

# **Exhibit D**

## **Transportation Report**

# **TRANSPORTATION EFFECT AND ROUTE EVALUATION STUDY**

**FOR**

## **Hecate Energy Highland LLC**

Clay and White Oak Township, Highland County, Ohio

**Developer:**



**Published:** October 2018

**Prepared By:**



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### **Appendix A**

*Exhibit 1: Site Location/Road Study Map*

*Exhibit 2: Road Width and Conditions*

*Exhibit 3: Areas of Concern*

### **Appendix B – Road Jurisdictions**

### **Appendix C – Road and Bridge Data**

### **Appendix D – Areas of Concern Photos and Descriptions**

### **Appendix E – Truck Load Estimate**

## I. Project Overview

Fisher Associates, P.E., L.S., L.A., D.P.C (FA) has been contracted by Hecate Energy Highland LLC to complete a Transportation Study for the proposed Hecate Energy Highland LLC 300 MW solar project. This study has been prepared to satisfy the relevant portions of the Ohio Power Siting Board (OPSB) requirements specified in the Ohio Administrative Code, Sections 4906-4-06(F)(3) and 4906-4-06(F)(4).

Section 4906-4-06(F)(3) states: *“The applicant shall evaluate and describe the anticipated impact to roads and bridges associated with construction vehicles and equipment delivery. Describe measures that will be taken to improve inadequate roads and repair roads and bridges to at least the condition present prior to the project.”*

Section 4906-4-06(F)(4) states: *“The applicant shall list all transportation permits required for construction and operation of the project, and describe any necessary coordination with appropriate authorities for temporary or permanent road closures, lane closures, road access restrictions, and traffic control necessary for construction and operation of the proposed facility.”*

The proposed Hecate Energy Highland LLC solar project is located in Clay and White Oak Townships, Highland County, Ohio as depicted on the location map in Appendix A, Exhibit 1. The proposed project layout is shown on the exhibits provided in Appendix A.

### A. Transportation Access Points

All construction equipment, aggregate, supplies, and general construction traffic could approach the project area from any direction. Unless authorized by the developer, this traffic will use the existing state routes until it reaches the project’s designated public roads. These possible routes are US Route 68 to State Route 286, 134 and 138, to enter the project from the west, or US Route 62 to State Route 321 to enter the project from the east.

The jurisdictions of the project’s designated public roads proposed to be used as shown in Appendix B are:

- Highland County – Gath Road (CH 2), Edwards Road (CH 56), Stringtown Road (CH 60), Taylorsville Road (CH 20)
- Clay Township – Rosselott Road (TH 406), Hereford Road (TH 210), Hess Road (TH 211), Gregory Road (TH 206)
- White Oak Township – Marconnette Road (TH 141), Neal Road (TH 145)

Based on the proposed project, it is estimated that there will be a minimum of 13 individual site access points to the solar panels. The project will utilize existing field entrances where possible, but in most cases new gravel access roads with culverts may be constructed.

## II. Pre-Construction Roadway Characteristics

### A. Traffic Volumes and Accident Data

Existing data on vehicle traffic volumes and accidents within the study area was obtained from the ODOT Transportation Information Mapping System (TIMS) and can be found in Appendix C. The Annual Average Daily Traffic (AADT) is listed for the State and county roads, but the local town roads had limited traffic volume data. Detailed capacity analysis was not completed for this study, however, field observation of the transportation network did not reveal any locations where traffic flow and/or capacity appeared to create undue delay for the traveling public.

The table below summarizes the traffic conditions on the roads within the study area.

Roadway Name		Total Road Widths	AADT
Township Highway 406	Rosselott Road	11'	155
Township Highway 210	Hereford Road	12.5' – 15'	78
Township Highway 211	Hess Road	13'	NA
State Route 138	-	-	2020
Township Highway 5	New Market Road	15'	NA
Township Highway 407	Clutter Line	15'	NA
County Highway 2	Gath Road	18' – 19'	221
County Highway 56	Edwards Road	18'	385
Township Highway 206	Gregory Road	10'	351
State Route 321	-	-	456
Township Highway 141	Marconette Road	11' – 12'	NA
County Highway 60	Stringtown Road	17' – 18.5'	NA
Township Highway 145	Neal Road	12'	NA
County Highway 20	Taylorsville Road	21'	1870

\* AADT = Average Annual Daily Traffic

\* Traffic volumes obtained from ODOT Transportation Information Mapping System (TIMS) on 9/24/18. Traffic volumes for Hess Road, New Market Road, Marconette Road, Stringtown Road and Neal Road were unavailable.

