Appendix I

TRAFFIC IMPACT STUDY

Barrelhead Solar, LLC

Wayne County, Kentucky

COPPERHEAD
ENVIRONMENTAL CONSULTING

Traffic Impact Analysis

BARRELHEAD SOLAR, LLC

WAYNE COUNTY, KENTUCKY

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INTRODUCTION

Barrelhead Solar, LLC (the Applicant) proposes to construct an approximately 54 megawatt (MW) alternating current (AC) solar energy facility in Wayne County. The project would be situated on approximately 307 acres of private land and is located on KY 1009 and Massingale Road, southwest of the city of Monticello, Kentucky.

The purpose of this traffic impact study is to characterize project-related traffic, assess potential impacts on roads and traffic, and identify best practices to avoid or minimize those impacts.

CURRENT CONDITIONS

Regional and Local Access

The Project Area is bordered by KY 1009, Massingale Road (CR 1249), and Massengale Road (CR 1018). A brief description of the surrounding roadways follows. A map of the proposed entrances and the roadways is shown in Figure 1.

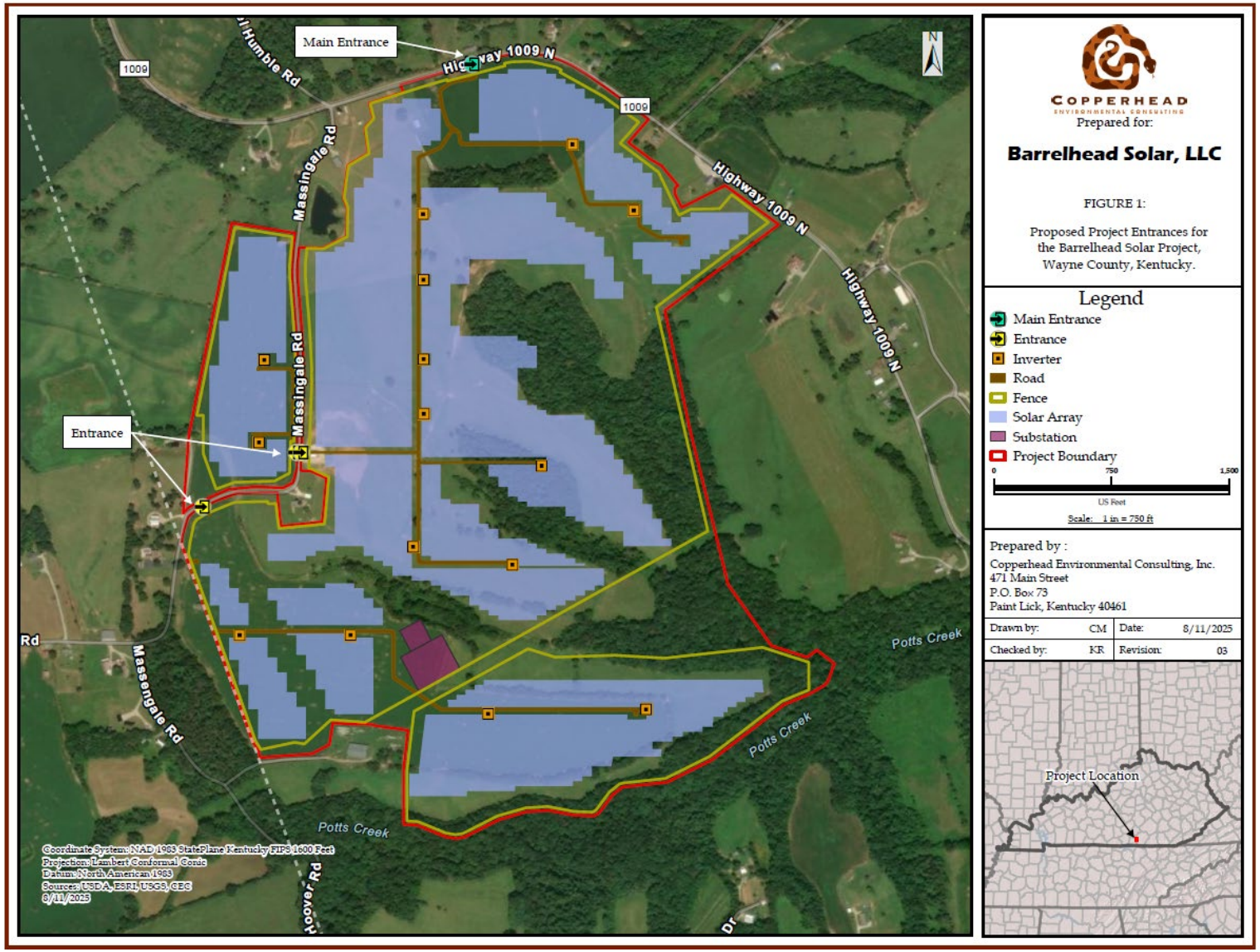

Figure 1. Overview of surrounding roadways and proposed entrances to the Project Area.

