

The Distillery Traffic Access Study

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SSI Project #: 820401

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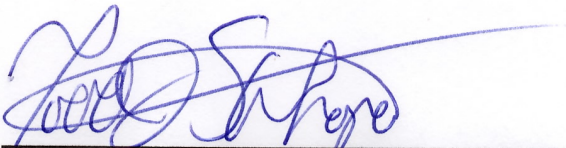
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Under the direction of:



Registered Engineer No. E-64507, Ohio

6-09-2022

Date



TABLE OF CONTENTS

Background	1
Existing Conditions	1
Projected Site Traffic	4
2023 & 2033 Traffic	4
Traffic Analysis	10
Conclusions	11

APPENDIX

Correspondence

Traffic Counts

Referenced Documents

Turn Lane Warrant Graphs

Turn Lane Length Calculations

BACKGROUND

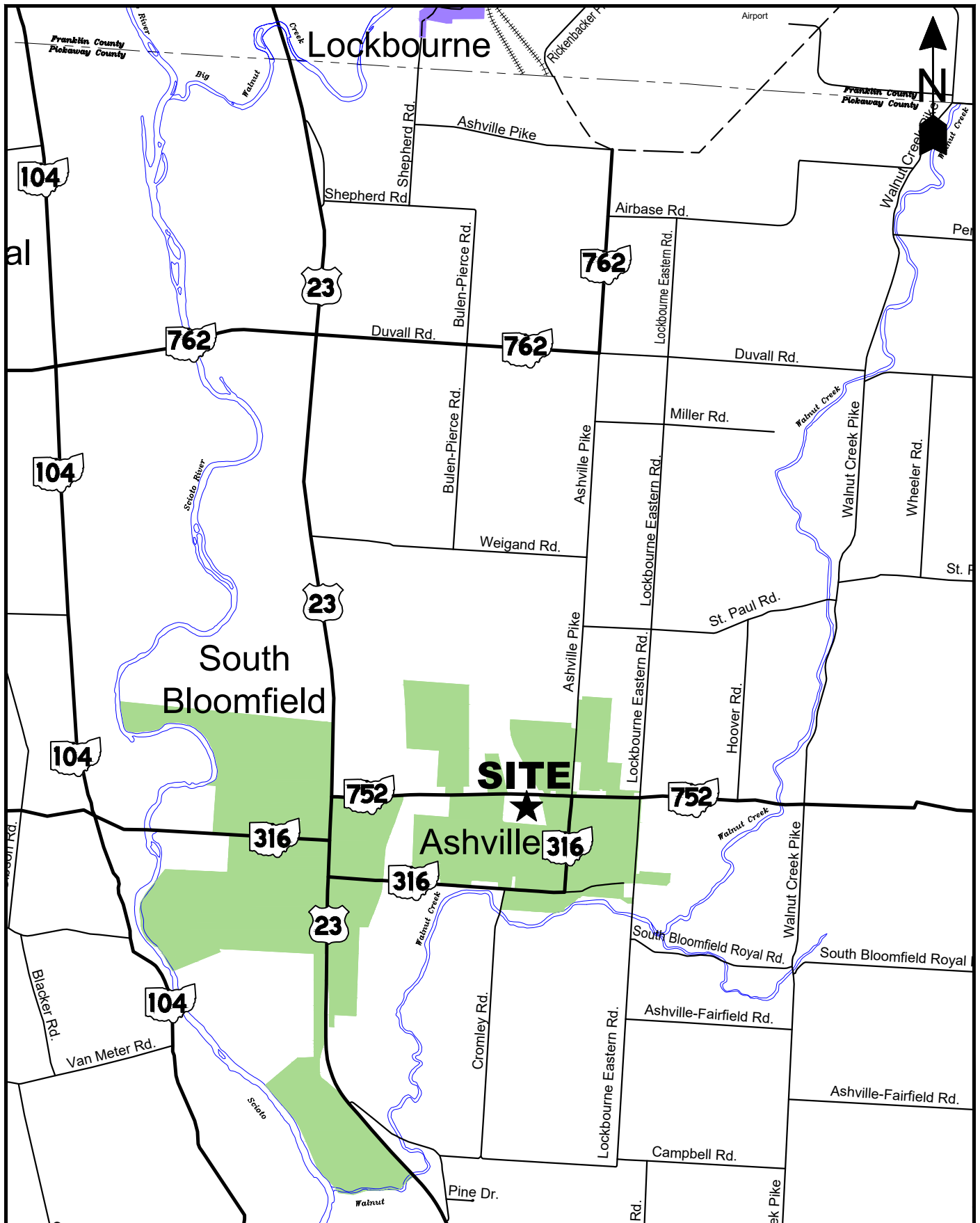
AB Contracting, Inc. is proposing to develop a site with 232 multifamily units. The site is located on the south side of SR 752 between Reynolds Road and Long Street (between the railroad overpass and the railroad at grade crossing). Figure 1 shows the location of the site. There is one proposed access on SR 752. The Village is also requiring the developer to connect and perform some upgrades to an existing access road to the east of the site. For purposes of the TAS, all traffic is assumed to utilize the SR 752 access. Figure 2 shows the site layout. The annexation for this property extends to the centerline of SR 752 so the permitting agency for the access is the Village of Ashville. It is our understanding that they are requiring a traffic access study (TAS). Because half of the road is outside the Village, the Ohio Department of Transportation (ODOT) will also have review of the TAS.

EXISTING CONDITIONS

SR 752 in the area of the site is a two-lane road with a posted speed limit of 55 MPH. Table 1 summarizes the data being used as the basis of the existing traffic as well as the traffic control. Per the ODOT *State Highway Access Management Manual*, a factor must be applied to the count to convert it to a design hour. This factor was applied to both peak hours and based on ODOT's Peak Hour to Design Hour Factors chart. SR 752 is classified as Major Collector (FC 5). The Major Collector Factors (in Appendix) were applied. The factor associated with a Thursday in March is 1.23.

