

**Appendix H**

TRAFFIC IMPACT STUDY

**Mantle Rock Solar LLC**

Livingston County, Kentucky



**COPPERHEAD**  
ENVIRONMENTAL CONSULTING

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# Traffic Impact Analysis

MANTLE ROCK SOLAR

LIVINGSTON COUNTY, KENTUCKY



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## INTRODUCTION

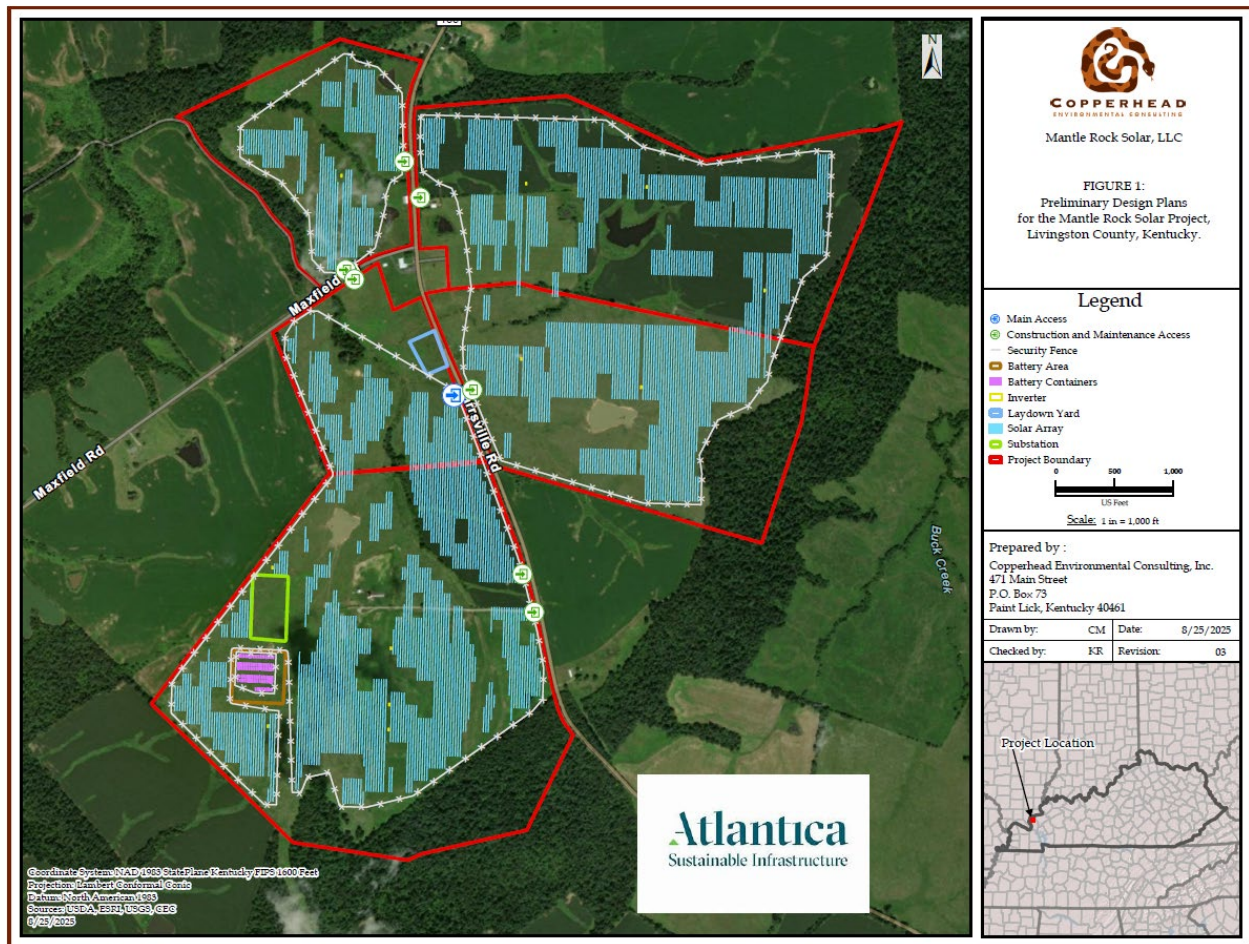
Mantle Rock Solar LLC (the Applicant) proposes to construct an approximately 42-megawatt (MW) alternating current (AC) solar energy facility in Livingston County. The project would be situated on approximately 562 acres and is located approximately 3.2 miles south of Joy, KY, and approximately 2.4 miles northwest of Hampton, KY.

