Request No. 22:

Provide a detailed table listing all residential structures within 2,000 feet of the Project boundary line. Indicate whether the residential structures are participating or non-participating.

Original Response:

See attached.

Supplemental Response:

The table attached to the Original Response to Request No. 22 mislabeled the residential structure identified as Receptor ID 22 as nonparticipating when it is a participating property with respect to the Project. The table attached to this Supplemental Response corrects the designation of Receptor ID 22 to a participating property.

Responding Witness: Tim Burgener

Data Request 22-23. Residential Structures within 2,000 Feet of Project Boundary

Receptor ID	Distance to Boundary (Feet)	Distance to Solar Panel (Feet)	Distance to Inverter (Feet)	Distance to Substation (Feet)	Participation Status
8	0	288	526	10914	Participating
62	0	239	334	6256	Participating
79	0	236	971	1410	Participating
82	0	96	580	6193	Participating
40	13	1215	1546	2662	Participating
61	41	221	526	5529	Participating
66	137	232	727	7880	Participating
18	255	458	1919	4452	Participating
2	467	677	1626	4116	Participating
30	921	1363	2103	1430	Participating
22	33	218	1794	4730	Participating
12	30	229	600	5926	Non-Participating
78	31	233	1098	940	Non-Participating
68	45	237	1001	2432	Non-Participating
54	53	238	1444	8081	Non-Participating
13	67	242	1463	4119	Non-Participating
64	79	232	836	4584	Non-Participating
23	99	293	842	1876	Non-Participating
49	102	299	3183	8611	Non-Participating
9	107	1176	3088	5307	Non-Participating
37	110	277	914	2235	Non-Participating
44	112	252	697	3789	Non-Participating
3	131	229	2716	6580	Non-Participating
27	133	475	1409	1945	Non-Participating
31	147	1248	2996	5173	Non-Participating
17	205	1275	1776	8442	Non-Participating
86	207	1203	1794	2786	Non-Participating
48	214	1068	1482	8997	Non-Participating
11	223	419	3343	8746	Non-Participating
72	261	479	1138	4515	Non-Participating
5	312	960	3696	6154	Non-Participating
39	457	666	1855	4484	Non-Participating
51	487	1100	3871	6323	Non-Participating
52	491	680	2040	5590	Non-Participating
77	529	1387	1812	9380	Non-Participating
36	537	1071	3905	6395	Non-Participating
21	571	844	1812	11305	Non-Participating
65	591	942	2223	13205	Non-Participating
85	599	1108	1438	3426	Non-Participating

Data Request 22-23. Residential Structures within 2,000 Feet of Project Boundary

Receptor ID	Distance to Boundary (Feet)	Distance to Solar Panel (Feet)	Distance to Inverter (Feet)	Distance to Substation (Feet)	Participation Status
16	628	789	1125	6088	Non-Participating
47	672	1328	1662	3496	Non-Participating
45	682	801	1636	5449	Non-Participating
26	784	971	2627	5700	Non-Participating
55	788	841	2459	12964	Non-Participating
81	804	1022	1898	3975	Non-Participating
41	951	1077	1437	3767	Non-Participating
4	963	1085	1621	4674	Non-Participating
15	1032	2098	2738	9032	Non-Participating
24	1061	1146	1803	9358	Non-Participating
71	1218	1401	4377	7026	Non-Participating
73	1313	2258	2914	9167	Non-Participating
19	1345	1541	2707	8727	Non-Participating
80	1361	1517	2235	8881	Non-Participating
38	1372	1507	4529	9990	Non-Participating
654	1385	2514	3164	9433	Non-Participating
42	1405	2831	3459	9837	Non-Participating
75	1462	1572	4204	7675	Non-Participating
63	1568	1835	2557	3258	Non-Participating
60	1595	1668	2615	4250	Non-Participating
20	1657	2832	3485	9741	Non-Participating
35	1783	1904	3621	13280	Non-Participating
34	1787	1925	2753	4605	Non-Participating
74	1809	2029	2975	7100	Non-Participating
6	1830	1964	2287	7885	Non-Participating
50	1834	2088	2961	7759	Non-Participating
43	1866	1997	4977	10473	Non-Participating
14	1885	2046	2714	8514	Non-Participating
33	1893	1950	2843	4179	Non-Participating
53	1913	1989	2315	8107	Non-Participating
88	1916	1975	2306	8295	Non-Participating
611	1928	3199	3605	10959	Non-Participating
67	1934	3348	3790	10657	Non-Participating
58	1942	2196	3094	7607	Non-Participating
59	1954	2101	2968	4812	Non-Participating
32	1957	2196	3124	7377	Non-Participating
87	1961	2111	3000	4833	Non-Participating
25	1989	2106	2679	6108	Non-Participating

Request No. 73:

Provide any geotechnical reports for the project.

