Fermi 3
U.S. Army Corps of Engineers Mitigation Strategy and Final Design

MDEQ/USACE Joint Permit Application

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Fermi 3 USACE Mitigation Strategy and Final Design

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1.0 INTRODUCTION

Detroit Edison has developed the following mitigation strategy to compensate for proposed impacts to aquatic resources associated with construction of Fermi 3 (Proposed Development) at the Enrico Fermi Atomic Power Plant (Fermi site). The Proposed Development site is located on the western shore of Lake Erie at Newport, Monroe County, Michigan on a 1,260-acre parcel owned and managed by Detroit Edison (Figure 1).

A full description of the Proposed Development was presented in the associated Joint Permit Application [Michigan Department of Environmental Quality (MDEQ) File Number 10-58-0011-P, U.S. Army Corps of Engineers (USACE) File Number LRE-2008-00443-1-S11]. Proposed impacts include 35.55 acres of mixed wetland types within the coastal zone of Western Lake Erie and the northern portion of the Ottawa-Stony Watershed, USGS Cataloging Unit and Hydrologic Unit Code (HUC): 04100001. Wetland types are classified broadly according to the U.S. Fish and Wildlife Service (USFWS) Cowardin classification and more specifically according to the Michigan Natural Community classification. Potential impacts include approximately 10.90 acres of palustrine emergent marsh (PEM; Great Lakes marsh), 3.15 acres of palustrine forested wetland (PFO; southern hardwood swamp), 3.91 acres of palustrine scrub shrub (PSS; southern shrub carr), 0.80 acres of PEM (coastal emergent wetland), 10.53 acres of PEM (other emergent wetland), 4.89 acres of PFO (other forested wetland) and 1.37 acres of PSS (other scrub shrub wetland).

To compensate for the wetland impacts, Detroit Edison proposes to restore wetlands offsite in the coastal zone of Western Lake Erie. This mitigation strategy is based on data collected onsite, existing databases, the attributes of potentially impacted wetlands, watershed priorities, feedback from natural resource professionals and ongoing communication with the regulatory and conservation community.

2.0 MITIGATION GOALS AND OBJECTIVES

The principal goal of this mitigation strategy is to restore and protect wetland functions and services of equal or greater value than those impacted by construction of the Proposed Development (Figure 2). This goal will be achieved through offsite wetland mitigation activities within the coastal zone of Western Lake Erie. The specific objectives listed below were developed based on an in-depth evaluation of the natural resources at the impact site and the mitigation site, and the condition and conservation needs of the surrounding watershed (see Section 3.1). A watershed analysis allowed for integration of watershed attributes including history, current condition, land use trends, stressors, conservation priorities and other conservation efforts in the Ottawa-Stony watershed and the coastal zone of Western Lake Erie in Monroe County, Michigan (Section 3.1.9). Site level and landscape level perspectives were combined with feedback from regulatory and conservation agency staff to develop an integrated compensation strategy, consistent with guidance from the USACE contained in 33 CFR Part 332 – Compensatory Mitigation for Losses of Aquatic Resources, the Environmental Protection Agency guidance contained in 40 CFR Part

230 – Section 404(b)(1) Guidelines for Specification of Disposal Sites for Dredged or Fill Material, and the MDEQ Technical Guidance for Wetland Mitigation (Reference 1).

2.1 Mitigation Overview

Over 500 acres of wetlands are present at the Fermi site. Wetlands potentially impacted by the Proposed Development have been avoided and minimized to the maximum extent practicable. Aquatic resources on the Fermi Site were identified, evaluated and considered throughout the design process. The first consideration was to determine if wetland impacts could be avoided entirely. The second consideration was to minimize potential impacts in terms of both quantity and quality to the maximum extent possible. The third consideration was to develop a mitigation strategy that would compensate for all unavoidable impacts. Design iterations reduced potential wetland impacts from over 150 acres to approximately 35.55 acres of regulated[1] wetlands requiring mitigation (21.4 acres of which will be restored post-construction). In addition to reducing total acreage of impacts, wetland location and quality were taken into consideration as discussed below and in Section 3.1.

To compensate for the loss of wetlands at the Proposed Development site, Detroit Edison will restore wetlands of similar ecological type within the same coastal zone. For the purposes of this document, restoration implies re-establishing conditions under which the natural functions of a pre-existing wetland can recover. To achieve the mitigation goal stated above Detroit Edison will restore wetlands offsite in the coastal zone of Western Lake Erie (Figure 3).

This comprehensive mitigation strategy is unique in that it proposes mitigation that will ultimately restore significant coastal wetland resources with direct connection to lake hydrology along Lake Erie. Detroit Edison proposes to implement these conservation measures to satisfy the site-specific compensation requirements for impacts to wetlands and address critical watershed needs and priorities as described below in Section 3.1.9. Mitigation activities will commence prior to or concurrent with wetland impacts at the Fermi site to reduce temporal losses of aquatic functions.

Under Part 303, Wetlands Protection, of the Natural Resources and Environmental Protection Act, 1994 PA 451, as amended, MDEQ may require compensatory wetland mitigation to replace unavoidably lost wetland resources with created or restored wetlands, with the goal of replacing as fully as possible the functions and public benefits of the impacted wetlands. A functional assessment was conducted to evaluate individual wetlands potentially impacted by the Proposed Development and to define appropriate compensation. A wetland mitigation and monitoring plan detailing the proposed mitigation activities has been submitted to MDEQ in accordance with Permit 10-58-0011-P. The proposed wetland restoration described herein satisfies the MDEQ requirements for wetland mitigation as set forth in the permit.

[1] Regulated wetland acreage includes those wetlands regulated by USACE and/or MDEQ.

2.2 Functional Replacement and Functional Lift

Restoration activities emphasize heterogeneity in microtopography, vegetation and hydrology to maximize diversity and ecological resilience of wetland habitat. Wetland mitigation has been designed to specifically replace the functions and values provided by wetlands with proposed impacts at the Fermi site. These functions and values include varying degrees of flood flow attenuation and storage, sediment, nutrient and toxicant retention, and fish and wildlife habitat. Section 3.1.8 details the wetland conditions, functions and values of impacted wetlands. Wetland mitigation has also been designed to significantly increase aquatic functions at the mitigation site over the level currently provided by existing wetlands. Existing wetlands are actively farmed or exhibit varying degrees of disturbance to hydrology, invasive species and disturbance from adjacent agricultural activities. Section 3.2 and Reference 38 describes the existing conditions of the mitigation site. The final mitigation design targets functions and values of high priority to the surrounding watershed including food chain support, breeding and migration habitat for migratory birds, breeding and over-wintering habitat for amphibians, increased nutrient cycling, increased connectivity of habitat types, and water quality improvements for surface outflow to Lake Erie.

The Evaluation of Planned Wetlands (EPW) method (Reference 2) was used to quantify the expected functional replacement of wetlands and the functional lift expected at the mitigation site. The EPW method focused on two comparisons. The first comparison describes and estimates how wetland functions provided by the planned wetland restoration (planned wetland) at the mitigation site compares to the lost functions of wetlands at the Fermi 3 site (impact wetlands). The second comparison quantifies the projected functional lift at the mitigation site by comparing projected wetland functions provided by the planned wetland to existing wetland functions at the mitigation site (Monroe Wetlands, Reference 37).

The EPW method was selected for several reasons. First, in the absence of a quantitative or scoring wetland assessment method for the Detroit District, the EPW provides a rapid assessment method based on a generic ecological model with the intention that it be applied to wetlands in the United States regardless of location. Second, the EPW method was developed specifically to evaluate projected functional values for planned wetlands. This evaluation provides guidance on final design and determines the degree of likelihood that mitigation requirements will be met. Finally, the EPW has been used by USACE and other state and federal agencies to evaluate wetland restoration and mitigation projects in New York, Maryland, Delaware and Virginia, many of which were as large and complex as Fermi 3.

Wetland functions and conditions of impact wetlands and current conditions of the mitigation site as assessed in the field compared with the targeted functions of the planned mitigation wetland demonstrate that the planned wetland is designed to specifically replace lost functions at the impact area and significantly improve on functions currently provided by wetlands at the mitigation site. The EPW method utilized previous assessment data and resulted in functional capacity calculations and comparisons that provide a clear, numerical description of how the mitigation action compensates for unavoidable impacts

to wetlands at the Fermi site and provides significantly increased benefits at the mitigation site. For each function evaluated (sediment stabilization, water quality, wildlife habitat, fish habitat, unique/heritage), the planned wetland matched or exceeded the functional capacity index of the impact wetlands and the existing conditions of the mitigation site. Weighted by area, the planned wetland is shown to significantly increase functional capacity over the impacted wetlands and over the functional capacity of the wetlands that currently exist at the mitigation site. The functional capacity of the planned wetland also exceeded the primary planned wetland goal which was to replace lost wetland functions of impact wetlands at an average replacement ratio of 3:1. The evaluation assumes the functional capacity of the impacted wetland is permanently lost; however, approximately 60% of the wetland impacts are temporary and the functions and values associated with those wetlands would be restored post-construction.

Based on field assessments and functional analysis, the mitigation plan is expected to exceed replacement goals for all wetland impacts and provide significant functional lift at the mitigation site. It is recognized that there is typically a time lag between loss of wetland functions due to wetland impacts and the gain of wetland functions at the mitigation site. As stated above, mitigation activities will commence prior to or concurrent with impacts to reduce temporal loss. The additional functional capacity projected for the planned wetland over and above impact wetlands, existing mitigation site wetlands and stated wetland goals will provide further compensation for temporal loss associated with both temporary and permanent impacts at the Fermi site.

2.3 Mitigation Acreages

A summary of wetland impacts and attributes is provided in Table 1. A more detailed description of the impacted wetlands is provided in Section 12 of the associated Joint Permit Application.

Wetland mitigation proposed here will replace wetland functions and values impacted on the Fermi site by restoring approximately 130 acres of wetlands of similar type offsite in the same watershed (coastal zone). Restoration will include approximately 97 acres of Great Lakes marsh (which includes 70 acres of emergent and 27 acres of open water), 22 acres of PFO (southern hardwood swamp), and 11 acres of PSS wetland. Table 2 provides the types and acreages of wetlands impacted and the proposed acreage of mitigation. Figure 4 shows the derivation of the mitigation acreages. In addition, the onsite restoration of 21.4 acres of the impacted wetlands post-construction will provide added ecological value and benefits above the required compensatory mitigation.

In summary, Detroit Edison recognizes the value of coastal wetland habitat along Lake Erie. Avoidance and minimization strategies were employed to minimize impacts to wetlands of high ecological value. Unavoidable impacts were restricted to low quality wetlands and wetland areas to the greatest extent possible. As described above, each acre of wetland impacted will be compensated for by the restoration of approximately 3 acres of high quality, intact wetland with a significantly greater projected functional capacity than impact wetlands and existing aquatic resources at the mitigation site. Additional compensation will be realized by post-construction restoration of approximately 60% of the impacted

wetlands onsite. This mitigation strategy satisfies regulatory mitigation requirements with proposed compensation at an appropriate level to achieve replacement of lost functions and values including temporal loss of aquatic resource functions. This mitigation strategy will also support Detroit Edison's corporate environmental stewardship initiatives through continued collaboration and partnership with USFWS and other conservation entities.

3.0 BASELINE INFORMATION

3.1 Impact Area

3.1.1 Location and Ownership

The Proposed Development is at the Fermi site, Latitude: 41.961 and Longitude: -83.261 on the western shore of Lake Erie at Newport, Monroe County, Michigan on a 1,260-acre parcel owned and managed by Detroit Edison (Figure 1). The impact site is within the coastal zone of Western Lake Erie and the northern portion of the Ottawa-Stony Watershed.

3.1.2 Land Use

Land use on the Fermi site is split mainly into developed areas and swamp or wetland areas. Most of the forested areas on the site are subject to flooding, and, therefore, are considered woody wetlands. The majority of the Fermi site that is not developed is included as part of the Detroit River International Wildlife Refuge (DRIWR), known as the Lagoona Beach Unit. The DRIWR encompasses a 656-acre portion of the Fermi site.

The 1260 acre Fermi site is composed of approximately 16.8% developed areas and 5.1% cropland. Terrestrial habitats account for 61% of the property. The remaining 17% are water bodies, e.g., Quarry Lakes and the main body of Lake Erie that lies east and north of the site. Figure 5 illustrates the extent and location of the habitats identified and the developed areas on the Fermi site. A summary of the acres of each habitat type on the site is provided below (Reference 7).

Habitat	Acres	Percent of Site
Coastal Emergent Wetland Open Water	35	2.8
Coastal Emergent Wetland Vegetated	238	18.9
Grassland: Right-of-Way	29	2.3
Grassland: Idle/Old Field/Planted	75	6.0
Grassland: Row Crop	64	5.1
Shrubland	113	9.0
Thicket	23	1.8
Forest: Coastal Shoreline	47	3.7
Forest: Lowland Hardwood	92	7.3
Forest: Woodlot	117	9.3
Developed Areas	212	16.8
Lakes, Ponds, Rivers	44	3.5
Lake Erie (main body)	171	13.6
Totals	1,260	100.0

3.1.3 Topography

Topography in the vicinity is fairly flat, with some lower elevation wetland areas along the Lake Erie shoreline, including the Fermi site (Figure 6). To prevent flooding of the developed areas, these areas were elevated during the construction of Fermi 2 using crushed limestone taken from the southwest portion of the Fermi site (Quarry Lakes). Site elevations range from the level of Lake Erie to approximately 25 feet above lake level on the western edge of the site (Reference 8). Topography on the Fermi site is relatively level in the undeveloped areas, with an elevation range of approximately 10 feet over the site according to U.S. Geological Service (USGS) topographic maps.

3.1.4 Soils

The overburden soils at the Fermi site consist of lacustrine deposits, glacial till, and rock fill (Figure 7). The rock fill is present only in the immediate area of the reactor; therefore, in the wetland areas, the overburden soils consist of lacustrine deposits and glacial till. The overburden is underlain by the Bass Islands Group dolomite bedrock. Groundwater is present in the overburden and the bedrock. The groundwater in the overburden is unconfined, while the Bass Islands Group aquifer is confined. The glacial till acts as an aquitard between the unconfined groundwater in the overburden and the confined groundwater in the Bass Islands Group aquifer.

The Monroe County Soil Survey (Reference 9) lists soil series Lenawee silty clay loam, ponded (Map Symbol 10) and Lenawee silty clay loam (21) as the primary mapped soil types on the Fermi site. Other soils found on the Fermi property include: urban land (63) on the eastern portion of the site where the

existing Fermi 1 and Fermi 2 buildings and infrastructure are located; urban land-Lenawee complex (57) on the southern edge of the Fermi site; Aquents complex (31) and Blount loam (13A) on the northwestern side of the site; Pits-Aquents complex (33) in the southeast portion of the site; water (W) primarily in the southeast and northeast portions of the site; and beaches (27) along the eastern edge of the Fermi property adjacent to Lake Erie. Figure 7 depicts the soil series identified.

3.1.5 Vegetative Communities

Vegetative communities and wetland habitats were evaluated during detailed terrestrial surveys conducted from 2008 through 2010. In 2008 and 2009, spring, summer and fall pedestrian surveys of flora and fauna were conducted in all habitat types including wetlands on the Fermi site (Reference 10). In 2010 individual wetlands were revisited to determine Michigan Natural Community classification and wetland condition and quality. Several upland and wetland vegetative communities have been distinguished at the Fermi site as listed in Section 3.1.2 - Land Use. An in-depth discussion of vegetative communities for wetland covertypes is provided in Section 3.1.8 - Wetlands.

Requests for data concerning known or potential occurrences of endangered, threatened, candidate, or special concern plant species on the Fermi site were submitted to the USFWS and the Michigan Natural Features Inventory. In addition, a list of threatened, endangered, or candidate species for Monroe County, Michigan was obtained online from the Michigan Natural Features Inventory. The American lotus (*Nelumbo lutea*) is a state threatened plant species. However, large local populations of American lotus are scattered in areas of southern Michigan, reaching an apparent peak in Monroe County (Reference 11). In the south lagoon, and to a lesser extent in the north lagoon, are large stands of American lotus. American lotus is also abundant in the South Canal (Figure 8).

3.1.6 Wildlife

As discussed in Section 3.1.5 and Section 3.1.8, the Fermi site includes several ecological communities, some of which are considered rare and imperiled. The Fermi site was extensively surveyed for wildlife in 1973 and 1974 (Reference 12) with updates to species occurrences in 2000 and 2002 as part of a wildlife habitat planning effort. The most recent terrestrial and aquatic wildlife surveys were conducted during 2008 and 2009 (References 13 and 14) to confirm data from earlier surveys and to further characterize the wildlife species using the Fermi property. Secondarily, the surveys aided in determining if important species use the site and to guide decisions concerning avoiding, minimizing or compensating for impacts to these species from the proposed expansion. As such, wildlife surveys focused on portions of the Fermi site where construction and operation of Fermi 3 could potentially impact wildlife, whether from habitat destruction, conversion to other habitat types or through general habitat degradation.

The USFWS was consulted concerning the occurrence or potential occurrence of species on or in the vicinity of the Fermi property that are protected under the Endangered Species Act. The USFWS stated that the project occurs within the potential range of some federally listed species, but that the USFWS

had no records of occurrence on the Fermi site or in the vicinity, nor was there any designated critical habitat in the area. The USFWS further stated that because of the types of habitat present at Fermi, no further action is required under Endangered Species Act. The USFWS did state that if more than 6 months pass before the project is initiated, then the USFWS should again be contacted to ensure there have been no regulatory changes. Detroit Edison will continue consultations with the USFWS per their recommendations.

The MDNR and the Michigan Natural Features Inventory (Reference 15) was consulted regarding the presence of known or potential occurrences of state-listed threatened or endangered species on the Fermi site. The only species in the USACE/MDEQ-regulated project areas is the Eastern fox snake (*Pantherophis gloydi*).

Based upon the review of the data collected in the terrestrial and aquatic surveys there were no occurrences of federally and/or state listed threatened or endangered species. Based on avian surveys conducted during 2006-2008, the bald eagle (*Haliaeetus leucocephalus*) is the only migratory species of note that has been observed on the Fermi site. None of the previously observed bald eagle nests were observed on the Fermi site as of January 2011. During 2008, while wetland surveys were being conducted, two fox snakes were observed on two separate occasions. In addition, fifteen separate sightings were made by Detroit Edison employees between 1990 and 2007 with 1-6 snakes identified on each occasion. In addition to minimizing wetland impacts, the fox snake's primary habitat, Detroit Edison has developed a mitigation plan which will be implemented to minimize the project's impact to the species.

3.1.7 Site Hydrology

Currently the hydrology of the area is influenced by the physical processes of Lake Erie. Lake Erie has a perfect seiche fetch. With a predominant southwest wind, specific locations on Lake Erie are susceptible to great fluctuations in water levels due to sustained winds pushing the lake water to the east, and then, as the winds subside, the water levelizes across the lake. This creates large waterless expanses followed quickly by water inundating creek and river mouths, resulting in a bathtub like “sloshing” effect. This creates unique opportunities for both plants and wildlife. Other local hydrological conditions are dictated by the Swan Creek.

Water is seasonally to permanently present throughout the majority of the Fermi site. Average annual precipitation is approximately 35 inches and generally well distributed throughout the year. The site receives direct, surface runoff from a 2,440 acre drainage basin with cropland, wetland and forest as the primary cover types. Surface water is received from Lake Erie during periods of high water and storm events.

The hydrology of the Fermi palustrine emergent (PEM) wetland areas is controlled almost entirely by the elevation of surface water in Swan Creek and Lake Erie. The surface water in Swan Creek and Lake Erie

is directly connected to the PEM areas on the Fermi site. Five sets of large-diameter culverts connect the majority of the inland PEM areas west of Doxy Road with the PEM areas that are directly connected with Swan Creek and Lake Erie. These culverts allow free flow of surface water throughout the interconnected PEM areas. Therefore, the surface water level in the majority of the PEM areas is directly controlled by the surface water elevation of Lake Erie and Swan Creek, rather than groundwater levels. Figure 9 shows the culvert locations and movement of surface water on the Fermi site.

Palustrine forested (PFO) and palustrine scrub-shrub (PSS) areas on the Fermi site are, for the most part, contiguous with the PEM areas. Therefore, these areas are hydraulically connected with the PEM wetlands, so the groundwater level in these areas is influenced by the surface water levels in Swan Creek and Lake Erie. With the exception of a few wetlands separated by berms or roads, the majority of wetland communities on the Fermi property are hydrologically connected and thus considered one wetland system.

3.1.8 Wetlands

Detroit Edison conducted assessments of wetland resources on 1,106 acres of undeveloped lands at the Proposed Development site between 2008 (Reference 16) and 2011. The purpose of these assessments is to identify and integrate natural resource considerations throughout the design and implementation phases of the Proposed Development and to guide mitigation measures including avoidance, minimization and the development of a high quality mitigation strategy to compensate for unavoidable impacts. The assessments are based on existing data and onsite data collection. Existing data include topographic maps, federal and state wetland maps, soil maps, aerial photos, land use data, and ecological survey data from previous studies. Onsite assessment data were collected in each year to delineate wetland boundaries, evaluate wetland functions and services, determine natural community types and assess wetland condition and quality. A jurisdictional determination was completed and minor edits to wetland boundaries were made in 2011 (Figure 10). Watershed assessments of the northern section of the Ottawa-Stony Creek watershed and the coastal zone of Western Lake Erie in Monroe County were completed to further inform development strategies and conservation priorities at the Proposed Development site. This section provides an overview of wetlands with potential impacts associated with the Proposed Development. Section 3.1.9 provides a summary of the watershed assessments.

A functional assessment based on the USACE New England Highway Method (Reference 17) was originally conducted during the 2008 field delineation (Reference 16). In 2010, field observations of wetlands with proposed impacts included a refined assessment of vegetation communities and other wetland characteristics to further describe the condition, functions and services of impact areas. Data collection and analysis methods were based on the Michigan Rapid Assessment Method for Wetlands (MiRAM, Reference 18) and the Delaware Rapid Assessment Procedure (Reference 19) and included metrics such as wetland size and connectivity, adjacent area use, hydrologic alterations and soil

disturbance, habitat structure, and presence of invasive species. The results of the 2008/2009 terrestrial surveys, 2010 field visits described above, and feedback from regulatory staff were used to further evaluate individual wetlands potentially impacted by the Proposed Development.

