GZA GeoEnvironmental
of New York

*Engineers and
Scientists*

January 26, 2007
File: 21.0056285.00

Mr. Neil Habig
PPM Energy, Inc.
1125 NW Couch Street, Suite 700
Portland, Oregon 97209

Re: Preliminary Geotechnical Engineering Assessment
Proposed Clayton Wind Farm Project
Clayton, New York

Dear Mr. Habig:

364 Nagel Drive
Buffalo
New York
14225
716-685-2300
Fax: 716-685-3629
www.gza.com

GZA GeoEnvironmental of New York (GZA) is pleased to present PPM Energy, Inc. (PPM) this letter report summarizing our work to collect readily available information pertaining to subsurface soil, bedrock, and groundwater conditions in the vicinity of the proposed Clayton Wind Farm project (Study Area) in the Towns of Clayton and Orleans, Jefferson County, New York. A Locus Plan/Site Plan showing the proposed project area is attached as Figure 1. Data was obtained from a literature review of publicly available documents.

Based on our preliminary geotechnical assessment of surficial soils and bedrock conditions, GZA found the Study area generally suitable for the planned project. We anticipate that the wind towers will be constructed on shallow mat foundations that bear on hard limestone bedrock. A more detailed summary of the work done and our conclusions/recommendations follows.

GENERAL STUDY AREA

The Study Area is generally located in the southeast corner of the Town of Clayton and the southwest portion, or western border, of the Town of Orleans. Approximately 54 wind turbines are proposed to be constructed in the Town of Clayton and 8 in the Town of Orleans. See Figure 1.

DATA COLLECTION

Literature Search

GZA collected documents from our files, documents available through the New York State Museum or New York State Department of Environmental Conservation, the Jefferson County Department of Soil Conservation, and documents obtained through an internet search. A list of the documents reviewed is attached as Appendix A.

As part of our literature review, we submitted a Freedom of Information Legislation (FOIL) request to the New York State Department of Environmental Conservation

(NYSDEC) requesting information pertaining to surface and subsurface soil, bedrock and groundwater conditions within the vicinity of the proposed wind farm area. In addition, we contacted representatives from the Town of Clayton Building and Zoning Department, the Town of Orleans Zoning and Code Enforcement Office, and the Jefferson County Fire Prevention and Building Code Office regarding potential specific zoning/building code requirements for the construction of wind energy structures.

STUDY AREA CONDITIONS

General

Based on the United States Geologic Survey (USGS) topographic maps reviewed, the study area is currently and has historically been occupied by agricultural fields and associated structures (e.g., barns, silos, sheds), wooded areas and residential dwellings. One major road (NY 12) is shown that runs northwest/southeast through the study area and is joined by a network of county paved roads. Based on the Clayton, La Fargeville, Dexter, and Brownville quadrangle topographic maps (Reference 1), prepared by the United States Geologic Service (USGS), the topography in the study area is generally flat to gently sloping. Elevations range from approximately 450-feet above mean sea level (MSL) in the northeast to approximately 370-feet above MSL in the southwest portion of the study area. Buttermilk Creek and Horse Creek cross NY 12 and run northeast/southwest through the study area. These creeks are tributaries to the Chaumont River located approximately 2,500 feet northwest of the closest proposed turbine. In addition, a wetland area lies approximately 800 feet southeast of a turbine array located in the Town of Orleans (Clayton quadrangle).

Overburden Soils

Soils within the study area are expected to vary, but generally consist of:

- Fine-grained clayey marine or glacial lake sediments;
- Glacial till soils comprised of sand, silt and clay with localized coarse-grained areas ranging in thickness from 0 (rock outcrop) to 40 inches.

These soils are located over limestone bedrock belonging to the Black River Group which is comprised of the Pamelia Formation, the Lowville Limestone and the Chaumont Limestone.

Soil Survey: The Soil Survey of Jefferson County (Reference 2) provides information regarding surface and subsurface soils in the Study Area (see Figure 2). The soil survey is a government sponsored[1] publication that provides surface soil information that can be applied in managing farms and woodlands; in selecting sites for roads, ponds, buildings, and other structures; and in judging the suitability of tracts of land for farming, industry and recreation. The general soil map for the Study Area indicates that four major soil

[1] United States Department of Agriculture, Natural Resources Conservation Service (NRCS) – http://soils.usda.gov/-formallythe UDSDA Soil Conservation Service.

groups are present: the Chaumont silty clay unit, the Galoo-Rock outcrop complex, the Guffin clay unit, and the Wilpoint silty clay unit.

Other soil groups identified to a lesser degree within the study area include the Covington silty clay, Farmington loam, Galway silt loam, Kingsbury silty clay, and the Vergennes silty clay loam.

A general description of each main soil unit mapped within the Study Site is provided as Appendix B. In general, the soils mapped within the Study Area range from very poorly drained soils of the Guffin clay unit formed from clayey glacial lake sediments to the excessively drained glacial till of the Galoo-Rock outcrop unit. With the exception of the Galoo-Rock outcrop unit, these soils are predominantly fine-grained (silts and clays) and are cohesive, with a low permeability or hydraulic conductivity (the rate of water movement through the soil is very slow). The Chaumont, Guffin and Wilpoint units exhibit a seasonally high water table within ½ to 2-feet of the surface from December through May. Figure 2 provides a copy of the soil survey map data. A summary of reported engineering properties is included in Appendix B, as Table B-1.

Surficial Geologic Map of New York, dated 1991 (Reference 3): This reference identifies the study area soils as Lacustrine silt and clay. These deposits are defined as follows: generally laminated silt and clay, deposited in proglacial lakes, generally calcareous, low-permeability, potential land instability, thickness variable (up to 50 meters). The lacustrine deposits, as shown on Figure 3, have a bedrock stipple overprint which indicates bedrock may be within 3 to 9 feet of the surface and may sporadically be visible as a rock outcrop.

Physiography and Geology

The study area lies within the Erie-Ontario Lowlands physiographic province. The Tug Hill Plateau lies east of the study area and the St. Lawrence River Basin to the north. Elevations range from 246-feet above MSL near Lake Ontario and the St. Lawrence River to 650-feet above MSL at Lake Iroquois, south of Watertown.

The Geologic Map of New York and the Limestones (Middle Ordovician) of Jefferson County, New York (Reference 4 and 5 respectfully) indicates that underlying bedrock beneath the overburden soil within the study area are Middle Ordovician carbonates belonging to the Black River Group. The three lithologic units of the Black River Group from north to south through the study area are the Pamelia Formation, the Lowville Limestone and the Chaumont Limestone. The oldest of the limestone group, the Pamelia Formation, is found at locations to be up to approximately 104 feet thick and generally consists of greenish-grey and medium-grey, conchoidally fracturing dolostone with medium to dark-grey interbedded limestone beds. The next limestone in the series, the Lowville Limestone, can be approximately 124 feet thick and generally consists of medium-grey, conchoidally fracturing limestone. The youngest of the limestone group, the Chaumont Limestone, can be approximately 23 feet thick and generally consists of medium to dark-grey, fine-textured cherty limestone with silicified fossils and large

cephalopods. Bedrock can generally be expected to be encountered within 3 to 9 feet of ground surface within the Study Area. Bedrock is also locally exposed across the study area.

An approximate aerial depiction of the bedrock formation with the proposed turbine arrays overlain within the Study Area is presented as Figure 4.

Groundwater

Jefferson County is underlain by a moderate to high-yielding bedrock carbonate and/or sandstone aquifer. Groundwater is obtained from bedrock wells because surficial deposits are generally too shallow to support a water table. The Lake Ontario and the St. Lawrence River Basin receive the majority of the drainage flow from Jefferson County. Groundwater flow in the overall study area is expected to be locally dependant on the proximity to a water source (i.e., Chaumont River, Horse Creek).

Study Area Water Well Information

GZA submitted a freedom of information (FOIL) request letter to the New York State Department of Environmental Conservation (NYSDEC) Division of Natural Resources and the Division of Water-Bureau of Water Resource Management, Water Well Program (Division of Water). Our FOIL letter, dated January 18, 2007, requested available information for gas, oil and water wells that may be available in and/or around the Study Area. The agencies referenced above have not responded to our requests at this time. GZA will forward PPM any pertinent information upon receipt.

CONSTRUCTION CONSIDERATIONS

Seismic Considerations

The Building Code of New York (Reference 6) states that every structure, and part thereof, shall as a minimum be designed and constructed to resist the effects of earthquake motions and be assigned a seismic design category. The design categories, identified as A through D, define specific requirements for construction of structures to withstand potential earthquake motions anticipated for specific locations and subsurface conditions.

The United States Geologic Survey (USGS) has developed rock accelerations for an expected earthquake in the region as referenced in the 1998 edition of the National Earthquake Hazard Reduction Program for the Federal Emergency Management Agency (FEMA). Seismic acceleration maps that have been developed by USGS suggest a horizontal acceleration at 7.5% of gravity has a 90% probability of not being exceeded in 50 years and a horizontal acceleration at 20% of gravity has a 90% probability of not being exceeded in 250 years.

For consideration under the New York State Building Code, a Site Class definition[2] is approximated using an assumed 100-foot general subsurface profile that consists of the following.

- From 0 – 100 feet- weathered to competent bedrock (Site Class B)

Engineering Properties

Based on our research, the bedrock encountered is structurally suitable for support of foundations for wind turbine and/or support building construction. Due to the documented shallow overburden thickness within the study area, it is presumed the soil material would be stripped as part of mat foundation construction. However, based on an assumption that overburden soils are glacial till or similar origin, an allowable bearing of 3,000 pounds per foot (psf) is presumed for soils at a depth of four feet or greater. The overburden soils are generally suitable for road and crane pad construction with proper preparation (proofroll, compaction, geotextile improvement, etc.). Based on our experience in upstate New York with similar soil/rock types, the following presumed values appear appropriate.

PARAMETER		Units	Generalized Overburden Soils	Limestone Bedrock
Allowable Net Soil Bearing Pressure, p_a		PSF	3,000	15,000
Modulus of Vertical Subgrade Reaction, k_v		PCF	200,000	800,000
Ultimate soil bearing pressure, P_u		PSF	9,000	45,000
Unconfined compressive strength		As Noted	NT	12 to 15 ksi
Earth Lateral Pressure Coefficients (K)	At Rest, K_o	None	0.5	NA
	Active, K_a	None	0.5	NA
	Passive, K_p	None	3.0	NA
Sliding Coefficient of Friction Angle at Concrete/Subgrade Interface, ϕ		Degrees	20	35
Cohesion, c		PSF	1,000 to 2,000	0
D	Unit Soil Weight, γ	PCF	106 to 116	160
	Soil Friction Angle, ϕ	Degrees	24 to 28	NA
S	Unit Soil Weight, γ	PCF	120 to 135	160
	Soil Friction Angle, ϕ	Degrees	24 to 28	NA
Dynamic Shear Modulus, G_d		ksf	2,000-3,000	60,000-125,000
Poisson's Ratio, υ		None	0.30 to 0.35	0.15 to 0.25

PSF (pounds per square foot), PCF (pounds per cubic foot), ksi (kips per square inch) or ksf (kips per square foot), NT (not tested), NA (not applicable), D (dry) and S (submerged/wet)

[2] International Building Code, International Code Council, Inc., 2000.

Conventional shallow mat foundations for wind turbine support and shallow continuous spread wall foundations for ancillary building support may be used. Limestone or dolostone bedrock is a suitable bearing surface for the bottom of wind turbine foundations.

