Wood Duck Solar Project

Traffic Impact Study

March 27, 2023

Prepared for:

Geenex Solar

Prepared by:

Stantec

Revision	Description	Author		Quality Check		Independent Review	

This document entitled Wood Duck Solar Project was prepared by Stantec Consulting Services Inc. (“Stantec”) for the account of Geenex Solar (the “Client”). Any reliance on this document by any third party is strictly prohibited. The material in it reflects Stantec’s professional judgment in light of the scope, schedule and other limitations stated in the document and in the contract between Stantec and the Client. The opinions in the document are based on conditions and information existing at the time the document was published and do not take into account any subsequent changes. In preparing the document, Stantec did not verify information supplied to it by others. Any use which a third party makes of this document is the responsibility of such third party. Such third party agrees that Stantec shall not be responsible for costs or damages of any kind, if any, suffered by it or any other third party as a result of decisions made or actions taken based on this document.

Prepared by Callie Castro
(signature)

Callie Castro, PE, PTOE

Approved by
(signature)

Joey Lefante, PE, PTOE

Table of Contents

Executive Summary

The purpose of this study is to estimate the traffic impacts of the Wood Duck Solar Project, (the Project), proposed by Geenex Solar. The Project is to be located six (6) miles northwest of Glasgow and three (3) miles south of Park City in Barren County, Kentucky. The Project site can be generally described as along Cumberland Parkway. The Project area encompasses approximately 2,117 acres in an agricultural area. The petitioner proposes to utilize the land to establish a solar-powered electric generating facility.

Historical Average Daily Traffic (ADT) volumes were obtained from the Kentucky Transportation Cabinet (KYTC) for four (4) locations along Cumberland Parkway, State Highway 255, County Route 1339, and Oak Grove Church Road. These routes will likely be impacted the most from increased traffic volumes during the construction process. Once operational, the facility will be managed and monitored by a small number of employees which will generate only a few trips per day. Therefore, trip generation during the construction phase of the Project will likely have the greatest impact on area traffic operations. While specific details concerning construction duration and intensity are not currently known, this study has employed a sensitivity analysis to demonstrate likely construction traffic levels will not have a significant, adverse effect on peak hour traffic operations. To demonstrate this, traffic on studied roadways was increased by 25 percent. This increase is far greater than would be anticipated for the actual construction of the Project.

Two-lane highway analysis was used to evaluate State Highway 255, County Route 1339, and Oak Grove Church Road and multilane highway analysis was used to evaluate Cumberland Parkway based on methods described in the Highway Capacity Manual (HCM) and implemented within the Highway Capacity Software (HCS 7). As demonstrated in the traffic analysis, the construction period will not produce significant operational changes to existing roadways. All roadways within the Project area will continue to operate at LOS A during peak construction and operational traffic. Although no significant adverse traffic impacts are expected during Project construction or operation, using mitigation measures such as ridesharing between construction workers, using appropriate traffic controls, or allowing flexible working hours outside of peak hours could be implemented to minimize any potential for delays during the peak hours.

1.0 INTRODUCTION

The purpose of this study is to estimate the traffic impacts of the Wood Duck Solar Project, (the Project), proposed by Geenex Solar. The Project is to be located six (6) miles northwest of Glasgow and three (3) miles south of Park City in Barren County, Kentucky. The Project site can be generally described as along Cumberland Parkway. The proposed Project site is shown in red in **Figure 1**.

The Project area encompasses 2,117 acres in an agricultural area. Geenex Solar proposes to utilize the land to establish a solar-powered electric generating facility. The Project will have access points around the site with major truck deliveries coming primarily from the southeast and northwest. A construction year of 2023 and operational build year of 2033 was evaluated as part of the study.

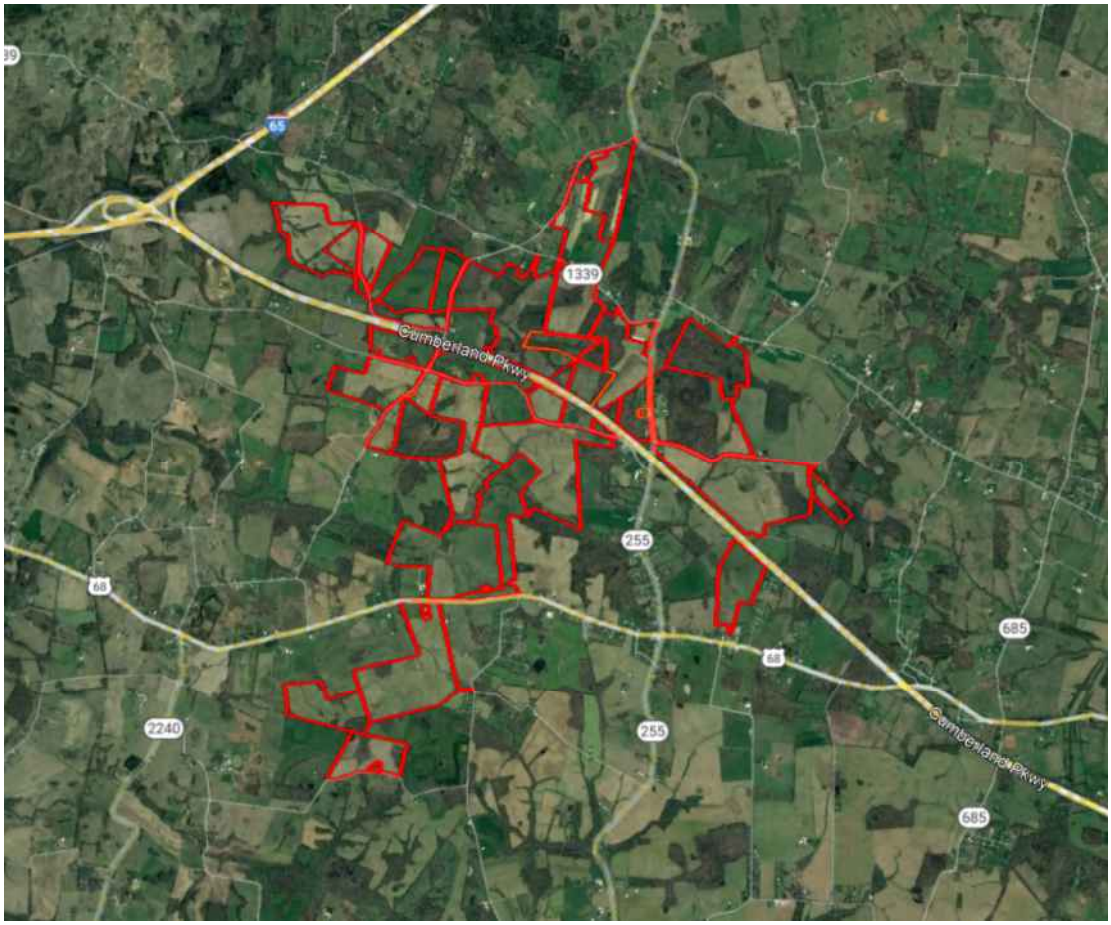


Figure 1: Project Area

1.1 PROJECT AREA ROADWAYS

Cumberland Parkway is a four-lane, divided highway with a 25-foot grassy median, 12-foot lanes, 12-foot outside shoulders, 6-foot inside shoulders and a posted speed limit of 70 mph. State Highway 255 is a two-lane, undivided highway with 10.5-foot lanes and no shoulders. County Route 1339 is a two-lane, undivided highway with 8-foot lanes and no shoulders. Oak Grove Church Road is a two-lane, undivided highway with 8-foot lanes and no shoulders. There is no available posted speed limit information for State Highway 255, County Route 1339, and Oak Grove Church Road so a 55 mph posted speed limit was assumed for each due to the rural nature of the area.

2.0 DATA COLLECTION

Historical Average Daily Traffic (ADT) volumes were obtained from the Kentucky Transportation Cabinet (KYTC) for four (4) locations listed below along Cumberland Parkway, State Highway 255, County Route 1339, and Oak Grove Church Route. These routes will likely be impacted the most from increased traffic volumes during the construction process.

- Count Station 005854 – Cumberland Parkway
- Count Station 005750 – State Highway 255
- Count Station 005828 – County Route 1339
- Count Station 114802 – Oak Grove Church Rd

Historical ADT data at Count Station 005750 on State Highway 255 was utilized to determine the area growth rate as this location included more historic count data than other locations. **Table 1** outlines the ADT volumes that were obtained from the database for each location. **Figure 2** shows the calculated historical growth rate at Count Station 005750. Based on this calculation, a growth rate of 1.2% was applied to the ADT volumes to determine the 2023 and 2033 volumes for capacity analysis.

Table 1: Historical ADT Volumes

Count Year	Count Station 005854 (Cumberland Parkway)	Count Station 005750 (SH 255)	Count Station 005828 (CR 1339)	Count Station 114802 (Oak Grove Church Rd)
2021		1,088		
2020	12,739		303	
2018		1,207		77
2017				
2015		1,069		
2012		1,005		

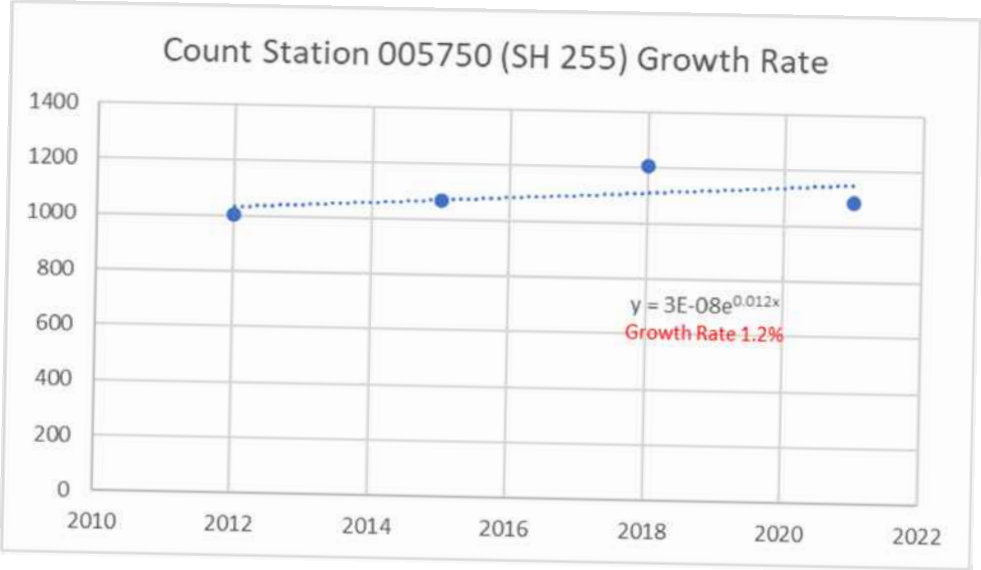


Figure 2: Count Station 005750 (SH 255) Growth Rate

Table 2 outlines the 2023 ADT and peak hour existing conditions volumes at the four (4) analysis locations. To determine the peak hour analysis volumes, a K factor was obtained from the Kentucky Transportation Cabinet (KYTC) for each analysis location to determine the amount of the daily traffic occurring in the peak hour and a 50/50 directional split in the peak hour was assumed due to the rural nature of the area.

Table 2: 2023 Existing Conditions Volumes

	Count Station 005854 (Cumberland Parkway)	Count Station 005750 (SH 255)	Count Station 005828 (CR 1339)	Count Station 114802 (Oak Grove Church Rd)
2023 ADT	13,203	1,114	314	82
2023 Peak Hour Directional Volume	574	55	20	9

3.0 PROJECT TRIP GENERATION

Once operational, the facility will be managed and monitored by a small number of employees which will generate only a few trips per day. Therefore, trip generation during the construction phase of the Project will likely have the greatest impact on area traffic operations. The trip generation analysis for the construction of the Project would generally be based on the number of workers and the associated construction and delivery truck trips expected during the construction of the Project. Construction workers will consist of laborers, equipment operators, electricians, supervisory personnel, support personnel, and construction management personnel. It is envisioned that workers will arrive/depart from passenger

vehicles and trucks daily during the AM (7:00 – 9:00 AM) and PM (3:00 – 6:00 PM) peak hours. Equipment deliveries will occur on trailers, flatbeds, or other large vehicles at various times during the day and from different inception locations. While specific details concerning construction duration and intensity are not currently known, this study has employed a sensitivity analysis to demonstrate likely construction traffic levels will not have a significant, adverse effect on peak hour traffic operations. To demonstrate this, traffic on studied roadways was increased by 25 percent during construction conditions as shown in **Table 3**. This increase is far greater than would be anticipated for the actual construction of the Project. Traffic volumes were also grown to an operational build year of 2033.

Table 3: 2023 and 2033 Peak Hour Analysis Volumes

	Count Station 005854 (Cumberland Parkway)	Count Station 005750 (SH 255)	Count Station 005828 (CR 1339)	Count Station 114802 (Oak Grove Church Rd)
2023 Peak Hour Volume - Existing Conditions	574	55	20	9
2023 Peak Hour Volume - Construction Conditions	718	69	25	11
2033 Peak Hour Volume – Build Conditions	647	62	23	10

4.0 CAPACITY ANALYSIS

Two-lane highway analysis was used to evaluate State Highway 255, County Route 1339, and Oak Grove Church Road and multilane highway analysis was used to evaluate Cumberland Parkway based on methods described in the Highway Capacity Manual (HCM) and implemented within the Highway Capacity Software (HCS 7). The results can be found in Appendix A. The analyses were used to estimate capacity and Level of Service (LOS) for given traffic and geometric conditions. LOS provides a measure of the quality of traffic flow provided by a roadway facility, expressed in terms of letter grades with LOS A representing the highest quality traffic flow and minimal delay, and LOS F representing poor traffic operations and significant delay. For rural areas, LOS C or better is generally considered to be desirable. In urban areas, LOS D or better is generally considered desirable. The two-lane highways method utilizes Percent Time Spent Following (PTSF) as the service measure for LOS. The multilane highway method utilizes Density in passenger cars per mile per lane (pc/mi/ln) as the service measure for LOS. **Table 4** outlines the capacity analysis results for the 2023 existing conditions, 2023 construction conditions, and 2033 build conditions. Complete HCS output reports are included in **Appendix A**.

Table 4: Capacity Results

Location	2023 Existing Conditions		2023 Construction Conditions		2033 Build Conditions	
	Density	LOS	Density	LOS	Density	LOS
Count Station 005854 (Cumberland Parkway)	4.6	A	5.8	A	5.2	A
	PTSF	LOS	PTSF	LOS	PTSF	LOS
Count Station 005750 (State Highway 255)	22.2	A	24.0	A	23.1	A
Count Station 005828 (County Route 1339)	17.5	A	18.2	A	17.9	A
Count Station 114802 (Oak Grove Church Rd)	15.9	A	16.3	A	16.0	A

5.0 CONCLUSIONS

As demonstrated in the traffic analysis, the construction period will not produce significant operational changes to existing roadways. All roadways within the Project area will continue to operate at LOS A during peak construction traffic. Once operational, the facility will be managed and monitored by a small number of employees which will generate only a few trips per day. This additional volume of daily traffic is considered negligible, and the operational phase of the Project will have no measurable impact on the traffic and/or transportation infrastructure. Although no significant adverse traffic impacts are expected during Project construction or operation, using mitigation measures such as ridesharing between construction workers, using appropriate traffic controls, or allowing flexible working hours outside of peak hours could be implemented to minimize any potential for delays during the peak hours.

Appendix A CAPACITY RESULTS

HCS7 Multilane Highway Report

Project Information

Analyst	Stantec	Date	3/21/2023
Agency		Analysis Year	2023
Jurisdiction		Time Period Analyzed	Existing
Project Description	Cumberland Parkway		

Direction 1 Geometric Data

Direction 1	Eastbound		
Number of Lanes (N), ln	2	Terrain Type	Level
Segment Length (L), ft	-	Percent Grade, %	-
Measured or Base Free-Flow Speed	Base	Grade Length, mi	-
Base Free-Flow Speed (BFFS), mi/h	70.0	Total Ramp Density (TRD), ramps/mi	0.00
Lane Width, ft	12	Left-Side Lateral Clearance (LC_R), ft	6
Median Type	Divided	Total Lateral Clearance (TLC), ft	12.00
Access Point Density, pts/mi	1.0	Free-Flow Speed (FFS), mi/h	69.8

Direction 1 Adjustment Factors

Driver Population	All Familiar	Final Speed Adjustment Factor (SAF)	1.000
Driver Population SAF	1.000	Final Capacity Adjustment Factor (CAF)	1.000
Driver Population CAF	1.000		

Direction 1 Demand and Capacity

Volume(V) veh/h	574	Heavy Vehicle Adjustment Factor (f_{HV})	0.943
Peak Hour Factor	0.94	Flow Rate (V_p), pc/h/ln	324
Total Trucks, %	6.00	Capacity (c), pc/h/ln	2300
Single-Unit Trucks (SUT), %	-	Adjusted Capacity (c_{adj}), pc/h/ln	2300
Tractor-Trailers (TT), %	-	Volume-to-Capacity Ratio (v/c)	0.14

Direction 1 Speed and Density

Lane Width Adjustment (f_{LW})	0.0	Average Speed (S), mi/h	69.8
Total Lateral Clearance Adj. (f_{LLC})	0.0	Density (D), pc/mi/ln	4.6
Median Type Adjustment (f_M)	0.0	Level of Service (LOS)	A
Access Point Density Adjustment (f_A)	0.3		

Direction 1 Bicycle LOS

Flow Rate in Outside Lane (v_{OL}),veh/h	305	Effective Speed Factor (S_t)	4.62
Effective Width of Volume (W_v), ft	18	Bicyle LOS Score (BLOS)	3.65
Average Effective Width (W_e), ft	24	Bicycle Level of Service (LOS)	D

HCS7 Multilane Highway Report

Project Information

Analyst	Stantec	Date	3/21/2023
Agency		Analysis Year	2023
Jurisdiction		Time Period Analyzed	Existing
Project Description	Cumberland Parkway		

Direction 2 Geometric Data

Direction 2	Westbound		
Number of Lanes (N), ln	2	Terrain Type	Level
Segment Length (L), ft	-	Percent Grade, %	-
Measured or Base Free-Flow Speed	Base	Grade Length, mi	-
Base Free-Flow Speed (BFFS), mi/h	70.0	Total Ramp Density (TRD), ramps/mi	0.00
Lane Width, ft	12	Left-Side Lateral Clearance (LC_R), ft	6
Median Type	Divided	Total Lateral Clearance (TLC), ft	12.00
Access Point Density, pts/mi	1.0	Free-Flow Speed (FFS), mi/h	69.8

Direction 2 Adjustment Factors

Driver Population	All Familiar	Final Speed Adjustment Factor (SAF)	1.000
Driver Population SAF	1.000	Final Capacity Adjustment Factor (CAF)	1.000
Driver Population CAF	1.000		

Direction 2 Demand and Capacity

Volume(V) veh/h	574	Heavy Vehicle Adjustment Factor (f_{HV})	0.943
Peak Hour Factor	0.94	Flow Rate (V_p), pc/h/ln	324
Total Trucks, %	6.00	Capacity (c), pc/h/ln	2300
Single-Unit Trucks (SUT), %	-	Adjusted Capacity (c_{adj}), pc/h/ln	2300
Tractor-Trailers (TT), %	-	Volume-to-Capacity Ratio (v/c)	0.14

Direction 2 Speed and Density

Lane Width Adjustment (f_{LW})	0.0	Average Speed (S), mi/h	69.8
Total Lateral Clearance Adj. (f_{LLC})	0.0	Density (D), pc/mi/ln	4.6
Median Type Adjustment (f_M)	0.0	Level of Service (LOS)	A
Access Point Density Adjustment (f_A)	0.3		

Direction 2 Bicycle LOS

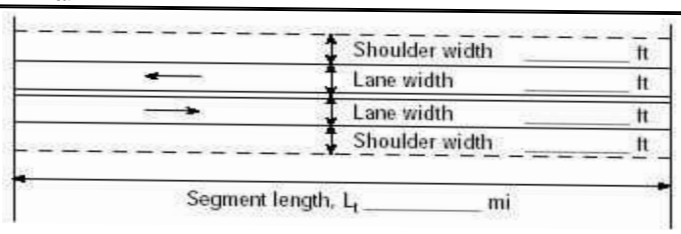
Flow Rate in Outside Lane (v_{OL}),veh/h	305	Effective Speed Factor (S_t)	4.62
Effective Width of Volume (W_v), ft	18	Bicyle LOS Score (BLOS)	3.65
Average Effective Width (W_e), ft	24	Bicycle Level of Service (LOS)	D

DIRECTIONAL TWO-LANE HIGHWAY SEGMENT WORKSHEET

General Information		***Site Information***	
Analyst	*Stantec*	Highway / Direction of Travel	*SH 255*
Agency or Company		From/To	
Date Performed	*3/14/2023*	Jurisdiction	
Analysis Time Period	*Peak Hour*	Analysis Year	*2023*

Project Description: *Existing*

Input Data



☐ Class I highway ☑ Class II highway ☐ Class III highway

Terrain ☑ Level ☐ Rolling

Grade Length mi Up/down

Peak-hour factor, PHF *0.88*

No-passing zone *20%*

% Trucks and Buses , P_T *10 %*

% Recreational vehicles, P_R *4%*

Access points *mi* *10*/mi

Analysis direction vol., V_d *55*veh/h

Opposing direction vol., V_o *55*veh/h

Shoulder width ft *0.0*

Lane Width ft *10.5*

Segment Length mi *2.0*

Average Travel Speed

	Analysis Direction (d)	Opposing Direction (o)
Passenger-car equivalents for trucks, E_T (Exhibit 15-11 or 15-12)	*1.9*	*1.9*
Passenger-car equivalents for RVs, E_R (Exhibit 15-11 or 15-13)	*1.0*	*1.0*
Heavy-vehicle adjustment factor, $f_{HV,ATS}=1/(1+P_T(E_T-1)+P_R(E_R-1))$	*0.917*	*0.917*
Grade adjustment factor[1], $f_{g,ATS}$ (Exhibit 15-9)	*1.00*	*1.00*
Demand flow rate[2], v_i (pc/h) $v_i=V_i/(PHF*f_{g,ATS}*f_{HV,ATS})$	*68*	*68*

Free-Flow Speed from Field Measurement		**Estimated Free-Flow Speed**	
Mean speed of sample[3], S_{FM}		Base free-flow speed[4], BFFS	*55.0 mi/h*
Total demand flow rate, both directions, *v*		Adj. for lane and shoulder width,[4] f_{LS}(Exhibit 15-7)	*5.3 mi/h*
Free-flow speed, $FFS=S_{FM}+0.00776(v/f_{HV,ATS})$		Adj. for access points[4], f_A (Exhibit 15-8)	*10.0 mi/h*
Adj. for no-passing zones, $f_{np,ATS}$ (Exhibit 15-15)	*0.1 mi/h*	Free-flow speed, FFS (FSS=BFFS-f_{LS}-f_A)	*39.7 mi/h*
		Average travel speed, $ATS_d=FFS-0.00776(v_{d,ATS}+v_{o,ATS})-f_{np,ATS}$	*38.5 mi/h*
		Percent free flow speed, PFFS	*97.1 %*

Percent Time-Spent-Following

	Analysis Direction (d)	Opposing Direction (o)
Passenger-car equivalents for trucks, E_T(Exhibit 15-18 or 15-19)	*1.1*	*1.1*
Passenger-car equivalents for RVs, E_R (Exhibit 15-18 or 15-19)	*1.0*	*1.0*
Heavy-vehicle adjustment factor, $f_{HV}=1/(1+P_T(E_T-1)+P_R(E_R-1))$	*0.990*	*0.990*
Grade adjustment factor[1], $f_{g,PTSF}$ (Exhibit 15-16 or Ex 15-17)	*1.00*	*1.00*
Directional flow rate[2], v_i(pc/h) $v_i=V_i/(PHF*f_{HV,PTSF}*f_{g,PTSF})$	*63*	*63*
Base percent time-spent-following[4], $BPTSF_d(\%)=100(1-e^{av_d^b})$	*7.6*	
Adj. for no-passing zone, $f_{np,PTSF}$ (Exhibit 15-21)	*29.2*	
Percent time-spent-following, $PTSF_d(\%)=BPTSF_d+f_{np,PTSF}*(v_{d,PTSF}/v_{d,PTSF}+v_{o,PTSF})$	*22.2*	

Level of Service and Other Performance Measures

Level of service, LOS (Exhibit 15-3)	*A*
Volume to capacity ratio, *v/c*	*0.04*

Capacity, $C_{d,ATS}$ (Equation 15-12) veh/h	*1700*
Capacity, $C_{d,PTSF}$ (Equation 15-13) veh/h	*1700*
Percent Free-Flow Speed $PFFS_d$(Equation 15-11 - Class III only)	*97.1*
Bicycle Level of Service	
Directional demand flow rate in outside lane, v_{OL} (Eq. 15-24) veh/h	*62.5*
Effective width, Wv (Eq. 15-29) ft	*18.11*
Effective speed factor, S_t (Eq. 15-30)	*4.79*
Bicycle level of service score, BLOS (Eq. 15-31)	*5.98*
Bicycle level of service (Exhibit 15-4)	*F*

Notes

1. Note that the adjustment factor for level terrain is 1.00,as level terrain is one of the base conditions. For the purpose of grade adjustment, specific downgrade segments are treated as level terrain.
2. If v_i(v_d or v_o) >=1,700 pc/h, terminate analysis--the LOS is F.
3. For the analysis direction only and for v>200 veh/h.
4. For the analysis direction only
5. Exhibit 15-20 provides coefficients a and b for Equation 15-10.
6. Use alternative Exhibit 15-14 if some trucks operate at crawl speeds on a specific downgrade.

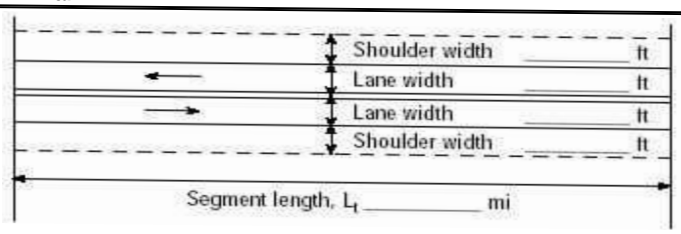
 HCS™ TwoLane Version 7.7 Generated: 3/14/2023 10:55 AM

DIRECTIONAL TWO-LANE HIGHWAY SEGMENT WORKSHEET

General Information		Site Information	
Analyst	*Stantec*	Highway / Direction of Travel	*CR 1339*
Agency or Company		From/To	
Date Performed	*3/14/2023*	Jurisdiction	
Analysis Time Period	*Peak Hour*	Analysis Year	*2023*

Project Description: *Existing*

Input Data



☐ Class I highway ☑ Class II highway ☐ Class III highway

Terrain ☑ Level ☐ Rolling

Grade Length mi Up/down

Peak-hour factor, PHF *0.88*

No-passing zone *20%*

% Trucks and Buses , P_T *10 %*

% Recreational vehicles, P_R *4%*

Access points *mi* *10*/mi

Analysis direction vol., V_d *20*veh/h

Opposing direction vol., V_o *20*veh/h

Shoulder width ft *0.0*

Lane Width ft *9.0*

Segment Length mi *2.0*

Average Travel Speed

	Analysis Direction (d)	Opposing Direction (o)
Passenger-car equivalents for trucks, E_T (Exhibit 15-11 or 15-12)	*1.9*	*1.9*
Passenger-car equivalents for RVs, E_R (Exhibit 15-11 or 15-13)	*1.0*	*1.0*
Heavy-vehicle adjustment factor, $f_{HV,ATS}=1/(1+P_T(E_T-1)+P_R(E_R-1))$	*0.917*	*0.917*
Grade adjustment factor[1], $f_{g,ATS}$ (Exhibit 15-9)	*1.00*	*1.00*
Demand flow rate[2], v_i (pc/h) $v_i=V_i/(PHF*f_{g,ATS}*f_{HV,ATS})$	*25*	*25*

Free-Flow Speed from Field Measurement		Estimated Free-Flow Speed	
Mean speed of sample[3], S_{FM}		Base free-flow speed[4], BFFS	*55.0 mi/h*
Total demand flow rate, both directions, *v*		Adj. for lane and shoulder width,[4] f_{LS}(Exhibit 15-7)	*6.4 mi/h*
Free-flow speed, $FFS=S_{FM}+0.00776(v/f_{HV,ATS})$		Adj. for access points[4], f_A (Exhibit 15-8)	*10.0 mi/h*
Adj. for no-passing zones, $f_{np,ATS}$ (Exhibit 15-15)	*0.1 mi/h*	Free-flow speed, FFS (FSS=BFFS-f_{LS}-f_A)	*38.6 mi/h*
		Average travel speed, $ATS_d=FFS-0.00776(v_{d,ATS}+v_{o,ATS})-f_{np,ATS}$	*38.1 mi/h*
		Percent free flow speed, PFFS	*98.7 %*

Percent Time-Spent-Following

	Analysis Direction (d)	Opposing Direction (o)
Passenger-car equivalents for trucks, E_T(Exhibit 15-18 or 15-19)	*1.1*	*1.1*
Passenger-car equivalents for RVs, E_R (Exhibit 15-18 or 15-19)	*1.0*	*1.0*
Heavy-vehicle adjustment factor, $f_{HV}=1/(1+P_T(E_T-1)+P_R(E_R-1))$	*0.990*	*0.990*
Grade adjustment factor[1], $f_{g,PTSF}$ (Exhibit 15-16 or Ex 15-17)	*1.00*	*1.00*
Directional flow rate[2], v_i(pc/h) $v_i=V_i/(PHF*f_{HV,PTSF}*f_{g,PTSF})$	*23*	*23*
Base percent time-spent-following[4], $BPTSF_d(\%)=100(1-e^{av_d^b})$	*2.9*	
Adj. for no-passing zone, $f_{np,PTSF}$ (Exhibit 15-21)	*29.2*	
Percent time-spent-following, $PTSF_d(\%)=BPTSF_d+f_{np,PTSF}*(v_{d,PTSF}/v_{d,PTSF}+v_{o,PTSF})$	*17.5*	

Level of Service and Other Performance Measures

Level of service, LOS (Exhibit 15-3)	*A*
Volume to capacity ratio, *v/c*	*0.01*

Capacity, $C_{d,ATS}$ (Equation 15-12) veh/h	*1700*
Capacity, $C_{d,PTSF}$ (Equation 15-13) veh/h	*1700*
Percent Free-Flow Speed $PFFS_d$(Equation 15-11 - Class III only)	*98.7*
Bicycle Level of Service	
Directional demand flow rate in outside lane, v_{OL} (Eq. 15-24) veh/h	*22.7*
Effective width, Wv (Eq. 15-29) ft	*17.10*
Effective speed factor, S_t (Eq. 15-30)	*4.79*
Bicycle level of service score, BLOS (Eq. 15-31)	*5.65*
Bicycle level of service (Exhibit 15-4)	*F*
Notes	
1. Note that the adjustment factor for level terrain is 1.00,as level terrain is one of the base conditions. For the purpose of grade adjustment, specific downgrade segments are treated as level terrain. 2. If v_i(v_d or v_o) >=1,700 pc/h, terminate analysis--the LOS is F. 3. For the analysis direction only and for v>200 veh/h. 4. For the analysis direction only 5. Exhibit 15-20 provides coefficients a and b for Equation 15-10. 6. Use alternative Exhibit 15-14 if some trucks operate at crawl speeds on a specific downgrade.	

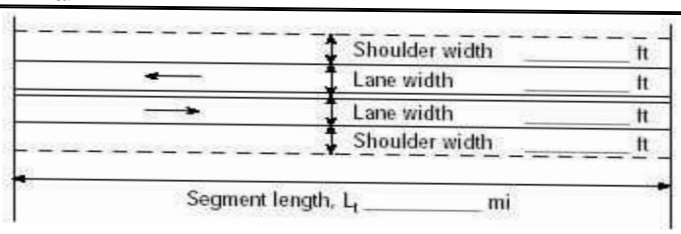
 HCS™ TwoLane Version 7.7 Generated: 3/14/2023 10:59 AM

DIRECTIONAL TWO-LANE HIGHWAY SEGMENT WORKSHEET

General Information		Site Information	
Analyst	*Stantec*	Highway / Direction of Travel	*Oak Grove Church Road*
Agency or Company		From/To	
Date Performed	*3/14/2023*	Jurisdiction	
Analysis Time Period	*Peak Hour*	Analysis Year	*2023*

Project Description: *Existing*

Input Data



☐ Class I highway ☑ Class II highway ☐ Class III highway

Terrain ☑ Level ☐ Rolling

Grade Length mi Up/down

Peak-hour factor, PHF *0.88*

No-passing zone *20%*

% Trucks and Buses , P_T *10 %*

% Recreational vehicles, P_R *4%*

Access points *mi* *10*/mi

Analysis direction vol., V_d *9*veh/h

Opposing direction vol., V_o *9*veh/h

Shoulder width ft *0.0*

Lane Width ft *9.0*

Segment Length mi *2.0*

Average Travel Speed

	Analysis Direction (d)	Opposing Direction (o)
Passenger-car equivalents for trucks, E_T (Exhibit 15-11 or 15-12)	*1.9*	*1.9*
Passenger-car equivalents for RVs, E_R (Exhibit 15-11 or 15-13)	*1.0*	*1.0*
Heavy-vehicle adjustment factor, $f_{HV,ATS}=1/(1+P_T(E_T-1)+P_R(E_R-1))$	*0.917*	*0.917*
Grade adjustment factor[1], $f_{g,ATS}$ (Exhibit 15-9)	*1.00*	*1.00*
Demand flow rate[2], v_i (pc/h) $v_i=V_i/(PHF*f_{g,ATS}*f_{HV,ATS})$	*11*	*11*

Free-Flow Speed from Field Measurement		Estimated Free-Flow Speed	
Mean speed of sample[3], S_{FM}		Base free-flow speed[4], BFFS	*55.0 mi/h*
Total demand flow rate, both directions, *v*		Adj. for lane and shoulder width,[4] f_{LS}(Exhibit 15-7)	*6.4 mi/h*
Free-flow speed, $FFS=S_{FM}+0.00776(v/f_{HV,ATS})$		Adj. for access points[4], f_A (Exhibit 15-8)	*10.0 mi/h*
Adj. for no-passing zones, $f_{np,ATS}$ (Exhibit 15-15)	*0.1 mi/h*	Free-flow speed, FFS (FSS=BFFS-f_{LS}-f_A)	*38.6 mi/h*
		Average travel speed, $ATS_d=FFS-0.00776(v_{d,ATS}+v_{o,ATS})-f_{np,ATS}$	*38.3 mi/h*
		Percent free flow speed, PFFS	*99.3 %*

Percent Time-Spent-Following

	Analysis Direction (d)	Opposing Direction (o)
Passenger-car equivalents for trucks, E_T(Exhibit 15-18 or 15-19)	*1.1*	*1.1*
Passenger-car equivalents for RVs, E_R (Exhibit 15-18 or 15-19)	*1.0*	*1.0*
Heavy-vehicle adjustment factor, $f_{HV}=1/(1+P_T(E_T-1)+P_R(E_R-1))$	*0.990*	*0.990*
Grade adjustment factor[1], $f_{g,PTSF}$ (Exhibit 15-16 or Ex 15-17)	*1.00*	*1.00*
Directional flow rate[2], v_i(pc/h) $v_i=V_i/(PHF*f_{HV,PTSF}*f_{g,PTSF})$	*10*	*10*
Base percent time-spent-following[4], $BPTSF_d(\%)=100(1-e^{av_d^b})$	*1.3*	
Adj. for no-passing zone, $f_{np,PTSF}$ (Exhibit 15-21)	*29.2*	
Percent time-spent-following, $PTSF_d(\%)=BPTSF_d+f_{np,PTSF}*(v_{d,PTSF}/v_{d,PTSF}+v_{o,PTSF})$	*15.9*	

Level of Service and Other Performance Measures

Level of service, LOS (Exhibit 15-3)	*A*
Volume to capacity ratio, *v/c*	*0.01*

Capacity, $C_{d,ATS}$ (Equation 15-12) veh/h	*1700*
Capacity, $C_{d,PTSF}$ (Equation 15-13) veh/h	*1700*
Percent Free-Flow Speed $PFFS_d$(Equation 15-11 - Class III only)	*99.3*
Bicycle Level of Service	
Directional demand flow rate in outside lane, v_{OL} (Eq. 15-24) veh/h	*10.2*
Effective width, Wv (Eq. 15-29) ft	*17.59*
Effective speed factor, S_t (Eq. 15-30)	*4.79*
Bicycle level of service score, BLOS (Eq. 15-31)	*5.14*
Bicycle level of service (Exhibit 15-4)	*E*
Notes	
1. Note that the adjustment factor for level terrain is 1.00,as level terrain is one of the base conditions. For the purpose of grade adjustment, specific downgrade segments are treated as level terrain. 2. If v_i(v_d or v_o) >=1,700 pc/h, terminate analysis--the LOS is F. 3. For the analysis direction only and for v>200 veh/h. 4. For the analysis direction only 5. Exhibit 15-20 provides coefficients a and b for Equation 15-10. 6. Use alternative Exhibit 15-14 if some trucks operate at crawl speeds on a specific downgrade.	

 HCS™ TwoLane Version 7.7 Generated: 3/14/2023 11:17 AM

HCS7 Multilane Highway Report

Project Information

Analyst	Stantec	Date	3/21/2023
Agency		Analysis Year	2023
Jurisdiction		Time Period Analyzed	Construction
Project Description	Cumberland Parkway		

Direction 1 Geometric Data

Direction 1	Eastbound		
Number of Lanes (N), ln	2	Terrain Type	Level
Segment Length (L), ft	-	Percent Grade, %	-
Measured or Base Free-Flow Speed	Base	Grade Length, mi	-
Base Free-Flow Speed (BFFS), mi/h	70.0	Total Ramp Density (TRD), ramps/mi	0.00
Lane Width, ft	12	Left-Side Lateral Clearance (LCR), ft	6
Median Type	Divided	Total Lateral Clearance (TLC), ft	12.00
Access Point Density, pts/mi	1.0	Free-Flow Speed (FFS), mi/h	69.8

Direction 1 Adjustment Factors

Driver Population	All Familiar	Final Speed Adjustment Factor (SAF)	1.000
Driver Population SAF	1.000	Final Capacity Adjustment Factor (CAF)	1.000
Driver Population CAF	1.000		

Direction 1 Demand and Capacity

Volume(V) veh/h	718	Heavy Vehicle Adjustment Factor (f_{HV})	0.943
Peak Hour Factor	0.94	Flow Rate (V_p), pc/h/ln	405
Total Trucks, %	6.00	Capacity (c), pc/h/ln	2300
Single-Unit Trucks (SUT), %	-	Adjusted Capacity (c_{adj}), pc/h/ln	2300
Tractor-Trailers (TT), %	-	Volume-to-Capacity Ratio (v/c)	0.18

Direction 1 Speed and Density

Lane Width Adjustment (f_{LW})	0.0	Average Speed (S), mi/h	69.8
Total Lateral Clearance Adj. (f_{LLC})	0.0	Density (D), pc/mi/ln	5.8
Median Type Adjustment (f_M)	0.0	Level of Service (LOS)	A
Access Point Density Adjustment (f_A)	0.3		

Direction 1 Bicycle LOS

Flow Rate in Outside Lane (v_{OL}),veh/h	382	Effective Speed Factor (S_t)	4.62
Effective Width of Volume (W_v), ft	18	Bicyle LOS Score (BLOS)	3.77
Average Effective Width (W_e), ft	24	Bicycle Level of Service (LOS)	D

HCS7 Multilane Highway Report

Project Information

Analyst	Stantec	Date	3/21/2023
Agency		Analysis Year	2023
Jurisdiction		Time Period Analyzed	Construction
Project Description	Cumberland Parkway		

Direction 2 Geometric Data

Direction 2	Westbound		
Number of Lanes (N), ln	2	Terrain Type	Level
Segment Length (L), ft	-	Percent Grade, %	-
Measured or Base Free-Flow Speed	Base	Grade Length, mi	-
Base Free-Flow Speed (BFFS), mi/h	70.0	Total Ramp Density (TRD), ramps/mi	0.00
Lane Width, ft	12	Left-Side Lateral Clearance (LCR), ft	6
Median Type	Divided	Total Lateral Clearance (TLC), ft	12.00
Access Point Density, pts/mi	1.0	Free-Flow Speed (FFS), mi/h	69.8

Direction 2 Adjustment Factors

Driver Population	All Familiar	Final Speed Adjustment Factor (SAF)	1.000
Driver Population SAF	1.000	Final Capacity Adjustment Factor (CAF)	1.000
Driver Population CAF	1.000		

Direction 2 Demand and Capacity

Volume(V) veh/h	718	Heavy Vehicle Adjustment Factor (fHV)	0.943
Peak Hour Factor	0.94	Flow Rate (Vp), pc/h/ln	405
Total Trucks, %	6.00	Capacity (c), pc/h/ln	2300
Single-Unit Trucks (SUT), %	-	Adjusted Capacity (cadj), pc/h/ln	2300
Tractor-Trailers (TT), %	-	Volume-to-Capacity Ratio (v/c)	0.18

Direction 2 Speed and Density

Lane Width Adjustment (fLW)	0.0	Average Speed (S), mi/h	69.8
Total Lateral Clearance Adj. (fLLC)	0.0	Density (D), pc/mi/ln	5.8
Median Type Adjustment (fM)	0.0	Level of Service (LOS)	A
Access Point Density Adjustment (fA)	0.3		

Direction 2 Bicycle LOS

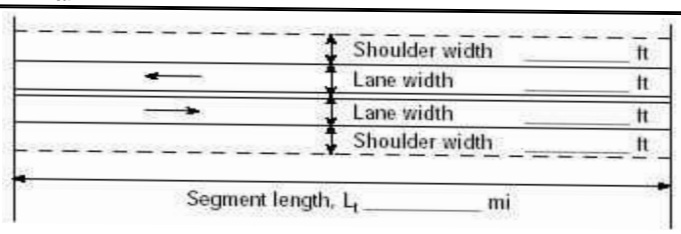
Flow Rate in Outside Lane (vOL),veh/h	382	Effective Speed Factor (St)	4.62
Effective Width of Volume (Wv), ft	18	Bicyle LOS Score (BLOS)	3.77
Average Effective Width (We), ft	24	Bicycle Level of Service (LOS)	D

DIRECTIONAL TWO-LANE HIGHWAY SEGMENT WORKSHEET

General Information		Site Information	
Analyst	*Stantec*	Highway / Direction of Travel	*SH 255*
Agency or Company		From/To	
Date Performed	*3/14/2023*	Jurisdiction	
Analysis Time Period	*Peak Hour*	Analysis Year	*2023*

Project Description: *Construction*

Input Data



☐ Class I highway ☑ Class II highway ☐ Class III highway

Terrain ☑ Level ☐ Rolling

Grade Length mi Up/down

Peak-hour factor, PHF *0.88*

No-passing zone *20%*

Analysis direction vol., V_d *69* veh/h

% Trucks and Buses , P_T *10* %

Opposing direction vol., V_o *69* veh/h

% Recreational vehicles, P_R *4%*

Shoulder width ft *0.0*

Access points *mi* *10*/mi

Lane Width ft *10.5*

Segment Length mi *2.0*

Average Travel Speed

	Analysis Direction (d)	Opposing Direction (o)
Passenger-car equivalents for trucks, E_T (Exhibit 15-11 or 15-12)	*1.9*	*1.9*
Passenger-car equivalents for RVs, E_R (Exhibit 15-11 or 15-13)	*1.0*	*1.0*
Heavy-vehicle adjustment factor, $f_{HV,ATS}=1/(1+P_T(E_T-1)+P_R(E_R-1))$	*0.917*	*0.917*
Grade adjustment factor[1], $f_{g,ATS}$ (Exhibit 15-9)	*1.00*	*1.00*
Demand flow rate[2], v_i (pc/h) $v_i=V_i/(PHF*f_{g,ATS}*f_{HV,ATS})$	*86*	*86*

Free-Flow Speed from Field Measurement		Estimated Free-Flow Speed	
Mean speed of sample[3], S_{FM}		Base free-flow speed[4], BFFS	*55.0 mi/h*
Total demand flow rate, both directions, *v*		Adj. for lane and shoulder width,[4] f_{LS}(Exhibit 15-7)	*5.3 mi/h*
Free-flow speed, $FFS=S_{FM}+0.00776(v/f_{HV,ATS})$		Adj. for access points[4], f_A (Exhibit 15-8)	*10.0 mi/h*
Adj. for no-passing zones, $f_{np,ATS}$ (Exhibit 15-15)	*0.1 mi/h*	Free-flow speed, FFS (FSS=BFFS-f_{LS}-f_A)	*39.7 mi/h*
		Average travel speed, $ATS_d=FFS-0.00776(v_{d,ATS}+v_{o,ATS})-f_{np,ATS}$	*38.3 mi/h*
		Percent free flow speed, PFFS	*96.4 %*

Percent Time-Spent-Following

	Analysis Direction (d)	Opposing Direction (o)
Passenger-car equivalents for trucks, E_T(Exhibit 15-18 or 15-19)	*1.1*	*1.1*
Passenger-car equivalents for RVs, E_R (Exhibit 15-18 or 15-19)	*1.0*	*1.0*
Heavy-vehicle adjustment factor, $f_{HV}=1/(1+P_T(E_T-1)+P_R(E_R-1))$	*0.990*	*0.990*
Grade adjustment factor[1], $f_{g,PTSF}$ (Exhibit 15-16 or Ex 15-17)	*1.00*	*1.00*
Directional flow rate[2], v_i(pc/h) $v_i=V_i/(PHF*f_{HV,PTSF}*f_{g,PTSF})$	*79*	*79*
Base percent time-spent-following[4], $BPTSF_d(\%)=100(1-e^{av_d^b})$	*9.4*	
Adj. for no-passing zone, $f_{np,PTSF}$ (Exhibit 15-21)	*29.2*	
Percent time-spent-following, $PTSF_d(\%)=BPTSF_d+f_{np,PTSF}*(v_{d,PTSF}/v_{d,PTSF}+v_{o,PTSF})$	*24.0*	

Level of Service and Other Performance Measures

Level of service, LOS (Exhibit 15-3)	*A*
Volume to capacity ratio, *v/c*	*0.05*

Capacity, $C_{d,ATS}$ (Equation 15-12) veh/h	*1700*
Capacity, $C_{d,PTSF}$ (Equation 15-13) veh/h	*1700*
Percent Free-Flow Speed $PFFS_d$(Equation 15-11 - Class III only)	*96.4*
Bicycle Level of Service	
Directional demand flow rate in outside lane, v_{OL} (Eq. 15-24) veh/h	*78.4*
Effective width, Wv (Eq. 15-29) ft	*17.38*
Effective speed factor, S_t (Eq. 15-30)	*4.79*
Bicycle level of service score, BLOS (Eq. 15-31)	*6.22*
Bicycle level of service (Exhibit 15-4)	*F*
Notes	
1. Note that the adjustment factor for level terrain is 1.00,as level terrain is one of the base conditions. For the purpose of grade adjustment, specific downgrade segments are treated as level terrain. 2. If v_i(v_d or v_o) >=1,700 pc/h, terminate analysis--the LOS is F. 3. For the analysis direction only and for v>200 veh/h. 4. For the analysis direction only 5. Exhibit 15-20 provides coefficients a and b for Equation 15-10. 6. Use alternative Exhibit 15-14 if some trucks operate at crawl speeds on a specific downgrade.	

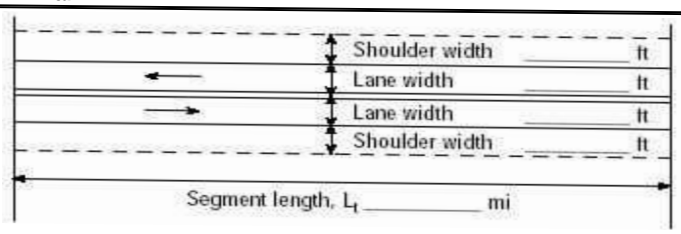
 HCS™ TwoLane Version 7.7 Generated: 3/14/2023 10:56 AM

DIRECTIONAL TWO-LANE HIGHWAY SEGMENT WORKSHEET

General Information		Site Information	
Analyst	*Stantec*	Highway / Direction of Travel	*CR 1339*
Agency or Company		From/To	
Date Performed	*3/14/2023*	Jurisdiction	
Analysis Time Period	*Peak Hour*	Analysis Year	*2023*

Project Description: *Construction*

Input Data



☐ Class I highway ☑ Class II highway ☐ Class III highway

Terrain ☑ Level ☐ Rolling

Analysis direction vol., V_d	*25*veh/h	Grade Length	mi Up/down
Opposing direction vol., V_o	*25*veh/h	Peak-hour factor, PHF	*0.88*
Shoulder width ft	*0.0*	No-passing zone	*20%*
Lane Width ft	*9.0*	% Trucks and Buses , P_T	*10 %*
Segment Length mi	*2.0*	% Recreational vehicles, P_R	*4%*
		Access points *mi*	*10*/mi

Average Travel Speed

	Analysis Direction (d)	Opposing Direction (o)
Passenger-car equivalents for trucks, E_T (Exhibit 15-11 or 15-12)	*1.9*	*1.9*
Passenger-car equivalents for RVs, E_R (Exhibit 15-11 or 15-13)	*1.0*	*1.0*
Heavy-vehicle adjustment factor, $f_{HV,ATS}=1/(1+P_T(E_T-1)+P_R(E_R-1))$	*0.917*	*0.917*
Grade adjustment factor[1], $f_{g,ATS}$ (Exhibit 15-9)	*1.00*	*1.00*
Demand flow rate[2], v_i (pc/h) $v_i=V_i/(PHF*f_{g,ATS}*f_{HV,ATS})$	*31*	*31*

Free-Flow Speed from Field Measurement		Estimated Free-Flow Speed	
Mean speed of sample[3], S_{FM}		Base free-flow speed[4], BFFS	*55.0 mi/h*
Total demand flow rate, both directions, *v*		Adj. for lane and shoulder width,[4] f_{LS}(Exhibit 15-7)	*6.4 mi/h*
Free-flow speed, $FFS=S_{FM}+0.00776(v/f_{HV,ATS})$		Adj. for access points[4], f_A (Exhibit 15-8)	*10.0 mi/h*
Adj. for no-passing zones, $f_{np,ATS}$ (Exhibit 15-15)	*0.1 mi/h*	Free-flow speed, FFS (FSS=BFFS-f_{LS}-f_A)	*38.6 mi/h*
		Average travel speed, $ATS_d=FFS-0.00776(v_{d,ATS}+v_{o,ATS})-f_{np,ATS}$	*38.0 mi/h*
		Percent free flow speed, PFFS	*98.5 %*

Percent Time-Spent-Following

	Analysis Direction (d)	Opposing Direction (o)
Passenger-car equivalents for trucks, E_T(Exhibit 15-18 or 15-19)	*1.1*	*1.1*
Passenger-car equivalents for RVs, E_R (Exhibit 15-18 or 15-19)	*1.0*	*1.0*
Heavy-vehicle adjustment factor, $f_{HV}=1/(1+P_T(E_T-1)+P_R(E_R-1))$	*0.990*	*0.990*
Grade adjustment factor[1], $f_{g,PTSF}$ (Exhibit 15-16 or Ex 15-17)	*1.00*	*1.00*
Directional flow rate[2], v_i(pc/h) $v_i=V_i/(PHF*f_{HV,PTSF}*f_{g,PTSF})$	*29*	*29*
Base percent time-spent-following[4], $BPTSF_d(\%)=100(1-e^{av_d^b})$	*3.6*	
Adj. for no-passing zone, $f_{np,PTSF}$ (Exhibit 15-21)	*29.2*	
Percent time-spent-following, $PTSF_d(\%)=BPTSF_d+f_{np,PTSF}*(v_{d,PTSF}/v_{d,PTSF}+v_{o,PTSF})$	*18.2*	

Level of Service and Other Performance Measures

Level of service, LOS (Exhibit 15-3)	*A*
Volume to capacity ratio, *v/c*	*0.02*

Capacity, $C_{d,ATS}$ (Equation 15-12) veh/h	*1700*
Capacity, $C_{d,PTSF}$ (Equation 15-13) veh/h	*1700*
Percent Free-Flow Speed $PFFS_d$(Equation 15-11 - Class III only)	*98.5*
Bicycle Level of Service	
Directional demand flow rate in outside lane, v_{OL} (Eq. 15-24) veh/h	*28.4*
Effective width, Wv (Eq. 15-29) ft	*16.88*
Effective speed factor, S_t (Eq. 15-30)	*4.79*
Bicycle level of service score, BLOS (Eq. 15-31)	*5.79*
Bicycle level of service (Exhibit 15-4)	*F*
Notes	
1. Note that the adjustment factor for level terrain is 1.00,as level terrain is one of the base conditions. For the purpose of grade adjustment, specific downgrade segments are treated as level terrain. 2. If v_i(v_d or v_o) >=1,700 pc/h, terminate analysis--the LOS is F. 3. For the analysis direction only and for v>200 veh/h. 4. For the analysis direction only 5. Exhibit 15-20 provides coefficients a and b for Equation 15-10. 6. Use alternative Exhibit 15-14 if some trucks operate at crawl speeds on a specific downgrade.	

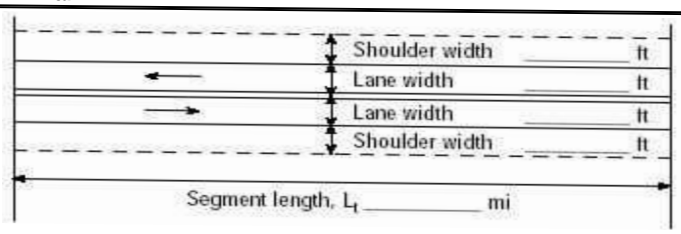
 HCS™ TwoLane Version 7.7 Generated: 3/14/2023 11:08 AM

DIRECTIONAL TWO-LANE HIGHWAY SEGMENT WORKSHEET

General Information		Site Information	
Analyst	*Stantec*	Highway / Direction of Travel	*Oak Grove Church Road*
Agency or Company		From/To	
Date Performed	*3/14/2023*	Jurisdiction	
Analysis Time Period	*Peak Hour*	Analysis Year	*2023*

Project Description: *Construction*

Input Data



☐ Class I highway ☑ Class II highway ☐ Class III highway

Terrain ☑ Level ☐ Rolling

Grade Length mi Up/down

Peak-hour factor, PHF *0.88*

No-passing zone *20%*

% Trucks and Buses , P_T *10 %*

% Recreational vehicles, P_R *4%*

Access points *mi* *10*/mi

Analysis direction vol., V_d *11*veh/h

Opposing direction vol., V_o *11*veh/h

Shoulder width ft *0.0*

Lane Width ft *9.0*

Segment Length mi *2.0*

Average Travel Speed

	Analysis Direction (d)	Opposing Direction (o)
Passenger-car equivalents for trucks, E_T (Exhibit 15-11 or 15-12)	*1.9*	*1.9*
Passenger-car equivalents for RVs, E_R (Exhibit 15-11 or 15-13)	*1.0*	*1.0*
Heavy-vehicle adjustment factor, $f_{HV,ATS}=1/(1+P_T(E_T-1)+P_R(E_R-1))$	*0.917*	*0.917*
Grade adjustment factor[1], $f_{g,ATS}$ (Exhibit 15-9)	*1.00*	*1.00*
Demand flow rate[2], v_i (pc/h) $v_i=V_i/(PHF*f_{g,ATS}*f_{HV,ATS})$	*14*	*14*

Free-Flow Speed from Field Measurement		Estimated Free-Flow Speed	
Mean speed of sample[3], S_{FM}		Base free-flow speed[4], BFFS	*55.0 mi/h*
Total demand flow rate, both directions, *v*		Adj. for lane and shoulder width,[4] f_{LS}(Exhibit 15-7)	*6.4 mi/h*
Free-flow speed, $FFS=S_{FM}+0.00776(v/f_{HV,ATS})$		Adj. for access points[4], f_A (Exhibit 15-8)	*10.0 mi/h*
Adj. for no-passing zones, $f_{np,ATS}$ (Exhibit 15-15)	*0.1 mi/h*	Free-flow speed, FFS (FSS=BFFS-f_{LS}-f_A)	*38.6 mi/h*
		Average travel speed, $ATS_d=FFS-0.00776(v_{d,ATS}+v_{o,ATS})-f_{np,ATS}$	*38.3 mi/h*
		Percent free flow speed, PFFS	*99.2 %*

Percent Time-Spent-Following

	Analysis Direction (d)	Opposing Direction (o)
Passenger-car equivalents for trucks, E_T(Exhibit 15-18 or 15-19)	*1.1*	*1.1*
Passenger-car equivalents for RVs, E_R (Exhibit 15-18 or 15-19)	*1.0*	*1.0*
Heavy-vehicle adjustment factor, $f_{HV}=1/(1+P_T(E_T-1)+P_R(E_R-1))$	*0.990*	*0.990*
Grade adjustment factor[1], $f_{g,PTSF}$ (Exhibit 15-16 or Ex 15-17)	*1.00*	*1.00*
Directional flow rate[2], v_i(pc/h) $v_i=V_i/(PHF*f_{HV,PTSF}*f_{g,PTSF})$	*13*	*13*
Base percent time-spent-following[4], $BPTSF_d(\%)=100(1-e^{av_d^b})$	*1.7*	
Adj. for no-passing zone, $f_{np,PTSF}$ (Exhibit 15-21)	*29.2*	
Percent time-spent-following, $PTSF_d(\%)=BPTSF_d+f_{np,PTSF}*(v_{d,PTSF}/v_{d,PTSF}+v_{o,PTSF})$	*16.3*	

Level of Service and Other Performance Measures

Level of service, LOS (Exhibit 15-3)	*A*
Volume to capacity ratio, *v/c*	*0.01*

Capacity, $C_{d,ATS}$ (Equation 15-12) veh/h	*1700*
Capacity, $C_{d,PTSF}$ (Equation 15-13) veh/h	*1700*
Percent Free-Flow Speed $PFFS_d$(Equation 15-11 - Class III only)	*99.2*
Bicycle Level of Service	
Directional demand flow rate in outside lane, v_{OL} (Eq. 15-24) veh/h	*12.5*
Effective width, Wv (Eq. 15-29) ft	*17.50*
Effective speed factor, S_t (Eq. 15-30)	*4.79*
Bicycle level of service score, BLOS (Eq. 15-31)	*5.29*
Bicycle level of service (Exhibit 15-4)	*E*
Notes	
1. Note that the adjustment factor for level terrain is 1.00,as level terrain is one of the base conditions. For the purpose of grade adjustment, specific downgrade segments are treated as level terrain. 2. If v_i(v_d or v_o) >=1,700 pc/h, terminate analysis--the LOS is F. 3. For the analysis direction only and for v>200 veh/h. 4. For the analysis direction only 5. Exhibit 15-20 provides coefficients a and b for Equation 15-10. 6. Use alternative Exhibit 15-14 if some trucks operate at crawl speeds on a specific downgrade.	

 HCS™ TwoLane Version 7.7 Generated: 3/14/2023 11:18 AM

HCS7 Multilane Highway Report

Project Information

Analyst	Stantec	Date	3/21/2023
Agency		Analysis Year	2033
Jurisdiction		Time Period Analyzed	Operational
Project Description	Cumberland Parkway		

Direction 1 Geometric Data

Direction 1	Eastbound		
Number of Lanes (N), ln	2	Terrain Type	Level
Segment Length (L), ft	-	Percent Grade, %	-
Measured or Base Free-Flow Speed	Base	Grade Length, mi	-
Base Free-Flow Speed (BFFS), mi/h	70.0	Total Ramp Density (TRD), ramps/mi	0.00
Lane Width, ft	12	Left-Side Lateral Clearance (LCR), ft	6
Median Type	Divided	Total Lateral Clearance (TLC), ft	12.00
Access Point Density, pts/mi	1.0	Free-Flow Speed (FFS), mi/h	69.8

Direction 1 Adjustment Factors

Driver Population	All Familiar	Final Speed Adjustment Factor (SAF)	1.000
Driver Population SAF	1.000	Final Capacity Adjustment Factor (CAF)	1.000
Driver Population CAF	1.000		

Direction 1 Demand and Capacity

Volume(V) veh/h	647	Heavy Vehicle Adjustment Factor (fHV)	0.943
Peak Hour Factor	0.94	Flow Rate (Vp), pc/h/ln	365
Total Trucks, %	6.00	Capacity (c), pc/h/ln	2300
Single-Unit Trucks (SUT), %	-	Adjusted Capacity (cadj), pc/h/ln	2300
Tractor-Trailers (TT), %	-	Volume-to-Capacity Ratio (v/c)	0.16

Direction 1 Speed and Density

Lane Width Adjustment (fLW)	0.0	Average Speed (S), mi/h	69.8
Total Lateral Clearance Adj. (fLLC)	0.0	Density (D), pc/mi/ln	5.2
Median Type Adjustment (fM)	0.0	Level of Service (LOS)	A
Access Point Density Adjustment (fA)	0.3		

Direction 1 Bicycle LOS

Flow Rate in Outside Lane (vOL),veh/h	344	Effective Speed Factor (St)	4.62
Effective Width of Volume (Wv), ft	18	Bicyle LOS Score (BLOS)	3.71
Average Effective Width (We), ft	24	Bicycle Level of Service (LOS)	D

HCS7 Multilane Highway Report

Project Information

Analyst	Stantec	Date	3/21/2023
Agency		Analysis Year	2033
Jurisdiction		Time Period Analyzed	Operational
Project Description	Cumberland Parkway		

Direction 2 Geometric Data

Direction 2	Westbound		
Number of Lanes (N), ln	2	Terrain Type	Level
Segment Length (L), ft	-	Percent Grade, %	-
Measured or Base Free-Flow Speed	Base	Grade Length, mi	-
Base Free-Flow Speed (BFFS), mi/h	70.0	Total Ramp Density (TRD), ramps/mi	0.00
Lane Width, ft	12	Left-Side Lateral Clearance (LCR), ft	6
Median Type	Divided	Total Lateral Clearance (TLC), ft	12.00
Access Point Density, pts/mi	1.0	Free-Flow Speed (FFS), mi/h	69.8

Direction 2 Adjustment Factors

Driver Population	All Familiar	Final Speed Adjustment Factor (SAF)	1.000
Driver Population SAF	1.000	Final Capacity Adjustment Factor (CAF)	1.000
Driver Population CAF	1.000		

Direction 2 Demand and Capacity

Volume(V) veh/h	647	Heavy Vehicle Adjustment Factor (fHV)	0.943
Peak Hour Factor	0.94	Flow Rate (Vp), pc/h/ln	365
Total Trucks, %	6.00	Capacity (c), pc/h/ln	2300
Single-Unit Trucks (SUT), %	-	Adjusted Capacity (cadj), pc/h/ln	2300
Tractor-Trailers (TT), %	-	Volume-to-Capacity Ratio (v/c)	0.16

Direction 2 Speed and Density

Lane Width Adjustment (fLW)	0.0	Average Speed (S), mi/h	69.8
Total Lateral Clearance Adj. (fLLC)	0.0	Density (D), pc/mi/ln	5.2
Median Type Adjustment (fM)	0.0	Level of Service (LOS)	A
Access Point Density Adjustment (fA)	0.3		

Direction 2 Bicycle LOS

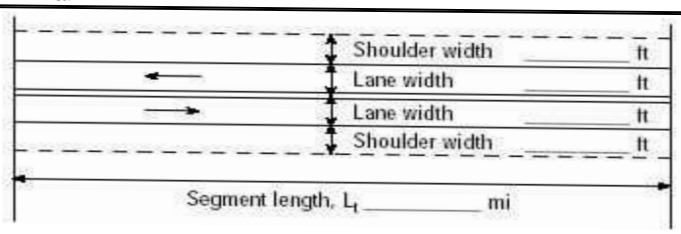
Flow Rate in Outside Lane (vOL),veh/h	344	Effective Speed Factor (St)	4.62
Effective Width of Volume (Wv), ft	18	Bicyle LOS Score (BLOS)	3.71
Average Effective Width (We), ft	24	Bicycle Level of Service (LOS)	D

DIRECTIONAL TWO-LANE HIGHWAY SEGMENT WORKSHEET

General Information		Site Information	
Analyst	*Stantec*	Highway / Direction of Travel	*SH 255*
Agency or Company		From/To	
Date Performed	*3/14/2023*	Jurisdiction	
Analysis Time Period	*Peak Hour*	Analysis Year	*2033*

Project Description: *Build*

Input Data



☐ Class I highway ☑ Class II highway ☐ Class III highway

Terrain ☑ Level ☐ Rolling

Grade Length mi Up/down

Peak-hour factor, PHF *0.88*

No-passing zone *20%*

% Trucks and Buses , P_T *10 %*

% Recreational vehicles, P_R *4%*

Access points *mi* *10*/mi

Analysis direction vol., V_d *62*veh/h

Opposing direction vol., V_o *62*veh/h

Shoulder width ft *0.0*

Lane Width ft *10.5*

Segment Length mi *2.0*

Average Travel Speed

	Analysis Direction (d)	Opposing Direction (o)
Passenger-car equivalents for trucks, E_T (Exhibit 15-11 or 15-12)	*1.9*	*1.9*
Passenger-car equivalents for RVs, E_R (Exhibit 15-11 or 15-13)	*1.0*	*1.0*
Heavy-vehicle adjustment factor, $f_{HV,ATS}=1/(1+P_T(E_T-1)+P_R(E_R-1))$	*0.917*	*0.917*
Grade adjustment factor[1], $f_{g,ATS}$ (Exhibit 15-9)	*1.00*	*1.00*
Demand flow rate[2], v_i (pc/h) $v_i=V_i/(PHF*f_{g,ATS}*f_{HV,ATS})$	*77*	*77*

Free-Flow Speed from Field Measurement		Estimated Free-Flow Speed	
Mean speed of sample[3], S_{FM}		Base free-flow speed[4], BFFS	*55.0 mi/h*
Total demand flow rate, both directions, *v*		Adj. for lane and shoulder width,[4] f_{LS}(Exhibit 15-7)	*5.3 mi/h*
Free-flow speed, $FFS=S_{FM}+0.00776(v/f_{HV,ATS})$		Adj. for access points[4], f_A (Exhibit 15-8)	*10.0 mi/h*
Adj. for no-passing zones, $f_{np,ATS}$ (Exhibit 15-15)	*0.1 mi/h*	Free-flow speed, FFS (FSS=BFFS-f_{LS}-f_A)	*39.7 mi/h*
		Average travel speed, $ATS_d=FFS-0.00776(v_{d,ATS}+v_{o,ATS})-f_{np,ATS}$	*38.4 mi/h*
		Percent free flow speed, PFFS	*96.7 %*

Percent Time-Spent-Following

	Analysis Direction (d)	Opposing Direction (o)
Passenger-car equivalents for trucks, E_T(Exhibit 15-18 or 15-19)	*1.1*	*1.1*
Passenger-car equivalents for RVs, E_R (Exhibit 15-18 or 15-19)	*1.0*	*1.0*
Heavy-vehicle adjustment factor, $f_{HV}=1/(1+P_T(E_T-1)+P_R(E_R-1))$	*0.990*	*0.990*
Grade adjustment factor[1], $f_{g,PTSF}$ (Exhibit 15-16 or Ex 15-17)	*1.00*	*1.00*
Directional flow rate[2], v_i(pc/h) $v_i=V_i/(PHF*f_{HV,PTSF}*f_{g,PTSF})$	*71*	*71*
Base percent time-spent-following[4], $BPTSF_d(\%)=100(1-e^{av_d^b})$	*8.5*	
Adj. for no-passing zone, $f_{np,PTSF}$ (Exhibit 15-21)	*29.2*	
Percent time-spent-following, $PTSF_d(\%)=BPTSF_d+f_{np,PTSF}*(v_{d,PTSF}/v_{d,PTSF}+v_{o,PTSF})$	*23.1*	

Level of Service and Other Performance Measures

Level of service, LOS (Exhibit 15-3)	*A*
Volume to capacity ratio, *v/c*	*0.04*

Capacity, $C_{d,ATS}$ (Equation 15-12) veh/h	*1700*
Capacity, $C_{d,PTSF}$ (Equation 15-13) veh/h	*1700*
Percent Free-Flow Speed $PFFS_d$(Equation 15-11 - Class III only)	*96.7*
Bicycle Level of Service	
Directional demand flow rate in outside lane, v_{OL} (Eq. 15-24) veh/h	*70.5*
Effective width, Wv (Eq. 15-29) ft	*17.75*
Effective speed factor, S_t (Eq. 15-30)	*4.79*
Bicycle level of service score, BLOS (Eq. 15-31)	*6.10*
Bicycle level of service (Exhibit 15-4)	*F*
Notes	
1. Note that the adjustment factor for level terrain is 1.00,as level terrain is one of the base conditions. For the purpose of grade adjustment, specific downgrade segments are treated as level terrain. 2. If v_i(v_d or v_o) >=1,700 pc/h, terminate analysis--the LOS is F. 3. For the analysis direction only and for v>200 veh/h. 4. For the analysis direction only 5. Exhibit 15-20 provides coefficients a and b for Equation 15-10. 6. Use alternative Exhibit 15-14 if some trucks operate at crawl speeds on a specific downgrade.	

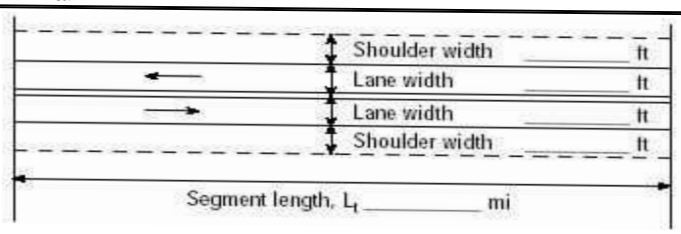
 HCS™ TwoLane Version 7.7 Generated: 3/14/2023 10:57 AM

DIRECTIONAL TWO-LANE HIGHWAY SEGMENT WORKSHEET

General Information		***Site Information***	
Analyst	*Stantec*	Highway / Direction of Travel	*CR 1339*
Agency or Company		From/To	
Date Performed	*3/14/2023*	Jurisdiction	
Analysis Time Period	*Peak Hour*	Analysis Year	*2033*

Project Description: *Build*

Input Data



☐ Class I highway ☑ Class II highway ☐ Class III highway

Terrain ☑ Level ☐ Rolling

Grade Length mi Up/down

Peak-hour factor, PHF *0.88*

No-passing zone *20%*

Analysis direction vol., V_d *23*veh/h

% Trucks and Buses , P_T *10* %

Opposing direction vol., V_o *23*veh/h

% Recreational vehicles, P_R *4%*

Shoulder width ft *0.0*

Access points *mi* *10*/mi

Lane Width ft *9.0*

Segment Length mi *2.0*

Average Travel Speed

	Analysis Direction (d)	Opposing Direction (o)
Passenger-car equivalents for trucks, E_T (Exhibit 15-11 or 15-12)	*1.9*	*1.9*
Passenger-car equivalents for RVs, E_R (Exhibit 15-11 or 15-13)	*1.0*	*1.0*
Heavy-vehicle adjustment factor, $f_{HV,ATS}=1/(1+P_T(E_T-1)+P_R(E_R-1))$	*0.917*	*0.917*
Grade adjustment factor[1], $f_{g,ATS}$ (Exhibit 15-9)	*1.00*	*1.00*
Demand flow rate[2], v_i (pc/h) $v_i=V_i/(PHF*f_{g,ATS}*f_{HV,ATS})$	*29*	*29*

Free-Flow Speed from Field Measurement		**Estimated Free-Flow Speed**	
Mean speed of sample[3], S_{FM}		Base free-flow speed[4], BFFS	*55.0 mi/h*
Total demand flow rate, both directions, *v*		Adj. for lane and shoulder width,[4] f_{LS}(Exhibit 15-7)	*6.4 mi/h*
Free-flow speed, $FFS=S_{FM}+0.00776(v/f_{HV,ATS})$		Adj. for access points[4], f_A (Exhibit 15-8)	*10.0 mi/h*
Adj. for no-passing zones, $f_{np,ATS}$ (Exhibit 15-15)	*0.1 mi/h*	Free-flow speed, FFS (FSS=BFFS-f_{LS}-f_A)	*38.6 mi/h*
		Average travel speed, $ATS_d=FFS-0.00776(v_{d,ATS}+v_{o,ATS})-f_{np,ATS}$	*38.0 mi/h*
		Percent free flow speed, PFFS	*98.6 %*

Percent Time-Spent-Following

	Analysis Direction (d)	Opposing Direction (o)
Passenger-car equivalents for trucks, E_T(Exhibit 15-18 or 15-19)	*1.1*	*1.1*
Passenger-car equivalents for RVs, E_R (Exhibit 15-18 or 15-19)	*1.0*	*1.0*
Heavy-vehicle adjustment factor, $f_{HV}=1/(1+P_T(E_T-1)+P_R(E_R-1))$	*0.990*	*0.990*
Grade adjustment factor[1], $f_{g,PTSF}$ (Exhibit 15-16 or Ex 15-17)	*1.00*	*1.00*
Directional flow rate[2], v_i(pc/h) $v_i=V_i/(PHF*f_{HV,PTSF}*f_{g,PTSF})$	*26*	*26*
Base percent time-spent-following[4], $BPTSF_d(\%)=100(1-e^{av_d^b})$	*3.3*	
Adj. for no-passing zone, $f_{np,PTSF}$ (Exhibit 15-21)	*29.2*	
Percent time-spent-following, $PTSF_d(\%)=BPTSF_d+f_{np,PTSF}*(v_{d,PTSF}/v_{d,PTSF}+v_{o,PTSF})$	*17.9*	

Level of Service and Other Performance Measures

Level of service, LOS (Exhibit 15-3)	*A*
Volume to capacity ratio, *v/c*	*0.02*

Capacity, $C_{d,ATS}$ (Equation 15-12) veh/h	*1700*
Capacity, $C_{d,PTSF}$ (Equation 15-13) veh/h	*1700*
Percent Free-Flow Speed $PFFS_d$(Equation 15-11 - Class III only)	*98.6*
Bicycle Level of Service	
Directional demand flow rate in outside lane, v_{OL} (Eq. 15-24) veh/h	*26.1*
Effective width, Wv (Eq. 15-29) ft	*16.97*
Effective speed factor, S_t (Eq. 15-30)	*4.79*
Bicycle level of service score, BLOS (Eq. 15-31)	*5.74*
Bicycle level of service (Exhibit 15-4)	*F*
Notes	
1. Note that the adjustment factor for level terrain is 1.00,as level terrain is one of the base conditions. For the purpose of grade adjustment, specific downgrade segments are treated as level terrain. 2. If v_i(v_d or v_o) >=1,700 pc/h, terminate analysis--the LOS is F. 3. For the analysis direction only and for v>200 veh/h. 4. For the analysis direction only 5. Exhibit 15-20 provides coefficients a and b for Equation 15-10. 6. Use alternative Exhibit 15-14 if some trucks operate at crawl speeds on a specific downgrade.	

