include such items as cooling tower structures, nonsafety-related circulating water lines, nonsafety-related fire protection lines, the new switchyard, and onsite interconnections

Construction activities include the following general types of activities:

- Driving of piles
- Subsurface preparation
- Installation of foundations
- Placement of backfill, concrete, or permanent retaining walls within an excavation
- In-place assembly, erection, fabrication, or testing

This applies to any of the following SSCs and facilities:

- Safety-related SSCs, as defined in 10 CFR 50.2
- SSCs relied upon to mitigate accidents or transients or used in plant emergency operating procedures
- SSCs whose failure could prevent safety-related SSCs from fulfilling their safety-related function
- SSCs whose failure could cause a reactor scram or actuation of a safety-related function
- SSCs necessary to comply with 10 CFR 73
- SSCs necessary to comply with 10 CFR 50.48 and Criterion 3 of 10 CFR 50, Appendix A
- Onsite emergency facilities, i.e., technical support and operations support centers that are necessary to comply with 10 CFR 50.47 and 10 CFR 50, Appendix E

The development of this chapter predated promulgation of Interim Staff Guidance which provided implementation guidance for the LWA Rule. Accordingly, the chapter sections do not individually distinguish between Pre-construction and Construction impacts. However, Section 4.8 provides a tabular binning of these impacts.

Various acreage values are presented throughout the Environmental Report (primarily in Chapter 4). Acreage values are primarily determined from two perspectives: 1) land use and terrestrial ecology impacts and 2) construction affected areas. Acreage values for land use and terrestrial ecology may vary from those presented for construction affected area impacts. Figure 4.2-1 shows the construction affected areas. Areas highlighted on Figure 4.2-1 include Unit 3 New Construction Affected Areas (Permanent Impact), Unit 3 New Construction (Temporary Impact), and Previously Affected Areas and Unit 3 Construction Affected Areas (Permanent Impact). These designations allow for determination of the permanent and temporary impacts from Fermi 3 to newly impacted areas and previously affected areas. Figure 4.2-1 shows approximately ~~302~~ 301 acres used for construction and operation of Fermi 3 (total permanent and temporary impacts). This total impact acreage can be separated into the following categories:

- Unit 3 new construction affected areas (permanent impact) — approximately ~~43~~ 42 acres

4.1.1 The Site and Vicinity

Construction impacts on land use at the Fermi site and vicinity are discussed in this subsection. The Fermi site is located in Monroe County, Michigan, with a property boundary that encompasses 1260 acres. For purposes of the land use analysis, the Fermi 3 site is considered the same as the entire Fermi property. The vicinity is the 7.5-mile area surrounding the Fermi site, which includes mostly Monroe County, a small portion of Wayne County, and Lake Erie. The vicinity includes both United States and Canadian waters. Monroe County comprises the majority of the vicinity; therefore, it is the focus of the vicinity land use impact discussions included in this subsection.

42

189

The total new construction area anticipated to be disturbed for onsite construction activities is approximately ~~190~~ acres. Impacts will be confined to designated areas as outlined on Figure 2.1-4. About ~~43~~ acres permanent impact areas (new impact) will be lost to other uses until after decommissioning of Fermi 3. The remaining 147 acres will be disturbed on a short-term, temporary basis. 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. Figure 2.1-4 indicates the areas proposed for use during Fermi 3 construction.

The conversion of 19 acres of the Lagoona Beach Unit of the Detroit River International Wildlife Refuge (DRIWR) from wetland and forest to developed use for Fermi 3 and associated structures constitutes the main irreversible and irretrievable land use impact for Fermi 3 construction. More than 90 percent of Lake Erie coastal wetlands have been lost to development in Monroe County, emphasizing the importance of the remaining land uses of this type (Reference 4.1-1).

4.1.1.1 Site and Vicinity Land Use Impacts

Construction of Fermi 3 will result in alterations to onsite land use. Some of these alterations are unavoidable and irreversible; others are unavoidable, but are temporary. As noted above, some of the areas designated for Fermi 3 were prepared or altered during the construction and the operation of Fermi 1 and Fermi 2.

Table 2.2-1 and Table 2.2-2 list land uses on the Fermi site and in the vicinity before construction of Fermi 3. During construction of Fermi 3, there will be a reduction (approximately 13 acres) in wetland and forested areas and a corresponding increase in the developed area acreage attributable to permanent impacts of construction activities on the Fermi site.

The various areas potentially affected by construction of Fermi 3 and the acreage within each area are provided in Table 4.1-1; these areas are also depicted on Figure 2.1-4. The site preparation and construction activities that will involve major impacts are clearing, grading, excavation, and dewatering. Explosives may be used during excavation work for Fermi 3 construction. The major types of construction impact that could result from these activities are alteration of existing vegetation, alteration of topography, and alteration of site drainage patterns and water quality.

The planned removal of the structures formerly used for Fermi 1 will free approximately 7 acres for use during Fermi 3 construction. Note - Fermi 1 disassembly may be carried out independently or

in conjunction with activities related to Fermi 3. This acreage is adjacent to the area where the Fermi 3 water intake and barge slip would be constructed.

New construction for Fermi 3 would have an impact in the construction areas because forest and wetland areas that are part of the DRIWR 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. Note - These Fermi 2 relocations may be carried out independently or in conjunction with activities related to Fermi 3.

301

Of the approximately ~~302~~ total acres estimated to be disturbed for the construction of Fermi 3, approximately 112 acres overlap currently developed or previously altered areas. It is estimated that approximately 12 acres would contain the permanent structure footprint associated with Fermi 3 (primarily the power block area, cooling tower area, intake area, and auxiliary structures, as shown in Figure 2.1-4). Approximately 125 acres of the Fermi site will be permanently occupied by facilities associated with Fermi 3. Acreage not containing permanent structures would be reclaimed after construction to the maximum extent possible and, where practicable, would be replanted or allowed to revegetate naturally. The combined Fermi 2 and Fermi 3 projected acreage for permanently affected areas (excluding temporary impacts) is approximately 259 acres. The ~~302~~ total acres of impact onsite from Fermi 3 construction and the 19 acres of land use (that would permanently change from wildlife refuge to high density development) are both substantially less than the 1235 acre threshold that the NRC considers a SMALL impact (refer to NUREG-1555, Section 4.1.1). It can therefore be concluded that the Fermi 3 land use impact during construction would be SMALL, and would not require mitigation.

301

As stated in Section 2.6, construction activities in support of Fermi 3 are not anticipated to adversely affect the geology of the site. Accordingly, the geological effects would be SMALL, and no mitigation measures would be needed.

4.1.1.2 Land Use Plan and Zoning Compliance

4.1.1.2.1 Local Monroe County and Frenchtown Township 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 (which is undergoing an update) emphasize county goals of retaining agricultural land uses while encouraging a strong economy. Development of the Fermi site has been consistent with county goals, leaving large portions of the natural wetland areas onsite intact while developing a power plant that provides economic benefits to the county and surrounding communities. The updated Monroe County Comprehensive Plan will not include changes to the planned use of the Fermi site or its immediate surroundings.

Michigan's local governmental structure involves land use planning and zoning authority that can be exercised by various entities. Counties, townships, cities, and villages work together and sometimes have overlapping jurisdictions concerning land use matters, as explained in

Onsite

The approximate route and impact areas associated with the short length of new transmission corridor that would be constructed within the Fermi site is shown on Figure 2.1-4 and described in Subsection 2.2.2.2.

In the onsite portion of the 345 kV transmission corridor, the Fermi 2 transmission lines are owned by ITC *Transmission*, while the Fermi 3 transmission lines will be owned by Detroit Edison up to the point of their interconnection with the new Fermi 3 switchyard. Outward from the Fermi 3 switchyard interconnection, ITC *Transmission* will own the lines and other transmission system equipment. Detroit Edison will maintain ownership and control of the land in the new onsite transmission corridor; however, it is expected that Detroit Edison would contract with ITC *Transmission* to maintain the transmission towers and lines located on Detroit Edison property.

Construction of the Fermi 3 switchyard, clearing of the onsite transmission line ROW, construction of the transmission towers, and stringing of the transmission lines will all be accomplished using methods that minimize impacts to wetlands and forest vegetation. The drainage area within this portion of the Fermi site will be spanned by the transmission lines; however, impacts to the drainage area are expected to be minimal because construction activities associated with the transmission structure installation are not expected to occur within the drainage area. The Fermi 3 switchyard will be constructed in the prairie restoration area at the intersection of Fermi Drive and Toll Road. The switchyard will permanently convert approximately 10 acres of the DRIWR from restored native grass vegetation to a developed use. The onsite transmission corridor will convert approximately an additional 6 acres of the DRIWR from woodlot forest, forested wetlands, and thicket to a developed use.

2.53 4.9 5.9

The onsite transmission line ROW and associated access pathways will have a combined temporary and permanent impact of approximately 8 acres (approximately ~~5.7~~ acres of permanent impacts to forested areas, and approximately 2.3 acres of temporary impacts to scrub-shrub and emergent wetland vegetation near the drainage area). Within the ~~4.7~~ acre forested area of the ROW near Toll Road, there will be approximately ~~1.53~~ acres of permanent impact to a forested wetland. Impacts to wetlands will be minimized as much as possible in this area through placement of the transmission line ROW adjacent to the Toll Road ROW so that the narrowest possible portion of the forested wetland would be impacted. Complete avoidance of wetland impacts in this area was not practicable because of the need for transmission lines to travel from the Fermi 3 power block to the Fermi 3 switchyard without impacting existing structures or other areas required for Fermi 3 construction (refer to Figure 2.1-4).

During construction of the transmission system, forest clearing will be limited to the 170-foot wide ROW to minimize impacts to existing vegetation and wildlife habitat. To the extent feasible, the transmission towers will be placed in locations outside forested areas and outside the central portion of the drainage area so that inundation of the transmission structures with water would be less likely. The drainage area holds water at varying levels depending on the amount of recent precipitation in the surrounding area and any seiche events that may occur in Lake Erie. The temporary access pathways to the transmission tower locations will approach the towers from both

Table 4.1-1 Acreage Affected by Various Facilities Associated with Fermi 3

	Area Acres
Total Site	1260[2]
Current Fermi 2 Total Developed Area	209
Nuclear Training Center and Nuclear Operations Center	1.5
Spoils Area (surrounded by Boomerang Road)	12
Decommissioned Fermi 1 Area	7
Transmission Line Corridors (onsite 345 kV and 120 KV)	30 (to western site boundary)
(all lines offsite along Fermi Drive to Dixie Highway)	54 (western site boundary east to Dixie Highway)
New Construction Areas Affected	
Fermi 3 Power Block (Cooling Tower, Fabrication Area, Construction Offices, and Batch Plant included in this area)	87
Fermi 2 New Parking, Warehouse, and Access Infrastructure	~~23~~ 22
Fermi 3 Construction Areas (Laydown, Access, Other)	143
Fermi 3 Switchyard	10
Newly Developed Onsite Transmission Areas	8
Fermi 3 Meteorological Tower and Access Road	6
Fermi 3 Simulator, Administrative Building	7
Total Onsite New Construction Areas Affected (not including Fermi 2 developed area)	~~190~~ 189
Newly Developed Offsite Transmission Corridor[3]	1069

Notes:

1. Acreages given are approximate based on Figure 2.1-4.
2. Acreages in this table do not total 1260 because most of the remaining acreage is occupied by the undeveloped areas of the Detroit River International Wildlife Refuge.
3. New offsite transmission line acreage overestimated by assuming a 300-foot corridor would be impacted along the entire 29.4 mile route. Actual impacts are likely to be much less because 18.6 miles of the new corridor will largely use existing structures.

significant impoundments, reservoirs, estuaries, or oceans located in the region that need to be considered when analyzing the water impacts on the construction of Fermi 3. The North and South Lagoons are discussed in Subsection 4.2.1.4.

The uppermost hydrogeologic unit present at the site is the shallow overburden. Several different geologic materials with varying properties comprise the overburden, and the groundwater is unconfined. The bedrock aquifer lies beneath the overburden at the site, and is generally confined. The upper bedrock unit at the site is the Bass Islands Group, which is underlain by the Salina Group. There are no sole source aquifers on the site or in the vicinity.

4.2.1.2 Construction Activities

301

This section identifies construction activities that could result in impacts to the hydrology at the Fermi 3 site. Fermi 3 construction is anticipated to disturb approximately ~~302~~ acres, which includes the Fermi 2 developed area. Figure 4.2-1 shows the various areas that will be affected by construction. The following construction activities are identified:

- Clearing additional land at the project site and constructing infrastructure such as roads and stormwater drainage systems
- Construction of new buildings (reactor containment structures, turbine building, cooling tower, electrical substation, and other related structures)
- Construction of additional parking lots and roads that will support the construction and operation of Fermi 3
- Construction of both the station water intake structure for water withdrawn from Lake Erie and the discharge pipe for water discharged to Lake Erie
- Construction of docking facilities for barges/vessels that will be used to bring in materials and machines
- Temporary disturbance of existing vegetated areas to establish construction laydown areas, concrete batch plants, sand/soil/gravel stockpiles, and construction worker parking areas
- Backfilling of onsite water bodies with excavation materials or materials brought in from offsite
- Dewatering of foundation excavations during construction
- Installation of underground piping such as sanitary, stormwater, and fire protection piping
- Installation of underground piping to the cooling tower, the discharge piping from the cooling tower to the intake groins area, and makeup water piping from the intake to the circulating water system

4.2.1.3 Construction Water Sources

The main water source utilized during construction will be Lake Erie. Due to its large volume, it will have sufficient capacity to meet construction water needs. Construction activities at Fermi 3 are expected to require water amounts of approximately 350,000 to 600,000 gallons per day for

as outlined on Figure 2.1-4. Onsite transmission construction activities result in approximately ~~5.7~~ 5.9 acres of permanent impacts and 2.3 acres of temporary impacts.

