MITIGATION & MONITORING PLAN
Off-Site Stream Mitigation
Westfield Boulevard Extension

VS Engineering

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Shaping the Future

Document Information

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Acronyms

IDEM	Indiana Department of Environmental Management
LF	Linear Feet
USACE	U.S. Army Corps of Engineers
TNW	Traditional Navigable Water
RPW	Relatively Permanent Water
QHEI	Qualitative Habitat Evaluation Index
IDNR	Indiana Department of Natural Resources
USFWS	United States Fish and Wildlife Service

1 Goals and Objectives

1.1 Project Need and Background

This mitigation plan has been created on the behalf of VS Engineering, Inc. for mitigation required by the US Army Corps of Engineers (USACE) and the Indiana Department of Environmental Management (IDEM). Proposed impacts to "waters of the U.S." for the Westfield Boulevard Extension project include approximately 0.19 acre of forested wetland and 280 linear feet of two unnamed tributaries (UNTs) to Cool Creek. This report addresses off-site mitigation for unavoidable impacts to streams. Wetland mitigation will be completed with the purchase of 0.19 credits from the Central Indiana Mitigation Bank (Appendix F).

The impact site is located in Sections 12 and 13, Range 3 East (E), Township 18 North (N), in Westfield, Hamilton County, Indiana (IN). The mitigation site is located in Section 18, Range 4 E, Township 18 N, in Carmel, Hamilton County, IN (Appendix A, Figure 1). The mitigation site is located within Cool Creek Park Nature Center (Park). The mitigation site is entirely within the Park and is surrounded by recreational facilities.

The Town of Westfield is planning to extend Westfield Boulevard to provide a connection from 151st Street to 156th Street.

Two streams, both UNTs to Cool Creek and three wetlands will be impacted by road crossings. Approximately 30 linear feet (LF) Stream 1 will be encapsulated to extend an existing pipe and 250 LF of Stream 02 will be encapsulated to accommodate for a new crossing. Stream mitigation will be constructed off-site further downstream of the proposed impacts at Cool Creek Park. The wetlands will be impacted by the construction of the new road. Two of these wetlands are isolated, one of which is exempt under the IDEM Isolated Wetland Exemption Rule and the third wetland is a "water of the U.S." Wetland impacts will be mitigated by purchasing credits from an agency approved mitigation bank. Credit determination methodology is further described in Section 5. The impact site, mitigation site, and wetland mitigation bank are located within the Upper White River Watershed, Hydrologic Unit Code (Appendix A, Figure 2).

Information regarding regulated "waters of the U.S." delineated as part of project planning efforts are contained in Regulated Waters Delineation Report-Westfield Boulevard Extension, completed by Cardno, June 2015. A copy of this report is provided as attachments to the IDEM and USACE permit application and can be made available upon request.

1.2 Mitigation Objectives

The objective of this proposed mitigation plan is to compensate for impacts to streams. The mitigation plan has been prepared to specifically replace or increase the functions and values of an UNT to Cool Creek by instituting an ecologically sound, well-developed and feasible restoration and mitigation plan that fulfills compensatory mitigation requirements and the environmental / ecological objectives of USACE, IDEM, and the Town of Westfield.

A stream assessment was performed for the UNT to Cool Creek, which included a functional assessment of the stream. This baseline study was used to assess existing functions and values of the impact stream and to set restoration goals for proposed mitigation. Datasheets from this analysis are provided in Appendix E and photos are provided in Appendix.

The mitigation stream will exhibit greater channel and side slope stability, while increasing wildlife habitat value by removal of invasive species and incorporation of a native riparian corridor along the entire mitigation reach. In stream measures for channel stability including rock grade control structures using native stone and live staking for slope protection. An approximate 100 foot wide corridor will be eradicated of invasive species, planted with native herbaceous vegetation, trees, and shrubs.

Functions of the mitigation stream will include storm water conveyance, wildlife habitat by establishment of an improved riparian corridor, increased side slope and channel stability, and improved water quality by establishment of native vegetation buffers and reduction of channel erosion. These improved functions will add value through wildlife and water quality improvements to the Cool Creek stream corridor within the localized watershed.

Specific Mitigation Objectives include the following:

- Provide a minimum of 280 feet of stream mitigation
- Provide an 100 foot total riparian corridor along the mitigation stream
- Meet performance criteria as set forth in Section 8 “Ecological Performance Standards”

1.3 Summary

Wetland impacts consist of 0.13 acre of one jurisdictional and one isolated wetland. As mitigation, credits will be purchased from an agency-approved mitigation bank. Stream impacts consist of 280 feet of two UNTs to Cool Creek. As mitigation, a minimum of 280 feet of stream mitigation will be created through removal of invasive species, grading steep stream banks to a more desirable 2:1 slope, installation of grade control structures, and rock toe. The graded banks will be seeded and protected with biodegradable coconut blanket and live staked with native shrub species. The mitigation area will be restored with native seed mixes, understory shrubs, and trees. The permitee will build 300 LF of mitigation for the impacts as well as clear out invasive species and restore an additional 140 LF upstream to the culvert. The channel is considered stable in this area upstream of the mitigation site but removal of invasives and restoration should occur to protect the mitigation site and create a unified corridor. There is also a 230 foot ephemeral side-channel that parallels the proposed stream mitigation to the south that will be improved as part of the restoration to the riparian corridor. All trees greater than 3” DBH will be protected. The mitigation stream shall exhibit similar or greater value than the impacted stream through accomplishment of the mitigation goals. Proposed mitigation will be in-kind, off-site stream mitigation, and will maintain a jurisdictional connection to the White River, a Traditional Navigable Water (TNW).

The following table summarizes the impacts and mitigation proposed.

Table 1 Wetland and Stream Impact and Mitigation Summary

Feature Name	Regulatory Status	Feature Class	Feature Size (AC/LF)	Impact (AC/LF)	Mitigation Ratio	Mitigation Quantity/Type
			WETLANDS			
Wetland 1	Jurisdictional	Palustrine Forested	0.06	0.06	1:1	0.06 (bank)
Wetland 2	Isolated - Exempt	Class II Forested	0.14	0.14	None	None
Wetland 3	Isolated – Non-exempt	Class II Forested	0.13	0.13	0.13	0.13
			STREAMS			
Stream 1	Jurisdictional	Riverine - Ephemeral	30 LF	30 LF	1:1	30 (off-site)
Stream 2	Jurisdictional	Riverine - Perennial	250 LF	250 LF	1:1	250 (off-site)
Total Wetland Mitigation Required						**0.19**
Total Stream Mitigation Required						**180 LF**

2 Site Selection

2.1 Mitigation Significant Nexus Determination

As described by the USACE, “a significant nexus analysis assesses the flow characteristics and functions of a tributary and the functions performed by any wetlands adjacent to the tributary to determine if they significantly affect the chemical, physical, and biological integrity of a TNW. Considerations when evaluating significant nexus include, but are not limited to, volume, duration, and frequency of the flow of water in the tributary and its proximity to a TNW, and the functions performed by the tributary and all its adjacent wetlands. It is not appropriate to determine significant nexus based solely on any specific threshold of distance. Similarly, the fact an adjacent wetland lies within or outside of a floodplain is not solely determinative of significant nexus.”

The area proposed for the mitigation stream is located 0.5 mile downstream proposed impact site. Therefore, the proposed mitigation site exhibits significant nexus findings for relatively permanent water (RPW) where the RPW flows directly or indirectly into a TNW.

2.2 Compensatory Mitigation Location Methodology

Per 33 CFR 332.3(b)(1), the USACE sets forth an order of preference for providing compensatory mitigation, as defined in sub sections (2) through (6). A step down approach analyzing these five options was performed for this project. The methodology used is as follows:

1. Mitigation bank credits – There are currently no stream mitigation bank credits available for this 8-digit watershed.
2. In-lieu fee program credits – There is currently no certified in-lieu fee program for mitigation in Indiana.
3. Permittee-responsible mitigation under a watershed approach – Since options 1 and 2 are not viable, permittee-responsible mitigation is the only option.
4. Permittee-responsible mitigation through on-site and in-kind mitigation – There is not enough right-of-way to provide for on-site stream mitigation. The location of the streams on the impact site is not favorable to completing successful on-site stream mitigation.

5. Permittee-responsible mitigation through off-site and/or out-of-kind mitigation - The permittee has identified mitigation that is off-site and in-kind.

2.3 Site Selection Methodology

As noted in Section 2.2 above, off-site and in-kind stream mitigation is proposed for this project. Mitigation on the UNT to Cool Creek, downstream of the impact site will provide the highest level of localized replacement value to the function of the existing stream.

3 Site Protection Instrument

The mitigation area shall be permanently protected using an USACE approved site protection instrument. A draft copy of the site protection instrument shall be submitted to the USACE within 60 days of permit approval, and a final executed and recorded copy submitted within 30 days following notification from the USACE to record.

A site protection instrument is a legal device which restricts certain activities on the property that may jeopardize the success or long-term protection of mitigation areas. Specifically, prohibited uses of the mitigation areas shall include, but not be limited to, timber harvests and other forestry activities, drainage of surface waters, cultivation, commercial activities, filling, grazing of domestic animals, soil removal, and the deposition of refuse, sewage, or other debris.

4 Baseline Information

4.1 Impact Site Location

The stream impact sites are located within the project area for the Westfield Boulevard Extension Project. The sites are located within Sections 12 and 13, Township 18 N, Range 3 E. Stream 01 is located in the northwest corner of the intersection of Westfield Boulevard and US 31. General coordinates (latitude/longitude) of the site are 40.01228° North, 86.1287° West. Stream 2 is located immediately north of Target and flows east across the project area. General coordinates (latitude/longitude) of the site are 40.00948° North, 86.13054° West.

4.2 Impact Site Stream Characteristics

The Ohio Environmental Protection Agency Primary Headwater Habitat Evaluation Form (HHEI) was utilized to assess the functions of the streams located at the impact site. The forms are provided in Appendix E.

Stream 1, an UNT to Cool Creek was an intermittent stream that flowed north through the northwest corner of the project study area. Stream 02 was considered to be recovering from past modifications. Both banks had a no riparian corridor, with the floodplain land use predominantly residential, park, or new field. The stream had no sinuosity, with no bends observed within the two hundred foot survey reach. The stream had a flat to moderate gradient, with a drop between a half a foot and two feet every hundred feet. This stream was at base flow conditions at the time of the stream survey. The turbidity levels were not elevated at the time of survey. The dominant substrates were gravel, and silt.

Ordinary High Water Mark width was one foot and depth was 0.2 foot. Bank Full width was two feet and depth was 0.4 foot. Top of Bank width was five feet and depth was 0.6 foot. The maximum pool depth observed was between five and ten centimeters. Stream 01 flows into the White River, a Traditional Navigable Water. The stream had a total HHEI score of 35.

Stream 02, also an unnamed tributary to Cool Creek, was a perennial stream that flowed east through the project study area. Stream 02 was considered to be recovering from past modifications. Both banks had a wide (greater than ten meters) riparian corridor, with the floodplain land use predominantly immature forest, shrub-scrub, or old field. The stream had moderate sinuosity, with two S-curves observed within the two hundred foot survey reach. The stream had a flat to moderate gradient, with a drop between a half a foot and two feet every hundred feet. This stream was at base flow conditions at the time of the stream survey. The turbidity levels were not elevated at the time of survey. The dominant substrates were sand and silt. Ordinary High Water Mark width was three feet and depth was 0.3 foot. Bank Full width was five feet and depth was 0.4 foot. Top of Bank width was twelve feet and depth was one foot. The maximum pool depth observed was between five and ten centimeters. The stream had a total HHEI score of 47.

4.3 Impact Site Wetland Characteristics

Three wetlands were delineated at the impact site. Detailed descriptions, photos, and data sheets for these wetlands are available in the June 2015 Delineation Report.

Wetland 01 was a 0.06 acre, forested wetland located abutting Stream 02. Dominant vegetation included Fowl Manna Grass (*Glyceria striata*). In addition, non-dominant vegetation observed included Reed Canary Grass (*Phalaris arundinacea*), and Cress-Leaf Groundsel (*Packera glabella*). Stream 03 flows into Cool Creek, which flows into the White River, a Traditional Navigable Water. Due to this connection, Wetland 01 should be considered a ‘water of the U.S.”

Wetland 02 was a Class II forested wetland located south of Wetland 01. Dominant vegetation included American Elm (*Ulmus americana*), Sugar Maple (*Acer saccharum*), Northern Spicebush (*Lindera benzoin*), Clustered Black-Snakeroot (*Sanicula odorata*), and Eastern Woodland Sedge (*Carex blanda*). No connection to any “water of the U.S.” was observed; therefore, this wetland should be considered an isolated, “water of the State”.

Wetland 03 was a 0.13 acre, Class II forested wetland located south of Wetland 02. Dominant vegetation included Green Ash (*Fraxinus pennsylvanica*), Gray Dogwood (*Cornus racemosa*), Southern Arrow-Wood (*Viburnum dentatum*), Hooded Blue Violet (*Viola sororia*), and Spotted Touch-Me-Not (*Impatiens capensis*).No connection to any “water of the U.S.” was observed; therefore this wetland should be considered an isolated, “water of the State”.

4.4 Impact Site Function and Value

The impact segment of Stream 01 functions as an ephemeral headwater stream. Current functions include storm water conveyance and flood storage. The HHEI score of 35 (out of 100 possible points) suggests the stream has the capability to function as Modified Class II Primary Headwater Habitat (PHWH); therefore, the stream is capable of supporting a warm water adapted community.

The impact segment of Stream 02 functions as a perennial headwater stream. Current functions include storm water conveyance, flood storage, and limited wildlife habitat. The HHEI score of 47 (out

of 100 possible points), constant flowing water, and watershed size less than 0.1 mi^2 suggests “spring” type aquatic habitat where a well-defined channel is formed.

4.5 Mitigation Site Location

Mitigation will be performed off-site within the Cool Creek Nature Preserve on an UNT to Cool Creek. The mitigation area is located along Stream 2 (impact site), approximately 0.5-mile downstream of the proposed project (Appendix A, Figure 1). The mitigation area will begin at the confluence of Stream 2 and an UNT to Cool Creek and extend 200 LF upstream (Appendix A, Figure 4).

4.6 Mitigation Site Stream Characteristics

The Ohio Environmental Protection Agency HHEI was utilized to assess the functions of the streams located at the impact site. Stream 2, the mitigation stream, was broken into two reaches (Appendix A, Figure 4). The forms are provided in Appendix E.

Stream 1, an UNT Cool Creek was an ephemeral stream that flowed northeast and into Stream 2. Stream 1 was considered to be recovering from past modifications. The left bank (facing downstream) had a wide (greater than ten meters) riparian corridor, with the floodplain land use predominantly mature forest. The stream had low sinuosity, with a half S-curve observed within the two hundred foot survey reach. The stream had a flat to moderate gradient, with a drop between a half a foot and two feet every hundred feet. This stream was at base flow conditions at the time of the stream survey. The turbidity levels were not elevated at the time of survey. The dominant substrates were gravel, and silt. Ordinary High Water Mark width was one foot and depth was 0.1 foot. Bank Full width was two feet and depth was 0.2 foot. Top of Bank width was ten feet and depth was one foot. The maximum pool depth observed was less than five centimeters. The HHEI score was 26.