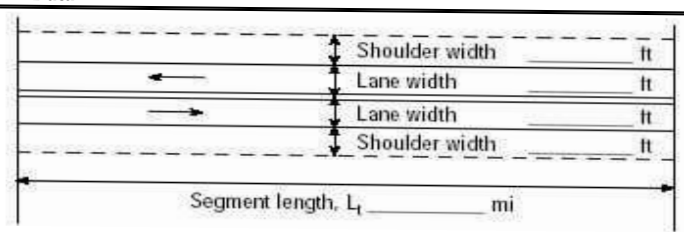
 HCS™ TwoLane Version 7.7 Generated: 3/14/2023 11:10 AM

DIRECTIONAL TWO-LANE HIGHWAY SEGMENT WORKSHEET

General Information		Site Information	
Analyst	*Stantec*	Highway / Direction of Travel	*Oak Grove Church Road*
Agency or Company		From/To	
Date Performed	*3/14/2023*	Jurisdiction	
Analysis Time Period	*Peak Hour*	Analysis Year	*2033*

Project Description: *Build*

Input Data



☐ Class I highway ☑ Class II highway ☐ Class III highway

Terrain ☑ Level ☐ Rolling

Grade Length mi Up/down

Peak-hour factor, PHF *0.88*

No-passing zone *20%*

% Trucks and Buses , P_T *10 %*

% Recreational vehicles, P_R *4%*

Access points *mi* *10*/mi

Analysis direction vol., V_d *10*veh/h

Opposing direction vol., V_o *10*veh/h

Shoulder width ft *0.0*

Lane Width ft *9.0*

Segment Length mi *2.0*

Average Travel Speed

	Analysis Direction (d)	Opposing Direction (o)
Passenger-car equivalents for trucks, E_T (Exhibit 15-11 or 15-12)	*1.9*	*1.9*
Passenger-car equivalents for RVs, E_R (Exhibit 15-11 or 15-13)	*1.0*	*1.0*
Heavy-vehicle adjustment factor, $f_{HV,ATS}=1/(1+P_T(E_T-1)+P_R(E_R-1))$	*0.917*	*0.917*
Grade adjustment factor[1], $f_{g,ATS}$ (Exhibit 15-9)	*1.00*	*1.00*
Demand flow rate[2], v_i (pc/h) $v_i=V_i/(PHF*f_{g,ATS}*f_{HV,ATS})$	*12*	*12*

Free-Flow Speed from Field Measurement		Estimated Free-Flow Speed	
Mean speed of sample[3], S_{FM}		Base free-flow speed[4], BFFS	*55.0 mi/h*
Total demand flow rate, both directions, *v*		Adj. for lane and shoulder width,[4] f_{LS}(Exhibit 15-7)	*6.4 mi/h*
Free-flow speed, $FFS=S_{FM}+0.00776(v/f_{HV,ATS})$		Adj. for access points[4], f_A (Exhibit 15-8)	*10.0 mi/h*
Adj. for no-passing zones, $f_{np,ATS}$ (Exhibit 15-15)	*0.1 mi/h*	Free-flow speed, FFS (FSS=BFFS-f_{LS}-f_A)	*38.6 mi/h*
		Average travel speed, $ATS_d=FFS-0.00776(v_{d,ATS}+v_{o,ATS})-f_{np,ATS}$	*38.3 mi/h*
		Percent free flow speed, PFFS	*99.3 %*

Percent Time-Spent-Following

	Analysis Direction (d)	Opposing Direction (o)
Passenger-car equivalents for trucks, E_T(Exhibit 15-18 or 15-19)	*1.1*	*1.1*
Passenger-car equivalents for RVs, E_R (Exhibit 15-18 or 15-19)	*1.0*	*1.0*
Heavy-vehicle adjustment factor, $f_{HV}=1/(1+P_T(E_T-1)+P_R(E_R-1))$	*0.990*	*0.990*
Grade adjustment factor[1], $f_{g,PTSF}$ (Exhibit 15-16 or Ex 15-17)	*1.00*	*1.00*
Directional flow rate[2], v_i(pc/h) $v_i=V_i/(PHF*f_{HV,PTSF}*f_{g,PTSF})$	*11*	*11*
Base percent time-spent-following[4], $BPTSF_d(\%)=100(1-e^{av_d^b})$	*1.4*	
Adj. for no-passing zone, $f_{np,PTSF}$ (Exhibit 15-21)	*29.2*	
Percent time-spent-following, $PTSF_d(\%)=BPTSF_d+f_{np,PTSF}*(v_{d,PTSF}/v_{d,PTSF}+v_{o,PTSF})$	*16.0*	

Level of Service and Other Performance Measures

Level of service, LOS (Exhibit 15-3)	*A*
Volume to capacity ratio, *v/c*	*0.01*

Capacity, $C_{d,ATS}$ (Equation 15-12) veh/h	*1700*
Capacity, $C_{d,PTSF}$ (Equation 15-13) veh/h	*1700*
Percent Free-Flow Speed $PFFS_d$(Equation 15-11 - Class III only)	*99.3*
Bicycle Level of Service	
Directional demand flow rate in outside lane, v_{OL} (Eq. 15-24) veh/h	*11.4*
Effective width, Wv (Eq. 15-29) ft	*17.55*
Effective speed factor, S_t (Eq. 15-30)	*4.79*
Bicycle level of service score, BLOS (Eq. 15-31)	*5.20*
Bicycle level of service (Exhibit 15-4)	*E*
Notes	
1. Note that the adjustment factor for level terrain is 1.00,as level terrain is one of the base conditions. For the purpose of grade adjustment, specific downgrade segments are treated as level terrain. 2. If v_i(v_d or v_o) >=1,700 pc/h, terminate analysis--the LOS is F. 3. For the analysis direction only and for v>200 veh/h. 4. For the analysis direction only 5. Exhibit 15-20 provides coefficients a and b for Equation 15-10. 6. Use alternative Exhibit 15-14 if some trucks operate at crawl speeds on a specific downgrade.	

 *HCS*TM TwoLane Version 7.7 Generated: 3/27/2023 7:38 AM

Kirkland Appraisals, LLC

Richard C. Kirkland, Jr., MAI
9408 Northfield Court
Raleigh, North Carolina 27603
Phone (919) 414-8142
rkirkland2@gmail.com
www.kirklandappraisals.com

May 25, 2023

Ms. Kelley Pope
Geenex Solar
1000 NC Music Factory Boulevard, Suite C3
Charlotte, NC 28206

RE: Wood Duck Solar, Off Cumberland Parkway, Glasgow, Barren County, KY

Ms. Pope

At your request, I have considered the impact of a 100 MW solar farm proposed to be constructed on a 1,126.70-acre portion of a 2,259.40-acre assemblage of land off Cumberland Parkway, Glasgow, Barren County, Kentucky. Specifically, I have been asked to give my professional opinion on whether the proposed solar farm will have any impact on adjoining property value and whether "the location and character of the use, if developed according to the plan as submitted and approved, will be in harmony with the area in which it is to be located."

To form an opinion on these issues, I have researched and visited existing and proposed solar farms in Kentucky as well as other states, researched articles through the Appraisal Institute and other studies, and discussed the likely impact with other real estate professionals. I have not been asked to assign any value to any specific property.

This letter is a limited report of a real property appraisal consulting assignment and subject to the limiting conditions attached to this letter. My client is Geenex Solar, represented to me by Kelley Pope. My findings support the Kentucky Siting Board Application. The effective date of this consultation is May 25, 2023.

While based in NC, I am also a Kentucky State Certified General Appraiser #5522.

Conclusion

The adjoining properties are well set back from the proposed solar panels and supplemental vegetation is proposed to enhance the areas where the existing trees do not currently provide a proper screen. The closest non-participating home will be 300 feet from the nearest panel and the average distance will be 1,298 feet.

The matched pair analysis shows no impact on home values due to abutting or adjoining a solar farm as well as no impact to abutting or adjacent vacant residential or agricultural land where the solar farm is properly screened and buffered. The criteria that typically correlates with downward adjustments on property values such as noise, odor, and traffic all indicate that a solar farm is a compatible use for rural/residential transition areas and that it would function in a harmonious manner with this area.

Data from the university studies, broker commentary, and other appraisal studies support a finding of no impact on property value adjoining a solar farm with proper setbacks and landscaped buffers.

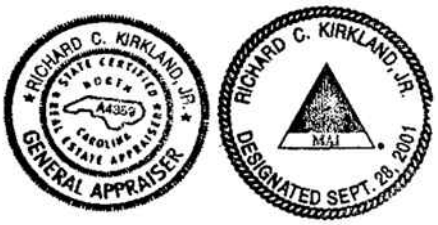
Very similar solar farms in very similar areas have been found by hundreds of towns and counties not to have a substantial negative effect to abutting or adjoining properties, and many of those

findings of no impact have been upheld by appellate courts. Similar solar farms have been approved with adjoining agricultural uses, schools, churches, and residential developments.

Based on the data and analysis in this report, it is my professional opinion that the solar farm proposed at the subject property will have no impact on the value of adjoining or abutting properties and that the proposed use is in harmony with the area in which it is located. I note that some of the positive implications of a solar farm that have been expressed by people living next to solar farms include protection from future development of residential developments or other more intrusive uses, reduced dust, odor and chemicals from former farming operations, protection from light pollution at night, it is quiet, and there is minimal traffic.

If you have any questions please contact me.

Sincerely,



Richard C. Kirkland, Jr., MAI
NC Certified General Appraiser A4359
KY Certified General Appraiser #5522

Table of Contents

I. Proposed Project and Adjoining Uses

Proposed Use Description

This 100 MW solar farm is proposed to be constructed on a 1,126.70-acre portion of a 2,259.40-acre assemblage of land off Cumberland Parkway, Glasgow, Barren County, Kentucky.

Adjoining Properties

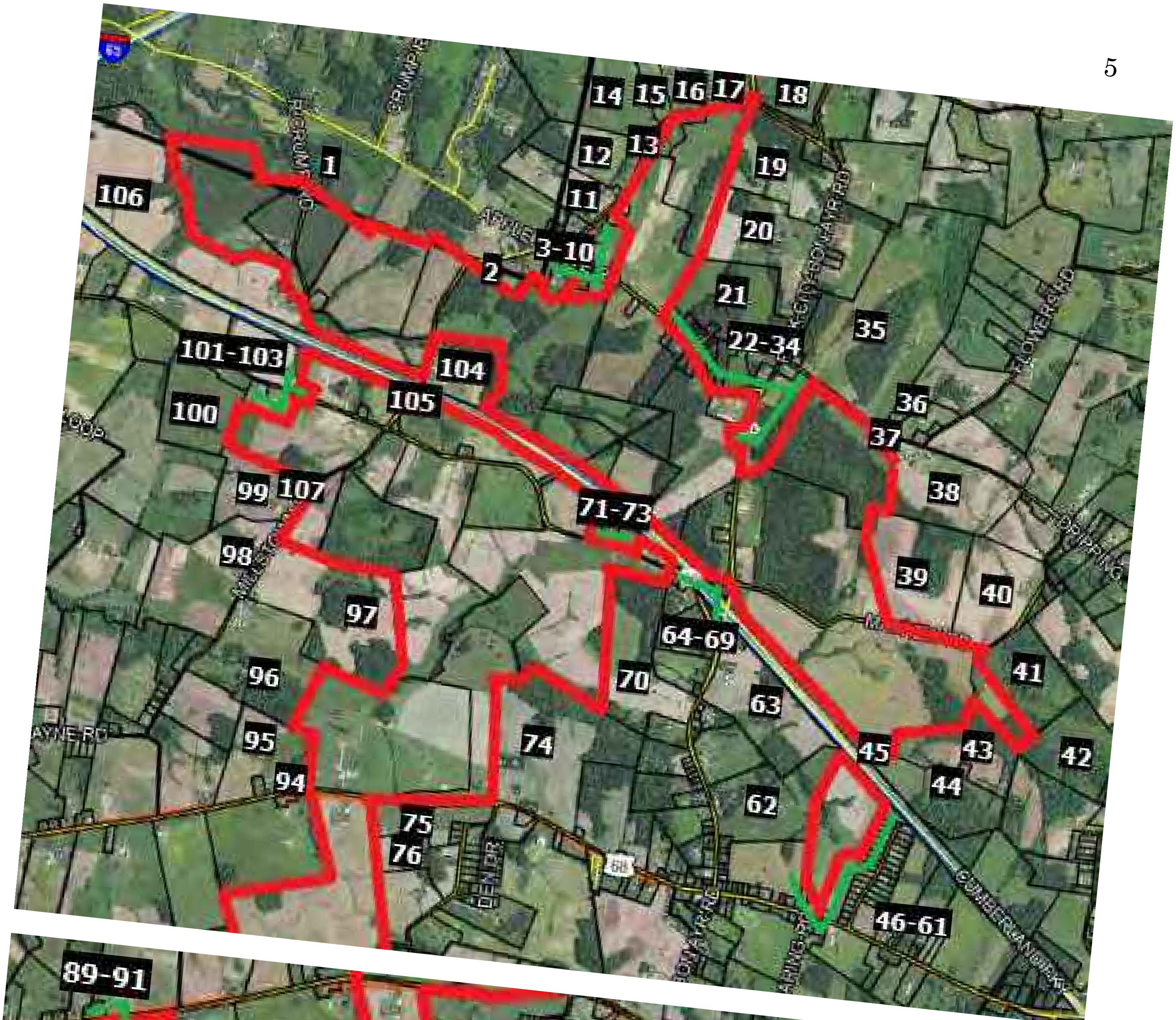
I have considered adjoining uses and included a map to identify each parcel's location. Based on the current site plan the closest adjoining home will be 300 feet from the closest solar panel and the average distance to adjoining homes will be 1,298 feet to the nearest solar panel. Most of these setbacks are larger than what is typically found and will go beyond what is needed to protect adjoining property values when coupled with sufficient landscaped buffers. The minimum distance noted is further than some of the examples identified later in this report showing no impact on property values.

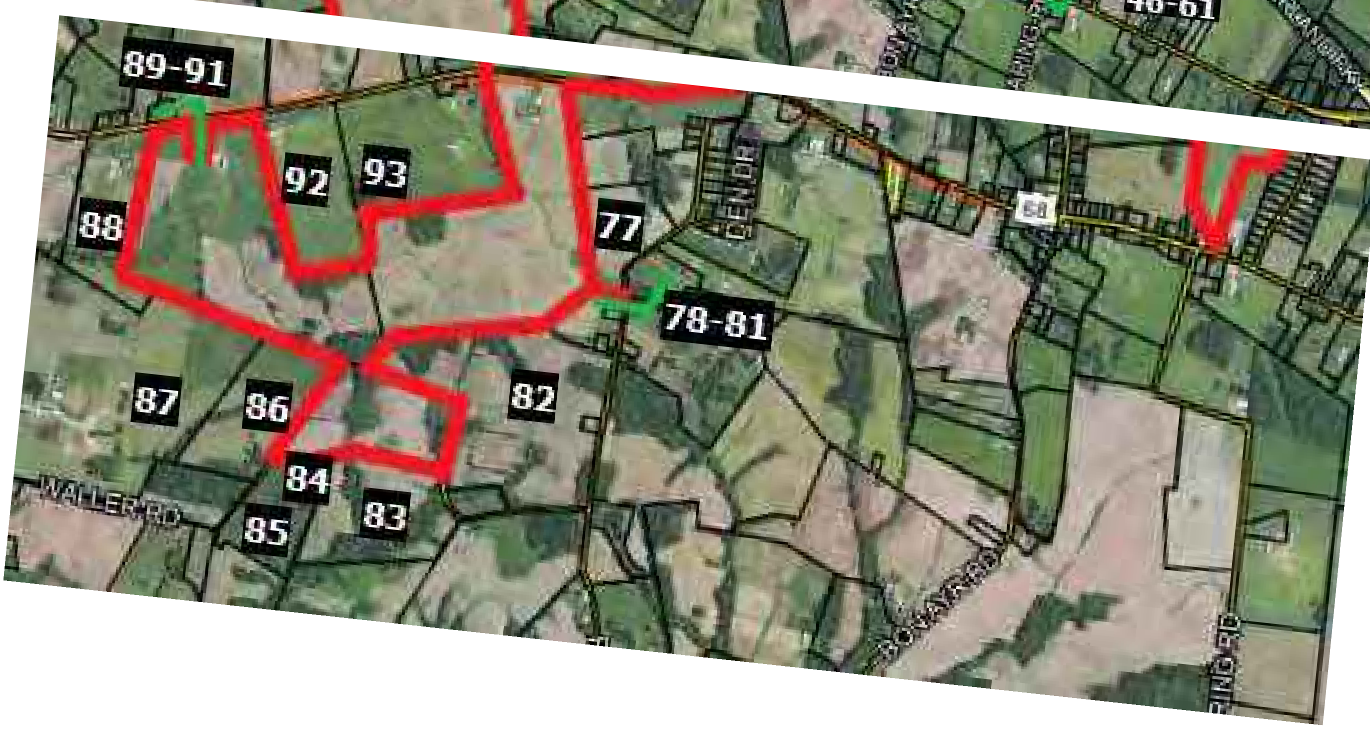
Adjoining land is primarily a mix of residential and agricultural uses, which is very typical of solar farm sites.

The breakdown of those uses by acreage and number of parcels is summarized below.

Adjoining Use Breakdown

	Acreage	**Parcels**
Residential	5.64%	54.21%
Agricultural	35.37%	17.76%
Agri/Res	58.64%	25.23%
Utility	0.33%	1.87%
Commercial	0.02%	0.93%
Total	**100.00%**	**100.00%**


1
2
3-10
11
12
13
14
15
16
17
18
19
20
21
22-34
35
36
37
38
39
40
41
42
43
44
45
46-61
62
63
64-69
70
71-73
74
75
76
94
95
96
97
98
99
100
101-103
104
105
106
107
68
DEN DR


89-91
92
93
88
77
78-81
82
86
87
84
83
85
68
DEN DR
WALLER RD

Surrounding Uses

#	MAP ID	Owner	GIS Data Acres	Present Use	Adjoin Acres	Adjoin Parcels	Distance (ft) Home/Panel	L.F Adjacent
1	Edmonson County	N/A	0.00	Agri/Res	0.00%	0.93%	N/A	7025
2	19-4A	Burris	2.18	Residential	0.07%	0.93%	485	505
3	19-6B	Hinkle	5.94	Residential	0.18%	0.93%	630	1385
4	18-6	Partridge	3.15	Residential	0.10%	0.93%	950	55
5	18-6B	Burris	3.08	Residential	0.09%	0.93%	710	1
6	19-6A	Pendleton	2.30	Residential	0.07%	0.93%	920	400
7	19-6C	Childress	5.00	Residential	0.15%	0.93%	1,040	1210
8	19-6	Edmonds	0.48	Residential	0.01%	0.93%	760	120
9	19-7	Burris	7.75	Residential	0.24%	0.93%	N/A	1305
10	18-6C	Harris	3.48	Residential	0.11%	0.93%	615	245
11	18-3E	John	34.47	Agricultural	1.06%	0.93%	N/A	420
12	18-3F	Croley	38.39	Agricultural	1.18%	0.93%	N/A	840
13	18-5	Farrell	2.86	Residential	0.09%	0.93%	335	490
14	18-3H	Mitchell	108.47	Agricultural	3.34%	0.93%	N/A	140
15	18-3J	Croley	42.78	Agricultural	1.32%	0.93%	N/A	330
16	18-3B	Croley	23.18	Agri/Res	0.71%	0.93%	1,650	640
17	18-3	Aidala	32.02	Agri/Res	0.99%	0.93%	2,170	950
18	31-25A	Bunnell	135.88	Agri/Res	4.18%	0.93%	3,635	1
19	32-5	Trulock	139.08	Agri/Res	4.28%	0.93%	3,475	1845
20	32-14	Fox	71.50	Agri/Res	2.20%	0.93%	2,440	1450
21	32-15	Campbell	70.50	Agri/Res	2.17%	0.93%	1,915	1670
22	32-15H	Pancake	1.00	Residential	0.03%	0.93%	530	395
23	32-15J	Sexton	2.00	Residential	0.06%	0.93%	690	195
24	32-15M	Torres	1.00	Residential	0.03%	0.93%	675	80
25	32-15K	Patton	1.00	Residential	0.03%	0.93%	595	80
26	32-15F	Stout	1.00	Residential	0.03%	0.93%	670	100
27	32-15P	Vibbert	2.00	Residential	0.06%	0.93%	720	95
28	32-15G	Craft	1.00	Residential	0.03%	0.93%	645	95
29	32-15N	McDavitt	2.00	Residential	0.06%	0.93%	500	235
30	32-15E	Hill	1.46	Residential	0.04%	0.93%	N/A	405
31	32-15B	Campbell	5.00	Residential	0.15%	0.93%	N/A	130
32	32-15A	Esters	3.03	Residential	0.09%	0.93%	1,145	240
33	32-19	Ortega	28.90	Agricultural	0.89%	0.93%	N/A	3875
34	32-17B	Aidala	0.84	Residential	0.03%	0.93%	710	565
35	32-13	Stephens	175.52	Agri/Res	5.41%	0.93%	1,690	1510
36	32-13A	Martin	5.49	Residential	0.17%	0.93%	N/A	1
37	32-24A	Martin	1.14	Residential	0.04%	0.93%	705	380
38	32-24	Martin	98.86	Agri/Res	3.04%	0.93%	830	1340
39	32-40B	Martin	80.44	Agricultural	2.48%	0.93%	N/A	3865

#	MAP ID	Owner	GIS Data Acres	Present Use	Adjoin Acres	Adjoin Parcels	Distance (ft) Home/Panel	L.F Adjacent
40	32-37C	Martin	55.88	Agri/Res	1.72%	0.93%	1,715	730
41	32-38	Ewing	50.00	Agricultural	1.54%	0.93%	N/A	2030
42	33-58	Burks	48.42	Agricultural	1.49%	0.93%	N/A	425
43	33-12	Martin	46.15	Agri/Res	1.42%	0.93%	300	3775
44	33-12B	Kendrick	50.22	Agri/Res	1.55%	0.93%	800	215
45	32-40A	Walker	0.58	Utility	0.02%	0.93%	N/A	370
46	33B-18	Carroll	1.29	Residential	0.04%	0.93%	1,590	305
47	33B-17	Campbell	0.94	Residential	0.03%	0.93%	1,625	120
48	33B-16	Scott	0.95	Residential	0.03%	0.93%	1,745	130
49	33B-15	Martin	0.99	Residential	0.03%	0.93%	1,860	125
50	33B-14	Walker	1.03	Residential	0.03%	0.93%	1,940	130
51	33B-13	Wilson	1.12	Residential	0.03%	0.93%	N/A	145
52	33B-12	Savers	1.06	Residential	0.03%	0.93%	N/A	135
53	33B-11	Wright	1.03	Residential	0.03%	0.93%	2,330	125
54	33B-10	Deal	1.02	Residential	0.03%	0.93%	2,440	1
55	33-7C	East	10.00	Utility	0.31%	0.93%	N/A	1495
56	33-7F	Savers	0.70	Commercial	0.02%	0.93%	N/A	125
57	33-23	Miller	1.47	Residential	0.05%	0.93%	3,750	35
58	33-23G	Goodman	0.93	Residential	0.03%	0.93%	3,750	55
59	33-7E	Robertson	0.93	Residential	0.03%	0.93%	N/A	410
60	33-7	Robertson	1.27	Residential	0.04%	0.93%	3,525	360
61	33-31A	Holmes	31.46	Agricultural	0.97%	0.93%	N/A	905
62	33-6	Emerson	62.36	Agri/Res	1.92%	0.93%	3,395	1815
63	32-40	Martin	69.91	Agri/Res	2.15%	0.93%	1,275	3190
64	32-41J	Wells	1.24	Residential	0.04%	0.93%	N/A	660
65	32-41K	Garrett	1.36	Residential	0.04%	0.93%	740	1
66	32-41F	Wells	6.80	Residential	0.21%	0.93%	1,220	145
67	32-41G	Furlong	0.76	Residential	0.02%	0.93%	1,480	160
68	32-41D	England	0.99	Residential	0.03%	0.93%	1,580	50
69	32-21A	Woodland	0.11	Residential	0.00%	0.93%	N/A	350
70	32-43	Emerson	71.99	Agricultural	2.22%	0.93%	N/A	3915
71	32-20C	Arms	3.69	Residential	0.11%	0.93%	510	1250
72	32-20	Kirby	3.58	Residential	0.11%	0.93%	600	485
73	32-20B	Simpson	29.30	Residential	0.90%	0.93%	985	1235
74	19-33	Lyons	127.07	Agri/Res	3.91%	0.93%	1,055	4850
75	20-6	Burks	25.55	Agri/Res	0.79%	0.93%	365	3190
76	20-5B	Burks	27.10	Agri/Res	0.83%	0.93%	1,530	620
77	20-5A	Burks	27.14	Agri/Res	0.84%	0.93%	905	1730
78	20-7	Houchens	11.12	Residential	0.34%	0.93%	1,410	60

#	MAP ID	Owner	GIS Data Acres	Present Use	Adjoin Acres	Adjoin Parcels	Distance (ft) Home/Panel	L.F Adjacent
79	20-2V	Gray	13.00	Residential	0.40%	0.93%	N/A	1
80	20-9C	James	1.00	Residential	0.03%	0.93%	595	250
81	20-9C	Froedge	9.99	Residential	0.31%	0.93%	670	935
82	20-2P	Hawkins	113.18	Agricultural	3.49%	0.93%	N/A	4875
83	20-2F	Allen	56.82	Agricultural	1.75%	0.93%	N/A	1870
84	20-14A	Chambers	0.78	Residential	0.02%	0.93%	365	120
85	20-14	Allen	28.87	Agricultural	0.89%	0.93%	N/A	280
86	20-13	Allen	50.00	Agri/Res	1.54%	0.93%	640	2640
87	9-8	Allen	163.50	Agri/Res	5.04%	0.93%	2,535	1590
88	20-1	Gordeuk	40.00	Agri/Res	1.23%	0.93%	1,420	2485
89	19-28	Boatman	1.97	Residential	0.06%	0.93%	1,720	300
90	19-28A	Pennycuff	50.00	Agricultural	1.54%	0.93%	N/A	1010
91	20-2D	Gray	1.88	Residential	0.06%	0.93%	1,085	1300
92	20-3	Pennycuff	50.00	Agri/Res	1.54%	0.93%	1,840	3825
93	20-4	Pennycuff	74.62	Agricultural	2.30%	0.93%	N/A	3740
94	19-30B	Copas	2.86	Residential	0.09%	0.93%	1,550	260
95	19-30	Wininger	46.90	Agricultural	1.44%	0.93%	N/A	1205
96	19-25	Double	73.00	Agri/Res	2.25%	0.93%	1,980	1335
97	19-23	Millstown	109.21	Agricultural	3.36%	0.93%	N/A	5900
98	19-17	Roark	81.52	Agricultural	2.51%	0.93%	N/A	365
99	19-16A	Roark	39.68	Agri/Res	1.22%	0.93%	365	2360
100	19-13B	Williams	52.00	Agricultural	1.60%	0.93%	N/A	730
101	19-12	Bellamy	10.75	Residential	0.33%	0.93%	N/A	1475
102	19-10B	Vincent	0.97	Residential	0.03%	0.93%	415	670
103	19-13	Williams	35.50	Agri/Res	1.09%	0.93%	1,300	685
104	19-5A	Gingerich	33.65	Agri/Res	1.04%	0.93%	595	5065
105	19-10C	Cook	1.07	Residential	0.03%	0.93%	340	670
106	19-13A	Williams	180.74	Agri/Res	5.57%	0.93%	720	5660
107	19-16	West	1.83	Residential	0.06%	0.93%	345	730
		Total	**3246.970**		**100.00%**	**100.00%**	1,298	

N/A indicates that there is no adjoining home to which to measure. Linear feet of adjacency listed in red means that the property is across a right of way from the subject property. Linear feet of adjacency of 1 foot is assigned where properties meet at a corner.

II. Demographics

I have pulled the following demographics for a 1-mile, 3-mile and 5-mile radius around the proposed solar farm project.

Housing Profile

1507-1999 Oak Grove Church Rd, Smiths Grove, Kentucky,
Ring: 1 mile radius

Prepared by Esri
Latitude: 37.04451
Longitude: -86.05543

Population		Households	
2010 Total Population	102	2022 Median Household Income	$44,005
2020 Total Population	104	2027 Median Household Income	$56,362
2022 Total Population	105	2022-2027 Annual Rate	5.07%
2027 Total Population	106		
2022-2027 Annual Rate	0.19%		

	Census 2010		2022		2027	
Housing Units by Occupancy Status and Tenure	Number	Percent	Number	Percent	Number	Percent
Total Housing Units	38	100.0%	39	100.0%	39	100.0%
Occupied	35	92.1%	37	94.9%	37	94.9%
Owner	27	71.1%	28	71.8%	28	71.8%
Renter	8	21.1%	9	23.1%	9	23.1%
Vacant	3	7.9%	3	7.7%	2	5.1%

	2022		2027	
Owner Occupied Housing Units by Value	Number	Percent	Number	Percent
Total	27	100.0%	28	100.0%
<$50,000	5	18.5%	5	17.9%
$50,000-$99,999	6	22.2%	6	21.4%
$100,000-$149,999	4	14.8%	4	14.3%
$150,000-$199,999	5	18.5%	5	17.9%
$200,000-$249,999	3	11.1%	3	10.7%
$250,000-$299,999	2	7.4%	3	10.7%
$300,000-$399,999	1	3.7%	1	3.6%
$400,000-$499,999	1	3.7%	1	3.6%
$500,000-$749,999	0	0.0%	0	0.0%
$750,000-$999,999	0	0.0%	0	0.0%
$1,000,000-$1,499,999	0	0.0%	0	0.0%
$1,500,000-$1,999,999	0	0.0%	0	0.0%
$2,000,000+	0	0.0%	0	0.0%
Median Value	$131,250		$137,500	
Average Value	$147,222		$151,786	

Census 2010 Housing Units	Number	Percent
Total	38	100.0%
In Urbanized Areas	0	0.0%
In Urban Clusters	0	0.0%
Rural Housing Units	38	100.0%

Data Note: Persons of Hispanic Origin may be of any race.
Source: Esri forecasts for 2022 and 2027. U.S. Census Bureau 2010 decennial Census data converted by Esri into 2020 geography.

May 23, 2023

Housing Profile

1507-1999 Oak Grove Church Rd, Smiths Grove, Kentucky,
Ring: 3 mile radius

Prepared by Esri
Latitude: 37.04451
Longitude: -86.05543

Population		Households	
2010 Total Population	1,634	2022 Median Household Income	$51,347
2020 Total Population	1,653	2027 Median Household Income	$59,717
2022 Total Population	1,644	2022-2027 Annual Rate	3.07%
2027 Total Population	1,639		
2022-2027 Annual Rate	-0.06%		

	Census 2010		2022		2027	
Housing Units by Occupancy Status and Tenure	Number	Percent	Number	Percent	Number	Percent
Total Housing Units	683	100.0%	698	100.0%	700	100.0%
Occupied	601	88.0%	625	89.5%	623	89.0%
Owner	471	69.0%	482	69.1%	482	68.9%
Renter	130	19.0%	143	20.5%	141	20.1%
Vacant	82	12.0%	73	10.5%	77	11.0%

	2022		2027	
Owner Occupied Housing Units by Value	Number	Percent	Number	Percent
Total	483	100.0%	483	100.0%
<$50,000	107	22.2%	92	19.0%
$50,000-$99,999	91	18.8%	80	16.6%
$100,000-$149,999	65	13.5%	57	11.8%
$150,000-$199,999	98	20.3%	109	22.6%
$200,000-$249,999	44	9.1%	49	10.1%
$250,000-$299,999	38	7.9%	47	9.7%
$300,000-$399,999	17	3.5%	22	4.6%
$400,000-$499,999	16	3.3%	20	4.1%
$500,000-$749,999	2	0.4%	2	0.4%
$750,000-$999,999	0	0.0%	0	0.0%
$1,000,000-$1,499,999	1	0.2%	1	0.2%
$1,500,000-$1,999,999	0	0.0%	0	0.0%
$2,000,000+	4	0.8%	4	0.8%
Median Value	$133,462		$155,734	
Average Value	$165,166		$179,400	

Census 2010 Housing Units	Number	Percent
Total	683	100.0%
In Urbanized Areas	0	0.0%
In Urban Clusters	0	0.0%
Rural Housing Units	683	100.0%

Data Note: Persons of Hispanic Origin may be of any race.
Source: Esri forecasts for 2022 and 2027. U.S. Census Bureau 2010 decennial Census data converted by Esri into 2020 geography.

May 23, 2023

Housing Profile

1507-1999 Oak Grove Church Rd, Smiths Grove, Kentucky,
Ring: 5 mile radius

Prepared by Esri
Latitude: 37.04451
Longitude: -86.05543

Population		Households	
2010 Total Population	4,958	2022 Median Household Income	$50,459
2020 Total Population	5,217	2027 Median Household Income	$58,633
2022 Total Population	5,225	2022-2027 Annual Rate	3.05%
2027 Total Population	5,279		
2022-2027 Annual Rate	0.21%		

	Census 2010		2022		2027	
Housing Units by Occupancy Status and Tenure	Number	Percent	Number	Percent	Number	Percent
Total Housing Units	2,074	100.0%	2,177	100.0%	2,200	100.0%
Occupied	1,881	90.7%	2,009	92.3%	2,031	92.3%
Owner	1,442	69.5%	1,476	67.8%	1,497	68.0%
Renter	439	21.2%	533	24.5%	534	24.3%
Vacant	194	9.4%	167	7.7%	169	7.7%

	2022		2027	
Owner Occupied Housing Units by Value	Number	Percent	Number	Percent
Total	1,476	100.0%	1,498	100.0%
<$50,000	293	19.9%	244	16.3%
$50,000-$99,999	255	17.3%	222	14.8%
$100,000-$149,999	185	12.5%	159	10.6%
$150,000-$199,999	289	19.6%	317	21.2%
$200,000-$249,999	162	11.0%	184	12.3%
$250,000-$299,999	147	10.0%	184	12.3%
$300,000-$399,999	85	5.8%	117	7.8%
$400,000-$499,999	37	2.5%	45	3.0%
$500,000-$749,999	12	0.8%	15	1.0%
$750,000-$999,999	0	0.0%	0	0.0%
$1,000,000-$1,499,999	4	0.3%	4	0.3%
$1,500,000-$1,999,999	0	0.0%	0	0.0%
$2,000,000+	7	0.5%	7	0.5%
Median Value	$150,865		$169,558	
Average Value	$170,512		$187,867	

Census 2010 Housing Units	Number	Percent
Total	2,074	100.0%
In Urbanized Areas	0	0.0%
In Urban Clusters	7	0.3%
Rural Housing Units	2,067	99.7%

Data Note: Persons of Hispanic Origin may be of any race.
Source: Esri forecasts for 2022 and 2027. U.S. Census Bureau 2010 decennial Census data converted by Esri into 2020 geography.

May 23, 2023

III. Methodology and Discussion of Issues

Standards and Methodology

I conducted this analysis using the standards and practices established by the Appraisal Institute and that conform to the Uniform Standards of Professional Appraisal Practice. The analyses and methodologies contained in this report are accepted by all major lending institutions, and they are used in Kentucky and across the country as the industry standard by certified appraisers conducting appraisals, market analyses, or impact studies and are considered adequate to form an opinion of the impact of a land use on neighboring properties. These standards and practices have also been accepted by the courts at the trial and appellate levels and by federal courts throughout the country as adequate to reach conclusions about the likely impact a use will have on adjoining or abutting properties.

The aforementioned standards compare property uses in the same market and generally within the same calendar year so that fluctuating markets do not alter study results. Although these standards do not require a linear study that examines adjoining property values before and after a new use (e.g. a solar farm) is developed, some of these studies do in fact employ this type of analysis. Comparative studies, as used in this report, are considered an industry standard.

The type of analysis employed is a Matched Pair Analysis or Paired Sales Analysis. This methodology is outlined in **The Appraisal of Real Estate**, Twelfth Edition by the Appraisal Institute pages 438-439. It is further detailed in **Real Estate Damages**, Third Edition, pages 33-36 by Randall Bell PhD, MAI. Paired sales analysis is used to support adjustments in appraisal work for factors ranging from the impact of having a garage, golf course view, or additional bedrooms. It is an appropriate methodology for addressing the question of impact of an adjoining solar farm. The paired sales analysis is based on the theory that when two properties are in all other respects equivalent, a single difference can be measured to indicate the difference in price between them. Dr. Bell describes it as comparing a test area to control areas. In the example provided by Dr. Bell he shows five paired sales in the test area compared to 1 to 3 sales in the control areas to determine a difference. I have used 3 sales in the control areas in my analysis for each sale developed into a matched pair.

Determining what is an External Obsolescence

An external obsolescence is a use of property that, because of its characteristics, might have a negative impact on the value of adjacent or nearby properties because of identifiable impacts. Determining whether a use would be considered an external obsolescence requires a study that isolates that use, eliminates any other causing factors, and then studies the sales of nearby versus distant comparable properties. The presence of one or a combination of key factors does not mean the use will be an external obsolescence, but a combination of these factors tend to be present when market data reflects that a use is an external obsolescence.

External obsolescence is evaluated by appraisers based on several factors. These factors include but are not limited to:

1) Traffic. Solar Farms are not traffic generators.

2) Odor. Solar farms do not produce odor.

3) Noise. Solar farms generate no noise concerns according to a wide range of noise studies that have been completed.

4) Environmental. Solar farms do not produce toxic or hazardous waste. Grass is maintained underneath the panels so there is minimal impervious surface area.

5) Appearance/Viewshed. This is the one area that potentially applies to solar farms. However, solar farms are generally required to provide significant setbacks and landscaping buffers to address that concern. Furthermore, any consideration of appearance of viewshed impacts has to be considered in comparison with currently allowed uses on that site. For example if a residential subdivision is already an allowed use, the question becomes in what way does the appearance impact adjoining property owners above and beyond the appearance of that allowed subdivision or other similar allowed uses.

6) Other factors. I have observed and studied many solar farms and have never observed any characteristic about such facilities that prevents or impedes neighbors from fully using their homes or farms or businesses for the use intended.

Market Imperfection

Throughout this analysis, I have specifically considered the influence of market imperfection on data analysis. Market imperfection is the term that refers to the fact that unlike a can of soup at the supermarket or in your online shopping cart, real estate cannot be comparison shopped for the best price and purchased at the best price for that same identical product. Real estate products are always similar and never identical. Even two adjacent lots that are identical in almost every way, have a slight difference in location. Once those lots are developed with homes, the number of differences begin to multiply, whether it is size of the home, landscaping, layout, age of interior upfit, quality of interior upfit, quality of maintenance and so on.

Neoclassical economics indicates a perfectly competitive market as having the following: A large number of buyers and sellers (no one person dominates the market), no barriers or transaction costs, homogeneous product, and perfect information about the product and pricing. Real estate is clearly not homogeneous. The number of buyers and sellers for a particular product in a particular location is limited by geography, financing, and the limited time period within a property is listed. There are significant barriers that limit the liquidity in terms of time, costs and financing. Finally, information on real estate is often incomplete or partial – especially at the time that offers are made and prices set, which is prior to appraisals and home inspections. So real estate is very imperfect based on this definition and the impact of this are readily apparent in the real estate market.

What appear to be near-identical homes that are in the same subdivision will often sell with slight variations in price. When multiple appraisers approach the same property, there is often a slight variation among all of those conclusions of value, due to differences in comparables used or analysis of those comparables. This is common and happens all of the time. In fact, within each appraisal, after making adjustments to the comparables, the appraiser will typically have a range of values that are supported that often vary more than +/-5% from the median or average adjusted value.

Based on this understanding of market imperfection, it is important to note that very minor differences in value within an impact study do not necessarily indicate either a negative or positive impact. When the impacts measured fall within that +/-5%, I consider this to be within typical market variation/imperfection. Therefore it may be that there is a negative or positive impact identified if the impact is within that range, but given that it is indistinguishable from what amounts to the background noise or static within the real estate data, I do not consider indications of +/-5% to support a finding of a negative or positive impact.

Impacts greater than that range are however, considered to be strong indications of impacts that fall outside of typical market imperfection. I have used this as a guideline while considering the impacts identified within this report.

Relative Solar Farm Sizes

Solar farms have been increasing in size in recent years. Much of the data collected is from existing, older solar farms of smaller size, but there are numerous examples of sales adjoining 75 to 80 MW facilities that show a similar trend as the smaller solar farms. This is understandable given that the primary concern relative to a solar farm is the appearance or view of the solar farm, which is typically addressed through setbacks and landscaping buffers. The relevance of data from smaller solar farms to larger solar farms is due to the primary question being one of appearance. If the solar farm is properly screened, then little of the solar farm would be seen from adjoining property regardless of how many acres are involved.

Larger solar farms are often set up in sections where any adjoining owner would only be able to see a small section of the project even if there were no landscaping screen. Once a landscaping screen is in place, the primary view is effectively the same whether you are adjoining a 5 MW, 20 MW or 100 MW facility.

I have split out the data for the matched pairs adjoining larger solar farms only to illustrate the similarities later in this report. I note that I have matched pairs adjoining solar farms up to 500 MWs in size showing no impact on property value.

Steps Involved in the Analysis

The paired sales analysis employed in this report follows the following process:

1. Identify sales of property adjoining existing solar farms.
2. Compare those sales to similar property that does not adjoin an existing solar farm.
3. Confirmation of sales are noted in the analysis write ups.
4. Distances from the homes to panels are included as a measure of the setbacks.
5. Topographic differences across the solar farms themselves are likewise noted along with demographic data for comparing similar areas.

There are a number of Sale/Resale comparables included in the write ups, but most of the data shown is for sales of homes after a solar farm has been announced (where noted) or after a solar farm has been constructed.

IV. Research on Solar Farms

A. Appraisal Market Studies

I have also considered a number of impact studies completed by other appraisers as detailed below.

CohnReznick – Property Value Impact Study: Adjacent Property Values Solar Impact Study: A Study of Eight Existing Solar Facilities

Patricia McGarr, MAI, CRE, FRICS, CRA and Andrew R. Lines, MAI with CohnReznick completed an impact study for a proposed solar farm in Cheboygan County, Michigan completed on June 10, 2020. I am familiar with this study as well as a number of similar such studies completed by CohnReznick. I have not included all of these studies but I submit this one as representative of those studies.

This study addresses impacts on value from eight different solar farms in Michigan, Minnesota, Indiana, Illinois, Virginia and North Carolina. These solar farms are 19.6 MW, 100 MW, 11.9 MW, 23 MW, 71 MW, 61 MW, 40 MW, and 19 MW for a range from 11.9 MW to 100 MW with an average of 31 MW and a median of 31.5 MW. They analyzed a total of 24 adjoining property sales in the Test Area and 81 comparable sales in the Control Area over a five-year period.

The conclusion of this study is that there is no evidence of any negative impact on adjoining property values based on sales prices, conditions of sales, overall marketability, potential for new development or rate of appreciation.

Christian P. Kaila & Associates – Property Impact Analysis – Proposed Solar Power Plant Guthrie Road, Stuarts Draft, Augusta County, Virginia

Christian P. Kaila, MAI, SRA and George J. Finley, MAI developed an impact study as referenced above dated June 16, 2020. This was for a proposed 83 MW facility on 886 acres.

Mr. Kaila interviewed appraisers who had conducted studies and reviewed university studies and discussed the comparable impacts of other development that was allowed in the area for a comparative analysis of other impacts that could impact viewshed based on existing allowed uses for the site. He also discussed in detail the various other impacts that could cause a negative impact and how solar farms do not have such characteristics.

Mr. Kaila also interviewed County Planners and Real Estate Assessor's in eight different Virginia counties with none of the assessor's identifying any negative impacts observed for existing solar projects.

Mr. Kaila concludes on a finding of no impact on property values adjoining the indicated solar farm.

Fred Beck, MAI, CCIM – Impact Analysis in Lincoln County 2013

Mr. Fred Beck, MAI, CCIM completed an impact analysis in 2013 for a proposed solar farm that concluded on a negative impact on value. That report relied on a single cancelled contract for an adjoining parcel where the contracted buyers indicated that the solar farm was the reason for the cancellation. It also relied on the activities of an assessment impact that was applied in a nearby county.

Mr. Beck was interviewed as part of the Christian Kalia study noted above. From that I quote "Mr. Beck concluded on no effect on moderate priced homes, and only a 5% change in his limited research of higher priced homes. His one sale that fell through is hardly a reliable sample. It also was misleading on Mr. Beck's part to report the lower re-assessments since the primary cause of the

re-assesments were based on the County Official, who lived adjacent to the solar farm, appeal to the assessor for reductions with his own home." In that Clay County Case study the noted lack of lot sales after announcement of the solar farm also coincided with the recession in 2008/2009 and lack of lot sales effectively defined that area during that time. I contacted the Clay County Assessor who indicated that there is no set downward adjustment for properties adjoining solar farms in the county at this time.

I further note, that I was present at the hearing where Mr. Beck presented these findings and the predominance of his argument before the Lincoln County Board of Commissioner's was based on the one cancelled sale as well as a matched pair analysis of high-end homes adjoining a four-story call center. He hypothesized that a similar impact from that example could be compared to being adjacent solar farm without explaining the significant difference in view, setbacks, landscaping, traffic, light, and noise. Furthermore, Mr. Beck did have matched pairs adjoining a solar farm in his study that he put in the back of his report and then ignored as they showed no impact on property value.

Also noted in the Christian Kalia interview notes is a response from Mr. Beck indicating that in his opinion "the homes were higher priced homes and had full view of the solar farm." Based on a description of screening so that "the solar farm would not be in full view to adjoining property owners. Mr. Beck said in that case, he would not see any drop in property value."

NorthStar Appraisal Company – Impact Analysis for Nichomus Run Solar, Pilesgrove, NJ, September 16, 2020

Mr. William J. Sapio, MAI with NorthStar Appraisal Company considered a matched pair analysis for the potential impact on adjoining property values to this proposed 150 MW solar farm. Mr. Sapio considered sales activity in a subdivision known as Point of Woods in South Brunswick Township and identified two recent new homes that were constructed and sold adjoining a 13 MW solar farm and compared them to similar homes in that subdivision that did not adjoin the solar farm. These homes sold in the $1,290,450 to $1,336,613 price range and these homes were roughly 200 feet from the closest solar panel.

Based on this analysis, he concluded that the adjoining solar farm had no impact on adjoining property value.

Mary McClinton Clay, MAI – McCracken County Solar Project Value Impact Report, July 10, 2021

Ms. Mary Clay, MAI reviewed a report by Kirkland Appraisals in this case and also provided a differing opinion of impact. She cites a number of other appraisal studies and interestingly finds fault with heavily researched opinions, while praising the results of poorly researched studies that found the opposing view.

Her analysis includes details from solar farms that show no impact on value, but she dismisses those.

She cites the University of Texas study noted later in this report, but she cites only isolated portions of that study to conclude the opposite of what that study specifically concludes.

She cites the University of Rhode Island study noted alter in this report, but specifically excludes the conclusion of that study that in rural areas they found no impact on property value.

She cites lot sales near Spotsylvania Solar without confirming the purchase prices with brokers as indicative of market impact and has made no attempt to compare lot prices that are contemporaneous. In her 5 lot sales that she identifies, all of the lot prices decline with time from 2015 through 2019. This includes the 3 lot sales prior to the approval of the solar farm. The lot sales she cites showing a drop are all related to the original developer of that subdivision 20+ years

ago liquidating all of their lots in that time period and shows significant drops on all of the lots due to it being a liquidation value. More recent lot sales show lot prices over $100,000 with the most recent land sale adjoining the solar farm having sold in December of 2021 for $140,000. I spoke with Chris Kalia, MAI out of VA about these lot sales and he confirmed along with two other appraisers in that market that he connected me with that the lot sales Ms. Clay identified were all related to that liquidation and not related to the solar farm. All three appraisers agreed that they had seen no negative impacts from Spotsylvania Solar and that lot prices among builders and home owners were going up and home prices in the neighborhood were likewise going up. Additional analysis on Spotsylvania Solar is shown later in this report with a new section of homes and new price points significantly higher than historical sales in this subdivision.

She considers data at McBride Place Solar Farm and does a sale/resale analysis based on Zillow Home Value Index, which is not a reliable indication for appreciation in the market. She then adjusted her initial sales prior to the solar farm over 7 years to determine what she believes the home should have appreciated by and then compares that to an actual sale. She has run no tests or any analysis to show that the appreciation rates she is using are consistent with the market but more importantly she has not attempted to confirm any of these sales with market participants. I have spoken with brokers active in the sales that she cites and they have all indicated that the solar farm was not a negative factor in marketing or selling those homes.

She has considered lot sales at Sunshine Farms in Grandy, NC. She indicates that the lots next to the solar farm are selling for less than lots not near the solar farm, but she is actually using lot sales next to the solar farm prior to the solar farm being approved. She also ignores recent home sales adjoining this solar farm after it was built that show no impact on property value.

She also notes a couple of situations where solar developers have purchased adjoining homes and resold them or where a neighbor agreement was paid as proof of a negative impact on property value. Given that there are over 2,500 solar farms in the USA as of 2018 according to the U.S. Energy Information Administration and there are only a handful of such examples, this is clearly not an industry standard but a business decision. Furthermore, solar developers are not in the business of flipping homes and are in a position very similar to a bank that acquires a home as OREO (Other Real Estate Owned), where homes are frequently sold at discounted prices, not because of any drop in value, but because they are not a typically motivated seller. Market value requires an analysis of a typically motivated buyer and seller. So these are not good indicators of market value impacts.

The comments throughout this study are heavy in adjectives, avoids stating facts contrary to the conclusion and shows a strong selection bias.

Kevin T. Meeks, MAI – Corcoran Solar Impact Study, June 19, 2017

Mr. Kevin Meeks, MAI reviewed a report by Kirkland Appraisals in this case and also provided additional research on the topic with additional paired sales. The sales he considered are well presented and show that they were confirmed by third parties and all of the broker commentary is aligned with the conclusion that the adjoining solar farms considered had no impact on the adjoining home values.

Mr. Meeks also researched a 100 MW project in Chisago County, known as North Star Solar Garden in MN. He interviewed local appraisers and a broker who was actively marketing homes adjoining that solar farm to likewise support a finding of no impact on property value.

Conclusion of Impact Studies

Of the six studies noted three included actual sales data to derive an opinion of no impact on value. The two studies to conclude on a negative impact includes the Fred Beck study based on no actual sales data, and he has since indicated that with landscaping screens he would not conclude on a

negative impact. The other study by Mary Clay shows improper adjustments for time, a lack of confirmation of sales comparables, and exclusion of data that does not support her position.

I have relied on these studies as additional support for the findings in this impact analysis.

B. Articles

I have also considered a number of articles on this subject as well as conclusions and analysis as noted below.

Farm Journal Guest Editor, March 22, 2021 – Solar's Impact on Rural Property Values

Andy Ames, ASFMRA (American Society of Farm Managers and Rural Appraisers) published this article that includes a discussion of his survey of appraisers and studies on the question of property value related to solar farms. He discusses the university studies that I have cited as well as Patricia McGarr, MAI.

He also discusses the findings of Donald A. Fisher, ARA, who served six years at the Chair of the ASFMRA's National Appraisal Review Committee. He is also the Executive Vice President of the CNY Pomeroy Appraiser and has conducted several market studies on solar farms and property impact. He is quoted in the article as saying, "Most of the locations were in either suburban or rural areas, and all of those studies found either a neutral impact, or ironically, a positive impact, where values on properties after installation of solar farms went up higher than time trends."

Howard Halderman, AFM, President and CEO of Halderman Real Estate and Farm Management attended the ASFMRA solar talk hosted by the Indiana Chapter of the ASFMRA and he concludes that other rural properties would likely see no impact and farmers and landowners shown even consider possible benefits. "In some cases, farmers who rent land to a solar company will insure the viability of their farming operation for a longer time period. This makes them better long-term tenants or land buyers so one can argue that higher rents and land values will follow due to the positive impact the solar leases offer."

More recently in August 2022, Donald Fisher, ARA, MAI and myself led a webinar on this topic for the ASFMRA discussing the issues, the university studies and specific examples of solar farms having no impact on adjoining property values.

National Renewable Energy Laboratory – Top Five Large-Scale Solar Myths, February 3, 2016

Megan Day reports form NREL regarding a number of concerns neighbors often express. Myth #4 regarding property value impacts addresses specifically the numerous studies on wind farms that show no impact on property value and that solar farms have a significantly reduced visual impact from wind farms. She highlights that the appearance can be addressed through mitigation measures to reduce visual impacts of solar farms through vegetative screening. Such mitigations are not available to wind farms given the height of the windmills and again, those studies show no impact on value adjoining wind farms.

North Carolina State University: NC Clean Energy Technology Center White Paper: Balancing Agricultural Productivity with Ground-Based Solar Photovoltaic (PV) Development (Version 2), May 2019

Tommy Cleveland and David Sarkisian wrote a white paper for NCSU NC Clean Energy Technology Center regarding the potential impacts to agricultural productivity from a solar farm use. I have interviewed Tommy Cleveland on numerous occasions and I have also heard him speak on these issues at length as well. He addresses many of the common questions regarding how solar farms work and a detailed explanation of how solar farms do not cause significant impacts on the soils, erosion and other such concerns. This is a heavily researched paper with the references included.

North Carolina State University: NC Clean Energy Technology Center White Paper: Health and Safety Impacts of Solar Photovoltaics, May 2017

Tommy Cleveland wrote a white paper for NCSU NC Clean Energy Technology Center regarding the health and safety impacts to address common questions and concerns related to solar farms. This is a heavily researched white paper addressing questions ranging from EMFs, fire safety, as well as vegetation control and the breakdown of how a solar farm works.

C. Broker Commentary

In the process of working up the matched pairs used later in this report, I have collected comments from brokers who have actually sold homes adjoining solar farms indicating that the solar farm had no impact on the marketing, timing, or sales price for the adjoining homes. I have comments from brokers noted within the solar farm write ups of this report including brokers from Kentucky, Virginia, Tennessee, and North Carolina. I have additional commentary from other states including New Jersey and Michigan that provide the same conclusion.

V. University Studies

I have also considered the following studies completed by four different universities related to solar farms and impacts on property values.

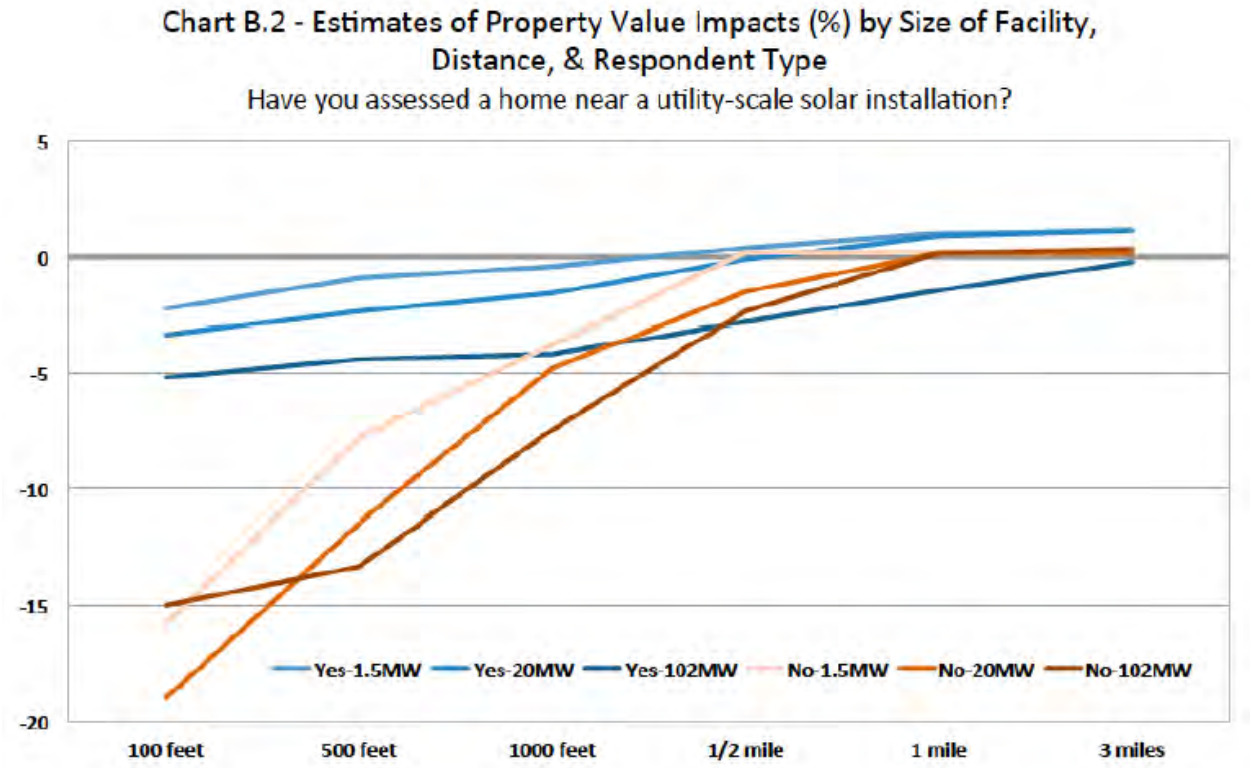
A. University of Texas at Austin, May 2018

An Exploration of Property-Value Impacts Near Utility-Scale Solar Installations

This study considers solar farms from two angles. First it looks at where solar farms are being located and concludes that they are being located primarily in low density residential areas where there are fewer homes than in urban or suburban areas.

The second part is more applicable in that they conducted a survey of appraisers/assessors on their opinions of the possible impacts of proximity to a solar farm. They consider the question in terms of size of the adjoining solar farm and how close the adjoining home is to the solar farm. I am very familiar with this part of the study as I was interviewed by the researchers multiple times as they were developing this. One very important question that they ask within the survey is very illustrative. They asked if the appraiser being surveyed had ever appraised a property next to a solar farm. There is a very noticeable divide in the answers provided by appraisers who have experience appraising property next to a solar farm versus appraisers who self-identify as having no experience or knowledge related to that use.

On Page 16 of that study they have a chart showing the responses from appraisers related to proximity to a facility and size of the facility, but they separate the answers as shown below with appraisers with experience in appraising properties next to a solar farm shown in blue and those inexperienced shown in brown. Even within 100 feet of a 102 MW facility the response from experienced appraisers were -5% at most on impact. While inexperienced appraisers came up with significantly higher impacts. This chart clearly shows that an uninformed response widely diverges from the sales data available on this subject.



Furthermore, the question cited above does not consider any mitigating factors such as landscaping buffers or screens which would presumably reduce the minor impacts noted by experienced appraisers on this subject.

The conclusion of the researchers is shown on Page 23 indicated that "Results from our survey of residential home assessors show that the majority of respondents believe that proximity to a solar installation has either no impact or a positive impact on home values."

This analysis supports the conclusion of this report that the data supports no impact on adjoining property values. The only impact suggested by this study is -5% if a home was within 100 feet of a 100 MW solar farm with little to no landscaping screening. The proposed project has a landscaping screening, is much further setback than 100 feet from adjoining homes, and is less than 100 MW.

B. University of Rhode Island, September 2020

Property Value Impacts of Commercial-Scale Solar Energy in Massachusetts and Rhode Island

The University of Rhode Island published a study entitled **Property Value Impacts of Commercial-Scale Solar Energy in Massachusetts and Rhode Island** on September 29, 2020 with lead researchers being Vasundhara Gaur and Corey Lang. I have read that study and interviewed Mr. Corey Lang related to that study. This study is often cited by opponents of solar farms but the findings of that study have some very specific caveats according to the report itself as well as Mr. Lang from the interview.

While that study does state in the Abstract that they found depreciation of homes within 1-mile of a solar farm, that impact is limited to non-rural locations. On Pages 16-18 of that study under Section 5.3 Heterogeneity in treatment effect they indicate that the impact that they found was limited to non-rural locations with the impact in rural locations effectively being zero. For the study they defined "rural" as a municipality/township with less than 850 population per square mile.

They further tested the robustness of that finding and even in areas up to 2,000 population per square mile they found no statistically significant data to suggest a negative impact. They have not specifically defined a point at which they found negative impacts to begin, as the sensitivity study stopped checking at the 2,000-population per square mile.

Where they did find negative impacts was in high population density areas that was largely a factor of running the study in Massachusetts and Rhode Island which the study specifically cites as being the 2nd and 3rd most population dense states in the USA. Mr. Lang in conversation as well as in recorded presentations has indicated that the impact in these heavily populated areas may reflect a loss in value due to the scarce greenery in those areas and not specifically related to the solar farm itself. In other words, any development of that site might have a similar impact on property value.

Based on this study I have checked the population for the Rocky Hill Division of Barren County, which has a population of 3,571 population for 2022 based on HomeTownLocator using Census Data and a total area of 64.93 square miles. This indicates a population density of 55 people per square mile which puts this well below the threshold indicated by the Rhode Island Study.

I therefore conclude that the Rhode Island Study supports the indication of no impact on adjoining properties for the proposed solar farm project.

Rocky Hill Division Data & Demographics (As of July 1, 2022)

POPULATION	
Total Population	3,571 (100%)
Population in Households	3,571 (100.0%)
Population in Families	3,033 (84.9%)
Population in Group Quarters[1]	0
Population Density	55
Diversity Index[2]	18

HOUSING	
Total HU (Housing Units)	1,592 (100%)
Owner Occupied HU	1,080 (67.8%)
Renter Occupied HU	281 (17.7%)
Vacant Housing Units	231 (14.5%)
Median Home Value	$165,546
Average Home Value	$195,718
Housing Affordability Index[3]	154

INCOME	
Median Household Income	$54,230
Average Household Income	$69,396
% of Income for Mortgage[4]	16%
Per Capita Income	$26,448
Wealth Index[5]	53

HOUSEHOLDS	
Total Households	1,361
Average Household Size	2.62
Family Households	992
Average Family Size	3

C. Georgia Institute of Technology, October 2020

Utility-Scale Solar Farms and Agricultural Land Values

This study was completed by Nino Abashidze as Post-Doctoral Research Associate of Health Economics and Analytics Labe (HEAL), School of Economics, Georgia Institute of Technology. This research was started at North Carolina State University and analyzes properties near 451 utility-scale ground-mount solar installations in NC that generate at least 1 MW of electric power. A total of 1,676 land sales within 5-miles of solar farms were considered in the analysis.

This analysis concludes on Page 21 of the study "Although there are no direct effects of solar farms on nearby agricultural land values, we do find evidence that suggests construction of a solar farm may create a small, positive, option -value for land owners that is capitalized into land prices. Specifically, after construction of a nearby solar farm, we find that agricultural land that is also located near transmission infrastructure may increase modestly in value."

This study supports a finding of no impact on adjoining agricultural property values and in some cases could support a modest increase in value.

D. Master's Thesis: ECU by Zachary Dickerson July 2018

A Solar Farm in *My* Backyard? Resident Perspectives of Utility-Scale Solar in Eastern North Carolina

This study was completed as part of a Master of Science in Geography Master's Thesis by Zachary Dickerson in July 2018. This study sets out to address three questions:

1. Are there different aspects that affect resident satisfaction regarding solar farms?

2. Are there variations in satisfaction for residents among different geographic settings, e.g. neighborhoods adjacent to the solar farms or distances from the solar farms?

3. How can insight from both the utility and planning sectors, combined with knowledge gained from residents, fill gaps in communication and policy writing in regard to solar farms?

This was done through survey and interview with adjacent and nearby neighbors of existing solar farms. The positive to neutral comments regarding the solar farms were significantly higher than negative. The researcher specifically indicates on Page 46 "The results show that respondents generally do not believe the solar farms pose a threat to their property values."

The most negative comments regarding the solar farms were about the lack of information about the approval process and the solar farm project prior to construction.

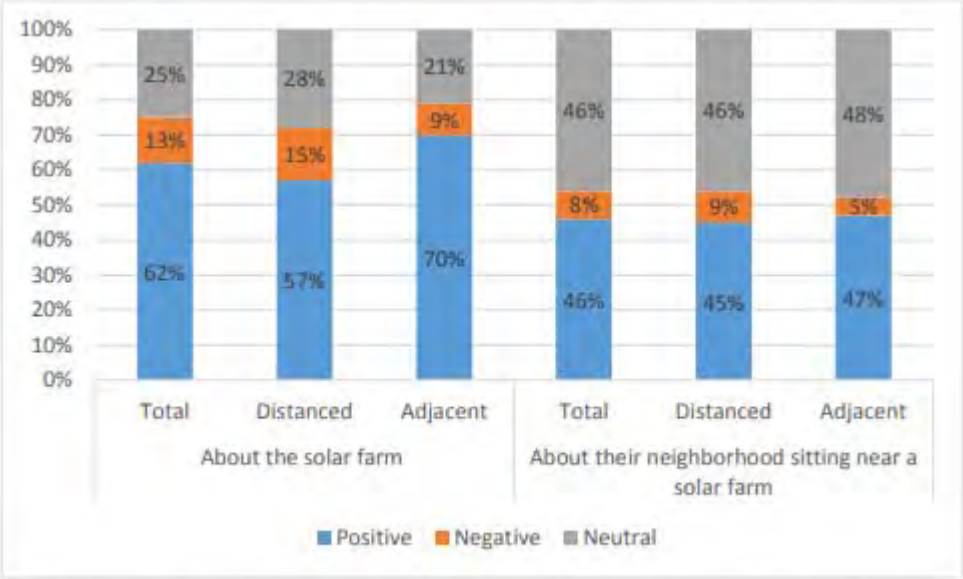
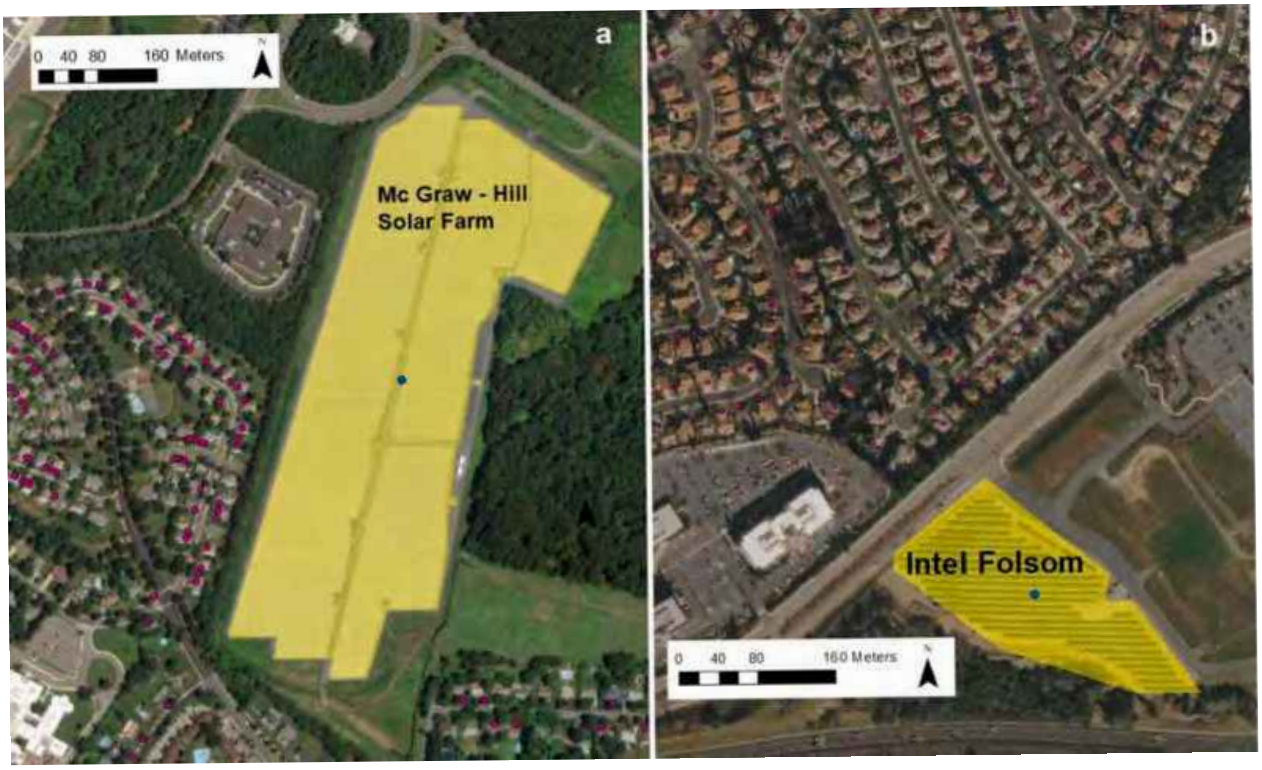


Figure 11: Residents' positive/negative word choices by geographic setting for both questions

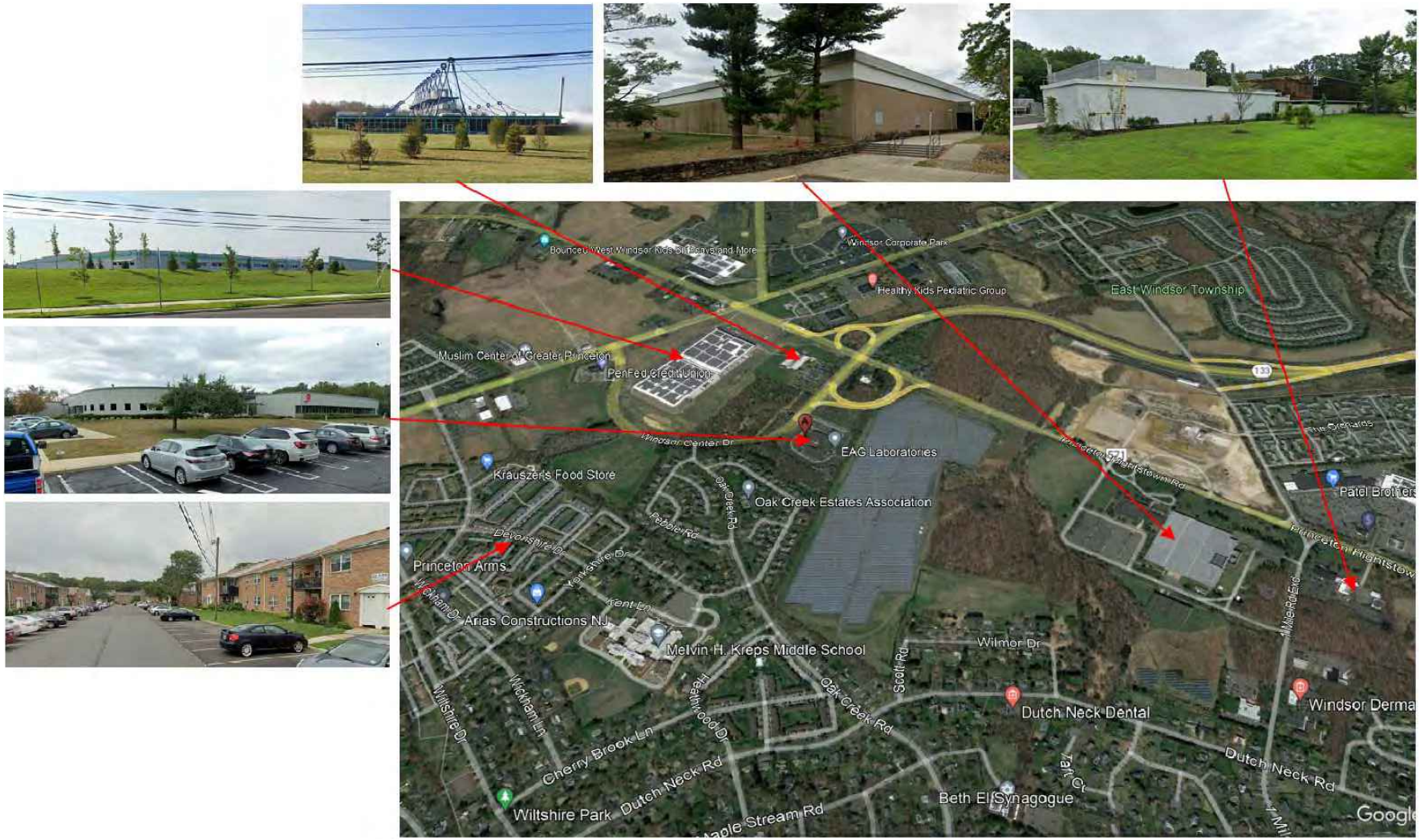
E. Lawrence Berkeley National Lab, March 2023

Shedding light on large-scale solar impacts: An analysis of property values and proximity to photovoltaics across six U.S. states

This study was completed by researchers including Salma Elmallah, Ben Hoen, K. Sydny Fujita, Dana Robson, and Eric Brunner. This analysis considers home sales before and after solar farms were installed within a 1 mile radius and compared them to home sales before and after the solar farms at a 2-4 mile radius. The conclusion found a 1.5% impact within 1 mile of a solar farm as compared to homes 2-4 miles from solar farms. This is the largest study of this kind on solar and addresses a number of issues, but also does not address a number of items that could potentially skew these results. First of all, the study found no impact in the three states with the most solar farm activity and only found impacts in smaller sets of data. The data does not in any way discuss actual visibility of solar farms or address existing vegetation screens. This lack of addressing this is highlighted by the fact that they suggest in the abstract that vegetative shading may be needed to address possible impacts. Another notable issue is the fact that they do not address other possible impacts within the radii being considered. This lack of consideration is well illustrated within the study on Figure A.1 where they show satellite images of McGraw Hill Solar Farm in NJ and Intel Folsom in CA. The Folsom image clearly shows large highways separating the solar farm from nearby housing, but with tower office buildings located closer to the housing being considered. In no place do they address the presence of these towers that essentially block those homes from the solar farm in some places. An excerpt of Fig. A.1. is shown below.



For each of these locations, I have panned out a little further on Google Earth to show the areas illustrated to more accurately reflect the general area. For the McGraw Hill Solar Farm you can see there is a large distribution warehouse to the west along with a large offices and other industrial uses. Further to the west is a large/older apartment complex (Princeton Arms). To the east there are more large industrial buildings. However, it is even more notable that 1.67 miles away to the west is Cranbury Golf Club. Given how this analysis was set up, these homes around the industrial buildings are being compared to homes within this country club to help establish impacts from the solar farm. Even considering the idea that each set is compared to itself before and after the solar farm, it is not a reasonable supposition that homes in each area would appreciate at the same rates even if no solar farm was included. Furthermore the site where the solar farm is located an all of the surrounding uses not improved with residential housing to the south is zoned Research Office (RO) which allows for: manufacturing, preparation, processing or fabrication of products, with all activities and product storage taking place within a completely enclosed building, scientific or research laboratories, warehousing, computer centers, pharmaceutical operations, office buildings, industrial office parks among others. Homes adjoining such a district would likely have impacts and influences not seen in areas zoned and surrounded by zoning strictly for residential uses.


Bounced | West Windsor Kids Birthdays and More
Windsor Corporate Park
Healthy Kids Pediatric Group
East Windsor Township
Muslim Center of Greater Princeton
PenFed Credit Union
Windsor Center Dr
EAG Laboratories
Krauszer's Food Store
Oak Creek Estates Association
Princeton Arms
Arias Constructions NJ
Melvin H. Kreps Middle School
Wilmor Dr
Dutch Neck Dental
Windsor Derma
Cherry Brook Ln
Dutch Neck Rd
Wiltshire Park
Beth El Synagogue
Eagle Stream Rd
Google


COVENTRY AT NATOMA STATION
NATOMA STATION
Natoma Station Elementary School
Waterford Place
Deer/Rabbit Mini Park
Polite Scholars
Redfin | Sacramento Real Estate Agents
PBK Architects
Safeway
Intel Corporation
Intel - FM7
Intel - FM5
Iron Point Rd
Folsom Blvd
El Dorado Fwy
Alder Creek

On the Intel Folsom map I have shown the images of two of the Intel Campus buildings, but there are roughly 8 such buildings on that site with additional solar panels installed in the parking lot as shown in that image. I included two photos that show the nearby housing having clear and close views of adjoining office parking lots. This illustrates that the homes in that 1 mile radius are significantly more impacted by the adjoining office buildings than a solar farm located distantly that are not within the viewshed of those homes. Also, this solar farm is located on land adjoining the Intel Campus on a tract that is zoned M-1 PD, which is a Light Industrial/Manufacturing zoning. Nearby homes. Furthermore, the street view at the solar farm shows not only the divided four-lane highway that separates the office buildings and homes from the solar farm, but also shows that there is no landscaping buffer at this location. All of these factors are ignored by this study. Below is another image of the Folsom Solar at the corner of Iron Point Road and Intel West Driveway which shows just how close and how unscreened this project is.