Foundations should be constructed at least 4.5-feet below existing and final ground surface to prevent soil heave due to frost action or anchored into bedrock. For footings supported on soil, continuous wall footings should be at least 24-inches wide and isolated footings at least 36-inches wide. Wind turbine foundations are anticipated to be octagonal shallow spread (raft) structures with a diameter of between approximately 50 to 65-feet.

Natural soils within the Study Area are generally expected to consist (greater than 50% by weight) of fine-grained (silt and clay) material with lesser amounts of coarse grained (sand and gravel) material. However, some areas may have a slightly more coarse soil fraction such as the Galoo sandy loam (SM, ML) and the Galway gravelly fine sandy loam (GM-GC) as documented in the Jefferson County Soil Survey. The natural soils within the study area are generally considered moisture sensitive and compressible.

CONSTRUCTION PROCEDURES AND RECOMMENDATIONS

General preliminary guidelines are outlined below that address the geotechnically related construction aspects for this project.

- Prior to construction, the organic layer and topsoil (generally the upper 6 to 12-inches) should be stripped from the Site in access road, crane pad, slab-on-grade and foundation areas. GZA recommends completing fill placement within and adjacent to the proposed construction zone prior to the construction of foundations. Any loose or unstable soils that are encountered during preparation of the subgrade should be removed and replaced with compacted approved granular fill.

- Following the site stripping of grass, vegetation and underlying topsoils, as well as unsuitable fill soils, the exposed undisturbed soils should be proof-rolled with a drum roller (typical static drum weight of 10,000-pounds capable of at least 20,000-pounds of dynamic force). Weak or soft spots identified during "proof-rolling" should be excavated and replaced with compacted approved granular fill.

- Approved granular fill is anticipated to be a suitable soil having no more than 10-percent by weight material passing the No. 200 sieve and should be generally free of particles greater than 6 inches. It should also be free of topsoil, asphalt, concrete rubble, wood, debris, clay and other deleterious materials. Suitable material classified as GW, GP, GM, SW, SP and SM soils using the Unified Soil Classification System (ASTM D-2487) could be acceptable.

- Based on the information provided by the Jefferson County Soil Survey, it is anticipated that construction excavations may encounter zones of perched groundwater should construction occur during times when a seasonally high water table may be present (spring and fall). In addition, construction during rainy

periods may see an increase in perched groundwater due to the study area soils low hydraulic conductivity.

- Construction dewatering may be required for surface water control and for excavations that encounter perched groundwater conditions. Surface water should be diverted away from open excavations and prevented from accumulating on exposed subgrades. Silt and clay natural soil subgrades will be susceptible to strength degradation in the presence of excess moisture. If perched groundwater is encountered during construction, dewatering should be implemented prior to excavation below the groundwater surface. The groundwater levels should be maintained below the proposed excavation bottom. It is anticipated that diversion berms, proper site grading, cut-off trenches and sump and pump methods of dewatering may be used to control surface water and near surface groundwater conditions.
- It is unlikely that foundation construction activities will encounter a groundwater aquifer, which is assumed to be at deeper depths (greater than 15 to 20-feet below ground surface).
- Foundation construction will likely encounter bedrock that requires removal. Blasting of near surface exposed rock and rock removal may be required for the proposed Clayton Wind Farm project when bedrock is encountered at depths within the zone required for foundation construction; assuming the bedrock is not ripable with an excavator or able to be broken by pneumatic hammer. A preliminary blasting plan for consideration is attached as Appendix C. Rock or boulders may be broken into a well graded mixture of the size recommended by the geotechnical engineer and used as follows:

    - Used for deeper fills (over 2' below finish grade) as specified in the geotechnical report (requires verification by a geotechnical engineer prior to final design).
    - Crushed for topping gravel (requires verification by a geotechnical engineer prior to final design).
    - Crushed for use as surface gravel for access road pavement (requires verification by a geotechnical engineer prior to final design).
    - Processed and used as rip rap.

Should you have any questions or comments regarding our findings, please feel free to contact the undersigned. We appreciate the opportunity to be involved with PPM Energy, Inc. on this project.

Sincerely,

GZA GEOENVIRONMENTAL OF NEW YORK

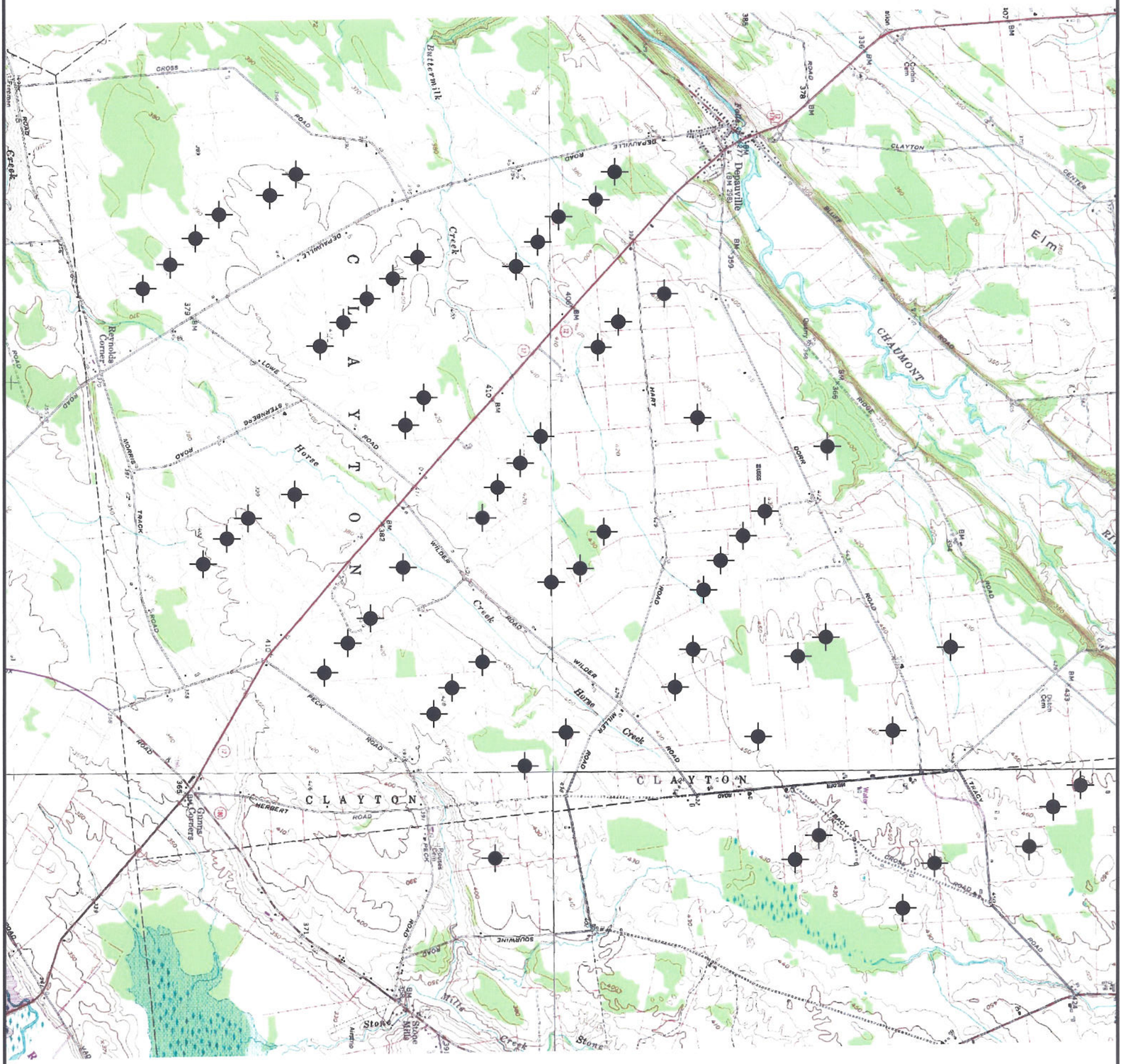
John Beninati
Project Manager

Ernest R. Hanna, P.E.
Principal

Attachments: Figure 1 – Locus Plan/Site Plan
Figure 2 – Soil Survey Map (1989)
Figure 3 – Surficial Geologic Map (1991)
Figure 4 – Bedrock Geologic Map (1970) reprinted 1995

Appendix A - References
Appendix B- Jefferson County Soil Survey Soil Data/Table B1 Jefferson County Soil Survey Soil Physical Properties within Study Area
Appendix C – Preliminary Blasting Plan

FIGURES



LEGEND:

✦ APPROXIMATE LOCATION OF PROPOSED WIND TURBINE

NOTES:

1. BASE MAP ADAPTED FROM U.S.G.S. TOPOGRAPHIC MAPS DOWNLOADED FROM TERRASERVER.MICROSOFT.COM.
2. THE SIZE AND LOCATION OF EXISTING SITE FEATURES SHOULD BE CONSIDERED APPROXIMATE.

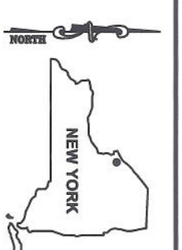
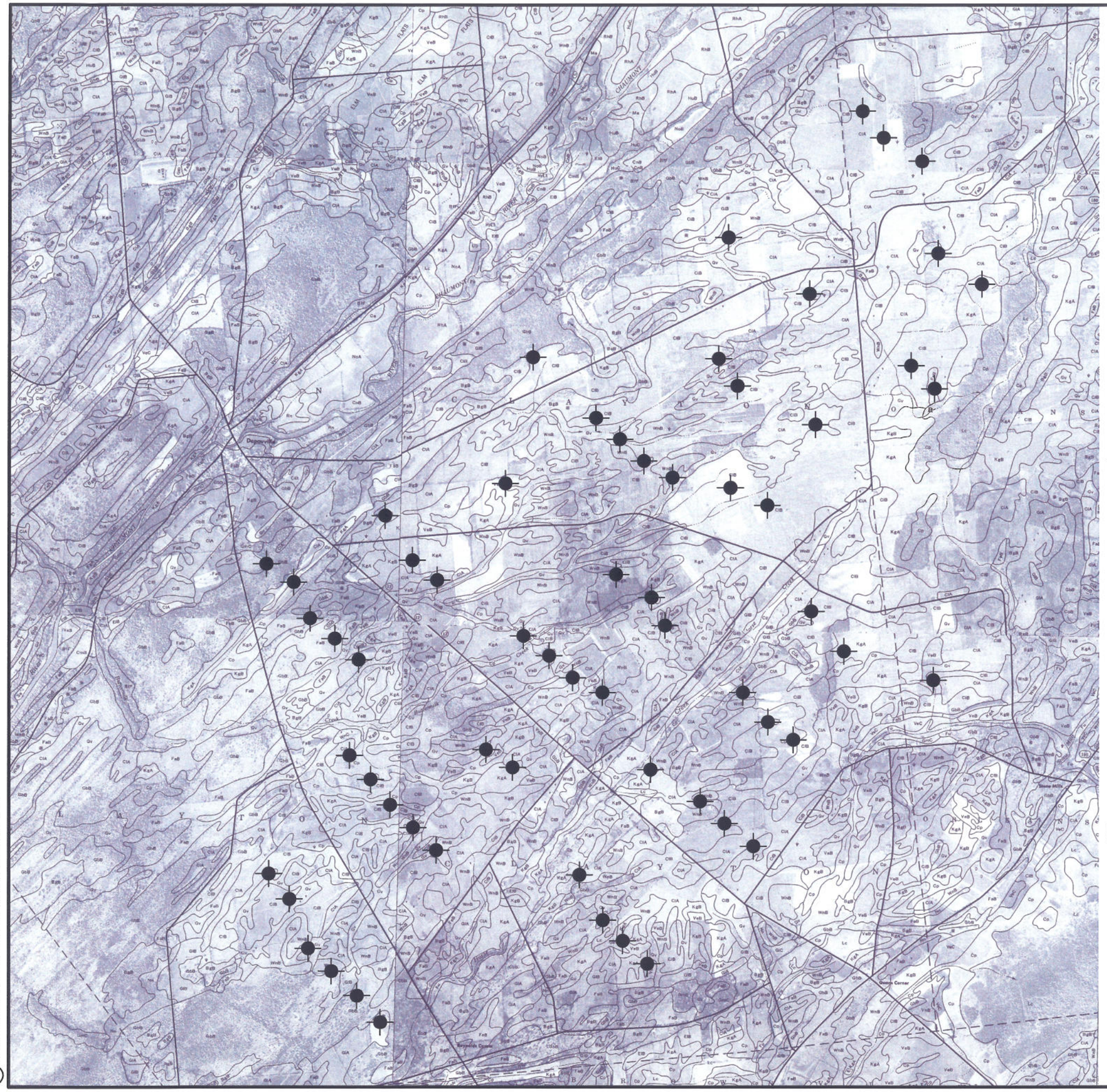