SEGMENT	SOURCE	AM PEAK HOUR	PM PEAK HOUR
SR 752	Smart Services, Inc.	3/03/2022 6:45-7:45 AM	3/03/2022 4:30-5:30 PM

TABLE 1 - Summary of Existing Traffic Basis



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TRAFFIC ACCESS STUDY**

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6/2022

FIGURE 1

SITE LOCATION

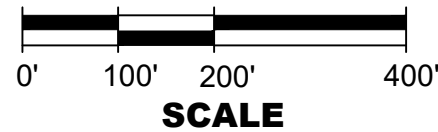
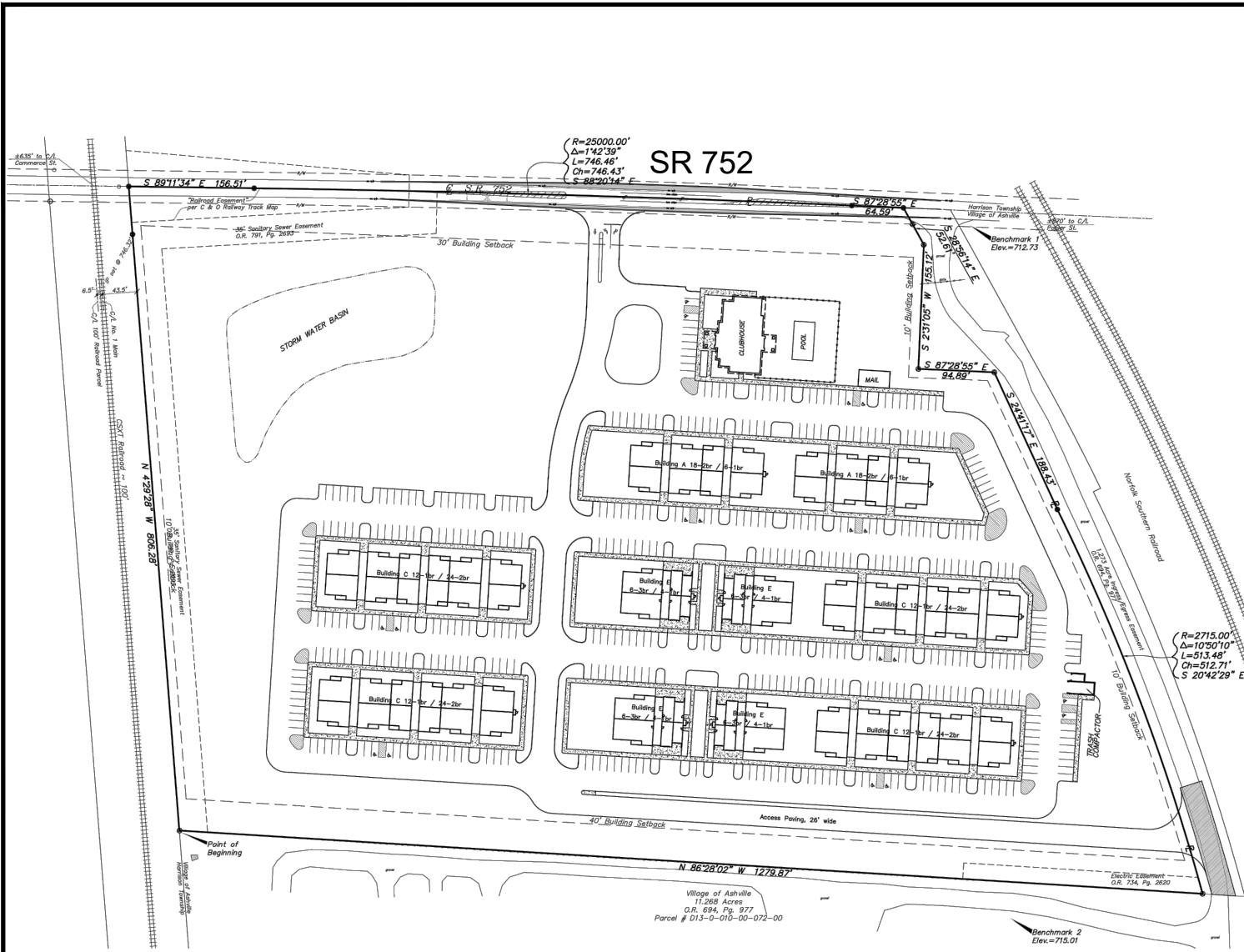


FIGURE 2
 SITE LAYOUT
THE DISTILLERY TRAFFIC ACCESS STUDY
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PROJECTED SITE TRAFFIC

Trip Generation

In traffic engineering, the accepted method for computing trip generation is utilizing data from the *Trip Generation Manual, 11th Edition* published by the Institute of Transportation Engineers. Table 2 shows the trip generation calculations.

Trip Distribution

The distribution of traffic was assumed to be the same as the existing distribution in the PM Peak which is as follows:

- 45% - To/from the east on SR 752
- 55% - To/from the west on SR 752

2023 & 2033 TRAFFIC

A 10-Year design horizon is required by ODOT for this level of development. Opening Day is assumed to be 2023; therefore, the design year is 2033. The growth rates were obtained from the ODOT TIMS website. The printout from TIMS is in the Appendix. Table 3 shows the growth rates and corresponding factors applied to the 2022 counts.

SEGMENT	LINEAR ANNUAL GROWTH RATE	2022 TO 2023 FACTOR	2022 TO 2033 FACTOR
SR 752	2.79%	1.028	1.307

TABLE 3 – Growth Factor Summary for 2022 Counts

Figures 3 and 4 show the components of the 2023 'Build' traffic. Figures 5 and 6 show the components of the 2033 'Build' traffic.

