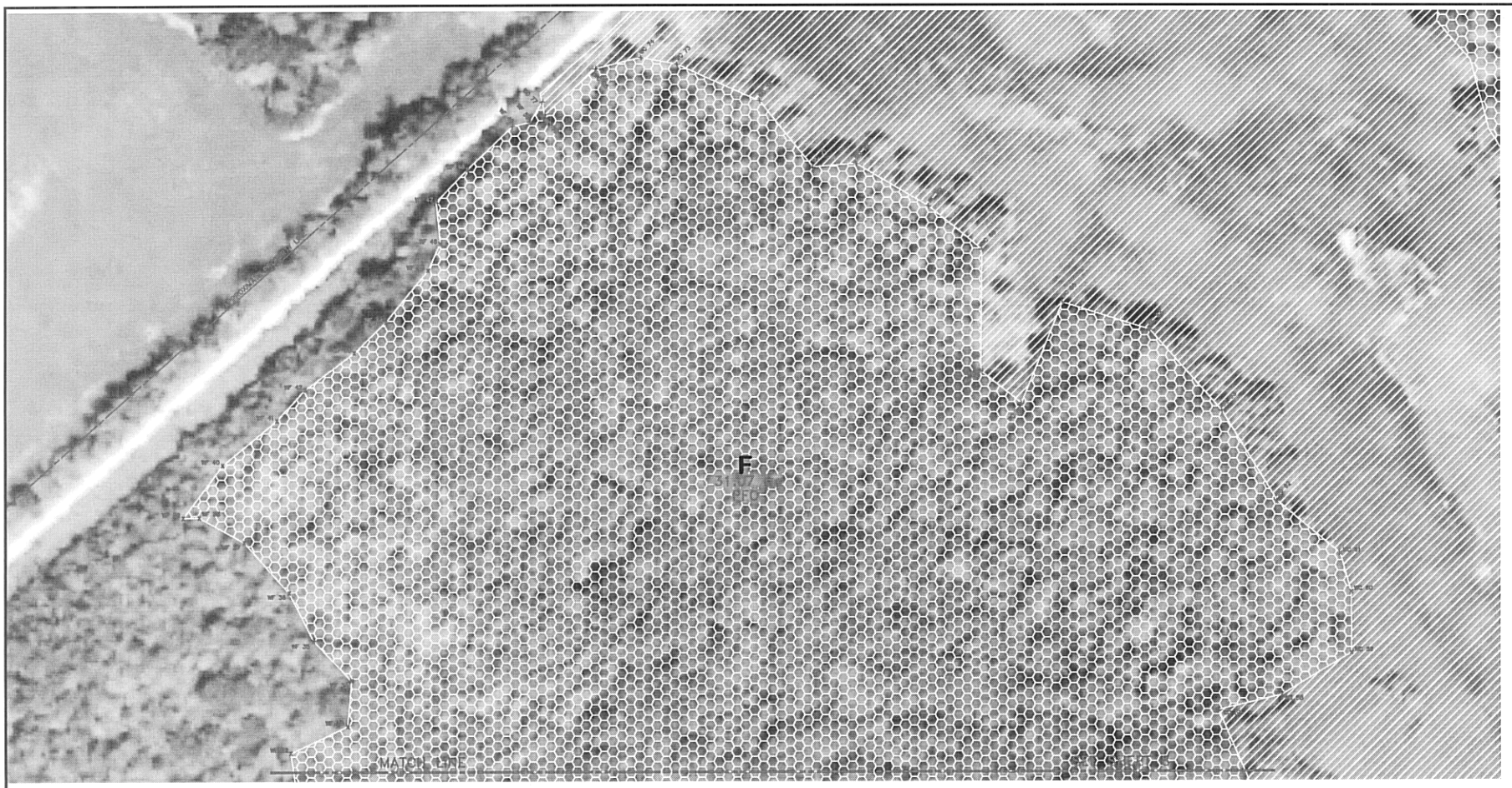

N

GRAPHIC SCALE

50 0 25 50 100 200

(IN FEET)
1 inch = 50 ft.

LEGEND

- OPEN WATER (FLAGGED)
- OPEN WATER (NOT FLAGGED)
- WETLAND BOUNDARY
- DATA POINT
- WETLAND FLAG
- PALUSTRINE SCRUB-SHRUB (PSS)
- PALUSTRINE EMERGENT (PEM)
- PALUSTRINE FORESTED (PFO)

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WETLAND DELINEATION F NORTH
DTE FERMI II PLANT
MONROE COUNTY, MICHIGAN

REVISIONS:

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DESIGNED BY:	-
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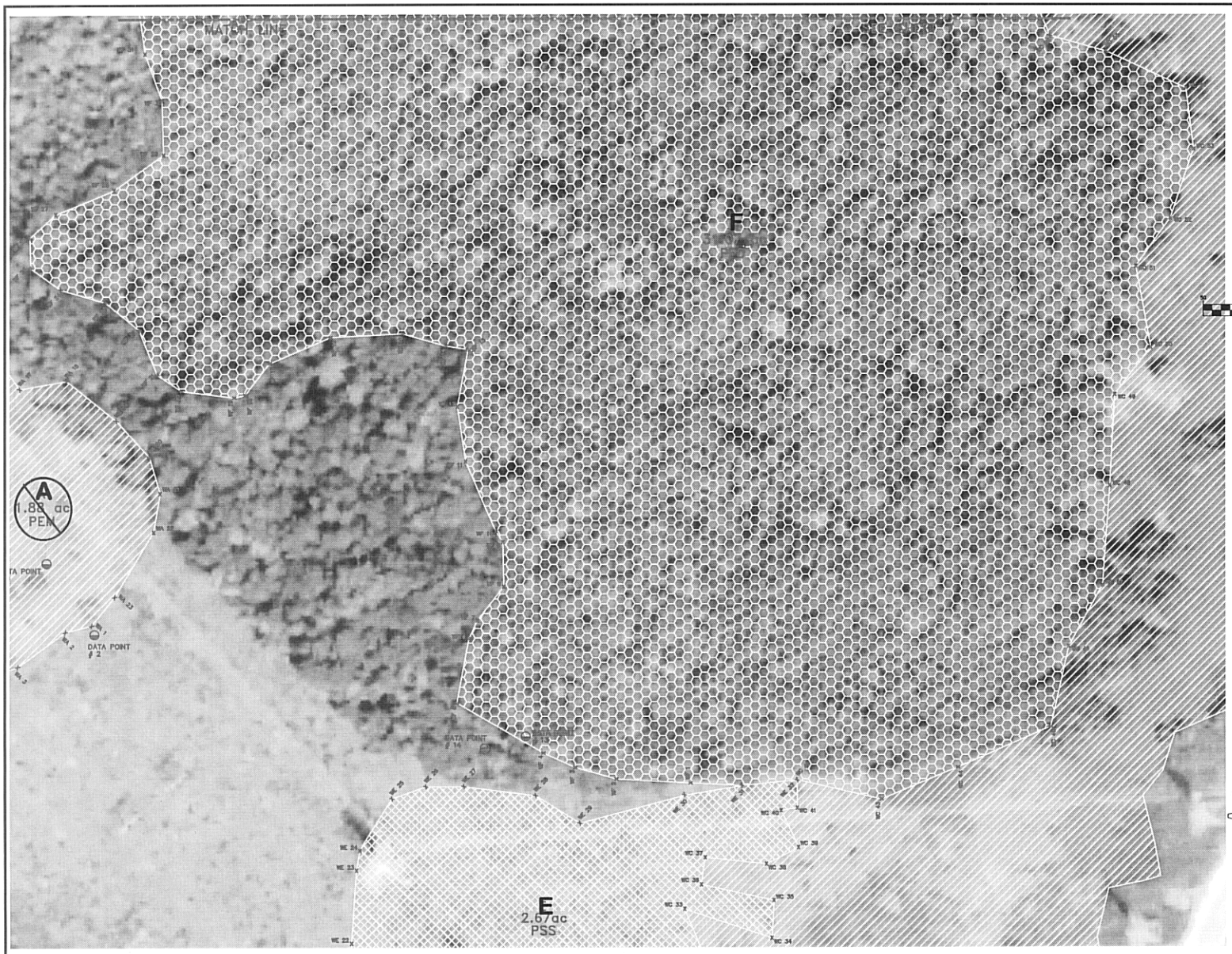

N

GRAPHIC SCALE

50 0 25 50 100 200

(IN FEET)
1 inch = 50 ft.

LEGEND

- OPEN WATER (FLAGGED)
- OPEN WATER (NOT FLAGGED)
- WETLAND BOUNDARY
- DATA POINT
- WA 25 WETLAND FLAG
- PALUSTRINE SCRUB-SHRUB (PSS)
- PALUSTRINE EMERGENT (PEM)
- PALUSTRINE FORESTED (PFO)

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WETLAND DELINEATION F SOUTH
DTE FERMI II PLANT
MONROE COUNTY, MICHIGAN

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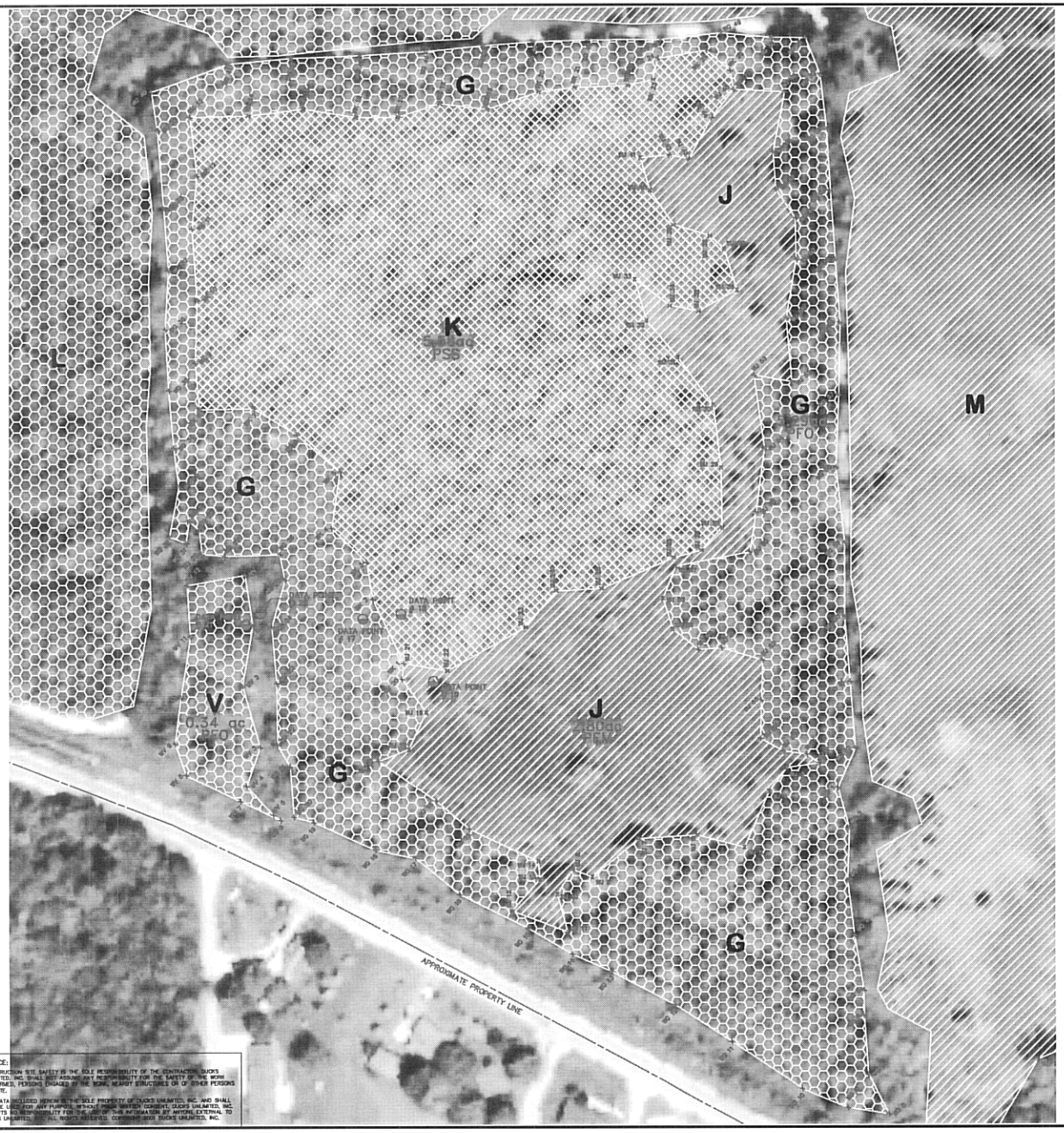

N

GRAPHIC SCALE

50 0 25 50 100 200

(IN FEET)
1 inch = 50 ft.

LEGEND

- OPEN WATER (FLAGGED)
- OPEN WATER (NOT FLAGGED)
- WETLAND BOUNDARY
- DATA POINT
- WETLAND FLAG (WA 25)
- PALUSTRINE SCRUB-SHRUB (PSS)
- PALUSTRINE EMERGENT (PEM)
- PALUSTRINE FORESTED (PFO)

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WETLAND DELINEATION G, J, K, V
DTE FERMI II PLANT
MONROE COUNTY, MICHIGAN

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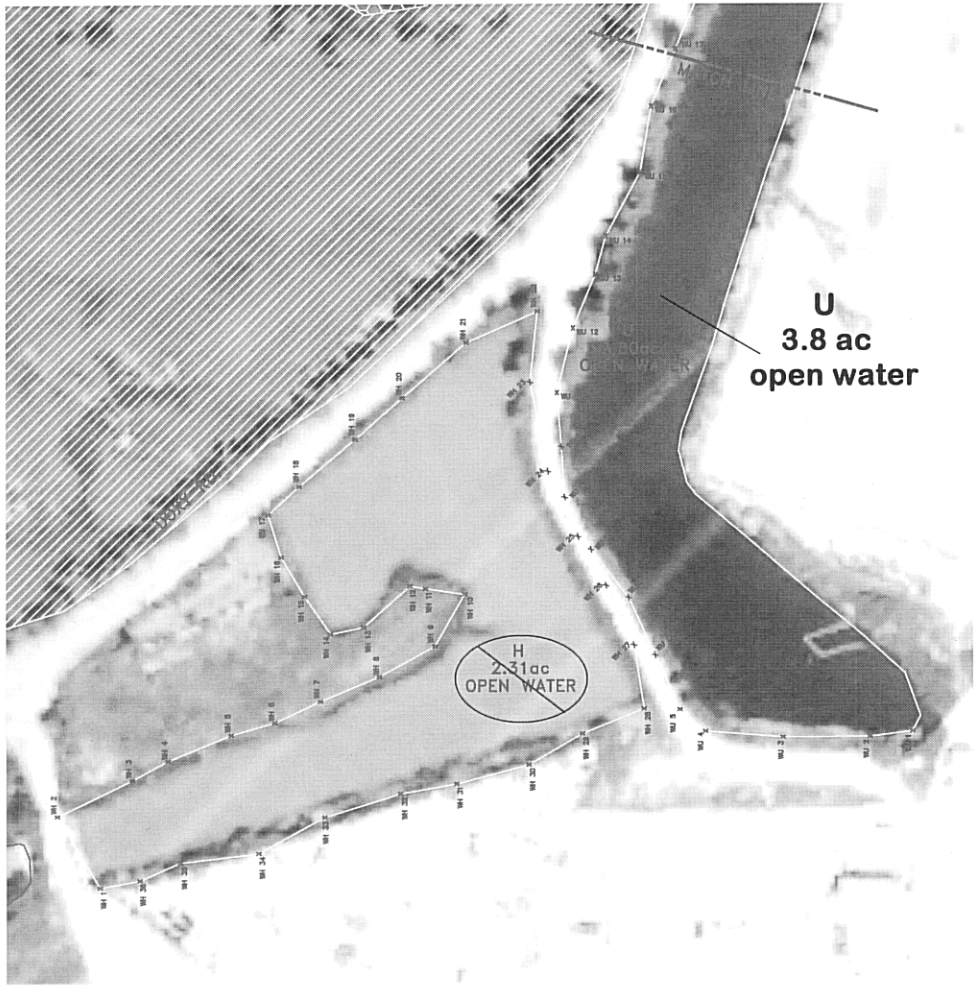

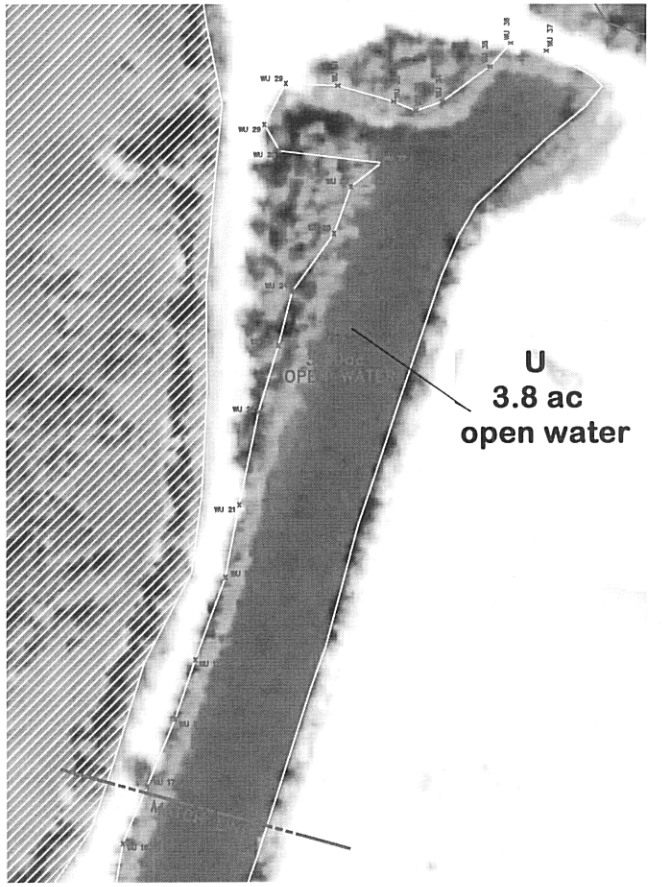

N

GRAPHIC SCALE

50 0 25 50 100 200

(IN FEET)
1 inch = 50 ft.

LEGEND

- OPEN WATER (FLAGGED)
- OPEN WATER (NOT FLAGGED)
- WETLAND BOUNDARY
- DATA POINT
- WETLAND FLAG
- PALUSTRINE SCRUB-SHRUB (PSS)
- PALUSTRINE EMERGENT (PEM)
- PALUSTRINE FORESTED (PFO)

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WETLAND DELINEATION H, U
DTE FERMI II PLANT
MONROE COUNTY, MICHIGAN

REVISIONS:

CAD FILE:	Wetland Delineation 50
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GLARO-MI3-46-10

N

GRAPHIC SCALE

100 0 50 100 200 400

(IN FEET)
1 inch = 100 ft.

LEGEND

- OPEN WATER (FLAGGED)
- OPEN WATER (NOT FLAGGED)
- WETLAND BOUNDARY
- DATA POINT
- WETLAND FLAG (WA 25)
- PALUSTRINE SCRUB-SHRUB (PSS)
- PALUSTRINE EMERGENT (PEM)
- PALUSTRINE FORESTED (PFO)

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WETLAND DELINEATION I
DTE FERMI II PLANT
MONROE COUNTY, MICHIGAN

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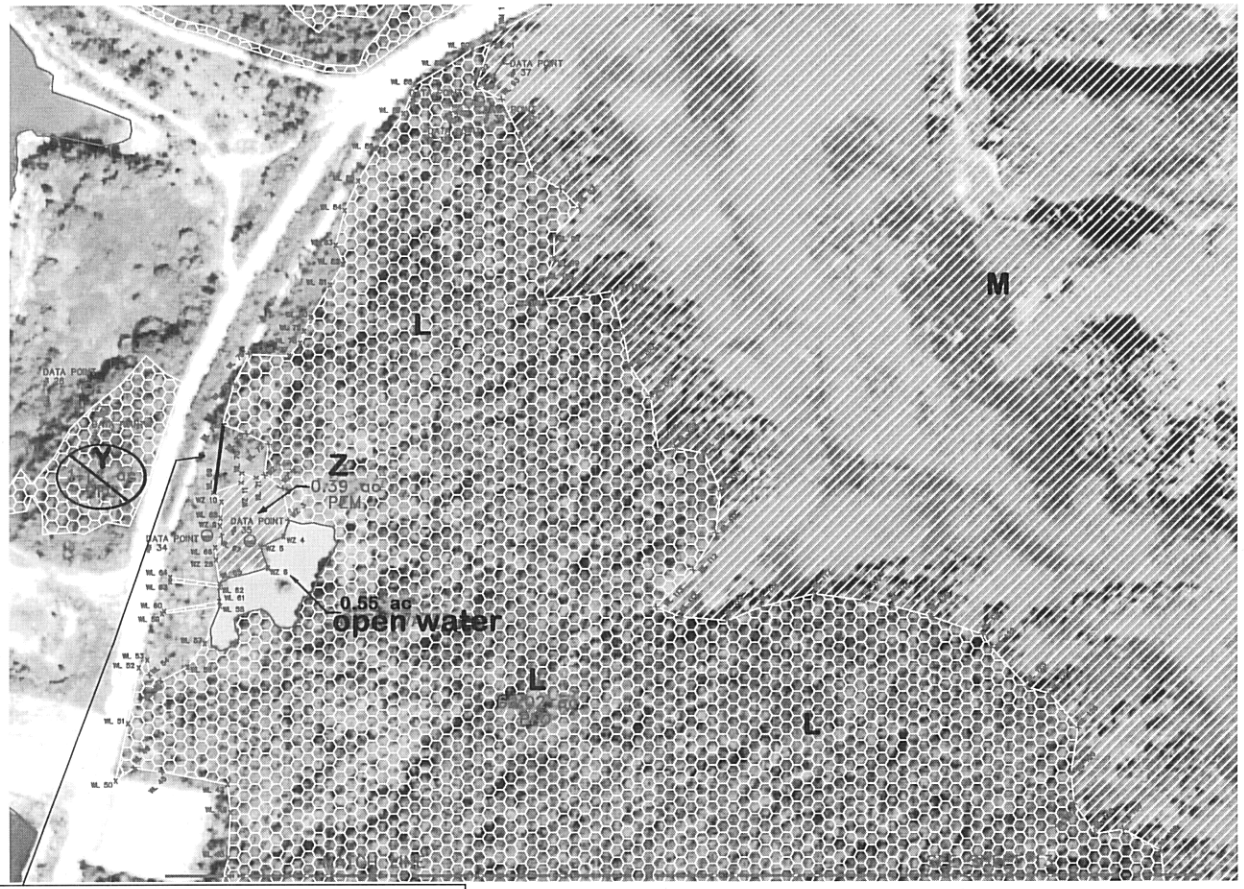

N

GRAPHIC SCALE

100 0 50 100 200 400

(IN FEET)
1 inch = 100 ft.

USACE NOTE:

AREA L: ENLARGE-CONNECT WL 69 to WL 74

LEGEND

- OPEN WATER (FLAGGED)
- OPEN WATER (NOT FLAGGED)
- WETLAND BOUNDARY
- DATA POINT
- xWA 25 WETLAND FLAG
- PALUSTRINE SCRUB-SHRUB (PSS)
- PALUSTRINE EMERGENT (PEM)
- PALUSTRINE FORESTED (PFO)

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WETLAND DELINEATION L_NORTH
DTE FERMI II PLANT
MONROE COUNTY, MICHIGAN

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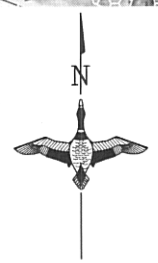

GRAPHIC SCALE

100 0 50 100 200 400

(IN FEET)
1 inch = 100 ft.

LEGEND

- OPEN WATER (FLAGGED)
- OPEN WATER (NOT FLAGGED)
- WETLAND BOUNDARY
- DATA POINT
- WA 25 WETLAND FLAG
- PALUSTRINE SCRUB-SHRUB (PSS)
- PALUSTRINE EMERGENT (PEM)
- PALUSTRINE FORESTED (PFO)

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DTE FERMI II PLANT
MONROE COUNTY, MICHIGAN

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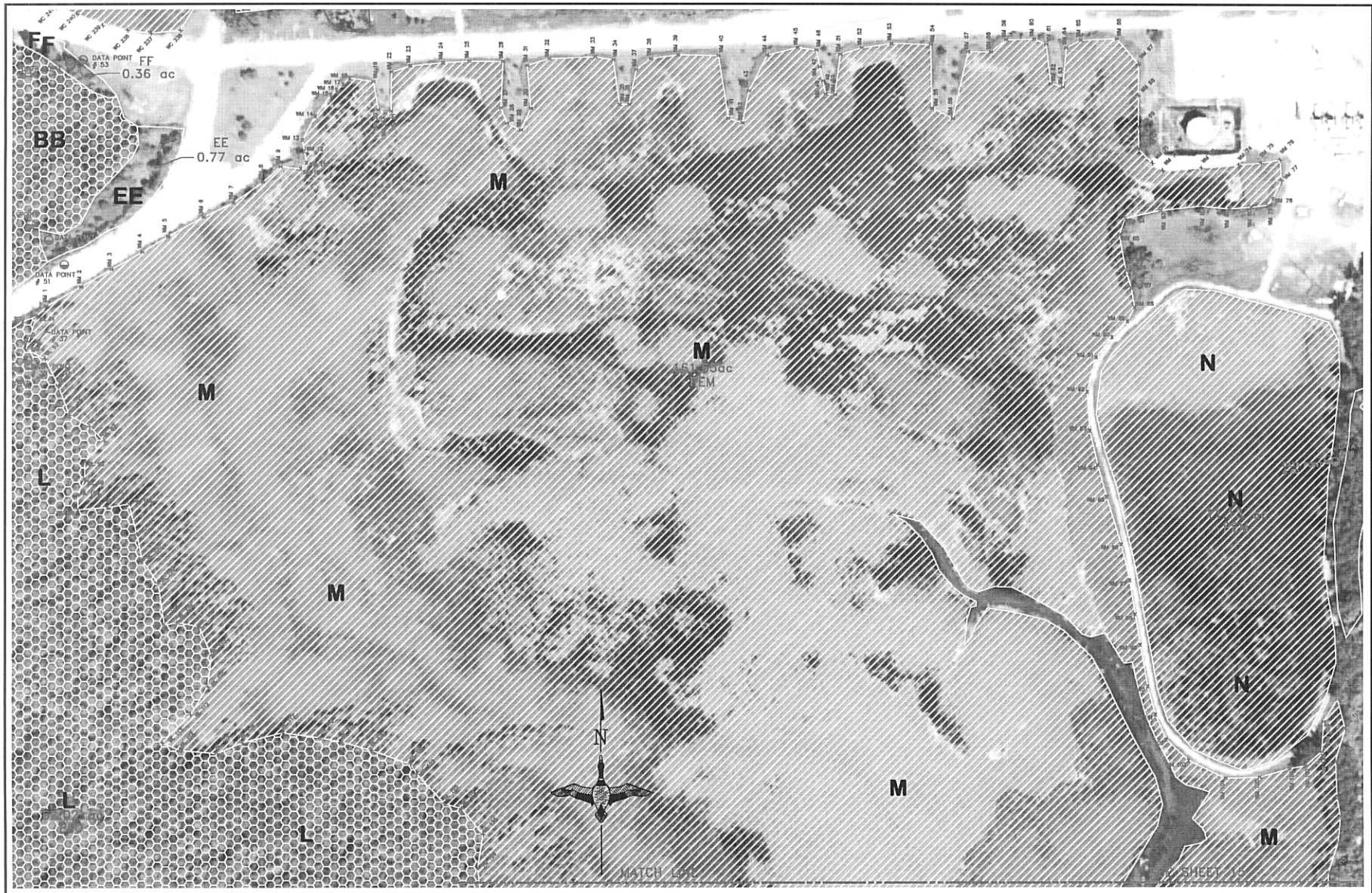

GRAPHIC SCALE

100 0 50 100 200 400

(IN FEET)
1 inch = 100 ft.

LEGEND

- OPEN WATER (FLAGGED)
- OPEN WATER (NOT FLAGGED)
- WETLAND BOUNDARY
- DATA POINT
- WETLAND FLAG
- PALUSTRINE SCRUB-SHRUB (PSS)
- PALUSTRINE EMERGENT (PEM)
- PALUSTRINE FORESTED (PFO)

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WETLAND DELINEATION M NORTH
DTE FERMI II PLANT
MONROE COUNTY, MICHIGAN

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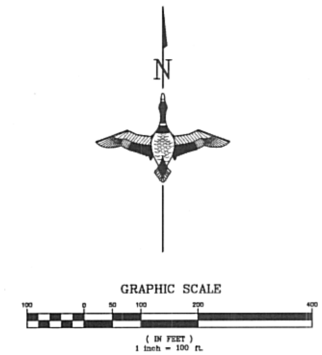

LEGEND

OPEN WATER (FLAGGED)

OPEN WATER (NOT FLAGGED)

WETLAND BOUNDARY

DATA POINT

WA 25 — WETLAND FLAG

PALUSTRINE SCRUB-SHRUB (PSS)

PALUSTRINE EMERGENT (PEM)

PALUSTRINE FORESTED (PFO)

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DTE FERMI II PLANT
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N

GRAPHIC SCALE

50 0 25 50 100 200

(IN FEET)
1 inch = 50 ft.

LEGEND

- OPEN WATER (FLAGGED)
- OPEN WATER (NOT FLAGGED)
- WETLAND BOUNDARY
- DATA POINT
- WETLAND FLAG (WA 25)
- PALUSTRINE SCRUB-SHRUB (PSS)
- PALUSTRINE EMERGENT (PEM)
- PALUSTRINE FORESTED (PFO)

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WETLAND DELINEATION N, O
DTE FERMI II PLANT
MONROE COUNTY, MICHIGAN

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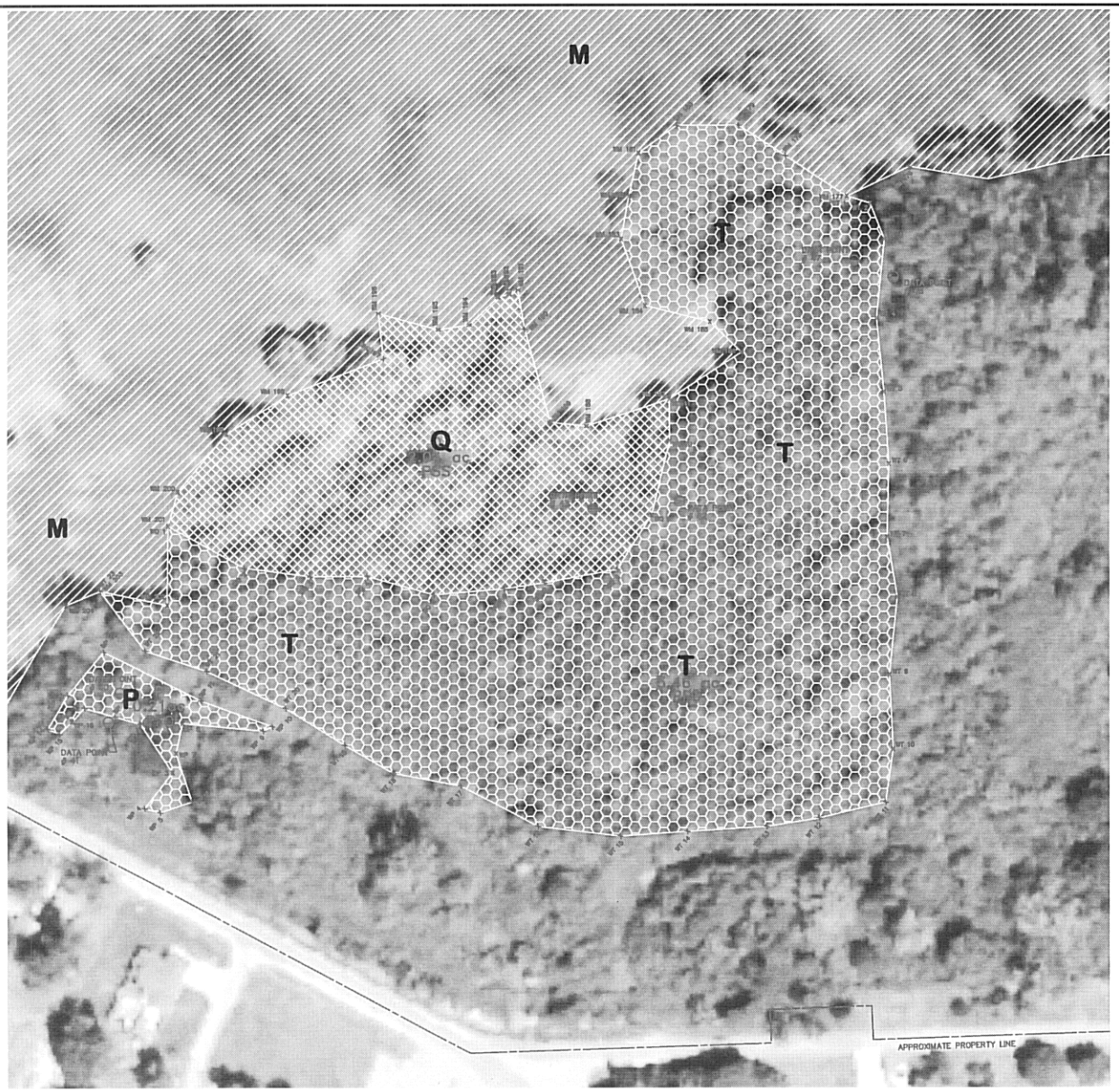

N

GRAPHIC SCALE

50 0 25 50 100 200

(IN FEET)
1 inch = 50 ft.

LEGEND

- OPEN WATER (FLAGGED)
- OPEN WATER (NOT FLAGGED)
- WETLAND BOUNDARY
- DATA POINT
- WA 25 — WETLAND FLAG
- PALUSTRINE SCRUB-SHRUB (PSS)
- PALUSTRINE EMERGENT (PEM)
- PALUSTRINE FORESTED (PFO)

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WETLAND DELINEATION P, Q, T
DTE FERMI II PLANT
MONROE COUNTY, MICHIGAN

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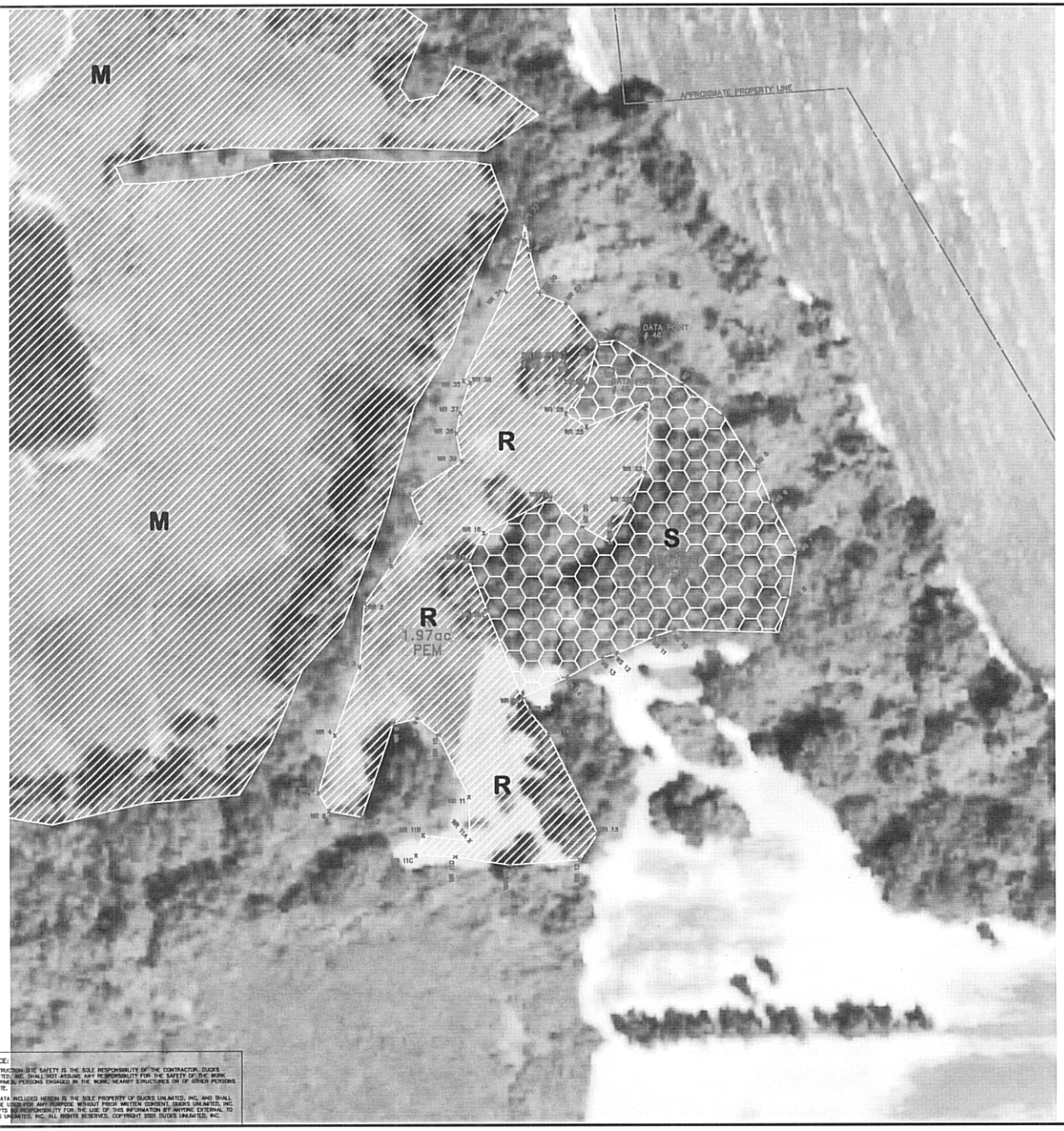

N

GRAPHIC SCALE

50 0 25 50 100 200

(IN FEET)
1 inch = 50 ft.

LEGEND

- OPEN WATER (FLAGGED)
- OPEN WATER (NOT FLAGGED)
- WETLAND BOUNDARY
- DATA POINT
- WETLAND FLAG (WA 25)
- PALUSTRINE SCRUB-SHRUB (PSS)
- PALUSTRINE EMERGENT (PEM)
- PALUSTRINE FORESTED (PFO)

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WETLAND DELINEATION, R, S
DTE FERMI II PLANT
MONROE COUNTY, MICHIGAN

REVISIONS:

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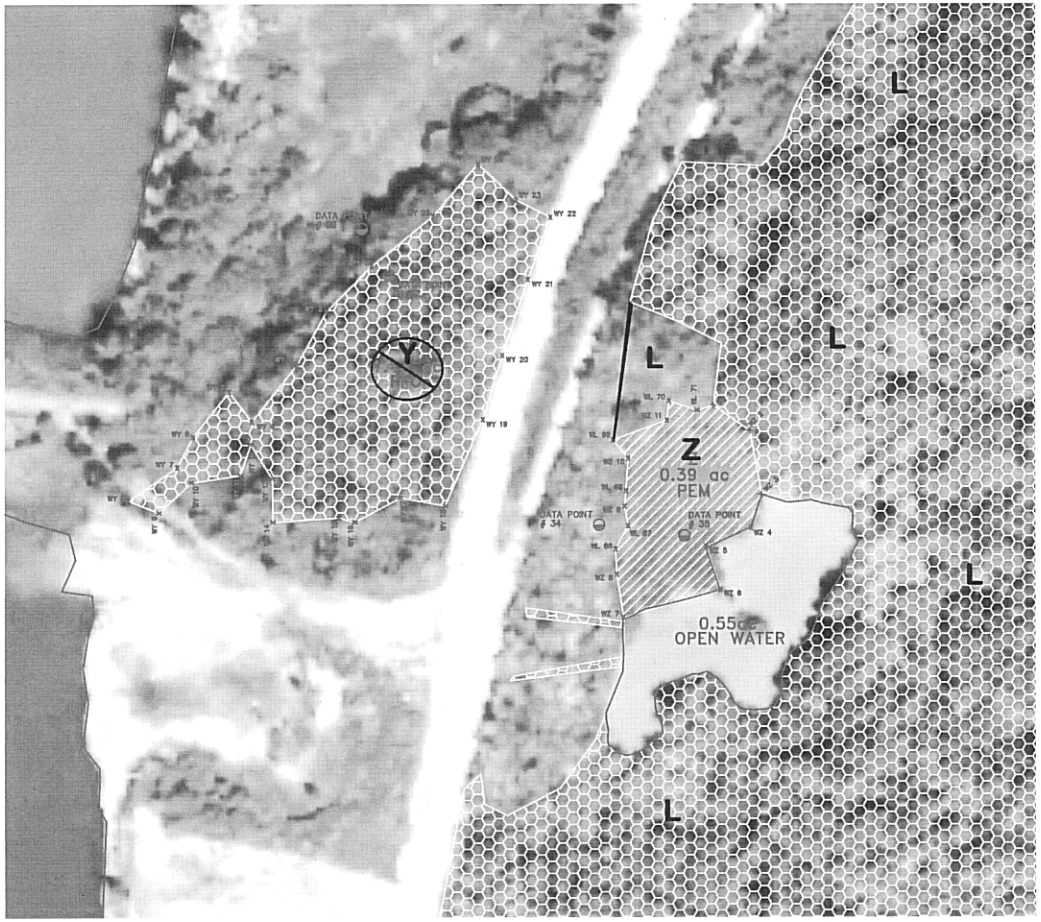

N

GRAPHIC SCALE

50 0 25 50 100 200

(IN FEET)
1 inch = 50 ft.

USACE NOTE:

AREA L: ENLARGE-CONNECT WL 69 to WL 74

LEGEND

- OPEN WATER (FLAGGED)
- OPEN WATER (NOT FLAGGED)
- WETLAND BOUNDARY
- DATA POINT
- WETLAND FLAG (WA 25)
- PALUSTRINE SCRUB-SHRUB (PSS)
- PALUSTRINE EMERGENT (PEM)
- PALUSTRINE FORESTED (PFO)

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WETLAND DELINEATION Y, Z
DTE FERMI II PLANT
MONROE COUNTY, MICHIGAN

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GRAPHIC SCALE

50 0 25 50 100 200

(IN FEET)
1 inch = 50 ft.

LEGEND

- OPEN WATER (FLAGGED)
- OPEN WATER (NOT FLAGGED)
- WETLAND BOUNDARY
- DATA POINT
- WETLAND FLAG (e.g. WA 25)
- PALUSTRINE SCRUB-SHRUB (PSS)
- PALUSTRINE EMERGENT (PEM)
- PALUSTRINE FORESTED (PFO)

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DTE FERMI II PLANT
MONROE COUNTY, MICHIGAN

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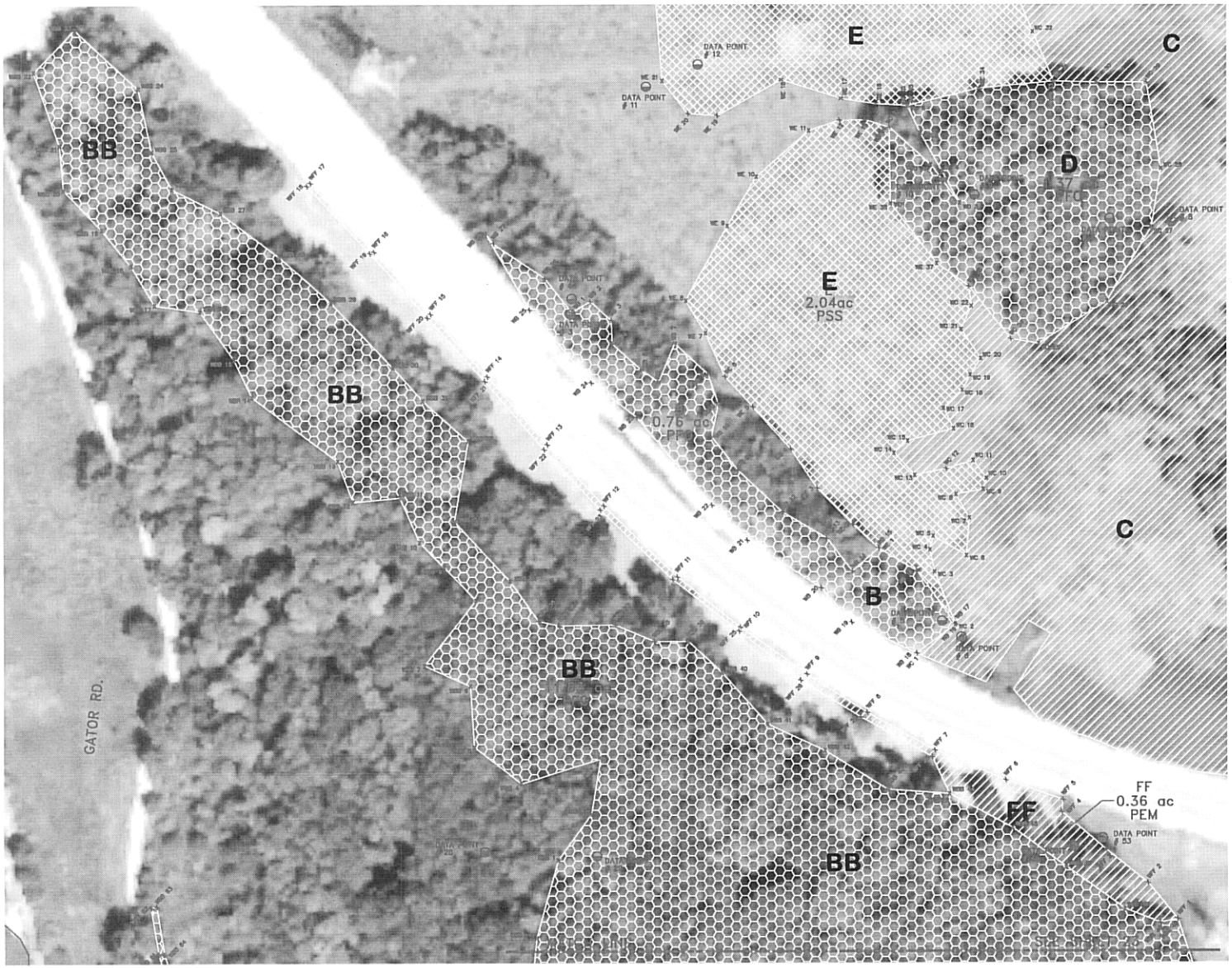

N

GRAPHIC SCALE

50 0 25 50 100 200

(IN FEET)
1 inch = 50 ft.

LEGEND

- OPEN WATER (FLAGGED)
- OPEN WATER (NOT FLAGGED)
- WETLAND BOUNDARY
- DATA POINT
- WETLAND FLAG (xWA 25)
- PALUSTRINE SCRUB-SHRUB (PSS)
- PALUSTRINE EMERGENT (PEM)
- PALUSTRINE FORESTED (PFO)

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WETLAND DELINEATION BB NORTH, FF
DTE FERMI II PLANT
MONROE COUNTY, MICHIGAN

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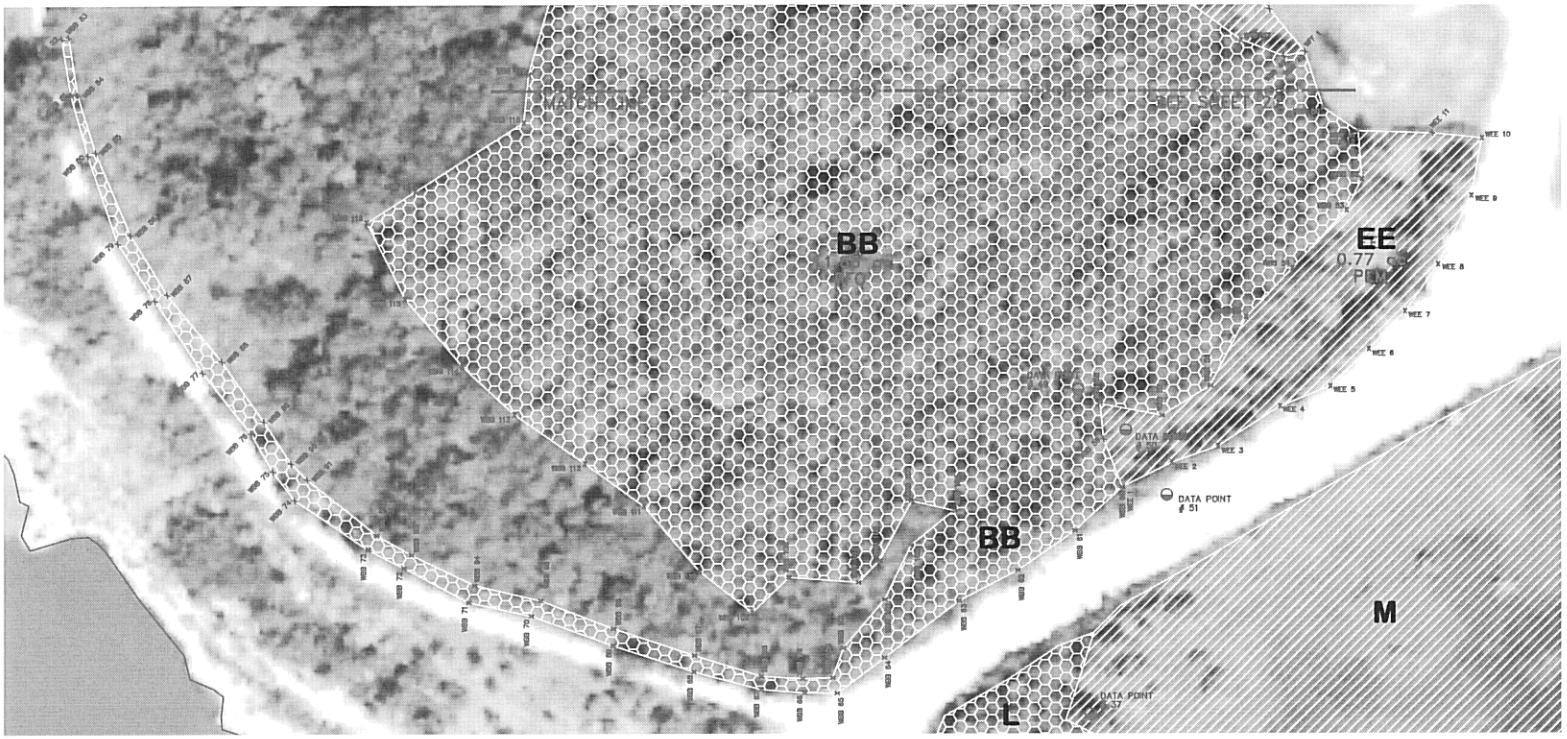

N

GRAPHIC SCALE

50 0 25 50 100 200

(IN FEET)
1 inch = 50 ft.

LEGEND

- OPEN WATER (FLAGGED)
- OPEN WATER (NOT FLAGGED)
- WETLAND BOUNDARY
- DATA POINT
- WETLAND FLAG (WA 35)
- PALUSTRINE SCRUB-SHRUB (PSS)
- PALUSTRINE EMERGENT (PEM)
- PALUSTRINE FORESTED (PFO)

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WETLAND DELINEATION BB SOUTH, EE
DTE FERMI II PLANT
MONROE COUNTY, MICHIGAN

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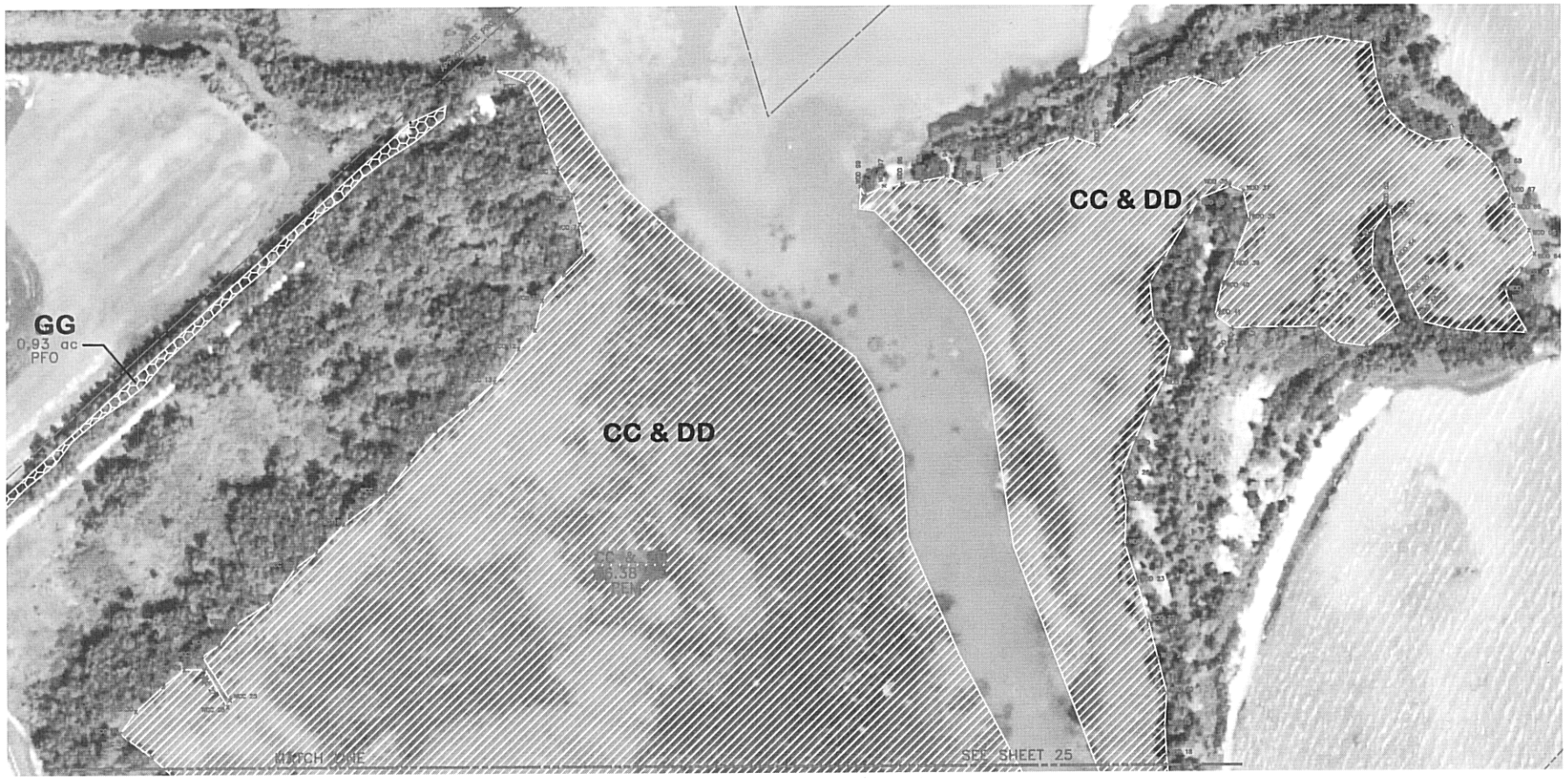

N

GRAPHIC SCALE

100 0 50 100 200 400

(IN FEET)
1 inch = 100 ft.

LEGEND

- OPEN WATER (FLAGGED)
- OPEN WATER (NOT FLAGGED)
- WETLAND BOUNDARY
- DATA POINT
- WA 25 WETLAND FLAG
- PALUSTRINE SCRUB-SHRUB (PSS)
- PALUSTRINE EMERGENT (PEM)
- PALUSTRINE FORESTED (PFO)

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WETLAND DELINEATION CC DD NORTH
DTE FERMI II PLANT
MONROE COUNTY, MICHIGAN

REVISIONS:

CAD FILE:	Wetland Delineation 100
DESIGNED BY:	-
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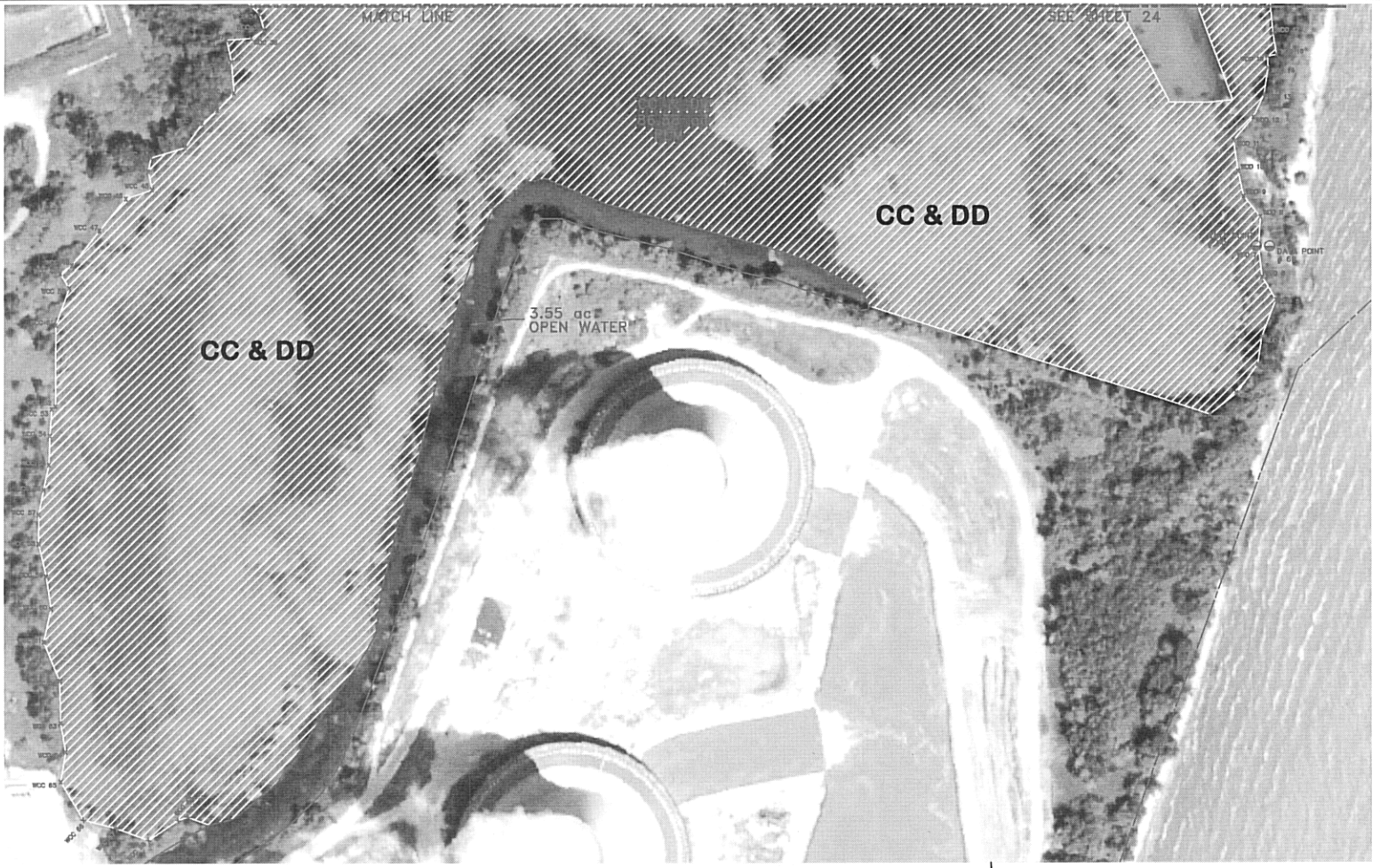

N

GRAPHIC SCALE

100 0 50 100 200 400

(IN FEET)
1 inch = 100 ft.

LEGEND

- OPEN WATER (FLAGGED)
- OPEN WATER (NOT FLAGGED)
- WETLAND BOUNDARY
- DATA POINT
- WETLAND FLAG
- PALUSTRINE SCRUB-SHRUB (PSS)
- PALUSTRINE EMERGENT (PEM)
- PALUSTRINE FORESTED (PFO)

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WETLAND DELINEATION CC DD SOUTH
DTE FERMI II PLANT
MONROE COUNTY, MICHIGAN

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CAD FILE:	Wetland Delineation 100
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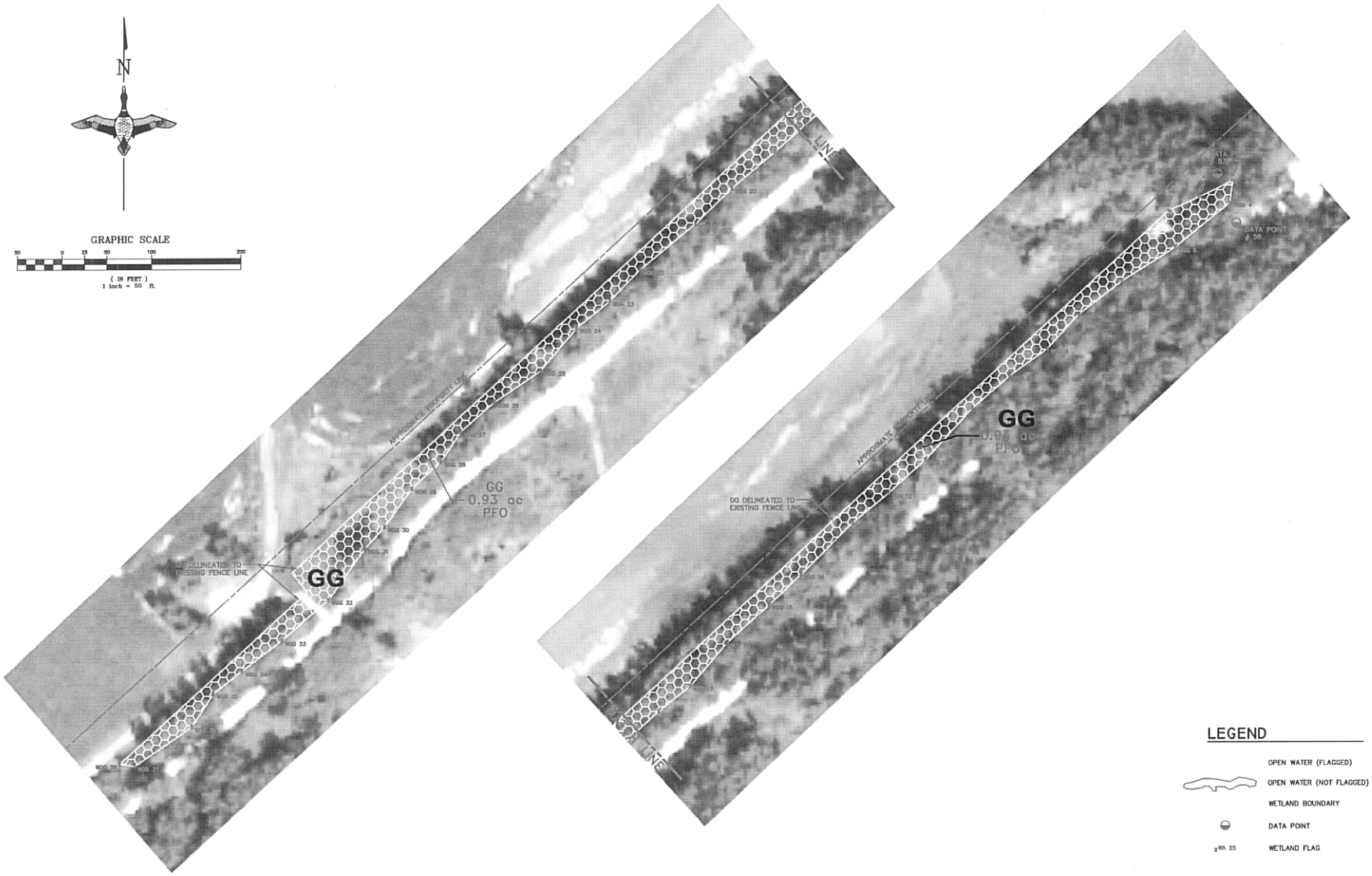

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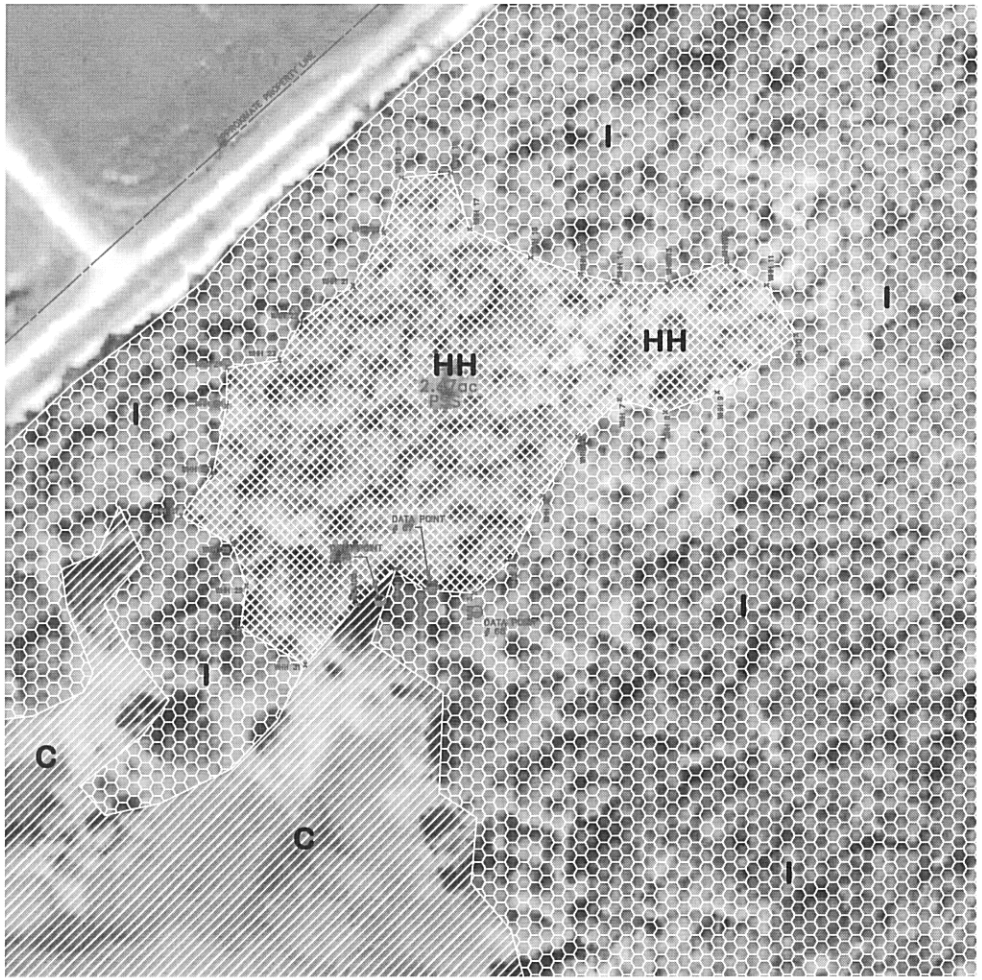
DUCKS UNLIMITED

WETLAND DELINEATION GG
DTE FERMI II PLANT
MONROE COUNTY, MICHIGAN

REVISIONS:

CAD FILE:	Wetland Delineation 50
DESIGNED BY:	-
DRAWN BY:	GB, DA
SURVEYED BY:	GB,WW,PW
BOOK NO. # 18 PAGE 13-19	
DATE:	7/7/08
PROJECT NO.:	US-MI-188-1

GLARO-MI3-46-26



N

GRAPHIC SCALE

50 0 25 50 100 200

(IN FEET)
1 inch = 50 ft.

LEGEND

- OPEN WATER (FLAGGED)
- OPEN WATER (NOT FLAGGED)
- WETLAND BOUNDARY
- DATA POINT
- WETLAND FLAG (WA 25)
- PALUSTRINE SCRUB-SHRUB (PSS)
- PALUSTRINE EMERGENT (PEM)
- PALUSTRINE FORESTED (PFO)

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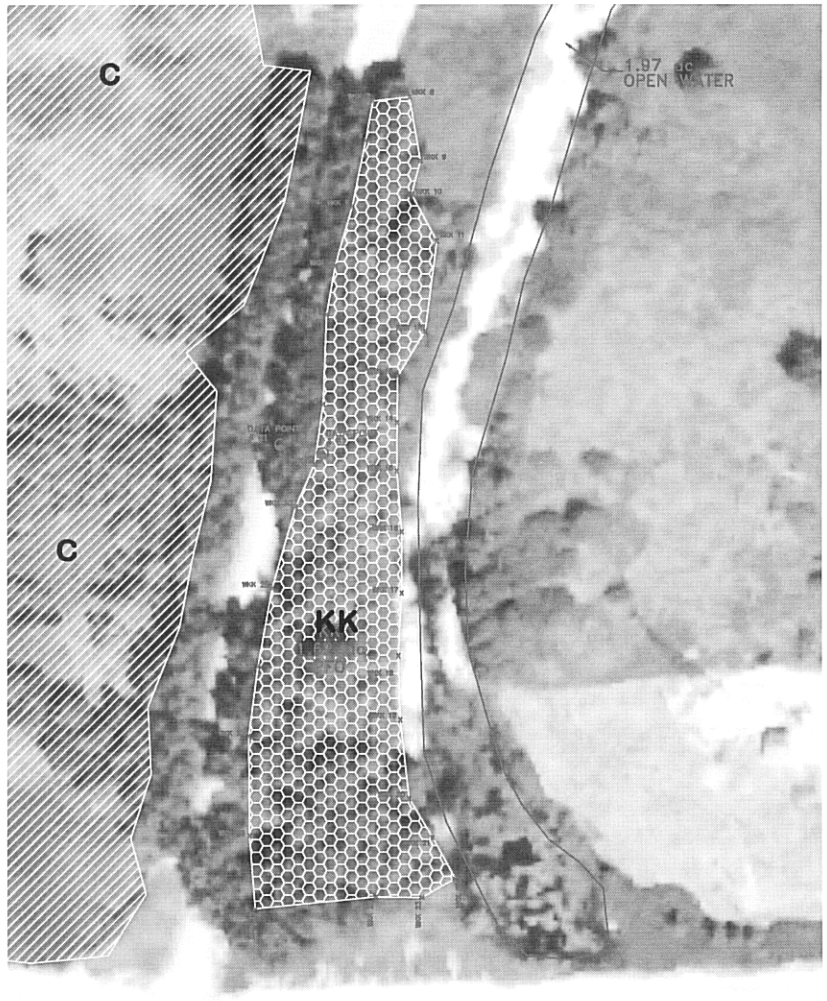
WETLAND DELINEATION HH
DTE FERMI II PLANT
MONROE COUNTY, MICHIGAN

REVISIONS:

CAD FILE: Wetland Delineation 50
DESIGNED BY: -
DRAWN BY: GB, DA
SURVEYED BY: GB,WW,PW
BOOK NO. # 16 PAGE 13-19
DATE: 7/7/08
PROJECT NO.: US-MI-188-1
GLARO-MI3-46-27



N

GRAPHIC SCALE

50 0 25 50 100 200

(IN FEET)
1 inch = 50 ft.

LEGEND

- OPEN WATER (FLAGGED)
- OPEN WATER (NOT FLAGGED)
- WETLAND BOUNDARY
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- PALUSTRINE EMERGENT (PEM)
- PALUSTRINE FORESTED (PFO)

NOTICE:
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DUCKS UNLIMITED

WETLAND DELINEATION KK
DTE FERMI II PLANT
MONROE COUNTY, MICHIGAN

REVISIONS:

CAD FILE:	Wetland Delineation 50
DESIGNED BY:	-
DRAWN BY:	GB, DA
SURVEYED BY:	GB,WW,PW
BOOK NO. # 16	PAGE 13-19
DATE:	7/7/08
PROJECT NO.:	US-MI-188-1
	GLARO-MI3-46-28

APPROVED JURISDICTIONAL DETERMINATION FORM
U.S. Army Corps of Engineers

This form should be completed by following the instructions provided in Section IV of the JD Form Instructional Guidebook.

SECTION I: BACKGROUND INFORMATION

A. REPORT COMPLETION DATE FOR APPROVED JURISDICTIONAL DETERMINATION (JD): 9 November 2010

B. DISTRICT OFFICE, FILE NAME, AND NUMBER: Detroit District, Detroit Edison Company-Fermi 3 Nuclear Power Plant, LRE-2008-00443-1

C. PROJECT LOCATION AND BACKGROUND INFORMATION:

State: MI County/parish/borough: Monroe City: Newport/Frenchtown Township
Center coordinates of site (lat/long in degree decimal format): Lat. 41.96105° **N**, Long. -83.26413° **W**.
Universal Transverse Mercator:
Name of nearest waterbody: Lake Erie
Name of nearest Traditional Navigable Water (TNW) into which the aquatic resource flows: Lake Erie
Name of watershed or Hydrologic Unit Code (HUC): 4100001

☒ Check if map/diagram of review area and/or potential jurisdictional areas is/are available upon request.
☐ Check if other sites (e.g., offsite mitigation sites, disposal sites, etc…) are associated with this action and are recorded on a different JD form.

D. REVIEW PERFORMED FOR SITE EVALUATION (CHECK ALL THAT APPLY):

☐ Office (Desk) Determination. Date:
☒ Field Determination. Date(s): 14 & 15 October 2008, 7 October 2010

SECTION II: SUMMARY OF FINDINGS

A. RHA SECTION 10 DETERMINATION OF JURISDICTION.

There **Are** *"navigable waters of the U.S."* within Rivers and Harbors Act (RHA) jurisdiction (as defined by 33 CFR part 329) in the review area. [*Required*]

☐ Waters subject to the ebb and flow of the tide.
☒ Waters are presently used, or have been used in the past, or may be susceptible for use to transport interstate or foreign commerce.
Explain: Portions of the project site are inundated by waters of Lake Erie.

B. CWA SECTION 404 DETERMINATION OF JURISDICTION.

There **Are** *"waters of the U.S."* within Clean Water Act (CWA) jurisdiction (as defined by 33 CFR part 328) in the review area. [*Required*]

1. **Waters of the U.S.**
   a. **Indicate presence of waters of U.S. in review area (check all that apply):** [1]
      ☒ TNWs, including territorial seas
      ☒ Wetlands adjacent to TNWs
      ☐ Relatively permanent waters[2] (RPWs) that flow directly or indirectly into TNWs
      ☐ Non-RPWs that flow directly or indirectly into TNWs
      ☐ Wetlands directly abutting RPWs that flow directly or indirectly into TNWs
      ☐ Wetlands adjacent to but not directly abutting RPWs that flow directly or indirectly into TNWs
      ☐ Wetlands adjacent to non-RPWs that flow directly or indirectly into TNWs
      ☐ Impoundments of jurisdictional waters
      ☐ Isolated (interstate or intrastate) waters, including isolated wetlands

   b. **Identify (estimate) size of waters of the U.S. in the review area:**
      Non-wetland waters: linear feet: width (ft) and/or acres.
      Wetlands: 185 acres.

   c. **Limits (boundaries) of jurisdiction** based on: **Established by OHWM.**
      Elevation of established OHWM (if known): 573.4 (IGLD1985); wetland boundaries defined by 1987 Manual.

2. **Non-regulated waters/wetlands (check if applicable):**[3]
   ☐ Potentially jurisdictional waters and/or wetlands were assessed within the review area and determined to be not jurisdictional.
   Explain: .

[1] Boxes checked below shall be supported by completing the appropriate sections in Section III below.
[2] For purposes of this form, an RPW is defined as a tributary that is not a TNW and that typically flows year-round or has continuous flow at least "seasonally" (e.g., typically 3 months).
[3] Supporting documentation is presented in Section III.F.

ENCLOSURE 4

SECTION III: CWA ANALYSIS

A. TNWs AND WETLANDS ADJACENT TO TNWs

The agencies will assert jurisdiction over TNWs and wetlands adjacent to TNWs. If the aquatic resource is a TNW, complete Section III.A.1 and Section III.D.1. only; if the aquatic resource is a wetland adjacent to a TNW, complete Sections III.A.1 and 2 and Section III.D.1.; otherwise, see Section III.B below.

1. **TNW**
   Identify TNW: **Lake Erie**.

   Summarize rationale supporting determination: Lake Erie is on the Detroit District's list of navigable waters. This waterway is currently used to transport interstate and foreign commerce.

2. **Wetland adjacent to TNW**
   Summarize rationale supporting conclusion that wetland is "adjacent": Areas B, D, E, F, I, L (including additional area), Q, T, Z, AA, GG and HH are contiguous with Lake Erie; Areas G, J, K, O, P, R, S, V, BB, EE, FF, KK are bordering Lake Erie.

B. CHARACTERISTICS OF TRIBUTARY (THAT IS NOT A TNW) AND ITS ADJACENT WETLANDS (IF ANY):

This section summarizes information regarding characteristics of the tributary and its adjacent wetlands, if any, and it helps determine whether or not the standards for jurisdiction established under *Rapanos* have been met.

The agencies will assert jurisdiction over non-navigable tributaries of TNWs where the tributaries are "relatively permanent waters" (RPWs), i.e. tributaries that typically flow year-round or have continuous flow at least seasonally (e.g., typically 3 months). A wetland that directly abuts an RPW is also jurisdictional. If the aquatic resource is not a TNW, but has year-round (perennial) flow, skip to Section III.D.2. If the aquatic resource is a wetland directly abutting a tributary with perennial flow, skip to Section III.D.4.

A wetland that is adjacent to but that does not directly abut an RPW requires a significant nexus evaluation. **Corps districts and EPA regions will include in the record any available information that documents the existence of a significant nexus between a relatively permanent tributary that is not perennial (and its adjacent wetlands if any) and a traditional navigable water, even though a significant nexus finding is not required as a matter of law.**

If the waterbody[4] is not an RPW, or a wetland directly abutting an RPW, a JD will require additional data to determine if the waterbody has a significant nexus with a TNW. If the tributary has adjacent wetlands, the significant nexus evaluation must consider the tributary in combination with all of its adjacent wetlands. This significant nexus evaluation that combines, for analytical purposes, the tributary and all of its adjacent wetlands is used whether the review area identified in the JD request is the tributary, or its adjacent wetlands, or both. If the JD covers a tributary with adjacent wetlands, complete Section III.B.1 for the tributary, Section III.B.2 for any onsite wetlands, and Section III.B.3 for all wetlands adjacent to that tributary, both onsite and offsite. The determination whether a significant nexus exists is determined in Section III.C below.

1. **Characteristics of non-TNWs that flow directly or indirectly into TNW**

   (i) General Area Conditions:
   Watershed size: **Pick List**
   Drainage area: **Pick List**
   Average annual rainfall: inches
   Average annual snowfall: inches

   (ii) Physical Characteristics:
   (a) Relationship with TNW:
   ☐ Tributary flows directly into TNW.
   ☐ Tributary flows through **Pick List** tributaries before entering TNW.

   Project waters are **Pick List** river miles from TNW.
   Project waters are **Pick List** river miles from RPW.
   Project waters are **Pick List** aerial (straight) miles from TNW.
   Project waters are **Pick List** aerial (straight) miles from RPW.
   Project waters cross or serve as state boundaries. Explain: .

[4] Note that the Instructional Guidebook contains additional information regarding swales, ditches, washes, and erosional features generally and in the arid West.

Identify flow route to TNW[5]: .
Tributary stream order, if known: .

(b) General Tributary Characteristics (check all that apply):
Tributary is: ☐ Natural
☐ Artificial (man-made). Explain: .
☐ Manipulated (man-altered). Explain: .

Tributary properties with respect to top of bank (estimate):
Average width: feet
Average depth: feet
Average side slopes: **Pick List.**

Primary tributary substrate composition (check all that apply):
☐ Silts ☐ Sands ☐ Concrete
☐ Cobbles ☐ Gravel ☐ Muck
☐ Bedrock ☐ Vegetation. Type/% cover:
☐ Other. Explain: .

Tributary condition/stability [e.g., highly eroding, sloughing banks]. Explain: .
Presence of run/riffle/pool complexes. Explain: .
Tributary geometry: **Pick List**
Tributary gradient (approximate average slope): %

(c) Flow:
Tributary provides for: **Pick List**
Estimate average number of flow events in review area/year: **Pick List**
Describe flow regime: .
Other information on duration and volume: .

Surface flow is: **Pick List.** Characteristics: .

Subsurface flow: **Pick List**. Explain findings: .
☐ Dye (or other) test performed: .

Tributary has (check all that apply):
☐ Bed and banks
☐ OHWM[6] (check all indicators that apply):
☐ clear, natural line impressed on the bank ☐ the presence of litter and debris
☐ changes in the character of soil ☐ destruction of terrestrial vegetation
☐ shelving ☐ the presence of wrack line
☐ vegetation matted down, bent, or absent ☐ sediment sorting
☐ leaf litter disturbed or washed away ☐ scour
☐ sediment deposition ☐ multiple observed or predicted flow events
☐ water staining ☐ abrupt change in plant community
☐ other (list):
☐ Discontinuous OHWM.[7] Explain: .

If factors other than the OHWM were used to determine lateral extent of CWA jurisdiction (check all that apply):
☐ High Tide Line indicated by: ☐ Mean High Water Mark indicated by:
☐ oil or scum line along shore objects ☐ survey to available datum;
☐ fine shell or debris deposits (foreshore) ☐ physical markings;
☐ physical markings/characteristics ☐ vegetation lines/changes in vegetation types.
☐ tidal gauges
☐ other (list):

(iii) Chemical Characteristics:
Characterize tributary (e.g., water color is clear, discolored, oily film; water quality; general watershed characteristics, etc.).
Explain: .
Identify specific pollutants, if known: .

---

[5] Flow route can be described by identifying, e.g., tributary a, which flows through the review area, to flow into tributary b, which then flows into TNW.
[6] A natural or man-made discontinuity in the OHWM does not necessarily sever jurisdiction (e.g., where the stream temporarily flows underground, or where the OHWM has been removed by development or agricultural practices). Where there is a break in the OHWM that is unrelated to the waterbody's flow regime (e.g., flow over a rock outcrop or through a culvert), the agencies will look for indicators of flow above and below the break.
[7] Ibid.

(iv) Biological Characteristics. Channel supports (check all that apply):

- ☐ Riparian corridor. Characteristics (type, average width): .
- ☐ Wetland fringe. Characteristics: .
- ☐ Habitat for:
  - ☐ Federally Listed species. Explain findings: .
  - ☐ Fish/spawn areas. Explain findings: .
  - ☐ Other environmentally-sensitive species. Explain findings: .
  - ☐ Aquatic/wildlife diversity. Explain findings: .

2. Characteristics of wetlands adjacent to non-TNW that flow directly or indirectly into TNW

(i) Physical Characteristics:

(a) General Wetland Characteristics:
Properties:
Wetland size: acres
Wetland type. Explain: .
Wetland quality. Explain: .
Project wetlands cross or serve as state boundaries. Explain: .

(b) General Flow Relationship with Non-TNW:
Flow is: **Pick List**. Explain: .

Surface flow is: **Pick List**
Characteristics: .

Subsurface flow: **Pick List**. Explain findings: .
- ☐ Dye (or other) test performed: .

(c) Wetland Adjacency Determination with Non-TNW:
- ☐ Directly abutting
- ☐ Not directly abutting
  - ☐ Discrete wetland hydrologic connection. Explain: .
  - ☐ Ecological connection. Explain: .
  - ☐ Separated by berm/barrier. Explain: .

(d) Proximity (Relationship) to TNW
Project wetlands are **Pick List** river miles from TNW.
Project waters are **Pick List** aerial (straight) miles from TNW.
Flow is from: **Pick List.**
Estimate approximate location of wetland as within the **Pick List** floodplain.

(ii) Chemical Characteristics:

Characterize wetland system (e.g., water color is clear, brown, oil film on surface; water quality; general watershed characteristics; etc.). Explain: .
Identify specific pollutants, if known: .

(iii) Biological Characteristics. Wetland supports (check all that apply):

- ☐ Riparian buffer. Characteristics (type, average width): .
- ☐ Vegetation type/percent cover. Explain: .
- ☐ Habitat for:
  - ☐ Federally Listed species. Explain findings: .
  - ☐ Fish/spawn areas. Explain findings: .
  - ☐ Other environmentally-sensitive species. Explain findings: .
  - ☐ Aquatic/wildlife diversity. Explain findings: .

3. Characteristics of all wetlands adjacent to the tributary (if any)

All wetland(s) being considered in the cumulative analysis: **Pick List**
Approximately ( ) acres in total are being considered in the cumulative analysis.

For each wetland, specify the following:

Directly abuts? (Y/N)	Size (in acres)	Directly abuts? (Y/N)	Size (in acres)

Summarize overall biological, chemical and physical functions being performed: .

C. SIGNIFICANT NEXUS DETERMINATION

A significant nexus analysis will assess the flow characteristics and functions of the tributary itself and the functions performed by any wetlands adjacent to the tributary to determine if they significantly affect the chemical, physical, and biological integrity of a TNW. For each of the following situations, a significant nexus exists if the tributary, in combination with all of its adjacent wetlands, has more than a speculative or insubstantial effect on the chemical, physical and/or biological integrity of a TNW. Considerations when evaluating significant nexus include, but are not limited to the volume, duration, and frequency of the flow of water in the tributary and its proximity to a TNW, and the functions performed by the tributary and all its adjacent wetlands. It is not appropriate to determine significant nexus based solely on any specific threshold of distance (e.g. between a tributary and its adjacent wetland or between a tributary and the TNW). Similarly, the fact an adjacent wetland lies within or outside of a floodplain is not solely determinative of significant nexus.

Draw connections between the features documented and the effects on the TNW, as identified in the *Rapanos* Guidance and discussed in the Instructional Guidebook. Factors to consider include, for example:

- Does the tributary, in combination with its adjacent wetlands (if any), have the capacity to carry pollutants or flood waters to TNWs, or to reduce the amount of pollutants or flood waters reaching a TNW?
- Does the tributary, in combination with its adjacent wetlands (if any), provide habitat and lifecycle support functions for fish and other species, such as feeding, nesting, spawning, or rearing young for species that are present in the TNW?
- Does the tributary, in combination with its adjacent wetlands (if any), have the capacity to transfer nutrients and organic carbon that support downstream foodwebs?
- Does the tributary, in combination with its adjacent wetlands (if any), have other relationships to the physical, chemical, or biological integrity of the TNW?

Note: the above list of considerations is not inclusive and other functions observed or known to occur should be documented below:

1. **Significant nexus findings for non-RPW that has no adjacent wetlands and flows directly or indirectly into TNWs.** Explain findings of presence or absence of significant nexus below, based on the tributary itself, then go to Section III.D: .

2. **Significant nexus findings for non-RPW and its adjacent wetlands, where the non-RPW flows directly or indirectly into TNWs.** Explain findings of presence or absence of significant nexus below, based on the tributary in combination with all of its adjacent wetlands, then go to Section III.D: .

3. **Significant nexus findings for wetlands adjacent to an RPW but that do not directly abut the RPW.** Explain findings of presence or absence of significant nexus below, based on the tributary in combination with all of its adjacent wetlands, then go to Section III.D: .

D. DETERMINATIONS OF JURISDICTIONAL FINDINGS. THE SUBJECT WATERS/WETLANDS ARE (CHECK ALL THAT APPLY):

1. **TNWs and Adjacent Wetlands.** Check all that apply and provide size estimates in review area:
   - ☒ TNWs: linear feet width (ft), Or, acres.
   - ☒ Wetlands adjacent to TNWs: 158 acres.

2. **RPWs that flow directly or indirectly into TNWs.**
   - ☐ Tributaries of TNWs where tributaries typically flow year-round are jurisdictional. Provide data and rationale indicating that tributary is perennial: .
   - ☐ Tributaries of TNW where tributaries have continuous flow "seasonally" (e.g., typically three months each year) are jurisdictional. Data supporting this conclusion is provided at Section III.B. Provide rationale indicating that tributary flows seasonally: .

Provide estimates for jurisdictional waters in the review area (check all that apply):
☐ Tributary waters: linear feet width (ft).
☐ Other non-wetland waters: acres.
Identify type(s) of waters: .

3. **Non-RPWs[8] that flow directly or indirectly into TNWs.**
☐ Waterbody that is not a TNW or an RPW, but flows directly or indirectly into a TNW, and it has a significant nexus with a TNW is jurisdictional. Data supporting this conclusion is provided at Section III.C.

Provide estimates for jurisdictional waters within the review area (check all that apply):
☐ Tributary waters: linear feet width (ft).
☐ Other non-wetland waters: acres.
Identify type(s) of waters: .

4. **Wetlands directly abutting an RPW that flow directly or indirectly into TNWs.**
☐ Wetlands directly abut RPW and thus are jurisdictional as adjacent wetlands.
☐ Wetlands directly abutting an RPW where tributaries typically flow year-round. Provide data and rationale indicating that tributary is perennial in Section III.D.2, above. Provide rationale indicating that wetland is directly abutting an RPW: .

☐ Wetlands directly abutting an RPW where tributaries typically flow "seasonally." Provide data indicating that tributary is seasonal in Section III.B and rationale in Section III.D.2, above. Provide rationale indicating that wetland is directly abutting an RPW: .

Provide acreage estimates for jurisdictional wetlands in the review area: acres.

5. **Wetlands adjacent to but not directly abutting an RPW that flow directly or indirectly into TNWs.**
☐ Wetlands that do not directly abut an RPW, but when considered in combination with the tributary to which they are adjacent and with similarly situated adjacent wetlands, have a significant nexus with a TNW are jurisidictional. Data supporting this conclusion is provided at Section III.C.

Provide acreage estimates for jurisdictional wetlands in the review area: acres.

6. **Wetlands adjacent to non-RPWs that flow directly or indirectly into TNWs.**
☐ Wetlands adjacent to such waters, and have when considered in combination with the tributary to which they are adjacent and with similarly situated adjacent wetlands, have a significant nexus with a TNW are jurisdictional. Data supporting this conclusion is provided at Section III.C.

Provide estimates for jurisdictional wetlands in the review area: acres.

7. **Impoundments of jurisdictional waters.[9]**
As a general rule, the impoundment of a jurisdictional tributary remains jurisdictional.
☐ Demonstrate that impoundment was created from "waters of the U.S.," or
☐ Demonstrate that water meets the criteria for one of the categories presented above (1-6), or
☐ Demonstrate that water is isolated with a nexus to commerce (see E below).

E. ISOLATED [INTERSTATE OR INTRA-STATE] WATERS, INCLUDING ISOLATED WETLANDS, THE USE, DEGRADATION OR DESTRUCTION OF WHICH COULD AFFECT INTERSTATE COMMERCE, INCLUDING ANY SUCH WATERS (CHECK ALL THAT APPLY):[10]
☐ which are or could be used by interstate or foreign travelers for recreational or other purposes.
☐ from which fish or shellfish are or could be taken and sold in interstate or foreign commerce.
☐ which are or could be used for industrial purposes by industries in interstate commerce.
☐ Interstate isolated waters. Explain: .
☐ Other factors. Explain: .

Identify water body and summarize rationale supporting determination: .

---

[8] See Footnote # 3.
[9] To complete the analysis refer to the key in Section III.D.6 of the Instructional Guidebook.
[10] **Prior to asserting or declining CWA jurisdiction based solely on this category, Corps Districts will elevate the action to Corps and EPA HQ for review consistent with the process described in the Corps/EPA *Memorandum Regarding CWA Act Jurisdiction Following Rapanos.***

Provide estimates for jurisdictional waters in the review area (check all that apply):
☐ Tributary waters: linear feet width (ft).
☐ Other non-wetland waters: acres.
Identify type(s) of waters: .
☐ Wetlands: acres.

F. NON-JURISDICTIONAL WATERS, INCLUDING WETLANDS (CHECK ALL THAT APPLY):
☐ If potential wetlands were assessed within the review area, these areas did not meet the criteria in the 1987 Corps of Engineers Wetland Delineation Manual and/or appropriate Regional Supplements.
☐ Review area included isolated waters with no substantial nexus to interstate (or foreign) commerce.
☐ Prior to the Jan 2001 Supreme Court decision in "*SWANCC*," the review area would have been regulated based solely on the "Migratory Bird Rule" (MBR).
☐ Waters do not meet the "Significant Nexus" standard, where such a finding is required for jurisdiction. Explain: .
☐ Other: (explain, if not covered above): .