FIGURE No. 1	PROJECT No. 21.0056285.00	**PPM ENERGY, INC.** **PROPOSED CLAYTON WIND FARM PROJECT** CLAYTON AND ORLEANS TOWNSHIPS JEFFERSON COUNTY, NEW YORK **GEOTECHNICAL ASSESSMENT** **LOCUS PLAN \ SITE PLAN**	SCALE IN FEET 0 1500 3000 6000

DRAWN BY: **DEW**

DATE: **JANUARY 2007**

GZA GeoEnvironmental of New York



NORTH

LEGEND:

+	APPROXIMATE LOCATION OF PROPOSED WIND TURBINE
Cla	CHAUMONT SILTY CLAY
Cp	COVINGTON SILTY CLAY
FaB	FARMINGTON LOAM,
GbB	GALOO-ROCK OUTCROP COMPLEX
GlA	GALWAY SILT LOAM
Gv	GUFFIN CLAY
KgA	KINGSBURY SILTY CLAY
VeB	VERGENNES SILTY CLAY LOAM
Wnb	WILPOINT SILTY CLAY LOAM

NOTE: SEE APPENDIX B FOR DEFINITION OF SOILS UNITS

NOTES:

1. BASE MAP ADAPTED FROM A SOIL SURVEY OF JEFFERSON COUNTY, NEW YORK BY U.S. DEPTARTMENT OF AGRICULTURE, SOIL CONSERVATION SERVICE IN COOPERATION WITH CORNELL UNIVERSITY, SEPTEMBER 1989.

2. THE SIZE AND LOCATION OF EXISTING SITE FEATURES SHOULD BE CONSIDERED APPROXIMATE.

DRAWN BY: DEW

DATE: JANUARY 2007

GZA GeoEnvironmental of New York

SCALE IN FEET

0 1500 3000 6000

PPM ENERGY, INC.

PROPOSED CLAYTON WIND FARM PROJECT

CLAYTON AND ORLEANS TOWNSHIPS

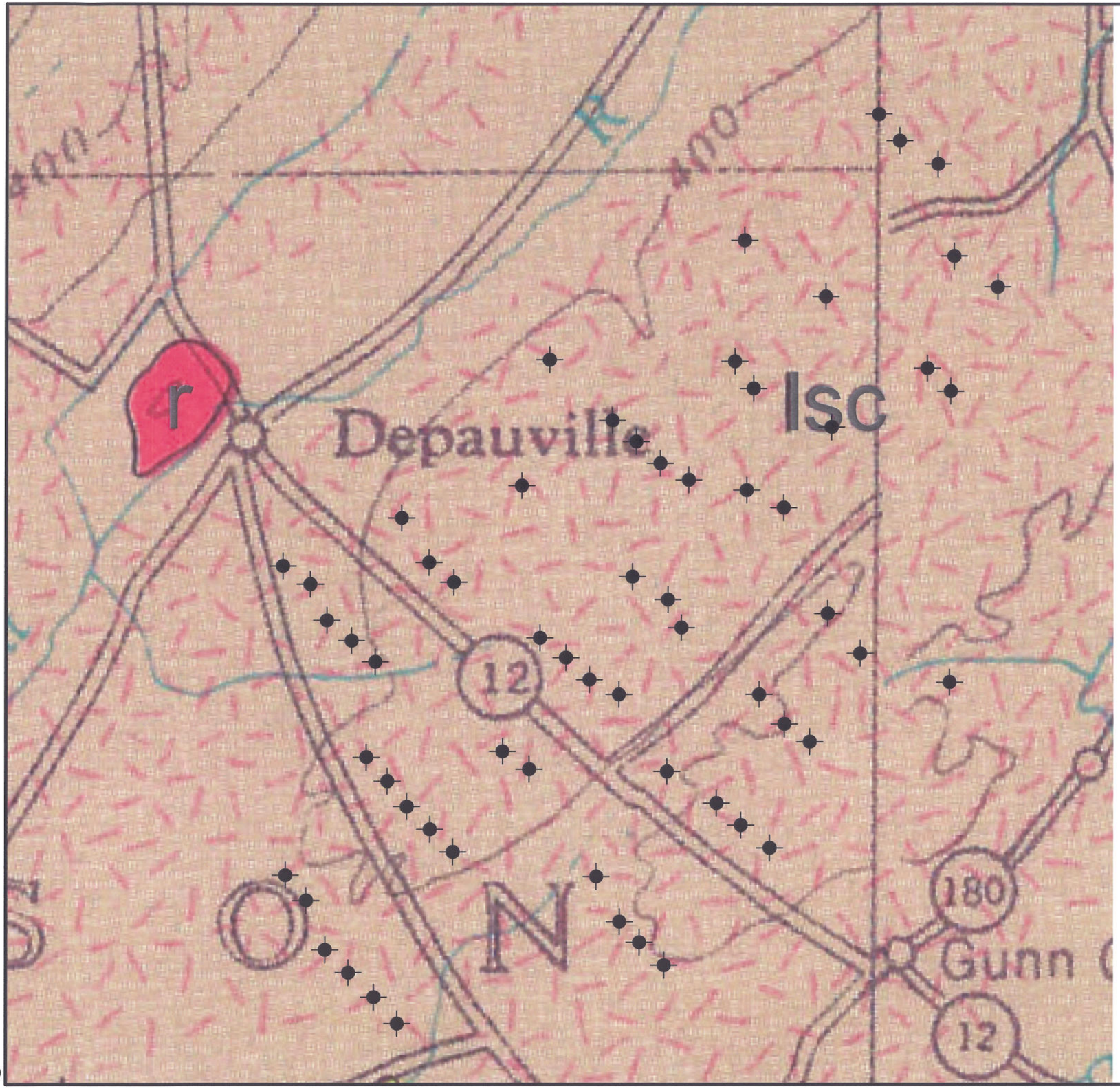
JEFFERSON COUNTY, NEW YORK

GEOTECHNICAL ASSESSMENT

SOIL SURVEY MAP (1989)

PROJECT No. 21.0056285.00

FIGURE No. 2



NORTH

LEGEND:

- APPROXIMATE LOCATION OF PROPOSED WIND TURBINE
- lsc LACUSTRINE SILT AND CLAY
- r BEDROCK
- BEDROCK MAY BE WITHIN 1-3 METERS OF SURFACE, MAY SPORADICALLY CROP OUT

NOTES:

1. BASE MAP ADAPTED FROM A SURFICIAL GEOLOGIC MAP OF NEW YORK, ADIRONDACK SHEET, COMPILED AND EDITED BY: DONALD H. CALDWELL AND DONALD L. PAIR, 1991.

2. THE SIZE AND LOCATION OF EXISTING SITE FEATURES SHOULD BE CONSIDERED APPROXIMATE.

DRAWN BY: DEW

DATE: JANUARY 2007

GZA GeoEnvironmental of New York

SCALE IN FEET

0 1500 3000 6000

PPM ENERGY, INC.

PROPOSED CLAYTON WIND FARM PROJECT

CLAYTON AND ORLEANS TOWNSHIPS

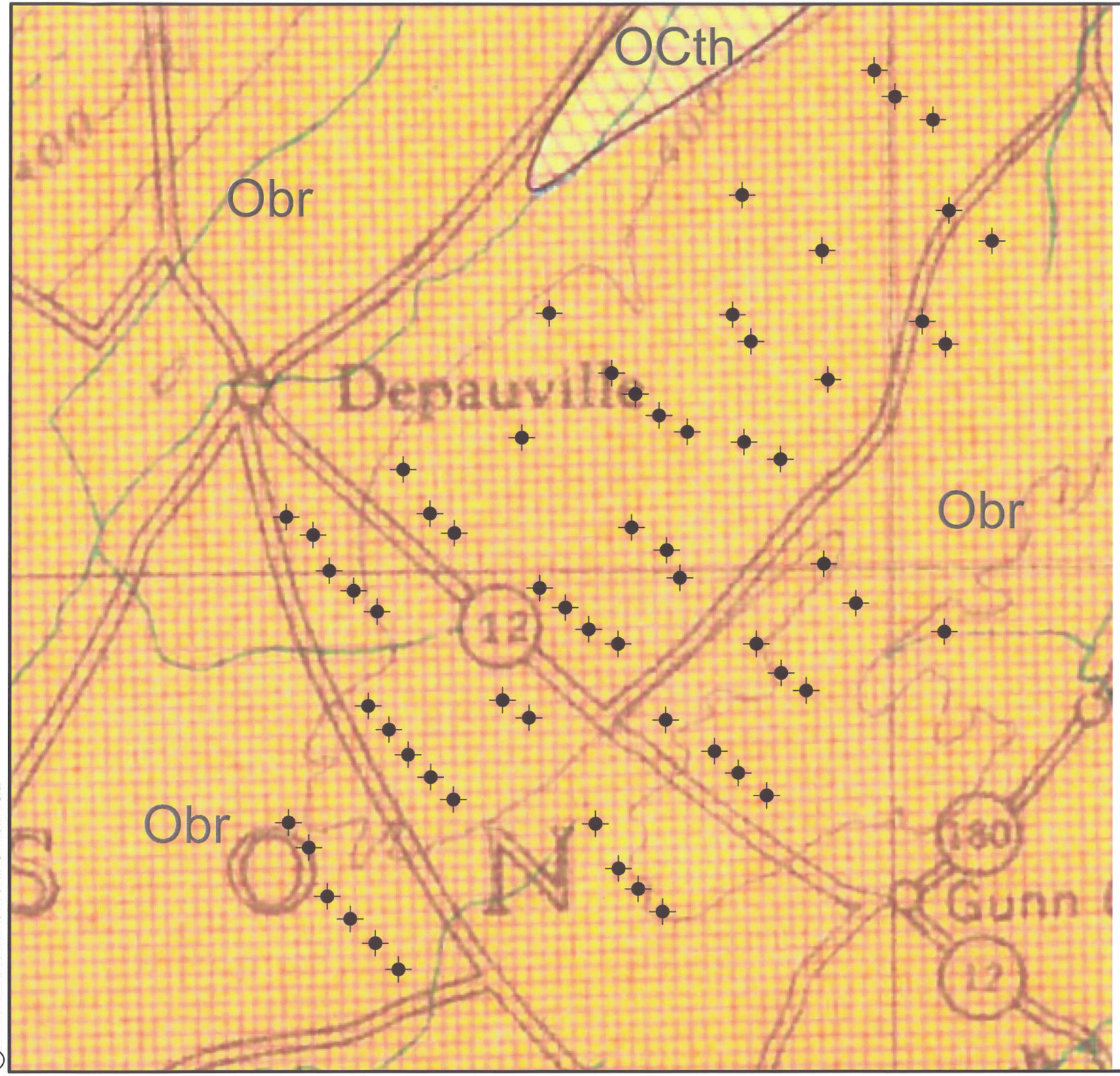
JEFFERSON COUNTY, NEW YORK

GEOTECHNICAL ASSESSMENT

SURFICIAL GEOLOGY MAP (1991)

PROJECT No.
21.0056285.00

FIGURE No.
3



NORTH

LEGEND:

- APPROXIMATE LOCATION OF PROPOSED WIND TURBINE
- Obr — BLACK RIVER GROUP - CHAUMONT LIMESTONE, LOWVILLE LIME STONE, PAMELIA FORMATION
- OCth — THERESA FORMATION - DOLOSTONE, SANDSTONE

NOTES:

1. BASE MAP ADAPTED FROM A GEOLOGIC MAP OF NEW YORK, 1970, ADIRONDACK SHEET, COMPILED AND EDITED BY: DONALD W. FISHER AND YNGVAR W. ISACHSEN, MARCH 1970.