Original Response:

See attached.

Supplemental Response:

A Karst Desktop Report was completed by Terracon for the Project in October 2024 that was inadvertently excluded from Attachment to Response No. 73 filed on October 4, 2025. This study is attached hereto. As discussed in Response No. 19(c) to Siting Board Staff's Second Request for Information, additional geotechnical investigations are planned prior to commencing construction and the Project's karst studies attached in its Original Response and this Supplemental Response will be field verified.

Responding Witness: Courtney Whitworth

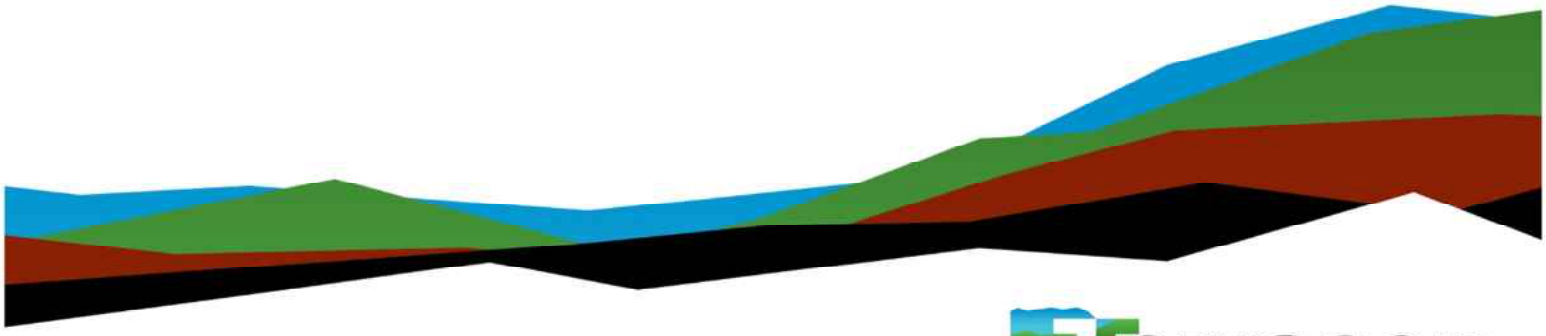
Exie Solar

Karst Desktop Report

October 1, 2024 | Terracon Project No. 57247152

Prepared for:

National Grid Renewables
8400 Normandale Lake Blvd Ste 1200
Bloomington, MN 55437



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October 1, 2024

National Grid Renewables
8400 Normandale Lake Blvd Ste 1200
Bloomington, MN 55437

Attn: Mr. Ali Hashimee
E: ahashimee@@nationalgridrenewables.com

Re: Karst Desktop Report
Exie Solar
Green County, Kentucky
Terracon Project No. 57247152

Dear Mr. Hashimee:

We have completed the scope of Karst Desktop services for the above referenced project in general accordance with the proposal P57247151 and work order dated September 16, 2024. This report presents the findings of the preliminary desktop study at the proposed Exie Solar site in Green County, Kentucky.

We appreciate the opportunity to be of service to you on this project. If you have any questions concerning this report or if we may be of further service, please contact us.

Sincerely,

Terracon

Sean Vanderhoff
Senior Staff Geologist

Doug Trusty
Senior Geologist

Introduction

The proposed Exie Solar site located in Green County, Kentucky was assessed for potential karst geohazards underlying the property. The objective of the desktop review was to identify suspect karst features which could impact the proposed solar development, roadways, and supporting infrastructure. The northern parcels of the site are mapped as underlain by unconsolidated calcareous or carbonate rocks forming a regional karst terrain (i.e., a landscape characterized by the presence of sinkholes, small caves, and conduits).