Compare that image from the McGraw Hill street view facing south from County Rte 571. There is a distant view and much of the project is hidden by a mix of berms and landscaping. The analysis makes no distinction between these projects.

The third issue with this study is that it identifies impacts following development in areas where they note that "more adverse home price impacts might be found where LSPVPS (large-scale photovoltaic project) displace green space (consistent with results that show higher property values

near green space." The problem with this statement is that it assumes that the greenspace is somehow guaranteed in these areas, when in fact, they could just as readily be developed as a residential subdivision and have the same impacts. They have made no effort to differentiate loss of greenspace through other development purposes such as schools, subdivisions, or other uses versus the impact of solar farms. In other words, they may have simply identified the impact of all forms of development on property value. This would in fact be consistent with the comments in the Rhode Island study where the researchers noted that the loss of greenspace in the highly urban areas was likely due to the loss of greenspace in particular and not due to the addition of solar panels.

Despite these three shortcomings in the analysis – the lack of differentiating landscape screening, the lack of consideration of other uses within the area that could be impacting property values, and the lack of consideration of alternative development impacts – the study still only found impacts between 0 and 5% with a conclusion of 1.5% within a 1-mile radius. As discussed later in this report, real estate is an imperfect market and real estate transactions typically sell for much wider variability than 5% even where there are no external factors operating on property value.

I therefore conclude that the minor impacts noted in this study support a finding of no impact on property value. Most appraisals show a variation between the highest and lowest comparable sale that is substantially greater than 1.5% and this measured impact for all it flaws would just be lost in the static of normal real estate transactions.

VI. Assessor Surveys

While I have not completed a survey of assessors in Kentucky as of yet, I have been reaching out to assessors in other states about their experience and research on solar farm impacts.

I have completed surveys in North Carolina, Virginia, Colorado, New Mexico, and Mississippi. I have so far found no responses from any assessor that they make negative adjustments to adjoining properties. I currently have 39 responses in North Carolina, 16 responses from Virginia, 4 from Mississippi, and 15 from Colorado. Adding in the 5 responses in New Mexico, I have a total of 79 assessor responses and all 79 indicate either no negative impacts on adjoining property values, or else they did not respond to that part of the question. A total of 69 of the responses were definitively "No" with an additional 10 being "No response" to that question.

I have included the breakdown of that data on the following pages.

New Mexico Tax Assessors

County	Number of Farms in Operation	Change in adjacent property value
Colfax	3, 1 in planning	No
Curry	1, quite a few in talks	No
Dona Ana	2 owned by city and county	No
Lincoln	1	No
Union	1	No
	Total Responses With Solar	5
	Total Responses "No"	5
	Total Responses "Yes"	0

NC Assessor Survey on Solar Farm Property Value Impacts

County	Assessor's Name	Number of Farms	Change in Adjacent Property Value
Alexander	Doug Fox	3	No
Buncombe	Lisa Kirbo	1	No
Burke	Daniel Isenhour	3, 2 on 1 parcel, 1 on 3 parcels	No
Cabarrus	Justin	less than 10, more in the works	No
Caldwell	Monty Woods	3 small	No, but will look at data in 2025
Catawba	Lori Ray	14	No
Chatham	Jenny Williams	13	No
Cherokee	Kathy Killian	9	No
Chowan	Melissa Radke	3, I almost operational	No
Clay	Bonnie L. Lyvers		No
Davidson	Libby	1	No
Duplin	Gary Rose	34, 2 more in planning	No
Franklin	Marion Cascone	11	No
Gaston	Traci Hovis	3	No
Gates	Chris Hill	3	No
Granville	Jenny Griffin	8	No
Halifax	C. Shane Lynch	Multiple	No
Hoke	Mandi Davis	4	No
Hyde	Donnie Shumate	1 to supplement egg processing plant	No
Iredell	Wes Long	2, 3 others approved	No
Lee	Lisa Faulkner	8	No
Lincoln	Susan Sain	2	No
Moore	Michael Howery	10	No
New Hanover	Rhonda Garner	35	No
Orange	Chad Phillip	2 or 7 depending on breakdown	No
Pender	Kayla Bolick Futrell	6	No
Person	Russell Jones	9	No
Pitt	Russell D. Hill	8, 1 in planning	No
Randolph	Mark Frick	19	No
Rockingham	Mark C McClintock	6	No
Rutherford	Kim Aldridge	20	No
Sampson	Jim Johnson	9, 1 in construction	No
Scotland	James Brown	15, 1 in process	No
Stokes	Richard Brim	2	No
Surry	Penny Harrison	4, 2 more in process	No
Union	Robin E. Merry	6	No
Vance	Cathy E. Renn	13	No
Warren	John Preston	7	No
Wayne	Alan Lumpkin	32	No
Wilson	William (Witt) Putney	~16	No, mass appraisal standards applied

Responses: 39
Negative Impact on Adjoining Value = Yes: 0
Negative Impact on Adjoining Value = No: 39

VIRGINIA Commissioner of the Revenue

County	Assessor Name	Number of Farms in Operation	Change in adjacent property value
Appomattox	Sara Henderson	1, plus one in process	No
Augusta	W. Jean Shrewsbury	no operational	No
Buckingham	Stephanie D. Love	1	No
Charlotte	Naisha Pridgen Carter	1, several others in the works	No
Clarke	Donna Peake	1	No
Frederick	Seth T. Thatcher	none, 2 appoved for 2022	No, assuming compatible with rural area
Goochland	Mary Ann Davis		No
Hanover	Ed Burnett	1	No
Louisa	Stacey C. Fletcher	2 operational by end of year	No, only if supported by market data
Mecklenburg	Joseph E. "Ed" Taylor		No
Nottoway	Randy Willis with Pearson Assessors		No
Powhatan	Charles Everest	2 approved, 1 built	Likely increase in value
Rockingham	Dan Cullers	no operational	Likely no
Southampton	Amy B. Carr	1	Not normally
Surry	Jonathan F. Judkins	1	None at this time
Westmoreland	William K. Hoover	4	No

Responses: 16
Negative Impact on Adjoining Value = Yes: 0
Negative Impact on Adjoining Value = No: 16

MS Assessor Survey on Solar Farm Property Value Impacts

County	Assessor's Name	Number of Farms	Change in Adjacent Property Value
Desoto	Jeff Fitch	1, 1 in planning	No response
Monroe	Mitzi Presley	2 in planning	No response
Stone	Charles Williams, Jr.	1 in planning	No
Union	Tameri Dunnam	1	No

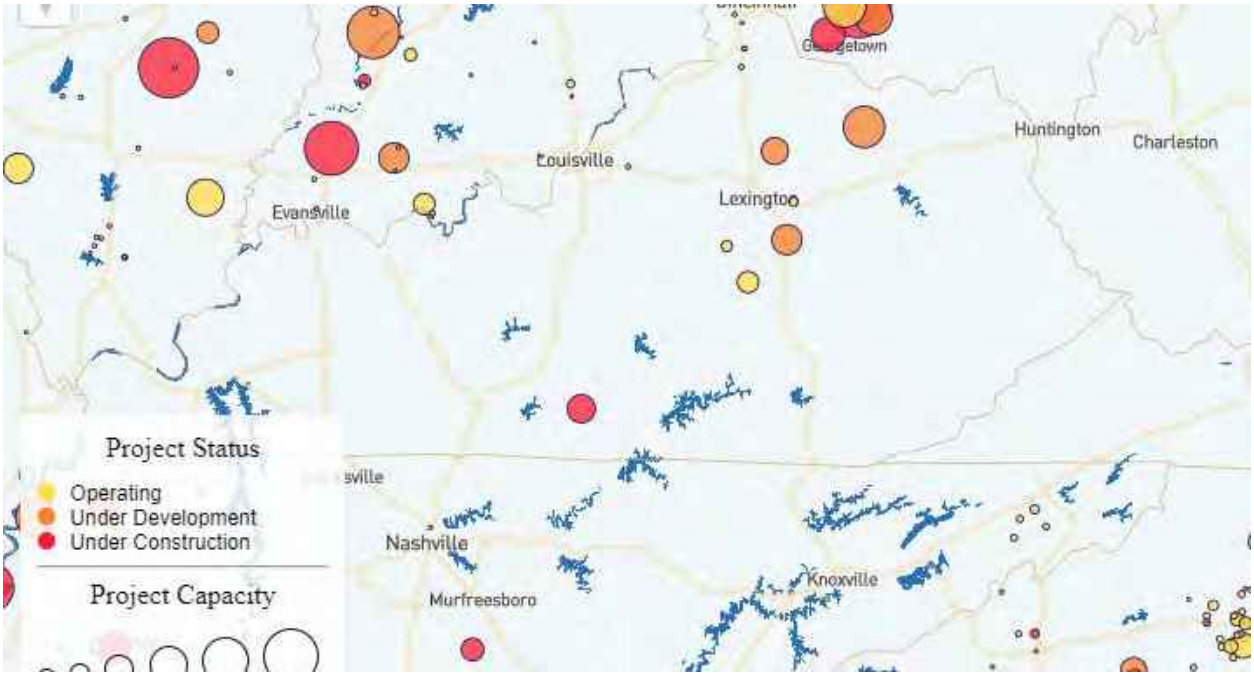
CO Assessor Survey on Solar Farm Property Value Impacts

County	Assessor's Name	Number of Farms	Change in Adjacent Property Value
Conejos	Naomi Keys	3 or 4	No response
Denver	Keith Erffmeyer	3	No
Garfield	Jim Yellico (Vicki Riley)	No response	Classification and value could change
Kiowa	Marci Miller	0, 2 in planning	No
La Plata	Carrie Woodson	0, 1 in planning	No response
Las Animas	Jodi Amato	1 operational, 1 in planning	No
Moffat	Charles "Chuck" Cobb	0, 5 in planning	No
Montezuma	Leslie Bugg	3 approved	No
Montrose	Brad Hughes	2, 1 in planning	Maybe, but would be based on sales data
Morgan	Tim Amen	2, operational, 3 in planning	No
Pitkin	Wendy Schultz	1	No
Rio Blanco	Renae Neilson	2	No response
Saguache	Peter Peterson	1	No
San Miguel	Sarah Enders	1	Not enough data
Yuma	Cindy Taylor	1 in planning	No response

Responses: 15
Negative Impact on Adjoining Value = Yes: 0
Negative Impact on Adjoining Value = No: 7
Negative Impact on Adjoining Value = No Response: 8

VII. Summary of Solar Projects in Kentucky

I have researched the solar projects in Kentucky. I identified the solar farms through the Solar Energy Industries Association (SEIA) Major Projects List and then excluded the roof mounted facilities. This leaves only six solar farms in Kentucky for analysis at this time. Below is a map pulled from SEIA on Major Projects and it shows projects under development in orange and under construction in red, with only the smaller yellow dots representing existing solar farms. It was from this map that I have identified the six existing solar farms researched in Kentucky.



One of these six solar farms has limited analysis potential: E.W. Brown near Harrodsburg in Mercer County. The E. W. Brown 10 MW solar farm was built in 2014 and adjoins three coal-fired units. Given that research studies that I have read regarding fossil fuel power plants including "The Effect of Power Plants on Local Housing Values and Rents" by Lucas W. Davis and published May 2010, it would not be appropriate to use any data from this solar farm due to the influence of the coal-fired power plant that could have an impact on up to a one-mile radius. I note that the closest home to a solar panel at this site is 565 feet and the average distance is 1,026 feet. The homes are primarily clustered at the Herrington Lake frontage. Recent sales in this area range from $164,000 to $212,000 for these waterfront homes. Again, no usable data can be derived from this solar farm due to the adjoining coal fired plant.

Furthermore, the Cooperative solar farm in Shelby County is a 0.5 MW facility on 35 acres built in 2020 that is proposed to eventually be 4 MW. This project is too new and there have been no home sales adjoining this facility. I also cannot determine how close the nearby homes are to the adjoining solar panels as the aerial imagery does not yet show these panels.

I have provided a summary of projects below and additional detailed information on the projects on the following pages. I specifically note the similarity in most of the sites in Kentucky in terms of mix of adjoining uses, topography, and distances to adjoining homes.

The number of solar farms currently in Kentucky is low compared to a number of other states and North Carolina in particular. I have looked at solar farms in Kentucky for sales activity, but the small number of sites coupled with the relatively short period of time these solar farms have been in place has not provided as many examples of sales adjoining a solar farm as I am able to pull from other places. I have therefore also considered sales in other states, but I have shown in the

summary how the demographics around the solar farms in other locations relate to the demographics around the proposed solar farm to show that generally similar locations are being considered. The similarity of the sites in terms of adjoining uses and surrounding demographics makes it reasonable to compare the lack of significant impacts in other areas would translate into a similar lack of significant impacts at the subject site.

Parcel #	State	County	City	Name	Output (MW)	Total Acres	Used Acres	Avg. Dist to home	Closest Home	Adjoining Use by Acre					Adjoining Use by Number			
										Res	Agri	Agri/Res	Com		Reside	Agricul	Comm/Ind	%
610	KY	Warren	Bowling Green	Bowling Green	2	17.36	17.36	720	720	1%	64%	0%	36%	100%	10%	30%	60%	100%
611	KY	Clark	Winchester	Cooperative Solar I	8.5	181.47	63	2,110	2,040	0%	96%	3%	0%	100%	22%	78%	0%	100%
612	KY	Kenton	Walton	Walton 2	2	58.03	58.03	891	120	21%	0%	60%	19%	100%	65%	0%	35%	100%
613	KY	Grant	Crittenden	Crittenden	2.7	181.7	34.1	1,035	345	22%	27%	51%	0%	100%	96%	4%	0%	100%
617	KY	Metcalfe	Summer Shade	Glover Creek		968.2	322.4	1,731	375	6%	25%	69%	0%	100%	83%	17%	0%	100%
618	KY	Garrard	Lancaster	Turkey Creek		752.8	297.1	976	240	8%	36%	51%	5%	100%	73%	12%	15%	100%
		Total Number of Solar Farms			6													
				Average	3.80	359.9	132.0	1244	640	9%	41%	39%	10%		58%	24%	18%	
				Median	2.35	181.6	60.5	1006	360	7%	32%	51%	3%		69%	14%	7%	
				High	8.50	968.2	322.4	2110	2040	22%	96%	69%	36%		96%	78%	60%	
				Low	2.00	17.4	17.4	720	120	0%	0%	0%	0%		3%	0%	0%	

610: Bowling Green Solar, Bowling Green, KY

This project was built in 2011 and located on 17.36 acres for a 2 MW project on Scotty's Way with the adjoining uses being primarily industrial. The closest dwelling is 720 feet from the nearest panel.

Adjoining Use Breakdown

	Acreage	Parcels
Residential	0.58%	10.00%
Agricultural	63.89%	30.00%
Industrial	35.53%	60.00%
Total	**100.00%**	**100.00%**

611: Cooperative Solar I, Winchester, KY

This project was built in 2017 on 63 acres of a 181.47-acre parent tract for an 8.5 MW project with the closest home at 2,040 feet from the closest solar panel.

Adjoining Use Breakdown

	Acreage	Parcels
Residential	0.15%	11.11%
Agricultural	96.46%	77.78%
Agri/Res	3.38%	11.11%
Total	**100.00%**	**100.00%**

612: Walton 2 Solar, Walton, KY

This project was built in 2017 on 58.03 acres for a 2 MW project with the closest home 120 feet from the closest panel.

Adjoining Use Breakdown

	Acreage	Parcels
Residential	20.84%	47.06%
Agri/Res	59.92%	17.65%
Commercial	19.25%	35.29%
Total	**100.00%**	**100.00%**

613: Crittenden Solar, Crittenden, KY

This project was built in late 2017 on 34.10 acres out of a 181.70-acre tract for a 2.7 MW project where the closest home is 345 feet from the closest panel.

Adjoining Use Breakdown

	Acreage	Parcels
Residential	1.65%	32.08%
Agricultural	73.39%	39.62%
Agri/Res	23.05%	11.32%
Commercial	0.64%	9.43%
Industrial	0.19%	3.77%
Airport	0.93%	1.89%
Substation	0.15%	1.89%
Total	**100.00%**	**100.00%**

659: Cooperative Shelby Solar, Simpsonville, KY

This project was built in 2020 on 35 acres for a 0.5 MW project that is approved for expansion up to 4 MW.

Adjoining Use Breakdown

	Acreage	Parcels
Residential	6.04%	44.44%
Agricultural	10.64%	11.11%
Agri/Res	31.69%	33.33%
Institutional	51.62%	11.11%
Total	**100.00%**	**100.00%**

660: E.W. Brown Solar, Harrodsburg, KY

This project was built in 2016 on 50 acres for a 10 MW project. This solar facility adjoins three coal-fired units, which makes analysis of these nearby home sales problematic as it is impossible to extract the impact of the coal plant on the nearby homes especially given the lake frontage of the homes shown.

Adjoining Use Breakdown

	Acreage	Parcels
Residential	2.77%	77.27%
Agricultural	43.92%	9.09%
Agri/Res	28.56%	9.09%
Industrial	24.75%	4.55%
Total	**100.00%**	**100.00%**

VIII. Market Analysis of the Impact on Value from Solar Farms

I have researched hundreds of solar farms in numerous states to determine the impact of these facilities on the value of adjoining properties. This research has primarily been in North Carolina, but I have also conducted market impact analyses in Virginia, South Carolina, Tennessee, Texas, Oregon, Mississippi, Maryland, New York, California, Missouri, Florida, Montana, Georgia, Kentucky, and New Jersey.

I have derived a breakdown of the adjoining uses to show where solar farms are located. A summary showing the results of compiling that data over hundreds of solar farms is shown later in the Scope of Research section of this report.

I also consider whether the properties adjoining a solar farm in one location have characteristics similar to the properties abutting or adjoining the proposed site so that I can make an assessment of market impact on each proposed site. Notably, in most cases solar farms are placed in areas very similar to the site in question, which is surrounded by low density residential and agricultural uses. In my over 700 studies, I have found a striking repetition of that same typical adjoining property use mix in over 90% of the solar farms I have looked at. Matched pair results in multiple states are strikingly similar, and all indicate that solar farms – which generate very little traffic, and do not generate noise, dust or have other harmful effects – do not negatively impact the value of adjoining or abutting properties.

I have previously been asked by the Kentucky Siting Board about how the solar farms and the matched pair sets were chosen. This is the total of all the usable home sales adjoining the 900+ solar farms that I have looked at over the last 12 years. Most of the solar farms that I have looked at are only a few years old and have not been in place long enough for home or land sales to occur next to them for me to analyze. There is nothing unusual about this given the relatively rural locations of most of the solar farms where home and land sales occur much less frequently than they do in urban and suburban areas and the number of adjoining homes is relatively small.

I review the solar farms that I have looked at periodically to see if there are any new sales. If there is a sale I have to be sure it is not an inhouse sale or to a related family member. A great many of the rural sales that I find are from one family member to another, which makes analysis impossible given that these are not "arm's length" transactions. There are also numerous examples of sales that are "arm's length" but are still not usable due to other factors such as adjoining significant negative factors such as a coal fired plant or at a landfill or prison. I have looked at homes that require a driveway crossing a railroad spur, homes in close proximity to large industrial uses, as well as homes adjoining large state parks, or homes that are over 100 years old with multiple renovations. Such sales are not usable as they have multiple factors impacting the value that are tangled together. You can't isolate the impact of the coal fired plant, the industrial building, or the railroad unless you are comparing that sale to a similar property with similar impacts. Matched pair analysis requires that you isolate properties that only have one differential to test for, which is why the type of sales noted above is not appropriate for analysis.

After my review of all sales and elimination of the family transactions and those sales with multiple differentials, I am left with the matched pairs shown in this report to analyze. I do have additional matched pair data in other areas of the United States that were not included in this report due to being states less comparable to Kentucky than those shown. The only other sales that I have eliminated from the analysis are home sales under $100,000, which there haven't been many such examples, but at that price range it is difficult to identify any impacts through matched pair analysis. I have not cherry picked the data to include just the sales that support one direction in value, but I have included all of them both positive and negative with a preponderance of the evidence supporting no impact to mild positive impacts.

A. Kentucky and Adjoining States Data

1. Matched Pair – Crittenden Solar, Crittenden, Grant County, KY

This solar farm was built in December 2017 on a 181.70-acre tract but utilizing only 34.10 acres. This is a 2.7 MW facility with residential subdivisions to the north and south.

I have identified five home sales to the north of this solar farm on Clairborne Drive and one home sale to the south on Eagle Ridge Drive since the completion of this solar farm. The home sale on Eagle Drive is for a $75,000 home and all of the homes along that street are similar in size and price range. According to local broker Steve Glacken with Cutler Real Estate these are the lowest price range/style home in the market. I have not analyzed that sale as it would unlikely provide significant data to other homes in the area.

Mr. Glacken has been selling lots at the west end of Clairborne for new home construction. He indicated in 2020 that the solar farm near the entrance of the development has been a complete non-factor and none of the home sales are showing any concern over the solar farm. Most of the homes are in the $250,000 to $280,000 price range. The vacant residential lots are being marketed for $28,000 to $29,000. The landscaping buffer is considered light, but the rolling terrain allows for distant views of the panels from the adjoining homes along Clairborne Drive.

The first home considered is a bit of an anomaly for this subdivision in that it is the only manufactured home that was allowed in the community. It sold on January 3, 2019. I compared that sale to three other manufactured home sales in the area making minor adjustments as shown on the next page to account for the differences. After all other factors are considered the adjustments show a -1% to +13% impact due to the adjacency of the solar farm. The best indicator is 1250 Cason, which shows a 3% impact. A 3% impact is within the normal static of real estate transactions and therefore not considered indicative of a positive impact on the property, but it strongly supports an indication of no negative impact.

Adjoining Residential Sales After Solar Farm Approved

Parcel	Solar	Address	Acres	Date Sold	Sales Price	Built	GBA	$/GBA	BR/BA	Park	Style	Other
	Adjoins	250 Claiborne	0.96	1/3/2019	$120,000	2000	2,016	$59.52	3/2	Drive	Manuf	
	Not	1250 Cason	1.40	4/18/2018	$95,000	1994	1,500	$63.33	3/2	2-Det	Manuf	Carport
	Not	410 Reeves	1.02	11/27/2018	$80,000	2000	1,456	$54.95	3/2	Drive	Manuf	
	Not	315 N Fork	1.09	5/4/2019	$107,000	1992	1,792	$59.71	3/2	Drive	Manuf	

Adjustments

Solar	Address	Time	Site	YB	GLA	BR/BA	Park	Other	Total	% Diff	Avg % Diff	Distance
Adjoins	250 Claiborne								$120,000			373
Not	1250 Cason	$2,081		$2,850	$26,144		-$5,000	-$5,000	$116,075	3%		
Not	410 Reeves	$249		$0	$24,615				$104,865	13%		
Not	315 N Fork	-$1,091		$4,280	$10,700				$120,889	-1%		
											5%	

I also looked at three other home sales on this street as shown below. These are stick-built homes and show a higher price range.

Adjoining Residential Sales After Solar Farm Approved

Parcel	Solar	Address	Acres	Date Sold	Sales Price	Built	GBA	$/GBA	BR/BA	Park	Style	Other
	Adjoins	300 Claiborne	1.08	9/20/2018	$212,720	2003	1,568	$135.66	3/3	2-Car	Ranch	Brick
	Not	460 Claiborne	0.31	1/3/2019	$229,000	2007	1,446	$158.37	3/2	2-Car	Ranch	Brick
	Not	2160 Sherman	1.46	6/1/2019	$265,000	2005	1,735	$152.74	3/3	2-Car	Ranch	Brick
	Not	215 Lexington	1.00	7/27/2018	$231,200	2000	1,590	$145.41	5/4	2-Car	Ranch	Brick

Adjustments

Solar	Address	Time	Site	YB	GLA	BR/BA	Park	Other	Total	% Diff	Avg % Diff	Distance
Adjoins	300 Claiborne								$213,000			488
Not	460 Claiborne	-$2,026		-$4,580	$15,457	$5,000			$242,850	-14%		
Not	2160 Sherman	-$5,672		-$2,650	-$20,406				$236,272	-11%		
Not	215 Lexington	$1,072		$3,468	-$2,559	-$5,000			$228,180	-7%		
											-11%	

This set of matched pairs shows a minor negative impact for this property. I was unable to confirm the sales price or conditions of this sale. The best indication of value is based on 215 Lexington, which required the least adjusting and supports a -7% impact.

Adjoining Residential Sales After Solar Farm Approved

Parcel	Solar	Address	Acres	Date Sold	Sales Price	Built	GBA	$/GBA	BR/BA	Park	Style	Other
	Adjoins	350 Claiborne	1.00	7/20/2018	$245,000	2002	1,688	$145.14	3/3	2-Car	Ranch	Brick
	Not	460 Claiborne	0.31	1/3/2019	$229,000	2007	1,446	$158.37	3/2	2-Car	Ranch	Brick
	Not	2160 Sherman	1.46	6/1/2019	$265,000	2005	1,735	$152.74	3/3	2-Car	R/FBsmt	Brick
	Not	215 Lexington	1.00	7/27/2018	$231,200	2000	1,590	$145.41	5/4	2-Car	Ranch	Brick

Adjustments

Solar	Address	Time	Site	YB	GLA	BR/BA	Park	Other	Total	% Diff	Avg % Diff	Distance
Adjoins	350 Claiborne								$245,000			720
Not	460 Claiborne	-$3,223		-$5,725	$30,660	$5,000			$255,712	-4%		
Not	2160 Sherman	-$7,057		-$3,975	-$5,743				$248,225	-1%		
Not	215 Lexington	-$136		$2,312	$11,400	-$5,000			$239,776	2%		
											-1%	

The following photograph shows the light landscaping buffer and the distant view of panels that was included as part of the marketing package for this property. The panels are visible somewhat on the left and somewhat through the trees in the center of the photograph. The first photograph is from the home, with the second photograph showing the view near the rear of the lot.

This set of matched pairs shows a no negative impact for this property. The range of adjusted impacts is -4% to +2%. The best indication is -1%, which as described above is within the typical market static and supports no impact on adjoining property value.

Adjoining Residential Sales After Solar Farm Approved

Parcel	Solar	Address	Acres	Date Sold	Sales Price	Built	GBA	$/GBA	BR/BA	Park	Style	Other
	Adjoins	370 Claiborne	1.06	8/22/2019	$273,000	2005	1,570	$173.89	4/3	2-Car	2-Story	Brick
	Not	2160 Sherman	1.46	6/1/2019	$265,000	2005	1,735	$152.74	3/3	2-Car	R/FBsmt	Brick
	Not	2290 Dry	1.53	5/2/2019	$239,400	1988	1,400	$171.00	3/2.5	2-Car	R/FBsmt	Brick
	Not	125 Lexington	1.20	4/17/2018	$240,000	2001	1,569	$152.96	3/3	2-Car	Split	Brick

Adjustments

Solar	Address	Time	Site	YB	GLA	BR/BA	Park	Other	Total	% Diff	Avg % Diff	Distance
Adjoins	370 Claiborne								$273,000			930
Not	2160 Sherman	$1,831		$0	-$20,161				$246,670	10%		
Not	2290 Dry	$2,260		$20,349	$23,256	$2,500			$287,765	-5%		
Not	125 Lexington	$9,951		$4,800					$254,751	7%		
											4%	

This set of matched pairs shows a general positive impact for this property. The range of adjusted impacts is -5% to +10%. The best indication is +7%. I typically consider measurements of +/-5% to be within the typical variation in real estate transactions. This indication is higher than that and suggests a positive relationship.

The photograph from the listing shows panels visible between the home and the trampoline shown in the picture.

Adjoining Residential Sales After Solar Farm Approved

Solar	Address	Acres	Date Sold	Sales Price	Built	GBA	$/GBA	BR/BA	Park	Style	Other
Adjoins	330 Claiborne	1.00	12/10/2019	$282,500	2003	1,768	$159.79	3/3	2-Car	Ranch	Brick/pool
Not	895 Osborne	1.70	9/16/2019	$249,900	2002	1,705	$146.57	3/2	2-Car	Ranch	Brick/pool
Not	2160 Sherman	1.46	6/1/2019	$265,000	2005	1,735	$152.74	3/3	2-Car	R/FBsmt	Brick
Not	215 Lexington	1.00	7/27/2018	$231,200	2000	1,590	$145.41	5/4	2-Car	Ranch	Brick

Solar	Address	Time	Site	YB	GLA	BR/BA	Park	Other	Total	% Diff	Avg % Diff	Distance
Adjoins	330 Claiborne								$282,500			665
Not	895 Osborne	$1,790		$1,250	$7,387	$5,000		$0	$265,327	6%		
Not	2160 Sherman	$4,288		-$2,650	$4,032			$20,000	$290,670	-3%		
Not	215 Lexington	$9,761		$3,468	$20,706	-$5,000		$20,000	$280,135	1%		
											1%	

This set of matched pairs shows a general positive impact for this property. The range of adjusted impacts is -3% to +6%. The best indication is +6%. I typically consider measurements of +/-5% to be within the typical variation in real estate transactions. This indication is higher than that and suggests a positive relationship. The landscaping buffer on these is considered light with a fair visibility of the panels from most of these comparables and only thin landscaping buffers separating the homes from the solar panels.

I also looked at four sales that were during a rapid increase in home values around 2021, which required significant time adjustments based on the FHFA Housing Price Index. Sales in this time frame are less reliable for impact considerations as the peak buyer demand allowed for homes to sell with less worry over typical issues such as repairs.

The home at 250 Claiborne Drive sold with no impact from the solar farm according to the buyer's broker Lisa Ann Lay with Keller Williams Realty Service. As noted earlier, this is the only manufactured home in the community and is a bit of an anomaly. There was an impact on this sale due to an appraisal that came in low likely related to the manufactured nature of the home. Ms. Lay indicated that there was significant back and forth between both brokers and the appraiser to address the low appraisal, but ultimately, the buyers had to pay $20,000 out of pocket to cover the difference in appraised value and the purchase price. The low appraisal was not attributed to the solar farm, but the difficulty in finding comparable sales and likely the manufactured housing.

Adjoining Residential Sales After Solar Farm Built

Solar	Address	Acres	Date Sold	Sales Price	Built	GBA	$/GBA	BR/BA	Park	Style	Other
Adjoins	250 Claiborne	1.05	1/5/2022	$210,000	2002	1,592	$131.91	4/2	Drive	Ranch	Manuf
Not	255 Spillman	0.64	3/4/2022	$166,000	1991	1,196	$138.80	3/1	Drive	Ranch	Remodel
Not	546 Waterworks	0.28	4/29/2021	$179,500	2007	1,046	$171.61	4/2	Drive	Ranch	3/4 Fin B
Not	240 Shawnee	1.18	6/7/2021	$180,000	1977	1,352	$133.14	3/2	Gar	Ranch	N/A

Solar	Address	Time	YB	GLA	BR/BA	Park	Other	Total	% Diff	Avg % Diff	Distance
Adjoins	250 Claiborne							$210,000			365
Not	255 Spillman	-$379	$9,130	$43,971	$10,000		-$20,000	$208,722	1%		
Not	546 Waterworks	$1,772	-$4,488	$74,958			-$67,313	$184,429	12%		
Not	240 Shawnee	$1,501	$22,500	$25,562		-$10,000		$219,563	-5%		
										3%	

The photograph of the rear view from the listing is shown below.

The home at 260 Claiborne Drive sold with no impact from the solar farm according to the buyer's broker Jim Dalton with Ashcraft Real Estate Services. He noted that there was significant wood rot and a heavy smoker smell about the house, but even that had no impact on the price due to high demand in the market.

Adjoining Residential Sales After Solar Farm Built

Solar	Address	Acres	Date Sold	Sales Price	Built	GBA	$/GBA	BR/BA	Park	Style	Other
Adjoins	260 Claiborne	1.00	10/13/2021	$175,000	2001	1,456	$120.19	3/2	Drive	Ranch	N/A
Not	355 Oakwood	0.58	10/27/2020	$186,000	2002	1,088	$170.96	3/2	Gar	Ranch	3/4 Fin B
Not	30 Ellen Kay	0.50	1/30/2020	$183,000	1988	1,950	$93.85	3/2	Gar	2-Story	N/A
Not	546 Waterworks	0.28	4/29/2021	$179,500	2007	1,046	$171.61	4/2	Drive	Ranch	3/4 Fin B

Solar	Address	Time	YB	GLA	BR/BA	Park	Other	Total	% Diff	Avg % Diff	Distance
Adjoins	260 Claiborne							$175,000			390
Not	355 Oakwood	$18,339	-$930	$50,329		-$10,000	-$69,750	$173,988	1%		
Not	30 Ellen Kay	$31,974	$11,895	-$37,088		-$10,000		$179,781	-3%		
Not	546 Waterworks	$8,420	-$5,385	$56,287			-$67,313	$171,510	2%		
										0%	

The photograph of the rear view from the listing is shown below.

These next two were brick and with unfinished basements which made them easier to compare and therefore more reliable. For 300 Claiborne I considered the sale of a home across the street that did not back up to the solar farm and it adjusted to well below the range of the other comparables. I have included it, but would not rely on that which means this next comparable strongly supports a range of 0 to +3% and not up to +19%.

djoining Residential Sales After Solar Farm Built

Solar	Address	Acres	Date Sold	Sales Price	Built	GBA	$/GBA	BR/BA	Park	Style	Other
Adjoins	300 Claiborne	0.89	12/18/2021	$290,000	2002	1,568	$184.95	3/3	2-Car	Br Rnch	Bsmt
Not	405 Claiborne	0.41	2/1/2022	$267,750	2004	1,787	$149.83	3/2	2-Car	Br Rnch	Bsmt
Not	39 Pinhook	0.68	3/31/2022	$299,000	1992	1,680	$177.98	3/2	2-Car	Br Rnch	Bsmt
Not	5 Pinhook	0.70	4/7/2022	$309,900	1992	1,680	$184.46	3/2	2-Car	Br Rnch	Bsmt

Solar	Address	Time	YB	GLA	BR/BA	Park	Other	Total	% Diff	Avg % Diff	Distance
Adjoins	300 Claiborne							$290,000			570
Not	405 Claiborne	-$3,384	-$2,678	-$26,251				$235,437	19%		
Not	39 Pinhook	-$8,651	$14,950	-$15,947				$289,352	0%		
Not	5 Pinhook	-$9,576	$15,495	-$16,528				$299,291	-3%		
										5%	

The photograph of the rear view from the listing is shown below.

The home at 410 Claiborne included an inground pool with significant landscaping around it that was a challenge. Furthermore, two of the comparables had finished basements. I made no adjustment for the pool on those two comparables and considered the two factors to cancel out

Adjoining Residential Sales After Solar Farm Built

Solar	Address	Acres	Date Sold	Sales Price	Built	GBA	$/GBA	BR/BA	Park	Style	Other
Adjoins	410 Claiborne	0.31	2/10/2021	$275,000	2006	1,595	$172.41	3/2	2-Car	Br Rnch	Bsmt/Pool
Not	114 Austin	1.40	12/23/2020	$248,000	1994	1,650	$150.30	3/2	2-Car	Br Rnch	Bsmt
Not	125 Liza	0.29	6/25/2021	$315,000	2005	1,913	$164.66	4/3	2-Car	Br Rnch	Ktchn Bsmt
Not	130 Hannahs	0.42	2/9/2021	$295,000	2007	1,918	$153.81	3/3	2-Car	Br Rnch	Fin Bsmt

Solar	Address	Time	YB	GLA	BR/BA	Park	Other	Total	% Diff	Avg % Diff	Distance
Adjoins	410 Claiborne							$275,000			1080
Not	114 Austin	$3,413	$14,880	-$6,613			$20,000	$279,680	-2%		
Not	125 Liza	-$11,945	$1,575	-$41,890	-$10,000			$252,740	8%		
Not	130 Hannahs	$83	-$1,475	-$39,743	-$10,000			$243,864	11%		
										6%	

The nine matched pairs considered in this analysis includes five that show no impact on value, one that shows a negative impact on value, and three that show a positive impact. The negative indication supported by one matched pair is -7% and the positive impacts are +6% and +7%. The two neutral indications show impacts of -5% to +5%. The average indicated impact is +2% when all nine of these indicators are blended.

Furthermore, the comments of the local real estate brokers strongly support the data that shows no negative impact on value due to the proximity to the solar farm.

2. Matched Pair – Walton 2, Walton, Kenton County, KY

This project was built in 2017 on 58.03 acres for a 2 MW project with the closest home 120 feet from the closest panel.

The home located on Parcel 1 (783 Jones Road, Walton, KY) in the map above sold on May 4, 2022 for $346,000. This home is 410 feet from the nearest solar panel. I have considered a Sale/Resale analysis of this home as it previously sold on May 7, 2012 for $174,900. This analysis compares that 2012 purchase price and uses the FHFA House Price Index Calculator to identify what real estate values in the area have been appreciating at to determine where it was expected to appreciate to. I have then compared that to the actual sales price to determine if there is any impact attributable to the addition of the solar farm.

As can be seen on the calculator form, the expected value for $174,900 home sold in 2nd quarter 2012 would be $353,000 for 2nd quarter 2022. This is within 2% of the actual sales price and supports a finding of no impact on property value.

I have not attempted a paired sales analysis with other sales, as this property also has the nearby recycling and car lot that would be a potential factor in comparing to other sales. But based on aerial imagery, these same car lots were present in 2012 and therefore has no additional impact when comparing this home sale to itself.


Purchase Quarter
2012 Quarter 2
Purchase Value
$174,900
Valuation Quarter
2022 Quarter 2
Estimated Value for MSA
$353,000
Percentage Change
101.8%
X
Kentucky
Cincinnati, OH-KY-IN
$400,000
$350,000
$300,000
$250,000
$200,000
$150,000
$100,000
$50,000
$0
2012 Q2
2022 Q2
2013
2014
2015
2016
2017
2018
2019
2020
2021
2022

3. Matched Pair – Mulberry, Selmer, McNairy County, TN

This 16 MW solar farm was built in 2014 on 208.89 acres with the closest home being 480 feet.

This solar farm adjoins two subdivisions with Central Hills having a mix of existing and new construction homes. Lots in this development have been marketed for $15,000 each with discounts offered for multiple lots being used for a single home site. I spoke with the agent with Rhonda Wheeler and Becky Hearnsberger with United County Farm & Home Realty who noted that they have seen no impact on lot or home sales due to the solar farm in this community.

I have included a map below as well as data on recent sales activity on lots that adjoin the solar farm or are near the solar farm in this subdivision both before and after the announced plan for this solar farm facility. I note that using the same method I used to breakdown the adjoining uses at the subject property I show that the predominant adjoining uses are residential and agricultural, which is consistent with the location of most solar farms.

Adjoining Use Breakdown

	Acreage	Parcels
Commercial	3.40%	0.034
Residential	12.84%	79.31%
Agri/Res	10.39%	3.45%
Agricultural	73.37%	13.79%
Total	**100.00%**	**100.00%**

I have run a number of direct matched comparisons on the sales adjoining this solar farm as shown below. These direct matched pairs include some of those shown above as well as additional more recent sales in this community. In each of these I have compared the one sale adjoining the solar farm to multiple similar homes nearby that do not adjoin a solar farm to look for any potential impact from the solar farm.

Parcel	Solar	Address	Acres	Date Sold	Sales Price	Built	GBA	$/GBA	BR/BA	Park	Style	Other
3	Adjoins	491 Dusty	6.86	10/28/2016	$176,000	2009	1,801	$97.72	3/2	2-Gar	Ranch	
	Not	820 Lake Trail	1.00	6/8/2018	$168,000	2013	1,869	$89.89	4/2	2-Gar	Ranch	
	Not	262 Country	1.00	1/17/2018	$145,000	2000	1,860	$77.96	3/2	2-Gar	Ranch	
	Not	35 April	1.15	8/16/2016	$185,000	2016	1,980	$93.43	3/2	2-Gar	Ranch	

Adjoining Sales Adjusted

Parcel	Solar	Address	Time	Site	YB	GLA	Park	Other	Total	% Diff	Distance
3	Adjoins	491 Dusty							$176,000		480
	Not	820 Lake Trail	-$8,324	$12,000	-$3,360	-$4,890			$163,426	7%	
	Not	262 Country	-$5,450	$12,000	$6,525	-$3,680			$154,396	12%	
	Not	35 April	$1,138	$12,000	-$6,475	-$13,380			$178,283	-1%	
									Average	6%	

The best matched pair is 35 April Loop, which required the least adjustment and indicates a -1% increase in value due to the solar farm adjacency.

Adjoining Residential Sales After Solar Farm Built

Parcel	Solar	Address	Acres	Date Sold	Sales Price	Built	GBA	$/GBA	BR/BA	Park	Style	Other
12	Adjoins	57 Cooper	1.20	2/26/2019	$163,000	2011	1,586	$102.77	3/2	2-Gar	1.5 Story	Pool
	Not	191 Amelia	1.00	8/3/2018	$132,000	2005	1,534	$86.05	3/2	Drive	Ranch	
	Not	75 April	0.85	3/17/2017	$134,000	2012	1,588	$84.38	3/2	2-Crprt	Ranch	
	Not	345 Woodland	1.15	12/29/2016	$131,000	2002	1,410	$92.91	3/2	1-Gar	Ranch	

Adjoining Sales Adjusted

Parcel	Solar	Address	Sales Price	Time	Site	YB	GLA	Park	Other	Total	% Diff	Distance
12	Adjoins	57 Cooper	$163,000							$163,000		685
	Not	191 Amelia	$132,000	$2,303		$3,960	$2,685	$10,000	$5,000	$155,947	4%	
	Not	75 April	$134,000	$8,029	$4,000	-$670	-$135	$5,000	$5,000	$155,224	5%	
	Not	345 Woodland	$131,000	$8,710		$5,895	$9,811		$5,000	$160,416	2%	
										Average	4%	

The best matched pair is 191 Amelia, which was most similar in time frame of sale and indicates a +4% increase in value due to the solar farm adjacency.

Adjoining Residential Sales After Solar Farm Built

Parcel	Solar	Address	Acres	Date Sold	Sales Price	Built	GBA	$/GBA	BR/BA	Park	Style	Other
15	Adjoins	297 Country	1.00	9/30/2016	$150,000	2002	1,596	$93.98	3/2	4-Gar	Ranch	
	Not	185 Dusty	1.85	8/17/2015	$126,040	2009	1,463	$86.15	3/2	2-Gar	Ranch	
	Not	53 Glen	1.13	3/9/2017	$126,000	1999	1,475	$85.42	3/2	2-Gar	Ranch	Brick

Adjoining Sales Adjusted

Parcel	Solar	Address	Sales Price	Time	Site	YB	GLA	Park	Other	Total	% Diff	Distance
15	Adjoins	297 Country	$150,000							$150,000		650
	Not	185 Dusty	$126,040	$4,355		-$4,411	$9,167	$10,000		$145,150	3%	
	Not	53 Glen	$126,000	-$1,699		$1,890	$8,269	$10,000		$144,460	4%	
										Average	3%	

The best matched pair is 53 Glen, which was most similar in time frame of sale and required less adjustment. It indicates a +4% increase in value due to the solar farm adjacency.

The average indicated impact from these three sets of matched pairs is +4%, which suggests a mild positive relationship due to adjacency to the solar farm. The landscaping buffer for this project is mostly natural tree growth that was retained as part of the development but much of the trees separating the panels from homes are actually on the lots for the homes themselves. I therefore consider the landscaping buffer to be thin to moderate for these adjoining homes.

I have also looked at several lot sales in this subdivision as shown below.

These are all lots within the same community and the highest prices paid are for lots one parcel off from the existing solar farm. These prices are fairly inconsistent, though they do suggest about a $3,000 loss in the lots adjoining the solar farm. This is an atypical finding and additional details suggest there is more going on in these sales than the data crunching shows. First of all Parcel 4 was purchased by the owner of the adjoining home and therefore an atypical buyer seeking to expand a lot and the site is not being purchased for home development. Moreover, using the SiteToDoBusiness demographic tools, I found that the 1-mile radius around this development is expecting a total population increase over the next 5 years of 3 people. This lack of growing demand for lots is largely explained in that context. Furthermore, the fact that finished home sales as shown above are showing no sign of a negative impact on property value makes this data unreliable and inconsistent with the data shown in sales to an end user. I therefore place little weight on this outlier data.

Parcel	Solar	Address	Acres	Date Sold	Sales Price	4/18/2019 Adj for Time	$/AC	4/18/2019 Adj for Time
4	Adjoins	Shelter	2.05	10/25/2017	$16,000	$16,728	$7,805	$8,160
10	Adjoins	Carter	1.70	8/2/2018	$14,000	$14,306	$8,235	$8,415
11	Adjoins	Cooper	1.28	9/17/2018	$12,000	$12,215	$9,375	$9,543
	Not	75 Dusty	1.67	4/18/2019	$20,000	$20,000	$11,976	$11,976
	Not	Lake Trl	1.47	11/7/2018	$13,000	$13,177	$8,844	$8,964
	Not	Lake Trl	1.67	4/18/2019	$20,000	$20,000	$11,976	$11,976

	Adjoins	Per Acre	Not Adjoins	Per Acre	% DIF/Lot	% DIF/AC
Average	$14,416	$8,706	$17,726	$10,972	19%	21%
Median	$14,306	$8,415	$20,000	$11,976	28%	30%
High	$16,728	$9,543	$20,000	$11,976	16%	20%
Low	$12,215	$8,160	$13,177	$8,964	7%	9%

4. Matched Pair – Grand Ridge Solar, Streator, LaSalle County, IL

This solar farm has a 20 MW output and is located on a 160-acre tract. The project was built in 2012.

I have considered the recent sale of Parcel 13 shown above, which sold in October 2016 after the solar farm was built. I have compared that sale to a number of nearby residential sales not in proximity to the solar farm as shown below. Parcel 13 is 480 feet from the closest solar panel. The landscaping buffer is considered light.

Adjoining Residential Sales After Solar Farm Completed

#	TAX ID	Acres	Date Sold	Sales Price	Built	GBA	$/GBA
13	34-21-237-000	2	Oct-16	$186,000	1997	2,328	$79.90

Not Adjoining Residential Sales After Solar Farm Completed

#	TAX ID	Acres	Date Sold	Sales Price	Built	GBA	$/GBA
712 Columbus Rd	32-39-134-005	1.26	Jun-16	$166,000	1950	2,100	$79.05
504 N 2782 Rd	18-13-115-000	2.68	Oct-12	$154,000	1980	2,800	$55.00
7720 S Dwight Rd	11-09-300-004	1.14	Nov-16	$191,000	1919	2,772	$68.90
701 N 2050th Rd	26-20-105-000	1.97	Aug-13	$200,000	2000	2,200	$90.91
9955 E 1600th St	04-13-200-007	1.98	May-13	$181,858	1991	2,600	$69.95

TAX ID	Date Sold	Adjustments Time	Adjustments Total	$/Sf
34-21-237-000	Oct-16		$186,000	$79.90
32-39-134-005	Jun-16		$166,000	$79.05
18-13-115-000	Oct-12	$12,320	$166,320	$59.40
11-09-300-004	Nov-16		$191,000	$68.90
26-20-105-000	Aug-13	$12,000	$212,000	$96.36
04-13-200-007	May-13	$10,911	$192,769	$74.14

	Adjoins Solar Farm		Not Adjoin Solar Farm	
	Average	Median	Average	Median
Sales Price/SF	$79.90	$79.90	$75.57	$74.14
GBA	2,328	2,328	2,494	2,600

Based on the matched pairs I find no indication of negative impact due to proximity to the solar farm.

The most similar comparable is the home on Columbus that sold for $79.05 per square foot. This is higher than the median rate for all of the comparables. Applying that price per square foot to the subject property square footage indicates a value of $184,000.

There is minimal landscaping separating this solar farm from nearby properties and is therefore considered light.

5. Matched Pair – Portage Solar, Portage, Porter County, IN

This solar farm has a 2 MW output and is located on a portion of a 56-acre tract. The project was built in 2012. As can be seen by the more recent map, Lennar Homes is now developing a new subdivision on the vacant land just west of this solar farm.

I have considered the recent sale of Parcels 5 and 12. Parcel 5 is an undeveloped tract, while Parcel 12 is a residential home. I have compared each to a set of comparable sales to determine if there was any impact due to the adjoining solar farm. This home is 1,320 feet from the closest solar panel. The landscaping buffer is considered light.

Adjoining Residential Sales After Solar Farm Completed

#	TAX ID	Acres	Date Sold	Sales Price	Built	GBA	$/GBA
12	64-06-19-326-007.000-015	1.00	Sep-13	$149,800	1964	1,776	$84.35

Nearby Residential Sales After Solar Farm Completed

#	TAX ID	Acres	Date Sold	Sales Price	Built	GBA	$/GBA
2501 Architect Dr	64-04-32-202-004.000-021	1.31	Nov-15	$191,500	1959	2,064	$92.78
336 E 1050 N	64-07-09-326-003.000-005	1.07	Jan-13	$155,000	1980	1,908	$81.24
2572 Pryor Rd	64-05-14-204-006.000-016	1.00	Jan-16	$216,000	1960	2,348	$91.99

Adjoining Land Sales After Solar Farm Completed

#	TAX ID	Acres	Date Sold	Sales Price	$/AC
5	64-06-19-200-003.000-015	18.70	Feb-14	$149,600	$8,000

Nearby Land Sales After Solar Farm Completed

#	TAX ID	Acres	Date Sold	Sales Price	$/AC
	64-07-22-401-001.000-005	74.35	Jun-17	$520,450	$7,000
	64-15-08-200-010.000-001	15.02	Jan-17	$115,000	$7,658

Residential Sale Adjustment Chart

		Adjustments		
TAX ID	Date Sold	Time	Total	$/Sf
64-06-19-326-007.000-015	Sep-13	$8,988	$158,788	$89.41
64-04-32-202-004.000-021	Nov-15	$3,830	$195,330	$94.64
64-07-09-326-003.000-005	Jan-13	$9,300	$164,300	$86.11
64-05-14-204-006.000-016	Jan-16		$216,000	$91.99

2% adjustment/year
Adjusted to 2017

	Adjoins Solar Farm		Not Adjoin Solar Farm	
	Average	Median	Average	Median
Sales Price/SF	$89.41	$89.41	$90.91	$91.99
GBA	1,776	1,776	2,107	2,064

After adjusting the price per square foot is 2.88% less for the home adjoining the solar farm versus those not adjoining the solar farm. This is within the typical range of variation to be anticipated in any real estate transaction and indicates no impact on property value.

Applying the price per square foot for the 336 E 1050 N sale, which is the most similar to the Parcel 12 sale, the adjusted price at $81.24 per square foot applied to the Parcel 12 square footage yields a value of $144,282.

The landscaping separating this solar farm from the homes is considered light.

Land Sale Adjustment Chart

		Adjustments		
TAX ID	**Date Sold**	**Time**	**Total**	**$/Acre**
64-06-19-200-003.000-015	Feb-14	$8,976	$158,576	$8,480
64-07-22-401-001.000-005	Jun-17		$520,450	$7,000
64-15-08-200-010.000-001	Jan-17		$115,000	$7,658

2% adjustment/year
Adjusted to 2017

	Adjoins Solar Farm		**Not Adjoin Solar Farm**	
	Average	**Median**	**Average**	**Median**
Sales Price/Ac	$8,480	$8,480	$7,329	$7,329
Acres	18.70	18.70	44.68	44.68

After adjusting the price per acre is higher for the property adjoining the solar farm, but the average and median size considered is higher which suggests a slight discount. This set of matched pair supports no indication of negative impact due to the adjoining solar farm.

Alternatively, adjusting the 2017 sales back to 2014 I derive an indicated price per acre for the comparables at $6,580 per acre to $7,198 per acre, which I compare to the unadjusted subject property sale at $8,000 per acre.

6. Matched Pair – Dominion Indy III, Indianapolis, Marion County, IN

This solar farm has an 8.6 MW output and is located on a portion of a 134-acre tract. The project was built in 2013.

There are a number of homes on small lots located along the northern boundary and I have considered several sales of these homes. I have compared those homes to a set of nearby not adjoining home sales as shown below. The adjoining homes that sold range from 380 to 420 feet from the nearest solar panel, with an average of 400 feet. The landscaping buffer is considered light.

Adjoining Residential Sales After Solar Farm Completed

#	TAX ID	Acres	Date Sold	Sales Price	Built	GBA	$/GBA
2	2013249	0.38	12/9/2015	$140,000	2006	2,412	$58.04
4	2013251	0.23	9/6/2017	$160,000	2006	2,412	$66.33
5	2013252	0.23	5/10/2017	$147,000	2009	2,028	$72.49
11	2013258	0.23	12/9/2015	$131,750	2011	2,190	$60.16
13	2013260	0.23	3/4/2015	$127,000	2005	2,080	$61.06
14	2013261	0.23	2/3/2014	$120,000	2010	2,136	$56.18

Nearby Not Adjoining Residential Sales After Solar Farm Completed

#	TAX ID	Acres	Date Sold	Sales Price	Built	GBA	$/GBA
5836 Sable Dr	2013277	0.14	Jun-16	$141,000	2005	2,280	$61.84
5928 Mosaic Pl	2013845	0.17	Sep-15	$145,000	2007	2,280	$63.60
5904 Minden Dr	2012912	0.16	May-16	$130,000	2004	2,252	$57.73
5910 Mosaic Pl	2000178	0.15	Aug-16	$146,000	2009	2,360	$61.86
5723 Minden Dr	2012866	0.26	Nov-16	$139,900	2005	2,492	$56.14

		Adjustments		
TAX ID	Date Sold	Time	Total	$/Sf
2013249	12/9/2015	$5,600	$145,600	$60.36
2013251	9/6/2017		$160,000	$66.33
2013252	5/10/2017		$147,000	$72.49
2013258	12/9/2015	$5,270	$137,020	$62.57
2013260	3/4/2015	$5,080	$132,080	$63.50
2013261	2/3/2014	$7,200	$127,200	$59.55
2013277	6/1/2016	$2,820	$143,820	$63.08
2013845	9/1/2015	$5,800	$150,800	$66.14
2012912	5/1/2016	$2,600	$132,600	$58.88
2000178	8/1/2016	$2,920	$148,920	$63.10
2012866	11/1/2016	$2,798	$142,698	$57.26

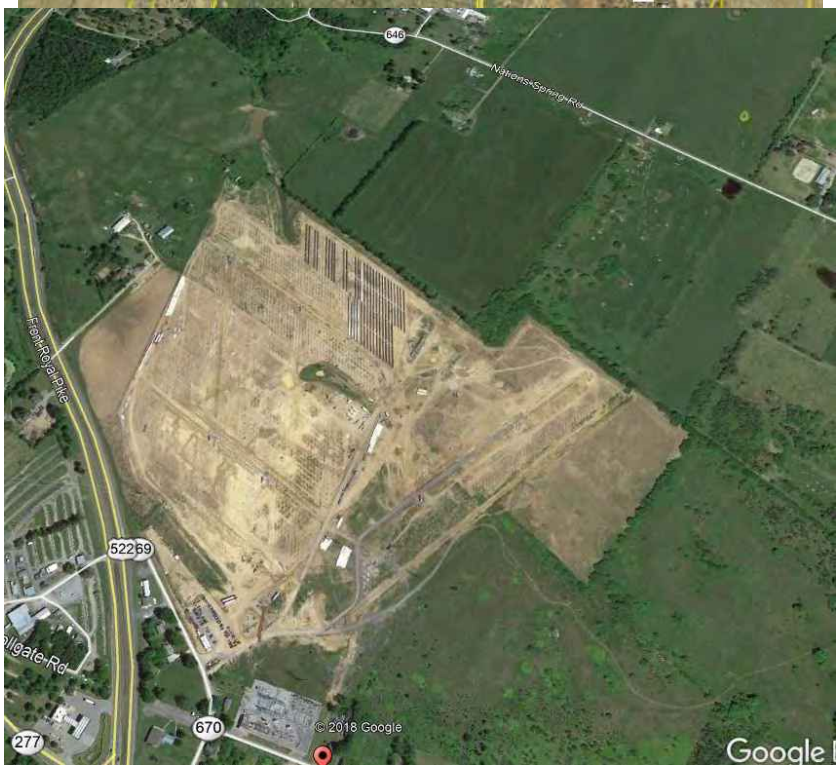
2% adjustment/year
Adjusted to 2017

	Adjoins Solar Farm		Not Adjoin Solar Farm	
	Average	Median	Average	Median
Sales Price/SF	$64.13	$63.03	$61.69	$63.08
GBA	2,210	2,163	2,333	2,280

This set of homes provides very strong indication of no impact due to the adjacency to the solar farm and includes a large selection of homes both adjoining and not adjoining in the analysis.

The landscaping screen is considered light in relation to the homes considered above.

7. Matched Pair – Clarke County Solar, Double Tollgate Road, White Post, Clarke County, VA



This project is a 20 MW facility located on a 234-acre tract that was built in 2017.

I have considered a recent sale or Parcel 3. The home on this parcel is 1,230 feet from the closest panel as measured in the second map from Google Earth, which shows the solar farm under construction.

I've compared this home sale to a number of similar rural homes on similar parcels as shown below. I have used multiple sales that bracket the subject property in terms of sale date, year built, gross living area, bedrooms and bathrooms. Bracketing the parameters insures that all factors are well balanced out in the adjustments. The trend for these sales shows a positive value for the adjacency to the solar farm.

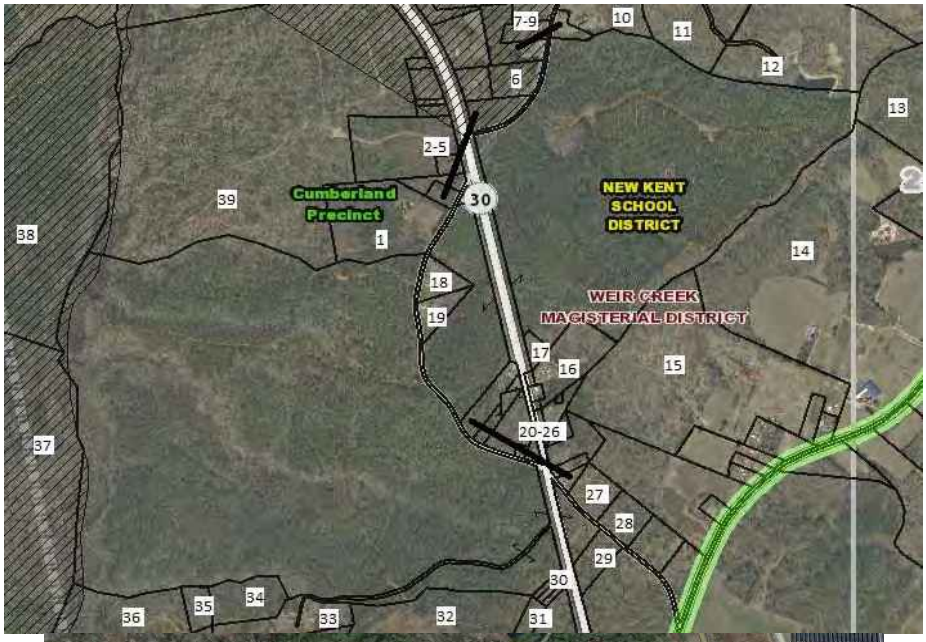
Adjoining Residential Sales After Solar Farm Approved

Solar	Address	Acres	Date Sold	Sales Price	Built	GBA	$/GBA	BR/BA	Park	Style	Other
Adjoins	833 Nations Spr	5.13	1/9/2017	$295,000	1979	1,392	$211.93	3/2	Det Gar	Ranch	Unfin bsmt
Not	85 Ashby	5.09	9/11/2017	$315,000	1982	2,333	$135.02	3/2	2 Gar	Ranch	
Not	541 Old Kitchen	5.07	9/9/2018	$370,000	1986	3,157	$117.20	4/4	2 Gar	2 story	
Not	4174 Rockland	5.06	1/2/2017	$300,000	1990	1,688	$177.73	3/2	3 Gar	2 story	
Not	400 Sugar Hill	1.00	6/7/2018	$180,000	1975	1,008	$178.57	3/1	Drive	Ranch	

Adjoining Residential Sales After Solar Farm Approved					Adjoining Sales Adjusted								
Solar	Address	Acres	Date Sold	Sales Price	Time	Acres	YB	GLA	BR/BA	Park	Other	Total	% Diff
Adjoins	833 Nations Spr	5.13	1/9/2017	$295,000								$295,000	
Not	85 Ashby	5.09	9/11/2017	$315,000	-$6,300		-$6,615	-$38,116		-$7,000	$15,000	$271,969	8%
Not	541 Old Kitchen	5.07	9/9/2018	$370,000	-$18,500		-$18,130	-$62,057		-$7,000	$15,000	$279,313	5%
Not	4174 Rockland	5.06	1/2/2017	$300,000			-$23,100	-$15,782		-$12,000	$15,000	$264,118	10%
Not	400 Sugar Hill	1.00	6/7/2018	$180,000	-$9,000	$43,000	$5,040	$20,571	$10,000	$3,000	$15,000	$267,611	9%
											Average		8%

The landscaping screen is primarily a newly planted buffer with a row of existing trees being maintained near the northern boundary and considered light.

8. Matched Pair – Walker-Correctional Solar, Barham Road, Barhamsville, New Kent County, VA



This project was built in 2017 and located on 484.65 acres for a 20 MW with the closest home at 110 feet from the closest solar panel with an average distance of 500 feet.

I considered the recent sale identified on the map above as Parcel 19, which is directly across the street and based on the map shown on the following page is 250 feet from the closest panel. A limited buffering remains along the road with natural growth being encouraged, but currently the

panels are visible from the road. Alex Uminski, SRA with MGMiller Valuations in Richmond VA confirmed this sale with the buying and selling broker. The selling broker indicated that the solar farm was not a negative influence on this sale and in fact the buyer noticed the solar farm and then discovered the listing. The privacy being afforded by the solar farm was considered a benefit by the buyer. I used a matched pair analysis with a similar sale nearby as shown below and found no negative impact on the sales price. Property actually closed for more than the asking price. The landscaping buffer is considered light.

Adjoining Residential Sales After Solar Farm Approved

Solar	Address	Acres	Date Sold	Sales Price	Built	GBA	$/GBA	BR/BA	Park	Style	Other
Adjoins	5241 Barham	2.65	10/18/2018	$264,000	2007	1,660	$159.04	3/2	Drive	Ranch	Modular
Not	17950 New Kent	5.00	9/5/2018	$290,000	1987	1,756	$165.15	3/2.5	3 Gar	Ranch	
Not	9252 Ordinary	4.00	6/13/2019	$277,000	2001	1,610	$172.05	3/2	1.5-Gar	Ranch	
Not	2416 W Miller	1.04	9/24/2018	$299,000	1999	1,864	$160.41	3/2.5	Gar	Ranch	

Adjoining Sales Adjusted

Solar	Address	Time	Ac/Loc	YB	GLA	BR/BA	Park	Other	Total	% Diff	Dist
Adjoins	5241 Barham								$264,000		250
Not	17950 New Kent		-$8,000	$29,000	-$4,756	-$5,000	-$20,000	-$15,000	$266,244	-1%	
Not	9252 Ordinary	-$8,310	-$8,000	$8,310	$2,581		-$10,000	-$15,000	$246,581	7%	
Not	2416 W Miller		$8,000	$11,960	-$9,817	-$5,000	-$10,000	-$15,000	$279,143	-6%	
								Average Diff		0%	

I also spoke with Patrick W. McCrerey of Virginia Estates who was marketing a property that sold at 5300 Barham Road adjoining the Walker-Correctional Solar Farm. He indicated that this property was unique with a home built in 1882 and heavily renovated and updated on 16.02 acres. The solar farm was through the woods and couldn't be seen by this property and it had no impact on marketing this property. This home sold on April 26, 2017 for $358,000. I did not set up any matched pairs for this property as it was such a unique property that any such comparison would be difficult to rely on. The broker's comments do support the assertion that the adjoining solar farm had no impact on value. The home in this case was 510 feet from the closest panel.

9. Matched Pair – Sappony Solar, Stony Creek, Sussex County, VA

This project is a 30 MW facility located on a 322.68-acre tract that was built in the fourth quarter of 2017.

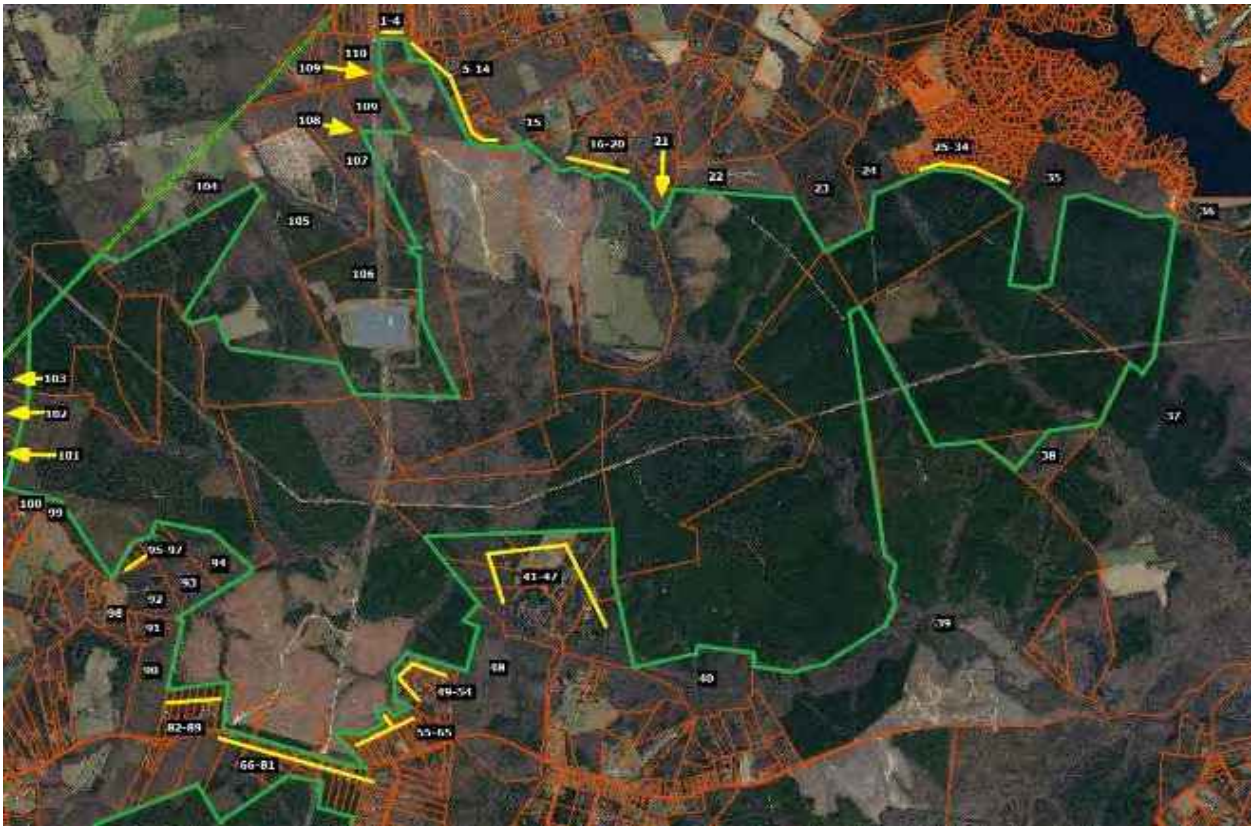
I have considered the 2018 sale of Parcel 17 as shown below. From Parcel 17 the retained trees and setbacks are a light to medium landscaped buffer.

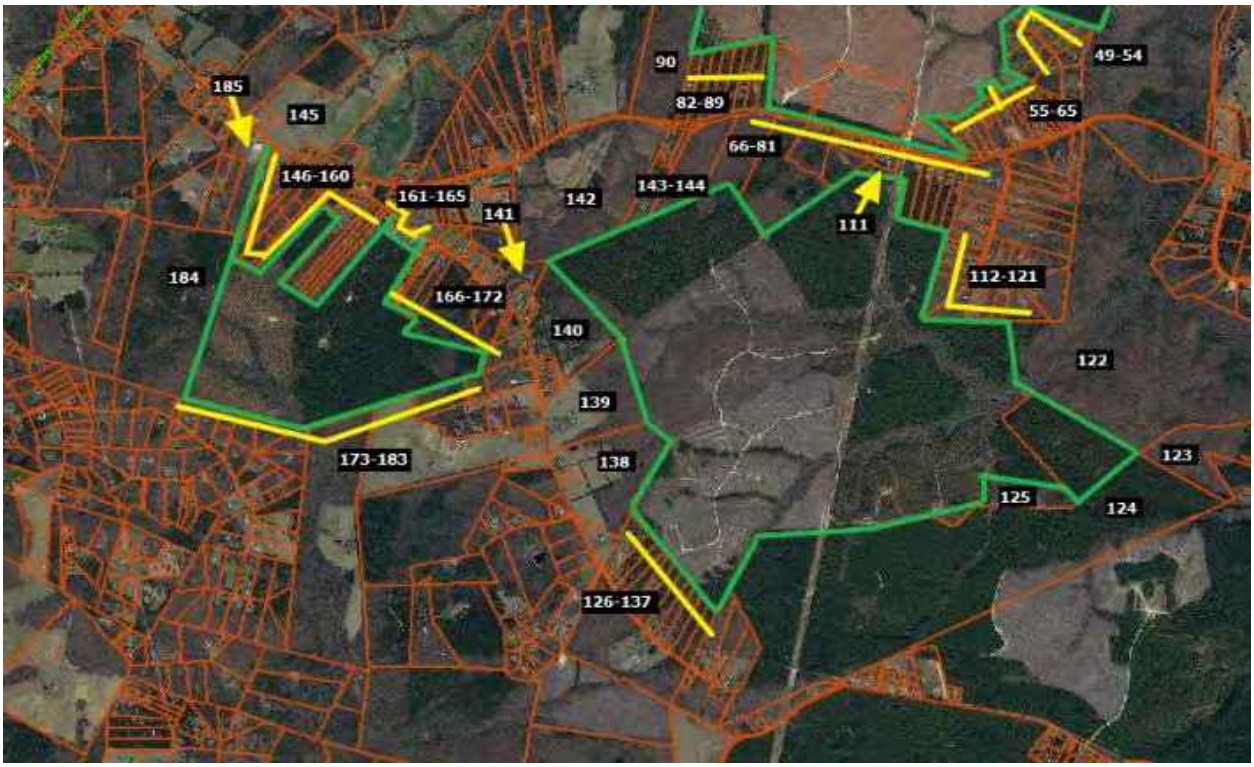
Adjoining Residential Sales After Solar Farm Approved

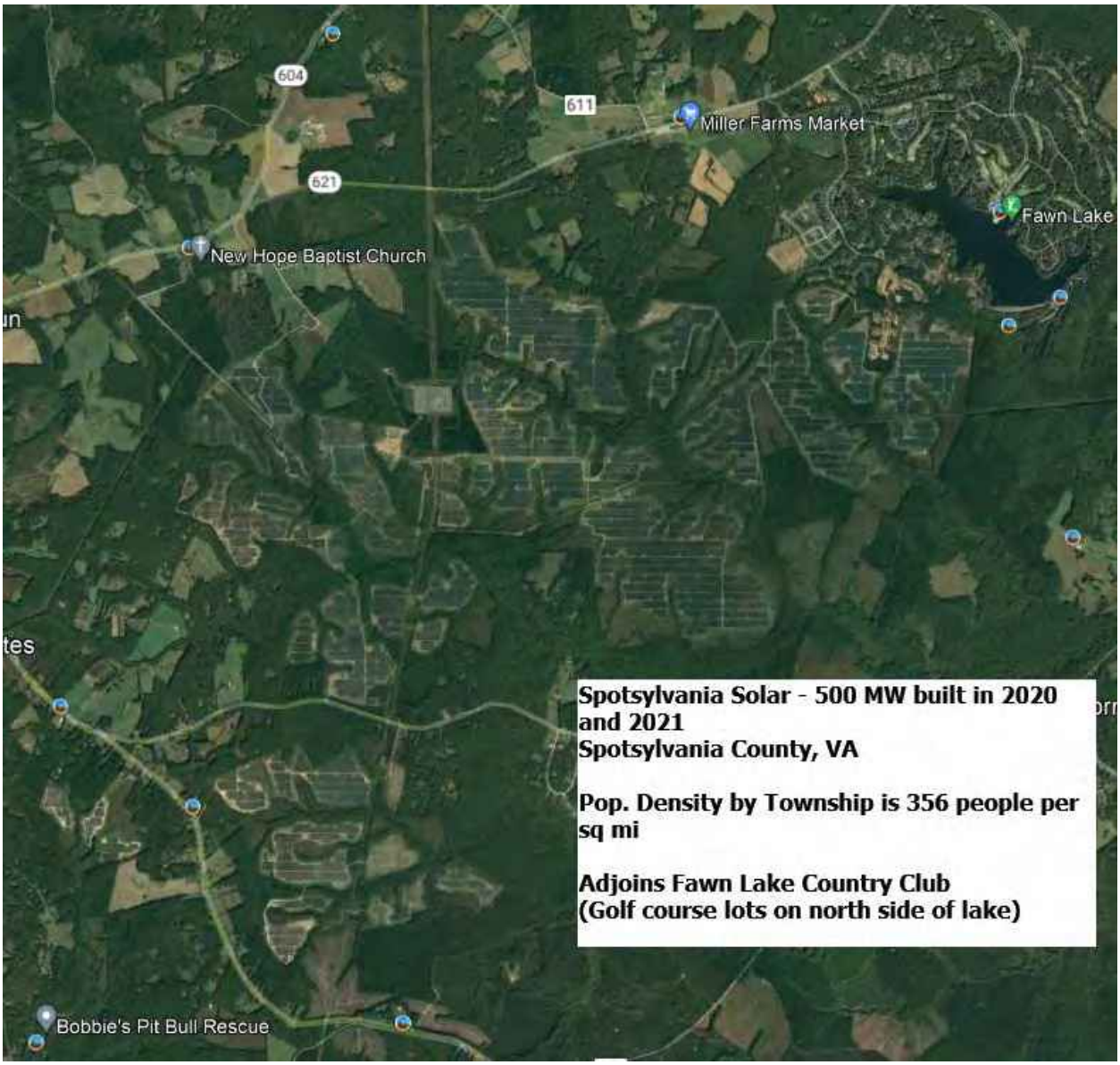
Parcel	Solar	Address	Acres	Date Sold	Sales Price	Built	GBA	$/GLA	BR/BA	Park	Style	Other
	Adjoins	12511 Palestine	6.00	7/31/2018	$128,400	2013	1,900	$67.58	4/2.5	Open	Manuf	
	Not	15698 Concord	3.92	7/31/2018	$150,000	2010	2,310	$64.94	4/2	Open	Manuf	Fence
	Not	23209 Sussex	1.03	7/7/2020	$95,000	2005	1,675	$56.72	3/2	Det Crpt	Manuf	
	Not	6494 Rocky Br	4.07	11/8/2018	$100,000	2004	1,405	$71.17	3/2	Open	Manuf	

Adjoining Sales Adjusted									Avg	
Time	Site	YB	GLA	BR/BA	Park	Other	Total	% Diff	% Diff	Distance
							$128,400			1425
$0		$2,250	-$21,299	$5,000			$135,951	-6%		
-$5,660	$13,000	$3,800	$10,209	$5,000	$1,500		$122,849	4%		
-$843		$4,500	$28,185				$131,842	-3%		
									-1%	

10. Matched Pair – Spotsylvania Solar, Paytes, Spotsylvania County, VA







This solar farm is being built in four phases with the area known as Site C having completed construction in November 2020 after the entire project was approved in April 2019. Site C, also known as Pleinmont 1 Solar, includes 99.6 MW located in the southeast corner of the project and shown on the maps above with adjoining parcels 111 through 144. The entire Spotsylvania project totals 617 MW on 3500 acres out of a parent tract assemblage of 6,412 acres.

