Large Filing Separator Sheet

Case Number: 09-1066-EL-BGN

File Date: 12/21/09

Section: 2

Number of Pages: 199

Description of Document: Application
Volume 2

Barr Engineering Company
4700 W 77th St. Suite 200
Edina, MN 55435

LOG OF BORING T-148

Sheet 1 of 1

Project: Blue Creek Wind Project | Location: Van Wert County, Ohio | Client: Iberdrola Renewables, Inc

Barr Project Number: 35/81-1001

Surface Elev.:

Elevation, feet	Depth, feet	MATERIAL DESCRIPTION (ASTM D2488)	Graphic Log	Sample Type & Rec.	STANDARD PENETRATION TEST DATA (N in blows/ft @)	WATER CONTENT % (PL, LL)	SIEVE ANALYSIS (GRAVEL, SAND, SILT, CLAY, FINES)	Physical Properties WC %	γ pcf	ϕ °	Q_u tsf	Q_p tsf	Gs	RQD %
	0	SILTY TOPSOIL (OL), black, moist												
		SILT (ML), brown, moist, stiff			14			23.4				4.5		
	5													
		CLAY (CL), gray, little gravel (small), hard. 2-inch poorly graded sand with gravel layer (above bedrock) at 20 feet			53	15.6, 30.7		15.1	118.2		5.96			
	10													
					23			14.5				4.5		
	15							13	122.3		5.64			
					50/4"									
	20	DOLOMITE and DOLOMITIC LIMESTONE, gray, slightly to moderately fractured, slight or no decomposition, strong, isolated vugs (up to 2-inch diameter), uppermost (1 ft to 2 ft) contact of limestone is intensely fractured.						20						26
	25													58
	30													100
		End of borehole @ 30 feet												
	35													
	40													

Completion Depth:	30.0
Date Boring Started:	10/22/09
Date Boring Completed:	10/22/09
Logged By:	LAJ
Drilling Contractor:	GeoCon
Drilling Method:	HSA
Ground Surface Elevation:	
Coordinates: -84.5702, 40.9954	Datum: NAD 83

Remarks:

SAMPLE TYPES: Split Spoon, Shelby Tube, Rock Core

WATER LEVELS

While Drilling:	16
End of Drilling:	
hrs After Drilling:	10.5

LEGEND

MC Moisture Content; γ Dry Unit Weight; ϕ Friction Angle; Q_u Unconfined Compression; Q_p Hand Penetrometer UC; Gs Specific Gravity; RQD Rock Quality Designation

The stratification lines represent approximate boundaries. The transition may be gradual.

LOG BORING HORIZONTAL 8.5 X 11 GS GRAPH WITH COORDINATES 35811001 BLUECREEK.GPJ PENASCAL-TX WIND PROJECT.GPJ 11/20/09

Barr Engineering Company
4700 W 77th St. Suite 200
Edina, MN 55435

LOG OF BORING T-22

Project: Blue Creek Wind Project | Location: Van Wert County, Ohio | Client: Iberdrola Renewables, Inc

Barr Project Number: 35/81-1001

Elevation, feet	Depth, feet	MATERIAL DESCRIPTION (ASTM D2488)	Graphic Log	Sample Type & Rec.	STANDARD PENETRATION TEST DATA (N in blows/ft @)	WATER CONTENT % (PL — LL)	SIEVE ANALYSIS (GRAVEL / SAND / SILT / CLAY / FINES)	Physical Properties: WC %	γ pcf	ϕ °	Q_u tsf	Q_p tsf	Gs	RQD %
	0	Surface Elev.:												
	0	SILTY TOPSOIL (OL), black, moist												
	2.0	CLAY (CL), brown, moist, stiff			14 / 36			18.1				2.5		
	7.0	CLAY (CL), gray, little gravel (small), hard. 2-inch poorly graded sand with gravel layer(above bedrock) at 10.5 feet					0.7 / 53.3 / 72	12.6				4.25		
	10.5	DOLOMITE and DOLOMITIC LIMESTONEE, gray, slightly to moderately fractured, slight or no decomposition, strong.												0
														70
														0
	22.5	End of borehole @ 22.5 feet												

Completion Depth:	22.5
Date Boring Started:	10/20/09
Date Boring Completed:	10/20/09
Logged By:	LAJ
Drilling Contractor:	GeoCon
Drilling Method:	HSA
Ground Surface Elevation:	
Coordinates: -84.6748, 40.9513	Datum: NAD 83

Remarks:

SAMPLE TYPES: Split Spoon | Shelby Tube | Rock Core

WATER LEVELS

While Drilling:	10
End of Drilling:	
hrs After Drilling:	8.6

LEGEND

MC Moisture Content; γ Dry Unit Weight; ϕ Friction Angle; Q_u Unconfined Compression; Q_p Hand Penetrometer UC; Gs Specific Gravity; RQD Rock Quality Designation

The stratification lines represent approximate boundaries. The transition may be gradual.

LOG BORING HORIZONTAL 8.5 X 11 GS GRAPH WITH COORDINATES 35811001 BLUECREEK.GPJ PENASCAL-TX WIND PROJECT.GPJ 11/20/09

Barr Engineering Company
4700 W 77th St. Suite 200
Edina, MN 55435

LOG OF BORING T-42

Project: Blue Creek Wind Project | Location: Van Wert County, Ohio | Client: Iberdrola Renewables, Inc

Barr Project Number: 35/81-1001

Surface Elev.:

Elevation, feet	Depth, feet	MATERIAL DESCRIPTION (ASTM D2488)		Graphic Log	Sample Type & Rec.	STANDARD PENETRATION TEST DATA N in blows/ft @	WATER CONTENT % PL LL	SIEVE ANALYSIS GRAVEL SAND SILT CLAY FINES	Physical Properties WC %	γ pcf	ϕ °	Q_u tsf	Q_p tsf	Gs	RQD %
	0	SILTY TOPSOIL (OL), black, moist													
		CLAY (CL), brown, trace gravel, moist, very stiff	2.0			14			15.4				4		
	5														
	10					22	17.9 38.9		17.5				4.5		
		CLAY (CL), gray and brown, little gravel (small), very stiff.	13.0			21			15	118.9		3.14			
	15								14.2				4.5		
	20	DOLOMITE and DOLOMITIC LIMESTONE, gray, slightly to moderately fractured, slight or no decomposition, strong.	19.0			>>50/1"			28.9						50
	25														66
	30		29.0												
	35	End of borehole @ 29 feet													
	40														

Completion Depth:	29.0
Date Boring Started:	10/19/09
Date Boring Completed:	10/19/09
Logged By:	LAJ
Drilling Contractor:	GeoCon
Drilling Method:	HSA
Ground Surface Elevation:	
Coordinates: -84.654, 40.921	Datum: NAD 83

Remarks:

SAMPLE TYPES: Split Spoon, Shelby Tube, Rock Core

WATER LEVELS

While Drilling:	13.3
End of Drilling:	
hrs After Drilling:	10.8

LEGEND

MC Moisture Content; γ Dry Unit Weight; ϕ Friction Angle; Q_u Unconfined Compression; Q_p Hand Penetrometer UC; Gs Specific Gravity; RQD Rock Quality Designation

The stratification lines represent approximate boundaries. The transition may be gradual.

LOG BORING HORIZONTAL 8.5 X 11 GS GRAPH WITH COORDINATES 35811001 BLUECREEK.GPJ PENASCAL-TX WIND PROJECT.GPJ 11/20/09

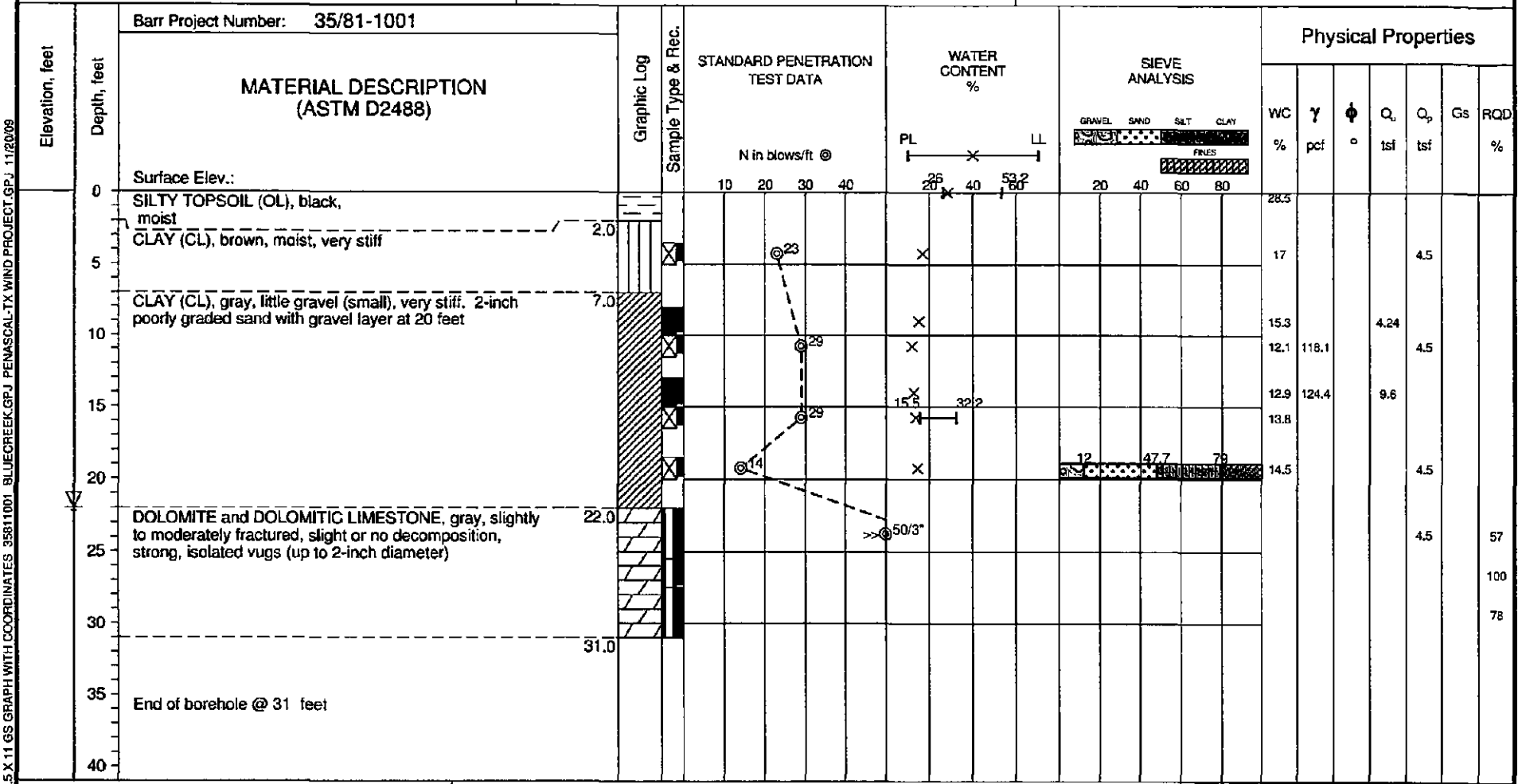
Barr Engineering Company
4700 W 77th St. Suite 200
Edina, MN 55435

LOG OF BORING T-71

Sheet 1 of 1

Project: Blue Creek Wind Project | Location: Van Wert County, Ohio | Client: Iberdrola Renewables, Inc

Barr Project Number: 35/81-1001



Completion Depth:	31.0
Date Boring Started:	10/21/09
Date Boring Completed:	10/21/09
Logged By:	LAJ
Drilling Contractor:	GeoCon
Drilling Method:	HSA
Ground Surface Elevation:	
Coordinates: -84.6446, 41.0021	Datum: NAD 83

Remarks:

SAMPLE TYPES: Split Spoon, Shelby Tube, Rock Core

WATER LEVELS: While Drilling: 22; End of Drilling:; hrs After Drilling: Dry

LEGEND: MC Moisture Content; γ Dry Unit Weight; ϕ Friction Angle; Q_u Unconfined Compression; Q_p Hand Penetrometer UC; Gs Specific Gravity; RQD Rock Quality Designation

The stratification lines represent approximate boundaries. The transition may be gradual.

LOG BORING HORIZONTAL 8.5 X 11 GS GRAPH WITH COORDINATES 35811001_BLUECREEK.GPJ PENASCAL-TX WIND PROJECT.GPJ 11/20/09

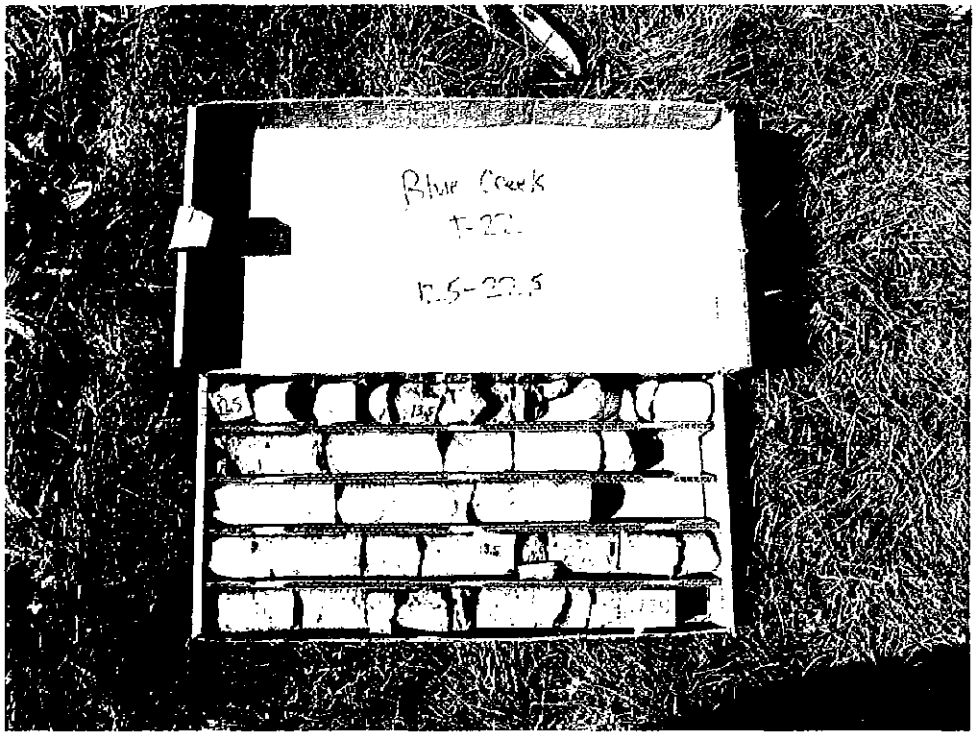


Figure 1. Picture of rock core at turbine site T-22

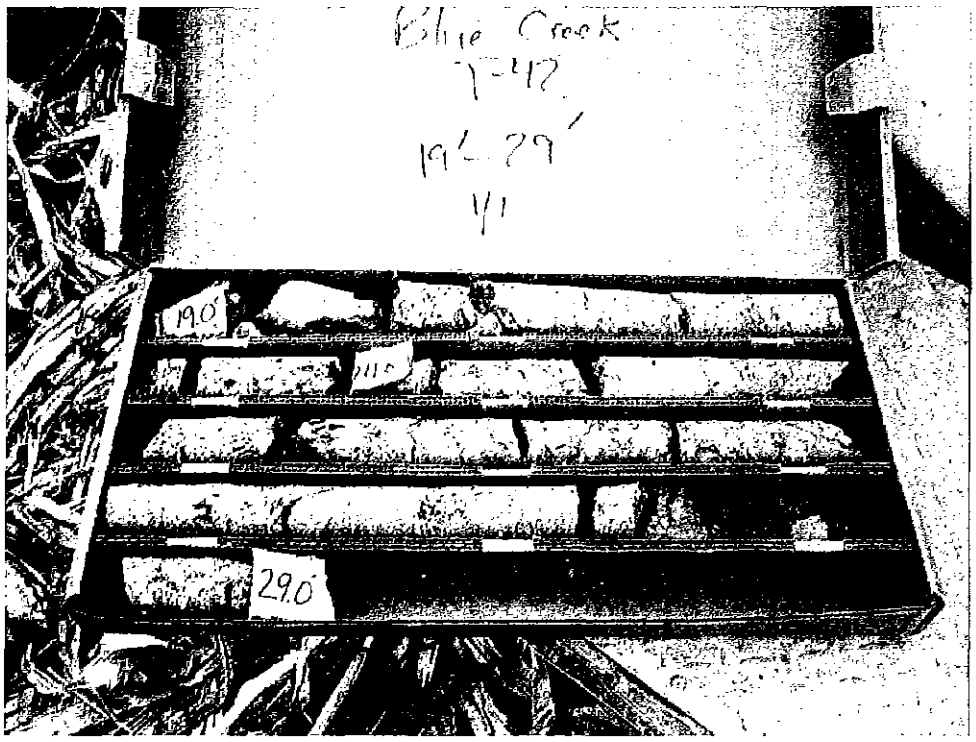


Figure 2. Picture of rock core at turbine site T-42

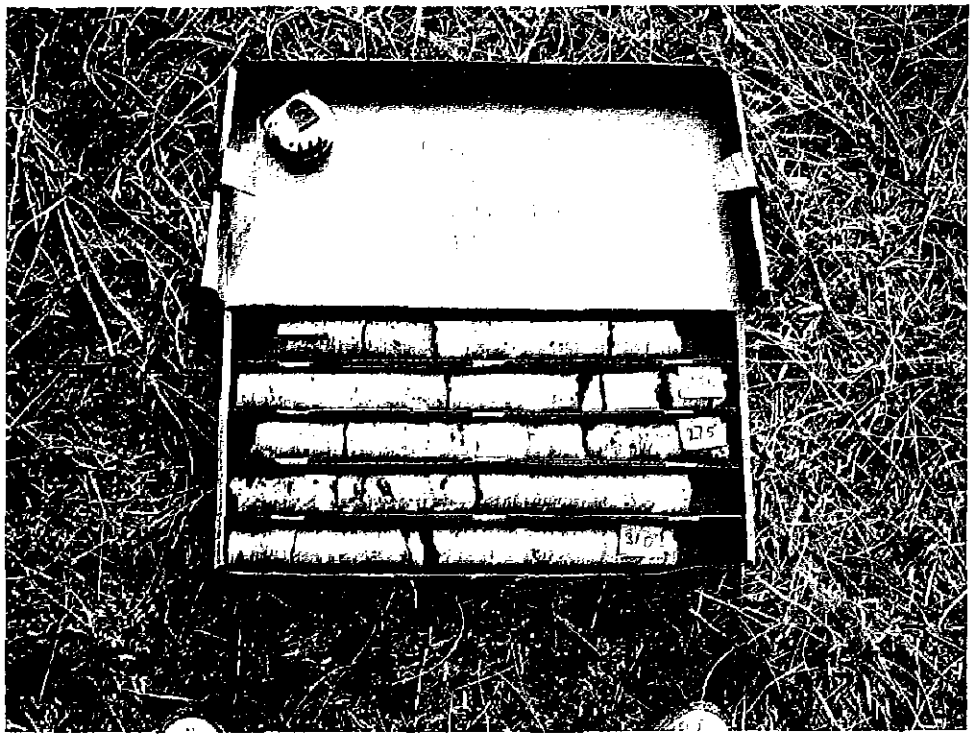


Figure 3. Picture of rock core at turbine site T-71

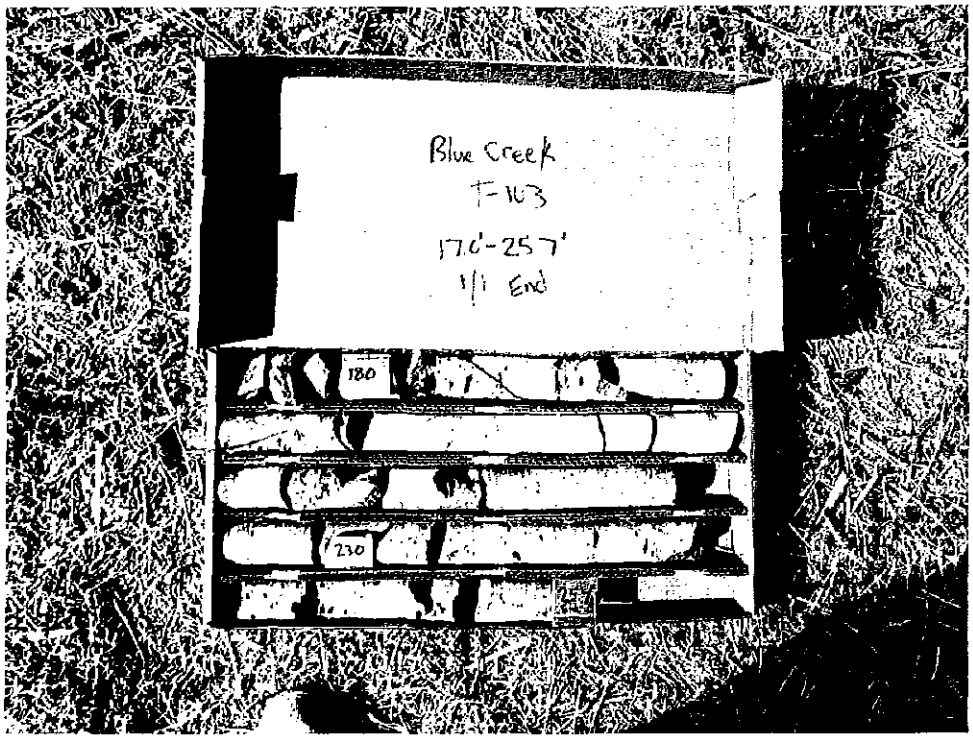


Figure 4. Picture of rock core at turbine site T-71

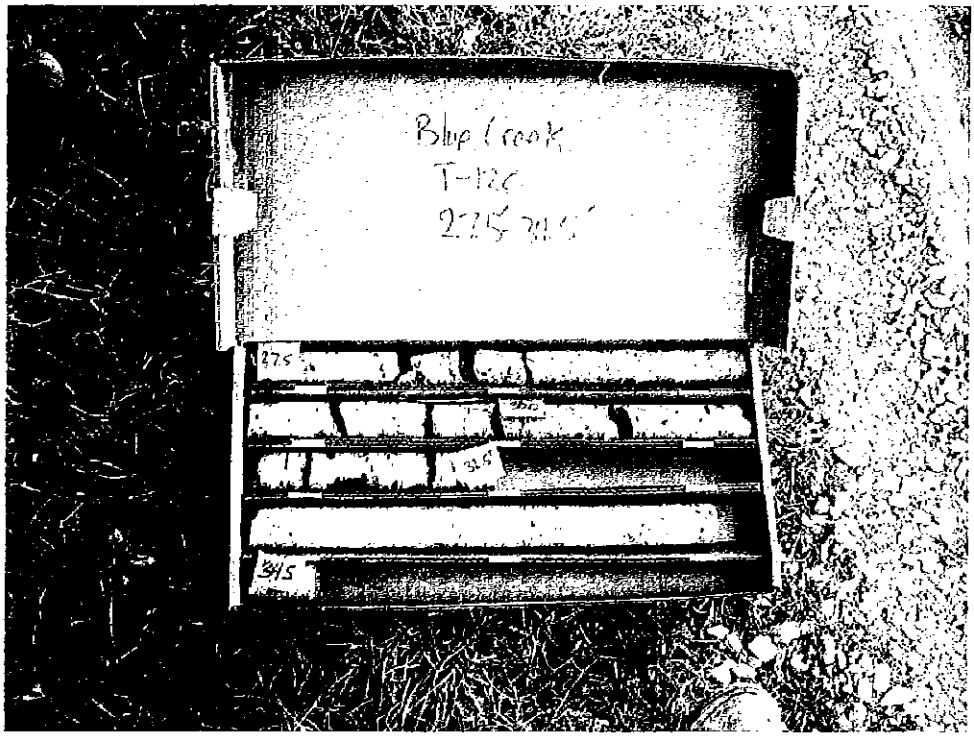


Figure 5. Picture of rock core at turbine site T-120

Figure 6. Picture of rock core at turbine site T-148.

Appendix F

Evaluation of Karst Potential

Karst Evaluation Report
Blue Creek Wind Project
Paulding & Van Wert Counties, Ohio

Prepared for
Iberdrola Renewables

December 2009

Karst Evaluation Report
Blue Creek Wind Project
Paulding & Van Wert Counties, Ohio

Prepared for
Iberdrola Renewables

December 2009

BARR

4700 West 77th Street
Minneapolis, MN 55435
Phone: (952) 832-2600
Fax: (952) 832-2601

Karst Evaluation Report
Blue Creek Wind Project
Paulding & Van Wert Counties, Ohio

Prepared For
Iberdrola Renewables
Portland, Oregon
December 2009

Table of Contents

Figures

Appendices

Certification

I hereby certify that this report was prepared by me or under my direct supervision and that I am a duly licensed Professional Engineer under the laws of the State of Ohio.

Matthew B. Johnson

Date: December 4, 2009

License No.: 74181

1.0 Background

The Blue Creek Wind Project Desktop Study (Barr 2009) identified karst as a possible geologic hazard due to two factors: relatively thin glacial overburden (less than 50 feet) and carbonate bedrock. Carbonate rock is susceptible to dissolution by the formation of weak acid in groundwater. Features that are characteristic to karst regions include sinkholes, underground (or internal) drainage through solution-enlarged fractures (joints), and caves. The geologic hazards associated with karst regions are related to the collapse of an underground cavern or opening of a sinkhole that causes surface subsidence.

The karst issue at Blue Creek is complicated because the bedrock is covered by unrelated glacial soil. Barr has conducted previous investigations in karst related areas, in particular, the Barton I/II Wind Project near Northwood, Iowa, which is similar to the Blue Creek area. The Barton investigation determined that the thickness of glacial overburden provides some mitigation against surface development. At the Barton site, the likelihood formation of karst features at the surface was lowest where the overburden was at least 50 feet thick. Further evaluation included visiting local quarry operations to better understand the size of karst features and the rock quality. Also, where overburden was less than 50 feet, selected turbine sites were core-drilled to determine rock quality. In addition to rock quality at the Barton Wind Project, the risk for potential karst development is lower because an observed stable water table in abandoned quarries existed only about five feet below the overburden/bedrock contact. The Barton karst investigation was used as a model for the investigation for Blue Creek.

Karst potential at the Blue Creek project site is controlled by these main factors:

- The soils overlying the bedrock are less than 50 feet thick throughout the entire project site. This increases risk.
- Fluctuation in groundwater levels are an important factor in sinkhole development. Significant water level changes are not likely in the Blue Creek & Woburn area due to the flat regional topography. This reduces risk.
- Water well records indicate a shallow potentiometric surface in this area, typically less than 10 feet below ground surface. Since most of the wells were drilled into the bedrock, this indicates a stable potentiometric surface in the overburden, which is consistent with the previous paragraph. Piezometers installed for this project indicate a shallow water table as well. This reduces risk.

2.0 Methods

Barr completed the following tasks to determine the risk potential of karst development at the Blue Creek Wind Project site:

1. Existing data were evaluated using geographic information systems (GIS). Some of these data were completed as part of preliminary geotechnical investigation.
    - Depth to bedrock (Figure 1): Water well data from the Ohio Geological Survey was combined with data collected during the site investigation (see below).
    - Bedrock surface: the bedrock surface is fairly flat and roughly parallels the existing surface topography
    - Water levels (Figure 2). Fluctuations in water table tend to be triggering events in the change in stability of a subsurface void, especially the lowering of the water table. A water table that is low with respect to the void means that there is more of a tendency for downward flow and downward movement of solids, which in turn leads to the upward propagation of the void, eventually resulting in the sudden appearance of a sinkhole at the ground surface. Similarly if there is a great difference between the water table and the bedrock aquifer potentiometric surface, there is more gradient for downward groundwater flow.
        - Water table (Figure 3)
        - Potentiometric surface (Figure 3)
        - Water Levels relative to bedrock surface (Figure 3)

2. We contacted local people who have information on karst features.
    - Ohio Geological Survey Staff
    - Van Wert County Engineer
    - Quarry operators: The Scott Quarry (owned by The Shelly Company) is present within the project area.

3. Field Investigation (in conjunction with main geotechnical investigation)
    - Visit and inspect the Scott Quarry for karst features
    - Core bedrock to determined rock type and quality
    - Determination of depth to bedrock at selected proposed turbine locations

3.0 Results

3.1 Existing Data

GIS was used to evaluate data from the Ohio Geological Survey (OGS) and Ohio Department of Natural Resources (ODNR) in conjunction with a preliminary literature review.

3.1.1 Depth to Bedrock

Based on a review of well log data and geologic maps from the OGS, depth to bedrock is shallower than 50 feet throughout the project area.

3.1.3 Type of Bedrock

Based on available bedrock geology maps of the area, the uppermost bedrock in the area is the Silurian age Salina Group consisting of mainly dolomite with lesser rock types of anhydrite, gypsum, salt and shale. Dolomite is generally less susceptible to dissolution than evaporite rocks or limestone. While the Salina Group does exhibit karst features in other portions of Ohio, the conditions necessary to form these do not appear to exist within the project area (OGS, 2007).

3.1.4 Groundwater Levels

Differences in groundwater levels that occur vertically over time can be drivers of sinkhole formations. Figure 2 shows water wells with static water levels (i.e. potentiometric levels) prior to well pumping. A preliminary review of the OGS hydrogeologic data indicates the generalized potentiometric surface is in a northeast direction, which corresponds to the overall drainage pattern of the region (Angle 2007; Schmidt 1982). Regionally, groundwater has a northeast and downward flow direction into the aquifers within the Salina Group.

3.2 Local Expert Communications

Barr initiated contact with several people who would likely have experience or expert knowledge of local karst conditions.

3.2.1 State Officials

Information from the Ohio Geological Survey tends to be either (1) for a broad audience (2) geographically focused on areas of concern. The initial concern of karst potential was related to

the state-wide identifying potential karst areas in Ohio. The specific areas of highest karst potential in Ohio do not exist in the project area. Consequently, Van Wert and Paulding counties have not had site specific studies completed in relation to karst potential.

Barr contacted from Rick Pavey of the OGS regarding karst potential in the project area. Mr. Pavey is an active researcher of karst areas in Ohio. Based on his experience, he was not aware of any karst issues that would warrant further study.

Barr also contacted Doug Shrake of the OGS regarding karst potential in the project area. Mr. Shrake stated he had a recent conversation with the Glenn E. Larsen (author of a regional geologic map, Larsen, 1994) who completed extensive field work in the area. Mr. Shrake recapped that Mr. Larsen had documented the thin overburden cover in the Van Wert County, but he was not aware of any karst issues in this area.

3.2.2 County Officials

Barr contacted Kyle Wendel, Van Wert County Engineer. He was not aware of any karst formations in the project area.

3.2.2 Local Quarries

Barr contacted The Shelly Company, the owner and operator of the Scott Quarry that is on the west side of the project site. Two successful contacts were made. Based on conversations with the quarry supervisor, Rick Welch, and a company geologist, Michelle Kronberg, there do not appear to be any major karst features in the Scott Quarry. Ms. Kronberg also went further on to explain there likely are no karst issues in other quarries (Shelly Company owned) in the region. She was also not aware of any voids occurring in drilling during her company's exploration programs in the area.

3.3 Field Investigation

3.3.1 Quarry and area karst inspections

The Scott Quarry lies within the boundary extents of the project site and contains good exposure of bedrock conditions down to around 150 feet below the ground surface. Appendix B shows pictures taken during the site visit. In summary, the quarry is located in an area where the

overburden thickness is less than 10 feet, has a maximum depth of about 150 feet below ground surface with dimensions of about 3,000 feet by 1,200 feet. The bedrock in the quarry is fairly uniform dolomite or dolomitic limestone. There does not appear to any significant karst features within any of the high walls observed. Some significant bedrock fracturing is present within the top 10 feet, but no large-scale voids or cavities present below.

Observed groundwater flow into the quarry was limited to slow seepage along the pit walls. No areas of large water discharge from fractures were observed; such large discharges would indicate a system of interconnected solution cavities. The only area of standing water in the quarry pit was at the lowest elevation (about 120-150) feet below ground surface) where a pump had been installed. This water was used as a source for drilling operations for the entire week while Barr was onsite. At various times when Barr or the drilling contractor returned to this site, the pump was never observed in operation. No rain events occurred during the week either. This likely indicates that the inflow of groundwater seepage into the pit is relatively low.

Based on information gathered prior to the site visit and observations within the quarry, no known karst features were observed in the quarry during the course the preliminary geotechnical inspection.

3.3.2 Depth to Bedrock

Figure 1 shows the depth to bedrock/overburden thickness based on data collected from CPT data and boreholes. CPT data is limited because refusal depth could be a premature depth to bedrock because this method cannot penetrate stiff materials. Based on results from borehole locations and bedrock depths obtained from area well logs, it is assumed CPT refusal was within one foot of actual bedrock.

Depth to bedrock is less than 30 feet throughout the project. The thinnest overburden is located near the Scott Quarry on the west side of the project site, where it is likely less than six feet thick in places. As noted previously, karst risk decreases with increasing soil thickness, and at least 50 feet of soil cover is needed to mitigate risk.

3.3.3 Bedrock Coring & Type of Bedrock

The six turbine locations sited in the preliminary geotechnical inspection for hollow auger-stem drilling were also investigated using rock coring methods into the uppermost ten feet of the

bedrock. Bedrock coring in the uppermost 10 feet of the formation revealed dolomite as the predominant rock type, without any occurrences of anhydrite, gypsum, or shale.

In summary, the bedrock is massive dolomite with some interlayers of dolomitic limestone and microfolding. Isolated vugs (cavities) exist ranging in size from less than ¼ inch to 2 inches in diameter. Predominantly, the bedrock contains little to moderate fracturing. Based on the rock coring for this portion of the geotechnical investigation, it does not appear the bedrock would pose a significant risk to the proposed wind farm.

3.3.4 Piezometer Water Levels

Figure 3 demonstrates there is likely a shallow water table based on data from piezometer water levels collected in early November 2009 and static water levels from the ODNR. As previously stated, the likelihood of a void propagating upwards increases where a lower water table exists in relation to the void.

In summary, the potentiometric level in the uppermost bedrock is likely less than 10 feet below the water table. This means there is a downward gradient to groundwater flow, which raises the karst risk potential (Figure 3).

Fluctuation in groundwater levels are an important factor sinkhole development in general. Based on the review of the hydrogeology in this region, this is unlikely to occur. This tends to lower the risk of karst potential.

4.0 Conclusions and Recommendations

4.1 Conclusions

1. This study has evaluated karst related geologic hazards that may pose a risk to the development of the proposed wind farm. The project area is underlain by bedrock that has the potential for karst features.

2. Sinkhole development near a turbine is the major concern and reason for conducting the karst investigation. Sinkholes can form gradually or very rapidly. A quickly forming sinkhole has the potential to cause catastrophic failure, while a slowly developing sinkhole has the potential to cause a turbine to tilt out of specification. No apparent sinkholes exist within the project area, based on literature review, discussions with local experts, and Barr's site reconnaissance.

3. One major factor in assessing risk is depth to bedrock or overburden thickness. The amount of soil that appears to be protective against surface subsidence is 50 feet. None of the proposed turbine locations are located where the overburden thickness is at least 50 feet thick.

4. The type and condition of the bedrock is another major factor in assessing risk. Evaporite deposits (gypsum, anhydrite, and salt) are all more soluble than dolomite. Dolomite is also less soluble than limestone. Dolomite is the predominant bedrock type under most of the project site, and no gypsum, anhydrite, and salt appear to be present near the proposed turbine locations.

5. *Other risks are related to groundwater flow.*
   - The water table is likely less than 10 feet above the potentiometric level in the uppermost bedrock. This means there is a downward gradient to groundwater flow. This raises risk.
   - Fluctuation in groundwater levels are an important factor in sinkhole development in general. Barr does not foresee significant water level fluctuations. This lowers risk.
   - Static water levels in water wells indicate the present water table is likely at or slightly below the overburden/bedrock contact. This reduces risk.

- An observed groundwater flow condition in the quarry indicates that there is likely slow groundwater movement through the project area. This reduces risk.

6. All local experts contacted in the course of this investigation stated that there are no apparent karst features in the area. The key experts in this case are personnel from the Ohio Geological Survey who have mapped and completed field work in the area. This is a strong indicator that the karst risk is negligible.

7. All of the work on karst risk assessment to this point has combined regional data with site specific information from CPT soundings, drilling, and onsite inspection of a quarry. These data gives us a good understanding of the overall karst risk assessment to the entire site. Site specific data to individual turbine locations is limited by the methods applied. CPT data only indicate depth to refusal, which we assumed is depth to bedrock. The auger drilling and rock coring give us depth to bedrock along with type and condition of bedrock at specific sites. However, local variations of karst conditions could occur from site to site. Observations made at the Scott Quarry may not exist at all proposed turbine locations.

8. Based on Barr's evaluation of known available geologic data along with an onsite inspection of project site, it is likely significant karst conditions do not exist at the proposed project site. If, however, new information becomes available that may suggest otherwise, further evaluation of the project site is necessary.

4.2 Recommendations

1. No further evaluation directed specifically to karst potential is warranted at this time.
2. Data generated during future geotechnical investigation work should be reviewed for evidence of karst features.
3. Any excavations completed during construction that encounter bedrock should be inspected for karst features by a qualified person.

5.0 References

Angle, M.P., 2007. Groundwater Pollution Potential of Van Wert County, Ohio, Ground Water Pollution Potential Report No. 70. Ohio Department of Natural Resources, Division of Geological Survey.

Barr Engineering, 2008. *Barton I/II Karst Evaluation Report.* Barr Engineering. Internal submitted to Iberdrola Renewables, Inc.

Ground Water Mapping & Technical Services, Ohio Department of Natural Resources, Division of Geological Water. http://www.dnr.state.oh.us/water/maptechs/wellogs/app. Accessed November 2009.

Larsen, G. M., 1994. *Regional Bedrock geology of the Ohio portion of the Lima, Ohio-Indiana 30 x 60 minute quadrangle*, Ohio Department of Natural Resources; Division of Geological Survey.

Ohio Dept. of Natural Resources, 2006. *Bedrock Geologic Map of Ohio*, BG-1, Data Version 1, Ohio Department of Natural Resources; Division of Geological Survey.

Ohio Dept. of Natural Resources, 2007. *Known and Probable Karst Areas in Ohio,* Ohio Department of Natural Resources, Division of Geological Survey.

Schmidt, J.J., 1982, Groundwater Resources of Van Wert County, Ohio Department of Natural Resources, Division of Geological Water.

Slucher, E.R., Vorbau, K.E., Larsen, G.E., 2002. *Bedrock topography of the Latty, Ohio Quadrangle.* Digital Map Series BT-3B, Ohio Department of Natural Resources; Division of Geological Survey.

Vormelker, J.D., 1991. *Bedrock topography of the Dixon, Ohio Quadrangle.* Digital Map Series BT-3B, Ohio Department of Natural Resources; Division of Geological Survey.

Vormelker, J.D., 2002. *Bedrock topography of the Convoy, Ohio Quadrangle.* Digital Map Series BT-3B, Ohio Department of Natural Resources; Division of Geological Survey.

Disclaimer

The conclusions stated in this report are limited to the Blue Creek Wind Project proposed turbine locations detailed in the Preliminary Geotechnical Investigation report delivered to Iberdrola in November 2009. Barr understands that there is potential for future stages of wind projects in directly adjacent areas. Karst conditions may change significantly and should be evaluated accordingly in future wind developments.

The analysis and conclusions provided are based on the results of the preliminary fieldwork described in this report. Using generally accepted engineering methods and practices, the investigation performed and the data gathered has made every reasonable effort to characterize the site. However, local variations of the subsurface conditions at any specific location tested are still possible and careful attention to soil or bedrock conditions should be undertaken during the time of construction by qualified personnel.

Figures

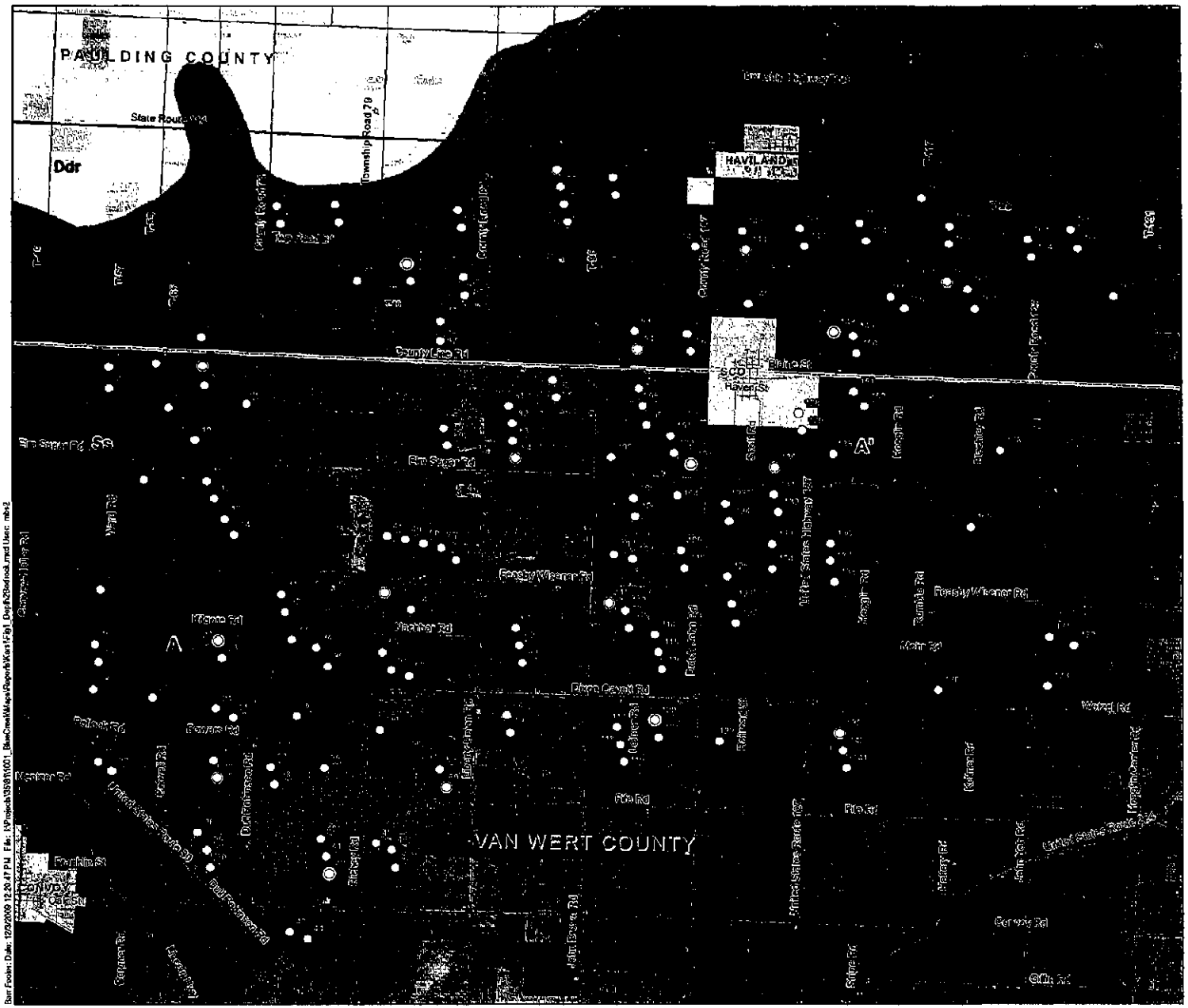


Figure 1

DEPTH TO BEDROCK
Blue Creek Wind Project
Iberdrola Renewables, Inc.
Paulding & Van Wert Counties, Ohio

Figure 2

PIEZOMETER WATER LEVELS &
SELECTED WELLS WITH STATIC WATER LEVELS
Blue Creek Wind Project
Iberdrola Renewables, Inc.
Paulding & Van Wert Counties, Ohio

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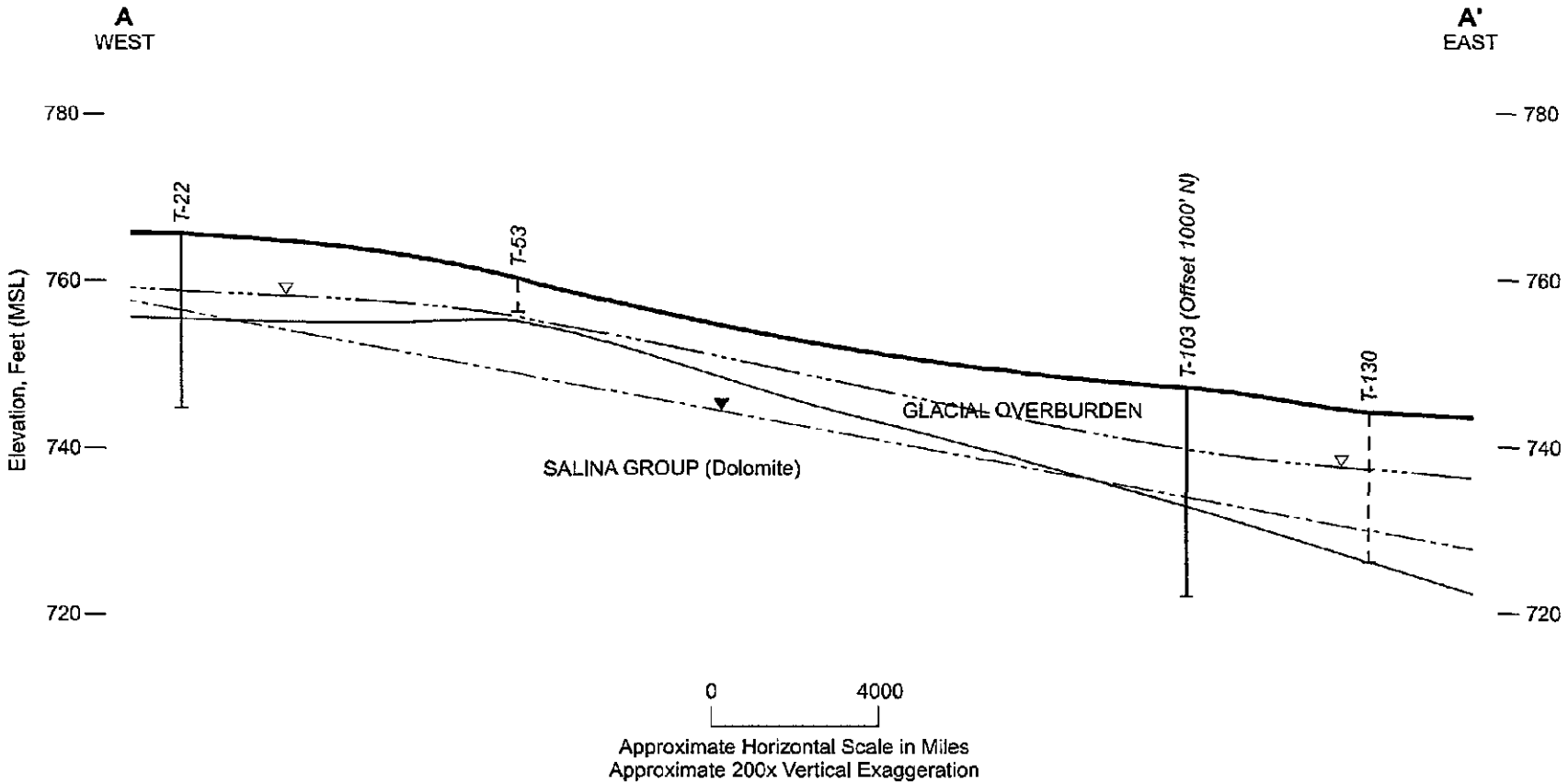


LEGEND

- Water Table (Approximate)
- Potentiometric Level (Approximate)
- Borehole
- CPT

Figure 3

CONCEPTUAL GEOLOGIC CROSS SECTION A-A'
Blue Creek Wind Project
Iberdrola Renewables, Inc.
Van Wert County, Ohio

Appendices

Appendix A – Contact Information

Local Contacts

Kyle Wendel, Van Wert County Engineer, 419.238.0210

State Officials

Rick Pavey, Ohio Geological Survey, Rick.Pavey@dnr.state.oh.us

Doug Shrake, Ohio Geological Survey, doug.shrake@dnr.state.oh.us

Quarries

Rick Welch, Supervisor, Shelly Company (Scott Quarry), 419.393.2555

Michelle Kronberg, Geologist, Shelly Company (Scott Quarry), 419.893.8731 (ext. 501)

Appendix B – Quarry Photographs

Figure 1. Shows profile of quarry highwall. Highwall height is approximately 50 feet

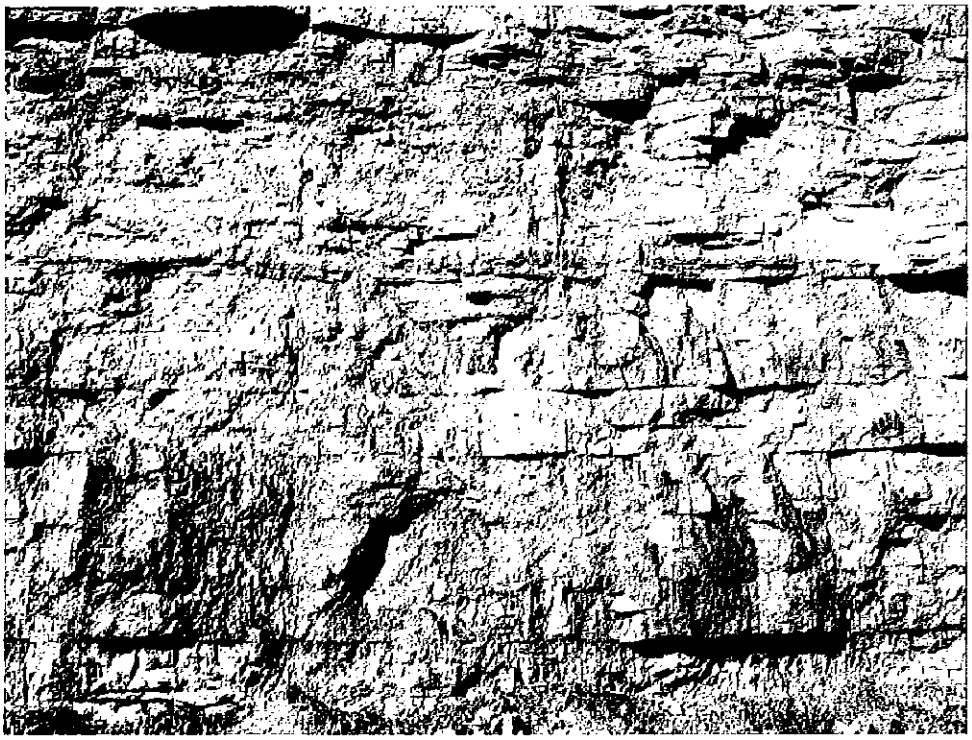


Figure 2. Shows closer view of Figure 1. Yellow staining on rock face is ground water seepage.

Appendix C – Rock Core Logs and Photographs of Core

Barr Engineering Company
4700 W 77th St. Suite 200
Edina, MN 55435

LOG OF BORING T-103

Project: Blue Creek Wind Project | Location: Van Wert County, Ohio | Client: Iberdrola Renewables, Inc

Barr Project Number: 35/81-1001

Surface Elev.:

Depth, feet	MATERIAL DESCRIPTION (ASTM D2488)	Graphic Log	Sample Type & Rec.	STANDARD PENETRATION TEST DATA (N in blows/ft @)	WATER CONTENT % (PL, LL)	SIEVE ANALYSIS (GRAVEL, SAND, SILT, CLAY, FINES)	WC %	γ pcf	ϕ °	Q_u tsf	Q_p tsf	Gs	RQD %
0	SILTY TOPSOIL (OL), black, moist												
2.0	CLAY (CL), brown, moist, very stiff			11			26.9				3		
7.0	CLAY (CL), gray, little gravel (small), hard. 2-inch poorly graded sand with gravel layer (above bedrock) at 17 feet			38	14.4, 26.6		13.8	121.9		5.3			
				50/5"			11.8				4.5		
				50/2"			6.1						
17.0	DOLOMITE and DOLOMITIC LIMESTONE, gray, slightly to moderately fractured, slight or no decomposition, strong, isolated vugs (up to 2-inch diameter)												0
													80
													78
26.0	End of borehole @ 26 feet												

Completion Depth:	26.0
Date Boring Started:	10/21/09
Date Boring Completed:	10/21/09
Logged By:	LAJ
Drilling Contractor:	GeoCon
Drilling Method:	HSA
Ground Surface Elevation:	
Coordinates:	-84.5941, 40.977 Datum: NAD 83

Remarks:

SAMPLE TYPES: Split Spoon, Shelby Tube, Rock Core

WATER LEVELS: While Drilling: 16; End of Drilling: ; hrs After Drilling: Dry

LEGEND: MC Moisture Content; γ Dry Unit Weight; ϕ Friction Angle; Q_u Unconfined Compression; Q_p Hand Penetrometer UC; Gs Specific Gravity; RQD Rock Quality Designation

The stratification lines represent approximate boundaries. The transition may be gradual.

LOG BORING HORIZONTAL 8.5 X 11 GS GRAPH WITH COORDINATES 35811001_BLUECREEK.GPJ PENASCAL-TX WIND PROJECT.GPJ 11/20/09

Barr Engineering Company
4700 W 77th St. Suite 200
Edina, MN 55435

LOG OF BORING T-120

Project: Blue Creek Wind Project | Location: Van Wert County, Ohio | Client: Iberdrola Renewables, Inc

Barr Project Number: 35/81-1001

Surface Elev.:

Elevation, feet	Depth, feet	MATERIAL DESCRIPTION (ASTM D2488)		WC %	γ pcf	ϕ °	Q_u tsf	Q_p tsf	Gs	RQD %
	0	SILTY TOPSOIL (OL), black, moist								
		SILT (ML), brown, moist, stiff	2.0	20.1				0		
	5	CLAY (CL), gray, with interlayered silty-sand (SM), moist, very stiff.	6.0	13.5	122.5		9			
	10	SILTY SAND (SM)	10.5	18				0		
		CLAY (CL), gray, little gravel (small), hard. 2-inch poorly graded sand with gravel layer(above bedrock) at 22 feet	11.5	13.5				4		
	15									
	20			12.6	124.9		8.09			
		DOLOMITE and DOLOMITIC LIMESTONE, gray, slightly to moderately fractured, slight or no decomposition, strong.	22.0	13.8				4.5		
	25									
	30									67
										57
	35	End of borehole @ 34.5 feet	34.5							82
	40									

Graphic Log / Sample Type & Rec.

STANDARD PENETRATION TEST DATA — N in blows/ft ◎ — 10 20 30 40

WATER CONTENT % — PL — LL — 20 40 60

SIEVE ANALYSIS — GRAVEL SAND SILT CLAY — FINES — 20 40 60 80

Physical Properties

Completion Depth:	34.5
Date Boring Started:	10/20/09
Date Boring Completed:	10/20/09
Logged By:	LAJ
Drilling Contractor:	GeoCon
Drilling Method:	HSA
Ground Surface Elevation:	
Coordinates: -84.5988, 40.9431	Datum: NAD 83

Remarks:

SAMPLE TYPES: Split Spoon | Shelby Tube | Rock Core

WATER LEVELS: While Drilling: 21 | End of Drilling: | hrs After Drilling: Dry

LEGEND: MC Moisture Content; γ Dry Unit Weight; ϕ Friction Angle; Q_u Unconfined Compression; Q_p Hand Penetrometer UC; Gs Specific Gravity; RQD Rock Quality Designation

The stratification lines represent approximate boundaries. The transition may be gradual.

LOG BORING HORIZONTAL 8.5 X 11 GS GRAPH WITH COORDINATES 35811001 BLUECREEK.GPJ PENASCAL-TX WIND PROJECT.GPJ 11/20/09

Barr Engineering Company
4700 W 77th St. Suite 200
Edina, MN 55435

LOG OF BORING T-148

Sheet 1 of 1

Project: Blue Creek Wind Project | Location: Van Wert County, Ohio | Client: Iberdrola Renewables, Inc

Barr Project Number: 35/81-1001

Surface Elev.:

Elevation, feet	Depth, feet	MATERIAL DESCRIPTION (ASTM D2488)	Graphic Log	Sample Type & Rec.	STANDARD PENETRATION TEST DATA N in blows/ft @	WATER CONTENT % PL — LL	SIEVE ANALYSIS GRAVEL SAND SILT CLAY FINES	Physical Properties WC %	γ pcf	ϕ °	Q_u tsf	Q_p tsf	Gs	RQD %
	0	SILTY TOPSOIL (OL), black, moist												
		SILT (ML), brown, moist, stiff			14			23.4				4.5		
	5													
		CLAY (CL), gray, little gravel (small), hard. 2-inch poorly graded sand with gravel layer (above bedrock) at 20 feet			53	15.6 — 30.7		15.1	118.2		5.96			
	10													
	15				23			14.5				4.5		
								13	122.3		5.64			
	20	DOLOMITE and DOLOMITIC LIMESTONE, gray, slightly to moderately fractured, slight or no decomposition, strong, isolated vugs (up to 2-inch diameter), uppermost (1 ft to 2 ft) contact of limestone is intensely fractured.			50/4"			20						26
	25													58
	30	End of borehole @ 30 feet												100
	35													
	40													

Completion Depth:	30.0
Date Boring Started:	10/22/09
Date Boring Completed:	10/22/09
Logged By:	LAJ
Drilling Contractor:	GeoCon
Drilling Method:	HSA
Ground Surface Elevation:	
Coordinates: -84.5702, 40.9954	Datum: NAD 83

Remarks:

SAMPLE TYPES: Split Spoon; Shelby Tube; Rock Core

WATER LEVELS: While Drilling: 16; End of Drilling:; hrs After Drilling: 10.5

LEGEND: MC Moisture Content; γ Dry Unit Weight; ϕ Friction Angle; Q_u Unconfined Compression; Q_p Hand Penetrometer UC; Gs Specific Gravity; RQD Rock Quality Designation

The stratification lines represent approximate boundaries. The transition may be gradual.

LOG BORING HORIZONTAL 8.5 X 11 GS GRAPH WITH COORDINATES 35811001 BLUECREEK.GPJ PENASCAL-TX WIND PROJECT.GPJ 11/20/09

Barr Engineering Company
4700 W 77th St. Suite 200
Edina, MN 55435

LOG OF BORING T-22

Project: Blue Creek Wind Project | Location: Van Wert County, Ohio | Client: Iberdrola Renewables, Inc

Barr Project Number: 35/81-1001

Elevation, feet	Depth, feet	MATERIAL DESCRIPTION (ASTM D2488)	Graphic Log	Sample Type & Rec.	STANDARD PENETRATION TEST DATA (N in blows/ft @)	WATER CONTENT % (PL, LL)	SIEVE ANALYSIS (GRAVEL, SAND, SILT, CLAY, FINES)	WC %	γ pcf	ϕ °	Q_u tsf	Q_p tsf	Gs	RQD %
	0	Surface Elev.:												
		SILTY TOPSOIL (OL), black, moist												
		CLAY (CL), brown, moist, stiff — 2.0			14			18.1				2.5		
	5													
		CLAY (CL), gray, little gravel (small), hard. 2-inch poorly graded sand with gravel layer(above bedrock) at 10.5 feet — 7.0			36		0.7 / 53.3 / 72	12.6				4.25		
	10	DOLOMITE and DOLOMITIC LIMESTONEE, gray, slightly to moderately fractured, slight or no decomposition, strong. — 10.5												0
	15													70
	20													0
		22.5												
	25													
	30													
	35	End of borehole @ 22.5 feet												
	40													

Physical Properties

Completion Depth:	22.5
Date Boring Started:	10/20/09
Date Boring Completed:	10/20/09
Logged By:	LAJ
Drilling Contractor:	GeoCon
Drilling Method:	HSA
Ground Surface Elevation:	
Coordinates: -84.6748, 40.9513	Datum: NAD 83

Remarks:

SAMPLE TYPES: Split Spoon; Shelby Tube; Rock Core

WATER LEVELS: ▽ While Drilling: 10; End of Drilling:; ▽ hrs After Drilling: 8.6

LEGEND: MC Moisture Content; γ Dry Unit Weight; ϕ Friction Angle; Q_u Unconfined Compression; Q_p Hand Penetrometer UC; Gs Specific Gravity; RQD Rock Quality Designation

The stratification lines represent approximate boundaries. The transition may be gradual.

LOG BORING HORIZONTAL 8.5 X 11 GS GRAPH WITH COORDINATES 35811001 BLUECREEK.GPJ PENASCAL-TX WIND PROJECT.GPJ 11/20/09

Barr Engineering Company
4700 W 77th St. Suite 200
Edina, MN 55435

LOG OF BORING T-42

Sheet 1 of 1

Project: Blue Creek Wind Project | Location: Van Wert County, Ohio | Client: Iberdrola Renewables, Inc

Barr Project Number: 35/81-1001

Elevation, feet	Depth, feet	MATERIAL DESCRIPTION (ASTM D2488)		WC %	γ pcf	ϕ °	Q_u tsf	Q_p tsf	Gs	RQD %
	0	Surface Elev.:								
		SILTY TOPSOIL (OL), black, moist								
		CLAY (CL), brown, trace gravel, moist, very stiff	2.0	15.4				4		
	5									
	10			17.5				4.5		
		CLAY (CL), gray and brown, little gravel (small), very stiff.	13.0	15	118.9		3.14			
	15			14.2				4.5		
	20	DOLOMITE and DOLOMITIC LIMESTONE, gray, slightly to moderately fractured, slight or no decomposition, strong.	19.0	28.9						50
	25									66
	30		29.0							
	35	End of borehole @ 29 feet								
	40									

Graphic Log / Sample Type & Rec.

STANDARD PENETRATION TEST DATA — N in blows/ft @ (10 20 30 40)
- 14
- 22
- 21
- >>50/1"

WATER CONTENT % — PL ⟷ LL (20 40 60)
- 17.9
- 38.9

SIEVE ANALYSIS — GRAVEL SAND SILT CLAY / FINES (20 40 60 80)

Physical Properties: WC %, γ pcf, ϕ °, Q_u tsf, Q_p tsf, Gs, RQD %

Completion Depth:	29.0
Date Boring Started:	10/19/09
Date Boring Completed:	10/19/09
Logged By:	LAJ
Drilling Contractor:	GeoCon
Drilling Method:	HSA
Ground Surface Elevation:	
Coordinates: -84.654, 40.921	Datum: NAD 83

Remarks:

SAMPLE TYPES: Split Spoon; Shelby Tube; Rock Core

WATER LEVELS
- While Drilling: 13.3
- End of Drilling:
- hrs After Drilling: 10.8

LEGEND
- MC Moisture Content
- γ Dry Unit Weight
- ϕ Friction Angle
- Q_u Unconfined Compression
- Q_p Hand Penetrometer UC
- Gs Specific Gravity
- RQD Rock Quality Designation

The stratification lines represent approximate boundaries. The transition may be gradual.

LOG BORING HORIZONTAL 8.5 X 11 GS GRAPH WITH COORDINATES 35811001 BLUECREEK.GPJ PENASCAL-TX WIND PROJECT.GPJ 11/20/09

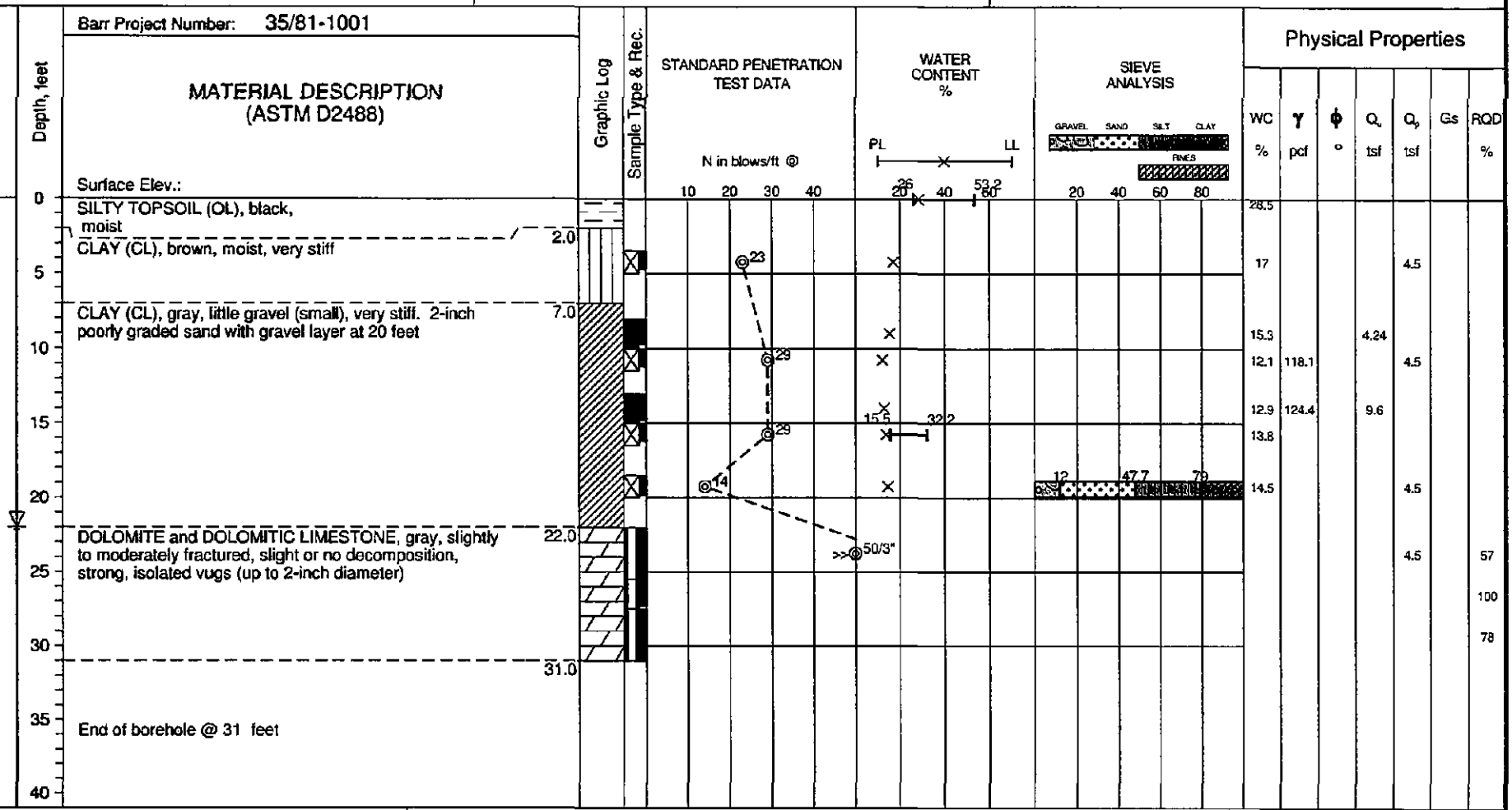
Barr Engineering Company
4700 W 77th St. Suite 200
Edina, MN 55435

LOG OF BORING T-71

Sheet 1 of 1

Project: Blue Creek Wind Project | Location: Van Wert County, Ohio | Client: Iberdrola Renewables, Inc

Barr Project Number: 35/81-1001



Completion Depth:	31.0
Date Boring Started:	10/21/09
Date Boring Completed:	10/21/09
Logged By:	LAJ
Drilling Contractor:	GeoCon
Drilling Method:	HSA
Ground Surface Elevation:	
Coordinates:-84.6446, 41.0021	Datum: NAD 83

Remarks:

SAMPLE TYPES: Split Spoon, Shelby Tube, Rock Core

WATER LEVELS: While Drilling: 22; End of Drilling:; hrs After Drilling: Dry

LEGEND: MC Moisture Content; γ Dry Unit Weight; φ Friction Angle; Q_u Unconfined Compression; Q_p Hand Penetrometer UC; Gs Specific Gravity; RQD Rock Quality Designation

The stratification lines represent approximate boundaries. The transition may be gradual.

LOG BORING HORIZONTAL 8.5 X 11 GS GRAPH WITH COORDINATES 35811001 BLUECREEK.GPJ PENASCAL-TX WIND PROJECT.GPJ 11/20/09

Figure 1. Picture of rock core at turbine site T-22

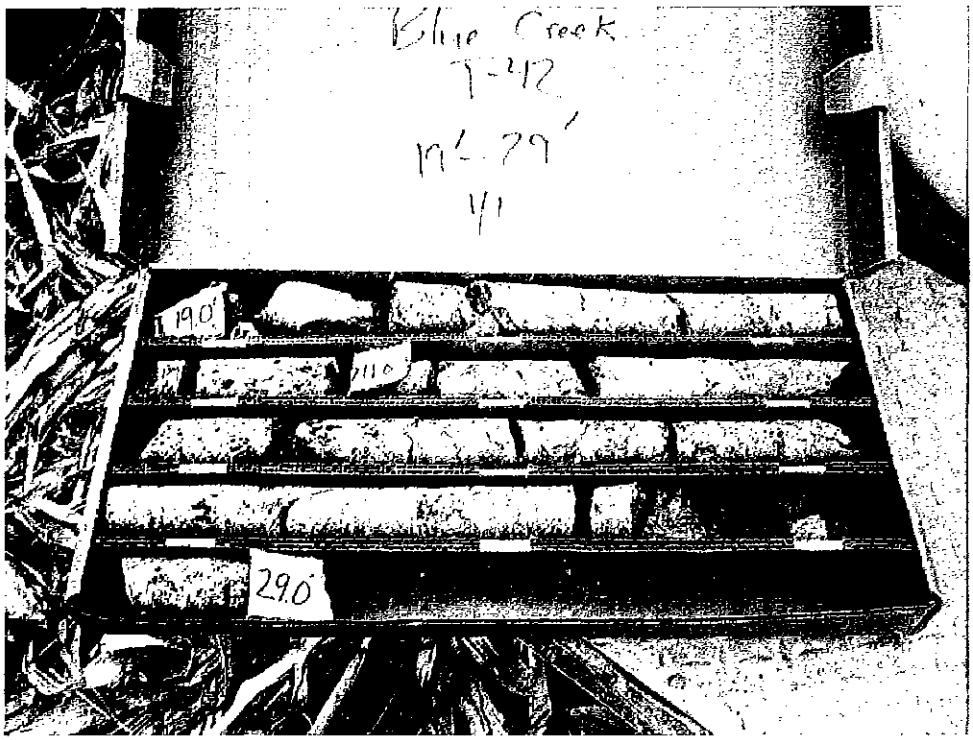


Figure 2. Picture of rock core at turbine site T-42

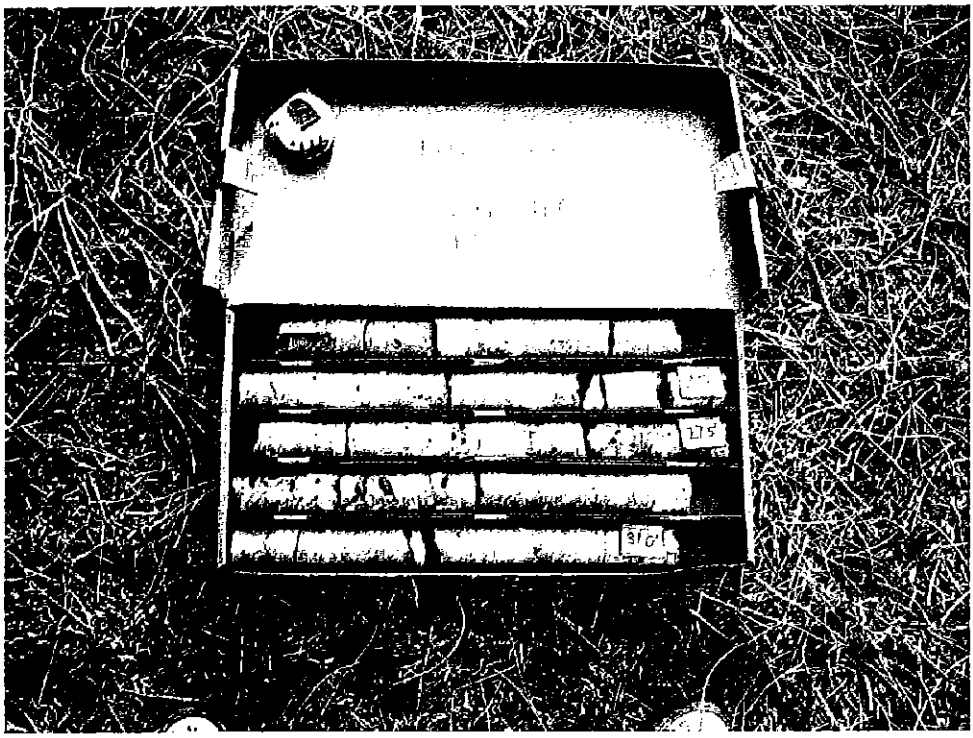


Figure 3. Picture of rock core at turbine site T-71

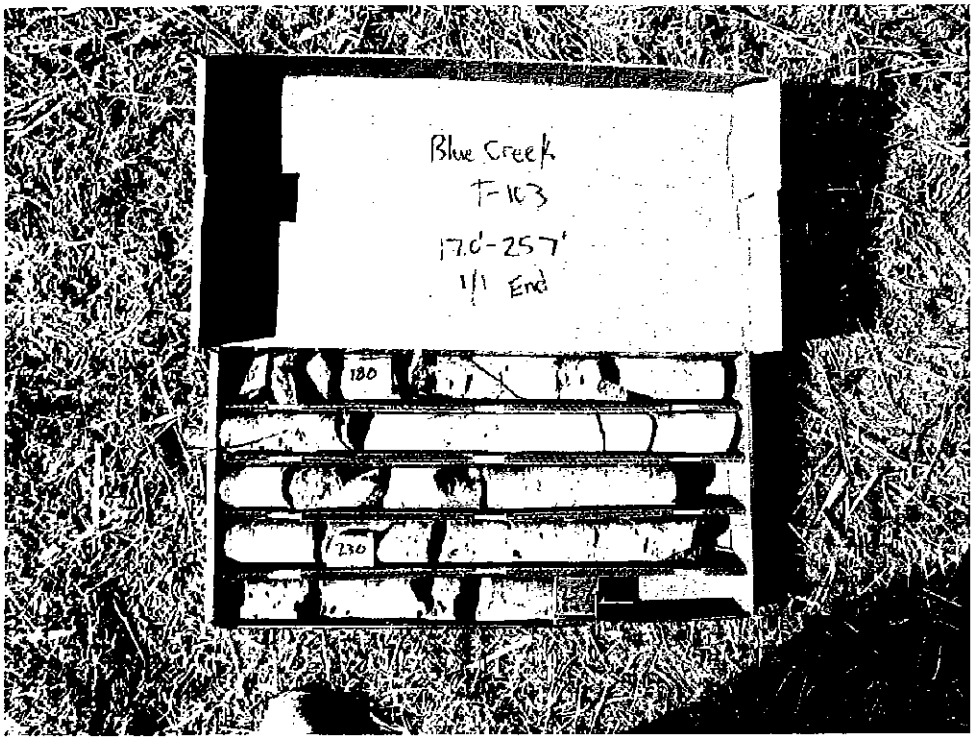


Figure 4. Picture of rock core at turbine site T-71

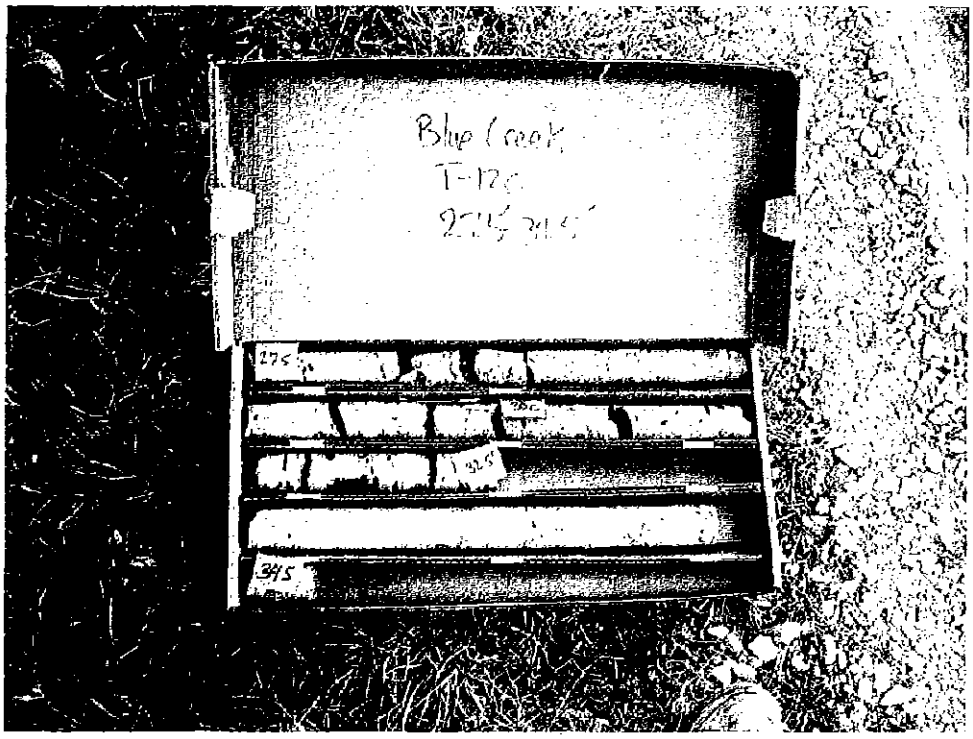


Figure 5. Picture of rock core at turbine site T-120

Figure 6. Picture of rock core at turbine site T-148.

Appendix G

Thermal and Electrical Resistivity Reports

Barr Engineering Company
4700 West 77th Street • Minneapolis, MN 55435-4803
Phone: 952-832-2600 • Fax: 952-832-2601 • www.barr.com *An EEO Employer*

Minneapolis, MN • Hibbing, MN • Duluth, MN • Ann Arbor, MI • Jefferson City, MO • Bismarck, ND

November 20, 2009

Mr. Jeromy Miceli
Project Manager
Iberdrola Renewables
110 N. Brockway Street, Suite 110
Palatine, IL 60067

Re: Soil Thermal Resistivity Testing
Blue Creek Wind Project
Paulding & Van Wert Counties, Ohio

Dear Jeromy:

This letter presents the soil thermal resistivity testing results. Barr Engineering Company (Barr) personnel collected soil samples at selected locations at the Blue Creek Wind Project site in October 2009. Thermal resistivity laboratory testing was completed on the samples in October and November 2009. The methods and results are summarized below.

Methods

A total of five soil samples were collected by GeoCon Engineering of Crescent City, Illinois, under the direction of on-site Barr personnel. The specific locations of the tests were provided by you in an email to Barr, dated September 9, 2009.

Samples at turbine locations T-22, T-42, T-103, and T-120 were collected by hollow-stem augering to a depth of three feet below existing grade and then collecting a bulk sample from the auger cuttings from a depth of two to five feet. The sample collected at the West Substation (Sub-W) was collected by digging an oversize pit to a depth of five feet and collecting a bulk sample from the pit walls at depths from two to five feet. The samples were placed in five gallon buckets and sealed in the field in order to preserve the in-situ moisture content. All samples were hand-delivered to Soil Engineering Testing, Inc. (SET) of Bloomington, Minnesota, for laboratory testing.

All thermal resistivity samples were collected at staked turbine or substation locations. Barr personnel located the thermal resistivity sample locations based on the provided coordinates with a hand-held GPS unit (+/- approximately 14 feet of accuracy). The sample locations are indicated in Figure 1, which includes a recent turbine layout (turbine layout, dated September 4, 2009). Coordinates of each sample location and other pertinent information can be found in Table 1.