The lower reach of Stream 2, an UNT to Cool Creek, was perennial stream that flowed northeast through the project study area (Appendix A, Figure 4). Stream 2 was a natural channel; no modifications were observed within the survey reach. Both banks had a wide (greater than ten meters) riparian corridor, with the floodplain land use predominantly mature forest or wetland. The stream had low sinuosity, with one S-curve observed within the two hundred foot survey reach. The stream had a flat gradient, with a drop of a half a foot or less every hundred feet. This stream was at base flow conditions at the time of the stream survey. The turbidity levels were not elevated at the time of survey. The dominant substrates were gravel and sand. Ordinary High Water Mark width was six feet and depth was 0.6 foot. Bank Full width was seven feet and depth was one foot. Top of Bank width was sixteen feet and depth was three feet. The maximum pool depth observed was greater than 30 centimeters. The HHEI score was 60.

The upper reach Stream 2 was a natural channel; no modifications were observed within the survey reach. Both banks had a wide (greater than ten meters) riparian corridor, with the floodplain land use predominantly mature forest or wetland. The stream had low sinuosity, with a one and a half S-curve observed within the two hundred foot survey reach. The stream had a flat gradient, with a drop of a half a foot or less every hundred feet. This stream was at base flow conditions at the time of the stream survey. The turbidity levels were not elevated at the time of survey. The dominant substrates were gravel and sand. Ordinary High Water Mark width was six feet and depth was 0.6 foot. Bank Full width was seven feet and depth was one foot. Top of Bank width was sixteen feet and depth was three feet. The maximum pool depth observed was between 22.5 and 30 centimeters. Due to the presence of boulder-sized substrate, the HHEI score was 70.

4.7 Mitigation Site Wetland Characteristics

One wetland was delineated within the study area (Appendix A, Figure 4). Photos are provided in Appendix D and datasheets are provided in Appendix E. Wetland 1 was a forested wetland, abutting Stream 2. Dominant vegetation included American Elm, Sugar Maple, Ash-Leaf Maple (*Acer negundo*), Amur honeysuckle (*Lonicera maackii*), Sandbar Willow (*Salix interior*), Crested Sedge (*Carex cristatella*), and Eastern Daisy Fleabane (*Erigeron annuus*). In addition, non-dominant vegetation observed included Rufous Bulrush (*Scirpus pendulus*, OBL), Frank's Sedge (*Carex frankii*), Wingstem (*Verbesina alternifolia*), Fowl Manna Grass, and Great Blue Lobelia (*Lobelia siphilitica*). The soil from 0-20 inches had a matrix soil color of 10YR 4/2 with concentrations in the matrix at 5%, and a texture of Silty Clay Loam. The soil at the data point was mapped as Miami silt loam, 6-12% slopes, eroded, and met the Depleted Matrix (F3) hydric soil criteria. Primary indicators of hydrology included High Water Table (A2) and Saturation (A3).

Stream 2 flows into an UNT to Cool Creek, which flows into Cool Creek, which flows into the White River, a TNW. Due to this connection, Wetland 1 should be considered a “waters of the U.S.” The boundary of this wetland has been placed on the construction plans and no work will be conducted within the wetland except for the removal of invasive species.

4.8 Mitigation Site Function and Value

Stream 1 functions as an intermittent, headwater stream. Current functions include storm water conveyance, flood storage, and limited wildlife habitat. The HHEI score of 26 (out of 100 possible points), constant flowing water, and watershed size less than 0.1 mi^2 suggests a modified Class I PHWH stream.

Stream 2 functions as a perennial, headwater stream. Current functions include storm water conveyance, flood storage, and limited wildlife habitat. The HHEI scores of 60 and 70 (out of 100 possible points), suggest that the stream functions as a Class III PHWH system.

4.9 Climate

Average temperature and precipitation is depicted in Table 2 for Carmel, Indiana (U.S. Climate Office, Carmel 3 E, Normals:121303, 1981-2010). Based on normal data average, annual precipitation at this station is 42.22 inches.

Table 2 Average Climatological Data

Month	Average High (°F)	Precipitation (Inches)	Month	Temperature (°F)	Precipitation (Inches)
Jan	34	1.92	July	85	4.65
Feb	38	2.17	Aug	84	3.23
March	50	3.23	Sept	77	3.27
April	62	3.9	Oct	65	3.15
May	72	4.96	Nov	52	3.62
June	82	4.49	Dec	38	3.19

4.10 Endangered, Rare, and Threatened (ETR) Species

Information on protected species with the potential to occur on or near the project site was obtained from the Indiana Department of Natural Resources (IDNR) Division of Nature Preserves. IDNR responded that there are no ETR species documented within a ½-mile of the project area.

5 Credit Determination Methodology

To compensate for 280 feet of impact due to channel relocation, the applicant proposes to receive credit for establishing, at a 1:1 ratio, a minimum of 280 feet of mitigation stream. The stream mitigation credit will be fulfilled by restoring an UNT to Cool Creek at the Cool Creek Nature Center. The wetland mitigation credit will be purchased from the Central Indiana Mitigation Bank.

Table 3 Mitigation Credits

Mitigation Type	Amount	Ratio	Credits
Offsite Stream Restoration	280	1:1	280
Wetland Bank	0.19	1:1	0.19

An additional 20 feet of mitigation stream may be created in excess of the minimum credits required; however, there is no plan to apply this credit to other projects.

6 Mitigation Work Plan

6.1 Site Grading

Site grading will be necessary to repair eroded stream banks. When possible, existing mature trees and shrubs will be avoided by site grading activities, as designated in the area denoted on the mitigation plan layout. Further details concerning site grading with respect to channel cross section and layout are described in Section 15.

6.2 Site Planting

An approximate 100 foot corridor will be cleared of invasive species and planted with native herbaceous vegetation, trees, and shrubs. Trees will be planted on approximately 24 foot centers and shrubs will be planted on 16 foot centers. This planting strategy generally mimics existing conditions of the impact stream, while establishing greater species diversity and assemblage of plants native to the region. Trees and shrubs scheduled for planting were selected from the Indiana Department of Natural Resource lists of approved native woody vegetation for riparian areas. The herbaceous seed mixes are custom mixes utilizing native species adapted for use in riparian corridors, and includes additional species commonly used for native slope stabilization. Live stakes will be used for stream bank protection in areas designated on the plans.

Specific details of the planting plan and native seed mixes are included in Appendix C.

6.3 Hydrologic Modification

Base flow conditions of the existing stream will not be changed. The stream mitigation has been designed in a manner that will allow for increased stream stability and channel dimensions are based on the reference upstream of the proposed mitigation where the channel is stable.

6.4 Construction Methods/Sequencing

The sequence of construction for the mitigation site shall be performed in the following general steps.

1. Identify and provide tree protection for trees and natural areas to be preserved
2. Install perimeter erosion and sediment control measures
3. Cut, remove, and treat invasive species
4. Perform site grading and excavation beginning at the downstream end of the mitigation stream
5. Install in-stream structures, treat invasive species, and perform native seeding
6. Stabilize stream side slopes with biodegradable erosion control materials
7. Plant trees, shrubs, and install live stakes
8. Install mitigation area signage

6.5 Schedule

Construction of the mitigation stream shall be constructed before or concurrent with impacts, and completed within one year of permit authorization, unless an extension is granted from IDEM and the USACE.

6.6 Soil Management and Erosion Control

Perimeter sediment controls such as silt fence and/or sediment basins, as appropriate, shall be installed prior to earthmoving activities.

A temporary seed mix shall be utilized with all plantings to provide appropriate vegetative cover during the native plant establishment period.

Erosion control blankets shall be installed on all slopes that are 3:1 or steeper.

Soil management and erosion control shall be performed in accordance with the overall site Storm Water Pollution Prevention Plan (SWPPP) and Rule 5 permit as applicable.

6.7 Equipment

Construction equipment for site grading and excavation may include bulldozers, skid steers, excavators, backhoes, front end loaders, and dump trucks. It is recommended that equipment with rubberized treads be used where possible to avoid soil compaction. Heavy trucks used to haul off, or import topsoil shall be restricted to avoid excessive driving through the native planting areas. Planting and seeding equipment may include tractors, skid steers, no-till drills, tilling implements, and augers.

Construction equipment shall be cleaned prior to entering the mitigation site and be free of excessive amounts of mud and dirt from off-site which may carry noxious weed seed sources.

6.8 Record Drawing Conditions

As-built drawings will be submitted to the respective agencies upon completion of mitigation implementation. The mitigation area shall be marked with mitigation area signage after initial grading and planting activities.

7 Maintenance Plan

A long-term maintenance plan will be followed for the proposed mitigation site and associated buffer areas. Long-term management at the mitigation site will include hydrology, vegetation, and channel stability monitoring to document mitigation success criteria as required.

Maintenance may include any combination of the following: selective herbicide application, mowing, hand-pulling or cutting undesirable species, supplemental seeding/planting, and minor erosion repairs to channel side slopes. Additional management tools and procedures may be considered as the site develops and adaptive strategies may evolve. Special attention will be paid to preventing infestation by invasive species.

Maintenance shall be provided for a period of five consecutive years, or until the project is deemed to be successful by the applicant, the USACE, and the IDEM. Maintenance shall be provided by the applicant and/or its authorized agents until regulatory signoff is received. Maintenance conducted beyond the regulatory monitoring period shall be conducted by the landowner, if necessary. Only under *force majeure* conditions, such as tornado damage, major flood damage, outbreaks of invasive non-native plants, and other Acts of God, shall the applicant deviate from the mitigation and maintenance plan.

8 Ecological Performance Standards

8.1 Off-Site Stream Mitigation Area

The following standards will be used to determine the success of the mitigation stream:

- The length of mitigation is a minimum of 280 linear feet of perennial headwater stream.
- A 0.9 acre native vegetation buffer, consisting of forested riparian establishment, native herbaceous riparian establishment, and forest preservation is established along the mitigation stream. The buffer shall have an average width of 100 feet.
- 70% of the planted trees and shrubs shall be alive and showing signs of growth for two consecutive years before release, not including re-plantings or supplemental plantings which have been in place for less than two years.
- At least five species from the tree and shrub planting list shall be alive and present at the completion of monitoring.
- Stream banks exhibit 90% vegetative cover.
- Stream banks are stable and show no signs of gully erosion from overland flow or excessive bank scour from stream flows.
- The mitigation site is free of *Elaeagnus umbellate* (autumn olive), *Elaeagnus angustifolia* (russion olive), *Rosa multiflora* (multiflora rose), and *Lonicera maackii, L. morrowii, L. tatarica* (honeysuckle).
- No one species of surviving tree shall represent more than 20% of the total planted surviving trees.

9 Monitoring Requirements

The mitigation area shall be monitored in accordance with the IDEM and USACE requirements. Monitoring will include randomly placing sample plots and collecting vegetation data from the area in and around each plot.

- A minimum of one site visit shall be performed during the growing season. Overall progress of the mitigation site shall be assessed at each visit.
- The HHEI form shall be used to assess habitat quality within the mitigation stream during each monitoring year. The baseline HHEI forms are included in Appendix E.
- Mitigation monitoring shall continue for a period of five years or until the site is granted a release from monitoring from IDEM and the USACE. The site must meet success criteria for two consecutive years to be released from monitoring.
- Permanent photo points shall be established in throughout the mitigation area and shall be included with each annual monitoring report.
- A report for the site shall be completed and submitted to the IDEM and the USACE by December 31st following each growing season.

Throughout the monitoring period, any maintenance activities that take place shall be recorded and included in the report. Additional seeding, grading, and removal of invasive species shall be performed as needed to assure the goals of the mitigation plan are being met. Monitoring can end after the five-year period if the mitigation success criteria have been met for two years.

10 Long-Term Management Plan

The conservation easement holder shall be responsible for long-term management activities. Responsibilities of the easement holder shall include maintaining the site as a natural area, and policing of the mitigation site to ensure vandalism and/or inappropriate uses do not deter from mitigation objectives. City of Westfield will be the holder of the conservation easement and will retain the option to release the mitigation site to a local land trust after mitigation acceptance.

11 Adaptive Management Plan

Any necessary adaptive management shall be the responsibility of Purdue University and/or its authorized agents during the regulatory monitoring period. In the event any mitigation area fails to achieve the success criteria as described in Section 8.0 “Ecological Performance Standards,” the applicant, the USACE and the IDEM shall coordinate to develop necessary contingency plans and implement appropriate remedial actions.

12 Financial Assurances

The Town of Westfield will be responsible for successful establishment and operation of the mitigation site. This includes the upfront cost for construction, installation, materials, labor, maintenance, and regulatory monitoring. The Town shall assume all financial responsibility for the successful installation

and maintenance of the mitigation site for a period of three to five consecutive years or until regulatory signoff is granted from the USACE and the IDEM. Following regulatory sign-off of the mitigation, financial responsibility for the continued operation of the mitigation sites will be assumed as described in Section 10 above.

13 Other Information

At this time, the regulatory agencies have requested no other specialized information concerning the stream mitigation site as described in this document.

14 Planform Geometry

The proposed planform geometry consists of a moderately sinuous channel centerline which is consistent to the current alignment. No realignment will occur.

15 Channel Form

The proposed channel cross section consists of an excavated channel with bottom widths approximately 6 feet wide. The channel section was designed based on the reference reach upstream where the channel is stable. Rock cross vanes are proposed at approximately every two foot of elevation gain in order to provide in-stream habitat, and reduce the occurrence of headcutting within the mitigation stream segment.

16 Watershed Size

The design drainage area was calculated from the confluence of Stream 2 (the mitigation stream) with the UNT to Cool Creek. Computer software output (Streamstats Indiana) suggests the contributing drainage area is 0.159 square miles and urban land cover accounts for approximately 53% of the drainage area.

17 Design Discharge

The design discharge will mimic conditions of the existing stream. Since no inputs or pipes will be altered.

