adam kirk engineering

TO: Jim Calvery
Louisville Water Company

FROM: Adam Kirk
Adam Kirk Engineering
137 McClelland Springs Drive
Georgetown, KY 40324

DATE: July 10, 2023

RE: N. English Station Road Trip Generation and Distribution

The purpose of this letter is to provide an estimate of trip generation for a 8.7 acre property to be rezoned. The subject property is located on the southeast quadrant of N. English Station Road and Data Vault Drive as shown in Figure 1. The property contains a contiguous 7.4 acre parcel and an adjacent 1.34 acre property separated by an existing access drive. A development plan has not been prepared for the parcels due to the nature of PUD zoning. Therefore, assumptions for land use were made to estimate potential trip generation, consistent with development plans in the area.

Figure 1: Study Area

Tract 1 was assumed to contain a 100 room 3-story hotel on 2.5 acres and a 60,000 s.f. (2-story) office building. The hotel development is consistent with nearby hotel lot sizes at 1650, 1530, 1451 and 1250 Alliant Drive (Table 1a). The commercial uses were consistent with average building footprints at 12941, 12949 and 12955 Shelbyville Road (Table 1b) and assumed a 2-story office building . Tract 2 was assumed to be 16,500 s.f. of retail, consistent with Shelbyville Road development densities.

Table 1: Average Hotel Lot Size

Address	Parcel ID	Parcel Size (acres)
1650 ALLIANT AVE	183100690000	2.51
1530 ALLIANT AVE	183100710000	2.3
1451 ALLIANT AVE	183100800000	2.04
1520 ALLIANT AVE	183100750000	1.65
Average		2.125

Table 2: Development Density

Address	Parcel ID	Parcel Size (acres)	Estimated Build Footprint (ft^2)	Average Building s.f. per Acre
12941 SHELBYVILLE RD	2306860000	2.35	30213	12,857
12949 SHELBYVILLE RD	2307290000	1.74	24210	13,914
12955 SHELBYVILLE RD	2307560000	1.29	13849	10,736
Average				12,502

Trip Generation was conducted in accordance with the ITE Trip Generation Web Based App, 11th edition, based on the assumed land uses. **Table 3** summarizes the trip generation and **Attachment A** contains output from the ITE Trip Generation Manual. No reductions for pass-by trips or internal trip capture trips were made.