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 bisected by Carrsville Road (KY 135) and Maxfield Road (KY 1608). Additional roads bordering or proximal to the project include Peck Branch Road and Quertermous Road.



**Figure 1. Preliminary site design and access points.**



A brief description of the surrounding roadways and access points follows:

**Carrsville Rd (KY 135)** – Carrsville Rd is a paved two-lane public road that extends north-south through the Project Area. The posted speed limit is 55 mph. This route is considered a *rural minor collector*, which means it generally serves to link cities, larger towns, and other major traffic generators and provides relatively high overall travel speeds with minimum interference to movement. The truck weight class is A, or 44,000 lbs maximum.

Most of the Project Area access points are on Carrsville Rd, including the main Project Area access point (Figure 1). Two access points to the western and eastern sides of the Project Area, including the main entrance, would be between mileposts 5.3 and 5.4. One entrance to the northeastern side of the Project Area would be between mileposts 5.6 and 5.7, and an entrance to the northwestern side of the Project Area would be between mileposts 5.7 and 5.8. Two additional entrances to the southwestern part of the Project Area between mileposts 4.9 and 5.1.

**Maxfield Rd (KY 1608)** – Maxfield Rd is a two-lane road that extends southwest to northeast into the center of the Project Area with a posted speed limit of 55 mph. The truck weight class is A, or 44,000 lbs maximum. This route is considered *rural local*, which means that it primarily provides access to adjacent land and includes trips over relatively short distances.

There will be two access points to the Project Area from KY 1608 that will allow access to both the northwest and southwest portions of the Project Area between mileposts 6.3 and 6.4. The southwestern portion of the facility is also accessible from KY 135.

**Peck Branch Road (County Road (CR) 1354)** – Peck Branch Road is an unmarked gravel public road off KY 1608. The route is west of the facility and borders the northwest corner of the Project Area. The Project Area would not be accessible from this route.

**Quertermous Road (CR 1333)** – Quertermous Road is an unmarked, paved two-way road located north of the eastern portion of the Project Area. It is approximately 1.02 miles long and is not a through road. It is not immediately adjacent to the Project Area and would not provide access to the site.

## **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. Three bridges were identified within two miles of the Project Area using the application, all are classified as good (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
070C00044N	070-CR-1323-000	18	No posting	Good
070B00087N	070-KY-0135-000	24	No posting	Good
070B00080N	070-KY-0135-000	30.8	Truck Type 1: 60,000 Truck Type 2: 60,000 Truck Type 3: 98,000 Truck Type 4: 120,000	Good

### Base Traffic Volumes

Existing traffic volumes on roadways in the Project vicinity were determined by querying the Kentucky Transportation Cabinet's 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 for Peck Branch Rd and Quertermous Rd are not available in the tool because KYTC does not have stations on these routes. Traffic volumes are available for Carrsville and Maxfield Roads, and the most recent collection year is provided in Table 2.

Based on correspondence with KYTC District 1, in lieu of assigning a Level of Service (LOS) letter grade that characterizes operating conditions on roadways, a combination of AADT and Functional Class of the roadway are 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 AADT for state roadways in the Project vicinity.**

Route	Station ID	Mileposts	AADT (year)	Functional Class
070-KY-0135 -000	070786	2.79 - 5.59	244 (2023)	Rural Minor Collector
070-KY-0135 -000	070784	5.59 - 8.23	158 (2021)	Rural Minor Collector
070-KY-1608 -000	070774	0 - 6.49	15 (2019)	Rural Local

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

## **Historic Traffic Volumes**

Since 2010, the traffic volumes along Maxfield Rd have steadily declined. KYTC has separated Carrsville Rd into two segments with separate traffic stations, which show different trends in the available data. The first segment begins south of the Project Area at milepost 2.79 (Hampton Rd) and ends at milepost 5.59 (Maxfield Rd). A more recent AADT (2023) is provided for this segment, showing an increase in traffic since 2017 after a steady decline. The second segment for Carrsville Rd picks up at milepost 5.59 (Maxfield Rd) and ends north of the Project Area at milepost 8.23 (KY 133 junction). Compared to the first segment, the AADT is older (2021) but shows a decline in traffic from the 2018 report. Prior to 2018, the AADT for this segment had been steadily decreasing.