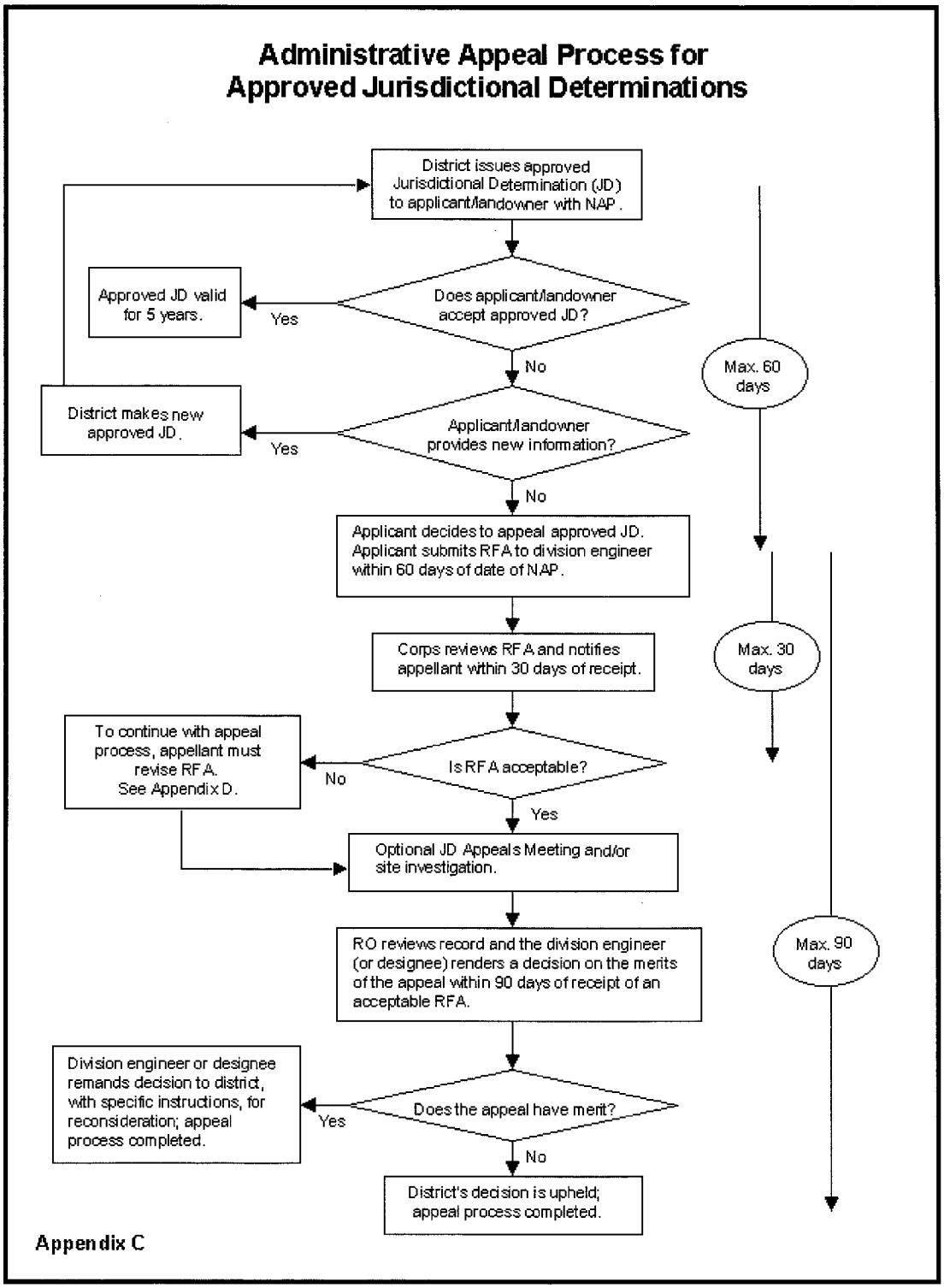
Provide acreage estimates for non-jurisdictional waters in the review area, where the sole potential basis of jurisdiction is the MBR factors (i.e., presence of migratory birds, presence of endangered species, use of water for irrigated agriculture), using best professional judgment (check all that apply):
☐ Non-wetland waters (i.e., rivers, streams): linear feet width (ft).
☐ Lakes/ponds: acres.
☐ Other non-wetland waters: acres. List type of aquatic resource: .
☐ Wetlands: acres.

Provide acreage estimates for non-jurisdictional waters in the review area that do not meet the "Significant Nexus" standard, where such a finding is required for jurisdiction (check all that apply):
☐ Non-wetland waters (i.e., rivers, streams): linear feet, width (ft).
☐ Lakes/ponds: acres.
☐ Other non-wetland waters: acres. List type of aquatic resource: .
☐ Wetlands: acres.

SECTION IV: DATA SOURCES.

A. SUPPORTING DATA. Data reviewed for JD (check all that apply - checked items shall be included in case file and, where checked and requested, appropriately reference sources below):
☒ Maps, plans, plots or plat submitted by or on behalf of the applicant/consultant: .
☐ Data sheets prepared/submitted by or on behalf of the applicant/consultant.
☐ Office concurs with data sheets/delineation report.
☐ Office does not concur with data sheets/delineation report.
☐ Data sheets prepared by the Corps: .
☐ Corps navigable waters' study: .
☐ U.S. Geological Survey Hydrologic Atlas: .
☐ USGS NHD data.
☐ USGS 8 and 12 digit HUC maps.
☒ U.S. Geological Survey map(s). Cite scale & quad name: .
☒ USDA Natural Resources Conservation Service Soil Survey. Citation: Monroe County Soil Survey.
☐ National wetlands inventory map(s). Cite name: .
☐ State/Local wetland inventory map(s): .
☐ FEMA/FIRM maps: .
☐ 100-year Floodplain Elevation is: (National Geodectic Vertical Datum of 1929)
☒ Photographs: ☒ Aerial (Name & Date): various from 1949 through 2009.
or ☐ Other (Name & Date): .
☐ Previous determination(s). File no. and date of response letter: .
☐ Applicable/supporting case law: .
☐ Applicable/supporting scientific literature: .
☐ Other information (please specify): .

B. ADDITIONAL COMMENTS TO SUPPORT JD: .



Appendix C

ENCLOSURE 5

NOTIFICATION OF ADMINISTRATIVE APPEAL OPTIONS AND PROCESS AND REQUEST FOR APPEAL		
Applicant: Detroit Edison	File Number: LRE-2008-00443-1	Date: 9 November, 2010
Attached is:		See Section below
	INITIAL PROFFERED PERMIT (Standard Permit or Letter of permission)	A
	PROFFERED PERMIT (Standard Permit or Letter of permission)	B
	PERMIT DENIAL	C
X	APPROVED JURISDICTIONAL DETERMINATION	D
	PRELIMINARY JURISDICTIONAL DETERMINATION	E

SECTION I - The following identifies your rights and options regarding an administrative appeal of the above decision. Additional information may be found at http://www.usace.army.mil/inet/functions/cw/cecwo/reg or Corps regulations at 33 CFR Part 331.

A: INITIAL PROFFERED PERMIT: You may accept or object to the permit.

- ACCEPT: If you received a Standard Permit, you may sign the permit document and return it to the district engineer for final authorization. If you received a Letter of Permission (LOP), you may accept the LOP and your work is authorized. Your signature on the Standard Permit or acceptance of the LOP means that you accept the permit in its entirety, and waive all rights to appeal the permit, including its terms and conditions, and approved jurisdictional determinations associated with the permit.
- OBJECT: If you object to the permit (Standard or LOP) because of certain terms and conditions therein, you may request that the permit be modified accordingly. You must complete Section II of this form and return the form to the district engineer. Your objections must be received by the district engineer within 60 days of the date of this notice, or you will forfeit your right to appeal the permit in the future. Upon receipt of your letter, the district engineer will evaluate your objections and may: (a) modify the permit to address all of your concerns, (b) modify the permit to address some of your objections, or (c) not modify the permit having determined that the permit should be issued as previously written. After evaluating your objections, the district engineer will send you a proffered permit for your reconsideration, as indicated in Section B below.

B: PROFFERED PERMIT: You may accept or appeal the permit.

- ACCEPT: If you received a Standard Permit, you may sign the permit document and return it to the district engineer for final authorization. If you received a Letter of Permission (LOP), you may accept the LOP and your work is authorized. Your signature on the Standard Permit or acceptance of the LOP means that you accept the permit in its entirety, and waive all rights to appeal the permit, including its terms and conditions, and approved jurisdictional determinations associated with the permit.
- APPEAL: If you choose to decline the proffered permit (Standard or LOP) because of certain terms and conditions therein, you may appeal the declined permit under the Corps of Engineers Administrative Appeal Process by completing Section II of this form and sending the form to the division engineer. This form must be received by the division engineer within 60 days of the date of this notice.

C: PERMIT DENIAL: You may appeal the denial of a permit under the Corps of Engineers Administrative Appeal Process by completing Section II of this form and sending the form to the division engineer. This form must be received by the division engineer within 60 days of the date of this notice.

ENCLOSURE 6

D: APPROVED JURISDICTIONAL DETERMINATION: You may accept or appeal the approved JD or provide new information.

- ACCEPT: You do not need to notify the Corps to accept an approved JD. Failure to notify the Corps within 60 days of the date of this notice means that you accept the approved JD in its entirety, and waive all rights to appeal the approved JD.
- APPEAL: If you disagree with the approved JD, you may appeal the approved JD under the Corps of Engineers Administrative Appeal Process by completing Section II of this form and sending the form to the division engineer. This form must be received by the division engineer within 60 days of the date of this notice.

E: PRELIMINARY JURISDICTIONAL DETERMINATION: You do not need to respond to the Corps regarding the preliminary JD. The Preliminary JD is not appealable. If you wish, you may request an approved JD (which may be appealed), by contacting the Corps district for further instruction. Also you may provide new information for further consideration by the Corps to reevaluate the JD.

SECTION II - REQUEST FOR APPEAL or OBJECTIONS TO AN INITIAL PROFFERED PERMIT

REASONS FOR APPEAL OR OBJECTIONS: (Describe your reasons for appealing the decision or your objections to an initial proffered permit in clear concise statements. You may attach additional information to this form to clarify where your reasons or objections are addressed in the administrative record.)

ADDITIONAL INFORMATION: The appeal is limited to a review of the administrative record, the Corps memorandum for the record of the appeal conference or meeting, and any supplemental information that the review officer has determined is needed to clarify the administrative record. Neither the appellant nor the Corps may add new information or analyses to the record. However, you may provide additional information to clarify the location of information that is already in the administrative record.

POINT OF CONTACT FOR QUESTIONS OR INFORMATION:

If you have questions regarding this decision and/or the appeal process you may contact:	If you only have questions regarding the appeal process you may also contact:
Colette Luff USACE-Detroit, Regulatory Office 477 Michigan Avenue, 6th Floor Detroit, MI 48226-2550 Tel. (313) 226-7485 Fax (313) 226-6763	Pauline Thorndike U.S. Army Corps of Engineers Great Lakes and Ohio River Division 550 Main Street, Room 10-524 Cincinnati, OH 45202-3222 Tel. (513) 684-6212 Fax. (513) 684-2460

RIGHT OF ENTRY: Your signature below grants the right of entry to Corps of Engineers personnel, and any government consultants, to conduct investigations of the project site during the course of the appeal process. You will be provided a 15 day notice of any site investigation, and will have the opportunity to participate in all site investigations.

	Date:	Telephone number:
_____ Signature of appellant or agent.		

Fermi 3 Conceptual Aquatic Resource Mitigation Strategy

MDEQ/USACE Joint Permit Application

PREPARED BY:

CONSERVATION CONNECTS

TETRA TECH

August 2011

Aquatic Resource Conceptual Mitigation Strategy

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1.0 INTRODUCTION

Detroit Edison has developed the following conceptual 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 is presented in the associated Joint Permit Application. 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 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 wetland impacts, Detroit Edison proposes to:

- Restore approximately 87 acres of wetland and enhance existing wetlands offsite in the coastal zone of Western Lake Erie. Restoration will include approximately 58 acres of PEM (Great Lakes marsh), 21 acres of PFO (southern hardwood swamp), and 8 acres of PSS wetland.
- Restore approximately 19.5 acres of impacted wetlands onsite post-construction.

This conceptual mitigation strategy is based on existing, available data, the attributes of potentially impacted wetlands, watershed priorities, feedback from natural resource professionals and ongoing communication with the regulatory and conservation community. The following narrative provides an overview of the conceptual mitigation strategy and its development.

2.0 MITIGATION GOALS AND OBJECTIVES

The principal goal of this mitigation strategy is to restore, enhance and protect wetland functions and values of equal or greater value than those impacted by construction of the Proposed Development (Figure 2). This goal will be achieved through wetland mitigation activities offsite within the coastal zone and restoration of impact areas onsite post-construction. The specific objectives listed below were developed based on an in-depth evaluation of the natural resources at the impact 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 3.1.2). 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 U.S. Army Corps of Engineers (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 Michigan Department of Environmental Quality (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 wetlands requiring mitigation (19.5 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 and enhance wetlands of similar ecological type within the same coastal zone. For the purposes of this document, restoration implies returning an area to wetland that once was wetland but currently is not because of past and ongoing modifications. Enhancement implies improving wetland functions in an existing wetland. To achieve the mitigation goal stated above, this conceptual mitigation strategy proposes to implement the following mitigation actions:

- Restore approximately 87 acres of wetland and enhance existing wetlands offsite in the coastal zone of Western Lake Erie. Restoration will include approximately 58 acres of PEM (Great Lakes marsh), 21 acres of PFO (southern hardwood swamp), and 8 acres of PSS wetland.
- Restore approximately 19.5 acres of impacted wetlands onsite post-construction.

Restoration and enhancement activities proposed for the on- and offsite wetland mitigation projects emphasize heterogeneity in microtopography, vegetation and hydrology to maximize diversity and ecological resilience of wetland habitat. Projects were designed to restore and enhance wetland functions and values including:

- Flood flow attenuation and storage
- Sediment retention
- 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.

Wetland mitigation has also 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. This comprehensive mitigation strategy proposes mitigation that will ultimately restore and enhance significant coastal wetland resources 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 with, or prior to, wetland impacts.

2.2 Mitigation Ratios

Ratio of wetland replacement is based on the community type and other attributes of a particular wetland and on guidance from regulatory agencies (see MDEQ Wetland Assessment Wetland Identification File Number 8-58-0003-WA November 7, 2008 and March 30, 2009 included as supplemental information with the Joint Permit Application). These guidance ratios are presented in Table 1. A summary of wetland impacts and attributes is provided in Table 2. A more detailed description of the impacted wetlands is provided in Section 12 of the associated Joint Permit Application.

Wetland mitigation objectives proposed here will replace wetland functions and values impacted in the expansion area by restoring 87 acres of wetlands of similar type offsite in the same watershed (coastal zone) at an average replacement ratio of approximately 2.4:1. In addition, several existing wetlands at the offsite mitigation area will be enhanced, and 19.5 acres of impacted wetlands onsite will be restored to wetland habitat once construction is complete. Table 1 provides the types and acreages of wetlands impacted, the required ratios and mitigation, and the proposed acreage of mitigation. As per regulatory guidance, the onsite restoration of 19.5 acres of the impacted wetlands post-construction and the enhancement of existing wetlands at the offsite mitigation area will provide added ecological value and benefits above the required compensatory mitigation. These actions may be proposed to decrease the acreage of mitigation required by 20 percent. This 20 percent decrease is reflected in the total acreage of wetland mitigation proposed in the offsite mitigation plan (Table 1).

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 2.4 acres of high quality, intact wetland, enhancement of existing wetland habitat, and by post-

construction restoration of approximately 55% of the impacted wetlands onsite. This mitigation strategy proposes compensation at the appropriate level to achieve replacement of lost functions and values, satisfy regulatory mitigation requirements and will also support Detroit Edison's corporate environmental stewardship initiatives through continued collaboration and partnership with U.S. Fish and Wildlife Service and other conservation entities.

3.0 BASELINE INFORMATION

3.1 Impact Area

3.1.1 Location and Ownership

The Proposed Development site is at the Enrico Fermi Atomic Power Plant (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 3 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 2).

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

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 4). 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 3)**.** 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 site consist of lacustrine deposits, glacial till, and rock fill. 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 4) 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 5 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 5). 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 above in Section 3.1.2 - Land Use. An in-depth discussion of vegetative communities for wetland covertypes is provided below 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 United States Fish and Wildlife Service (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 6). 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 6).

3.1.6 Wildlife

As discussed in Section 3.1.5 above and Section 3.1.8 below, 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 7) 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 8 and 12) 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 10) 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 draft 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 31.5 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 7 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 13) 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 8). 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 3.1.2 provides a summary of the watershed assessments.

A functional assessment based on the USACE New England Highway Method (Reference 14) was originally conducted during the 2008 field delineation (Reference 13). 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 15) and the Delaware Rapid Assessment Procedure (Reference 16) 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 and to define appropriate compensation ratios as presented in Table 1.

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.

Chapter 324, Section 303.01(t) of the Michigan Natural Resources and Environmental Protection Act identifies Michigan Natural Communities that are considered rare and imperiled. These include Great Lakes marsh and southern swamp (southern hardwood swamp). At the Fermi site, these communities are found relatively intact in Wetlands C, M and the South Canal (Great Lakes marsh) and I, F, BB/EE/FF and L (southern swamp, Figure 8). Impacts to these wetlands will require a 5:1 replacement ratio. Wetland E is a combination of emergent marsh/wet meadow and southern shrub carr with direct surface water connection to Lake Erie requiring a 2:1 replacement ratio (coastal wetland ratio). The other wetlands potentially impacted by Fermi 3 activities do not readily fall into a natural community category due to variables such as fragmentation and disturbance. Any wetland considered “other” that is connected hydrologically to Lake Erie or is within 1000 feet of the ordinary high water mark (elevation 571.6 ft IGLD 1955) is considered coastal and a 2:1 mitigation ratio applies. This excludes Wetland A and possibly Open Water H and Wetlands II and JJ. If any of the open water areas were officially developed as stormwater areas exemptions may apply. The depth of open water areas H and U may mean they are not protected as wetlands. Anything up to 2 meters in depth is considered wetland. The open water areas H and U are treated as other emergent wetland for purposes of this conceptual mitigation plan. MDEQ staff indicated that condition and quality are relevant factors in any mitigation proposed for areas that are fragmented with a high level of disturbance (not just invasive species), limited functions and that do not match a natural community description. It would not be expected that these areas, which include B, D, R, T, Y, AA, II, JJ, and KK would require a 5:1 mitigation ratio. These “other” wetlands would require a 2:1 ratio if they are considered coastal and a 1.5:1 ratio if they are not.

Wetlands with proposed impacts and their associated covertypes are presented in Table 2. 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), USGS Cataloging Unit and Hydrologic Unit Code (HUC): 04100001 and the coastal zone of Western Lake Erie in Monroe County (CZM, Figure 9 and 10). The OSW drains areas to the north and west of Lake Erie and flows directly into the lake (Figure 9). 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 8). The CZM encompasses approximately 18,697 acres with an almost even interspersion of natural lands (38%), developed lands (38%) and agriculture (24%, Figure 10). 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 11). 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 12). 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 enhance 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 and enhance 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 75 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. In addition, existing wetlands will be enhanced and protected at the offsite mitigation area to decrease invasive species, increase vegetation diversity and provide enhanced habitat for wildlife. Approximately 19.5 acres of impacted wetlands will be restored post-construction. On- and offsite mitigation actions are in close proximity to existing conservation efforts to help establish connectivity and habitat corridors.

3.2 Onsite Restoration Area Overview

The 19.5 acres of impacted wetlands that will be restored post-construction include approximately 10.95 acres of PEM, 3.27 acres of PFO, and 5.28 acres of PSS wetland. These areas are described in detail in Section 12 of the associated Joint Permit Application.

3.3 Offsite Mitigation Area Overview

The proposed offsite mitigation area, referred to as the Monroe Site, is approximately 7.25 miles from the Fermi site on Detroit Edison's Monroe Plant, east of Interstate 75, north of La Plaisance Creek and immediately adjacent to Lake Erie (La Plaisance Bay), Town of Monroe, Monroe County, Michigan, in the Ottawa-Stony Watershed (HUC: 04100001, Figures 13 and 14). The Monroe Site is owned and managed by Detroit Edison as part of the Monroe Power Plant, a coal-fired power plant constructed in the early 1970s. The Monroe Site and adjacent areas include active agriculture, early successional old field and shrub habitat, agricultural ditches, small forest patches, existing and restored wetland and grassland habitat, industrial, residential and other developed areas, access roads, highways and Lake Erie.

The proposed mitigation targets a 174-acre agricultural field. Figures 13-17 show location, aerial photo, topography, soils, hydrology, land use, and mapped federal wetlands. The restoration site is primarily active agriculture with small remnants of PEM and PSS wetlands separated from Lake Erie by perimeter dikes. Excess water is pumped from the fields to accommodate farming. The soil observed within the wetland mitigation area is predominately Lenawee silty clay loam, a hydric soil suitable for wetland restoration/creation. The area was dry at the time of a site visit on August 20, 2010 with the exception of existing swales. The pumps were not running. The Davis Drain, under the jurisdiction of the Monroe County Drain Commissioner, is located along the southwest corner of the site. The drain carries storm water runoff from Interstate 75 and upstream property.

4.0 MITIGATION SITE SELECTION FACTORS

An extensive exploration of potential mitigation projects spanning several years both on- and offsite within the Ottawa Creek and coastal zone of Western Lake Erie has been conducted. The on- and offsite mitigation projects proposed here were 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.

5.0 MITIGATION WORK PLAN

A conceptual discussion of on- and offsite work plans including construction techniques and sequence, planting, and conceptual design drawings illustrating the location, type and extent of mitigation actions are discussed here and illustrated in Figures 18 and 19. The conceptual design and work plan are based on existing, available data. Final site plans are contingent upon verification of existing data, collection of additional topography, soil, hydrology and vegetation information, and input and approval by the governing regulatory agencies. Final mitigation plan sets will contain detailed grading, planting and soil erosion and sediment control plans suitable for the mitigation site construction. Wetland mitigation activities including both restoration and enhancement actions will commence with or prior to impacts and once all necessary permits are in place.

Mitigation design emphasizes heterogeneity in vegetation and hydrology to maximize ecological diversity and functional resilience of the wetland. Wetland restoration and enhancement 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. The final mitigation wetland design and management plan will be developed in cooperation with the existing conservation focus areas (e.g., Detroit River International Wildlife Refuge), watershed plans and priorities supported by local, state and federal conservation agencies and organizations.

5.1 Onsite Work Plan

Approximately 19.5 acres of proposed wetland impact will be restored to wetland habitat following construction at the Fermi site (Figure 18). Best management practices will be applied to these areas before, during and after construction to the greatest extent possible to facilitate the return of these areas to functional wetland systems. It is anticipated that restoration measures will result in higher quality wetland systems than currently exist in those locations.

5.2 Offsite Work Plan

Offsite wetland restoration and enhancement efforts will replace and repair habitat modified by agricultural practices and hydrological disturbance within sensitive coastal areas (Figure 19). 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 a total of 87 acres of wetlands in the 174-acre agricultural area as illustrated in Figure 19. The 87 acres will include approximately 21 acres of forested, 8 acres of scrub shrub, and 58 acres of emergent wetland with direct hydrological connection to Lake Erie. A wetland delineation will be conducted in the 174-acre agricultural field prior to final design. Any existing wetlands that are improved by the mitigation action proposed here will then be counted as enhancement in addition to the restoration acreages proposed above.

A specific objective of the offsite restoration 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.

5.2.1 Construction and Planned Hydrology

Construction activities in the agricultural area will include clearing, excavating and grading the proposed mitigation area to elevations conducive for development of coastal PEM, PSS and PFO wetlands. The entire restoration area will be restored to two separate but hydrologically connected wetland units. The eastern unit will be directly connected to Lake Erie and water levels in this unit will fluctuate with Lake Erie water levels. The western unit will be partially connected to Lake Erie and with a wetter hydroperiod than the eastern unit.

Existing fill and an existing berm along the east side and adjacent to Lake Erie will be partially removed to allow water from Lake Erie to enter the proposed wetland area (Figure 19). A meandering waterway excavated to the west of the lake connection will allow for a permanent open water marsh zone in the emergent marsh area, providing habitat for aquatic species. Grading of soils adjacent to this waterway will provide for a variety of water levels and habitat types within the eastern unit.

A low berm will be constructed between the eastern and western restoration units. This berm will be constructed to an elevation that will help to ensure successful restoration of proposed habitat types and acreages in the western unit. A spillway will be constructed in the berm to allow excess water to spill over and enter the eastern unit waterway and eventually flow into Lake Erie. Depending on topography and final design, this spillway will also be constructed at an elevation that will allow high lake levels (e.g., seiche events) to enter the western unit. Additional hydrology will be introduced into the western unit by plugging a drainage ditch that currently flows along the north perimeter of the entire area. This ditch will be plugged to the west of the proposed berm to redirect its water into the western unit. Additionally, a Michigan DOT drainage ditch that currently transfers water from Interstate 75 to La Plaisance Creek and into Lake Erie will be redirected into the western unit. This step will increase water flow into the wetland and also slow floodwater and reduce sediment loading and filter toxicants from runoff water before it reaches Lake Erie. There may be an additional grading and planting plan designed specifically to accommodate requirements of a right-of-way associated with existing electric power lines located along the northern edge of the western unit.

Graded wetland basins will be left rough to establish microtopography essential for creating niches for a variety of wetland plants. The edges of the excavated wetlands will be irregular in shape with variable, shallow slopes. Soil disturbance and compaction will be minimized as much as possible. Earthmoving equipment will be cleaned before deployment to prevent possible contamination by invasive species.

5.2.2 Planned Vegetation and Habitat Features

Existing wetlands at the offsite enhancement area will be treated with herbicide to kill invasive plant species including common reed, cattail and reed canary grass. A treatment plan will be implemented with herbicide applied in years 1-3, year 5, year 7 and year 10, or adjusted as needed. Response from native vegetation will be facilitated by removing dead, chemically treated vegetation through mechanical removal after each treatment. MDEQ, MDNR, Ducks Unlimited and other participating land managers are currently experimenting with various techniques for controlling common reed in coastal wetlands along Saginaw Bay. The techniques being tested include glyphosate, imazapyr, and a glyphosate/imazapyr mixture along with mechanical management actions. The USFWS Detroit River International Wildlife Refuge is also evaluating Phragmites control techniques in coastal wetlands immediately north of the Fermi site. The treatment plan for the mitigation enhancement project proposed here will be based on the MDEQ Guide to the Control and Management of Invasive Phragmites (Reference 17), the most current results of the Saginaw Bay study, 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.

The offsite restoration area and buffer will be planted and seeded to establish a native plant community, prevent soil erosion, increase the likelihood of mitigation success, and minimize the opportunity for invasive species to become established. 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 18). Seed will be adapted to northern United States ecotypes and will be applied in a manner and at a rate that will allow effective establishment of the wetland pool area and wetland margins. Planting and seeding of these species will stabilize soil structure, provide biological diversity, restore ecosystem functionality, and protect against invasion by exotic and invasive herbaceous species. Construction areas will be seeded with a mix to prevent erosion, stabilize excavated areas and establish an herbaceous community typical of the region. Re-vegetation of wetland areas will be accomplished by using a combination of potted trees and shrubs, plugs, rootstock cuttings, and seed. Plant species will be chosen for their proven hardiness in the area, their ability to out-compete invasive plant species, wildlife value and their overall suitability to develop native communities. The species all will occur naturally within the region and no exotic or potentially nuisance species will be utilized. Wild-type nursery stock of an age and condition suitable for transplantation will be used. The precise list of species to be planted will be dependent on availability of nursery stock. Final design will include species lists, quantities and locations for container, plug and seed stock.

Habitat structures will be placed on the site following construction and prior to seeding and planting at a minimum of six per acre as required by MDEQ mitigation guidance (Reference 1). Habitat structures include whole trees, logs, snags, tree stumps and sand mounds. Some habitat structures, namely tree stumps, whole trees, and logs, may be taken from the impacted areas at the Proposed Development site.

6.0 PROTECTION

Ownership of on- and offsite mitigation areas will remain with Detroit Edison. The restored and enhanced mitigation wetlands will be permanently protected as directed by regulatory requirements to preserve the wetland functions restored.

7.0 PERFORMANCE STANDARDS

Performance standards for on- and offsite mitigation areas will be based on the goals and objectives of the mitigation projects as well as the character of existing wetlands surrounding the mitigation site. The general standards listed below were developed using the MDEQ Technical Guidance for Wetland Mitigation (Reference 1). These standards will be refined with final design and will be used to evaluate development and overall success of the mitigation project:

1. Construction has been completed in accordance with approved plans and specifications in the permit.
2. The wetland has soil saturation and/or evidence of inundation via water potential or water height measurements during the growing season during the required monitoring period.
3. A 6-inch layer of high-quality soil, from the A horizon of an organic or loamy surface texture soil, is present over the entire mitigation area.
4. The mitigation wetland is free of oil, grease, debris, and all other contaminants.
5. A minimum of six habitat structures, consisting of at least three types, have been placed per acre of mitigation wetland with at least 50% of each structure extending above the normal water level.
6. Mean percent cover of native wetland species (those with a regional indicator status of FAC, FAC+, FACW +/-, or OBL in the U.S. Fish and Wildlife Service report entitled National List of Plant Species that Occur in Wetlands, North Central Region 3, Reference 19), in the herbaceous layer at the end of the monitoring period is not less than 60% for a PEM wetland and 80% for PFO and PEM (wet meadow) wetlands.
7. Open water with no emergent or floating vegetation will not exceed 20% of the mitigation wetland area.
8. Extensive areas of bare soil shall not exceed 5% of the mitigation wetland area, with the exception of heavily shaded portions of the PFO portion of the mitigation site.
9. The minimum number of native wetland species per wetland type shall not be less than 15 species for PSS, PFO and PEM wetlands and not less than 20 species for PEM – wet meadow.
10. At the end of the monitoring period, the mitigation wetland will support a minimum of:
    a. 300 individual surviving, established, and free-to-grow trees per acre in the PFO wetlands that are classified as native wetland species and consisting of at least three different plant species.
    b. Eight native wetland species of grasses, sedges, or rushes in PEM - wet meadow wetlands.
11. At the end of the fifth monitoring year, no more than 10 percent of the vegetation will consist of the following invasive species: purple loosestrife, common reed and reed canary grass.

The success of this wetland mitigation project will be determined based on the performance standards outlined above along with any additional conditional standards identified and agreed on by the USACE and upon final design or during the permitting process.

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. 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 following the year that construction is completed, as follows:

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 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 once between July 15 and August 31. The number of sample plots necessary within each wetland type shall be determined by use of a species-area curve or another approach approved by the MDEQ and USACE. 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 or by another approach acceptable to the MDEQ and USACE. If additional or alternative sample transects are needed to sufficiently evaluate each wetland type, they must be approved in advance in writing by the MDEQ and USACE. 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. Provide plot data and a list of all the plant species identified in the plots and otherwise observed during monitoring. Data for each plant species will include common name in English, scientific name, wetland indicator category from the U.S. Fish and Wildlife Service's National List of Plant Species That Occur in Wetlands for Region 3 (Reference 19), and whether the species is considered native according to the Michigan Floristic Quality Assessment (Reference 20). Nomenclature shall follow Reference 21 through Reference 23. 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, LONG-TERM AND ADAPTIVE MANAGEMENT

When monitoring indicates that a performance standard is not being met or will not be met, that standard will be evaluated to determine if more time is needed for site development and maturation or if a remedial action may be required. This will be accomplished by consulting wetland experts and permitting agencies to determine an appropriate course of action. Remedial measures may include seeding or planting, additional non-native plant control and/or erosion control measures. In rare circumstances, contingencies

may require re-grading the wetland basin, removal or addition of water control structures and access control. An implementation timetable will be constructed to correct deficiencies noted in the annual monitoring report. It is the responsibility of Detroit Edison to address adaptive management issues. Once the monitoring period is over, the completed wetland will be protected and managed as needed and specified in the site management plan.

10.0 FINANCIAL ASSURANCES

Financial assurances at the appropriate level and type will be provided by Detroit Edison for completion of the mitigation strategy described above. Cost estimates for implementation of the mitigation strategy will be provided with final design to determine the financial assurance amount.

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TABLES AND FIGURES

Table 1. Wetland Impacts, Proposed Mitigation and Ratios

Wetland Type - Emergent Marsh	Fermi 3 Impacted Areas (Acres)	Mitigation Ratio for Wetland Type	Required Mitigation (Acres)	
Great Lakes marsh (rare/imperiled)	10.90	5:1	54.50	
Great Lakes marsh (rare/imperiled) [a]	2.29	0:0	0.0	
Palustrine emergent (coastal)	0.80	2:1	1.60	
Palustrine emergent (other)	10.53	1.5:1	15.80	
Emergent Marsh Totals	**24.52**		**71.90**	
Wetland Type - Forested Wetland	**Fermi 3 Impacted Areas (Acres)**	**Mitigation Ratio for Wetland Type**	**Required Mitigation (Acres)**	
Southern hardwood swamp (rare/imperiled)	3.15	5:1	15.75	
Palustrine forested (coastal and other)	4.89	2:1	9.78	
Forested Wetland Totals	**8.04**		**25.53**	
Wetland Type - Scrub Shrub Wetland	**Fermi 3 Impacted Areas (Acres)**	**Mitigation Ratio for Wetland Type**	**Required Mitigation (Acres)**	
Southern shrub carr (coastal)	3.91	2:1	7.82	
Palustrine scrub shrub (other)	1.37	1.5:1	2.06	
Shrub/Scrub Wetland Totals	**5.28**		**9.88**	
Total Wetlands	**Fermi 3 Impacted Areas Requiring Mitigation (Acres)[b]**	**Combined Mitigation Ratio for All Wetland Types**	**Required Mitigation (Acres)**	**Proposed Mitigation Plan Compensation (Acres)[c]**
Wetland Totals	**35.55**	**3:1**	**107.30**	**87**

[a] Approximately 2.29 acres of temporary impact associated with construction of transmission lines. As per communication with regulatory staff this impact requires a permit and restoration after impact but no additional mitigation.

[b] Total impacts minus 2.29 acres of temporary impacts described in note (a) above.

[c] A 20% reduction of the mitigation requirement is requested for the onsite restoration of 19.5 acres of the impacted wetlands post-construction and the enhancement of existing wetlands at the offsite mitigation area. Those actions provide added ecological value and benefits above the required compensatory mitigation.

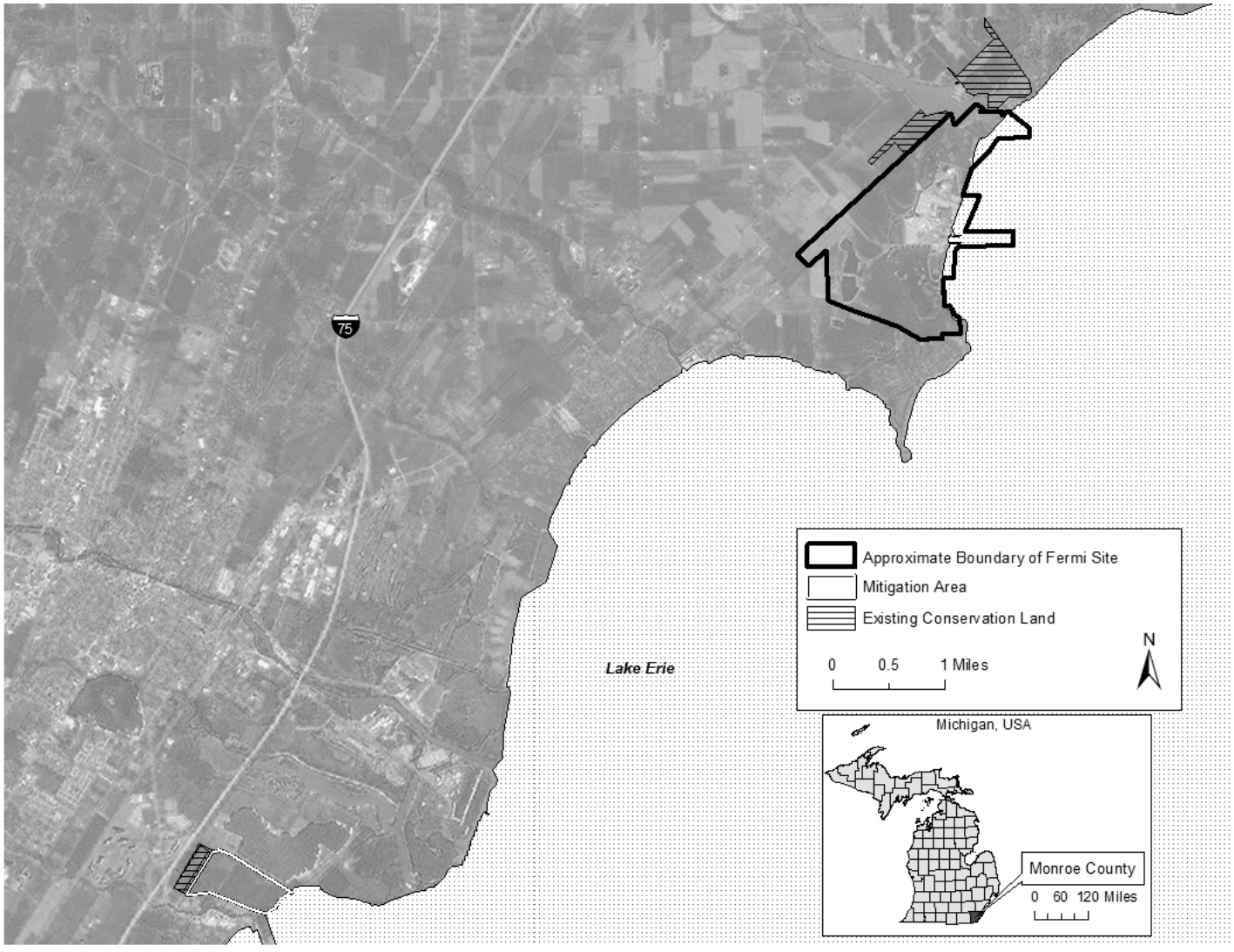
Table 2. Wetland Impacts and Attributes Summary Table (Sheet 1 of 2)

ID	Type/General Description	Total Size (acres)	Impact (acres)	Jurisdiction	Condition/ Primary Function	Guidance Mitigation Ratio
B	Linear PFO	0.76	0.76	MDEQ/USACE	Low/ Floodflow alteration, sediment, toxicant retention, nutrient removal and wildlife habitat	2:1
C	Great Lakes marsh, fragmented from Lake Erie by access roads, but connected hydrologically through culverts	48.18	9.73	MDEQ/USACE	Medium (high ecological value)/ Floodflow alteration, sediment, toxicant retention, nutrient removal and wildlife habitat	5:1
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	2:1
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	2:1
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	5:1
H	PEM edge around a created open water pit	1.96	1.96	MDEQ	Low/Minimal floodflow alteration, sediment/toxicant retention and nutrient removal	1.5:1
I	PFO southern hardwood swamp, relatively intact, indirectly connected to Lake Erie, provides a buffer for the interior and less disturbed wetland	39.74	0.10	MDEQ/USACE	Medium (high ecological value)/Floodflow alteration, sediment, toxicant retention, nutrient removal and wildlife habitat	5:1
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.	1.5:1
W	PEM wet meadow wetland	4.59	4.59	MDEQ	Low/ Floodflow alteration, sediment, toxicant retention, nutrient removal and marginal wildlife habitat	1.5:1

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

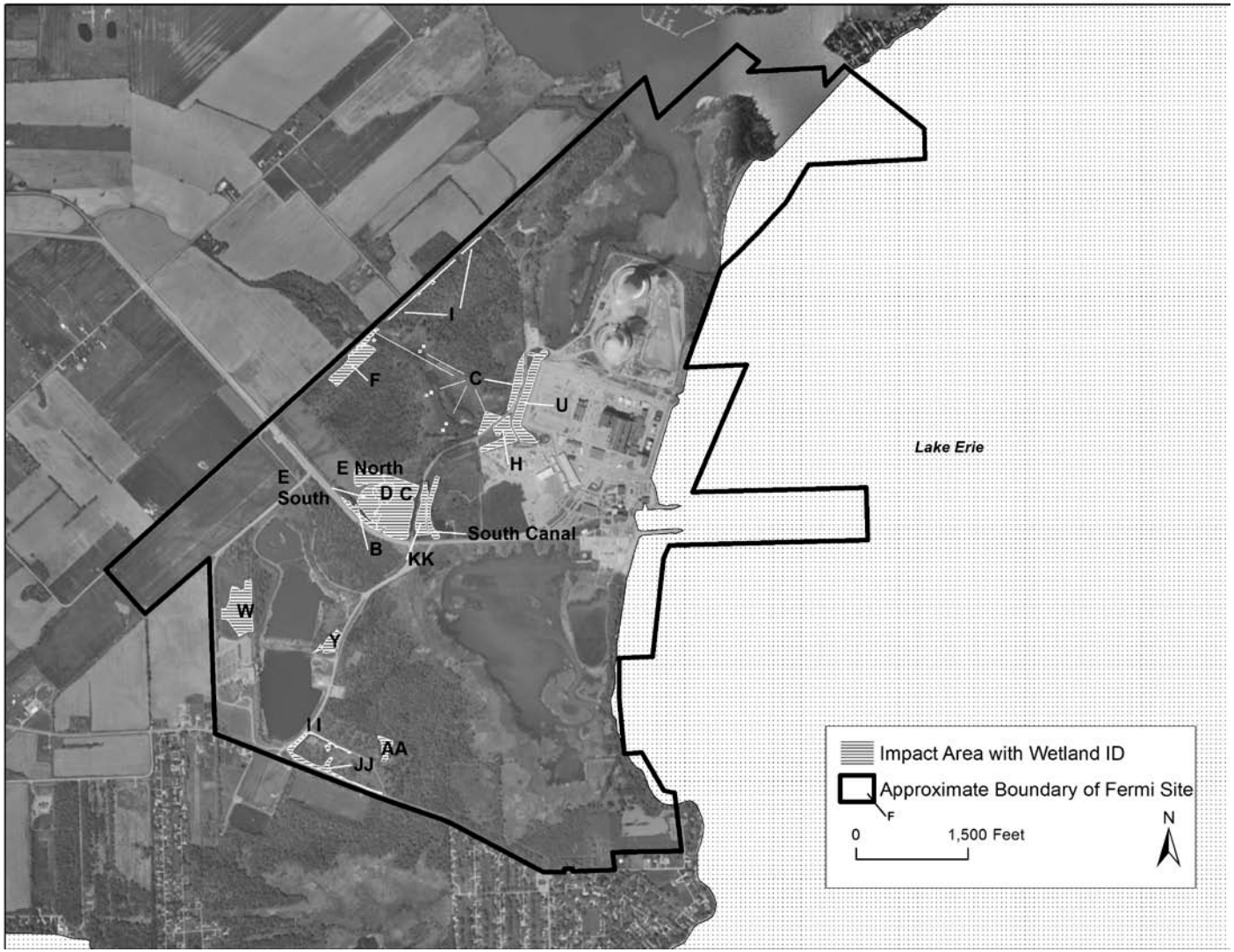
ID	Type/General Description	Total Size (acres)	Impact (acres)	Jurisdiction	Condition/ Primary Function	Guidance Mitigation Ratio
Y	PFO fragmented early successional with mixed vegetation and a partially open canopy	1.14	1.14	MDEQ	Low/Marginal wildlife habitat for edge species and limited water storage.	2:1
AA	PEM established spoil area	0.80	0.80	MDEQ/USACE	Low/Minimal floodflow alteration, sediment/toxicant retention and nutrient removal	2:1
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	1.5:1
JJ	PSS established spoil area	1.37	1.37	MDEQ	Low/ minimal floodflow alteration, sediment/toxicant retention and nutrient removal	1.5:1
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	2:1
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	5:1

Figure 1: Site Location Map



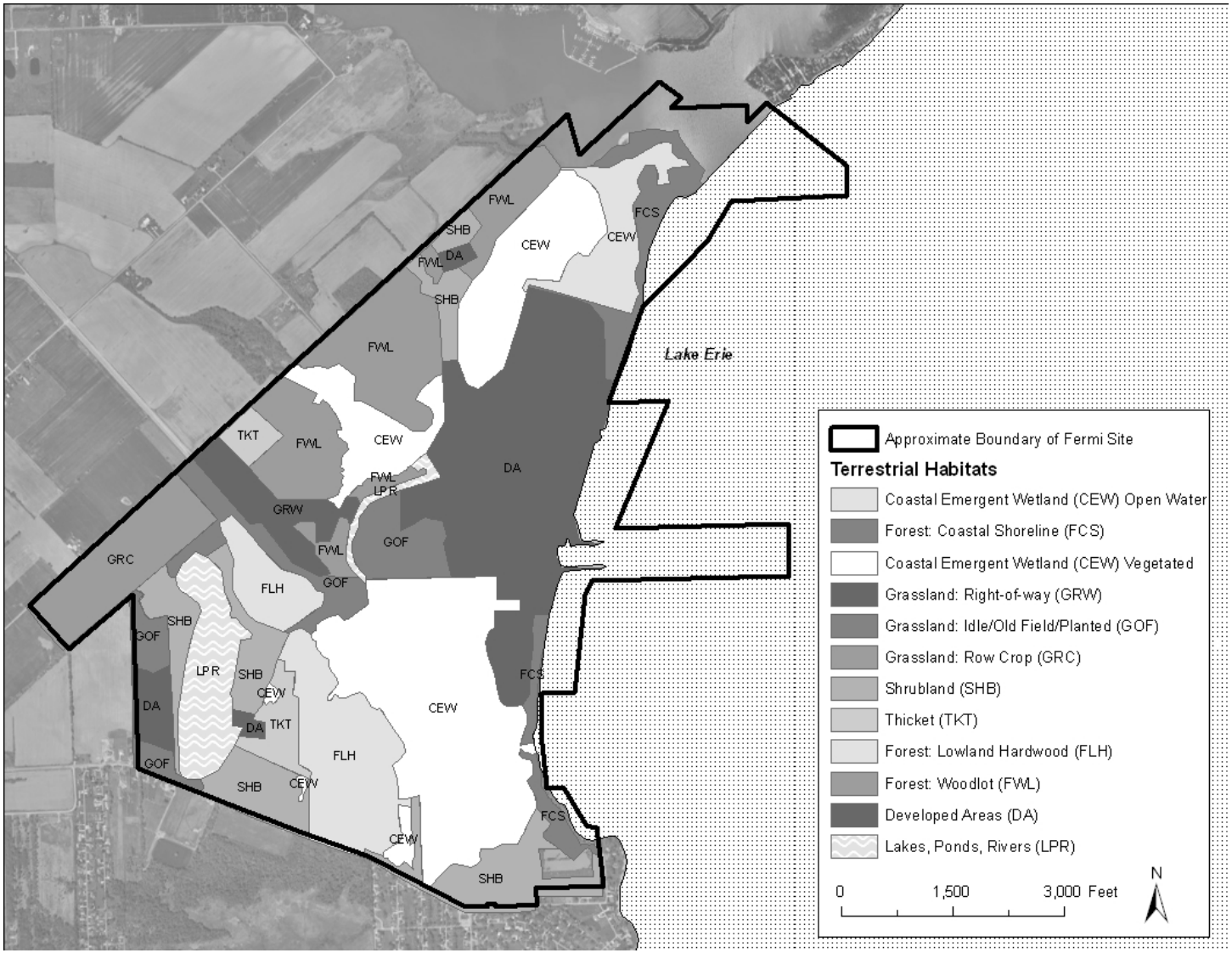
Source: Reference 24

Figure 2: Wetland Impact Area Map



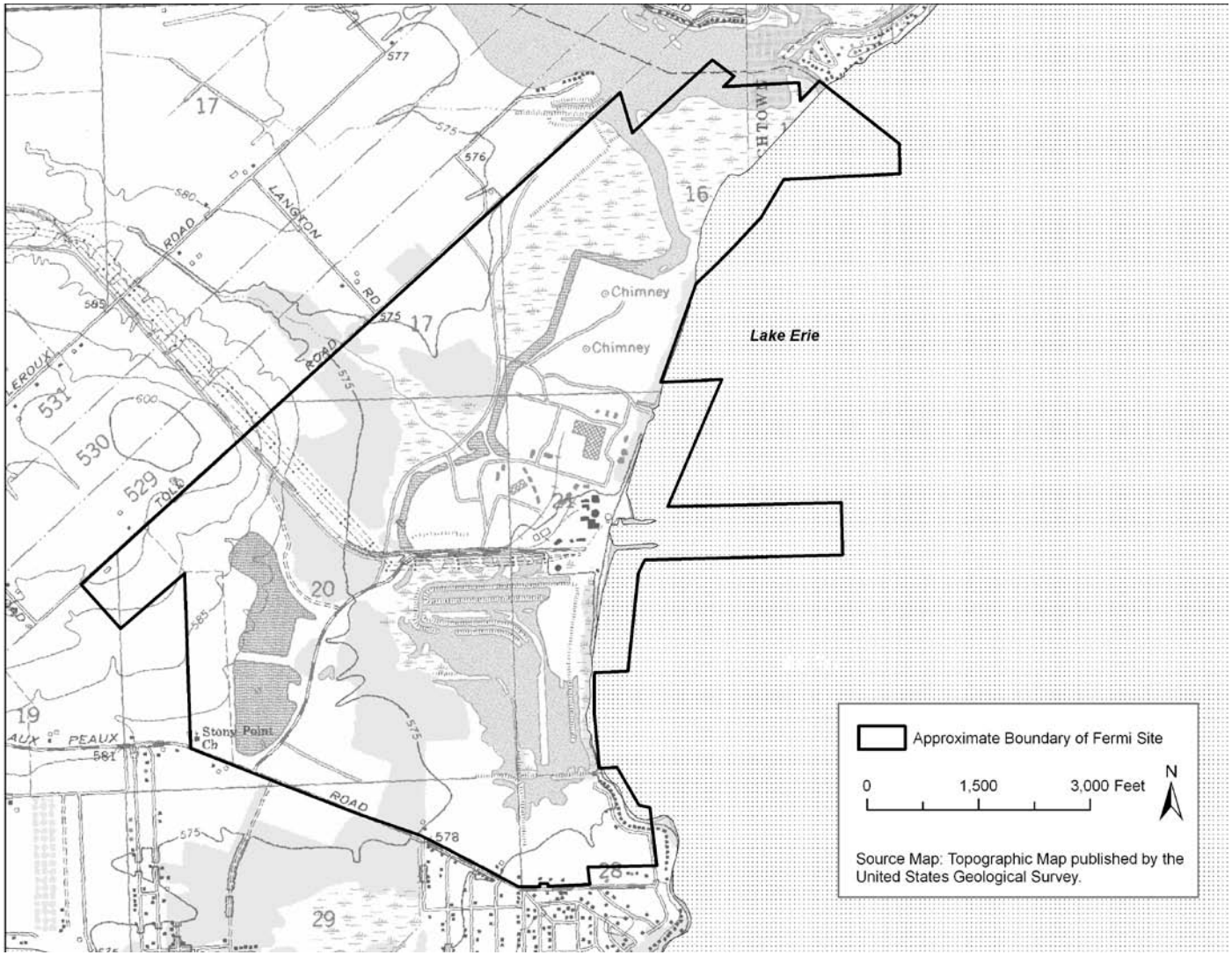
Source: Reference 24

Figure 3: Land Uses on the Fermi Site



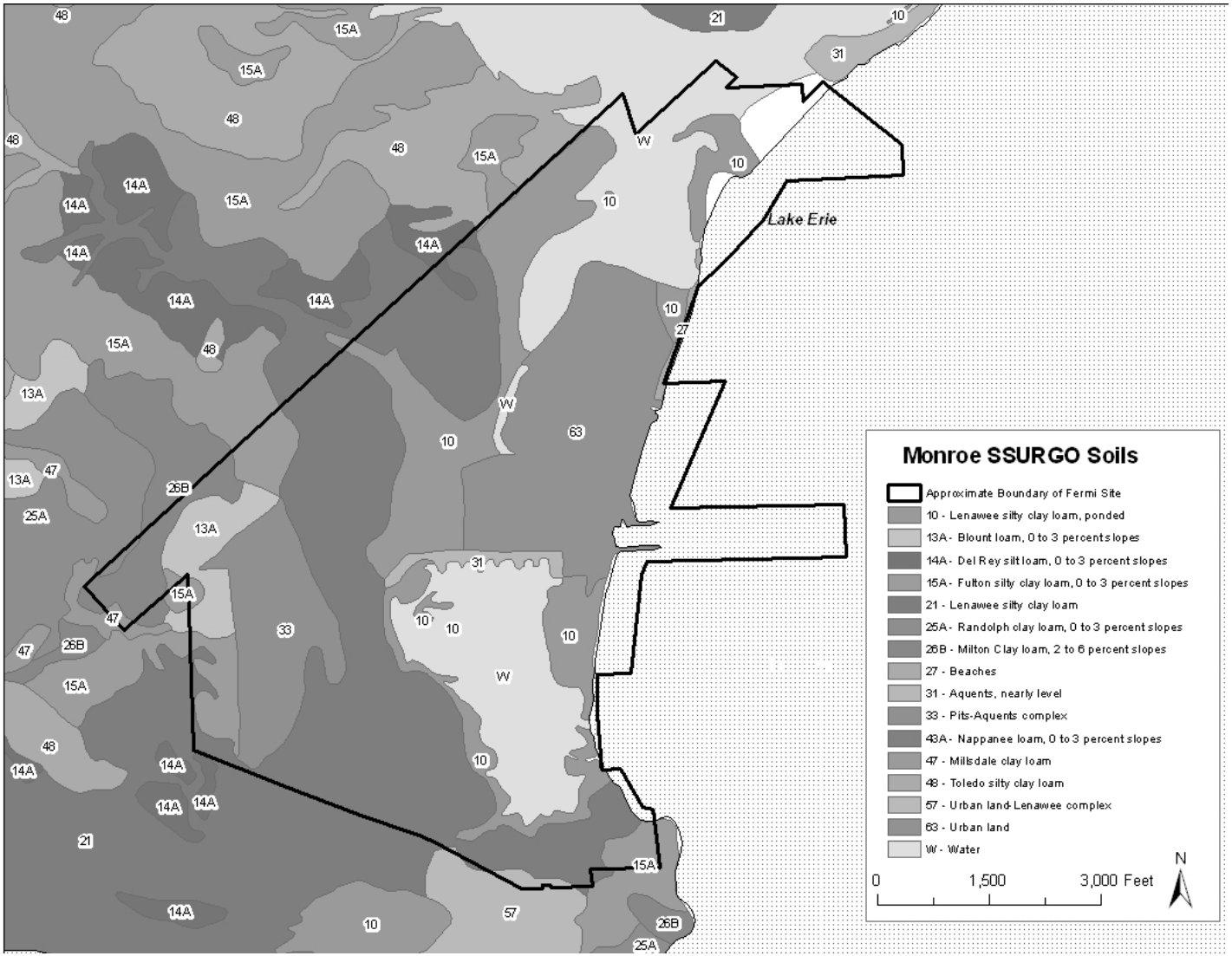
Source: Reference 2

Figure 4: Topography of the Fermi Site



Source: Reference 31

Figure 5: Soil Types on the Fermi Site



Source: Reference 32

Figure 6: Observed Locations of American Lotus on the Fermi Site

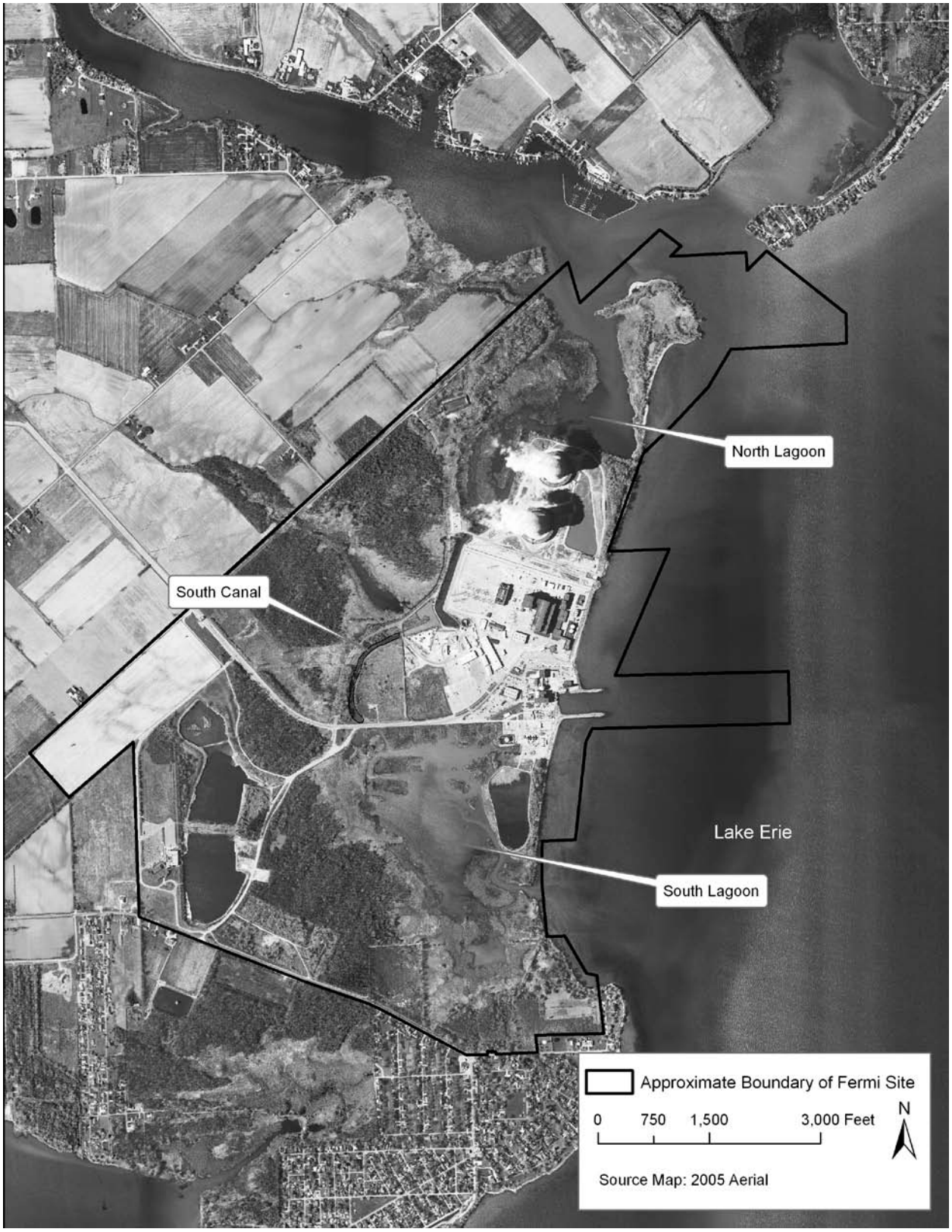


Figure 7: Culvert Locations on the Fermi Site

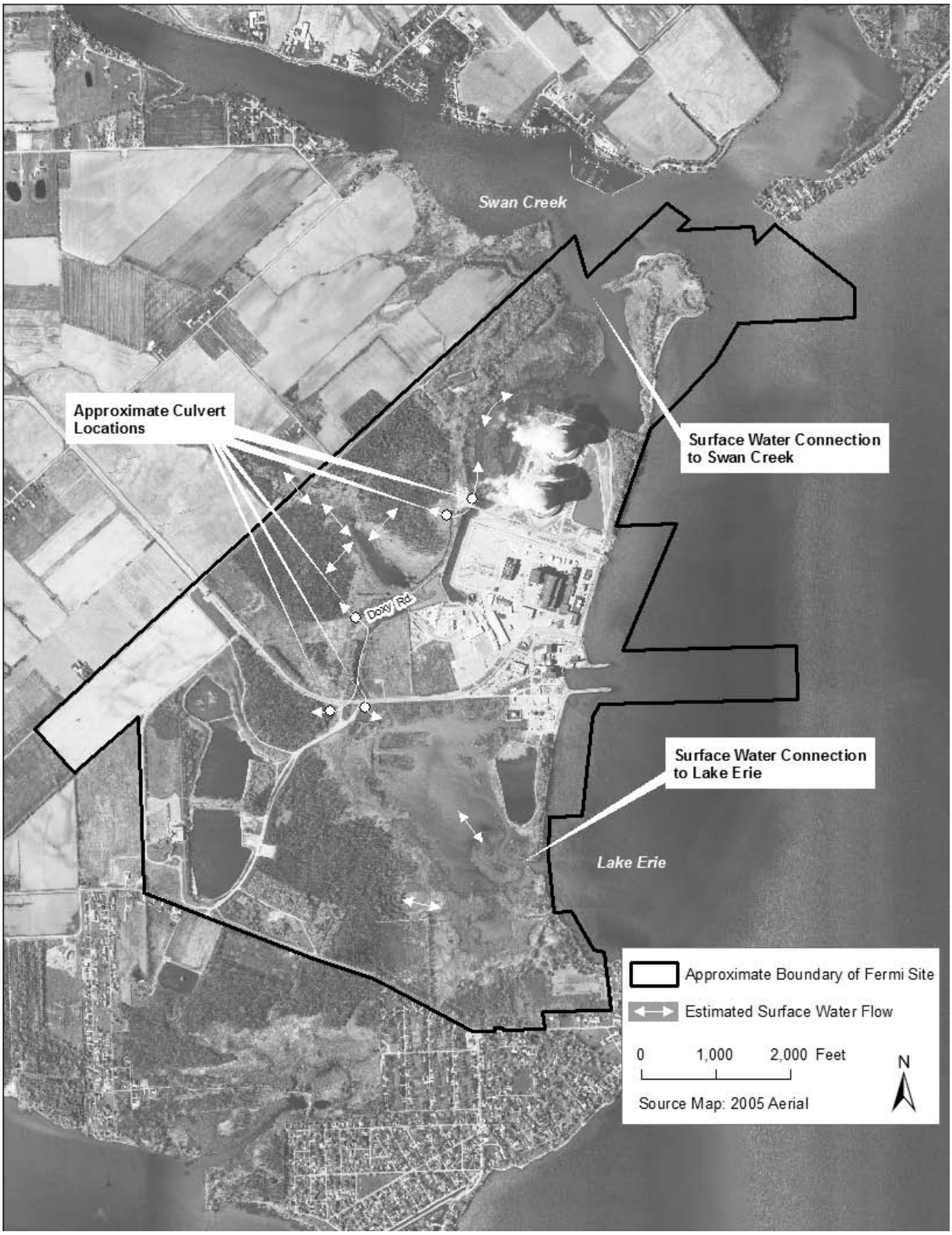


Figure 8: Wetlands Delineated on the Fermi Site

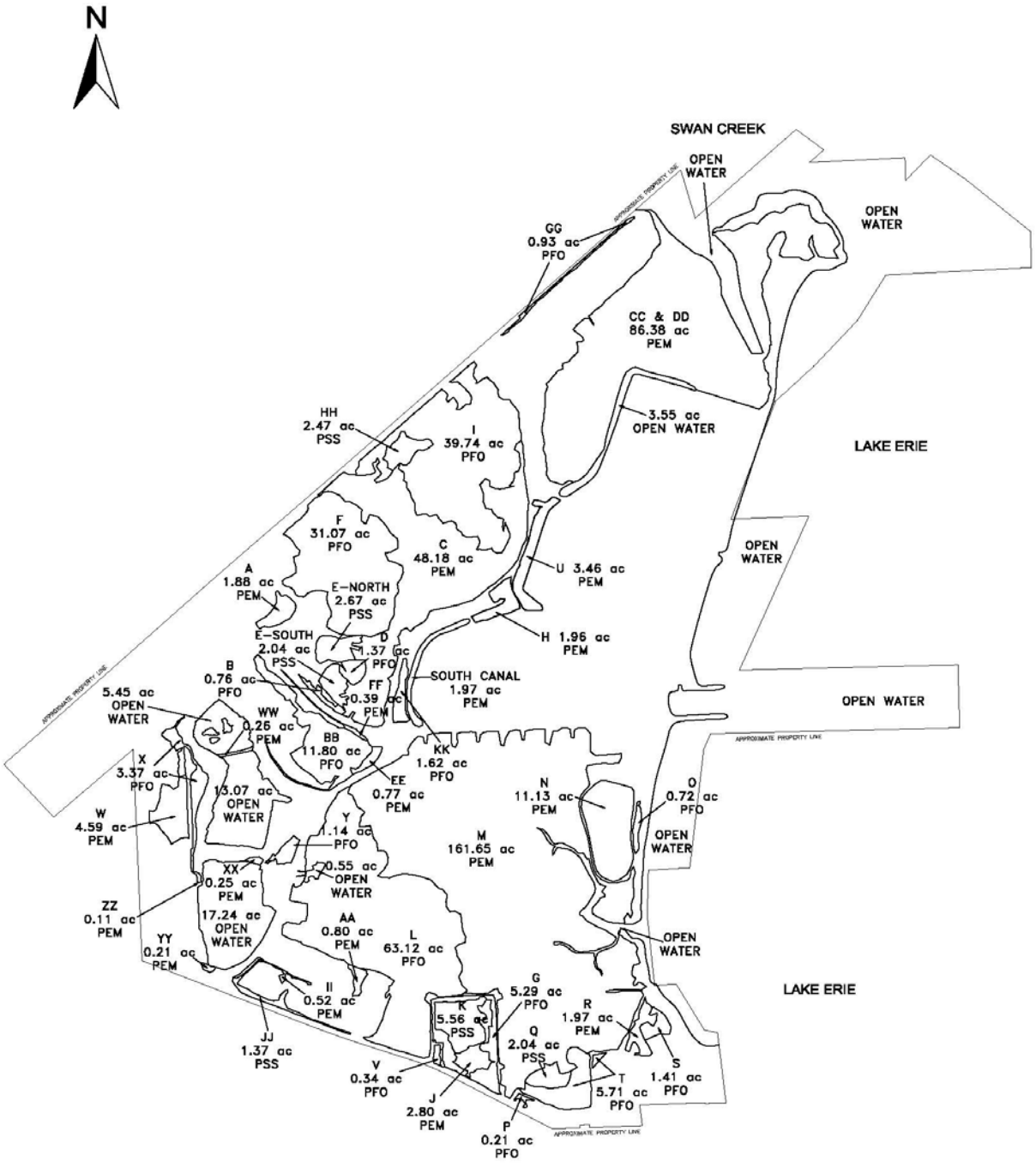
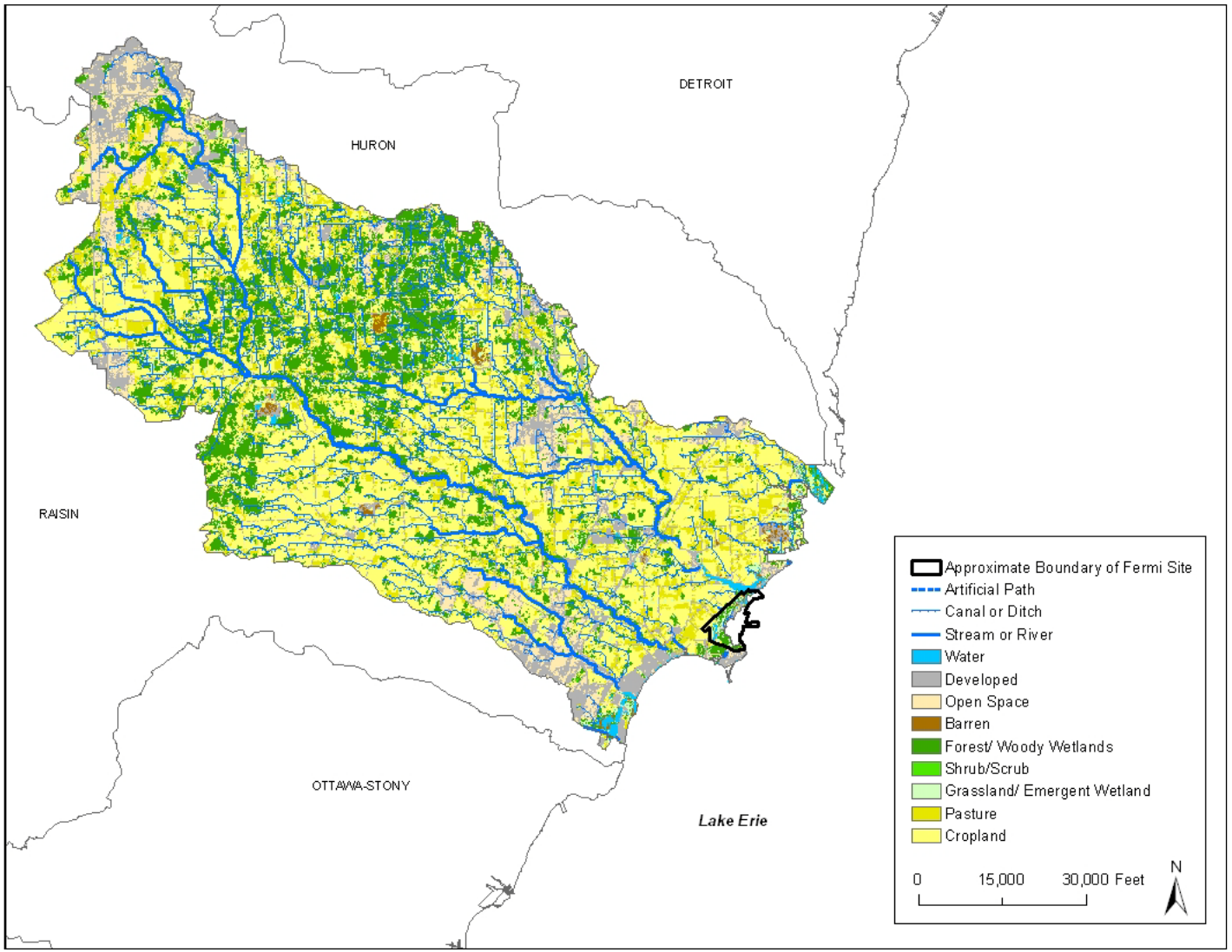
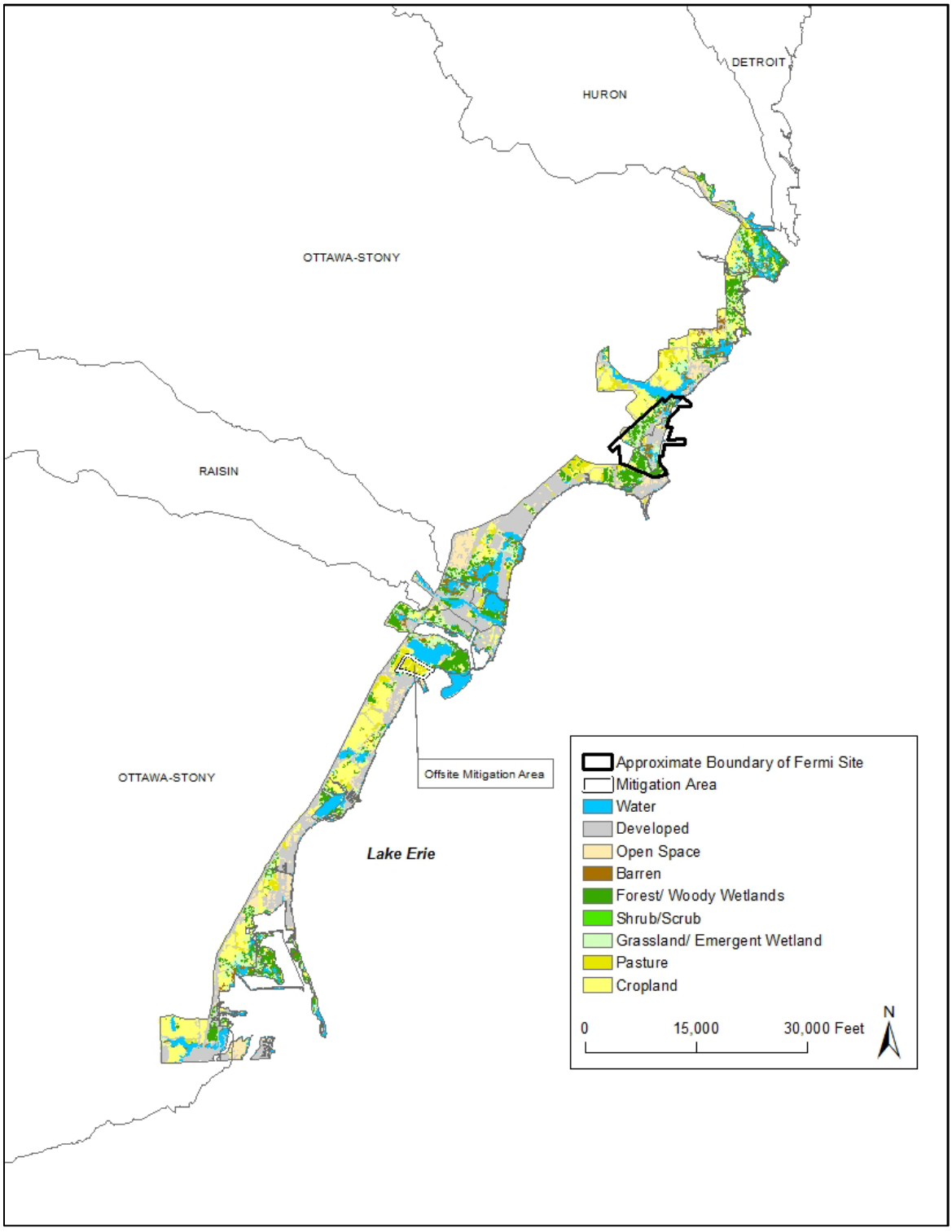


Figure 9: Land Use Land Cover (2001) in the Ottawa-Stony Watershed



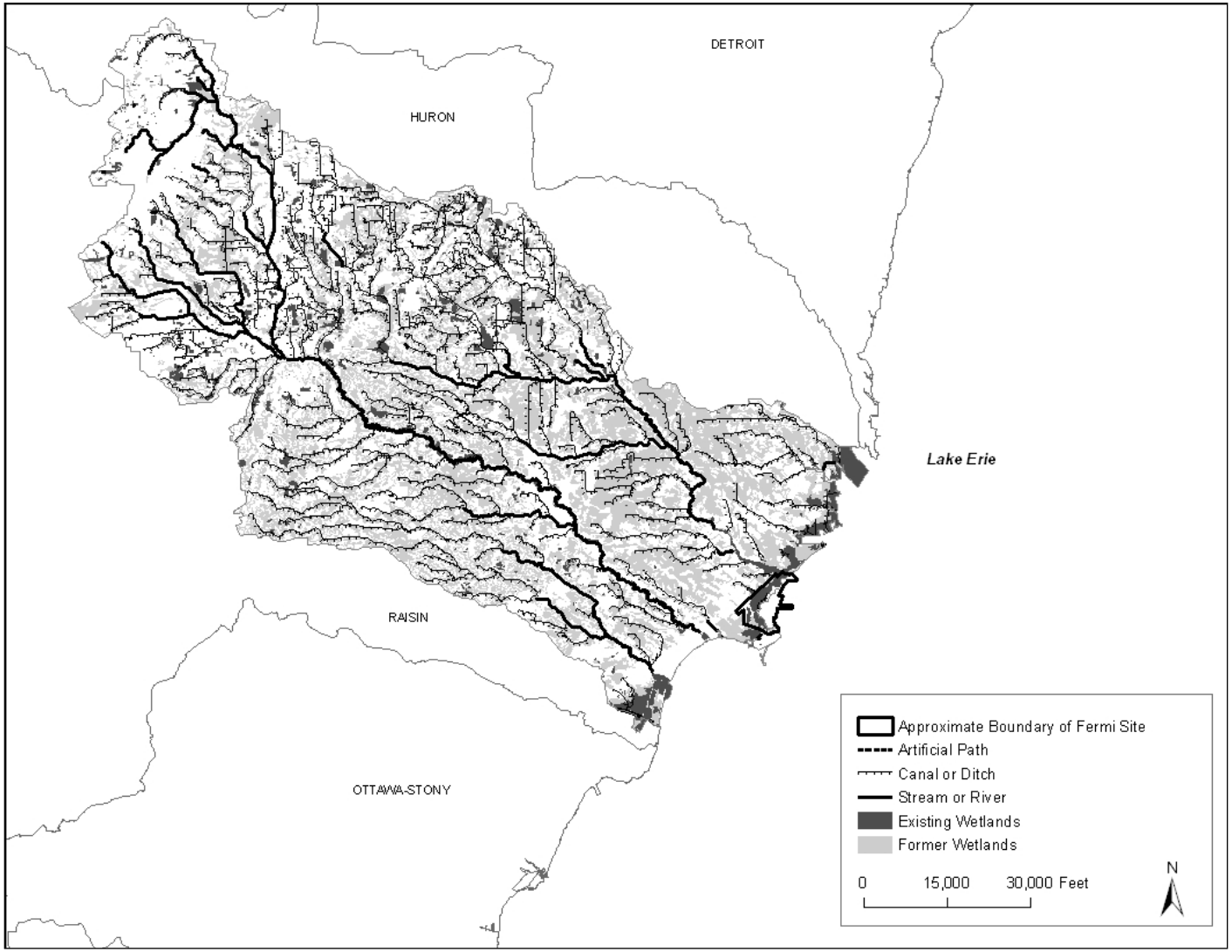
Source: Reference 25 and Reference 26

Figure 10: Land Use Land Cover (2001) in the Coastal Zone of Lake Erie



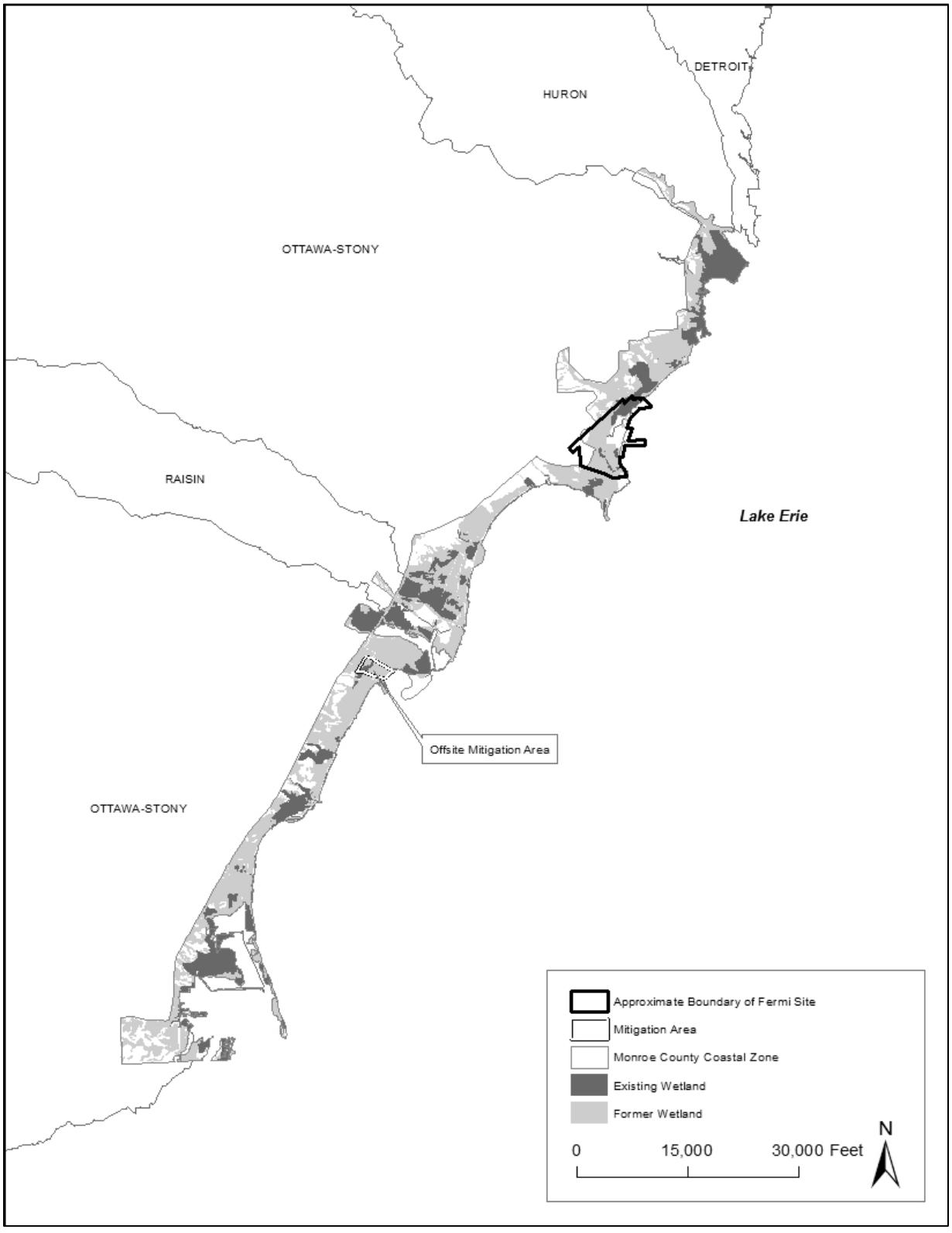
Source: Reference 26 and Reference 27

Figure 11: Existing and Former Wetlands in the Ottawa-Stony Watershed



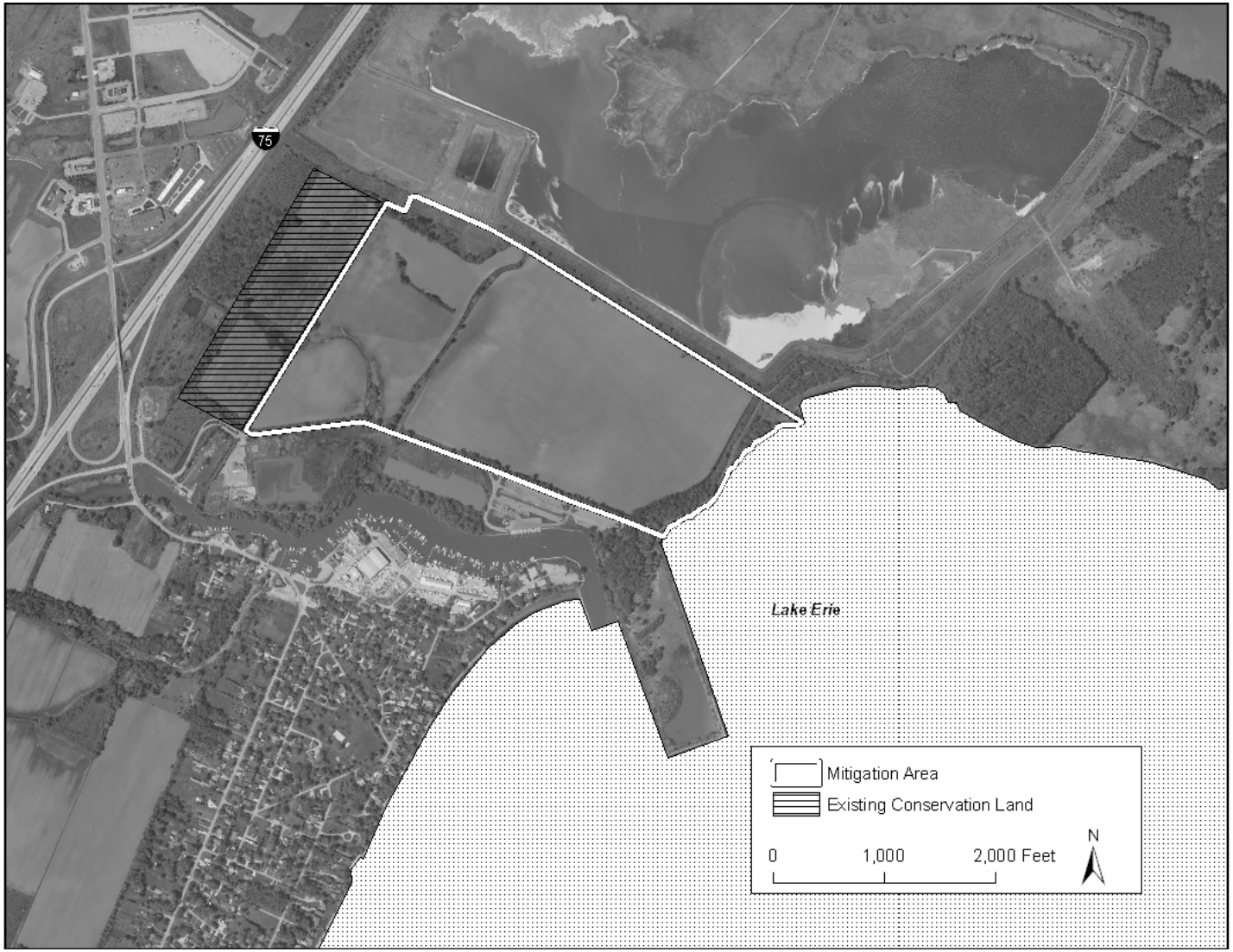
Source: Reference 25 and Reference 28 through Reference 30