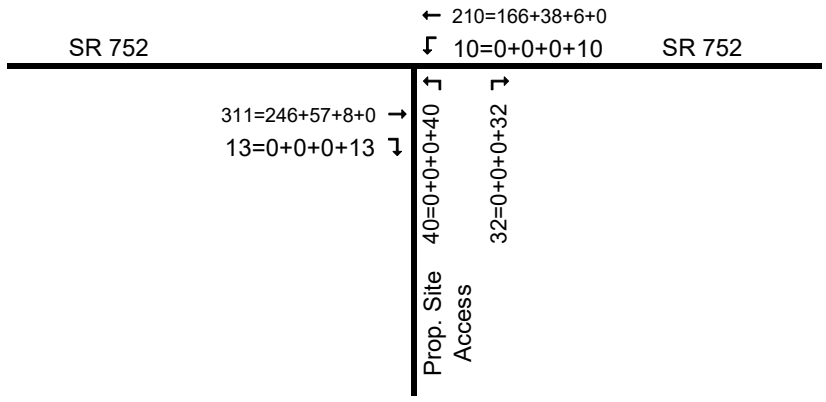
TIS SUBAREA	LAND USE	TIME OF DAY	DATA SET <i>Trip Generation Manual, 11th Edition</i> (Unless noted Otherwise)	RATE OR EQUATION FROM: <i>Trip Generation Manual 11th Edition</i>	TOTAL TRIPS	ENTERING		EXITING	
						%	TOTAL TRIPS	%	TOTAL TRIPS
1	Multifamily Housing (Low-Rise) Not Close to Rail/Transit (ITE Code #220) Ind. Variable (X) = 232 Dwelling Units	Daily	Weekday	$T = 6.41(X) + 75.31$	1562	50%	781	50%	781
		AM Peak	Peak Hour of Adj. Street Traffic, One Hour between 7 & 9 AM	$T=0.31(X)+22.85$	95	24%	23	76%	72
		PM Peak	Peak Hour of Adj. Street Traffic, One Hour between 4 & 6 PM	$T=0.43(X)+20.55$	120	63%	76	37%	44
TOTALS		Daily			1562		781		781
		AM Peak			95		23		72
		PM Peak			120		76		44

The Distillery Traffic Access Study - 3/2022

TABLE 2 - SITE TRIP GENERATION SUMMARY



L A (SHEET TITLE)=B+C+D+E
E B = EXISTING (2022)
C C = DHF ADJUSTMENT
G D = GROWTH
E E = SITE TOTAL
N
D

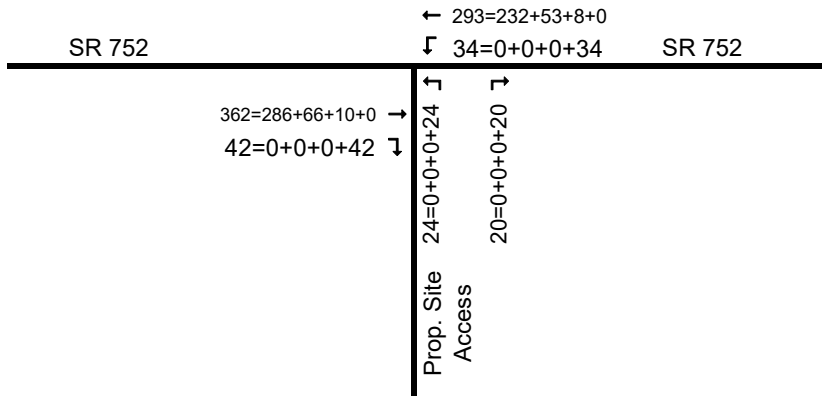


NOTE: Existing AM Peak volumes have been adjusted to account for the dhf.

NOTE: Rounding as a result of software algorithms can result in one car discrepancies in the site traffic between intersections.



L A (SHEET TITLE)=B+C+D+E
E B = EXISTING (2022)
C C = DHF ADJUSTMENT
G D = GROWTH
E E = SITE TOTAL
N
D



NOTE: Existing PM Peak volumes have been adjusted to account for the dhf.

NOTE: Rounding as a result of software algorithms can result in one car discrepancies in the site traffic between intersections.

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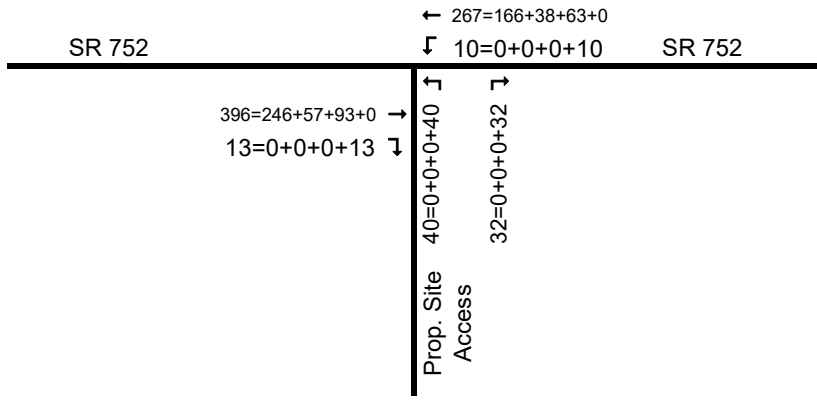
3/2022

FIGURE 4

2023 'BUILD' - PM PEAK



L A (SHEET TITLE)=B+C+D+E
E B = EXISTING (2022)
C C = DHF ADJUSTMENT
G D = GROWTH
E E = SITE TOTAL
N
D



NOTE: Existing AM Peak volumes have been adjusted to account for the dhf.

NOTE: Rounding as a result of software algorithms can result in one car discrepancies in the site traffic between intersections.

