LEVEL ONE ECOLOCIGAL SURVEY
FOR THE
VROOMAN ROAD BRIDGE REPLACEMENT

LEROY AND PERRY TOWNSHIPS, LAKE COUNTY, OHIO

PREPARED BY:

MICHAEL BAKER JR., INC.
1228 EUCLID AVENUE
SUITE 1050
CLEVELAND, OHIO 44115
(216) 664-6493

FOR:

THE LAKE COUNTY ENGINEER
550 BLACKBROOK ROAD
PAINESVILLE, OHIO 44077

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Baker

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1.0 EXECUTIVE SUMMARY

The intention of this Level One Ecological Survey Report (ESR) is to provide ecological data for the proposed Vrooman Road (CR 277) bridge replacement in Lake County, Ohio. The current project study area consists of two alternative bridge locations (A and B) along Vrooman Road, a segment of State Route (SR) 84 between Madison Avenue and Lane Road, and a segment of Vrooman Road from the existing bridge south to Interstate 90 (Figure 1). The current study area reflects refinements to the remaining feasible alternatives resulting from additional preliminary engineering and environmental studies. All further references to "the study area" in this report should be construed to mean "the current study area". This project will alleviate the deficiencies along the roadway from Interstate Route (IR) 90, north to SR 84. These problems include flooding, sub-standard curves and steep grades, retaining wall failure, and structural deficiencies of the existing bridge.

TranSystems Corporation conducted initial field investigations of the study area for the conceptual alternatives described in the 2008 Planning Study on June 17, October 19, November 3 and 10, 2004 and February 15, 2005. Michael Baker Jr., Inc., conducted additional field investigations of the current study area for the remaining feasible alternatives on October 22 and 23, 2008. Figure 4 in Appendix A depicts the ecological study area for both Transystems 2004 and 2005 field investigations: and Baker's 2008 field investigations. The weather conditions for June 2004 investigations were warm and sunny; October 2004, overcast and mild; November 2004, rainy with no snow cover and February 2005, warm and sunny with no snow cover. The weather conditions for the October 2008 investigation was warm and sunny. The aquatic, terrestrial, and wetland habitats, as well as endangered species were examined according to the procedures identified in the Ohio Department of Transportation (ODOT), *Ecological Manual, 2005*. Three streams, the Grand River and two unnamed tributaries to the Grand River were identified within the limits of the study area. Ponds and jurisdictional ditches were not found within the study area. The identified terrestrial habitats of the project area are mixed deciduous forest, residential/commercial/disturbed and agriculture. The majority of the land use within the project area is comprised of 31.61 acres of mixed deciduous forest followed by 25.93 acres of the residential/commercial/disturbed land use with the remaining 7.92 acres comprised of agriculture fields (i.e., cropland). Nineteen wetlands comprising 2.93 acres were identified within the study area.

A total of three streams comprising approximately 1,952 linear feet were identified within the study area. Stream 1 (The Grand River) has a drainage area greater than one square mile and has pools greater than 40 centimeters deep. Therefore, Stream 1 was evaluated using Ohio EPA's qualitative habitat evaluation index (QHEI). The QHEI scores indicate that the Grand River has a provisional aquatic life use designation of Exceptional Warmwater Habitat (EWH) based on the QHEI score. Ohio EPA Water Quality Standards reveal that the Grand River within the study area has an Exceptional Warmwater Habitat (EWH) use designation (confirmed with data), and is listed as State

Resource Water (SRW) and Seasonal Salmonid Habitat (SSH). Stream 2 was considered to be headwater habitat and as such this stream was evaluated using the headwater habitat evaluation index (HHEI) and the headwater macroinvertebrate field evaluation index (HMFEI). The results of this evaluation verified that Stream 2 is classified as a provisional Class I primary headwater habitat (PHWH) stream. Stream 3 was considered to be headwater habitat and as such this stream was evaluated using the HHEI. The results of this evaluation verified that Stream 3 is classified as provisional Class I primary headwater habitat (PHWH) stream.

A total of nineteen wetlands comprising approximately 2.93 acres were identified within the study area. The wetlands are comprised of the palustrine emergent (PEM), palustrine scrub-shrub (PSS), and palustrine forested (PFO) wetland habitat types. Six wetlands are considered provisional Category 1 wetlands. One wetland is considered a Category 1 or 2 gray zone wetland. Two wetlands are considered provisional Category 2 wetlands. Six wetlands are considered provisional modified Category 2 wetlands. Three wetlands are considered provisional Category 2 or 3 gray zone wetlands. One wetland is considered a provisional Category 3 wetland. Fifteen wetlands are considered to be adjacent wetlands, meaning they are non-isolated. Four of the wetlands are considered to be isolated.

Field investigations did not reveal the presence of any State listed endangered, threatened, potentially threatened, or other rare plant species as occurring within the project area. No federally listed threatened, endangered, proposed, or candidate species were identified within the study area. However, several dead shells, of listed mussel species presumed to have washed up on a sandbar from upstream, were identified within the study area.

The Division of Natural Areas and Preserves has no records of any Indiana bat capture locations or hibernacula within a ten-mile radius of the study area (Appendix E). No winter hibernacula for the Indiana bat were found or are known to exist within the study area. Trees identified as potential roost or maternity colony trees will be identified, marked and mapped by ODOT Office of Environmental Services, and will be included as an addendum to this report.

Alternative A - Madison Avenue would have no impacts to endangered species, however, aquatic, terrestrial and wetland impacts are likely to occur. The aquatic impacts will occur on approximately 264 linear feet of Stream 3. The terrestrial impacts would result in 5.14 acres of mixed deciduous forested habitat and 0.53 acres of residential/commercial/disturbed habitat during bridge construction. The wetland impacts within the study area are estimated to be approximately 0.49 acre.

Alternative B – Lane Road would have no impacts to endangered species, however aquatic, terrestrial, and wetland impacts are likely to occur. The aquatic impacts will occur on approximately 264 linear feet of Stream 3and approximately 100 linear feet of Stream 2. The terrestrial impacts would result in 6.93 acres of mixed deciduous forested habitat, 2.77 acres of agricultural habitat, and 3.08 acres of residential / commercial / disturbed habitat during bridge construction. The wetland impacts within the study area are estimated to be approximately 0.50 acre.

2.0 INTRODUCTION

2.1 Project Description

The intention of this Level One ESR is to provide ecological data for the proposed Vrooman Road (CR 277) bridge replacement in Lake County, Ohio (Figure 1). The project study area for the October 2008 investigation consists of two alternative bridge locations (Alternative A – Madison Avenue and Alternative B - Lane Road), as well as the Vrooman Road corridor from the Interstate-90 interchange to the southern termini of the proposed bridge alignments (Figure 4). This project will alleviate the deficiencies along the roadway from IR 90 north to SR 84. These problems include flooding, sub-standard curves and steep grades, retaining wall failure, and structural deficiencies of the existing bridge.

Alternative A – The Madison Avenue alignment consists of a high-level bridge connecting Vrooman Road with Madison Avenue. This alternative includes intersection improvements at State Route 84 and Madison Avenue, and possibly at State Route 84 and Lane Road. Along with the intersection improvements, the stretch of State Route 84 between these two intersections will need to be improved, as well. The alignment for Alternative A is presented in Figure 5. It should be noted that the alignment of Alternative A has shifted to the east due to detailed engineering studies completed since the initial field investigations were conducted in 2004 and 2005.

Alternative B – The Lane Road alignment consists of a high-level bridge connecting Vrooman Road to Lane Road. This alternative will include improvements to the intersection at State Route 84 and Lane Road. It will also include the reconfiguring of River Road access to State Route 84; either by redirecting its connection with State Route 84 east of its current location, or by turning River Road into a cul-de-sac and developing a “side road” for access to State Route 84. The alignment for Alternative B is presented in Figure 6. It should be noted that the alignment of Alternative B has shifted to the east due to detailed engineering studies completed since the initial field investigations were conducted in 2004 and 2005.

2.2 Objectives

This report documents data that was collected to describe the terrestrial, wetland, and aquatic habitats as well as any endangered species present in the proposed project vicinity and allow for impact prediction based on the proposed design for the project. The study objectives were as follows:

- Identify and evaluate the significance of the terrestrial, wetland, and aquatic habitats as well as any endangered species, which may be directly or indirectly affected by the proposed Vrooman Road bridge replacement.

- Comply with state and federal requirements and policies ensuring that wetland resources and endangered species are considered as part of the overall project development and decision making processes.

- Evaluate any streams and wetlands identified within the study area by utilizing the most current versions of the Ohio Environmental Protection Agency (Ohio EPA) Qualitative Habitat Evaluation Index (QHEI), Headwater Habitat Evaluation Index (HHEI), and the Ohio Rapid Assessment Method (ORAM).

3.0 METHODS

TranSystems Corporation conducted initial field investigations of the study area for the conceptual alternatives described in the 2008 Planning Study on June 17, October 19, November 3 and 10, 2004 and February 15, 2005. The weather conditions for June 2004 investigations were warm and sunny; October 2004, overcast and mild; November 2004, rainy with no snow cover and February 2005, warm and sunny with no snow cover. In 2008, detailed engineering studies refined the project alternatives. As a result, Michael Baker Jr., Inc., conducted additional field investigations of the current study area for the remaining feasible alternatives on October 22 and 23, 2008. The weather conditions for the October 2008 investigations were warm and sunny. The aquatic, terrestrial, and wetland habitats, as well as endangered species were initially examined according to the procedures identified in the Ohio Department of Transportation (ODOT), *Ecological Manual, 2004.* ODOT has since released the revised Ecological Manual (2005) which was reviewed prior to completion of this report to ensure compliance with up to date procedures. Secondary source information was reviewed prior to the field visit. The USGS topographic map (Figure 1); the Lake County Soil Survey map (Figure 2); the National Wetland Inventory map (Figure 3); and study area aerial photograph (Figure 4) were reviewed.

3.1 Aquatic Resources Methodology

The aquatic resources assessment consisted of physical, chemical, and biological habitat evaluations of all streams located within the study area. Data was collected for streams using the applicable Ohio EPA form, either the QHEI form, or the HHEI form (version 1.0). According to Ohio EPA guidance documents, any surface water with a drainage area of greater than 1.0 square mile, or water pools with maximum depths over 40 centimeters should be evaluated using the QHEI form, otherwise the HHEI form is applicable (Ohio EPA, 2002).

Stream Habitats

The physical assessment consisted of a visual inspection of any streams and riparian corridors within the study area. An HHEI form was used to score the physical habitat features of any primary headwater streams within the project area. Data was collected for those areas using the applicable Ohio EPA form and in accordance with Ohio EPA, guidance documents (Ohio EPA, 2002). Those areas identified as dry swales in agricultural fields or mowed highway rights-of-ways as well as drainageways without a well-defined bed and bank morphology were not considered for further investigation.

Water Chemistry

Chemical characteristics were examined to determine water quality of possible impacted streams. Water chemistry parameters measured included water temperature, pH, dissolved oxygen, and conductivity. These parameters were measured in the field using

an YSI 556 Multi-Probe System (MPS) prior to the biological investigation and according to the updated ODOT *Ecological Manual* (2005).

Biological Sampling

The HHEI is used to determine the status of smaller streams as one of three classes of Primary Headwater Habitats (PHWH). Class I streams offer limited aquatic habitat (namely, ephemeral streams). Class II streams offer seasonal aquatic habitat for pioneering species of fish, salamander, and benthic macroinvertebrates (warm-water adapted native fauna community). Class III streams offer substantial benthic macroinvertebrate, fish and amphibian habitat often associated with cold water adapted species of headwater fish and/or obligate aquatic species of salamanders (cool-cold water adapted native fauna community). The HHEI method scores streams on a range of 0 to 100 based on physical characteristics. Generally, scores of less than 30 indicate a Class I PHWH, scores 30 to 50 indicate a Class II PHWH, scores 50 to 70 can be either Class II or Class III depending on substrate composition, and scores 70 or greater indicate a Class III PHWH. However, the presence or absence of certain taxa of macroinvertebrates, salamanders, or fish found in a stream can "overrule" the classification determined through the Ohio EPA scoring flowchart based on habitat score alone. Biological indicators can be the best predictor for appropriately classifying a headwater stream. Therefore, biotic evaluations, primarily the Headwater Macroinvertebrate Field Evaluation Index (HMFEI) were utilized on Stream 2 where the ecologist felt the stream may have been over scored during the habitat characterization method or assigned a higher provisional use designation. It is known that the HHEI is designed to over score a stream or err on the high side, thus placing it in a higher class. All streams identified as Class III Primary Headwater Habitat streams were verified with either an HMFEI score of at least 20 or observations of Class III PHWH vertebrate species. QHEI, HHEI, and HMFEI field data sheets can be found in Appendix B.

3.2 Terrestrial Resources Methodology

Vegetative Communities

The county soil survey, topographic maps, and aerial photography were examined to identify probable vegetative communities within the project area prior to the field study. The terrestrial field survey described vegetative habitat types present in the study area. In each community, the dominant plant species in each applicable vegetative stratum were distinguished and quality of vegetation type was established. Habitat boundaries were determined and digitized into base mapping. The terrestrial habitat acreage (the area of each habitat type within the study area) was then calculated.

Terrestrial Vertebrates

Literature concerning distribution patterns and habitat preferences of Ohio's mammals, birds, reptiles, and amphibians was reviewed prior to field study. A listing of anticipated animals was created to alert field workers of possible observations. Animals were identified by direct sightings or secondary signs including, calls, carcasses, skeletal remains, tracks, and scat.

3.3 Wetland Resources Methodology

Wetland Determination

Wetlands within the study area were identified and their boundaries were determined using the procedures outlined in the *Corps of Engineers Wetlands Delineation Manual* (*1987 Manual*) (Environmental Laboratory, 1987). Initial suspect wetlands were identified using the off-site method, which consisted of examining aerial photos and soils, topographic, and National Wetlands Inventory (NWI) maps.

Fieldwork for the wetlands determination took place on October 19, 2004 and November 3, 10, 2004. In the field, each suspect wetland was visited and the plant community assessment procedure of the routine onsite determination method of the 1987 Manual was used. Baker visually verified the presence and limits of previously identified wetlands during field investigations conducted on October 22 and 23, 2008. Additionally, any new or additional wetland resources located within the current study area were evaluated using the methodologies detailed below.

Soils were examined using a 2-inch-diameter soil auger to extract cores or a tile spade to dig soil pits exposing soil profiles. These cores and/or exposed soil profiles were examined for hydric soil characteristics just below the A-horizon, usually between eight and 18 inches below the ground surface. The *Munsell Soil Color Chart* (GretagMacbeth, 2000) was used to determine the hue, value, and chroma of the soil matrix and mottle. Generally, mottled soils with a matrix chroma of two or less or unmottled soils with a matrix chroma of one or less are considered to exhibit hydric soil characteristics (Environmental Laboratory, 1987). Mottled soils with a matrix chroma greater than two and unmottled soils with a matrix chroma greater than one are considered to exhibit non-hydric characteristics.

Signs of hydrology were sought, including primary signs such as standing water or saturated soils, and secondary signs such as water marks on trees, drift lines, sediment deposits, wetland drainage patterns, oxidized root zones within the upper 12 inches, and water-stained leaves.

Dominant vegetation for each community was determined using a variant of the transect approach of the intermediate method (per ODOT) outlined in the 1989 Federal Manual for Identifying and Delineating Jurisdictional Wetlands (FICWD, 1989). In this procedure, representative observation areas within each plant community were selected that best represented characteristics of the entire community. Vegetation data for the tree, sapling, shrub, and woody vine strata were gathered from a 30-foot radius circle plot. Vegetation data for the herb stratum, although normally gathered from a 5-foot radius circle plot, was gathered from the same 30-foot plot due to sparseness in the herb layer of some communities. Dominant species for each stratum were determined by estimating and recording aerial percent cover of each species present. These species were then ranked in descending order of abundance and cumulatively totaled until 50 percent of the total dominance measure was immediately exceeded. Any species whose aerial

percent cover exceeded 20 percent of the total dominance measure was also considered dominant for that stratum.