Over 500 acres of wetland were delineated at the Proposed Development site. The majority of wetlands at the Fermi site were ranked low to medium quality based on factors including hydrological disturbance, presence of invasive species, adjacent land use, fragmentation, human activity, deforestation, etc. There were several wetlands ranked high quality based on connectivity, presence of native, diverse vegetation communities, and wildlife habitat potential. Several other wetlands were given high ecological value based solely on their rare and imperiled status in Michigan even though condition ratings were low (MiRAM guidance, see below). Depending on condition, the principal functions and services provided by wetlands on the Fermi site include flood flow alteration, sediment/toxicant retention, nutrient removal, and fish and wildlife habitat.

Wetlands with proposed impacts and their associated covertypes are presented in Table 1. Mitigation is proposed for approximately 35.55 acres of potential impacts to regulated wetlands due to the Proposed Development. These potential impacts include approximately 10.90 acres of Great Lakes marsh, 3.15 acres of southern hardwood swamp, 3.91 acres of southern shrub carr, 0.80 acres of coastal emergent wetland, 10.53 acres of other emergent wetland, 4.89 acres of other forested wetland and 1.37 acres of other scrub shrub wetland.

3.1.9 Watershed Analysis

As part of the natural resource assessment effort, Detroit Edison conducted a watershed analysis to provide a broader geographic context to guide land use decisions at the Fermi site. The purpose of the watershed assessment is to provide an analysis of land use features of the inland and coastal watersheds that encompass the Fermi site and evaluate the connection between natural resources on the Fermi site and site-specific and watershed conservation priorities. The watershed assessment also provides a landscape level perspective useful in consideration of any land use changes, proposed impacts and proposed compensation strategies.

The Fermi site is located in the northern portion of the Ottawa-Stony watershed (OSW, Figure 11), USGS Cataloging Unit and Hydrologic Unit Code (HUC): 04100001 and the coastal zone of Western Lake Erie in Monroe County (CZM, Figure 12). The OSW drains areas to the north and west of Lake Erie and flows directly into the lake. The northern portion of the OSW has a drainage basin of approximately 182,733 acres and is dominated by agriculture (55%). Approximately 25% of the OSW land area is in natural cover and approximately 20% is developed (Figure 11). The CZM encompasses approximately 18,697 acres with an almost even interspersion of natural lands (38%), developed lands (38%) and agriculture (24%) (Figure 12). Protected lands for conservation and recreation make up approximately 4% of the OSW and 36% of the CZM.

Wetlands comprise approximately 6% of the OSW and 43% of the CZM. The OSW is dominated by vegetated wetlands. Forested wetlands comprise the majority of vegetated wetlands (60%) with the remainder being emergent (24%) and shrub/scrub (15%). The CZM has equal proportions of vegetated and non-vegetated (open water) wetlands. Emergent wetlands are the dominant type comprising 71% of the vegetated wetlands with the remaining wetlands being forested (17%) and scrub shrub (11%).

An approximation of historic wetlands for the OSW and the CZM was developed based on soils classified as >80% hydric (soils >80% of a soil map unit classified as hydric by the Natural Resources Conservation Service) and current mapped wetlands. Former wetlands were defined as areas that are mapped hydric soils (>80% of map unit) but not mapped as wetlands based on the latest wetland maps. The topography and landscape position of the OSW and CZM are ideal for the development of wetlands because the land is very flat and in close proximity to the coast of Lake Erie. Prior to European colonization, approximately 45% of the land area of the OSW was wetland (Figure 13). Based on the most recent wetland maps 6% of the OSW area is currently wetland which constitutes an 86% loss in the OSW. Historically, 77% of the land area of the CZM was wetland (Figure 14). Based on the most recent wetland maps, 43% of the CZM is wetland which constitutes a 44% loss in the CZM.

Watershed Conservation Priorities

Based on natural resource assessments conducted at the Fermi site and within the OSW and CZM, the following wetland-based conservation priorities were identified for this project:

1. Protect and restore existing high quality wetlands especially those that are directly connected to Lake Erie in the CZM and/or part of a larger wetland complex.
2. Improve a network of natural land use in the CZM and OSW by increasing the amount of large blocks (>50 acres) of natural lands and buffered streams to support ecosystem functions and services and establish corridors to connect large blocks.
3. Restore wetlands in the CZM to provide wildlife habitat and protect water quality in Lake Erie.
4. Restore wetlands and stream buffers in the OSW to re-establish large wetland complexes and riparian connections.

Because of the Fermi site's location in the lowest reaches of the OSW (in the CZM), any activity onsite will have the greatest local effects (either positive or negative) on coastal resources and Lake Erie itself. Based on the results of the watershed assessment, planned activities at Fermi have strategically avoided and minimized impacts to natural resources of high ecological value to the greatest extent possible. For unavoidable impacts, this mitigation strategy has been designed to address any loss of coastal habitat and the watershed conservation priorities listed above. Specifically, the proposed mitigation will restore approximately 130 acres of coastal wetland including Great Lakes marsh and southern hardwood swamp and reconnect this large block of natural land directly to Lake Erie via a restored and buffered stream channel. Approximately 21.4 acres of impacted wetlands will be restored post-construction on the Fermi

site. On- and offsite mitigation actions are in close proximity to existing conservation efforts to help establish connectivity and habitat corridors.

3.2 Mitigation Area

The following description of the mitigation area is based on field data and review of existing, available data including aerial photography, soil survey maps, USGS topographic maps, state and federal wetland mapping, Monroe County Drain Commissioner records, and as-built drawings for I-75. Field surveys were conducted for topography, soils, hydrology, and wetland communities between 2010 and 2012. Figure 15 provides a plan view of existing conditions including site boundary, surveyed topography, existing easements, and USACE Ordinary High Water Mark (OHWM). In Lake Erie, the OHWM extends approximately to the elevation contour of 573.4 feet referenced to the 1985 International Great Lakes Datum (IGLD 85).

3.2.1 Location and Ownership

The proposed offsite mitigation area, referred to as the Monroe site, is approximately 210 acres in size and 7.25 miles from the Fermi site on Detroit Edison's Monroe Plant, east of Interstate 75, north of La Plaisance Creek, immediately adjacent to Lake Erie (La Plaisance Bay), Town of Monroe, Monroe County, Michigan, in the Ottawa-Stony Watershed (HUC: 04100001, Figure 1). The mitigation site is owned and managed by Detroit Edison.

3.2.2 Land Use

The proposed mitigation targets a 173-acre agricultural field at the Monroe site (Figures 16 and 17). This portion of the site is currently farmed and includes small areas of remnant wetlands and dikes which separate the site from Lake Erie. Excess water is pumped from the fields to accommodate farming. Adjacent areas include a 36-acre conservation area with a wetland restored approximately 10 years ago and associated grassland buffer. Adjacent land uses also include active agriculture, early successional old field and shrub habitat, agricultural ditches, small forest patches, existing wetland habitat, industrial, residential and other developed areas, access roads, highways and Lake Erie. Historical maps and aerial photos indicate the land has been in agricultural use with no structures present.

3.2.3 Topography

The topography of the site is very flat with an average elevation of approximately 572 ft. Figure 15 provides surveyed elevations including OHWM as designated by USACE. The lowest elevations in existing ditches and swales are below 570 feet with the highest elevation located on the top of a small rise in the northwestern corner of the site at approximately 589 feet. The elevation of the dike separating the site from Lake Erie has an average elevation of approximately 578 feet. Average lake levels of Lake Erie are 571.5 feet with seasonal fluctuations and periodic seiches causing significantly higher and lower elevations.

3.2.4 Soils

The Monroe County Soil Survey soil mapping for the site shows the presence of two soil types within the site boundaries (Figure 18). These soil types include Warners silt loam and Lenawee silty clay loam. The Warners series consists of very deep, very poorly drained soils on nearly level floodplains and seepage areas of hillsides. The Lenawee series consists of very deep, very poorly drained soils in lacustrine deposits. These soils are on lake plains and in depressional areas on moraines, outwash plains, and glacial drainageways. Both mapped soils are hydric and suitable for wetland restoration/creation.

3.2.5 Vegetative/Wildlife Communities

Vegetative communities were observed at the mitigation site primarily during wetland delineation field visits. The dominant covertype is active agriculture (Figures 16 and 17). Other covertypes include a mix of wetlands such as emergent marsh, floodplain forest, southern shrub-carr and wet meadow, and uplands such as old field, successional shrub and forest. The MDNR and the Michigan Natural Features Inventory (Reference 15) was consulted regarding the presence of known or potential occurrences of state-listed threatened or endangered species on the mitigation site. Based on review of known or potential occurrences and observations during field data collection, there are no occurrences of federally and/or state listed threatened or endangered species at the site. The shallow waters of La Plaisance Bay, immediately adjacent to the site, support a population of American Lotus. Restoration of the site will likely provide additional habitat for this state-threatened species.

3.2.6 Site Hydrology

The mitigation site receives runoff from the 588-acre Davis Drain watershed. The Davis Drain, under the jurisdiction of the Monroe County Drain Commissioner, is located along the southwest corner of the site. The drain carries stormwater runoff from Interstate 75 and upstream property. Water is seasonally to permanently present in ditches, swales and small remnant wetlands on the project site. Average annual precipitation is 31.5 inches and generally well distributed throughout the year. The site receives direct runoff from a 250-acre drainage basin with cropland, wetland and forest as the primary covertypes. The hydrology of the site is influenced by extensive tile and ditching for the purpose of draining surface water to facilitate farming. Figure 19 illustrates the location of ditches, culverts, and direction of flow for surface water drainage. Excess water is pumped from the fields at the northeast corner of the site into the adjacent ash basin. There is currently no direct hydrological connection between the mitigation site and Lake Erie. Depth to groundwater has not been determined however soil borings up to 20 inches revealed a compact clay lens and no groundwater penetration: the mitigation site is primarily surface-water driven.

A hydrological study was conducted for the mitigation site and the drainage basin. A water budget was developed to support mitigation design. Two models were developed to estimate the average annual volume of water that could enter the mitigation site from the drainage basin and from the planned mitigation wetland itself. Models include estimates of peak flows and average rainfall volume of the Davis

Drain. Water budget calculations for the proposed wetland mitigation plan demonstrate the sustainability of the wetland design.

3.2.7 Existing Wetlands

The mitigation site is adjacent to and includes existing wetlands, some of which are mapped on USFWS National Wetland Inventory (NWI) maps as PFO, PSS and PEM wetland types (Figure 20). Wetland boundaries within the mitigation site were delineated in 2011 (Reference 38) and a jurisdictional determination was completed. A total of 13 wetlands areas (Figure 21) were identified on the site totaling 74.52 acres. These wetlands are distributed throughout the site with the greatest concentration adjacent to site drainage ditches and the near shore areas adjacent to the dike separating the site from Lake Erie. The majority of wetlands identified at the site are significantly impacted by ongoing agricultural activities including plowing and manipulation of site hydrology (draining). Low diversity and the presence of invasive species such as reed canary grass (*Phalaris arundinacea*) and common reed (*Phragmites australis*) are typical of many of these existing wetlands. A functional assessment and conditions assessment were conducted during wetland delineations using the same methods that were used at the impact site and described in Section 3.1.8. Eleven of the 13 wetlands (Wetlands 1-5, 7, 11-14, 16) were ranked low to medium quality based on factors including hydrological disturbance, presence of invasive species, adjacent land use, fragmentation, human activity (farming), deforestation and degree of departure from their original functions and values. Two wetlands (Wetlands 8 and 10) were assigned high ecological value based solely on their rare and imperiled status in Michigan even though condition ratings were low (MiRAM guidance). A description of individual wetlands is provided in Reference 38.

4.0 MITIGATION SITE SELECTION FACTORS

An extensive exploration of potential mitigation projects spanning several years both on- and offsite within the Ottawa-Stony Watershed and coastal zone of Western Lake Erie has been conducted. The offsite mitigation project proposed here was determined to be the best based on site selection factors including:

- location, size and attributes of existing habitat;
- quality of mitigation options and likelihood of success based on both ecological and economic factors;
- land ownership and availability;
- adjacent land use;
- value and proximity to existing conservation plans, projects and watershed priorities;
- connectivity of habitat types;
- possible benefits to threatened and endangered species; and
- stewardship capabilities.

The mitigation site is in the coastal zone of Lake Erie immediately adjacent to the lake. It is one of only a few existing restoration opportunities for rare and imperiled coastal wetlands along the western edge of

Lake Erie. This valuable restoration opportunity has the potential to provide habitat for threatened and endangered plant, fish and wildlife species that rely on this highly impacted habitat type. The mitigation site originally supported coastal wetland habitat. Agricultural activities resulted in ditching, draining and isolation from the lake by construction of a farm dike along the eastern edge of the property. In spite of drainage and ongoing agricultural activities at the site, the topography, soils and access to hydrology from both the lake and the upstream watershed remain typical of coastal wetland systems and supportive of restoration efforts. Once artificial drainage features are removed and the site is reconnected directly to Lake Erie, wetland functions will be restored with a high likelihood of success. The mitigation site is adjacent to an existing conservation area restored by Detroit Edison in partnership with USFWS.

Restoration of coastal wetlands is a priority conservation activity for natural resource agencies and organizations. The mitigation design integrates ecological attributes of coastal wetlands at the impact site and high quality wetlands managed by natural resource agencies along Western Lake Erie. These include direct connection to lake hydrology, establishment of microtopography, interspersion of wetland types, irregular shoreline, shallow slopes and habitat structures. The existing topography, soils and access to hydrology at the mitigation site support restoration of a diverse coastal wetland system that is ecologically responsive to Lake Erie water level fluctuations. Plantings will augment the existing natural wetland seed bank. These factors along with the resource capacity and commitment of Detroit Edison to protect and manage the wetland mitigation effort from design through long term management ensure a successful mitigation strategy.

5.0 MITIGATION WORK PLAN

Implementation of the mitigation plan will commence prior to or concurrent with wetland impacts at the Fermi site and once all necessary permits are in place. A plan set has been developed detailing the final design for the mitigation site including an overall site plan, grading plan and details, planting plan, and erosion and sediment control plan. Qualified contractors will be secured to construct mitigation elements and to provide professional oversight and management of project implementation. Measures as detailed in the invasive species management plan in Section 9.1 will be utilized to prevent the establishment of invasive species within the mitigation sites. All equipment brought to the site will be thoroughly cleaned of all soil before entry into any of the mitigation zones. All soil materials and amendments brought to the mitigation site from offsite locations will require pre-approval by the site inspector to ensure that these materials are not sources of potential invasive species contamination.

Mitigation design emphasizes heterogeneity in vegetation and hydrology to maximize ecological diversity and functional resilience of the wetland. Wetland restoration activities are designed to emphasize techniques that restore functions such as flood flow attenuation and storage, sediment/toxicant retention, nutrient removal, food chain support, breeding and migration habitat for migratory birds, breeding and over-wintering habitat for amphibians, increased nutrient cycling, increased connectivity of coastal habitat types, and water quality improvements for surface outflow. A natural buffer will be established or existing

buffers maintained to protect mitigation wetlands. This final mitigation design is based on a full site evaluation and has been developed in cooperation with existing conservation focus areas (e.g., Detroit River International Wildlife Refuge), watershed plans and priorities, and input from local, state and federal conservation agencies and organizations.

Wetland restoration efforts will replace and repair habitat modified by agricultural practices and hydrological disturbance within sensitive coastal areas. Mitigation actions will increase the abundance, integrity and quality of aquatic habitat types that are currently listed as rare and imperiled in the state of Michigan. The mitigation actions described below will restore wetlands in the 173-acre agricultural area as illustrated in Figure 3. The mitigation actions will include forested, scrub shrub, and emergent wetland (including open water and wet meadow wetland types) with direct hydrological connection to Lake Erie. A specific objective of the offsite mitigation area is to reestablish a direct connection between the current agricultural area and Lake Erie and to redirect runoff from Interstate 75 into the restored wetland. These actions will reconnect a relatively large coastal floodplain area and will allow water to be filtered before it reaches Lake Erie.

5.1 Construction and Planned Hydrology

Construction activities in the agricultural area will include clearing, excavating and grading the proposed mitigation area to target elevations conducive for development of Great Lakes marsh including open water and wet meadow zonation, southern hardwood swamp, and southern shrub-carr wetlands. The construction sequence is described in Section 5.3. The mitigation area will be restored to two separate but hydrologically connected wetland units. The eastern unit will be directly connected to Lake Erie via a 60-foot cut in the existing dike to an elevation of 569 feet. Water levels in the eastern unit will fluctuate with Lake Erie water levels. A meandering waterway with a bottom channel width of 60 feet and 10:1 side slopes will be excavated to the west of the lake connection to allow for a permanent open water marsh zone in the emergent marsh area, providing habitat for aquatic species. Several pools extending to an elevation of 567.5 feet connected by a narrow channel of similar elevation will be created within the meandering waterway in the eastern unit. Two of these pools nearest Lake Erie will be dug to approximately 563.5 feet to accommodate fish species overwinter and during times of extended low water. Grading of soils adjacent to this waterway including the development of a rolling, pit and mound topography, will provide for a variety of water levels and habitat types within the eastern unit.

The western unit will be connected to Lake Erie where the open water channel of the eastern unit meets the spillway and the water control structure controlling the western unit. The western unit is designed to have a more stable hydroperiod than the eastern unit. To achieve the desired wetland communities in the western unit, a low berm will be constructed between the eastern and western restoration units. This berm will be constructed to a top elevation of 575 feet with a 12-foot top width and 4:1 side slopes with armored sides to protect against erosion and muskrat activity. A spillway and water control structure will be set to a full service elevation of 574 feet. The water control structure will provide water level

management in increments of 6 inches from 574 feet to a complete drawdown. The berm, spillway and structure have been sized according to the drainage basin and hydrologic models to ensure adequate drainage capacity and successful restoration of proposed habitat types and acreages in the western unit. Additional hydrology will be introduced into the wetland by searching for and breaking drainage tile and plugging existing ditches. The western unit will be connected to the Davis Drain by allowing a small base flow to continue to Lake Erie and diverting a larger storm overflow to the wetland. This diversion will be accomplished by installing a small diameter culvert covered with soil in the Davis Drain. A cut in the Davis Drain bank upstream of this low flow culvert will be made to allow overflow to the wetland. This overflow will increase water flow into the wetland, slow floodwater, reduce sediment loading and filter toxicants from runoff water before it reaches Lake Erie.

Graded wetland basins (with the exception of open water channels) will integrate pit and mound topography and will be left rough to establish additional microtopography essential for creating niches for a variety of wetland plants. The edges of the excavated wetlands and transitions between wetland types will be irregular in shape with variable, shallow slopes.

5.2 Planned Vegetation and Habitat Features

5.2.1 Planned Vegetation

Recent surveys of the mitigation site have identified the presence of several invasive species, including common reed (*Phragmites australis*), reed canary grass (*Phalaris arundinacea*), flowering rush (*Butomus umbellatus*), and Canada thistle (*Cirsium arvense*). Purple loosestrife (*Lythrum salicaria*) has not been observed but is likely to occur in southeast Michigan in the habitat types present on the Monroe site. These species can be problematic if they are allowed to become established within mitigation areas. To ensure proper development of target vegetative communities, mechanical and chemical treatment of existing invasive species at the mitigation area will be conducted at least once before construction activities commence. Additional applications will be conducted if necessary. Response from native vegetation will be facilitated by removing dead, chemically treated vegetation through mechanical removal after each treatment. Section 9.1 below provides a detailed description of the Invasive Species Management Plan for the mitigation site pre- and post-construction.

Portions of the mitigation area that are currently farmed will be planted and seeded to establish native plant communities. Planting and seeding will also stabilize soil structure, provide biological diversity, restore ecosystem functionality, and protect against invasion by exotic and invasive herbaceous species. The constructed berm and all other upland construction areas will be seeded with a mix to prevent erosion, stabilize excavated areas and establish an herbaceous community typical of the region. Forested, shrub and emergent wetlands will be planted and seeded to closely resemble vegetation communities typical of southern hardwood swamps, southern shrub carr and Great Lakes marsh prior to invasion of common reed and other invasive and exotic species. These vegetation communities are described in Natural Communities of Michigan: Classification and Description (Reference 20).

A wetland seed bank is evident at the mitigation site and is expected to contribute to the development of target wetland communities. However, the primary method to establish target communities will be through direct seeding and planting. Seed and plant material will be from a recognized native seed and plant nursery and native to Michigan. A limited amount of hand collection of seed (up to 5% of seed requirement) may be conducted targeting key species from reference wetland locations or species that are not currently available from native nurseries. The genetic origin of all seed and plants will be from within 150 miles of the mitigation site to the maximum extent possible. A genetic origin within the eight-state Great Lakes region which includes Illinois, Indiana, Michigan, Ohio, Pennsylvania, Minnesota, New York and Wisconsin is also acceptable for species not commercially available with a genetic origin within a 150-mile radius. Wild-type nursery stock of an age and condition suitable for transplantation will be used. Seed will be applied in a manner and at a rate that will allow effective establishment of the wetland pool area and wetland margins. Seed distribution for adjacent wetland community types will be overlapped on slopes directly influenced by fluctuating lake levels to create a transitional zone that can respond to variable water regimes. These areas are typically dynamic in terms of plant and wildlife assemblages and exhibit high diversity. An overlapping seed distribution will support the development and responsiveness of these transition zones. Plant species are selected, and planting techniques will be applied, to emphasize both horizontal and vertical diversity of vegetation community structure. This aspect of the planting plan is supported by the grading plan that integrates microtopography including pits and mounds into all wetland community types.