Figure 12: Existing and Former Wetlands in the Coastal Zone of Lake Erie



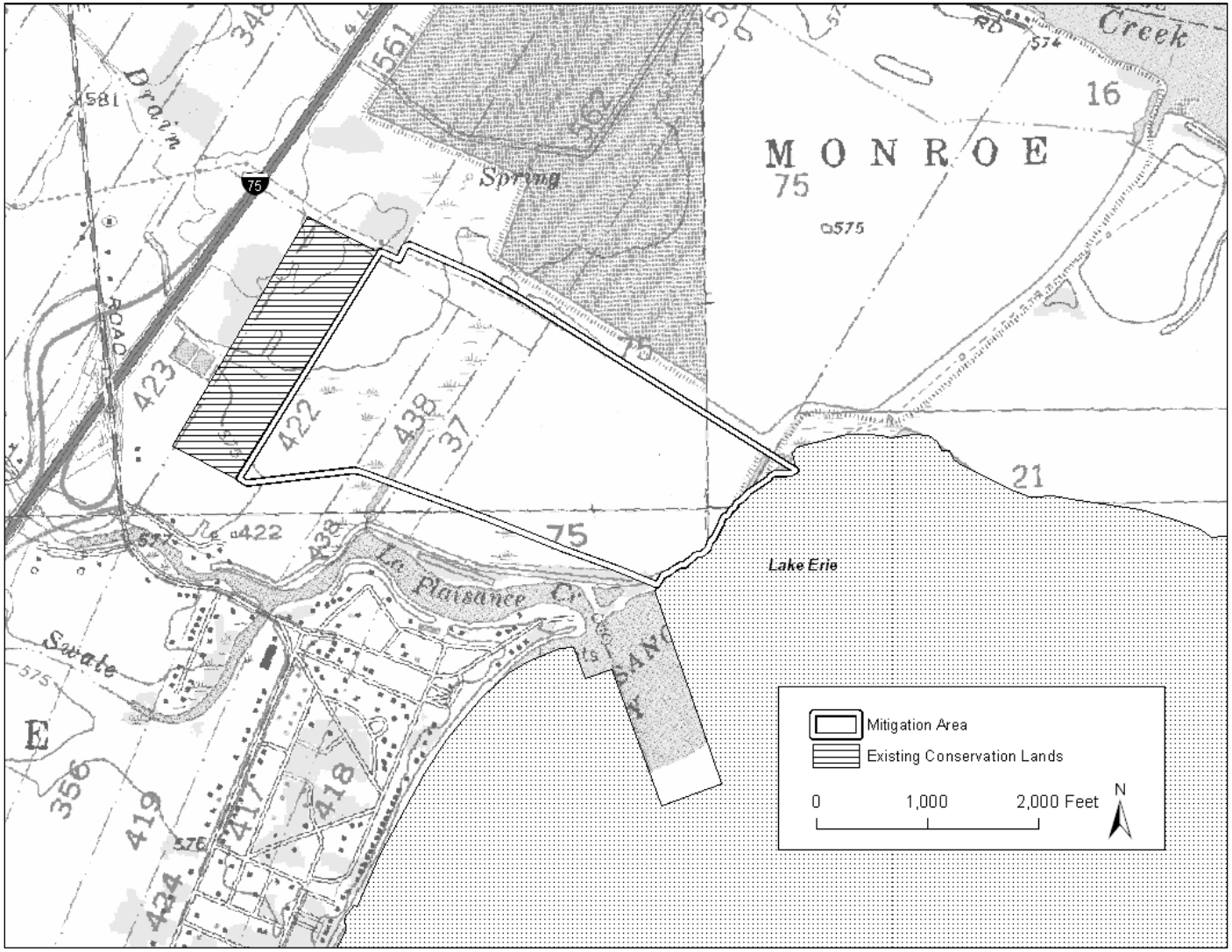
Source: Reference 27 and Reference 30

Figure 13: Offsite Mitigation Project Area Aerial Photo



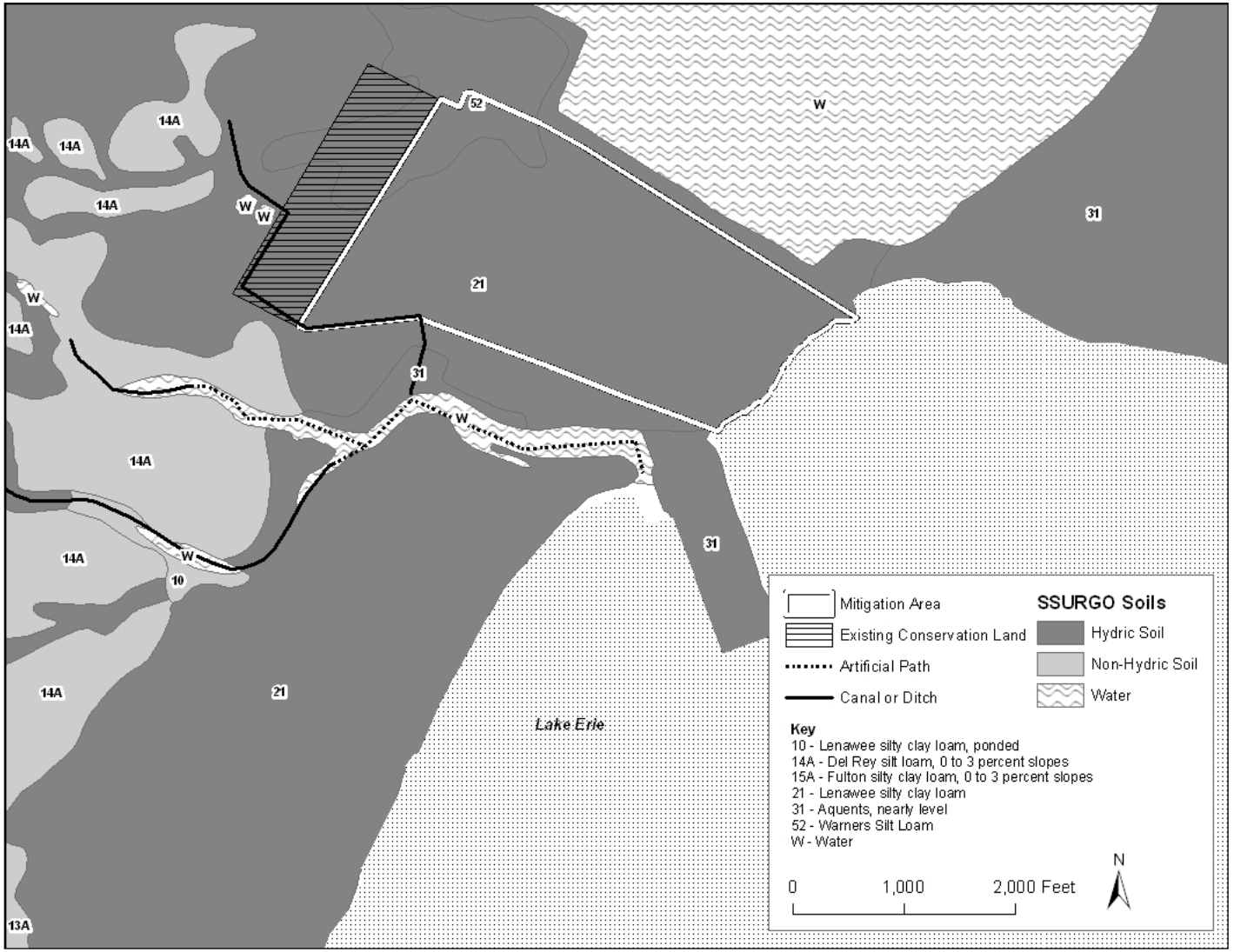
Source: Reference 24

Figure 14: Offsite Mitigation Area Topographic Map



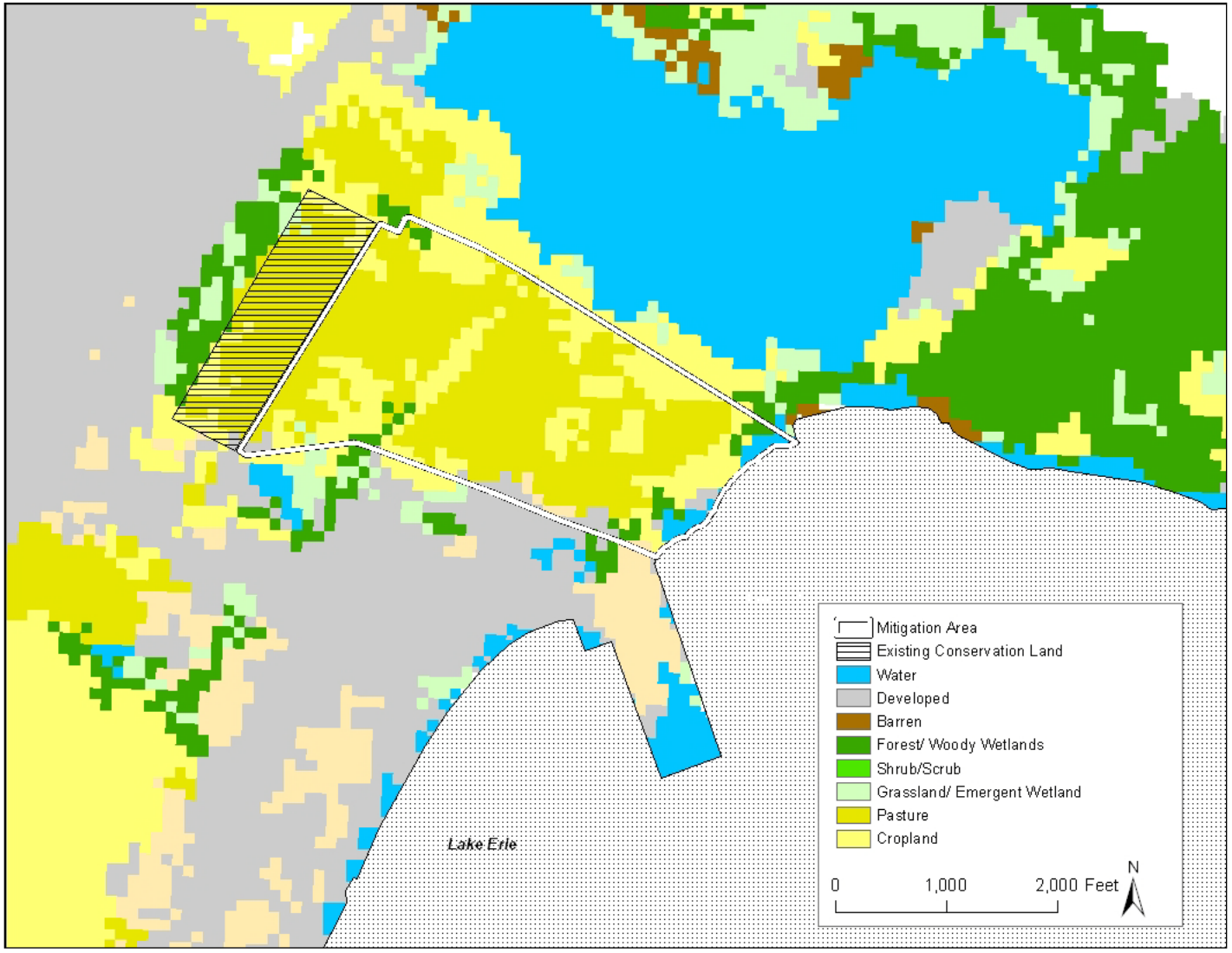
Source: Reference 31

Figure 15: Offsite Mitigation Area Soils and Hydrology Map



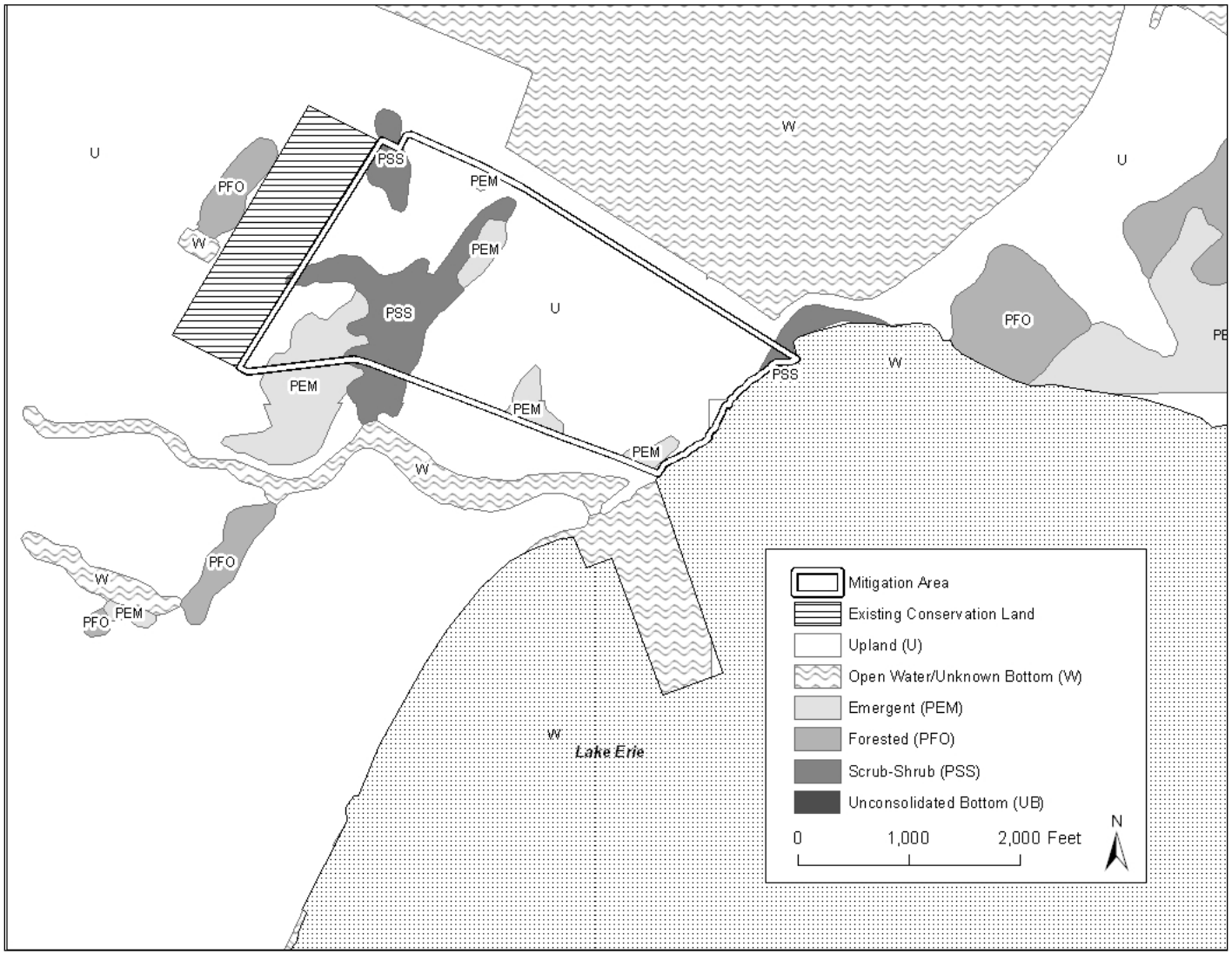
Source: Reference 25 and Reference 32

Figure 16: Offsite Mitigation Area Covertype Map



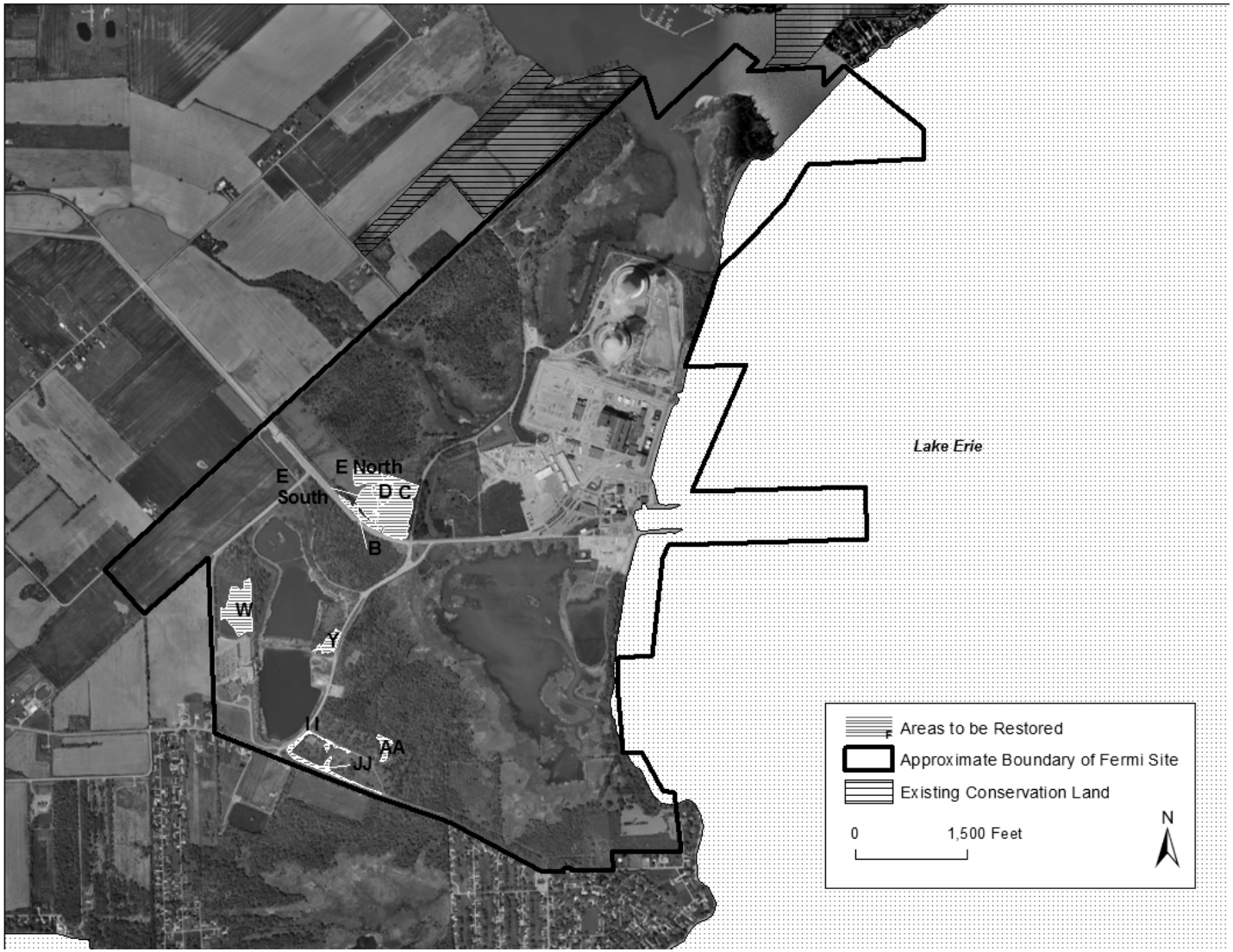
Source: Reference 26

Figure 17: Offsite Mitigation Area Federal Mapped Wetlands



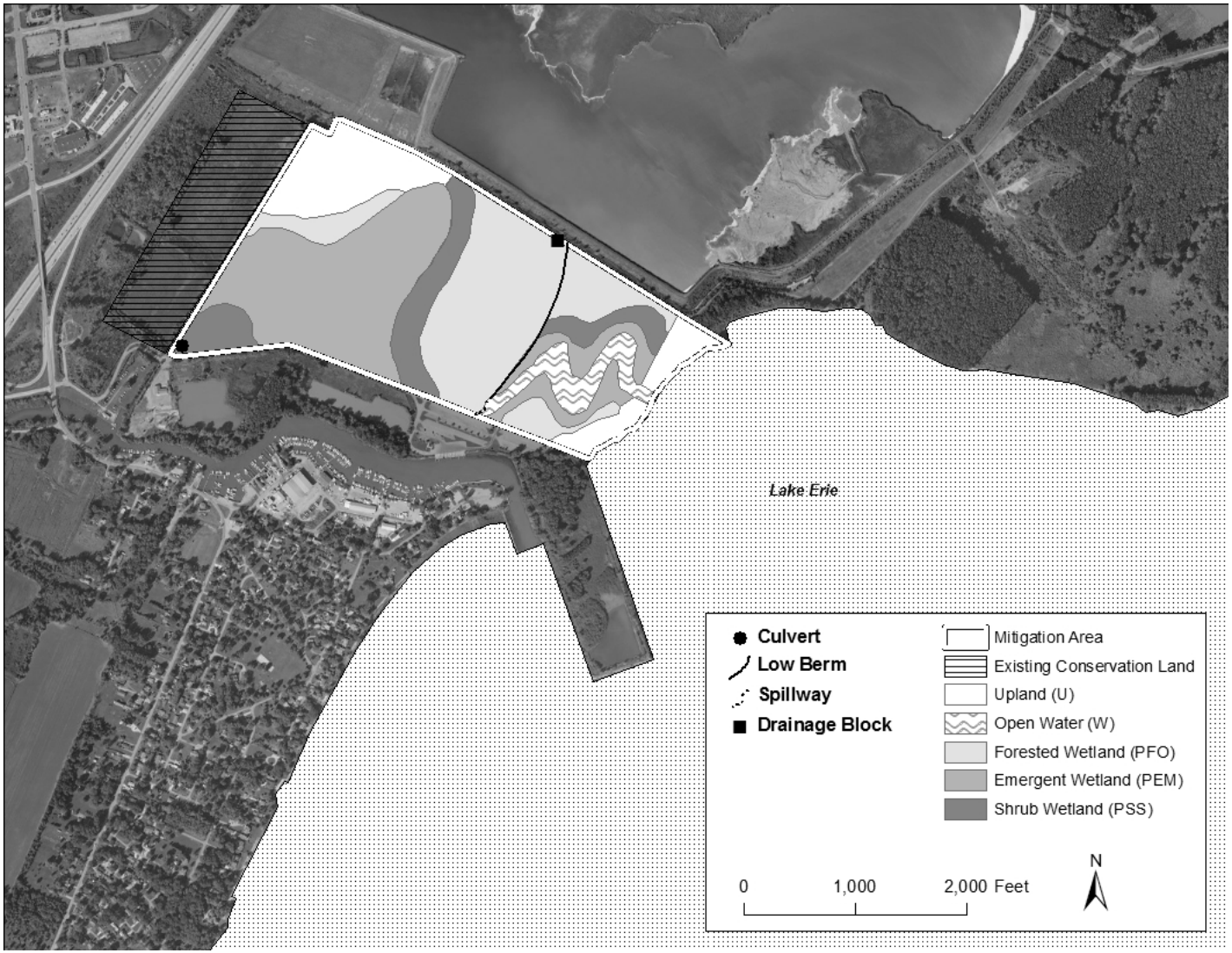
Source: Reference 30

Figure 18: Onsite Mitigation Conceptual Plan



Source: Reference 24

Figure 19: Offsite Mitigation Conceptual Plan



Source: Reference 24

The Detroit Edison Company
One Energy Plaza, Detroit, MI 48226-1279

DTE Energy
Detroit Edison

December 15, 2010
2010-MEP-F3COLA-0071

Michigan Department of Natural Resources and Environment
Attention: Katherine David
P.O. Box 30473
Lansing, MI 48909

Subject: Letter of Understanding, Documenting Conclusions of the Fermi Site Meeting October 7, 2010

Dear Ms. David,

This letter is a follow-up to the onsite meeting held at the Fermi location on October 7, 2010. Based on review of wetlands and discussions with the Michigan Department of Natural Resources and Environment (MDNRE) on October 7, 2010, this letter describes Detroit Edison's understanding of the compensation ratios that MDNRE will require to mitigate impacts to wetlands which may result from future Fermi 3 construction activities.

Wetland evaluations and ratios provided in this letter are based on the following:

- A review of wetland types using the wetland classification system presented in the Fermi 3 Combined Operating License Application (Attachment 1)
- A review of wetland types using the Natural Communities of Michigan: Classification and Description, 2007
- The September 13, 2010 discussion with MDNRE regarding the Fermi Site Wetlands Overview (Attachment 2)
- Section 324.30301 of Michigan's Natural Resources and Environmental Protection Act
- The October 7, 2010 onsite review and discussion of wetlands and mitigation ratios with MDNRE.

The following attachments referenced in this letter are contained on the enclosed CD:

- Attachment 1 – Fermi Site Wetland Delineation
- Attachment 2 – Fermi Site Wetlands Overview and Meeting Notes
- Attachment 3 – *Fermi 3 Extended Terrestrial Vegetation Survey Final Report*, Black and Veatch, October 2009

- Attachment 4 – *Aquatic Ecology Characterization Report Detroit Edison Company Fermi 3 Project Final Report*, AECOM Environment, November 2009
- Attachment 5 – Canal Survey
- Attachment 6 – Water Elevation in Canals at Culvert Crossings

Wetlands and Compensation Ratios

- Wetlands I, L, F and the combined area of Wetlands BB, EE, and FF represent relatively intact coastal wetlands with vegetation communities typical of southern hardwood swamps. Southern hardwood swamp is a Michigan Natural Community that is considered rare and imperiled by MDNRE and the compensation ratio for any impacts will be made at a ratio of 5:1. MDNRE requested the vegetation analysis for Wetland BB and it is provided in Attachment 3.

- Wetlands C and M represent the Great Lakes marsh Michigan Natural Community which is considered rare and imperiled by MNDRE. The compensation ratio for impacts to these wetlands will be made at 5:1.

- Wetland A is a small, isolated wetland that does not represent a Michigan Natural Community but is regulated by MDNRE. The compensation ratio for impacts to this wetland will be made at 1.5:1.

- Wetland AA is an emergent marsh dominated by non-native species. It does not represent a Michigan Natural Community but maintains a connection to Lake Erie. The compensation ratio for impacts to this wetland will be made at 2:1.

- Wetland II and JJ are located along roadside ditches. They do not represent a Michigan Natural Community and are non-coastal. The compensation ratio for impacts to these areas will be made at 1.5:1.

- Wetlands B, D and Y are forested wetlands and are similar in composition. These areas each have a high level of disturbance with both pioneer and non-native species being the major representatives. The wetlands are coastal, but do not represent a Michigan Natural Community. The compensation ratio for impacts to these wetlands will be made at 2:1.

- The southern canal, located to the east of and adjacent to wetland KK, is connected to Wetland M and Lake Erie. The area is shallow enough to support vegetation zones typical of Great Lakes marsh communities including submerged aquatic, floating-leaved, weak-stemmed, and robust emergent vegetation. The Great Lakes marsh Michigan Natural Community is considered rare and imperiled by MNDRE. The compensation ratio for impacts to these wetlands will be made at 5:1 and will integrate the functions and values that this area supports for aquatic species (Attachment 4).

- The wetland edge along H and U is narrow, steep and dominated by invasive species. Compensation ratio for impacts to wetland edge in H and U will be made at 1.5:1. The open water areas of H and U are not considered wetland and there is no mitigation proposed for any impacts to these areas. MDNRE asked to review the aquatic species present in H and U (Attachment 4) and elevation survey data. The canal survey data for H, U, and for the southern canal (discussed above) is provided in Attachment 5.

- Wetland KK is a highly disturbed, early successional forested wetland that, while connected to the coastal system, is not a natural community. The compensation for impacts to this wetland will be made at 2:1.

- Wetland E is shown represented on the map in two distinct parts, one more northerly and one more southerly. The northern portion is an emergent marsh/wet meadow that does not represent a Michigan Natural Community and the southern portion could be either a southern shrub carr or other coastal wetland type. The compensation ratio for impacts to both of these wetlands will be made at 2:1.

At the October 7, 2010, meeting there was a request that functionality of culverts connecting the canals, wetlands, and Lake Erie be confirmed. Survey elevations were taken at the surface of the water in each of the canals and these data are provided in Attachment 6. All of the connected canals had the same elevation of 572.5', demonstrating that the culverts that connect these canals are functional. Note that the isolated central canal, open water H, displays disconnection from the other canals with a surface elevation of 573.2'.

Detroit Edison requests that MDNRE respond with concurrence, corrections, and comments to this letter within 60 days.

If you have any questions, or need additional information, please contact me at (313) 235-3368.

Sincerely,

Randall D. Westmoreland, Technical Expert
Nuclear Development – Licensing
Detroit Edison Company

Attachments:
1) Fermi Site Wetland Delineation
2) Fermi Site Wetlands Overview and Meeting Notes

3) *Fermi 3 Extended Terrestrial Vegetation Survey Final Report*, Black and Veatch, October 2009
4) *Aquatic Ecology Characterization Report Detroit Edison Company Fermi 3 Project Final Report*, AECOM Environment, November 2009
5) Canal Survey
6) Water Elevation in Canals at Culvert Crossings

cc: Colette Luff, US Army Corps of Engineers
Bruce Olsen, US NRC (with Attachments 2, 5 and 6 as hard copies, i.e. no CD)

Detroit Edison Fermi 3 Project

US Army Corps of Engineers Supplemental RAI Response

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EXECUTIVE SUMMARY

This document constitutes Detroit Edison's response to United States Army Corps of Engineers (USACE) supplemental requests for additional information (RAIs) 1 and 2, and all subparts. The response was prepared using the Clean Water Act (CWA) 404(b)(1) guidelines (40 CFR Part 230), the USACE public interest factors (33 CFR Part 320.4), and the USACE Detroit District generic master template document. The purpose of this response is to assist the USACE in assessing compliance with the CWA Section 404(b)(1) guidelines and determining whether the project is compatible with the public interest.

The USACE Supplement RAI Response is organized as follows:

- Section 1 maps the subparts of the RAI to the sections of the response document where the requested information can be found.
- Section 2 describes the baseline environmental setting for the USACE regulated activities associated with the construction and operation of Fermi 3.
- Section 3 describes the proposed Fermi 3 project, including the construction approach and sequence, and the mitigation techniques that will be implemented to minimize the effects on waters and wetlands of the United States.
- Section 4 provides an assessment of impacts (both beneficial and adverse) of the Fermi 3 project on relevant USACE public interest factors.
- Section 5 describes the alternatives that were considered to avoid and minimize the potential impacts of the Fermi 3 project.
- Appendix A contains a copy of the USACE Supplemental RAIs.
- Appendix B evaluates the candidate sites identified in the Detroit Edison service area to determine whether a practicable alternative site would be environmentally preferable to the proposed project at the Fermi site.
- Appendix C provides a conceptual strategy to mitigate the unavoidable impacts associated with the proposed project.

The evaluation of the proposed Fermi 3 project and alternatives, and the assessment of impacts in this supplemental RAI response indicate that the project will comply with the CWA Section 404(b)(1) guidelines and is compatible with the public interest. This evaluation includes analyses which clearly demonstrate that the Fermi site is:

1. The least environmentally damaging practicable alternative – The Fermi site is the practicable alternative site with the least impact on waters of the United States that does not have significant adverse impacts on other environmental resources.

2. Compatible with the public interest – The project will not result in significant adverse impacts on relevant public interest factors.

In addition to compliance with state and federal requirements, implementation of appropriate and practicable steps will minimize potential adverse impacts of discharges and ensure that the construction and operation of Fermi 3 will not result in significant degradation of wetlands and the aquatic environment. Further, the project proposes appropriate and practicable mitigation to offset the anticipated loss of wetlands within the USACE's jurisdiction.

This comprehensive CWA 404(b)(1) and Fermi site-specific public interest factor evaluation clearly demonstrates that the Fermi site has the smallest overall impact on environmental resources and is in accordance with the public's interest. Therefore, the Fermi site is the least environmentally damaging practicable alternative for the construction and operation of Fermi 3 in Detroit Edison's service area.

1.0 INTRODUCTION

This document constitutes Detroit Edison's response to the United States Army Corps of Engineers (USACE) Supplemental RAIs 1 and 2 (and all subparts) concerning the Fermi 3 project, provided to Detroit Edison on November 19, 2010. A copy of the USACE Supplemental RAIs is included in Appendix A of the response. Table 1-1 correlates the USACE Supplemental RAIs to the RAI response location.

The Supplemental RAI response was prepared utilizing the Clean Water Act (CWA) Section 404(b)(1) guidelines (40 CFR Part 230), the USACE public interest factors (33 CFR Part 320.4), and the USACE Detroit District generic master template document that facilitates consideration of the range of all possible impacts from projects within the purview of the USACE Regulatory Program. The Supplemental RAI response discusses the project alternatives considered and the relevant environmental issues associated with those alternatives and the environmental impacts associated with the Fermi 3 project.

Table 1-1. Location of USACE RAI Responses

USACE RAI Number	USACE RAI Brief Description	Location of Response in the USACE Report
USACE-1	**Conduct a Public Interest Review**	
USACE-1a	Public Interest Factor Baseline Condition	Section 2
USACE-1b	Coastal Wetlands	Sections 2 and 4
USACE-1c	Public Interest Impact Evaluation	Sections 3 and 4
USACE-1d	Water-related and Wetland Impact Discussion	Section 3
USACE-1e	Minimization of Discharges into the Waters of the United States and Adjacent Wetlands and Compensation	Sections 3 and 4
USACE-1f	Minimization of Detrimental Project Effects	Section 3
USACE-1g	Project Description	Section 3
USACE-1h	Consideration of General Criteria	Sections 4 and 5
USACE-1i	Impact Significance Levels	Sections 3 and 4
USACE-1j	Public Interest/NEPA Review Supportive Documentation	Shape files for updated wetland delineation and proposed mitigation areas provided on DVD.
USACE-2	**Alternative Analysis Package**	
USACE-2a	Project Description/Purpose & Need	RAI complete. No supplemental response is required.
USACE-2b	Alternative Site Analysis – Wetland Fill Avoidance Emphasis	Section 5 Appendix B
USACE-2c	Onsite Alternative Analysis	Section 5
USACE-2d	Analysis Supportive Documentation	All sections

2.0 BASELINE CONDITIONS

The information provided in the following subsections establishes a baseline environmental setting from which to assess the impact of the activities associated with the construction and operation of Fermi 3. The site-specific information describes the baseline condition regarding pertinent issues presented by federal and state agencies for the following factors: Conservation and Overall Ecology, Wetland, Fish & Wildlife, Historic Properties and Archaeological Resources.

2.1 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 2.1-1 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 1).

Approximate Acres per Plant Community Present on the Fermi Site

Habitat	Acres	Percent of Site
Coastal Emergent Wetland (CEW) Open Water	35	2.8
Coastal Emergent Wetland (CEW) Vegetated	238	18.9
Grassland: Right-of-Way (GRW)	29	2.3
Grassland: Idle/Old Field/Planted (GOF)	75	6.0
Grassland: Row Crop (GRC)	64	5.1
Shrubland (SHB)	113	9.0
Thicket (TKT)	23	1.8
Forest: Coastal Shoreline (FCS)	47	3.7
Forest: Lowland Hardwood (FLH)	92	7.3
Forest: Woodlot (FWL)	117	9.3
Developed Areas (DA)	212	16.8
Lakes, Ponds, Rivers (LPR)	44	3.5
Lake Erie (main body)	171	13.6
Totals	1260	100

A brief description of the habitats is provided below.

Grassland: Row Crops (GRC): agricultural fields planted with a single species (usually corn or soybeans) and harvested annually.

Grassland: Idle/Old Field/Planted (GOF): communities of opportunistic plants that recolonize land once cleared for agriculture or other purposes. In some cases, these areas are initially planted with a cover grass, usually perennial brome or fescue, when the area is to remain idle for the long term.

Grassland: Right-of-way (GRW): linear features of previously disturbed land associated with roadways, railways, power lines, pipelines, etc. An existing power line right-of-way accounts for the majority of this classification. The power line right-of-way is periodically mowed to keep the area free of trees to maintain adequate line clearance.

Shrubland (SHB): generally upland areas with relatively dry soils dominated by deciduous shrubs. On the Fermi property, all shrublands are located in areas that were filled or otherwise severely disturbed by Fermi 1 and 2 construction activities.

Thicket (TKT): generally areas densely populated with small trees, shrubs, and saplings located between wetlands and uplands. Ground cover is sparse to lacking except in a few open areas. The low-quality species composition present suggests that the area was disturbed in the past.

Forest: Coastal Shoreline (FCS): a narrow, interrupted band along the east side of the property, adjacent to the main body of Lake Erie.

Forest: Lowland Hardwood (FLH): the most mature habitat on the Fermi property.

Forest: Woodlot (FWL): in the east-central and northwestern portions of the Fermi property. The FWL developed over fill material from Fermi 1 and Fermi 2 construction or on land otherwise heavily disturbed by Fermi 1 and 2 activities.

Coastal Emergent Wetland (CEW): the largest plant community on site. The area is divided between a north and south lagoon and an unnamed drainage corridor entering the site from the west.

Developed Areas (DA): buildings, parking areas, equipment storage areas, roadways, maintained lawns, and similar areas.

Lakes, Ponds and Rivers (LPR): water bodies including an unnamed stream draining east across the central portion of the site, Quarry Lakes, the South Canal, and Open Water H.

Lake Erie (main body): lies north and east of the project.

2.2 Topography

Topography in the vicinity is fairly flat, with some lower elevation wetland areas along the Lake Erie shoreline, including the Fermi site (Figure 2.2-1). 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 2). 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.

2.3 Soils

The overburden soils at the site consist of lacustrine deposits, glacial till, and rock fill. 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 3) 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 2.3-1 depicts the soil series identified.

2.4 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 4). In 2010 individual wetlands were revisited to determine Michigan Natural Community classification and wetland condition and quality. Field observations included additional vegetation inventory and evaluation of wetland characteristics similar to those suggested in the Michigan Rapid Assessment Method for Wetlands (Reference 5). The vegetative species are further described in Section 2.7. Important species habitats at the Fermi site are discussed below.

Requests for data concerning known or potential occurrences of endangered, threatened, candidate, or special concern species on the Fermi site were submitted to the United States Fish and Wildlife Service (USFWS) and the Michigan Natural Features Inventory as part of an Environmental Report to the Nuclear Regulatory Commission (NRC) in support of a Combined License Application (COLA) for the proposed Fermi 3 project. In addition, a list of threatened, endangered, or candidate species for Monroe County,

Michigan was obtained online from the Michigan Natural Features Inventory. Two species were identified by the Michigan Department of Natural Resources (MDNR) as occurring or potentially present. Species listed by MDNR as "species of special concern" are not protected under state endangered species legislation.

State-Listed Protected Species

Frank's Sedge: Frank's Sedge was previously listed as a State Species of Special Concern, but was delisted in 2009 (Reference 6). This sedge was observed in the transmission line (restored prairie area) in 2005, but was not observed in the terrestrial studies conducted from 2008 to 2010. Accordingly, no further consideration is being given to this species as being potentially affected by Fermi 3.

American Lotus: The American lotus (*Nelumbo lutea*) is a state threatened species. However, large local populations of American lotus are scattered in areas of southern Michigan, reaching an apparent peak in Monroe County (Reference 6). 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 2.4-1).

2.5 Wildlife Habitat

The site was extensively surveyed for wildlife in 1973 and 1974 by NUS Corporation (Reference 7). In 2000, the Detroit Edison Fermi 2 Plant Wildlife Habitat Team, in cooperation with the Wildlife Habitat Council, prepared a Wildlife Management Plan, including updated onsite wildlife occurrences. The Wildlife Management Plan was re-certified in 2002, resulting in an updated wildlife occurrence list. The most recent terrestrial wildlife survey was conducted during 2008 and 2009 (Reference 8). Surveys were conducted quarterly in July and October 2008 and January and April 2009. Because wildlife habitats could be impacted by the construction and operation of the proposed Fermi 3 facility, the results are being used to identify wildlife present or potentially present in the project site. Most of the undeveloped portions of the Fermi site are included in the DRIWR (Figure 2.5-1). The wildlife study surveyed the onsite portion of the DRIWR.

The 2008/2009 survey was conducted to confirm data from earlier surveys and to further characterize the terrestrial wildlife species using the Fermi property. Secondarily, the survey 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 following discussion reflects the results of the detailed wildlife survey conducted in 2008/2009 (Reference 8) and other information sources as cited, as it applies to U.S. Army Corps of Engineers (USACE) and Michigan Department of Natural Resources and Environment (MDNRE)-regulated activities.

2.5.1 Important Terrestrial Species and Habitats

The NRC's "Standard Review Plan for Environmental Reviews for Nuclear Power Plants" (NUREG-1555, Reference 9) defines "important species" as: 1) species listed or proposed for listing as threatened, endangered, candidate, or species of special concern in 50 CFR 17.11 and 50 CFR 17.12, by the USFWS, or the state in which the project is located; 2) commercially or recreationally valuable species; 3) species essential to the maintenance and survival of rare or commercially or recreationally valuable species; 4) species critical to the structure and function of local terrestrial ecosystems; or 5) species that could serve as biological indicators of effects on local terrestrial ecosystems. From the above definition, only element 1) is applicable to the species on the Fermi site and vicinity. "Important habitat" is defined by the NRC in NUREG-1555 as wildlife sanctuaries, refuges, or preserves, wetland, floodplains and areas identified as critical habitat by the USFWS. The important terrestrial species and habitats are addressed below.

Terrestrial Species - Federal Protected Species

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 USFWS de-listed the bald eagle (*Haliaeetus leucocephalus*) as federally threatened under the Endangered Species Act, effective August 8, 2007. However, the species continues to receive federal protection under the Migratory Bird Treaty Act and the Bald and Golden Eagle Protection Act, which prohibits the take, transport, sale, barter, trade, import and export, and possession of eagles, making it illegal for anyone to collect eagles and eagle parts, nests, or eggs without a USFWS permit.

Terrestrial Species - State-Listed Protected

The MDNR and the Michigan Natural Features Inventory (Reference 10) 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/MDNRE-regulated project areas is the Eastern fox snake (*Pantherophis gloydi*).

Bald Eagle: None of the previously observed bald eagle nests were observed on the Fermi site as of January 2011. The bald eagle has been delisted in Michigan; however, MDNR guidelines for bald eagle

management would follow those provided by the USFWS *National Bald Eagle Management Guidelines* (Reference 11).

Eastern Fox Snake: The Eastern fox snake is state threatened. Primarily an open wetland species, this snake inhabits emergent wetlands along Great Lakes shorelines and associated drainages where cattails are common. Little is known about the life history of the Eastern fox snake. They are typically active from mid-April to late October, usually throughout the day except during periods of intense heat. Breeding probably occurs annually beginning at two to four years of age with mating occurring in June or early July. The eggs are deposited in rotten stumps, mammal burrows, soft soil or mats of decaying vegetation. Eastern fox snakes eat small rodents and amphibians, insects and earthworms. In 2007, nine occurrences were reported in Monroe County (Reference 6). 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 draft mitigation plan which will be implemented to minimize the project's impact to the species.

2.5.2 Aquatic Habitat and Species Summary

The baseline conditions described in this section are based on the aquatic ecology survey conducted at the Fermi site from July 2008 through July 2009 (Reference 12). For that survey, nine representative sampling locations were chosen from a variety of aquatic habitats on and adjacent to the Fermi site. These locations were selected based on their ability to represent the aquatic resources adjacent to the site and those areas that are in proximity to the proposed new facilities and construction areas. Five of the locations selected for the study included two in Lake Erie adjacent to the intake, the South Canal, the North Canal, and Open Water H, and are discussed below (Figure 2.5-2). Open Water U was not sampled; however, because of culverts to the north (Figure 2.6-1) it is assumed to contain an assemblage of fish that is a subset of those in the North Canal.

The Lake Erie, South Canal, and North Canal locations were sampled monthly over the year-long survey period. The sampling of Open Water H ended in March 2009 because the populations in the isolated water body were not expected to undergo dramatic fluctuations.

Based upon the review of data collected in the aquatic sampling, there were no occurrences of federally and/or state listed threatened or endangered aquatic species. These results indicate that the occurrence of these species in the vicinity of the Fermi site is highly unlikely.

Lake Erie/Intake

Two areas were sampled in Lake Erie, including the Lake Erie – Intake (LE1-A) area adjacent to the intake structure and the Lake Erie – South Lagoon (LE2-A) (Figure 2.5-2).

Fish Community: A total of 1909 fish comprising 19 species were collected in eight sampling events at the LE1-A location from July 2008 through June 2009. The August 2008 sample contained the greatest total number of fish (1274) while the June 2009 sample yielded the fewest number of fish (5). Species composition was dominated by gizzard shad (*Dorosoma cepedianum*; 45%), white perch (*Morone americana*; 33%), emerald shiner (*Notropis atherinoides;* 7%), and spottail shiner (*N. hudsonius*; 6%). The 19 species of fish represented in the samples indicate an overall moderate level of species richness relative to the other locations. Monthly species richness ranged from a minimum of 1 species in November 2008 to a maximum of 12 species in July 2008.

A total of 3856 fish comprising 38 species were collected at the LE2-A location during monthly events from July 2008 through June 2009. Of the samples collected, August 2008 yielded the greatest total number of fish (1791) while the November 2008 sample represented the fewest number of fish (78). Species composition was dominated by goldfish (*Cyprinidae*; 28%), gizzard shad (16%), and emerald shiner (14%). The 38 species of fish represented in the samples indicate a relatively high level of species richness for the habitat. Monthly species richness ranged from a minimum of four species in November 2008 to a maximum of 23 species in August 2008 and October 2008.

Macroinvertebrate Community: A total of 260 individuals comprising 8 orders and 32 taxa were collected in seven monthly sampling events at the LE1-A between July 2008 and June 2009. The October 2008 sample contained the greatest number of individuals (100) while the May 2009 sample yielded no organisms and the November 2008 sample had 8. Sample composition was dominated by Amphipoda (61%) and Diptera (18%). *Gammarus fasciatus* (95%) made up a majority of the Order Amphipoda, while *Rheotanytarsus exiguus gr.* (21%) was the prevalent Dipteran.

A total of 32 taxa were represented in the samples, indicating moderate to high taxa richness for the habitat. Monthly taxa richness ranged from 0 individuals in the May 2009 sample to 19 taxa in the July 2008 sample.

The LE2-A station samples provided a total of 592 individuals representing 43 taxa for the seven monthly samples collected between July 2008 and June 2009. No sample was collected in September 2008 as a result of weather conditions. Of the samples collected, August 2008 exhibited the greatest total number of individuals (127) while the April 2009 sample had the fewest individuals (12).

Sample composition was dominated by Ephemeroptera and Amphipoda (19% each). Order Ephemeroptera was comprised entirely of *Caenis sp.,* while Amphipoda was dominated by *Gammarus fasciatus* (85%).

A total of 43 taxa were represented in the samples, indicating a high taxa richness for the habitat. Monthly taxa richness ranged from 5 taxa in November 2008 to 17 in the October 2008 and June 2009 samples.

Conclusions: Sample locations LE1-A and LE2-A had relatively high numbers of fish and species richness, which is representative of a healthy ecosystem. Gizzard shad was most prevalent in both Lake Erie stations. This is consistent with their habitat requirements which suggest that they are more common in open water environments.

The two Lake Erie sample locations had comparatively different species richness and abundance. The LE1-A location had much lower species richness and abundance levels. Even though the sampling methodologies were different, differences between the two locations are more likely attributed to differences in habitat structure associated with each location. The LE1-A location is located along a sand to gravel beach in the open waters of Lake Erie with little to no structure or habitat present for cover or spawning. The LE2-A location has sand and gravel shoreline and vegetated shoreline to support structure for cover and spawning. In addition, the LE2-A location is at the confluence of the South Lagoon which has extensive aquatic vegetation that potentially supports a larger fish population which can move freely from the lagoon out into the main body of the lake.

Macroinvertebrate samples indicate that these locations support a sufficiently structured benthic community and were moderately to highly diverse, dominated by amphipods, midges and mayflies.

South Canal

The South Canal sample location is identified as CS-A (Figure 2.5-2).

Fish Community: The South Canal samples consisted of a total of 2438 fish comprising 28 species collected from July 2008 through June 2009. The October 2008 sample contained the greatest number of fish (1,707), while the fewest were collected in June 2009 (51). Species composition was dominated by goldfish (63%), common carp (*Cyprinus carpio*; 10%), bluegill (*Lepomis macrochirus*; 5%), golden shiner (*Notemigonus crysoleucas*; 5%), and pumpkinseed (*L. gibbosus*; 5%). The 28 species of fish in the samples indicate high species richness relative to the other locations. Monthly species richness ranged from a minimum of 7 in April 2009 to a maximum of 17 in August 2008.

Macroinvertebrate Community: The South Canal samples yielded a total of 768 individuals comprising 63 taxa from the monthly samples collected between July 2008 and June 2009. The June 2009 sample had the greatest number of individuals (142), while the fewest were collected in May 2009 (70).

The samples were dominated by Ephemeroptera (26%), Amphipoda (25%), and Diptera (20%). *Caenis sp.* (98%) was the dominant Ephemeroptera, while *Hyalella azteca* (95%) and *Paratanytarsus sp.* (17%) were dominate in the Amphipoda and Diptera, respectively.

A total of 25 taxa were represented in the samples indicating a comparatively high taxa richness for the habitat. Monthly taxa richness ranged from 15 in July 2008 to 23 taxa in September 2008.

Conclusions: The South Canal sample location has relatively high numbers of fish and species richness which is representative of a healthy ecosystem. The South Canal is hydrologically connected to the south

lagoon and Lake Erie, which allows for movement of fish species to and from each of these areas. Fish composition within these areas is highly diverse with no one species being dominant.

Macroinvertebrate samples in the South Canal indicate the location supports a sufficiently structured benthic community and included high macroinvertebrate family diversity dominated by oligochaetes and mayflies.

North Canal

The North Canal sample location is identified as CN-A (Figure 2.5-2).

Fish Community: The North Canal samples consisted of a total of 1822 fish comprising 30 species in seven samples collected from July 2008 through June 2009. The September 2008 sample contained the greatest total number of fish (574), while the fewest were collected in April 2009 (52). Species composition was dominated by bluegill (22%), followed by pumpkinseed (16%), emerald shiner (11%), and gizzard shad (10%). The 30 species of fish in the samples indicate a comparatively high level of species richness for the habitat. Monthly species richness ranged from a minimum of 11 in October 2008 to a maximum of 19 species in July 2008.

Macroinvertebrate Community: The North Canal samples yielded a total of 763 individuals representing 34 taxa in seven samples collected from July 2008 through June 2009. The October 2008 sample contained the greatest total number of individuals (131), while the fewest were collected in July 2008 (99). The samples were dominated by Ephemeroptera (28%), Diptera (24%), and Tubificida (14%). *Caenis s*p. (99%) was the dominant Ephemeroptera, Diptera consisted mostly of *Dicrotendipes modestus* (18%), and Tubificida was dominated by *Naidinae* (65%).

A total of 34 taxa were represented in the samples indicating a comparatively high level of taxa richness for the habitat. Monthly taxa richness ranged from a minimum of 14 in October 2008 to a maximum of 25 taxa in April 2009.

Conclusions:

The North Canal sample location has relatively high numbers of fish and species richness which is representative of a healthy ecosystem. The North Canal is hydrologically connected to Lake Erie, Open Water U, and Swan Creek, which allows for movement of fish species to and from each of these areas. Fish composition within these areas is highly diverse with no one species being dominant.

Macroinvertebrate samples in the North Canal indicate the location supports a sufficiently structured benthic community and included high macroinvertebrate family diversity dominated by oligochaetes and mayflies.

Open Water H

Open Water H is an isolated component of the canal system. Although it appears to be part of the canal system there is not a hydrological link from Open Water H to Open Water U or the South Canal. Open Water H sample location is identified as IC-A (Figure 2.5-2).

Fish Community: A total of 861 fish comprising 13 species were collected in four samples between July 2008 and October 2008. August 2008 yielded the greatest number of fish (316); the July 2008 sample contained the fewest (118). Species composition was dominated by bluegill (58%), gizzard shad (13%), largemouth bass (*Micropterus salmoides*; 11%), and white crappie (*Pomoxis annularis*; 6%). The 13 species of fish indicate a moderate level of species richness compared to the other habitats sampled. Monthly species richness ranged from 7 in July 2008 11 in September 2008.

Macroinvertebrate Community: A total of 323 individuals representing 38 taxa were collected in four samples from July 2008 through October 2008. October 2008 yielded the greatest numbers of individuals (123); the July 2008 sample had the fewest (37).

Sample composition was dominated by Amphipoda (36%) and Diptera (31%). Order Amphipoda was consisted mostly of *Crangonyx sp.* (57%) while Diptera was made up mostly of *Tanytarsus sp.* (24%).

A total of 25 taxa were represented in the samples, indicating a comparatively moderate taxa richness for the habitat. Monthly taxa richness ranged from 11 in July 2008 to 21 taxa in August 2008.

Conclusions: Open Water H had high numbers of fish, but low to moderate numbers of species. These lower values may be attributed to the isolated nature the system. This system does consist of aquatic habitat such as fringing wetland vegetation and prey organisms necessary for supporting fish populations.

Open Water H exhibited less diversity in macroinvertebrate community compared to the other canal sites and was dominated by amphipods and oligochaetes. Open Water H had fewer individuals than the rest of the sample stations. The low numbers can be attributed to the steep banks, deep water, and rock substrate which typically do not support the types of benthic organisms identified at the other sample locations.

2.6 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 31.5 inches and generally well distributed throughout the year. The site receives direct, surface runoff from a 2440 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. (Reference 13)

Construction of Fermi 3 will likely require pumping groundwater to dewater the excavation, which will extend into the Bass Islands Group dolomite bedrock. Several potential approaches for dewatering are under consideration. All the dewatering approaches include hydraulic barriers to prevent groundwater from entering the excavation. Even with the hydraulic barriers in place, it is likely that some groundwater will still leak into the excavation. Use of the barriers will minimize the amount of groundwater that will be removed, thereby minimizing any impacts to areas outside of the installed hydraulic barriers.

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. As shown on Figure 2.6-1, the surface water in Swan Creek to the north and Lake Erie to the south of the existing Fermi units is directly connected to the PEM areas on the Fermi site. Figure 2.6-1 shows locations of five sets of large-diameter culverts that 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.

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 isolated by berms or roads, the majority of wetland communities on the Fermi property are hydrologically connected and thus considered one wetland system.

The extent of aquatic vegetation on the Fermi site fluctuates annually depending on water conditions in Lake Erie. High water years are associated with more open water on the site and less aquatic vegetation. The 1981 aerial photograph in Figure 2.6-2 illustrates relatively high water conditions, while Figure 2.6-1 (which was taken in 2005) shows an increase in vegetation in the lagoons during low water periods.

Figure 2.6-3 provides hydrographs from June 2007 to May 2008 for monitoring wells and piezometers at the Fermi site. Monitoring wells MW-381S, MW-388S, and MW-393S monitor the groundwater in the overburden and are located away from the PEM areas, near the PFO and PSS areas. At MW-381S and MW-393S, the groundwater level in the shallow wells varied approximately 5 to 7 feet, while at MW-388S the groundwater level varied approximately 4 feet over the year of measurements, with all three wells

showing the same fluctuation trend. During this time no improvement or deterioration in the PFO and PSS areas was reported. This 4- to 7-foot natural variation in the groundwater level in the overburden indicates that groundwater level variations do not negatively impact the PFO and PSS areas, and that precipitation has more influence on these systems.

As part of the COL application, a groundwater model was developed to estimate the dewatering impacts within the Bass Islands Group dolomite. The estimated drawdown of the potentiometric surface of the Bass Islands Group aquifer beneath the PFO and PSS areas ranges from less than 1 foot to approximately 3 feet, depending on the hydraulic barrier installed. The dewatering pumping rate estimated using the groundwater model ranges from approximately 50 to 90 gallons per minute, and depends on the type of hydraulic barrier system in place.

The glacial and lacustrine deposits are characterized by very low horizontal hydraulic conductivity. A slug test in clay at Piezometer P-389 yielded a horizontal hydraulic conductivity estimate of 0.13 feet/day. Vertical hydraulic conductivity is generally assumed to be significantly lower than horizontal hydraulic conductivity, due to bedding plane structures and the flat, plate-like shape of clay particles. Laboratory test results for (vertical) hydraulic conductivity in samples of clay collected from P-385S, MW-387S, and MW-384S are 5.8E-5 feet/day, 6.2E-5 feet/day, and 3.7E-5 feet/day, respectively. These vertical hydraulic conductivity values for the clay overburden are lower than the hydraulic conductivity in the bedrock. Therefore, based on these hydraulic conductivities, dewatering is not expected to have significant impacts to wetlands.

2.7 Aquatic Resources

2.7.1 Wetland Mapping, Delineation, and Jurisdiction

In 2008, Detroit Edison delineated wetland boundaries on 1106 acres at the Fermi site and presented the delineation results in the 2008 Wetland Investigation Report (Reference 13). The wetland delineation was conducted between May 16, 2008 and June 13, 2008 using the 1987 USACE Wetlands Delineation Manual (Reference 14), cross-referencing the MDNRE delineation methods. All wetlands on the site were surveyed, the boundaries were mapped and wetland types were classified according to Reference 15. Summaries of key soil, vegetation and hydrology characteristics used to determine wetland boundaries and classifications were provided.

The 2008 Wetland Investigation Report was provided to MDNRE and USACE in 2008 with a request for review and a jurisdictional determination. Jurisdictional determination letters were provided by MDNRE on November 7, 2008 (Reference 16) and March 30, 2009 (Reference 17) and by USACE on November 9, 2010 (Reference 18). Minor modifications were made to the wetland boundaries in 2010 in response to the jurisdictional determination. Additional updates to the wetland delineation were based on site visits and verbal and written feedback from MDNRE and USACE. These include a delineation of wetland fringe around open water H and open water U and reclassification of the South Canal from open water (OW) to

palustrine emergent marsh (PEM). Watershed assessments of the northern section of the Ottawa-Stony Creek and the Western Lake Erie Coastal Zone were completed to further inform development strategies and conservation priorities at the Fermi site.

2.7.2 Wetland Conditions, Functions and Values

Wetland habitats were evaluated during detailed terrestrial surveys conducted from 2008 through 2010. In 2008 and 2009 pedestrian surveys of flora and fauna were conducted in all habitat types, including wetlands, on the Fermi site (Reference 4 and Reference 8). In 2010 individual wetlands were revisited to determine Michigan Natural Community classification and wetland condition and quality. Field observations included additional vegetation inventory and evaluation of wetland characteristics similar to those suggested in the Michigan Rapid Assessment Method for Wetlands. These wetland characteristics include 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, and feedback from regulatory staff were used to further evaluate individual wetlands potentially impacted by proposed Fermi 3 development activities and to define appropriate compensation ratios. The wetland delineation boundaries on the Fermi site are presented on Figure 2.7-1. The following section details the results of this evaluation and identifies compensation ratios for each wetland area discussed.

2.7.2.1 Michigan Natural Community Classification and Mitigation Ratios

Chapter 324, Section 303.01(t) of the Michigan Natural Resources and Environmental Protection Act identifies Michigan Natural Communities that are considered rare and imperiled. These include Great Lakes marsh and southern swamp (southern hardwood swamp). At the Fermi site, these communities are found relatively intact in Wetlands C, M and the South Canal (Great Lakes marsh) and I, F, BB/EE/FF and L (southern swamp). Impacts to these wetlands will require a 5:1 replacement ratio. Wetland E is a combination of emergent marsh/wet meadow and southern shrub carr with direct surface water connection to Lake Erie requiring a 2:1 replacement ratio (coastal wetland ratio).

The other wetlands potentially impacted by Fermi 3 activities do not readily fall into a natural community category due to variables such as fragmentation and disturbance. Any wetland considered “other” that is connected hydrologically to Lake Erie or is within 1000 feet of the ordinary high water mark (elevation 571.6 ft IGLD 1955) is considered coastal and a 2:1 mitigation ratio applies. This excludes Wetland A and possibly Open Water H and Wetlands II and JJ. If any of the open water areas were officially developed as stormwater areas exemptions may apply. The depth of open water areas H and U may mean they are not protected as wetlands. Anything up to 2 meters in depth is considered wetland. MDNRE staff indicated that condition and quality are relevant factors in any mitigation proposed for areas that are fragmented with a high level of disturbance (not just invasive species), limited functions and that do not match a natural community description. It would not be expected that these areas, which include

B, D, R, T, Y, AA, II, JJ, and KK would require a 5:1 mitigation ratio. These "other" wetlands would require a 2:1 ratio if they are considered coastal and a 1.5:1 ratio if they are not.

2.7.2.2 Wetlands Potentially Impacted by Activities at Fermi

The following section provides details associated with individual wetlands that may be impacted by activities associated with the Fermi 3 project. Wetlands are grouped according to area and potential impact rather than listed singly and organized by letter. Table 2.7-1 provides a quick cross-reference for individual wetlands discussed.

2.7.2.2.1 Wetlands AA, II, JJ (Figure 2.7-2)

Description, Condition, Functions and Values

Wetland AA is a triangular-shaped PEM wetland containing 0.80 acres northeast of Fox Road and south of wetland L. Wetland II is a 0.52-acre ditch southwest of Wetland AA and along the south side of Fox Road. Wetland JJ is a 1.37-acre ditch on the north side of Acorn Road and east side of Quarry Lake Road (Figure 2.7-2). Wetlands AA, II and JJ are in an established spoil area and share the following properties:

- Highly disturbed by fill (spoil piles, concrete, gravel), ditching and multiple access roads
- Vegetation communities with high structural diversity and low species diversity with well-established invasive species populations including common reed *(Phragmites australis)* and reed canary grass *(Phalaris arundinacea*). Other common vegetation species include eastern cottonwood (*Populus deltoides),* gray-stemmed dogwood *(Cornus racemosa)* and riverbank grape (*Vitis riparia)*
- Water is seasonally present

These three wetlands provide minimal floodflow alteration, sediment/toxicant retention and nutrient removal. Wetlands II and JJ are ditches adjacent to the roadside which contain sparse wetland vegetation. All three wetland areas are dominated by invasive species such as common reed *(Phragmites australis).* These wetlands are of poor quality, limited size and connectivity.

Natural Community Type and Mitigation Ratios

Wetland AA is an emergent marsh dominated by non-native species. It does not represent a Michigan Natural Community but maintains a connection to Lake Erie. The compensation ratio for impacts to this wetland will be 2:1. Wetland II and JJ are located along roadside ditches. They do not represent a Michigan Natural Community and are non-coastal. The compensation ratio for impacts to these areas will be 1.5:1.

2.7.2.2.2 Wetlands L, M, Y, R and T (Figure 2.7-3)

Description, Condition, Functions and Values

Wetland L is a 63.12-acre PFO wetland along the east side of Quarry Lake Road and north of Pointe Aux Peaux Road. Wetland M is a 161.65-acre PEM wetland south of Fermi Drive; east of Quarry Lake Road, and west of Boomerang Road. Wetland Y is a 1.14-acre PFO wetland along the west side of Quarry Lake Road. Wetland R is a 1.97-acre PEM wetland southwest of Long Road in the southeastern portion of the Fermi site. Wetland T is a 5.71-acre PFO wetland also southwest of Long Road in the southeastern portion of the property. Existing manmade berms divide Wetland M from both wetland T and R (Figure 2.7-3).

Wetland L is a relatively large, intact PFO wetland. Vegetation species include silver maple (*Acer saccharinum),* American hornbeam *(Carpinus caroliniana*), American elm *(Ulmus americana)*, American basswood *(Tilia americana),* shagbark hickory *(Carya ovata),* green ash (*Fraxinus pennsylvanica*), silky dogwood *(C. amomum*), common buckthorn *(Rhamnus cathartica),* poison ivy (*Toxicodendron radicans)*, Virginia creeper *(Parthenocissus quinquefolia),* riverbank grape *(V. riparia*), garlic mustard *(Alliaria petiolata)*, Canada anemone *(Anemone canadensis)*, aster *(Aster spp.)*, yellow rocket (*Barbarea vulgaris)*, false nettle (*Boehmeria cylindrica*), sedges (*Carex spp.)*, enchanter's nightshade (*Circaea lutetiana*), wild strawberry (*Fragaria virginiana*), white avens (*Geum canadense*), fowl manna grass (*Glyceria striata*), touch-me-not (*Impatiens spp.)*, whitegrass (*Leersia Virginica*), moneywort (*Lysimachia nummularia*), common yellow wood sorrel (*Oxalis stricta*), reed canary grass, common reed, jumpseed (*Polygonum virginianum*), Maryland sanicle (*Sanicula marilandica*), goldenrod (*Solidago spp.*) and Canadian white violet (*Viola canadensis*). The species with the greatest cover were silver maple, reed canary grass, jumpseed, moneywort, poison ivy, and whitegrass.

Wetland M is a large coastal marsh directly connected to Lake Erie and includes an expanse of open water with submerged and floating aquatic vegetation [pondweed (*Potamogeton spp*.), common waterweed (*Elodea canadensis*), bladderwort (*Utricularia spp.),* coontail (*Ceratophyllum demersum*), lotus (*Nelumbo spp*.)] surrounded by zones of weak-stemmed and robust emergent vegetation [(cattail (*Typha spp*.), common reed, arrowhead (*Sagittaria spp.*), bulrush (*Scirpus spp.*), American bur-reed (*Sparganium americanum*)] eventually grading into a shrubby edge that becomes Wetland L to the south and west.

Wetland Y is a fragmented early successional PFO wetland with mixed vegetation and a partially open canopy. This wetland includes many of the species listed above for Wetland L with a greater component of invasive and pioneer species such as eastern cottonwood and common reed.

Edge properties of these wetlands differ markedly from interior areas and are similar in character. These wetlands share the following characteristics along the edge:

- Open or partially open tree canopy due to ash die-off

- Significant cover of invasive species including common reed and reed canary grass
- Early successional and edge species such as eastern cottonwood, silky dogwood, buckthorn, American elm saplings, riverbank grape, grasses and sedges
- Disturbance including ditching, dumping (concrete/metal), activity on adjacent access roads, quarry lakes and parking areas.

Wetlands L and M represent intact PFO and PEM wetland habitats that are large, flat and have significant storage potential with dense vegetation and slow water flow. These two wetlands have diverse cover types and conditions ranging from fragmented, highly disturbed shrub-forested edges to an interior coastal marsh with well-established zonation and an intact PFO with a predominance of native vegetation. These wetlands are directly connected to Lake Erie and provide floodflow alteration, sediment/toxicant retention, nutrient removal and wildlife habitat functions. The western edge of Wetlands L and M exhibit vegetation communities and conditions that reflect a high degree of disturbance including invasive species and altered hydrology associated with the adjacent roadway and other human activities. The edges of Wetlands L and M provide a buffer for the interior and less disturbed wetland conditions. Wetland Y is a small, fragmented wetland with similar properties to the western edge of Wetlands L and M including invasive species and altered hydrology. Wetland Y provides marginal wildlife habitat for edge species and limited water storage.

Wetland R is a small patch of PEM wetland dominated by common reed. Wetland T is a young PFO wetland with partially closed canopy and a mix of upland and wetland vegetation communities dominated by invasive and pioneer species including common reed, reed canary grass, riverbank grape, eastern cottonwood, box elder, and poison ivy.

Much of Wetlands R and T are highly disturbed with fill from past residential and agricultural practices, extensive ditching and draining, refuse from past and nearby residential areas, and a predominance of invasive species including common reed and reed canary grass. The forested portions of these wetlands have relatively small trees with the exception of larger eastern cottonwoods. The wetlands are disconnected hydrologically to varying degrees from coastal Wetland M and Lake Erie. The primary function of Wetlands R and T is low quality wildlife habitat and buffer. These wetlands provide early-successional wildlife habitat for edge species and a buffer for Wetland M and Lake Erie.

Natural Community Type and Mitigation Ratio

Wetland L represents a relatively intact, coastal wetland with a vegetation community typical of southern hardwood swamps. Southern hardwood swamp is a Michigan Natural Community that is considered rare and imperiled by MDNRE and the compensation ratio for any impacts will be 5:1.

Wetland M represents the Great Lakes marsh Michigan Natural Community which is considered rare and imperiled by MNDRE. The compensation ratio for impacts to Wetland M will be 5:1.

Wetland Y is a forested wetland with a high level of disturbance and both pioneer and non-native species as the major representatives. The wetland is coastal, but does not represent a Michigan Natural Community. The compensation ratio for impacts to this wetland will be 2:1.

Wetlands R and T are highly disturbed, PEM and early successional forested wetlands that, while connected to the coastal system, are not natural communities. The compensation ratio for impacts to these wetlands will be 2:1.

2.7.2.2.3 Wetland BB/EE/FF (Figure 2.7-4)

Description, Condition, Functions and Values

Wetland BB is an 11.80-acre PFO wetland. Wetland EE (0.77 acres) and Wetland FF (0.39 acres) are PEM linear ditch wetlands running along the eastern and northern edges of Wetland BB. These three wetlands are considered together as Wetland BB/EE/FF as described below (Figure 2.7-4).

Wetland BB/EE/FF is an intact PFO wetland with relatively high diversity. The wetland interior has a closed canopy and open understory dominated by grasses and large woody debris. While there is some hydrological connection via culverts, Wetland BB/EE/FF is fragmented from other wetlands by multiple roads and developed/agricultural areas. Vegetation species include a mix of upland and wetland vegetation such as silver maple, American elm, American basswood, green ash, box elder (*Acer negundo*), silky dogwood, rough-leaved dogwood (*C. drummondii*), common buckthorn, poison ivy, Virginia creeper riverbank grape, garlic mustard, Canada anemone, swamp agrimony (*Agrimonia parviflora*), beggarticks (*Bidens spp*.), false nettle, sedges, enchanter's nightshade (*Circaea lutetiana*), creeping thistle (*Cirsium arvense*), cleavers (*Galium aparine*), wild strawberry, white avens, fowl manna grass, spotted touch-me-not (*I. capensis*), whitegrass, moneywort, horehound (*Lycopus spp*.), common yellow wood sorrel, sensitive fern (*Onoclea sensibilis*), clearweed (*Pilea pumila*), multiflora rose (*Rosa multiflora*), blackberry (*Rubus spp*.), reed canary grass, common reed, jumpseed, Maryland sanicle, stinging nettle, trillium (*Trillium spp.)* and Canadian white violet. The species with the greatest cover were silver maple, reed canary grass, jumpseed, moneywort, poison ivy, and whitegrass.

The edges of Wetland BB/EE/FF are characterized by pioneer and early successional species, invasive species and a greater degree of disturbance than the interior wetland area. Vegetation species include reed canary grass, common reed, sedges, buckthorn, silky dogwood, eastern cottonwood and riverbank grape. These wetlands are immediately adjacent to access roads (paved and gravel).

While there has been notable evidence of past disturbance, Wetland BB/EE/FF represents an intact PFO wetland with dense, diverse vegetation. Both native and invasive vegetation communities are present. The wetland is connected hydrologically with culverts but fragmented from other wetland areas and Lake Erie due to multiple roadways completely surrounding the site. The primary function of Wetland BB/EE/FF is wildlife habitat. The edges of the wetland exhibit vegetation communities and conditions that

reflect a high degree of disturbance, including invasive species and altered hydrology associated with ditching, the adjacent roadway and other human activities. These edge wetlands provide wildlife habitat for edge species and a buffer for the interior and less disturbed wetland conditions of Wetland BB.

Natural Community Type and Mitigation Ratios

Wetland BB, supported by EE and FF as edge and buffer, represents a relatively intact, coastal wetland with vegetation communities typical of southern hardwood swamps. Southern hardwood swamp is a Michigan Natural Community that is considered rare and imperiled by MDNRE and the compensation ratio for any impacts will be 5:1.

2.7.2.2.4 Wetlands A, B, C, D, E (Figure 2.7-5 and Figure 2.7-7)

Description, Condition, Functions and Values

Wetland A is a 1.88-acre PEM wet meadow on the north side of Fermi Drive in between restored prairie grass habitat to the east and west and south of upland and Wetland F. Wetland B is a 0.76-acre PFO wetland along the ditch adjacent to railway and the north edge of Fermi Drive near Wetlands E-North and E-South and C. Wetland C is a 48.18-acre PEM wetland north of Fermi Drive extending north along the west side of Doxy Road and to the northwest boundary of the Fermi site. Wetland D is a 1.37-acre PFO wetland located north of Fermi Drive, west of Doxy Road and is surrounded by Wetlands C and E-North and E-south. Wetland E was delineated as a 4.71-acre PSS wetland north of Fermi Drive in power line right-of-ways with two sections (E-North and E-South) split by Wetland D and bordered to the north by restored prairie grassland habitat. The 2.67-acre portion of Wetland E-North has been brush-hogged leaving a mix of wet meadow and upland old field herbaceous species. These wetlands are shown on Figures 2.7-5 and 2.7-7.

Wetland A is surrounded by a fringe of silky and rough-leaf dogwood, riverbank grape and willow (*Salix spp*.). The herbaceous layer is dominated by reed canary grass with few individuals of other species including sedge, wild carrot (*Daucus carota*), purple coneflower (*Echinacea purpurea*), Canada wild rye (*Elymus canadensis*), annual fleabane (*Erigeron annuus*), cleavers, bedstraw, wild strawberry, white avens, fowl manna grass, black medick (*Medicago lupulina*), wild bergamot (*Monarda fistulosa*), common yellow wood sorrel, witchgrass (*Panicum capillare*), Virginia plantain (*Plantago virginica*), common cinquefoil (*Potentilla simplex*), common selfheal (*Prunella vulgaris*), prairie coneflower (*Ratibida spp*.), blackberry, black-eyed susan (*Rudbeckia hirta*), little bluestem (*Schizachyrium scoparium*), yellow foxtail (*Setaria glauca*), Canada goldenrod (*Solidago canadensis*), indiangrass (*Sorghastrum nutans*), dandelion (*Taraxacum officinale*) and violet (*Viola spp*.). Many of these species are along the fringes and a result of the prairie restoration plantings.

The restored prairie habitat is associated with an existing power line right-of-way that is previously disturbed. The power line right-of-way is periodically mowed to discourage the growth of woody species.

The prairie was planted in 2003 by Detroit Edison with the assistance of a North American Wetland Conservation Act grant managed by Ducks Unlimited and the Natural Resources Conservation Service (NRCS). The area is dominated by big bluestem (*Andropogon gerardii*) and Indiangrass (*Sorghastrum avenaceum*). Broomsedge (*A. virginicus*) is an undesirable and invasive grass that is relatively common in the area and is even abundant in some localities. Other undesirable plants are also present, including purple loosestrife (*Lythrum salicaria*), common reed, teasel (*Dipsacus sylvestris*), and all non-native species.

Wetland B is an early successional forested ditch dominated by Eastern cottonwood and willow species.

Wetland C grades into PSS and PFO wetland areas to the north and south and bound by Doxy Road to the southeast and Bullit Road to the northwest. It is isolated from Lake Erie by access roads but is connected hydrologically through culverts. This wetland has low vegetation species diversity and is dominated by common reed, cattail and reed canary grass.

Wetland D has a partially open canopy. Dominant tree species include silver maple and young and dying green ash. A relatively dense herbaceous understory is dominated by reed canary grass, common reed and wet meadow species such as blue vervain (*Verbena hastata*), sedges, beggarticks and grass species (*Poa spp., Elymus spp.).*

Vegetation diversity is high in Wetland E with a mix of upland and wetland sapling, shrub and herbaceous vegetation. Species include box elder, red maple (*A. rubrum*), green ash, Eastern cottonwood, American elm, silky and rough-leaf dogwood, poison ivy, riverbank grape, swamp agrimony (*Agrimonia parviflora*), quackgrass (*Agropyron repens*), creeping bentgrass (*Agrostis stolonifera*), wild chives (*Allium schoenoprasum*), onion (*Allium spp*.), annual ragweed (*Ambrosia artemisiifolia*), giant ragweed (*A. trifida*), big bluestem, Canada anemone, dogbane (*Apocynum spp*.), white heath aster (*Aster pilosus*), white panicle aster (*A. simplex*), yellow rocket, beggarticks, smooth brome (*Bromus inermis*), Japanese brome (*B. japonicas*), bluejoint grass (*Calamagrostis canadensis*), sedge, ox-eye daisy (*Chrysanthemum leucanthemum*), creeping thistle (*Cirsium arvense*), field thistle (*C. discolor*), wild carrot, rosette grass (*Dichanthelium spp.*), fuller's teasel (*D. fullonum*), purple coneflower, barnyard grass (*Echinochloa crusgalli*), bald spikerush (*Eleocharis erythropoda*), Canada wild rye (*Elymus canadensis*), annual fleabane (*Erigeron annuus*), Philadelphia fleabane (*E. Philadelphicus*), daisy fleabane (*E. strigosus*), late boneset (*Eupatorium serotinum*), spurge (*Euphorbia spp.)*, flattop-fragrant goldenrod (*Euthamia graminifolia*), wild strawberry, bedstraw, wild geranium (*Geranium maculatum*), white avens, fowl manna grass, Dudley's rush (*Juncus dudleyi*), inland rush (*J. interior*), grassleaf rush (*J. marginatus*), lettuce (*Lactuca spp*.), whitegrass, prairie blazing star (*Liatris pycnostachya*), great blue lobelia (*Lobelia siphilitica*), horehound, bugleweed (*Lycopus virginicus*), fringed loosestrife (*Lysimachia ciliata*), moneywort, purple loosestrife, black medick, sweet white clover (*Melilotus alba*), wild mint (*Mentha arvensis*), wild bergamot (*Monarda fistulosa*), sensitive fern, common yellow wood sorrel, witchgrass

(*Panicum capillare*), reed canary grass, common reed, common plantain (*Plantago major*), blackseed plantain (P. rugelii), Virginia plantain (*P. virginica*), Canada bluegrass (*Poa compressa*), Kentucky bluegrass (*P. pratensis*), woodland bluegrass (*P. sylvestris*), sulphur cinquefoil (*Potentilla recta*), common cinquefoil, common selfheal, narrowleaf mountain mint (*Pycnanthemum tenuifolium*), pinnate prairie coneflower (*Ratibida pinnata*), currant (*Ribes spp*.), rose (*Rosa spp*.), blackberry, black-eyed susan, rose pink (*Sabatia angularis*), willow, little bluestem (*Schizachyrium scoparium*), dark green bulrush (*Scirpus atrovirens*), nodding bulrush (*S. pendulus*), yellow foxtail, narrowleaf blue-eyed grass (*Sisyrinchium angustifolium*), Canada goldenrod, Indiangrass, dandelion, moth mullein (*Verbascum blattaria*), blue vervain, Baldwin's ironweed (*Vernonia baldwinii*) and violet. This high species diversity is in part due to the ongoing right-of-way mowing which keeps this area in a perpetual state of early succession and also due to its location at the edge of the prairie restoration plantings.

Natural Community Type and Mitigation Ratio

Wetland A is a small, isolated wetland that does not represent a Michigan Natural Community and is not regulated by MDNRE. No compensation ratio for impacts to this wetland is required.

Wetlands B and D are forested wetlands and are similar in composition. These areas each have a high level of disturbance with mostly pioneer and non-native species. The wetlands are coastal, but do not represent a Michigan Natural Community. The compensation ratio for impacts to these wetlands will be 2:1.

Wetland C represents the Great Lakes marsh Michigan Natural Community which is considered rare and imperiled by MNDRE. The compensation ratio for impacts to these wetlands will be 5:1.

Wetland E is shown represented on the map in two distinct parts, one more northerly (E-North) and one more southerly (E-South). The E-North portion is an emergent marsh/wet meadow that does not represent a Michigan Natural Community and the E-South portion could be either a southern shrub carr or other coastal wetland type. The compensation ratio for impacts to both of these wetlands will be 2:1.

2.7.2.2.5 Areas H and U, South Canal and Wetland KK (Figure 2.7-6)

Description, Condition, Functions and Values

Three waterbodies, referred to as H, U and the South Canal, receive stormwater from onsite surface runoff. Area H is a 1.86-acre open water area along the southeast side of Doxy Road. Area U is a 3.32-acre linear open water area north of Area H and also along the southeast side of Doxy Road. The South Canal is a 1.97-acre PEM linear wetland. Connected to the South Canal adjacent to the west is Wetland KK, a linear 1.62 acres of low quality PFO wetland. These areas are shown on Figure 2.7-6.

Areas H and U are created open water areas with no submerged or floating vegetation. The edges are steep, rocky slopes with a 1 to 2-foot band of sparse vegetation dominated by common reed. Other species observed include purple loosestrife, silky dogwood, and riverbank grape. These areas are

immediately adjacent to parking areas, utility infrastructure, access roads and receive significant human disturbance.

The South Canal/linear wetland is a PEM with typical marsh zonation from open water with submerged and floating vegetation to 10-12 feet of weak-stemmed and robust emergent vegetation along the edges ending in shrub and sapling borders. The width of the emergent vegetation thickens toward the middle and north end of the linear wetland. Vegetation is diverse and includes pondweed, common waterweed, bladderwort, coontail, duckweed (*Lemna spp.*), common reed, arrowhead, American bur-reed, silky dogwood, riverbank grape and American lotus at the southern end near Fermi Drive. The South Canal functions primarily as habitat for fish and wildlife species with connectivity via culvert to two large PEM wetlands (Wetland M and C).

Wetland KK is a highly disturbed, early successional wetland with an open canopy dominated by pioneer and invasive species such as Eastern cottonwood, reed canary grass, blackberry and common reed. Several trees were damaged in a recent storm (June 2010) and downed trees and woodchips from clean-up efforts litter the understory.

Open water areas H and U provide minimal floodflow alteration, sediment/toxicant retention and nutrient removal functions but little, if any, wildlife habitat. Functions provided primarily by the South Canal and to a lesser degree Wetland KK include floodflow alteration, sediment/toxicant retention, nutrient removal, biodiversity and wildlife habitat.

Natural Community Type and Mitigation Ratio

The South Canal, to the east of and adjacent to wetland KK, is connected to Wetland M and Lake Erie. The area is shallow enough to support vegetation zones typical of Great Lakes marsh communities including submerged aquatic, floating-leaved, weak-stemmed and robust emergent vegetation. The Great Lakes marsh Michigan Natural Community is considered rare and imperiled by MNDRE. The compensation ratio for impacts to these wetlands will be 5:1.

The wetland edge along H and U is narrow, steep and dominated by invasive species. The compensation ratio for impacts to wetland edge in H and U will be 1.5:1. The open water areas of H and U are not considered wetland and there is no mitigation proposed for any impacts to these areas.

Wetland KK is a highly disturbed, early successional forested wetland that, while connected to the coastal system, is not a natural community. The compensation ratio for impacts to this wetland will be 2:1.

2.7.2.2.6 Wetland I and F (Figure 2.7-7)

Description, Condition, Functions and Values

Wetland I is a 39.74-acre PFO wetland on the northwest perimeter of the Fermi site immediately east of Bullit Road. Wetland F is a 31.07-acre PFO wetland also on the northwest perimeter of the Fermi site immediately east of Bullit Road and separated from Wetland I by PEM Wetland C (Figure 2.7-7).

Wetland I grades into PEM Wetland C to the west, north and south. Wetland F grades into PEM Wetland C to the east, Wetlands C and E to the south and Wetland A and upland prairie to the west. Vegetation in these two wetlands is diverse, reflecting mixed upland and wetland conditions with hydrological fluctuations and evidence of past disturbance including ditching and soil piles. Species include silver maple, green ash, American elm, hop hornbeam (*Ostrya virginiana*), silky dogwood, rough-leaved dogwood, downy hawthorne (*Crataegus mollis*), honey locust (*Gleditsia triacanthos*), Virginia creeper, poison ivy, riverbank grape, Canadian honeywort (*Cerinthe spp*.), wild carrot, bottle brush grass (*Elymus hystrix*), Virginia wild rye (*E. virginicus*), false nettle, moneywort, sedge, creeping thistle, enchanter's nightshade, swamp agrimony, beggarticks, garlic mustard, giant ragweed (*Ambrosia trifida),* American hogpeanut (*Amphicarpaea bracteata*), heath aster (*A. ericoides*), Spanish needles (*Bidens bipinnata*), bedstraw (*Galium spp*.), wild geranium, white avens, fowl manna grass, Virginia stickseed (*Hackelia virginiana*), prince's feather (*Polygonum orientale*), whitegrass, reed canary grass, common yellow wood sorrel, clearweed, common reed, common plantain (*Plantago major*), Virginia waterleaf (*Hydrophyllum virginianum*), touch-me-not, climbing false buckwheat (*Polygonum scandens*), white vervain (*Verbena urticifolia*), jumpseed (*Polygonum virginianum*), buckthorn, rose, multiflora rose, blackberry, snakeroot (*Sanicula spp.*), stinging nettle, and violet. The species with the greatest cover were silver maple, reed canary grass, jumpseed, moneywort, poison ivy and whitegrass.

Wetlands I and F represent intact PFO wetland habitat. The wetlands are large, flat and have significant storage potential with dense vegetation and slow water flow. There is some diversity in structure and cover ranging from a disturbed, partially open canopy at the edges to a closed canopy interior with a predominance of native vegetation. These wetlands are indirectly connected to Lake Erie and provide floodflow alteration, sediment/toxicant retention, nutrient removal and wildlife habitat functions. The northern edge of Wetlands I and F exhibit vegetation communities and conditions that reflect a high degree of disturbance including invasive species and altered hydrology associated with the adjacent roadway and other human activities. This edge provides a buffer for the interior and less disturbed wetland.

Natural Community Type and Mitigation Ratio

Wetlands I and F represent relatively intact, coastal wetlands with vegetation communities typical of southern hardwood swamps. Southern hardwood swamp is a Michigan Natural Community that is considered rare and imperiled by MDNRE and the compensation ratio for any impacts will be 5:1.

2.7.2.2.8 Wetland W (Figure 2.7-8)

Description, Condition, Functions and Values

Wetland W is a 4.59-acre PEM wetland in the southeast corner of the Fermi site and adjacent and to the west of Wetland X and the Quarry Lakes, east of Critical Path and north of the Nuclear Training Center (Figure 2.7-8).

Wetland W is disturbed and dominated by low species diversity with well-established invasive species populations including common reed and reed canary grass. Wetland W is isolated from other wetlands and provides minimal floodflow alteration, sediment/toxicant retention, nutrient removal and marginal wildlife habitat.

Natural Community Type and Mitigation Ratio

Wetland W is a disturbed PEM wetland and does not represent a Michigan Natural Community. The compensation ratio for impacts to this wetland will be 2:1.

2.7.3 Streams

An intermittent unnamed stream is located offsite and northwest of the Fermi site (Figure 2.2-1). The intermittent stream is part of an agricultural drainage system. The intermittent stream enters the Fermi site via a culvert under Toll Road and connects with Wetland C. Wetland C is a large PEM wetland located north of Fermi Drive extending north along the west side of Doxy Road and to the northwest boundary of the Fermi site. It is isolated from Lake Erie by access roads but is connected hydrologically through culverts. There is not continuous flow from Wetland C.

2.8 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 associated with 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 in the northern portion of the Ottawa-Stony watershed (OSW), U.S. Geological Survey (USGS) Cataloging Unit and Hydrologic Unit Code (HUC): 04100001. The OSW drains areas to the north and west of Lake Erie and flows directly into the lake (Figure 2.8-1). The Fermi site and the proposed offsite mitigation area are in the lowest reaches of the OSW in the coastal zone of Western Lake Erie in Monroe County (Figure 2.8-2).

The northern portion of the OSW has a drainage basin of approximately 183,000 acres and is dominated by agriculture (55%). Approximately 25% of the OSW land area is in natural cover and approximately 20% is developed (Figure 2.8-1).

As described in NRC RAI TE4.3.1-6, the coastal management zone as defined by MDNRE's Coastal Zone Boundary Maps in Monroe County, Michigan includes 24,514.37 acres of palustrine and lacustrine wetlands and waters. To specifically evaluate natural resources on the Fermi site from a watershed perspective, the coastal management zone was clipped to the shoreline to include palustrine and upland communities within the coastal management zone and exclude all but a tiny fraction of lacustrine habitat along the shoreline. This refines the analysis of community types to those potentially impacted by any proposed activity at the Fermi site. Clipped to the shoreline, the coastal zone of Western Lake Erie in Monroe County (CZM) encompasses approximately 18,700 acres with an almost even division of natural lands (38%), developed lands (38%) and agriculture (24%, Figure 2.8-2).

Since 1970 efforts have been made to protect and restore coastal habitats along the Detroit River and Western Lake Erie. Currently protected lands for conservation and recreation make up approximately 36% of the CZM. This is a dramatic shift in the Detroit River and Western Lake Erie area and is considered one of the most impressive recoveries of habitat in North America. Much of these protected areas are part of the MDNRE management areas and Detroit River International Wildlife Refuge.

Palustrine wetlands comprise 6% of the OSW and 43% of the CZM. The Federal National Wetland Inventory (NWI; Reference 19) was used for Monroe County which covers the entire CZM analysis area and part of OSW. An updated NWI produced by Ducks Unlimited for Wayne (Reference 20) and Washtenaw (Reference 21) Counties was used to provide updated coverage for the remainder of the OSW.

Wetland types vary between the OSW and 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%). In contrast, the CZM has equal proportions of vegetated and non-vegetated wetlands. Emergent wetlands are the dominant type, comprising 71% of the vegetated wetlands with the remaining wetlands being forested (17%) or 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 NRCS (Reference 22)] 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. Historically, approximately 45% of the land area of the OSW was wetland (Figure 2.8-3). Based on the most recent wetland maps, 6% of the OSW is currently wetland which represents a loss of 86% of wetlands formerly part of the OSW. Historically, 77% of the land area

of the CZM was wetland (Figure 2.8-4). Based on the most recent wetland maps, 43% of the CZM is wetland which constitutes a 44% loss of wetlands in the CZM.

Stream condition in the OSW was evaluated by determining the proportion of waterways that are ditches and the percent of land adjacent to streams that serves as riparian buffer. The waterways in the OSW were characterized using the National Hydrologic Dataset (Reference 23). There are 617 miles of mapped waterways in the OSW. Artificial waterways (canals/ditches) comprise 80% (491 miles) of the total length while streams and rivers comprise 20% of the total length (Figure 2.8-5). Coastal regions typically have extensive ditch networks to drain wetlands primarily for agriculture. Ditches include both natural streams that have been channelized and created ditches through uplands and wetlands. Both types of ditches expedite the flow of water off the land into larger streams and rivers, and ultimately into Lake Erie. In addition to the high percentage of artificial waterways in the surrounding watershed, there is also a high percentage of waterways that lack natural buffers. This was determined by examining the NRCS land use classification (Reference 22) within 150 feet of streams that are mapped on the National Hydrography Dataset layer. The width of buffer that is needed to perform various functions (i.e., pollutant removal, habitat) is highly variable depending on which function is priority and local factors such as soils, topography, types of pollutant, species of interest, and water flow paths. For the purpose of this assessment, a buffer of 150 feet was used to evaluate current conditions and determine general conservation priorities.

Based on natural resource assessments conducted at the Fermi site and trends within the OSW and CZM, the following wetland-based conservation priorities were identified for the Fermi 3 project:

- Protect and enhance existing high quality wetlands especially those that are directly connected to Lake Erie in the CZM and/or part of a larger wetland complex.
- 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.
- Restore and enhance wetlands in the CZM to provide wildlife habitat and protect water quality in Lake Erie.
- Restore wetlands and stream buffers in the OSW to re-establish large wetland complexes and riparian connections.

2.9 Historic Properties and Archaeological Resources

Surveys of cultural resources (above-ground and archaeological) were conducted from November 2007 to October 2009 to identify historic resources in and near the Fermi 3 project area and to assess possible Fermi 3 impacts to these resources. Additionally, preliminary investigations were conducted along the

transmission line route from the Fermi 3 project area to the Milan substation in Washtenaw County to identify previously recorded historic resources. The cultural resources investigations for the Fermi 3 project were carried out pursuant to Section 106 of the National Historic Preservation Act (NHPA), as amended (P.L. 89-665, October 15, 1966; 16 U.S.C. 470) and its implementing regulations (36 CFR 800), which require federal agencies to take into account their activities on historic resources that may be impacted as a result of project activities.

The area of potential effect (APE) is defined as "…the geographic area within which an undertaking may directly or indirectly cause changes in the character or use of historic properties, if any such properties exist" (36 CFR 800.16(d)). In consultation with the State Historic Preservation Office (SHPO), two APEs were delineated for the Fermi 3 project, one for archaeological resources and one for above-ground resources. The APE for archaeological resources encompasses approximately 549 acres, including the construction impact areas. The APE included a series of interconnected roadway grades (60 acres), a stone quarry (48 acres), two spoil disposal zones (11 acres and 12 acres), two previously affected Fermi site locations -- a 37-acre tract and a 172-acre tract -- and a 53-acre tract on the northwest margin of the site. It also included a tentative access road for the meteorological tower site from Pointe Aux Peaux Road. At the determination of the Michigan SHPO, the survey for above-ground resources included an area encompassing the Fermi site and the communities of Estral Beach, Stony Point, and Woodland Beach.

The Fermi 3 site contains no above-ground resources that are listed in the National Register of Historic Places (NRHP) or that have been determined eligible for listing in the NRHP. Fermi 1 has been evaluated and recommended for listing on the NRHP, pending review by the SHPO. It is anticipated that any necessary mitigation will involve archiving Fermi 1 information and not restrict dismantlement following termination of the Fermi 1 license.

The archaeological survey resulted in the identification of seven archaeological sites (four prehistoric, two historic, and one multi-component [prehistoric/historic]) within the Fermi site and vicinity. However, only two sites are within the Fermi 3 site. The five other sites are not on Detroit Edison-owned property. None of these sites is recommended eligible for listing on the NRHP.

The natural ground at the Fermi 3 project site generally consists of poorly drained clay loams that are partially inundated or saturated with runoff from the higher ground to the west or from overflow from high water episodes of Lake Erie on the east. This low-lying, marshy environment reduces the overall potential for archaeological sites to be located within the Fermi 3 project area.

Preliminary investigations of the transmission line route from the Sumpter-Post Road junction to the Milan substation, owned by ITC*Transmission*, indicate a moderate to high potential for encountering archaeological resources. The preliminary field view of the built environment along the transmission line route revealed few above-ground resources that meet the minimum age requirement or retain sufficient

integrity for listing on the NRHP. Any further investigations would be conducted by ITC*Transmission* in accordance with applicable regulatory requirements.

A Submerged Site Sensitivity Study (Study) was conducted in 2009 to assess the Fermi 3 project's potential to impact underwater resources within the vicinity of the Fermi site. The Study consisted of identifying previously reported submerged sites and maritime-related resources within the vicinity of the dredging/outfall activity area and developing a predictive model to determine the likelihood of the area to contain cultural resources. The Study did not involve conducting a survey for underwater resources.

The Study included a review of all recorded resources within 3 miles of the Fermi 3 project because of the dynamic nature of the submerged sites and the absence of precise location information for submerged sites. The Study recommended that the Fermi site and vicinity be considered as having a moderate to high sensitivity for containing previously unidentified maritime resources, based on the proximity of known submerged resources in the vicinity, the lack of research on submerged sites within the area, and the shallow-water environment of the project area.

The Study included a search of the files maintained by the Michigan Office of the State Archaeologist (OSA). A review of the Michigan OSA files indicated one previously recorded archaeological site (20MR702) on the Lake Erie shoreline of the existing Fermi site. This site is listed as a prehistoric site of unknown cultural period, and it has not been evaluated for possible listing in the NRHP. No evidence of this site was found during the Fermi 3 archaeological survey conducted between 2007 and 2009.