I have identified three adjoining home sales that occurred during construction and development of the site in 2020.

The first is located on the north side of Site A on Orange Plank Road. The second is located on Nottoway Lane just north of Caparthin Road on the south side of Site A and east of Site C. The third is located on Post Oak Road for a home that backs up to Site C that sold in September 2020 near the completion of construction for Site C.

Spotsylvania Solar Farm

Solar	Address	Acres	Date Sold	Sales Price	Built	GBA	$/GBA	BR/BA	Park	Style	Other
Adjoins	12901 Orng Plnk	5.20	8/27/2020	$319,900	1984	1,714	$186.64	3/2	Drive	1.5	Un Bsmt
Not	8353 Gold Dale	3.00	1/27/2021	$415,000	2004	2,064	$201.07	3/2	3 Gar	Ranch	
Not	6488 Southfork	7.26	9/9/2020	$375,000	2017	1,680	$223.21	3/2	2 Gar	1.5	Barn/Patio
Not	12717 Flintlock	0.47	12/2/2020	$290,000	1990	1,592	$182.16	3/2.5	Det Gar	Ranch	

Adjoining Sales Adjusted

Address	Time	Ac/Loc	YB	GLA	BR/BA	Park	Other	Total	% Diff	Dist
12901 Orng Plnk								$319,900		1270
8353 Gold Dale	-$5,219	$20,000	-$41,500	-$56,298		-$20,000		$311,983	2%	
6488 Southfork	-$401	-$20,000	-$61,875	$6,071		-$15,000		$283,796	11%	
12717 Flintlock	-$2,312	$40,000	-$8,700	$17,779	-$5,000	-$5,000		$326,767	-2%	
							Average Diff		4%	

I contacted Keith Snider to confirm this sale. This is considered to have a medium landscaping screen.

Solar	Address	Acres	Date Sold	Sales Price	Built	GBA	$/GBA	BR/BA	Park	Style	Other
Adjoins	9641 Nottoway	11.00	5/12/2020	$449,900	2004	3,186	$141.21	4/2.5	Garage	2-Story	Un Bsmt
Not	26123 Lafayette	1.00	8/3/2020	$390,000	2006	3,142	$124.12	3/3.5	Gar/DtG	2-Story	
Not	11626 Forest	5.00	8/10/2020	$489,900	2017	3,350	$146.24	4/3.5	2 Gar	2-Story	
Not	10304 Pny Brnch	6.00	7/27/2020	$485,000	1998	3,076	$157.67	4/4	2Gar/Dt2	Ranch	Fn Bsmt

Adjoining Sales Adjusted

Address	Time	Ac/Loc	YB	GLA	BR/BA	Park	Other	Total	% Diff	Dist
9641 Nottoway								$449,900		1950
26123 Lafayette	-$2,661	$45,000	-$3,900	$4,369	-$10,000	-$5,000		$417,809	7%	
11626 Forest	-$3,624		-$31,844	-$19,187		-$5,000		$430,246	4%	
10304 Pny Brnch	-$3,030		$14,550	$13,875	-$15,000	-$15,000	-$10,000	$470,396	-5%	
							Average Diff		2%	

I contacted Annette Roberts with ReMax about this transaction. This is considered to have a medium landscaping screen.

Solar	Address	Acres	Date Sold	Sales Price	Built	GBA	$/GBA	BR/BA	Park	Style	Other
Adjoins	13353 Post Oak	5.20	9/21/2020	$300,000	1992	2,400	$125.00	4/3	Drive	2-Story	Fn Bsmt
Not	9609 Logan Hgt	5.86	7/4/2019	$330,000	2004	2,352	$140.31	3/2	2Gar	2-Story	
Not	12810 Catharpian	6.18	1/30/2020	$280,000	2008	2,240	$125.00	4/2.5	Drive	2-Story	Bsmt/Nd Pnt
Not	10725 Rbrt Lee	5.01	10/26/2020	$295,000	1995	2,166	$136.20	4/3	Gar	2-Story	Fn Bsmt

Adjoining Sales Adjusted

Address	Time	Ac/Loc	YB	GLA	BR/BA	Park	Other	Total	% Diff	Dist
13353 Post Oak								$300,000		1171
9609 Logan Hgt	$12,070		-$19,800	$5,388		-$15,000	$15,000	$327,658	-9%	
12810 Catharpian	$5,408		-$22,400	$16,000	$5,000		$15,000	$299,008	0%	
10725 Rbrt Lee	-$849		-$4,425	$25,496		-$10,000		$305,222	-2%	
							Average Diff		-4%	

I contacted Joy Pearson with CTI Real Estate about this transaction. This is considered to have a heavy landscaping screen.

All three of these homes are well set back from the solar panels at distances over 1,000 feet and are well screened from the project. All three show no indication of any impact on property value.

There are a couple of recent lot sales located along Southview Court that have sold since the solar farm was approved. The most recent lot sales include 11700 Southview Court that sold on December 29, 2021 for $140,000 for a 0.76-acre lot. This property was on the market for less than 2 months before closing within 6% of the asking price. This lot sold earlier in September 2019 for $55,000 based on a liquidation sale from NTS to an investor.

A similar 0.68-acre lot at 11507 Stonewood Court within the same subdivision located away from the solar farm sold on March 9, 2021 for $109,000. This lot sold for 18% over the asking price within 1 month of listing suggesting that this was priced too low. Adjusting this lot value upward by 12% for very strong growth in the market over 2021, the adjusted indicated value is $122,080 for this lot. This is still showing a 15% premium for the lot backing up to the solar farm.

The lot at 11009 Southview Court sold on August 5, 2019 for $65,000, which is significantly lower than the more recent sales. This lot was sold by NTS the original developer of this subdivision, who was in the process of liquidating lots in this subdivision with multiple lot sales in this time period throughout the subdivision being sold at discounted prices. The home was later improved by the buyer with a home built in 2020 with 2,430 square feet ranch, 3.5 bathrooms, with a full basement, and a current assessed value of $492,300.

I spoke with Chris Kalia, MAI, Mark Doherty, local real estate investor, and Alex Doherty, broker, who are all three familiar with this subdivision and activity in this neighborhood. All three indicated that there was a deep sell off of lots in the neighborhood by NTS at discounted prices under $100,000 each. Those lots since that time are being sold for up to $140,000. The prices paid for the lots below $100,000 were liquidation values and not indicative of market value. Homes are being built in the neighborhood on those lots with home prices ranging from $600,000 to $800,000 with no sign of impact on pricing due to the solar farm according to all three sources.


New areas of new lot construction started after approval of solar farm in 2019 outlined in green.
Future development to the south shown with preliminary road clearing outlined in blue.
Fawn Lake Virginia
Ryan Homes at Fawn Lake
Fawn Lake Pkwy
Pinnacle Dr
Cobble Run
Southview Ct
Whitetail Creek

Fawn Lake Lot Sales

Parcel	Solar?	Address	Acres	Sale Date	Sale Price	Ad. For Time	% Diff
A	Adjoins	11700 Southview Ct	0.76	12/29/2021	$140,000		
1	1 parcel away	11603 Southview Ct	0.44	3/31/2022	$140,000	$141,960	-1.4%
2	Not adjoin	11507 Stonewood Ct	0.68	3/9/2021	$109,000	$118,374	15.4%
3	Not adjoin	11312 Westgate Wy	0.83	10/15/2020	$125,000	$142,000	-1.4%
4	Not adjoin	11409 Darkstone Pl	0.589	9/23/2021	$118,000	$118,000	15.7%

Average	7.1%
Median	7.0%

Least Adjusted	15.7%
2nd Least Adjusted (Parcel 1 off solar farm)	-1.4%

Time Adjustments are based on the FHFA Housing Price Index

11. Matched Pair – Whitehorn Solar, Gretna, Pittsylvania County, VA

This project was built in 2021 for a solar project with 50 MW. Adjoining uses are residential and agricultural. There was a sale located at 1120 Taylors Mill Road that sold on December 20, 2021, which is about the time the solar farm was completed. This sold for $224,000 for 2.02 acres with a 2,079 s.f. mobile home on it that was built in 2010. The property was listed for $224,000 and sold for that same price within two months (went under contract almost exactly 30 days from listing). This sales price works out to $108 per square foot. This home is 255 feet from the nearest panel.

I have compared this sale to an August 20, 2020 sale at 1000 Long Branch Drive that included 5.10 acres with a 1,980 s.f. mobile home that was built in 1993 and sold for $162,000, or $81.82 per square foot. Adjusting this upward for significant growth between this sale date and December 2021 relied on data provided by the FHFA House Pricing Index, which indicates that for homes in the Roanoke, VA MSA would be expected to appreciate from $162,000 to $191,000 over that period of time. Using $191,000 as the effective value as of the date of comparison, the indicated value of this sale works out to $96.46 per square foot. Adjusting this upward by 17% for the difference in year built, but downward by 5% for the much larger lot size at this comparable, I derive an adjusted indication of value of $213,920, or $108 per square foot.

This indicates no impact on value attributable to the new solar farm located across from the home on Taylors Mill Road.

12. Matched Pair – Altavista Solar, Altavista, Campbell County, VA

This project was mostly built in 2021 with final construction finished in 2022. This is an 80 MW facility on 720 acres just north of Roanoke River and west of Altavista. Adjoining uses are residential and agricultural.

I have done a Sale/Resale analysis of 3211 Leesville Road which is approximately 540 feet from the nearest solar panel. There was an existing row of trees between this home and the panels that was supplemented with additional screening for a narrow landscaped buffer between the home and the solar panels.

This home sold in December 2018 for $72,500 for this 1,451 s.f. home built in 1940 with a number of additional outbuildings on 3.35 acres. This was before any announcement of a solar farm. This home sold again on March 28, 2022 for $124,048 after the solar farm was constructed. This shows a 71% increase in value on this property since 2018. There was significant growth in the market between these dates and to accurately reflect that I have considered the FHFA House Price Index that is specific for the Lynchburg area of Virginia (the closest regional category), which shows an expected increase in home values over that same time period of 33.8%, which would suggest a normal growth in value up to $97,000. The home sold for significantly more than this which certainly does not support a finding of a negative impact and in fact suggests a significant positive impact. However, I was not able to discuss this sale with the broker and it is possible that the home also was renovated between 2018 and 2022, which may account for that additional increase in value. Still give that the home increased in value so significantly over the initial amount there is no sign of any negative impact due to the solar farm adjacency.

Similarly, I looked at 3026 Bishop Creek Road that is approximately 600 feet from the nearest solar panel. This home sold on July 16, 2019 for $120,000, which was before construction of the solar farm. This home sold again on February 23, 2022 for $150,000. This shows a 25% increase in value over that time period. Using the same FHFA House Price Index Calculator, the expected increase in value was 29.2% for an indicated expected value of $155,000. This is within 3% of the actual closed price, which supports a finding of no impact from the solar farm. This home has a dense wooded area between it and the adjoining solar farm.

13. Matched Pair – DG Amp Piqua, Piqua, Miami County, OH

This project is located on the southeast corner of Manier Street and N Washington Road, Piqua, OH. There are a number of nearby homes to the north, south and west of this solar farm.

I considered one adjoining sale and one nearby sale (one parcel off) that happened since the project was built in 2019. I did not consider the sale of a home located at Parcel 20 that happened in that time period as that property was marketed with damaged floors in the kitchen and bathroom, rusted baseboard heaters and generally was sold in an As-Is condition that makes it difficult to compare to move-in ready homes. I also did not consider some sales to the north that sold for prices significantly under $100,000. The homes in that community includes a wide range of smaller, older homes that have been selling for prices ranging from $25,000 to $80,000. I have not been tracking home sales under $100,000 as homes in that price range are less susceptible to external factors.

The adjoining sale at 6060 N Washington is a brick range fronting on a main road. I did not adjust the comparables for that factor despite the subdivision exposure on those comparables was superior. I considered the difference in lot size to be balancing factors. If I adjusted further for that main road frontage, then it would actually show a positive impact for adjoining the solar farm.

Adjoining Residential Sales After Solar Farm Approved

Parcel	Solar	Address	Acres	Date Sold	Sales Price	Built	GBA	$/GLA	BR/BA	Park	Style	Other
22	Adjoins	6060 N Washington	0.80	10/30/2019	$119,500	1961	1,404	$85.11	3/1	2 Gar	Br Rnch	Updates
	Not	1523 Amesbury	0.25	5/7/2020	$119,900	1973	1,316	$91.11	3/2	Gar	Br Rnch	Updates
	Not	1609 Haverhill	0.17	10/17/2019	$114,900	1974	1,531	$75.05	3/1	Gar	Br Rnch	Updates
	Not	1511 Sweetbriar	0.17	8/6/2020	$123,000	1972	1,373	$89.58	4/2	Gar	Br Rnch	Updates

Adjoining Sales Adjusted									Avg	
Time	Site	YB	GLA	BR/BA	Park	Other	Total	% Diff	% Diff	Distance
							$119,500			155
-$1,920		-$7,194	$6,414	-$5,000	$7,500	$0	$119,700	0%		
$126		-$7,469	-$7,625		$7,500	$0	$107,432	10%		
-$2,913		-$6,765	$2,222	-$5,000	$7,500	$0	$118,044	1%		
									4%	

I also considered a home fronting on Plymouth Avenue which is one lot to the west of the solar farm with a rear view towards the solar farm. After adjustments this set of matched pairs shows no impact on the value of the property due to proximity to the solar farm.

Adjoining Residential Sales After Solar Farm Approved

Parcel	Solar	Address	Acres	Date Sold	Sales Price	Built	GBA	$/GLA	BR/BA	Park	Style	Other
	Nearby	1011 Plymouth	0.21	2/24/2020	$113,000	1973	1,373	$82.30	4/2	Gar	1.5 Stry	Fnce/Shd
	Not	1630 Haverhill	0.32	8/18/2019	$94,900	1973	1,373	$69.12	4/2	Gar	1.5 Stry	N/A
	Not	1720 Williams	0.17	12/4/2019	$119,900	1968	1,682	$71.28	4/1	2Gar	1.5 Br	Fnce/Shd
	Not	1710 Cambridge	0.17	1/22/2018	$116,000	1968	1,648	$70.39	4/2	Det 2	1.5 Br	Fnce/Shd

Adjoining Sales Adjusted									Avg	
Time	Site	YB	GLA	BR/BA	Park	Other	Total	% Diff	% Diff	Distance
							$113,000			585
$1,519		$0	$0			$10,000	$106,419	6%		
$829		$2,998	-$17,621	$5,000			$111,105	2%		
$7,459		$2,900	-$15,485				$110,873	2%		
									3%	

I considered a home located at 6010 N Washington that sold on August 3, 2021. This property was sold with significant upgrades that made it more challenging to compare, but I focused on similar older brick ranches with updates in the analysis. The comparables suggest an enhancement to this property due to proximity from the solar farm, but it is more likely that the upgrades at the subject were superior. Still this strongly supports a finding of no impact on the value of the property due to proximity to the solar farm.

Adjoining Residential Sales After Solar Farm Built

Parcel	Solar	Address	Acres	Date Sold	Sales Price	Built	GBA	$/GLA	BR/BA	Park	Style	Other
24	Adjoins	6010 N Washington	0.80	8/3/2021	$176,900	1961	1,448	$122.17	4/2	2 Gar	Br Ranch	Updates
	Not	1244 Severs	0.19	10/29/2021	$149,900	1962	1,392	$107.69	3/2	Gar	Br Ranch	Updates
	Not	1515 Amesbury	0.19	5/5/2022	$156,500	1973	1,275	$122.75	3/2	2 Gar	Br Ranch	Updates
	Not	1834 Wilshire	0.21	12/3/2021	$168,900	1979	1,265	$133.52	3/2	2 Gar	Br Ranch	Updates

Adjoining Sales Adjusted									Avg	
Time	Site	YB	GLA	BR/BA	Park	Other	Total	% Diff	% Diff	Distance
							$176,900			155
-$1,099		-$750	$4,221		$7,000		$159,273	10%		
-$3,627		-$9,390	$16,988				$160,471	9%		
-$1,736		-$14,357	$19,547				$172,354	3%		
									7%	

I considered a home located at 6240 N Washington that sold on October 15, 2021. The paired sale located at 532 Wilson included a sunroom that I did not adjust for. The -4% impact from that sale is related to that property having a superior sunroom and not related to proximity to the solar farm. The other two comparables strongly support that assertion as well as a finding of no impact on the value of the property due to proximity to the solar farm.

Adjoining Residential Sales After Solar Farm Built

Parcel	Solar	Address	Acres	Date Sold	Sales Price	Built	GBA	$/GLA	BR/BA	Park	Style	Other
	Adjoins	6240 N Washington	1.40	10/15/2021	$155,000	1962	1,582	$97.98	2/1	Det 3	Ranch	
	Not	1408 Brooks	0.13	8/20/2021	$105,000	1957	1,344	$78.13	3/1	Drive	Ranch	
	Not	532 Wilson	0.14	7/29/2021	$159,900	1948	1,710	$93.51	3/2	Det Gar	Ranch	Sunroom
	Not	424 Pinewood	0.17	5/20/2022	$151,000	1960	1,548	$97.55	4/2	Gar	Ranch	

Adjoining Sales Adjusted									Avg	
Time	Site	YB	GLA	BR/BA	Park	Other	Total	% Diff	% Diff	Distance
							$155,000			160
$496		$2,625	$13,016		$15,000		$136,136	12%		
$1,051		$11,193	-$9,575	-$10,000	$8,000		$160,569	-4%		
-$2,761		-$2,265	$2,653	-$10,000	$7,000		$145,627	6%		
									5%	

Based on these four matched pairs, the data at this solar farm supports a finding of no impact on property value due to the proximity of the solar farm for homes as close as 155 feet.

I also identified three new construction home sales on Arrowhead Drive that sold in 2022. I have reached out to the builder regarding those homes, but these homes sold between $250,000 and $275,000 each and were located within 350 feet of the solar farm. These sales show that the presence of the solar farm is not inhibiting new home construction in proximity to the solar farm.

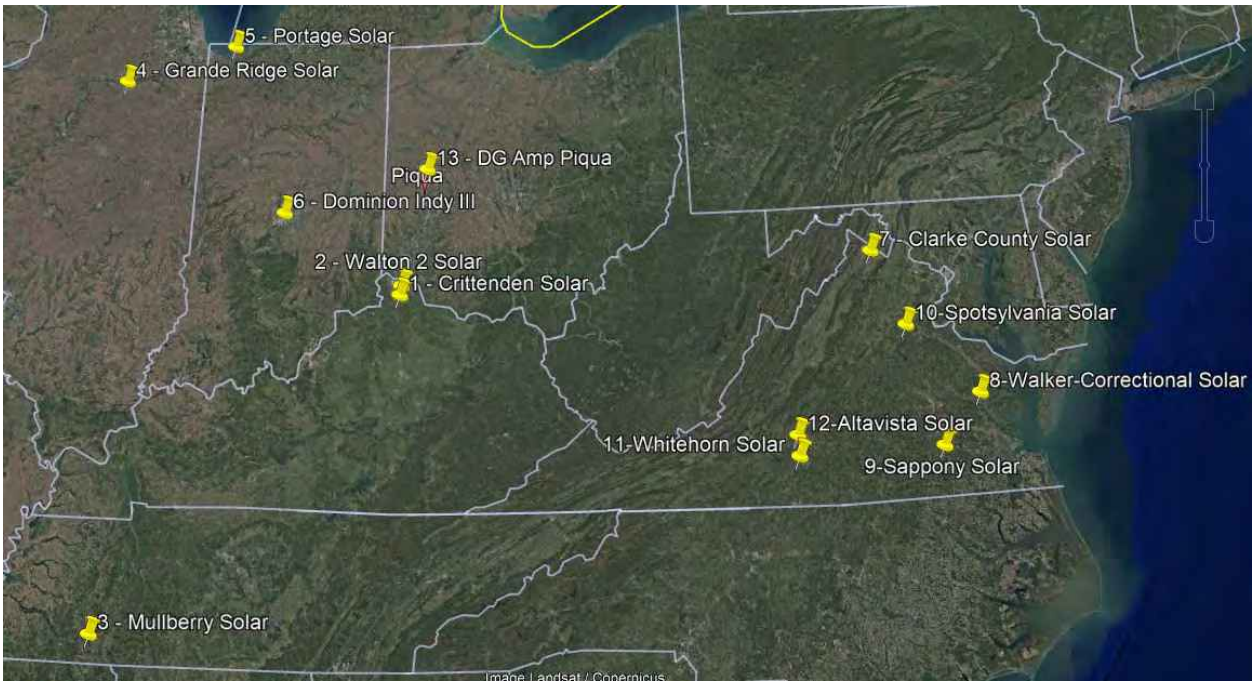
Conclusion

The solar farm matched pairs shown above have similar characteristics to each other in terms of population, but with several outliers showing solar farms in far more urban areas. The median income for the population within 1 mile of a solar farm among this subset of matched pairs is $61,115 with a median housing unit value of $186,463. Most of the comparables are under $300,000 in the home price, with $483,333 being the high end of the set, though I have matched pairs in other states over $1,600,000 in price adjoining large solar farms. The predominate adjoining uses are residential and agricultural. These figures are in line with the larger set of solar farms that I have looked at with the predominant adjoining uses being residential and agricultural and similar to the solar farm breakdown shown for Kentucky and adjoining states as well as the proposed subject property.

Based on the similarity of adjoining uses and demographic data between these sites and the subject property, I consider it reasonable to compare these sites to the subject property.

Matched Pair Summary

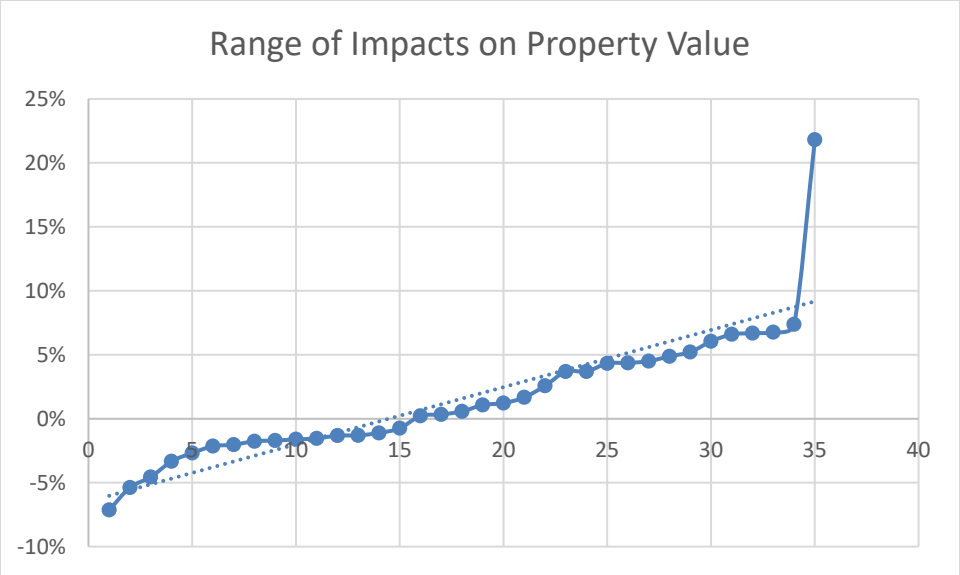
							Adj. Uses By Acreage				1 mile Radius (2010-2022 Data)			
	Name	City	State	Acres	MW	Topo Shift	Res	Ag	Ag/Res	Com/Ind	Population	Med. Income	Avg. Housing Unit	Veg. Buffer
1	Crittenden	Crittenden	KY	34	2.70	40	22%	51%	27%	0%	1,419	$60,198	$178,643	Light
2	Walton 2	Walton	KY	58	2.00	90	21%	0%	60%	19%	880	$81,709	$277,717	Light
3	Mulberry	Selmer	TN	160	5.00	60	13%	73%	10%	3%	467	$40,936	$171,746	Lt to Med
4	Grand Ridge	Streator	IL	160	20.00	1	8%	87%	5%	0%	96	$70,158	$187,037	Light
5	Portage	Portage	IN	56	2.00	0	19%	81%	0%	0%	6,642	$65,695	$186,463	Light
6	Dominion	Indianapolis	IN	134	8.60	20	3%	97%	0%	0%	3,774	$61,115	$167,515	Light
7	Clarke Cnty	White Post	VA	234	20.00	70	14%	39%	46%	1%	578	$81,022	$374,453	Light
8	Walker	Barhamsville	VA	485	20.00	N/A	12%	68%	20%	0%	203	$80,773	$320,076	Light
9	Sappony	Stony Crk	VA	322	20.00	N/A	2%	98%	0%	0%	74	$51,410	$155,208	Medium
10	Spotyslvania	Paytes	VA	3,500	500.00	160	37%	52%	11%	0%	74	$120,861	$483,333	Med to Hvy
11	Whitehorn	Gretna	VA	N/A	50.00	N/A	N/A	N/A	N/A	N/A	166	$43,179	$168,750	None to Lt
12	Altavista	Altavista	VA	720	80.00	N/A	N/A	N/A	N/A	N/A	7	$50,000	$341,667	Light
13	DG Amp Piqua	Piqua	OH	86	12.60	2	26%	16%	58%	0%	6,735	$38,919	$96,555	
	Average			496	57.15	49	16%	60%	22%	2%	1,624	$65,075	$239,166	
	Median			160	20.00	40	14%	68%	11%	0%	467	$61,115	$186,463	
	High			3,500	500.00	160	37%	98%	60%	19%	6,735	$120,861	$483,333	
	Low			34	2.00	0	2%	0%	0%	0%	7	$38,919	$96,555	



These are very similar to the demographics shown around these comparable solar farms.

On the following page is a summary of the 35 matched pairs for all of the solar farms noted above. They show a pattern of results from -7% to +22%. As can be seen in the chart of those results below, most of the data points are between -2% and +5%. This variability is common with real estate and consistent with market imperfection. I therefore conclude that these results strongly support an indication of no impact on property value due to the adjacent solar farm.

There is one significant outlier that shows a 22% enhancement due to adjacency to a solar farm. I have attempted to confirm that sale as it appears likely that renovations were done that would explain that significant difference. I have not considered that to be a reliable indicator on property value impacts. Excluding that one indicator the range is -7% to +7%.



	MW	Avg. Distance	% Dif
Average	65.53	625	2%
Median	8.60	480	1%
High	617.00	1,950	22%
Low	2.00	155	-7%

Residential Dwelling Matched Pairs Adjoining Solar Farms

Pair	Solar Farm	City	State	Area	MW	Approx Distance	Tax ID/Address	Sale Date	Sale Price	Adj. Price	% Diff	Notes
1	Portage	Portage	IN	Rural	2	1320	836 N 450 W	Sep-13	$149,800			
							336 E 1050 N	Jan-13	$155,000	$144,282	4%	
2	Dominion	Indianapolis	IN	Rural	8.6	400	2013249 (Tax ID)	Dec-15	$140,000			
							5723 Minden	Nov-16	$139,900	$132,700	5%	
3	Dominion	Indianapolis	IN	Rural	8.6	400	2013251 (Tax ID)	Sep-17	$160,000			
							5910 Mosaic	Aug-16	$146,000	$152,190	5%	
4	Dominion	Indianapolis	IN	Rural	8.6	400	2013252 (Tax ID)	May-17	$147,000			
							5836 Sable	Jun-16	$141,000	$136,165	7%	
5	Dominion	Indianapolis	IN	Rural	8.6	400	2013258 (Tax ID)	Dec-15	$131,750			
							5904 Minden	May-16	$130,000	$134,068	-2%	
6	Dominion	Indianapolis	IN	Rural	8.6	400	2013260 (Tax ID)	Mar-15	$127,000			
							5904 Minden	May-16	$130,000	$128,957	-2%	
7	Dominion	Indianapolis	IN	Rural	8.6	400	2013261 (Tax ID)	Feb-14	$120,000			
							5904 Minden	May-16	$130,000	$121,930	-2%	
8	DG Amp	Piqua	OH	Suburban	12.6	155	6060 N Washington	Oct-19	$119,500			
							1511 Sweetbriar	Aug-20	$123,000	$118,044	1%	
9	DG Amp	Piqua	OH	Suburban	12.6	585	1011 Plymouth	Feb-20	$113,000			
							1720 Williams	Dec-19	$119,900	$111,105	2%	
10	DG Amp	Piqua	OH	Suburban	12.6	155	6010 N Washington	Aug-21	$176,900			
							1834 Wilshire	Dec-21	$168,900	$172,354	3%	
11	DG Amp	Piqua	OH	Suburban	12.6	160	6240 N Washington	Oct-21	$155,000			
							424 Pinewood	May-22	$151,000	$145,627	6%	
12	Spotsylvania	Paytes	VA	Rural	617	1270	12901 Orange Plnk	Aug-20	$319,900			Medium
							12717 Flintlock	Dec-20	$290,000	$326,767	-2%	
13	Spotsylvania	Paytes	VA	Rural	617	1950	9641 Nottoway	May-20	$449,900			Medium
							11626 Forest	Aug-20	$489,900	$430,246	4%	
14	Spotsylvania	Paytes	VA	Rural	617	1171	13353 Post Oak	Sep-20	$300,000			Heavy
							12810 Catharpin	Jan-20	$280,000	$299,008	0%	
15	Walker	Barhamsville	VA	Rural	20	250	5241 Barham	Oct-18	$264,000			Light
							9252 Ordinary	Jun-19	$277,000	$246,581	7%	
16	Clarke Cnty	White Post	VA	Rural	20	1230	833 Nations Spr	Aug-19	$385,000			Light
							2393 Old Chapel	Aug-20	$330,000	$389,286	-1%	
17	Sappony	Stony Creek	VA	Rural	20	1425	12511 Palestine	Jul-18	$128,400			Medium
							6494 Rocky Branch	Nov-18	$100,000	$131,842	-3%	
18	Crittenden	Crittenden	KY	Suburban	2.7	373	250 Claiborne	Jan-19	$120,000			
							315 N Fork	May-19	$107,000	$120,889	-1%	
19	Crittenden	Crittenden	KY	Suburban	2.7	488	300 Claiborne	Sep-18	$213,000			
							1795 Bay Valley	Dec-17	$231,200	$228,180	-7%	
20	Crittenden	Crittenden	KY	Suburban	2.7	720	350 Claiborne	Jul-18	$245,000			
							2160 Sherman	Jun-19	$265,000	$248,225	-1%	
21	Crittenden	Crittenden	KY	Suburban	2.7	930	370 Claiborne	Aug-19	$273,000			
							125 Lexington	Apr-18	$240,000	$254,751	7%	
22	Crittenden	Crittenden	KY	Suburban	2.7	365	250 Claiborne	Jan-22	$210,000			Light
							240 Shawnee	Jun-21	$166,000	$219,563	-5%	
23	Crittenden	Crittenden	KY	Suburban	2.7	390	260 Claiborne	Oct-21	$175,000			Light
							355 Oakwood	Oct-20	$186,000	$173,988	1%	
24	Crittenden	Crittenden	KY	Suburban	2.7	570	300 Claiborne	Dec-21	$290,000			Light
							39 Pinhook	Mar-22	$299,000	$289,352	0%	
25	Crittenden	Crittenden	KY	Suburban	2.7	1080	410 Claiborne	Feb-21	$275,000			Light
							114 Austin	Dec-20	$248,000	$279,680	-2%	
26	Mulberry	Selmer	TN	Rural	5	400	0900A011	Jul-14	$130,000			Light
							099CA043	Feb-15	$148,900	$136,988	-5%	
27	Mulberry	Selmer	TN	Rural	5	400	099CA002	Jul-15	$130,000			Light
							0990NA040	Mar-15	$120,000	$121,200	7%	
28	Mulberry	Selmer	TN	Rural	5	480	491 Dusty	Oct-16	$176,000			Light
							35 April	Aug-16	$185,000	$178,283	-1%	
29	Mulberry	Selmer	TN	Rural	5	650	297 Country	Sep-16	$150,000			Medium
							53 Glen	Mar-17	$126,000	$144,460	4%	
30	Mulberry	Selmer	TN	Rural	5	685	57 Cooper	Feb-19	$163,000			Medium
							191 Amelia	Aug-18	$132,000	$155,947	4%	
31	Grand Ridge	Streator	IL	Rural	20	480	1497 E 21st	Oct-16	$186,000			Light
							712 Columbus	Jun-16	$166,000	$184,000	1%	
32	Walton 2	Walton	KY	Suburban	2	410	783 Jones	May-22	$346,000			Light
							783 Jones	May-12	$174,900	$353,000	-2%	
33	Whitehorn	Gretna	VA	Rural	50	255	1120 Taylors Mill	Dec-21	$224,000			Light
							100 Long Branch	Aug-20	$162,000	$213,920	5%	
34	Altavista	Altavista	VA	Rural	80	540	3211 Leesville	Mar-22	$124,048			Light
							3211 Leesville	Dec-18	$72,500	$97,000	22%	
35	Altavista	Altavista	VA	Rural	80	600	3026 Bishop Crk	Feb-22	$150,000			Heavy
							3026 Bishop Crk	Jul-19	$120,000	$155,000	-3%	

B. Southeastern USA Data – Over 5 MW

1. Matched Pair – AM Best Solar Farm, Goldsboro, Wayne County, NC

This 5 MW solar farm adjoins Spring Garden Subdivision which had new homes and lots available for new construction during the approval and construction of the solar farm. The recent home sales have ranged from $200,000 to $250,000. This subdivision sold out the last homes in late 2014. The solar farm is clearly visible particularly along the north end of this street where there is only a thin line of trees separating the solar farm from the single-family homes.

Homes backing up to the solar farm are selling at the same price for the same floor plan as the homes that do not back up to the solar farm in this subdivision. According to the builder, the solar farm has been a complete non-factor. Not only do the sales show no difference in the price paid for the various homes adjoining the solar farm versus not adjoining the solar farm, but there are actually more recent sales along the solar farm than not. There is no impact on the sellout rate, or time to sell for the homes adjoining the solar farm.

I spoke with a number of owners who adjoin the solar farm and none of them expressed any concern over the solar farm impacting their property value.

The data presented on the following page shows multiple homes that have sold in 2013 and 2014 adjoining the solar farm at prices similar to those not along the solar farm. These series of sales indicate that the solar farm has no impact on the adjoining residential use.

The homes that were marketed at Spring Garden are shown below.

The homes adjoining the solar farm are considered to have a light landscaping screen as it is a narrow row of existing pine trees supplemented with evergreen plantings.

Matched Pairs
As of Date: 9/3/2014

Adjoining Sales After Solar Farm Completed

TAX ID	Owner	Acres	Date Sold	Sales Price	Built	GBA	$/GBA	Style
3600195570	Helm	0.76	Sep-13	$250,000	2013	3,292	$75.94	2 Story
3600195361	Leak	1.49	Sep-13	$260,000	2013	3,652	$71.19	2 Story
3600199891	McBrayer	2.24	Jul-14	$250,000	2014	3,292	$75.94	2 Story
3600198632	Foresman	1.13	Aug-14	$253,000	2014	3,400	$74.41	2 Story
3600196656	Hinson	0.75	Dec-13	$255,000	2013	3,453	$73.85	2 Story
	Average	1.27		$253,600	2013.4	3,418	$74.27	
	Median	1.13		$253,000	2013	3,400	$74.41	

Adjoining Sales After Solar Farm Announced

TAX ID	Owner	Acres	Date Sold	Sales Price	Built	GBA	$/GBA	Style
0	Feddersen	1.56	Feb-13	$247,000	2012	3,427	$72.07	Ranch
0	Gentry	1.42	Apr-13	$245,000	2013	3,400	$72.06	2 Story
	Average	1.49		$246,000	2012.5	3,414	$72.07	
	Median	1.49		$246,000	2012.5	3,414	$72.07	

Adjoining Sales Before Solar Farm Announced

TAX ID	Owner	Acres	Date Sold	Sales Price	Built	GBA	$/GBA	Style
3600183905	Carter	1.57	Dec-12	$240,000	2012	3,347	$71.71	1.5 Story
3600193097	Kelly	1.61	Sep-12	$198,000	2012	2,532	$78.20	2 Story
3600194189	Hadwan	1.55	Nov-12	$240,000	2012	3,433	$69.91	1.5 Story
	Average	1.59		$219,000	2012	2,940	$74.95	
	Median	1.59		$219,000	2012	2,940	$74.95	

Nearby Sales After Solar Farm Completed

TAX ID	Owner	Acres	Date Sold	Sales Price	Built	GBA	$/GBA	Style
3600193710	Barnes	1.12	Oct-13	$248,000	2013	3,400	$72.94	2 Story
3601105180	Nackley	0.95	Dec-13	$253,000	2013	3,400	$74.41	2 Story
3600192528	Mattheis	1.12	Oct-13	$238,000	2013	3,194	$74.51	2 Story
3600198928	Beckman	0.93	Mar-14	$250,000	2014	3,292	$75.94	2 Story
3600196965	Hough	0.81	Jun-14	$224,000	2014	2,434	$92.03	2 Story
3600193914	Preskitt	0.67	Jun-14	$242,000	2014	2,825	$85.66	2 Story
3600194813	Bordner	0.91	Apr-14	$258,000	2014	3,511	$73.48	2 Story
3601104147	Shaffer	0.73	Apr-14	$255,000	2014	3,453	$73.85	2 Story
	Average	0.91		$246,000	2013.625	3,189	$77.85	
	Median	0.92		$249,000	2014	3,346	$74.46	

Nearby Sales Before Solar Farm Announced

TAX ID	Owner	Acres	Date Sold	Sales Price	Built	GBA	$/GBA	Style
3600191437	Thomas	1.12	Sep-12	$225,000	2012	3,276	$68.68	2 Story
3600087968	Lilley	1.15	Jan-13	$238,000	2012	3,421	$69.57	1.5 Story
3600087654	Burke	1.26	Sep-12	$240,000	2012	3,543	$67.74	2 Story
3600088796	Hobbs	0.73	Sep-12	$228,000	2012	3,254	$70.07	2 Story
	Average	1.07		$232,750	2012	3,374	$69.01	
	Median	1.14		$233,000	2012	3,349	$69.13	

Matched Pair Summary

	Adjoins Solar Farm		Nearby Solar Farm	
	Average	**Median**	**Average**	**Median**
Sales Price	$253,600	$253,000	$246,000	$249,000
Year Built	2013	2013	2014	2014
Size	3,418	3,400	3,189	3,346
Price/SF	$74.27	$74.41	$77.85	$74.46

Percentage Differences

Median Price	-2%
Median Size	-2%
Median Price/SF	0%

I note that 2308 Granville Drive sold again in November 2015 for $267,500, or $7,500 more than when it was purchased new from the builder two years earlier (Tax ID 3600195361, Owner: Leak). The neighborhood is clearly showing appreciation for homes adjoining the solar farm.

The Median Price is the best indicator to follow in any analysis as it avoids outlying samples that would otherwise skew the results. The median sizes and median prices are all consistent throughout the sales both before and after the solar farm whether you look at sites adjoining or nearby to the solar farm. The average size for the homes nearby the solar farm shows a smaller building size and a higher price per square foot. This reflects a common occurrence in real estate where the price per square foot goes up as the size goes down. So even comparing averages the indication is for no impact, but I rely on the median rates as the most reliable indication for any such analysis.

I have also considered four more recent resales of homes in this community as shown on the following page. These comparable sales adjoin the solar farm at distances ranging from 315 to 400 feet. The matched pairs show a range from -9% to +6%. The range of the average difference is -2% to +1% with an average of 0% and a median of +0.5%. These comparable sales support a finding of no impact on property value.

Adjoining Residential Sales After Solar Farm Approved

Parcel	Solar	Address	Acres	Date Sold	Sales Price	Built	GBA	$/GBA	BR/BA	Park	Style	Other	Distance
	Adjoins	103 Granville Pl	1.42	7/27/2018	$265,000	2013	3,292	$80.50	4/3.5	2-Car	2-Story		385
	Not	2219 Granville	1.15	1/8/2018	$260,000	2012	3,292	$78.98	4/3.5	2-Car	2-Story		
	Not	634 Friendly	0.96	7/31/2019	$267,000	2018	3,053	$87.45	4/4.5	2-Car	2-Story		
	Not	2403 Granville	0.69	4/23/2019	$265,000	2014	2,816	$94.11	5/3.5	2-Car	2-Story		

	Solar	Address	Time	Site	YB	GLA	BR/BA	Park	Other	Total	% Diff	Avg % Diff
	Adjoins	103 Granville Pl								$265,000		-2%
	Not	2219 Granville	$4,382		$1,300	$0				$265,682	0%	
	Not	634 Friendly	-$8,303		-$6,675	$16,721	-$10,000			$258,744	2%	
	Not	2403 Granville	-$6,029		-$1,325	$31,356				$289,001	-9%	

Adjoining Residential Sales After Solar Farm Approved

Parcel	Solar	Address	Acres	Date Sold	Sales Price	Built	GBA	$/GBA	BR/BA	Park	Style	Other	Distance
	Adjoins	104 Erin	2.24	6/19/2017	$280,000	2014	3,549	$78.90	5/3.5	2-Car	2-Story		315
	Not	2219 Granville	1.15	1/8/2018	$260,000	2012	3,292	$78.98	4/3.5	2-Car	2-Story		
	Not	634 Friendly	0.96	7/31/2019	$267,000	2018	3,053	$87.45	4/4.5	2-Car	2-Story		
	Not	2403 Granville	0.69	4/23/2019	$265,000	2014	2,816	$94.11	5/3.5	2-Car	2-Story		

	Solar	Address	Time	Site	YB	GLA	BR/BA	Park	Other	Total	% Diff	Avg % Diff
	Adjoins	104 Erin								$280,000		0%
	Not	2219 Granville	-$4,448		$2,600	$16,238				$274,390	2%	
	Not	634 Friendly	-$17,370		-$5,340	$34,702	-$10,000			$268,992	4%	
	Not	2403 Granville	-$15,029		$0	$48,285				$298,256	-7%	

Adjoining Residential Sales After Solar Farm Approved

Parcel	Solar	Address	Acres	Date Sold	Sales Price	Built	GBA	$/GBA	BR/BA	Park	Style	Other	Distance
	Adjoins	2312 Granville	0.75	5/1/2018	$284,900	2013	3,453	$82.51	5/3.5	2-Car	2-Story		400
	Not	2219 Granville	1.15	1/8/2018	$260,000	2012	3,292	$78.98	4/3.5	2-Car	2-Story		
	Not	634 Friendly	0.96	7/31/2019	$267,000	2018	3,053	$87.45	4/4.5	2-Car	2-Story		
	Not	2403 Granville	0.69	4/23/2019	$265,000	2014	2,816	$94.11	5/3.5	2-Car	2-Story		

	Solar	Address	Time	Site	YB	GLA	BR/BA	Park	Other	Total	% Diff	Avg % Diff
	Adjoins	2312 Granville								$284,900		1%
	Not	2219 Granville	$2,476		$1,300	$10,173				$273,948	4%	
	Not	634 Friendly	-$10,260		-$6,675	$27,986	-$10,000			$268,051	6%	
	Not	2403 Granville	-$7,972		-$1,325	$47,956				$303,659	-7%	

Adjoining Residential Sales After Solar Farm Approved

Parcel	Solar	Address	Acres	Date Sold	Sales Price	Built	GBA	$/GBA	BR/BA	Park	Style	Other	Distance
	Adjoins	2310 Granville	0.76	5/14/2019	$280,000	2013	3,292	$85.05	5/3.5	2-Car	2-Story		400
	Not	2219 Granville	1.15	1/8/2018	$260,000	2012	3,292	$78.98	4/3.5	2-Car	2-Story		
	Not	634 Friendly	0.96	7/31/2019	$267,000	2018	3,053	$87.45	4/4.5	2-Car	2-Story		
	Not	2403 Granville	0.69	4/23/2019	$265,000	2014	2,816	$94.11	5/3.5	2-Car	2-Story		

	Solar	Address	Time	Site	YB	GLA	BR/BA	Park	Other	Total	% Diff	Avg % Diff
	Adjoins	2310 Granville								$280,000		1%
	Not	2219 Granville	$10,758		$1,300	$0				$272,058	3%	
	Not	634 Friendly	-$1,755		-$6,675	$16,721	-$10,000			$265,291	5%	
	Not	2403 Granville	$469		-$1,325	$31,356				$295,500	-6%	

I have also considered the original sales prices in this subdivision relative to the recent resale values as shown in the chart below. This rate of appreciation is right at 2.5% over the last 6 years. Zillow indicates that the average home value within the 27530 zip code as of January 2014 was $101,300 and as of January 2020 that average is $118,100. This indicates an average increase in the market of 2.37%. I conclude that the appreciation of the homes adjoining the solar farm are not impacted by the presence of the solar farm based on this data.

	Address	Initial Sale Date	Price	Second Sale Date	Price	Year Diff	Apprec.	% Apprec.	Apprec. %/Year
1	103 Granville Pl	4/1/2013	$245,000	7/27/2018	$265,000	5.32	$20,000	8.16%	1.53%
2	105 Erin	7/1/2014	$250,000	6/19/2017	$280,000	2.97	$30,000	12.00%	4.04%
3	2312 Granville	12/1/2013	$255,000	5/1/2015	$262,000	1.41	$7,000	2.75%	1.94%
4	2312 Granville	5/1/2015	$262,000	5/1/2018	$284,900	3.00	$22,900	8.74%	2.91%
5	2310 Granville	8/1/2013	$250,000	5/14/2019	$280,000	5.79	$30,000	12.00%	2.07%
6	2308 Granville	9/1/2013	$260,000	11/12/2015	$267,500	2.20	$7,500	2.88%	1.31%
7	2304 Granville	9/1/2012	$198,000	6/1/2017	$225,000	4.75	$27,000	13.64%	2.87%
8	102 Erin	8/1/2014	$253,000	11/1/2016	$270,000	2.25	$17,000	6.72%	2.98%
								Average	2.46%
								Median	2.47%

2. Matched Pair – Mulberry, Selmer, McNairy County, TN

This 16 MW solar farm was built in 2014 on 208.89 acres with the closest home being 480 feet.

This solar farm adjoins two subdivisions with Central Hills having a mix of existing and new construction homes. Lots in this development have been marketed for $15,000 each with discounts offered for multiple lots being used for a single home site. I spoke with the agent with Rhonda Wheeler and Becky Hearnsberger with United County Farm & Home Realty who noted that they have seen no impact on lot or home sales due to the solar farm in this community.

I have included a map below as well as data on recent sales activity on lots that adjoin the solar farm or are near the solar farm in this subdivision both before and after the announced plan for this solar farm facility. I note that using the same method I used to breakdown the adjoining uses at the subject property I show that the predominant adjoining uses are residential and agricultural, which is consistent with the location of most solar farms.

Adjoining Use Breakdown

	Acreage	Parcels
Commercial	3.40%	0.034
Residential	12.84%	79.31%
Agri/Res	10.39%	3.45%
Agricultural	73.37%	13.79%
Total	**100.00%**	**100.00%**

I have run a number of direct matched comparisons on the sales adjoining this solar farm as shown below. These direct matched pairs include some of those shown above as well as additional more recent sales in this community. In each of these I have compared the one sale adjoining the solar farm to multiple similar homes nearby that do not adjoin a solar farm to look for any potential impact from the solar farm.

Parcel	Solar	Address	Acres	Date Sold	Sales Price	Built	GBA	$/GBA	BR/BA	Park	Style	Other
3	Adjoins	491 Dusty	6.86	10/28/2016	$176,000	2009	1,801	$97.72	3/2	2-Gar	Ranch	
	Not	820 Lake Trail	1.00	6/8/2018	$168,000	2013	1,869	$89.89	4/2	2-Gar	Ranch	
	Not	262 Country	1.00	1/17/2018	$145,000	2000	1,860	$77.96	3/2	2-Gar	Ranch	
	Not	35 April	1.15	8/16/2016	$185,000	2016	1,980	$93.43	3/2	2-Gar	Ranch	

Adjoining Sales Adjusted

Parcel	Solar	Address	Time	Site	YB	GLA	Park	Other	Total	% Diff	Distance
3	Adjoins	491 Dusty							$176,000		480
	Not	820 Lake Trail	-$8,324	$12,000	-$3,360	-$4,890			$163,426	7%	
	Not	262 Country	-$5,450	$12,000	$6,525	-$3,680			$154,396	12%	
	Not	35 April	$1,138	$12,000	-$6,475	-$13,380			$178,283	-1%	
									Average	6%	

The best matched pair is 35 April Loop, which required the least adjustment and indicates a -1% increase in value due to the solar farm adjacency.

Adjoining Residential Sales After Solar Farm Built

Parcel	Solar	Address	Acres	Date Sold	Sales Price	Built	GBA	$/GBA	BR/BA	Park	Style	Other
12	Adjoins	57 Cooper	1.20	2/26/2019	$163,000	2011	1,586	$102.77	3/2	2-Gar	1.5 Story	Pool
	Not	191 Amelia	1.00	8/3/2018	$132,000	2005	1,534	$86.05	3/2	Drive	Ranch	
	Not	75 April	0.85	3/17/2017	$134,000	2012	1,588	$84.38	3/2	2-Crprt	Ranch	
	Not	345 Woodland	1.15	12/29/2016	$131,000	2002	1,410	$92.91	3/2	1-Gar	Ranch	

Adjoining Sales Adjusted

Parcel	Solar	Address	Sales Price	Time	Site	YB	GLA	Park	Other	Total	% Diff	Distance
12	Adjoins	57 Cooper	$163,000							$163,000		685
	Not	191 Amelia	$132,000	$2,303		$3,960	$2,685	$10,000	$5,000	$155,947	4%	
	Not	75 April	$134,000	$8,029	$4,000	-$670	-$135	$5,000	$5,000	$155,224	5%	
	Not	345 Woodland	$131,000	$8,710		$5,895	$9,811		$5,000	$160,416	2%	
										Average	4%	

The best matched pair is 191 Amelia, which was most similar in time frame of sale and indicates a +4% increase in value due to the solar farm adjacency.

Adjoining Residential Sales After Solar Farm Built

Parcel	Solar	Address	Acres	Date Sold	Sales Price	Built	GBA	$/GBA	BR/BA	Park	Style	Other
15	Adjoins	297 Country	1.00	9/30/2016	$150,000	2002	1,596	$93.98	3/2	4-Gar	Ranch	
	Not	185 Dusty	1.85	8/17/2015	$126,040	2009	1,463	$86.15	3/2	2-Gar	Ranch	
	Not	53 Glen	1.13	3/9/2017	$126,000	1999	1,475	$85.42	3/2	2-Gar	Ranch	Brick

Adjoining Sales Adjusted

Parcel	Solar	Address	Sales Price	Time	Site	YB	GLA	Park	Other	Total	% Diff	Distance
15	Adjoins	297 Country	$150,000							$150,000		650
	Not	185 Dusty	$126,040	$4,355		-$4,411	$9,167	$10,000		$145,150	3%	
	Not	53 Glen	$126,000	-$1,699		$1,890	$8,269	$10,000		$144,460	4%	
										Average	3%	

The best matched pair is 53 Glen, which was most similar in time frame of sale and required less adjustment. It indicates a +4% increase in value due to the solar farm adjacency.

The average indicated impact from these three sets of matched pairs is +4%, which suggests a mild positive relationship due to adjacency to the solar farm. The landscaping buffer for this project is mostly natural tree growth that was retained as part of the development but much of the trees separating the panels from homes are actually on the lots for the homes themselves. I therefore consider the landscaping buffer to be thin to moderate for these adjoining homes.

I have also looked at several lot sales in this subdivision as shown below.

These are all lots within the same community and the highest prices paid are for lots one parcel off from the existing solar farm. These prices are fairly inconsistent, though they do suggest about a $3,000 loss in the lots adjoining the solar farm. This is an atypical finding and additional details suggest there is more going on in these sales than the data crunching shows. First of all Parcel 4 was purchased by the owner of the adjoining home and therefore an atypical buyer seeking to expand a lot and the site is not being purchased for home development. Moreover, using the SiteToDoBusiness demographic tools, I found that the 1-mile radius around this development is expecting a total population increase over the next 5 years of 3 people. This lack of growing demand for lots is largely explained in that context. Furthermore, the fact that finished home sales as shown above are showing no sign of a negative impact on property value makes this data unreliable and inconsistent with the data shown in sales to an end user. I therefore place little weight on this outlier data.

Parcel	Solar	Address	Acres	Date Sold	Sales Price	4/18/2019 Adj for Time	$/AC	4/18/2019 Adj for Time
4	Adjoins	Shelter	2.05	10/25/2017	$16,000	$16,728	$7,805	$8,160
10	Adjoins	Carter	1.70	8/2/2018	$14,000	$14,306	$8,235	$8,415
11	Adjoins	Cooper	1.28	9/17/2018	$12,000	$12,215	$9,375	$9,543
	Not	75 Dusty	1.67	4/18/2019	$20,000	$20,000	$11,976	$11,976
	Not	Lake Trl	1.47	11/7/2018	$13,000	$13,177	$8,844	$8,964
	Not	Lake Trl	1.67	4/18/2019	$20,000	$20,000	$11,976	$11,976

	Adjoins	Per Acre	Not Adjoins	Per Acre	% DIF/Lot	% DIF/AC
Average	$14,416	$8,706	$17,726	$10,972	19%	21%
Median	$14,306	$8,415	$20,000	$11,976	28%	30%
High	$16,728	$9,543	$20,000	$11,976	16%	20%
Low	$12,215	$8,160	$13,177	$8,964	7%	9%

3. Matched Pair – Leonard Road Solar Farm, Hughesville, Charles County, MD

This 5 MW solar farm is located on 47 acres and mostly adjoins agricultural and residential uses to the west, south and east as shown above. The property also adjoins retail uses and a church. I looked at a 2016 sale of an adjoining home with a positive impact on value adjoining the solar farm of 2.90%. This is within typical market friction and supports an indication of no impact on property value.

I have shown this data below. The landscaping buffer is considered heavy.

Leonardtown Road Solar Farm, Hughesville, MD

Nearby Residential Sale After Solar Farm Construction

Address	Solar Farm	Acres	Date Sold	Sales Price*	Built	GBA	$/GBA	Style	BR/BA	Bsmt	Park	Upgrades	Other
14595 Box Elder Ct	Adjoins	3.00	2/12/2016	$291,000	1991	2,174	$133.85	Colonial	5/2.5	No	2 Car Att	N/A	Deck
15313 Bassford Rd	Not	3.32	7/20/2016	$329,800	1990	2,520	$130.87	Colonial	3/2.5	Finished	2 Car Att	Custom	Scr Por/Patio

*$9,000 concession deducted from sale price for Box Elder and $10,200 deducted from Bassford

Adjoining Sales Adjusted			Adjustments					
Address	Date Sold	Sales Price	Time	GLA	Bsmt	Upgrades	Other	Total
14595 Box Elder Ct	2/12/2016	$291,000						$291,000
15313 Bassford Rd	7/20/2016	$329,800	-$3,400	-$13,840	-$10,000	-$15,000	-$5,000	$282,560

Difference Attributable to Location $8,440
2.90%

This is within typical market friction and supports an indication of no impact on property value.

4. Matched Pair – Gastonia SC Solar, Gastonia, Gaston County, NC

This 5 MW project is located on the south side of Neal Hawkins Road just outside of Gastonia. The property identified above as Parcel 4 was listed for sale while this solar farm project was going

through the approval process. The property was put under contract during the permitting process with the permit being approved while the due diligence period was still ongoing. After the permit was approved the property closed with no concerns from the buyer. I spoke with Jennifer Bouvier, the broker listing the property and she indicated that the solar farm had no impact at all on the sales price. She considered some nearby sales to set the price and the closing price was very similar to the asking price within the typical range for the market. The buyer was aware that the solar farm was coming and they had no concerns.

This two-story brick dwelling was sold on March 20, 2017 for $270,000 for a 3,437 square foot dwelling built in 1934 in average condition on 1.42 acres. The property has four bedrooms and two bathrooms. The landscaping screen is light for this adjoining home due to it being a new planted landscaping buffer.

Adjoining Residential Sales After Solar Farm Approved

Solar	Address	Acres	Date Sold	Sales Price	Built	GBA	$/GLA	BR/BA	Park	Style	Other
Adjoins	609 Neal Hawkins	1.42	3/20/2017	$270,000	1934	3,427	$78.79	4/2	Open	2-Brick	
Not	1418 N Modena	4.81	4/17/2018	$225,000	1930	2,906	$77.43	3/3	2-Crprt	2-Brick	
Not	363 Dallas Bess	2.90	11/29/2018	$265,500	1968	2,964	$89.57	3/3	Open	FinBsmt	
Not	1612 Dallas Chry	2.74	9/17/2018	$245,000	1951	3,443	$71.16	3/2	Open	2-Brick	Unfin bath

Adjoining Sales Adjusted

Address	Time	Site	YB	GLA	BR/BA	Park	Other	Total	% Diff	Avg % Diff	Distance
609 Neal Hawkins								$270,000			225
1418 N Modena	$7,319		$2,700	$32,271		-$10,000		$257,290	5%		
363 Dallas Bess	$746		-$27,081	$33,179	-$10,000		$53,100	$262,456	3%		
1612 Dallas Chry	$4,110		-$12,495	-$911			$10,000	$235,704	13%		
										7%	

I also considered the newer adjoining home identified as Parcel 5 that sold later in 2017 and it likewise shows no negative impact on property value. This is also considered a light landscaping buffer.

Adjoining Residential Sales After Solar Farm Approved

Solar	Address	Acres	Date Sold	Sales Price	Built	GBA	$/GLA	BR/BA	Park	Style
Adjoins	611 Neal Hawkins	0.78	7/6/2017	$288,000	1991	2,256	$127.66	5/3	2-Gar	1.5 Brick
Not	1211 Still Frst	0.51	7/30/2018	$280,000	1989	2,249	$124.50	3/3	2-Gar	Br Rnch
Not	2867 Colony Wds	0.52	8/14/2018	$242,000	1990	2,006	$120.64	3/3	2-Gar	Br Rnch
Not	1010 Strawberry	1.00	10/4/2018	$315,000	2002	2,330	$135.19	3/2.5	2-Gar	1.5 Brick

Adjoining Sales Adjusted

Address	Time	Site	YB	GLA	BR/BA	Park	Other	Total	% Diff	Avg % Diff	Distance
611 Neal Hawkins								$288,000			145
1211 Still Frst	$1,341		$2,800	$697				$284,838	1%		
2867 Colony Wds	$7,714		$1,210	$24,128				$275,052	4%		
1010 Strawberry	-$4,555		-$17,325	-$8,003	$5,000			$290,116	-1%		
										2%	

5. Matched Pair – Summit/Ranchlands Solar, Moyock, Currituck County, NC

This project is located at 1374 Caritoke Highway, Moyock, NC. This is an 80 MW facility on a parent tract of 2,034 acres. Parcels Number 48 and 53 as shown in the map above were sold in 2016. The project was under construction during the time period of the first of the matched pair sales and the permit was approved well prior to that in 2015.

I looked at multiple sales of adjoining and nearby homes and compared each to multiple comparables to show a range of impacts from -10% up to +11% with an average of +2% and a median of +3%. These ranges are well within typical real estate variation and supports an indication of no impact on property value.

Adjoining Residential Sales After Solar Farm Approved

Parcel	Solar	Address	Acres	Date Sold	Sales Price	Built	GBA	$/GBA	BR/BA	Park	Style	Other	Distance
48	Adjoins	129 Pinto	4.29	4/15/2016	$170,000	1985	1,559	$109.04	3/2	Drive	MFG		1,060
	Not	102 Timber	1.30	4/1/2016	$175,500	2009	1,352	$129.81	3/2	Drive	MFG		
	Not	120 Ranchland	0.99	10/1/2014	$170,000	2002	1,501	$113.26	3/2	Drive	MFG		

Solar	Address	Time	Site	YB	GLA	BR/BA	Park	Other	Total	% Diff	Avg % Diff
Adjoins	129 Pinto								$170,000		-3%
Not	102 Timber	$276	$10,000	-$29,484	$18,809				$175,101	-3%	
Not	120 Ranchland	$10,735	$10,000	-$20,230	$4,598				$175,103	-3%	

Solar	Address	Acres	Date Sold	Sales Price	Built	GBA	$/GLA	BR/BA	Park	Style	Other
Adjoins	105 Pinto	4.99	12/16/2016	$206,000	1978	1,484	$138.81	3/2	Det G	Ranch	
Not	111 Spur	1.15	2/1/2016	$193,000	1985	2,013	$95.88	4/2	Gar	Ranch	
Not	103 Marshall	1.07	3/29/2017	$196,000	2003	1,620	$120.99	3/2	Drive	Ranch	
Not	127 Ranchland	0.00	6/9/2015	$219,900	1988	1,910	$115.13	3/2	Gar/3Det	Ranch	

Adjoining Sales Adjusted

Address	Time	Site	YB	GLA	BR/BA	Park	Other	Total	% Diff	Avg % Diff	Distance
105 Pinto								$206,000			980
111 Spur	$6,747	$10,000	-$6,755	-$25,359				$177,633	14%		
103 Marshall	-$2,212	$10,000	-$24,500	-$8,227		$5,000		$176,212	14%		
127 Ranchland	$13,399	$10,000	-$10,995	-$24,523		-$10,000		$197,781	4%		
										11%	

Adjoining Residential Sales After Solar Farm Built

Parcel	Solar	Address	Acres	Date Sold	Sales Price	Built	GBA	$/GBA	BR/BA	Park	Style	Other	Distance
15	Adjoins	318 Green View	0.44	9/15/2019	$357,000	2005	3,460	$103.18	4/4	2-Car	1.5 Brick		570
	Not	195 St Andrews	0.55	6/17/2018	$314,000	2002	3,561	$88.18	5/3	2-Car	2.0 Brick		
	Not	336 Green View	0.64	1/13/2019	$365,000	2006	3,790	$96.31	6/4	3-Car	2.0 Brick		
	Not	275 Green View	0.36	8/15/2019	$312,000	2003	3,100	$100.65	5/3	2-Car	2.0 Brick		

Solar	Address	Time	Site	YB	GLA	BR/BA	Park	Other	Total	% Diff	Avg % Diff
Adjoins	318 Green View								$357,000		4%
Not	195 St Andrews	$12,040		$4,710	-$7,125	$10,000			$333,625	7%	
Not	336 Green View	$7,536		-$1,825	-$25,425			-$5,000	$340,286	5%	
Not	275 Green View	$815		$3,120	$28,986	$10,000			$354,921	1%	

Adjoining Residential Sales After Solar Farm Built

Parcel	Solar	Address	Acres	Date Sold	Sales Price	Built	GBA	$/GBA	BR/BA	Park	Style	Other	Distance
29	Adjoins	164 Ranchland	1.01	4/30/2019	$169,000	1999	2,052	$82.36	4/2	Gar	MFG		440
	Not	150 Pinto	0.94	3/27/2018	$168,000	2017	1,920	$87.50	4/2	Drive	MFG		
	Not	105 Longhorn	1.90	10/10/2017	$184,500	2002	1,944	$94.91	3/2	Drive	MFG		
	Not	112 Pinto	1.00	7/27/2018	$180,000	2002	1,836	$98.04	3/2	Drive	MFG	Fenced	

Solar	Address	Time	Site	YB	GLA	BR/BA	Park	Other	Total	% Diff	Avg % Diff
Adjoins	164 Ranchland								$169,000		-10%
Not	150 Pinto	$5,649		-$21,168	$8,085			$5,000	$165,566	2%	
Not	105 Longhorn	$8,816	-$10,000	-$3,875	$7,175			$5,000	$191,616	-13%	
Not	112 Pinto	$4,202		-$3,780	$14,824			$5,000	$200,245	-18%	

Adjoining Residential Sales After Solar Farm Built

Parcel	Solar	Address	Acres	Date Sold	Sales Price	Built	GBA	$/GBA	BR/BA	Park	Style	Other	Distance
	Adjoins	358 Oxford	10.03	9/16/2019	$478,000	2008	2,726	$175.35	3/3	2 Gar	Ranch		635
	Not	276 Summit	10.01	12/20/2017	$355,000	2006	1,985	$178.84	3/2	2 Gar	Ranch		
	Not	176 Providence	6.19	5/6/2019	$425,000	1990	2,549	$166.73	3/3	4 Gar	Ranch	Brick	
	Not	1601 B Caratoke	12.20	9/26/2019	$440,000	2016	3,100	$141.94	4/3.5	5 Gar	Ranch	Pool	

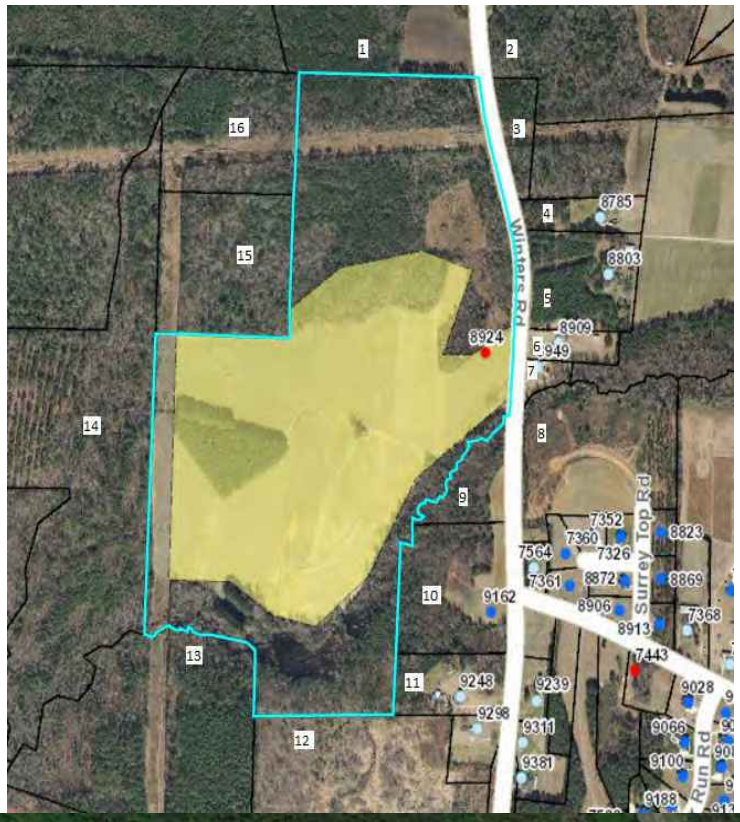
Solar	Address	Time	Site	YB	GLA	BR/BA	Park	Other	Total	% Diff	Avg % Diff
Adjoins	358 Oxford								$478,000		5%
Not	276 Summit	$18,996		$3,550	$106,017	$10,000			$493,564	-3%	
Not	176 Providence	$4,763		$38,250	$23,609		-$10,000	-$25,000	$456,623	4%	
Not	1601 B Caratoke	-$371	$50,000	-$17,600	-$42,467	-$5,000	-$10,000		$414,562	13%	

Adjoining Residential Sales After Solar Farm Approved

Parcel	Solar	Address	Acres	Date Sold	Sales Price	Built	GBA	$/GBA	BR/BA	Park	Style	Other	Distance
	Nearby	343 Oxford	10.01	3/9/2017	$490,000	2016	3,753	$130.56	3/3	2 Gar	1.5 Story	Pool	970
	Not	287 Oxford	10.01	9/4/2017	$600,000	2013	4,341	$138.22	5/4.5	8-Gar	1.5 Story	Pool	
	Not	301 Oxford	10.00	4/23/2018	$434,000	2013	3,393	$127.91	5/3	2 Gar	1.5 Story		
	Not	218 Oxford	10.01	4/4/2017	$525,000	2006	4,215	$124.56	4/3	4 Gar	1.5 Story	VG Barn	

Solar	Address	Time	Site	YB	GLA	BR/BA	Park	Other	Total	% Diff	Avg % Diff
Adjoins	343 Oxford								$490,000		3%
Not	287 Oxford	-$9,051		$9,000	-$65,017	-$15,000	-$25,000		$494,932	-1%	
Not	301 Oxford	-$14,995	-$10,000	$6,510	$36,838				$452,353	8%	
Not	218 Oxford	-$1,150		$26,250	-$46,036		-$10,000	-$10,000	$484,064	1%	

6. Matched Pair – Tracy Solar, Bailey, Nash County, NC



This project is located in rural Nash County on Winters Road with a 5 MW facility that was built in 2016 on 50 acres. A local builder acquired parcels 9 and 10 following construction as shown below

at rates comparable to other tracts in the area. They then built a custom home for an owner and sold that at a price similar to other nearby homes as shown in the matched pair data below. The retained woods provide a heavy landscaped buffer for this homesite.

Adjoining Land Sales After Solar Farm Completed

#	Solar Farm	TAX ID	Grantor	Grantee	Address	Acres	Date Sold	Sales Price	$/AC	Other
9 &10	Adjoins	316003 & 316004	Cozart	Kingsmill	9162 Winters	13.22	7/21/2016	$70,000	$5,295	
	Not	6056	Billingsly		427 Young	41	10/21/2016	$164,000	$4,000	
	Not	33211	Fulcher	Weikel	10533 Cone	23.46	7/18/2017	$137,000	$5,840	Doublewide, structures
	Not	106807	Perry	Gardner	Claude Lewis	11.22	8/10/2017	$79,000	$7,041	Gravel drive for sub, cleared
	Not	3437	Vaughan	N/A	11354 Old Lewis Sch	18.73	Listing	$79,900	$4,266	Small cemetery,wooded

Adjoining Sales Adjusted

Time	Acres	Location	Other	Adj $/Ac	% Diff
				$5,295	
$0	$400	$0	$0	$4,400	17%
-$292	$292	$0	-$500	$5,340	-1%
-$352	$0	$0	-$1,000	$5,689	-7%
-$213	$0	$0	$213	$4,266	19%
				Average	7%

Adjoining Residential Sales After Solar Farm Completed

#	Solar Farm	n	Address	Acres	Date Sold	Sales Price	Built	GLA	$/GLA	BR/BA	Style	Other
9 &10	Adjoins	gs	9162 Winters	13.22	1/5/2017	$255,000	2016	1,616	$157.80	3/2	Ranch	1296 sf wrkshp
	Not	w	7352 Red Fox	0.93	6/30/2016	$176,000	2010	1,529	$115.11	3/2	2-story	

Adjoining Sales Adjusted

Time	Acres	YB	GLA	Style	Other	Total	% Diff
						$255,000	
$0	$44,000	$7,392	$5,007	$5,000	$15,000	$252,399	1%

The comparables for the land show either a significant positive relationship or a mild negative relationship to having and adjoining solar farm, but when averaged together they show no negative impact. The wild divergence is due to the difficulty in comping out this tract of land and the wide variety of comparables used. The two comparables that show mild negative influences include a property that was partly developed as a residential subdivision and the other included a doublewide with some value and accessory agricultural structures. The tax assessed value on the improvements were valued at $60,000. So both of those comparables have some limitations for comparison. The two that show significant enhancement due to adjacency includes a property with a cemetery located in the middle and the other is a tract almost twice as large. Still that larger tract after adjustment provides the best matched pair as it required the least adjustment. I therefore conclude that there is no negative impact due to adjacency to the solar farm shown by this matched pair.

The dwelling that was built on the site was a build-to-suit and was compared to a nearby homesale of a property on a smaller parcel of land. I adjusted for that differenced based on a $25,000 value for a 1-acre home site versus the $70,000 purchase price of the larger subject tract. The other adjustments are typical and show no impact due to the adjacency to the solar farm.

The closest solar panel to the home is 780 feet away.

I note that the representative for Kingsmill Homes indicated that the solar farm was never a concern in purchasing the land or selling the home. He also indicated that they had built a number of nearby homes across the street and it had never come up as an issue.

n is located near Seminole Trail, Parrish, FL. The solar farm has a 74.50 MW output on a 1,180.38 acre tract and was built in 2016. The tract is owned by Florida Power any.

ered the recent sale of 13670 Highland Road, Wimauma, Florida. This one-story, home is located just north of the solar farm and separated from the solar farm by a or. This home is a 3 BR, 3 BA 1,512 s.f. home with a carport and workshop. The des new custom cabinets, granite counter tops, brand new stainless steel appliances, ooms and new carpet in the bedrooms. The home is sitting on 5 acres. The home 997.

red this sale to several nearby homesales as part of this matched pair analysis as The landscaping separating the home from the solar farm is considered heavy.

Solar	TAX ID/Address	Acres	Date Sold	Sales Price	Built	GBA	$/GBA	BR/BA	Park	Style	Note
Adjoins	13670 Highland	5.00	8/21/2017	$255,000	1997	1,512	$168.65	3/3	Carport/Wrkshp	Ranch	Renov.
Not	2901 Arrowsmith	1.91	1/31/2018	$225,000	1979	1,636	$137.53	3/2	2 Garage/Wrkshp	Ranch	
Not	602 Butch Cassidy	1.00	5/5/2017	$220,000	2001	1,560	$141.03	3/2	N/A	Ranch	Renov.
Not	2908 Wild West	1.23	7/12/2017	$254,000	2003	1,554	$163.45	3/2	2 Garage/Wrkshp	Ranch	Renov.
Not	13851 Highland	5.00	9/13/2017	$240,000	1978	1,636	$146.70	4/2	3 Garage	Ranch	Renov.

		Adjoining Sales Adjusted								
Solar	**TAX ID/Address**	**Time**	**Acres**	**YB**	**GLA**	**BR/BA**	**Park**	**Note**	**Total**	**% Diff**
Adjoins	13670 Highland								$255,000	
Not	2901 Arrowsmith	$2,250	$10,000	$28,350	-$8,527	$5,000	-$10,000	$10,000	$262,073	-3%
Not	602 Butch Cassidy	-$2,200	$10,000	-$6,160	-$3,385	$5,000	$2,000		$225,255	12%
Not	2908 Wild West	$0	$10,000	-$10,668	-$3,432	$5,000	-$10,000		$244,900	4%
Not	13851 Highland	$0	$0	$31,920	-$9,095	$3,000	-$10,000		$255,825	0%
									Average	3%

The sales prices of the comparables before adjustments range from $220,000 to $254,000. After adjustments they range from $225,255 to $262,073. The comparables range from no impact to a strong positive impact. The comparables showing -3% and +4% impact on value are considered within a typical range of value and therefore not indicative of any impact on property value.

This set of matched pair data falls in line with the data seen in other states. The closest solar panel to the home at 13670 Highland is 1,180 feet. There is a wooded buffer between these two properties.

I have included a map showing the relative location of these properties below.

8. Matched Pair – McBride Place Solar Farm, Midland, Cabarrus County, NC

This project is located on Mount Pleasant Road, Midland, North Carolina. The property is on 627 acres on an assemblage of 974.59 acres. The solar farm was approved in early 2017 for a 74.9 MW facility.

I have considered the sale of 4380 Joyner Road which adjoins the proposed solar farm near the northwest section. This property was appraised in April of 2017 for a value of $317,000 with no consideration of any impact due to the solar farm in that figure. The property sold in November

2018 for $325,000 with the buyer fully aware of the proposed solar farm. The landscaping buffer relative to Joyner Road, Hayden Way, Chanel Court and Kristi Lane is considered medium, while the landscaping for the home at the north end of Chanel Court is considered very light.

I have considered the following matched pairs to the subject property.