Subsection 3.7 describes the three new 345 kV transmission lines proposed to serve Fermi 3. The 29.4-mile route of the new 345 kV transmission lines would use 18.6 miles of an existing route running along a corridor already used for transmission structures and lines. Additionally, a short (10.8-mile) tract of an existing undeveloped corridor would be used along the route to the Milan substation. Assuming a nominal 300-foot width along the entire proposed transmission corridor, a total of approximately 1069 acres could potentially be disturbed for construction activities. Laydown and other areas potentially located outside the corridor may be defined by ITC *Transmisssion* at a time closer to construction of the lines. Use of existing roads are expected for access and construction traffic as much as possible, and no new access roads are anticipated because the topography of the area is flat.

Table 2.2-6 shows the land uses within 0.5 miles of Fermi associated with the existing corridors, including the proposed transmission routes. Table 4.3-4 shows the vegetation communities along the 10.8 mile undeveloped portion of the route to the Milan substation, including the impacted areas. These tables show that open water and wetland areas comprise a relatively small portion of the total area both within the transmission corridors and within the impacted areas.

Due to the minimal acreage of open water and wetlands along the proposed route, hydrological impacts resulting from the new transmission line route are expected to be minimal. ITC *Transmission* plans to use available existing rights-of-way (ROW) for the new route rather than using a route that would convert open space to transmission use. This plan will aid in minimizing the environmental impacts of the proposed new transmission infrastructure.

4.2.1.7 Floodplains and Wetlands

Figure 2.3-16 shows the Federal Emergency Management Agency (FEMA) flood map for the Fermi site. As shown, the location for Fermi 3 is located in Zone X, which represents areas outside the 500-year flood zone. As shown in Table 2.3-1, based on the IGLD 1985 datum, the 10-year flood level is 576.3 feet, the 50-year flood level is 577.4 feet, the 100-year flood level is 577.9 feet and the 500-year flood level is 578.8 feet. All of these flood levels are less than the current site grade elevation of approximately 581.5 feet. Therefore, based on design and configuration, the site is adequately protected from flooding during construction.

Wetlands and Open Waters comprise approximately 60 percent of the area within the Fermi site (see Figure 2.4-19). The majority of the Fermi site that is not developed is included as part of the DRIWR at the time of this COL application. The DRIWR encompasses a 656 acre portion of the site. Of the 7.5 mile vicinity, about four percent is comprised of wetlands. Figure 2.2-1 depicts land use of the vicinity.

Dewatering is confined to the confined Bass Islands Group aquifer and will, therefore, have a minimal effect on wetlands, as described in Subsection 4.2.1.5. Appropriate permits and procedures will be used per State and Federal guidelines and regulations, as required, for specific construction activities affecting wetlands.

Insert New Figure

Figure 4.2-1 Construction Affected Areas

Figure 4.2-1 Construction Affected Areas

4.3 Ecological Impacts of Construction

This section describes the potential impacts from the construction of Fermi 3 on the ecological resources at the Fermi site and in the vicinity and those associated with the transmission corridor construction activities. The vicinity considered includes a 7.5 mile radius area around the Fermi site (Figure 2.2-1). The section is divided into two subsections: Terrestrial Ecosystems and Aquatic Ecosystems. For purposes of characterization, wetlands are principally described as terrestrial ecosystems. The subsections summarize relevant information from field studies and other existing data in accordance with the guidance in NUREG-1555 and Regulatory Guide 4.2, Revision 2. The Chapter 4 introduction provides an overview of the Fermi 3 construction schedule and key construction activities.

During construction, several activities will be directed at protecting the terrestrial and aquatic environment, including using BMPs to reduce the risk of stormwater runoff, erosion, and pollutant spills, as outlined in the SESC Plan and the PIPP for the Fermi 3 site. The requirements for the SESC Plan and the PIPP are described in more detail in Subsection 4.2.1. BMPs that are used will be consistent with the practices discussed in Guidebook of Best Management Practices for Michigan Watersheds (Reference 4.3-1). As part of Reference 4.3-1, BMPs are categorized into one of eight categories:

- Construction Site Preparation
- Housekeeping
- Managerial
- Runoff Conveyance and Outlets
- Runoff Storage
- Sedimentation Control Structures
- Vegetative Establishment
- Wetlands

Each of these categories contains several BMPs that will be implemented as the conditions warrant. For each of the BMPs, Reference 4.3-1 provides more detailed information including a description of the BMP, the basis for implementing the BMP, the application of the BMP, relationship with other BMPs and how other BMPs can be used to compliment each other, considerations during the planning phase, considerations during the implementation phase and post-construction considerations.

4.3.1 Terrestrial Ecosystems

This subsection describes the impacts of construction on the existing terrestrial ecosystem as described in Subsection 2.4.1. Figure 4.3-1 shows the undeveloped areas that would be impacted by the construction of Fermi 3. The site layout for Fermi 3 is shown in Figure 2.1-4. The total impact area for Fermi 3 is ~~302~~ 301 acres, which includes the aquatic area impacts, as discussed in Subsection 4.3.2. Fermi 3 construction would disturb approximately 200 acres of terrestrial habitat

habitats in the immediate and surrounding vicinity provide opportunities for shelter and perhaps better foraging. On the Fermi site, 113 acres of this community were mapped during site visits. The onsite acreage of Shrubland habitat is unclear because of inconsistencies between USGS data and onsite observations. USGS data indicate 95 acres of Shrubland in the vicinity (refer to Table 2.2-2), which is less than the observed habitat (113 acres). One possible explanation is that USGS data were collected before subsequent expansion of Shrubland had occurred, resulting in the recent larger estimate. However, because this is an early succession community, the project impacts to the community are considered SMALL, and no mitigation measures are needed.

Thicket

Approximately 7 percent of the 23 acres (i.e., 1.7 acres) of this community present onsite would be permanently impacted. This is an early succession community that has developed on lands that were previously disturbed (cleared or filled) during the construction of Fermi 2 as discussed in Subsection 2.4.1.1.1. Wildlife use of the area is mostly for shelter. Due to the small area of permanent loss and early succession character of this community, the project impacts to the community are considered SMALL, and no mitigative measures are needed.

Forest: Lowland Hardwood

Approximately 4.8 acres of this community present onsite would be temporarily impacted. As described in Subsection 2.4.1.1.1, this is a natural community and probably represents the most mature plant community on the Fermi site. Wildlife use the community for shelter, and some foraging is available due to the presence of mast producing species, mostly oaks. The area to be temporarily impacted is associated with the construction laydown areas. This same area will be re-vegetated following construction. The temporary loss to the community from the project is considered SMALL based on the amount of similar community in the vicinity, and no mitigative measures are needed.

Forest: Woodlot

8.6

Approximately 117 acres of this community are present onsite. Of this total, approximately 5 percent (i.e., approximately ~~8.4~~ acres) would be permanently affected by Fermi 3 construction. There will be 6.3 acres of temporary impacts. As described in Subsection 2.4.1.1.1, this community occurs entirely on previously cleared and/or filled land. The plant species present are mostly not representative of native forested areas in the region but local wildlife do utilize the area for shelter and limited foraging. The temporarily impacted areas, those associated with the Fermi 3 construction parking area, would be re-vegetated following construction. Due to the early succession character of this community, the project impacts to the community are considered SMALL, and no mitigative measures are needed.

Forest: Coastal Shoreline

The Coastal Shoreline Forest plant community encompasses about 47 acres of land or 3.7 percent of the Fermi site. One acre near the meteorological tower will be permanently impacted. This is a dynamic plant community composed of opportunistic, early succession (pioneer) species. The area

Eastern Fox Snake

The eastern fox snake (a Michigan threatened species) was sighted two times on the Fermi property, in June 2008. The Michigan Natural Features Inventory has recorded nine occurrences for Monroe County, with the most recent report in 2007 (Reference 4.3-5). The snake was found along the cattail marshes or wetland shorelines around woody debris. The life history of the eastern fox snake is discussed in Subsection 2.4.1.2.2.1. Detroit Edison has prepared a mitigation plan for eastern fox snakes to be used during the construction phase of the project (Reference 4.3-8). The primary goal of this plan is to minimize the impacts to resident fox snakes. Detroit Edison has also committed to developing a procedure which will be used during the operation of Fermi 3 to minimize the impact to fox snakes. [START: COM ER-2.4-016] Detroit Edison will develop a procedure to be used during the operation of Fermi 3 to mitigate impacts to eastern fox snakes on-site. [END: COM ER-2.4-016]

4.3.1.2.2 Important Habitats

Important habitats for the Fermi site are described in Subsection 2.4.1.2.3 and include the DRIWR and areas of wetlands as discussed below.

Detroit River International Wildlife Refuge

18.7

The DRIWR Lagoona Beach Unit is located entirely within the Fermi property and includes a total of 656.4 acres (Figure 2.4-6). The Fermi 3 construction impact area includes approximately 45 acres, or about 7 percent of the Lagoona Beach Unit as illustrated in Figure 4.3-3; ~~18.5~~ acres would be permanent impacts and 26.2 acres temporary impacts. The area of each section of the Lagoona Beach Unit and the area of that unit to be impacted is provided in Table 4.3-3. 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 4.3-6). The construction impacts of reducing the effective area of the DRIWR are principally land-use impacts, which discussed in Subsection 4.1.1.1. 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 below.

Wetlands

Detroit Edison conducted a wetlands investigation to delineate wetland boundaries and assess functions and values of the wetlands present on the Fermi property. The 2008 wetland investigation report was provided to MDEQ and USACE in the fall of 2008 with a request for review and a jurisdictional determination. Jurisdictional determination letters were provided by the now MDNRE in November 2008 (Reference 4.3-9) and March 2009 (Reference 4.3-10) and by USACE in November 2010 (Reference 4.3-11). The wetland delineation boundaries were updated in response to the jurisdictional determination letters. Additional updates to the wetland delineation were based on site visits and verbal and written feedback from MDNRE and USACE during 2010. The results of the wetland investigation are summarized in Subsection 2.4.1.2.3. Impacts to approximately ~~38.27~~ acres of wetland and open water habitat regulated by the MDEQ and USACE are anticipated within the construction impact area at the Fermi property (see Figure 4.3-5). This acreage includes

39.80

21.22

8.03

60

~~20.89~~ acres of emergent marsh (PEM), ~~6.84~~ acres of forested wetland (PFO), 5.28 acres of scrub-shrub wetland (PSS), and 5.26 acres of open water. Of this acreage, approximately 23.75 acres (~~62~~ percent) are temporary impacts that would be restored following construction. Characteristics of these wetlands are discussed in Subsection 2.4.1.2.3. In sum, the construction impacts are projected to be MODERATE. Accordingly, Detroit Edison will prepare a mitigation plan for Fermi construction activities that will be submitted to the MDEQ and USACE.

Impacts to wetlands as part of Fermi 3 construction activities are a matter that must be carefully considered due to the importance of these habitats. Measures are taken to first avoid impacts and when that is not possible, impacts are minimized to the greatest extent possible. Work in areas adjacent to wetlands, such as the parking lot construction, would utilize silt fencing to protect the wetland from siltation and entry by construction equipment. Other BMPs would apply as appropriate. Wherever possible, disturbed areas would be revegetated as soon as possible following disturbance to avoid impacts from stormwater runoff. Plantings will be of tree species or seed mixes of grasses and forbs appropriate for the Fermi region.

4.3.1.3 Other Projects within the Area with Potential Impacts

No major projects have been identified in the vicinity that would add cumulatively to the impacts associated with the construction of Fermi 3. This includes consideration of terrestrial communities, important species and habitats, and other terrestrial resources considered in Subsection 4.3.1.

4.3.1.4 Regulatory Consultation

Affected Federal and State agencies were contacted or consulted regarding potential impacts to the terrestrial ecosystem resulting from the construction of Fermi 3. The USFWS, the MDNR Natural Heritage Program (Reference 4.3-2), and the Michigan State University Extension Michigan Natural Features Inventory program (Reference 4.3-7) were consulted in 2007 regarding Federal and State protected species and sensitive habitats.

The MDEQ and USACE have been consulted regarding wetlands. A wetland investigation, including a wetland delineation was completed for the Fermi property in May and June 2008. A summary of the wetland delineation is provided in Subsection 2.4.1.2.3. The updated wetland delineation and jurisdictional determinations will be the basis from which impacts to wetlands and the need for mitigation will be determined. Federal and State permit applications for working in wetlands will be submitted to these agencies at a later date, but prior to any construction activities.

4.3.1.5 Transmission Corridors and Other Offsite Areas

Onsite

The layout and construction plan associated with the onsite transmission line is discussed in Subsection 4.1.2.

As discussed, the construction of the transmission line onsite will include the Fermi 3 switchyard, clearing of onsite transmission line ROW, construction of towers, and stringing of the transmission lines. Direct impacts to terrestrial habitats will be minimized to the extent possible, but are expected to result in permanent impacts to 15.5 acres (Grassland: Row Crop 9.6 acres; Thicket 1.7 acres;

Siltation caused by increased sedimentation could result in the temporary loss of benthic habitats and biota associated with the onsite drainage systems and canals. Increased turbidity from the runoff could limit phytoplankton productivity and decrease zooplankton densities within these water bodies, as well. While this may temporarily reduce food resources for forage fish species, these effects will be limited in duration and temporary in nature, terminating upon the completion of Fermi 3 construction.