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Table 2.7-1. Wetland Impacts and Attributes Summary Table (Sheet 1 of 3)

ID	Type	Size (acres)	Jurisdiction	Condition/Primary Function	Guidance Mitigation Ratio
A	PEM wet meadow wetland, located on the north side of Fermi Drive in between restored prairie grass habitat to the east and west, south of upland and Wetland F	1.88	--	Low / Floodflow alteration, sediment, toxicant retention, nutrient removal and wildlife habitat	0:0
B	PFO located along the ditch adjacent to railway and the north edge of Fermi Drive near Wetlands E and C	0.76	MDNRE/USACE	Low / Floodflow alteration, sediment, toxicant retention, nutrient removal and wildlife habitat	2:1
C	PEM Great Lakes Marsh, fragmented from Lake Erie by access roads , but connected hydrologically through culverts	48.18	MDNRE/USACE	Medium (high ecological value) / Floodflow alteration, sediment, toxicant retention, nutrient removal and wildlife habitat	5:1
D	PFO partially open canopy, located north of Fermi Drive, west of Doxy Road and surrounded by Wetlands C and E	1.37	MDNRE/USACE	Medium / Floodflow alteration, sediment, toxicant retention, nutrient removal and wildlife habitat	2:1
E-North	North: PSS emergent marsh/wet meadow, located north of Fermi Drive in power line right-of-ways with two sections split by Wetland D, bordered to the north by restored prairie grassland habitat	2.67	MDNRE/USACE	Medium / Floodflow alteration, sediment, toxicant retention, nutrient removal and wildlife habitat for both portions of E	2.1
E-South	South: PSS southern shrub carr or other coastal wetland type	2.04			
F	PFO southern hardwood swamp, relatively intact, located immediately east of Bullit Road and separated from Wetland I by PEM Wetland C	31.07	MDNRE/USACE	Medium (high ecological value) / Floodflow alteration, sediment, toxicant retention, nutrient removal and wildlife habitat	5:1
H	PEM edge around a created open water pit located along the southeast side of Doxy Road	0.10	MDNRE	Low / Minimal floodflow alteration, sediment/toxicant retention and nutrient removal	1.5:1

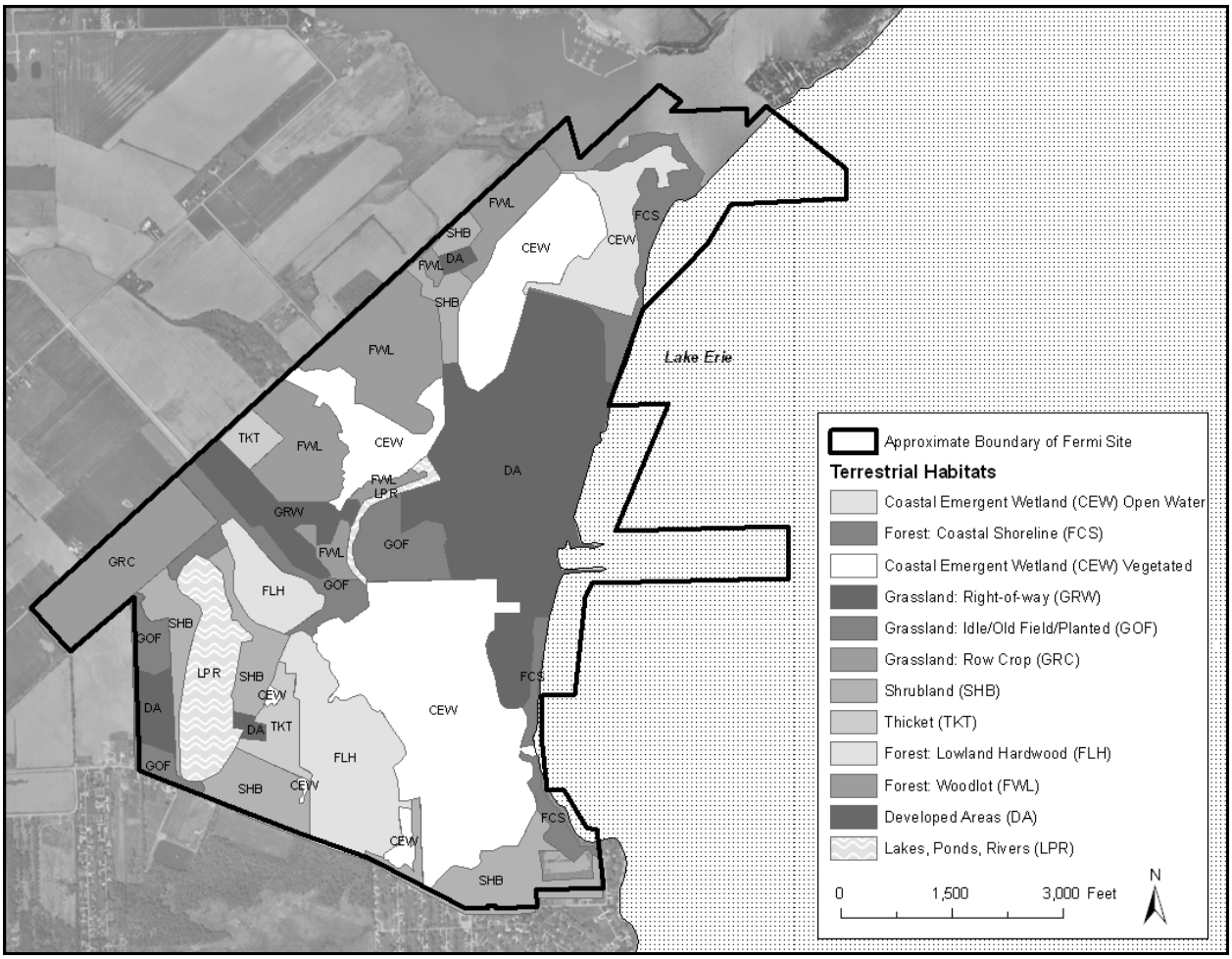
Table 2.7-1. Wetland Impacts and Attributes Summary Table (Sheet 2 of 3)

ID	Type	Size (acres)	Jurisdiction	Condition/Primary Function	Guidance Mitigation Ratio
I	PFO southern hardwood swamp, relatively intact, indirectly connected to Lake Erie, located on the northwest perimeter of the site, east of Bullit Road, provides a buffer for the interior and less disturbed wetland	39.74	MDNRE/USACE	Medium (high ecological value) / Floodflow alteration, sediment, toxicant retention, nutrient removal and wildlife habitat	5:1
L	PFO southern hardwood swamp, large and intact located on the east side of Quarry Lake Road and the north side of Acorn Road	63.12	MDNRE/USACE	High / Floodflow alteration, sediment, toxicant retention, nutrient removal and wildlife habitat	5:1
M	PEM Great Lakes marsh, directly connected to Lake Erie to the east and includes an expanse of open water with submerged and floating aquatic vegetation surrounded by zones of weak-stemmed and robust emergent vegetation eventually grading into a shrubby edge that becomes Wetland L	161.65	MDNRE/USACE	High / Floodflow alteration, sediment, toxicant retention, nutrient removal and wildlife habitat	5:1
O	PFO fragmented early-mid successional with mixed vegetation located west of Wetland N (dredged spoils basin) separated by an access road and east of a narrow beach ridge along Lake Erie	0.72	MDNRE/USACE	Low / Marginal wildlife habitat for edge species and limited water storage	2:1
R	PEM separated from Wetland M by manmade berm and highly disturbed, located southwest of Long Road	1.97	MDNRE/USACE	Low / Floodflow alteration, sediment, toxicant retention, nutrient removal and low quality wildlife habitat and buffer	2:1
T	PFO separated from Wetland M by manmade berms, highly disturbed, located southwest of Long Road	5.71	MDNRE/USACE	Low / Floodflow alteration, sediment, toxicant retention, nutrient removal and low quality wildlife habitat and buffer	2:1
U	PEM edge around a created open water canal located along the east side of Doxy Road	0.15	MDNRE/USACE	Low / Minimal floodflow alteration, sediment/toxicant retention and nutrient removal	1.5:1
Y	PFO fragmented early successional with mixed vegetation and a partially open canopy located between Quarry Lakes and Quarry Lake Road, south of Gator Road	1.14	MDNRE	Low / Marginal wildlife habitat for edge species and limited water storage	2:1

Table 2.7-1. Wetland Impacts and Attributes Summary Table (Sheet 3 of 3)

ID	Type	Size (acres)	Jurisdiction	Condition/Primary Function	Guidance Mitigation Ratio
AA	PEM established spoil area, located NE of Fox Road and south of Wetland L	0.80	MDNRE/USACE	Low / Minimal floodflow alteration, sediment/toxicant retention and nutrient removal	2:1
BB/EE/ FF	PFO southern hardwood swamp, intact with relatively high diversity, fragmented from other wetlands by multiple roads and developed/agricultural areas, EE and FF represent a PEM/mixed edge of the BB/EE/FF wetland area	12.97 (BB 11.80, EE 0.77, FF 0.39)	MDNRE/USACE	High / Wildlife habitat, marginal floodflow alteration, sediment, toxicant retention, and nutrient removal	5:1
II	PEM ditch southwest of Wetland AA and along the south side of Fox Road, contains vegetation communities with high structural diversity and low species diversity with well-established invasive species populations	0.52	MDNRE	Low / Minimal floodflow alteration, sediment/toxicant retention and nutrient removal	1.5:1
JJ	PSS established spoil area, ditch on the north side of Acorn Road and the east side of Quarry Lake Road	1.37	MDNRE	Low / Minimal floodflow alteration, sediment/toxicant retention and nutrient removal	1.5:1
KK	PFO linear wetland, connected to the South Canal adjacent to the west	1.62	MDNRE/USACE	Low / Floodflow alteration, sediment/toxicant retention, nutrient removal, marginal wildlife habitat for edge species	2:1
South Canal	PEM Great Lakes Marsh hydrologically connected to Lake Erie, located north of Fermi Drive, west of Doxy Road and Wetland KK	1.97	MDNRE/USACE	Medium / Fish and wildlife habitat, floodflow alteration, sediment, toxicant retention and nutrient removal	5:1

Figure 2.1-1 Land Uses on the Fermi Site



Source: Reference 1

Figure 2.2-1. Topography of the Fermi Site

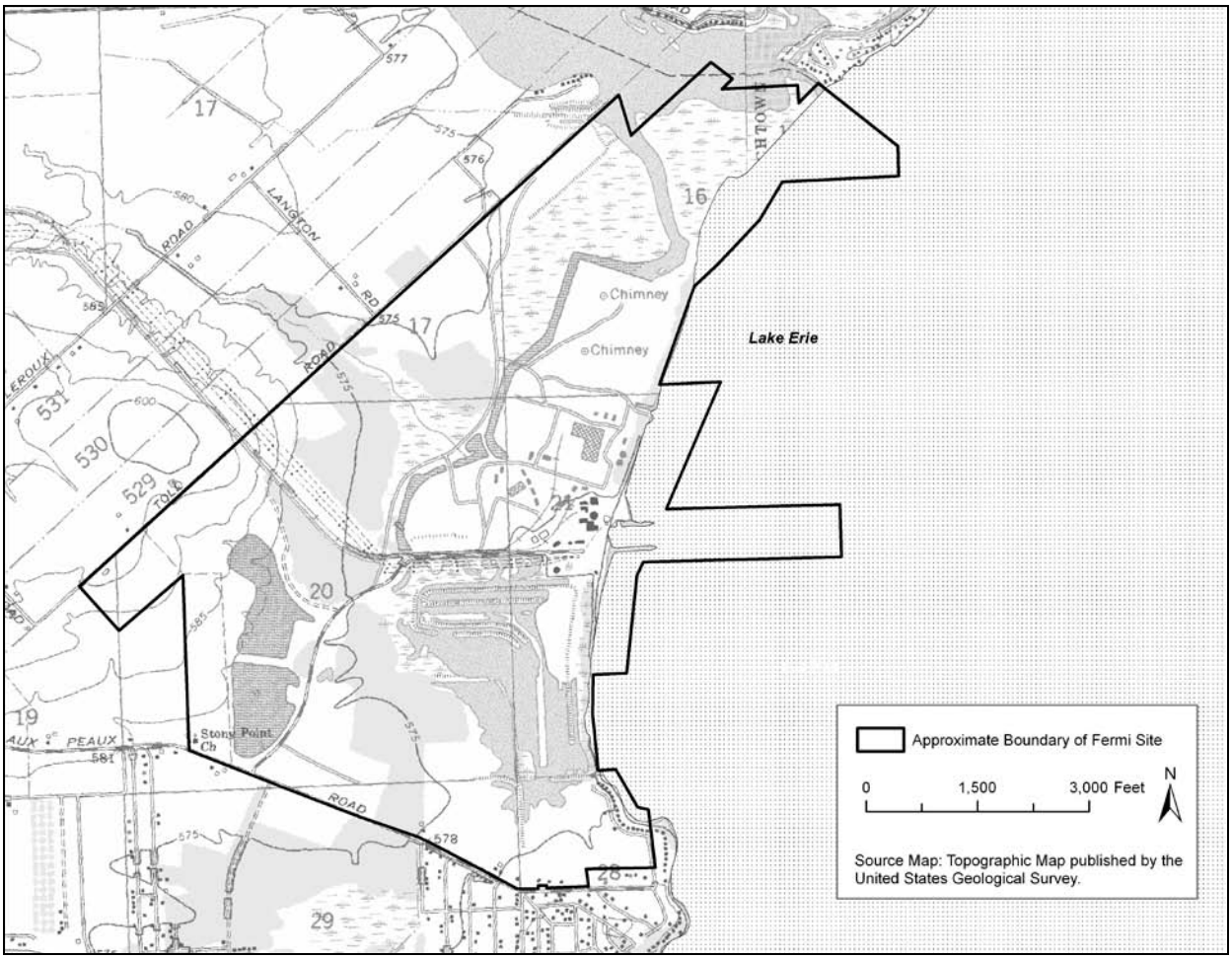
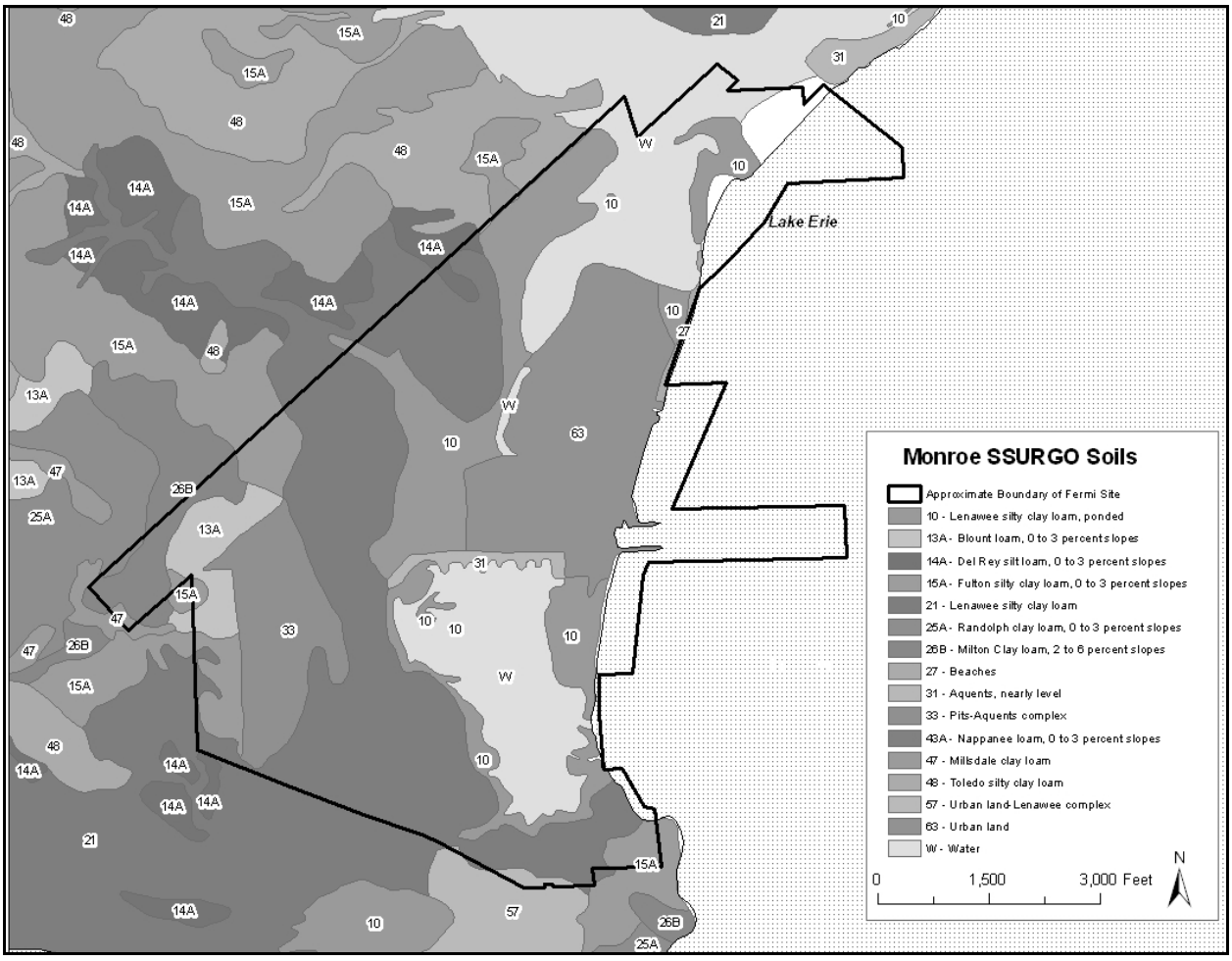


Figure 2.3-1. Soil Types on the Fermi Site



Source: Reference 24

Figure 2.4-1. Observed Locations of American Lotus on the Fermi Site

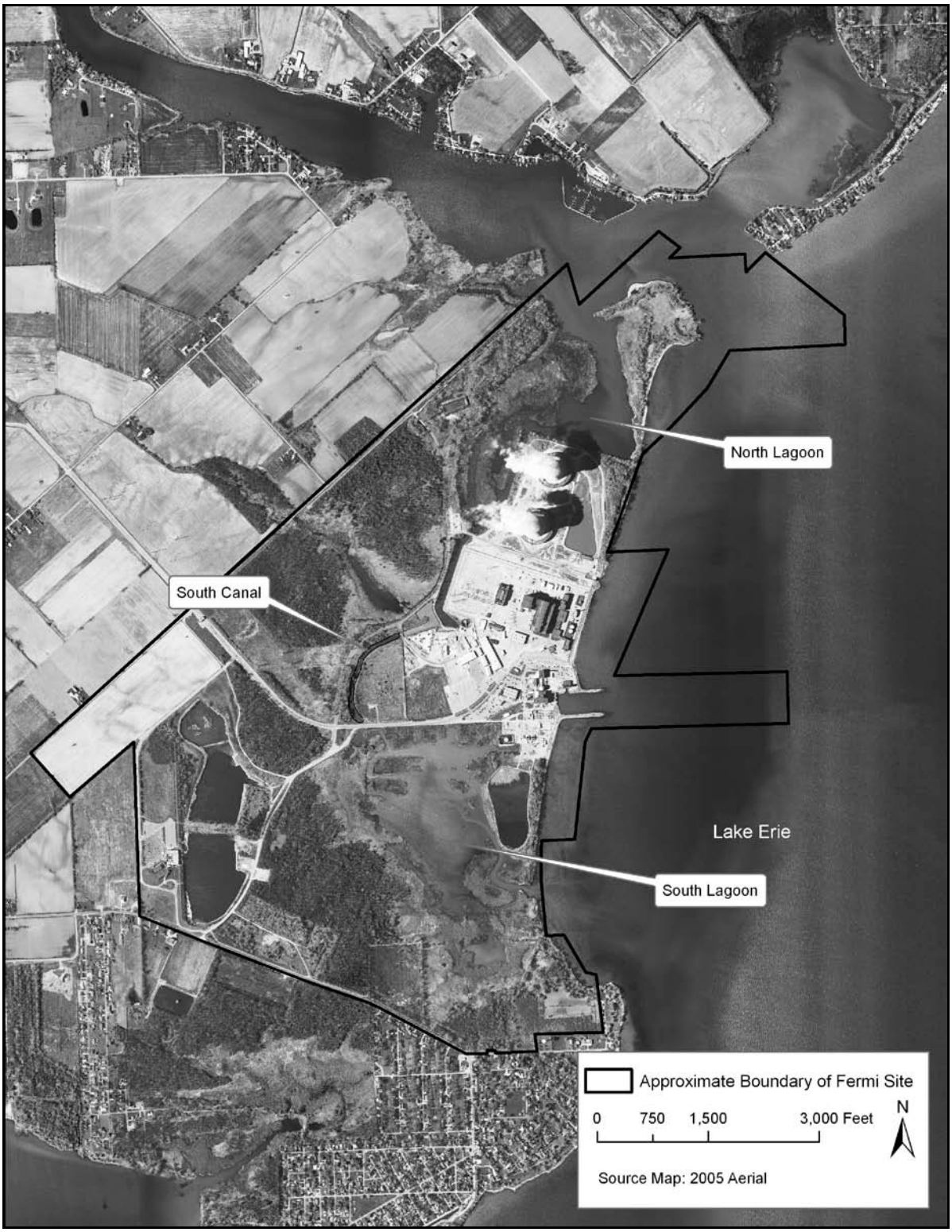


Figure 2.5-1. Boundaries of the Detroit River International Wildlife Refuge, Laguna Beach Unit, Monroe County, MI

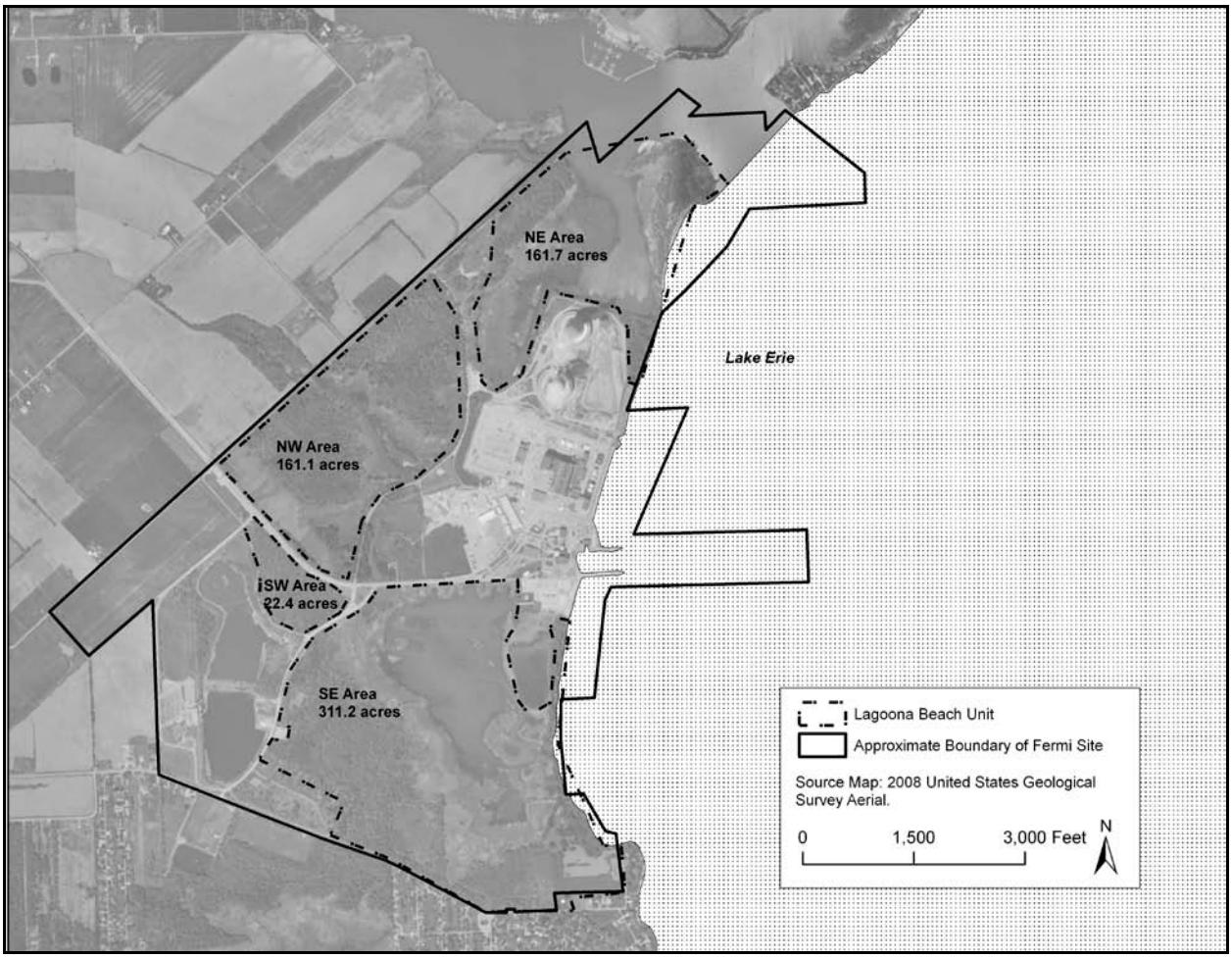


Figure 2.5-2. Aquatic Ecology Survey Sample Locations

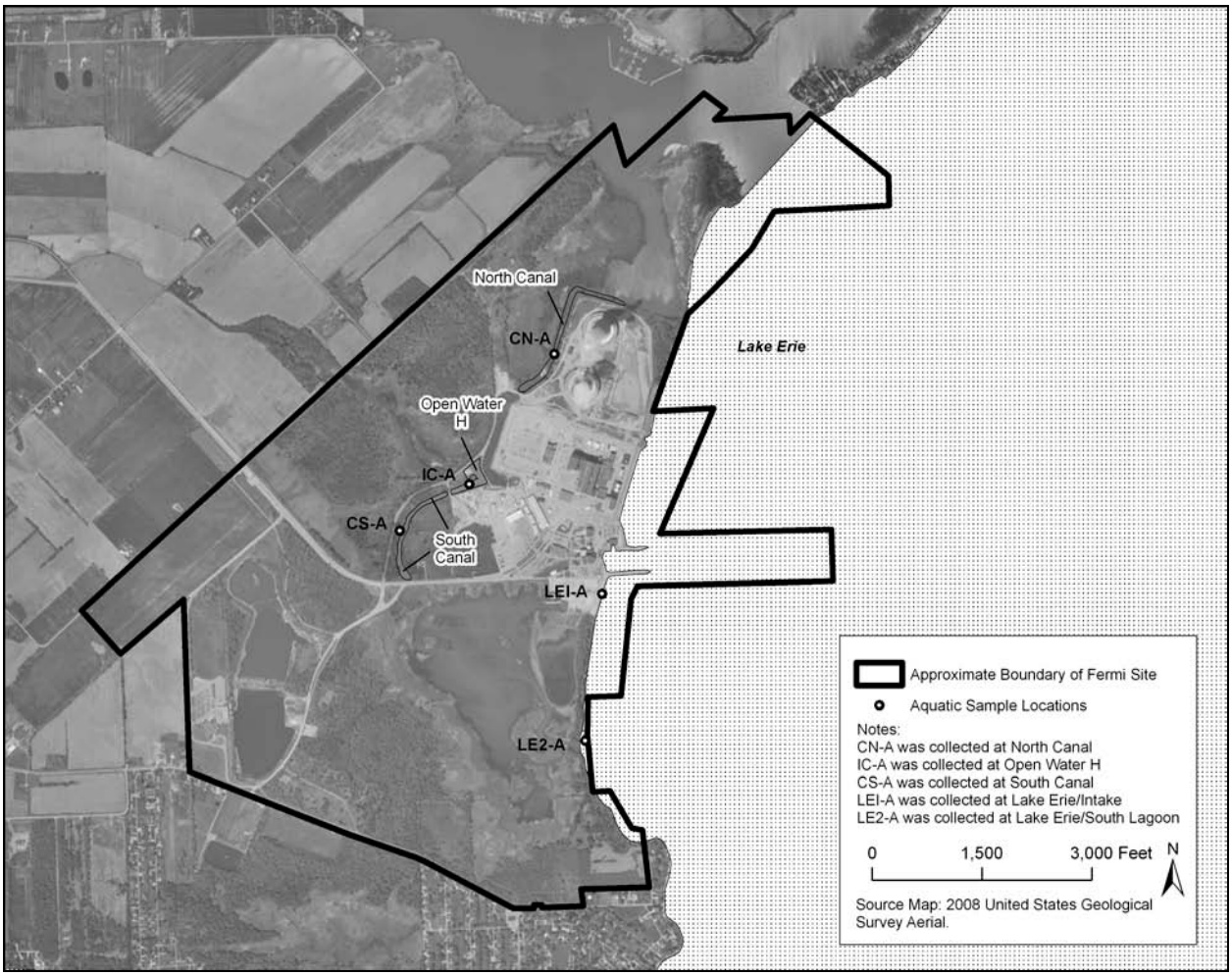


Figure 2.6-1. Existing Culvert Locations

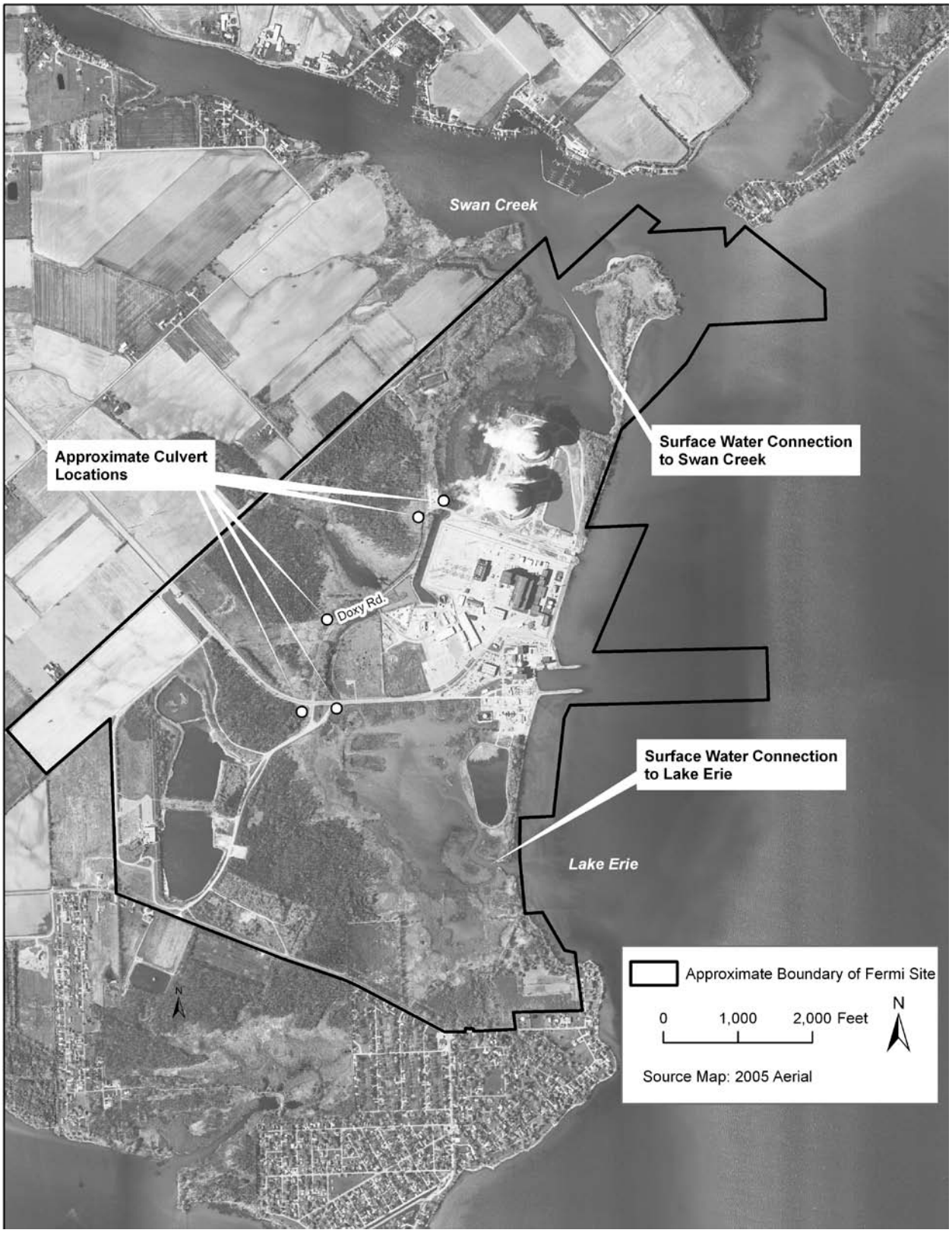


Figure 2.6-2. Aerial Photograph of the Fermi Site Taken in 1981

Figure 2.6-3 Fermi 3 Paired Hydrographs

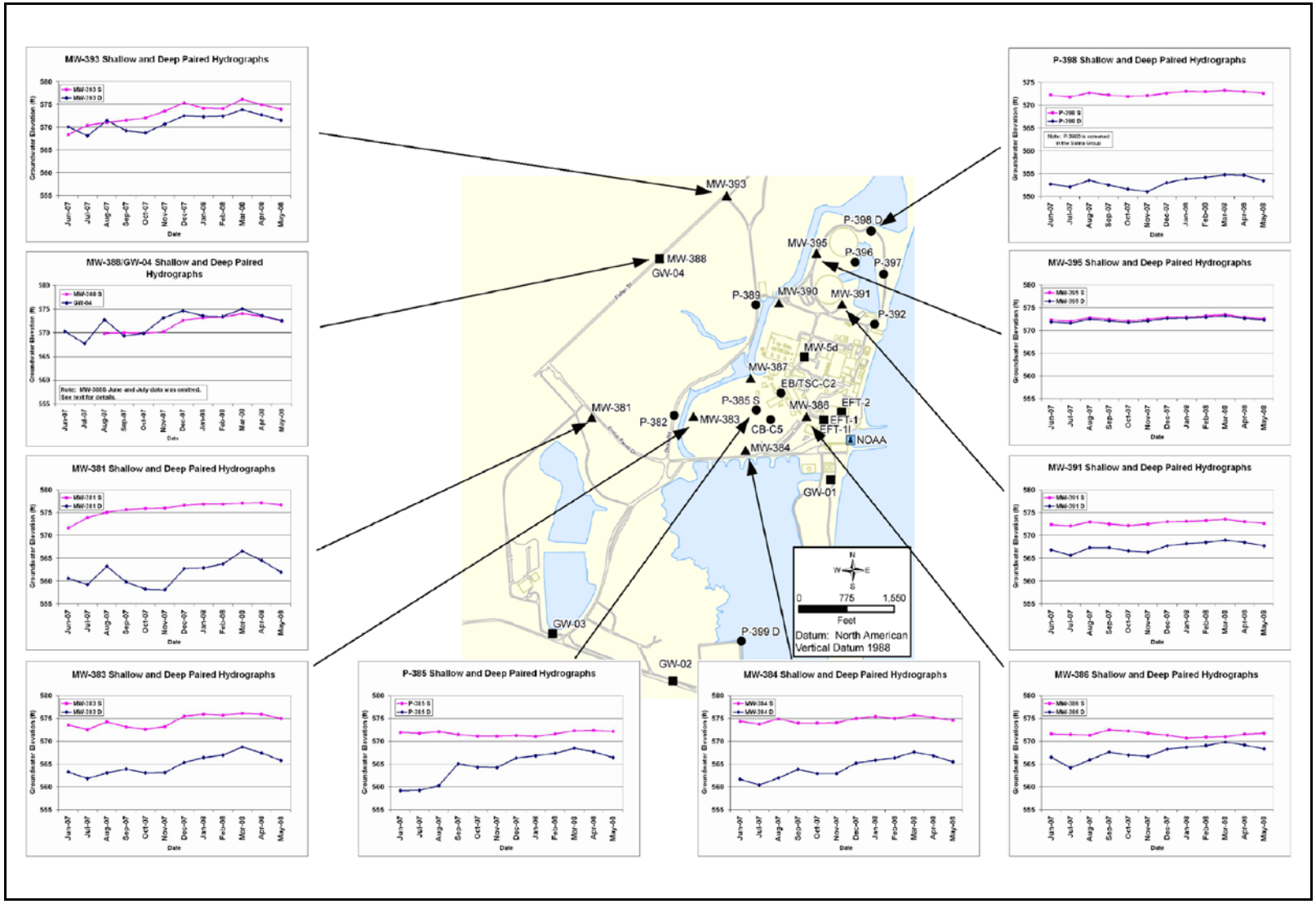


Figure 2.7-1. Fermi Site Wetlands Delineation

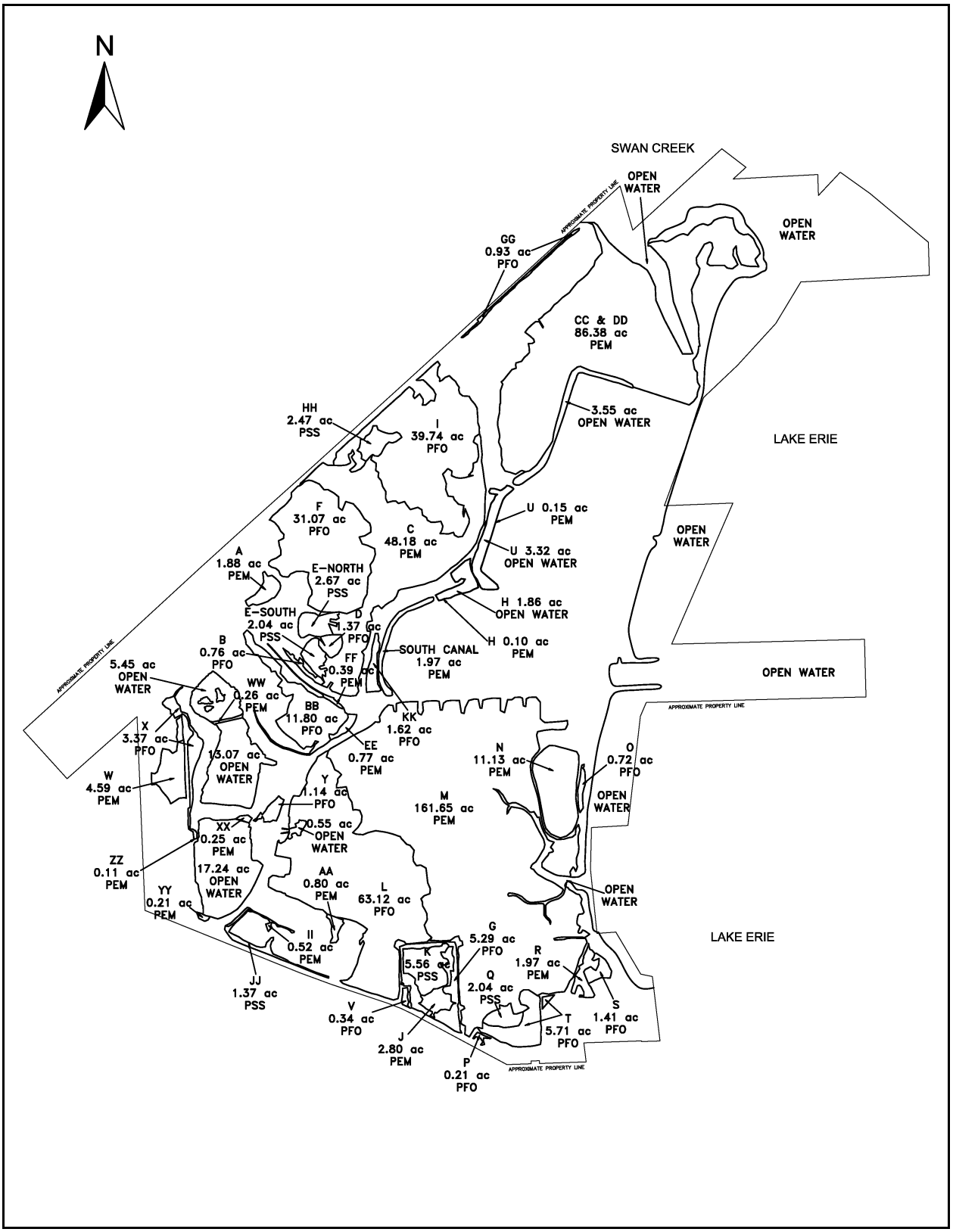


Figure 2.7-2. Wetlands AA, II, and JJ

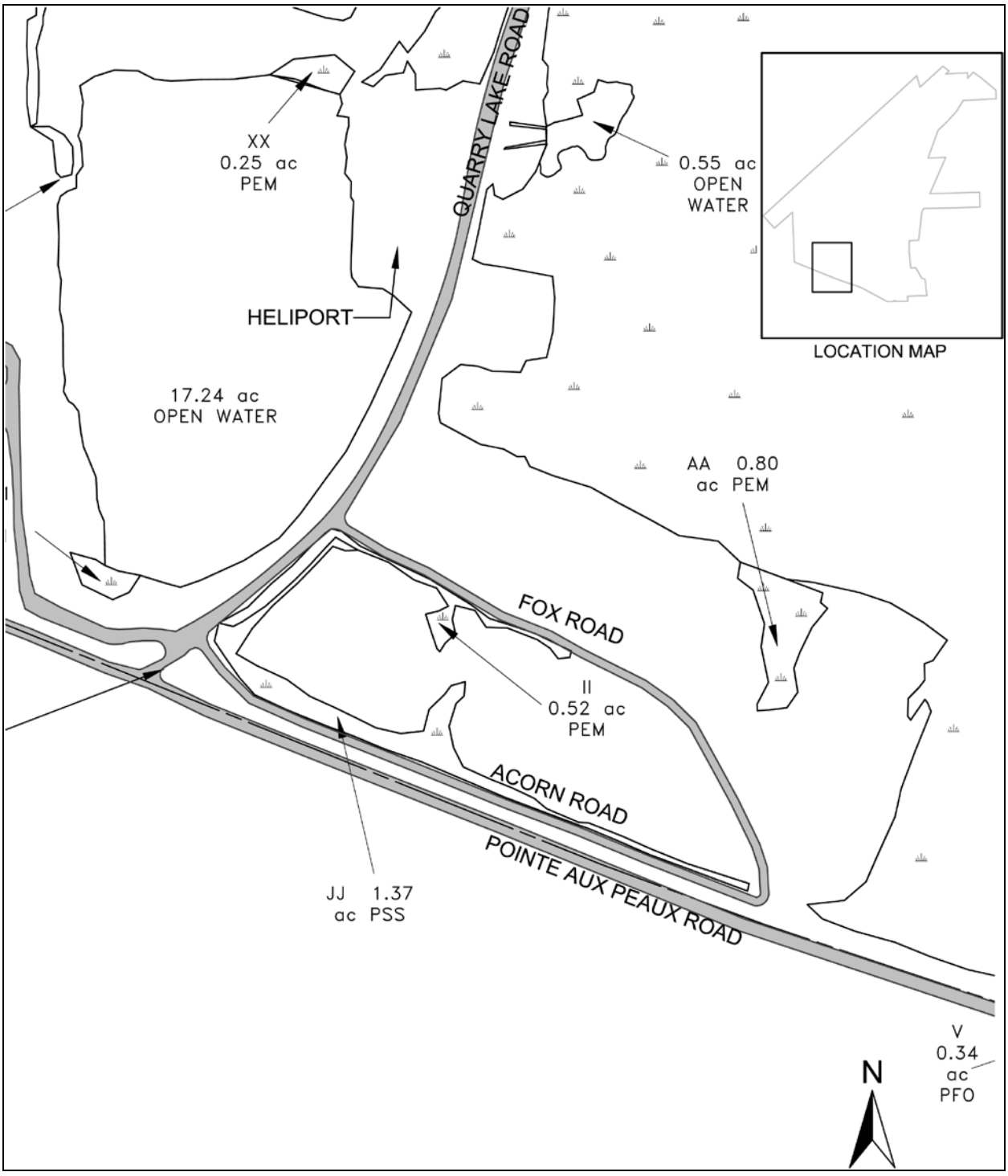


Figure 2.7-3. Wetlands L, M, Y, R and T

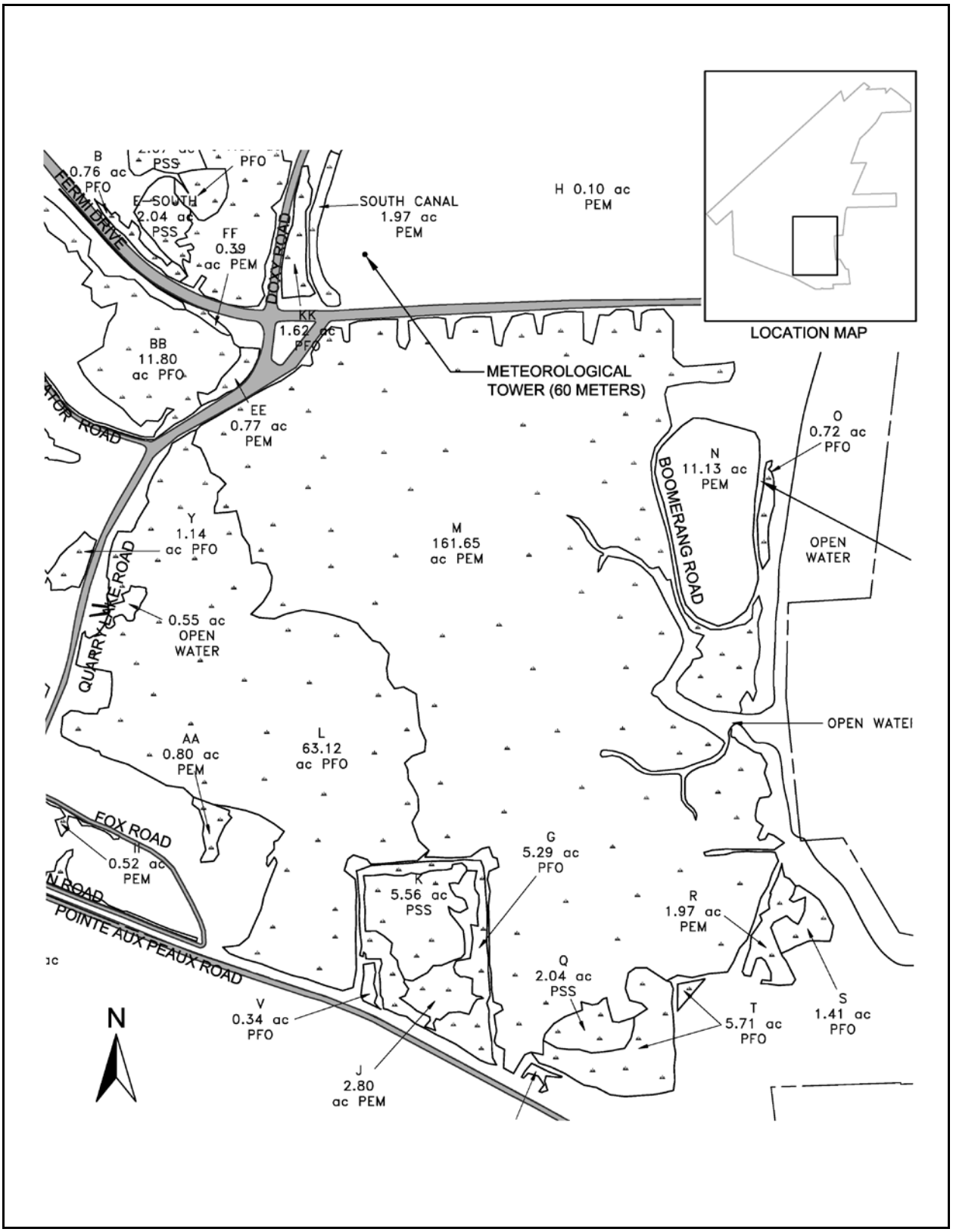


Figure 2.7-4. Wetlands BB, EE, and FF

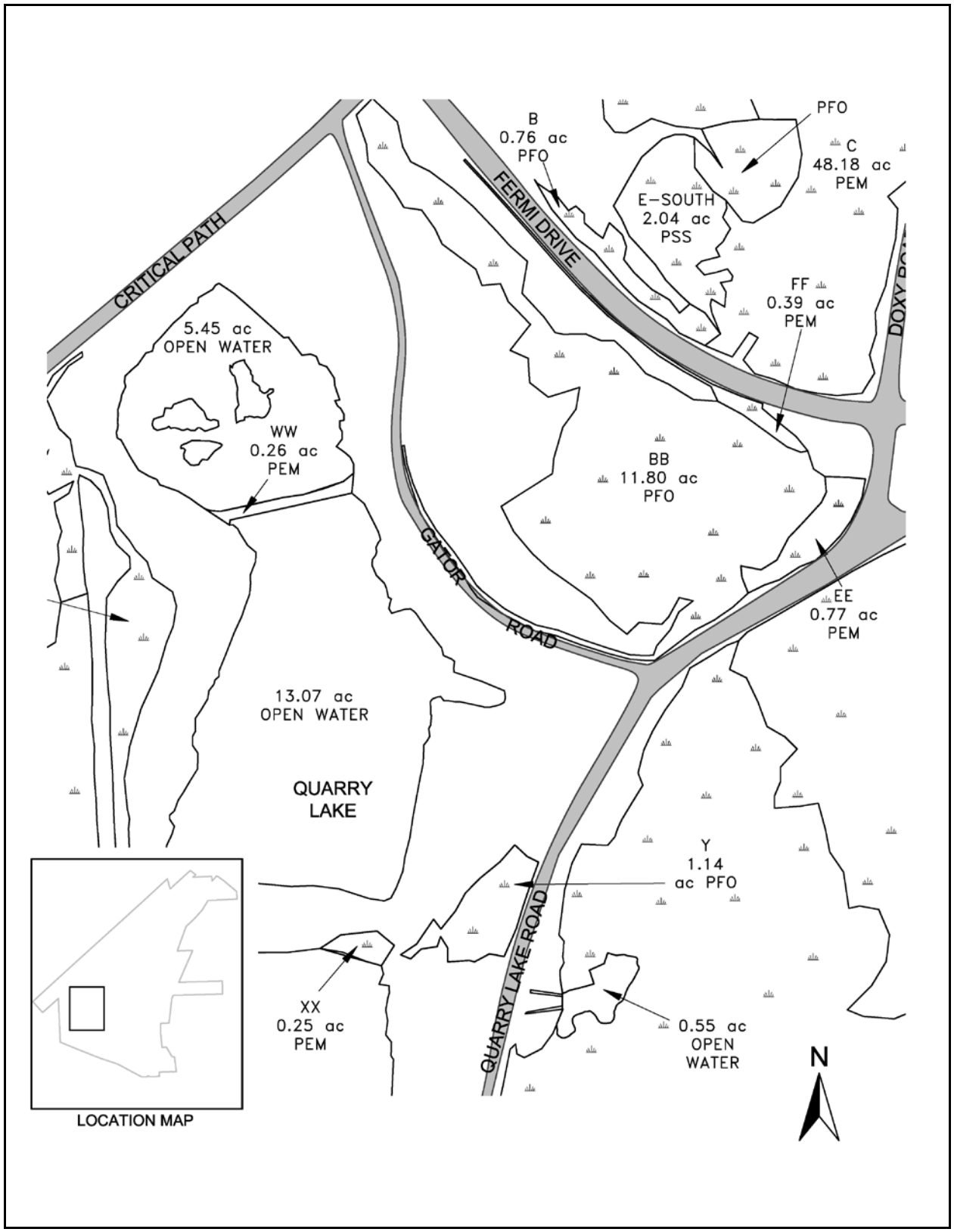


Figure 2.7-5. Wetlands A, B, C, D, and E

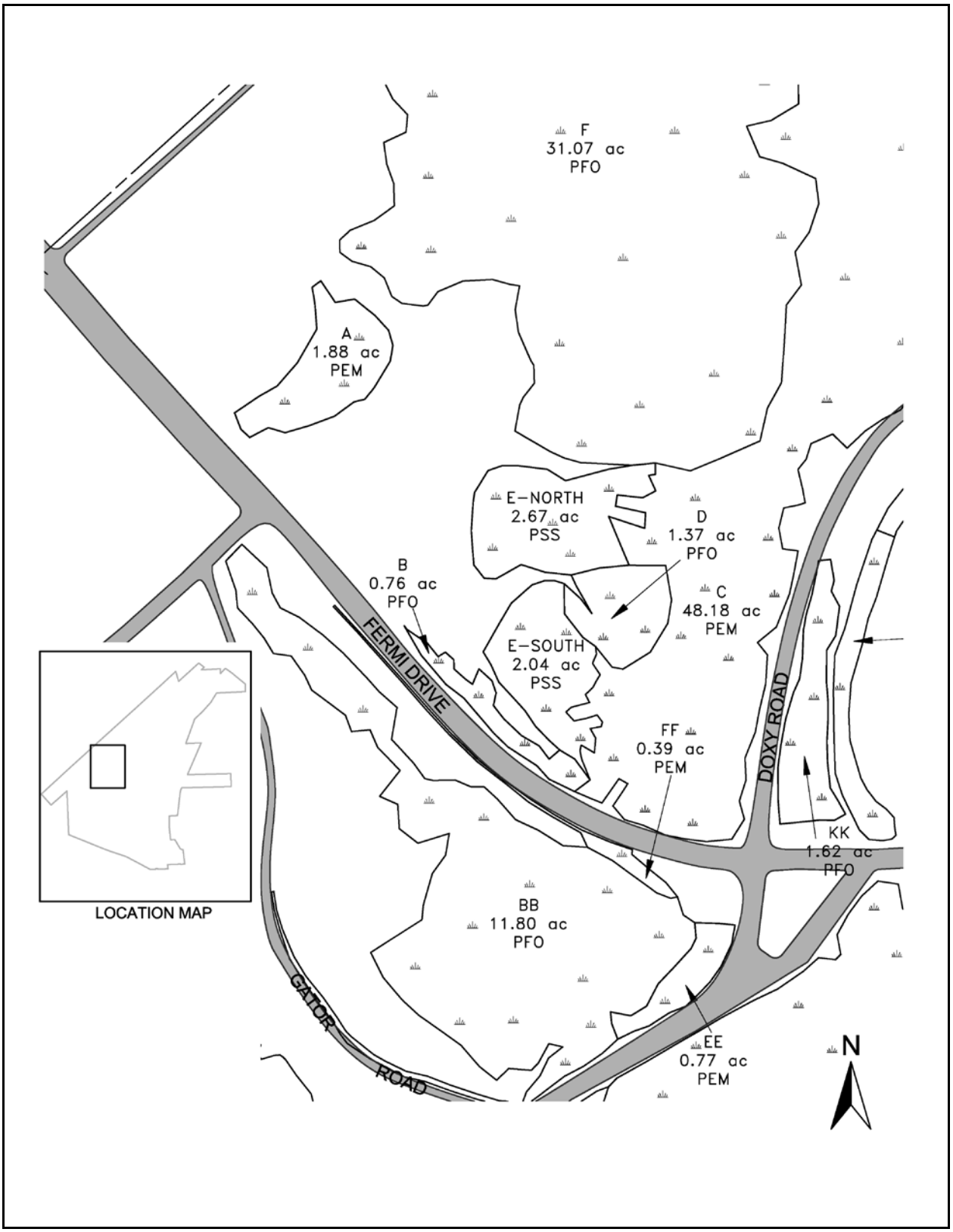


Figure 2.7-6. Areas H and U, South Canal and Wetland KK

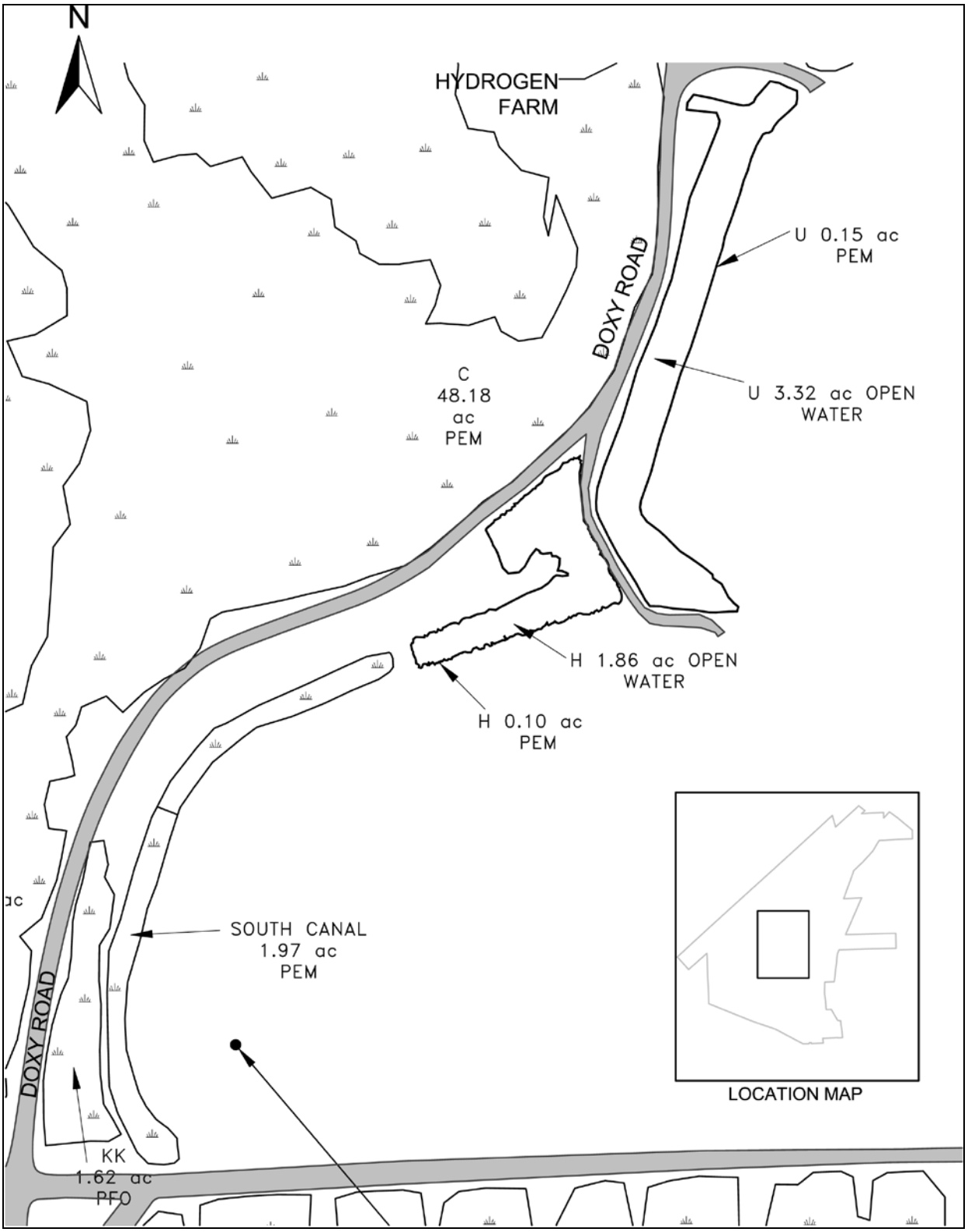


Figure 2.7-7. Wetlands C, I, and F

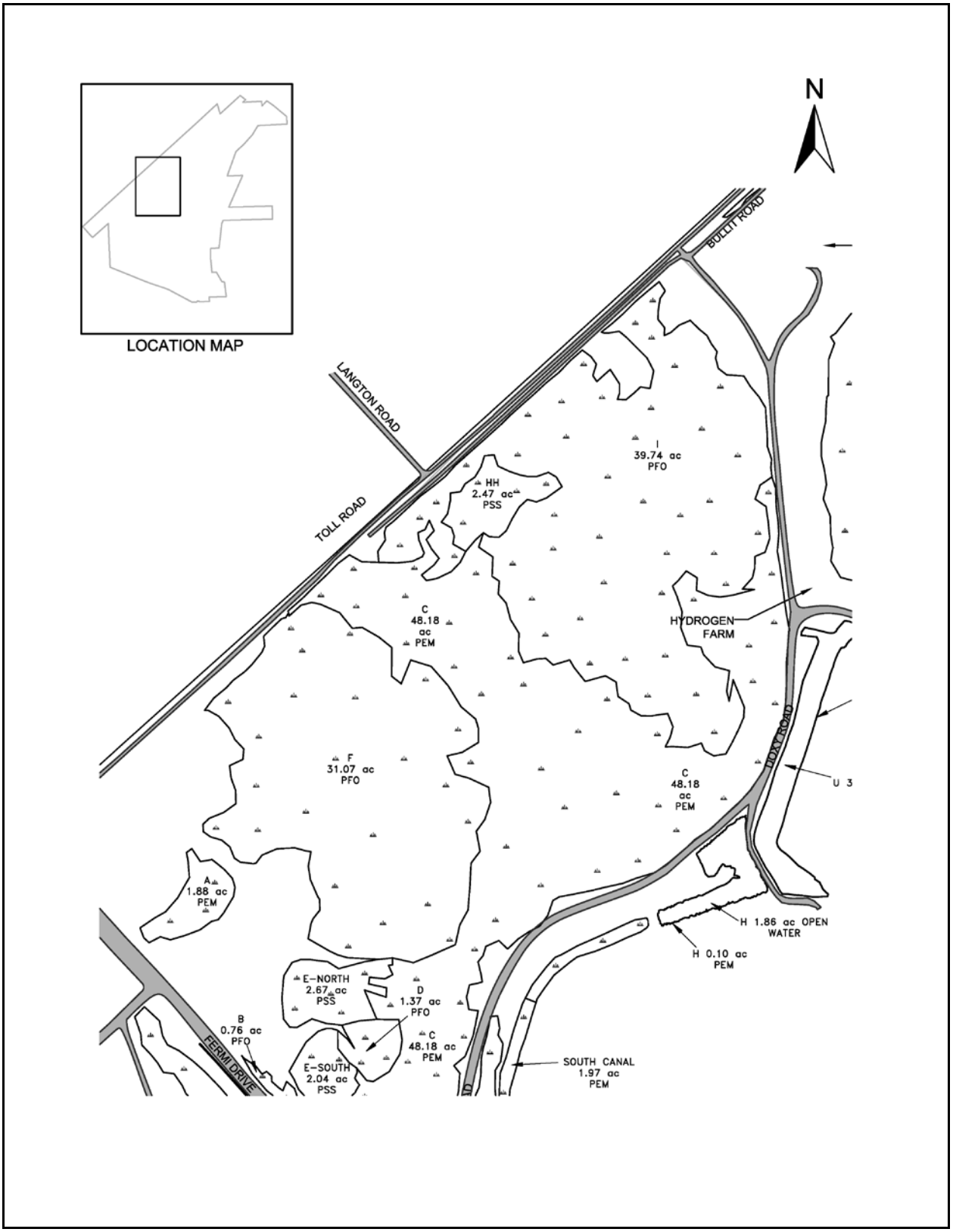


Figure 2.7-8. Wetland W

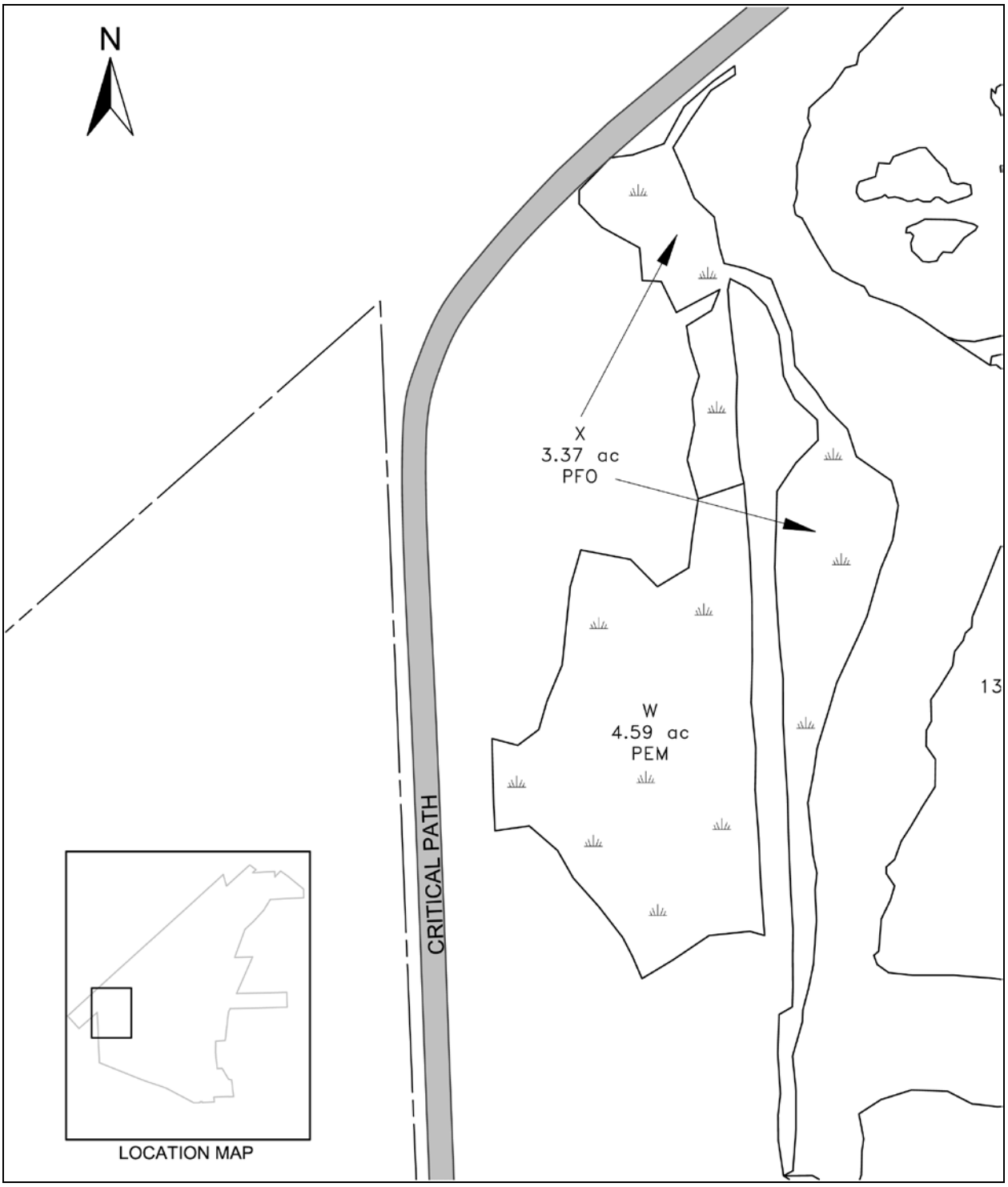
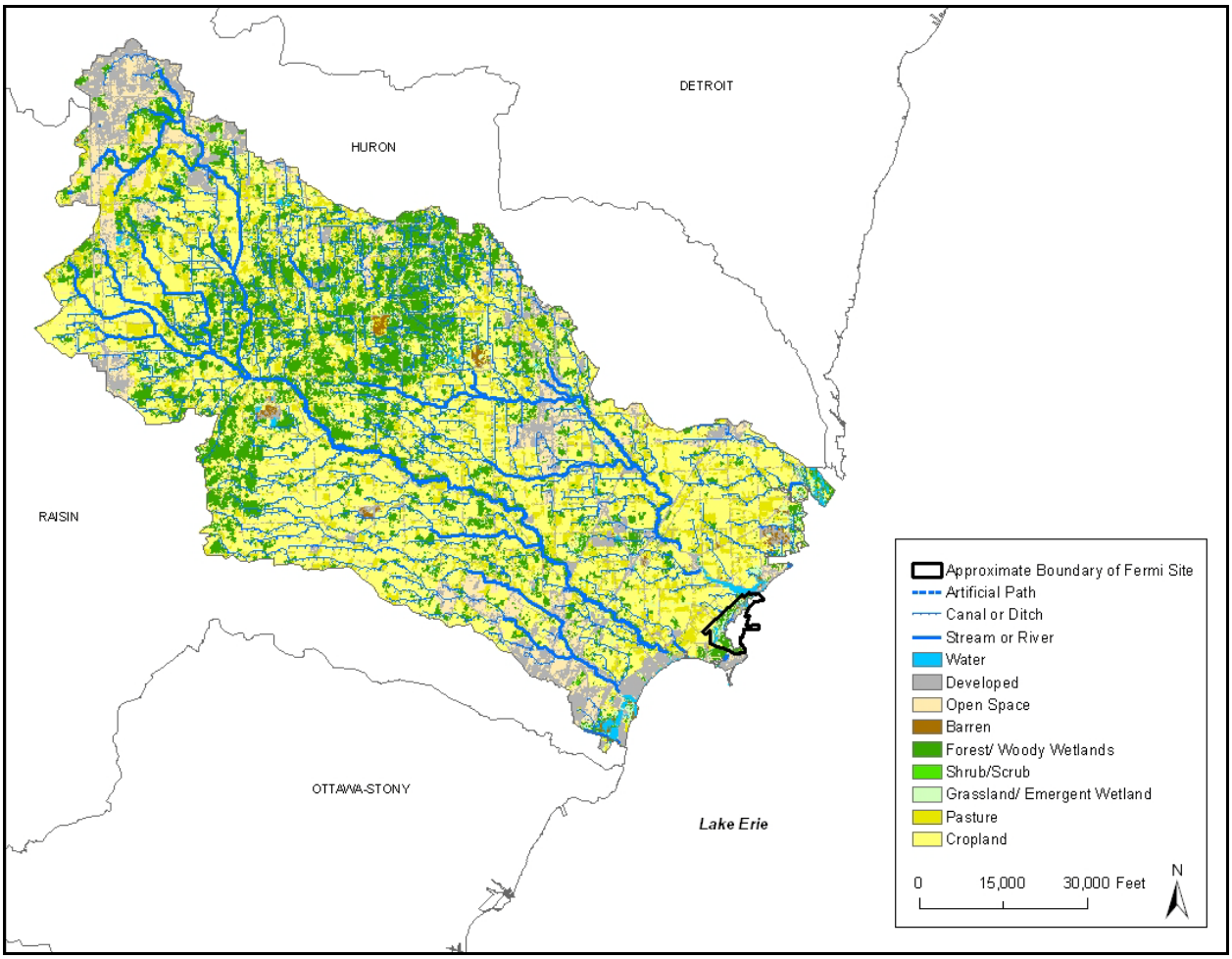
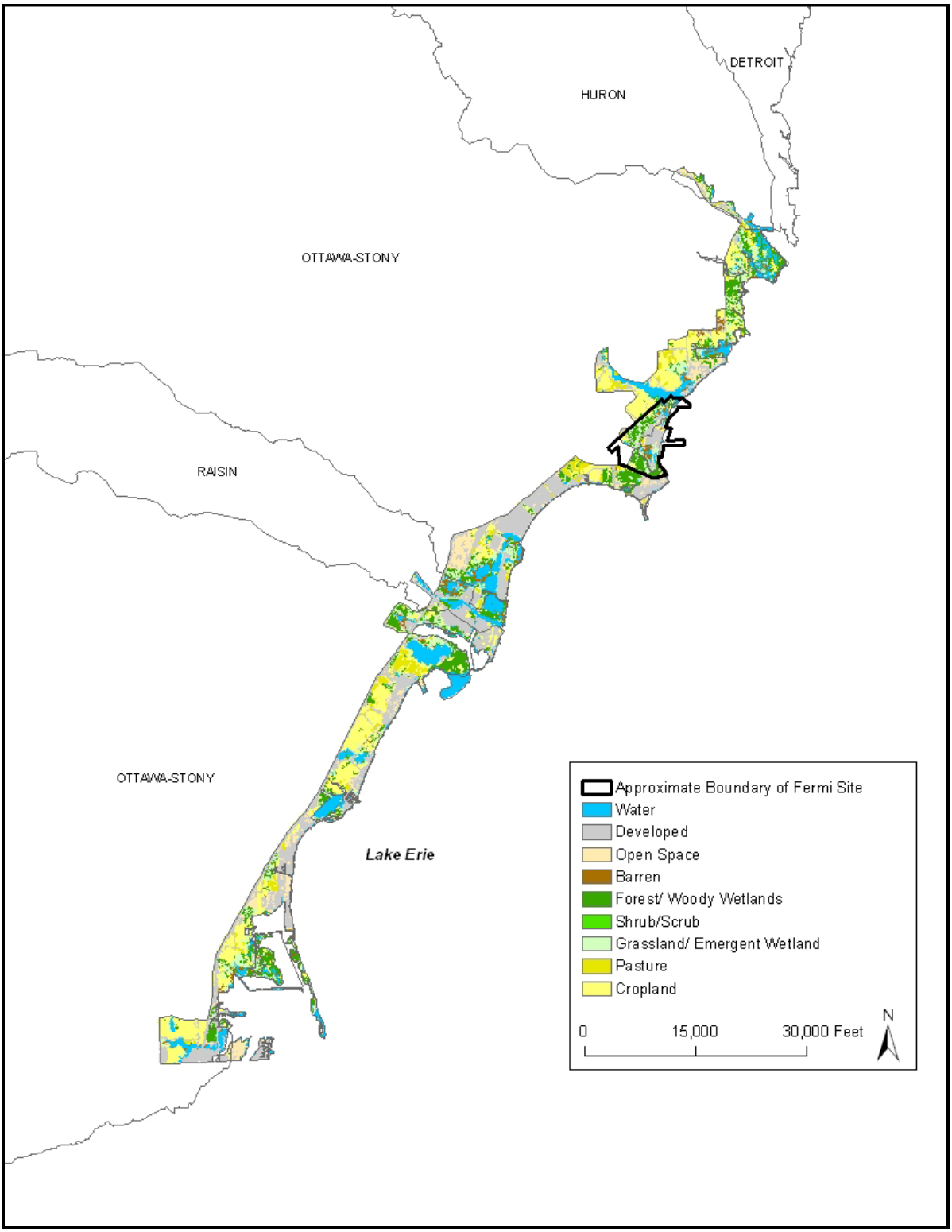


Figure 2.8-1. Ottawa-Stony Watershed Land Use



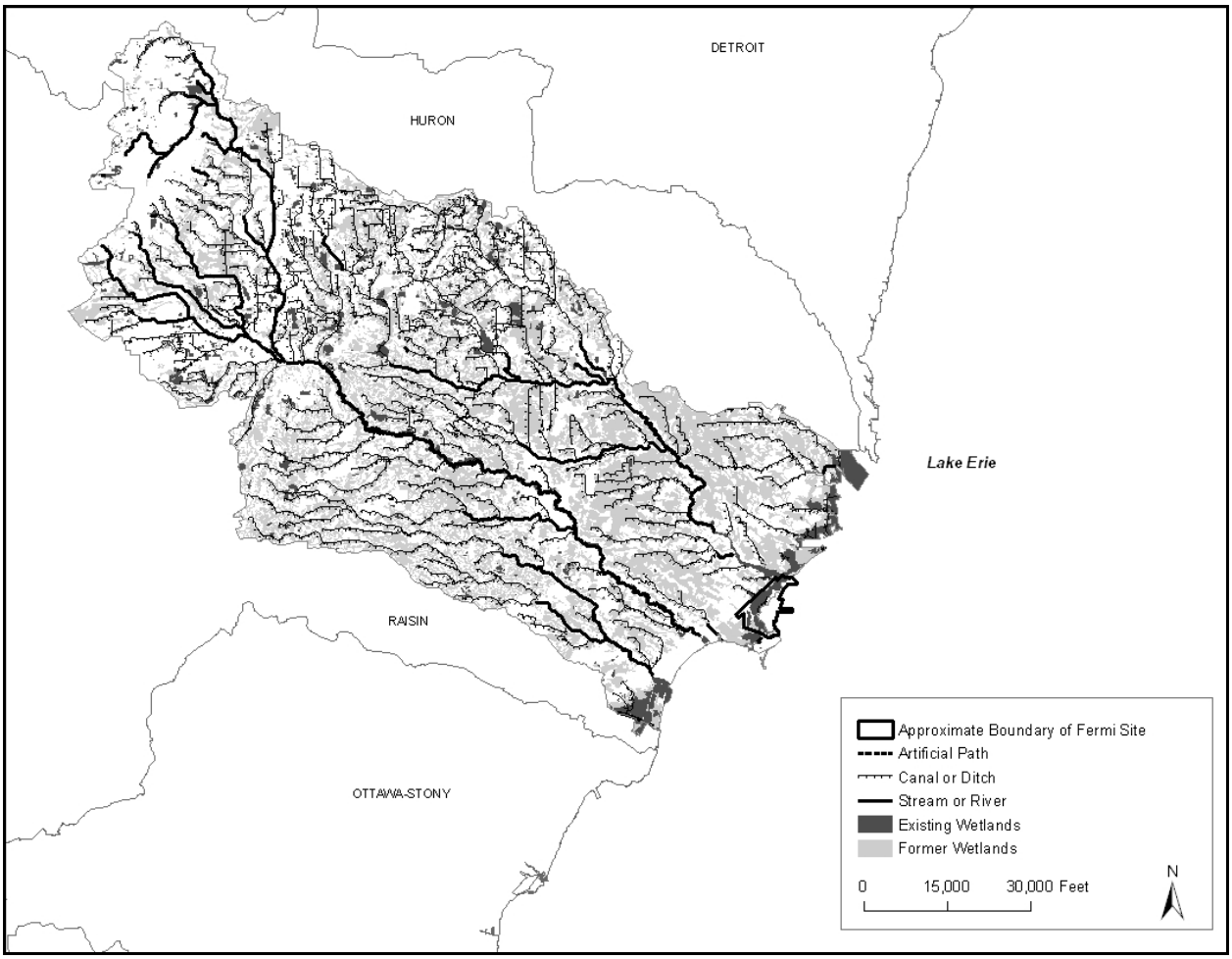
Source: Reference 23 and Reference 25

Figure 2.8-2. Coastal Zone Land Use



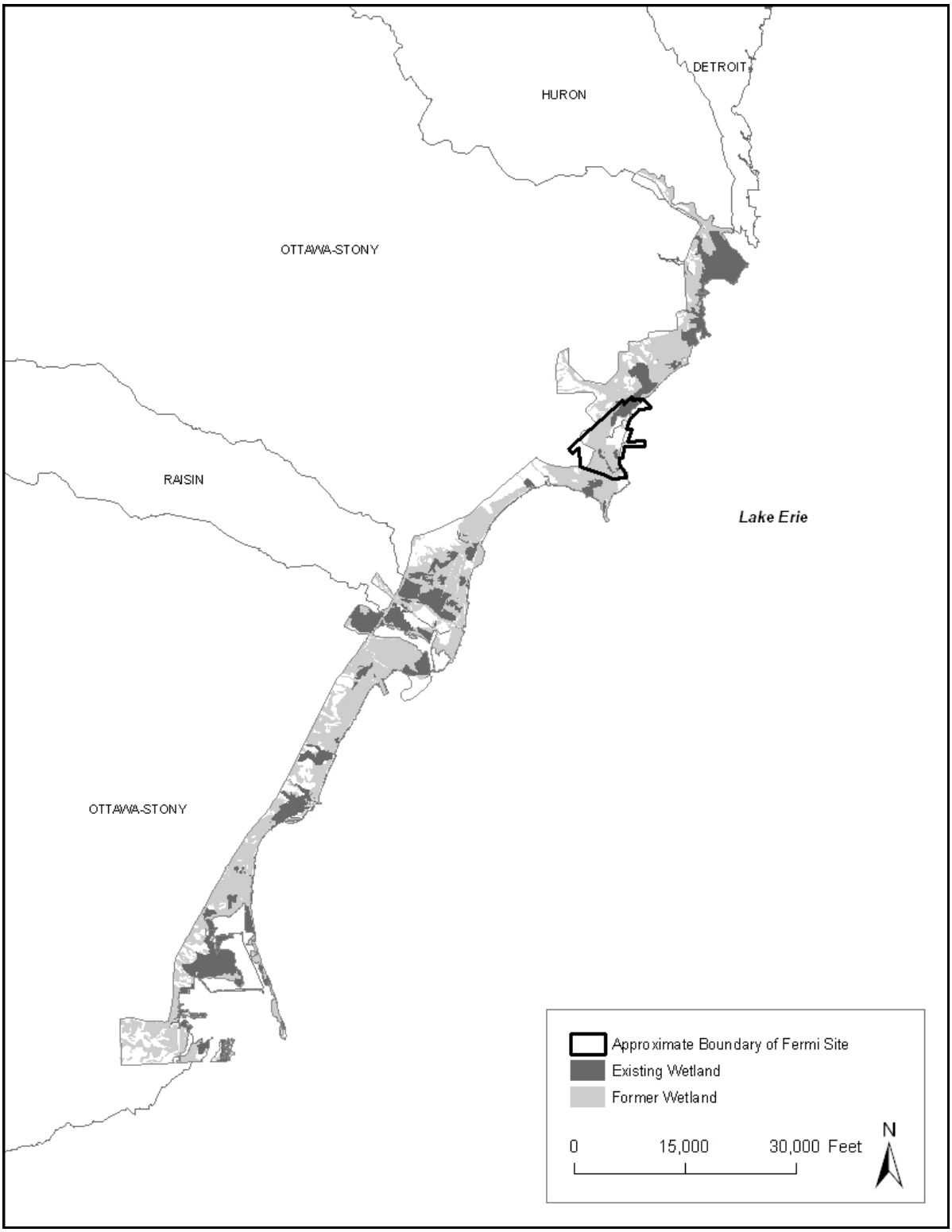
Source: Reference 25 and Reference 26

Figure 2.8-3. Existing and Former Wetlands in the Ottawa-Stony Watershed



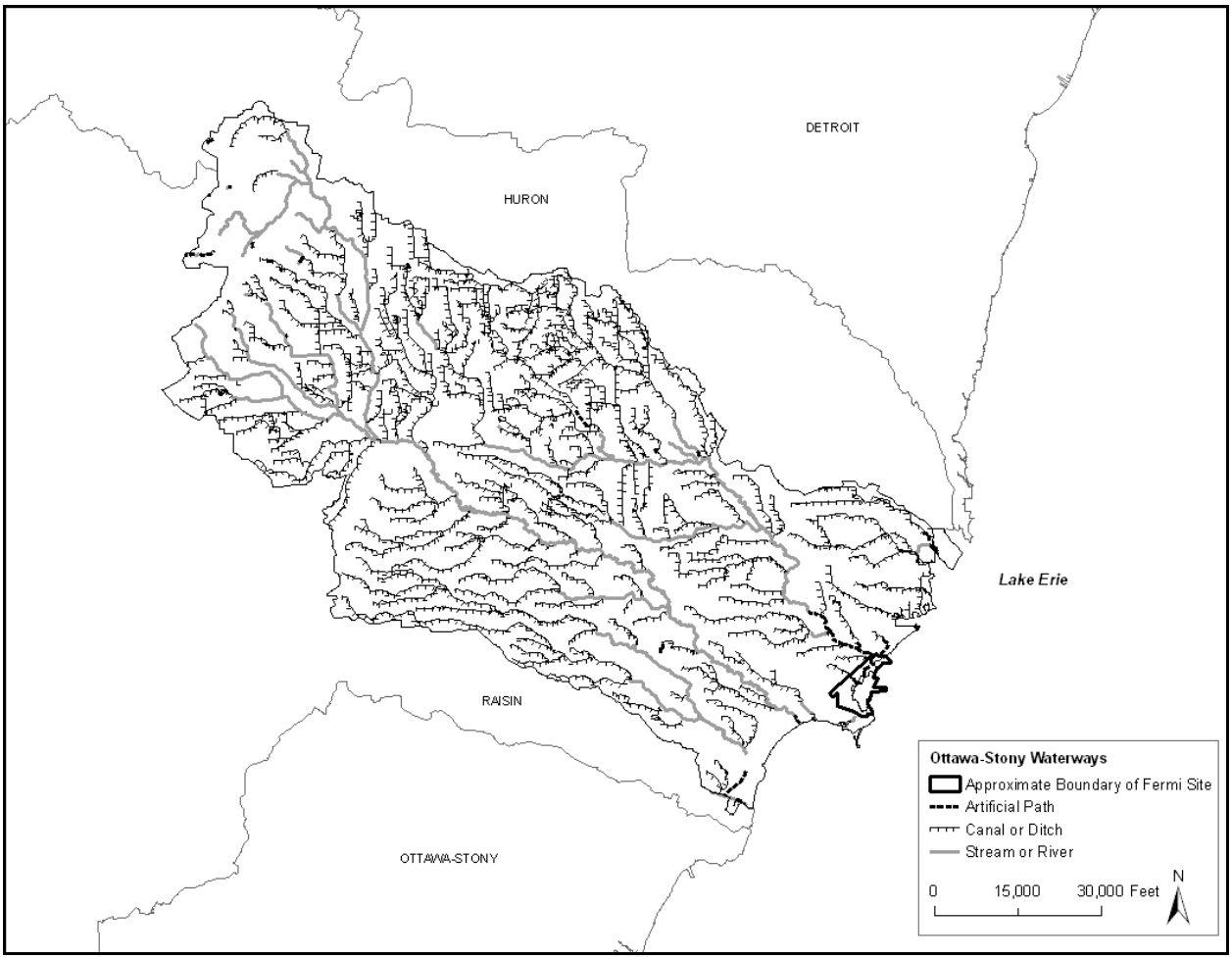
Source: Reference 19 through 21 and Reference 23

Figure 2.8-4. Existing and Former Wetlands in the Coastal Zone



Source: Reference 19 and Reference 26

Figure 2.8-5. Streams and Ditches in the Ottawa-Stony Watershed



Source: Reference 23

3.0 PROJECT DESCRIPTION

The following sections provide a description of the overall construction approach and sequence proposed at the Fermi site and mitigation techniques that will be implemented to minimize the effect on waters and wetlands of the United States. Specific project descriptions for regulated activity areas are included that define the limits of the work area. If applicable, area-specific construction approaches, sequencing and mitigation techniques and the restoration of temporary impacts are also described.

3.1 Overall Construction Approach/Sequence

The overall construction approach and sequencing will be used for the preparation of temporary construction laydown, building and support structure construction, parking areas and infrastructure installation. This will include land clearing (tree and vegetation removal), grubbing where necessary, site grading, backfilling, and compaction. Vegetation and trees will be disposed of onsite in a designated area. Materials suitable for backfill and compaction may be obtained from an offsite source until onsite excavation is underway.

3.2 Overall Mitigation Techniques (Best Management Practices, Erosion and Sediment Control Measures, Restoration of Temporary Impacts)

Detroit Edison successfully implemented a planning process that will avoid, minimize and then compensate for unavoidable, permanent impacts on waters of the U.S., including wetlands, from the construction and operation of Fermi 3. These include using developed and previously disturbed lands where practicable and limiting clearing to the smallest construction footprint possible. Detroit Edison will obtain the necessary authorizations prior to initiating the regulated activities associated with the construction and operation of Fermi 3. Detroit Edison's compliance with permit conditions and implementation of associated plans (e.g., Soil Erosion and Sedimentation Control [SESC] Plan, Storm Water Pollution Prevention Plan [SWPPP], and Compensatory Mitigation Plan) will afford further environmental protection. Figure 3.3-1 shows potential wetland construction impacts.

One purpose of mitigation is to avoid or minimize impacts to jurisdictional wetlands and waters. Mitigation includes:

- minimizing dredging and construction-related turbidity;
- minimizing erosion, chemical releases, and stormwater impacts to water quality and wetland habitat;
- minimizing potential impacts to aquatic species during dredging and construction activities in the water;
- minimizing impacts to the fishery by, for example, scheduling dredging and construction of the intake and discharge structures to avoid fish spawning;

- minimizing impacts to terrestrial habitats and wildlife by, for example, scheduling land clearing and construction to avoid nesting/breeding habitats where practicable;
    - scheduling construction activities in wetlands in the winter when possible to reduce compaction, runoff and vegetation destruction.

A summary of restoration methods for temporary impacts is provided below.

- Best management practices (BMPs) will be implemented during construction, as applicable:
    - Any ground-disturbing activities will be in accordance with permit requirements, including a construction stormwater discharge permit and SESC permit under National Pollutant Discharge Elimination System (NPDES) regulations. The SESC Plan to control erosion and run-off will include: silt fence or curtain installation as applicable, and the placement of straw bales, slope breakers, or other erosion prevention measures, as necessary.
    - Compliance with SWPPP.
    - Protecting existing runoff drains from excessive sedimentation.
    - Using standard stabilization and restoration methods such as re-contouring, mulching, seeding and replanting cleared land; encouraging natural re-vegetation; permanent stabilization using pavement, rock or gravel; and installing temporary or permanent stormwater management and erosion and SESC measures.
    - Site grading and drainage during construction will be designed to avoid erosion and in compliance with the SESC Plan.
    - Run-on flow diversion, stormwater collection ponds, seeding and re-vegetation plans will be used as appropriate.
    - Final stabilization will consist of restoration or re-vegetation at final grade conditions as practical.
- Regular visual inspections of erosion control measures will be conducted to monitor the effectiveness of the control measures and to aid in determining if other mitigation measures are necessary;
- Sediment build up around silt fencing will be removed to prevent fabric tears, undermining and fence failures.
    - Construction barriers will delineate construction zones, to minimize the destruction of vegetation and reduce the potential for erosion and compaction;
    - Vegetation removal will be limited to those areas designated for construction activities.
    - Temporarily disturbed areas will be restored;
    - Exposed spoils piles will be stabilized with cover to minimize run-off;

  - Spill prevention, control, and response measures will be implemented as part of the Pollution Incident Prevention Plan (PIPP) to minimize/eliminate possible spills from construction and/or construction equipment;
  - Inspections of the storage areas will be completed periodically to ensure equipment is not leaking;

- Fugitive dust will be controlled through watering of construction roads;
- Vehicle emissions will be controlled with regular maintenance;
- The following BMPs will be implemented to minimize the impacts of dewatering, dredging, and backfilling, as applicable:
  - Backfilling Open Waters H and U and the South Canal east of current operations, may impact stormwater runoff flowing to the North and South Lagoons, potentially causing a small increase of sediment into Lake Erie. The NPDES Stormwater Construction Permit will be in effect during construction. As part of the NPDES Stormwater Construction Permit, an SESC Plan will be required to be in place. As part of the SESC Plan, actions will be taken to minimize the potential increased sediment. Backfilling Open Waters H and U and the South Canal will have a small impact on Lake Erie sediment loading, and no mitigative measures beyond those described here will be necessary. Backfilling Open Waters H and U and the South Canal are the most significant hydrological alteration of construction of Fermi 3.

    Fermi 2 currently releases stormwater via the North Lagoon to the mouth of Swan Creek. Due to its proximity to the construction site, Swan Creek may experience elevated sedimentation from increased runoff from the backfilled onsite water bodies. Although a small increase in sediment loading into Lake Erie through Swan Creek's discharge is expected as a result of filling in the onsite water bodies, the implementation of the SESC Plan and BMPs will reduce the potential for sediment loading during construction. SESC Plan mitigation measures will be implemented to alleviate the potential for increased sedimentation in Swan Creek and other onsite water bodies.

    Slight increases in stormwater runoff are expected from new impervious areas at Fermi 3. This impact would be minimal due to the relatively small Fermi 3 developed area in the Swan Creek Watershed.

  - Implementing the SESC Plan will limit sedimentation of drainage to Lake Erie;
  - Dewatering will include barriers to minimize the groundwater flow entering the excavation, reducing the amount of water discharged;

- Dewatering will occur at a rate such that that the velocity of the discharged water does not cause scouring of the receiving area;
- Sediment-laden water from cofferdams, trenches and other areas will be pumped through a geotextile material before the water is discharged to a watercourse;
- Rock groins will limit the turbidity to the intake bay during dredging and limit scouring at the intake structure during construction of the intake;
- Spoil collected during dredging will be placed in the existing onsite dredged spoils disposal basin;

Restoration of Temporary Construction Impacts

Most of the regulated activities affecting waters of the U.S. are temporary impacts resulting from Fermi 3 construction. Wetlands temporarily affected by Fermi 3 construction activities will be restored to preconstruction conditions. When construction activities begin, vegetation within the temporarily affected wetlands will be removed, and the top 6 to 12 inches of topsoil will be stripped, stockpiled and covered or seeded.

Upon completion of construction, any impervious surfaces or fill installed for construction within these areas will be removed. The previously stockpiled topsoil will be replaced to their preconstruction contours and elevations and aerated as necessary. Additional topsoil may be required. These areas will be seeded and/or planted with native trees, shrubs, and herbaceous plants similar to those present before construction. An enhanced planting mix may be used in wetlands where the preconstruction vegetation was dominated by undesirable species. The restored wetlands are expected to have an improved plant species composition that should, in turn, provide enhanced wildlife habitat by supplying an improved forage and shelter. Through restoration, preexisting or enhanced functions and values will be restored as much as practical. A final design and mitigation plan will be developed and implemented in conjunction with the wetland permit for the Fermi 3 construction.

Mitigation of Operational Impacts

The Fermi 3 facilities will be designed to minimize operational impacts to waters of the U.S.

- The diffuser design will minimize the size of the thermal mixing zone, both lateral and vertical in extent. The diffuser, as well as localized armoring, will minimize bottom scour and associated turbidity;
- Location and orientation of discharge ports and diffuser design will minimize siltation resulting from turbidity at the diffuser ports;
- Compliance with NPDES permit effluent limits and use of one Lake Erie outfall for Fermi 3 will minimize chemical impacts;

- Impingement, entrapment, or entrainment of aquatic species by the intake system will be minimized by maintaining a low intake velocity; intake screens will be designed with appropriate size mesh and include a trash rack; regular washing of the intake screens will minimize impingement; and locating the Fermi 3 intake near the Fermi 2 intake will reduce the cumulative entrapment.

3.3 Proposed Regulated Activity and Aquatic Resource Impacts

A description of the regulated construction activity that would affect water and wetlands of the U.S. is provided below. The limits of the work area are defined and area-specific construction approaches, sequencing, and mitigation techniques and/or restoration activities not described in Section 3.2 are provided. An overall site layout with proposed impacts is included as Figure 3.3-1. A summary of the proposed impacts is included as Table 3.3-1.

3.3.1 Barge Slip/Water Intake/Discharge Pipe/Fish Return (Figure 3.3-2)

Description/Limits of Work Area

The Fermi plant was issued USACE Permit Number 88-001-040-8 on May 26, 2004. The permit authorizes hydraulic dredging of up to 25,000 cu. yards annually from the Fermi 2 intake area and disposal of dredged material into the onsite Dredged Material Disposal Basin (Reference 1). The MDEQ issued Permit Number 04-58-0009-P to the Fermi site that authorizes hydraulic dredging of the Fermi 2 intake area (Reference 2).

Dredging of a barge slip within the existing Lake Erie intake embayment will be conducted to allow delivery of heavy construction equipment and building materials during Fermi 3 construction and for removal of construction debris. Dredging also will take place at the intake embayment to allow for the addition of a new water intake for Fermi 3, installation of the discharge pipe and diffuser, and access for barge unloading. The location of these structures is shown on Figure 3.3-2.

Barge Docking Facility

Barges will be used to deliver equipment and construction materials for Fermi 3. Barges may be used for the removal of construction debris. Near the northeast corner of the Fermi site in the area of the Fermi 2 cooling towers, there is a former barge slip that was used to offload equipment during Fermi 2 construction. The environment of the former Fermi 2 barge slip and offloading area is cleared gravel with some trees and weedy vegetation along a sandy inlet area with no permanent structures. The Fermi 2 barge slip would require substantial dredging and other preparation work before it could be used as the Fermi 3 barge slip. Also, the Fermi 2 barge slip is located on the opposite side of the Fermi 2 protected area from the Fermi 3 construction site. A key consideration in the construction of Fermi 3 is the requirement to minimize construction impacts to Fermi 2 operations. Therefore, use of the existing barge slip is not practicable and Detroit Edison proposes to construct a barge slip within the existing embayment

where the Fermi 2 water intake structure is located. Construction of the Fermi 3 intake structure, discharge pipe, and barge slip within the existing intake embayment reduces the cumulative area of lake bottom that will be disturbed. Construction would occur at different times, starting with construction and operation of the barge slip.

The reactor vessel is the largest single component that could be delivered via barge. It is anticipated that a barge size of 260 feet by 72 feet with a maximum load of 1500 tons would be utilized for delivery of the reactor vessel. A barge of this size would require a draft of no more than 5.5 feet. The existing USACE Permit 88-001-040-8 allows dredging of the intake channel to create a lake bottom elevation of 560.0 feet (1985 International Great Lakes Datum [IGLD] low water datum of 569.2 feet). An elevation of 560.0 feet 1985 IGLD results in a channel that is 9.2 feet deep. Therefore, it is anticipated that dredging (beyond that already performed) would not be required for delivery of the reactor vessel, because the channel depth is 9.2 feet and the required barge draft is 5.5 feet.

The aggregate materials necessary for Fermi 3 construction could also be delivered to the site via barge. The delivery of bulk materials is anticipated to be restricted to a maximum load of 1000 tons, or similar load to limit the maximum draft of the barge to approximately 7 feet. Thus Detroit Edison anticipates that dredging to deepen the channel would not be required because no barge deliveries would require a draft of greater than 7 feet and the current channel depth is 9.2 feet.

