearly absent <5% (1)

Comments:

3-Channel Morphology (20) (check only one per category, OR two and AVERAGE)

Channel Score:

Sinuosity	Development	Channelization	Stability	Modifications/Other	
☐ High (4)	☐ Excellent (7)	☐ None (6)	☐ High (3)	☐ Snagging	☐ Impound
☐ Moderate (3)	☐ Good (5)	☐ Recovered (4)	☐ Moderate (2)	☐ Relocation	☐ Islands
☐ Low (2)	☐ Fair (3)	☐ Recovering (3)	☐ Low (1)	☐ Canopy Removal	☐ Leveed
☐ None (1)	☐ Poor (1)	☐ Recent or no recovery (1)		☐ Dredging	☐ Bank shaping
				☐ One side channel modifications	

Comments:

4-Riparian Zone & Bank Erosion (10 points maximum)

Riparian Score:

Left/Right banks looking downstream (For each category, check only one per bank, OR two per bank and AVERAGE).

Riparian width L	Riparian width R	(per bank)	Erosion/Runoff-Floodplain quality (past 100 ft Riparian) L	R	(most predominant per bank)	L	R	Bank Erosion L	R	(per bank)
☐	☐	Wide >50m (4)	☐	☐	Forest, Swamp (3)	☐	☐	☐	☐	None or little (3)
☐	☐	Moderate 10-50m (3)	☐	☐	Shrub or Old field (2)	☐	☐	☐	☐	Moderate (2)
☐	☐	Narrow 5-10m (2)	☐	☐	Residential, Park, New field (1)	☐	☐	☐	☐	Heavy/Severe (1)
☐	☐	Very narrow <5m (1)	☐	☐	Fenced pasture (1)	☐	☐			
☐	☐	None (0)				☐	☐			

Comments:

5a-Pool/Glide Quality (12 points maximum

Pool/Glide Score:

Max pool depth (check one)

☐ >1m (6)
☐ 0.7-1m (4)
☐ 0.4-0.7m (2)
☐ 0.2-0.4m (1)
☐ <0.2m (pool=0)

Morphology (check only one, OR check two and AVERAGE)

☐ Pool width > riffle width (2)
☐ Pool width = riffle width (1)
☐ Pool width < riffle width (0)

Pool/Run/Riffle current velocity (check all that apply)

☐ Eddies (1) ☐ Torrential (-1)
☐ Fast (1) ☐ Interstitial (-1)
☐ Moderate (1) ☐ Intermittent (-2)
☐ Slow (1) ☐ No pool (0)

Comments:

5b-Riffle/Run Quality (8) (check only one per category, OR two and AVERAGE)

Riffle/Run Score:

Riffle/run depth (check one)

☐ Generally>10cm, Max>50cm (4)
☐ Generally>10cm, Max<50cm(3)
☐ Generally 5-10cm (1)
☐ Generally<5cm (riffle=0)

Riffle/run substrate

☐ Stable-e.g. cobble, boulder (2)
☐ Mod. stable-e.g. pea gravel (1)
☐ Unstable-e.g. sand, gravel (0)

Riffle/run embeddedness

☐ Extensive (-1) ☐ Normal/Low (1)
☐ Moderate (0) ☐ None (2)
☐ No riffle (0)

Comments:

6-Gradient (10 points maximum)

Gradient Score:

Average width: *Gradient:* *(ft/mile)* *Drainage Area:* *(square miles)*

Comments:

IDEM OWQ Biological Studies QHEI (Qualitative Habitat Evaluation Index)

Sample #	bioSample #	Stream Name	Location

Surveyor	Sample Date	County	Macro SampleType	Habitat Complete	QHEI Score:
				☐	

Impacts/Miscellaneous

Major Suspected Impacts (Check all that apply)

- ☐ None
- ☐ Industrial
- ☐ WWTP
- ☐ Agricultural
- ☐ Livestock
- ☐ Silviculture
- ☐ Construction
- ☐ Urban Runoff
- ☐ Suburban
- ☐ Channelization
- ☐ Riparian Removal
- ☐ Flow Alteration
- ☐ CSOs
- ☐ Mining
- ☐ Landfills
- ☐ Natural

Pollution Impact Comments:

Miscellaneous QHEI Information

Subjective rating (1-10): % Riffle:

Aesthetic rating (1-10): % Run:

% Glide:

Canopy Cover (% Open): % Pool:

Is reach representative of stream?

General QHEI Notes:

OWQ Biological Studies QHEI (Qualitative Habitat Evaluation Index)

Sample # | bioSample # | Stream Name | Location

Surveyor | Sample Date | County | Macro SampleType | ☐ Habitat Complete | **QHEI Score:**

1-Substrate (20 points maximum)

Substrate Score:

Check 1 Predominant Pool & 1 Predominant Riffle

Check all that are present — P=Pool, R=Riffle

Predominant P	Predominant R		Present P	Present R	Predominant P	Predominant R		Present P	Present R
☐	☐	Bldrs/Slabs(10)	☐	☐	☐	☐	Hardpan(4)	☐	☐
☐	☐	Boulders(9)	☐	☐	☐	☐	Detritus(3)	☐	☐
☐	☐	Cobble(8)	☐	☐	☐	☐	Muck(2)	☐	☐
☐	☐	Gravel(7)	☐	☐	☐	☐	Silt(2)	☐	☐
☐	☐	Sand(6)	☐	☐	☐	☐	Sludge(1)	☐	☐
☐	☐	Bedrock(5)	☐	☐	☐	☐	Artificial(0)	☐	☐

Substrate Quality (check only 1, or check 2 and AVERAGE)

Substrate Origin: ☐ Limestone(1) ☐ Hardpan(0) ☐ Lacustrine(0) ☐ Tills(1) ☐ Sandstone(0) ☐ Shale(-1) ☐ Wetlands(0) ☐ Rip/Rap(0) ☐ Coal fines(-2)

Silt Cover: ☐ Silt heavy(-2) ☐ Silt moderate(-1) ☐ Silt normal(0) ☐ Silt free(1)

Embeddedness: ☐ Extensive(-2) ☐ Moderate(-1) ☐ Low/Normal(0) ☐ None(1)

NOTE: ignore sludge originating from point sources; score based on natural substrates

☐ >4 substrates present(2)

Comments:

2-Instream Cover (20 points maximum

Instream Cover Score:

Type (check ALL that apply)

☐ Undercut banks(1) ☐ Deep pools(2) ☐ Oxbows(1)
☐ Overhanging vegetation(1) ☐ Rootwads(1) ☐ Aquatic macrophytes(1)
☐ Shallows(in slow water)(1) ☐ Boulders(1) ☐ Logs and woody debris(1)
☐ Rootmats(1)

Amount (check only 1, or 2 and AVERAGE)

☐ Extensive >75% (11)
☐ Moderate 25-75% (7)
☐ Sparse 5-25% (3)
☐ Nearly absent <5% (1)

Comments:

3-Channel Morphology (20) (check only one per category, OR two and AVERAGE)

Channel Score:

Sinuosity	Development	Channelization	Stability	Modifications/Other	
☐ High (4)	☐ Excellent (7)	☐ None (6)	☐ High (3)	☐ Snagging	☐ Impound
☐ Moderate (3)	☐ Good (5)	☐ Recovered (4)	☐ Moderate (2)	☐ Relocation	☐ Islands
☐ Low (2)	☐ Fair (3)	☐ Recovering (3)	☐ Low (1)	☐ Canopy Removal	☐ Leveed
☐ None (1)	☐ Poor (1)	☐ Recent or no recovery (1)		☐ Dredging	☐ Bank shaping
				☐ One side channel modifications	

Comments:

4-Riparian Zone & Bank Erosion (10 points maximum)

Riparian Score:

Left/Right banks looking downstream (For each category, check only one per bank, OR two per bank and AVERAGE).