Vegetation, associated with the onsite drainage systems, canals, and wetlands, functions as filters and barriers that trap silt and sediment (refer to Subsection 4.3.1 for vegetation listing). Plants growing in these types of habitats thrive in high nutrient conditions, making these areas ideal buffer zones for sediment and silt runoff. The filtering capacity of these plants also aids in the removal of potentially harmful nutrients from construction effluents and run-off. Effects to the aquatics of the onsite drainage systems and canals would be similar to those naturally occurring to this system during periods of heavy inundation and flooding, and therefore impacts would be expected to be SMALL.

Wetland and coastal habitats, such as those identified within the DRIWR, routinely experience habitat changes associated with heavy rains and flooding events. These episodic events are representative of those expected as a result of surrounding construction activities (erosion, increased sedimentation and turbidity). The aquatic biota found in these types of habitats are highly adapted to survive in dynamic aquatic regimes, and therefore can be expected to recover from these effects quickly without significant decreases in overall health and sustainability. Wetlands are further discussed in Subsection 4.3.1.2.2.

Historically, onsite aquatic resources have been subjected to heavy sediment deposition associated with clearing of adjacent lands for agricultural purposes as well as with the construction of Fermi 2. Increased erosion and turbidity in and around the identified water bodies likely occurred as a result of these activities. The presence of established aquatic communities in these water bodies (described in Subsection 2.4.2) demonstrates the ability of these resources to recover from such perturbation. Because of the highly adaptive nature of the onsite aquatic system, impacts to aquatic resources at the Fermi site due to construction activities are expected to be SMALL.

10.87 6.10 4.77

Construction activities associated with Fermi 3 Construction as well as transferal of Fermi 2 structures will permanently impact approximately ~~9.34~~ acres of wetland and 5.18 acres of open water habitats (see Figure 4.3-5). This acreage includes ~~5.77~~ acres of emergent marsh (PEM), and ~~3.57~~ acres of forested wetland (PFO) In addition, construction may lead to soil erosion and sedimentation into onsite drainage systems, canals, Swan Creek, and other waters within the DRIWR. Erosion and sedimentation may cause some temporary disruption and modification of the onsite drainage systems and may provide a surface conveyance of silt and sediment to aquatic habitats. This input of materials will be minimized and controlled through the use of BMPs established in the SESC Plan. BMPs include the utilization of silt fencing, hay bales, turbidity curtains, and sediment traps. BMPs are discussed in more detail in Section 4.3. These measures will be installed prior to the start of construction activities and will be maintained on a routine basis. Accordingly, impacts to these habitats will be SMALL,

Table 4.3-3 Acreage of Detroit River International Wildlife Refuge, Lagoona Beach Unit, Impacted by Fermi 3

Refuge Unit	Area Size (acres)	Area Impacted (acres)	
		Permanent	Temporary
NE	161.7	0	0
NW	161.1	~~15.9~~ 16.1	22.7
SE	311.2	2.6	3.5
SW	22.4	0	0
Totals	656.4	~~18.5~~ 18.7	26.2

Insert New Figure

Figure 4.3-1 Fermi 3 Impacts to Undeveloped Areas (yellow lines) on Fermi Site (red line)

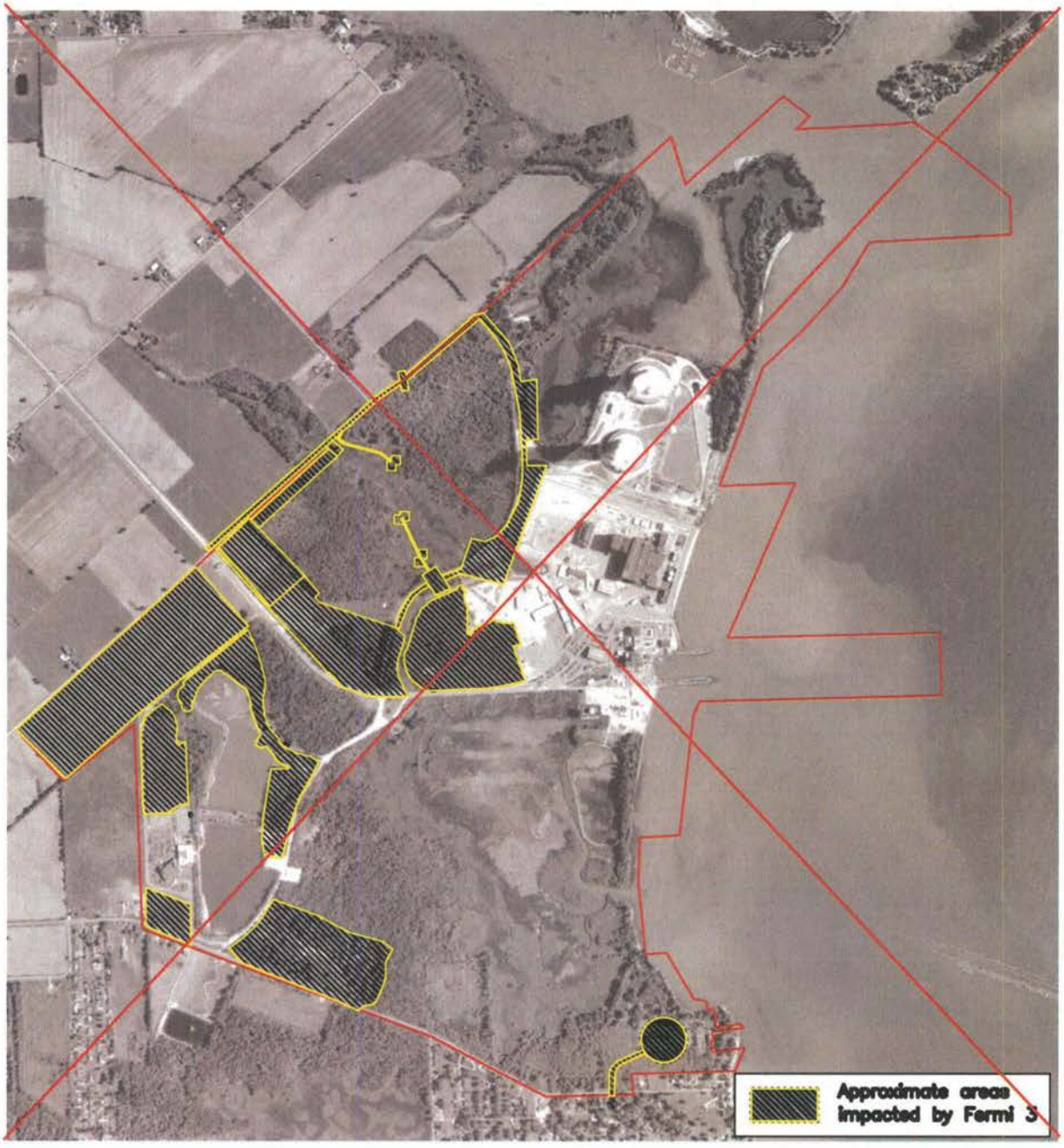

Figure 4.3-1 Fermi 3 Impacts to Undeveloped Areas (yellow lines) on Fermi Site (red line)

Insert New Figure

Figure 4.3-2 Permanent and Temporary Impacts to Undeveloped Areas from Fermi 3 Construction Overlaid on Existing Terrestrial Communities

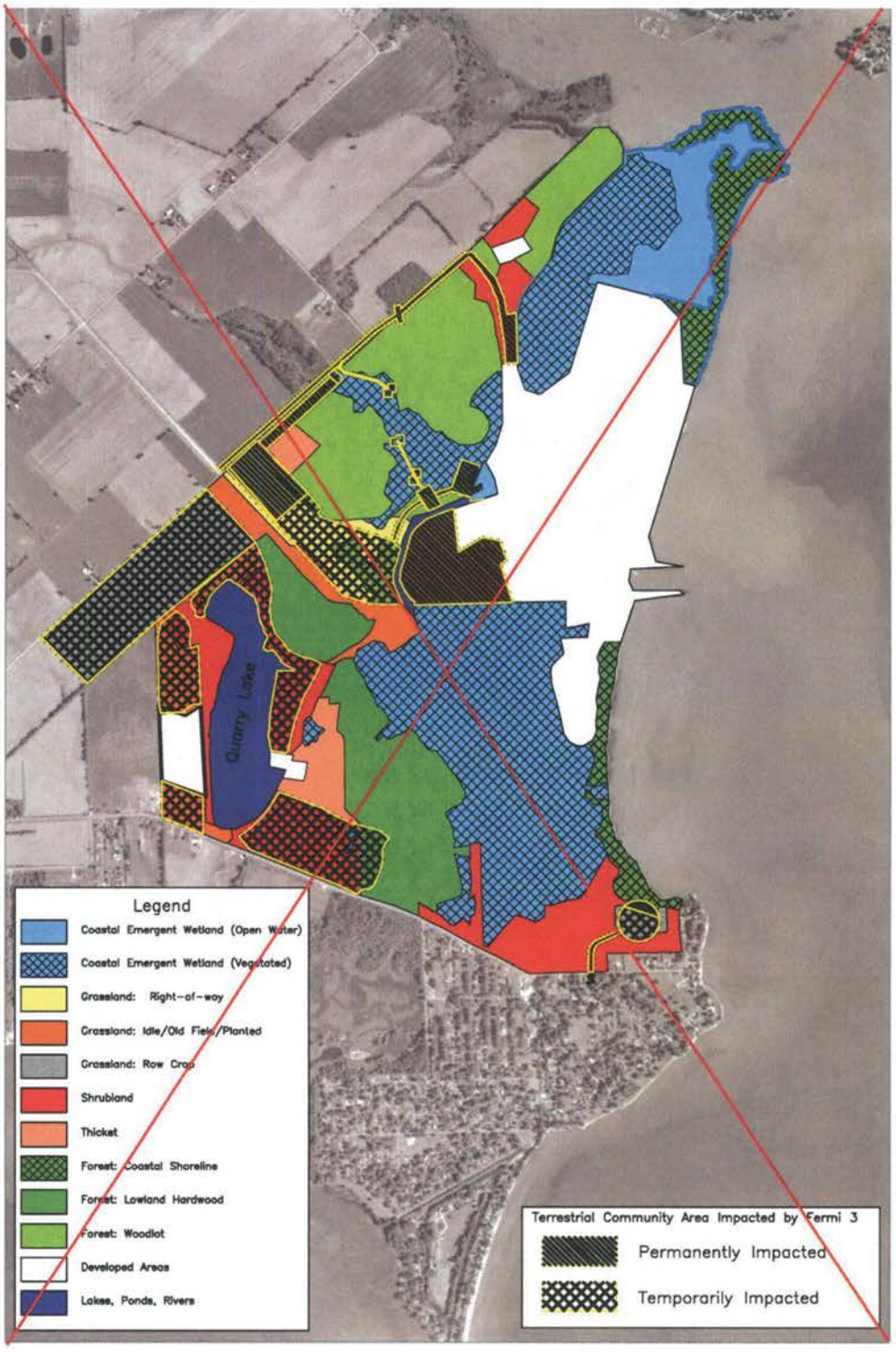

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Figure 4.3-2 Permanent and Temporary Impacts to Undeveloped Areas from Fermi 3 Construction Overlaid on Existing Terrestrial Communities