The indicator status of each dominant species was then determined. An indicator status of OBL, FACW, FAC, FACU, or UPL has been assigned to each plant species on the National List of Plant Species that Occur in Wetlands: Ohio (Reed, 1988). The three facultative categories are subdivided by (+) and (-) modifiers. An area has hydrophytic vegetation when, under normal circumstances, more than 50 percent of the composition of the dominant species from all strata are obligate wetland (OBL), facultative wetland (FACW), and/or facultative (FAC) (excluding FAC-) species (Environmental Laboratory, 1987). An area has non-hydrophytic vegetation when 50 percent or more of the composition of the dominant species from all strata are facultative minus (FAC-), facultative upland (FACU) and/or upland (UPL) species.

In addition, a FAC-neutral test was run on each plot data set. This test considers all FAC species (including FAC- and FAC+) as neutral and compares the number of dominant species wetter than FAC (*i.e*. OBL, FACW) against the number of dominant species drier than FAC (FACU, UPL). Hydrophytic vegetation is confirmed when considered species wetter than FAC outnumber considered species drier than FAC.

Plots, and consequently communities, that met the three criteria of hydric soils, wetland hydrology, and hydrophytic vegetation were identified as wetlands. Photographs were taken of most wetlands. Wetland boundaries were placed where one or more of these criteria gave way to upland characteristics. Plots were also conducted and documented in nearby upland areas for purposes of comparison.

For the purposes of mapping, the wetland boundaries were identified through the use of mapping grade Differential Global Positioning System (DGPS). The collected data were post-processed for maximum accuracy, entered into a GIS, and overlaid on digital basemapping for analysis.

Ohio Rapid Assessment Method

To assess the function and quality of all wetlands within the study area, the Ohio Rapid Assessment Method for Wetlands (ORAM) version 5.0 by the Ohio EPA was utilized (Mack, 2001). Ohio EPA has developed a method for the categorization of wetlands based on the quantification of certain criteria, which imposes differing levels of regulation. Those wetland categories are defined as 1, 2, and 3 and correspond to wetlands of low, medium, and high “quality” as per the ORAM v. 5.0. Following Ohio EPA guidance, scoring sheets for individual wetlands within the study area were completed by detailed field observations and were used as the basis for provisional wetland categorizations.

Determination of Adjacency

A United States Supreme Court ruling in 2001, found that while the United States Army Corps of Engineers (Corps) does have jurisdiction over wetlands that are considered adjacent (hydrologically connected) to a “water of the U.S.,” it does not have jurisdiction

over isolated wetlands (SWANCC *v*. USACE, *et al*., 2001). In response to this decision, the Ohio General Assembly (2001) enacted a bill that gives the Ohio EPA authority to regulate and permit impacts to isolated wetlands. Therefore, in an attempt to establish the level of jurisdictional authority, the hydrology of each wetland within the study area was evaluated to define whether individual wetlands should be considered adjacent or isolated.

As of the time of the field work, the U.S. Supreme Court's Decision in Rapanos v. United States & Carabell v. United States had not been issued. Thus, the isolated / non-isolated determinations were made based on the guidance regarding the Supreme Court's decision in Solid Waste Agency of Northern Cook County (SWANCC) v. United States Army Corps of Engineers, 531 U.S. 159 (2001). The main criterion used in this determination was whether the wetland had a surface water (including intermittent or ephemeral) connection to a broad tributary system, considered "Waters of the U.S." Under Section 404 of the federal Clean Water Act, any wetland adjacent to an upstream tributary system is considered jurisdictional by the Corps and thus regulated by both the Corps and the Ohio EPA. Wetlands that meet the three-wetland criteria as per the *1987 Manual*, but are considered as not having a connection to other "Waters of the U.S." are classified as non-adjacent or isolated and thus fall under the jurisdiction of the Ohio EPA only.

Jurisdictional Ditches

All ditches within the study area have been investigated to determine the presence of any of the criteria listed in the *Standard Operating Procedures for the Regulatory Program* (U.S. Army Corps of Engineers, 1999). Ditches considered to meet the criteria of jurisdictional ditch were identified on project mapping, whereas ditches that did not meet any of the required criteria were not included in this report.

In order for a ditch to be considered jurisdictional, one or more of the following criteria would have to be met:

- All three wetland criteria are present and it is no longer confined to the designed configuration of the constructed ditch;
- If the roadside ditch was constructed through a wetland;
- If the roadside ditch was constructed through upland and connects two "Waters of the U.S.";
- Ditches that appeared to be cut through hydric soils (as listed in the soil survey);
- Ditches that are a channelized or captured stream;
- Ditches that connect two "Waters of the U.S.", and possess a defined ordinary high water mark (OHWM), and a defined channel with evidence of stream flow;
- Ditches constructed in such a way to extend the OHWM of a Section 10 navigable water;
- Ditches excavated through a "Water of the U.S." and ditches constructed in a "Water of the U.S."

Ditches that did not meet any of these required criteria are considered ditches through uplands and are not regulated (non-jurisdictional) and therefore excluded from discussion in this report.

Baker evaluated the ditches located within the project area to determine their potential for jurisdictional status. Ditches considered to meet the criteria of jurisdictional ditch were identified on project mapping, whereas ditches that did not meet any of the required criteria were not included in this report.

In order for a ditch to be considered jurisdictional, the following questions were assessed and if questions 1 or 4 were answered yes then it was considered jurisdictional:

1) Does the ditch possess relatively permanent water flow?
2) What were the baseline conditions before the ditches were constructed?
3) Why were the ditches constructed?
4) Does the ditch drain wetlands?
5) Approximately when were the ditches constructed?
6) When was the ditch maintained last?

3.4 Endangered Species Methodology

The Ohio Department of Natural Resources (ODNR) Division of Natural Areas and Preserves (DNAP) were contacted for records of occurrences of endangered, threatened, or potentially threatened species and features within the study area. DNAP's *Ohio Natural Heritage Data Base, Lake County, Rare Plant Species (2008 status list)* was also reviewed for possible occurrences of endangered, threatened, or potentially threatened species and features within the county.

The U.S. Fish and Wildlife Service's (USFWS) *County Distribution of Federally-Listed Threatened, Endangered, Proposed, and Candidate Species* was reviewed for potential occurrences of endangered plant and animal species, or designated critical habitats within the study area. A listing, based on species' preferred habitat, was generated to alert biologists to species on which special emphasis should be placed.

Prior investigations adjacent to the study area have confirmed the presence of endangered and / or threatened mussel species in the Grand River. Baker conducted a preliminary mussel survey within the project area per ODOT's direction. Methods used to assess the mussel taxa within the project area included reviewing previous surveys and conducting a reconnaissance level survey within the study area. The reconnaissance survey employed qualitative methods including visual and hand searches along the shoreline of proposed impacted waters. Empty shells from different mussel species were collected and identified in the lab.

An Indiana bat habitat analysis will be conducted by the ODOT Office of Environmental Services to determine the potential roost or maternity colony trees within the study area. The trees will be identified, marked, and mapped by ODOT Office of Environmental Services, and will be included as an addendum to this report.

4.0 SITE DESCRIPTION

4.1 Physiography

Lake County occupies two physiographic provinces: the Glaciated Allegheny Plateau of the Appalachian Plateaus province in the south and the Eastern Lake Section of the Central Lowland province in the north. The line between the two provinces is the Portage Escarpment which crosses the county roughly in a northeast-southwest line. The Chagrin and Grand Rivers and Arcola Creek drain Lake County into the Great Lakes Basin. (SCS, 1991).

4.2 Topography and Drainage

The topography of the study area is severely steep to gently rolling with flat river terraces. The maximum relief is 80 feet from north to south along the study area (Figure 1).

There are 15 distinct subwatershed areas in Lake County. The study area lies within one distinct subwatersheds (Natural Resources Conservation Service, 1998). Drainage of the study area occurs by way of overland flow, drainage ditches and an unnamed stream. The study area drains into the Grand River. This segment of the Grand River has a drainage area of over 552 square miles. Drainage of the study area continues 14.0 river miles northwest off site into Lake Erie (Figure 1).

4.3 Soils

The project area is mapped as occurring in three soil associations. The dominant soil association is Tioga-Euclid-Orrville. This association consists of nearly level, well drained and somewhat poorly drained soils that formed in alluvial deposits; on flood plains and terraces. The Platea-Pierpont association consists of nearly level to moderately steep, somewhat poorly drained and moderately well drained soils that formed in silty or loamy glacial till; on till plains. The Conneaut-Painesville association consists of nearly level and gently sloping, poorly drained and somewhat poorly drained soils that formed in silty glacial till or loamy material over silty glacial till; on the lake plain (Soil Conservation Service, 1979).

The Soil Survey of Lake County, Ohio (1979) maps eleven soil types as occurring in the study area (Figure 2). Only one soil type within the study area is listed as hydric and is described in detail below (Soil Conservation Service, 1998).

***Conneaut silt loam, 0 to 1 percent slopes* (CtA)** is a deep, level, poorly drained soil and is the dominant soil type found on the lake plain. Permeability is slow, and available water capacity is high. The depth to the seasonal high water table is 0 to 1 foot (Soil

Conservation Service, 1979). This soil is listed as hydric for Lake County (Soil Conservation Service, 1998).

One soil type within our study area is listed as non-hydric with hydric inclusions and is described in detail below (Soil Conservation Service, 1998).

Red Hook sandy loam, 0 to 2 percent slopes **(RhA)** is a deep, nearly level, somewhat poorly drained soil found on low beach ridges and offshore bars on the lake plain. Permeability is moderate or moderately slow with a moderate available water capacity. Runoff is slow with a depth to the seasonal high water table at 0.5 to 1.5 foot (Soil Conservation Service, 1979). This soil is listed as non-hydric with hydric inclusions for Lake County (Soil Conservation Service, 1998).

The remaining nine soil types are not listed as hydric soils or non-hydric soils with hydric inclusions and are described in detail below (Soil Conservation Service, 1998).

Conotton gravelly loam, 2 to 6 percent slopes **(CyB)** is deep, gently sloping, somewhat excessively drained soil found on the upper part of sides and crests of postglacial beach ridges. Permeability is rapid and available water capacity is low. Runoff is slow or medium. The depth to the seasonal high water table is greater than 6.0 feet (Soil Conservation Service, 1979).

Darien silt loam, 1 to 4 percent slopes **(DaB)** is a deep nearly level and gently sloping, somewhat poorly drained soil found on slightly convex side slopes. Permeability is slow with a moderate available water capacity. Runoff is slow or medium. The depth to the seasonal high water table is 0.5 to 1.5 feet (Soil Conservation Service, 1979).

Darien silt loam, 6 to 12 percent slopes **(DaC)** is a deep sloping, somewhat poorly drained soil found on hillsides and side slopes parallel to drainageways . Permeability is slow with a moderate available water capacity. Runoff is medium. The depth to the seasonal high water table is 0.5 to 1.5 feet (Soil Conservation Service, 1979).

Ellsworth silt loam, 6 to 12 percent slopes **(ElC)** is a deep, sloping, moderately well drained soil found on hillsides and side slopes parallel to drainageways. Permeability is slow or very slow with a moderate available water capacity. Runoff is rapid. The depth to the seasonal high water table is 1.5 to 3.0 feet (Soil Conservation Service, 1979).

Gosport silty clay loam, 25 to 75 percent slopes **(GoF)** is a moderately deep, well drained very steep soil found on dissected areas along streams. Permeability is slow, with a low available water capacity. Runoff is very rapid. The depth to the seasonal high water table is greater than 6.0 feet (Soil Conservation Service, 1979).

Lobdell silt loam, 0 to 2 percent slopes **(Lb)** is a deep nearly level, moderately well drained soil found on flood plains and is subject to flooding. Permeability is moderate or moderately rapid with a high available water capacity. Runoff is slow. The depth to the seasonal high water table is 1.0 to 3.0 feet (Soil Conservation Service, 1979).

***Otisville gravelly loamy sand, 1 to 6 percent slopes* (OtB)** is a deep nearly level and gently sloping, excessively drained soil found on the upper part of sides and crests of postglacial beach ridges. Permeability is rapid, and runoff is slow. Available water capacity is very low. The depth to the seasonal high water table is greater than 6.0 feet (Soil Conservation Service, 1979).

***Pierpont silt loam, 6 to 12 percent slopes, moderately eroded* (PeC2)** is a deep, sloping, moderately well drained soil found on hillsides and side slopes parallel to drainage ways. A perched seasonal high water table is on the slowly or very slowly permeable fragipan in winter, spring, and other extended wet periods. Runoff is rapid with a low available water capacity (Soil Conservation Service, 1979).

***Tioga loam* (Tg)** is a deep nearly level, well drained soil found on flood plains and is subject to flooding. Permeability is moderate or moderately rapid with a moderate available water capacity. Runoff is slow. The depth to the seasonal high water table is 3.0 to 6.0 feet (Soil Conservation Service, 1979).

4.4 Land Use

Residential is the primary land use for Lake County. The land use within and adjacent to the study area consist of agricultural, residential/commercial/disturbed and mixed deciduous forest. The dominant land use of the study area is mixed deciduous forest, primarily comprised of public parkland owned by the Lake Metro Parks.

5.0 ECOLOGICAL RESOURCES RESULTS

5.1 Aquatic Resources Results

Literature Review

The study area is drained by the Grand River, which flows west along the northern portion of the study area (Figure 1, Appendix A). The Grand River flows northwest 14.0 river miles from the study area to Lake Erie. The study area is located in the water body segment of the Grand River that starts at Harpersfield dam, and extends to the Norfolk and Western railroad trestle south of Painesville. This reach of the river has a designation of Grand State Wild River. This segment of the Grand River is designated as a state resource water (SRW) and seasonal salmonid habitat (SSH), based on the 1978 water quality standards (Ohio EPA, 2003). Based on the results of a biological field assessment performed by the Ohio EPA this segment of the Grand River is also designated as an exceptional warmwater habitat (EWH), agricultural water supply (AWS), industrial water supply (IWS), and a primary contact recreation stream (PCR) (Ohio EPA, 2003).

Field Survey

Three streams were identified within this project area. Each stream identified within the study area was assigned a stream name; the Grand River is referred to as Stream 1, an unnamed tributary to the Grand River is referred to as Stream 2, and a second unnamed tributary to the Grand River is referred to as Stream 3 in this report. Water chemistry parameters determined in the field were only performed on streams which exhibited flow during the field investigations. These streams are listed in Table 1. QHEI and HHEI field data sheets can be found in Appendix B and color photographs can be found in Appendix F. Identified aquatic resources are depicted in Figure 7.

Stream 1 (Grand River)

Stream 1, the Grand River, runs along the northwestern portion of the study area (Figure 7). Within the study area, this stream segment is approximately 649 linear feet long with an average width of 170 feet. The Grand River has a drainage area greater than 552 square miles with a gradient of 10 feet per mile. The Grand River had a QHEI score of 76 utilizing the latest version of the QHEI (Table 1 & Appendix B). The substrate of the Grand River within the study area is comprised of gravel, cobble, boulder and silt with gravel and cobble being the dominant substrates. This stream segment has sparse instream vegetative cover (Photo 1). The high QHEI score of this stream is consistent with the EWH aquatic life use designation from the Ohio EPA (Ohio EPA, 2003).

Table 1- Streams within the LAK-CR 277 Study Area

Stream ID	Stream Name	HHEI / QHEI	Score	Provisional Classification / Aquatic Life Use Designation*	Drainage Area mi^2	Linear Feet of Stream within Study Area	PHWH Biological Evaluation Performed ?	Fish Observed?	Salamanders Observed? Larvae or Juv/Adult or both	HMFEI score	Temp °C	DO mg/l	pH	Conductivity µmhos/cm	Photo #	Comments
1	Grand River	QHEI	76	EWH*	522	649	No	Yes	No		5.84	27.0	7.61	0.312	1	Average pool depth 65cm
2	UT to Grand River	HHEI	63	Class I	<0.50	1,032	Yes	No	No	4	12.71	27.9	7.52	0.943	5	Very small drainage area in residential area, good substrate but poor aquatic life
3	UT to Grand River	HHEI	27	Class I	<0.50	271	Yes	No	No		10.2	14.65	8	0.900	31	Very small drainage area,
Total Length of Stream within Study Area						1,952										

* Ohio EPA Water Quality Standards reveal that the segments of Grand River within the study area meet the Exceptional Warmwater Habitat (EWH) aquatic life use designation (confirmed with data), and are listed as EWH, SRW, SSH, IWS, AWS, and PCR. Therefore, these are assigned aquatic life use designations, not provisional. The HHEI Classifications are provisional.