Riparian width L	R	(per bank)	Erosion/Runoff-Floodplain quality (past 100 ft Riparian) L	R	(most predominant per bank)	L	R		Bank Erosion L	R	(per bank)
☐	☐	Wide >50m (4)	☐	☐	Forest, Swamp (3)	☐	☐	Conservation Tillage (1)	☐	☐	None or little (3)
☐	☐	Moderate 10-50m (3)	☐	☐	Shrub or Old field (2)	☐	☐	Urban or Industrial (0)	☐	☐	Moderate (2)
☐	☐	Narrow 5-10m (2)	☐	☐	Residential, Park, New field (1)	☐	☐	Mining, Construction (0)	☐	☐	Heavy/Severe (1)
☐	☐	Very narrow <5m (1)	☐	☐	Fenced pasture (1)	☐	☐	Open Pasture/Rowcrop (0)			
☐	☐	None (0)									

Comments:

5a-Pool/Glide Quality (12 points maximum

Pool/Glide Score:

Max pool depth (check one)
☐ >1m (6)
☐ 0.7-1m (4)
☐ 0.4-0.7m (2)
☐ 0.2-0.4m (1)
☐ <0.2m (pool=0)

Morphology (check only one, OR check two and AVERAGE)
☐ Pool width > riffle width (2)
☐ Pool width = riffle width (1)
☐ Pool width < riffle width (0)

Pool/Run/Riffle current velocity (check all that apply)
☐ Eddies (1) ☐ Torrential (-1)
☐ Fast (1) ☐ Interstitial (-1)
☐ Moderate (1) ☐ Intermittent (-2)
☐ Slow (1) ☐ No pool (0)

Comments:

5b-Riffle/Run Quality (8) (check only one per category, OR two and AVERAGE)

Riffle/Run Score:

Riffle/run depth (check one)
☐ Generally>10cm, Max>50cm (4)
☐ Generally>10cm, Max<50cm(3)
☐ Generally 5-10cm (1)
☐ Generally<5cm (riffle=0)

Riffle/run substrate
☐ Stable-e.g. cobble, boulder (2)
☐ Mod. stable-e.g. pea gravel (1)
☐ Unstable-e.g. sand, gravel (0)

Riffle/run embeddedness
☐ Extensive (-1) ☐ Normal/Low (1)
☐ Moderate (0) ☐ None (2)
☐ No riffle (0)

Comments:

6-Gradient (10 points maximum)

Gradient Score:

Average width: *Gradient:* *(ft/mile)* *Drainage Area:* *(square miles)*

Comments:

OWQ Biological Studies QHEI (Qualitative Habitat Evaluation Index)

Sample #	bioSample #	Stream Name	Location

Surveyor	Sample Date	County	Macro SampleType	☐ Habitat Complete	QHEI Score:

Impacts/Miscellaneous

Major Suspected Impacts (Check all that apply)

- ☐ None
- ☐ Industrial
- ☐ WWTP
- ☐ Agricultural
- ☐ Livestock
- ☐ Silviculture
- ☐ Construction
- ☐ Urban Runoff
- ☐ Suburban
- ☐ Channelization
- ☐ Riparian Removal
- ☐ Flow Alteration
- ☐ CSOs
- ☐ Mining
- ☐ Landfills
- ☐ Natural

Pollution Impact Comments:

Miscellaneous QHEI Information

Subjective rating (1-10):
Aesthetic rating (1-10):
Canopy Cover (% Open):

% Riffle:
% Run:
% Glide:
% Pool:

Is reach representative of stream?

General QHEI Notes:

Primary Headwater Habitat Evaluation Form

HHEI Score (sum of metrics 1, 2, 3) : [illegible]

SITE NAME/LOCATION [illegible] SITE NUMBER [illegible] RIVER BASIN [illegible] DRAINAGE AREA (mi²) [illegible]

LENGTH OF STREAM REACH (ft) [illegible] LAT. ____ LONG. ____ RIVER CODE ____ RIVER MILE ____

DATE [illegible] SCORER [illegible] COMMENTS ____

NOTE: Complete All Items On This Form - Refer to "Field Evaluation Manual for Ohio's PHWH Streams" for Instructions

STREAM CHANNEL MODIFICATIONS: ☒ NONE / NATURAL CHANNEL ☐ RECOVERED ☐ RECOVERING ☐ RECENT OR NO RECOVERY

1. SUBSTRATE (Estimate percent of every type of substrate present. Check *ONLY* two predominant substrate *TYPE* boxes (Max of 32). Add total number of significant substrate types found (Max of 8). Final metric score is sum of boxes A & B.

HHEI Metric Points

TYPE		PERCENT	TYPE		PERCENT
☐☐	BLDR SLABS [16 pts]	____	☐☐	SILT [3 pt]	____
☐☐	BOULDER (>256 mm) [16 pts]	____	☐☐	LEAF PACK/WOODY DEBRIS [3 pts]	____
☐☐	BEDROCK [16 pt]	____	☐☐	FINE DETRITUS [3 pts]	____
☐☐	COBBLE (65-256 mm) [12 pts]	____	☐☐	CLAY or HARDPAN [0 pt]	____
☐☐	GRAVEL (2-64 mm) [9 pts]	____	☐☐	MUCK [0 pts]	____
☐☐	SAND (<2 mm) [6 pts]	____	☐☐	ARTIFICIAL [3 pts]	____

Total of Percentages of Bldr Slabs, Boulder, Cobble, Bedrock ____ **(A)** **(B)**

Substrate Max = 40 [illegible]

A + B

SCORE OF TWO MOST PREDOMINATE SUBSTRATE TYPES: [illegible] **TOTAL NUMBER OF SUBSTRATE TYPES:** [illegible]

2. Maximum Pool Depth *(Measure the maximum pool depth within the 61 meter (200 ft)* evaluation reach at the time of evaluation. Avoid plunge pools from road culverts or storm water pipes) (Check *ONLY* one box):

Pool Depth Max = 30 [illegible]

- ☐ > 30 centimeters [20 pts]
- ☐ > 22.5 - 30 cm [30 pts]
- ☐ > 10 - 22.5 cm [25 pts]
- ☐ > 5 cm - 10 cm [15 pts]
- ☒ < 5 cm [5 pts]
- ☐ NO WATER OR MOIST CHANNEL [0 pts]

COMMENTS ____ **MAXIMUM POOL DEPTH (centimeters):** [illegible]

3. BANK FULL WIDTH (Measured as the average of 3-4 measurements) **(Check *ONLY* one box):**

Bankfull Width Max=30 [illegible]

- ☐ > 4.0 meters [30 pts]
- ☐ > 3.0 m - 4.0 m [25 pts]
- ☐ > 1.5 m - 3.0 m [20 pts]
- ☒ > 1.0 m - 1.5 m [15 pts]
- ☐ ≤ 1.0 m [5 pts]

COMMENTS ____ **AVERAGE BANKFULL WIDTH (meters):** [illegible]

This information must also be completed

RIPARIAN ZONE AND FLOODPLAIN QUALITY ☆NOTE: River Left (L) and Right (R) as looking downstream☆

RIPARIAN WIDTH L	R	(Per Bank)	FLOODPLAIN QUALITY L	R	(Most Predominant per Bank)	L	R	
☒	☒	Wide >10m	☒	☒	Mature Forest, Wetland	☐	☐	Conservation Tillage
☐	☐	Moderate 5-10m	☐	☐	Immature Forest, Shrub or Old Field	☐	☐	Urban or Industrial
☐	☐	Narrow <5m	☐	☐	Residential, Park, New Field	☐	☐	Open Pasture, Row Crop
☐	☐	None	☐	☐	Fenced Pasture	☐	☐	Mining or Construction