Table 3: Trip Generation

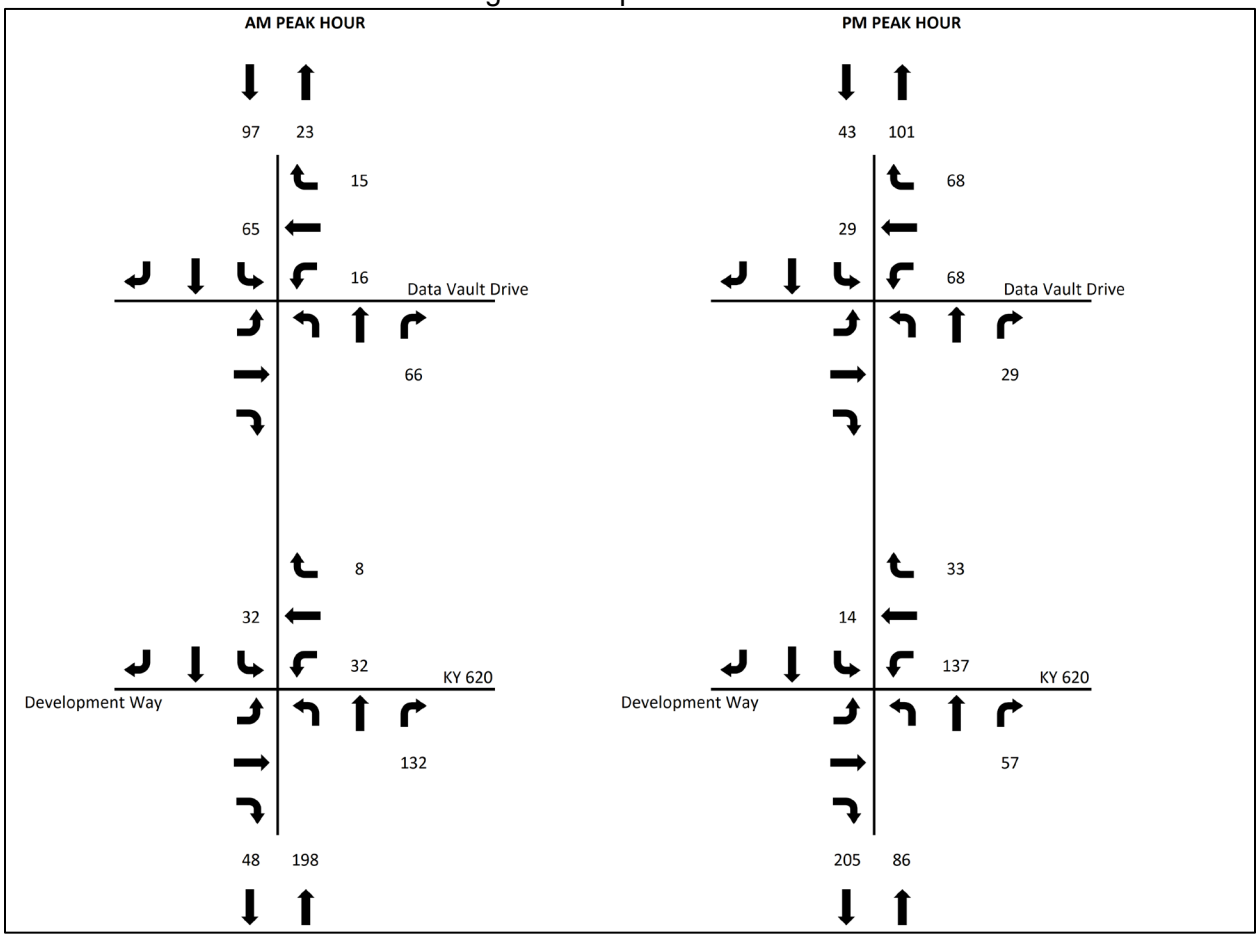
ITE Land Use	Land Use Code	Independent Variable	Var.	AM Peak Hour			PM Peak Hour		
				Total	Entry	Exit	Total	Entry	Exit
Hotel	310	110	rooms	48	27	21	54	27	27
General Office	710	60	1000 GFA	278	244	34	270	46	224
Strip Retail Plaza (<40	822	16.5	16752.7	40	24	16	111	56	55
Total				**366**	**295**	**71**	**435**	**129**	**306**

Based on KYTC count stations N. English Station Road has an Average Daily Traffic (ADT) of 15,962 and Shelbyville Road has an ADT of 33,408. Trip distribution was performed based on these volumes, with 33% of traffic assumed to have an origin or destination north on N. English Station Road and 67% of traffic having an origin/destination south on Shelbyville Road.

Access from the tracts to N. English Station Road may be made from either Data Vault Drive to the north or Development Way to the South. Consistent with KYTC Traffic Impact Study guidance, 2/3 of traffic was assigned to enter, exit from the first encountered access point and 1/3 of traffic

assigned to the downstream access point. Figure 5 shows the AM and PM peak hour trips based on these assumptions.

Figure 2: Trip Distribution



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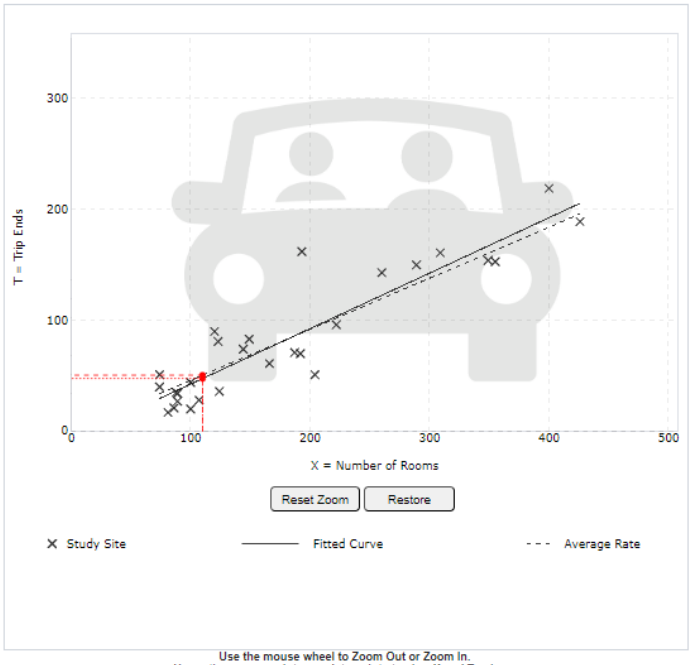
ATTACHMENT A: TRIP GENERATION