Adjoining Residential Sales After Solar Farm Approved

Solar	Address	Acres	Date Sold	Sales Price	Built	GBA	$/GBA	BR/BA	Park	Style	Other
Adjoins	4380 Joyner	12.00	11/22/2017	$325,000	1979	1,598	$203.38	3/2	2xGar	Ranch	Outbldg
Not	3870 Elkwood	5.50	8/24/2016	$250,000	1986	1,551	$161.19	3/2.5	Det 2xGar	Craft	
Not	8121 Lower Rocky	18.00	2/8/2017	$355,000	1977	1,274	$278.65	2/2	2xCarprt	Ranch	Eq. Fac.
Not	13531 Cabarrus	7.89	5/20/2016	$267,750	1981	2,300	$116.41	3/2	2xGar	Ranch	

Adjoining Sales Adjusted

Time	Acres	YB	Condition	GLA	BR/BA	Park	Other	Total	% Diff
								$325,000	
$7,500	$52,000	-$12,250	$10,000	$2,273	-$2,000	$2,500	$7,500	$317,523	2%
$7,100	-$48,000	$4,970		$23,156	$0	$3,000	-$15,000	$330,226	-2%
$8,033	$33,000	-$3,749	$20,000	-$35,832	$0	$0	$7,500	$296,702	9%
								Average	3%

The home at 4380 Joyner Road is 275 feet from the closest solar panel.

I also considered the recent sale of a lot at 5800 Kristi Lane that is on the east side of the proposed solar farm. This 4.22-acre lot sold in December 2017 for $94,000. A home was built on this lot in 2019 with the closest point from home to panel at 689 feet. The home site is heavily wooded and their remains a wooded buffer between the solar panels and the home. I spoke with the broker, Margaret Dabbs, who indicated that the solar farm was considered a positive by both buyer and seller as it insures no subdivision will be happening in that area. Buyers in this market are looking for privacy and seclusion.

The breakdown of recent lot sales on Kristi are shown below with the lowest price paid for the lot with no solar farm exposure, though that lot has exposure to Mt Pleasant Road South. Still the older lot sales have exposure to the solar farm and sold for higher prices than the front lot and adjusting for time would only increase that difference.

Adjoining Lot Sales After Solar Farm Built

Parcel	Solar	Address	Acres	Date Sold	Sales Price	$/AC	$/Lot
	Adjoins	5811 Kristi	3.74	5/1/2018	$100,000	$26,738	$100,000
	Adjoins	5800 Kristi	4.22	12/1/2017	$94,000	$22,275	$94,000
	Not	5822 Kristi	3.43	2/24/2020	$90,000	$26,239	$90,000

The lot at 5811 Kristi Lane sold in May 2018 for $100,000 for a 3.74-acre lot. The home that was built later in 2018 is 505 feet to the closest solar panel. This home then sold to a homeowner for $530,000 in April 2020. I have compared this home sale to other properties in the area as shown below.

Adjoining Residential Sales After Solar Farm Built

Solar	Address	Acres	Date Sold	Sales Price	Built	GBA	$/GBA	BR/BA	Park	Style	Other
Adjoins	5811 Kristi	3.74	3/31/2020	$530,000	2018	3,858	$137.38	5/3.5	2 Gar	2-story	Cement Ext
Not	3915 Tania	1.68	12/9/2019	$495,000	2007	3,919	$126.31	3/3.5	2 Gar	2-story	3Det Gar
Not	6782 Manatee	1.33	3/8/2020	$460,000	1998	3,776	$121.82	4/2/2h	2 Gar	2-story	Water
Not	314 Old Hickory	1.24	9/20/2019	$492,500	2017	3,903	$126.18	6/4.5	2 Gar	2-story	

Solar	Address	Time	Site	YB	GLA	BR/BA	Park	Other	Total	% Diff	Avg % Diff
Adjoins	5811 Kristi								$530,000		5%
Not	3915 Tania	$6,285		$27,225	-$3,852		-$20,000		$504,657	5%	
Not	6782 Manatee	$1,189		$46,000	$4,995	$5,000			$517,183	2%	
Not	314 Old Hickory	$10,680		$2,463	-$2,839	-$10,000			$492,803	7%	

After adjusting the comparables, I found that the average adjusted value shows a slight increase in value for the subject property adjoining a solar farm. As in the other cases, this is a mild positive impact on value but within the typical range of real estate transactions.

I also looked at 5833 Kristi Lane that sold on 9/14/2020 for $625,000. This home is 470 feet from the closest panel.

Solar	Address	Acres	Date Sold	Sales Price	Built	GBA	$/GLA	BR/BA	Park	Style	Other
Nearby	5833 Kristi	4.05	9/14/2020	$625,000	2008	4,373	$142.92	5/4	3-Car	2-Brick	
Not	4055 Dakeita	4.90	12/30/2020	$629,000	2005	4,427	$142.08	4/4	4-Car	2-Brick	4DetGar/Stable
Not	9615 Bales	2.16	6/30/2020	$620,000	2007	4,139	$149.79	4/5	3-Car	2-Stone	2DetGar
Not	9522 Bales	1.47	6/18/2020	$600,000	2007	4,014	$149.48	4/4.5	3-Car	2-Stone	

Adjoining Sales Adjusted

Address	Time	Site	YB	GLA	BR/BA	Park	Other	Total	% Diff	Avg % Diff	Distance
5833 Kristi								$625,000			470
4055 Dakeita	-$9,220		$5,661	-$6,138		-$25,000		$594,303	5%		
9615 Bales	$6,455		$1,860	$28,042	-$10,000	-$15,000		$631,356	-1%		
9522 Bales	$7,233		$1,800	$42,930	-$5,000			$646,963	-4%		
										0%	

The average difference is 0% impact and the differences are all within a close range with this set of comparables and supports a finding of no impact on property value.

I have also looked at 4504 Chanel Court. This home sold on January 1, 2020 for $393,500 for this 3,010 square foot home built in 2004 with 3 bedroooms, 3.5 bathrooms, and a 3-car garage. This home includes a full partially finished basement that significantly complicates comparing this to other sales. This home previously sold on January 23, 2017 for $399,000. This was during the time that the solar farm was a known factor as the solar farm was approved in early 2017 and public discussions had already commenced. I spoke with Rachelle Killman with Real Estate Realty, LLC the buyer's agent for this transaction and she indicated that the solar farm was not a factor or consideration for the buyer. She noted that you could see the panels sort of through the trees, but it wasn't a concern for the buyer. She was not familiar with the earlier 2017 sale, but indicated that it was likely too high. This again goes back to the partially finished basement issue. The basement has a fireplace, and an installed 3/4 bathroom but otherwise bare studs and concrete floors with different buyers assigning varying value to that partly finished space. I also reached out to Don Gomez with Don Anthony Realty, LLC as he was the listing agent.

I also looked at the recent sale of 4599 Chanel Court. This home is within 310 feet of solar panels but notably does not have a good landscaping screen in place as shown in the photo below. The plantings appear to be less than 3-feet in height and only a narrow, limited screen of existing hardwoods were kept. The photograph is from the listing.

According to Scott David with Better Homes and Gardens Paracle Realty, this property was under contract for $550,000 contingent on the buyer being able to sell their former home. The former home was apparently overpriced and did not sell and the contract stretched out over 2.5 months.

The seller was in a bind as they had a home they were trying to buy contingent on this closing and were about to lose that opportunity. A cash buyer offered them a quick close at $500,000 and the seller accepted that offer in order to not lose the home they were trying to buy. According to Mr. David, the original contracted buyer and the actual cash buyer never considered the solar farm as a negative. In fact Mr. David noted that the actual buyer saw it as a great opportunity to purchase a home where a new subdivision could not be built behind his house. I therefore conclude that this property supports a finding of no impact on adjoining property, even where the landscaping screen still requires time to grow in for a year-round screen.

I also considered a sale/resale analysis on this property. This same home sold on September 15, 2015 for $462,000. Adjusting this upward by 5% per year for the five years between these sales dates suggests a value of $577,500. Comparing that to the $550,000 contract that suggests a 5% downward impact, which is within a typical market variation. Given that the broker noted no negative impact from the solar farm and the analysis above, I conclude this sale supports a finding of no impact on value.

9. Matched Pair – Mariposa Solar, Blacksnake Road, Stanley, Gaston County, NC

This project is a 5 MW facility located on 35.80 acres out of a parent tract of 87.61 acres at 517 Blacksnake Road, Stanley that was built in 2016.

I have considered a number of recent sales around this facility as shown below.

The first is identified in the map above as Parcel 1, which is 215 Mariposa Road. This is an older dwelling on large acreage with only one bathroom. I've compared it to similar nearby homes as shown below. The landscaping buffer for this home is considered light.

Adjoining Residential Sales After Solar Farm Approved

Solar	Address	Acres	Date Sold	Sales Price	Built	GBA	$/GBA	BR/BA	Park	Style
Adjoins	215 Mariposa	17.74	12/12/2017	$249,000	1958	1,551	$160.54	3/1	Garage	Br/Rnch
Not	249 Mariposa	0.48	3/1/2019	$153,000	1974	1,792	$85.38	4/2	Garage	Br/Rnch
Not	110 Airport	0.83	5/10/2016	$166,000	1962	2,165	$76.67	3/2	Crprt	Br/Rnch
Not	1249 Blacksnake	5.01	9/20/2018	$242,500	1980	2,156	$112.48	3/2	Drive	1.5
Not	1201 Abernathy	27.00	5/3/2018	$390,000	1970	2,190	$178.08	3/2	Crprt	Br/Rnch

Adjoining Residential Sales After Solar Farm Approved — Adjoining Sales Adjusted

Solar	Address	Acres	Date Sold	Sales Price	Time	YB	Acres	GLA	BR/BA	Park	Other	Total	% Diff
Adjoins	215 Mariposa	17.74	12/12/2017	$249,000								$249,000	
Not	249 Mariposa	0.48	3/1/2019	$153,000	-$5,583	-$17,136	$129,450	-$20,576	-$10,000			$229,154	8%
Not	110 Airport	0.83	5/10/2016	$166,000	$7,927	-$4,648	$126,825	-$47,078	-$10,000			$239,026	4%
Not	1249 Blacksnake	5.01	9/20/2018	$242,500	-$5,621	-$37,345	$95,475	-$68,048	-$10,000	$5,000		$221,961	11%
Not	1201 Abernathy	27.00	5/3/2018	$390,000	-$4,552	-$32,760	-$69,450	-$60,705	-$10,000			$212,533	15%
												Average	9%

The average difference after adjusting for all factors is +9% on average, which suggests an enhancement due to the solar farm across the street. Given the large adjustments for acreage and size, I will focus on the low end of the adjusted range at 4%, which is within the typical deviation and therefore suggests no impact on value.

I have also considered Parcel 4 that sold after the solar farm was approved but before it had been constructed in 2016. The landscaping buffer for this parcel is considered light.

Adjoining Residential Sales After Solar Farm Approved

Solar	Address	Acres	Date Sold	Sales Price	Built	GBA	$/GBA	BR/BA	Park	Style	Other
Adjoins	242 Mariposa	2.91	9/21/2015	$180,000	1962	1,880	$95.74	3/2	Carport	Br/Rnch	Det Wrkshop
Not	249 Mariposa	0.48	3/1/2019	$153,000	1974	1,792	$85.38	4/2	Garage	Br/Rnch	
Not	110 Airport	0.83	5/10/2016	$166,000	1962	2,165	$76.67	3/2	Crprt	Br/Rnch	
Not	1249 Blacksnake	5.01	9/20/2018	$242,500	1980	2,156	$112.48	3/2	Drive	1.5	

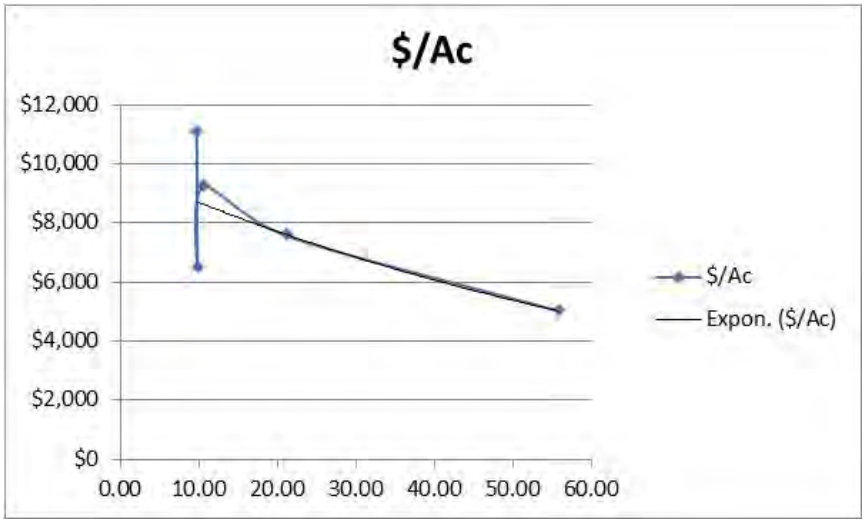
Adjoining Residential Sales After Solar Farm Approved — Adjoining Sales Adjusted

Solar	Address	Acres	Date Sold	Sales Price	Time	YB	Acres	GLA	BR/BA	Park	Other	Total	% Diff
Adjoins	242 Mariposa	2.91	9/21/2015	$180,000								$180,000	
Not	249 Mariposa	0.48	3/1/2019	$153,000	-$15,807	-$12,852	$18,468	$7,513		-$3,000	$25,000	$172,322	4%
Not	110 Airport	0.83	5/10/2016	$166,000	-$3,165	$0	$15,808	-$28,600			$25,000	$175,043	3%
Not	1249 Blacksnake	5.01	9/20/2018	$242,500	-$21,825	-$30,555	-$15,960	-$40,942		$2,000	$25,000	$160,218	11%
												Average	6%

The average difference after adjusting for all factors is +6%, which is again suggests a mild increase in value due to the adjoining solar farm use. The median is a 4% adjustment, which is within a standard deviation and suggests no impact on property value.

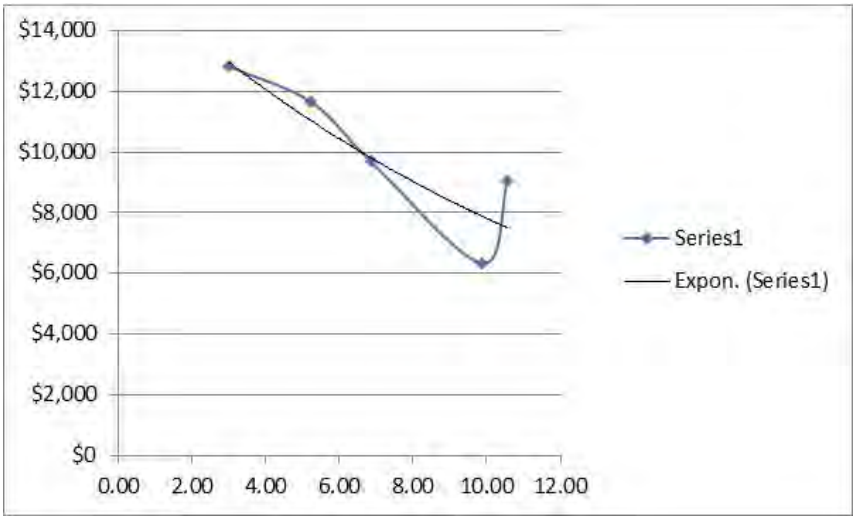
I have also considered the recent sale of Parcel 13 that is located on Blacksnake Road south of the project. I was unable to find good land sales in the same 20-acre range, so I have considered sales of larger and smaller acreage. I adjusted each of those land sales for time. I then applied the price per acre to a trendline to show where the expected price per acre would be for 20 acres. As can be seen in the chart below, this lines up exactly with the purchase of the subject property. I therefore conclude that there is no impact on Parcel 13 due to proximity to the solar farm.

Adjoining Residential Land Sales After Solar Farm Approved						**Adjoining Sales Adjusted**	
Solar	**Tax/Street**	**Acres**	**Date Sold**	**Sales Price**	**$/Ac**	**Time**	**$/Ac**
Adjoins	174339/Blacksnake	21.15	6/29/2018	$160,000	$7,565		$7,565
Not	227852/Abernathy	10.57	5/9/2018	$97,000	$9,177	$38	$9,215
Not	17443/Legion	9.87	9/7/2018	$64,000	$6,484	-$37	$6,447
Not	164243/Alexis	9.75	2/1/2019	$110,000	$11,282	-$201	$11,081
Not	176884/Bowden	55.77	6/13/2018	$280,000	$5,021	$7	$5,027

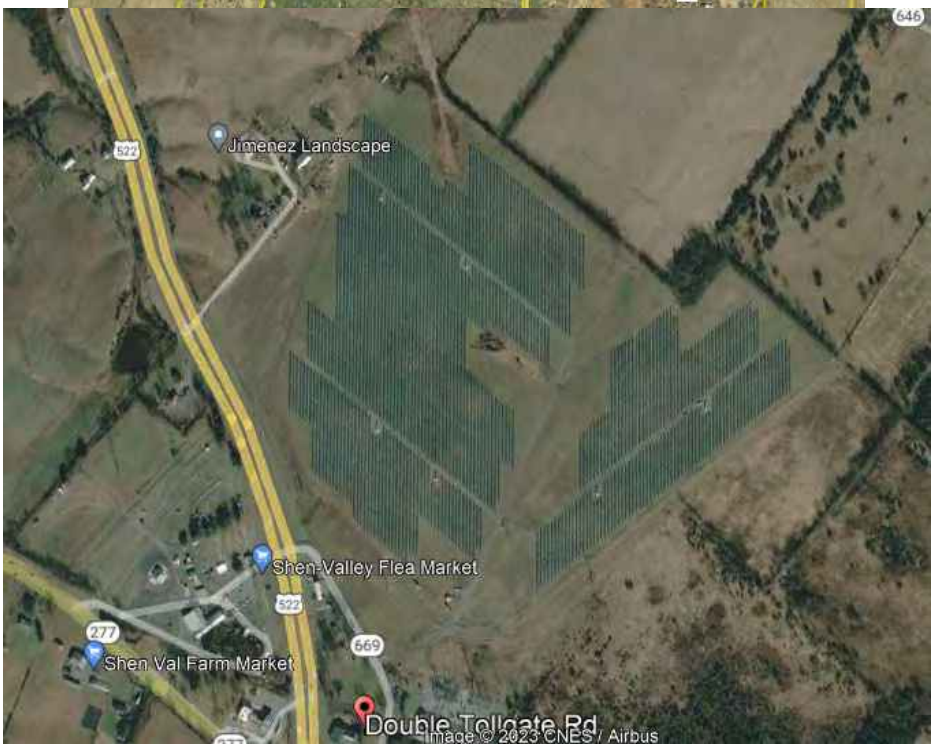


Finally, I have considered the recent sale of Parcel 17 that sold as vacant land. I was unable to find good land sales in the same 7 acre range, so I have considered sales of larger and smaller acreage. I adjusted each of those land sales for time. I then applied the price per acre to a trendline to show where the expected price per acre would be for 7 acres. As can be seen in the chart below, this lines up with the trendline running right through the purchase price for the subject property. I therefore conclude that there is no impact on Parcel 13 due to proximity to the solar farm. I note that this property was improved with a 3,196 square foot ranch built in 2018 following the land purchase, which shows that development near the solar farm was unimpeded.

Adjoining Residential Land Sales After Solar Farm Approved						**Adjoining Sales Adjusted**		
Solar	**Tax/Street**	**Acres**	**Date Sold**	**Sales Price**	**$/Ac**	**Time**	**Location**	**$/Ac**
Adjoins	227039/Mariposa	6.86	12/6/2017	$66,500	$9,694			$9,694
Not	227852/Abernathy	10.57	5/9/2018	$97,000	$9,177	-$116		$9,061
Not	17443/Legion	9.87	9/7/2018	$64,000	$6,484	-$147		$6,338
Not	177322/Robinson	5.23	5/12/2017	$66,500	$12,715	$217	-$1,272	$11,661
Not	203386/Carousel	2.99	7/13/2018	$43,500	$14,548	-$262	-$1,455	$12,832



10. Matched Pair – Clarke County Solar, Double Tollgate Road, White Post, Clarke County, VA



This project is a 20 MW facility located on a 234-acre tract that was built in 2017.

I have considered two recent sales of Parcel 3. The home on this parcel is 1,230 feet from the closest panel as measured in the second map from Google Earth, which shows the solar farm under construction. This home sold in January 2017 for $295,000 and again in August 2019 for $385,000. I show each sale below and compare those to similar home sales in each time frame. The significant increase in price between 2017 and 2019 is due to a major kitchen remodel, new roof, and related upgrades as well as improvement in the market in general. The sale and later resale of the home with updates and improvements speaks to pride of ownership and increasing overall value as properties perceived as diminished are less likely to be renovated and sold for profit.

I note that 102 Tilthammer includes a number of barns that I did not attribute any value in the analysis. The market would typically give some value for those barns but even without that adjustment there is an indication of a positive impact on value due to the solar farm. The landscaping buffer from this home is considered light.

Adjoining Residential Sales After Solar Farm Approved

Parcel	Solar	Address	Acres	Date Sold	Sales Price	Built	GBA	$/GLA	BR/BA	Park	Style	Other
3	Adjoins	833 Nations Spr	5.13	8/18/2019	$385,000	1979	1,392	$276.58	3/2	Det Gar	Ranch	UnBsmt
	Not	167 Leslie	5.00	8/19/2020	$429,000	1980	1,665	$257.66	3/2	Det2Gar	Ranch	
	Not	2393 Old Chapel	2.47	8/10/2020	$330,000	1974	1,500	$220.00	3/1.5	Det Gar	Ranch	
	Not	102 Tilthammer	6.70	5/7/2019	$372,000	1970	1,548	$240.31	3/1.5	Det Gar	Ranch	UnBsmt

Adjoining Sales Adjusted

Time	Site	YB	GLA	BR/BA	Park	Other	Total	% Diff	Avg % Diff	Distance
							$385,000			1230
-$13,268		-$2,145	-$56,272		-$5,000	$50,000	$402,315	-4%		
-$9,956	$25,000	$8,250	-$19,008	$5,000		$50,000	$389,286	-1%		
$3,229		$16,740	-$29,991	$5,000			$366,978	5%		
									0%	

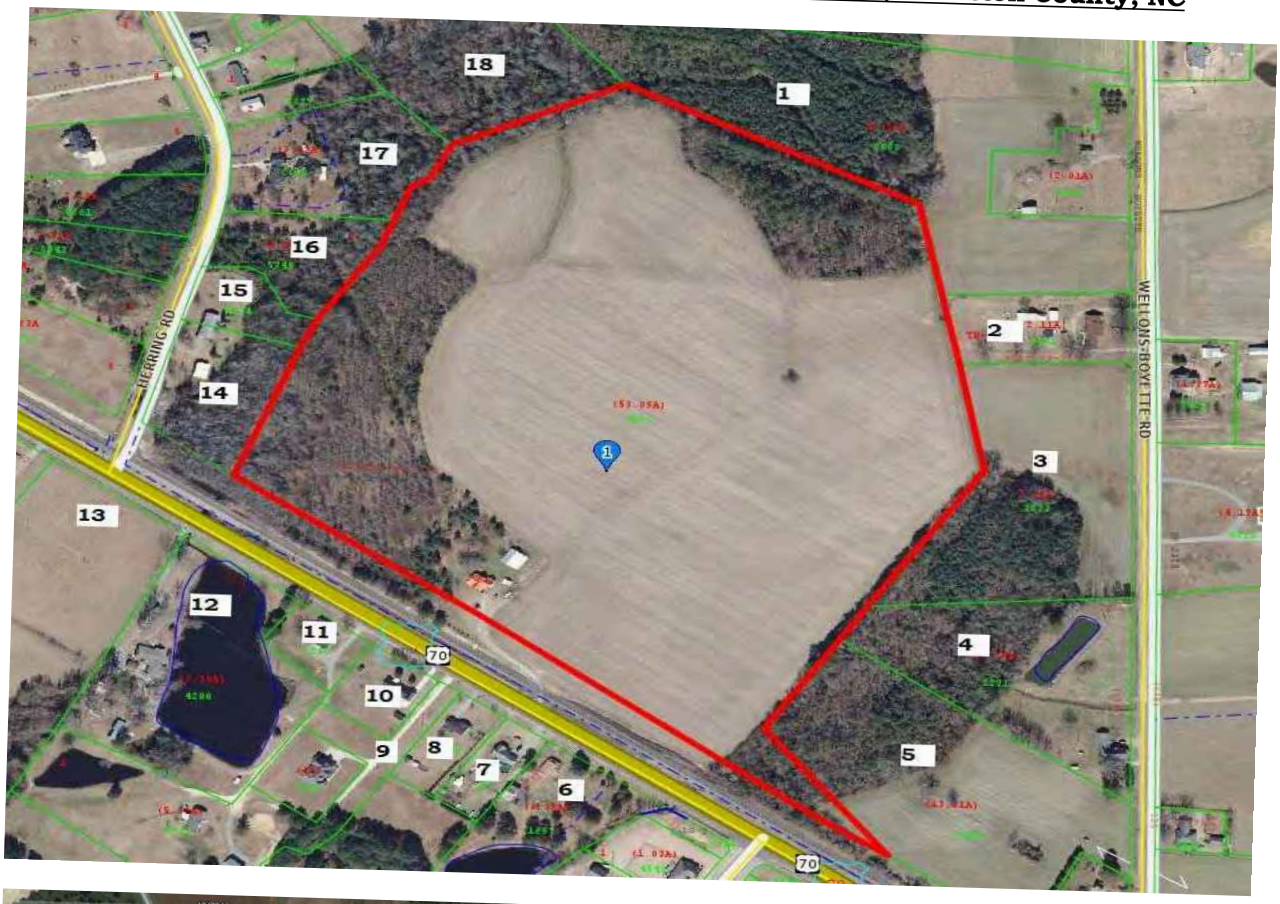
Adjoining Residential Sales After Solar Farm Approved

Parcel	Solar	Address	Acres	Date Sold	Sales Price	Built	GBA	$/GLA	BR/BA	Park	Style	Other
3	Adjoins	833 Nations Spr	5.13	1/9/2017	$295,000	1979	1,392	$211.93	3/2	Det Gar	Ranch	UnBsmt
	Not	6801 Middle	2.00	12/12/2017	$249,999	1981	1,584	$157.83	3/2	Open	Ranch	
	Not	4174 Rockland	5.06	1/2/2017	$300,000	1990	1,688	$177.73	3/2	2 Gar	2-story	
	Not	400 Sugar Hill	1.00	6/7/2018	$180,000	1975	1,008	$178.57	3/1	Open	Ranch	

Adjoining Sales Adjusted

Time	Site	YB	GLA	BR/BA	Park	Other	Total	% Diff	Avg % Diff	Distance
							$295,000			1230
-$7,100	$25,000	-$2,500	-$24,242		$5,000	$50,000	$296,157	0%		
$177		-$16,500	-$42,085		-$10,000	$50,000	$281,592	5%		
-$7,797		$3,600	$54,857	$10,000	$5,000	$50,000	$295,661	0%		
									1%	

11. Matched Pair – Candace Solar, US 70 Highway, Princeton, Johnston County, NC



This 5 MW solar farm is located at 4839 US 70 Highway just east of Herring Road. This solar farm was completed on October 25, 2016.

I identified three adjoining sales to this tract after development of the solar farm with frontage on US 70. I did not attempt to analyze those sales as they have exposure to an adjacent highway and railroad track. Those homes are therefore problematic for a matched pair analysis unless I have similar homes fronting on a similar corridor.

I did consider a land sale and a home sale on adjoining parcels without those complications.

The lot at 499 Herring Road sold to Paradise Homes of Johnston County of NC, Inc. for $30,000 in May 2017 and a modular home was placed there and sold to Karen and Jason Toole on September 29, 2017. I considered the lot sale first as shown below and then the home sale that followed. The landscaping buffer relative to this parcel is considered medium.

Adjoining Land Sales After Solar Farm Approved							**Adjoining Sales Adjusted**				
Parcel	**Solar**	**Address**	**Acres**	**Date Sold**	**Sales Price**	**Other**	**Time**	**Site**	**Other**	**Total**	**% Diff**
16	Adjoins	499 Herring	2.03	5/1/2017	$30,000					$30,000	
	Not	37 Becky	0.87	7/23/2019	$24,500	Sub/Pwr	-$1,679	$4,900		$27,721	8%
	Not	5858 Bizzell	0.88	8/17/2016	$18,000		$390	$3,600		$21,990	27%
	Not	488 Herring	2.13	12/20/2016	$35,000		$389			$35,389	-18%
										Average	5%

Following the land purchase, the modular home was placed on the site and sold. I have compared this modular home to the following sales to determine if the solar farm had any impact on the purchase price.

Adjoining Residential Sales After Solar Farm Approved

Parcel	**Solar**	**Address**	**Acres**	**Date Sold**	**Sales Price**	**Built**	**GBA**	**$/GBA**	**BR/BA**	**Park**	**Style**	**Other**
16	Adjoins	499 Herring	2.03	9/27/2017	$215,000	2017	2,356	$91.26	4/3	Drive	Modular	
	Not	678 WC	6.32	3/8/2019	$226,000	1995	1,848	$122.29	3/2.5	Det Gar	Mobile	Ag bldgs
	Not	1810 Bay V	8.70	3/26/2018	$170,000	2003	2,356	$72.16	3/2	Drive	Mobile	Ag bldgs
	Not	1795 Bay V	1.78	12/1/2017	$194,000	2017	1,982	$97.88	4/3	Drive	Modular	

Adjoining Residential Sales Af			**Adjoining Sales Adjusted**									**Avg**	
Parcel	**Solar**	**Address**	**Time**	**Site**	**YB**	**GLA**	**BR/BA**	**Park**	**Other**	**Total**	**% Diff**	**% Diff**	**Distance**
16	Adjoins	499 Herring								$215,000			488
	Not	678 WC	-$10,037	-$25,000	$24,860	$37,275	-$5,000	-$7,500	-$20,000	$220,599	-3%		
	Not	1810 Bay V	-$2,579	-$20,000	$11,900	$0				$159,321	26%		
	Not	1795 Bay V	-$1,063		$0	$21,964				$214,902	0%		
												8%	

The best comparable is 1795 Bay Valley as it required the least adjustment and was therefore most similar, which shows a 0% impact. This signifies no impact related to the solar farm.

The range of impact identified by these matched pairs ranges are therefore -3% to +26% with an average of +8% for the home and an average of +4% for the lot, though the best indicator for the lot shows a $5,000 difference in the lot value due to the proximity to the solar farm or a -12% impact.

12. Matched Pair – Walker-Correctional Solar, Barham Road, Barhamsville, New Kent County, VA

This project was built in 2017 and located on 484.65 acres for a 20 MW with the closest home at 110 feet from the closest solar panel with an average distance of 500 feet.

I considered the recent sale identified on the map above as Parcel 19, which is directly across the street and based on the map shown on the following page is 250 feet from the closest panel. A limited buffering remains along the road with natural growth being encouraged, but currently the panels are visible from the road. Alex Uminski, SRA with MGMiller Valuations in Richmond VA confirmed this sale with the buying and selling broker. The selling broker indicated that the solar farm was not a negative influence on this sale and in fact the buyer noticed the solar farm and then discovered the listing. The privacy being afforded by the solar farm was considered a benefit by the buyer. I used a matched pair analysis with a similar sale nearby as shown below and found no negative impact on the sales price. Property actually closed for more than the asking price. The landscaping buffer is considered light.

Adjoining Residential Sales After Solar Farm Approved

Solar	Address	Acres	Date Sold	Sales Price	Built	GBA	$/GBA	BR/BA	Park	Style	Other
Adjoins	5241 Barham	2.65	10/18/2018	$264,000	2007	1,660	$159.04	3/2	Drive	Ranch	Modular
Not	17950 New Kent	5.00	9/5/2018	$290,000	1987	1,756	$165.15	3/2.5	3 Gar	Ranch	
Not	9252 Ordinary	4.00	6/13/2019	$277,000	2001	1,610	$172.05	3/2	1.5-Gar	Ranch	
Not	2416 W Miller	1.04	9/24/2018	$299,000	1999	1,864	$160.41	3/2.5	Gar	Ranch	

Adjoining Sales Adjusted

Solar	Address	Time	Ac/Loc	YB	GLA	BR/BA	Park	Other	Total	% Diff	Dist
Adjoins	5241 Barham								$264,000		250
Not	17950 New Kent		-$8,000	$29,000	-$4,756	-$5,000	-$20,000	-$15,000	$266,244	-1%	
Not	9252 Ordinary	-$8,310	-$8,000	$8,310	$2,581		-$10,000	-$15,000	$246,581	7%	
Not	2416 W Miller		$8,000	$11,960	-$9,817	-$5,000	-$10,000	-$15,000	$279,143	-6%	
								Average Diff		0%	

I also spoke with Patrick W. McCrerey of Virginia Estates who was marketing a property that sold at 5300 Barham Road adjoining the Walker-Correctional Solar Farm. He indicated that this property was unique with a home built in 1882 and heavily renovated and updated on 16.02 acres. The solar farm was through the woods and couldn't be seen by this property and it had no impact on marketing this property. This home sold on April 26, 2017 for $358,000. I did not set up any matched pairs for this property since it is a unique property that any such comparison would be difficult to rely on. The broker's comments do support the assertion that the adjoining solar farm had no impact on value. The home in this case was 510 feet from the closest panel.

13. Matched Pair – Innovative Solar 46, Roslin Farm Rd, Hope Mills, Cumberland County, NC

This project was built in 2016 and located on 532 acres for a 78.5 MW solar farm with the closest home at 125 feet from the closest solar panel with an average distance of 423 feet.

I considered the recent sale of a home on Roslin Farm Road just north of Running Fox Road as shown below. This sale supports an indication of no impact on property value. The landscaping buffer is considered light.

Adjoining Residential Sales After Solar Farm Approved

Solar	Address	Acres	Date Sold	Sales Price	Built	GBA	$/GBA	BR/BA	Park	Style	Other	Distance
Adjoins	6849 Roslin Farm	1.00	2/18/2019	$155,000	1967	1,610	$96.27	3/3	Drive	Ranch	Brick	435
Not	6592 Sim Canady	2.43	9/5/2017	$185,000	1974	2,195	$84.28	3/2	Gar	Ranch	Brick	
Not	1614 Joe Hall	1.63	9/3/2019	$145,000	1974	1,674	$86.62	3/2	Det Gar	Ranch	Brick	
Not	109 Bledsoe	0.68	1/17/2019	$150,000	1973	1,663	$90.20	3/2	Gar	Ranch	Brick	

Solar	Address	Time	Site	YB	GLA	BR/BA	Park	Other	Total	% Diff	Avg % Diff
Adjoins	6849 Roslin Farm								$155,000		5%
Not	6592 Sim Canady	$8,278		-$6,475	-$39,444	$10,000	-$5,000		$152,359	2%	
Not	1614 Joe Hall	-$2,407		-$5,075	-$3,881	$10,000	-$2,500		$141,137	9%	
Not	109 Bledsoe	$404	$10,000	-$4,500	-$3,346		-$5,000		$147,558	5%	

14. Matched Pair – Innovative Solar 42, County Line Rd, Fayetteville, Cumberland County, NC

This project was built in 2017 and located on 413.99 acres for a 71 MW with the closest home at 135 feet from the closest solar panel with an average distance of 375 feet.

I considered the recent sales identified on the map above as Parcels 2 and 3, which is directly across the street these homes are 330 and 340 feet away. Parcel 2 includes an older home built in 1976, while Parcel 3 is a new home built in 2019. So the presence of the solar farm had no impact on new construction in the area.

The matched pairs for each of these are shown below. The landscaping buffer relative to these parcels is considered light.

Adjoining Residential Sales After Solar Farm Approved

Solar	Address	Acres	Date Sold	Sales Price	Built	GBA	$/GBA	BR/BA	Park	Style	Other	Distance
Adjoins	2923 County Ln	8.98	2/28/2019	$385,000	1976	2,905	$132.53	3/3	2-Car	Ranch	Brick/Pond	340
Not	1928 Shaw Mill	17.00	7/3/2019	$290,000	1977	3,001	$96.63	4/4	2-Car	Ranch	Brick/Pond/Rental	
Not	2109 John McM.	7.78	4/25/2018	$320,000	1978	2,474	$129.35	3/2	Det Gar	Ranch	Vinyl/Pool,Stable	

Solar	Address	Time	Site	YB	GLA	BR/BA	Park	Other	Total	% Diff	Avg % Diff
Adjoins	2923 County Ln								$385,000		3%
Not	1928 Shaw Mill	-$3,055	$100,000	-$1,450	-$7,422	-$10,000			$368,074	4%	
Not	2109 John McM.	$8,333		-$3,200	$39,023	$10,000		$5,000	$379,156	2%	

Adjoining Residential Sales After Solar Farm Approved

Solar	Address	Acres	Date Sold	Sales Price	Built	GBA	$/GBA	BR/BA	Park	Style	Other	Distance
Adjoins	2935 County Ln	1.19	6/18/2019	$266,000	2019	2,401	$110.79	4/3	Gar	2-Story		330
Not	3005 Hemingway	1.17	5/16/2019	$269,000	2018	2,601	$103.42	4/3	Gar	2-Story		
Not	7031 Glynn Mill	0.60	5/8/2018	$255,000	2017	2,423	$105.24	4/3	Gar	2-Story		
Not	5213 Bree Brdg	0.92	5/7/2019	$260,000	2018	2,400	$108.33	4/3	3-Gar	2-Story		

Solar	Address	Time	Site	YB	GLA	BR/BA	Park	Other	Total	% Diff	Avg % Diff
Adjoins	2935 County Ln								$266,000		3%
Not	3005 Hemingway	$748		$1,345	-$16,547				$254,546	4%	
Not	7031 Glynn Mill	$8,724		$2,550	-$1,852				$264,422	1%	
Not	5213 Bree Brdg	$920		$1,300	$76			-$10,000	$252,296	5%	

Both of these matched pairs adjust to an average of +3% on impact for the adjoining solar farm, meaning there is a slight positive impact due to proximity to the solar farm. This is within the standard +/- of typical real estate transactions, which strongly suggests no impact on property value. I noted specifically that for 2923 County Line Road, the best comparable is 2109 John McMillan as it does not have the additional rental unit on it. I made no adjustment to the other sale for the value of that rental unit, which would have pushed the impact on that comparable downward – meaning there would have been a more significant positive impact.

15. Matched Pair – Sunfish Farm, Keenebec Rd, Willow Spring, Wake County, NC

This project was built in 2015 and located on 49.6 acres (with an inset 11.25 acre parcel) for a 6.4 MW project with the closest home at 135 feet with an average distance of 105 feet.

I considered the 2017 sale identified on the map above, which is 205 feet away from the closest panel. The matched pairs for each of these are shown below followed by a more recent map showing the panels at this site. The average difference in the three comparables and the subject property is +3% after adjusting for differences in the sales date, year built, gross living area, and other minor differences. This data is supported by the comments from the broker Brian Schroepfer with Keller Williams that the solar farm had no impact on the purchase price. The landscaping screen is considered light.

Adjoining Residential Sales After Solar Farm Approved

Parcel	Solar	Address	Acres	Date Sold	Sales Price	Built	GBA	$/GBA	BR/BA	Park	Style
	Adjoins	7513 Glen Willow	0.79	9/1/2017	$185,000	1989	1,492	$123.99	3/2	Gar	BR/Rnch
	Not	2968 Tram	0.69	7/17/2017	$155,000	1984	1,323	$117.16	3/2	Drive	BR/Rnch
	Not	205 Pine Burr	0.97	12/29/2017	$191,000	1991	1,593	$119.90	3/2.5	Drive	BR/Rnch
	Not	1217 Old Honeycutt	1.00	12/15/2017	$176,000	1978	1,558	$112.97	3/2.5	2Carprt	VY/Rnch

Adjustments

Solar	Address	Time	Site	YB	GLA	BR/BA	Park	Other	Total	% Diff	Avg % Diff
Adjoins	7513 Glen Willow								$185,000		
Not	2968 Tram	$601		$3,875	$15,840		$10,000		$185,316	0%	
Not	205 Pine Burr	-$1,915		-$1,910	-$9,688	-$5,000			$172,487	7%	
Not	1217 Old Honeycutt	-$1,557		$9,680	-$5,965	-$5,000		$5,280	$178,438	4%	
											3%

16. Matched Pair – Sappony Solar, Sussex Drive, Stony Creek, Sussex County, VA

This project is a 30 MW facility located on a 322.68-acre tract that was built in the fourth quarter of 2017.

I have considered the 2018 sale of Parcel 17 as shown below. This was a 1,900 s.f. manufactured home on a 6.00-acre lot that sold in 2018. I have compared that to three other nearby manufactured homes as shown below. The range of impacts is within typical market variation with an average of -1%, which supports a conclusion of no impact on property value. The landscaping buffer is considered medium.

Adjoining Residential Sales After Solar Farm Approved

Parcel	Solar	Address	Acres	Date Sold	Sales Price	Built	GBA	$/GLA	BR/BA	Park	Style	Other
	Adjoins	12511 Palestine	6.00	7/31/2018	$128,400	2013	1,900	$67.58	4/2.5	Open	Manuf	
	Not	15698 Concord	3.92	7/31/2018	$150,000	2010	2,310	$64.94	4/2	Open	Manuf	Fence
	Not	23209 Sussex	1.03	7/7/2020	$95,000	2005	1,675	$56.72	3/2	Det Crpt	Manuf	
	Not	6494 Rocky Br	4.07	11/8/2018	$100,000	2004	1,405	$71.17	3/2	Open	Manuf	

Adjoining Sales Adjusted									Avg	
Time	Site	YB	GLA	BR/BA	Park	Other	Total	% Diff	% Diff	Distance
							$128,400			1425
$0		$2,250	-$21,299	$5,000			$135,951	-6%		
-$5,660	$13,000	$3,800	$10,209	$5,000	$1,500		$122,849	4%		
-$843		$4,500	$28,185				$131,842	-3%		
									-1%	

17. Matched Pair – Camden Dam, Shiloh, Camden County, NC

This 5 MW project was built in 2019 and located on a portion of 49.83 acres.

Parcel 1 noted above along with the home on the adjoining parcel to the north of that parcel sold in late 2018 after this solar farm was approved but prior to construction being completed in 2019. I have considered this sale as shown below. The landscaping screen is considered light.

The comparable at 548 Trotman is the most similar and required the least adjustment shows no impact on property value. The other two comparables were adjusted consistently with one showing significant enhancement and another as showing a mild negative. The best indication is the one requiring the least adjustment. The other two sales required significant site adjustments which make them less reliable. The best comparable and the average of these comparables support a finding of no impact on property value.

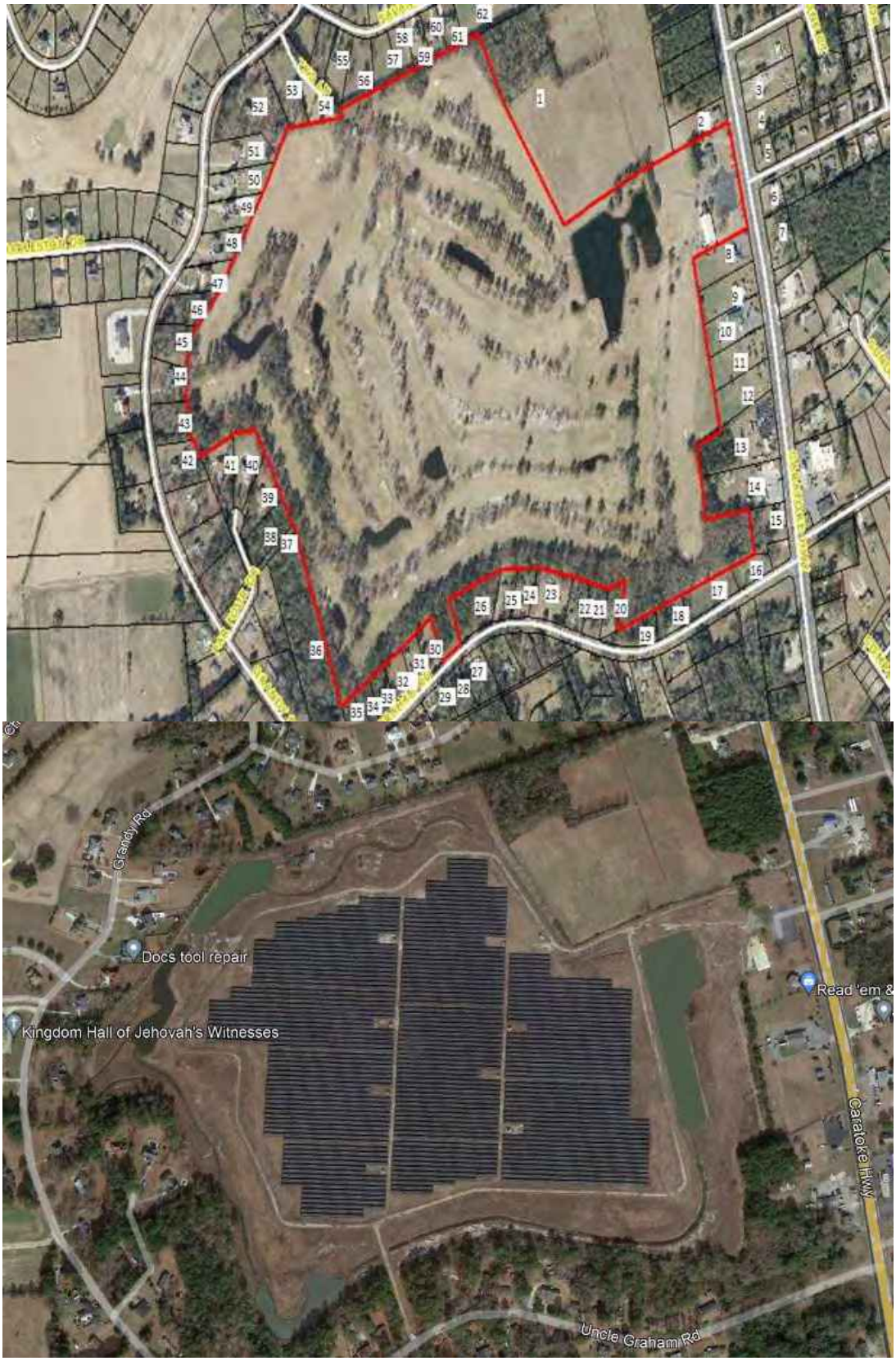
Adjoining Residential Sales After Solar Farm Approved

Solar	Address	Acres	Date Sold	Sales Price	Built	GBA	$/GLA	BR/BA	Park	Style	Other
Adjoins	122 N Mill Dam	12.19	11/29/2018	$350,000	2005	2,334	$149.96	3/3.5	3-Gar	Ranch	
Not	548 Trotman	12.10	5/31/2018	$309,000	2007	1,960	$157.65	4/2	Det2G	Ranch	Wrkshp
Not	198 Sand Hills	2.00	12/22/2017	$235,000	2007	2,324	$101.12	4/3	Open	Ranch	
Not	140 Sleepy Hlw	2.05	8/12/2019	$330,000	2010	2,643	$124.86	4/3	1-Gar	1.5 Story	

Adjoining Sales Adjusted

Address	Time	Site	YB	GLA	BR/BA	Park	Other	Total	% Diff	Avg % Diff	Distance
122 N Mill Dam								$350,000			342
548 Trotman	$6,163		-$3,090	$35,377	$5,000			$352,450	-1%		
198 Sand Hills	$8,808	$45,000	-$2,350	$607		$30,000		$317,064	9%		
140 Sleepy Hlw	-$9,258	$45,000	-$8,250	-$23,149	$5,000	$30,000		$369,343	-6%		
										1%	

18. Matched Pair – Grandy Solar, Uncle Graham Road, Grandy, Currituck County, NC



This 20 MW project was built in 2019 and located on a portion of 121 acres.

Parcels 40 and 50 have sold since construction began on this solar farm. I have considered both in matched pair analysis below. I note that the marketing for Parcel 40 (120 Par Four) identified the lack of homes behind the house as a feature in the listing. The marketing for Parcel 50 (269 Grandy) identified the property as "very private." Landscaping for both of these parcels is considered light.

Adjoining Residential Sales After Solar Farm Approved

Solar	Address	Acres	Date Sold	Sales Price	Built	GBA	$/GLA	BR/BA	Park	Style	Other
Adjoins	120 Par Four	0.92	8/17/2019	$315,000	2006	2,188	$143.97	4/3	2-Gar	1.5 Story	Pool
Not	102 Teague	0.69	1/5/2020	$300,000	2005	2,177	$137.80	3/2	Det 3G	Ranch	
Not	112 Meadow Lk	0.92	2/28/2019	$265,000	1992	2,301	$115.17	3/2	Gar	1.5 Story	
Not	116 Barefoot	0.78	9/29/2020	$290,000	2004	2,192	$132.30	4/3	2-Gar	2 Story	

Adjoining Sales Adjusted

Address	Time	Site	YB	GLA	BR/BA	Park	Other	Total	% Diff	Avg % Diff	Distance
120 Par Four								$315,000			405
102 Teague	-$4,636		$1,500	$910	$10,000		$20,000	$327,774	-4%		
112 Meadow Lk	$4,937		$18,550	-$7,808	$10,000	$10,000	$20,000	$320,679	-2%		
116 Barefoot	-$12,998		$2,900	-$318			$20,000	$299,584	5%		
										0%	

Adjoining Residential Sales After Solar Farm Approved

Solar	Address	Acres	Date Sold	Sales Price	Built	GBA	$/GLA	BR/BA	Park	Style	Other
Adjoins	269 Grandy	0.78	5/7/2019	$275,000	2019	1,535	$179.15	3/2.5	2-Gar	Ranch	
Not	307 Grandy	1.04	10/8/2018	$240,000	2002	1,634	$146.88	3/2	Gar	1.5 Story	
Not	103 Branch	0.95	4/22/2020	$230,000	2000	1,532	$150.13	4/2	2-Gar	1.5 Story	
Not	103 Spring Lf	1.07	8/14/2018	$270,000	2002	1,635	$165.14	3/2	2-Gar	Ranch	Pool

Adjoining Sales Adjusted

Address	Time	Site	YB	GLA	BR/BA	Park	Other	Total	% Diff	Avg % Diff	Distance
269 Grandy								$275,000			477
307 Grandy	$5,550		$20,400	-$8,725	$5,000	$10,000		$272,225	1%		
103 Branch	-$8,847		$21,850	$270				$243,273	12%		
103 Spring Lf	$7,871		$22,950	-$9,908	$5,000		-$20,000	$275,912	0%		
										4%	

Both of these matched pairs support a finding of no impact on value. This is reinforced by the listings for both properties identifying the privacy due to no housing in the rear of the property as part of the marketing for these homes.

19. Matched Pair – Champion Solar, Pelion, Lexington County, SC

This project is a 10 MW facility located on a 366.04-acre tract that was built in 2017.

I have considered the 2020 sale of an adjoining home located off 517 Old Charleston Road. Landscaping is considered light.

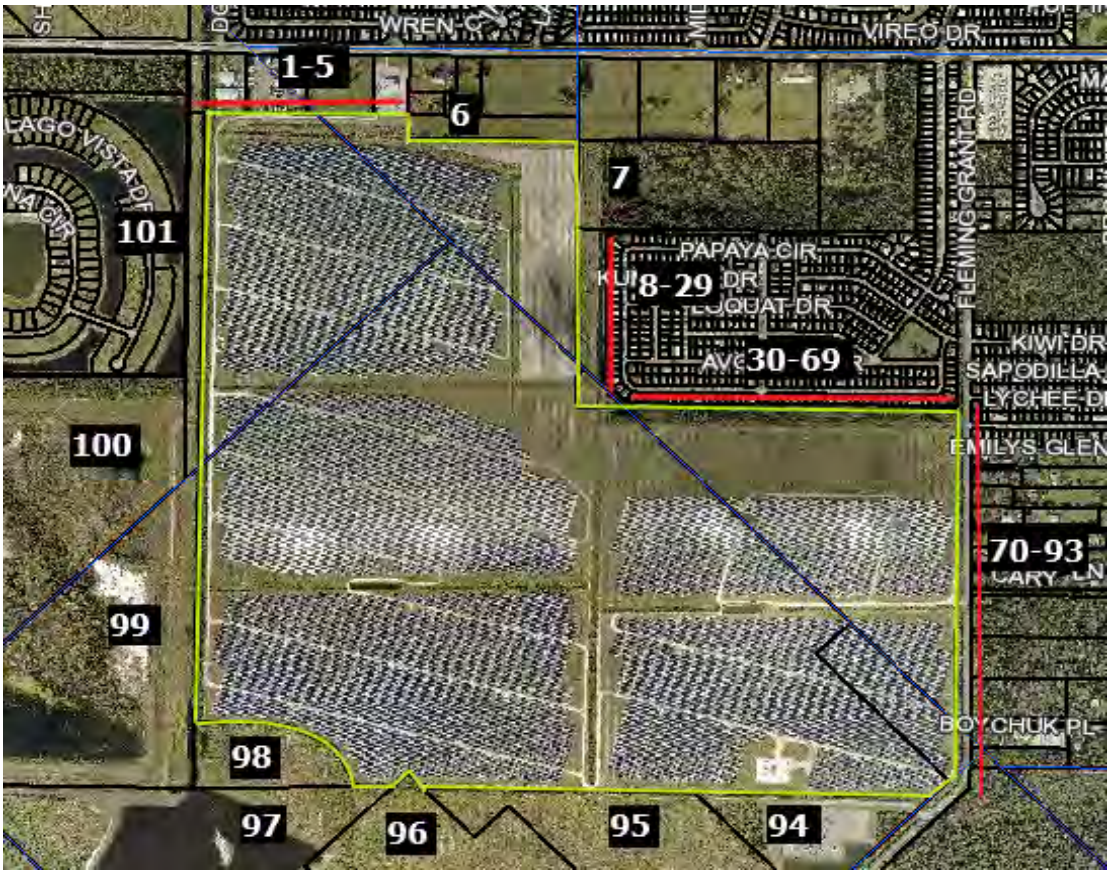
Adjoining Residential Sales After Solar Farm Approved

Solar	Address	Acres	Date Sold	Sales Price	Built	GBA	$/GBA	BR/BA	Park	Style	Other
Adjoins	517 Old Charleston	11.05	8/25/2020	$110,000	1962	925	$118.92	3/1	Crport	Br Rnch	
Not	133 Buena Vista	2.65	6/21/2020	$115,000	1979	1,104	$104.17	2/2	Crport	Br Rnch	
Not	214 Crystal Spr	2.13	6/10/2019	$102,500	1970	1,025	$100.00	3/2	Crport	Rnch	
Not	1429 Laurel	2.10	2/21/2019	$126,000	1960	1,250	$100.80	2/1.5	Open	Br Rnch	3 Gar/Brn

Adjoining Sales Adjusted

Address	Time	Site	YB	GLA	BR/BA	Park	Other	Total	% Diff	Avg % Diff	Distance
517 Old Charleston								$110,000			505
133 Buena Vista	$410	$17,000	-$9,775	-$14,917	-$10,000			$97,718	11%		
214 Crystal Spr	$2,482	$18,000	-$4,100	-$8,000	-$10,000		$10,000	$110,882	-1%		
1429 Laurel	$3,804	$18,000	$1,260	-$26,208	-$5,000	$5,000	-$15,000	$107,856	2%		
										4%	

20. Matched Pair – Barefoot Bay Solar Farm, Barefoot Bay, Brevard County, FL



This project is located on 504 acres for a 74.5 MW facility. Most of the adjoining uses are medium density residential with some lower density agricultural uses to the southwest. This project was built in 2018. There is a new subdivision under development to the west.

I have considered a number of recent home sales from the Barefoot Bay Golf Course in the Barefoot Bay Recreation District. There are a number of sales of these mobile/manufactured homes along the eastern boundary and the lower northern boundary. I have compared those home sales to other similar homes in the same community but without the exposure to the solar farm. Staying within the same community keeps location and amenity impacts consistent. I did avoid any comparison with home sales with golf course or lakefront views as that would introduce another variable.

The six manufactured/double wide homes shown below were each compared to three similar homes in the same community and are consistently showing no impact on the adjoining property values. Based on the photos from the listings, there is limited but some visibility of the solar farm to the east, but the canal and landscaping between are providing a good visual buffer and actually are commanding a premium over the non-canal homes.

Landscaping for these adjoining homes is considered light, though photographs from the listings show that those homes on Papaya that adjoin the solar farm from east/west have no visibility of the solar farm and is effectively medium density due to the height differential. The homes that adjoin the solar farm from north/south along Papaya have some filtered view of the solar farm through the trees.

Adjoining Residential Sales After Solar Farm Approved

Parcel	Solar	Address	Acres	Date Sold	Sales Price	Built	GBA	$/GLA	BR/BA	Park	Style	Other
14	Adjoins	465 Papaya Cr	0.12	7/21/2019	$155,000	1993	1,104	$140.40	2/2	Drive	Manuf	Canal
	Not	1108 Navajo	0.14	2/27/2019	$129,000	1984	1,220	$105.74	2/2	Crprt	Manuf	Canal
	Not	1007 Barefoot	0.11	9/3/2020	$168,000	2005	1,052	$159.70	2/2	Crprt	Manuf	Canal
	Not	1132 Waterway	0.11	7/10/2020	$129,000	1982	1,012	$127.47	2/2	Crprt	Manuf	Canal

Adjoining Sales Adjusted

Address	Time	YB	GLA	BR/BA	Park	Other	Total	% Diff	Avg % Diff	Distance
465 Papaya Cr							$155,000			765
1108 Navajo	$1,565	$5,805	-$9,812				$126,558	18%		
1007 Barefoot	-$5,804	-$10,080	$6,643				$158,759	-2%		
1132 Waterway	-$3,859	$7,095	$9,382				$141,618	9%		
									8%	

Adjoining Residential Sales After Solar Farm Approved

Parcel	Solar	Address	Acres	Date Sold	Sales Price	Built	GBA	$/GLA	BR/BA	Park	Style	Other
19	Adjoins	455 Papaya	0.12	9/1/2020	$183,500	2005	1,620	$113.27	3/2	Crprt	Manuf	Canal
	Not	938 Waterway	0.11	2/12/2020	$160,000	1986	1,705	$93.84	2/2	Crprt	Manuf	Canal
	Not	719 Barefoot	0.12	4/14/2020	$150,000	1996	1,635	$91.74	3/2	Crprt	Manuf	Canal
	Not	904 Fir	0.17	9/27/2020	$192,500	2010	1,626	$118.39	3/2	Crprt	Manuf	Canal

Adjoining Sales Adjusted

Address	Time	YB	GLA	BR/BA	Park	Other	Total	% Diff	Avg % Diff	Distance
455 Papaya							$183,500			750
938 Waterway	$2,724	$15,200	-$6,381				$171,542	7%		
719 Barefoot	$1,770	$6,750	-$1,101				$157,419	14%		
904 Fir	-$422	-$4,813	-$568				$186,697	-2%		
									6%	

Adjoining Residential Sales After Solar Farm Approved

Parcel	Solar	Address	Acres	Date Sold	Sales Price	Built	GBA	$/GLA	BR/BA	Park	Style	Other
37	Adjoins	419 Papaya	0.09	7/16/2019	$127,500	1986	1,303	$97.85	2/2	Crprt	Manuf	Green
	Not	865 Tamarind	0.12	2/4/2019	$133,900	1995	1,368	$97.88	2/2	Crprt	Manuf	Green
	Not	501 Papaya	0.10	6/15/2018	$109,000	1986	1,234	$88.33	2/2	Crprt	Manuf	
	Not	418 Papaya	0.09	8/28/2019	$110,000	1987	1,248	$88.14	2/2	Crprt	Manuf	

Adjoining Sales Adjusted

Address	Time	YB	GLA	BR/BA	Park	Other	Total	% Diff	Avg % Diff	Distance
419 Papaya							$127,500			690
865 Tamarind	$1,828	-$6,026	-$5,090				$124,613	2%		
501 Papaya	$3,637	$0	$4,876			$5,000	$122,513	4%		
418 Papaya	-$399	-$550	$3,878			$5,000	$117,930	8%		
									5%	

Adjoining Residential Sales After Solar Farm Approved

Parcel	Solar	Address	Acres	Date Sold	Sales Price	Built	GBA	$/GLA	BR/BA	Park	Style	Other
39	Adjoins	413 Papaya	0.09	7/16/2020	$130,000	2001	918	$141.61	2/2	Crprt	Manuf	Grn/Upd
	Not	341 Loquat	0.09	2/3/2020	$118,000	1985	989	$119.31	2/2	Crprt	Manuf	Full Upd
	Not	1119 Pocatella	0.19	1/5/2021	$120,000	1993	999	$120.12	2/2	Crprt	Manuf	Green
	Not	1367 Barefoot	0.10	1/12/2021	$130,500	1987	902	$144.68	2/2	Crprt	Manuf	Green/Upd

Adjoining Sales Adjusted

Address	Time	YB	GLA	BR/BA	Park	Other	Total	% Diff	Avg % Diff	Distance
413 Papaya							$130,000			690
341 Loquat	$1,631	$9,440	-$6,777				$122,294	6%		
1119 Pocatella	-$1,749	$4,800	-$7,784			$5,000	$120,267	7%		
1367 Barefoot	-$1,979	$9,135	$1,852				$139,507	-7%		
									2%	

Adjoining Residential Sales After Solar Farm Approved

Parcel	Solar	Address	Acres	Date Sold	Sales Price	Built	GBA	$/GLA	BR/BA	Park	Style	Other
48	Adjoins	343 Papaya	0.09	12/17/2019	$145,000	1986	1,508	$96.15	3/2	Crprt	Manuf	Gn/Fc/Upd
	Not	865 Tamarind	0.12	2/4/2019	$133,900	1995	1,368	$97.88	2/2	Crprt	Manuf	Green
	Not	515 Papaya	0.09	3/22/2018	$145,000	2005	1,376	$105.38	3/2	Crprt	Manuf	Green
	Not	849 Tamarind	0.15	6/26/2019	$155,000	1997	1,716	$90.33	3/2	Crprt	Manuf	Grn/Fnce

Adjoining Sales Adjusted

Address	Time	YB	GLA	BR/BA	Park	Other	Total	% Diff	Avg % Diff	Distance
343 Papaya							$145,000			690
865 Tamarind	$3,566	-$6,026	$10,963				$142,403	2%		
515 Papaya	$7,759	-$13,775	$11,128				$150,112	-4%		
849 Tamarind	$2,273	-$8,525	-$15,030			$5,000	$138,717	4%		
									1%	

Adjoining Residential Sales After Solar Farm Approved

Parcel	Solar	Address	Acres	Date Sold	Sales Price	Built	GBA	$/GLA	BR/BA	Park	Style	Other
52	Nearby	335 Papaya	0.09	4/17/2018	$110,000	1987	1,180	$93.22	2/2	Crprt	Manuf	Green
	Not	865 Tamarind	0.12	2/4/2019	$133,900	1995	1,368	$97.88	2/2	Crprt	Manuf	Green
	Not	501 Papaya	0.10	6/15/2018	$109,000	1986	1,234	$88.33	2/2	Crprt	Manuf	
	Not	604 Puffin	0.09	10/23/2018	$110,000	1988	1,320	$83.33	2/2	Crprt	Manuf	

Adjoining Sales Adjusted

Address	Time	YB	GLA	BR/BA	Park	Other	Total	% Diff	Avg % Diff	Distance
335 Papaya							$110,000			710
865 Tamarind	-$3,306	-$5,356	-$14,721			$0	$110,517	0%		
501 Papaya	-$542	$545	-$3,816			$5,000	$110,187	0%		
604 Puffin	-$1,752	-$550	-$9,333			$5,000	$103,365	6%		
									2%	

I also identified a new subdivision being developed just to the west of this solar farm called The Lakes at Sebastian Preserve. These are all canal-lot homes that are being built with homes starting at $271,000 based on the website and closed sales showing up to $342,000. According to Monique, the onsite broker with Holiday Builders, the solar farm is difficult to see from the lots that back up to that area and she does not anticipate any difficulty in selling those future homes or lots or any impact on the sales price. The closest home that will be built in this development will be approximately 340 feet from the nearest panel.

Based on the closed home prices in Barefoot Bay as well as the broker comments and activity at The Lakes at Sebastian Preserve, the data around this solar farm strongly indicates no negative impact on property value.

21. Matched Pair – Miami-Dade Solar Farm, Miami, Dade County, FL

This project is located on 346.80 acres for a 74.5 MW facility. All of the adjoining uses are agricultural and residential. This project was built in 2019.

I considered the recent sale of Parcel 26 to the south that sold for over $1.6 million dollars. This home is located on 4.2 acres with additional value in the palm trees according to the listing. The comparables include similar homes nearby that are all actually on larger lots and several include avocado or palm tree income as well. All of the comparables are in similar proximity to the subject and all have similar proximity to the Miami-Dade Executive airport that is located 2.5 miles to the east.

These sales are showing no impact on the value of the property from the adjoining solar farm. The landscaping is considered light.

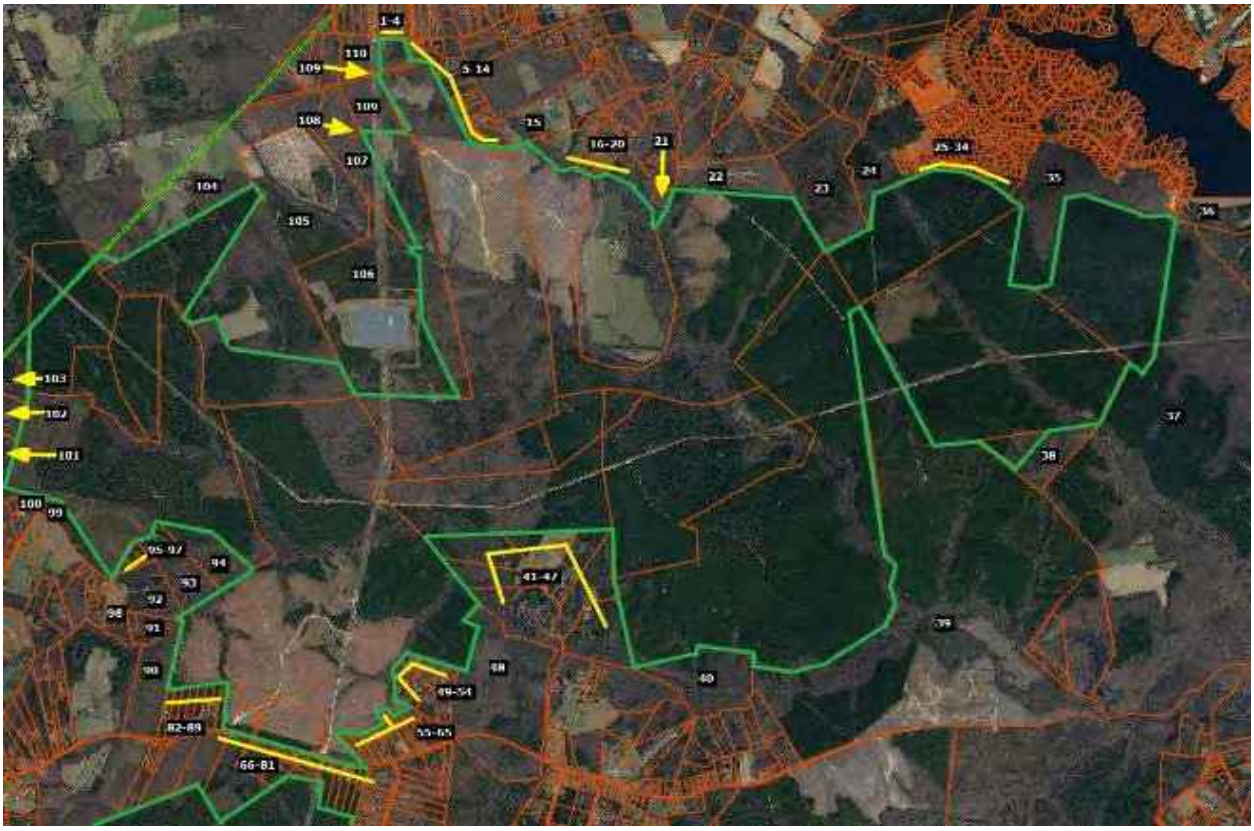
Adjoining Residential Sales After Solar Farm Approved

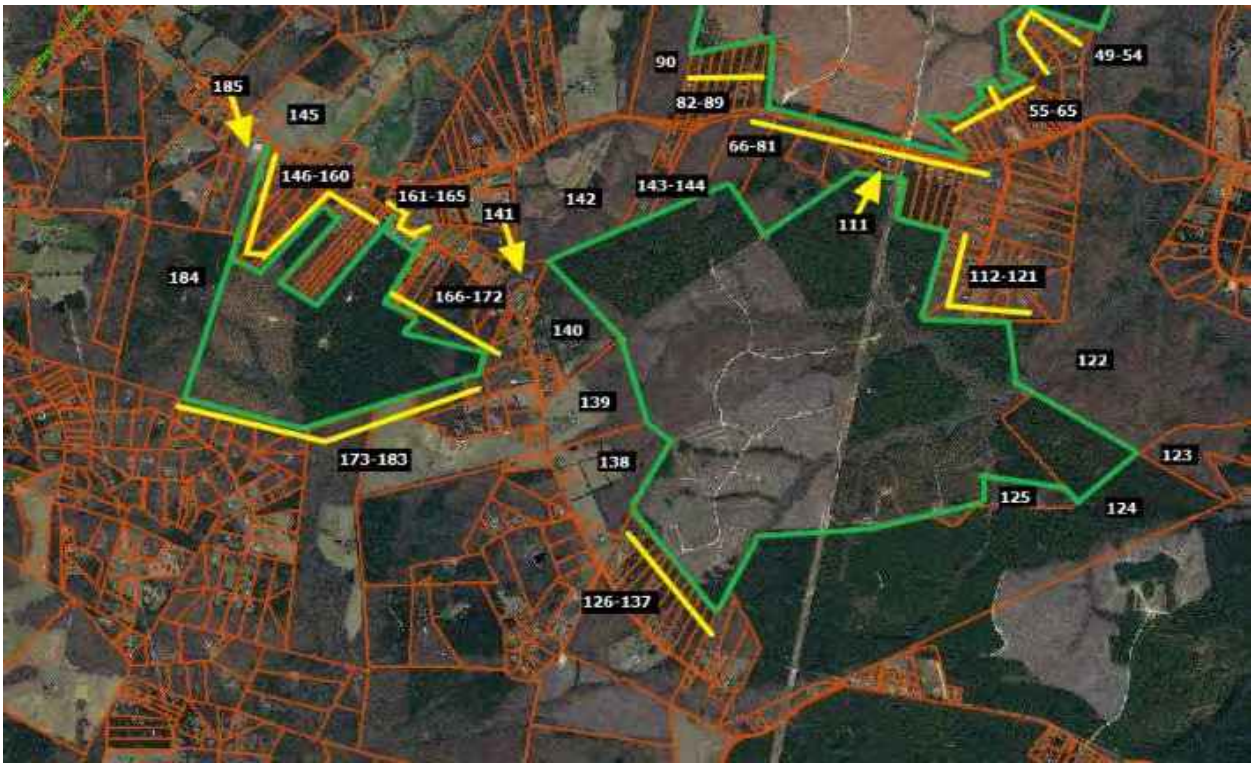
Parcel	Solar	Address	Acres	Date Sold	Sales Price	Built	GBA	$/GLA	BR/BA	Park	Style	Other
26	Adjoins	13600 SW 182nd	4.20	11/5/2020	$1,684,000	2008	6,427	$262.02	5/5.5	3 Gar	CBS Rnch	Pl/Guest
	Not	18090 SW 158th	5.73	10/8/2020	$1,050,000	1997	3,792	$276.90	5/4	3 Gar	CBS Rnch	
	Not	14311 SW 187th	4.70	10/22/2020	$1,100,000	2005	3,821	$287.88	6/5	3 Gar	CBS Rnch	Pool
	Not	17950 SW 158th	6.21	10/22/2020	$1,730,000	2000	6,917	$250.11	6/5.5	2 Gar	CBS Rnch	Pool

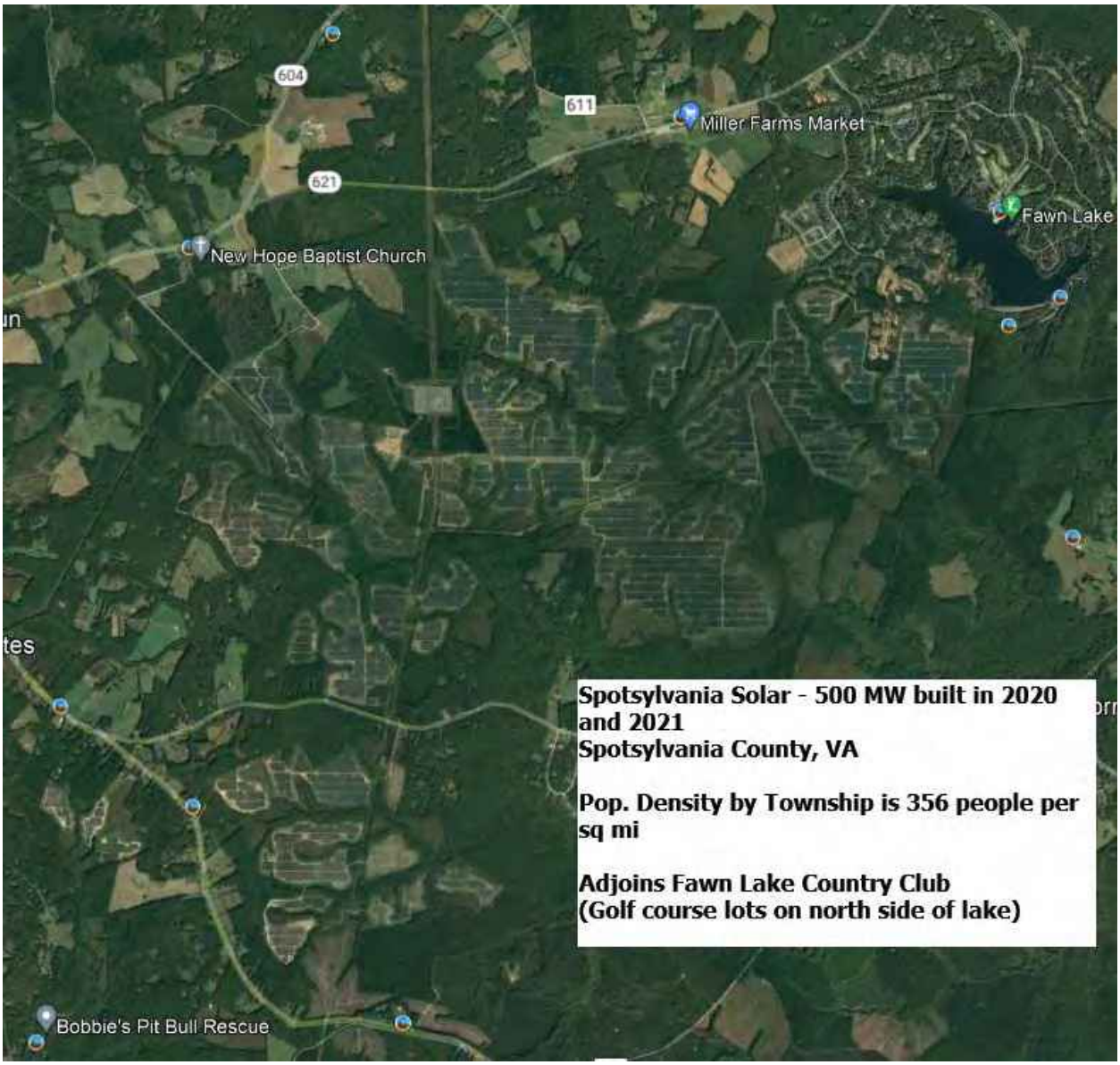
Adjoining Sales Adjusted

Address	Time	Site	YB	GLA	BR/BA	Park	Other	Total	% Diff	Avg % Diff	Distance
13600 SW 182nd								$1,684,000			1390
18090 SW 158th	$2,478		$57,750	$583,703	$30,000			$1,723,930	-2%		
14311 SW 187th	$1,298		$16,500	$600,178	$10,000			$1,727,976	-3%		
17950 SW 158th	$2,041		$69,200	-$98,043		$10,000		$1,713,199	-2%		
										-2%	

22. Matched Pair – Spotsylvania Solar, Paytes, Spotsylvania County, VA







This solar farm is being built in four phases with the area known as Site C having completed construction in November 2020 after the entire project was approved in April 2019. Site C, also known as Pleinmont 1 Solar, includes 99.6 MW located in the southeast corner of the project and shown on the maps above with adjoining parcels 111 through 144. The entire Spotsylvania project totals 617 MW on 3500 acres out of a parent tract assemblage of 6,412 acres.