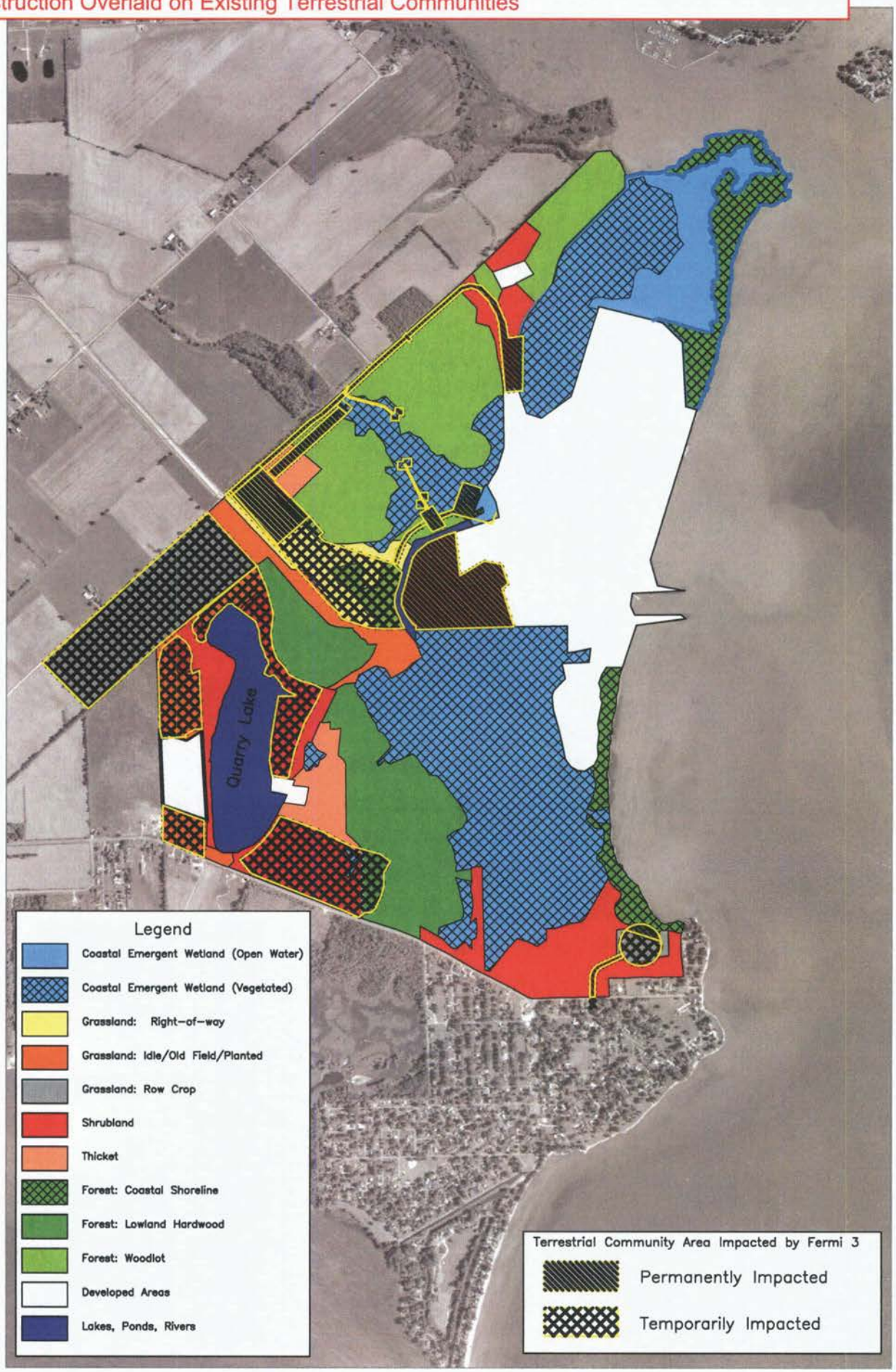

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Figure 4.3-3 Permanent and Temporary Impacts to DRIWR, Lagoona Beach Unit from Fermi 3 Construction Overlaid on Existing Terrestrial Communities

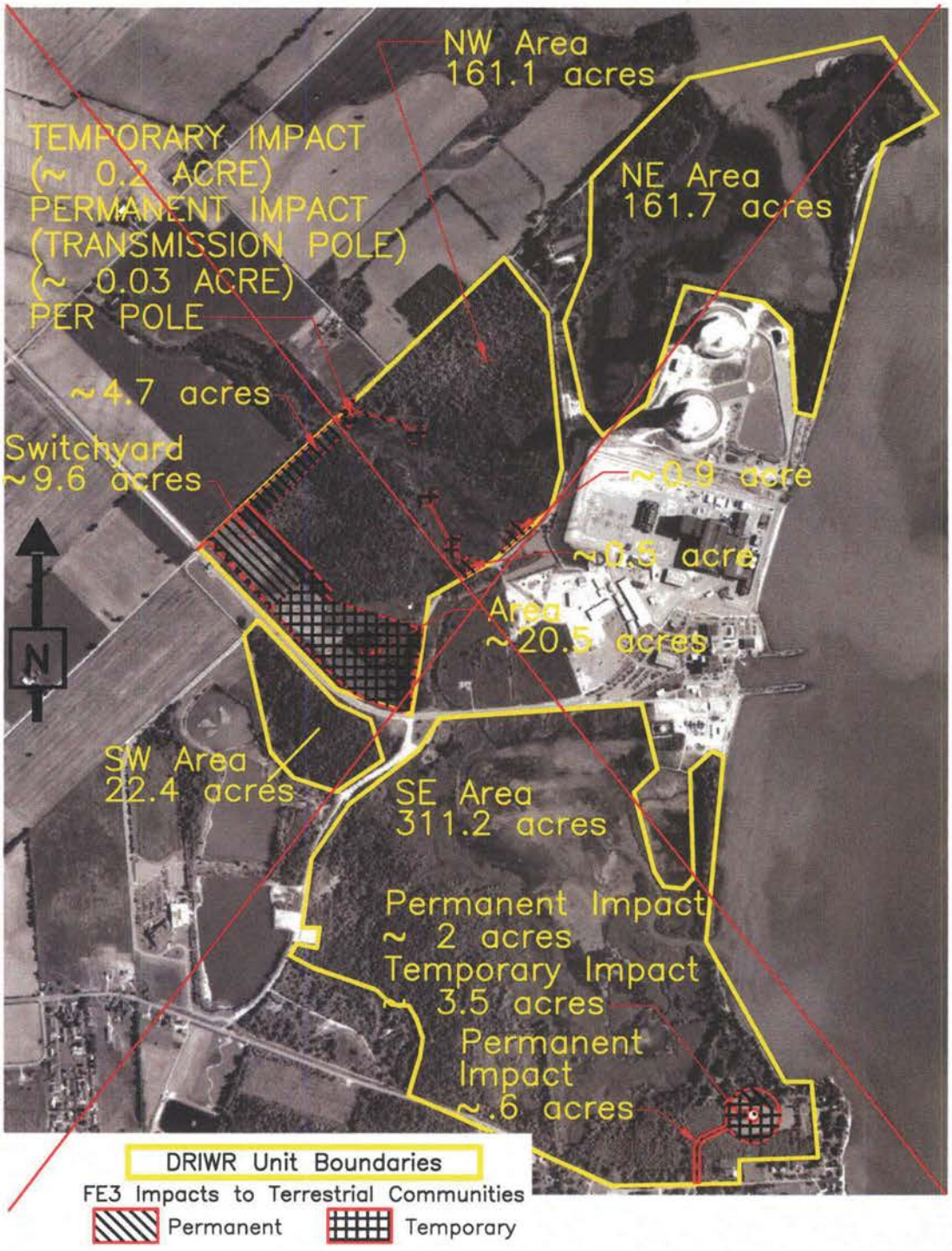

Figure 4.3-3 Permanent and Temporary Impacts to DRIWR, Lagoona Beach Unit from Fermi 3 Construction Overlaid on Existing Terrestrial Communities

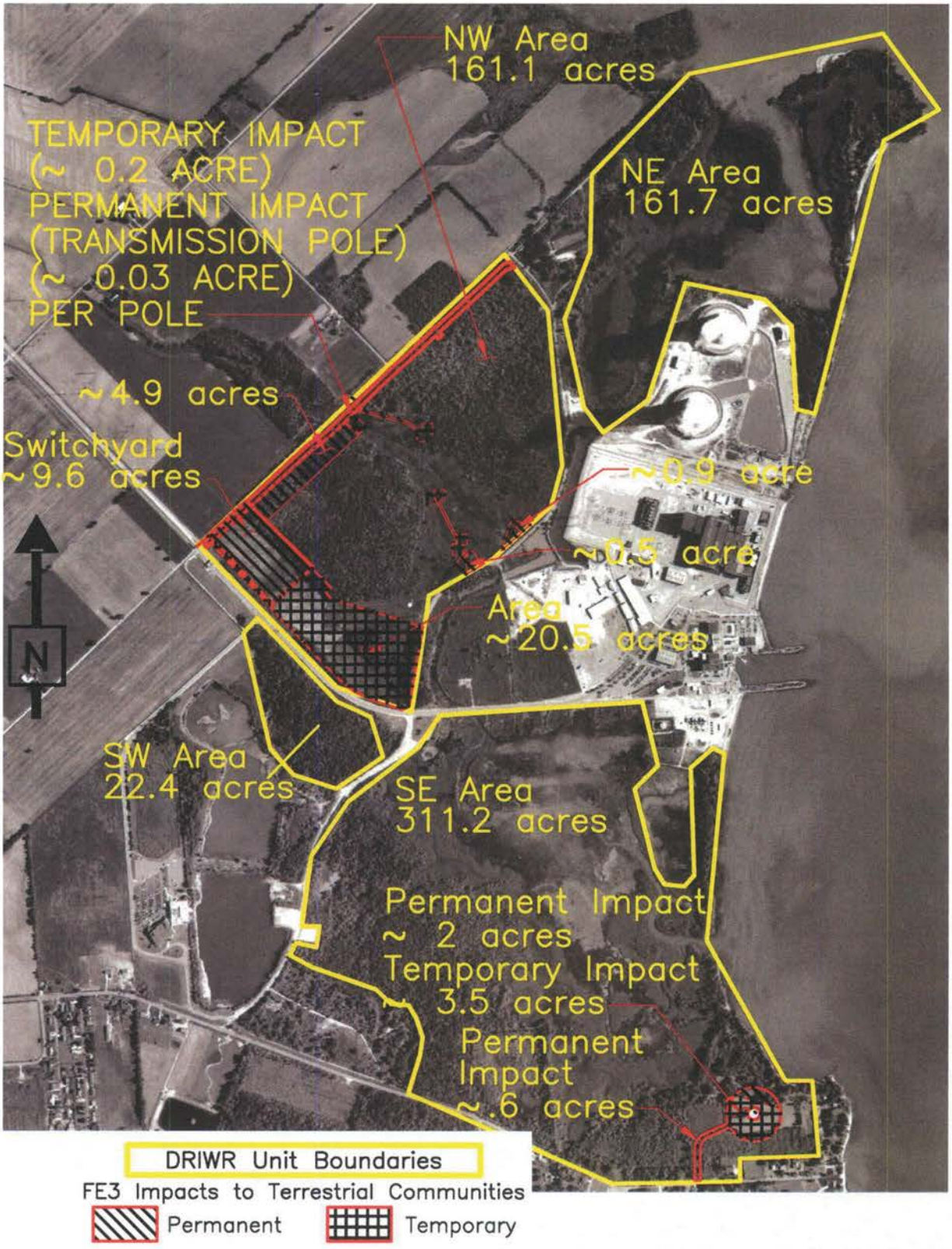

Figure 4.3-4 Permanent and Temporary Impacts to Undeveloped Areas of the Fermi Property (red line) Overlaid on Existing Aquatic Communities

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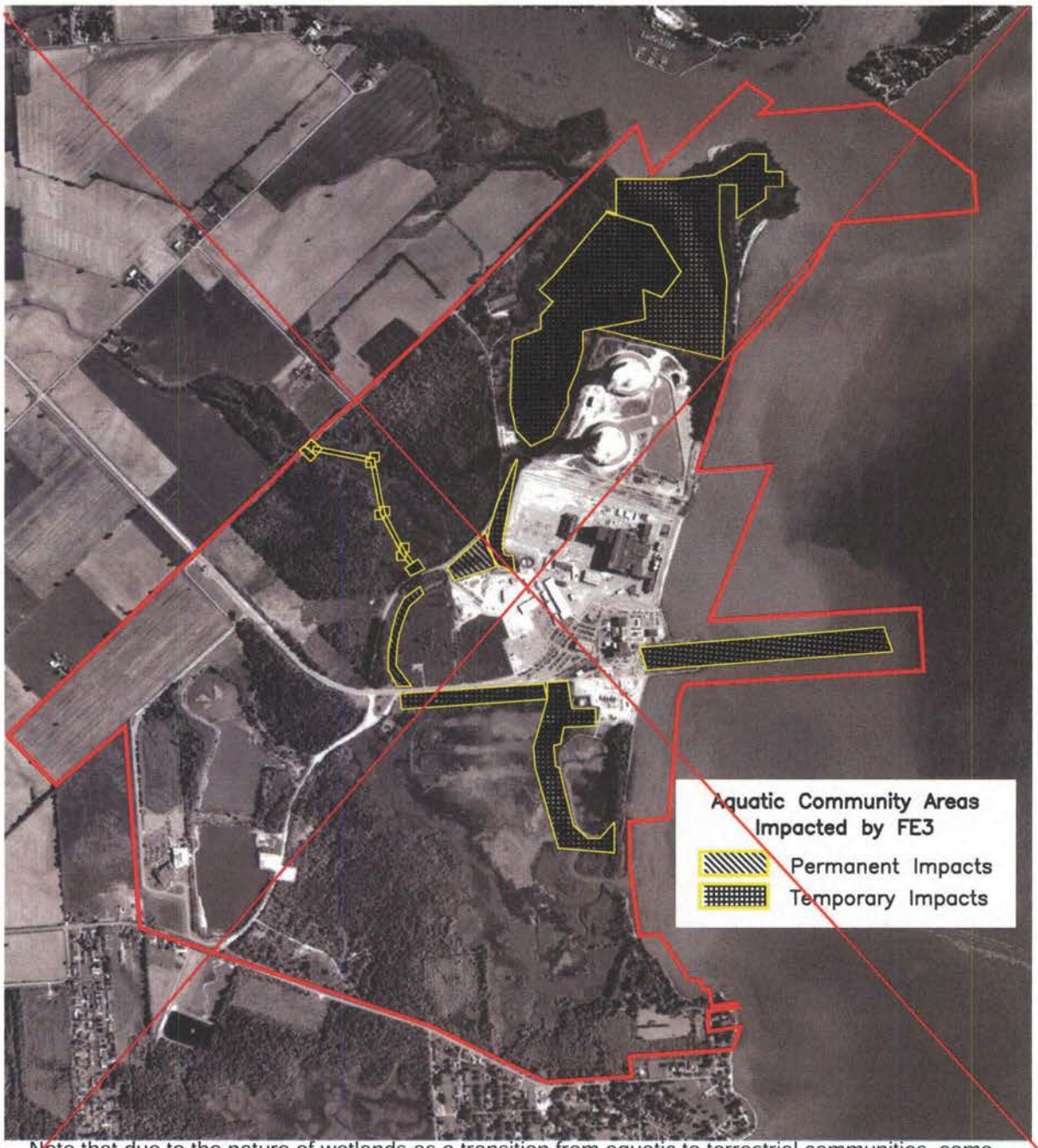

* Note that due to the nature of wetlands as a transition from aquatic to terrestrial communities, some impacted areas outlined on this figure overlap with those in Figure 4.3-2.

