

STRUCTURES INVENTORY & ASSESSMENT

FOR

HORSE CREEK WIND PROJECT

Town of Clayton
Jefferson County
New York

Prepared For:

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TABLE OF CONTENTS

	<u>Page No.</u>
I. Introduction	1
A. Horse Creek Wind Project Delivery Route.....	1
B. Construction Vehicles	1
II. Transportation Systems	2
A. Existing Roadway Conditions	2
1. Surface Type.....	2
2. Roadway Width.....	2
B. Existing Drainage Structures	3
1. Bridges.....	3
2. Culverts	3
C. Projected Physical Impacts & Proposed Mitigation.....	4
III. Conclusion.....	5

Appendix A

- Exhibit 1: Project Location Map*
- Exhibit 2: Project Map*
- Exhibit 3: Drainage Structure Inventory*
- Exhibit 4: Culvert Type & Diameter*
- Exhibit 5: Culvert Minimum Cover & Condition*

I. Introduction

Fisher Associates, P.E., L.S., P.C. (FA) has been contracted by Iberdrola Renewables to complete a Structures Inventory & Assessment for the proposed Horse Creek Wind Project. The project is located in the southern portions of the Towns of Clayton and Orleans in Jefferson County, New York as shown on the location map included in Exhibit 1. This report reviewed the existing bridge and drainage structure conditions along the proposed hauling route within the project area. The review revealed areas where modifications to the existing structures will be required to accommodate the delivery of the turbines to the site.

A. Horse Creek Wind Project Delivery Route

It is expected that the wind turbine components will be delivered to the Port of Oswego in Oswego, NY and then trucked to the project site. NYS Route 12 is projected to be the primary delivery route to the project area. The route from the port to NYS Route 12 was not included in the scope of this study. A Special Hauling Permit is required for vehicles and/or loads that exceed the legal maximum dimensions or weights specified in Section 385 of the New York State Vehicle and Traffic Law. Those dimensions and weights include a maximum width of 8 feet 6 inches, maximum height of 13 feet 6 inches, maximum length of single trailer of 53 feet, and maximum weight of one axle of 22,400 pounds.

The delivery route for the purposes of this report will begin at the intersection of NYS Route 12 and NYS Route 180 and then move into the Horse Creek Wind Project area. The local on-site roads that will complete the delivery routes, as shown in Exhibit 2, include the following:

- Depauville Road
- Lowe Road
- Sternberg Road
- Hart Road
- NYS Route 12
- Miller Road
- Woodard Road
- Wilder Road
- Overbluff Road (CR 12)
- Haller Road

B. Construction Vehicles

Construction traffic will consist of standard construction equipment and specialized hauling trucks to deliver the turbine components. Standard construction traffic consists of gravel/dump trucks, concrete trucks, excavation equipment, conventional semi-trailers, transport/tool vehicles and employee vehicles. These standard construction vehicles should not require physical modifications to the structures to accommodate their presence.

Delivery of the wind turbine components will utilize Over-Size/Over-Weight (OS/OW) trucks to bring the components from the manufacturer to the project area.

The OS/OW trucks are special hauling vehicles with unique lengths, widths, heights, and weights depending on the component being transported. These trucks require particular clearances due to

their size and turning radii. The actual vehicles used to deliver the turbines varies dependent on the transportation contractor. This report determines potential impacts to the existing bridge and culverts due to the anticipated construction/delivery traffic. For each impact, proposed mitigation methods are identified to address specific deficiencies due to the requirements of the OS/OW vehicles.

II. Transportation Systems

The assessment completed as a part of the study included a review of the drainage structures and bridges. Each bridge or drainage structure, 3 feet in diameter or larger, found in the field was inventoried for approximate location, type, size, approximate depth of cover over the structure, and roadway width at the structure. The structure and road data is included in the Structure Inventory Table in Exhibit 3. Several locations appeared to have existing features that may not accommodate the construction traffic anticipated for the proposed project. In the Structure Inventory Table these locations are indicated as blue cells under the “Concern” column and were marked as such for one or more of the following reasons:

- Roadway width less than 16 feet
- Less than 2 feet of cover
- Structure in poor condition
- Unknown conditions
- Bridge location (discussed in a later section)

A. Existing Roadway Conditions

1. Surface Type

The Structure Inventory Table, Exhibit 3, presents the roadway type at each drainage structure. As depicted, the roadways within the project area are either paved with asphalt or gravel. The state and county roads appear to be in good condition with clear pavement markings and signage. The local town roads are in fair condition with little to no pavement markings. All roadway surface conditions appear to be adequate to accommodate construction activities.