According to TIMS, between 2015 and 2017, there were eight (8) accidents along the stretches of State Route 138, Gath Road (CH 2) and Edwards Road (CH 56) within the transportation study area. Of the eight accidents, three were at intersections- two at the intersection of State Route 138 and New Market Road and one at the intersection of Edwards and Taylorsville Roads. State Route 138 has a posted speed limit of 45 mph and, therefore, extra caution must be taken while turning onto and off of that highway. Of the eight total accidents, none were fatal. Therefore, the fatal accident rate (fatal accidents/million vehicle miles) is zero (0) compared to the Ohio rural statewide average fatal accident rate of 1.50 fatal accidents/million vehicle miles between 2013 and 2015 as found on the United State Department of Transportation's National Highway Traffic Safety Administration's website.

## B. School Bus Route Information and Mass Transit Systems

The students in the project area attend the Bright Local School District in Mowrystown. The high school and middle school are located on the same campus, which is located about 4.5 miles southeast of the project site via Route 321. The elementary school is about 6 miles away from the project site via Township Highway 147 eastbound and Route 136. Due to the distance from the schools and lack of sidewalks, most of the students are picked-up/dropped-off at their place of residence. The number of stops and buses within the project area is limited due to the low density of houses within and adjacent to the project area. Because the majority of the project activities and deliveries will likely occur during the middle of the day, the impacts to the local school bus routes should be minimal.

There are no rail or bus mass transit systems in the project area.

## C. Emergency Service Responder Information

Highland County is served by Mercy Health – Mount Orab Medical Center and Mercy Health – Clermont Hospital. These emergency services are located within 10 to 20 miles of the project southwest of the project site. They can be reached by travelling southwest on Route 138, south on Route 86 and west on Route 32.

An Emergency Response Plan for the project will be implemented which will include procedures (preconstruction through project operation) for fire and emergency services. This plan will outline on-site equipment and the procedures for fire suppression, medical and weather emergency evacuation as well as other critical areas. In addition, regularly scheduled meetings will be held with local emergency providers. As with any large-scale development, project components will meet all state and federal safety and fire codes.

## D. Traffic Routes Load Bearing and Structural Rating Information

A field review of existing conditions along the roads within the project area was conducted by Fisher Associates on September 20 through 21. Data observed during the site visit as depicted in Appendices A and D, includes:

- Bridge and road load postings
- Road widths, type, and condition
- Culvert cover and condition
- Posted signs of caution

### Bridge and Road Load Posting Restrictions

There are no posted loading restrictions to the bridges located on the transport route. As shown in Appendix A, the ODOT bridges along the transportation study roads all are rated as fair to good condition:

Bridge Number	Roadway Name		Feature Intersected	Sufficiency Rating	National Bridge Inventory Rating
12	State Route 138	-	Ruble Run	99.5	Fair
14	County Highway 20	Taylorsville Road	Stream	88.4	Fair
20	County Highway 56	Edwards Road	Branch Whiteoak Creek	89.9	Fair
25	County Highway 2	Gath Road	Flat Run Creek	99.9	Good
30	County Highway 2	Gath Road	Flat Run	89.8	Good
30	Township Highway 206	Gregory Road	Flat Run	82.9	Good
72	Township Highway 406	Rosselott Road	Little N Fork Whiteoak Creek	83.5	Good
118	Township Highway 210	Hereford Road	Whiteoak Creek	99	Good

### Road Surface Type and Widths

As depicted on the Road Width and Conditions Exhibit (Appendix A, Exhibit 2), the road surface types along the transport route are all asphalt. The table below summarizes the road conditions along the transport route.