## **ASSUMPTIONS**

During the construction phase, access to the project would be primarily via Carrsville and Maxfield Roads. Contingent on other factors, construction is anticipated to begin in 2026 and last approximately 8 to 12 months. During peak construction periods, approximately 100-150 laborers may be entering the site from any of the eight available Project Area entrances on Carrsville or Maxfield Roads. This number would be less daily during construction and would equate to approximately 50 to 100 passenger vehicles, pickup trucks, or other types of employee vehicles onsite for the majority of the construction phase. The main access point would serve as a primary location for access point for workers to meet for morning meetings, daily-action plan meetings, etc., and workers would disperse to assigned locations from this point.

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 commuting with passenger vehicles and trucks would occur daily, with traffic peaks 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 15 to 30 semi-trucks per day could be used to deliver facility components during peak periods. These vehicles would primarily use entrances to the Project Area on Carrsville Rd. 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.

## **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 Livingston County Road Department (LCRD) 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 LCRD and the Livingston 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 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.
- Eight access points will spread out construction and worker vehicles entering and leaving the Project Area.
- The Applicant will inform and obtain permits from state and local road authorities for commercial vehicle classes used for transporting equipment and materials to the Project Area. The Applicant will also comply with those permit requirements by coordinating with the proper road officials prior to these trips.
- 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 under 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.
- The Applicant will consult with the LCRD regarding truck and other construction traffic and obtain any necessary permits from the LCRD.
- 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**

Construction traffic will use existing roadway systems to access one of the eight entrances to the Project Area. 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 100-150 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 Carrsville and Maxfield Roads (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 the 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 LCRD 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 will 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 are anticipated to require primarily the use of light trucks.

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 will 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 five planned entrances to the Project Area. A road use agreement with LCRD and Livingston 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 result in an increase in 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**

There is one active rail line located at the far southern end of Livingston County. The line is operated by P&L Railway. There are no other active or abandoned rail lines located in the County. The proposed Project would have no effect on the active rail line, nor would the Project utilize a railroad for deliveries.

## 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 improve driver safety and reduce the risk of collisions for approaching traffic. A traffic management plan would be developed and implemented to further reduce traffic impacts and improve safety.

During construction, the traffic volume would temporarily increase due to the delivery of construction equipment, materials, and workers. While damages to the existing roadway infrastructure are not anticipated, the Applicant would seek a road use agreement with Livingston County to outline responsibilities should damages occur.

It is anticipated that the construction period would not produce significant operational changes to existing roadways. All roadways within the Project Area would continue to operate at acceptable levels during peak construction 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 AM and PM peak hours.

In the long term, during the operation and maintenance phase, a small maintenance crew would travel to the Project Area regularly and as needed to make repairs or for vegetation maintenance (e.g., 1-4 workers, several times a month). It is anticipated that workers will use small to medium trucks. This traffic is considered negligible, and the operation phase of the Project would have no measurable impact on the traffic and/or transportation infrastructure.

Based on the analyses performed, no changes to the roadway network are recommended within the study area in order for traffic conditions to operate within acceptable conditions.

The only active rail line in Livingston County is at the far southern end of the County and would not be used by the Project for deliveries. The Project would not affect the existing rail line.

Construction and associated land disturbance associated with the proposed project may temporarily contribute airborne materials. The Project would utilize Best Management Practices such as: appropriate revegetation measures, application of water, or covering of spoil piles, to minimize dust. Additionally, open-bodied trucks transporting dirt would be covered while moving. During construction activities water may be applied to the internal road system to reduce dust generation. Water used for dust control is authorized under the Kentucky Pollutant Discharge Elimination System (KPDES) as a non-stormwater discharge activity, which would be required for the proposed project.

## SOURCE CITATIONS

Federal Highway Administration. 2023. Highway Functional Classification Concepts, Criteria and Procedures.