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TRAFFIC ACCESS STUDY**

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3/2022

FIGURE 5

2033 'BUILD' - AM PEAK

TRAFFIC ANALYSIS

Turn Lane Warrant Analysis

The procedure to determine whether turn lanes are warranted is according to the *ODOT L&D Manual* published by the Ohio Department of Transportation (ODOT). Since the Village corporation limit is the centerline of SR 752, it is the understanding of Smart Services, Inc. that the developer has received conflicting direction regarding the prima-facie speed limit on SR 752. Therefore, the analysis was considered for both the criteria over and under 40 MPH. The results are shown in Table 4. The graphs from the *ODOT L&D Manual* are in the Appendix. Also in Table 4 is the number of units that result in the approximate threshold units for the 2033 'Build' condition.

MOVEMENT	2023 'BUILD'		2033 'BUILD'	
	>40 MPH	=<40 MPH	>40 MPH	=<40 MPH
SR 752 WB left turn at Prop. Site Access	Warrant Met	Warrant Met	Warrant Met (≈ 70 Units)	Warrant Met (≈165 Units)
SR 752 EB right turn at Prop. Site Access	Warrant Not Met	Warrant Not Met	*Warrant Met (≈165 Units)	Warrant Not Met

*The Village may not require the eastbound right turn lane.

TABLE 4 – Summary of Turn Lane Warrant Analysis

Turn Lane Length Analysis

Turn lane lengths for the warranted turn lanes per the turn lane analyses were calculated. The calculations were performed per Section 400 of the *ODOT L&D Manual*. ODOT has indicated that the prima-facie speed limit is 50 MPH. The design speed is typically assumed to be 5 MPH above the speed limit. Because there is limited space for developing turn lanes between the railroad tracks to the east and west, calculations have been provided for both 50 MPH and 55 MPH. Table 5 shows a summary of the results. The calculations are in the Appendix.

LOCATION	DIRECTION	SPEED LIMIT/ DESIGN SPEED	2023 'BUILD'	2033 'BUILD'
			<i>ODOT L&D Manual</i>	<i>ODOT L&D Manual</i>
SR 752 & Prop. Site Access	WB LT	50 / 50 MPH	225'/285' *100'	225'/285' *100'
	EB RT	50 / 55 MPH	NA	225'/285' *100'

*Storage Distance

TABLE 5– Turn Lane Length Results (Includes the 50' diverging taper)

CONCLUSIONS

2023 'Build' and 2033 'Build' volumes were developed for use in turn lane warrant and turn lane length analyses. Below is a summary of the conclusions for each condition:

2023 'Build'

- SR 752 & Prop. Site Access
 - A westbound left turn lane is warranted. For a design speed of 55 MPH, the length of the lane is 285 feet which includes the 50-foot diverging taper. For a design speed of 50 MPH, the length of the lane is 225 feet which includes the 50-foot diverging taper. Because of the limited space in this area between the railroad tracks, the developer and ODOT will have to work out the design parameters.
 - An eastbound right turn lane is not warranted.

2033 'Build'

- SR 752 & Prop. Site Access
 - A westbound left turn lane is warranted. The threshold occurs at approximately 70 units. For a design speed of 55 MPH, the length of the lane is 285 feet which includes the 50-foot diverging taper. For a design speed of 50 MPH, the length of the lane is 225 feet which includes the 50-foot diverging taper. Because of the limited space in this area between the railroad tracks, the developer and ODOT will have to work out the design parameters.
 - An eastbound right turn lane is warranted. The threshold occurs at approximately 165 units. For a design speed of 55 MPH, the length of the lane is 285 feet which includes the 50-foot diverging taper. For a design speed of 50 MPH, the length of the lane is 225 feet which includes the 50-foot diverging taper. The Village may not require the eastbound right turn lane.

APPENDIX

SR 752 West of SR 316 (Long St)-Ashville Pike - ATR

Thu Mar 3, 2022

Full Length (6 AM-10 AM, 3 PM-7 PM)

All Classes (Lights and Motorcycles, Heavy)

All Channels

ID: 927598, Location: 39.7235, -82.952874



Provided by: Smart Services, Inc.
88 W. Church Street, Newark, OH, 43055, US

Leg Direction	West		East		Int
	Eastbound		Westbound		
Time	T	App	T	App	
2022-03-03 6:00AM	18	18	29	29	47
6:15AM	14	14	33	33	47
6:30AM	27	27	57	57	84
6:45AM	34	34	46	46	80
Hourly Total	93	93	165	165	258
7:00AM	69	69	35	35	104
7:15AM	85	85	49	49	134
7:30AM	58	58	36	36	94
7:45AM	24	24	43	43	67
Hourly Total	236	236	163	163	399
8:00AM	27	27	33	33	60
8:15AM	30	30	39	39	69
8:30AM	35	35	41	41	76
8:45AM	24	24	42	42	66
Hourly Total	116	116	155	155	271
9:00AM	37	37	37	37	74
9:15AM	39	39	35	35	74
9:30AM	27	27	38	38	65
9:45AM	27	27	36	36	63
Hourly Total	130	130	146	146	276
3:00PM	50	50	34	34	84
3:15PM	29	29	30	30	59
3:30PM	58	58	52	52	110
3:45PM	52	52	49	49	101
Hourly Total	189	189	165	165	354
4:00PM	70	70	59	59	129
4:15PM	71	71	43	43	114
4:30PM	63	63	69	69	132
4:45PM	83	83	48	48	131
Hourly Total	287	287	219	219	506
5:00PM	82	82	58	58	140
5:15PM	58	58	57	57	115
5:30PM	73	73	47	47	120
5:45PM	76	76	43	43	119
Hourly Total	289	289	205	205	494
6:00PM	60	60	41	41	101
6:15PM	54	54	39	39	93
6:30PM	60	60	32	32	92
6:45PM	53	53	26	26	79
Hourly Total	227	227	138	138	365
Total	1567	1567	1356	1356	2923
% Approach	100%	-	100%	-	-
% Total	53.6%	53.6%	46.4%	46.4%	-
Lights and Motorcycles	1515	1515	1310	1310	2825
% Lights and Motorcycles	96.7%	96.7%	96.6%	96.6%	96.6%
Heavy	52	52	46	46	98
% Heavy	3.3%	3.3%	3.4%	3.4%	3.4%