2. Roadway Width

A majority of the roadways in the project area have widths between 18 feet and 24 feet. The State Routes are all 24 feet wide with at least 4 feet wide asphalt shoulders. The county and town roads vary in width with shoulders varying from 0 feet to 8 feet. All existing roadway widths will accommodate construction activities.

B. Existing Drainage Structures

Drainage structures with a span length of greater than twenty feet are considered bridges and referenced as such in this summary. Information regarding bridge structure type and history was obtained from the 2010 NYSDOT bridge inspection reports inventory for the Bridge Identification Numbers (BINs) indicated where available. Information regarding culverts was obtained through field inspection and evaluation.

1. Bridges

There are three bridge structures that were reviewed for this study:

- BIN 3367270 – Depauville Road over Horse Creek
- BIN 1077370 – Route 180 over Stone Mills Creek
- BIN Unknown – County Route 12 over Unknown Creek

The locations of these bridges can be found in Exhibit 4. The bridges all carry loads over water. Each of these bridges was reviewed for geometric conditions and load rating to determine if each could accommodate the OS/OW vehicles.

All bridges are safe for legal loads and do not have posted weight restrictions. All also have sufficient horizontal and vertical clearances to accommodate the OS/OW trucks.

At this time the only bridge structure on the proposed hauling routes is BIN 3367270 (Depauville Road over Horse Creek). This structure is comprised of twin 96 inch CMP pipes and cannot be rated. Since the hauling company has not been selected at the time of this report, exact truck configurations are not known. However, based on truck configurations from previously completed wind power projects, it is anticipated that this structure will be able to handle the load as it is buried under three feet of cover.

The other two structures are not on the proposed hauling route at this time. BIN 1077370 (Route 180 over Stone Mill Creek) is a post-tensioned structure. Jefferson County was contacted regarding the bridge over County Route 12. The County responded that it was built in 1956 with 18" I-beams on abutments with an open grate deck. The County has no further information regarding the deck or the abutments.

2. Culverts

The Culvert Type & Diameter and Culvert Minimum Cover & Condition maps, Exhibits 4 and 5, present the locations of the drainage structures apparent in the field. For the purposes of this study, it is assumed that any culvert with less than 2 feet of cover may be susceptible to damage during construction activities. The inventory table in Exhibit 3 highlights any locations with concerns in regards to insufficient cover, roadway width, and/or structure condition.

C. Projected Physical Impacts & Proposed Mitigation

Roadway Type

Impact – The existing surface conditions appear adequate to accommodate construction activities. The amount, type, and weight of both general construction traffic (gravel/concrete trucks, semi-trailers, etc.) and OS/OW vehicles, however, will likely damage the surface condition of the roadways in the project area.

Mitigation – After completion of construction activities, the applicant will be required to repair the roadway surface to preconstruction conditions. A roadway condition video survey can be completed prior to construction to document the existing surface conditions. The applicant will need to repair the roadways using the appropriate treatment (oil & stone, hot or cold mix asphalt) to re-establish the preconstruction surface conditions.

Roadway Width

Impact – The existing roadway widths for the on-site traveled roads at the time of this report are expected to be adequate to accommodate the construction activities due to the absence of guide rail along the edge of the roadways that are 16 feet wide.

Mitigation – None required.

Weight

Impact – Twelve drainage pipes/culverts have been identified as having less than 2-feet of cover or are in poor condition as shown in Exhibit 5. Of those twelve, eight of them are on the proposed transportation route. These culverts may be crushed or deformed by construction activities causing construction delays, delays to local motorists, and damage to construction vehicles and/or turbine components.

Mitigation – Each pipe should be evaluated during final design of the roadway improvements to determine if improvements will be necessary to accommodate the construction activities. Improvements may include:

- Additional cover over pipes,
- Reinforce pipes with bracing,
- Use bridge jumpers to clear pipes,
- Use bridge plates to distribute vehicle loading,
- Replace pipes prior to construction,
- Replace pipes during or after construction if damaged by construction activities.

Six of the eight pipes on the transportation route are in fair or good condition but have less than two feet of cover. It is anticipated that these structures could be mitigated by

replacement, adding additional cover over the pipes, or other improvement as determined in final design.