Figure A1: Hotel (310) AM Peak

Data Plot and Equation



Use the mouse wheel to Zoom Out or Zoom In.
Hover the mouse pointer on data points to view X and T values.

DATA STATISTICS

Land Use:
Hotel (310) Click for Description and Data Plots

Independent Variable:
Rooms

Time Period:
Weekday
Peak Hour of Adjacent Street Traffic
One Hour Between 7 and 9 a.m.

Setting/Location:
General Urban/Suburban

Trip Type:
Vehicle

Number of Studies:
28

Avg. Num. of Rooms:
182

Average Rate:
0.46

Range of Rates:
0.20 - 0.84

Standard Deviation:
0.14

Fitted Curve Equation:
T = 0.50(X) - 7.45

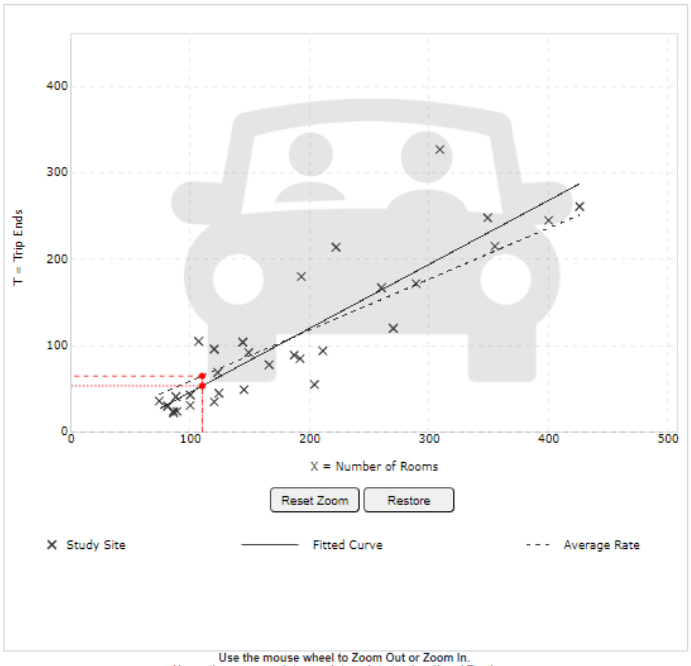
R^2:
0.84

Directional Distribution:
56% entering, 44% exiting

Calculated Trip Ends:
Average Rate: 51 (Total), 28 (Entry), 23 (Exit)
Fitted Curve: 48 (Total), 27 (Entry), 21 (Exit)

Figure A2: Hotel (310) PM Peak

Data Plot and Equation



Use the mouse wheel to Zoom Out or Zoom In.
Hover the mouse pointer on data points to view X and T values.

DATA STATISTICS

Land Use:
Hotel (310) Click for Description and Data Plots

Independent Variable:
Rooms

Time Period:
Weekday
Peak Hour of Adjacent Street Traffic
One Hour Between 4 and 6 p.m.