Targeted species and associated details are provided by vegetation community type (Tables 3 through 7 and Figure 22). The Michigan Natural Features Inventory (Reference 20) for all target community types was used to create species lists. The Great Lakes marsh - emergent wetland was further refined to closely represent the common species found in this ecotype in Monroe County, MI (Reference 21). Plant species are chosen for their proven hardiness in the area, their ability to out-compete invasive plant species, wildlife value, availability, and their overall suitability to develop diverse, native communities. Individual plant species may be substituted with a native, ecologically similar species if the listed species are not available by the contracted seed/plant distributor at the time of implementation. Species in the planting plan tables are currently available from nurseries that are members of the Michigan Native Plant Producers Association (http://www.mnppa.org/members.html). Sources for plant materials include:

- The Native Plant Nursery LLC: http://www.nativeplant.com/
- Wildtype Plants- Mason, MI: http://www.wildtypeplants.com/
- Hidden Savanna Nursery : http://www.hiddensavanna.com
- Other MI native plant nurseries at: http://castle.eiu.edu/n_plants/michigan.htm

Seed will be purchased in quantities to support the overlapping seed distribution described above. Seed and plant quantities may be adjusted based on availability.

5.2.2 Habitat Structures

Habitat structures will be placed in all areas of the mitigation wetland with a grade of 570 feet or higher prior to seeding and planting. Habitat structures will be placed at a minimum of six per acre and include whole trees, logs, snags, tree stumps and sand mounds and are described in greater detail in Section 7, Item 2. Additional habitat structures in the form of snake and turtle hibernacula, basking and nesting structures may also be placed in appropriate locations on the mitigation site as directed by herpetological experts working with Detroit Edison on stewardship opportunities that will maximize the ecological value of the mitigation site beyond requirements for wetland compensation. These measures would augment the value of the proposed communities. They would not be in conflict with mitigation goals, objectives and performance standards.

5.3 Construction Sequence

The grading, planting, and introduction of hydrology at the offsite mitigation area will be constructed prior to or concurrent with initiating any Fermi 3 permitted activities. Construction is planned over a 4-year period to accommodate site preparation primarily in regards to eradicating existing invasive species and establishing planned hydrology. Invasive species control techniques will be applied in years 1 and 2 and each year thereafter, if necessary, as discussed in the Invasive Species Management Plan in Section 9.1. Farming is expected to continue until year 2 and assist in managing invasive plant species in the proposed mitigation area. The majority of the earthwork will be completed in year 2 along with seeding of all wetland community types and disturbed areas. Once seeded vegetation has been established in year 3, water levels on the west side of the wetland will be held to full service elevations and on the east side of the wetland the cut will be constructed to allow direct hydrological connection to Lake Erie. Water levels will be monitored throughout the rest of year 3 and into year 4. In year 4, plugs and container tree and shrub species will be installed. A summary of construction activities for each construction year and an approximate timeline is provided below.

- Year 1 - Initiate site preparation. Existing wetlands at the offsite mitigation area will be surveyed and treated with appropriate measures (manual removal and herbicide) to eradicate invasive plant species as described in the Invasive Species Management Plan in Section 9.1.
- Year 2 - Continue treatment of invasive plant species. Construction activities in the offsite mitigation area will include clearing, excavating and grading to elevations conducive for development of planned wetland communities. The berm separating the eastern and western units will be constructed and the water control structure and spillway will be installed along with the structure to allow flow from the Davis Drain onto the mitigation area. Habitat structures will be placed prior to seeding. Construction areas will be seeded with a mix to prevent erosion, stabilize excavated areas and establish an herbaceous community typical of the region.

Preconstruction meeting and site visit	June
Mobilization - install soil erosion control measures	June
Clearing and grubbing	June
Excavation and grading, construct berm, install water control structures	July - September
Install habitat structures	October
Final grading and seeding	October - November

- Year 3 – Manage western unit at full service water elevation. Excavate channel to connect the eastern unit of the mitigation site with Lake Erie.

Pre-Construction Meeting and Site Visit	June
Mobilization – install soil erosion control measures	June
Construct coffer dam	June
Excavate channel, install rip rap	July – August
Remove coffer dam	September
Remove spoils/Seed disturbed areas	October – November
Monitor water levels	November - May

- Year 4 – Complete final planting of plugs, tree/shrub potted materials after establishment of grade and hydrology. An assessment of water levels may require minor adjustments in grading to ensure proper hydroperiods are established for target wetland communities or minor adjustments in acreage goals for wetland community types.

Pre-construction meeting and site visit	June
Continue to monitor water levels	June - August
Adjust grade or hydrology, as required	August
Planting of potted nursery stock	October/May - June

6.0 PROTECTION

Ownership of on- and offsite mitigation areas will remain with Detroit Edison. The restored mitigation wetlands will be permanently protected as directed by regulatory requirements to preserve the wetland functions restored. Detroit Edison will execute a conservation easement over the mitigation area in a form identical to the conservation easement model on the MDEQ website at www.michigan.gov/deqwetlands. The original executed conservation easement and associated exhibits will be sent to the MDEQ for review and recording within 6 months of the Decision to Construct Fermi 3 and prior to commencing any permitted work within regulated areas. The boundary of the conservation easement is shown on Figure 23. The conservation easement boundary will be demarcated by the placement of signs along the perimeter. The signs will be placed at an adequate frequency, visibility, and height for viewing, made of a suitable material to withstand climatic conditions, and will be replaced as needed. The signs will include the following language:

WETLAND CONSERVATION EASEMENT

NO CONSTRUCTION OR PLACEMENT OF STRUCTURES ALLOWED.

NO MOWING, CUTTING, FILLING, DREDGING OR APPLICATION OF CHEMICALS ALLOWED.

MICHIGAN DEPARTMENT OF ENVIRONMENTAL QUALITY

7.0 PERFORMANCE STANDARDS

The following performance standards will be used to evaluate the mitigation wetland:

1. In the first monitoring year, a layer of high-quality topsoil, from the A horizon of an organic or loamy surface texture soil, is placed (or exists) over the entire wetland mitigation area at a minimum thickness of 6 inches.

2. In the first monitoring year, a minimum of six (6) habitat structures, consisting of at least three (3) types, have been placed per acre of mitigation wetland. At least 50 percent of each structure shall extend above the normal water level. This standard shall apply to all areas of the mitigation wetland with a grade of 570 feet or higher. The types of acceptable wildlife habitat structures are:

    a. Tree stumps laid horizontally within the wetland area. Acceptable stumps shall be a minimum of 6 feet long (log and root ball combined) and 12 inches in diameter.

    b. Logs laid horizontally within the wetland area. Acceptable logs shall be a minimum of 10 feet long and 6 inches in diameter.

    c. Whole trees laid horizontally within the wetland area. Acceptable whole trees shall have all of their fine structure left intact (i.e., not trimmed down to major branches for installation), be a minimum of 20 feet long (tree and root ball), and a minimum of 12 inches in diameter at breast height (DBH).

d. Snags which include whole trees left standing that are dead or dying, or live trees that will be flooded and die, or whole trees installed upright into the wetland. A variety of tree species should be used for the creation of snag habitat. Acceptable snags shall be a minimum of 20 feet tall (above the ground surface) and a minimum of 12 inches DBH. Snags should be grouped together to provide mutual functional support as nesting, feeding, and perching sites.

e. Sand mounds at least 18 inches in depth and placed so that they are surrounded by a minimum of 30 feet of water measuring at least 18 inches in depth. The sand mound shall have at least a 200 square foot area that is 18 inches above the projected high water level and oriented to receive maximum sunlight.

3. Planted woody species in the scrub-shrub and forested wetlands will achieve at least 70 percent survival one year after the site is planted. Survival is measured only during this establishment period. Any necessary replacement of dead woody plantings will ensure this performance measure is met.

4. Interim and final performance standards for the herbaceous layer mean percent cover of native hydrophytic species on the west and east sides of the constructed berm for each wetland type are as follows:

Year	Emergent	Wet Meadow	Shrub, Forested Wetlands
1	30	40	30
2	40	45	40
3	45	50	45
4	50	75	50
5	60 (Final)	80 (Final)	60
6 and 7			70
8 and 9			75
10			80 (Final)

The total percent cover of non-invasive, native, hydrophytic species in each plot shall be averaged for plots taken in the same wetland type to obtain a mean percent cover value for each wetland type. Plots within identified extensive open water and submergent areas, bare soil areas, and areas without a predominance of wetland vegetation shall not be included in this average. Hydrophytic species refers to species listed as facultative and wetter in the USACE 2012 National Wetland Plant List.

5. Interim and final performance standards for the minimum number of native hydrophytic plant species by wetland type are as follows.

Year	Emergent	Wet Meadow	Shrub, Forested Wetlands
1	7	7	7
2	8	10	8
3	10	12	10
4	12	15	12
5	15 (Final)	20 (Final)	15
6 and 7			15
8 and 9			15
10			15 (Final)

The total number of native hydrophytic plant species shall be determined by a sum of all species identified in sample plots of the same wetland type.

6. A Floristic Quality Assessment (Reference 23) will be conducted to evaluate plant community structure. The Floristic Quality Index including species richness and average conservatism of species will be calculated each monitoring year. The FQI of the mitigation site shall demonstrate a stable or increasing trend over the last two years of the monitoring period.

7. Interim and final performance standards for the number of individual surviving, established and free-to-grow trees per acre in the shrub and forested wetlands that are classified as native, hydrophytic wetland species and consisting of at least three different species are as follows.

   At year 5 of the monitoring period, the mitigation wetland supports a minimum of:

   a. Two hundred (200) individual surviving, established, and free-to-grow trees per acre in the forested wetland that are classified as native wetland species and consisting of at least three different plant species.

   b. Two hundred (200) individual surviving, established, and free-to-grow shrubs per acre in the scrub-shrub wetland that are classified as native wetland species and consisting of at least four different plant species.

   At the end of the monitoring period, the mitigation wetland supports a minimum of:

   c. Three hundred (300) individual surviving, established, and free-to-grow trees per acre in the forested wetland that are classified as native wetland species and consisting of at least three different plant species.

   d. Three hundred (300) individual surviving, established, and free-to-grow shrubs per acre in the scrub-shrub wetland that are classified as native wetland species and consisting of at least four different plant species.

8. Throughout the monitoring period the mean percent cover of invasive species including, but not limited to, *Phragmites australis* (Common Reed), *Lythrum salicaria* (Purple Loosestrife), and *Phalaris*

arundinacea (Reed Canary Grass) shall in combination be limited to no more than ten (10) percent within each wetland type. Invasive species shall not dominate the vegetation in any extensive area of the mitigation wetland.

If the mean percent cover of invasive species is more than ten (10) percent within any wetland type or if there are extensive areas of the mitigation wetland in which an invasive species is one of the dominant plant species, the permittee shall submit an evaluation of the problem to the USACE.

9. Extensive open water and submergent vegetation areas having no emergent and/or floating vegetation shall not exceed 20 percent of the mitigation wetland area west of the berm and 40 percent east of the berm.

10. By the end of the monitoring periods, extensive areas of bare soil shall not exceed five percent of the mitigation wetland area. For the purposes of these performance standards, extensive refers to areas greater than 0.01 acre (436 square feet) in size. The hydrologic variation experienced at this location will be considered when reviewing this standard.

11. At the end of the monitoring period, the mitigation wetland shall be free of oil, grease, debris, and all other contaminants.

12. At the end of the monitoring period the established wetlands will meet the federal wetland criteria outlined in the report entitled “Corps of Engineers Wetlands Delineation Manual” dated January 1987, as modified by all applicable supplements, associated lists, documents, etc. The site will be characterized by the presence of water at a frequency and duration sufficient to meet the hydrology criteria of the Corps of Engineers Wetlands Delineation Manual for at least three consecutive years and support a predominance of wetland vegetation and the wetland types specified. This will be documented in a final delineation report including a certified land survey of the wetland boundaries submitted to USACE prior to release of the mitigation.

If the mitigation wetland does not satisfactorily meet these final success criteria by the end of the monitoring period, or is not satisfactorily progressing according to interim success criteria during the monitoring period, the permittee will be required to evaluate and may be required to take corrective action.

This mitigation project was designed to replace functions and values of Great Lakes marsh by development of plant communities and zones as described in the Michigan Natural Features Inventory Natural Communities of Michigan: Classification and Description (Reference 20). This document recognizes that Great Lakes marshes are characterized by dynamic water level cycles that can dramatically alter vegetation zones and their placement on the landscape. Monitoring reports shall indicate if performance standards are not satisfactorily met due to these natural, dynamic hydrologic conditions with a description of corrective actions or an explanation if corrective actions are not merited.

8.0 MONITORING

Monitoring activities completed at the mitigation site will be conducted as described by MDEQ Technical Guidance for Wetland Mitigation represented below (Reference 1). This monitoring plan also satisfies USACE guidance contained in 33 CFR Part 332 – Compensatory Mitigation for Losses of Aquatic Resources. A monitoring plan is necessary to evaluate the mitigation wetland in regards to meeting the performance standards of the project. A biologist, experienced with wetland restoration and mitigation will coordinate and oversee monitoring activities. Detroit Edison will submit a surveyed drawing showing the as-built conditions of the mitigation area to MDEQ and USACE within 60 days following completion of construction. Monitoring visits will be performed annually beginning with the first growing season after construction is completed. Emergent wetlands will be monitored for a minimum of 5 years and shrub and forested wetlands will be monitored for a minimum of 10 years or until performance standards are met. Monitoring includes:

1. During construction provide one-time photographic documentation of high quality soil placement across the site.

2. Measure inundation and saturation at all staff gauges, monitoring wells, and other stationary points shown in the mitigation plan (Figure 24) monthly during the growing season. Hydrology data shall be measured and provided at sufficient sample points to accurately depict the water regime of each wetland type.

3. Sample vegetation in plots located along transects shown in the mitigation plan (Figure 24) once between July 15 and August 31 or other timeline required to adequately sample target vegetation communities. The final number of sample plots necessary within each wetland type shall be determined by use of a species-area curve. The minimum number of sample plots for each wetland type shall be no fewer than five (5). Sample plots shall be located on the sample transect at evenly spaced intervals. If additional or alternative sample transects are needed to sufficiently evaluate each wetland type, they must be approved in advance in writing by regulatory staff. The herbaceous layer (all non-woody plants and woody plants less than 3.2 feet in height) shall be sampled using a 3.28 foot by 3.28 foot (1 square meter) sample plot. The shrub and tree layer shall be sampled using a 30-foot radius sample plot. The data recorded for each herbaceous layer sample plot shall include a list of all living plant species, and an estimate of percent cover in 5 percent intervals for each species recorded, bare soil areas and open water relative to the total area of the plot. The number and species of surviving, established and free-to-grow trees and surviving, established, and free-to-grow shrubs shall be recorded for each 30-foot radius plot. Plot data and a list of all the plant species identified in the plots and otherwise observed during monitoring will be provided. Data for each plant species will include common name in English, scientific name, wetland indicator category from the USFWS's National List of Plant Species That Occur in Wetlands for Region 3 (Reference 22), whether the species is considered native according to the Michigan Floristic Quality Assessment

(Reference 23) and associated coefficient of conservatism value. Nomenclature shall follow Reference 24 through Reference 26. Data will be used to calculate diversity, species richness, mean coefficient of conservatism values and a Floristic Quality Index for the mitigation site. Water depth measurements will be taken at the center of each sampling plot. The location of sample transects and plots will be identified in the monitoring report on a plan view showing the location of wetland types. Sample transects shall be permanently staked at a frequency sufficient to relocate the transect in the field.

4. Delineate any extensive (greater than 0.01 acre in size) open water areas, bare soil areas, areas dominated by invasive species, and areas without a predominance of wetland vegetation, and provide their location on a plan view.

5. Document any sightings or evidence of wading birds, songbirds, waterfowl, amphibians, reptiles, and other animal use (lodges, nests, tracks, scat, etc.) noted within the wetland during monitoring. Note the number, type, date, and hour of the sightings and evidence.

6. Inspect the site during all monitoring visits and inspections for oil, grease, man-made debris, and all other contaminants and report findings. Rate (e.g., poor, fair, good, excellent) and describe the water clarity in the mitigation wetland and determine source(s) of turbidity.

7. Provide annual photographic documentation of mitigation wetland development during vegetation sampling from permanent photo stations located within the mitigation site. At a minimum, photo stations shall be located at both ends of each transect. Photos will be labeled with the location, date, and direction.

8. Provide the number, type and location of habitat structures placed and representative photographs of each structure type.

9. Conduct a wetland delineation to determine the area meeting all three wetland criteria (dominance by hydrophytic vegetation, wetland hydrology and hydric soils) at the completion of the monitoring period. Include the wetland delineation in the final monitoring report as a supplement and include the estimated wetland acreage in the report.

10. Provide a written summary of data from previous monitoring periods and a discussion of changes or trends based on all monitoring results.

11. Provide a written summary of all the problem areas that have been identified and potential corrective measures to address them.

Monitoring reports shall cover the period of January 1 through December 31 of each year following planting. Reports will be submitted to Detroit Edison before January 31 of the following year. Detroit Edison will forward the annual reports to the appropriate regulatory agencies. Additional monitoring

beyond the 5 or 10-year standard monitoring period may be required if all performance standards are not met to the satisfaction of MDEQ and USACE.

9.0 MAINTENANCE, ADAPTIVE MANAGEMENT AND INVASIVE SPECIES MANAGMENT

Necessary steps will be taken to ensure the proper establishment and maintenance of the mitigation wetland. The mitigation site will be visited one to two times each year by qualified contractors during the monitoring period to satisfy standard maintenance requirements and to identify any conditions that threaten the proper protection, function and development of the wetlands, streams and associated buffers. Any deficiencies in vegetative community development including plant survival will be noted and appropriate corrective measures will be implemented.

If monitoring indicates that a performance standard is not being met, that standard will be evaluated to determine if simply more time is needed or if a remedial action may be required. Remedial measures may include seeding or planting, non-native plant control, and erosion control measures. In less common circumstances contingency may be required regarding the wetland basin, removal or addition of dikes, spillways, or other water control structures, and access control. Should adaptive management be required, Detroit Edison will develop an adaptive management plan and implementation timetable and submit it to the MDEQ and USACE for review and approval. Upon approval, Detroit Edison will proceed with implementation of adaptive management activities.

9.1 Invasive Species Management Plan

Recent surveys of the mitigation site have identified the presence of several invasive species, including common reed (*Phragmites australis*), reed canary grass (*Phalaris arundinacea*), flowering rush (*Butomus umbellatus*), and Canada thistle (*Cirsium arvense*). Purple loosestrife (*Lythrum salicaria*) has not been observed but is likely to occur in southeast Michigan in the habitat types present on the Monroe site. These species can be problematic if they are allowed to become established within mitigation areas. Most of these species prefer wetland sites, but upland areas can be just as susceptible to colonization by some of these and other invasive species. These and most other invasive species produce many seeds, grow quickly, have few natural predators in the area, and can quickly produce monocultures within mitigation areas to the significant detriment of more desirable native species. The invasive species management program for the Monroe site includes measures to identify and address the presence of invasive species within the site boundary and adjacent areas owned by Detroit Edison.

Mechanical and chemical treatment of existing invasive species will be conducted at least once before construction activities commence. Additional applications will be conducted if necessary. One treatment should sufficiently control the existing invasive species to a point where they can effectively be monitored and treated during and after construction as necessary to minimize existing coverage of all onsite invasive species. Several existing wetlands and upland areas at the mitigation site will be treated with herbicide to kill invasive plant species including common reed, reed canary grass and Canada thistle prior to construction of the mitigation wetland. Response from native vegetation will be facilitated by removing

dead, chemically treated vegetation through burning or mowing after each treatment. Seeding and planting within the mitigation area will be conducted as soon as conditions allow following earthwork, limiting the potential for new infestations. After construction, the mitigation area will be monitored to allow for early detection of, and rapid response to, the future establishment of any invasive species.

9.1.1 Monitoring

Monitoring of the mitigation area has already begun with the preconstruction vegetation surveys and wetland delineation. Species present have been recorded and invasive species have been noted. Additional surveys will be conducted prior to construction activities to map the specific location of invasive species patches in preparation for control activities. Monitoring will be conducted using both visual ocular and transect surveys once after preconstruction treatment but before construction, monthly during construction, and semi-annually after construction activities have ceased, to identify any regrowth of original invasive patches as well as any colonization of new areas by invasive species. Post construction monitoring will continue annually through the life of the monitoring period. This monitoring will be conducted by Detroit Edison staff or a qualified contractor. Anyone involved with identification of invasive species will be given instruction in identification of all invasive species likely to occur in southeast Michigan in the habitat types present on the Monroe site. Emphasis will be given to those species present prior to construction. Estimates of the percent cover of invasive species will be based on qualitative ocular estimates and reported to MDEQ and USACE as part of the regularly scheduled monitoring reports. If invasive species are observed, they will be addressed in accordance with the following management procedures.

If the permittee determines that it is infeasible to reduce the cover of invasive species to meet the performance standard identified in Section 7, item 8, the permittee must submit an assessment of the problem, a control plan, and the projected percent cover that can be achieved for review by the USACE. Based on this information, the USACE may approve an alternative invasive species standard. Any alternative invasive species standard must be approved in writing by the USACE.

9.1.2 Invasive Plant Species Management

Invasive plant species most likely to be a problem in the restored wetland areas include common reed, purple loosestrife, reed canary grass and flowering rush. Additionally, upland areas within the site are likely to be degraded by the presence of Canada thistle. Each species is addressed below including a discussion of its ecology and control measures.

Common Reed (*Phragmites australis*)

Common reed is an aggressive grass with an extensive rhizome root system (http://plants.usda.gov/factsheet/pdf/fs_phau7.pdf). Once established, common reed can be extremely difficult to eliminate. While many control measures have been tried in the past, including mowing, flooding, burning, and covering with black plastic, the most effective control method has been herbicide

application. Glyphosate has been shown to be an effective control measure but may take two or three seasons of applications to eliminate dense stands. Other herbicides, such as Imazapyr, have recently shown promise in controlling common reed and may be an effective alternative to Glyphosate. MDEQ and Michigan Department of Natural Resources (MDNR), Ducks Unlimited, USFWS, and other participating land managers are currently experimenting with various techniques for controlling common reed in coastal wetlands along Lake Erie and Saginaw Bay. The techniques being tested include glyphosate, imazapyr, and a glyphosate/imazapyr mixture along with mechanical management actions. The treatment plan for existing and any future growth of common reed at the Monroe site is based on the MDEQ Guide to the Control and Management of Invasive Phragmites (Reference 27), any new, widely accepted, information resulting from Phragmites control studies, and on consultation with regulatory and conservation agency staff who have extensive knowledge of chemical control of invasive species in the coastal zone of Western Lake Erie.