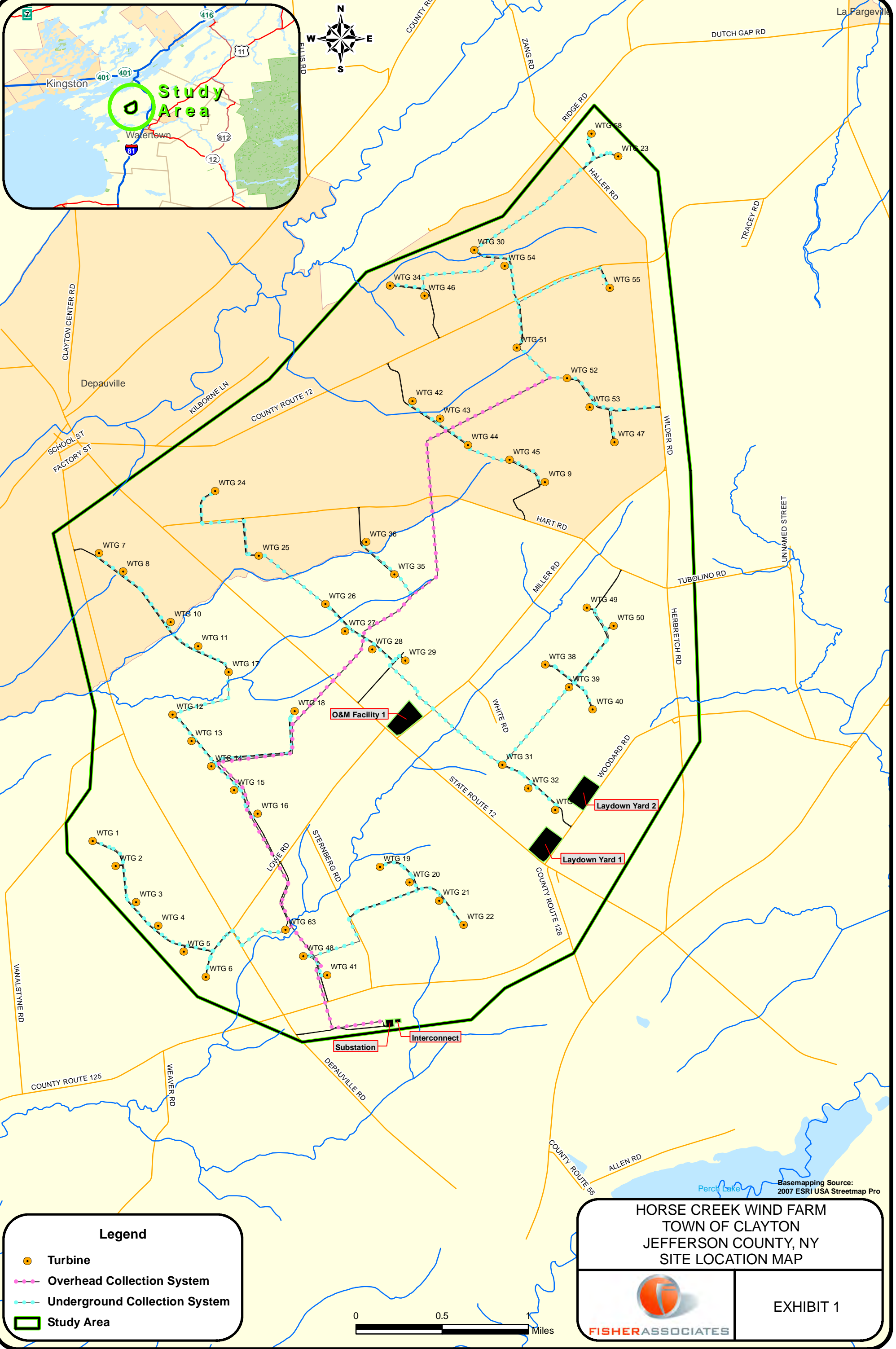
The remaining three pipes on the transportation route are in poor condition and would likely need to be replaced or avoided for construction.

III. Conclusion

This study has identified the structure related impacts that may be experienced during construction of the Horse Creek Wind Project. Mitigation measures have been provided to accommodate the construction traffic and minimize impacts to the traveling public. Final engineering design will be required prior to construction activities to ensure all transportation related impacts have been addressed to the satisfaction of the NYSDOT and the local highway departments.