Figure 4.3-4 Permanent and Temporary Impacts to Undeveloped Areas of the Fermi Property (red line) Overlaid on Existing Aquatic Communities

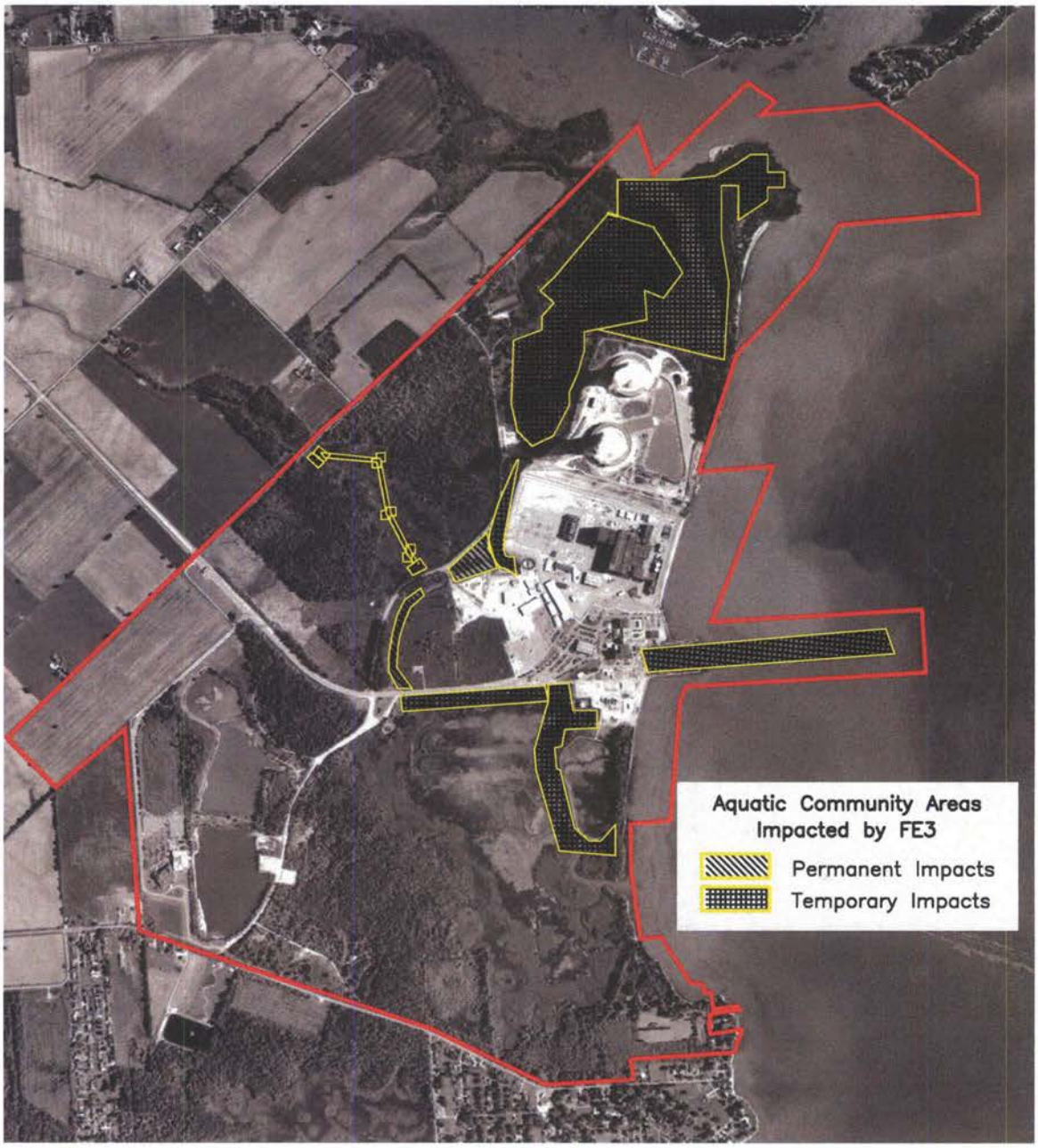

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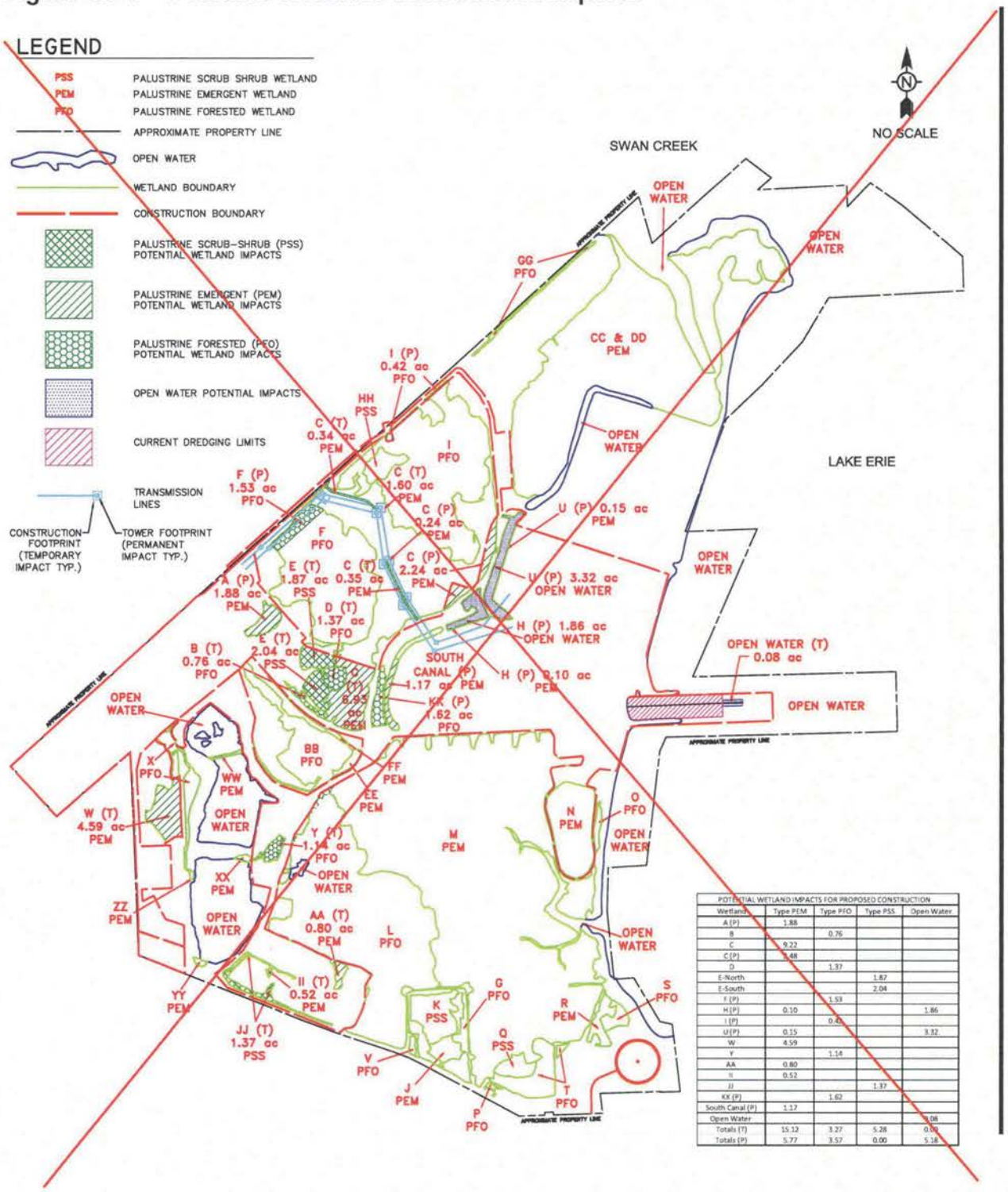
Figure 4.3-5 Potential Wetlands Construction Impacts



POTENTIAL WETLAND IMPACTS FOR PROPOSED CONSTRUCTION

Wetland	Type PEM	Type PFO	Type PSS	Open Water
A (P)	1.88			
B		0.76		
C	9.22			
C (P)	2.48			
D		1.37		
E-North			1.87	
E-South			2.04	
F (P)		1.53		
H (P)	0.10			1.86
I (P)		0.42		
U (P)	0.15			3.32
W	4.59			
Y		1.14		
AA	0.80			
II	0.52			
JJ			1.37	
KK (P)		1.62		
South Canal (P)	1.17			
Open Water				0.08
Totals (T)	15.12	3.27	5.28	0.08
Totals (P)	5.77	3.57	0.00	5.18

Figure 4.3-5 Potential Wetlands Construction Impacts

POTENTIAL WETLAND IMPACTS FOR PROPOSED CONSTRUCTION

Wetland	Type PEM Acres	Type PFO Acres	Type PSS Acres	Open Water Acres
A (P)	1.88			
B(T)		0.76		
C (T)	9.22			
C (P)	2.80			
D (T)		1.37		
E-North (T)			1.87	
E-South(T)			2.04	
F (P)		2.71		
H (P)	0.10			1.86
I (P)		0.44		
U (P)	0.15			3.32
W	4.59			
Y (T)		1.14		
AA	0.80			
II	0.52			
JJ			1.37	
KK (P)		1.62		
South Canal (P)	1.17			
Open Water				0.08
Totals (T)	15.12	3.27	5.28	0.08
Totals (P)	6.10	4.77	0.00	5.18

Insert New Figure

Figure 4.5-1 Radiation Sources from Fermi 2

DTE000008
3/29/2013

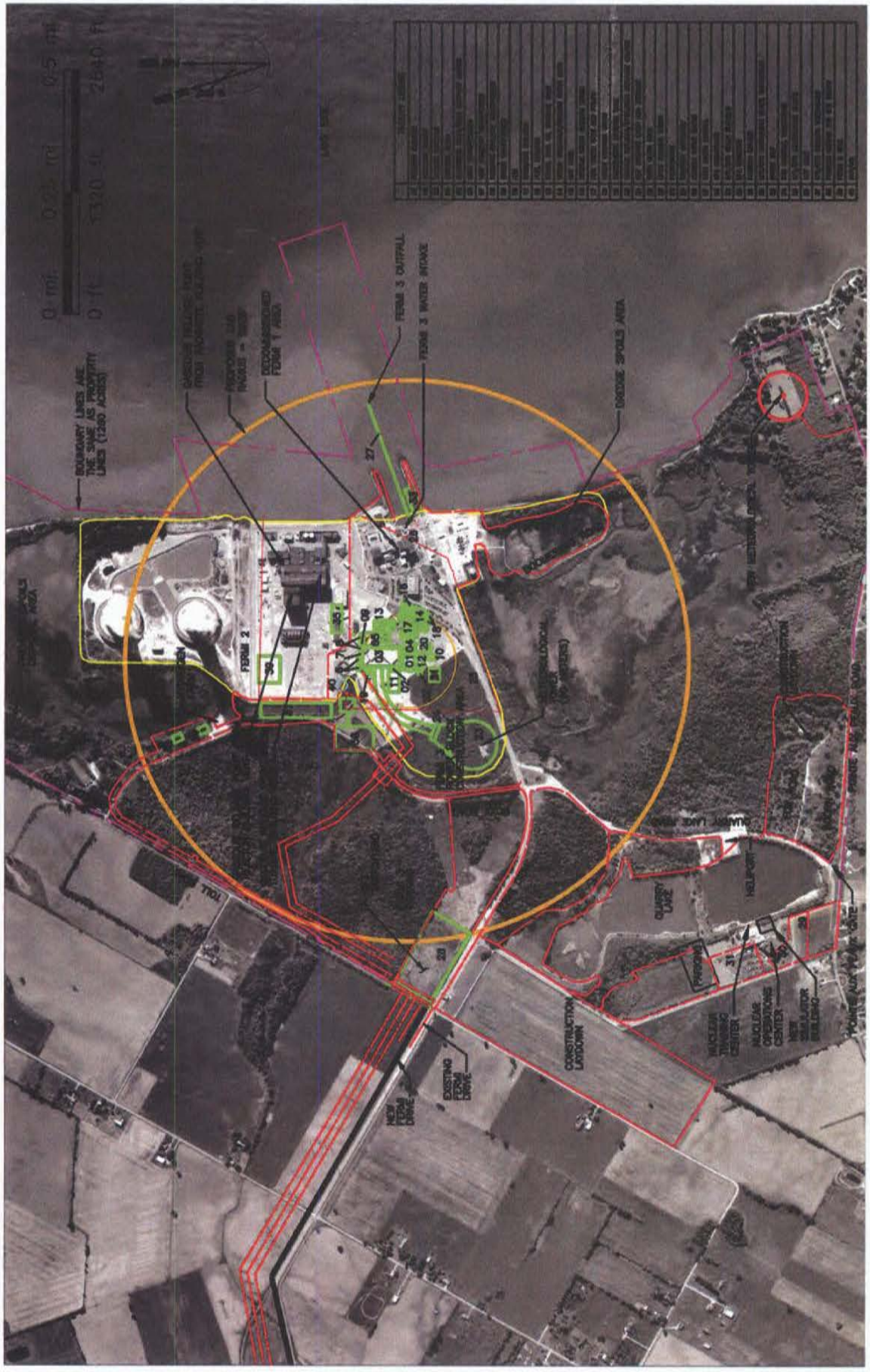


Figure 4.5-1 Radiation Sources from Fermi 2

4.7 Cumulative Impacts of Construction

This section discusses cumulative impacts to the environment that could result from the construction of Fermi 3. A cumulative impact is defined in the Council of Environmental Quality (CEQ) regulations (40 CFR 1508.7) as an "impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (federal or nonfederal) or person undertakes such other actions."