COMMENTS ____

FLOW REGIME *(At Time of Evaluation)* (Check *ONLY* one box):

- ☐ Stream Flowing
- ☐ Subsurface flow with isolated pools (Interstitial)
- ☒ Moist Channel, isolated pools, no flow (Intermittent)
- ☐ Dry channel, no water (Ephemeral)

COMMENTS ____

SINUOSITY (Number of bends per 61 m (200 ft) of channel) (Check *ONLY* one box):

☐ None	☐ 1.0	☐ 2.0	☐ 3.0
☐ 0.5	☐ 1.5	☒ 2.5	☐ >3

STREAM GRADIENT ESTIMATE

☐ Flat (0.5 ft/100 ft) ☐ Flat to Moderate ☐ Moderate (2 ft/100 ft) ☐ Moderate to Severe ☐ Severe (10 ft/100 ft)

ADDITIONAL STREAM INFORMATION (This Information Must Also be Completed):

QHEI PERFORMED? - ☐ Yes ☒ No QHEI Score _____ (If Yes, Attach Completed QHEI Form)

DOWNSTREAM DESIGNATED USE(S)

☐ WWH Name: _____ Distance from Evaluated Stream _____

☐ CWH Name: _____ Distance from Evaluated Stream _____

☐ EWH Name: _____ Distance from Evaluated Stream _____

MAPPING: ATTACH COPIES OF MAPS, INCLUDING THE ENTIRE WATERSHED AREA. CLEARLY MARK THE SITE LOCATION

USGS Quadrangle Name: _____ NRCS Soil Map Page: _____ NRCS Soil Map Stream Order _____

County: _____ Township / City: _____

MISCELLANEOUS

Base Flow Conditions? (Y/N): _____ Date of last precipitation: _____ Quantity: _____

Photograph Information: _____

Elevated Turbidity? (Y/N): _____ Canopy (% open): _____

Were samples collected for water chemistry? (Y/N): _____ (Note lab sample no. or id. and attach results) Lab Number: _____

Field Measures: Temp (°C) _____ Dissolved Oxygen (mg/l) _____ pH (S.U.) _____ Conductivity (µmhos/cm) _____

Is the sampling reach representative of the stream (Y/N) _____ If not, please explain: _____

_____

Additional comments/description of pollution impacts: _____

_____

BIOTIC EVALUATION

Performed? (Y/N): _____ (If Yes, Record all observations. Voucher collections optional. NOTE: all voucher samples must be labeled with the site ID number. Include appropriate field data sheets from the Primary Headwater Habitat Assessment Manual)

Fish Observed? (Y/N) _____ Voucher? (Y/N) _____ Salamanders Observed? (Y/N) _____ Voucher? (Y/N) _____

Frogs or Tadpoles Observed? (Y/N) _____ Voucher? (Y/N) _____ Aquatic Macroinvertebrates Observed? (Y/N) _____ Voucher? (Y/N) _____

Comments Regarding Biology: _____

_____

_____

DRAWING AND NARRATIVE DESCRIPTION OF STREAM REACH (This must be completed):

Include important landmarks and other features of interest for site evaluation and a narrative description of the stream's location

FLOW ➜

OhioEPA Primary Headwater Habitat Evaluation Form

HHEI Score (sum of metrics 1, 2, 3) : ~~29~~ 35 KLC

SITE NAME/LOCATION

Tab of Downs Creek SITE NUMBER Sec3-S72 RIVER BASIN White River DRAINAGE AREA (mi²) 0.13 mi²

LENGTH OF STREAM REACH (ft) _____ LAT. _____ LONG. _____ RIVER CODE _____ RIVER MILE _____

DATE 9/13/05 SCORER K. Allison COMMENTS

NOTE: Complete All Items On This Form - Refer to "Field Evaluation Manual for Ohio's PHWH Streams" for Instructions

STREAM CHANNEL MODIFICATIONS: ☐ NONE (NATURAL CHANNEL ☒ RECOVERED ☐ RECOVERING ☐ RECENT OR NO RECOVERY

1. SUBSTRATE (Estimate percent of every type of substrate present. Check *ONLY* two predominant substrate *TYPE* boxes (Max of 32). Add total number of significant substrate types found (Max of 8). Final metric score is sum of boxes A & B.

TYPE		PERCENT	TYPE		PERCENT
☐☐	BLDR SLABS [16 pts]		☐☐	SILT [3 pts]	
☐☐	BOULDER (>256 mm) [16 pts]		☐☐	LEAF PACK/WOODY DEBRIS [3 pts]	5%
☐☐	BEDROCK [16 pt]		☐☐	FINE DETRITUS [3 pts]	
☐☐	COBBLE (65-256 mm) [12 pts]		☐☐	CLAY or HARDPAN [0 pt]	
☐☐	GRAVEL (2-64 mm) [9 pts]	5%	☐☐	MUCK [0 pts]	
☒☒	SAND (<2 mm) [6 pts]	90%	☐☐	ARTIFICIAL [3 pts]	

Total of Percentages of Bldr Slabs, Boulder, Cobble, Bedrock 0% (A) (B)

SCORE OF TWO MOST PREDOMINATE SUBSTRATE TYPES: ~~16~~ 12 TOTAL NUMBER OF SUBSTRATE TYPES: 3

HHEI Metric Points — Substrate Max = 40: ~~21~~ 15 KLC (A + B)

2. Maximum Pool Depth ***(Measure the maximum pool depth within the 61 meter (200 ft)*** evaluation reach at the time of evaluation. Avoid plunge pools from road culverts or storm water pipes) (Check *ONLY* one box):

- ☐ > 30 centimeters [20 pts]
- ☐ > 22.5 - 30 cm [30 pts]
- ☐ > 10 - 22.5 cm [25 pts]
- ☐ > 5 cm - 10 cm [15 pts]
- ☒ < 5 cm [5 pts]
- ☐ NO WATER OR MOIST CHANNEL [0 pts]

COMMENTS _____ MAXIMUM POOL DEPTH (centimeters): 3

Pool Depth Max = 30: 5

3. BANK FULL WIDTH (Measured as the average of 3-4 measurements) (Check *ONLY* one box):

- ☐ > 4.0 meters [30 pts]
- ☐ > 3.0 m - 4.0 m [25 pts]
- ☐ > 1.5 m - 3.0 m [20 pts]
- ☒ > 1.0 m - 1.5 m [15 pts]
- ☐ ≤ 1.0 m [5 pts]

COMMENTS _____ AVERAGE BANKFULL WIDTH (meters): 1.2

Bankfull Width Max=30: 15

This information must also be completed

RIPARIAN ZONE AND FLOODPLAIN QUALITY ☆NOTE: River Left (L) and Right (R) as looking downstream☆

RIPARIAN WIDTH L	R	(Per Bank)	FLOODPLAIN QUALITY L	R	(Most Predominant per Bank)	L	R	
☒	☒	Wide >10m	☒	☒	Mature Forest, Wetland	☐	☐	Conservation Tillage
☐	☐	Moderate 5-10m	☐	☐	Immature Forest, Shrub or Old Field	☐	☐	Urban or Industrial
☐	☐	Narrow <5m	☐	☐	Residential, Park, New Field	☐	☐	Open Pasture, Row Crop
☐	☐	None	☐	☐	Fenced Pasture	☐	☐	Mining or Construction

COMMENTS _____

FLOW REGIME *(At Time of Evaluation)* (Check *ONLY* one box):

- ☒ Stream Flowing
- ☐ Subsurface flow with isolated pools (interstitial)
- ☐ Moist Channel, isolated pools, no flow (Intermittent)
- ☐ Dry channel, no water (Ephemeral)

COMMENTS _____

SINUOSITY (Number of bends per 61 m (200 ft) of channel) (Check *ONLY* one box):