Barges will be offloaded using a ramp to the shoreline. Construction below the ordinary high water mark of Lake Erie would include placement of sheet piling (see Figure 3.3-2) necessary to create the vertical face needed to dock and unload the barge. The pilings will be perpendicular to the southern groin to facilitate ingress and egress of the barge. The piling will also be used to transition into the intake structure. Piling will be installed at or landward of the existing shoreline (the need to be perpendicular to the groin necessitates it be installed somewhat to the upland side of the shoreline).

Discharge Pipe

The 48-inch diameter discharge pipe will extend approximately 1340 feet into Lake Erie to avoid recirculation of discharged water through the cooling system. Another consideration in the length of the discharge pipe was to preclude the discharge plume from intruding on environmentally sensitive onsite areas (such as wetlands) during wind-driven rises in Lake Erie water level (seiche events). The pipe from the cooling tower basin to the shoreline will be buried and will enter Lake Erie below the water surface. The pipe discharges through a diffuser. The conceptual design of the multiport diffuser (see Figure 3.3-3) consists of three individual ports spaced evenly over 32.8 feet. Each port will be 16.5 inches in diameter and located 19.7 inches above the lakebed. The ports are assumed to discharge into water approximately 8 feet deep, depending on the time of year and are designed to achieve a desired exit velocity and direction.

The exact method and means of dredging the barge slip and installing the discharge pipe will be determined once a construction contractor is retained. The installation of the discharge pipe is anticipated to require dredging to remove approximately 3300 cu. yards of overburden to create a trench approximately 1340 feet long, 17 feet wide at the top (11 feet average width), and 6 feet deep (see Figure 3.3-4). The discharge pipe is planned to be installed after barge operations supporting construction of Fermi 3 are completed. The route of the pipe will cross some of the area used for the barge slip (Figure 3.3-2). The material removed through mechanical dredging is expected to be used onsite as fill. Turbidity curtains are anticipated during the work to contain suspended sediments. After installation the pipeline trench will be fortified with riprap to prevent scouring. Approximately 1690 cu. yards of heavy riprap and 970 cu. yards of stone would be necessary for the full installation of the discharge pipe.

The current USACE permit allows for dredging from an area 200 feet wide and extending 1100 feet into Lake Erie, to a depth of 9.2 feet below the low water datum elevation of 569.2 feet IGLD 1985 (Reference 1). The existing area of dredging operations is shown on Figures 3.3-5 and 3.3-6. Installation of the Fermi 3 discharge pipe will require dredging a distance of approximately 240 feet beyond the area authorized for maintenance dredging under the existing USACE permit. The additional dredging would result in approximately 0.08 acre of open water impacts.

Maintenance dredging is conducted using a hydraulic dredge with an 8-inch slurry discharge line to the existing 11-acre dredge spoils disposal basin where the spoils settle. Chemical additives (Polyfloc AP1120 and Klaraid PC2700) may be used to assist in the settling of suspended solids from the water column. The clarified water returns to Lake Erie through outfall 013, as authorized under the Fermi 2 NPDES permit (Reference 3), via a weir and valve system at the south end of the basin. Per the existing NPDES permit requirements, prior to returning the clarified water to Lake Erie, the water is tested and must meet permit limits for total suspended solids and pH. In addition, while discharging to Lake Erie, a daily visual observation is performed to ensure the discharge does not contain unnatural turbidity, color, oil films, floating solids, foams, settleable solids, or deposits that are or may become injurious to any designated use. Future treatment of dredge slurry entering the basin is expected to be consistent with the permit conditions, and water effluents from the basin will meet or exceed permit conditions. Maintenance dredging is prohibited between March 31 and June 30.

Intake Structure

The Fermi 3 water intake structure will be built at the location indicated in Figure 3.3-2. The general dimensions and layout of the structure are shown in Figures 3.3-7 and 3.3-8. In order to build this structure a cofferdam will be installed to isolate the construction zone. The cofferdam will span the width separating the groins. The water behind the dam will be pumped back into Lake Erie. Any ingression or rain water which accumulates behind the cofferdam will be pumped to the lake. Heavy excavation equipment will be used to remove materials from the shoreline for the intake structure's foundation.

The top of the cofferdam is estimated to be at elevation 576.0 feet plant datum (574.78 feet NAVD 88). In addition to the cofferdam, sheet piling will be erected and extend an additional 3 feet above the top elevation of the cofferdam. The sheet piling will protect the work area against the wave action of Lake Erie. Removing the cofferdam will require dredging approximately 1100 cu. yards of fill material.

Fish Return

Detroit Edison will design a fish return system that takes into consideration research findings to ensure the highest possible fish survival, but it is premature to design such a system until more of the plant requirements/engineering parameters are established. Figure 3.3-2 depicts a conceptual layout based on a review of the CWA Section 316(b) literature and discussions with environmental staff at operating power plants with fish return systems.

Due to the topography at the Fermi site, gravity flow would not be sufficient to carry the screenwash and fish from the intake pump house to the lake. Water would be pumped through the system. A 24-inch diameter pipe is estimated to be used. The route of the pipe extends south from the intake pumphouse and bends gradually to the east, ultimately emptying into the lake south of the southernmost rock groin.

Detroit Edison would engage the natural resource and regulatory agencies during the design for the fish return system. The fish return system could terminate at the lake's edge. However, it may be preferable for the system to convey fish to a deeper portion of the lake that has better circulation and does not warm up as much in summer. In that case, water and fish would be pumped from the pumphouse to the lake via a pipe that terminates on the lake bottom. That is the scenario depicted in Figure 3.3-2. In either case, the fish return system would terminate in the arm of the lake adjacent to the southernmost rock groin. This would physically separate impinged/returned fish from the intake area, preventing re-impingement, and from the discharge pipe and diffuser, preventing thermal shock. (The potential for thermal shock is low in any case, as the mixing zone/thermal plume is small.) The impacts associated with construction within the lake are anticipated to be similar in both cases.

Construction Approach/Sequence

The proposed dredging would be similar to ongoing operations and maintenance dredging used to maintain the barge slip and the intake embayment in operable condition under the existing USACE permit. Maintenance dredging for the Fermi 2 intake embayment has been performed every 4 years. Approximately 22,000 cu. yards of material are removed from the intake embayment during these activities. The permit allows for removal of up to 25,000 cu. yards of material each year for 5 years. Approximately 200 gallons (roughly 1 cu. yard) per minute of flow from dredge material is anticipated from construction efforts at the location of intake structure. Effects of the dredging activities include increased turbidity, siltation, and temporary loss of benthic habitat and associated biota. Impacts to the biota are expected to be temporary. Adverse effects would cease on completion of dredging. Affected aquatic

systems are expected to revert to pre-construction conditions following construction. The open water impacts are considered temporary.

As described earlier, the dredged materials will be deposited in the permitted dredged spoils disposal basin encircled by Boomerang Road (Wetland N on Figure 2.7-3). The basin has an area of approximately 11 acres and is supported by embankments that are used to retain the dredged spoils. The basin has a weir that allows water to return to Lake Erie while retaining the sediment (Reference 1). The dredged spoils disposal basin discharges through Outfall 013, as authorized under the Fermi 2 NPDES permit (Reference 3). Wetland O is a linear PFO wetland covering 0.72 acre along the east side of the basin. No impacts to this wetland are expected due to construction activities or operation of the dredged spoils disposal basin.

The Fermi site accumulates spoils from periodic dredging activities. Detroit Edison contracts the dredging of the water intake canal on approximately a 4-year cycle. Spoils accumulate in the onsite dredged spoils disposal basin. Additional spoils are generated by yearly cleaning of pump house intakes with approximately 1000 cu. yards of spoils generated every year. Dredged material may either be used onsite as fill or sold for use as topsoil. In the past, dredge material had been removed from the basin periodically and used onsite as fill material under case-by-case approval of the Office of Monroe County Drain Commissioner. Because other dredging projects in the area have been able to sell the dredge material as prime topsoil, Detroit Edison is considering options to sell spoils in the future if they are not needed for onsite fill purposes.

3.3.2 Construction Area 1 (Figure 3.3-9)

The proposed area for disposal of spoils generated during the construction of Fermi 3 is in a 27-acre area (Figure 3.3-9). The excavated material from the power block and circulating water pipe runs will be processed and used as backfill and structural fill for the cooling tower and circulating water pipe run area. An estimated 265,000 cu. yards of excavated material is expected to be excess, and will be used in onsite construction laydown, parking areas and for filling in canals.

The proposed area has historically been used for spoils disposal and is a likely candidate for further disposal activities. Another potential location that has been used in the past for spoils disposal is adjacent to the access road in the northwestern portion of the site (Figure 5.2-2). Transfer of spoils to that area would require use of the access road supporting Fermi 2 operations, which is inconsistent with Detroit Edison's objective to separate the Fermi 3 construction activities from Fermi 2.

The proposed regulated activity is to entirely but temporarily fill three wetlands in the construction spoils disposal area. The following table summarizes the total acreage of each wetland and the proposed impact acreage and square footage for each wetland in Construction Area 1.

Wetland	Type	Total Acreage	Impact Acreage	Impact Square Footage
AA	PEM	0.80	0.80	3.469E04
II	PEM	0.52	0.52	2.261E04
JJ	PSS	1.37	1.37	5.956E04

The temporary loss of these wetlands will result in minimal impact to the overall functions and values of the wetland system at Fermi and in the watershed as a whole because they provide minimal floodflow alteration, sediment/toxicant retention and nutrient removal. Wetlands II and JJ are ditches surrounding the roadside that contain sparse wetland vegetation. The poor quality, limited size and connectivity of these three wetlands to other wetlands, combined with the previous disposal practices support the designation of this area for spoils disposal. All three of these wetlands are located in an established spoil area and share the following properties:

- Highly disturbed by fill (spoil piles, concrete, gravel), ditching and multiple access roads
- Vegetation communities with high structural diversity and low species diversity with well-established invasive species populations
- Seasonal water

Construction will require up to 10 years to complete. The area will be restored to PEM for Wetlands AA and II and PSS for Wetland JJ. The functions and values of these wetlands are expected to be restored and enhanced within 3 to 5 years after construction.

3.3.3 Construction Area 2 (Figure 3.3-10)

An 18-acre temporary construction laydown area is proposed in the southwest corner of the property and includes both wetland and upland communities. The proposed regulated activity is temporarily filling Wetland Y entirely. Wetland Y is 1.14 acres (4.967E04 sq. feet) of the proposed 18 acres of laydown area (Figure 3.3-10). The proposed temporary laydown area will be used for the placement of support structures and buildings that will be used during Fermi 3 construction activities.

Wetland Y is a fragmented early successional PFO wetland with mixed vegetation and a partially open canopy. It has a high level of disturbance with both pioneer and non-native species present. The temporary impact of Wetland Y is expected to result in minor impacts to the overall functions and values of the wetland system at Fermi and the watershed as a whole. Wetland Y provides marginal wildlife habitat for edge species and limited water storage. The proposed activity will restrict surface hydrology and route rainwater to the lower adjacent areas, including the Quarry Lakes to the west, and the PFO Wetland L on the eastern side of the road. Although a coastal wetland, Wetland Y does not represent a Michigan Natural Community.

Construction will require up to 10 years to complete. Following construction, Wetland Y will be restored to PFO. A portion of the functions and values of this wetland will be restored within 3 to 5 years after construction and will be fully restored in 10 to 20 years.

3.3.4 Construction Area 3 (Figure 3.3-11)

The 20.5-acre construction area north of Fermi Drive will be the location of the Fermi 3 switchyard, and will be used temporarily for construction laydown and support structures and buildings. It will require rerouting the existing transmission lines. The Fermi 2 345-kV and 120-kV transmission lines traverse the site northwest to southeast, bisecting Wetland E into a north and south portion.

This area includes both wetland and upland communities. The proposed regulated activity is temporarily filling PFO Wetlands B and D, PSS Wetland E-South and E-North and PEM Wetland C: 12.97 acres of the total 20.5 acres of laydown area (Figure 3.3-11). The following table summarizes the total acreage of each wetland and the proposed impact acreage and square footage for each wetland in Construction Area 3.

Wetland	Type	Total Acreage	Impact Acreage	Impact Square Footage
B	PFO	0.76	0.76	3.309E04
C	PEM – Great Lakes marsh	48.18	6.93	3.018E05
D	PFO	1.37	1.37	5.957E04
E-North E-South	PSS PSS southern shrub carr	2.67 2.04	1.87 2.04	8.142E04 8.890E04

This staging, modular fabrication, and assembly area will be subject to heavy machinery staging, equipment hauling, materials handling and delivery. The Fermi 3 switchyard will be located north of Fermi Drive and east of Toll Road, permanently impacting an upland prairie restoration area and nonjurisdictional Wetland A.

Wetlands B and D have a high level of disturbance with both pioneer and non-native species present. Both are coastal wetlands; however neither represents a Michigan Natural Community. Wetland C is a Great Lakes marsh fragmented from Lake Erie by access roads but connected hydrologically through culverts. As a result, the wetland has high ecological value. Wetland E-North is an emergent marsh/wet meadow and scrub shrub mix that does not represent a Michigan Natural Community. Wetland E-South is likely a southern shrub carr. Both portions of E have high species diversity due to transmission line ROW maintenance. These wetlands primarily provide floodflow alteration, sediment retention, toxicant retention, nutrient removal and wildlife habitat.

The short-term impact to wetlands B, D, E-South and portions of C and E-North is expected to result in minor impacts on the overall functions and values of the wetland system at Fermi and the watershed as a whole. Construction will require up to 10 years to complete after which the area will be restored to the pre-impact wetland types. The functions and values of Wetland C, E-North and E-South will be restored within 3 to 5 years and partially restored for Wetlands B and D. The functions and values of Wetlands B and D will be fully restored in 10 to 20 years.

3.3.5 Construction Area 4 (Figure 3.3-12)

The 11.5-acre area east and south of Critical Path Road will be used temporarily for Fermi 3 construction laydown and includes both wetland and upland communities.

The proposed regulated activity is temporarily filling the entire 4.59 acres (2.001E05 sq. feet) of PEM Wetland W, in the primarily upland 11.5 acre temporary laydown area (Figure 3.3-12). Wetland W is a wet meadow dominated by invasive species. This activity will result in minimal and short-term impact to the overall functions and values of the wetland system at Fermi and the watershed as a whole. Wetland W is isolated from other wetlands and provides minimal floodflow alteration, sediment/toxicant retention, nutrient removal and marginal wildlife habitat.

Construction will require up to 10 years to complete. Wetland W will be restored to a wet meadow with enhanced functions and values reestablished within 3 to 5 years after construction.

3.3.6 Warehouse, PAP/VIB and Parking Garage (Figure 3.3-13)

Approximately 7 acres east of Wetland C, south of the northernmost canal and west of the Fermi 2 operating facility is proposed to support permanent structures including the Fermi 2/Fermi 3 Warehouse, PAP/VIB and parking garage.

Open Water H is an isolated pond. Based on aquatic surveys completed in 2008 (Section 2.5.2), this pond was characterized by relatively low numbers and diversity of fish. Collections in 2008 were dominated by common sunfish and gizzard shad. Dewatering/filling this waterbody will not impact any rare, unusual, or special-status fish species and, by virtue of its hydrological isolation, will have no impact on fish communities of nearby waterbodies or Lake Erie. Open Water U was not sampled but because of culverts to the north (Figure 2.6-1) it is assumed to contain an assemblage of fish that is a subset of those in the North Canal. The North Canal was characterized by high numbers and high measures of species richness in 2008 and 2009, due presumably to its connection with Swan Creek and Lake Erie. North Canal collections were dominated by common sunfish (e.g., bluegill and pumpkinseed), gizzard shad, and notropids (shiners/minnows). Almost all of the fish lost as a result of dewatering/filling Open Water U would be representatives of species that are common to ubiquitous in Swan Creek and Lake Erie and prolific, maturing early and producing large numbers of young. Some would leave the affected area via connections to the North Canal. Any impact to Swan Creek and Lake Erie would be very small.

Wetland C is a large Great Lakes marsh fragmented from Lake Erie by access roads but connected hydrologically to Lake Erie through culverts to Open Water U and the South Canal (Figure 2.6-1). The edge of Wetland C, where permanent impacts are proposed, exhibits vegetation communities and conditions that reflect a high degree of disturbance including invasive species and altered hydrology associated with the adjacent roadway and other human activities.

The proposed regulated activity is permanently filling 2.24 acres (9.747E04 sq. feet) of PEM Wetland C. The wetland impact to H is 0.10 acres (4223 sq. feet) and to U is 0.15 acres (6477 sq. feet). The wetland impact represents a total of 2.49 acres of the total 7 acres of construction impacts (Figure 3.3-13).

Open Water H and U will be dewatered using standard dewatering practices. The isolated Open Water H will be dewatered to Open Water U. Once dewatered, H will serve as a dredge spoils basin. Sediments will be allowed to settle out in the basin. The water in the basin will be conveyed through an outfall structure to Wetland C. Soil erosion and sedimentation control measures will be in place prior to the discharge to prevent siltation. After dewatering, the depression will be backfilled and compacted.

To accommodate the parking garage and PAP/VIB footprint, a portion of Wetland C will require excavating wetland soils, backfilling and compacting. Sheet piling will be installed on the west side of the construction footprint to minimize impacts to Wetland C and eliminate the need for additional excavation and fill material necessary for slope stabilization.

The Fermi 2 outfalls that currently discharge to Open Water U will be directed to culverts to the North Canal to Lake Erie. A concrete junction box at the north end of Open Water U will maintain the hydrologic connection between Wetland C and the North Canal to Lake Erie (Figure 3.3-13). New culverts through this connection will be installed with an earthen bottom to promote benthic habitat. After culvert installation, the remaining area will be backfilled and compacted. Final grade will be in accordance with the final construction grading plan for Fermi 3. Filling these areas will result in the loss of aquatic communities and aquatic organisms that currently reside in these areas. These include the loss of fringing wetland habitats, aquatic vegetation, fish and benthic species as well as reptile and amphibians. The long term impacts of Open Water areas H and U and the small roadside area of Wetland C will result in minimal disturbances to the functions and value of the wetland system at Fermi and the watershed as a whole. The edge of Wetland C along Doxy Road, and Open Waters H and U provide minimal floodflow alteration, sediment/toxicant retention, nutrient removal, and wildlife habitat.

3.3.7 Cooling Tower (Figure 3.3-14)

The proposed location for the cooling tower is entirely within upland; however, the construction footprint is expected to impact the adjacent aquatic resources, South Canal and Wetland KK. The South Canal is a 1.97 acre PEM Great Lakes marsh with typical marsh zonation. South Canal is hydraulically connected to Lake Erie through a culvert under Fermi Drive to Wetland M and also to Wetland C through a culvert

under Doxy Road. Wetland KK is a 1.62 acre highly disturbed PFO wetland. It contains early successional species with an open canopy. A storm in June 2010 damaged or downed several trees in the wetland.

The proposed regulated activity includes permanently filling the entire 1.62 acres (7.062E04 sq. feet) of PFO Wetland KK and 1.17-acres (5.093E04 sq. feet) of PEM South Canal, totaling 2.79 acres of impact (Figure 3.3-14). The southern portion of the South Canal will be filled during construction of the new cooling tower. South Canal fish collections in 2008-2009 were dominated by goldfish and common carp, both invasives that are considered nuisance species or "rough fish" by many fisheries managers. Small numbers of common sunfish were also collected here. Given that no rare, unusual, or special-status species are found in the South Canal and the fish that are present are largely invasive species with no recreational or commercial value, impacts from cooling tower construction are considered negligible.

Site preparation activities include dismantling the current meteorological tower, transplantation of American lotus (*Nelumbo lutea*) from the South Canal and removal of vegetation in the impact areas. To maintain the hydraulic connection to Lake Erie and Wetland C, two arch shaped steel-reinforced concrete culverts will be installed in parallel. These will have an earthen bottom to promote habitat for benthic organisms and will be installed for a length of approximately 880 feet, maintaining connection to the northern portion of the South Canal (Figure 3.3-15). The culverts are sized to allow stormwater from upstream areas to be transported to Lake Erie. Likewise, the culverts will maintain the function of the existing canal to allow wind-driven Lake Erie water to be transported through the canals and into adjacent wetlands. Slight increases in stormwater runoff are expected from new impervious areas at Fermi 3. Implementation of the SESC Plan will prevent sediment loading during construction.

These long-term impacts will result in a decrease in functions provided primarily by the South Canal and, to a lesser extent, by Wetland KK. Currently, these wetlands provide floodflow alteration, sediment/toxicant retention, nutrient removal, biodiversity and wildlife habitat. These impacts will not have a significant effect on the functions and values provided by the larger, more intact wetland systems on the property; and the earthen culvert has been designed to maintain the biodiversity, fish and wildlife habitat function between the wetland onsite and Lake Erie.

3.3.8 New Operations Access Road (Figure 3.3-16)

Toll Road at Fermi Drive to approximately 230 feet north of Langton Road is owned and maintained by the Monroe County Road Commission (MCRC). The remainder of Toll Road along the Fermi property boundary is privately owned. A new operations access road is proposed that will parallel the western property boundary. The access road will utilize the MCRC right-of-way, cross an intermittent stream and then transition along a slight angle to the east onto Fermi property. The transition will be at the location of the privately owned portion of Toll Road. The proposed road will turn east, onto existing Bullit Road and

continue through the site to the proposed parking garage and warehouse via the route shown on Figure 3.3-16.

The road has been designed to include two 12-foot lanes, 8 feet of shoulder, 17 feet of drainage to the west and 11 feet of drainage to the east and into the property. The road design includes sediment traps that will reduce erosion and stormwater runoff to the adjacent wetlands. The following SESC and BMPs will be implemented specifically for road construction:

- Concrete or hot mix asphalt paving
- Ditching
- Restoration
- Appropriate signage installations
- Culvert installation/construction
- Designation and implementation of material storage locations
- Designation and coordination of worker vehicles/parking

The proposed regulated activity includes long-term impacts to 0.42 acres (1.836E04 sq. feet) of PFO Wetland I, a rare and imperiled southern hardwood swamp (Figure 3.3-17). Wetland I is a 39.74 acre PFO wetland on the northwest perimeter of the Fermi property immediately east of Bullit Road. Wetland I grades into PEM Wetland C to the west and south. Vegetation is diverse, reflecting mixed upland and wetland conditions with hydrological fluctuations and evidence of past disturbance including ditching and soil piles.

Wetland I represents an intact PFO wetland habitat. The wetland is large, flat and has significant storage potential with dense vegetation and slow water flow. There is some diversity in structure and cover ranging from a disturbed, partially open canopy at the edges to a closed canopy interior with a predominance of native vegetation. This wetland is indirectly connected to Lake Erie and provides floodflow alteration, sediment/toxicant retention, nutrient removal and wildlife habitat. The northern edge of Wetland I, where permanent impacts are proposed, exhibits vegetation communities and conditions that reflect a high degree of disturbance including invasive species and altered hydrology associated with the adjacent roadway and other human activities. This edge provides a buffer for the interior and less disturbed wetland conditions and edge impacts could result in minor impacts to overall wetland function to the wetland system on the Fermi site and the watershed as a whole.

3.3.9. Onsite Transmission (Figure 3.3-18)

Transmission lines currently cross the site north of Fermi Drive. To accommodate the Fermi 2 and Fermi 3 transmission needs and avoid construction equipment clearance issues in the area north of Fermi Drive, the transmission lines have been proposed to be rerouted. The new onsite transmission lines will begin at the northeast corner of Fermi Drive and Toll Road, just east of the proposed Fermi 3 switchyard.

The line will continue north on the east side of Toll Road and turn northeast/east toward the power block via the route shown on Figure 3.3-18. The transmission lines will cross over Wetlands F and C and require the installation of towers in Wetland C. The proposed transmission plan includes placing the Fermi 3 and Fermi 2 lines on common towers to reduce the overall impacts of the transmission rerouting. The placement of the Fermi 3 switchyard location in Construction Area 3 is based on rerouting and alignment with the existing transmission corridor to the site.

The proposed regulated activity requires long-term impacts to 0.24 acres (1.037E04 sq. feet) of Wetland C, a rare and imperiled Great Lakes marsh, to accommodate the tower footprints for eight transmission towers. Because the onsite transmission of electricity would consist of elevated lines, permanent impacts would occur only within the footprint required for support structures. Excavation and pile driving / drilling would be required for transmission tower foundations

An additional 2.29 acres of temporary and short-term impacts are estimated in Wetland C for the installation of the support structure, and two access roads to install and maintain the towers. Construction work mats, or bog mats are expected to be used within a 20-foot wide easement. The following table summarizes the acreage and square footage for each of the temporary impacts in Wetland C.

Temporary Impact Location	Impact Acreage	Impact Square Footage
Doxy Road Access	0.35	1.512E04
Toll Road Access	0.34	1.493E04
Tower footprint	1.60	6.963E04

Vegetation clearance of 50 feet on either side of the transmission towers along a length of approximately 700 feet will be required for the transmission lines parallel and east of Toll Road over Wetland F. As a result of the vegetation clearance, PFO Wetland F will convert from a forested wetland to an emergent wetland. Wetland F is a rare and imperiled southern hardwood swamp. The long term impact to Wetland F is 1.53 acres (6.657E04 sq. feet).

The edge of Wetland C, on the west side of Doxy Road is tree-lined. Tree clearing is necessary where the elevated transmission line exits Wetland C at Doxy Road. Silt fencing will be installed in the area as depicted on Figure 3.3-18 to minimize impacts to the wetland. Because Wetland C is a PEM, there will not be a conversion of wetland types and therefore compensation is not required for this tree clearing activity.

The additional 1.60 acres of temporary impact to Wetland C and long term impacts to Wetland F are due to the following:

- Provisions for installation of the transmission line structures and stringing the lines. This includes providing area for drilling equipment work locations for trucks and cranes, laydown areas for equipment and supplies, etc.
- Provisions for access of equipment and personnel to the work locations.
- Provisions for trimming and clearing activities.

The construction period to install the towers and wires is expected to be up to 3 months. Impacts to wetland plant communities consist of plant damage, compaction of wetland soils and short-term reductions in productivity.

Structures and access ways would be sited, to the extent practical, to avoid and minimize impacts to wetlands and streams. Construction impacts associated with transmission line crossings are associated with clearing activities and potential runoff and sedimentation. Tree cutting will occur along the transmission line right of way east of Toll Road. Bog mats will be laid in the wetland to facilitate access by construction equipment. Bog mats will be removed upon completion of the tower construction and installation of the lines and are considered a temporary impact that will minimize soil compaction and vegetation damage. To further reduce impacts to vegetation and soil, balloon tires will be used on equipment and the construction activities can be completed during the winter. Restoration is expected to occur within the following growing season.

3.4 Proposed Wetland, Stream, and Water Impacts

Potential wetland impacts include 12.86 acres of Great Lakes marsh, 1.95 acres of southern hardwood swamp, 3.91 acres of southern shrub carr, 0.80 acres of coastal emergent wetland, 7.24 acres of other emergent wetland, 4.89 acres of other forested wetland and 1.37 acres of other scrub shrub wetland. This total wetland acreage includes 1.88 acres of nonjurisdictional emergent wetland impacts (Wetland A) and activities associated with the rerouting of onsite transmission lines affecting 2.29 acres of Great Lakes marsh (Wetland C) for a brief period of time. A summary of the proposed Fermi site impacts is provided in Table 3.3-1.

3.5 Mitigation for Wetland and Stream Impacts

Because of the Fermi site's location in the coastal zone of Lake Erie, any activity onsite will have the greatest local effects (either positive or negative) on coastal resources and Lake Erie itself. Detroit Edison recognizes the value of coastal wetland habitat along Lake Erie. Several investigations of wetlands were conducted at the site and landscape level assessments were performed within the watershed and coastal zone to determine the location, quantity and quality of existing wetlands onsite and their significance in the Monroe County coastal zone of Lake Erie. Information was then used in

conjunction with communication and feedback from regulatory agencies and conservation organizations to guide avoidance, minimization and mitigation strategies associated with design of Fermi 3. These strategies resulted in a significant reduction in proposed impacts to wetlands and their associated functions and values.

Since the first design iteration for Fermi 3, impacts to over a hundred acres of wetland considered rare and imperiled and of high ecological value have been avoided including Great Lakes marsh and southern hardwood swamp. The majority of remaining unavoidable wetland impacts have been restricted to areas that are highly disturbed, fragmented and are not considered natural communities. Mitigation actions proposed as compensation for these impacts have been designed to replace and exceed the quantity and quality of these wetland areas. In general, proposed compensation will exceed regulatory requirements for spatial mitigation and specifically address conservation priorities determined by a watershed assessment including protection, restoration and enhancement of rare and imperiled coastal wetlands, large blocks of natural area, and increased connectivity with ongoing conservation lands and initiatives. The conceptual mitigation strategy in Appendix C describes this information in greater detail.

In response to the rarity of forested wetlands and the length of time it takes to restore these systems, Detroit Edison's unavoidable impacts to southern hardwood swamps were reduced to 1.95 acres with a compensation strategy that will result in the restoration of approximately 54 acres of forested wetlands immediately adjacent to Lake Erie. As stated, unavoidable impacts were restricted to non-forested, low quality wetlands to the greatest extent possible. However, compensation is still proposed at an average ratio of 5:1; a ratio generally associated with impacts to high quality, intact wetland systems. Additional mitigation is proposed in the form of enhancement of Great Lakes marsh at a ratio 23:1. This strategy proposes compensation above and beyond guidance ratios to satisfy regulatory mitigation requirements and also in support of Detroit Edison's corporate environmental stewardship initiatives and ongoing partnership with USFWS and other conservation entities.

Once the proposed compensation actions have been implemented, an additional 390 acres of rare and imperiled wetland habitat will be restored, enhanced and permanently protected in the coastal zone of Lake Erie in Monroe County. This will result in a net positive benefit to the coastal zone in terms of quantity and quality of wetland, protected area and associated watershed functions including improved water quality outflow into Lake Erie, floodflow alteration and wildlife habitat. In addition to compensatory mitigation, any wetland areas with temporary impacts will be restored to wetland habitat that will exceed the original quality, functions and values that were temporarily lost during construction of Fermi 3. This includes an additional 21.39 acres of improved wetland habitat that will be restored after temporary impacts to Construction Area 1 through 4:

- 6.93 acres of Great Lakes marsh (Wetland C)
- 3.91 acres of southern shrub carr (Wetlands E-North and E-South)

- 3.27 of PFO wetland (Wetlands B, D and Y)
- 0.80 acres of coastal PEM (Wetland AA)
- 5.11 acres of PEM wetland (Wetlands W and II)
- 1.37 acres of PSS wetland (Wetland JJ)

References

1. Department of the Army, Detroit District Corps of Engineers, Engineering and Technical Services, Regulatory Office, Permit Number 88-001-040-8 issued to Detroit Edison, May 26, 2004.

2. Michigan Department of Environmental Quality, Permit Number 04-58-0009-P, Part 325, Great Lakes Submerged Lands, issued to Detroit Edison on July 21, 2004.

3. Michigan Department of Environmental Quality, "National Pollutant Discharge Elimination System (NPDES) Permit – Detroit Edison Company Fermi 2 Power Plant, Permit No. MI0037028," 2005, available online at http://www.epa.gov/npdescan/MI0037028FS.pdf.

Table 3.3-1. Summary of Wetland Impacts (Sheet 1 of 2)

Impact Type	Wetland ID	Proposed Impacts	
		Acres	Square Feet
Emergent marsh wetland			
Great Lakes marsh (rare and imperiled)	C	9.40	4.096E05
	C[a]	2.29	9.968E04
	South Canal	1.17	5.093E04
	Total	12.86	5.603E05
Palustrine emergent (coastal)	AA	0.80	3.469E04
Palustrine emergent (other)	A[b]	1.88	8.188E04
	W	4.59	2.001E05
	II	0.52	2.261E04
	H	0.10	4223
	U	0.15	6477
	Total	7.24	3.153E05
Total emergent marsh		20.90	9.102E05
Forested wetland			
Southern hardwood swamp (rare/imperiled)	I	0.42	1.836E04
	F	1.53	6.657E04
	Total	1.95	8.493E04
Palustrine forested (coastal and other)	B	0.76	3.309E04
	D	1.37	5.957E04
	Y	1.14	4.967E04
	KK	1.62	7.062E04
	Total	4.89	2.129E05
Total forested wetland		6.84	2.979E05
Shrub scrub wetland			
Southern shrub carr (coastal)	E-North	1.87	8.142E04
	E-South	2.04	8.890E04
	Total	3.91	1.703E05
Palustrine scrub shrub (other)	JJ	1.37	5.956E04
Total shrub scrub wetland		5.28	2.299E05
Total Wetland Impacts		33.01	1.438E06

Table 3.3-1. Summary of Wetland Impacts (Sheet 2 of 2)

Impact Type	Wetland ID	Proposed Impacts	
		Acres	Square Feet
Open water	H	1.86	8.120E04
	U	3.32	1.445E05
	Lake Erie	0.08	3600
	Total[c]	5.26	2.293E05

[a]Temporary impacts to Wetland C (laydown area around the transmission towers and access) are included in the impacts to Great Lakes marsh. Because of the limited duration of the impact, mitigation is not proposed for this acreage.

[b]Wetland A is included in the impacts to emergent wetland. Because Wetland A is unregulated, mitigation is not proposed for this acreage.

[c]Mitigation is not proposed for open water impacts.

Figure 3.3-1. Potential Wetlands Construction Impacts

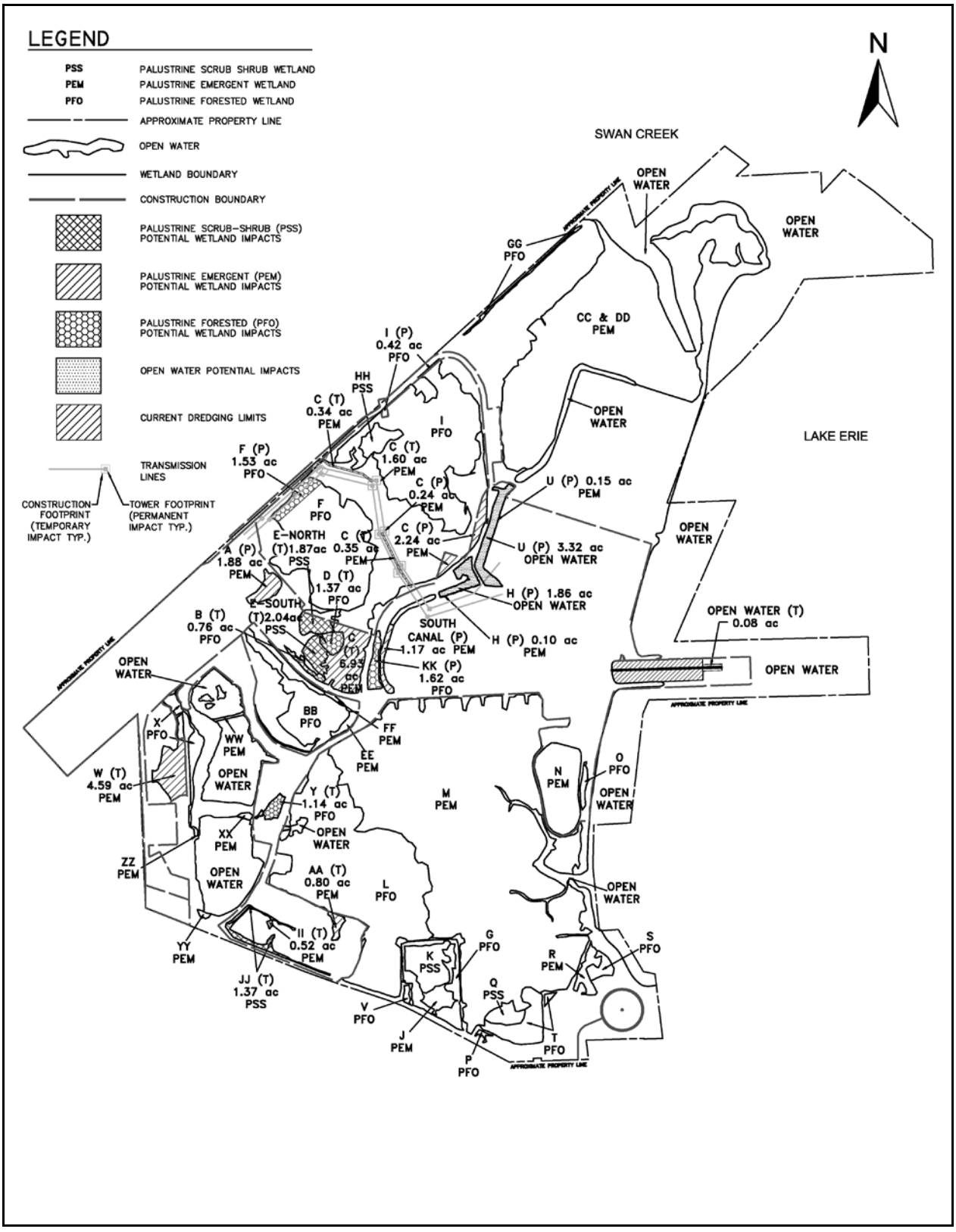


Figure 3.3-2. Location of Intake Structure/Discharge Pipe/Fish Return/Barge Slip

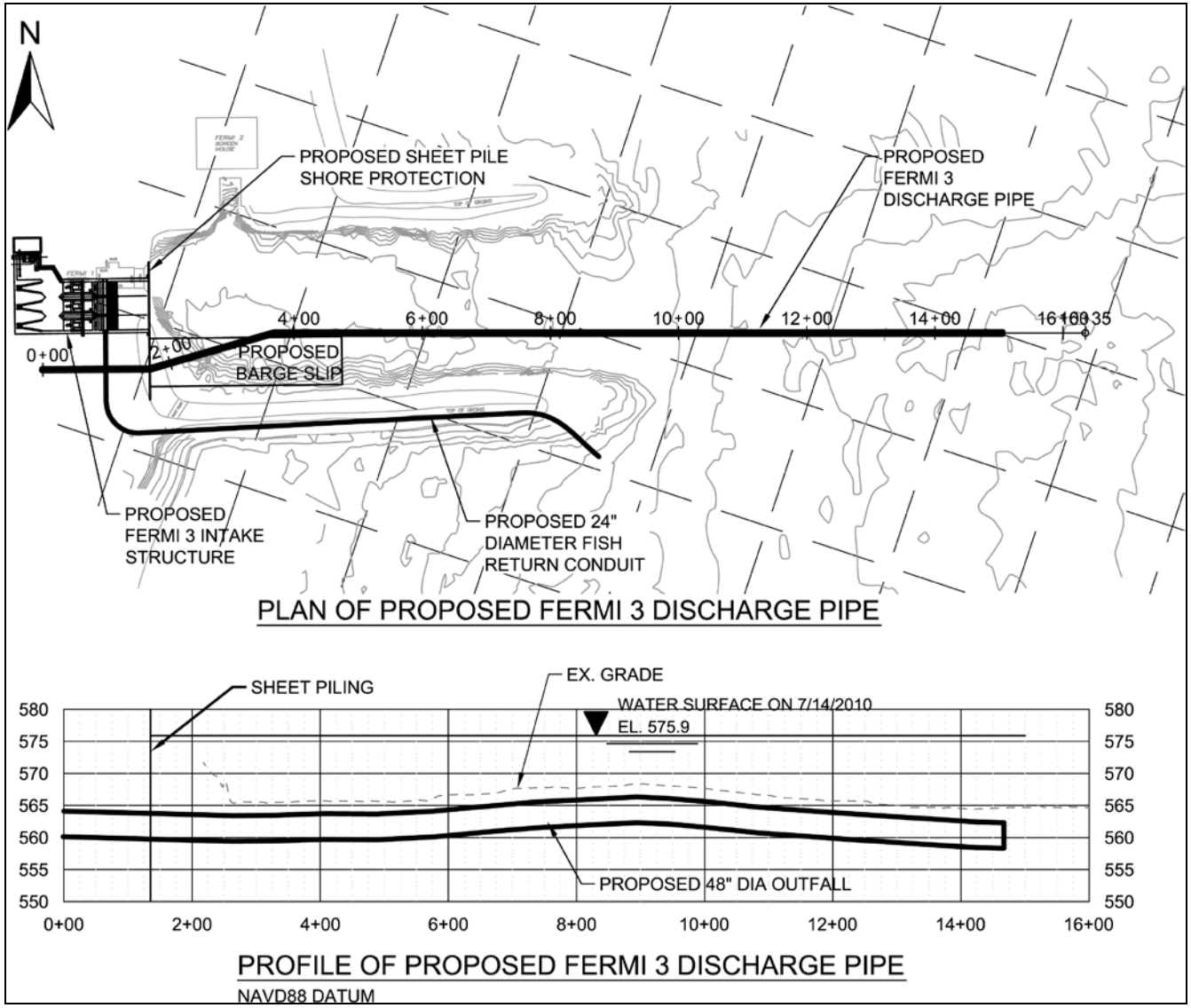


Figure 3.3-3. Outfall Diffuser Arrangement

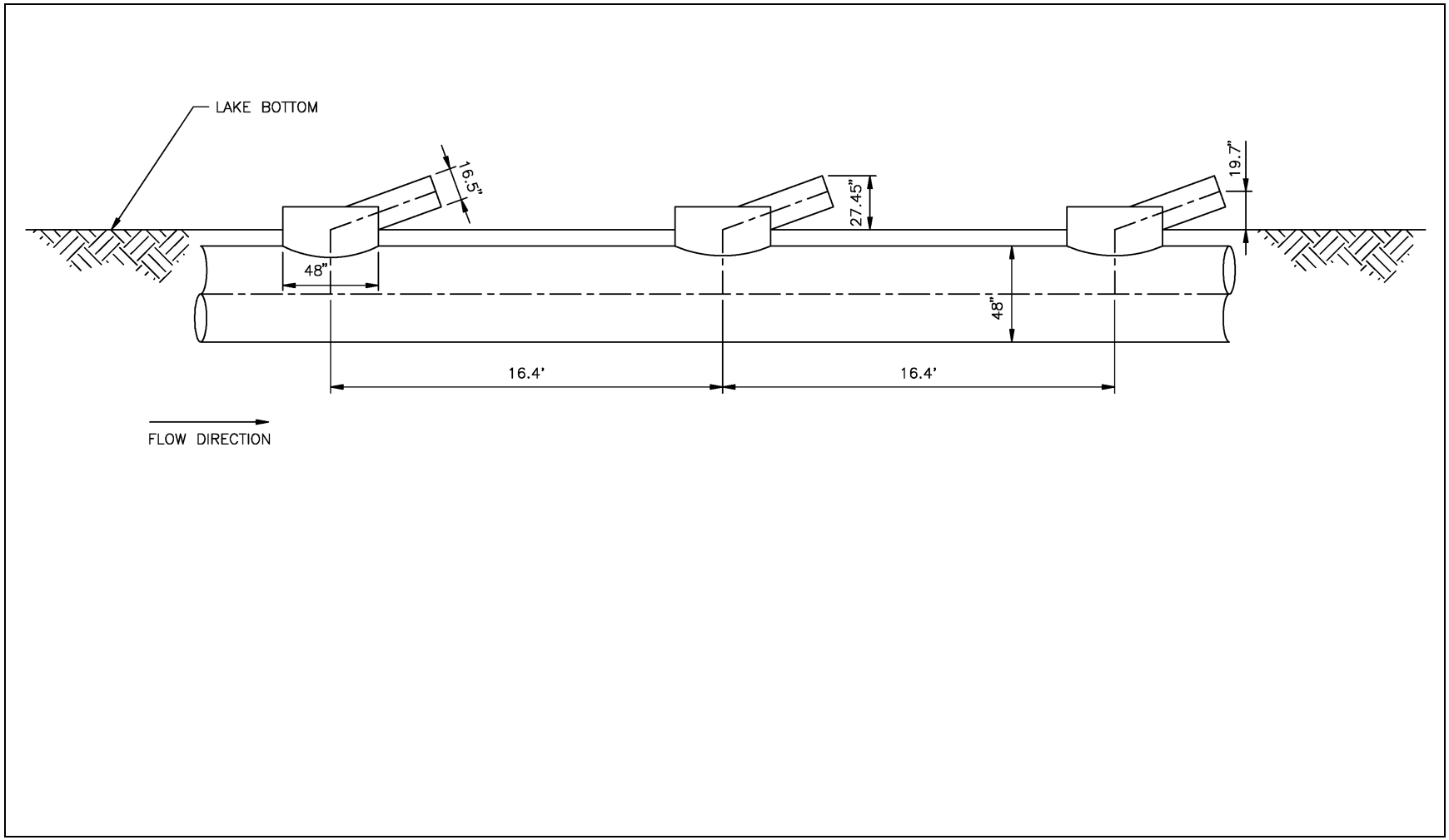


Figure 3.3-4. Discharge Pipe Dredging Cross Section

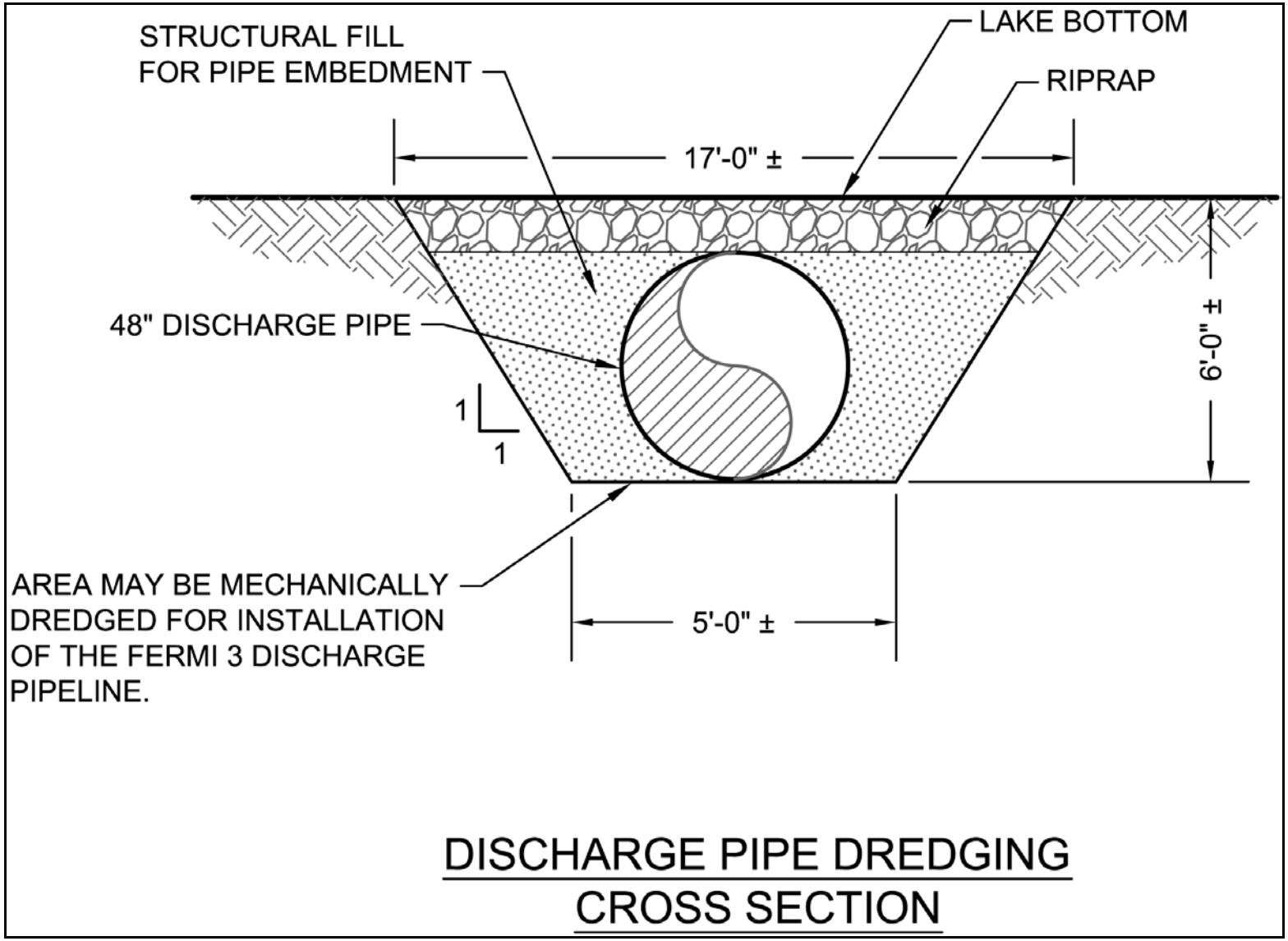


Figure 3.3-5. Existing Intake Canal Plan View

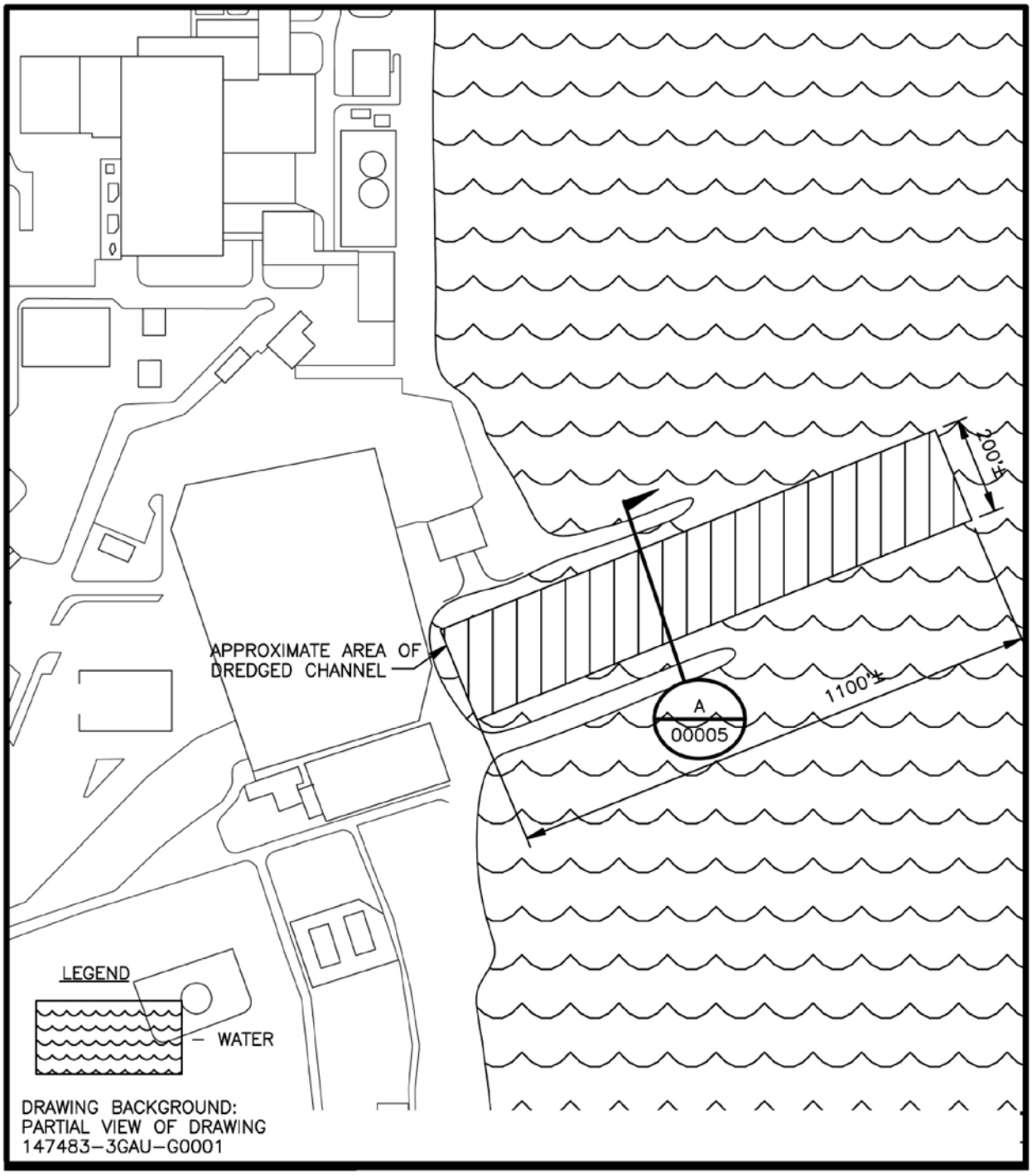


Figure 3.3-6. Existing Intake Canal Cross Section

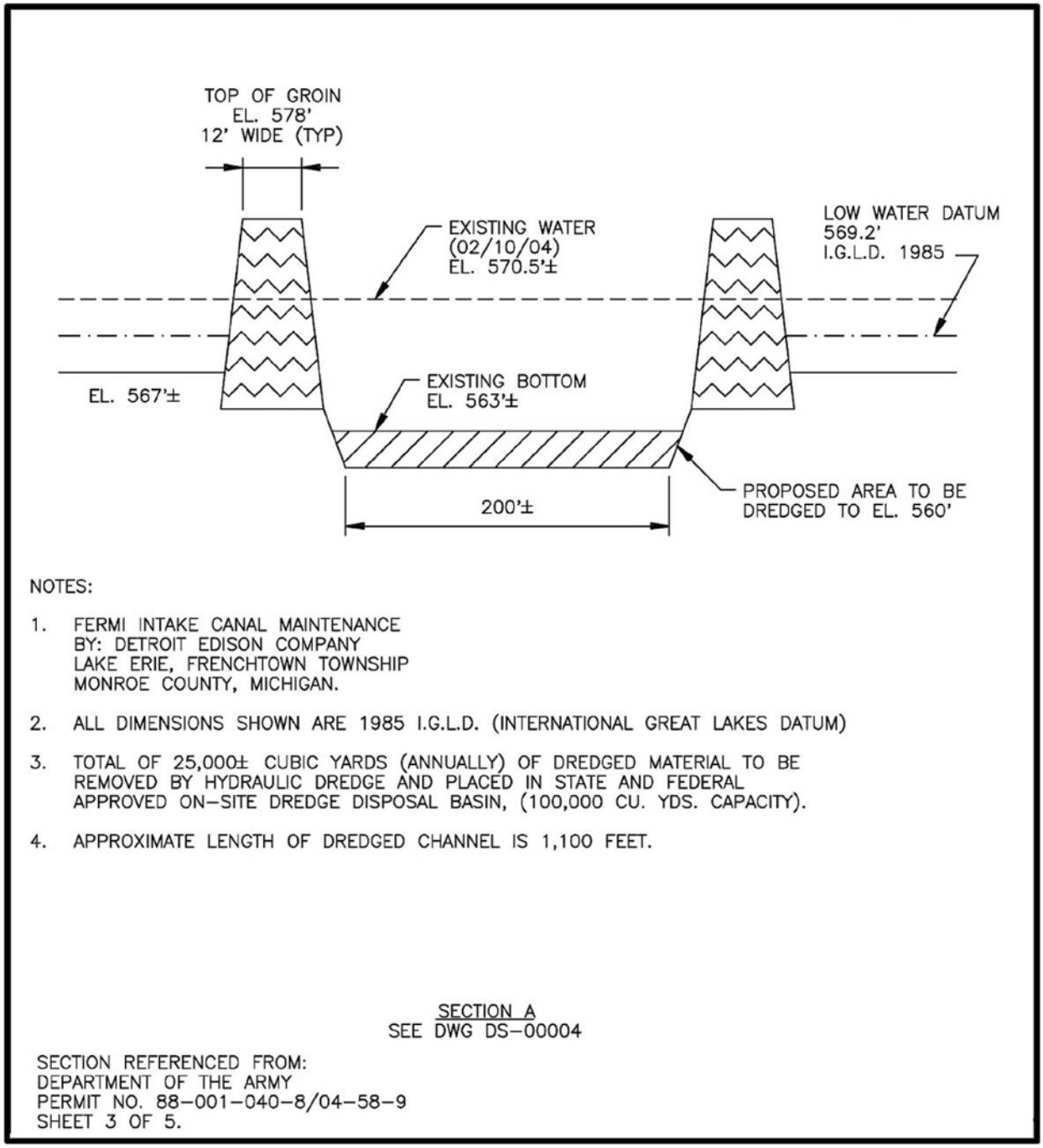


Figure 3.3-7. Fermi 3 Station Water Intake Structure (Plan View)

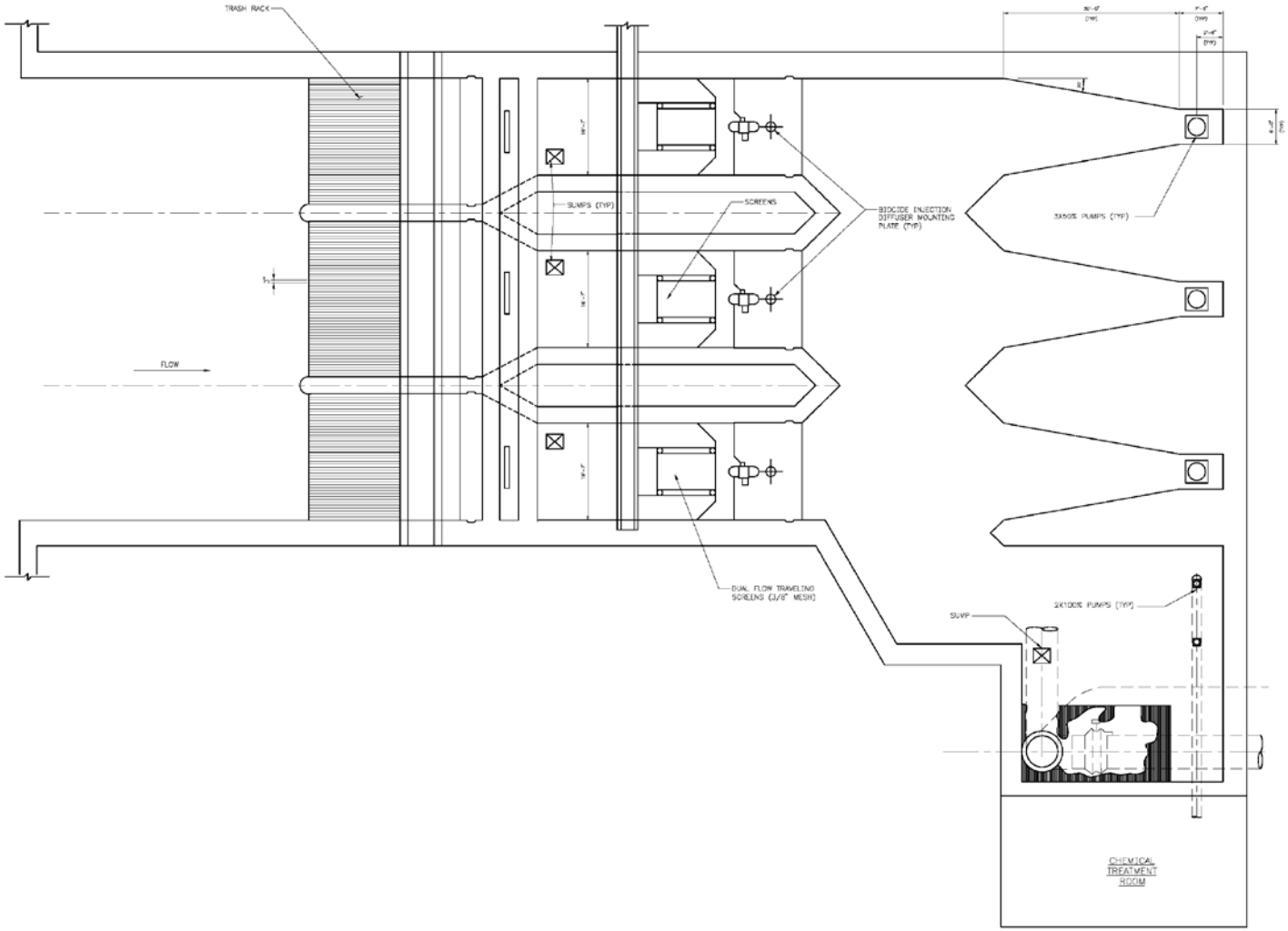


Figure 3.3-8. Fermi 3 Station Water Intake Structure (Elevation View)

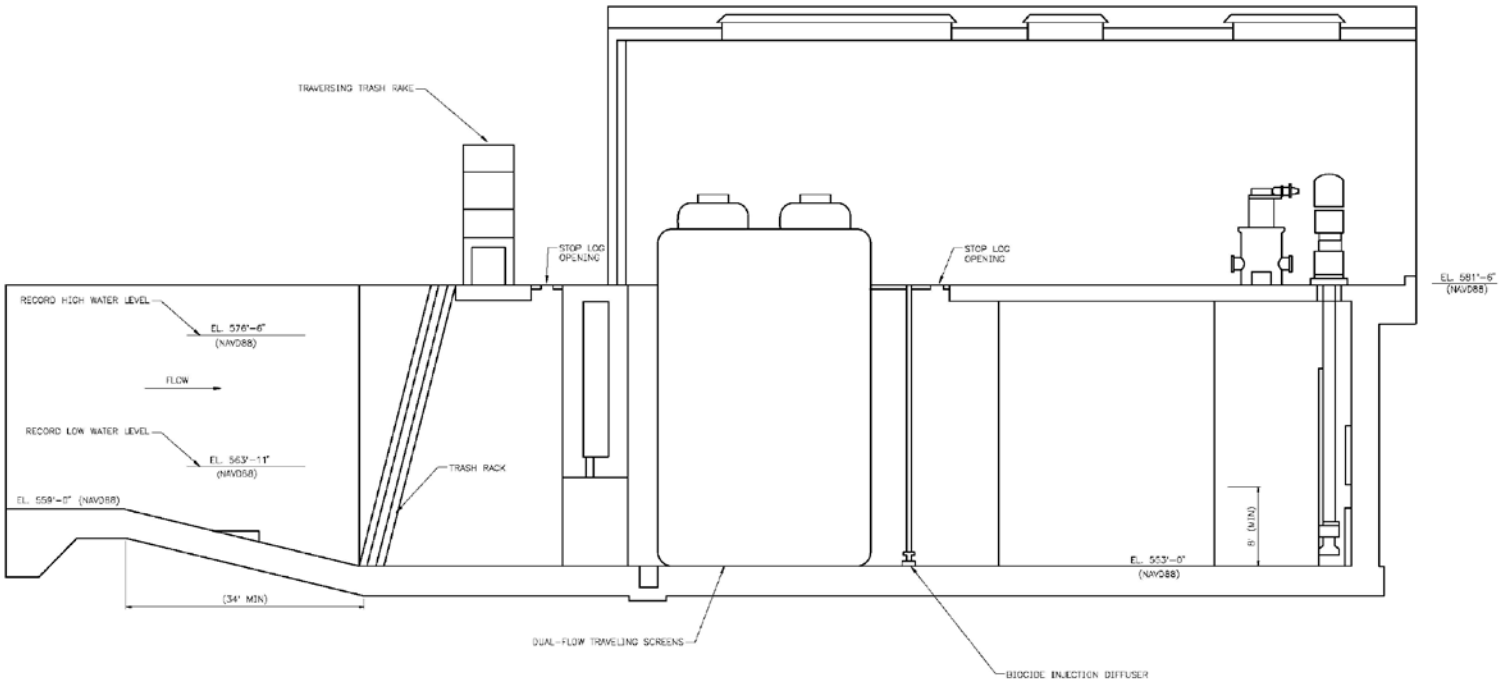


Figure 3.3-9. Construction Area 1 Impact

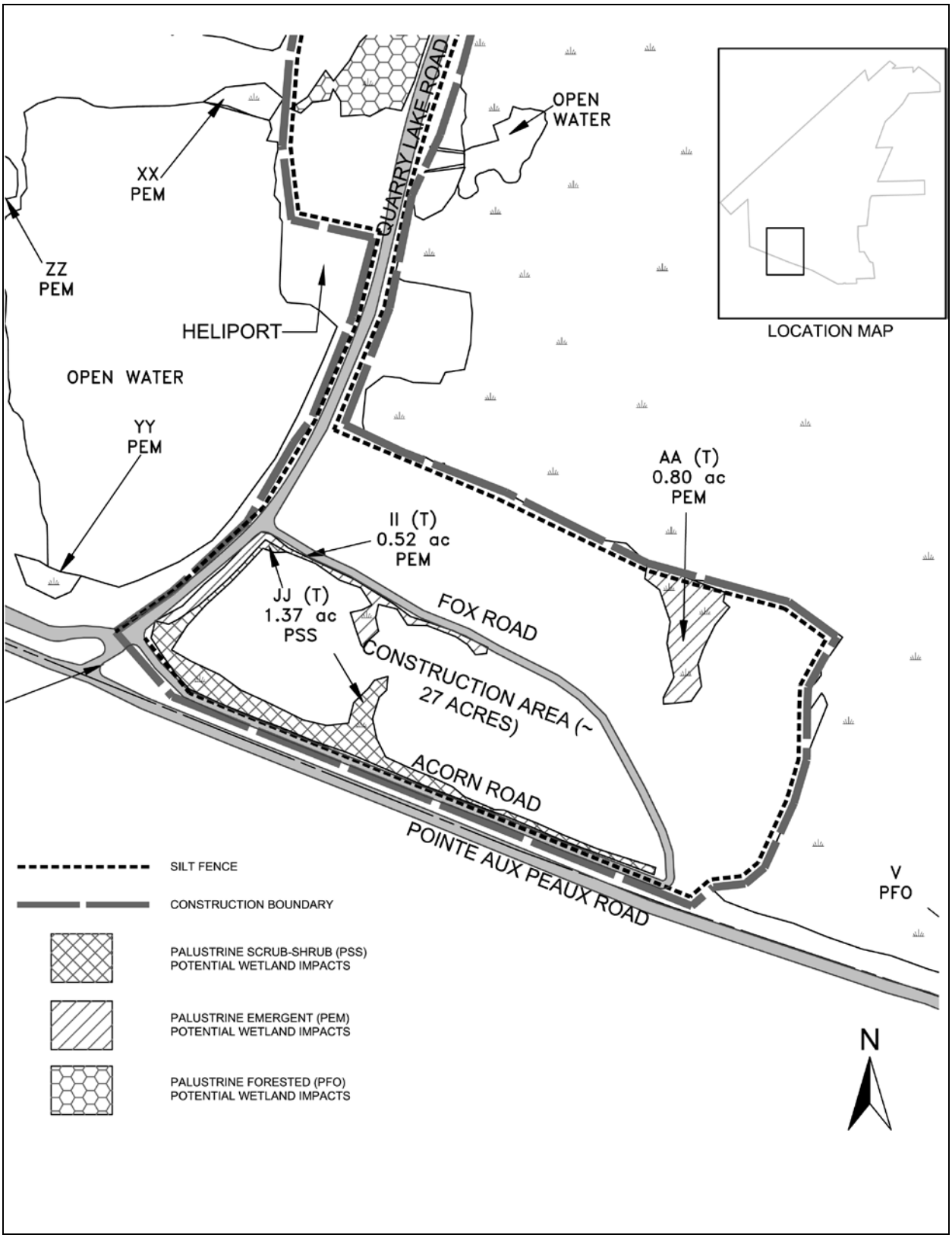


Figure 3.3-10. Construction Area 2 Impact

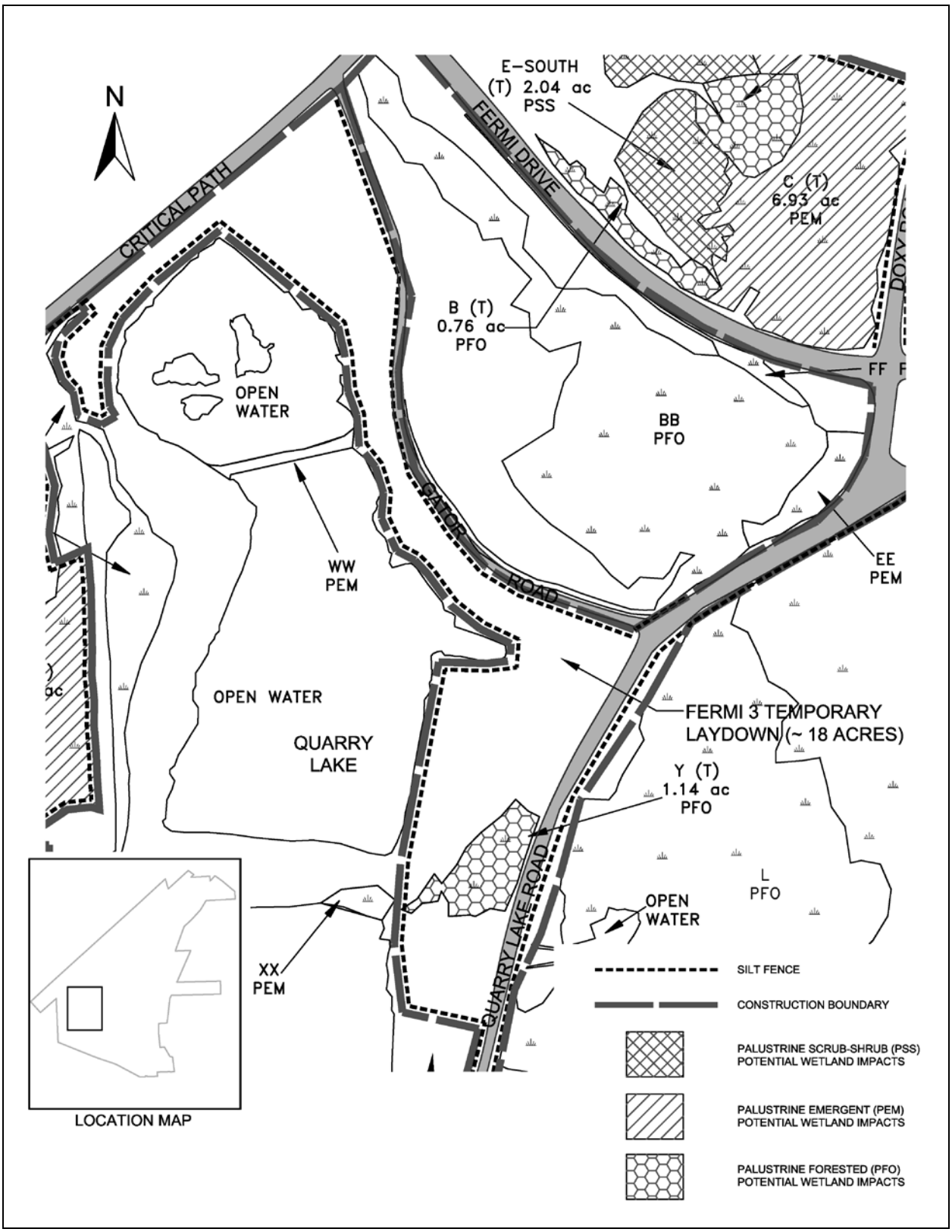


Figure 3.3-11. Construction Area 3 Impact

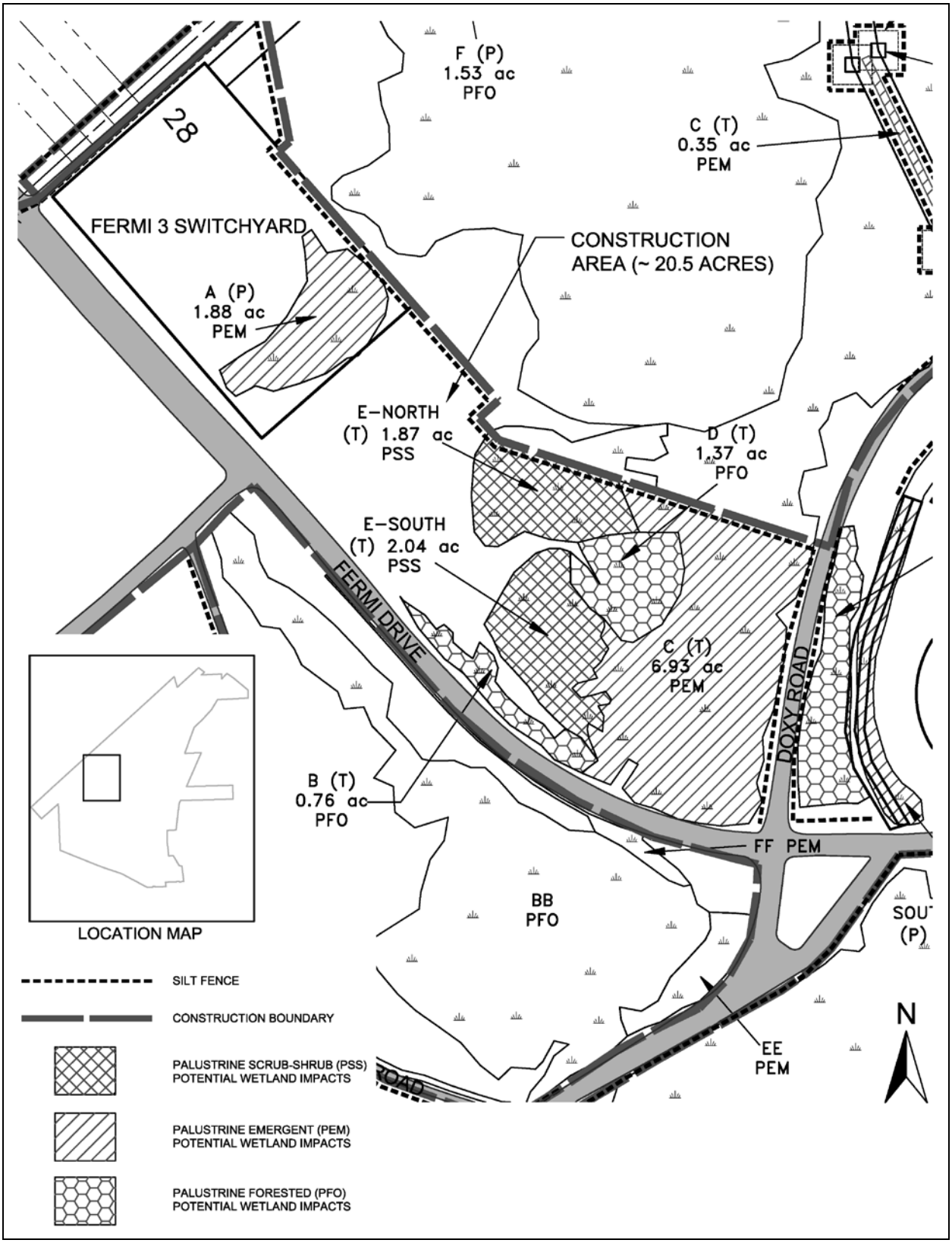


Figure 3.3-12. Construction Area 4 Impact

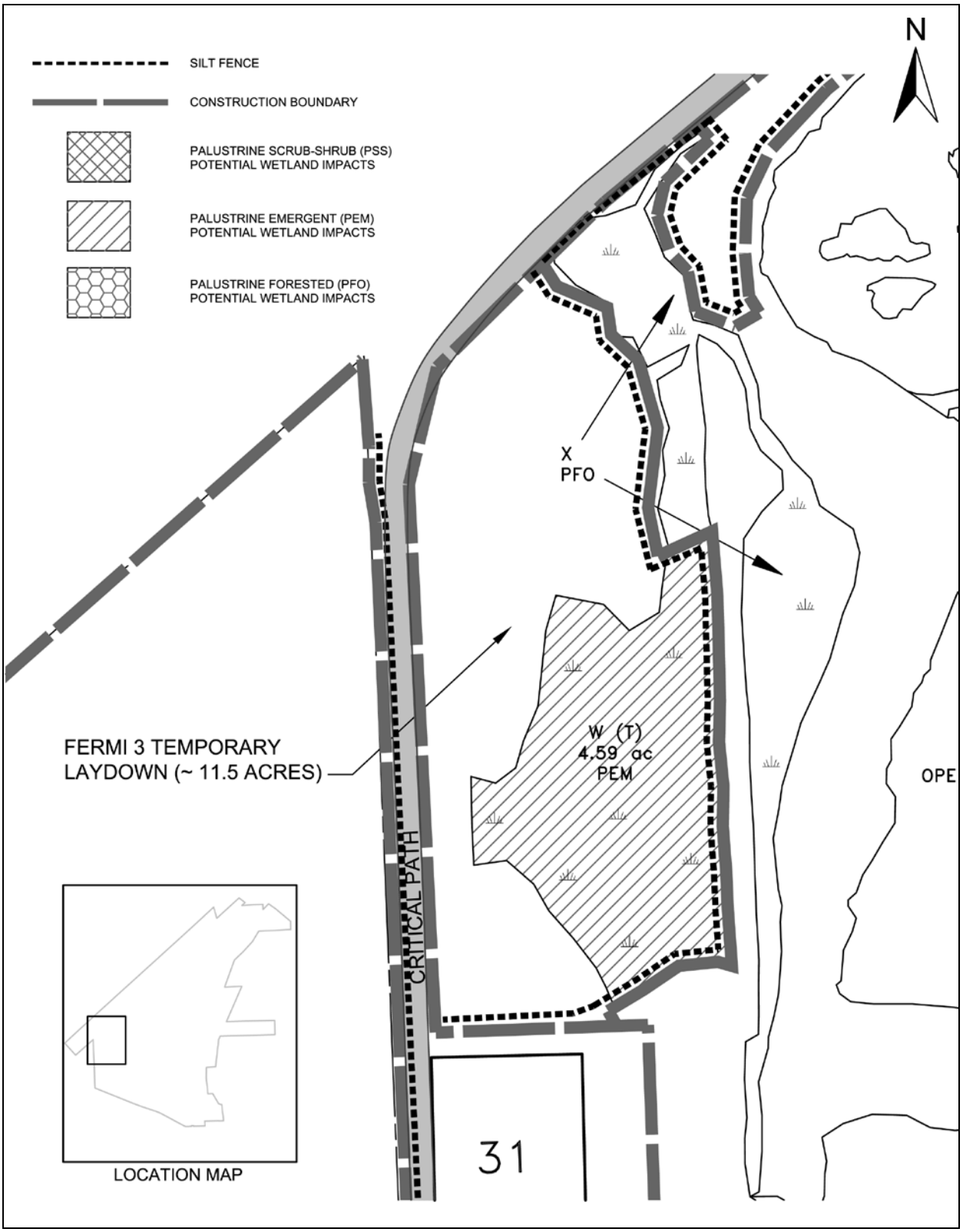


Figure 3.3-13. Warehouse, PAP/VIB and Parking Garage Impact

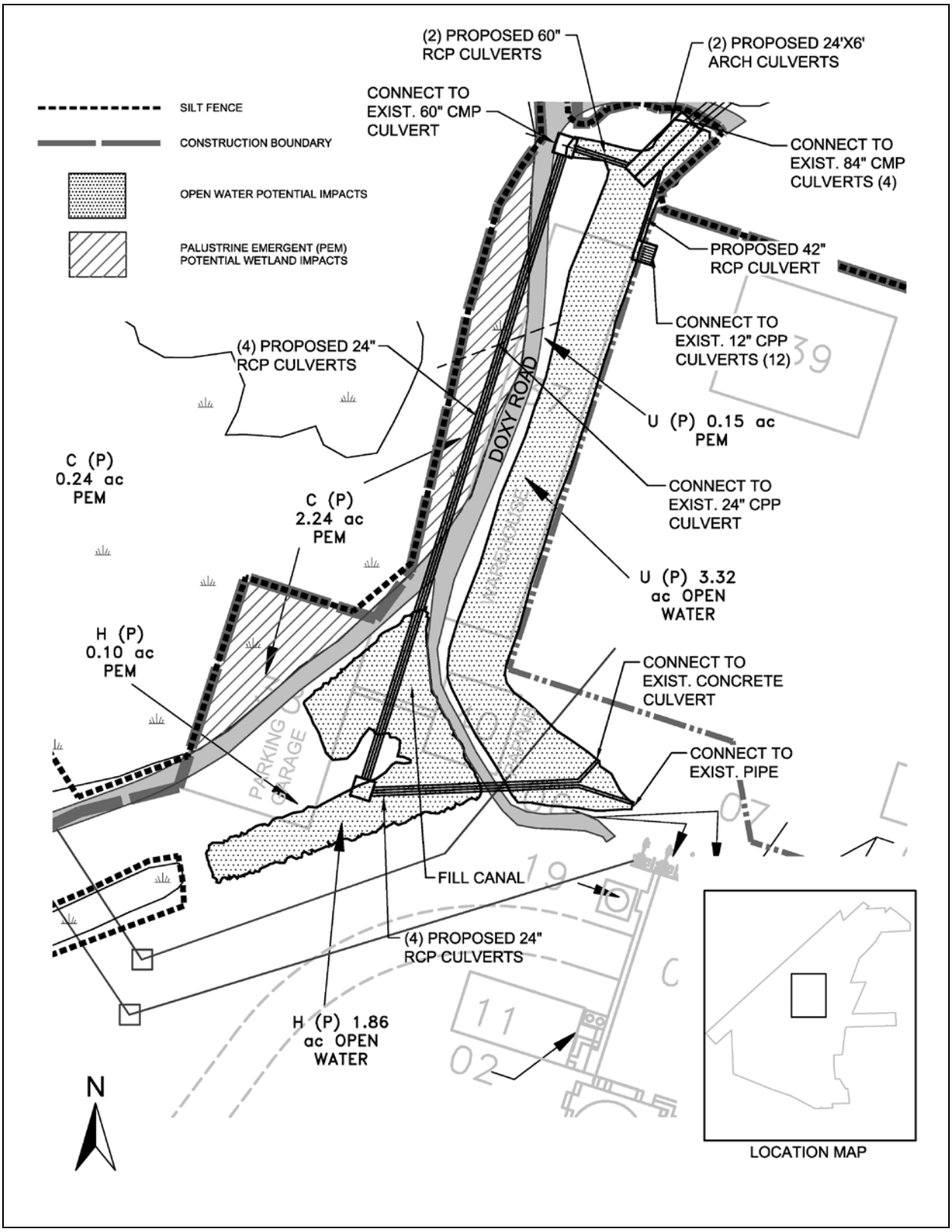


Figure 3.3-14. Cooling Tower Impact

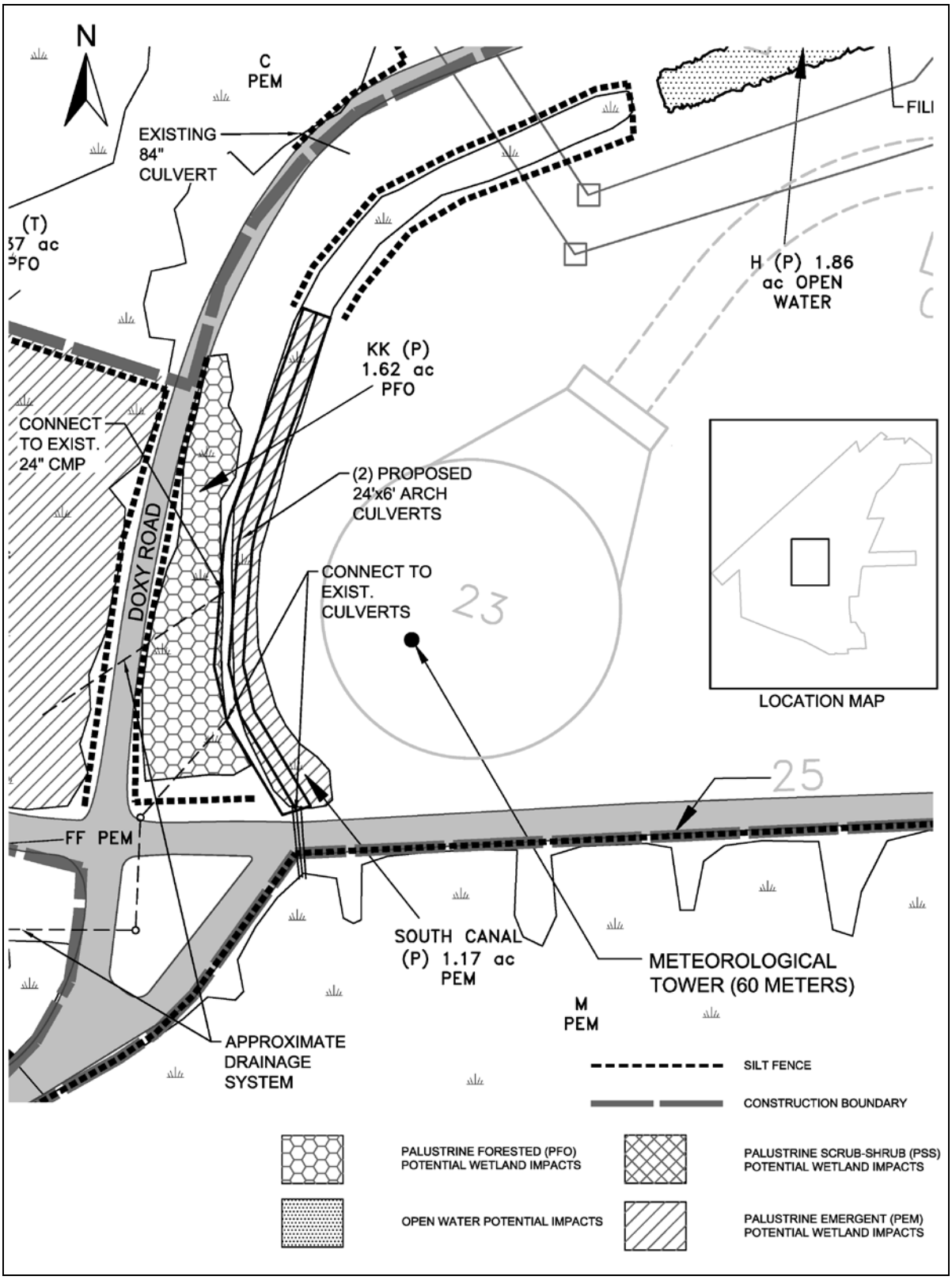


Figure 3.3-15. South Canal Culvert Cross Section

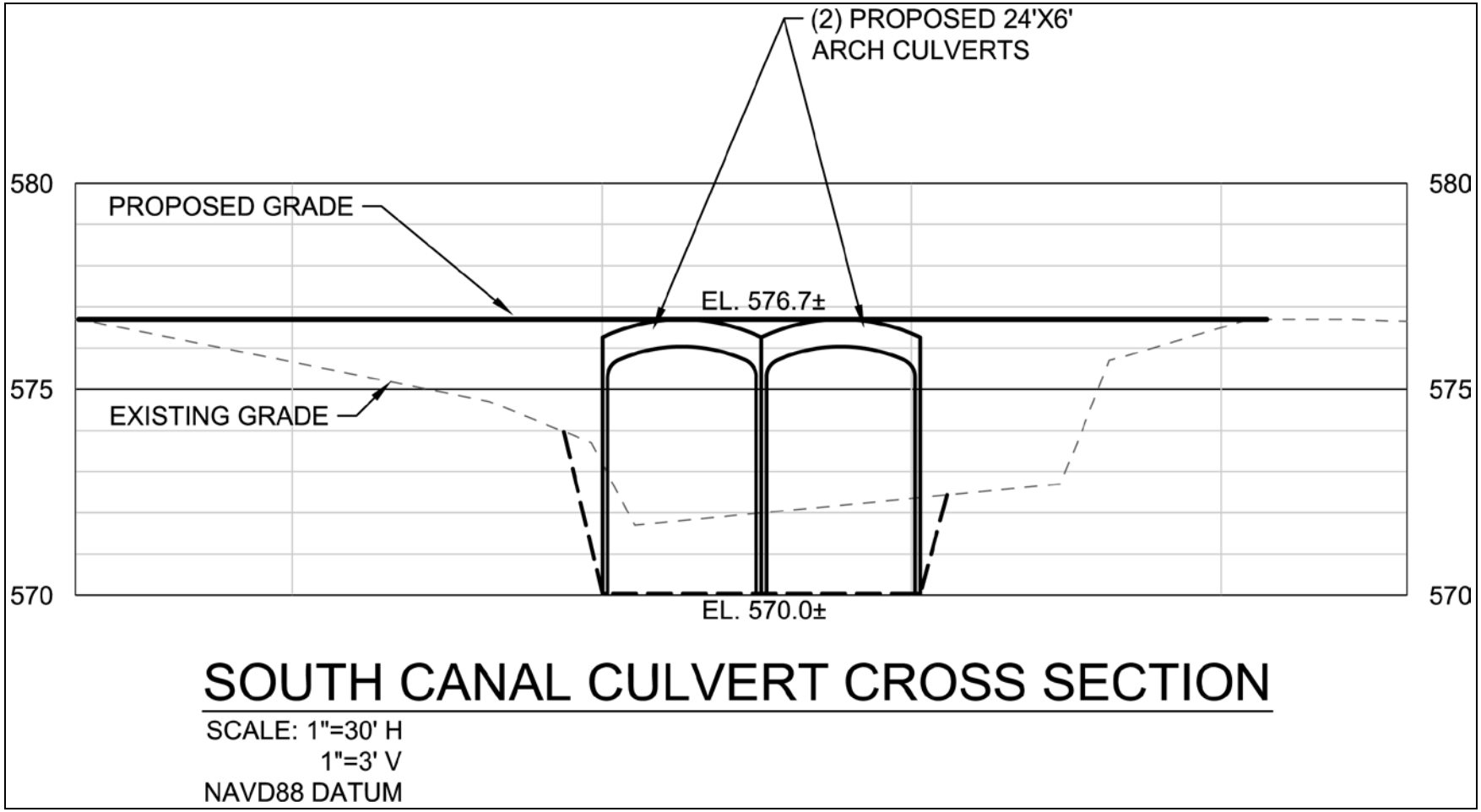


Figure 3.3-16. New Operations Access Road Design

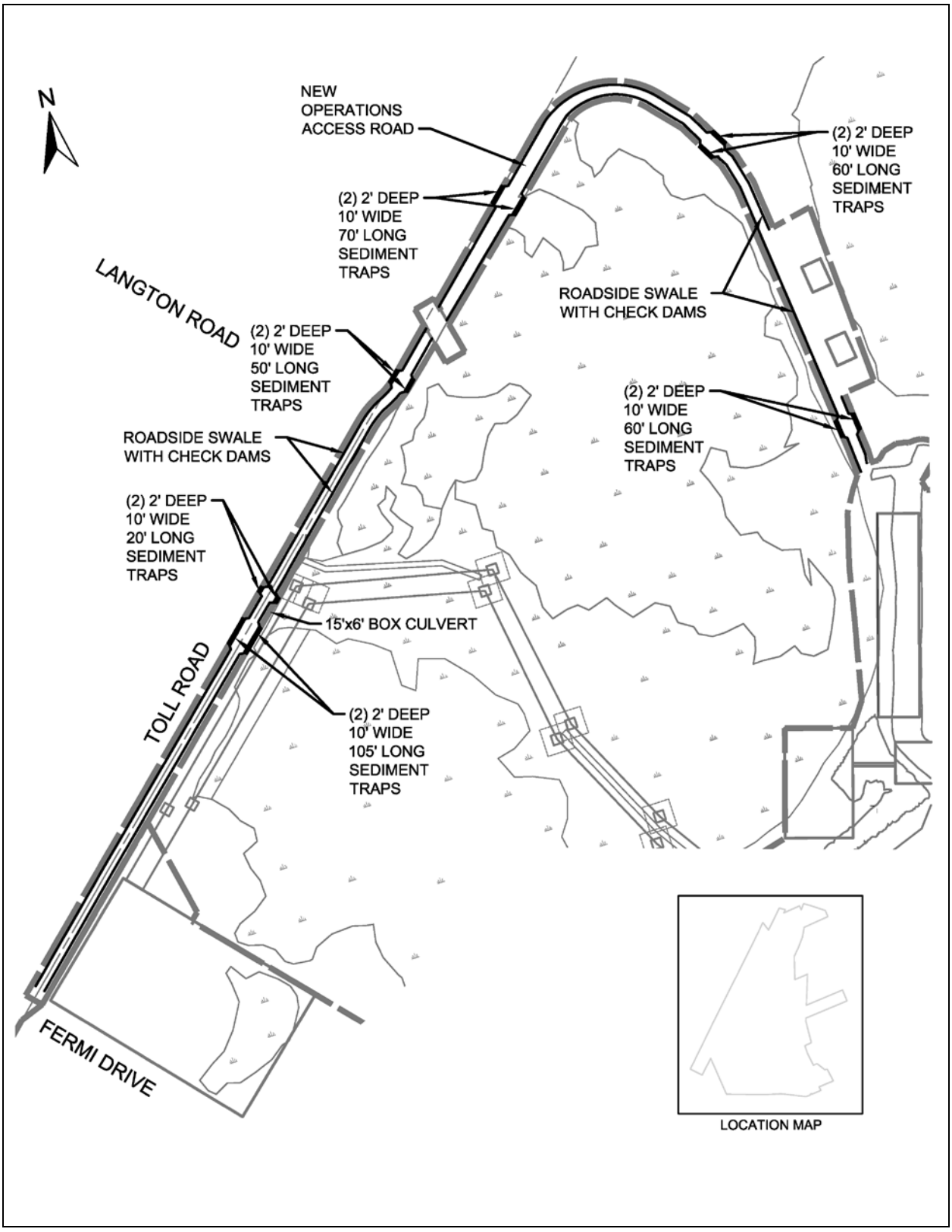


Figure 3.3-17. New Operations Access Road Impact

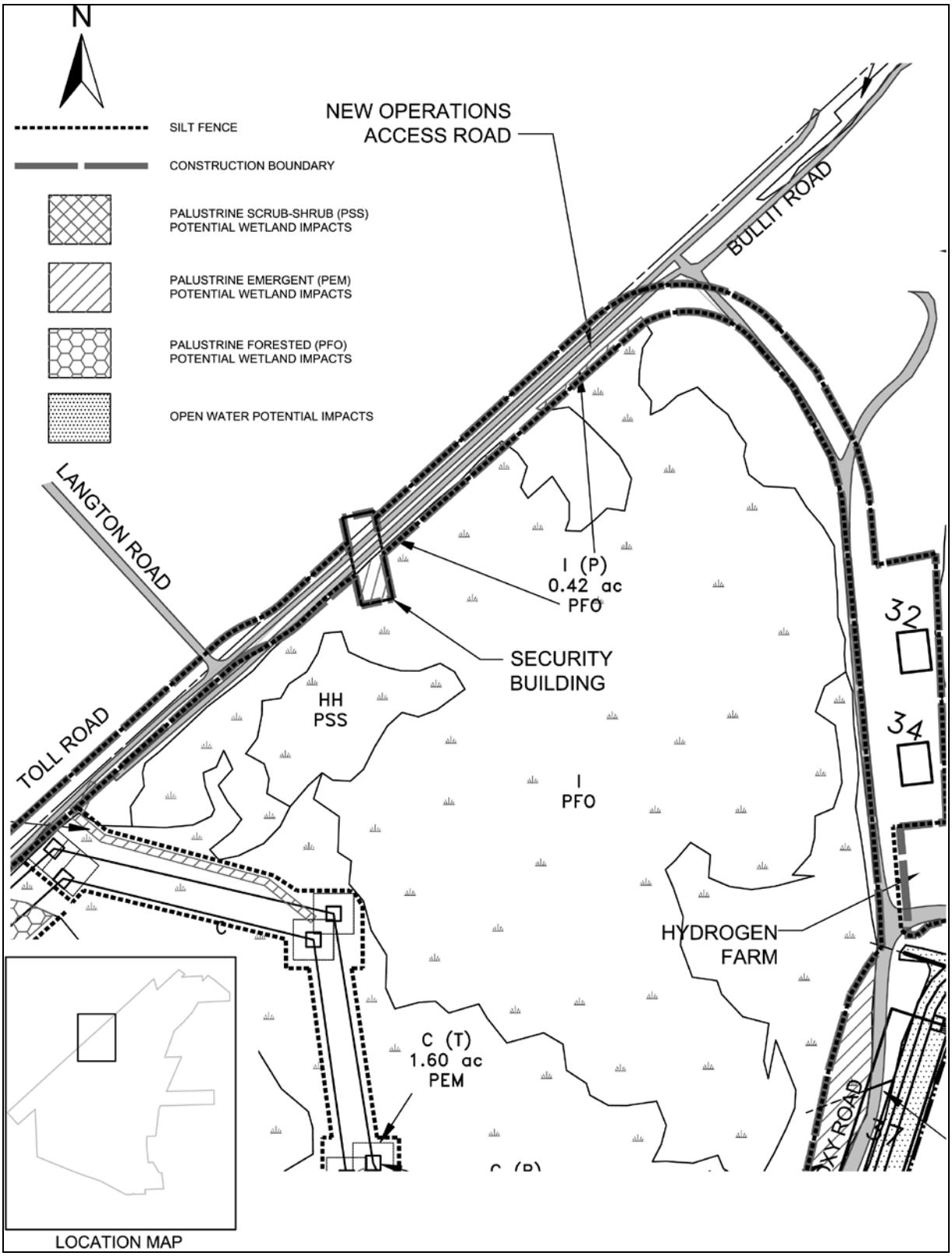
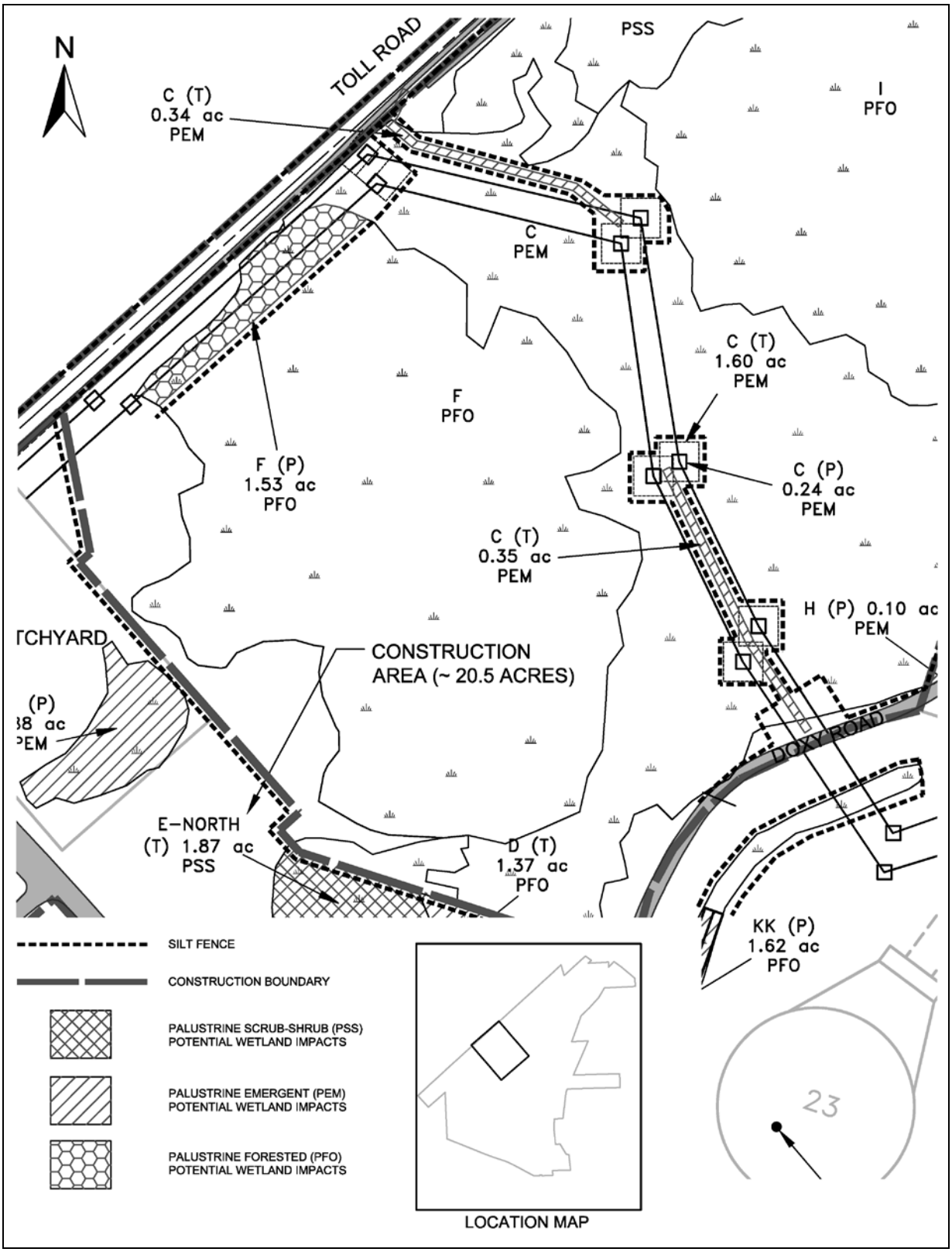


Figure 3.3-18. Onsite Transmission Impact



4.0 PUBLIC INTEREST REVIEW

The public interest review is part of both federal and state permitting. In federal permitting, according to 33 CFR 320.4(a), a factor important in determining whether or not to issue a permit is an evaluation of the probable impacts, including cumulative impacts, and a project's intended relationship to overall public interest. According to these regulations, a permit will be granted unless the district engineer determines that it will be contrary to the public interest. A summary of the potential benefits and impacts of the proposed Fermi 3 project and proposed mitigation measures is provided below.