Stream 2, (Unnamed Tributary to Grand River. Stream 2 is located in the northeast portion of the study area (Figure 7). This stream is approximately 1,032 linear feet long, has a drainage area of <_0.50 square mile and a moderate to severe gradient within the study area. Stream 2 had a HHEI score of 63 utilizing the latest version of the HHEI (Table 1). The substrate was dominated by gravel and sand (Photo 5). A biotic evaluation was completed to verify that this was a Class III stream as indicated by the higher than anticipated HHEI score and amount of substrate types. The stream was sampled for a total of 30 minutes, which did not reveal the presence of any species of fish or salamanders. In addition, a minimal occurrence of macroinvertebrates scored a 4 on the HMFEI, thus verifying that this stream should more accurately be classified as a provisional Class I PHWH stream.

Stream 3, (Unnamed Tributary to Grand River) is located in the southern portion of the study area (Figure 7). This stream is approximately 3,595 linear feet long and has a drainage area of approximately 46 acres. Approximately 271 linear feet of Stream 3 is located within the study area. Stream gradient within the study area is relatively flat (approximately 2 percent). Stream 3 had a HHEI score of 27 utilizing the latest version of the HHEI. The substrate was dominated by silt and sand. This stream segment is classified as a provisional Class I PHWH stream. Water temperature, pH, conductivity, and dissolved oxygen at this site were within acceptable ranges for Warm Water habitats.

Streams listed in the Water Quality Standards with an assigned aquatic life use designation override any provisional aquatic life use designation determined solely by a QHEI. Therefore, if the QHEI scores of the Grand River as determined during this evaluation indicated something other than EWH, the official aquatic life use designation as listed by the Ohio EPA would override any provisional designation unless the scores were backed up with detailed biological criteria data. The principal biological evaluation tools used by Ohio EPA are the Index of Biotic Integrity (IBI), the Modified Index of Well-Being (MIWB) and the Invertebrate Community Index (ICI). These three indices are based on species richness, trophic composition, diversity, presence of pollution-tolerant individuals or species, abundance of biomass, and the presence of diseased or abnormal organisms. The IBI and the MIWB apply to fish; the ICI applies to macroinvertebrates. Ohio EPA uses the results of sampling reference sites to set minimum criteria index scores for use designations in water quality standards.

October 2008 Preliminary Mussel Survey

Methods used to assess the mussel taxa within the project area included reviewing previous surveys and conducting a reconnaissance level survey within the study area. The reconnaissance survey employed qualitative methods including visual and hand searches along the shoreline of proposed impacted waters. The shoreline and shallow portions of the Grand River within the study area were surveyed on October 23, 2008 by a qualified Baker biologist. Empty shells from different mussel species were collected and identified in the lab following the survey. Ten species were observed during the reconnaissance survey, including the Ohio species of concern round pig-toe (*Pleurobema*

sintoxia) and kidneyshell (*Ptychobranchus fasciolaris*). All mussels observed and collected during the survey were dead. No live mussel beds were identified during the survey. Photos of identified mussels are included in Appendix F.

Mussel species collected along the shoreline during the reconnaissance survey within the study area include:

- Mucket (*Actinonaias ligamentina*)
- Spike (*Elliptio dilatata*)
- Wabash pigtoe (*Fusconaia flava*)
- Eastern lampmussel (*Lampsilis radiata*)
- Fluted shell (*Lasmigona costata*)
- Round hickorynut (*Obovaria subrotunda*)
- Round pig-toe (*Pleurobema sintoxia*) - Ohio Species of Concern
- Pink heelsplitter (*Potamilus alatus*)
- Kidneyshell (*Ptychobranchus fasciolaris*) – Ohio Species of Concern
- Rainbow (*Villosa iris*)

A total of twenty three (23) mussel species have been previously documented near the study area within the Grand River, including Ohio endangered species snuffbox (*Epioblasma triquetra*), Ohio threatened species black sandshell (*Ligumia recta*) and Ohio species of concern wavy-rayed lampmussel (*Lampsilis fasciola*), creek heelsplitter (*Lasmigona compressa*), round pig-toe, kidneyshell, salamander mussel (*Simpsonaias ambigua*) and deertoe (*Truncilla truncata*). Data regarding mussel species within the study area were obtained from two sources: the Ohio Mussel Atlas (Ohio State University, 2008), a database of mussel vouchers from different collection sites; and a study by Huehner (2005) of mussels within the Grand River.

The Ohio Mussel Atlas documents eleven mussel species collected near Vrooman Road Bridge, immediately downstream from Alternative A. These specimens were collected between 1966 and 1987 (Ohio State University, 2008) (Table 1B). Eight species were collected in 1995 from two sites located approximately two and four miles upstream from the project site and are documented in the Ohio Mussel Atlas as well. Huehner (2005) divided the Grand River into four portions, the mouth (river miles 0.5-1.75), wild and scenic (miles 9-30), scenic (miles 31-65) and headwaters (66-99). The project area is located within the wild portion of the river. In 1996, nineteen mussel species were documented by Huehner (2005) within the wild portion of the river (Table 2).

In summary, two special status mussel species, round pig-toe and kidneyshell, were observed during the reconnaissance survey and six additional special status mussel species have been documented near the study area in past independent surveys. No impacts to mussel species are anticipated by the proposed project; assuming no bridge piers or footings are placed below ordinary high water levels of the Grand River, as indicated by current bridge design. Reductions in water quality, due to increases in sedimentation could result during construction activities. However, this is temporary and will be minimized to the fullest extent possible by implementing best management practices (BMPs), as outlined in ODOT's Construction and Material Specifications

Manual (ODOT, 2005). In addition, impacts to mussel species will be minimized and avoided through the preparation and implementation of a Storm Water Pollution Prevention Plan (SWPPP) specifying BMPs.

Table 2- Mussel species observed within and near the project area

Common Name	Scientific Name	1966-1987 vouchers	1995 vouchers	1996 study	2008 survey
Mucket	*Actinonaias ligamentina*	x		x	x
Elktoe	*Alasmidonta marginata*	x			
Threeridge	*Amblema plicata*		x	x	
Spike	*Elliptio dilatata*	x		x	x
Snuffbox	*Epioblasma triquetra**		x		
Wabash pigtoe	*Fusconaia flava*	x		x	x
Plain pocketbook	*Lampsilis cardium*		x	x	
Wavy-rayed lampmussel	*Lampsilis fasciola**	x			
Eastern lampmussel	*Lampsilis radiata*	x		x	x
Creek heelsplitter	*Lasmigona compressa**			x	
Fluted shell	*Lasmigona costata*	x		x	x
Black sandshell	*Ligumia recta**	x		x	
Round hickorynut	*Obovaria subrotunda*		x	x	x
Round pig-toe	*Pleurobema sintoxia**			x	x
Pink heelsplitter	*Potamilus alatus*		x		x
Kidneyshell	*Ptychobranchus fasciolaris**	x		x	x
Giant floater	*Pygandon grandis*		x	x	
Salamander mussel	*Simpsonaias ambigua**			x	
Creeper	*Strophitus undulatus*	x		x	
Lilliput	*Toxolasma parvus*		x	x	
Deertoe	*Truncilla truncata**		x		
Paper pondshell	*Utterbackia imbecillis*			x	
Rainbow	*Villosa iris*	x		x	x

* = special status

5.2 Terrestrial Resources Results

Literature Review

The majority of the land use within and adjacent to the project area is mixed deciduous forest owned by Lake Metro Parks. The identified terrestrial habitats of the project area are mixed deciduous forest, residential/commercial/disturbed and agriculture (Figure 8). The extent and percentage of the each habitat type within the study area is listed in Table 3.

Table 3 - Extent and Percentage of Terrestrial Habitats within the LAK-CR 277 Study Area

Habitat Type	Acres	Percentage of Study Area
Mixed Deciduous Forest	31.61	44.5%
Residential/Commercial/Disturbed	25.93	36.5%
Agricultural	7.92	11.1%
Wetlands*	2.93	4.1%
Steams (Grand River)	2.67	3.8%
Total	**71.06**	**100%**

*Wetlands are listed in this Table for the purposes of comparing land use types within the study area based on 100%.

Field Survey

***Mixed Deciduous Forest*:** The mixed deciduous forest habitat comprises 44.5 percent of the study area and is dominated by upland woody and herbaceous species (Table 3, Figure 8). The tree species included box elder (*Acer negundo*), red maple (*Acer rubrum*), silver maple (*Acer saccharinum*), shag-bark hickory (*Carya ovata*), sugar maple (*Acer saccharum*), white ash (*Fraxinus americana*), green ash (*Fraxinus pennsylvanica*), American sycamore (*Platanus occidentalis*), cottonwood (*Populus deltoides*), black-locust (*Robinia pseudoacacia*), black walnut (*Juglans nigra*), northern red oak (*Quercus rubra*), American elm (*Ulmus americana*), Ohio buckeye (*Aesculus glabra*), red elm (*Ulmus rubra*), tulip-popular (*Liriodendron tulipifera*), and downy hawthorn (*Crataegus mollis*). The scrub/shrub species included burning-bush (*Euonymus atropurpureus)*, privet (*Ligustrum vulgare*), tartarian honeysuckle (*Lonicera tartarica*), witch-hazel (*Hamamelis virginiana*), and hop hornbeam (*Ostrya virginiana*). The vine species included moonseed (*Menispermum canadense*), poison ivy (*Toxicodendron radicans*), summer grape (*Vitis aestivalis*), riverbank grape (*Vitis riparia*), trumpet creeper (*Campsis radicans*), multiflora rose (*Rosa multiflora*), blackberry (*Rubus allegheniensis*), black raspberry (*Rubus occidentalis*), and Virginia creeper (*Parthenocissus quinquefolia*). The herbaceous species included white avens (*Geum canadense*), tall coneflower (*Rudbeckia laciniata*), jumpseed (*Polygonum virginianum*), cocklebur (*Xanthium strumarium*), white hellebore (*Veratum viride*), beaked agrimony (*Agrimonia rostellata*), small-flowered agrimony (*Agrimonia parviflora*), wood sorrel (*Oxalis montana*), coltsfoot (*Tussilago farfara*), black bugbane (*Cimicifuga racemosa*), Michigan lily (*Lilium michiganense*), horse nettle (*Solanum carolinense*), false nettle (*Boehmeria cylindrical*), horehound (*Marrubium vulgare*), spotted touch-me-not (*Impatiens capensis*), wingstem (*Verbesina alternifolia*), sensitive fern (*Onoclea sensibilis*), reed canary grass (*Phalaris arundinacea*), pinkweed (*Polygonum pensylvanicum*), arrow-leaved tearthumb (*Polygonum sagittatum*), ironweed (*Vernonia gigantea*), cinnamon fern (*Osmunda cinnamomea*), garlic mustard (*Alliaria petiolata*), Japanese knotweed (*Polygonum cuspidatum*), beggartick (*Bidens cernua*), path rush (*Juncus tenuis*), dark green bulrush (*Scirpus atrovirens*), New England aster (*Aster novae-angliae*), white snakeroot (*Eupatorium rugosum*), and scouring rush (*Equisetum hyemale*).

***Residential/Commercial/Disturbed*:** The residential/commercial/disturbed habitat comprised 36.5 percent of the project area (Table 3, Figure 8). Impermeable roadway surfaces, regularly maintained lawns, and landscaped areas were common. The vegetated areas consisted primarily of cultivated tree, shrub, and herbaceous plant species commonly used in landscaping. The herbaceous stratum consisted primarily of mown lawns which were dominated by grasses and forbs such as Kentucky bluegrass (*Poa pratensis*), Kentucky fescue (*Festuca arundinacea*), gill-over-the-ground (*Glecoma hederacea*), English plantain (*Plantago lanceolata*), common plantain (*Plantago major*), and common dandelion (*Taraxacum officinale*). The dominant shrub species included burning-bush, privet, tartarian honeysuckle and other common landscape shrubs. The common tree species included white ash, red maple, red oak, and blue spruce (*Picea pungens*).

Agricultural: The agriculture habitat comprised 11.1 percent of the project area (Table 3, Figure 8). Mowed hay fields, cultivated corn fields and landscape nursery fields were common. The mowed hay fields contained a herbaceous stratum consisting of grasses and forbs such as timothy (*Phleum pretense*), green foxtail grass (*Setaria viridis*), gill-over-the-ground, English plantain, common plantain, and common dandelion. The cultivated corn fields contained a herbaceous stratum consisting of field corn (*Zea mays*), green foxtail grass and gill-over-the-ground (Photo 23). The landscape nursery fields contained common landscape trees and shrubs consisting of sweetbay magnolia (*Magnolia virginiana*), burning-bush, privet, tartarian honeysuckle and other common landscape shrubs (Photo 24).

Wildlife Observed: A review was conducted of the literature concerning distribution patterns and habitat preferences of Ohio's mammals, birds, reptiles, and amphibians (ODNR, 2004). A listing of expected animals was created to alert biologists of probable observations. Observed species were recorded during the field investigation. Animals were identified by sightings and secondary signs including calls, tracks, and scat. Table 4 lists the animals observed during field investigations.

Table 4 - Wildlife Observed within the LAK – CR 277 Study Area

Mammals/Scientific Name	**Common Name**	**Observation Type**
Castor canadensis	Beaver	2
Didelphis virginiana	Virginia opossum	2
Marmota monax	Woodchuck	2
Mephitis mephitis	Striped skunk	2
Odocoileus virginianus	White-tailed deer	2
Procyon lotor	Raccoon	2
Sciurus niger	Fox squirrel	1
Sylvilagus floridanus	Eastern cottontail	1
Tamias striatus	Eastern chipmunk	1
Birds/Scientific Name	**Common Name**	**Observation Type**
Bombycilla cedrorum	Cedar waxwing	1
Branta canadensis	Canada goose	1

Mammals/Scientific Name	Common Name	Observation Type
Buteo lineatus	Red-shouldered hawk	1
Contopus virens	Eastern wood-pewee	1
Corvus brachyrhynchos	American crow	1
Cyanocitta cristata	Blue jay	1
Turdus migratorius	American robin	1

1. Direct sightings of species within project area.
2. Secondary observations-carcasses, calls, dens, scat, skeletal remains, or tracks.

5.3 Wetland Resources Results

Literature Review

The National Wetlands Inventory map (NWI) for the Painesville quadrangle was referenced for the study area (Figure 3). The NWI map identified three potential wetland systems within the study area boundaries. These mapped wetland systems did coincide with wetlands actually found on the ground during the field reconnaissance (Figure 9). The NWI maps often show wetlands that no longer exist due to development, farming, etc. and even wetlands that never existed (errors). However, since these wetlands are located on the floodplain of the Grand River and within the boundary of the Lake Metro Parks, it is not surprising that these existing wetlands coincide with the mapped images. The Grand River and the two NWI wetlands are depicted on Figure 3 as the following types (number of each type follows in parenthesis):

- PFO1Y (2) Palustrine forested, broad leaved deciduous, seasonally semipermanent flooded.
- R2OWZ (1) Riverine, lower perennial, open water/unknown bottom, intermittently exposed / permanent (Grand River).

The field investigation did however identify a total of nineteen wetlands (labeled A through N, and 1 through 5) within the study area (Figure 9). All identified wetlands were found to consist of one of the following wetland habitat types per the classification system developed by Cowardin *et al*. (1979) for wetland categorization:

- **Palustrine Forested (PFO) Wetland Habitat** is characterized by woody vegetation that is six meters tall or taller. The species composition includes an overstory of trees, an understory of young trees or shrubs, and a herbaceous layer (Cowardin, *et al*. 1979).
- **Palustrine Scrub-Shrub (PSS) Wetland Habitat** is characterized by woody vegetation less than six meters tall. The species composition includes true shrubs, young trees, and trees or shrubs that are small or stunted due to environmental conditions (Cowardin, *et al*. 1979).
- **Palustrine Emergent (PEM) Wetland Habitat** is characterized by erect, rooted herbaceous hydrophytes, excluding mosses and lichens and

includes a vast array of grasslike plants, true grasses, and broad leaved plants (Cowardin, *et al*. 1979).