☐ None	☐ 1.0	☒ 2.0	☐ 3.0
☐ 0.5	☐ 1.5	☐ 2.5	☐ >3

STREAM GRADIENT ESTIMATE

☐ Flat (0.5 ft/100 ft) ☒ Flat to Moderate ☐ Moderate (2 ft/100 ft) ☐ Moderate to Severe ☐ Severe (10 ft/100 ft)

ADDITIONAL STREAM INFORMATION (This Information Must Also be Completed):

QHEI PERFORMED? - ☐ Yes ☐ No QHEI Score _____ (If Yes, Attach Completed QHEI Form)

DOWNSTREAM DESIGNATED USE(S)

☐ WWH Name: _____ Distance from Evaluated Stream _____

☐ CWH Name: _____ Distance from Evaluated Stream _____

☐ EWH Name: _____ Distance from Evaluated Stream _____

MAPPING: ATTACH COPIES OF MAPS, INCLUDING THE ENTIRE WATERSHED AREA. CLEARLY MARK THE SITE LOCATION

USGS Quadrangle Name: _____ NRCS Soil Map Page: _____ NRCS Soil Map Stream Order _____

County: _____ Township / City: _____

MISCELLANEOUS

Base Flow Conditions? (Y/N): _____ Date of last precipitation: _____ Quantity: _____

Photograph Information: _____

Elevated Turbidity? (Y/N): _____ Canopy (% open): 60

Were samples collected for water chemistry? (Y/N): _____ (Note lab sample no. or id. and attach results) Lab Number: _____

Field Measures: Temp (°C) _____ Dissolved Oxygen (mg/l) _____ pH (S.U.) _____ Conductivity (µmhos/cm) _____

Is the sampling reach representative of the stream (Y/N) _____ If not, please explain: _____

Additional comments/description of pollution impacts: _____

BIOTIC EVALUATION

Performed? (Y/N): _____ (If Yes, Record all observations. Voucher collections optional. NOTE: all voucher samples must be labeled with the site ID number. Include appropriate field data sheets from the Primary Headwater Habitat Assessment Manual)

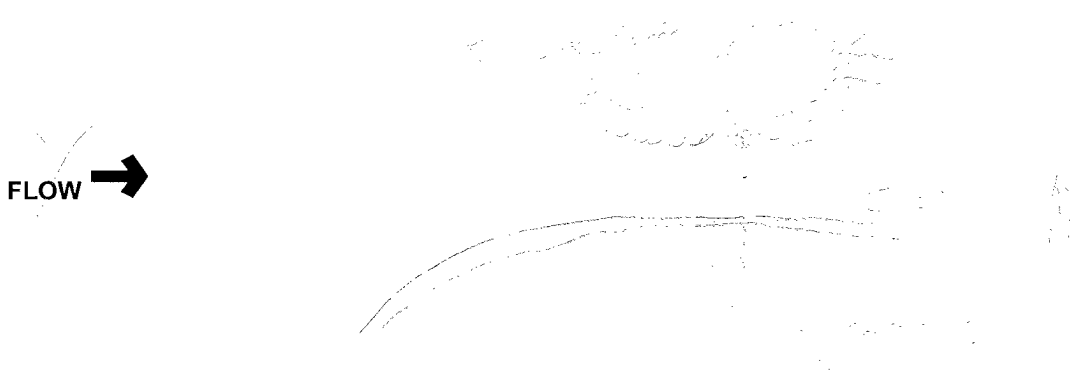
Fish Observed? (Y/N) _____ Voucher? (Y/N) _____ Salamanders Observed? (Y/N) _____ Voucher? (Y/N) _____

Frogs or Tadpoles Observed? (Y/N) _____ Voucher? (Y/N) _____ Aquatic Macroinvertebrates Observed? (Y/N) _____ Voucher? (Y/N) _____

Comments Regarding Biology: _____

DRAWING AND NARRATIVE DESCRIPTION OF STREAM REACH (This must be completed):

Include important landmarks and other features of interest for site evaluation and a narrative description of the stream's location



Qualitative Habitat Evaluation Index and Use Assessment Field Sheet

QHEI Score: 92.5 91.5

Stream & Location: 572A N of 231 RM: Date: 8/17/09 (RLL)

Scorers Full Name & Affiliation: Kirk Roth, Corporate Ecl

River Code: - - STORET #: Lat/ Long.: (Decimal°) . 18 . Office verified location ☐

1] SUBSTRATE

Check ONLY Two substrate TYPE BOXES; estimate % or note every type present

BEST TYPES	POOL	RIFFLE	OTHER TYPES	POOL	RIFFLE
☐☐ BLDR /SLABS [10]			☐☐ HARDPAN [4]		
☐☐ BOULDER [9]			☐☐ DETRITUS [3]		
☐☑ COBBLE [8]			☐☐ MUCK [2]		
☑☐ GRAVEL [7]			☐☐ SILT [2]		
☐☐ SAND [6]			☐☐ ARTIFICIAL [0]		
☐☐ BEDROCK [5]					

(Score natural substrates; ignore sludge from point-sources)

NUMBER OF BEST TYPES: ☑ 4 or more [2] ☐ 3 or less [0]

Check ONE (Or 2 & average)

ORIGIN	QUALITY
☑ LIMESTONE [1]	☐ HEAVY [-2]
☑ TILLS [1]	☐ MODERATE [-1]
☐ WETLANDS [0]	☐ NORMAL [0]
☐ HARDPAN [0]	☑ FREE [1]
☐ SANDSTONE [0]	☐ EXTENSIVE [-2]
☐ RIPIRAP [0]	☐ MODERATE [-1]
☐ LACUSTURINE [0]	☑ NORMAL [0]
☐ SHALE [-1]	☐ NONE [1]
☐ COAL FINES [-2]	

SILT

EMBEDDEDNESS

Substrate 20 19 Maximum 20 (RLL)

Comments

2] INSTREAM COVER

Indicate presence 0 to 3: 0-Absent; 1-Very small amounts or if more common of marginal quality; 2-Moderate amounts, but not of highest quality or in small amounts of highest quality; 3-Highest quality in moderate or greater amounts (e.g., very large boulders in deep or fast water, large diameter log that is stable, well developed rootwad in deep / fast water, or deep, well-defined, functional pools.

2 UNDERCUT BANKS [1]	2 POOLS > 70cm [2]	___ OXBOWS, BACKWATERS [1]
2 OVERHANGING VEGETATION [1]	1 ROOTWADS [1]	___ AQUATIC MACROPHYTES [1]
2 SHALLOWS (IN SLOW WATER) [1]	3 BOULDERS [1]	1 LOGS OR WOODY DEBRIS [1]
___ ROOTMATS [1]		

AMOUNT — Check ONE (Or 2 & average)

☑ EXTENSIVE >75% [11]
☐ MODERATE 25-75% [7]
☐ SPARSE 5-<25% [3]
☐ NEARLY ABSENT <5% [1]

Comments "Old Method" of Scoring Used for Consistency

Cover Maximum 20: 19

3] CHANNEL MORPHOLOGY

Check ONE in each category (Or 2 & average)

SINUOSITY	DEVELOPMENT	CHANNELIZATION	STABILITY
☑ HIGH [4]	☑ EXCELLENT [7]	☑ NONE [6]	☑ HIGH [3]
☐ MODERATE [3]	☐ GOOD [5]	☐ RECOVERED [4]	☐ MODERATE [2]
☐ LOW [2]	☐ FAIR [3]	☐ RECOVERING [3]	☐ LOW [1]
☐ NONE [1]	☐ POOR [1]	☐ RECENT OR NO RECOVERY [1]	

Comments

Channel Maximum 20: 20

4] BANK EROSION AND RIPARIAN ZONE

Check ONE in each category for EACH BANK (Or 2 per bank & average)

River right looking downstream

EROSION (L R)	RIPARIAN WIDTH (L R)	FLOOD PLAIN QUALITY (L R)	(L R)
☑☑ NONE / LITTLE [3]	☐☑ WIDE > 50m [4]	☑☑ FOREST, SWAMP [3]	☐☐ CONSERVATION TILLAGE [1]
☐☐ MODERATE [2]	☑☐ MODERATE 10-50m [3]	☐☐ SHRUB OR OLD FIELD [2]	☐☐ URBAN OR INDUSTRIAL [0]
☐☐ HEAVY / SEVERE [1]	☐☐ NARROW 5-10m [2]	☐☐ RESIDENTIAL, PARK, NEW FIELD [1]	☐☐ MINING / CONSTRUCTION [0]
	☐☐ VERY NARROW < 5m [1]	☐☐ FENCED PASTURE [1]	
	☐☐ NONE [0]	☐☐ OPEN PASTURE, ROWCROP [0]	

Indicate predominant land use(s) past 100m riparian.