KY 1009 – KY 1009 is a paved two-lane public road that extends north-south on the northern and eastern sides of the Project Area. It is approximately 19-20 feet wide. A representative photo of KY 1009 is in Figure 2. The posted speed limit for KY 1009 is 55 mph. This route is considered a *minor collector*, meaning it gathers traffic from local roads and funnels it into the arterial network. In rural areas, these roads generally serve primarily intra-county travel of shorter distances. Travel speeds are typically more moderate than their urban counterparts (FWHA 2023). The truck weight class is A, or 44,000 lbs maximum.

The majority of the Project Area would be accessible from a proposed access point on KY 1009, which would be between mileposts 10.3 and 10.4.

Figure 2. Representative photo of KY 1009 taken at the northern side of the Project Area, looking west.

Massingale Road (CR 1249) – Massingale Road is a single lane (approximately 13 feet wide) mixed bituminous surfaced (also known as "chip and seal") road off KY 1009 that extends north to south on the northwestern side of the Project Area. A representative photo of Massingale Road is in Figure 3. The name of this road changes to Pleasant Ridge Road at the Wayne-Clinton County line. Massingale Road bisects the main Project Area and a small western portion of the Project

Area. There is no posted speed limit on this route. The Kentucky Transportation Cabinet (KYTC) does not assign a Functional Class to county roads.

There are three proposed access points on Massingale Rd: one would provide access to the western portion of the Project Area that is separated from the main area by Massingale Rd; one would be a secondary access point to the main portion of the Project Area, which also would be accessible from KY 1009; and one access point would provide access to the southern portion of the Project Area, including the substation.

Figure 3. Representative photo of Massingale Road (CR 1249) taken at the western side of the Project Area, looking northeast.

Massengale Road (CR 1018) – Massengale Road is a single lane asphalt surfaced road off Pleasant Ridge Road in Clinton County (Figure 4). It is approximately 11 feet wide for about 0.10 miles, but transitions to gravel and becomes approximately 8 feet wide after that (Figure 5). The road extends north to south on the southwestern side of the Project Area before turning east toward the Project Area. This road can currently be used to access the Project Area, but would not be used in the future for either construction or maintenance purposes. There is no posted speed limit on this route. The Kentucky Transportation Cabinet (KYTC) does not assign a Functional Class to county roads.

Figure 4. Representative photo of the paved portion of Massengale Road (CR 1018) taken at the southwestern side of the Project Area, looking south.

Figure 5. Massengale Road (CR 1018) becomes a narrow gravel road after approximately 0.10 miles.

Bridges

Information for existing bridges within two miles of the Project was collected using the KYTC Bridge Data Miner application. Bridges are given ratings of good, fair, and poor, which are defined per the Pavement and Bridge Condition Performance measures final rule. The Bridge Condition is based on condition ratings within the National Bridge Inventory for Item 58 (deck), Item 59 (superstructure), Item 60 (substructure), or Item 62 (culvert). If the lowest rating is greater than or equal to 7, the bridge is classified as good. If the rating is between 1 and 4, the classification is poor. Ratings of 5 or 6 are classified as fair. Using the application, eight bridges were identified within two miles of the Project Area. Seven are classified as fair, and one is classified as poor. The approximate width for one bridge was not available (Table 1).

Where posted, weight limits are defined by four different truck types. As defined by Kentucky Administrative Regulations (KAR), 603 KAR 5:066 Section 1(2): Type 1 is a single unit truck with two single axles; Type 2 is a single unit truck with one steering axle and two axles in tandem arrangement; Type 3 is a single unit truck with one steering axle and three axles in tridem arrangement; Type 4 is a tractor-semitrailer combination truck with five or more axles.

Table 1. Bridges within two miles of the Project Area.