Common reed is shade intolerant and once the planted shrub and forested species provide a canopy that shades the restoration areas, common reed should not be a concern. If common reed becomes established in the emergent marsh areas, it will remain indefinitely since no shading will be likely. Regardless of its location, common reed will be aggressively controlled on the entire mitigation site during the monitoring period. Hand pulling or digging may be effective on small or very young plants. This technique is very labor intensive particularly if the plant becomes well established. However, once a stand becomes established, the extensive root system will make hand pulling or digging very difficult and essentially ineffective. At this point the most effective means of control of common reed will be application of herbicides, usually glyphosate as discussed above.

Herbicide can be sprayed or applied by wick application. Glyphosate is a nonspecific herbicide and the foliage of any plant sprayed will be killed. Therefore, spraying will be conducted in a manner in which overspray of non-target species is minimized. Control of dense stands of common reed may require multiple applications over several years. Application of herbicide will be conducted using a concentration and during a time period that has been shown to be effective in southeastern Michigan (e.g., 6 pints/acre of Glyphosate sprayed in early September). Any herbicide application within the mitigation site will be conducted by a Michigan licensed herbicide applicator. Additionally, any herbicide sprayed within the wetland areas of the site will be approved for such applications.

Currently, several dense stands of common reed exist on the mitigation site. These stands total approximately 15 acres. These stands will be treated with ground application equipment at least once before construction activities commence. Additional applications will be conducted if necessary. One application should sufficiently control the existing common reed stands to a point where they can effectively be monitored and treated while construction activities are underway.

Purple Loosestrife (*Lythrum salicaria*)

Purple loosestrife is a wetland indicator species and often found in natural and man-made wetlands (http://plants.usda.gov/plantguide/pdf/pg_lysa2.pdf). This species can be effectively controlled by several methods. Typical control measures include hand pulling, herbicide treatment or biological control (*Galerucella* spp. beetles). Similar to common reed, purple loosestrife is shade intolerant and once the planted shrub and forested species provide a canopy that shades the restoration areas, purple loosestrife should not be a concern. If purple loosestrife becomes established in the emergent marsh areas, it will remain indefinitely without treatment since no shading will be likely.

Regardless of its location, purple loosestrife will be aggressively controlled on the entire mitigation site during the monitoring period. Young plants can be pulled up by hand or dug up if the plant is not too big and the infestation is not too widespread. This technique is very labor intensive particularly if the plant becomes well established. However, once a stand becomes established, the extensive root system will make hand pulling or digging very difficult and essentially ineffective. Once the plants get larger than 18 inches in height, or the density of plants is excessive, herbicide treatment with Glyphosate or another suitable herbicide, as described for common reed above, will be more effective to control purple loosestrife. Control of dense stands of purple loosestrife may require multiple applications over several years.

Biological control may provide the best opportunity for long term treatment of an extensive infestation of purple loosestrife. Control would be achieved by the release of two leaf-feeding species of *Galerucella* spp. beetles (*G. pusilla* and *G. calmariensis*). Adults and larvae of these species prefer purple loosestrife as a food source feeding on the leaves, significantly weakening the plants and can cause a reduction in purple loosestrife density of up to 90 percent. Biological control is not expected to completely eradicate purple loosestrife and utilizing this approach will require review of performance standards. Use of these beetles has been shown to be effective in controlling purple loosestrife in other locations in Michigan including the Fermi site. Michigan Sea Grant, a cooperative program of the University of Michigan and Michigan State University, and administered through the National Oceanic and Atmospheric Administration (NOAA), provides information on the efficacy and use of biological control for purple loosestrife in Michigan (http://www.miseagrant.umich.edu/ais/pp/index.html). Biological control will be applied as needed and coordinated with Michigan Sea Grant and appropriate regulatory staff.

To date, purple loosestrife has not been detected at the Monroe site.

Reed Canary Grass (*Phalaris arundinacea*)

Reed canary grass is an aggressive wetland species that forms dense monotypic stands to the exclusion of other wetland species (http://plants.usda.gov/factsheet/pdf/fs_phar3.pdf). It spreads by rhizomous growth and seeds. Once established it can be difficult to adequately control due to resprouting from the soil seed bank. Similar to the previously highlighted species reed canary grass is shade intolerant and

once the planted shrub and forested species provide a canopy that shades the restoration areas, reed canary grass should not be a concern. If reed canary grass becomes established in the emergent marsh areas, it will remain indefinitely without treatment since no shading will be likely. Some control may be realized by increasing water levels, but this could negatively affect desirable species as well. Regardless of its location, reed canary grass will be aggressively managed prior to construction and controlled on the entire mitigation site and adjacent areas owned by Detroit Edison where appropriate during the monitoring period.

Several methods of control are available each with moderate effectiveness. No one methodology will be fully effective if the reed canary grass is well established. Control methods include, herbicides, burning, mowing or mechanical removal. Use of Glyphosate has shown to have some success, being effective for up to two years. After two years, regrowth from the seed bank may reestablish the stand. Spraying large stands and or wicking small stands or individual plants will provide the best options. Repeated application will likely be needed. Burning and twice yearly mowing have also shown some success, but again resprouting from the seed bank will require management over multiple years. Removal using heavy construction equipment has not shown to be effective due to rapid regrowth from rhizomes and seeds left in the soil.

Currently, stands of reed canary grass are present in existing wetlands at the mitigation site.

Flowering Rush (*Butomus umbellatus*)

Flowering rush is a perennial aquatic herb that spreads via rhizomes (http://www.in.gov/dnr/files/FLOWERING_RUSH.pdf). It can grow as both an emergent along shorelines and as a submersed plant in rivers and lakes. Once established, it can form dense stands which crowd out native plants. It is difficult to identify, especially when not flowered, as it resembles many native emergent plants, including common bulrush.

Control methods include, cutting and hand digging of the plant. It is very difficult to eradicate with the use of herbicides, herbicides easily wash off the narrow leaves of the plant. Cutting the plant below the surface of the water is an effective method of control. Cutting will not kill the plant, however it will decrease the abundance. Several cuttings within the same growing season will be required. It is very important that all cuttings of the plant be removed, any cuttings left can re-sprout and cause further spread. Hand digging is also an option for isolated plants or small stands. Care must be taken to remove all root fragments. As with the cuttings, any disturbed root fragment left can re-sprout and lead to the spread of the plant. Raking and pulling of the plants are not recommended as methods for this reason. Once the plant is removed from the water it can still grow and spread, mainly through sending out new shoots from the root stalk. All plants and pieces removed should be thoroughly dried. Drying should not occur near a wetland or any body of water, large piles should be turned frequently to ensure adequate drying. Control methods will have to be continued as long as the plant is present on the site. There is a

small stand of flowering rush in a wetland adjacent to the mitigation site that will be treated prior to construction and monitored thereafter.

Canada Thistle (*Cirsium arvense*)

Canada thistle is an aggressive, creeping perennial weed that reproduces from vegetative buds in its root system and from seed (http://plants.usda.gov/java/profile?symbol=ciar4). Infestation generally occurs on disturbed soils. It is difficult to control due to its extensive root structure, which allows it to recover after control attempts.

The key to controlling Canada thistle is to stress the plant and force it to use stored root nutrients. It is able to recover from almost any control method due to these root nutrient stores. Successful control and eradication requires several years of action. There are several viable options for control, and the best management includes combining multiple methods. Grasses and alfalfa can effectively compete with Canada thistle. If desired, planting these species in areas with Canada thistle will aid in control. Herbicide control is also an effective method; however, it will need to occur for several years as described for common reed above. Mowing is another option for control, in conjunction with herbicide treatments. Mowing should occur on a monthly basis, over several growing seasons. This repeated mowing regime depletes nutrients stored in the roots of the plant. Control methods should continue as long the plant is a problem on the site.

Farmed wetlands and upland areas at the mitigation site are colonized by Canada thistle and will be treated before, during and after construction utilizing a combination of the methods described above.

Control of Other Invasive Species

It is possible that other invasive species, not discussed in this document may become established in the mitigation area. Monitoring activities will be conducted with identification of any new species infestations as a priority. If any new invasive species are observed during monitoring or other site activities, those species will be identified, the size of the infestation determined and the best control methods researched and implemented.

9.1.3 Summary of Invasive Species Control

This plan provides a number of potential management techniques for the most likely invasive species that will be encountered in this project. No single management technique may be adequate to address all invasive species problems. Monitoring will be conducted on the entire mitigation site, including all habitat types. Once established, invasive species can be very difficult to control and even harder to eliminate. Therefore, the most important component of this invasive species control program is early detection and rapid response to new invasive species infestations. If the presence of invasive species is noted, a response plan will quickly be prepared to address the problem and determine the most effective and efficient control program. Action will be taken as soon as conditions (e.g., weather, time of year, plant life stage, etc.) allow. If a new infestation moves beyond a few plants and into a large area of coverage, it is

likely that control will have to incorporate one or more techniques over multiple seasons. However, even under this circumstance, the most effective and efficient control techniques will be used in an effort to eliminate the problem as soon as possible. When determining the proper technique to use to control invasive species, many variables will be reviewed. Control techniques will be reviewed based on factors such as historical and recent research, range wide efficacy, local efficacy, ecological impact of the control technique, and onsite experience with the control technique.

Monitoring for invasive species will be conducted throughout the construction period as part of the regular construction environmental monitoring and will continue after completion of construction as part of the wetland mitigation monitoring. Results of invasive species monitoring and control measures will be reported in annual monitoring reports. The Long Term Management Plan will also incorporate periodic monitoring and management measures for invasive species as appropriate.

10.0 LONG TERM MANAGEMENT PLAN

As discussed in Section 6, ownership of the mitigation site will remain with Detroit Edison. The site will be permanently protected via a conservation easement. In addition, Detroit Edison will implement the following actions to ensure long term management for the mitigation site. The long term management actions will commence with the acceptance of the final mitigation monitoring report and regulatory approval that the mitigation site has met all necessary performance standards. Detroit Edison will commence long term management by developing all necessary stewardship agreements and endowments. Copies of agreements and documentation of endowment funds to support annual site visits and any necessary long term management actions will be provided to regulatory agencies for the permit file.

This long term management plan provides an overview of how the wetland mitigation site will be monitored and maintained after mitigation construction has been completed and final performance standards have been met. Detroit Edison will enter into a long term agreement with a suitable third party steward and establish an endowment to support third party review of site conditions and long term management activities. The responsibility of Detroit Edison and the third party steward is to implement the activities described here and to prescribe, execute and evaluate any necessary management actions.

The third party steward will be provided with a copy of the Final Aquatic Resource Mitigation Strategy and Final Design, which includes this long term management plan. Section 3.2 of the mitigation strategy provides detailed background on the mitigation site including location, site history, existing conditions and adjacent land use. Section 5 provides a detailed description of mitigation actions and community types targeted for development of the site. A copy of as-built conditions and detailed monitoring reports will also be provided to the third party steward to support and guide stewardship review and activities. Monitoring reports will include as-built conditions, a final wetland delineation identifying wetland community boundaries, documentation of any rare and imperiled vegetation communities and animal species, photo documentation, existing and potential threats and potential problem areas. The third party

steward will review all available information and conduct an initial site visit. Detroit Edison will establish permanent photo stations and water level monitoring stations designated for the long term management phase. Detroit Edison will conduct annual site visits to the mitigation site. During annual site visits qualified staff will:

- Traverse the perimeter of the mitigation site
- Traverse wetland areas including a representative sample of each wetland community type
- Take photos from permanent photos stations
- Collect water level data from permanent water level gauges
- Record anecdotal observation of plant and animal species
- Record observations of public use activities
- Record, photograph and map potential threats (invasive species, erosion, signs of incompatible public use, etc.)
- Record, photograph and map rare and imperiled communities/species
- Visit areas where threats were previously recorded and evaluate efficacy of previous management actions.
- Check perimeter signs demarcating the conservation easement boundary to ensure signs are in place and readable.

In addition to the items listed above, annual site visits will document adherence to the conservation easement ensuring there has been no alteration of topography, creation of unplanned paths, trails, or roads; placement of fill, dredging, or excavation; drainage of surface or groundwater; construction or placement of any structure; plowing, tilling, or cultivating the soils or vegetation; cutting, removal, or alteration of vegetation; including the planting of non-native plant species; construction of unauthorized utility or petroleum lines; storage or disposal of garbage, trash, debris, abandoned equipment; accumulation of machinery or other waste materials; use or storage of off-road vehicles; placement of billboards or signs; or the use of the wetland for the dumping of storm water.

An annual stewardship report will be submitted to the third party steward for review. This report wil include recommendations for any required management actions and a suggested implementation schedule and cost estimate. Management actions will be implemented at the appropriate time and for the appropriate duration. Management actions will be prescribed only in the case of a documented threat. Threats may include erosion, presence of invasive species, nuisance wildlife, changes to adjacent land use, incompatible use of wetland areas, missing or unreadable boundary signs. Recommended management actions may include:

- Water level manipulation
- Manual or chemical removal of undesirable plant species as described in the invasive species management plan in Section 9.1
- Control of nuisance wildlife

- Repairs to berm, spillway or water control structures as needed
- Water level management as needed to maintain healthy interspersion of water and emergent vegetation on the west side of the mitigation site.
- Monitoring and management of public use to ensure compatible activities.
- Water quality monitoring to protect from undesirable impacts from land use changes in adjacent areas.
- Clean up of trash and debris
- Repair and maintenance of conservation easement signs and designated public use trails and signage.

The annual stewardship report will also be used to inform and update the long term management plan to continue utilizing an adaptive management strategy for development and maintenance of the wetland communities at the mitigation site.

11.0 FINANCIAL ASSURANCES

Detroit Edison will provide financial assurances in the amount of $7,500,000 in the form of a letter of credit or bond to ensure that the replacement wetland is constructed, the conservation easement is recorded, monitoring is completed, and corrective actions are performed as required to comply with the mitigation requirements and conditions of MDEQ permit 10-58-0011-P. The financial assurance document shall be provided to and accepted by the MDEQ within 6 months after the Decision to Construct Fermi 3.

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TABLES AND FIGURES

Table 1. Wetland Impacts and Attributes Summary Table (Sheet 1 of 2)

ID	Type/General Description	Total Size (acres)	Impact (acres)	Jurisdiction	Condition/ Primary Function
B	Linear PFO	0.76	0.76	MDEQ/USACE	Low/ Floodflow alteration, sediment, toxicant retention, nutrient removal and wildlife habitat
C	Great Lakes marsh, fragmented from Lake Erie by access roads, but connected hydrologically through culverts	48.18	9.73[a]	MDEQ/USACE	Medium (high ecological value)/ Floodflow alteration, sediment, toxicant retention, nutrient removal and wildlife habitat
D	Palustrine forested wetland with partially open canopy	1.37	1.37	MDEQ/USACE	Medium/ Floodflow alteration, sediment, toxicant retention, nutrient removal and wildlife habitat
E-North	North: Palustrine mix of scrub-shrub, emergent marsh/wet meadow, in two sections split by Wetland D,	2.67	1.87	MDEQ/USACE	Medium/Floodflow alteration, sediment, toxicant retention, nutrient removal and wildlife habitat for both portions of E
E-South	South: Southern shrub carr or other coastal wetland type	2.04	2.04		
F	PFO southern hardwood swamp, relatively intact,	31.07	2.71	MDEQ/USACE	Medium (high ecological value)/Floodflow alteration, sediment, toxicant retention, nutrient removal and wildlife habitat
H	PEM edge around a created open water pit	1.96	1.96	MDEQ	Low/Minimal floodflow alteration, sediment/toxicant retention and nutrient removal
I	PFO southern hardwood swamp, relatively intact, indirectly connected to Lake Erie, provides a buffer for the interior and less disturbed wetland	39.74	0.44	MDEQ/USACE	Medium (high ecological value)/Floodflow alteration, sediment, toxicant retention, nutrient removal and wildlife habitat
U	PEM edge around a created open water canal	3.46	3.46	MDEQ/USACE	Low/Minimal floodflow alteration, sediment/toxicant retention and nutrient removal.
W	PEM wet meadow wetland	4.59	4.59	MDEQ	Low/ Floodflow alteration, sediment, toxicant retention, nutrient removal and marginal wildlife habitat

Table 1. Wetland Impacts and Attributes Summary Table (Sheet 2 of 2)

ID	Type/General Description	Total Size (acres)	Impact (acres)	Jurisdiction	Condition/ Primary Function
Y	PFO fragmented early successional with mixed vegetation and a partially open canopy	1.14	1.14	MDEQ	Low/Marginal wildlife habitat for edge species and limited water storage.
AA	PEM established spoil area	0.80	0.80	MDEQ/USACE	Low/Minimal floodflow alteration, sediment/toxicant retention and nutrient removal
II	PEM ditch, contains vegetation communities with high structural diversity and low species diversity with well-established invasive species populations	0.52	0.52	MDEQ	Low/ minimal floodflow alteration, sediment/toxicant retention and nutrient removal
JJ	PSS established spoil area	1.37	1.37	MDEQ	Low/ minimal floodflow alteration, sediment/toxicant retention and nutrient removal
KK	PFO linear wetland, connected to the South Canal	1.62	1.62	MDEQ/USACE	Low/ floodflow alteration, sediment/toxicant retention, nutrient removal, marginal wildlife habitat for edge species
South Canal	PEM Great Lakes marsh hydrologically connected to Lake Erie	1.97	1.17	MDEQ/USACE	Medium/ fish and wildlife habitat, floodflow alteration, sediment, toxicant retention and nutrient removal

a. 2.29 acres of temporary impact associated with transmission line construction are excluded. The area will be restored immediately after construction and does not require additional mitigation as per regulatory guidance.

Table 2. Wetland Impacts and Proposed Mitigation

Wetland Type	Fermi 3 Impacted Areas (Acres)[a]	USACE Jurisdictional Impacted Areas (Acres)[a]	Proposed Mitigation (Acres)
Emergent Marsh			
Great Lakes marsh (rare/imperiled)	9.73	9.73	
Palustrine emergent (coastal)	0.80	0.80	
Palustrine emergent (other)	5.11	0	
Emergent Marsh Totals	**15.64**	**10.53**	**69.99**
Open water - Great Lakes marsh (rare/imperiled)	1.17	1.17	
Open water - emergent (other)	5.42	3.46	
Open Water Totals	**6.59**	**4.63**	**27.25**
Forested Wetland			
Southern hardwood swamp (rare/imperiled)	3.15	3.15	
Palustrine forested (coastal and other)	4.89	3.75	
Forested Wetland Totals	**8.04**	**6.90**	**22.30**
Scrub Shrub Wetland			
Southern shrub carr (coastal)	3.91	3.91	
Palustrine scrub shrub (other)	1.37	0	
Shrub/Scrub Wetland Totals	**5.28**	**3.91**	**10.61**
Wetland Totals	**35.55**	**25.97**	**130.15**

a. 2.29 acres of temporary impact associated with transmission line construction will be restored immediately after construction and does not require additional mitigation as per regulatory guidance.

Table 3. Great Lakes Marsh – Emergent Planting Plan

Great Lakes Marsh	**67.69 acres**		
Seed Mix Species List	**Seeding Rate: 6 lbs/acre**		
Common Name	**Scientific Name**	**Form[a]**	**% by Seeds**
Sweet flag	*Acorus calamus*	Seed/Plug	0.31
Common water plantain	*Alisma subcordatum*	Seed/Plug	2.81
Swamp milkweed	*Asclepias incarnata*	Seed/Plug	0.23
Swamp aster	*Aster puniceus*	Seed/Plug	0.38
American slough grass	*Beckmannia syzigache*	Seed	3.28
Nodding bur marigold	*Bidens cernua*	Seed	2.95
Bristly sedge	*Carex comosa*	Seed/Plug	1.41
Bottlebrush sedge	*Carex hystericina*	Seed/Plug	1.13
Awlfruit sedge	*Carex stipata*	Seed/Plug	1.59
Fox sedge	*Carex vulpinoidea*	Seed/Plug	1.88
Joe pye weed	*Eupatorium maculatum*	Seed/Plug	0.45
Common boneset	*Eupatorium perfoliatum*	Seed/Plug	0.75
Canada manna grass	*Glyceria canadensis*	Seed	3.47
Reed manna grass	*Glyceria grandis*	Seed	3.75
Southern blue flag	*Iris virginica*	Seed/Plug	0.09
Soft rush	*Juncus effusus*	Seed/Plug	4.69
Cardinal flower	*Lobelia cardinalis*	Seed/Plug	1.88
Great blue lobelia	*Lobelia siphilitica*	Seed/Plug	2.34
Monkey flower	*Mimulus ringens*	Seed/Plug	21.57
Pennsylvania smartweed	*Polygonum pennsylvanicum*	Seed	1.22
Pickerel weed	*Pontederia cordata*	Seed/Plug	0.03
Common arrowhead	*Sagittaria latifolia*	Seed/Plug	0.29
Dark green bulrush	*Scirpus atrovirens*	Seed	21.57
Soft-stem bulrush	*Scirpus validus*	Seed	4.36
Common bur reed	*Sparganium eurycarpum*	Seed/Plug	0.14
Blue vervain	*Verbena hastata*	Seed/Plug	17.44

a. Plugs will be planted at a density of 500 plugs/acre along open water emergent marsh transition zones comprised of a mix of the listed species where Seed/Plug is indicated in the Form column.