Table 1: Thermal Resistivity Sample Information

Turbine/Structure Number	Sample ID	Sample Depth (ft)	Coordinates [UTM, NAD83]	
			Northing (m)	Easting (m)
22	T-22	3.0-5.0	695701.0467	4535958.66
42	T-42	3.0-5.0	697537.8238	4532646.54
103	T-103	3.0-5.0	702413.5276	4539001.6
120	T-120	3.0-5.0	702121.8296	4535227.64
Substation	Sub-W	2.0-5.0	697947	4534983

SET completed the testing in accordance with ASTM method D5334-08 "Standard Test Method for Determination of Thermal Conductivity of Soil and Soft Rock by Thermal Needle Probe Procedure." Laboratory tests included measurement of the soil's in-situ moisture content, standard Proctor density and optimum moisture content and thermal dryout characteristics, which is a function of moisture content. All of the bulk samples were re-compacted at their as-received moisture contents and to approximately 85 percent of standard Proctor density, per your instructions. Soil was compacted in four layers in test molds (75 mm diameter by 150 mm high) to minimize contact resistance at the soil/probe interface and to ensure a uniform density.

Thermal dryout characteristics were measured using a laboratory type thermal needle held central and vertical in the base plate. Thermal resistivity measurements were conducted starting at the existing moisture content of the soil sample to the totally dry condition. At the end of each drying stage, samples were sealed and brought to thermal equilibrium with the ambient air to ensure uniform moisture re-distribution through the sample. Tests were conducted using a KD2 Thermal Property Analyzer. The instrument was calibrated prior to testing.

Results

The resulting laboratory soil thermal resistivity measurements presented in tabular form with full dryout curves are included in the attached Thermal Resistivity Report by SET.

Thank you for the opportunity to provide this service. Please call me at 952-832-2639 with questions or requests for additional information.

Sincerely,

Leif Johnson

LAJ
Attachment

Attachments:

Figure 1: Thermal and Electrical Resistivity Test locations
SET, Inc. Thermal Resistivity Test Results

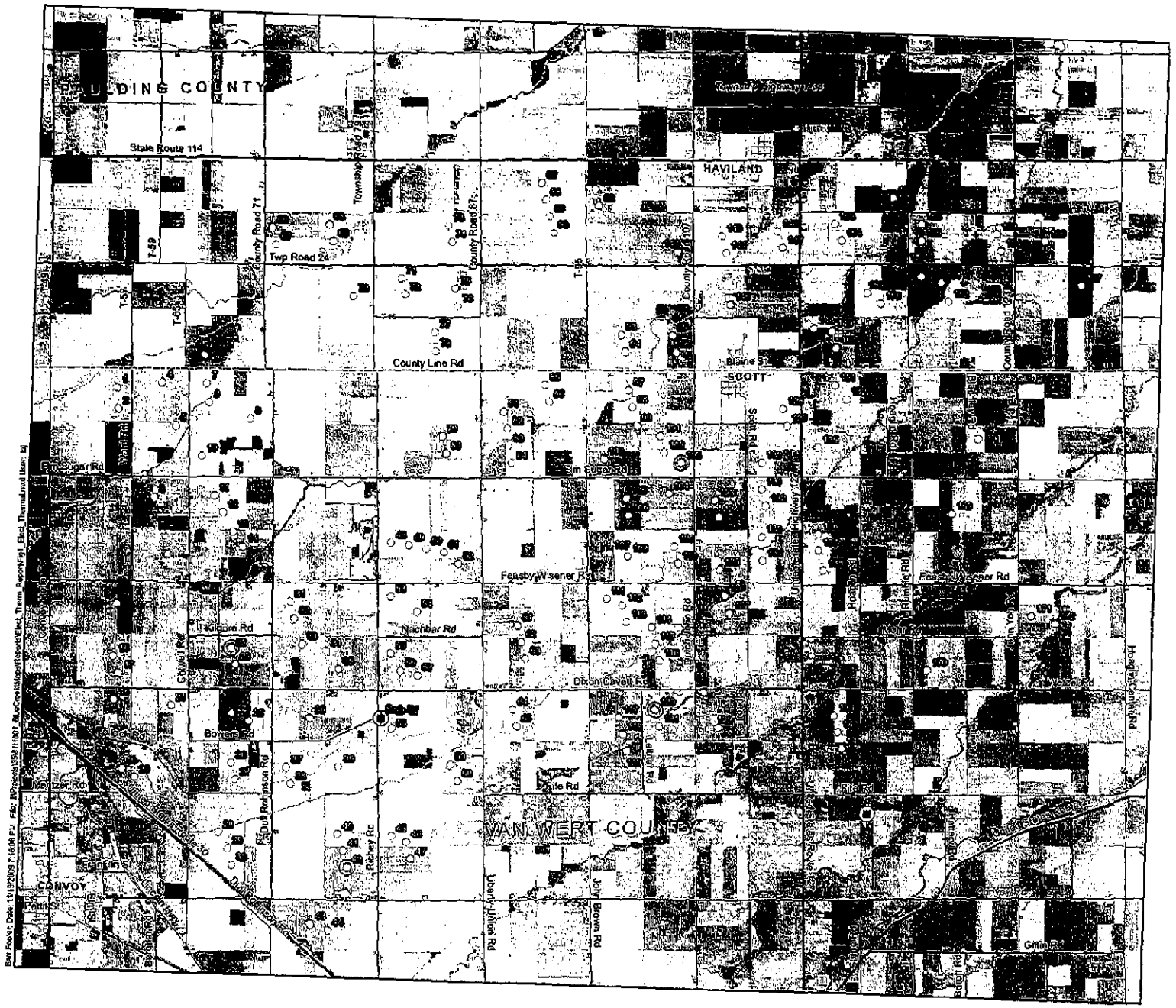


Figure 1

THERMAL / ELECTRICAL RESISTIVITY
Blue Creek & Woodburn Wind Project
Iberdrola Renewables, Inc.
Paulding and Van Wert Counties, Ohio

Thermal Resistivity Report ASTM D:5334

Project: **Blue Creek** Job #: **7237**

Client: **Barr Engineering Company** Date: **11/18/09**

Boring	Sample Type	Depth	Type	Classification	Initial Conditions			Dry
					Dry Density (PCF)	WC (%)	Thermal Resistivity (°C-cm/W)	Thermal Resistivity (°C-cm/W)
T-22	Reconstituted	3-5	Bucket	Fat Clay (CH)	86.5	21.9%	89	219
T-42	Reconstituted	3-5	Bucket	Lean Clay (CL/CH)	90.2	19.6%	97	228
T-103	Reconstituted	3-5	Bucket	Lean Clay (CL/CH)	89.1	20.7%	87	217
T-120	Reconstituted	3-5	Bucket	Lean Clay w/sand (CL)	94.7	19.7%	86	241
Sub-West	Reconstituted	2-5	Bucket	Fat Clay (CH)	86.9	26.8%	74	189

Specimens reconstituted to approximately 85% of maximum standard proctor density near optimum moisture content.

9301 Bryant Ave. South, Suite #107 SOIL ENGINEERING TESTING, INC. Bloomington MN 55420-3436

http://www.soilengineeringtesting.com

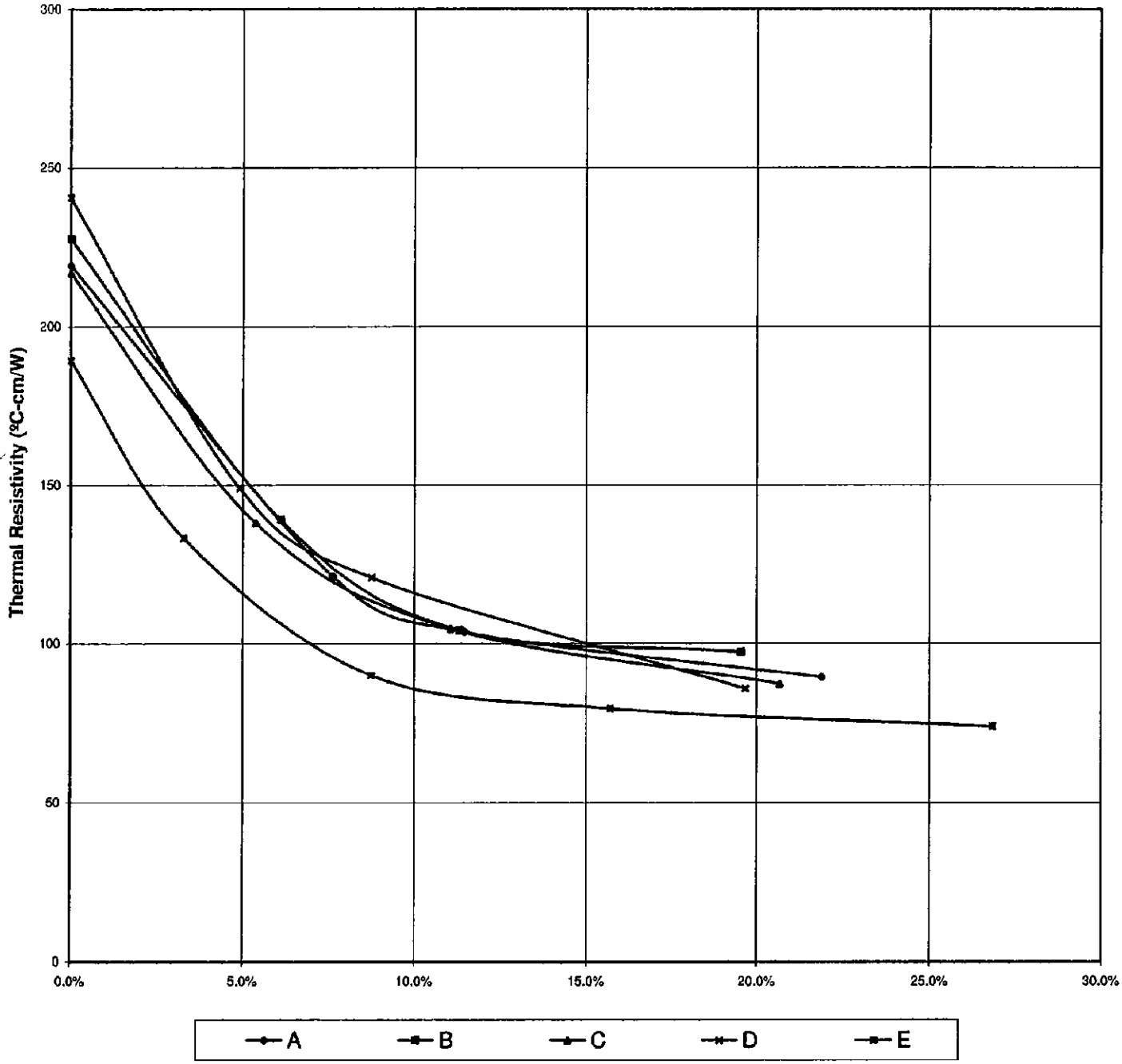
Thermal Resistivity Report ASTM D:5334

Project: Blue Creek — Job: 7237

Client: Barr Engineering Company — Date: 11/18/09

	Boring	Sample
Specimen A:	T-22	
Specimen B:	T-42	
Specimen C:	T-103	
Specimen D:	T-120	
Specimen E:	Sub-West	

Thermal Dryout Curves (Resistivity vs. Water Content)

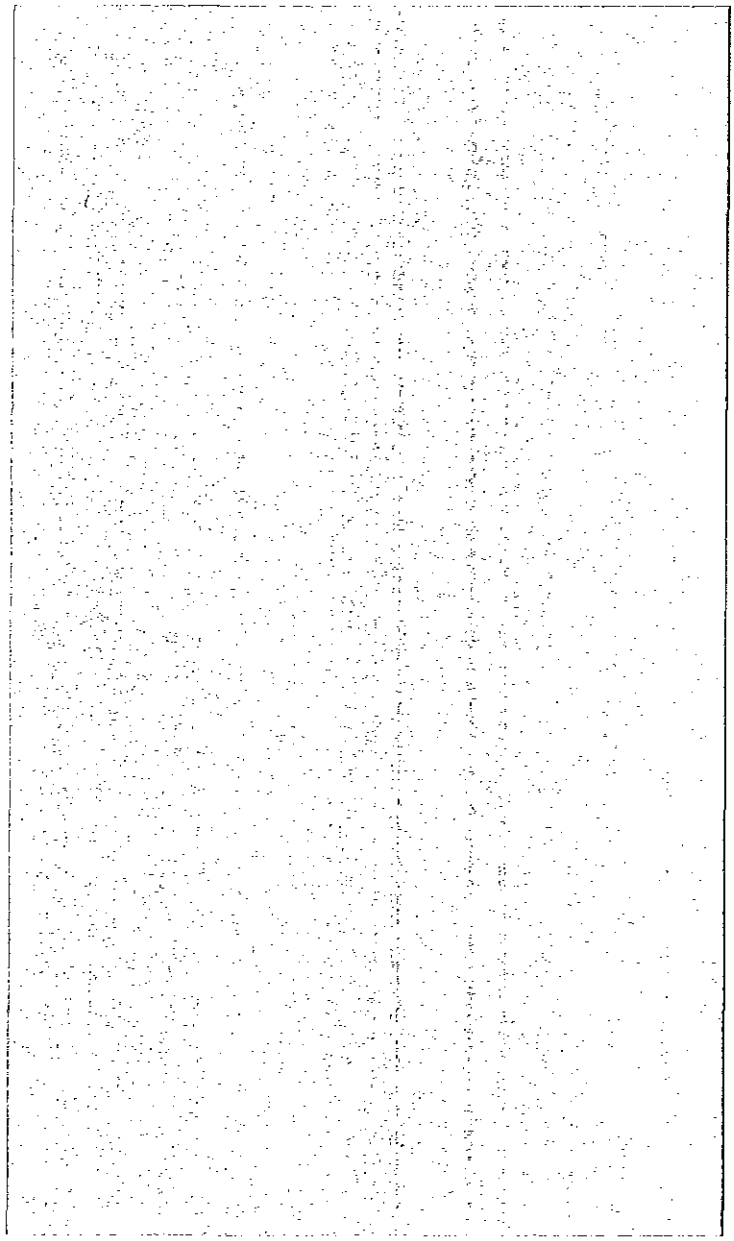


9301 Bryant Ave. South, Suite #107

SOIL ENGINEERING TESTING, INC.

Bloomington MN 55420-3436

http://www.soilengineeringtesting.com



Moisture Density Curve ASTM: D698, Method B

Project: **Blue Creek** Date: **11/4/09**

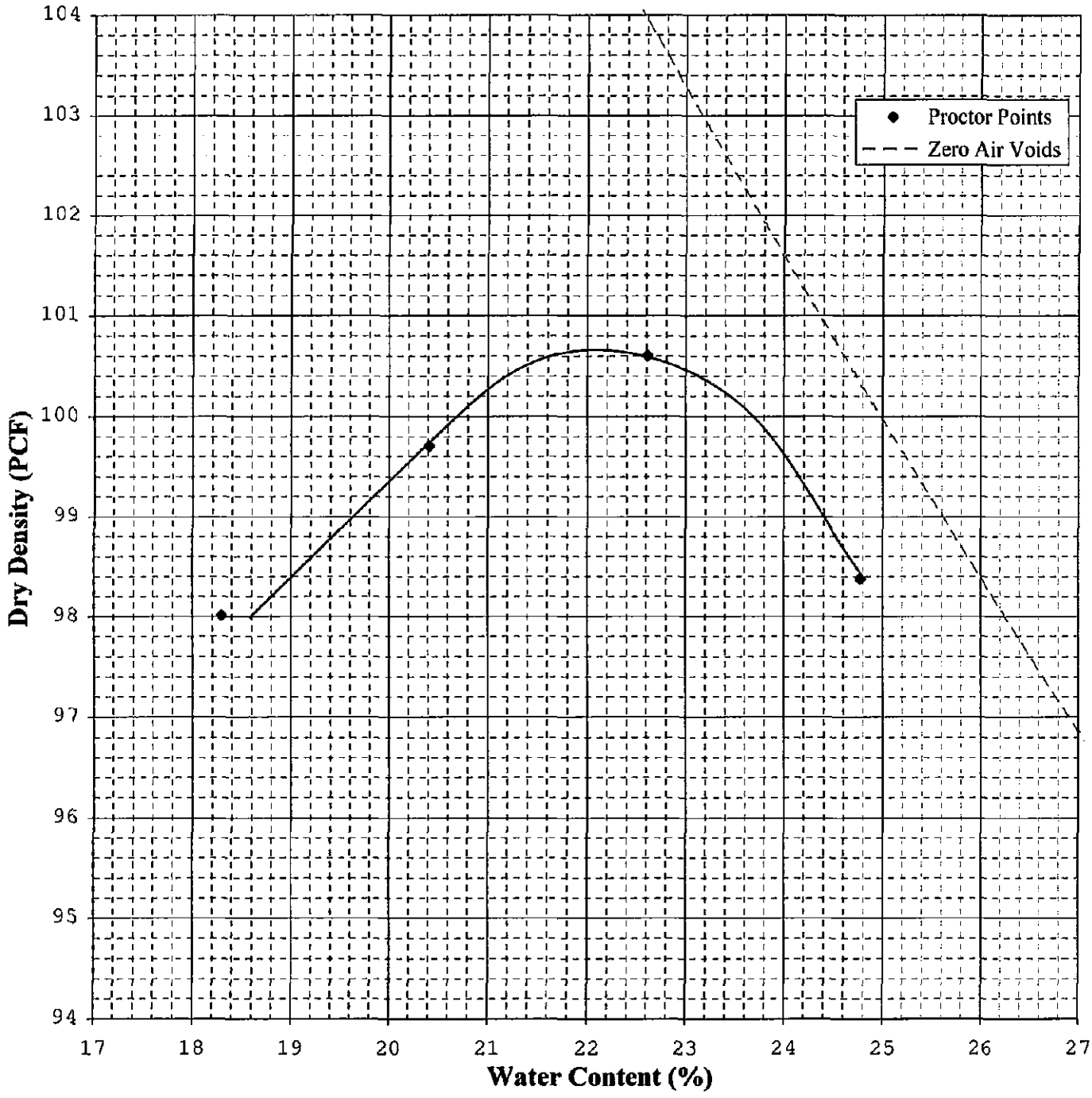
Client: **Barr Engineering Company** Job No. **7237**

Boring No. **T-22** Sample: **Thermal** Depth(ft): **3-5** Location:

Soil Type: **Fat Clay (CH)**

As Received W.C. (%): **22.6** LL: PL: PI: Specific Gravity: **2.67** *Assumed

Maximum Dry Density (pcf): **100.7** Opt. Water Content (%): **22.1**



9301 Bryant Ave. South, Suite 107 SOIL ENGINEERING TESTING, INC. Bloomington, Minnesota 55420-3436

SET-R18a

Moisture Density Curve ASTM: D698, Method B

Project: **Blue Creek** Date: **11/4/09**

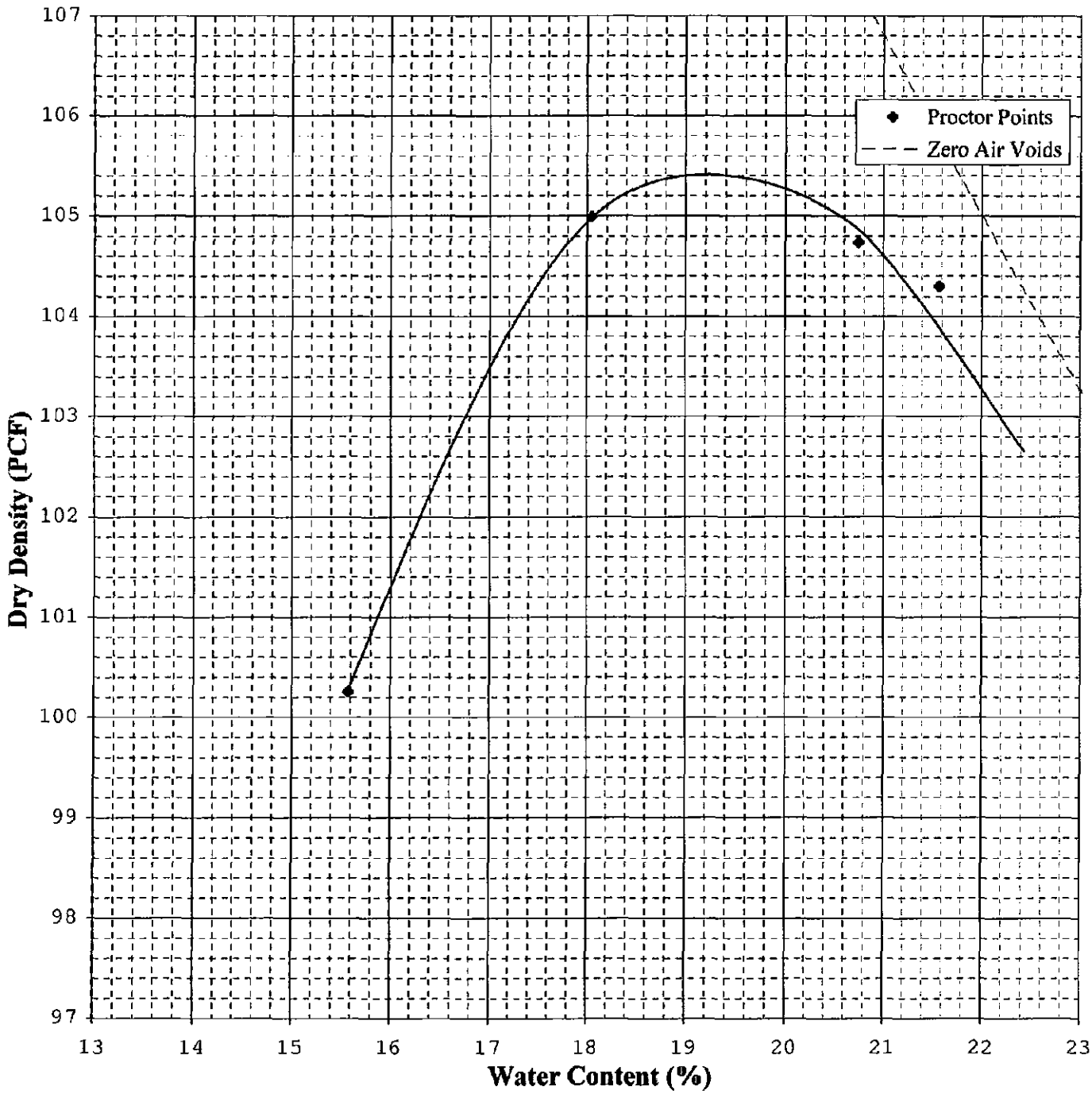
Client: **Barr Engineering Company** Job No. **7237**

Boring No. **T-42** Sample: **Thermal** Depth(ft): **3-5** Location:

Soil Type: **Lean Clay (CL/CH)**

As Received W.C. (%): **20.2** LL: PL: PI: Specific Gravity: **2.67** *Assumed

Maximum Dry Density (pcf): **105.4** Opt. Water Content (%): **19.2**



9301 Bryant Ave. South, Suite 107 SOIL ENGINEERING TESTING, INC. Bloomington, Minnesota 55420-3436

SET-R18a

Moisture Density Curve ASTM: D698, Method B

Project: **Blue Creek** Date: **11/4/09**

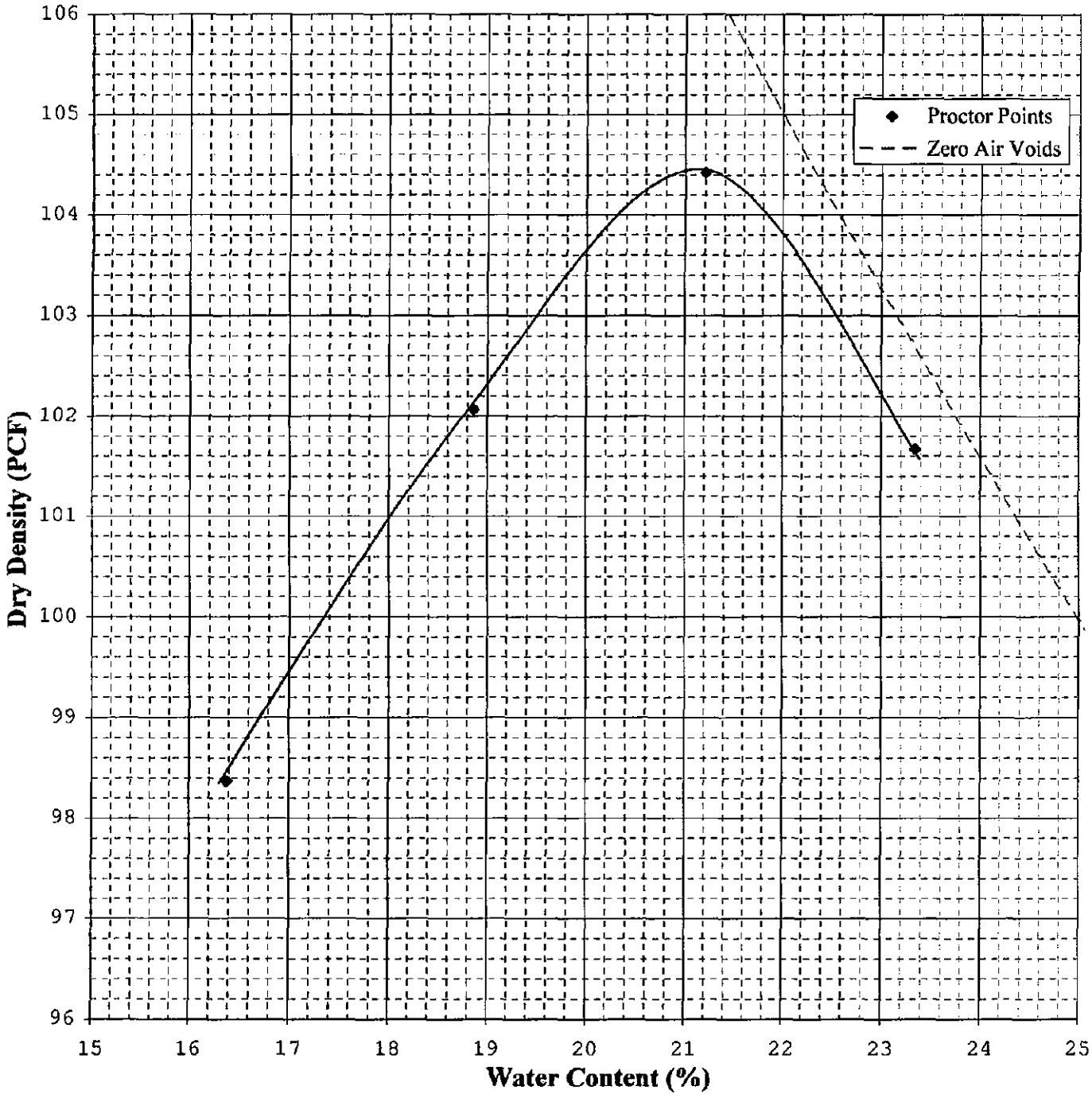
Client: **Barr Engineering Company** Job No. **7237**

Boring No. **T-103** Sample: **Thermal** Depth(ft): **3-5** Location:

Soil Type: **Lean Clay (CL/CH)**

As Received W.C. (%): **21.0** LL: PL: PI: Specific Gravity: **2.67** *Assumed

	◆	△		◆	△
Maximum Dry Density (pcf):	104.4		Opt. Water Content (%):	21.1	



9301 Bryant Ave. South, Suite 107

SOIL ENGINEERING TESTING, INC.

Bloomington, Minnesota 55420-3436

SET-R18a

Moisture Density Curve ASTM: D698, Method B

Project: **Blue Creek** Date: **11/4/09**

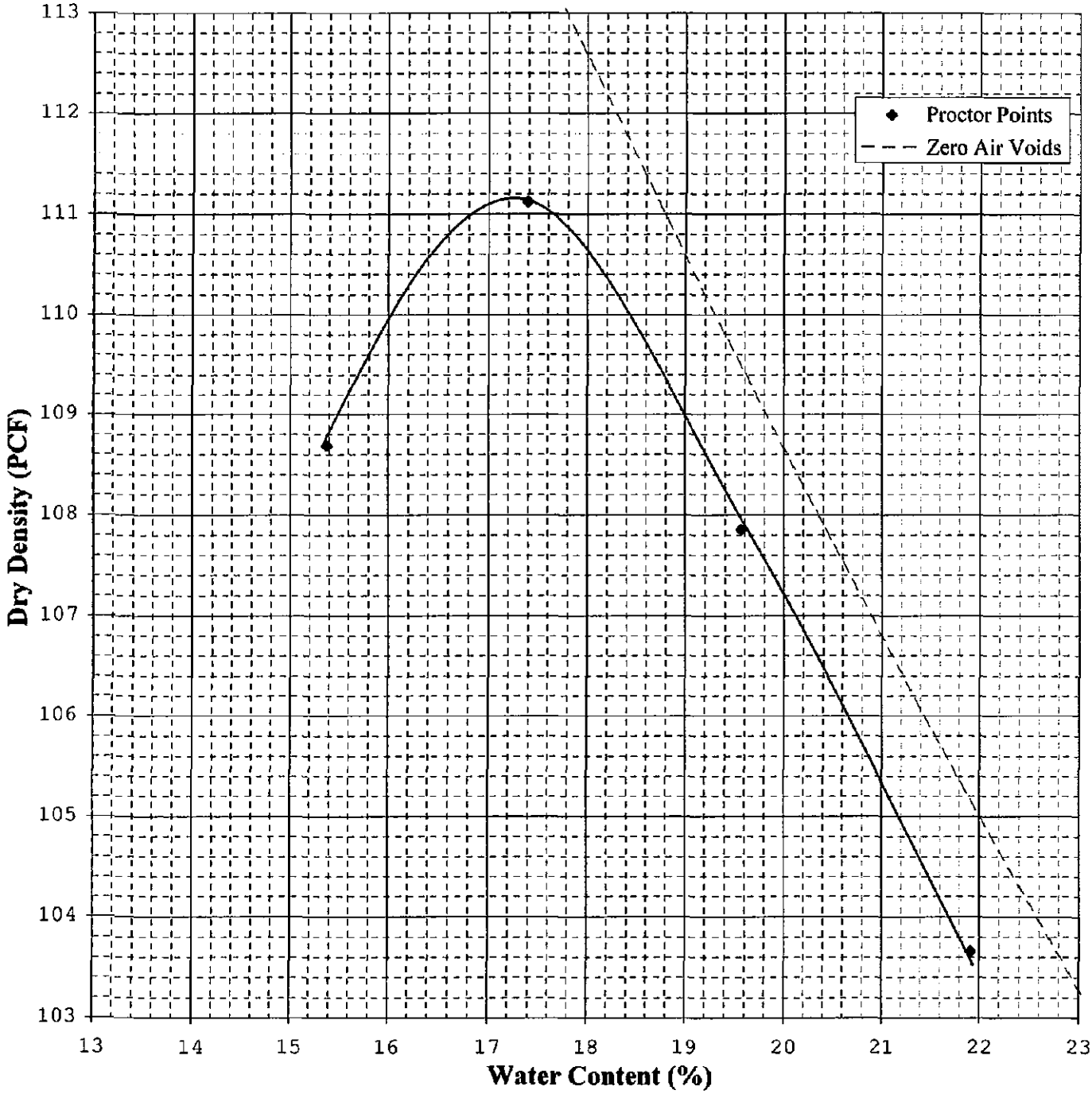
Client: **Barr Engineering Company** Job No. **7237**

Boring No. **T-120** Sample: ***Thermal*** Depth(ft): **3-5** Location:

Soil Type: **Lean Clay w/sand (CL)**

As Received W.C. (%): **19.8** LL: PL: PI: Specific Gravity: **2.67** *Assumed

Maximum Dry Density (pcf): **111.1** Opt. Water Content (%): **17.3**



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SET-R18a

Moisture Density Curve ASTM: D698, Method B

Project: **Blue Creek** Date: **11/4/09**

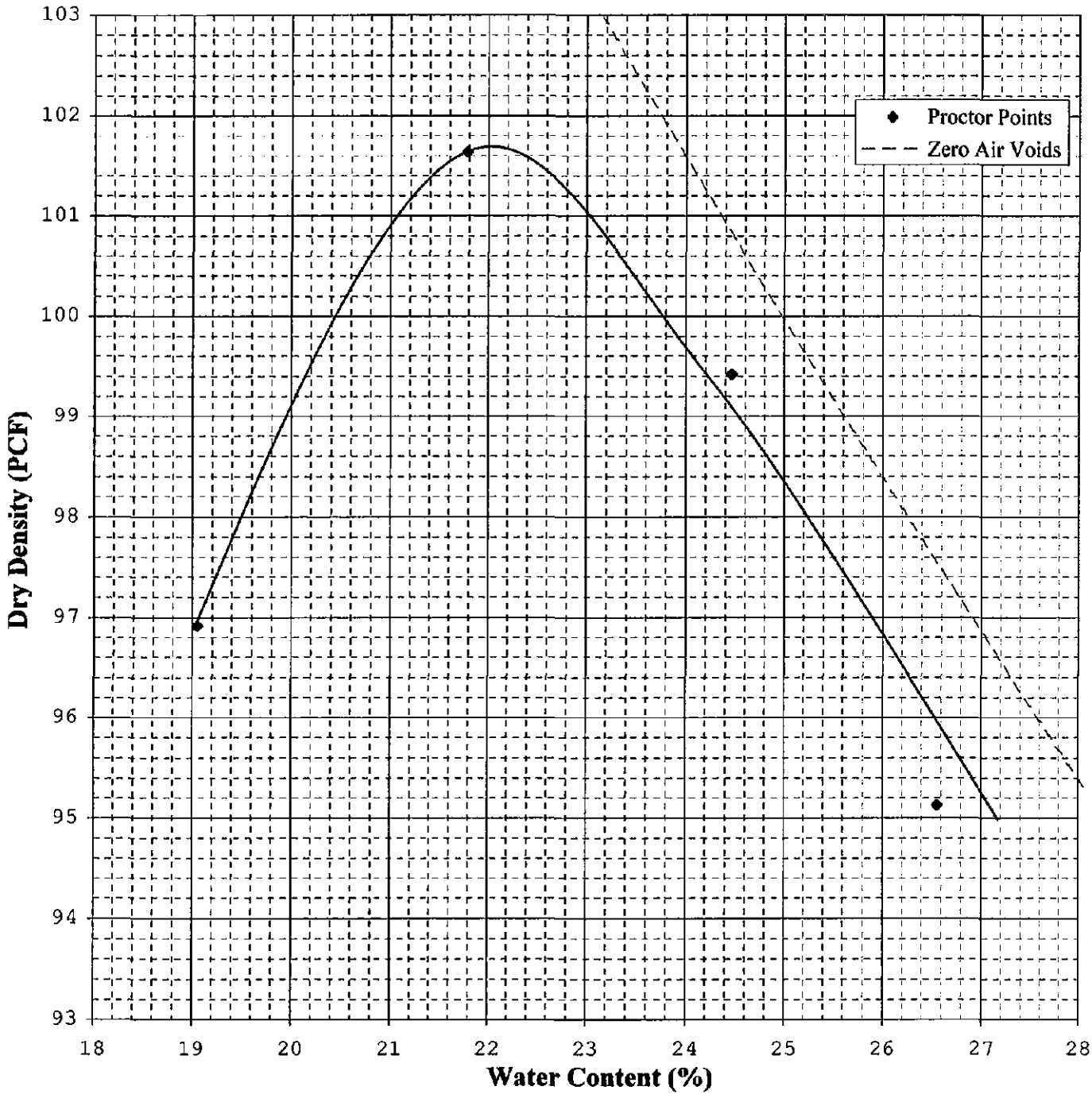
Client: **Barr Engineering Company** Job No. **7237**

Boring No. **Sub-West** Sample: **Thermal** Depth(ft): **2-5** Location:

Soil Type: **Fat Clay (CH)**

As Received W.C. (%): **27.4** LL: PL: PI: Specific Gravity: **2.67** *Assumed

Maximum Dry Density (pcf): **101.7** Opt. Water Content (%): **22.1**



9301 Bryant Ave. South, Suite 107 SOIL ENGINEERING TESTING, INC. Bloomington, Minnesota 55420-3436

SET-R18a

Barr Engineering Company
4700 West 77th Street • Minneapolis, MN 55435-4803
Phone: 952-832-2600 • Fax: 952-832-2601 • www.barr.com *An EEO Employer*

Minneapolis, MN • Hibbing, MN • Duluth, MN • Ann Arbor, MI • Jefferson City, MO • Bismarck, ND

November 19, 2009

Mr. Jeromy Miceli
Project Manager
Iberdrola Renewables
110 N. Brockway Street, Suite 110
Palatine, IL 60067

Re: Soil Electrical Resistivity Testing
Blue Creek Wind Project
Van Wert & Paulding Counties, Ohio

Dear Jeromy:

Barr Engineering Company (Barr) collected soil resistivity measurements at the Blue Creek Wind Project site on October 22 & 23, 2009. This letter presents the methods and results.

Methods

Two electrical resistivity tests were conducted at substation locations by Barr personnel. The specific locations of the tests were provided by you in an email to Barr, dated October 19, 2009. Barr personnel located the test sites based on the provided coordinates with a hand-held GPS unit (+/- approximately 14 feet of accuracy). The test locations are provided in Figure 1, which includes the most recent turbine locations (turbine layout, dated September 4, 2009. Coordinates of each test location and other pertinent information can be found in Table 1.

Table 1: Testing Conditions and Coordinates

Resistivity Testing Conditions		Coordinates (UTM, NAD 83)	
Location/ Turbine Number	Ambient Air Temperature (°F)	Northing	Easting
Sub-E	50	4533731	705398
Sub-W	55	4534983	697947

Barr conducted the work in accordance with ASTM method G57-06 "Standard Test Method for Field Measurement of Soil Resistivity Using the Wenner Four-Electrode Method" (equivalent to IEEE Std. 81).

The equipment used to collect the data consisted of a resistivity meter, four metal electrodes and connecting wire. A Mini-Res Ultra resistivity meter manufactured by L & R Instruments, Inc. was

used to collect the data. The resistivity meter read in resistance (Ω) directly, and did not require the conversion of electrical potential (V) and inductance (I) to calculate resistance (V/I in Ω).

Before and after each array was completed, the resistivity meter was connected to a resistor of known resistance, and the resulting values were compared to the known resistance value for quality assurance and quality control purposes. The meter was properly calibrated for all test locations and no instrument adjustments had to be made.

Electrode "a" spacings of 2, 5, 10, 20, and 40 feet were used at each location. At each location, all of the "a" spacings were set up along the same orientation.

Co-linear arrays of four electrodes were placed in the ground for each measurement. Electrical current was input to the ground through the two outer electrodes of the array. The voltage drop produced by the resulting electrical field was measured across the two inner electrodes. The "a" spacing was increased with each measurement, expanding the array about a common center. Increasing the electrode separation increases the depth of investigation, and indicates vertical variation in resistivity.

In order to check the accuracy of the single resistivity array, a perpendicular array was set up at each test location for all electrode spacings. Apparent resistivity (ρ_a) was calculated for each measurement and corresponding electrode spacing (a) using the resistance measurement (Ω) and the geometric factor (K) as follows:

$$\rho_a = K(V/I) \qquad \text{where } K = 2\pi a$$

All field results and calculated values are presented in the attachments.

Results and Discussion

Apparent resistivity measurements for both locations at the site range from 3,016 to 13,716 ohm centimeters (Ωcm). The average apparent resistivity for the entire data set is 5,834 Ωcm.

Soil resistivity variations are likely associated with differences in soil type, layer thicknesses and degree of water saturation in the near surface soils. Higher moisture contents generally reduce the electrical resistivity of a soil.

There was some relation between electrode spacing and apparent resistivity, indicating soil at greater depth may have lower electrical resistivity, based on the mean values. Table 2 provides a summary of the range found in apparent resistivity with electrode spacing.

Table 2: Apparent Resistivity versus Electrode Spacing

Electrode Spacing [feet]	Apparent Resistivity [Ω-cm]		
	Range	Mean	Standard Deviation
2	3,016 – 3,441	3,288	200
5	3,464 – 3,791	3,651	137
10	3,852 – 4,689	4,291	388
20	5,268 – 7,689	6,445	1,360
40	9,341 – 13,716	11,497	2,435

Thank you for the opportunity to provide this service. Please call me at 952-832-2639 with questions or requests for additional information.

Sincerely,

Leif Johnson

LAJ
Attachment

Attachments:

Figure 1: Electrical and Thermal Resistivity Test Locations
Electrical Resistivity Test Results

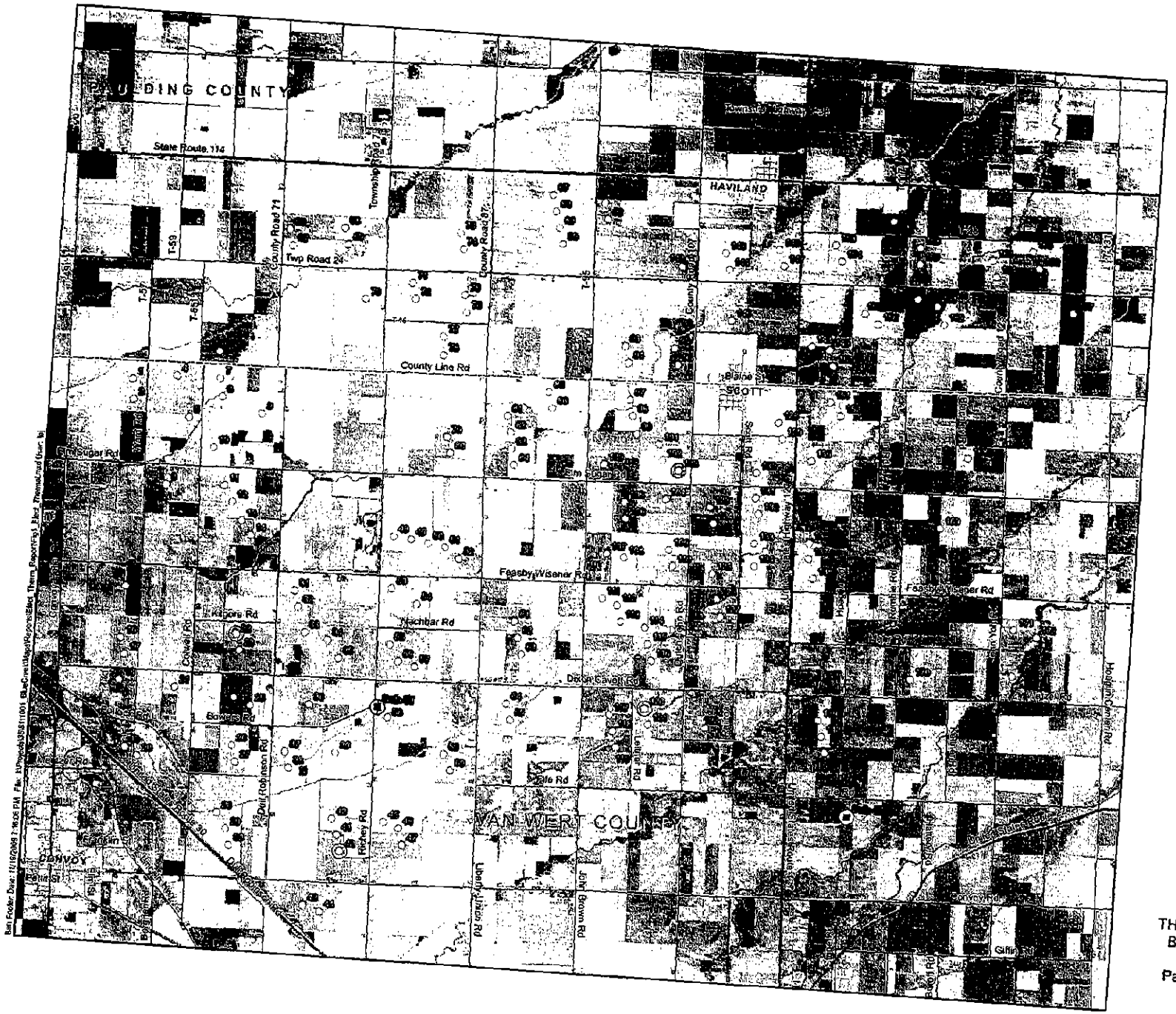


Figure 1

THERMAL / ELECTRICAL RESISTIVITY
Blue Creek & Woodburn Wind Project
Iberdrola Renewables, Inc.
Paulding and Van Wert Counties, Ohio

WENNER SOUNDING
PROJECT: Blue Creek Wind Project, Van Wert County, Ohio

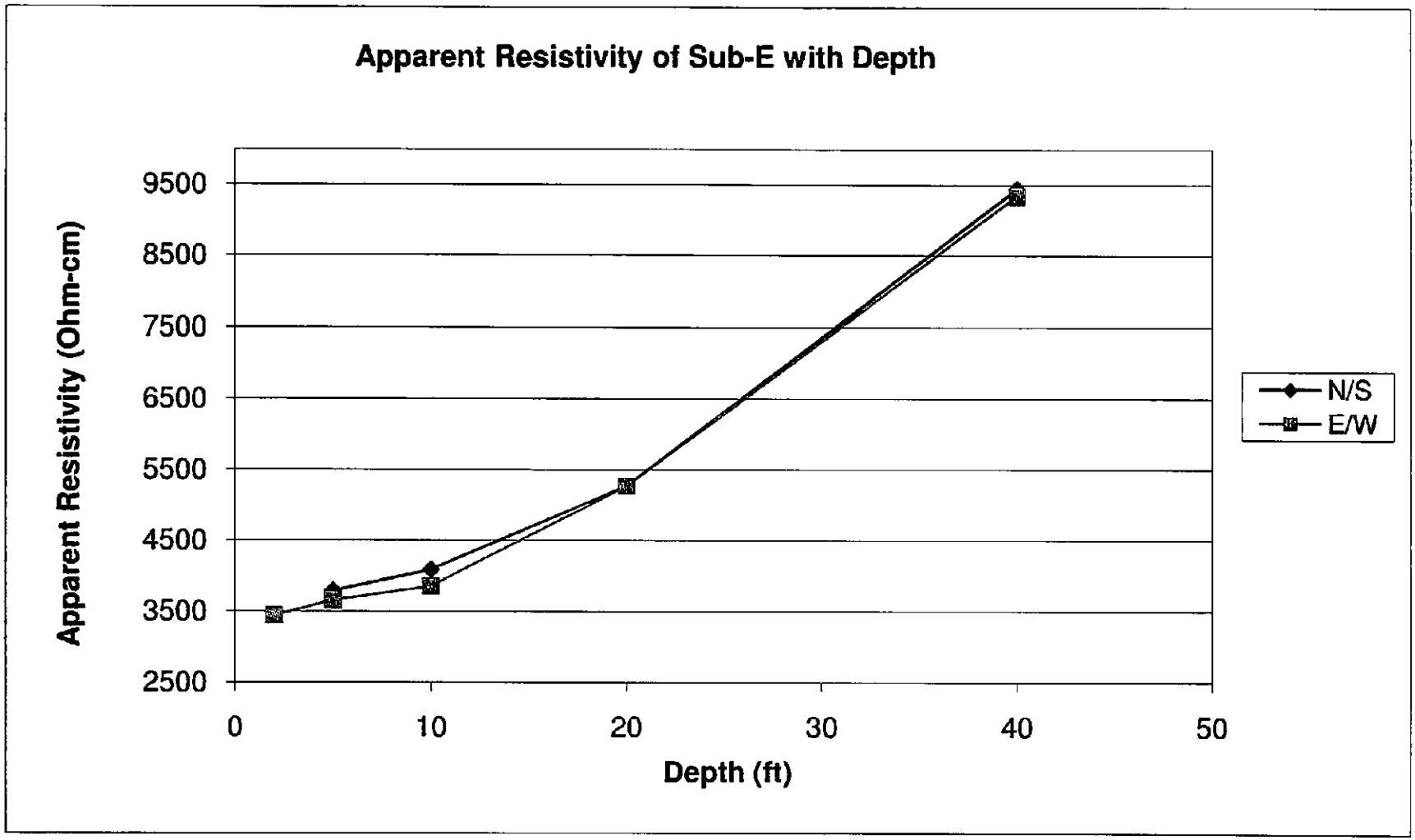
Sounding Number Sub-E **Date** 10/22/2009
Observer LAJ
Location East Substation

Electrode Spacing "a" feet	Resistance V/I Ohms	Geometric Factor $K=2\pi a$ feet	Apparent Resistivity $\rho_a=K(V/I)$ Ohm-feet	Apparent Resistivity $\rho_a=K(V/I)$ Ohm-cm
N/S Orientation				
2	8.51	12.566	106.97	3261.13
5	3.958	31.416	124.34	3790.99
10	2.134	62.832	134.08	4087.91
20	1.375	125.664	172.79	5267.93
40	1.232	251.328	309.64	9440.12
E/W Orientation				
2	8.981	12.566	112.86	3440.82
5	3.817	31.416	119.91	3655.94
10	2.011	62.832	126.36	3852.29
20	1.375	125.664	172.79	5267.93
40	1.219	251.328	306.37	9340.51

Cultural Features	None
Ground Cover	Unharvested corn field
Ambient Air Temp. (°F)	50
Line Bearing	NS/EW

GPS Coordinates (NAD83 UTM Zone 13)	
Northing	4533731
Easting	705398

Calibration Test (Resistor Harness)	
known resistance	19.000
actual resistance	19.001


Apparent Resistivity of Sub-E with Depth
Apparent Resistivity (Ohm-cm)
9500
8500
7500
6500
5500
4500
3500
2500
0
10
20
30
40
50
Depth (ft)
N/S
E/W

WENNER SOUNDING

PROJECT: Blue Creek Wind Project, Van Wert County, Ohio

Sounding Number Sub-W **Date** 10/23/2009

Observer LAJ

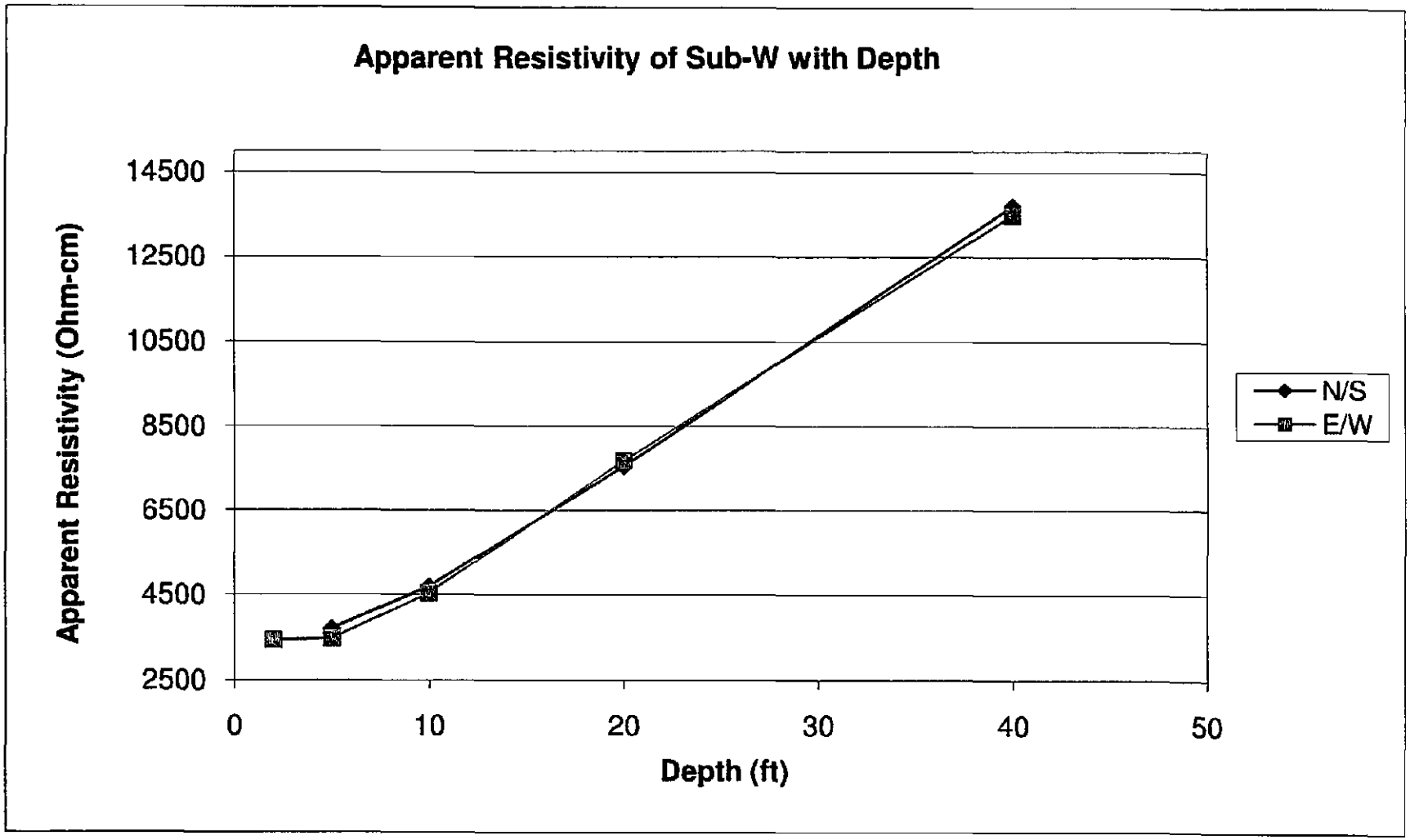
Location West Substation

Electrode Spacing "a" feet	Resistance V/I Ohms	Geometric Factor $K=2\pi a$ feet	Apparent Resistivity $\rho_a=K(V/I)$ Ohm-feet	Apparent Resistivity $\rho_a=K(V/I)$ Ohm-cm
N/S Orientation				
2	7.87	12.566	98.91	3015.55
5	3.857	31.416	121.17	3694.25
10	2.448	62.832	153.81	4689.41
20	1.972	125.664	247.81	7555.16
40	1.790	251.328	449.88	13715.77
E/W Orientation				
2	8.964	12.566	112.65	3434.31
5	3.617	31.416	113.63	3464.38
10	2.368	62.832	148.79	4536.16
20	2.007	125.664	252.21	7689.26
40	1.761	251.328	442.59	13493.56

Cultural Features	None
Ground Cover	Till bean field
Ambient Air Temp. (°F)	55
Line Bearing	NS/EW

GPS Coordinates (NAD83 UTM Zone 13)	
Northing	4534983
Easting	697947

Calibration Test (Resistor Harness)	
known resistance	19.000
actual resistance	19.001


Apparent Resistivity of Sub-W with Depth
Apparent Resistivity (Ohm-cm)
14500
12500
10500
8500
6500
4500
2500
0
10
20
30
40
50
Depth (ft)
N/S
E/W

	'a' Spacing (ft)	Sub-E Apparent Resistivity ra=K(V/I) Ohm-cm	Sub-W Apparent Resistivity ra=K(V/I) Ohm-cm	Max	Min	Range (NS & EW)	Mean (NS & EW)	Std Dev (NS & EW)
N/S Orientation	2	3015.55	3261.13	3,441	3,016	3016-3441	3,288	200
	5	3694.25	3790.99	3,791	3,464	3464-3791	3,651	137
	10	4689.41	4087.91	4,689	3,852	3852-4689	4,291	388
	20	7555.16	5267.93	7,689	5,268	5268-7689	6,445	1,360
	40	13715.77	9440.12	13,716	9,341	9341-13716	11,497	2,435
E/W Orientation	2	3434.31	3440.82					
	5	3464.38	3655.94					
	10	4536.16	3852.29					
	20	7689.26	5267.93					
	40	13493.56	9340.51					

Overall Average Apparent Resistivity [Ohm-cm]	5834.67

Appendix H

Laboratory Test Results

SET Job#: 7237

Extrusion Log

Date: 11/2/2009

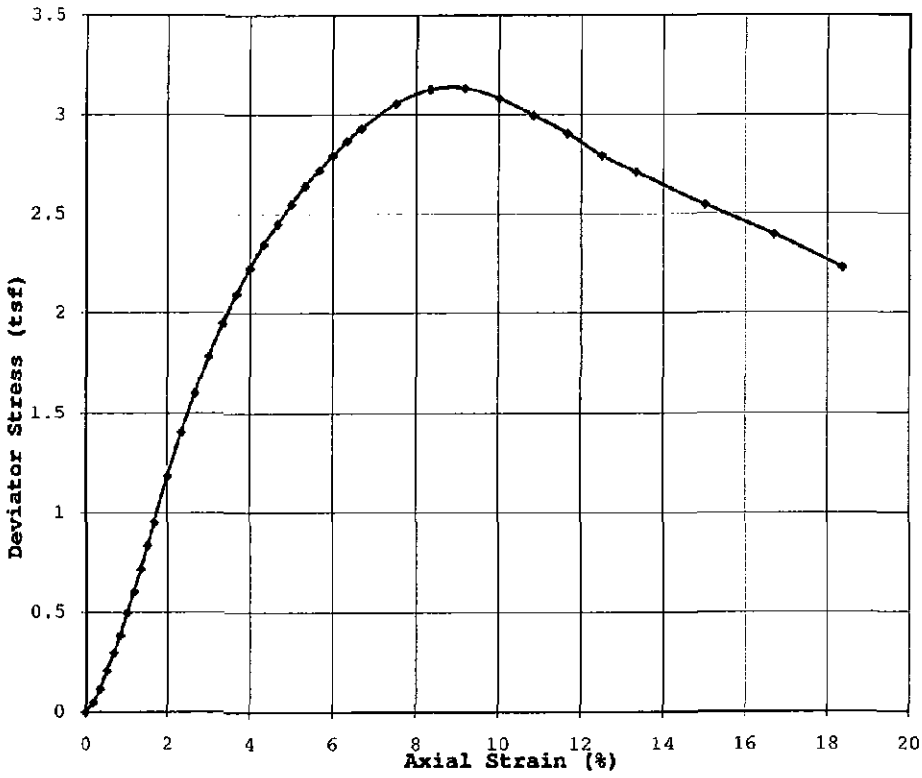
Project/Client: Blue Creek

Boring #	Sample#	Depth(ft)	Recovery (in)		Soil Description
T-22		8 - 9	BE:	6.5	Top 5" Pickup/Disturbed Bottom of tube damaged, cut-off 3.5"
			AE:	6.5	1.5" Lean Clay w/Sand & a Little Gravel, Dk. Brn., Stiff (CL)
T-42		11.5 - 13.5	BE:	26	Top 4" Pickup/Disturbed
			AE:	25	21" Lean Clay w/Sand & a Little Gravel, Dk. Brn., Stiff (CL)
T-71		8 - 10	BE:	20.5	Top 8" Pickup/Disturbed
			AE:	18.5	10.5" Lean Clay w/Sand & a Little Gravel, Dk. Brn., Stiff (CL)
T-71		13 - 15	BE:	22	Top 7" Pickup/Disturbed
			AE:	21	14" Lean Clay w/Sand & a Little Gravel, Dk. Brn., Stiff (CL)
T-103		8 - 10	BE:	22	Top 8" Pickup/Disturbed
			AE:	21.5	13.5" Lean Clay w/Sand & a Little Gravel, Dk. Brn., Stiff (CL)
T-120		8 - 10	BE:	19	Top 5" Pickup/Disturbed
			AE:	18	13" Lean Clay w/Sand & a Little Gravel, Dk. Brn., Stiff (CL)
T-120		18 - 20	BE:	24	Top 5" Pickup/Disturbed
			AE:	22.5	17.5" Lean Clay w/Sand & a Little Gravel, Dk. Brn., Stiff (CL)
T-148		8 - 9	BE:	8.5	Top 2.5" Pickup/Disturbed Bottom of tube damaged, cut-off 2"
			AE:	8.5	6" Lean Clay w/Sand & a Little Gravel, Dk. Brn., Stiff (CL)
T-148		15 - 17	BE:	13	Top 9" Pickup/Disturbed Bottom of tube damaged, cut-off 2"
			AE:	13	4" Lean Clay w/Sand & a Little Gravel, Dk. Brn., Stiff (CL)

Unconfined Stress/Strain Curves

ASTM: D2166

Project: Blue Creek — Job: 7237
Client: Barr Engineering Company — Date: 11/5/09
Remarks:



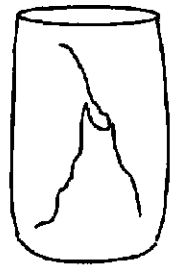
Boring: T-42 — Depth: 11.5 - 13.5 (Top)
Sample #:
Soil Type: Lean Clay w/Sand & a Little Gravel (CL)

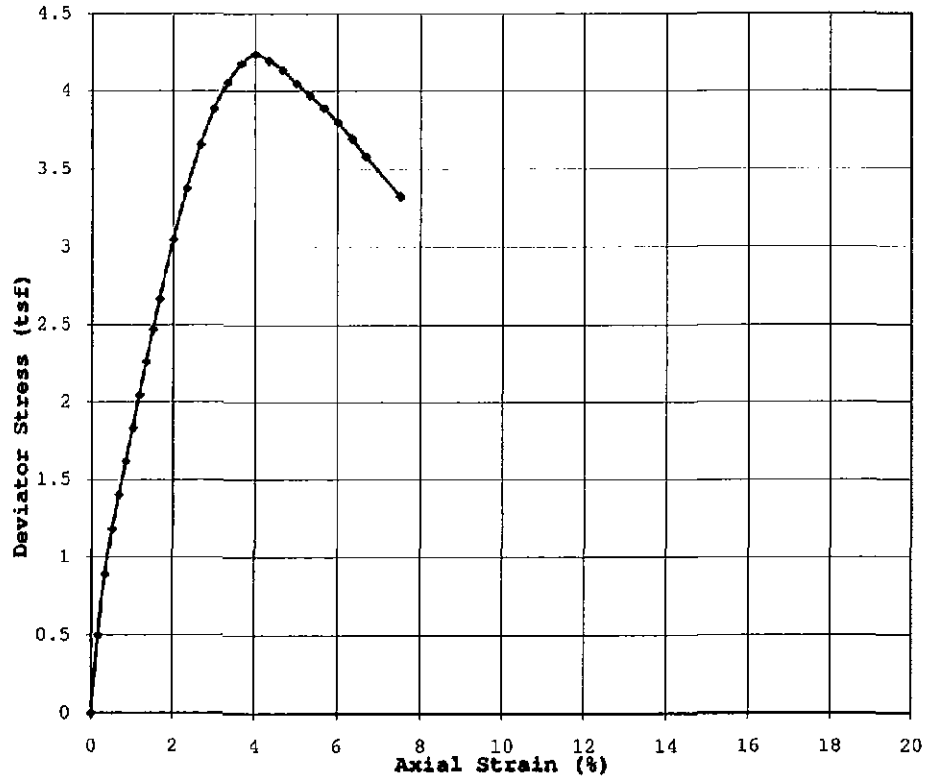
Strain Rate (in/min): 0.050
Sample Type: 3T
Dia. (in) 2.88 — Ht. (in) 5.99
Height to Diameter Ratio: 2.08

Unconfined Comp. Strength: 3.14 tsf
Strain at Failure (%): 9.18

W.C. (%): 15.0
Yd (pcf): 119.9

Sketch of Specimen After Failure





Boring: T-71 — Depth: 8 - 10 (Top)
Sample #:
Soil Type: Lean Clay w/Sand & a Little Gravel (CL)

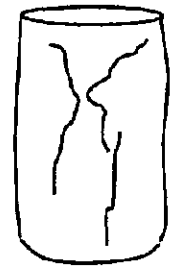
Strain Rate (in/min): 0.050
Sample Type: 3T

Dia. (in): 2.88 — Ht. (in): 6.00
Height to Diameter Ratio: 2.08

Unconfined Comp. Strength: 4.24 tsf
Strain at Failure (%): 4.00

W.C. (%): 15.3
Yd (pcf): 118.1

Sketch of Specimen After Failure

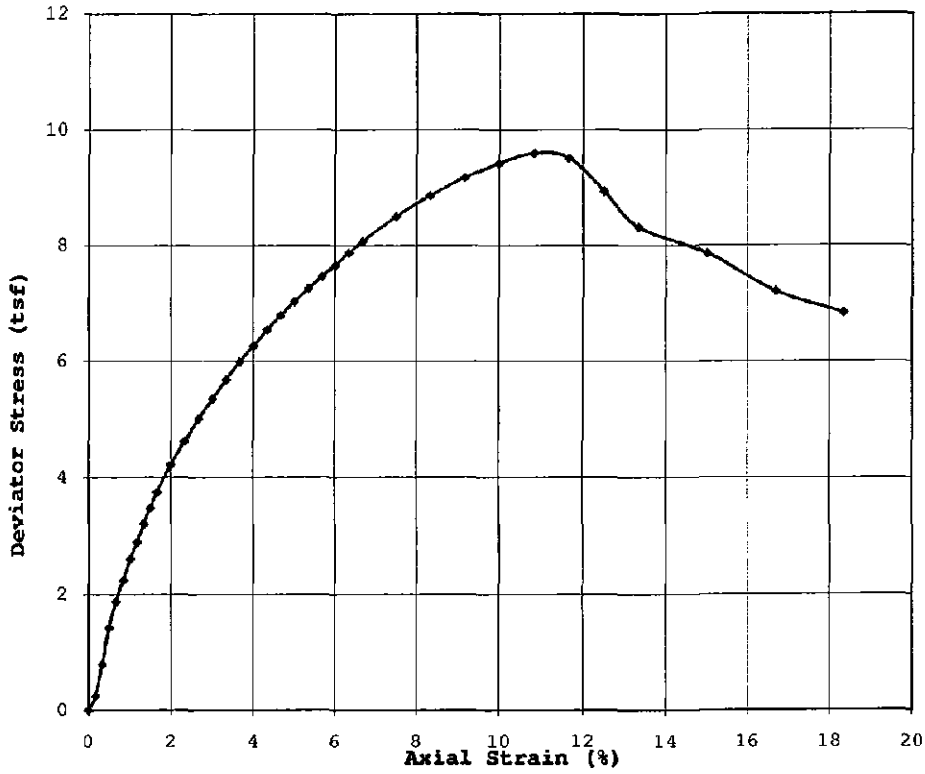


9301 Bryant Ave. South, Suite 107 — SOIL ENGINEERING TESTING, INC. — Bloomington, Minnesota 55420-3436

Unconfined Stress/Strain Curves

ASTM: D2166

Project: Blue Creek — Job: 7237
Client: Barr Engineering Company — Date: 11/5/09
Remarks:



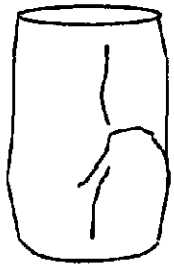
Boring: T-71 Depth: 13 - 15 (Top)
Sample #:
Soil Type: Lean Clay w/Sand & a Little Gravel (CL)

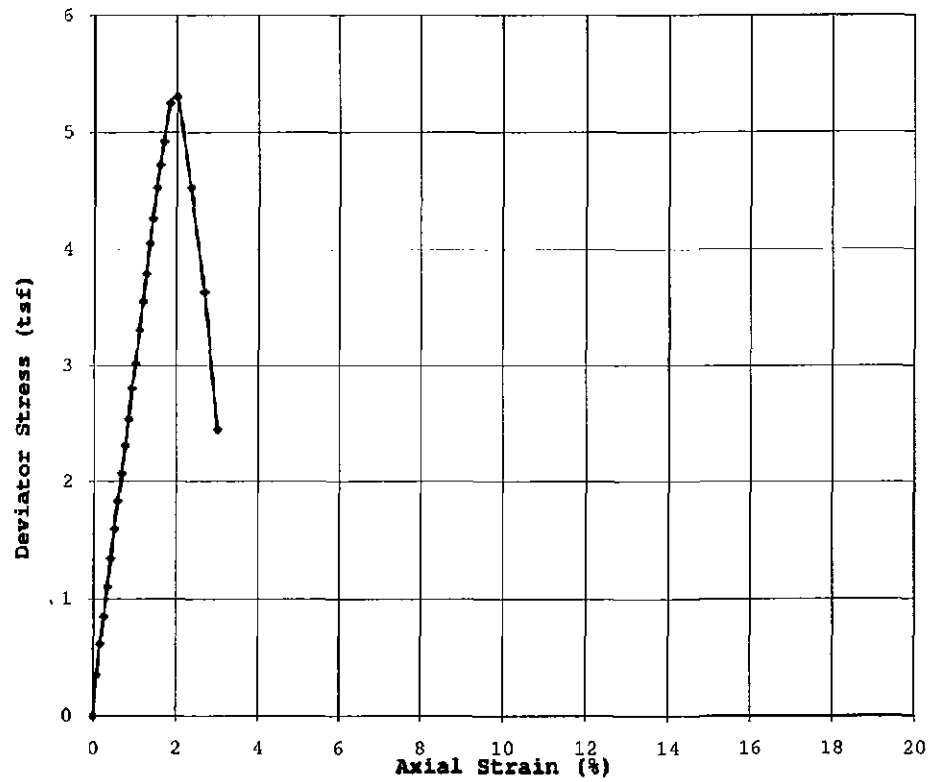
Strain Rate (in/min): 0.050
Sample Type: 3T
Dia. (in) 2.88 Ht. (in) 6.00
Height to Diameter Ratio: 2.08

Unconfined Comp. Strength: 9.60 tsf
Strain at Failure (%): 10.84

W.C. (%): 12.9
Yd (pcf): 124.4

Sketch of Specimen After Failure





Boring: T-103 Depth: 8 - 10 (Top)
Sample #:
Soil Type: Lean Clay w/Sand & a Little Gravel (CL)

Strain Rate (in/min): 0.050
Sample Type: 3T

Dia. (in): 2.88 Ht. (in): 6.00
Height to Diameter Ratio: 2.08

Unconfined Comp. Strength: 5.30 tsf
Strain at Failure (%): 2.00

W.C. (%): 13.8
Yd (pcf): 121.9

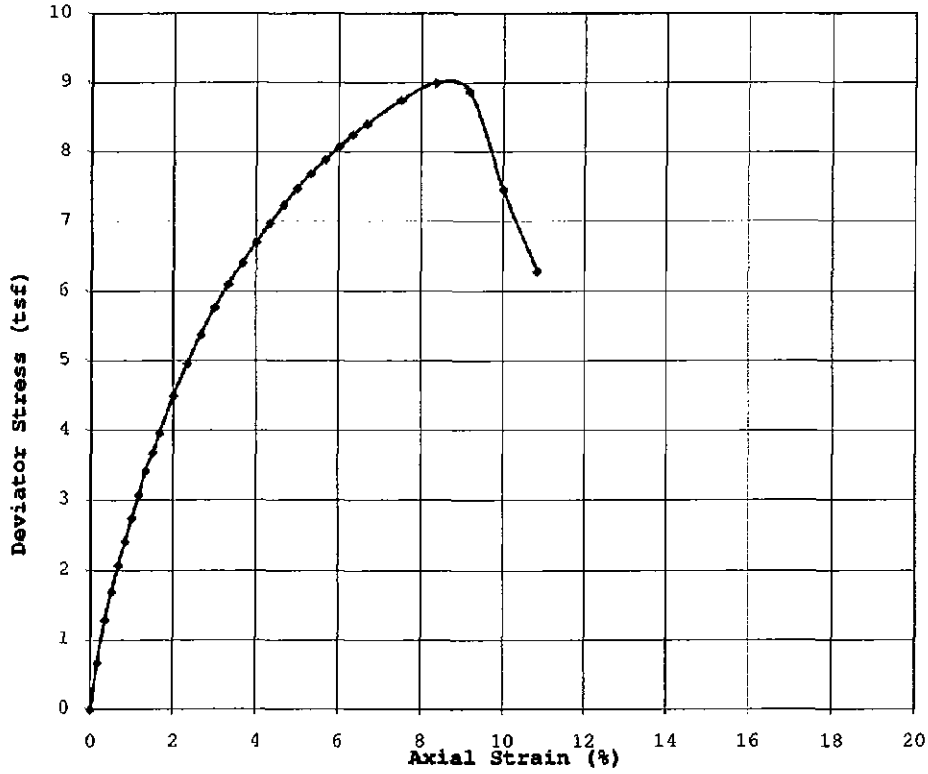
Sketch of Specimen After Failure

9301 Bryant Ave. South, Suite 107 SOIL ENGINEERING TESTING, INC. Bloomington, Minnesota 55420-3436

Unconfined Stress/Strain Curves

ASTM: D2166

Project: Blue Creek — Job: 7237
Client: Barr Engineering Company — Date: 11/5/09
Remarks:



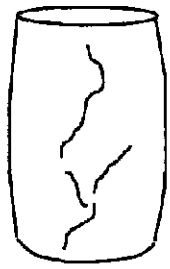
Boring: T-120 Depth: 8 - 10 (Bot)
Sample #:
Soil Type: Lean Clay w/Sand & a Little Gravel (CL)

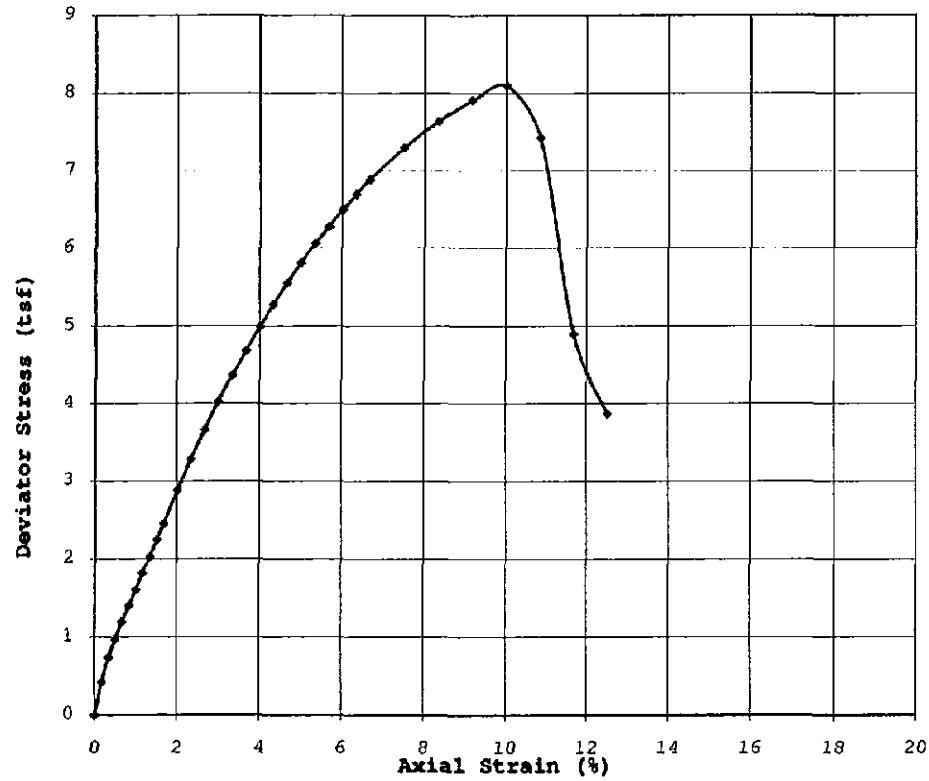
Strain Rate (in/min): 0.050
Sample Type: 3T
Dia. (in) 2.88 Ht. (in) 6.00
Height to Diameter Ratio: 2.08

Unconfined Comp. Strength: 9.00 tsf
Strain at Failure (%): 8.33

W.C. (%): 13.5
Yd (pcf): 122.5

Sketch of Specimen After Failure





Boring: T-120 Depth: 18 - 20 (Top)
Sample #:
Soil Type: Lean Clay w/Sand & a Little Gravel (CL)

Strain Rate (in/min): 0.050
Sample Type: 3T

Dia. (in): 2.89 Ht. (in): 5.99
Height to Diameter Ratio: 2.08

Unconfined Comp. Strength: 8.09 tsf
Strain at Failure (%): 10.01

W.C. (%): 12.6
Yd (pcf): 124.9

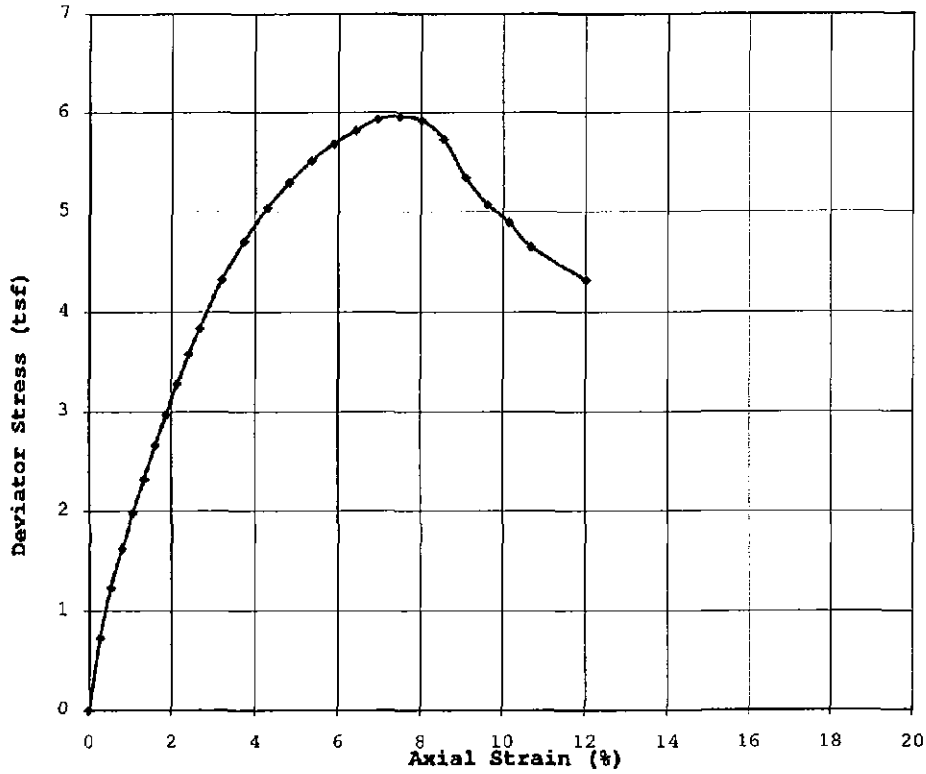
Sketch of Specimen After Failure

9301 Bryant Ave. South, Suite 107 SOIL ENGINEERING TESTING, INC. Bloomington, Minnesota 55420-3436

Unconfined Stress/Strain Curves

ASTM: D2166

Project: Blue Creek — Job: 7237
Client: Barr Engineering Company — Date: 11/5/09
Remarks:



Boring: T-148 Depth: 8 - 9
Sample #:
Soil Type: Lean Clay w/Sand & a Little Gravel (CL)

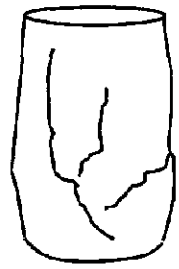
Strain Rate (in/min): 0.050
Sample Type: 3T
Dia. (in) 1.93 Ht. (in) 3.74
Height to Diameter Ratio: 1.94

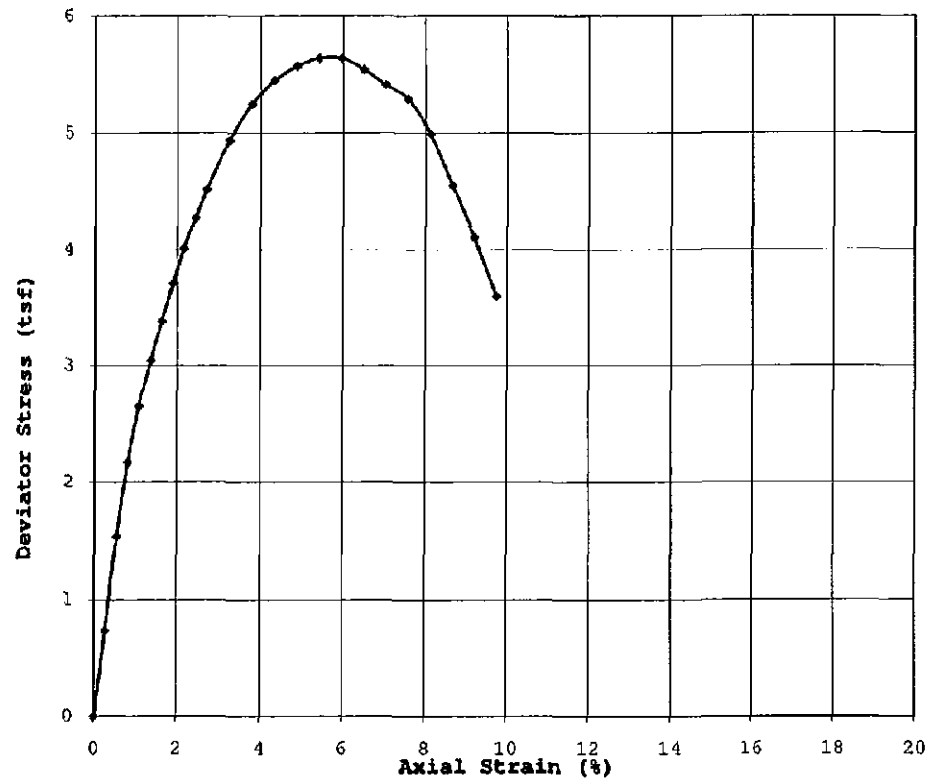
Unconfined Comp. Strength: 5.96 tsf
Strain at Failure (%): 7.48

W.C. (%): 15.1
Yd (pcf): 119.2

LL: 30.7
PL: 15.6
PI: 15.1

Sketch of Specimen After Failure





Boring: T-148 Depth: 15 - 17 (Top)
Sample #:
Soil Type: Lean Clay w/Sand & a Little Gravel (CL)

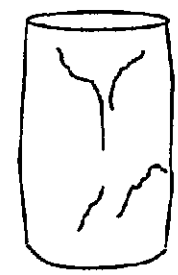
Strain Rate (in/min): 0.050
Sample Type: 3T

Dia. (in): 2.00 Ht. (in): 3.69
Height to Diameter Ratio: 1.85

Unconfined Comp. Strength: 5.64 tsf
Strain at Failure (%): 5.42

W.C. (%): 13.0
Yd (pcf): 122.3

Sketch of Specimen After Failure



9301 Bryant Ave. South, Suite 107 SOIL ENGINEERING TESTING, INC. Bloomington, Minnesota 55420-3436

Laboratory Test Summary

Project: Blue Creek Job: 7237

Client: Barr Engineering Company Date: 10/29/2009

Sample Information & Classification								
Boring #	T-22	T-22						
Sample #								
Depth (ft)	3.5-5	9-10.5						
Type or BPF	Jar	Jar						
Material Classification	Lean Clay w/a trace of gravel (CL)	Lean Clay w/sand (CL) & Clayey Sand w/a trace of gravel (SC)						
Water Content (%)	18.1	12.6						

Sample Information & Classification								
Boring #	T-42	T-42	T-42	T-42				
Sample #								
Depth (ft)	5-6.5	8.5-10	13.5-15	18.5-20				
Type or BPF	Jar	Jar	Jar	Jar				
Material Classification	Sandy Lean Clay w/a little gravel (CL)	Lean Clay w/a trace of gravel (CL)	Sandy Lean Clay (CL)	Lean Clay w/a 1" piece of gravel (CL)				
Water Content (%)	15.4	17.5	14.2	28.9				

Sample Information & Classification								
Boring #	T-71	T-71	T-71	T-71	T-71			
Sample #								
Depth (ft)	Surface	3.5-5	10-11.5	15-16.5	18.5-20			
Type or BPF	Jar	Jar	Jar	Jar	Jar			
Material Classification	Fat Clay w/a trace of organic material (CH)	Lean Clay w/a trace of gravel (CL)	Lean Clay w/sand (CL)	Lean Clay w/sand (CL)	Lean Clay w/a little gravel (CL)			
Water Content (%)	28.5	17.0	12.1	13.8	14.5			

Sample Information & Classification								
Boring #	T-103	T-103	T-103					
Sample #								
Depth (ft)	3.5-5	10-11.5	13.5-15					
Type or BPF	Jar	Jar	Jar					
Material Classification	Lean Clay w/a trace of gravel (CL)	Lean Clay w/sand (CL)	Clayey Sand w/a little gravel (SC)					
Water Content (%)	26.9	11.8	6.1					

Laboratory Test Summary

Project: Blue Creek Job: 7237

Client: Barr Engineering Company Date: 10/29/2009

Sample Information & Classification								
Boring #	T-120	T-120	T-120	T-120				
Sample #								
Depth (ft)	3.5-5	10-11.5	13.5-15	20-21.5				
Type or BPF	Jar	Jar	Jar	Jar				
Material Classification	Lean Clay (CL)	Lean Clay (CL) & Sand (SP)	Lean Clay w/sand (CL)	Sandy Lean Clay (CL)				
Water Content (%)	20.1	18.0	13.5	13.8				

Sample Information & Classification								
Boring #	T-148	T-148	T-148					
Sample #								
Depth (ft)	3.5-5	13.5-15	19-20.5					
Type or BPF	Jar	Jar	Jar					
Material Classification	Lean Clay w/a trace of gravel (CL)	Lean Clay w/sand (CL)	Lean Clay w/sand and gravel (CL)					
Water Content (%)	23.4	14.5	20.0					

Sample Information & Classification								
Boring #								
Sample #								
Depth (ft)								
Type or BPF								
Material Classification								
Water Content (%)								

Sample Information & Classification								
Boring #								
Sample #								
Depth (ft)								
Type or BPF								
Material Classification								
Water Content (%)								

Laboratory Test Summary

Project: Blue Creek Job: 7237

Client: Barr Engineering Company Date: 10/29/2009

Sample Information & Classification						
Boring #	T-42	T-71	T-71	T-103	T-120	
Sample #						
Depth (ft)	8.5-10	Surface	15-16.5	10-11.5	10-11.5	
Type or BPF	Jar	Jar	Jar	Jar	Jar	
Material Classification	Lean Clay w/a trace of gravel (CL)	Fat Clay w/a trace of organic material (CH)	Lean Clay w/sand (CL)	Lean Clay w/sand (CL)	Lean Clay (CL)	
Moisture Contents & Atterberg Limits						
Moisture Content (%)	17.5	28.5	13.8	11.8	18.0	
Liquid Limit (%)	38.9	53.2	32.2	26.6	31.7	
Plastic Limit (%)	17.9	26.0	15.5	14.4	14.6	
Plasticity Index (%)	21.0	27.2	16.7	12.2	17.1	

Sample Information & Classification						
Boring #						
Sample #						
Depth (ft)						
Type or BPF						
Material Classification						
Moisture Contents & Atterberg Limits						
Moisture Content (%)						
Liquid Limit (%)						
Plastic Limit (%)						
Plasticity Index (%)						

pH Testing Summary Sheet

Project: **Blue Creek** Job: **7237**

Client: **Barr Engineering Company** Date: **10/28/2009**

Boring / Location	Sample Type	Depth (ft)	pH	Visual Classification
T-22		3.5-5	7.6	Lean Clay w/a trace of gravel (CL)
T-71		3.5-5	7.7	Lean Clay w/a trace of gravel (CL)
T-120		3.5-5	7.8	Lean Clay (CL)
T-148		3.5-5	7.6	Lean Clay w/a trace of gravel (CL)

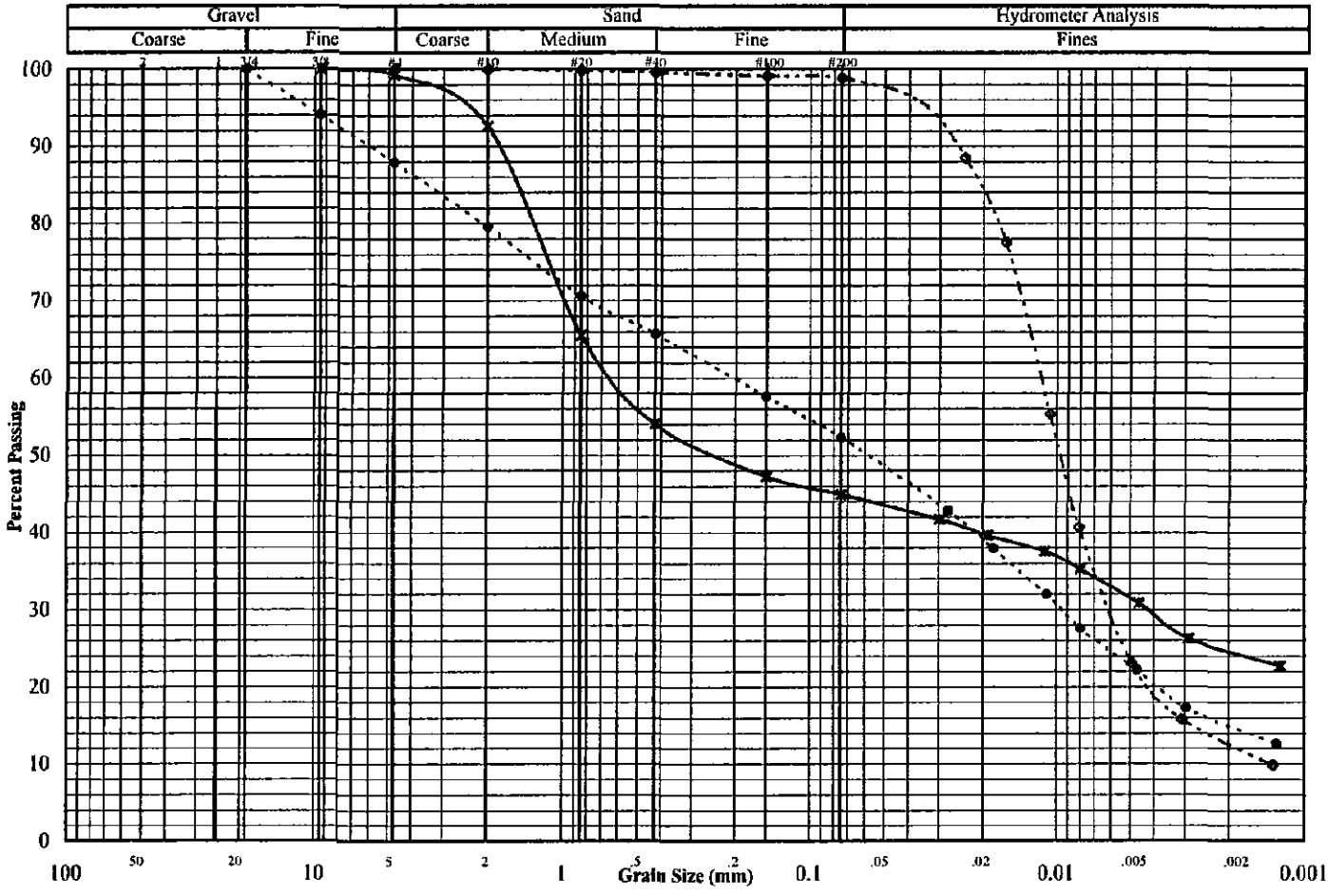
SOIL ENGINEERING TESTING, INC.

