4906-4-05 Electric Grid Interconnection

(A) INTERCONNECTION TO THE REGIONAL ELECTRIC POWER SYSTEM

The Project will deliver power to the electrical grid via interconnection with a 138-kV FirstEnergy transmission circuit and two 345-kV FirstEnergy transmission circuits, all located approximately 1,200 feet north of the Project Site. To accommodate the Project's interconnection, a Utility Switchyard (a new 3-breaker 138-kV ringbus) will be constructed and the Lallendorf Switchyard (an existing 5-breaker 345-kV ringbus) will be upgraded by adding a sixth 345-kV breaker. The switchyard locations are south of the FirstEnergy ROW into which the ringbuses will connect (Figure 05-1).

Each of the three power generators (the two CTGs and the STG) will have three generator leads. Power generated by one of the CTGs and the STG will be "stepped up" to 345 kV prior to being conveyed to the existing 345-kV Lallendorf Switchyard, in which a sixth breaker will be constructed. Power generated by the other CTG will be "stepped up" to 138-kV prior to be conveyed to the new off-site 138-kV Utility Switchyard.

The 345-kV interconnection will extend approximately 0.5 mile between the on-site collector bus and the sixth breaker that will be constructed in the Lallendorf Switchyard. The proposed route, illustrated in Figure 05-1, will exit the Project's on-site collector bus to a double-circuit, monopole structure (P1; Figure 05-2) shared with the 138-kV connection and will extend northeast, above the Norfolk Southern railway, to a dead-end tandem monopole structure (P2; Figure 05-3). The 345-kV connection will continue to the northeast to a single-circuit, monopole turning structure (P3; Figure 05-4) then turn approximately 90 degrees to the northwest to cross above Johlin Ditch. In order to cross under the existing FirstEnergy transmission lines, the 345-kV connection will use two H-frame dead-end structures (P4 and P5; Figure 05-5) then continue west to a single-circuit monopole turning structure (P6; Figure 05-4) before turning 90 degrees to the south and entering the Lallendorf Switchyard. Given the short distance of this interconnection, no reasonable alternatives have been identified.

The 138-kV interconnection will stretch approximately 0.2 mile between the on-site collector bus and the new 138-kV Utility Switchyard, proposed on 1 acre within the Electrical Interconnection Property. The proposed route, illustrated in Figure 05-1, will exit the on-site collector bus to the shared double-circuit, monopole structure referenced above, continuing with the 345 kV lines to cross above the Norfolk Southern railway to the shared dead-end tandem monopole. From there, the two routes diverge, and the 138-kV connection will turn 90 degrees to the east to a single-circuit, monopole structure (P7; Figure 05-6) before turning 90 degrees to the north and entering the Utility Switchyard. Given the short distance of this interconnection, no reasonable alternatives have been identified.

Access associated with the electrical interconnection will be determined in consultation with FirstEnergy; several potential access road options are shown on Figure 05-1. The gravel access road will lie within a 100-foot easement, and will be approximately 20-feet wide. Depending upon the option selected, either one or two ditch crossings will be required. Appropriate culvert sizing and authorization by the USACE will be obtained for the selected option, and other appropriate environmental studies (e.g., cultural resource investigations) will be completed prior to construction.

Tie-in to the regional grid will be the responsibility of FirstEnergy, and final design of the proposed electrical interconnection will depend on guidance from FirstEnergy.

(B) INTERCONNECTION REQUEST

(1) Feasibility Study

System interconnection studies have been initiated with PJM for 955 MW with the input of FirstEnergy and PJM. The PJM Feasibility Study was completed in June 2016 (Appendix C). As a result, the Project was assigned queue position AB1-107.

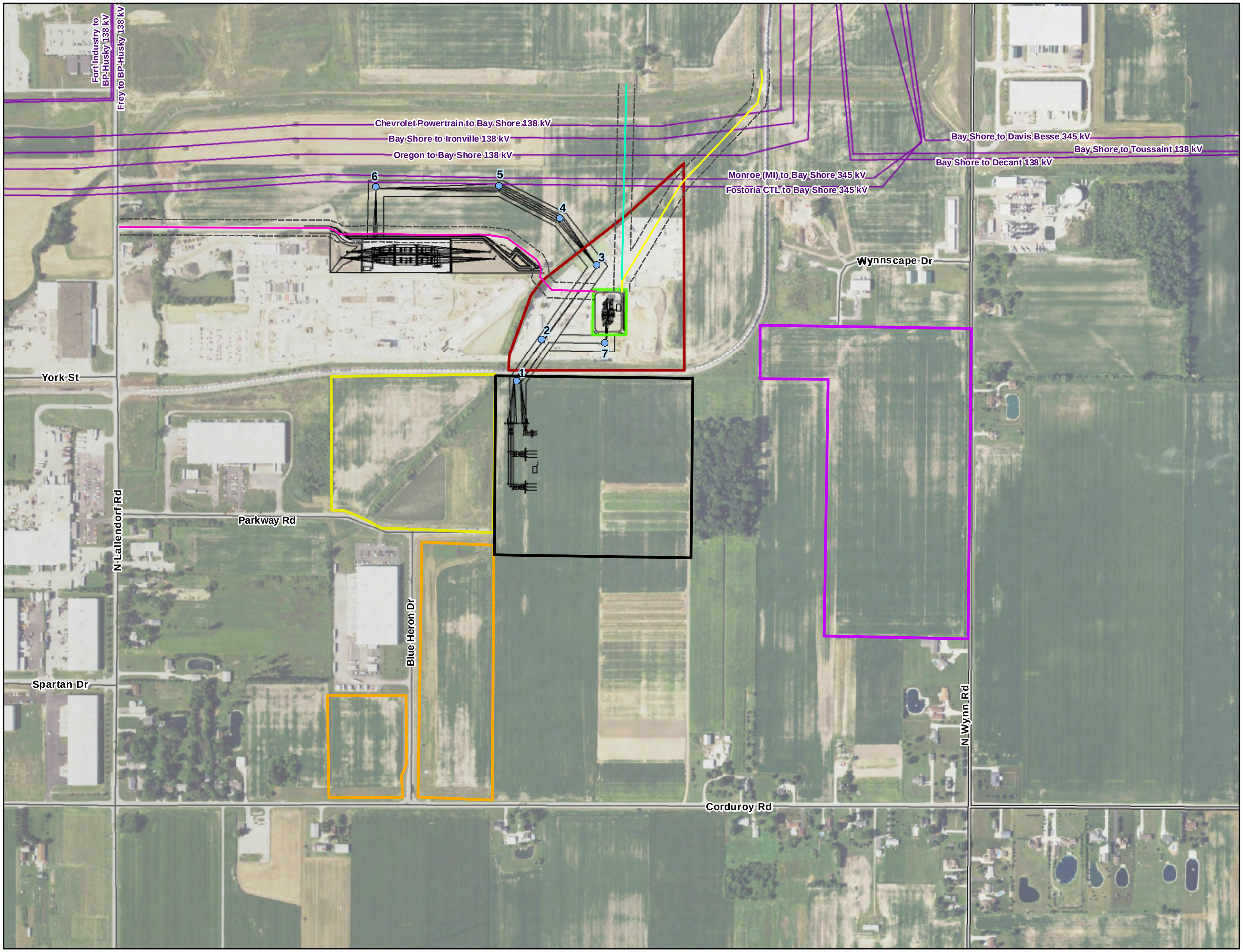
(2) System Impact Study

The second step in the PJM 3-step interconnection evaluation process, the System Impact Study, was initiated with PJM in July 2016. Completion of the System Impact Study is anticipated in April 2017. This information will be provided to OPSB staff once available, and will also be available through the PJM website (http://pjm.com/planning.aspx).

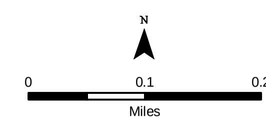
Section 4906-4-05: Figures

Figure 05-1
Proposed
Electrical Interconnection

Oregon Energy Center
Lucas County, Ohio



Legend
- Project Site
- Electrical Interconnection Property
- Eastern Laydown Area
- Southern Laydown Area
- Western Laydown Area
- Utility Switchyard
- Access Option #1
- Access Option #2
- Access Option #3
- Access Road Easement
- Pole
- Existing Transmission Lines
- Major Road
- Local Road



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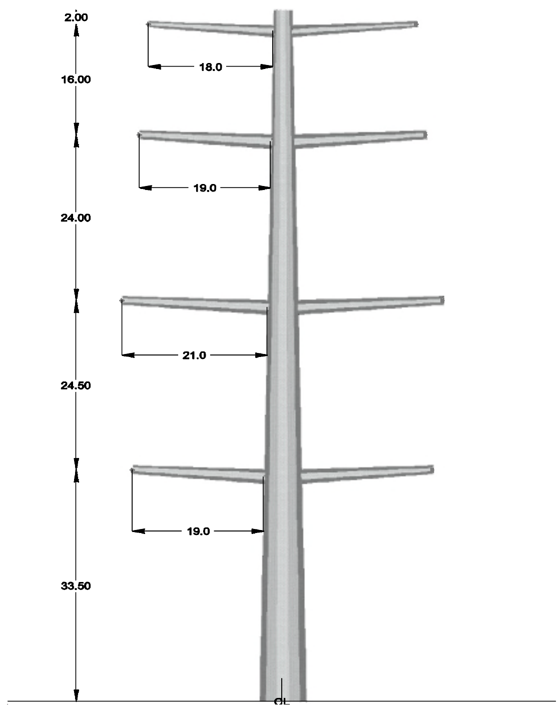
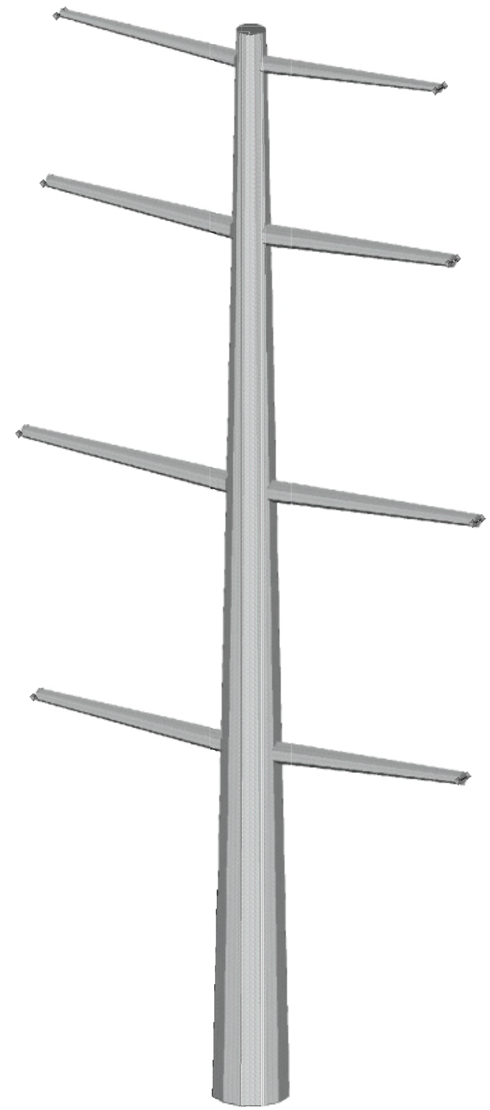
Plan



Longitudinal

Transverse



Isometric

A	ISSUED FOR REVIEW	SWL	AJB	JPM	02/24/17
REV.	REVISION DESCRIPTION	DRAWN	CHECKED	APPROVED & DATE	

REALTIME Utility Engineers INCORPORATED
A QUANTA SERVICES COMPANY

2908 Marketplace Drive
Fitchburg, Wi. 53719
608-906-7800 Direct
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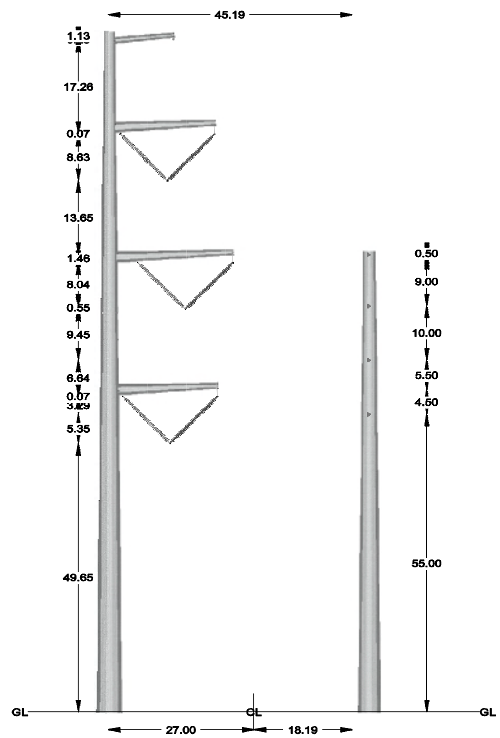
www.realtimeutilityengineers.com

ENGINEER:	SWL	
DESIGNER:		
DRAWN:	SWL	DATE
CHECKED:	AJB	02/17
APPROVED:	JPM	02/17

Figure 05-2
Typical Structure: 345-kV Dead-End Double-Circuit Monopole Structure

Oregon Energy Center
Lucas County, Ohio

Plan



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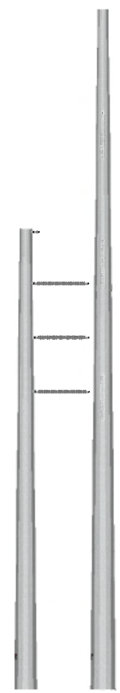

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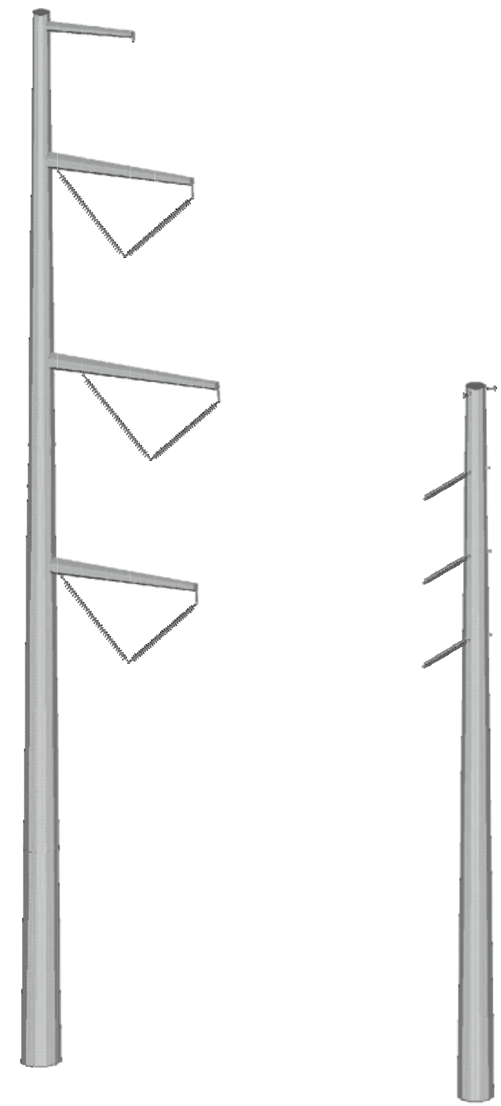

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Figure 05-3
Typical Structure: 138/345-kV Dead-End Tandem Structure

Oregon Energy Center
Lucas County, Ohio

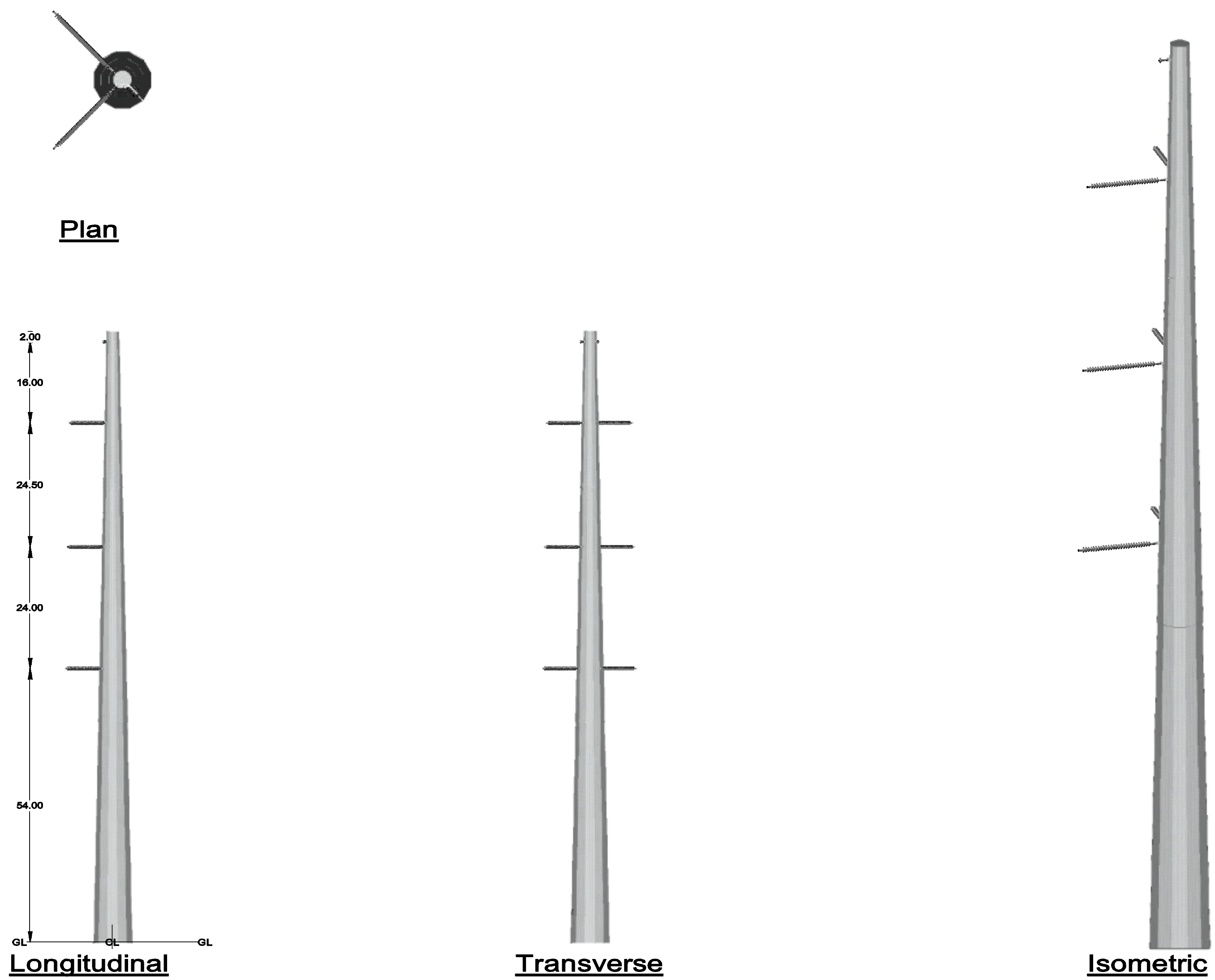

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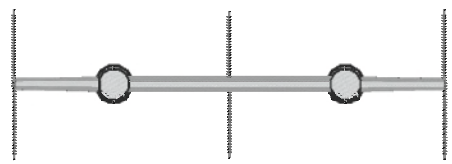
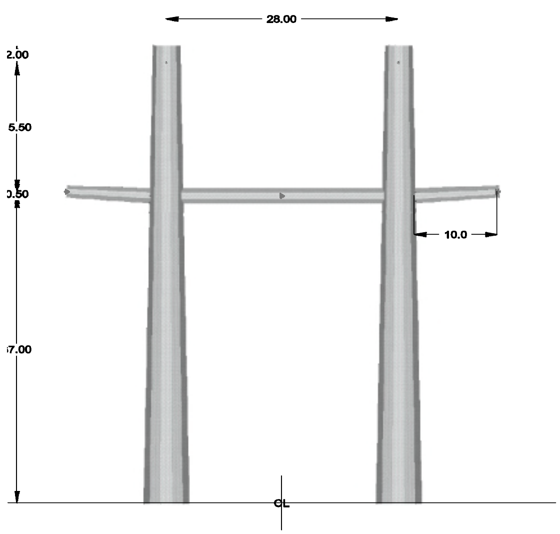
Figure 05-4
Typical Structure: 345-kV Dead-End Single-Circuit Monopole Turning Structure

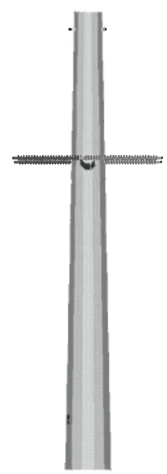
Oregon Energy Center
Lucas County, Ohio



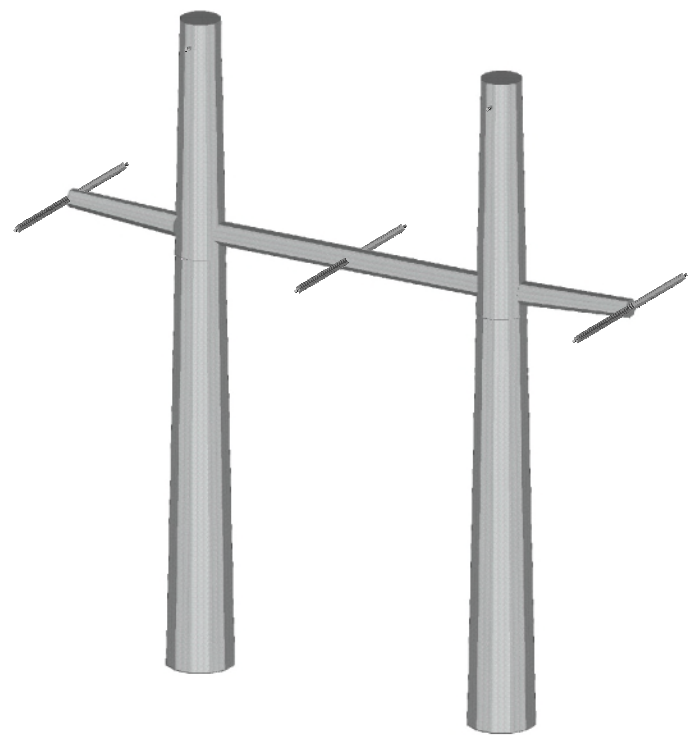
Plan



Longitudinal



Transverse



Isometric

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Figure 05-5
Typical Structure: 345-kV H-Frame Dead-End Structure

Oregon Energy Center
Lucas County, Ohio

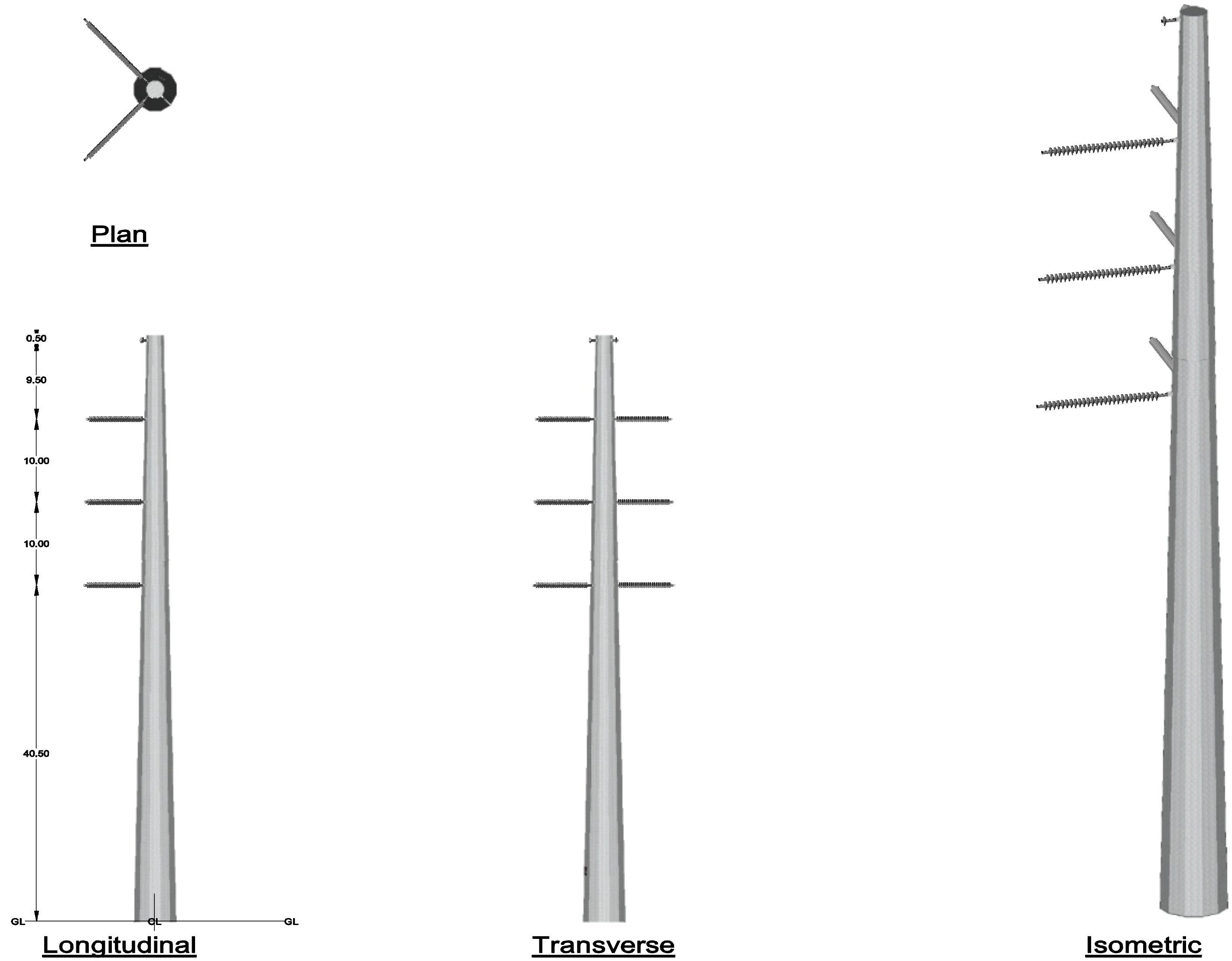

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Figure 05-6
Typical Structure: 138-kV Dead-End Monopole Structure

Oregon Energy Center
Lucas County, Ohio

4906-4-06 Economic Impact and Public Interaction

(A) OWNERSHIP

CEF-O will develop, construct, own, and operate the proposed Project. CEF-O has an option to purchase the approximately 30-acre property on which it proposes to construct the Project. CEF-O will own all the equipment, structures, and on-site improvements associated with the Project. Nine non-contiguous, nearby parcels, totaling approximately 88 acres, are available for use as construction laydown and parking, and a 20-acre area north of the Project Site has been optioned for the Project's utility ringbus. Land will either be purchased or easement agreements will be negotiated for the electrical interconnection.

(B) CAPITAL AND INTANGIBLE COSTS

(1) Estimated Capital and Intangible Costs

Table 06-1 presents cost information using Generally Acceptable Accounting Principles accounting format.

TABLE 06-1
ESTIMATED CAPITAL AND INTANGIBLE COSTS

Description	Cost ($1,000)
Engineering, Procurement, Construction	655,000
Transmission Interconnection Costs	16,500
Project Development Costs	28,700
Land	1,500
Project Financing Costs	156,700
Total ($898 per kW)	**858,000**

(2) Capital Cost Comparison

Within the recent past, a number of large-scale combined cycle power projects have been successfully financed by non-utility entities, throughout PJM. Due to multiple factors, including unique local economic conditions, specific Project modifications and timing of equipment purchases, CEF-O estimates that the PJM regional range of combined cycle combustion turbine costs would vary from $760 million ($950 per kW) to $960 million ($1,200 per kW). Therefore, the Project's all-in capital cost (including financing-related costs) of $898 per kW is clearly within the range of similar large-scale combined cycle plants.

(3) Present Worth and Annualized Capital Costs

No Project configuration alternates are presently being considered and, thus, no comparison can be developed.

(C) OPERATION AND MAINTENANCE EXPENSES

(1) Estimated Annual Operation and Maintenance Expenses

CEF-O estimates that the fixed and variable annual operation and maintenance (O&M) expense for the Project's partial calendar year in operation (2020) will be approximately $14.1 million. Commercial operation is currently expected to occur in the summer of 2020, so that expenses for that year reflect only 6 months of operation. In 2021, the Project's first entire calendar year in operation, the estimated O&M expense will be $28.8 million. However, neither of these expense estimates includes the cost of fuel or major overhauls required by the Project machinery. Using a conservative dispatch estimate of 86 available hours in 2020 and 2021, the sum of all O&M annual expense corresponds to an expected $3.92 per megawatt-hour (MW-hr). Due to the unique features of a particular combined cycle project, the variable O&M costs, when coupled with the large amount of fixed costs associated with operation, can result in a total O&M value expressed as costs per MW-hr that can vary slightly from location to location.

The amount, and thus cost, of natural gas that will be utilized by the Project is a function of both the net heat rate and the percentage of the annual hours in a given year that the Project will be run, or "dispatched." Assuming a conservative 86 percent annual average dispatch rate and a 2020 delivered gas price of $2.80/MMBtu, the annual cost of purchasing natural gas, including transportation to the Project Site, will be approximately $131 million (on a full-year basis).

(2) Operation and Maintenance Expenses Comparison

As discussed in Section 4906-4-06(B)(2), using publicly available data, CEF-O estimates that annual, non-fuel fixed and variable O&M expenses range from $4.25 per MW-hr to $5.25 per MW-hr, depending in large part on the forecasted plant dispatch, local economic conditions, and specific facility characteristics. With consideration of these influences, the Project is anticipated to perform well within this given range of expected plant costs. This fact has been confirmed by an in-depth independent dispatch analysis by Leidos (Washington, D.C.). Their analysis shows that the favorable economics of the Project, coupled with its low net heat rate and scale, will push the Project to surpass other combined cycle gas turbines in PJM with its dispatch factor above 90 percent during summer on-peak hours and conservatively projected above 86 percent dispatch year-round.

(3) Present Worth and Annualized Operation and Maintenance Expenses

CEF-O is not considering any alternate O&M regime or Project technology configurations at this time.

(D) COST OF DELAYS

A portion of the initial annual Project energy revenues are associated with commercial operation during both the summer and winter months, a period of the year when energy use is sizeable. Any cost associated with a delay of operations would primarily be the result of summer energy and capacity revenue opportunities. Each of those summer months has an estimated lost revenue value of $21.8 million per month.

Delay also adds unnecessary Project costs, such as: storage and double-handling costs for major equipment slated for the Project; interest costs on funds used to purchase major equipment; higher risk for increases in cost of construction debt; and cost increases associated with general construction.

It is critical that the proposed in-service date of summer 2020 be achieved in order to meet the commitments the Project has made to PJM. PJM manages the eastern U.S. electrical grid that includes Ohio. To the extent CEF-O commits to PJM in 2018 to have the Project operational in summer 2020 and does not meet that schedule, there are significant non-performance penalties that would be owed by CEF-O to PJM. Therefore, the OPSB certificate should ideally be issued to allow for Financial Closing in the fall of 2017 and the scheduled start of construction in January 2018, in order for the Project to be completed on schedule. A delay in the Project process will automatically delay construction and thus jeopardize the Project's ability to meet peak summer demand of 2020.

CEF-O is about to order two combustion turbines from Siemens, which will become the primary power generation equipment within the Project. This “power island” package, including the two CTGs, HRSG, and single STG, represents a CEF-O financial commitment of more than $200 million. The fabrication of these units will need to commence in 2017; however, this significant expenditure would not occur until OPSB approval is certain. Any delay in the OPSB process results in a day-for-day delay in commencing manufacturing of the primary generation equipment that is the critical path component of the overall Project construction schedule.

(E) ECONOMIC IMPACT

(1) Annual Total Present Worth of Construction and Operation Payroll

Project construction is scheduled to take place during the period from early 2018 to summer 2020. An estimated $185.3 million in labor income (or $74.1 million each year of the two and a half year construction period) will result in Lucas County during this period, including secondary and tertiary multiplier impacts (Appendix F – Table 10). Annual labor income will increase by $4.6 million in Lucas, Ottawa, and Wood Counties, and by an additional $1.1 million in other parts of Ohio, as a result of annual Project operations (Appendix F – Table 11). See Appendix F for additional economic analysis. CEF-O has not hired any workers at this time.