Table 4. Southern Wet Meadow – Emergent Planting Plan (Sheet 1 of 2)

Southern Wet Meadow	**15.87 acres**		
Seed Mix Species List	**Seeding Rate: 6 lbs/acre**		
Common Name	**Scientific Name**	**Form**	**% by Seeds**
Swamp milkweed	*Asclepias incarnata*	Seed	0.12
Eastern lined aster	*Aster lanceolatus*	Seed	7.58
Side flowering aster	*Aster lateriflorus*	Seed	0.6
Swamp aster	*Aster puniceus*	Seed	7.73
Blue joint grass	*Calamagrostis canadensis*	Seed	13.53
Marsh bellflower	*Campanula americana*	Seed	0.82
Fringed sedge	*Carex crinita*	Seed	0.56
Bottlebrush sedge	*Carex hystericina*	Seed	1.09
Hairy sedge	*Carex lacustris*	Seed	0.06
Wollyfruit sedge	*Carex lasiocarpa*	Seed	0.03
Shallow sedge	*Carex lurida*	Seed	0.29
Fen panicled sedge	*Carex prairea*	Seed	2.03
Sartwell's sedge	*Carex sartwellii*	Seed	0.16
Awlfruit sedge	*Carex stipata*	Seed	0.82
Upright sedge	*Carex stricta*	Seed	0.13
Water hemlock	*Cicuta maculata*	Seed	0.29
Swamp thistle	*Cirsium muticum*	Seed	0.02
Spike rush	*Eleocharis calva*	Seed	8.7
Joe pye weed	*Eupatorium maculatum*	Seed	2.3
Common boneset	*Eupatorium perfoliatum*	Seed	15.46
Northern bedstraw	*Galium boreale*	Seed	0.17
Fowl manna grass	*Glyceria striata*	Seed	15.46
Marsh St.John's wort	*Hypericum virginicum*	Seed	0.56
Jewelweed	*Impatiens capensis*	Seed	0.01
Southern blue flag	*Iris virginica*	Seed	0.02
Marsh pea	*Lathyrus venosus*	Seed	0.01
Water horehound	*Lycopus americanus*	Seed	12.56
Prairie loosestrife	*Lysimachia quadriflora*	Seed	0.22
Wild mint	*Mentha arvensis*	Seed	1.45
Marsh wild timothy	*Muhlenbergia glomerata*	Seed	0.54
Water smartweed	*Polygonum amphibium*	Seed	0.01

Table 4. Southern Wet Meadow – Emergent Planting Plan (Sheet 2 of 2)

Southern Wet Meadow	**15.87 acres**		
Seed Mix Species List	**Seeding Rate: 6 lbs/acre**		
Common Name	**Scientific Name**	**Form**	**% by Seeds**
Mountain mint	*Pycnanthemum virginianum*	Seed	1.06
Great water dock	*Rumex orbiculatus*	Seed	0.02
Common arrowhead	*Sagittaria latifolia*	Seed	1.47
Mad dog skullcap	*Scutellaria lateriflora*	Seed	0.16
Late goldenrod	*Solidago gigantea*	Seed	0.6
Swamp goldenrod	*Solidago patula*	Seed	0.87
Rough goldenrod	*Solidago rugosa*	Seed	2.23
Purple meadow rue	*Thalictrum dasycarpum*	Seed	0.27

Table 5. Southern Shrub-Carr – Shrub Wetland Planting Plan (Sheet 1 of 2)

Southern Shrub-Carr	**10.84 acres**				
Container Species					
Common Name	**Scientific Name**	**Form**	**Size**	**Spacing**	**%**
Black chokeberry	*Aronia prunifolia*	Flat/Cont	1 gal	10'x10'	5
Bog birch	*Betula pumila*	Flat/Cont	1 gal	10'x10'	15
Silky dogwood	*Cornus amomum*	Flat/Cont	1 gal	10'x10'	15
Red osier dogwood	*Cornus sericea*	Flat/Cont	1 gal	10'x10'	10
American hazelnut	*Corylus americana*	Cont	1 gal	10'x10'	5
Winterberry	*Ilex verticillata*	Cont	1 gal	10'x10'	10
Swamp rose	*Rosa palustris*	Flat/Cont	1 gal	10'x10'	5
Pussy willow	*Salix discolor*	Flat/Cont	1 gal	10'x10'	10
Elderberry	*Sambuscus canadensis*	Flat/Cont	1 gal	10'x10'	10
Meadowsweet	*Spiraea alba*	Flat/Cont	1 gal	10'x10'	5
Nannyberry	*Viburnum lentago*	Cont	1 gal	10'x10'	5
Shrubby cinquefoil	*Potentilla fruticosa*	Flat	1 gal	10'x10'	5
		TOTAL PLANTS		**4,336**	**100**

Table 5. Southern Shrub-Carr – Shrub Wetland Planting Plan (Sheet 2 of 2)

Southern Shrub-Carr	**10.84 acres**		
Seed Mix Species List	**Seeding Rate: 6 lbs/acre**		
Common Name	**Scientific Name**	**Form**	**% by Seeds**
Water plantain	*Alisma subcordatum*	Seed	4.17
Swamp milkweed	*Asclepias incarnata*	Seed	0.67
Blue joint grass	*Calamagrostis canadensis*	Seed	19.46
Tall bellflower	*Campanula americana*	Seed	2.95
Longhair sedge	*Carex comosa*	Seed	2.09
Bottlebrush sedge	*Carex hystericina*	Seed	2.09
Hairy sedge	*Carex lacustris*	Seed	0.09
Upright sedge	*Carex stricta*	Seed	0.18
Fox sedge	*Carex vulpinoidea*	Seed	8.69
Water hemlock	*Cicuta maculata*	Seed	0.42
Common boneset	*Eupatorium perfoliatum*	Seed	11.12
Northern bedstraw	*Gallium boreale*	Seed	0.24
Rattlesnake grass	*Glyceria canadensis*	Seed	10.29
Soft rush	*Juncus effusus*	Seed	6.95
Water horehound	*Lycopus americanus*	Seed	6.78
Dark green bulrush	*Scirpus atrovirens*	Seed	6.39
Wool grass	*Scirpus cyperinus*	Seed	11.82
Rufous bulrush	*Scirpus pendulus*	Seed	1.31
Softstem bulrush	*Scirpus validus*	Seed	1.08
Rough goldenrod	*Solidago rugosa*	Seed	3.21

Table 6. Southern Hardwood Swamp – Forested Wetland Planting Plan (Sheet 1 of 2)

Southern Hardwood Swamp	**25.69 acres**				
Container Species					
Common Name	**Scientific Name**	**Form**	**Size**	**Spacing**	**%**
Red maple	*Acer rubrum*	Cont	1 gal	10'x10'	5
Silver maple	*Acer saccharinum*	Flat/Cont	1 gal	10'x10'	15
Yellow birch	*Betula alleghaniensis*	Flat/Cont	1 gal	10'x10'	10
Tamarack	*Larix laricina*	Cont	1 gal	10'x10'	5
Eastern cottonwood	*Populus deltoides*	Cont	1 gal	10'x10'	5
Swamp white oak	*Quercus bicolor*	Cont	1 gal	10'x10'	10
Pin Oak	*Quercus palustris*	Cont	1 gal	10'x10'	5
Musclewood	*Carpinus caroliniana*	Cont	1 gal	10'x10'	5
Shagbark hickory	*Carya ovata*	Cont	1 gal	10'x10'	10
Hackberry	*Celtis occidentalis*	Cont	1 gal	10'x10'	2
Buttonbush	*Cephalanthus occidentalis*	Flat/Cont	1 gal	10'x10'	2
Gray dogwood	*Cornus racemosa*	Cont	1 gal	10'x10'	5
Running strawberry bush	*Euonymus obovatus*	Cont	1 gal	10'x10'	2
Michigan holly	*Ilex verticillata*	Cont	1 gal	10'x10'	5
Spicebush	*Lindera benzoin*	Cont	1 gal	10'x10'	5
Chokecherry	*Prunus virginiana*	Cont	1 gal	10'x10'	2
Wild black currant	*Ribes americanum*	Cont	1 gal	10'x10'	1
Swamp rose	*Rosa palustris*	Flat/Cont	1 gal	10'x10'	2
Elderberry	*Sambuscus canadensis*	Flat/Cont	1 gal	10'x10'	2
Nannyberry	*Viburnum lentago*	Cont	1 gal	10'x10'	2
		TOTAL PLANTS		**10,276**	**100**

Table 6. Southern Hardwood Swamp – Forested Wetland Planting Plan (Sheet 2 of 2)

Southern Hardwood Swamp	**25.69 acres**		
Seed Mix Species List	**Seeding Rate: 6 lbs/acre**		
Common Name	**Scientific Name**	**Form**	**% by Seeds**
Water plantain	*Alisma subcordatum*	Seed	4.17
Swamp milkweed	*Asclepias incarnata*	Seed	0.67
Blue joint grass	*Calamagrostis canadensis*	Seed	19.46
Tall bellflower	*Campanula americana*	Seed	2.95
Longhair sedge	*Carex comosa*	Seed	2.09
Bottlebrush sedge	*Carex hystericina*	Seed	2.09
Hairy sedge	*Carex lacustris*	Seed	0.09
Upright sedge	*Carex stricta*	Seed	0.18
Fox sedge	*Carex vulpinoidea*	Seed	8.69
Water hemlock	*Cicuta maculata*	Seed	0.42
Common boneset	*Eupatorium perfoliatum*	Seed	11.12
Northern bedstraw	*Gallium boreale*	Seed	0.24
Rattlesnake grass	*Glyceria canadensis*	Seed	10.29
Soft rush	*Juncus effusus*	Seed	6.95
Water horehound	*Lycopus americanus*	Seed	6.78
Dark green bulrush	*Scirpus atrovirens*	Seed	6.39
Wool grass	*Scirpus cyperinus*	Seed	11.82
Rufous bulrush	*Scirpus pendulus*	Seed	1.31
Softstem bulrush	*Scirpus validus*	Seed	1.08
Rough goldenrod	*Solidago rugosa*	Seed	3.21

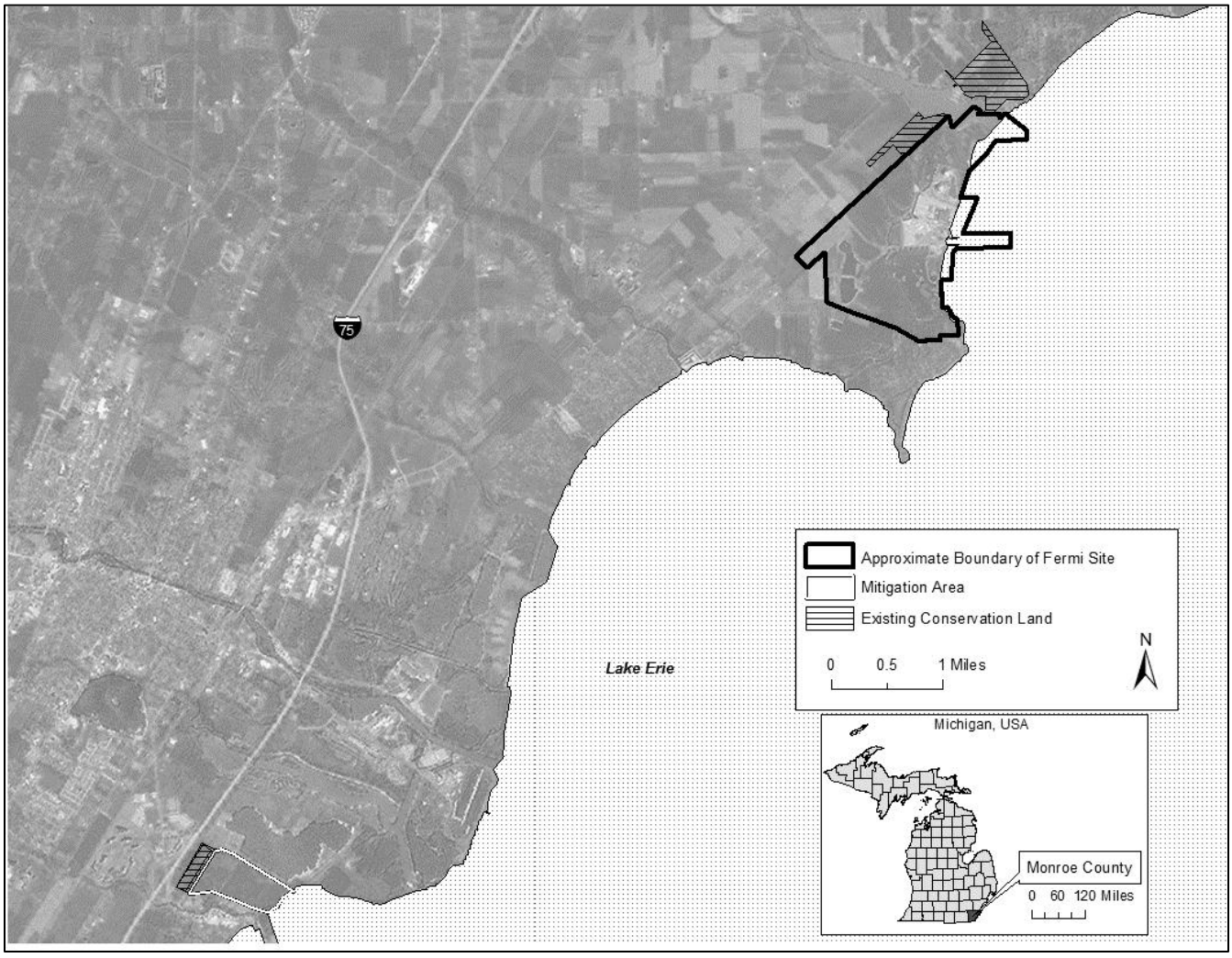
Table 7. Mesic Southern Forest – Upland Planting Plan (Sheet 1 of 2)

Mesic Southern Forest	**13.31 acres**				
Container Species					
Common Name	**Scientific Name**	**Form**	**Size**	**Spacing**	**%**
Red maple	*Acer rubrum*	Cont	1 gal	30'x30'	10.0
Sugar maple	*Acer saccharum*	Flat/Cont	1 gal	30'x30'	20.0
Bitternut hickory	*Carya cordiformis*	Flat/Cont	1 gal	30'x30'	12.5
American beech	*Fagus grandifolia*	Cont	1 gal	30'x30'	12.5
Tulip tree	*Liriodendron tulipifera*	Cont	1 gal	30'x30'	7.5
Black cherry	*Prunus serotina*	Cont	1 gal	30'x30'	7.5
White oak	*Quercus alba*	Cont	1 gal	30'x30'	5.0
Northern red oak	*Quercus rubra*	Cont	1 gal	30'x30'	5.0
American basswood	*Tilia americana*	Cont	1 gal	30'x30'	5.0
Pawpaw	*Asimina triloba*	Cont	1 gal	30'x30'	2.0
Musclewood	*Carpinus caroliniana*	Flat/Cont	1 gal	30'x30'	2.0
Alternate-leaved dogwood	*Cornus alternifolia*	Cont	1 gal	30'x30'	2.0
Witch hazel	*Hamamelis virginiana*	Cont	1 gal	30'x30'	2.0
Spicebush	*Lindera benzoin*	Cont	1 gal	30'x30'	3.0
Virginia creeper	*Parthenocissus quinquefolia*	Cont	1 gal	30'x30'	2.0
Maple-leaf viburnum	*Viburnum acerifolium*	Cont	1 gal	30'x30'	2.0
		TOTAL PLANTS		**644**	**100.0**

Table 7. Mesic Southern Forest – Upland Planting Plan (Sheet 2 of 2)

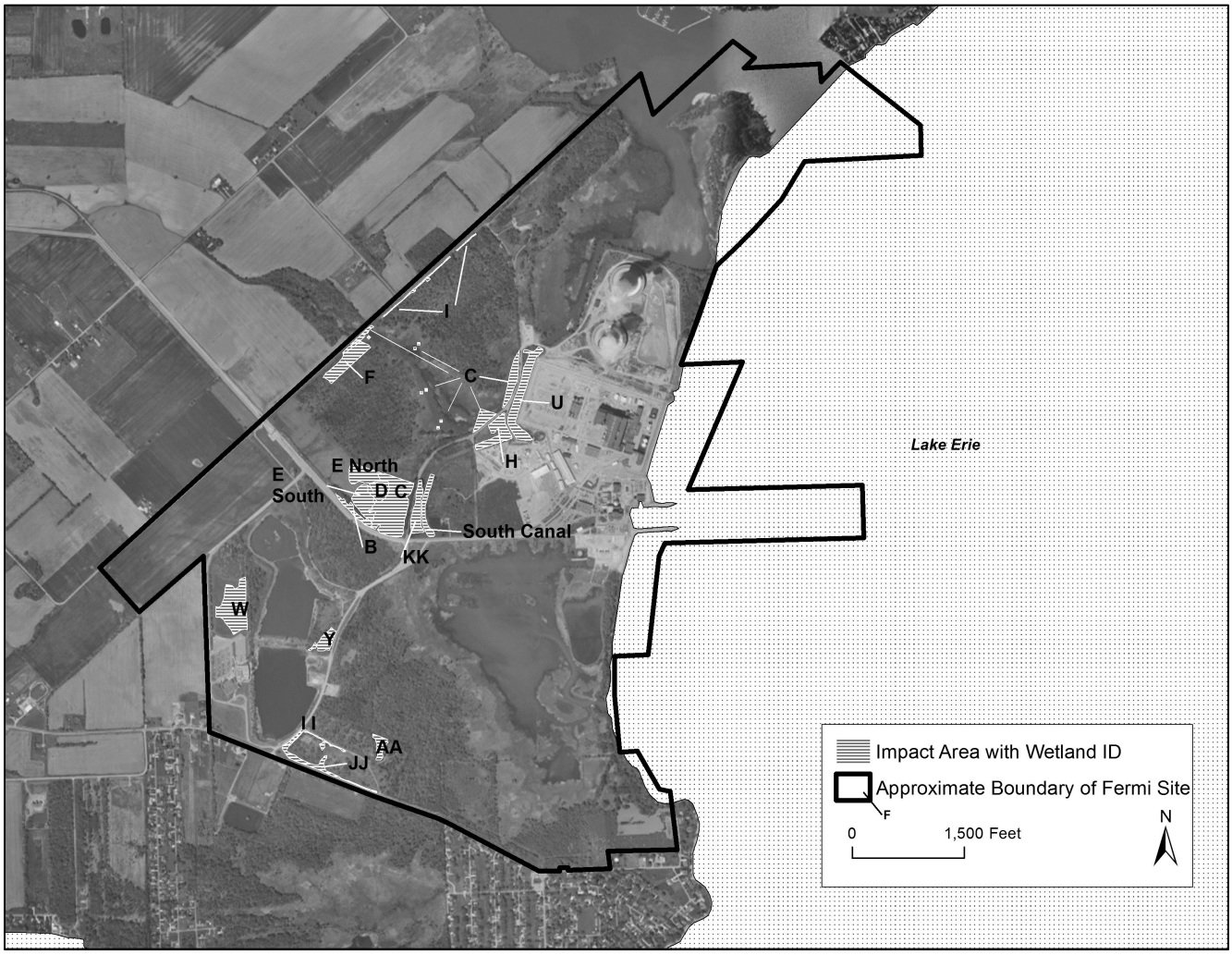
Mesic Southern Forest	**13.31 acres**		
Seed Mix Species List	**Seeding Rate: 7 lbs/acre**		
Common Name	**Scientific Name**	**Form**	**% by Weight**
Big bluestem	*Andropogon gerardii*	Seed	8.93
Common milkweed	*Asclepias syriaca*	Seed	0.9
Butterfly milkweed	*Asclepias tuberosa*	Seed	0.45
Arrow-leaved aster	*Aster sagittifolius*	Seed	1.34
White wild indigo	*Baptisia lactea*	Seed	0.9
Partridge pea	*Cassia fasciculata*	Seed	3.93
Lance-leaf coreopsis	*Coreopsis lanceolata*	Seed	1.8
Purple coneflower	*Echinacea purpurea*	Seed	3.57
Canada wild rye	*Elymus canadensis*	See	28.57
Rattlesnake master	*Eryngium yuccifolium*	Seed	0.9
False sunflower	*Heliopsis helianthoides*	Seed	3.57
Wild bergamot	*Monarda fistulosa*	Seed	0.27
Switchgrass	*Panicum virgatum*	Seed	7.14
Foxglove beardtongue	*Penstemon digitalis*	Seed	1.8
Yellow coneflower	*Ratibida pinnata*	Seed	2.68
Black-eyed susan	*Rudbeckia hirta*	Seed	4.46
Brown-eyed susan	*Rudbeckia triloba*	Seed	0.27
Little bluestem	*Schizachyrium scoparium*	Seed	8.93
Indian grass	*Sorghastrum nutans*	Seed	17.86
Hoary vervain	*Verbena stricta*	Seed	1.8