18 References

Field Evaluation Manual for Ohio's Primary Headwater Habitat Streams Version 3.0, January 2012, OEPA Division of Surface Water

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Westfield Boulevard Extension

APPENDIX A
FIGURES

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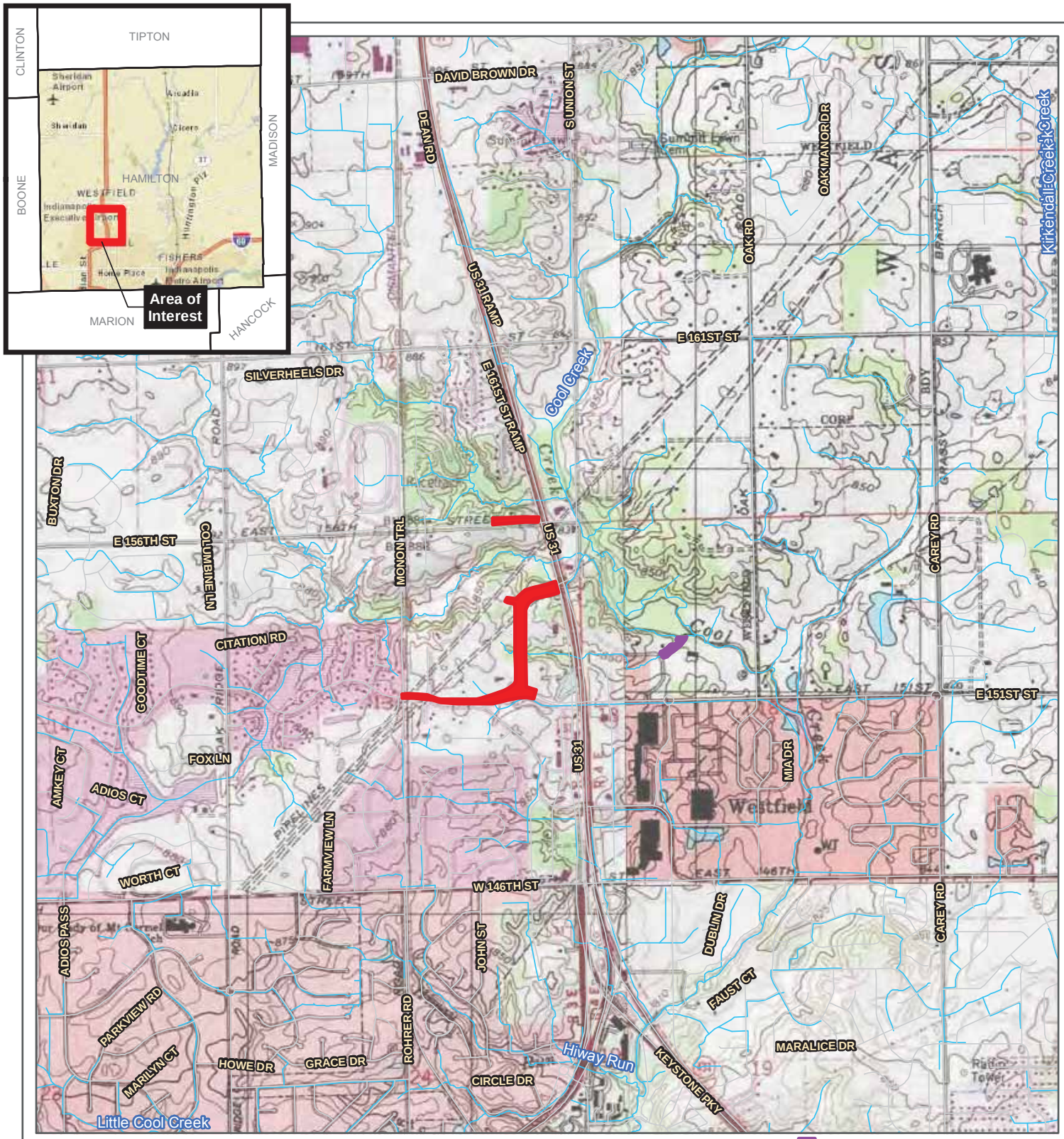

2

Township: 18 N
Range: 4 E
Section: 18
Project No.
J 152573100

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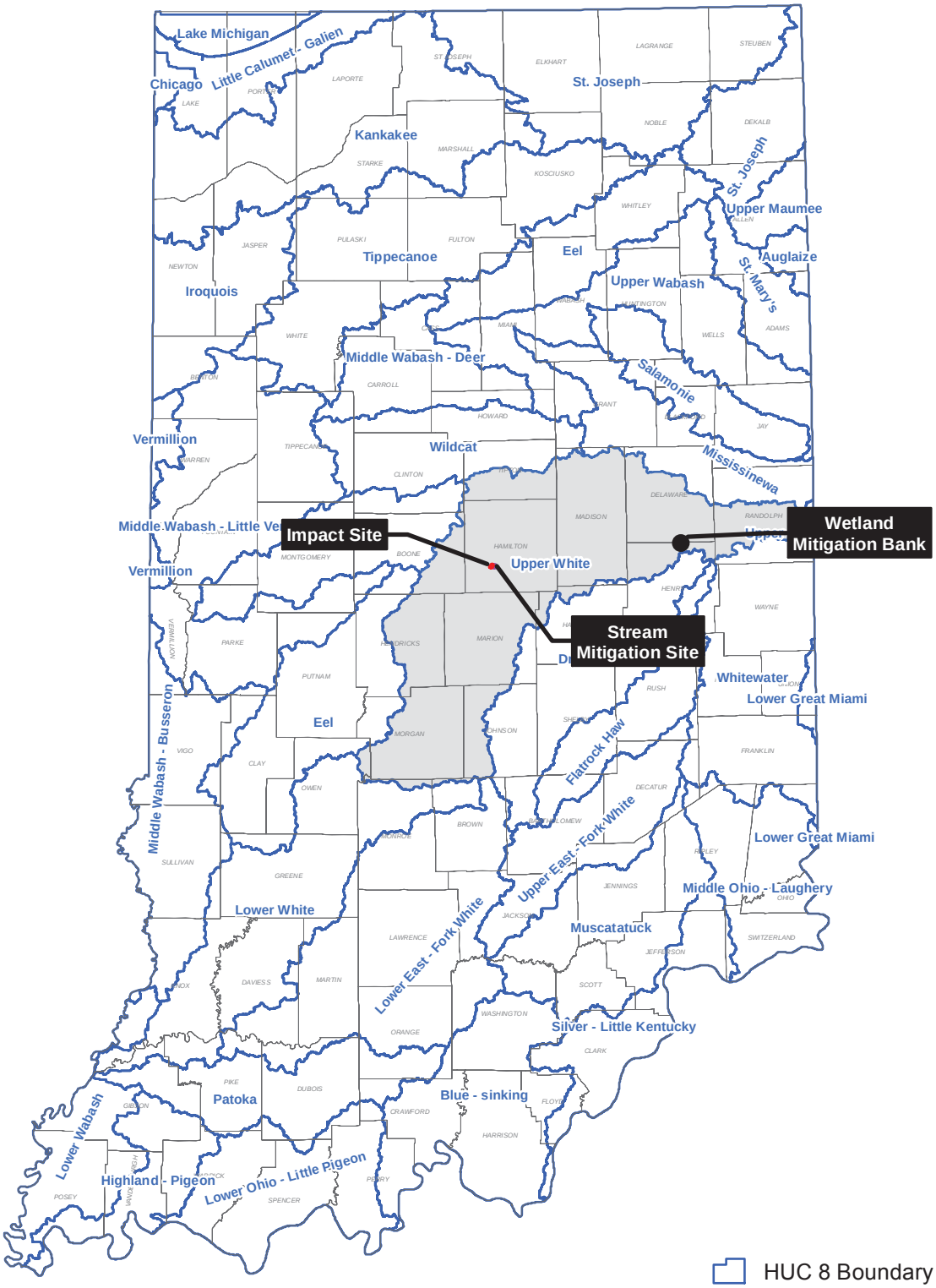
Figure 1: Project Location

Westfield Boulevard Extension
Off-Site Stream Mitigation Plan
VS Engineering
Hamilton County, Indiana

Cardno
Shaping the Future
3901 Industrial Blvd.,Indianapolis, IN 46254 USA
Phone (+1) 317-388-1982 Fax (+1) 317-388-1982
www.cardno.com

Date Created: 6/18/2015 Date Revised: 6/18/2015 File Path: R:\Projects\15\152\152573100_VSEngineering_WestfieldWestRd\GIS\MXD\OffSite_Mitigation\F1_Location.mxd Saved By: tamara.miller
Basemap: Sources: Esri, DeLorme, NAVTEQ, USGS, Intermap, iPC, NRCAN, Esri Japan, METI, Esri China (Hong Kong), Esri (Thailand), TomTom, 2013, Copyright:© 2013 National Geographic Society, i-cubed



2

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TRS: 18 N 3 E 12, 13
18 N 4 E 18
Project No. 152573100

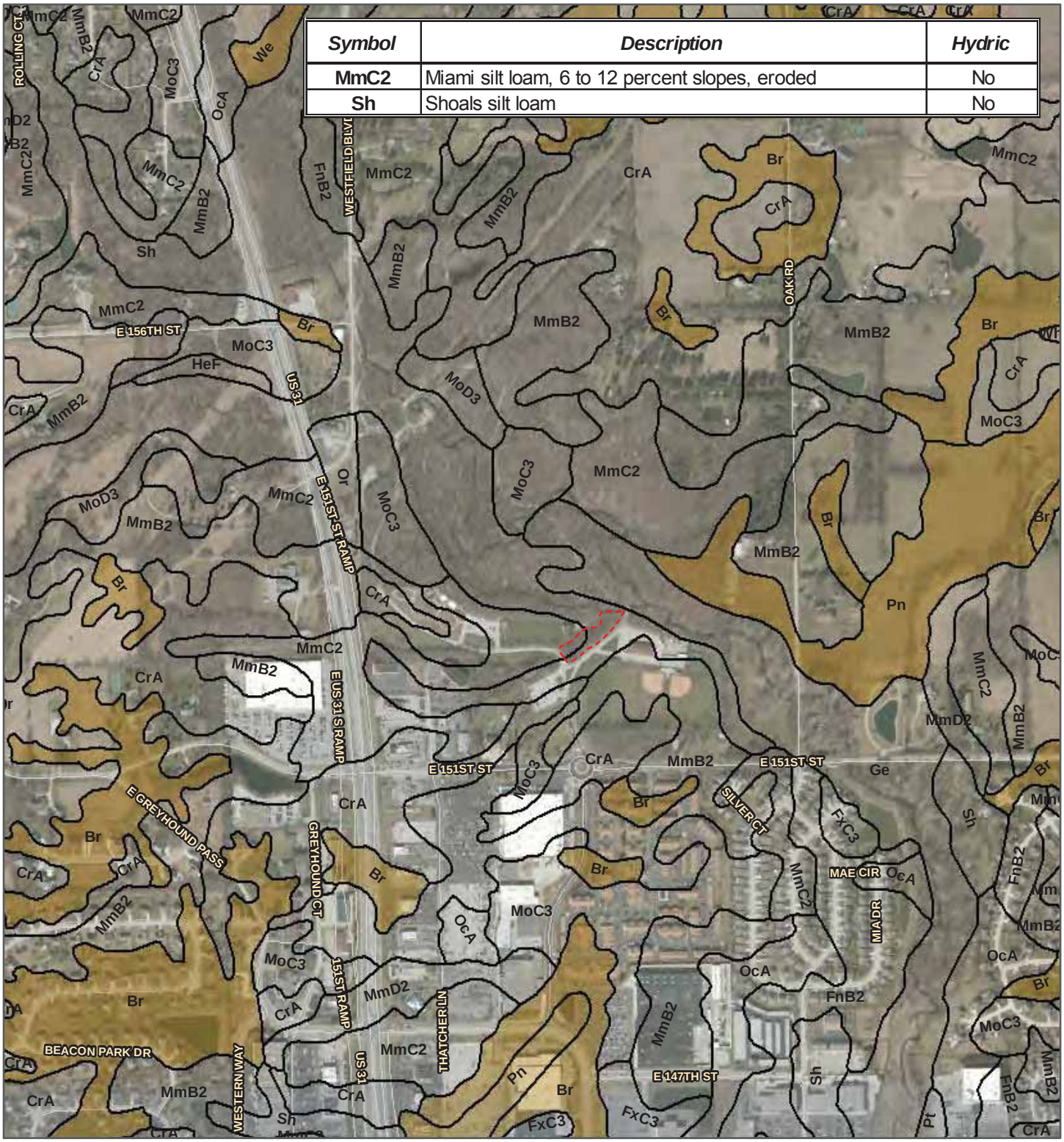
Figure 2: 8-Digit Hydrologic Unit Code

Westfield Boulevard Extension
Off-site Stream Mitigation
VS Engineering
Hamilton County, Indiana

Cardno JFNew
3901 Industrial Blvd.,Indianapolis, IN 46254 USA
Phone (+1) 317-388-1982 Fax (+1) 317-388-1982
www.cardnojfnew.com

Date Created: 6/26/2015 Date Revised: 6/26/2015 File Path: \\jfnew.com\Projects\Projects\15\152\152573100_VSEngineering_WestfieldWestRd\GIS\MXD\OffSite_Mitigation\F2_8digit_HUC.mxd GIS Analyst: tamara.miller
Basemap:

Symbol	Description	Hydric
MmC2	Miami silt loam, 6 to 12 percent slopes, eroded	No
Sh	Shoals silt loam	No



0 500 1,000 Feet

0 100 200 Meters

Off-site Mitigation

Soil Unit

Soil Unit - Hydric

2

Township: 18 N
Range: 4 E
Section: 18
Project No.
J 152573100

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Figure 3: Soil Survey
Westfield Boulevard Extension
Off-site Stream Mitigation
VS Engineering
Hamilton County, Indiana

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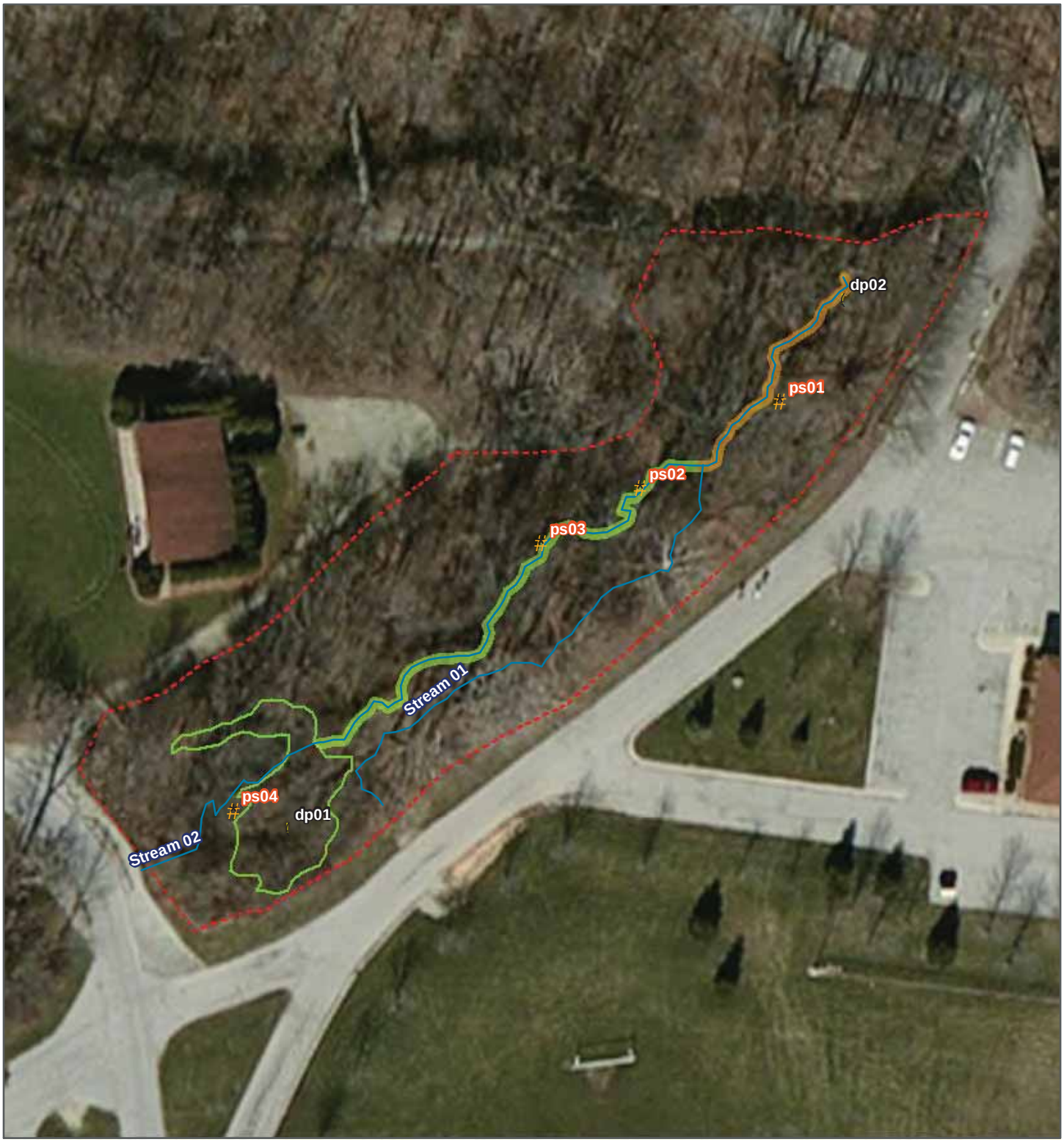
Date Created: 6/18/2015 Date Revised: 6/18/2015 File Path: R:\Projects\15\152\152573100_VSEngineering_WestfieldWestRd\GIS\MXD\OffSite_Mitigation\F3_SoilSurvey.mxd Saved By: tamara.miller
Basemap: Source: Esri, DigitalGlobe, GeoEye, i-cubed, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community