4.1 Benefits of Proposed Development

Construction and operation of the Fermi 3 generating facility would provide reliable, affordable power to address Michigan's expected future baseload electric demand. The construction and operation of Fermi 3 would produce secure, dependable, electrical energy that will help Michigan move towards meeting its projected need for power, create jobs, and generate tax revenues that contribute to the local and regional economies. Additional benefits include the reduction of air pollutant emissions and greenhouse gases relative to fossil-fuel generated power. The public benefits that will result from the proposed Fermi 3 project include the following:

- The states of Michigan and Ohio and the counties surrounding Fermi 3 would experience an increase in the amount of taxes collected from labor, services, construction materials and supplies purchased for the project. An estimated $19.1 million in property taxes, $1.2 million in direct sales taxes, and $4.5 million in indirect sales taxes would be generated annually over the operating life of the plant. The increased tax revenue will support improvement to public infrastructure and social services. The increased revenue will spur future growth and development.
- The construction of the Fermi 3 project is expected to directly create approximately 2900 jobs (peak) and $627.5 million in direct earnings within the region. Eighty-five percent of the construction workers are projected to be from the existing workforce in the primary impact area.
- The operation of Fermi 3 will require approximately 900 workers, which is an incremental increase in 640 direct permanent jobs within the region for at least 40 operating years. Over the first 30 years of Fermi 3 operations, the direct earnings for Fermi 3 staff would exceed $2.0 billion (2008 dollars).
- Fermi 3 will provide an annual average 12 million MWh of total power generation. The additional generation from Fermi 3 will help maintain system reliability by increasing the availability of baseload power.
- The operation of Fermi 3 will enhance electrical reliability, dampen the potential for fuel price volatility, and reduce the exposure to supply and price risk associated with reliance on any fuel source.

- The construction and operation of Fermi 3 will produce less air pollutant emissions and greenhouse gases since nuclear reactors produce relatively small levels of pollutant air emissions when compared to the principal viable energy alternatives, coal and natural gas.
- Energy generation from Fermi 3 represents a potential for reducing the foreign trade deficit and enhancing the nation's energy security by way of decreased reliance on imported natural gas and other fuels.
- The operation of Fermi 3 will offset the rate of depletion of the nation's finite fossil fuel supplies.

4.2 Summary of Public Interest Factors

The public interest factors listed in 33 CFR Part 320.4(a)(1) are conservation, economics, aesthetics, general environmental concerns, wetlands, historic properties, fish & wildlife values, flood hazard, floodplain values, land use, navigation, recreation, shore erosion and accretion, water supply and conservation, water quality, energy needs, safety, food and fiber production, mineral needs, considerations of property ownership, and in general, the needs and welfare of the people.

4.2.1 Public Interest Factors Eliminated from Detailed Analysis

The Fermi 3 project will have little or no impact on fourteen of the public interest factors. This section briefly summarizes each of the factors eliminated from detailed analysis.

4.2.1.1 Aesthetics

Aesthetic impacts are limited due to the public's general inability to access the Fermi site. The construction of Fermi 3 will occur in the heart of the Fermi site, and most of the activity will not be visible from beyond the site. The primary exceptions are the temporary increase in traffic volume, particularly during the peak construction months, plus the cooling tower that will be approximately 600 feet tall and will become visible from beyond the site as construction proceeds; therefore, impacting the visual aesthetics of the area. Once construction is complete, the aesthetic and visual impacts associated with construction will recede, with the cooling tower the only Fermi 3 facility remaining visible from offsite. Thus, the impacts on aesthetics from construction are expected to be minor, short-term negative impacts.

The Fermi 3 project is not expected to transform the viewscape of the area. The Fermi site will remain an area characterized by its use for power generation. Fermi 3 construction would be consistent with similar types of structures found currently on the Fermi site. Construction of Fermi 3 is not expected to encourage unplanned and incompatible human access or to destroy vital elements that contribute to the compositional harmony or unity, visual distinctiveness, or diversity of an area as viewed by the public because there is no public access to the site. The Fermi 3 project will include construction of structures that extend offshore and the discharge of dredged or fill materials. The construction of offshore structures (e.g., intake structure, outfall structure, and barge facility) and the discharge of dredged or fill material (e.g., discharge of dredged material onsite) will result in localized impacts on the Fermi site's general

aesthetics and the aesthetics of the onsite aquatic ecosystem. However, because of the localized nature of the impacts and the public's lack of access to the Fermi site, construction of offshore structures and the discharge of dredged or fill material is not expected to result in aesthetic impairments or obstructions to the public.

Standard noise control measures for construction equipment, such as the use of silencers on diesel powered equipment exhausts, are expected to be employed to limit the noise emissions from Fermi 3 construction. Additionally, administrative measures will be employed to mitigate construction noise impacts. These administrative measures include limiting the types of construction activities during nighttime and weekend hours, notifying all affected neighbors of planned activities, and establishing a construction noise monitoring program. The overall noise impacts on the surrounding areas (including effects on people and buildings) due to Fermi 3 construction activities will be temporary and are expected to be minor.

4.2.1.2 Flood Hazard and Floodplain Values

The Fermi site and Fermi 3 project activities are located in an area where water levels are largely under control of the Great Lakes and Lake Erie. The volume of water in Lake Erie and connected Great Lakes is so vast that the Fermi 3 project and similar projects would not induce any measurable change in the system's water level. Any change would be indiscernible and trivial when compared to weather-related impacts. No impacts on flood hazards and floodplain values are expected.

4.2.1.3 Land Use

The construction of Fermi 3 will comply with Monroe County and Frenchtown Township land use plans and policies and will comply with county zoning regulations and their specified uses. Monroe County land use planning documents, including the 1985 Comprehensive Plan, emphasize retaining agricultural land uses and preserving existing farmland while encouraging a strong economy. Development of the Fermi site has been consistent with county planning goals, leaving large portions of natural wetland areas onsite intact while developing a power plant that provides economic and environmental benefits to the county and surrounding communities.

4.2.1.4 Navigation

The West Outer Channel and the East Outer Channel are federal navigation channels that connect in Lake Erie approximately 7 miles northeast of the Fermi site. The West Outer Channel provides the closest shipping approach in Lake Erie, but is more than 5 miles from the Fermi site. Should dredging be required for barge deliveries for Fermi 3, there would be no impacts to navigation, since the dredging would likely be limited to the immediate vicinity of the intake groins or possibly waterward of the tip of the groins, depending on the current lake bathymetry. The dredging would not interfere with the West Outer Channel.

The waters and adjacent shoreline of Fermi 2 are designated as a security zone, as set forth in 33 CFR 165.915. Entry into this zone is prohibited unless authorized by the U.S. Coast Guard. The Fermi 2 exclusion area boundary (EAB) extends a radius of 915 meters from the center line of Fermi 2. The Fermi 3 EAB will extend 2928 feet from the center line of Fermi 3. The EAB radius extends into Lake Erie.

The water portion of Fermi 2 and Fermi 3 EABs in Lake Erie is controlled through security surveillance, use of the public address (PA) system to warn boaters, and placement of buoys which identify the area as restricted. Flyers providing information to boaters regarding the Fermi security zone and restricted area are posted at nearby marinas and bait shops. The Lake Erie shoreline on the plant site is unsuitable for beach activities, inaccessible to the public from the land side, and posted as private property. Due to poor fishing and the shallowness of Lake Erie in this area, the public rarely attempts to approach the Fermi site from the lake or use the Fermi shoreline area.

There is no recreational or commercial boat traffic immediately offshore of the Fermi site due to the security zone. The proposed Fermi 3 construction activities (e.g., dredging to install the discharge pipeline) will take place within the security zone. Thus, there will be no impacts to navigation.

4.2.1.5 Recreation

Detroit Edison does not allow public access to Fermi site for recreational purposes. Water-related recreational activities are not permitted on the Fermi site or within the security zone extending into Lake Erie. The proposed construction activities would not impact public recreation because there are no opportunities for public recreation on the Fermi site or within the Fermi security zone.

4.2.1.6 Shore Erosion and Accretion

Because of the lack of shoreline-related activities, the proposed construction activities associated with Fermi 3 are unlikely to cause notable accretion or erosion issues along adjacent shoreline areas. If the Fermi 3 construction activities have any impact on shore erosion or accretion, those impacts are expected to be minor and short term. Fermi 3 operations are not expected to affect the current rate of erosion or accretion experienced by the Fermi site and adjacent properties.

4.2.1.7 Water Supply and Conservation

There are no indicators of inadequate water supply availability at the Fermi site or competition with other potential users for water supply needs. The Fermi 3 project is not expected to limit the availability of water to satisfy potential water needs of other users. Given Lake Erie's vast size, Fermi 3's modest surface water withdrawals will have no impact on the availability of lake water for consumptive use. Fermi 3 construction will include dewatering of foundation excavations. Groundwater wells located near the Fermi site could fall within the area of influence of the dewatering. The maximum water level decline of offsite wells associated with temporary construction dewatering will be less than the typical annual potentiometric head variation. Accordingly, the impact on nearby wells due to dewatering will be minimal,

and does not warrant mitigation. Groundwater levels will be monitored during construction. If local well users are affected during Fermi 3 construction, Detroit Edison will ensure that appropriate mitigation measures are implemented.

4.2.1.8 Water Quality

Construction and operations of Fermi 3 would result in sediment and chemical releases. Best management practices, sediment and erosion control measures, and other mitigation techniques such as those described in Section 3.2 would be implemented to limit the impacts to water quality. No major or permanent degradation of water quality is expected from the proposed Fermi 3 construction and long-term operations. There are no water intakes in the area that are likely to be affected and no anticipated impacts on any drinking water aquifer. The Fermi 3 project will comply with state and federal water quality standards and will not contribute to any significant adverse effects on aquatic life or ecosystem diversity, productivity, or stability.

4.2.1.9 Energy Needs

As noted in Section 4.1, the Fermi 3 project will provide additional baseload capacity, diversify energy sources, promote stability, reduce reliance on fossil fuels, and increase energy security. With an average annual electrical energy generation of 12 million MWh, Fermi 3 will help address the future baseload generation needs in the region. Fermi 3 construction will require some consumption of energy, but that demand will not impact the level of energy resources in the region. The operational impacts of Fermi 3 on energy needs are major, long-term, and positive.

4.2.1.10 Economics

As noted in Section 4.1, the socioeconomic impacts of the Fermi 3 project will be positive and will likely be significant in the areas of employment, income generation, and tax benefits. The principal benefit of construction and operation of a new unit would be the production of electrical energy and the economic productivity of the site. The jobs created by the construction and operation of the new facility would represent a substantial stimulus to the local economy. In addition, tax revenues from the facility would benefit Monroe County, the region, and the State of Michigan.

4.2.1.11 Safety

The Final Safety Analysis Report for the Fermi 3 project, contained in Part 2 of the COL application, provides an evaluation of the facility for conformance with the acceptance criteria contained in NUREG-0800, “Standard Review Plan for the Review of Safety Analysis Reports for Nuclear Power Plants LWR Edition” (Reference 1). That safety anaylsis report documents how the Fermi 3 project will comply with the Commission's regulations and guidance. The Fermi 3 plant will be constructed and operated in accordance with required codes, specifications, and regulations. Accordingly, impacts on public safety from Fermi 3 construction and operations are not expected. Emergency, medical, fire, law enforcement,

and other offsite response support to the Fermi site would be performed in accordance with agreements established in the Fermi Emergency Plan, contained in Part 5 of the COL application.

Workers relocating to the primary impact area counties (Monroe, Wayne, and Lucas counties) could potentially create a slight increase in demand for safety services, such as police, fire, ambulance, and hospital services. However, given the projected small increase in the percentage of households in all counties arising from Fermi 3 construction or operation, and given that these additions are well within the long-term historical growth rate of housing and population growth for the area, the additional households will represent a minimal increase in the demand for police, ambulance, or hospital services in the primary impact area.

4.2.1.12 Food and Fiber Production

The food production of the aquatic ecosystem at the Fermi site is primarily characterized by the commercial and recreational fishing taking place in Lake Erie. There is no indication that subsistence fishing occurs on or near the site. Commercial and recreational fishing are limited to areas outside the security zone. Potential impacts to commercially and recreationally important fish species are expected to be minimal because of the limited presence of these species in the vicinity of the Fermi site.

The rectangular parcel in the west-southwest corner of the Fermi site is proposed to be used for temporary construction laydown and parking. Portions of this area are prime farmland. This area would be used to store construction materials during the construction phase of the project and provide for vehicle parking during construction. Most of the prime farmland in the agricultural field is located toward the southwestern portion of the field. The use of the prime farmland will be temporary and this land would revert to agricultural use after Fermi 3 construction ends. The vicinity of the Fermi site includes approximately 30,400 acres of cultivated crops, pasture, and hay fields. The 60-acre field represents 0.2 percent of the agricultural acreage in the vicinity. Therefore, irreversible conversion of unique agricultural lands onsite by Fermi 3 construction would be minimal.

4.2.1.13 Mineral Needs

Detroit Edison owns 99.93 percent of the mineral rights to the Fermi site. The MDNR owns the remaining 0.07 percent of mineral rights in the far southeast corner of the Fermi site near the proposed meteorological tower site. No mineral production currently exists at the Fermi site, nor is any anticipated in the future. An onsite quarry, now known as the Quarry Lakes, was used to supply foundation material for Fermi 1 and Fermi 2 and is no longer used for quarrying materials. Construction of Fermi 3 will not affect mineral rights in areas not directly owned by Detroit Edison. The construction will not have any impact on mineral resources at the Fermi site.

4.2.1.14 Property Ownership

Detroit Edison possesses the required interests in the Fermi site for construction of Fermi 3. The construction of Fermi 3 is a reasonable private use of the Fermi site and is consistent with the site's current use for power generation. Therefore, the construction of Fermi 3 is not expected to affect ownership.

The offsite transmission corridors are, and will remain, under ITC*Transmission* ownership. Transmission corridors are zoned for the conveyance of electrical energy, which is consistent with the intended use. Therefore, construction of the transmission lines associated with Fermi 3 is not expected to affect ownership.

4.2.2 Public Interest Factors Analysis

The conservation and ecology, wetlands, fish and wildlife, and historic properties and archaeological resources public interest factors received detailed consideration. A summary of each of these factors and how it relates to development of Fermi 3 is provided in the sections that follow.

4.2.2.1 Conservation and Overall Ecology

4.2.2.1.1 Important Habitat

The NRC's "Standard Review Plan for Environmental Reviews for Nuclear Power Plants" (NUREG-1555, Reference 2) defines important aquatic habitats as (1) sanctuaries, refuges, or preserves potentially affected by plant construction or operation; (2) habitats identified by State and Federal agencies as unique, rare, or of priority for protection that may be adversely affected by plant construction or operation; (3) wetlands, floodplains, or other aquatic resources specifically protected by State and Federal regulations or Executive orders; and (4) areas identified as "critical habitat" for species listed as threatened and endangered by the USFWS. The only important aquatic habitat identified for the Fermi site is the Detroit River International Wildlife Refuge (DRIWR).

The Lagoona Beach Unit of the DRIWR occupies 656 acres of the 1260 acre Fermi site. The U.S. Fish and Wildlife Service (USFWS) manages the DRIWR and has published a Comprehensive Conservation Plan for the refuge (Reference 3). The Comprehensive Conservation Plan states that there are several options for acquisition of land for the refuge other than outright purchase of land. One of these alternative methods, a cooperative agreement, was used to create the Lagoona Beach Unit of the DRIWR on Fermi property. Detroit Edison has a 2003 Cooperative Agreement with the USFWS for the onsite portion of the DRIWR that allows Detroit Edison and the USFWS to share management of the refuge areas, but that allows Detroit Edison to retain ownership and control of those areas. The agreement allows Detroit Edison to withdraw from or revise the agreement at any time. Detroit Edison expects to revise the agreement to reflect the approximately 637 acres expected to be available for refuge use after construction of Fermi 3. This revision in the size of the Lagoona Beach Unit of the DRIWR is consistent

with the 2003 Cooperative Agreement, the Comprehensive Conservation Plan, and land acquisition procedures for the refuge. Even though Fermi 3 will reduce the acreage that can be included in the DRIWR, Fermi 3 construction would be compatible with the plans and agreements governing the DRIWR.

New construction for Fermi 3 would have an impact in the forest and wetland areas that are part of the DRIWR. The DRIWR Lagoona Beach Unit is located entirely within the Fermi property. Portions of the Lagoona Beach Unit would be cleared for construction of several facilities and construction areas associated with Fermi 3 and the relocation of the Fermi 2 parking and warehouse area. The Fermi 3 construction impact area includes approximately 45 acres, or about 7 percent of the Lagoona Beach Unit; 19 acres would be permanent impacts and 26 acres temporary impacts. The agreement between Detroit Edison and the USFWS that established the wildlife refuge allows for modifications to the agreement (such as Fermi 3) by either party at any time (Reference 4). The construction impacts of reducing the effective area of the DRIWR are principally land-use impacts, which are discussed above. The importance of DRIWR as an ecological habitat is principally due to it being a wetlands area. Accordingly, the construction impacts are bounded by the overall wetlands impacts, as discussed in Section 4.2.2.2. The final wetland mitigation plan will be developed in cooperation with local, state, and federal conservation agencies and organizations and will be consistent with existing conservation/watershed plans and conservation priorities established by these organizations.

4.2.2.1.2 Coastal Zone

The Coastal Zone Management Act authorizes states like Michigan to develop Coastal Zone Management Plans to protect and ensure the reasonable use of coastal areas. The Fermi site and part of the vicinity are in the coastal zone. A coastal zone consistency determination from the Michigan Department of Environmental Quality (MDEQ) will be obtained for Fermi 3 construction work in conjunction with other permits and authorizations from MDEQ. Construction of Fermi 3 would impact a very small portion of the coastal zone in Monroe County and the surrounding areas, and many of the impacted areas would be restored and revegetated after construction. Therefore, construction impacts on the Lake Erie coastal zone are expected to be short-term and minor, and no mitigation measures are needed.

4.2.2.1.3 Fish Spawning or Cover Areas

Potential impacts from construction activities at the Fermi site to commercially and recreationally important fish species are minimal due to limited presence of these species within the site. Incidental impacts may occur indirectly due to interference with fish migration and spawning and (less likely) due to fish mortality from accidental chemical spills. However, such events are unlikely to occur due to implementation of the appropriate spill prevention measures detailed in the Pollution Incident Prevention Plan (PIPP). Consequently, impacts to commercially and recreationally important Lake Erie fish species are expected to be minimal.

While it is not expected that migratory movement would be physically blocked during construction, increased turbidity could act to inhibit migratory cues in some fish species. Contaminants in construction effluents can also act as chemical barriers inhibiting fish migratory behavior. With the implementation of construction runoff and spill control measures detailed in the PIPP, it is unlikely that such contaminants would be present at levels that would significantly impact fish migration behavior, at least on a long-term basis.

4.2.2.2 Wetlands

Onsite Wetlands

Unavoidable impacts to 33.01 acres of wetland and 5.26 acres of open water habitat are anticipated within the construction impact areas on the Fermi property. This acreage includes 20.90 acres of emergent marsh, 6.84 acres of forested wetland, 5.28 acres of scrub-shrub wetland, and 5.26 acres of open water. Of this acreage, approximately 23.75 acres (62 percent) would be subject to temporary impacts that would be restored following construction. The construction impacts are projected to be moderate. The restoration of wetland areas that do not require long-term use for Fermi 3 operations along with the preservation of remaining wetlands on the Fermi site will serve to mitigate these impacts. In addition, Detroit Edison will prepare a plan for mitigating construction impacts to wetlands that will be submitted to the MDNRE and USACE in conjunction with future permit applications. A conceptual mitigation strategy is provided in Appendix C.

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. That analysis is described in Section 2.8. The watershed assessment provides an analysis of land use features of the Ottawa-Stony watershed (OSW, Figure 2.8-1) and the coastal management zone (CZM, Figure 2.8-2) of Western Lake Erie in Monroe County. The results of the watershed assessment helps put into context natural resource impacts associated with Fermi 3 and provides guidance for the avoidance, minimization and mitigation strategy. An analysis of the status and trends of wetlands, streams and protected areas within OSW and CZM provides the necessary landscape level perspective to evaluate site specific impacts and compensation.

Because of the Fermi site's location in the lowest reaches of the OSW (in the CZM), the proposed Fermi 3 activities will have the greatest potential effects (either positive or negative) on coastal resources and Lake Erie itself. Based on the watershed assessment in the CZM, approximately 77 percent of the land area in the coastal zone was historically wetland. Based on the most recent wetland maps, 43 percent of the coastal zone in Monroe County is wetland which constitutes a 44 percent loss. The rate of wetland loss has decreased dramatically. Since the 1970s there has been an ongoing effort to protect and restore coastal habitats along the Detroit River and Western Lake Erie and land set aside for conservation and recreation, much of which is coastal wetland habitat (over 8,000 acres), currently make up approximately

36 percent of the coastal zone of Monroe County. Unavoidable impacts to wetlands associated with Fermi 3 will result in a relatively small reduction in coastal wetland acreage in Monroe County (33.01 acres impacted on the Fermi site versus more than 8,000 acres of wetlands in the coastal zone of Monroe County; approximately a 0.40 percent reduction). Existing wetlands and protected areas provide ecological resilience which buffers the impact of wetland loss within the coastal zone.

Detroit Edison recognizes the value of coastal wetland habitat along Lake Erie. Based on natural resource assessments, watershed assessments, and conservation priorities discussed in Section 2.8, avoidance and minimization strategies were employed that have significantly reduced impacts to wetland communities of high ecological value. Unavoidable impacts were restricted to low quality wetland areas to the greatest extent possible. Compensation is proposed at an average ratio of 5:1; a ratio generally associated with impacts to high quality, intact wetland systems. Additional mitigation is proposed in the form of enhancement of Great Lakes marsh at a ratio 23:1. Detroit Edison proposes compensation beyond guidance ratios to satisfy regulatory mitigation requirements and also in support of Detroit Edison's corporate environmental stewardship initiatives and ongoing partnership with USFWS and other conservation entities. Natural resource investigative, avoidance, and minimization measures in association with compensatory mitigation design are intended to address watershed conservation priorities, focusing on the prevention of wetland habitat fragmentation and improvements to connectivity of coastal wetland habitat in Monroe County.

Transmission Corridor Streams and Wetlands

Transmission corridor construction activities includes the installation of three new transmission lines in an assumed 300-foot wide corridor 29.4 miles long between the Fermi site and the Milan Substation, located near Milan, MI. The three Fermi 3 345-kV lines will run in a common corridor with Fermi 2 transmission lines, extending to a point just east of I-75. From the intersection of this Fermi site corridor and I-75, the three Fermi-Milan lines will run west and north for approximately 12 miles in a corridor shared with other non-Fermi lines in an assumed 300-foot-wide right-of-way in which the vegetation has been managed to control tall woody vegetation. The western 10.8 miles of the corridor is currently undeveloped, and no transmission infrastructure exists. Where vegetation is present, the maintenance has been minimal, except to control tall woody vegetation. It is assumed that the Milan Substation may expand from its current size of 350 by 500 feet to an area of approximately 1,000 by 1,000 feet to accommodate the new transmission lines to Fermi 3.

Construction impacts to aquatic resources along the eastern 18.6 miles of the transmission corridor are expected to be minimal, since the reconfiguration of existing conductors would largely allow for the use of existing infrastructure to create the new lines, and access for installing additional lines is good (as the plant life has been managed to exclude tall woody vegetation). Existing aquatic habitats in this portion of the corridor will be spanned and best management practices will be used to protect aquatic habitats

crossed by the new lines. This includes, but is not limited to, the use of silt fencing, hay bales, and similar practices to ensure the protection of aquatic habitats in close proximity to construction activity.

The western 10.8 miles of the transmission corridor is undeveloped. The creeks and ditches occurring in the western corridor are mostly narrow and could be avoided by using tower spans of 700-900 feet. Numerous roads in the vicinity are expected to provide sufficient access to this region of the corridor without the need for construction of new access roads.

No wetlands will be impacted in the eastern section of the corridor, because towers to accommodate new lines are already present. No wetlands are present at the Milan Substation site. The western section could require the placement of towers in wetlands that are longer than 900 feet and cannot be spanned. A relatively small area of wetland, approximately 0.5 acre, would be disturbed during installation of transmission towers. Impacts to wetlands from the construction of the transmission system are therefore considered minimal. Any necessary mitigation would be determined by ITC*Transmission* in consultation with responsible regulatory agencies, including the USACE, at the time permit applications are submitted.

4.2.2.3 Fish and Wildlife

General ecological environmental impacts are described in the response in the "Conservation and Overall Ecology" section. The Fish and Wildlife section has been limited, to the extent practicable, to a discussion of threatened or endangered species. The construction and operations impacts of interest for USACE-regulated activities would be those occurring on the shoreline, in the water of Lake Erie, and those in or adjacent to wetlands. Wetlands could occur either on site or in transmission line corridors.

4.2.2.3.1 Construction Impacts

There are no federally protected threatened or endangered species subject to impact from Fermi 3 construction. However, as described in Section 2.5.1, species that are listed by MDNR, with some potential for impact, are the American lotus and the Eastern fox snake.

Terrestrial Species

Bald Eagle

None of the previously observed bald eagle (*Haliaeetus leucocephalus*) nests were observed on the Fermi site as of January 2011. Formerly listed as an endangered species, the bald eagle nationwide (except in parts of Arizona) was federally de-listed in 2007, but continues to be protected under the Migratory Bird Treaty Act and the Bald and Golden Eagle Protection Act. MDNR eagle management guidelines impose activity restrictions within a one-quarter mile radius of active nests from mid-March to the end of June, if young are in the nest. These guidelines suggest a radius of 660 feet around the nest during the breeding season. The restricted area is imposed because bald eagles are extremely sensitive

to human activity during the first 12 weeks of the breeding season. Applicable state and federal guidelines relating to activity restrictions will be adhered to during Fermi 3 construction.

American Lotus

The American lotus (a Michigan threatened species) is a wetland plant common in moderately shallow areas of the South and North Lagoons and the South Canal. Although the species reaches a northern limit of its distribution in southeast Michigan, healthy populations are scattered throughout this portion of the state. American lotus grows from thick and creeping underground tubers that make it impossible to determine how many plants are actually present in a given area. The plants, however, are hardy and relatively easy to transplant.

Construction activities are not expected to affect the North or South Lagoons, therefore, no American lotus in these areas should be affected. American lotus occurring in the South Canal will be affected by the filling of the portion of the canal adjacent to the Fermi 3 cooling tower area. MDNRE endangered species specialists have indicated that plants expected to be impacted by Fermi 3 construction activities should be transplanted to other areas on the Fermi site or possibly offsite to minimize adverse impact. Detroit Edison intends to engage in further consultation with the MDNRE in developing a mitigation strategy that will ensure that the impact to this species are minor.

Eastern Fox Snake

The Eastern fox snake (*Elaphe Gloydi)* is state threatened. During 2008, while wetland surveys were being conducted, two fox snakes were observed on two separate occasions. In addtion, 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 draft mitigation plan which will be implemented to minimize the project's impact to the species. It included redesigning the site layout to minimize impacts, employee education and briefings, capture and release of snakes prior to land disturbance, and stop-work procedures in the event a snake is discovered.

Aquatic Species

The construction of the Fermi 3 intake structure, the barge slip, and discharge line to Lake Erie will require (1) temporary construction dredging and operational maintenance dredging of the existing water intake bay and (2) construction of the intake structure and associated components. Construction of the intake structure and barge facility will benefit from ongoing maintenance dredging of the area between the groins. No dredging in addition to that which is routinely completed is anticipated for installation of those structures. Construction of the discharge pipeline will extend approximately 240 feet beyond the area routinely dredged for Fermi 2 maintenance. Therefore, construction of the above structures will result in a minimal permanent loss of benthic habitat associated with the intake structure. Impacts to other general

aquatic species associated with the station water intake structure are considered to be short-term and minimal.

Transmission Corridor Construction

No Federal or State protected species or designated critical habitat listed by the USFWS will be impacted along transmission lines.

4.2.2.3.2 Operations Impacts

Cooling Water Intake

Potential impacts to aquatic ecosystems associated with the operation of the Fermi 3 intake structure and cooling water systems are entrapment, impingement, and entrainment. No threatened or endangered species were documented in the 1991-1992 (Reference 5) or the 2008-2009 (Reference 6) impingement and entrainment studies conducted at the Fermi site. Accordingly, the impact of the Fermi 3 intake on federally listed threatened and endangered species is expected to be minimal, and no mitigation measures, other than a well designed intake structure, are needed.

The brindled madtom (*Noturus miurus*) is listed as a state species of concern. Although no confirmed occurrences of the brindled madtom have been noted within the intake bay, it has been documented as having potential to occur at the Fermi site. Habitat associated with the brindled madtom has not been identified in or adjacent to the intake bay, therefore limiting the likelihood for impacts resulting from the cooling system. Accordingly, the impact of the Fermi 3 intake on state-listed threatened and endangered species is expected to be minimal, and no mitigating measures are needed.

Cooling Water Discharge

The use of a cooling tower for Fermi 3 represents Best Available Technology under Phase I of Section 316(b) of the Clean Water Act and also acts to greatly reduce the thermal loading to Lake Erie. Discharge of cooling tower blowdown constitutes the thermal discharge to Lake Erie from Fermi 3. A high-rate effluent diffuser will be used to maximize mixing and minimize the area of thermal mixing zone impacts on ambient water temperature. However, because listed species are not expected in the vicinity of the discharge, impacts to threatened or endangered aquatic species are expected to be minimal.

Cooling Tower Impacts

The cooling tower can affect the terrestrial and aquatic environment primarily through deposition of dissolved solids from cooling tower drift. The maximum predicted annual salt deposition rate is 0.01 $kg/km^2/mo$ and is principally to offshore areas to the northeast. This value is several orders of magnitude less than levels known to be damaging to plants. Additionally, monitoring results from a sample of nuclear plants, in conjunction with the literature review and information provided by the natural resource agency and agricultural agencies in all states with nuclear power plants, have revealed no instances

where cooling tower operation has resulted in measurable degradation of the health of natural plant communities.

The risk of soil salinization from cooling towers is generally considered to be low (NUREG-1555, Section 5.3.3.2, Reference 2). Soil salinization is of most concern in arid areas (deserts) where salts could accumulate in soils over long time intervals. The Fermi site is not located in an arid area. Accordingly the impacts from salt deposition are anticipated to be minimal, and no mitigation is required.

Two species listed as State-threatened are known to occur on the Fermi site: one animal (Eastern fox snake) and one plant (the American lotus). Animal species are typically less impacted by salt deposition or plume shadowing than plant species. Given the minimal impact on vegetation, impacts to the Eastern fox snake are also expected to be minimal.

Transmission Corridor Operation

Minimal impacts to wetlands and floodplains are anticipated from the operation of the new transmission lines or Milan Substation. Areas within the corridor that have the potential to regenerate in forest vegetation are expected to be periodically cleared of woody vegetation for line safety clearance. Access to these areas for maintenance would likely be on foot or by the use of matting for vehicle equipment, so as not to disturb the soil. There should be only selected and occasional pesticide or herbicide use in specific areas where needed in the corridor. It is expected that the use of such chemicals in the right-of-way would be minimized to the greatest extent possible in wetland areas. Because there are no listed species expected in the transmission corridors, impacts are considered minimal.

4.2.2.4 Historic Properties and Archaeological Resources

As discussed in Section 2.9, archaeological surveys were conducted in support of the Fermi 3 project. The surveys resulted in the identification of two sites that are located within the Fermi 3 site. Neither of the sites is located near Fermi 3 construction areas.

No above-ground resources within the Fermi 3 project area have been assessed as to National Register of Historic Places (NRHP) eligibility; therefore, the construction activities would have no impact on resources that are listed in the NRHP or that have been determined eligible for listing in the NRHP. Fermi 1 has been evaluated and recommended for consideration for listing on the NRHP, pending review by the Michigan State Historic Preservation Office. It is anticipated that any necessary mitigation will involve archiving Fermi 1 information and not restrict dismantlement following termination of the Fermi 1 license.

Fermi 3 construction activities will include installing the discharge pipeline. The pipeline will extend approximately 240 feet beyond the area of the Fermi 2 intake embayment subject to routine operations and maintenance dredging. Detroit Edison has conducted an investigation into the archaeological resources which could be impacted as a result of the construction of the Fermi 3 discharge line. There are no known archaeological resources within the planned path of the discharge line. Athough the Fermi 3

offshore project area has been extensively disturbed by previous activities and natural events, there is considered to be a moderate to high sensitivity for unidentified maritime resources. However, due to the dynamic and turbulent nature of the shallow-water near shore environment typical of the Great Lakes and present within the project area, any potentially significant maritime resources that may be present within the project area may exhibit degraded integrity.

Detroit Edison has developed a cultural resource management plan and corporate procedures to address protection of known historic and archaeological resources and the discovery of artifacts and cultural features during construction activities. Newly discovered archaeological sites located in the construction area of Fermi 3 would be managed in accordance with the provisions of the license.

Fermi 3 operations that would impact above-ground resources are limited to noise-related and visual impacts. The Fermi site currently houses Fermi 2, which currently produces indirect effects in the form of ambient noise and visual impacts associated with two cooling towers. Because these impacts currently exist, and have existed for at least three decades, any additional impacts associated with Fermi 3 operation would not introduce any elements that are substantively different from those that already exist.

Offsite Transmission Corridors

Preliminary investigations of the transmission line route from the Sumpter-Post Road junction to the Milan Substation indicate a moderate to high potential for encountering archaeological resources. The preliminary field view of the built environment along the transmission line route revealed few above-ground resources that meet the minimum age requirement or retain sufficient integrity for listing on the NRHP. Any further investigations would be conducted by ITC*Transmission* in accordance with applicable regulatory requirements.

References

1. U.S. Nuclear Regulatory Commission, Standard Review Plan for the Review of Safety Analysis Reports for Nuclear Power Plants, LWR Edition, NUREG-0800, March 2007.

2. U.S. Nuclear Regulatory Commission, Standard Review Plans for Environmental Reviews for Nuclear Power Plants, NUREG-1555, October 1999.

3. U.S. Fish and Wildlife Service, Division of Conservation Planning, “Detroit River International Wildlife Refuge Comprehensive Conservation Plan,” Appendix K, 2005, Available at http://www.fws.gov/midwest/planning/detroitriver/.

4. U.S. Fish and Wildlife Service, Establishment of the Lagoona Beach Unit of the Detroit River International Wildlife Refuge, “Cooperative Agreement Between Detroit Edison and U.S. Fish and Wildlife Service,” September 25, 2003.

5. Lawler, Matusky, & Skelly Engineers, Fish Entrainment and Impingement Study (October 1991-September 1992), Fermi Power Plant, February 1993.

6. Aquatic Ecology Characterization Report, Detroit Edison Company Fermi 3 Project, Final Report, AECOM, November 2009.

5.0 ALTERNATIVES ANALYSIS

Detroit Edison sought to avoid, minimize, and then mitigate unavoidable impacts to waters of the United States, including wetlands, associated with the proposed Fermi 3 project by evaluating the practicable alternatives. Detroit Edison's alternatives analysis illustrates that use of the Fermi site is the least environmentally damaging practicable alternative (LEDPA) that fulfills the project's purpose and need.

5.1 Alternative Sites

Detroit Edison reviewed the eight candidate sites identified in Section 9.3 of the Fermi 3 Combined License Application (COLA) Environmental Report within the context of the CWA Section 404(b)(1) guidelines to identify a LEDPA site. The details of that analysis are presented in Appendix B.

First Detroit Edison performed a practicability assessment that considered various technical, economic, safety, and environmental criteria that reflect the overall purpose of the project. Sites that passed the practicability assessment were then evaluated for potential impacts on waters of the United States and adjacent wetlands to identify an environmentally preferable location. The candidate sites included five greenfield sites, two existing fossil-fired sites, and one existing commercial nuclear site. Six sites (five greenfield sites and one existing fossil-fired site) that exhibited undesirable characteristics were judged to be impracticable as sites for locating a new nuclear plant and were excluded from further review. The two remaining candidate sites, the Greenwood Energy Center site and the Fermi site, were then evaluated for impacts on waters of the U.S. and adjacent wetlands.

Detroit Edison evaluated the potential wetland and stream impacts associated with construction of the nuclear generating facility and any required infrastructure such as transmission corridors and make-up water supply or blowdown discharge pipelines to support the closed-cycle cooling system. The potential impacts associated with nuclear development at the Fermi and Greenwood sites are provided in Table 5.1-1. Based on the overall potential impacts to waters of the U.S., the Fermi site would be the LEDPA.

Table 5.1-1. Potential Construction Impacts for the Alternative Sites

Resource Type	Fermi site	Greenwood site
Wetlands	154 acres 6.709E06 sq. feet	300 acres 1.306E07 sq. feet
Streams	7304 linear feet	3.470E04 linear feet
Open water (Lake Erie)	0.08 acre 3600 sq. feet	NA[a]
Open water (inland)	5.2 acres 2.256E05 sq. feet	NA

[a] Impacts within Lake Huron for the construction of an intake structure at the Greenwood site were not evaluated.

5.2 Facility Layout Alternatives

Detroit Edison proposes to construct and operate a new nuclear power plant at the Fermi site. The proposed unit is to be designated as Fermi 3. The Fermi site (the area within the Fermi property boundary) consists of approximately 1260 acres in eastern Monroe County, Michigan. The existing Fermi 2 unit is in the northeast part of the site. Fermi 3 and associated facilities will be located in an area south of the existing Fermi 2 protected area. Most of the land that will be occupied by Fermi 3 and associated facilities was disturbed during construction of Fermi 1 and Fermi 2; however, some construction will occur in areas that have been undisturbed for longer periods of time. This section discusses the onsite layout alternatives considered and the relevant impacts to aquatic resources associated with those alternatives for the Fermi 3 project.

The Fermi 3 site layout includes the power block, cooling tower, switchyard, parking, construction laydown areas, transmission lines, access road, cooling water intake structure, discharge pipe, and barge docking facility. Detroit Edison applied as much repositioning of project components as possible within project practicability limits to avoid and minimize impacts to wetlands and other natural resources at the Fermi site. Three project layout alternative scenarios were evaluated. These alternative layouts are identified as Revision 0, Revision 1, and the Preferred Alternative (Revision 2) (Figures 5.2-1, 5.2-2, and 5.2-3, respectively).

The site layout was evaluated for potential environmental impacts to the Fermi site. This analysis focused on environmental categories that are protected under special-purpose environmental laws and that contain specific provisions for the avoidance and minimization of impacts. These categories include wetlands, archaeological resources, and protected species. Complete avoidance of some impacts to environmental categories, such as wetlands, associated with Fermi 3 may not be feasible due to the large area of land disturbance required. Efforts were made to avoid impacts to wetlands through consideration of several different project alternatives.

A process to avoid, minimize, or compensate impacts to waters of the United States, including wetlands, was completed for the Fermi 3 project. This process included the consideration of alternative onsite locations for major structures and changes in site configuration to minimize damages to waters of the United States.

Key Constraints

Several key constraints guided the process of determining locations for Fermi 3 Nuclear Power Plant and construction-related activities relative to the available property on the Fermi site and the location and operational needs of the Fermi 2 Nuclear Power Plant. As this discussion will illustrate, unavoidable impacts to wetlands resulted when the key constraints could not be satisfied without incurring those temporary or permanent impacts.

The key constraints are as follows:

1) The site layout must minimize impacts to the environment and to the Detroit River International Wildlife Refuge.

2) Fermi 3 construction cannot interfere with the operations of the existing Fermi 2 Nuclear Power Plant.

3) Fermi 3 construction cannot interfere with Fermi 2 security requirements or programs.

4) Fermi 2 operations must not interfere with Fermi 3 construction.

5) Fermi 2 operations must not interfere with federally mandated Fermi 3 security requirements, which are distinct from operating plant security requirements.

6) The location of the Fermi 3 power block must allow for both Fermi 2 and Fermi 3 plants to be combined into a single protected area security boundary after construction is completed that meets federally mandated security requirements. This will facilitate operational synergies such as sharing of personnel and common support facilities, the primary access portal (PAP) to the protected area, warehouses, and maintenance shops.

7) The construction site must provide for a contiguous, unimpeded flow of personnel, equipment and materials.

8) The Fermi 3 construction site must have adequate, onsite space for the following: laydown and staging of materials; fabrication and assembly of modular components, and; construction support facilities. Nuclear power plant construction management consultants have advised Detroit Edison that a minimum of 100 acres of land should be available onsite, contiguous to or near the construction area, for these activities.

9) Placement of structures must satisfy nuclear safety requirements.

Constraint 1 has been a primary consideration throughout the site layout development process, however, as the project has moved forward, additional environmental studies and information have been developed which have been the principal driver for revisions to the proposed site layout to further minimize environmental impacts.

While the constraints have remained the same throughout the development of the site layout, as Detroit Edison's knowledge of site environmental conditions evolved, revised versions of the site layout were created in keeping with Constraint 1. Each of the three versions of the site layout satisfied the key constraints based upon the state of knowledge at the time the site revision was developed.

The method chosen to address Constraints 2 through 5 was to separate Fermi 2 operational activities from the Fermi 3 construction site the maximum extent. This separation resulted in Constraints 10 and 11, as follows:

10) All Fermi 2 operational activities will be on the north side of the Fermi site and all Fermi 3 construction activities will be on the south side of the site. The boundary separating Fermi 2 operations from Fermi 3 construction activities is roughly an east-west line extending across the site from the southern boundary of the Fermi 2 protected area (see Figure 5.2-4). This constraint significantly reduces the amount of land available for building and construction because land north of the line will not be available for Fermi 3 construction.

11) Fermi 2 operations and the Fermi 3 construction site must have completely separate access roads, entrances and exits. Fermi 2 and Fermi 3 roads and activities must not cross each other. This is to avoid traffic impacting either site. This also relates to Constraint 7.

Constraints 2, 3, 4, 5, and 6 allow very little flexibility on where power block structures such as the reactor building can be located. The only location suitable is south of the existing Fermi 2 protected area on the opposite side of the imaginary east-west dividing line.

Constraints 7 and 8 require arranging the Fermi 3 site to ensure that there will be adequate space near the primary construction area to allow a free flow of personnel, materials and equipment. Fermi 3 requires a large construction workforce with up to 2900 construction workers at peak and 900 onsite workers when operational. Adequate staging and laydown area (temporary storage of construction materials) is needed to support the modular construction of nuclear power plants. Reactors such as the ESBWR proposed for Fermi 3, use standardized modules and certified designs to expedite the construction schedule. Nuclear power plant construction management consultants have advised Detroit Edison that a minimum of 100 acres of land should be available near the construction site for staging, laydown, and assembly of equipment and pre-assembled modules. A comparison of the amount of proposed land available for other United States nuclear license applicants indicates that the Fermi 3 site, in the preferred site layout, is among the smallest sites in terms of acres used.

Constraint 9 requires a final review and approval of any proposed site layout arrangement by security subject matter experts with appropriate clearances to ensure that the layout is in compliance with all security plan requirements.

Efforts to minimize impacts in the alternatives development process included:

- Avoiding and minimizing impacts to all wetlands with priority given to avoiding impacts to the most valuable/functional wetlands;
- Where wetland impacts were unavoidable, the preference was for temporary wetland impacts over permanent wetland impacts, with the understanding that wetland mitigation implemented prior to, or

concurrent with, the impact will still be required. A temporary impact means that the wetland will be restored to existing or better condition once the temporary land use for construction activities is completed, and;

- Placing the Fermi 3 power block in the largest contiguous upland area.

Efforts were made to avoid, to the extent practicable, adverse impacts associated with filling or modification of wetlands and new construction in wetlands wherever there is a practicable alternative. Impacts were only considered when there was no practicable alternative, and the proposed configuration for Fermi 3 includes all practicable measures to reduce impacts to wetlands and jurisdictional waters. Detroit Edison evaluated each of the onsite alternative layouts based on the approximate acreage, type, and value of wetlands that would be impacted. Alternatives that would minimize impacts to wetlands were preferred over alternatives that would result in greater impacts.

Wetland impacts of the Revision 0, Revision 1, and Revision 2 (preferred) site layouts presented in the Fermi 3 Environmental Report, were evaluated using the updated Fermi site wetland delineation provided in this current analysis. Therefore, the acres of impact presented here differ slightly from those presented in Revision 0 and Revision 1 of the Environmental Report. A description of the wetland delineation updates is provided in Section 2.7.1.

5.2.1 Revision 0 Site Layout (Figure 5.2-1)

Revision 0 is the site layout presented in the original COLA submittal in September 2008. The Revision 0 layout was finalized in February 2008 using preliminary site wetlands information and was laid out along traditional concepts for large, long-term, construction sites.

Unchanged Site-Layout Elements

The location of the Fermi 3 power block, which includes the reactor building, turbine building, control building, fuel building, radwaste building, diesel generators and other plant support systems, is fixed according to the requirements set out in Constraints 6 and 10. This location did not change in subsequent site-layout revisions.

Lake Erie will be used as the source for makeup water to the plant. The Fermi 3 makeup water intake will be adjacent to the intake for Fermi 2, i.e., located between the two existing groins that protrude into Lake Erie in the location of existing Fermi 1 structures. A barge slip for delivery of prefabricated modules, large components and building materials will be located between the two groins and adjacent to the south groin. These structures will be located in areas that have already been disturbed, in conformance with Constraint 1 and 10. The location of these structures did not change in subsequent revisions.

The Fermi 3 blow-down water outfall to Lake Erie will be offshore via an underwater discharge line in conformance to Constraints 1, 2 and 10. The configuration and discharge location of this line did not change in subsequent revisions. Four discharge locations were considered including two shoreline

discharges (concrete, partially submerged, discharge structure along the shoreline) and an inland location. The inland location into the south lagoon was eliminated due to environmental considerations according to Constraint 1. The warm blow-down water could potentially disturb the local aquatic ecosystem and wetlands in the south lagoon. The two shoreline discharge locations considered on the south side of the site, per Constraint 2, were also eliminated due to environmental considerations per Constraint 1 and potential Fermi 2 operational impacts per Constraint 2. One consideration with both shoreline locations was the possibility of variable, near-shore currents sending the warm blow-down water back into the Fermi 2 and Fermi 3 makeup water intakes, which could impact plant heat loads and water chemistry. The other consideration with both shoreline locations was that warm blow-down water discharged during a seiche event, with winds from the east, could flow back into the south lagoon, potentially disturbing the local aquatic ecosystem and wetlands. Shoreline discharge locations would pose greater impacts than the proposed offshore discharge, which is considered environmentally preferable.

Site Layout Elements that Changed in Subsequent Site Layout Revisions

The normal power heat sink for Fermi 3 is a single concrete natural draft cooling tower. The cooling tower location changed from Revision 0 to Revision 1. Several criteria were utilized in identifying the initial cooling tower location, as follows:

- The cooling tower must be at least 800 feet away from safety-related structures in conformance with Constraint 9 (the cooling tower must be located, at minimum, a distance equal to its height from any safety-related structures such as the reactor building. This is to eliminate the potential for damage to these structures, if the tower collapsed), and;
- The cooling tower must be at least 1000 feet away from the switchyard to minimize icing and salt drift impacts also in conformance with Constraint 9.

Other considerations included the following: minimizing the length of the circulating water piping; minimizing the distance to Lake Erie, minimizing wetland impacts according to Constraint 1; minimizing Fermi 2 system impacts, and; minimizing temporary impacts to Fermi 2 and Fermi 3 site access during construction according to Constraints 2, 10 and 11. Four locations were considered. The location chosen was south of Fermi 3 in an area that was considered to be forested upland. The location selected conformed with the above-mentioned constraints and had the smallest impact to wetlands, the shortest circulating water pipe length, and had the smallest Fermi 2 system impacts.

In conformance with Constraints 10 and 11, several Fermi 2 operational facilities (warehouses, administration and engineering offices, maintenance shops) were relocated from the Fermi 3 construction site to the Fermi 2 side of the site. These facilities were to be relocated in an area that was considered to be forested upland. The location of these facilities changed from Revision 0 to Revision 1 to minimize wetland impacts, in conformance with Constraint 1, based on additional wetlands delineation information.

In conformance with Constraint 11, the Fermi 2 site to the north, and the Fermi 3 construction site to the south, must have completely separate access roads, entrances and exits. This is to prevent traffic from either site affecting the operation of Fermi 2 or Fermi 3. The Fermi 2 access road followed the west property line along Toll Road, then turned west through an area that was considered to be forested upland. The access road was altered from Revision 0 to Revision 1 to minimize wetland impacts, in conformance with Constraint 1, based on additional wetlands delineation information. The Fermi 2 access road was slightly altered in Revision 2 to further reduce wetland impacts.

The Fermi 3 temporary construction parking lot was proposed to be located on the north side of Fermi Drive, beneath the existing transmission corridors in accordance with the Fermi 2 and Fermi 3 separation requirements per Constraint 10. A large area is needed for construction parking to accommodate 2900 workers at the peak of construction. This area is also directly connected to the construction site and meets the requirements of Constraint 7. The utility of this area for other construction activities was limited due to the existing high-voltage overhead lines. The location of construction parking and the utilization of this field changed from Revision 1 to Revision 2.

Revision 0 Site Layout Impact Summary

The total construction area anticipated to be disturbed in the Revision 0 site layout is approximately 260 acres. The Revision 0 site layout and associated wetland and open water impacts are presented in Figure 5.2-1. The Revision 0 site layout results in a total of 151.43 acres of wetland impacts, 1.88 acres of nonjurisdictional wetland impacts, and 14.05 acres of open water impacts. Based on the proposed construction activities, these impacts include:

- 62.05 acres of wetland and 0.55 acre of open water impacts due to cooling tower construction,
- 30.56 acres of wetland and 1.88 acres of nonjurisdictional wetland impacts due to Fermi 3 parking,
- 43.61 acres of wetland impacts due to Fermi 2 parking and warehouse,
- 14.48 acres of wetland and 1.03 acre of open water impacts associated with the dredged spoils disposal activities,
- 0.74 acre of wetland and 5.18 acres of open water impacts associated with access road and power block construction, and
- 7.3 acres of open water impacts due to intake structure, barge docking facility, and discharge pipe construction.

Table 5.2-1 summarizes the impacts that would result from the construction of the Revision 0 site layout.

Table 5.2-1. Potential Fermi 3 Construction Impacts for Revision 0

Wetland Type[a]	Impacts (acres)	Impacts (square feet)
PEM wetland[b]	49.66	2.163E06
PFO wetland	96.66	4.210E06
PSS wetland	7.00	3.048E05
Open water	14.05	6.122E05
Total	167.37	7.291E06

[a] Wetland types present on the Fermi site include palustrine emergent marsh (PEM), palustrine forested (PFO), and palustrine scrub-shrub (PSS).

[b] Includes 1.88 acres (8.188E04 sq. feet) of nonjurisdictional PEM wetland impacts.

5.2.2 Revision 1 Site Layout (Figure 5.2-2)

Based on completion of the Ducks Unlimited wetland study in July 2008 (Reference 1), Detroit Edison recognized that the cooling tower location and the location of the Fermi 2 facilities moved from the Fermi 3 construction site, had greater wetland impacts than originally assessed and that these placements would have to be modified. Therefore, at the NRC environmental audit in February 2009, Detroit Edison informed the NRC, Michigan Department of Environmental Quality (MDEQ, now Michigan Department of Natural Resources and Environment [MDNRE]), and the U.S. Army Corps of Engineers (USACE), that the Revision 0 site layout would be revised to further minimize wetland impacts.

Through planning and consultation with natural resource professionals, stakeholders and subject matter experts (nuclear security, materials management, construction planning, operations, maintenance, environmental and licensing), Detroit Edison developed a Revision 1 site layout that reduced wetland impacts to only those areas where a practicable alternative could not be identified that would still fulfill the overall project purpose. All available land onsite with no wetland impacts and low wetland impacts that also conformed to the key constraints, was identified on a figure, for use in reconfiguring the Fermi 3 site layout. The stakeholder team then worked to eliminate or minimize wetland impacts by redesigning the site layout utilizing those identified low-impact and no-impact areas, with a focus on relocating Fermi 3 structures and activities with the greatest wetland impacts (e.g., cooling tower location, Fermi 2/Fermi 3 Primary Access Portal [PAP], parking, office buildings, warehousing, and shops). The Revision 1 site layout was submitted to the NRC in December of 2009 (Reference 2).

One of the key changes made to the Revision 1 site layout was moving the cooling tower from the forested wetland, south of Fermi Drive, to land just west of the Fermi 3 power block. This location has several advantages such as shorter circulating water lines, no temporary disturbance to construction site roadways, and no wetland impacts (per the 2008 wetlands delineation). One consideration of this location was that it was close to safety-related structures such as the reactor building. According to Constraint 9, the cooling tower was positioned a distance greater than its height from safety-related structures to prevent damage to these structures, if the tower were to collapse. The South Canal is

impacted by the new cooling tower location and by the need to maintain a free flow of personnel, equipment and materials to the construction site, according to Constraint 7. The intersection of Fermi Drive, Quarry Lake Road and Doxy Road is considered a pinch point to the free flow of personnel, equipment and materials. Bridging of the South Canal allows for an unconstrained connection between the field to the west and the construction site. Due to the considerations explained above regarding Constraints 7 and 9, the impact to the South Canal is unavoidable.

A disadvantage to locating the cooling tower adjacent to the Fermi 3 power block is the loss of a large expanse of land adjacent to the primary construction site needed for laydown, staging, fabrication and assembly of modular components, according to Constraint 8. This loss can be partially, but not completely, compensated by managing the construction sequence. To address this constraint, the area known as the "pork chop" located south of Fermi Drive and west of Quarry Lakes Road, was utilized in the Revision 1 site layout, in conformance with Constraints 7, 8, and 10. The "pork chop" provides approximately 30 acres of prime construction land that includes 11.80 acres of forested wetland near the construction site. Natural resource inventories suggested the forested wetland in this area was of lower value ecologically than the other large forested systems onsite. The wetland is connected hydrologically with culverts but fragmented from other wetland areas and Lake Erie due to multiple roadways completely surrounding the site. It also had a larger component of dead/dying ash trees and invasive species and was subject to ongoing disturbance.

The "pork chop" is an important feature of the Revision 1 site layout due to its proximity to the construction site; location adjacent to Fermi Drive and rail access; and, the absence of overhead transmission lines that can present a safety hazard and barrier to movement and assembly of equipment, materials and modules. Construction warehouses, staging, assembly areas, and maintenance shops were planned for this location. Utilization of this area greatly facilitates the free flow of personnel, equipment and materials, further relieving the pinch-point concern at the Fermi Drive and Quarry Lakes Road intersection. Traffic through this area includes workers and materials coming from Dixie Highway, laydown and staging areas, the rail spur, and the barge slip.

The other key change to the Revision 1 site layout was removing the Fermi 2 operational structures (permanent parking lot, warehouses, an administration building and maintenance shops) from the forested wetland west of the Fermi 2 protected area. These structures were relocated in the Revision 1 site layout as follows:

- An administrative support campus outside the owner controlled area, associated with the NOC/Nuclear Training Center (NTC), was created to move the Fermi 2/Fermi 3 Administration Building and the Fermi 3 Training Simulator out of forested Wetland I, in conformance with Constraint 1. Conformance to Constraints 4, 10 and 11 was evaluated for this location due to Fermi 2 operational support facilities being moved to the southern, Fermi 3 side of the site. Several

considerations mitigate these constraint conformance issues, as follows: a bridge or tunnel will be utilized to cross Fermi Drive without affecting the construction site; personnel utilizing the training facility and administrative offices are generally at that location the entire day and would not need to cross to the Fermi 2 side of the site; and; increased use of technology such as video conferencing will minimize cross over. In addition, this arrangement reduces the need for additional operational parking at the PAP due to reduced personnel inside the protected area, which reduces the parking-structure foot print, thus minimizing environmental impacts in this area in conformance with Constraint 1.

- The flat operational parking was moved out of forested Wetland I and replaced by two multiple-level parking structures to minimize land use and wetland impacts, and to improve the overall site parking situation in conformance with Constraint 1. One parking structure is proposed near the NTC for permanent training and administration parking to support the new administrative campus. The other structure is located near the new PAP on the west side of the protected area boundary for protected area parking. A small wetland impact associated with a portion of this parking structure remains. This impact could not be avoided due to the proximity of existing and proposed structures in this area, along with nuclear security distance requirements in conformance to Constraint 9. The two parking garages will be sized to accommodate Fermi 2 and Fermi 3 operational parking.
- The combined Fermi 2/Fermi 3 warehouse was moved out of forested Wetland I in conformance with Constraint 1 and moved east to straddle the protected area boundary near the vehicle inspection building (VIB) and PAP. This location minimizes impacts, however some wetland impacts were unavoidable due to necessary sizing of the Fermi 2/Fermi 3 warehouse and the need for an access road along the west side of the structure. This arrangement will improve operational efficiency of the Fermi 2 and Fermi 3 sites. Other areas north and west of the protected area were considered, however, key stakeholder feedback, primarily from materials management and nuclear security, insisted on this location for secure protected area operations in conformance with Constraints 2, 3, 6 and 9. Two other smaller warehouses (32 and 34) were also moved out of forested Wetland I, to a location along the access road with no associated wetland impact.
- The Fermi 2 operational access road was moved to minimize environmental impacts in conformance with Constraint 1. The access road no longer cuts through forested Wetland I. The access road now follows the existing Toll Road, then transitions to existing site roads, which route around Wetland I to access the site. Wetland impacts were minimized, however some impacts were unavoidable, in conformance with Constraints 6, 10 and 11. The unavoidable impacts were associated with a new Fermi 2 operational security gate, necessary road improvements and rerouting of the existing road along the west side of the new Fermi 2/Fermi 3 warehouse.

Other modifications reflected in the Revision 1 site layout include the following:

- The Fermi 2/Fermi 3 meteorological tower was relocated because the new Fermi 3 cooling tower location will interfere with the current meteorological tower location. The new meteorological tower is relocated in an area near the southeast corner of the site. This location was selected because there were no known wetland impacts in conformance with Constraint 1 and because it met NRC regulatory guidance for meteorological tower placement.
- Construction staging and laydown was added on the south site border in a low-wetland impact area, on the east side of Quarry Lakes Road and around Fox Road, in conformance with Constraints 8 and 10. Unavoidable, temporary impacts are incurred to several small, fragmented, low-value emergent and scrub shrub wetlands (Wetlands AA, JJ, II). Nuclear construction subject matter experts engaged by Detroit Edison indicated that more land was needed for construction activities (staging, laydown, temporary spoils storage, and component assembly) than was originally allocated in the Revision 0 site layout.
- The Fermi 3 switchyard was moved to the agricultural field at the far west side of the property, adjacent to the south side of Fermi Drive. In Revision 0, the Fermi 3 switchyard was adjacent to the Fermi 2 switchyard in the protected area. Further analysis of the Fermi 3 interconnection determined the available space adjacent to the Fermi 2 switchyard was not sufficient for the new Fermi 3 switchyard. In addition, in accordance with Constraint 2, the original location was an impediment to movement and a potential impact to Fermi 2 operations. The new location also places the switchyard outside the owner-controlled area to facilitate access by *ITCTransmission* (owner and operator of the switchyard).

Revision 1 Site Layout Impact Summary

The total construction area anticipated to be disturbed is approximately 190 acres. The Revision 1 site layout and associated wetland and open water impacts are presented in Figure 5.2-2. Construction of the Revision 1 site layout would result in a total of 36.68 acres of wetland impacts and 12.58 acres of open water impacts. Of these total impacts, 11.22 acres would be permanent and 38.03 acres would be temporary. Based on the proposed construction activities, these impacts include:

- 2.79 acres of wetland impacts due to cooling tower construction,
- 0.51 acres of wetland impacts due to access road development,
- 1.88 acres of wetland impacts (nonjurisdictional) associated with construction laydown areas,
- 2.49 acres of wetland and 5.18 acres of open water impacts associated with the Fermi 2 and Fermi 3 common warehouse, parking, VIB and PAP,
- 0.26 acre of wetland conversion impacts due to vegetation clearance in forested wetland areas within the zone of influence for the meteorological tower,
- 26.75 acres of wetland impacts due to construction laydown areas,

- 0.72 acre of wetland impacts associated with the dredged spoils disposal activities,
- 1.28 acres of wetland impacts due to spoils disposal, and
- 7.40 acres of open water impacts due to intake structure, barge docking facility, and discharge pipeline construction.

Table 5.2-2 summarizes the impacts that would result from the construction of the Revision 1 site layout.

Table 5.2-2. Potential Fermi 3 Construction Impacts for Revision 1

Wetland Type	Temporary Impacts	Permanent Impacts
PEM wetland	9.96 acres 4.338E05 sq. ft	3.65 acres[a] 1.591E05 sq. ft
PFO wetland	16.58 acres 7.220E05 sq. ft	2.39 acres 1.042E05 sq. ft
PSS wetland	4.10 acres 1.786E05 sq. ft	0
Open water	7.40 acres 3.222E05 sq. ft	5.18 acres 2.257E05 sq. ft
Total	36.68 acres 1.598E06 sq. ft	11.22 acres 4.889E05 sq. ft

[a] Includes 1.88 acres (8.188E04 sq. feet) of nonjurisdictional PEM wetland impacts.

5.2.3 Preferred Site Layout (Revision 2 - Figure 5.2-3)

After the Revision 1 site layout was finalized, terrestrial and aquatic studies continued on the site. The results indicated a greater diversity in the vegetative communities within the "pork chop," than was originally understood. Subsequently, in a meeting to discuss Fermi 3 wetland permitting in July 2010, the MDNRE and USACE indicated that the wetland impacts associated with the "pork chop," contained in the Revision 1 site layout, were problematic. In response to this feedback and in conformance with Constraint 1, Revision 2 of the site layout was developed to address the wetland impact to the "pork chop" area.

Construction activities were moved out of the "pork chop" (Wetlands BB, EE, and FF) and the contiguous forested upland associated with that parcel, in accordance with Constraint 1. Site elements were rearranged to eliminate the "pork chop" impact, in conformance with Constraints 1, 7, 8 and 10. Most of the construction activities planned for the "pork chop," were moved to the north side of Fermi Drive. Some of the construction activities were also moved into areas designated for construction laydown located around the Quarry Lakes. Construction parking originally planned for the field north of Fermi Drive, was moved into the farmer's field located along the western property line. The use of the field on the north side of Fermi drive was limited in the previous site layout because of existing overhead transmission lines, so in Revision 2, the 345 kV lines are rerouted.

The resulting changes are summarized as follows:

- The 345 kV transmission lines that serve Fermi 2 and the proposed Fermi 3 were rerouted to open up the field on the north side of Fermi Drive for all necessary construction activities to satisfy Constraints 7, 8 and 10. The transmission is rerouted due west through emergent Wetland C, then south along Toll Road, to the Fermi 3 switchyard, which was moved into the field at the corner of Toll Road and Fermi Drive. This change eliminates impacts to a large parcel of rare and imperiled wetland (the "pork chop") and incurs unavoidable impacts to approximately 2 acres of forested wetland (the impacts will change the edge of Wetland F below the transmission lines from a forested wetland to a emergent wetland) and small, unavoidable, permanent and temporary impacts to an emergent Wetland C.
- Land surrounding the Quarry Lakes, designated as laydown, was added for various construction activities in conformance with Constraints 7, 8 and 10, to replace loss of laydown and staging areas from the "pork chop" area and from moving construction parking into the farmer's field. Some temporary, unavoidable impacts are incurred to small, fragmented, low-value forested and emergent wetlands in these areas (Wetlands W and Y).
- The Fermi 3 switchyard was moved from the south side to the north side of Fermi Drive to facilitate the transmission corridor rerouting in conformance with Constraints 1, 7 and 8. Construction parking, previously located in the field north of Fermi Drive, is moved into the farmer's field.
- The Fermi 2 access road was realigned to further minimize impacts to forested Wetland I in conformance with Constraint 1. The new alignment will follow Toll Road further north, just past Langton Road, prior to transferring onto the Fermi site access road.
- The meteorological tower was moved southeast of the Revision 1 location to eliminate any potential wetland impacts. When the Revision 1 location was identified, the understanding was that cutting trees in a wetland did not require a wetland permit. At the July 2010 meeting with the MDNRE and USACE, the staff clarified that cutting trees from forested wetland areas in association with the meteorological tower would require a permit for the conversion of wetland type. In conformance with Constraint 1, the Revision 2 site layout identified a location that was consistent with the recommendations of the meteorological tower siting study and did not require tree cutting in wetland areas.
- In Revision 2, construction boundaries were refined to eliminate unintended impacts in the Revision 1 site layout associated with construction along Quarry Lake Road (0.60 acres of forested and 0.05 acre of emergent wetland impacts) and the Dredged Spoils Disposal Basin (0.72 acre of forested wetland impacts).
- Operations and maintenance dredging authorized under existing Fermi 2 permits was eliminated as an impact attributed to Fermi 3 construction (reduction of 7.32 acres of open water impacts). The incremental change in the extent of dredging within Lake Erie required to support Fermi 3 construction was included.

Preferred Site Layout (Revision 2) Impact Summary

The total construction area anticipated to be disturbed is approximately 190 acres. The Preferred Alternative site layout and associated wetland and open water impacts are presented in Figure 5.2-3. Construction of the preferred site layout would result in a total of 31.13 acres of jurisdictional wetland impacts, 1.88 acres of nonjurisdictional wetland impacts, and 5.26 acres of open water impacts. Of these total impacts, 14.52 acres would be permanent and 23.75 acres would be temporary. Based on the proposed construction activities, these impacts include:

- 2.79 acres of wetland impacts due to cooling tower construction,
- 0.42 acres of wetland impacts due to access road development,
- 1.88 acres of wetland impacts (nonjurisdictional) associated with Fermi 3 switchyard construction
- 2.49 acres of wetland and 5.18 acres of open water impacts associated with the Fermi 2 and Fermi 3 common warehouse, parking, VIB and PAP,
- 4.06 acres of wetland impacts due to Fermi 2 and Fermi 3 transmission construction,
- 18.70 acres of wetland impacts due to construction laydown areas,
- 2.69 acres of wetland impacts due to spoils disposal, and
- 0.08 acre of open water impacts[1] due to discharge pipeline construction.

Table 5.2-3 summarizes the impacts that would result from the construction of the Preferred Alternative site layout.

Table 5.2-3. Potential Fermi 3 Construction Impacts of the Preferred Alternative

Wetland Type	Temporary Impacts	Permanent Impacts
PEM wetland	15.13 acres 6.589E05 sq. ft	5.77 acres[a] 2.513E05 sq. ft
PFO wetland	3.27 acres 1.423E05 sq. ft	3.57 acres 1.556E05 sq. ft
PSS wetland	5.28 acres 2.299E05 sq. ft	0
Open water	0.08 acres 3600 sq. ft	5.18 acres 2.257E05 sq. ft
Total	23.75 acres 1.035E06 sq. ft	14.52 acres 6.325E05 sq. ft

[a] Includes 1.88 acres (8.,88E04 sq. feet) of nonjurisdictional PEM wetland impacts.

[1] These open water impacts include the area of dredging in Lake Erie associated with installation of the discharge pipeline beyond the operations and maintenance dredging activity currently authorized by USACE Permit Number 88-001-040-8 and MDEQ Permit Number 04-58-0009-P.

5.3 Summary of Project Alternatives and LEDPA Analysis

Table 5.3-1 compares potential impacts to wetlands on the Fermi site to the three alternative site layouts discussed above. Wetland impacts were further characterized by Michigan Natural Communities to illustrate impacts to higher valued wetlands.

Detroit Edison minimized potential project impacts to waters of the United States, including wetlands. The site layout for the Fermi 3 project was based on an iterative approach to determine a layout that would most practicably avoid and minimize impacts to USACE jurisdictional waters and wetlands. Areas of the Fermi site that represented no, or minimal, impacts to wetland functions and values were identified. Stakeholders were engaged to identify constraints on the site layout, including integration of Fermi 3 with the ongoing operations of Fermi 2. Those constraints were used to identify locations for the proposed Fermi 3 and associated construction. Efforts were made to avoid, to the extent possible, impacts associated with the destruction or modification of wetlands and streams and new construction in wetlands and streams wherever there was a practicable alternative.

The Fermi 3 power block was located in the largest contiguous upland area consistent with Constraints 1, 2, 3, 4, 5, 6, 7, 9 and 10. The cooling tower was also located in this upland area at a distance from the power block that satisfies nuclear safety considerations, per Constraint 9. The minimum separation distance precludes siting the cooling tower entirely within the available upland adjacent to the Fermi 3 power block area.

A combined Fermi 2/Fermi 3 warehouse, parking, VIB, and PAP located on the west side of the protected area boundary, offers significant efficiency advantages over the operational life of the plants. A multi-level parking structure connected to the PAP addresses the need for parking for an additional 900 staff when Fermi 3 is operational while minimizing impact to the adjacent wetlands. The location of these facilities supports the integration of the Fermi 2 and Fermi 3 protected areas when construction is completed and satisfies other nuclear security considerations per Constraints 2, 3, 6, 9 and 10.

Construction of the Fermi 3 intake structure, discharge pipe, and barge slip within the existing Fermi 2 intake embayment reduces the cumulative area of lake bottom that will be disturbed per Constraint 1. The discharge pipe is the only Fermi 3 component that will require dredging beyond the operations and maintenance dredging currently authorized for Fermi 2 under MDEQ and USACE permits.

Adequate laydown area is needed to support the modular construction that is a key component of modern nuclear power plants, as described in Constraint 8. Reactors such as the ESBWR proposed for Fermi 3 use standardized modules to expedite the construction schedule. With the relocation of the 345kV transmission, the field to the west, and immediately adjacent to the power block, along the north side of Fermi Drive, possesses the attributes necessary for key construction activities consistent with Constraints 7 and 8. Use of this area includes some unavoidable impacts to wetland areas that will be restored following completion of construction of Fermi 3.

Overall impacts to wetlands were reduced in the Preferred Alternative (Revision 2) from those in Revisions 0 and 1. There would be an approximately 120-acre decrease in wetland impacts from Revision 0 and an approximately 4-acre decrease in impacts from Revision 1. Open water impacts were also reduced in the Preferred Alternative from Revisions 0 and 1. The Preferred Alternative also presents less total impact to those Michigan Natural Communities that are considered rare and imperiled. These include Great Lakes marsh and southern swamp (southern hardwood swamp). For the rare and imperiled wetland types, there was an approximately 125-acre decrease in impacts from Revision 0 to the Preferred Alternative and an approximately 10-acre decrease in impacts from Revision 1 to the Preferred Alternative. All the permanent and temporary wetland impacts in the Revision 2 site layout were unavoidable given the ten constraints previously outlined. The Preferred Alternative presents significantly less impact to the high functioning, high value wetland communities at the Fermi site. Based on the results of the alternative site layout analysis, the Preferred Alternative was selected as the proposed site layout that best addresses avoidance and minimization of wetland impacts.

References

1. Ducks Unlimited, DTE Fermi II Site, Monroe County, Wetland Investigation Report, July 2008

2. Letter from Peter W. Smith (Detroit Edison) to USNRC, “Detroit Edison Company Response to NRC Requests for Additional Information Related to the Environmental Review,” NRC3-09-0017, dated December 23, 2009.

Table 5.3-1 Comparison of Impacts for Alternative Site Layouts

Type	Revision 0	Revision 1	Preferred Alternative
Wetland Impacts by Type			
PEM wetland[a]	49.66 acres 2.163E06 sq. ft	13.61 acres 5.929E05 sq. ft	20.90 acres 9.102E05 sq. ft
PFO wetland	96.66 acres 4.210E06 sq. ft	18.97 acres 8.262E05 sq. ft	6.84 acres 2.979E05 sq. ft
PSS wetland	7.00 acres 3.048E05 sq. ft	4.10 acres 1.786E05 sq. ft	5.28 acres 2.29E059 sq. ft
Total wetlands	153.31 acres 6.678E06 sq. ft	36.68 acres 1.598E06 sq. ft	33.01 acres 1.438E06 sq. ft
Open water	14.05 acres 6.122E05 sq. ft	12.58acres 5.479E05 sq. ft	5.26 acres 2.293E05 sq. ft
Wetland Impacts by Michigan Natural Community[b]			
Rare and imperiled: Great Lakes marsh	47.53 acres 2.071E06 sq. ft	10.38 acres 4.524E05 sq. ft	12.86 acres 5.603E05 sq. ft
Rare and imperiled: southern hardwood swamp	92.19 acres 4.016E06 sq. ft	14.08 acres 6.131E05 sq. ft	1.95 acres 8.493E04 sq. ft
Southern shrub carr	7.00 acres 3.048E05 sq. ft	3.92 acres 1.709E05 sq. ft	3.91 acres 1.703E05 sq. ft
PEM wetland – coastal	0	0.80 acres 3.469E04 sq. ft	0.80 acres 3.469E04 sq. ft
PEM wetland[a]	2.13 acres 9.258E04 sq. ft	2.43 acres 1.058E05 sq. ft	7.24 acres 3.153E05 sq. ft
PFO wetland	4.47 acres 1.948E05 sq. ft	4.89 acres 2.131E05 sq. ft	4.89 acres 2.129E05 sq. ft
PSS wetland	0	0.18 acres 7698 sq. ft	1.37 acres 5.956E04 sq. ft
Open water	14.05 acres 6.122E05 sq. ft	12.58 acres 5.479E05 sq. ft	5.26 acres 2.293E05 sq. ft

[a] Includes 1.88 acres (8.188E047 sq. feet) of nonjurisdictional PEM wetland impacts.

[b] Chapter 324, Section 303.01(t) of the Michigan Natural Resources and Environmental Protection Act lists Michigan Natural Communities that are considered rare and imperiled. These include Great Lakes marsh and southern swamp (southern hardwood swamp). At Fermi, these communities include Wetlands C, M and the South Canal (Great Lakes marsh) and I, F, BB/EE/FF and L (southern swamp) because they are relatively intact systems with vegetation communities typical of Great Lakes marshes and southern swamps. Wetland E is a combination of emergent marsh/wet meadow and southern shrub carr with direct surface water connection to Lake Erie. The other Fermi site wetlands do not readily fall into a natural community category due to fragmentation and disturbance factors. Any wetland considered “other” that is connected hydrologically to Lake Erie or is within 1000 feet of the ordinary high water mark (elevation 571.6 feet IGLD 1955) is considered coastal.

Figure 5.2-1 Revision 0 Site Layout and Wetland Impacts

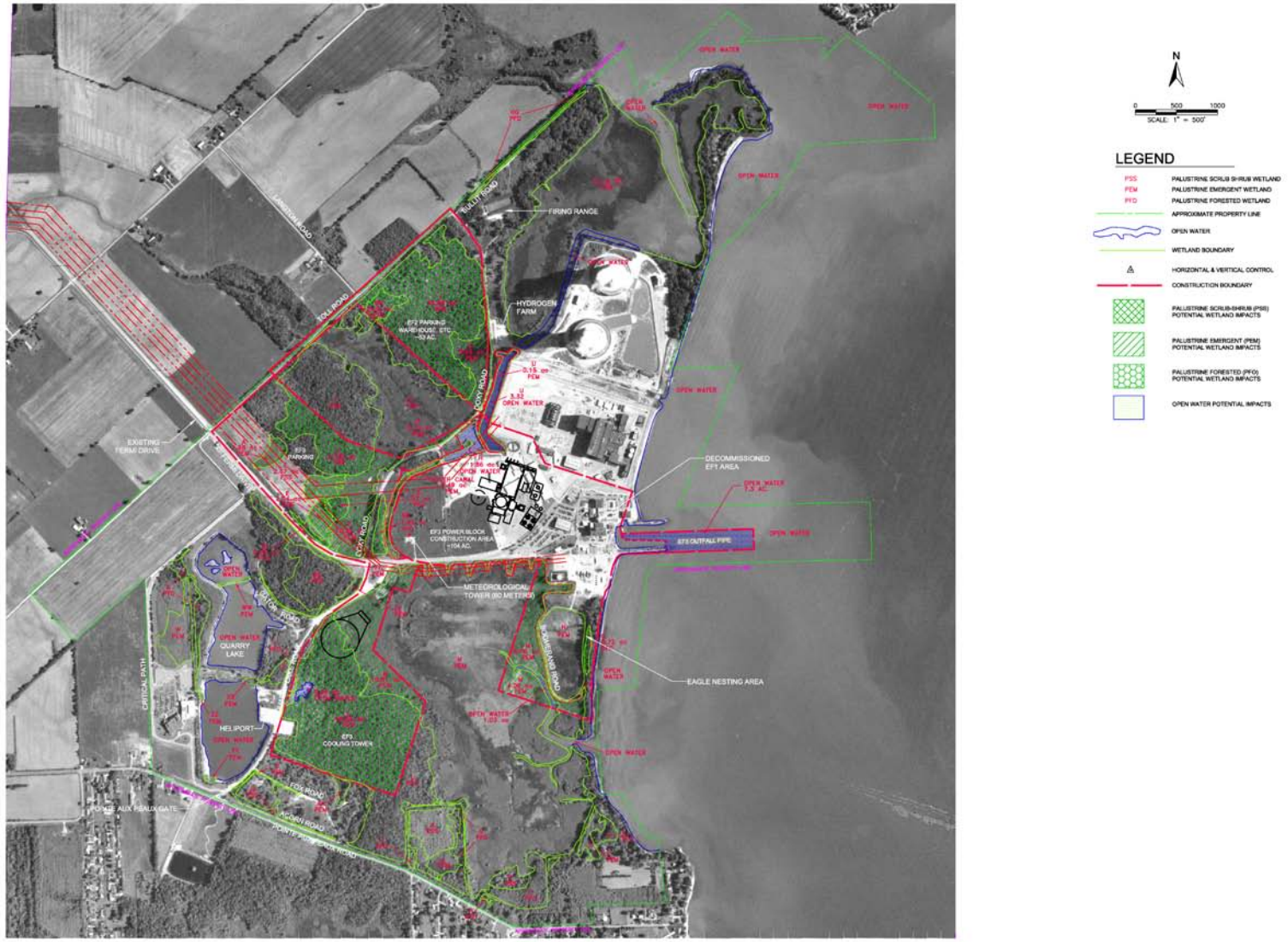


Figure 5.2-2 Revision 1 Site Layout and Wetland Impacts

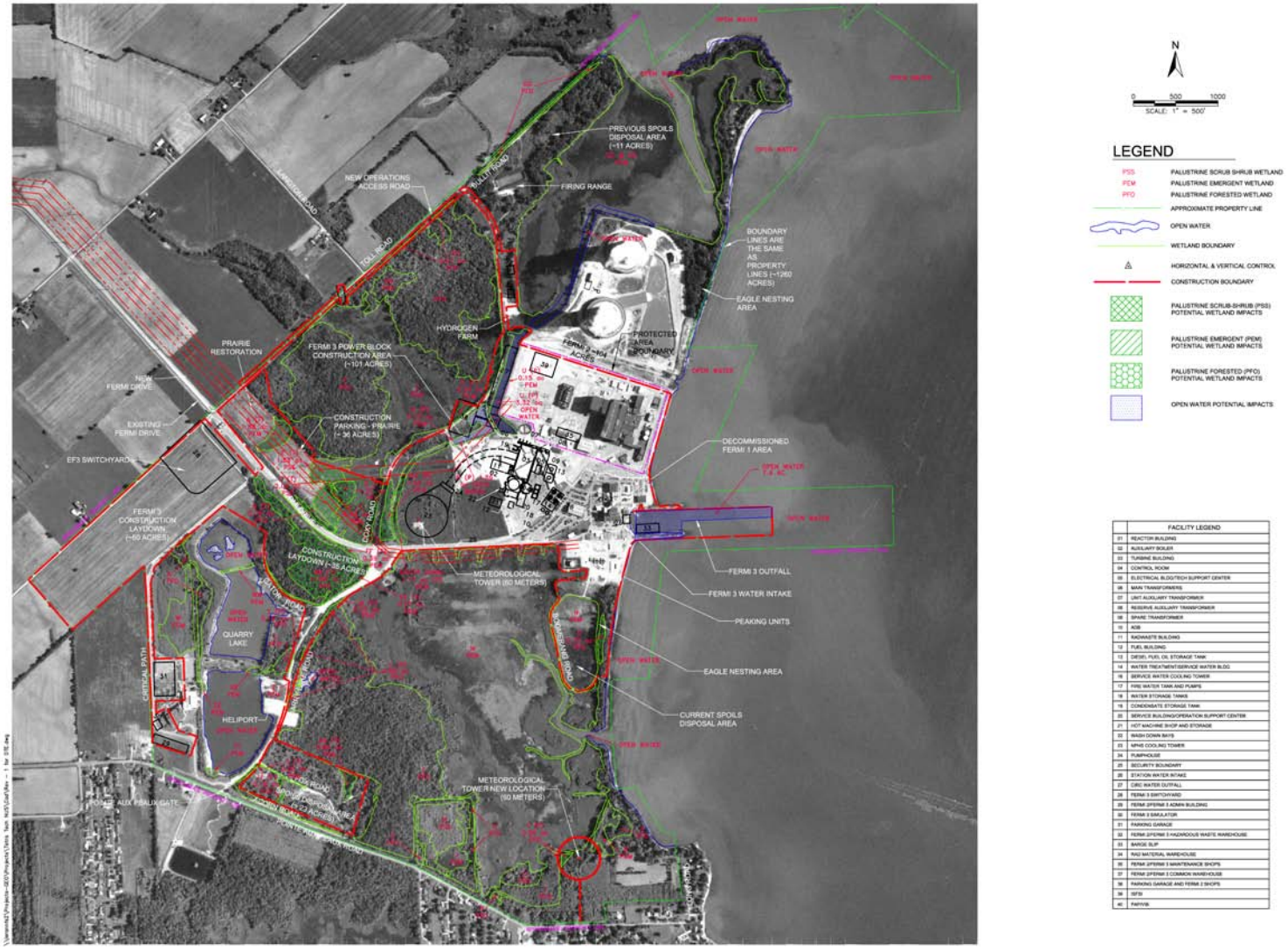


Figure 5.2-3 Preferred Site Layout and Wetland Impacts

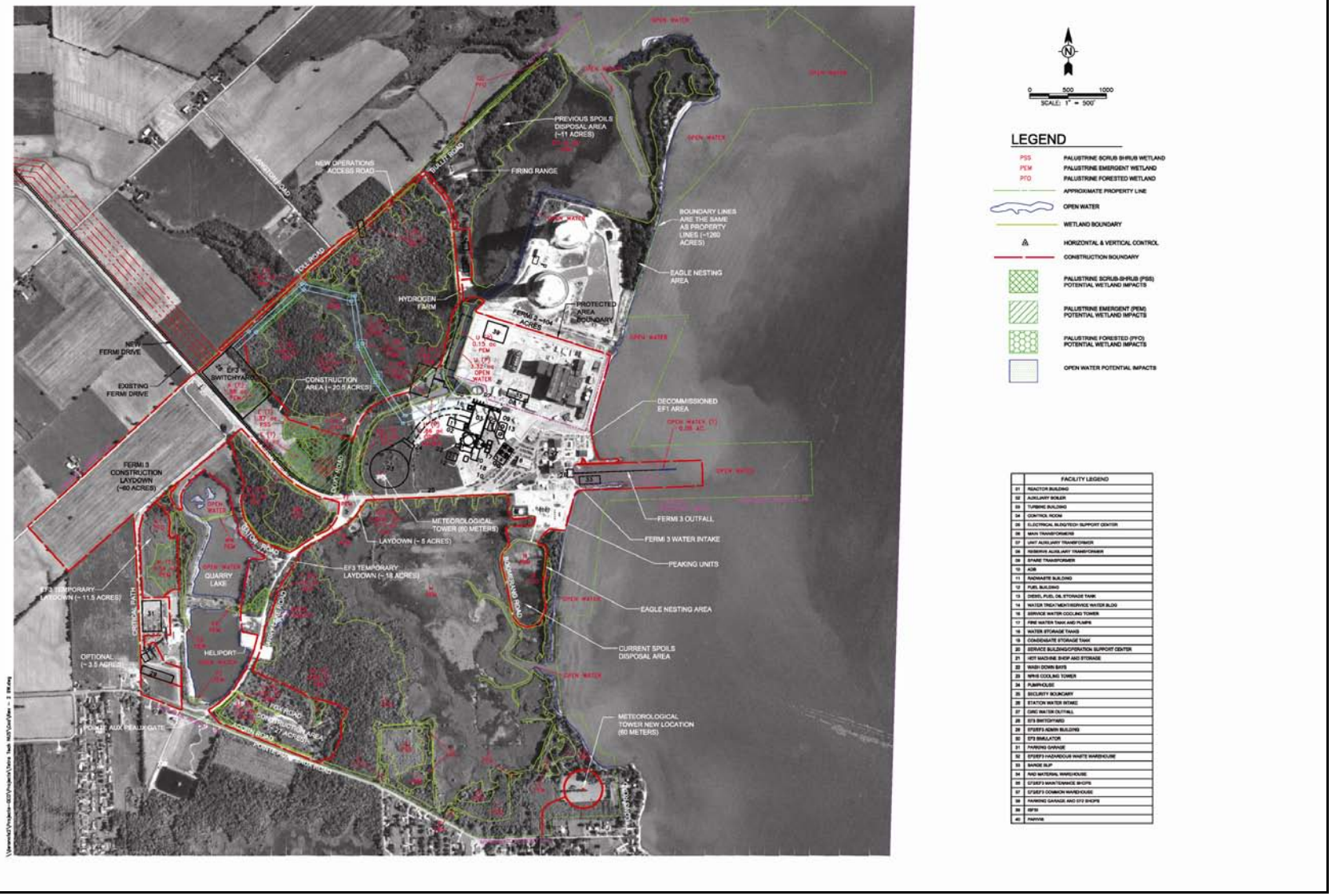


Figure 5.2-4 Separation of Fermi 2 from Fermi 3 Construction Activities

APPENDIX A

Appendix A. USACE Supplemental RAIs

DEPARTMENT OF THE ARMY
DETROIT DISTRICT, CORPS OF ENGINEERS
REGULATORY OFFICE
477 MICHIGAN AVENUE, 6TH FLOOR
DETROIT, MICHIGAN 48226-2550

REPLY TO
ATTENTION OF:

November 19, 2010

Engineering & Technical Services
Regulatory Office
File No. LRE-2008-00443-1

Randy Westmoreland
Detroit Edison Company
2000 Second Avenue, 337 WCB
Detroit, Michigan 48226

Dear Mr. Westmoreland:

The purpose of this letter is to transmit Detroit District, U.S. Army Corps of Engineers (USACE) comments on the Detroit Edison (DTE) response, received February 11, 2010, to our November 2009 request for additional information (RAI) on the proposed Fermi 3 nuclear power plant project.