Setting/Location:
General Urban/Suburban

Trip Type:
Vehicle

Number of Studies:
31

Avg. Num. of Rooms:
186

Average Rate:
0.59

Range of Rates:
0.26 - 1.06

Standard Deviation:
0.22

Fitted Curve Equation:
T = 0.74(X) - 27.89

R^2:
0.78

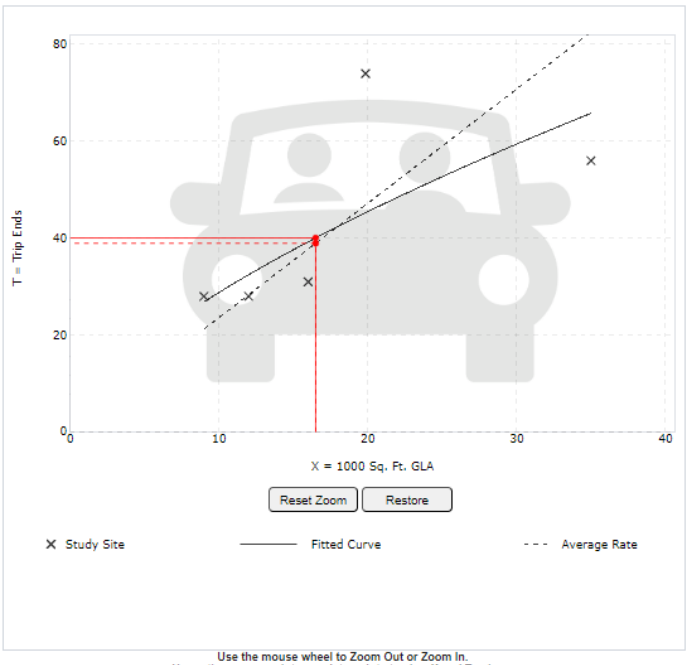
Directional Distribution:
51% entering, 49% exiting

Calculated Trip Ends:
Average Rate: 65 (Total), 33 (Entry), 32 (Exit)
Fitted Curve: 54 (Total), 27 (Entry), 27 (Exit)

Figure A3: Retail (822) AM Peak

Data Plot and Equation

Caution – Small Sample Size



Use the mouse wheel to Zoom Out or Zoom In.
Hover the mouse pointer on data points to view X and T values.

DATA STATISTICS

Land Use:
Strip Retail Plaza (<40k) (822) Click for Description and Data Plots

Independent Variable:
1000 Sq. Ft. GLA

Time Period:
Weekday
Peak Hour of Adjacent Street Traffic
One Hour Between 7 and 9 a.m.

Setting/Location:
General Urban/Suburban

Trip Type:
Vehicle

Number of Studies:
5

Avg. 1000 Sq. Ft. GLA:
18

Average Rate:
2.36

Range of Rates:
1.60 - 3.73

Standard Deviation:
0.94

Fitted Curve Equation:
Ln(T) = 0.66 Ln(X) + 1.84

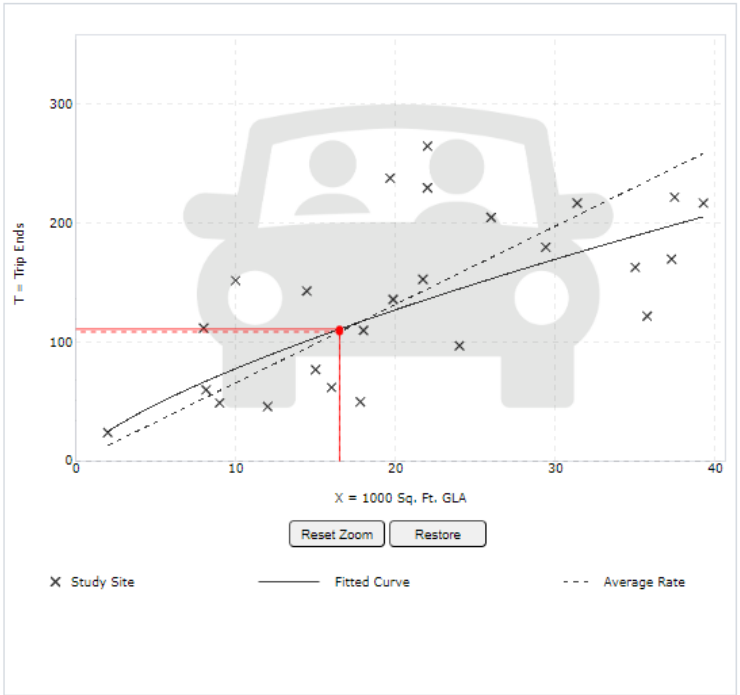
R^2:
0.57

Directional Distribution:
60% entering, 40% exiting

Calculated Trip Ends:
Average Rate: 39 (Total), 23 (Entry), 16 (Exit)
Fitted Curve: 40 (Total), 24 (Entry), 16 (Exit)

Figure A4: Retail (822) PM Peak

Data Plot and Equation



Use the mouse wheel to Zoom Out or Zoom In.
Hover the mouse pointer on data points to view X and T values.