Geology and Terrain

Physiography

The Exie Solar site is in Green County, Kentucky. The site is located within the Interior Plains Division of the Physiographic Map of the United States[1], and in the Lexington Plain Section of the Interior Low Plateaus Province.

Referencing the physiographic map of Kentucky, Specifically, this part of the Highland Rim subsection of the Low Plateaus Physiographic Province in Kentucky is referred to as the Mississippian Plateau (or the "Pennyrile", named for the Pennyroyal plant, *Hedeoma puligiodes*). The Mississippian Plateau wraps around the Western Kentucky Coalfield Province, in a crescent that opens towards the north. The Mississippian Plateau in the site area is divided by the Dripping Springs Escarpment into an upland often called the Mammoth Cave Plateau, and an adjacent, lower elevation area called the Pennyroyal Plateau (or Plain). The Exie Solar Site lies within the western edge of the Pennyroyal Plateau section on the border of Green County Metcalfe County.

Topography

Referencing the USGS 7.5-minute Exie and East Fork, Kentucky topographic quadrangle. the site has an average elevation of between EL900 on ridgetops and EL715 in valleys

[1] *Fenneman, Nevin M. (January 1917). "Physiographic Subdivision of the United States"*

along Greasy Creek. Site gradient varies across the site with runoff to Greasy Creek and its tributaries.

Geology

Based on the highest resolution available geological mapping the site is mapped as underlain by the formations as follows.

Reef limestone of the Fort Payne Formation (rl)

Limestone, yellowish-gray and brownish-gray to medium-dark-gray, medium- to coarse-grained, detrital, medium-bedded to thick-bedded, crossbedded, massive, locally shaly, argillaceous, and cherty; stylolites common in upper part. Very fossiliferous, containing silicified fragments of large (1 inch diameter) crinoid stems, bryozoans, and brachiopods. Microfossils locally abundant near top.

Fort Payne Formation (Mfp)

Limestone, yellowish-gray and brownish-gray to medium-dark-gray, medium- to coarse-grained, detrital, medium-bedded to thick-bedded, crossbedded, massive, locally shaly, argillaceous, and cherty; stylolites common in upper part. Very fossiliferous, containing silicified fragments of large (1 inch diameter) crinoid stems, bryozoans, and brachiopods. Microfossils locally abundant near top.

Salem and Warsaw Limestones (Msw)

Limestone, shale, siltstone, and sandstone. Limestone is yellowish-gray to medium-dark-gray and medium-bluish-gray. Fine to coarse grained, medium to thick-bedded, locally crossbedded. This unit is fossiliferous, cherty, argillaceous, and arenaceous. Limestone composed largely of fragments of brachiopods, bryozoans, crinoids, and blastoids

Shale, siltstone and limestone. Shale is medium to dark-gray, and greenish-gray, very fossiliferous and fissile. Weathers to greenish-gray or grayish-green clay soil that contains abundant fossils and which is readily eroded and gullied. Grades locally into relatively unfossiliferous gray siltstone. Lenses of very fossiliferous yellowish-gray to medium-dark-gray and brown medium- to coarse-grained detrital limestone and chert occur within shale. Small crinoid stems, brachiopods, horn corals, and small blastoids (Pentremites) are common in shale and limestone.

St. Louis Limestone (Msl)

Representing the majority of the site, the St. Louis Limestone is light olive-gray and medium-gray. Sublithographic to very fine grained, medium-bedded, argillaceous and locally arenaceous, cherty, and fossiliferous. Near base limestone interbedded with light-olive-gray and greenish-gray claystone and siltstone. Weathered to moderate reddish-

brown clay residuum containing abundant spheroidal, knobby, and blocky chert that is gray in center and white to yellowish gray and moderate reddish brown on weathered surfaces. Silicified colonial corals, brachiopods, and bryozoans occur in blocky chert and residuum.

Karst

The site is within the Pennyroyal Plateau region, an area characterized by tens of thousands of sinkholes, sinking streams, dry valleys, springs, and caverns. It is of note that the limestones of the Pennyroyal Plateau lowland south and east of the Dripping Springs Escarpment are not capped by the soft sandstone that is found on the Mammoth Cave Plateau. For this reason, there is a much higher concentration of karst features located in this area, most of which have open throats that lead directly into the subsurface, and are not clogged with sandstone residual sediment as are often found within the Mammoth Cave upland area.