0 12.5 25 50 75 Feet

0 5 10 15 20 Meters

Off-site Mitigation
Data Point
Photo Station
Delineated Stream
Delineated Wetland

Functional Assessment

HHEI 01
HHEI 02

2

Township: 18 N
Range: 4 E
Section: 18
Project No.
J 152573100

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Figure 4: Delineation
Westfield Boulevard Extension
Off-site Stream Mitigation
VS Engineering
Hamilton County, Indiana

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Date Created: 6/26/2015 Date Revised: 6/26/2015 File Path: \\jfnew.com\Projects\Projects\15\152\152573100_VSEngineering_WestfieldWestRd\GIS\MXD\OffSite_Mitigation\F4_Delineation.mxd
Saved By: tamara.miller
Basemap: Source: Esri, DigitalGlobe, GeoEye, i-cubed, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community

Westfield Boulevard Extension

APPENDIX B
MITIGATION PLAN SPECIFICATION

Cardno
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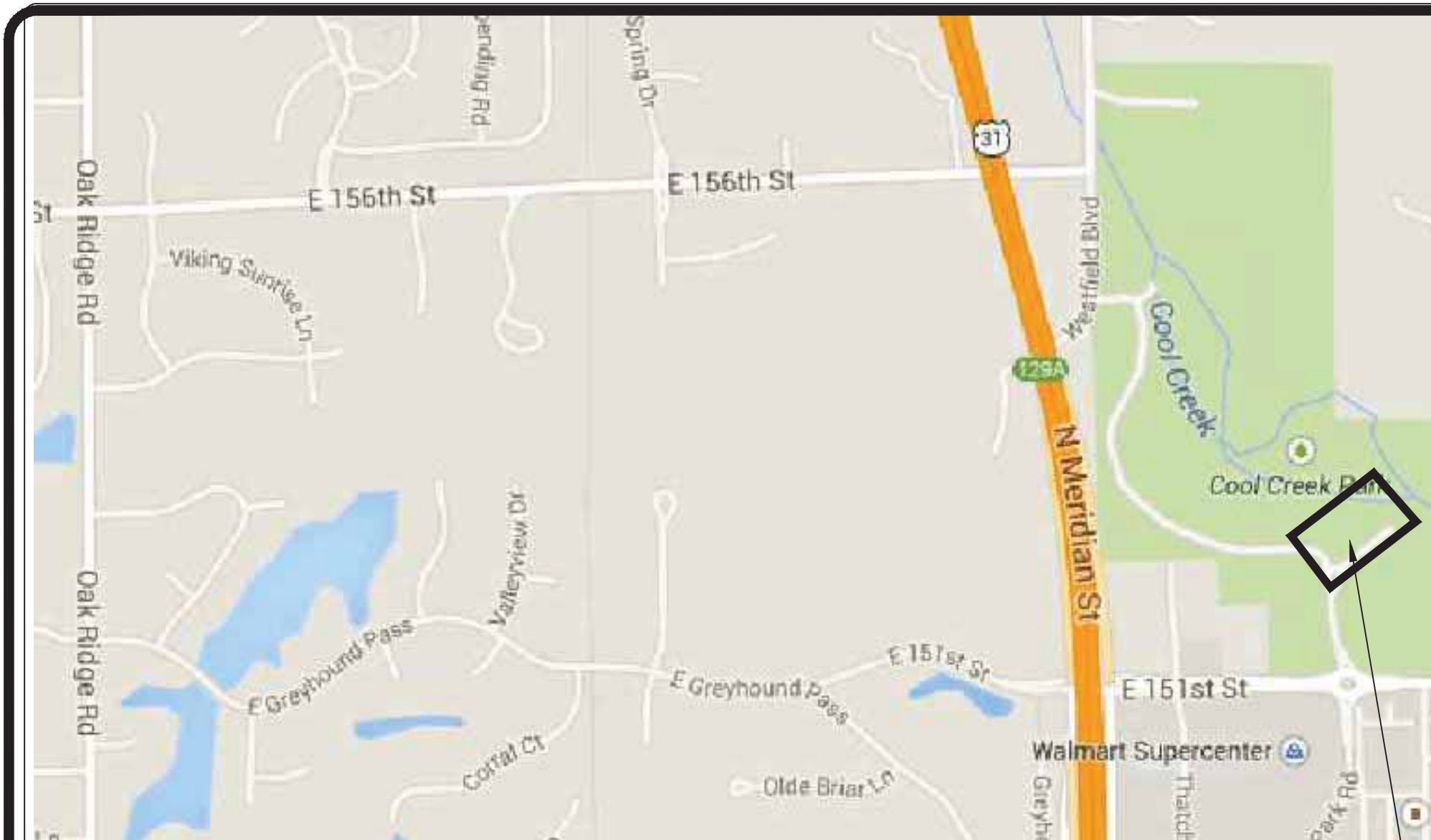
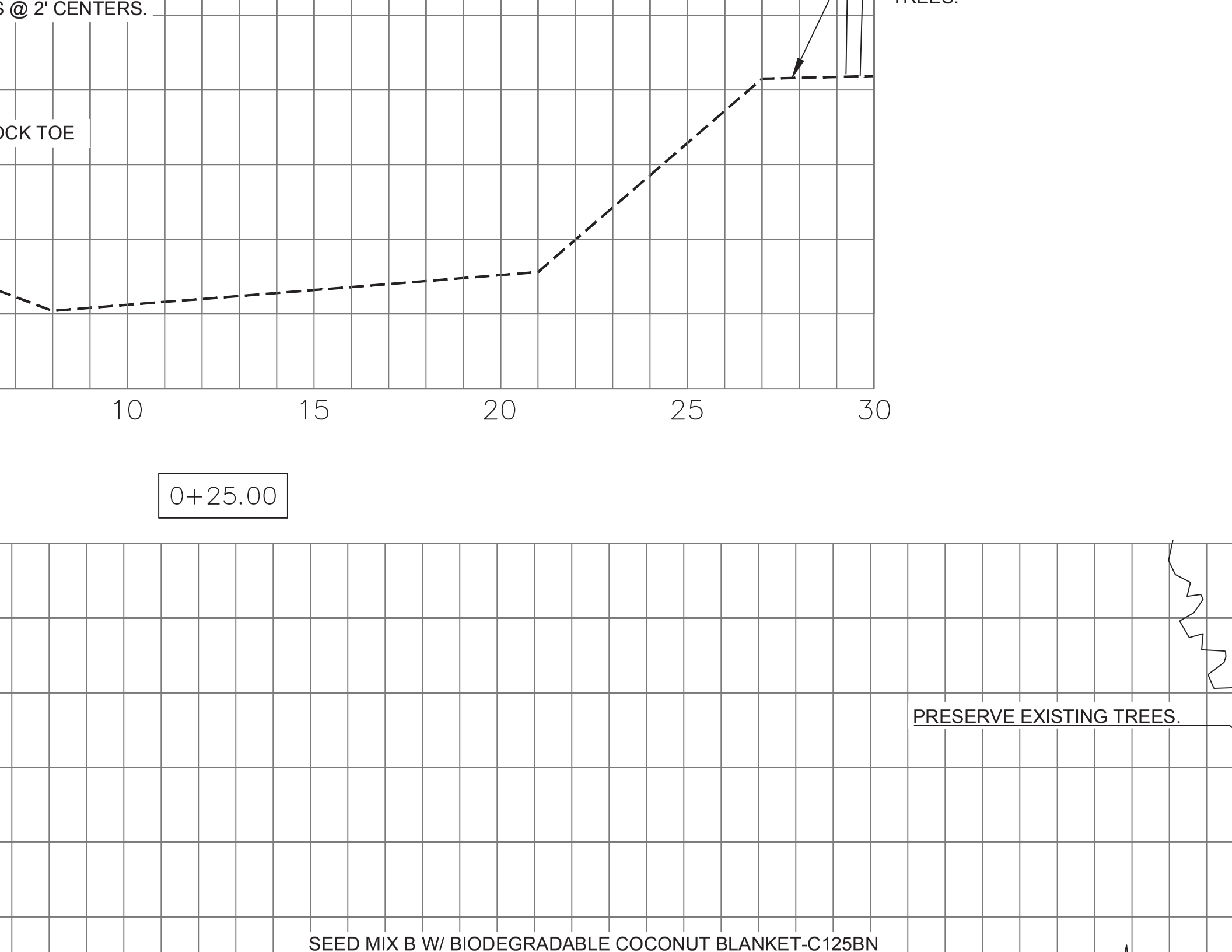
OWSKI
OULEVARD
NA 46254
1982
36
CARDNO.COM

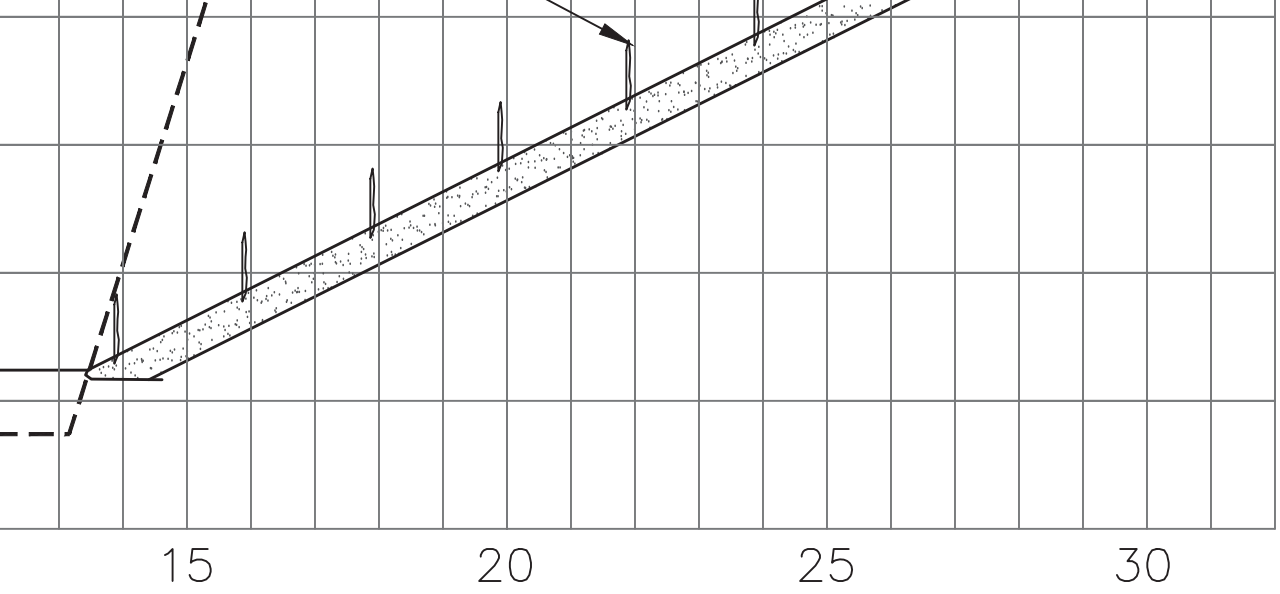
4	PLANT
5	SECTIO
6	SECTIO
7	DETAIL



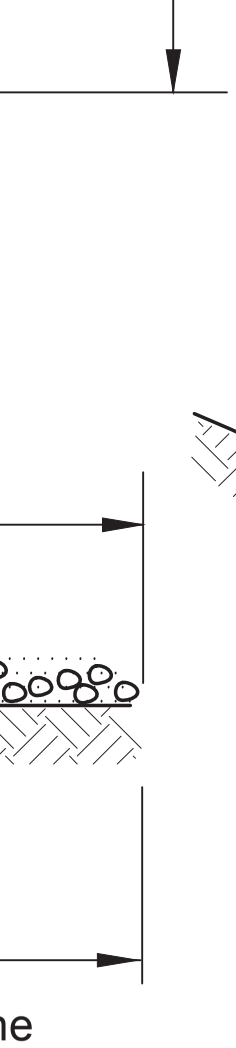
TRAIL
UNNAMED TRIB.
EPHEMERAL SIDE CHANNEL
ROAD
828
828
831

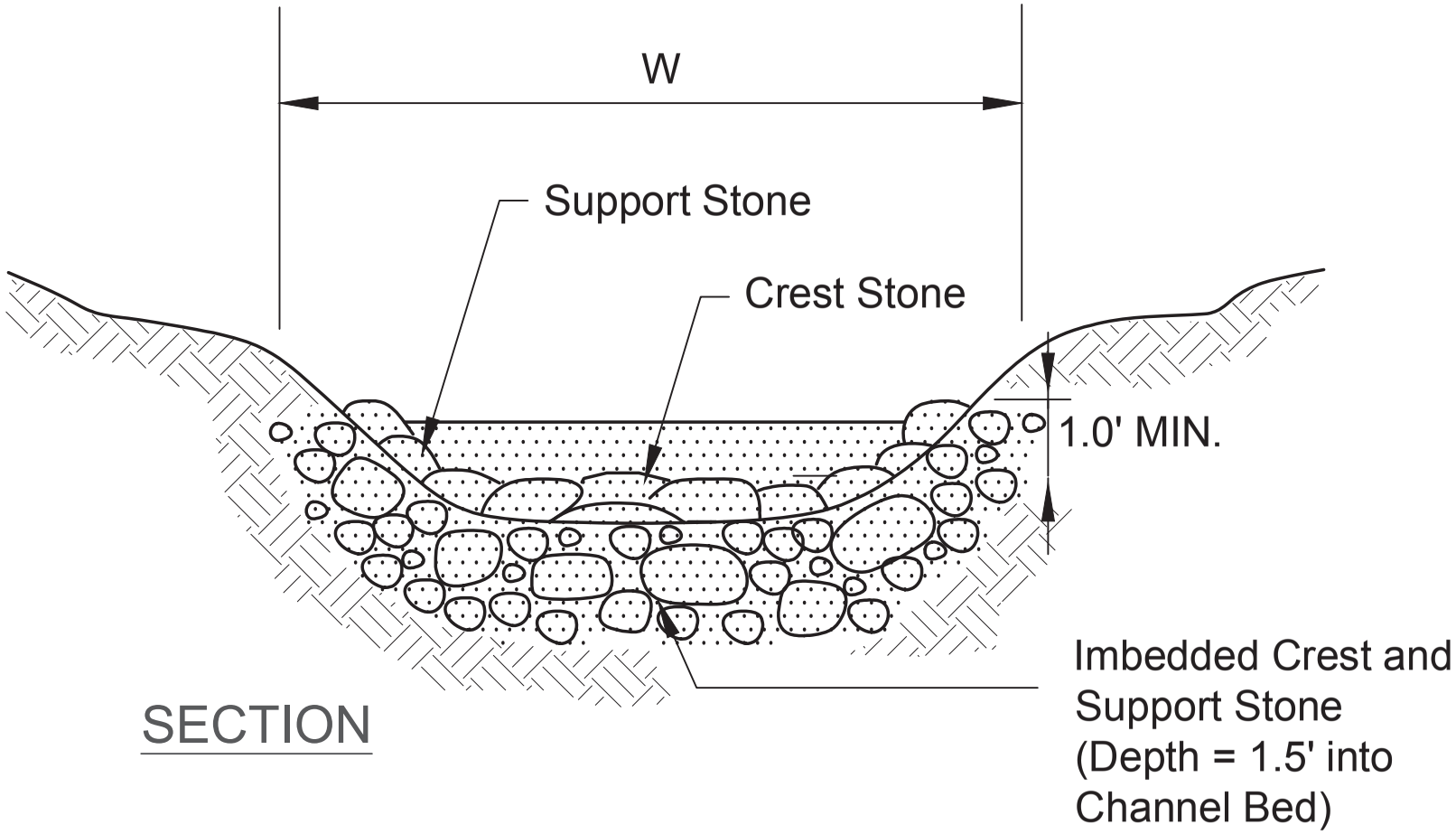
831
828
828
3+00
2+75
2+50
2+25
2+00
1+50
1+25
1+00
0+75


S @ 2' CENTERS.
TREES.
OCK TOE
10
15
20
25
30
0+25.00
PRESERVE EXISTING TREES.
SEED MIX B W/ BIODEGRADABLE COCONUT BLANKET-C125BN


15
20
25
30

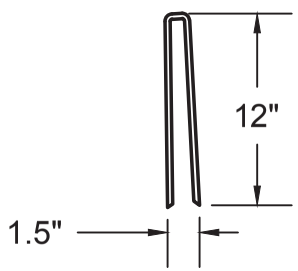
W = Bankfull Width = Width of Channel
from Bank to Bank.