Grain Size Distribution ASTM D422

Job No. : 7237

Project:	Blue Creek	Test Date:	11/2/09
Reported To:	Barr Engineering Company	Report Date:	11/4/09

	Location / Boring No.	Sample No.	Depth (ft)	Sample Type	Soil Classification
*	T-22		9-10.5	Jar	Clayey Sand (SC)
●	T-71		18.5-20	Jar	Sandy Lean Clay w/a little gravel (CL)
◇	T-120		3.5-5	Jar	Lean Clay (CL)



Other Tests

	*	●	◇
Liquid Limit			
Plastic Limit			
Plasticity Index			
Water Content	12.6	14.5	20.1
Dry Density (pcf)			
Specific Gravity	2.69*	2.69*	2.69*
Porosity			
Organic Content			
pH			7.8
Shrinkage Limit			
Penetrometer			
Qu (psf)			

(* = assumed)

Percent Passing

	*	●	◇
Mass (g)	196.8	200.0	79.8
2"			
1.5"			
1"			
3/4"		100.0	
3/8"	100.0	94.1	
#4	99.3	88.0	100.0
#10	92.6	79.6	100.0
#20	65.5	70.6	99.8
#40	54.1	65.7	99.6
#100	47.3	57.6	99.2
#200	45.0	52.3	98.9

	*	●	◇
D_{60}			
D_{30}			
D_{10}			
C_U			
C_C			

Remarks:

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Bloomington, Minnesota 55420-3436

Moisture Density Curve ASTM: D698, Method B

Project: **Blue Creek** Date: **10/28/09**

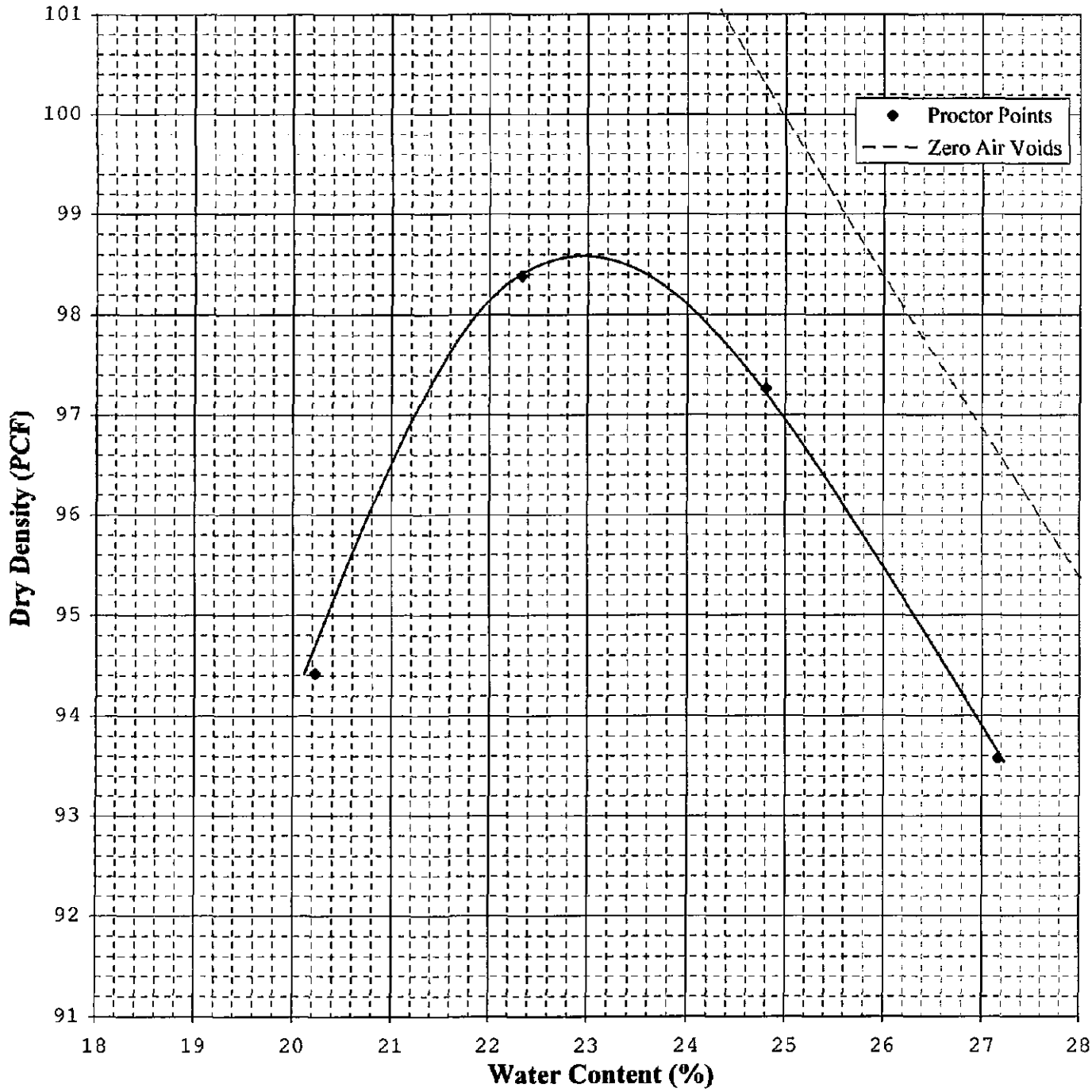
Client: **Barr Engineering Company** Job No. **7237**

Boring No. **T-22** Sample: Depth(ft): **0-1** Location:

Soil Type: **Fat Clay (CH)**

As Received W.C. (%): **24.6** LL: PL: PI: Specific Gravity: **2.67** *Assumed

	◆	△		◆	△
Maximum Dry Density (pcf):	**98.6**		Opt. Water Content (%):	**23.0**	



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Moisture Density Curve ASTM: D698, Method B

Project: **Blue Creek** Date: **10/28/09**

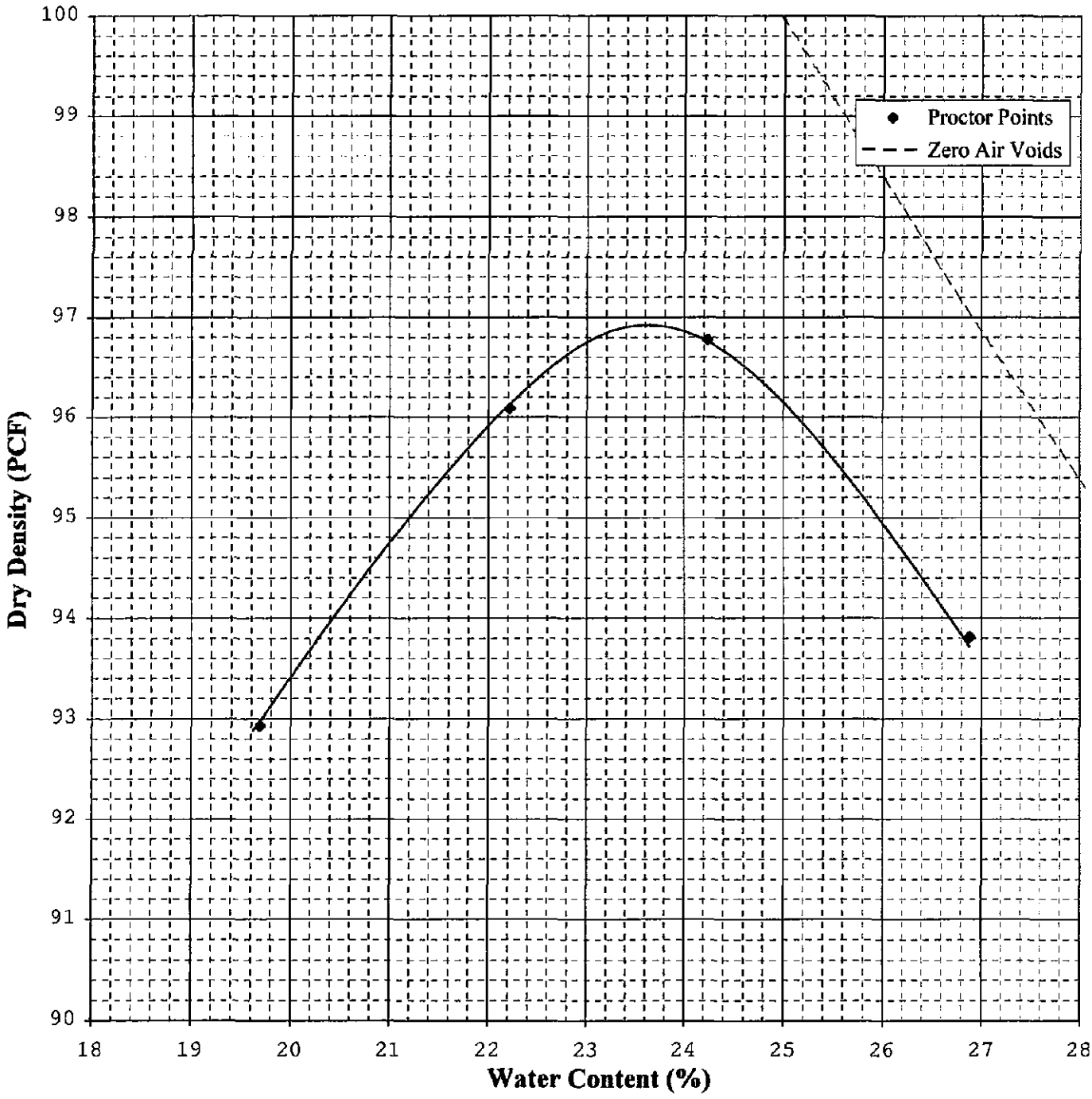
Client: ***Barr Engineering Company*** Job No. **7237**

Boring No. **T-42** Sample: Depth(ft): **0-2** Location:

Soil Type: **Fat Clay (CH)**

As Received W.C. (%): **26.3** LL: PL: PI: Specific Gravity: **2.67** *Assumed

Maximum Dry Density (pcf): **96.9** Opt. Water Content (%): **23.6**



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SET-R18a

Moisture Density Curve ASTM: D698, Method B

Project: **Blue Creek** Date: **10/28/09**

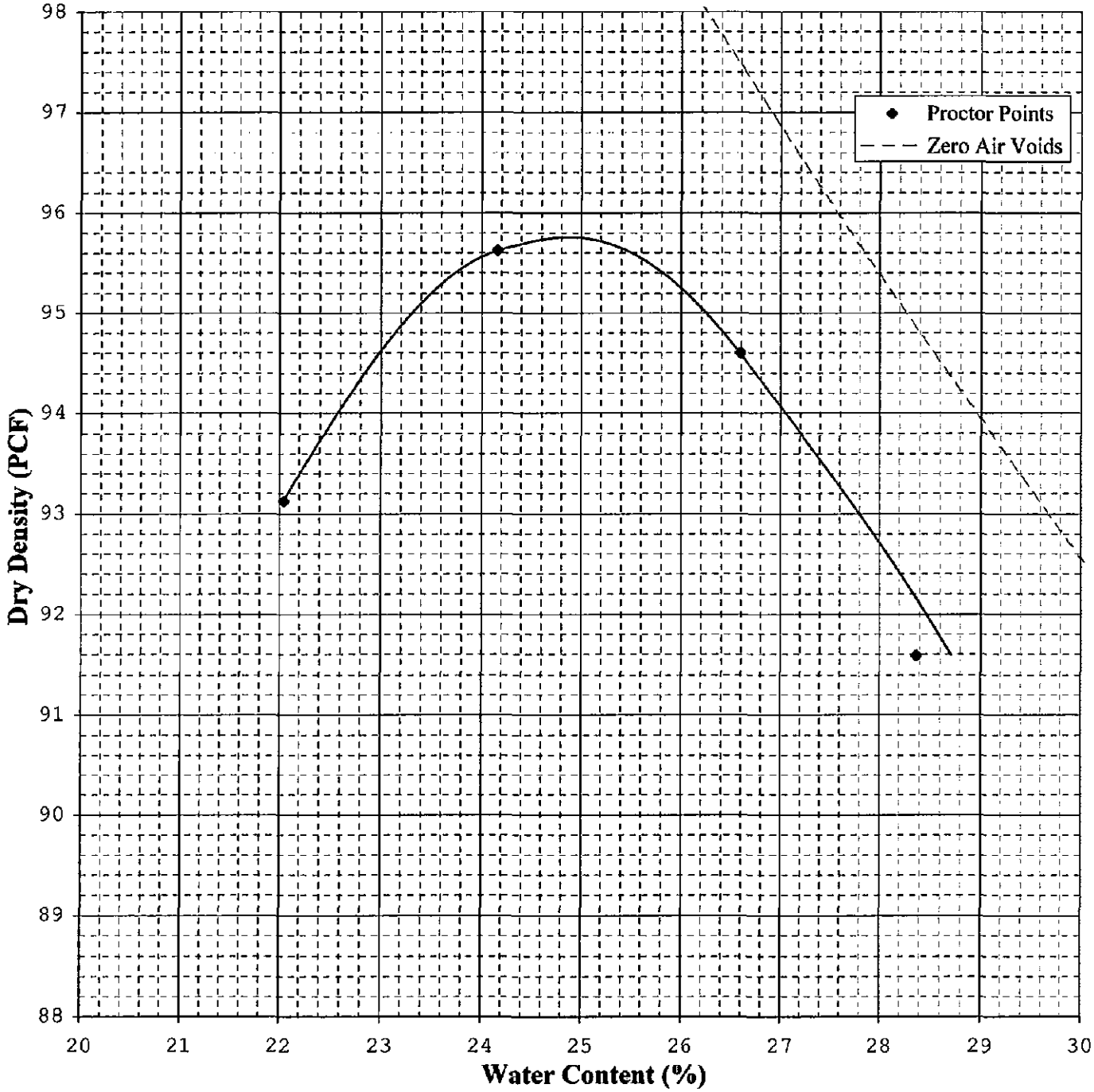
Client: **Barr Engineering Company** Job No. **7237**

Boring No. **T-71** Sample: **CBR** Depth(ft): **0-1** Location:

Soil Type: **Fat Clay (CH)**

As Received W.C. (%): **28.7** LL: PL: PI: Specific Gravity: **2.67** *Assumed

	◆	△		◆	△
Maximum Dry Density (pcf):	95.8		Opt. Water Content (%):	24.9	



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SET-R18a

Moisture Density Curve ASTM: D698, Method B

Project: **Blue Creek** Date: **10/28/09**

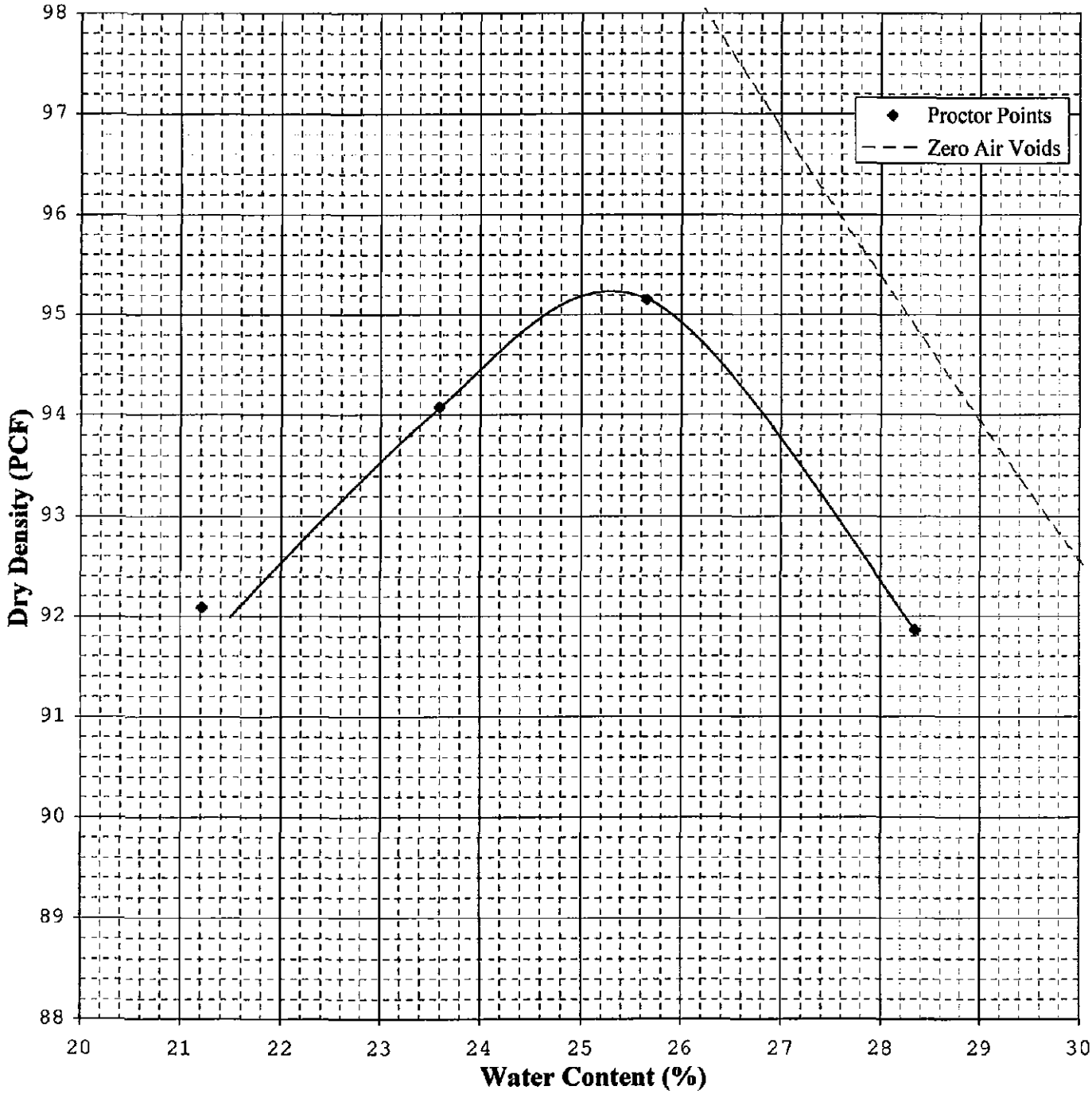
Client: **Barr Engineering Company** Job No. **7237**

Boring No. **T-103** Sample: **CBR** Depth(ft): Location:

Soil Type: **Fat Clay (CH)**

As Received W.C. (%): **28.8** LL: PL: PI: Specific Gravity: **2.67** *Assumed

	◆	△		◆	△
Maximum Dry Density (pcf):	95.2		Opt. Water Content (%):	25.3	



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SET-R18a

Moisture Density Curve ASTM: D698, Method B

Project: **Blue Creek** Date: **10/28/09**

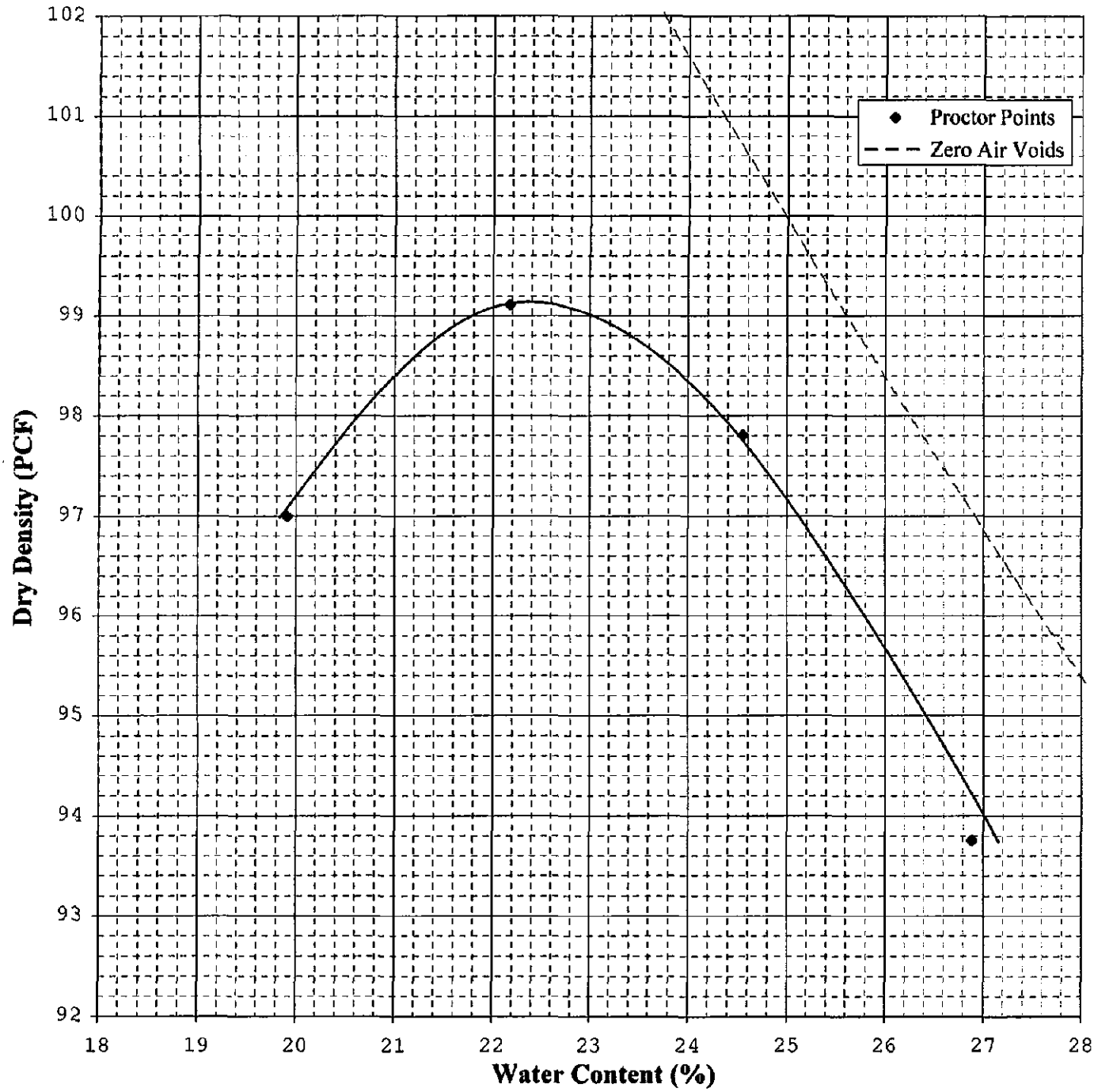
Client: **Barr Engineering Company** Job No. **7237**

Boring No. **T-148** Sample: **CBR** Depth(ft): **0-1** Location:

Soil Type: **Fat Clay (CH/CL)**

As Received W.C. (%): **25.5** LL: PL: PI: Specific Gravity: **2.67** *Assumed

	◆	△		◆	△
Maximum Dry Density (pcf):	99.2		Opt. Water Content (%):	22.4	



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SET-R18a

Moisture Density Curve ASTM: D698, Method B

Project: **Blue Creek** Date: **11/4/09**

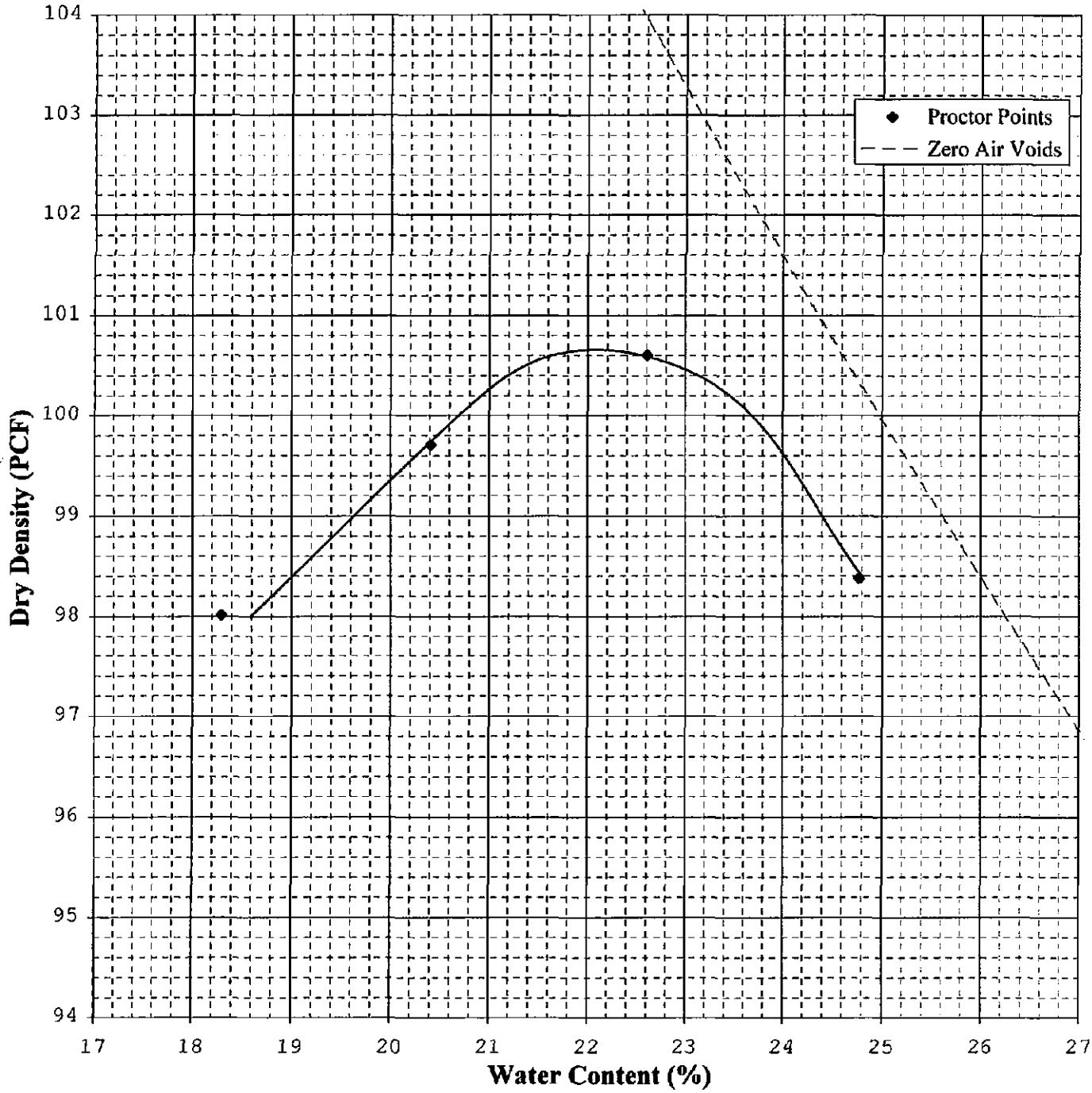
Client: **Barr Engineering Company** Job No. **7237**

Boring No. **T-22** Sample: **Thermal** Depth(ft): **3-5** Location:

Soil Type: **Fat Clay (CH)**

As Received W.C. (%): **22.6** LL: PL: PI: Specific Gravity: **2.67** *Assumed

Maximum Dry Density (pcf): **100.7** Opt. Water Content (%): **22.1**



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Moisture Density Curve ASTM: D698, Method B

Project: **Blue Creek** Date: **11/4/09**

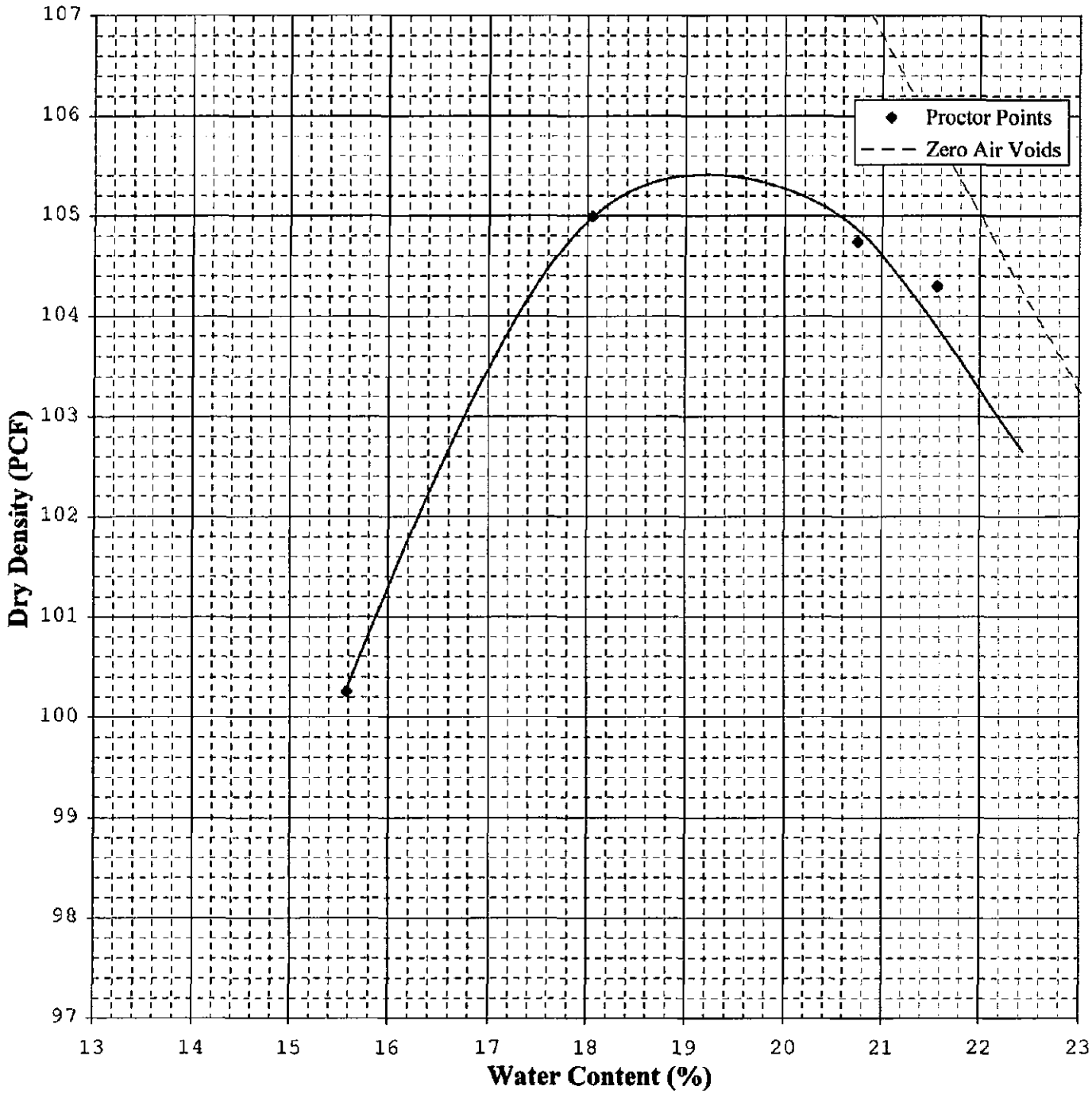
Client: **Barr Engineering Company** Job No. **7237**

Boring No. **T-42** Sample: **Thermal** Depth(ft): **3-5** Location:

Soil Type: **Lean Clay (CL/CH)**

As Received W.C. (%): **20.2** LL: PL: PI: Specific Gravity: **2.67** *Assumed

Maximum Dry Density (pcf): **105.4** Opt. Water Content (%): **19.2**



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SET-R18a

Moisture Density Curve ASTM: D698, Method B

Project: **Blue Creek** Date: **11/4/09**

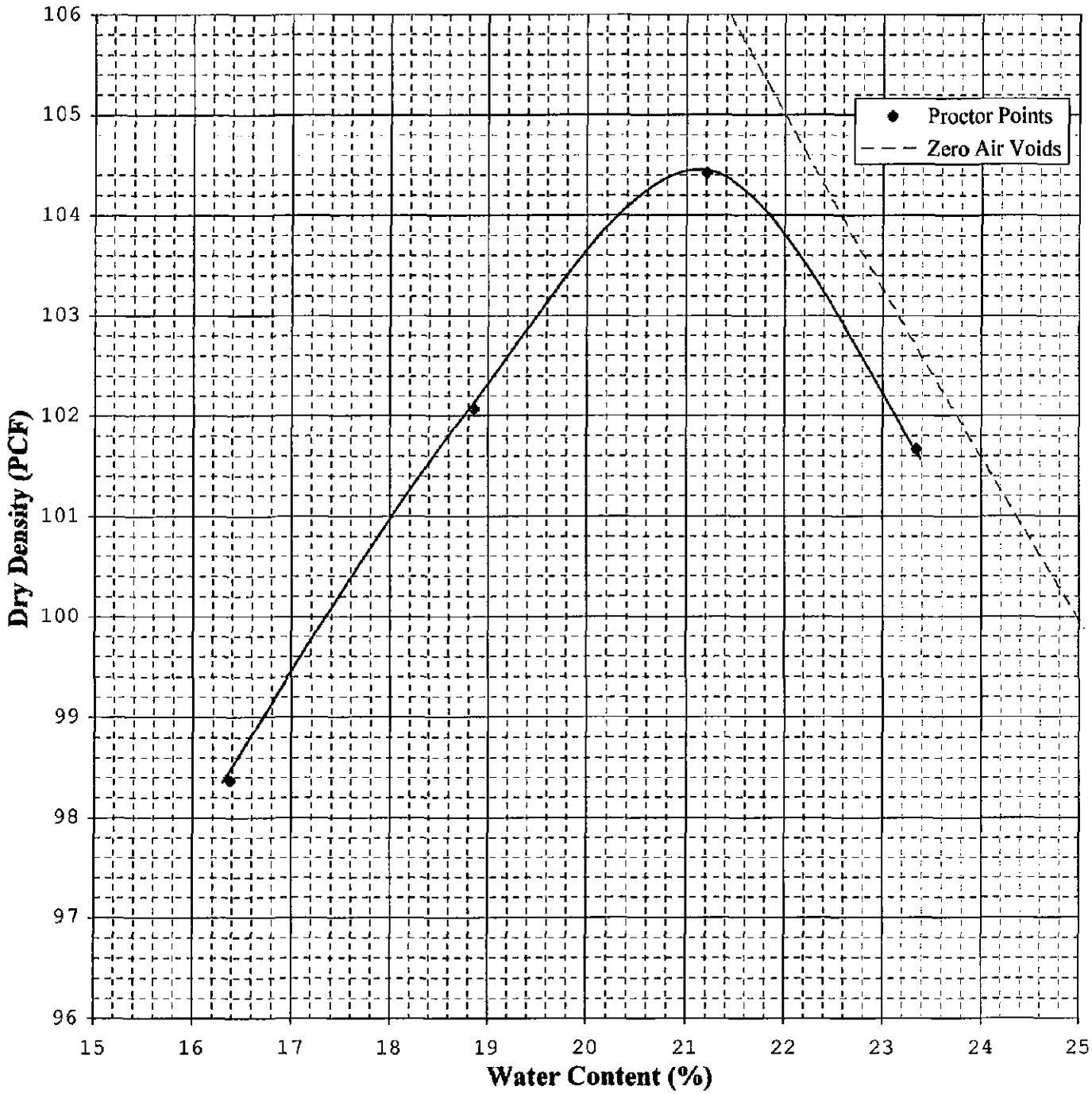
Client: **Barr Engineering Company** Job No. **7237**

Boring No. **T-103** Sample: **Thermal** Depth(ft): **3-5** Location:

Soil Type: **Lean Clay (CL/CH)**

As Received W.C. (%): **21.0** LL: PL: PI: Specific Gravity: **2.67** *Assumed

Maximum Dry Density (pcf): **104.4** Opt. Water Content (%): **21.1**



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SET-R18a

Moisture Density Curve ASTM: D698, Method B

Project: **Blue Creek** Date: **11/4/09**

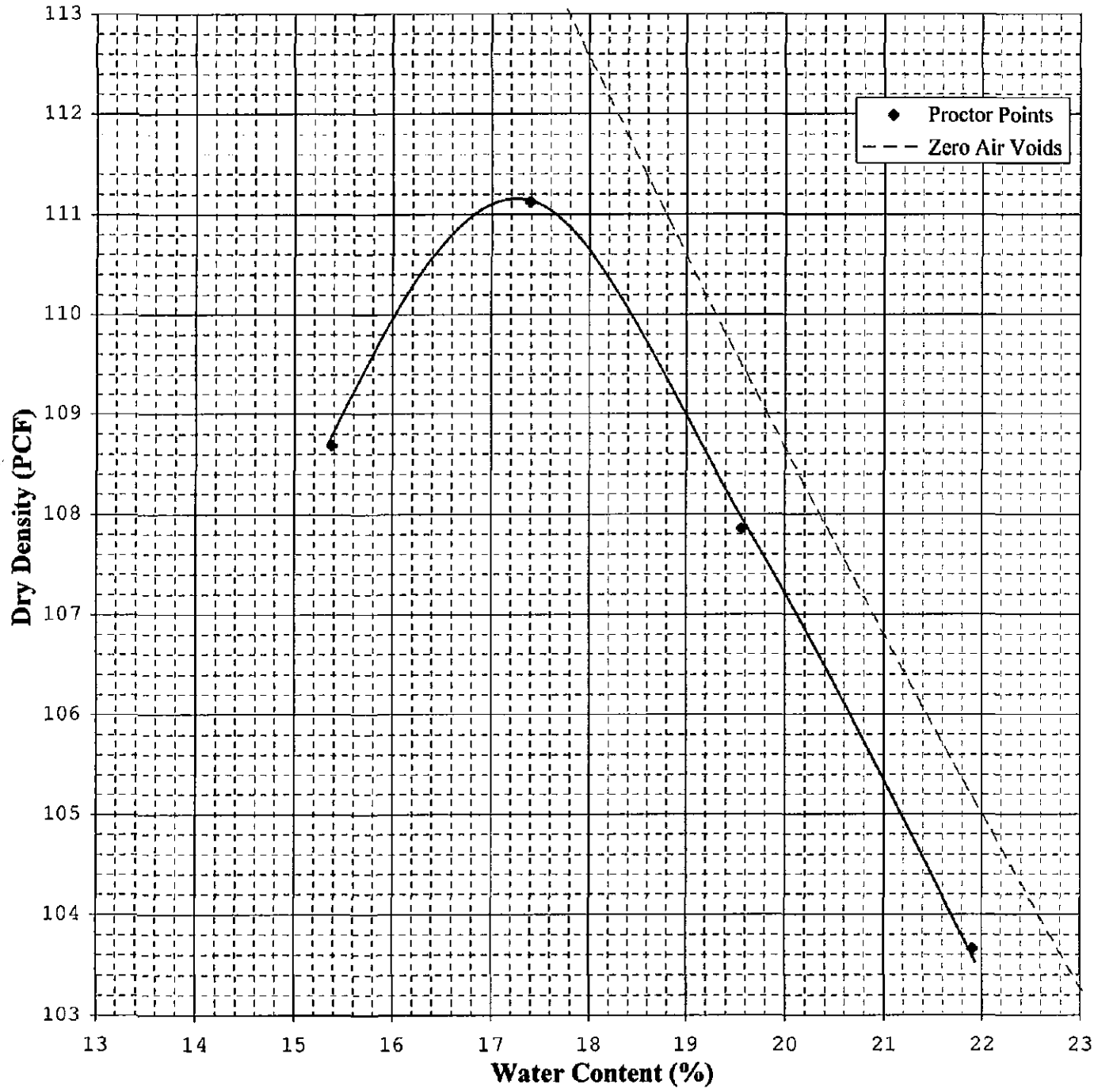
Client: **Barr Engineering Company** Job No. **7237**

Boring No. **T-120** Sample: **Thermal** Depth(ft): **3-5** Location:

Soil Type: **Lean Clay w/sand (CL)**

As Received	W.C. (%):	LL:	PL:	PI:	Specific Gravity:	*Assumed
◆	**19.8**		△		◆ **2.67**	△

Maximum Dry Density (pcf): **111.1** Opt. Water Content (%): **17.3**



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SET-R18a

Moisture Density Curve ASTM: D698, Method B

Project: **Blue Creek** Date: **11/4/09**

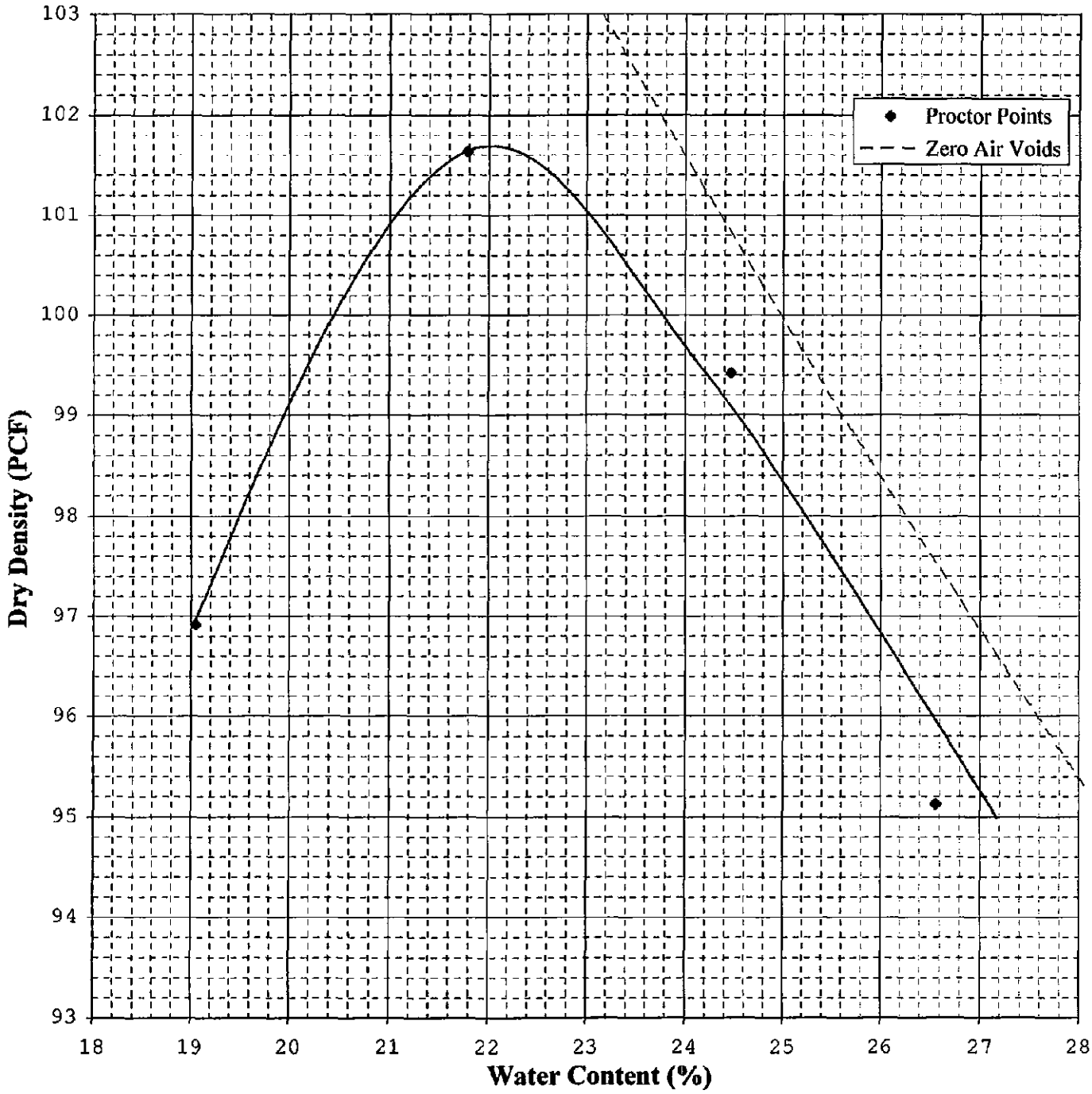
Client: **Barr Engineering Company** Job No. **7237**

Boring No. **Sub-West** Sample: **Thermal** Depth(ft): **2-5** Location:

Soil Type: **Fat Clay (CH)**

As Received W.C. (%): **27.4** LL: PL: PI: Specific Gravity: **2.67** *Assumed

Maximum Dry Density (pcf): **101.7** Opt. Water Content (%): **22.1**



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SET-R18a

Thermal Resistivity Report ASTM D:5334

Project: **Blue Creek** Job #: **7237**

Client: **Barr Engineering Company** Date: **11/16/09**

Boring	Sample	Location	Depth	Type	Classification	Initial Conditions			Dry
						Dry Density (PCF)	WC (%)	Thermal Resistivity (°C-cm/W)	Thermal Resistivity (°C-cm/W)
T-22			3-5	Bucket	Fat Clay (CH)	86.5	21.9%	89	219
T-42			3-5	Bucket	Lean Clay (CL/CH)	90.2	19.6%	97	228
T-103			3-5	Bucket	Lean Clay (CL/CH)	89.1	20.7%	87	217
T-120			3-5	Bucket	Lean Clay w/sand (CL)	94.7	19.7%	86	241
Sub-West			2-5	Bucket	Fat Clay (CH)	86.9	26.8%	74	189

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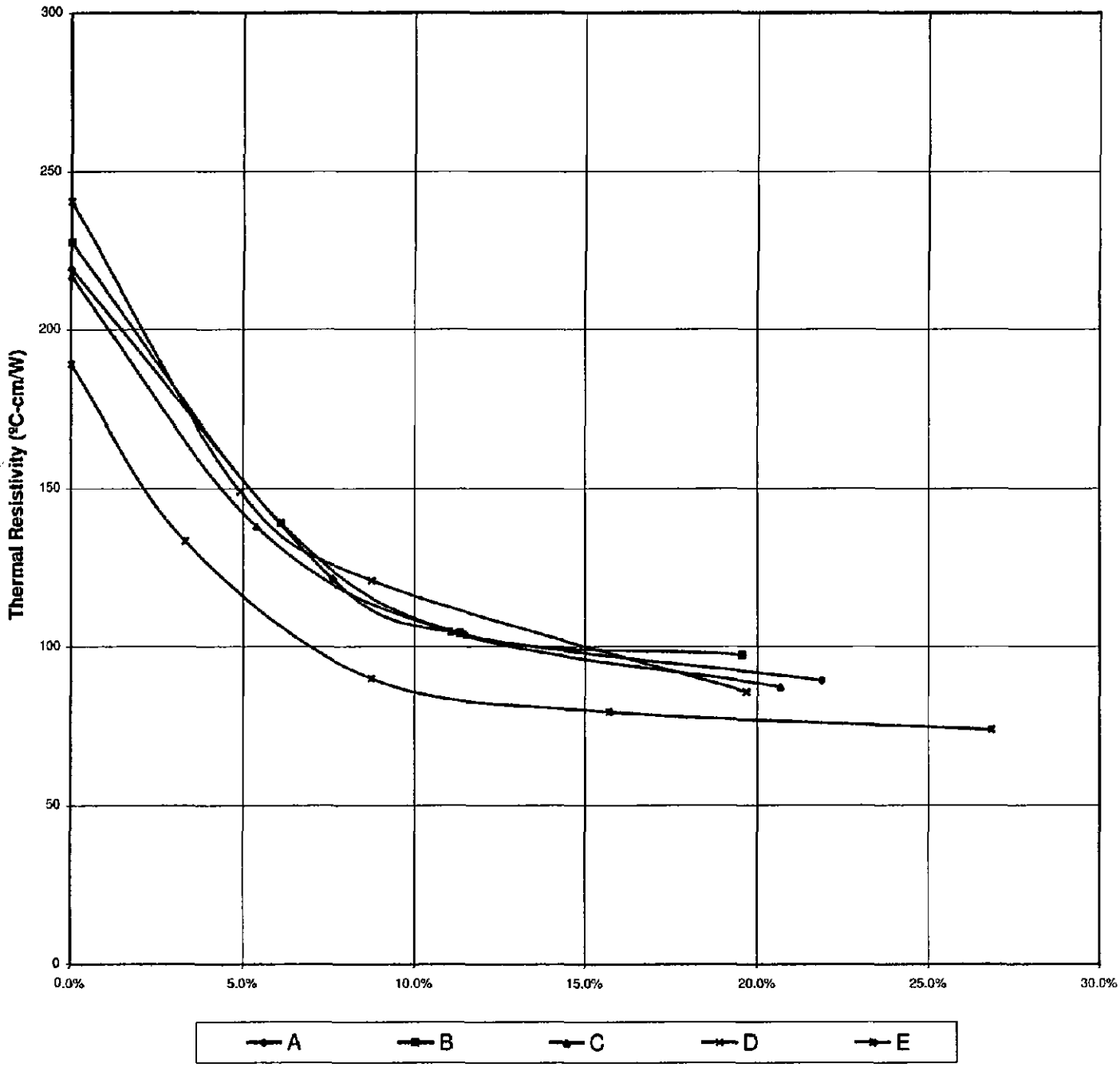
Thermal Resistivity Report ASTM D:5334

Project: Blue Creek — Job: 7237

Client: Barr Engineering Company — Date: 11/16/09

	Boring	Sample		Boring	Sample
Specimen A:	T-22		Specimen F:		
Specimen B:	T-42		Specimen G:		
Specimen C:	T-103		Specimen H:		
Specimen D:	T-120		Specimen I:		
Specimen E:	Sub-West		Specimen J:		

Thermal Dryout Curves (Resistivity vs. Water Content)



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California Bearing Ratio ASTM:D1883

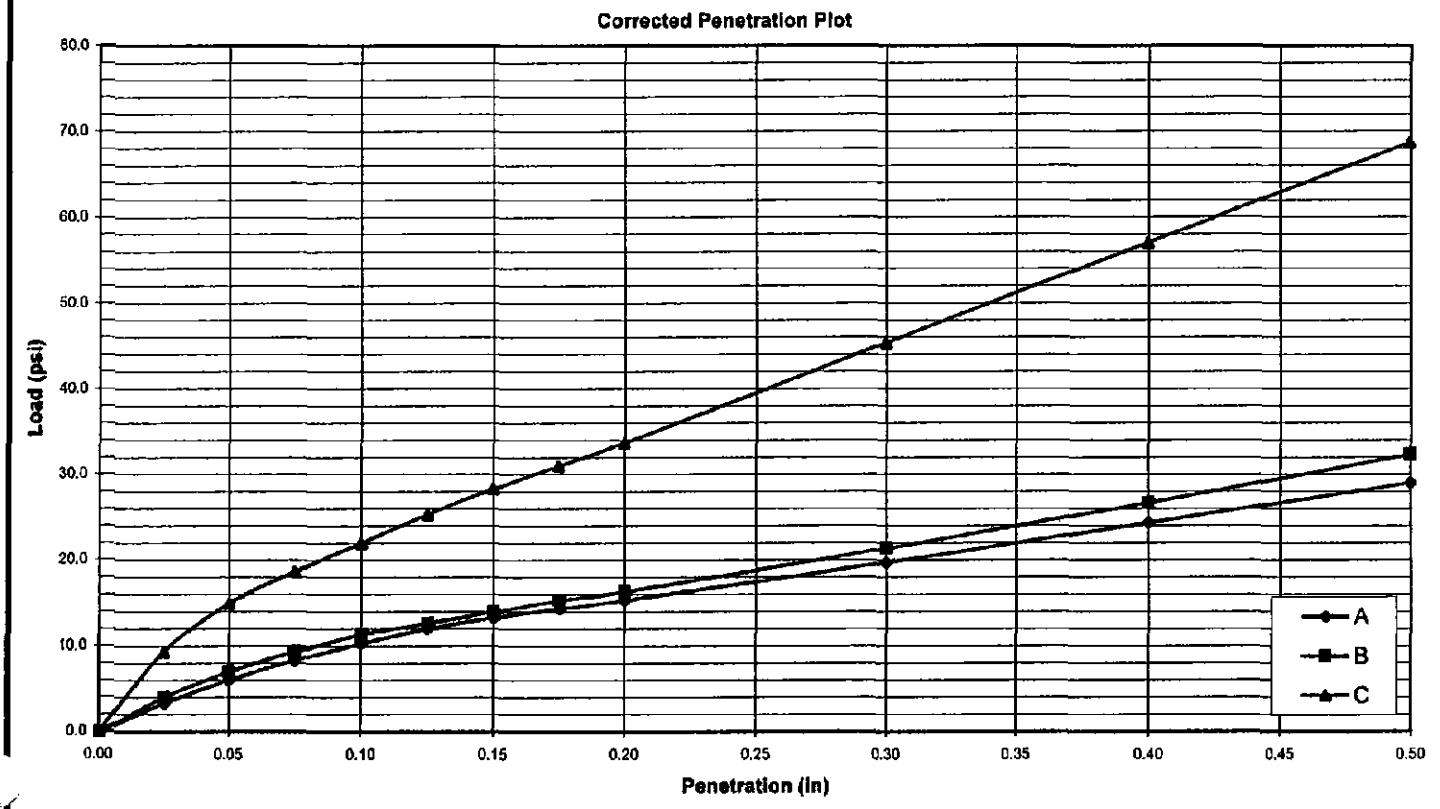
Project:	Blue Creek	Job:	7237
Client:	Barr Engineering Company	Date:	11/6/09

Boring #: T-22	Procedural Method:
Sample:	Specimens compacted to approximately 90%, 95% and 98% of maximum standard proctor density at optimum moisture content. Specimens soaked for a period of 4 days before CBR test was performed.
Depth (ft): 0-1 Type: Bulk	
Location:	
Classification: Fat Clay (CH)	

Laboratory Moisture-Density Values		Index Properties	
Method:	ASTM:D698 Method B	LL:	Gs:
Maximum Dry Density (PCF):	98.6	PL:	Organic Content:
Optimum Water Content:	23.0%	PI:	pH:

Initial Molding Conditions			
Specimen	A	B	C
Compaction Hammer:	5 lb	5 lb	5 lb
Number of Layers:	3	3	3
Blows per Layer:	NA	NA	NA
Initial Moisture Content:	23.0%	23.0%	23.0%
Initial Dry Density (PCF)	89.4	92.4	96.0
Relative Compaction	90.7%	93.7%	97.4%
Soaking Phase			
Days Soaked	4	4	4
Surcharge (psf)	50	50	50
Total Swell (%)	4.0%	3.9%	3.0%
Penetration Phase			
Surcharge (psf)	50	50	50
Corrected CBR Values			
at 0.1 inch (%)	1.0%	1.1%	2.2%
at 0.2 inch (%)	1.0%	1.1%	2.2%
Moisture Content After Penetration			
Top 1" of Specimen:	31.4%	31.0%	28.4%
Average of specimen:	28.1%	27.2%	25.6%

Stress vs. Penetration Graph



SOIL ENGINEERING TESTING, INC.

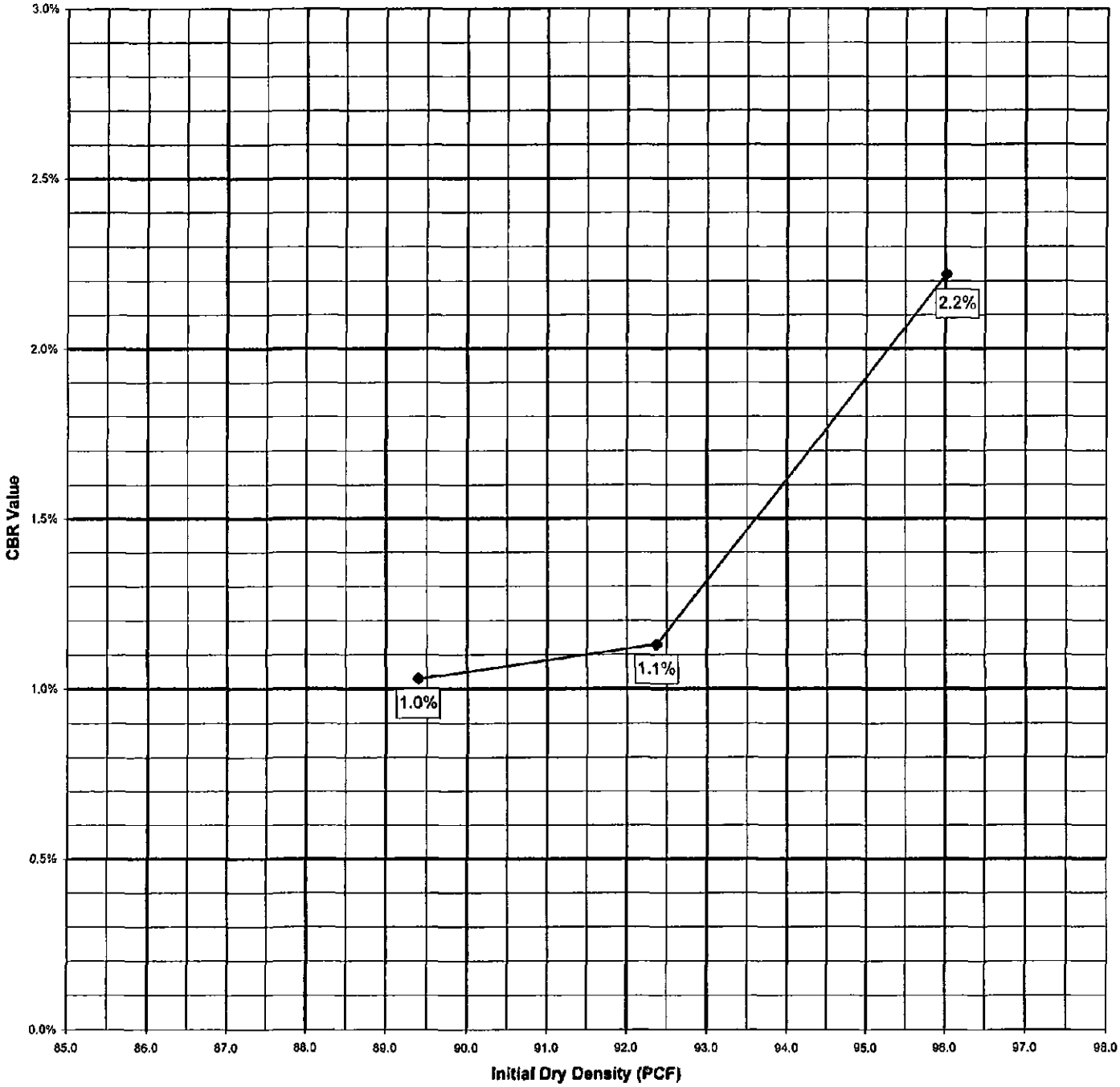
California Bearing Ratio ASTM:D1883

Project:	Blue Creek	Job:	7237
Client:	Barr Engineering Company	Date:	11/6/09

Boring #: T-22	Procedural Method:
Sample:	Specimens compacted to approximately 90%, 95% and 98% of maximum standard proctor density at optimum moisture content. Specimens soaked for a period of 4 days before CBR test was performed.
Depth (ft): 0-1 Type: Bulk	
Location:	
Classification: Fat Clay (CH)	

Test Plot

Dry Density vs CBR



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California Bearing Ratio ASTM:D1883

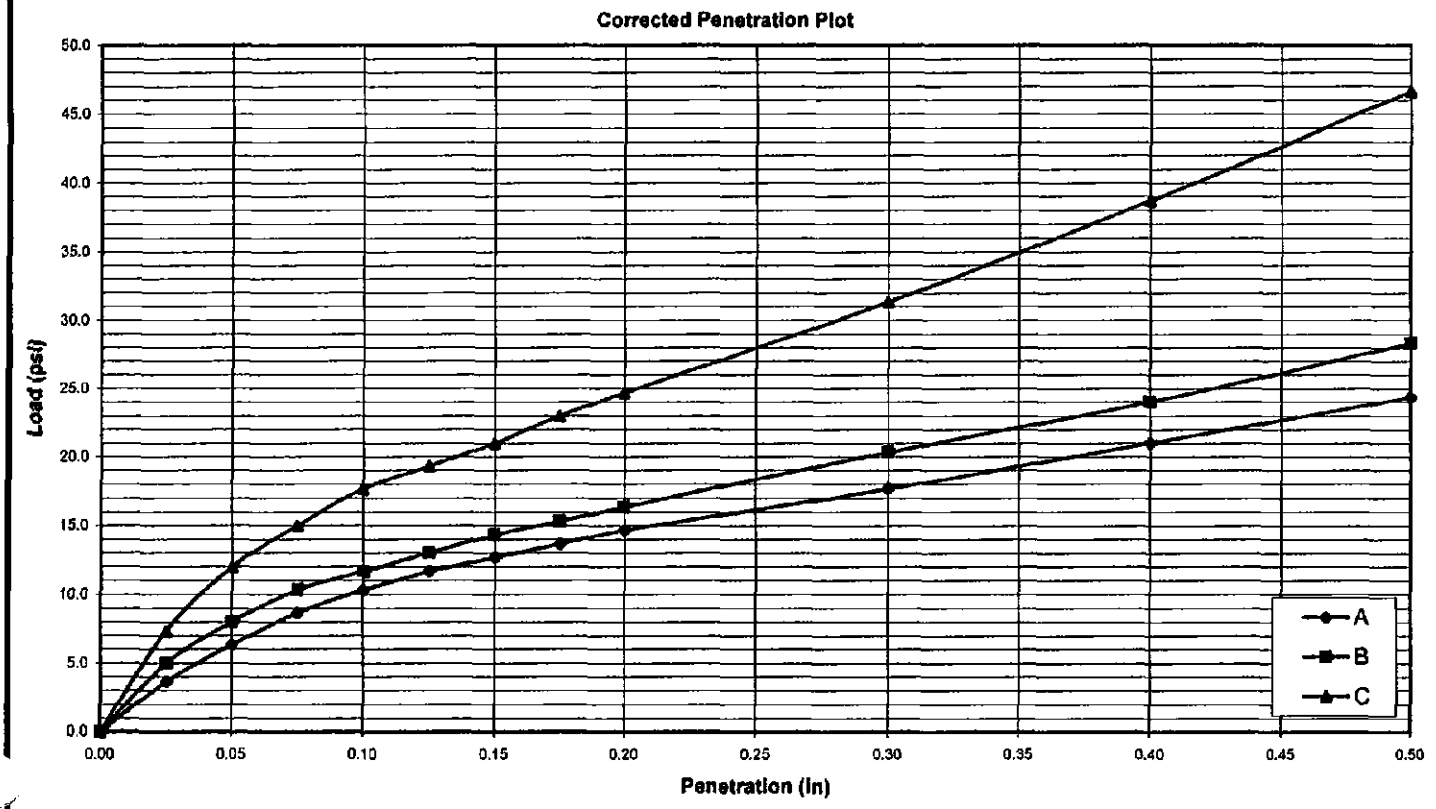
Project:	Blue Creek	Job:	7237
Client:	Barr Engineering Company	Date:	11/6/09

Boring #: T-42	Procedural Method:
Sample:	Specimens compacted to approximately 90%, 95% and 98% of maximum standard proctor density at optimum moisture content. Specimens soaked for a period of 4 days before CBR test was performed.
Depth (ft): 0-2 Type: Bulk	
Location:	
Classification: Fat Clay (CH)	

Laboratory Moisture-Density Values		Index Properties	
Method:	ASTM:D698 Method B	LL:	Gs:
Maximum Dry Density (PCF):	96.9	PL:	Organic Content:
Optimum Water Content:	23.6%	PI:	pH:

Initial Molding Conditions			
Specimen	A	B	C
Compaction Hammer:	5 lb	5 lb	5 lb
Number of Layers:	3	3	3
Blows per Layer:	NA	NA	NA
Initial Moisture Content:	23.6%	23.6%	23.6%
Initial Dry Density (PCF)	87.4	91.8	94.6
Relative Compaction	90.1%	94.7%	97.6%
Soaking Phase			
Days Soaked	4	4	4
Surcharge (psf)	50	50	50
Total Swell (%)	3.6%	3.9%	3.5%
Penetration Phase			
Surcharge (psf)	50	50	50
Corrected CBR Values			
at 0.1 inch (%)	**1.0%**	**1.2%**	**1.8%**
at 0.2 inch (%)	1.0%	1.1%	1.6%
Moisture Content After Penetration			
Top 1" of Specimen:	34.9%	33.5%	31.1%
Average of specimen:	30.9%	28.9%	27.1%

Stress vs. Penetration Graph



SOIL ENGINEERING TESTING, INC.