I have identified three adjoining home sales that occurred during construction and development of the site in 2020.

The first is located on the north side of Site A on Orange Plank Road. The second is located on Nottoway Lane just north of Caparthin Road on the south side of Site A and east of Site C. The third is located on Post Oak Road for a home that backs up to Site C that sold in September 2020 near the completion of construction for Site C.

Spotsylvania Solar Farm

Solar	Address	Acres	Date Sold	Sales Price	Built	GBA	$/GBA	BR/BA	Park	Style	Other
Adjoins	12901 Orng Plnk	5.20	8/27/2020	$319,900	1984	1,714	$186.64	3/2	Drive	1.5	Un Bsmt
Not	8353 Gold Dale	3.00	1/27/2021	$415,000	2004	2,064	$201.07	3/2	3 Gar	Ranch	
Not	6488 Southfork	7.26	9/9/2020	$375,000	2017	1,680	$223.21	3/2	2 Gar	1.5	Barn/Patio
Not	12717 Flintlock	0.47	12/2/2020	$290,000	1990	1,592	$182.16	3/2.5	Det Gar	Ranch	

Adjoining Sales Adjusted

Address	Time	Ac/Loc	YB	GLA	BR/BA	Park	Other	Total	% Diff	Dist
12901 Orng Plnk								$319,900		1270
8353 Gold Dale	-$5,219	$20,000	-$41,500	-$56,298		-$20,000		$311,983	2%	
6488 Southfork	-$401	-$20,000	-$61,875	$6,071		-$15,000		$283,796	11%	
12717 Flintlock	-$2,312	$40,000	-$8,700	$17,779	-$5,000	-$5,000		$326,767	-2%	
							Average Diff		4%	

Solar	Address	Acres	Date Sold	Sales Price	Built	GBA	$/GBA	BR/BA	Park	Style	Other
Adjoins	9641 Nottoway	11.00	5/12/2020	$449,900	2004	3,186	$141.21	4/2.5	Garage	2-Story	Un Bsmt
Not	26123 Lafayette	1.00	8/3/2020	$390,000	2006	3,142	$124.12	3/3.5	Gar/DtG	2-Story	
Not	11626 Forest	5.00	8/10/2020	$489,900	2017	3,350	$146.24	4/3.5	2 Gar	2-Story	
Not	10304 Pny Brnch	6.00	7/27/2020	$485,000	1998	3,076	$157.67	4/4	2Gar/Dt2	Ranch	Fn Bsmt

Adjoining Sales Adjusted

Address	Time	Ac/Loc	YB	GLA	BR/BA	Park	Other	Total	% Diff	Dist
9641 Nottoway								$449,900		1950
26123 Lafayette	-$2,661	$45,000	-$3,900	$4,369	-$10,000	-$5,000		$417,809	7%	
11626 Forest	-$3,624		-$31,844	-$19,187		-$5,000		$430,246	4%	
10304 Pny Brnch	-$3,030		$14,550	$13,875	-$15,000	-$15,000	-$10,000	$470,396	-5%	
							Average Diff		2%	

Solar	Address	Acres	Date Sold	Sales Price	Built	GBA	$/GBA	BR/BA	Park	Style	Other
Adjoins	13353 Post Oak	5.20	9/21/2020	$300,000	1992	2,400	$125.00	4/3	Drive	2-Story	Fn Bsmt
Not	9609 Logan Hgt	5.86	7/4/2019	$330,000	2004	2,352	$140.31	3/2	2Gar	2-Story	
Not	12810 Catharpian	6.18	1/30/2020	$280,000	2008	2,240	$125.00	4/2.5	Drive	2-Story	Bsmt/Nd Pnt
Not	10725 Rbrt Lee	5.01	10/26/2020	$295,000	1995	2,166	$136.20	4/3	Gar	2-Story	Fn Bsmt

Adjoining Sales Adjusted

Address	Time	Ac/Loc	YB	GLA	BR/BA	Park	Other	Total	% Diff	Dist
13353 Post Oak								$300,000		1171
9609 Logan Hgt	$12,070		-$19,800	$5,388		-$15,000	$15,000	$327,658	-9%	
12810 Catharpian	$5,408		-$22,400	$16,000	$5,000		$15,000	$299,008	0%	
10725 Rbrt Lee	-$849		-$4,425	$25,496		-$10,000		$305,222	-2%	
							Average Diff		-4%	

All three of these homes are well set back from the solar panels at distances over 1,000 feet and are well screened from the project. All three show no indication of any impact on property value.

There are a couple of recent lot sales located along Southview Court that have sold since the solar farm was approved. The most recent lot sales include 11700 Southview Court that sold on December 29, 2021 for $140,000 for a 0.76-acre lot. This property was on the market for less than 2 months before closing within 6% of the asking price. This lot sold earlier in September 2019 for $55,000 based on a liquidation sale from NTS to an investor.

A similar 0.68-acre lot at 11507 Stonewood Court within the same subdivision located away from the solar farm sold on March 9, 2021 for $109,000. This lot sold for 18% over the asking price within 1 month of listing suggesting that this was priced too low. Adjusting this lot value upward by 12% for very strong growth in the market over 2021, the adjusted indicated value is $122,080 for this lot. This is still showing a 15% premium for the lot backing up to the solar farm.

The lot at 11009 Southview Court sold on August 5, 2019 for $65,000, which is significantly lower than the more recent sales. This lot was sold by NTS the original developer of this subdivision, who was in the process of liquidating lots in this subdivision with multiple lot sales in this time period throughout the subdivision being sold at discounted prices. The home was later improved by the buyer with a home built in 2020 with 2,430 square feet ranch, 3.5 bathrooms, with a full basement, and a current assessed value of $492,300.

I spoke with Chris Kalia, MAI, Mark Doherty, local real estate investor, and Alex Doherty, broker, who are all three familiar with this subdivision and activity in this neighborhood. All three indicated that there was a deep sell off of lots in the neighborhood by NTS at discounted prices under $100,000 each. Those lots since that time are being sold for up to $140,000. The prices paid for the lots below $100,000 were liquidation values and not indicative of market value. Homes are being built in the neighborhood on those lots with home prices ranging from $600,000 to $800,000 with no sign of impact on pricing due to the solar farm according to all three sources.

Fawn Lake Lot Sales

Parcel	Solar?	Address	Acres	Sale Date	Sale Price	Ad. For Time	% Diff
A	Adjoins	11700 Southview Ct	0.76	12/29/2021	$140,000		
1	1 parcel away	11603 Southview Ct	0.44	3/31/2022	$140,000	$141,960	-1.4%
2	Not adjoin	11507 Stonewood Ct	0.68	3/9/2021	$109,000	$118,374	15.4%
3	Not adjoin	11312 Westgate Wy	0.83	10/15/2020	$125,000	$142,000	-1.4%
4	Not adjoin	11409 Darkstone Pl	0.589	9/23/2021	$118,000	$118,000	15.7%

Average	7.1%
Median	7.0%

Least Adjusted	15.7%
2nd Least Adjusted (Parcel 1 off solar farm)	-1.4%

Time Adjustments are based on the FHFA Housing Price Index

23. Matched Pair – Whitehorn Solar, Gretna, Pittsylvania County, VA

This project was built in 2021 for a solar project with 50 MW. Adjoining uses are residential and agricultural. There was a sale located at 1120 Taylors Mill Road that sold on December 20, 2021, which is about the time the solar farm was completed. This sold for $224,000 for 2.02 acres with a 2,079 s.f. mobile home on it that was built in 2010. The property was listed for $224,000 and sold for that same price within two months (went under contract almost exactly 30 days from listing). This sales price works out to $108 per square foot. This home is 255 feet from the nearest panel.

I have compared this sale to an August 20, 2020 sale at 1000 Long Branch Drive that included 5.10 acres with a 1,980 s.f. mobile home that was built in 1993 and sold for $162,000, or $81.82 per square foot. Adjusting this upward for significant growth between this sale date and December 2021 relied on data provided by the FHFA House Pricing Index, which indicates that for homes in the Roanoke, VA MSA would be expected to appreciate from $162,000 to $191,000 over that period of time. Using $191,000 as the effective value as of the date of comparison, the indicated value of this sale works out to $96.46 per square foot. Adjusting this upward by 17% for the difference in year built, but downward by 5% for the much larger lot size at this comparable, I derive an adjusted indication of value of $213,920, or $108 per square foot.

This indicates no impact on value attributable to the new solar farm located across from the home on Taylors Mill Road.

24. Matched Pair – Altavista Solar, Altavista, Campbell County, VA

This project was mostly built in 2021 with final construction finished in 2022. This is an 80 MW facility on 720 acres just north of Roanoke River and west of Altavista. Adjoining uses are residential and agricultural.

I have done a Sale/Resale analysis of 3211 Leesville Road which is approximately 540 feet from the nearest solar panel. There was an existing row of trees between this home and the panels that was supplemented with additional screening for a narrow landscaped buffer between the home and the solar panels.

This home sold in December 2018 for $72,500 for this 1,451 s.f. home built in 1940 with a number of additional outbuildings on 3.35 acres. This was before any announcement of a solar farm. This home sold again on March 28, 2022 for $124,048 after the solar farm was constructed. This shows a 71% increase in value on this property since 2018. There was significant growth in the market between these dates and to accurately reflect that I have considered the FHFA House Price Index that is specific for the Lynchburg area of Virginia (the closest regional category), which shows an expected increase in home values over that same time period of 33.8%, which would suggest a normal growth in value up to $97,000. The home sold for significantly more than this which certainly does not support a finding of a negative impact and in fact suggests a significant positive impact. However, I was not able to discuss this sale with the broker and it is possible that the home also was renovated between 2018 and 2022, which may account for that additional increase in value. Still give that the home increased in value so significantly over the initial amount there is no sign of any negative impact due to the solar farm adjacency.

Similarly, I looked at 3026 Bishop Creek Road that is approximately 600 feet from the nearest solar panel. This home sold on July 16, 2019 for $120,000, which was before construction of the solar farm. This home sold again on February 23, 2022 for $150,000. This shows a 25% increase in value over that time period. Using the same FHFA House Price Index Calculator, the expected increase in value was 29.2% for an indicated expected value of $155,000. This is within 3% of the actual closed price, which supports a finding of no impact from the solar farm. This home has a dense wooded area between it and the adjoining solar farm.

Conclusion – SouthEast Over 5 MW

Southeast USA Over 5 MW
Matched Pair Summary

						Topo	Adj. Uses By Acreage				1 mile Radius (2010-2022 Data)			
	Name	City	State	Acres	MW	Shift	Res	Ag	Ag/Res	Com/Ind	Pop.	Med. Income	Avg. Housing Unit	Veg. Buffer
1	AM Best	Goldsboro	NC	38	5.00	2	38%	0%	23%	39%	1,523	$37,358	$148,375	Light
2	Mulberry	Selmer	TN	160	5.00	60	13%	73%	10%	3%	467	$40,936	$171,746	Lt to Med
3	Leonard	Hughesville	MD	47	5.00	20	18%	75%	0%	6%	525	$106,550	$350,000	Light
4	Gastonia SC	Gastonia	NC	35	5.00	48	33%	0%	23%	44%	4,689	$35,057	$126,562	Light
5	Summit	Moyock	NC	2,034	80.00	4	4%	0%	94%	2%	382	$79,114	$281,731	Light
6	Tracy	Bailey	NC	50	5.00	10	29%	0%	71%	0%	312	$43,940	$99,219	Heavy
7	Manatee	Parrish	FL	1,180	75.00	20	2%	97%	1%	0%	48	$75,000	$291,667	Heavy
8	McBride	Midland	NC	627	75.00	140	12%	10%	78%	0%	398	$63,678	$256,306	Lt to Med
9	Mariposa	Stanley	NC	36	5.00	96	48%	0%	52%	0%	1,716	$36,439	$137,884	Light
10	Clarke Cnty	White Post	VA	234	20.00	70	14%	39%	46%	1%	578	$81,022	$374,453	Light
11	Candace	Princeton	NC	54	5.00	22	76%	24%	0%	0%	448	$51,002	$107,171	Medium
12	Walker	Barhamsville	VA	485	20.00	N/A	12%	68%	20%	0%	203	$80,773	$320,076	Light
13	Innov 46	Hope Mills	NC	532	78.50	0	17%	83%	0%	0%	2,247	$58,688	$183,435	Light
14	Innov 42	Fayetteville	NC	414	71.00	0	41%	59%	0%	0%	568	$60,037	$276,347	Light
15	Sunfish	Willow Spring	NC	50	6.40	30	35%	35%	30%	0%	1,515	$63,652	$253,138	Light
16	Sappony	Stony Crk	VA	322	20.00	N/A	2%	98%	0%	0%	74	$51,410	$155,208	Light
17	Camden Dam	Camden	NC	50	5.00	0	17%	72%	11%	0%	403	$84,426	$230,288	Light
18	Grandy	Grandy	NC	121	20.00	10	55%	24%	0%	21%	949	$50,355	$231,408	Light
19	Champion	Pelion	SC	100	10.00	N/A	4%	70%	8%	18%	1,336	$46,867	$171,939	Light
20	Barefoot Bay	Barefoot Bay	FL	504	74.50	0	11%	87%	0%	3%	2,446	$36,737	$143,320	Lt to Med
21	Miami-Dade	Miami	FL	347	74.50	0	26%	74%	0%	0%	127	$90,909	$403,571	Light
22	Spotyslvania	Paytes	VA	3,500	617.00	160	37%	52%	11%	0%	74	$120,861	$483,333	Md to Hvy
23	Whitehorn	Gretna	VA	N/A	50.00	N/A	N/A	N/A	N/A	N/A	166	$43,179	$168,750	None to Lt
24	Altavista	Altavista	VA	720	80.00	N/A	N/A	N/A	N/A	N/A	7	$50,000	$341,667	Light
	Average			506	58.83	36	25%	47%	22%	6%	883	$62,000	$237,816	
	Median			234	20.00	20	18%	56%	11%	0%	458	$55,049	$230,848	
	High			3,500	617.00	160	76%	98%	94%	44%	4,689	$120,861	$483,333	
	Low			35	5.00	0	2%	0%	0%	0%	7	$35,057	$99,219	

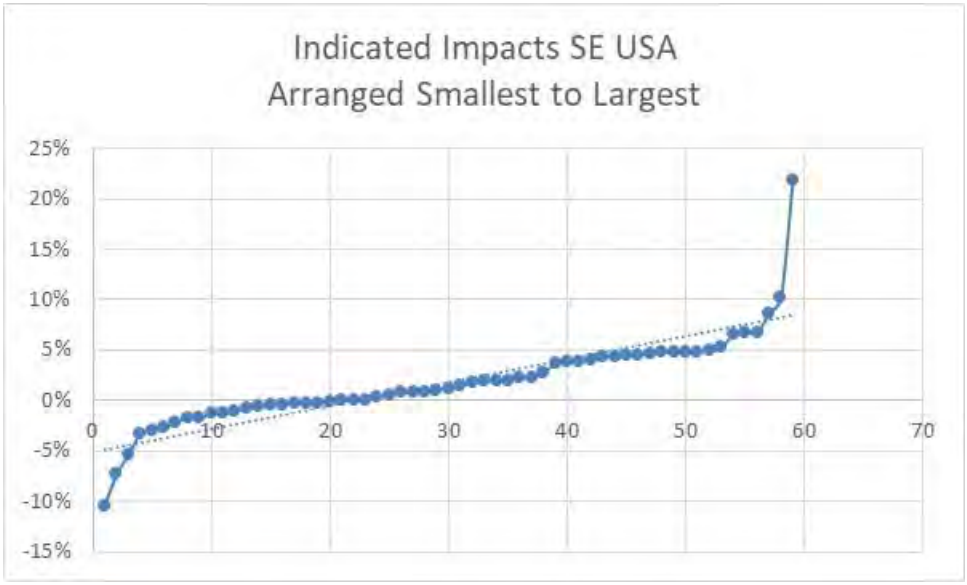
The solar farm matched pairs shown above have similar characteristics to each other in terms of population, but with several outliers showing solar farms in farm more urban areas. The median income for the population within 1 mile of a solar farm is $55,049 with a median housing unit value of $230,848. Most of the comparables are under $300,000 in the home price, with $483,333 being the high end of the set, though I have matched pairs in multiple states over $1,600,000 adjoining solar farms. The adjoining uses show that residential and agricultural uses are the predominant adjoining uses. These figures are in line with the larger set of solar farms that I have looked at with the predominant adjoining uses being residential and agricultural and similar to the solar farm breakdown shown for Virginia and adjoining states as well as the proposed subject property.

Based on the similarity of adjoining uses and demographic data between these sites and the subject property, I consider it reasonable to compare these sites to the subject property.

I have pulled 59 matched pairs from the above referenced solar farms to provide the following summary of home sale matched pairs and land sales next to solar farms. The summary shows that the range of differences is from -10% to +22% with an average of +2% and median of +1%. Excluding the significant 22% outlier, the range is -10% to +10% with an average and median of +1%. This means that the average and median impact is for a slight positive impact due to adjacency to a solar farm. However, this +1% rate is within the typical variability I would expect from real estate. I therefore conclude that this data shows no negative or positive impact due to adjacency to a solar farm.

While the range is seemingly wide, the graph below clearly shows that the vast majority of the data falls between -5% and +5% and most of those are clearly in the 0 to +5% range. This data strongly supports an indication of no impact on adjoining residential uses to a solar farm.

I therefore conclude that these matched pairs support a finding of no impact on value at the subject property for the proposed project, which as proposed will include a landscaped buffer to screen adjoining residential properties.


Indicated Impacts SE USA
Arranged Smallest to Largest
25%
20%
15%
10%
5%
0%
-5%
-10%
-15%
0
10
20
30
40
50
60
70

C. Summary of National Data on Solar Farms

I have worked in over 20 states related to solar farms and I have been tracking matched pairs in most of those states. On the following pages I provide a brief summary of those findings showing 38 solar farms over 5 MW studied with each one providing matched pair data supporting the findings of this report.

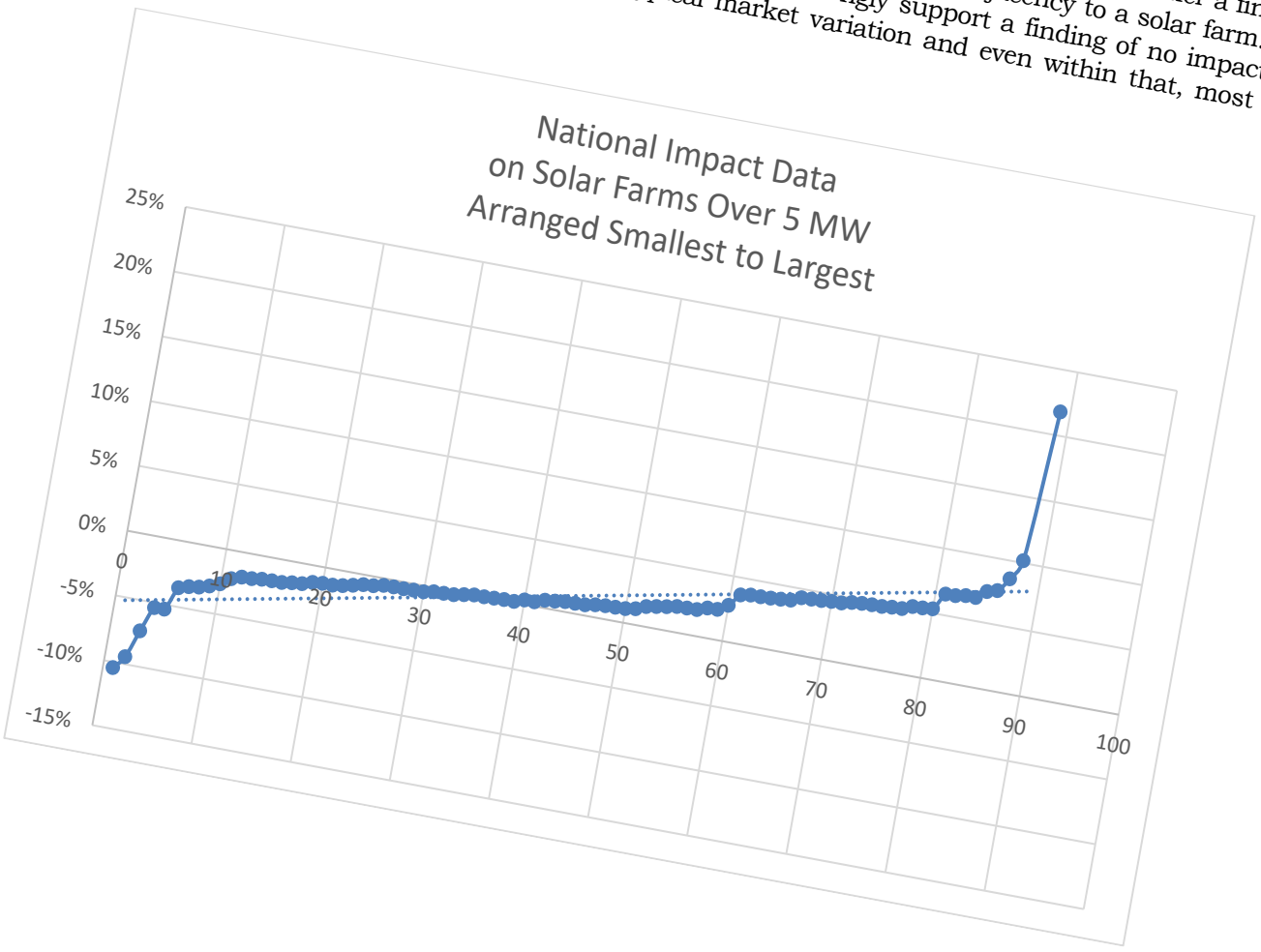
The solar farms summary is shown below with a summary of the matched pair data shown on the following page.

Matched Pair Summary							**Adj. Uses By Acreage**				**1 mile Radius (2020 Data)**		
	Name	**City**	**State**	**Acres**	**MW**	**Topo Shift**	**Res**	**Ag**	**Ag/Res**	**Com/Ind**	**Population**	**Med. Income**	**Avg. Housing Unit**
1	AM Best	Goldsboro	NC	38	5.00	2	38%	0%	23%	39%	1,523	$37,358	$148,375
2	Mulberry	Selmer	TN	160	5.00	60	13%	73%	10%	3%	467	$40,936	$171,746
3	Leonard	Hughesville	MD	47	5.00	20	18%	75%	0%	6%	525	$106,550	$350,000
4	Gastonia SC	Gastonia	NC	35	5.00	48	33%	0%	23%	44%	4,689	$35,057	$126,562
5	Summit	Moyock	NC	2,034	80.00	4	4%	0%	94%	2%	382	$79,114	$281,731
6	Tracy	Bailey	NC	50	5.00	10	29%	0%	71%	0%	312	$43,940	$99,219
7	Manatee	Parrish	FL	1,180	75.00	20	2%	97%	1%	0%	48	$75,000	$291,667
8	McBride	Midland	NC	627	75.00	140	12%	10%	78%	0%	398	$63,678	$256,306
9	Grand Ridge	Streator	IL	160	20.00	1	8%	87%	5%	0%	96	$70,158	$187,037
10	Dominion	Indianapolis	IN	134	8.60	20	3%	97%	0%	0%	3,774	$61,115	$167,515
11	Mariposa	Stanley	NC	36	5.00	96	48%	0%	52%	0%	1,716	$36,439	$137,884
12	Clarke Cnty	White Post	VA	234	20.00	70	14%	39%	46%	1%	578	$81,022	$374,453
13	Flemington	Flemington	NJ	120	9.36	N/A	13%	50%	28%	8%	3,477	$105,714	$444,696
14	Frenchtown	Frenchtown	NJ	139	7.90	N/A	37%	35%	29%	0%	457	$111,562	$515,399
15	McGraw	East Windsor	NJ	95	14.00	N/A	27%	44%	0%	29%	7,684	$78,417	$362,428
16	Tinton Falls	Tinton Falls	NJ	100	16.00	N/A	98%	0%	0%	2%	4,667	$92,346	$343,492
17	Simon	Social Circle	GA	237	30.00	71	1%	63%	36%	0%	203	$76,155	$269,922
18	Candace	Princeton	NC	54	5.00	22	76%	24%	0%	0%	448	$51,002	$107,171
19	Walker	Barhamsville	VA	485	20.00	N/A	12%	68%	20%	0%	203	$80,773	$320,076
20	Innov 46	Hope Mills	NC	532	78.50	0	17%	83%	0%	0%	2,247	$58,688	$183,435
21	Innov 42	Fayetteville	NC	414	71.00	0	41%	59%	0%	0%	568	$60,037	$276,347
22	Demille	Lapeer	MI	160	28.40	10	10%	68%	0%	22%	2,010	$47,208	$187,214
23	Turrill	Lapeer	MI	230	19.60	10	75%	59%	0%	25%	2,390	$46,839	$110,361
24	Sunfish	Willow Spring	NC	50	6.40	30	35%	35%	30%	0%	1,515	$63,652	$253,138
25	Picture Rocks	Tucson	AZ	182	20.00	N/A	6%	88%	6%	0%	102	$81,081	$280,172
26	Avra Valley	Tucson	AZ	246	25.00	N/A	3%	94%	3%	0%	85	$80,997	$292,308
27	Sappony	Stony Crk	VA	322	20.00	N/A	2%	98%	0%	0%	74	$51,410	$155,208
28	Camden Dam	Camden	NC	50	5.00	0	17%	72%	11%	0%	403	$84,426	$230,288
29	Grandy	Grandy	NC	121	20.00	10	55%	24%	0%	21%	949	$50,355	$231,408
30	Champion	Pelion	SC	100	10.00	N/A	4%	70%	8%	18%	1,336	$46,867	$171,939
31	Eddy II	Eddy	TX	93	10.00	N/A	15%	25%	58%	2%	551	$59,627	$139,088
32	Somerset	Somerset	TX	128	10.60	N/A	5%	95%	0%	0%	1,293	$41,574	$135,490
33	DG Amp Piqua	Piqua	OH	86	12.60	2	26%	16%	58%	0%	6,735	$38,919	$96,555
34	Barefoot Bay	Barefoot Bay	FL	504	74.50	0	11%	87%	0%	3%	2,446	$36,737	$143,320
35	Miami-Dade	Miami	FL	347	74.50	0	26%	74%	0%	0%	127	$90,909	$403,571
36	Spotyslvania	Paytes	VA	3,500	500.00	160	37%	52%	11%	0%	74	$120,861	$483,333
37	Whitehorn	Gretna	VA	N/A	50.00	N/A	N/A	N/A	N/A	N/A	166	$43,179	$168,750
38	Altavista	Altavista	VA	720	80.00	N/A	N/A	N/A	N/A	N/A	7	$50,000	$341,667
	Average			372	40.18	32	24%	52%	19%	6%	1,440	$65,255	$243,139
	Median			160	19.80	10	16%	59%	7%	0%	538	$60,576	$230,848
	High			3,500	500.00	160	98%	98%	94%	44%	7,684	$120,861	$515,399
	Low			35	5.00	0	1%	0%	0%	0%	7	$35,057	$96,555

From these 38 solar farms, I have derived 89 matched pairs. The matched pairs show no negative impact at distances as close as 105 feet between a solar panel and the nearest point on a home. The range of impacts is -10% to +10% with an average and median of +1% (after excluding the one +22% outlier that may have other factors influencing it).

	MW	Avg. Distance	% Dif
Average	48.77	569	1%
Median	16.00	400	1%
High	617.00	2,020	22%
Low	5.00	145	-10%

While the range is broad, the two charts below show the data points in range from lowest to highest. There is only 3 data points out of 89 that show a negative impact. The rest support either a finding of no impact or 9 of the data points suggest a positive impact due to adjacency to a solar farm. As discussed earlier in this report, I consider this data to strongly support a finding of no impact on value as most of the findings are within typical market variation and even within that, most are mildly positive findings.



D. Larger Solar Farms

I have also considered larger solar farms to address impacts related to larger projects. Projects have been increasing in size and most of the projects between 100 and 1000 MW are newer with little time for adjoining sales. I have included a breakdown of solar farms with 20 MW to 80 MW facilities with one 500 MW facility.

Matched Pair Summary - @20 MW And Larger							Adj. Uses By Acreage				1 mile Radius (2010-2020 Data)		
	Name	City	State	Acres	MW	Topo Shift	Res	Ag	Ag/Res	Com/Ind	Population	Med. Income	Avg. Housing Unit
1	Summit	Moyock	NC	2,034	80.00	4	4%	0%	94%	2%	382	$79,114	$281,731
2	Manatee	Parrish	FL	1,180	75.00	20	2%	97%	1%	0%	48	$75,000	$291,667
3	McBride	Midland	NC	627	75.00	140	12%	10%	78%	0%	398	$63,678	$256,306
4	Grand Ridge	Streator	IL	160	20.00	1	8%	87%	5%	0%	96	$70,158	$187,037
5	Clarke Cnty	White Post	VA	234	20.00	70	14%	39%	46%	1%	578	$81,022	$374,453
6	Simon	Social Circle	GA	237	30.00	71	1%	63%	36%	0%	203	$76,155	$269,922
7	Walker	Barhamsville	VA	485	20.00	N/A	12%	68%	20%	0%	203	$80,773	$320,076
8	Innov 46	Hope Mills	NC	532	78.50	0	17%	83%	0%	0%	2,247	$58,688	$183,435
9	Innov 42	Fayetteville	NC	414	71.00	0	41%	59%	0%	0%	568	$60,037	$276,347
10	Demille	Lapeer	MI	160	28.40	10	10%	68%	0%	22%	2,010	$47,208	$187,214
11	Turrill	Lapeer	MI	230	19.60	10	75%	59%	0%	25%	2,390	$46,839	$110,361
12	Picure Rocks	Tucson	AZ	182	20.00	N/A	6%	88%	6%	0%	102	$81,081	$280,172
13	Avra Valley	Tucson	AZ	246	25.00	N/A	3%	94%	3%	0%	85	$80,997	$292,308
14	Sappony	Stony Crk	VA	322	20.00	N/A	2%	98%	0%	0%	74	$51,410	$155,208
15	Grandy	Grandy	NC	121	20.00	10	55%	24%	0%	21%	949	$50,355	$231,408
16	Barefoot Bay	Barefoot Bay	FL	504	74.50	0	11%	87%	0%	3%	2,446	$36,737	$143,320
17	Miami-Dade	Miami	FL	347	74.50	0	26%	74%	0%	0%	127	$90,909	$403,571
18	Spotyslvania	Paytes	VA	3,500	500.00	160	37%	52%	11%	0%	74	$120,861	$483,333
19	Whitehorn	Gretna	VA	N/A	50.00	N/A	N/A	N/A	N/A	N/A	166	$43,179	$168,750
20	Altavista	Altavista	VA	720	80.00	N/A	N/A	N/A	N/A	N/A	7	$50,000	$341,667
	Average			644	69.08		19%	64%	17%	4%	658	$67,210	$261,914
	Median			347	40.00		12%	68%	2%	0%	203	$66,918	$273,135
	High			3,500	500.00		75%	98%	94%	25%	2,446	$120,861	$483,333
	Low			121	19.60		1%	0%	0%	0%	7	$36,737	$110,361

The breakdown of adjoining uses, population density, median income and housing prices for these projects are very similar to those of the larger set. The matched pairs for each of these were considered earlier and support a finding of no negative impact on the adjoining home values.

I have included a breakdown of solar farms with 50 MW to 617 MW facilities adjoining.

Matched Pair Summary - @50 MW And Larger							Adj. Uses By Acreage				1 mile Radius (2010-2020 Data)		
	Name	City	State	Acres	MW	Topo Shift	Res	Ag	Ag/Res	Com/Ind	Population	Med. Income	Avg. Housing Unit
1	Summit	Moyock	NC	2,034	80.00	4	4%	0%	94%	2%	382	$79,114	$281,731
2	Manatee	Parrish	FL	1,180	75.00	20	2%	97%	1%	0%	48	$75,000	$291,667
3	McBride	Midland	NC	627	75.00	140	12%	10%	78%	0%	398	$63,678	$256,306
4	Innov 46	Hope Mills	NC	532	78.50	0	17%	83%	0%	0%	2,247	$58,688	$183,435
5	Innov 42	Fayetteville	NC	414	71.00	0	41%	59%	0%	0%	568	$60,037	$276,347
6	Barefoot Bay	Barefoot Bay	FL	504	74.50	0	11%	87%	0%	3%	2,446	$36,737	$143,320
7	Miami-Dade	Miami	FL	347	74.50	0	26%	74%	0%	0%	127	$90,909	$403,571
8	Spotyslvania	Paytes	VA	3,500	500.00	160	37%	52%	11%	0%	74	$120,861	$483,333
9	Whitehorn	Gretna	VA	N/A	50.00	N/A	N/A	N/A	N/A	N/A	166	$43,179	$168,750
10	Altavista	Altavista	VA	720	80.00	N/A	N/A	N/A	N/A	N/A	7	$50,000	$341,667
	Average			1,095	115.85		19%	58%	23%	1%	646	$67,820	$283,013
	Median			627	75.00		15%	67%	0%	0%	274	$61,858	$279,039
	High			3,500	500.00		41%	97%	94%	3%	2,446	$120,861	$483,333
	Low			347	50.00		2%	0%	0%	0%	7	$36,737	$143,320

The breakdown of adjoining uses, population density, median income and housing prices for these projects are very similar to those of the larger set. The matched pairs for each of these were considered earlier and support a finding of no negative impact on the adjoining home values.

The data for these larger solar farms is shown in the SE USA and the National data breakdowns with similar landscaping, setbacks and range of impacts that fall mostly in the +/-5% range as can be seen earlier in this report.

On the following page I show a summary of 248 projects ranging in size from 50 MW up to 1,000 MW with an average size of 119.7 MW and a median of 80 MW. The average closest distance for an adjoining home is 365 feet, while the median distance is 220 feet. The closest distance is 50 feet. The mix of adjoining uses is similar with most of the adjoining uses remaining residential or agricultural in nature. This is the list of solar farms that I have researched for possible matched pairs and not a complete list of larger solar farms in those states.

Total Number of Solar Farms Researched Over 50 MW 238

	Output (MW)	Total Acres	Used Acres	Avg. Dist to home	Closest Home	Adjoining Use by Acre			
						Res	Agri	Agri/Res	Com
Average	119.7	1521.4	1223.3	1092	365	10%	68%	18%	4%
Median	80.0	987.3	805.5	845	220	7%	72%	12%	0%
High	1000.0	19000.0	9735.4	6835	6810	98%	100%	100%	70%
Low	50.0	3.0	3.0	241	50	0%	0%	0%	0%

IX. Distance Between Homes and Panels

I have measured distances at matched pairs as close as 105 feet between panel and home to show no impact on value. This measurement goes from the closest point on the home to the closest solar panel. This is a strong indication that at this distance there is no impact on adjoining homes.

However, in tracking other approved solar farms across Kentucky, North Carolina and other states, I have found that it is common for there to be homes within 100 to 150 feet of solar panels. Given the visual barriers in the form of privacy fencing or landscaping, there is no sign of negative impact.

I have also tracked a number of locations where solar panels are between 50 and 100 feet of single-family homes. In these cases the landscaping is typically a double row of more mature evergreens at time of planting. There are many examples of solar farms with one or two homes closer than 100-feet, but most of the adjoining homes are further than that distance.

X. Topography

As shown on the summary charts for the solar farms, I have been identifying the topographic shifts across the solar farms considered. Differences in topography can impact visibility of the panels, though typically this results in distant views of panels as opposed to up close views. The topography noted for solar farms showing no impact on adjoining home values range from as much as 160-foot shifts across the project. Given that appearance is the only factor of concern and that distance plus landscape buffering typically addresses up close views, this leaves a number of potentially distant views of panels. I specifically note that in Crittenden in KY there are distant views of panels from the adjoining homes that showed no impact on value.

General rolling terrain with some distant solar panel views are showing no impact on adjoining property value.

XI. Potential Impacts During Construction

I have previously been asked by the Kentucky Siting Board about potential impacts during construction. This is not a typical question I get as any development of a site will have a certain amount of construction, whether it is for a commercial agricultural use such as large-scale poultry operations or a new residential subdivision. Construction will be temporary and consistent with other development uses of the land and in fact dust from the construction will likely be less than most other construction projects given the minimal grading. I would not anticipate any impacts on property value due to construction on the site.

I note that in the matched pairs that I have included there have been a number of home sales that happened after a solar farm was approved but before the solar farm was built showing no impact on property value. Therefore the anticipated construction had no impact as shown by that data.

XII. Scope of Research

I have researched over 1,000 solar farms and sites on which solar farms are existing and proposed in Kentucky, Illinois, Tennessee, North Carolina, Virginia as well as other states to determine what uses are typically found in proximity with a solar farm. The data I have collected and provide in this report strongly supports the assertion that solar farms are having no negative consequences on adjoining agricultural and residential values.

Beyond these references, I have quantified the adjoining uses for a number of solar farm comparables to derive a breakdown of the adjoining uses for each solar farm. The chart below shows the breakdown of adjoining or abutting uses by total acreage.

Percentage By Adjoining Acreage

	Res	Ag	Res/AG	Comm	Ind	Avg Home	Closest Home	All Res Uses	All Comm Uses
Average	19%	53%	20%	2%	6%	887	344	91%	8%
Median	11%	56%	11%	0%	0%	708	218	100%	0%
High	100%	100%	100%	93%	98%	5,210	4,670	100%	98%
Low	0%	0%	0%	0%	0%	90	25	0%	0%

Res = Residential, Ag = Agriculture, Com = Commercial

Total Solar Farms Considered: 705

I have also included a breakdown of each solar farm by number of adjoining parcels to the solar farm rather than based on adjoining acreage. Using both factors provides a more complete picture of the neighboring properties.

Percentage By Number of Parcels Adjoining

	Res	Ag	Res/AG	Comm	Ind	Avg Home	Closest Home	All Res Uses	All Comm Uses
Average	61%	24%	9%	2%	4%	887	344	93%	6%
Median	65%	19%	5%	0%	0%	708	218	100%	0%
High	100%	100%	100%	60%	78%	5,210	4,670	105%	78%
Low	0%	0%	0%	0%	0%	90	25	0%	0%

Res = Residential, Ag = Agriculture, Com = Commercial

Total Solar Farms Considered: 705

Both of the above charts show a marked residential and agricultural adjoining use for most solar farms. Every single solar farm considered included an adjoining residential or residential/agricultural use.

XIII. Specific Factors Related To Impacts on Value

I have completed a number of Impact Studies related to a variety of uses and I have found that the most common areas for impact on adjoining values typically follow a hierarchy with descending levels of potential impact. I will discuss each of these categories and how they relate to a solar farm.

1. Hazardous material
2. Odor
3. Noise
4. Traffic
5. Stigma
6. Appearance

1. Hazardous material

A solar farm presents no potential hazardous waste byproduct as part of normal operation. Any fertilizer, weed control, vehicular traffic, or construction will be significantly less than typically applied in a residential development and even most agricultural uses.

The various solar farms that I have inspected and identified in the addenda have no known environmental impacts associated with the development and operation.

2. Odor

The various solar farms that I have inspected produced no odor.

3. Noise

Whether discussing passive fixed solar panels, or single-axis trackers, there is no negative impact associated with noise from a solar farm. The transformer reportedly has a hum similar to an HVAC that can only be heard in close proximity to this transformer and the buffers on the property are sufficient to make emitted sounds inaudible from the adjoining properties. Even less sound is emitted from the facility at night. The various solar farms that I have inspected were inaudible from the roadways.

4. Traffic

The solar farm will have no onsite employee's or staff. The site requires only minimal maintenance. Relative to other potential uses of the site (such as a residential subdivision), the additional traffic generated by a solar farm use on this site is insignificant.

5. Stigma

There is no stigma associated with solar farms and solar farms and people generally respond favorably towards such a use. While an individual may express concerns about proximity to a solar farm, there is no specific stigma associated with a solar farm. Stigma generally refers to things such as adult establishments, prisons, rehabilitation facilities, and so forth.

Solar panels have no associated stigma and in smaller collections are found in yards and roofs in many residential communities. Solar farms are adjoining elementary, middle and high schools as well as churches and subdivisions. I note that one of the solar farms in this report not only adjoins a church, but is actually located on land owned by the church. Solar panels on a roof are often cited as an enhancement to the property in marketing brochures.

I see no basis for an impact from stigma due to a solar farm.

6. Appearance

I note that larger solar farms using fixed or tracking panels are a passive use of the land that is in keeping with a rural/residential area. As shown below, solar farms are comparable to larger greenhouses. This is not surprising given that a greenhouse is essentially another method for collecting passive solar energy. The greenhouse use is well received in residential/rural areas and has a similar visual impact as a solar farm.

The solar panels are all less than 20 feet high. Were the subject property developed with single family housing, that development would have a much greater visual impact on the surrounding area given that a two-story home with attic could be significantly taller than thee proposed panels.

Whenever you consider the impact of a proposed project on viewshed or what the adjoining owners may see from their property it is important to distinguish whether or not they have a protected viewshed or not. Enhancements for scenic vistas are often measured when considering properties that adjoin preserved open space and parks. However, adjoining land with a preferred view today conveys no guarantee that the property will continue in the current use. Any consideration of the impact of the appearance requires a consideration of the wide variety of other uses a property already has the right to be put to, which for solar farms often includes subdivision development, agricultural business buildings such as poultry, or large greenhouses and the like.

Dr. Randall Bell, MAI, PhD, and author of the book **Real Estate Damages**, Third Edition, on Page 146 "Views of bodies of water, city lights, natural settings, parks, golf courses, and other amenities are considered desirable features, particularly for residential properties." Dr. Bell continues on Page 147 that "View amenities may or may not be protected by law or regulation. It is sometimes argued that views have value only if they are protected by a view easement, a zoning ordinance, or covenants, conditions, and restrictions (CC&Rs), although

such protections are relatively uncommon as a practical matter. The market often assigns significant value to desirable views irrespective of whether or not such views are protected by law."

Dr. Bell concludes that a view enhances adjacent property, even if the adjacent property has no legal right to that view. He then discusses a "borrowed" view where a home may enjoy a good view of vacant land or property beyond with a reasonable expectation that the view might be partly or completely obstructed upon development of the adjoining land. He follows that with "This same concept applies to potentially undesirable views of a new development when the development conforms to applicable zoning and other regulations. Arguing value diminution in such cases is difficult, since the possible development of the offending property should have been known." In other words, if there is an allowable development on the site then arguing value diminution with such a development would be difficult. This further extends to developing the site with alternative uses that are less impactful on the view than currently allowed uses.

This gets back to the point that if a property has development rights and could currently be developed in such a way that removes the viewshed such as a residential subdivision, than a less intrusive use such as a solar farm that is easily screened by landscaping would not have a greater impact on the viewshed of any perceived value adjoining properties claim for viewshed. Essentially, if there are more impactful uses currently allowed, then there is no viewshed enhancement to adjoining parcels.

Conclusion

On the basis of the factors described above, it is my professional opinion that the proposed solar farm will not negatively impact adjoining property values. The only category of impact of note is appearance, which is addressed through setbacks and landscaping buffers. The matched pair data supports that conclusion.

XIV. Conclusion

The matched pair analysis shows no negative impact in home values due to abutting or adjoining a solar farm as well as no impact to abutting or adjacent vacant residential or agricultural land. The proposed setbacks are further than those measured showing no impact for similar price ranges of homes and for areas with similar demographics to the subject area. The criteria that typically correlates with downward adjustments on property values such as noise, odor, and traffic all support a finding of no impact on property value. Similar paired sales showed no impact from adjoining battery storage facilities.

Very similar solar farms in very similar areas have been found by hundreds of towns and counties not to have a substantial injury to abutting or adjoining properties, and many of those findings of no impact have been upheld by appellate courts. Similar solar farms have been approved adjoining agricultural uses, schools, churches, and residential developments.

I have found no difference in the mix of adjoining uses or proximity to adjoining homes based on the size of a solar farm and I have found no significant difference in the matched pair data adjoining larger solar farms versus smaller solar farms. The data in the Southeast is consistent with the larger set of data that I have nationally, as is the more specific data located in and around Kentucky.

Based on the data and analysis in this report, it is my professional opinion that the solar farm proposed at the subject property will have no negative impact on the value of adjoining or abutting property. I note that some of the positive implications of a solar farm that have been expressed by people living next to solar farms include protection from future development of residential developments or other more intrusive uses, reduced dust, odor and chemicals from former farming operations, protection from light pollution at night, it's quiet, and there is no traffic.

XV. Certification

I certify that, to the best of my knowledge and belief:

1. The statements of fact contained in this report are true and correct;

2. The reported analyses, opinions, and conclusions are limited only by the reported assumptions and limiting conditions, and are my personal, unbiased professional analyses, opinions, and conclusions;

3. I have no present or prospective interest in the property that is the subject of this report and no personal interest with respect to the parties involved;

4. I have no bias with respect to the property that is the subject of this report or to the parties involved with this assignment;

5. My engagement in this assignment was not contingent upon developing or reporting predetermined results;

6. My compensation for completing this assignment is not contingent upon the development or reporting of a predetermined value or direction in value that favors the cause of the client, the amount of the value opinion, the attainment of a stipulated result, or the occurrence of a subsequent event directly related to the intended use of the appraisal;

7. The reported analyses, opinions, and conclusions were developed, and this report has been prepared, in conformity with the requirements of the Code of Professional Ethics and Standards of Professional Appraisal Practice of the Appraisal Institute;

8. My analyses, opinions and conclusions were developed, and this report has been prepared, in conformity with the Uniform Standards of Professional Appraisal Practice.

9. The use of this report is subject to the requirements of the Appraisal Institute relating to review by its duly authorized representatives;

10. I have not made a personal inspection of the property that is the subject of this report, and;

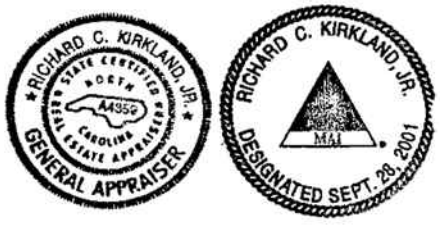
11. No one provided significant real property appraisal assistance to the person signing this certification.

12. As of the date of this report I have completed the continuing education program for Designated Members of the Appraisal Institute;

13. I have not performed services, regarding the property that is the subject of this report within the three-year period immediately preceding acceptance of this assignment.

Disclosure of the contents of this appraisal report is governed by the bylaws and regulations of the Appraisal Institute and the National Association of Realtors.

Neither all nor any part of the contents of this appraisal report shall be disseminated to the public through advertising media, public relations media, news media, or any other public means of communications without the prior written consent and approval of the undersigned.



Richard C. Kirkland, Jr., MAI
State Certified General Appraiser

Kirkland Appraisals, LLC

Richard C. Kirkland, Jr., MAI
9408 Northfield Court
Raleigh, North Carolina 27603
Mobile (919) 414-8142
rkirkland2@gmail.com
www.kirklandappraisals.com

Professional Experience

Kirkland Appraisals, LLC, Raleigh, N.C. — 2003 – Present
Commercial appraiser

Hester & Company, Raleigh, N.C.
Commercial appraiser — 1996 – 2003

Professional Affiliations

MAI (Member, Appraisal Institute) designation #11796 — 2001
NC State Certified General Appraiser # A4359 — 1999
VA State Certified General Appraiser # 4001017291
SC State Certified General Appraiser # 6209
FL State Certified General Appraiser # RZ3950
GA State Certified General Appraiser # 321885
MI State Certified General Appraiser # 1201076620
PA State Certified General Appraiser # GA004598
OH State Certified General Appraiser # 2021008689
IN State Certified General Appraiser # CG42100052
KY State Certified General Appraiser # 5522

Education

Bachelor of Arts in English, University of North Carolina, Chapel Hill — 1993

Continuing Education

Uniform Standards of Professional Appraisal Practice Update	2022
Sexual Harassment Prevention Training	2021
Appraisal of Land Subject to Ground Leases	2021
Michigan Appraisal Law	2020
Uniform Standards of Professional Appraisal Practice Update	2020
Uniform Appraisal Standards for Federal Land Acquisitions (Yellow Book)	2019
The Cost Approach	2019
Income Approach Case Studies for Commercial Appraisers	2018
Introduction to Expert Witness Testimony for Appraisers	2018
Appraising Small Apartment Properties	2018
Florida Appraisal Laws and Regulations	2018
Uniform Standards of Professional Appraisal Practice Update	2018
Appraisal of REO and Foreclosure Properties	2017
Appraisal of Self Storage Facilities	2017
Land and Site Valuation	2017
NCDOT Appraisal Principles and Procedures	2017
Uniform Standards of Professional Appraisal Practice Update	2016
Forecasting Revenue	2015
Wind Turbine Effect on Value	2015
Supervisor/Trainee Class	2015

Business Practices and Ethics	2014
Subdivision Valuation	2014
Uniform Standards of Professional Appraisal Practice Update	2014
Introduction to Vineyard and Winery Valuation	2013
Appraising Rural Residential Properties	2012
Uniform Standards of Professional Appraisal Practice Update	2012
Supervisors/Trainees	2011
Rates and Ratios: Making sense of GIMs, OARs, and DCFs	2011
Advanced Internet Search Strategies	2011
Analyzing Distressed Real Estate	2011
Uniform Standards of Professional Appraisal Practice Update	2011
Business Practices and Ethics	2011
Appraisal Curriculum Overview (2 Days – General)	2009
Appraisal Review - General	2009
Uniform Standards of Professional Appraisal Practice Update	2008
Subdivision Valuation: A Comprehensive Guide	2008
Office Building Valuation: A Contemporary Perspective	2008
Valuation of Detrimental Conditions in Real Estate	2007
The Appraisal of Small Subdivisions	2007
Uniform Standards of Professional Appraisal Practice Update	2006
Evaluating Commercial Construction	2005
Conservation Easements	2005
Uniform Standards of Professional Appraisal Practice Update	2004
Condemnation Appraising	2004
Land Valuation Adjustment Procedures	2004
Supporting Capitalization Rates	2004
Uniform Standards of Professional Appraisal Practice, C	2002
Wells and Septic Systems and Wastewater Irrigation Systems	2002
Appraisals 2002	2002
Analyzing Commercial Lease Clauses	2002
Conservation Easements	2000
Preparation for Litigation	2000
Appraisal of Nonconforming Uses	2000
Advanced Applications	2000
Highest and Best Use and Market Analysis	1999
Advanced Sales Comparison and Cost Approaches	1999
Advanced Income Capitalization	1998
Valuation of Detrimental Conditions in Real Estate	1999
Report Writing and Valuation Analysis	1999
Property Tax Values and Appeals	1997
Uniform Standards of Professional Appraisal Practice, A & B	1997
Basic Income Capitalization	1996

Paul A. Coomes, Ph.D.
Consulting Economist
3604 Trail Ridge Road Louisville KY 40241 502.608.4797 coomes.economics@gmail.com
Emeritus Professor of Economics, University of Louisville

REVISED DRAFT: June 7, 2023

TO: Kelley Pope
Director of Development
Geenex Solar
1000 NC Music Factory Blvd, Suite C3
Charlotte NC 28206
(606)356-0266
kelley.pope@geenexsolar.com

FROM: Paul Coomes

RE: Estimated economic impact of Barren County solar project

Executive Summary

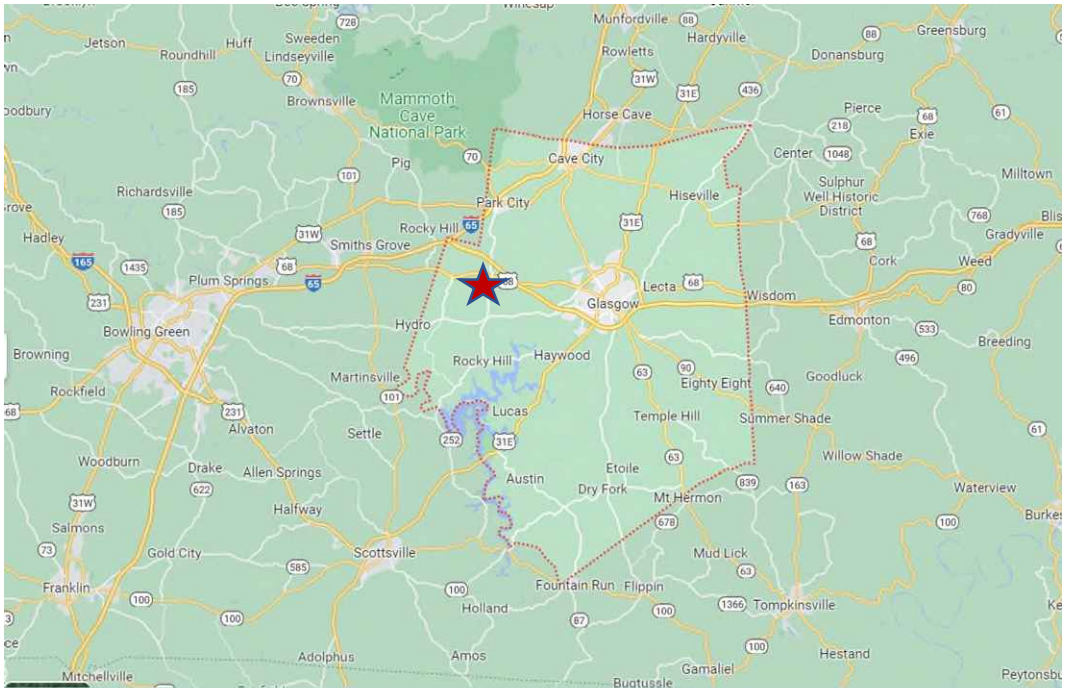
Geenex Solar is developing a solar farm with 100 MW generating capacity on about 2,300 acres of rolling farmland in Barren County KY. The company plans to invest approximately $130 million to develop the site, named *Wood Duck*. This note provides estimates of the new local economic and fiscal activity expected from the development.

There are two primary impacts expected from the project. First, there will be a spike in construction and linked jobs as the site is built out over approximately one year. Using estimates of the construction payroll, I estimate that there will be a total (direct and spinoff) of 323 new jobs in the County in year one, with new labor compensation of $20.2 million.

The company has provided me with tax projections related to their capital expenditures. Kentucky state government is projected to receive $5.2 million over the subsequent four decades. Local jurisdictions would receive $15.1 million, of which $11.0 would go to the County school system. The twenty-five land parcels generated about $17,000 in property tax revenues for local jurisdictions in 2022. This can be compared to an average of $378,000 potentially generated per year by the solar project over forty years.

Demographic and Economic Characteristics of Barren County

Barren County is located in south central Kentucky, just northeast of Bowling Green. Interstate 65 cuts across its northern border, with three interchanges – Park City, Cave City, and the Cumberland Parkway, near the solar site. The County seat is Glasgow, as shown on the Google map screenshot below. The red star indicates the approximate location of the proposed Wood Duck solar farm.



The company provided me with KMZ site coordinates, and I made a Google Earth Map shown above. This reveals the exact location of the proposed solar farm, which is along the Cumberland Parkway, just south of the I-65 intersection. One can see that the site is rural, mainly rolling farmland.

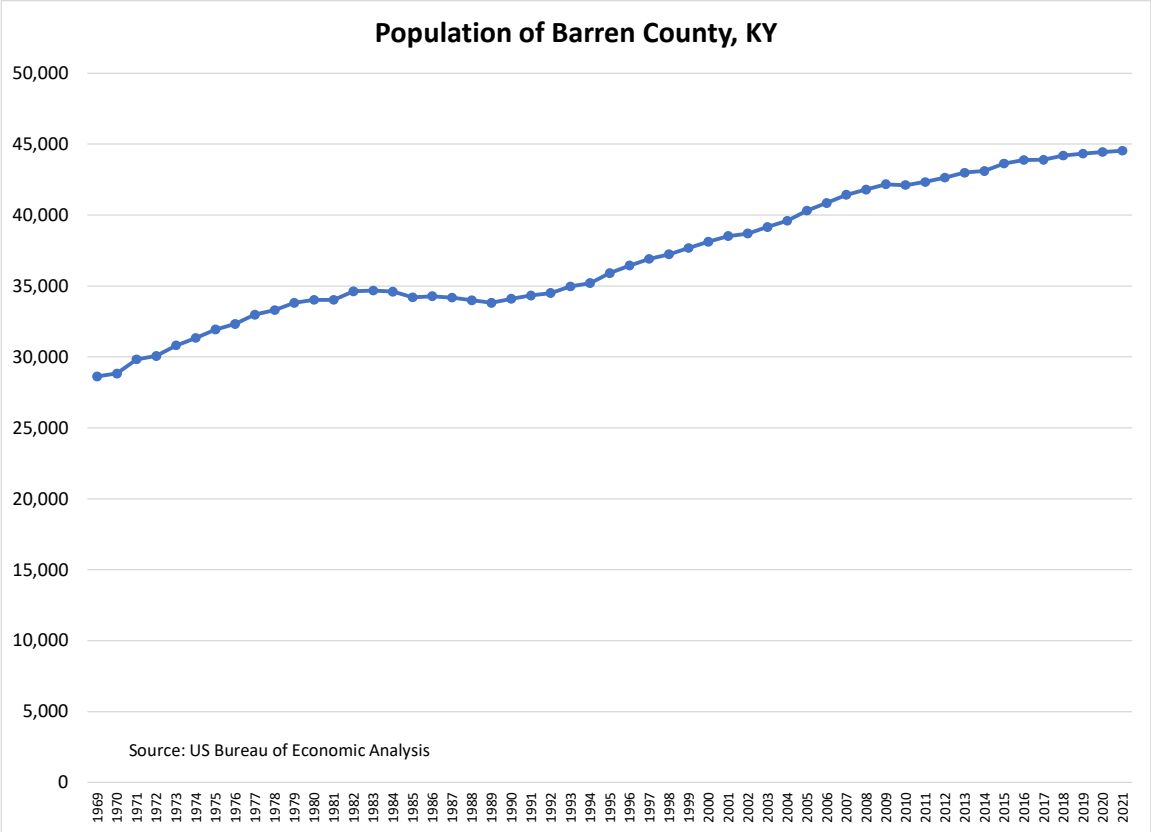
Newly released results from the 2021 American Community Survey provide a nice summary of demographic and economic characteristics of Barren County. Some details are provided in a table at the end of this report. For many of the measures, the County is similar to the State, for example median age, persons per household, and commute times. However, a few things stand out:

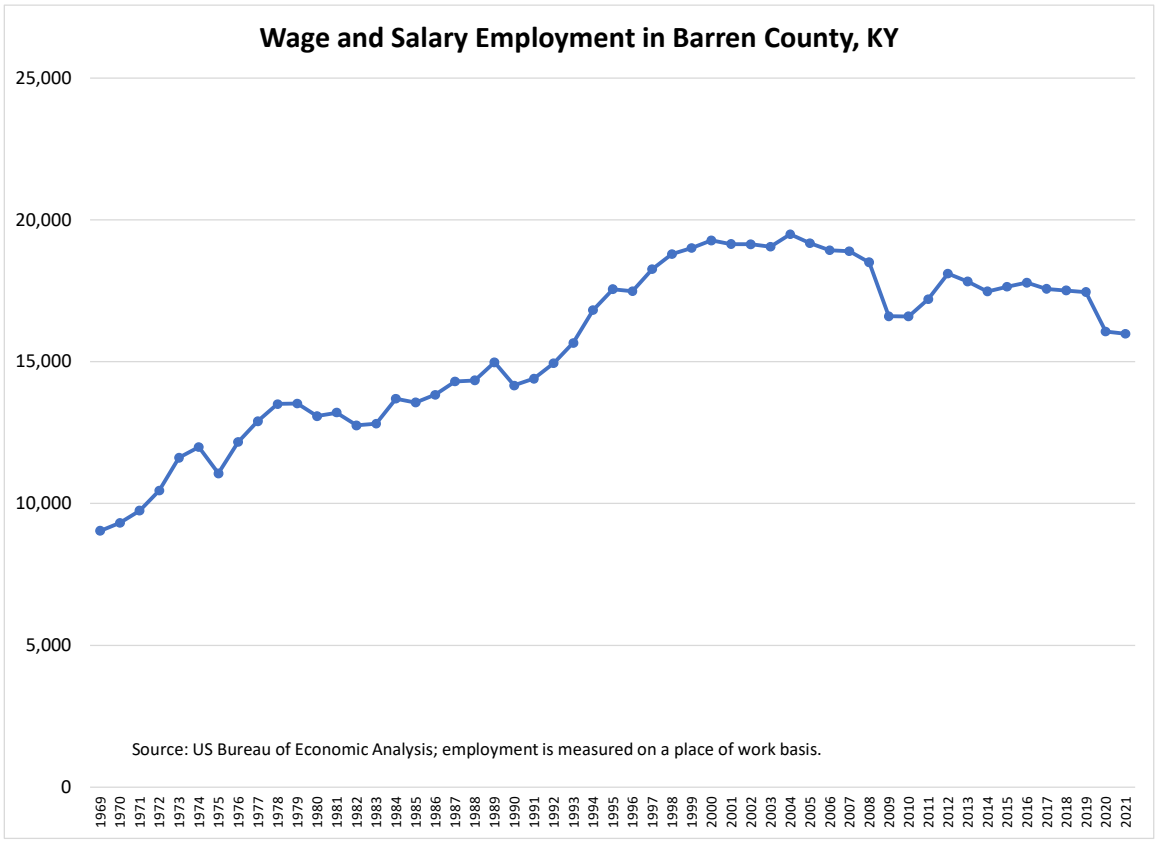
- Compared to the Kentucky state average, the County population is whiter, and less likely to be foreign-born.
- Fewer adults have a four-year college degree, and a larger percentage of adults are not in the labor force.
- Residents tend to work disproportionately in manufacturing industries around the region, and in production and transportation occupations.
- Median household income was $44,300, compared to a state average of $55,500[1].

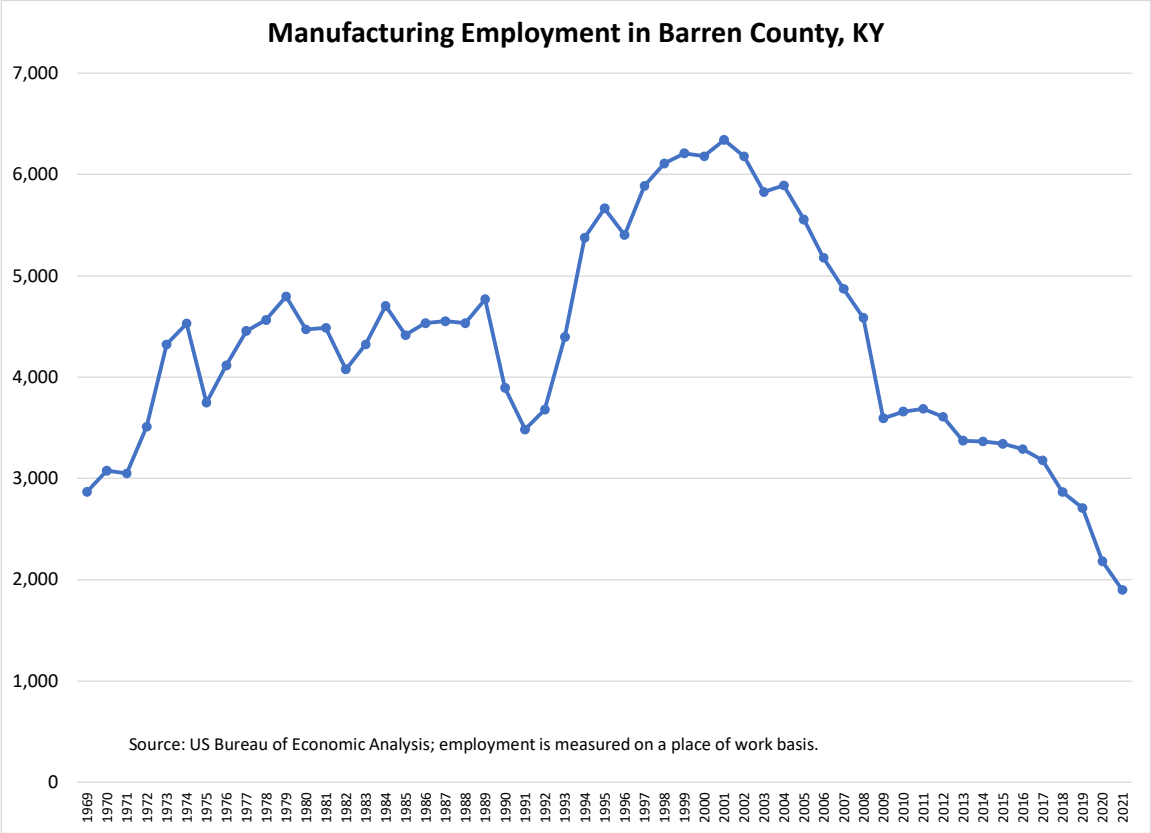
Barren County's population has grown fairly steadily over the past several decades, and now has around 45,000 residents. It has grown 56 percent over the period shown below (1969 to 2021), with some slippage in the 1980s. Interestingly, this demographic pattern seems uncorrelated with the number of jobs in the County, as is evident in the second chart.

The County was gaining jobs in the 1980s while losing population. And the County then began losing jobs after they peaked around 2004, but then gained population. The County added about 5,000 jobs in the 1982 to 2004 period, driven particularly by growth in manufacturing employment in the 1990s. However, since then the County has lost most of its manufacturing jobs, and growth in other sectors has not been sufficient to prevent an overall net loss. The five sectors that added significant employment over the past two decades were retail trade, finance and insurance, health care, hotels, and restaurants. But their combined growth was only 2,200 jobs, not enough to offset the severe loss in manufacturing employment. Moreover, average pay in the growing hospitality sector is much less than that in manufacturing.

[1] There was an error in an earlier draft, where I reported Barren County median household income to be $49,900.


Population of Barren County, KY
50,000
45,000
40,000
35,000
30,000
25,000
20,000
15,000
10,000
5,000
0
Source: US Bureau of Economic Analysis
1969 1970 1971 1972 1973 1974 1975 1976 1977 1978 1979 1980 1981 1982 1983 1984 1985 1986 1987 1988 1989 1990 1991 1992 1993 1994 1995 1996 1997 1998 1999 2000 2001 2002 2003 2004 2005 2006 2007 2008 2009 2010 2011 2012 2013 2014 2015 2016 2017 2018 2019 2020 2021


Wage and Salary Employment in Barren County, KY
25,000
20,000
15,000
10,000
5,000
0
Source: US Bureau of Economic Analysis; employment is measured on a place of work basis.
1969 1970 1971 1972 1973 1974 1975 1976 1977 1978 1979 1980 1981 1982 1983 1984 1985 1986 1987 1988 1989 1990 1991 1992 1993 1994 1995 1996 1997 1998 1999 2000 2001 2002 2003 2004 2005 2006 2007 2008 2009 2010 2011 2012 2013 2014 2015 2016 2017 2018 2019 2020 2021



The loss of manufacturing jobs in Barren County caused a flip in the net flow of income to residents. Until the early 2000s, nonresidents working in the County earned more than Barren County residents working in other counties. This resulted in tens of millions of dollars in negative annual adjustments to the estimated personal income of Barren County residents. After 2004, the residence adjustment flipped the other way, and by 2021 the adjustment was a positive $76 million – meaning residents earned that much more working outside the County than nonresidents earned working in the County. This commuting out to Bowling Green and other nearby places of work has helped stabilize the income and population of Barren County.

It appears from historical data on personal income that the County residents are increasingly dependent on income from government transfer payments. It is the fastest growing component of personal income in Barren County. The share of residents' personal income from government transfer payments rose from 11 to 37 percent over the last five decades. The value of those transfer payments to residents, such as Social Security, Medicare, and Medicaid was $726 million in 2021. Wages and salaries paid to workers in the County were only $668 million.

Data on commuting patterns are only published with a long lag, but reveal the historical interchange of workers to and from Barren County. Local residents fill 74 percent of the jobs in the County, and a significantarge flow of nonresidents commute in to work in from Metcalfe, Hart, Warren and Monroe counties.

County of Residence for Barren County Workers		
	Number	Share of Total
Barren	13,716	74.4%
Metcalfe	1,260	6.8%
Hart	950	5.2%
Warren	718	3.9%
Monroe	611	3.3%
Allen	264	1.4%
Edmonson	232	1.3%
other	683	3.7%
Total	18,434	100.0%

Source: US Census Bureau, American Community Survey, Residence County to Workplace County Commuting Flows, 5-Year ACS, 2011-2015

Consider now the opposite flow, where Barren County residents work. In this survey there were 18,314 working Barren County residents, of which 75 percent worked in their home county. Where do the rest of the residents work? One can see the primary work locations in the next table. Warren, Hart and Allen counties are the primary destinations.

Warren County (Bowling Green) is by far the most developed area in the region, with diversified industries, many high paying jobs, and a full complement of retail and services. It is also one of the fastest growing counties in Kentucky.

County of Work for Barren County Residents		
	Number	Share of Total
Barren	13,716	74.9%
Warren	1,906	10.4%
Hart	786	4.3%
Allen	399	2.2%
Metcalfe	217	1.2%
Monroe	208	1.1%
Edmonson	168	0.9%
other	1,082	5.9%
Total workers	18,314	100.0%

Source: US Census Bureau, American Community Survey, Residence County to Workplace County Commuting Flows, 5-Year ACS, 2011-2015

Modeling the Economic Impacts

I take a conventional approach to modeling the regional economic impacts, using a customized input-output model of Barren County[2]. I have purchased annual economic data for all 120 Kentucky counties, and use these as needed to construct regional models – of a county, a group of counties, or the whole state. The model has detailed information about the linkages among 500 potential industries in each regional economy, as well as the relationship between household spending and demand for local retail goods and services due to the employee compensation or other forms of income. When there is new industrial activity in a region, the model can predict how much of the supply chain can be met by local businesses and how much the new payroll will result in additional sales (and jobs) by local businesses.

The ratio of the total regional economic activity to a change in activity by a local industry is call a multiplier. For example, if a new manufacturing company adds 100 jobs and the County were to ultimately see another 80 jobs due to related spinoff activity, the employment multiplier would be 1.8 (180 total jobs divided by 100 direct jobs). Similar multiplier effects are generated for business output, employee compensation, and value-added[3].

The relevant sector for the construction phase is number 52, "Construction of new power and communication structures", and I use this to model the initial investment. The employment multiplier for that sector in Barren County is 1.346. This is a very modest multiplier, due to the fact that almost all the materials used to assemble a solar farm are made outside the County; thus, there are few inter-industry impacts locally. Moreover, the County is not developed enough to supply all the goods and services demanded by households, and thus the predicted impact of the new construction wages is also relatively small.

There will also be some modest spin-off impacts from ongoing operations. Unfortunately, for the operations phase, the relevant IMPLAN sector, number 42, "Electric Power Generation – Solar", is empty of data and results for Barren County. This is because there is no history of solar electricity generation and therefore no basic

[2] For documentation of IMPLAN modeling, see www.implan.com/history/ . For this project I use economic data for 2019. While data for 2020 and 2021 are available now, they reflect abnormal pandemic conditions, and I do not believe they are representative of typical economic linkages.

[3] Value-added is a measure of how much economic activity actually sticks to a region. For example, if one purchases a new vehicle for $40,000 from a local dealership, only a few thousand dollars actually is captured in the county. Business revenues rise by $40,000, but most of it flows right out to the place where the vehicle was made. Local value-added measures the fraction of the sale that ends up paying workers and owners at the dealership, as well as any local taxes captured as a result of the sale.

economic data to construct industry relationships. The sector is also empty of data for the statewide model.

Construction Payroll and Local Economic Impacts

From an economic perspective, the solar project has two phases, construction and operations. The construction phase is expected to last about one year, while the operations phase will last several decades. Almost all the employment occurs in the construction phase. The regional economic impacts consist of the direct effects of spending by the developer, and any spinoff impacts due to local purchases of supplies and new spending by households as a result of the increased incomes.

Direct effects

The company expects to invest approximately $130 million in the solar project. The investment involves land acquisition, site preparation, solar panel and electrical equipment installation, plus landscaping and security fencing. Geenex Solar plans to enter into an Engineering, Procurement, and Construction (EPC) contract for this project, so it is not possible to know precisely how many workers will be employed nor their total compensation. For modeling purposes, I am using an estimate of average employment over a one-year construction phase. The results of a recent California study of six large photovoltaic projects suggests that there will be an average of 240 direct jobs over a twelve-month construction period for this project[4].

Construction wages and benefits from 2014 Berkeley study

	Average annual wage	Average annual benefits	Total compensation
CA Valley & Topaz Combined, Low Wage	$52,736	$24,104	$76,840
Average Across Six Solar Projects	$78,002	$36,880	$114,882

Source: https://laborcenter.berkeley.edu/pdf/2014/building-solar-ca14.pdf

The California study also provides a range of results for construction wages and benefits. The lowest average annual construction wage reported was $52,736, and the average wage across the six projects was $78,002, as shown in the table. California is, of course, a high wage state, with a much higher cost of living than Kentucky. On the other hand,

[4] A University of California-Berkeley study looked at six large PV projects in California, and summarized the economics. The author finds a ratio of 2.4 FTE construction jobs per MW. Applied to Barren County project's 100 MW one gets 240 direct construction jobs. He shows the permanent operations jobs per MW, and applied to this project one gets 3.2 FTEs. See page 28 of *Economic and Environmental Benefits of Building Solar in California*, by Peter Philips, November 10, 2014, https://laborcenter.berkeley.edu/pdf/2014/building-solar-ca14.pdf

the wage results are from projects developed a decade ago, and there have been large increases in average wages across the US since then.[5]

Occupations include construction managers, earth grader operators, panel installers, electricians, and fencers. I searched the federal database on hundreds of occupations to learn how much these workers are likely to earn on the project. There is no listing in the Kentucky data for "Solar Photovoltaic Installer", but the national average annual wage in 2021 was $50,710[6].

Good inferences about other relevant occupations can be gleaned from the accompanying table. The construction managers are likely to earn over $90,000, heavy

	Kentucky Wages for Related Occupations, 2021			
SOC code	Occupation	Employment	Hourly mean wage	Annual mean wage
11-9021	Construction Managers	980	$46.54	$96,800
47-2073	Operating Engineers and Other Construction Equipment Operators	5,930	$24.80	$51,580
47-2111	Electricians	9,260	$25.66	$53,370
47-4031	Fence Erectors	60	$16.77	$34,880
17-2112	Industrial Engineers	320	$41.01	$85,300
17-2131	Materials Engineers	2,370	$45.47	$94,570
17-2141	Mechanical Engineers	1,210	$39.23	$81,600
49-9021	Heating, Air Conditioning, and Refrigeration Mechanics and Installers	5,790	$24.27	$50,470
49-9051	Electrical Power-Line Installers and Repairers	2,930	$32.41	$67,410
49-9052	Telecommunications Line Installers and Repairers	1,170	$23.25	$48,350
	Source: US Bureau of Labor Statistics, Occupational Employment Survey, www.bls.gov/oes/current/oes_ky.htm			

equipment operators and installers over $50,000, electricians around $53,000, and fencers $35,000. The average annual pay for all jobs in Barren County in 2021 was $41,782[7]. Based on this information, I assume the average annual pay across the construction occupations will be $50,000, excluding fringe benefits.