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

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

Historical Traffic Volume Summary

Station Details:

Sta ID:	070784
Sta Type:	Full Coverage
Map:	<a href="#">MapIt</a>
District:	1
County:	Livingston
Route:	070-KY-0135 -000
Route Desc:	CARRSVILLE RD

Begin MP:	5.5930
Begin Desc:	KY 1608
End Mp:	8.2320
End Desc:	KY 133 JUNCTION
Impact Year:	
Year Added:	

Newest Count:

AADT:	158
Year:	2021
% Single:	
% Combo:	
K Factor:	12
D Factor:	57

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

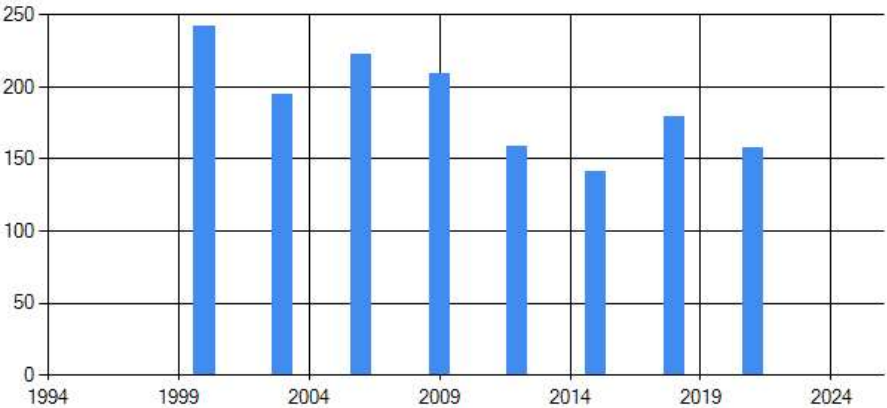
% Single – single unit truck volume as a percentage of the AADT

% 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	141	2005	
2024		2014		2004	
2023		2013		2003	195
2022		2012	159	2002	
2021	158	2011		2001	
2020		2010		2000	242
2019		2009	209	1999	
2018	179	2008		1998	
2017		2007		1997	
2016		2006	223	1996	





Historical Traffic Volume Summary

Station Details:

Sta ID:	070786
Sta Type:	Full Coverage
Map:	<a href="#">MapIt</a>
District:	1
County:	Livingston
Route:	070-KY-0135 -000
Route Desc:	CARRSVILLE RD

Begin MP:	2.7940
Begin Desc:	KY 838 (HAMPTON ROAD)
End Mp:	5.5930
End Desc:	KY 1608
Impact Year:	
Year Added:	

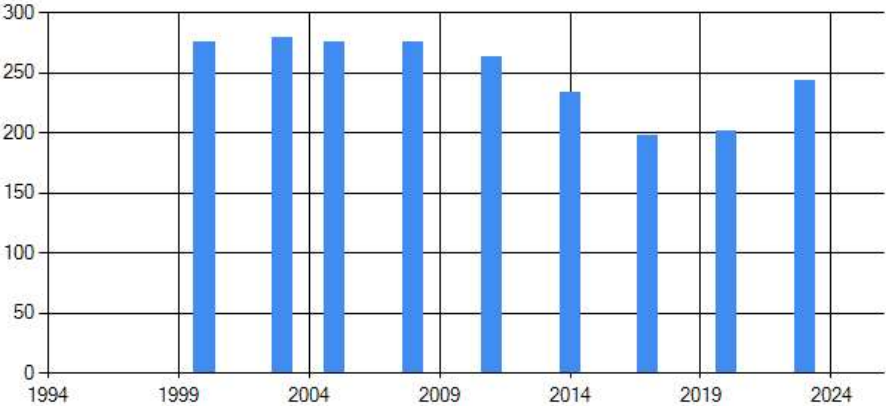
Newest Count:

AADT:	244
Year:	2023
% Single:	
% Combo:	
K Factor:	11.50
D Factor:	56

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	276
2024		2014	234	2004	
2023	244	2013		2003	280
2022		2012		2002	
2021		2011	264	2001	
2020	201	2010		2000	276
2019		2009		1999	
2018		2008	276	1998	
2017	198	2007		1997	
2016		2006		1996	



Historical Traffic Volume Summary

Station Details:

Sta ID:	070774
Sta Type:	Full Coverage
Map:	<a href="#">MapIt</a>
District:	1
County:	Livingston
Route:	070-KY-1608 -000
Route Desc:	MAXFIELD RD

Begin MP:	0
Begin Desc:	KY 763
End Mp:	6.4950
End Desc:	KY 135
Impact Year:	
Year Added:	

Newest Count:

AADT:	15
Year:	2019
% Single:	
% Combo:	
K Factor:	20
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	31
2023		2013	23	2003	
2022		2012		2002	
2021		2011		2001	37
2020		2010	28	2000	
2019	15	2009		1999	
2018		2008		1998	
2017		2007	25	1997	
2016	19	2006		1996	