*T: Thru

SR 752 West of SR 316 (Long St)-Ashville Pike - ATR

Thu Mar 3, 2022

AM Peak (6:45 AM - 7:45 AM)

All Classes (Lights and Motorcycles, Heavy)

All Channels

ID: 927598, Location: 39.7235, -82.952874



Provided by: Smart Services, Inc.
88 W. Church Street, Newark, OH, 43055, US

Leg Direction	West Eastbound		East Westbound		Int
	T	App	T	App	
Time					
2022-03-03 6:45AM	34	34	46	46	80
7:00AM	69	69	35	35	104
7:15AM	85	85	49	49	134
7:30AM	58	58	36	36	94
Total	246	246	166	166	412
% Approach	100%	-	100%	-	-
% Total	59.7%	59.7%	40.3%	40.3%	-
PHF	0.724	0.724	0.847	0.847	0.769
Lights and Motorcycles	236	236	162	162	398
% Lights and Motorcycles	95.9%	95.9%	97.6%	97.6%	96.6%
Heavy	10	10	4	4	14
% Heavy	4.1%	4.1%	2.4%	2.4%	3.4%

*T: Thru

SR 752 West of SR 316 (Long St)-Ashville Pike - ATR

Thu Mar 3, 2022

PM Peak (4:30 PM - 5:30 PM) - Overall Peak Hour

All Classes (Lights and Motorcycles, Heavy)

All Channels

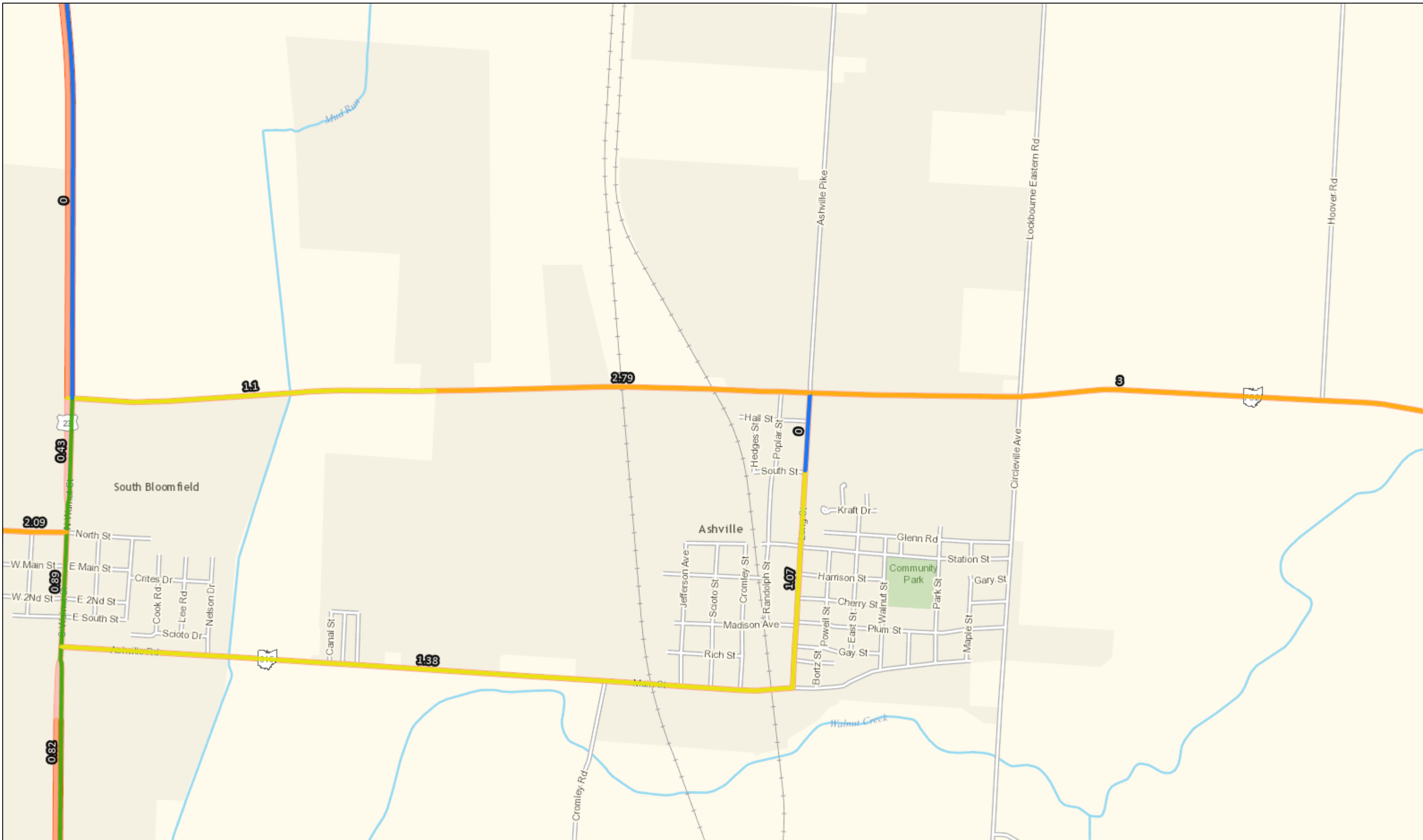
ID: 927598, Location: 39.7235, -82.952874



Provided by: Smart Services, Inc.
88 W. Church Street, Newark, OH, 43055, US

Leg Direction	West Eastbound		East Westbound		Int
	T	App	T	App	
Time					
2022-03-03 4:30PM	63	63	69	69	132
4:45PM	83	83	48	48	131
5:00PM	82	82	58	58	140
5:15PM	58	58	57	57	115
Total	286	286	232	232	518
% Approach	100%	-	100%	-	-
% Total	55.2%	55.2%	44.8%	44.8%	-
PHF	0.861	0.861	0.841	0.841	0.925
Lights and Motorcycles	279	279	225	225	504
% Lights and Motorcycles	97.6%	97.6%	97.0%	97.0%	97.3%
Heavy	7	7	7	7	14
% Heavy	2.4%	2.4%	3.0%	3.0%	2.7%