Figure 1. Site Location Map



Source: Reference 28

Figure 2. Wetland Impact Area Map



Source: Reference 28

Figure 3. Mitigation Site Plan

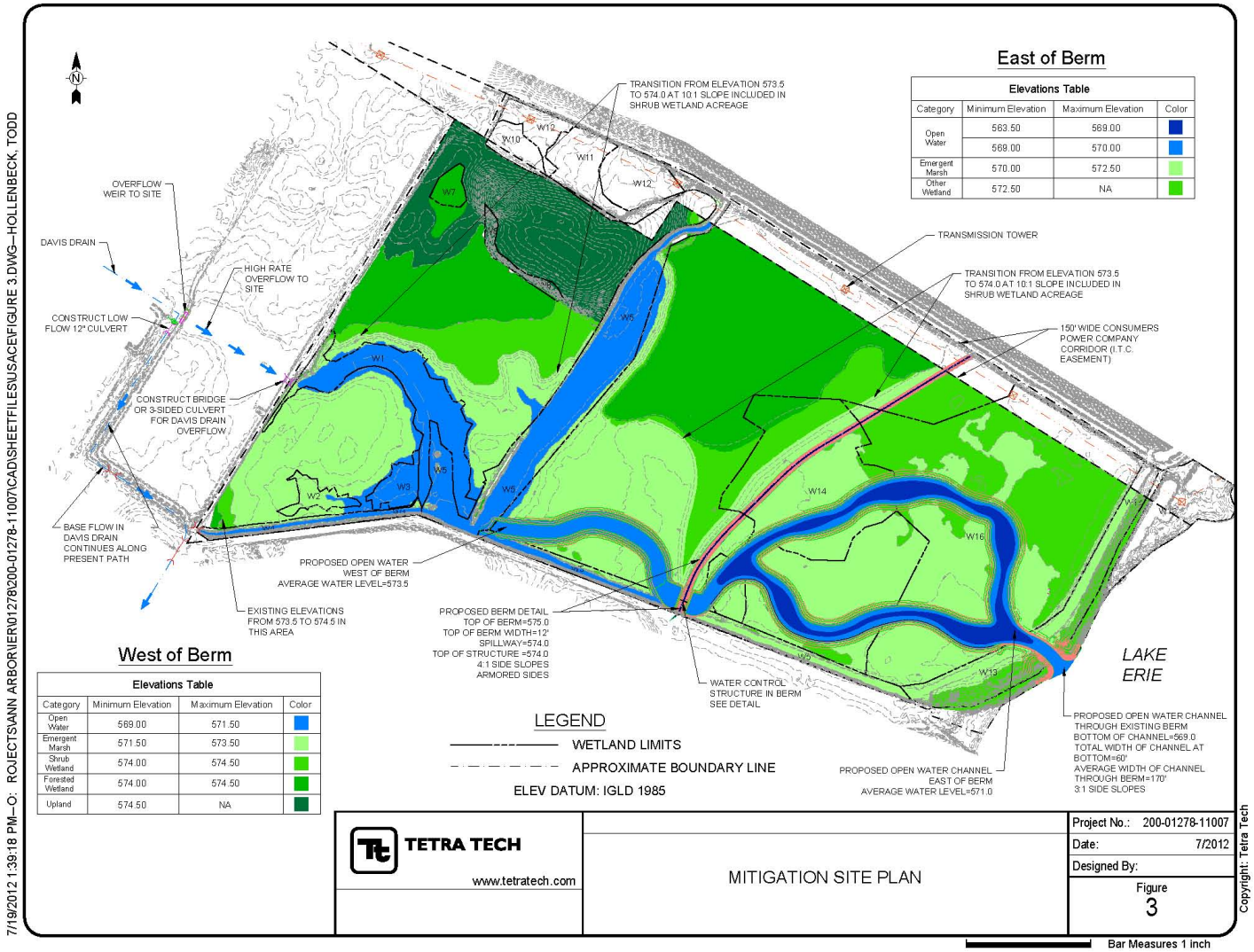


Figure 4. Mitigation Acreages

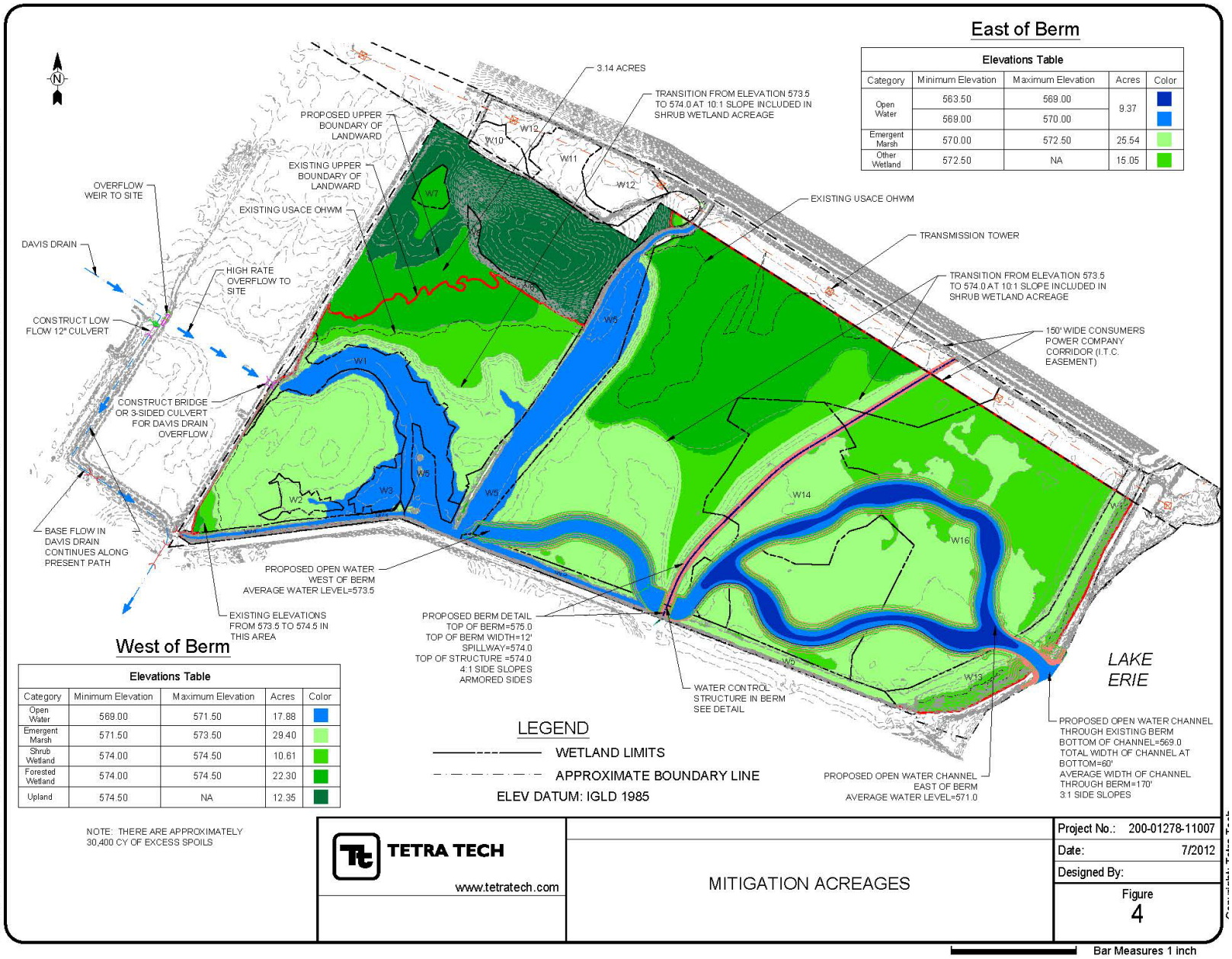
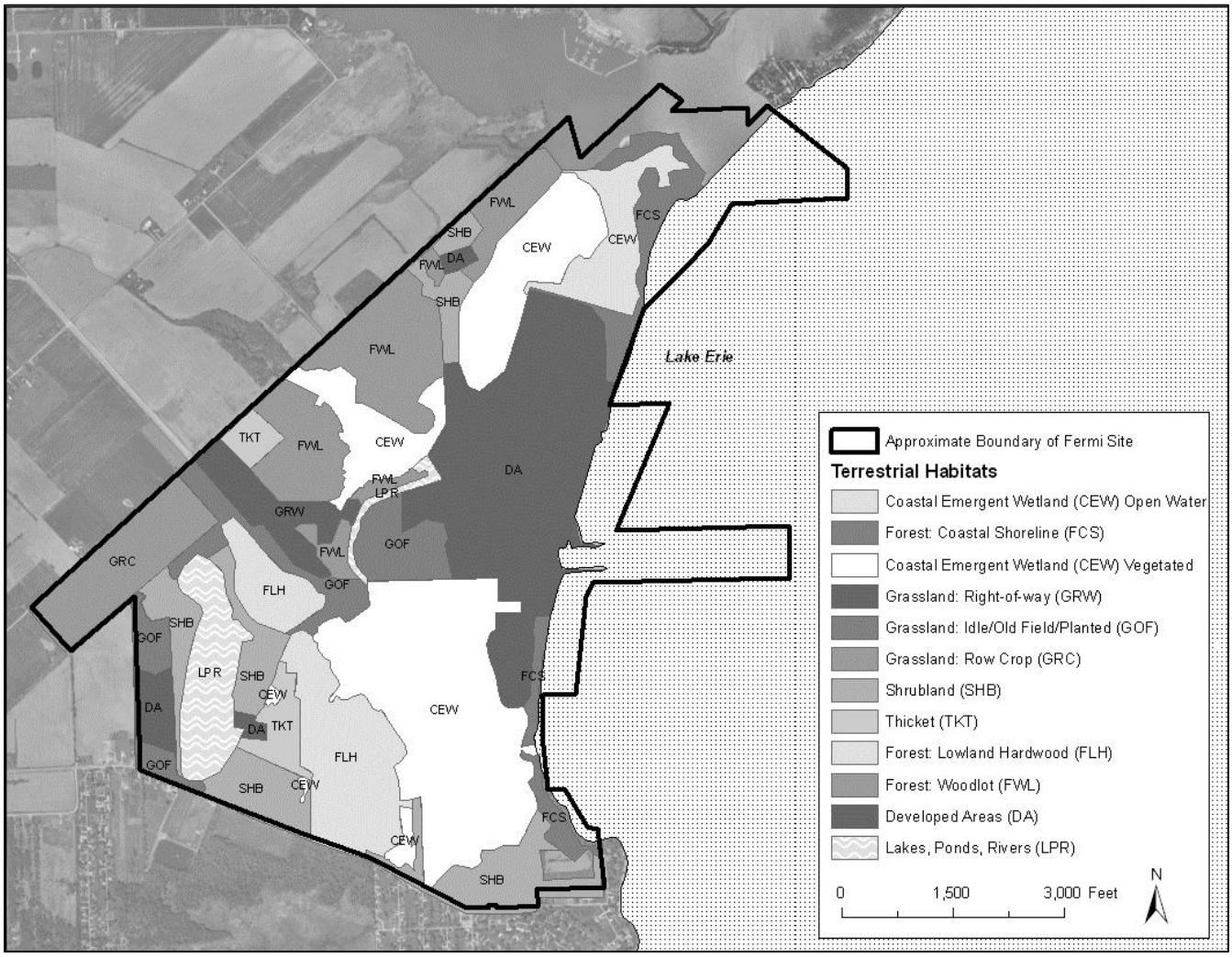
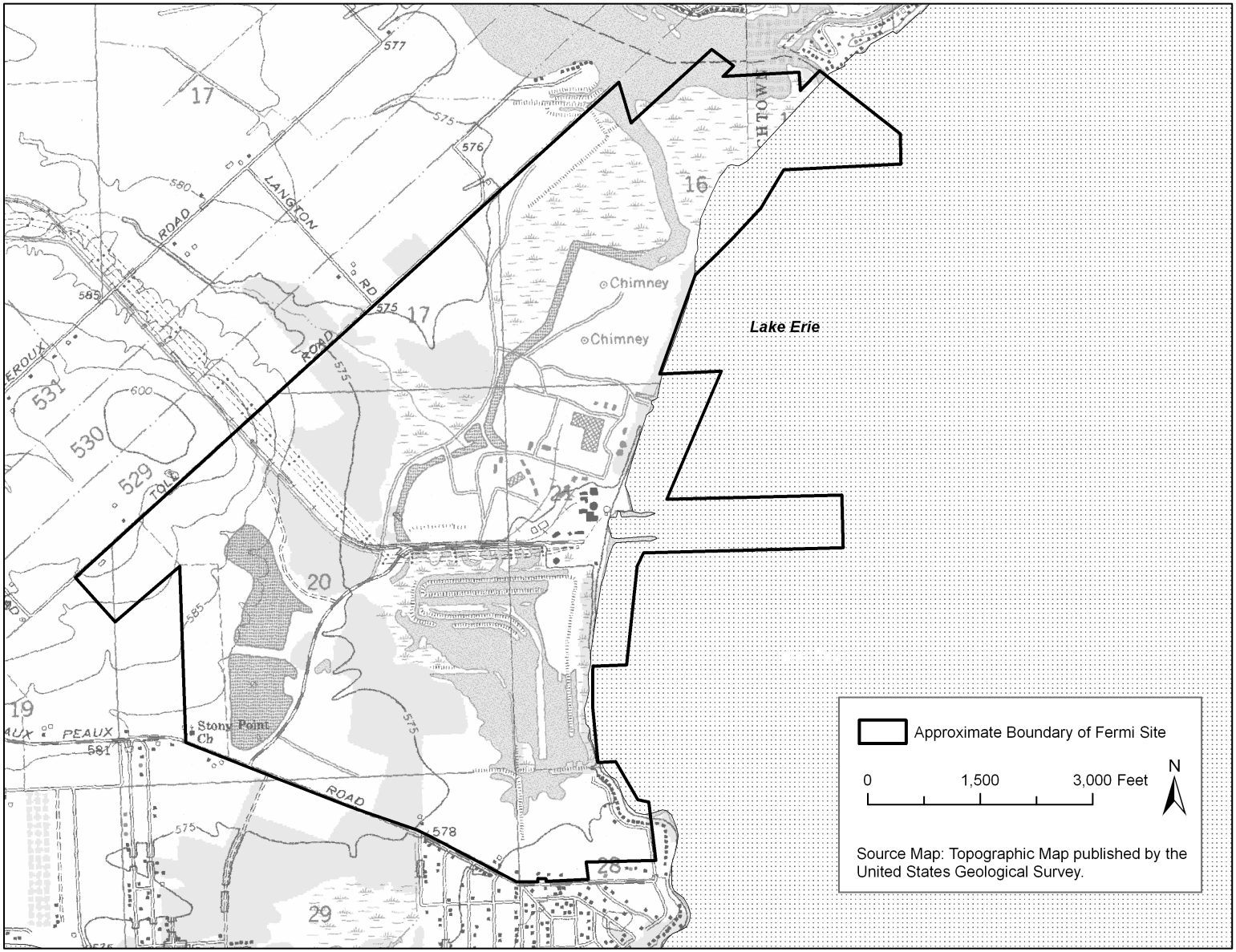