Field Survey

During the wetland determination, nineteen potential wetlands were identified within the study area (Figure 9). Wetland habitat descriptions for the identified wetlands (below) list the dominant species in each wetland type by common name, scientific name, and indicator status (Reed, 1988) along with the hydrologic regime, mapped soil type, and approximate wetland acreage. Field data was collected on Routine Data Forms (Appendix C) while ORAM scoring sheets (Appendix D) were used to score and categorize each wetland. The routine data forms provide the field support for the wetland/upland boundary determination.

Table 5 - Summary of Wetland Habitat Types, ORAM Scores, Adjacency, and Area

Wetland Identifier	Figure	Photo #	Wetland Habitat Types [1]	ORAM Score (Category) [2]	Isolated or Adjacent[3]	Total Wetland Area (acre)	Area in study area (acre)
A	9A	7	Palustrine Forested	45 (2)	Adjacent	1.30	1.02
B	9A	8	Palustrine Forested	50.5 (2)	Adjacent	0.03	0.01
C	9A	9	Palustrine Forested	38 (2)	Adjacent	0.11	0.01
D	9A	10	Palustrine Forested	38.5 (2)	Adjacent	0.19	0.13
E	9A	11	Palustrine Forested	40 (2)	Adjacent	0.13	0.06
F	9A	12	Palustrine Emergent	37 (2)	Adjacent	0.05	0.05
G	9A	13	Palustrine Emergent	27 (1)	Adjacent	0.07	0.01
H	9A	14	Palustrine Forested	29 (1)	Adjacent	0.02	0.01
I	9B	15	Palustrine Forested	62 (3)	Adjacent	3.54	0.56
J	9	16	Palustrine Forested	63 (3)	Adjacent	2.91	0.0
K	9B	17	Palustrine Forested	79 (3)	Adjacent	1.32	0.23
L	9B	18	Palustrine Scrub-Shrub	32 (2)	Adjacent	0.03	0.0
M	9B	19	Palustrine Forested	62 (3)	Adjacent	1.25	0.62

Wetland Identifier	Figure	Photo #	Wetland Habitat Types [1]	ORAM Score (Category) [2]	Isolated or Adjacent[3]	Total Wetland Area (acre)	Area in study area (acre)
N	9B	20	Palustrine Emergent	22 (1)	Adjacent	0.04	0.04
1	9A	25	Palustrine Forested	40 (2)	Isolated	0.02	0.02
2	9A	26	Palustrine Emergent	5 (1)	Isolated	0.03	0.03
3	9A	27	Palustrine Scrub-shrub	35 (2)	Isolated	0.03	0.03
4	9B	28	Palustrine Emergent	12 (1)	Isolated	0.04	0.01
5	9B	29	Palustrine Emergent	5 (1)	Adjacent	0.09	0.09
	Total (acres) within study area						2.93

[1] Based on Cowardin, *et al*. (1979) classification system

[2] ORAM version 5.0 utilized for determining wetland category. Scores that fall within the "transitional" zones between two categories are bumped up to the higher category unless proven otherwise with detailed data (Mack, 2001)

[3] Based on SWANCC *v*. USACE, *et al*., 2001

Wetland A is a palustrine forested (PFO) wetland based on the Cowardin (1979) classification system (Table 5). Wetland A is located within the mapped soil type Lobdell silt loam (Lb). The hydrologic regime of this wetland is considered seasonally inundated or saturated. The overall forested wetland area was approximately 1.30 acre in size, of which 1.02 acre was within the study area. This wetland was dominated by American elm (*Ulmus americana*, FACW-) and poison ivy (*Toxicodendron radicans*, FAC). It was determined through the latest version of the ORAM that this wetland was of medium quality, primarily due to the small size, good buffers, and diverse habitat. This wetland scored a 45 on the ORAM, which indicates a provisional Category 2 wetland (Mack, 2001). The 2004 field view identified Wetland A as a non-isolated or adjacent wetland since it has an unbroken hydrologic connection to jurisdictional waters, or is separated from those waters by a berm or similar feature, or it is in reasonably close proximity to jurisdictional water. The location of this wetland can be found in Appendix A (Figure 9A), a color photograph is located in Appendix F (Photo 7), Wetland Determination forms are located in Appendix C, and ORAM forms are located in Appendix D.

Wetland B is a palustrine forested (PFO) wetland based on the Cowardin (1979) classification system (Table 5). Wetland B is located within the mapped soil type Tioga loam (Tg). The hydrologic regime of this wetland is considered seasonally inundated or saturated. The overall palustrine forested wetland area was approximately 0.03 acre in

size, of which 0.01 acre was within the study area. This wetland was dominated by silver maple (*Acer saccharinum*, FACW) and sensitive fern (*Onoclea sensibilis*, FACW). It was determined through the latest version of the ORAM that this wetland was of medium quality, primarily due to the small size, good buffers, and diverse habitat. This wetland scored a 50.5 on the ORAM, which indicates a provisional Category 2 wetland (Mack, 2001). The 2004 field view identified Wetland B as a non-isolated or adjacent wetland since it has an unbroken hydrologic connection to jurisdictional waters, or is separated from those waters by a berm or similar feature, or it is in reasonably close proximity to jurisdictional water. The location of this wetland can be found in Appendix A (Figure 9A), color photographs are located in Appendix F (Photo 8), Wetland Determination forms are located in Appendix C, and ORAM forms are located in Appendix D.

Wetland C is a palustrine forested (PFO) wetland based on the Cowardin (1979) classification system (Table 5). Wetland C is located within the mapped soil type Tioga loam (Tg). The hydrologic regime of this wetland is considered seasonally inundated or saturated. The overall palustrine forested wetland area was approximately 0.11 acre in size, of which 0.01 acre was within the study area. This wetland was dominated by uptight sedge (*Carex stricta*, OBL) and sensitive fern. It was determined through the latest version of the ORAM that this wetland was of medium quality, primarily due to the small size, good buffers, and diverse habitat. This wetland scored a 38 on the ORAM, which indicates a provisional Category 2 wetland (Mack, 2001). However, based on Ohio EPA guidance, ORAM scores that fall between two categories into the transitional zone must be placed in the higher of the two categories. Therefore, this wetland is a provisional Category 2 wetland. The 2004 field view identified Wetland C as a non-isolated or adjacent wetland since it has an unbroken hydrologic connection to jurisdictional waters, or is separated from those waters by a berm or similar feature, or it is in reasonably close proximity to jurisdictional water. The location of this wetland can be found in Appendix A (Figure 9A), color photographs are located in Appendix F (Photo 9), Wetland Determination forms are located in Appendix C, and ORAM forms are located in Appendix D.

Wetland D is located within the mapped soil type Tioga loam (Tg). The hydrologic regime of this wetland is considered seasonally inundated or saturated. Wetland D is a palustrine forested (PFO) wetland based on Cowardin (1979) classification system (Table 5). The overall palustrine forested wetland area was approximately 0.19 acre in size, of which 0.13 acre was within the study area. This wetland was dominated by silver maple and uptight sedge. It was determined through the latest version of the ORAM that this wetland was of medium quality, primarily due to the small size, good buffers, and diverse habitat. This wetland scored a 38.5 on the ORAM, which indicates a provisional Category 2 wetland (Mack, 2001). However, based on Ohio EPA guidance, ORAM scores that fall between two categories into the transitional zone must be placed in the higher of the two categories. Therefore, this wetland is a provisional Category 2 wetland. The 2004 field view identified Wetland D as a non-isolated or adjacent wetland since it has an unbroken hydrologic connection to jurisdictional waters, or is separated from those waters by a berm or similar feature, or it is in reasonably close proximity to jurisdictional water. The location of this wetland can be found in Appendix A (Figure

9A), color photographs are located in Appendix F (Photo 10), Wetland Determination forms are located in Appendix C, and ORAM forms are located in Appendix D.

Wetland E is a palustrine forested (PFO) wetland based on the Cowardin (1979) classification system (Table 5). Wetland E is located within the mapped soil type Tioga loam (Tg). The hydrologic regime of this wetland is considered seasonally inundated or saturated. The overall palustrine forested wetland area was approximately 0.13 acre in size, of which 0.06 acre was within the study area. This wetland was dominated by silver maple and spotted touch-me-not (*Impatiens capensis*, FACW). It was determined through the latest version of the ORAM that this wetland was of medium quality, primarily due to the small size, good buffers, and diverse habitat. This wetland scored a 40 on the ORAM, which indicates a provisional Category 2 wetland (Mack, 2001). However, based on Ohio EPA guidance, ORAM scores that fall between two categories into the transitional zone must be placed in the higher of the two categories. Therefore, this wetland is a provisional Category 2 wetland. The 2004 field view identified Wetland E as a non-isolated or adjacent wetland since it has an unbroken hydrologic connection to jurisdictional waters, or is separated from those waters by a berm or similar feature, or it is in reasonably close proximity to jurisdictional water. The location of this wetland can be found in Appendix A (Figure 9A), color photographs are located in Appendix F (Photo 11), Wetland Determination forms are located in Appendix C, and ORAM forms are located in Appendix D.

Wetland F is a palustrine emergent (PEM) wetland based on the Cowardin (1979) classification system (Table 5). Wetland F is located within the mapped soil type Gosport silty clay loam (GoF). The hydrologic regime of this wetland is considered seasonally inundated or saturated. The overall palustrine emergent wetland area was approximately 0.05 acre in size, and is located entirely within the study area. This wetland was dominated by glossy buckthorn (*Rhamnus frangula*, FAC) and fowl manna grass (*Glyceria striata*, OBL). It was determined through the latest version of the ORAM that this wetland was of medium quality, primarily due to the small size, good buffers, and diverse habitat. This wetland scored a 37 on the ORAM, which indicates a provisional Category 2 wetland (Mack, 2001). However, based on Ohio EPA guidance, ORAM scores that fall between two categories into the transitional zone must be placed in the higher of the two categories. Therefore, this wetland is a provisional Category 2 wetland. The 2004 field view identified Wetland F as a non-isolated or adjacent wetland since it has an unbroken hydrologic connection to jurisdictional waters, or is separated from those waters by a berm or similar feature, or it is in reasonably close proximity to jurisdictional water. The location of this wetland can be found in Appendix A (Figure 9A), color photographs are located in Appendix F (Photo 12), Wetland Determination forms are located in Appendix C, and ORAM forms are located in Appendix D.

Wetland G is a palustrine emergent (PEM) wetland based on the Cowardin (1979) classification system (Table 5). Wetland G is located within the mapped soil type Gosport silty clay loam (GoF). The hydrologic regime of this wetland is considered seasonally inundated or saturated. The overall palustrine emergent wetland area was approximately 0.07 acre in size, of which 0.01 acre was within the study area. This

wetland was dominated by common reed (*Phragmites australis*, FACW) and sensitive fern. It was determined through the latest version of the ORAM that this wetland was of low quality, primarily due to the small size, medium buffers, and minimal habitat. This wetland scored a 27 on the ORAM, which indicates a provisional Category 1 wetland (Mack, 2001). The 2004 field view identified Wetland G as a non-isolated or adjacent wetland since it has an unbroken hydrologic connection to jurisdictional waters, or is separated from those waters by a berm or similar feature, or it is in reasonably close proximity to jurisdictional water. The location of this wetland can be found in Appendix A (Figure 9A), color photographs are located in Appendix F (Photo 13), Wetland Determination forms are located in Appendix C, and ORAM forms are located in Appendix D.

Wetland H is a palustrine forested (PFO) wetland based on the Cowardin (1979) classification system (Table 5). Wetland H is located within the mapped soil type Tioga loam (Tg). The hydrologic regime of this wetland is considered seasonally inundated or saturated. The overall palustrine forested wetland area was approximately 0.02 acre in size, of which 0.01 acre was within the study area. This wetland and was dominated by American hornbeam (*Carpinus caroliniana*, FAC) and sensitive fern. It was determined through the latest version of the ORAM that this wetland was of low quality, primarily due to the small size, medium buffers, and minimal habitat. This wetland scored a 29 on the ORAM, which indicates a provisional Category 1 wetland (Mack, 2001). The 2004 field view identified Wetland H as a non-isolated or adjacent wetland since it has an unbroken hydrologic connection to jurisdictional waters, or is separated from those waters by a berm or similar feature, or it is in reasonably close proximity to jurisdictional water. The location of this wetland can be found in Appendix A (Figure 9A), color photographs are located in Appendix F (Photo 14), Wetland Determination forms are located in Appendix C, and ORAM forms are located in Appendix D.

Wetland I is a palustrine forested (PFO) wetland based on the Cowardin (1979) classification system (Table 5). Wetland I is located within the mapped soil type Tioga loam (Tg). The hydrologic regime of this wetland is considered seasonally inundated or saturated. The overall palustrine forested wetland area was approximately 3.54 acres in size, of which 0.56 acre was within the study area. This wetland was dominated by silver maple and cinnamon fern (*Osmunda cinnamomea*, FACW). It was determined through the latest version of the ORAM that this wetland was of medium to high quality, primarily due to the large size, good buffers, and diverse habitat. This wetland scored a 62 on the ORAM, which indicates a provisional Category 2 or 3 gray zone wetland (Mack, 2001). However, based on guidance from the Ohio EPA, this is a provisional Category 3 wetland unless proven otherwise by detailed data. Wetland I is located within an area identified by the Lake Metro Parks as a Critical Area for mole salamander (*Ambystoma*) habitat protection (Hildebrant, 1995). The 2004 field view identified Wetland I as a non-isolated or adjacent wetland since it has an unbroken hydrologic connection to jurisdictional waters, or is separated from those waters by a berm or similar feature, or it is in reasonably close proximity to jurisdictional water. The location of this wetland can be found in Appendix A (Figure 9B), color photographs are located in

Appendix F (Photo 15), Wetland Determination forms are located in Appendix C, and ORAM forms are located in Appendix D.

Wetland J is a palustrine forested (PFO) wetland based on the Cowardin (1979) classification system (Table 5). Wetland J is located within the mapped soil type Lobdell silt loam complex (Lb). The hydrologic regime of this wetland is considered seasonally inundated or saturated. The overall palustrine forested wetland area was approximately 2.91 acres in size and is located outside the current study area. This wetland was dominated by silver maple and moneywort (*Lysimachia nummularia*, OBL). It was determined through the latest version of the ORAM that this wetland was of medium to high quality, primarily due to the large size, good buffers, and diverse habitat. This wetland scored a 63 on the ORAM, which indicates a provisional Category 2 or 3 gray zone wetland (Mack, 2001). However, based on guidance from the Ohio EPA, this is a Category 3 wetland unless proven otherwise by detailed data. The 2004 field view identified Wetland J as a non-isolated or adjacent wetland since it has an unbroken hydrologic connection to jurisdictional waters, or is separated from those waters by a berm or similar feature, or it is in reasonably close proximity to jurisdictional water. The location of this wetland can be found in Appendix A (Figure 9), color photographs are located in Appendix F (Photo 16), Wetland Determination forms are located in Appendix C, and ORAM forms are located in Appendix D.

Wetland K is a palustrine forested (PFO) wetland based on the Cowardin (1979) classification system (Table 5). Wetland K is located within the mapped soil type Lobdell silt loam complex (Lb). The hydrologic regime of this wetland is considered seasonally inundated or saturated. The overall palustrine forested wetland area was approximately 1.32 acre in size, of which 0.23 acre was within the study area. This wetland was dominated by american elm and sedge species (*Carex sp*.). It was determined through the latest version of the ORAM that this wetland was of high quality, primarily due to the large size, good buffers, and diverse habitat. This wetland scored a 79 on the ORAM, which indicates a provisional Category 3 wetland (Mack, 2001). The 2004 field view identified Wetland K as a non-isolated or adjacent wetland since it has an unbroken hydrologic connection to jurisdictional waters, or is separated from those waters by a berm or similar feature, or it is in reasonably close proximity to jurisdictional water. The location of this wetland can be found in Appendix A (Figure 9B), color photographs are located in Appendix F (Photo 17), Wetland Determination forms are located in Appendix C, and ORAM forms are located in Appendix D.