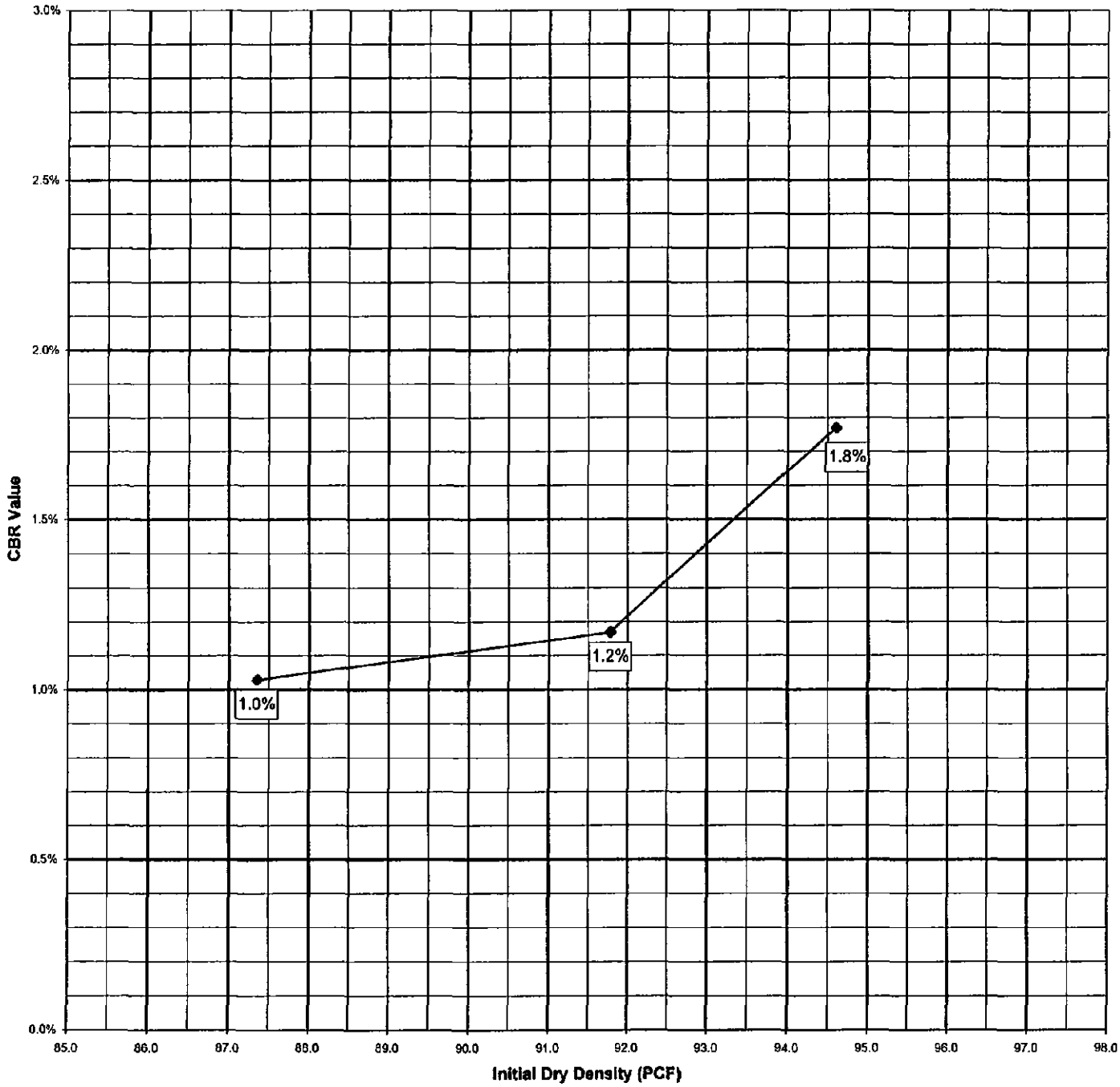
California Bearing Ratio ASTM:D1883

Project:	Blue Creek	Job:	7237
Client:	Barr Engineering Company	Date:	11/6/09

Boring #: T-42	Procedural Method:
Sample:	Specimens compacted to approximately 90%, 95% and 98% of maximum standard proctor density at optimum moisture content. Specimens soaked for a period of 4 days before CBR test was performed.
Depth (ft): 0-2 Type: Bulk	
Location:	
Classification: Fat Clay (CH)	

Test Plot

Dry Density vs CBR



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California Bearing Ratio ASTM:D1883

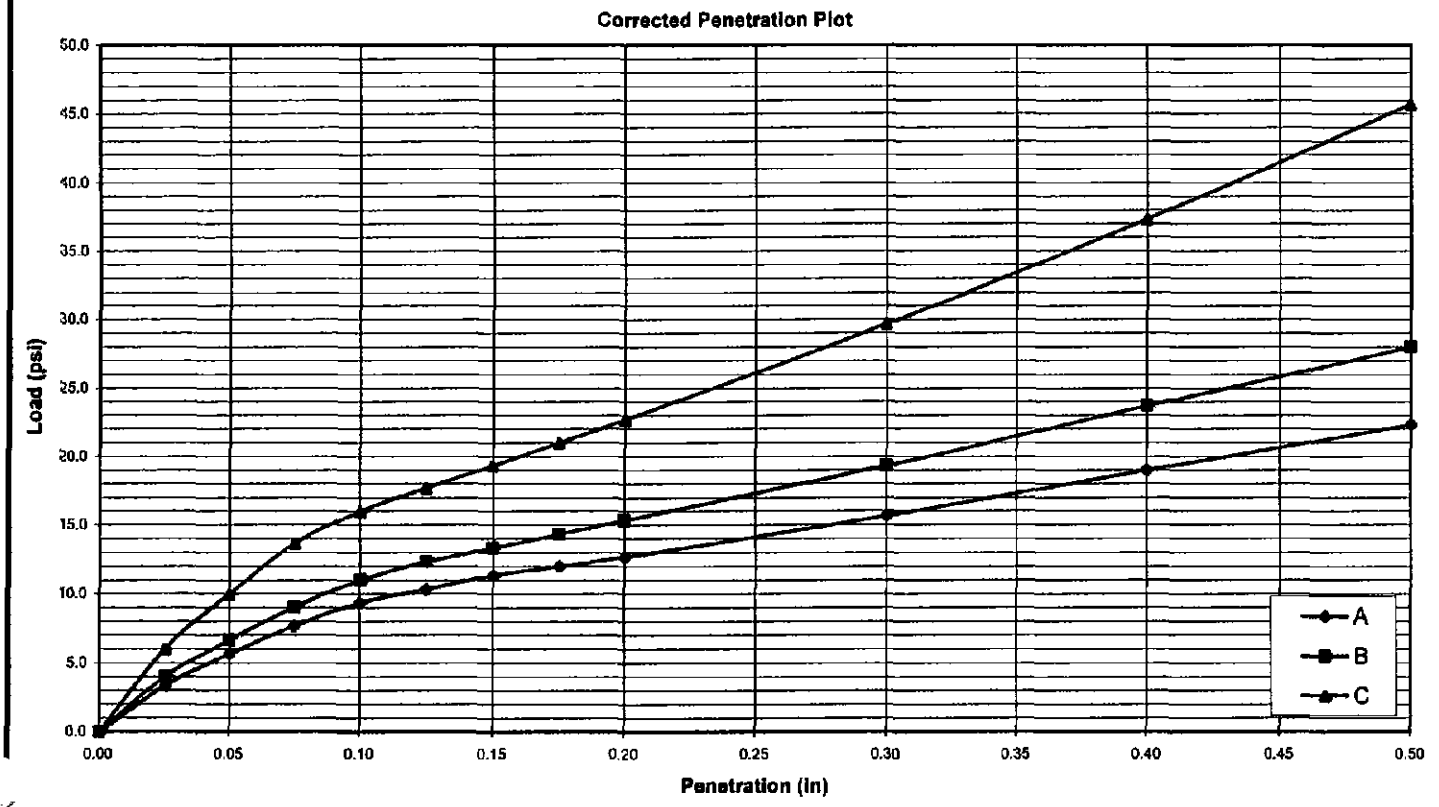
Project:	Blue Creek	Job:	7237
Client:	Barr Engineering Company	Date:	11/6/09

Boring #: T-71	Procedural Method:
Sample:	Specimens compacted to approximately 90%, 95% and 98% of maximum standard proctor density at optimum moisture content. Specimens soaked for a period of 4 days before CBR test was performed.
Depth (ft): 0-1 Type: Bulk	
Location:	
Classification: Fat Clay (CH)	

Laboratory Moisture-Density Values		Index Properties	
Method:	ASTM:D698 Method B	LL:	Gs:
Maximum Dry Density (PCF):	95.8	PL:	Organic Content:
Optimum Water Content:	24.9%	PI:	pH:

Initial Molding Conditions			
Specimen	A	B	C
Compaction Hammer:	5 lb	5 lb	5 lb
Number of Layers:	3	3	3
Blows per Layer:	NA	NA	NA
Initial Moisture Content:	24.9%	24.9%	24.9%
Initial Dry Density (PCF)	86.0	90.5	93.1
Relative Compaction	89.8%	94.5%	97.1%
Soaking Phase			
Days Soaked	4	4	4
Surcharge (psf)	50	50	50
Total Swell (%)	3.9%	3.8%	2.9%
Penetration Phase			
Surcharge (psf)	50	50	50
Corrected CBR Values			
at 0.1 inch (%)	0.9%	1.1%	1.6%
at 0.2 inch (%)	0.8%	1.0%	1.5%
Moisture Content After Penetration			
Top 1" of Specimen:	34.2%	32.9%	29.4%
Average of specimen:	31.1%	29.3%	27.4%

Stress vs. Penetration Graph



SOIL ENGINEERING TESTING, INC.

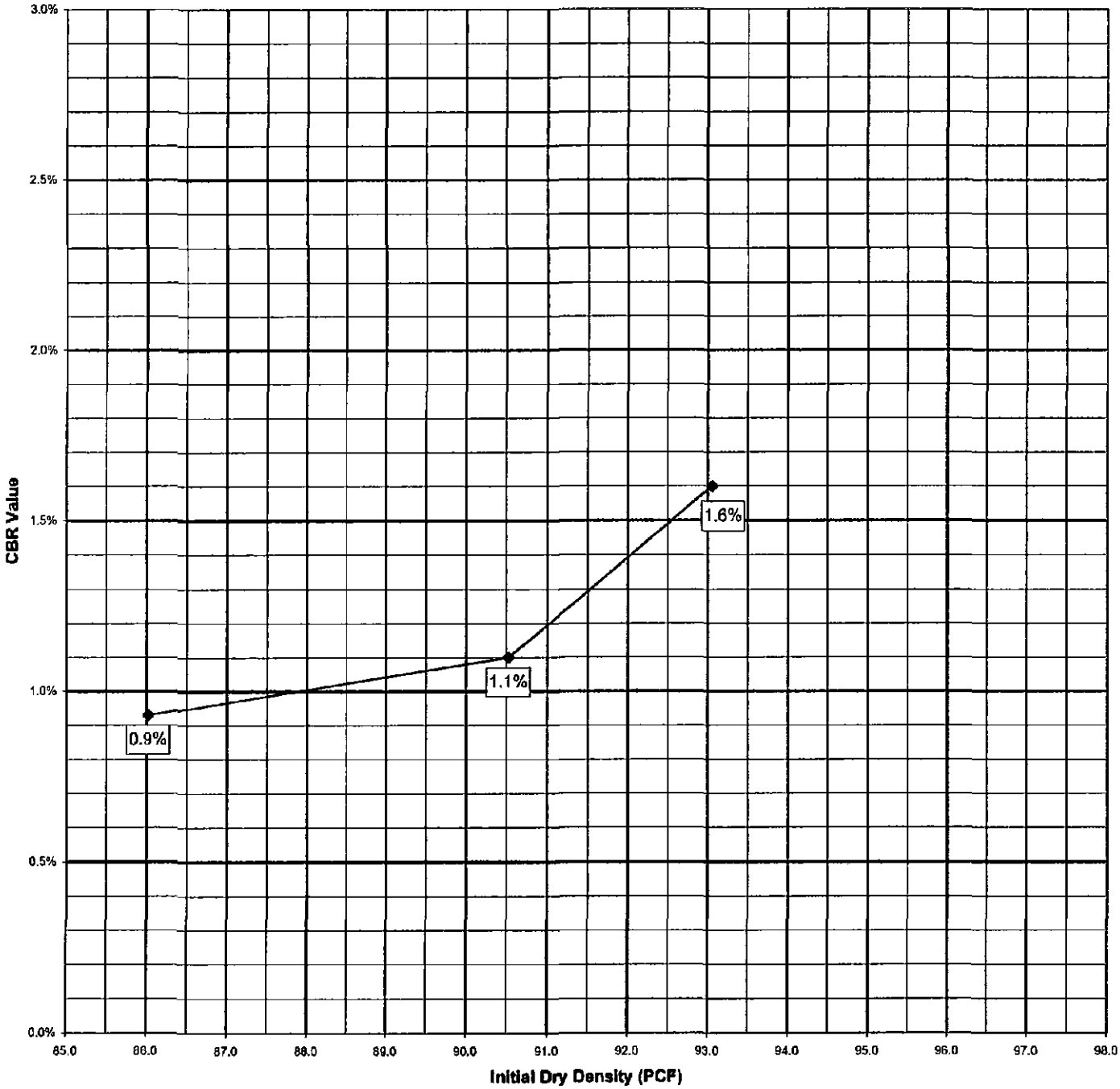
California Bearing Ratio ASTM:D1883

Project:	Blue Creek	Job:	7237
Client:	Barr Engineering Company	Date:	11/6/09

Boring #: T-71	Procedural Method:
Sample:	Specimens compacted to approximately 90%, 95% and 98% of maximum standard proctor density at optimum moisture content. Specimens soaked for a period of 4 days before CBR test was performed.
Depth (ft): 0-1 Type: Bulk	
Location:	
Classification: Fat Clay (CH)	

Test Plot

Dry Density vs CBR



SOIL ENGINEERING TESTING, INC.

California Bearing Ratio ASTM:D1883

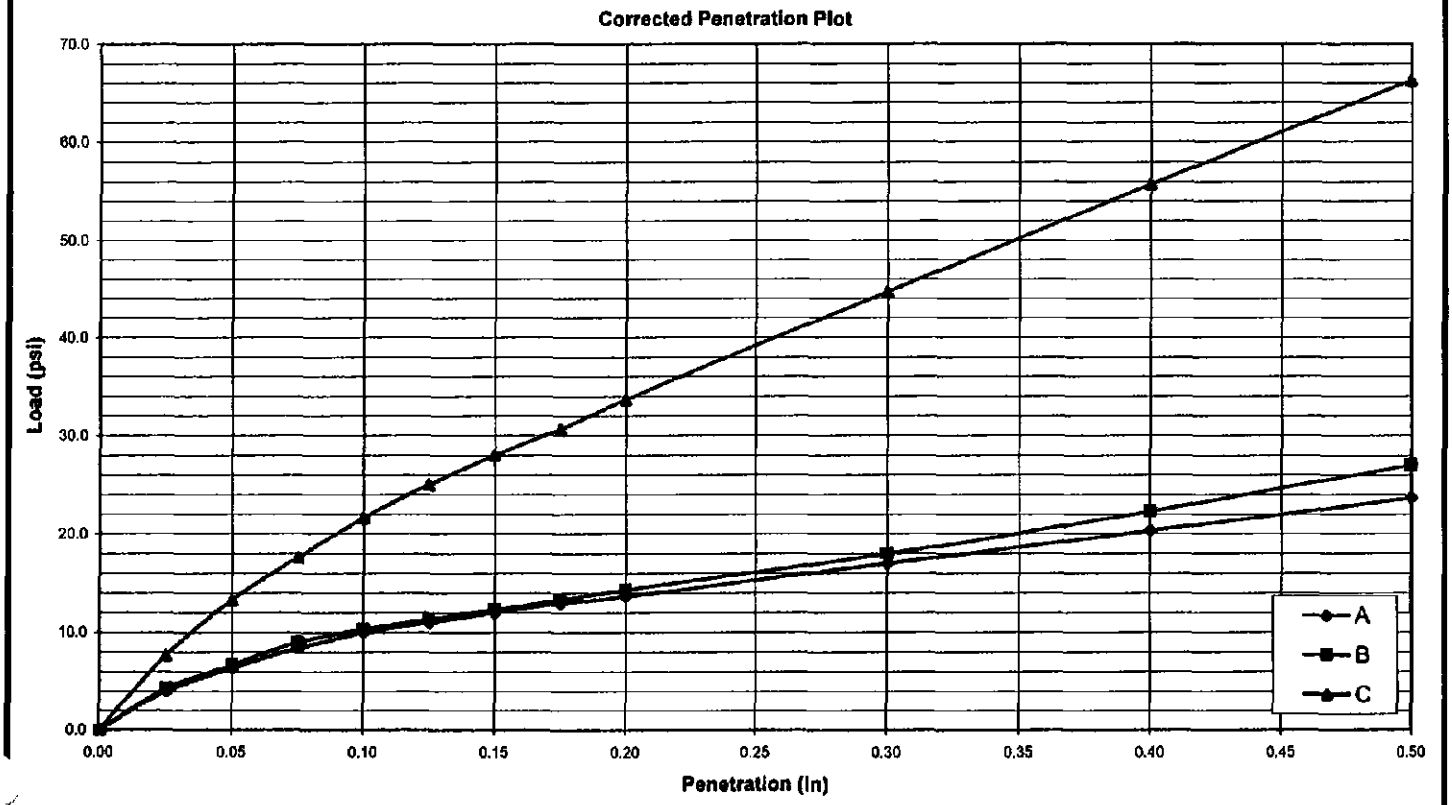
Project:	Blue Creek	Job:	7237
Client:	Barr Engineering Company	Date:	11/6/09

Boring #: T-103	Procedural Method:
Sample:	Specimens compacted to approximately 90%, 95% and 98% of maximum standard proctor density at optimum moisture content. Specimens soaked for a period of 4 days before CBR test was performed.
Depth (ft): Type: Bulk	
Location:	
Classification: Fat Clay (CH)	

Laboratory Moisture-Density Values		Index Properties	
Method:	ASTM:D698 Method B	LL:	Gs:
Maximum Dry Density (PCF):	95.2	PL:	Organic Content:
Optimum Water Content:	25.3%	PI:	pH:

Initial Molding Conditions			
Specimen	A	B	C
Compaction Hammer:	5 lb	5 lb	5 lb
Number of Layers:	3	3	3
Blows per Layer:	NA	NA	NA
Initial Moisture Content:	25.3%	25.3%	25.3%
Initial Dry Density (PCF)	85.7	90.1	92.8
Relative Compaction	90.1%	94.7%	97.5%
Soaking Phase			
Days Soaked	4	4	4
Surcharge (psf)	50	50	50
Total Swell (%)	3.7%	3.4%	2.5%
Penetration Phase			
Surcharge (psf)	50	50	50
Corrected CBR Values			
at 0.1 inch (%)	**1.0%**	**1.0%**	**2.2%**
at 0.2 inch (%)	0.9%	1.0%	2.2%
Moisture Content After Penetration			
Top 1" of Specimen:	34.6%	33.5%	30.0%
Average of specimen:	31.3%	29.4%	27.7%

Stress vs. Penetration Graph



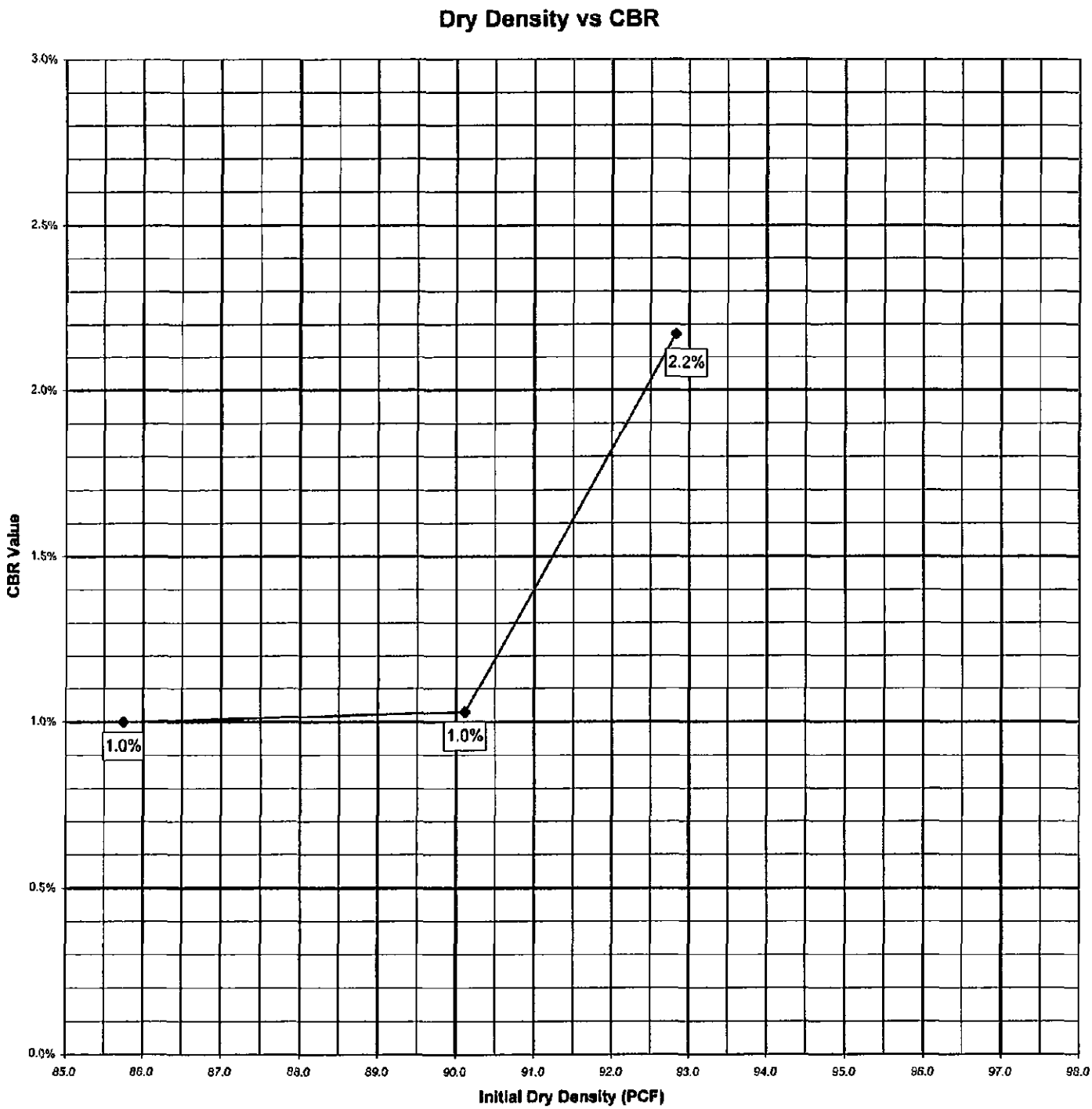
SOIL ENGINEERING TESTING, INC.

California Bearing Ratio ASTM:D1883

Project:	Blue Creek	Job:	7237
Client:	Barr Engineering Company	Date:	11/6/09

Boring #: T-103	Procedural Method:
Sample:	Specimens compacted to approximately 90%, 95% and 98% of maximum standard proctor density at optimum moisture content. Specimens soaked for a period of 4 days before CBR test was performed.
Depth (ft): Type: Bulk	
Location:	
Classification: Fat Clay (CH)	

Test Plot



SOIL ENGINEERING TESTING, INC.

California Bearing Ratio ASTM:D1883

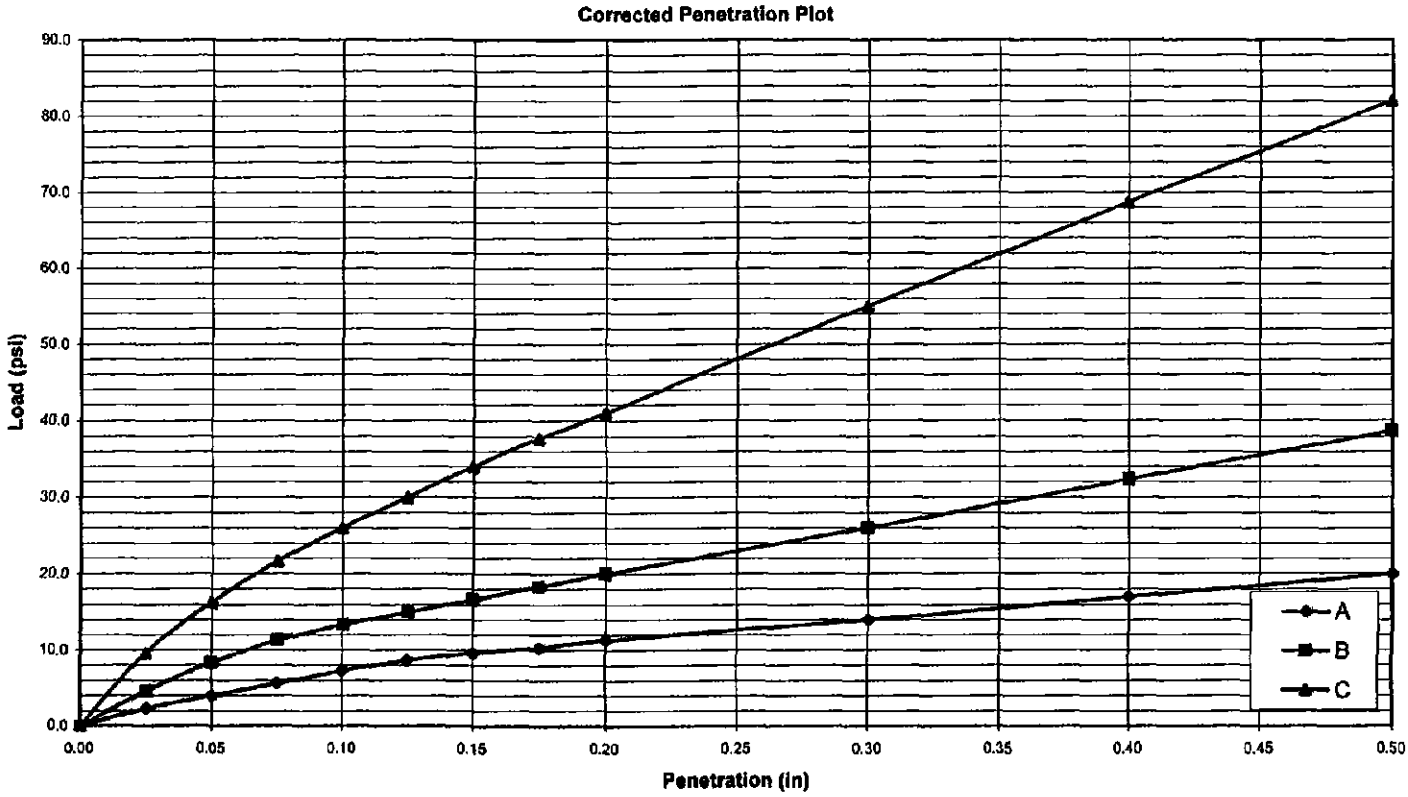
Project:	Blue Creek	Job:	7237
Client:	Barr Engineering Company	Date:	11/6/09

Boring #: T-148	Procedural Method:
Sample:	Specimens compacted to approximately 90%, 95% and 98% of maximum standard proctor density at optimum moisture content. Specimens soaked for a period of 4 days before CBR test was performed.
Depth (ft): 0-1 Type: Bulk	
Location:	
Classification: Fat Clay (CH/CL)	

Laboratory Moisture-Density Values		Index Properties	
Method:	ASTM:D698 Method B	LL:	Gs:
Maximum Dry Density (PCF):	99.2	PL:	Organic Content:
Optimum Water Content:	22.4%	PI:	pH:

Initial Molding Conditions			
Specimen	A	B	C
Compaction Hammer:	5 lb	5 lb	5 lb
Number of Layers:	3	3	3
Blows per Layer:	NA	NA	NA
Initial Moisture Content:	22.4%	22.4%	22.4%
Initial Dry Density (PCF)	89.3	94.2	97.1
Relative Compaction	90.0%	94.9%	97.9%
Soaking Phase			
Days Soaked	4	4	4
Surcharge (psf)	50	50	50
Total Swell (%)	3.6%	3.4%	2.4%
Penetration Phase			
Surcharge (psf)	50	50	50
Corrected CBR Values			
at 0.1 inch (%)	0.7%	1.3%	2.6%
at 0.2 inch (%)	0.8%	1.3%	2.7%
Moisture Content After Penetration			
Top 1" of Specimen:	32.6%	30.0%	27.0%
Average of specimen:	29.0%	26.7%	25.0%

Stress vs. Penetration Graph



SOIL ENGINEERING TESTING, INC.

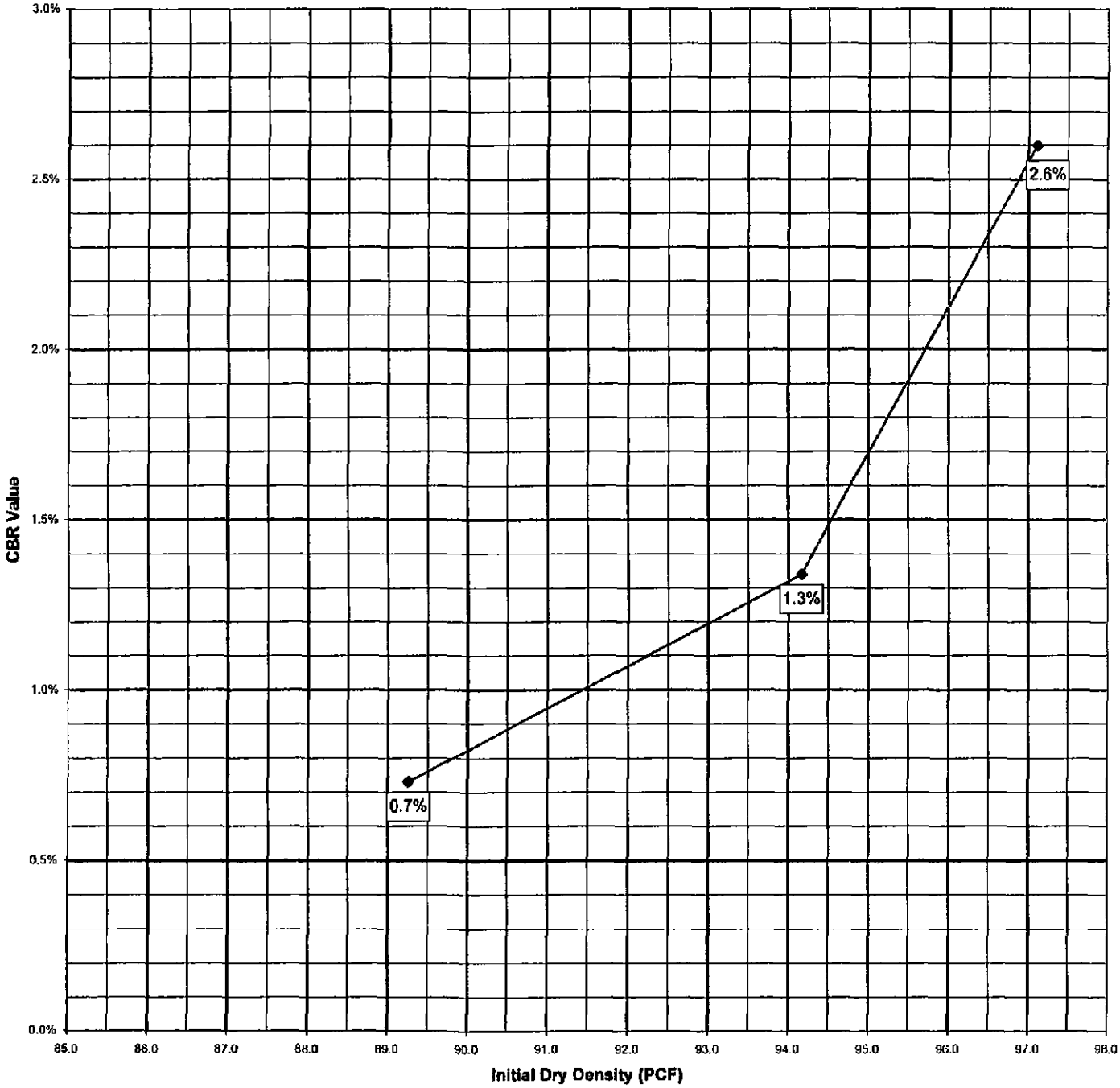
California Bearing Ratio ASTM:D1883

Project:	Blue Creek	Job:	7237
Client:	Barr Engineering Company	Date:	11/6/09

Boring #: T-148	Procedural Method:
Sample:	Specimens compacted to approximately 90%, 95% and 98% of maximum standard proctor density at optimum moisture content. Specimens soaked for a period of 4 days before CBR test was performed.
Depth (ft): 0-1 Type: Bulk	
Location:	
Classification: Fat Clay (CH/CL)	

Test Plot

Dry Density vs CBR



SOIL ENGINEERING TESTING, INC.

Storm Water Pollution Prevention Plan

for

Wind Turbine Generators, Access Roads, Drainage and Erosion Control

for

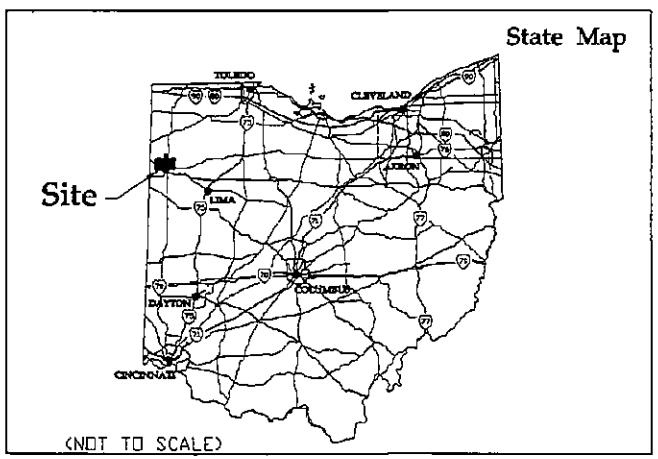
Blue Creek Wind Farm

Paulding & Van Wert Counties, Ohio

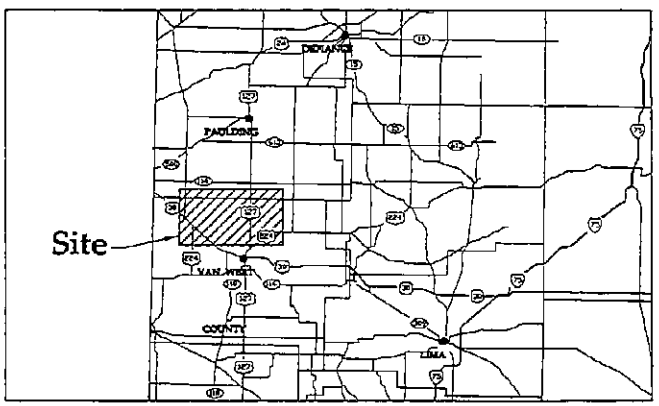
NO.	DATE	REVISION	SHEETS

SHEET LIST TABLE	
SHEET NUMBER	SHEET TITLE
1	COVER
2	OVERALL CIVIL SITE PLAN
3	CONSTRUCTION DETAILS
4	CONSTRUCTION DETAILS
5	CONSTRUCTION DETAILS
6	SWPPP DETAILS
7	CIVIL SITE PLAN
8	CIVIL SITE PLAN
9	CIVIL SITE PLAN
10	CIVIL SITE PLAN
11	CIVIL SITE PLAN
12	CIVIL SITE PLAN
13	CIVIL SITE PLAN
14	CIVIL SITE PLAN
15	CIVIL SITE PLAN
16	CIVIL SITE PLAN
17	CIVIL SITE PLAN
18	CIVIL SITE PLAN
19	CIVIL SITE PLAN
20	CIVIL SITE PLAN
21	CIVIL SITE PLAN
22	CIVIL SITE PLAN
23	CIVIL SITE PLAN

State Map



Vicinity Map



Westwood

Project: ABC
Checked: DSB
Drawn: ABC

Revisions:
#	DATE	DESCRIPTION

Prepared for:

IBERDROLA RENEWABLES
1125 Northwest Couch, Suite 700
Portland, Oregon 97209

Blue Creek Wind Farm
Paulding & Van Wert Counties, Ohio

Cover

SWPP PLAN
NOT FOR CONSTRUCTION

Date: 12/01/09
Sheet: 1 OF 23

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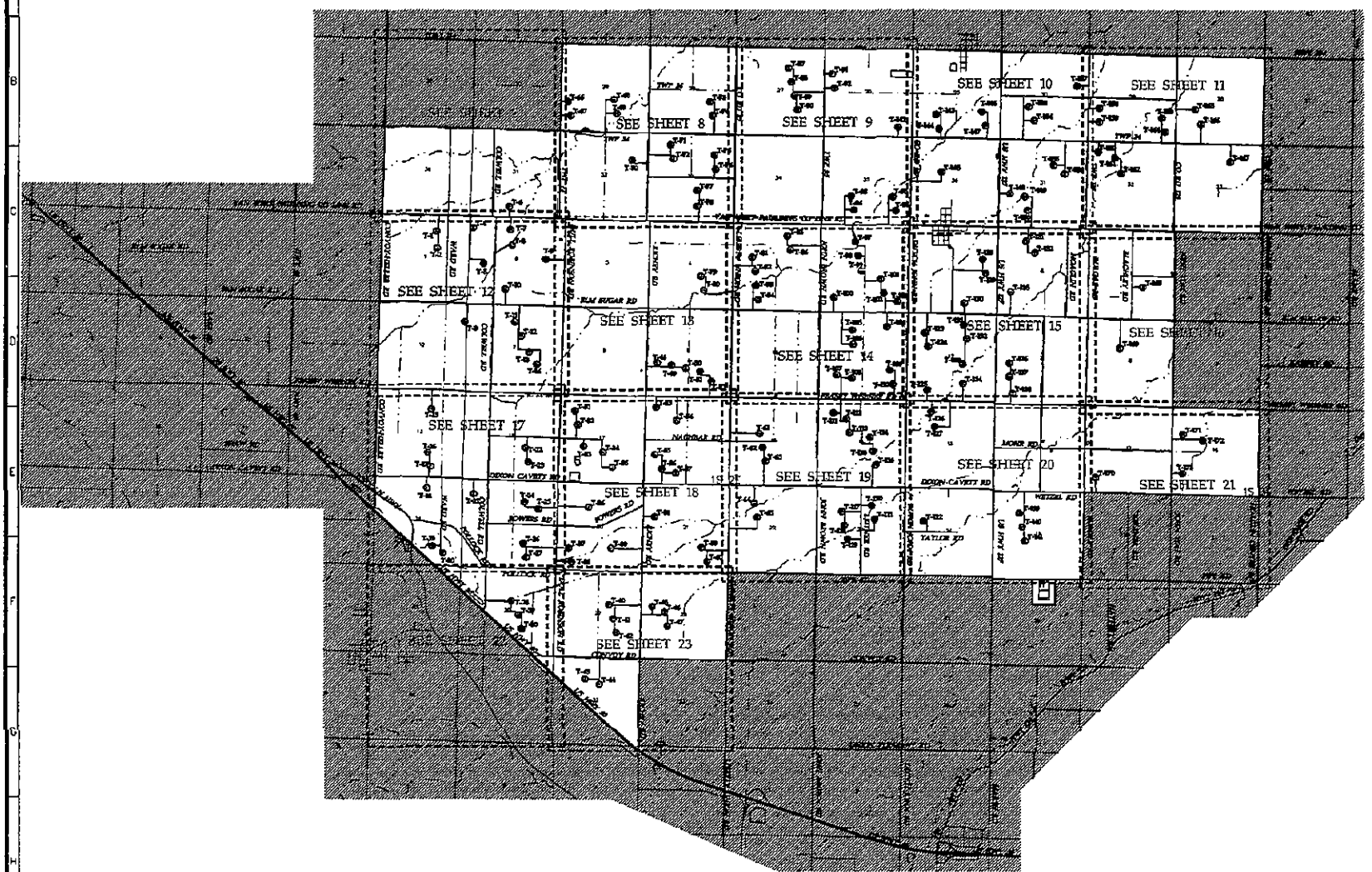


Westwood

Prepared for:

IBERDROLA RENEWABLES
1125 Northwest Couch, Suite 700
Portland, Oregon 97209

LEGEND:

- TURBINE LOCATION
- T-XX TURBINE NUMBER
- PROPOSED ACCESS ROADS
- EXISTING STREAMS

N

0' 3000' 6000' 9000'

Blue Creek Wind Farm

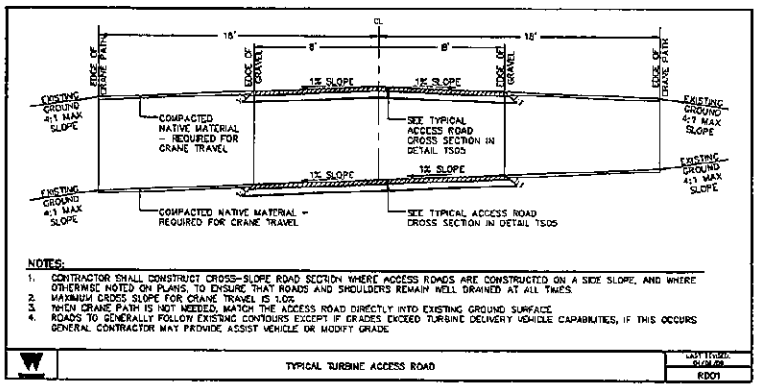
Paulding & Van Wert Counties, Ohio

Overall Civil Site Plan

SWPP PLAN
NOT FOR CONSTRUCTION

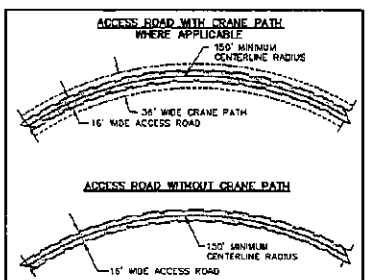
Date: 12/01/09

Sheet: 2 OF 23



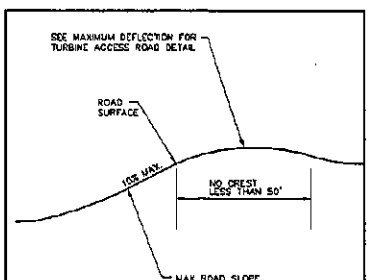
NOTES:
1. CONTRACTOR SHALL CONSTRUCT CROSS-SLOPE ROAD SECTION WHERE ACCESS ROADS ARE CONSTRUCTED ON A SIDE SLOPE, AND WHERE OTHERWISE NOTED ON PLANS, TO ENSURE THAT ROADS AND SHOULDERS REMAIN WELL DRAINED AT ALL TIMES.
2. MAXIMUM CROSS SLOPE FOR CRANE TRAVEL IS 1.0%.
3. WHEN CRANE PATH IS NOT NEEDED, MATCH THE ACCESS ROAD DIRECTLY INTO EXISTING GROUND SURFACE.
4. ROADS TO GENERALLY FOLLOW EXISTING CONTOURS EXCEPT IF GRADES EXCEED TURBINE DELIVERY VEHICLE CAPABILITIES, IF THIS OCCURS GENERAL CONTRACTOR MAY PROVIDE ASSIST VEHICLE OR MODIFY GRADE.

TYPICAL TURBINE ACCESS ROAD — RD01

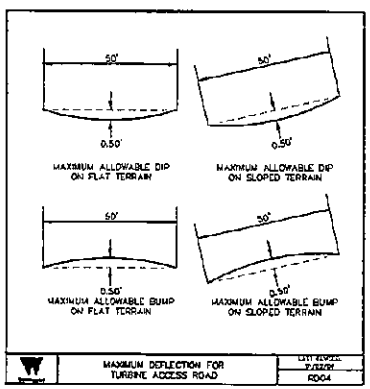


NOTE:
1. SOME RADII MAY REQUIRE ADDITIONAL SOIL COMPACTION OR GRAVEL OUTSIDE OF THE WIDTH SHOWN ABOVE TO ACCOMMODATE TRACTORS OR TRAILERS TRACKING OFF THE ACCESS ROAD.

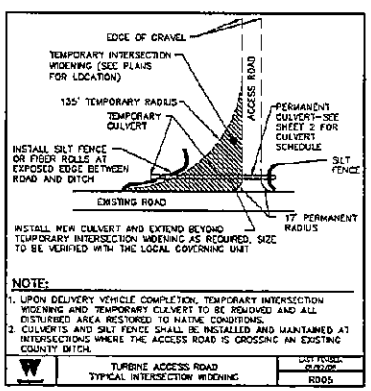
MINIMUM RADIUS FOR TURBINE ACCESS ROAD — RD02



MAXIMUM VERT. SLOPE FOR TURBINE ACCESS ROAD/CRANE TRAVEL PATH — RD03

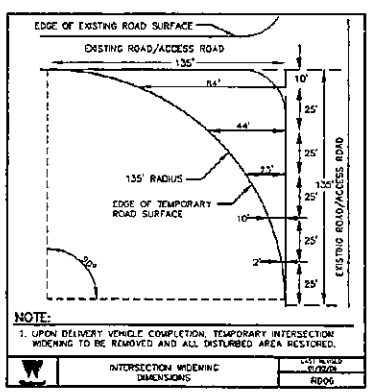


MAXIMUM DEFLECTION FOR TURBINE ACCESS ROAD — RD04



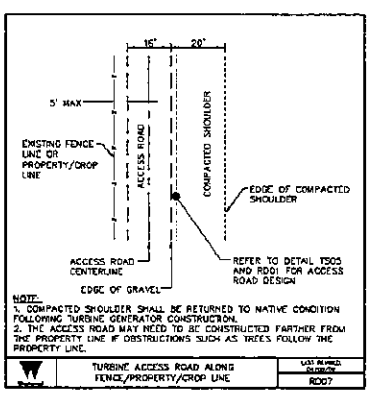
NOTE:
1. UPON DELIVERY VEHICLE COMPLETION, TEMPORARY INTERSECTION WIDENING AND TEMPORARY CULVERT TO BE REMOVED AND ALL DISTURBED AREA RESTORED TO NATIVE CONDITIONS.
2. CULVERTS AND SILT FENCE SHALL BE INSTALLED AND MAINTAINED AT INTERSECTIONS WHERE THE ACCESS ROAD IS CROSSING AN EXISTING COUNTY DITCH.

TURBINE ACCESS ROAD TYPICAL INTERSECTION WIDENING — RD05



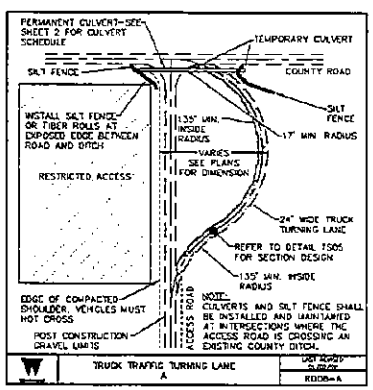
NOTE:
1. UPON DELIVERY VEHICLE COMPLETION, TEMPORARY INTERSECTION WIDENING TO BE REMOVED AND ALL DISTURBED AREA RESTORED.

INTERSECTION WIDENING DIMENSIONS — RD06



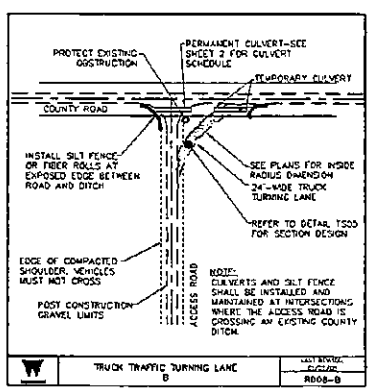
NOTE:
1. COMPACTED SHOULDER SHALL BE RETURNED TO NATIVE CONDITION FOLLOWING TURBINE GENERATOR CONSTRUCTION.
2. THE ACCESS ROAD MAY NEED TO BE CONSTRUCTED FARTHER FROM THE PROPERTY LINE IF OBSTRUCTIONS SUCH AS TREES FOLLOW THE PROPERTY LINE.

TURBINE ACCESS ROAD ALONG FENCE/PROPERTY/CROP LINE — RD07



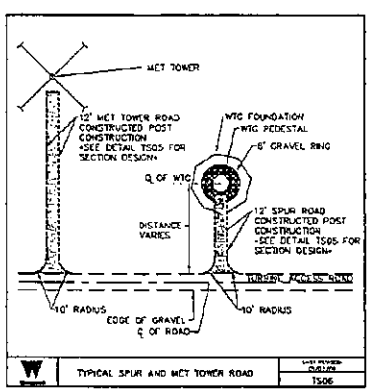
NOTE: CULVERTS AND SILT FENCE SHALL BE INSTALLED AND MAINTAINED AT INTERSECTIONS WHERE THE ACCESS ROAD IS CROSSING AN EXISTING COUNTY DITCH.

TRUCK TRAFFIC TURNING LANE A — RD05-A



NOTE: CULVERTS AND SILT FENCE SHALL BE INSTALLED AND MAINTAINED AT INTERSECTIONS WHERE THE ACCESS ROAD IS CROSSING AN EXISTING COUNTY DITCH.

TRUCK TRAFFIC TURNING LANE B — RD05-B



TYPICAL SPUR AND MET TOWER ROAD — TS06

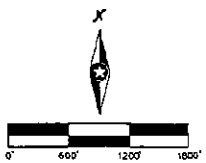
Westwood

IBERDROLA RENEWABLES
1125 Northwest Couch, Suite 700
Portland, Oregon 97209

Designed ADC
Checked BDW
Drawn ADC
Record Drawings by/date:

Symbol	Date	Description

Prepared for:



Blue Creek Wind Farm

Paulding & Van Wert Counties, Ohio

Construction Details

SWPP PLAN
NOT FOR CONSTRUCTION

Date 12/01/09
Sheet 3 OF 23

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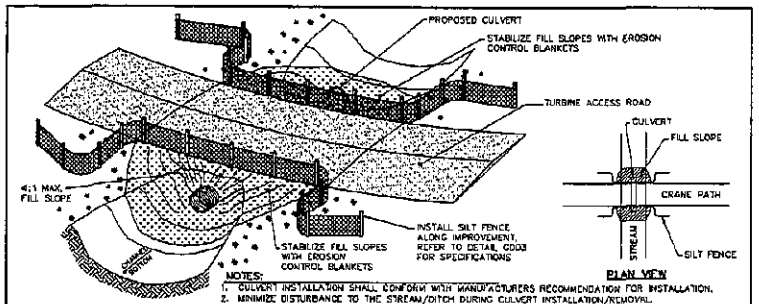
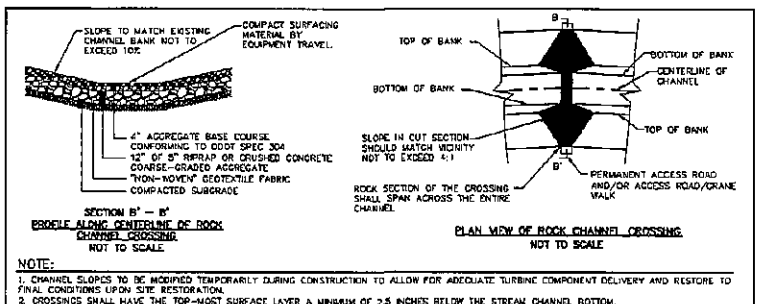


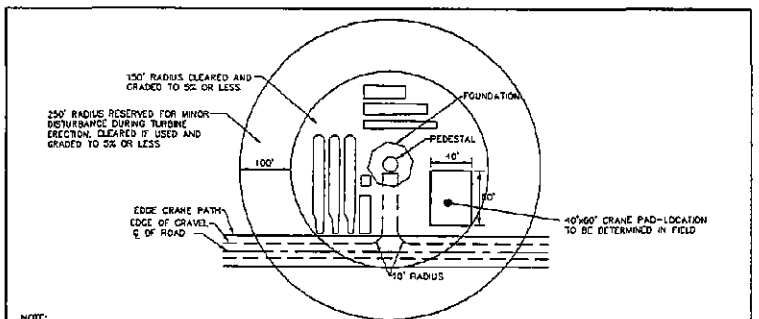
NOTES:
1. CULVERT INSTALLATION SHALL CONFORM WITH MANUFACTURERS RECOMMENDATION FOR INSTALLATION.
2. MINIMIZE DISTURBANCE TO THE STREAM/DITCH DURING CULVERT INSTALLATION/REMOVAL.
3. RIP RAP WITH GEOTEXTILE FABRIC MAY BE SUBSTITUTED FOR THE EROSION CONTROL BLANKETS WHERE NEEDED.
4. UPON REMOVAL OF ANY TEMPORARY ROAD WIDENING, THE DISTURBED AREA SHALL BE RESTORED TO NATIVE CONDITIONS. REFER TO THE BLUE CREEK SWPPP.

TYPICAL TURBINE ACCESS ROAD STREAM CROSSING WITH EROSION CONTROL BLANKETS — RD13



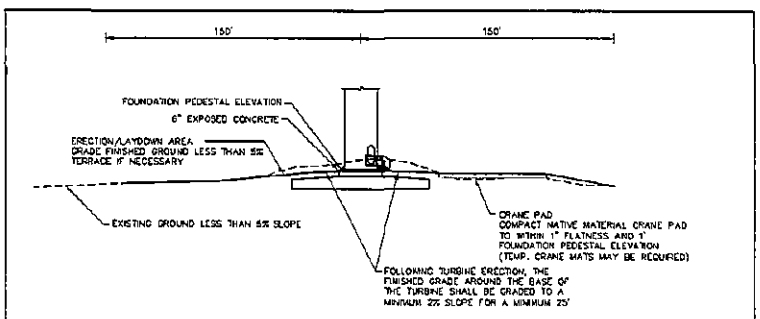
NOTE:
1. CHANNEL SLOPES TO BE MODIFIED TEMPORARILY DURING CONSTRUCTION TO ALLOW FOR ADEQUATE TURBINE COMPONENT DELIVERY AND RESTORE TO FINAL CONDITIONS UPON SITE RESTORATION.
2. CROSSINGS SHALL HAVE THE TOP-MOST SURFACE LAYER A MINIMUM OF 2.5 INCHES BELOW THE STREAM CHANNEL BOTTOM.
3. THE ACCESS ROAD SHALL CROSS THE DITCH AT 90° ANGLE.
4. THE TOP DED OF THE ROCK CHANNEL CROSSING SHALL CONFORM TO THE EXISTING DITCH CROSS SECTIONAL SLOPES.
5. MATERIAL THICKNESSES MAY BE FIELD ADJUSTED TO ACHIEVE SUFFICIENT BEARING CAPACITIES AS ARE NECESSARY FOR ANTICIPATED ROAD USE.

TYPICAL TURBINE ACCESS ROAD LOW WATER CROSSING — RD16

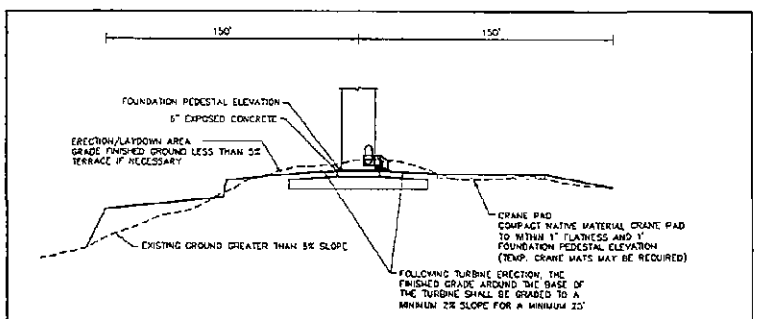


NOTE:
1. ACTUAL CRANE PAD LOCATION TO BE DETERMINED BY CONTRACTOR.
2. DISTANCE BETWEEN CENTER OF TURBINE AND EDGE OF GRAVEL ROAD VARIES BY TURBINE SITE

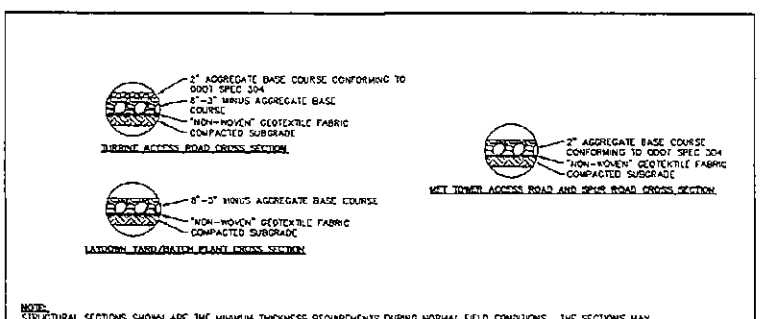
TYPICAL WTG SITE – PLAN VIEW — T501



TYPICAL WTG SITE – PROFILE VIEW — T503



TYPICAL WTG SITE, EXISTING GROUND GREATER THAN 5% – PROFILE VIEW — T504



NOTE:
STRUCTURAL SECTIONS SHOWN ARE THE MINIMUM THICKNESS REQUIREMENTS DURING NORMAL FIELD CONDITIONS. THE SECTIONS MAY NEED TO BE INCREASED BASED ON ACTUAL FIELD CONDITIONS AT THE TIME OF CONSTRUCTION. CONDITIONS INCLUDE BUT ARE NOT LIMITED TO CONSTRUCTION DURING THE FREEZE/THAW CYCLE, UNUSUALLY WET PERIODS, OR IN LOW/WET AREAS.

TYPICAL STRUCTURAL CROSS SECTIONS — T505

Westwood
Westwood Professional Services, Inc.
7699 Anagram Drive
Eden Prairie, MN 55344
PHONE 952.937.5150
FAX 952.937.5822
TOLL FREE 1.800.433.2958
www.westwoodps.com

Designed: ADC
Checked: RDS
Drawn: ADC
Record Drawing by/date:

#	DATE	DESCRIPTION

Prepared for:
IBERDROLA RENEWABLES
7125 Northwest Couch, Suite 700
Portland, Oregon 97209

N

0' 600' 1200' 1800'

Blue Creek Wind Farm
Paulding & Van Wert Counties, Ohio

Construction Details

SWPP PLAN
NOT FOR CONSTRUCTION

Date: 12/01/09
Sheet: 4 OF 23

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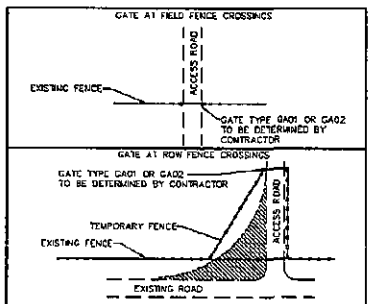
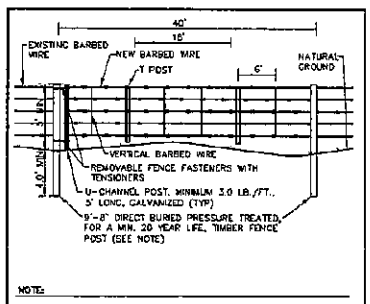


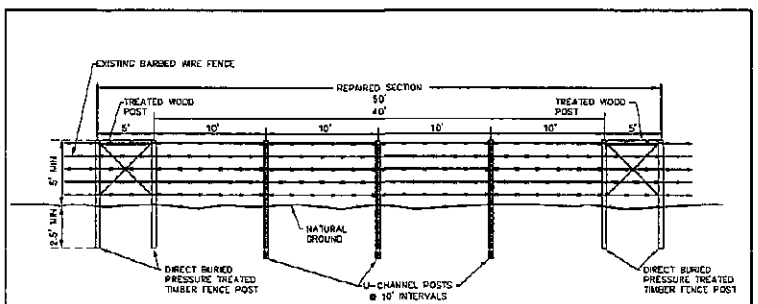
NOTE:
1. FOLLOWING TURBINE CONSTRUCTION TRAFFIC, THE TEMPORARY FENCE AND GATE SHALL BE REMOVED AND REINSTALLED TO MATCH THE PRECONSTRUCTION CONFIGURATION.

GATE AT ROW/FIELD FENCE CROSSINGS — FN01



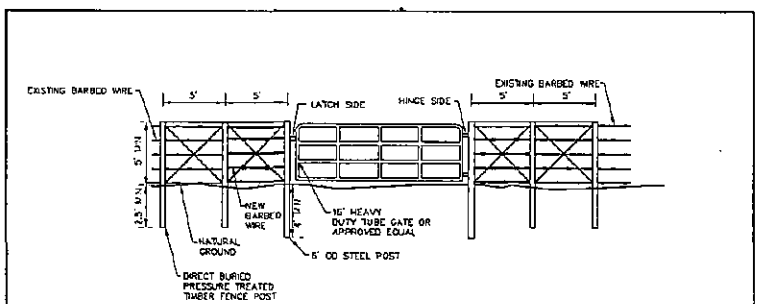
NOTE:
1. TO BE USED AT UNDERGROUND POWER COLLECTION CROSSINGS
2. ALL FITTINGS, HARDWARE AND OTHER APPURTENANCES SHALL BE FABRICATED AND FITTED IN ACCORDANCE WITH THE MANUFACTURES RECOMMENDATIONS

BARBWIRE GATE — FN02



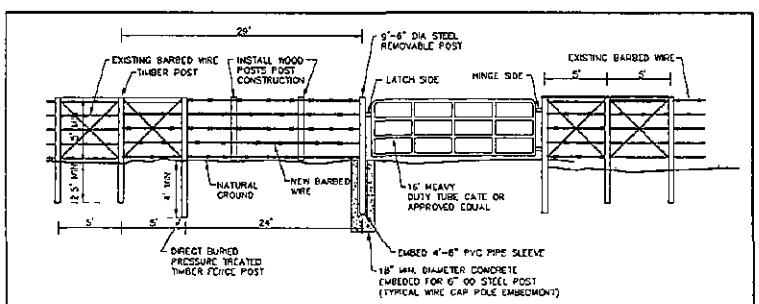
NOTE:
1. WHEN FENCE IS REMOVED FOR FUTURE REPLACEMENT, H-BRACING SHALL BE CONSTRUCTED ON EACH END OF THE REPAIRED SECTION TO ALLOW REPAIR SECTION TO BE TIGHTENED

FENCE REPAIR — FN03



NOTE:
1. H-BRACING SHALL BE CONSTRUCTED ON EACH END OF THE GATE

TYPICAL SINGLE GATE — GA01

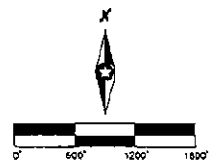


NOTE:
1. H-BRACING SHALL BE CONSTRUCTED ON EACH END OF THE GATE

TYPICAL SINGLE GATE WITH FENCE GATE EXTENSION — GA02

Westwood

Prepared for:
IBERDROLA RENEWABLES
1125 Northwest Couch, Suite 700
Portland, Oregon 97209



Blue Creek Wind Farm

Paulding & Van Wert Counties, Ohio

Construction Details

SWPP PLAN
NOT FOR CONSTRUCTION

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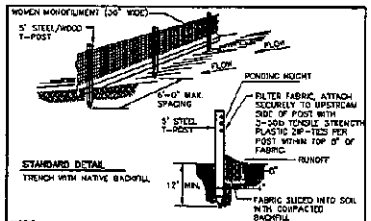
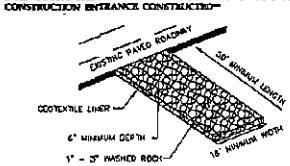


NOTE:
1. INSPECT AND REPAIR FENCE AFTER EACH STORM EVENT AND REMOVE SEDIMENT WHEN ACCUMULATED TO 1/3 THE HEIGHT OF THE FABRIC OR MORE.
2. REMOVED SEDIMENT SHALL BE DEPOSITED TO AN AREA THAT WILL NOT CONTRIBUTE SEDIMENT OFF-SITE AND CAN BE PERMANENTLY STABILIZED.
3. SILT FENCE SHALL BE PLACED ON SLOPE CONTOURS TO MAXIMIZE PONDING EFFICIENCY.
4. ALL ENDS OF THE SILT FENCE SHALL BE WRAPPED UPSLOPE SO THE ELEVATION OF THE BOTTOM OF FABRIC IS HIGHER THAN "PONDING HEIGHT".

SILT FENCE — GD03

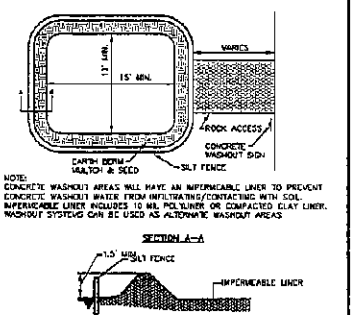
"ACCESS ROADS SHALL BE CONSTRUCTED FROM PUBLIC ROADS WHERE THE CONSTRUCTION DELIVERY TRAFFIC WILL TRAVEL ON THE CONSTRUCTED ACCESS ROAD. SEDIMENT TRACKING ONTO PUBLIC PAVED ROADS IS NOT ANTICIPATED. IF SEDIMENT TRACKING DOES OCCUR, THE SEDIMENT SHALL BE REMOVED AND A ROCK CONSTRUCTION ENTRANCE CONSTRUCTED"



NOTE:
ROCK CONSTRUCTION ENTRANCE SHOULD BE A MINIMUM THICKNESS OF 1.0' AND CONTAIN MAXIMUM SIDE SLOPES OF 4:1. ROCK ENTRANCE SHOULD BE INSPECTED AND MAINTAINED REGULARLY. ROCK ENTRANCE LENGTH MAY NEED TO BE EXTENDED IN CLAY SOILS.

ROCK CONSTRUCTION ENTRANCE — GD05

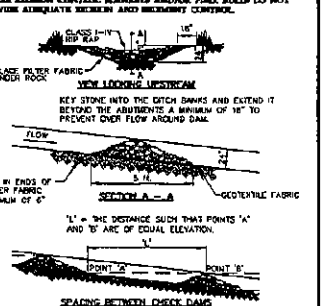
"AN APPROVED ALTERNATE MAY BE USED"



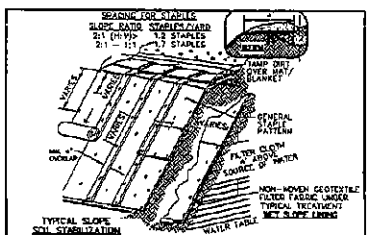
NOTE:
CONCRETE WASHOUT AREAS WILL HAVE AN IMPERMEABLE LINER TO PREVENT CONCRETE WASHOUT WATER FROM INFILTRATING/CONTACTING WITH SOIL. IMPERMEABLE LINER INCLUDES 10 MIL POLYLINER OR COMPACTED CLAY LINER. WASHOUT SYSTEMS CAN BE USED AS ALTERNATIVE WASHOUT AREAS

CONCRETE WASHOUT AREA — GD08

ROCK CHECK SHALL BE USED WHERE NEEDED AS A FILTER MEDIA, OR WHERE FLOWING CONFINE, REARERS AND/OR FORCE NEEDS TO NOT PROVIDE ADEQUATE SEDIMENT AND SEDIMENT CONTROL.

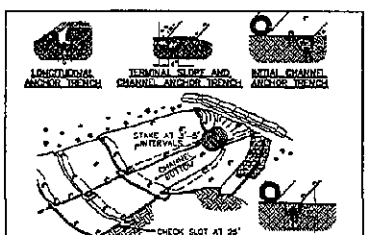


TEMPORARY ROCK CHECK DAM — GD16



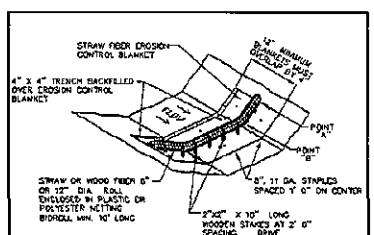
NOTE:
1. REFER TO THE BLUE CREEK SWPPP FOR IMPLEMENTATION REQUIREMENTS.
2. MATS/BLANKETS SHOULD BE INSTALLED VERTICALLY DOWNSLOPE.
3. SLOPE SURFACE SHALL BE FREE OF ROCKS, CLODS, STICK AND GRASS.
4. MATS/BLANKETS SHALL HAVE GOOD SOIL CONTACT.
5. LAY BLANKETS LOOSELY AND STAKE OR STAPLE TO MAINTAIN DIRECT CONTACT WITH THE SOIL.
6. DO NOT STRETCH.
7. BLANKET TYPE AND WEIGHT MUST BE CHOOSEN BASED ON SITE CONDITIONS AND MANUFACTURERS RECOMMENDATIONS.
8. STAPLE LENGTHS SHALL CONFORM TO MANUFACTURERS RECOMMENDATIONS.

TEMPORARY EROSION BLANKETS
TURF REINFORCEMENT MATS FOR SLOPES — GD21



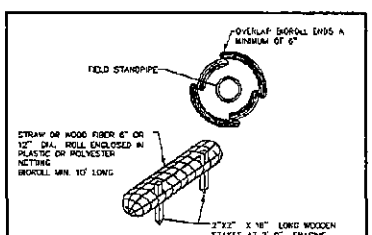
NOTE:
1. REFER TO THE BLUE CREEK SWPPP FOR IMPLEMENTATION REQUIREMENTS.
2. CHECK SLOTS TO BE CONSTRUCTED PER MANUFACTURERS SPECIFICATIONS.
3. STAKING OR STAPLING LAYOUT PER MANUFACTURERS SPECIFICATIONS.
4. MINIMUM OF 3.5 STAPLES/YARD.
5. BLANKET TYPE AND WEIGHT MUST BE CHOOSEN BASED ON SITE CONDITIONS AND MANUFACTURERS RECOMMENDATIONS.
6. STAPLE LENGTHS SHALL CONFORM TO MANUFACTURERS RECOMMENDATIONS.
7. EROSION CONTROL BLANKETS SHALL EXTEND TO THE EDGE OF THE DISTURBANCE LIMITS

TEMPORARY EROSION BLANKETS
TURF REINFORCEMENT MATS FOR CHANNELS — GD22



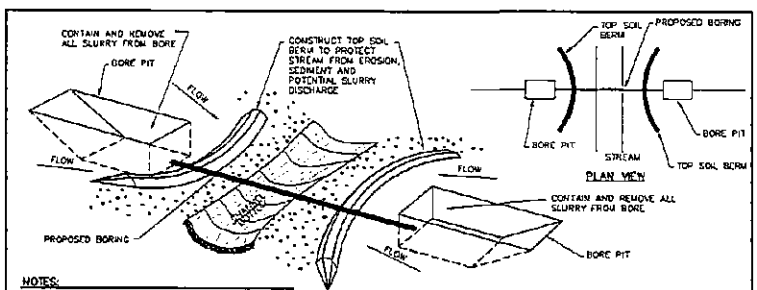
NOTE:
1. REFER TO THE BLUE CREEK SWPPP FOR IMPLEMENTATION REQUIREMENTS.
2. POINT "A" MUST BE HIGHER THAN POINT "B" TO ENSURE THAT WATER FLOWS OVER THE DIKE AND NOT AROUND THE ENDS.
3. TYPE OF MATERIAL FOR EROSION CONTROL BLANKET IS SUBJECT TO FIELD CONDITIONS AND MANUFACTURERS RECOMMENDATION.

TEMPORARY BIOROLL BLANKET SYSTEM (DITCH APPLICATION) — GD23



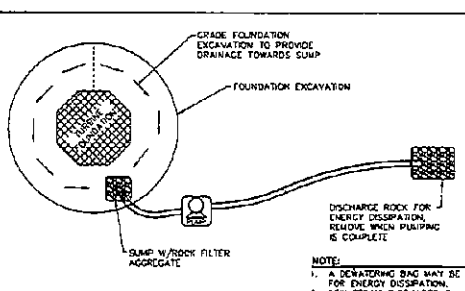
NOTE:
1. INLET PROTECTION SHALL BE USED FOR FIELD STANDPIPES THAT HAVE SOIL DISTURBANCE WITHIN 200' OF INLET.
2. INSPECT AND REPAIR BIOROLL AFTER EACH STORM EVENT AND REMOVE SEDIMENT WHEN ACCUMULATION TO 1/2 THE HEIGHT OF THE FABRIC OR MORE.
3. REMOVED SEDIMENT SHALL BE DEPOSITED TO AN AREA THAT WILL NOT CONTRIBUTE SEDIMENT OFF-SITE AND CAN BE PERMANENTLY STABILIZED.

INLET PROTECTION WITH BIOROLL — GD30



NOTES:
1. CONSTRUCT TOPSOIL BERM TO PROTECT EXISTING CHANNELS WHERE BORING WILL OCCUR FOR UNDERGROUND COLLECTION SYSTEM INSTALLATION.
2. NO DISTURBANCE TO THE STREAM DURING CONSTRUCTION.
3. SILT FENCE MAY BE SUBSTITUTED FOR THE TOPSOIL BERM.
4. UPON REMOVAL OF THE BORE PITS, THE DISTURBED AREAS SHALL BE RESTORED TO NATIVE CONDITIONS. REFER TO THE BLUE CREEK SWPPP.

TYPICAL UNDERGROUND COLLECTION SYSTEM STREAM CROSSING — UTDG



NOTE:
1. A DEWATERING BAG MAY BE SUBSTITUTED FOR DISCHARGE ROCK FOR ENERGY DISSIPATION.
2. DEWATERING DISCHARGE SHALL BE MONITORED FOR ANY EROSINE CONDITIONS. IF EROSION OCCURS, THE AREA SHALL BE STABILIZED IN ACCORDANCE WITH THE SWPPP. DEWATERING MAY RESUME FOLLOWING STABILIZATION.