Figure 5. Land Uses on the Fermi Site



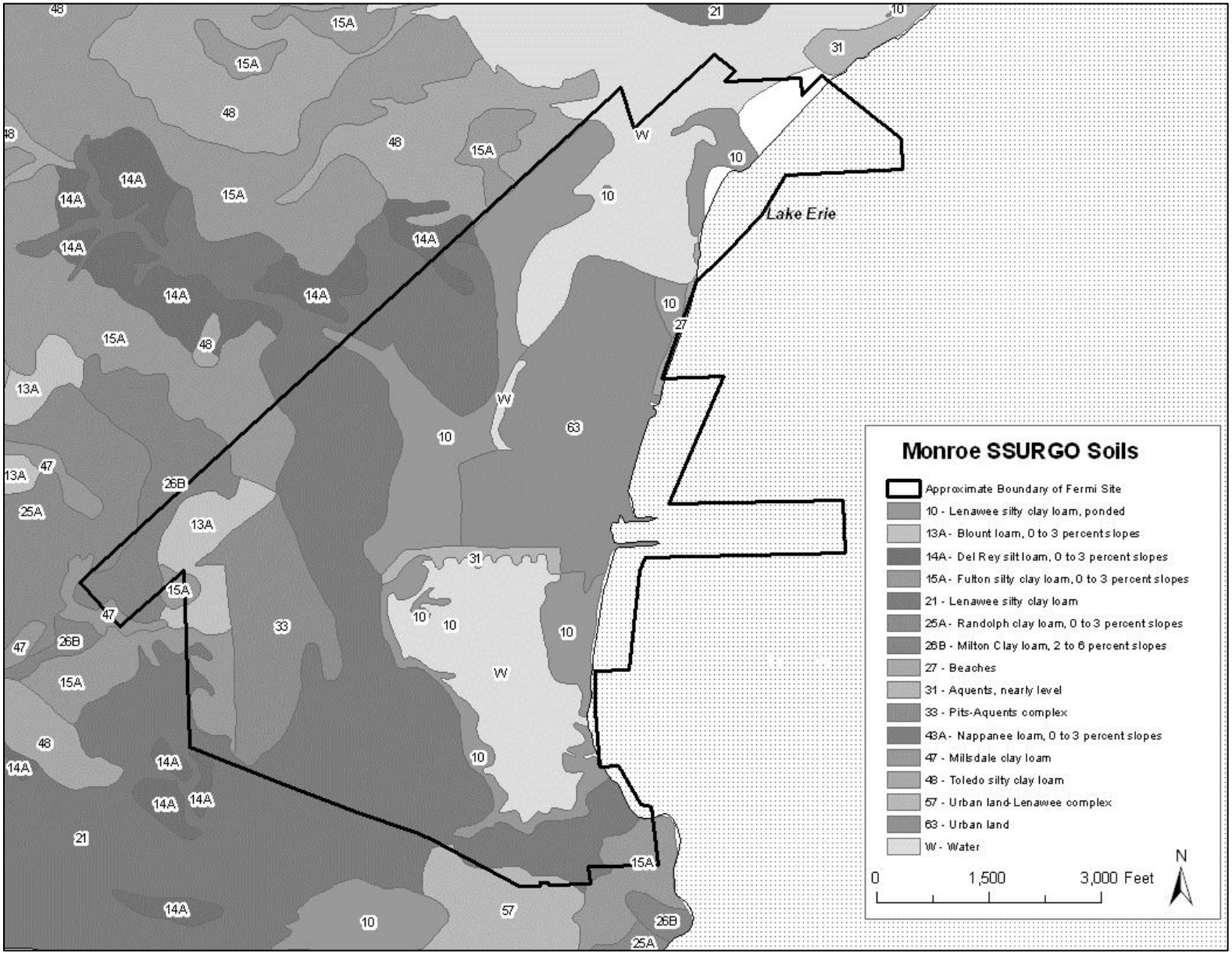
Source: Reference 7

Figure 6. Topography of the Fermi Site



Source: Reference 29

Figure 7. Soil Types on the Fermi Site



Source: Reference 30

Figure 8. Observed Locations of American Lotus on the Fermi Site

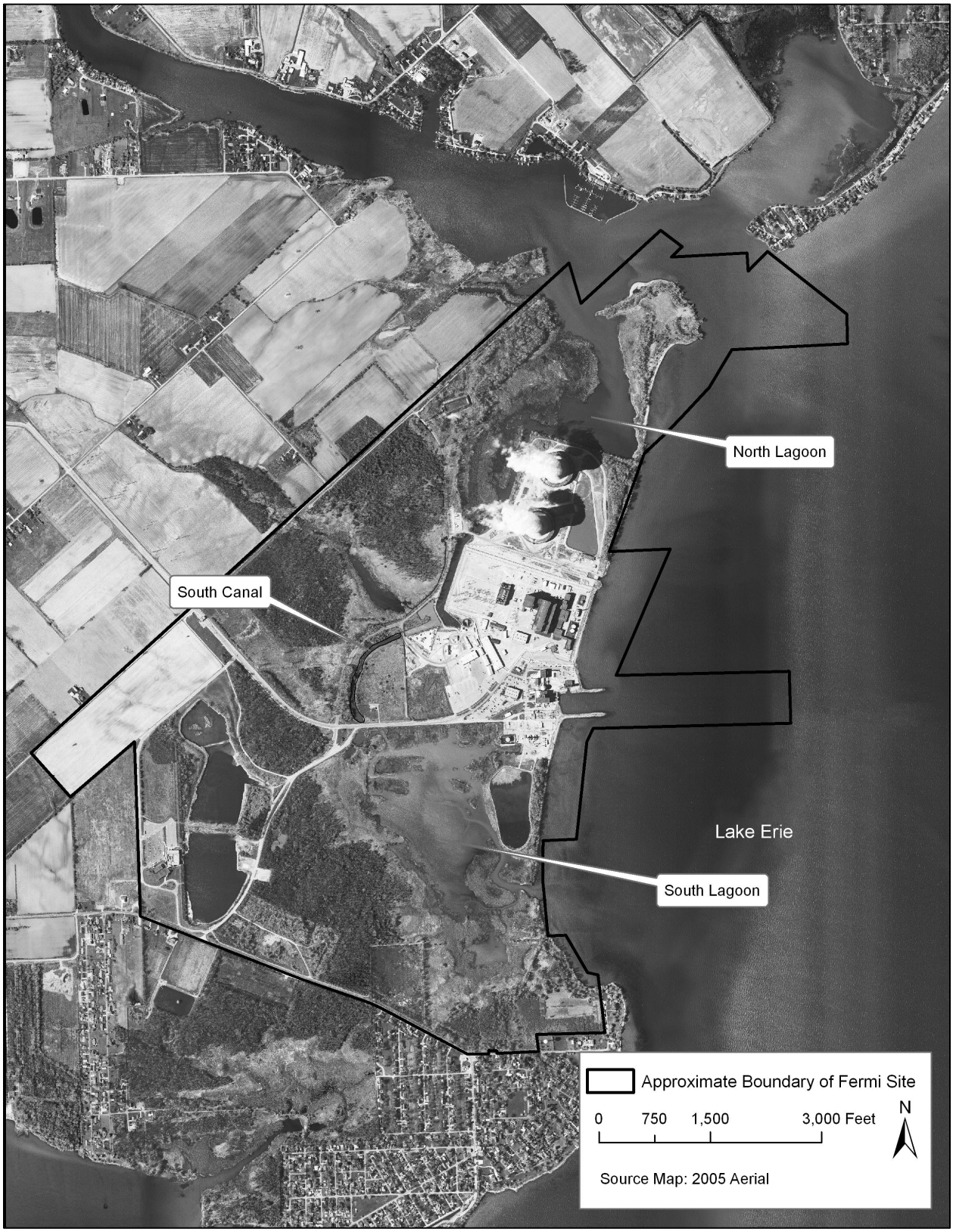


Figure 9. Culvert Locations on the Fermi Site

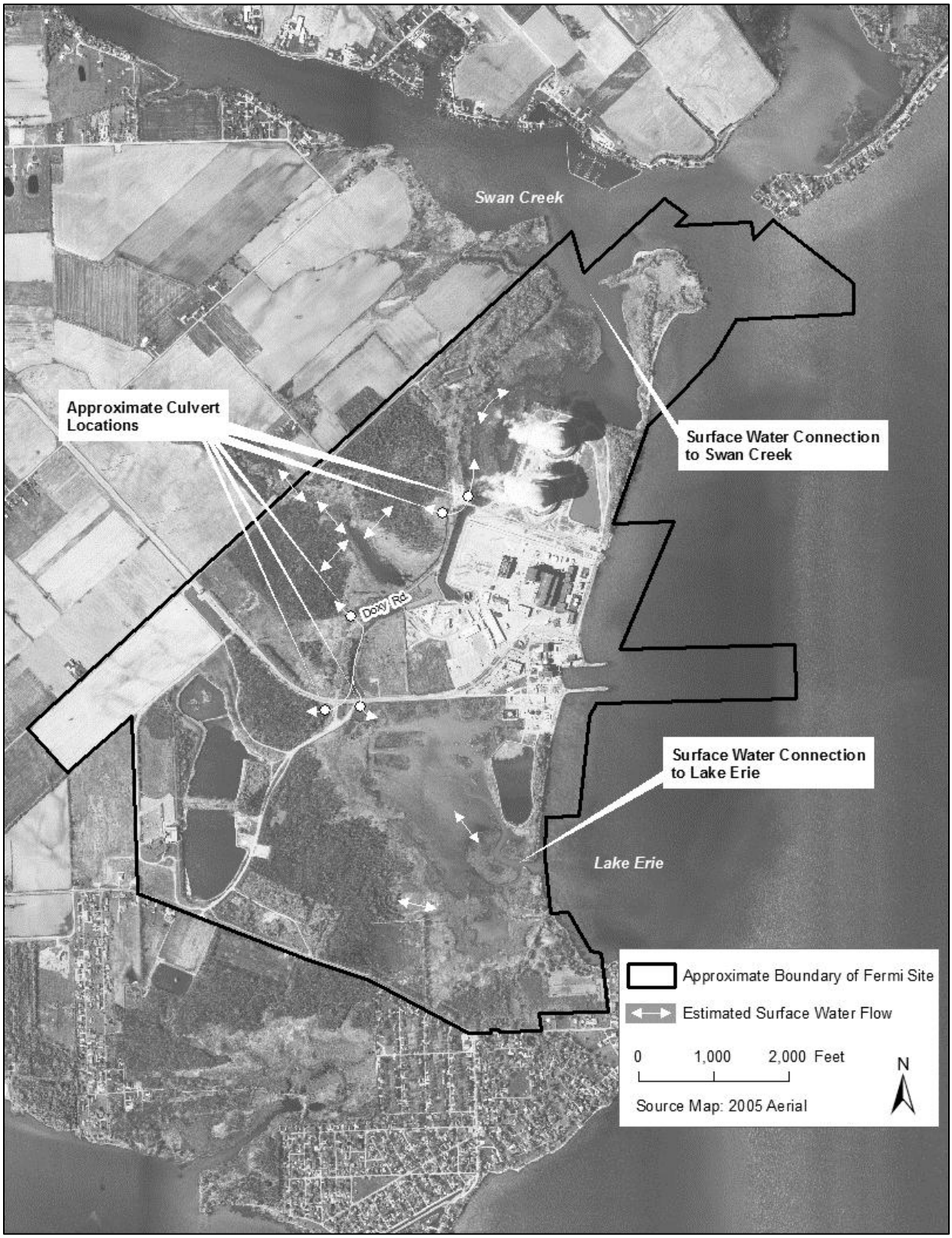


Figure 10. Fermi Site Delineated Wetlands

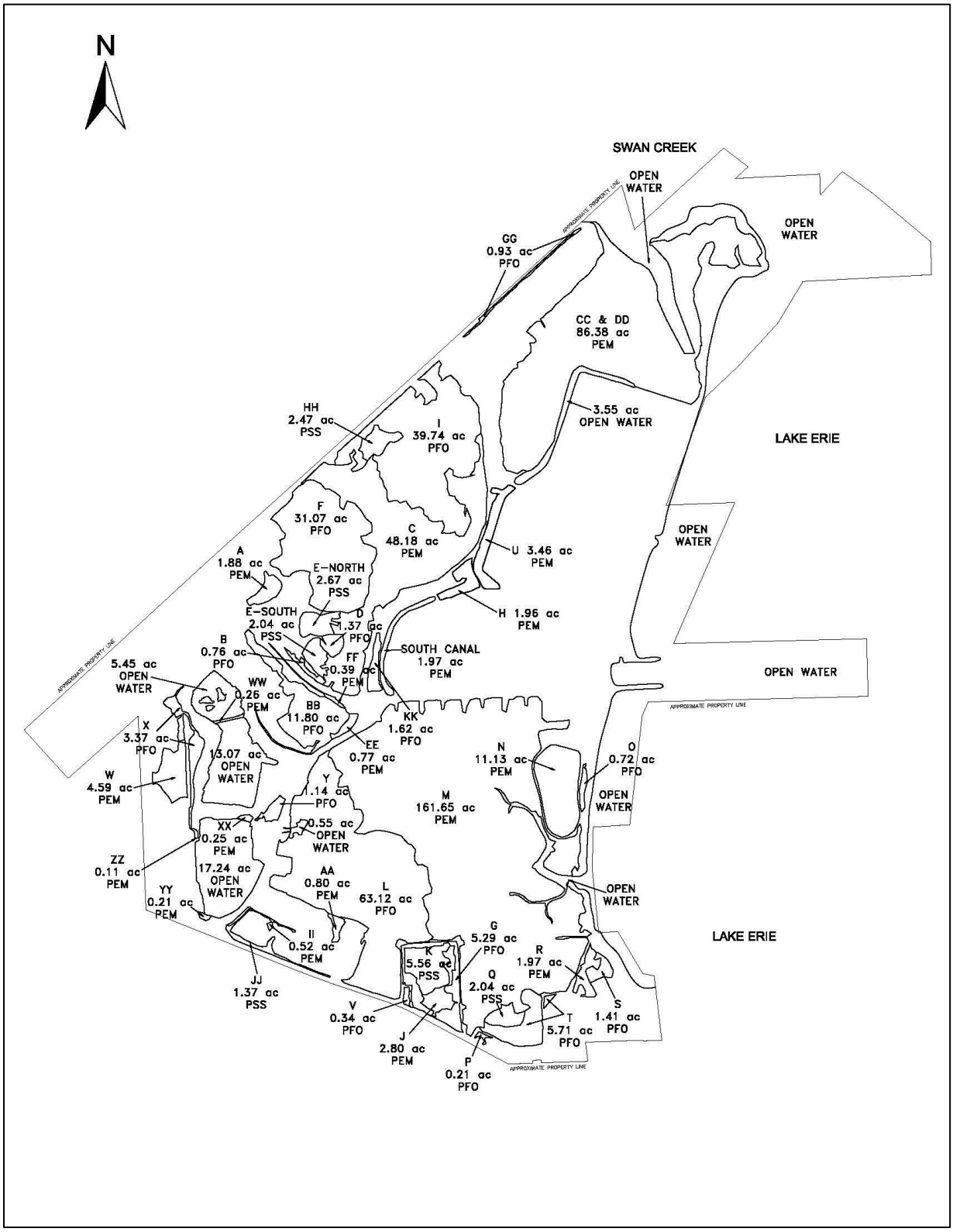
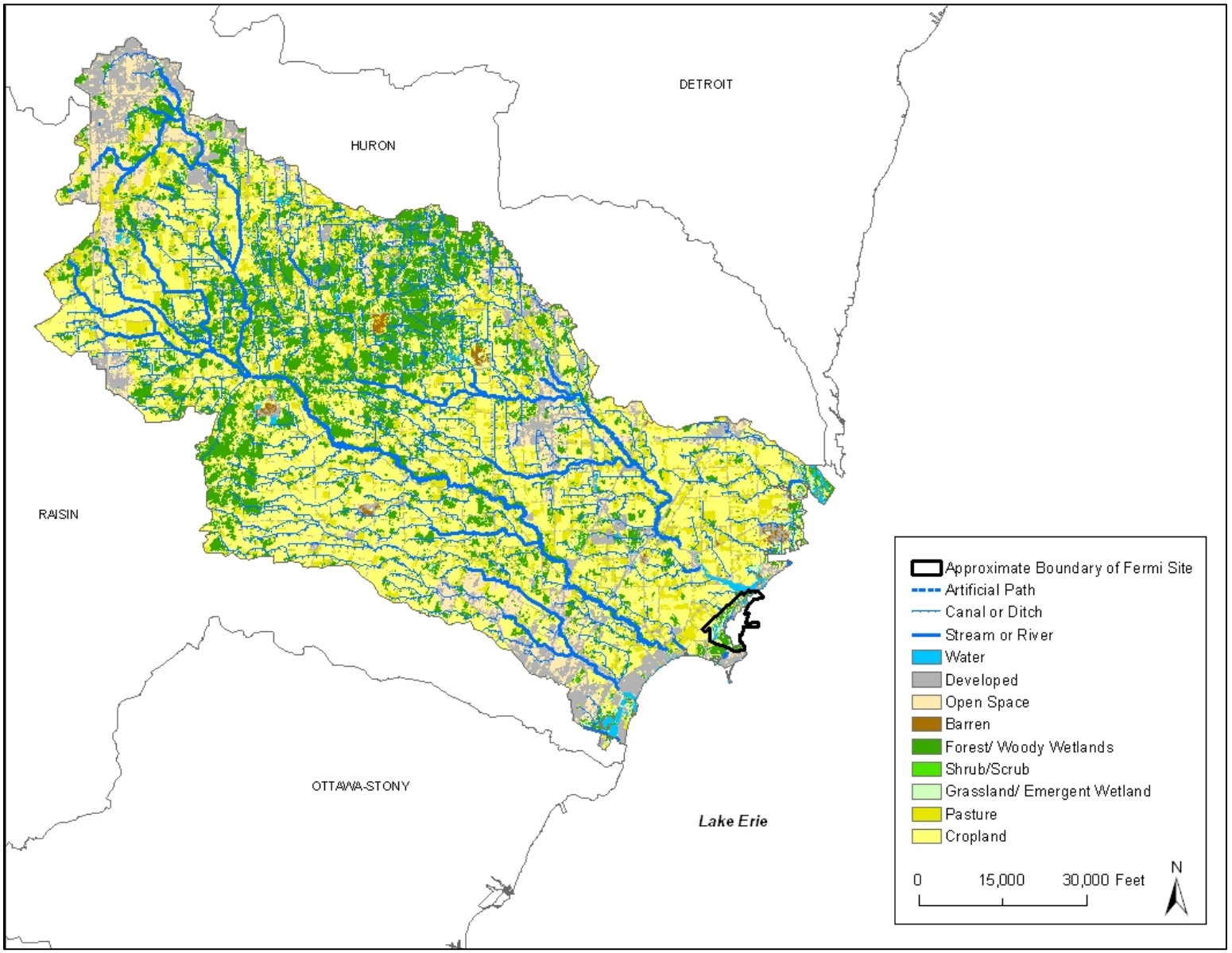
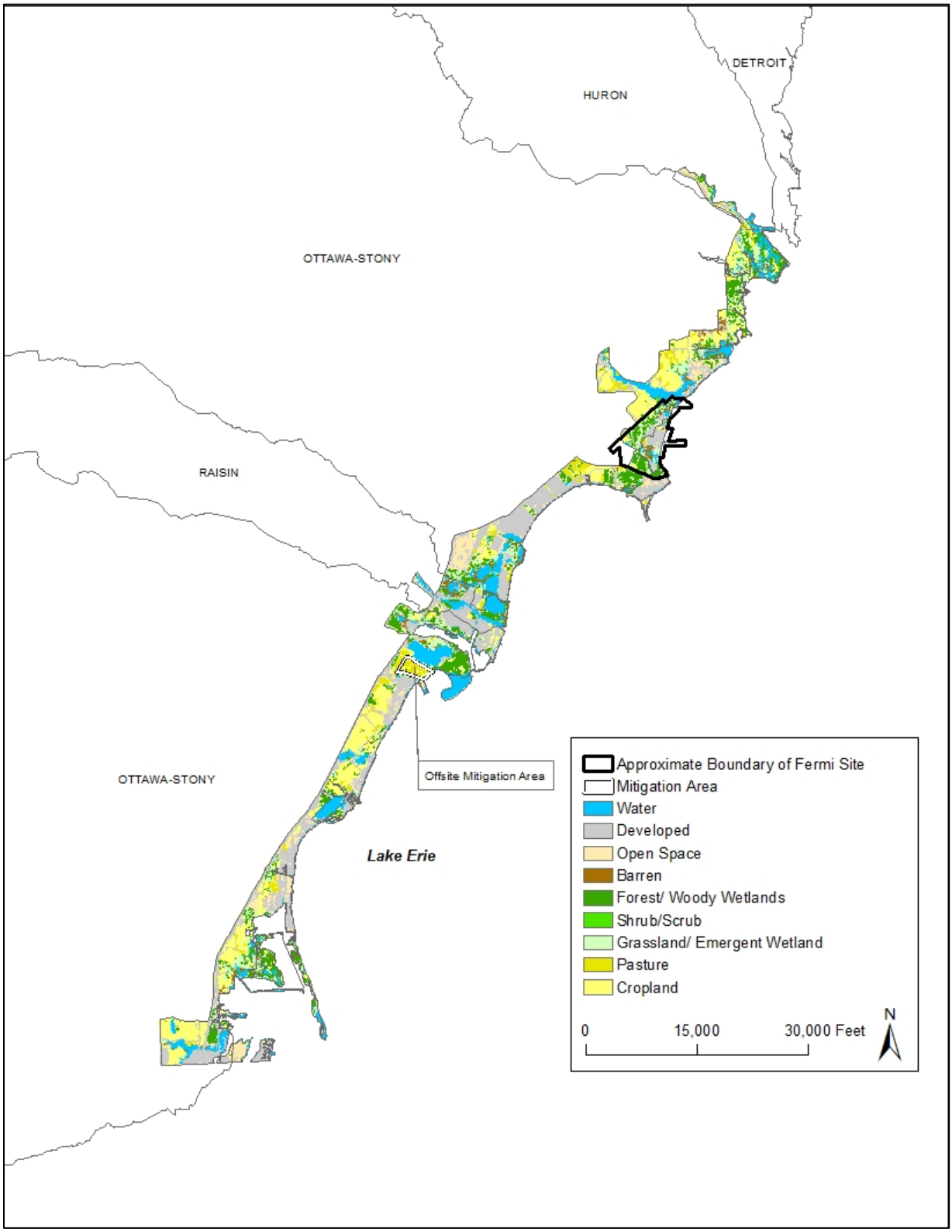