The construction impacts of Fermi 3, as described in Chapter 4, are combined with other past, present, and reasonably foreseeable future actions that would affect the same resources in the vicinity. Cumulative impacts anticipated during construction phases are discussed in this section.

To determine whether cumulative impacts to the existing environment near the Fermi site are likely to occur, the baseline environmental information and proposed, ongoing and future development projects in the Fermi area of similar magnitude (Chapter 2) are considered herein along with the environmental impacts (Chapter 4) of constructing a new unit on the Fermi site. For purposes of this review, the geographical area considered for cumulative impacts from construction is Monroe County, and the focus includes and Fermi 3 along with other comparable projects. Apart from Fermi 3, the only known major construction project planned in Monroe County is the installation of scrubbers at the Monroe Power Plant. The respective environmental impacts from Fermi 3 and Monroe Power Plant construction are anticipated to be contained within the respective sites by various regulatory and permit requirements. Furthermore, potential cumulative impacts related to the scrubber installation (e.g., air quality effects from construction equipment, increased temporary work force size, and commuter traffic) are anticipated to decrease before Fermi 3 construction is started. Therefore, Fermi 3 is considered the primary action influencing cumulative impacts for the Fermi 3 project.

As discussed in the Chapter 4 introduction, activities involving Fermi 1 and 2 will be taking place during the Fermi 3 construction period (e.g. deconstruction of Fermi 1, relocation of Fermi 2 outbuildings, access separation between Fermi 2 and 3, etc.). Although they are separate activities from Fermi 3 construction, there is still a close interdependent environmental relationship. Accordingly, the Chapter 4 impacts previously took these activities into consideration in characterizing the Fermi 3 construction impacts, and no specific itemization is provided in this section for Fermi 1 and 2 cumulative impacts.

4.7.1 Land Use

301 301

For purposes of this analysis, the geographical area considered for cumulative impacts to land use resulting from construction is a circular area within 7.5 miles of the existing facility, centered on the proposed Fermi 3 location. Approximately ~~302~~ acres of the existing 1260-acre Fermi site will be used for construction of Fermi 3. Of the ~~302~~ acres required, approximately 112 acres already are developed and contain structures, pavement or other maintained areas; the remainder is composed of various terrestrial habitats as discussed in Subsection 4.3.1 and shown on Figure 4.3-2. The construction and operation of Fermi 2 did not stimulate substantial industrial growth in Monroe County, and impacts from construction of Fermi 3 are expected to be similar. Land use in the

construction excavation phase. The construction dewatering impact is discussed in Section 4.2. Once details related to construction are determined following final project design, the drawdown impact on groundwater users in the affected area will be further investigated before dewatering is started.

Considering that no discharges to groundwater will occur and the low volume of dewatering required during excavation, with the implementation of mitigation measures discussed in Section 4.6, Fermi 3 construction impacts to groundwater are expected to be SMALL and are not anticipated to affect groundwater use away from the Fermi site.

4.7.3.4 Groundwater Quality

Because of changes in seepage patterns from temporary redirection of surface flows for construction and stormwater runoff control, groundwater recharge may be temporarily reduced during the construction phase of Fermi 3. As building construction and paving progresses, increased runoff and decreased seepage on the developed portion of the site may occur. However, there will be no groundwater discharges, so groundwater quality will not be affected by influents or seepage.

The impact of this reduction in groundwater recharge on groundwater quality is expected to be minimal because the larger area surrounding the construction site will not be affected. Execution of the SESC Plan and its housekeeping elements will limit potential groundwater contamination resulting from the potential seepage of construction materials/supplies into groundwater. Potential contamination of groundwater from Fermi 3 construction activities will be limited by such actions as preventing spills, leaks and material releases under the SESC Plan, the PIPP, appropriate use of chemical storage systems, and frequent inspections of material storage systems.

Combined with existing and proposed activities at the Fermi site and in Monroe County, the cumulative impacts to groundwater quality are expected to be SMALL, and no mitigative measures are needed.

4.7.4 Ecology

The Fermi 3 site layout and construction plan was designed to minimize site-specific and cumulative impacts to the terrestrial ecosystem to the greatest feasible extent while meeting the project purpose. Currently developed and previously disturbed land will be preferentially used wherever practicable. Approximately ~~9.34~~ 10.87 acres of wetlands and 5.18 acres of open water habitats would be permanently impacted.

A 29.4-mile 345 kV transmission line corridor, with an assumed width of 300 feet, between the Fermi site and the Milan Substation is being proposed. Route selection will use already developed land to avoid impacts to terrestrial resources. The land in the transmission corridor is not owned or controlled by Detroit Edison. Accordingly, any impacts would be addressed by ITC *Transmission*. Should any such impacts be unavoidable, mitigation to alleviate the adverse effects would be expected to be provided in coordination with the appropriate land authority (e.g., MDNR) in compliance with applicable regulatory oversight.

There are no other past, present, or known planned actions in Monroe County that involve major effects on wildlife and wildlife habitat similar to those from construction of Fermi 3. Most impacts from construction would be temporary or limited in effect through site management and regulatory compliance mechanisms. American lotus in wetlands affected by construction activities will be subject to future consultation with MDNR to minimize impacts (Subsection 4.3.1.2.1). Construction activities near bald eagle nests, particularly noise, will be limited during the nesting season to reduce the effects of disturbance. Therefore, cumulative impacts to county rare species, plant communities or wildlife will be SMALL, and no mitigative measures are needed.

4.7.4.1 Terrestrial Ecology

The geographic area evaluated for cumulative effects to terrestrial resources (vegetation and wildlife) is the vegetation or species-specific habitat within one mile of the Fermi 3 site and along the offsite transmission corridor. Existing terrestrial resources are described in Subsection 2.4.1, and the potential impacts to these resources are discussed in Subsection 4.3.1. As noted in Subsection 4.3.1, aside from developed or temporarily impacted areas, Fermi 3 construction will impact ~~9.34~~ acres of wetlands. In the region (50-mile radius) there are 910,711 acres of this habitat where the total wetland acreage was derived by combining open water, emergent herbaceous and woody wetland acreage (Table 2.2-7). As a percentage of the regional acreage, approximately 0.001 percent of the total disturbance will be in wetland habitats. These impacts are the minimum needed to satisfy the project need and purpose and impacts will have been reduced by avoiding adverse effects to protected species, wildlife resources, wetlands, and other resources as discussed in Subsection 4.3.1. Construction work is subject to regulatory compliance requirements, which further promotes impact avoidance. Terrestrial resource use in the region will not be dramatically shifted from agricultural to industrial or urban uses because of the addition of another nuclear unit to the Fermi site. Thus, the cumulative impacts to terrestrial resources from construction of Fermi 3 are considered SMALL, and no additional mitigative measures are needed.

10.87

10.87

4.77

6.10

Coastal Emergent Wetlands and other wetlands yet to be identified will be avoided to the extent feasible. Approximately ~~9.34~~ acres of wetland, composed of forested wetland (~~3.57~~ acres), and emergent wetland (~~5.77~~ acres), associated with DRIWR, would be permanently impacted. An additional 5.18 acres of open waters also would be permanently impacted. Wetland acreage filled for Fermi 3 construction may require separate mitigation. Cumulative impacts to wetlands are expected to be MODERATE. The type and extent of wetland mitigation will be determined during the Clean Water Act Section 404 permitting process.

The cumulative impacts from offsite transmission line construction were assessed using desktop research and ground studies. Detroit Edison does not own the offsite ROW and does not control the construction or operation activities in the offsite transmission corridor. Resource agency consultation is expected by ITC *Transmission* during the final stages of offsite transmission route development. This will allow for measures to be taken to avoid or minimize impacts. However, line routing uses already developed lands as much possible, including avoiding protected species, wetlands and other important terrestrial resources wherever feasible. Because wildlife impacts from construction, including wildlife displacement, fugitive dust and noise from construction are

Table 4.8-1 Summary of Construction and Pre-Construction Related Impacts (Sheet 1 of 10)

Section Reference	Potential Impacts and Significance[a]	Estimated Impacts Percentage		Basis for Estimate
		Construction	Pre-Construction	
Section 4.1 Land Use Impacts				
Subsection 4.1.1.1 The Site and Vicinity, Site and Vicinity Land Use Impacts	S – Land Use	10%	90%	Estimates are based on the area of land use that will be dedicated to Structures, Systems and Components (SSC) with a reasonable nexus to radiological health and safety and common defense and security, and meet the criteria in 10 CFR 50.10(a)(1). It is assumed that the construction of SSC's will occur on no more than approximately 25 acres of the project area being developed (i.e., ~~302~~ 301 acres, excluding offsite electric transmission lines)
Subsection 4.1.1.2.1 Local Monroe County and Frenchtown Township Land Use	S – Land Use	10%	90%	Estimates are based on the area of land use that will be dedicated to Structures, Systems and Components (SSC) with a reasonable nexus to radiological health and safety and common defense and security, and meet the criteria in 10 CFR 50.10(a)(1). It is assumed that the construction of SSC's will occur on no more than approximately 25 acres of the project area being developed (i.e., ~~302~~ 301 acres, excluding offsite electric transmission lines)
Subsection 4.1.1.2.2 Agricultural and Soil Issues	S – Land Use	10%	90%	Estimates are based on the area of land use that will be dedicated to Structures, Systems and Components (SSC) with a reasonable nexus to radiological health and safety and common defense and security, and meet the criteria in 10 CFR 50.10(a)(1). It is assumed that the construction of SSC's will occur on no more than approximately 25 acres of the project area being developed (i.e., ~~302~~ 301 acres, excluding offsite electric transmission lines)

DTE000008
3/29/2013

Table 4.8-1 Summary of Construction and Pre-Construction Related Impacts (Sheet 2 of 10)

Section Reference	Potential Impacts and Significance[a]	Estimated Impacts Percentage		Basis for Estimate
		Construction	Pre-Construction	
Subsection 4.1.1.2.3 Federal, Regional, and State Land Use Plans	S – Land Use	10%	90%	Estimates are based on the area of land use that will be dedicated to Structures, Systems and Components (SSC) with a reasonable nexus to radiological health and safety and common defense and security, and meet the criteria in 10 CFR 50.10(a)(1). It is assumed that the construction of SSC's will occur on no more than approximately 25 acres of the project area being developed (i.e., ~~302~~ 301 acres, excluding offsite electric transmission lines)
Subsection 4.1.1.3 The Site and Vicinity, Transportation and Rights-of-Way	S – Land Use	70%	30%	Estimates are based on the area of land use that will be dedicated to Structures, Systems and Components (SSC) with a reasonable nexus to radiological health and safety and common defense and security, and meet the criteria in 10 CFR 50.10(a)(1). Estimates also based on percent of man hours expected to be dedicated to the construction of activities within the definition of construction of SSC as this provides a measure of impacts to vicinity and transportation relative to land use.
Subsection 4.1.2 Transmission Corridors and Offsite Areas, Planning and Zoning	S – Land Use	0%	100%	Activities within transmission corridors are not included within the definition of construction of SSC's.
Subsection 4.1.2.1 Planning and Zoning	S – Land Use	0%	100%	Activities within transmission corridors are not included within the definition of construction of SSC's.
Subsection 4.1.2.2 Transmission Corridors and Offsite Areas, Transportation and Rights-of-Way	S – Land Use	0%	100%	Activities within transmission corridors are not included within the definition of construction of SSC's.

DTE000008
3/29/2013

Table 4.8-1 Summary of Construction and Pre-Construction Related Impacts (Sheet 5 of 10)

Section Reference	Potential Impacts and Significance[a]	Estimated Impacts Percentage		Basis for Estimate
		Construction	Pre-Construction	
Subsection 4.2.2.4 Water-Use Impacts, Water Quality Changes Due to Substratum Exposure	S – Water	25%	75%	Estimates based upon the expected contribution of activities within the definition of construction of SSC's resulting in the discharge of water from the Spoil Disposal Pond and impacts to the intake and discharge areas.
Subsection 4.2.2.5 Water-Use Impacts, Effects of Alterations on Other Water Users	S – Water	95%	5%	Estimates based upon the expected contribution of activities within the definition of construction of SSC's to the need for dewatering.
Section 4.3 Ecological Impacts of Construction				
Subsection 4.3.1.1.1 Vegetation on the Site and in the Vicinity	S – Terrestrial Ecosystems	10%	90%	Estimates are based on the acreage that will be dedicated to Structures, Systems and Components (SSC) with a reasonable nexus to radiological health and safety and common defense and security, and meet the criteria in 10 CFR 50.10(a)(1).It is assumed that the construction of SSC's will occur on no more than approximately 25 acres of the project area being developed (i.e., ~~302~~ 301 acres, excluding offsite electric transmission lines)
Subsection 4.3.1.1.2 Wildlife on the Site and in the Vicinity	S – Terrestrial Ecosystems	10%	90%	Estimates based upon the expected contribution of activities within the definition of construction of SSC's resulting in takes or displacement of wildlife, fugitive dust emissions, bird collisions with elevated construction equipment, pollutant spills, and noise.