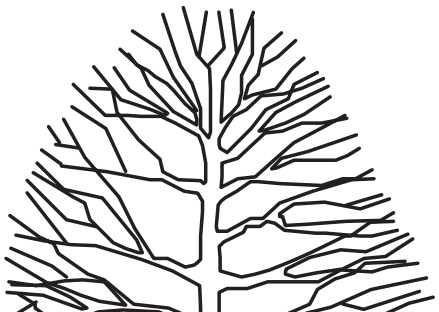


SECTION

TYPICAL RIFFLE DETAIL
NOT TO SCALE



STAPLES



Westfield Boulevard Extension

APPENDIX C
PLANTING PLAN SPECIFICATION

Cardno
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831
828
828

Westfield Boulevard Extension

APPENDIX D
SITE PHOTOGRAPHS

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Stream 1, View Looking Downstream

Stream 1, View Looking Upstream

Wetland 1, View Looking North

Wetland 1, View Looking South

Project Number:
J152573100

Site Photographs

06/25/2015

Westfield Boulevard Extension—Offsite Mitigation

VS Engineering

Hamilton County, Indiana

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PS01. Stream 2, View Looking Downstream

PS01,. Stream 2, View Looking Upstream

PS02, Stream 2, View Looking Downstream

PS02. Stream 2, View Looking Upstream

Project Number:
J152573100

Site Photographs

06/25/2015

Westfield Boulevard Extension—Offsite Mitigation

VS Engineering

Hamilton County, Indiana

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PS03. Stream 2, View Looking Downstream

PS03,. Stream 2, View Looking Upstream

PS04, Stream 2, View Looking Downstream

PS04. Stream 2, View Looking Upstream

Project Number:
J152573100

Site Photographs

06/25/2015

Westfield Boulevard Extension—Offsite Mitigation

VS Engineering

Hamilton County, Indiana

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Shaping the Future

Westfield Boulevard Extension

APPENDIX E
FUNCTIONAL ASSESSMENT DATASHEETS

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Primary Headwater Habitat Evaluation Form

HHEI Score (sum of metrics 1, 2, 3) : 35

SITE NAME/LOCATION VS Westfield
SITE NUMBER s02 RIVER BASIN the White River DRAINAGE AREA (mi^2) <1
LENGTH OF STREAM REACH (ft) 30 LAT. LONG. RIVER CODE RIVER MILE
DATE 4/22/2015 SCORER BRH 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 40). 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]	20
☐☐ BOULDER (>256 mm) [16 PTS]		☐☐ LEAF PACK/WOODY DEBRIS [3 PTS]	
☐☐ BEDROCK [16 PTS]		☐☐ FINE DETRITUS [3 PTS]	
☐☐ COBBLE (65-256 mm) [12 PTS]		☐☐ CLAY or HARDPAN [0 PTS]	
☐☑ GRAVEL (2-64 mm) [9 PTS]	70	☐☐ MUCK [0 PTS]	
☐☐ SAND (<2 mm) [6 PTS]	10	☐☐ ARTIFICIAL [3 PTS]	

Total of Percentages of Bldr Slabs, Boulder, Cobble, Bedrock 0 (A) **SCORE OF TWO MOST PREDOMINANT SUBSTRATE TYPES:** 12

(B) **TOTAL NUMBER OF SUBSTRATE TYPES:** 3

HHEI Metric Points
Substrate Max = 40
15
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):** 8

Pool Depth Max = 30
15

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

☐ >4.0 meters (>13') [30 PTS]
☐ >3.0 m - 4.0 m (>9' 7" - 13') [25 PTS]
☐ >1.5 m - 3.0 m (>4' 8" - 9' 7") [20 PTS]
☐ >1.0 m - 1.5 m (>3' 3" - 4' 8") [15 PTS]
☑ ≤1.0 m (≤3' 3") [5 PTS]

COMMENTS **AVERAGE BANKFULL WIDTH (meters)** 0.8

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 >10 m	☐☐	Mature Forest, Wetland	☐☐	Conservation Tillage
☐☐	Moderate 5 - 10 m	☐☐	Immature Forest, Shrub or Old Field	☐☐	Urban or Industrial
☐☐	Narrow <5 m	☑☑	Residential, Park, New Field	☐☐	Open Pasure, 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 61m (200ft) of channel) (Check *ONLY* one box):

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

STREAM GRADIENT ESTIMATE

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

ADDITIONAL STREAM INFORMATION (This Information Must Also be Completed): s02

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): Y Date of last precipition: _____ Quantity: _____

Photographer Information: _____

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

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 EVAULATION

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 appopriate field data sheets from the Primary Hedwater Habitat Assessment Manual)

Fish observed? (Y/N) N Voucher(Y/N) N Salamander 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

FLOW →

Primary Headwater Habitat Evaluation Form

HHEI Score (sum of metrics 1, 2, 3) : 47

SITE NAME/LOCATION VS Westfield
SITE NUMBER s03 RIVER BASIN the White River DRAINAGE AREA (mi^2) <1
LENGTH OF STREAM REACH (ft) 247 LAT. LONG. RIVER CODE RIVER MILE
DATE 4/22/2015 SCORER BRH 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 40). 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]	40
☐☐ BOULDER (>256 mm) [16 PTS]		☐☐ LEAF PACK/WOODY DEBRIS [3 PTS]	10
☐☐ BEDROCK [16 PTS]		☐☐ FINE DETRITUS [3 PTS]	
☐☐ COBBLE (65-256 mm) [12 PTS]		☐☐ CLAY or HARDPAN [0 PTS]	
☐☐ GRAVEL (2-64 mm) [9 PTS]		☐☐ MUCK [0 PTS]	
☐☑ SAND (<2 mm) [6 PTS]	50	☐☐ ARTIFICIAL [3 PTS]	

Total of Percentages of Bldr Slabs, Boulder, Cobble, Bedrock 0 (A) **SCORE OF TWO MOST PREDOMINANT SUBSTRATE TYPES:** 9

(B) **TOTAL NUMBER OF SUBSTRATE TYPES:** 3

HHEI Metric Points — **Substrate Max = 40** — 12 — **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):** 9

Pool Depth Max = 30 — 15

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

☐ >4.0 meters (>13') [30 PTS]
☐ >3.0 m - 4.0 m (>9' 7" - 13') [25 PTS]
☑ >1.5 m - 3.0 m (>4' 8" - 9' 7") [20 PTS]
☐ >1.0 m - 1.5 m (>3' 3" - 4' 8") [15 PTS]
☐ ≤1.0 m (≤3' 3") [5 PTS]

COMMENTS **AVERAGE BANKFULL WIDTH (meters)** 1.8

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 >10 m	☐☐	Mature Forest, Wetland	☐☐	Conservation Tillage
☐☐	Moderate 5 - 10 m	☑☑	Immature Forest, Shrub or Old Field	☐☐	Urban or Industrial
☐☐	Narrow <5 m	☐☐	Residential, Park, New Field	☐☐	Open Pasure, 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 61m (200ft) of channel) (Check *ONLY* one box):

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

STREAM GRADIENT ESTIMATE

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

ADDITIONAL STREAM INFORMATION (This Information Must Also be Completed): s03

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): Y Date of last precipition: _____ Quantity: _____

Photographer Information: _____

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

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 EVAULATION

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 appopriate field data sheets from the Primary Hedwater Habitat Assessment Manual)

Fish observed? (Y/N) N Voucher(Y/N) N Salamander 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

FLOW →

Site: Cool Creek Park Mitigation Site
Locale: Westfield, IN
By: BRH
File: r:\Projects\15\152\152573100_VSEngineering_WestfieldWestRd\Data\MitSite\coolcreek.inv

FLORISTIC QUALITY DATA	Native	92	80.7%	Adventive	22	19.3%
92 NATIVE SPECIES	Tree	19	16.7%	Tree	2	1.8%
114 Total Species	Shrub	8	7.0%	Shrub	5	4.4%
2.7 NATIVE MEAN C	W-Vine	6	5.3%	W-Vine	1	0.9%
2.2 W/Adventives	H-Vine	0	0.0%	H-Vine	0	0.0%
26.2 NATIVE FQI	P-Forb	35	30.7%	P-Forb	6	5.3%
23.5 W/Adventives	B-Forb	4	3.5%	B-Forb	5	4.4%
-0.1 NATIVE MEAN W	A-Forb	6	5.3%	A-Forb	0	0.0%
0.3 W/Adventives	P-Grass	5	4.4%	P-Grass	3	2.6%
AVG: Faculative	A-Grass	0	0.0%	A-Grass	0	0.0%
	P-Sedge	9	7.9%	P-Sedge	0	0.0%
	A-Sedge	0	0.0%	A-Sedge	0	0.0%
	Fern	0	0.0%	Fern	0	0.0%

ACRONYM	C	SCIENTIFIC NAME	W	WETNESS	PHYSIOGNOMY	COMMON NAME
ACENEG	1	Acer negundo	-2	FACW-	Nt Tree	BOXELDER
ACESAS	4	Acer saccharum s. saccharum	3	FACU	Nt Tree	SUGAR MAPLE
AESGLA	5	Aesculus glabra	-1	FAC+	Nt Tree	OHIO BUCKEYE
AGRPUB	5	Agrimonia pubescens	5	UPL	Nt P-Forb	SOFT AGRIMONY
ALLPET	0	ALLIARIA PETIOLATA	0	FAC	Ad B-Forb	GARLIC MUSTARD
ALLVIN	0	ALLIUM VINEALE	3	FACU	Ad P-Forb	FIELD GARLIC
AMBARE	0	Ambrosia artemisiifolia v. elatior	3	FACU	Nt A-Forb	COMMON RAGWEED
ASACAN	5	Asarum canadense	5	UPL	Nt P-Forb	CANADA WILD GINGER
ASITRI	6	Asimina triloba	0	FAC	Nt Tree	PAPAW
BIDFRO	1	Bidens frondosa	-3	FACW	Nt A-Forb	COMMON BEGGAR'S TICKS
CXBLAN	1	Carex blanda	0	FAC	Nt P-Sedge	COMMON WOOD SEDGE
CXCRIS	3	Carex cristatella	-4	FACW+	Nt P-Sedge	CRESTED OVAL SEDGE
CXFRAN	2	Carex frankii	-5	OBL	Nt P-Sedge	BRISTLY CATTAIL SEDGE
CXGRIS	3	Carex grisea	5	UPL	Nt P-Sedge	WOOD GRAY SEDGE
CXHYST	5	Carex hystericina	-5	OBL	Nt P-Sedge	PORCUPINE SEDGE
CXSHOR	3	Carex shortiana	-4	FACW+	Nt P-Sedge	SHORT'S SEDGE
CXSTIS	2	Carex stipata v. stipata	-5	OBL	Nt P-Sedge	COMMON FOX SEDGE
CATBIG	0	CATALPA BIGNONIOIDES	3	FACU	Ad Tree	COMMON CATALPA
CELORB	0	CELASTRUS ORBICULATA	5	UPL	Ad W-Vine	ORIENTAL BITTERSWEET
CELSCA	2	Celastrus scandens	3	FACU	Nt W-Vine	CLIMBING BITTERSWEET
CELOCC	3	Celtis occidentalis	1	FAC-	Nt Tree	HACKBERRY
CERCAN	3	Cercis canadensis	3	FACU	Nt Tree	EASTERN REDBUD
CIRARV	0	CIRSIUM ARVENSE	3	FACU	Ad P-Forb	FIELD THISTLE
CIRDIS	3	Cirsium discolor	5	UPL	Nt B-Forb	PASTURE THISTLE
CONCAN	0	Conyza canadensis	1	FAC-	Nt A-Forb	HORSEWEED
CORDRU	2	Cornus drummondii	0	FAC	Nt Shrub	ROUGH-LEAVED DOGWOOD
CORRAC	2	Cornus racemosa	-2	FACW-	Nt Shrub	GRAY DOGWOOD
CRYCAN	3	Cryptotaenia canadensis	0	FAC	Nt P-Forb	HONEWORT
DACGLO	0	DACTYLIS GLOMERATA	3	FACU	Ad P-Grass	ORCHARD GRASS
DAUCAR	0	DAUCUS CAROTA	4	FACU-	Ad B-Forb	QUEEN ANNE'S LACE
ELYHYS	5	Elymus hystrix	5	UPL	Nt P-Grass	BOTTLEBRUSH GRASS
ELYVIL	4	Elymus villosus	3	FACU	Nt P-Grass	HAIRY WILD RYE
ELYVIR	3	Elymus virginicus	-2	FACW-	Nt P-Grass	VIRGINIA WILD RYE
ERIANS	0	Erigeron annuus	1	FAC-	Nt B-Forb	ANNUAL FLEABANE
ERISTR	2	Erigeron strigosus	1	FAC-	Nt P-Forb	DAISY FLEABANE
EUPPER	4	Eupatorium perfoliatum	-4	FACW+	Nt P-Forb	COMMON BONESET
FRAAME	4	Fraxinus americana	3	FACU	Nt Tree	WHITE ASH
GEUCAN	1	Geum canadense	0	FAC	Nt P-Forb	WHITE AVENS
GLEHED	0	GLECHOMA HEDERACEA	3	FACU	Ad P-Forb	GROUND IVY
GLETRI	1	Gleditsia triacanthos	0	FAC	Nt Tree	HONEY LOCUST
GLYSTR	4	Glyceria striata	-5	OBL	Nt P-Grass	FOWL MANNA GRASS
HACVIR	0	Hackelia virginiana	1	FAC-	Nt P-Forb	STICKSEED
IMPCAP	2	Impatiens capensis	-3	FACW	Nt A-Forb	SPOTTED TOUCH-ME-NOT
JUGNIG	2	Juglans nigra	3	FACU	Nt Tree	BLACK WALNUT
JUNDUD	2	Juncus dudleyi	0	FAC	Nt P-Forb	DUDLEY'S RUSH
JUNTEN	0	Juncus tenuis	0	FAC	Nt P-Forb	PATH RUSH
JUNVIR	2	Juniperus virginiana	3	FACU	Nt Tree	EASTERN RED CEDAR
LACBIE	2	Lactuca biennis	0	FAC	Nt B-Forb	TALL BLUE LETTUCE
LEEVIR	4	Leersia virginica	-3	FACW	Nt P-Grass	WHITE GRASS
LIGOBT	0	LIGUSTRUM OBTUSIFOLIUM	5	UPL	Ad Shrub	BORDER PRIVET
LINBEN	5	Lindera benzoin	-5	OBL	Nt Shrub	HAIRY SPICEBUSH
LIRTUL	4	Liriodendron tulipifera	2	FACU+	Nt Tree	TULIP POPLAR
LOBSIP	3	Lobelia siphilitica	-4	FACW+	Nt P-Forb	GREAT BLUE LOBELIA
LONMAA	0	LONICERA MAACKII	5	UPL	Ad Shrub	AMUR HONEYSUCKLE
LONMOR	0	LONICERA MORROWII	5	UPL	Ad Shrub	MORROW'S HONEYSUCKLE
LYCAME	3	Lycopus americanus	-5	OBL	Nt P-Forb	COMMON WATER HOREHOUND
LYSCIL	4	Lysimachia ciliata	-3	FACW	Nt P-Forb	FRINGED LOOSESTRIFE