Wetland L is a palustrine scrub-shrub (PSS) wetland based on the Cowardin (1979) classification system (Table 5). Wetland L is located within the mapped soil type Gosport silty clay loam (GoF). The hydrologic regime of this wetland is considered seasonally inundated or saturated. The overall palustrine scrub-shrub wetland area was approximately 0.03 acre in size, and is not located within the current study area. This wetland was dominated by red-osier dogwood (*Cornus stolonifera*, FACW+) and rice cutgrass (*Leersia oryzoides* OBL). It was determined through the latest version of the ORAM that this wetland was of low to medium quality, primarily due to the small size, narrow buffers, and minimal habitat. This wetland scored a 32 on the ORAM, which

indicates a provisional Category 1 or 2 gray zone wetland (Mack, 2001). However, based on Ohio EPA guidance, ORAM scores that fall between two categories into the transitional zone must be placed in the higher of the two categories. Therefore, this wetland is a provisional Category 2 wetland. The 2004 field view identified Wetland L as a non-isolated or adjacent wetland since it has an unbroken hydrologic connection to jurisdictional waters, or is separated from those waters by a berm or similar feature, or it is in reasonably close proximity to jurisdictional water. The location of this wetland can be found in Appendix A (Figure 9), color photographs are located in Appendix F (Photo 18), Wetland Determination forms are located in Appendix C, and ORAM forms are located in Appendix D.

Wetland M is a palustrine forested (PFO) wetland based on the Cowardin (1979) classification system (Table 5). Wetland M is located within the mapped soil type Tioga loam (Tg). The hydrologic regime of this wetland is considered seasonally inundated or saturated. The overall palustrine forested wetland area was approximately 1.25 acre in size, of which 0.62 acre was within the study area. This wetland was dominated by silver maple, buttonbush (*Cephalanthus occidentalis*, OBL) and cinnamon fern. It was determined through the latest version of the ORAM that this wetland was of medium to high quality, primarily due to the large size, good buffers, and diverse habitat. This wetland scored a 62 on the ORAM, which indicates a provisional Category 2 or 3 gray zone wetland (Mack, 2001). However, based on guidance from the Ohio EPA, this is a provisional Category 3 wetland unless proven otherwise by detailed data. Wetland M is located within an area identified by the Lake Metro Parks as a Critical Area for mole salamander habitat protection (Hildebrant, 1995). The 2004 field view identified Wetland M as a non-isolated or adjacent wetland since it has an unbroken hydrologic connection to jurisdictional waters, or is separated from those waters by a berm or similar feature, or it is in reasonably close proximity to jurisdictional water. The location of this wetland can be found in Appendix A (Figure 9B), color photographs are located in Appendix F (Photo 19), Wetland Determination forms are located in Appendix C, and ORAM forms are located in Appendix D.

Wetland N is located within the mapped soil type Darien silt loam (DaB). The hydrologic regime of this wetland is considered seasonally inundated or saturated. Wetland N is considered to be a palustrine emergent (PEM) wetland based on the Cowardin (1979) classification system (Table 5). The overall palustrine emergent wetland area was approximately 0.04 acre in size, and is located entirely within the study area. This wetland was dominated by fowl manna grass and sensitive fern. It was determined through the latest version of the ORAM that this wetland was of low quality, primarily due to the small size, narrow buffers, and minimal habitat. This wetland scored a 22 on the ORAM, which indicates a provisional Category 1 wetland (Mack, 2001). The 2004 field view identified Wetland N as a non-isolated or adjacent wetland since it has an unbroken hydrologic connection to jurisdictional waters, or is separated from those waters by a berm or similar feature, or it is in reasonably close proximity to jurisdictional water. The location of this wetland can be found in Appendix A (Figure 9B), color photographs are located in Appendix F (Photo 20), Wetland Determination forms are located in Appendix C, and ORAM forms are located in Appendix D.

Wetland 1 (102201 WET01) is a palustrine forested (PFO) wetland based on the Cowardin (1979) classification system (Table 5). This wetland is 0.02 acre in size and is entirely within the study area. It is located within the mapped soil type Gosport silty clay loam (GoF) and has a hydrologic regime of seasonally inundated or saturated. Wetland 1 is an isolated wetland since it does not have a significant nexus (i.e., surface water connection) with a navigable watercourse or a tributary to a navigable water. Vegetation is dominated by common rush (*Juncus effusus*, FACW+), southern arrowwood (*Viburnum dentatum*, FACW-), sensitive fern (*Onoclea sensibilis*, FACW) and red maple (*Acer rubrum*, FAC). This wetland scored a 40 by the ORAM, which indicates a modified Category 2 Wetland (Mack, 2001). The modified Category 2 classification was primarily due to the small size, medium buffers, and good habitat development. The location of this wetland can be found in Appendix A (Figure 9A), color photographs are located in Appendix F (Photo 25), Wetland Determination forms are located in Appendix C, and ORAM forms are located in Appendix D.

Wetland 2 (102202 WET02) is a palustrine emergent (PEM) wetland based on the Cowardin (1979) classification system (Table 5). This wetland is 0.03 acre and is entirely within the existing study area. It is located within the mapped soil type Darien silt loam (DaB) and has a hydrologic regime of seasonally inundated or saturated. The wetland is located immediately adjacent to Vrooman Road and its hydrology is supported by runoff from the roadway and shall be considered an isolated resource since it does not have a significant nexus with a navigable waterway or its tributaries. The wetland vegetation consists of a monotypic stand of common reed (*Phragmites australis*, FACW). It was determined through the latest version of the ORAM that this wetland was of low quality, primarily due to its small size, narrow buffers, and extensive coverage of invasive plants. This wetland scored a 5 by the ORAM which indicates a Category 1 wetland (Mack, 2001). The location of this wetland can be found in Appendix A (Figure 9A), color photographs are located in Appendix F (Photo 26), Wetland Determination forms are located in Appendix C, and ORAM forms are located in Appendix D.

Wetland 3 (102203 WET03) is an isolated palustrine scrub-shrub (PSS) wetland based on the Cowardin (1979) classification system (Table 5). This wetland exhibits no significant nexus with a navigable waterway or its tributaries. This wetland is 0.03 acre in size and is entirely within the existing study area. It is located within the mapped soil type Darien silt loam (DaB) and has a hydrologic regime of seasonally inundated or saturated. Vegetation is dominated by common rush, with associate species including, blackberry (*Rubus allegheniensis*, FACU), small white aster (*Aster vimineus*, FACW), highbush blueberry (*Vaccinium corymbosum*, FACW-), poison ivy (*Toxicodendron radicans*, FAC) and rough-stemmed goldenrod (*Solidago rugosa*, FAC). It was determined through the latest version of the ORAM that this wetland was of medium quality (i.e., modified Category 2), primarily due to its small size and narrow buffers, but good habitat development. This wetland scored a 35 by the ORAM (Mack, 2001). The location of this wetland can be found in Appendix A (Figure 9A), color photographs are located in Appendix F (Photo 27), Wetland Determination forms are located in Appendix C, and ORAM forms are located in Appendix D.

Wetland 4 (102304 WET01) is a palustrine emergent (PEM) wetland based on the Cowardin (1979) classification system (Table 5). This wetland is 0.04 acre in size, of which 0.01 acre was within the study area. It is located within the mapped soil type Conneaut silt loam and has a hydrologic regime of seasonally inundated or saturated. The wetland is adjacent to agricultural cornfields (*Zea mays*). Wetland 4 shall be considered an isolated wetland, since it does not have a significant nexus with a navigable waterway or its tributaries. Vegetation is dominated by needle spikerush (*Eleocharis acicularis*, OBL), barnyard grass (*Echinochloa crus-galli*, FACU), green bulrush (*Scirpus atrovirens*, OBL), yellow foxtail (*Setaria pumila*, FAC) and beaksedge (*Rhynchospora* sp., OBL). It was determined through the latest version of the ORAM that this wetland was of low quality, primarily due to its small size, narrow buffers, and poor habitat development. This wetland scored a 12 by the ORAM, which indicates a Category 1 wetland (Mack, 2001). The location of this wetland can be found in Appendix A (Figure 9B), color photographs are located in Appendix F (Photo 28), Wetland Determination forms are located in Appendix C, and ORAM forms are located in Appendix D.

Wetland 5 (102305 WET02) is a palustrine emergent (PEM) wetland based on the Cowardin (1979) classification system (Table 5). This wetland is 0.09 acre in size and is entirely within the study area. It is located within the mapped soil type Conneaut silt loam and has a hydrologic regime of seasonally inundated or saturated. The wetland is adjacent to agricultural fields dominated by corn. Wetland 5 is considered to be a non-isolated wetland since it is separated from a tributary to a navigable water by a berm. The wetland is immediately adjacent to an unnamed tributary to the Grand River, which has been modified and straightened as it crosses through the agricultural fields within the study area. Vegetation within the wetland is dominated by barnyard grass, green bulrush, and yellow foxtail. It was determined through the latest version of the ORAM that this wetland was of low quality, primarily due to its small size, narrow buffers and extensive coverage of invasive plants. This wetland scored a 5 by the ORAM which indicates a Category 1 wetland (Mack, 2001). The location of this wetland can be found in Appendix A (Figure 9B), color photographs are located in Appendix F (Photo 29), Wetland Determination forms are located in Appendix C, and ORAM forms are located in Appendix D.

Upland Habitat data collection occurred in proximity to all identified wetlands. Upland data forms are included in Appendix C (Data Form UPL). All upland data forms are representative of the adjacent upland habitat and as such do not contain all three wetland indicators (i.e., wetland hydrology, hydric soils characteristics, or hydrophytic vegetation) necessary for wetland classification.

Wetland Categorization

The study area wetlands were assessed utilizing the ORAM (version 5.0) for categorizing wetlands as developed by the Ohio EPA (Mack, 2001). This methodology has been designed to attempt to evaluate wetlands based on quality and function. ORAM scores are typically used to categorize wetlands during the permitting phase, in order to

determine wetland mitigation ratios. Field investigations determined that six wetlands identified were provisional Category 1 wetlands, nine wetlands identified were provisional Category 2 wetlands and four wetlands identified were provisional Category 3 wetlands (Table 5). In general, the scores of most of the wetlands were high due to the land use (Metro Park) surrounding them. The ORAM Data Sheets can be found in Appendix D.

Jurisdictional Ditches

All ditches within the study area have been investigated to determine the presence of any of the criteria listed in the *Standard Operating Procedures for the Regulatory Program* (U.S. Army Corps of Engineers, 1999). It was determined that all of the roadside ditches within the study area did not meet any of the required criteria and therefore are considered non-jurisdictional and excluded from this report. A man made ditch running east to west along the central portion of the study area is located on upland soils, was recently dredged and did not contain evidence of hydric soils, hydrophytic vegetation or hydrology. Therefore, this ditch shall be considered non-jurisdictional.

Two roadside ditches were identified during the October 2008 field investigation. Both of these ditches were located along Vrooman Road, north of the Interstate 90 interchange. Both of these ditches are located within the study area. They did not meet the required criteria and therefore are considered non-jurisdictional and excluded from this report.

5.4 Endangered Species Results

Literature Review

The ODNR Division of Natural Areas and Preserves, Ohio Natural Heritage Database, verified that the Grand River is located within the study area. The Grand River is listed as a “State Scenic and Wild River”. The “Wild” designated section falls within the limits of the study area for this proposed project. It should be noted that the ODNR study area includes the existing project study area and a 1-mile radius from the project study area.

The study area also falls within two Lake County Metro Park Districts: Masons Landing Park, and Indian Point Park. Two additional Lake County Metro Park Districts, Paine Falls Park and Conley Paradise Metropark exist within a one-mile radius of the study area.

A special forest plant community of Hemlock-Hardwood exists within a one-mile radius of the study area. One endangered midge species (*Rheopelopia acra*) was identified within this community.

Five potentially threatened plant species, American chestnut (*Castanea dentata*), straw sedge (*Carex straminea*), round-leaved dogwood (*Cornus rugosa*), rock serviceberry (*Amelanchier sanguinea*), and floating pondweed (*Potamogeton natans*) and two threatened species, the Keeled Bur-reed (*Sparganium androcladum*) and the few-

flowered St. John's–wort (*Hypericum ellipticum*) have a general location within the study area.

There are two breeding animal concentrations (mollusk beds) located outside of the study area. The one mussel bed located upstream of the study area has one endangered species, the snuffbox (*Epioblasma triquetra*), and four species of concern, the round pigtoe (*Pleurobema sintoxia*), the wavy-rayed lampmussel (*Lampsilis fasciola*), the deertoe (*Truncilla truncata*), and the salamander mussel (*Simpsonaias ambigua*) identified within it. Two endangered species, the snuffbox, and a midge (*Rheopelopia acra*); and one species of concern, the salamander mussel, have a known general location within the study area (Appendix E).

The ODNR Division of Natural Areas and Preserves, Ohio Natural Heritage Database, list of Rare Plant Species for Lake County was reviewed for potential occurrences of endangered, threatened, potentially threatened plant species, or plant species of special concern within the study area (ODNR, 2008). Sixty plant species were identified as endangered, threatened, or potentially threatened in Lake County. These species were noted for possible sightings during field investigations (Appendix E).

The U.S. Fish and Wildlife Service names two federally-listed threatened, endangered, proposed, and candidate species for Lake County (USFWS, 2008). Those species include the endangered Indiana bat (*Myotis sodalis*), the endangered piping plover (*Charadrius melodus*) and critical habitat designated for the piping plover.

Field Survey

Field investigations did not reveal the presence of any state listed endangered, threatened, potentially threatened, or other rare plant species as occurring within the study area. Furthermore, no state or federally listed endangered, threatened, species of concern, and special interest living mussels were identified within the study area. However, several dead shells of listed mollusk species were observed within the boundaries of the study area. These species have been documented in this portion of the stream before. The dead shells were observed on a sand bar and were likely washed from an upstream location.

The project is within the known range the state and federally endangered Indiana bat, which is a migratory species that uses distinctly different habitats during summer and winter. In winter, the bats hibernate primarily in a few select mines or caves of which none occurs within the project area. In spring, the females migrate to and inhabit suitable roosting and brooding trees (living or standing dead trees or snags with exfoliating, peeling or loose bark, split trunks and or branches, or cavities) throughout summer. No winter hibernacula for the Indiana bat were found within the study area. The Division of Natural Areas and Preserves has no records of any Indiana bat capture locations or hibernacula within a ten-mile radius of the study area (Appendix E). Trees identified as potential roost and maternity roost trees will be identified, marked, and mapped by ODOT Office of Environmental Services for inclusion as an addendum to this report.

The five potentially threatened plant species, American chestnut, straw sedge, round-leaved dogwood, rock serviceberry and floating pondweed and two threatened species, keeled bur-reed and few-flowered St. John's-wort were not found within the study area during Baker's investigation.

The endangered piping plover and its critical habitat (beaches along shorelines of the Great Lakes) does not exist within or adjacent to the project area and thus no impacts to the plover are anticipated.

6.0 IMPACTS

While the development of the feasible alternatives and alignments has been on-going and refined, final bridge design has not been completed to date. The impacts reported in this section have been generalized and are reported as a "worst case scenario" based on the amount of a particular resource within the 100-foot wide study corridor. The proposed road and bridge replacement project may have direct, indirect, and/or cumulative effects on ecological resources within the study area. Direct impacts are "effects" caused by the action (road and bridge replacement) and occur at the same time and place. While indirect effects are caused by the action and are later in time or farther removed in distance, but are still reasonably foreseeable. Cumulative impacts result from the incremental impact of the action when added to past, present, and reasonably foreseeable future actions (Ohio EPA, 1998). Possible or likely ecological impacts for each resource are further discussed below by alternatives. Impacts were calculated based on a 100-foot wide corridor centered along the current Alternative A and Alternative B alignments. The 100-foot wide corridor is large enough to encompass both the permanent facilities as well as construction activities.