Comments

Riparian Maximum 10: 9.5

5] POOL / GLIDE AND RIFFLE / RUN QUALITY

MAXIMUM DEPTH	CHANNEL WIDTH	CURRENT VELOCITY
Check ONE (ONLY!)	Check ONE (Or 2 & average)	Check ALL that apply
☑ > 1m [6]	☑ POOL WIDTH > RIFFLE WIDTH [2]	☐ TORRENTIAL [-1] ☑ SLOW [1]
☐ 0.7-<1m [4]	☐ POOL WIDTH = RIFFLE WIDTH [1]	☐ VERY FAST [1] ☐ INTERSTITIAL [-1]
☐ 0.4-<0.7m [2]	☐ POOL WIDTH < RIFFLE WIDTH [0]	☑ FAST [1] ☐ INTERMITTENT [-2]
☐ 0.2-<0.4m [1]		☑ MODERATE [1] ☐ EDDIES [1]
☐ < 0.2m [0]		Indicate for reach - pools and riffles.

Recreation Potential
Primary Contact
Secondary Contact
(circle one and comment on back)

Comments

Pool / Current Maximum 12: 11

Indicate for functional riffles; Best areas must be large enough to support a population of riffle-obligate species: Check ONE (Or 2 & average). ☐ NO RIFFLE [metric=0]

RIFFLE DEPTH	RUN DEPTH	RIFFLE / RUN SUBSTRATE	RIFFLE / RUN EMBEDDEDNESS
☑ BEST AREAS > 10cm [2]	☑ MAXIMUM > 50cm [2]	☑ STABLE (e.g., Cobble, Boulder) [2]	☐ NONE [2]
☐ BEST AREAS 5-10cm [1]	☐ MAXIMUM < 50cm [1]	☐ MOD. STABLE (e.g., Large Gravel) [1]	☑ LOW [1]
☐ BEST AREAS < 5cm [metric=0]		☐ UNSTABLE (e.g., Fine Gravel, Sand) [0]	☐ MODERATE [0]
			☐ EXTENSIVE [-1]

Comments

Riffle / Run Maximum 8: 7

6] GRADIENT

(8.0 ft/mi) ☐ VERY LOW - LOW [2-4] ☒ MODERATE [6-10] ☐ HIGH - VERY HIGH [10-6]

DRAINAGE AREA (0.91 mi²)

%POOL: 20 %GLIDE: 10 %RUN: 30 %RIFFLE: 40

Gradient Maximum 10: 6

740 cm depth

STA

A] SAMPLED REACH

Check ALL that apply

Comment RE: Reach consistency/ Is reach typical of steam?, Recreation/ Observed - Inferred, Other/ Sampling observations, Concerns, Access directions, etc.

METHOD

- ☐ BOAT
- ☐ WADE
- ☐ L. LINE
- ☐ OTHER

STAGE

1st -sample pass- 2nd

- ☐ HIGH ☐
- ☐ UP ☐
- ☐ NORMAL ☐
- ☐ LOW ☐
- ☐ DRY ☐

DISTANCE

- ☐ 0.5 Km
- ☐ 0.2 Km
- ☐ 0.15 Km
- ☐ 0.12 Km
- ☐ OTHER

_____ meters

CLARITY

1st --sample pass-- 2nd

- ☐ < 20 cm ☐
- ☐ 20-<40 cm ☐
- ☐ 40-70 cm ☐
- ☐ > 70 cm/ CTB ☐
- ☐ SECCHI DEPTH ☐

CANOPY

- ☐ > 85%- OPEN
- ☐ 55%-<85%
- ☐ 30%-<55%
- ☐ 10%-<30%
- ☐ <10%- CLOSED

1st _____ cm
2nd _____ cm

B] AESTHETICS

- ☐ NUISANCE ALGAE
- ☐ INVASIVE MACROPHYTES
- ☐ EXCESS TURBIDITY
- ☐ DISCOLORATION
- ☐ FOAM / SCUM
- ☐ OIL SHEEN
- ☐ TRASH / LITTER
- ☐ NUISANCE ODOR
- ☐ SLUDGE DEPOSITS
- ☐ CSOs/SSOs/OUTFALLS

C] RECREATION

AREA DEPTH

POOL: ☐ >100ft² ☐ >3ft

D] MAINTENANCE

Circle some & COMMENT

PUBLIC / PRIVATE / BOTH / NA
ACTIVE / HISTORIC / BOTH / NA
YOUNG-SUCCESSION-OLD
SPRAY / SNAG / REMOVED
MODIFIED / DIPPED OUT / NA
LEVEED / ONE SIDED
RELOCATED / CUTOFFS
MOVING-BEDLOAD-STABLE
ARMOURED / SLUMPS
ISLANDS / SCOURED
IMPOUNDED / DESICCATED
FLOOD CONTROL / DRAINAGE