Please submit the additional information requested to this office no later than January 10, 2011. For any RAIs that cannot be addressed within this timeframe, provide an expected submittal date (s) within 30 days of the date of this letter.

If you have questions, please contact Colette Luff of my staff at the above address, or by telephone (313-226-7485), or by E-Mail (Colette.M.Luff@usace.army.mil). Please reference File No. LRE-2008-00443-1 in all future communications with USACE regarding this project.

We are interested in your thoughts and opinions concerning your experience with the Detroit District, Corps of Engineers Regulatory Program. If you are interested in letting us know how we are doing, you can complete an electronic Customer Service Survey from our web site at: **http://per2.nwp.usace.army.mil/survey.html**. Alternatively, you may contact us and request a paper copy of the survey that you may complete and return to us by mail or fax. Thank you for taking the time to complete the survey, we appreciate your feedback.

Sincerely,

John Konik
Chief, Regulatory Office
Engineering & Technical Services

Enclosure

Copy Furnished:

Nuclear Regulatory Commission, Bruce Olson, w/Encl.

USACE Supplemental Requests for Additional Information
November 19, 2010

1. General comments regarding all DTE responses to USACE RAIs:

a. US Army Corps of Engineers, Detroit District (USACE) acceptance of DTE's response to RAI USACE-1 and -2 in part or whole is not an indication of USACE agreement/acceptance of conclusions stated in the response, including those regarding: status of proposed project relative to the least environmentally damaging practicable alternative; compliance of proposed regulated activities with 404(b)(1) Guidelines; public interest review; and acceptability of proposed mitigation to compensate for unavoidable loss of waters of the US and adjacent wetlands.

b. USACE Jurisdiction: See Reference 2.a. for USACE jurisdictional determination:

During our site inspections of the Fermi property, we determined that there are several non-wetland open water features that are physically separated from the ordinary high waters of Lake Erie, a navigable water of the US, by patches of upland ground. In addition, our review of potential transmission line corridors indicates that there may be non-wetland open water areas that are upstream and/or isolated from the ordinary high waters of the nearest navigable waters of the US. The USACE does not have Section 10 or Section 404 jurisdiction over such water features. The State of Michigan (Michigan Department of Natural Resources and Environment-MDNRE) assumed Federal permit authority for non-navigable/non-wetland waters per Section 404(g) of the Clean Water Act (CWA) and 40 Code of Federal Regulations (CFR), Part 233 (see General Comment 1.c.).

During our site inspections of the Fermi property, we also determined that several wetland areas identified in the Ducks Unlimited (DU) wetland delineation report for the Fermi property are not adjacent to Lake Erie. In addition, our review of the potential transmission line corridors also indicates that there may be wetlands within the corridors that are not adjacent to navigable waters of the US. The State of Michigan has assumed Federal permit authority for such wetlands per Section 404(g) of the CWA and 40 CFR, Part 233(see General Comment 1.c.). In the event that the Environmental Protection Agency, per 40 CFR, Part 233.50, directs us to conduct a permit evaluation for discharges in any of the non-navigable/non-wetland waters or non-adjacent wetlands at the Fermi property or within the transmission line corridors, the Detroit District USACE will make the final determination on Section 404 jurisdiction.

The discharge of dredged material/fill into wetlands adjacent to navigable waters of the US and non-adjacent wetlands requires compliance with the Section 404(b)(1) Guidelines regardless of whether there is joint USACE-MDNRE jurisdiction or just MDNRE jurisdiction. In this regard, we recommend that Section 404 compliance be addressed in holistic manner to facilitate a comprehensive understanding of DTE's site alternative analysis, project description, impacts, on-site alternative analysis, subsequent avoidance and minimization analysis and ultimately, compliance with the 404(b)(1) Guidelines.

c. State of Michigan assumption of Section 404 program:

In 1984, Michigan received authorization from the federal government to administer Section 404 of the CWA in most areas of the state. A state administered 404 program must be consistent with the requirements of the CWA and associated regulations set forth in the Section 404(b)(1) guidelines. Whereas in other states, where an applicant must apply to the USACE and a state agency separately for wetland permits, applicants in Michigan generally submit only one wetland permit application using a joint application form that directs submission to the MDNRE. State and federal authorities overlap in coastal and certain other waters according to Section 10 of the Federal Rivers and Harbors Act, and both federal and state permits are required. In accordance with Section 404(g) of the CWA, the USACE retains federal jurisdiction over traditionally navigable waters including the Great Lakes, connecting channels, other waters connected to the Great Lakes where navigational conditions are maintained, and wetlands adjacent to these waters. Activities in these waters require a joint permit application.

Federal oversight of state-administered 404 programs is the responsibility of the U.S. Environmental Protection Agency (USEPA). The MDNRE1983 Memorandum of Agreement with USEPA Region 5 outlines the procedures to be followed in program administration. This agreement waives federal review of the vast majority of applications in areas under Michigan's 404 jurisdiction. However, federal agencies must review projects which impact critical environmental areas, or which involve large quantities of fill. At the present time, USEPA review about one percent of all applications received. If the MDNRE determines that an application under Michigan's 404 program is subject to federal review, copies of the public notice are sent to USEPA Region 5, Detroit District USACE, and the U.S. Fish and Wildlife Service. The USEPA is responsible for compiling all federal comments, and submitting comments on the federal position to the MDNRE.

The MDNRE may not issue a permit which carries Section 404 authority if the USEPA objects to the project. This is true even if the applicant successfully appeals the state's denial of a permit at the administrative level or through a state court. Section 404 provides for a reversion to USACE processing if a state and USEPA reach an impasse on a project (that is, if the state is prepared to issue a permit, but USEPA continues to object)

d. Many of the figures/tables provided in support of DTE's RAI responses are not legible in 8-1/2" x 11" format and/or not legible if printed in black and white, then copied/reproduced in black and white. This is required for all figures, tables, maps, etc. submitted with a permit application. Reductions of engineering drawings are usually not acceptable as they may be cluttered and illegible when reduced. Further, the figures/drawings/maps should not identify activities that are outside of the regulatory scope of analysis unless identified as state-regulated per General Comments 1.b. & 1.c. above.

2. References:

a. USACE 9 Nov 2010 letter to DTE, USACE jurisdictional determination for Fermi property

b. Alternative Site Analysis, Calvert Cliffs Nuclear Power Plant Unit

c. Pages J-2 to J-7, Appendix J, Draft EIS for COL for Calvert Cliffs Nuclear Power Plant, Unit 3

d. 40 CFR Part 230-Section 404(b)(1) Guidelines for Specification of Disposal Sites for Dredged or fill Material, available at **http://www.usace.army.mil/CECW/Pages/reg_materials.aspx**

e. Calvert Cliffs Nuclear Power Plant Figures

f. Appendix B, Sample Drawings, of MDNRE-USACE Joint Permit Application available at: **http://www.michigan.gov/deq/0,1607,7-135-3307_29692_24403-67371--,00.html**

g. On-site Alternative Analysis (Calvert Cliffs Nuclear Power Plant, Unit 3

h. Page J-9, Appendix J, Draft EIS for the COL for Calvert Cliffs Nuclear Power Plant, Unit 3

i. Ducks Unlimited (DU) document, dated July 2008, prepared for DTE: DTE Fermi Site, Monroe County Wetland Investigation Report

j. Michigan's Natural Communities: http://web4.msue.msu.edu/mnfi/communities/index.cfm

k. MiRAM Version 2.1 User's Manual available at: http://www.michigan.gov/deq/0,1607,7-135-3313_3687-240071--,00.html . The Michigan Rapid Assessment Method for Wetlands (MiRAM) provides a standardized method to evaluate and document a wetland's functional value which includes its ecological condition (integrity) and its potential to provide ecological and societal services (functions and values).

l. Detroit District Corps of Engineers permit evaluation document template (attachment to initial RAIs)

m. 33 CFR Parts 320-332: Regulatory Programs of the Corps of Engineers, available at: **http://www.usace.army.mil/CECW/Pages/reg_materials.aspx**

n. Part 332 of reference 1.m (also known as Department of the Army, USACE of Engineers 33 CFR Parts 325 as amended and 332, and Environmental Protection Agency 40 CFR Part 230, Final Rule: Compensatory Mitigation for Losses of Aquatic Resources, available at : http://www.epa.gov/owow_keep/wetlands/wetlandsmitigation/index.html#regs)

o. Shape file submittal format (attachment 1)

3. USACE Response to DTE Response to USACE RAIs 1 & 2:

a. **RAI USACE-2a:** Project description/purpose & need

DTE Response: Project description/purpose & need, Subsection 1.2.2 and Section 1.3
USACE Response: Complete

b. **RAI USACE-2b: Alternative Site Analysis, wetland fill avoidance emphasis**

DTE Response: Avoidance-site selection emphasis, Subsection 2.1.1.
USACE Response: Incomplete. Chapter 5 Conclusion not supported. Eight candidate sites were identified as reasonable locations for construction of a project to accomplish the project purpose (add baseload electric generating capacity to address current and future peak electricity demand in the DTE service area). However, the analysis of alternative sites conducted to reach DTE's preferred site alludes to, but does not identify specifics as to why the other sites are either not practicable or why a project at the Fermi site would be the environmentally preferable site. Table C-1, as is, does not support the site alternative analysis. The Appendix C figures do not provide useful supportive information for the site alternative analysis. The figures provided in support are not legible. To complete this RAI, the following is required:

Provide Corps/MDNRE-focused alternative site analysis narrative that includes specific, supported reasoning, within the context of the 404 (b)(1) Guidelines, as to why candidate sites have been discarded from further consideration using first, the practicability test (Reference 2.d: Paragraph 230.10(a)(2)). An alternative is only practicable where it is available and capable of being done taking into account cost, existing technology and logistics in light of overall project purpose.

If more than a single site remains following application of the practicability test, apply the "less environmentally damaging" test by conducting a reconnaissance level assessment of the impacts of the project footprint, at each practicable site, on waters of the US and adjacent wetlands, and on relevant public interest factors followed by an analysis that leads to the selection of an environmentally preferable location.

Include a text description of the practicability outcome, and if more than a single site remains, the impact analysis outcome for the practicable sites. Provide a statement indicating which site location would be the environmentally preferable site.

For the analysis of practicable alternative sites, provide legible figures illustrating impact of the project footprint on waters of the US and adjacent wetlands, as well as tabular presentation of the information. Note that Table C-1 could be used to illustrate impacts to waters of the US and

wetlands after removing alternatives that are not practicable and adding the Fermi site to the table. Provide additional supporting figures and/or tables to illustrate other relevant impacts, level of impacts, etc. to support the analysis and conclusion.

It is not acceptable to support the analysis by reference to a RAI response or ER section, table, figure, etc. All such information should be directly incorporated into the narrative. All supportive figures and tables should be submitted in the format described in General Comment 1. d.

Reference 2.b. is provided as an example of a supported alternative site analysis, with the final summary of the selection of the preferred alternative documented in Reference 2.c. In total, such documentation provides a complete alternative site analysis.

Assuming the alternative site analysis outcome results in an environmentally preferred site that is either the least environmentally damaging site (relative to wetland impacts), or selection of a different site is justified, the presumption of "avoidance" is overcome for site locations. Then the analysis of alternatives at the environmentally preferred site, for the purpose of demonstrating that wetland fill impacts to the selected site have been avoided to the extent possible and the proposed project is the least environmentally damaging practicable alternative (LEDPA), can proceed.

c. RAI USACE-1g. Project (proposed, USACE/DNRE-regulated activities) description

DTE Response: Project Descriptions and Figures, Subsection 1.2.2.
USACE Response: Incomplete. The response provided is too broad. In addition, the supporting figures provided are not legible in 8-1/2 x 11" format and not reproducible in black and white.

For the alternative site analysis, provide a narrative description of project elements and construction activities, for each practicable alternative, that would affect waters and wetlands of the US, and a figure (s) showing the footprint of the project that clearly illustrates the siting of each proposed plan element/construction activity in relation to waters of the US and adjacent wetlands. If necessary for legibility, figures can be referenced to an index sheet. Provide additional project description narrative and figures, as necessary, to support the analysis and conclusions.

On completion of the alternative site analysis and selection of a preferred site and to provide a basis for the on-site alternative analysis, provide a narrative of the proposed project plan that describes the regulated activity (dredging, wetland fill, pier construction, etc) and purpose for (navigation, grading for structure, fill discharge for construction road, toe protection, temporary laydown area, etc), and the location of the activity on environmentally preferable site and in relation to the waters of the US and adjacent wetlands. Provide a similar narrative for

features/construction activities of each alternative site layout that differ from the proposed project, as well as locations and descriptions of off-site areas considered. For each alternative layout, provide figures that show the footprint of each project alternative feature/construction activity in relation to waters of the US and adjacent wetlands and the location of off-site areas considered. If necessary for legibility, figures can be referenced to an index sheet.

On completion of the on-site alternative analysis, as the proposed plan may change, provide a narrative description of the final proposed plan and descriptive figures as discussed above.

Supportive figures should be legible, succinct, specific representations of existing and proposed (as a result of regulated activities) site conditions. It is not acceptable to support the analysis by reference to a RAI response or ER section, table, figure, etc. All such information should be directly incorporated into the narrative. All supportive figures and tables should be submitted in the format described in General Comment 1. d.

References 2.e. is provided as an example of final project plan figures. Reference 2.f. provides samples project figures depicting various regulated structures and fills.

d. RAI USACE-2c: On-Site Alternative Analysis (Minimization). Note: In determining which proposed project alternative is the least environmentally damaging, the USACE uses a sequential approach of first analyzing project modifications to avoid wetland impacts, including use of non wetland sites whether on or off the environmentally preferable site, then analyzing project modifications to minimize wetland impacts. Since there are no activities associated with a power plant that require siting in wetlands, we presume there are practicable alternatives available that do not have a discharge into wetlands and such alternatives will have less environmental impact and therefore be environmentally preferable unless the applicant demonstrates otherwise. Unless DTE can rebut this presumption, a permit cannot be issued.

DTE Response: Minimization of wetland impacts. Minimization must be shown for each of the alternative sites in the analysis of avoidance, Subsection 2.2.1
USACE Response: Incomplete. Subsection 2.2.1 is part of the alternative site analysis and does not address the on-site alternative analysis. Section 2.3 of DTE's response provides a limited and incomplete, for the purposes of the Section 404(b)(1) Guidelines, analysis of on-site alternatives. Chapter 5 conclusions are not supported. Completion of this response requires:

A USACE/MDNRE-focused analysis of alternatives to the proposed plan (see 1.c.), presented as a narrative. The alternative analysis will require some degree of baseline condition and impact analysis. The analysis must include:

Description (see 1.c.)of the proposed project plan and alternatives with each description supported by figures depicting, at a minimum, plan-view of the alternative features relative to the aquatic resource impacts, and a detailed analysis of the steps taken to avoid and minimize wetland fill and reduce other environmental impacts (public interest factors).

Consideration of project modifications involving reconfiguration of project elements, movement of project features upland (off site or on site), reduction in project scope or size to avoid wetland and waterway impacts to the minimum necessary to meet applicable requirements (e.g., access, safety, erosion control, etc.), changes in construction methods/equipment, construction sequence, implementation of special operating procedures (e.g., monitoring, protection of critical areas, adherence to environmental windows, etc.) or the use of other methods that reflect sensitivity to the environment. Examples include:

Relocation or redesign of the proposed construction laydown areas to uplands. Include off-site areas;

Modification of the construction schedule so that the areas proposed for permanent impacts could be used as construction laydown areas;

Relocation or redesign of the proposed roads/warehouse areas to uplands;

Reduction in the length and width of the impact area for the discharge pipe and fish return to the minimum necessary to meet the purpose of these project aspects;

Reduction in the width of the proposed dredge channel necessary to the minimum necessary for barge ingress and egress and to ensure dredge barge access for the proposed method of dredging;

Reduction of the footprint of any in-water structure to the minimum necessary to meet the purpose of the project aspect;

Relocation or redesign of cooling tower fill to avoid/minimize impact to south canal.

Quantification of all impacts to waters of the US (both temporary and permanent), including jurisdictional wetlands, for each on-site alternative. For waterways, include both linear feet of waterway impacts and square feet of impact; for permanent wetlands impacts, include both square foot and acreage impacts; and for temporary wetland impacts, include both square foot and acreage, and temporal impact (length of time necessary to return the affected wetland to pre-project condition and function) in years.

Consideration of the general functions and value of the wetlands (reference 2.k, and natural community status (reference 2. j and per discussions during October 7, 2010 Fermi on-site meeting/site inspection).

Reasons for amending the project as changes developed from the initial proposal through the current proposal and ultimately to a project that would further minimize the currently proposed impacts, including a complete description of the criteria used to identify, evaluate, and screen the alternatives.

Provide a statement that identifies the least environmentally damaging practicable alternative (LEDPA) configuration and summarize the final selection and identify the quantity of unavoidable losses, including temporal losses. Provide a final description and depiction of the preferred alternative as described in 1.c.

Reference 2.g. is provided as an example of an on-site alternative analysis, with the final summary of the selection of the preferred alternative documented in Reference 2.h.

Provide supportive figures that are legible, succinct, specific representations of existing and proposed (as a result of regulated activities) site conditions. It is not acceptable to support the analysis by reference to a RAI response or ER section, table, figure, etc. All such information should be directly incorporated into the narrative. All supportive figures and tables should be submitted in the format described in General Comment 1. d.

e. **RAI USACE-1a:** Public interest factor baseline condition description for proposed plan

DTE Response: Public Interest Factor Baseline Condition Description, Chapter 3 of RAI response per Table 1-1
USACE Response: Incomplete. For the proposed Fermi 3 revised layout, DTE provided the baseline information on the environmental setting for the region and the entire Fermi 3 project area. However, the USACE/MDNRE regulatory decisions are based on a subset of the Fermi 3 project, specifically that portion of the project which involves USACE/MDNRE- regulated activities. In addition, the supporting figures provided/referenced in the response were, in part, not legible in 8-1/2" x 11" format and some were not legible when printed/copied in black and white format. Completion of this RAI requires:

For the proposed DTE preferred alternative, as determined by the on-site analysis, provide a succinct description of the baseline condition of each site for each proposed regulated activity (temporary and permanent) (e.g., dredge/fill discharge , structure, construction/stockpile activity, operation, etc. in water of US or adjacent wetlands) including specific relevant figures, tables, etc. and summaries of pertinent issues presented by federal and state agencies, mined from the information provided in the RAI response (including references) for the following factors: Conservation and Overall Ecology (project area overview), Wetlands, Fish & Wildlife, Historic Properties and Archaeological Resources.

Regarding navigation, provide vessel information, including the ship/barge navigation needs to access the site; maximum draft when full; length and width of ships/barge.

Identification of the specific functions and values of each individual wetland impact area. The general discussion provided in reference 1.i. is not specific enough to determine impacts and subsequent compensatory mitigation. If specific information is not already available for impacted wetland areas, USACE/MDNRE suggests the use of the Michigan Rapid Assessment

Method (MiRAM) (reference 1.k) for documenting the functions and values of impact areas (unavoidable, including temporary loss areas). For non-wetland aquatic site areas, describe the functions and values of the resource and basis for the decision. The documentation can be supported by studies/reports, but relevant support information must be summarized & included as narrative, figures, tables, etc. This discussion will serve as the basis for determining compensatory mitigation.

Work at the meteorological tower(s) sites may be regulated. Include baseline conditions for the construction, operation, and maintenance impact area(s) in waters of US or adjacent wetlands.

Section II D of Reference 1.l can be used as a guide (or format) for narrowing the discussion to the baseline information of interest to the USACE/MDNRE review. This section of the referenced document provides the groundwork for the environmental impact analysis which includes the USACE-required NEPA, public interest and 404 reviews.

It is not acceptable to support the analysis by reference to a RAI response or ER section, table, figure, etc. All such information should be directly incorporated into the narrative. All supportive figures and tables should be submitted in the format described in General Comment 1. d.

f. **RAI USACE-1b:** Aquatic resource context/importance

DTE Response: Coastal Wetlands, Subsection 3.6.1 of RAI response per Table 1-1
USACE Response: Incomplete. The discussion is too general for impact evaluation purposes. Completion of this RAI requires:

Further refinement in identification of natural community types and status (reference 1. h and per discussions during October 7, 2010 Fermi on-site meeting/site inspection) in the USACE/MDNRE-regulated work areas.

Natural community identification for each on-site alternative determined to be practicable or less damaging than the preferred alternative.

Identification and location of the same community types along western Lake Erie and current status (federal/state protected, reasonably foreseeable development, loss, fragmentation, etc.) of the resource. This could be incorporated into baseline conditions.

Provide supportive figures that are legible, succinct, specific representations of existing and proposed (as a result of regulated activities) site conditions. It is not acceptable to support the analysis by reference to a RAI response or ER section, table, figure, etc. All such information should be directly incorporated into the narrative. All supportive figures and tables should be submitted in the format described in General Comment 1. d.

g. RAI USACE-1c: Public Interest Impact assessment

DTE Response: Impact Evaluation, Chapter 4 of RAI response per Table 1-1.
USACE Response: Incomplete. For the proposed Fermi 3 preferred alternative (revised layout), DTE provided the impact assessment for the region and the entire Fermi 3 project area. However, the USACE/MDNRE regulatory decisions are based on a subset of the Fermi 3 project, specifically that portion of the project which involves USACE/MDNRE- regulated activities. In addition, the supporting figures provided/referenced in the response were, in part, not legible in 8-1/2" x 11" format and some were not legible when printed/copied in black and white format. Completion of this RAI, requires prior completion of the alternative site analysis and on-site analysis and identification of the LEDPA plan:

For the proposed DTE preferred plan, provide a succinct description of the short term (temporary) and long term (permanent) direct, indirect and cumulative impacts per each proposed regulated activity (temporary and permanent) (e.g., dredge/fill discharge , structure, construction/stockpile activity, operation, etc. in water of US or adjacent wetlands) including specific relevant figures, tables, etc. and summaries of pertinent issues presented by federal and state agencies, mined from the information provided in the RAI response (including references) for the following factors: Conservation and Overall Ecology (project area overview), Wetlands, Fish & Wildlife, Historic Properties and Archaeological Resources.

The impact assessment must address permanent and temporal impacts to the functions and values of the aquatic resources to be impacted. The general discussion provided is not specific enough to determine impacts and subsequent compensatory mitigation.

It is not acceptable to support the analysis by reference to a RAI response or ER section, table, figure, etc. All such information should be directly incorporated into the narrative. All supportive figures and tables should be submitted in the format described in General Comment 1. d.

h. RAI USACE-1d. Function and value identification/impact assessment of affected waters of US and adjacent wetlands.

DTE Response: Water-related and wetland impact discussion, Section 4.5 & Subsection 4.18 of RAI Response per Table 1-1
USACE Response: Incomplete. Note that a small regional reduction in wetland quantity is not necessarily considered a minor impact, given the cumulative loss and national "no net loss of wetlands" policy, unless the "Avoidance" test has been met and unavoidable losses are mitigated.

The regulated activities are a subset of the entire Fermi 3 project. To complete this RAI, the following is required:

See USACE responses: 1a, 1b, 1c.

i. RAI USACE-1f. Proposed special conditions to minimize project impacts

DTE Response: Minimization of Detrimental Project Effects, Subsection 2.4.2
USACE Response: Incomplete. In accordance with the 404(b)(1) Guidelines, because mitigation will be required for any potential adverse impacts on the aquatic environment, even when the LEDPA is selected, the LEDPA will be determined first and then appropriate and practicable steps to minimize then mitigate any impacts that the LEDPA may cause on the aquatic environment (unavoidable losses) will be determined. These are the last steps in the sequence of avoiding impacts, then minimizing impacts, then compensating for any aquatic sites that have been destroy

The public interest determination involves more than an evaluation of impacts to the aquatic environment. Once the project has been determined to comply with the 404(b)(1) guidelines, the project must also be evaluated to ensure it is not contrary to the public interest through a review of 20 public interest factors (listed in 33 CFR 320.4(a)(1). A project may have an adverse effect, a beneficial effect, a negligible effect or no effect on any or all these factors. The project must be evaluated in light of these factors, other relevant public interest factors, and the interest of the applicant to determine the overall balance of the project with respect to the public interest.

Per 33 CFR Section 325.4 USACE is authorized to include special conditions in a permit to insure the proposal will not be contrary to the public interest. Any special practices or conditions proposed minimize impacts would be limited to those necessary to comply with Federal law (relative to USACE authorities; see 33 CFR Parts 320.1, 320.2, and 320.3) while affording the appropriate environmental protection, including the offsetting of aquatic impacts with compensatory mitigation. The special conditions must be sufficiently justified and substantially related to impact issues raised in the public interest review process.
In response to this RAI, DTE did not adequately identify appropriate and practicable steps to minimize impacts raised in the public interest review process (3.e.-3.h.). While a conceptual mitigation plan was provided to address compensation for unavoidable wetland losses and ensure project activities are not contrary to the public interest, review of the plan at this time would be premature since the LEDPA plan was not adequately identified as previously discussed.

Completion of this RAI requires completion of 3.b. and 3.c. then, as part of the public review impact analysis (3.e-3.h) process, identify and provide, in narrative form, specific measures proposed (relative to USACE/MDNRE regulated activities and associated sites) to minimize

impacts raised in the public interest review. This narrative can be incorporated with the impact analysis (see reference 2.l.as a guide to incorporation). At a minimum, include the following:

Measures proposed (or status of coordination) to mitigate Federal and/or state endangered/threatened species, bald eagle, historic properties/cultural resource impacts

Methods to avoid and minimize impacts to waters of the US, including:

Methods to minimize dredging and construction related turbidity;

Methods to minimize project effects (erosion, chemical releases, stormwater, etc) to water quality;

A plan to manage potential impacts to aquatic species during dredging, pipe installation, and other in- water construction, including the use of silt curtains or containment structures, dredging/work windows, etc;

Measures proposed to minimize the fishery impacts by the elimination of the south channel year-round fishery access to wetland C;

Discussion of the reduction in impact level due to implementation of the methods, measures, mitigation.

Notwithstanding the lack of a LEDPA, the USACE notes the following conceptual level deficiencies in the plan: Table in Appendix A figure illegible in 8-1/2" x 11" format ; lack of the following information: Focused function and value basis for the compensatory mitigation (see USACE response 3.h); description/summary of expected temporal function loss; description/summary of existing functions at mitigation site; comparison of permanent and temporary functional loss at impact sites to the expected gain (above existing functions) at the mitigation site(s); and identification of sustainability issues/risks related to the mitigation plan. Completion of this portion of the RAI requires revision, as necessary of the concept mitigation plan based on a completed LEDPA analysis and correction of the deficiencies. Note that USACE approval of the final plan will be in accordance with 33 CFR part 332 (reference 1.n). Provide supportive figures that are legible, succinct, specific representations of existing and proposed (as a result of regulated activities) site conditions. It is not acceptable to support the analysis by reference to a RAI response or ER section, table, figure, etc. All such information should be directly incorporated into the narrative. All supportive figures and tables should be submitted in the format described in General Comment 1. d.

j. RAI USACE-1e. Appropriate and practicable steps taken to minimize potential adverse impacts of the proposed discharge(s) on the aquatic ecosystem

DTE Response: Minimization of Discharges & Mitigation, Chapter 2 of RAI response per Table 1-1
USACE Response: Incomplete. See USACE response 3.i. of this document.

k. RAI USACE-1h. Consideration of general criteria

DTE Response: Consideration of General Criteria within Evaluation, Chapter 4
USACE Response: Incomplete. Completion of this RAI requires:

Receipt of acceptable responses to 3.b – 3.j.

An additional narrative summarizing:

The unresolved conflicts relative to resource use involving the preferred site plan

The practicability of using reasonable alternative locations and methods to accomplish the objectives of such project feature(s)

The public interest factors considered relevant and evaluated;

The project (USACE/MDNE regulatory focus) benefits and detriments, including extent and permanence (see RAI USACE-1i question summary and supporting information) associated with the relevant public interest factors;

The conditions and/or mitigation proposed and/or required to offset detrimental impacts

Other public interest factors considered but determined to have little or no impact applicable to the public interest review.

l. RAI USACE-1i. Impact significance levels

DTE Response: Impact Significant Levels, Chapter 4
USACE Response: Apply to future USACE RAI responses

m. RAI USACE-1j. Public interest/NEPA review supportive documentation

DTE Response: Supporting materials, throughout
USACE Response: Incomplete. Many of the figures provided were in excess of the information necessary, were provided as references and not included in the document and were not legible. To complete this RAI, the following is required:

Provide supporting documentation per general comment 1.d. It is not acceptable to provide supporting documentation by reference to a RAI response or ER section, table, figure, etc. All such information should be directly incorporated into the narrative. All supportive figures and tables should be submitted in the format described in General Comment 1. d.

Provide shape files in the format provided in Attachment 1 (reference 2.o) for the following:

Delineated areas (A through ZZ) as presented in the DU wetland investigation report (reference 2.i) and revised by the USACE JD (reference 2.a), and other areas on site referenced in the report but not assigned a letter designation;

Proposed mitigation area(s)

n. RAI USACE-2d. 404(b)(1) Analysis supportive documentation

DTE Response: Supporting records and drawings, throughout Appendix C
USACE Response: Incomplete. See USACE response 3.m.

APPENDIX B

Appendix B. ALTERNATIVE SITES ANALYSIS

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LIST OF FIGURES

Detroit Edison reviewed the eight candidate sites identified in Section 9.3 of the Fermi 3 Combined License Application (COLA) Environmental Report (Reference 1) within the context of the CWA Section 404 (b)(1) guidelines to identify a least environmentally damaging practicable alternative (LEDPA). First Detroit Edison performed a practicability assessment that considered various technical, economic, safety, and environmental criteria that reflect the overall purpose of the project. Sites that passed the practicability assessment were then evaluated for potential impacts on waters of the U.S. and adjacent wetlands to identify an environmentally preferable location. A detailed description of the review is provided below.

B.1 PRACTICABILITY ASSESSMENT

Detroit Edison conducted an assessment of the eight candidate sites identified in Section 9.3 of the Environmental Report to determine the practicability of locating the proposed nuclear generating facility at each site. The criteria applied during the practicability assessment included the following:

- Land acquisition
- Proximity to 345-kV or greater transmission line
- Proximity to adequate water supply
- Proximity to hazardous land uses (e.g., airports, dams, transportation routes, chemical plants, refineries, mining operations, oil or gas pipelines/storage installations, military facilities)

Detroit Edison established threshold values for each criterion based on guidance provided in the Electric Power Research Institute (EPRI) *Siting Guide: Site Selection and Evaluation Criteria for an Early Site Permit Application,* March 2002 (Reference 2). Sites that did not meet the threshold value were judged to be impracticable. The remaining sites were retained for further evaluation.

The study involved reviewing existing data from the 2006 Detroit Edison preliminary siting study (Reference 3), the Fermi 3 Environmental Report (Reference 1), the Detroit Edison response to NRC RAI Question AL9.3-1 (Reference 4), and supplementing the dataset with additional Geographical Information System (GIS) information (Reference 5), to facilitate data collection and analysis.

The practicability evaluation criteria and the rationale used to establish their threshold values are described below. Table 1 provides a comparative summary of candidate site attributes relative to each of the evaluation criteria, and Detroit Edison's conclusions regarding the practicability of the site under that criterion. Site boundaries and attributes are shown in Figures 1 through 8.

B.1.1 Land Acquisition

The costs and effects of land acquisition are important in siting a nuclear plant. In this assessment, sites that are owned by Detroit Edison, whole or in part, were considered practicable. For the purpose of this assessment, it was assumed that land not owned by Detroit Edison would be purchased from the land owner. The cost of acquiring the necessary land area for a proposed project and the potential for in-holdings and title restrictions increase with the number of parcels and land owners. When multiple parcels need to be assembled, the individual owners have an incentive to hold out for prices in excess of their true valuation of the property in hopes of capturing a share of the surplus from the project. Also, individual owners, especially those who have occupied their property for a long period of time may place a higher value on the land than the

assessed value, and that value could be substantial. In addition, the Michigan Farmlands and Open Spaces Preservation Act of 1974 provides for the formation of a development rights agreement between individual farm owners and the State that ensures the land is maintained in agricultural use for a minimum of 10 years in return for tax benefits. If the agreement is terminated or allowed to expire, repayment of tax credits received during the last 7 years under the agreement plus 6 percent interest is required (Reference 6).

The potential for displacement of individuals and businesses also increase with the number parcels and land owners. This could impact the availability of comparable replacement dwellings and sites in the local area, and has the potential for other social and economic impacts.

In the preliminary siting study (Reference 3), sites that required land acquisition from more than 30 owners were eliminated, while sites with 30 or fewer land owners or residences were retained. Therefore, sites with 30 or more individual owners or residences were identified as impracticable.

Four candidate sites (Sites A, W1, W2, and W3) have more than 30 owners and were considered to be impracticable.

B.1.2 Proximity to 345-kV or Greater Transmission Line

Access to an existing transmission system is an essential criterion in siting a nuclear plant. According to the preliminary siting study (Reference 3), the cost of construction for a single-circuit 345-kV transmission line is approximately $980,000 per mile. Additional costs for land acquisition and permitting would also be incurred. Not only do costs increase with increasing transmission line construction to support the new plant, but impacts to the environment also increase. In addition, upgrades to the existing transmission grid, including substation improvements, the addition of new transmission lines in existing rights-of way (ROWs), and the addition of new ROWs, are potentially required. The need for such upgrades is determined through detailed analysis, but the need for additional upgrades typically increases with the distance. The distances in this assessment were estimated by measuring the straight-line distance from each candidate site to the nearest existing 345-kV transmission line.

Sites beyond a distance of 15 miles from existing 345-kV transmission lines were identified as impracticable.

Three candidate sites (Sites W1, W2, and W3) are more than 15 miles from the nearest 345-kV transmission line and were considered to be impracticable.

B.1.3 Proximity to Adequate Water Source

Access to an adequate water source is an essential criterion in siting a nuclear plant. According to the preliminary siting study (Reference 3), the cost of construction for a water supply pipeline is approximately $1,100,000 per mile. Additional costs for land acquisition, construction of an intake structure and pumping facility, and permitting would also be incurred. Not only do costs increase with increasing distance to the water source, but impacts to the environment also increase. The distances in this assessment were estimated by measuring the straight-line distance from each candidate site to the identified water source.

Sites beyond a pumping distance of 15 miles were identified as impracticable.

Two candidate sites (Sites A, and C) are more than 15 miles from the nearest water source and were considered to be impracticable.

B.1.4 Proximity to Railroad Access

Access to railroad lines is an important criterion in siting a nuclear plant because sufficient access must be present in order to accommodate the transport of materials that will be used in reactor construction and the transport of fuel assemblies during reactor operation.

According to the preliminary siting study (Reference 3), the cost of construction for a railroad spur is approximately $2,000,000 per mile. Additional costs for land acquisition and permitting would also be incurred. Not only do costs increase with increasing distance to the railroad access, but impacts to the environment also increase. In addition, upgrades to the existing railroad system, including rails, cross ties, other track material, sidings, road crossings, and bridges, are potentially required. The need for such upgrades is determined through detailed analysis, but the need for additional upgrades typically increases with the distance to the site. The distances in this assessment were estimated by measuring the straight-line distance from each candidate site to the identified railroad access.

Sites beyond a distance of 7 miles were identified as impracticable.

No sites were considered to be impracticable under this criterion. All eight candidate sites are located within 7 miles of an existing railroad line.

B.1.5 Hazardous Land Uses

The proximity of facilities that could present a hazard to the proposed facility is an essential criterion in siting a nuclear plant. As stated in the EPRI Siting Guide (Reference 2), “the purpose of this criterion is to incorporate NRC guidance on site suitability consideration regarding the nature and proximity of man-related hazards (e.g., airports, dams, transportation routes, and military and chemical facilities) into the site selection process.” Data on the location of airports, dams, mining and quarrying operations, military bases, and petroleum/gas pipelines were used to evaluate criterion.

Detroit Edison established the following metrics for evaluation of hazardous land uses near a candidate site:

- Sites with high energy facilities located within a 1-mile radius were identified as impracticable.
- Sites with a high density of hazardous land uses were identified as impracticable.

Two candidate sites (Sites A and C) have multiple large-diameter natural gas pipelines traversing the site within ½-mile of the reactor location and were considered to be impracticable.

Site N has a high density of hazardous land uses within 5 miles of the site and was considered to be impracticable.

B.1.6 Summary

Eight sites within the Detroit Edison service area were evaluated for the practicability of locating the proposed nuclear generating facility at each site. Six sites (five greenfield sites and one existing fossil-fired site) that

exhibited undesirable characteristics were judged to be impracticable as sites for locating a new nuclear plant and were excluded from further review. The six sites and the reasons for excluding them are listed below.

- Site A (Petersburg) – Impracticable due to number of land owners, a large distance to the nearest water source, and proximity to sites with hazardous uses.
- Site C (South Britton) – Impracticable due to a large distance to the nearest water source and proximity to sites with hazardous uses.
- Site N (Belle River) – Impracticable due to proximity to sites with hazardous uses.
- Site W1 (Port Austin) – Impracticable due to number of land owners and a great distance to the transmission grid.
- Site W2 (Caseville) – Impracticable due to number of land owners and a great distance to the transmission grid and the nearest railroad.
- Site W3 (Bay Port) – Impracticable due to number of land owners and a great distance to the transmission grid.

The two remaining candidate sites, Site F (Greenwood) and Site M (Fermi) were evaluated for impacts on the waters of the U.S. and adjacent wetlands.

B.2 WETLAND IMPACT ANALYSIS

Detroit Edison evaluated wetland and stream impacts associated with constructing a new nuclear generating plant at the Fermi site (Site M) and the Greenwood site (Site F). This review was conducted as a screening-level analysis to evaluate the general presence of wetlands and waters of the U. S., and potential impacts on these resources related to siting a nuclear power plant. Recent wetland delineations were available for both the Fermi site (Reference 7) and Greenwood site (Reference 8). The site-specific delineations were used to evaluate potential construction impacts within the property boundaries. Potential offsite wetland and stream impacts were evaluated using publically available GIS data from the National Wetlands Inventory (Reference 9) and ESRI (Reference 10).

B.2.1 Greenwood Site (Site F)

The Greenwood site is an existing Detroit Edison-owned oil/gas-fired power plant site in Greenwood Township of St. Clair County, Michigan. In 1972, Detroit Edison submitted an application to the U.S. Atomic Energy Commission (USAEC)[1] for construction at the 1729-acre Greenwood site of a two-unit nuclear generating plant that used spray canals to cool the circulating water system. The permit application included an environmental report that evaluated the environmental impacts related to the construction of the proposed Greenwood Energy Center Units 2 and 3. In 1974, USAEC staff published an environmental statement (Reference 11) that evaluated the environmental impacts of the proposed nuclear generating plant; balanced the adverse environmental effects with the environmental, economic, technical, and other benefits of the facility; and concluded that the benefits associated with the proposed project were greater than its adverse environmental effects. After Reference 11 was published, Detroit Edison made several design changes to the proposed nuclear generating plant, including the use of natural draft cooling towers instead of spray canals, which necessitated a major revision to their environmental report. Detroit Edison submitted the revised environmental

[1] The U.S. Atomic Energy Commission is the predecessor to the NRC.

report (Reference 12) to the USAEC in 1979. The revised environmental report and construction permit application were under review when the nuclear project was cancelled in 1980.

As shown in Figure 10, the project area for the new nuclear plant is located in the southwestern portion of the property. The potential configuration of the nuclear power plant within the Greenwood site was based on the Impact Minimization Layout presented in Figure AppC-5 of Reference 13. That plant configuration for the Greenwood site was derived by rotating the generic ESBWR plant layout 90 degrees and reconfiguring to avoid impacts on Engles Drain. The construction areas at the Greenwood site include approximately 70 acres.

Because nuclear development at the Greenwood site was previously proposed, decisions regarding the make-up water source, blowdown discharge location, likely routes for water supply and blowdown pipelines and transmission lines, ROW widths, and transmission system upgrades are based on information provided in the Greenwood Energy Center environmental report (Reference 12). The information provided in Reference 12 was the result of detailed engineering assessments and was reviewed by NRC and various State and Federal regulatory agencies.

Blowdown from the closed-cycle cooling system would be discharged through a 5.1-mile pipeline to the Black River. The ROW for the blowdown pipeline would extend southeast from the project area to the southeastern corner of the Greenwood site. The route would then extend east along Norman Road to a terminal diffuser in the Black River approximately 0.2 mile south of the point where Norman Road crosses the river. Detroit Edison estimated that the ROW for the blowdown pipeline would be 100-feet wide. The route for the blowdown pipeline is depicted on Figure 10.

Make-up water for the closed-cycle cooling system would be provided by a 17.5-mile water pipeline from Lake Huron. The ROW for the water supply pipeline would follow existing roadways, extending south from the project area along Kilgore Road to Metcalf Road, then east along Metcalf Road to an intake structure on the bottom of Lake Huron. As discussed in the Final Environmental Report for Greenwood Energy Center Units 2 & 3 (Reference 12), the intake structure needs to be located 3 to 4 miles out into Lake Huron at a minimum depth of 30 feet to avoid damage from surface ice, wave action, and low water levels; and to provide navigation clearance. Consistent with the discussion in Reference 12, Detroit Edison assumed the intake structure would be located approximately 4 miles from the lakeshore and approximately 40 feet below the surface. Detroit Edison estimated that the ROW for the water supply pipeline would be 125-feet wide. The route for the water supply pipeline is depicted on Figure 11.

Detroit Edison anticipates that two 345 kV transmission lines would be required to connect the new nuclear generating plant at the Greenwood site. As discussed above, the routes for the new transmission lines are based on information provided in the Greenwood Energy Center environmental report (Reference 12). Detroit Edison believes that the information in Reference 12 represents the most likely configuration because the transmission route proposed for the new nuclear unit at Fermi is the same as what was proposed for the Fermi site in the 1970's. The Greenwood-Millington line would extend west from the Greenwood site for 12.2 miles, then 19.3 miles north to the Bennett Substation. From the Bennett Substation the line would extend west for approximately 25 miles to a future substation in Millington Township of Lapeer County. The Greenwood-

Blackfoot line would extend west from the Greenwood site in the same ROW as the Greenwood-Millington line for 12.2 miles. The Greenwood-Blackfoot line would then extend south through St. Clair County for 7.2 miles, then west for 17.6 miles to the Hunters Creek Substation in Lapeer County. The Greenwood-Blackfoot line would follow existing transmission lines west through Lapeer County for 7.1 miles, then south for 4.8 miles to the Blackfoot Substation. The transmission line routes are depicted on Figure 12, sections A, B and C. Detroit Edison estimated that the ROWs for the transmission lines would be 200-feet wide. If a new nuclear generating plant was located at the Greenwood site, the actual tie-in locations, transmission line routes, ROW widths, and the need for substation improvements would be determined through a detailed analysis of the existing transmission grid that considers system impacts from the new nuclear plant as well as impacts from other planned facilities and facility retirements.

Wetlands and streams on the Greenwood site were delineated in 2005 (Reference 8). The 2005 delineation study identified a number of wetland areas on the property, some of which were determined to be high quality. The study also identified several water features (i.e., ditches and streams) that crossed the property. Detroit Edison used GIS to evaluate potential wetland and stream impacts on the Greenwood site. Maps of the delineated wetlands and water features from the 2005 delineation study were digitized onto a base map of the Greenwood site. Then the footprint for the proposed nuclear facility and associated pipeline and transmission line ROWs were overlaid on the map. Areas where the plant footprint and ROWs overlap wetlands and streams were identified as impacted areas. Detroit Edison then used GIS to calculate the acreage of impacted wetlands and linear feet of impacted streams. The delineation indentified 386 acres of wetland and 30,303 linear feet of stream within the area of the wetland investigation (Reference 8). Impacts to approximately 39 acres of wetland habitat are anticipated within the construction areas of the Greenwood site.

Potential offsite wetland and stream impacts were evaluated using publically available GIS data from the National Wetlands Inventory (Reference 9) and ESRI (Reference 10). Detroit Edison created a map of the wetlands and streams in the region surrounding the Greenwood site. Then pipeline and transmission line ROWs were overlaid on the map. Areas where the ROWs overlap wetlands and water features were identified as impacted areas. Detroit Edison then used GIS to calculate the acreage of impacted wetlands and linear feet of impacted streams. The transmission line corridors include 257 acres of wetlands and 29,648 linear feet of streams.

B.2.2 Fermi Site (Site M)

Detroit Edison conducted a wetlands investigation to delineate wetland boundaries and assess functions and values of the wetlands present on 1106 acres of the Fermi property. The delineation indentified 509 acres of wetland and 45 acres of open water within the area of the wetland investigation (Reference 7). The proposed layout of the nuclear power plant at the Fermi site is presented in Figure 5.2-3 of this RAI response. The construction areas at the Fermi site include approximately 190 acres. Impacts to approximately 33 acres of wetland and 5.3 acres of open water habitat are anticipated within the construction areas of the Fermi 3 project at the Fermi site.

The Fermi 3 offsite transmission system will consist of three 345 kV lines running from the Fermi site north, then west to the Milan Substation, located approximately 1.5 miles northwest of Milan, a distance of about 29.4 miles. The transmission line route is depicted on Figure 13. The three 345 kV lines for Fermi 3 will run in a common corridor, with transmission lines for Fermi 2, to a point just east of I-75. From the intersection of this Fermi site corridor and I-75, the three Fermi-Milan lines will run west and north for approximately 12 miles in a corridor shared with other non-Fermi lines within the assumed 300-foot wide ROW in which the vegetation has been managed to exclude tall woody vegetation. The western 10.8 miles of the corridor is currently undeveloped, and no transmission infrastructure exists. Where vegetation is present, the maintenance has been minimal, except to keep tall woody vegetation removed. The Milan Substation may expand to accommodate the new transmission lines to Fermi 3. There are no other offsite areas associated with Fermi 3 construction.

Construction impacts in the existing eastern 18.6 miles of transmission corridor are expected to be minimal, because the reconfiguration of existing conductors would largely allow for the use of existing infrastructure to create the new lines, access for installing additional lines is good, and the ROW is maintained. Impacts from construction are primarily limited to the western 10.8 miles of the corridor where both tower and steel pole installation could occur and some clearing would be required. The 10.8-mile tract of existing undeveloped corridor along the route to the Milan Substation is shown on Figure 14 and includes 121 acres of wetlands and 7,304 linear feet of streams.

B.2.3 Summary

The acreage of impacted wetlands or open water and linear feet of impacted streams associated with nuclear development at the Fermi and Greenwood sites are provided in Table 2. The plant configuration analyzed at the Greenwood site is generic and included approximately 70 acres. A site layout based on more detailed design considerations, similar to the process described in Section 5 for the Fermi site, is expected to result in a total acreage requirement comparable to the 190 acres proposed for the Fermi site. The potential for wetland impacts increases with a larger construction footprint. Review of Table 2 indicates that based on overall impacts to waters of the U.S., the Fermi site would be the LEDPA site.

REFERENCES

1. Fermi 3 Combined License Application Environmental Report.
2. Electric Power Research Institute Siting Guide: Site Selection and Evaluation Criteria for an Early Site Permit Application, March 2002.
3. Detroit Edison Preliminary Siting Study Report, August 2006.
4. Detroit Edison Company Response to NRC RAIs Related to the Environmental Review, Letter NRC3-09-0013, RAI Question AL9.3-1, August 25, 2009.
5. Environmental Protection Agency 2010 EPA Geospatial Data Access Project, Featured Environmental Interests. November 30. Available at http://www.epa.gov/enviro/geo_data.html, last accessed December 22, 2010.

6. Michigan Department of Agriculture “The Farmland & Open Space Preservation Program (PA 116), Farmland Agreements Transferring, Dividing & Releasing.” Available online at www.michigan.gov/farmland.

7. Detroit Edison Fermi Property 2010 Wetland Report. Detroit Edison. December 2010.

8. Greenwood Energy Center Wetland Delineation and Determination of Jurisdiction. Brooks Williamson and Associates, Inc. December 2005.

9. U.S. Fish and Wildlife Service National Wetlands Inventory. Available online at http://www.mcgi.state.mi.us/mgdl/?rel=thext&action=thmname&cid=3&cat=National+Wetlands+Inventory, last accessed December 23, 2010.

10. ESRI U.S. Rivers and Streams Data compiled from U.S. Geological Survey and U.S. Environmental Protection Agency, 2006.

11. Final Environmental Statement Related to the Proposed Greenwood Energy Center Units 2 and 3, Docket Nos. 50-452 and 50-453. U.S. Atomic Energy Commission Directorate of Licensing, November 1974.

12. Greenwood Energy Center Units 2 & 3 Applicant’s Environmental Report Construction Permit Stage, Supplement 5. Detroit Edison, February 27, 1979.

13. Detroit Edison Fermi 3 U.S. Corps of Engineers Response to Requests for Additional Information. Revision 0, December 2009.

Table 1. Candidate Site Practicability Review (Sheet 1 of 2)

	Site A – Petersburg	Site C – South Britton	Site F – Greenwood	Site M – Fermi	Site N – Belle River	Site W1 – Port Austin	Site W2 – Caseville	Site W3 – Bay Port
Land Acquisition	**Impracticable** 32 private owners, few houses.	**Acceptable** 14 private owners, 15-25 houses/ facilities. May need to acquire additional land for EAB	**Acceptable** Detroit Edison. Would need to acquire additional land for EAB	**Acceptable** Detroit Edison. Fermi 3 EAB entirely within existing Fermi property and security zone	**Acceptable** 81% Detroit Edison / 19 % Michigan Public Power Authority	**Impracticable** 85 private owners. Many houses/ facilities	**Impracticable** 90 private owners. Many houses/ facilities	**Impracticable** 120 private owners. Many houses/ facilities. May need to acquire additional land for EAB
Transmission Lines	**Acceptable** 345-kV lines with available capacity 1.2 miles north of site	**Acceptable** 345-kV line with available capacity 1 mile north of site	**Marginal** 345-kV line onsite but congested	**Acceptable** 345-kV line with available capacity onsite	**Marginal** 345-kV line onsite but congested	**Impracticable** Nearest 345-kV line is approximately 48 miles from the site	**Impracticable** Nearest 345-kV line is approximately 41 miles from the site	**Impracticable** Nearest 345-kV line is approximately 35 miles from the site
Water Supply	**Impracticable** 15.4 miles inland from Lake Erie	**Impracticable** 24.4 miles inland from Lake Erie	**Acceptable** 11 miles inland from Lake Huron	**Acceptable** On the shore of Lake Erie	**Acceptable** 2 miles west of St. Clair River	**Acceptable** 1.4 miles inland from Lake Huron	**Acceptable** 2.8 miles inland from Lake Huron	**Acceptable** 1.4 mile inland from Saginaw Bay

Table 1. Candidate Site Practicability Review (Sheet 2 of 2)

	Site A – Petersburg	Site C – South Britton	Site F – Greenwood	Site M – Fermi	Site N – Belle River	Site W1 – Port Austin	Site W2 – Caseville	Site W3 – Bay Port
Hazardous Land Uses	**Impracticable** Petroleum product pipeline 2 miles south. Two natural gas pipelines traversing the site from southwest to northeast within ½ mile of plant	**Impracticable** Two natural gas pipelines traversing the site from southwest to northeast. Would require relocation of a 30-inch line to avoid conflicts with the plant	**Marginal** Oil-fired peaking unit and three gas turbines onsite	**Acceptable** Two limestone quarries 3 miles northeast.	**Impracticable** Multiple large natural gas transmission lines, gas storage field and compressor station within 2 miles. Bulk petroleum facility 3 miles north of the site	**Acceptable** No hazardous land use sites within 5 miles.	**Acceptable** No hazardous land use sites within 5 miles.	**Acceptable** Limestone quarry and anhydrous ammonia facility within 3 miles of the site.
Railroad Access	**Acceptable** Indiana & Ohio Railroad 1.5 miles west of the site.	**Acceptable** Norfolk Southern Railway 1.9 miles east of the site.	**Acceptable** PVTX Railway spur on site.	**Acceptable** Canada National Railway spur on site.	**Acceptable** CSX Transportation spur on site.	**Acceptable** Huron & Eastern Railway 1.4 miles southeast of the site.	**Marginal** Huron & Eastern Railway 6.7 miles south of the site.	**Acceptable** Huron & Eastern Railway 5.4 miles south of the site.
Overall Conclusion	**Impracticable**	**Impracticable**	**Acceptable**	**Acceptable**	**Impracticable**	**Impracticable**	**Impracticable**	**Impracticable**

Table 2. Comparison of Wetland/Water Impacts from Alternative Sites

	Proposed Site		Alternative Site	
Onsite Wetlands/Waters	**Fermi**		**Greenwood**	
Delineated Property Acreage	1106		1729	
Wetlands Acreage	509		386	
Open Water Acreage	45		NA	
Streams Linear Feet (LF)	0		30,303	
Wetlands Affected Acreage	33		39	
Streams Affected LF	0		401	
Open Water (Lake Erie) Affected Acreage	0.08		NA	
Open Water (inland) Affected Acreage	5.2		NA	
Offsite Wetlands/Waters	**Wetlands (acreage)**	**Streams (LF)**	**Wetlands (acreage)**	**Streams (LF)**
Makeup Water Intake (acreage)[a]	-	-	NA	NA
Water Pipeline ROW	-	-	3.1	4378
Transmission Line ROW	121	7304	257	29,648
Blowdown Pipeline ROW	-	-	0	273
Total Wetlands/Waters Affected				
Wetlands Affected Acreage	154		300	
Streams Affected LF	7304		34,701	
Open Water (Lake Erie) Affected Acreage	0.08		NA	
Open Water (inland) Affected Acreage	5.2		NA	

[a] Impacts within Lake Huron for the construction of an intake structure for the Greenwood site alternative were not evaluated.