TYPICAL DEWATERING OPERATION — GD31

Westwood

Designed: ADC
Checked: DDS
Drawn: ADC
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Revisions
DATE DESCRIPTION

Prepared for:

IBERDROLA RENEWABLES
1125 Northwest Couch, Suite 700
Portland, Oregon 97209

0 600' 1200' 1800'

Blue Creek Wind Farm
Paulding & Van Wert Counties, Ohio

SWPPP Details

SWPP PLAN
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Date 12/01/09
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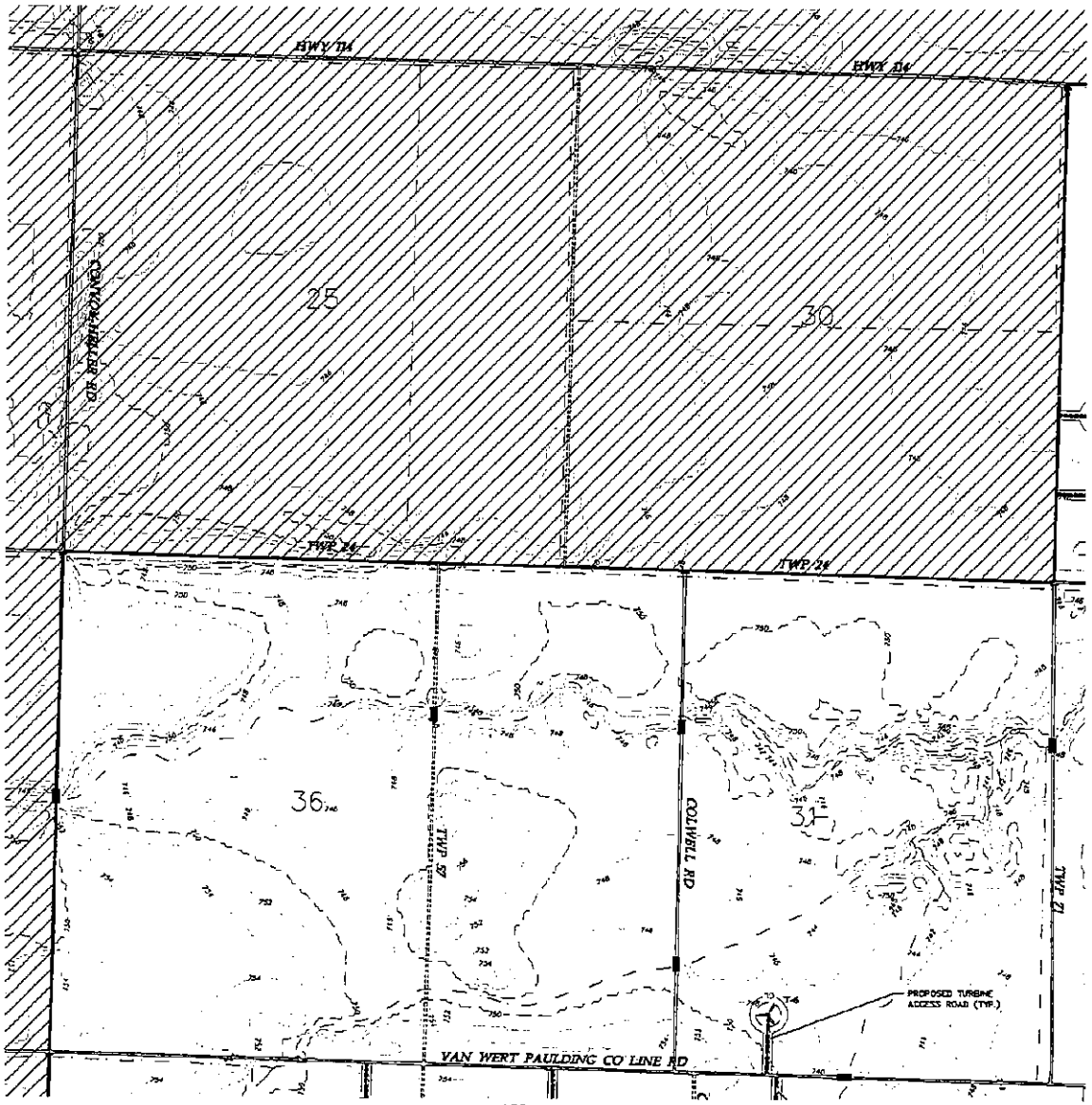

LEGEND:

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- T-XX — ALTERNATE TURBINE LOCATION / ALTERNATE TURBINE NUMBER / ALTERNATE ACCESS ROADS
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- EXISTING GAS PIPELINE
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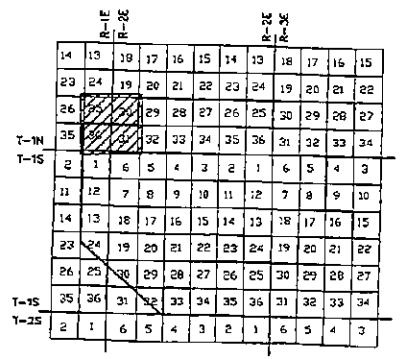
- EXISTING 2' CONTOURS
- EXISTING TREE LINE
- EXISTING WATERWAY
- OUTSIDE OF PROJECT BOUNDARY
- EXISTING BRIDGE
- KNI WETLAND



KEY MAP

Westwood

Prepared for:

IBERDROLA RENEWABLES
1125 Northwest Couch, Suite 700
Portland, Oregon 97209

0' 600' 1200' 1800'

Blue Creek Wind Farm

Paulding & Van Wert Counties, Ohio

Civil Site Plan

SWPP PLAN
NOT FOR CONSTRUCTION

Date: 12/01/09

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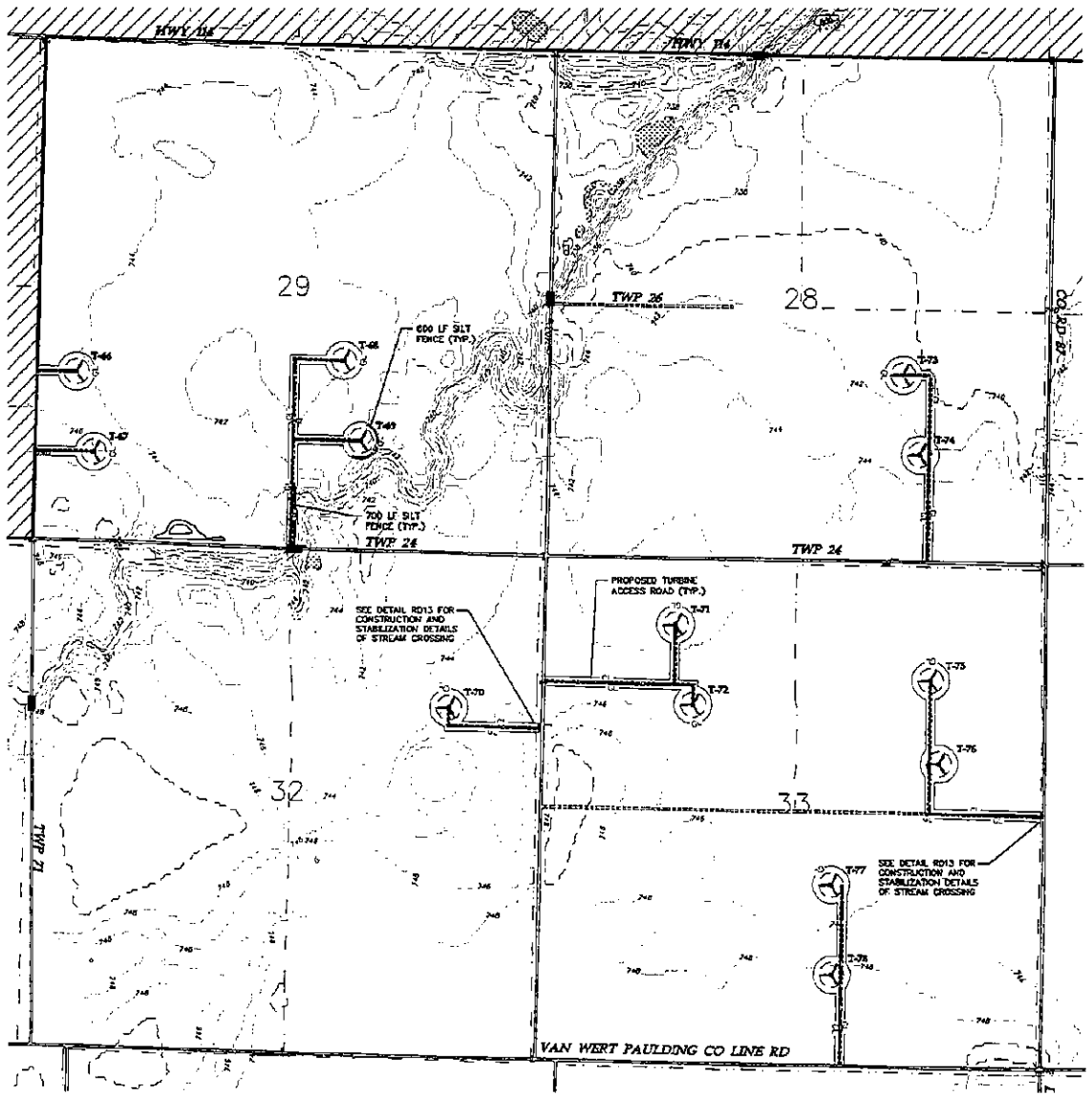

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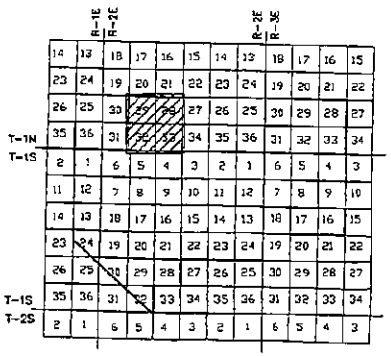

KEY MAP

Westwood

Designed: ABC
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Drawn: ABC
Record Drawings by/date:

#	DATE	DESCRIPTION

Prepared for:

IBERDROLA RENEWABLES
1125 Northwest Couch, Suite 700
Portland, Oregon 97209

0' 600' 1200' 1800'

Blue Creek Wind Farm

Paulding & Van Wert Counties, Ohio

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Date: 12/01/09
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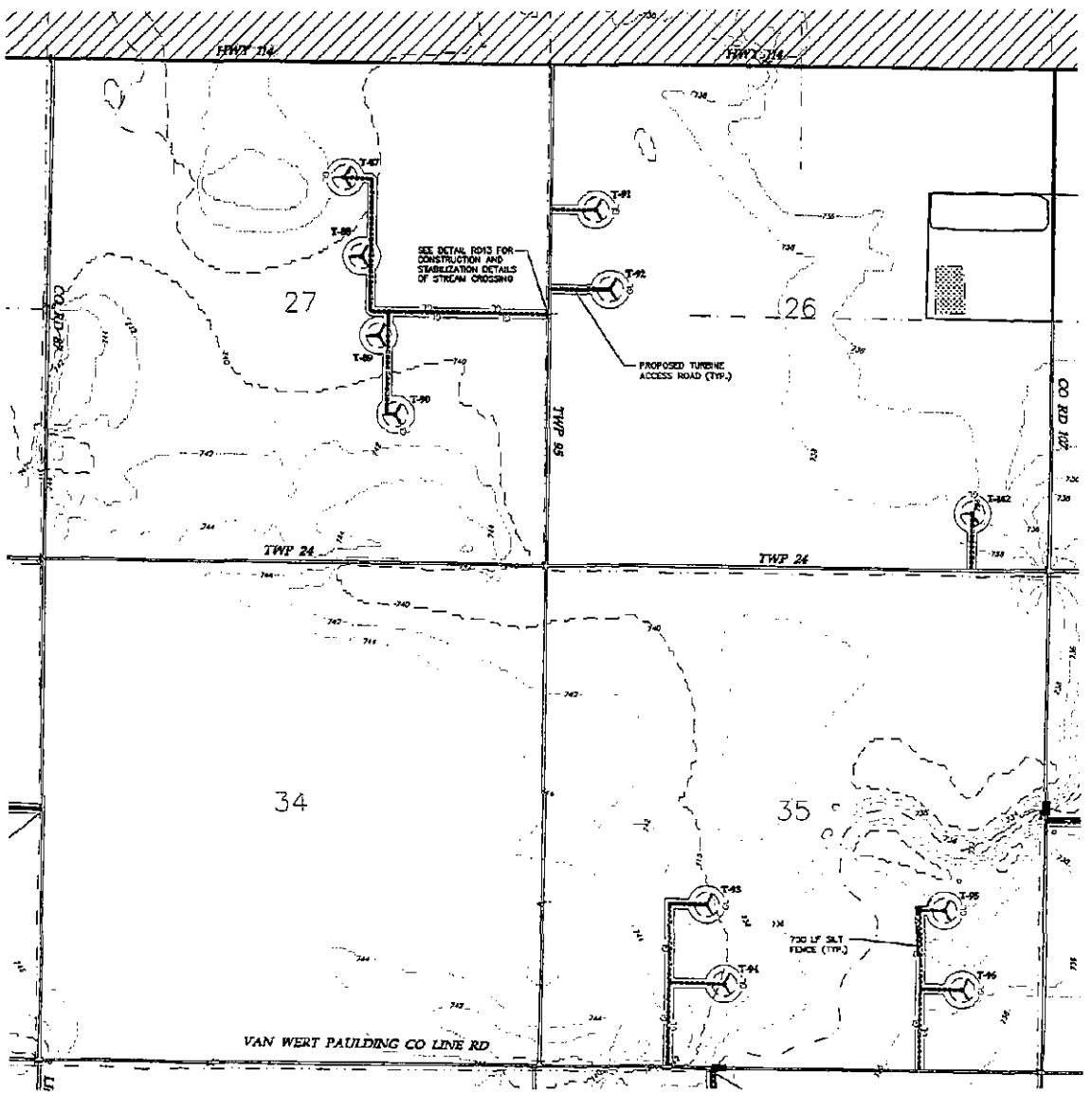

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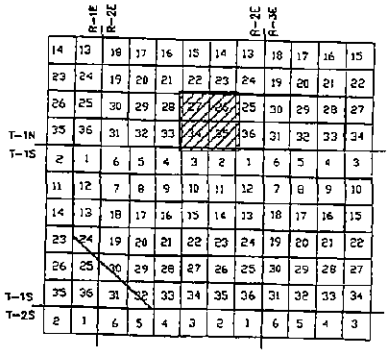

KEY MAP

Westwood

Designed: ADC
Checked: TDH
Drawn: ADC
Record Drawing by/date:

#	DATE	DESCRIPTION

Prepared for:

IBERDROLA RENEWABLES
1125 Northwest Couch, Suite 700
Portland, Oregon 97209

N

0' 600' 1200' 1800'

Blue Creek Wind Farm

Paulding & Van Wert Counties, Ohio

Civil Site Plan

SWPP PLAN
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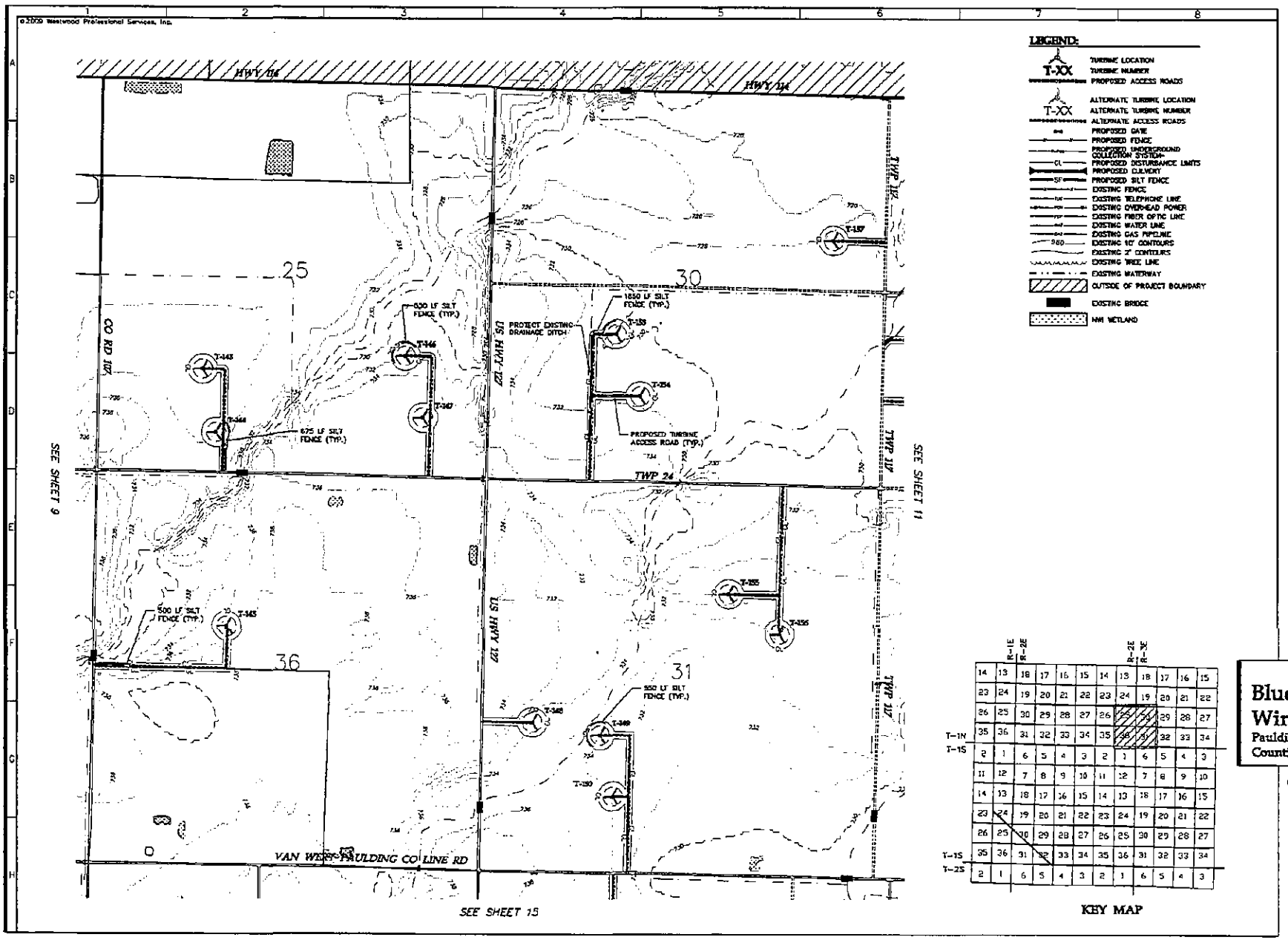

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- NWI WETLAND

KEY MAP

Westwood

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1125 Northwest Couch, Suite 700
Portland, Oregon 97209

0' 600' 1200' 1800'

Blue Creek Wind Farm

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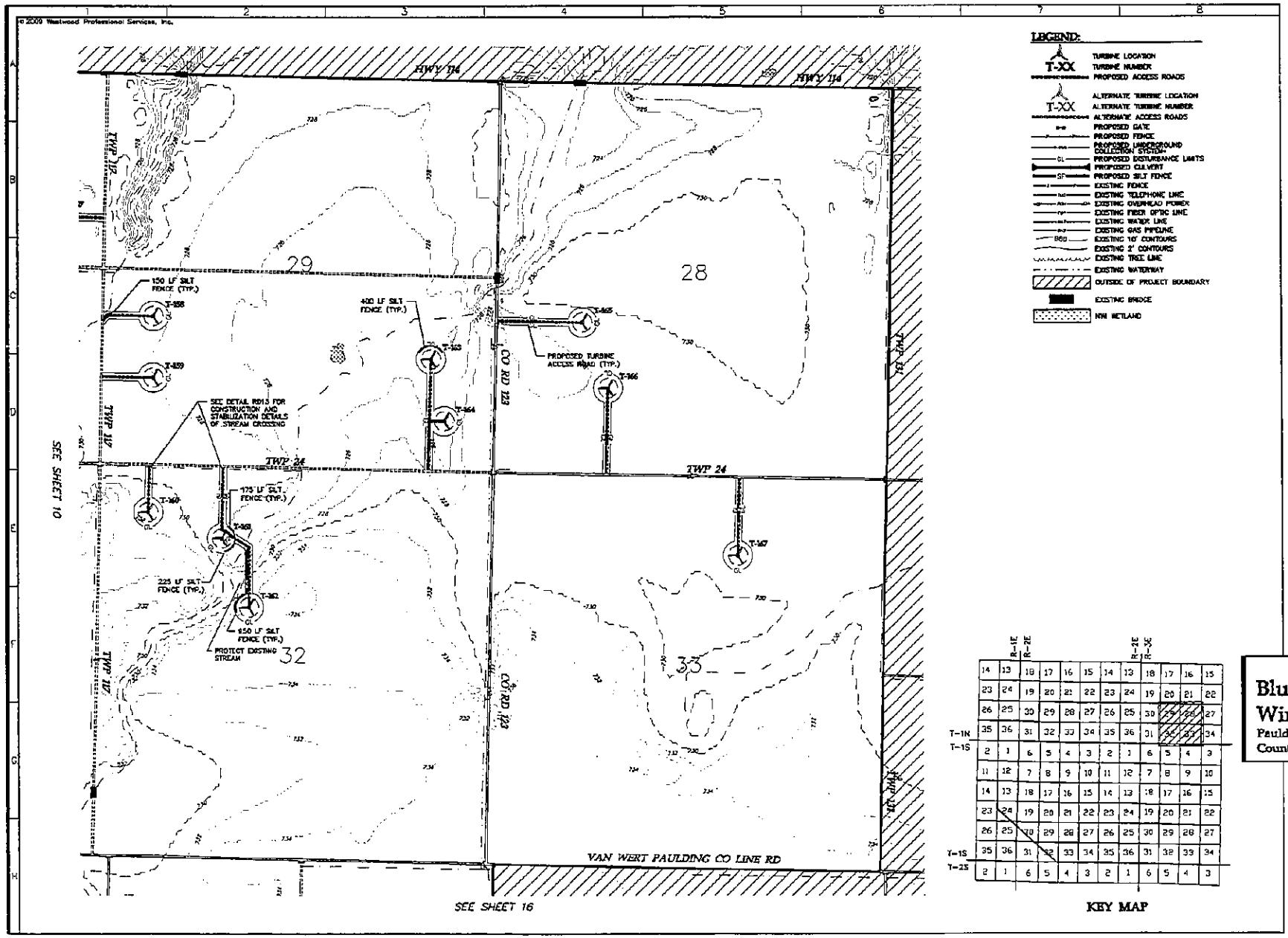

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- OUTSIDE OF PROJECT BOUNDARY
- EXISTING BRIDGE
- NWI WETLAND

KEY MAP

Westwood

Designed: ADC
Checked: BDR
Drawn: ADC
Record Drawings by/date:

Revisions
Date comment

Prepared for:

IBERDROLA RENEWABLES
1125 Northwest Couch, Suite 700
Portland, Oregon 97209

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Sheet 11 OF 23

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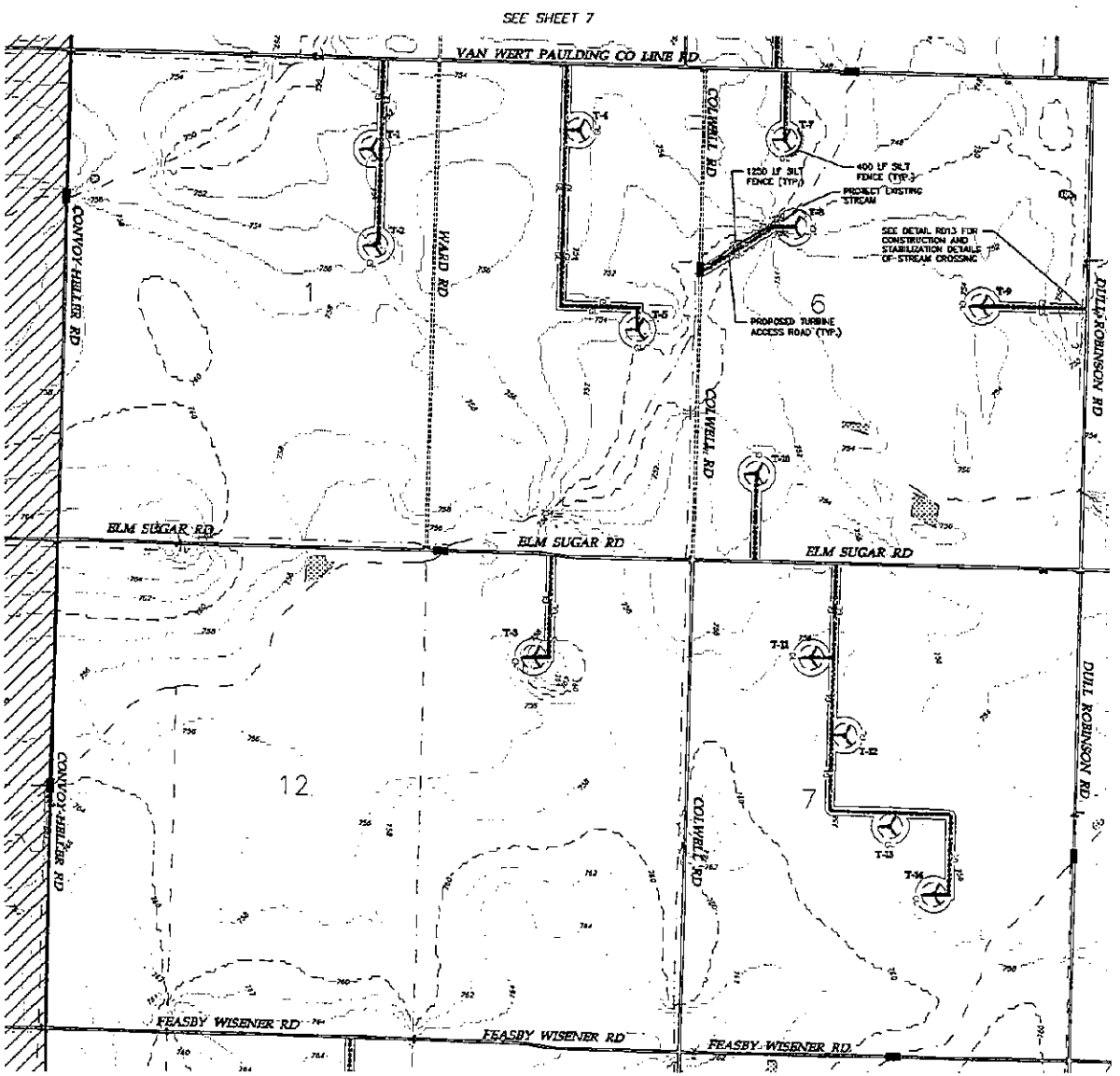

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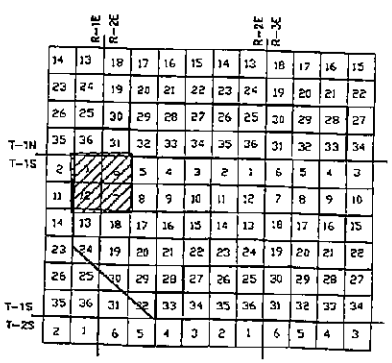

KEY MAP

Westwood

Prepared for:

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1125 Northwest Couch, Suite 700
Portland, Oregon 97209

0' 600' 1200' 1800'

Blue Creek Wind Farm

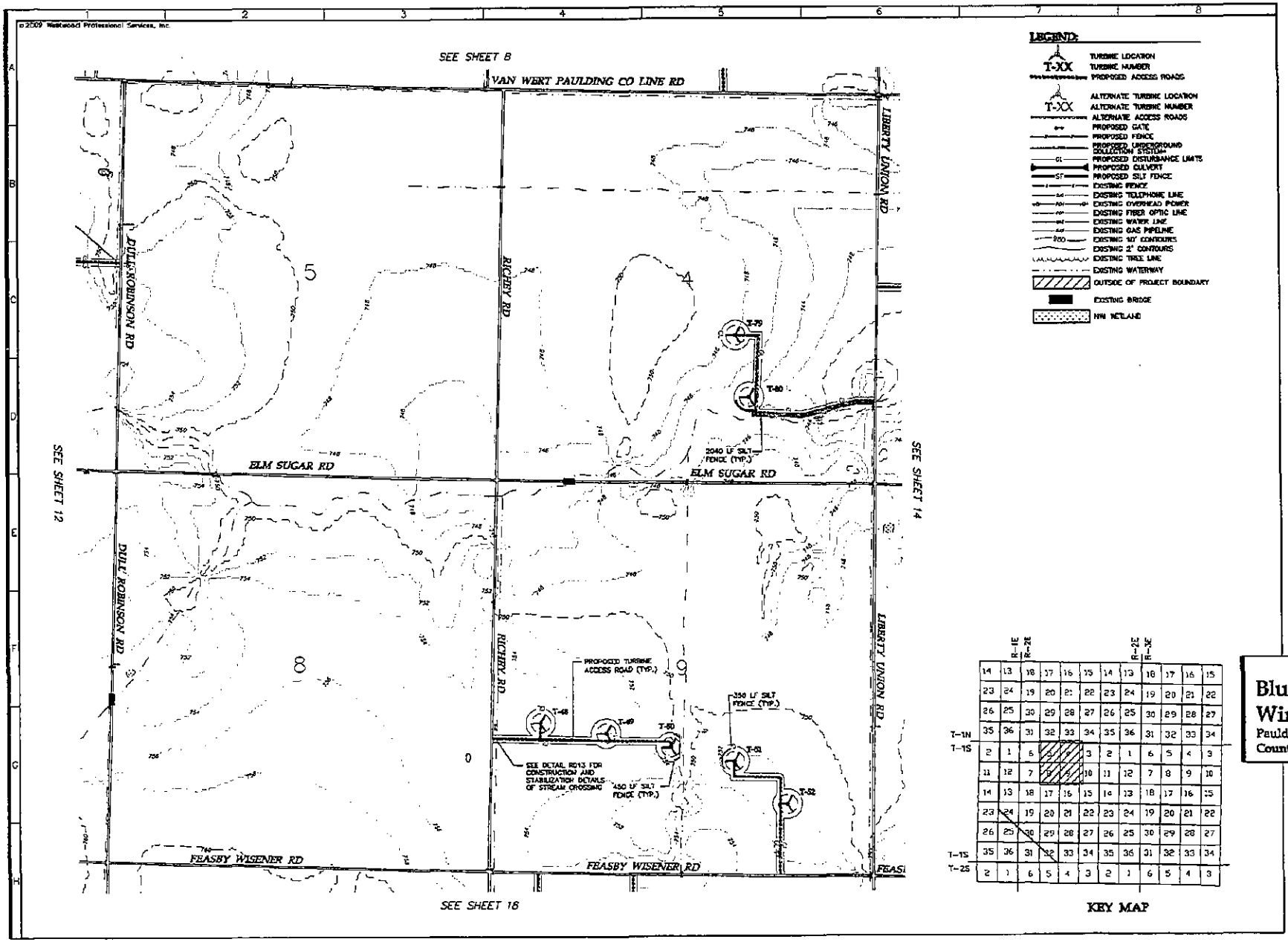
Paulding & Van Wert Counties, Ohio

Civil Site Plan

SWPP PLAN
NOT FOR CONSTRUCTION

Date: 12/01/09

Sheet 12 OF 23



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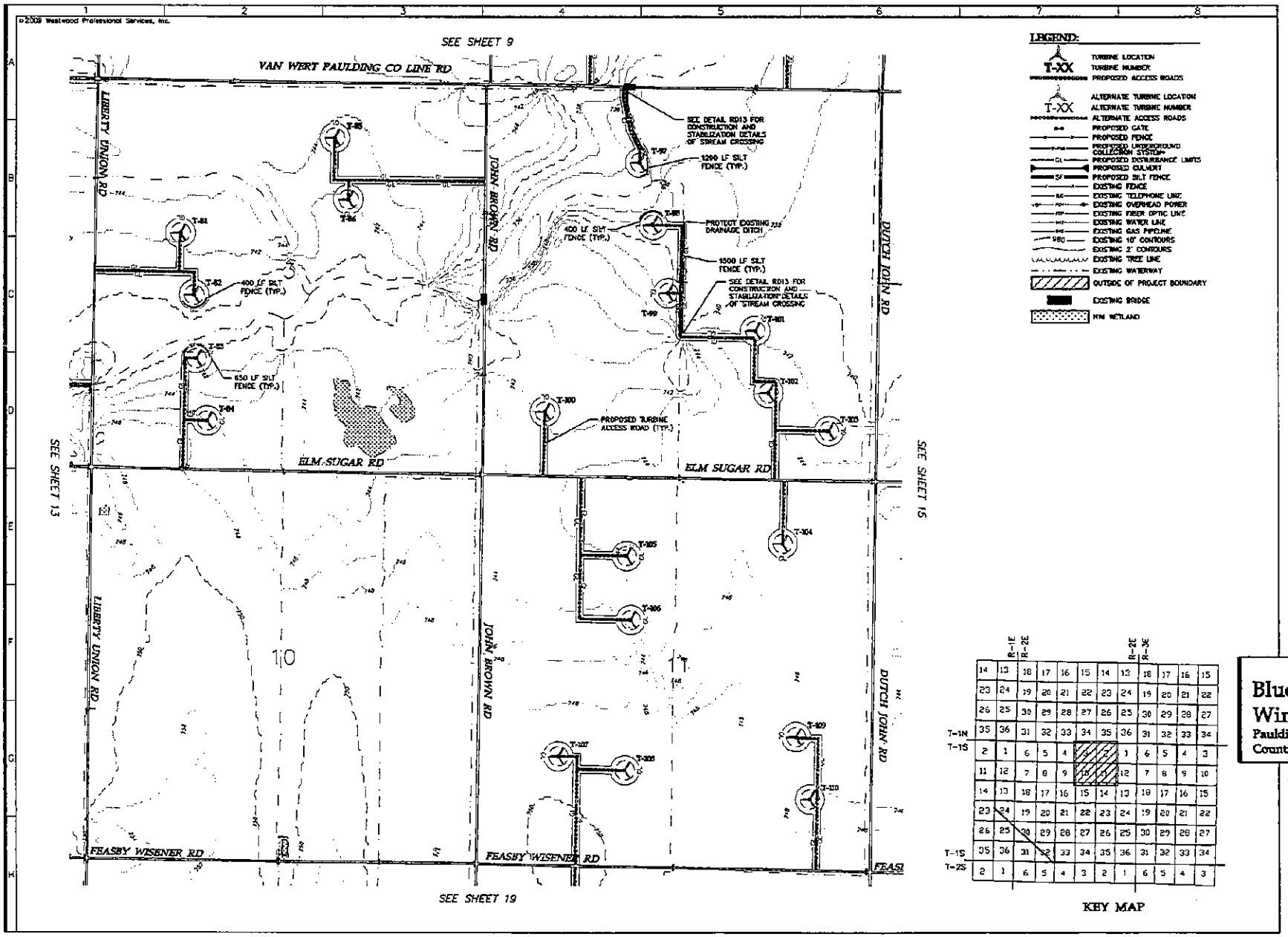
Date 12/01/09

Sheet 13 OF 23



LEGEND:

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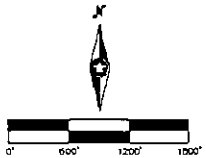
KEY MAP



Westwood

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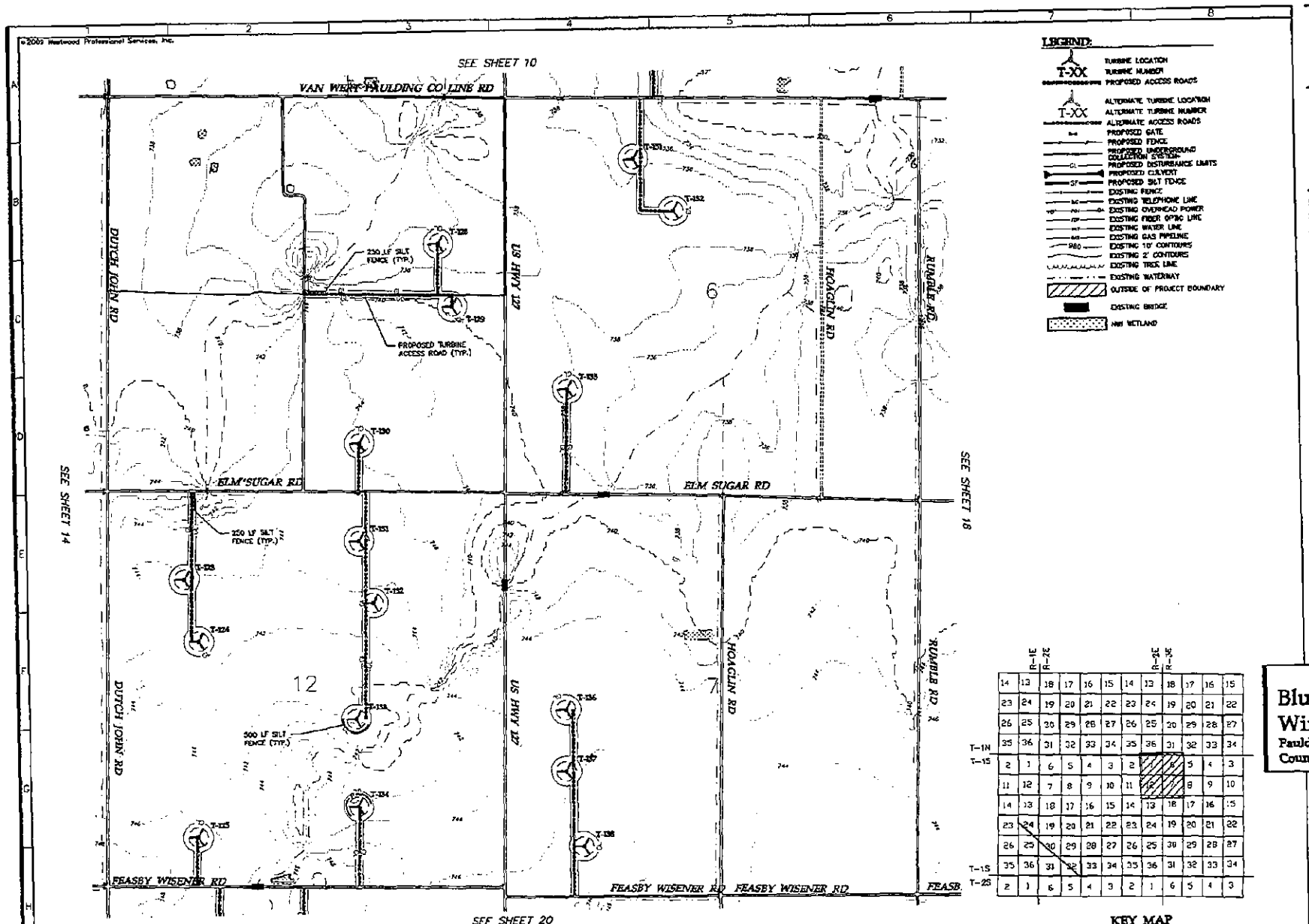
Civil Site Plan

SWPP PLAN
NOT FOR CONSTRUCTION

Date: 12/01/09

Sheet: 14 OF 25

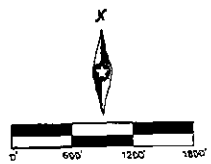


KEY MAP

Westwood

Prepared for:

IBERDROLA RENEWABLES
7125 Northwest Couch, Suite 200
Portland, Oregon 97209



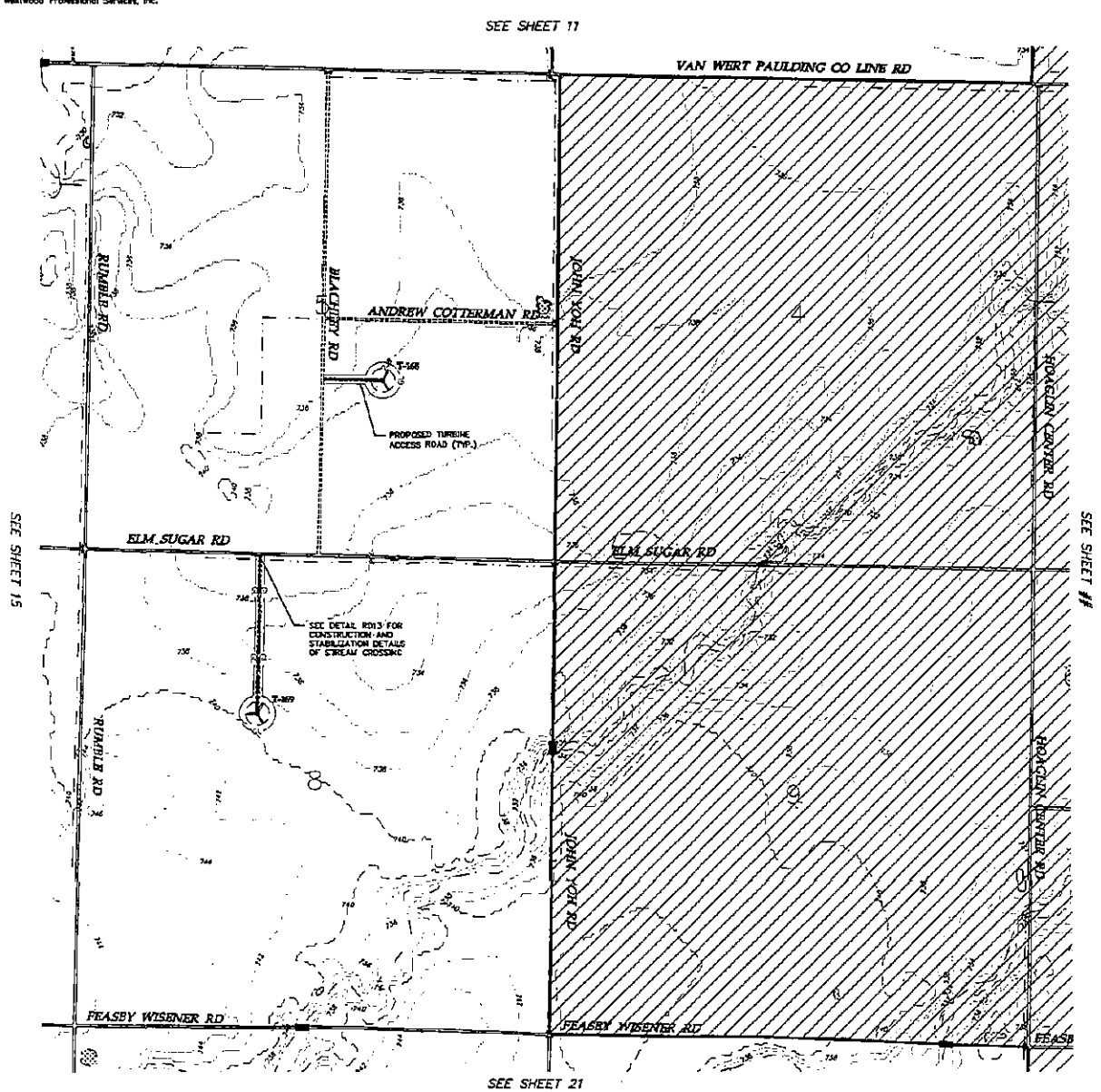
Blue Creek Wind Farm

Paulding & Van Wert Counties, Ohio

Civil Site Plan

SWPP PLAN
NOT FOR CONSTRUCTION

Date: 12/01/09
Sheet: 15 OF 23



LEGEND:

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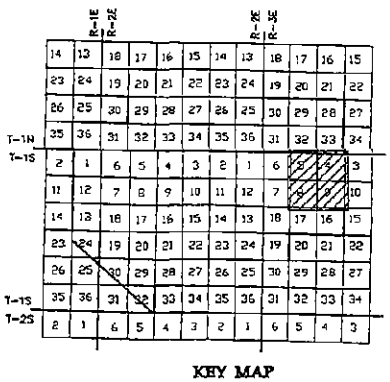
- T-XX — ALTERNATE TURBINE LOCATION / ALTERNATE TURBINE NUMBER / ALTERNATE ACCESS ROADS
- PROPOSED GATE
- PROPOSED FENCE
- PROPOSED UNDERGROUND COLLECTION SYSTEM
- CL — PROPOSED DISTURBANCE LIMITS
- PROPOSED CULVERT
- SF — PROPOSED SILT FENCE
- EXISTING FENCE
- TEL — EXISTING TELEPHONE LINE
- OHP — EXISTING OVERHEAD POWER
- FOC — EXISTING FIBER OPTIC LINE
- W — EXISTING WATER LINE
- GAS — EXISTING GAS PIPELINE
- 740 — EXISTING 10' CONTOURS
- 740 — EXISTING 2' CONTOURS
- EXISTING TREE LINE
- EXISTING WATERWAY
- OUTSIDE OF PROJECT BOUNDARY
- EXISTING BRIDGE
- NWI WETLAND

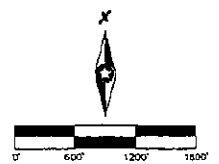


KEY MAP

Westwood

Prepared for:

IBERDROLA RENEWABLES
1125 Northwest Couch, Suite 700
Portland, Oregon 97209



Blue Creek Wind Farm

Paulding & Van Wert Counties, Ohio

Civil Site Plan

SWPP PLAN
NOT FOR CONSTRUCTION

Date: 12/01/09

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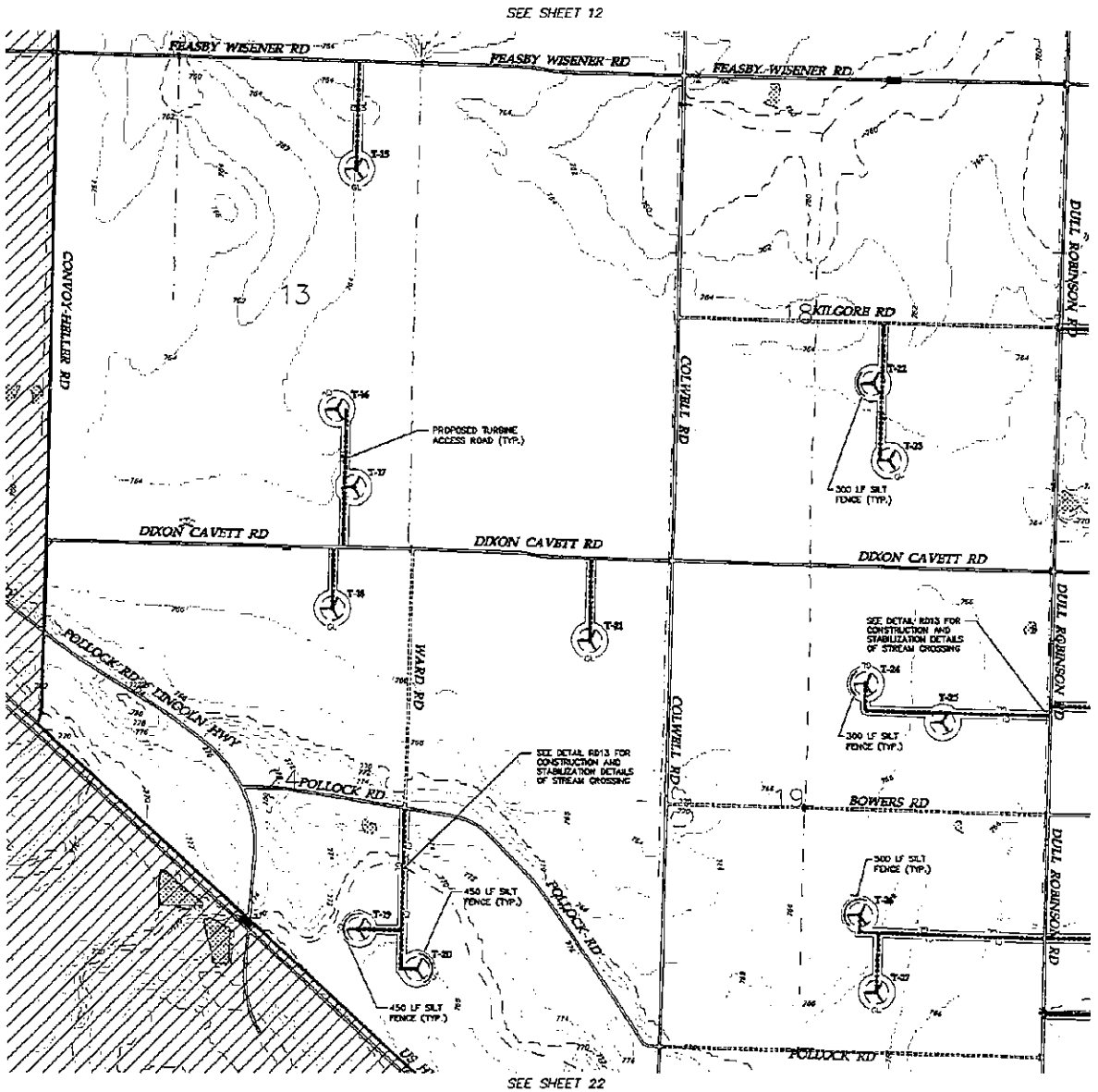

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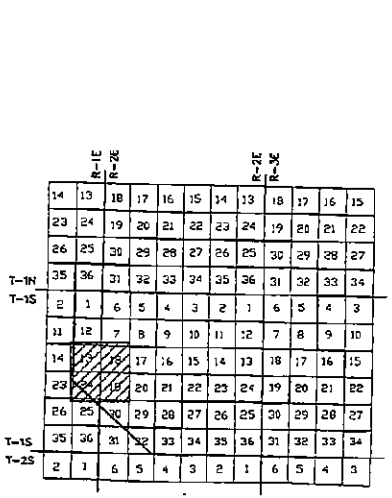

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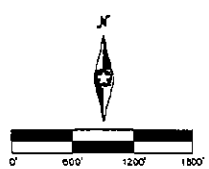

Westwood

Prepared for:

IBERDROLA RENEWABLES
1125 Northwest Couch, Suite 700
Portland, Oregon 97209

Blue Creek Wind Farm

Paulding & Van Wert Counties, Ohio

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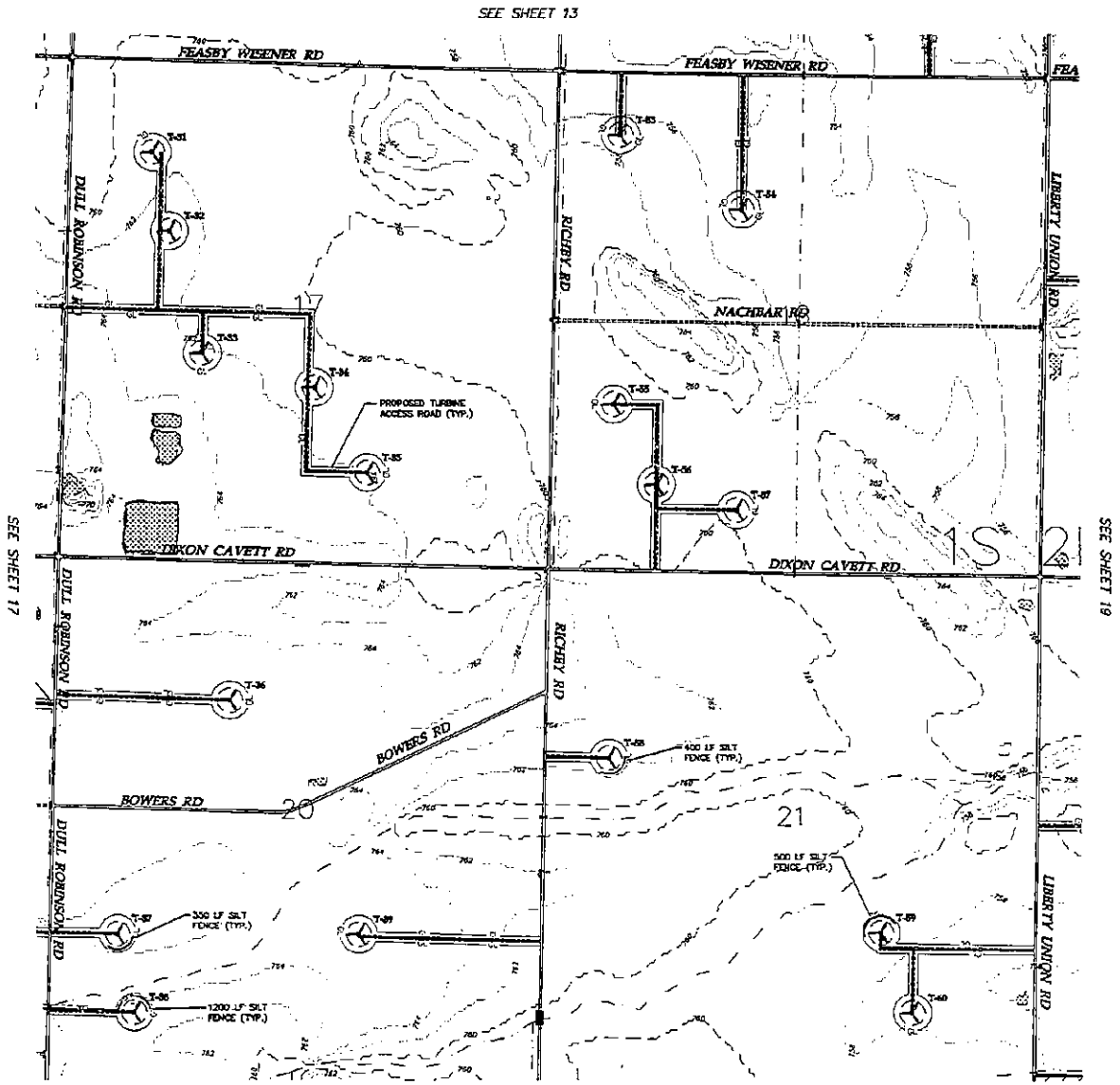

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- EXISTING FIBER OPTIC LINE
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- EXISTING GAS PIPELINE
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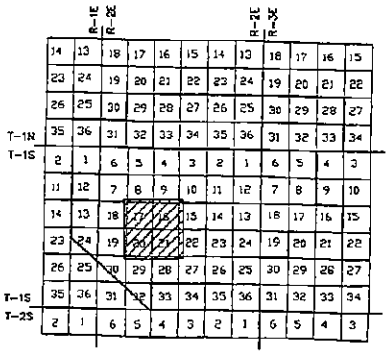
- NW WETLAND



KEY MAP

Westwood

Prepared for:

IBERDROLA RENEWABLES
1125 Northwest Couch, Suite 700
Portland, Oregon 97209

0' 600' 1200' 1800'

Blue Creek Wind Farm

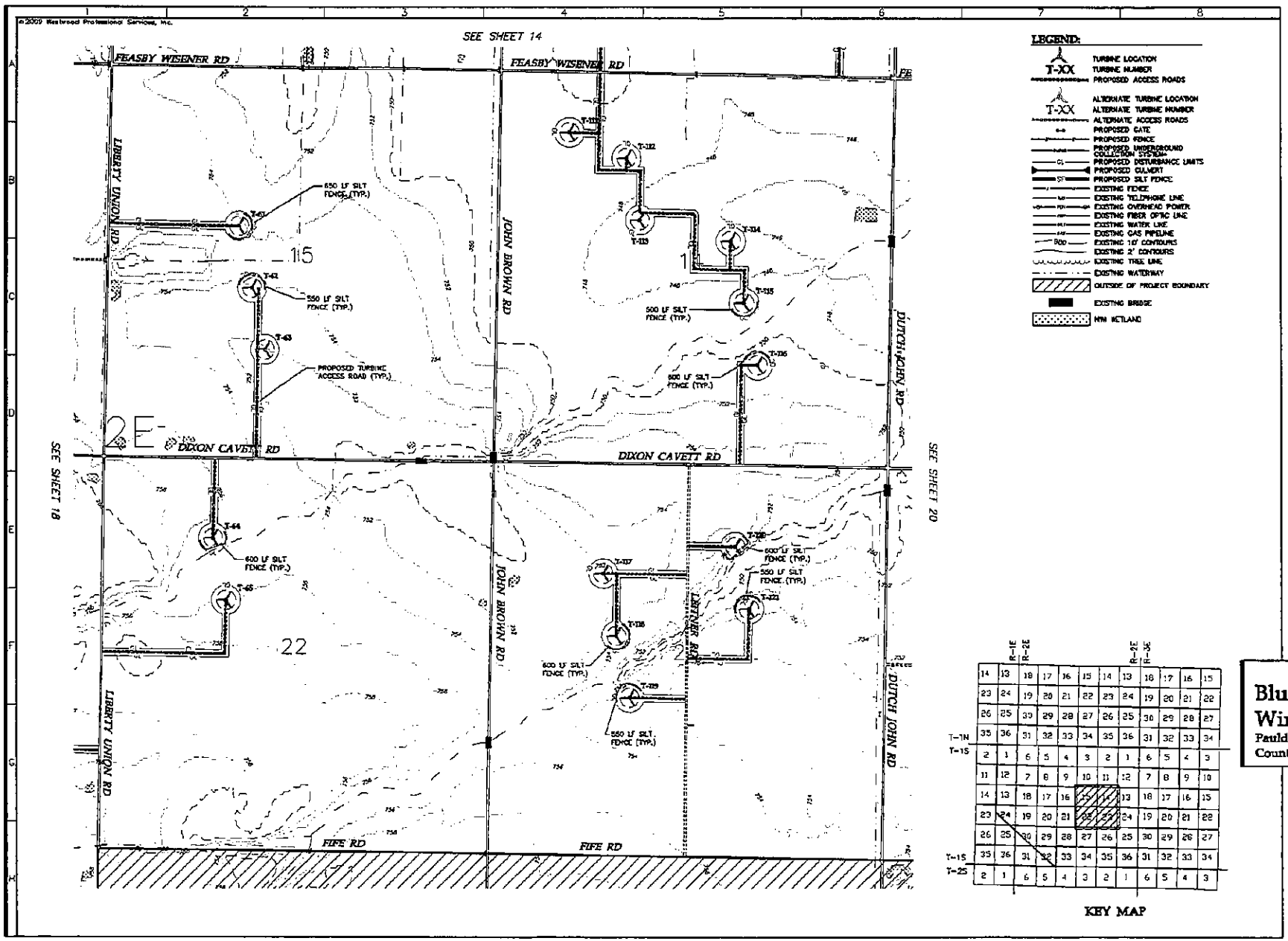
Paulding & Van Wert Counties, Ohio

Civil Site Plan

SWPP PLAN
NOT FOR CONSTRUCTION

Date 12/01/09

Sheet 18 OF 23



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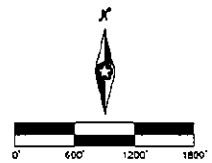

Westwood

Designed: MCC
Checked: BDR
Drawn: MCC
Record Drawing by/date:

Prepared for:

IBERDROLA RENEWABLES
1125 Northwest Couch, Suite 700
Portland, Oregon 97209

Blue Creek Wind Farm

Paulding & Van Wert Counties, Ohio

Civil Site Plan

SWPP PLAN
NOT FOR CONSTRUCTION

Date: 12/01/09
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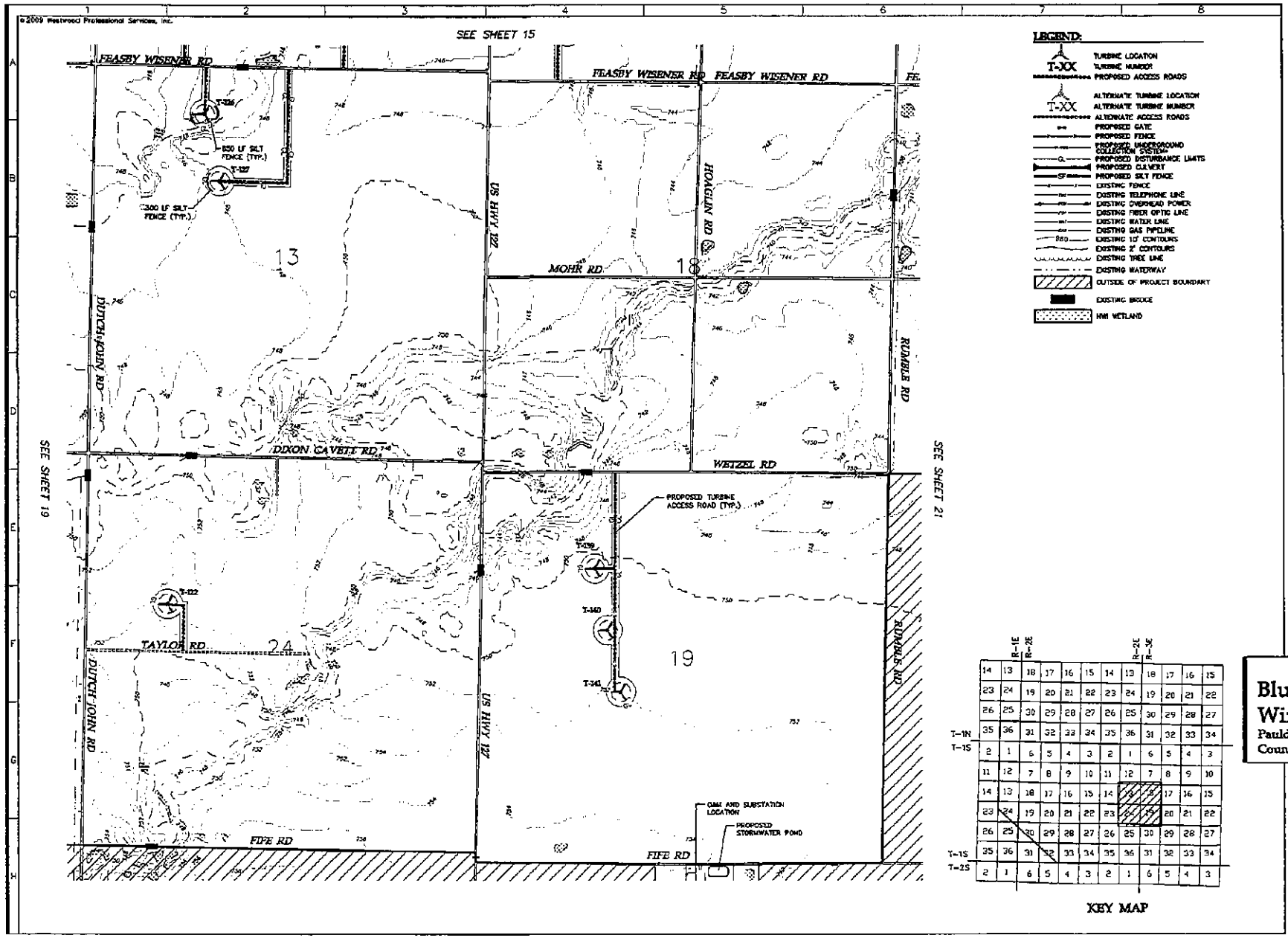

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- EXISTING WATERWAY
- OUTSIDE OF PROJECT BOUNDARY
- EXISTING BRIDGE
- HWI WETLAND

KEY MAP

Westwood

Prepared for:

IBERDROLA RENEWABLES
1125 Northwest Couch, Suite 700
Portland, Oregon 97209

N

0' 600' 1200' 1800'

Blue Creek Wind Farm

Paulding & Van Wert Counties, Ohio

Civil Site Plan

SWPP PLAN
NOT FOR CONSTRUCTION

Date: 12/01/09

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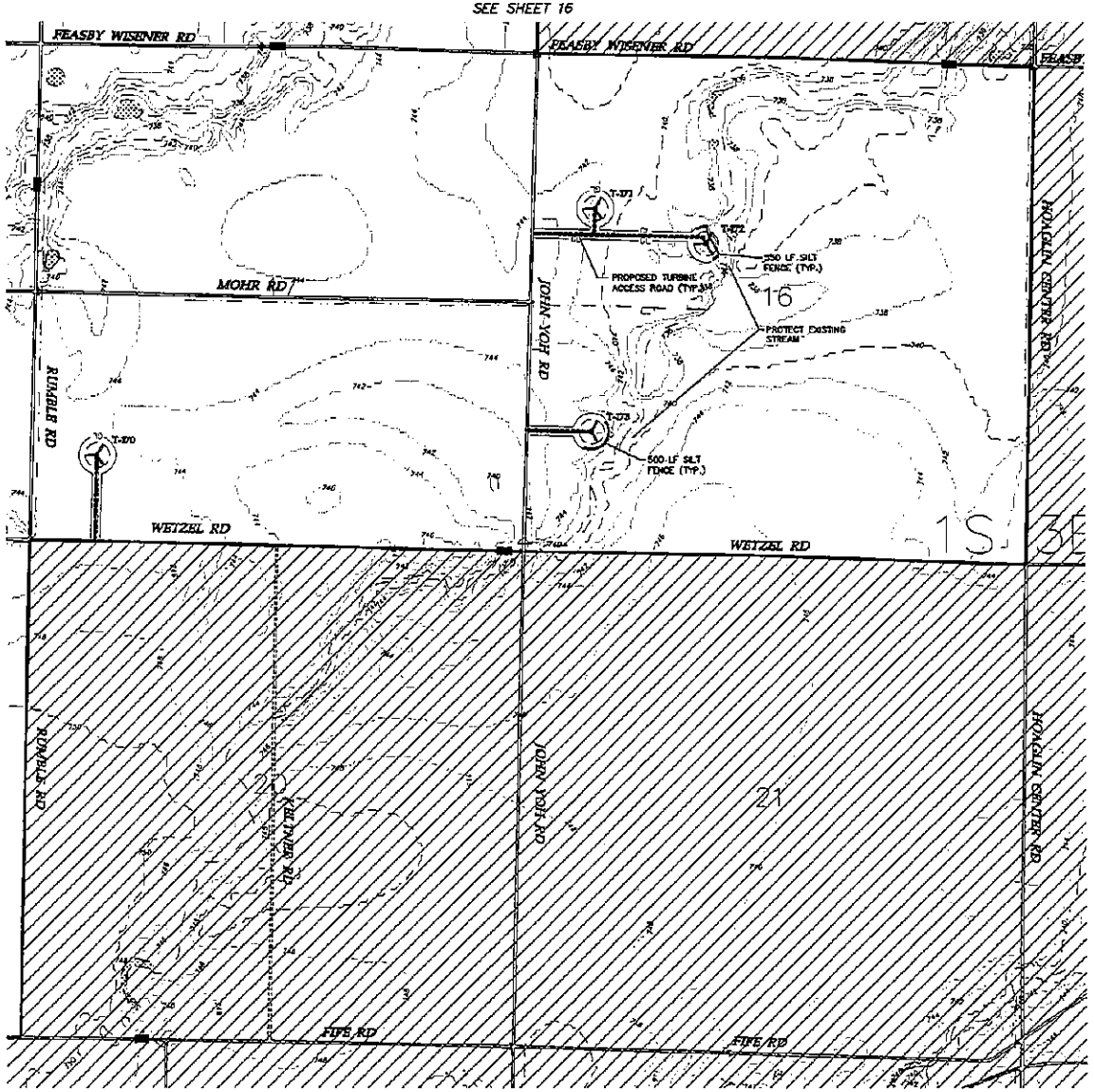

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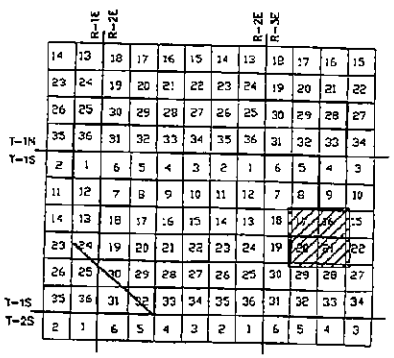

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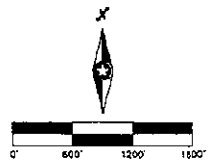

Westwood

Prepared for:

IBERDROLA RENEWABLES
1125 Northwest Couch, Suite 700
Portland, Oregon 97209

Blue Creek Wind Farm

Paulding & Van Wert Counties, Ohio

Civil Site Plan

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NOT FOR CONSTRUCTION

Date: 12/01/09
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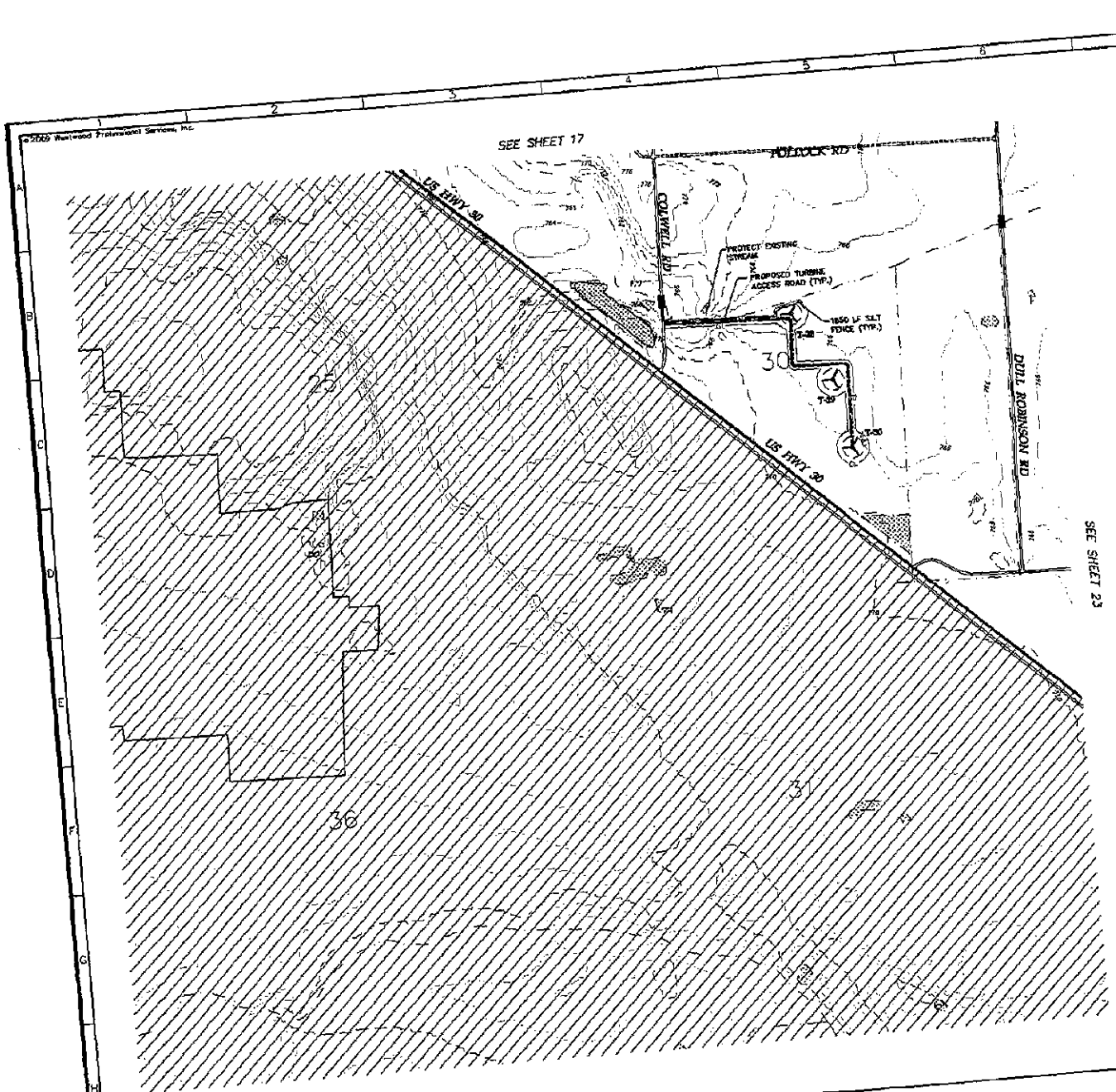

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- OUTSIDE OF PROJECT BOUNDARY
- EXISTING BRIDGE
- NW WETLAND

Westwood

Project: ABC
Contact: XYZ
Drawn: ABC
Record Drawings by/date:
Revisions: 1 12/01 Incorporated

Prepared for:

IBERDROLA RENEWABLES
1125 Northwest Couch, Suite 700
Portland, Oregon 97209

N

0 600' 1200' 1800'

KEY MAP

						R2-1E	R2-2E		R1-2E	R1-3E	
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26	25	30	29	28	27	26	25	30	29	28	27
35	36	31	32	33	34	35	36	31	32	33	34
T-1N											
T-1S	2	1	6	5	4	3	2	1	6	5	4	3
	11	12	7	8	9	10	11	12	7	8	9	10
	14	13	18	17	16	15	14	13	18	17	16	15
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	26	25	30	29	28	27	26	25	30	29	28	27
T-1S	35	36	31	32	33	34	35	36	31	32	33	34
T-2S	2	1	6	5	4	3	2	1	6	5	4	3

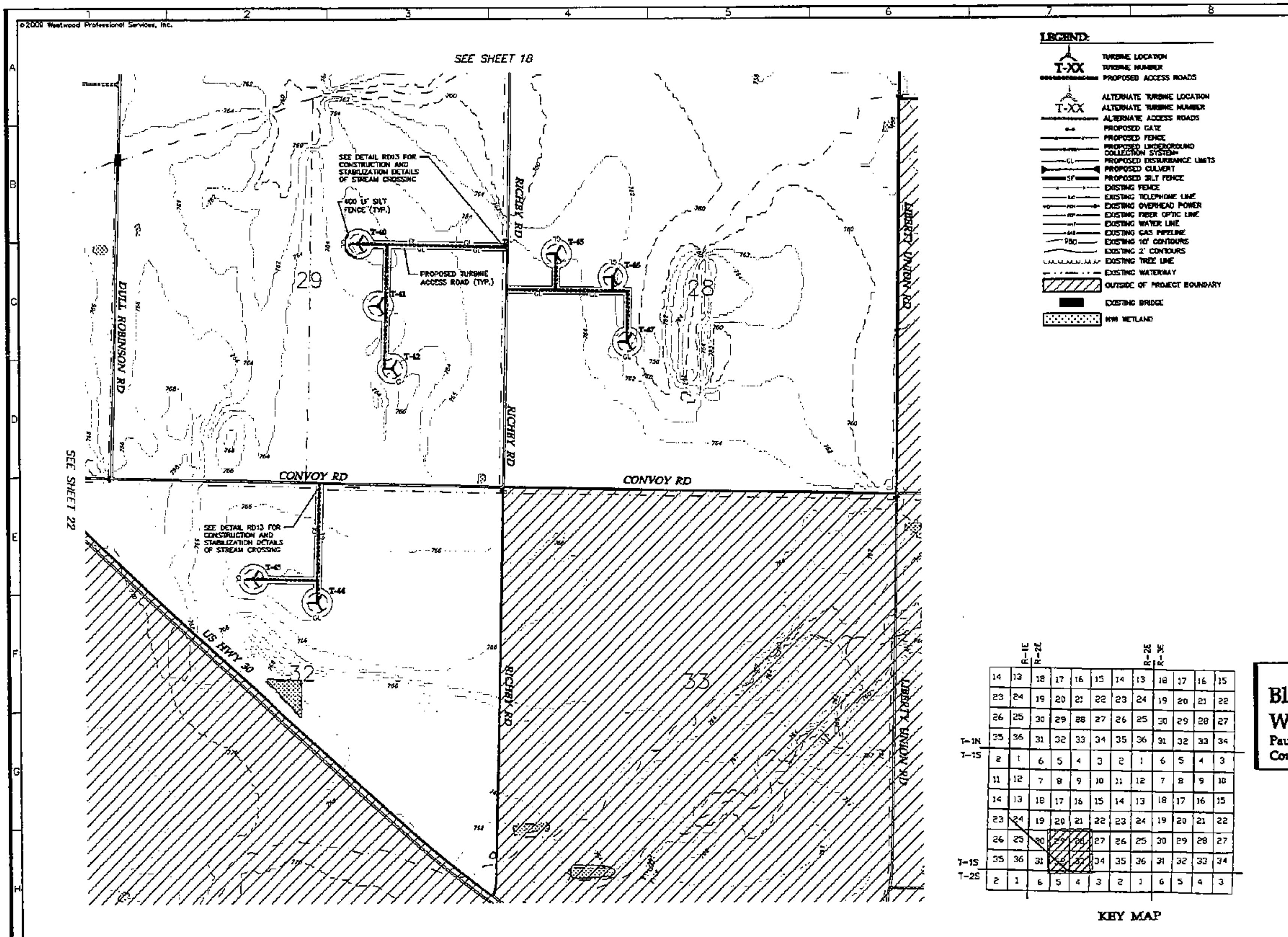
Blue Creek Wind Farm

Paulding & Van Wert Counties, Ohio

Civil Site Plan

SWPP PLAN
NOT FOR CONSTRUCTION

Date: 12/01/09
Sheet: 22 OF 23



Westwood

Designed: ADC
Checked:
Drawn: ADC

Prepared for:

IBERDROLA RENEWABLES
1125 Northwest Couch, Suite 700
Portland, Oregon 97209

0' 600' 1200' 1800'

Blue Creek Wind Farm
Paulding & Van Wert Counties, Ohio

Civil Site Plan

SWPP PLAN
NOT FOR CONSTRUCTION

Date: 12/01/09
Sheet: 23 of 23

Stormwater Pollution Prevention Plan (SWPPP)

WESTWOOD

Blue Creek Wind Farm, Ohio

Van Wert and Paulding County

December 4, 2009

Prepared for:

Heartland Wind, LLC
1125 Northwest Couch, Suite 700
Portland, Oregon 97209

Prepared by:

Westwood Professional Services, Inc.
7699 Anagram Drive
Eden Prairie, MN 55344
(952) 937-5150
Contact: Aaron Mlynek, CPESC (#3344)

Table of Contents

Attachments

A. SWPPP Maps
   Site Location, Topography, Surface Waters and Soil Map
   Construction Drawings, Erosion and Sediment Control Plan and Details

B. NPDES Permit and Correspondence
   NPDES NOI
   NPDES General Permit Authorization
   NPDES/SDS General Stormwater Permit for Construction Activity (Ohio State NPDES Permit)
   Other Correspondences (Insert as Applicable)

C. SWPPP Certification, Delegation and Notification
   SWPPP Certification
   SWPPP Delegation Letters
   Contractor Certification

D. NPDES / SWPPP Logs
   Inspection Form / Log
   Inspection / Rainfall Log
   Subcontractor Authorization Log
   Grading and Stabilization Log
   BMP Installation Log
   SWPPP Amendment Log
   Maintenance Log

E. NPDES Permit Forms
   NPDES Permit Application (NOI) (blank copy)
   NPDES Co-Permittee NOI (blank copy)
   NPDES Notice of Termination (NOT) (blank copy)

F. Endangered Species Act
   Endangered Species Documentation

G. SHPO / Cultural Resources
   SHPO / Cultural Resources Documentation

H. TMDL / 303(d) / Special Waters / Wetland and 404 Determination
   TMDL / 303(d) Waters Documentation
   Wetland and 404 Documentation

I. Inspection Reports (Insert Completed Reports)

J. Training / Certification Documentation (Insert as Applicable)

K. Local Requirements / Rules / Ordinances and Permits

L. Permanent Stormwater
Summary of Drainage Calculations (If applicable)

SWPPP NARRATIVE

1.0 Introduction

This SWPPP is prepared in accordance with the national pollutant discharge elimination system (NPDES) regulations as established by the Clean Water Act and guided by the State of Ohio, Environmental Protection Agency Construction General Permit OHC000003 (April 21, 2008). This SWPPP is for the Blue Creek Wind Project with the project location as defined in section 2.1 of this SWPPP. This report shall be on the site at all times during construction. The owner must also keep this SWPPP on file for three years after submittal of the notice of termination. The following are outlined in this SWPPP:

- Control measures for storm water pollution prevention prior to and during construction
- Control measures for storm water pollution prevention after construction
- Sources of storm water and non-storm water pollution
- Inspection and maintenance procedures
- Additional BMP information and notes

2.0 Project Information

2.1 Project Location

This document represents a Storm Water Pollution Prevention Plan (SWPPP) narrative for the Blue Creek Wind Project located in Van Wert and Paulding Counties, Ohio. The project is located in the following portions of Paulding County and Van Wert County near the town of Van Wert:

Township (T) 1 North (N) Range (R) 2 East (E) Section (S) 25-29, 31-36;
T 1 N, R 3 E, S 28-33; T 1 S, R 1 E, S 1, 12, 13, 24, 25; T 1 S, R 2 E, S 1-24, 28-30, 32
T 1 S, R 3 E, S 5-8, 16-19
Latitude / Longitude: 40.9608, -84.6111

Generally, the project is located with the boundary upon the north by Highway 114, the western boundary is located near Highway 30 and Convoy-Heller Road, the southern boundary near Convoy Road, and the eastern boundary located near Hoaglin Center Road. The approximate midpoint of the project is located at the intersection of Feasby Wisener Road and John Brown Road.

2.2 Project Description

The Project area is approximately XX,XXX acres; construction activity and disturbed area will consist of approximately XXX acres. Construction activity will include installation of up to 175 wind turbines. Construction of the wind turbines requires, but is not limited to, the installation of approximately XX miles (XXX acres) of 16-foot wide gravel access roads with 20 feet of compacted shoulders (10 feet on each side), approximately XX miles of temporary crane walking paths (approximately 36 foot width for the temporary paths for XX acres of disturbance). Crane paths are temporary, minimum use accesses (up to 4 passes of cranes throughout the life of the path) to individual turbine sites and will not include major grading activity or soil disturbance. The paths are specifically utilized to stay out of streams and other sensitive areas such as steep slopes. All crane paths will be restored to preconstruction conditions after the use of the paths.

Support activities for the Project include:

1. An underground power collection system (XX acres disturbance) which is trenched with minimal disturbance (less than a 20-foot wide trench and disturbance area) or impact to drainage.
2. **One temporary "lay down area"** (XXX Acres) used to load and unload and store material and supplies which will be primarily a temporary rock base area with temporary offices and storage facilities, dumpsters and portable sanitary facilities.
3. A XXXX (XXX) acre Electrical Substation with permanent rock base and electrical equipment.
4. A XXX (XXX) acre operation and maintenance facility

Once the erection of the wind turbines is complete, the outside 10-feet of each side of the gravel access roads will be restored, while maintaining a permanent 16-foot gravel maintenance road. Additionally, the area around each turbine site will be returned to predevelopment condition with exception of the gravel ring around the turbine.

2.3 Owner/Operator Information

Project Owner: Blue Creek Wind Farm is owned by Heartland Wind, LLC. Heartland Wind, LLC is headquartered at 1125 Northwest Couch, Suite 700, Portland, Oregon 97209.

Project Operator: _____

_____

2.4 Project Contact Information

Title	Company	Name	Contact Number
Project Engineer (SWPPP Authorization and Amending)	Heartland Wind, LLC	Jeromy Miceli	847-241-1361
Operator / General Contractor			
Project Manager			
NPDES Contact			
Project Manager	Westwood Professional Services	Dan Beckmann	952-906-7424
Emergency Response (Hazardous Material leaks / Environmental Spills)	Ohio EPA	N/A	1-800-282-9378
Site Inspector			
State Inspector / coordinator	Ohio EPA, Division of Storm Water	Patricia Tibbie	419-373-3016

SWPPP Author / NPDES Assistance	Westwood Professional Services	Aaron Mlynek, CPESC	952-697-5710

2.5 Owner / Operator Responsibilities

Owner:

The owner must submit a complete and accurate NPDES application form (Notice of Intent – NOI). The owner must identify and delegate a person(s) knowledgeable and experienced in the application of erosion prevention and sediment control BMP's who will oversee the implementation of the SWPPP, and the installation, inspection and maintenance of the erosion prevention and sediment control BMP's before and during construction (see Section 2.6 SWPPP Delegation). The owner is responsible for all NPDES compliance with all terms and conditions of the NPDES permit and is jointly responsible with the operator for implementation of the SWPPP. The owner shall retain all SWPPP documentation as required by the permit for a period 3 years past the date of the NOT submittal. Additional conditions may be assigned to the project through Ohio Power Siting Board jurisdiction.

Operator/General Contractor:

The operator is responsible for implementation of the SWPPP and BMP's to minimize sediment, contaminated stormwater and non-stormwater discharges from the site. The general contractor shall identify all subcontractors that will be performing work on this project that will result in soil disturbance activities and include documentation that such work is authorized by the general contractor or Owner in Subcontractor Log in Attachment D. All contractors and subcontractors identified in the plan must sign a copy of the certification statement (a copy of the certification statement and signature form is located in Attachment Section C of this SWPPP). Additionally, the operator shall update the SWPPP as needed during the life of the project. The general contractor is responsible to post or retain a copy of the permit NOI letter and a copy of the Ohio EPA authorization letter in a conspicuous location and to retain a copy of the SWPPP and records on site during business hours throughout the life of the project.

2.6 SWPPP Delegation

Certification, delegation and notification of the NPDES permit are located in Attachment C section of the SWPPP.

2.7 Training and Certification

All applicable training and certification documentation for the personnel overseeing, planning, implementing, and inspecting NPDES / SWPPP related activities are located in Attachment J section of the SWPPP (as applicable).

Ohio EPA recommends the site owner (Iberdrola) review the SWPPP with the primary contractor or general contractor (XXXXXXX) prior to the start of construction. Documentation of the training shall be inserted into Attachment Section J of this training / meeting.

2.8 Endangered Species Information

Included in (Attachment section F) the SWPPP is the documentation and BMPs regarding endangered species reported to be present in the vicinity of the proposed project area, as compiled previously by other investigators. An investigation regarding the potential for both state and federal threatened, endangered or special concern species to be located within or near the project area was conducted. The United States Fish and Wildlife Service and Ohio Department of Natural Resources confirmed that not federal or state listed species or habitats of concern would be affected by the proposed project.

2.9 SHPO / Cultural Resources Information

Included in Attachment G of the SWPPP is documentation of the SHPO / Cultural Resources determination of areas present or near the site area (insert as received and applicable). Cultural Resource studies are ongoing at the time of SWPPP completion but avoidance of direct impacts to archeological and historical is expected. An unanticipated discovery plan is provided in Attachment G.

3.0 Site Information, Stormwater and Non-stormwater BMPs

3.1 Pre-Development Site Conditions and Soils Information

Pre-Development Site Conditions:

The existing site primarily consists of farmland / agricultural land (>80% of the area), and to a lesser extent grasslands, wetland, hay land, farmstead. The following land uses comprise less than 1% for each use within the project area: residential, gravel pit, and roads. The surface coverage primarily consists of a mixture of row crops and cover crops / cultivated areas. The soils primarily consist of Hoytville Silty Clay Loams, Hoytville Silty Clay, Nappanee Silty Clay Loam and Latty Silty Clay. The site area has very flat topography with an elevation of approximately 780 feet above sea level. Most of the land is privately owned.

Soils Information:

A soils map and information was generated from the NRCS website Web Soil Survey 2.1: Soil Survey Staff, Natural Resources Conservation Service, United States Department of Agriculture. Web Soil Survey. Available online at http://websoilsurvey.nrcs.usda.gov/ accessed [11/25/09]. The soils information below is from that report and a soils map is included in Attachment Section A of this SWPPP. The major soil types are silty clay, clay loam, clay and silty clay loam. The soils are listed as a "Slight" erosion hazard which is the lowest hazard level for disturbed areas in over 98% of the project area. Approximately 2% of the project area is listed as a "not rated" which includes a gravel pit area. The soils in project area are poorly to very poorly drained and ground water elevations vary from 0 – 24 inches from the surface. Erosion and sediment control BMPs and phasing will be used to minimize erosion within the project area and should be adequate given the soil conditions and slope. Dewatering BMPs will likely be needed for foundation construction. A Geotech report will be available on site or included in Attachment Section A during construction activities.

3.2 Post-Development Site Conditions

The post-developed conditions will primarily consist of the same as the pre-development conditions. The main changes include the addition of the gravel maintenance roads, the wind turbine sites, and the operation and maintenance building. The drainage areas and paths will remain mostly unchanged. A stormwater pond will be required for this site to treat the runoff water from the Operation and Maintenance Building and Substation Area. Additional information on the permanent stormwater facility can be found in section 3.5 of this SWPPP.

3.3 Receiving Waters

The project area discharges water from six (6) drainage areas: Middle Blue Creek; Upper Prairie Creek; Prairie Creek; Hagarman Creek; West Branch Prairie Creek; Maddox Creek. The water from the project is collected via overland flow which is then collected by existing draws / channels which concentrate the flows to the above named tributaries / receiving waters. The ultimate receiving water (unless otherwise listed) is: Blue Creek – Auglaize; Prairie Creek and Lower Little Auglaize River. The project has multiple discharge points to the receiving waters but the runoff directly from the disturbed areas is generally non-point discharges via overland flow. Point discharge locations (where

realized and an actuality) are noted below and located within the drainage area map located in Appendix Section A of this SWPPP.

Drainage Area 1 **Middle Blue Creek** (HUC041000071003) is located in the northwest area of the project with an area covering 3,934 acres. The immediate receiving water is Blue Creek. The ultimate receiving water is the Blue Creek Auglaize River. The Project discharges water to Middle Blue Creek via overland flow and unnamed tributaries, ditches / conveyances to Blue Creek.
Drainage Area 2 **Upper Prairie Creek** (HUC041000070703) is located in the west area of the Project with an area covering 3,243 acres. The immediate receiving waters are Middle Prairie and Upper Prairie Creek. The ultimate receiving water is the Blue Creek Auglaize River. The Project discharges water to Middle and Upper Prairie Creek via overland flow and and unnamed tributaries, ditches / conveyances.
Drainage Area 3 **Upper Prairie Creek** (HUC041000071001) is located in the central area of the project with an area covering 14,910 acres. The immediate receiving waters is Prairie Creek and Dry Creek which ultimately discharges to Prairie Creek. The Project discharges water to Prairie Creek via overland flow and unnamed ditches / conveyances through Dry Creek.
Drainage Area 4 **Hagarman Creek** (HUC041000070701)is located in the east-central area of the project with an area covering 7,677 acres. The ultimate receiving water is Prairie Creek. The project discharges water to Prairie Creek via overland flow and unnamed ditches / conveyances through Hagarman Creek.
Drainage Area 5 **West Branch Prairie Creek** (HUC041000070702) is located in the eastern area of the Project with an area covering 5,240 acres. The ultimate receiving water is Prairie Creek. The project discharges water to Prairie Creek via overland flow via overland flow and unnamed ditches / conveyances through Pottawatomie and Hoaglin Creeks.
Drainage Area 6 **Maddox Creek** (HUC041000070803) is located in the southeastern most area of the Project with an area covering 1,176 acres. The ultimate receiving water is Lower Little Auglaize River. The project discharges water to Auglaize via overland flow via overland flow and unnamed ditches / conveyances through Maddox Creek.