E] ISSUES

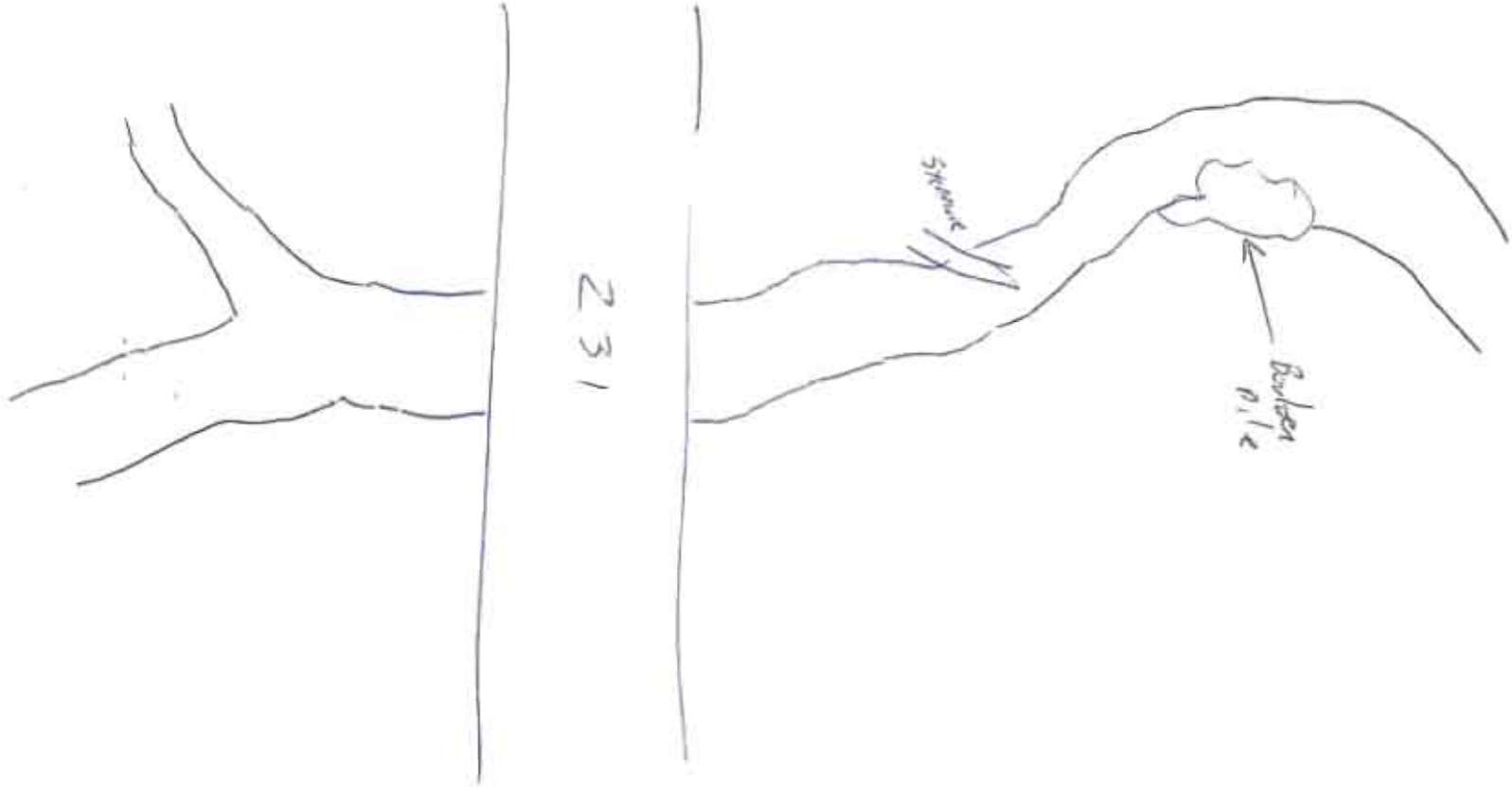
WWTP / CSO / NPDES / INDUSTRY
HARDENED / URBAN / DIRT&GRIME
CONTAMINATED / LANDFILL
BMPs-CONSTRUCTION-SEDIMENT
LOGGING / IRRIGATION / COOLING
BANK / EROSION / SURFACE
FALSE BANK / MANURE / LAGOON
WASH H_20 / TILE / H_20 TABLE
ACID / MINE / QUARRY / FLOW
NATURAL / WETLAND / STAGNANT
PARK / GOLF / LAWN / HOME
ATMOSPHERE / DATA PAUCITY

F] MEASUREMENTS

- $\bar{x}$ width
- $\bar{x}$ depth
- max. depth
- $\bar{x}$ bankfull width
- bankfull $\bar{x}$ depth
- W/D ratio
- bankfull max. depth
- floodprone x^2 width
- entrench. ratio

Legacy Tree:

Stream Drawing:



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Primary Headwater Habitat Evaluation Form

HHEI Score (sum of metrics 1, 2, 3) : 54

SITE NAME/LOCATION _____

Class III SITE NUMBER Sec3-S72B RIVER BASIN White River DRAINAGE AREA (mi²) 0.010

LENGTH OF STREAM REACH (ft) 200 LAT. _____ LONG. _____ RIVER CODE _____ RIVER MILE _____

DATE Dec 18, 2008 SCORER K. Roth COMMENTS _____

NOTE: Complete All Items On This Form - Refer to "Field Evaluation Manual for Ohio's PHWH Streams" for Instructions

STREAM CHANNEL MODIFICATIONS: ☐ NONE / NATURAL CHANNEL ☐ RECOVERED ☑ RECOVERING ☐ RECENT OR NO RECOVERY

1. SUBSTRATE (Estimate percent of every type of substrate present. Check *ONLY* two predominant substrate *TYPE* boxes (Max of 32). Add total number of significant substrate types found (Max of 8). Final metric score is sum of boxes A & B.

TYPE		PERCENT	TYPE		PERCENT
☐ ☐	BLDR SLABS [16 pts]	0.0%	☐ ☑	SILT [3 pt]	20.0%
☐ ☐	BOULDER (>256 mm) [16 pts]	10.0%	☐ ☐	LEAF PACK/WOODY DEBRIS [3 pts]	0.0%
☐ ☐	BEDROCK [16 pt]	0.0%	☐ ☐	FINE DETRITUS [3 pts]	0.0%
☐ ☐	COBBLE (65-256 mm) [12 pts]	10.0%	☐ ☐	CLAY or HARDPAN [0 pt]	0.0%
☐ ☐	GRAVEL (2-64 mm) [9 pts]	20.0%	☐ ☐	MUCK [0 pts]	0.0%
☑ ☐	SAND (<2 mm) [6 pts]	40.0%	☐ ☐	ARTIFICIAL [3 pts]	0.0%

Total of Percentages of Bldr Slabs, Boulder, Cobble, Bedrock 20.0% (A)

Substrate Percentage Check 100% (B)

SCORE OF TWO MOST PREDOMINATE SUBSTRATE TYPES: 9 **TOTAL NUMBER OF SUBSTRATE TYPES:** 5

HHEI Metric Points

Substrate Max = 40

14

A + B

2. Maximum Pool Depth ***(Measure the maximum pool depth within the 61 meter (200 ft)*** evaluation reach at the time of evaluation. Avoid plunge pools from road culverts or storm water pipes) (Check *ONLY* one box):

☑ > 30 centimeters [20 pts]
☐ > 22.5 - 30 cm [30 pts]
☐ > 10 - 22.5 cm [25 pts]
☐ > 5 cm - 10 cm [15 pts]
☐ < 5 cm [5 pts]
☐ NO WATER OR MOIST CHANNEL [0 pts]

COMMENTS _____ **MAXIMUM POOL DEPTH (centimeters):** _____

Pool Depth Max = 30

20

3. BANK FULL WIDTH (Measured as the average of 3-4 measurements) (Check *ONLY* one box):

☐ > 4.0 meters [30 pts]
☐ > 3.0 m - 4.0 m [25 pts]
☑ > 1.5 m - 3.0 m [20 pts]
☐ > 1.0 m - 1.5 m [15 pts]
☐ ≤ 1.0 m [5 pts]

COMMENTS _____ **AVERAGE BANKFULL WIDTH (meters):** 2.00

Bankfull Width Max=30

20

This information must also be completed

RIPARIAN ZONE AND FLOODPLAIN QUALITY ☆NOTE: River Left (L) and Right (R) as looking downstream☆

L	R	RIPARIAN WIDTH (Per Bank)	L	R	FLOODPLAIN QUALITY (Most Predominant per Bank)	L	R	
☐	☐	Wide >10m	☑	☐	Mature Forest, Wetland	☐	☐	Conservation Tillage
☑	☑	Moderate 5-10m	☐	☑	Immature Forest, Shrub or Old Field	☐	☐	Urban or Industrial
☐	☐	Narrow <5m	☐	☐	Residential, Park, New Field	☐	☐	Open Pasture, Row Crop
☐	☐	None	☐	☐	Fenced Pasture	☐	☐	Mining or Construction

COMMENTS _____

FLOW REGIME *(At Time of Evaluation)* (Check *ONLY* one box):

☑ Stream Flowing
☐ Subsurface flow with isolated pools (Interstitial)
☐ Moist Channel, isolated pools, no flow (Intermittent)
☐ Dry channel, no water (Ephemeral)

COMMENTS _____

SINUOSITY (Number of bends per 61 m (200 ft) of channel) (Check *ONLY* one box):

☐ None ☐ 1.0 ☐ 2.0 ☑ 3.0
☐ 0.5 ☐ 1.5 ☐ 2.5 ☐ >3

STREAM GRADIENT ESTIMATE

☐ Flat (0.5 ft/100 ft) ☐ Flat to Moderate ☐ Moderate (2 ft/100 ft) ☐ Moderate to Severe ☐ Severe (10 ft/100 ft)