*T: Thru



PEAK HOUR to DESIGN HOUR FACTORS
FUNCTIONAL CLASSIFICATION = 05, 06r
(Rural Major Collector & Rural Minor Collector)

Day Month	Monthly Average by Day-of-Week							
	WEEKDAY MON- THUR	Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
January	1.31	2.00	1.35	1.32	1.29	1.28	1.23	1.80
February	1.26	1.91	1.27	1.25	1.27	1.28	1.18	1.67
March	1.24	1.80	1.25	1.24	1.24	1.23	1.17	1.64
April	1.16	1.60	1.20	1.18	1.13	1.14	1.08	1.55
May	1.13	1.56	1.15	1.12	1.12	1.11	1.06	1.46
June	1.18	1.57	1.20	1.20	1.15	1.15	1.13	1.44
July	1.22	1.60	1.25	1.22	1.20	1.22	1.17	1.50
August	1.17	1.53	1.18	1.17	1.16	1.14	1.09	1.40
September	1.13	1.54	1.16	1.13	1.12	1.10	1.04	1.39
October	1.13	1.59	1.17	1.11	1.12	1.11	1.04	1.39
November	1.18	1.77	1.21	1.17	1.17	1.19	1.08	1.59
December	1.22	1.86	1.22	1.22	1.22	1.24	1.16	1.64

peak hour volume * factor = design hour volume

source: year 2016, 2017, & 2018 Automatic Traffic Recorders (ATR) Data

ATR Stations:

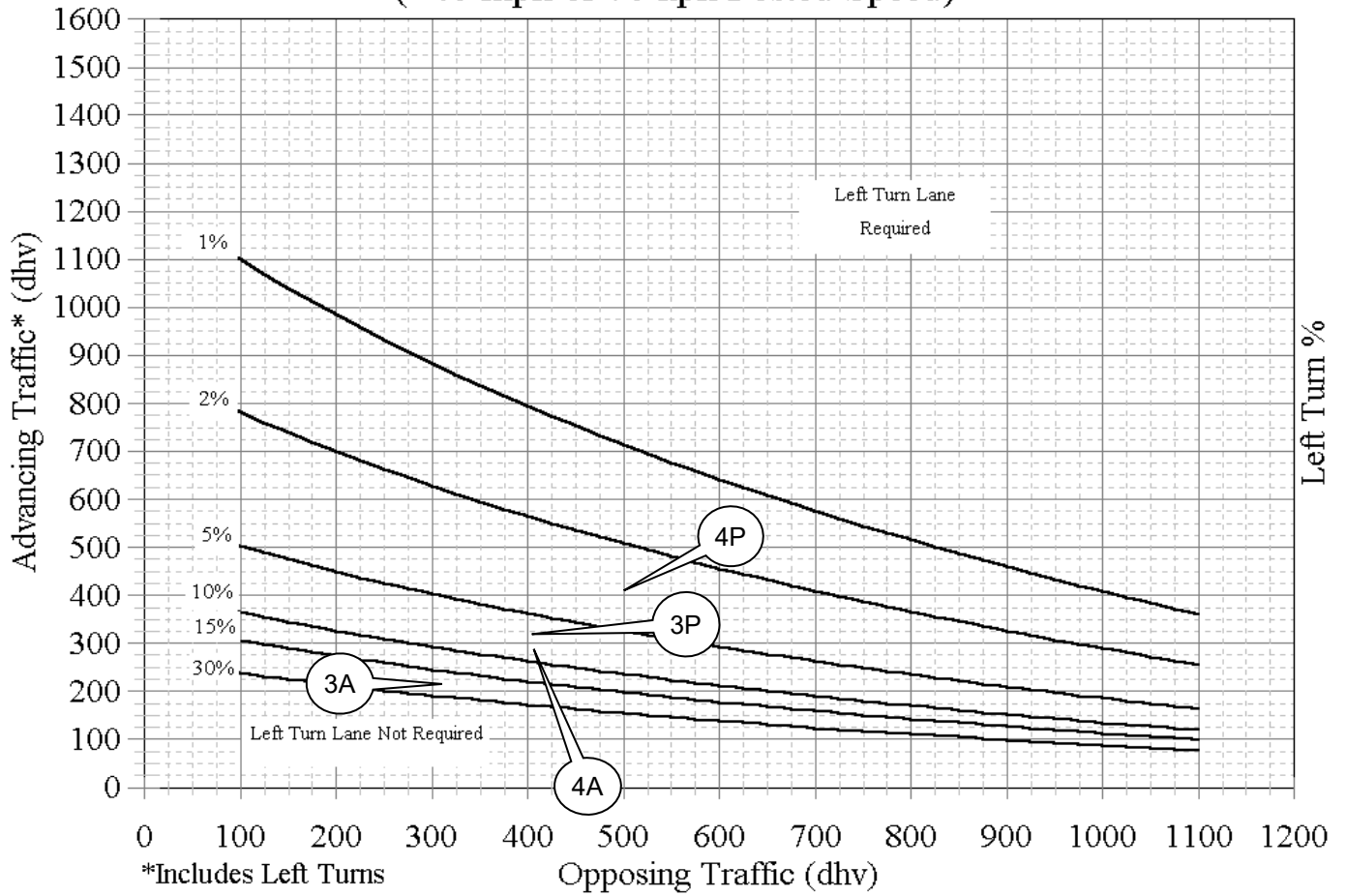
2018: 7, 67, 171, 516, 520, 548, 773, 774

2017: 7, 67, 171, 516, 520, 773, 774, 548, 549

2016: 7, 67, 516, 520, 773, 774, 548, 549

Ohio Department of Transportatio
 Modeling & Forecasting Section
 June 2019

2-Lane Highway Left Turn Lane Warrant (>40 mph or 70 kph Posted Speed)