Alternative A involves replacing the existing bridge with a high-level bridge, spanning the Grand River Valley, tying into Madison Avenue. Alternative A will alleviate the deficiencies at the current intersection and will maintain access to Seeley Road.

Alternative B involves replacing the existing bridge with a high-level bridge, spanning the Grand River Valley, tying into Lane Road at State Route 84. This alternative will also maintain access to Seeley Road. It will also include reconfiguration of River Road access to State Route 84; either by redirecting its connection with State Route 84 east of its current location, or by turning River Road into a cul-de-sac and developing a "side road" for access to State Route 84.

6.1 Aquatic Impacts

Direct impacts to the Grand River are not anticipated from the construction of the proposed bridge for either Alternative A or Alternative B, as footings are not to be located within the ordinary high water mark (OHWM) of the river.

Habitat loss is quantified by estimating the length of the proposed stream channel to be piped (i.e., culverted) or from channelization (e.g., straightening). These impacts cause a reduction of aquatic habitat diversity, which is directly proportional to a reduction in fish, and macroinvertebrate species diversity. The length of proposed channelization (in-stream work) also quantifies impacts of this type. These types of impacts may occur on Stream 3 along Vrooman Road resulting in potentially 264 linear stream feet for both Alternative A and Alternative B (Table 6). These types of impacts may also occur on Stream 2 due to the construction of the River Road bypass resulting in an additional 100 linear stream feet of impact for Alternative B (Table 6).

Indirect aquatic impacts will be limited to siltation during periods when soils in a stream's watershed are exposed during construction. These impacts can be limited through installation of temporary erosion protection during construction. To ensure siltation will be minimized to the fullest extent possible, ODOT will adhere to best management practices and their *Construction and Material Specifications Manual* (ODOT, 2005b).

6.2 Terrestrial Impacts

Impacts on terrestrial resources can result from grading, and vegetation removal, as well as the possible invasion of weedy and/or non-native species. Terrestrial impacts are quantified in terms of the aerial extent of habitat degraded or lost.

Alternative A would impact 5.14 acres of mixed deciduous forested habitat and 0.53 acres of residential/commercial/disturbed habitat (Table 6). Areas within this alignment include Masons Landing Park and Indian Point Park; however, these potential impacts will be minimized to the fullest extent possible, bridge construction will adhere to best management practices and the *Construction and Material Secifications Manual* (ODOT, 2005b). Paine Falls Park and the Hemlock-Hardwood forest community are located outside the study area and will not be impacted.

Alternative B would impact 6.93 acres of mixed deciduous forested habitat, 2.77 acres of agricultural habitat, and 3.08 acres of residential/commercial/disturbed habitat (Table 6). Indian Point Park will be traversed by Alternative B within the study area; however, potential impacts will be minimized to the fullest extent possible, bridge construction will adhere to best management practices and the *Construction and Material Secifications Manual* (ODOT, 2005b). Paine Falls Park and the Hemlock-Hardwood forest community is outside the study area and will not be impacted.

6.3 Wetland Impacts

Impacts on wetland resources occur when construction occurs directly in a wetland area or upslope within the wetland's watershed. Direct impacts include the filling or draining of wetlands, or removal of wetland vegetation. Indirect impacts include alterations of hydrology to and from a wetland. Wetland impacts are quantified in terms of aerial extent of wetlands lost. The amount of wetlands within the study area is 2.93 acres and can be viewed on Figure 9. The wetland impacts within the 100-foot wide area centered along the current Alternative A alignment are estimated to be 0.49 acre (Table 6) and can be viewed on Figure 9A. The total amount of wetland impacts within the 100-foot wide area centered along the current Alternative B alignment are estimated to be 0.50 acres (Table 6) and can be viewed on Figure 9B.

Table 6- Summary of Alternative Impacts* (October 2008)

Habitat Type	Alternative A	Alternative B
Stream 1 (Grand River)	-	-
Stream 2	-	100
Stream 3	264	264
Mixed Deciduous Forest	5.14	6.93
Agricultural	0	2.77
Residential/Commercial/ Disturbed	0.53	3.08
Wetland A	0.35	-
Wetland B	-	-
Wetland C	-	-
Wetland D	0.03	-
Wetland E	0.02	-
Wetland F	0.05	-
Wetland G	-	-
Wetland H	-	-
Wetland I	-	0.18
Wetland J	-	-
Wetland K	-	0.02
Wetland L	-	-
Wetland M	-	0.21
Wetland N	-	-
Wetland 1	0.01	-
Wetland 2	-	-
Wetland 3	0.03	-
Wetland 4	-	-
Wetland 5	-	0.09
Total Streams (linear feet)	**264**	**364**
Total Terrestrial (acre)	**5.67**	**12.78**
Total Wetlands (acre)	**0.49**	**0.50**

* Details of the proposed impacts are not available at the time of this writing. The impacts reported in this section have been generalized and are reported as a "worst case scenario" based on the amount of a particular resource within the study area.

6.4 Endangered Species Impacts

No endangered species are anticipated to be impacted by the proposed road and bridge of the Vrooman Road project. However, there are trees within the study area that provide suitable habitat consistent with habitat utilized by the State and Federally endangered Indiana bat that may need to be removed. Alternative A would impact 5.14 acres of forested habitat. Alternative B would impact 6.93 acres of forested habitat. Impacts to the species will be determined by ODOT OES and included as an addendum to this report.

The five potentially threatened plant species, American chestnut, straw sedge, round-leaved dogwood, rock serviceberry and floating pondweed and two threatened species, keeled bur-reed and few-flowered St. John's-wort were not found within the study area during our field investigations, therefore no impacts are anticipated for either Alternative A or Alternative B.

No impacts to mollusk beds, the six Ohio species of concern, (round pig-toe, wavy-rayed lampmussel, kidneyshell, creek heelsplitter, deertoe, and salamander mussel), the Ohio threatened black sandshell or the Ohio endangered snuffbox are anticipated for either Alternative A or Alternative B as bridge footings are not to be located within the Grand River.

The endangered piping plover and critical habitat designated for the piping plover (beaches along shorelines of the Great Lakes) would not be impacted by this project due to the absence of preferred habitat within or adjacent to the study area.

7.0 SUMMARY

- Three streams were identified and sampled within the study area. The study area streams comprise approximately 1,952 linear feet.
- Stream 1, (Grand River) has an official aquatic life use designation of EWH based on detailed studies completed by the Ohio EPA.
- Stream 2, (Unnamed Tributary to Grand River) was considered provisional a Class I PHWH stream based on the low HMFEI score.
- Stream 3, (Unnamed Tributary to Grand River) was considered a provisional Class I PHWH stream based on the low HHEI score.
- According to the Ohio EPA, the portion of Stream 1 (Grand River) within the study area is also listed in the State of Ohio, Water Quality Standards as SRW, SSH, IWS, AWS, and PCR (Ohio EPA, 2003).
- The study area consists of 71.06 acres; of which residential/commercial/disturbed comprises approximately 25.93 acres, agriculture comprises approximately 7.92 acres, wetlands comprises approximately 2.93 acres, open water (Grand River) comprises approximately 2.67 acres and the mixed deciduous forest comprises approximately 31.61 acres.
- Nineteen wetlands comprising 2.93 acres were identified within the study area.
- The wetlands are comprised of the PEM, PSS, and PFO wetland habitat types.
- Six (6) wetlands are considered provisional Category 1 wetlands.
- Nine (9) wetlands are considered provisional Category 2 wetlands.
- Four (4) wetlands are considered provisional Category 3 wetlands.
- Fifteen wetlands are considered to be adjacent wetlands.
- Four wetlands are considered to be isolated.
- Field investigations did not reveal the presence of any state or federally listed endangered, threatened, potentially threatened, or other rare plant species as occurring within the study area.
- No <u>live</u> state or federally listed endangered, threatened, species of concern, special interest, or candidate species were identified within the study area. However, several dead shells of listed mussel species presumed to have washed up on a sandbar from up stream, were identified within the study area.
- The Division of Natural Areas and Preserves has no records of any Indiana bat capture locations or hibernacula within a ten-mile radius of the study area.
- Alternative A would have no impacts to endangered species, however aquatic, terrestrial, and wetland impacts are likely to occur. Culvert installation and possible stream channelization may occur to potentially 264 linear stream feet of Stream 3. The terrestrial impacts would result in 5.14 acres of mixed deciduous forested habitat and 0.53 acres of residential/commercial/disturbed habitat during bridge construction. The wetland impacts within the study area are estimated to be 0.49 acre.
- Alternative B would have no impacts to endangered species, however aquatic, terrestrial, and wetland impacts are likely to occur. Culvert installation and possible stream channelization may occur to potentially 100 linear stream feet of Stream 2 and 264 linear stream feet of Stream 3. The terrestrial impacts would

result in 6.93 acres of mixed deciduous forested habitat, 2.77 acres of agricultural habitat, and 3.06 acres of residential/commercial/disturbed habitat during bridge construction. The wetland impacts within the study area are estimated to be 0.50 acres.

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APPENDIX A
FIGURES

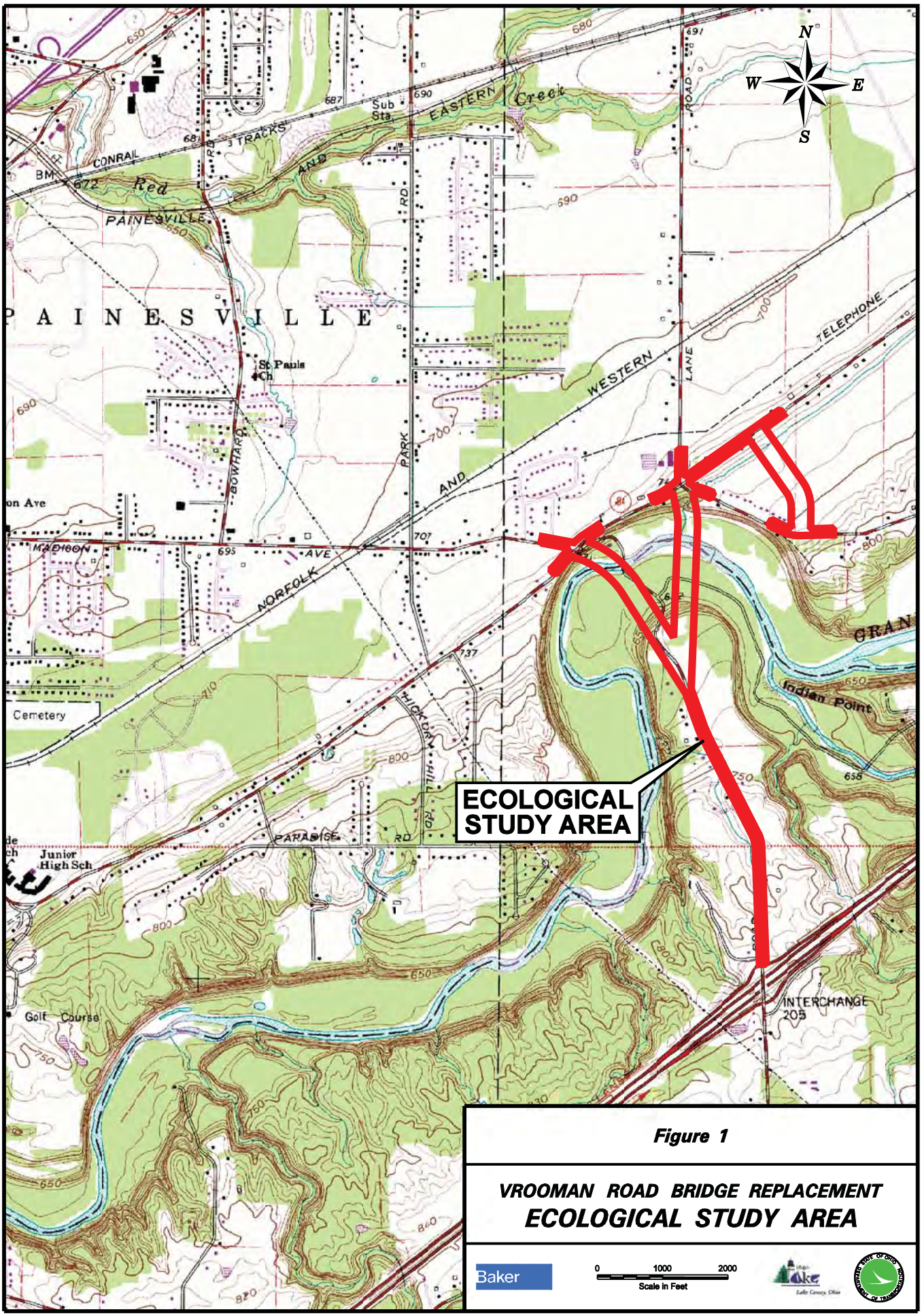

Figure 1

VROOMAN ROAD BRIDGE REPLACEMENT
ECOLOGICAL STUDY AREA

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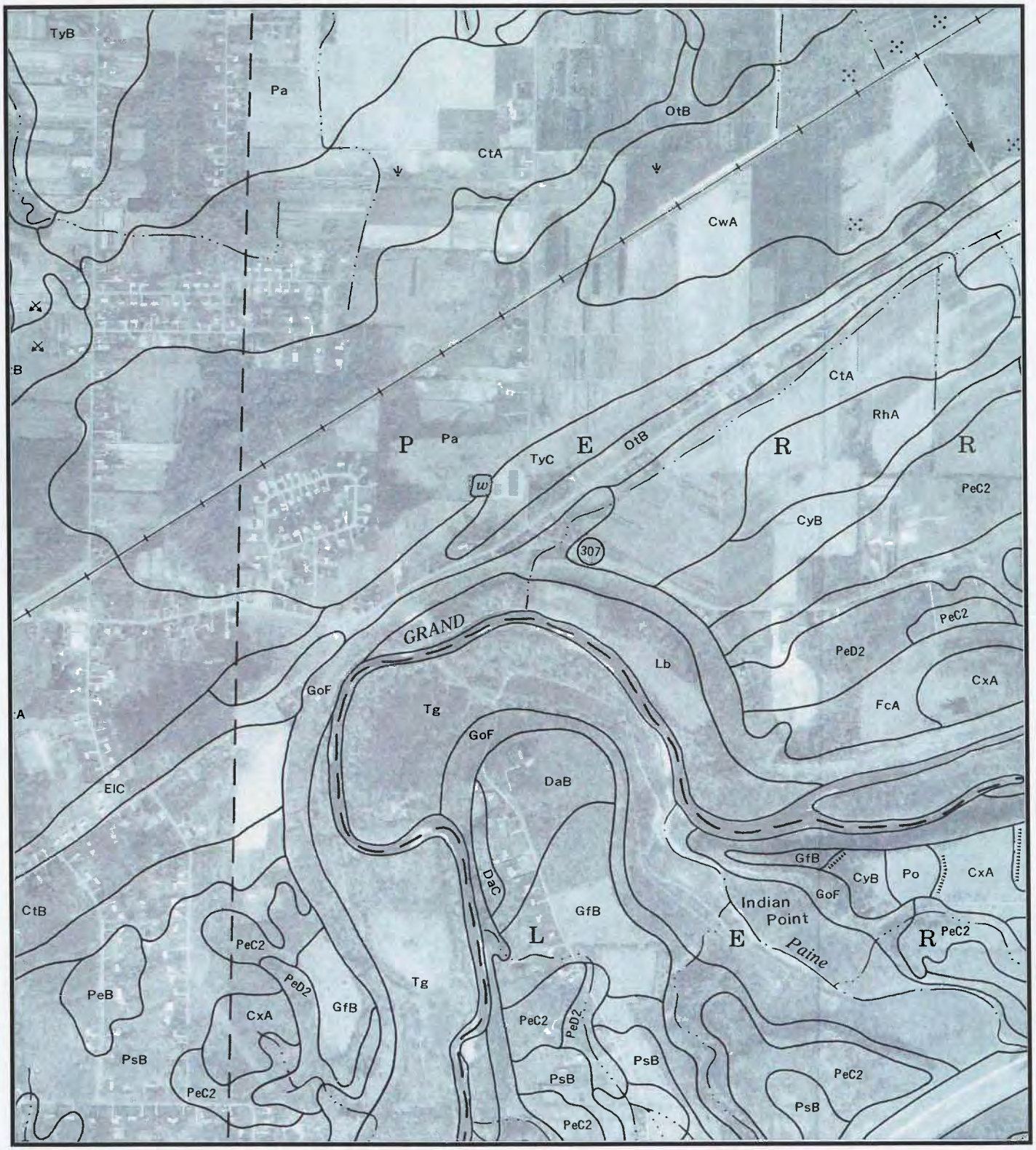

Baker

Michael Baker Jr., Inc.