ADDITIONAL STREAM INFORMATION (This Information Must Also be Completed):

QHEI PERFORMED? - ☐ Yes ☑ No QHEI Score _____ (If Yes, Attach Completed QHEI Form)

DOWNSTREAM DESIGNATED USE(S)

☐ WWH Name: _____ Distance from Evaluated Stream _____
☐ CWH Name: _____ Distance from Evaluated Stream _____
☐ EWH Name: _____ Distance from Evaluated Stream _____

MAPPING: ATTACH COPIES OF MAPS, INCLUDING THE ENTIRE WATERSHED AREA. CLEARLY MARK THE SITE LOCATION

USGS Quadrangle Name:_____ NRCS Soil Map Page:_____ NRCS Soil Map Stream Order 0

County: Greene Township / City:_____

MISCELLANEOUS

Base Flow Conditions? (Y/N): Y Date of last precipitation:_____ Quantity: 0.00

Photograph Information: _____

Elevated Turbidity? (Y/N): N Canopy (% open): 0%

Were samples collected for water chemistry? (Y/N): N (Note lab sample no. or id. and attach results) Lab Number:_____

Field Measures: Temp (°C)_____ Dissolved Oxygen (mg/l) _____ pH (S.U.) _____ Conductivity (µmhos/cm) _____

Is the sampling reach representative of the stream (Y/N) Y If not, please explain:_____

_____

Additional comments/description of pollution impacts:_____

_____

BIOTIC EVALUATION

Performed? (Y/N): N (If Yes, Record all observations. Voucher collections optional. NOTE: all voucher samples must be labeled with the site ID number. Include appropriate field data sheets from the Primary Headwater Habitat Assessment Manual)

Fish Observed? (Y/N) N Voucher? (Y/N) N Salamanders Observed? (Y/N) N Voucher? (Y/N) N
Frogs or Tadpoles Observed? (Y/N) N Voucher? (Y/N) N Aquatic Macroinvertebrates Observed? (Y/N) N Voucher? (Y/N) N

Comments Regarding Biology: _____

_____

_____

DRAWING AND NARRATIVE DESCRIPTION OF STREAM REACH (This must be completed):

Include important landmarks and other features of interest for site evaluation and a narrative description of the stream's location

STREAM DRAWING ON ORIGINAL FIELD DATA SHEETS STORED AT LAKE SWCD OFFICE.

FLOW →

A] SAMPLED REACH

Check ALL that apply

Comment RE: Reach consistency/ Is reach typical of steam?, *Recreation/* Observed - Inferred, *Other/* Sampling observations, Concerns, Access directions, etc.

METHOD

- ☐ BOAT
- ☐ WADE
- ☐ L. LINE
- ☐ OTHER

STAGE

1st -sample pass- 2nd

- ☐ HIGH ☐
- ☐ UP ☐
- ☐ NORMAL ☐
- ☐ LOW ☐
- ☐ DRY ☐

DISTANCE

- ☐ 0.5 Km
- ☐ 0.2 Km
- ☐ 0.15 Km
- ☐ 0.12 Km
- ☐ OTHER

_____ meters

CLARITY

1st --sample pass-- 2nd

- ☐ < 20 cm ☐
- ☐ 20-<40 cm ☐
- ☐ 40-70 cm ☐
- ☐ > 70 cm/ CTB ☐
- ☐ SECCHI DEPTH ☐

CANOPY

- ☐ > 85%- OPEN
- ☐ 55%-<85%
- ☐ 30%-<55%
- ☐ 10%-<30%
- ☐ <10%- CLOSED

1st pass _____ cm

2nd _____ cm

B] AESTHETICS

- ☐ NUISANCE ALGAE
- ☐ INVASIVE MACROPHYTES
- ☐ EXCESS TURBIDITY
- ☐ DISCOLORATION
- ☐ FOAM / SCUM
- ☐ OIL SHEEN
- ☐ TRASH / LITTER
- ☐ NUISANCE ODOR
- ☐ SLUDGE DEPOSITS
- ☐ CSOs/SSOs/OUTFALLS

C] RECREATION

AREA DEPTH

POOL: ☐ >100ft² ☐ >3ft

D] MAINTENANCE

Circle some & *COMMENT*

PUBLIC / PRIVATE / BOTH / NA
ACTIVE / HISTORIC / BOTH / NA
YOUNG-SUCCESSION-OLD
SPRAY / SNAG / REMOVED
MODIFIED / DIPPED OUT / NA
LEVEED / ONE SIDED
RELOCATED / CUTOFFS
MOVING-BEDLOAD-STABLE
ARMOURED / SLUMPS
ISLANDS / SCOURED
IMPOUNDED / DESICCATED
FLOOD CONTROL / DRAINAGE

E] ISSUES

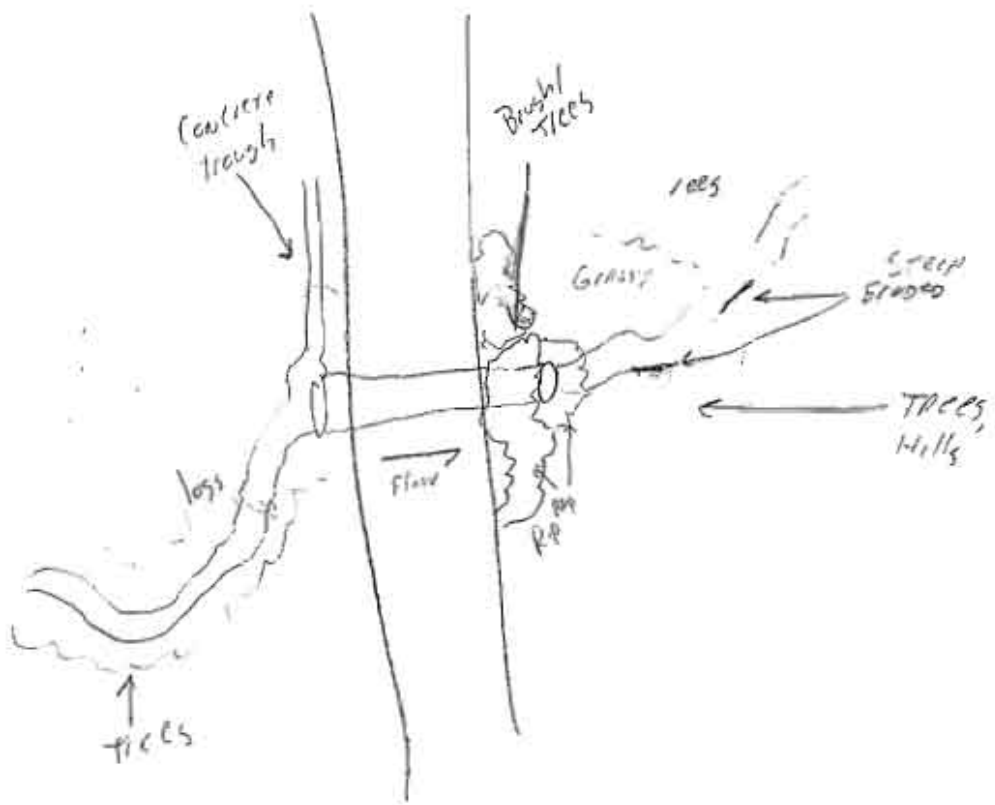
WWTP / CSO / NPDES / INDUSTRY
HARDENED / URBAN / DIRT&GRIME
CONTAMINATED / LANDFILL
BMPs-CONSTRUCTION-SEDIMENT
LOGGING / IRRIGATION / COOLING
BANK / EROSION / SURFACE
FALSE BANK / MANURE / LAGOON
WASH H_2O / TILE / H_2O TABLE
ACID / MINE / QUARRY / FLOW
NATURAL / WETLAND / STAGNANT
PARK / GOLF / LAWN / HOME
ATMOSPHERE / DATA PAUCITY