APPENDIX A

Exhibit 1: Project Location Map



Basemapping Source:
2007 ESRI USA Streetmap Pro

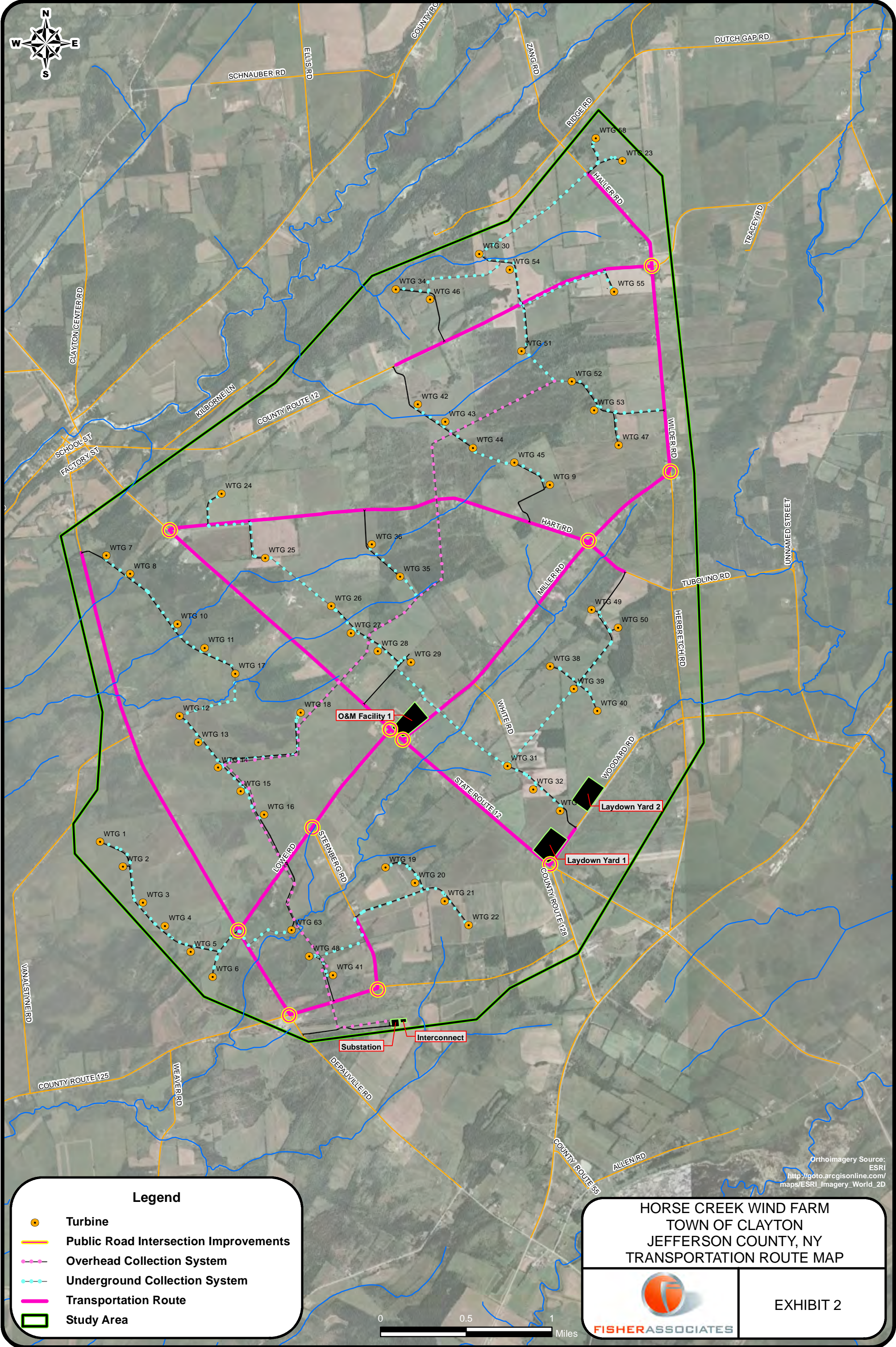
**HORSE CREEK WIND FARM
TOWN OF CLAYTON
JEFFERSON COUNTY, NY
SITE LOCATION MAP**



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EXHIBIT 1

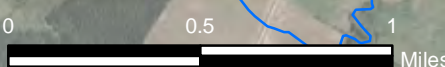
Exhibit 2: Project Map



Orthoimagery Source:
ESRI
http://gto.arcgis.com/maps/ESRI_Imagery_World_2D

Legend

- Turbine
- Public Road Intersection Improvements
- Overhead Collection System
- Underground Collection System
- Transportation Route
- Study Area