DTE000008
3/29/2013

Table 4.8-1 Summary of Construction and Pre-Construction Related Impacts (Sheet 6 of 10)

Section Reference	Potential Impacts and Significance[(a)]	Estimated Impacts Percentage		Basis for Estimate
		Construction	Pre-Construction	
Subsection 4.3.1.2.1 Important Species	S – Terrestrial Species	10%	90%	Estimates are based on the area of land use and potential presence of important species within those areas dedicated to Structures, Systems and Components (SSC) with a reasonable nexus to radiological health and safety and common defense and security, and meet the criteria in 10 CFR 50.10(a)(1). It is assumed that the construction of SSC's will occur on no more than approximately 25 acres of the project area being developed (i.e., ~~302~~ 301 acres, excluding offsite electric transmission lines)
Subsection 4.3.1.2.2 Important Habitats	M – Terrestrial Habitats	5%	95%	Estimates are based on the expected acreage of land delineated as wetlands that that will be dedicated to Structures, Systems and Components (SSC) with a reasonable nexus to radiological health and safety and common defense and security, and meet the criteria in 10 CFR 50.10(a)(1).
Subsection 4.3.1.5 Terrestrial Ecosystems, Transmission Corridors and Other Offsite Areas	S – Terrestrial Ecosystems	0%	100%	Activities within transmission corridors are not included within the definition of construction of SSC's.
Subsection 4.3.2.1 Aquatic Ecosystems, Impacts to Impoundments and Streams	S – Aquatic Ecosystems	25%	75%	Estimates based upon the expected contribution of activities within the definition of construction of SSC's resulting in increased sedimentation and turbidity, increased sediment/silt loads into onsite impoundments, surface drainages, site clearing and grading, loss of vegetated buffer zones, and site dewatering.
Subsection 4.3.2.2 Aquatic Ecosystems, Impacts to Lake Erie	S – Aquatic Ecosystems	5%	95%	Estimates based upon the expected contribution of activities within the definition of construction of SSC's resulting in dredging activities within Lake Erie and dewatering.

5.6.1.4 Wetlands and Floodplains

2.53

In the short new portion of the transmission corridor onsite, minimal impacts to wetlands and floodplains are anticipated. The portion of the onsite transmission corridor parallel to Toll Road will permanently impact approximately ~~1.53~~ acres of palustrine forested wetland. During operation, this area will be maintained as a wetland with lower-height vegetation more typical of an emergent wetland. No transmission towers are expected to be located in the central portion of the drainage area of the onsite transmission corridor. Operation of the onsite transmission corridor is not expected to affect any other wetland areas.

According to Federal Emergency Management Agency (FEMA) Flood Insurance Rate Map 26115C0259D, the area surrounding the majority of the onsite transmission corridor near the onsite drainage area (Berns Drain) is within Zone AE, a special flood hazard area inundated by a 100-year flood (Reference 5.6-9). There is also a portion of the onsite transmission corridor parallel to Toll Road that would fall within Zone X, an area of either 500-year flood or 100-year flood with shallow depth, limited drainage area, or protected by levees. The small areas occupied by the transmission towers in the floodplain would not impact the carrying capacity of the drainage area or the floodplain, and the towers and foundations would be in place as designed for corrosion resistance in periodically flooded conditions in that area of the site.

Maintenance of the onsite corridor is anticipated to be very similar to the offsite corridor maintenance detailed below.

In the offsite portion, 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 hand 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. As noted in Subsection 5.6.1.1, 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 wetlands areas to protect these important resources.

5.6.1.5 Impact of Electromagnetic Fields on Flora and Fauna

Electromagnetic fields (EMF) are unlike other agents that have an adverse impact (e.g., toxic chemicals) in that dramatic acute effects cannot be demonstrated and long-term effects, if they exist, are subtle, according to the NRC's Generic Environmental Impact Statement for License Renewal (GEIS) conclusions (Reference 5.6-7). As discussed in the GEIS, a careful review of biological and physical studies of EMFs did not reveal consistent evidence linking harmful effects with field exposures. Thus the conclusion presented in the GEIS was that the impacts of EMFs on terrestrial flora and fauna were of small significance at operating nuclear power plants, including transmission systems variable numbers of power lines. On this basis, it is concluded that the incremental EMF impacts posed by possible additions of new power lines for the Fermi 3 project would be minimal and mitigation is not anticipated.

likely to be a concern for agricultural producers because most cooling tower drift impacts will be confined to the site, with minimal drift reaching beyond the site property boundary.

5.11.1 Land Use

The geographic area considered for potential cumulative impacts to land use from Fermi 3 operation encompasses a 7.5-mile area centered on the Fermi site (Figure 2.1-2).

Cumulative impacts to land use include new development to accommodate workers and worker-related services. Development would result in land conversion from forested and agricultural land to various development types, such as housing, gas stations and shopping centers. Impacts from general work force changes are expected to be minor since the operations work force is expected to relocate from a wider area than Monroe County, which may include the metro regions of Detroit, Michigan and Toledo, Ohio. Because the work force will be dispersed over these larger cities in the labor supply region, the induced impacts on land use (from operations of a new unit at the Fermi site) can be easily absorbed within the surrounding region. The exception is the vicinity of the Fermi site. Historically, the area contained within the Fermi site was agricultural and undeveloped lands undergoing slow development. Therefore, cumulative impacts would accrue with more effect, positive or negative, within Frenchtown Township nearest the Fermi site.

As discussed in Subsection 4.1.1, approximately ~~155~~ 154 acres of the Fermi site will be permanently occupied by facilities associated with Fermi 3 until the unit is decommissioned. The existing Fermi 2 facility occupies 172 acres, including the remaining Fermi 1 structures. Proposed operation of Fermi 3 will contribute to changing land use within the Fermi site. Fermi 3 operation is not likely to encourage offsite industrial or urban development on a scale similar to Fermi 2, in part because of county and township zoning, which favors preservation of agricultural and rural land use. No large-scale industrial or commercial projects are planned near the Fermi site. Following construction of Fermi 2, Monroe Country did not experience increased development and similar results are expected for Fermi 3. Fermi 3 has a projected commercial in-operation date of 2020, which will spread any projected impacts over a greater length of time, making it less likely to have any discernible cumulative impacts. Because Fermi 3 construction will comply with all applicable county and township land use and zoning regulations, the cumulative impacts from Fermi 3 operation are anticipated to be SMALL.

As noted in Subsection 2.2.2.2, an ITC *Transmission* study has indicated that a separate switchyard and three new transmission lines will be needed for power output from the proposed Fermi 3. It is assumed that the existing Milan Substation may be expanded from its current size of 350 by 500 feet to an area approximately 1,000 by 1,000 feet to accommodate the addition of the three new transmission lines. This expansion would be into maintained grass and agricultural areas. The proposed expansion of the transmission corridor would affect predominately agricultural or forested land along the approximate 29.4-mile route.

The new transmission route would pass through Monroe, southwest Wayne, and southeast Washtenaw Counties along an assumed 300-foot wide corridor currently used or previously characterized for transmission purposes, thereby avoiding environmentally sensitive areas, such as population concentrations, National Forest lands, military installations, large bodies of water, wildlife

9.2.3.1 Coal-Fired Generation

In general, the environmental impacts of constructing a typical coal-fired power plant are well known because coal, as discussed earlier, is the most prevalent type of central generating technology in the United States. The impacts of constructing a large coal-fired power plant at a "greenfield" site can be substantial, particularly if it is sited in a rural area with considerable natural habitat (Reference 9.2-2).

9.2.3.1.1 Land Use and Related Impacts to Ecology

301

Since this alternative would involve new construction, one key environmental impact area is land use. In Reference 9.2-2 it is estimated that approximately 1700 acres would be needed for a 1000 MWe coal-fired power plant. This estimate would be scaled up for the approximately 1600 MWe capacity of the proposed coal-fired alternative (i.e., 2720 acres), which is considerably larger than that required for Fermi 3 (approximately ~~302~~ acres total, including permanent and temporary impacts). The Fermi site is approximately 1260 acres total, as noted in Section 2.2. Thus, the current site would not support a comparable sized coal-fired power plant.

Since large quantities of coal and lime (or limestone) would be delivered via rail line, new construction would be required to support railcar turnaround facilities. Given the substantial land use (relative to Fermi 3), the associated impacts related to land clearing, erosion and sedimentation, air quality from construction vehicles, impact to the ecology, etc., would be proportionally much greater for the coal-fired alternative.

In Reference 9.2-2, it is estimated that approximately 22,000 acres would be affected for mining the coal and disposing of the waste to support a 1000 MWe coal-fired power plant during its operational life. Thus, the equivalent land usage requirement for 1600 MWe coal-fired production would be approximately 35,200 acres. In contrast, based on estimates discussed in Reference 9.2-2, uranium mining and processing required to supply fuel during the operating life of a nuclear facility of 1600 MWe capacity would be approximately 1600 acres.

9.2.3.1.2 Waste Generation and Emissions

It is assumed that the new coal-fired power plants would primarily use western sub-bituminous coal – similar to the current fleet of Detroit Edison coal-fired power plants. It is estimated that the proposed power plant would consume approximately 7 million tons/yr of pulverized sub-bituminous coal with corresponding ash content (determined from information in Reference 9.2-14 for Detroit Edison historical coal usage versus power generation). Lime or limestone, used in the scrubbing process for control of sulfur dioxide emissions, is injected as a slurry into the hot effluent combustion gases to remove entrained sulfur dioxide. The lime-based scrubbing solution reacts with sulfur dioxide to form calcium sulfite, which precipitates and is removed from the process as sludge.

As discussed in Reference 9.2-27, coal combustion products (CCP) are among material targeted by the U.S. Environmental Protection Agency (EPA) Resource Conservation Challenge (RCC). The RCC is designed to facilitate changes in the economics and practice of waste generation,

9.2.3.1.7 Coal-Fired Generation Conclusion

In conclusion, as discussed above, coal-fired generation is not expected to be an environmentally preferable alternative. This conclusion is based on significantly increased air emissions and land usage requirements.

9.2.3.2 Natural Gas-Fired Generation

The environmental impacts of the natural gas-fired alternative are examined in this subsection, considering both the Fermi site and an unnamed alternate site. The analysis assumes a closed-cycle cooling system since the once-through system is considered to have greater overall environmental impacts (for reasons discussed in the preceding analysis of the coal-fired alternative).

9.2.3.2.1 Land Use and Related Impacts to Ecology

As reported in Subsection 2.2.1.2.7, the closest natural gas pipeline is approximately 10 miles west of the Fermi site. Thus, for the case in which the natural gas-fired power plant is built at (or near) the Fermi site, there would be an associated considerable impact related to pipeline construction. For the purposes of this assessment, without performing more detailed evaluations of pipeline capacity, it is assumed that the capacity of this closest pipeline would be sufficient. This provides a conservative assessment as this assumption minimizes the potential land use and ecological impacts.

In Reference 9.2-2, it is estimated that approximately 110 acres would be needed for a 1000 MWe natural gas-fired power plant. This estimate would be scaled up for the approximately 1600 MWe capacity of the natural gas-fired alternative, resulting in 176 acres. The natural gas-fired power plant likely could be sited on the Fermi site on land that was previously disturbed in the construction of Fermi 1 and 2 and on land previously not disturbed. From Reference 9.2-18, approximately 100 acres would be impacted by a new five mile gas pipeline. Thus, the 10 miles of new pipeline need to locate a natural gas-fired power plant at the Fermi site would impact an additional 200 acres. Thus, the total land use commitment (for siting the natural gas-fired power plant at the Fermi site) would be approximately 376 acres.

154

Fermi 3 is expected to require approximately ~~155~~ acres. Thus, the natural gas-fired power plant's footprint (if sited at the Fermi site) is larger than the Fermi 3 land use (176 acres vs. ~~155~~ acres). This does not include land impacted by transmission changes. Impacts to transmission will be similar for either the natural gas-fired power plant or Fermi 3. As the land permanently impacted for either a natural gas-fired power plant or the proposed project is approximately equivalent, the impacts to wildlife would also be approximately equivalent. Therefore, in sum from this perspective, the natural gas-fired power plant would not be considered environmentally preferable to Fermi 3.

154

In addition to the use of ~~155~~ acres for permanent structures for Fermi 3, up to approximately 147 additional acres could be affected (temporarily) during construction of Fermi 3. Land used temporarily during construction would be subject to standard mitigation procedures to minimize impact. Appropriate measures would also be taken to restore the land, and long-term impact is not

154

Table 10.1-1 Unavoidable Adverse Environmental Impacts of Construction (Sheet 1 of 5)

301

Impact Category	Adverse Impact	Potential Actions to Mitigate Impacts	Unavoidable Adverse Impact
Land Use	Construction of new buildings and impervious surfaces clears vegetation, disturbs area soils, and increases stormwater runoff. Soils are stockpiled onsite. Land is not available for other uses. Many of these impacts continue into the operational phase.	Limit ground disturbances to the smallest amount of area practical to construct Fermi 3 (approximately ~~302~~ acres). Use Best Management Practices (BMPs) and minimize footprint of the designated construction area. 301 Restrict soil stockpiling and reuse to designated areas within the construction footprint on the Fermi site. Conduct ground-disturbing activities in accordance with permit requirements. Implement erosion control measures described in the Fermi 3 Soil Erosion and Sedimentation Control (SESC) Plan. Limit vegetation removal to those areas designated for construction activities. Restore temporarily disturbed areas to allow their inclusion in the Detroit River International Wildlife Refuge on the Fermi site. The material to be dredged will be disposed in the onsite Spoil Disposal Pond, which is isolated from the surrounding environment. If it becomes necessary to remove the dredged material from the Spoil Disposal Pond, the dredged material would be subjected to chemical analysis to ascertain if the material can be disposed via land application or if an alternate disposal method is required.	Disturbance of ~~302~~ acres of land occupied by one ESBWR unit and ancillary structures. Mitigation measures allow most of this land to return to its pre-disturbed state. Much of the land is currently dedicated to Fermi 1 and 2 uses.