DATA STATISTICS

Land Use:
Strip Retail Plaza (<40k) (822) Click for Description and Data Plots

Independent Variable:
1000 Sq. Ft. GLA

Time Period:
Weekday
Peak Hour of Adjacent Street Traffic
One Hour Between 4 and 6 p.m.

Setting/Location:
General Urban/Suburban

Trip Type:
Vehicle

Number of Studies:
25

Avg. 1000 Sq. Ft. GLA:
21

Average Rate:
6.59

Range of Rates:
2.81 - 15.20

Standard Deviation:
2.94

Fitted Curve Equation:
Ln(T) = 0.71 Ln(X) + 2.72

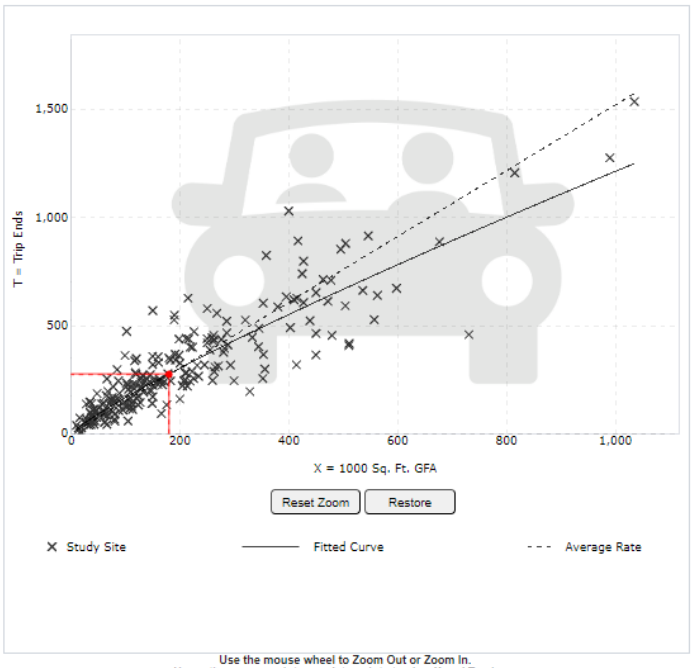
R^2:
0.56

Directional Distribution:
50% entering, 50% exiting

Calculated Trip Ends:
Average Rate: 109 (Total), 54 (Entry), 55 (Exit)
Fitted Curve: 111 (Total), 56 (Entry), 55 (Exit)

Figure A5: General Office (710) AM Peak

Data Plot and Equation



Use the mouse wheel to Zoom Out or Zoom In.
Hover the mouse pointer on data points to view X and T values.

DATA STATISTICS

Land Use:
General Office Building (710) Click for Description and Data Plots

Independent Variable:
1000 Sq. Ft. GFA

Time Period:
Weekday
Peak Hour of Adjacent Street Traffic
One Hour Between 7 and 9 a.m.

Setting/Location:
General Urban/Suburban

Trip Type:
Vehicle

Number of Studies:
221

Avg. 1000 Sq. Ft. GFA:
201

Average Rate:
1.52

Range of Rates:
0.32 - 4.93

Standard Deviation:
0.58

Fitted Curve Equation:
Ln(T) = 0.86 Ln(X) + 1.16

R^2:
0.78

Directional Distribution:
88% entering, 12% exiting

Calculated Trip Ends:
Average Rate: 274 (Total), 241 (Entry), 33 (Exit)
Fitted Curve: 278 (Total), 244 (Entry), 34 (Exit)

Figure A6: General Office (710) PM Peak