Roadway Name		Total Road Widths	Road Condition
Township Highway 406	Rosselott Road	11'	No apparent deficiencies
Township Highway 210	Hereford Road	12.5' – 15'	Road repairs
Township Highway 211	Hess Road	13'	No apparent deficiencies
State Route 138	-	-	No apparent deficiencies
Township Highway 5	New Market Road	15'	Road Patch Depressed
Township Highway 407	Clutter Line	15'	No apparent deficiencies
County Highway 2	Gath Road	18' – 19'	Culvert to be Replaced
County Highway 56	Edwards Road	18'	Road Patch Leveling
Township Highway 206	Gregory Road	10'	No apparent deficiencies
State Route 321	-	-	No apparent deficiencies
Township Highway 141	Marconette Road	11' – 12'	Slight Road Depression
County Highway 60	Stringtown Road	17' – 18.5'	No apparent deficiencies
Township Highway 145	Neal Road	12'	Road Patch Degrading
County Highway 20	Taylorsville Road	21'	No apparent deficiencies

The roads that are less than 16'-18' in width will require a construction traffic plan so as to not negatively impact the landowners/residents and limit trucks driving off the pavement. There are some pavement repair locations and depressions which are depicted on the Areas of Concern Exhibit (Appendix A, Exhibit 3) and corresponding photographs in Appendix D. The least stable section of the study area appears to be Edwards Road (CH 56); however, due to the limited traffic planned for that section, this is not anticipated to be a concern. The remainder of the transport roads do not appear to exhibit any underlying issues, but rather normal aging that requires routine maintenance. If necessary, road use agreements will be prepared with the county prior to construction to address any potential issues with the

existing roads; however, there does not seem to be any significant structural concerns to the existing roads from a transportation perspective.

### Culvert Cover and Conditions

During the site visit, it was observed that there are many culverts of varying sizes that have recently been replaced and appear to be in good structural condition. Some have minimal cover; however, these are either small or are made of concrete in order to handle the vehicle and equipment loads. As noted on the Areas of Concern Exhibit (Appendix A, Exhibit 3) and corresponding photographs in Appendix D, some asphalt patches at these new culvert locations are deteriorating faster than the remaining road surface or there is some settlement on either side of the culvert. In these cases, the additional traffic may increase the rate of degradation and will need to be monitored during construction for possible upgrades.

- Hereford Road: road repair visible over 30 inch HDPE culvert with two foot cover (Area of Concern 1).
- New Market Road: concrete patch depressed over 24 inch (Area of Concern 2).
- Marconette Road: 5 foot high concrete box culvert with no cover, and a slight depression (Area of Concern 5).
- Neal Road: road patch degrading over 36 inch HDPE with 6 inches of cover (Area of Concern 6).
- Edwards Road: road patch leveled over 18 inch concrete culvert with 1 foot of cover (Area of Concern 7).
- Edwards Road: road patch leveling over a 36 by 16 inch concrete culvert (Area of Concern 8).

Road use agreements may be prepared, if necessary, with the county prior to construction to address any potential issues with existing culverts.

### Posted Signs of Caution

As depicted on the Areas of Concern Exhibit (Appendix A, Exhibit 3) and corresponding photographs in Appendix D, there are three areas that have been posted for flood water potential: two on Taylorsville Road and one on Gath Road. During and after heavy storm events, construction vehicles traveling along these roads should use caution during or after a high rainfall event.

### Overhead Clearance

Because the construction vehicles for the project will be legal heights and no intersection improvements are proposed, there will not be any issues with vehicle clearance to overhead electric crossings and tree overhang locations.



### **III. Trip Generation Characteristics**

#### **A. Vehicle Trips Frequency**

A truck load estimate calculation during the construction phase is included in Appendix E. Any assumptions in the calculations are based on anticipated solar project loads. Based on the site visit, potential locations for proposed access roads off of the transport roads are depicted on the exhibits in Appendix A. As the construction traffic volumes do not appear to exceed capacities, the roadways should not be significantly impacted by standard construction traffic.

During operation and maintenance, the facility will not generate a significant volume of traffic with the anticipation of only a few pickup trucks during routine scheduled maintenance as well as unanticipated unscheduled maintenance periods.

## **IV. Traffic and Transportation Impacts of the Facility**

### **A. Projected Future Traffic Conditions**

While construction vehicles are traveling along project area and delivery route roadways, the existing traffic may experience minor delays to allow for the safe passage of these vehicles.

During development of the potential road use agreements if necessary, the Applicant will coordinate with appropriate authorities to determine applicable thresholds and procedures for implementing temporary or permanent road closures, lane closures, road access restrictions, and traffic control.

During operation and maintenance, the facility will not generate a significant volume of traffic. Therefore, any projected additional future traffic will be negligible.