MAIRAC	4	Maianthemum racemosum	3	FACU	Nt	P-Forb	FEATHERY FALSE SOLOMON SEAL
MELALB	0	MELILOTUS ALBA	3	FACU	Ad	B-Forb	WHITE SWEET CLOVER
MELOFC	0	MELILOTUS OFFICINALIS	3	FACU	Ad	B-Forb	YELLOW SWEET CLOVER
MENCAN	3	Menispermum canadense	-1	FAC+	Nt	W-Vine	MOONSEED
MONFIS	3	Monarda fistulosa	3	FACU	Nt	P-Forb	WILD BERGAMOT
MORALB	0	MORUS ALBA	0	FAC	Ad	Tree	WHITE MULBERRY
OENBIE	0	Oenothera biennis	3	FACU	Nt	B-Forb	COMMON EVENING PRIMROSE
OXASTR	0	Oxalis stricta	3	FACU	Nt	P-Forb	TALL WOOD SORREL
PACAUR	4	Packera aurea	-3	FACW	Nt	P-Forb	GOLDEN RAGWORT
PACGLA	0	Packera glabella	-5	OBL	Nt	A-Forb	BUTTERWEED
PARQUI	2	Parthenocissus quinquefolia	1	FAC-	Nt	W-Vine	VIRGINIA CREEPER
PASSAT	0	PASTINACA SATIVA	5	UPL	Ad	B-Forb	WILD PARSNIP
PENDIG	4	Penstemon digitalis	1	FAC-	Nt	P-Forb	FOXGLOVE BEARD TONGUE
PHAARU	0	PHALARIS ARUNDINACEA	-4	FACW+	Ad	P-Grass	REED CANARY GRASS
PHRLEP	4	Phryma leptostachya	5	UPL	Nt	P-Forb	LOPSEED
PHYAME	0	Phytolacca americana	1	FAC-	Nt	P-Forb	POKEWEED
PLARUG	0	Plantago rugelii	0	FAC	Nt	A-Forb	RED-STALKED PLANTAIN
PLAOCC	3	Platanus occidentalis	-3	FACW	Nt	Tree	SYCAMORE
POAPRA	0	POA PRATENSIS	1	FAC-	Ad	P-Grass	KENTUCKY BLUE GRASS
POPDEL	1	Populus deltoides	-1	FAC+	Nt	Tree	EASTERN COTTONWOOD
PREALT	5	Prenanthes altissima	3	FACU	Nt	P-Forb	TALL WHITE LETTUCE
PRUSER	1	Prunus serotina	3	FACU	Nt	Tree	WILD BLACK CHERRY
PYCVIR	5	Pycnanthemum virginianum	-4	FACW+	Nt	P-Forb	COMMON MOUNTAIN MINT
QUEPAL	3	Quercus palustris	-3	FACW	Nt	Tree	PIN OAK
QUERUB	4	Quercus rubra	3	FACU	Nt	Tree	NORTHERN RED OAK
ROSMUL	0	ROSA MULTIFLORA	3	FACU	Ad	Shrub	JAPANESE ROSE
ROSSET	4	Rosa setigera	2	FACU+	Nt	Shrub	ILLINOIS ROSE
RUBOCC	1	Rubus occidentalis	3	FACU	Nt	Shrub	BLACK RASPBERRY
RUMCRI	0	RUMEX CRISPUS	-1	FAC+	Ad	P-Forb	CURLY DOCK
RUMOBT	0	RUMEX OBTUSIFOLIUS	-3	FACW	Ad	P-Forb	BITTER DOCK
SALINT	1	Salix interior	-5	OBL	Nt	Shrub	SANDBAR WILLOW
SALNIG	3	Salix nigra	-5	OBL	Nt	Tree	BLACK WILLOW
SAMNIC	2	Sambucus nigra s. canadensis	4	FACU-	Nt	Shrub	COMMON ELDERBERRY
SAMVAL	5	Samolus valerandi	-5	OBL	Nt	P-Forb	WATER PIMPERNEL
SANMAR	6	Sanicula marilandica	5	UPL	Nt	P-Forb	BLACK SNAKEROOT
SCIATR	4	Scirpus atrovirens	-5	OBL	Nt	P-Sedge	DARK-GREEN BULRUSH
SCIPEN	2	Scirpus pendulus	-5	OBL	Nt	P-Sedge	RED BULRUSH
SILPER	4	Silphium perfoliatum	-2	FACW-	Nt	P-Forb	CUP PLANT
SMIHIS	3	Smilax hispida	0	FAC	Nt	W-Vine	BRISTLY GREEN BRIER
SOLALT	0	Solidago altissima	3	FACU	Nt	P-Forb	TALL GOLDENROD
SOLGIG	4	Solidago gigantea	-3	FACW	Nt	P-Forb	LATE GOLDENROD
SYMLAN	3	Symphyotrichum lanceolatum	-5	OBL	Nt	P-Forb	PANICLED ASTER
SYMLAT	3	Symphyotrichum lateriflorum	-2	FACW-	Nt	P-Forb	SIDE-FLOWERING ASTER
TAROFF	0	TARAXACUM OFFICINALE	3	FACU	Ad	P-Forb	COMMON DANDELION
TEUCAC	3	Teucrium canadense v. canadense	-2	FACW-	Nt	P-Forb	AMERICAN GERMANDER
TOVVIR	3	Tovara virginiana	0	FAC	Nt	P-Forb	VIRGINIA KNOTWEED
TOXRAN	1	Toxicodendron radicans s. negundo	5	UPL	Nt	W-Vine	EASTERN POISON VY
TRASUB	4	Tradescantia subaspera	5	UPL	Nt	P-Forb	BROAD-LEAVED SPIDERWORT
ULMAME	3	Ulmus americana	-2	FACW-	Nt	Tree	AMERICAN ELM
ULMRUB	3	Ulmus rubra	0	FAC	Nt	Tree	SLIPPERY ELM
VERURU	3	Verbena urticifolia v. urticifolia	-1	FAC+	Nt	P-Forb	WHITE VERVIAN
VERALT	3	Verbesina alternifolia	-3	FACW	Nt	P-Forb	WINGSTEM
VERGIG	2	Vernonia gigantea	0	FAC	Nt	P-Forb	TALL IRONWEED
VIBOPO	0	VIBURNUM OPULUS v. OPULUS	0	FAC	Ad	Shrub	EUROPEAN HIGH-BUSH CRANBERRY
VIBPRU	4	Viburnum prunifolium	3	FACU	Nt	Shrub	BLACK HAW
VIOPUB	5	Viola pubescens	4	FACU-	Nt	P-Forb	DOWNY YELLOW VIOLET
VITRIP	1	Vitis riparia	-2	FACW-	Nt	W-Vine	RIVERBANK GRAPE

Primary Headwater Habitat Evaluation Form

HHEI Score (sum of metrics 1, 2, 3) : 26

SITE NAME/LOCATION Cool Creek Stream Mitigation
SITE NUMBER S01 RIVER BASIN _____ DRAINAGE AREA (mi^2) <1
LENGTH OF STREAM REACH (ft) _____ LAT. _____ LONG. _____ RIVER CODE _____ RIVER MILE _____
DATE 6/25/2015 SCORER Ben Hess 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 40). 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]	75
☐☐ BOULDER (>256 mm) [16 PTS]		☐☐ LEAF PACK/WOODY DEBRIS [3 PTS]	
☐☐ BEDROCK [16 PTS]		☐☐ FINE DETRITUS [3 PTS]	
☐☐ COBBLE (65-256 mm) [12 PTS]		☐☐ CLAY or HARDPAN [0 PTS]	5
☐☑ GRAVEL (2-64 mm) [9 PTS]	15	☐☐ MUCK [0 PTS]	
☐☐ SAND (<2 mm) [6 PTS]	5	☐☐ ARTIFICIAL [3 PTS]	

Total of Percentages of Bldr Slabs, Boulder, Cobble, Bedrock 0 (A) **SCORE OF TWO MOST PREDOMINANT SUBSTRATE TYPES:** 12

(B) **TOTAL NUMBER OF SUBSTRATE TYPES:** 4

HHEI Metric Points — **Substrate Max = 40** — 16 — **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 (>13') [30 PTS]
☐ >3.0 m - 4.0 m (>9' 7" - 13') [25 PTS]
☐ >1.5 m - 3.0 m (>4' 8" - 9' 7") [20 PTS]
☐ >1.0 m - 1.5 m (>3' 3" - 4' 8") [15 PTS]
☑ ≤1.0 m (≤3' 3") [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

L R	RIPARIAN WIDTH (Per Bank)	L R	FLOODPLAIN QUALITY (Most Predominant per Bank)	L R	
☑☑	Wide >10 m	☐☐	Mature Forest, Wetland	☐☐	Conservation Tillage
☐☐	Moderate 5 - 10 m	☐☐	Immature Forest, Shrub or Old Field	☐☐	Urban or Industrial
☐☐	Narrow <5 m	☐☐	Residential, Park, New Field	☐☐	Open Pasure, 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 61m (200ft) of channel) (Check *ONLY* one box):

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

STREAM GRADIENT ESTIMATE

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

ADDITIONAL STREAM INFORMATION (This Information Must Also be Completed): S01

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): Y Date of last precipition: _____ Quantity: _____

Photographer Information: _____

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

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 EVAULATION

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 appopriate field data sheets from the Primary Hedwater Habitat Assessment Manual)

Fish observed? (Y/N) N Voucher(Y/N) N Salamander 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

FLOW →

Primary Headwater Habitat Evaluation Form

HHEI Score (sum of metrics 1, 2, 3) : 60

SITE NAME/LOCATION Cool Creek Stream Mitigation
SITE NUMBER S02 RIVER BASIN DRAINAGE AREA (mi^2) <1
LENGTH OF STREAM REACH (ft) LAT. LONG. RIVER CODE RIVER MILE
DATE 6/25/2015 SCORER Ben Hess 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 40). 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]	10
☐☐ BOULDER (>256 mm) [16 PTS]	10	☐☐ LEAF PACK/WOODY DEBRIS [3 PTS]	
☐☐ BEDROCK [16 PTS]		☐☐ FINE DETRITUS [3 PTS]	
☐☐ COBBLE (65-256 mm) [12 PTS]	10	☐☐ CLAY or HARDPAN [0 PTS]	
☐☑ GRAVEL (2-64 mm) [9 PTS]	40	☐☐ MUCK [0 PTS]	
☐☑ SAND (<2 mm) [6 PTS]	30	☐☐ ARTIFICIAL [3 PTS]	

Total of Percentages of Bldr Slabs, Boulder, Cobble, Bedrock 20 (A)

SCORE OF TWO MOST PREDOMINANT SUBSTRATE TYPES: 15

(B) **TOTAL NUMBER OF SUBSTRATE TYPES:** 5

HHEI Metric Points

Substrate Max = 40

20

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):** 60

Pool Depth Max = 30

20

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

- ☐ >4.0 meters (>13') [30 PTS]
- ☐ >3.0 m - 4.0 m (>9' 7" - 13') [25 PTS]
- ☑ >1.5 m - 3.0 m (>4' 8" - 9' 7") [20 PTS]
- ☐ >1.0 m - 1.5 m (>3' 3" - 4' 8") [15 PTS]
- ☐ ≤1.0 m (≤3' 3") [5 PTS]

COMMENTS **AVERAGE BANKFULL WIDTH (meters)** 2.0

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 >10 m	☐☐	Mature Forest, Wetland	☐☐	Conservation Tillage
☐☐	Moderate 5 - 10 m	☐☐	Immature Forest, Shrub or Old Field	☐☐	Urban or Industrial
☐☐	Narrow <5 m	☐☐	Residential, Park, New Field	☐☐	Open Pasure, 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 61m (200ft) of channel) (Check *ONLY* one box):

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

STREAM GRADIENT ESTIMATE

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

ADDITIONAL STREAM INFORMATION (This Information Must Also be Completed): S02

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): Y Date of last precipition: _____ Quantity: _____

Photographer Information: _____

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

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 EVAULATION

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 appopriate field data sheets from the Primary Hedwater Habitat Assessment Manual)

Fish observed? (Y/N) N Voucher(Y/N) N Salamander 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

FLOW →

Primary Headwater Habitat Evaluation Form

HHEI Score (sum of metrics 1, 2, 3) : 70

SITE NAME/LOCATION Cool Creek Mitigation Site
SITE NUMBER S02 RIVER BASIN _____ DRAINAGE AREA (mi²) <1
LENGTH OF STREAM REACH (ft) _____ LAT. _____ LONG. _____ RIVER CODE _____ RIVER MILE _____
DATE 6/25/2015 SCORER Ben Hess 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 40). 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]	10
☐☐ BOULDER (>256 mm) [16 PTS]		☐☐ LEAF PACK/WOODY DEBRIS [3 PTS]	
☐☐ BEDROCK [16 PTS]		☐☐ FINE DETRITUS [3 PTS]	
☐☐ COBBLE (65-256 mm) [12 PTS]	20	☐☐ CLAY or HARDPAN [0 PTS]	20
☐☑ GRAVEL (2-64 mm) [9 PTS]	25	☐☐ MUCK [0 PTS]	
☐☑ SAND (<2 mm) [6 PTS]	25	☐☐ ARTIFICIAL [3 PTS]	

Total of Percentages of Bldr Slabs, Boulder, Cobble, Bedrock 20 (A)

SCORE OF TWO MOST PREDOMINANT SUBSTRATE TYPES: 15

(B) **TOTAL NUMBER OF SUBSTRATE TYPES:** 5

HHEI Metric Points
Substrate Max = 40
20
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):** 30

Pool Depth Max = 30
30

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

☐ >4.0 meters (>13') [30 PTS]
☐ >3.0 m - 4.0 m (>9' 7" - 13') [25 PTS]
☑ >1.5 m - 3.0 m (>4' 8" - 9' 7") [20 PTS]
☐ >1.0 m - 1.5 m (>3' 3" - 4' 8") [15 PTS]
☐ ≤1.0 m (≤3' 3") [5 PTS]

COMMENTS _____ **AVERAGE BANKFULL WIDTH (meters)** 2.0

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 >10 m	☐☐	Mature Forest, Wetland	☐☐	Conservation Tillage
☐☐	Moderate 5 - 10 m	☐☐	Immature Forest, Shrub or Old Field	☐☐	Urban or Industrial
☐☐	Narrow <5 m	☐☐	Residential, Park, New Field	☐☐	Open Pasure, 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 61m (200ft) of channel) (Check *ONLY* one box):

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

STREAM GRADIENT ESTIMATE

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

ADDITIONAL STREAM INFORMATION (This Information Must Also be Completed): S02

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): Y Date of last precipition: _____ Quantity: _____

Photographer Information: _____

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

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 EVAULATION

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 appopriate field data sheets from the Primary Hedwater Habitat Assessment Manual)

Fish observed? (Y/N) N Voucher(Y/N) N Salamander 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

FLOW →

WETLAND DETERMINATION DATA FORM -- Midwest Region

Project/Site: Cool Creek Mitigation Site City/County: Westfield/Hamilton Sampling Date: 6/25/2015
Applicant/Owner: City of Westfield State: IN Sampling Point: dp01
Investigator(s): BRH Section, Township, Range:
Landform (hillslope, terrace, etc.): stream terrace Local relief (concave, convex, none): none
Slope (%): 1% Lat: Long: Datum: NAD83 UTM16N
Soil Map Unit Name: Miami silt loam, 6-12% slopes, eroded NWI classification: none
Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No (If no, explain in Remarks.)
Are Vegetation N, Soil N, or Hydrology N significantly disturbed? Are "Normal Circumstances" present? Yes X No
Are Vegetation N, Soil N, or Hydrology N naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS -- Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present? Yes X No
Hydric Soil Present? Yes X No
Wetland Hydrology Present? Yes X No

Is the Sampled Area within a Wetland? Yes X No

Remarks:

VEGETATION -- Use scientific names of plants.

