

BEFORE THE OHIO POWER SITING BOARD

In the Matter of the Application of)	
Angelina Solar I, LLC)	
for a Certificate of Environmental)	Case No. 18-1579-EL-BGN
Compatibility and Public Need)	

DIRECT TESTIMONY OF NOAH WATERHOUSE

Q.1. Please state your name, title and business address.

A.1. My name is Noah Waterhouse. I am the Director of Solar - Civil Engineering for EVS, Inc. My business address is 10025 Valley View Road, Suite 140, Eden Prairie, MN 55344.

Q.2. What are your duties as the Director of Solar – Civil Engineering?

A.2. As the Director of Solar Civil at EVS, my role is to lead a group of engineers in providing civil design for solar projects. That leadership includes developing design procedures, establishing scopes with clients, overseeing project execution, and educating staff on Solar Civil specific design principles.

Q.3. What is your educational and professional background?

A.3. I have a Bachelor of Science in Civil Engineering from the University of Minnesota. I am a licensed Professional Engineer in the State of Minnesota. I have worked as a Civil Engineer at EVS continuously for the past 15 years, and have been doing work exclusively for solar projects for approximately five years. I became Director of Solar Civil at EVS in 2017. During my career I have been the site design engineer for both government, including military, and commercial projects. I have performed project management and design duties, including field work, regarding grading and drainage, stormwater management, utilities, erosion control, pavement design, and demolition

1 design. I have also prepared permit applications for a number of projects, including
2 water discharge permits and various local permits for grading, driveway connections, and
3 stormwater management. I have extensive experience evaluating drainage and runoff
4 issues and/or drain tile at dozens of sites, including more than 50 solar projects.

5 **Q.4. On whose behalf are you offering testimony?**

6 **A.4.** I am testifying on behalf of the Applicant, Angelina Solar I, LLC, in support of its
7 application filed in Case No. 18-1579-EL-BGN.

8 **Q.5. What is the purpose of your testimony?**

9 **A.5.** The purpose of my testimony is to describe the methodology of the Drain Tile
10 Assessment (“DTA”) my firm will complete on behalf of the Applicant and to summarize
11 the projected impacts of the Angelina Solar Project (“Project”) on drain tile, drainage,
12 and runoff in the area in which the Project will be located (“Project Area”).

13 **Q.6. Please describe the study that you and your firm will complete on behalf of the**
14 **Applicant.**

15 **A.6.** The DTA will include both desktop and onsite physical evaluation of the Project
16 Area to locate drain tile. Specific measures to be undertaken include evaluation of aerial
17 images, location of inlets and outlets, soil subsidence, and topography, all of which can
18 provide indications of the location of drain tile. Following these measures, physical
19 exploration allowing drain tile routes to be marked and surveyed would be used. These
20 physical measures could include:

- 21 • Using an excavator or other small piece of equipment to dig trenches perpendicular to
22 the suspected drain tile route until the pipe is exposed, where it can be marked and
23 surveyed.
- 24 • Using a T-handled steel rod during soft soil conditions to press vertically down into
25 the soil where drain tile is suspected to occur. When the rod touches a tile, the spot is
26 marked and surveyed.

- Using a maverick tile finder. A flexible rod is inserted into the drain tile at a known location. Embedded in the rod is a copper wire that sends a signal to a locator on the surface. The locator traverses the approximate drain tile route above and when a positive signal is encountered, the location is marked and surveyed.

Q.7. What is your role in completion of the DTA?

A.7. My role is to conduct and/or provide management of the various aspects of the DTA, including 1) planning, scheduling, organization, and management of desktop investigations, 2) conducting field reviews, 3) performing review and quality assurance on the study products (e.g., report, figures, tables), and 4) providing communication with the Applicant regarding the study's progress, results and Project implications.

Q.8. What activities have you undertaken to date in support of the DTA?

A.8. I visited the Project Area on April 15 and April 16, 2019 to evaluate the site and verify that the techniques described previously in my testimony would be effective in identifying the locations of drain tile, and that adequate measures could be put into place to avoid impacts to drain tile where possible, and to repair any damage if impacts do occur. Part of my visit to the Project Area included a preliminary evaluation of drainage and runoff in the Project Area.

Q.9. What was the conclusion of your site visit with respect to drain tile?

A.9. It should be possible to identify drain tile in the Project Area using the methods described previously. If advance identification is not possible, it should be possible, during construction, to identify damaged drain tile and repair it at that time. Damaged drain tile generally can be identified by the presence of water flowing out of the ground in an unexpected location. Excavating the area and following the source of the flowing water will lead to any broken pipe. The construction period for the Project should be

1 long enough for an ample number of rain events to reveal any locations in which tile was
2 damaged but not immediately discovered and repaired.

3 **Q.10. What is your overall assessment of the potential impact of the Angelina Solar**
4 **Project on drain tile?**

5 **A.10.** Many megawatts of solar energy facilities have been designed and constructed on
6 agricultural land similar to the Project throughout the Midwest where drain tile is
7 commonly used. Unknown drain tile locations can present a challenge, but one that can
8 be overcome through a well-coordinated program of research, preliminary mapping,
9 physical investigation, locating, surveying, and design. The Applicant is in the process of
10 implementing such a program to ensure that neither the Project Area itself nor adjacent
11 properties are negatively impacted by damage to existing drain tile networks.

12 **Q.11. What is your overall assessment of the potential impact of the Angelina Solar**
13 **Project on drainage and runoff?**

14 **A.11.** The Project should not have an impact on drainage, nor should it result in an
15 increase in runoff from the Project Area. Although the solar panels and some of the
16 ancillary equipment are impervious, the large gaps between panel arrays to prevent
17 shading and other open areas, combined with the vegetation surrounding and beneath
18 each panel, means that drainage and runoff characteristics should not be dissimilar from a
19 farmed field with crops growing on it. In my experience, the construction and operation
20 of similar projects to the Project has not led to drainage issues, or an increase in runoff.
21 In fact, when compared to a fallow field, I would expect the Project to have superior
22 drainage and runoff characteristics, due to the year-round vegetation maintained in and
23 around the Project Area.

1 **Q.12. Does this conclude your direct testimony?**

2 **A.12.** Yes, it does.

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CERTIFICATE OF SERVICE

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Summary: Testimony Direct Testimony of Noah Waterhouse electronically filed by Mr. MacDonald W Taylor on behalf of Angelina Solar I, LLC