Multiplying the expected number of jobs times the assumed average pay per job yields a direct construction payroll of $12.0 million. The average fringe benefits, such as employer payments for health insurance, in Kentucky for the construction industry is 21

[5] By contrast, a recent union-oriented report on Ohio solar projects claims temp workers there are only making $18 to $20 per hour, implying average annual pay of around $40,000; See https://columbusfreepress.com/article/ohio-solar-panel-farms-are-booming-construction-workers-are-being-exploited-make-it-happen

[6] Source: US Bureau of Labor Statistics, Occupational Employment Survey. For national data on solar photovoltaic installer, see www.bls.gov/oes/current/oes_nat.htm#47-2231 . For Kentucky data, see www.bls.gov/oes/current/oes_ky.htm County-level data are not available.

[7] Source: US Bureau of Economic Analysis (BEA), https://www.bea.gov/data/by-place-county-metro-local , Table CAINC30, average annual wages and salaries in county.

percent[8]; so, total labor compensation for these jobs is $14.6 million, or $60,700 per job.

Total impacts in Barren County from construction

The construction phase will have some spin-off effects in Barren County, due to materials and labor purchased locally. The economic impact of local supplies purchased is called the indirect effect, and the impact of new local household spending is called the induced effect. Adding these two effects to the direct effect yields the total effect of a development, and dividing the total effect by the direct effect yields a multiplier. Using the Barren County multipliers for the relevant construction sector, and the direct construction budget, I project there will be a total of 323 new jobs in the County, and new labor compensation of $20.2 million.

The accompanying table illustrates the various impact components across several standard economic measures. These are stated in terms of 100 direct jobs, but can be scaled up to fit any assumed number of construction jobs[9]. Note that both the indirect and induced effects are quite small. The indirect effect is small due to the lack of local suppliers of solar farm materials. The induced effect is somewhat bigger, though still small due to the lack of retail and service businesses in the County to absorb the new household income linked to the construction jobs.

100 Jobs in Sector 52, Construction of new power and communication structures

Impact Type	Employ-ment	Labor Income	Value Added	Output
Direct Effect	100.0	$3,665,492	$5,928,209	$11,921,766
Indirect Effect	14.4	$670,368	$1,122,167	$2,241,269
Induced Effect	20.1	$750,002	$1,377,798	$2,625,709
Total Effect	134.6	$5,085,862	$8,428,174	$16,788,744
implied multiplier	1.346	1.387	1.422	1.408

Source: IMPLAN model of Barren County, using 2019 economic data.

[8] BEA provides estimates of both total compensation and total wages by industry for the state. Dividing total construction industry compensation by wages in 2021 yields 1.21.

[9] This linear scaling is a feature of IMPLAN and other regional input-output modeling systems. It is reasonable in the case of a solar farm construction project. The feature becomes a problem in cases where an industrial development dramatically changes a local economy, for example, in the case of a large manufacturing plant in rural county. In that case, one could expect complicated and nonlinear effects, such as growth in the local population, much higher wage rates, and growth in support industries.

Wider regional impacts from construction

Some readers may wonder why I have focused on impacts in Barren County as opposed to more widespread regional impacts. Keep in mind that most federal-state statistical agencies and models measure employment on a place of work basis, as opposed to a place of residence basis. So, all construction workers at the site are counted as Barren County jobs. Nevertheless, clearly there will be some spinoff economic activity in surrounding counties, as supplies are purchased and workers spend their paychecks at retail establishments.

To investigate possible broader regional impacts, I built another IMPLAN model, this time of Barren, Allen, Edmonson, Hart, Metcalfe, Monroe, and Warren counties. The results are slightly larger than that of the Barren-only simulation.

The job multipliers for the solar farm construction phase are 1.346 for Barren alone, and 1.492 for the seven-county region, for a net change of 35 total predicted jobs. (Other economic multipliers, such as labor income and business output, are also consistently in that range). I also performed a comparable simulation using a model covering the whole state of Kentucky. That job multiplier for the solar farm is 1.564, slightly higher than that for the seven-county region. Based on our impact analysis tools, there are not significant differences in the predicted regional impacts when zooming out to adjacent counties or statewide[10]. In this case, the economic multipliers are relatively small whether one models one county, seven, or 120. This is due primarily to the lack of industrial linkages in the region to the solar industry.

Impact of Ongoing Operations

As mentioned in the above discussion of modeling methods, the IMPLAN sector for solar farm operations is empty of data. A reasonable recourse is to tap the literature on solar project impacts, find comparable places, and use other studies to estimate the likely operational impacts on local economies in Kentucky. The California PV study cited above found that a ratio of 31.3 MW per permanent operations job. Applied to the Barren County project, this results in an estimate of 3.2 permanent operational jobs at the site. Thus, ongoing annual economic impacts are expected to be very small relative to the one-time impacts of construction.

[10] For other industrial developments around Kentucky it is common for our models to predict job multipliers of 3, 4, or 5, particularly for complicated manufacturing operations such as motor vehicles and parts.

Local Tax Revenues

Barren County and the Commonwealth of Kentucky levy property taxes on real estate and tangible property, and the Commonwealth taxes the value of manufacturing machinery. The table provides the latest published tax rates that are applied Countywide. They total less than one percent of the assessed value of property, with about 76 percent of the revenue going to the County public school system. There are three municipal taxing jurisdictions in Barren County – Cave City, Glasgow, and Park City - but the project is outside their city boundaries and thus would not be subject to those property taxes.

Barren County Property Tax Rates, 2022

in cents per $100 valuation

Jurisdiction	Real Estate	Tangible Personal
Ambulance	2.4000	2.4000
Extension Service	1.6000	2.0300
General Fiscal Court	13.9000	15.3000
Library	2.9000	2.5400
County Public Schools	67.2000	67.4000
Total, County-wide	88.0000	89.6700

Source: Kentucky Department of Revenue

https://revenue.ky.gov/News/Publications/Property%20Tax%20Rate%20Books/Property%20Tax%20Rate%20Book%202022.pdf

Barren County does not levy a countywide occupational or net profits tax, though the cities of Cave City (2%) and Glasgow (1.75%) do[11].

The company has provided me with a property tax projection for their intended investment. Much of the capital expenditures will be for equipment classified as manufacturing machinery, which is taxed at the state level, but not locally. The value of the real estate is enhanced by two factors. The solar project will add fencing and other improvements that increase the land value; and the lease payments to the landowners greatly increase the valuation as compared to its former agricultural use. Kentucky state government is projected to receive $5.2 million over the subsequent four decades. Local jurisdictions would receive $15.1 million, of which $11.0 would go to the County school system[12]. So, local jurisdictions would receive an average of $378,000 per year under this projection.

[11] See https://barrencoea.com/taxes

[12] The ultimate net financial benefit to the schools is more complicated than this. Extra property tax revenues to the County school system would trigger a reduction in state SEEK funding to the district.

The company may pursue an Industrial Revenue Bond (IRB) for the project through Barren County Fiscal Court. Under an IRB, the County would actually own the property for the likely 30-40 year life of the bond, and thus the investment is exempt from property taxes. Under the IRB the company makes the debt service payments and the County incurs no financial risk. Moreover, the company would likely make Payments in Lieu of Taxes (PILOT) each year to partially replace the tax revenues that the County would have received.

The company also provided me with the parcel numbers of the land for the site, and I requested the 2022 tax bills from the Barren County Sheriff. There are twenty-five land parcels, currently leased at the site, covering 2,200 acres, and tax bills total taxes paid in 2022 of $16,919. This can be compared to an average of $378,000 expected to be generated by the solar project per year over four decades. It should be pointed out that solar projects like this require almost no public services from local government; and because they require so few people to operate do not add students and expenses to the County public school system.

Demographic and Economic Characteristics of Barren County		
	Barren County	**State of Kentucky**
Number of residents	*44,277*	*4,494,141*
Median age	40.3	39.0
Percent white	91.0%	85.5%
Percent of noninstitutionalized population w disability	21.2%	17.4%
Percent foreign-born	2.30%	4.00%
Percent 18 and older veteran	5.7%	7.2%
Percent living in same house as a year ago	87.8%	86.0%
High school attainment rate, population aged 25+	84.2%	87.7%
College attainment rate, population aged 25+	17.2%	25.7%
Number of Households	17,307	1,748,475
Median household income	$44,254	$55,454
Persons per household	2.56	2.57
With broadband internet subscription	83.4%	83.6%
Population 16+	*35,018*	*3,588,209*
In the labor force	55.6%	59.5%
Employed civilian	52.0%	56.0%
Unemployed	3.6%	3.1%
Armed forces	0.0%	0.4%
Not in labor force	44.4%	40.5%
Median travel time to work (minutes)	23.1	23.7
Civilian employed population 16 years and over	*18,211*	*2,009,185*
Management, business, science, and arts occupations	30.4%	35.7%
Service occupations	15.1%	15.8%
Sales and office occupations	19.6%	21.0%
Natural resources, construction, and maintenance occupations	11.2%	8.9%
Production, transportation, and material moving occupations	23.7%	18.5%
Industry		
Agriculture, forestry, fishing and hunting, and mining	3.5%	1.9%
Construction	5.8%	6.1%
Manufacturing	23.6%	14.3%
Wholesale trade	2.7%	2.4%
Retail trade	11.6%	11.9%
Transportation and warehousing, and utilities	4.6%	6.6%
Information	1.3%	1.4%
Finance and insurance, and real estate and rental and leasing	3.3%	5.6%
Professional, scientific, and mgmt, and admin and waste mgmt	6.7%	8.7%
Educational services, and health care and social assistance	20.8%	24.1%
Arts, entertainment, and recreation, and accommodation and	8.9%	8.3%
Other services, except public administration	4.6%	4.5%
Public administration	2.7%	4.3%

Source: US Census Bureau, American Community Survey, 5-year profiles, 2017-21, https://www.census.gov/acs/www/data/data-tools/data-profiles/

Visual Resource Assessment and Mitigation Plan

Wood Duck Solar Project

May 2023

Stantec

Document Information

Prepared for	Geenex Solar
Project Name	Wood Duck Solar Project Visual Resource Assessment
Project Number	237801898
Project Manager	Chad Martin
Date	May 2023

Prepared for:

Geenex Solar
1000 NC Music Factory Blvd
Suite C3
Charlotte, NC 28206

Prepared by:

Stantec, Inc.
76 San Marcos Street, Austin, Texas 78702 USA

Table of Contents

Appendices

Figures

Tables

Acronyms

AC	Alternating Current
DC	Direct Current
DSM	Digital Surface Model
GPS	Global Positioning System
LT	Landscape Type
MW	Megawatt
NHL	National Historic Landmarks
NLCD	National Land Cover Database
NRHP	National Register of Historic Places
PV	Photovoltaic
SRHP	Sate Register of Historic Places
VRA	Visual Resource Assessment
VSA	Visual Study Area
VSR	Visually Sensitive Resource

1 Introduction

1.1 Purpose of the Investigation

At the request of Wood Duck Solar Project, LLC (Wood Duck), Stantec has prepared this Visual Resource Assessment (VRA) in support of the Wood Duck Solar Project (Project) located near Glasgow, in Barren County, Kentucky (Figure 1-1).

This study has been conducted to identify and assess the Visually Sensitive Resources (VSRs), project visibility, and potential visual impacts resulting from construction of the proposed solar-powered electric generation facility.

The VRA includes the following:

> Description of the visible components of the proposed Project;

> Definition of the visual character of the Visual Study Area (VSA);

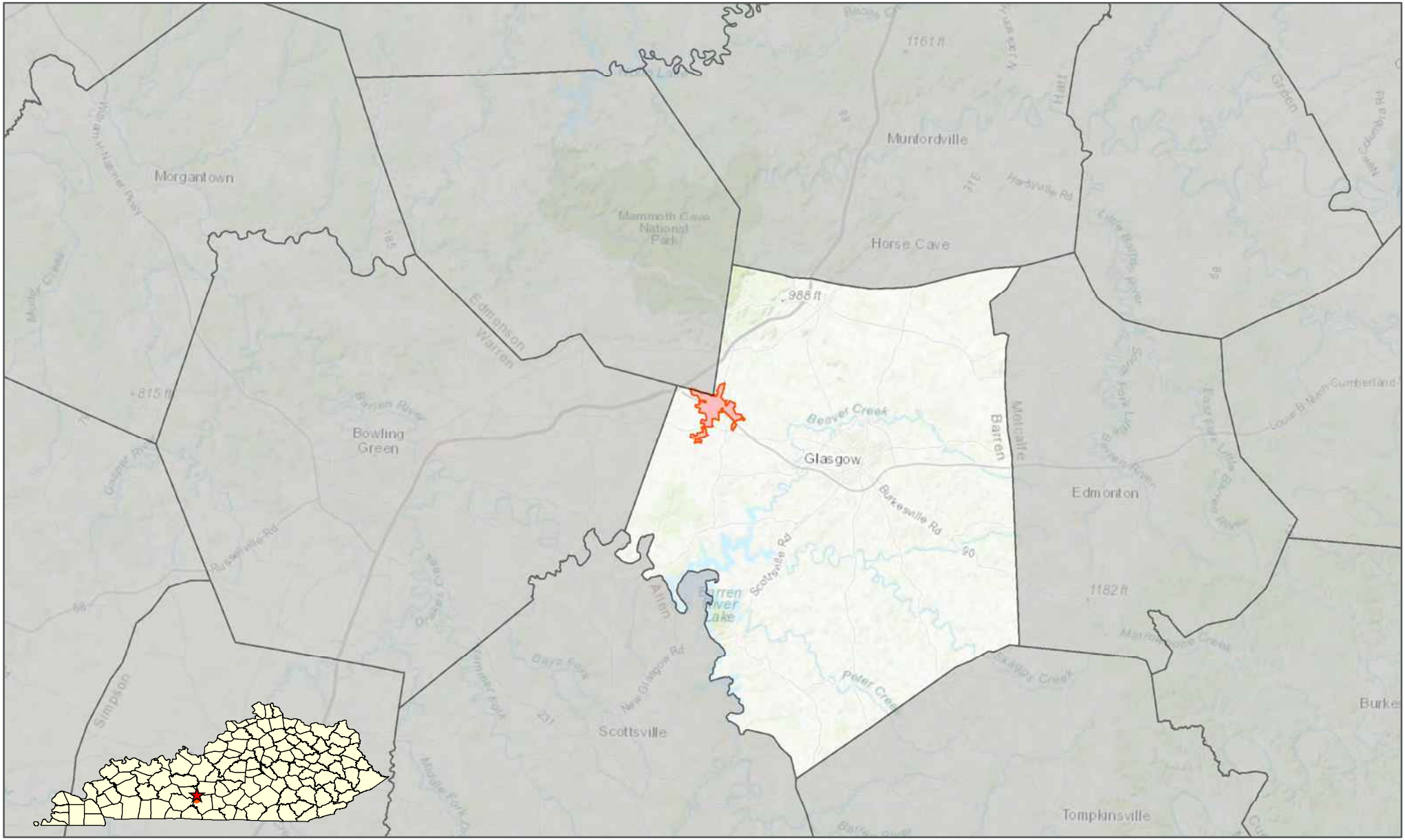
> Inventory and evaluation of the existing Visually Sensitive Resources (VSRs) within the VSA;

> Evaluation of the potential visibility of the Project within the VSA;

> Photographic simulations of the proposed Project from select locations;

> Assessment of the visual impacts associated with the Project; and

> Description of measures proposed to minimize visual impact.



7.5' Quadrangles

PLSS: unsectioned

1-1: Project Location - US Topographic

Visual Resource Assessment for the Wood Duck Energy Project
Wood Duck Solar, LLC
Barren County, Kentucky

Stantec
76 San Marcos Street, Austin, TX 78702 USA
Phone(+1) 512-306-9669
www.cardno.com

Date: 5/30/2023

File Path: U:\237801898\03_data\gis_cad\gis\1-1 - Project Location - Topo.mxd

GIS Analyst: swaltman

Basemap: Sources: Esri, HERE, Garmin, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), (c) OpenStreetMap contributors, and the GIS User Community

1.2 Project Location and Description

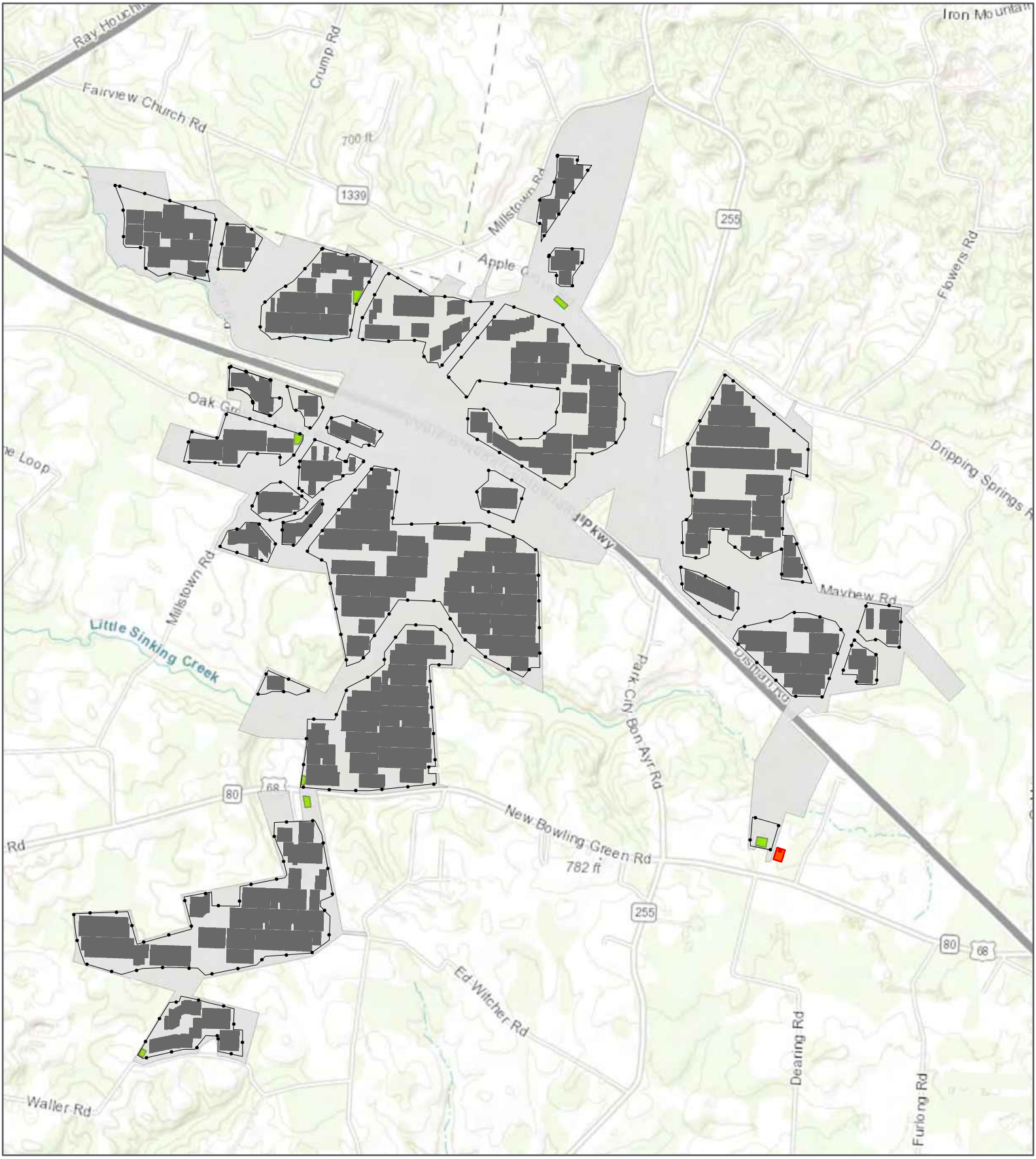
The Project is located to the immediate northeast of Glasgow, in Barren County, Kentucky. It is bisected by the Cumberland Parkway which runs northeast/southwest through the Project Area, and by Highway 68, which also runs east/west through the Project Area.

At the time of this study, the total acreage of the privately-owned parcels within which the planned Project is 1,920.3-acres (Study Area), but only 1126.7 acres are expected to be occupied by project components (Project Area). The land use within and immediately adjacent to the Project Area consists primarily of agricultural and forested land.

The proposed Project is a solar power electric generation facility with a generating capacity up to 100 megawatts (MW) alternating current (AC). The Project will include the installation of single-axis tracking solar panel arrays mounted on support piles that are driven into the ground. Additionally, a collection substation will be constructed, which will collect the generated electricity and increase the voltage for transfer to the electric transmission grid. Inverters will be installed to convert the generated electricity from direct current to alternating current, which will be transferred to the collection substation via buried collection lines. Groupings of facility infrastructure will be surrounded by fencing for safety and security. Gravel covered permanent access roads will be constructed to provide access to solar array components for the use by maintenance crews and emergency services. The preliminary locations of the proposed major Project components are illustrated in Figure 1-2.

1.2.1 Visual Study Area

Traditionally, a VRA may be prepared to evaluate the visual impacts to recreational, scenic, and historic resources from a proposed generating facility within a 10-mile radius; however, a 10-mile radius is an excessive size for a study area for this assessment due to the low profile of the proposed Project components and the results of the visibility analysis presented in this report. In order to determine a more appropriately sized study area, a viewshed analysis was conducted to better understand the Project's area of potential effect. The viewshed analysis indicated that areas of potential Project visibility do not extend beyond 5-miles, with only discrete corridors and pockets of visibility extending beyond 0.5-miles from the Project. As such, it was determined that a 5-mile radius around the Project would be a more than sufficient study area for the purposes of this assessment. The Visual Study Area (VSA) encompasses approximately 143.6 square miles and is located primarily within Barren County, The location and extent of the VSA is illustrated in Figure 1-3.



0 1 Kilometers

Project Area
Substation
Solar Panel Arrays
Laydown Areas
Fenceline

7.5' Quadrangles

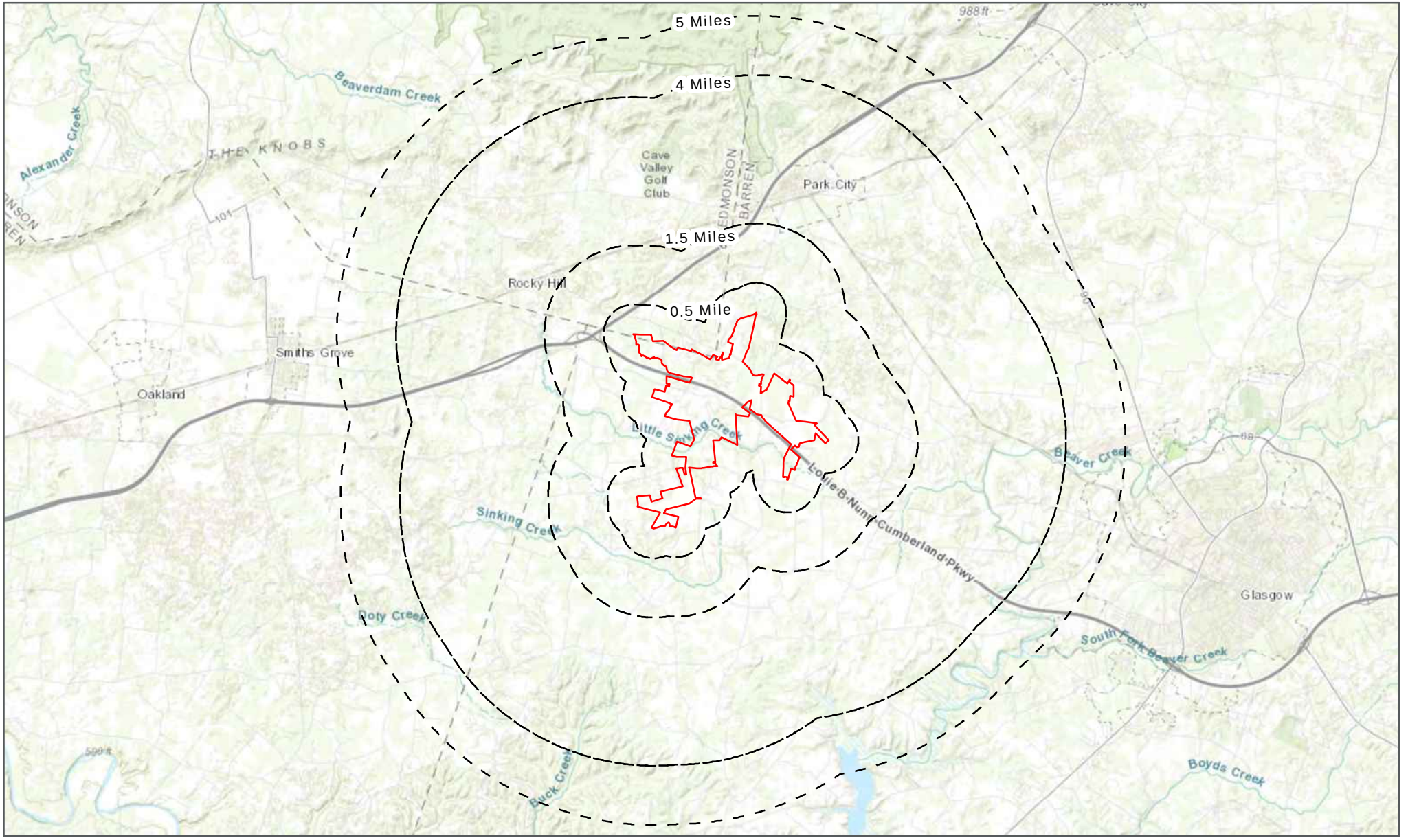
PLSS: unsectioned

1-2: Preliminary Project Layout Map

Visual Resource Assessment for the Wood Duck Energy Project
Wood Duck Solar, LLC
Barren County, Kentucky

Stantec
3901 Industrial Boulevard,
Indianapolis, IN 46254 USA
Phone (+1) 317.388.1982
Fax (+1) 317.945.6309
www.cardno.com

GIS Analyst: swaltman



0 1 2 3 4 Miles

0 2 4 6 Kilometers

Project Area

Visibility Range Rings

7.5' Quadrangles

PLSS: unsectioned

1-3 Visual Study Area

Visual Resource Assessment for the Wood Duck Energy Project
Wood Duck Solar, LLC
Barren County, Kentucky

Stantec
76 San Marcos Street, Austin, TX 78702 USA
Phone(+1) 512-306-9669
www.stantec.com

Date: 5/19/2023

File Path: \\US0571-PPFSS01\shared_projects\237801898\03_data\gis_cad\gis\1-3 - Visual Study Area.mxd

GIS Analyst: krubio

Basemap: Sources: Esri, HERE, Garmin, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), (c) OpenStreetMap contributors, and the GIS User Community

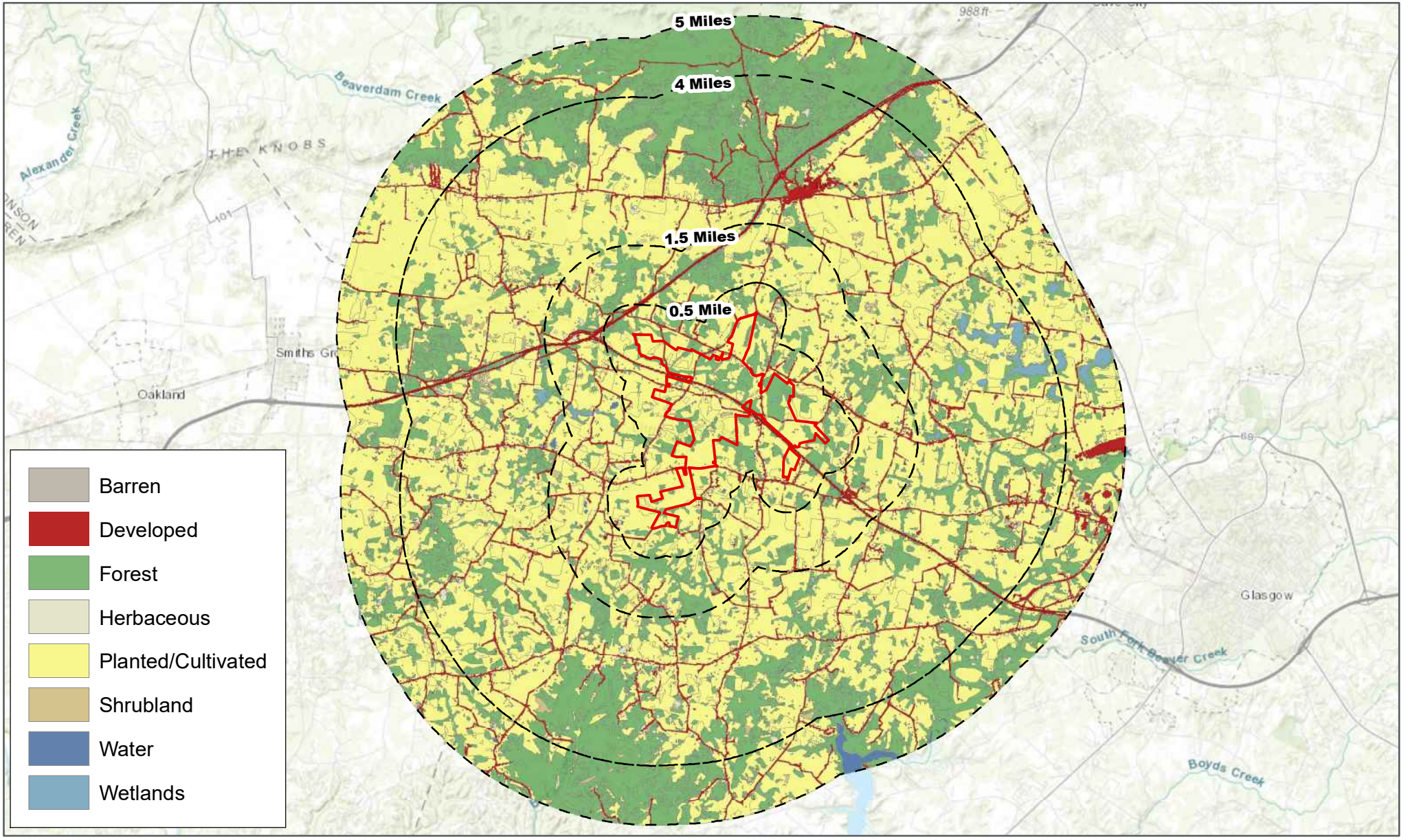
1.2.2 Landscape Character

The land use and landscape community types within the VSA are based on data provided by the Multi-Resolution Land Characteristics Consortium (MRLC) from the 2019 National Land Cover Database, amended 2019 (MRLC 2019). Understanding the landscape types (LTs) within the VSA provides the framework for analyzing the potential visual effects of the Project. These LTs were categorized based on the similarity of various features, including landform, vegetation, and/or land use patterns. The LTs defined within the VSA are presented in Table 1-1 and Figure 1-4.

Table 1-1 Landscape Types within the Visual Study Area

Landscape Type	Total Area of LT within the Visual Study Area (acres)	Total Area within the Visual Study Area (percent)
Planted/Cultivated	55,460.51	60.35%
Forest	28,725.09	31.26%
Developed	6,244.69	6.79%
Wetlands	449.49	0.49%
Shrubland	426.47	0.46%
Water	274.36	0.30%
Herbaceous	261.01	0.28%
Barren	60.49	0.07%
Grand Total	91,902.10	100.00%

The Project components are proposed to be built principally within the Planted/Cultivated LT, which makes up 60.35% of the VSA. The agricultural LT has the greatest opportunity for views of PV panels within the Project Area and vicinity due to the relatively low growing crops and lack of mature vegetation and other screening. The Forest LT makes up 31.26% of the VSA. Views within the Forest LT are typically limited due to the presence of mature trees and dense vegetation. The Developed LT makes up 6.79% of the VSA and includes Park City. The Developed LT typically provides limited outward views due to the presence of buildings and closely situated houses, landscaped yards/planted vegetation, utility poles, and other visual clutter. The Open Water and Wetlands LTs are scattered throughout the VSA and collectively make up only 0.79% of the land area. These LTs are often associated with river or stream corridors, the most notable being the tributaries of Sinking Creek and Beaver Creek, where long distance views are typically limited due to the presence of tree-lined creek banks and adjacent forested slopes.



0 1 2 3 4 Miles

0 2 4 6 Kilometers

Project Area

Visibility Range Rings

7.5' Quadrangles

PLSS: unsectioned

1-4 Landcover Types Within the Visual Study Area

Visual Resource Assessment for the Wood Duck Energy Project
Wood Duck Solar, LLC
Barren County, Kentucky

Stantec
76 San Marcos Street, Austin, TX 78702 USA
Phone(+1) 512-306-9669
www.stantec.com

Date: 5/11/2023

File Path: \\US0571-PPFSS01\shared_projects\237801898\03_data\gis_cad\gis\1-4 - Land Cover within VSA.mxd

GIS Analyst: krubio

Basemap: Sources: Esri, HERE, Garmin, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), (c) OpenStreetMap contributors, and the GIS User Community

1.2.3 Distance Zones

Distance zones are used to divide the VSA into distinct radii around the Project Area that are based on visual receptors that can be perceived by a viewer. Four distance zones have been defined, per agency protocols published by the U.S. Forest Service, Bureau of Land Management and U.S. Department of Transportation, as a guide for identifying distances from which landscape detail can be perceived by a viewer. Using appropriate adjustments associated with Kentucky's landscape types, the following distance zones have been defined for use in this VSA:

> Near-Foreground: 0 to 0.5 mile. At this distance, a viewer is able to perceive details of an object with clarity. Surface textures, small features, and the full intensity and value of color can be seen on foreground objects.

> Foreground: 0.5 to 1.5 miles. At this distance, elements in the landscape tend to retain visual distinction, but specific textures become less defined. So larger intact scale landscapes, seamless mosaics of a landscape type, will appear more as a series or a pattern instead of discrete individual landscape components.

> Middle ground: 1.5 to 4.0 miles. The middle ground is the prevalent distance at which landscapes are seen. At these distances a viewer can recognize trees and individual structures but not in great detail. This is the zone where the parts of the landscape start to merge; individual hills become a range, individual trees merge into a forest, and buildings appear as shapes. Colors will be softened and blended. Contrast in texture between landscape elements will also be decreased.

> Background: Over 4.0 miles. The background encompasses the general regional landscape within the viewshed. Within this distance zone, the landscape is simplified; little detail is visible, vegetation and non-vegetated areas are seen as blocks of color, and colors are muted by atmospheric haze. Prominent land masses or other regional features (mountains, larger bodies of water, vast tracks of open lands, etc.) and/or the skyline are often the overriding visual characteristics in the background. The background acts as the backdrop for the foreground and middle ground features, creating the basis of the regional scenic quality.

For the purpose of this assessment, the visual conditions described in these distance zones depict potential perspectives for viewers during periods of peak visual clarity, and do not account for variations in environmental factors such as atmospheric conditions, time of day, or background composition/coloration.

The landscape types defined within the distance zones of the VSA are presented in Table 1-2. As can be seen, the most significant landscape type, Planted/Cultivated, is reflective of the agricultural nature of the area. Forest is characteristic of certain areas within the VSA, with density of forested areas in each given location varying as shown on Figure 1-4. Also of note, the Developed LT only makes up an average of approximately 6.79% across all distance zones within the VSA.

Table 1-2 Distance Zones by Landscape Type

Common Name	Total Area (acres) and Percent of Landscape Type in Distance Zone			
	Near-Foreground (0 – 0.5 mile)	Foreground (0.5 – 1.5 miles)	Middle Ground (1.5 – 4.0 miles)	Background (>4.0 miles)
Planted/Cultivated	5,613.57 (68.37%)	8,337.12 (69.14%)	28,242.48 (61.13%)	13,267.34 (52.17%)
Forest	1,864.92 (22.71%)	2,711.02 (22.48%)	14,069.05 (30.45%)	10,080.10 (39.64%)
Developed	673.27 (8.20%)	889.83 (7.38%)	3,063.30 (6.63%)	1,618.29 (6.36%)
Open Water	14.30 (0.17%)	25.08 (0.21%)	56.04 (0.12%)	178.94 (0.70%)
Wetlands	5.03 (0.06%)	24.53 (0.20%)	293.12 (0.63%)	126.80 (0.50%)
Shrubland	26.11 (0.32%)	34.21 (0.28%)	285.64 (0.62%)	80.51 (0.32%)
Grasslands/herbaceous	12.06 (0.15%)	37.10 (0.31%)	155.23 (0.34%)	56.62 (0.22%)
Barren Land	0.89 (0.01%)	0.22 (0.00%)	37.63 (0.08%)	21.74 (0.09%)
Total Distance Zone Area	**8,210.15**	**12,059.11**	**46,202.50**	**25,430.35**

2 Methodology

2.1 PV Array Viewshed Analysis

Stantec conducted a viewshed analysis to assess the visibility of solar panels within the Project Area. The analysis was conducted using a digital surface model (DSM) derived from the Statewide Imagery Program's (KyFromAbove) 2021 LIDAR data for Barren County and enhanced with Esri ArcGIS® software. Because the specific layout of solar panels is in the preliminary design phase, sample points were placed approximately 400 to 1,000 feet apart along the proposed infrastructure within the Project Area boundary. The sample points were placed at a height of 9 feet to represent the maximum height of the solar panels and the analysis assumed a viewer height of 6 feet. Although the proposed substation and interconnection structures will result in some minimal visual impacts in their immediate vicinity, their location is in close proximity to an existing substation and overhead power line corridor and will comprise a footprint considerably smaller than the proposed solar panels. For these reasons, the DSM did not include these structures.

The viewshed analysis incorporated the screening effects of existing topography, structures, and vegetation within the VSA. This was accomplished by creating a DSM of the VSA from the LIDAR data, which includes the elevations of buildings, trees, and other objects large enough to be resolved by LIDAR technology. Transmission lines that were included in these LIDAR data were removed from the resulting DSM and road centerlines were buffered 50 feet to remove utility lines. LIDAR data for these narrow, vertical landscape features are removed from the DSM to avoid including artificial screening in the analysis. Additionally, vegetation within the fence line was removed, including narrow hedgerows that will be cleared during construction of the Project. This was done to simulate bare-earth elevation.

Although the viewshed analysis provides a useful representation of Project visibility, there are conditions that are not incorporated into the DSM (e.g., color, distance from viewer, and atmospheric/weather conditions). Therefore, being located within the VSA does not reflect actual visibility of the Project.

2.2 Visually Sensitive Resources

Below are the potential VSR categories that may be present within the VSA. In addition, other aesthetic resources were considered for evaluation based on the type of resource, or the prominence within the VSA. Typical VSRs include the following:

> Landmarks such as districts, sites, buildings, structures, and objects that are recognized by, registered with, or identified as eligible for registration by the national registry of natural landmarks, the state historical preservation office, or the Kentucky Department of Fish & Wildlife

> Recreation Areas that are any formally adopted land and water recreation areas, recreational trails, scenic rivers, scenic routes, or byways.

> Registered landmarks of historic, religious, archaeological, scenic, natural, or other cultural significance.

> Other public areas such as state, US, and Interstate Highways, Schools, Cities, and Villages.

2.3 Field Verification

Stantec conducted a site visit to the Project Area on April 6, 2023, to verify the results of the viewshed analysis, document characteristics of the LTs and existing visual screening, and collect photographs for use in the creation of visual simulations.

The Stantec field team drove public roads throughout the Project Area and collected photographs from 6 individual viewpoints.

2.4 Creation of Visual Simulations

Visual simulations of key components of the proposed Project were developed using a three-dimensional (3D) computer model of the proposed Project infrastructure based on specifications, dimensions, and locations provided by Wood Duck. Camera specifications and global positioning system (GPS) coordinates collected at each photo location were incorporated into the 3D model. Next, the photo was pulled into the model and the scale and perspective of the project components (e.g., fence, panels) were adjusted appropriately.

At viewpoints where vegetative screening is proposed, plantings were added to the simulations to represent conditions at the time of planting. Vegetative screening was illustrated based on the following screening applications that are planned for certain segments of the Project's perimeter. Greater detail of the module composition can be found in the separate landscaping plan prepared for the Project.

> **Module 1** –Vertical Softening (double row evergreen trees, spaced 15ft on-center): for use in areas of high viewership and visibility potential, but low stationary (residential or recreational) activity occurs. Provides the highest level of screening, for use in areas where stationary adjacent uses and non-participating viewers could be impacted by the installation of Project components.

3 Results

3.1 Viewshed Analysis

3.1.1 PV Array Viewshed Analysis

Potential visibility of the proposed Project is illustrated in Figure 3-1 and results of the analysis are summarized in Table 3-1. The results of the analysis indicate the Project will be screened from approximately 98.3% of the VSA by topography, vegetation, and physical structures.

Table 3-1 PV Array Viewshed Analysis Results

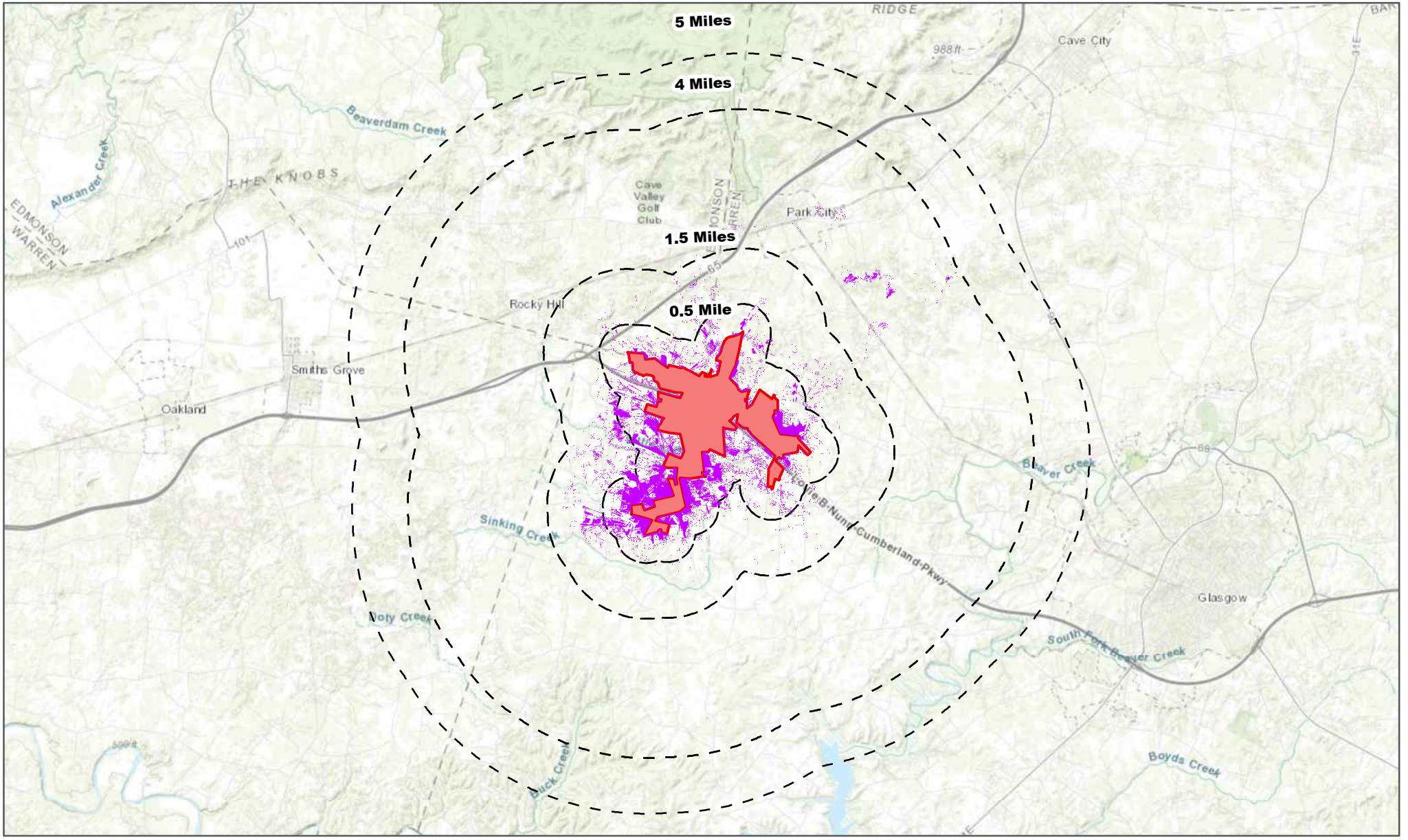
		Distance from Project			
Analysis	VSA	Near-Foreground (0 – 0.5 mile)	Foreground (0.5 – 1.5 mile)	Middle Ground (1.5 – 4.0 mile)	Background (4.0 – 5.0) mile
Total Area	143.6 mi^2	12.83 mi^2	18.84 mi^2	72.19 mi^2	39.73 mi^2
DSM Viewshed Visibility	2.47mi^2 (1.72%)	2.16 mi^2 (1.5%)	0.25 mi^2 (0.18%)	0.07 mi^2 (0.05%)	0 mi^2 (0%)

The majority of Project visibility is concentrated within the near-foreground distance zone, with 1.5% of the area out to 0.5 miles from the Project Area indicated as having potential views of some portion of the Project. Views from areas beyond the near-foreground and into the foreground distance zone (0.5 to 1.5 miles) are better screened, with 0.18% of the foreground distance zone having the potential for views of the PV arrays. The DSM viewshed analysis indicates that potential Project visibility is further reduced at distances beyond the foreground. More than 99% of the VSA is screened from view of the PV arrays in the middle ground (1.5 to 4 miles) and in the background (4 to 5 miles).

The topography and vegetation associated with hills, streams, and forested woodlots play a significant role in reducing potential PV array visibility within the VSA. Due to their establishment and orientation throughout the VSA, stream corridors and forested areas serve to concentrate areas of potential visibility in the near-foreground distance zone, on level open ground within agricultural tracts. A few additional locations of potential visibility are present in the distance zones beyond the near-foreground distance zone. These areas are discrete corridors of visibility that result from breaks in the forest vegetation combined with slight topographic elevation. Due to the limited portion of the Project that would be visible, and the distance from the Project, it is unlikely that Project visibility within these narrow corridors or elevated viewpoints would be readily noticeable to a casual viewer.

Existing structures and vegetation (i.e., small woodlots and hedgerows) are assumed to fully block views of the Project. This scenario is likely in leaf-on conditions; however, during leaf-off conditions (fall, winter), this may be conservative since sparsely vegetated areas may not actually provide screening that fully obscure views of the Project. Furthermore, although the LIDAR data used in this analysis is from 2021, any changes to structures and vegetation since its creation would not be represented in the analysis. Stantec reviewed available recent aerial photography and field-collected photos which suggest that the LIDAR data appear to accurately reflect current screening conditions within the VSA.

Figure 3-1 of the DSM viewshed analysis for a 5-mile radius depicts a viewshed that incorporates a vegetative model. This figure illustrates that visibility beyond a 0.5-mile radius will be primarily limited to discrete corridors of agricultural fields at higher elevations to the southwest and southeast. Further analysis is provided on the vegetative model below.



0 1 2 3 4 Miles

0 2 4 6 Kilometers

Viewshed

Project Area

Visibility Range Rings

7.5' Quadrangles

PLSS: unsectioned

3-1 Viewshed Analysis - PV Panel (5-mile radius)

Visual Resource Assessment for the Wood Duck Energy Project
Wood Duck Solar, LLC
Barren County, Kentucky

Stantec
76 San Marcos Street, Austin, TX 78702 USA
Phone(+1) 512-306-9669
www.stantec.com

Date: 5/19/2023

File Path: \\US0571-PPFSS01\shared_projects\237801898\03_data\gis_cad\gis\3-1 - Viewshed Analysis PV Panel_Updated.mxd

GIS Analyst: krubio

Basemap: Sources: Esri, HERE, Garmin, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), (c) OpenStreetMap contributors, and the GIS User Community

Potential PV panel visibility within the various LTs, as predicted by the DSM viewshed analysis, is summarized in Table 3-2.

Table 3-2 Landscape Types Viewshed Analysis Results Summary

Analysis	VSA	Landscape Types							
		Planted/ Cultivated	Forest	Developed	Open Water	Wetlands	Grassland/ Herbaceous	Shrubland	Barren
Total Area	143.6 mi^2	88.66 mi^2	44.88 mi^2	9.76 mi^2	0.43 mi^2	0.7 mi^2	0.41 mi^2	0.67 mi^2	0.09 mi^2
DSM Viewshed Visibility	2.47 mi^2 (1.5%)	1.93 mi^2 (1.34%)	0.27 mi^2 (0.19%)	0.27 mi^2 (0.19%)	0.0032 mi^2 (0.002%)	0.0002 mi^2 (0.0002%)	0.0004 mi^2 (0.0003%)	0.0009 mi^2 (0.0006%)	0. mi^2 (0%)

The greatest potential for visibility of the proposed solar arrays is indicated within the Planted/Cultivated LT. The DSM viewshed indicates that 1.34% of the total VSA could potentially offer views of the proposed PV panels from this LT. Visibility within the Planted/Cultivated LT is most heavily concentrated within the Project itself, and within adjacent open agricultural fields in the near-foreground distance zone.

The potential for solar array visibility within the Forested LT is indicated in approximately 0.19% of the total VSA. Visibility may occur in small breaks or clearings in the forest vegetation, but the occurrence of these areas is generally limited. Visibility within this LT occurs most frequently along the forest edges where abutting open fields provide opportunities for outward views. However, there will be little to no PV panel visibility from the majority of the forested areas, particularly during the growing season.

The potential for solar array visibility within the Developed LT is indicated in approximately 0.19% of the VSA. Visibility within this LT occurs most frequently along its edges, with limited outward views due to the presence of buildings and closely situated houses, landscaped yards/planted vegetation, utility poles, and other visual clutter.

The LTs with the least amount of potential solar array visibility are the Open Water (0.002%), Wetlands (0.0002%), Grassland/Herbaceous (0.0003%), Shrubland (0.0006%), and Barren Land (0%). Visible portions of these LTs comprise 0.0031% of the total VSA and their visibility varies considerably based on proximity to the Project, elevation, and orientation.

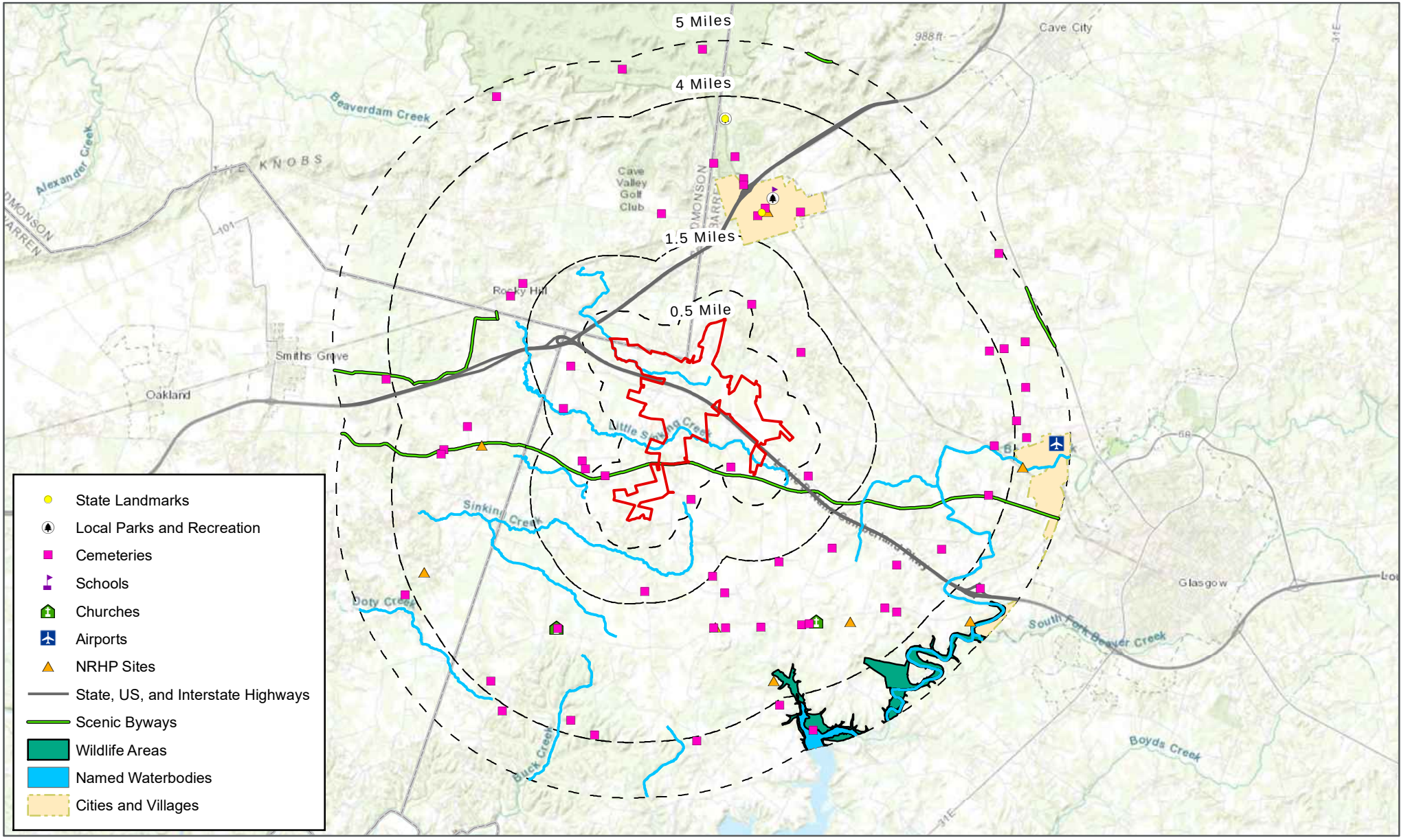
3.1.2 Visibility Results from Visually Sensitive Resources

As summarized in Table 3-3, the DSM viewshed analysis indicates that 7 of the 91 VSRs identified within the VSA (7.6%) may have some visibility of the PV arrays. The locations of mapped VSRs within the VSA are illustrated in Figure 3-2.

Table 3-3 Visually Sensitive Resources in the DSM Viewshed

Visually Sensitive Resources	Total Number of Resources within the Visual Study Area	Total Number of Resources with Visibility
Properties of Historic Significance		
National Historic Landmarks (NHL)	0	0
Sites Listed on National or State Registers of Historic Places (NRHP/SRHP)	8	0
National/State Historic Sites	0	0
Historic Bridges	0	0

Visually Sensitive Resources	Total Number of Resources within the Visual Study Area	Total Number of Resources with Visibility
Cemeteries	61	5
Kentucky Historic State Markers	2	0
Total	**71**	**5**
Designated Scenic Resources		
Rivers Designated as National or State Wild, Scenic or Recreational	0	0
Sites, Areas, Lakes, Reservoirs or Highways Designated or Eligible for Designation as Scenic ([ECL Article 49Title 1] or equivalent)	0	0
Scenic Areas of Statewide Significance [Article 42 of Executive Law]	0	0
Other Designated Scenic Resources (Easements, Roads, Districts, and Overlooks)	8	1
Total	8	**1**
Public Lands and Recreational Resources		
National Parks, Recreation Areas, Seashores, and/or Forests [16 U.S.C. 1c]	0	0
National Natural Landmarks [36 CFR Part 62]	0	0
National Wildlife Refuges [16 U.S.C. 668dd]	0	0
State Parks [Parks, Recreation and Historic Preservation Law Section 3.09]	0	0
Wildlife Areas	1	0
State Forest	0	0
Other State Lands	0	0
Designated Trails	0	0
Local Parks and Recreation Areas	2	0
Conservation Lands/Easements	0	0
Named Lakes, Ponds, and Reservoirs	1	0
Total	**4**	**0**
High-Use Public Areas		
State, US, and Interstate Highways	2	1
Cities, Villages,	2	0
Schools	1	0
Airports	1	0
Hospitals	0	0
Churches	2	0
Total	**8**	**1**
Total Number of Visually Sensitive Resources in the VSA	**91**	**7**



7.5' Quadrangles

PLSS: unsectioned

3-2: Location of Visually Sensitive Resources

Visual Resource Assessment for the Wood Duck Energy Project
Wood Duck Solar, LLC
Barren County, Kentucky

Stantec
76 San Marcos Street, Austin, TX 78702 USA
Phone(+1) 512-306-9669
www.stantec.com

Date: 5/19/2023

File Path: \\US0571-PPFSS01\shared_projects\237801898\03_data\gis_cad\gis\3-2 - Location of VSRs_Updated Working.mxd

GIS Analyst: krubio

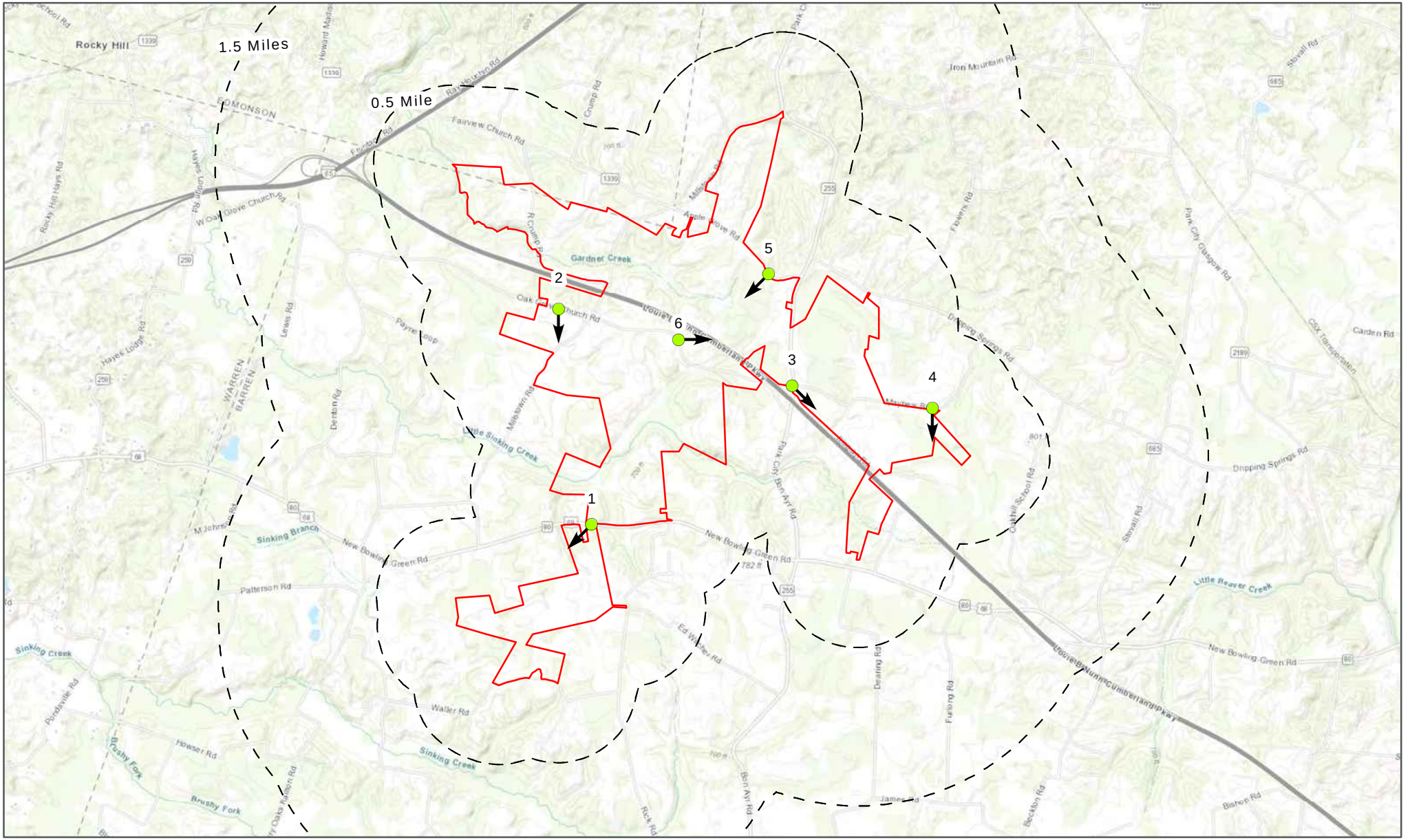
Basemap: Sources: Esri, HERE, Garmin, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), (c) OpenStreetMap contributors, and the GIS User Community

3.1.3 Field Verification Results

According to the DSM viewshed analysis, the Project will be screened from approximately 98.5% of the VSA by intervening landforms, vegetation, and structures. Field visits confirmed the results of this analysis, as Project visibility was observed to be largely restricted to areas adjacent to the Project Area where public roads are bordered by open agricultural fields. It was also confirmed during field visits that existing topography, as well as mature vegetation associated with hills, stream corridors, woodlots, and hedgerows will screen the Project from more distant portions of the VSA. Within the near-foreground (0-0.5 miles) distance zone, field review revealed that although portions of the Project are technically visible as indicated in the viewshed analysis, there is a low likelihood of discerning the proposed Project due to the level of visual blending into the background at the outer extents of this distance zone (see Figure 3-4 and Figure 3-5). During the growing season, visibility of the Project from residences and roadways may also be limited by the growth of cultivated crops in the foreground agricultural fields. The combination of relatively low panel height, along with existing hedgerows, rolling topographic relief, and the atmospheric effects of distance, will significantly limit visibility of the Project from the majority of the VSA.

3.2 Visual Simulations

Visual simulations were created to illustrate the Project from six representative locations. These visual simulations provide a time-lapse from existing conditions, to initial construction of Project components, to post-construction with the inclusion of prescribed plantings where applicable (see Appendix A). The prescribed planting simulations illustrate view at the time of initial planting and are anticipated to grow to provide a robust screen the Project Area within 5-7 years. Images and details are presented in Appendix A of all six visual simulations.



0 1 Miles
0 2 Kilometers

Project Area
Visibility Range Rings
Visual Simulation Locations

7.5' Quadrangles

PLSS: unsectioned

3-3 Visual Simulation Viewpoints Map

Visual Resource Assessment for the Wood Duck Solar Project
Wood Duck Solar, LLC
Barren County, Kentucky

Stantec
76 San Marcos Street, Austin, TX 78702 USA
Phone(+1) 512-306-9669
www.cardno.com

Date: 5/30/2023

File Path: U:\237801898\03_data\gis_cad\gis\3-3 - Visual Simulation Viewpoints Map.mxd

GIS Analyst: swaltman

Basemap: Sources: Esri, HERE, Garmin, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), (c) OpenStreetMap contributors, and the GIS User Community

4 Conclusions

4.1 Visual Resource Assessment Summary

Results of this viewshed analysis indicate that the proposed solar arrays associated with the Project will be screened from view in approximately 98.5% of the 5-mile radius VSA. Visibility is concentrated within the Project Area and adjacent open fields. The viewshed analysis also suggests that panel visibility substantially diminishes beyond the near-foreground distance zone (0.5 mile).

The viewshed analysis of the 91 identified VSRs within the VSA indicates that 7 (7.6%) have potential Project visibility. Viewshed results suggest that views from VSRs will generally be small and/or include only a limited number of Project components.

The Field visit confirmed the results of the viewshed analysis. Beyond 0.5 mile, Project visibility will be reduced due to screening provided by topography and hedgerows in combination with the low height of the solar panels. Additionally, discernibility of panels that are visible in the outer extents of the 0.5 mile range will be diminished due to visual blending with the background at these distances.

The Project will result in varying levels of visual impact when viewed from its surrounding vicinity. The Project will install structures that will alter the scenic quality and/or existing agricultural character of the landscape. However, as illustrated in the visual simulations, Project visibility and potential visual impact will diminish rapidly at greater distances. For this reason, it is anticipated that the impacts will be localized to a limited number of areas adjacent to the Project. Additionally, these impacts will likely be mitigated to some degree by the presence of seasonal crops in actively farmed fields.

4.2 Mitigation

Wood Duck Solar proposes to plant vegetation along the Project boundary at publicly viewable areas to reduce or screen views of constructed PV panels. The conceptual plan developed for this Project is based on the assumption that 100% screening is not necessary and that introduction of native vegetation in clumps and hedgerows will adequately mimic the existing plant materials observed in the vicinity of the Project Area. The visual simulations illustrate how the proposed planting module will minimize potential visual impacts created by the installation of the PV panels. Although the mitigation represented in the visual simulations is conceptual at this time, and planting composition may be adjusted, the design goals and approach will not change. Additional details can be found in the separate landscaping plan for the Project.

5 References

Multi-Resolution Land Characteristics Consortium (MRLC). 2016. National Land Cover Database. Available at: https://www.mrlc.gov/data/nlcd-2011-land-cover-conus-0. Accessed May 2023.