Referencing the USGS Karst Map of the United States[2], the entirity of the site parcels are mapped as "carbonate rocks at or near the surface in a humid climate", except for the far southern portion of the site. The Kentucky Geological Survey has the majority of the site mapped as very high potential for karst.

Desktop Data Review

A review of the LiDAR derived shaded relief map and 2-foot contour layer across the site resulted in the identification of 273 suspect karst features where 98 are point features and 175 are area features (Exhibit 1, 2, and 3). The "point" and "area" designation are related to the dimensions, where point features are typically less than 10-feet and area features are anything larger. This system works well for display on maps and planning and data management.

The shaded relief map derived from LiDAR data shows slope related details of the suspect karst features on-site and concentrations of suspect karst features, as shown in Image 1.

[2] Weary, D.J., and Doctor, D.H., 2014, Karst in the United States: A digital map compilation and database: U.S. Geological Survey Open-File Report 2014–1156, 10 p.

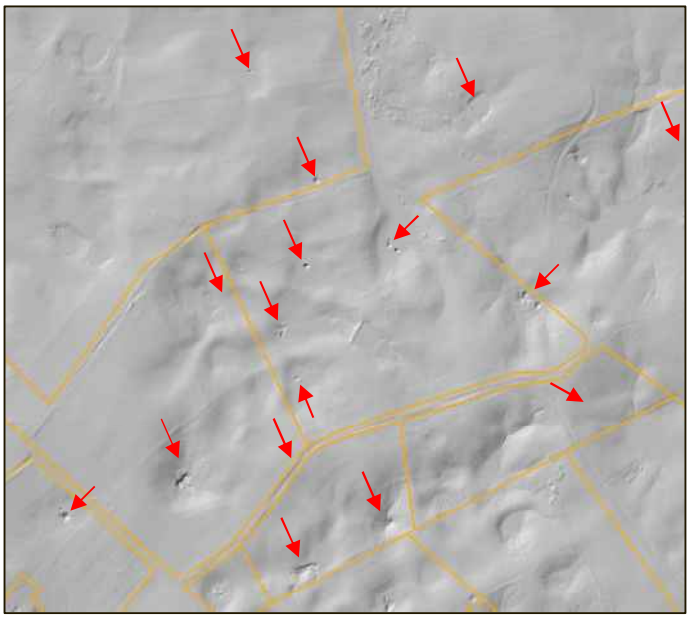


Image 1. A concentration of suspect sinkholes (shown by red arrows) on the north-central portion of the site.

Recommendations

The results of the karst desktop data review serve as a conservative estimate and indication for suspect karst feature locations and karst potential concentrations. The desktop delineates potential karst features using all remote resources available; therefore, the product is comprised of points and polygons to design around. According to the Natural Resource Conservation Service (NRCS) Code 527[3], the minimum setback around karst features should be 25-feet, yet since the features have not been field verified, we recommend utilizing a 50-feet setback to further reduce the likelihood of future issues. This setback area shall remain in an undisturbed natural state[4] through all periods of construction and subsequent facility operations. In general, the relatively low

[3] 2015, Conservation Practice Standard Karst Sinkhole Treatment, Code 527. Natural Resources Conservation Service, United States Department of Agriculture.

[4] An "Undisturbed Natural State" is defined for the purpose of karst conservation as not causing any disturbance to the natural vegetation and soils within the 25-foot buffer of a karst feature. This would include (but not be limited to) activities such as cutting, trimming, stripping and grubbing, grading, use of herbicides and/or insecticides, application of fertilizers or soil amendments, and depositing vegetation cuttings or trash of any kind.

number of closed depressions per acre and the fact that most of the features are smooth bottomed indicates that the karst risk at this site is very low. It is unlikely that sinkholes and karst issues will significantly impact development on this site.

General Comments

Our services and any correspondence or collaboration are intended for the sole benefit and exclusive use of our client for specific application to the project discussed and are accomplished in accordance with generally accepted geotechnical and geological engineering practices with no third-party beneficiaries intended. Any third-party access to services or correspondence is solely for information purposes to support the services provided by Terracon to our client. Reliance upon the services and any work product is limited to our client and is not intended for third parties. Any use or reliance of the provided information by third parties is done solely at their own risk. No warranties, either express or implied, are intended or made.