(2) Construction and Operation Employment

The number of employees during Project construction will vary on a monthly basis in accordance with the construction schedule; the maximum number at the Project Site at any one time is estimated to be in the range of 800 to 1,000, with a total of 862 jobs within Lucas County supported, on average, in each year of the construction effort (see

Appendix F – Table 8). This Lucas County investment by the Project will result in an additional 70 jobs within Ohio, both inside and outside of Lucas County. Approximately 19 to 22 employees will be employed full time at the plant during Project operation. Table 9 of Appendix F summarizes these on-going O&M jobs. CEF-O will seek to use local labor where practical.

(3) Increase in Local Revenue

CEF-O has begun and will continue discussions regarding tax payments with local and state economic development officials. Property tax negotiations have not yet been concluded.

(4) Economic Impact on Local Commercial and Industrial Activities

Construction and operation of the proposed Project will have a substantial positive effect on local commercial and industrial activities. The Project will affect local commercial and industrial activities both directly and indirectly. Financial benefits will be associated with direct purchases related to construction activities, and also by indirect purchases.

The major equipment that comprises the Project, such as the Siemens combustion turbines, will be purchased from outside the local region. However, the local commercial and industrial communities are anticipated to benefit from direct purchases that will include construction materials and general supplies purchased from local vendors. The same communities will also benefit indirectly from the expenditures by operating personnel for locally supplied goods and services.

CEF-O has retained an independent firm, Calypso Communications LLC (Calypso), to analyze both the direct and indirect economic impact of building and operating the planned Project (Appendix F). Key findings of this study were:

- Construction of the Project is estimated to generate $542.7 million in total economic activity in the State of Ohio. This will produce $16.2 million in additional state and local tax revenues (not including property taxes).
- Construction of the Project is anticipated to create on average over 384 direct construction jobs per year and on average an addition 750 jobs per year in surrounding parts of Ohio during the 32-month construction period. Construction of the Project will increase the forecasted rate of job growth in the Toledo metropolitan statistical area region by 10 to 25 percent per year for each year of the construction phase.
- Once operation, the Project will result in $34.0 million annually in new business activity in a wide variety of industries in the Lucas County and surrounding region. Operation will increase state and local (non-property) tax revenues by $5.2 million annually.
- During operation, the Project will employ approximately 19 to 22 full-time workers and result in an additional 70 jobs in the Lucas County region. Average annual wages of these jobs will be significantly higher than the current regional average.

These economic impacts do not include the effect of local Property tax payments that will be made by the Project.

(F) RESPONSIBILITY TO THE PUBLIC

(1) Public Information Program

Work within the community has been on-going since 2013, including meetings with the political leadership of the City of Oregon, led by Mayor Michael J. Seferian. Since the principal of CEF-O has been intimately involved in the development of three combined cycle gas turbine projects, most notably the Oregon Clean Energy Center (currently under construction in Oregon, Ohio), the political leadership of Oregon felt comfortable that another natural gas-to-electricity plant would be a welcome addition to the City of Oregon.

CEF-O's planned public interaction included mailing letters to residents, tenants, and elected officials, issuing a public notice and a news release to the local media, creating a website, and hosting a public informational open house. Copies of informational materials available at the public open house are included in Appendix D. During the construction of the Project, CEF-O will maintain the Project updates via postings on Clean Energy Future's website.

The policies and procedures outlined in the Complaint Resolution Program, provided as an attachment to the Sound Survey and Analysis Report (Appendix E), will be implemented during the construction of the Project. Notification to affected parties will be provided at least 7 days prior to the start of construction. All complaints will be addressed in a timely manner, with information sought to correct the root cause, as appropriate. Once the Project is operational, the Complaint Resolution Program will be updated accordingly.

From construction and on into operations, the Project can be a focal point for on-the-job education, internships, workshops, and seminars. CEF-O is working with the Oregon School Board to plan and implement such a cooperative program. In essence, the Project will be a "living lab" providing insight into the process of converting a common product like natural gas into electricity. Through this partnership between the Project and local/regional education system, the opportunities for learning and career enhancement are extensive.

(2) Liability Compensation Plans

CEF-O will carry significant amounts of liability insurance. The Project will be covered under CEF-O's liability insurance programs for general commercial liability insurance and automobile liability insurance during the construction and operation of the Project.

(3) Impact to Surrounding Infrastructure

The proposed laydown areas, located adjacent to and nearby the Project Site, will be used for equipment and material storage, as well as construction worker parking. The proximity of these areas will minimize construction traffic on public roadways. Use of agricultural fields and area previously used for construction laydown associated with the adjacent Oregon Clean Energy Center will minimize disturbance of the surrounding land. Temporary access roads to all construction laydown areas would allow for internal construction traffic, minimizing Project-related travel on public roadways.

No upgrades to local roads or bridges are expected to be necessary for transportation of construction vehicles and Project equipment, as the City of Oregon has planned for industrial traffic within this area and has upgraded road bearing capacities.

Once in operation, the staff required to run the Project is not expected to exceed 19 to 22 employees, working across three shifts. This additional volume on the existing transportation infrastructure is not expected to cause a significant impact.

(4) Transportation Permits

The Project Site is in close proximity to a well-established transportation network. Located approximately 4.25 miles northeast of Interstate 280 and approximately 2 miles north of Route 2, the Project Site is accessible by major highways for delivery of equipment and supplies. The network of smaller roads which provide direct access to the Project Site, including Parkway Road, North Lallendorf Road and Corduroy Road, currently accommodate traffic associated with other nearby industrial facilities and, therefore, will also be capable of support traffic associated with the Project.

It is anticipated that the Project would cause short-term increases in traffic on route leading the Project Site due to deliveries of equipment and materials during construction. Workers arriving and departing during construction would also increase traffic. Some traffic management during the construction phase may be necessary in the immediate vicinity of the Project Site to ensure safe and efficient maintenance of existing traffic patterns and usages. As applicable, coordination with state and local agencies will be undertaken to plan the schedule and route of equipment deliveries, and all applicable transportation permits will be obtained.

(5) Plan for Decommissioning

The Project is expected to be in place and providing efficient energy throughout its operating life. However, at the time the Project is no longer planned for operation, CEF-O will work closely with the City of Oregon towards retaining infrastructure that could be utilized for another productive use, while removing equipment no longer required. It is expected that the future use of the Project Site will remain industrial, consistent with the City of Oregon's plans and other nearby uses.

Equipment to be removed from the Project Site will be evaluated by a professional to determine the extent to which individual components or materials can be recycled or reused in another location. Once all useful equipment and material is salvaged, other structures to be removed will be demolished and disposed of in accordance with federal and state law. Appropriate dust control and other measures will be utilized to protect air quality and minimize the potential for offsite impacts.

It is anticipated that subsurface utilities and infrastructure will not be removed, but will remain in place for potential future use. Graded features, such as stormwater management facilities, will also remain in place for modification and/or use in the future. During decommissioning activities, Best Management Practices (BMPs) such as silt fencing or silt socks will be employed to prevent inadvertent erosion and sedimentation or impact to surface waters or wetlands. Once all equipment to be removed is no longer present, soil stabilization measures suitable to the remaining features will be employed (e.g., seeding).

Access roads and electrical utilities are anticipated to remain in place pending direction from the City of Oregon and PJM, respectively. Should environmental impacts be anticipated that would require any impact, appropriate state and/or federal approvals will be obtained prior to the impact for which approval would be required.

CEF-O believes that the salvage value of equipment to be removed from the Project Site when decommissioned will fully offset the cost of removal such that no additional financial assurance is required. A detailed timetable will be established prior to implementation that will focus on logistics that would support obtaining maximum reuse and recycling of equipment and components.

4906-4-07 Air, Water, Solid Waste, and Aviation Regulations

(A) COMPLIANCE WITH APPLICABLE REGULATIONS

This section provides an assessment of the environmental effects, specifically relating to air quality, water quality and waste generation/disposal associated with the proposed Project. Under some headings of this section, reference may be made to separate documents that have been filed to meet federal, state, and local regulations. Where appropriate, copies of these documents (or portions thereof), have been included with this Application as appendices for completeness. The Applicant believes that it has met, or will have met, all of the appropriate environmental requirements for the proposed Project.

(B) AIR QUALITY

(1) Preconstruction

(a) Ambient Air Quality

The Ohio Environmental Protection Agency (Ohio EPA) collects air quality data (ambient air pollutant concentrations) at a number of monitoring locations in the area surrounding the Project. Ohio EPA collects data in Lucas County, where the Project is proposed. Data collected from air quality monitoring sites are used, in part, to verify attainment of the NAAQS. NAAQS exist for criteria pollutants, including particulate matter (PM_{10} and $PM_{2.5}$), nitrogen dioxide (NO_2), SO_2, ozone (O_3), lead (Pb), and CO. Every area of the United States has been designated as attainment, unclassifiable, or nonattainment with respect to the NAAQS. In areas designated as attainment, the air quality with respect to the pollutant is equal to or better than the NAAQS. These areas are under a mandate to maintain, i.e., prevent significant deterioration of, such air quality. In areas designated as unclassifiable, there are limited air quality data, and those areas are treated as attainment areas for regulatory purposes. In areas designated as nonattainment, the air quality with respect to the pollutant is worse than the NAAQS. These areas must take actions to improve air quality and achieve attainment with the NAAQS within a certain period of time. The Project Site is within an area classified as "unclassified/attainment" for all criteria pollutants.

In addition, the current ambient air quality monitored concentrations (i.e., background) are used in the air quality dispersion modeling analysis of the Project, i.e., they will be added to the model-predicted concentrations for comparison with the NAAQS. As defined by the Ohio EPA, background air quality includes pollutant concentrations due to natural sources, mobile sources, nearby sources other than the one(s) under consideration, and unidentified sources. Background air quality is defined as the ambient air pollutant concentration that is present as a result of these existing sources, not including the proposed Project.

Background ambient air quality concentrations were determined from the closest, most representative available monitoring stations to the Project with adequate data. Selection of monitoring sites considered proximity to the Project Site, and comparison of the monitoring site environment to the environment surrounding the Project Site.

For the Study Area, monitoring data from Ohio EPA and Michigan Department of Environmental Quality (MDEQ) were reviewed to determine representative monitoring sites and ambient background concentrations. Table 07-1 lists the selected monitoring station, and Table 07-2 summarizes the background concentrations and compares these concentrations to the NAAQS. In general, the monitors located closest to the Study Area were selected for each pollutant. In addition, the location of each monitor is generally in an area that is similar or more industrialized than the Study Area, which makes the monitoring data conservatively representative. The selected background concentrations for 1-hour NO_2, 1-hour SO_2, and $PM_{2.5}$ (24-hour and annual) are based on three-year average design values. The background values for the other pollutants are based on the maximum measured concentrations across the three years (2013-2015). Figure 07-1 shows the location of each monitoring station.

TABLE 07-1
BACKGROUND AIR QUALITY MONITORING STATIONS

Pollutant	Station Location	Station ID
NO_2	23751 Fenkell Street, Detroit, Michigan	26-163-0094
$PM_{2.5}$	Erie, Toledo, Ohio	39-095-0024
PM_{10}	Allen Park, Detroit, Michigan	26-163-0001
CO		
SO_2	3040 York Street, Toledo, Ohio	39-099-0013
	West Fort Street, Detroit, Michigan	26-163-0015
O_3	Erie, Toledo, Ohio	39-095-0024

TABLE 07-2
BACKGROUND AIR QUALITY DATA

Pollutant	Average Period	Proposed Background (µg/m³)[a]	NAAQS (µg/m³)
NO_2	1-hour	87.1	188
	Annual	23.4	100
$PM_{2.5}$	24-hour	23	35
	Annual	10	12
PM_{10}	24-hour	35	150
	Annual	17	None
CO	1-hour	2,290	40,000
	8-hour	1,260	10,000
SO_2	1-hour	60.26	196
	3-hour	78.60	1300
	24-hour	19.91	365
	Annual	6.81	80
O_3	8-hour	140	150

[a] microgram per cubic meter (µg/m³)

The following subsections summarize background air quality by pollutant.

Particulates – PM_{10} is defined as any liquid (aerosol) or solid substance found in the atmosphere with a diameter equal to or less than 10 microns. Common forms of PM_{10} are fly ash, process dusts, soot, and oil aerosols. Industrial processes, electric power generation, industrial fuel combustion, and dust from the plowed fields, roadways or construction sites are examples of major sources of PM_{10}. The background concentration for PM_{10} was selected from a monitoring station located in Detroit, Michigan. The selected monitoring station is conservatively representative since it is more densely populated and industrialized than the Project Site area, and is closer than the next closest monitoring site, which is located in Cleveland, Ohio.

$PM_{2.5}$ is defined as any liquid (aerosol) or solid substance found in the atmosphere with a diameter equal to or less than 2.5 microns. Industrial processes, electric power generation, industrial fuel combustion, and dust from plowed fields, roadways or construction sites are examples of major sources of $PM_{2.5}$. The background concentration for $PM_{2.5}$ was selected from a monitoring station located in Toledo, Ohio. The selected monitoring station is conservatively representative since it is more densely populated and industrialized than the Project Site area, and provided a complete data set, which the next closest monitoring site, also located in Toledo, Ohio, did not have.

Nitrogen Dioxide – Oxides of nitrogen are formed in a high temperature combustion process when nitrogen in the air is oxidized to nitric oxide (NO) or NO_2. The NAAQS is specific to NO_2, but NO is oxidized in the atmosphere to NO_2 and, therefore, NO_X is the emitted regulated pollutant. Major sources of NO_X are fuel combustion, including boilers, gas turbines, and motor vehicles, as well as certain chemical processes.

The background concentrations for NO_2 were selected from a monitoring station in Detroit, Michigan. The selected monitoring station is conservatively representative since it is more densely populated and industrialized than the Project

Site area, and is closer than the next closest monitoring sites, which were located in Detroit, Michigan and Cleveland, Ohio.

Carbon Monoxide – CO is produced by the incomplete combustion of carbon-containing fuels, primarily from internal combustion engines. CO is generally an urban pollutant that is produced mainly from mobile sources.

The background concentrations of CO were selected from monitoring station in Detroit, Michigan. The selected monitoring station is conservatively representative since it is more densely populated and industrialized than the Project site area, and is closer than the next closest monitoring site, which is located in Cleveland, Ohio.

Sulfur Dioxide – SO_2 is produced through the combustion of sulfur-containing fuels, such as coal and oil; primarily sources include heat and power generation facilities and petroleum refineries.

The background concentrations of SO_2 were selected from monitoring stations located in Toledo, Ohio and Detroit, Michigan. Two monitoring locations were used because the monitoring location in Toledo did not have a complete annual SO_2 dataset. Therefore, data from the Detroit monitoring site is used for the annual SO_2 concentration. The selected monitoring stations are conservatively representative since they are located in more densely populated and industrialized than the Project Site area, and also located closer than the next closest monitoring site located in Monroe, Michigan.

Ozone – Ground level ozone[3] is considered a secondary pollutant because it is not emitted directly into the atmosphere, but is created by chemical reactions between NO_X and volatile organic compounds (VOCs) in the presence of sunlight. Sources of ground-level O_3 precursors (NO_X and VOCs), include mobile sources and power plants. Since O_3 is produced through a secondary formation, higher concentrations may be found far downwind of the original source of the precursor emissions (NO_X and VOCs).

The background concentrations of O_3 were selected from monitoring station in Toledo, Ohio. The selected monitoring station is closer than the next closest monitoring site, which is also located in Toledo, Ohio.

(b) Pollution Control Equipment

A review of the air emissions and controls for the proposed Project is presented below.

Nitrogen Oxides - NO_X is formed in the gas turbine combustor during high temperature gas firing primarily as a result of the reaction between nitrogen and oxygen present in the combustion air. The combustion turbines will utilize DLN combustors which are integrated within the combustion turbines. The DLN combustion controls NO_X formation by minimizing both the flame temperature and the concentration of oxygen at the flame front.

SCR, a post-combustion chemical process, will be installed in the HRSGs to treat exhaust gases downstream of the CTGs and duct burners. The SCR process

[3] Ground-level O_3 should not be confused with stratospheric O_3. Stratospheric O_3 is beneficial because it filters out the sun's harmful ultraviolet radiation, while ground-level O_3 is a health and environmental problem.

will use 19 percent aqueous NH_3 as a reagent. Aqueous NH_3 will be injected into the flue gas stream, upstream of the SCR catalyst, where it will mix with NO_X. The catalyst bed will be located in a temperature zone of the HRSG where the catalyst is most effective. The mixture will pass over the catalyst and the NO_X will react with NH_3 and be reduced to nitrogen gas and water. The SCR system will reduce NO_X concentrations to 2.0 ppmvdc, with or without duct firing, at all steady-state load conditions and ambient temperatures. A small amount of NH_3 will remain un-reacted through the catalyst, which is called the "ammonia slip." The ammonia slip will be limited to 5.0 ppmvdc at all steady-state load conditions, with or without duct firing, and ambient temperatures.

NO_X emissions will increase during limited periods of startup and shutdown since the DLN combustor does not operate the same way at these loads as it does during steady-state loads. Additionally, the SCR unit is not operational during startup and shutdown until the SCR catalyst reaches its minimum operating temperature.

The use of DLN and SCR meets Best Available Control Technology (BACT) for control of NO_X emissions from the CTG and duct burners.

The proposed auxiliary boiler will minimize NO_X emissions using flue gas recirculation, low NO_X burners, and clean-burning natural gas as the sole fuel for the Project. This meets BACT for NO_X; NO_X emissions will be less than 0.02 pounds per British thermal units (lb/MMBtu).

State-of-the-art combustion design in both the emergency fire pump and emergency generator engines will minimize NO_X emissions to satisfy BACT.

Particulate Matter – PM emissions result from trace quantities of ash (non-combustibles) in the fuel, trace amounts of PM in the combustion air, and formation of ammonia sulfate salts from unreacted NH_3 from the SCR system. PM emissions for the combustion turbines, duct burners, and auxiliary boiler are minimized through the exclusive use of clean-burning natural gas as the sole fuel in conjunction with good combustion practices. A $PM_{10}/PM_{2.5}$ emissions limit of 0.0060 (lb/MMBtu, HHV) without duct burning and 0.0046 lb/MMBtu, HHV, with duct burning is proposed for the Project. This level of emissions will be achieved by combusting only commercially available pipeline-quality natural gas in the turbines. A $PM_{10}/PM_{2.5}$ emission limit of 0.008 lb/MMBtu is proposed for the auxiliary boiler. The use of clean-burning natural gas, in conjunction with good combustion practices, is BACT for control of $PM_{10}/PM_{2.5}$ emissions from the CTGs, duct burners, and auxiliary boiler.

The Project will use a 10-cell cooling tower for condensing the steam turbine exhaust. PM may be emitted from the cooling tower as some small water droplets evaporate and liberate dissolved solids in the cooling water to the atmosphere. In order to minimize particulate emissions from the cooling tower, drift eliminators with a drift rate of no greater than 0.0005 percent of the circulating water flow will be used for this Project. This represents BACT for $PM_{10}/PM_{2.5}$ from the cooling tower.

State-of-the-art combustion design in both the emergency fire pump and emergency generator engines will minimize $PM_{10}/PM_{2.5}$ emissions to satisfy BACT.

Carbon Monoxide – CO emitted from combustion turbines, duct burners, and auxiliary boiler is a product of incomplete combustion of the fuel. An oxidation catalyst system will be located within each HRSG to control emissions of CO. Exhaust gases from the combustion turbines and duct burners will be passed over a catalyst bed where excess air will oxidized the CO to CO_2. The oxidation catalyst system will reduce CO concentrations to 2.0 ppmvdc in the exhaust gas under all steady-state load conditions. The use of oxidation catalyst systems meets BACT for CO. CO emissions will increase during limited periods of startup and shutdown due to less efficient combustion at these loads.

BACT for control of CO from the auxiliary boiler will also be met through good combustion practices; CO emissions will be less than 0.055 lb/MMBtu.

State-of-the-art combustion design in both the emergency fire pump and emergency generator engines will minimize CO emissions to satisfy BACT.

Volatile Organic Compounds – VOCs emitted from the combustion turbines, duct burners, and auxiliary boiler are products of incomplete combustion of the fuel. The use of an oxidation catalyst system within each HRSG will control VOC emissions from the combustion turbines and duct burners. Exhaust gases from the combustion turbines and duct burners will pass over a catalyst bed where excess air will oxidize the VOCs. The oxidation catalyst will also reduce VOC emissions from the combustion turbines to 1.0 ppmvdc without supplemental duct firing and 2.0 ppmvdc with supplemental duct firing. The use of oxidation catalyst systems is BACT for control of VOC from the combustion turbines. VOC emissions will increase during limited periods of startup and shutdown due to less efficient combustion at these loads.

BACT for control of VOC from the auxiliary boiler will be met through good combustion practices; VOC emissions will be less than 0.006 lb/MMBtu.

State-of-the-art combustion design in both the emergency fire pump and emergency generator engines will minimize VOC emissions to satisfy BACT.

(c) State and Federal Performance Standards

Prevention of Significant Deterioration Review and New Source Review

New major stationary sources of air pollution are required by the Clean Air Act to obtain an air permit before commencing construction. This process is called New Source Review (NSR) and is required whether the new major source or modification to an existing major source is planned for an area where the NAAQS are not being achieved (i.e., nonattainment area) or an area where air quality is better than the NAAQS or cannot be classified (i.e., attainment and unclassifiable areas). NSR for subject sources in attainment areas is referred to a Prevention of Significant Deterioration (PSD) review, whereas NSR for subject sources in nonattainment areas is referred to as Nonattainment NSR. The entire program, including both PSD and Nonattainment NSR permits, is referred to as the NSR program. The United States Environmental Protection Agency (USEPA) has delegated authority to issue PSD and Nonattainment NSR permits to the Ohio EPA. Regulations adopted and administered by the Ohio EPA for PSD and Nonattainment NSR are codified in the Ohio Administrative Code (OAC) Chapter 3745-31, Permit to Install New Sources of Pollution. OAC Chapter 3745-31 provides requirements for obtaining a Permit to Install (PTI) for industrial processes. The requirements in this chapter incorporate the provisions of the federal PSD and Nonattainment NSR programs as defined in 40 Code of Federal Regulations (CFR) Parts 51 and 52.

The NSR requirements are pollutant-specific. Even though a source may emit many types of air pollutants, only specific pollutants may be governed by the NSR program, depending on the magnitude of the emissions of each pollutant. Moreover, a source may undergo both PSD and Nonattainment NSR permitting if it is located in an area that is designated as non-attainment for one or more pollutants and attainment for the remaining pollutants. Lucas County, Ohio has been designated or is regulated as attainment for all criteria pollutants. Because the area is designated as unclassified/attainment for all pollutants, only PSD review applies to the Project.

The PSD program requires that an applicability determination be conducted for any proposed source (either a new source or modification of an existing source) to see if it will be subject to PSD pre-construction review. Three basic criteria must be evaluated when making a PSD applicability determination. These criteria are the magnitude of the emissions for a new or modified source, location in an attainment or nonattainment area, and the pollutants released.

A combined cycle power generating facility is listed as one of the 28 named source categories under the PSD program and is considered a new major source under the PSD regulations if it has the potential to emit 100 tons per year (tpy) or more (including fugitive emissions) of a regulated air pollutant. The Project has the potential to emit more than 100 tpy of the regulated pollutants NO_X, PM, $PM_{2.5}$, PM_{10}, VOC, and CO and is, therefore, subject to review for these pollutants under PSD regulations.

Once a facility is subject to review under the PSD regulations by exceeding the major source threshold for at least one regulated pollutant, PSD review also applies for each regulated air pollutant that can be emitted at rates greater than its Significant Emission Rate (SER) listed in 40 CFR 52.21 and OAC Rule 3745-31-01(MMMMM). Based on potential emission estimates, the Project is subject to PSD review for several regulated air pollutants. The air pollutants subject to PSD review and their respective SERs include: NO_X (40 tpy); CO (100 tpy); PM (25 tpy); PM_{10} (15 tpy); $PM_{2.5}$ (10 tpy); VOC (40 tpy); SO_2 (40 tpy), and the PSD-regulated non-criteria pollutant, sulfuric acid mist (7 tpy). The Project's emissions of lead are well below its SER (0.6 tpy) and therefore, PSD review is not required for lead emissions. Isopleths illustrating dispersion modeling results for applicable criteria pollutants are provided in Figures 07-2 through 07-15.

On April 2, 2007, the United States Supreme Court found that greenhouse gases (GHGs), including carbon dioxide (CO_2), are air pollutants covered by the Clean Air Act. On May 13, 2010, the USEPA issued a rule (called the "Tailoring Rule") that established an approach to regulating GHG emissions from stationary sources under the Clean Air Act. This final rule "tailored" the requirements of the Clean Air Act permitting program to limit which GHG emitting facilities will be required to obtain PSD permits. Under this rule, effective July 1, 2011, PSD permitting requirements would apply to new sources that emitted in excess of

100,000 tpy of GHG emissions as carbon dioxide equivalents (CO_{2e}). However, on June 23, 2014, the United States Supreme Court ruled that GHG emissions alone cannot determine PSD major source status, but that sources otherwise classified as PSD major sources (so-called "anyway" sources) can still be subject to PSD review for GHG, if GHG emissions exceed an agency threshold. USEPA then issued a Policy Memo dated July 24, 2014, indicating that it intends to apply the GHG SER threshold for requiring PSD BACT review of GHGs for "anyway" sources with potential emissions of greater than 75,000 tpy CO_{2e}. The Project has the potential to emit more than 75,000 tpy of GHG emissions as CO_{2e} and, therefore, is subject to PSD BACT review for GHGs in addition to the pollutants discussed above.

The other significant aspects of OAC Chapter 3745-31 are outlined in the following paragraphs.

<u>OAC Rule 3745-31-06 – Completeness determinations, processing requirements, public participation, public notice, and issuance</u> – This section mandates that a completeness determination be rendered within 60 days of application receipt by Ohio EPA and within 40 days of receiving a written request from the applicant. The director must rule on a permit application within 180 days after the date that the application is deemed complete. The director must notify the public, by advertisement in a local newspaper, of the draft decision to grant or deny the permit and offer an opportunity for the public to comment or request a hearing.

<u>OAC Rule 3745-31-11 – Ambient Air Ceilings and Increments</u> – The emissions increases due to the proposed new source or modification must not cause an ambient air quality impact that exceeds the maximum allowable increment in

the area, nor can they cause any exceedance of any NAAQS, which represent the ambient air quality ceilings.

OAC Rule 3745-31-13/OAC Rule 3745-31-14 – Ambient Monitoring Requirements – The director may determine that pre-construction ambient monitoring data is needed for the purposes of determining whether emission of an air pollutant would cause or contribute to a violation of any NAAQS or applicable increment. Existing air quality data in the Project vicinity is sufficient for determining ambient background levels and pre-construction ambient monitoring data is not required.

OAC Rule 3745-31-15 – Control Technology Review – The owner or operator of a new source must employ BACT for each pollutant subject to PSD review.

OAC Rule 3745-31-16 – Impact Analysis – The owner or operator of a new source must conduct an impact analysis to demonstrate that the increase in emissions, in conjunction with all other applicable emission increases and decreases, will not cause an exceedance of any NAAQS or applicable increment.

OAC Rule 3745-31-17 – Additional Impact Analysis – The owner or operator of a new source must provide an analysis of the impairment to visibility, soils, and vegetation that would occur as a result of the emission increases and an analysis of the ambient air quality impact of expected secondary growth in the area.

Other Regulatory Requirements

In addition to the NSR program, other federal and state air quality standards also apply during operation of an air pollutant source. They include federal New

Source Performance Standards (NSPS), federal National Emission Standards for Hazardous Air Pollutants (NESHAP), and the Ohio EPA rules codified under the various chapters of OAC Chapter 3745.

40 CFR 60 Subpart KKKK applies to Stationary Combustion Turbines and places emission limits on NO_X and SO_2 from new combustion turbines. The combustion turbines and duct burners would be subject to this standard. For new combustion turbines firing natural gas with a rated heat input greater than 850 MMBtu/hr, NO_X emissions are limited to:

- 15 ppmvdc exhaust concentration; or
- 54 nanograms per Joule (ng/J) of useful output (0.43 pounds per megawatt-hour [lb/MW-hr]).

Additionally, SO_2 emissions must meet one of the following:

- 110 ng/J (0.90 lb/MW-hr) gross output; or
- 26 ng/J (0.060 lb/MMBtu) heat input.

The Project will use an SCR system to reduce NO_X emissions to 2.0 ppmvdc and pipeline-quality natural gas to limit SO_2 emissions to 0.0015 lb/MMBtu. As such, the Project will meet the emission limits under Subpart KKKK.

Additionally, the provisions of this Subpart (for units using DLN combustors) contain monitoring provisions that can be satisfied with a Part 75 certified NO_X CEMS. The Project proposes to use a 40 CFR Part 75 certified NO_X CEMS, to satisfy Subpart KKKK monitoring requirements.

40 CFR Subpart TTTT applies to new fossil fuel electric generating units with an output capacity greater than 25 MW; the proposed CTGs and duct burners

will be subject to this Subpart. Subpart TTTT limits CO_2 emissions to 1,000 pounds of CO_2 per megawatt-hour (lb CO_2/MW-hr) gross energy output or 1,030 lb CO_2/MW-hr net energy output. The combined cycle design of the combustion turbines and duct burners will meet a full load emission rate of 833 lb CO_2/MW-hr, without duct firing, at International Organization for Standardization conditions, well below the applicable limit of this Subpart. The Project will track rolling 12-month CO_2 emissions as required by Subpart TTTT to demonstrate satisfaction of the Subpart TTTT monitoring and compliance provision.

40 CFR 60 Subpart Dc applies to steam generating units with a maximum input capacity greater than 10 MMBtu/hr and less than 100 MMBtu/hr. The auxiliary boiler has a maximum input capacity of 37.8 MMBtu/hr, and is, therefore, subject to 40 CFR 60 Subpart Dc. Subpart Dc does not impose any emission standards on natural gas-fired boilers, but requires that records be maintained regarding the amount of fuel burned on a monthly basis.

40 CFR 60 Subpart IIII is applicable to owners and operators of stationary compression ignition internal combustion engines that commence operation after July 11, 2005. For the Project, this rule applies to the emergency generator and emergency fire pump. For model year 2009 and later fire pump engines with a displacement less than 30 liters per cylinder and an energy rating between 300 and 600 hp, Subpart IIII provides the following emission limits:

- 4.0 grams per kilowatt-hour (g/kW-hr)(3.0 grams per horsepower [hp]-hour [g/hp-hr]) of VOC + NO_X
- 3.5 g/kW-hr (2.6 g/hp-hr) of CO

- 0.2 g/kW-hr (0.15 g/hp-hr) of PM

The Project will install a fire pump engine that is certified to meet these emissions standards.

To comply with Subpart IIII, the emergency generator engines must meet the emission standards for new non-road combustion ignition engines (Tier 2). Engines with a model year 2006 or later with a power rating of 560 kW (750 hp) or greater must meet the following Tier 2 limits:

- 6.4 g/kW-hr (4.8 g/hp-hr) of VOC + NO_X
- 3.5 g/kW-hr (2.6 g/hp-hr) of CO
- 0.2 g/kW-hr (0.15 g/hp-hr) of PM

The Project will install an emergency generator engine that is certified to meet these emissions standards.

There are no NESHAP regulations under 40 CFR Part 61 that are applicable to the Project's operations. However, the NESHAP regulations under 40 CFR 63 are applicable to certain emission sources types. The USEPA has promulgated a variety of standards for each category or subcategory of sources located at major and area (non-major) sources of hazardous air pollutants (HAPs) under 40 CFR 63. For the Project, the potential emissions of any single HAP will not exceed the major source threshold of 10 tpy. In addition, potential emissions of combined HAPs will be less than the major source threshold of 25 tpy. Therefore, under 40 CFR Part 63, the Project is considered an "area" HAP source. The only area source NESHAP that applies to the Project is the NESHAP under Subpart ZZZZ for Stationary Reciprocating Internal Combustion Engines, which applies to the emergency generator and the emergency fire pump engines. The Project will comply with the NESHAP Subpart ZZZZ standards, which requires compliance with the NSPS Subpart IIII standards.