Figure 2
Vrooman Road Bridge Replacement
Painesville, Lake County, Ohio
Lake County Soils Map

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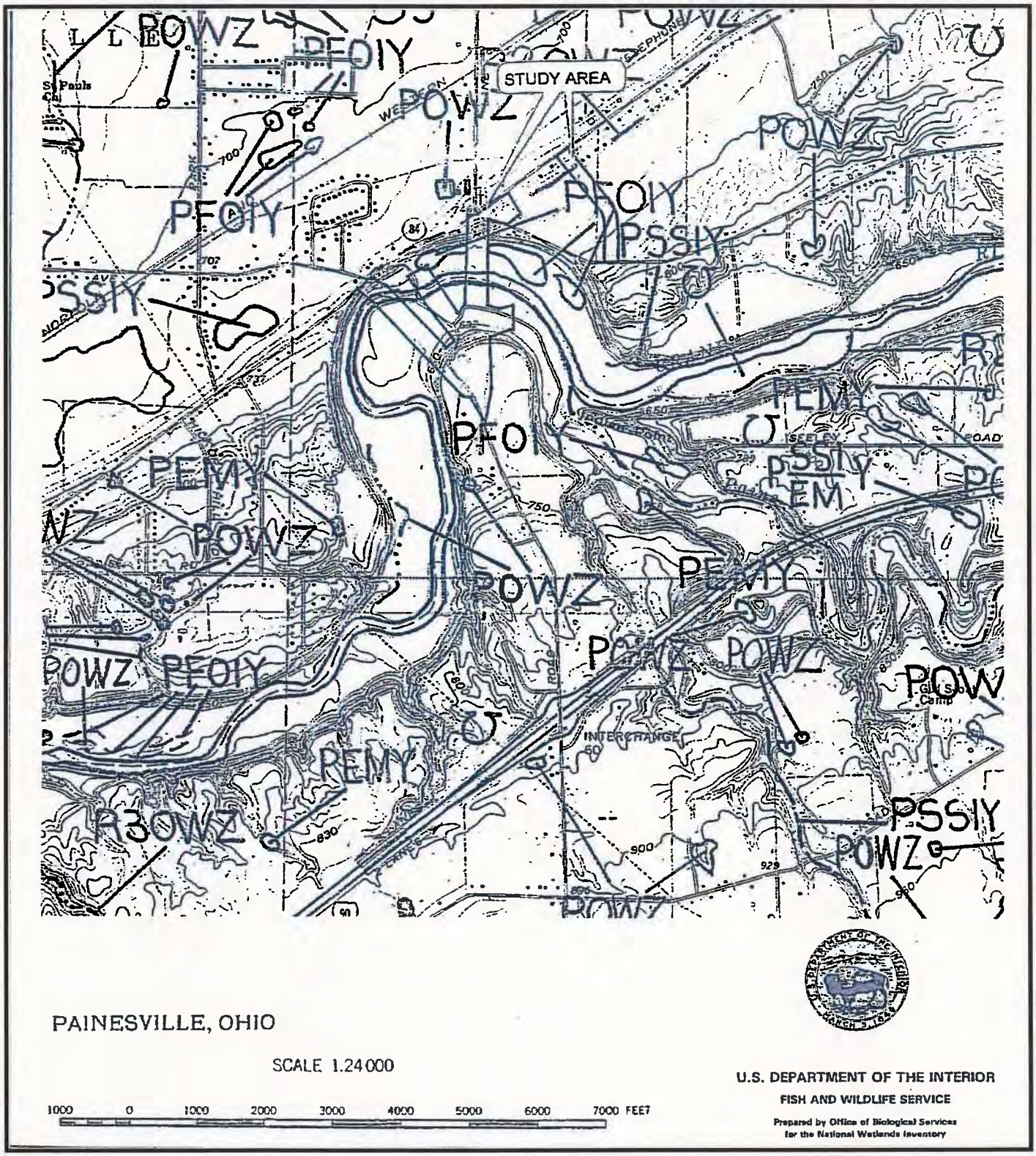

Baker

Michael Baker Jr., Inc.

Figure 3
Vrooman Road Bridge Replacement
Painesville, Lake County, Ohio
National Wetlands Inventory Map

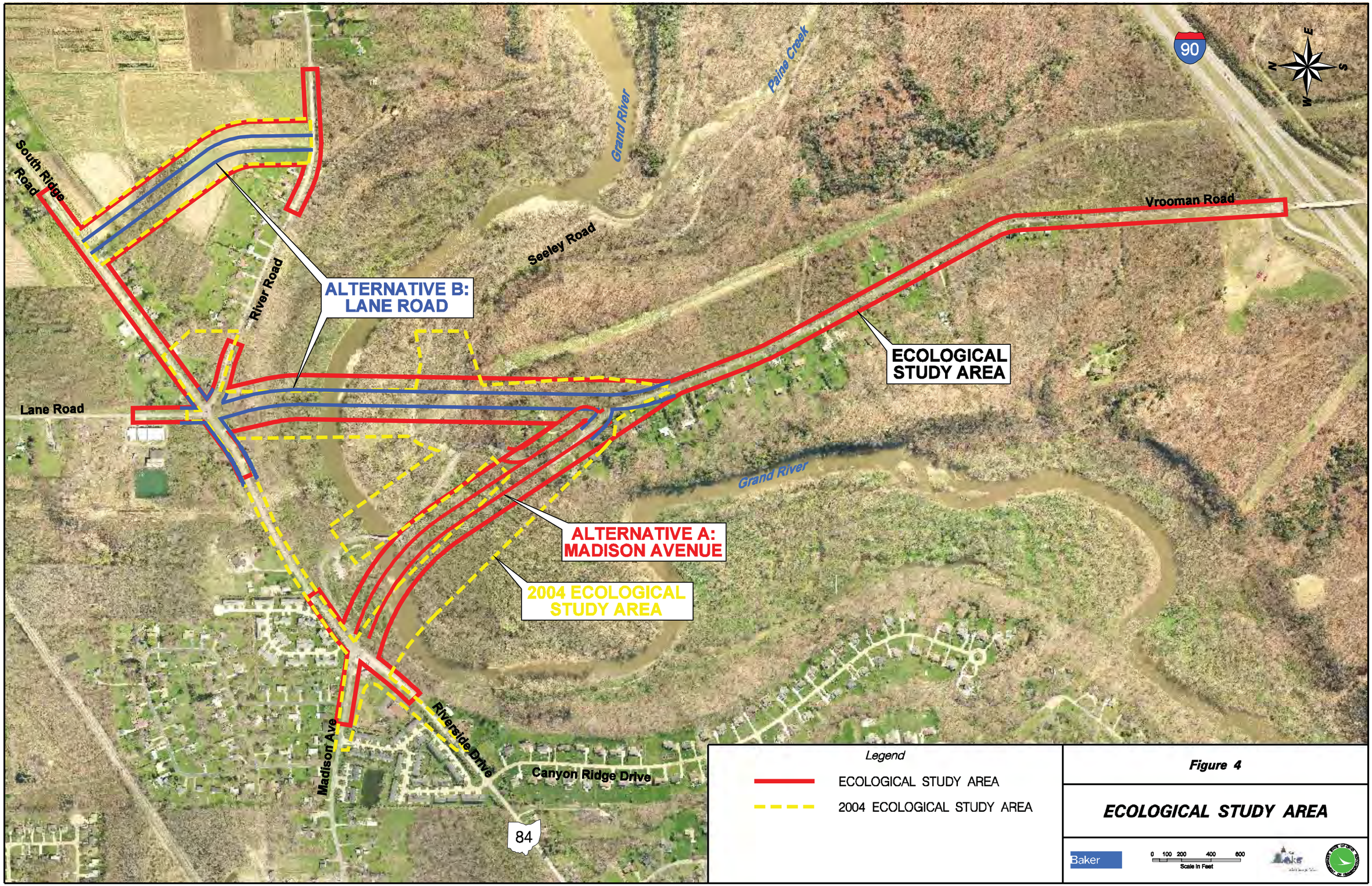

Figure 4

ECOLOGICAL STUDY AREA

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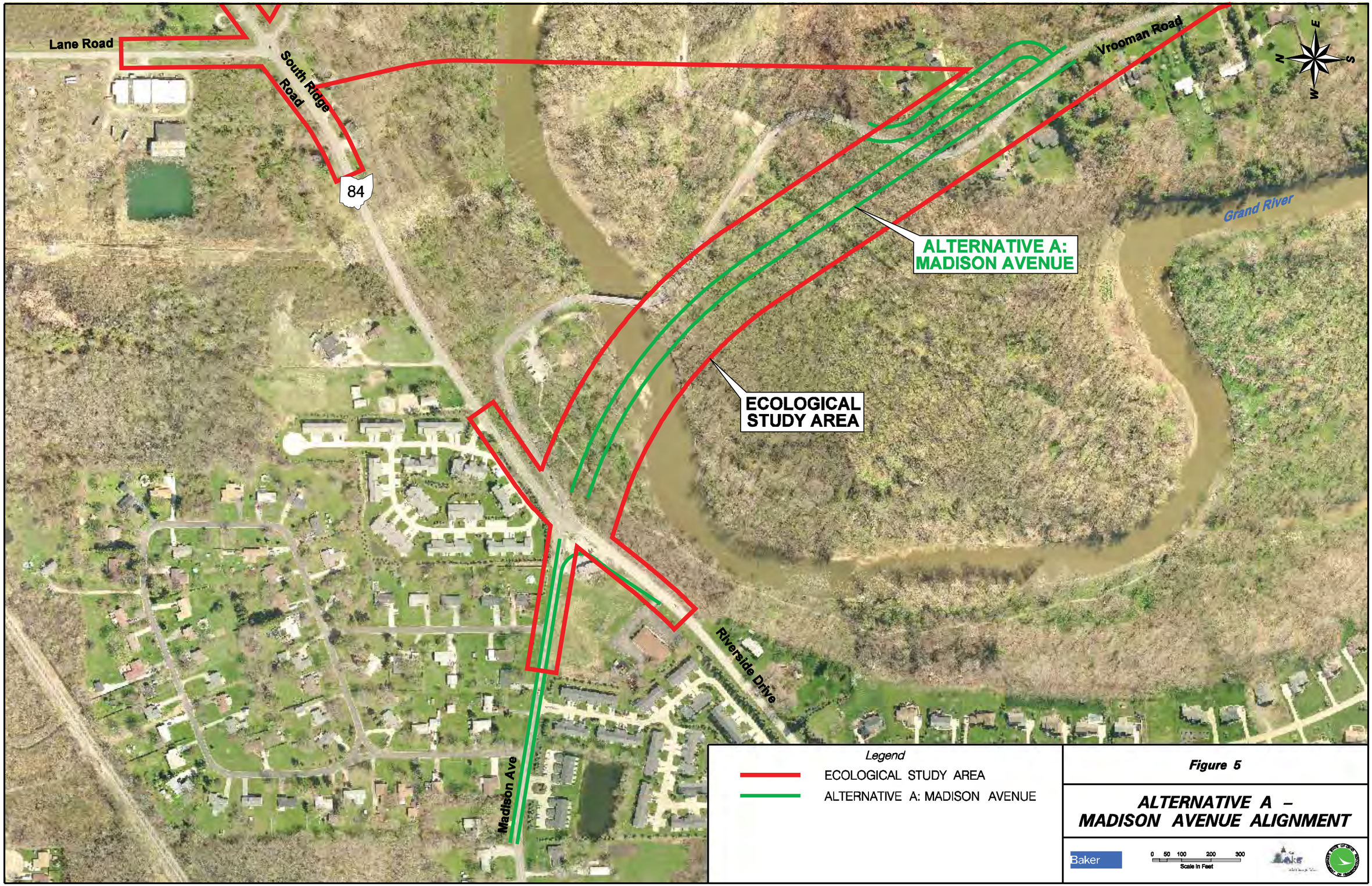

Figure 5

ALTERNATIVE A – MADISON AVENUE ALIGNMENT

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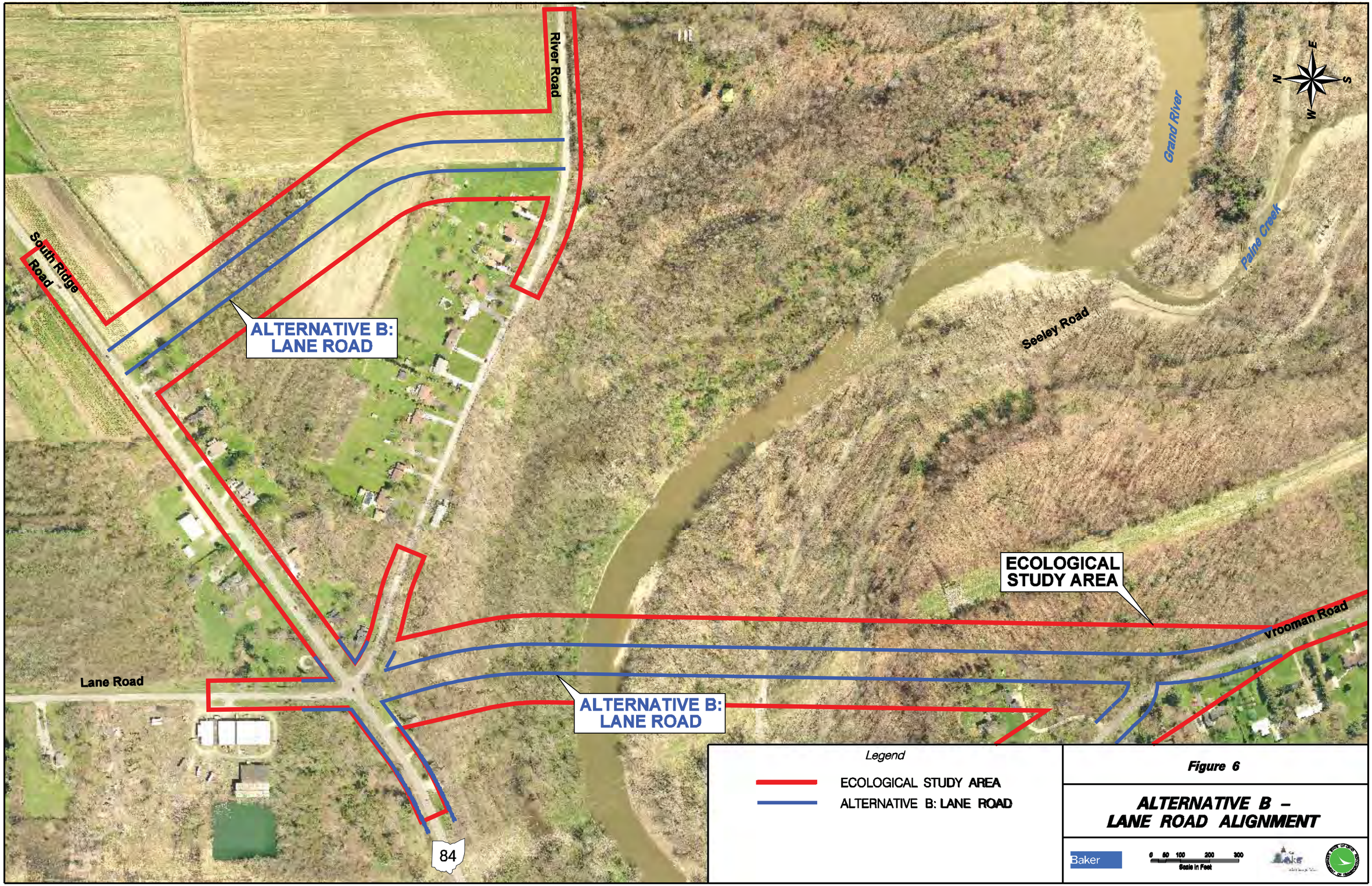