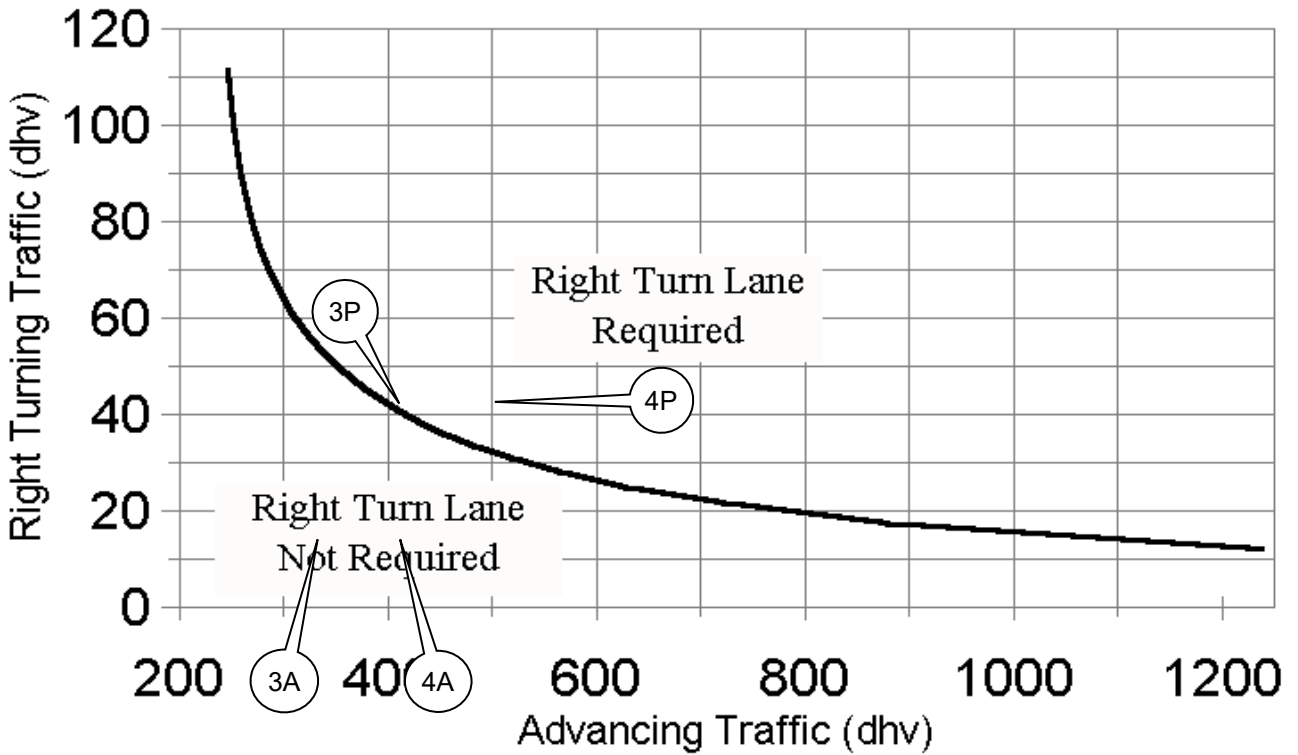


WARRANT SUMMARY

ID	INTERSECTION [MOVEMENT] - VOLUME SET	AM PEAK (A)	PM PEAK (P)	RESULT
3	Prop. Site Access & SR 752 [WB LT] - 2023 'BUILD'	(324,220 / 4.5%)	(404,327 / 10.4%)	MET
4	Prop. Site Access & SR 752 [WB LT] - 2033 'BUILD'	(409,277 / 3.6%)	(502,406 / 8.4%)	MET