Bridge ID	Route ID	Approx. Width (feet)	Weight Limit/Posting	Bridge Classification
116B00036N	116-KY-0090-000	20	No posting	Fair
116C00021N	116-CR-1272-000	23.8	Gross Tons: 22	Fair
116C00018N	116-CR-1285-000	18.8	Gross Tons: 16	Fair
116B00022N	116-KY-1009-000	20	No posting	Fair
116C00045N	116-CR-1242-000	22.5	No posting	Fair
116B00037N	116-KY-1009-000	-	No posting	Fair
116C00056N	116-CR-1265-000	11.3	Gross Tons: 3	Poor
116B00027N	027-KY-0696 -000	20	No posting	Fair

Base Traffic Volumes

Existing traffic volumes on roadways in the Project vicinity were determined by querying the KYTC interactive Statewide Traffic Counts tool. This online map displays the most recent average annual daily traffic (AADT) for selected roads throughout the Commonwealth. Note that traffic volumes are not provided for Massingale Rd because KYTC does not have traffic count stations

on this county route. Traffic volume available for KY 1009, and the most recent collection year, is provided in Table 2.

Based on correspondence with KYTC District 8, in place of assigning a Level of Service (LOS) letter grade that characterizes operating conditions on roadways, a combination of AADT, Functional Class of the roadway, and other factors to characterize congestion is used to make decisions for roadway projects. Where data is available, the Functional Class is listed for each roadway in Table 2.

Table 2. Available traffic counts for roadways in the Project vicinity.

Route	Station ID	Mileposts	AADT (year)	Functional Class
116-KY-1009-000	116536	8.224 – 11.567	253 (2022)	Minor Collector
116-CR-1249-000	N/A	--	N/A	N/A

Data source: (KYTC n.d., KYTC Various)

Historic Traffic Volumes

Although there was a slight increase in traffic volumes along KY 1009 in 2019, they have declined overall since 2010. Prior to 2010, recorded traffic volumes along this roadway were similar to present-day volumes.

ASSUMPTIONS

Site preparation and construction traffic would use existing roadway systems to access one of the four proposed entrances to the Project Area. Contingent on other factors, construction is anticipated to begin in 2027 and last approximately 8 to 12 months. During peak construction periods, approximately 50-100 laborers may be entering the site from any of the four available Project Area entrances on KY 1009 or Massengale Road. However, the main access for traffic will be on KY 1009. Approximately 50 to 100 passenger vehicles, pickup trucks, or other types of employee vehicles may be onsite for the majority of the construction phase. Site preparation would take place prior to any construction activities and would include approximately 3-4 months or less of timber removal. Timber removal activities would require a small work crew, approximately 5-10 workers with associated vehicles and equipment (tractor trailer log trucks, track cutters, skidders, service trucks, dozers, excavator/log loaders). The southernmost proposed access point on Massengale Road would be used to access the substation and transformer delivery.

During construction, a temporary increase in traffic volume associated with travel of construction laborers, delivery of construction equipment and material, and delivery of solar panel components and equipment is anticipated. Laborers would commute daily with passenger

vehicles and trucks, and traffic peaks would occur in the morning, at lunch, and at the end of the workday.

Equipment deliveries will occur on trailers, flatbeds, and other large vehicles at various times during the day. Approximately 10 to 15 semi-trucks per day could be used to deliver facility components during peak periods. Delivery vehicles would use any of the proposed entrances on both KY 1009 and Massengale Road, and the substation would be delivered to the entrance on Massengale Road. Other construction and worker traffic will be split among the four access points to the Project Area. Maximum expected load limits are: cement truck, 80,000 lbs; water truck, 40,000 lbs; tractor trailer, 80,000 lbs; and general delivery trucks, 20,000 lbs.

During the operations and maintenance phase, a small maintenance crew will regularly drive through the area to monitor and maintain the facilities as needed. Crews will primarily utilize light trucks or pickup trucks for operation and maintenance. Occasional and infrequent flatbed trucks may be used to haul equipment to the Project Area to perform maintenance activities. The majority of operations and maintenance traffic will use the main access off KY 1009.

MITIGATION MEASURES

The following measures will be implemented by the Applicant during and after the construction phase to reduce impacts to local traffic. A separate traffic management plan for the Project will be developed in coordination with the Wayne County Road Department (WCRD), Wayne County Fiscal Court, and the Kentucky Transportation Cabinet (KYTC), which will discuss traffic and staging onsite during construction to minimize the impact on traffic flow and keep traffic safe.