3.4 TMDL / 303(d) Impaired Waters, Special Waters and Wetland / 404

Impaired Waters:
A phone call was placed to Jason Fiff with the Ohio EPA (614) 728-1793 at 1:00pm on November 24, 2009 regarding TMDL and Impaired waters. Mr. Fiff explained that there are no construction implications or perimeters pertaining to the TMDL or 303(d) listed waters in the project vicinity.

Additionally, the OH TMDL website (http://www.epa.ohio.gov/dsw/tmdl/OhioTMDLs_InProgress.aspx) was consulted and the TMDL reports were searched for TMDL waters, 11/24/09 1:20pm). The Upper Auglaize River (HUC11: 04100007060) is listed as TMDL water with an approved TMDL plan. However, the site is not part of the Upper Auglaize watershed area hence the site area is not subject to the TMDL. See Attachment Section H for TMDL and 303(d) lists and information (if applicable).

Clean Water Act Sections 404 / 401 Permitting (Wetlands, Waterbodies) and Floodplain info:
A wetland delineation report has been completed by CH2M Hill Dated November 2009. The report is included in Attachment section H. A 404 Army Corp of Engineer permit is not anticipated as there are no anticipated permanent impacts to jurisdictional waters; all wetland impacts are covered under Nationwide Permit 12 and 14. Wetland impacts include approximately XX locations. A total of up to 0.5 acres of wetland impacts for road entrance construction is anticipated. Utility line activities and roads through waters of the US are authorized under NWP 12 and linear access roads are authorized under NWP 14 if impacts are less than ½ acre and there are no changes to preconstruction contours. Should impacts exceed perimeters of the NWP the USACE district will need to be notified by Heartland Wind, LLC.

3.5 Storm Water Management Plan

During construction, it is not anticipated to have a contiguous 10 acres of disturbed area contributing to a common point of discharge. Therefore temporary sediment settling ponds are not planned at this

time. Additionally, the project will not be constructing new concentrated sources of storm water runoff so temporary sediment settling ponds are not planned at this time.

The project will be adding permanent impervious surfaces with the access roads, substation, operation and maintenance building and to a lesser extent, the turbine pedestals. All roads will be constructed to allow unabated flow of stormwater and minimize alteration to the existing drainage patterns; where possible the roads will be located in areas to minimize erosion and sedimentation risks. All permanent structures (substation, operation and maintenance building and turbines) will be located in areas which minimize cut and fill of soils as well as areas to minimize impacts to drainage ways and ditches. Structures will located in areas to allow for natural overland drainage and will not contribute to flow impedance of existing drainage ways.

To plan for minimal alteration of existing drainage patterns any location where a road must cross a swale, ditch, waterway, or other conveyance every attempt will be made to allow for overland flow without installation of culverts. Additionally, without culverts the long term maintenance needs of the project area will likely be less as there will be fewer culverts to possibly plug fail or otherwise need replacement in the future. There will be areas, however, which culverts will be needed to adequately convey runoff and minimize impacts to the road areas. Numerous culverts will be installed at the determined intersections of the access roads where the access road will intersect with existing local, county and state roads and highways. Culverts shall be sized based on the immediate downstream culvert size from the proposed culvert; as needed Heartland Wind, LLC and the General Contractor will consult with Van Wert and Paulding Counties regarding culvert sizes.

Other areas throughout the project which may necessitate a drainage feature crossing will take the following three best management practices (BMP's) into consideration:

1. A direct overland flow crossing with the road area
2. Installation of a "Low Water Crossing"
3. Installation of a culvert

The following table summarizes the increase in impervious surfaces (as an acreage and percentage) as well as predevelopment and post development runoff coefficients in each watershed area of the project.

	Impervious Cover Summary		Runoff Coefficients	
Watershed Name (See Attachment A for Map)	Amount of Increase	% Increase	Pre	Post
Maddox Creek	9.8 Acres	0.008	0.203	0.208
West Branch Prairie Creek	7.6 Acres	0.002	0.204	0.205
Hagarman Creek	19.5 Acres	0.003	0.203	0.205
Middle Blue Creek	9.7 Acres	0.003	0.208	0.209
Prairie Creek	42.8 Acres	0.003	0.211	0.213
Upper Prairie Creek	6.5 Acres	0.002	0.203	0.204

Permanent stormwater runoff treatment of the roads and turbine pads will be directed into the adjacent farm fields for infiltration with additional treatment from the existing vegetated ditches present on site. However, the Operation and Maintenance Building and Substation area will have a permanent stormwater treatment BMP installed. Information regarding the permanent stormwater treatment including calculations and maintenance can be found in Attachment Section L. (NEED TO COMPLETE DESIGN AND CALUCATIONS WITH A MAINTEANANCE PLAN)

3.6 Erosion / Sediment Control Prevention Measures (BMPs)

Temporary (T) and permanent (P) erosion and sediment control BMP's along with the procedures to be used to establish additional temporary BMP's as necessary for site conditions during construction are identified on the site grading and erosion control plan prepared for the development of this project, and within the project stormwater pollution prevention plan. Approved equals to the BMPs below can be used with prior approval from the project engineer. The BMPs used should meet the **specifications contained within the current edition of Ohio's Rainwater and Land Development manual** located online at: http://www.dnr.state.oh.us/portals/12/water/rainwater/Rainwater2009-6-23/6-23-09RLDFiles/6-24-09RLD_Full_Report.pdf. Specifications from the manual have been inserted into this SWPPP binder for reference and consideration during construction. Review the specifications in section Appendix A and review specific sediment control prevention measures include below:

1. (T) Project Phasing / Design BMP: This should minimize exposure of soils at any given time and allow for concurrent stabilization of soils following construction activity of the access roads, temporary crane paths and turbine sites.
2. (T) Silt Fence BMP: Silt fences will be used as perimeter controls down gradient of exposed soils during construction to capture suspended sediment particles on site to extent possible. Silt fences will be installed near the constructed roads where they intersect with existing roads to protect the ditches from sediment laden runoff as well. Silt fence will be used around the turbine locations, access roads, crane paths, lay-down area and concrete batch plant area. The standard silt fence will also be used in smaller watershed areas where the contributing areas are typically less than ¼ acre of drainage per 100 feet of standard silt fence. The standard silt fence will also be used for stockpiles which are approximately 8 feet high and 3:1 slopes. The silt fence should provide adequate protect if placed 3 – 5 feet from the toe of the stockpile. The standard silt fence should not be used in areas of highly erodible soils.
3. (T) Rock Entrance / Exit Tracking Control BMP: Rock construction entrances will be installed where access to a construction area is needed from adjacent paved surfaces to minimize sediment tracking and may be used at the temporary and permanent access roads lay down area, batch plant location and elsewhere where ever the site exits onto existing paved surfaces.
4. (T) Street Scraping / Sweeping BMP: Street scraping and sweeping will be used to retrieve tracked or washed sediment onto paved surfaces at the end of the working day or as needed.
5. (P) Riprap Energy Dissipation: Rock will be used at the discharge location of the culvert locations within the site to prevent scour erosion from occurring during high flow conditions. Riprap will also be used where needed at access road intersections where road ditch crossings are needed if vegetation / blanket are not sufficient to control scour.
6. (T) Temporary Ditch Crossing BMP: Temporary ditch crossing locations may be needed. Perimeter controls (such as silt fence) will be used at the crossing location to minimize runoff from the exposed soils. The crossing will be done during dry conditions or if the streams are wet / flowing alternative BMPs such as, but not limited to a temporary dam and bypass pump to install the crossing in dry conditions will be implemented.
7. (T) Dewatering: A temporary sump and rock base should be used where a temporary pump is installed to dewater an area of accumulated water. If a rock base cannot be used the pump intake shall be elevated to draw water from the top of the water column to limit sedimentation. Energy dissipation (riprap) should be applied to the discharge area of the pump hose. The water should be discharged to a large flat vegetated area for filtration / infiltration prior to flowing into receiving waters of conveyances / ditches. If discharge water is turbid; dewatering bags, temporary traps and rock weepers or other adequate BMP is needed to control sediment discharge. (See SWPPP Section 2.8 for additional information prior to dewatering).
8. (T) Erosion control blanket and seed BMP: Erosion control blanket (double sided netting with wood and / or straw fiber) will be used as temporary stabilization for areas of steep slopes (steeper than 4:1) and for areas of concentrated flow (ditches, swales and similar areas around culverts). Seed will be applied in these areas with the blanket for temporary and / or

permanent vegetative growth as necessary. Erosion control blanket will be used on slopes of 3:1 and steeper and in areas of concentrated flow where straw mulch will not be adequate. The blanket typically used is erosion control blanket which is deemed appropriate for slopes 3:1 and steeper with the 50 feet in long and in areas of ditch gradients of 3% and less. Where field conditions are more than 50 feet long and 4% and less erosion control blankets of straw / coconut mix will be used as deemed appropriate by field specifications.

9. (T) Temporary mulch cover and seed BMP: Temporary mulch cover (straw / hay type) will be applied at rates of 2 tons per acre to provide temporary erosion protection of exposed soils areas with slopes flatter than or equal to 4:1. Seed will be applied with the mulch for temporary and / or permanent vegetative growth as necessary. Straw mulch (straw / hay type) is used for all soil types where slopes are flatter than 3:1 and no significant concentrated flows are present. The mulch is disc-anchored to the soil to keep it from blowing away. The mulch prohibits the impact of the rain drop from dislodging soil and subsequently carrying the soil away during sheet drainage. In sandy soils the use of tackifier may be used to assist the disc anchoring if the mulch cannot be secured to the sandy soils.
10. (P) Permanent seed and temporary mulch and / or erosion control blanket BMP: In areas of final grade permanent seed will be applied to promote vegetative cover for permanent erosion control (areas may include the temporary crane paths, adjacent areas to the access roads, for temporary cover at the lay-down and batch plant location when the areas are no longer needed). Temporary mulch and / or blanket will be applied to areas of permanent seeding to provide temporary erosion protection until the permanent seed is established.

3.7 Temporary and Permanent Vegetation Establishment

All disturbed areas without permanent impermeable or gravel surfaces will be vegetated for final stabilization. In agricultural areas, the disturbed soils shall be returned to the predevelopment condition. For example, where the soils were tilled / farmed and not covered with vegetation, the area must be graded, de-compacted and tilled to predevelopment condition. See BMPs 8 - 10 in Section 3.6 in this SWPPP as stated above. All slopes steeper than 4:1 shall be restored with erosion control blanket. Erosion control blanket shall be straw or wood fiber with 2 sided netting and shall include seed application prior to application of the blanket. All slopes 4:1 or flatter shall be restored with seed and mulch and shall be disc anchored. Application rate of the mulch (straw or hay type) should be 4000 lbs/ac. The site shall be stabilized with a site-appropriate seed mixtures specified in this SWPPP, by the Owner or by an equal seed specification(s) determined by the site owner.

Temporary Seed Mixes

Seeding Dates	Species	Lb./1000 ft2	Lb/Acre
March 1 to August 15	Oats Tall Fescue Annual Ryegrass	3 1 1	128 (4 Bushel) 40 40
	Perennial Ryegrass Tall Fescue Annual Ryegrass	1 1 1	40 40 40
	Annual Ryegrass Perennial Ryegrass Creeping Red Fescue Kentucky Bluegrass	1.25 3.25 0.4 0.4	55 142 17 17
	Oats Tall Fescue Annual Ryegrass	3 1 1	128 (3 bushel) 40 40
August 16th to November	Rye Tall Fescue Annual Ryegrass	3 1 1	112 (2 bushel) 40 40
	Wheat Tall Fescue Annual Ryegrass	3 1 1	120 (2 bushel) 40 40
	Perennial Rye Tall Fescue Annual Ryegrass	1 1 1	40 40 40
	Annual Ryegrass Perennial Ryegrass Creeping Red Fescue Kentucky Bluegrass	1.25 3.25 0.4 0.4	40 40 40
November 1 to Feb. 29	Use mulch only or dormant seeding		

Note: Other approved species may be substituted

Permanent Seed Mixes

Seed Mix	Seeding Rate		Notes:
	Lbs./acre	Lbs./1,000 Sq. Feet	
General Use			
Creeping Red Fescue Domestic Ryegrass Kentucky Bluegrass	20-40 10-20 20-40	1/2-1 1/4-1/2 1/2-1	For close mowing & for waterways with <2.0 ft/sec velocity
Tall Fescue	40-50	1-1 1/4	
Turf-type (dwarf) Fescue	90	2 1/4	
Steep Banks or Cut Slopes			
Tall Fescue	40-50	1-1 1/4	
Crown Vetch Tall Fescue	10-20 20-30	1/4-1/2 1/2-3/4	Do not seed later than August
Flat Pea Tall Fescue	20-25 20-30	1/2-3/4 1/2-3/4	Do not seed later than August
Road Ditches and Swales			
Tall Fescue	40-50	1-1 1/4	
Turf-type (Dwarf) Fescue Kentucky Bluegrass	90 5	2 1/4 0.1	
Lawns			
Kentucky Bluegrass Perennial Ryegrass	100-120	2 2	
Kentucky Bluegrass Creeping Red Fescue	100-120	2 1-1/2	For shaded areas

Note: Other approved seed species may be substituted

3.8 Potential Pollutants and Sources

Potential pollutant sources, including construction and waste materials that are used or stored at the site are described in this section. By implementation of these BMP's, the potential pollutant sources are not reasonably expected to affect the storm water discharges from the site. Construction

materials and chemicals used or stored on-site are kept in small quantities whenever possible. A spill prevention, control and countermeasure plan will likely be needed should materials or tanks be present on site with more than or ability to contain more than 1,320 gallons of petroleum products. When not in use, they will be stored in sealed containers and under cover to prevent direct contact with storm water. Any inadvertent spills will be cleaned up immediately upon discovery and the materials will be disposed of in accordance with local, state and federal requirements. Contractors will have spill kits available on site for rapid deployment to contain and cleanup spills.

SPILL REPORTING: Spills shall be reported to Ohio EPA (1-800-282-9378). Spills of 25 gallons or more of petroleum products shall be reported to Ohio EPA (1-800-282-9378), the local fire department, and the Local Emergency Planning Committee within 30 min. of the discovery of the release. All spills, which result in contact with waters of the state, must be reported to OHIO EPA's Hotline.

Construction materials, chemicals and waste materials that may be used or stored at the site:

POTENTIAL POLLUTANT	LOCATION	CONTROL MEASURE*
Antifreeze	Vehicle/Equipment (Laydown Yard)	S.C. / Drippan
Diesel Fuel	Vehicle/Equipment/Fuel Tank (Laydown Yard)	S.C. / Drippan
Gasoline	Vehicle/Equipment/Fuel Tank	S.C. / Drippan
Hydraulic Oils/Fluids	Vehicle/Equipment (Laydown Yard)	S.C. / Drippan
Grease	Vehicle/Equipment (Laydown Yard)	S.C. / Drippan
Sanitary Waste Restrooms	Portable	Service Provider To Secure Units From Tipping
Trash And Construction Debris	Various (Laydown Yard)	Dumpster (covered and leak proof)
Paints	Contractor (Laydown Yard)	S.C. and secure / covered storage.
Glue/Adhesives/Curing Compounds	Contractor (Laydown Yard)	S.C. and secure / covered storage.
Soil Amendments	Various (Laydown Yard)	S.C. and secure / covered storage.
Landscaping Materials Fertilizer	Various (Laydown Yard)	S.C. and secure / covered storage.
Concrete Mortar	Mobile Mixer	S.C. / Washout Area and secure / covered storage
Concrete	Trucks/Washout	Washout Area / S.C.
Bentonite	Directional Boring / equipment	S.C. / Sump area

*S.C. refers to secure secondary containment unit or area.

3.9 Potential Non-Stormwater Pollutants / Management

Non-storm water discharges will be eliminated or reduced to the extent feasible, with the exception of those necessary for the completion of certain construction activities. Authorized non-storm water discharges from this site include:

1. Water used for dust control purposes

2. Pavement wash waters where spills or leaks of toxic materials have not occurred (unless all spilled material has been removed) and where detergents are not used
3. Uncontaminated groundwater or spring water
4. Uncontaminated excavation dewatering
5. The application of water by water trucks or piped irrigation
6. Pre-watering of a construction site in order to conduct grading activities
7. Landscaping activities requiring irrigation
8. Street cleaning (where permitted and necessary)
9. Other: _____

These authorized non-storm water discharges will be conducted in accordance with the requirements of the CGP, and every effort will be made to minimize non-storm water runoff from these site activities.

The Contractors are responsible to implement the following BMP's and management for non-stormwater discharges.

The BMPs for the non-storm water discharges from this site are:

Water used for Dust Control: This is not anticipated to be a contamination / pollution issue. During the dry times when dust control is needed the minimal amount of water is anticipated to be absorbed into the soil. If any runoff does occur, the standard BMP's (such as silt fence, mulch and erosion control blanket, inlet controls and stormwater basins should adequately control the runoff from reaching off site surface waters).

Uncontaminated Ground Water / Spring Water: clean water will be pumped from the ground and discharged through hoses to stormwater ponds or receiving waters as appropriate and applicable according to local permits and regulations.

Uncontaminated excavation dewatering: Clean water will be discharged to temporary or permanent stormwater / sediment basins via hose and energy dissipation will be applied to the discharge location to minimize scour. Alternatively, uncontaminated water could be discharged to receiving waters as allowed by local permits and regulations.

Application of water by water trucks or piped irrigation: Water runoff is not anticipated from this activity. If application of water by water truck or irrigation is occurring on site it will likely be during dry times of the year and the water will be absorbed or evaporated on site. If runoff occurs the existing BMP's (silt fence, mulch and seed, sod, inlet protection devices, stormwater ponds and others) will likely adequately control the runoff.

Prewatering of Construction Sites: This is not anticipated to be a contamination / pollution issue. During the dry times when prewatering is needed the minimal amount of water is anticipated to be absorbed into the soil as it is intended to adjust the moisture content of the soil. If any runoff does occur, the standard BMP's (such as silt fence, mulch and erosion control blanket, inlet controls and stormwater basins should adequately control the runoff from reaching off site surface waters).

Other (Owner / Operator to fill in if needed):

4.0 Construction Phasing and Notes

4.1 Stockpile of Materials

It is highly recommended that the contractor maintain a stockpile of erosion control devices and sediment control BMP's on site at all times for immediate usage.

4.2 Timing of BMP installation

The erosion prevention and sediment control BMP's shall be installed to minimize erosion from disturbed surfaces and capture sediment on site. Sediment controls (such as silt fences) shall be installed immediately prior to disturbing up-gradient soils / areas or within 7 days from the start of grubbing activities. Rock entrance pads shall be installed prior to accessing the construction areas from paved surfaces or exiting from the disturbed area to paved surfaces. Erosion control BMPs (mulch / blanket) shall be installed within the time frames of the Construction General Permit as listed below:

Table 1: Permanent Stabilization

Area requiring permanent stabilization	Time frame to apply erosion controls
Any areas that will lie dormant for one year or more	Within seven days of the most recent disturbance
Any areas within 50 feet of a surface water of the State and at final grade	Within two days of reaching final grade
Any other areas at final grade	Within seven days of reaching final grade within that area

Table 2: Temporary Stabilization

Area requiring temporary stabilization	Time frame to apply erosion controls
Any disturbed areas within 50 feet of a surface water of the State and not at final grade	Within two days of the most recent disturbance if the area will remain idle for more than 21 days
For all construction activities, any disturbed areas that will be dormant for more than 21 days but less than one year, and not within 50 feet of a surface water of the State	Within seven days of the most recent disturbance within the area For residential subdivisions, disturbed areas must be stabilized at least seven days prior to transfer of permit coverage for the individual lot(s).
Disturbed areas that will be idle over winter	Prior to the onset of winter weather

Where vegetative stabilization techniques may cause structural instability or are otherwise unobtainable, alternative stabilization techniques must be employed.

The following list defines the timing of erosion prevention and sediment control measures in specific areas.

4.3 Before construction

The following erosion prevention and sediment control measures are shown in the plans and shall be implemented prior to construction:

1. Consult the Section 2.8 of this SWPPP report for phasing / construction buffer and siting information and SWPPP Section 3.6 for BMPs.

2. Install silt fence (prior to disturbing up-gradient areas) around the perimeter of areas to be graded as shown on the plans and where field conditions dictate upon notification from the inspector.

3. Construct gravel construction entrances at entrances as shown on the plans prior to accessing the construction area as construction sequencing dictates. See 4.4 item 9 for additional information.

4. Install sediment protection as shown on plans or as field conditions dictate at all open tile line intakes within 200 feet of construction limits and /or culverts which have the potential to receive storm water runoff from the construction site.

4.4 During construction

The following erosion prevention and sediment control and pollution prevention measures are shown in the plans and shall be implemented during construction:

1. Phase grading work to minimize the duration that any disturbed soil is exposed; only expose soils in areas which will be actively worked within a 21 day period. Additionally, utilize and protect existing vegetated areas to the extent possible for use as sediment control.

2. Protect and / or avoid existing agricultural conservation practices such as grass waterways, filter strips, and field borders unless these areas are specifically staked for construction or within construction limits.

3. All disturbed areas shall have temporary protection or permanent cover over exposed soil areas if not being actively graded and/or if not at final grade within the time frames stated in Table 2, Section 4.2 of this SWPPP.

4. Temporary protection shall be disc anchored straw or hay mulch, erosion control blanket or an approved equal. If an approved equal is used; the BMP(s) used will be noted as a change to the SWPPP in Attachment Section D of the SWPPP.

5. Place a minimum of 4 inches of native topsoil over vegetation re-establishment areas when grading is complete.

6. Install silt fence around all temporary stockpile areas prior to disturbing or stockpiling material that are within 200-feet of a surface water and / or which will pose as a source of sediment discharge to surface waters (such as open tile inlets or broken tile lines) if not already contained within perimeter controls.

7. Install silt fence ditch checks on downhill side of intersection installation for access to county roads or use the blanket / bioroll system as a ditch check.

8. Install stream crossings as needed. The stream crossing work and BMPs installed to minimize sediment from entering the stream should be done within the same day. Implement **stream crossings under dry conditions or use BMP's such as a diversion dam / pump to** temporarily divert the flow around the work area.

9. Implement dewatering of foundations as needed. A temporary sump and rock base should be used where a temporary pump is installed to dewater an area of accumulated water. Energy dissipation (riprap) should be applied to the discharge area of the pump hose. The water should be discharged to a large flat vegetated area for filtration / infiltration prior to flowing into receiving waters of conveyances / ditches. If discharge water is turbid; dewatering bags, temporary traps and rock weepers or other adequate BMP is needed to control sediment discharge. .

10. Construction of access roads with immediate application of rock base (if sequencing of activity is possible) could result in no rock pad access being needed if truck / vehicle access will not result in erosion / tracking of sediment onto adjacent paved roads.

11. Remove any sediment that has been tracked onto public streets at the end of the day.

12. Generation of dust shall be controlled through the use of water application or other approved dust palliatives such as calcium chloride.

13. Collect all construction debris in dumpsters and roll-off boxes. Dumpsters should include a plug to control potential discharge of contaminated water from the dumpster if material in dumpster poses a storm water contamination potential. Empty dumpsters when debris *reaches top of dumpster.*

14. Repair silt fences, rock checks, gravel construction entrances, vegetated terraces and other erosion and sediment controls as needed to maintain working order. Maintenance activities *should be done within a 7 Day time frame or prior to the next rainfall event, whichever is* soonest. If maintenance prior to the next rain event is impractical document why the maintenance cannot be done and perform maintenance as soon as possible.

15. Concrete truck washout is going to occur at the project site in areas other than the batch plant, a designated and contained washout location must be shown on the plan and constructed according to the detail provided or approved equal. If an approved equal is used the SWPPP shall be amended to provide information on washout BMP used. All washout areas shall be *located away from watercourses, drainage ditches, and field drains.*

16. Storage of hazardous materials (e.g. paints, solvents, petroleum, concrete) out of contact with stormwater in a secure location; if the material is in contact with stormwater, the material should be located and stored in air-tight and secure containers within secondary containment devices.

4.5 After Construction

The following erosion prevention and sediment control measures are shown in the plans and shall be implemented upon completion of construction activities:

1. Remove, cleanup and stabilize any accumulated sediment material from the temporary sediment controls during final stabilization measures and removal of temporary BMPs.

2. Install Permanent Vegetation Establishment in accordance with the Permanent Vegetation Establishment Section 3.7 in this SWPPP.

3. Remove all silt fence and other temporary erosion and sediment control devices after vegetation is 70% established by uniform perennial vegetation cover over the entire pervious surface area or following the disturbed areas restored to predevelopment conditions in agricultural areas. Repair and restore all areas disturbed during removal of BMPs.

4. Submit Notice to terminate the permit shall be done when construction activity is complete and areas of disturbance have been permanently stabilized with gravel base or areas which will be vegetated have been covered with 70% density cover of 100% of the area. Notice to terminate the permit shall be done with NOT Form and mailed to OH EPA within 45 days of completion of construction activities and establishment of permanent stabilization. See Attachment E for NOT form.

5.0 SWPPP Documentation and Records

5.1 SWPPP Inspections

During active construction activities, inspections shall be conducted by the contractor or other qualified personnel designated by the Owner every seven (7) days and within 24 hours of the end of a storm that is 0.5 inches or greater. Inspections can be reduced to once per calendar month where runoff is unlikely due to winter conditions (snow covered or ground is frozen) or if the entire site is temporarily stabilized.

A waiver of inspection requirements is available until one month before thawing conditions are expected to result in a discharge if all of the following conditions are met:

1. The project is located in a n area where frozen conditions are anticipated to continue for more than one month.
2. Land disturbance activities have been suspended.
3. Documentation of the beginning and ending dates of the waiver period are documented in Attachment Section D, Inspection Log.

Areas which have final stabilization established and recorded in Attachment Section D, Stabilization Log, do not need further inspection.

The owner or an alternate designated person(s) will conduct the inspections as specified in this SWPPP. Alternates will include individuals to be designated by the owner and may include contractor personnel or other qualified individuals and shall be listed in the project contact information section of this report and SWPPP Delegation section (Attachment Section C) of this SWPPP.

The following shall be completed during each inspection:

1. Record date and time of inspection
2. Name of person(s) conducting inspection, title of the person and qualifications
3. Record rainfall / weather information since most recent inspection including an estimate of the time of storm events, duration of each storm event and amount of rainfall for each storm event and whether any discharges occurred.
4. Record of weather information and description of any discharges occurring at the time of inspection
5. Locations of discharges of sediment or other pollutants from the site
6. Inspect the site for excess erosion and sedimentation
7. Inspect site for debris, trash and spills
8. Inspect temporary erosion and sedimentation control devices
9. Inspect construction entrances for sediment tracking onto paved streets.
10. Inspect the adjacent streets and areas for sediment, litter, and construction debris.
11. Inspect site runoff outfall or discharge areas
12. Record findings of inspection, including recommendations for corrective actions, locations of BMPs that need maintenance, locations of BMPs that failed and BMPs which are needed and not implemented at the time of inspection.
13. Record corrective actions taken (including dates, times and party completing maintenance activities in the Maintenance Log located in Attachment Section D)

14. Record changes made to the SWPPP as required in paragraph Part III.C.3 and Part III.D of the General Permit within 10 days of inspection
15. Certify/sign inspection reports

5.2 Maintenance of BMPs

The owner/contractor is responsible for the operation, maintenance and inspection of temporary and permanent water quality management BMPs as well as all erosion prevention and sediment control BMP's, for the duration of the construction work at the site. The controls in place will be maintained in working order to ensure proper compliance with the NPDES permit. Maintenance of the BMPs must be done within **3 days** of the inspection.

If the inspection reveals a BMP failed or if a BMP was not implemented as needed according to the SWPPP BMP must be replaced or installed within **10 Days** of the inspection.

The following guidelines will be used to determine if the erosion and sediment control devices require maintenance, repair, or replacement:

1. If sediment control devices such as silt fence or fiber rolls (wattles) are filled to **1/3 of the height of the control device**, the contractor shall remove accumulated sediment.
2. If open tile intake protection / culvert protection devices appear plugged with sediment, are filled to **1/3 capacity**, or have standing water around them, the contractor shall remove the sediment and clean or replace the filter.
3. If the gravel construction entrances are filled with sediment or not controlling tracking adequately the contractor shall either replace the entrance or add additional gravel.
4. If sediment from the site is observed on paved adjacent streets or other properties, the contractor shall remove the sediment and temporarily stabilize and seed areas if vegetation is disturbed on adjacent property.
5. If sediment from the site is observed on adjacent streets, in surface waters or other properties, the contractor shall identify the source and discharge location of the sediment and implement additional erosion and sediment controls at those locations to prevent future discharges. Sediment must be retrieved within **3 days** from surface waters unless additional regulatory approval is needed. The operator is responsible to contact all local, regional, state and federal authorities and obtain any applicable permits prior to conducting any work to remove sediment that has been discharged from the site.
6. If excessive sediments or debris are observed at the flared end section outfalls, the contractor shall determine the source and discharge locations of such materials. If the discharge has occurred on the property, the contractor shall remove the sediments and debris and correct the source of such materials.
7. If mulch and seed or blanket and seeding does not establish adequately; over-seeding and re-mulching or blanketing may be necessary. Proper establishment is dependent upon time of year but establishment of 70% density is the bench mark.

5.3 Sampling Requirements / Effluent Limitations

Sampling requirements are not applicable to this project as the State of OH Construction Site General Permit nor do local requirements exist for sampling requirements.

5.4 SWPPP Amendments and Archiving Documentation

SWPPP Amendments:

The SWPPP must be amended if there is a change in the design, construction, operation, or maintenance at the Site that has or could have a significant effect on the discharge of pollutants to surface water. The SWPPP also must be amended if regulatory officials inspecting the Site determine that the SWPPP is ineffective in eliminating or significantly minimizing pollutants in storm water. And, the SWPPP must be amended within 10 days if any routine inspection indicates that additional or modified BMPs are needed at the construction site. Such additional or modified BMPs must be implemented within 10 days of

the inspection. The SWPPP amendment should be noted / drawn into the SWPPP plan sheets and noted within this SWPPP document as necessary. A SWPPP Amendment Log is located in Attachment Section D of this SWPPP.

Archiving Documentation:

The owner and operator shall archive all SWPPP documentation contained within this narrative and SWPPP plan / maps and inspection records for a period of three (3) years after submittal of the Notice of Termination (NOT). The SWPPP information archived, including other permit information for the project; records of inspections and maintenance conducted during construction; permanent operation and maintenance agreements (ROW / Contracts / Covenants / Other Maintenance); required calculations for design of the temporary and permanent storm water management systems; will be done as required.

6.0 Post Construction Stormwater BMPs and Activities

6.1 BMP(s) Locations and Descriptions

Culverts: numerous culverts will be installed at the determined intersections of the access roads where the road will come in contact with existing local, county and state roads and highways. There are XX culverts of various sizes planned for installation. Culvert locations and sizes are shown on the Construction Drawings located in Appendix A.

Long term operation and maintenance of the culverts and ditches / swales not owned / operated by private land owners will be done by Iberdrola Renewables. Contact information can be found in SWPPP section 2.4.

6.2 MS4 Information and Contact(s)

Using the OH EPA website: (http://www.epa.ohio.gov/dsw/permits/gplist.aspx) a search of MS4s was conducted. No MS4 communities were found for Paulding or Van Wert Counties or nearby cities / towns.

7.0 Additional BMPs and Housekeeping

7.1 Work in and Next to Streams

- Construction activities in streams will be scheduled for periods when flows are anticipated to be at a minimum.
- Temporary low flow drainage crossings (fords) shall be constructed of clean stabilizing material such as rock.
- If there is flowing water during construction the flow shall be diverted around the work site in a stable manner using methods approved by the engineer
- If a bypass channel is necessary, it will be stabilized with riprap before diverting the stream.
- Trees shall be selectively trimmed along banks (if applicable) or cleared to allow equipment to operate.
- Grubbing of roots shall be kept to a minimum.
- The primary BMP shall be heavy duty silt fence along the stream bank.

7.2 Vehicle Maintenance

- Routine maintenance of vehicles shall occur in staging areas only.
- Vehicle washing shall be avoided. If washing is necessary, runoff from the washing will be contained in a lined sediment trap and the wash water shall be properly disposed of at a treatment facility.

- Engine degreasing shall be avoided. If degreasing is necessary, runoff from the operation will be contained in a lined sediment trap and properly disposed of at a treatment facility.

7.3 Fueling

- Any fuel tank or truck stored on the project site shall be protected by a secondary containment system.
- *Fueling areas shall not be washed or rinsed with water since this could cause fuel spills to be* discharged into storm water systems.
- Absorbent materials shall be available on site for use in cleaning up small spills.

7.4 Hazardous materials

- Hazardous materials shall be properly stored to prevent vandalism or unauthorized access.
- Containment units shall be installed in accordance with federal, state, and local regulations.
- No hazardous material shall be stored within 200 feet of an identified critical area.
- Absorbent materials shall be available on site for use in cleaning up small spills.
- If building materials, chemicals, or general refuse is being used, stored, disposed of, or otherwise managed inappropriately, the contractor shall correct such defects within 24 hours of detection or notification.

7.5 Chemical Containment

- Gasoline, oil, paint, solvents, and other chemicals necessary for construction are not allowed to contact the ground surface, be exposed to groundwater or be released to a surface or groundwater except in minimal quantities.
- All products shall be kept in their original container, with original labels still attached, unless the container is not resalable.
- Hazardous materials shall be returned to the hazardous material storage area at the end of each day.
- An effort should be made to store only enough products to do the required job.
- The contractor shall provide tanks or barrels to collect liquid byproducts that pose a pollution hazard.
- The pollutants shall be removed from the site on a weekly basis and disposed of in accordance with federal, state and local regulations.
- All spills shall be cleaned up immediately after discovery, in accordance with the *manufacture's recommended methods.*

7.6 Solid Waste

- Solid waste shall be stored in appropriate containers and properly disposed of on a regular basis.
- Containers shall be covered to prevent wind blowing the waste around the site.
- OH EPA disposal requirements will be followed for all solid waste.

7.7 Dewatering

- During dewatering activities, the sediment laden water cannot be directly discharged to surface waters. Options for reducing the turbidity of the water include:
    - Constructing a temporary sediment trap for turbid water discharge pretreatment.
    - Use of a portable sediment containment system such as dumpsters.
    - Application of natural based flocculent technology such as chitosan in sediment traps or a series of ditch checks to contain sediment.
    - Discharge water through a series of fiber logs or a rock weeper into a large vegetated buffer area.
- Energy dissipation will be provided at all discharge points.

- Dewatering or basin draining activities will not cause erosion in receiving channels or adversely impact wetlands.

7.8 Stockpiles (Temporary and Permanent)

- Locate stockpiles a minimum of 100 feet from site drainage routes.
- Perimeter controls such as silt fence shall be installed around all stockpiles if not placed within existing silt fences or other sediment controls.
- Temporary seed and mulch shall be used to stabilize the stockpiles and the stockpiles shall be shaped to facilitate seeding and minimize erosion and shall be seeded within 14 days.
- If temporary seed and mulch cannot be used, then the stockpiles shall be covered with hydromulch, tarps or plastic sheeting as approved by the owner.

7.9 Winter Stabilization

- Cover exposed soils on or around November 15th and/or prior to termination of construction activities for winter
- All exposed soils to be covered with 2 tons straw / hay mulch
- All exposed soils to be seeded with temporary seed mix
- All low points in roads to be adequately drained in accordance with NPDES dewatering requirements.
- Perimeter silt fence or other controls to be installed 3-5 feet from the back of the plowed snow area.
- If work has occurred near or in streams or other surface waters, the exposed soils shall be stabilized to protect against flooding and spring runoff to the 100-yr flood elevation.
- All temporary and permanent stormwater basins and sediment basins should have outlets and stabilized emergency overflows installed as per the plan set and at the approval of the owner.

ATTACHMENT A

Storm Water Pollution Prevention Plan

for

Wind Turbine Generators, Access Roads, Drainage and Erosion Control

for

Blue Creek Wind Farm

Paulding & Van Wert Counties, Ohio

NO.	DATE	REVISION	SHEETS

SHEET LIST TABLE	
SHEET NUMBER	SHEET TITLE
1	COVER
2	OVERALL CIVIL SITE PLAN
3	CONSTRUCTION DETAILS
4	CONSTRUCTION DETAILS
5	CONSTRUCTION DETAILS
6	SWPPP DETAILS
7	CIVIL SITE PLAN
8	CIVIL SITE PLAN
9	CIVIL SITE PLAN
10	CIVIL SITE PLAN
11	CIVIL SITE PLAN
12	CIVIL SITE PLAN
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18	CIVIL SITE PLAN
19	CIVIL SITE PLAN
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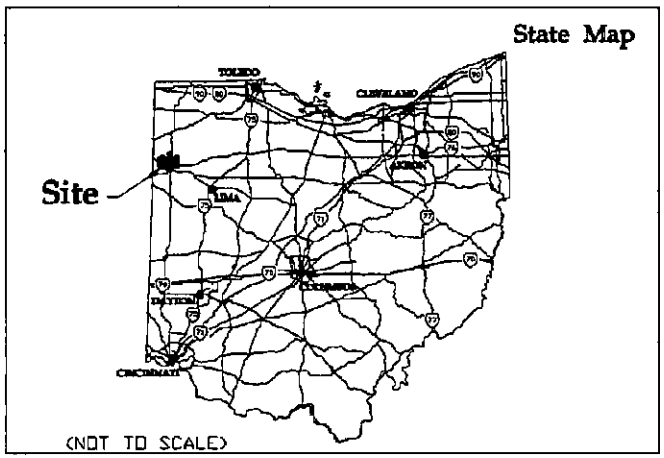
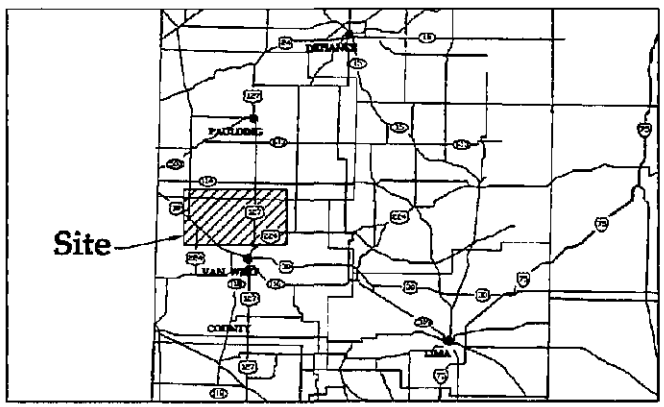
21	CIVIL SITE PLAN
22	CIVIL SITE PLAN
23	CIVIL SITE PLAN

State Map



Vicinity Map



Westwood

Designed: ASC
Checked: BRH
Drawn: ASC
Record Drawings by/date:

No.	Date	Description

Prepared for:

IBERDROLA RENEWABLES
1125 Northwest Couch, Suite 700
Portland, Oregon 97209

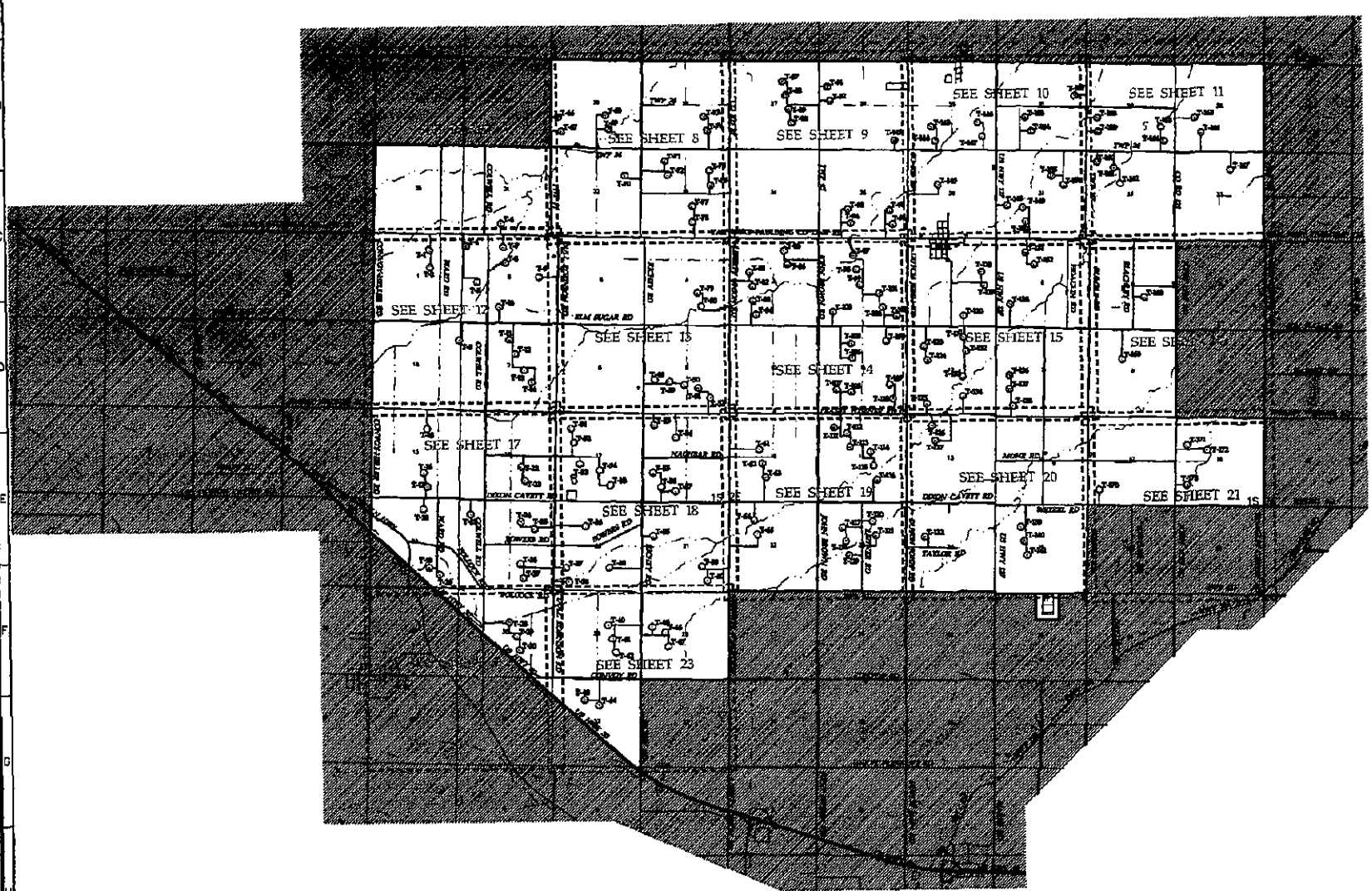
Blue Creek Wind Farm
Paulding & Van Wert Counties, Ohio

Cover

SWPP PLAN
NOT FOR CONSTRUCTION

Date: 12/01/09
Sheet: 1 OF 23

20081566-SWPP01.dwg



Westwood

Prepared for:

IBERDROLA RENEWABLES
1125 Northwest Couch, Suite 700
Portland, Oregon 97209

LEGEND:

- TURBINE LOCATION
- T-XX TURBINE NUMBER
- PROPOSED ACCESS ROADS
- EXISTING STREAMS

0' 3000' 6000' 9000'

Blue Creek Wind Farm

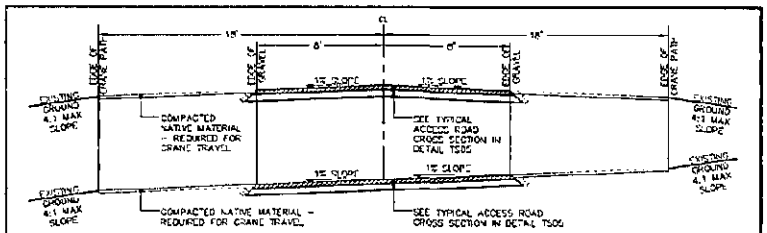
Paulding & Van Wert Counties, Ohio

Overall Civil Site Plan

SWPP PLAN
NOT FOR CONSTRUCTION

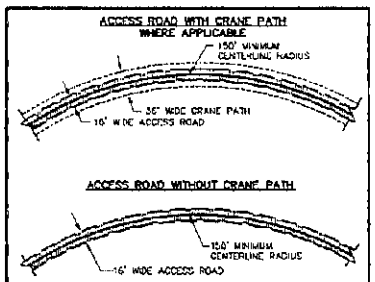
Date 12/01/09

Sheet 2 OF 23



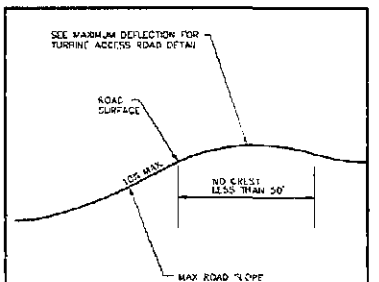
NOTES:
1. CONTRACTOR SHALL CONSTRUCT CROSS-SLOPE ROAD SECTION WHERE ACCESS ROADS ARE CONSTRUCTED ON A SIDE SLOPE, AND WHERE OTHERWISE NOTED ON PLANS, TO ENSURE THAT ROADS AND SHOULDERS REMAIN WELL DRAINED AT ALL TIMES.
2. MAXIMUM CROSS SLOPE FOR CRANE TRAVEL IS 1.0%
3. WHEN CRANE PATH IS NOT NEEDED, MATCH THE ACCESS ROAD DIRECTLY INTO EXISTING GROUND SURFACE
4. ROADS TO GENERALLY FOLLOW EXISTING CONTOURS EXCEPT IF GRADES EXCEED TURBINE DELIVERY VEHICLE CAPABILITIES. IF THIS OCCURS GENERAL CONTRACTOR MAY PROVIDE ASSIST VEHICLE OR MODIFY GRADE.

TYPICAL TURBINE ACCESS ROAD — RD01

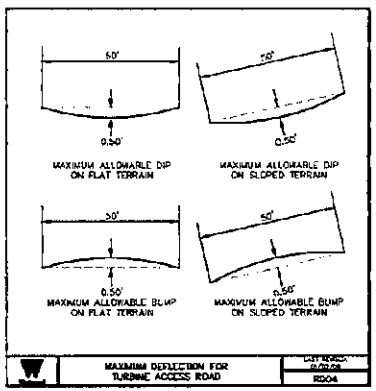


NOTE:
1. SOME RADII MAY REQUIRE ADDITIONAL SOIL COMPACTION OR GRAVEL OUTSIDE OF THE WIDTH SHOWN ABOVE TO ACCOMMODATE TRACTORS OR TRAILERS TRACKING OFF THE ACCESS ROAD.

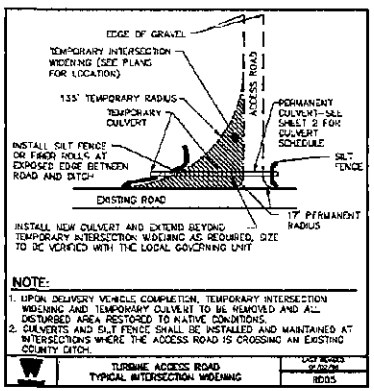
MINIMUM RADIUS FOR TURBINE ACCESS ROAD — RD02



MAXIMUM VERT. SLOPE FOR TURBINE ACCESS ROAD/CRANE TRAVEL PATH — RD03

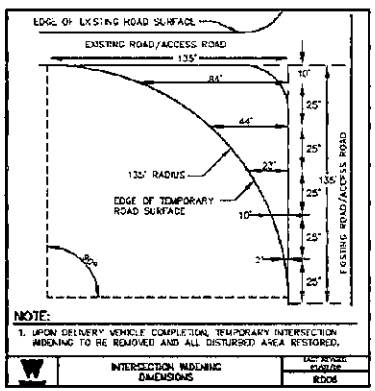


MAXIMUM DEFLECTION FOR TURBINE ACCESS ROAD — RD04



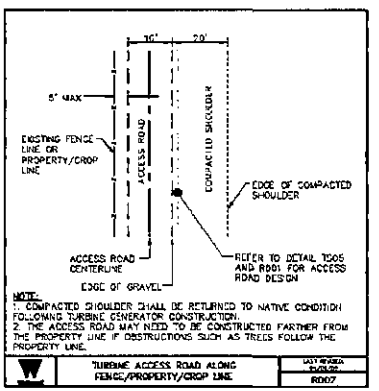
NOTE:
1. UPON DELIVERY VEHICLE COMPLETION, TEMPORARY INTERSECTION WIDENING AND TEMPORARY CULVERT TO BE REMOVED AND ALL DISTURBED AREA RESTORED TO NATIVE CONDITIONS.
2. CULVERTS AND SILT FENCE SHALL BE INSTALLED AND MAINTAINED AT INTERSECTIONS WHERE THE ACCESS ROAD IS CROSSING AN EXISTING COUNTY DITCH.

TURBINE ACCESS ROAD TYPICAL INTERSECTION WIDENING — RD05



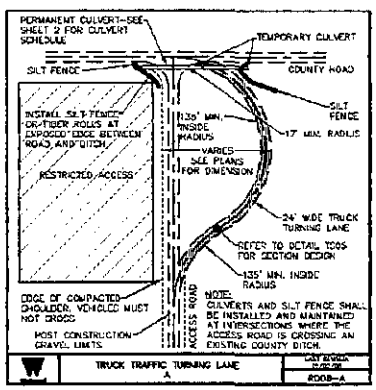
NOTE:
1. UPON DELIVERY VEHICLE COMPLETION, TEMPORARY INTERSECTION WIDENING TO BE REMOVED AND ALL DISTURBED AREA RESTORED.

INTERSECTION WIDENING DIMENSIONS — RD06



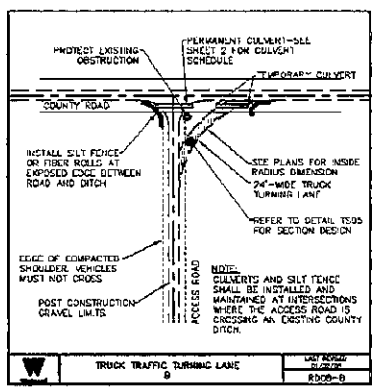
NOTE:
1. COMPACTED SHOULDER SHALL BE RETURNED TO NATIVE CONDITION FOLLOWING TURBINE GENERATOR CONSTRUCTION.
2. THE ACCESS ROAD MAY NEED TO BE CONSTRUCTED FARTHER FROM THE PROPERTY LINE IF OBSTRUCTIONS SUCH AS TREES FOLLOW THE PROPERTY LINE.

TURBINE ACCESS ROAD ALONG FENCE/PROPERTY/CROP LINE — RD07



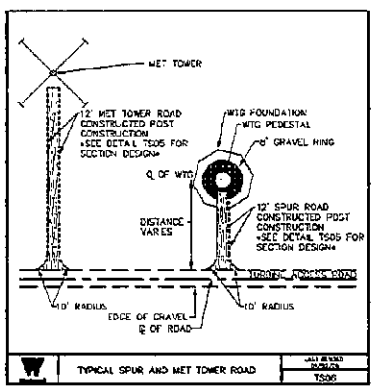
NOTE: CULVERTS AND SILT FENCE SHALL BE INSTALLED AND MAINTAINED AT INTERSECTIONS WHERE THE ACCESS ROAD IS CROSSING AN EXISTING COUNTY DITCH.

TRUCK TRAFFIC TURNING LANE A — RD08-A



NOTE: CULVERTS AND SILT FENCE SHALL BE INSTALLED AND MAINTAINED AT INTERSECTIONS WHERE THE ACCESS ROAD IS CROSSING AN EXISTING COUNTY DITCH.

TRUCK TRAFFIC TURNING LANE B — RD08-B



TYPICAL SPUR AND MET TOWER ROAD — TS06

Westwood

Prepared for:
IBERDROLA RENEWABLES
1125 Northwest Couch, Suite 700
Portland, Oregon 97209

0' 600' 1200' 1600'

Blue Creek Wind Farm

Paulding & Van Wert Counties, Ohio

Construction Details

SWPP PLAN
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Date: 12/01/09
Sheet: 3 of 23

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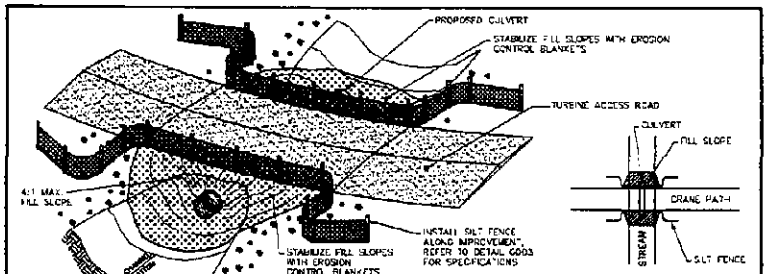
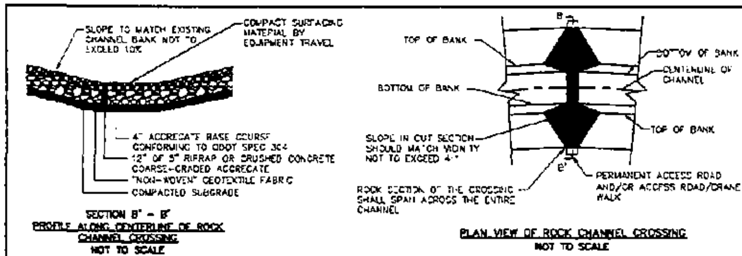


PROPOSED CULVERT
STABILIZE FILL SLOPES WITH EROSION CONTROL BLANKETS
TURBINE ACCESS ROAD
4:1 MAX. FILL SLOPE
STABILIZE FILL SLOPES WITH EROSION CONTROL BLANKETS
INSTALL SILT FENCE ALONG IMPROVEMENT. REFER TO DETAIL G003 FOR SPECIFICATIONS
CULVERT
FILL SLOPE
CRANE PATH
STREAM
SILT FENCE
PLAN VIEW

NOTES:

1. CULVERT INSTALLATION SHALL CONFORM WITH MANUFACTURERS RECOMMENDATION FOR INSTALLATION.
2. MINIMIZE DISTURBANCE TO THE STREAM/DITCH DURING CULVERT INSTALLATION/REMOVAL.
3. RIP RAP WITH GEOTEXTILE FABRIC MAY BE SUBSTITUTED FOR THE EROSION CONTROL BLANKETS WHERE NEEDED.
4. UPON REMOVAL OF ANY TEMPORARY ROAD WIDENING, THE DISTURBED AREA SHALL BE RESTORED TO NATIVE CONDITIONS. REFER TO THE BLUE CREEK SWPPP.

TYPICAL TURBINE ACCESS ROAD STREAM CROSSING WITH EROSION CONTROL BLANKETS — RD13

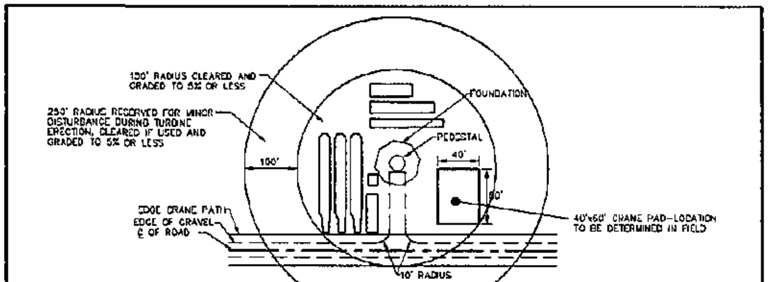


SLOPE TO MATCH EXISTING CHANNEL BANK NOT TO EXCEED 10%
COMPACT SURFACING MATERIAL BY EQUIPMENT TRAVEL
4" AGGREGATE BASE COURSE CONFORMING TO ODOT SPEC 304
12" OF 5" RIPRAP OR CRUSHED CONCRETE COARSE-GRADED AGGREGATE
"NON-WOVEN" GEOTEXTILE FABRIC
COMPACTED SUBGRADE
SECTION B' - B'
PROFILE ALONG CENTERLINE OF ROCK CHANNEL CROSSING
NOT TO SCALE
TOP OF BANK
BOTTOM OF BANK
BOTTOM OF BANK
CENTERLINE OF CHANNEL
TOP OF BANK
SLOPE IN CUT SECTION SHOULD MATCH WIDN TY NOT TO EXCEED 4:1
ROCK SECTION 0" THE CROSSING SHALL SPAN ACROSS THE ENTIRE CHANNEL
PERMANENT ACCESS ROAD AND/OR ACCESS ROAD/CRANE WALK
PLAN VIEW OF ROCK CHANNEL CROSSING
NOT TO SCALE

NOTE:

1. CHANNEL SLOPES TO BE MODIFIED TEMPORARILY DURING CONSTRUCTION TO ALLOW FOR ADEQUATE TURBINE COMPONENT DELIVERY AND RESTORE TO FINAL CONDITIONS UPON SITE RESTORATION.
2. CROSSINGS SHALL HAVE THE TOP-MOST SURFACE LAYER A MINIMUM OF 2.5 INCHES BELOW THE STREAM CHANNEL BOTTOM.
3. THE ACCESS ROAD SHALL CROSS THE DITCH AT 90° ANGLE.
4. THE TOP BED OF THE ROCK CHANNEL CROSSING SHALL CONFORM TO THE EXISTING DITCH CROSS SECTIONAL SLOPES.
5. MATERIAL THICKNESSES MAY BE FIELD ADJUSTED TO ACHIEVE SUFFICIENT BEARING CAPACITIES AS ARE NECESSARY FOR ANTICIPATED ROAD USE.

TYPICAL TURBINE ACCESS ROAD LOW WATER CROSSING — RD16

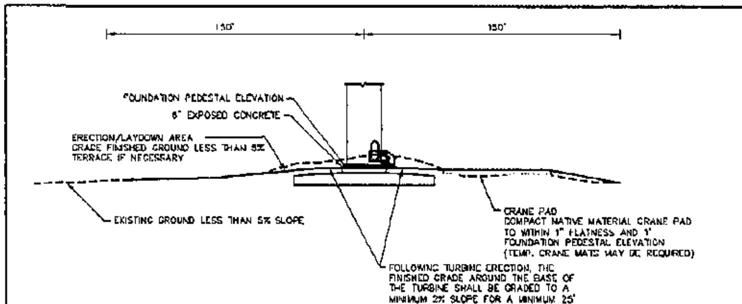


150' RADIUS CLEARED AND GRADED TO 5% OR LESS
250' RADIUS RESERVED FOR MINOR DISTURBANCE DURING TURBINE ERECTION, CLEARED IF USED AND GRADED TO 5% OR LESS
FOUNDATION
PEDESTAL
40'
60'
100'
EDGE CRANE PATH
EDGE OF GRAVEL
℄ OF ROAD
40'x60' CRANE PAD-LOCATION TO BE DETERMINED IN FIELD
10' RADIUS

NOTE:

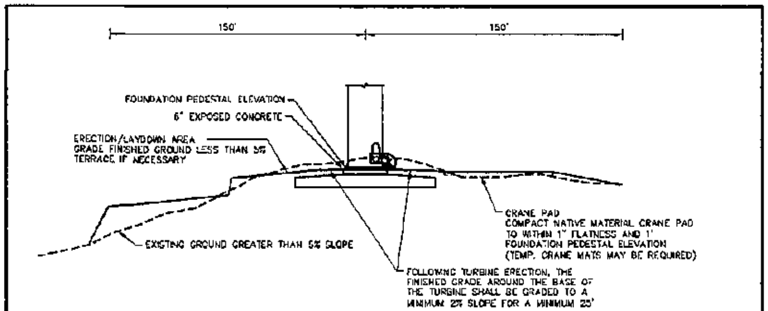
1. ACTUAL CRANE PAD LOCATION TO BE DETERMINED BY CONTRACTOR.
2. DISTANCE BETWEEN CENTER OF TURBINE AND EDGE OF GRAVEL ROAD VARIES BY TURBINE SITE

TYPICAL WTG SITE – PLAN VIEW — TS01



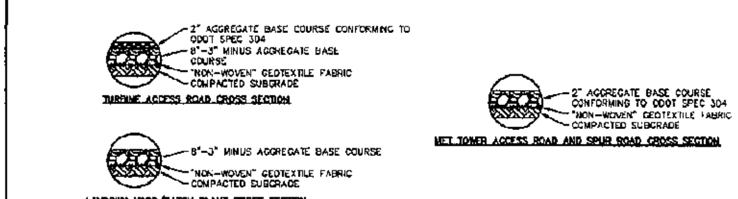
150'
150'
FOUNDATION PEDESTAL ELEVATION
6" EXPOSED CONCRETE
ERECTION/LAYDOWN AREA GRADE FINISHED GROUND LESS THAN 5% TERRACE IF NECESSARY
EXISTING GROUND LESS THAN 5% SLOPE
CRANE PAD COMPACT NATIVE MATERIAL CRANE PAD TO WITHIN 1" FLATNESS AND 1' FOUNDATION PEDESTAL ELEVATION (TEMP. CRANE MATS MAY BE REQUIRED)
FOLLOWING TURBINE ERECTION, THE FINISHED GRADE AROUND THE BASE OF THE TURBINE SHALL BE GRADED TO A MINIMUM 2% SLOPE FOR A MINIMUM 25'

TYPICAL WTG SITE – PROFILE VIEW — TS03



150'
150'
FOUNDATION PEDESTAL ELEVATION
6" EXPOSED CONCRETE
ERECTION/LAYDOWN AREA GRADE FINISHED GROUND LESS THAN 5% TERRACE IF NECESSARY
EXISTING GROUND GREATER THAN 5% SLOPE
CRANE PAD COMPACT NATIVE MATERIAL CRANE PAD TO WITHIN 1" FLATNESS AND 1' FOUNDATION PEDESTAL ELEVATION (TEMP. CRANE MATS MAY BE REQUIRED)
FOLLOWING TURBINE ERECTION, THE FINISHED GRADE AROUND THE BASE OF THE TURBINE SHALL BE GRADED TO A MINIMUM 2% SLOPE FOR A MINIMUM 25'

TYPICAL WTG SITE, EXISTING GROUND GREATER THAN 5% – PROFILE VIEW — TS04



2" AGGREGATE BASE COURSE CONFORMING TO ODOT SPEC 304
8"-3" MINUS AGGREGATE BASE COURSE
"NON-WOVEN" GEOTEXTILE FABRIC
COMPACTED SUBGRADE
TURBINE ACCESS ROAD CROSS SECTION
8"-3" MINUS AGGREGATE BASE COURSE
"NON-WOVEN" GEOTEXTILE FABRIC
COMPACTED SUBGRADE
LAYDOWN YARD/BATCH PLANT CROSS SECTION
2" AGGREGATE BASE COURSE CONFORMING TO ODOT SPEC 304
"NON-WOVEN" GEOTEXTILE FABRIC
COMPACTED SUBGRADE
MET TOWER ACCESS ROAD AND SPUR ROAD CROSS SECTION

NOTE:
STRUCTURAL SECTIONS SHOWN ARE THE MINIMUM THICKNESS REQUIREMENTS DURING NORMAL FIELD CONDITIONS. THE SECTIONS MAY NEED TO BE INCREASED BASED ON ACTUAL FIELD CONDITIONS AT THE TIME OF CONSTRUCTION. CONDITIONS INCLUDE BUT ARE NOT LIMITED TO CONSTRUCTION DURING THE FREEZE/THAW CYCLE, UNUSUALLY WET PERIODS, OR IN LOW/WET AREAS.

TYPICAL STRUCTURAL CROSS SECTIONS — TS05

Westwood

Designed: ABC
Checked:
Drawn: ABC

Prepared for:

IBERDROLA RENEWABLES
1125 Northwest Couch, Suite 700
Portland, Oregon 97209

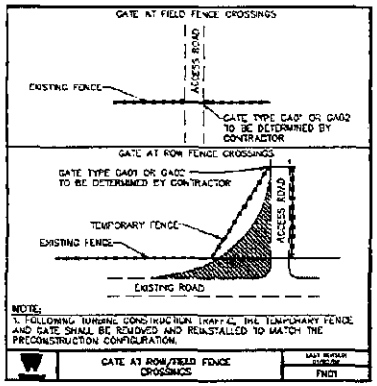
0' 600' 1200' 1800'

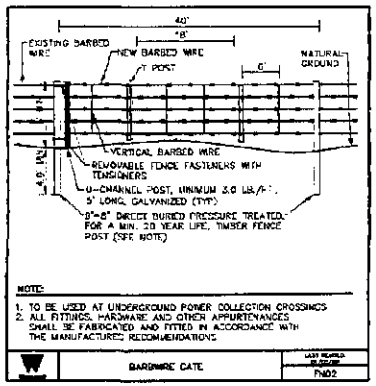
Blue Creek Wind Farm
Paulding & Van Wert Counties, Ohio

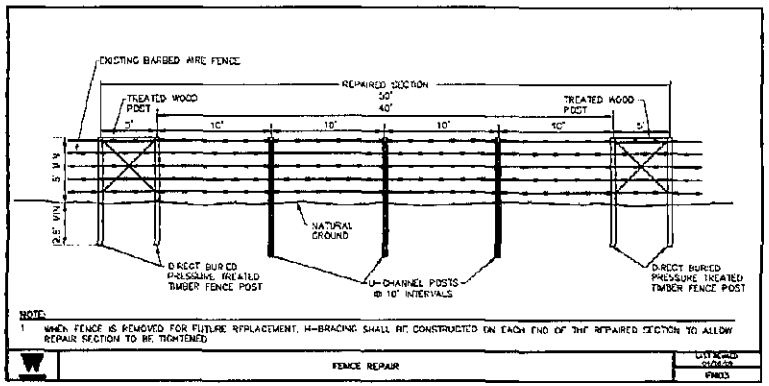
Construction Details

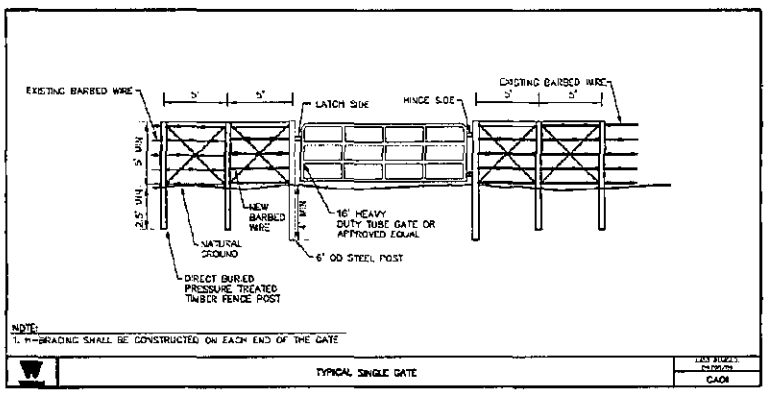
SWPP PLAN
NOT FOR CONSTRUCTION

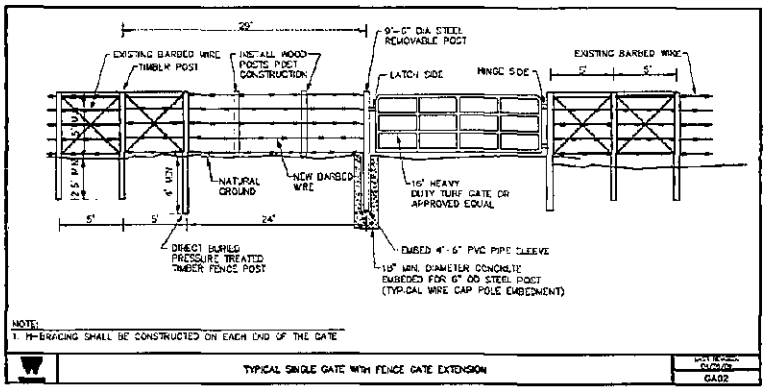
Date 12/01/09
Sheet 4 OF 23





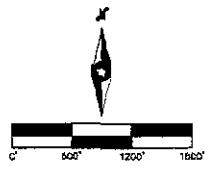






Westwood

IBERDROLA RENEWABLES
825 Northeast Couch, Suite 920
Portland, Oregon 97232



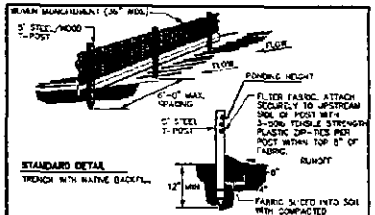
Blue Creek Wind Farm

Paulding & Van Wert Counties, Ohio

Construction Details

SWPP PLAN
NOT FOR CONSTRUCTION

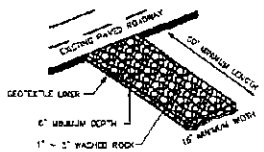
Date 12/01/09
Sheet 5 OF 23



NOTE:
1. INSPECT AND REPAIR FENCE AFTER EACH STORM EVENT AND REMOVE SEDIMENT WHEN ACCUMULATED TO 1/3 THE HEIGHT OF THE FABRIC OR MORE.
2. REMOVED SEDIMENT SHALL BE DEPOSITED TO AN AREA THAT WILL NOT CONTRIBUTE SEDIMENT OFF-SITE AND CAN BE PERMANENTLY STABILIZED.
3. SILT FENCE SHALL BE PLACED ON SLOPE CONTOURS TO MAXIMIZE PONDING EFFICIENCY.
4. ALL ENDS OF THE SILT FENCE SHALL BE WRAPPED UPSLOPE TO THE ELEVATION OF THE BOTTOM OF FABRIC IS HIGHER THAN "PONDING HEIGHT".

SILT FENCE — GD03

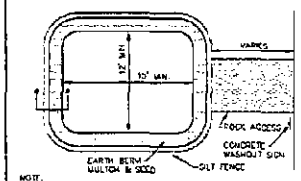
"ACCESS ROADS SHALL BE CONSTRUCTED FROM PUBLIC ROADS WHERE THE CONSTRUCTION DELIVERY TRAFFIC WILL TRAVEL ON THE CONSTRUCTED ACCESS ROAD. SEDIMENT TRACKING ONTO PUBLIC PAVED ROADS IS NOT ANTICIPATED. IF SEDIMENT TRACKING DOES OCCUR, THE SEDIMENT SHALL BE REMOVED AND A ROCK CONSTRUCTION ENTRANCE CONSTRUCTED"



NOTE:
ROCK CONSTRUCTION ENTRANCE SHOULD BE A MINIMUM THICKNESS OF 1.0' AND CONTAIN MAXIMUM SIDE SLOPES OF 4:1. ROCK ENTRANCE SHOULD BE INSPECTED AND MAINTAINED REGULARLY. ROCK ENTRANCE LENGTH MAY NEED TO BE EXTENDED IN CLAY SOILS.

ROCK CONSTRUCTION ENTRANCE — GD05

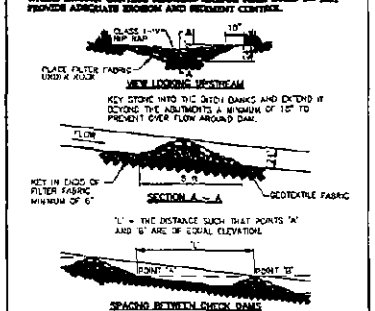
"AN APPROVED ALTERNATE MAY BE USED"



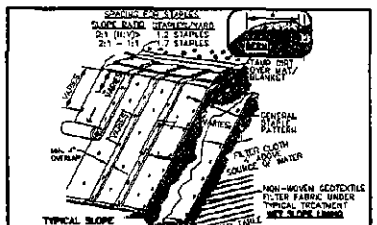
NOTE:
CONCRETE WASHOUT AREAS WILL HAVE AN IMPERMEABLE LINER TO PREVENT CONCRETE WASHOUT WATER FROM INFILTRATING/CONTACTING WITH SOIL. INFITRACLE LINER INC (GDC) TO MIL POLYLINER OR COMPACTED CLAY LINER. WASHOUT SYSTEMS CAN BE USED AS ALTERNATE WASHOUT AREAS.

CONCRETE WASHOUT AREA — GD06

ROCK CHECK SHALL BE USED WHERE NEEDED AS A FILTER MEDIA, OR WHERE EROSION CONTROL BLANKETS AND/OR SEED SOILS DO NOT PROVIDE ADEQUATE EROSION AND SEDIMENT CONTROL.

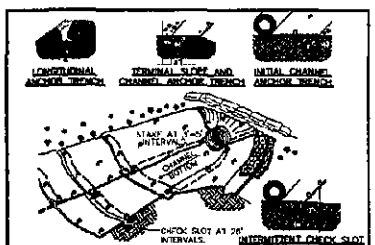


TEMPORARY ROCK CHECK DAM — GD16



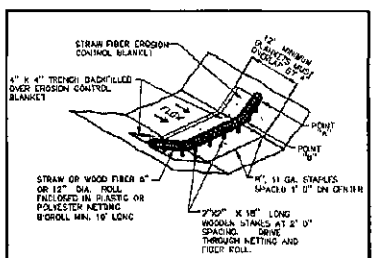
NOTE:
1. REFER TO THE BLUE CREEK SWPPP FOR IMPLEMENTATION REQUIREMENTS.
2. MATS/BLANKETS SHOULD BE INSTALLED VERTICALLY DOWN-SLOPE.
3. SLOPE SURFACE SHALL BE FREE OF ROCKS, CLODS, STICK AND GRASS.
4. MATS/BLANKETS SHALL HAVE GOOD SOIL CONTACT.
5. LAY BLANKETS LOOSELY AND STAKE OR STAPLE TO MAINTAIN DIRECT CONTACT WITH THE SOIL.
6. DO NOT STRETCH.
7. BLANKET TYPE AND WEIGHT MUST BE CHOOSEN BASED ON SITE CONDITIONS AND MANUFACTURERS RECOMMENDATIONS.
8. STAPLE LENGTHS SHALL CONFORM TO MANUFACTURERS RECOMMENDATIONS.

TEMPORARY EROSION BLANKETS TURF REINFORCEMENT MATS FOR SLOPES — GD21



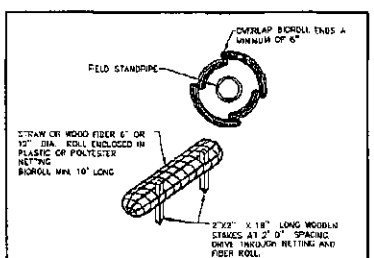
NOTE:
1. REFER TO THE BLUE CREEK SWPPP FOR IMPLEMENTATION REQUIREMENTS.
2. CHECK SLOTS TO BE CONSTRUCTED PER MANUFACTURERS SPECIFICATIONS.
3. STAKING OR STAPLING LAYOUT PER MANUFACTURERS SPECIFICATIONS.
4. MINIMUM OF 3.5 STAPLES/YARD.
5. BLANKET TYPE AND WEIGHT MUST BE CHOOSEN BASED ON SITE CONDITIONS AND MANUFACTURERS RECOMMENDATIONS.
6. STAPLE LENGTHS SHALL CONFORM TO MANUFACTURERS RECOMMENDATIONS.
7. EROSION CONTROL BLANKETS SHALL EXTEND TO THE EDGE OF THE DISTURBANCE LIMITS.

TEMPORARY EROSION BLANKETS TURF REINFORCEMENT MATS FOR CHANNELS — GD22



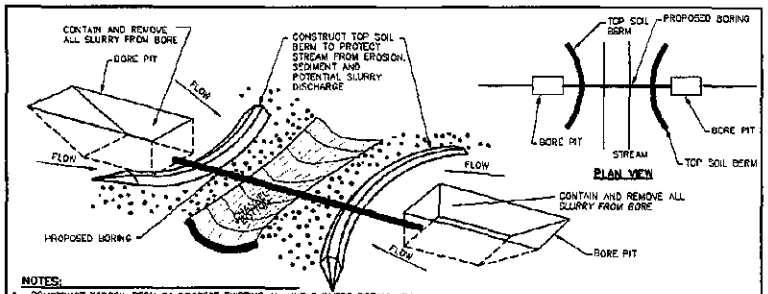
NOTE:
1. REFER TO THE BLUE CREEK SWPPP FOR IMPLEMENTATION REQUIREMENTS.
2. POINT "A" MUST BE HIGHER THAN POINT "B" TO ENSURE THAT WATER FLOWS OVER THE DIKE AND NOT AROUND THE ENDS.
3. TYPE OF MATERIAL FOR EROSION CONTROL BLANKET IS SUBJECT TO FIELD CONDITIONS AND MANUFACTURERS RECOMMENDATION.

TEMPORARY BIOROLL BLANKET SYSTEM (DITCH APPLICATION) — GD23



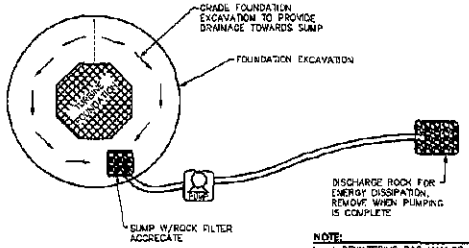
NOTE:
1 INLET PROTECTION SHALL BE USED FOR FIELD STANDPIPES THAT HAVE SOIL DISTURBANCE WITHIN 300' OF INLET.
2. INSPECT AND REPAIR BIOROLL AFTER EACH STORM EVENT AND REMOVE SEDIMENT WHEN ACCUMULATED TO 1/2 THE HEIGHT OF THE FABRIC OR MORE.
3. REMOVED SEDIMENT SHALL BE DEPOSITED TO AN AREA THAT WILL NOT CONTRIBUTE SEDIMENT OFF-SITE AND CAN BE PERMANENTLY STABILIZED.

INLET PROTECTION WITH BIOROLL — GD30



NOTES:
1. CONSTRUCT TOPSOIL BERM TO PROTECT EXISTING CHANNELS WHERE BORING WILL OCCUR FOR UNDERGROUND COLLECTION SYSTEM INSTALLATION.
2. NO DISTURBANCE TO THE STREAM DURING CONSTRUCTION.
3. SILT FENCE MAY BE SUBSTITUTED FOR THE TOPSOIL BERM.
4. UPON REMOVAL OF THE BORE PITS, THE DISTURBED AREAS SHALL BE RESTORED TO NATIVE CONDITIONS, REFER TO THE BLUE CREEK SWPPP.

TYPICAL UNDERGROUND COLLECTION SYSTEM STREAM CROSSING — UT08



NOTE:
1. A DEWATERING BAG MAY BE SUBSTITUTED FOR DISCHARGE ROCK FOR ENERGY DISSIPATION.
2. DEWATERING DISCHARGE SHALL BE MONITORED FOR ANY EROSIVE CONDITIONS. IF EROSION OCCURS, THE AREA SHALL BE STABILIZED IN ACCORDANCE WITH THE SWPPP. DEWATERING MAY RESUME FOLLOWING STABILIZATION.