This memo outlines the findings and opinions of our initial step in the proposed preliminary karst survey. Information presented herein is based on the review of publicly available information. No site or project-specific information has been reviewed for the preparation of this memo. Field reconnaissance will be required as the next step to locate and characterize suspect karst features from our desktop review as well as identify other features at the site in the field based on observations from the ground surface. This memo is representative only of surficial indications from remote sensing data observable at the time the data was collected. It should be noted that karst is a dynamic landform and significant changes can occur over time. Absence of a mapped resource does not mean that it is not present.

Our opinions of the site surface and subsurface geologic conditions are very preliminary in nature. Confirmation of opinions stated in this document is essential. These opinions must be validated with site-specific field reconnaissance, exploration, and testing. In order to characterize the subsurface conditions, we recommend geotechnical explorations of the site. Geotechnical explorations will provide the necessary sampling and testing to provide design parameter recommendations. In conjunction with borings, a geophysical survey could also correlate depth of rock and offer some reduction to the potential number of necessary explorations, thus reducing our impact on any given site. Additionally, the results of the geophysical survey can be used to characterize the subsurface conditions and potential karst features more accurately and in greater detail than visual observations alone.

All parties are advised that any decisions or actions taken by any party based on the information contained herein, including decisions with financial implications are done solely at the risk of that party. By providing this information in this preliminary form, Terracon expressly disclaims any duties or obligations associated with the usage of this information for decision-making or design purposes.

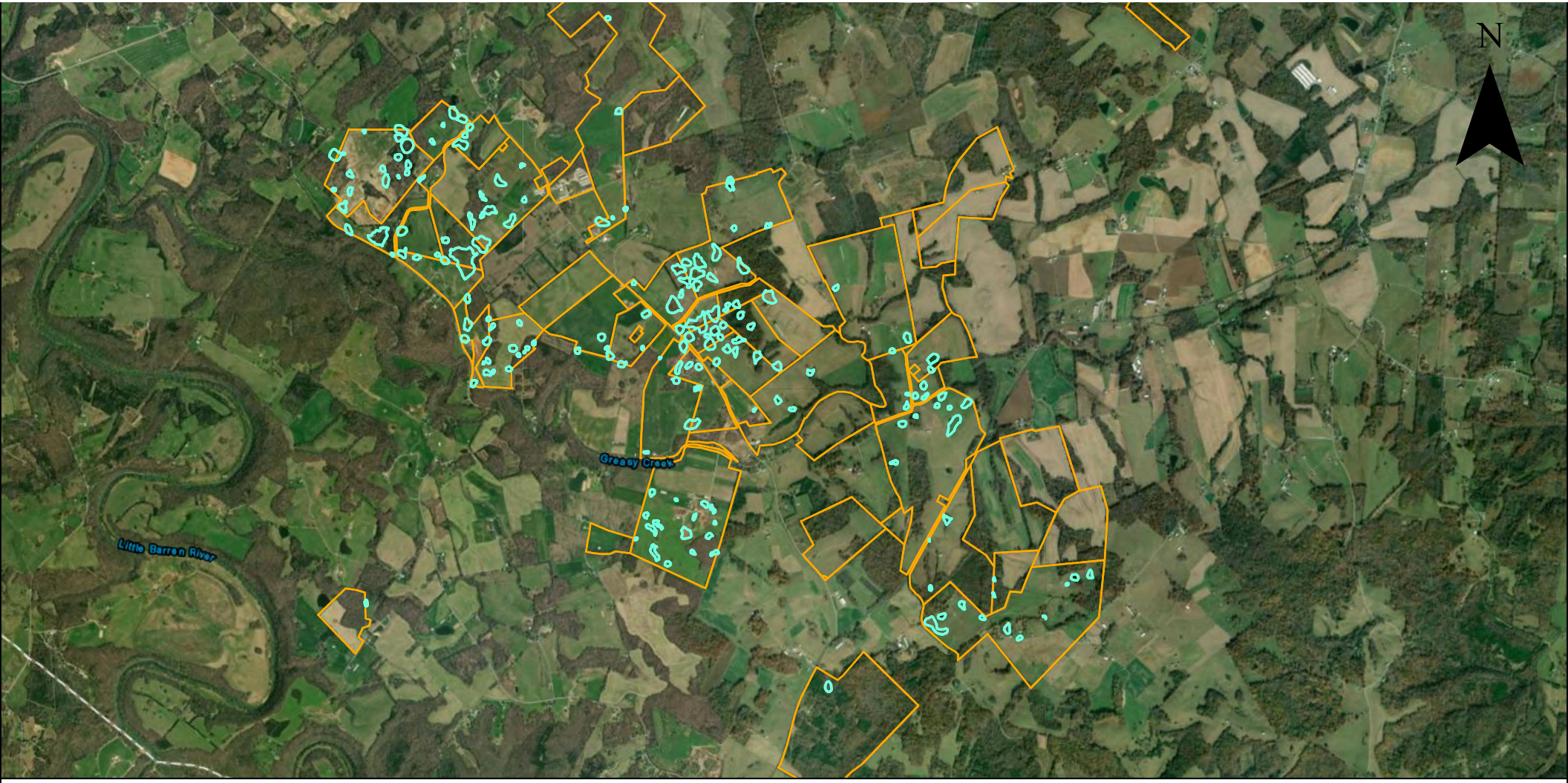
In the event that changes to the nature, design, or location of the project, as outlined in this report, are planned, the preliminary conclusions and recommendations contained in this report shall not be used unless Terracon reviews the changes and either verifies or modifies the conclusions of this report in writing. As the project moves into the design phase, Terracon should be retained to develop and complete a scope of work that includes site-specific explorations.