2. THE SIZE AND LOCATION OF EXISTING SITE FEATURES SHOULD BE CONSIDERED APPROXIMATE.

DRAWN BY: DEW

DATE: JANUARY 2007

GZA GeoEnvironmental of New York

SCALE IN FEET

0 1500 3000 6000

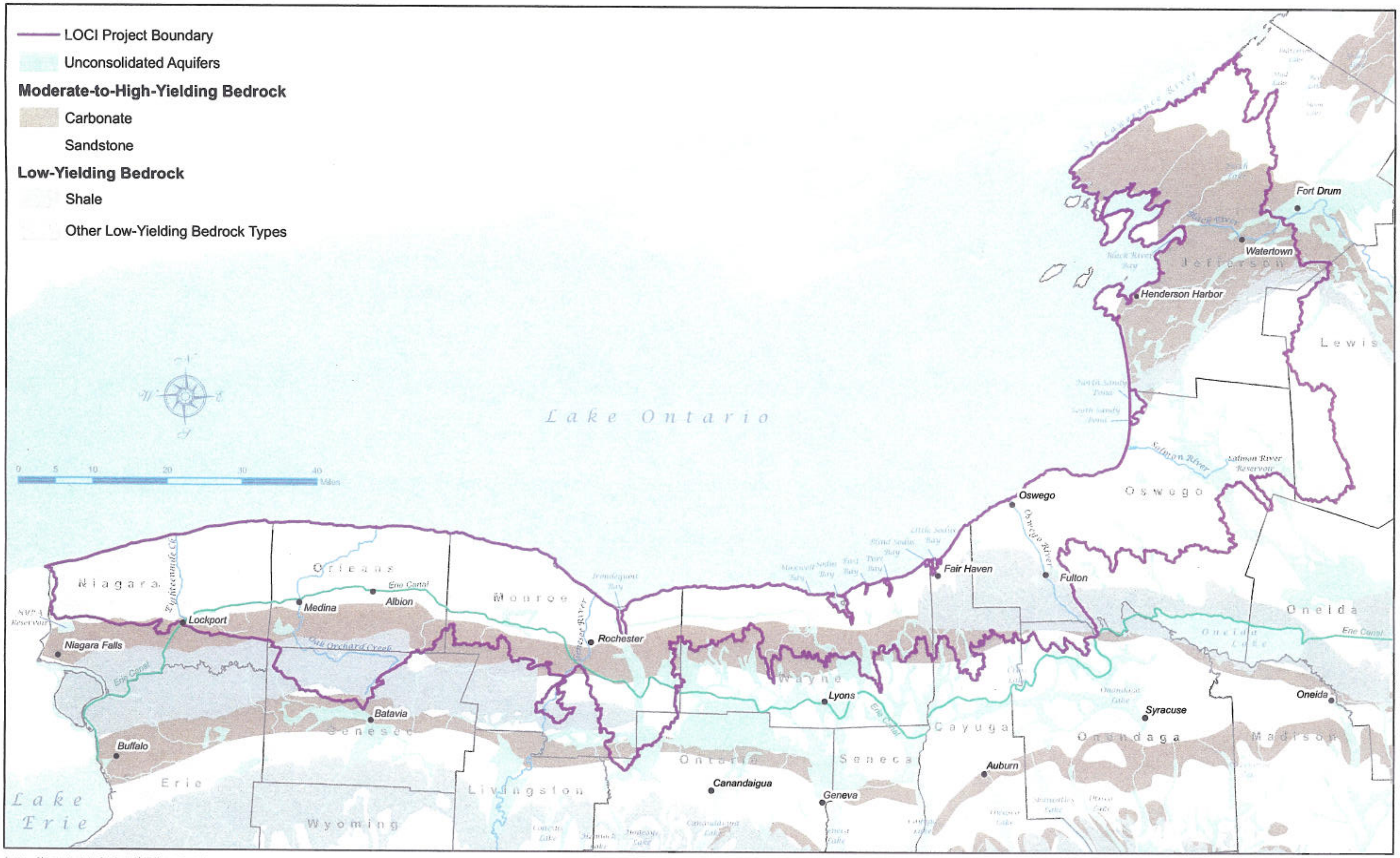
PPM ENERGY, INC.

PROPOSED CLAYTON WIND FARM PROJECT
CLAYTON AND ORLEANS TOWNSHIPS
JEFFERSON COUNTY, NEW YORK
GEOTECHNICAL ASSESSMENT

BEDROCK MAP (1970)

PROJECT No. 21.0056285.00

FIGURE No. 4


LOCI Project Boundary
Unconsolidated Aquifers
Moderate-to-High-Yielding Bedrock
Carbonate
Sandstone
Low-Yielding Bedrock
Shale
Other Low-Yielding Bedrock Types
Lake Ontario
Lake Erie
0 5 10 20 30 40 Miles
Niagara
Orleans
Monroe
Wayne
Cayuga
Oswego
Jefferson
Lewis
Oneida
Onondaga
Madison
Seneca
Ontario
Livingston
Wyoming
Genesee
Erie
Niagara Falls
Lockport
Medina
Albion
Rochester
Batavia
Buffalo
Lyons
Canandaigua
Geneva
Auburn
Syracuse
Oneida
Fair Haven
Fulton
Oswego
Henderson Harbor
Watertown
Fort Drum
Erie Canal
Oak Orchard Creek
Salmon River
Salmon River Reservoir
Oneida Lake

APPENDIX A

REFERENCES

APPENDIX A
REFERENCES

1. United States Geologic Survey Topographic Maps, Clayton, La Fargeville, Dexter, and Brownville NY Quadrangles, dated 1958.

2. Soil Survey of Jefferson County, New York prepared by United States Department of Agriculture Soil Conservation Service issued September 1989.

3. Surficial Geologic Map of New York, Adirondack Sheet, Complied and Edited by Donald H. Cadwell and Donald L. Pair, dated 1991.

4. Geologic Map of New York, Adirondack Sheet, by Yngvar W. Isachsen and Donald W. Fisher, Dated March 1970.

5. The Limestones (Middle Ordovician) of Jefferson County, New York, by John H. Johnsen, 1970.

6. International Building Code, International Code Council, Inc., 2000.

General Documents and Data Reviewed

- Roadside Geology of New York, Brandford Van Diver, 2000

- Geology of New York: A simplified Account (New York State Museum Educational Leaflet #28) by Yngvar W. Isachsen, 2000.

- Deep Wells in New York State by W.L. Kreidler; A.M. Van Tyner and K.M. Jorgensen dated 1972.

- Hydrogeology of the Fort Drum Area, Jefferson, Lewis, and St. Lawrence Counties, New York by Richard J. Reynolds, 1983.

- Preliminary Brittle Structures Map of New York, Yngvar W. Isachsen and William G. Mc Kendree dated 1972.

- Jefferson County Agricultural and Farmland Protection Plan, 2002.

- New York State Aquifers: New York State Department of Health, Bureau of Public Water Supply Protection, 2001.

- Principal Aquifers of New York State: US Geological Survey, 1998.

APPENDIX B

JEFFERSON COUNTY SOIL SURVEY SOIL DATA

APPENDIX B

JEFFERSON COUNTY SOIL SURVEY SOIL GROUP DESCRIPTIONS

Chaumont silty clay (ClA, 0-3 percent slopes & ClB 3-8 percent slopes) – Chaumont soils formed in a relatively thin mantle of clayey marine sediments that overlie hard bedrock. These nearly level or gently sloping soils are in nearly flat to slightly concave areas. They are somewhat poorly drained and fine-textured. Bedrock is at a depth of 20 to 40 inches. The seasonal high water table is commonly within ½ to 1 ½ feet of the surface from December through May. The rate of water movement through the soils is slow to very slow. The surface layer is moderately acid to neutral.

Covington silty clay (Cp) – A nearly level, very deep, poorly drained soil in smooth, broad, mostly level areas and partly depressed areas of lowland plains. Slope ranges from 0 to 3 percent, but is predominantly less than 1%. The seasonal high water table is commonly within ½ foot to 1 foot of the surface from October through May. The rate of water movement through the soil is slow or very slow in the surface layer and very slow in the subsoil and substratum. The surface layer is moderately acid to neutral.

Farmington loam, 0 to 8 percent slopes (FaB) – This is a nearly level to gently sloping, shallow, well-drained and somewhat excessively drained soil. Bedrock is at a depth of 10 to 20 inches. The rate of water movement through the soils is moderate. The surface layer is strongly acid to slightly acid.

Galoo-Rock outcrop complex, 0-8 percent slopes (GbB) – Galoo soils formed in a very thin layer of glacial till that overlies limestone or calcareous sandstone bedrock. Bedrock is at a depth of less than 10 inches. These nearly level or gently sloping soils are on smooth landscapes that have some bedrock escarpments and terrace fronts. They are excessively drained and somewhat excessively drained and medium textured. The seasonal high water table is commonly at a depth of more than 6 feet. The rate of water movement through the soils is moderate.

Galway silt loam, 0-3 percent slopes (GlA) – A nearly level, moderately deep, well-drained and moderately well-drained soil. Bedrock is at a depth of 20 to 40 inches. Also included in this soil are small areas of rock outcrops, bedrock escarpments, stony areas, and wet areas. The seasonal high water table is commonly within 1 ½ to 3 feet of the surface in March and April. The rate of water movement through the soils is moderate. The surface layer is moderately acid to neutral.

Guffin clay (Gv) - A nearly level, moderately deep, poorly drained and very poorly drained soil. Bedrock is at a depth of 20 to 40 inches. Also included are areas of rock outcrop and bedrock escarpments. The seasonal high water table is commonly between the surface and a depth of 6 inches from December through May. The rate of water movement through the soils is slow to very slow. The surface layer is moderately acid to neutral.

Kingsbury silty clay (KgA) – A nearly level, very deep, somewhat poorly drained soil. Also included are rock outcrops, small gravelly areas, stony areas, and sand spots. The seasonal high water table is commonly within ½ to 1 ½ feet of the surface from December through May. The rate of water movement through the soil is slow in the surface layer and very slow in the subsoil and substratum. The surface layer is strongly acid to mildly alkaline.

Vergennes silty clay loam, 3 to 8 percent slopes (VeB) – A gently sloping, very deep, moderately well drained soil. Also included are rock outcrops, marshes, wet spots, and sand spots. The seasonal high water table is commonly within 1 to 3 feet of the surface from December through May. The rate of water movement through the soil is slow in the surface layer and very slow in the subsoil and substratum. The surface layer is strongly acid to neutral.