Section 112(r) of the 1990 Clean Air Act Amendments, known as the USEPA's Accidental Release Prevention Program, requires facilities to address the catastrophic release of specified hazardous chemicals if stored above a trigger threshold. NH_3 is a listed hazardous chemical under Section 11(r); however, the SCR system will use aqueous NH_3 with a concentration no greater than 19 percent by weight. Aqueous solutions of ammonia at concentrations below 20 percent by weight are exempt from the requirements of the USEPA's Accidental Release Prevention Program.

The Project will be subject to the Acid Rain Program based on the provisions of 40 CFR 72.6(a)(3) because the turbines are considered utility units with a generating capacity greater than 25 MW under the program definition and do not meet the exemptions listed under paragraph (b) of this Section. As required under this rule, the Project will submit an acid rain permit application at least 24 months prior to the date on which the affected unit commences operation.

The Cross-State Air Pollution Rule (CSAPR) became effective on January 1, 2015 to reduce annual NO_X emissions, ozone season NO_X emissions, and annual SO_2 emissions from fossil fuel-fired electric generating facilities in 28 states, including Ohio. Similar to the Acid Rain Program, CSAPR implemented a market-based approach for lowering emissions by imposing program wide caps and providing an initial allocation of allowances to existing subject sources. Unlike the

Acid Rain Program, CSAPR sets aside a percentage of the allowance budgets to provide to new units. The proposed CTGs and duct burners will be subject to CSAPR and will receive an allocation of annual NO_X, ozone season NO_X, and annual SO_2 allowances from the new unit set aside account. The Project will comply with CSAPR by utilizing the new unit set-aside allowance allocation with additional allowances obtained in the marketplace, as necessary.

The applicable Ohio EPA rules include OAC Rule 3745-17-07(A)(1), which limits visible emissions from all emission source exhaust stacks to no greater than 20 percent opacity as a six-minute average; OAC Rule 3745-17-10(B)(1), which limits PM emissions from gaseous fuel-burning equipment; OAC Rule 3745-18-06(F), which limits SO_2 emissions; OAC Rule 3745-21-08, which limits CO emissions; OAC Rule 3745-21-09, which limits VOC emissions; OAC Chapter 3745-31, which requires a PTI and use of Best Available Technology (BAT) for emissions abatement; OAC Chapter 3745-77, which requires a Title V Operating Permit; and OAC Chapter 3745-103, which requires an Acid Rain Permit. The emission standards imposed by these regulations are far less stringent than the PSD BACT emission limits.

(d) Required Permits

Federal authority is delegated to the state, and all air permit applications will be submitted to Ohio EPA. The air construction permit, known as the PTI, will serve as the air construction permit and initial operating permit. Since the Project qualifies as a "Part 70" major source under Title V rules, the Project will be required to apply for a Title V Operating Permit within 12 months after initial startup.

The following list of air permits is applicable to the proposed Project:

- *Ohio EPA PTI*: OAC Chapter 3745-31 – Permit to Install New Source of Pollution: OAC Rules 3745-31-01 through -27. The PTI will serve as the submission vehicle for the PSD preconstruction review and construction permit.
- *Title V Permits*: OAC Chapter 374-77 – Title V Permits: OAC 3745-77-01 through -10. The Title V permit will serve as the federally enforceable operating permit for the Project.
- *Title IV:* Phase II Acid Rain Permit Program (40 CFR Part 72)

(e) Air Monitoring Stations and Major Source Mapping

Existing ambient air quality data are available for the Study Area from representative locations within Ohio and Michigan. Figure 07-1 provides a section of a USGS map (1:100,000 scale) showing the location of the Project Site in relation to the selected monitoring stations used to identify background levels for the proposed Project, along with other identified major point sources in the area.

(f) Compliance Plans

A PTI application for the Project, including the associated modeling report, will be submitted to Ohio EPA in April 2017. This application will address compliance with the requirements identified in Section 4906-4-07(B)(1)(c) and (B)(1)(d) and demonstrate that the Project will meet the range of applicable standards, including demonstrating compliance with NAAQS and PSD increments. A variety of compliance demonstration procedures, in the form of testing, monitoring, recordkeeping, and report, will be required to ensure operational compliance with all applicable air rules, standards, and permit conditions. These procedures will be performed in accordance with federal NSPS for combustion turbines (Subparts KKKK and TTTT), boilers (Subpart Dc), and emergency generator and emergency fire pump engines (Subpart IIII).

(2) Construction

Construction impacts on air quality will consist mainly of the relatively minor emissions from the construction equipment required for Project Site preparation and from fugitive dust emissions. General construction vehicles (both gasoline- and diesel-powered) and other diesel-powered engines will emit minor amounts of VOC, SO_2, CO, NO_X, and PM. These contaminants are not expected to cause any significant impacts on-site or beyond the Project Site boundary.

(3) Operation

(a) Description of Air Monitoring Plans

There are no plans to perform any ambient air quality monitoring during operation. However, as noted above, a variety of compliance monitoring procedures will be implemented in accordance with the federal NSPS for combustion turbines to ensure compliance with all applicable rules, standards, and permit conditions.

(b) Estimated Air Concentration Isopleths

The ambient air quality impacts of the Project were assessed by dispersion modeling, using the USEPA model AERMOD, in accordance with Ohio EPA guidance as summarized in Engineering Guide #69, Air Dispersion Modeling Guidance and in accordance with an Air Quality Modeling Protocol. Modeling was performed using five years of hourly meteorological data (2010 through 2014) consisting of surface data collected at the Toledo Express Airport located in Toledo, Ohio merged with upper air data collected at the Detroit International Airport located in Detroit, Michigan. This data set was provided by the Ohio EPA, Division of Air Pollution Control. Impacts of the CTGs were evaluated for a series of ambient temperatures and operating loads spanning the range of anticipated operating conditions, including startup and shutdown (SU/SD). In addition to the CTGs, the Project consists of an auxiliary boiler, an emergency diesel generator, an emergency diesel fire pump engine and a wet mechanical draft cooling tower. The cooling tower is a source of PM_{10} and $PM_{2.5}$ emissions only. Consistent with Ohio EPA guidance, the emergency diesel generator engine and emergency diesel fire pump engine are not considered in the short-term modeling analysis due to their intermittent nature of operation and limited total hours of operation. They are considered in the modeling for annual impacts.

The calculated maximum air quality impacts of the Project sources are summarized in Table 07-3. Compliance is demonstrated for pollutants with predicted insignificant impacts (less than SILs), and, therefore, no additional modeling for these pollutants and averaging periods is necessary. As shown in the table, maximum predicted impacts are less than the corresponding SILs for all criteria pollutants for the NAAQS analysis. The 24-hour $PM_{2.5}$ is greater than the PSD increment SIL; therefore, a cumulative PSD increment assessment will be conducted with other potential $PM_{2.5}$ increment consuming sources to demonstrate compliance with the 24-hour $PM_{2.5}$ PSD increment.

TABLE 07-3
MAXIMUM CALCULATED PROJECT IMPACTS FOR CRITERIA POLLUTANTS

Pollutant	Averaging Period	Maximum Calculated Impact (μg/m³)	SIL (μg/m³)	Class II PSD Increment (μg/m³)
NO_2	1-hour – Steady State	5.59	7.5	NA
	Annual – SU/SD	0.25	1	25
CO	1-hour	273.34	2,000	NA
	8-hour	53.76	500	NA
PM_{10}	24-hour	2.58	5	30
	Annual	0.28	1	17
$PM_{2.5}$	24-hour – NAAQS	1.15	1.2	--
	24-hour PSD	1.53	1.2	9
	Annual – NAAQS	0.10	0.2	--
	Annual – PSD	0.11	0.2	4

Consistent with Ohio EPA guidance, assessment of the 1-hour NO_2 NAAQS for the transient CTG SU/SD conditions consists of adding ambient background to the maximum predicted concentrations. As shown in Table 07-4, the total 1-hour NO_2 concentration during SU/SD operations (Project impact plus ambient background) is well below the NAAQS.

Isopleth plots showing the spatial pattern of Project calculated concentrations by pollutant and averaging period are provided in Figures 07-2 through 07-15.

TABLE 07-4
MAXIMUM CALCULATED PROJECT IMPACTS FOR 1-HOUR NO_2 FOR COMPARISON WITH THE NAAQS

Pollutant	Averaging Period	Predicted Impact (μg/m³)	Background Concentration (μg/m³)	Predicted Impact plus Background (μg/m³)	NAAQS (μg/m³)
NO_2	1-hour – SU/SD	47.8	87.1	134.9	188

(c) Potential Failure of Air Pollution Control Equipment

The air pollution control equipment includes the DLN combustors, the SCR, and the oxidation catalyst system. This equipment has been proven to be reliable, safe, and effective. The DLN combustors are integral to the combustion turbines. If a DLN combustor fails, there are detection systems that will notice the failure and automatically initiate shutdown, informing the operator to initiate corrective action. The typical life span of a DLN combustor is based upon the number of starts and hours of operation. The turbine manufacturer recommends periodic maintenance, including inspection of the combustor at specific intervals, which will minimize the risk of in-service failure of any of the components.

Performance of the combustor is also monitored in the Project computer control system, which will detect degradation in a combustor prior to failure. The NO_X and CO CEMS would also detect changes in emissions.

The SCR and oxidation catalyst systems are integral parts of the HRSG. Steel framework is erected in the combustion turbine exhaust gas path along with the HRSG boiler tubes. This framework holds catalyst blocks. The oxidation catalyst is a passive device (no reagent required). Aqueous NH_3 is distributed into the exhaust gas stream ahead of the SCR catalyst blocks to achieve the chemical reaction for NO_X reduction. The catalyst blocks for both systems must be periodically replaced. Their life span varies by manufacturer; however, replacements would typically be completed during a regularly scheduled preventative maintenance outage. The NO_X and CO CEMS will detect a deterioration of performance well before a failure of the catalyst could occur. In addition, the Project will have a sophisticated computer control system that has the ability to automatically shut down the unit quickly, if necessary.

(C) WATER QUALITY

The proposed Project design incorporates significant water conservation measures. The Project's maximum water use will be on the order of 5.4 mgd. The maximum daily water use is conservatively estimated based on operating the Project with full utilization of evaporative cooling on the two CTGs and 100 percent duct-firing of the HRSG at an average ambient temperature of 105°F for a 24-hour period. As shown in Figure 03-5, the Project's average water use will be on the order of 4.8 mgd. The average daily water use is estimated based on operating the Project with 100 percent duct-firing of the HRSG and maximum evaporative cooling at an average ambient temperature of 59°F for a 24-hour period.

Average wastewater from the Project is also shown on Figure 03-5. Based on the Project operating with full evaporative cooling and duct-firing at an average ambient temperature of 59°F, average wastewater will be on the order of 0.51 mgd. At 105°F, with the Project operating with full utilization of evaporative cooling on the two CTGs and 100 percent duct-firing, maximum wastewater will be approximately 0.58 mgd. When the temperature drops to -5°F, and the Project is operating with no evaporative cooling or duct-firing, wastewater will fall to approximately 0.28 mgd. These noted water and wastewater quantities assume that water within the cooling tower is recycled nine times.

To meet its water needs, the Project will utilize potable water from the City of Toledo. As outlined below, adequate water supply exists from this source; therefore, the supply of water to the Project will not stress or overburden the system.

Wastewater will be discharged to the existing City of Oregon POTW, which has adequate capacity.

The proposed water supply and discharge are further described below.

City of Toledo Water Supply

The City of Toledo owns and operates its own public water system. Although significant water volume is available, water use within the Toldeo distribution system has been steadily declining since the mid-1980s, due to the departure of several large industrial customers. The City of Toledo obtains its raw water supply from Lake Erie, which is piped to the Collins Park Water Treatment Plant. The Collins Park Water Treatment Plant has a design capacity of 120 mgd, however, due to manufacturing and population losses in the City of Toledo, the plant filters an average of 70 mgd. Water is treated using conventional sedimentation and filtration processes with a 4 gallon per minute per square foot filtration loading rate. Finished water meets all applicable primary and secondary drinking water standards. The distribution system includes a 70 million gallon reservoir and high-service pumps, which pump water into the distribution network at a high force. The Collins Park Water Treatment Plant is located approximately 1.4 miles west of the Project Site.

Since the Project is not located in Toledo and is not within the City of Toledo's water distribution system, CEF-O will work with the City of Oregon to build a new approximately 1.4 mile potable water lateral from the Collins Park Water Treatment Plant to the Project Site. The new potable water lateral will be licensed and built by the City of Oregon, and CEF-O will reimburse the City for the construction effort. The City of Toledo and the City of Oregon have discussed construction of a water system interconnection for several years; however, budgetary constraints have prevented construction of a water lateral. Interconnection between the water systems will provide added redundancy and reliability of water supplies for both cities in case of a water emergency. Therefore, development of the Project has an added benefit of improving the potable water systems of both the Cities of Oregon and Toledo.

Potable water piped from the City of Toledo will be utilized for the Project's sanitary uses without the need for additional treatment. Potable water from the City of Toledo used for process water will require treatment with a reverse osmosis system to supply demineralized water to the HRSG and other process water needs. Water used in the cooling tower will not require any further on-site treatment.

City of Oregon Wastewater Treatment Plant Discharge

All wastewater generated by the Project will be collected and disposed via the City of Oregon's POTW. The City of Oregon owns and operates a POTW that is capable of treating 8 mgd on a normal basis, and 36 mgd during wet weather periods,[4] which provides sufficient capacity to serve not only the Project, but the Oregon Clean Energy Center (which will become operational in summer 2017). Treated effluent from the POTW is discharged directly to Lake Erie, in accordance with National Pollutant Discharge Elimination System (NPDES) Permit 2PD00035*MD.

A City of Oregon wastewater collection pipeline is located immediately west of the Project Site along North Lallendorf Road. The City of Oregon is currently seeking to make improvements to its wastewater collection system, including construction of new collector pipelines. The Project anticipates an interconnection with the collector pipeline along North Lallendorf Road; however, the City of Oregon may determine that interconnection with an alternate wastewater collection line in the immediate area is advantageous.

[4] City of Oregon. *Wastewater Plant*. http://www.oregonohio.org/water-department/water/wastewater-plant.html

(1) Preconstruction

(a) Required Permits

Prior to construction, the Project will obtain a general NPDES permit for stormwater discharges associated with construction (Ohio EPA's Construction General Permit #OHC000004). A permit associated with industrial discharge the City of Oregon POTW will be obtained prior to the start of operations.

(b) Location of Survey Data Sources

No new surface or groundwater sources will be utilized by the proposed Project, therefore, no monitoring or gauging stations have been used to collect preconstruction survey data. Any impact associated with on-site stormwater or wastewater discharge will be negligible due to the use of standard engineering desing, BMPs and pretreatment as appropriate to comply with NPDES and the City of Oregon's POTW standards. Stormwater and wastewater flows will have no discernible effect on surface or groundwater quality.

(c) Description of Data Sampling Stations and Reporting Procedures

Since there are no monitoring stations, this section is not applicable.

(d) Water Quality of Receiving Stream

Project wastewater will be discharged to the City of Oregon's POTW in accordance with its existing NPDES requirements and stormwater discharge will incorporate BMPs and good engineering design practices; therefore, water quality impact will not occur as a result of the Project.

(e) Water Discharge Permit Information

No water discharge permitting is required prior to construction, other than confirmation of coverage under the Ohio EPA construction general permit.

(2) Construction

(a) Location of Monitoring Equipment

No water discharges will be associated with the Project during construction with the exception of stormwater runoff. Sanitary wastes during construction will be handled using portable units that will be the responsibility of an independent contractor. Therefore, no monitoring or gauging stations are intended to be utilized during construction.

(b) Aquatic Discharges

Discharges are not anticipated to occur in association with construction of the Project that would influence aquatic resources.

(c) Mitigation Plans

The use of BMPs in accordance with federal and state requirements will ensure that the potential for erosion and sedimentation will be minimized during construction, and that stormwater from the Project Site will not cause off-site impacts.

(d) Changes in Flow Patterns and Erosion

The Project Site is flat, and existing drainage patterns will be maintained to the extent possible; therefore, no significant changes in flow patterns are anticipated.

(e) Description of Monitoring Equipment

Since no water discharges are anticipated to occur in association with Project construction, with the exception of stormwater runoff, no monitoring stations are proposed.

(3) Operation

(a) Location of Monitoring Equipment

The Project will discharge wastewater to the City of Oregon POTW in accordance with existing NPDES requirements. The Project will implement BMPs and good engineering design practices to prevent water quality impacts as a result of the Project.

(b) Water Pollution Control Equipment and Treatment Process

Water pollution control equipment to be located at the Project Site will include: an in-line pH meter; a neutralization tank for demineralizer regenerate waste; oil/water separator for equipment drains; spill containment areas for bulk chemical storage tanks and unloading areas; in-line flow equalization; and a detention pond for stormwater management. A waste neutralization tank will receive the regeneration wastes from the water demineralizer system. The neutralization tank equalizes and adjusts the pH of the wastewater by the addition of acid or caustic to comply with pre-treatment standards.

(c) Issuance of Required Permits

The Project will obtain approvals from the City of Oregon and Ohio EPA to discharge to the City of Oregon POTW. Project wastewater will meet pre-treatment requirements prior to discharge to the City's wastewater collection system.

The Project may require coverage under a general NPDES permit for operational stormwater. As appropriate, the Project will incorporate BMPs and identify responsibility for tracking changes in stormwater management procedures.

(d) Quantitative Flow Diagram

The Project water balance, shown in Figure 03-5, provides specific information with regard to water use and discharge. The following are shown: sewerage; blowdown; chemical and additive processing; wastewater processing; oil/water separators; and runoff from other soils/surfaces. No runoff or leachate from fuels and solid wastes is anticipated due to the Project's exclusive use of natural gas as fuel, the limited solid waste storage planned, and the use of an oil/water separator to ensure collection of any incidental materials on-site.

Under normal summer baseload operating conditions, a maximum of approximately 0.58 mgd is expected to be discharged from the Project to the City of Oregon's wastewater collection system. This maximum discharge, based on 100 percent duct-firing, no utilization of evaporative cooling, and an ambient temperature of 105°F, will be limited to only the hottest summer days. Conversely, the wastewater volume will be at its minimum of 0.34 mgd when the Project is operating on a cold winter day (i.e., -5°F).

(e) Water Conservation

The proposed Project design incorporates significant water conservation measures. The Project's cooling water system is designed to maximize cycles of concentration to reduce water intake requirements. Another measure incorporated in the cooling tower to minimize water requirements is the use of a state-of-the-art cooling tower drift elimination system (0.0005%). Other measures include the return of recovered boiler blowdown to the cooling tower and recycling of water throughout the system.

(D) SOLID WASTE

(1) Preconstruction

(a) Debris and Solid Waste

The Project Site is currently an agricultural field with no structures or forested areas. Since the Project Site is undeveloped, no debris are anticipated to be found onsite, therefore, no disposal of solid waste is expected to be required during the pre-construction phase of the Project.

(b) Waste Management Plan

As there will be no debris or solid waste on the Project Site, a pre-construction Waste Management Plan is not required.

(2) Construction

(a) Debris and Solid Waste

During Project construction, solid waste will be generated that is typical of normal construction efforts. This includes packing materials, office waste, scrap lumber, metals, cables, glass, cardboard containers, and miscellaneous trash. In addition, during Project construction and pre-operational cleaning, some solvents and flushing materials will be used. The estimated volume of solid waste generated by construction activities during this time is approximately 1,200 cubic yards.

(b) Waste Management Plan

Solid waste that can be neither recycled nor reused will be stored in on-site containers for disposal. Programs will be developed to ensure that potentially hazardous wastes are separated from normal waste, including segregation of storage areas and proper labeling of containers. All waste will be removed from the Project Site by licensed contractors in accordance with applicable regulatory requirements and managed in licensed facilities.

(3) Operations

(a) Solid Waste

During Project operation, generated solid waste is anticipated to consist of office waste, including paper and miscellaneous trash, as well as plant operations wastes such as spent chemical and lube oil containers, spare parts, packaging, etc. The estimated volume of solid waste generated during operation of the Project is 120 cubic yards on an annual basis.

(b) Waste Management Plan

Any solid waste generated during operation of the Project will be removed from the Project Site by a licensed hauler.

(4) Licenses and Permits

No new solid waste treatment or disposal facility is proposed as part of this Project, or will be necessitated as a result of the construction or operation of this Project. All solid waste generated will be trucked off-site by an appropriately licensed contractor. SCR catalyst will be removed and returned to a catalyst vendor for regeneration, salvage or disposal. Therefore, since no hazardous wastes are expected to be generated, no such license or permit will be required.

(E) AVIATION

(1) Surrounding Air Navigation Facilities

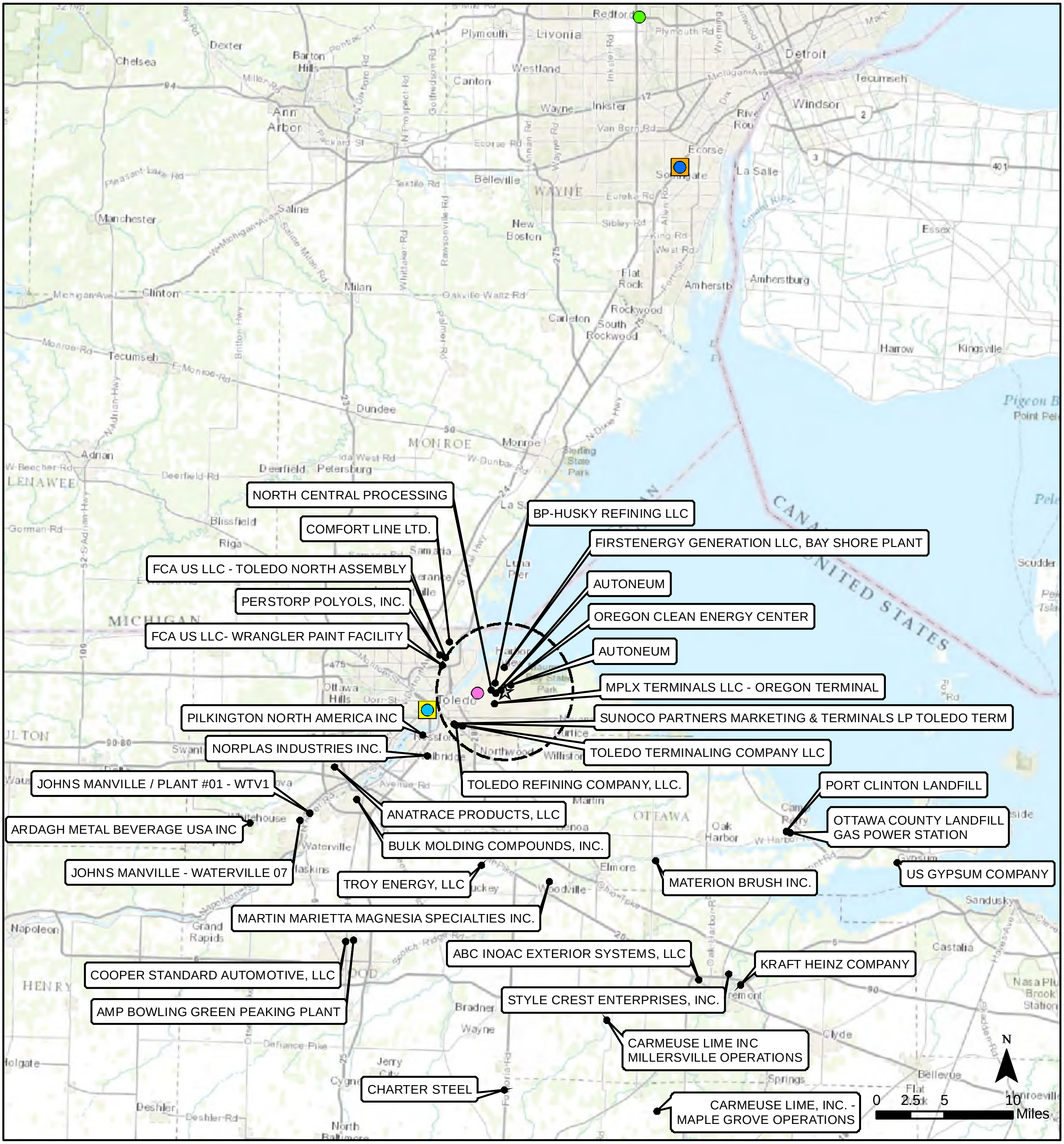
As shown in Figure 07-16, there are no airports or heliports located within one mile of the Project Site. The Culver Field Airport, a privately owned, private use airport with a single unpaved runway, is located approximately 1.1 miles east of the Project Site. The Toledo Executive Airport, a public use airport with two paved runways, is the next closest airport of higher use and is located approximately 7 miles southwest of the Project Site. The closest heliport is located approximately 1.15 miles northwest of the Project Site and appears to be associated with the BP Toledo Refinery. A heliport associated with Saint Charles Hospital is the next closest heliport, located approximately 3.15 miles southwest of the Project Site.

(2) Federal Aviation Administration Filings

Filing with the Federal Aviation Administration (FAA) is required for structures over 200 feet above base elevation or for structures located within certain imaginary surfaces extending out from airport runways or heliport landing or takeoff areas. Although the Project's two, 185-foot tall stacks did not trigger this requirement, CEF-O determined it was important to obtain documentation from the FAA for its records to support financing of the Project. The presence of other tall structures located in proximity of the proposed stacks, such as the two Oregon Clean Energy Center 240-foot tall stacks, which received a Determination of No Hazard from the FAA on January 30, 2013 and February 2, 2013, leads CEF-O to expect the FAA to issue Determinations of No Hazard for the two proposed Project stacks. An FAA Notice was submitted for the Project on April 5, 2017.

Section 4906-4-07: Figures

- **Figure 07-1: Air Monitoring Stations and Major Source Mapping**
- **Figure 07-2: Air Modeling Isopleths: 1-hour NO_2 Normal Operations (5-year Average)**
- **Figure 07-3: Air Modeling Isopleths: Annual NO_2**
- **Figure 07-4: Air Modeling Isopleths: 1-hour CO**
- **Figure 07-5: Air Modeling Isopleths: 8-hour CO**
- **Figure 07-6: Air Modeling Isopleths: 24-hour PM_{10}**
- **Figure 07-7: Air Modeling Isopleths: Annual PM_{10}**
- **Figure 07-8: Air Modeling Isopleths: 24-hour $PM_{2.5}$ (5-year Average – NAAQS)**
- **Figure 07-9: Air Modeling Isopleths: Annual $PM_{2.5}$ (5-year Average – NAAQS)**
- **Figure 07-10: Air Modeling Isopleths: 24-hour $PM_{2.5}$ (PSD)**
- **Figure 07-11: Air Modeling Isopleths: Annual $PM_{2.5}$ (PSD)**
- **Figure 07-12: Air Modeling Isopleths: 1-hour SO_2 (5-year Average)**
- **Figure 07-13: Air Modeling Isopleths: 3-hour SO_2**
- **Figure 07-14: Air Modeling Isopleths: 24-hour SO_2**
- **Figure 07-15: Air Modeling Isopleths: Annual SO_2**
- **Figure 07-16: Air Navigation Facilities**



Legend

- ☆ Project Site
- 5-Mile Radius
- CO Monitor (26-163-0001)
- NO_2 Monitor (26-163-0094)
- Ozone (O_3) Monitor (39-095-0024)
- PM_{10} Monitor (26-163-0001)
- $PM_{2.5}$ Monitor (39-095-0024)
- SO_2 Monitor (39-095-0008)
- Emission Source

Figure 07-1
Air Monitoring Stations and Emission Source Mapping

Oregon Energy Center
Lucas County, Ohio

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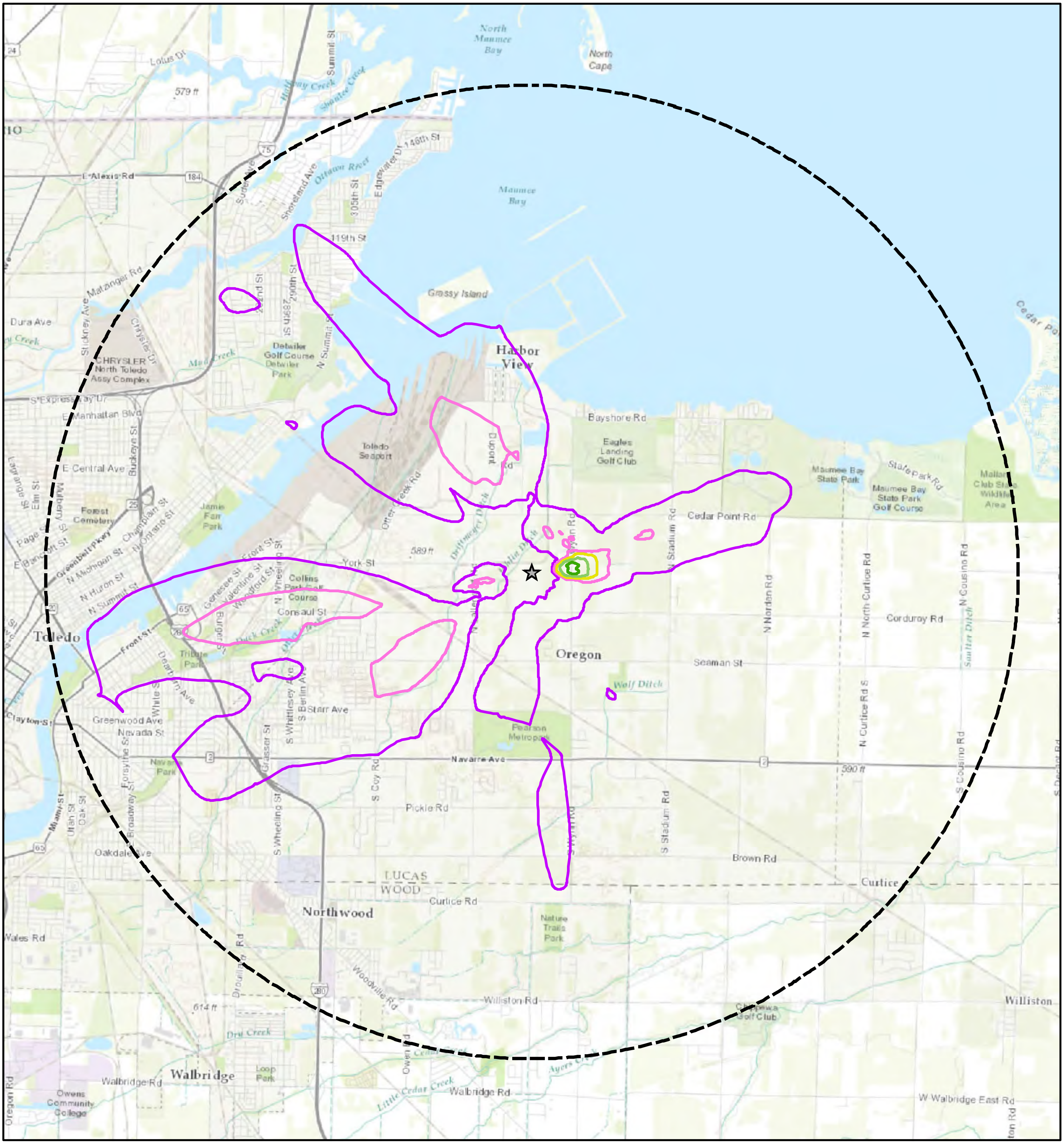

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Project Site

5-Mile Radius

1-hour NO_2 Concentration Contour (µg/m^3)

2.80 3.45 4.10 4.75 5.40

Maximum impact = 5.59 µg/m^3

0 0.5 1 2 Miles

Figure 07-2
Air Modeling Concentration Isopleths:
1-hour NO_2 Normal Operation
(5-year Average)