TYPICAL DEWATERING OPERATION — GD31

Westwood

Designed: ADC
Checked: WEB
Drawn: ARC
Record Drawings by/date:
Revisions: # DATE DESCRIPTION

Prepared for:

IBERDROLA RENEWABLES
1125 Northwest Couch, Suite 700
Portland, Oregon 97209

N

0' 600' 1200' 1800'

Blue Creek Wind Farm

Paulding & Van Wert Counties, Ohio

SWPPP Details

SWPP PLAN
NOT FOR CONSTRUCTION

Date: 12/01/09
Sheet: 6 OF 23

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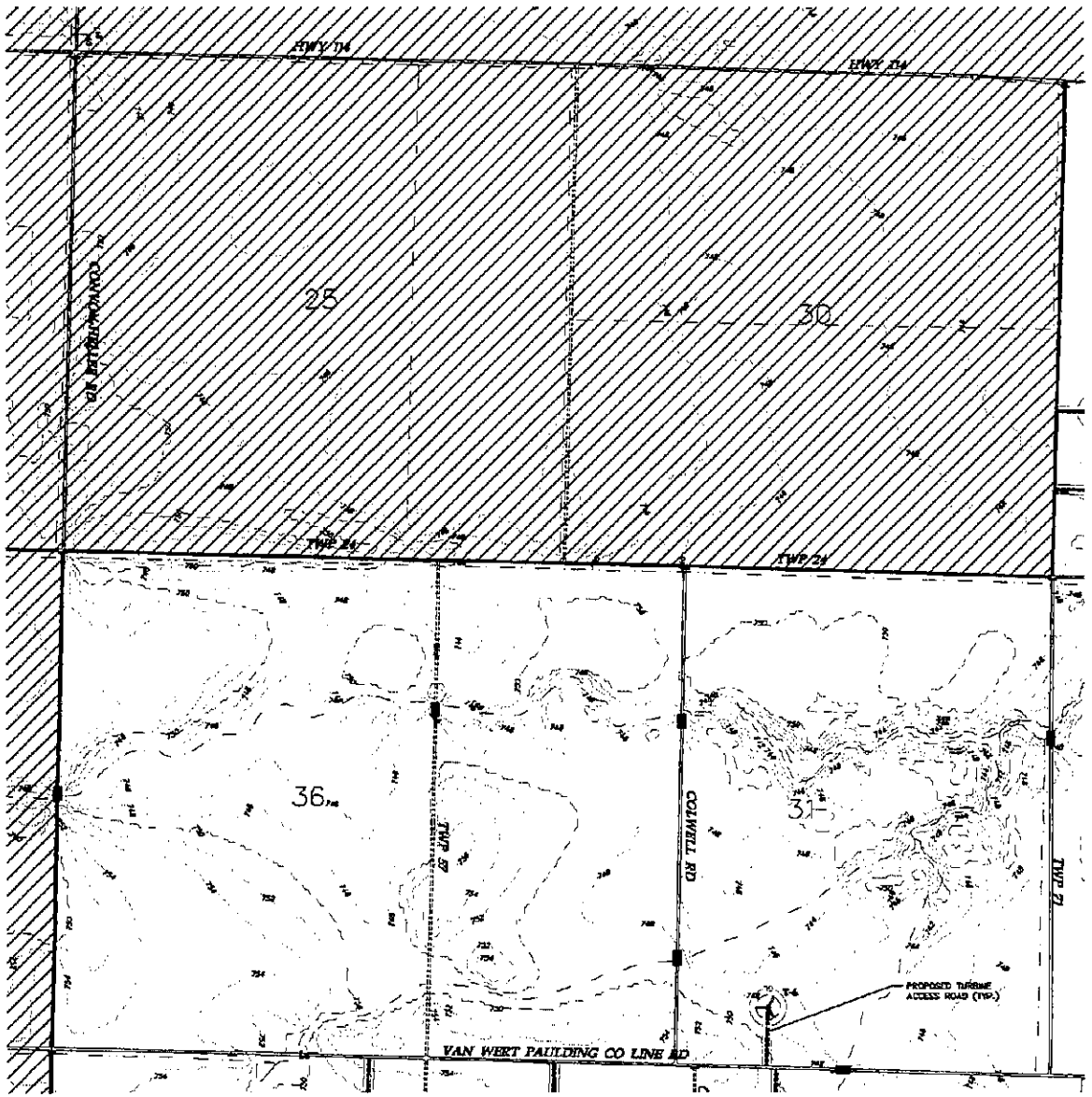
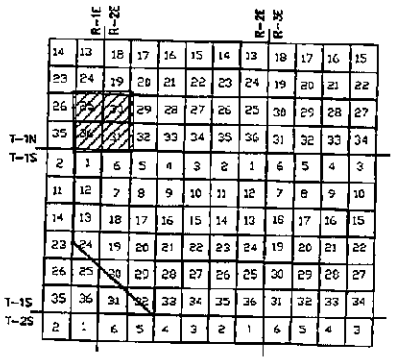


LEGEND:

- T-XX — TURBINE LOCATION
- T-XX — TURBINE NUMBER
- PROPOSED ACCESS ROADS
- T-XX — ALTERNATE TURBINE LOCATION
- ALTERNATE TURBINE NUMBER
- ALTERNATE ACCESS ROADS
- PROPOSED GATE
- PROPOSED FENCE
- PROPOSED UNDERGROUND COLLECTION SYSTEM
- DL — PROPOSED DISTURBANCE LIMITS
- PROPOSED CULVERT
- SF — PROPOSED SILT FENCE
- EXISTING FENCE
- EXISTING TELEPHONE LINE
- EXISTING OVERHEAD POWER
- EXISTING FIBER OPTIC LINE
- EXISTING WATER LINE
- EXISTING GAS PIPELINE
- 980 — EXISTING 10' CONTOURS
- EXISTING 2' CONTOURS
- EXISTING TREE LINE
- EXISTING WATERWAY
- OUTSIDE OF PROJECT BOUNDARY
- EXISTING BRIDGE
- NHB WETLAND



KEY MAP

Westwood

Prepared for:

IBERDROLA RENEWABLES
1125 Northwest Couch, Suite 700
Portland, Oregon 97209

0' 600' 1200' 1800'

Blue Creek Wind Farm

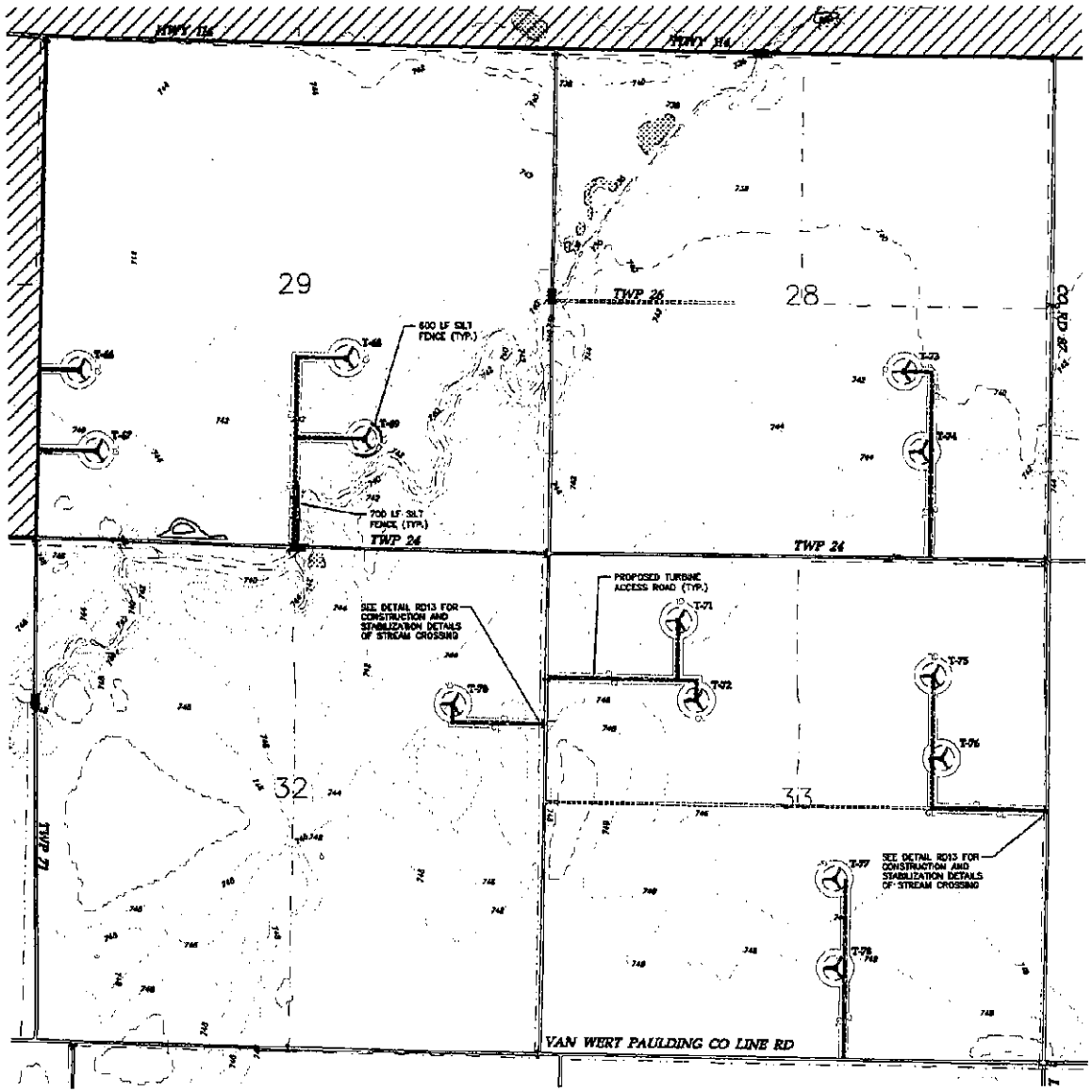
Paulding & Van Wert Counties, Ohio

Civil Site Plan

SWPP PLAN
NOT FOR CONSTRUCTION

Date: 12/01/09

Sheet 7 of 23



LEGEND:

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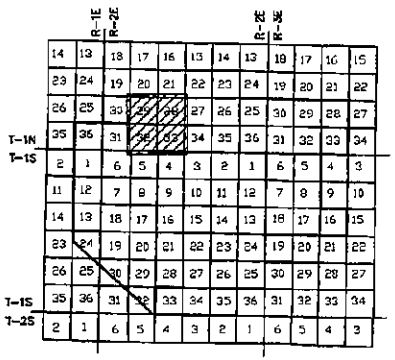
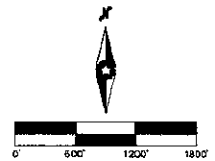
- EXISTING BRIDGE
- AMI WETLAND



KEY MAP



Westwood

Designed: ADC
Checked: EDB
Drawn: ADC
Record Drawings by/date:

Revisions #	Date	Description

Prepared for:

IBERDROLA RENEWABLES
1125 Northwest Couch, Suite 700
Portland, Oregon 97209

Blue Creek Wind Farm

Paulding & Van Wert Counties, Ohio

Civil Site Plan

SWPP PLAN
NOT FOR CONSTRUCTION

Date 12/01/09
Sheet 8 OF 23

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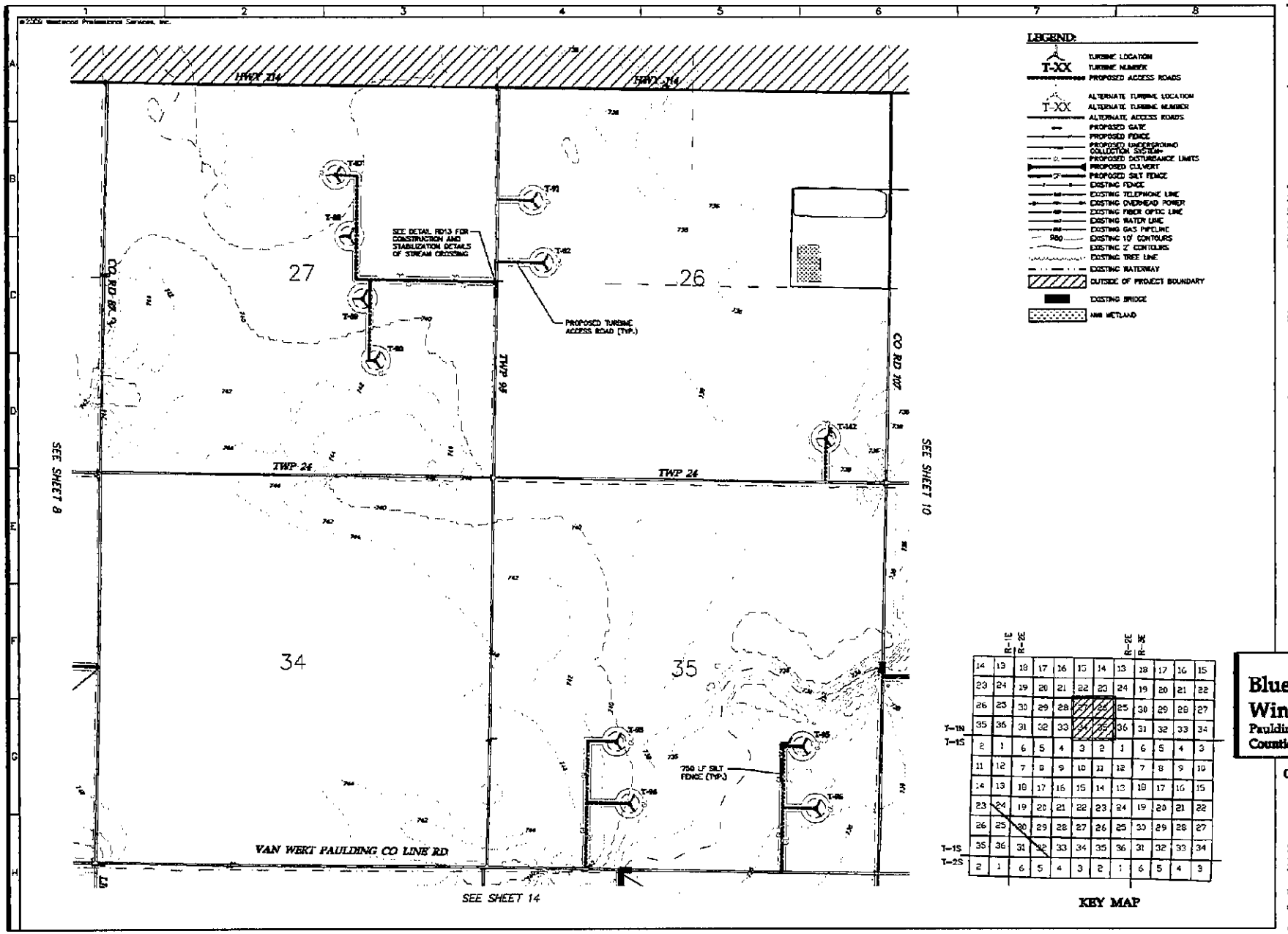

LEGEND:

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- PROPOSED FENCE
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- PROPOSED DISTURBANCE LIMITS
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- EXISTING BRIDGE
- ANR WETLAND

KEY MAP

Westwood

Drawn: ABC
Checked: BBB
Date: ABC
Record Drawing Info/Date:

Revisions		
#	DATE	DESCRIPTION

Prepared for:

IBERDROLA RENEWABLES
1125 Northwest Couch, Suite 700
Portland, Oregon 97209

N

0' 600' 1200' 1800'

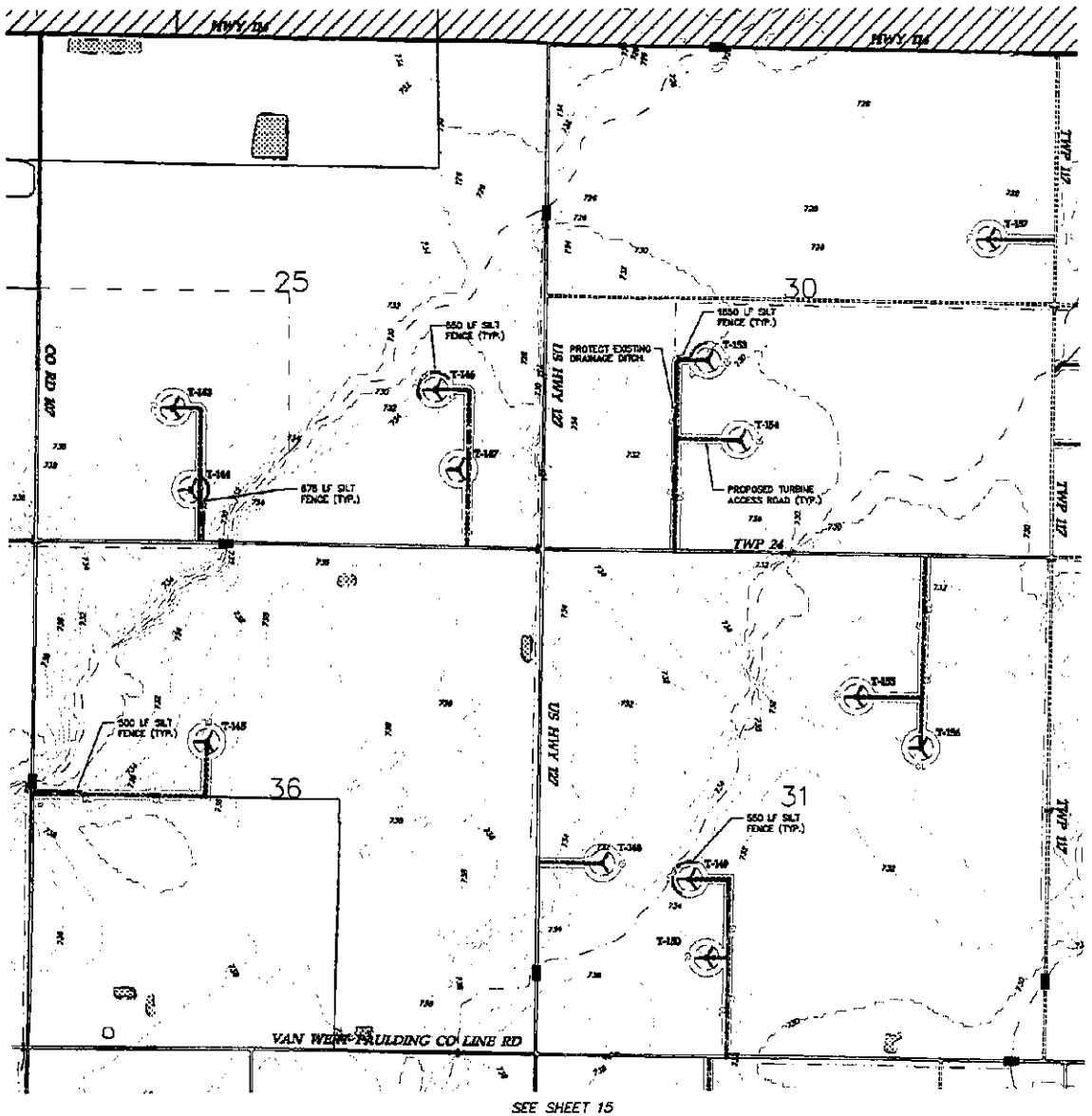
Blue Creek Wind Farm

Paulding & Van Wert Counties, Ohio

Civil Site Plan

SWPP PLAN
NOT FOR CONSTRUCTION

Date: 12/01/09
Sheet: 9 of 23



LEGEND:

- TURBINE LOCATION
- T-XX TURBINE NUMBER
- PROPOSED ACCESS ROADS
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- EXISTING BRIDGE
- NWI WETLAND

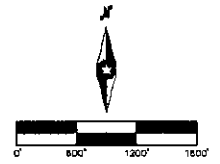
Westwood

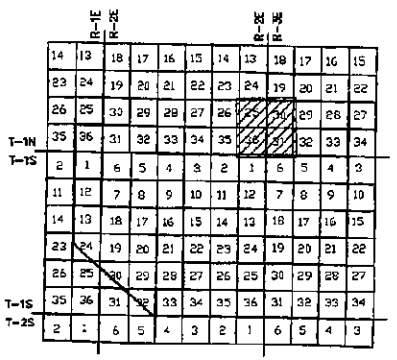
1125 Northwest Couch, Suite 700
Portland, Oregon 97209

Designed: ADC
Checked: DDB
Drawn: ADC
Record Drawings by/date:

No.	DATE	DESCRIPTION

Proposed by:





KEY MAP

Blue Creek Wind Farm

Paulding & Van Wert Counties, Ohio

Civil Site Plan

SWPP PLAN
NOT FOR CONSTRUCTION

Date 12/01/09
Sheet 10 OF 23

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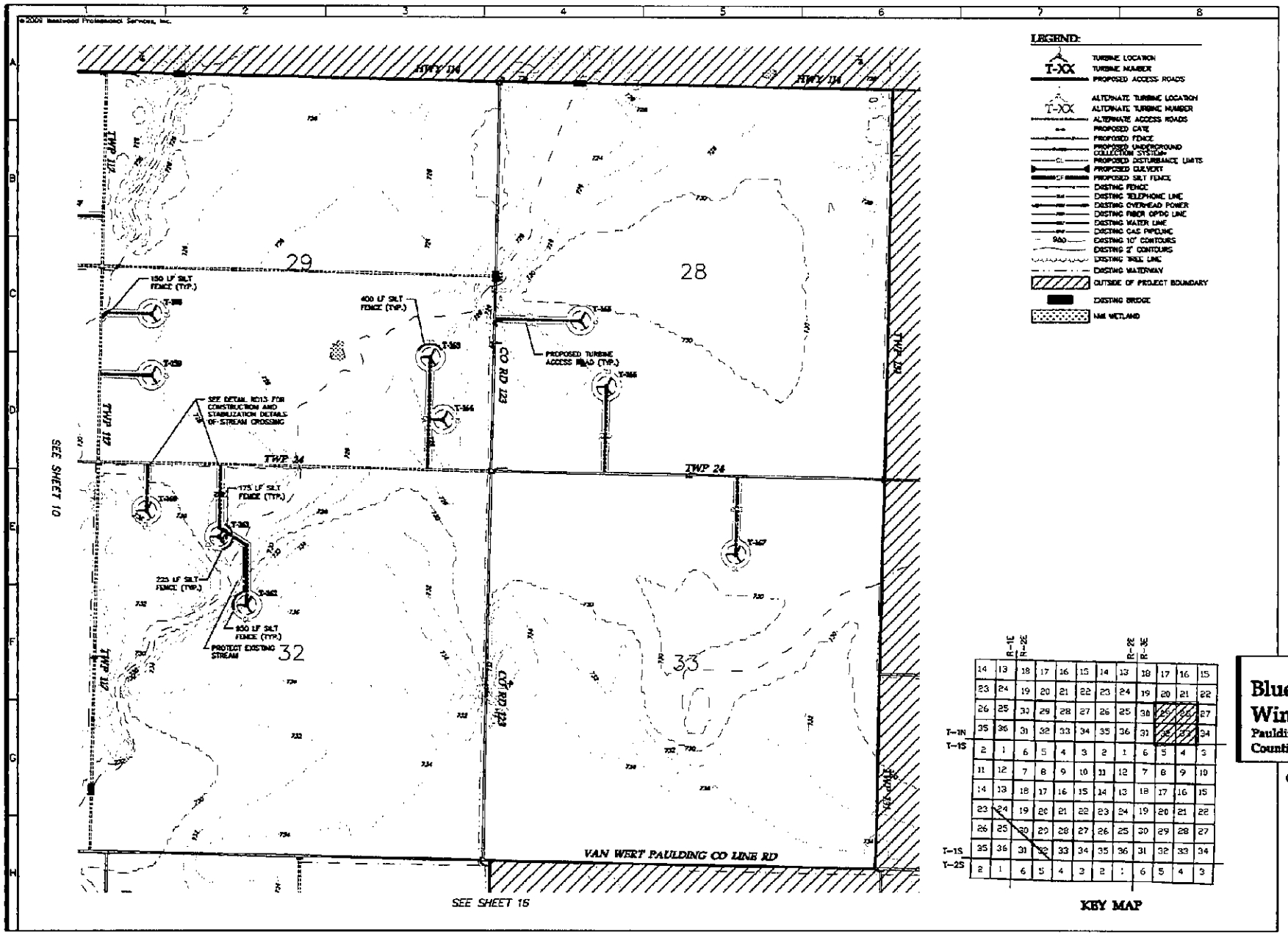

LEGEND:

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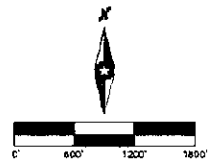
KEY MAP



Westwood

Prepared for:

IBERDROLA RENEWABLES
1125 Northwest Couch, Suite 700
Portland, Oregon 97209

Blue Creek Wind Farm

Paulding & Van Wert Counties, Ohio

Civil Site Plan

SWPP PLAN
NOT FOR CONSTRUCTION

Date 12/01/09

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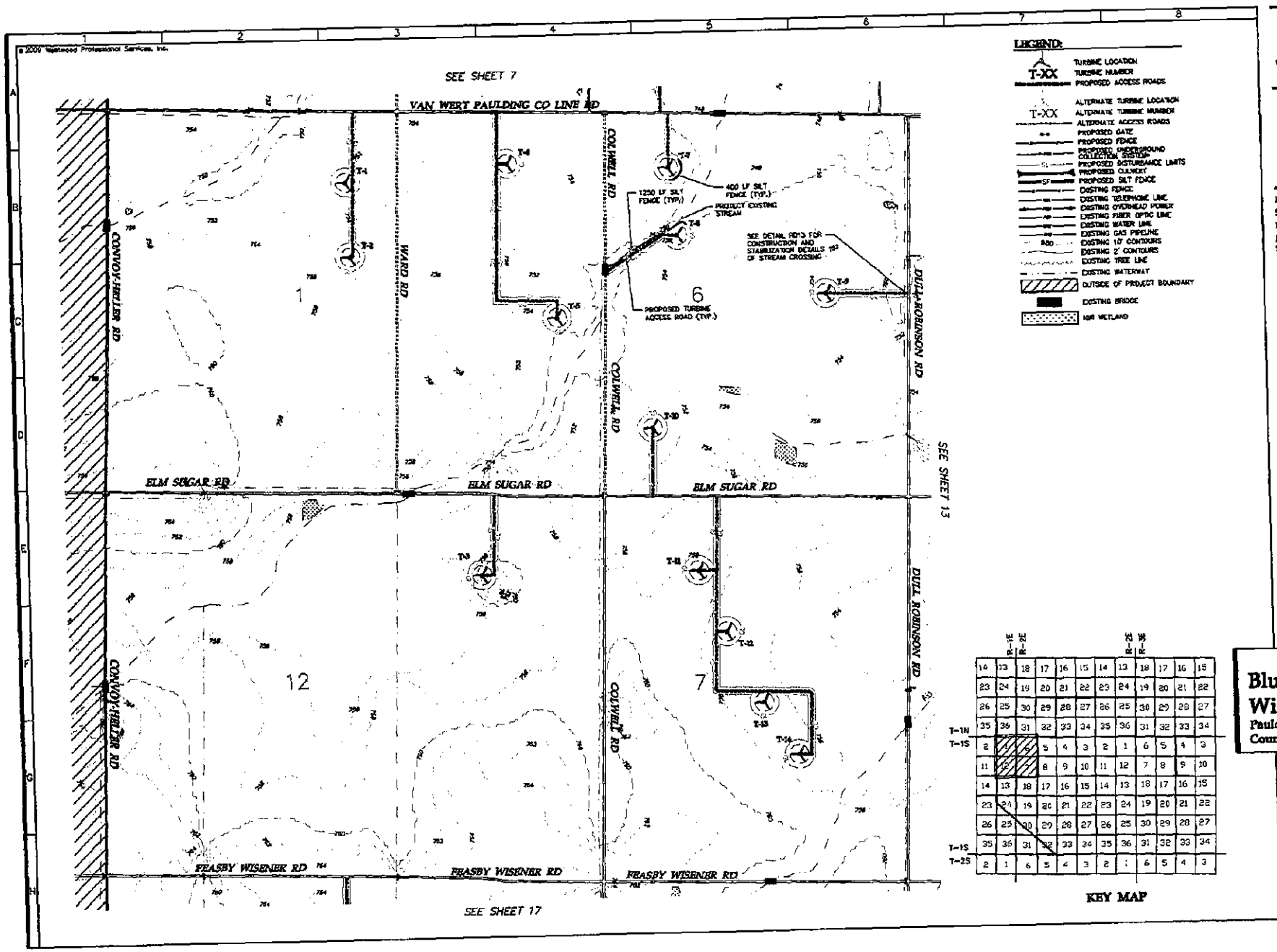

LEGEND:

- T-XX — TURBINE LOCATION / TURBINE NUMBER / PROPOSED ACCESS ROADS
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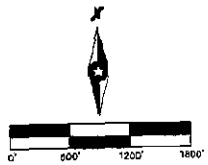
- NWI WETLAND

KEY MAP



Westwood

Designed: ADC
Checked: DWR
Reviewed: ADC
Issued / Revised By/Date:
Revisions: # Date Description
Prepared for:

IBERDROLA RENEWABLES
1125 Northwest Couch, Suite 700
Portland, Oregon 97209

Blue Creek Wind Farm

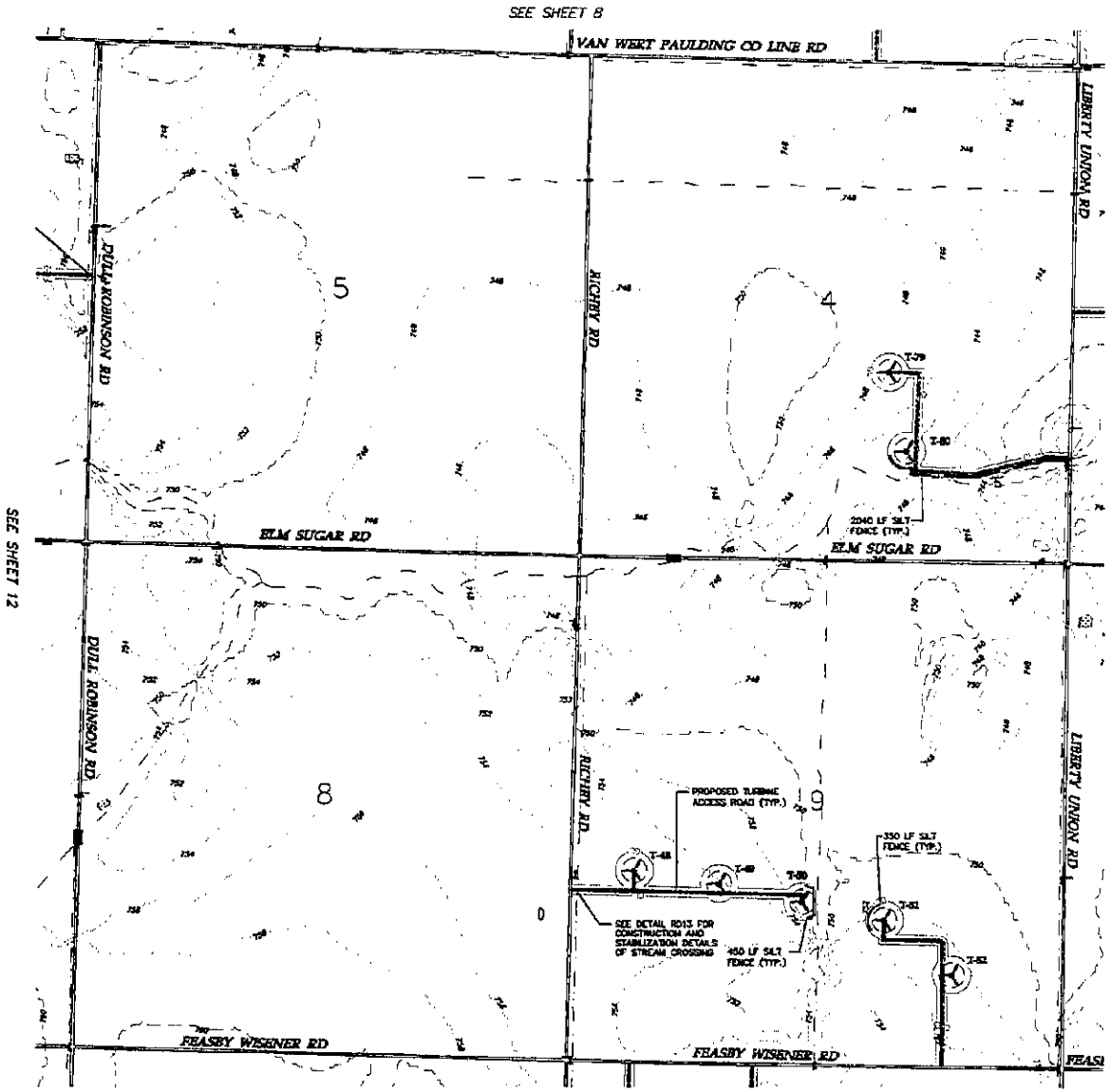
Paulding & Van Wert Counties, Ohio

Civil Site Plan

SWPP PLAN
NOT FOR CONSTRUCTION

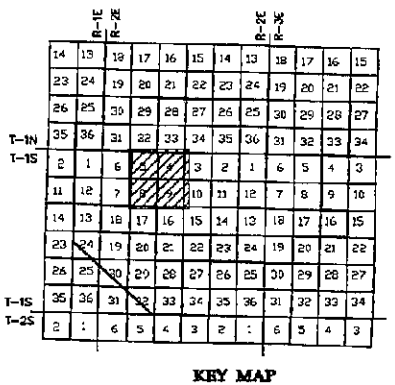
Date: 12/01/09
Sheet 12 OF 23

20062008-01SPP01.dwg



LEGEND:

- T-XX — TURBINE LOCATION / TURBINE NUMBER / PROPOSED ACCESS ROADS
- T-XX — ALTERNATE TURBINE LOCATION / ALTERNATE TURBINE NUMBER / ALTERNATE ACCESS ROADS
- PROPOSED GATE
- PROPOSED FENCE
- PROPOSED UNDERGROUND COLLECTION SYSTEM
- PROPOSED DISTURBANCE LIMITS
- PROPOSED CULVERT
- PROPOSED SILT FENCE
- EXISTING FENCE
- EXISTING TELEPHONE LINE
- EXISTING OVERHEAD POWER
- EXISTING FIBER OPTIC LINE
- EXISTING WATER LINE
- EXISTING GAS PIPELINE
- EXISTING 10' CONTOURS
- EXISTING 2' CONTOURS
- EXISTING TREE LINE
- EXISTING WATERWAY
- OUTSIDE OF PROJECT BOUNDARY
- EXISTING BRIDGE
- NWI WETLAND



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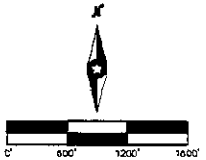


Westwood

Checked: ASC
Checked: DEB
Drawn: ASC
Record Drawing by/date:

Revision	Date	Description

Prepared for:

IBERDROLA RENEWABLES
3125 Northwest Couch, Suite 700
Portland, Oregon 97209

Blue Creek Wind Farm

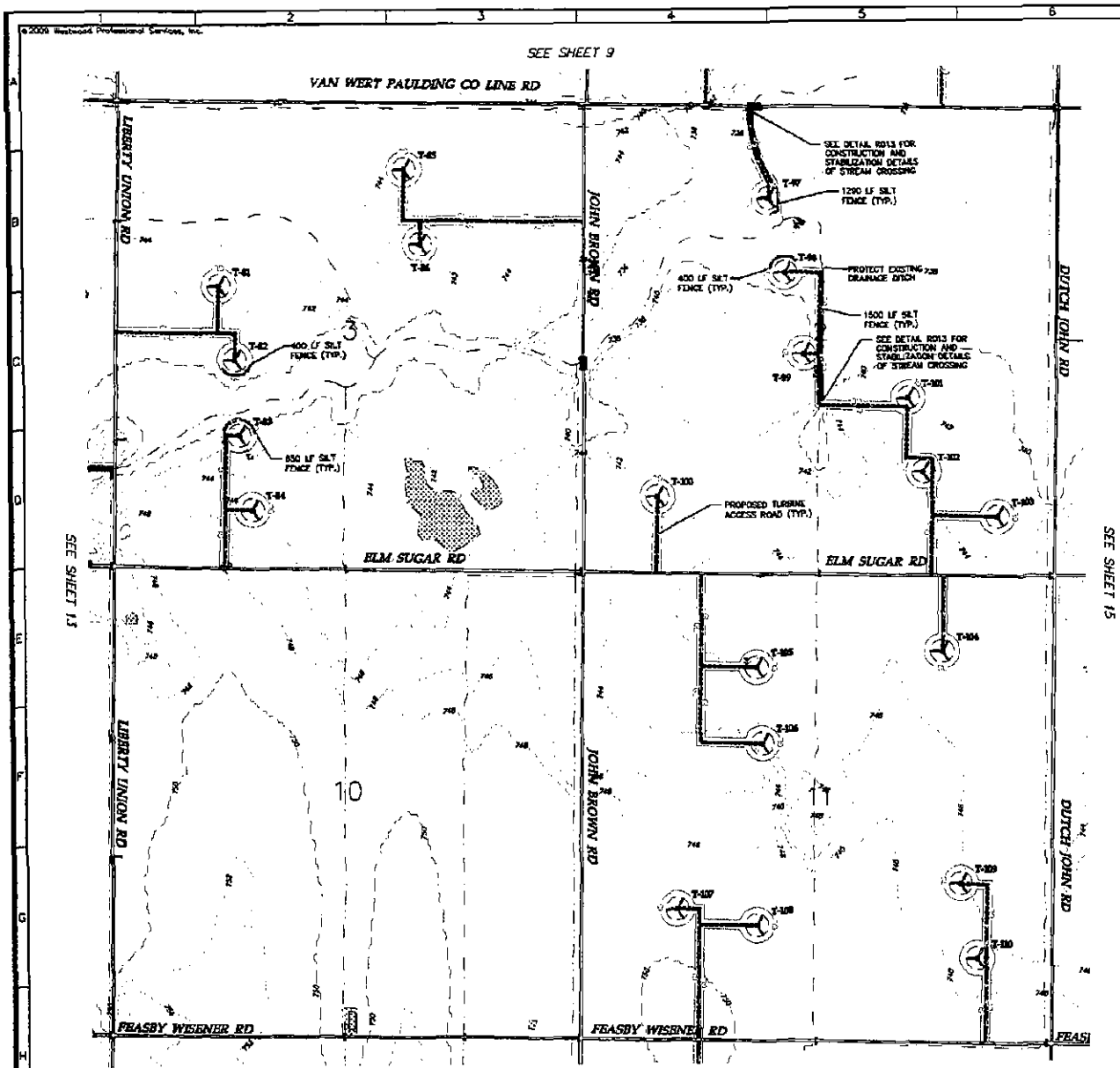
Paulding & Van Wert Counties, Ohio

Civil Site Plan

SWPP PLAN
NOT FOR CONSTRUCTION

Date: 12/01/09
Sheet: 13 OF 23

20081508-SWPPPLAN.dwg



LEGEND:

- T-XX — TURBINE LOCATION / TURBINE NUMBER / PROPOSED ACCESS ROADS
- T-XX — ALTERNATE TURBINE LOCATION / ALTERNATE TURBINE NUMBER / ALTERNATE ACCESS ROADS
- PROPOSED GATE
- PROPOSED FENCE
- PROPOSED UNDERGROUND COLLECTION SYSTEM
- PROPOSED DISTURBANCE LIMITS
- PROPOSED CULVERT
- PROPOSED SILT FENCE
- EXISTING FENCE
- EXISTING TELEPHONE LINE
- EXISTING OVERHEAD POWER
- EXISTING FIBER OPTIC LINE
- EXISTING WATER LINE
- EXISTING GAS PIPELINE
- EXISTING 10' CONTOURS
- EXISTING 2' CONTOURS
- EXISTING TREE LINE
- EXISTING WATERWAY
- OUTSIDE OF PROJECT BOUNDARY
- EXISTING BRIDGE
- NWI WETLAND

KEY MAP

	R-1E	R-2E					R-2E	R-3E			
	14	13	18	17	16	15	13	18	17	16	15
	23	24	19	20	21	22	24	19	20	21	22
	26	25	30	29	28	27	25	30	29	28	27
T-1N	35	36	31	32	33	34	36	31	32	33	34
T-1S	2	1	6	5	4	3	1	6	5	4	3
	11	12	7	8	9	10	12	7	8	9	10
	14	13	18	17	16	15	14	13	18	17	16	15
	23	24	19	20	21	22	23	24	19	20	21	22
	26	25	30	29	28	27	26	25	30	29	28	27
T-1S	35	36	31	32	33	34	35	36	31	32	33	34
T-2S	2	1	6	5	4	3	2	1	6	5	4	3

0' 600' 1200' 1800'

Westwood

Prepared for:

IBERDROLA RENEWABLES
1125 Northwest Couch, Suite 700
Portland, Oregon 97209

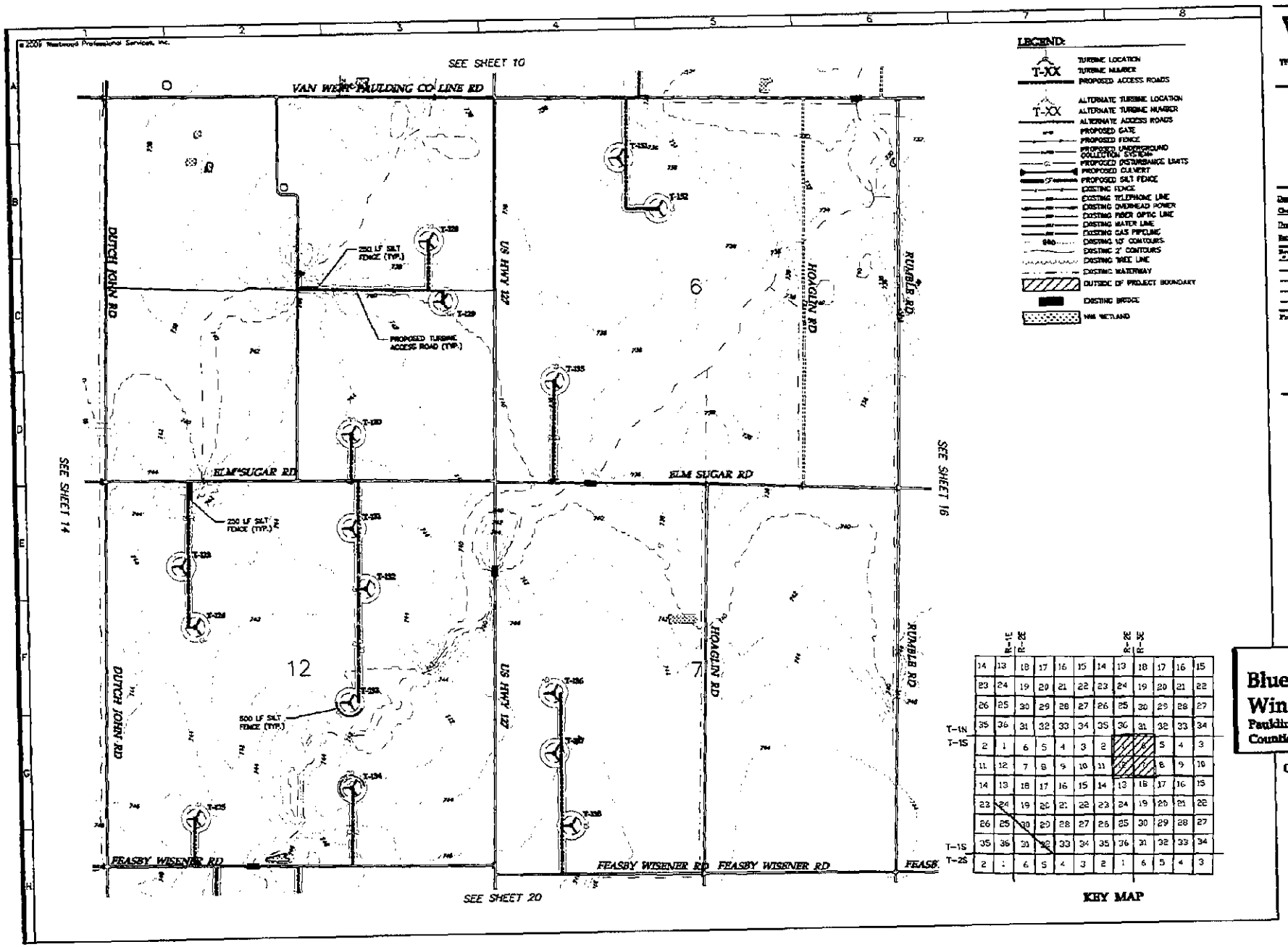
Blue Creek Wind Farm

Paulding & Van Wert Counties, Ohio

Civil Site Plan

SWPP PLAN
NOT FOR CONSTRUCTION

Date: 12/01/09
Sheet: 14 OF 23



LEGEND:

- T-XX — TURBINE LOCATION / TURBINE NUMBER
- PROPOSED ACCESS ROADS
- T-XX — ALTERNATE TURBINE LOCATION / ALTERNATE TURBINE NUMBER
- ALTERNATE ACCESS ROADS
- PROPOSED GATE
- PROPOSED FENCE
- PROPOSED UNDERGROUND COLLECTION SYSTEM
- PROPOSED DISTURBANCE LIMITS
- PROPOSED CULVERT
- PROPOSED SILT FENCE
- EXISTING FENCE
- EXISTING TELEPHONE LINE
- EXISTING OVERHEAD POWER
- EXISTING FIBER OPTIC LINE
- EXISTING WATER LINE
- EXISTING GAS PIPELINE
- EXISTING 10' CONTOURS
- EXISTING 2' CONTOURS
- EXISTING TREE LINE
- EXISTING WATERWAY
- OUTSIDE OF PROJECT BOUNDARY
- EXISTING BRIDGE
- NWI WETLAND

KEY MAP

R-1E R-2E R-3E R-4E

T-1N	14	13	18	17	16	15	14	13	18	17	16	15
	23	24	19	20	21	22	23	24	19	20	21	22
	26	25	30	29	28	27	26	25	30	29	28	27
	35	36	31	32	33	34	35	36	31	32	33	34
T-1S	2	1	6	5	4	3	2	1	6	5	4	3
	11	12	7	8	9	10	11	12	7	8	9	10
	14	13	18	17	16	15	14	13	18	17	16	15
	23	24	19	20	21	22	23	24	19	20	21	22
	26	25	30	29	28	27	26	25	30	29	28	27
T-1S	35	36	31	32	33	34	35	36	31	32	33	34
T-2S	2	1	6	5	4	3	2	1	6	5	4	3

0' 600' 1200' 1800'

Westwood

Prepared for:

IBERDROLA RENEWABLES
1125 Northwest Couch, Suite 700
Portland, Oregon 97209

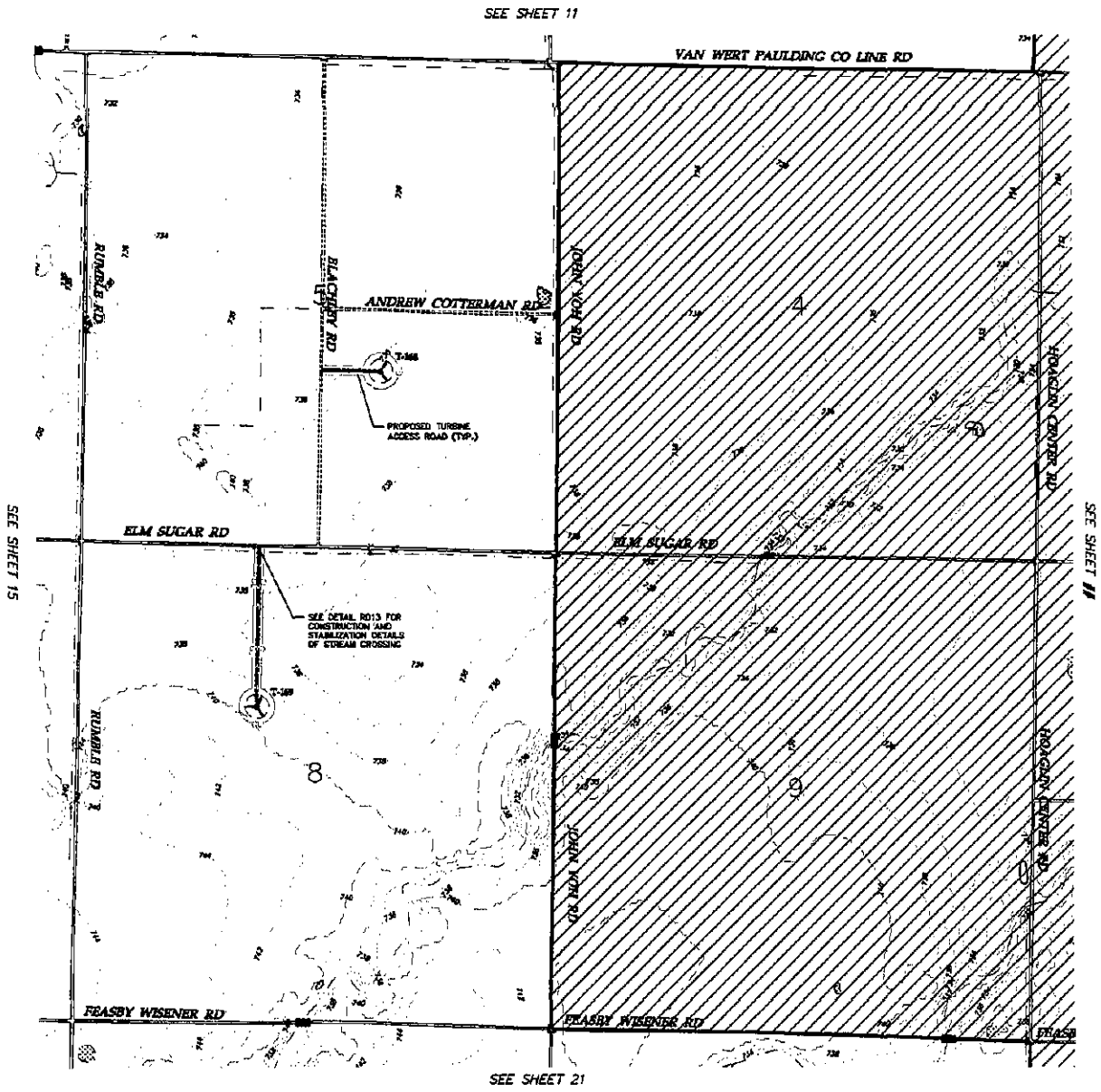
Blue Creek Wind Farm

Paulding & Van Wert Counties, Ohio

Civil Site Plan

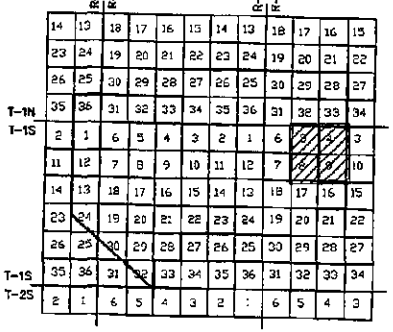
SWPP PLAN
NOT FOR CONSTRUCTION

Date 12/01/09
Sheet 15 OF 23



LEGEND:

- T-XX — TURBINE LOCATION / TURBINE NUMBER
- PROPOSED ACCESS ROADS
- T-XX — ALTERNATE TURBINE LOCATION / ALTERNATE TURBINE NUMBER
- ALTERNATE ACCESS ROADS
- PROPOSED GATE
- PROPOSED FENCE
- PROPOSED UNDERGROUND COLLECTION SYSTEM
- PROPOSED DISTURBANCE LIMITS
- PROPOSED CULVERT
- PROPOSED SILT FENCE
- EXISTING FENCE
- EXISTING TELEPHONE LINE
- EXISTING OVERHEAD POWER
- EXISTING FIBER OPTIC LINE
- EXISTING WATER LINE
- EXISTING GAS PIPELINE
- 980 — EXISTING 10' CONTOURS
- EXISTING 2' CONTOURS
- EXISTING TREE LINE
- EXISTING WATERWAY
- OUTSIDE OF PROJECT BOUNDARY
- EXISTING BRIDGE
- NWI WETLAND



KEY MAP

Westwood

Designed: ABC
Checked: BRB
Drawn: ABC
Record Drawings by/date:

Revisions #	Date	DESCRIPTION

Prepared for:

IBERDROLA RENEWABLES
1125 Northwest Couch, Suite 700
Portland, Oregon 97209

0' 600' 1200' 1800'

Blue Creek Wind Farm

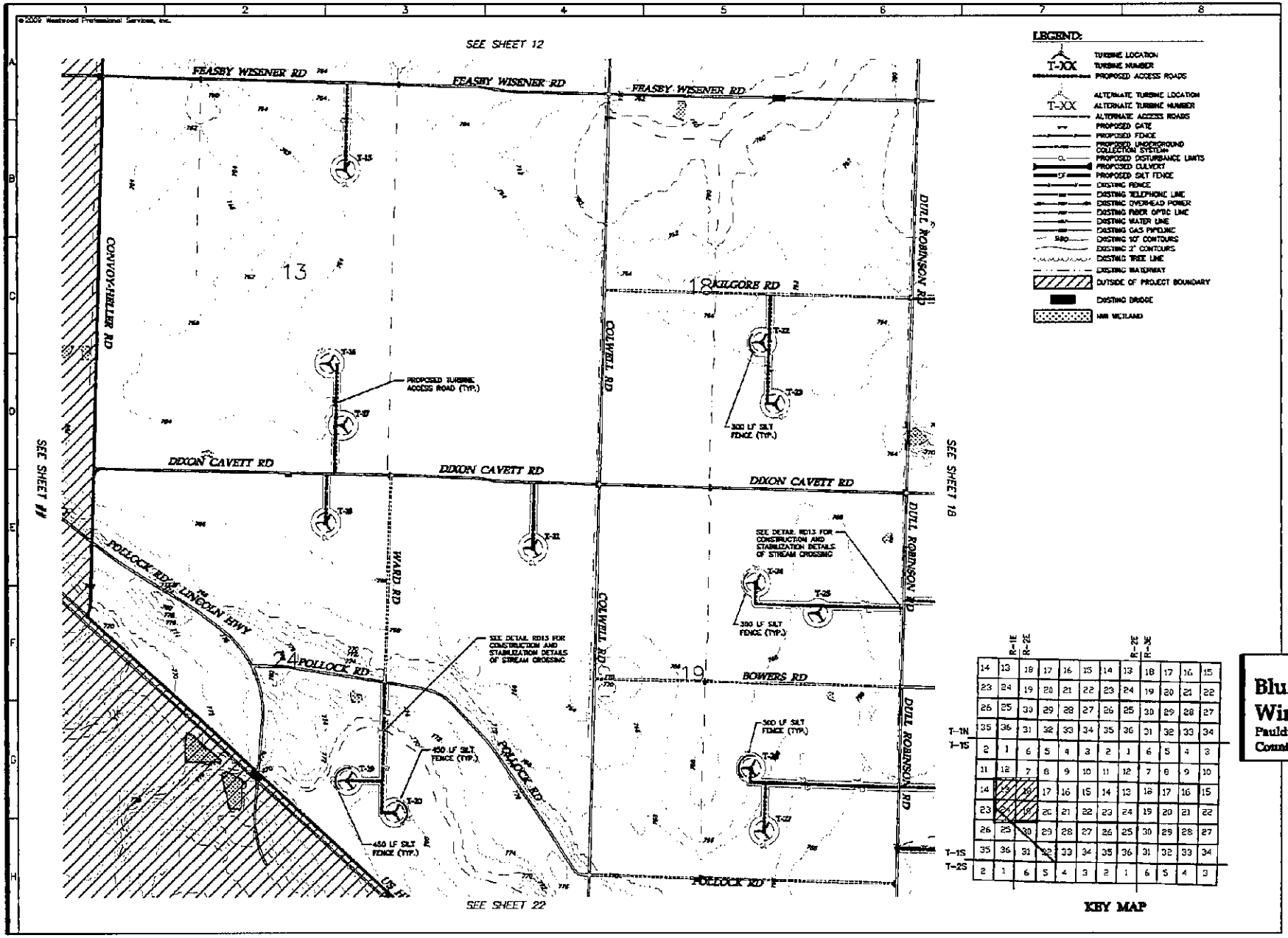
Paulding & Van Wert Counties, Ohio

Civil Site Plan

SWPP PLAN
NOT FOR CONSTRUCTION

Date 12/01/09
Sheet 16 OF 23

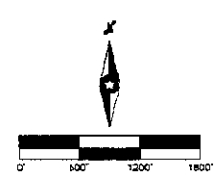
20082509-CIVPP01.dwg



LEGEND:

- T-XX — TURBINE LOCATION / TURBINE NUMBER
- PROPOSED ACCESS ROADS
- T-XX — ALTERNATE TURBINE LOCATION / ALTERNATE TURBINE NUMBER
- ALTERNATE ACCESS ROADS
- PROPOSED GATE
- PROPOSED FENCE
- PROPOSED UNDERGROUND COLLECTION SYSTEM
- PROPOSED DISTURBANCE LIMITS
- PROPOSED CULVERT
- SF — PROPOSED SILT FENCE
- EXISTING FENCE
- EXISTING TELEPHONE LINE
- EXISTING OVERHEAD POWER
- EXISTING FIBER OPTIC LINE
- EXISTING WATER LINE
- EXISTING GAS PIPELINE
- 580 — EXISTING 10' CONTOURS
- EXISTING 2' CONTOURS
- EXISTING TREE LINE
- EXISTING WATERWAY
- OUTSIDE OF PROJECT BOUNDARY
- EXISTING BRIDGE
- NWI WETLAND

KEY MAP



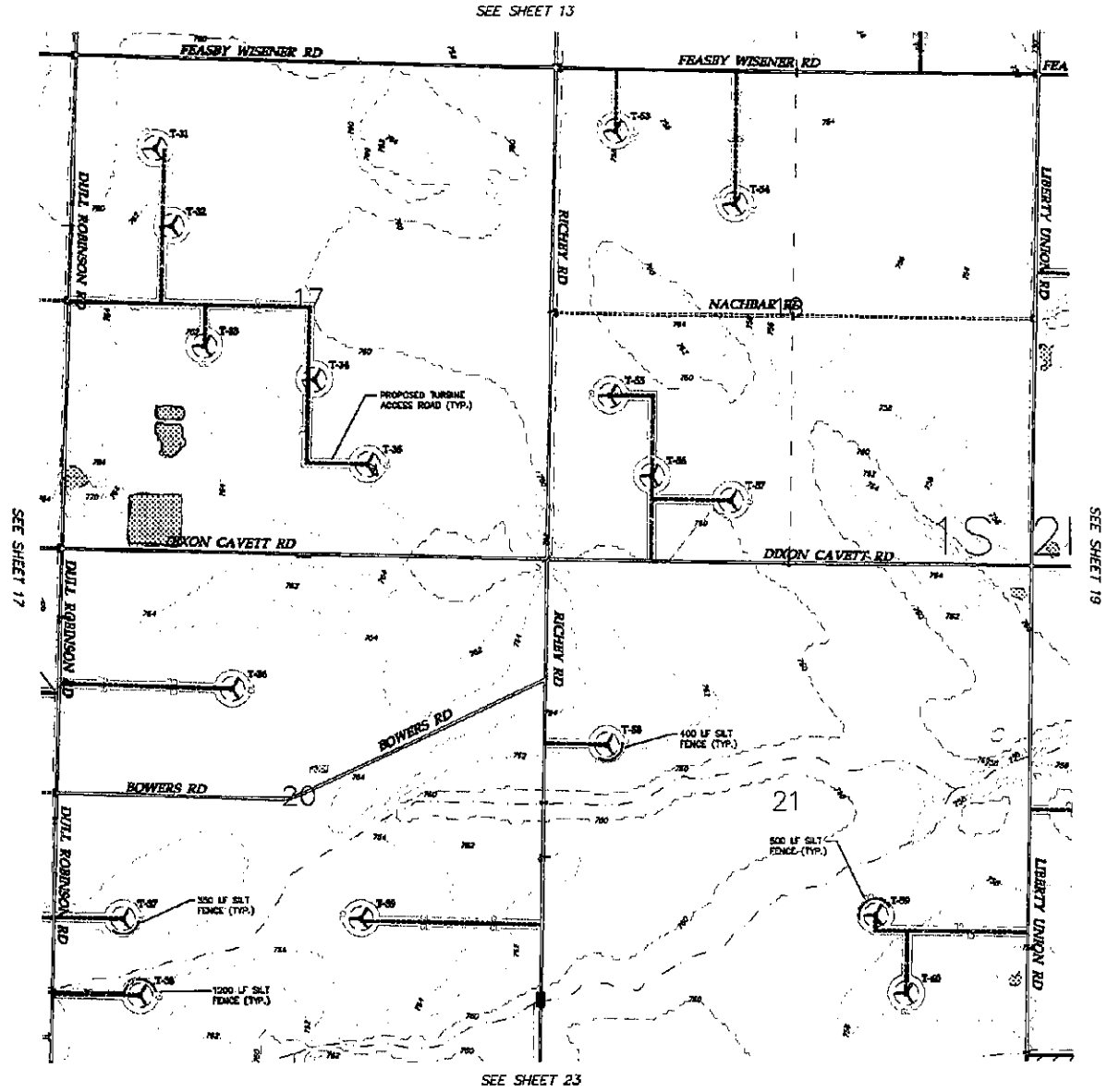
Blue Creek Wind Farm

Paulding & Van Wert Counties, Ohio

Civil Site Plan

SWPP PLAN
NOT FOR CONSTRUCTION

Date: 12/01/09
Sheet 17 OF 23



LEGEND:

- T-XX — TURBINE LOCATION / TURBINE NUMBER
- PROPOSED ACCESS ROADS
- T-XX — ALTERNATE TURBINE LOCATION / ALTERNATE TURBINE NUMBER
- ALTERNATE ACCESS ROADS
- PROPOSED GATE
- PROPOSED FENCE
- PROPOSED UNDERGROUND COLLECTION SYSTEM
- PROPOSED DISTURBANCE LIMITS
- PROPOSED CULVERT
- PROPOSED SILT FENCE
- EXISTING FENCE
- EXISTING TELEPHONE LINE
- EXISTING OVERHEAD POWER
- EXISTING FIBER OPTIC LINE
- EXISTING WATER LINE
- EXISTING GAS PIPELINE
- EXISTING 10' CONTOURS
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- EXISTING WATERWAY
- OUTSIDE OF PROJECT BOUNDARY
- EXISTING BRIDGE
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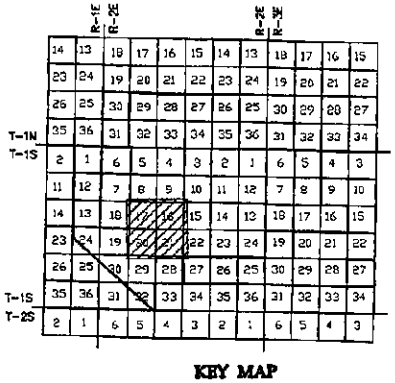

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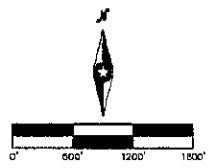


Westwood

Prepared for:

IBERDROLA RENEWABLES
1125 Northwest Couch, Suite 700
Portland, Oregon 97209

Blue Creek Wind Farm

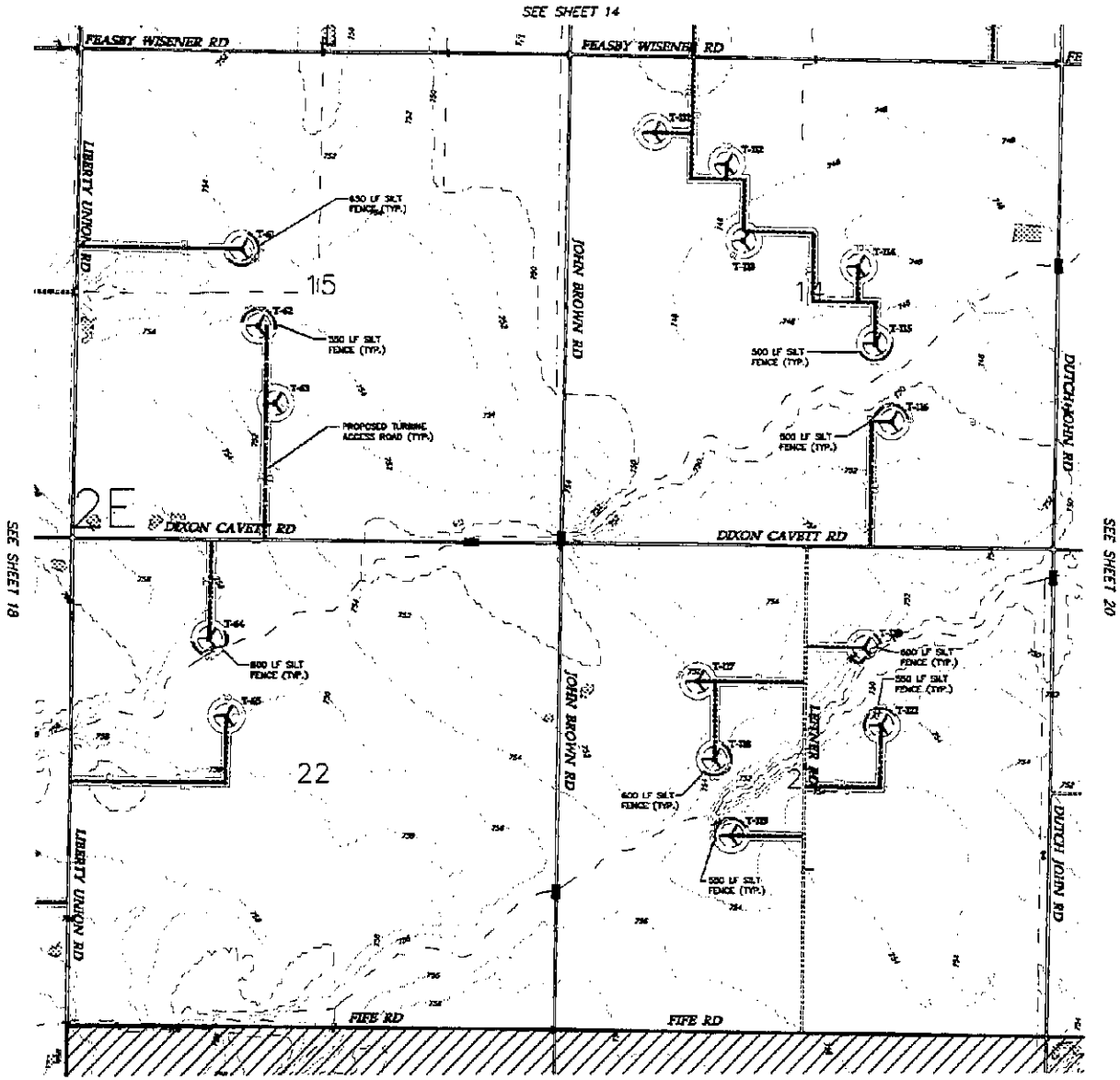
Paulding & Van Wert Counties, Ohio

Civil Site Plan

SWPP PLAN
NOT FOR CONSTRUCTION

Date 12/01/09

Sheet 18 OF 23



LEGEND:

- T-XX — TURBINE LOCATION / TURBINE NUMBER / PROPOSED ACCESS ROADS
- T-XX — ALTERNATE TURBINE LOCATION / ALTERNATE TURBINE NUMBER / ALTERNATE ACCESS ROADS
- PROPOSED GATE
- PROPOSED FENCE
- PROPOSED UNDERGROUND COLLECTION SYSTEM
- PROPOSED DISTURBANCE LIMITS
- PROPOSED CLAYPAD
- PROPOSED SILT FENCE
- EXISTING FENCE
- EXISTING TELEPHONE LINE
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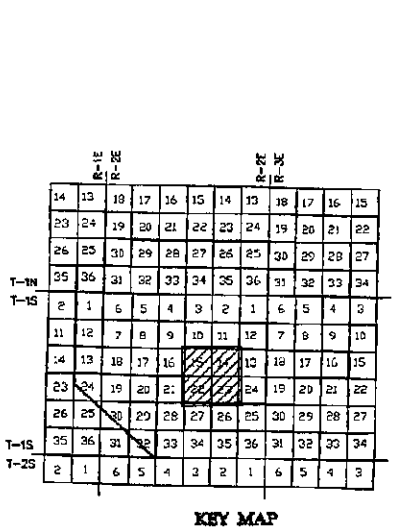

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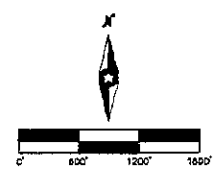


Westwood

Prepared for:

IBERDROLA RENEWABLES
1125 Northwest Couch, Suite 700
Portland, Oregon 97209

Blue Creek Wind Farm

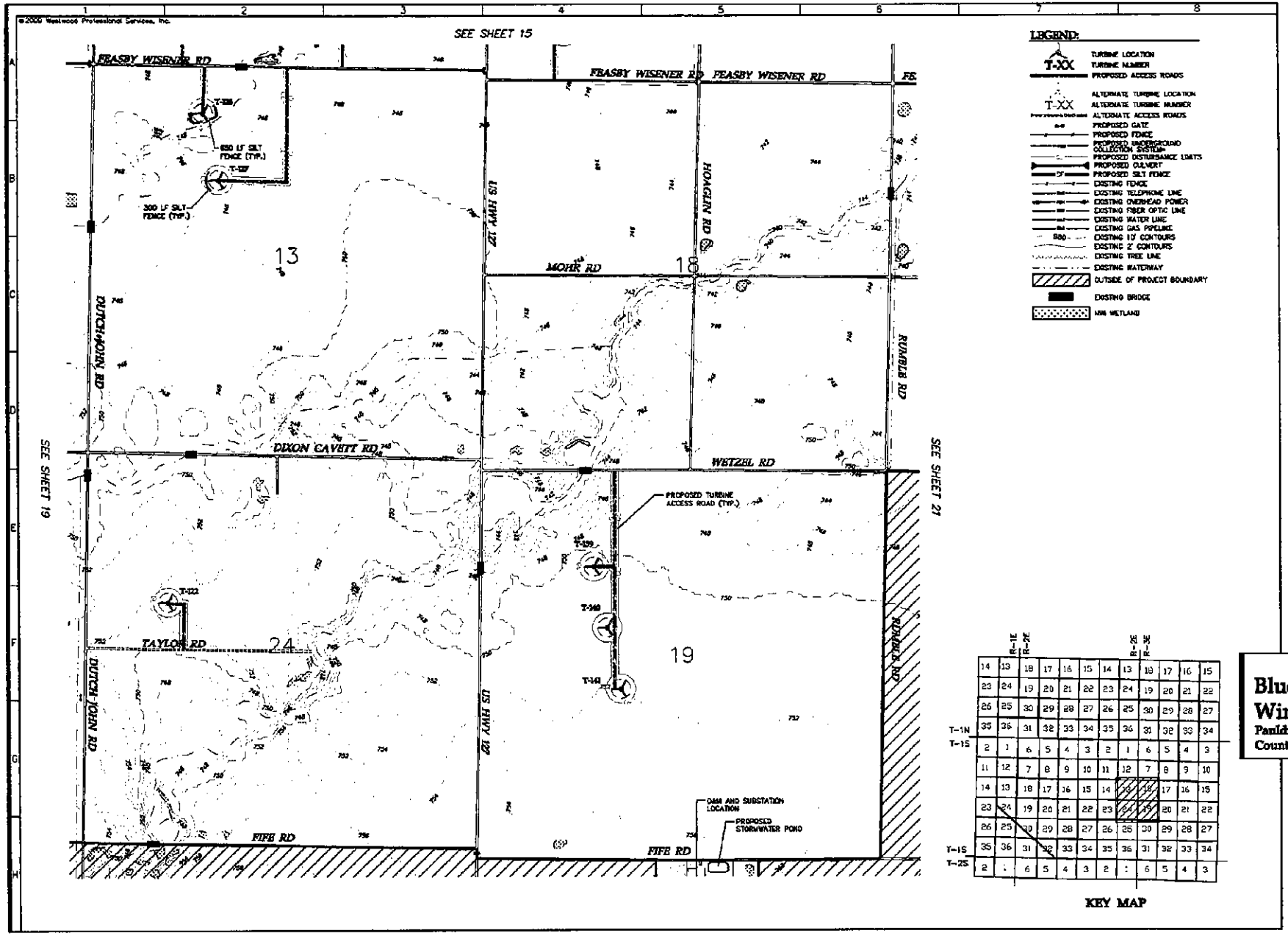
Paulding & Van Wert Counties, Ohio

Civil Site Plan

SWPP PLAN
NOT FOR CONSTRUCTION

Date 12/01/09

Sheet 13 OF 23



Westwood

Iberdrola Renewables
1125 Northwest Couch, Suite 700
Portland, Oregon 97209

Designed ABC
Checked DSW
Drawn ABC
Record Drawings by/date
Revisions
DATE DESCRIPTION

Prepared for:

N

0' 600' 1200' 1800'

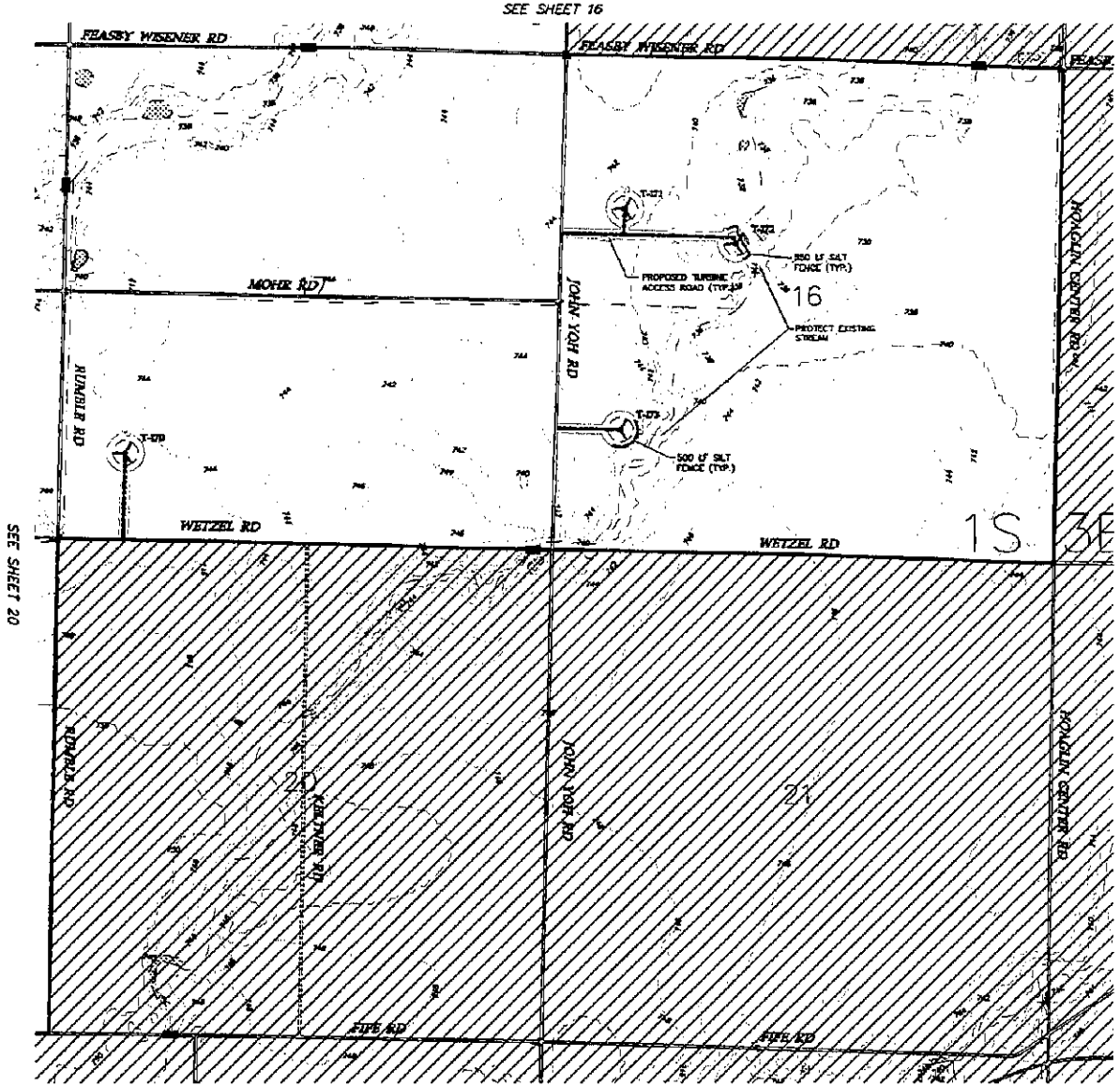
Blue Creek Wind Farm

Paulding & Van Wert Counties, Ohio

Civil Site Plan

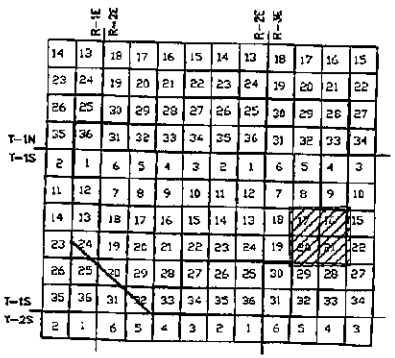
SWPP PLAN
NOT FOR CONSTRUCTION

Date 12/01/09
Sheet 20 OF 23



LEGEND:

- T-XX — TURBINE LOCATION / TURBINE NUMBER
- PROPOSED ACCESS ROADS
- T-XX — ALTERNATE TURBINE LOCATION / ALTERNATE TURBINE NUMBER
- ALTERNATE ACCESS ROADS
- PROPOSED GATE
- PROPOSED FENCE
- PROPOSED UNDERGROUND COLLECTION SYSTEM
- PROPOSED DISTURBANCE LIMITS
- PROPOSED CULVERT
- PROPOSED SILT FENCE
- EXISTING FENCE
- EXISTING TELEPHONE LINE
- EXISTING OVERHEAD POWER
- EXISTING FIBER OPTIC LINE
- EXISTING WATER LINE
- EXISTING GAS PIPELINE
- EXISTING 10' CONTOURS
- EXISTING 2' CONTOURS
- EXISTING TREE LINE
- EXISTING WATERWAY
- OUTSIDE OF PROJECT BOUNDARY
- EXISTING BRIDGE
- NWI WETLAND



KEY MAP

Westwood

Prepared for:

IBERDROLA RENEWABLES
1125 Northwest Couch, Suite 700
Portland, Oregon 97209

0' 600' 1200' 1800'