F] MEASUREMENTS

- $\bar{x}$ width
- $\bar{x}$ depth
- max. depth
- $\bar{x}$ bankfull width
- bankfull $\bar{x}$ depth
- W/D ratio
- bankfull max. depth
- floodprone x^2 width
- entrench. ratio

Legacy Tree:

Stream Drawing:



Primary Headwater Habitat Evaluation Form

HHEI Score (sum of metrics 1, 2, 3) : [illegible]

SITE NAME/LOCATION _____

[illegible] SITE NUMBER [illegible] RIVER BASIN [illegible] DRAINAGE AREA (mi²) [illegible]

LENGTH OF STREAM REACH (ft) [illegible] LAT. _____ LONG. _____ RIVER CODE _____ RIVER MILE _____

DATE [illegible] SCORER [illegible] COMMENTS _____

NOTE: Complete All Items On This Form - Refer to "Field Evaluation Manual for Ohio's PHWH Streams" for Instructions

STREAM CHANNEL MODIFICATIONS: ☒ NONE / NATURAL CHANNEL ☐ RECOVERED ☐ RECOVERING ☐ RECENT OR NO RECOVERY

1. **SUBSTRATE (Estimate percent of every type of substrate present.** Check *ONLY* two predominant substrate *TYPE* boxes (Max of 32). Add total number of significant substrate types found (Max of 8). Final metric score is sum of boxes A & B.

HHEI Metric Points

TYPE		PERCENT	TYPE		PERCENT
☐ ☐	BLDR SLABS [16 pts]		☐ ☐	SILT [3 pt]	
☐ ☐	BOULDER (>256 mm) [16 pts]		☐ ☐	LEAF PACK/WOODY DEBRIS [3 pts]	
☐ ☐	BEDROCK [16 pt]		☐ ☐	FINE DETRITUS [3 pts]	
☐ ☐	COBBLE (65-256 mm) [12 pts]		☐ ☐	CLAY or HARDPAN [0 pt]	
☒ ☐	GRAVEL (2-64 mm) [9 pts]		☐ ☐	MUCK [0 pts]	
☐ ☐	SAND (<2 mm) [6 pts]		☐ ☐	ARTIFICIAL [3 pts]	

Total of Percentages of Bldr Slabs, Boulder, Cobble, Bedrock _____ **(A)** **(B)**

Substrate Max = 40

A + B

SCORE OF TWO MOST PREDOMINATE SUBSTRATE TYPES: [illegible] **TOTAL NUMBER OF SUBSTRATE TYPES:** [illegible]

2. **Maximum Pool Depth** ***(Measure the maximum pool depth within the 61 meter (200 ft)*** evaluation reach at the time of evaluation. Avoid plunge pools from road culverts or storm water pipes) (Check *ONLY* one box):

Pool Depth Max = 30

- ☐ > 30 centimeters [20 pts]
- ☐ > 22.5 - 30 cm [30 pts]
- ☐ > 10 - 22.5 cm [25 pts]
- ☐ > 5 cm - 10 cm [15 pts]
- ☒ < 5 cm [5 pts]
- ☐ NO WATER OR MOIST CHANNEL [0 pts]

COMMENTS _____ **MAXIMUM POOL DEPTH (centimeters):** [illegible]

3. **BANK FULL WIDTH (Measured as the average of 3-4 measurements)** **(Check *ONLY* one box):**

Bankfull Width Max=30

- ☐ > 4.0 meters [30 pts]
- ☐ > 3.0 m - 4.0 m [25 pts]
- ☐ > 1.5 m - 3.0 m [20 pts]
- ☒ > 1.0 m - 1.5 m [15 pts]
- ☐ ≤ 1.0 m [5 pts]

COMMENTS _____ **AVERAGE BANKFULL WIDTH (meters):** [illegible]

This information must also be completed

RIPARIAN ZONE AND FLOODPLAIN QUALITY ☆NOTE: River Left (L) and Right (R) as looking downstream☆

RIPARIAN WIDTH L	R	(Per Bank)	FLOODPLAIN QUALITY L	R	(Most Predominant per Bank)	L	R	
☒	☐	Wide >10m	☐	☐	Mature Forest, Wetland	☐	☐	Conservation Tillage
☐	☐	Moderate 5-10m	☒	☒	Immature Forest, Shrub or Old Field	☐	☐	Urban or Industrial
☐	☐	Narrow <5m	☐	☐	Residential, Park, New Field	☐	☐	Open Pasture, Row Crop
☐	☐	None	☐	☐	Fenced Pasture	☐	☐	Mining or Construction

COMMENTS [illegible]

FLOW REGIME *(At Time of Evaluation)* (Check *ONLY* one box):

- ☐ Stream Flowing
- ☐ Subsurface flow with isolated pools (Interstitial)
- ☒ Moist Channel, isolated pools, no flow (Intermittent)
- ☐ Dry channel, no water (Ephemeral)

COMMENTS _____

SINUOSITY (Number of bends per 61 m (200 ft) of channel) (Check *ONLY* one box):

☐ None	☒ 1.0	☐ 2.0	☐ 3.0
☐ 0.5	☐ 1.5	☐ 2.5	☐ >3

STREAM GRADIENT ESTIMATE

☐ Flat (0.5 ft/100 ft) ☐ Flat to Moderate ☒ Moderate (2 ft/100 ft) ☐ Moderate to Severe ☐ Severe (10 ft/100 ft)

ADDITIONAL STREAM INFORMATION (This Information Must Also be Completed):

QHEI PERFORMED? - ☐ Yes ☐ No QHEI Score _____ (If Yes, Attach Completed QHEI Form)

DOWNSTREAM DESIGNATED USE(S)

☐ WWH Name: _____ Distance from Evaluated Stream _____

☐ CWH Name: _____ Distance from Evaluated Stream _____

☐ EWH Name: _____ Distance from Evaluated Stream _____

MAPPING: ATTACH COPIES OF MAPS, INCLUDING THE ENTIRE WATERSHED AREA. CLEARLY MARK THE SITE LOCATION

USGS Quadrangle Name: _____ NRCS Soil Map Page: _____ NRCS Soil Map Stream Order _____

County: _____ Township / City: _____

MISCELLANEOUS

Base Flow Conditions? (Y/N): _____ Date of last precipitation: _____ Quantity: _____

Photograph Information: _____

Elevated Turbidity? (Y/N): _____ Canopy (% open): _____

Were samples collected for water chemistry? (Y/N): _____ (Note lab sample no. or id. and attach results) Lab Number: _____

Field Measures: Temp (°C)_____ Dissolved Oxygen (mg/l) _____ pH (S.U.) _____ Conductivity (µmhos/cm) _____

Is the sampling reach representative of the stream (Y/N)_____ If not, please explain: _____

_____

Additional comments/description of pollution impacts: _____

_____

BIOTIC EVALUATION

Performed? (Y/N): _____ (If Yes, Record all observations. Voucher collections optional. NOTE: all voucher samples must be labeled with the site ID number. Include appropriate field data sheets from the Primary Headwater Habitat Assessment Manual)

Fish Observed? (Y/N)_____ Voucher? (Y/N)_____ Salamanders Observed? (Y/N)_____ Voucher? (Y/N)_____
Frogs or Tadpoles Observed? (Y/N)____ Voucher? (Y/N)____ Aquatic Macroinvertebrates Observed? (Y/N)____ Voucher? (Y/N)____

Comments Regarding Biology: _____

_____

_____

DRAWING AND NARRATIVE DESCRIPTION OF STREAM REACH (This must be completed):

Include important landmarks and other features of interest for site evaluation and a narrative description of the stream's location

FLOW →