Wilpoint silty clay loam, 3 to 8 percent slopes (WnB) – Wilpoint soils formed in a relatively thin mantle of clayey marine sediments that overlie hard bedrock. They are gently sloping, fine-textured and moderately well drained soils. Bedrock is at a depth of 20 to 40 inches. The seasonal high water table is commonly within 1 ½ to 2 feet of the surface from December through May. The rate of water movement through the soil is slow to very slow. The surface layer is moderately acid to neutral.

APPENDIX B
TABLE B1
JEFFERSON COUNTY SOIL SURVEY SOIL PHYSICAL PROPERTIES FOR SOIL GROUPS WITHIN STUDY AREA

Engineering Properties and Classifications

Soil Classification	Depth (in bgs)	% Passing 10 Sieve	% Passing 40 Sieve	% Passing 200 Sieve	Liquid Limit	Plasticity Index	Unified Classification
Chaumont Silty Clay (ClA, ClB)	0-5	95-100	90-100	70-95	55-80	15-50	MH, CH
	5-11	95-100	90-100	70-95	50-80	20-45	MH, CH
	11-22	95-100	90-100	70-95	50-80	20-45	MH, CH
	22-27	95-100	90-100	70-95	40-60	15-25	ML, CL
	Unweathered bedrock						
Covington Silty Clay (Cp)	0-6	95-100	95-100	90-100	40-80	10-40	CH, MH
	6-32	95-100	95-100	95-100	50-80	25-40	CH, MH
	32-64	95-100	95-100	95-100	50-80	25-40	CH, MH
Farmington loam (FaB)	0-8	75-90	50-85	30-80	20-35	3-15	ML, CL, SM, SC
	8-19	55-90	35-85	20-80	20-35	3-15	ML, CL, GM, GC
	Unweathered bedrock						
Galoo-Rock outcrop complex (GbB)	0-4	75-95	50-95	30-85	15-30	3-15	CL, ML, SM, CL-ML
	4-7	70-95	50-95	30-85	15-30	3-15	CL, ML, SM, CL-ML
	Unweathered bedrock						
Galway silt loam (GlA)	0-9	75-100	65-100	45-90	35-45	10-15	ML, SM
	9-23	50-95	35-90	20-75	20-40	30-15	ML, GM, GM-GC, CL-ML
	23-26	15-85	10-85	5-75	<20	NP	GM, GW-GM, ML, SP-SM
	Unweathered bedrock						
Guffin clay (Gv)	0-7	95-100	90-100	80-100	55-80	15-50	MH, CH
	7-19	95-100	90-100	90-100	50-80	20-45	MH, CH
	19-22	95-100	90-100	90-100	50-80	20-45	MH, CH
	Unweathered bedrock						
Kingsbury silty clay (KgA)	0-12	100	90-100	80-95	40-55	11-20	ML, MH
	12-28	100	90-100	90-100	50-65	21-35	MH, CH
	28-60	100	90-100	80-100	50-65	21-35	MH, CH
Vergennes silty clay loam (VeB)	0-8	100	90-100	85-100	40-80	20-40	MH, CH, CL, ML
	8-29	100	95-100	95-100	55-80	20-45	MH, CH
	29-72	100	95-100	95-100	55-80	20-45	MH, CH
Wilpoint silty clay loam (WnB)	0-9	95-100	90-100	80-90	55-80	15-50	MH, CH
	9-22	95-100	90-100	70-95	50-80	20-45	MH, CH
	22-29	95-100	90-100	70-95	40-60	15-25	ML, CL, MH, CH
	Unweathered bedrock						

Note: (in. bgs) = inches below ground surface

Department of Sustainable Natural Resources

SOIL SURVEY STANDARD TEST METHOD

UNIFIED SOIL CLASSIFICATION SYSTEM: FIELD METHOD

ABBREVIATED NAME	USCS
TEST NUMBER	P13
TEST METHOD TYPE	B
VERSION NUMBER	2

SCOPE

This test method describes the engineering properties of a soil based on the size of the particles, the amounts of the various sizes and the characteristics of the very fine grains. It can be carried out by either field examination or laboratory testing.

SPECIAL APPARATUS

Sieves, 75 mm, 4.75 mm (ASTM No 4), 2.0 mm (ASTM No 10), 0.425 mm aperture (ASTM No 40).

PROCEDURE

Field Classification Technique for Coarse-Grained Soils

1. Take a representative sample of soil (excluding particles >75 mm) (see Note 1) and classify the soil as coarse-grained or fine-grained by estimating whether 50% by weight, of the particles can be seen individually by the naked eye. Soils containing >50% of particles that can be seen are coarse-grained soils; soils containing <50% of particles smaller than the eye can see are fine-grained soils. If the soil is predominantly coarse-grained, identify as being a gravel or a sand by estimating whether 50% or more, by weight, of the coarse grains are larger or smaller than 4.75 mm (No 4 sieve size).

2. If the soil is a gravel, identify as being "clean" (containing little or no fines, <5%) or "dirty" (containing an appreciable amount of fines, >12%). For clean gravels final classification is made by estimating the gradation: the well-graded gravels belong to the GW groups and uniform and gap-graded gravels belong to the GP group. Dirty gravels are of two types: those with non-plastic (silty) fines (GM) and those with plastic (clayey) fines (GC). The determination of whether the fines are silty or clayey is made by the three manual tests for fine-graded soils.

3. If a soil is a sand, the same steps and criteria are used as for gravels in order to determine whether the soil is a well-graded clean sand (SW), poorly-graded clean sand (SP), sand with silty fines (SM) or sand with clayey fines (SC).

4. If a material is predominantly (>50% by weight) fine-grained, it is classified into one of six groups (ML, CL, OL, MH, CH, OH) by estimating its dilatancy (reaction to shaking), dry strength (crushing characteristics), and toughness (consistency near the plastic limit) and by identifying it as being organic or inorganic. (See Note 2.)

Table 1. Summary of Field Identification Tests

COARSE-GRAINED SOILS **More than half the material (by weight) is individual grains visible to the naked eye**	GRAVELLY SOILS More than half of coarse fraction is larger than 4.75 mm	CLEAN GRAVELS Will not leave a stain on a wet palm	Substantial amounts of all grain particle sizes	GW
			Predominantly one size or range of sizes with some intermediate sizes missing	GP
		DIRTY GRAVELS Will leave a stain on a wet palm	Non-plastic fines (to identify, see ML below)	GM
			Plastic fines (to identify, see CL below)	GC
	SANDY SOILS More than half of coarse fraction is smaller than 4.75 mm	CLEAN SANDS Will not leave a stain on a wet palm	Wide range in grain size and substantial amounts of all grain particle sizes.	SW
			Predominantly one size or a range of sizes with some intermediate sizes missing	SP
		DIRTY SANDS Will leave a stain on a wet palm	Non-plastic fines (to identify, see ML below)	SM
			Plastic fines (to identify, see CL below)	SC

FINE-GRAINED SOILS	**Ribbon**	**Liquid Limit**	**Dry Crushing Strength**	**Dilatancy Reaction**	**Toughness**	**Stickiness**	
More than half the material (by weight) is individual grains not visible to the naked eye **(<0.074 mm)**	None	<50	None to Sight	Rapid	Low	None	ML
	Weak	<50	Medium to High	None to Very Slow	Medium to High	Medium	CL
	Strong	>50	Slight to Medium	Slow to None	Medium	Low	MH
	Very Strong	>50	High to Very High	None	High	Very High	CH
HIGHLY ORGANIC SOILS	Readily identified by colour, odour, spongy feel and frequently by fibrous texture						OL OH Pt

Dilatancy (Reaction to Shaking)

After moving particles >0.4 mm (No 40 sieve size), prepare a pat of moist soil with a volume of about 10 cm^3. Add enough water, if necessary, to make the soil soft but not sticky.

Place the pat in the open palm of one hand and shake horizontally, striking vigorously against the other hand several times. A positive reaction consists of the appearance of water on the surface of the pat which changes to a livery consistency and becomes glossy. When the sample is squeezed between the fingers, the water and the gloss disappear from the surface, and the pat stiffens and finally it cracks or crumbles. The rapidity of appearance of water during shaking and of its disappearance during squeezing assist in identifying the character of the fines in a soil.

Very fine clean sands give the quickest and most distinct reaction whereas a plastic clay has no reaction. Inorganic silts, such as a typical rock flour, show a moderately quick reaction.

Dry Strength (Crushing characteristics)

After removing particles >0.4 mm (No 40 sieve size) mould a pat of soil to the consistency of putty, adding water if necessary. Allow the pat to dry completely by oven, sun or air drying, and then test its strength by breaking and crumbling between the fingers. This strength is a measure of the character and quantity of the colloidal fraction contained in the soil. The dry strength increases with increasing plasticity.

High dry strength is characteristic for clays of the CH group. A typical inorganic silt possesses only very slight dry strength. Silty fine sands and silts have about the same slight dry strength, but can be distinguished by the feel when powdering the dried specimen. Fine sand feels gritty whereas a typical silt has the smooth feel of flour.

Toughness (Consistency near plastic limit)

After removing particles larger than the 0.4 mm (No 40 sieve size), a specimen of soil about 10 cm^3 in size is moulded to the consistency of putty. If too dry, water must be added and if sticky, the specimen should be spread out in a thin layer and allowed to lose some moisture by evaporation. Then the specimen is rolled out by hand on a smooth surface or between the palms into a thread about 3 mm in diameter. The thread is then folded and re-rolled repeatedly. During this manipulation, the moisture content is gradually reduced and the specimen stiffens, finally loses its plasticity and crumbles when the plastic limit is reached.

After the thread crumbles, the pieces should be lumped together and a slight kneading action continued until the lump crumbles.

The tougher the thread near the plastic limit and the stiffer the lump when it finally crumbles, the more potent is the colloidal clay fraction in the soil. Weakness of the thread at the plastic limit and quick loss of coherence of the lump below the plastic limit indicate either inorganic clay of low plasticity, or materials such as kaolin-type clays and organic clays.

Highly organic clays have a very weak and spongy feel at the plastic limit.

REFERENCES

Charman, PEV & Murphy, BW (eds) 1991, *Soils: Their Properties and Management: A Soil Conservation Handbook for New South Wales.* Sydney University Press.

US Bureau of Reclamation 1960, *Design of Small Dams.* US Government Printing Office.

NOTES

1. This value is not included in the USCS. It is necessary to know the amount of particles >75 mm if gravel content is required.

2. Many natural soils will have property characteristics of two groups because they are close to the borderline between the groups, either in percentages of the various sizes or in plasticity characteristics. For this substantial number of soils, boundary classifications are used i.e. the groups symbols most nearly describing the soil are connected by a hyphen, such as GW-GC.

   Proper boundary classification of a soil near the borderline between coarse-grained and fine-grained soils is accomplished by classifying it first as a coarse-grained soil and then as a fine-grained soil. Such classification as SM-ML and SC-CL are common.

APPENDIX C

PRELIMINARY BLASTING PLAN

PRELIMINARY BLASTING PLAN

GZA GeoEnvironmental of New York (GZA) has prepared this Preliminary Blasting Plan that provides narrative draft specifications for consideration. If required, the geotechnical consultant and the turbine foundation engineer will finalize the plan prior to completion of detailed design, project specific blasting specifications and project implementation.

The anticipated blasting procedure for the removal of rock material at proposed turbine foundation locations shall consist of implementing line control to full depth and then the use of controlled blasting techniques in one or more benches to create minimum breakage outside the line control but create maximum rock fragmentation within the target area. Prior to blasting, the applicable regulatory concerns/requirements shall be met.