Blue Creek Wind Farm

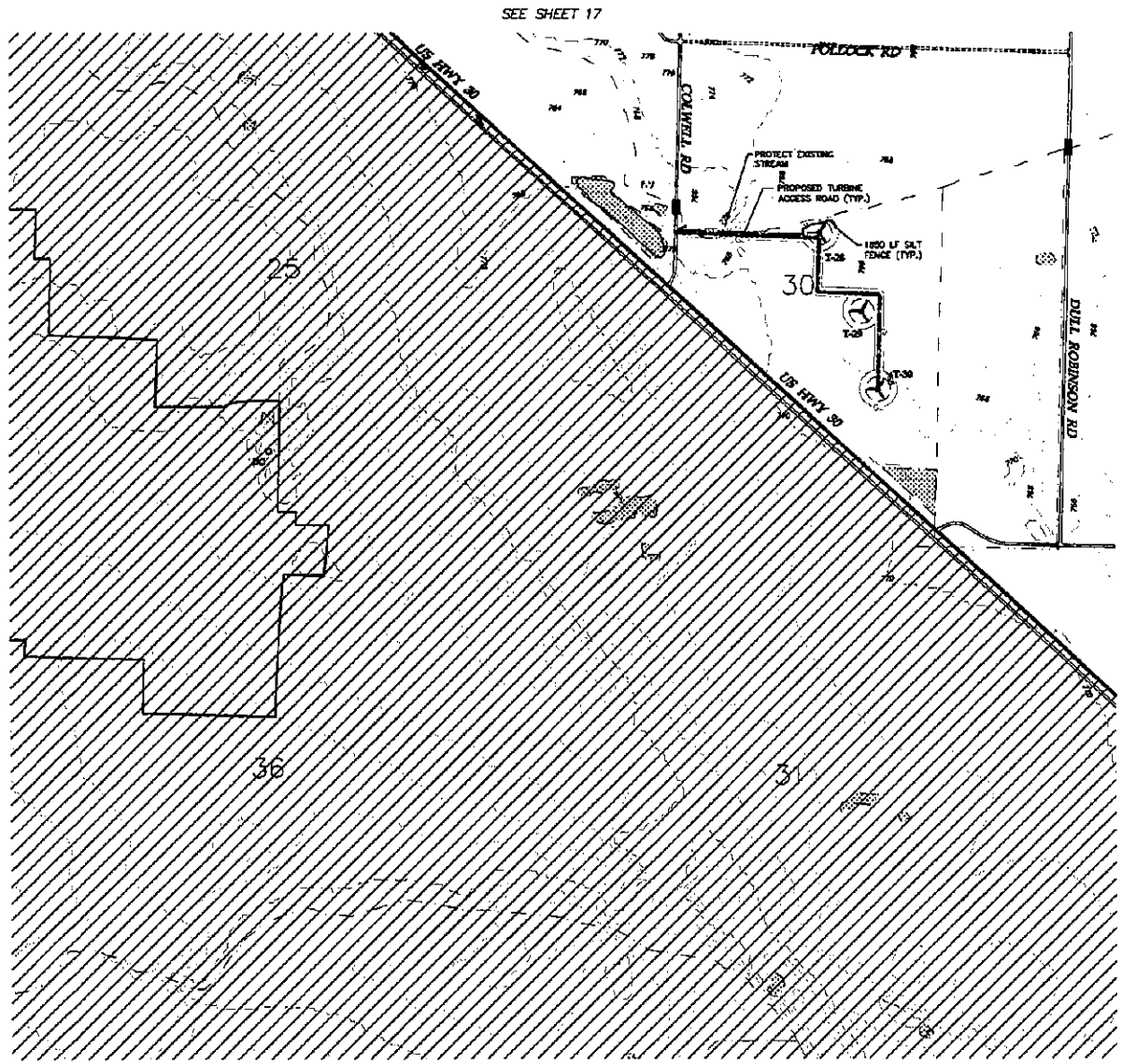
Paulding & Van Wert Counties, Ohio

Civil Site Plan

SWPP PLAN
NOT FOR CONSTRUCTION

Date 12/01/09

Sheet 21 OF 25



LEGEND:

- T-XX — TURBINE LOCATION / TURBINE NUMBER
- PROPOSED ACCESS ROADS
- T-XX — ALTERNATE TURBINE LOCATION / ALTERNATE TURBINE NUMBER
- ALTERNATE ACCESS ROADS
- PROPOSED GATE
- PROPOSED FENCE
- PROPOSED UNDERGROUND COLLECTION SYSTEM
- PROPOSED DISTURBANCE LIMITS
- PROPOSED CULVERT
- PROPOSED SILT FENCE
- EXISTING FENCE
- EXISTING TELEPHONE LINE
- EXISTING OVERHEAD POWER
- EXISTING FIBER OPTIC LINE
- EXISTING WATER LINE
- EXISTING GAS PIPELINE
- EXISTING 10' CONTOURS
- EXISTING 2' CONTOURS
- EXISTING TREE LINE
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- OUTSIDE OF PROJECT BOUNDARY
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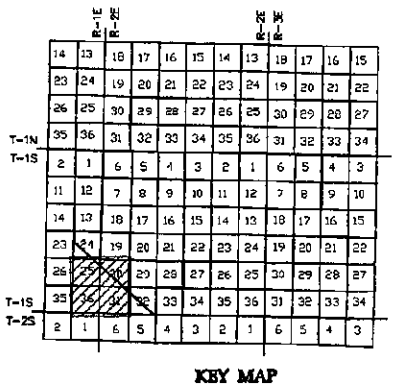
- NWI WETLAND



KEY MAP

Westwood

Designed: ADC
Checked: DDS
Drawn: ADC
Record Drawings by/date:
Revisions
DATE DESCRIPTION
Proposed for:

EDP RENEWABLES
1125 Northwest Couch, Suite 700
Portland, Oregon 97209

N

0' 600' 1200' 1800'

Blue Creek Wind Farm

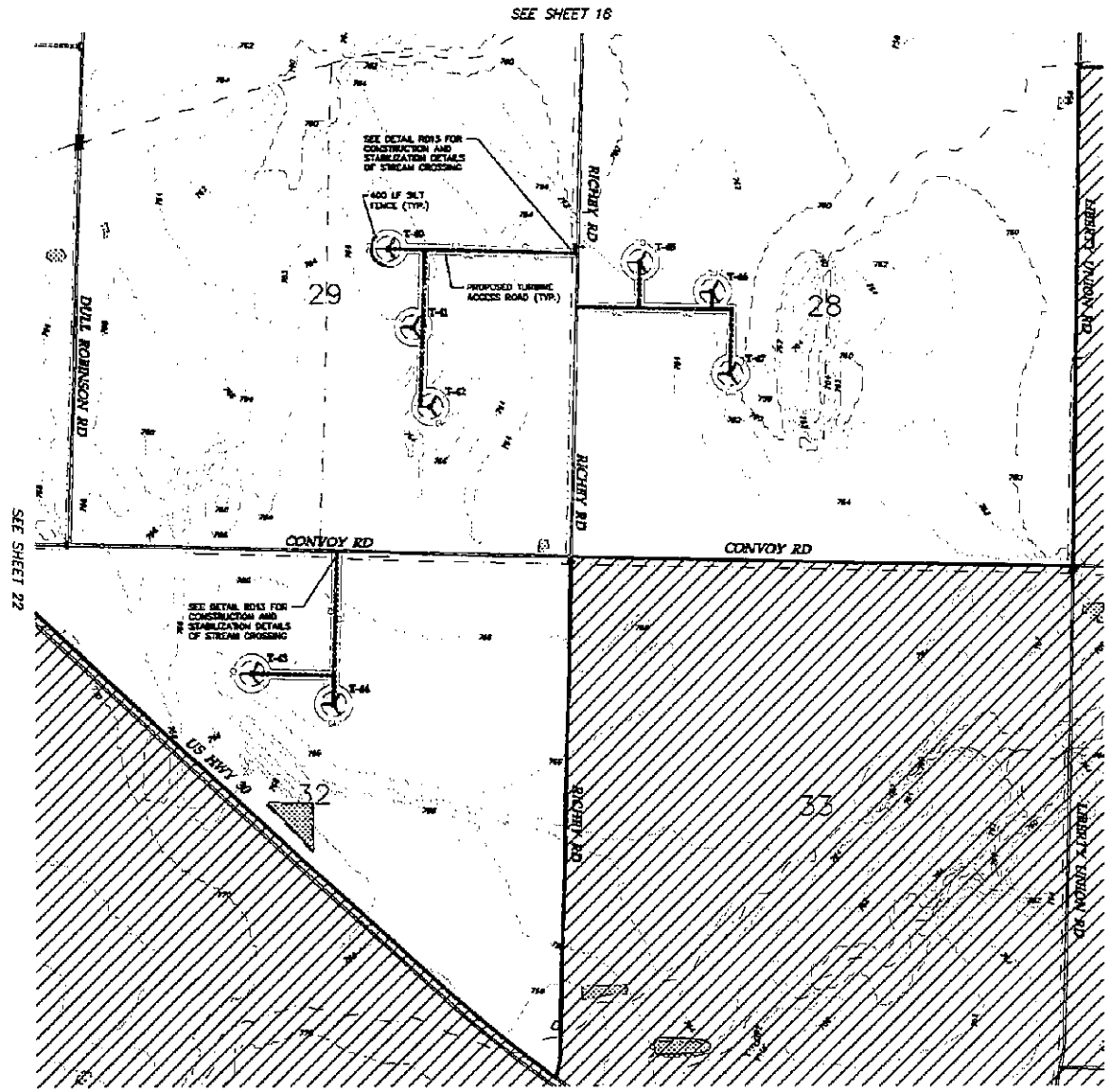
Paulding & Van Wert Counties, Ohio

Civil Site Plan

SWPP PLAN
NOT FOR CONSTRUCTION

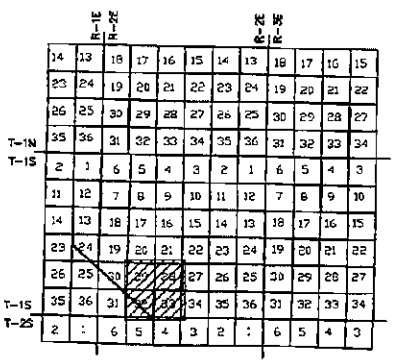
Date 12/01/09
Sheet 22 OF 23

20062506-SWPPP.dwg



LEGEND:

- T-XX — TURBINE LOCATION
- T-XX — TURBINE NUMBER
- PROPOSED ACCESS ROADS
- T-XX — ALTERNATE TURBINE LOCATION
- ALTERNATE TURBINE NUMBER
- ALTERNATE ACCESS ROADS
- PROPOSED GATE
- PROPOSED FENCE
- PROPOSED UNDERGROUND COLLECTION SYSTEM
- CL — PROPOSED DISTURBANCE LIMITS
- PROPOSED CULVERT
- PROPOSED SILT FENCE
- EXISTING FENCE
- EXISTING TELEPHONE LINE
- EXISTING OVERHEAD POWER
- EXISTING FIBER OPTIC LINE
- EXISTING WATER LINE
- EXISTING GAS PIPELINE
- 980 — EXISTING 10' CONTOURS
- EXISTING 2' CONTOURS
- EXISTING TREE LINE
- EXISTING WATERWAY
- OUTSIDE OF PROJECT BOUNDARY
- EXISTING BRIDGE
- NWI WETLAND



KEY MAP

Westwood

Engineer: ARC
Checked: BEW
Plotted: ARC
Record Drawing by/date:

Revisions		
#	Date	Description

Proposed Issue

IBERDROLA RENEWABLES
1125 Northwest Couch, Suite 700
Portland, Oregon 97209

0' 600' 1200' 1800'

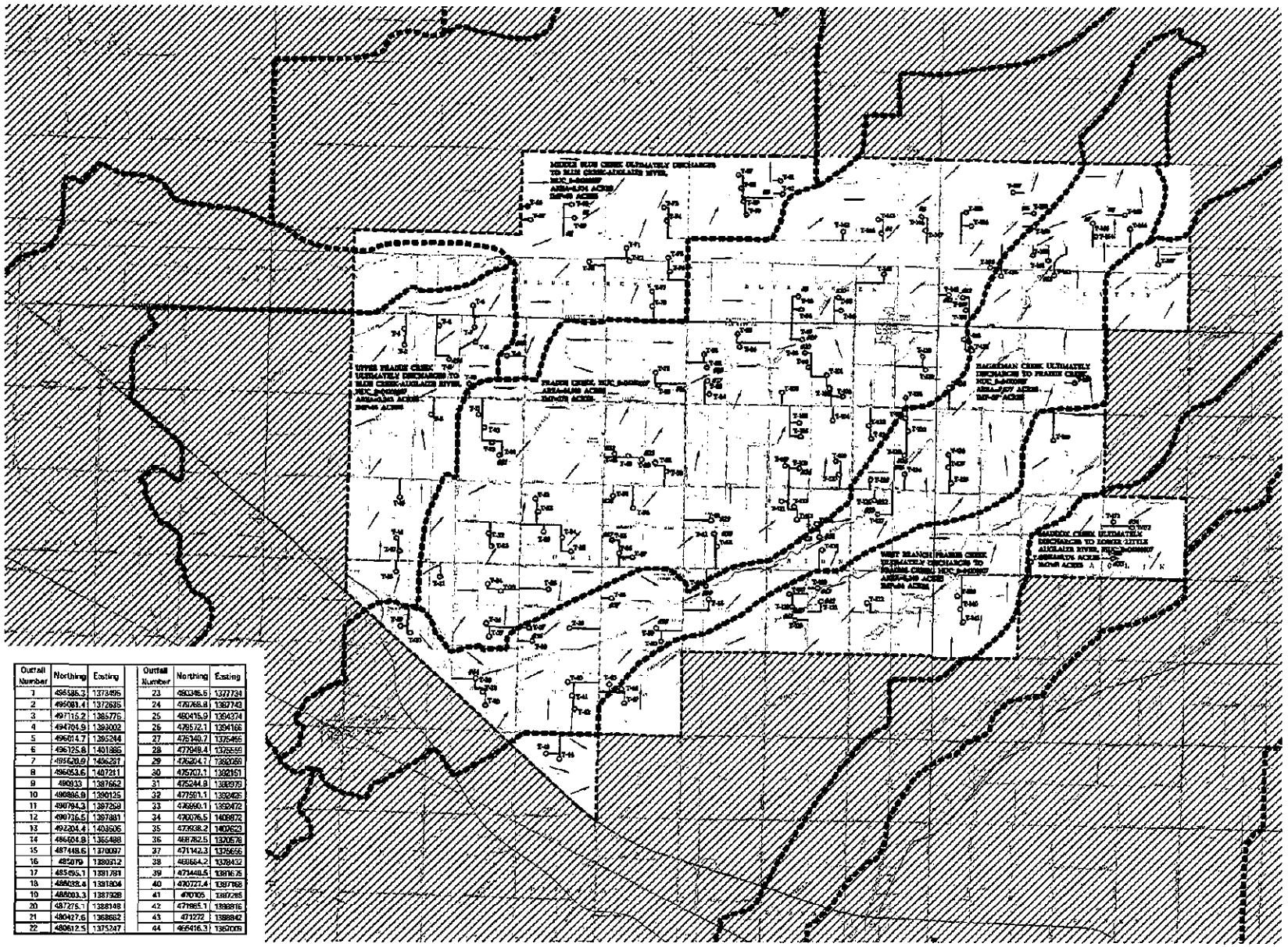
Blue Creek Wind Farm

Paulding & Van Wert Counties, Ohio

Civil Site Plan

SWPP PLAN
NOT FOR CONSTRUCTION

Date: 12/01/09
Sheet: 23 of 29



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2	495081.4	1372635	24	479768.8	1362743
3	497115.2	1385776	25	480415.9	1364374
4	494704.9	1393002	26	478572.1	1394166
5	496014.7	1395244	27	476340.7	1375466
6	496125.8	1401885	28	477048.4	1375559
7	495670.9	1406287	29	476804.7	1362089
8	495053.6	1407211	30	475707.1	1362151
9	490833	1387662	31	475244.8	1388975
10	490886.9	1390125	32	477501.1	1392405
11	490794.3	1387259	33	476990.1	1392472
12	490736.5	1397881	34	476076.5	1400872
13	492204.4	1403505	35	473938.2	1400623
14	486604.8	1365488	36	468782.5	1320576
15	487448.6	1378097	37	471142.3	1375656
16	485079	1380312	38	468664.2	1328432
17	485495.1	1391781	39	471448.5	1381675
18	488032.4	1391804	40	470727.4	1387768
19	485803.3	1387928	41	470105	1387265
20	487275.1	1388148	42	471985.1	1388916
21	480427.6	1368682	43	471272	1388842
22	480612.5	1375247	44	466416.3	1362009

Westwood

1325 Northwest Couch, Suite 700
Portland, Oregon 97209

Drawn: ADC
Checked: JDP
Project: ADC
Record Drawing Set Date:

No.	DATE	DESCRIPTION

Prepared for:

LEGEND:

- T-XX — TURBINE LOCATION / TURBINE NUMBER
- GRADE BREAK
- GENERAL OVERLAND FLOW DIRECTION
- PROPOSED ACCESS ROAD
- OUTSIDE PROJECT BOUNDARY

N

0' 3000' 6000' 9000'

Blue Creek

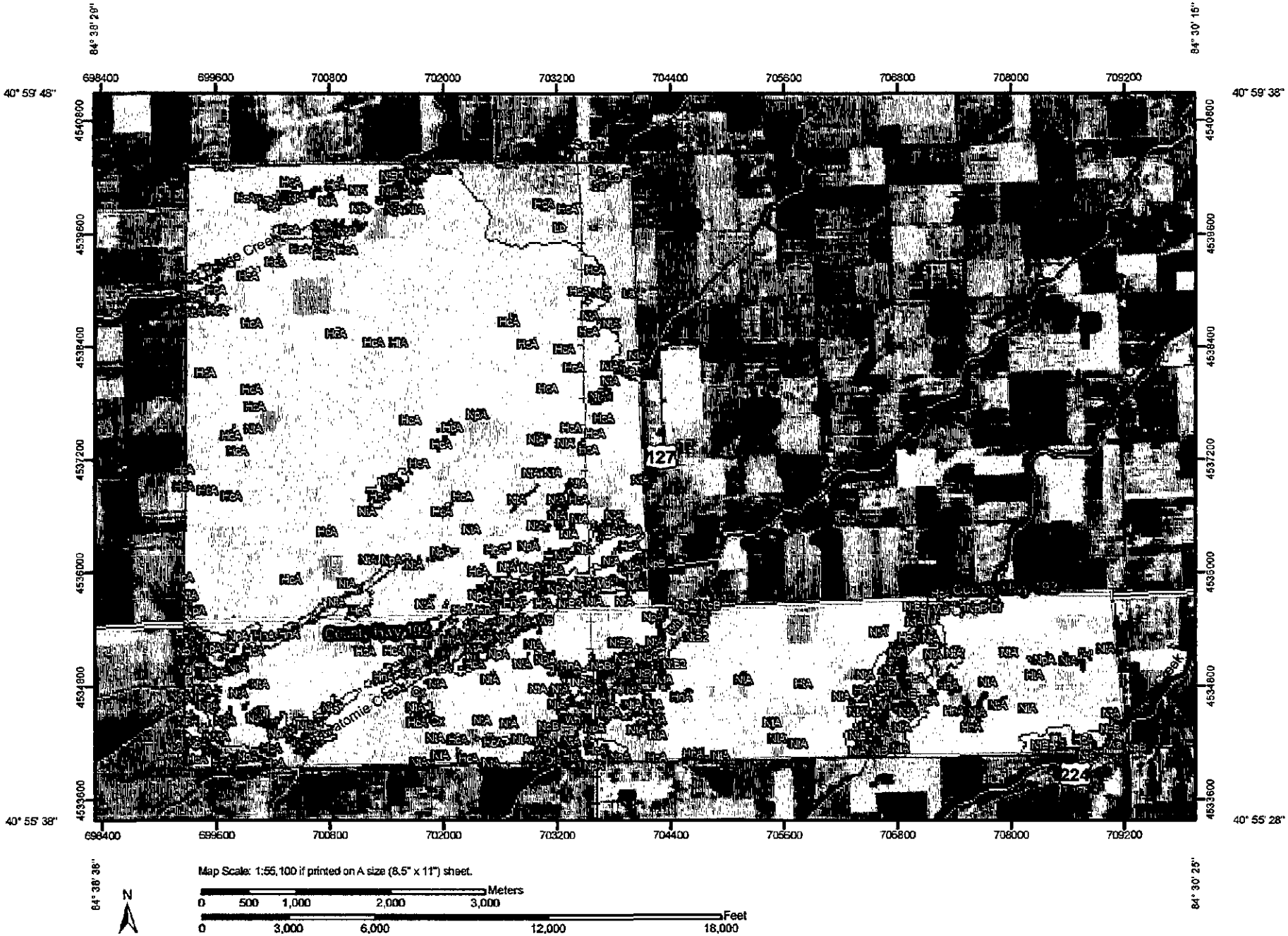
Van Wert and Paulding County, Ohio

USGS Quad Map

SWPPP

Date: 11/23/09
Sheet 1 OF 1

K Factor, Whole Soil—Paulding County, Ohio, and Van Wert County, Ohio
(East Area Blue Creek Wind Farm)



MAP LEGEND

Area of Interest (AOI)
- Area of Interest (AOI)

Soils
- Soil Map Units

Soil Ratings
- .02
- .05
- .10
- .15
- .17
- .20
- .24
- .28
- .32
- .37
- .43
- .49
- .55
- .64
- Not rated or not available

Political Features
- Cities

Water Features
- Oceans
- Streams and Canals

Transportation
- Rails
- Interstate Highways
- US Routes
- Major Roads

MAP INFORMATION

Map Scale: 1:55,100 if printed on A size (8.5" × 11") sheet.

The soil surveys that comprise your AOI were mapped at scales ranging from 1:12,000 to 1:15,840.

Please rely on the bar scale on each map sheet for accurate map *measurements.*

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL: http://websoilsurvey.nrcs.usda.gov
Coordinate System: UTM Zone 16N NAD83

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Paulding County, Ohio
Survey Area Data: Version 9, Sep 16, 2009

Soil Survey Area: Van Wert County, Ohio
Survey Area Data: Version 9, Sep 16, 2009

Your area of interest (AOI) includes more than one soil survey area. These survey areas may have been mapped at different scales, with a different land use in mind, at different times, or at different levels of detail. This may result in map unit symbols, soil properties, and interpretations that do not completely agree across soil survey area boundaries.

Date(s) aerial images were photographed: 6/23/2004; 6/24/2004

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

K Factor, Whole Soil

K Factor, Whole Soil— Summary by Map Unit — Paulding County, Ohio				
Map unit symbol	**Map unit name**	**Rating**	**Acres in AOI**	**Percent of AOI**
HtA	Hoytville silty clay, 0 to 1 percent slopes	.20	8.6	0.1%
Subtotals for Soil Survey Area			**8.6**	**0.1%**
Totals for Area of Interest			**9,641.9**	**100.0%**

K Factor, Whole Soil— Summary by Map Unit — Van Wert County, Ohio				
Map unit symbol	**Map unit name**	**Rating**	**Acres in AOI**	**Percent of AOI**
Cx	Cut and fill land		2.1	0.0%
Df	Defiance silty clay loam	.37	3.5	0.0%
DmA	Digby loam, 0 to 2 percent slopes	.32	0.5	0.0%
HcA	Hoytville silty clay loam, 0 to 1 percent slopes	.24	691.0	7.2%
HdB	Haney loam, 2 to 6 percent slopes	.32	1.0	0.0%
HnA	Haskins loam, 0 to 2 percent slopes	.37	66.3	0.7%
HnB	Haskins loam, 2 to 6 percent slopes	.37	0.7	0.0%
HtA	Hoytville silty clay, 0 to 1 percent slopes	.20	7,545.1	78.3%
La	Latty silty clay loam	.28	8.6	0.1%
Lb	Latty silty clay	.28	453.3	4.7%
Md	Mermill silt loam	.32	12.9	0.1%
NaA	Nappanee loam, 0 to 2 percent slopes	.37	1.6	0.0%
NpA	Nappanee silt loam, 0 to 2 percent slopes	.37	182.4	1.9%
NpB	Nappanee silt loam, 2 to 6 percent slopes	.37	22.9	0.2%
NtA	Nappanee silty clay loam, 0 to 2 percent slopes	.43	381.6	4.0%
NtB	Nappanee silty clay loam, 2 to 6 percent slopes	.43	42.9	0.4%
NtB2	Nappanee silty clay loam, 2 to 6 percent slopes, moderately eroded	.43	20.6	0.2%
Pm	Pewamo silty clay loam	.28	0.4	0.0%
ScB	St. Clair silt loam, 2 to 6 percent slopes	.37	2.6	0.0%
Wa	Wabasha silty clay loam	.32	102.6	1.1%
Wh	Wabasha silty clay	.32	92.7	1.0%

K Factor, Whole Soil— Summary by Map Unit — Van Wert County, Ohio				
Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
Subtotals for Soil Survey Area			9,635.3	99.9%
Totals for Area of Interest			9,641.9	100.0%

Description

Erosion factor K indicates the susceptibility of a soil to sheet and rill erosion by water. Factor K is one of six factors used in the Universal Soil Loss Equation (USLE) and the Revised Universal Soil Loss Equation (RUSLE) to predict the average annual rate of soil loss by sheet and rill erosion in tons per acre per year. The estimates are based primarily on percentage of silt, sand, and organic matter and on soil structure and saturated hydraulic conductivity (Ksat). Values of K range from 0.02 to 0.69. Other factors being equal, the higher the value, the more susceptible the soil is to sheet and rill erosion by water.

"Erosion factor Kw (whole soil)" indicates the erodibility of the whole soil. The estimates are modified by the presence of rock fragments.

Rating Options

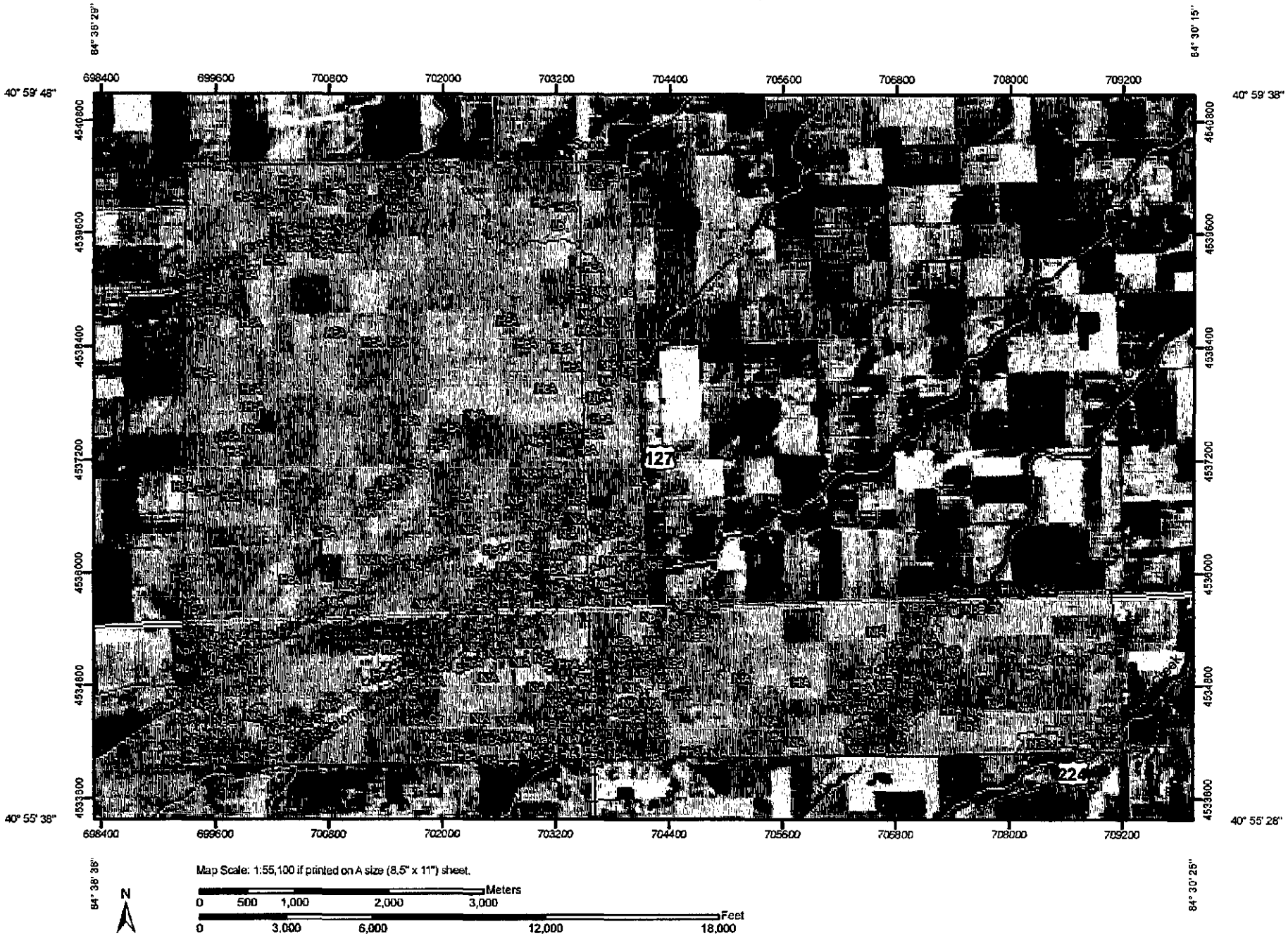
Aggregation Method: Dominant Condition

Component Percent Cutoff: *None Specified*

Tie-break Rule: Higher

Layer Options: Surface Layer

Erosion Hazard (Off-Road, Off-Trail)—Paulding County, Ohio, and Van Wert County, Ohio
(East Area Blue Creek Wind Farm)



MAP LEGEND

Area of Interest (AOI)
- Area of Interest (AOI)

Soils
- Soil Map Units

Soil Ratings
- Very severe
- Severe
- Moderate
- Slight
- Not rated or not available

Political Features
- Cities

Water Features
- Oceans
- Streams and Canals

Transportation
- Rails
- Interstate Highways
- US Routes
- Major Roads

MAP INFORMATION

Map Scale: 1:55,100 if printed on A size (8.5" × 11") sheet.

The soil surveys that comprise your AOI were mapped at scales ranging from 1:12,000 to 1:15,840.

Please rely on the bar scale on each map sheet for accurate map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL: http://websoilsurvey.nrcs.usda.gov
Coordinate System: UTM Zone 16N NAD83

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Paulding County, Ohio
Survey Area Data: Version 9, Sep 16, 2009

Soil Survey Area: Van Wert County, Ohio
Survey Area Data: Version 9, Sep 16, 2009

Your area of interest (AOI) includes more than one soil survey area. These survey areas may have been mapped at different scales, with a different land use in mind, at different times, or at different levels of detail. This may result in map unit symbols, soil properties, and interpretations that do not completely agree across soil survey area boundaries.

Date(s) aerial images were photographed: 6/23/2004; 6/24/2004

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Erosion Hazard (Off-Road, Off-Trail)

Erosion Hazard (Off-Road, Off-Trail)— Summary by Map Unit — Paulding County, Ohio						
Map unit symbol	Map unit name	Rating	Component name (percent)	Rating reasons (numeric values)	Acres in AOI	Percent of AOI
HtA	Hoytville silty clay, 0 to 1 percent slopes	Slight	Hoytville (92%)		8.6	0.1%
			Nappanee (8%)			
Subtotals for Soil Survey Area					**8.6**	**0.1%**
Totals for Area of Interest					**9,641.9**	**100.0%**

Erosion Hazard (Off-Road, Off-Trail)— Summary by Map Unit — Van Wert County, Ohio						
Map unit symbol	Map unit name	Rating	Component name (percent)	Rating reasons (numeric values)	Acres in AOI	Percent of AOI
Cx	Cut and fill land	Not rated	Cut and fill land (98%)		2.1	0.0%
			trash and other nonsoil material (1%)			
			poorly drained soils (1%)			
Df	Defiance silty clay loam	Slight	Defiance (92%)		3.5	0.0%
DmA	Digby loam, 0 to 2 percent slopes	Slight	Digby (90%)		0.5	0.0%
HcA	Hoytville silty clay loam, 0 to 1 percent slopes	Slight	Hoytville (91%)		691.0	7.2%
			Nappanee (9%)			
HdB	Haney loam, 2 to 6 percent slopes	Slight	Haney (100%)		1.0	0.0%
HnA	Haskins loam, 0 to 2 percent slopes	Slight	Haskins (92%)		66.3	0.7%
HnB	Haskins loam, 2 to 6 percent slopes	Slight	Haskins (88%)		0.7	0.0%
HtA	Hoytville silty clay, 0 to 1 percent slopes	Slight	Hoytville (92%)		7,545.1	78.3%
			Nappanee (8%)			
La	Latty silty clay loam	Slight	Latty (99%)		8.6	0.1%
Lb	Latty silty clay	Slight	Latty (95%)		453.3	4.7%
Md	Mermill silt loam	Slight	Mermill (100%)		12.9	0.1%
NaA	Nappanee loam, 0 to 2 percent slopes	Slight	Nappanee (91%)		1.6	0.0%
NpA	Nappanee silt loam, 0 to 2 percent slopes	Slight	Nappanee (91%)		182.4	1.9%
NpB	Nappanee silt loam, 2 to 6 percent slopes	Slight	Nappanee (91%)		22.9	0.2%
NtA	Nappanee silty clay loam, 0 to 2 percent slopes	Slight	Nappanee (92%)		381.6	4.0%

Erosion Hazard (Off-Road, Off-Trail)— Summary by Map Unit — Van Wert County, Ohio						
Map unit symbol	**Map unit name**	**Rating**	**Component name (percent)**	**Rating reasons (numeric values)**	**Acres in AOI**	**Percent of AOI**
NtB	Nappanee silty clay loam, 2 to 6 percent slopes	Slight	Nappanee (91%)		42.9	0.4%
NtB2	Nappanee silty clay loam, 2 to 6 percent slopes, moderately eroded	Slight	Nappanee (96%)		20.6	0.2%
Pm	Pewamo silty clay loam	Slight	Pewamo (97%)		0.4	0.0%
ScB	St. Clair silt loam, 2 to 6 percent slopes	Slight	St. Clair (100%)		2.6	0.0%
Wa	Wabasha silty clay loam	Slight	Wabasha (100%)		102.6	1.1%
Wh	Wabasha silty clay	Slight	Wabasha (100%)		92.7	1.0%
Subtotals for Soil Survey Area					**9,635.3**	**99.9%**
Totals for Area of Interest					**9,641.9**	**100.0%**

Erosion Hazard (Off-Road, Off-Trail)— Summary by Rating Value		
Rating	**Acres in AOI**	**Percent of AOI**
Slight	9,641.7	100.0%
Null or Not Rated	2.1	0.0%
Totals for Area of Interest	**9,641.9**	**100.0%**

Description

The ratings in this interpretation indicate the hazard of soil loss from off-road and off-trail areas after disturbance activities that expose the soil surface. The ratings are based on slope and soil erosion factor K. The soil loss is caused by sheet or rill erosion in off-road or off-trail areas where 50 to 75 percent of the surface has been exposed by logging, grazing, mining, or other kinds of disturbance.

The ratings are both verbal and numerical. The hazard is described as "slight," "moderate," "severe," or "very severe." A rating of "slight" indicates that erosion is unlikely under ordinary climatic conditions; "moderate" indicates that some erosion is likely and that erosion-control measures may be needed; "severe" indicates that erosion is very likely and that erosion-control measures, including revegetation of bare areas, are advised; and "very severe" indicates that significant erosion is expected, loss of soil productivity and off-site damage are likely, and erosion-control measures are costly and generally impractical.

Numerical ratings indicate the severity of individual limitations. The ratings are shown as decimal fractions ranging from 0.01 to 1.00. They indicate gradations between the point at which a soil feature has the greatest negative impact on the specified aspect of forestland management (1.00) and the point at which the soil feature is not a limitation (0.00).

The map unit components listed for each map unit in the accompanying Summary by Map Unit table in Web Soil Survey or the Aggregation Report in Soil Data Viewer are determined by the aggregation method chosen. An aggregated rating class is shown for each map unit. The components listed for each map unit are only those that have the same rating class as listed for the map unit. The percent composition of each component in a particular map unit is presented to help the user better understand the percentage of each map unit that has the rating presented.

Other components with different ratings may be present in each map unit. The ratings for all components, regardless of the map unit aggregated rating, can be viewed by generating the equivalent report from the Soil Reports tab in Web Soil Survey or from the Soil Data Mart site. Onsite investigation may be needed to validate these interpretations and to confirm the identity of the soil on a given site.

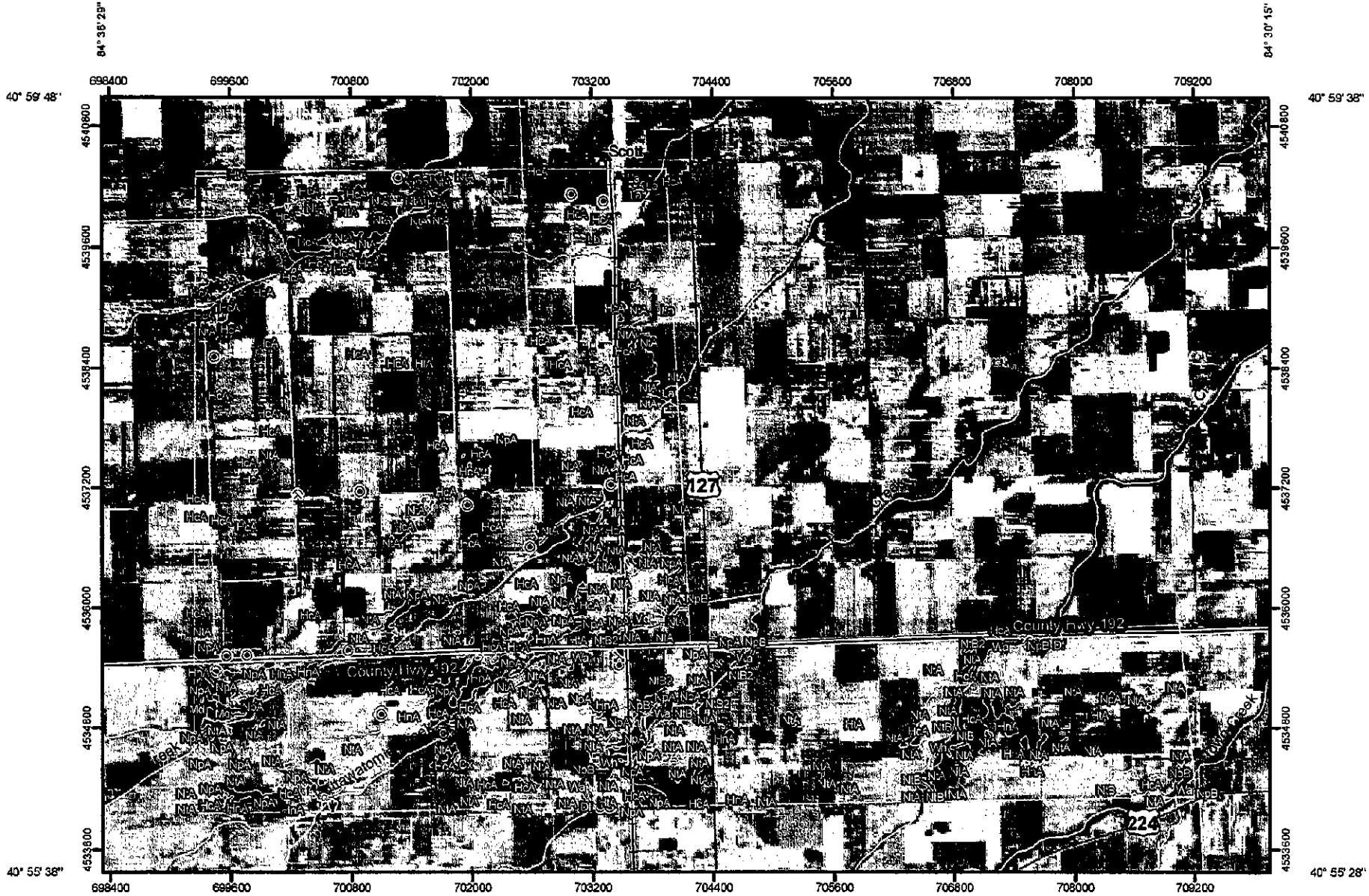
Rating Options

Aggregation Method: Dominant Condition

Component Percent Cutoff: *None Specified*

Tie-break Rule: Higher

Soil Map—Paulding County, [illegible], and Van Wert County, Ohio
(East Area Blue Creek Wind Farm)



USDA Natural Resources Conservation Service

Web Soil Survey
National Cooperative Soil Survey

MAP LEGEND

Area of Interest (AOI)
- Area of Interest (AOI)

Soils
- Soil Map Units

Special Point Features
- Blowout
- Borrow Pit
- Clay Spot
- Closed Depression
- Gravel Pit
- Gravelly Spot
- Landfill
- Lava Flow
- Marsh or swamp
- Mine or Quarry
- Miscellaneous Water
- Perennial Water
- Rock Outcrop
- Saline Spot
- Sandy Spot
- Severely Eroded Spot
- Sinkhole
- Slide or Slip
- Sodic Spot
- Spoil Area
- Stony Spot
- Very Stony Spot
- Wet Spot
- Other

Special Line Features
- Gully
- Short Steep Slope
- Other

Political Features
- Cities

Water Features
- Oceans
- Streams and Canals

Transportation
- Rails
- Interstate Highways
- US Routes
- Major Roads

MAP INFORMATION

Map Scale: 1:55,100 if printed on A size (8.5" × 11") sheet.

The soil surveys that comprise your AOI were mapped at scales ranging from 1:12,000 to 1:15,840.

Please rely on the bar scale on each map sheet for accurate map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL: http://websoilsurvey.nrcs.usda.gov
Coordinate System: UTM Zone 16N NAD83

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Paulding County, Ohio
Survey Area Data: Version 9, Sep 16, 2009

Soil Survey Area: Van Wert County, Ohio
Survey Area Data: Version 9, Sep 16, 2009

Your area of interest (AOI) includes more than one soil survey area. These survey areas may have been mapped at different scales, with a different land use in mind, at different times, or at different levels of detail. This may result in map unit symbols, soil properties, and interpretations that do not completely agree across soil survey area boundaries.

Date(s) aerial images were photographed: 6/23/2004; 6/24/2004

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Map Unit Legend

Paulding County, Ohio (OH125)			
Map Unit Symbol	**Map Unit Name**	**Acres in AOI**	**Percent of AOI**
HtA	Hoytville silty clay, 0 to 1 percent slopes	8.6	0.1%
Subtotals for Soil Survey Area		**8.6**	**0.1%**
Totals for Area of Interest		**9,641.9**	**100.0%**

Van Wert County, Ohio (OH161)			
Map Unit Symbol	**Map Unit Name**	**Acres in AOI**	**Percent of AOI**
Cx	Cut and fill land	2.1	0.0%
Df	Defiance silty clay loam	3.5	0.0%
DmA	Digby loam, 0 to 2 percent slopes	0.5	0.0%
HcA	Hoytville silty clay loam, 0 to 1 percent slopes	691.0	7.2%
HdB	Haney loam, 2 to 6 percent slopes	1.0	0.0%
HnA	Haskins loam, 0 to 2 percent slopes	66.3	0.7%
HnB	Haskins loam, 2 to 6 percent slopes	0.7	0.0%
HtA	Hoytville silty clay, 0 to 1 percent slopes	7,545.1	78.3%
La	Latty silty clay loam	8.6	0.1%
Lb	Latty silty clay	453.3	4.7%
Md	Mermill silt loam	12.9	0.1%
NaA	Nappanee loam, 0 to 2 percent slopes	1.6	0.0%
NpA	Nappanee silt loam, 0 to 2 percent slopes	182.4	1.9%
NpB	Nappanee silt loam, 2 to 6 percent slopes	22.9	0.2%
NtA	Nappanee silty clay loam, 0 to 2 percent slopes	381.6	4.0%
NtB	Nappanee silty clay loam, 2 to 6 percent slopes	42.9	0.4%
NtB2	Nappanee silty clay loam, 2 to 6 percent slopes, moderately eroded	20.6	0.2%
Pm	Pewamo silty clay loam	0.4	0.0%
ScB	St. Clair silt loam, 2 to 6 percent slopes	2.6	0.0%
Wa	Wabasha silty clay loam	102.6	1.1%
Wh	Wabasha silty clay	92.7	1.0%
Subtotals for Soil Survey Area		**9,635.3**	**99.9%**
Totals for Area of Interest		**9,641.9**	**100.0%**


84° 34' 59"
84° 30' 9"
41° 1' 30"
41° 1' 24"
703400
704500
705600
706700
707800
708900
4543800
4542700
4541600
4540500
4539400
4538300
4537200
4536100
127
40° 56' 34"
40° 56' 28"
84° 35' 9"
84° 30' 25"
Map Scale: 1:43,500 if printed on A size (8.5" x 11") sheet.
N
Meters
0 400 800 1,600 2,400
Feet
0 1,500 3,000 6,000 9,000

MAP LEGEND

Area of Interest (AOI)
- Area of Interest (AOI)

Soils
- Soil Map Units

Soil Ratings
- Very severe
- Severe
- Moderate
- Slight
- Not rated or not available

Political Features
- Cities

Water Features
- Oceans
- Streams and Canals

Transportation
- Rails
- Interstate Highways
- US Routes
- Major Roads

MAP INFORMATION

Map Scale: 1:43,500 if printed on A size (8.5" × 11") sheet.

The soil surveys that comprise your AOI were mapped at scales ranging from 1:12,000 to 1:15,840.

Please rely on the bar scale on each map sheet for accurate map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL: http://websoilsurvey.nrcs.usda.gov
Coordinate System: UTM Zone 16N NAD83

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Paulding County, Ohio
Survey Area Data: Version 9, Sep 16, 2009

Soil Survey Area: Van Wert County, Ohio
Survey Area Data: Version 9, Sep 16, 2009

Your area of interest (AOI) includes more than one soil survey area. These survey areas may have been mapped at different scales, with a different land use in mind, at different times, or at different levels of detail. This may result in map unit symbols, soil properties, and interpretations that do not completely agree across soil survey area *boundaries*.

Date(s) aerial images were photographed: 6/23/2004; 6/24/2004

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Erosion Hazard (Off-Road, Off-Trail)

Erosion Hazard (Off-Road, Off-Trail)— Summary by Map Unit — Paulding County, Ohio						
Map unit symbol	**Map unit name**	**Rating**	**Component name (percent)**	**Rating reasons (numeric values)**	**Acres in AOI**	**Percent of AOI**
Lb	Latty silty clay loam	Slight	Latty (90%)		3.3	0.0%
Lc	Latty silty clay	Slight	Latty (95%)		3,707.9	38.0%
NpA	Nappanee silty clay loam, 0 to 2 percent slopes	Slight	Nappanee (90%)		151.2	1.6%
Sb	Saranac silty clay loam, occasionally flooded	Slight	Saranac (90%)		23.0	0.2%
To	Toledo silty clay	Slight	Toledo (95%)		11.1	0.1%
W	Water	Not rated	Water (100%)		0.8	0.0%
Wb	Wabasha silty clay loam, frequently flooded	Slight	Wabasha (90%)		106.0	1.1%
Subtotals for Soil Survey Area					**4,003.3**	**41.1%**
Totals for Area of Interest					**9,760.0**	**100.0%**

Erosion Hazard (Off-Road, Off-Trail)— Summary by Map Unit — Van Wert County, Ohio						
Map unit symbol	**Map unit name**	**Rating**	**Component name (percent)**	**Rating reasons (numeric values)**	**Acres in AOI**	**Percent of AOI**
HcA	Hoytville silty clay loam, 0 to 1 percent slopes	Slight	Hoytville (91%)		24.7	0.3%
			Nappanee (9%)			
HnA	Haskins loam, 0 to 2 percent slopes	Slight	Haskins (92%)		0.4	0.0%
HtA	Hoytville silty clay, 0 to 1 percent slopes	Slight	Hoytville (92%)		1,377.0	14.1%
			Nappanee (8%)			
La	Latty silty clay loam	Slight	Latty (99%)		167.3	1.7%
Lb	Latty silty clay	Slight	Latty (95%)		3,283.6	33.7%
Md	Mermill silt loam	Slight	Mermill (100%)		6.5	0.1%
Mg	Millgrove silty clay loam	Slight	Millgrove (98%)		1.3	0.0%
NaA	Nappanee loam, 0 to 2 percent slopes	Slight	Nappanee (91%)		3.7	0.0%
NpA	Nappanee silt loam, 0 to 2 percent slopes	Slight	Nappanee (91%)		55.6	0.6%
NpB	Nappanee silt loam, 2 to 6 percent slopes	Slight	Nappanee (91%)		67.6	0.7%
NtA	Nappanee silty clay loam, 0 to 2 percent slopes	Slight	Nappanee (92%)		383.5	3.9%
NtB	Nappanee silty clay loam, 2 to 6 percent slopes	Slight	Nappanee (91%)		24.8	0.3%
NtB2	Nappanee silty clay loam, 2 to 6 percent slopes, moderately eroded	Slight	Nappanee (96%)		19.6	0.2%

Erosion Hazard (Off-Road, Off-Trail)— Summary by Map Unit — Van Wert County, Ohio						
Map unit symbol	Map unit name	Rating	Component name (percent)	Rating reasons (numeric values)	Acres in AOI	Percent of AOI
ScB	St. Clair silt loam, 2 to 6 percent slopes	Slight	St. Clair (100%)		3.1	0.0%
ScC2	St. Clair silt loam, 6 to 12 percent slopes, moderately eroded	Slight	St. Clair (99%)		5.2	0.1%
W	Water	Not rated	Water (100%)		8.9	0.1%
Wa	Wabasha silty clay loam	Slight	Wabasha (100%)		250.3	2.6%
Wh	Wabasha silty clay	Slight	Wabasha (100%)		63.5	0.7%
Subtotals for Soil Survey Area					**5,746.8**	**58.9%**
Totals for Area of Interest					**9,750.0**	**100.0%**

Erosion Hazard (Off-Road, Off-Trail)— Summary by Rating Value		
Rating	Acres in AOI	Percent of AOI
Slight	9,740.3	99.9%
Null or Not Rated	9.7	0.1%
Totals for Area of Interest	**9,750.0**	**100.0%**

Description

The ratings in this interpretation indicate the hazard of soil loss from off-road and off-trail areas after disturbance activities that expose the soil surface. The ratings are based on slope and soil erosion factor K. The soil loss is caused by sheet or rill erosion in off-road or off-trail areas where 50 to 75 percent of the surface has been exposed by logging, grazing, mining, or other kinds of disturbance.

The ratings are both verbal and numerical. The hazard is described as "slight," "moderate," "severe," or "very severe." A rating of "slight" indicates that erosion is unlikely under ordinary climatic conditions; "moderate" indicates that some erosion is likely and that erosion-control measures may be needed; "severe" indicates that erosion is very likely and that erosion-control measures, including revegetation of bare areas, are advised; and "very severe" indicates that significant erosion is expected, loss of soil productivity and off-site damage are likely, and erosion-control measures are costly and generally impractical.

Numerical ratings indicate the severity of individual limitations. The ratings are shown as decimal fractions ranging from 0.01 to 1.00. They indicate gradations between the point at which a soil feature has the greatest negative impact on the specified aspect of forestland management (1.00) and the point at which the soil feature is not a limitation (0.00).

The map unit components listed for each map unit in the accompanying Summary by Map Unit table in Web Soil Survey or the Aggregation Report in Soil Data Viewer are determined by the aggregation method chosen. An aggregated rating class is shown for each map unit. The components listed for each map unit are only those that have the same rating class as listed for the map unit. The percent composition of each component in a particular map unit is presented to help the user better understand the percentage of each map unit that has the rating presented.

Other components with different ratings may be present in each map unit. The ratings for all components, regardless of the map unit aggregated rating, can be viewed by generating the equivalent report from the Soil Reports tab in Web Soil Survey or from the Soil Data Mart site. Onsite investigation may be needed to validate these interpretations and to confirm the identity of the soil on a given site.

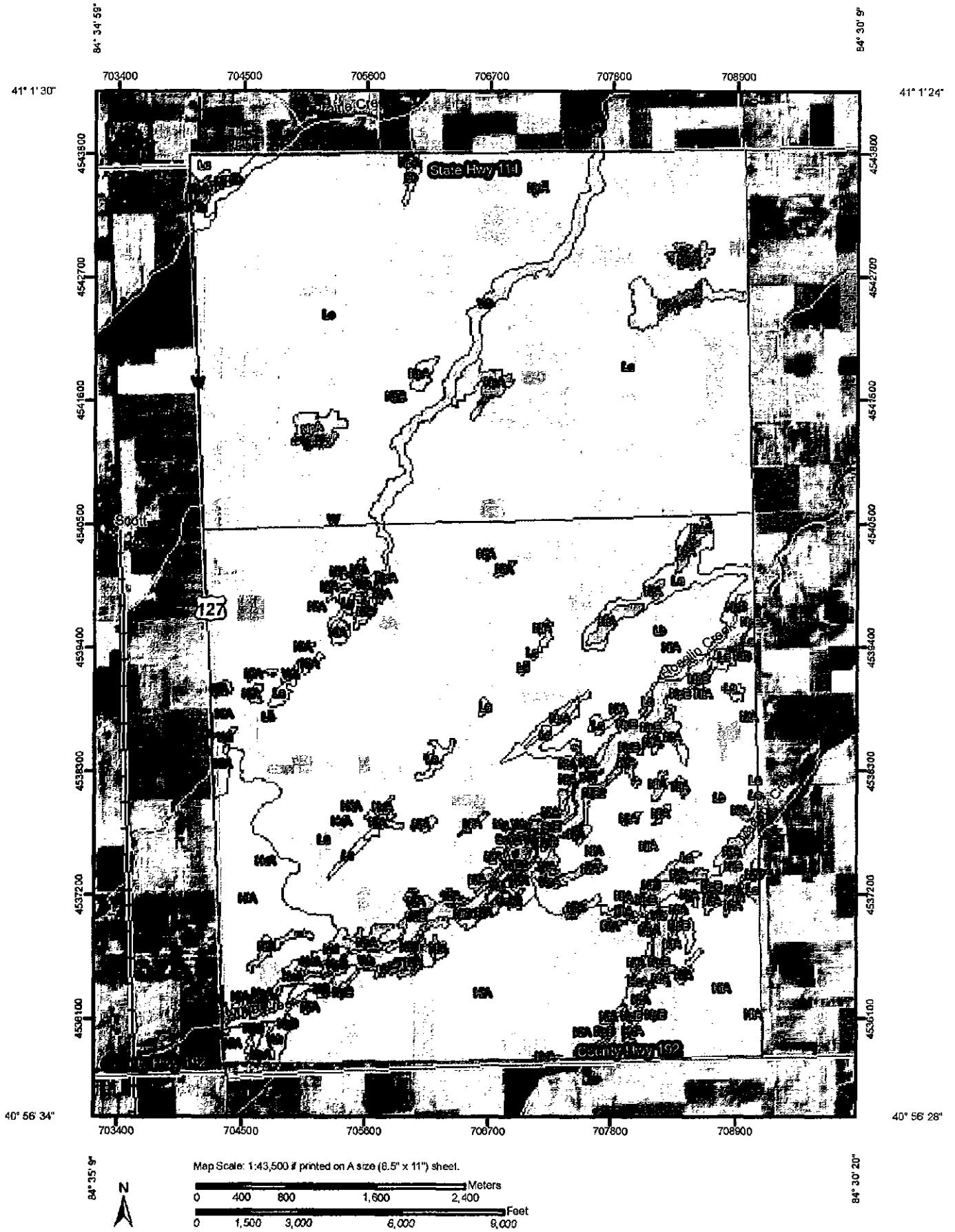
Rating Options

Aggregation Method: Dominant Condition

Component Percent Cutoff: None Specified

Tie-break Rule: Higher

K Factor, Whole Soil—Paulding County, Ohio, and Van Wert County, Ohio
(NE Area Blue Creek Wind Farm)



MAP LEGEND

Area of Interest (AOI)
- Area of Interest (AOI)

Soils
- Soil Map Units

Soil Ratings
- .02
- .05
- .10
- .15
- .17
- .20
- .24
- .28
- .32
- .37
- .43
- .49
- .55
- .64
- Not rated or not available

Political Features
- Cities

Water Features
- Oceans
- Streams and Canals

Transportation
- Rails
- Interstate Highways
- US Routes
- Major Roads

MAP INFORMATION

Map Scale: 1:43,500 if printed on A size (8.5" × 11") sheet.

The soil surveys that comprise your AOI were mapped at scales ranging from 1:12,000 to 1:15,840.

Please rely on the bar scale on each map sheet for accurate map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL: http://websoilsurvey.nrcs.usda.gov
Coordinate System: UTM Zone 16N NAD83

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Paulding County, Ohio
Survey Area Data: Version 9, Sep 16, 2009

Soil Survey Area: Van Wert County, Ohio
Survey Area Data: Version 9, Sep 16, 2009

Your area of interest (AOI) includes more than one soil survey area. These survey areas may have been mapped at different scales, with a different land use in mind, at different times, or at different levels of detail. This may result in map unit symbols, soil properties, and interpretations that do not completely agree across soil survey area boundaries.

Date(s) aerial images were photographed: 6/23/2004; 6/24/2004

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

K Factor, Whole Soil

K Factor, Whole Soil— Summary by Map Unit — Paulding County, Ohio				
Map unit symbol	**Map unit name**	**Rating**	**Acres in AOI**	**Percent of AOI**
Lb	Latty silty clay loam	.28	3.3	0.0%
Lc	Latty silty clay	.28	3,707.9	38.0%
NpA	Nappanee silty clay loam, 0 to 2 percent slopes	.43	151.2	1.6%
Sb	Saranac silty clay loam, occasionally flooded	.28	23.0	0.2%
To	Toledo silty clay	.28	11.1	0.1%
W	Water		0.8	0.0%
Wb	Wabasha silty clay loam, frequently flooded	.32	106.0	1.1%
Subtotals for Soil Survey Area			**4,003.3**	**41.1%**
Totals for Area of Interest			**9,750.0**	**100.0%**

K Factor, Whole Soil— Summary by Map Unit — Van Wert County, Ohio				
Map unit symbol	**Map unit name**	**Rating**	**Acres in AOI**	**Percent of AOI**
HcA	Hoytville silty clay loam, 0 to 1 percent slopes	.24	24.7	0.3%
HnA	Haskins loam, 0 to 2 percent slopes	.37	0.4	0.0%
HtA	Hoytville silty clay, 0 to 1 percent slopes	.20	1,377.0	14.1%
La	Latty silty clay loam	.28	167.3	1.7%
Lb	Latty silty clay	.28	3,283.6	33.7%
Md	Mermill silt loam	.32	6.5	0.1%
Mg	Millgrove silty clay loam	.28	1.3	0.0%
NaA	Nappanee loam, 0 to 2 percent slopes	.37	3.7	0.0%
NpA	Nappanee silt loam, 0 to 2 percent slopes	.37	55.6	0.6%
NpB	Nappanee silt loam, 2 to 6 percent slopes	.37	67.6	0.7%
NtA	Nappanee silty clay loam, 0 to 2 percent slopes	.43	383.5	3.9%
NtB	Nappanee silty clay loam, 2 to 6 percent slopes	.43	24.8	0.3%
NtB2	Nappanee silty clay loam, 2 to 6 percent slopes, moderately eroded	.43	19.6	0.2%
ScB	St. Clair silt loam, 2 to 6 percent slopes	.37	3.1	0.0%
ScC2	St. Clair silt loam, 6 to 12 percent slopes, moderately eroded	.37	5.2	0.1%
W	Water		8.9	0.1%
Wa	Wabasha silty clay loam	.32	250.3	2.6%
Wn	Wabasha silty clay	.32	63.5	0.7%

K Factor, Whole Soil— Summary by Map Unit — Van Wert County, Ohio				
Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
Subtotals for Soil Survey Area			5,746.8	58.9%
Totals for Area of Interest			9,750.0	100.0%

Description

Erosion factor K indicates the susceptibility of a soil to sheet and rill erosion by water. Factor K is one of six factors used in the Universal Soil Loss Equation (USLE) and the Revised Universal Soil Loss Equation (RUSLE) to predict the average annual rate of soil loss by sheet and rill erosion in tons per acre per year. The estimates are based primarily on percentage of silt, sand, and organic matter and on soil structure and saturated hydraulic conductivity (Ksat). Values of K range from 0.02 to 0.69. *Other factors being equal, the higher the value, the more susceptible* the soil is to sheet and rill erosion by water.

"Erosion factor Kw (whole soil)" indicates the erodibility of the whole soil. The estimates are modified by the presence of rock fragments.

Rating Options

Aggregation Method: Dominant Condition

Component Percent Cutoff: None Specified

Tie-break Rule: Higher

Layer Options: Surface Layer

Soil Map—Paulding County, Ohio, and Van Wert County, Ohio
(NE Area Blue Creek Wind Farm)

MAP LEGEND

Area of Interest (AOI)
- Area of Interest (AOI)

Soils
- Soil Map Units

Special Point Features
- Blowout
- Borrow Pit
- Clay Spot
- Closed Depression
- Gravel Pit
- Gravelly Spot
- Landfill
- Lava Flow
- Marsh or swamp
- Mine or Quarry
- Miscellaneous Water
- Perennial Water
- Rock Outcrop
- Saline Spot
- Sandy Spot
- Severely Eroded Spot
- Sinkhole
- Slide or Slip
- Sodic Spot
- Spoil Area
- Stony Spot
- Very Stony Spot
- Wet Spot
- Other

Special Line Features
- Gully
- Short Steep Slope
- Other

Political Features
- Cities

Water Features
- Oceans
- Streams and Canals

Transportation
- Rails
- Interstate Highways
- US Routes
- Major Roads

MAP INFORMATION

Map Scale: 1:43,500 if printed on A size (8.5" × 11") sheet.

The soil surveys that comprise your AOI were mapped at scales ranging from 1:12,000 to 1:15,840.

Please rely on the bar scale on each map sheet for accurate map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL: http://websoilsurvey.nrcs.usda.gov
Coordinate System: UTM Zone 16N NAD83

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Paulding County, Ohio
Survey Area Data: Version 9, Sep 16, 2009

Soil Survey Area: Van Wert County, Ohio
Survey Area Data: Version 9, Sep 16, 2009

Your area of interest (AOI) includes more than one soil survey area. These survey areas may have been mapped at different scales, with a different land use in mind, at different times, or at different levels of detail. This may result in map unit symbols, soil properties, and interpretations that do not completely agree across soil survey area boundaries.

Date(s) aerial images were photographed: 6/23/2004; 6/24/2004

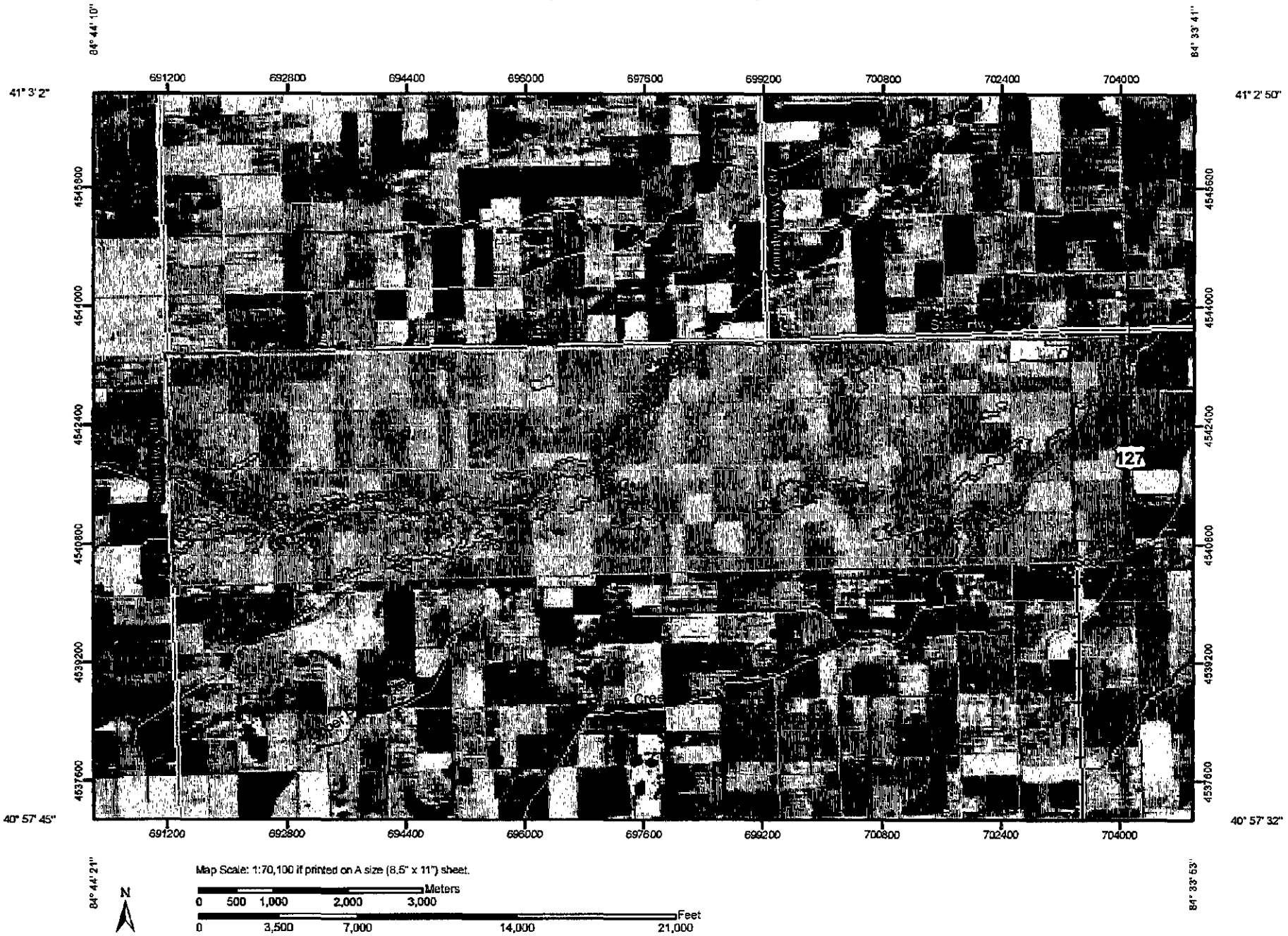
The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Map Unit Legend

Paulding County, Ohio (OH125)			
Map Unit Symbol	**Map Unit Name**	**Acres in AOI**	**Percent of AOI**
Lb	Latty silty clay loam	3.3	0.0%
Lc	Latty silty clay	3,707.9	38.0%
NpA	Nappanee silty clay loam, 0 to 2 percent slopes	151.2	1.6%
Sb	Saranac silty clay loam, occasionally flooded	23.0	0.2%
To	Toledo silty clay	11.1	0.1%
W	Water	0.8	0.0%
Wb	Wabasha silty clay loam, frequently flooded	106.0	1.1%
Subtotals for Soil Survey Area		**4,003.3**	**41.1%**
Totals for Area of Interest		**9,750.0**	**100.0%**

Van Wert County, Ohio (OH161)			
Map Unit Symbol	**Map Unit Name**	**Acres in AOI**	**Percent of AOI**
HcA	Hoytville silty clay loam, 0 to 1 percent slopes	24.7	0.3%
HnA	Haskins loam, 0 to 2 percent slopes	0.4	0.0%
HtA	Hoytville silty clay, 0 to 1 percent slopes	1,377.0	14.1%
La	Latty silty clay loam	167.3	1.7%
Lb	Latty silty clay	3,283.6	33.7%
Md	Mermill silt loam	6.5	0.1%
Mg	Millgrove silty clay loam	1.3	0.0%
NaA	Nappanee loam, 0 to 2 percent slopes	3.7	0.0%
NpA	Nappanee silt loam, 0 to 2 percent slopes	55.6	0.6%
NpB	Nappanee silt loam, 2 to 6 percent slopes	67.6	0.7%
NtA	Nappanee silty clay loam, 0 to 2 percent slopes	383.5	3.9%
NtB	Nappanee silty clay loam, 2 to 6 percent slopes	24.8	0.3%
NtB2	Nappanee silty clay loam, 2 to 6 percent slopes, moderately eroded	19.6	0.2%
ScB	St. Clair silt loam, 2 to 6 percent slopes	3.1	0.0%
ScC2	St. Clair silt loam, 6 to 12 percent slopes, moderately eroded	5.2	0.1%
W	Water	8.9	0.1%
Wa	Wabasha silty clay loam	250.3	2.6%
Wh	Wabasha silty clay	63.5	0.7%
Subtotals for Soil Survey Area		**5,746.8**	**58.9%**
Totals for Area of Interest		**9,750.0**	**100.0%**

Erosion Hazard (Off-Road, Off-Trail)—Paulding County, Ohio
(NW area Blue Creek Wind Farm)



MAP LEGEND

Area of Interest (AOI)
- Area of Interest (AOI)

Soils
- Soil Map Units

Soil Ratings
- Very severe
- Severe
- Moderate
- Slight
- Not rated or not available

Political Features
- Cities

Water Features
- Oceans
- Streams and Canals

Transportation
- Rails
- Interstate Highways
- US Routes
- Major Roads

MAP INFORMATION

Map Scale: 1:70,100 if printed on A size (8.5" × 11") sheet.

The soil surveys that comprise your AOI were mapped at 1:12,000.

Please rely on the bar scale on each map sheet for accurate map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL: http://websoilsurvey.nrcs.usda.gov
Coordinate System: UTM Zone 16N NAD83

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Paulding County, Ohio
Survey Area Data: Version 9, Sep 16, 2009

Date(s) aerial images were photographed: 6/23/2004

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Erosion Hazard (Off-Road, Off-Trail)

Erosion Hazard (Off-Road, Off-Trail)— Summary by Map Unit — Paulding County, Ohio						
Map unit symbol	Map unit name	Rating	Component name (percent)	Rating reasons (numeric values)	Acres in AOI	Percent of AOI
HcA	Hoytville silty clay loam, 0 to 1 percent slopes	Slight	Hoytville (91%)		272.6	2.8%
			Nappanee (9%)			
HkA	Haskins loam, 0 to 2 percent slopes	Slight	Haskins (95%)		31.5	0.3%
HkB	Haskins loam, 2 to 6 percent slopes	Slight	Haskins (95%)		21.4	0.2%
HtA	Hoytville silty clay, 0 to 1 percent slopes	Slight	Hoytville (92%)		6,396.6	65.7%
			Nappanee (8%)			
Lb	Latty silty clay loam	Slight	Latty (90%)		114.1	1.2%
Lc	Latty silty clay	Slight	Latty (95%)		1,890.4	19.4%
Me	Mermill loam	Slight	Mermill (92%)		20.9	0.2%
NnA	Nappanee loam, 0 to 2 percent slopes	Slight	Nappanee (93%)		19.8	0.2%
NpA	Nappanee silty clay loam, 0 to 2 percent slopes	Slight	Nappanee (90%)		498.1	5.1%
NpB	Nappanee silty clay loam, 2 to 6 percent slopes	Slight	Nappanee (95%)		18.4	0.2%
NpB2	Nappanee silty clay loam, 2 to 6 percent slopes, eroded	Slight	Nappanee (95%)		48.4	0.5%
Sb	Saranac silty clay loam, occasionally flooded	Slight	Saranac (90%)		266.6	2.7%
Sh	Shoals silt loam, occasionally flooded	Slight	Shoals (93%)		9.2	0.1%
To	Toledo silty clay	Slight	Toledo (95%)		70.0	0.7%
Uc	Udorthents, clayey, hilly	Not rated	Udorthents (80%)		50.9	0.5%
			slopes of 25 to 50 percent (4%)			
			slopes of 0 to 12 percent (4%)			
			occasionally flooded areas (3%)			
			Paulding (3%)			
			Latty (3%)			
			Fulton (3%)			
W	Water	Not rated	Water (100%)		4.7	0.0%
Totals for Area of Interest					**9,733.4**	**100.0%**

Erosion Hazard (Off-Road, Off-Trail)— Summary by Rating Value		
Rating	Acres in AOI	Percent of AOI
Slight	9,678.0	99.4%
Null or Not Rated	55.6	0.6%
Totals for Area of Interest	**9,733.4**	**100.0%**

Description

The ratings in this interpretation indicate the hazard of soil loss from off-road and off-trail areas after disturbance activities that expose the soil surface. The ratings are based on slope and soil erosion factor K. The soil loss is caused by sheet or rill erosion in off-road or off-trail areas where 50 to 75 percent of the surface has been exposed by logging, grazing, mining, or other kinds of disturbance.

The ratings are both verbal and numerical. The hazard is described as "slight," "moderate," "severe," or "very severe." A rating of "slight" indicates that erosion is unlikely under ordinary climatic conditions; "moderate" indicates that some erosion is likely and that erosion-control measures may be needed; "severe" indicates that erosion is very likely and that erosion-control measures, including revegetation of bare areas, are advised; and "very severe" indicates that significant erosion is expected, loss of soil productivity and off-site damage are likely, and erosion-control measures are costly and generally impractical.

Numerical ratings indicate the severity of individual limitations. The ratings are shown as decimal fractions ranging from 0.01 to 1.00. They indicate gradations between the point at which a soil feature has the greatest negative impact on the specified aspect of forestland management (1.00) and the point at which the soil feature is not a limitation (0.00).

The map unit components listed for each map unit in the accompanying Summary by Map Unit table in Web Soil Survey or the Aggregation Report in Soil Data Viewer are determined by the aggregation method chosen. An aggregated rating class is shown for each map unit. The components listed for each map unit are only those that have the same rating class as listed for the map unit. The percent composition of each component in a particular map unit is presented to help the user better understand the percentage of each map unit that has the rating presented.

Other components with different ratings may be present in each map unit. The ratings for all components, regardless of the map unit aggregated rating, can be viewed by generating the equivalent report from the Soil Reports tab in Web Soil Survey or from the Soil Data Mart site. Onsite investigation may be needed to validate these interpretations and to confirm the identity of the soil on a given site.

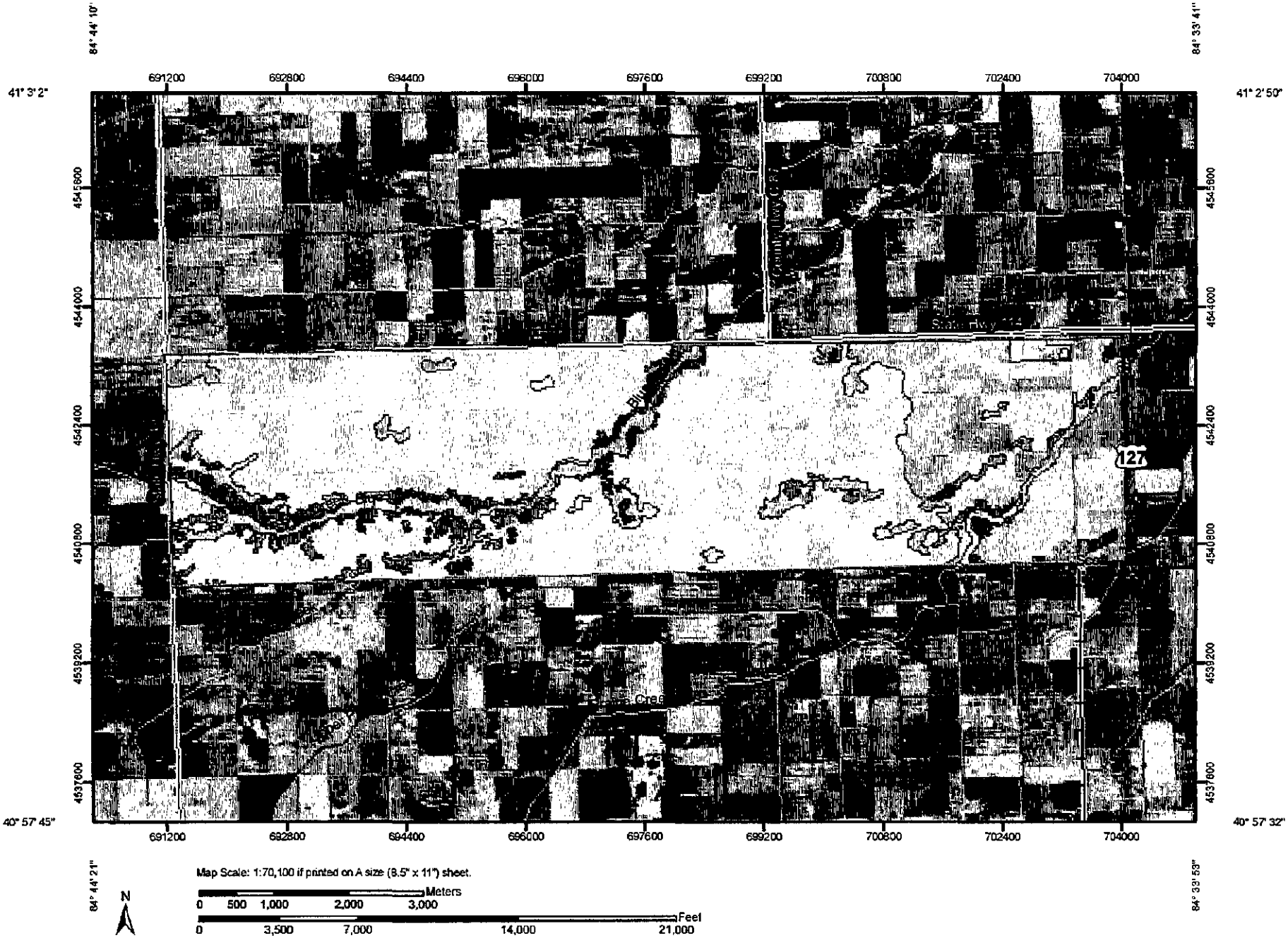
Rating Options

Aggregation Method: Dominant Condition

Component Percent Cutoff: None Specified

Tie-break Rule: Higher

K Factor, Whole Soil—Paulding County, Ohio
(NW area Blue Creek Wind Farm)



MAP LEGEND

Area of Interest (AOI)
- Area of Interest (AOI)

Soils
- Soil Map Units

Soil Ratings
- .02
- .05
- .10
- .15
- .17
- .20
- .24
- .28
- .32
- .37
- .43
- .49
- .55
- .64
- Not rated or not available

Political Features
- Cities

Water Features
- Oceans
- Streams and Canals

Transportation
- Rails
- Interstate Highways
- US Routes
- Major Roads

MAP INFORMATION

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The soil surveys that comprise your AOI were mapped at 1:12,000.

Please rely on the bar scale on each map sheet for accurate map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL: http://websoilsurvey.nrcs.usda.gov
Coordinate System: UTM Zone 16N NAD83

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Paulding County, Ohio
Survey Area Data: Version 9, Sep 16, 2009

Date(s) aerial images were photographed: 6/23/2004

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K Factor, Whole Soil

K Factor, Whole Soil— Summary by Map Unit — Paulding County, Ohio				
Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
HcA	Hoytville silty clay loam, 0 to 1 percent slopes	.24	272.6	2.8%
HkA	Haskins loam, 0 to 2 percent slopes	.37	31.5	0.3%
HkB	Haskins loam, 2 to 6 percent slopes	.37	21.4	0.2%
HtA	Hoytville silty clay, 0 to 1 percent slopes	.20	6,398.6	65.7%
Lb	Latty silty clay loam	.28	114.1	1.2%
Lc	Latty silty clay	.28	1,890.4	19.4%
Me	Mermill loam	.37	20.9	0.2%
NnA	Nappanee loam, 0 to 2 percent slopes	.37	19.8	0.2%
NpA	Nappanee silty clay loam, 0 to 2 percent slopes	.43	498.1	5.1%
NpB	Nappanee silty clay loam, 2 to 6 percent slopes	.43	18.4	0.2%
NpB2	Nappanee silty clay loam, 2 to 6 percent slopes, eroded	.43	48.4	0.5%
Sb	Saranac silty clay loam, occasionally flooded	.28	266.6	2.7%
Sh	Shoals silt loam, occasionally flooded	.24	9.2	0.1%
To	Toledo silty clay	.28	70.0	0.7%
Uc	Udorthents, clayey, hilly		50.9	0.5%
W	Water		4.7	0.0%
Totals for Area of Interest			9,733.4	100.0%

Description

Erosion factor K indicates the susceptibility of a soil to sheet and rill erosion by water. Factor K is one of six factors used in the Universal Soil Loss Equation (USLE) and the Revised Universal Soil Loss Equation (RUSLE) to predict the average annual rate of soil loss by sheet and rill erosion in tons per acre per year. The estimates are based primarily on percentage of silt, sand, and organic matter and on soil structure and saturated hydraulic conductivity (Ksat). Values of K range from 0.02 to 0.69. Other factors being equal, the higher the value, the more susceptible the soil is to sheet and rill erosion by water.

"Erosion factor Kw (whole soil)" indicates the erodibility of the whole soil. The estimates are modified by the presence of rock fragments.

Rating Options

Aggregation Method: Dominant Condition