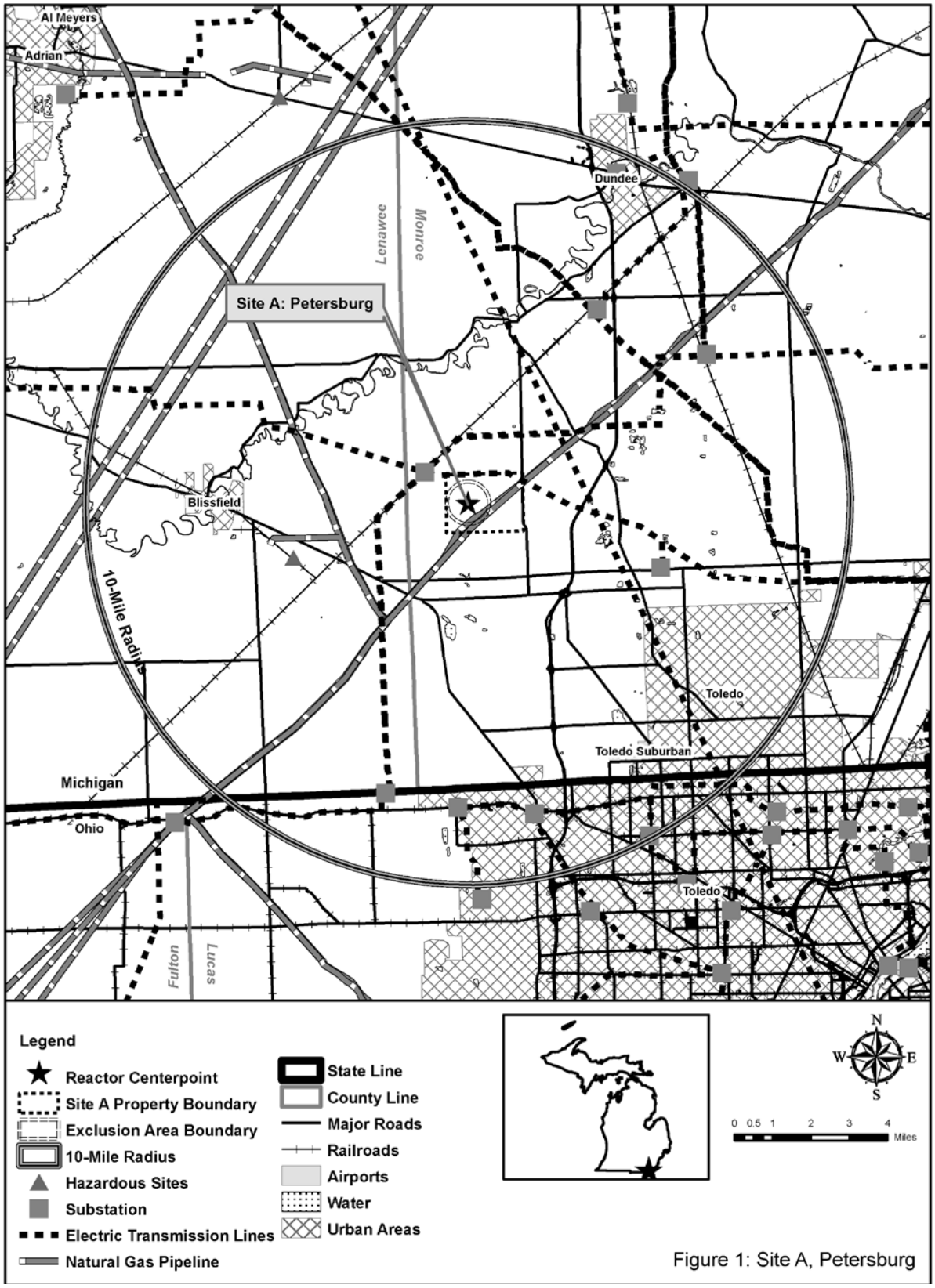

Figure 1: Site A, Petersburg

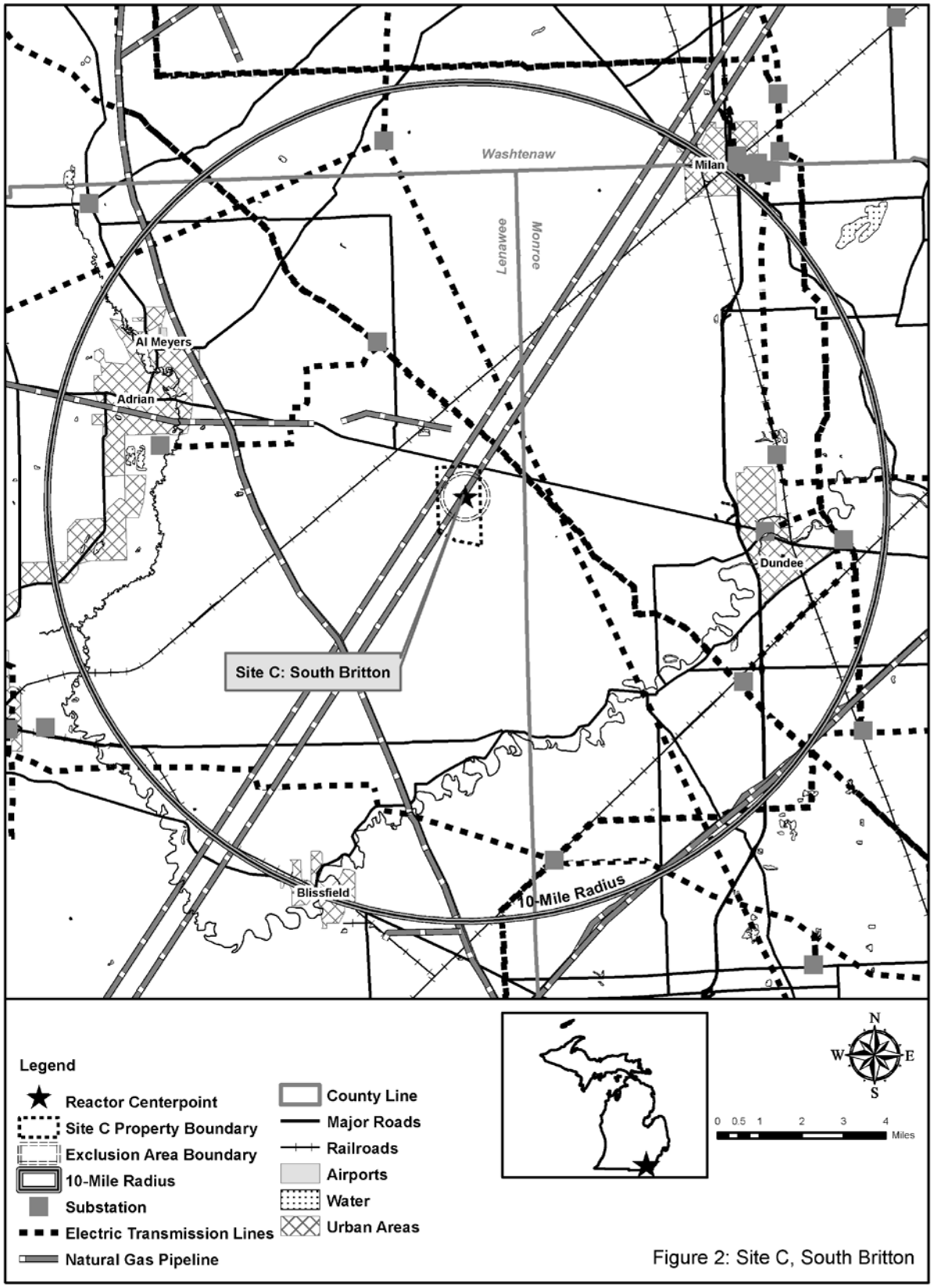

Figure 2: Site C, South Britton

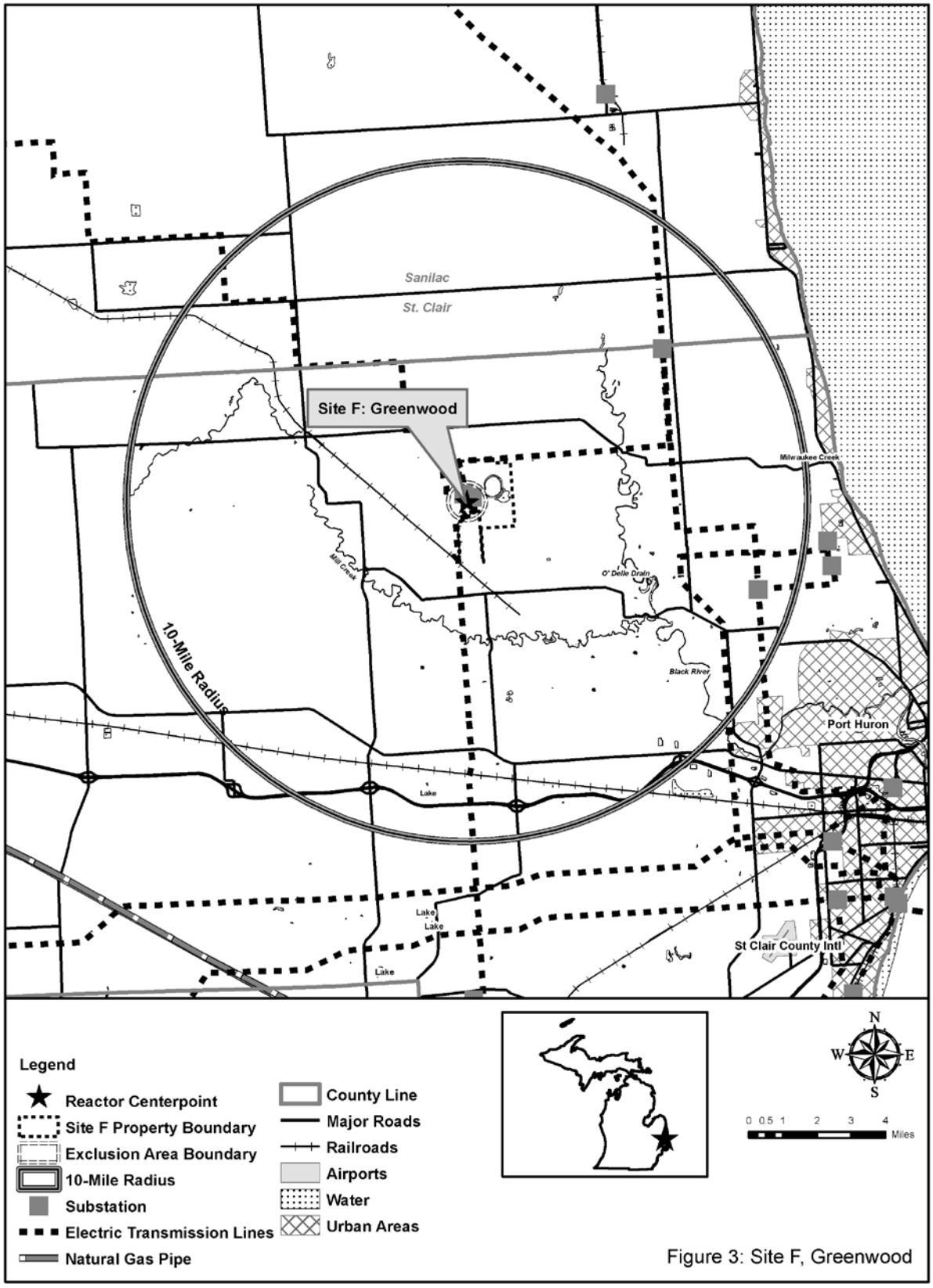

Figure 3: Site F, Greenwood

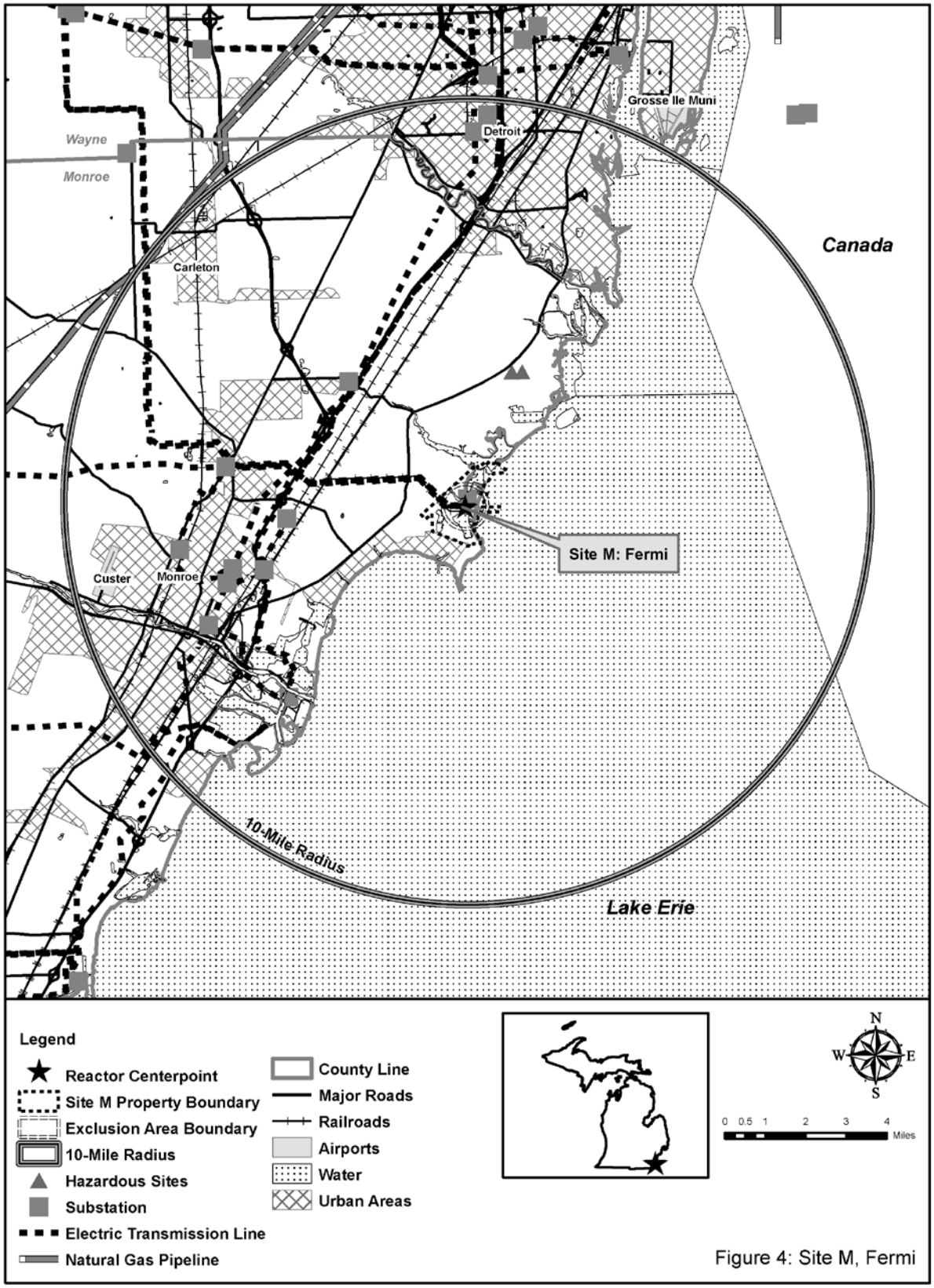

Figure 4: Site M, Fermi

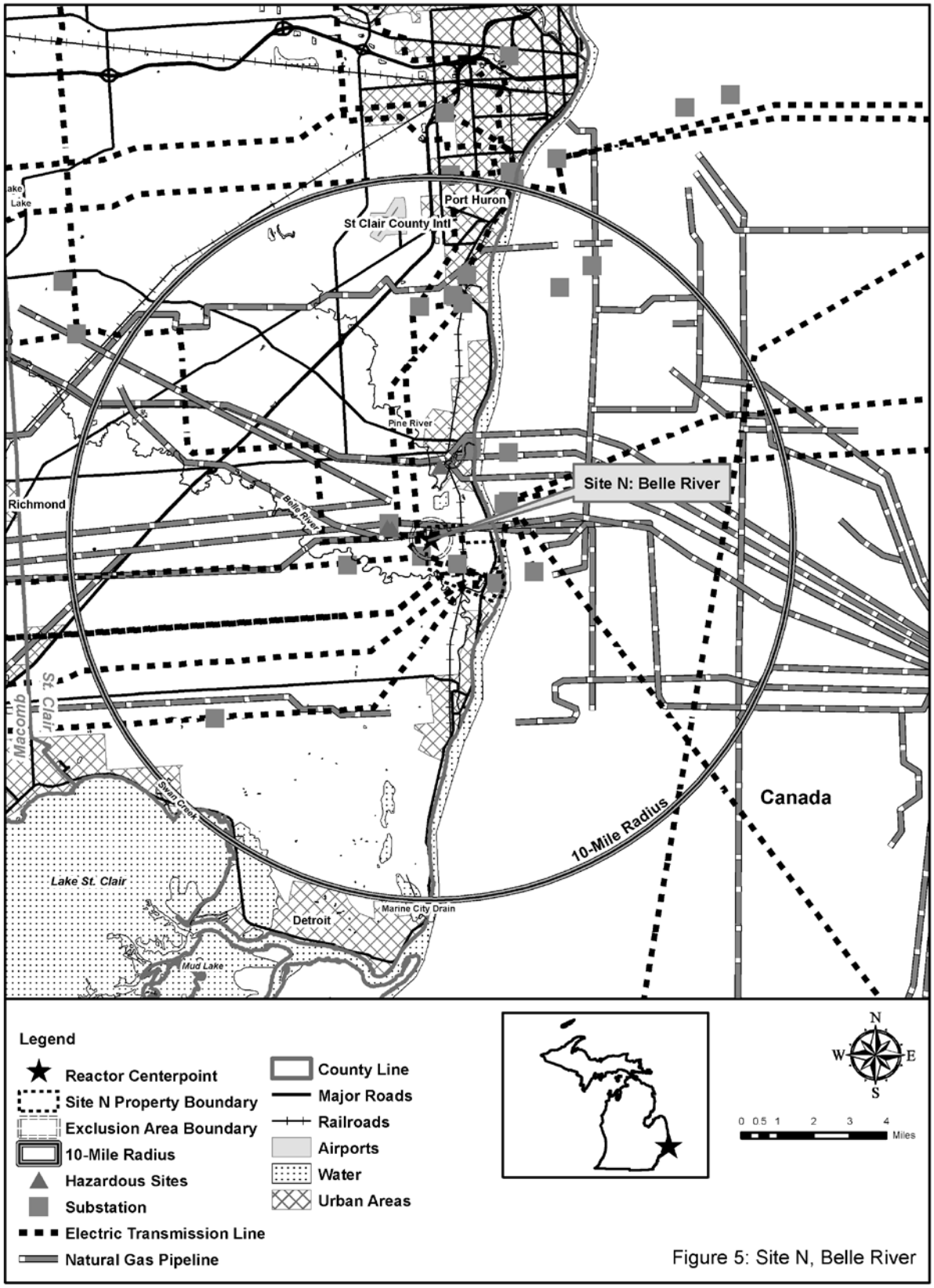

Figure 5: Site N, Belle River

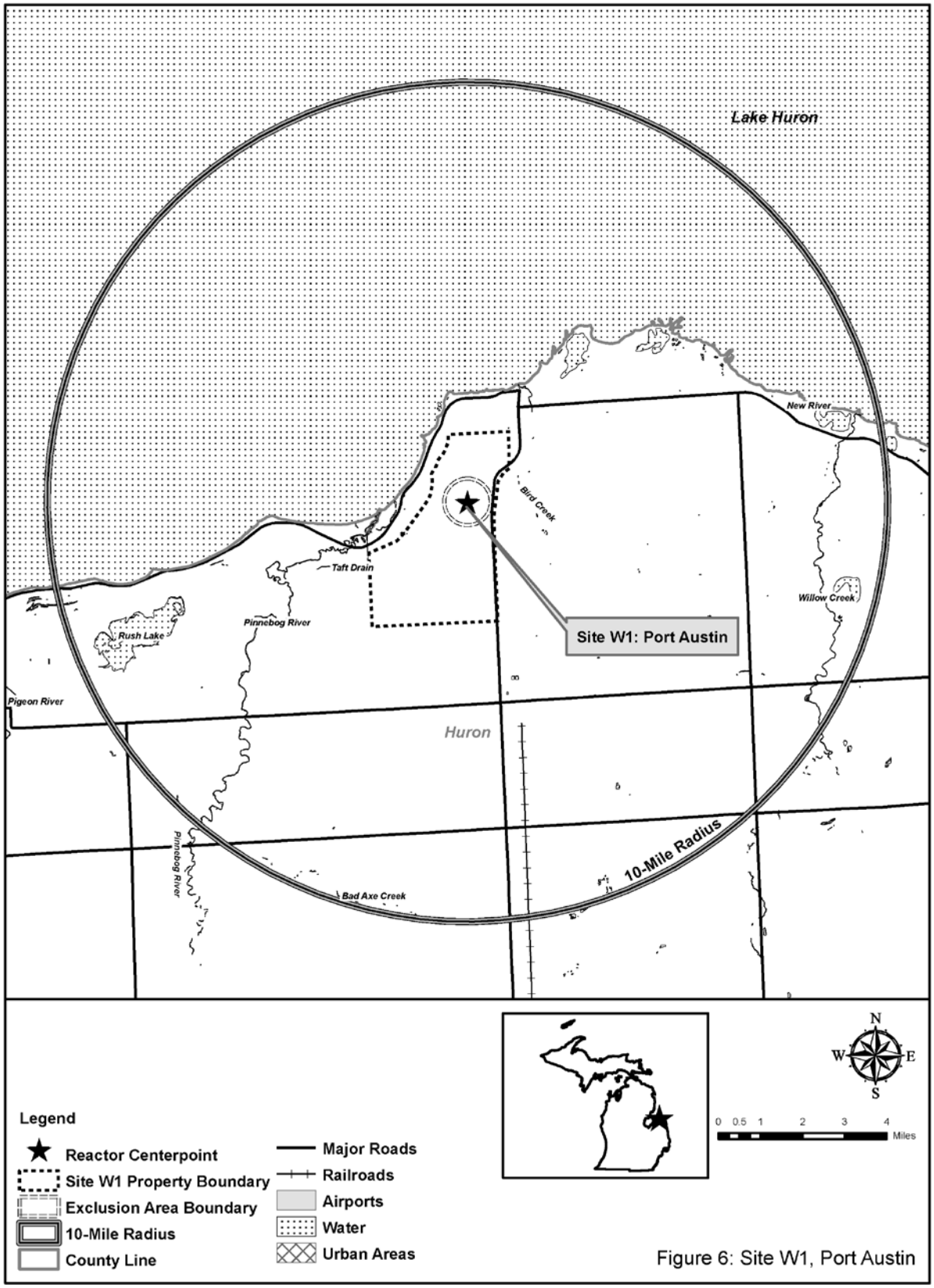

Figure 6: Site W1, Port Austin

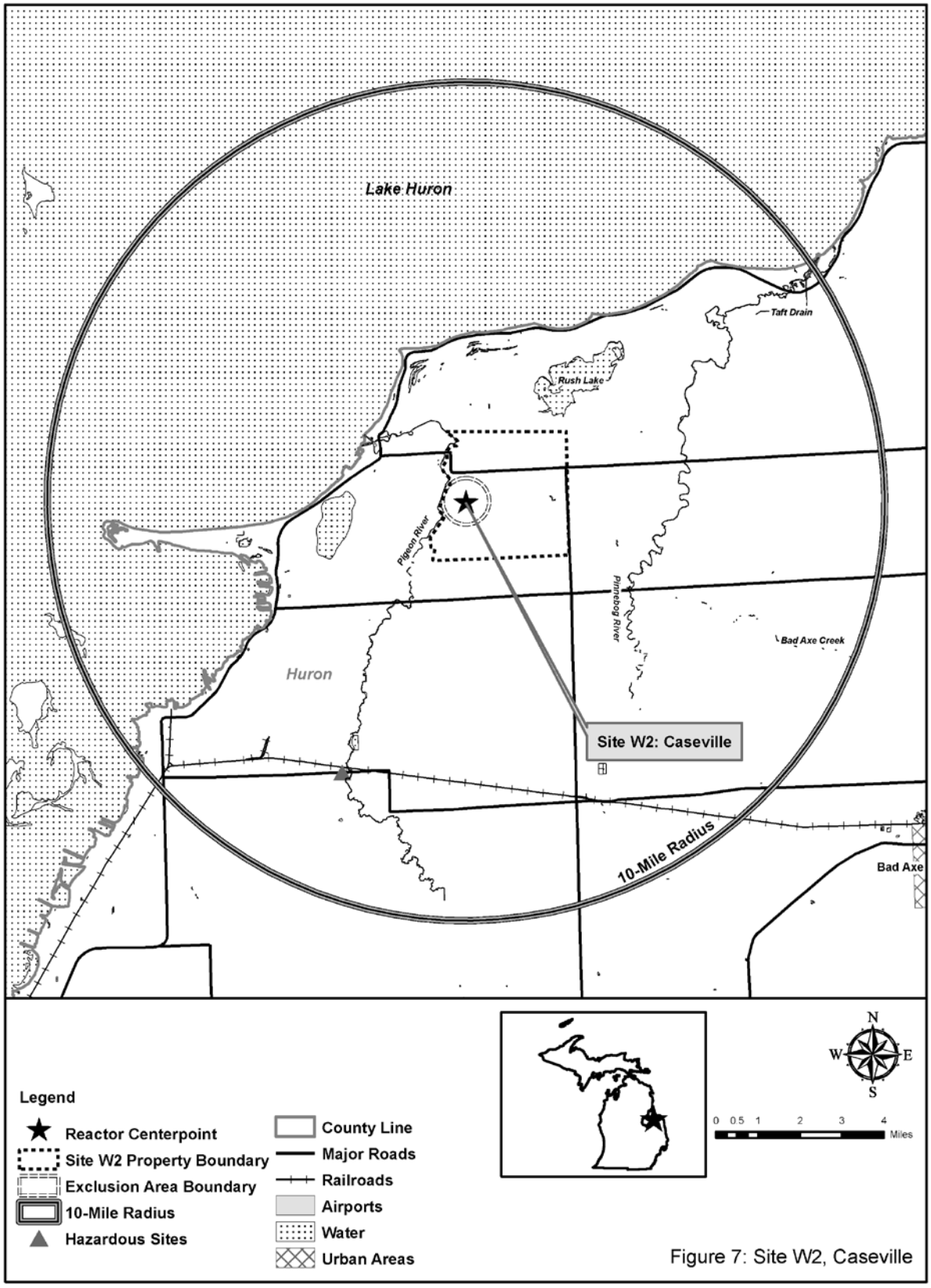

Figure 7: Site W2, Caseville

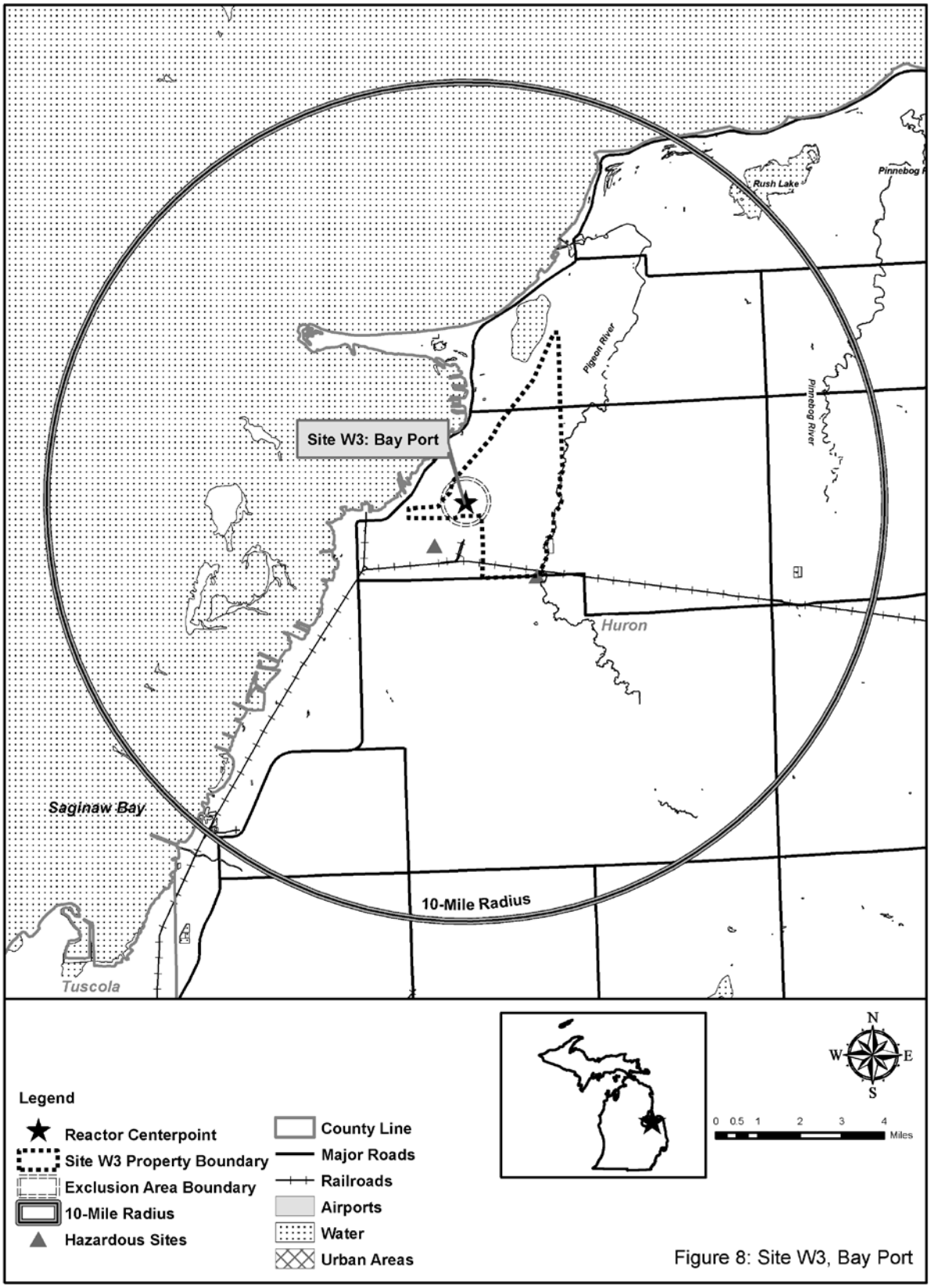

Figure 8: Site W3, Bay Port

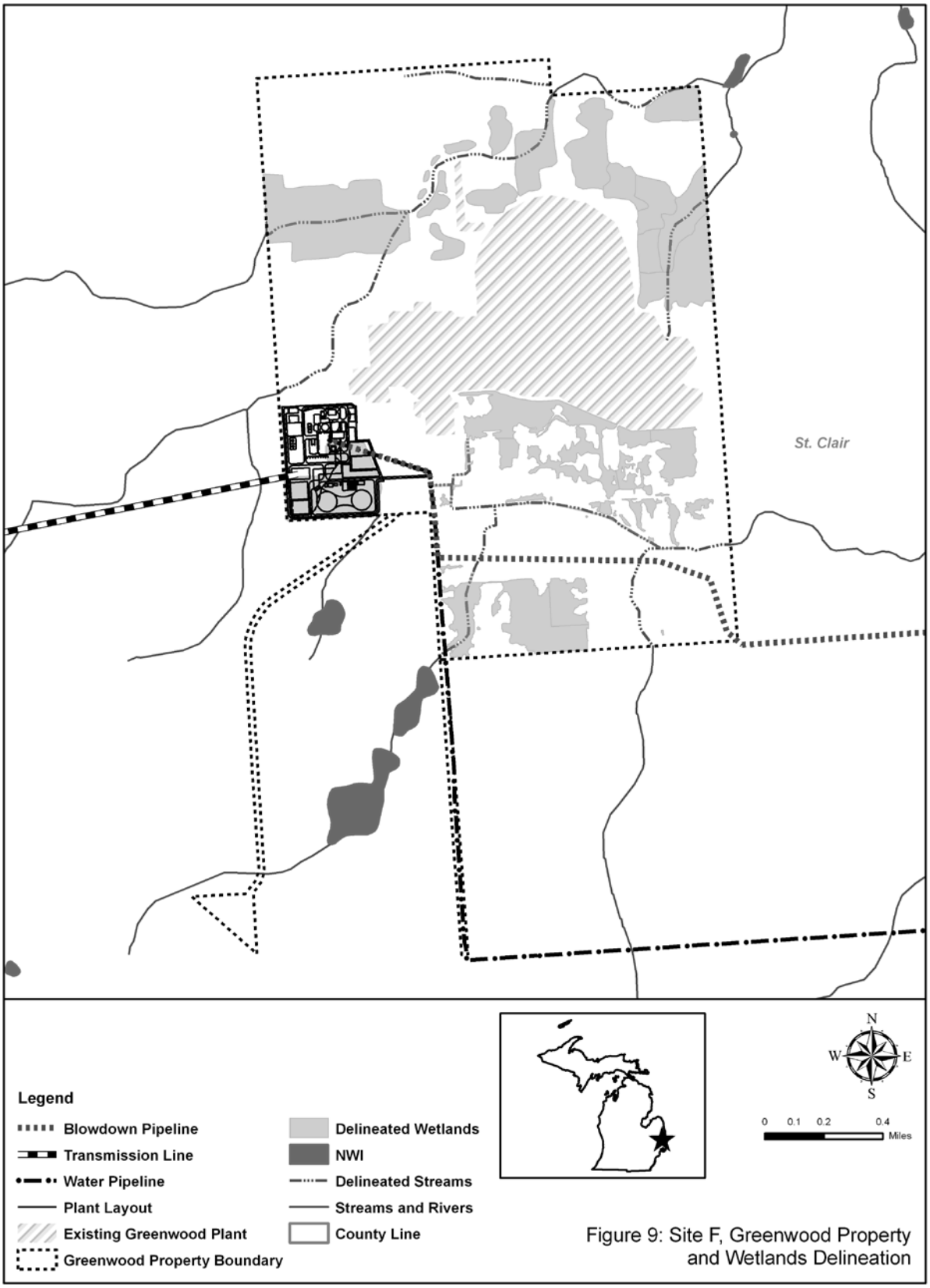

Figure 9: Site F, Greenwood Property and Wetlands Delineation

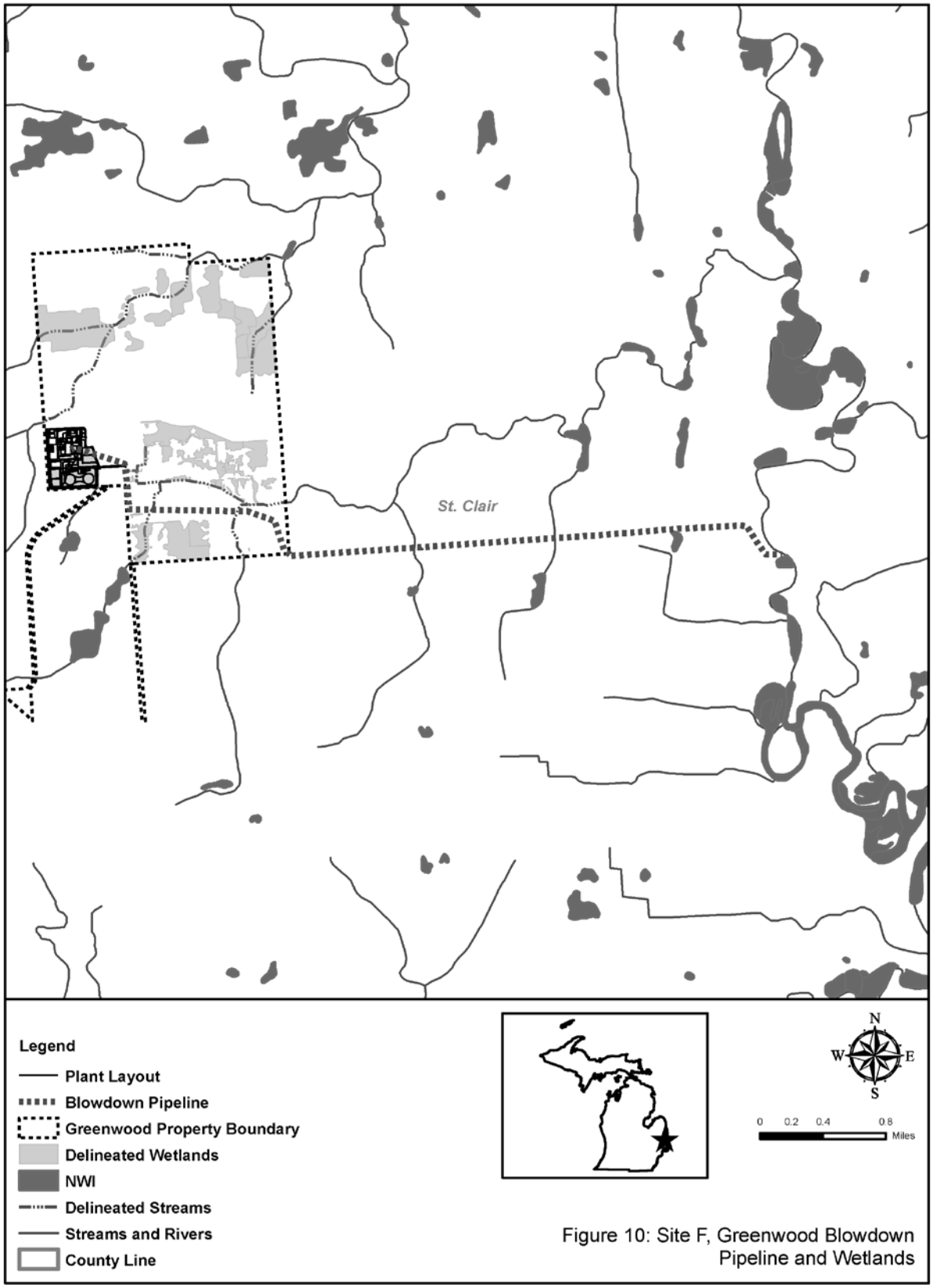

Figure 10: Site F, Greenwood Blowdown Pipeline and Wetlands

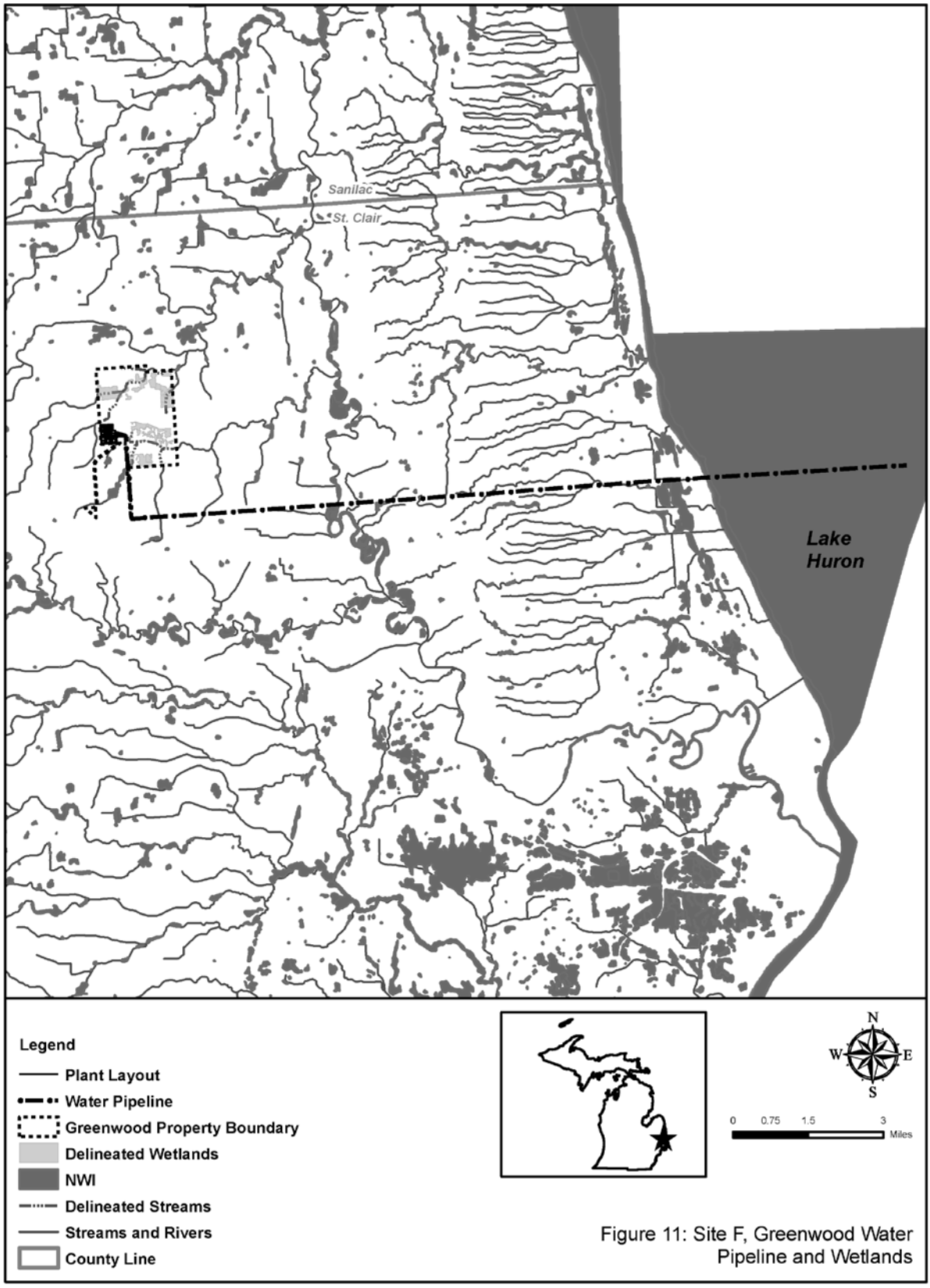

Figure 11: Site F, Greenwood Water Pipeline and Wetlands

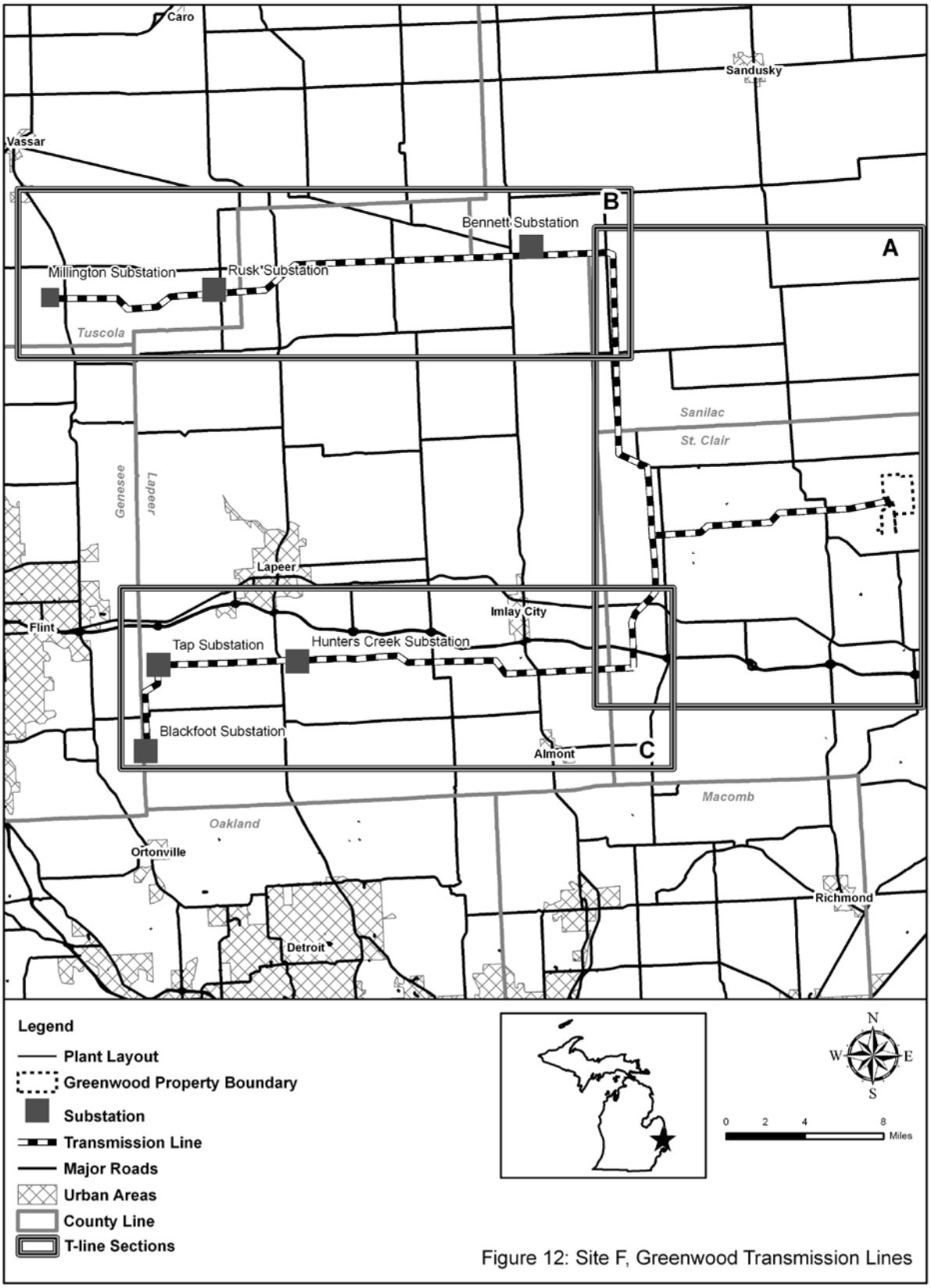

Figure 12: Site F, Greenwood Transmission Lines

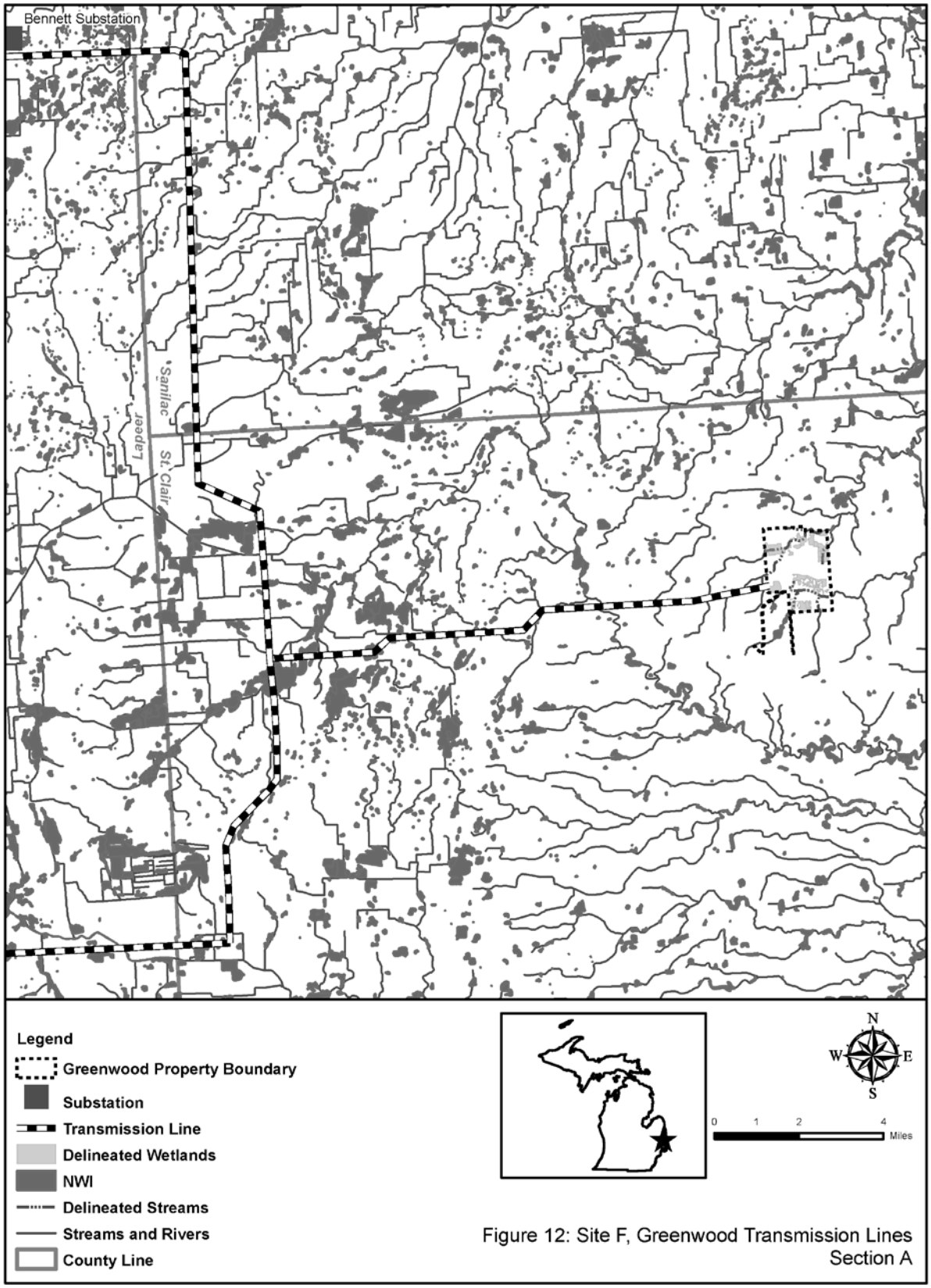

Figure 12: Site F, Greenwood Transmission Lines
Section A

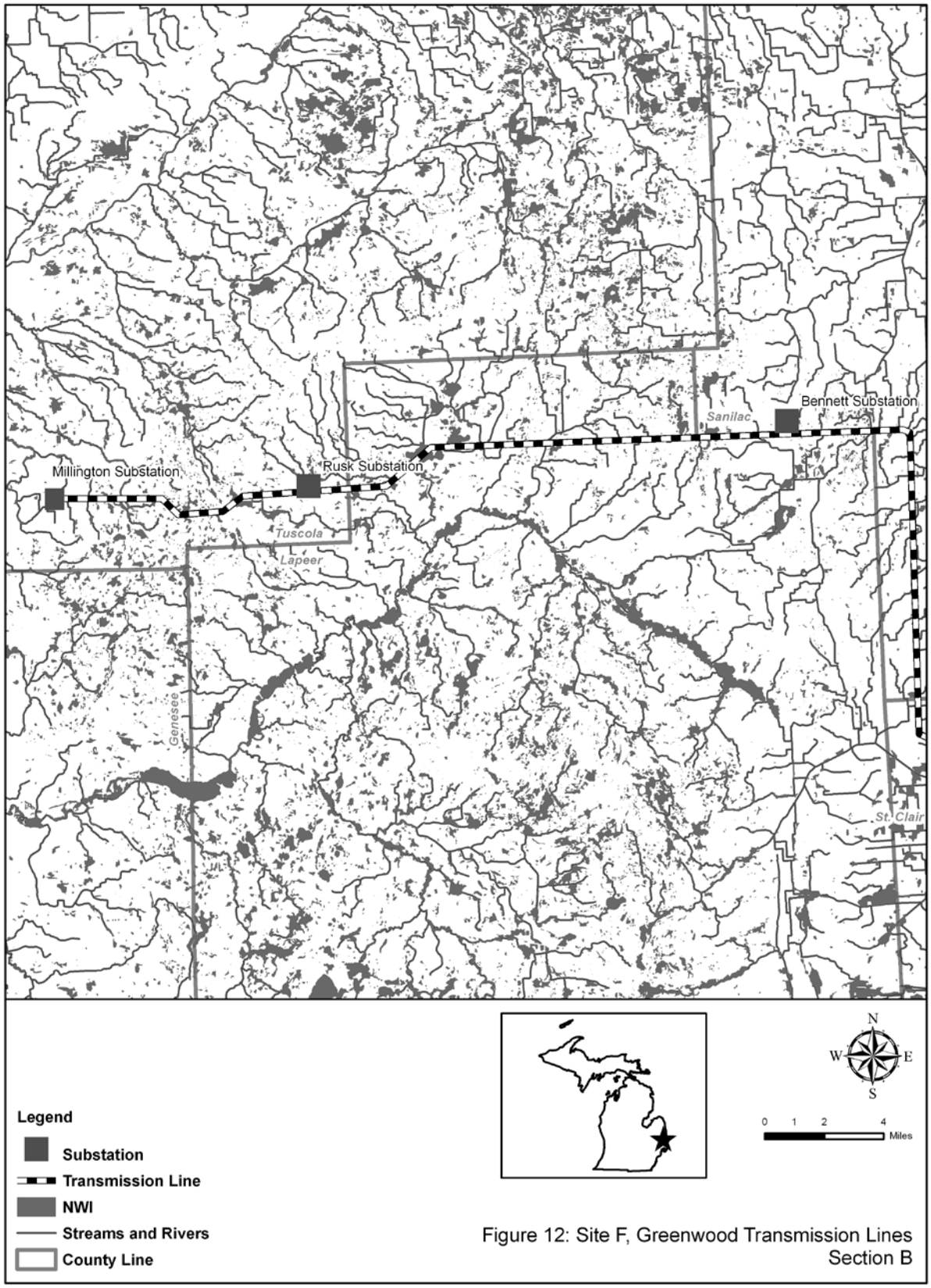

Figure 12: Site F, Greenwood Transmission Lines
Section B

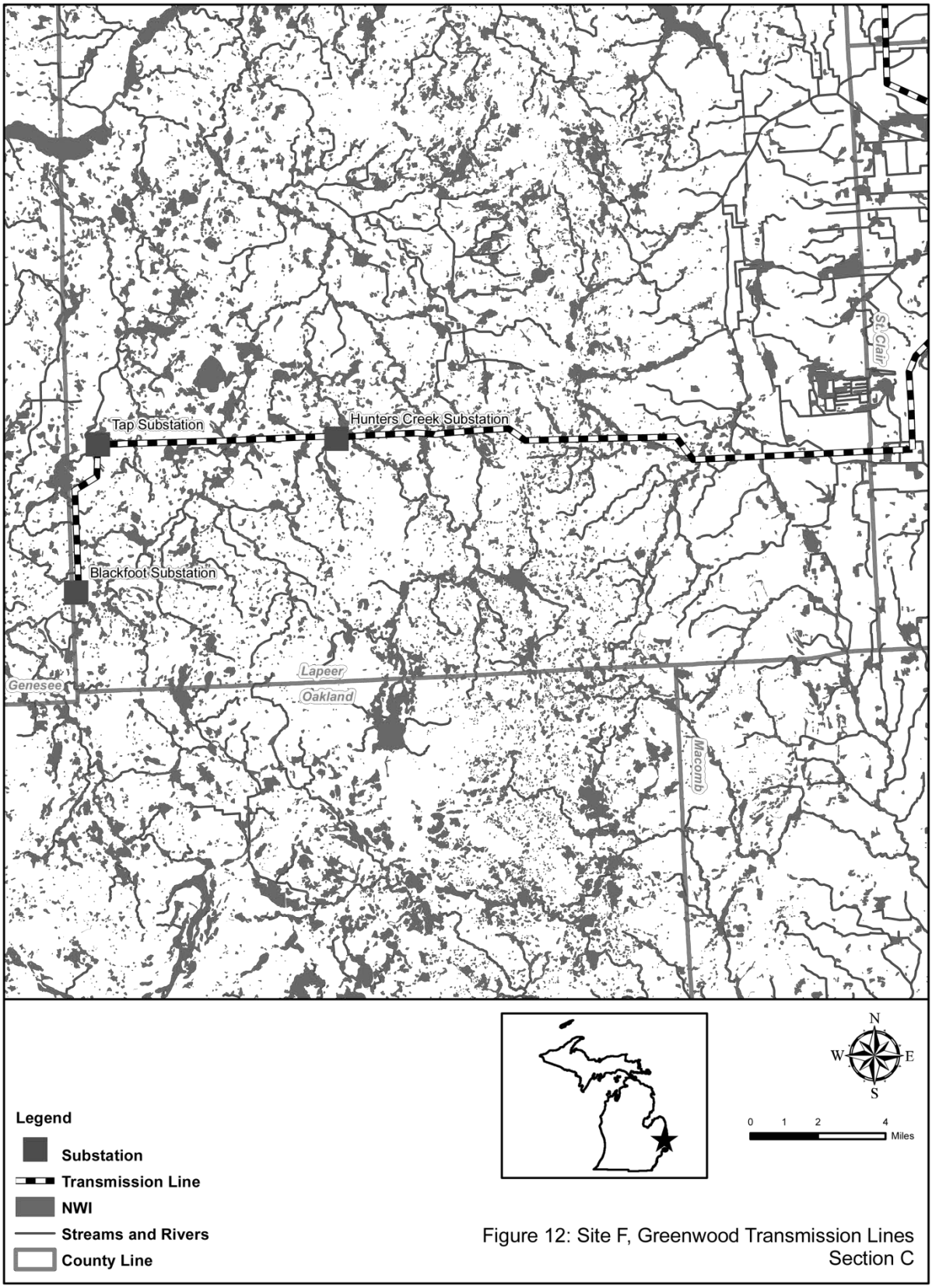

Figure 12: Site F, Greenwood Transmission Lines
Section C

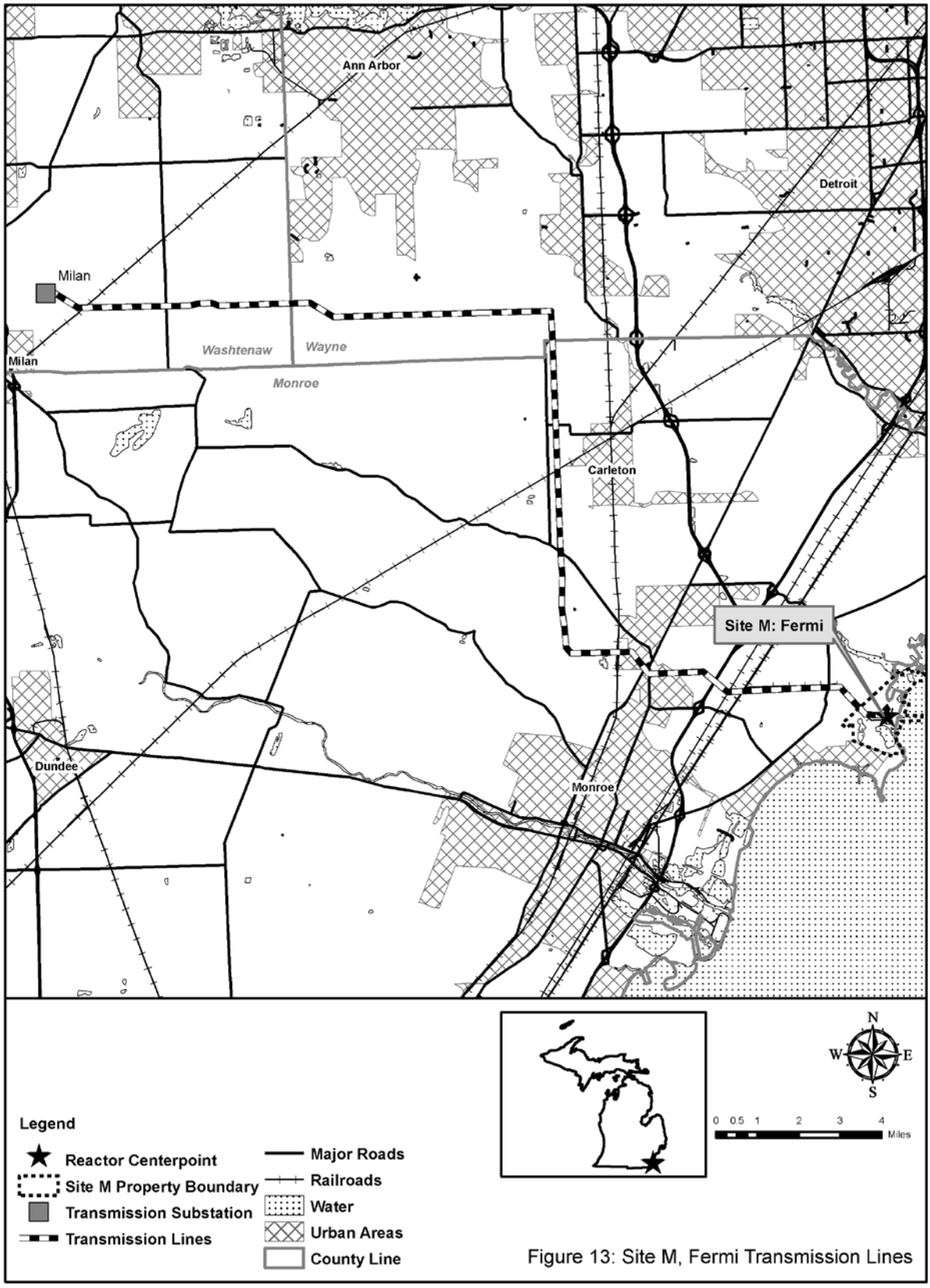

Figure 13: Site M, Fermi Transmission Lines

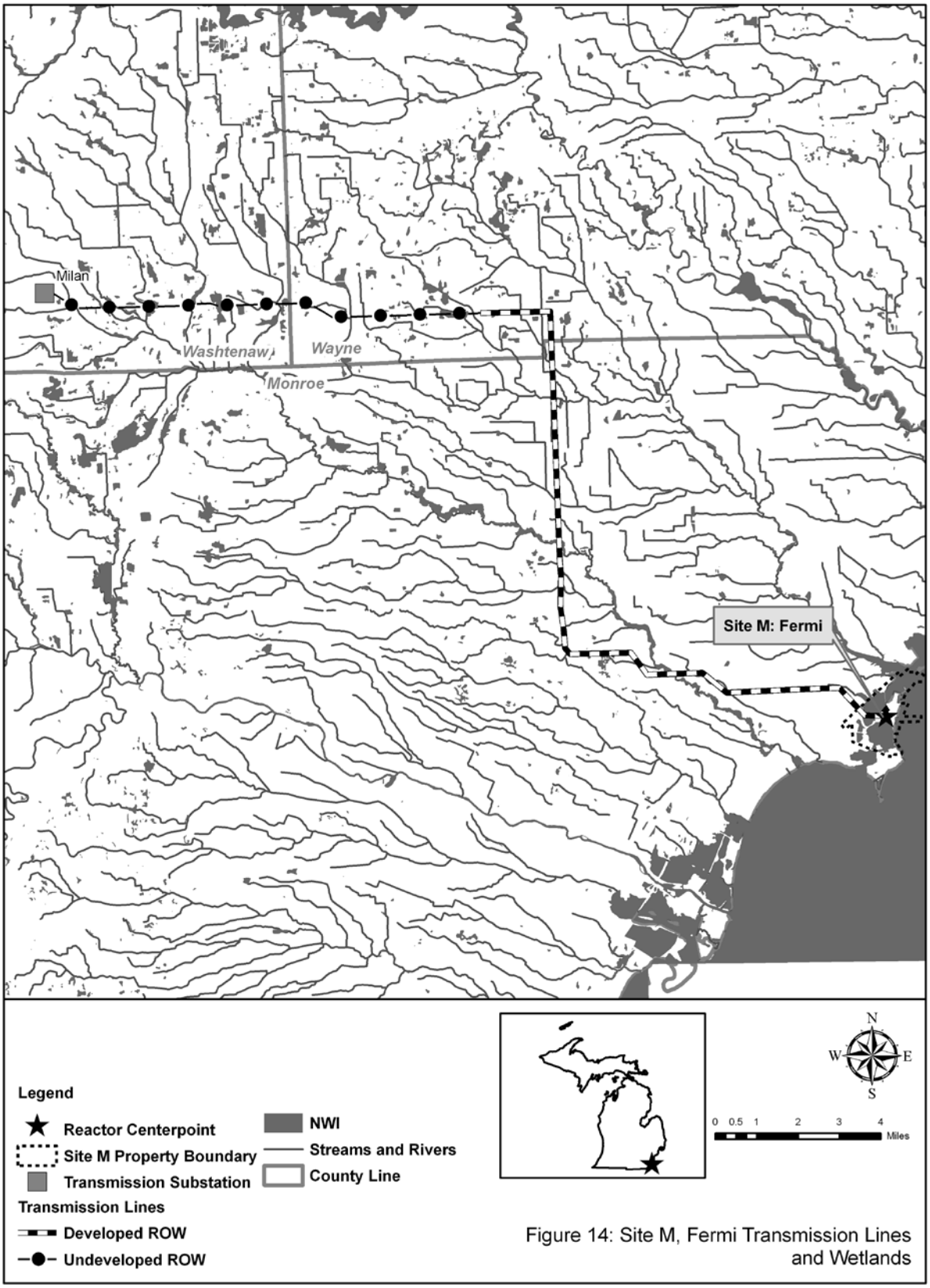

Figure 14: Site M, Fermi Transmission Lines and Wetlands

APPENDIX C

Appendix C - Aquatic Resource Conceptual Mitigation Strategy

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C.1.0 INTRODUCTION

Detroit Edison has developed the following conceptual 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 is presented in Section 3 of the Supplemental USACE RAI Response. Proposed impacts include 28.85 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. To compensate for wetland impacts, Detroit Edison proposes to:

- Enhance approximately 248 acres of Great Lakes marsh onsite
- Restore approximately 143 acres of wetland offsite in the coastal zone of Western Lake Erie and the northern portion of the Ottawa-Stony Watershed

This conceptual mitigation strategy is based on existing, available data, the attributes of potentially impacted wetlands, watershed priorities, feedback from natural resource professionals and ongoing communication with the regulatory and conservation community. The following narrative provides an overview of the conceptual mitigation strategy and its development.

C.2.0 MITIGATION GOALS AND OBJECTIVES

The principal goal of this mitigation strategy is to compensate for functions and values lost as a result of impacts to approximately 28.85 acres of regulated wetlands due to construction of the Proposed Development (Figure 2). This goal will be achieved through wetland mitigation activities both on- and offsite within the same watershed and coastal zone as the impacts. The specific objectives listed below were developed based on an in-depth evaluation of the natural resources at the impact site and the condition and conservation needs of the surrounding watershed (see Section C.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 C.3.1.2). 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 U.S. Army Corps of Engineers (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 Michigan Department of Environmental Quality (MDEQ) Technical Guidance for Wetland Mitigation (Reference 1).

C.2.1 Mitigation Overview

To compensate for the loss of wetlands at the Proposed Development site, Detroit Edison will restore and enhance wetlands of similar ecological type adjacent to wetland impacts and within the same watershed/coastal zone. For the purposes of this document, restoration implies returning an area to wetland that once was wetland but currently is not because of past and ongoing modifications. Enhancement implies improving wetland functions in an existing wetland. To achieve the mitigation goal described above, this conceptual mitigation strategy proposes to implement the following mitigation actions:

- Enhance approximately 248 acres of Great Lakes marsh wetland onsite
- Restore approximately 143 acres of wetland offsite in the coastal zone of Western Lake Erie and the northern portion of the Ottawa-Stony Watershed including
  - Approximately 67 acres of Great Lakes marsh
  - Approximately 54 acres of southern hardwood swamp
  - Approximately 22 acres of scrub shrub wetland

Restoration and enhancement activities proposed for the on- and offsite wetland mitigation projects emphasize heterogeneity in microtopography, vegetation and hydrology to maximize diversity and ecological resilience of wetland habitat. Projects were designed to restore and enhance priority watershed functions and values including:

- Flood flow attenuation and storage
- Sediment retention
- 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.

Wetland mitigation has also been designed to replace the functions and values provided by wetlands with proposed impacts at the Fermi site. Depending on the wetland condition and community type of these existing wetlands, functions and values include varying degrees of flood flow attenuation and storage, sediment, nutrient and toxicant retention and fish and wildlife habitat. Section C.3.1.1 details the wetland conditions, functions and values of impacted wetlands. This comprehensive mitigation strategy proposes mitigation that will ultimately restore and enhance approximately 391 acres of coastal wetland 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. Mitigation activities will commence with, or prior to, wetland impacts.

C.2.2 Mitigation Ratios

Ratio of wetland replacement is based on the community type and other attributes of a particular wetland and on guidance from regulatory agencies. These guidance ratios are presented in Table 1. A description of the impacted wetlands and ratio determination is provided in Section 2.7.2 of the Supplemental USACE RAI Response.

Wetland mitigation objectives proposed here will replace wetland functions and values impacted in the expansion area by restoring wetlands of similar type in the same watershed at an average ratio of approximately 5:1. In addition, existing Great Lakes marsh will be enhanced onsite at a ratio of approximately 23:1. Table 1 compares the types and acreages of wetlands impacted with the proposed acreage of mitigation and the guidance and proposed mitigation ratios by type.

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, compensation is proposed at an average ratio of 5:1; a ratio generally associated with impacts to high quality, intact wetland systems. Additional mitigation is proposed in the form of enhancement of Great Lakes marsh at a ratio 23:1. This mitigation strategy proposes compensation beyond guidance ratios to satisfy regulatory mitigation requirements and also in support of Detroit Edison's corporate environmental stewardship initiatives and ongoing partnership with U.S. Fish and Wildlife Service (USFWS) and other conservation entities.

C.3.0 BASELINE INFORMATION

C.3.1 Impact Area

The Proposed Development site is on property owned by Detroit Edison in Monroe County, Michigan (Figure 1). Baseline information for the impact area at the Proposed Development site including land use, topography, soils, covertypes, wildlife and hydrology can be found Section 2 of the Supplemental USACE RAI Response. A description of wetlands, wetland impacts and watersheds associated with the Proposed Development is provided below in Sections C.3.1.1 and C.3.1.2.

C.3.1.1 Wetlands

Detroit Edison conducted assessments of wetland resources on 1,106 acres of undeveloped lands at the Proposed Development site between 2008 (Reference 2) and 2010. 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 2010. 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 C.3.1.2 provides a summary of the watershed assessments.

Over 500 acres of wetland were delineated at the Proposed Development site. The principal functions of these wetlands are flood flow alteration, sediment/toxicant retention, nutrient removal, and fish and wildlife habitat. The condition of wetlands with proposed impacts range from low to medium quality with some wetlands given high ecological value based on their rare and imperiled status in Michigan. The potential impact acreages for each wetland identified at the Proposed Development site were calculated. Wetlands with proposed impacts and their associated covertypes are presented in Table 2.

In 2010, field observations of wetlands with proposed impacts included additional vegetation inventory and evaluation of wetland characteristics similar to those suggested in the Michigan Rapid Assessment Method for Wetlands (MiRAM, Reference 3). These wetland metrics include 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 and to define appropriate compensation ratios as presented in Table 1.

Mitigation is proposed for approximately 28.85 acres of potential impacts to regulated wetlands due to the Proposed Development. These potential impacts include approximately 10.57 acres of Great Lakes marsh, 1.95 acres of southern hardwood swamp, 3.91 acres of southern shrub carr, 0.80 acres of coastal emergent wetland, 5.36 acres of other emergent wetland, 4.89 acres of other forested wetland and 1.37 acres of other scrub shrub wetland. Details by individual wetlands are provided in Table 2.

C.3.1.2 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), USGS Cataloging Unit and Hydrologic Unit Code (HUC): 04100001. The OSW drains areas to the north and west of Lake Erie and flows directly into the lake (Figure 3). The Fermi site and offsite mitigation area are located in the lowest reaches of the OSW in the coastal zone of Western Lake Erie in Monroe County (CZM, Figure 4).

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 3). The CZM encompasses approximately 18,697 acres with an almost even interspersion of natural lands (38%), developed lands (38%) and agriculture (24%, Figure 4). 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 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 5). 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 6). 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 enhance 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 and enhance 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 for both the OSW and CZM, 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 over 140 acres of coastal wetland including Great Lakes marsh and southern hardwood swamp in the OSW and reconnect this large block of natural land directly to Lake Erie via a restored and buffered stream channel. In addition, approximately 248 acres of existing Great Lakes marsh will be enhanced and protected onsite to decrease invasive species, increase vegetation diversity and provide enhanced habitat for wildlife. All mitigation actions are in close proximity to existing conservation efforts to help establish connectivity and habitat corridors.

C.3.2 Onsite Mitigation Area Overview

The proposed onsite mitigation area consists of approximately 248 acres of Great Lakes marsh on lands owned by Detroit Edison (Figure 7). Figures 7-11 show location, aerial photo, topography, soils and hydrology, land use, and federal mapped wetlands. The mitigation area includes Wetland M (162 acres), as designated by the wetland delineation report, located south of Fermi Drive, east of Quarry Lake Road and west of Boomerang Road on the Proposed Development site and Wetland CC/DD (86 acres) located in the northeast corner of the Proposed Development site. These onsite wetlands are large coastal wetlands classified as Great Lakes marsh by the Michigan Natural Features Inventory and are considered rare and imperiled in Michigan. Both wetlands are directly connected to Lake Erie and include open water expanses with submerged and floating aquatic vegetation (pondweed, common waterweed, bladderwort, coontail, American lotus) surrounded by zones of weak-stemmed and robust emergent vegetation (cattail, common reed, arrowhead, bulrush, American bur-reed) eventually grading into a dense stand of common reed and reed canary grass. Dense stands of invasive species including common reed, cattail and reed canary grass comprise over 50% of Wetland M and over 75% of Wetland CC/DD.

C.3.3 Offsite Mitigation Area Overview

The proposed offsite mitigation area, referred to as the Monroe Site, is approximately 7.25 miles from the Fermi site on Detroit Edison's Monroe Plant, east of Interstate 75, north of La Plaisance Creek and immediately adjacent to Lake Erie (La Plaisance Bay), Town of Monroe, Monroe County, Michigan, in the

Ottawa-Stony Watershed (HUC: 04100001, Figures 12 and 13). The Monroe Site is owned and managed by Detroit Edison as part of the Monroe Power Plant, a coal-fired power plant constructed in the early 1970s. The Monroe Site and adjacent areas include active agriculture, early successional old field and shrub habitat, agricultural ditches, small forest patches, existing and restored wetland and grassland habitat, industrial, residential and other developed areas, access roads, highways and Lake Erie.

The proposed mitigation targets a 210-acre agricultural field. Figures 12-16 show location, aerial photo, topography, soils, hydrology, land use, and mapped federal wetlands. The restoration site is primarily active agriculture with small remnants of PEM and PSS wetlands isolated from Lake Erie hydrology by perimeter dikes. Excess water is pumped from the fields to accommodate farming. The soil observed within the wetland mitigation area is predominately Lenawee silty clay loam, a hydric soil suitable for wetland restoration/creation. The area was dry at the time of a site visit on August 20, 2010 with the exception of existing swales. The pumps were not running. There is a Michigan Department of Transportation (DOT) ditch that currently drains water from Interstate 75 through a ditch adjacent to the southwest corner of this site.

C.4.0 MITIGATION SITE SELECTION FACTORS

An extensive exploration of potential mitigation projects spanning several years both on- and offsite within the Ottawa Creek and coastal zone of Western Lake Erie has been conducted. The on- and offsite mitigation projects proposed here were 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.

C.5.0 MITIGATION WORK PLAN

A conceptual discussion of on- and offsite work plans including construction techniques and sequence, planting, and conceptual design drawings illustrating the location, type and extent of mitigation actions are discussed here and illustrated in Figures 17 and 18. The conceptual design and work plan are based on existing, available data. Final site plans are contingent upon verification of existing data, collection of additional topography, soil, hydrology and vegetation information, and input and approval by the governing regulatory agencies. Final mitigation plan sets will contain detailed grading, planting and soil

erosion and sediment control plans suitable for the mitigation site construction. Wetland mitigation activities including both restoration and enhancement actions will commence with or prior to impacts and once all necessary permits are in place.

Mitigation design emphasizes heterogeneity in vegetation and hydrology to maximize ecological diversity and functional resilience of the wetland. Wetland restoration and enhancement 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. The final mitigation wetland design and management plan will be developed in cooperation with the existing conservation focus areas (e.g., Detroit River International Wildlife Refuge), watershed plans and priorities supported by local, state and federal conservation agencies and organizations.

C.5.1 Onsite Work Plan

Approximately 82 acres of wetland area in the 162-acre Wetland M and 65 acres of wetland area in the 86-acre Wetland CC/DD will be treated with herbicide to kill invasive plant species including common reed, cattail and reed canary grass in the outer zones of the wetlands (Figure 17). A 10-year treatment plan will be implemented with herbicide applied in years 1-3, year 5, year 7 and year 10, or adjusted as needed. Response from native vegetation will be facilitated by removing dead, chemically treated vegetation through burning or mowing after each treatment.

MDEQ, MDNR, Ducks Unlimited and other participating land managers are currently experimenting with various techniques for controlling common reed in coastal wetlands along Saginaw Bay. The techniques being tested include glyphosate, imazapyr, and a glyphosate/imazapyr mixture along with mechanical management actions. The USFWS Detroit River International Wildlife Refuge is also evaluating Phragmites control techniques in coastal wetlands immediately north of the Fermi Site. The treatment plan for the mitigation enhancement project proposed here will be based on the MDEQ Guide to the Control and Management of Invasive Phragmites (Reference 4), the most current results of the Saginaw Bay study, 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.

C.5.2 Offsite Work Plan

Offsite wetland restoration and enhancement efforts will replace and repair habitat modified by agricultural practices and hydrological disturbance within sensitive coastal areas (Figure 18). 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 a total

of 143 acres of wetlands in the 210-acre agricultural area as illustrated in Figure 18. The 143 acres will include approximately 54 acres of forested, 21 acres of scrub shrub and 67 acres of emergent wetland with direct hydrological connection to Lake Erie. A wetland delineation will be conducted in the 210-acre agricultural field prior to final design. The acreage of existing wetland determined by a wetland delineation will be subtracted from the total restoration to get a refined estimate of restored acres being proposed for mitigation. Any existing wetlands that are improved by the mitigation action proposed here will then be counted as enhancement.

A specific objective of the offsite restoration 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.

C.5.2.1 Construction and Planned Hydrology

Construction activities in the agricultural area will include clearing, excavating and grading the proposed mitigation area to elevations conducive for development of coastal PEM, PSS and PFO wetlands. The entire restoration area will be restored to two separate but hydrologically connected wetland units. The eastern unit will be directly connected to Lake Erie and water levels in this unit will fluctuate with Lake Erie water levels. The western unit will be partially connected to Lake Erie and with a wetter hydroperiod than the eastern unit.

Existing fill and an existing berm along the east side and adjacent to Lake Erie will be partially removed to allow hydrology from Lake Erie to enter the proposed wetland area (Figure 18). A meandering waterway excavated to the west of the lake connection will allow for a permanent open water marsh zone in the emergent marsh area, providing habitat for aquatic species. Grading of soils adjacent to this waterway will provide for a variety of water levels and habitat types within the eastern unit.

A low berm will be constructed between the eastern and western restoration units. This berm will be constructed to an elevation that will help to ensure successful restoration of proposed habitat types and acreages in the western unit. A spillway will be constructed in the berm to allow excess water to spill over and enter the eastern unit waterway and eventually flow into Lake Erie. Depending on topography and final design, this spillway will also be constructed at an elevation that will allow high lake levels (e.g., seiche events) to enter the western unit. Additional hydrology will be introduced into the western unit by plugging a drainage ditch that currently flows along the north perimeter of the entire area. This ditch will be plugged to the west of the proposed berm to redirect its water into the western unit. Additionally, a Michigan DOT drainage ditch that currently transfers water from Interstate 75 to La Plaisance Creek and into Lake Erie will be redirected into the western unit. This step will increase water flow into the wetland and also slow floodwater and reduce sediment loading and filter toxicants from runoff water before it reaches Lake Erie. There may be an additional grading and planting plan designed specifically to

accommodate requirements of a right-of-way associated with existing electric power lines located along the northern edge of the western unit.

Graded wetland basins will be left rough to establish microtopography essential for creating niches for a variety of wetland plants. The edges of the excavated wetlands will be irregular in shape with variable, shallow slopes. Soil disturbance and compaction will be minimized as much as possible. Earthmoving equipment will be cleaned before deployment to prevent possible contamination by invasive species.

C.5.2.2 Planned Vegetation and Habitat Features

The offsite restoration area and buffer will be planted and seeded to establish a native plant community, prevent soil erosion, increase the likelihood of mitigation success and to minimize the opportunity for invasive species to become established. 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 5). Seed will be adapted to northern United States ecotypes and will be applied in a manner and at a rate that will allow effective establishment of the wetland pool area and wetland margins. Planting and seeding of these species will stabilize soil structure, provide biological diversity, restore ecosystem functionality, and protect against invasion by exotic and invasive herbaceous species. Construction areas will be seeded with a mix to prevent erosion, stabilize excavated areas and establish an herbaceous community typical of the region. Re-vegetation of wetland areas will be accomplished by using a combination of potted trees and shrubs, plugs, rootstock cuttings, and seed. Plant species will be chosen for their proven hardiness in the area, their ability to out-compete invasive plant species, wildlife value and their overall suitability to develop native communities. The species all will occur naturally within the region and no exotic or potentially nuisance species will be utilized. Wild-type nursery stock of an age and condition suitable for transplantation will be used. The precise list of species to be planted will be dependent on availability of nursery stock. Final design will include species lists, quantities and locations for container, plug and seed stock.

Habitat structures will be placed on the site following construction and prior to seeding and planting at a minimum of six per acre as required by MDEQ mitigation guidance (Reference 1). Habitat structures include whole trees, logs, snags, tree stumps and sand mounds. Some habitat structures, namely tree stumps, whole trees, and logs, may be taken from the impacted areas at the Proposed Development site.

C.6.0 PROTECTION

Ownership of on- and offsite mitigation areas will remain with Detroit Edison. The restored and enhanced mitigation wetlands will be permanently protected as directed by regulatory requirements to preserve the wetland functions restored.

C.7.0 PERFORMANCE STANDARDS

Performance standards for on- and offsite mitigation areas will be based on the goals and objectives of the mitigation projects as well as the character of existing wetlands surrounding the mitigation site. The standards listed below were developed using the MDEQ Technical Guidance for Wetland Mitigation (Reference 1). These standards will be refined with final design and will be used to evaluate development and overall success of the mitigation project:

1. Construction has been completed in accordance with approved plans and specifications in the permit.
2. The wetland has soil saturation and/or evidence of inundation via water potential or water height measurements during the growing season during the required monitoring period.
3. A 6-inch layer of high-quality soil, from the A horizon of an organic or loamy surface texture soil, is present over the entire mitigation area.
4. The mitigation wetland is free of oil, grease, debris, and all other contaminants.
5. A minimum of six habitat structures, consisting of at least three types, have been placed per acre of mitigation wetland with at least 50% of each structure extending above the normal water level.
6. Mean percent cover of native wetland species (those with a regional indicator status of FAC, FAC+, FACW +/-, or OBL in the U.S. Fish and Wildlife Service report entitled National List of Plant Species that Occur in Wetlands, North Central Region 3, Reference 6), in the herbaceous layer at the end of the monitoring period is not less than 60% for a PEM wetland and 80% for PFO and PEM (wet meadow) wetlands.
7. Open water with no emergent or floating vegetation will not exceed 20% of the mitigation wetland area.
8. Extensive areas of bare soil shall not exceed 5% of the mitigation wetland area, with the exception of heavily shaded portions of the PFO portion of the mitigation site.
9. The minimum number of native wetland species per wetland type shall not be less than 15 species for PSS, PFO and PEM wetlands and not less than 20 species for PEM – wet meadow.
10. At the end of the monitoring period, the mitigation wetland will support a minimum of:
    a. 300 individual surviving, established, and free-to-grow trees per acre in the PFO wetlands that are classified as native wetland species and consisting of at least three different plant species.
    b. Eight native wetland species of grasses, sedges, or rushes in PEM - wet meadow wetlands.

11. At the end of the fifth monitoring year, no more than 10 percent of the vegetation will consist of the following invasive species: purple loosestrife, common reed and reed canary grass.

The success of this wetland mitigation project will be determined based on the performance standards outlined above along with any additional conditional standards identified and agreed on by the USACE and upon final design or during the permitting process.

C.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). A monitoring plan is necessary to evaluate the mitigation wetland in regards to meeting the performance standards of the project. 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 following the year that construction is completed, as follows:

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 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 once between July 15 and August 31. The number of sample plots necessary within each wetland type shall be determined by use of a species-area curve or another approach approved by the MDEQ and USACE. 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 or by another approach acceptable to the MDEQ and USACE. If additional or alternative sample transects are needed to sufficiently evaluate each wetland type, they must be approved in advance in writing by the MDEQ and USACE. 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. Provide plot data and a list of all the plant species identified in the plots and otherwise observed during monitoring. Data for each plant species will include common name in English, scientific name, wetland indicator category

from the U.S. Fish and Wildlife Service's National List of Plant Species That Occur in Wetlands for Region 3 (Reference 6), and whether the species is considered native according to the Michigan Floristic Quality Assessment (Reference 7). Nomenclature shall follow Reference 8 through Reference 10. 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.

C.9.0 MAINTENANCE, LONG-TERM AND ADAPTIVE MANAGEMENT

When monitoring indicates that a performance standard is not being met or will not be met, that standard will be evaluated to determine if more time is needed for site development and maturation or if a remedial action may be required. This will be accomplished by consulting wetland experts and permitting agencies to determine an appropriate course of action. Remedial measures may include seeding or planting, additional non-native plant control and/or erosion control measures. In rare circumstances, contingencies may require re-grading the wetland basin, removal or addition of water control structures and access control. An implementation timetable will be constructed to correct deficiencies noted in the annual monitoring report. It is the responsibility of Detroit Edison to address adaptive management issues. Once the monitoring period is over, the completed wetland will be protected and managed as needed and specified in the site management plan.

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TABLES AND FIGURES

Table 1. Wetland Impacts, Proposed Mitigation and Ratios

Wetland Type	Guidance Ratio (mitigation:impact)	Proposed Impacts (regulated acres)	Proposed Mitigation		Averaged Proposed Ratio (restored acres: impact acres)
			Restored Acres	Enhanced Acres	
Great Lakes marsh (rare/imperiled)	5:1	10.57	67	248	6.3:1
Palustrine emergent (coastal)	2:1	0.80	0	0	0:1
Palustrine emergent (other)	1.5:1	5.36	0	0	0:1
Emergent Marsh Combined Average Ratio	3.3:1*	19.02	67	248	3.5:1
Southern hardwood swamp (rare/imperiled)	5:1	1.95	54	0	36:1
Palustrine forested (coastal and other)	2:1	4.89	0	0	0:1
Forested Wetland Combined Average Ratio	2.9:1*	6.84	54	0	7.9:1
Southern shrub carr (coastal)	2:1	3.91	6	0	1.5:1
Palustrine scrub shrub (other)	1.5:1	1.37	0	0	0:1
Shrub Combined Average Ratio	1.9:1*	5.28	22	0	4.2:1
TOTALS		28.85	143	248	5:1

*The average guidance ratio for each major type of wetland (emergent, forested, shrub) is a weighted average calculated by multiplying the guidance ratio by the number of wetland acres impacted for each sub-type (rare/imperiled, coastal and other) and averaging by major wetland type.

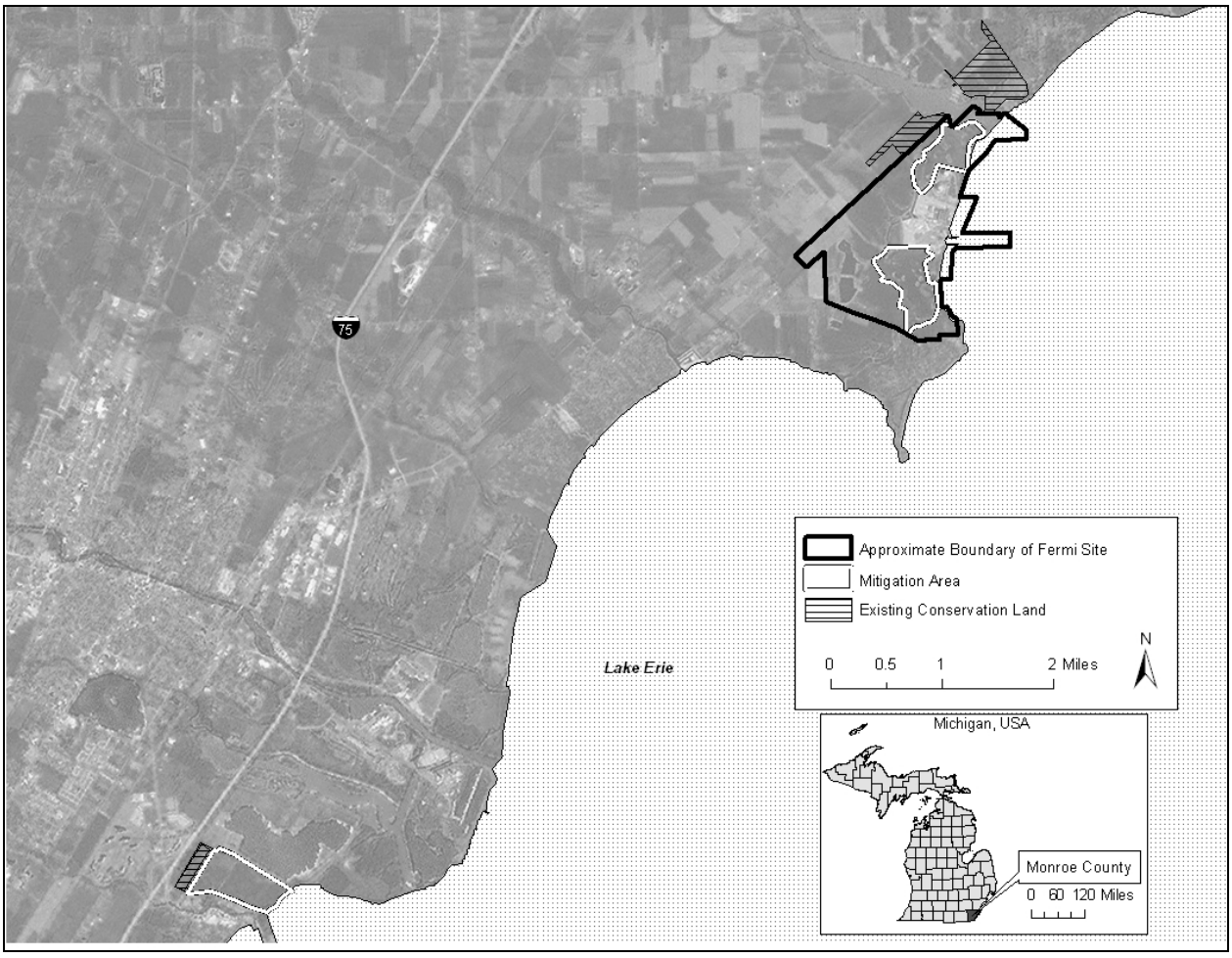
Table 2. Wetland Impacts and Attributes Summary Table (Sheet 1 of 2)

ID	Type/General Description	Total Size (acres)	Impact (acres)	Jurisdiction	Condition/ Primary Function	Guidance Mitigation Ratio
B	Linear PFO	0.76	0.76	MDNRE/USACE	Low/ Floodflow alteration, sediment, toxicant retention, nutrient removal and wildlife habitat	2:1
C	Great Lakes marsh, fragmented from Lake Erie by access roads, but connected hydrologically through culverts	48.18	9.40	MDNRE/USACE	Medium (high ecological value)/ Floodflow alteration, sediment, toxicant retention, nutrient removal and wildlife habitat	5:1
D	Palustrine forested wetland with partially open canopy	1.37	1.37	MDNRE/USACE	Medium/ Floodflow alteration, sediment, toxicant retention, nutrient removal and wildlife habitat	2:1
E-North	North: Palustrine mix of scrub-shrub, emergent marsh/wet meadow, in two sections split by Wetland D,	2.67	1.87	MDNRE/USACE	Medium/Floodflow alteration, sediment, toxicant retention, nutrient removal and wildlife habitat for both portions of E	2:1
E-South	South: Southern shrub carr or other coastal wetland type	2.04	2.04			
F	PFO southern hardwood swamp, relatively intact,	31.07	1.53	MDNRE/USACE	Medium (high ecological value)/Floodflow alteration, sediment, toxicant retention, nutrient removal and wildlife habitat	5:1
H	PEM edge around a created open water pit	0.10	0.10	MDNRE	Low/Minimal floodflow alteration, sediment/toxicant retention and nutrient removal	1.5:1
I	PFO southern hardwood swamp, relatively intact, indirectly connected to Lake Erie, provides a buffer for the interior and less disturbed wetland	39.74	0.42	MDNRE/USACE	Medium (high ecological value)/Floodflow alteration, sediment, toxicant retention, nutrient removal and wildlife habitat	5:1
U	PEM edge around a created open water canal	0.15	0.15	MDNRE/USACE	Low/Minimal floodflow alteration, sediment/toxicant retention and nutrient removal.	1.5:1
W	PEM wet meadow wetland	4.59	4.59	MDNRE	Low/ Floodflow alteration, sediment, toxicant retention, nutrient removal and marginal wildlife habitat	1.5:1

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

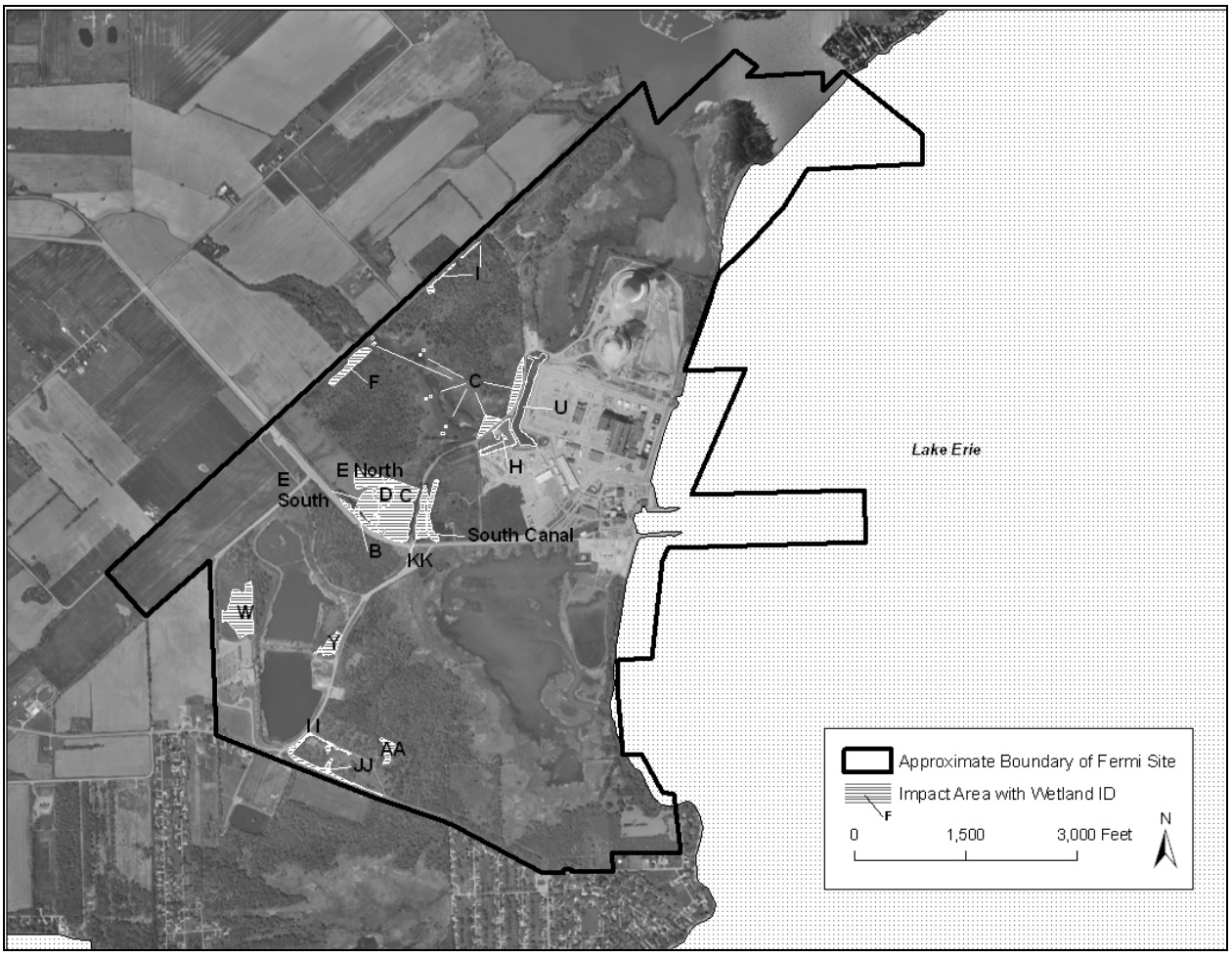
ID	Type/General Description	Total Size (acres)	Impact (acres)	Jurisdiction	Condition/ Primary Function	Guidance Mitigation Ratio
Y	PFO fragmented early successional with mixed vegetation and a partially open canopy	1.14	1.14	MDNRE	Low/Marginal wildlife habitat for edge species and limited water storage.	2:1
AA	PEM established spoil area	0.80	0.80	MDNRE/USACE	Low/Minimal floodflow alteration, sediment/toxicant retention and nutrient removal	2:1
II	PEM ditch, contains vegetation communities with high structural diversity and low species diversity with well-established invasive species populations	0.52	0.52	MDNRE	Low/ minimal floodflow alteration, sediment/toxicant retention and nutrient removal	1.5:1
JJ	PSS established spoil area	1.37	1.37	MDNRE	Low/ minimal floodflow alteration, sediment/toxicant retention and nutrient removal	1.5:1
KK	PFO linear wetland, connected to the South Canal	1.62	1.62	MDNRE/USACE	Low/ floodflow alteration, sediment/toxicant retention, nutrient removal, marginal wildlife habitat for edge species	2:1
South Canal	PEM Great Lakes marsh hydrologically connected to Lake Erie	1.97	1.17	MDNRE/USACE	Medium/ fish and wildlife habitat, floodflow alteration, sediment, toxicant retention and nutrient removal	5:1

Figure 1: Site Location Map



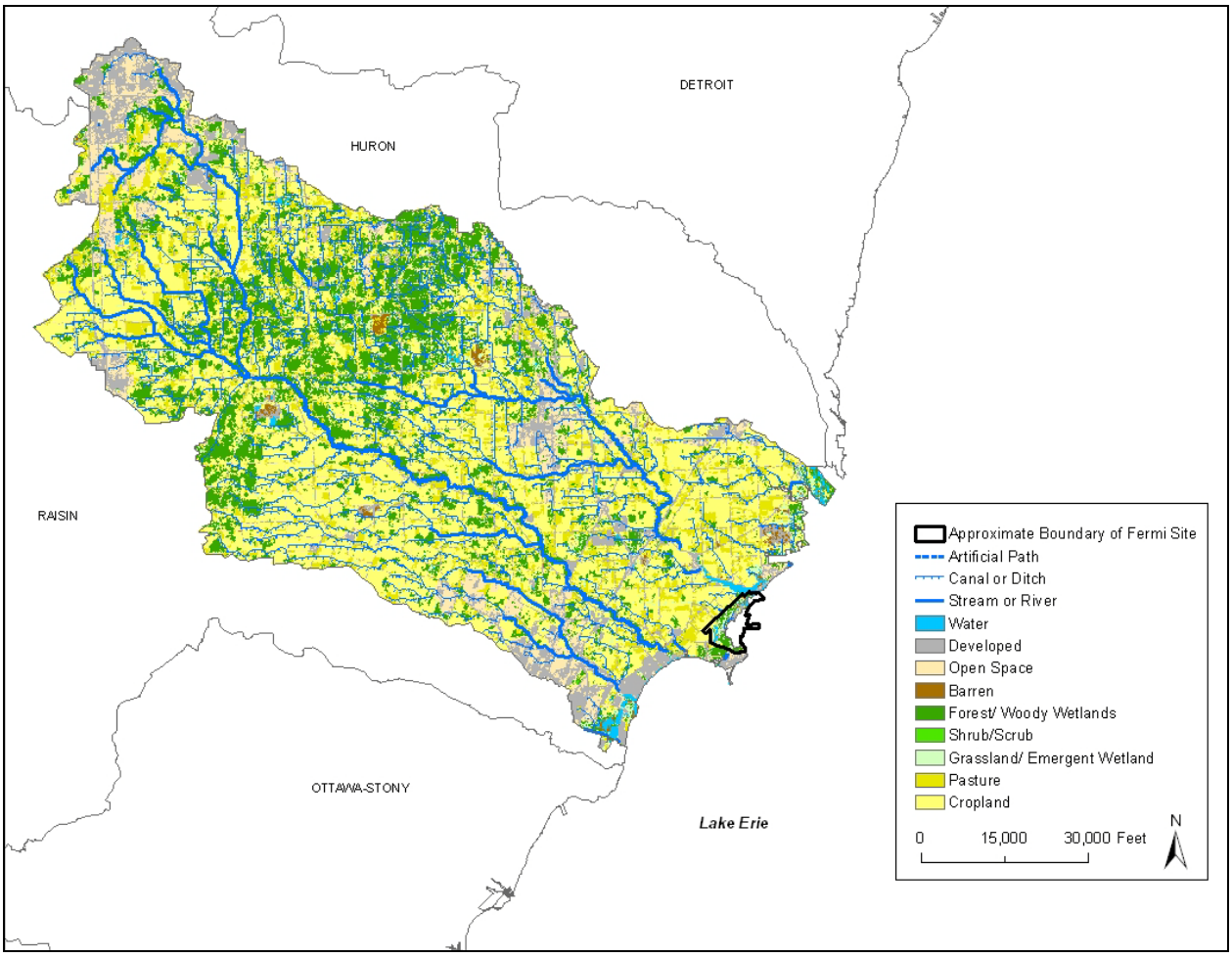
Source: Reference 11

Figure 2: Wetland Impact Area Map



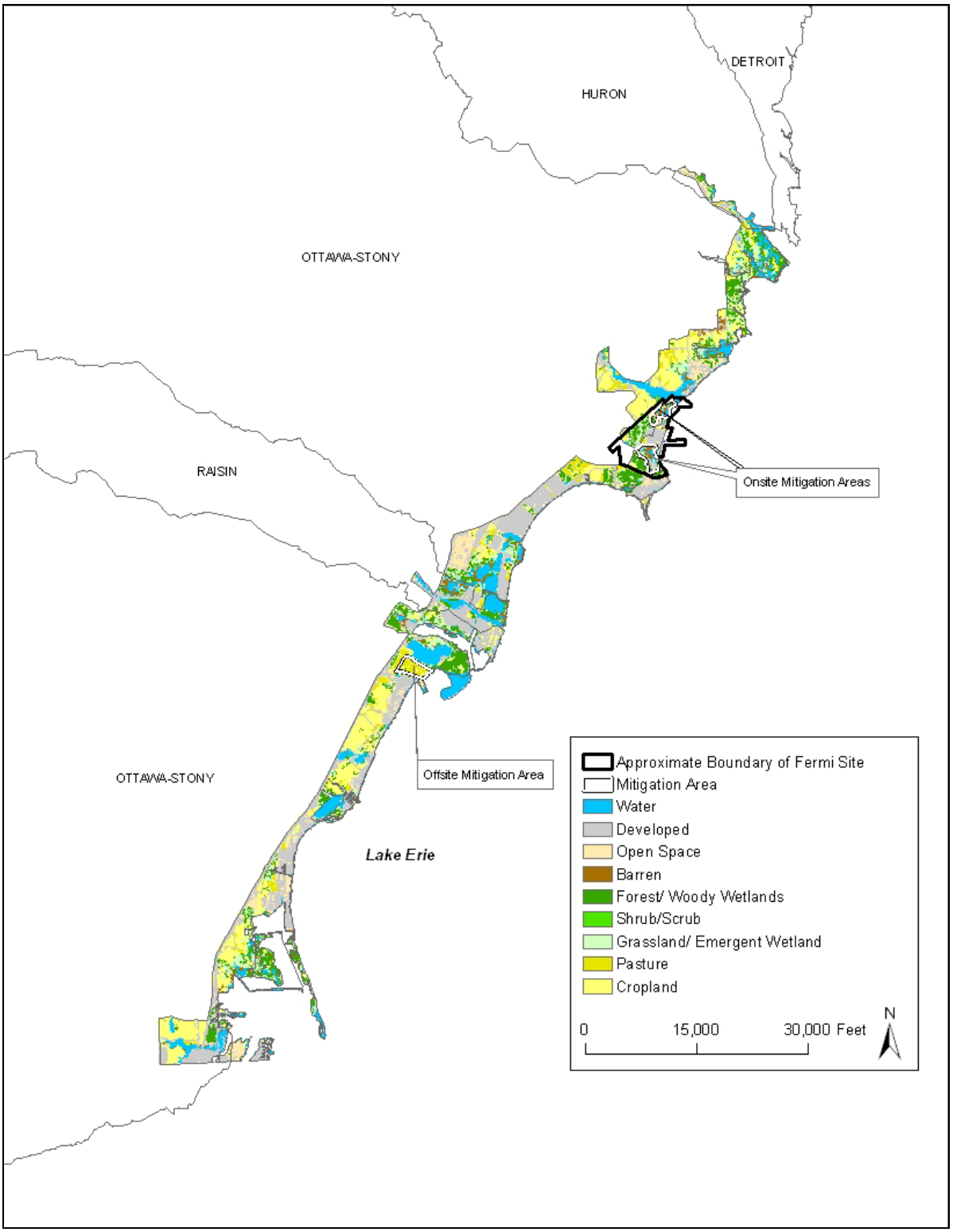
Source: Reference 11

Figure 3: Land Use Land Cover (2001) in the Ottawa-Stony Watershed



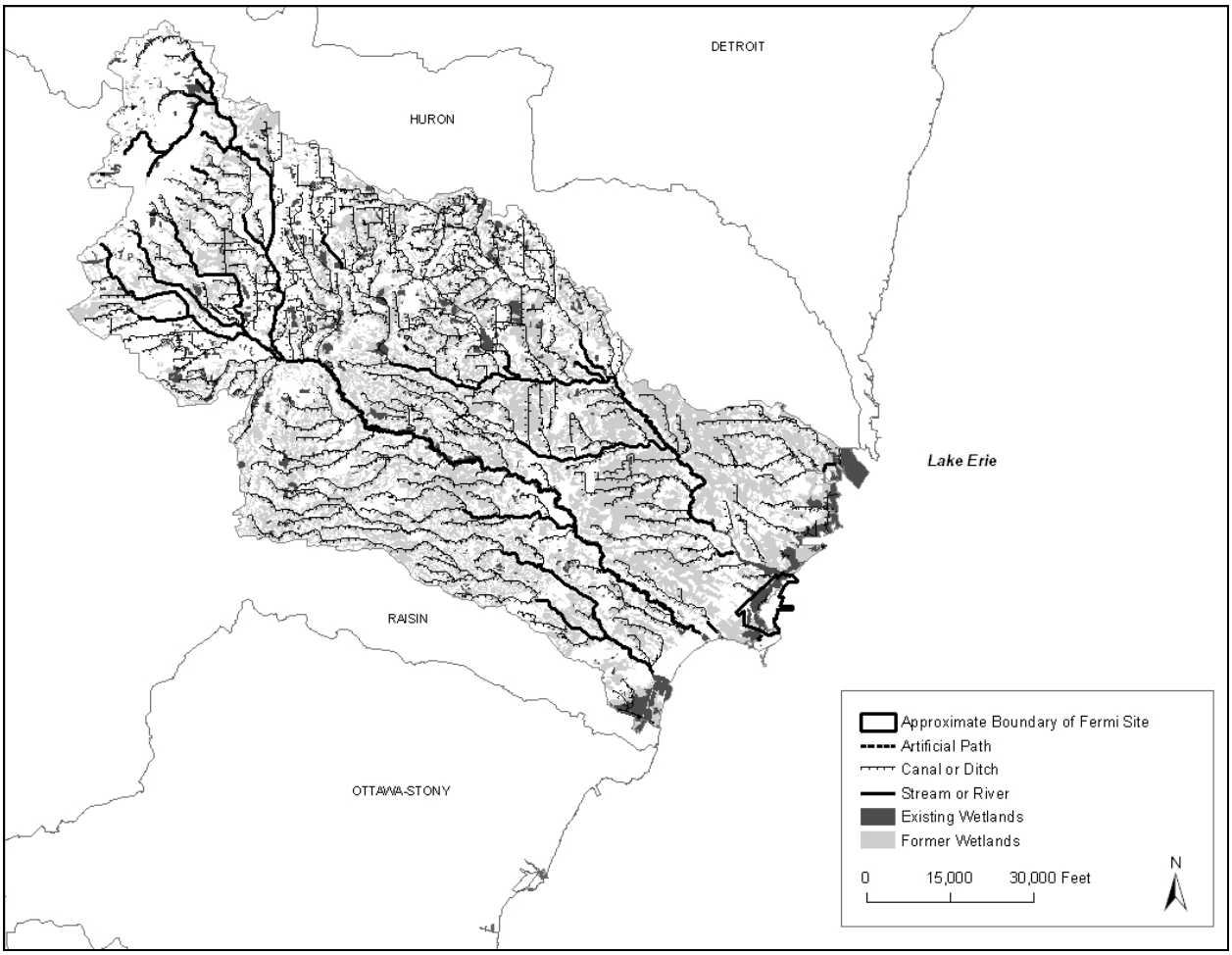
Source: Reference 12 and Reference 13

Figure 4: Land Use Land Cover (2001) in the Coastal Zone of Lake Erie



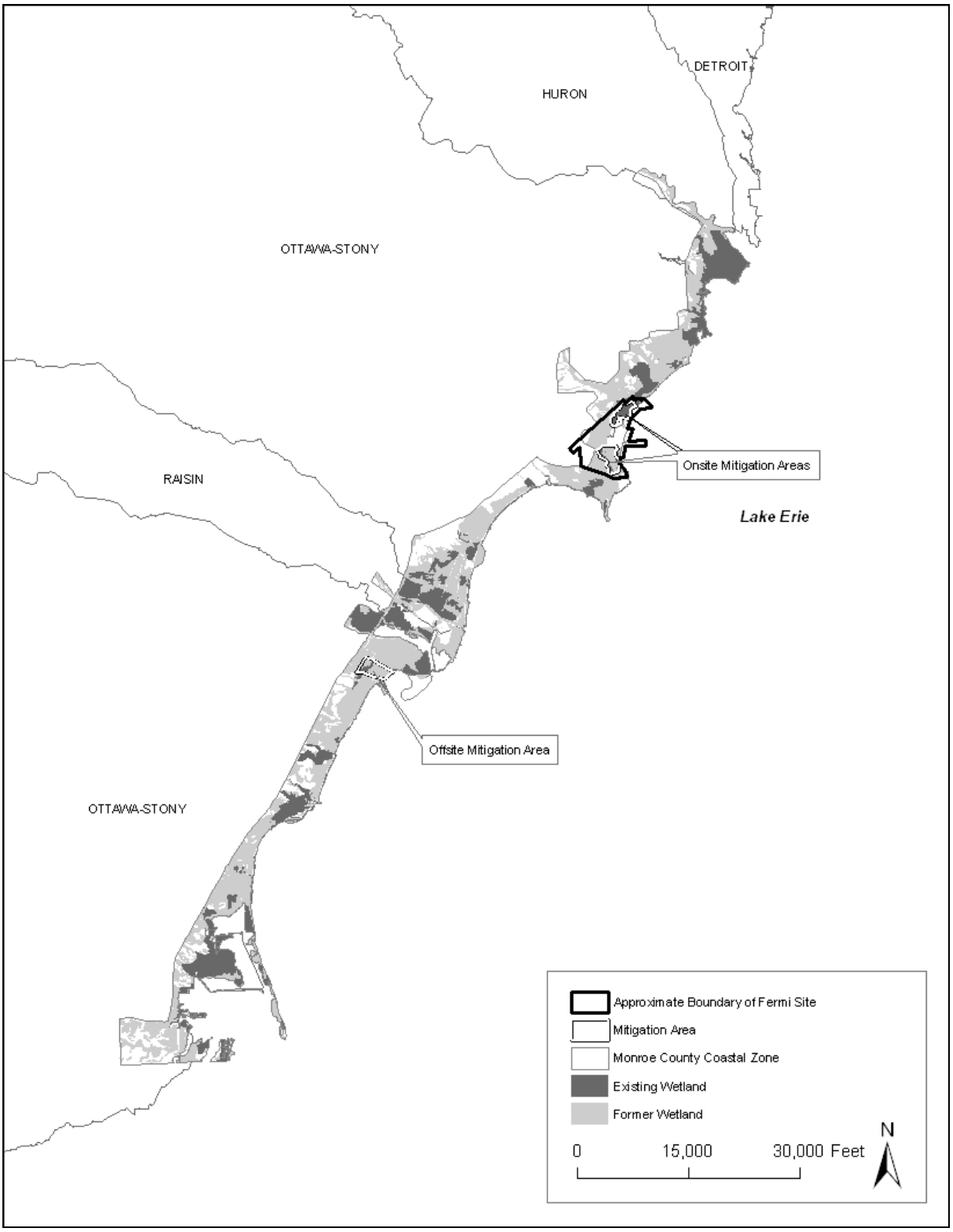
Source: Reference 13 and Reference 14

Figure 5: Existing and Former Wetlands in the Ottawa-Stony Watershed



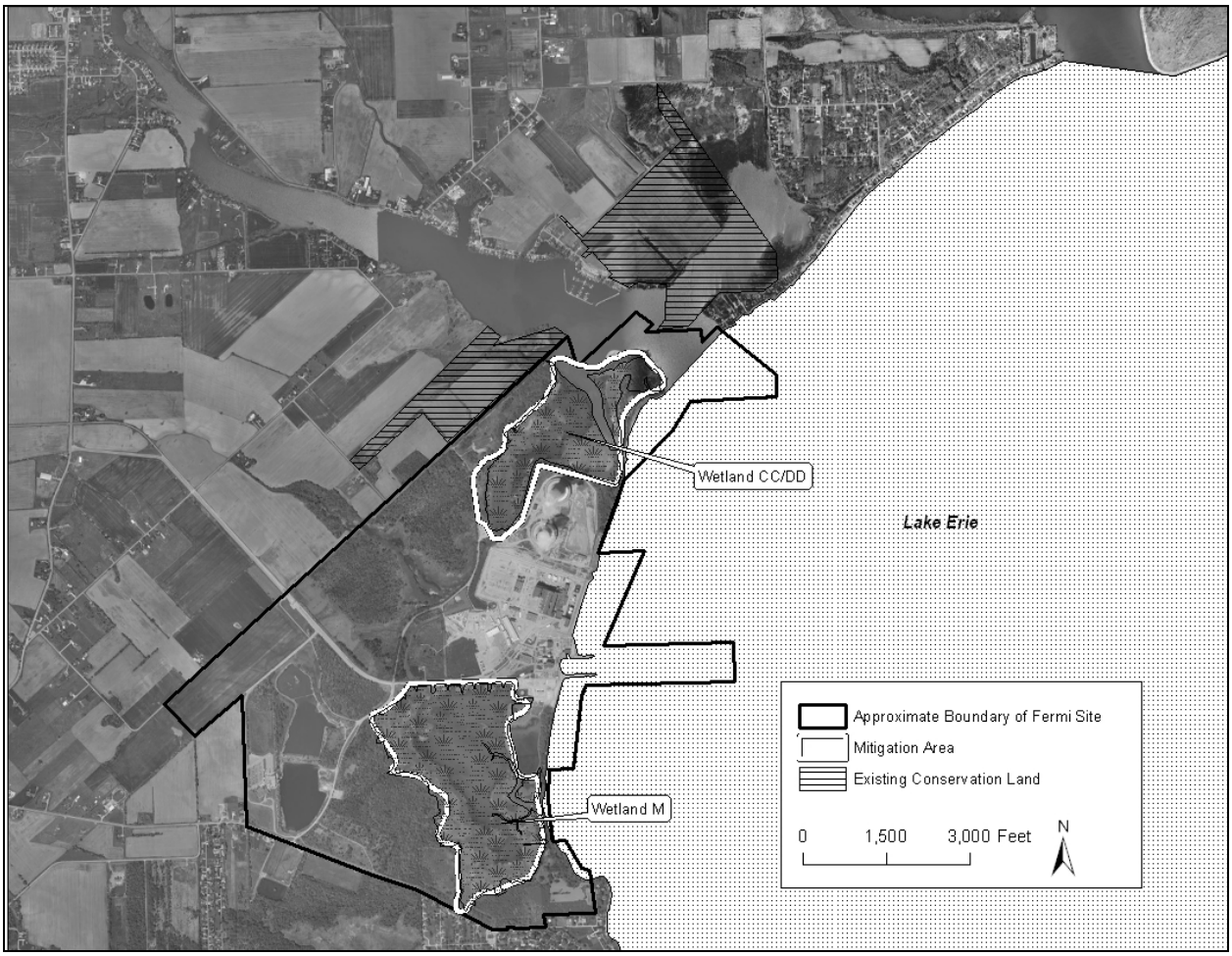
Source: Reference 12 and Reference 15 through Reference 17

Figure 6: Existing and Former Wetlands in the Coastal Zone of Lake Erie



Source: Reference 14 and Reference 17

Figure 7: Onsite Mitigation Project Area Aerial Photo



Source: Reference 11

Figure 8: Onsite Mitigation Area Topographic Map

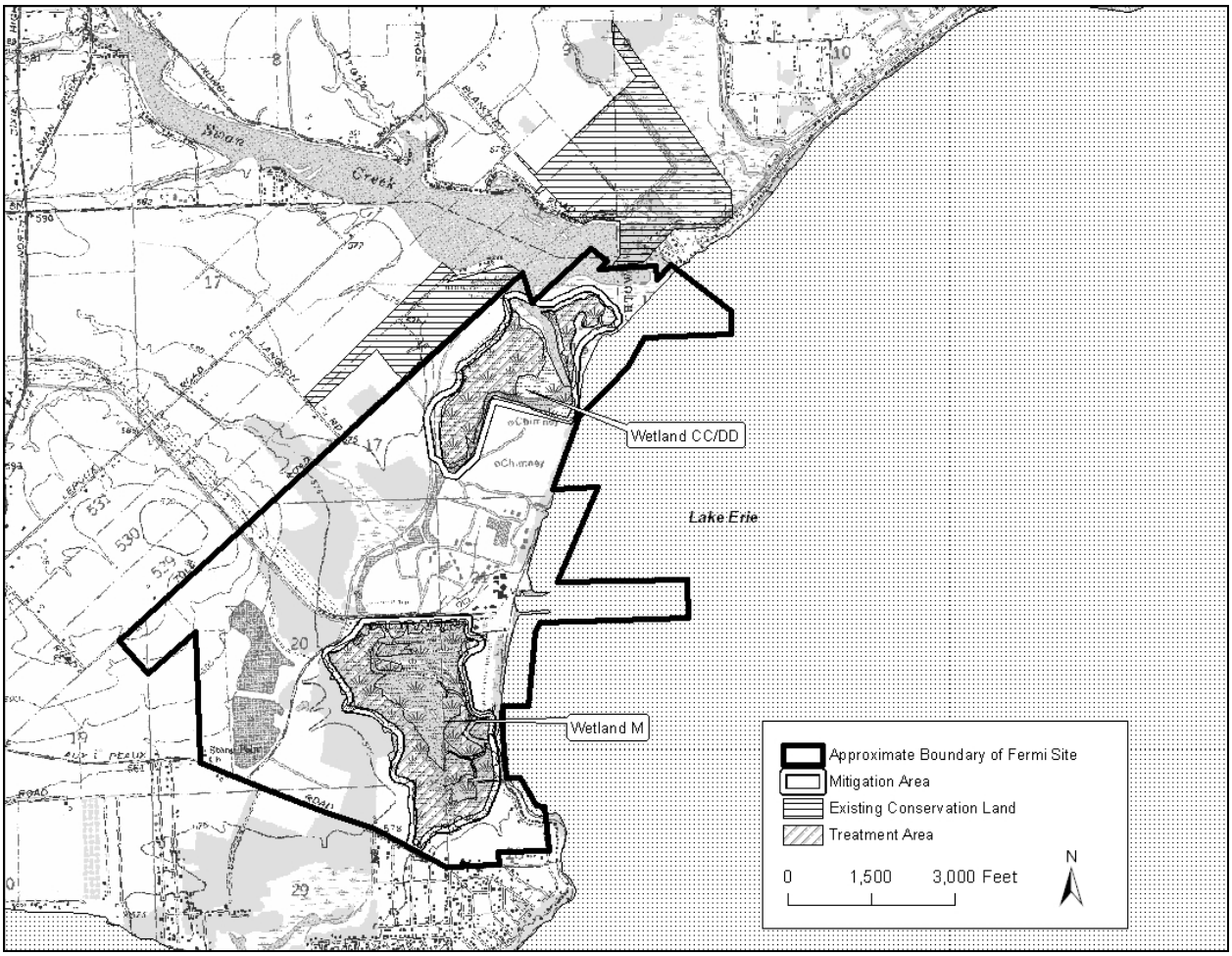


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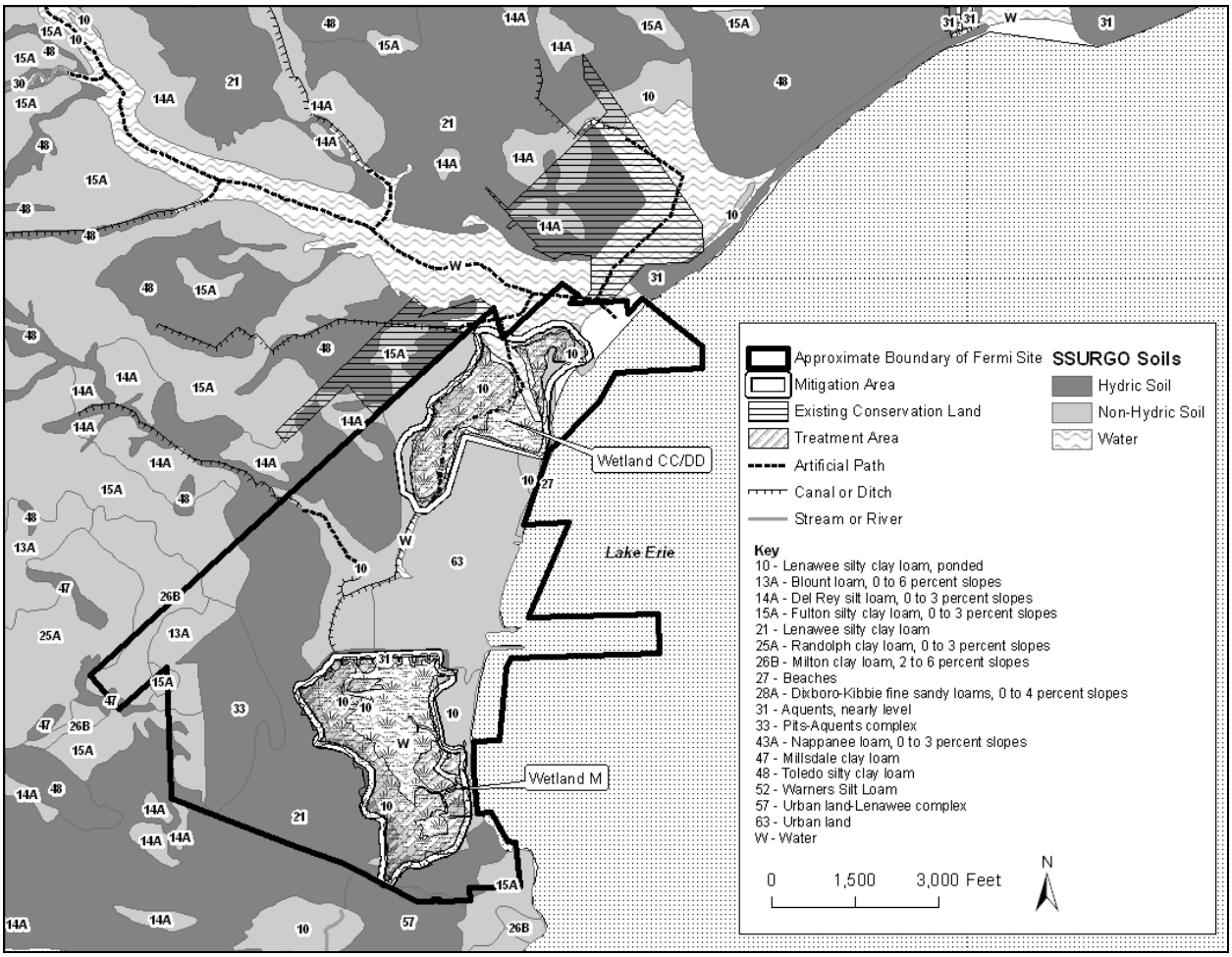
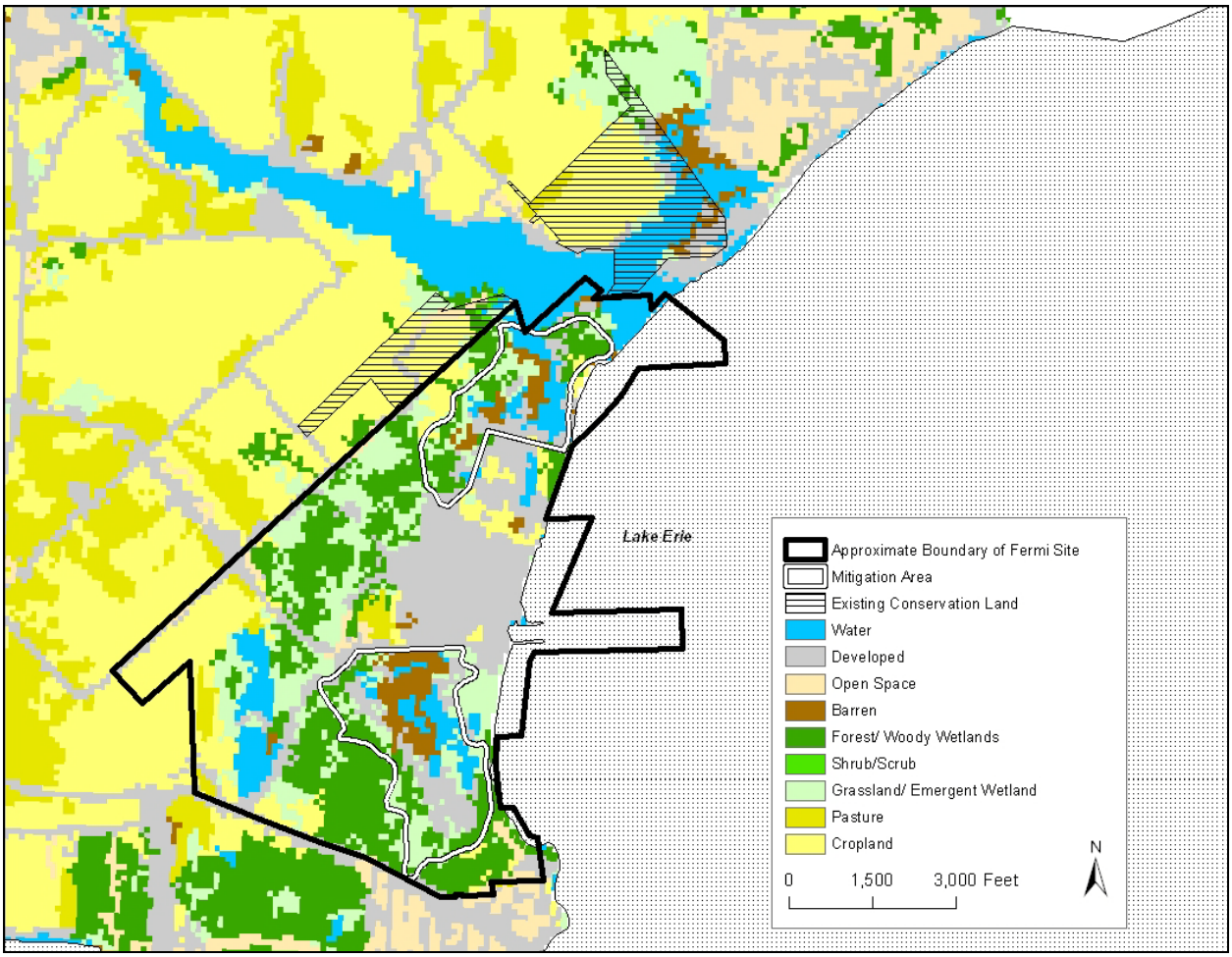
Figure 9: Onsite Mitigation Area Soils and Hydrology Map



Source: Reference 12 and Reference 19

Figure 10: Onsite Mitigation Area Covertype Map



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