Pre-Blast Survey: Qualifications and professional credentials will be required from the blasting subcontractor. The general contractor will be required to prepare a final blasting plan and pre-blast survey prior to any rock removal. A written report of the pre-blast survey and final blasting plan will be provided to Community Energy and the Towns of Warren and Stark by the contractor and will be available for review by the appropriate regulatory agency. The scope of the blasting plan and pre-blast survey will be required to conform to the following:

- Structures, including houses, within a minimum distance that could reasonably be affected by blasting and to be specified by the contractor using information gathered during the geotechnical design phase, shall be surveyed as part of the pre-blast survey. The extent beyond the minimum distance specified, shall be determined by the contractor and their blasting subcontractor. (wind turbine set backs are a minimum of 1,200 feet from residential dwellings). A pre-blast well survey will also be completed if a well is located within a minimum distance to be specified in the final Blasting Plan. This well pre-blast survey will include yield and turbidity measurements.
- The final blasting plan shall addresses air-blast limits, ground vibrations, and maximum peak particle velocity (PPV) for ground movement; including provisions to monitor and assess compliance with the air-blast, ground vibration and PPV requirements established.
- The Blasting Plan shall meet criteria established in Chapter 3 (Control of Adverse Effects) in the Blasting Guidance Manual of the United States Department of the Interior Office of Surface Mining Reclamation and Enforcement (www.osmre.gov/blastingindex.htm).

Blasting: Blasting shall be performed only after approval has been given by the applicant for such operations and must comply with the following provisions, as well as, others established by the appropriate regulatory agencies.

A. The contractor or its subcontractor shall use sufficient stemming[1], matting or natural protective cover to prevent fly rock from leaving property owned or under control of the permittee or operator or from entering protected natural resources or natural buffer strips. Crushed rock or other suitable material must be used for stemming when available. Native gravel, drill cuttings or other material may be used for stemming if no other suitable material is available.

B. The maximum allowable air-blast at any inhabited building not owned or controlled by the developer may not exceed 110 decibels[2] peak when measured by an instrument having a flat response (+ or - 3 decibels) over the range of 5 to 200 hertz.

C. The maximum allowable air-blast at any uninhabited building not owned or controlled by the developer may not exceed 120 decibels peak when measured by an instrument having a flat response (+ or - 3 decibels) over the range of 5 to 200 hertz.

Monitoring of air-blast levels is required when a pre-blast survey has determined that a structure is within the minimum distance. The contractor may file a request to the regulatory authority to waive the monitoring requirement if the contractor or subcontractor secures the permission of affected property owners to increase allowable air-blast levels on their property and the regulatory authority determines that no protected natural resource will be adversely affected by the increased air-blast levels.

D. If a blast is to be initiated by detonating cord, the detonating cord must be covered by crushed rock or other suitable cover to reduce noise and concussion effects.

E. A pre-blast survey is required for structures present within a minimum radius from the blast site. Notification that blasting will occur should be provided to all owners of the identified structures to be surveyed prior to commencement of blasting. Pre-blast surveys should include both the interior and exterior of each structure. The pre-blast survey must document any pre-existing damage to structures and buildings and any other physical features within the survey radius that could reasonably be affected by blasting. Assessment of features such as pipes, cables, transmission lines and water wells and other water supply systems must be

[1] Stemming – Defined as an inert material used to confine or separate explosives in a borehole.
[2] Blasting Guidance Manual, United States Department of the Interior, Office of Surface Mining Reclamation and Enforcement; March 1987.

limited to surface conditions and other readily available data, such as well yield and water quality. The pre-blast survey must be conducted prior to the initiation of blasting. The contractor or subcontractor shall retain a copy of all pre-blast surveys for at least one year from the date of the last blast.

(1) The contractor or the subcontractor is not required to conduct a pre-blast survey on properties for which the permittee or operator documents the rejection of an offer by registered letter, return receipt requested, to conduct a pre-blast survey. Any person owning a building within a pre-blast survey radius may voluntarily waive the right to a survey.

F. Blasting may not occur in the period between sundown and sunrise of the following day or in the period from 7:00 p.m. to 7:00 a.m., whichever is greater. Blasting is not allowed on Sunday.

G. Table 1 (see Item 4 below) can be used to evaluate ground vibration effects for all blasts.

(1) Blasting measured in accordance with Table 1 below is conducted so that the peak particle velocity of any one of the 3 mutually perpendicular components of motion does not exceed the ground vibration limits at the distances specified.

(2) Seismic instruments that monitor blasting in accordance with Table 1 must have the instrument's transducer firmly coupled to the ground.

(3) A permittee or operator using Table 1 may use the scaled-distance equation, $W=(D/D_s)^2$, to determine the allowable charge weight of explosives to be detonated in any 8 millisecond or greater delay period without seismic monitoring, where W is equal to the maximum weight of explosives, in pounds, and D and Ds are defined as in Table 1 of this paragraph.

(4) The following is Table 1.

Distance Versus Peak Particle Velocity Method

Distance (D) From the Blast Area (Feet)	Maximum Allowable Peak Particle velocity (V_{max}) for Ground Vibration (in/sec)	Scaled Distance Factor (D_s) to be Applied without Seismic Monitoring
0 to 300 Feet	1.25	50
301 to 5,000 Feet	1.00	55
Greater than 5,000 Feet	0.75	65

H. A record of each blast, including seismographic data, must be kept for at least one year from the date of the last blast by the general contractor, its subcontractor (if appropriate) and developer, and must be available for inspection during normal business hours. The blast record shall contain the following data:

- ✓ Name of blasting company or blasting contractor;
- ✓ Location, date and time of blast;
- ✓ Name and signature of blaster;
- ✓ Type of material blasted;
- ✓ Number and spacing of holes and depth of burden or stemming;
- ✓ Diameter and depth of holes;
- ✓ Type of explosives used;
- ✓ Total amount of explosives used;
- ✓ Maximum amount of explosives used per delay period of 8 milliseconds or greater;
- ✓ Maximum number of holes per delay period of 8 milliseconds or greater;
- ✓ Method of firing and type of circuit;
- ✓ Direction and distance in feet to the nearest structure neither owned nor controlled by the project developer;
- ✓ Weather conditions, including such factors as wind direction and cloud cover;
- ✓ Height or length of stemming;
- ✓ Amount of mats or other protection used;
- ✓ Type of detonators used and delay periods used;
- ✓ The exact location of each geophone and the distance of each geophone from the blast;
- ✓ Seismographic readings, including peak particle velocity and frequency measured in the horizontal, vertical and longitudinal directions, and air-blast data;
- ✓ Name and signature of the person operating each seismograph;
- ✓ Names of the person and the firm analyzing the seismographic data, and
- ✓ The stratum or structure on which the geophone is located during each blast.

I. All field seismographs must record the full analog wave form of each of the 3 mutually perpendicular components of motion in terms of particle velocity and frequency. All seismographs must be capable of sensor check and must be calibrated according to the manufacturer's recommendations.

NYS Department of Environmental Conservation
Office of Media Relations
625 Broadway, Albany, New York 12233-1016
(518) 402-8000 (518) 402-2209 (Fax)

FOIL Request No. 07-220
2/5/2007

Mr. John Beninati
GZA GeoEnvironmental of New York
364 Nagel Drive
Buffalo, NY 14225-

Dear Mr. Beninati:

This is to acknowledge receipt of your Freedom of Information Law request seeking records regarding: **groundwater well records for area in Town of Clayton, Jefferson County (map enclosed with request).**

I have referred your request to the following Records Custodian(s) / Freedom of Information Law Coordinator(s) who may possess the records you are requesting:

Ms. Sarah Rickard - Water
625 Broadway
Albany, NY 12233-3501 (518) 402-8216

You may expect a response to your request by **3/6/2007.**

If I can be of further assistance, please contact me at(518) 402-8000 . Refer to request number **07-220** , if you write or call.

Sincerely,

S/ Ruth L. Earl

Ruth L. Earl
Records Access Officer

New York State Department of Environmental Conservation
Division of Water
Bureau of Water Resource Management, 4th Floor
625 Broadway, Albany, New York 12233-3508
Toll Free: (877) 472-2619 • **Ph:** (518) 402-8291 • **FAX:** (518) 402-8290
Website: www.dec.state.ny.us/website/dow
Email: NYSWells@gw.dec.state.ny.us

March 5, 2007

GZA GeoEnvironmental of New York
Attn: John Beninati
364 Nagel Drive
Buffalo, New York 14225

Re: Foil No. 07-220
Clayton Well Reports

Dear Mr. Beninati:

The Bureau of Water Resource Management, within the Division of Water (DOW), has received your Freedom of Information Request dated January 29, 2007. This bureau has program responsibilities for the registration of water well drillers and the collection of water well records. The records we maintain are well completion reports which contain information pertaining to the construction of water wells (depth, yield, materials encountered, and it's location). Your information request may have been sent to other units of this Department who are responsible for responding to you separately.

We have found 8 (eight) records to be responsive to your request. The records are enclosed.

Future communications relative to this request may be sent to:
NYSDEC, Div. of Water
Bureau of Water Resource Management, Water Well Program
625 Broadway, 4th Floor
Albany, NY 12233-3508
(Telephone # 518 402-8291)

Sincerely,

Camille Bright

Camille Bright
Environmental Analyst

NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION

(1) County Jefferson

(2) Township Depauville / Clayton

(3) DEC Well Number J548

WELL COMPLETION REPORT

(4) OWNER [redacted]

(5) ADDRESS P.O. Box [redacted] Depauville N.Y.

(6) LOCATION OF WELL (See Instructions On Reverse) Show Lat/Long if available and method used: ☑ GPS ☐ DEC Website ☐ Map Interpolation — N44 08 323' H076 ° 03.652

LOG *

Ground Surface EL. 316 ft. above sea level

Top Of Casing is located 2 ft. ft. above (+) or below (-) ground surface

(7) DEPTH OF WELL BELOW LAND SURFACE (Feet)	(8) DEPTH TO GROUNDWATER BELOW LAND SURFACE (Feet)	DATE MEASURED
35 ft.	15 feet	5/12/01

CASINGS

(9) DIAMETER	6 in.	in.	in.	in.
(10) LENGTH	10 ft.	ft.	ft.	in.

(11) GROUT TYPE / SEALING

(12) GROUT / SEALING INTERVAL (Feet) FROM _____ TO _____

SCREENS

(13) MAKE & MATERIAL

(14) OPENINGS

(15) DIAMETER	in.	in.	in.	in.
(16) LENGTH	ft.	ft.	ft.	in.

(17) DEPTH TO TOP OF SCREEN, FROM TOP OF CASING (Feet)

YIELD TEST

(18) DATE 5/12/01

(19) DURATION OF TEST 30 minutes

(20) LIFT METHOD ☐ Pump ☐ Air Lift ☑ Bail

(21) STABILIZED DISCHARGE (GPM) 50 G.P.M.

(22) STATIC LEVEL PRIOR TO TEST (feet/inches below top of casing) 15 feet

(23) MAXIMUM DRAWDOWN (Stabilized) (feet/inches below top of casing) 15 feet

(24) RECOVERY (Time in hours/minutes)

(25) Was the water produced during test discharged away from immediate area? Yes ☑ No ☐

PUMP INSTALLATION

(26) PUMP INSTALLED?	(27) DATE	(28) PUMP INSTALLER
YES ☐ NO ☑		
(29) TYPE	(30) MAKE	(31) MODEL

(32) MAXIMUM CAPACITY (GPM)

(33) PUMP INSTALLATION LEVEL FROM TOP OF CASING (Feet)

(34) METHOD OF DRILLING ☐ Rotary ☑ Cable Tool ☐ Other _____

(35) USE OF WATER (see instructions for choices) DOMESTIC

(36) DATE DRILLING WORK STARTED 5/11/01

(37) DATE DRILLING WORK COMPLETED 5/12/01

(38) DATE REPORT FILED	(39) DRILLER & COMPANY	(40) DEC REGISTRATION NO.
	Allen Fitchette Thousand Island Drilling	NYRD10175

* Show log of geologic materials encountered with depth below ground surface, water bearing beds and water levels in each; casings; screens; pump; additional pumping tests and other matters of interest, e.g., water quality (sulphur, salt, methane). Describe repair work. Attach separate sheet if necessary.