**HORSE CREEK WIND FARM
TOWN OF CLAYTON
JEFFERSON COUNTY, NY
TRANSPORTATION ROUTE MAP**




EXHIBIT 2

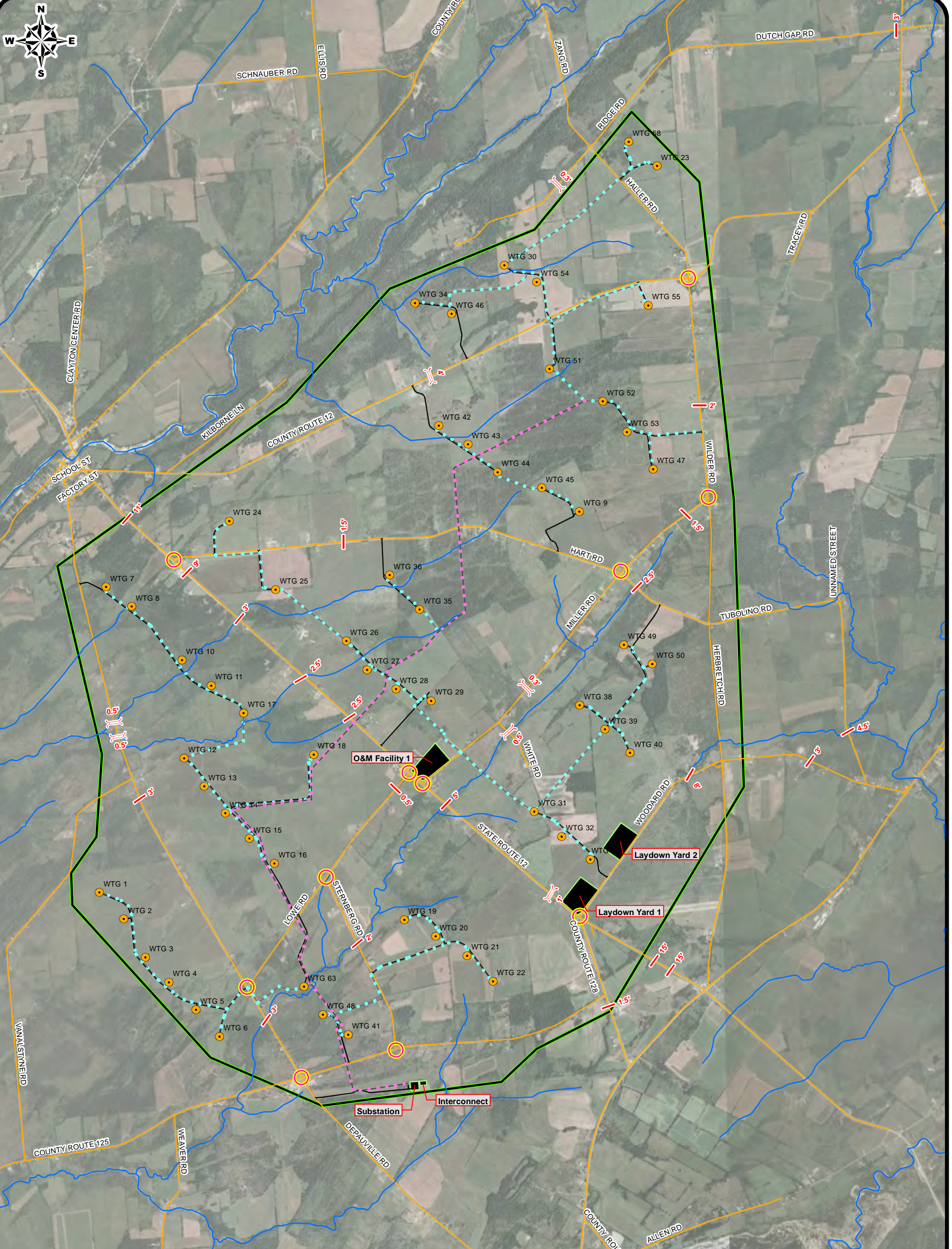
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Exhibit 3: Drainage Structure Inventory