- The Applicant will develop a road use agreement with the WCRD and the Wayne County Fiscal Court. Such an agreement might include special considerations for overweight loads, routes utilized by heavy trucks, road weight limits, and bridge weight limits. It also might include the use of a flag person during heavy commute periods, prioritizing access for nearby residents, and implementing staggered work shifts during daylight hours to manage construction traffic flow near the Project Area.
- Construction activities, processes, and deliveries will be limited to the hours between 7:00 am and 7:00 pm, Monday through Saturday; construction activities that create a higher level of noise, such as pile-driving, will be limited to 8 a.m. to 5 p.m. local time, Monday through Friday. Non-noise-causing and non-construction activities can take place on the site between 6 a.m. and 10 p.m. local time, Monday through Sunday, including field visits, arrival, departure, planning, meetings, mowing, surveying, etc.
- Appropriate signage and traffic signaling will be used as needed to aid construction traffic and prevent severe traffic issues.
- Four access points will spread construction and worker vehicles entering and leaving the Project Area.

- The Applicant will fix or pay for repairs for damage to roads and bridges resulting from any transport to the site, according to the road use agreement. For damage resulting from vehicle transport in accordance with all permits, those permits will control.
- The Applicant will comply with laws and regulations regarding use of roadways.
- The Applicant will consult with KYTC regarding truck and other construction traffic and obtain necessary permits from KYTC, including any permits needed for commercial vehicle classes used for transporting equipment and materials to the Project Area.
- The Applicant will consult with the WCRD regarding truck and other construction traffic and obtain any necessary permits from the WCRD, including any permits needed for commercial vehicle classes used for transporting equipment and materials to the Project Area.
- The Applicant will develop special plans and obtain necessary permits before transporting heavy loads, especially the substation transformer, onto state or county roads.
- The Applicant will develop and implement a traffic management plan to minimize the impact on traffic flow and keep traffic safe. Any such traffic management plan will also identify any traffic-related noise concerns during the construction phase and develop measures that would address those noise concerns.
- The Applicant will implement ridesharing between construction workers when feasible, use appropriate traffic controls, or allow flexible working hours outside of peak hours to minimize potential traffic delays during AM and PM peak hours.
- The Applicant will properly maintain construction equipment and vehicles and follow best management practices related to fugitive dust through the construction process, including the use of water trucks. Dust impacts shall be kept at a minimum level in compliance with 401 KAR 63:010.
- Activities that disturb land during the construction of the Project may temporarily add airborne materials. To reduce the contribution of airborne materials, the application of water to unpaved on-site roadways may occur. Vegetative buffer and revegetation measures along fencerows and property boundaries will help mitigate fugitive dust impacts to adjacent areas. Dust impacts will be kept at a minimal level to comply with 401 KAR 63:010.

TRAFFIC IMPACTS

Construction Phase

Site preparation and construction traffic would use existing roadway systems to access one of the four entrances to the Project Area. Site preparation would take place prior to any construction activities. This would include timber removal, which would occur for 3-4 months or less. It is estimated that a small work crew (approximately 10 workers) would perform these activities, and equipment could include tractor-trailer log trucks, track cutters, skidders, service trucks, dozers,

and excavators/log loaders. All equipment would be removed after site preparation and before construction begins.

Project construction is expected to take 8 to 12 months. While the number of construction workers will vary, it is anticipated that the Project may have 50 to 100 workers onsite during peak construction activity (four to six months). A temporary increase in traffic volume associated with the travel of construction workers, the delivery of construction equipment and materials, and the delivery of solar panel components and equipment is anticipated. The increased traffic may be perceptible to neighboring residents and commuters, especially given the relatively low AADT counts on KY 1009 (Appendix A).

Slow-moving construction vehicles may also cause delays on smaller roads. However, these delays should be like those experienced by farm equipment and will only occur during a relatively short construction delivery period.

Permanent road or lane closures are not anticipated for the construction of the proposed solar facility. However, the presence of signage, signaling, personnel flagging traffic, and temporary lane closures may be employed to reduce risk of collision on the roadway. For instance, the presence of a flag person to temporarily stop traffic to allow for a delivery truck and trailer to safely turn into the site may be necessary at times of large equipment deliveries. Appropriate signage of trucks entering the highway or slow-moving vehicles would be used to warn oncoming traffic of potential risk.

In coordination with WCRD and KYTC, the Applicant will develop and implement a traffic management plan to minimize the impact on traffic flow and keep traffic safe.

Operational and Maintenance Phase

Long-term impacts to traffic will be negligible because the project would require minimal staff during the operations and maintenance phase. The facility would be managed remotely and monitored by a small number of employees or contractors. Operations workers are expected to commute to and from the project site individually during the peak AM and PM hours. Work can also be conducted at night for up to thirty days a year. The operations and maintenance work is anticipated to require primarily the use of light trucks. The primary access point would be the proposed entrance on KY 1009. Entrances on Massengale Road would also be used to access the western and southern portions of the Project Area.

For vegetation management, periodic truck traffic will occur to deliver and move sheep as part of solar grazing activities or for mowing equipment.