See further instructions titled "Instructions for New York State Well Completion Report".

TOP OF WELL

4ft. of clay

Limestone rock

35-foot

BOTTOM OF HOLE

NYSDEC COPY

NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION

(1) County Jefferson

(2) Township ~~Lafargeville~~ Orleans

(3) DEC Well Number J 583

WELL COMPLETION REPORT

(4) OWNER

(5) ADDRESS William St. Watertown N.Y.

(6) LOCATION OF WELL (See Instructions On Reverse)
Show Lat/Long if available and method used:
~~GPS~~ ☐ DEC Website ☐ Map Interpolation
N 44° 07. 604'
H 075° 59. 707'

LOG *

Ground Surface EL. 119 ft. above sea level

Top Of Casing is located 2 ft. ft.above (+) or below (-) ground surface

(7) DEPTH OF WELL BELOW LAND SURFACE (Feet)

(8) DEPTH TO GROUNDWATER BELOW LAND SURFACE (Feet) DATE MEASURED

CASINGS

(9) DIAMETER: 6 in. | in. | in. | in

(10) LENGTH: 10 ft. | ft. | ft. | in.

(11) GROUT TYPE / SEALING

(12) GROUT / SEALING INTERVAL (Feet) FROM _____ TO _____

SCREENS

(13) MAKE & MATERIAL

(14) OPENINGS

(15) DIAMETER: in. | in. | in. | in.

(16) LENGTH: ft. | ft. | ft. | in.

(17) DEPTH TO TOP OF SCREEN, FROM TOP OF CASING (Feet)

YIELD TEST

(18) DATE 8/24/01

(19) DURATION OF TEST

(20) LIFT METHOD ☐ Pump ☐ Air Lift ~~Bail~~

(21) STABILIZED DISCHARGE (GPM) 2 g.p.m.

(22) STATIC LEVEL PRIOR TO TEST (feet/inches below top of casing) 15 foot

(23) MAXIMUM DRAWDOWN (Stabilized) (feet/inches below top of casing) Bottom of well

(24) RECOVERY (Time in hours/minutes) 1 1/2 hours

(25) Was the water produced during test discharged away from immediate area? Yes ✓ No ___

E

PUMP INSTALLATION

(26) PUMP INSTALLED? YES ___ NO ✓

(27) DATE

(28) PUMP INSTALLER

(29) TYPE

(30) MAKE

(31) MODEL

(32) MAXIMUM CAPACITY (GPM)

(33) PUMP INSTALLATION LEVEL FROM TOP OF CASING (Feet)

(34) METHOD OF DRILLING ☐ Rotary ~~Cable Tool~~ ☐ Other _____

(35) USE OF WATER (see instructions for choices) Domestic

(36) DATE DRILLING WORK STARTED 8/16/01

(37) DATE DRILLING WORK COMPLETED 8/24/01

(38) DATE REPORT FILED 8/24/01

(39) DRILLER & COMPANY Thousand Island Drilling Allen Fitchette

(40) DEC REGISTRATION NO. NYRD 10175

TOP OF WELL

4 foot of clay

↑ limestone ↓

100 foot

BOTTOM OF HOLE

* Show log of geologic materials encountered with depth below ground surface, water bearing beds and water levels in each; casings; screens; pump; additional pumping tests and other matters of interest, e.g., water quality (sulphur, salt, methane). Describe repair work. Attach separate sheet if necessary.

See further instructions titled "Instructions for New York State Well Completion Report".

NYSDEC COPY

NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION

(1) County Jefferson

(2) Township Orleans

(3) DEC Well Number J601

WELL COMPLETION REPORT

(4) OWNER

(5) ADDRESS Factory St. Lafargeville, N.Y.

(6) LOCATION OF WELL (See Instructions On Reverse) Show Lat/Long if available and method used: N44° 08.325', H076° 04.041'
☐ GPS ☐ DEC Website ☐ Map Interpolation

LOG *

Ground Surface EL. 540 ft. above sea level

Top Of Casing is located 2ft. ft. above (+) or below (-) ground surface

(7) DEPTH OF WELL BELOW LAND SURFACE (Feet) 34 foot

(8) DEPTH TO GROUNDWATER BELOW LAND SURFACE (Feet) 6 foot DATE MEASURED 4/12/02

CASINGS

(9) DIAMETER 6 in. | in. | in. | in.

(10) LENGTH 18 ft. | ft. | ft. | in.

(11) GROUT TYPE / SEALING

(12) GROUT / SEALING INTERVAL (Feet) FROM _____ TO _____

SCREENS

(13) MAKE & MATERIAL

(14) OPENINGS

(15) DIAMETER in. | in. | in. | in.

(16) LENGTH ft. | ft. | ft. | in.

(17) DEPTH TO TOP OF SCREEN, FROM TOP OF CASING (Feet)

YIELD TEST

(18) DATE 4/12/02

(19) DURATION OF TEST 1 hour

(20) LIFT METHOD ☑ Pump ☐ Air Lift ☐ Bailer

(21) STABILIZED DISCHARGE (GPM) 50 gals. plus

(22) STATIC LEVEL PRIOR TO TEST (feet/inches below top of casing) 29 ½ feet

(23) MAXIMUM DRAWDOWN (Stabilized) (feet/inches below top of casing) no drawdown

(24) RECOVERY (Time in hours/minutes) same static level

(25) Was the water produced during test discharged away from immediate area? Yes ✓ No ___

PUMP INSTALLATION

(26) PUMP INSTALLED? YES ___ NO ✓

(27) DATE

(28) PUMP INSTALLER

(29) TYPE

(30) MAKE

(31) MODEL

(32) MAXIMUM CAPACITY (GPM)

(33) PUMP INSTALLATION LEVEL FROM TOP OF CASING (Feet)

(34) METHOD OF DRILLING ☐ Rotary ☑ Cable Tool ☐ Other _____

(35) USE OF WATER (see instructions for choices) DOMESTIC

(36) DATE DRILLING WORK STARTED 4/10/02

(37) DATE DRILLING WORK COMPLETED 4/12/02

(38) DATE REPORT FILED 4/12/02

(39) DRILLER & COMPANY Allen Fitchette Thousand Island Drilling

(40) DEC REGISTRATION NO. NYRD 10175

TOP OF WELL

15 foot sand and gravel

3 foot sandstone shale rock

26 foot limestone and sandstone mixture

34 foot deep

BOTTOM OF HOLE

* Show log of geologic materials encountered with depth below ground surface, water bearing beds and water levels in each; casings; screens; pump; additional pumping tests and other matters of interest, e.g., water quality (sulphur, salt, methane). Describe repair work. Attach separate sheet if necessary.

See further instructions titled "Instructions for New York State Well Completion Report".

NYSDEC COPY

NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION

(1) County Jefferson

(2) Township Orleans

(3) DEC Well Number J704

WELL COMPLETION REPORT

(4) OWNER

(5) ADDRESS Tracy Rd. Lafargeville, NY 13656

(6) LOCATION OF WELL (See Instructions On Reverse)
Show Lat/Long if available
and method used:
☑ GPS ☐ DEC Website ☐ Map Interpolation 44° 09.51N 75° 59.14W

(7) DEPTH OF WELL BELOW LAND SURFACE (Feet) 62

(8) DEPTH TO GROUNDWATER BELOW LAND SURFACE (Feet) DATE MEASURED

CASINGS

(9) DIAMETER 6 in. | in. | in. | in.

(10) LENGTH 20 ft. | ft. | ft. | in.

(11) GROUT TYPE / SEALING Bentonite

(12) GROUT / SEALING INTERVAL (Feet) FROM _____ TO _____

SCREENS

(13) MAKE & MATERIAL

(14) OPENINGS

(15) DIAMETER in. | in. | in. | in.

(16) LENGTH ft. | ft. | ft. | in.

(17) DEPTH TO TOP OF SCREEN, FROM TOP OF CASING (Feet)

YIELD TEST

(18) DATE 9-23-02

(19) DURATION OF TEST

(20) LIFT METHOD ☐ Pump ☑ Air Lift ☐ Bail

(21) STABILIZED DISCHARGE (GPM) 20

(22) STATIC LEVEL PRIOR TO TEST (feet/inches below top of casing)

(23) MAXIMUM DRAWDOWN (Stabilized) (feet/inches below top of casing)

(24) RECOVERY (Time in hours/minutes)

(25) Was the water produced during test discharged away from immediate area? Yes ____ No ____

PUMP INSTALLATION

(26) PUMP INSTALLED? YES ___ NO ✓

(27) DATE

(28) PUMP INSTALLER

(29) TYPE

(30) MAKE

(31) MODEL

(32) MAXIMUM CAPACITY (GPM)

(33) PUMP INSTALLATION LEVEL FROM TOP OF CASING (Feet)

(34) METHOD OF DRILLING ☑ Rotary ☐ Cable Tool ☐ Other _____

(35) USE OF WATER (see instructions for choices) Drinking

(36) DATE DRILLING WORK STARTED 9-23-02

(37) DATE DRILLING WORK COMPLETED 9-23-02

(38) DATE REPORT FILED	(39) DRILLER & COMPANY	(40) DEC REGISTRATION NO.
10/22/02	Jeff Butcher	10136

* Show log of geologic materials encountered with depth below ground surface, water bearing beds and water levels in each; casings; screens; pump; additional pumping tests and other matters of interest, e.g., water quality (sulphur, salt, methane). Describe repair work. Attach separate sheet if necessary.

See further instructions titled "Instructions for New York State Well Completion Report".

LOG *

Ground Surface EL. _____ ft. above sea level

Top Of Casing is located _____ ft.above (+) or below (-) ground surface

TOP OF WELL

0-4	Top Soil Broken Limestone
4-62	Limestone

BOTTOM OF HOLE

NYSDEC COPY

NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION

J756

(1) County Jefferson

(2) Township Orleans

(3) DEC Well Number ~~J755~~

WELL COMPLETION REPORT

(4) OWNER

(5) ADDRESS N.Y.S. Rt # 180 Lafargeville N.Y.

(6) LOCATION OF WELL (See Instructions On Reverse)
Show Lat/Long if available
and method used:
~~DGPS~~ ☐ DEC Website ☐ Map Interpolation. 44°.06.830', H075° 58.226

LOG *

Ground Surface EL. 369 ft. above sea level

Top Of Casing is located 15 inches ft. above (+) or below (-) ground surface

(7) DEPTH OF WELL BELOW LAND SURFACE (Feet) 126½ foot

(8) DEPTH TO GROUNDWATER BELOW LAND SURFACE (Feet) DATE MEASURED 6/14/03

TOP OF WELL

CASINGS

(9) DIAMETER	(10) LENGTH
6 in. | in. | in. | in.	7 ft. | ft. | ft. | in.

(11) GROUT TYPE / SEALING

(12) GROUT / SEALING INTERVAL (Feet) FROM _____ TO _____

SCREENS

(13) MAKE & MATERIAL

(14) OPENINGS

(15) DIAMETER	(16) LENGTH
in. | in. | in. | in.	ft. | ft. | ft. | in.