Horse Creek Wind Project Drainage Structure Inventory

ID	TYPE	SIZE (in.)	COVER (ft.)	LENGTH (ft.)	CULVERT CONDITION	ROADWAY WIDTH (ft.)	ROAD TYPE	SHOULDER WIDTH (ft.)	SHOULDER TYPE	CLEAR ZONE (ft.)	ROAD NAME	NOTES	CONCERN		
1	Twin CMP	96	3.0	60	Good	18	Asphalt		Gravel		Depauville	BIN 3367270			
2	CMP	36	3.0	28	Good	18	Asphalt	0			Depauville				
3	Concrete Box	10' x 6'	0.5		Good	30	Asphalt	0			Depauville		cover		
4	Concrete Box	10' x 6'	0.5		Good	30	Asphalt	0			Depauville		cover		
5	CMP	96	2.0	49	Good	18	Asphalt	0			Sternberg				
6	Twin CMP	48	1.5	60	Good		Asphalt		Gravel		CR 128		cover		
7	CMP	36	15.0	95	Fair	24	Asphalt	5	Asphalt		SR 12				
8	CMP	36	15.0	95	Fair	24	Asphalt	5	Asphalt		SR 12				
9	Concrete Box	3' x 5'	1.0	54	Fair	24	Asphalt	5	Asphalt		SR 12		cover		
10	Twin CMP	84	5.0	55	Good	24	Asphalt	5	Asphalt		SR 12				
11	CMP	72	0.5	34	Fair	16	Asphalt	0			Lowe		cover		
12	CMP	36	2.5	55	Fair	24	Asphalt	5	Asphalt		SR 12				
13	Twin CMP	36	2.5	48	Fair	24	Asphalt	5	Asphalt		SR 12				
14	Twin CMP	84	3.0	45	Good	24	Asphalt	5	Asphalt		SR 12				
15	CMP	36	9.0	75	Good	24	Asphalt	5	Asphalt		SR 12				
16	CMP	48	11.0	104	Good	24	Asphalt	5	Asphalt		SR 12				
17	CMP	60	8.0	60	Fair	16	Asphalt	0			Woodard				
18	CMP	36	3.0	40	Fair	19	Asphalt	0			Woodard				
19	CMP	120	4.5	70	Good	16	Asphalt	8.5	Gravel		Sourwine				
20	Concrete Box	8' x 4'	0.5		Poor	18	Gravel	0			White		cover		condition
21	Concrete Box	4' x 4'	0.3	21	Poor	16	Asphalt	0			Miller		cover		condition
22	CMP	72	1.5	55	Good	16	Asphalt	0			Hart		cover		
23	CMP	72	2.5	60	Good	16	Asphalt	2	Gravel		Tubolino				
24	Steel	42	1.5	36	Good	18	Asphalt	0			Miller		cover		
25	CMP	36	2.0	40	Fair	16	Asphalt	2	Gravel		Wilder				
26	Concrete Box	30" x 30"	4.0	36	Poor	19	Asphalt	0			CR 12				condition
27	Concrete Box	4' x 4'	0.3	20	Poor	16	Asphalt	2	Gravel		Ridge		cover		condition
28	Bridge			32		22	Asphalt	6	Asphalt		SR 180	BIN 1077370			
29	Bridge			16		30	Metal Grid Deck	0			CR 12	BIN Unknown			
30	Twin CMP	36	3.0	45	Poor	16	Asphalt		Gravel		Dutch Gap				condition

Exhibit 4: Culvert Type & Diameter



Legend

- Turbine
- Box Culvert Cover (ft)
- Pipe Crossing Cover (ft)
- Overhead Collection System
- Underground Collection System
- Study Area

Orthoimagery Source:
ESRI
http://go.to.arcgisonline.com/maps/ESRI_Imagery_World_2D