During the operation phase, the additional volume to daily traffic is considered negligible, and it would have no measurable impact on the traffic and/or transportation infrastructure.

Impact on Road Infrastructure

Significant degradation of the existing roadways during or after the construction phase is not anticipated for the proposed Project. The temporary increase in localized traffic and the continued entry and exit of heavy trucks or equipment during the construction phase may result in some additional wear of the existing roadway or shoulder of the four planned entrances to the Project Area. A road use agreement with WCRD and Wayne County Fiscal Court will be implemented to address construction traffic, access, and restoration/maintenance of county roads. Oversize/overweight vehicle permits will be obtained from the State for travel on state roadways. The only delivery anticipated to be in this category is for the transformer, while all other vehicles will be typical construction size.

Access drives and internal roads will be constructed or improved as needed to accommodate vehicles and equipment necessary to construct the proposed solar facility. Internal roads would be compacted gravel or earthen, which may increase airborne dust particles. During construction, water may be applied to the internal road system to reduce fugitive dust.

During facility operation and maintenance, there would be no significant increase in traffic. Long-term impacts to the road infrastructure and vehicle traffic are not anticipated as daily traffic to the site will be minimal. For example, employees would generally contribute less to vehicle traffic than a typical single-family home would.

Railroad Effects

Based on KYTC Active Rail Lines and historical data, there are no active or abandoned rail lines in Wayne County.

CONCLUSION

Traffic in the vicinity of the Project Area is likely to increase temporarily during the construction phase of the Project. This includes daily morning, midday, and evening peaks for construction laborers entering and exiting the Project Area and periodic delivery of construction materials and equipment. Appropriate signage and traffic directing would occur as necessary to increase driver safety and reduce risk of collisions for approaching traffic. The Applicant will develop and implement a traffic management plan to reduce traffic impacts and keep traffic safe.

In addition, the Applicant will develop a road use agreement with WCRD and the Wayne County Fiscal Court to repair or pay for wear and tear or damages to county roadways.

Construction traffic is not expected to cause significant operational changes to existing roadways. The implementation of mitigation measures such as multiple access points, ridesharing between construction workers, appropriate traffic controls, or allowing flexible working hours outside of peak hours could be implemented to minimize any potential for delays during the AM and PM

peak hours. All roadways within the Project area should continue to operate at an acceptable level of service.

During the operation phase, the additional volume to daily traffic from maintenance crews is considered negligible, and it will have no measurable impact on the traffic and/or transportation infrastructure.

SOURCE CITATIONS

Federal Highway Administration. 2023. “Highway Functional Classification Concepts, Criteria and Procedures 2023 Edition”. Available at: https://gis.penndot.pa.gov/BPR_pdf_files/Documents/Traffic/Highway_Statistics/2023_FHWA_Functional_Classification_Guidelines.pdf.

KYTC. 2024. Kentucky Active Rail Lines. Accessed May 2025.

KYTC. (n.d.). "Highway Information View and Extract Interface (HIVEi)." Accessed May 2025.

KYTC. (Various). "Traffic Counting Reporting System." Accessed May 2025.

APPENDIX A.

Average Annual Traffic Count Data

Historical Traffic Volume Summary

Station Details:

Sta ID:	116536
Sta Type:	Full Coverage
Map:	MapIt
District:	8
County:	Wayne
Route:	116-KY-1009 -000
Route Desc:	KY-1009

Begin MP:	8.2240
Begin Desc:	KY 90 (MONTICELLO-ALBANY RD)
End Mp:	11.5680
End Desc:	CLINTON COUNTY LINE
Impact Year:	
Year Added:	

Newest Count:

AADT:	253
Year:	2022
% Single:	
% Combo:	
K Factor:	12.30
D Factor:	58

Definitions:
Sta. ID - Three digit county number + station number
MP - milepoint
Impact Year – year of significant change to traffic pattern within station segment
AADT – Annual Average Daily Traffic – the annualized average 24-hour volume of vehicles on a segment of roadway
% Single – single unit truck volume as a percentage of the AADT
% Combo – combination truck volume as a percentage of the AADT
K Factor – peak hour volume as a percentage of the AADT
D Factor – percentage of peak hour volume flowing in the peak direction

Year	AADT	Year	AADT	Year	AADT
2025		2015		2005	
2024		2014		2004	244
2023		2013	275	2003	
2022	253	2012		2002	255
2021		2011		2001	
2020		2010	325	2000	
2019	304	2009		1999	
2018		2008		1998	
2017		2007	271	1997	
2016	266	2006		1996	152