Table 10.1-2 Unavoidable Adverse Environmental Impacts of Operation (Sheet 1 of 4)

154

Impact Category	Adverse Impact	Mitigation Measures	Unavoidable Adverse Impact
Land Use	Commitment of approximately 155 acres for uses related to Fermi 3 onsite , and 1069 acres within the offsite transmission corridor.[1] This impact will occur for the operational life of Fermi 3.	The major plant structures are located, for the most part, on areas that were environmentally altered for construction and operation of Fermi 1 and Fermi 2. Uses are consistent with land use plans. Some of the disturbed land is revegetated following construction and after maintenance activities in the corridor.	Continued commitment of land use for the operational life of Fermi 3.
	Operation of Fermi 3 increases radioactive and nonradioactive wastes that are stored onsite (temporarily) and disposed of in permitted disposal facilities or landfills. Mixed waste generation and disposal occurs long-term through operation.	The established waste minimization program minimizes waste.	Land dedicated for the disposal of Fermi 3 waste is not available to other uses. This effect is long-term.
	New Independent Spent Fuel Storage Installation (ISFSI) for Fermi 3 will increase quantity of spent fuel storage onsite.	The ISFSI is sited to minimize radiation exposure to plant staff.	Land dedicated for spent fuel storage is not available to other uses for the operational life of Fermi 3.
	The cooling tower is visible from nearby locations and constitutes a small visual impact. The transmission corridor also constitutes a small visual impact.[1] These impacts occur through the operational phase.	Station operation does not contribute an additional impact to the viewshed, and no measures or controls are necessary.	The viewshed continues to be impacted over the operational phase but no more so than at the present.
	Archeological sites could be obscured or damaged through ground-disturbing activities related to operation and maintenance. This potential exists through the operational phase.	The shoreline is sensitive for archaeological resources. Shoreline stabilization may be required if NRHP-eligible archaeological resources are encountered during station operation. Continued station operation is unlikely to impact significant archaeological sites, and no measures or controls are necessary.	Minimal or no unavoidable adverse impacts.

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10.2 Irreversible and Irretrievable Commitments of Resources

This section describes the expected irreversible and irretrievable environmental resources used during construction and operation of Fermi 3. Environmental resources are considered "irreversible" when they are changed by the construction or operation of Fermi 3 and cannot be restored at some later time to the resource's pre-construction or pre-operation state (such as the permanent use of land). Irretrievable resources are generally materials (such as petroleum) that are used for Fermi 3 in such a way that the materials could not be, by practical means, recycled or restored for other uses.

Impacts from construction and operation of Fermi 3 will be similar to that of any major construction project, and the expected loss of resources used in construction is anticipated to be of small consequence with respect to the availability of such resources. The main resource irretrievably committed by operation of Fermi 3 is uranium, which is available in sufficient quantities such that the irreversible and irretrievable commitment of uranium would be of small consequence. The irreversible and irretrievable commitments of resources and materials resulting from construction and operation of Fermi 3 are discussed below and summarized in Table 10.2-1.

10.2.1 Irreversible Environmental Resource Commitments

Irreversible environmental commitments resulting from construction and operation of Fermi 3 encompass the following:

- Land Use Productivity
- Alteration of Terrestrial and Aquatic Habitat and Biota
- Socioeconomic Changes
- Degradation of Water and Air Quality
- Resource Commitments of the Uranium Fuel Cycle

10.2.1.1 Land Use Productivity

154

As described in Chapter 4 and Chapter 5, construction and operation of Fermi 3 temporarily and permanently modifies land uses on the Fermi site. Land uses onsite and in the transmission corridor are committed to Fermi 3 facility and electrical transmission uses, and are largely unavailable for other uses. Approximately ~~155~~ acres from Fermi 3 are lost to other uses until after decommissioning of Fermi 3 (Fermi 2 occupies approximately 172 acres). Once Fermi 3 ceases operations and is decontaminated and decommissioned in accordance with U.S. Nuclear Regulatory Commission (NRC) requirements, the land that supports the facilities may be returned to other industrial or non-industrial or similar uses.

Fermi 3 generates radioactive, chemical, and nonhazardous waste during operations that requires storage and disposal. Chemical wastes are accumulated onsite and transferred offsite to licensed/permitted facilities. Hazardous, mixed, and radioactive wastes are disposed of in permitted landfills or facilities. An irreversible commitment of land occurs because this land cannot be used for other purposes.

10.2.1.2 Alteration of Terrestrial and Aquatic Habitat and Biota

Construction activities disrupt or destroy flora and fauna in areas of and adjacent to the Fermi 3 site and the associated transmission corridor. As discussed in Section 4.3, approximately 26 acres (temporary) and 19 acres (permanent) of the Lagoona Beach Unit of the Detroit River International Wildlife Refuge (DRIWR) will be affected by construction. Fermi 3 construction activities will permanently convert ~~9.34~~ 10.87 acres of wetland and 5.18 acres of open water to Fermi 3 uses, which constitutes an irreversible commitment of resources. Fermi 3 construction activities will temporarily impact 23.75 acres of wetlands (including 0.08 acre of open water) that could return to their pre-construction condition.

American lotus specimens that occur within the south canal will be affected by the construction of the Fermi 3 cooling tower. The American lotus will be subject to a construction mitigation strategy to be established through consultation with MDNR, as discussed in Subsection 4.3.1.2.1. Specific plants that perish during transplanting, or specimens located below-ground that are not identified for transplanting and consequently perish during construction, will be irreversibly committed. Healthy populations of American lotus, however, exist across this area of Michigan.

Minimal impact on mammals, reptiles, and aquatic species occur during construction and operation of Fermi 3. Although losses of these individual species represent an irreversible commitment of resources, the overall populations of terrestrial and aquatic biota will remain healthy at the site and in the region.

10.2.1.3 Socioeconomic Changes

Short-term and long-term changes in the population and the local socioeconomic structure of Monroe County, and perhaps neighboring counties, will occur as a result of Fermi 3. Construction and operation of Fermi 3 will lead to an increase in population of these areas, which in turn, will spur increased housing construction and increased tax revenue. Impacts to infrastructure, schools, and community services will be mitigated by using the increased tax revenue to fund necessary improvements. Changes in noise levels, traffic congestion, and crime rates may only be partially mitigated resulting in potentially long-term changes in the overall community character.

10.2.1.4 Degradation of Water and Air Quality

In order to minimize environmental impacts, Detroit Edison intends to operate Fermi 3 as a zero-release radioactive liquid effluent plant. However, Fermi 3 will be configured for monitored radioactive liquid effluent releases, should it become necessary. Such releases will be in compliance with all applicable regulations and all necessary permits will be obtained.

Water quality can become slightly degraded as treated effluents containing small quantities of chemical and radioactive constituents enter area surface waters. Some chemical constituents are easily broken down and dissipate quickly; however, others may persist for longer periods of time. Radionuclides also vary in how long they remain in an area, depending on their half-life and total suspension time in the air.

Table 10.3-1 Comparison of Short-Term Uses to Long-Term Productivity (Sheet 1 of 3)

	Short-Term Uses and Benefits	Relationship to Maintenance and Enhancement of Long-Term Environmental Productivity
Land Use	The construction and operation of Fermi 3 would preclude these lands from being available for other uses.	Construction and operation of Fermi 3 does not necessarily represent a long-term impact to productivity of the human environment as the land might be available for other uses after the nuclear facility is decommissioned.
	The construction and operation of a new transmission route[1] offsite would convert 242 acres of agricultural land use and wildlife habitat. The construction and operation of a new onsite ~~tranmsission~~ route would convert approximately ~~5.9~~ 6.1 acres of wildlife habitat.	The construction and operation of new transmission lines does not result in any significant impact to agricultural land use or wildlife impact. New transmission lines will use existing transmission corridor infrastructure to the maximum extent possible. The acreage might be available again for agriculture production and wildlife habitat if the transmission lines are decommissioned upon decommissioning of the nuclear facility.[1]
Hydrological and Water Use	Construction is expected to require an anticipated maximum quantity of 600,000 GPD from Lake Erie. The water withdrawal from Lake Erie for the operation of Fermi 3 is approximately 34,000 gpm. The Frenchtown Township, which obtains its water from Lake Erie, will be the source of potable water for Fermi 3. The daily potable water consumed during construction is approximately 8700 gallons per day. Construction of the building foundations will require dewatering of groundwater.	The consumptive use of water during construction and operations does not result in any significant long-term impacts to water resources. Upon decommissioning of Fermi 3, the water would be available for other uses. Dewatering activities will not affect the long-term productivity of the groundwater aquifer. Dewatering is a temporary activity.

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total generation costs for coal-fired and natural gas-fired plants. The impact is more significant for coal-fired than for natural gas-fired generation due to the higher levels of carbon emissions associated with coal-fired generation. To summarize, as shown in Reference 10.4-2, the total generation cost associated with nuclear power is equivalent to, or lower, than other baseload load fuel sources, especially when additional costs associated with carbon emissions are included.

Measures to control adverse impacts related to operation are discussed in Section 5.10. There are monetary costs associated with the design and implementation of these measures which include such activities as training employees in environmental compliance and safety; treatment, storage, and disposal of any chemical wastes generated; and acquisition and compliance with required operational permits and environmental requirements.

10.4.2.2 **External Costs**

This discussion describes the external (non-monetary) environmental and social costs of constructing and operating Fermi 3. The environmental impacts of construction and operation of Fermi 3 are described in Section 4.6 and Section 5.10, respectively. Section 10.1 also provides details regarding potential mitigation and the unavoidable adverse impacts after mitigation measures have been considered. Several mitigation measures would be built into the project design, such as scheduling to ensure that construction is completed in the shortest possible time; using construction best management practices to limit erosion, fugitive dust, runoff, spills and air emissions; and providing first-aid stations at the construction site.

10.4.2.2.1 **Land Use**

42

Approximately ~~43~~ acres will be affected by the construction of Fermi 3 as a result of permanent facilities. An additional 147 acres will be disturbed on a short-term basis as a result of temporary activities and construction of temporary facilities and laydown areas. Clearing and removal of trees growing within the Fermi site will be required. Loss of land use is an external cost of the construction of Fermi 3. A detailed description of land use is provided in Section 4.1. As discussed in Subsection 9.2.3, the cost in land use for a nuclear-powered generating plant is about the same as that for a natural gas-fired power plant and less than that for a coal-fired power plant of comparable generation capacity. As discussed in Subsection 9.2.3, when overall land use requirements are considered, the cost in land use for a nuclear-power generation plant is less than that for both a coal-fired and natural gas-fired plant.

10.4.2.2.2 **Hydrological and Water Use**

Section 4.6 and Section 5.2 describe hydrologic alterations for construction and operation, respectively. As discussed in these sections, there are costs associated with providing water for various needs during construction and operation. The majority of water used for Fermi 3 operations would be surface-water drawn from Lake Erie. This water use represents only a small fraction of available water and is judged to be SMALL. There are also costs associated with potable water consumption that will be provided by the Frenchtown Township. Use of surface-water by the site should not impact off-site users in terms of either water availability or water quality. Relatively small levels of non-radioactive and radioactive effluents are introduced into Lake Erie (after treatment). It

Table 10.4-2 Internal and External Costs of Fermi 3 (Sheet 1 of 2)

Category of Cost	Description of Cost
Internal Costs	
Construction (Overnight Cost)	$3000 to $4000 per kW
Operation	$6.83 per MW-hr for O&M $4.64 per MW-hr for fuel cycle
Decommissioning (NRC Minimum)	$518,033,205
External Costs	
Land and Land Use	SMALL Fermi 3 will occupy approximately ~~155~~ 154 acres of the 1260 acres existing Fermi site.
Hydrological and Water Use	SMALL There are some costs associated with providing water for various needs during construction and operation. Cooling water will be taken from Lake Erie. Relatively small levels of chemical and/or radioactive effluents will be introduced into Lake Erie. Thermal plume resulting from cooling water blowdown will be discharged to Lake Erie. The effect of consumption of cooling water is relatively small.
Terrestrial and Aquatic Species	SMALL Some cost to wildlife due to mortality during construction operations is anticipated. However, these costs do not affect long term wildlife populations. Wildlife mortality, including aquatic biota, during operations is expected to be minimal.
Radioactive Effluents and Emissions	SMALL Radioactive waste will be generated. The plant will produce radioactive air emissions. Relatively small levels of radioactive effluents may be introduced into Lake Erie.
Chemical and Radioactive Waste	SMALL Storage, treatment, and disposal of high-level radioactive spent nuclear fuel. Commitment of underground geological resources for disposal of radioactive spent fuel.

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Enclosure 1

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