Oregon Energy Center
Lucas County, Ohio

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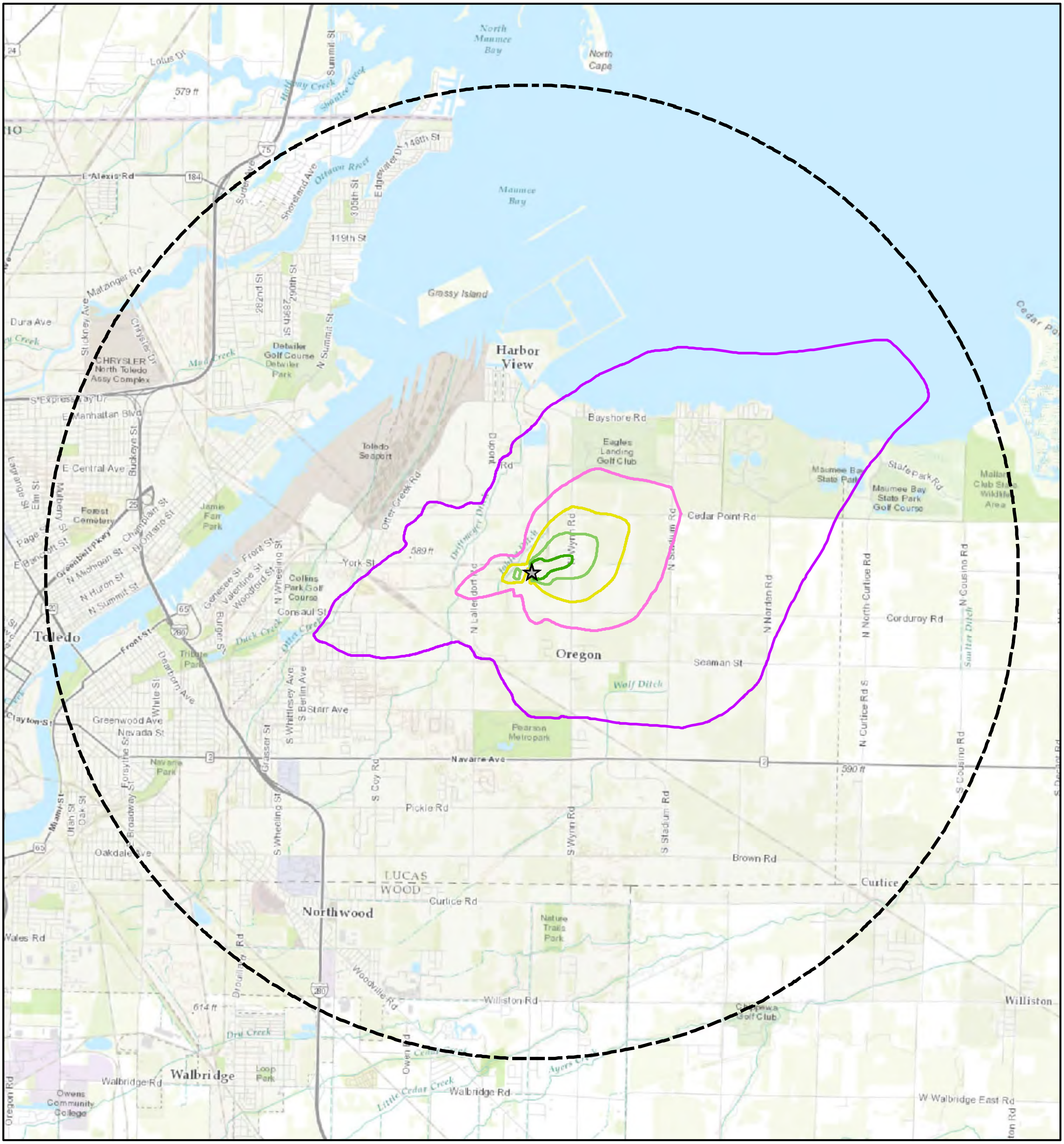

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☆ Project Site

5-Mile Radius

Annual NO_2 Concentration Contour ($\mu g/m^3$)

0.024 | 0.054 | 0.084 | 0.114 | 0.145

Maximum impact = 0.252 µg/m³

0 | 0.5 | 1 | 2 Miles

N

Figure 07-3
Air Modeling Concentration Isopleths: Annual NO_2

Oregon Energy Center
Lucas County, Ohio

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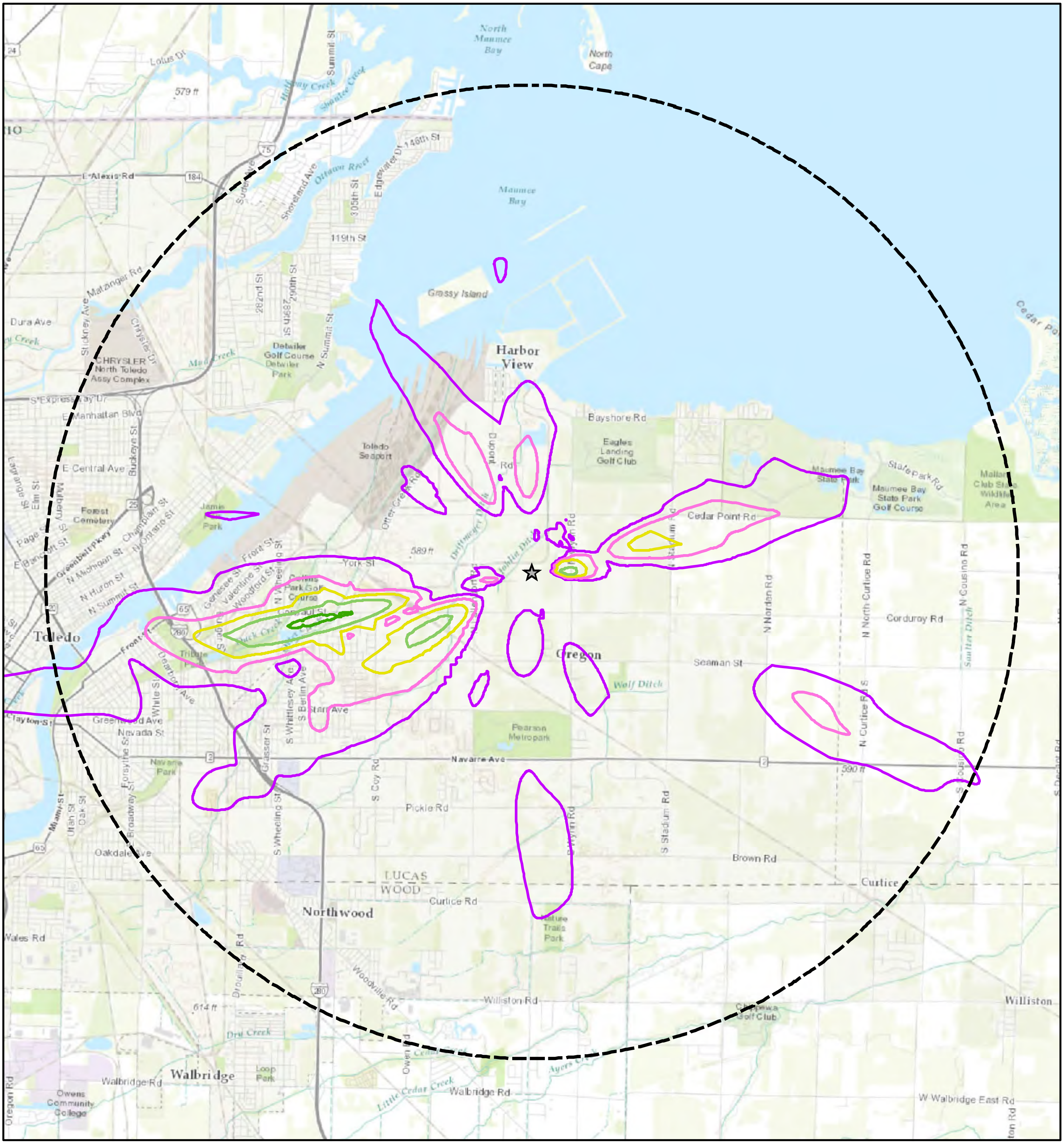

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★ Project Site

5-Mile Radius

1-hour CO Concentration Contour (µg/m^3)

140 172 204 236 268

Maximum impact = 273 µg/m^3

N

0 0.5 1 2 Miles

Figure 07-4
Air Modeling Concentration Isopleths: 1-hour CO

Oregon Energy Center
Lucas County, Ohio

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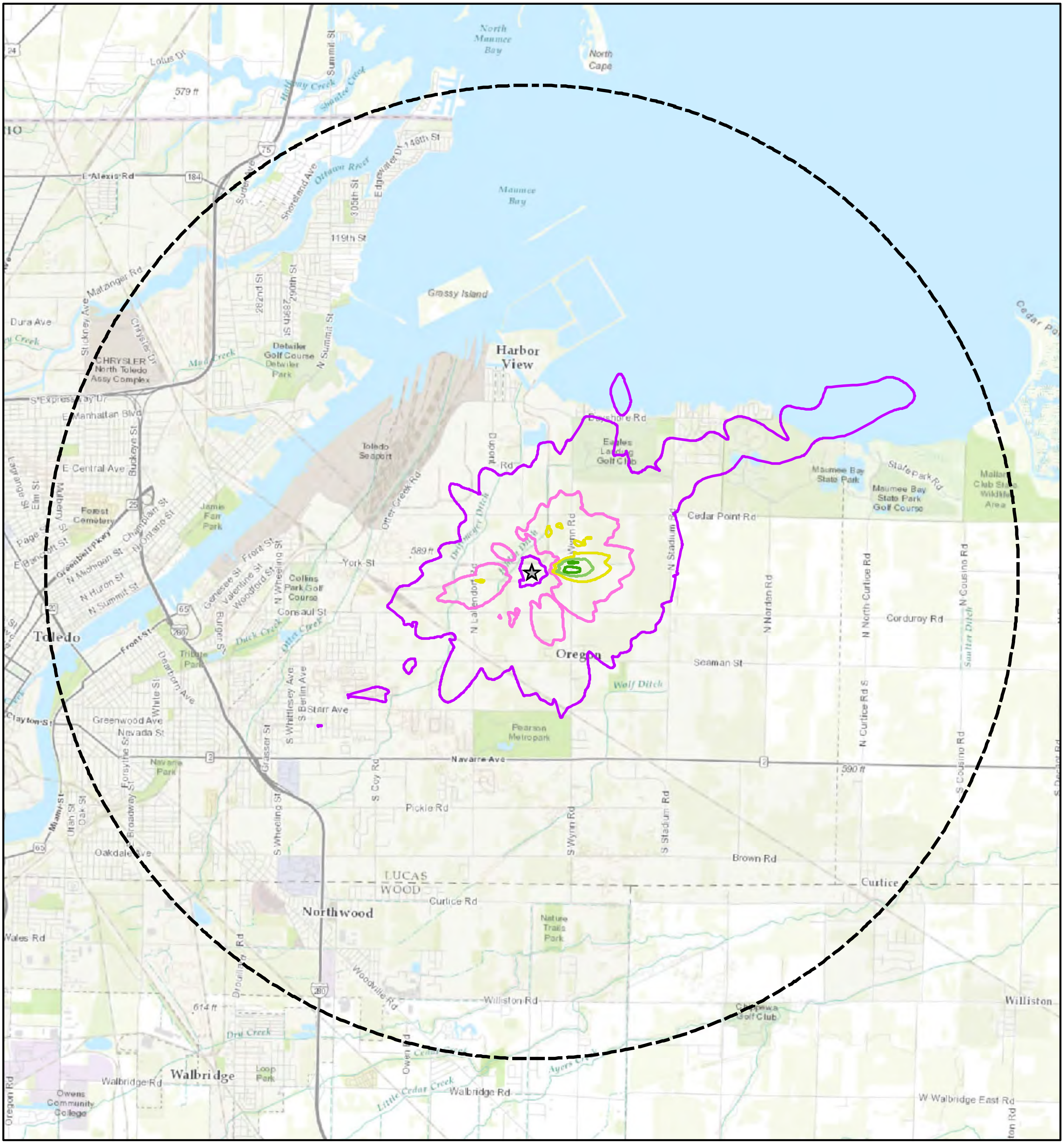

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☆ Project Site

5-Mile Radius

8-hour CO Concentration Contour (µg/m³)

11.8 | 21.3 | 30.8 | 40.3 | 49.8

Maximum impact = 53.8 µg/m³

N

0 0.5 1 2 Miles

Figure 07-5
Air Modeling Concentration Isopleths:
8-hour CO

Oregon Energy Center
Lucas County, Ohio

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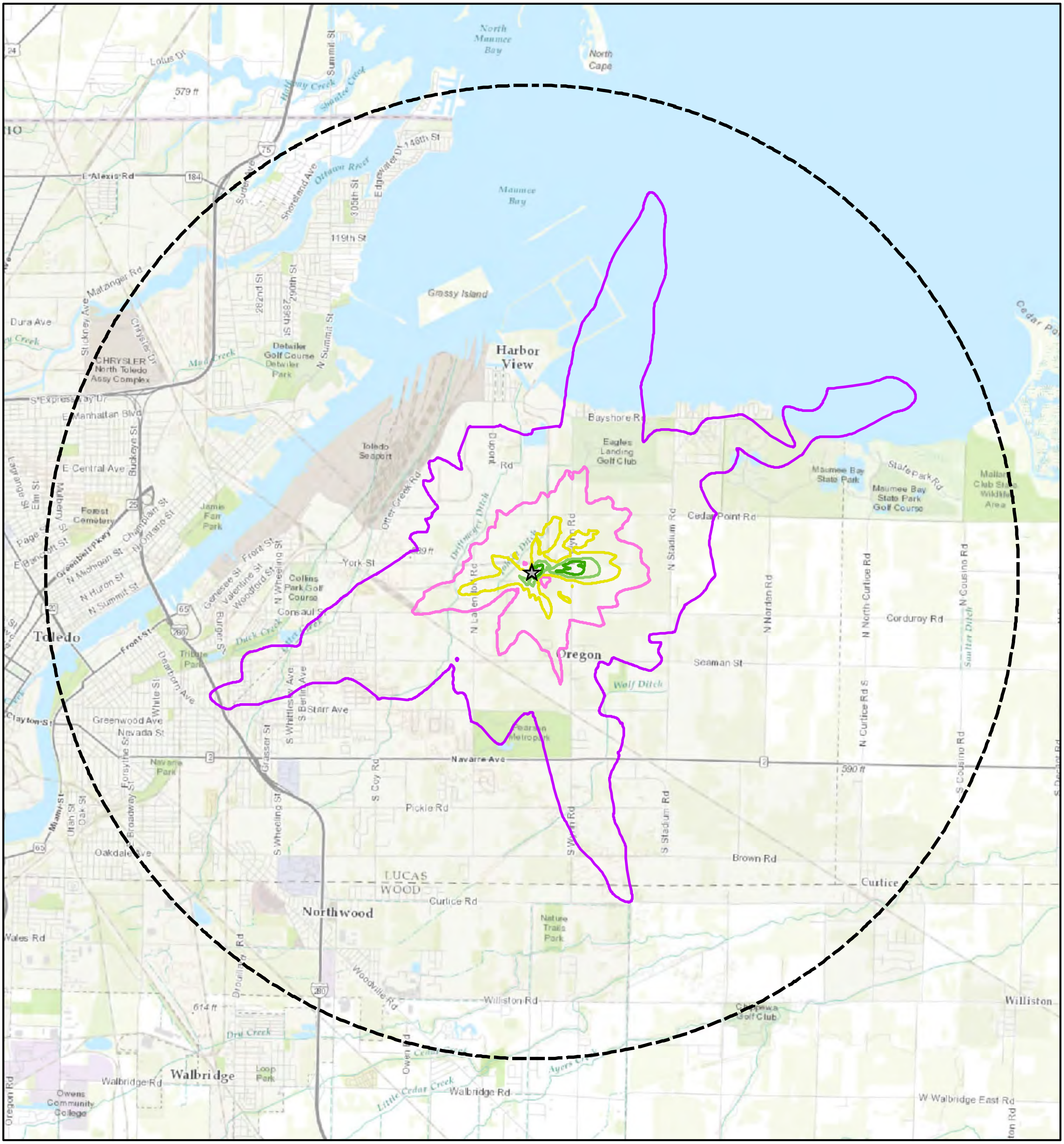

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☆ Project Site

5-Mile Radius

24-hour PM_{10} Concentration Contour µg/m³

0.32 | 0.62 | 0.92 | 1.22 | 1.52

Maximum impact = 2.58 µg/m³

N

0 0.5 1 2 Miles

Figure 07-6
Air Modeling Concentration Isopleths: 24-hour PM_{10}

Oregon Energy Center
Lucas County, Ohio

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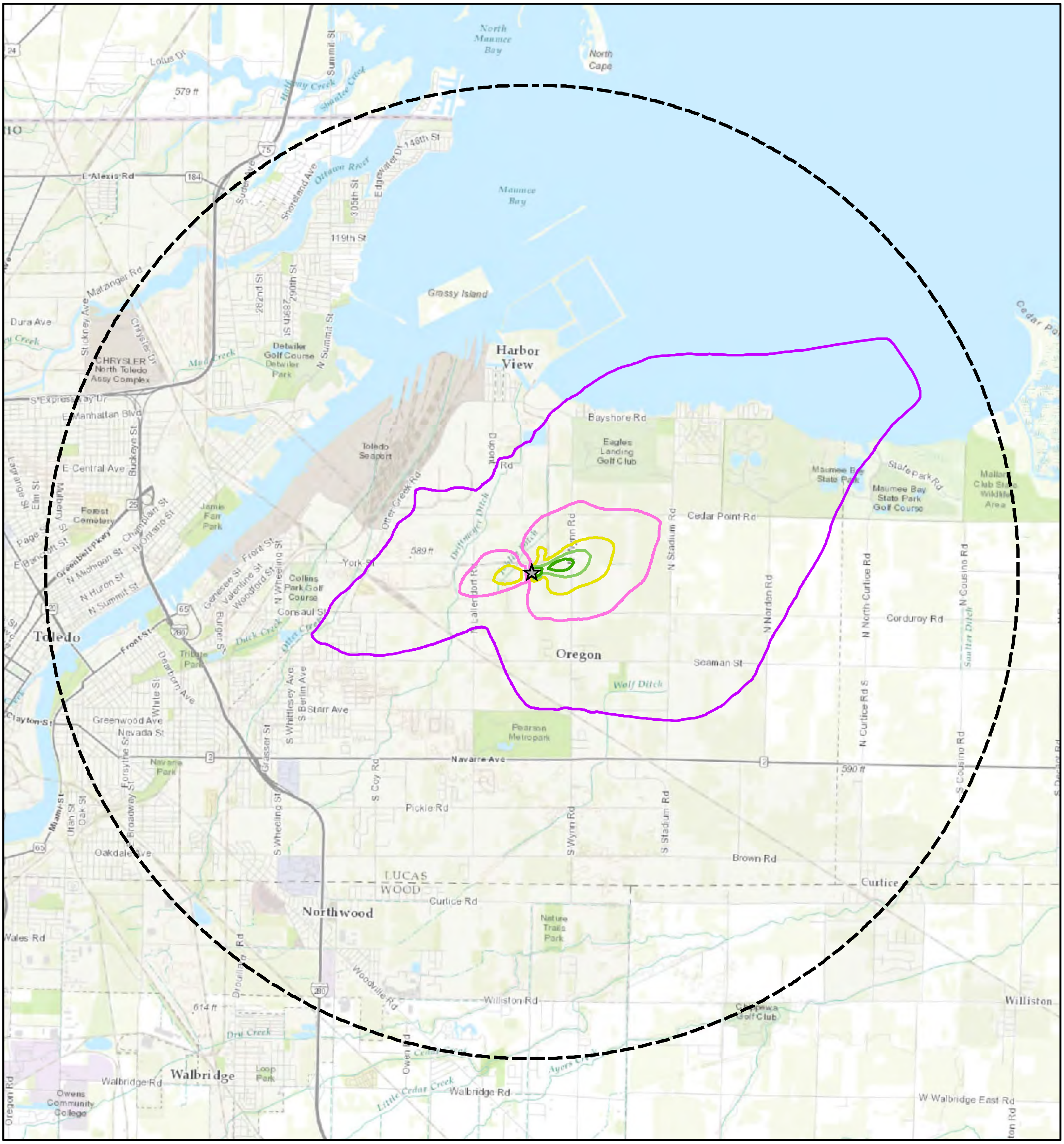

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☆ Project Site

5-Mile Radius

Annual PM_{10} Concentration Contour ($\mu g/m^3$)

0.018 | 0.051 | 0.084 | 0.117 | 0.150

Maximum impact = 0.279 $\mu g/m^3$

N

0 0.5 1 2 Miles

Figure 07-7
Air Modeling Concentration Isopleths: Annual PM_{10}

Oregon Energy Center
Lucas County, Ohio

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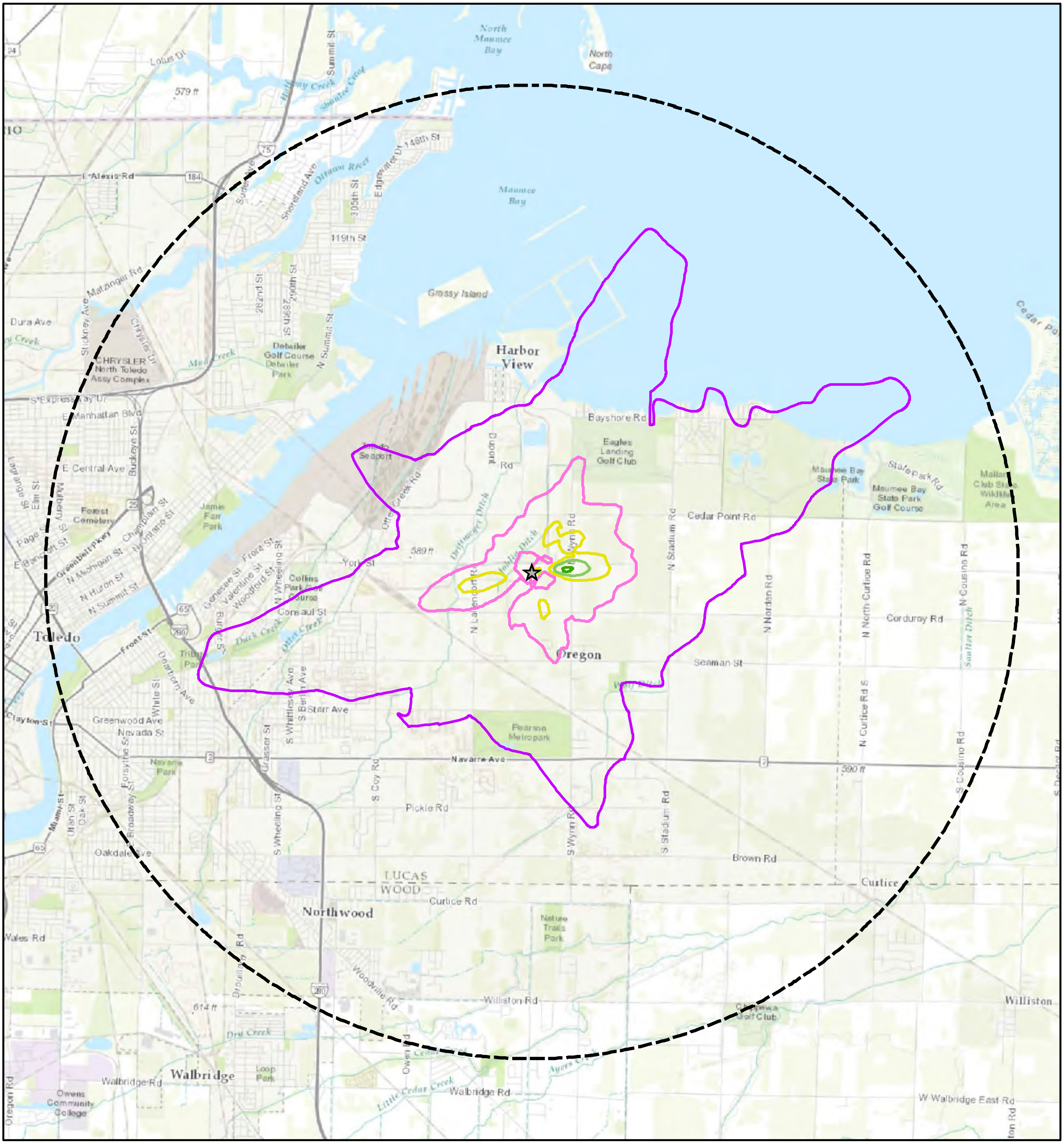

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☆ Project Site

5-Mile Radius

24-hour $PM_{2.5}$ Concentration Contour ($\mu g/m^3$)

0.16 | 0.40 | 0.64 | 0.88 | 1.12

Maximum impact = 1.51 $\mu g/m^3$

N

0 | 0.5 | 1 | 2 Miles

Figure 07-8
Air Modeling Concentration Isopleths:
24-hour $PM_{2.5}$
(5-year Average – NAAQS)

Oregon Energy Center
Lucas County, Ohio

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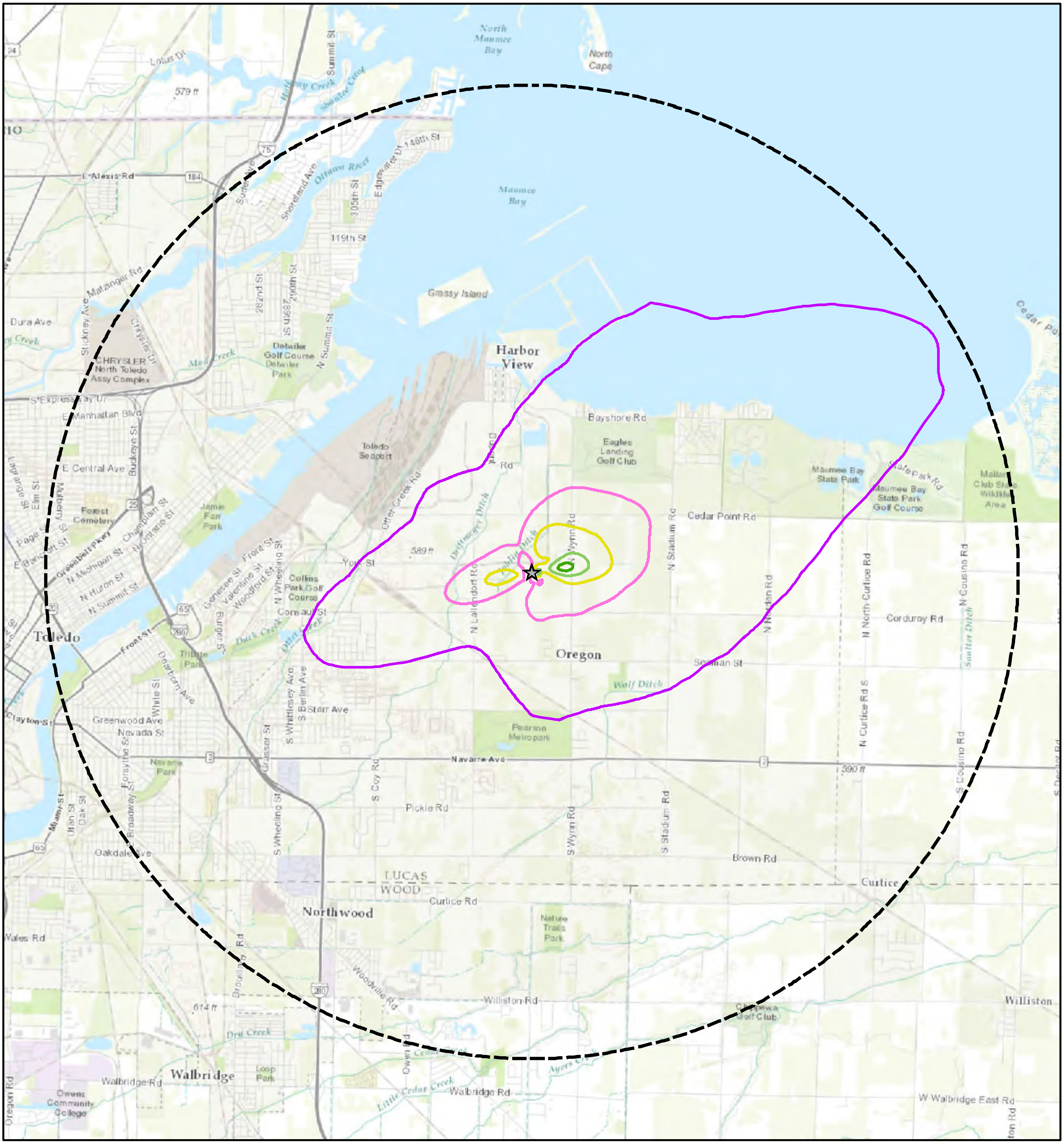

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☆ Project Site

5-Mile Radius

Annual $PM_{2.5}$ Concentration Contour ($\mu g/m^3$)

0.012 | 0.033 | 0.054 | 0.075 | 0.096

Maximum impact = 0.103 $\mu g/m^3$

N

0 | 0.5 | 1 | 2 Miles

Figure 07-9
Air Modeling Concentration Isopleths:
Annual $PM_{2.5}$
(5-year Average – NAAQS)

Oregon Energy Center
Lucas County, Ohio

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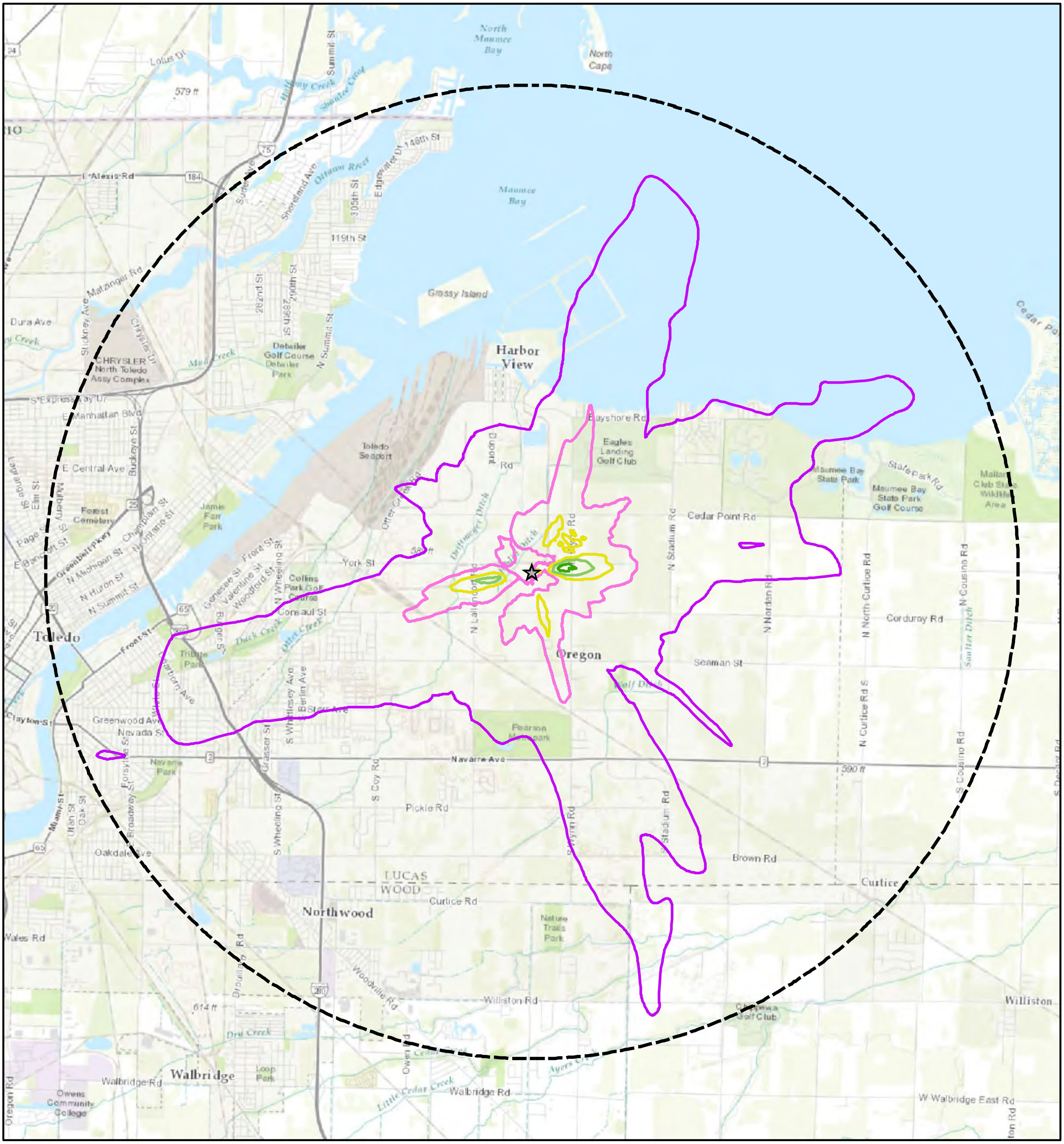