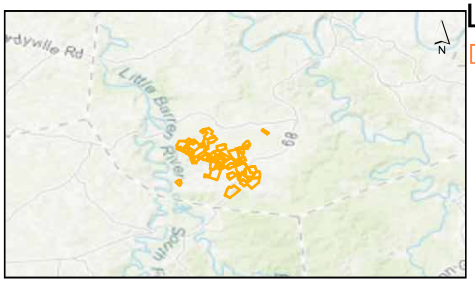
Appendix A – Site Location Plans

Contents:

Site Map
Topography Map
Geology Map

Note: All attachments are one page unless noted above.





Legend

- Site Boundary
- Suspect Karst Points
- Suspect Karst Areas

DATA SOURCES:
ESRI World Aerial Imagery
Parcel data referenced from Exie Parcels.kmz

Project No.:	57247151
Date:	Sep 2024
Drawn By:	SMV
Reviewed By:	WDFT

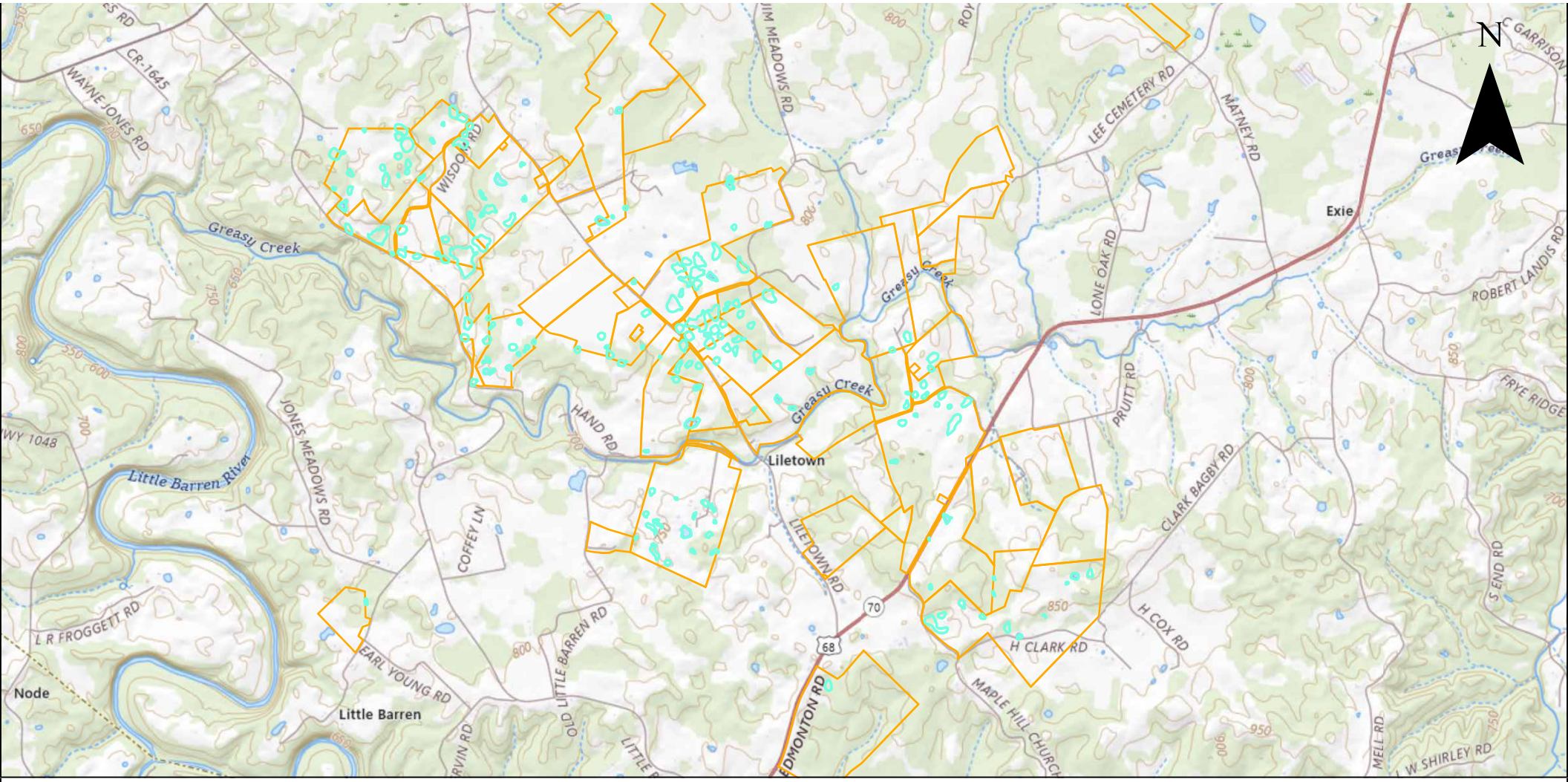
Terracon
13050 Eastgate Park Way, Suite 101 Louisville, KY 40223
PH. (502) 456-1256 terracon.com

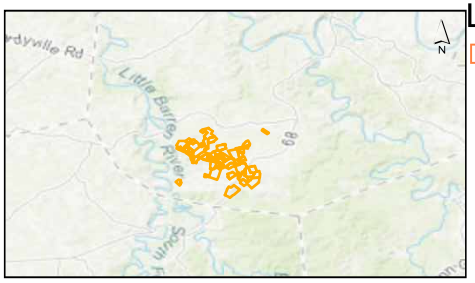
Site Map

Exie Solar
Karst Desktop Review
Green County, Kentucky

Exhibit

1





Legend

- Site Boundary
- Suspect Karst Points
- Suspect Karst Areas

DATA SOURCES:
USGS Topogrphic Basemap
Parcel data referenced from Exie Parcels.kmz