National Park Service (NPS). 2016. National Historic Landmarks. Accessed May 2023. Available at: https://www.nps.gov/subjects/nationalhistoriclandmarks/list-of-nhls-by-state.htm#onthisPage-35

NPS. 2018. National Natural Landmarks by State: Kentucky. Accessed May 2023. Available at: Kentucky (U.S. National Park Service) (nps.gov)

NPS. 2019. National Scenic Trails. Accessed May 2023. Available at: National Scenic Trails - National Trails System (U.S. National Park Service) (nps.gov)

KyGovMaps Open Data Portal. 2021. Accessed May 2023. Available at: https://opengisdata.ky.gov/

Kentucky Transportation Cabinet. 2021. Highway Information System GIS Extracts. Accessed May 2023. Available at: https://transportation.ky.gov/Planning/pages/his-extracts.aspx

United Sates Census Bureau (USCB). 2013. TIGER/Line Shapefile, Kentucky State. Accessed May 2023. Available at: TIGER/Line Shapefile, Current, State, Kentucky, County Subdivision - Catalog (data.gov)

United States Forest Service (USFS). 2013a. Find National Forests and Grasslands. Accessed May 2023. Available at: Forests and Grasslands | US Forest Service (usda.gov)

United States Forest Service (USFS). 2013b. Other Congressionally Designated Areas. Accessed May 2023. Available at: https://www.fs.fed.us/recreation/programs/cda/special-areas.shtml

United States Geological Survey (USGS). 2018. National Hydrography Dataset Waterbody data. The National Map. Accessed May 2023. Available at: https://viewer.nationalmap.gov/advanced-viewer/

United States Fish and Wildlife Service (USFWS). 2018. National Wildlife Refuge Locator. Accessed May 2023. Available at: Our Facilities | U.S. Fish & Wildlife Service (fws.gov)

Visual Resource Assessment and Mitigation Plan
Wood Duck Solar Project

APPENDIX A

VISUAL SIMULATIONS

Viewpoint 1| Glasgow

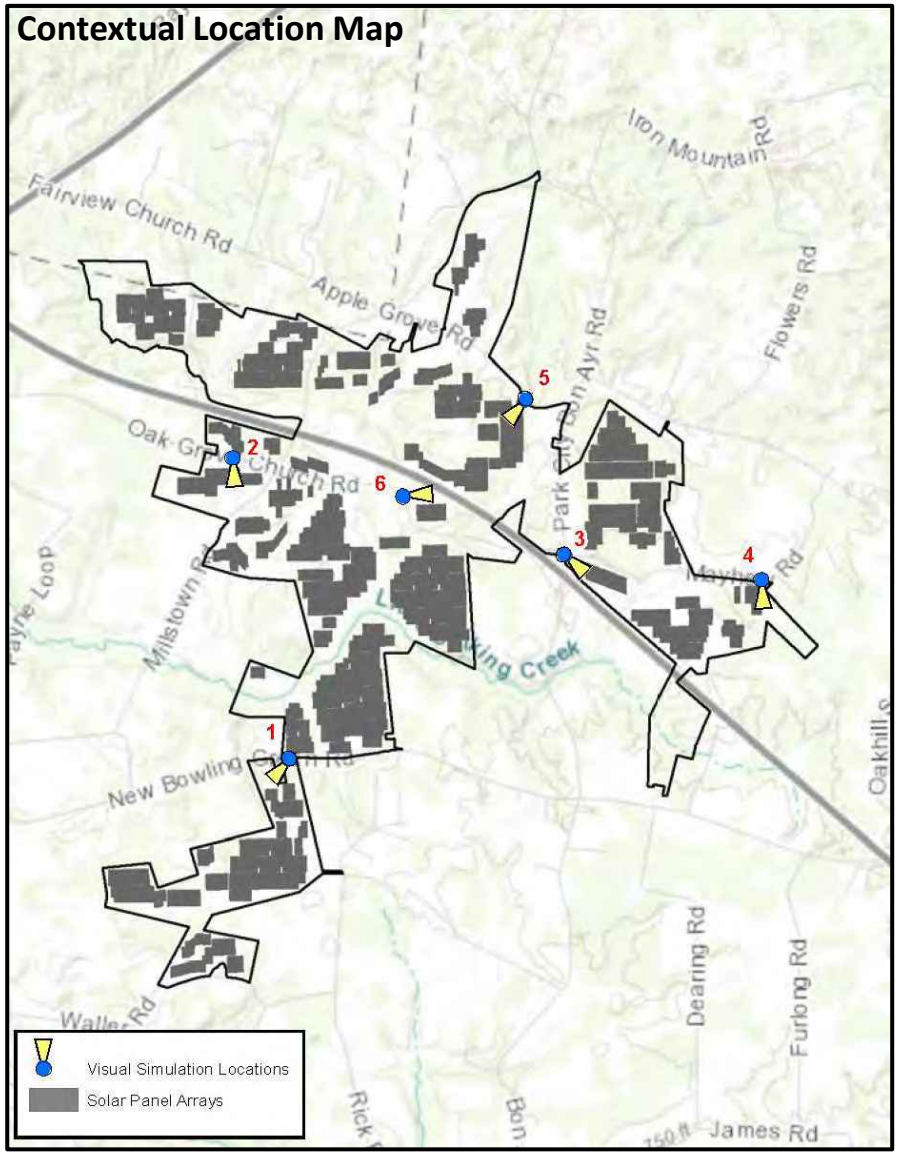
Viewpoint Information
Viewpoint ID: 1
County: Barren
City/Town: Glasgow
Location: New Bowling Green Road
Coordinates: 37.026076, -86.082623
Direction of View: South-West
Distance to Project: 0.02 mile
Distance Zone: Near-Foreground

Visual Resources
Landscape Type: Farmland
User Group: Resident

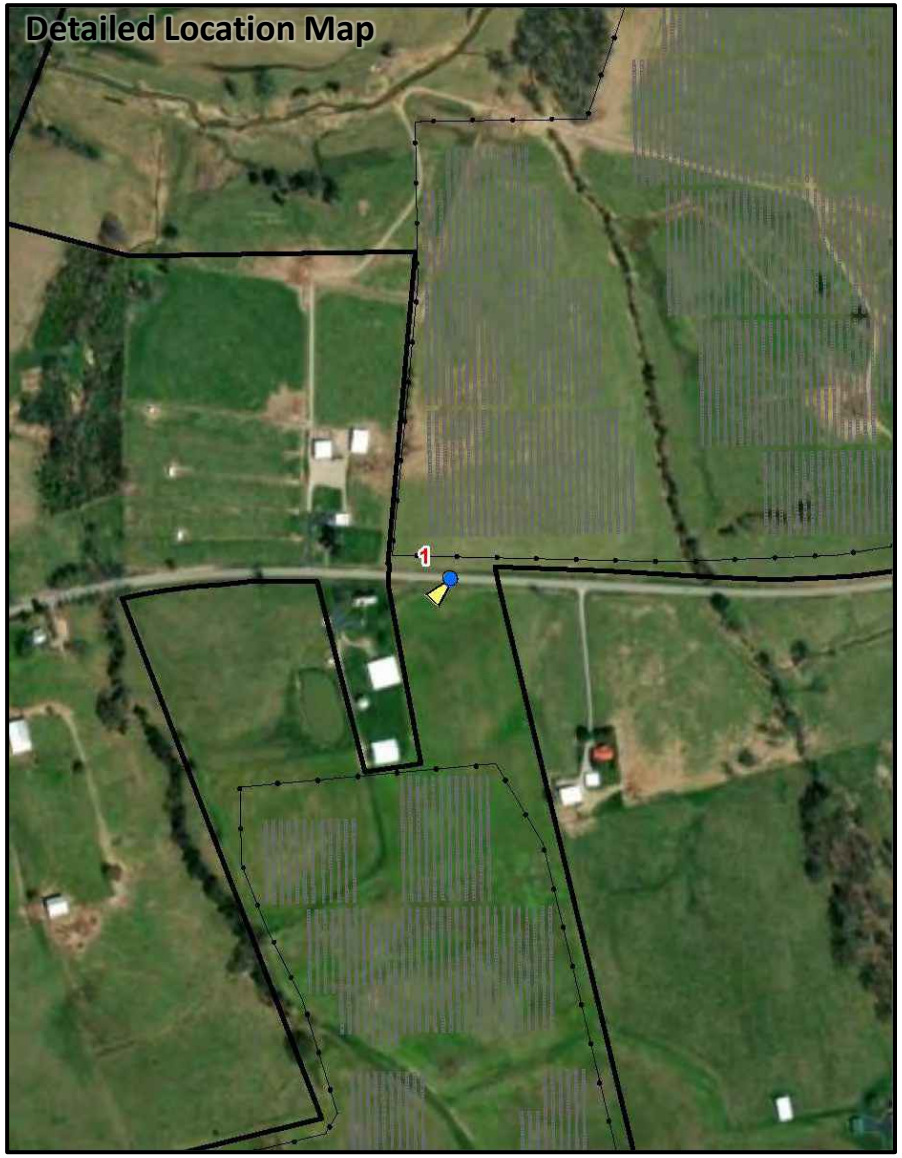
Photograph Information
Date Taken: April 6, 2023
Time: 11:56 AM
Camera: Canon EOS REBEL T5
Resolution: 5184 x 3456 pixels
Lens Focal Length: 29 mm
Camera Elevation: 5.6 feet

Project Information
Racking Type: Single Axis Tracker
Max Panel Height: 9.0 feet
Total Buildable Area: 1,126.7 acres

Contextual Location Map



Detailed Location Map



Wood Duck Solar Project

Barren County, Kentucky
Visual Resource Assessment | Appendix A, Viewpoint 1 at New Bowling Green Road – Context Sheet

Stantec

Existing Conditions

Wood Duck Solar Project

Barren County, Kentucky

Visual Resource Assessment | Appendix A, Viewpoint 1 at New Bowling Green Road – Existing Conditions

Stantec

Visual Simulation

Wood Duck Solar Project

Barren County, Kentucky

Visual Resource Assessment | Appendix A, Viewpoint 1 at New Bowling Green Road – Visual Simulation

Sheet 3 of 20

Stantec

Visual Simulation · Proposed Mitigation

Wood Duck Solar Project

Barren County, Kentucky

Visual Resource Assessment | Appendix A, Viewpoint 1 at New Bowling Green Road – Proposed Mitigation

Sheet 4 of 20

Stantec

Viewpoint 2| Glasgow

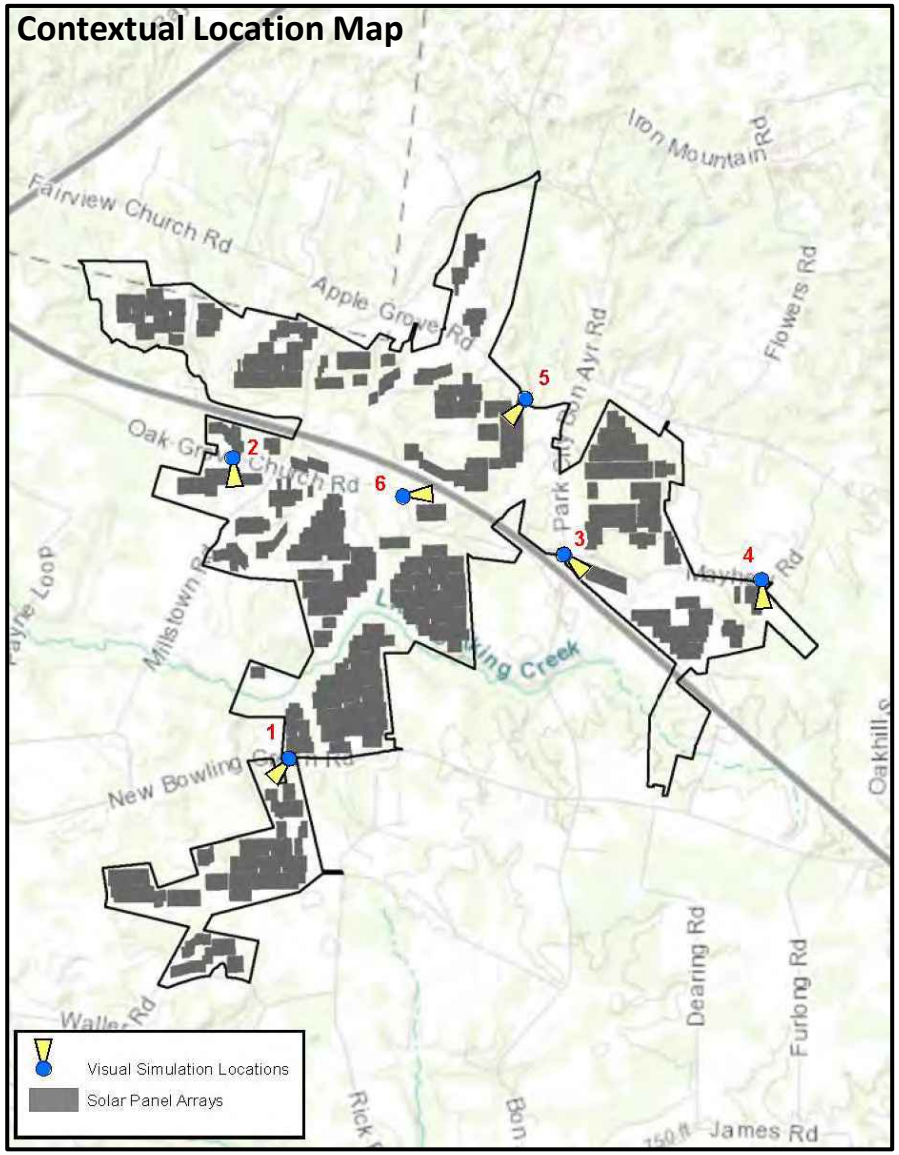
Viewpoint Information
Viewpoint ID: 2
County: Barren
City/Town: Glasgow
Location: Oak Grove Church Road
Coordinates: 37.045778, -86.086901
Direction of View: South
Distance to Project: 0.05 mile
Distance Zone: Near-Foreground

Visual Resources
Landscape Type: Farmland
User Group: Resident

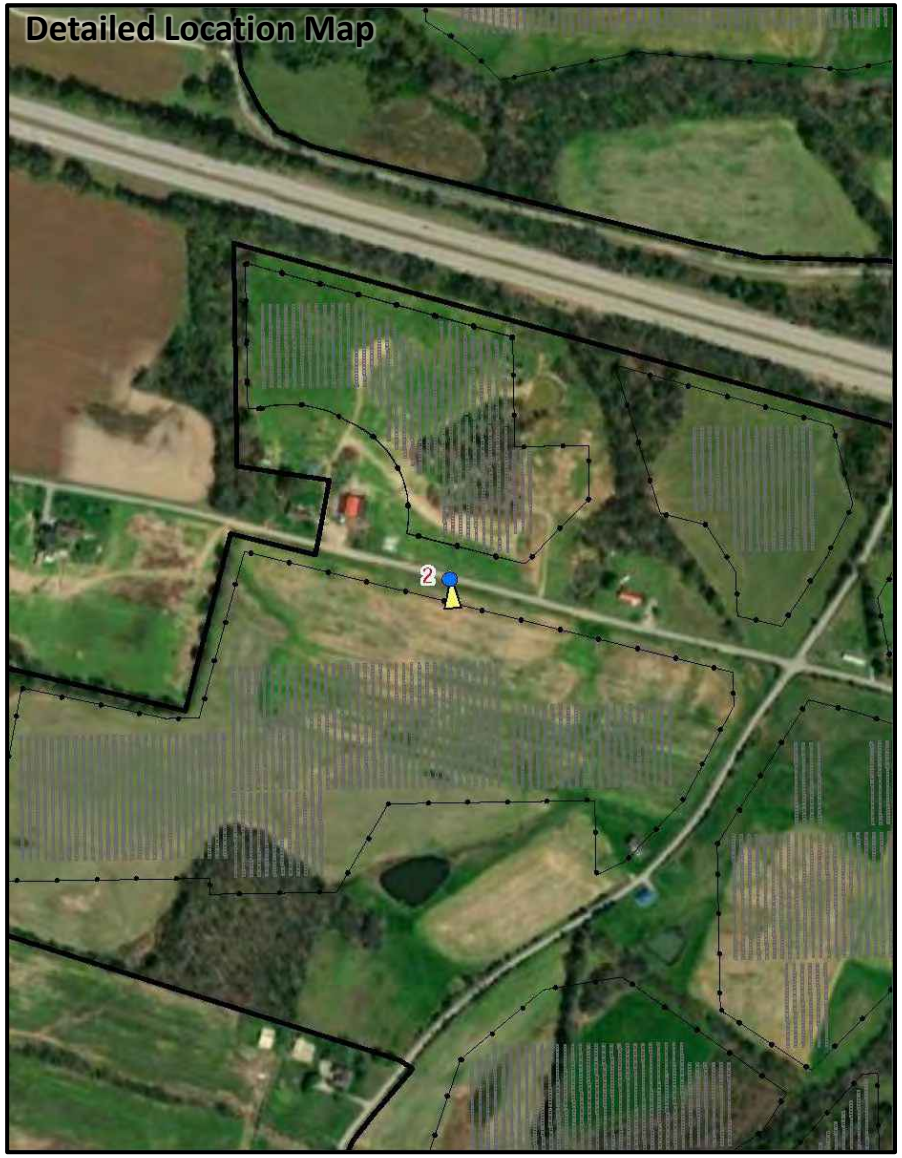
Photograph Information
Date Taken: April 6, 2023
Time: 10:37 AM
Camera: Canon EOS REBEL T5
Resolution: 5184 x 3456 pixels
Lens Focal Length: 29 mm
Camera Elevation: 5.6 feet

Project Information
Racking Type: Single Axis Tracker
Max Panel Height: 9.0 feet
Total Buildable Area: 1,126.7 acres

Contextual Location Map



Detailed Location Map



Wood Duck Solar Project

Barren County, Kentucky
Visual Resource Assessment | Appendix A, Viewpoint 2 at Oak Grove Church Road – Context Sheet
Sheet 5 of 20

Stantec

Wood Duck Solar Project

Barren County, Kentucky

Visual Resource Assessment | Appendix A, Viewpoint 2 at Oak Grove Church Road – Existing Conditions

Stantec

Wood Duck Solar Project

Barren County, Kentucky

Visual Resource Assessment | Appendix A, Viewpoint 2 at Oak Grove Church Road – Visual Simulation

Sheet 7 of 20

Stantec

Viewpoint 3| Glasgow

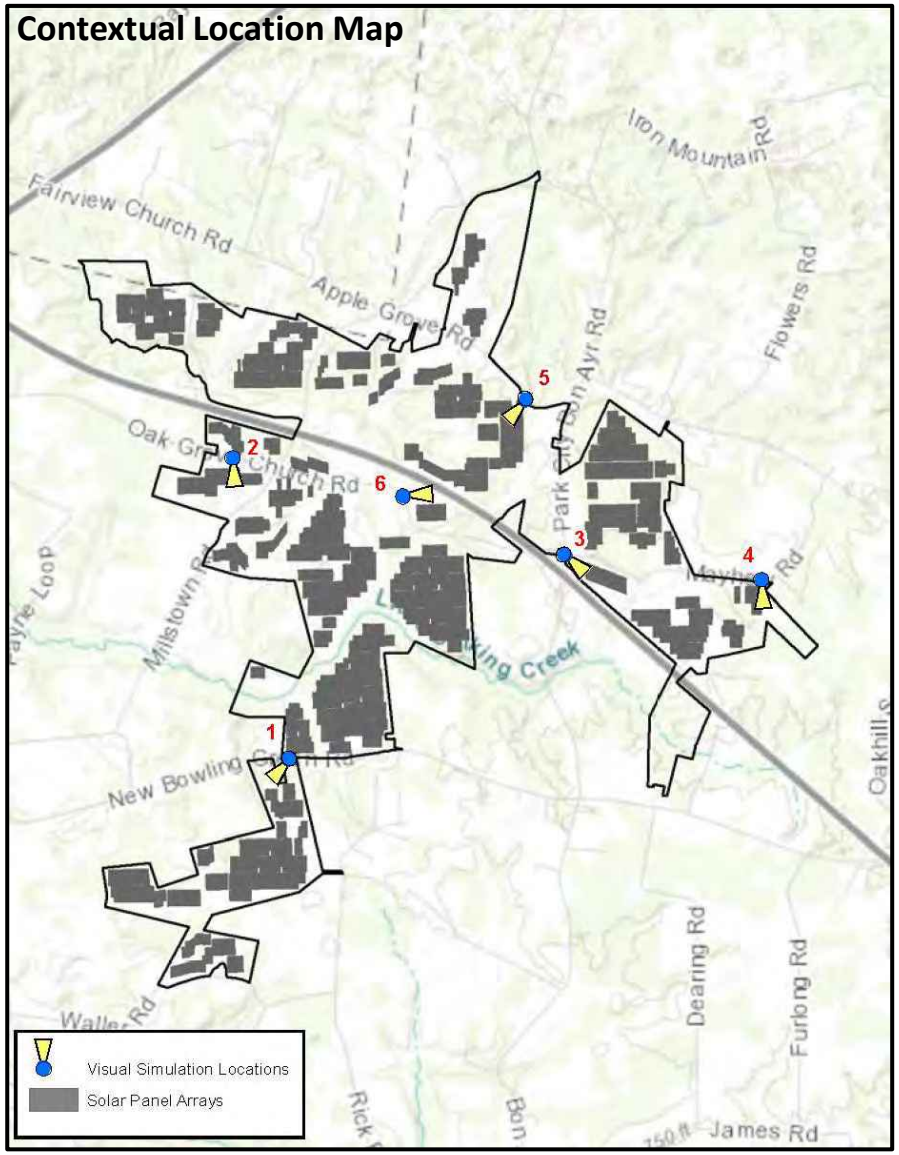
Viewpoint Information
Viewpoint ID: 3
County: Barren
City/Town: Glasgow
Location: Park City-Bon Ayr Road
Coordinates: 37.039196, -86.060045
Direction of View: South-East
Distance to Project: 0.10 mile
Distance Zone: Near-Foreground

Visual Resources
Landscape Type: Farmland
User Group: Resident

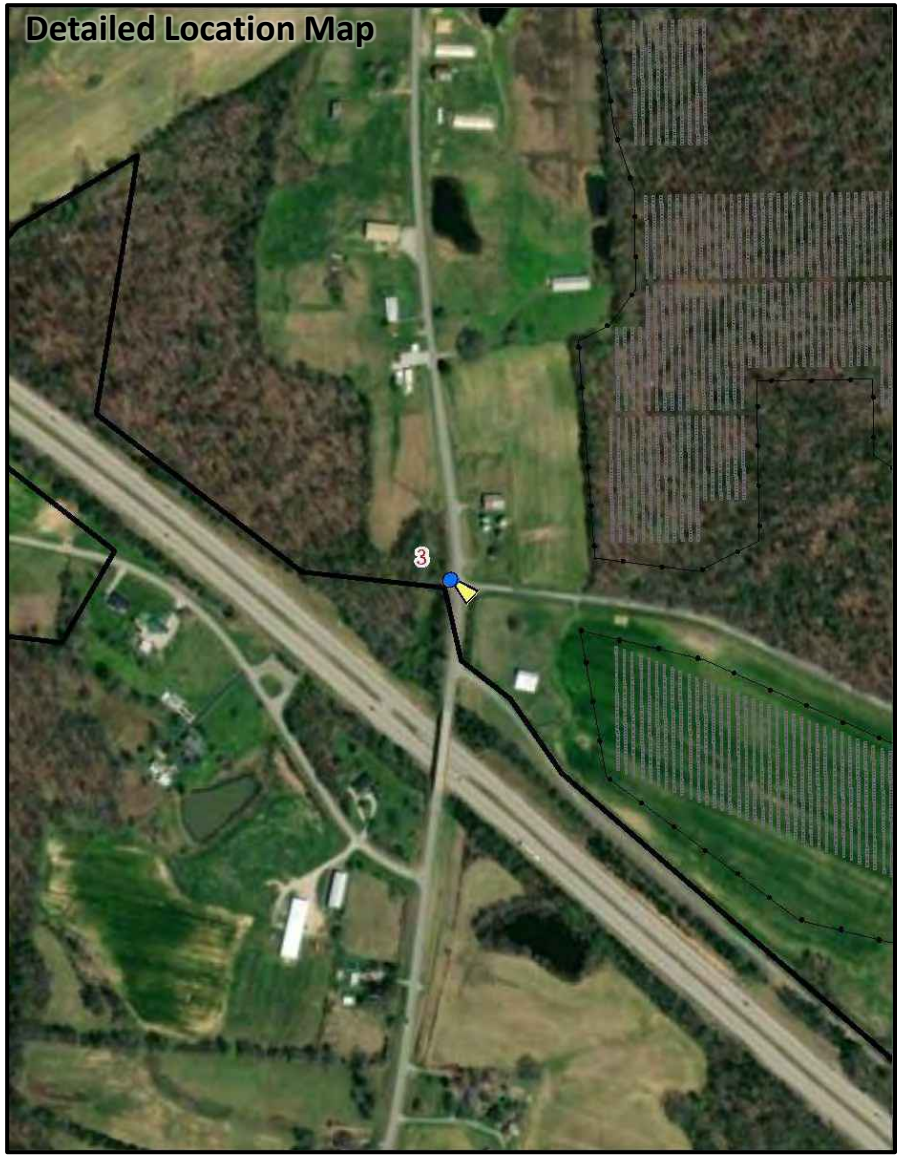
Photograph Information
Date Taken: April 6, 2023
Time: 11:13 AM
Camera: Canon EOS REBEL T5
Resolution: 5184 x 3456 pixels
Lens Focal Length: 29 mm
Camera Elevation: 5.6 feet

Project Information
Racking Type: Single Axis Tracker
Max Panel Height: 9.0 feet
Total Buildable Area: 1,126.7 acres

Contextual Location Map



Detailed Location Map



Wood Duck Solar Project

Barren County, Kentucky
Visual Resource Assessment | Appendix A, Viewpoint 3 at Park City-Bon Ayr Road – Context Sheet

Stantec

Wood Duck Solar Project

Barren County, Kentucky

Visual Resource Assessment | Appendix A, Viewpoint 3 at Park City-Bon Ayr Road – Existing Conditions

Stantec

Wood Duck Solar Project

Barren County, Kentucky

Visual Resource Assessment | Appendix A, Viewpoint 3 at Park City-Bon Ayr Road – Visual Simulation

Stantec

Viewpoint 4| Glasgow

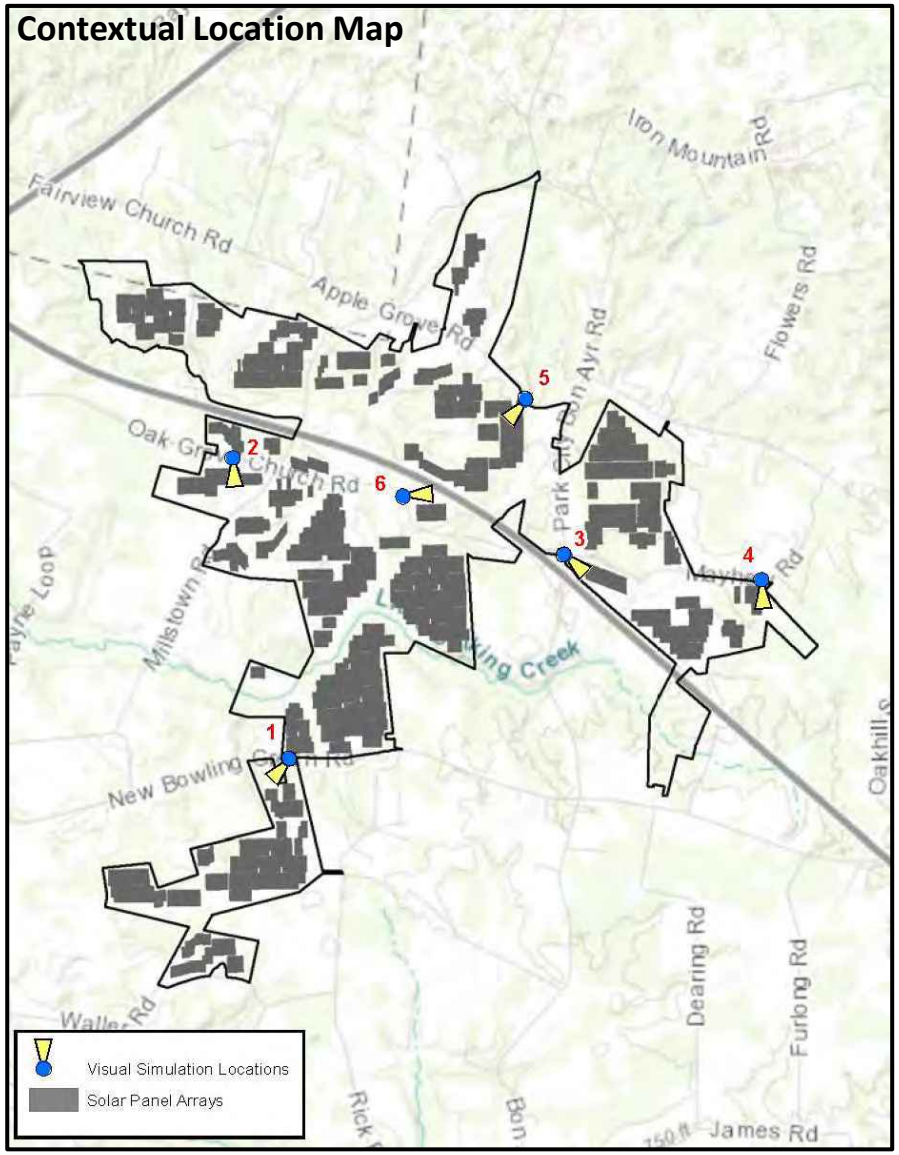
Viewpoint Information
Viewpoint ID: 4
County: Barren
City/Town: Glasgow
Location: Mayhew Road
Coordinates: 37.037369, -86.043998
Direction of View: South
Distance to Project: 0.03 mile
Distance Zone: Near-Foreground

Visual Resources
Landscape Type: Farmland
User Group: Resident

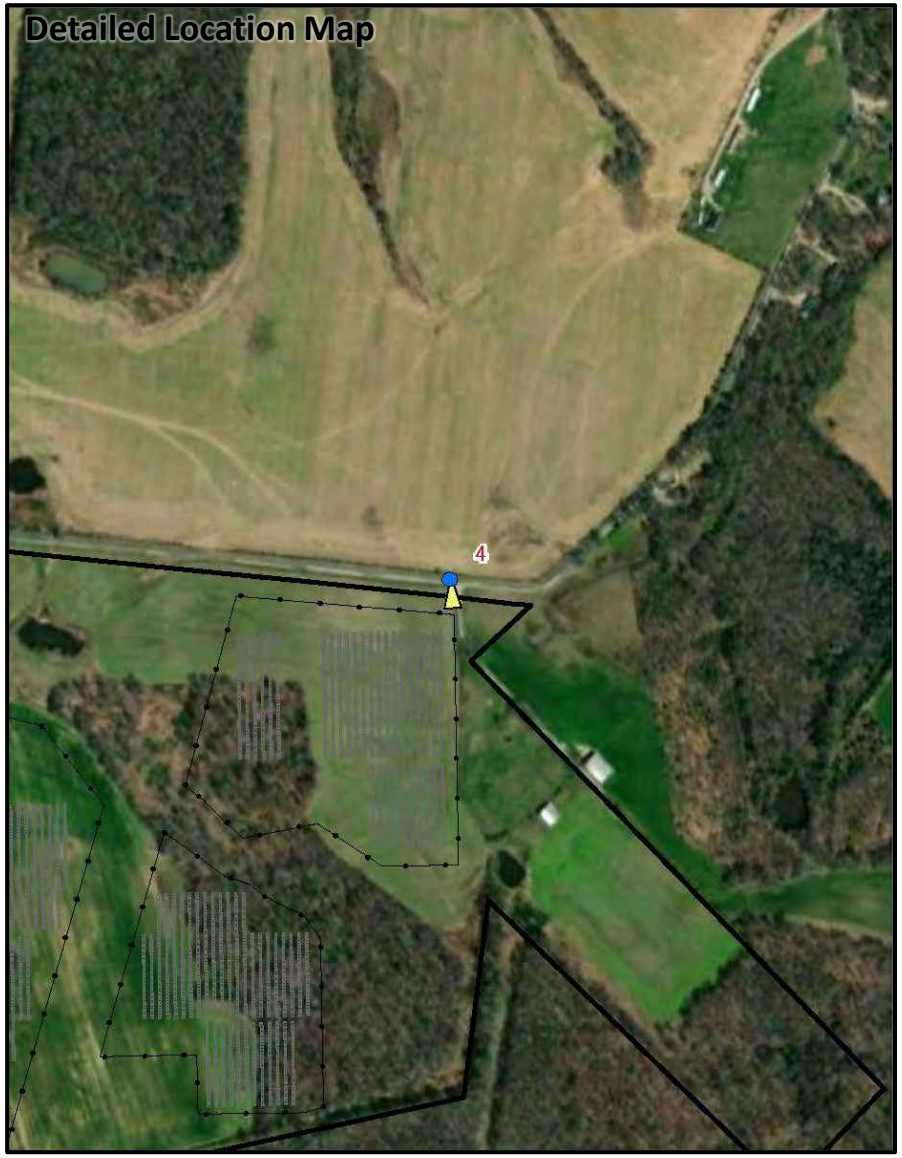
Photograph Information
Date Taken: April 6, 2023
Time: 11:24 AM
Camera: Canon EOS REBEL T5
Resolution: 5184 x 3456 pixels
Lens Focal Length: 29 mm
Camera Elevation: 5.6 feet

Project Information
Racking Type: Single Axis Tracker
Max Panel Height: 9.0 feet
Total Buildable Area: 1,126.7 acres

Contextual Location Map



Detailed Location Map



Wood Duck Solar Project

Barren County, Kentucky
Visual Resource Assessment | Appendix A, Viewpoint 4 at Mayhew Road – Context Sheet

Stantec

Wood Duck Solar Project
Barren County, Kentucky
Visual Resource Assessment | Appendix A, Viewpoint 4 at Mayhew Road – Existing Conditions
Sheet 12 of 20

Stantec

Wood Duck Solar Project

Barren County, Kentucky

Visual Resource Assessment | Appendix A, Viewpoint 4 at Mayhew Road – Visual Simulation

Stantec

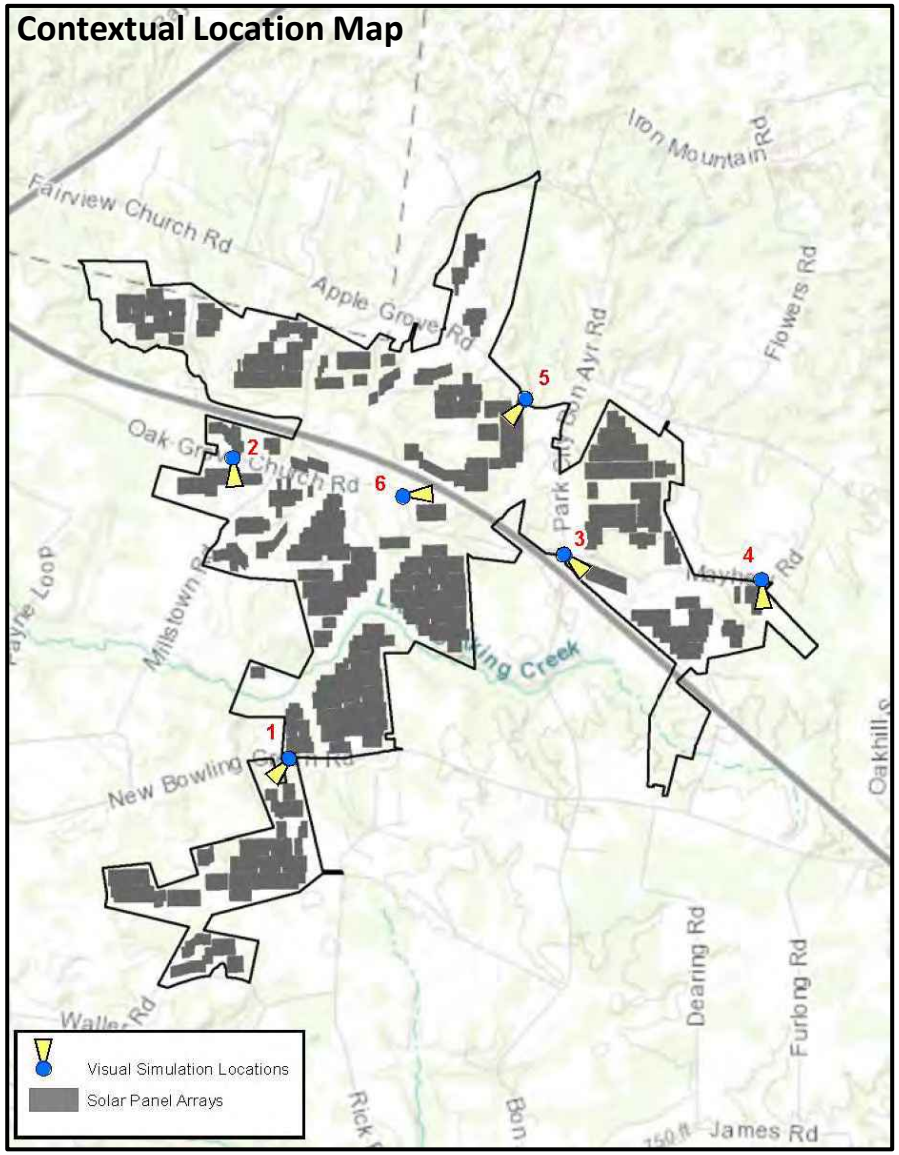
Viewpoint 5| Glasgow

Viewpoint Information
Viewpoint ID: 5
County: Barren
City/Town: Glasgow
Location: Apple Grove Road
Coordinates: 37.049345, -86.062965
Direction of View: South-West
Distance to Project: 0.02 mile
Distance Zone: Near-Foreground

Visual Resources
Landscape Type: Farmland
User Group: Resident

Photograph Information
Date Taken: April 6, 2023
Time: 11:04 AM
Camera: Canon EOS REBEL T5
Resolution: 5184 x 3456 pixels
Lens Focal Length: 29 mm
Camera Elevation: 5.6 feet

Project Information
Racking Type: Single Axis Tracker
Max Panel Height: 9.0 feet
Total Buildable Area: 1,126.7 acres



Wood Duck Solar Project

Barren County, Kentucky
Visual Resource Assessment | Appendix A, Viewpoint 5 at Apple Grove Road – Context Sheet

Stantec

Wood Duck Solar Project

Barren County, Kentucky

Visual Resource Assessment | Appendix A, Viewpoint 5 at Apple Grove Road – Existing Conditions

Stantec

Wood Duck Solar Project

Barren County, Kentucky

Visual Resource Assessment | Appendix A, Viewpoint 5 at Apple Grove Road – Visual Simulation

Stantec

Visual Simulation · Proposed Mitigation

Wood Duck Solar Project

Barren County, Kentucky

Visual Resource Assessment | Appendix A, Viewpoint 5 at Apple Grove Road – Proposed Mitigation

Stantec

Viewpoint 6| Glasgow

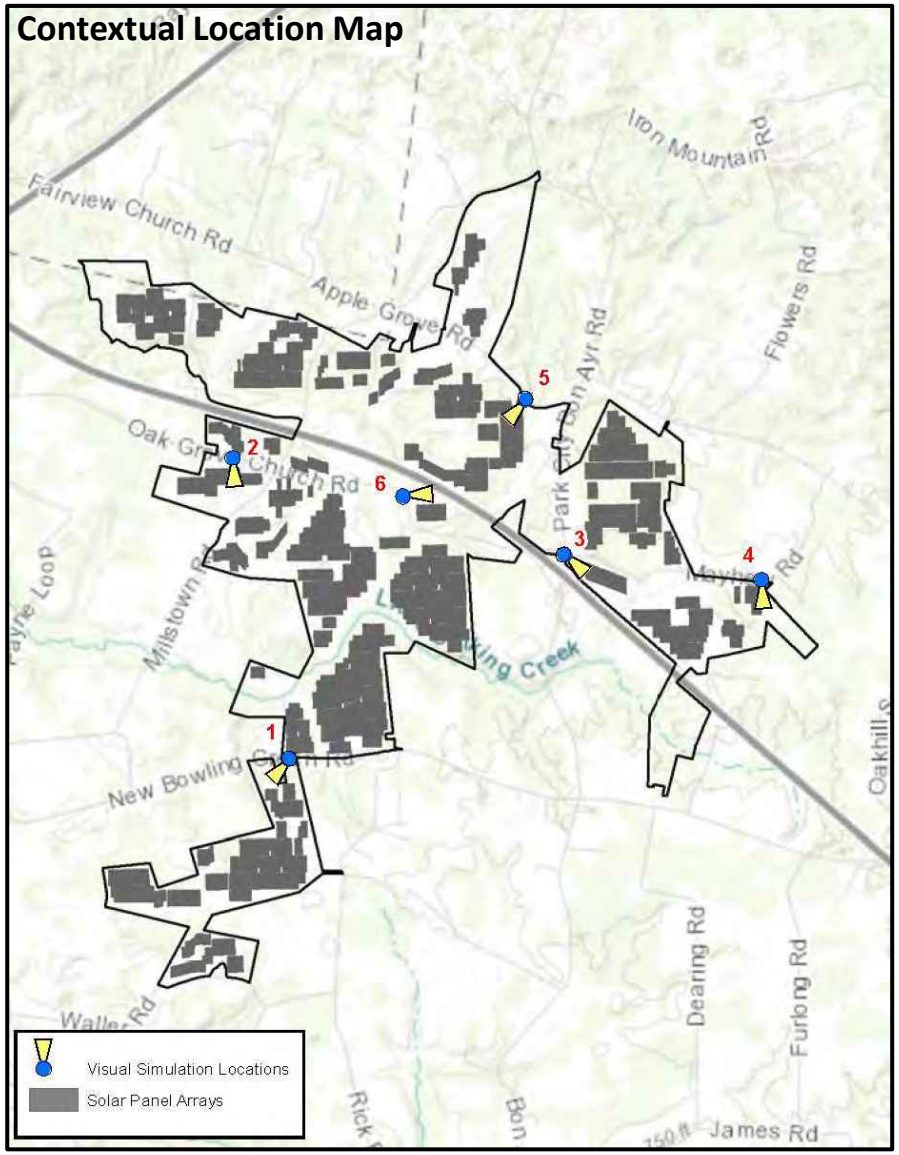
Viewpoint Information
Viewpoint ID: 6
County: Barren
City/Town: Glasgow
Location: Oak Grove Church Road
Coordinates: 37.043159, -86.073135
Direction of View: East
Distance to Project: 0.08 mile
Distance Zone: Near-Foreground

Visual Resources
Landscape Type: Farmland
User Group: Resident

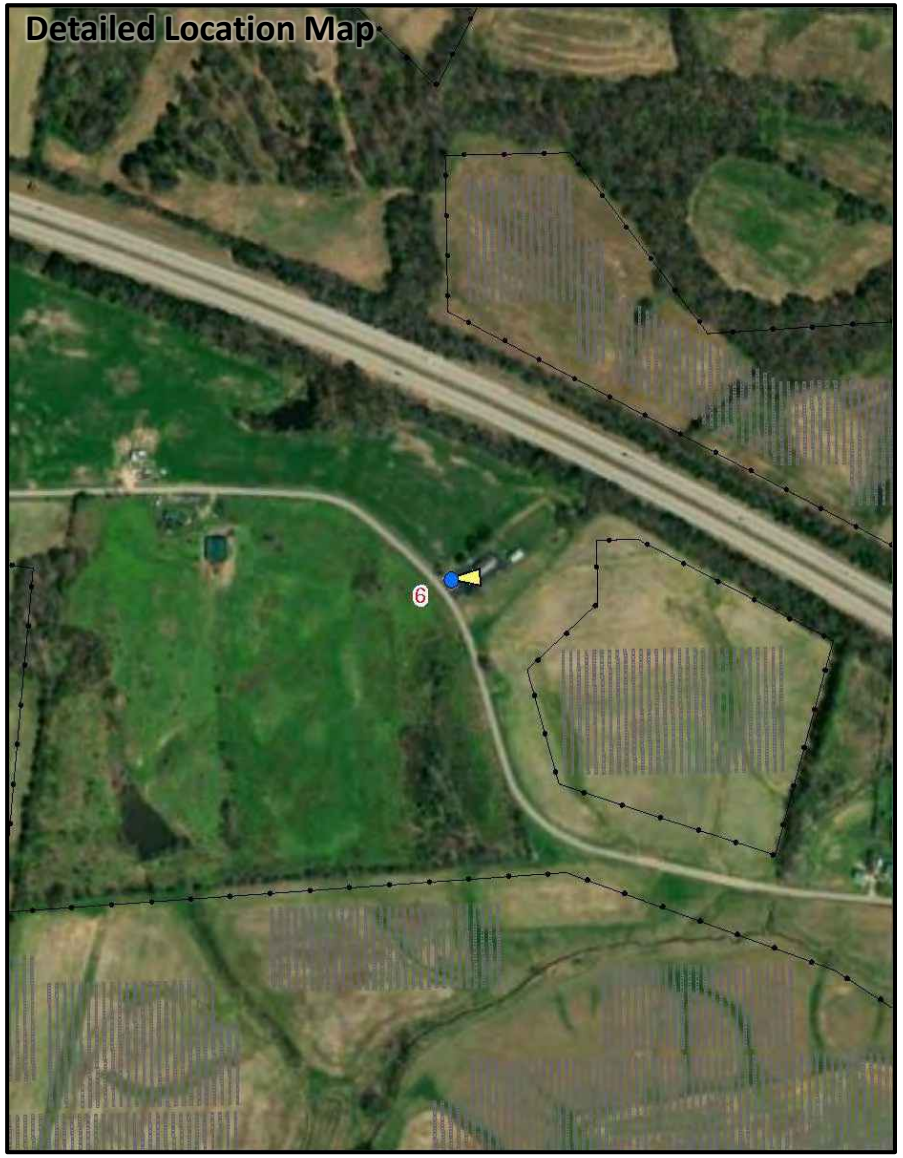
Photograph Information
Date Taken: April 6, 2023
Time: 10:16 AM
Camera: Canon EOS REBEL T5
Resolution: 5184 x 3456 pixels
Lens Focal Length: 29 mm
Camera Elevation: 5.6 feet

Project Information
Racking Type: Single Axis Tracker
Max Panel Height: 9.0 feet
Total Buildable Area: 1,126.7 acres

Contextual Location Map



Detailed Location Map



Wood Duck Solar Project

Barren County, Kentucky
Visual Resource Assessment | Appendix A, Viewpoint 6 at Oak Grove Church Road – Context Sheet

Stantec

Wood Duck Solar Project

Barren County, Kentucky

Visual Resource Assessment | Appendix A, Viewpoint 6 at Oak Grove Church Road – Existing Conditions

Stantec

Wood Duck Solar Project

Barren County, Kentucky

Visual Resource Assessment | Appendix A, Viewpoint 6 at Oak Grove Church Road – Visual Simulation

Stantec

Visual Resource Assessment and
Mitigation Plan
Wood Duck Solar Project

APPENDIX

B

VISUALLY SENSITIVE RESOURCE ANALYSIS

Visually Sensitive Resources	Location	Distance	Project Visibility (Viewshed Results)
	County	Miles from Nearest PV Array	+ Visible - Not Visible +/- Partially Visible
			DSM Viewshed (Topography, Structures, Vegetation)
Properties of Historic Significance			
National Historic LandMarks (NHL)			
None within VSA.			
Sites Listed on National or State Registers of Historic Places (NRHP/SRHP)			
Edmunds, Charles Penn, House	Barren	3.17	-
Gullian Gerig's Mill	Barren	4.18	-
Hays, James, House	Warren	2.51	-
Joggers, J. C., House	Warren	3.66	-
Mayfield, John, House	Barren	4.60	-
Octagon Cottage	Barren	3.67	-
Old Zion Methodist Church	Barren	2.27	-
Renfro Hotel	Barren	2.06	-
National/State Historic Sites			
None within VSA.			
Historic Bridges			
None within VSA.			
OGS Cemeteries			
Alexander Cemetery	Barren	1.89	-
Allen - Church - Steffey Cemetery	Edmonson	4.04	-
Allen - Sears Cemetery	Barren	0.72	-
Allen Cemetery Number 4	Barren	4.21	-
Allen Cemetery Number 5	Barren	1.53	-
Barber Cemetery	Barren	4.29	-
Barrick Cemetery	Barren	1.29	-
Beech Grove Church Cemetery	Barren	3.35	-
Bell Cemetery	Barren	1.94	-
Bon Ayr Methodist Church Cemetery	Barren	0.34	-
Bowles Cemetery Number 1	Barren	2.76	-
Bridges Cemetery	Barren	2.95	-
Buck Creek Cemetery	Barren	3.75	-
Chapmans Cemetery	Barren	4.53	-
Clack - Emmitt Cemetery	Barren	4.13	-
Clayton Family Cemetery	Edmonson	2.17	-
Cliburn Family Cemetery	Warren	3.14	-
Davidson Cemetery Number 1	Barren	4.73	-
Davidson Cemetery Number 2	Barren	4.09	-
Denton Cemetery	Barren	0.30	+/-
Duval Cemetery Number 1	Barren	2.84	-
Duval Cemetery Number 2	Barren	1.63	-
Edmunds Cemetery	Barren	2.38	-
Evergreen Cemetery	Barren	2.34	-
France Cemetery	Edmonson	4.85	-
Gray - Barrick Cemetery	Barren	0.34	+/-
Green Meadows Church Cemetery	Warren	3.17	-
Harlow Cemetery Number 4	Barren	4.93	-
Hayden Cemetery	Barren	2.42	-
Hays Cemetery	Warren	2.87	-
Heavenly Hills Cemetery	Barren	2.79	-
Hervey Edwards Cemetery	Barren	1.68	-
Hester Burial Ground	Barren	1.85	-
Hodge Cemetery	Barren	0.77	+/-
John B Bishop Cemetery	Barren	0.96	+/-
Keith's Cemetery	Edmonson	4.82	-
Lessenberry Cemetery	Barren	3.35	-
Littrell Cemetery	Barren	3.80	-
Locust Grove Cemetery	Edmonson	4.86	-

Visually Sensitive Resources	Location	Distance	Project Visibility (Viewshed Results)
	County	Miles from Nearest PV Array	+ Visible - Not Visible +/- Partially Visible
			DSM Viewshed (Topography, Structures, Vegetation)
Martin - Foster Cemetery	Barren	3.68	-
Merry Oaks Cemetery	Barren	0.64	+/-
Oak Grove United Methodist Church Cemetery	Barren	0.82	-
Old Littrell Cemetery	Barren	4.11	-
Old Zion Methodist Church Cemetery	Barren	2.27	-
Original Old Zion Cemetery	Barren	3.92	-
Park City Town Hall	Barren	2.11	-
Parrish Cemetery Number 1	Barren	4.34	-
Pleasant Grove Cemetery	Warren	4.13	-
Rocky Hill Baptist Church Cemetery	Edmonson	4.08	-
Rocky Hill Cemetery	Edmonson	1.94	-
Shiloh General Baptist Cemetery	Barren	2.32	-
Sinking Creek Baptist Church Cemetery	Barren	1.16	-
Staples Cemetery	Barren	3.63	-
Staples Cemetery	Barren	3.87	-
Steffey Cemetery Number 2	Barren	3.56	-
Stoney Point Baptist Church Cemetery	Warren	4.10	-
Walnut Hill Cemetery	Barren	0.54	-
Whitlow Cemetery	Barren	2.91	-
William P Edmunds Cemetery	Barren	2.87	-
Winlock Cemetery	Barren	1.93	-
Zion Hill Missionary Baptist Church Cemetery	Barren	2.53	-
Kentucky Historic State Markers			
Bell's Tavern State Landmark	Barren	2.16	-
Diamond Caverns State Landmark	Barren	3.67	-
Designated Scenic Resources			
Rivers Designated as National or State Wild, Scenic or Recreational			
None within VSA.			
Other Designated Scenic Resources (Easements, Roads, Districts, and Overlooks)			
Glasgow Road	Warren	1.75	-
Happy Valley Road/Street	Barren	4.93	-
Hays Lodge Road	Warren	2.06	-
Hays-Smith Grove Road	Warren	3.62	-
Mammoth Cave Road	Barren	4.97	-
New Bowling Green Road/Street	Barren	0.00	+
New Glasgow Road/Street	Barren	5.00	-
Rocky Hill-Hays Road	Warren	2.06	-
Sites, Areas, Lakes, Reservoirs or Highways Designated or Eligible for Designation as Scenic ([ECL Article 49 Title 1] or equivalent)			
None within VSA.			
Public Lands and Recreational Resources			
National Parks, Recreation Areas, Seashores, and/or Forests [16U.S.C. 1c]			
None within VSA.			
National Natural LandMarks [36 CFR Part 62]			
None within VSA.			
National Wildlife Refuges [16 U.S.C. 668dd]			
None within VSA.			
Heritage Areas [Parks, Recreation and Historic Preservation Law Section 35.15]			
None within VSA.			
State Parks [Parks, Recreation and Historic Preservation Law Section 3.09]			
None within VSA.			
State Nature and Historic Preserve Areas [Section 4 of Article XIV of the State Constitution]			
None within VSA.			
Wildlife Areas			
Barren River Lake WMA	Barren	3.66	-
State Forest			

Visually Sensitive Resources	Location	Distance	Project Visibility (Viewshed Results)
	County	Miles from Nearest PV Array	+ Visible - Not Visible +/- Partially Visible
			DSM Viewshed (Topography, Structures, Vegetation)
None within VSA.			
Other State Lands			
None within VSA.			
Designated Trails			
None within VSA.			
Local Parks and Recreation Areas			
Park City Elementary School Playground	Barren	2.40	-
Diamond Caverns	Barren	3.67	-
Conservation Lands/Easements			
None within VSA.			
Named Lakes, Ponds, and Reservoirs			
Barren River Lake	Barren	4.08	-
High-Use Public Areas			
State, US, and Interstate Highways			
I-65	Barren, Edmonson, Warren	0.35	-
Louie B. Nunn Cumberland Expressway	Barren	0.02	+/-
Cities, Villages			
Glasgow	Barren	4.03	-
Park City	Barren	1.04	-
Schools			
Park City Elementary School	Barren	2.39	-
Airports			
Glasgow Municipal Airport	Barren	4.75	-
Hospitals			
None within VSA.			
Churches			
Bekton Church of Christ	Barren	2.71	-
Shiloh Church	Barren	2.38	-

Landscape Plan

Wood Duck Solar Project

July 2023

237801898

Stantec

Document Information

Prepared for	Geenex Solar
Project Name	Wood Duck Solar Project
Project Number	237801898
Prepared by	Kevin Rubio – Biologist
Date	July 2023

Prepared for:

Geenex Solar
1000 NC Music Factory Blvd
Suite C3
Charlotte, NC 28206

Prepared by:

Stantec, Inc.
76 San Marcos Street, Austin, Texas 78702 USA

This Page Intentionally Left Blank

Table of Contents

Appendices

Tables

Figures

1 Introduction

Geenex Solar is proposing to construct the Wood Duck Solar Project (Project) near Glasgow, Kentucky. The proposed Project will have a generation capacity of 100 megawatts (MW). The Project is proposed to be constructed within an approximate area of 1920.3 acres (3.0 square miles) of private leased land and easements (Project Area), of which 1126.7 acres (1.76 square miles) can be occupied by Project components. The Project Area is located in Barren County, Kentucky. As part of the development of this site, Stantec has worked with Geenex Solar to develop a landscape plan to help mitigate any visual impacts of the Project from roadways and adjacent land uses while maintaining a natural character that fits within the context and character of the existing landscape. General information about proposed design methodology, plant materials, and planting module are included in this document.

The Project will be visible from various roadways and properties (see *Visual Resource Assessment*), including both participating and non-participating landowners. It is important that visual mitigation be considered differently for areas depending on the adjacent uses, intensity of viewership, viewsheds and overall contextual relationship to the Project. The specific treatment module outlined in this plan is designed to be replicable and is able to be prescribed in various scenarios around the Project.

With any site, plant community composition varies due to differences in topography, soils, sun exposure, and other factors. It is important to not only recognize what plants are appropriate for a region, but also for a specific site. This landscape plan proposes to utilize native landscape material that will be well adapted to the climate of this region. Native plants also provide long term maintenance benefits as well as ecological benefits for soil stabilization, water quality, wildlife habitat and pollinators. These ecological benefits will all be balanced with the need to provide visual mitigation and overall aesthetic character that will complement the existing land use and setting.

2 Design Methodology

The overall goal of the landscape plan is to provide visual interest while softening the infrastructure of the Project. Screening should be provided in higher viewership areas and where there are adjacent land uses that would require them. Screening intensity will vary based on the need to provide a visual barrier. One specific treatment module is proposed for this Project and is designed to be replicable and flexible in order to be prescribed in the various scenarios around the Project. The primary goals of the landscape plan are to:

1. Provide visual interest to soften the proposed infrastructure;
2. Provide screening and visual barriers that consider viewership intensity and adjacent land use;
3. Develop a module or modules that would be appropriate for the existing landscape;
4. Utilize existing landscape where possible;
5. Avoid monocultures of same species in order to increase biodiversity and;
6. Utilize native plant material when possible.

It is important to note that the vegetation will not provide 100% screening or visual obstruction from the Project. The primary intent is to provide visual relief in order to break up the lines of the infrastructure and enhance the overall aesthetics of the Project. Existing landscape along roadways, property lines and fence rows should be maintained where possible.

3 Vegetation Protection

The Project has been sighted in a way to minimize impacts to the forested lands, shrublands, wetlands, and streams within the Project area, thereby minimizing impacts to trees and woody vegetation. Project infrastructure and the maintained buffers around them will be located primarily on agriculture and open lands. In order to protect vegetation from unauthorized removal, Project drawings will clearly illustrate the limits of construction. Prior to any ground disturbing activities, the limits for clearing will be adequately flagged or staked in the field.

Wood Duck Solar intends to manage the ground coverage of its solar facility in a manner that includes pollinators, native and naturalized plants as much as possible to help ensure that the soil quality is as good or better when the project is decommissioned.

4 Vegetation Management

4.1 Construction

Construction activities for solar infrastructure have the potential to impact vegetation through cutting and clearing, removal of stumps and roots, and increased ground disturbance and soil exposure. In order to limit the impacts to vegetation, all clearing will be confined to the Project infrastructure footprint. In addition to solar panel arrays, typical footprints include:

- 10 feet on either side of access road centerline
- 10 feet on either side of buried collection line centerline
- 10 acres for laydown yard(s)

Project construction will require a limited area of permanent disturbance of vegetation. The majority of disturbance activities will occur in agricultural lands, and efforts to retain desirable vegetation growth will be maximized to the extent practicable. The Project will minimize clearing of tree stands within various windrow or tree lot communities. No trees greater than 3 inches in diameter at breast height (DBH) will be cut outside of the approved cutting season of October 1 through March 31. Any trees and limbs removed, with approval from Wood Duck, will be logged, and/or chipped, and either removed or left to remain on the land, per landowner request and as allowed under federal, state, and local regulations. Authorization to leave cleared vegetation on the land (either chipped or utilized by landowners) reduces the need for further equipment mobilization to haul cut vegetation, thereby reducing further impacts to the site; however, if removal is required, all equipment will utilize existing travel lanes to the extent practicable to reduce overland travel.

After construction, disturbed areas not used for Project infrastructure will be returned to approximate pre-construction use and capability via reclamation and revegetation. This involves the treatment of soil as necessary to preserve approximate pre-construction capability and the stabilization of the work surface in a manner consistent with the initial land use. Disturbed soils inside the Project's fence line will be re-seeded to stabilize exposed soils and control sedimentation and erosion.

4.2 Operation

During Project operation, on-site vegetation within the fence line of the Project will be regularly maintained through mowing or grazing. During maintenance inspections, the Project area will also be assessed for the growth of noxious weeds. If noxious weeds do become established, herbicide treatment may be conducted, as appropriate, by a licensed professional. All vegetation monitoring and maintenance will be conducted by an experienced and qualified contractor (see Section 7).

5 Plant Materials

The plant palette used for the module included in this plan is based on species observed during on-site field surveys as well as known regional vegetation species. Selected species are native to Central Kentucky and exclude invasive or nuisance plants as identified by the Kentucky Department of Fish and Wildlife Resources. Existing native species that were observed at the site in some form of abundance are summarized in Table 5-1 and detailed in Appendix B.

Table 5-1 Inventory of Trees Observed in the Project Area

Scientific Name	Common Name
Acer rubrum	Red maple
Prunus serotina	Black cherry
Quercus palustris	Pin oak
Liriodendron tulipifera	Tulip tree
Quercus velutina	Black oak
Liriodendron tulipifera	Tulip tree

While the table above provides a comprehensive list of tree species found within the limits of the site, it is important to select species that are best suited for the Project area and the purpose of the module (see Section 6). It is also important to add some other native species to increase diversity and provide additional benefits such as ornamental and screening value (Figure 5-1).

5.1 Native Plants

There are many benefits to using native plants. Most notably, they are adapted to the specific conditions of a region and are able to better tolerate weather, drought, disease, and soil conditions than non-native species. Because of these benefits, native plants generally survive longer and are easier to maintain over the course of their establishment. Native plants will also blend better into the existing landscape since many of these plants are naturally occurring in existing fields, roadsides, fence rows, etc.

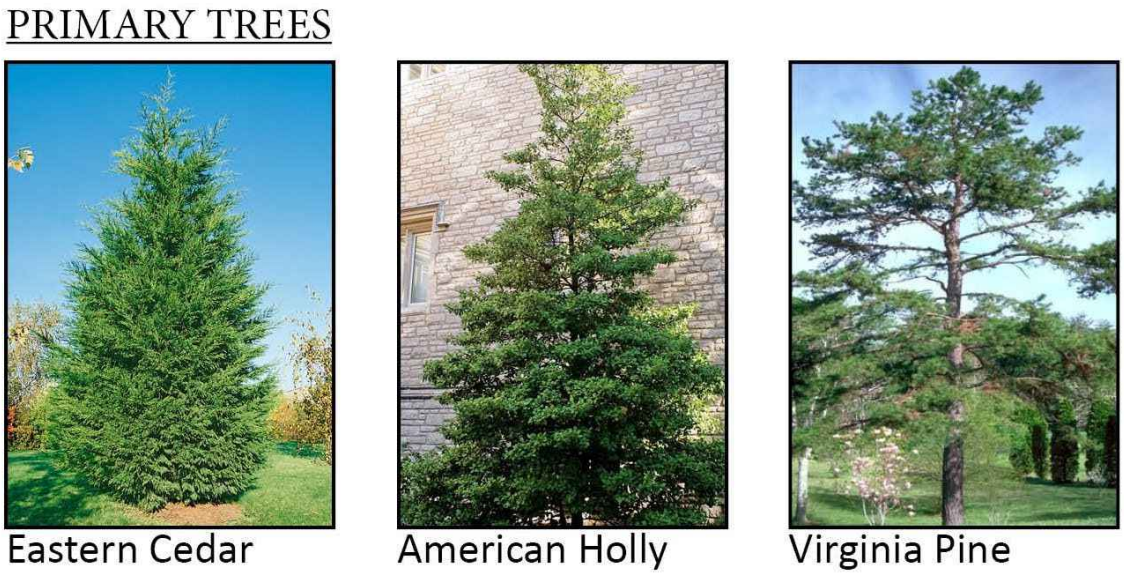


Figure 5-1 Proposed Plant Material Selection for the Wood Duck Solar Project

6 Planting Module

One module has been developed for this Project to help soften and screen the infrastructure of the Project. It is intended to be flexible and adaptable to the various conditions that occur along the perimeter of the Project. It will be prescribed for various areas based on the need to provide screening, visual interest, softening and character to the existing landscape. Where possible, existing vegetation will be utilized along the road, fence lines and property lines. These existing areas should be incorporated into any final design and the module should be adjusted to account for such conditions. A map of where the module is proposed is provided in Appendix A.

The intent of this module is to provide softening, visual interest and more robust screening in areas of the highest viewership and the longest viewing period. A good example would be when a residence is located across the street or adjacent to the Project. The intent is to provide a year-round visual landscape screen for more stationary viewers while also enhancing aesthetics of the Project to non-stationary receptors. The module is comprised of a double row of evergreen trees spaced at 15 feet on center to help provide visual screening from the infrastructure of the Project (Table 6-1). Shading should be considered as to not cast shadows on the solar arrays.

Table 6-1 Module Trees

Scientific Name	Common Name
Trees	
Juniperus virginiana	Eastern cedar
Ilex opaca	American holly
Pinus virginiana	Virginia pine

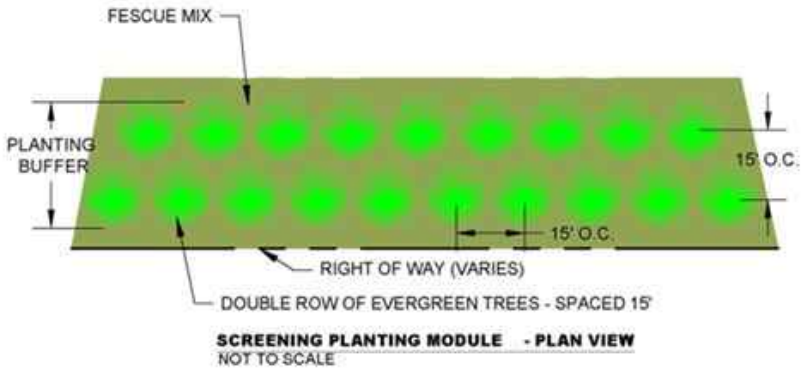


Figure 6-1 Module Screening

7 Buffer Visualizations

Figure 7-1 Module Simulation

Figure 7-2 Module Simulation

7.1 Buffer Landscape Maintenance

Maintenance of planted landscape buffers will be conducted as needed following installation and will focus on ensuring survival of planted materials.

7.1.1 Plants

After the initial planting, maintenance of native trees and shrubs will include:

- Guying and maintenance of guying for at least one season for trees to ensure they stay upright during the establishment period;
- Application of mulch around tree rings – mulch should be consistently at a depth of 2-3” to help retain moisture and prevent weed growth;
- Pruning of plants as needed to remove dead limbs or unwanted growth; and
- Watering as needed until final acceptance/warranty period expires.

After the initial maintenance period and 1-year warranty (provided by contractor), the plant material selected should not require ongoing intensive maintenance since the proposed species were selected because they are native to Kentucky. Wood Duck will replace any plantings that die within the first five years to ensure a minimum of 90% survival. Typically, plant material that has sustained one full growing season has a very high likelihood of continued survival. Wood Duck will monitor the plantings annually during operations to ensure no significant dieback or loss is occurring. Some dieback is expected, mimicking natural succession, and Wood Duck will evaluate any areas of concern to make sure the intent of the module prescribed is still being met for any specific area. If significant dieback were to occur, Wood Duck would evaluate the need for mitigation options to ensure the goals of the landscape plan are still being met.

7.1.2 Fescue Mix and Ground Cover

After the initial seeding, fescue requires some maintenance to ensure seed gets established. After the establishment period (5 years) the need for maintenance decreases. After the plantings are established, site maintenance is primarily dictated by the need to control woody growth and grass height, which is limited to 1-2 annual mowing events and spot spraying as needed. Wood Duck will monitor any areas planted in fescue for the first 5-years to ensure adequate establishment and desired fescue abundance is present and to make sure the goals of the landscape plan are still being met. Wood Duck Solar intends to manage the ground coverage of its solar facility by including pollinators, native and naturalized plants as much as possible to help ensure that the soil quality is as good or better when the project is decommissioned.

7.2 On-site Vegetation Establishment

The vegetation contractor shall be responsible for supplemental seeding, exotic and invasive species control, and any other activity that may contribute to the establishment of the vegetation. The contractor must have supervisors and crew who are experienced with identification of a variety of herbaceous vegetation. All crew members performing chemical applications must be licensed in accordance with state laws pertaining to the specific application being performed. There are several methods or techniques typically utilized to facilitate the establishment of a newly vegetated area. The exact techniques and frequencies used will depend largely on the degree of development of the site, as well as special social and cultural concerns that may arise from specific techniques. Typically, after several years of intensive maintenance and more robust growth of desirable species the frequency of the establishment activities will be reduced.

7.2.1 Supplemental Seeding

The need for supplemental seeding can usually be determined by the middle of the first growing season following installation. If the site exists as bare ground or is very sparsely vegetated, seeding should be performed with a no-till rangeland type drill planter.

7.2.2 Mowing

Mowing should be used for site management if an abundance of annual weeds are present which may compromise the success of the planting in the first few years after installation. Species such as foxtail (*Setaria spp*.) and ragweed (*Ambrosia spp.)* can be controlled by mowing.

7.2.3 Chemical Applications

Many perennial weed species in uplands, such as teasel (*Dipsacus fullonum*), Canada thistle (*Cirsium arvense*), marestail (*Conyza canadenis*), poison hemlock (*Conium maculatum*), spotted knapweed (*Centaurea maculosa*), purple loosestrife (*Lythrum salicaria*), and common reed (*Phragmites australis*), are best controlled through chemical applications. If left unmanaged, many of these weed species will quickly outcompete the young native species for sunlight, nutrients, and space. Additionally, allelopathic species such as spotted knapweed will actually emit chemicals into the soil that will inhibit the growth of other species.

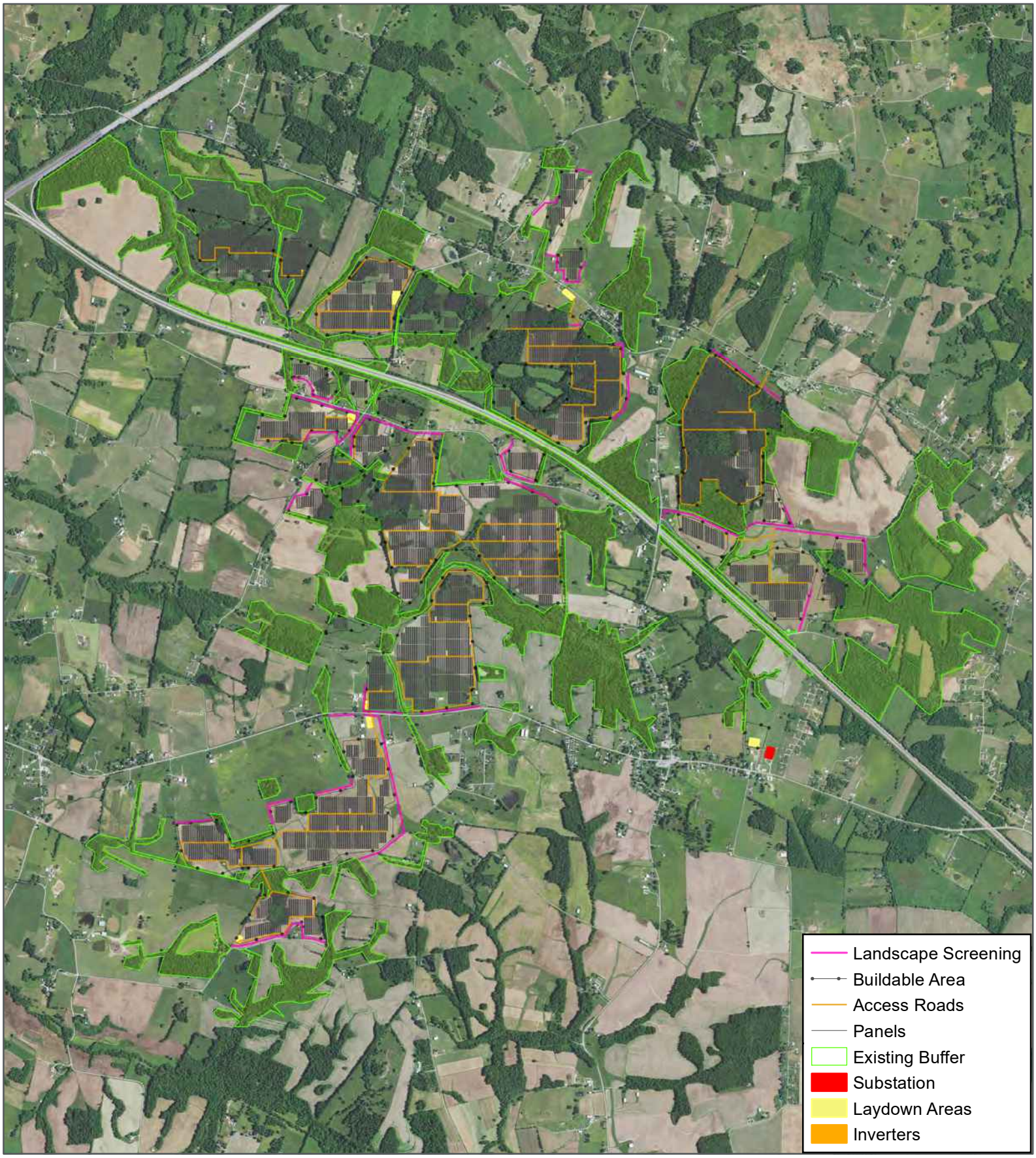
8 Summary

The proposed module and maintenance activities outlined in this plan serve as a guideline for the final landscape design to ensure that the installation of plant material will align with the objectives set forth for the Project. It is important that visual mitigation be planned according to adjacent uses, intensity of viewership, viewsheds and overall contextual relationship to the Project. It is also important that the proposed landscape blends into the overall character of the existing habitat by utilizing much of the same native plant materials found onsite. Doing so will create a landscape that will visually soften the infrastructure of the Project where needed while providing ecological benefits by incorporating native and pollinator species.

Wood Duck Solar Project

APPENDIX A

SCREENING PLAN



0 1.2 Miles

0 1.6 Kilometers

7.5' Quadrangles

PLSS: unsectioned

C202: Preliminary Landscape Plan

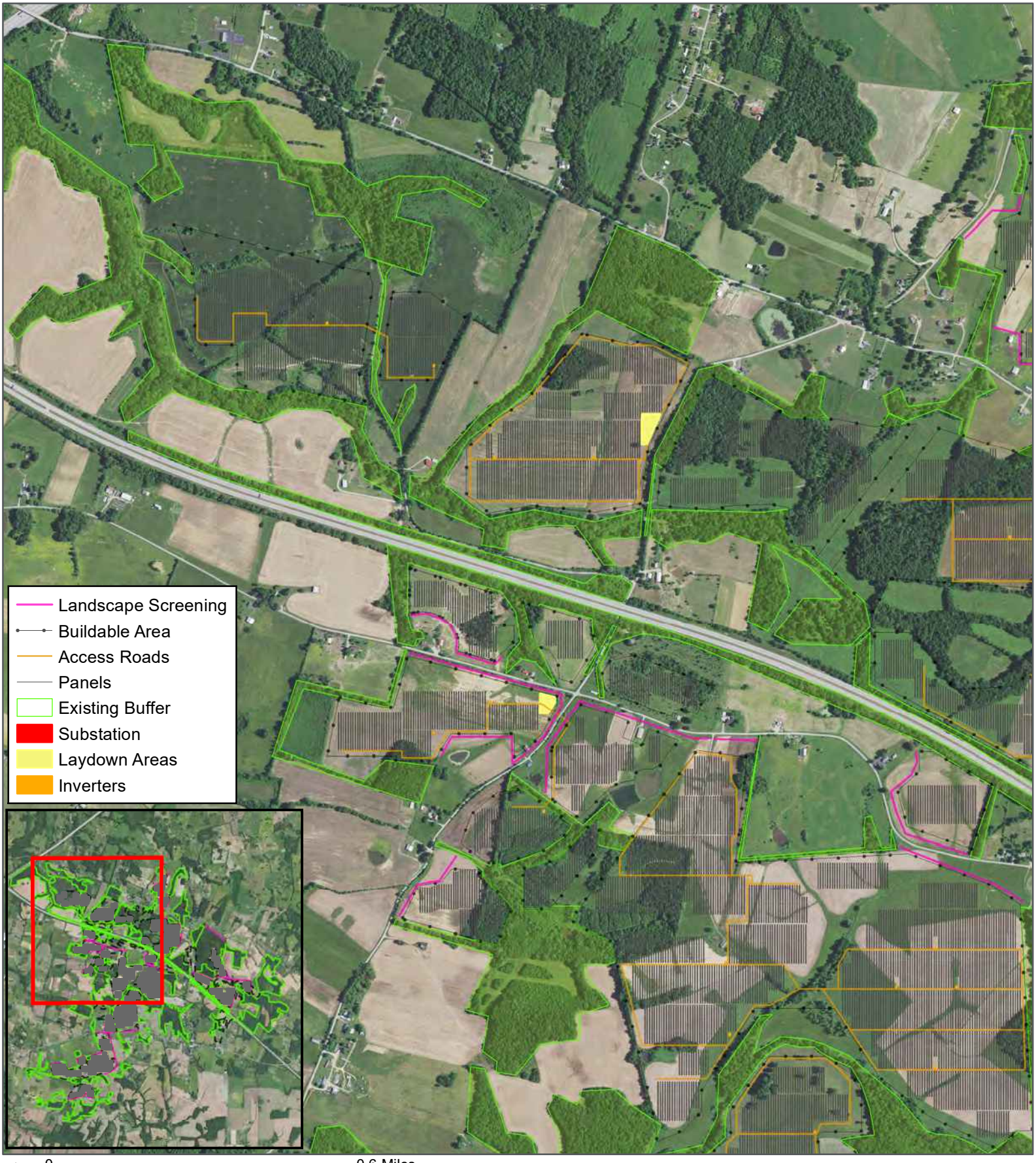
Visual Resource Assessment for the Wood Duck Solar Project
Geenex Solar, LLC
Barren County, Kentucky

Stantec
76 San Marcos Street
Austin, TX 78702 USA
Phone (+1) 512.745.8129
www.stantec.com

Basemap: Esri, USDA Farm Service Agency

File Path: U:\237801898\03_data\gis_cad\gis\C202-Landscaping Final_Updated.mxd

GIS Analyst: swaltman



7.5' Quadrangles

PLSS: unsectioned

C202: Preliminary Landscape Plan

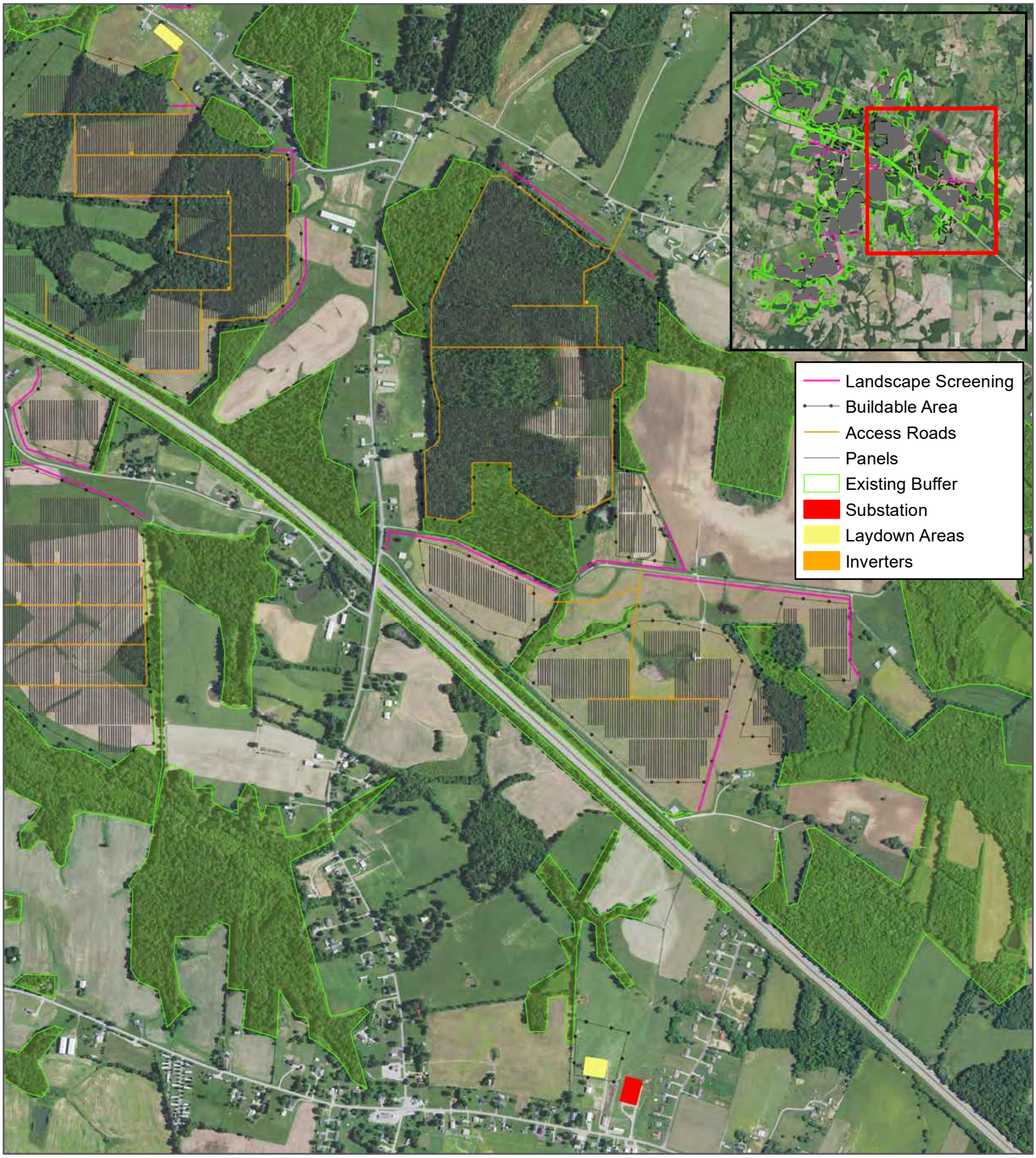
Visual Resource Assessment for the Wood Duck Solar Project
Geenex Solar, LLC
Barren County, Kentucky

Stantec
76 San Marcos Street
Austin, TX 78702 USA
Phone (+1) 512.745.8129
www.stantec.com

Basemap: Esri, USDA Farm Service Agency

File Path: U:\237801898\03_data\gis_cad\gis\C202-Landscaping Mapbook1_Updated.mxd

GIS Analyst: swaltman



7.5' Quadrangles

PLSS: unsectioned

C202: Preliminary Landscape Plan

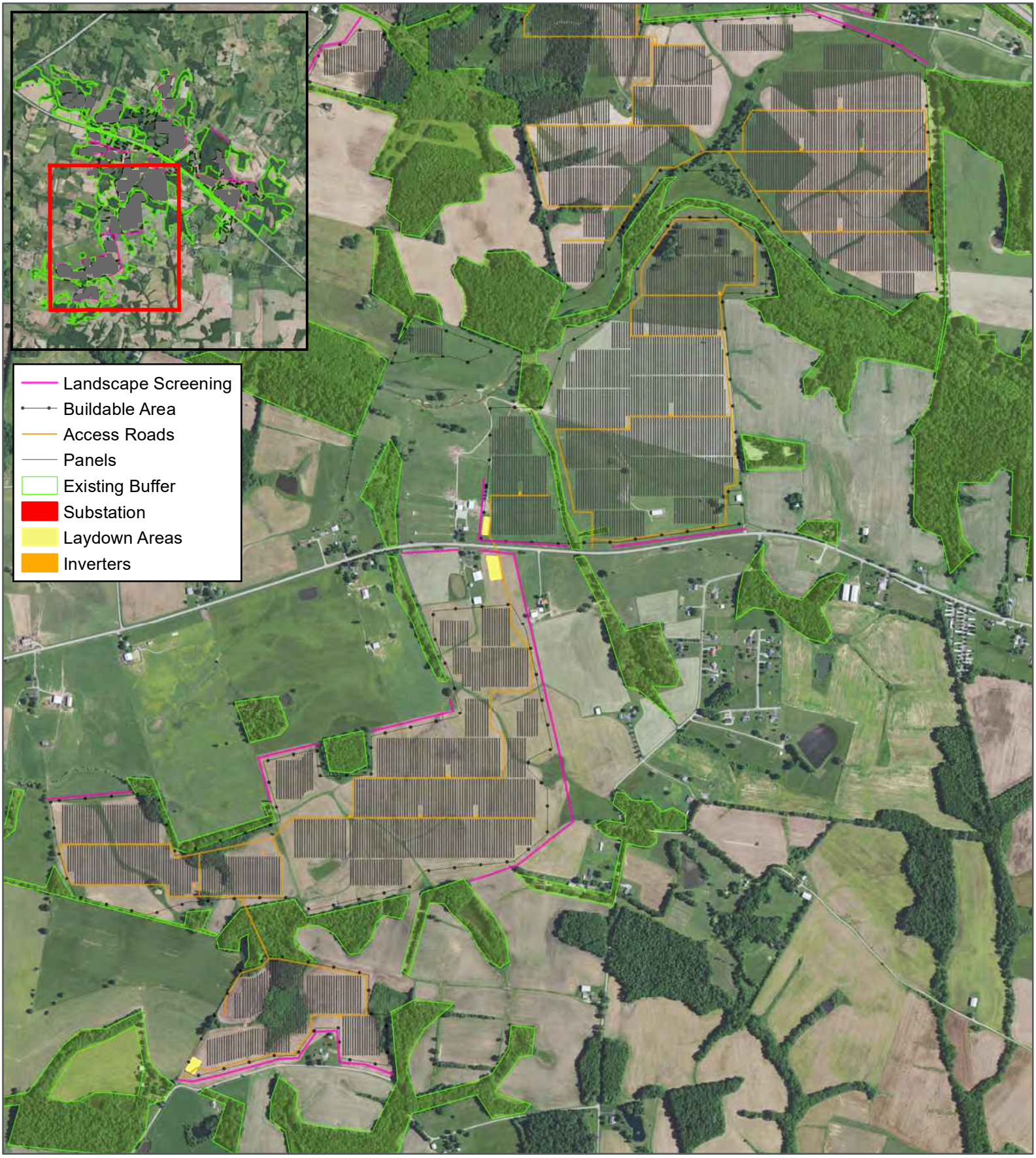
Visual Resource Assessment for the Wood Duck Solar Project
Geenex Solar, LLC
Barren County, Kentucky

Stantec
76 San Marcos Street
Austin, TX 78702 USA
Phone (+1) 512.745.8129
www.stantec.com

Basemap: Esri, USDA Farm Service Agency

File Path: U:\237801898\03_data\gis_cad\gis\C202-Landscaping Mapbook2_Updated.mxd

GIS Analyst: swaltman



7.5' Quadrangles

PLSS: unsectioned

C202: Preliminary Landscape Plan

Visual Resource Assessment for the Wood Duck Solar Project
Geenex Solar, LLC
Barren County, Kentucky

Stantec
76 San Marcos Street
Austin, TX 78702 USA
Phone (+1) 512.745.8129
www.stantec.com

Basemap: Esri, USDA Farm Service Agency

File Path: U:\237801898\03_data\gis_cad\gis\C202-Landscaping Mapbook3_Updated.mxd

GIS Analyst: swaltman