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☆ Project Site

5-Mile Radius

24-hour $PM_{2.5}$ Concentration Contour ($\mu g/m^3$)

0.21 | 0.51 | 0.81 | 1.11 | 1.41

Maximum impact = 1.53 $\mu g/m^3$

N

0 | 0.5 | 1 | 2 Miles

Figure 07-10
Air Modeling Concentration Isopleths:
24-hour $PM_{2.5}$ (PSD)

Oregon Energy Center
Lucas County, Ohio

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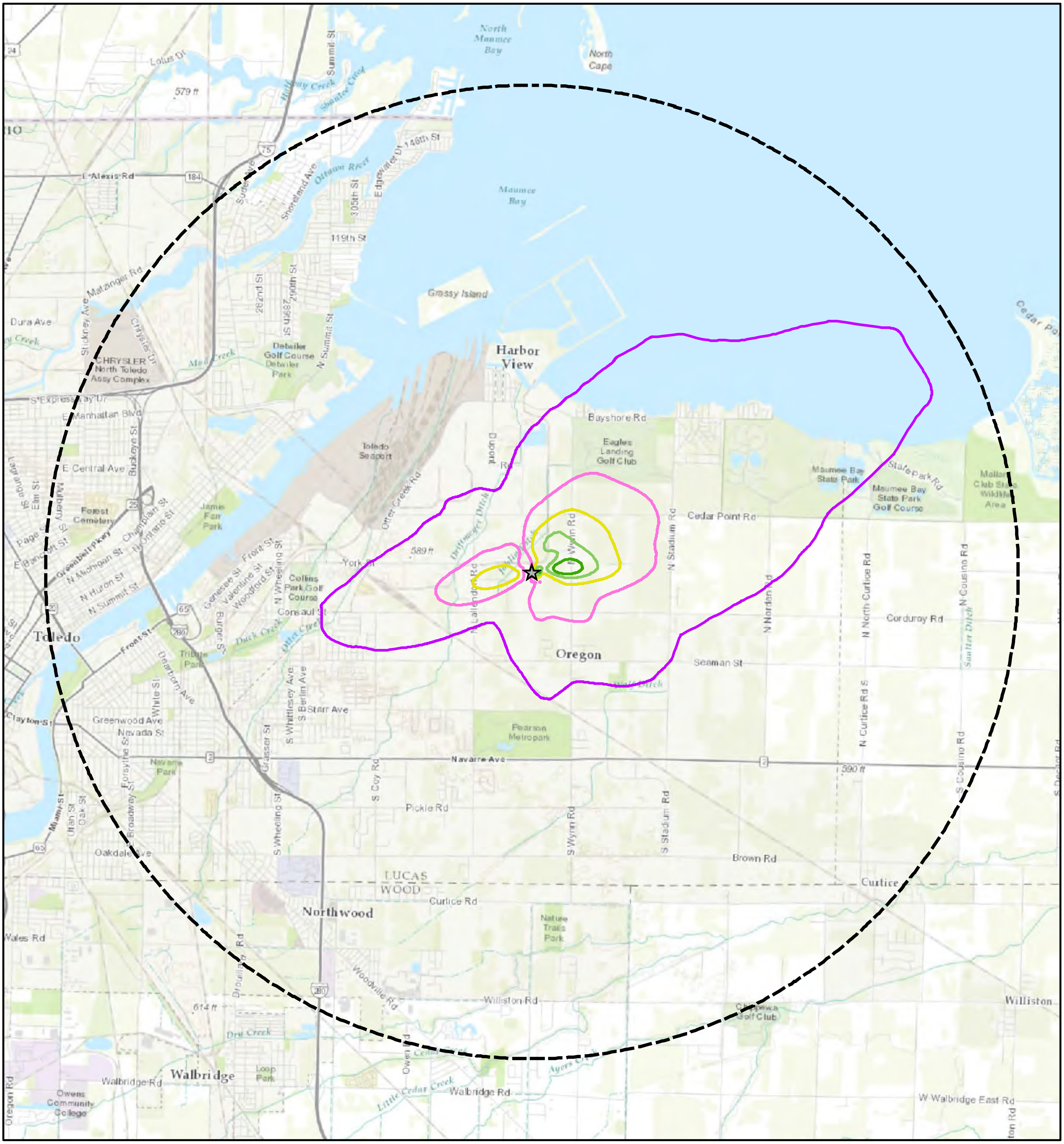

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☆ Project Site

5-Mile Radius

Annual $PM_{2.5}$ Concentration Contour ($\mu g/m^3$)

0.014 | 0.033 | 0.052 | 0.071 | 0.09

Maximum impact = 0.11 $\mu g/m^3$

N

0 0.5 1 2 Miles

Figure 07-11
Air Modeling Concentration Isopleths: Annual $PM_{2.5}$ (PSD)

Oregon Energy Center
Lucas County, Ohio

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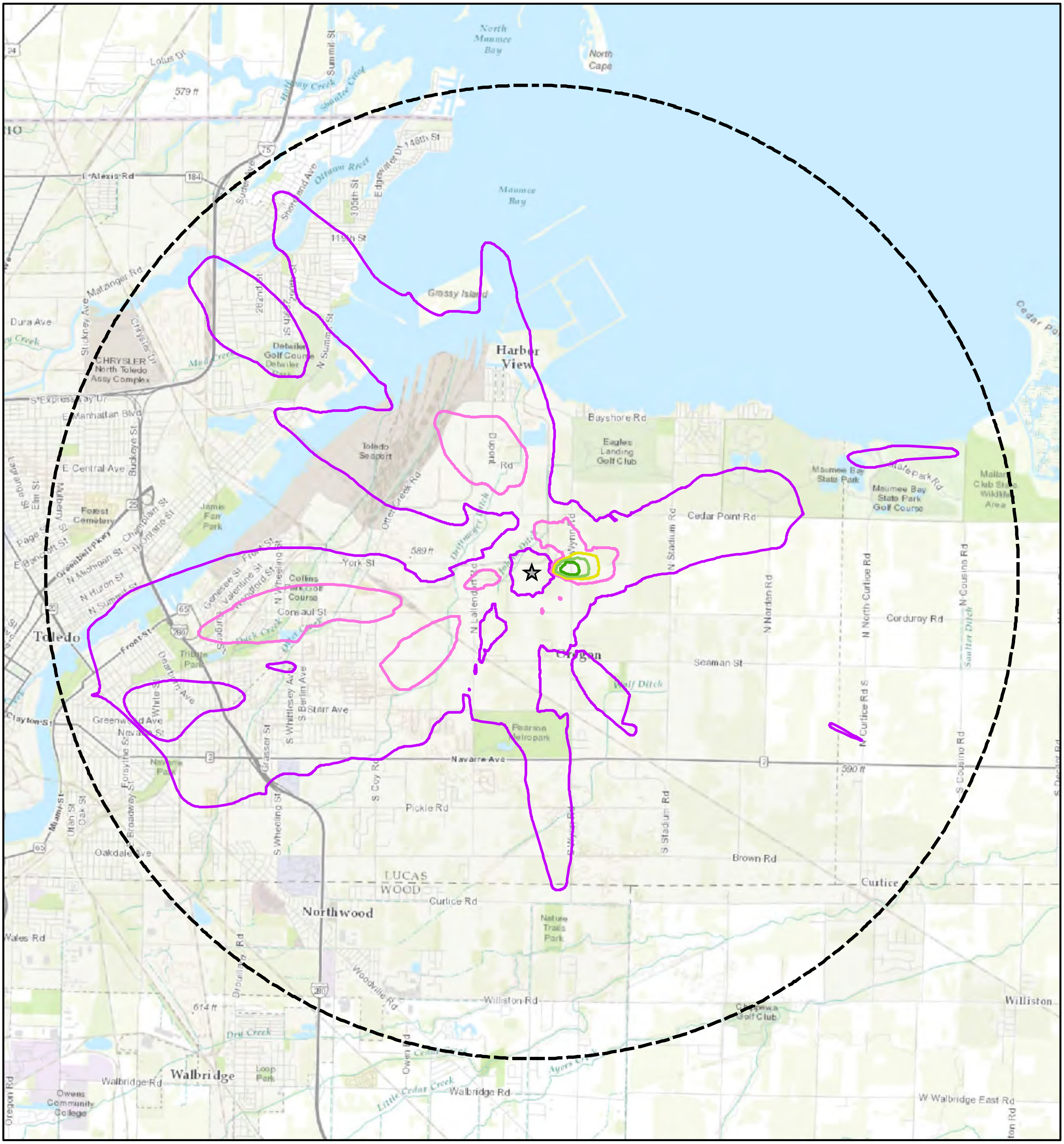

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Project Site

5-Mile Radius

1-hour SO_2 Concentration Contour (μg/m^3)

0.86 | 1.11 | 1.36 | 1.61 | 1.86

Maximum impact = 2.02 μg/m^3

N

0 0.5 1 2 Miles

Figure 07-12
Air Modeling Concentration Isopleths:
1-hour SO_2
(5-year Average)

Oregon Energy Center
Lucas County, Ohio

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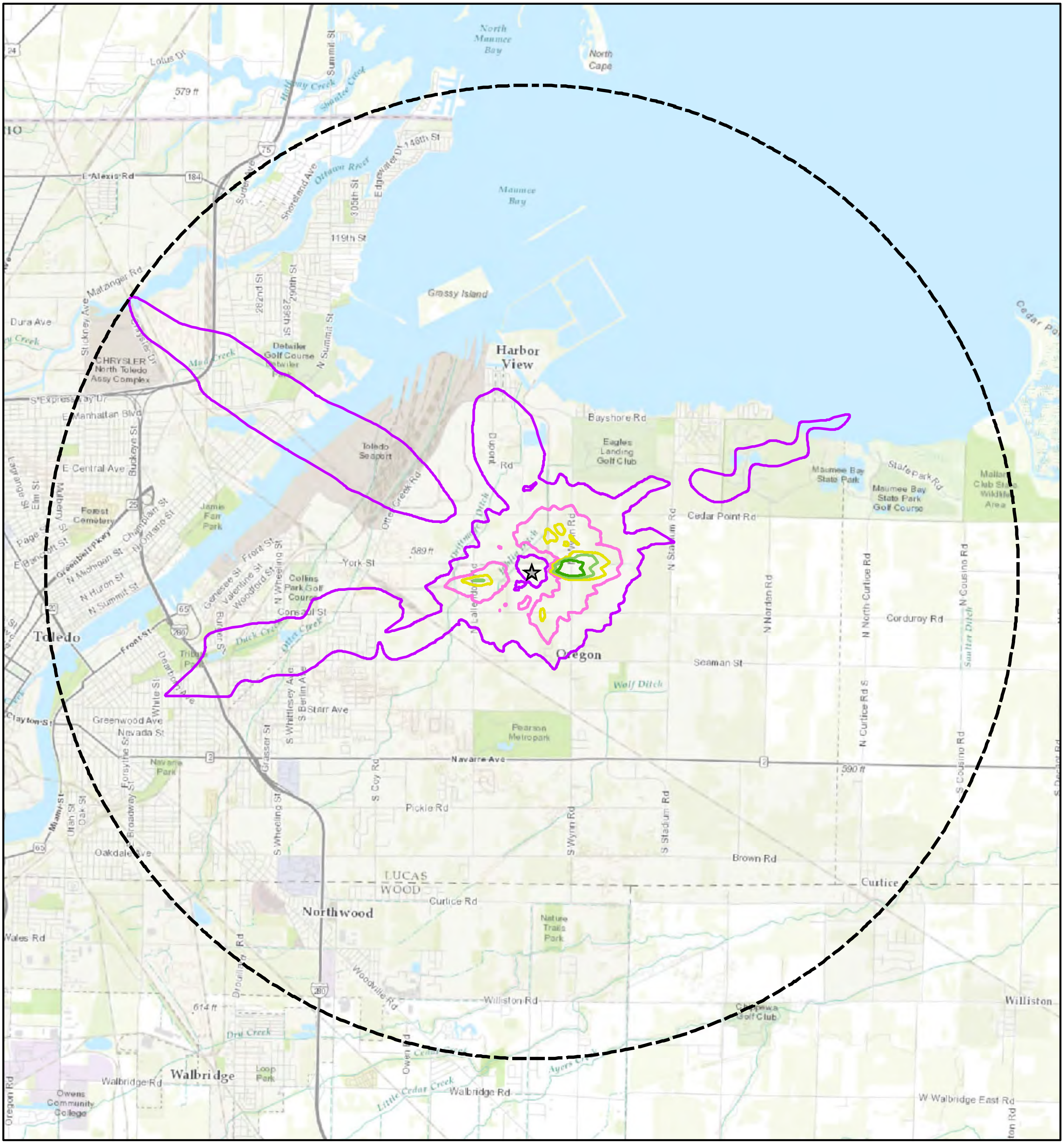

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☆ Project Site

5-Mile Radius

3-hour SO_2 Concentration Contour (µg/m^3)

0.64 | 0.89 | 1.14 | 1.39 | 1.64

Maximum impact = 2.04 µg/m^3

N

0 0.5 1 2 Miles

Figure 07-13
Air Modeling Concentration Isopleths:
3-hour SO_2

Oregon Energy Center
Lucas County, Ohio

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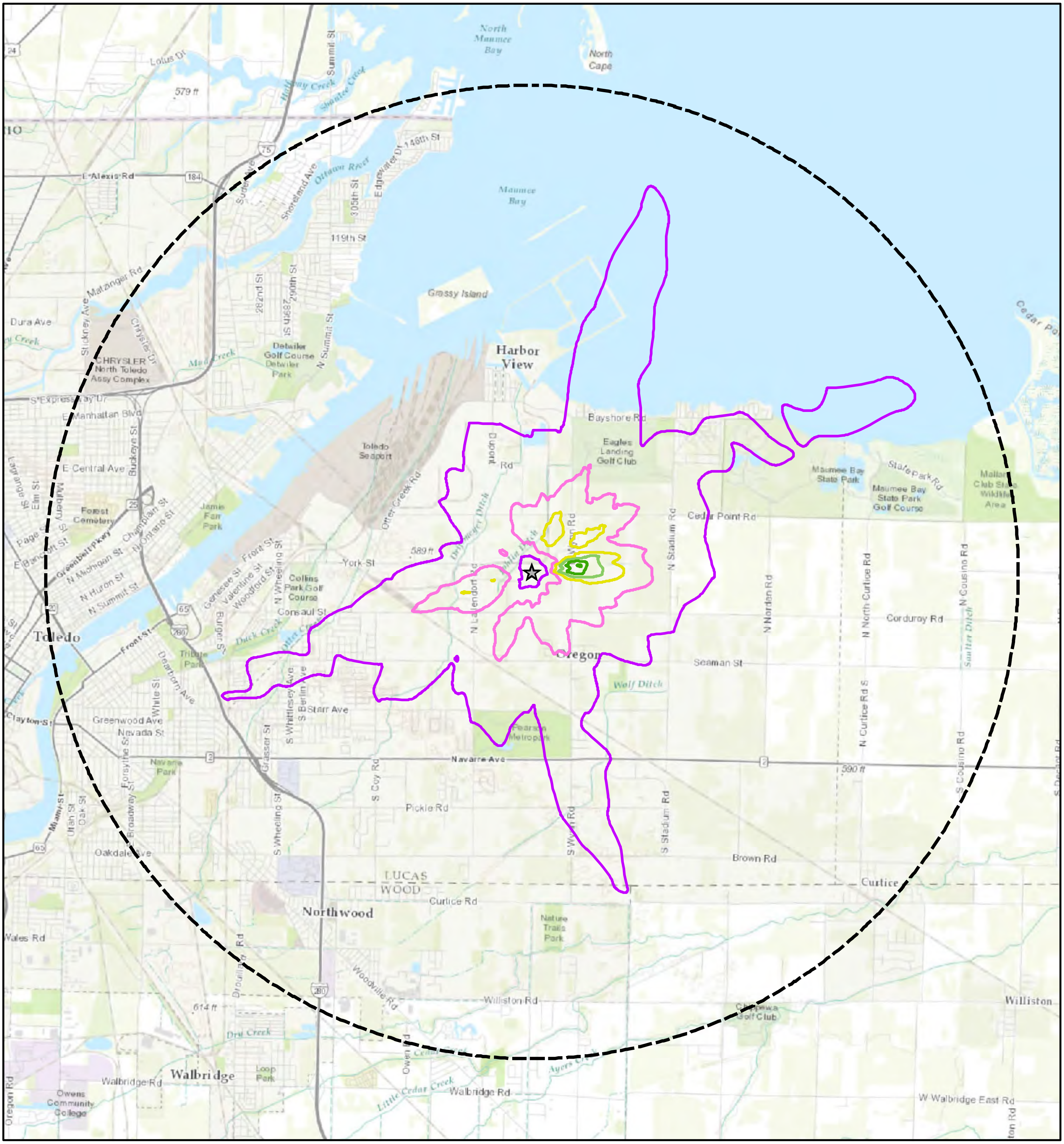

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☆ Project Site

5-Mile Radius

24-hour SO_2 Concentration Contour (µg/m^3)

0.098 | 0.176 | 0.254 | 0.332 | 0.41

Maximum impact = 0.45 µg/m^3

N

0 | 0.5 | 1 | 2 Miles

Figure 07-14
Air Modeling Concentration Isopleths:
24-hour SO_2

Oregon Energy Center
Lucas County, Ohio

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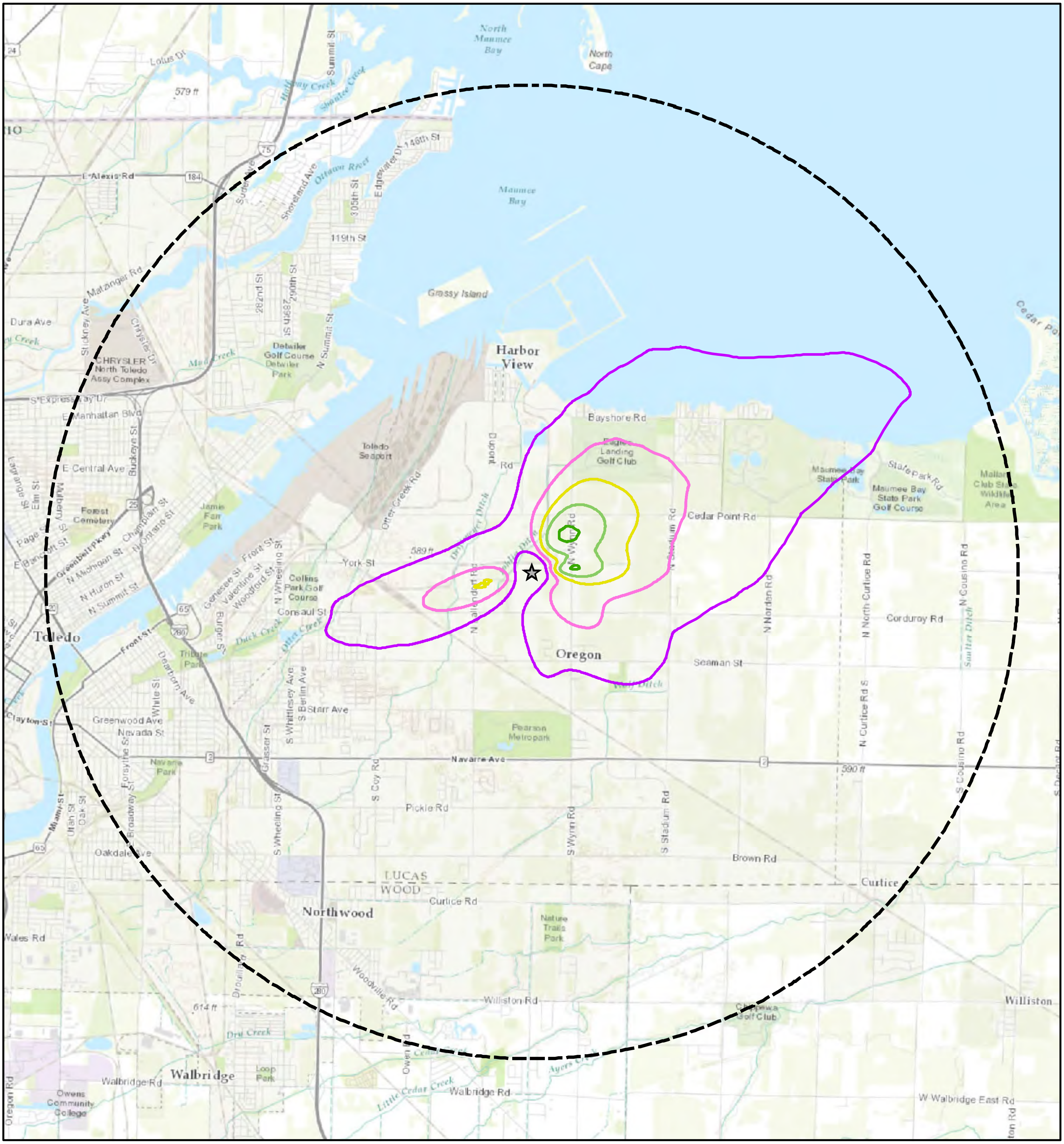

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Project Site

5-Mile Radius

Annual SO_2 Concentration Contour (µg/m^3)

0.006 0.010 0.014 0.018 0.022

Maximum impact = 0.023 µg/m^3

N

0 0.5 1 2 Miles

Figure 07-15
Air Modeling Concentration Isopleths:
Annual SO_2

Oregon Energy Center
Lucas County, Ohio

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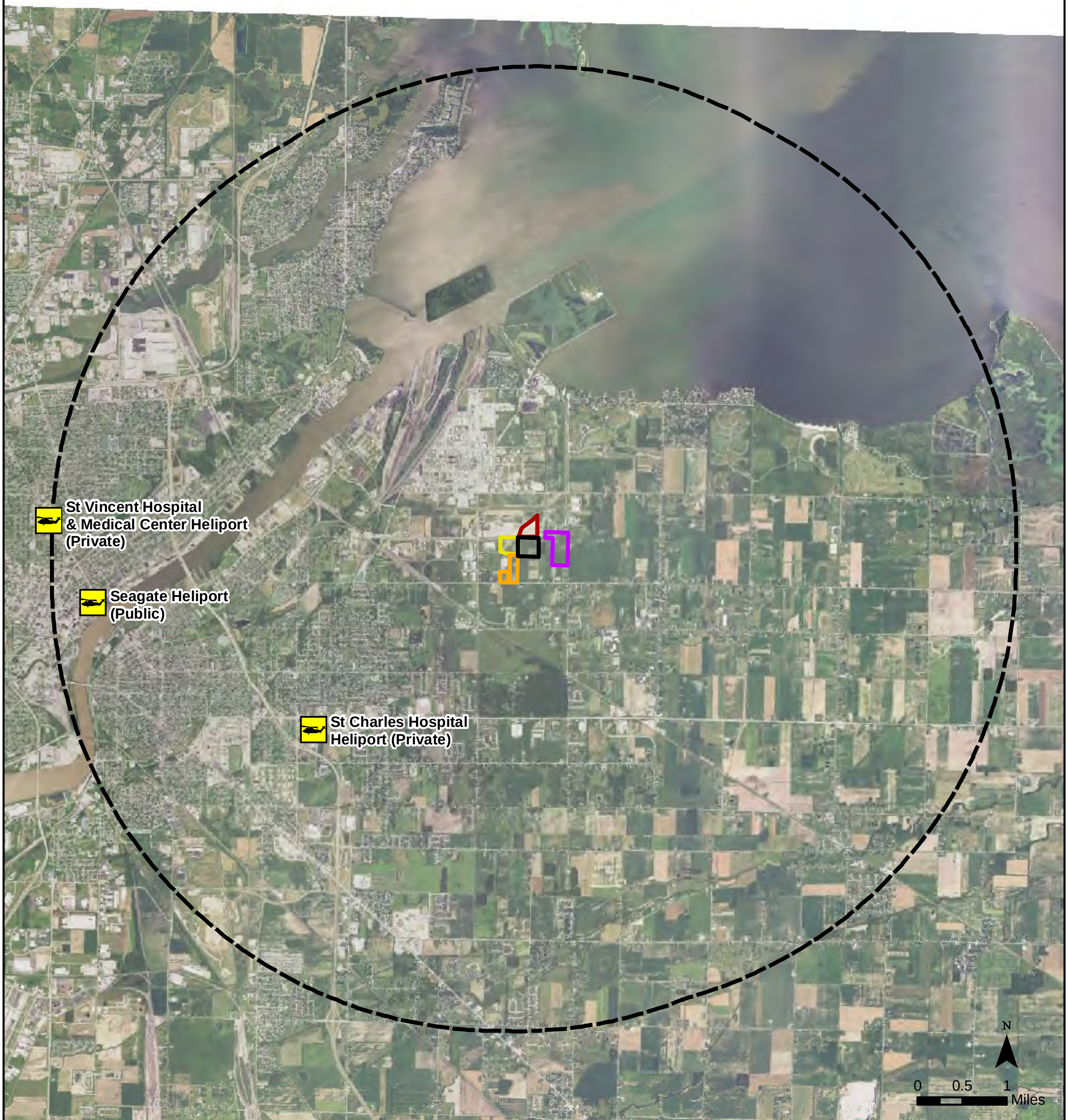

Legend

- Airport/Heliport
- Project Site
- Electrical Interconnection Property
- Eastern Laydown Area
- Southern Laydown Area
- Western Laydown Area
- 5-mile Radius

Figure 07-16
Air Navigation Facilities

Oregon Energy Center
Lucas County, Ohio

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4906-4-08 Health and Safety, Land Use, and Ecological Information

The data presented in this section are intended to provide a basis for assessing the costs and benefits of the Project with regard to health and safety; ecology; land use; community development; cultural and aesthetic qualities; public responsibility; and agricultural district land.

(A) HEALTH AND SAFETY

(1) Equipment Safety

(a) Public Safety Equipment

There will be no public access to the Project Site. A security fence will be installed around the Project with card-activated gates and Project operator access control.

Occupational Safety and Health Administration (OSHA) requirements will be implemented to ensure worker safety during Project construction and operation. NFPA standards will also be implemented to maintain a safe working environment. Various alarms and control systems will be installed to provide early detection and identification of emergency situations. In addition, the Project's fire protection system will consist of hydrants; hose stations; and portable fire extinguishers placed throughout the Project Site, as well as a sprinkler system, a deluge system, and a CO_2 monitoring system. During construction and operation, chemicals and hazardous substances will be appropriately handled, stored, and disposed of, in accordance with applicable regulatory requirements and manufacturer recommendations.

(b) Equipment Reliability

The reliability of the DLN system, because it is an integral combustion turbine component, exceeds combustion turbine reliability. A failure of a DLN combustor would require that the respective turbine be shut down. The oxidation catalyst is similarly integral to overall Project operation. The SCR system is of high reliability. Ceramic block life span varies by manufacturer, with replacement normally completed during a regularly scheduled preventative maintenance outage lasting a couple of days. The CEMS will detect a deterioration of performance well before a failure of the catalyst occurs. At no time will a unit operate if its respective SCR is not functioning properly.

(c) Safety Manuals

No safety manuals are available for the generation equipment. CEF-O will develop an Emergency Response Plan and will follow safety practices typical for facilities of this type during both construction and operation. Setback requirements are relevant for wind turbines, which are not proposed for this Project.

(d) Public Access

There will be no public access to the Project Site. A security fence will be installed around the Project Site, with card-activated gates and Project operator access control.

(e) Emergency Plans

Safety is extremely important to CEF-O; additional procedures will be put in place prior to initiation of construction in order to anticipate and prepare for potential emergencies. An Emergency Response Plan will be prepared prior to construction mobilization and will be designed and written to assist the Project's management, workers, and outside responding entities through emergency response actions at the Project. The Emergency Response Plan will be developed in consultation with local emergency responders to address the various types of potential emergencies and available emergency resources (equipment and personnel). The City of Oregon Police Station and Fire Department are located on Seaman Road, approximately 1.2 and 0.9 miles southeast of the Project Site, respectively. CEF-O will collaborate with local emergency responders to develop a detailed plan that outlines: the appropriate level of response; principles to be applied during a response; detailed steps for initial response, containment, rescue, first aid, and evacuation; and the process for updating and modifying the emergency procedures. Local emergency response personnel and Project staff will be trained on emergency procedures to ensure prompt and efficient response in the event of an emergency. Coordination will also occur with personnel at Mercy St. Charles Hospital, approximately 3.1 miles southwest of the Project Site.

(2) Impact of Air Pollution Control Equipment Failures

No impacts to the population are anticipated as a result of air pollution control equipment failures.

The pollution control equipment consists primarily of the DLN combustion, SCR, and the oxidation catalyst system. This equipment has been proven to be reliable, safe and efficient. The DLN control is built into the combustion chamber of the combustion turbine. If a DLN combustor fails, there are detection systems that will notice the failure and automatically initiate shutdown informing the operator to initiate corrective action.

The typical life span of a combustor is based upon the number of starts and hours of operation. The turbine manufacturer recommends periodic maintenance, including inspection of the combustor at specific intervals, which will minimize the risk of in-service failure of any of the components.

Performance of the combustor is also monitored in the Project's computer control system, which will detect degradation in a combustor prior to failure. The CEMS would also detect changes in emissions.

The SCR and oxidation catalyst systems are integral parts of the HRSG. Steel framework is erected in the combustion turbine exhaust gas path along with the HRSG boiler tubes. This framework holds catalyst blocks. The oxidation catalyst is a passive device (no reagent required). Aqueous NH_3 is distributed into the exhaust gas stream ahead of the SCR catalyst blocks to achieve the chemical reaction for NO_X reduction. The catalyst blocks for both systems must be periodically replaced. Their life span varies by manufacturer; however, replacements would typically be completed during a regularly scheduled preventative maintenance outage. The CEMS will detect a deterioration of performance well before a failure of the catalyst could occur. In addition, the Project will have a sophisticated computer control system that has the ability to automatically shut down the unit quickly, if necessary.

(3) Noise

An analysis of construction and operational sound anticipated from the Project has been completed, as outlined in the following sections and detailed in Appendix E.

Energy is required to produce sound and this sound energy is transmitted through the air in the form of sound waves – tiny, quick oscillations of pressure just above and just below atmospheric pressure. These oscillations, or sound pressures, impinge on the ear, creating the sound we hear. Since the range of human hearing is so wide, sound levels are expressed in terms of decibels (dB). The sound pressure level in dB is the logarithm of the ratio of the sound pressure of the source to the reference sound pressure of 20 microPascals (μPa), multiplied by 20. The range of sound pressures that can be detected by a person with normal hearing is very wide, ranging from about 20 μPa for very faint sounds at the threshold of hearing to nearly 10 million μPa for extremely loud sounds, such as a jet during take-off at a distance of 300 feet.

An inherent property of the logarithmic dB scale is that the sound pressure levels of two separate sources are not directly additive. For example, if a sound of 50 dB is added to another sound of 50 dB, the result is a 3 dB increase (or 53 dB), not an arithmetic doubling of 100 dB.

Since the human ear does not perceive every frequency with equal loudness, spectrally-varying sounds are often adjusted with a weighting filter. The A-weighted filter is applied to compensate for the frequency response of the human auditory system, and is represented in A-weighted decibels (dBA).