Figure 11. Land Use Land Cover (2001) in the Ottawa-Stony Watershed



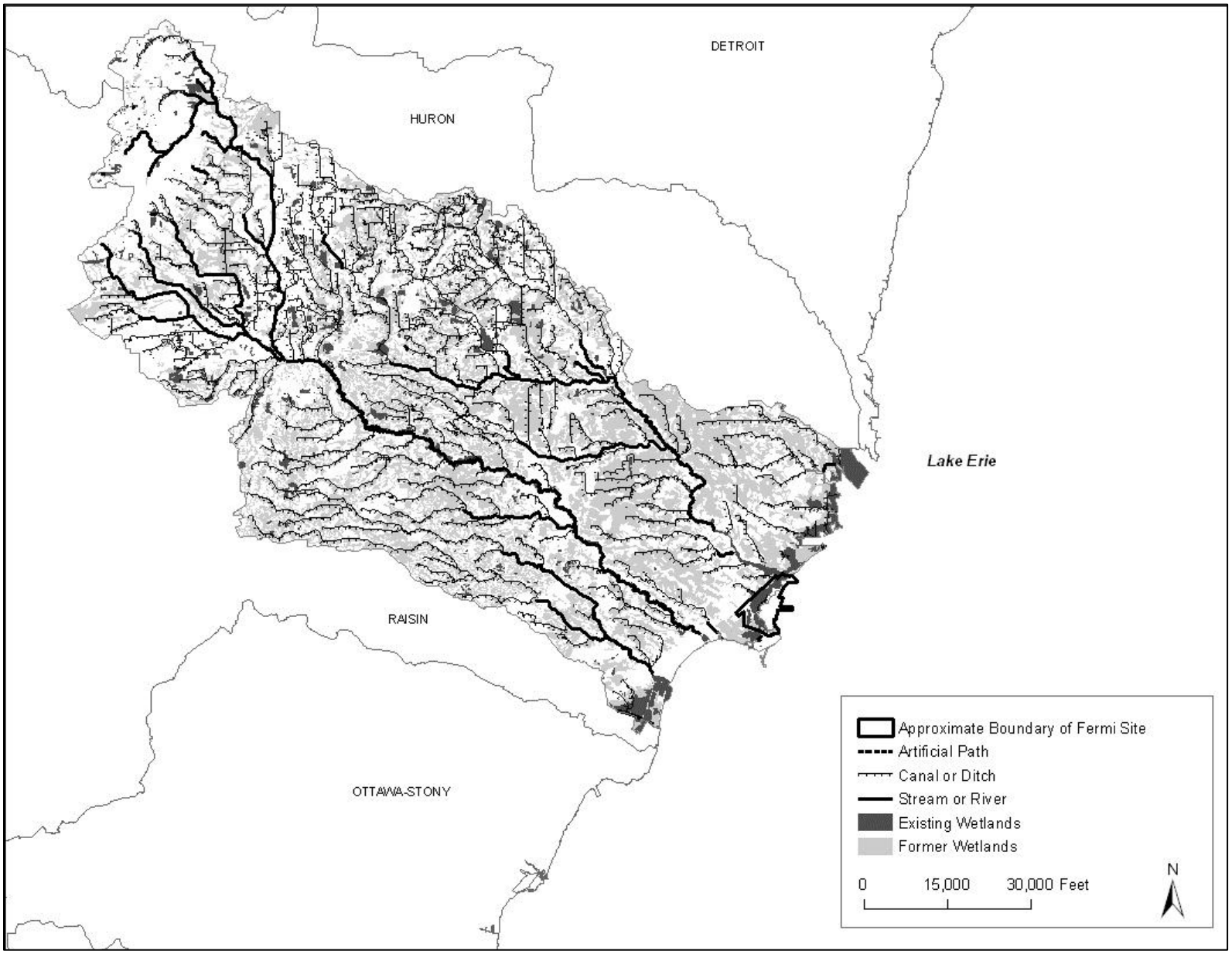
Source: Reference 31 and Reference 32

Figure 12. Land Use Land Cover (2001) in the Coastal Zone of Lake Erie



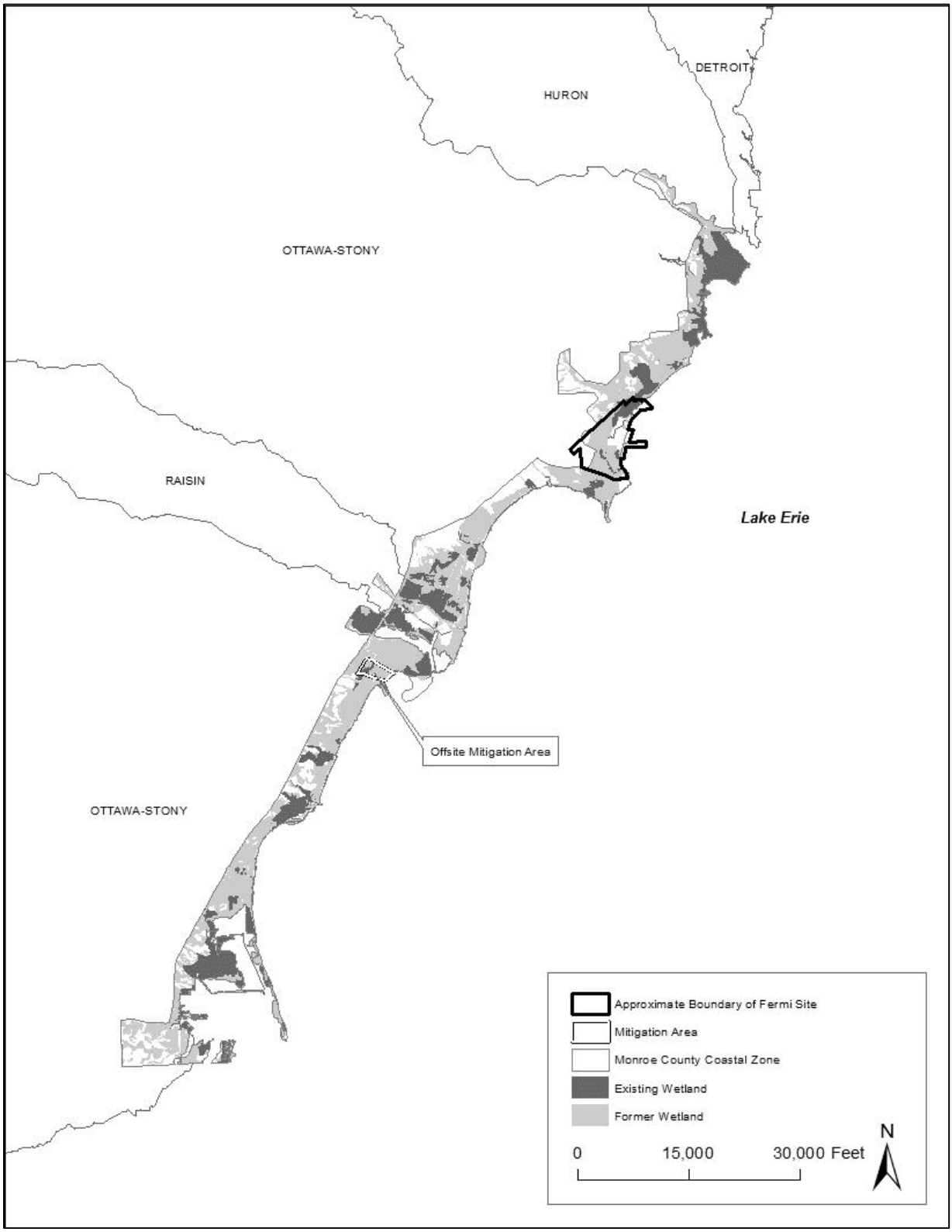
Source: Reference 32 and Reference 33

Figure 13. Existing and Former Wetlands in the Ottawa-Stony Watershed



Source: Reference 31 and Reference 34 through Reference 36

Figure 14. Existing and Former Wetlands in the Coastal Zone of Lake Erie



Source: Reference 33 and Reference 36

Figure 15. Mitigation Area Existing Conditions

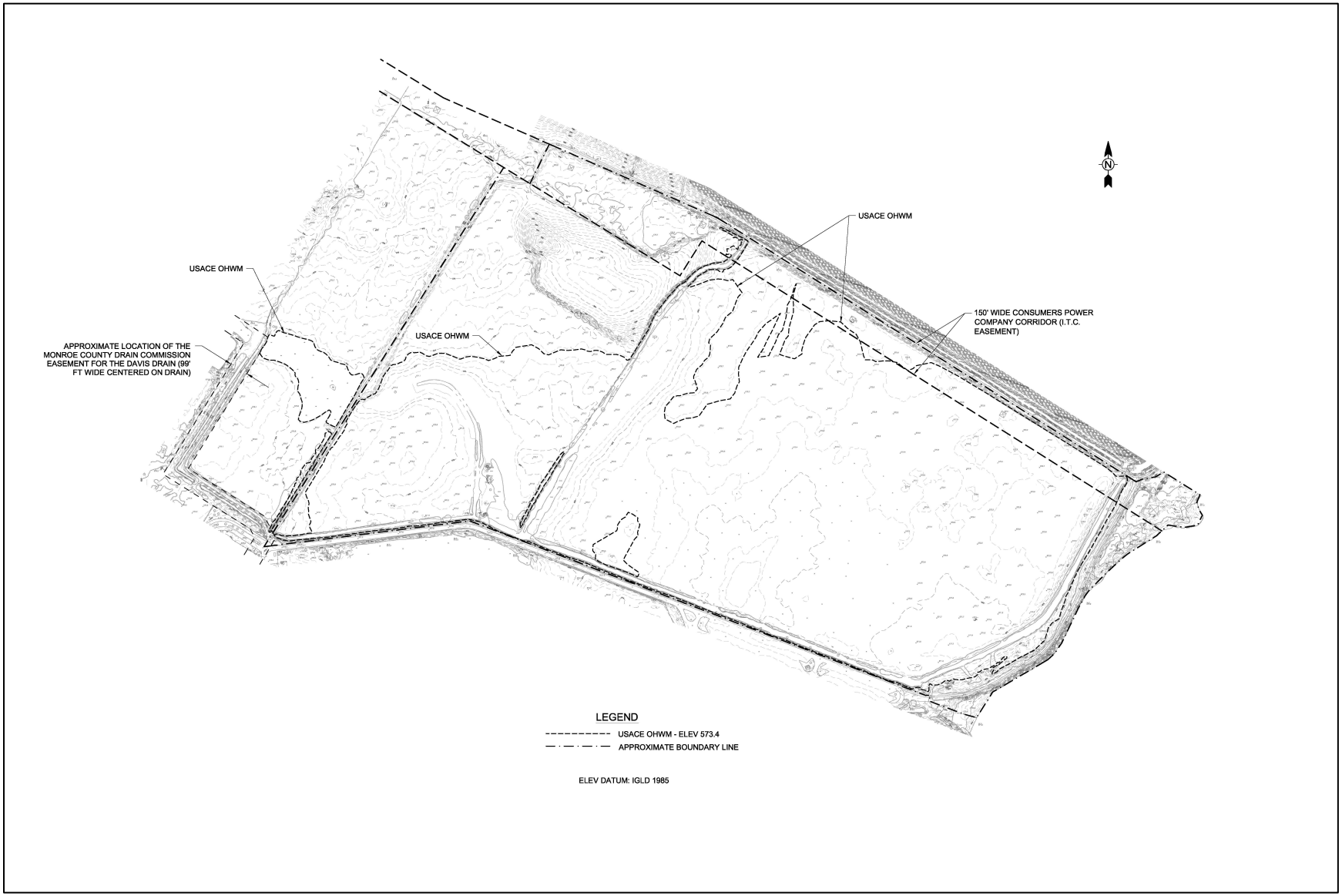
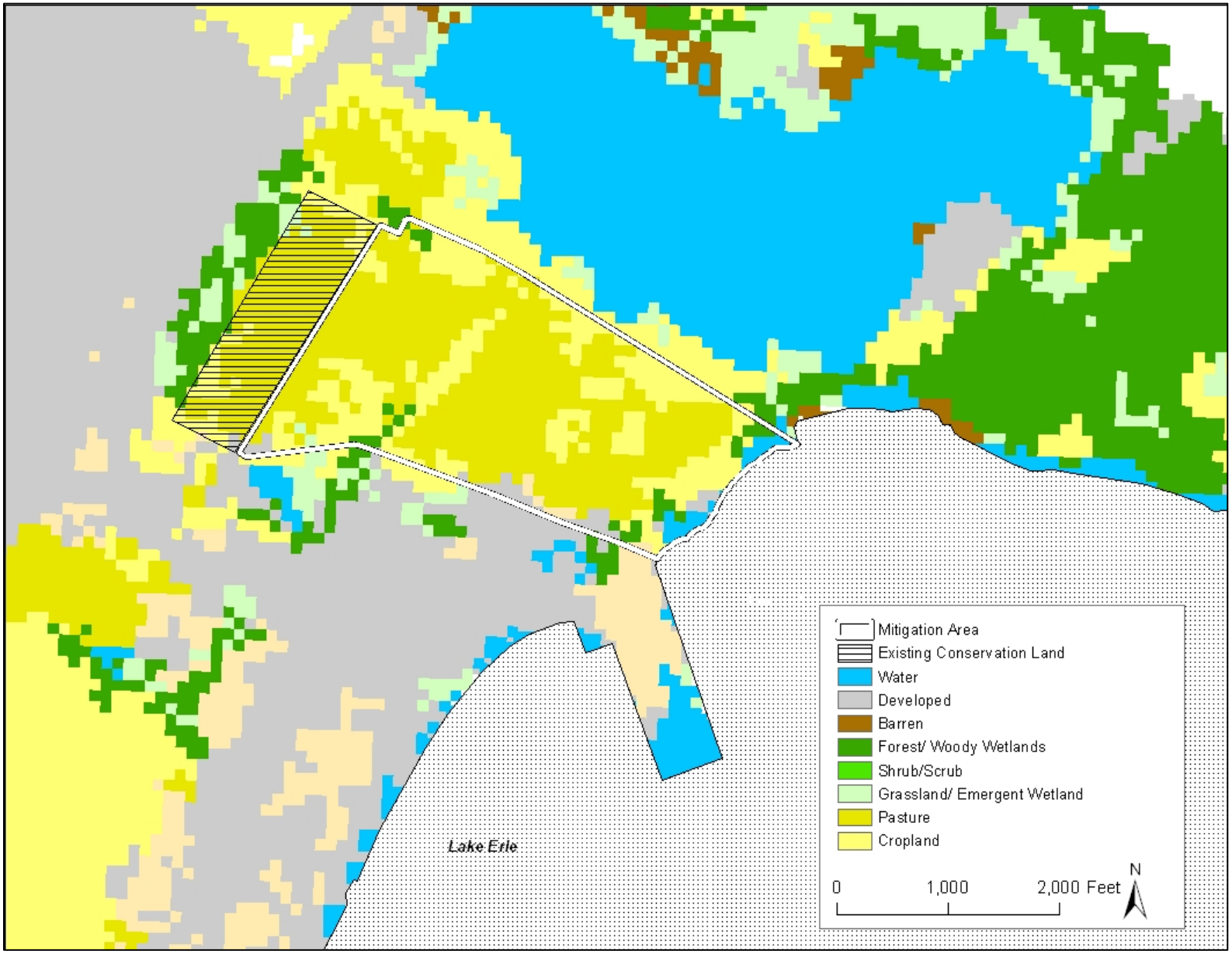


Figure 16. Mitigation Area Aerial Photo

Source: Reference 28

Figure 17. Mitigation Area Covertype Map



Source: Reference 32

Figure 18. Mitigation Area Soils Map

Source: Reference 30 and Reference 31

Figure 19. Mitigation Area Current Hydrologic Conditions

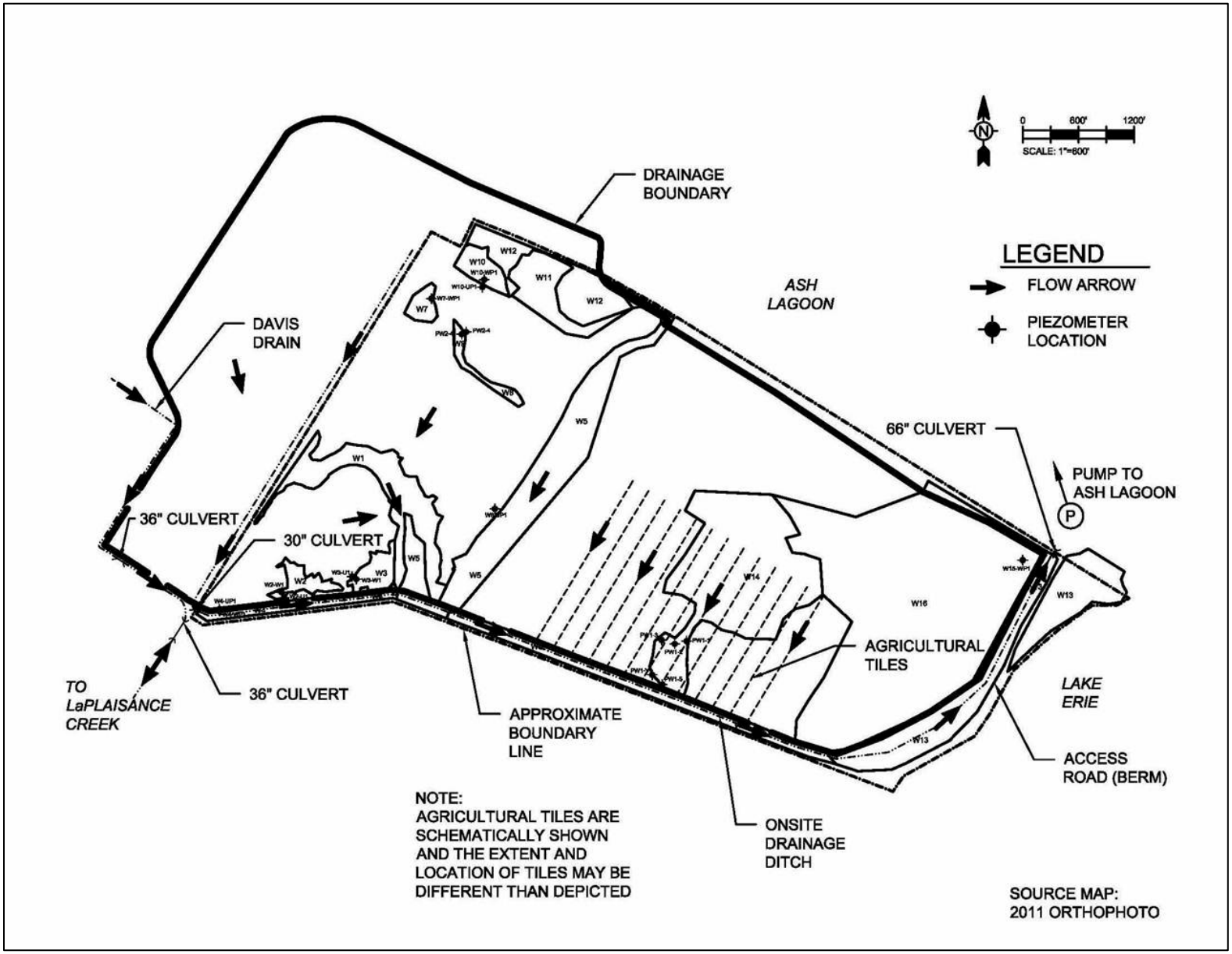
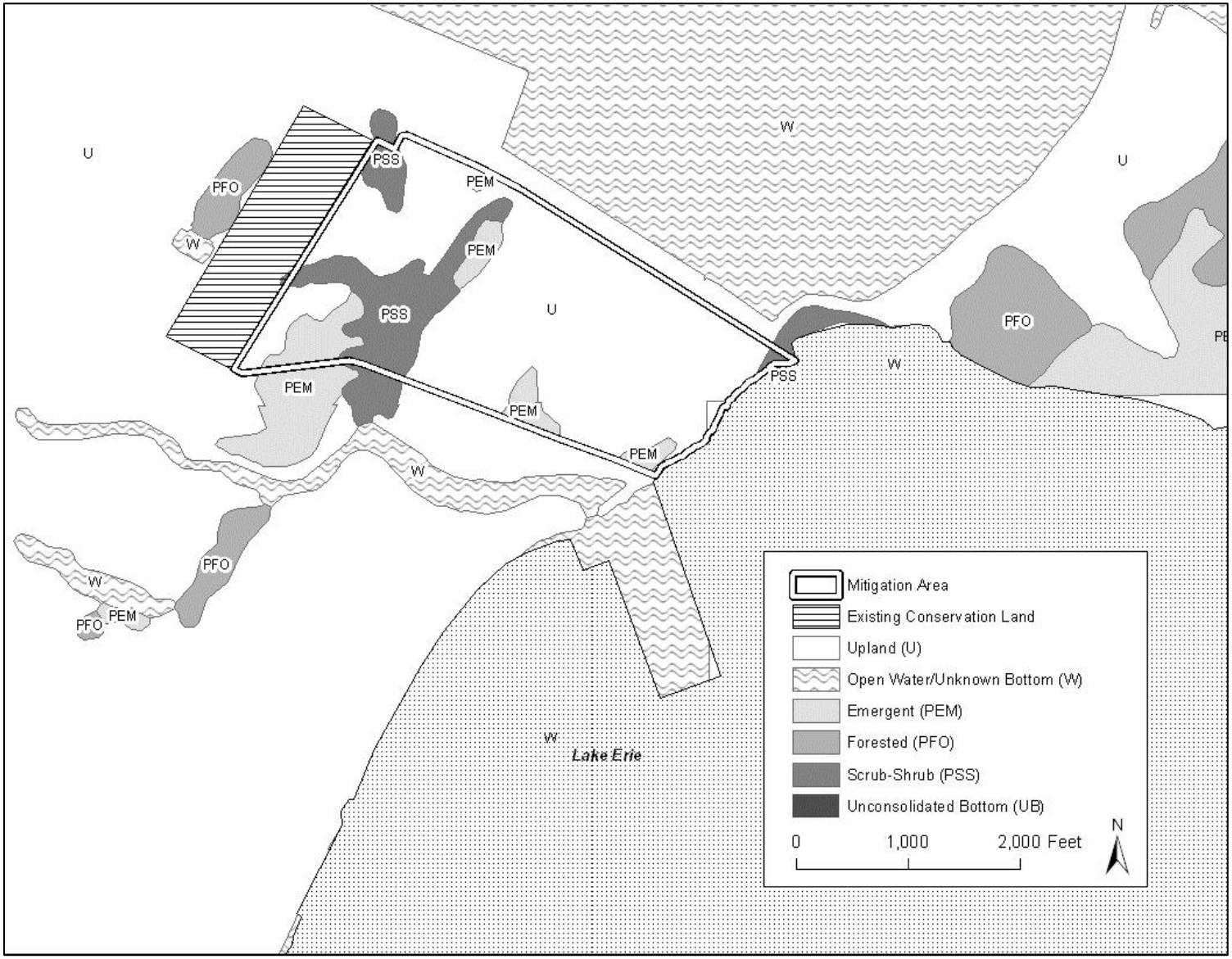


Figure 20. Mitigation Area Federal Mapped Wetlands



Source: Reference 36

Figure 21. Mitigation Area Delineated Wetlands

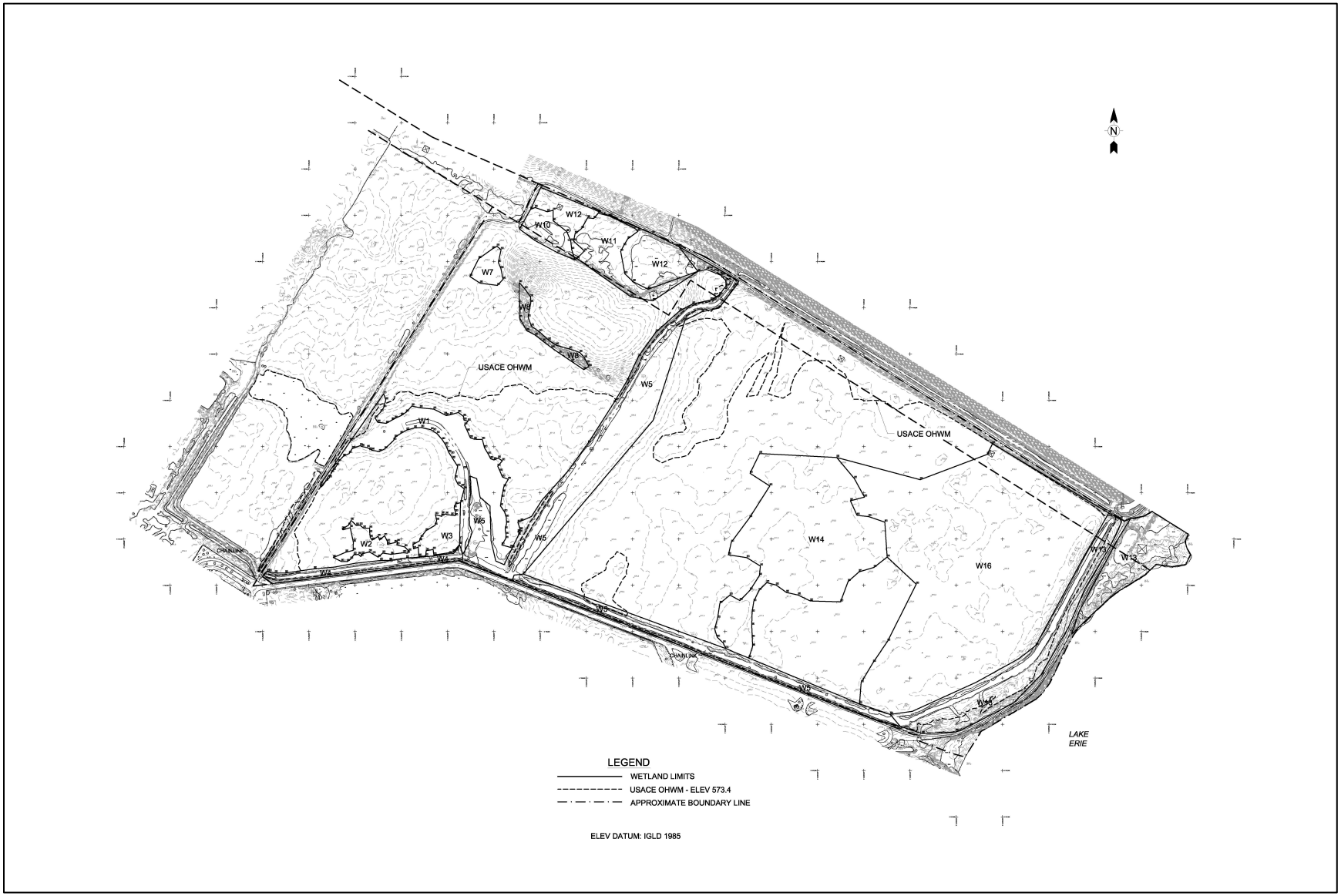


Figure 22. Mitigation Area Planting Plan

Figure 23. Conservation Easement

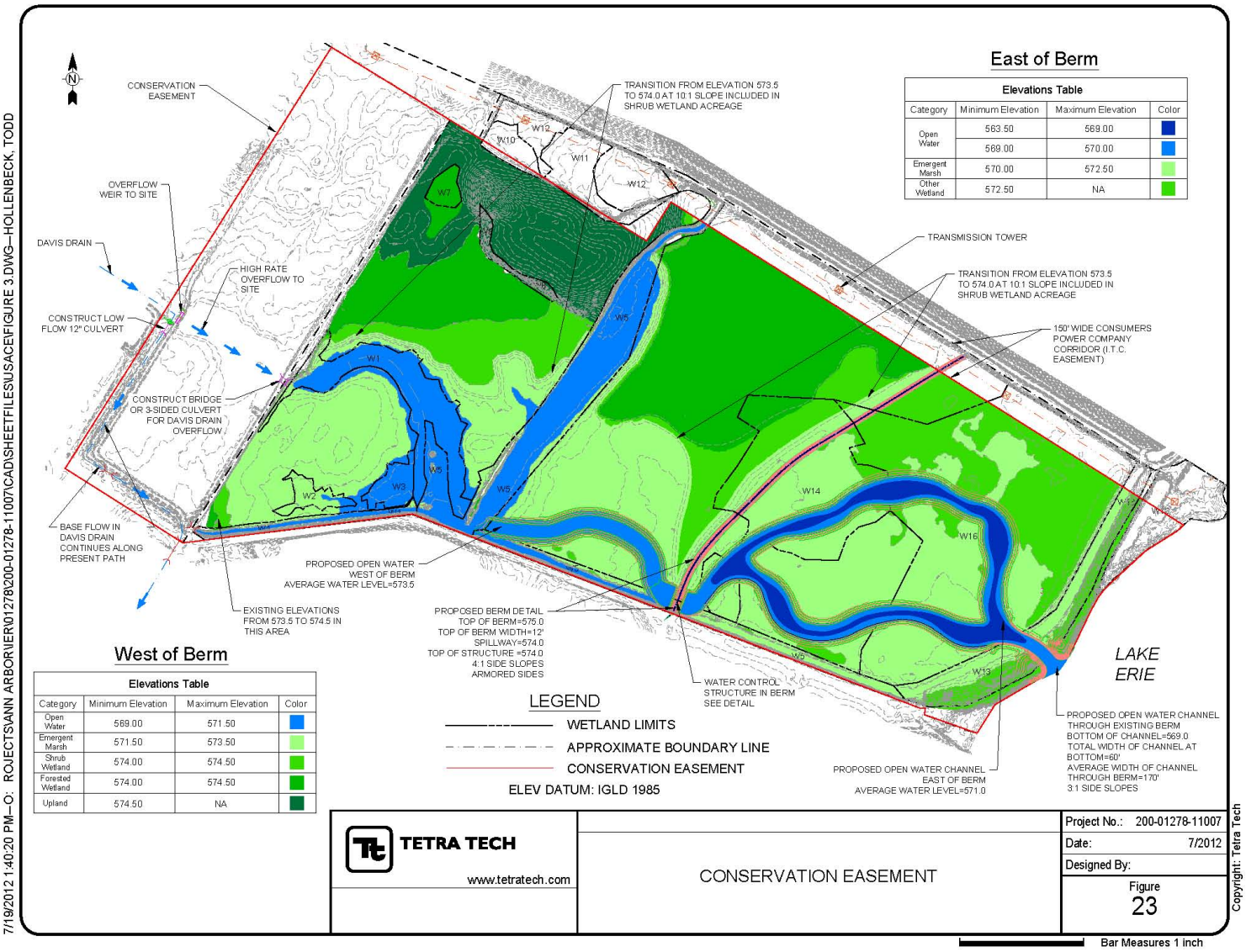


Figure 24. Monitoring Locations