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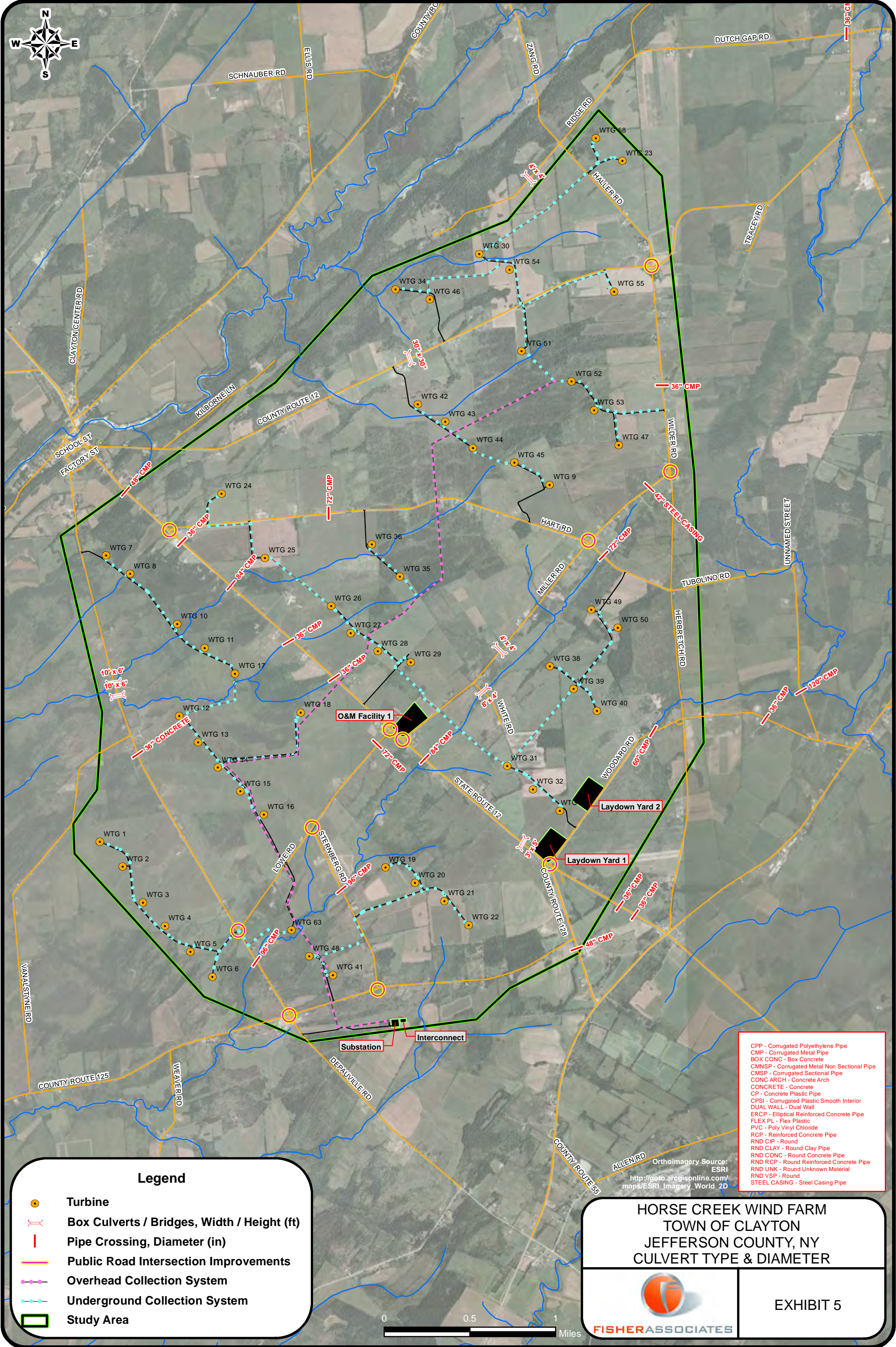
HORSE CREEK WIND FARM
TOWN OF CLAYTON
JEFFERSON COUNTY, NY
CULVERT MINIMUM COVER & CONDITION



EXHIBIT 4

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Exhibit 5: Culvert Minimum Cover & Condition



- CPP - Corrugated Polyethylene Pipe
- CMP - Corrugated Metal Pipe
- BOX CONC - Box Concrete
- CMNSP - Corrugated Metal Non Sectional Pipe
- CMSP - Corrugated Sectional Pipe
- CONC ARCH - Concrete Arch
- CONCRETE - Concrete
- CP - Concrete Plastic Pipe
- CPSI - Corrugated Plastic Smooth Interior
- DUAL WALL - Dual Wall
- ERCP - Elliptical Reinforced Concrete Pipe
- FLEX PL - Flex Plastic
- PVC - Poly Vinyl Chloride
- RCP - Reinforced Concrete Pipe
- RND CIP - Round
- RND CLAY - Round Clay Pipe
- RND CONC - Round Concrete Pipe
- RND RCP - Round Reinforced Concrete Pipe
- RND UNK - Round Unknown Material
- RND VSP - Round
- STEEL CASING - Steel Casing Pipe