While the concept of sound is defined by the laws of physics, the term "noise" has further qualities of being excessive or loud, and is subjective. The perception of sound as noise is influenced by technical factors such as intensity, sound quality, tonality, duration, and the existing background levels, which may mask new sources.

Sound can be measured, modeled, and presented in various formats, with the most common metric being the equivalent sound level (L_{eq}). The L_{eq} has been shown to provide both an effective and uniform method for comparing time-varying sound levels and is widely used in acoustic assessments in the state of Ohio.

Estimates of noise sources and outdoor acoustic environments, and the comparison of relative loudness are presented in Table 08-1.

TABLE 08-1
RELATIVE LOUDNESS OF TYPICAL NOISE SOURCES

Noise Source or Activity	Sound Level (dBA)	Subjective Impression
Vacuum cleaner (10 feet)	70	Moderate
Passenger car at 65 mph[a] (25 feet)	65	
Large store air-conditioning unit (20 feet)	60	
Light auto traffic (100 feet)	50	Quiet
Quiet rural residential area with no activity	45	
Bedroom or quiet living room; bird calls	40	Faint
Typical wilderness area	35	
Quiet library, soft whisper (15 feet)	30	Very quiet
Wilderness with no wind or animal activity	25	Extremely quiet
High-quality recording studio	20	
Acoustic test chamber	10	Just audible
	0	Threshold of hearing

[a] miles per hour (mph)

Adapted from Kurze and Beranek (1988).

The OPSB does not define quantifiable sound limits either absolute or relative to existing conditions, but utilizes information regarding a facility's setting and sound generation to evaluate the acceptability of projected sound levels. Although the OPSB approval supersedes local requirements, consideration is also given to local standards. Section 531.14 of the Oregon Codified Ordinance limits fixed noise sources, and prohibits exceedances of specific limits at the affected property boundary (Table 08-2).

TABLE 08-2
CITY OF OREGON FIXED SOURCE SOUND LIMITS

Zoning District[a]	Time Period	Sound Level (dBA, L_{eq}[b])
R-1, R-2	10:00 pm – 7:00 am	55
	7:00 am – 10:00 pm	60
R-3, R-4	10:00 pm – 7:00 am	60
	7:00 am – 10:00 pm	65
C-1, C-2, C-3	10:00 pm – 7:00 am	65
	7:00 am – 10:00 pm	70
M-1	Anytime	70
M-2, C-I[c]	Anytime	75

[a] Note that agricultural districts have no sound level standards, although sound levels at residences within agriculturally zoned parcels are assumed to be required to meet the R-1 standards.

[b] Metric was not specified in the ordinances. However, Leq was selected based on the ordinance's noise measurement requirements.

[c] M-2 standards are applicable within the C-I zone, as was confirmed during the permitting for the Oregon Clean Energy Center.

Short-term and long-term ambient sound measurements were performed at six monitoring locations (MLs) in association with the adjacent Oregon Clean Energy Center. These MLs also surround the Project Site, and are representative of the closest land uses in the vicinity of the Project. Updated measurements were not taken, as on-going construction efforts in the vicinity would inappropriately alter sound levels, resulting in measurements that would not be representative of existing conditions. Therefore, this analysis uses short-term measurements of 15 minutes in duration recorded at each of the short-term MLs for a typical daytime (7:00 a.m. to 10:00 p.m.) period, and two long-term measurements, which were recorded continuously over a two-week period from October 16, 2012 to October 31, 2012. Typical daytime (7:00 a.m. to 10:00 p.m.)

and nighttime (10:00 p.m. to 7:00 a.m.) ambient sound levels were determined from this dataset.

The MLs are mapped on Figure 08-1 and described in Table 08-3. Table 08-3 also presents baseline monitoring results in terms of sound level metrics for each of the MLs.

TABLE 08-3
BASELINE SOUND MONITORING LOCATIONS AND MONTIORING RESULTS

Location	Type	Land Use	Coordinates	Distance and Direction from the nearest Project Site Boundary	Time Period	Sound Level Metrics (L_{eq}, dBA)
ML-1	Short-term	Industrial	41°40’23.5” N, 83°26’56.2”W	0.64 mile NW	Day	63
ML-2	Short-term	Residential	41°40’26.6” N, 83°25’24.6”W	0.81 mile NE	Day	53
ML-3	Short-term	Residential	41°39’34.6” N, 83°25’50.7”W	0.38 mile SE	Day	53
ML-4	Short-term	Commercial	41°39’31.9” N, 83°27’28.7”W	0.98 mile SW	Day	64
ML-1	Long-term	Industrial	41°40’3.9” N, 83°26’52.2”W	0.40 mile WNW	Day	56
					Night	55
ML-2	Long-term	Industrial	41°40’6.1” N, 83°26’20.7”W	0.11 mile N	Day	52
					Night	51

(a) Construction Noise

Construction of the Project is expected to be typical of other power generating facilities in terms of schedule, equipment, and activities. Construction is anticipated to require approximately 32 months. Nighttime construction is not generally expected, but activities may occur 6 days per week, 10 hours per day. The last 4 to 6 months of construction would include commissioning and startup, which will involve periodic steam blows.

Acoustic emission levels for activities associated with construction were based upon typical ranges of energy equivalent noise levels at construction sites, as documented by USEPA (USEPA, Technical Document NTID300.1, December 1971) and the USEPA's "Construction Noise Control Technology Initiatives" (USEPA, Technical Report No. 1789, September 1980). The USEPA methodology distinguishes between type of construction and construction phase. The five phases are: (1) demolition and site preparation; (2) excavation; (3) concrete pouring and construction of buildings; (4) mechanical; and (5) equipment installation and finishing work.

Using those energy equivalent noise levels as input to a basic propagation model, construction noise levels were calculated at the Project Site boundary and the four short-term MLs. Conservative assumptions are reflected in the modeling to represent anticipated construction conditions over the various phases of activity.

Table 08-4 summarizes the projected noise levels due to construction. As shown in Table 08-4, the highest projected noise level from construction related activity is expected to occur at ML-3, during activities associated with excavation, placement of major structural concrete foundations, and equipment installation, commissioning, and testing.

TABLE 08-4
ESTIMATED PROJECT CONSTRUCTION SOUND LEVELS BY PHASE

Construction Phase	USEPA Construction Noise Level 50 feet	Closest Property Line	ML-1	ML-2	ML-3	ML-4
Phase 1: Site clearing and grading	86	67	50	47	54	45
Phase 2: Excavation and placement of major structural concrete foundations	89	70	53	51	57	49
Phase 3: Erection of building structural steel	85	66	49	46	53	44
Phase 4: Installation of mechanical and electrical equipment	83	65	47	45	51	43
Phase 5: Equipment installation, commissioning, and testing of equipment	89	71	53	51	57	49

Reasonable efforts will be made to minimize the impact of noise resulting from construction activities at proximate noise sensitive areas through the use of noise mitigation. Because of the temporary nature of the construction noise, no adverse or long-term effects are expected.

(b) Operational Noise

Operational broadband (dBA) sound pressure levels were calculated using the Cadna-A® model for normal operation assuming that all components identified previously are operating continuously and concurrently at the representative manufacturer-rated sound levels.

Sound contour plots displaying the modeled broadband (dBA) sound levels presented as color-coded contours are provided in Figure 08-2. Figure 08-2 shows the mitigated anticipated noise levels due to the full, normal operation of Project equipment as noise contours in 5-dB intervals. The noise contours are graphical representations of the noise associated with full operation of all equipment associated with the Project and show how operational noise would be distributed over the surrounding area. The contour lines shown in the figures are analogous to elevation contours on a topographic map, i.e., the noise contours are continuous lines of equal noise level around some source, or sources, of noise.

Table 08-5 shows the projected exterior sound levels resulting from full, normal operation of the Project at the short-term MLs under the mitigated design, as well as the expected incremental increase in existing sound levels.

TABLE 08-5
ACOUSTICAL MODEL RESULTS SUMMARY – MITIGATED DESIGN

Location	Assumed Nighttime Ambient (L_{eq}, dBA)[a]	Project Sound Level (dBA)	Total Sound Level (Ambient + Project), (dBA)	Net Increase in Sound Level (dBA)
ML-1	51	44	52	+1
ML-2	51	44	52	+1
ML-3	51	50	54	+3
ML-4	51	42	52	+1

[a] The lower nighttime value was selected from the two long-term ambient measurement locations.

As shown in Table 08-5, the predicted sound levels at all four of the short-term MLs do not exceed the most stringent nighttime noise limit of 55 dBA. Figure 08-2 illustrates that, even at the two closest residential receptors, Project sound level impacts are also less than 55 dBA. An additional assessment was completed for these two residences to determine the cumulative effect of the Project with the recently constructed Oregon Clean Energy Center (Table 08-6).

TABLE 08-6
CUMULATIVE MODELING ASSESSMENT

Location	Assumed Nighttime Ambient (L_{eq}, dBA)[a]	Received Project Sound Level (dBA)	Received Oregon Clean Energy Sound Level (dBA)	Received Sound from Combined Project and Oregon Clean Energy Center (dBA)
R-1	51	53	47	54
R-2	51	54	48	55
[a] The lower nighttime value was selected from the two long-term ambient measurement locations.				

As shown in Table 08-6, even with both facilities operating, the more stringent 55 dBA residential requirement can be met.

(c) Noise-Sensitive Areas

The Project Site is located in an industrial setting, with the immediate surroundings dominated by active agricultural fields and industrial facilities. The closest residences are located approximately 0.24 mile (1,250 feet) south and 0.3 mile southeast of the Project Site. These residences are in the vicinity of a cluster of residences to the south-southeast, located along Corduroy and North Wynn Road. There are several residences located along North Lallendorf Road, approximately 0.45 mile west of the Project Site. The nearest school and hospital are located approximately 1.3 miles southeast and 3.0 miles southwest of the Project Site, respectively. The modeled sound contours illustrated in Figure 08-2 indicate anticipated received sound levels from the Project at noise sensitive locations within proximity of the Project Site.

(d) Noise Mitigation Measures

Construction Noise

Construction noise is difficult to control because of the mobile nature of its sources and the flexibility of schedule inherent in most construction work. However, construction is also temporary in nature. In order to mitigate the possible effect of noise caused during the temporary construction period, the following steps will be taken:

- Maintain construction tools and equipment in good operating order according to manufacturers' specifications.
- Limit use of major excavating and earth moving machinery to daytime hours.
- To the extent practicable, schedule construction activity during normal working hours on weekdays when higher sound levels are typically present, and are found acceptable (some limited activities, such as concrete pours, will be required to occur continuously until completion).
- Equip internal combustion engine used for any purpose on the job or related to the job with a properly operating muffler that is free from rust, holes, and leaks.
- For construction devices that utilize internal combustion engines, ensure the engine's housing doors are kept closed and install noise-insulating material mounted on the engine housing consistent with manufacturers' guidelines, if possible.

- Limit possible evening shift work to low-noise activities, such as welding, wire pulling, and other similar lower-noise activities, together with appropriate material handling equipment.
- Prior to the start of construction, implement the Complaint Resolution Plan, attached to the Sound Survey and Analysis Report (Appendix E), to address any complaints received from residents.
- Notify the community prior to extended periods of activity that could be temporarily disruptive to the community, especially specific loud noise activities, such as steam blows.

By scheduling the construction effort to be as efficient as possible, sound associated with construction activity will be minimized as the duration of the construction effort is minimized. Because of the temporary nature of the construction noise, no adverse long-term effects are anticipated.

Operational Noise

The Project will incorporate design features to minimize potential noise impacts on the surrounding community. Sound resulting from normal operation of the Project will be minimized through design measures both inherent in the equipment and added for additional attenuation. In addition to the inherent design measures of the Project (such as the location of major equipment enclosed within a building), in order to demonstrate that compliant sound levels can be achieved by the Project, noise mitigation was incorporated into the boiler feed water pumps that will reduce the overall sound power level to 108 dBA, equivalent to sound pressure level of 97 dBA at 3 feet.

In addition, equipment will include sound attenuation to meet the OSHA nearfield sound levels whenever practical. Hearing protection will be mandatory in any areas where this is not practical. For the balance of Project components, no additional mitigation is required beyond what is typically provided by the manufacturers as part of their standard design and the enclosures associated with Project design.

Adjustments to this mitigation will occur through final design, eliminating or modifying features as appropriate while maintaining sound level commitments. During final design, the noise analysis will be updated to reflect final design conditions and confirm that the Project has been adequately designed to meet the results as reflected in this Application.

(e) Existing Ambient Conditions

Existing ambient conditions, measured during the ambient sound survey, are summarized in Table 08-2, and further discussed in the Noise Report, provided as Appendix E.

(4) Water

No significant impact to water bodies is anticipated as a result of the Project. The Project will have a maximum water demand of about 5.4 mgd, and a maximum discharge of 0.58 mgd. Water for the Project will be supplied via the City of Toledo's potable water system. This source has abundant water and the ability to meet the Project's water needs without adverse effect to other users.

CEF-O's plan is to discharge Project wastewater into the City of Oregon POTW. If necessary, appropriate pre-treatment measures will be integrated into Project design.

Stormwater will be treated on-site through a settling and detention basin prior to release of storm flows to nearby ditches. Stormwater features and calculations are provided in Appendix A.

(a) Construction and Operation Impacts

Water from the City of Toledo will be obtained by the Project during Project commissioning, startup, and operation. Adequate water supply is available from the selected source, which can meet the Project's needs without constraining other uses.

Known groundwater well logs and oil and gas wells in areas surrounding the Study Area are shown on Figure 08-3; geologic conditions at the Project Site are shown on Figures 08-4a and 08-4b. As shown in Figure 08-3, there is one water well located on the western boundary of the Southern Laydown Area, but there are no other water or oil and gas wells located within the Study Area. The Project will utilize spill prevention practices to prevent impact to the water well on the Southern Laydown Area and prevent potential contamination of groundwater; the Project is not anticipated to have an influence on any private groundwater wells in the area.

Based on distance from the Project Site and use of BMPs for chemical use, potential impact to public or private water supplies is expected to be extremely low. In addition to design measures, staff will receive training on emergency procedures to ensure prompt and efficient response in the event of an accidental release to the environment.

(b) Impact of Pollution Control Equipment Failure

No impact to public or private water supplies is anticipated as a result of water pollution control equipment failures. Non-point source water pollution controls to be used at the Project Site consist of an oil/water separator for in-plant treatment of floor drains and equipment washdown areas, and containment devices around aboveground storage tanks and station transformers (outdoors). The oil/water separator will be regularly maintained to ensure good operating condition. The containment devices will be designed to collect stormwater. After completion of a visual inspection, collected stormwater will be released through the stormwater discharge system.

(c) Proximate Water Sources

Figure 08-3 identifies the locations of known water wells and drinking water source protection areas relative to the Project Site and laydown areas. No water wells are located on the Project Site. The closest well is located along the western boundary of the Southern Laydown Area, approximately 0.3 miles southwest of the Project Site, within an agricultural field off of Corduroy Road. A second well is located at 844 North Wynn Road, approximately 0.4 miles east of Project Site, on a residential property. No drinking water protection areas exist in the vicinity of the Project Site. The Project intends to use potable or raw water from the City of Toledo, and has no plans to develop an on-site groundwater well.

(d) Compliance with Water Source Protection Plans

Construction and operation of the Project will not impact any drinking water sources as the Project will discharge all wastewater to the City of Oregon POTW.

The Project will also employ BMPs for stormwater management to ensure that water quality standards are met and erosion and sedimentation will be minimized. Should blasting be required, a licensed professional will conduct the blasting activities in accordance with BMPs. Employing BMPs will ensure safety and mitigate impacts to area water sources.

(e) Potential for Flooding

As shown in Figure 08-5, no mapped 100- or 500-year flood zones exist within the Study Area. The closest mapped 100-year flood zone is associated with an unnamed drainage ditch located approximately 0.3 miles north of the Project Site. Based on the distance of mapped flood zones from the Project Site, it is not anticipated that the Project Site will be impacted by flooding.

(5) Geological Features

(a) Site Geology

As can be seen in Figures 03-1A and 03-1B, the Project is located entirely within the City of Oregon, Lucas County, Ohio. The Project Site is a square-shaped parcel encompassing an area of approximately 30 acres. Additional property within the Study Area consists of: the 42.5-acre Eastern Laydown Site located approximately 0.1 miles to the east; the 22-acre Western Laydown Site located adjacent to the west; the 23.5-acres Southern Laydown Site, located to the southwest; and the 20-acre Electrical Interconnection Property to the north. The Project Site is located at a latitude of 41°39’54” North and a longitude of 83°26’17” West.

The Project Site and other portions of the Study Area are in active agricultural use or in use for construction laydown. The Project Site is relatively flat, with elevations from 588 feet above mean sea level (amsl) to 590 feet amsl.

(b) Soils and Soil Suitability

Review of the United States Department of Agriculture (USDA) Natural Resources Conservation Service (NRCS) Web Soil Survey and the Soil Survey of Lucas County, Ohio indicates that the Project Area is comprised of the following soil units: Del Rey loam, 0 to 3 percent slopes (DdA); Fulton silty clay loam, 0 to 2 percent slopes (FuA); Latty silty clay, till substratum, 0 to 1 percent slopes (Lc); and Toledo silty clay, 0 to 1 percent slopes (To). The distribution of the soils are presented in Figure 08-5. Additional information detailing each soil unit is provided below, in the order of prevalence within the Project Area.

Lc, which covers approximately 92 percent of the Project Area, is a very poorly drained soil, commonly located in till-floored lake plains and wave-worked till plains, and is subject to frequent ponding. Depth to a restrictive feature is more than 80 inches. Depth to the water table is about 0 to 12 inches. Available water storage in the soil profile is moderate (about 6.8 inches).

FuA, which covers approximately 6 percent of the Project Area, is a somewhat poorly drained soil, commonly located on lake plains. The soil runoff is classified as high and this soil is not subject to ponding or flooding. Depth to a restrictive feature is more than 80 inches. Depth to the water table is 6 to 18 inches. Available water storage in the profile is moderate (about 7.9 inches).

To, which covers approximately 2 percent of the Project Area, is a very poorly drained soil, commonly located in lakebeds (relict), and subject to frequent ponding. Depth to restrictive feature is more than 80 inches. Depth to water table is about 0 to 12 inches. Available water storage in the soil profile is moderate (about 7 inches).

DdA, which covers approximately 1 percent of the Project Area, is a somewhat poorly drained soil, commonly located on till plains. The soil runoff is classified as high and this soil is not subject to ponding or flooding. Depth to a restrictive features is more than 80 inches. Depth to the water table is about 12 to 36 inches. Available water storage in the profile is moderate (about 8.6 inches).

Table 08-7 presents a summary of the soil properties and characteristics as provided by the USDA.[5]

TABLE 08-7
SOIL PROPERTIES AND CHARACTERISTICS

Soil Series	Depth Below Surface (inches)	Permeability (inches per hour)	Soil pH	Potential Frost Action	Shrink-Swell Potential
Latty silty clay, till substratum, 0 to 1 percent slopes (Lc)	0 – 10 10 – 46 46 - 65	0.06 – 0.2 0.06 – 0.2 < 0.06	6.1 to 7.3 6.6 to 7.8 7.4 to 8.4	Moderate	High High High
Fulton silty clay loam, 0 to 2 percent slopes (FuA)	0 – 9 9 – 32 39 – 60	0.6 - 2.0 0.06 – 0.2 < 0.2	5.6 to 7.3 5.6 to 7.8 7.4 to 8.4	Moderate	Moderate High High
Toledo silty clay, 0 to 1 percent slopes (To)	0 – 9 9 – 47 47 – 60	0.6 – 2.0 0.06 – 0.2 0.06 – 0.2	6.1 to 7.3 6.1 to 7.8 7.4 to 8.4	Moderate	High High High

[5] Source: Soil Survey of Lucas County, Ohio. United States Department of Agriculture, Soil Conservation Service. Issued June 1980.

Soil Series	Depth Below Surface (inches)	Permeability (inches per hour)	Soil pH	Potential Frost Action	Shrink-Swell Potential
Del Rey loam, 0 to 3 percent slopes (DdA)	0 – 8 8 – 34 34 – 60	0.6 – 2.0 0.06 – 2.0 0.06 – 2.0	5.1 to 6.5 6.1 to 8.4 7.9 to 8.4	High	Low Moderate Moderate

As previously noted, a preliminary geotechnical investigation has been completed on the Study Area (Appendix G) to determine the suitability of the subsurface soil for construction of the proposed Project.

(c) Geotechnical Evaluation Plan

A preliminary geotechnical investigation has been completed for the Project. A copy of the report is provided as Appendix G, with information summarized in this section of the OPSB Application and presented in Figures 08-4a and b.

Regional geologic maps from the Ohio Department of Natural Resources (ODNR) indicate that the Project Site is located in the Maumee Lake Plains of the Huron-Erie Lake Plains Physiographic Region. Within this region, specifically in proximity to Lake Erie, the upper profile geology includes predominantly Pleistocene-age silts and clays that were lake-laid (lacustrine) sediments, deposited in historic glacial lakes following retreat and melting of glacial ice. The lacustrine soils are underlain by glacial till deposits, underlain by sedimentary bedrock.

Based on reviews of the boring logs and laboratory test results provided in Appendix G, the subsoils encountered underlying the topsoil and crushed stone consist predominantly of cohesive, fine-grained glacial till soils, with lean clays, sand, and traces of gravel, underlain by dolomite bedrock. The bedrock in the borings consists is very strong dolomite encountered at approximately 73 feet below ground surface (bgs) (elevation of 515 feet amsl).

Groundwater was encountered during the drilling in 20 of the 30 investigative borings, at depths ranging from 5.5 to 14 feet bgs. Upon completion of drilling operations, groundwater was observed in 13 of the borings at depths ranging from 6 to 26 feet bgs. Since borings were drilled and backfilled within the same day, stabilized water levels may not have occurred over this limited time period. Instrumentation was not installed to observe long-term groundwater levels.

Based on soil characteristics and groundwater conditions, long-term groundwater levels are at approximately 8 feet or deeper. Groundwater elevations can fluctuate, with seasonal and climatic influences; in particular, "perched" water may be encountered in the crushed stone surface material.

According to "Earthquakes and Seismic Risk" by the ODNR Division of Geologic Survey (GeoFacts No. 3, May 2012), earthquake risk in Ohio is difficult to determine due to the infrequency of earthquake occurrences. Ohio is on the edge of the New Madrid Seismic Zone, an area centered in Missouri and extending into adjacent states. While at least 120 earthquakes with epicenters in Ohio have been reported since 1776, the areas of Ohio that are found to be most susceptible to seismic activity are western Ohio, and Cuyahoga, Lake, Geauga, and Ashtabula Counties in northeastern Ohio.

In western Ohio, Shelby County and surrounding counties have experienced more than 40 "felt" earthquakes since 1875. Most of these events caused little or no damage, however, earthquakes in 1875, 1930, 1931, and 1937 cause minor to moderate damage. Two earthquakes in 1937 caused significant damage to the community of Anna in Shelby County. Damage included toppled chimneys, cracked plaster, broken windows, and structural damage to buildings.

According to ODNR, recent seismic events recorded in the vicinity of the Project Site include two earthquakes with magnitudes of 2.5 in Lucas County in 2012 and Ottawa County in 2016; however, since 2010, the majority of recorded seismic events have occurred in central and northeastern Ohio.

Damage to structures during an earthquake is primarily the result of liquefaction of soils. For liquefaction to occur, appreciable sand strata (typically loose and/or saturated) must be present in the subsurface profile. Liquefaction potential due to seismic-induced motions does not represent a significant risk at the Project Site, since the subsurface profile, as determined by the test borings, is primarily medium stiff, cohesive lean clays. Therefore, due to the low number of recorded seismic events in the region and the presence of soils not susceptible to liquefaction from seismic events, damage to structures on the Project Site is unlikely.

Based on a review of geological and seismic information, geological issues are not expected to restrict development at the Project Site.

(6) Potential for High Wind Conditions

Figure 08-6 presents the distribution of wind speeds and directions for historic data collected at the Toledo Express Airport for the years 2010 through 2014 in the form of a wind rose. The prevailing wind direction, occurring approximately 12 percent of the time, is from the west southwest. The average wind speed is 7.37 knots (8.48 mph).

High winds (greater than or equal to 21.5 knots) have been recorded from the west southwest, west, and southwest. Calm winds (less than 1 knot [1.15 mph]) were recorded 1.3 percent of the time. High winds will not influence the Project.

(7) Potential Impact from Blade Shear

Since the proposed Project does not include the installation of any wind turbine equipment, this section is not applicable.

(8) Potential Impact from Ice Throw

Since the proposed Project does not include the installation of any wind turbine equipment, this section is not applicable.

(9) Potential Impact from Shadow Flicker

Since the proposed Project does not include the installation of any wind turbine equipment, this section is not applicable.

(10) Potential Impact to Radio and TV Reception

Since the proposed Project does not include the installation of any wind turbine equipment, this section is not applicable.

(11) Potential Impact to Radar Systems

Since the proposed Project does not include the installation of any wind turbine equipment, this section is not applicable.

(12) Potential Impact to Microwave Communications

Since the proposed Project does not include the installation of any wind turbine equipment, this section is not applicable.

(B) ECOLOGICAL RESOURCES

(1) Existing Ecological Resources

(a) Nearby Resources

Figure 08-7 shows the boundary of the Study Area and information including: the location of wood lots of vacant fields, delineated wetlands; surface bodies of water; slopes greater than 12 percent; and wildlife areas, nature preserves, and other conservation areas. No wildlife areas, nature preserves or other conservation areas are present in the Study Area or within 0.5 mile. Figure 08-8 illustrates the ecological impacts of construction the Project and its associated components (as further discussed in Section 4906-4-08(B)(2)(a)).

(b) Wetland and Surface Water Survey

A wetland and surface water determination was completed for the Project and laydown areas in October and December 2016 and January 2017 (Appendix H). As shown on Figure 08-7, no wetlands were identified on the Project Site. However, a surface water feature running north to south adjacent to the eastern boundary of the Eastern Laydown Area was identified. The surface water feature was determined to be an intermittent tributary of nearby Johlin Ditch. Johlin Ditch was also identified traversing the central portion of the Western Laydown Area, flowing from northwest to southeast. A drainage ditch was identified along the eastern border of the Southern Laydown Area. A man-made stormwater pond was also observed on the Western Laydown Area, but not classified as a wetland resource. No other wetland resources were identified on any portion of the Study Area (Figure 08-7).

(c) Species Literature Survey

The United States Fish and Wildlife Service (USFWS) and ODNR were contacted regarding the potential presence of any sensitive natural communities or rare or endangered species in the vicinity of the Study Area (Appendix I).

USFWS correspondence dated January 24, 2017 (Appendix I-1) indicated there were no federal wilderness areas, wildlife refuges or designated critical habitat within the vicinity of the Project Site, but that the proposed Project lies within the range of the Kirtland's warbler (*Setophaga kirtlandii*), a federally listed endangered species. The Kirtland's warbler is a migratory songbird that forages in scrub shrub or forested habitat in the spring and fall and has been sighted within 3 miles of Lake Erie. Since the Project Site does not comprise scrub shrub or forested habitat and no clearing of these habitat types is proposed in association with the Project, the Project is not anticipated to impact Kirtland's warblers. USFWS also noted that the Project within the range of the federally endangered Indiana bat (*Myotis sodalis*) and the federally threatened northern long-eared bat (*Myotis septentrionalis*). Since the Project is located in a cleared agricultural field and no tree clearing is proposed, the Project is not anticipated to impact bat species of concern.

A response letter from ODNR dated March 3, 2017 (Appendix I-2), indicated that the Project Site is within the range of several state-listed mussel, fish, reptile, amphibian, bird, and bat species. Since the only in-water work proposed in association with the Project would be installation of a culvert to provide access to the Utility Switchyard, it is not anticipated that the Project will impact the listed mussel and fish species. The amphibian and reptile species with a range that overlaps the Project Site include the Blanding's turtle (*Emydoidea blandingii*), spotted turtle (*Clemmys guttata*), Kirtland's snake (*Clonophis kirtlandii*), and the blue-spotted salamander (*Ambystoma laterale*). The Project Site does not contain the wetland habitats these species prefer; therefore, ODNR determined that the Project is not likely to impact these species.

Nine bird species were identified with ranges that overlap the Project Site, including the piping plover (*Charadrius melodus*), Kirtland's warbler, American bittern (*Botaurus lentiginosus*), black tern (*Chlidonias niger*), common tern (*Sterna hirundo*), king rail (*Rallus elegans*), cattle egret (*Bubulcus ibis*), lark sparrow (*Chondestes grammacus*), upland sandpiper (*Bartramia longicauda*). Due to the location and type of habitat, suitable habitat for these species does not exist on the Project Site, and ODNR determined that the Project is not likely to impact these species. ODNR also determined that the Project Site lies within the range of the Indiana bat. As previously discussed, the Project Site contains no forested areas and no tree clearing is proposed; therefore, the Project is not likely to impact the Indiana bat.

A database of state, federal, and county managed lands was also searched, and ODNR provided shapefiles indicating that Pearson MetroPark is located approximately 0.8 miles south of the Project Site. Pearson MetroPark is an area managed by the Toldeo MetroParks and is under formal protection for its natural resources. The 624-acre park supports many recreational activities and includes forested and swamp habitat which are frequented by forest and migratory bird species. The Project is not anticipated to impact Pearson MetroPark. ODNR did not provide any other records of unique ecological attributes or rare and endangered species within 1 mile of the Project Site.

(d) Species Field Survey

Flora

A survey was conducted of representative plant species present on the Study Area in October and December 2016 and January 2017. A large majority of the Study Area consisted of agricultural fields in both active and dormant stages of growth. Perimeter and riparian vegetation species data were recorded. A list of plant species noted on and adjacent to the Study Area during the field visit is provided in Table 08-8.

TABLE 08-8
VEGETATION RECORDED ON THE STUDY AREA

Common Name	Scientific Name	Strata
Common hackberry	*Celtis occidentalis*	Tree
Downy hawthorn	*Crataegus mollis*	Shrub
Gray dogwood	*Cornus racemo*sa	Shrub
Redosier dogwood	*Cornus sericea*	Shrub
Canada goldenrod	*Solidago Canadensis*	Herb
Common wheat	*Triticum aestivum*	Herb
Eastern daisy fleabane	*Erigeron annuus*	Herb
Fescue	*Festuca*	Herb
Fuller's teasel	*Dipsacus fullonum*	Herb
Green foxtail	*Setaria viridis*	Herb
Multiflora rose	*Rosa multiflora*	Herb
Narrowleaf plantain	*Plantago lanceolata*	Herb
Red clover	*Trifolium pratense*	Herb
Reed canary grass	*Phalaris arundinacea*	Herb
Smooth crabgrass	*Digitaria ischaemum*	Herb
Soybeans	*Glycine max*	Herb
Wild carrot	*Daucus carota*	Herb

Plant communities that were present within the Study Area include agricultural fields, old field meadows, and upland riparian corridors.

The Project Site appeared to have been planted in soybeans, and had recently been harvested when the field survey occurred. Pockets of old-field upland vegetation were observed throughout the Project Site. No wetlands or other surface water features were observed on the Project Site; therefore, the diversity of vegetation on the Project Site was minimal and limited to primarily upland species.

The Eastern Laydown Area was planted with common wheat prior to the vegetation survey. An intermittent tributary was observed in the eastern portion of the Eastern Laydown Area, and dominant vegetation observed along the stream corridor included gray dogwood, reed canary grass, red osier dogwood, and Fuller's teasel.

The Western Laydown Area consisted of an active agricultural field planted with soybeans and an old field not in active agricultural production on the east side of Johlin Ditch. The old field area east of Johlin Ditch also had a stormwater pond in the southwestern portion of the Western Laydown Area, adjacent to Johlin Ditch. Dominant vegetation in the old field area included wild carrot, eastern daisy fleabane, Canada goldenrod, and Fuller's teasel. Johlin Ditch traverses the Western Laydown Area and vegetation along the riparian corridor consisted of common hackberry, downy hawthorn, gray dogwood, multiflora rose, and Canada goldenrod.