Tree Stratum (Plot size: 30' radius)	Absolute % Cover	Dominant Species?	Indicator Status
1. *Ulmus americana*	10%	Yes	FACW
2. *Acer saccharum*	10%	Yes	FACU
3. *Acer negundo*	5%	Yes	FAC
4.			
5.			
	25%	= Total Cover	

Sapling/Shrub Stratum (Plot size: 15' radius)			
1. *Lonicera maackii*	20%	Yes	UPL
2. *Salix interior*	35%	Yes	FACW
3.			
4.			
5.			
	55%	= Total Cover	

Herb Stratum (Plot size: 5' radius)			
1. *Carex cristatella*	40%	Yes	FACW
2. *Scirpus pendulus*	10%	No	OBL
3. *Carex frankii*	10%	No	OBL
4. *Erigeron annuus*	15%	Yes	FACU
5. *Verbesina alternifolia*	5%	No	FACW
6. *Glyceria striata*	5%	No	OBL
7. *Lobelia siphilitica*	5%	No	OBL
8.			
9.			
10.			
11.			
12.			
13.			
14.			
15.			
16.			
17.			
18.			
19.			
20.			
	90%	= Total Cover	

Woody Vine Stratum (Plot size: 30' radius)			
1.			
2.			
		= Total Cover	

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 4 (A)

Total Number of Dominant Species Across All Strata: 7 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 57% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
That Are OBL, FACW, or FAC:			A/B
OBL species	30%	x1 =	0.3
FACW species	90%	x2 =	1.8
FAC species	5%	x3 =	0.15
FACU species	25%	x4 =	1
UPL species	20%	x5 =	1
Column Totals:	1.70 (A)		4.25 (B)

Prevalence Index = B/A = 2.50

Hydrophytic Vegetation Indicators:

- ___ 1-Rapid Test for Hydrophytic Vegetation
- X 2-Dominance Test is >50%
- X 3-Prevalence Index is ≤3.0[1]
- ___ 4-Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes X No

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point: dp01

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0-20"	10yr 4/2	95	10YR 4/4	5	C	M	Silty Clay Loam	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ 2 cm Muck (A10)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ 5 cm Mucky Peat or Peat (S3)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- X Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ___ Coast Prairie Redox (A16)
- ___ Iron-Manganese Masses (F12)
- ___ Dark Surface (S7)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: ___

Depth (inches): ___

Hydric Soil Present? **Yes** X **No** ___

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required: check all that apply)

- ___ Surface Water (A1)
- X High Water Table (A2)
- X Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ True Aquatic Plants (B14)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Gauge or Well Data (D9)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- ___ Geomorphic Position (D2)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ___	No X	Depth (inches): N/A
Water Table Present?	Yes X	No ___	Depth (inches): 6"
Saturation Present? (includes capillary fringe)	Yes X	No ___	Depth (inches): Surface

Wetland Hydrology Present? **Yes** X **No** ___

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

Westfield Boulevard Extension

APPENDIX F
WETLAND MITIGATION BANK AGREEMENT

Cardno
Shaping the Future

WETLANDS MITIGATION CREDIT PURCHASE AGREEMENT

THIS WETLANDS MITIGATION CREDIT PURCHASE AGREEMENT (this "Agreement") is made as of this 17th day of June, 2015 ("Effective Date"), by and between **CENTRAL INDIANA MITIGATION PROVIDERS, LLC**, as seller ("Seller") and **CITY OF WESTFIELD, WESTFIELD, INDIANA** , as purchaser ("Purchaser").

RECITALS

A. Seller is the owner of certain property more particularly shown and described on Exhibit A, on which Seller operates a wetlands mitigation site known as the Central Indiana Mitigation Bank (the "Mitigation Site"). The establishment, use, operation and maintenance of the Mitigation Site are subject to the requirements of that certain Central Indiana Wetland Mitigation Bank Banking Instrument ("MBI") approved by the Interagency Review Team (as defined in the MBI) on March 9, 2009. A copy of which is available upon request.

B. Pursuant to the requirements of the Clean Water Act and regulations promulgated thereunder, Purchaser must mitigate for impacts to **0.00 acres** of emergent wetlands, **0.00 acres** scrub-shrub, **0.186 acres** of forested wetlands and on certain property commonly known as **Westfield Boulevard Extension, Westfield, Indiana** located in **HAMILTON** County, Indiana (the "Development Impacts").

C. Seller desires to sell, and Purchaser desires to buy **0.00 acres** of **emergent** wetlands bank credits and **0.28 acres** of **forested** wetlands bank credits ("Purchased Credits") generated from the Mitigation Site for Purchaser to mitigate for the Development Impacts, as more particularly set forth below.

AGREEMENT

NOW, THEREFORE, in consideration of the promises and the mutually dependent covenants contained herein and other good and valuable consideration, the adequacy and receipt of which are hereby acknowledged, and intending to be legally bound, Seller and Purchaser agree to the following terms and conditions:

1. **Sale of Credits**. Subject to the terms and conditions of this Agreement, Seller agrees to sell, assign, convey and transfer to Purchaser, and Purchaser agrees to purchase from Seller, the Purchased Credits, solely to mitigate for the Development Impacts. The parties acknowledge that the Section 404 permit process, and, if necessary, the Section 401 certification process under the Clean Water Act must be completed prior to Closing (defined below) and agree that this Agreement may be used to document Purchaser's mitigation plan for its Development Impacts. Purchaser covenants to diligently pursue, if applicable, IDEM approval of Purchaser's mitigation plan for its Development Impacts.

2. **Purchase Price**. The purchase price for each Purchased Credit shall be **Eighty Thousand Dollars ($80,000.00)**, for a total purchase price of **Twenty Two Thousand Four Hundred Dollars ($22,400.00)** (the "Purchase Price") **for 0.28 credits**. The Purchase Price includes all costs associated with monitoring and maintaining the wetlands comprising the Mitigation Site for such period of time as the Indiana Department of Environmental Management ("IDEM") or the Army Corps of Engineers

("Corps") shall require in their permit, water quality certification or regulations, preparing and/or recording such instruments as may be necessary to confirm the sale and allocation of the Purchased Credits to Purchaser and preparing such annual monitoring reports as may be required to document the continued viability of the wetlands comprising the Mitigation Site. The Purchase Price shall be payable as follows:

(a) Deposit. Simultaneous with Purchaser's execution and delivery to Seller of this Agreement, Purchaser shall deliver to Seller a cash deposit in the amount of **Eleven Thousand Two Hundred Dollars ($11,200.00)** (the "Deposit"). The Deposit shall, except as otherwise provided herein, be non-refundable and shall be applied toward the Purchase Price at Closing.

(b) Balance of Purchase Price. Purchaser shall pay the balance of the Purchase Price to Seller at Closing.

3. **Closing**. Closing on the purchase and sale of the Purchased Credits ("Closing") shall electronically or at a location as is reasonably acceptable to Purchaser and Seller, not more than fifteen (15) days from Purchaser's receipt of written confirmation from the Corps, and, if applicable, IDEM, approving mitigation of the Development Impacts through purchase of the Purchased Credits, unless otherwise agreed by the parties. Notwithstanding any provision of this Agreement to the contrary, if the Closing has not occurred within thirty (30) days after the Effective Date, Seller, in its sole discretion, may terminate this Agreement at any time without any rights, obligations or liability to Purchaser whatsoever, and, effective upon such termination, Purchaser shall forfeit the Deposit and Seller shall be entitled to retain the Deposit.

4. **Seller's Deliveries**.

(a) At Closing, Seller shall deliver to Purchaser a bill of sale, in proper form, evidencing the sale of the Purchased Credits to Purchaser.

(b) Not more than ten (10) calendar days following Closing, Seller shall deliver, or cause to be delivered, to Purchaser a copy of Seller's ledger entry, or other documentation in a form satisfactory to the parties, recording the sale of the Purchased Credits to Purchaser as provided herein and debiting the Purchased Credits sold to Purchaser against the outstanding wetland bank credits generated from the Mitigation Site (the "Credits"), in accordance with the MBI.

5. **Closing Costs**. Seller shall pay the cost of preparing the bill of sale, any taxes and costs customarily paid by sellers of Credits, and Seller's attorney's fees. Purchaser shall pay the cost of any inspections and investigations, any taxes and costs customarily paid by purchasers of Credits, Purchaser's attorney's fees and other costs of Closing, if any.

6. **Effect of Condemnation, Regulatory Action or Force Majeure**.

(a) Condemnation. If the Mitigation Site or any part thereof is taken prior to Closing pursuant to eminent domain proceedings, or if such proceedings are commenced prior to Closing, and as a result the Seller determines that it will be unable to transfer the Purchased Credits to Purchaser at Closing as specified in this Agreement, then either party may terminate this Agreement by providing written notice thereof to the

other at any time prior to Closing. If either party elects to terminate this Agreement as provided in this subparagraph, the Deposit shall be refunded to Purchaser and neither party shall have any further rights or obligations hereunder, except as expressly provided herein.

(b) Regulatory Action.

(i) If Seller is unable to transfer the Purchased Credits to Purchaser as provided in this Agreement because of the action or order of any regulatory agency, regardless of whether or not Seller has contested or challenged such action or order, either party may terminate this Agreement by providing written notice to the other party at any time prior to Closing. If either party elects to terminate this Agreement as provided in this subparagraph, the Deposit shall be refunded to Purchaser and neither party shall have any further rights or obligations hereunder, except as expressly provided herein.

(ii) If Purchaser is prevented by any regulatory agency from acquiring the Purchased Credits from Seller as provided in this Agreement, or if Purchaser's mitigation plan for its Development Impacts is not approved, despite Purchaser's diligent efforts, either party may terminate this Agreement by providing written notice to the other party at any time prior to Closing. If either party elects to terminate this Agreement as provided in this subparagraph, the Deposit shall be refunded to Purchaser and neither party shall have any further rights or obligations hereunder, except as expressly provided herein.

(c) Force Majeure. If Seller determines that Seller will be unable to transfer the Purchased Credits, or any part thereof, to Purchaser at Closing as provided in this Agreement because of damage to or loss of the Mitigation Site resulting from fire, flood, storm, drought or other natural disaster, or from any other cause that is not the fault of Seller and is beyond Seller's reasonable ability to prevent or control (a "Force Majeure Event"), Seller shall notify Purchaser that Seller is unable to transfer the Purchased Credits as a result of a Force Majeure Event, whereupon either party may terminate this Agreement by providing written notice to the other party at any time prior to the scheduled date for Closing. If either party elects to terminate this Agreement as provided in this subparagraph, the Deposit shall be refunded to Purchaser and neither party shall have any further rights or obligations hereunder, except as expressly provided herein.

7. **Mitigation Site Regulatory Requirements**. Seller shall comply with the terms and conditions of the MBI, this Agreement and all State of Indiana and federal statutes, regulations and requirements applicable to the operation, management and maintenance of the Mitigation Site, and shall pay prior to delinquency all property taxes owed by the Mitigation Site or assessed against the Mitigation Site ("Mitigation Site Regulatory Requirements"). This Paragraph 7 shall survive Closing or earlier termination of this Agreement.

8. **Limitations on Purchaser's Rights**. Seller's sale and conveyance of the Purchased Credits to Purchaser shall not constitute the conveyance or transfer of any right, interest or ownership in real property, nor shall such sale and conveyance impose upon Purchaser any right, obligation, duty or liability arising from or incident to any right, interest or ownership in real property.

9. **Default**.

(a) By Purchaser. If Purchaser fails to make any payment required of it hereunder in a timely manner, or fails to diligently pursue, if applicable, IDEM approval of Purchaser's mitigation plan for its Development Impacts, or fails to otherwise perform any of its other material obligations under this Agreement, or if any representation or warranty provided by Purchaser in this Agreement proves to have been misleading or false in any material respect when made or as of Closing, Purchaser shall be deemed to be in default and, at Seller's election, in its sole and absolute discretion, Seller may terminate this Agreement and all of Seller's obligations hereunder. Upon any such termination, (A) if prior to Closing, (i) the Deposit shall be forfeited to Seller, (ii) Purchaser shall lose all of its right and privilege to purchase the Purchased Credits from Seller, (iii) Seller shall notify, if applicable, IDEM, of Purchaser's failure to fulfill its obligations under this Agreement, and (B) if after Closing (or is discovered by Seller after Closing), Seller shall have the right to pursue all remedies as may be available to Seller at law or in equity. All rights and remedies of Seller hereunder shall be cumulative and not mutually exclusive of one another.

(b) By Seller. If Seller defaults in performing any of Seller's material obligations under this Agreement, and such default continues for a period of thirty (30) days after Purchaser has provided written notice to Seller of such default, or if any representation or warranty provided by Seller in this Agreement proves to have been misleading or false in any material respect when made or as of Closing, then Seller shall be deemed to be in default and (i) if prior to Closing, Purchaser's sole remedies shall be to terminate this Agreement by providing written notice thereof to Seller, and to receive a refund of the Deposit, in which event neither party shall have any further rights or obligations hereunder, except as expressly provided herein; or (ii) if after Closing (or such default is discovered by Purchaser after Closing), Purchaser shall have the right to pursue such remedies as may be available to it at law or in equity.