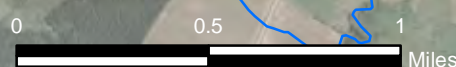
Legend

- Turbine
- Box Culverts / Bridges, Width / Height (ft)
- Pipe Crossing, Diameter (in)
- Public Road Intersection Improvements
- Overhead Collection System
- Underground Collection System
- Study Area

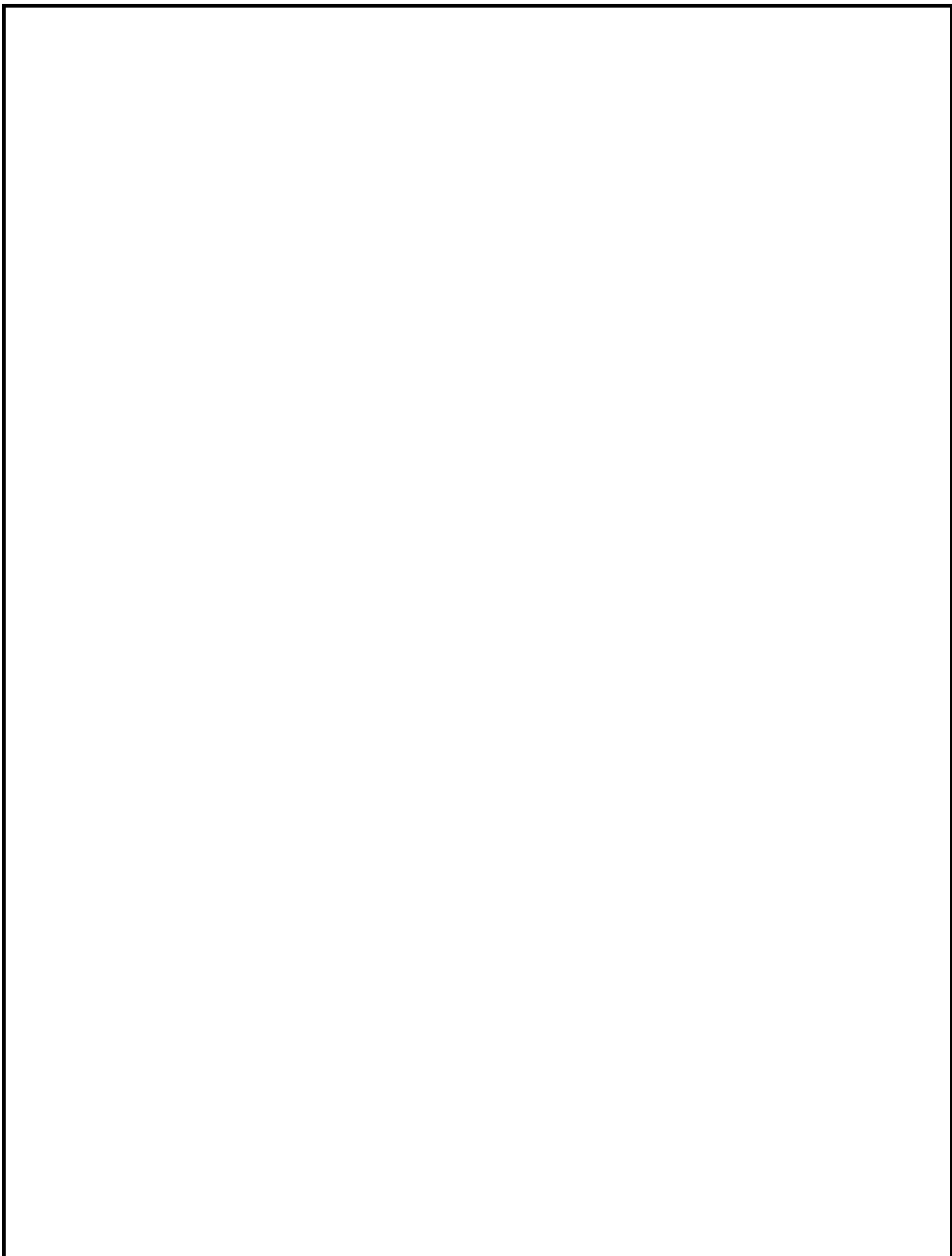
**HORSE CREEK WIND FARM
TOWN OF CLAYTON
JEFFERSON COUNTY, NY
CULVERT TYPE & DIAMETER**



EXHIBIT 5



Orthoimagery Source:
ESRI
http://gto.arcgis.com/maps/ESRI_Imagery_World_2D





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