The Southern Laydown Area also consisted of active agricultural fields planted with soybeans and an old field not in active agricultural production. Dominant vegetation in the old field included fescue, smooth crabgrass, narrowleaf plantain, eastern daisy fleabane, and red clover.

The Electrical Interconnection Property is currently in active construction use, with limited native vegetation.

No wetlands were identified within the Study Area; however, the surface water features identified within the Study Area are described in Section 4906-4-08(B)(1)(b).

Fauna

Based on observations of the Project Site and surrounding agricultural and industrial land use, limited species of fauna are likely to be present. Species that may be present include white-tail deer and mourning dove. Mourning doves breed in areas of shrubs and small trees, habitats that do not exist on the Project Site and will largely remain undisturbed. Mourning doves forage for seeds in open field and, although the Project will affect some agricultural land, the percentage lost in local areas is small and should not reduce foraging habitat to a degree that would affect the mourning dove population. Table 08-9 lists common wildlife species common in the area.

TABLE 08-9
WILDLIFE SPECIES COMMONLY OBSERVERD IN THE STUDY AREA

Common Name	Latin Binomial
Mourning dove	*Zenaida macroura*
White-tail deer	*Odocoileus virginianus*

(e) Additional Ecological Studies

No additional ecological studies, beyond the wetland determination, wildlife and vegetation surveys, have been completed in support of the Project. If determined necessary, future studies will be completed, and results will be provided to USFWS, ODNR, and OPSB.

(2) Potential Construction Impact

(a) Ecological Resource Impact Evaluation

The Project has been carefully sited to minimize impacts to ecological resources to the fullest extent possible. The Project Site, Eastern Laydown Area, Western Laydown Area, and Southern Laydown Area are agricultural fields, which have been cleared of natural vegetation. The Electrical Interconnection Property is currently in use for temporary construction laydown in association with the Oregon Clean Energy Center. Ecological impacts assessments conducted for the Project relied on previous jurisdictional determinations, field surveys conducted in fall and winter 2016 and winter 2017, and existing information obtained from agencies, including ODNR and USFWS. The Project is proposed on previously disturbed land, currently in use as agricultural land and construction laydown, for an adjacent facility of similar use. No tree clearing will be required associated with the proposed Project.

No wetland area exists within the Study Area, and impacts to the surface water feature on the Western Laydown Area will be avoided through the use of BMPs and erosion control measures, such as silt fencing. Local ditch impacts will be limited to potential culvert installation associated with access to the Utility

Switchyard. Anticipated ecological impacts from Project construction are illustrated in Figure 08-8.

Project construction will result in temporary and permanent impacts to plants and animals on the Project Site. Temporary impacts to wildlife are likely to result during the construction phase as increased noise levels and human activity may displace wildlife to surrounding habitats. After construction is complete, some displaced wildlife is expected to recolonize those areas of the Project Site that will remain undeveloped.

Of the total 138 acres that comprise the Study Area, the Project footprint will be located on approximately 23 acres. Approximately 108 acres of upland will have the potential to be used for temporary construction laydown, on four non-contiguous areas located east, west, and southwest of the Project Site. The electrical interconnection will involve construction of a new 1-acre Utility Switchyard, situated within the disturbed area of the Electrical Interconnection Property, a 0.5-mile 345-kV ROW from the on-site collector bus to the existing Lallendorf Switchyard located northwest of the Project Site, and a 0.2-mile 138-kV ROW from the on-site collector bus to the new Utility Switchyard. The two ROWs will be co-located for the first 0.15 mile as they extend north from the Project Site, across the railroad tracks and onto the Electrical Interconnection Property. Although the 345-kV ROW will cross Johlin Ditch, only overhead wires will span that resource, and no impact is anticipated. Both interconnection ROWs have been sited to avoid the need for any tree clearing.

(b) Mitigation

The following measures are proposed to ensure that short- and long-term construction impacts to ecological resources remain insignificant:

- Avoidance of Major Species: Adverse impacts to endangered or threatened species are not anticipated based on correspondence from the ODNR and USFWS, field confirmation that the Study Area habitat is not suitable for federally-listed species. Significant construction impacts are not anticipated on recreational or commercial species.
- Demarcation of surface waters: Surface waters will be flagged for easy identification and avoidance by construction workers and equipment, except where impact will be specifically permitted.
- Sediment and Erosion Control: A detailed sediment and erosion control plan will be developed prior to initiating Project construction. The plan will detail temporary stormwater collection ponds as well as silt fencing or other erosion control devices proposed to limit off-site transport of sediment. In addition, a Notice of Intent will be filed with the Ohio EPA for coverage under the NPDES General Construction Stormwater Permit. Preliminary information is provided in the Stormwater Management Plan presented in Appendix A.
- Dust and Particulate Control: During grading activities, dust may be generated as exposed soils dry. Water sprays or other dust suppression methods will be employed on areas of exposed soils to minimize the potential for dust generation.

- Revegetation: Areas of the Project Area temporarily impacted by construction activities will be revegetated as soon as possible following completion of construction to stabilize exposed areas of soil. Species proposed for the seeding will be selected to ensure compatibility and suitability with surrounding agricultural areas. Per comments received from the USFWS (Appendix I), care will be taken to prevent the spread of invasive species through revegetation with native plant species.

(3) Potential Operation and Maintenance Impact

(a) Ecological Resource Impact Evaluation

Operation of the Project is expected to result in localized increase in lighting and noise in its immediate vicinity. Wildlife species are not anticipated to use Project Site significantly, which is currently in use as an agricultural field where the majority of laydown is proposed. Within the Site Area, the laydown sites will only be temporarily disturbed. Wildlife species present in the Study Area are expected to acclimate to Project operation over time.

(b) Mitigation

Mitigation measures to protect streams and vegetation from short- and long-term O&M of the Project include: setback from existing water resources, to the extent possible; and installation of fencing and/or other protective measures for proximate water resources. Additionally, the use of pesticides and herbicide will be restricted within and near known surface water resources.

(c) Post-Construction Monitoring of Wildlife Impacts

Currently, the Project has no plans for post-construction monitoring of wildlife impacts.

(C) LAND USE AND COMMUNITY DEVELOPMENT

(1) Land Use

(a) Land Use Mapping

Figure 08-9 presents land use within a 1-mile radius of the Project Site. Indicated land uses include:

- Residential;
- Commercial;
- Industrial;
- Recreational; and
- Agricultural.

The land use map was developed from City of Oregon data, as well as field studies. Figure 08-10 illustrates the City of Oregon's zoning. As this figure shows, the Project Site is situated within a C-I zone for commercial and industrial use, within the Cedar Point Development Park in an area with designated Foreign Trade Zone status.

As can be seen, current land use on the Project Site, Eastern Laydown Area, Western Laydown Area, and Southern Laydown Area is agricultural. The balance of the Study Area, the Electrical Interconnection Property, is being used as temporary construction laydown associated with the Oregon Clean Energy Center.

Utility easements, roadways, and rail lines traverse the area surrounding the Study Area.

Land use within 1 mile is dominated by agricultural, industrial, residential, and institutional development. The closest recreational use is Pearson MetroPark, a 624-acre park which supports walking trails, picnic areas, sports fields, fishing, sledding, and many other recreational activities, located approximately 0.8 mile south of the Project Site.

The nearest school is Clay High School, located 1.3 mile southeast from the proposed Project Site, within the City of Oregon school district. The Wynn Elementary School is also located approximately 1.6 miles northeast of the Project Site.

(b) Existing Structures

There are no existing structures located on the Project Site, or any of the laydown areas. The Electrical Interconnection Property is currently being used as laydown area for construction of the Oregon Clean Energy Center and has several temporary structures, including trailers, on the property. These structures will be removed once construction of the Oregon Clean Energy Center is complete. There are no other existing structures within the Study Area.

Table 08-10 identifies the structures within 1,000 feet of the proposed Project Site.

TABLE 08-10
STRUCTURES WITHIN 1,000 FEET OF THE PROJECT SITE

Structure Type	Distance/Direction to Project Site
Industrial Facility (Oregon Clean Energy Center)	315 northwest
Industrial Warehouse	610 feet southwest

The closest residence is located over 1,000 feet from the Project Site, approximately 0.27 mile (1,425 feet) to the southwest on Corduroy Road. This residence is part of a cluster of residences that extends west along Corduroy Road and south along North Wynn Road. A cluster of residences also exists along North Lallendorf Road and Corduroy Road approximately 0.4 miles (2,100 feet) southwest of the Project Site. These residences are bordered to the east and west by industrial warehouses.

(c) Land Uses Impacts

The Project Site is currently in use as agricultural land. Industrial properties and agricultural land abut the Project Site. Residential developments exists to the southeast and southwest. Industrial development is in located to the north, with scattered industrial development west and east of the Project Site. Development is generally interspersed among agricultural fields that exist north, south, east, and west of the Project Site. Table 08-11 provides an area of each land use type within a 1-mile radius of the Study Area.

TABLE 08-11
LAND USE WITHIN A ONE-MILE RADIUS OF THE STUDY AREA

Land Use	Approximate Acres	Percentage of Total Area
Agricultural	2,157	55.6%
Industrial	770	19.8%
Residential	454	11.7%
Recreational	297	7.6%
Commercial	97	2.5%
Forested/Open Space	57	1.5%
Institutional	51	1.3%
Total	**3,883**	**100%**

Although it is in active agricultural use, the Project Site is located within the Cedar Point Development Park and zoned C-I for commercial and industrial use. Industrial and commercial development currently exists on adjacent properties, including the Oregon Clean Energy Center. Figure 08-10, which shows the Village's current zoning, also illustrates the compatibility of the Project within its proposed setting.

(d) Structures to be Removed or Relocated

No structures are located on the Project Site.

(2) Wind Turbine Structure Locations

Since the proposed Project does not include the installation of any wind turbine equipment, this section is not applicable.

(3) Land Use Plans

(a) Formally Adopted Plans for Future Use

The City of Oregon has identified the Project Site and the immediate surrounding land for industrial development in The City of Oregon 2025 Master

Plan. As shown on Figure 08-10, the Project Site is within the Cedar Point Development Park, which has been identified as Oregon's prime industrial development area. The Cedar Point Development Park is zoned under flexible commercial/industrial and Community Reinvestment codes to encourage industrial and commercial development. Some areas of the Cedar Point Development Park, including the location of the Project Site, are designated as Foreign Trade Zone. Additionally, development that has occurred within the Cedar Point Development Park is consistent with the proposed Project. The Oregon Clean Energy Center, currently under construction, is located within the Cedar Point Development Park northwest of the Project Site

(b) Applicant Plans for Concurrent or Secondary Use of the Site

There are no planned concurrent or secondary commercial uses of the Project Site other than for the proposed Project.

(c) Impact to Regional Development

The Project will have a sizeable positive impact on regional development because it will contribute to investment into the local economy, without the need for governmental investment.

Construction of the Project will employ workers both directly and indirectly in Lucas County, with labor enhancement of $74.1 million per year for the 32-month construction period (Appendix F – Table 10).

Regional human and material resources are abundant and mobile; no scarcities in labor or materials and equipment are anticipated to be likely. The requirement for non-regional resources, with the exception of major equipment, is expected to be negligible. Additional housing and other services, such as education, public health, and public safety, are very unlikely to be required because the labor force for the Project is already locally available.

Transportation facilities will not require expansion as a result of the Project because the impacts of construction will be temporary. Commuting by the approximately 19 to 22 operating personnel is not expected to have a significant impact on local roads.

(d) Compatibility with Current Regional Plans

The City of Oregon zoning map, shown in Figure 08-10, clearly indicates that the Project Site is located in an area designated for the encouragement of commercial and industrial development. The Project is also consistent with regional energy planning, as evidenced by the review on-going by PJM that indicates favorable interconnection into the existing 345-kV and 138-kV transmission grid located just north of the Project Site. PJM's Feasibility Study, completed in June 2016, determined that the Project can interconnect with the need for only limited system upgrades (Appendix C). Completion of the PJM System Impact Study is anticipated in April 2017. This information will be provided to OPSB staff once available, and will also be available through the PJM website (http://pjm.com/planning.aspx).

(e) Demographic Characteristics

Areas within a 5-mile radius of the Project Site include the City of Toledo, City of Oregon, Jerusalem Township, and Washington Township within Lucas County, the City of Northwood, and Lake Township within Wood County, Allen

Township within Ottawa County, and Erie Township within Monroe County, Michigan. Population data was obtained through the U.S. Census Bureau and 2016 population projection data for Lucas, Wood, and Ottawa Counties were obtained from the Ohio Research Office, a state affiliate of the U.S. Census Bureau, in November 2016. Population data and population projection data were obtained through the U.S. Census Bureau for Monroe County, Michigan. Table 08-12 presents the population data for each area within a 5-mile radius of the Project Site.

TABLE 08-12
EXISTING AND PROJECTED POPULATIONS

City/Village/Census Designated Area	Percent of Community within the 5-mile Radius[a]	2016 Estimated Population	2026 Projected Population[b]
Allen Township	13.76%	517	507
Erie Township, MI	1.25%	55	49
Jerusalem Township	24.74%	764	749
Lake Township	6.05%	692	794
Northwood City	50.07%	26,894	29,538
Oregon City	100%	20,070	19,283
Toledo City	19.99%	55,724	50,409
Washington Township	29.56%	958	922

[a] Based on a percentage of geographic area within the 5-mile radius, not population density.

[b] Based on the annual population change of each city/township obtained from the 2005 to 2009 American Community Survey, published by the United States Census Bureau, and accessed via the American FactFinder online tool.

(D) CULTURAL AND ARCHAEOLOGICAL RESOURCES

Phase I archaeological surveys were completed for the Study Area in December 2016 and January 2017. Phase I archaeological investigations were completed for the Electrical Interconnection Property in 2013 in support of the Oregon Clean Energy Center. The archaeological survey report provided in Appendix J (currently under review by the Ohio State Historic Preservation Office) documents the findings of the previous surveys and summarizes the results of a literature review and field study conducted on other portions of the Study Area.

(1) Cultural Resource Mapping

Figures 08-11A through 08-11H are a compilation of the following five USGS 7.5 minute series topographic maps: Oregon, Toledo, Walbridge, Genoa, and Reno Beach. These figures depict formally adopted land and water recreation areas and registered landmarks of historic, religious, archaeological, scenic, natural or other cultural significance within a 5-mile radius of the Project Site.

A Phase I archaeological investigation was conducted for the entire Study Area. Investigations began with a literature review for property within the Study Area (Appendix J), which identified that a previous study had been conducted for the Electrical Interconnection Property (in 2013); therefore, this area was eliminated from the 2016 and 2017 field investigation effort. Approximately 142 acres, including the Project Site, Eastern Laydown Area, Western Laydown Area, and Southern Laydown Area, were included in the 2016 and 2017 archaeological investigations. The surface collection, subsurface testing, and visual inspection completed did not identify any previously unrecorded archaeological sites. No further work is recommended for the Study Area.

Based on the land use throughout the area, characterized by industrial development, transportation corridors, and utilities, as well as upon the results of field investigations, the proposed Project is not anticipated to result in any impact to historic sites (Appendix J).

(2) Cultural Resource Impacts

Since a Historic Structures analysis was completed for the adjacent Oregon Clean Energy Center at a 5-mile radius, CEF-O is in communication with the State Historic Preservation Office (SHPO) to determine whether further studies are required for the Project. Correspondence with the SHPO is provided in Appendix J. The 5-mile area assessed in the Historic Structures analysis completed for the Oregon Clean Energy Center covers approximately 96 percent of the 5-mile area for the Project. Therefore, a summary of the findings from the Oregon Clean Energy Center Historic Structures analysis is provided below. Should further study be required by the SHPO, results would be provided to OPSB as they are available.

The Historic Structures analysis completed for the adjacent Oregon Clean Energy Center included a literature review and field survey within a 5-mile radius. The literature review identified a total of 29 previously recorded Ohio Historic Inventory (OHI); however, the field survey determined that 11 of these properties were no longer present, and 15 of these properties would not be visually impacted by the Project. The three properties determined to be visually impacted were not considered eligible to be listed on the National Register of Historic Places (NRHP). Field investigations also determined that the area of potential visual effect is greatly minimized to the north, west, and south due to nearby structures from other industrial uses, including the BP Refinery, urbanization and visual obstructions from the developed City of Oregon and City of Toledo, and Interstate 280 and Route 2 transportation corridors and other industrial development; therefore, the Area of Potential Effect (APE) was limited to the eastern quadrant of the 5-mile radius.

A total of five NRHP listed properties, and two NRHP Determination of Eligibility properties are located within 5 miles. All of these properties are over 2 miles from the Oregon Clean Energy Center and the Project Site, with most located to the west, in the urbanized areas of the City of Oregon and the City of Toledo.

The APE consisted of rural flat lands and small villages, with a considerable amount development including aerial utility lines and industrial parks. Development was more sparsely spread within the APE than in areas to the north, west, and south, resulting in more opportunities for unobstructed views of the Oregon Clean Energy Center and the Project Site.

All but 4 percent of the furthest portion of the 5-mile radius for the Lordstown Energy Center and the Project overlap. Therefore, based on the Historic Structures analysis for the Oregon Clean Energy Center, no direct or indirect impacts on document cultural resources are anticipated from construction or operation of the Project.

(3) Recreational Areas

There are 38 identified parks, golf courses, wildlife refuges, and recreational areas within 5 miles of the Project; however, the majority of these resources are located further than 1 mile from the Project Site along Lake Erie, the Ottawa and Maumee Rivers, and urban areas of Oregon and Toldeo. The closest park, Pearson MetroPark, is a public park managed by Toledo MetroParks, located approximately 0.8 miles south of the Project Site. Agricultural fields and scattered residences lie between the Project Site and Pearson MetroPark. Eagle's Landing Golf Club, an 18-hole public golf course, is the second closest recreational area located along Lake Erie approximately 1.0 mile north of the Project Site. Agricultural fields, scattered residences, and industrial warehouses lie between the Project Site and Eagle's Landing Golf Club.

There are three state or federally owned recreational areas within 5 miles of the Project. The Maumee Bay State Park and Golf Course, an approximately 1,336-acre recreational area, is located approximately 2.0 miles northeast of the Project Site along Lake Erie. In addition to the 18-hole public golf course, the state park offers camping and lodging, boating, fishing, hunting, wildlife and bird watching, swimming, hiking, and biking. Approximately 4.4 miles northeast of the Project Site, east of the Maumee Bay State Park, is the 402-acre Mallard Club Marsh Wildlife Area. This recreational area consists of six marshes separated by dikes and managed to sustain a variety of wildlife, and offers activities such as public fishing and wildlife watching, hunting, and trapping. Approximately 4.7 miles northeast of the Project Site, east of the Mallard Club Marsh Wildlife Area, is the Cedar Point National Wildlife Refuge owned by USFWS. The refuge totals 2,445 acres, of which, more than 1,500 acres consist of a large contiguous coastal marsh wetlands.

None of these recreational areas are in immediate proximity to the Project Site, and no impact to recreational activities in these areas is anticipated to result from construction or operation of the Project.

(4) Visual Impacts

(a) Project Visibility

A viewshed analysis (Figure 08-12) was conducted to identify areas within a 5-mile radius of the Project Site from which the Project's two 185-foot tall stacks could be potentially visible. Visibility in this area is anticipated to be considerable; however, the Project will be located among other industrial facilities and will not materially change the existing viewshed.

(b) Existing Landscape

The existing landscape within a 5-mile radius of the Project Site is a mixture of industrial, agricultural, and residential land. The majority of the 5-mile radius lies within the boundaries of the City of Oregon, the City of Northwood, Washington Township and Jerusalem Township, with denser development existing southwest of the Project Site within the City of Oregon and the City of Northwood. Land north and immediately west of the Project Site is occupied by industrial facilities and warehouses, with intervening agricultural fields. Less densely populated land occupied primarily by agricultural fields is located east, northeast, and southeast of the Project Site.

Southwest of the Project Site, the largest transportation corridor, Interstate 280, is located 3.2 miles from the Project. In addition, a robust transportation network exists within the area surrounding the Project Site, including Route 2, located approximately 1.8 miles to the south, and an intricate network of rail lines.

The Project Site has level topography, with an elevation of approximately 588 feet amsl, and is clear of tall vegetation and structures. The Project Site is surrounded by areas that are generally flat, with streams flowing north and northeast into Lake Erie. The relief of the land within a 1-mile radius of the Study Area is approximately 23 feet, with a high of approximately 604 feet to the west, and a low of approximately 581 feet to the north.

The vegetation existing on the Project Site primarily consists of agricultural crops, such as soybeans. Proximate industrial development includes the Oregon Clean Energy Center, currently under construction; the BP Toledo Refinery, to the north; and several industrial warehouses west of the Project Site. Several FirstEnergy ROWs lie in close proximity to the north of the Project Site.

No permanent structures exist within the Study Area. The Electrical Interconnection Property is currently being used for temporary laydown during the construction of the Oregon Clean Energy Center. The nearest off-site structures are industrial warehouses located along Blue Heron Dive, Parkway Road, and North Lallendorf Road. Two clusters of residences are located approximately 0.3 miles southeast and 0.4 miles southwest of the Project Site, along Corduroy Road, North Wynn Road, and North Lallendorf Road. The nearest school and recreational area are located 1.3 mile southeast and 0.8 mile south of the Project Site, respectively.

(c) Landscape Alterations

As the Project Site and laydown areas are generally vacant, no tree clearing will be required to accommodate the Project and ancillary facilities. As shown in Figure 08-12, Project components, particularly the top of the 185-foot tall stacks, will be visible in several locations due to the flat topography of the area and considerable amount of agricultural land cleared of trees.

The viewshed analysis, provided as Figure 08-12, suggests that residents and travelers in close proximity to the Project will have greatest potential to view the Project.

(d) Visual Impacts

As mentioned in Section 4906-4-08(D)(2), no visual impacts to historic resources are anticipated due to the distance to identified resources and existing industrial landscape.

In accordance with OAC 4906-4-08(D)(4)(d), an investigation of high-value, public and private scenic areas was undertaken for a 10-mile radius around the Project Site. The following resources were identified:

- Pearson MetroPark, located approximately 0.8 mile south of the Project Site;
- Collins Park, located approximately 2.0 miles west of the Project Site;
- Maumee Bay State Park, located approximately 2.0 miles northeast of the Project Site;
- Bay View Park, located approximately 2.6 miles northwest of the Project Site;
- Mallard Club Marsh Wildlife Area, located approximately 4.4 miles northeast of the Project Site;
- Cedar Point National Wildlife Refuge, located approximately 4.7 miles northeast of the Project Site;

No visual impacts to these high-value scenic resources are anticipated due to intervening distance, topography, vegetation, and the existing industrial landscape.

(e) Photographic Simulations

Figures 08-13A and 08-13B provide photographic simulations developed to provide a representation of what the operational Project will look in the existing landscape. These two locations were selected to represent nearby roads and residences from which the most direct views are anticipated.

Figure 08-13A depicts potential views from Clay High School, off of Seaman Road. This photo location is approximately 1.35 mile southeast of the Project stacks, in a parking lot. This view represents the potential visual experience of residents located along Seaman Road.

Figure 08-13B depicts potential views from North Stadium Road, a 2-lane road that runs north-south, east of the Project Site. The photo location is approximately 1.4 miles from the Project stacks, near several residences that line the road. This view represents the potential visual experience of the residents and through traveler driving along North Stadium Road.

Potential views from several other locations, including other residences, recreational areas, and schools, were considered and assessed. These assessments indicated no significant visual impacts would occur from these areas due to intervening vegetation and topography.

(f) Proposed Mitigation Measures

The Project is proposed on approximately 30 acres, adjacent to a facility of similar use, and within an area dedicated to industrial development. Project lighting will be designed to reduce impact to the extent feasible, with downward facing fixtures and appropriate fixture placement, while still meeting safety and security needs. Paint colors will be neutral, consistent with industrial-type facilities and are anticipated to have no adverse visual impact to the surrounding area.

(E) AGRICULTURAL DISTRICTS

(1) Agricultural Land Mapping

Figure 08-14 illustrates agricultural land located within and proximate to the boundaries of the proposed Project Site. No agricultural district land is located within the Study Area.

(2) Potential Impact to Agricultural Land

(a) Acreage Impacted

No impacts to field operations, irrigation or field drainage systems associated with agricultural district lands will occur as a result of construction, operation or maintenance of the proposed Project on agricultural district lands. No such lands were identified within the Study Area and measures will be taken to ensure that no impact will occur to adjacent properties.

(b) Impact of Project Activities

No impact will occur as a result of construction, operation or maintenance of the proposed Project on agricultural district lands since no such lands were identified within the Study Area. Should field tile disruptions be necessary, CEF-O will work with the Village and appropriate landowners for repair or relocation, or to facilitate suitable drainage alternatives.

(c) Agricultural Mitigation Practices

Mitigation procedures will not be necessary since no agricultural districts were identified in the Study Area and, should drainage tile systems utilized by adjoining parcels be affected, they will either be relocated or restored.

(d) Other Considerations in Preparing the Application

All appropriate aspects of the proposed Project are summarized in this Application. No other considerations, not previously mentioned, were made in the preparation of this Application.

Section 4906-4-08: Figures

- **Figure 08-1: Baseline Sound Survey Monitoring Locations**
- **Figure 08-2: Mitigated Project Contribution**
- **Figure 08-3: Aquifers, Water Wells, Oils and Gas Wells, and Drinking Water Protection Areas**
- **Figures 08-4A and B: Geologic Conditions**
- **Figure 08-5: Soils and Floodplain**
- **Figure 08-6: Wind Rose**
- **Figure 08-7: Existing Ecological Resources**
- **Figure 08-8: Ecological Impacts**
- **Figure 08-9: Land Use**
- **Figure 08-10: City of Oregon Zoning**
- **Figures 08-11A through H: Cultural Resources**
- **Figure 08-12: Viewshed Analysis**
- **Figures 08-13A and B: Visual Simulations**
- **Figure 08-14: Agricultural Mapping**

Figure 08-1
Noise Monitoring Locations

Oregon Energy Center
Lucas County, Ohio

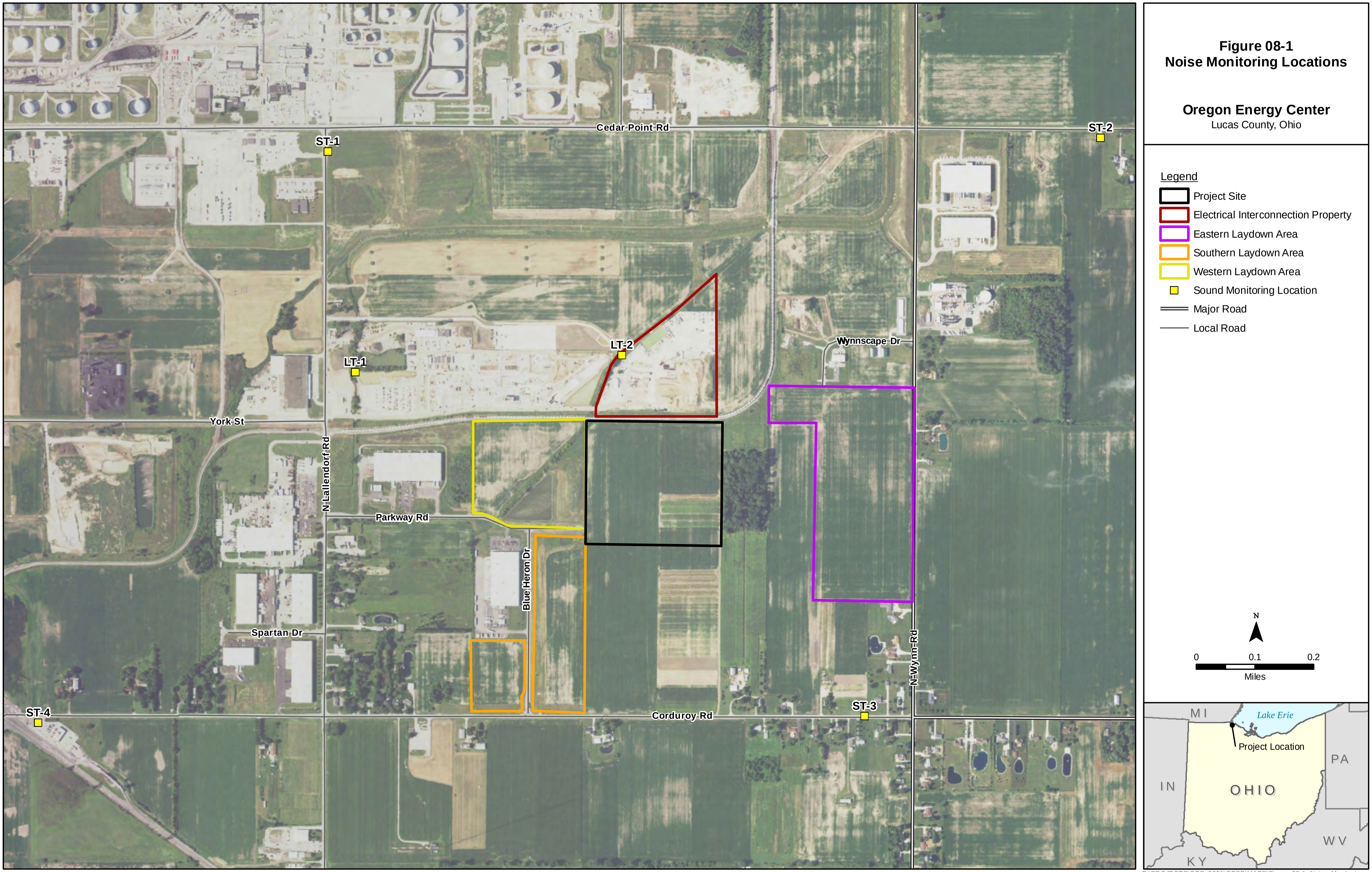

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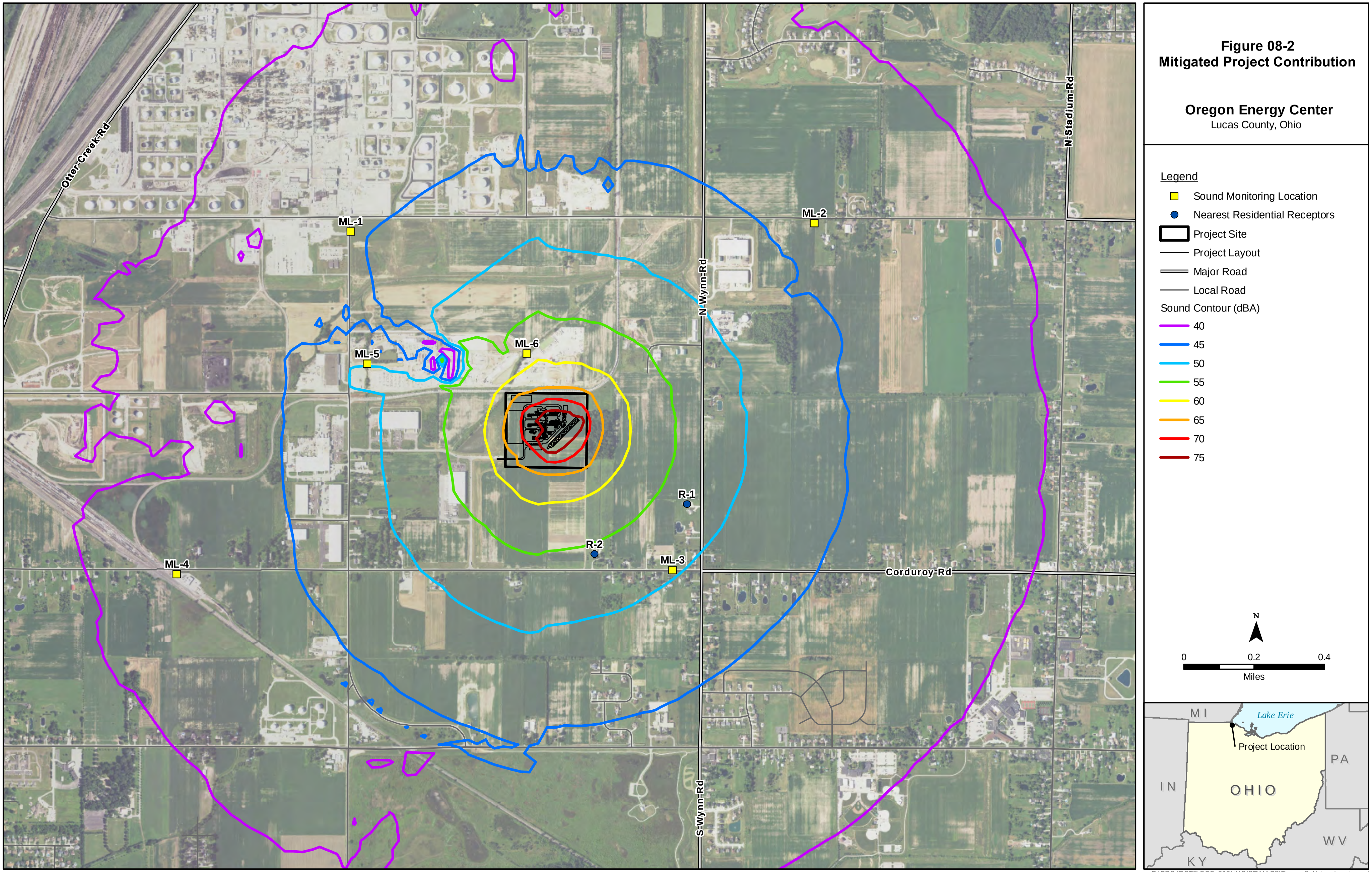
Figure 08-2
Mitigated Project Contribution