### **B. Adequacy of the Road System to Accommodate Projected Traffic**

Truck load assumptions are based on typical solar projects that will need to be finalized in conjunction with the anticipated county road use agreements, if required. Roads with low strength and/or poor surface conditions may require improvement after construction traffic. An area of concern is the stability of Edwards Road, but this is anticipated to be of no concern, given the limited traffic planned on that section. The rest of the transport roads do not appear to exhibit an underlying issue, but just normal aging that requires routine maintenance. During the pre-construction period, the applicant will coordinate with the county and townships to determine if any pre-construction road maintenance will be needed, but significant structural improvements are not anticipated. However, due to the width of some of the roads (less than 16' wide), limited construction traffic management plans may need to be created to avoid negatively impacting the residents/local traffic.

As shown in Appendix E, the trucks assumed to be used for the project are WB-50's (8.5 ft wide x 42.5 ft long x 10 ft high) for solar panel delivery and standard dump trucks for gravel delivery. An estimation of 4,250-5,000 trucks will be needed for the project, but none of the vehicles will be oversized or overweight. Roads will need to be monitored prior to and during construction and reviewed afterwards to determine the required repairs, if any. Roads will be returned to pre-construction conditions.

During operation and maintenance, the facility will not generate a significant volume of traffic. Therefore, improvements to the road system are not necessary to accommodate projected operations traffic.

### **C. Traffic and Transportation Mitigation Measures**

In conjunction with the anticipated county road use, mitigation measures to address maintenance will be developed as the project's layout is finalized. Final engineering design will be required prior to construction activities to ensure all transportation related impacts have

been addressed to the satisfaction of the local highway departments. High traffic areas will be determined once the engineering layout is determined.

All roads should be monitored during construction for potholing and deterioration of the pavement to ensure they are safe for general construction and local roadway traffic. The volume and weight of both the general construction traffic may cause some distress that could require temporary repair. These temporary repairs/improvements could include repaving with asphalt, temporary traffic signs, etc. and be as a condition of a road use agreement with the county or township. After completion of construction activities, there may be some improvements needed due to any damage caused by the high frequency of vehicle traffic (especially on any roads that had temporary repairs made during the construction activities). Repairing the roadways to pre-construction conditions may include using treatments such as oil and stone or hot or cold mix asphalt, which may be required should a road use agreement be required. Other repairs will likely require some asphalt patching or possibly some asphalt removal, subgrade compaction, and asphalt patching.

Although many of the culverts appear to be structurally sound, there are approximately 7 locations that may require more thorough monitoring throughout construction. These locations are showing signs of asphalt deterioration over the culverts and may need repair work done during/after construction. Additionally, there are drainage pipes/culverts along the construction routes that have 1 foot or less of cover, but most appear to either be of a smaller size or be made of concrete and are not anticipated to become damaged during construction. Each pipe should be analyzed to determine if necessary improvements are needed to accommodate the construction traffic.

#### D. Road Use and Restoration Agreements

Due to the size of the transformer required for the substation, an overweight/oversize permit may be necessary. However, the remainder of the construction vehicles for the project will be legal heights, widths, and weights, and would not require obtaining special hauling permits. All permits necessary to transport the transformer will be secured as necessary during final engineering and design.

# **APPENDIX A**



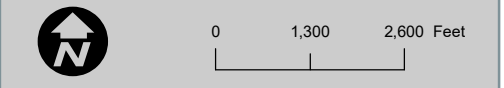


EXHIBIT 1 : SITE LOCATION / ROAD STUDY MAP  
HECTATE ENERGY HIGHLAND, LLC  
HIGHLAND COUNTY, OH

- ODOT Bridges
- Potential Access Points with Direction
- Fence
- Point of Interconnect
- Transportation Study Roads
- State Highway
- County Highway
- Town Road
- Other Road
- Project Area
- Townships
- Counties

Project USGS Quad(s):  
Sardinia, Sugar Tree Ridge

Map Revision Date: 9/28/2018    Map Author: AK



Data Sources:  
Roads, Bridges, Political Boundaries -  
Ohio Transportation Information Mapping System (ODOT TIMS)  
[www.gis.dot.state.oh.us.com](http://www.gis.dot.state.oh.us.com)