Project No.:	57247151
Date:	Sep 2024
Drawn By:	SMV
Reviewed By:	WDFT

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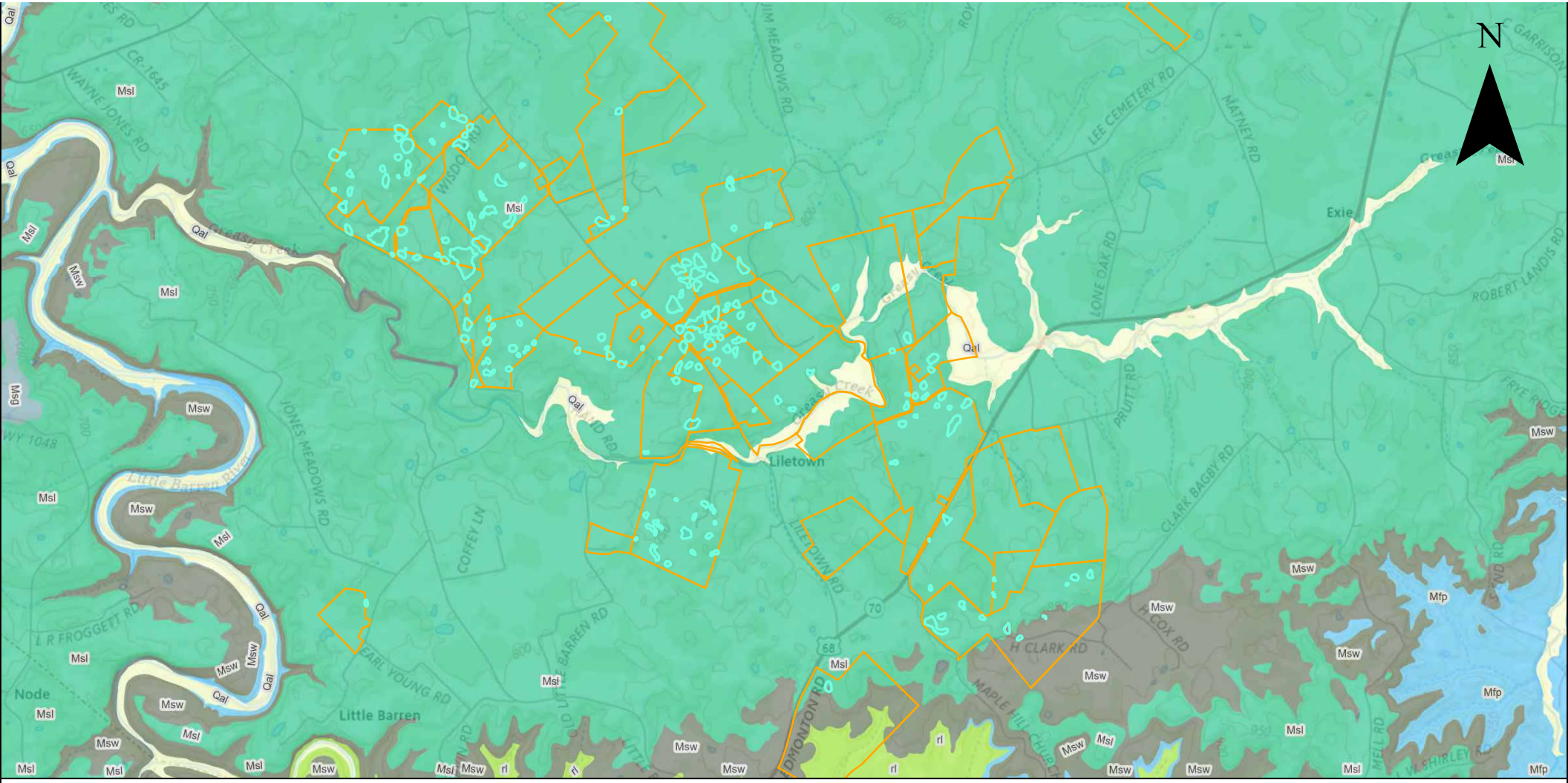
PH. (502) 456-1256 terracon.com

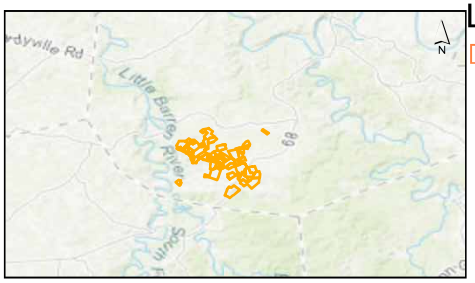
Topography Map

Exie Solar
Karst Desktop Review
Green County, Kentucky

Exhibit

2





Legend

- Site Boundary
- Suspect Karst Points
- Suspect Karst Areas
- reef limestone of Fort Payne Formation
- Fort Payne Formation
- Salem and Warsaw Limestones
- St. Louis Limestone
- Alluvium

DATA SOURCES:
USGS Topogrphic Basemap
Kentucky Geological Survey 1:24,000 Geologic Formations
Parcel data referenced from Exie Parcels.kmz

Project No.:	57247151
Date:	Sep 2024
Drawn By:	SMV
Reviewed By:	WDFT

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Geology Map

Exie Solar
Karst Desktop Review
Green County, Kentucky

Exhibit

3