Oregon Energy Center
Lucas County, Ohio



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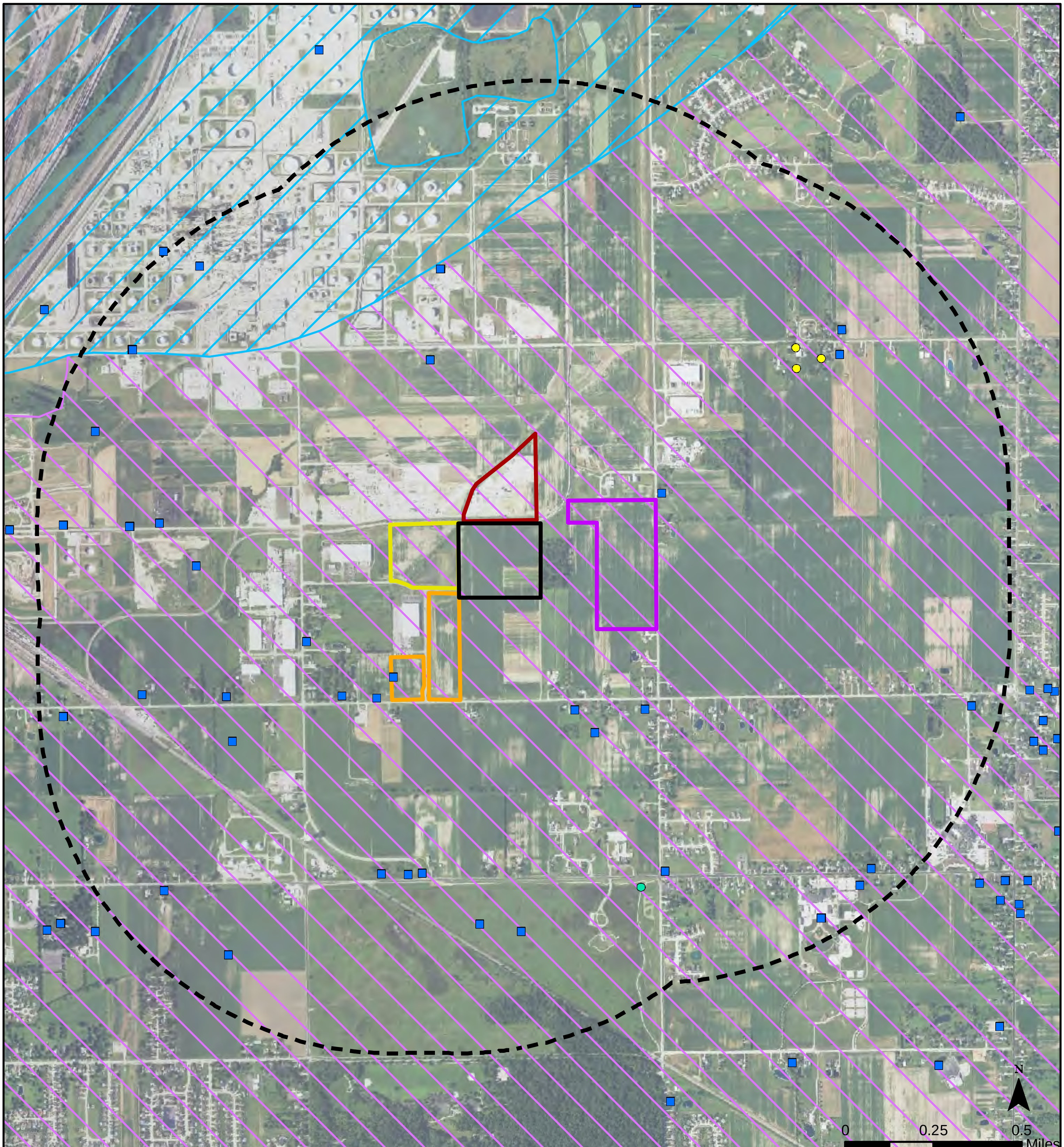

Legend

- Project Site
- Electrical Interconnection Property
- Eastern Laydown Area
- Southern Laydown Area
- Western Laydown Area
- 1-mile Radius
- Lake Maumee Buried Valley Aquifer
- Lake Maumee Lacustrine Aquifer
- Water Well
- Oil Well
- Plugged Well

* No drinking water protection areas in the Project vicinity.

Figure 08-3
Aquifers, Water Wells, Oil and Gas Wells, and Drinking Water Protection Areas

Oregon Energy Center
Lucas County, Ohio

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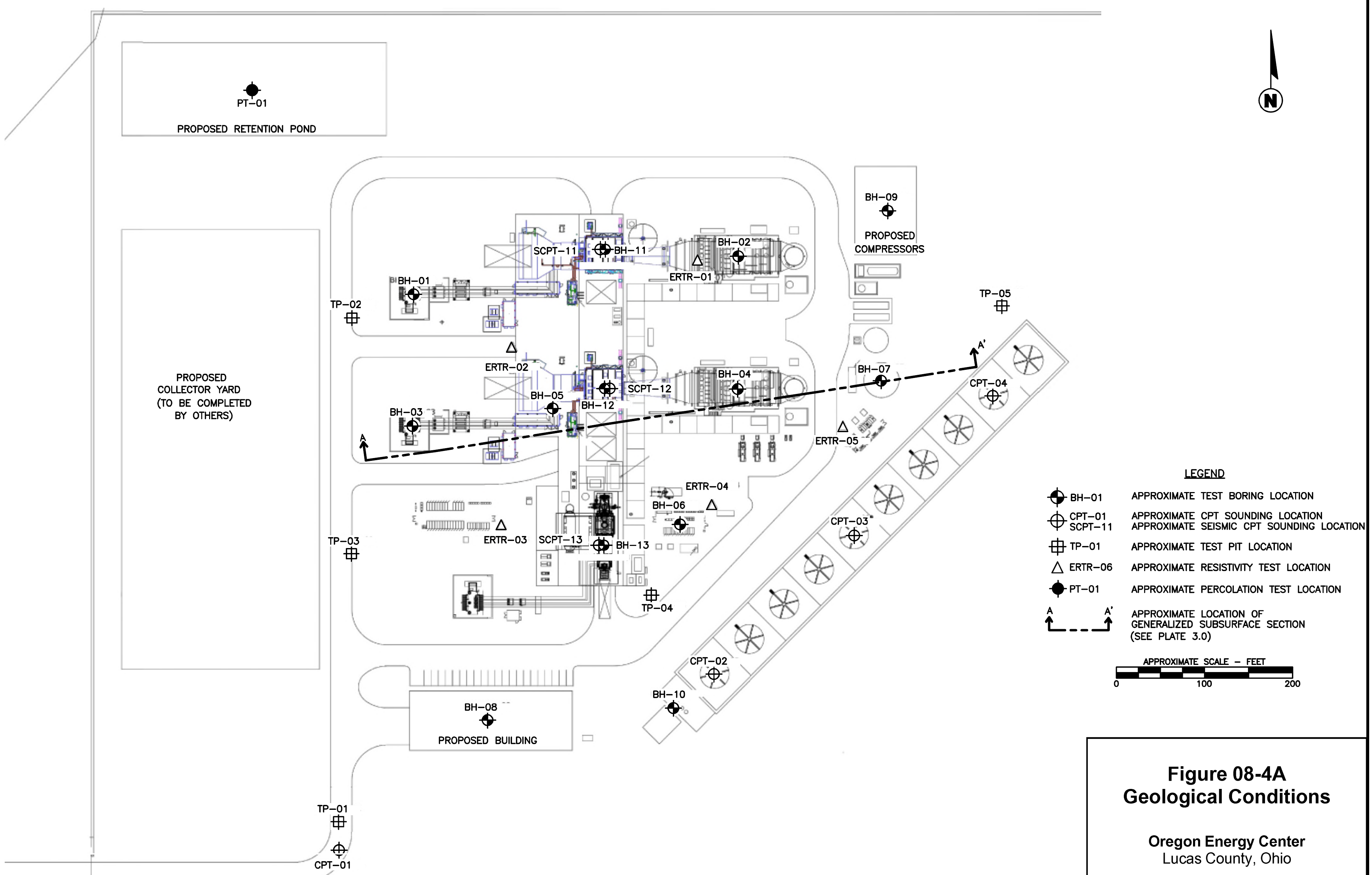
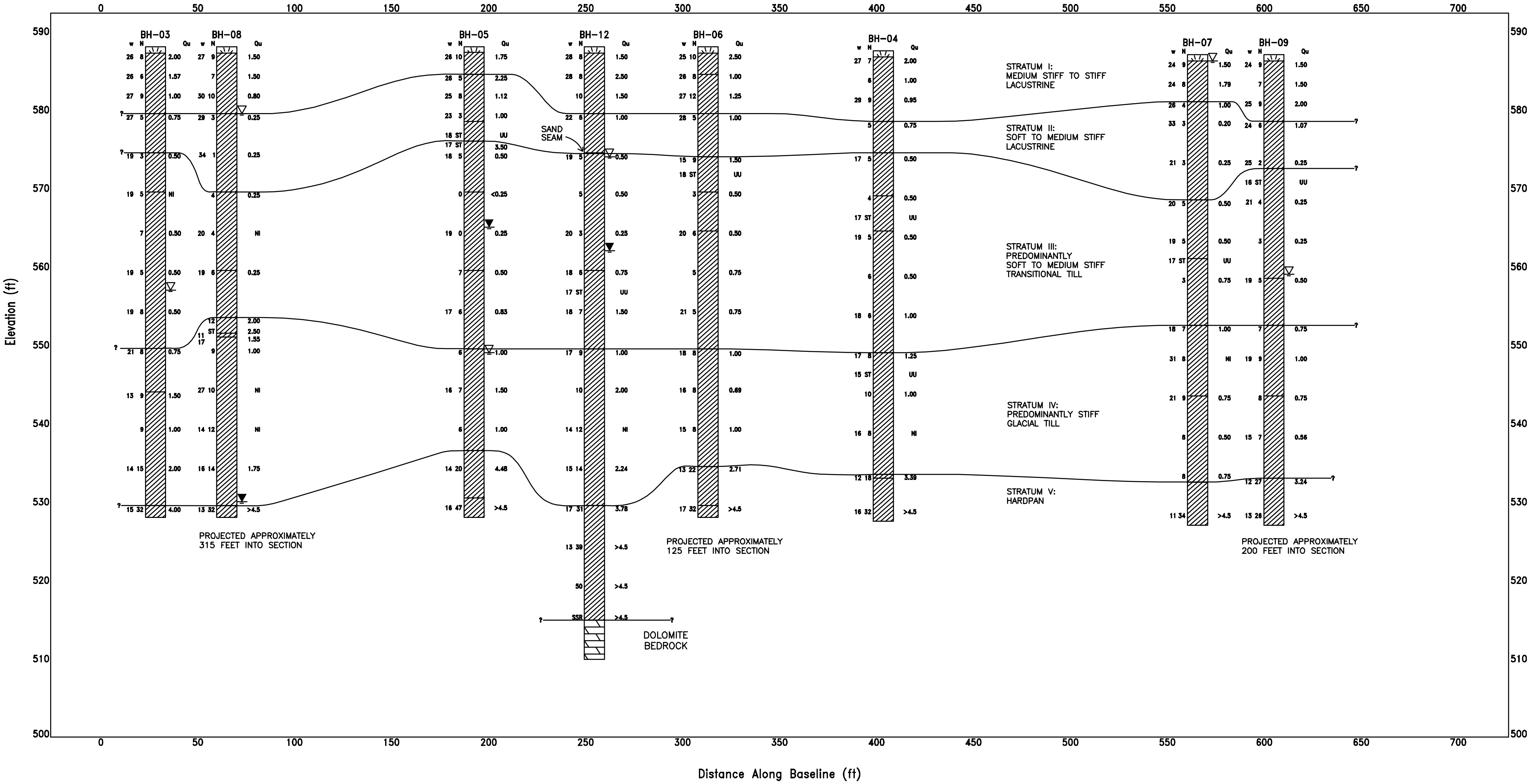


BASE DRAWING "GEOTECHNICAL INVESTIGATION LOCATION PLAN" PREPARED BY FLUOR CONSTRUCTORS INTERNATIONAL, INC., DATED NOVEMBER 21, 2016.

Figure 08-4A
Geological Conditions

Oregon Energy Center
Lucas County, Ohio



LEGEND

- Topsoil
- Dolomite
- USCS Low Plasticity Clay
- USCS Low Plasticity Sandy Clay
- USCS Poorly-graded Sand

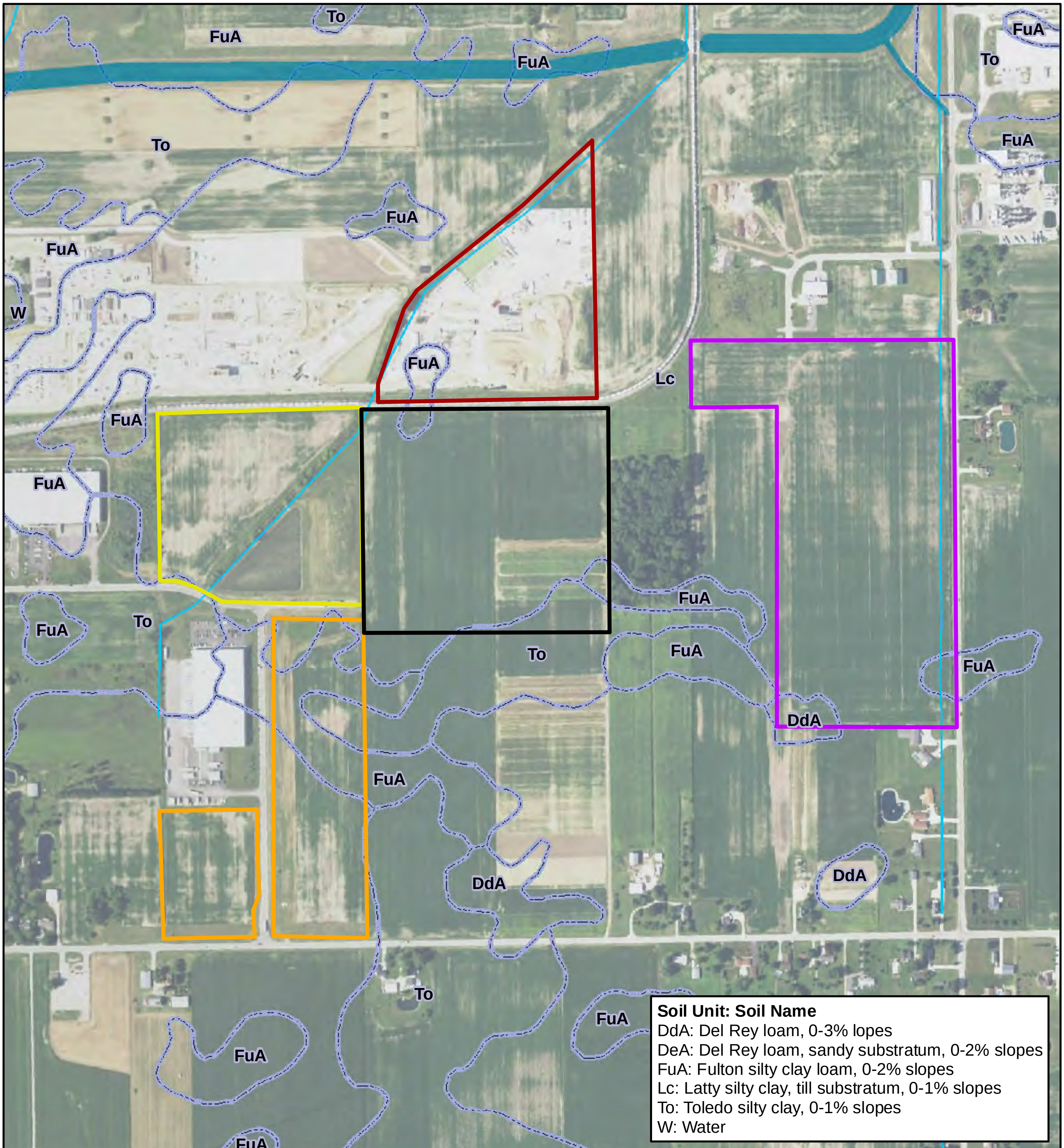
NOTES:

1. GROUND SURFACE ELEVATIONS AT THE BORING LOCATIONS WERE INTERPOLATED TO THE NEAREST ½-FOOT BASED ON TOPOGRAPHIC CONTOURS SHOWN ON THE "DRAFT TOPOGRAPHIC AND LOCATION SURVEY" PREPARED BY THE MANNIK & SMITH GROUP, INC., DATED DECEMBER 7, 2016.
2. SOIL STRATA BOUNDARIES ARE INFERRED BETWEEN BORINGS.
3. DRAWING EXHIBITS AN APPARENT DISTORTION OF APPROXIMATELY 4 TIMES WHEN COMPARING HORIZONTAL SCALE (APPROX. 1"=50') TO VERTICAL SCALE (APPROX. 1"=12 ½').
4. IT SHOULD BE NOTED THAT, WHILE ALL OF THE BORINGS PERFORMED FOR THIS INVESTIGATION ARE NOT INCLUDED ON THIS SUBSURFACE DIAGRAM, THE BORINGS SELECTED THROUGH THE CUT SECTION A–A' ARE REPRESENTATIVE OF THE CONDITIONS ENCOUNTERED AT THIS SITE.

W MOISTURE CONTENT
N SPT N-VALUE
ST: SHELBY TUBE SAMPLE (NO N-VALUE)
SSR: SPLIT-SPOON REFUSAL
QU UNCONFINED COMPRESSIVE STRENGTH (TSF)
NI: NOT INTACT
UU: UNCONSOLIDATED-UNDRAINED TRIAXIAL TEST
▽ DEPTH OF GROUNDWATER INITIALLY ENCOUNTERED DURING DRILLING
▼ DEPTH OF GROUNDWATER OBSERVED UPON COMPLETION OF DRILLING

Figure 08-4B
Geological Conditions

Oregon Energy Center
Lucas County, Ohio



Legend

- Project Site
- Electrical Interconnection Property
- Eastern Laydown Area
- Southern Laydown Area
- Western Laydown Area
- NHD Stream/Ditch
- 100-year Flood Zone
- Soil Unit

N

0 500 1,000 Feet

Figure 08-5
Soils and Floodplains

Oregon Energy Center
Lucas County, Ohio

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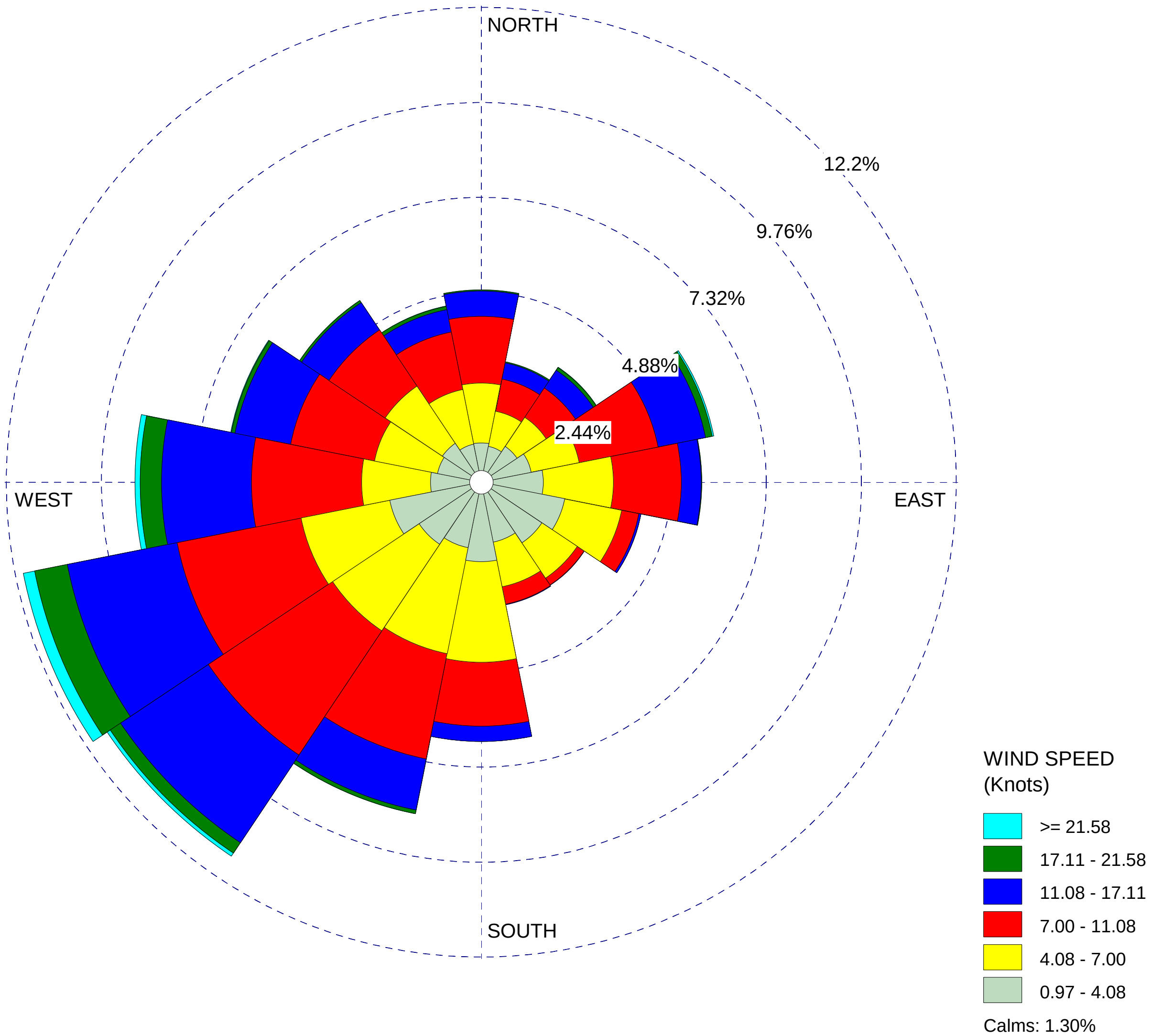
WIND ROSE PLOT:

Project: Oregon Energy Center
Met: Toledo Express Airport 2010-2014

DISPLAY:

Wind Speed
Direction (blowing from)



COMMENTS: Wind Rose Plot	DATA PERIOD: **Start Date: 1/1/2010 - 00:00** **End Date: 12/31/2014 - 23:59**	COMPANY NAME: **Tetra Tech**	
		MODELER:	**Figure 08-6** **Wind Rose** **Oregon Energy Center** Lucas County, Ohio
	CALM WINDS: **1.30%**	TOTAL COUNT: **43675 hrs.**	
	AVG. WIND SPEED: **7.37 Knots**	DATE: **3/10/2017**	

Figure 08-7
Existing Ecological Resources

Oregon Energy Center
Lucas County, Ohio

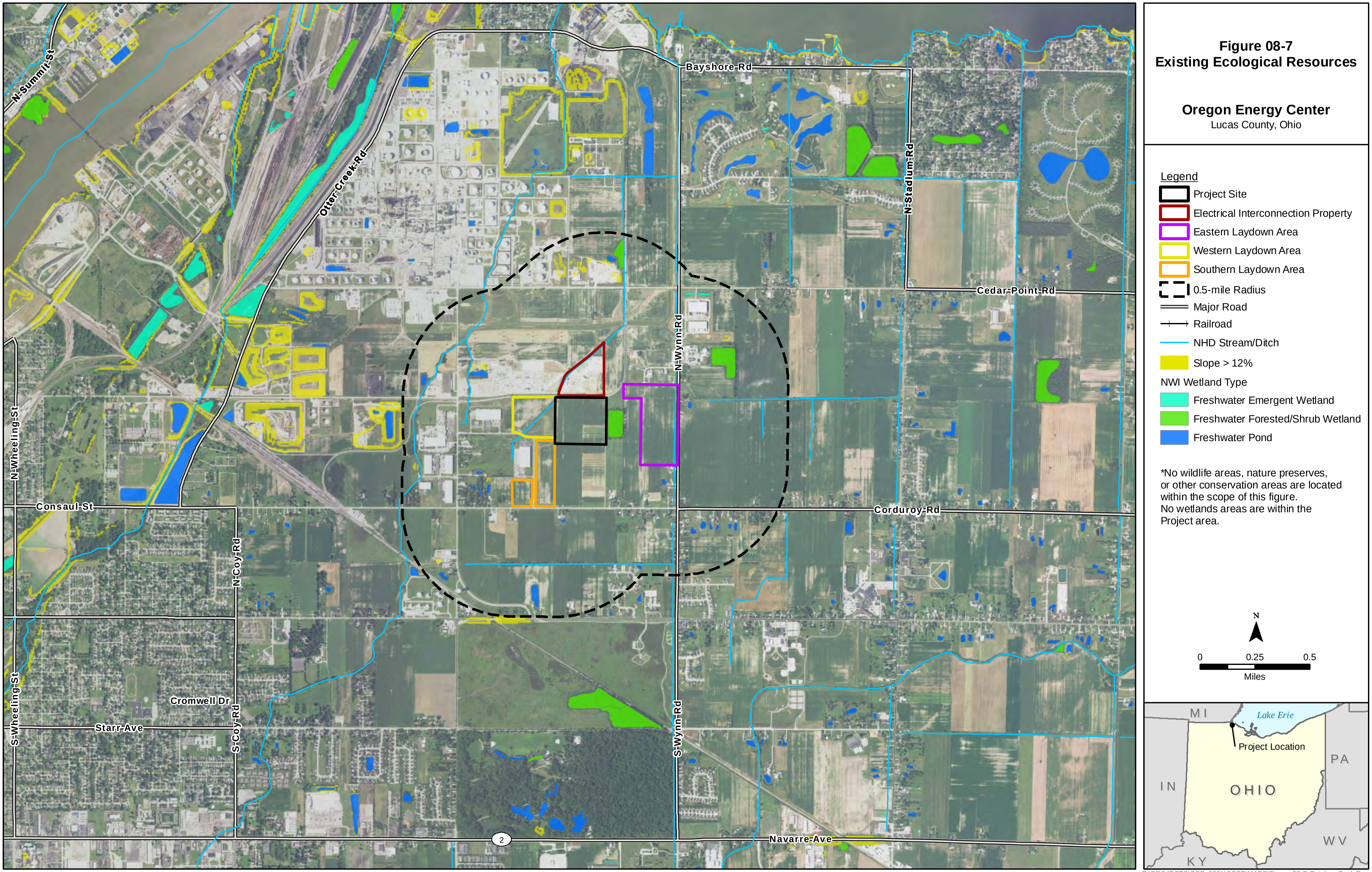


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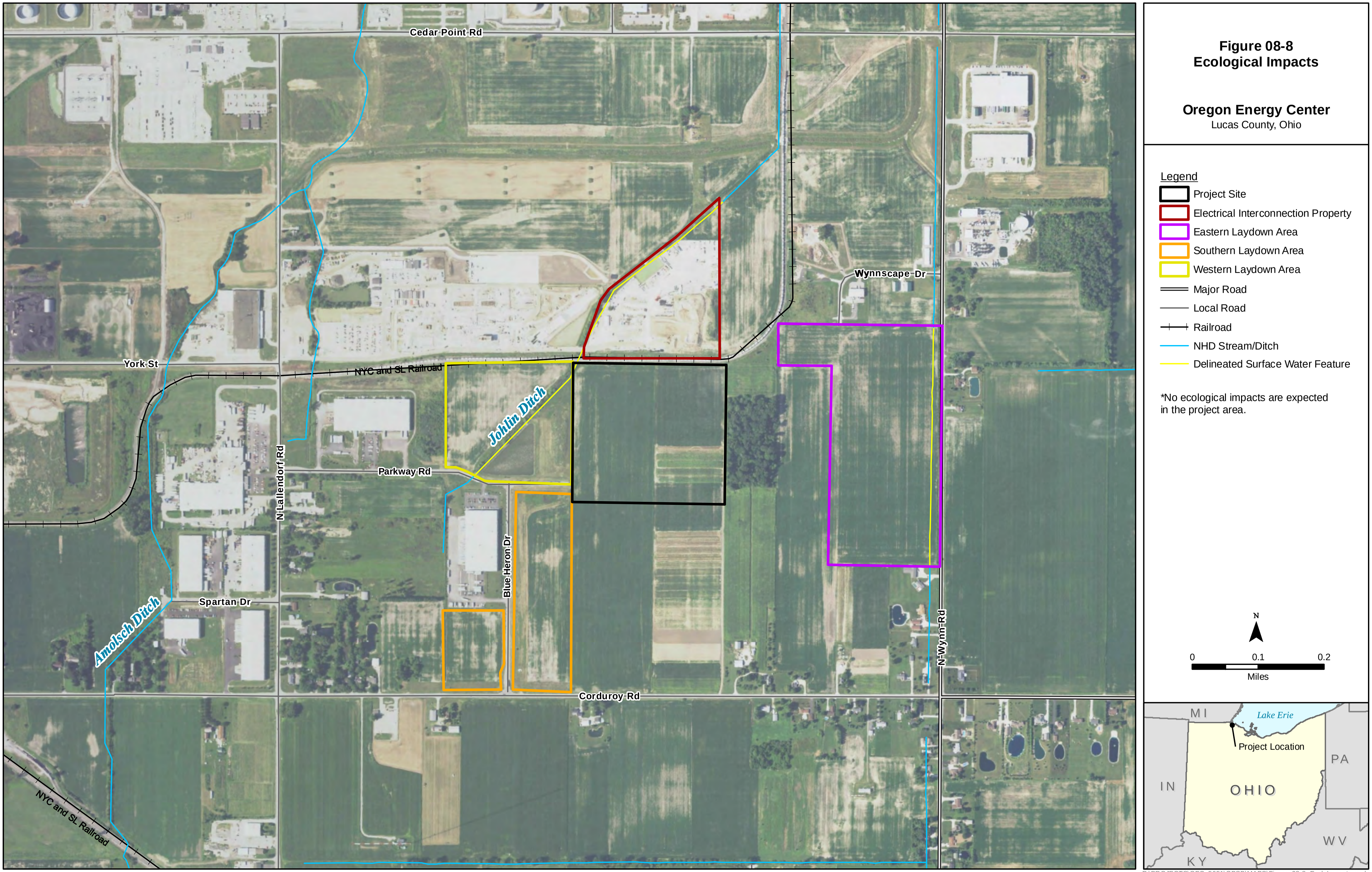
Figure 08-8
Ecological Impacts

Oregon Energy Center
Lucas County, Ohio



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