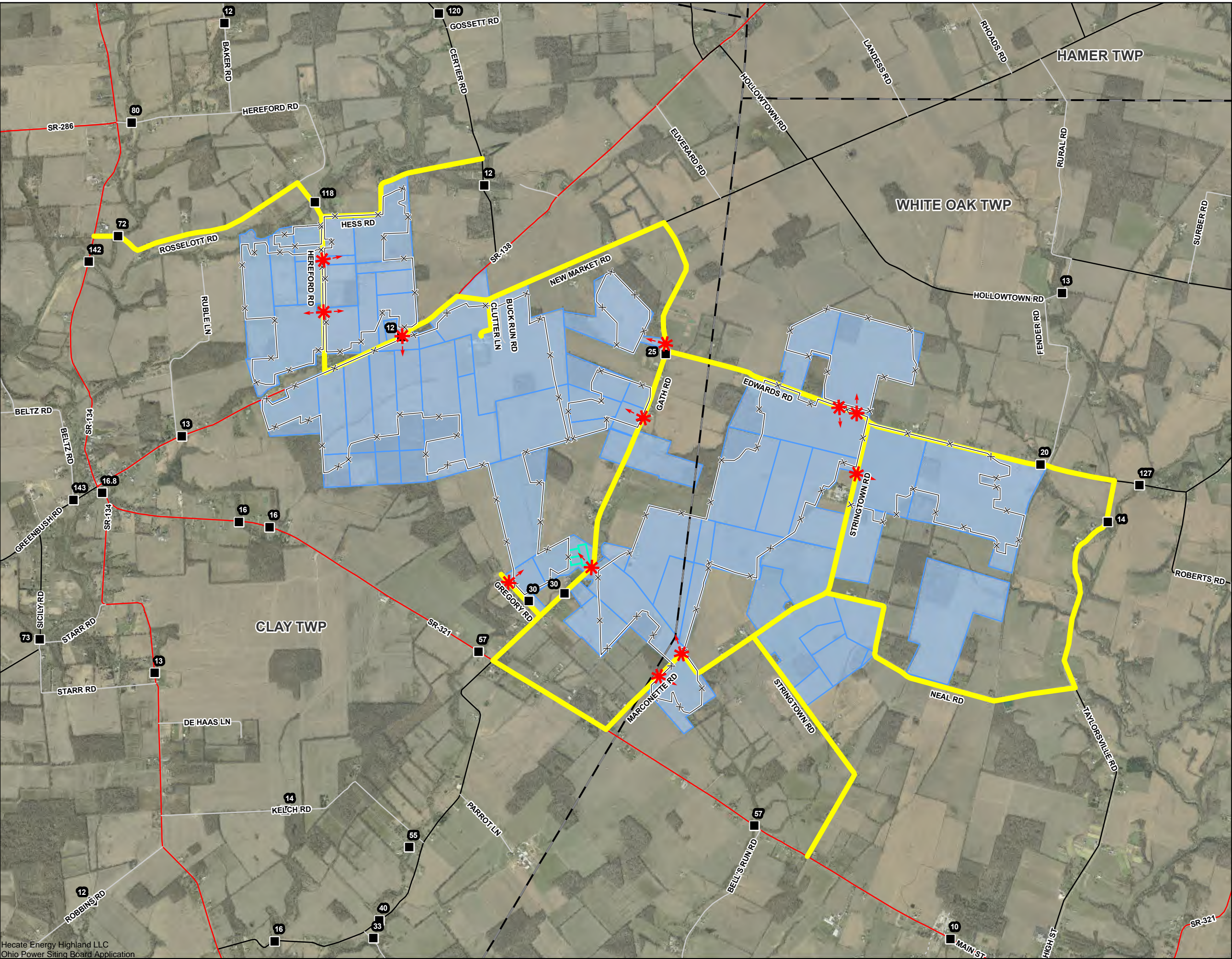






EXHIBIT 2 : ROAD WIDTH AND TYPE  
HECTATE ENERGY HIGHLAND, LLC  
HIGHLAND COUNTY, OH

ODOT Bridges

Potential Access Points with Direction

Fence

Point of Interconnect

Transportation Study Roads

State Highway

County Highway

Town Road

Other Road

Project Area

Counties

Townships

Project USGS Quad(s):  
Sardinia, Sugar Tree Ridge

Map Revision Date: 9/28/2018    Map Author: AK

N

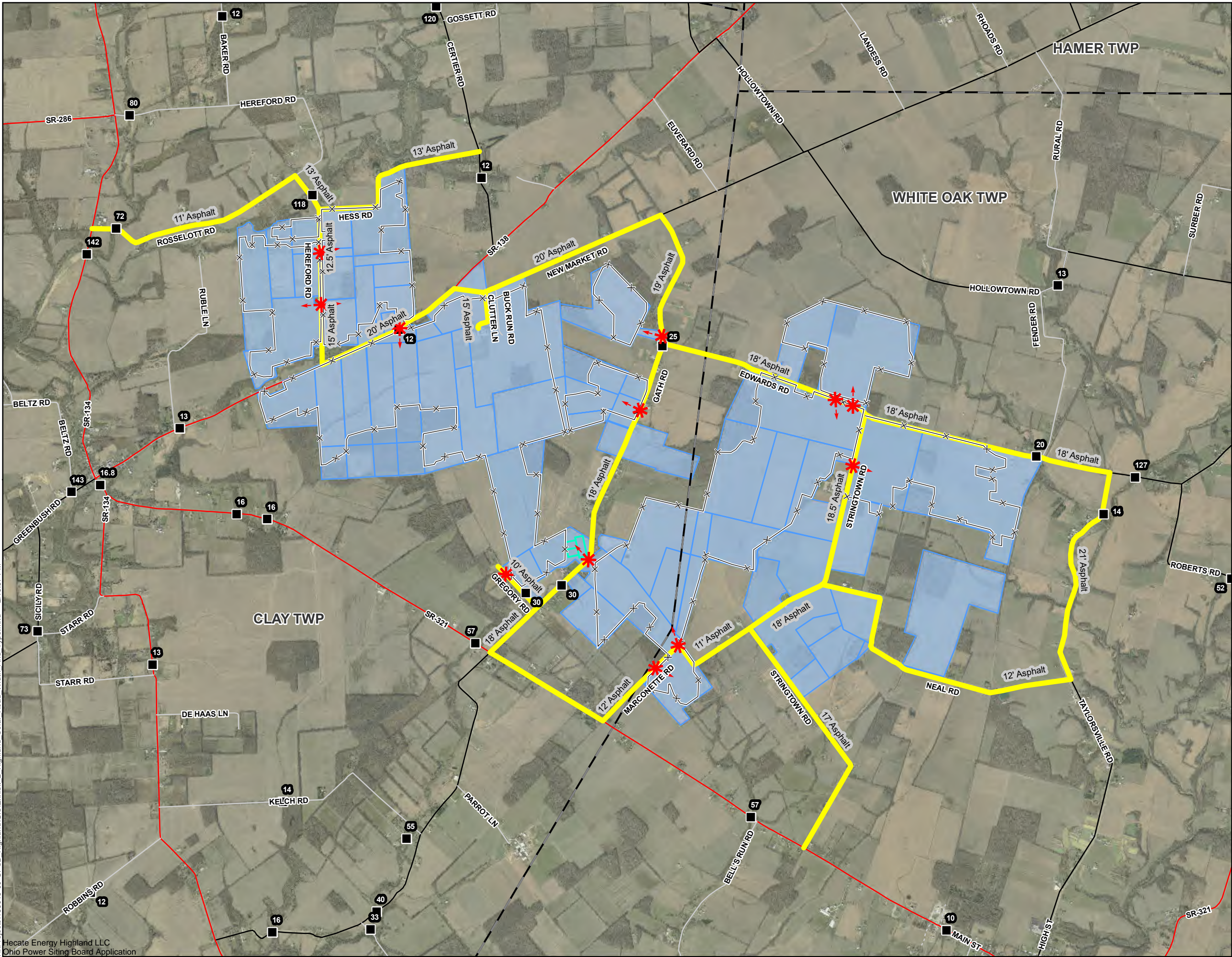
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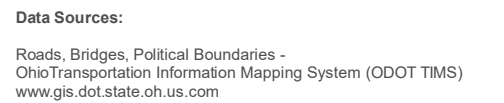
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Data Sources:  
Roads, Bridges, Political Boundaries -  
Ohio Transportation Information Mapping System (ODOT TIMS)  
[www.gis.dot.state.oh.us.com](http://www.gis.dot.state.oh.us.com)









## **APPENDIX B**



**This foregoing document was electronically filed with the Public Utilities**

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