(c) NOTWITHSTANDING ANYTHING TO THE CONTRARY CONTINUED IN THIS AGREEMENT, IN THE EVENT OF A DEFAULT, THE DEFAULTING PARTY'S LIABILITY SHALL BE LIMITED TO DIRECT, ACTUAL DAMAGES ONLY, AND SUCH DIRECT ACTUAL DAMAGES SHALL BE THE SOLE AND EXCLUSIVE REMEDY HEREUNDER. IN NO EVENT SHALL ANY OTHER LIABILITY BE INCURRED BY EITHER PARTY FOR ANY OBLIGATIONS WHICH ARISE UNDER THIS AGREEMENT, INCLUDING (BUT NOT LIMITED TO) CONSEQUENTIAL, INCIDENTAL, PUNITIVE, EXEMPLARY, OR INDIRECT DAMAGES IN TORT, CONTRACT OR OTHERWISE. EXCEPT AS OTHERWISE PROVIDED UNDER THIS AGREEMENT, SELLER MAKES NO REPRESENTATION OR WARRANTY HEREUNDER REGARDING THE MERCHANTABILITY OF THE CREDITS OR WITH RESPECT TO THE CREDITS, ANY ACTION OR FAILURE TO ACT, OR APPROVAL OR FAILURE TO APPROVE, OF ANY GOVERNMENTAL AUTHORITY. REDRESS FOR ANY CLAIM AGAINST SELLER UNDER THIS AGREEMENT SHALL BE LIMITED TO AND ENFORCEABLE ONLY AGAINST AND TO THE EXTENT OF SELLER'S INTEREST IN THE MITIGATION SITE. THE OBLIGATIONS OF SELLER AND PURCHASER UNDER THIS AGREEMENT ARE NOT INTENDED TO BE AND SHALL NOT BE PERSONALLY BINDING ON, NOR SHALL ANY RESORT BE HAD TO THE PRIVATE PROPERTIES OF, ANY OF THEIR DIRECTORS, OFFICERS, PARTNERS, BENEFICIARIES, MEMBERS, STOCKHOLDERS, EMPLOYEES, OR AGENTS.

(d) This Paragraph 9 shall survive Closing or earlier termination of this Agreement.

10. **Indemnities**.

(a) Seller's Indemnities. Seller shall indemnify, defend and hold harmless Purchaser and Purchaser's authorized successors and assigns from and against any action, order, investigation or proceeding initiated by any government agency and arising from or based upon Seller's failure to comply in any material respect with any Mitigation Site Regulatory Requirements. Seller's duty to indemnify Purchaser under this Paragraph 10 shall survive Closing or earlier termination of this Agreement.

(b) Purchaser's Indemnities. Purchaser shall indemnify, defend and hold harmless Seller from and against any action, order, investigation or proceeding initiated by any government agency and arising from or based upon Purchaser's failure to comply with any permit, authorization or condition thereof relating to Purchaser's Development Impacts or the Mitigation Site. Purchaser's duty to indemnify Seller under this Paragraph 10 shall survive Closing or earlier termination of this Agreement.

11. **Term and Termination**. This Agreement shall be effective upon the date that all signatures and approvals are obtained. This Agreement shall commence on the Effective Date and shall terminate upon Closing, unless earlier terminated pursuant to any other provision in this Agreement.

12. **Representations and Warranties**. Each of Seller and Purchaser represents and warrants to the other now and as of Closing that: (i) it is organized and validly existing under the laws of the jurisdiction of its organization or incorporation; (ii) it has the power to execute this Agreement and any other documentation relating to this Agreement to which it is a party, to deliver this Agreement and any other relevant documentation and to perform its obligations under this Agreement, and has taken all necessary action to authorize such execution, delivery and performance; (iii) it has obtained all licenses, authorizations, consents and exemptions necessary to have been obtained with respect to this Agreement and for the performance of its obligations under this Agreement, and all such licenses, authorizations, consents and exemptions are in full force and effect and, as of Closing, there shall be no outstanding condition precedent to such party's performance of its obligations under this Agreement, or any such conditions shall be satisfied; (iv) the entry into and observance and performance of its obligations under this Agreement do not violate or conflict with or require any consent or waiver which has not heretofore been obtained, except as set forth in Paragraph 1 of this Agreement, under any of the terms or conditions in its governing documents or any contract to which it is a party or by which any of its assets are bound or affected, or any applicable law; and (v) its obligations under this Agreement constitute legal, valid and binding obligations, enforceable in accordance with their respective terms by an appropriate legal remedy.

13. **Miscellaneous**.

(a). No Joint Venture. This Agreement is made solely for the purposes set forth herein and no joint venture, partnership or other relationship between Purchaser and Seller is created hereby.

(b) No Third-Party Beneficiary. This Agreement shall bind and inure to the benefit of the parties hereto and their respective successors and authorized assigns. The Agreement does not create or convey any rights, benefits or interests on behalf of any other person.

(c) Assignment. This Agreement may not be assigned by Purchaser without Seller's prior written consent in Seller's sole and absolute discretion, and any assignee shall assume the rights and obligations of its assignor.

(d) Entire Agreement. This Agreement sets forth the entire agreement between the parties with respect to the subject matter hereof and supersedes all prior negotiations and agreement, written or oral. This Agreement may be modified only by a written instrument duly executed by Seller and Purchaser.

(e) Choice of Laws. This agreement shall be construed, performed and enforced under the laws of the State of Indiana.

(f) Counterparts. This Agreement may be executed in one or more counterparts by the parties. All counterparts shall collectively constitute a single agreement.

(g) Notices. All notices shall be in writing and sent by hand, facsimile transmission, overnight delivery service or certified mail, return-receipt requested, to the following addresses (or such other addresses as either party may designate to the other from time to time by written notice) and any such notice of other communication shall be deemed to have been given on the day so delivered or refused by the party to whom such notice was sent (it being acknowledged that a facsimile or an e-mail transmission shall not be deemed to be a "writing"):

If to Seller:

Central Indiana Mitigation Providers, LLC
Attn: ~~David Brentlinger~~ Gerrity Lomsmis
275 Battery Street, Suite # 510
San Francisco CA 94111

With a copy to:

Don Ewoldt
902 Monterey Drive, Chesterton, IN 46304

If to Purchaser:

Phil Sundling
Project Manager Supervisor
2706 E. 171st Street
Westfield, IN 46074

(h). Legal Capacity of Signatory. Each person executing this Agreement in a representative capacity hereby warrants that he/she has been duly authorized by his/her principal to execute this Agreement on such principal's behalf.

IN WITNESS whereof, Seller and Purchaser have caused this Agreement to be executed on their behalf by their duly authorized representatives as of the date first written above.

Phil Sundling

By: Phil Sundling
Title: Project Manager Supervisor

CENTRAL INDIANA MITIGATION PROVIDERS, LLC

By: ~~David Brentlinger~~ Gerrity Lansing
Title: ~~Vice President~~ Manager

ACKNOWLEDGMENT

STATE OF ~~CALIFORNIA~~ New York
~~SAN FRANSICSO COUNTY~~ County of New York

Before me, the undersigned Notary Public in and for said County personally appeared ~~David Brentlinger, Vice President~~ Gerry Vansing, Manager of Central Indiana Mitigation Providers, LLC and acknowledged the execution of the foregoing Agreement on this 15 day of May 2015.

Witness my hand and seal the said last named date.

My Commission Expires
5/16/15
AJA JAYNE RICHMOND
NOTARY PUBLIC-STATE OF NEW YORK
No. 01RI6241256
Qualified In New York County
My Commission Expires May 16, 2015

Aja Jayne Richmond
~~Aja Jayne Richmond~~ Notary Public
County of Residence: New York

STATE OF INDIANA
HAMILTON COUNTY

Before me, the undersigned Notary Public in and for said County personally appeared Phil Sundling and acknowledged the execution of the foregoing Agreement on this 27th day of April 2015.

Witness my hand and seal the said last named date.

My Commission Expires
3/13/16

Patricia J. Leuteritz
Patricia Leuteritz Notary Public
County of Residence: ~~Mar~~ Hamilton

PATRICIA J. LEUTERITZ
Notary Public - Seal
State of Indiana
My Commission Expires Mar 13, 2016

EXHIBIT "A"
Description of Central Indiana Wetland Mitigation Bank

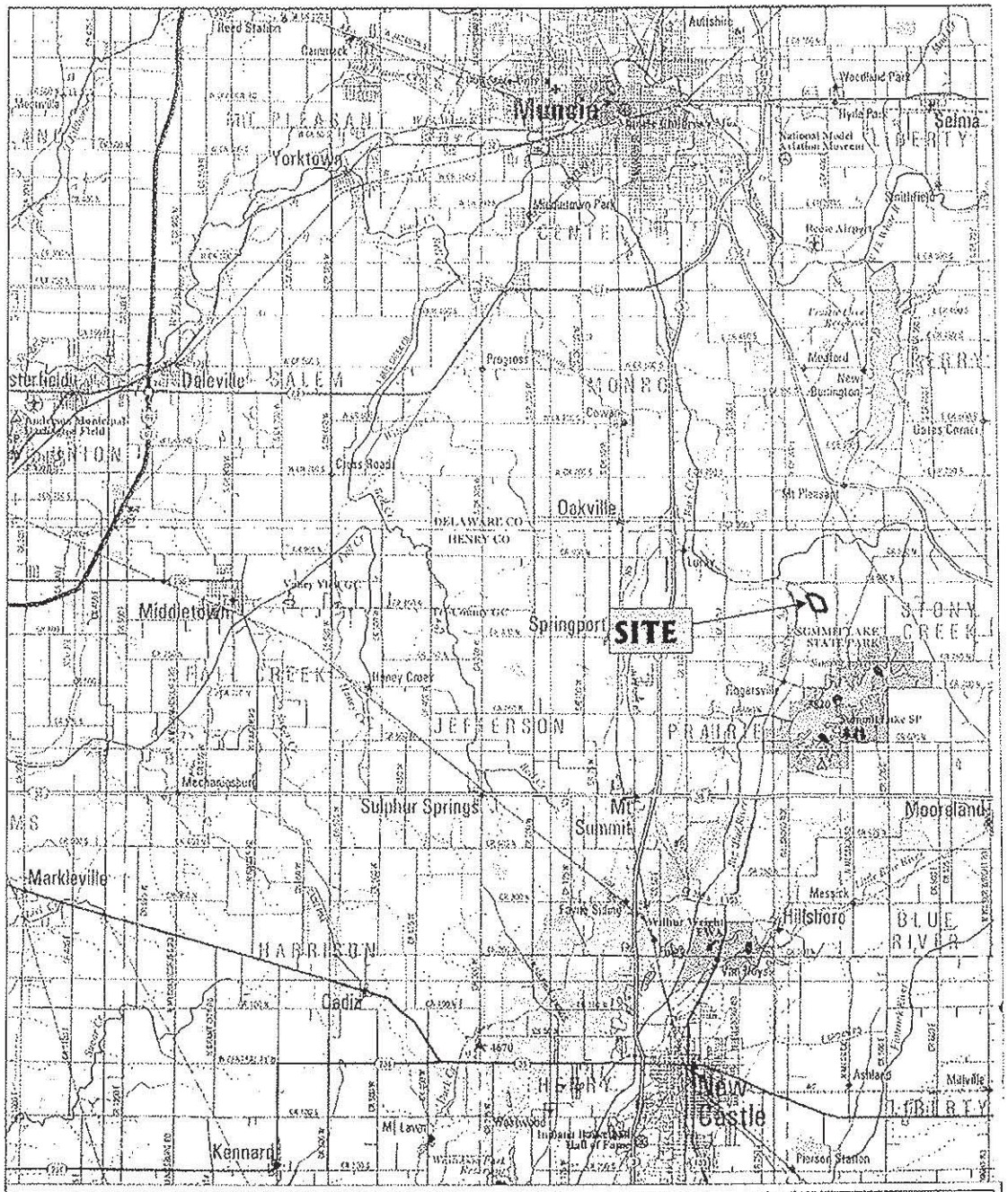

Figure 1: Location Map
Wetland Delineation Report
Central Indiana Mitigation Bank
Assailey Site
Henry County, Indiana

N

Scale: 1" = 2.5mi

JFNew# 920813INX

JFNew
708 Roosevelt Road, Walkerton, IN 46574
Phone 574-586-3400 / Fax 574-586-3446
www.jfnew.com

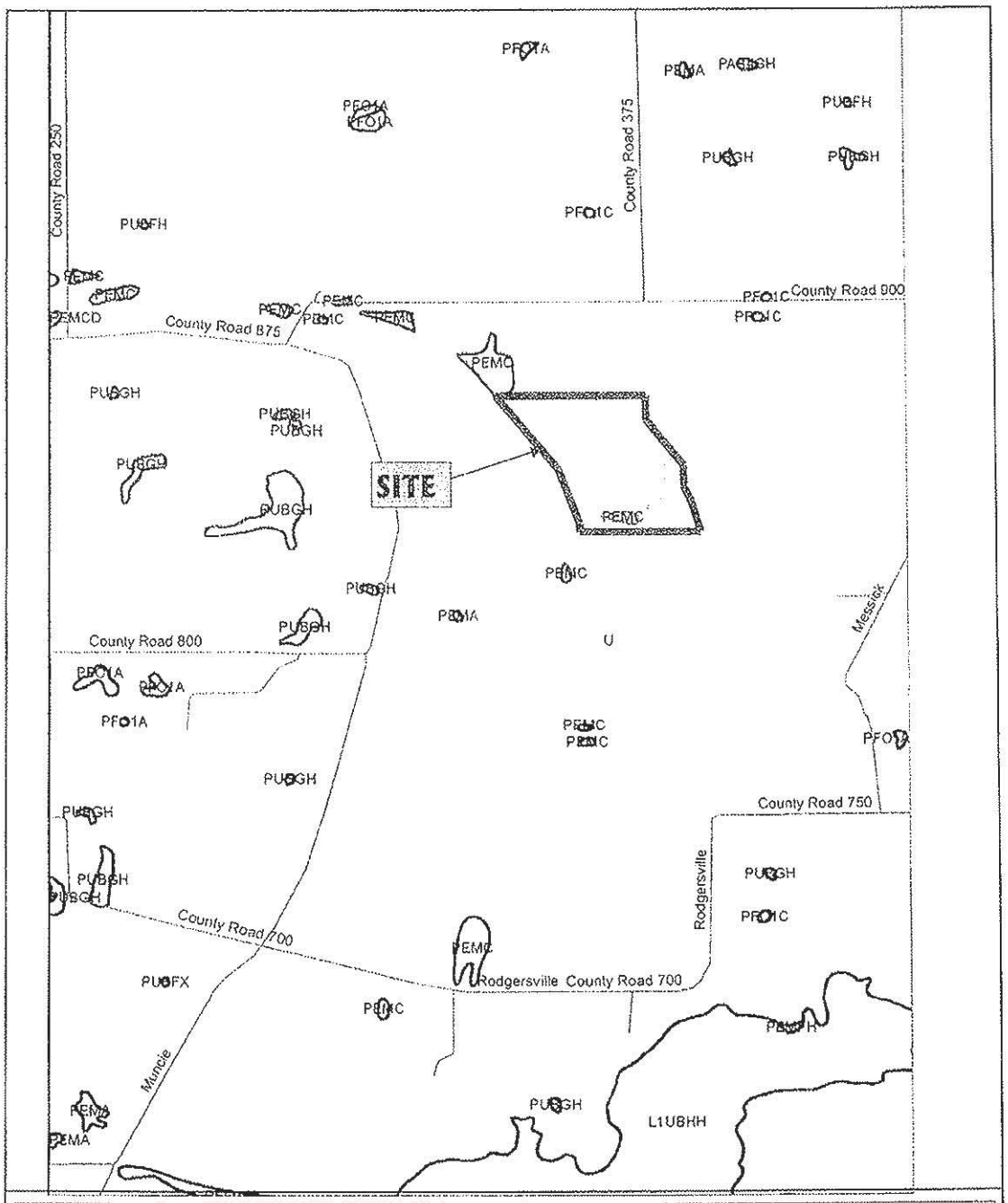

Figure 2: NWI Map
Wetland Delineation Report
Central Indiana Mitigation Bank
Assalley Site
Henry County, Indiana

N

Scale: 1" = 2000ft

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