Figure 6

ALTERNATIVE B – LANE ROAD ALIGNMENT

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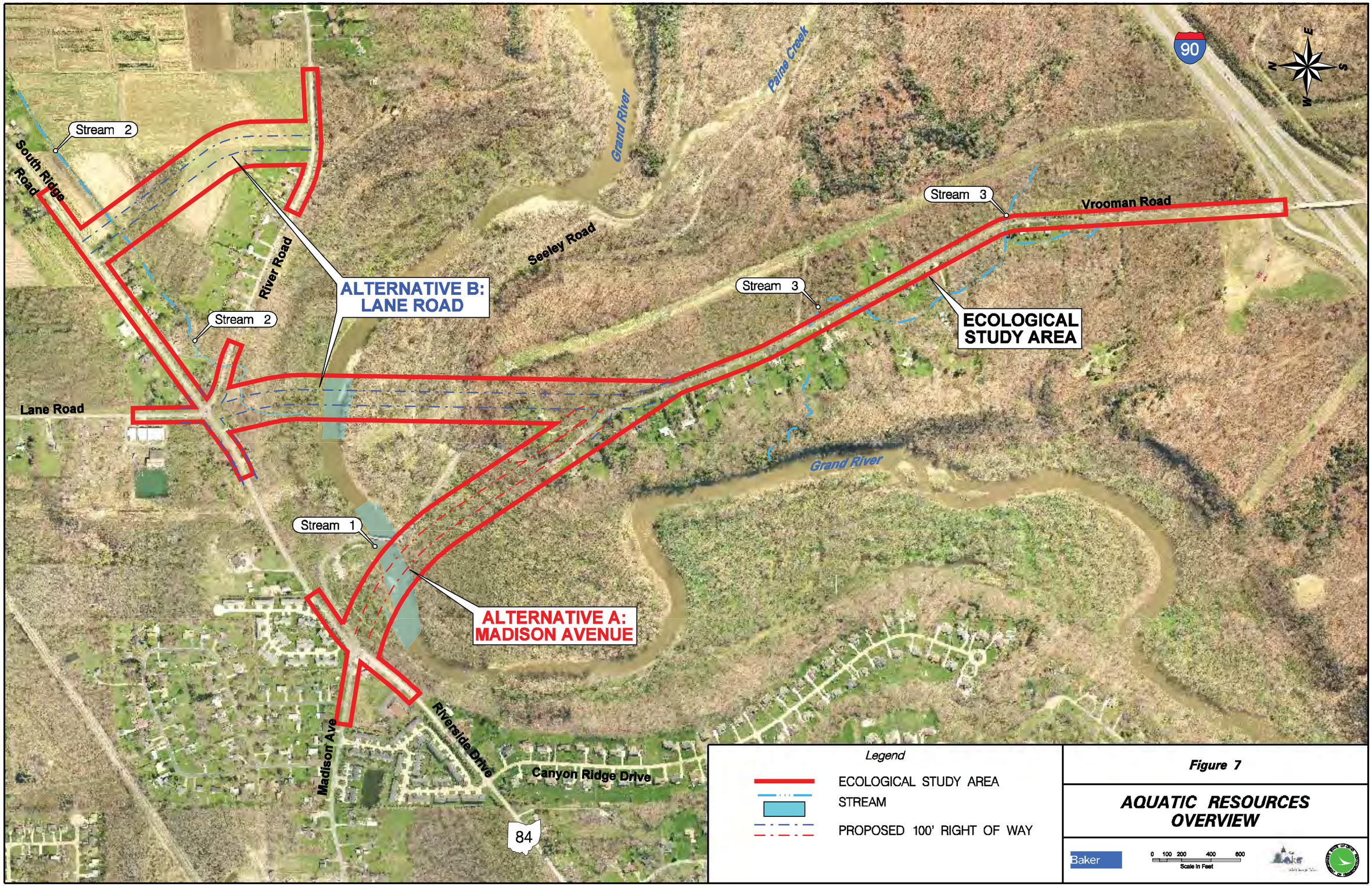

Figure 7

AQUATIC RESOURCES OVERVIEW

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Figure 7a

AQUATIC RESOURCES – ALTERNATIVE A MADISON AVENUE

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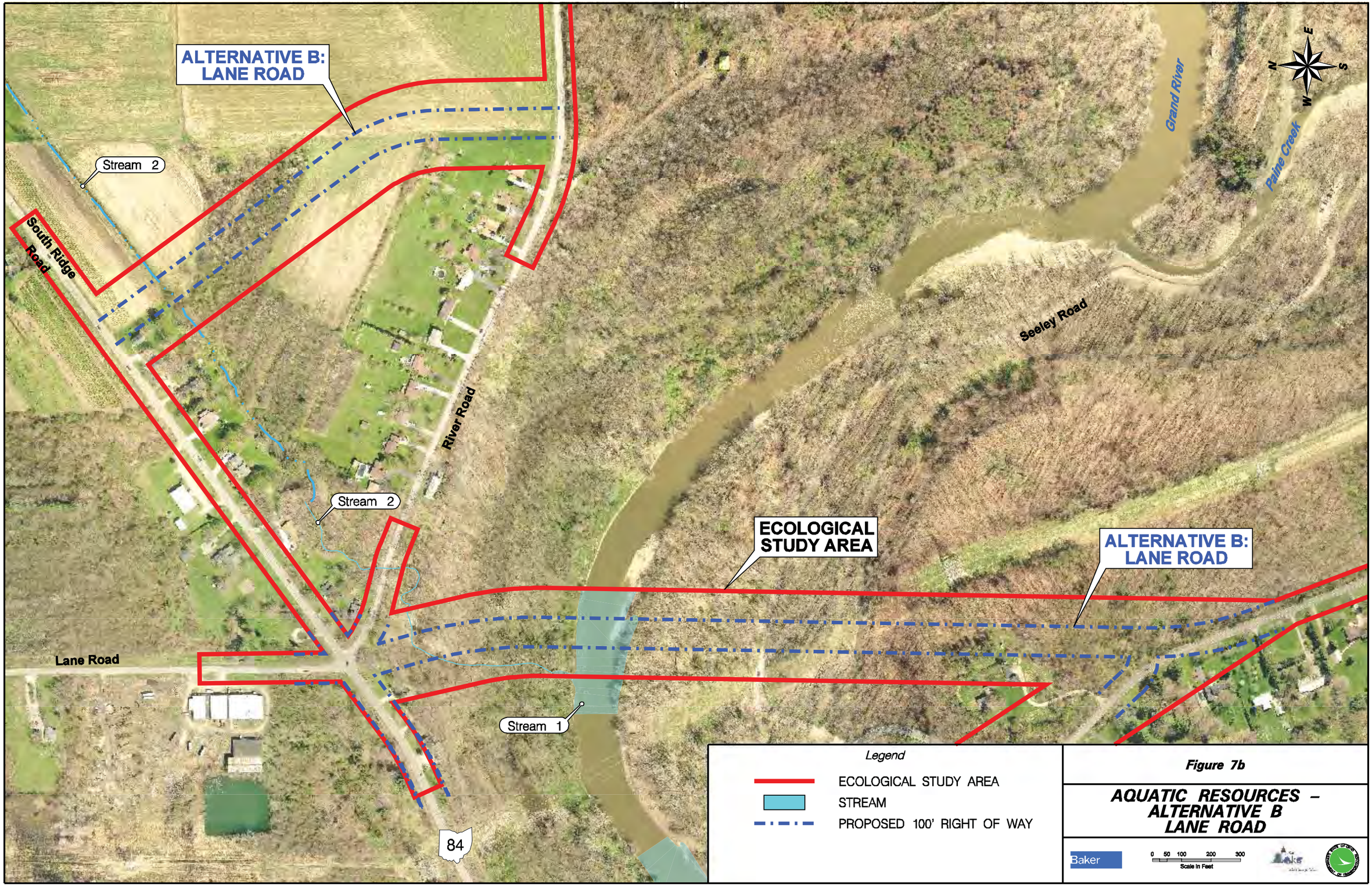

Figure 7b

AQUATIC RESOURCES – ALTERNATIVE B LANE ROAD

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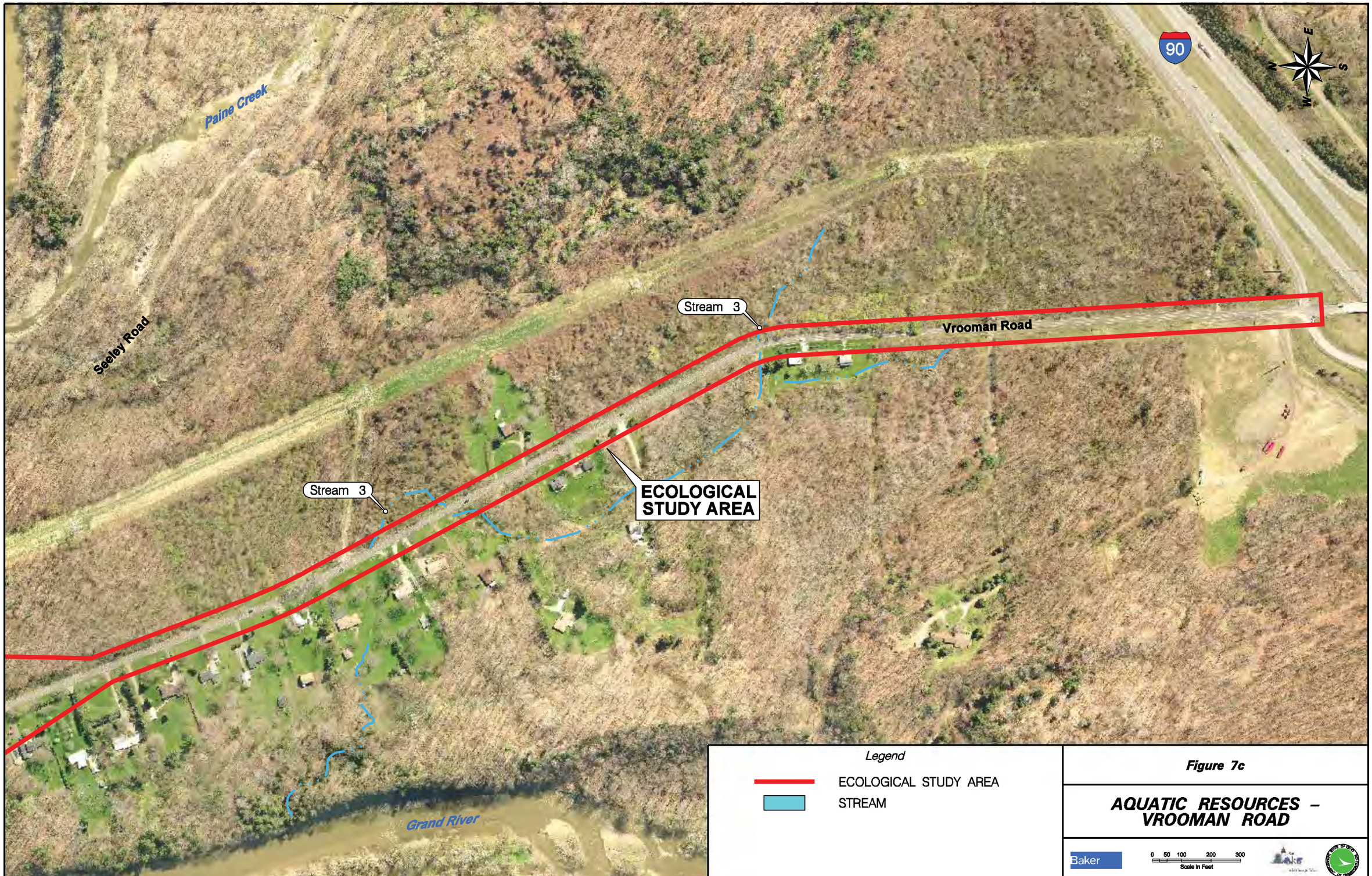

Figure 7c

AQUATIC RESOURCES – VROOMAN ROAD

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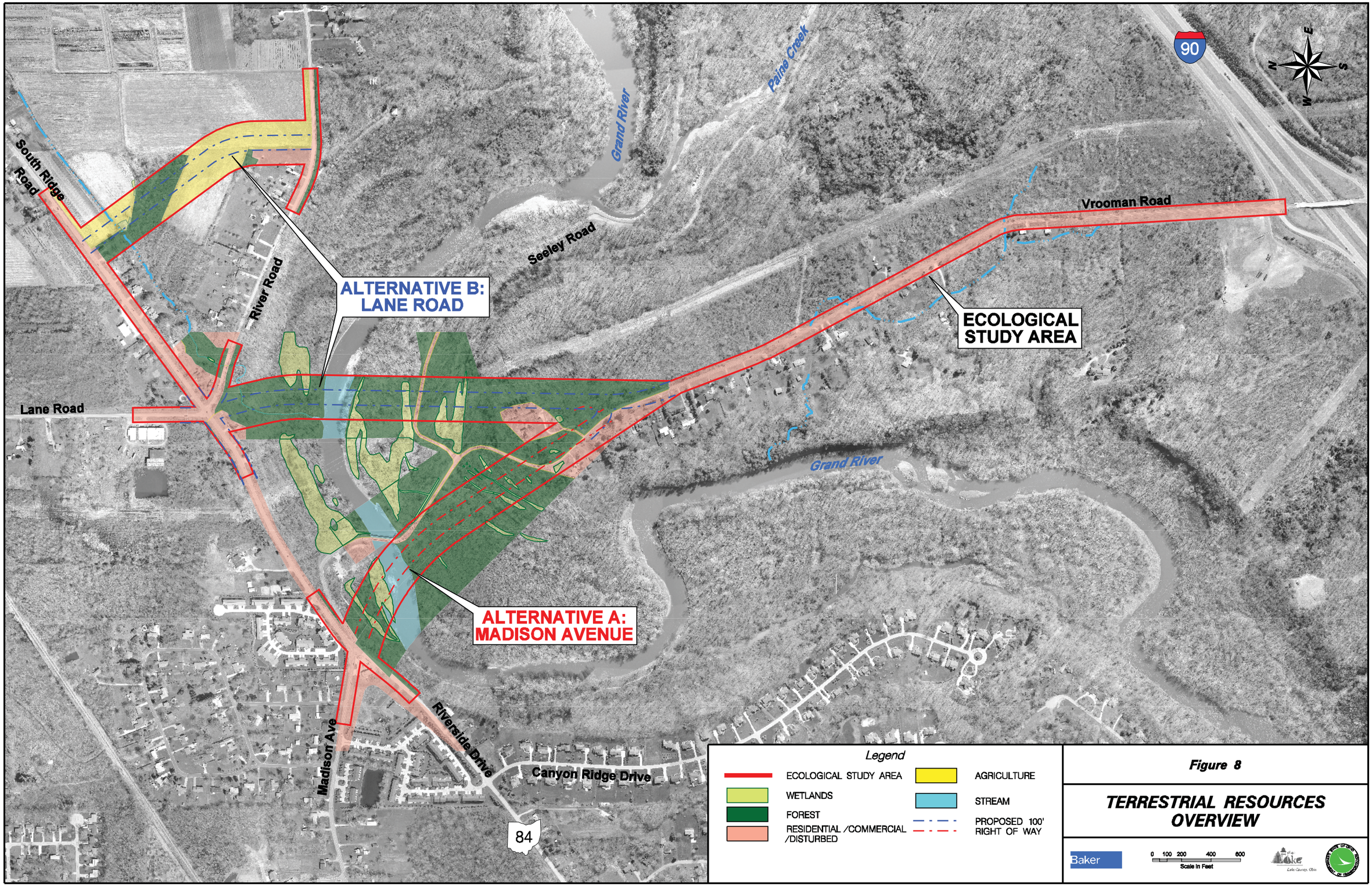

Figure 8

TERRESTRIAL RESOURCES OVERVIEW

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