(17) DEPTH TO TOP OF SCREEN, FROM TOP OF CASING (Feet)

YIELD TEST

(18) DATE 6/14/03

(19) DURATION OF TEST 15 minutes

(20) LIFT METHOD ☐ Pump ☐ Air Lift ~~☐ Bail~~

(21) STABILIZED DISCHARGE (GPM) 2 quarts

(22) STATIC LEVEL PRIOR TO TEST (feet/inches below top of casing) 30 foot

(23) MAXIMUM DRAWDOWN (Stabilized) (feet/inches below top of casing) 25 feet

(24) RECOVERY (Time in hours/minutes) 8 hours

(25) Was the water produced during test discharged away from immediate area? Yes ✓ No ___

PUMP INSTALLATION

(26) PUMP INSTALLED?	(27) DATE	(28) PUMP INSTALLER
YES ___ NO ✓		

(29) TYPE	(30) MAKE	(31) MODEL

(32) MAXIMUM CAPACITY (GPM)

(33) PUMP INSTALLATION LEVEL FROM TOP OF CASING (Feet)

(34) METHOD OF DRILLING ☐ Rotary ~~☐ Cable Tool~~ ☐ Other _____

(35) USE OF WATER (see instructions for choices) Domestic

(36) DATE DRILLING WORK STARTED 6/7/03

(37) DATE DRILLING WORK COMPLETED 6/13/03

(38) DATE REPORT FILED	(39) DRILLER & COMPANY	(40) DEC REGISTRATION NO.
	Allen Fitchette Thousand Island Drilling	NYRD 10175

* Show log of geologic materials encountered with depth below ground surface, water bearing beds and water levels in each; casings; screens; pump; additional pumping tests and other matters of interest, e.g., water quality (sulphur, salt, methane). Describe repair work. Attach separate sheet if necessary.

See further instructions titled "Instructions for New York State Well Completion Report".

BOTTOM OF HOLE

NYSDEC COPY

NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION

(1) County Jefferson

(2) Town Clayton

(3) DEC Well Number J 988

WELL COMPLETION REPORT

(4) OWNER

(5) ADDRESS P.O. Box Depauville N.Y.

(6) LOCATION OF WELL (See Instructions On Reverse)
Show Lat/Long if available and method used:
☐ GPS ☐ DEC Website ☐ Map Interpolation
N 44° 09.704'
H076 9 03.902'

LOG *

Ground Surface EL. .066 ft. above sea level

Top Of Casing is located 2 ft. ft.above (+) or below (-) ground surface

(7) DEPTH OF WELL BELOW LAND SURFACE (Feet) 57 foot

(8) DEPTH TO GROUNDWATER BELOW LAND SURFACE (Feet) 10ft. DATE MEASURED 12/13/04

CASINGS

(9) DIAMETER	(10) LENGTH
6 in. | in. | in. | in.	12 ft. | ft. | ft. | in.

(11) GROUT TYPE / SEALING

(12) GROUT / SEALING INTERVAL (Feet) FROM _____ TO _____

SCREENS

(13) MAKE & MATERIAL

(14) OPENINGS

(15) DIAMETER in. | in. | in. | in.

(16) LENGTH ft. | ft. | ft. | in.

(17) DEPTH TO TOP OF SCREEN, FROM TOP OF CASING (Feet)

YIELD TEST

(18) DATE 12/13/04

(19) DURATION OF TEST 1/2 hour

(20) LIFT METHOD ☐ Pump ☐ Air Lift ☑ Bail

(21) STABILIZED DISCHARGE (GPM) 20 g.p.m.

(22) STATIC LEVEL PRIOR TO TEST (feet/inches below top of casing) 40 ft.

(23) MAXIMUM DRAWDOWN (Stabilized) (feet/inches below top of casing) 37 foot

(24) RECOVERY (Time in hours/minutes) four minutes

(25) Was the water produced during test discharged away from immediate area? Yes ☑ No ☐

PUMP INSTALLATION

(26) PUMP INSTALLED?	(27) DATE	(28) PUMP INSTALLER
YES ☐ NO ☑		
(29) TYPE	(30) MAKE	(31) MODEL

(32) MAXIMUM CAPACITY (GPM)

(33) PUMP INSTALLATION LEVEL FROM TOP OF CASING (Feet)

(34) METHOD OF DRILLING ☐ Rotary ☑ Cable Tool ☐ Other _____

(35) USE OF WATER (see instructions for choices) Domestic

(36) DATE DRILLING WORK STARTED 12/7/04

(37) DATE DRILLING WORK COMPLETED 12/13/04

(38) DATE REPORT FILED	(39) DRILLER & COMPANY	(40) DEC REGISTRATION NO.
12/14/04	Allen Fitchette Thousand Island Drilling	NYRD10175

TOP OF WELL

8 ft. of clay

49 ft. of Lime-stone

well is 57 ft. deep

BOTTOM OF HOLE

* Show log of geologic materials encountered with depth below ground surface, water bearing beds and water levels in each; casings; screens; pump; additional pumping tests and other matters of interest, e.g., water quality (sulphur, salt, methane). Describe repair work. Attach separate sheet if necessary.

See further instructions titled "Instructions for New York State Well Completion Report".

NYSDEC COPY

NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION

(1) COUNTY Jefferson

(2) TOWN Clayton

(3) DEC Well Number J1023

WATER WELL COMPLETION REPORT

(4) OWNER [redacted]

(5) ADDRESS [redacted] Depauville Rd Chaumont 13622

(6) LOCATION OF WELL (See Instructions On Reverse)
Show Lat/Long if available and method used:
☑ GPS ☐ Map Interpolation N44° 06.418' W076° 03.327'

LOG *

Ground Surface EL. 434 ft. above sea level

Top Of Casing is located 2' ft. above (+) or below (-) ground surface

(7) DEPTH OF WELL BELOW LAND SURFACE (feet) 69 ft

(8) DEPTH TO GROUNDWATER BELOW LAND SURFACE (feet) 17' DATE MEASURED 4-11-05

CASINGS

(9) DIAMETER	(10) LENGTH
8 in.	6' ft.
6 in.	20 ft.
in.	ft.
in.	in.

(11) GROUT TYPE / SEALING Benseal

(12) GROUT / SEALING INTERVAL (feet) FROM 20 TO surface

SCREENS

(13) MAKE & MATERIAL	(14) OPENINGS	(15) DIAMETER	(16) LENGTH
		in.	ft.
		in.	ft.
		in.	ft.
		in.	in.

(17) DEPTH TO TOP OF SCREEN, FROM TOP OF CASING (Feet)

YIELD TEST

(18) DATE 4-13-05

(19) DURATION OF TEST 1hr

(20) LIFT METHOD ☐ Pump ☐ Air Lift ☑ Bail

(21) STABILIZED DISCHARGE (GPM) 9

(22) STATIC LEVEL PRIOR TO TEST (feet/inches below top of casing) 17'

(23) MAXIMUM DRAWDOWN (Stabilized) (feet/inches below top of casing) 55'

(24) RECOVERY (Time in hours/minutes) 5 min

(25) Was the water produced during the test discharged away from immediate area? Yes ✓ No ___

PUMP INSTALLATION

(26) PUMP INSTALLED?	(27) DATE	(28) PUMP INSTALLER
YES ___ NO ___		

(29) TYPE	(30) MAKE	(31) MODEL

(32) MAXIMUM CAPACITY (GPM)	(33) PUMP INSTALLATION LEVEL FROM TOP OF CASING (Feet)

(34) METHOD OF DRILLING ☐ Rotary ☑ Cable Tool ☐ Other ___

(35) USE OF WATER (See instructions for choices) Domestic

(36) DATE DRILLING WORK STARTED 4-9-05

(37) DATE DRILLING WORK COMPLETED 4-13-05

(38) DATE REPORT FILED	(39) REGISTERED COMPANY	(40) DEC REGISTRATION NO.
6-22-05	Greenhill Well Drilling	NYRD 10225

(41) CERTIFIED DRILLER (Print name)	(42) CERTIFIED DRILLER SIGNATURE
B.M. Greenhill	B.M. Greenhill

* Show log of geologic materials encountered with depth below ground surface, water bearing beds and water levels in each; casings; screens; pump; additional pumping tests and other matters of interest, e.g., water quality (sulphur, salt, methane). Describe repair work. Attach separate sheet if necessary.

TOP OF WELL

6' — Rock

18' — End of Casing

Black Limestone

55'

BOTTOM OF HOLE

NYSDEC COPY

NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION

(1) COUNTY Jefferson

(2) TOWN Chaumont

WATER WELL COMPLETION REPORT

(3) DEC Well Number: J 1116

(4) OWNER

(5) ADDRESS: Rt #128 Chaumont, N.Y. 783-9575

(6) LOCATION OF WELL (See Instructions On Reverse) Show Lat/Long if available and method used: ☑ GPS ☐ Map Interpolation
N 44° 05.619'
H076° 00.958

LOG *

Ground Surface EL. 376 ft. above sea level

Top Of Casing is located 18 inches ft. above (+) or below (-) ground surface

(7) DEPTH OF WELL BELOW LAND SURFACE (feet)	(8) DEPTH TO GROUNDWATER BELOW LAND SURFACE (feet)	DATE MEASURED
88 ft.	10 foot	11/5/05

CASINGS

(9) DIAMETER	6 in.	in.	in.	in.
(10) LENGTH	20 ft.	ft.	ft.	in.

(11) GROUT TYPE / SEALING	(12) GROUT / SEALING INTERVAL (feet) FROM _____ TO _____

SCREENS

(13) MAKE & MATERIAL	(14) OPENINGS

(15) DIAMETER	in.	in.	in.	in.
(16) LENGTH	ft.	ft.	ft.	in.

(17) DEPTH TO TOP OF SCREEN, FROM TOP OF CASING (Feet)

YIELD TEST

(18) DATE 11/5/05	(19) DURATION OF TEST ½ hour
(20) LIFT METHOD ☐ Pump ☐ Air Lift ☑ Bail	(21) STABILIZED DISCHARGE (GPM) 5 g.p.m.
(22) STATIC LEVEL PRIOR TO TEST (feet/inches below top of casing) 78 ft.	(23) MAXIMUM DRAWDOWN (Stabilized) (feet/inches below top of casing) 84 ft.
(24) RECOVERY (Time in hours/minutes) 30 minutes	(25) Was the water produced during the test discharged away from immediate area? Yes ✓ No ___

PUMP INSTALLATION

(26) PUMP INSTALLED? YES ___ NO ✓	(27) DATE	(28) PUMP INSTALLER
(29) TYPE	(30) MAKE	(31) MODEL
(32) MAXIMUM CAPACITY (GPM)	(33) PUMP INSTALLATION LEVEL FROM TOP OF CASING (Feet)	

(34) METHOD OF DRILLING ☐ Rotary ☑ Cable Tool ☐ Other _____	(35) USE OF WATER (See instructions for choices) Domestic
(36) DATE DRILLING WORK STARTED 11/2/05	(37) DATE DRILLING WORK COMPLETED 11/5/05

(38) DATE REPORT FILED	(39) REGISTERED COMPANY	(40) DEC REGISTRATION NO.
11/6/05	T. J. Well Drilling	NYRD 10175

(41) CERTIFIED DRILLER (Print name)	(42) CERTIFIED DRILLER SIGNATURE
Allen Fitchette	Allen Fitchette

* Show log of geologic materials encountered with depth below ground surface, water bearing beds and water levels in each; casings; screens; pump; additional pumping tests and other matters of interest, e.g., water quality (sulphur, salt, methane). Describe repair work. Attach separate sheet if necessary.

TOP OF WELL

Lime-Stone all the way

Well is 88ft. deep

BOTTOM OF HOLE

NYSDEC COPY