2-Lane Highway Right Turn Lane Warrant

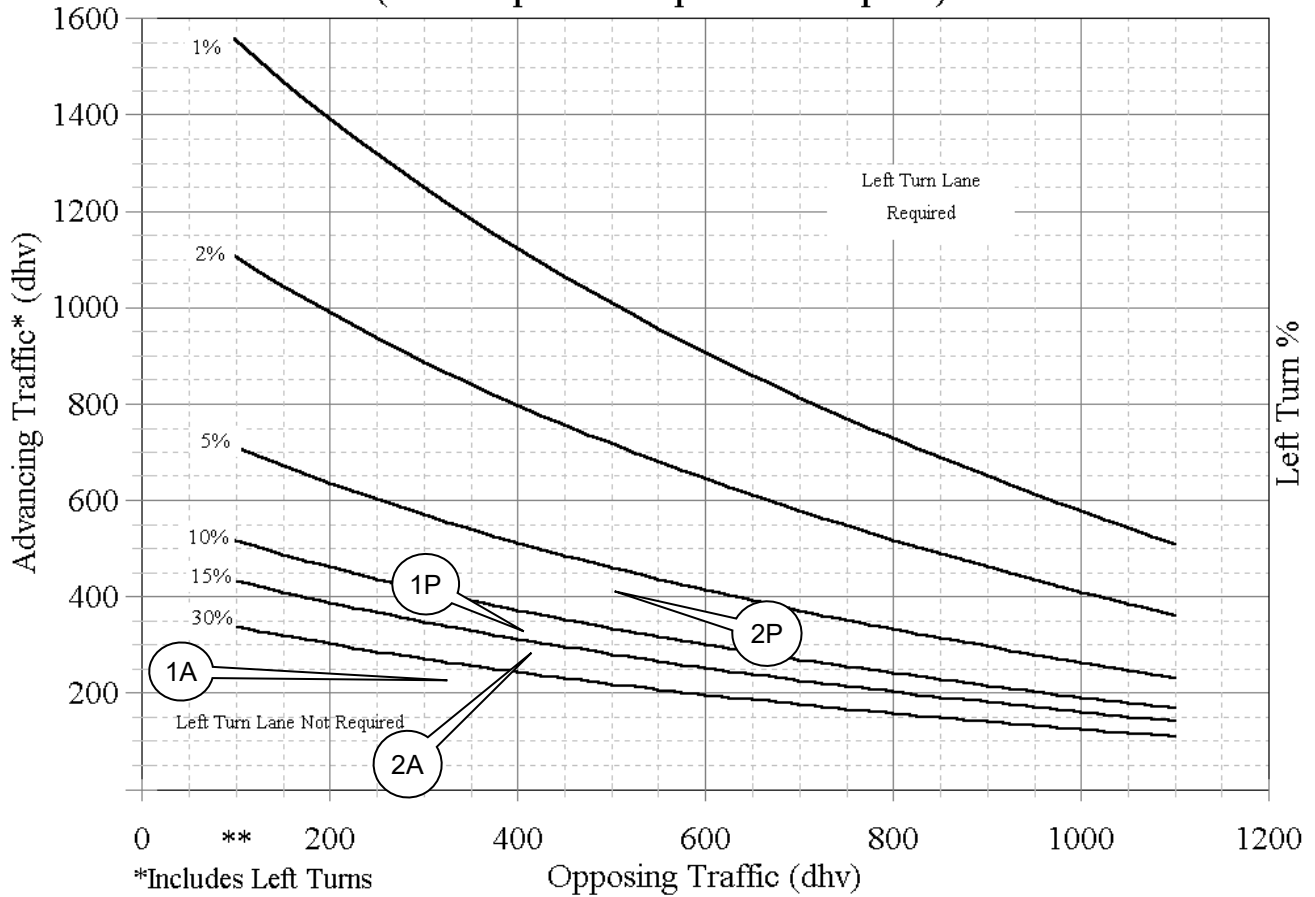
> 40 mph or 70 kph Posted Speed



WARRANT SUMMARY

ID	INTERSECTION [MOVEMENT] - VOLUME SET	AM PEAK (A)	PM PEAK (P)	RESULT
3	Prop. Site Access & SR 752 [EB RT] - 2023 'BUILD'	(324,13)	(404,42)	MET
4	Prop. Site Access & SR 752 [EB RT] - 2033 'BUILD'	(409,13)	(502,42)	MET

2-Lane Highway Left Turn Lane Warrant (=<40 mph or 70 kph Posted Speed)



*Includes Left Turns

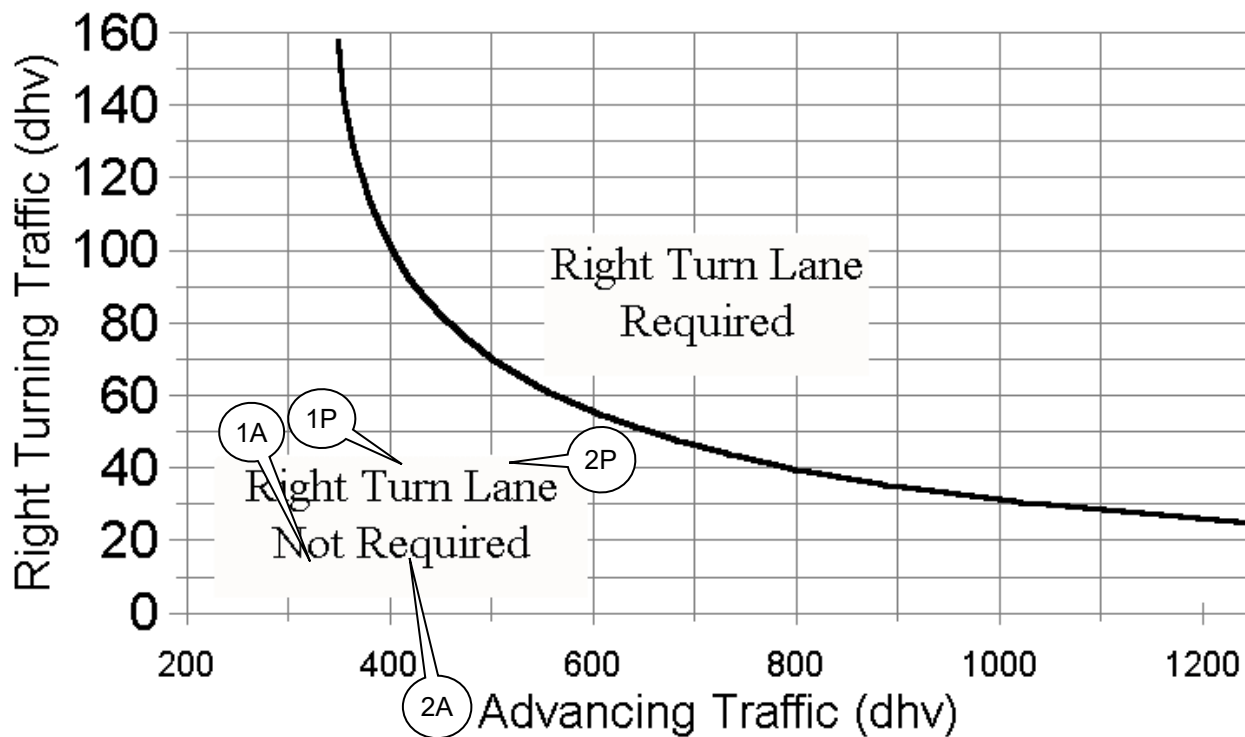
** There is no minimum number of turns

WARRANT SUMMARY

ID	INTERSECTION [MOVEMENT] - VOLUME SET	AM PEAK (A)	PM PEAK (P)	RESULT
1	Prop. Site Access & SR 752 [WB LT] - 2023 'BUILD'	(324,220 / 4.5%)	(404,327 / 10.4%)	NOT MET
2	Prop. Site Access & SR 752 [WB LT] - 2033 'BUILD'	(409,277 / 3.6%)	(502,406 / 8.4%)	MET

2-Lane Highway Right Turn Lane Warrant

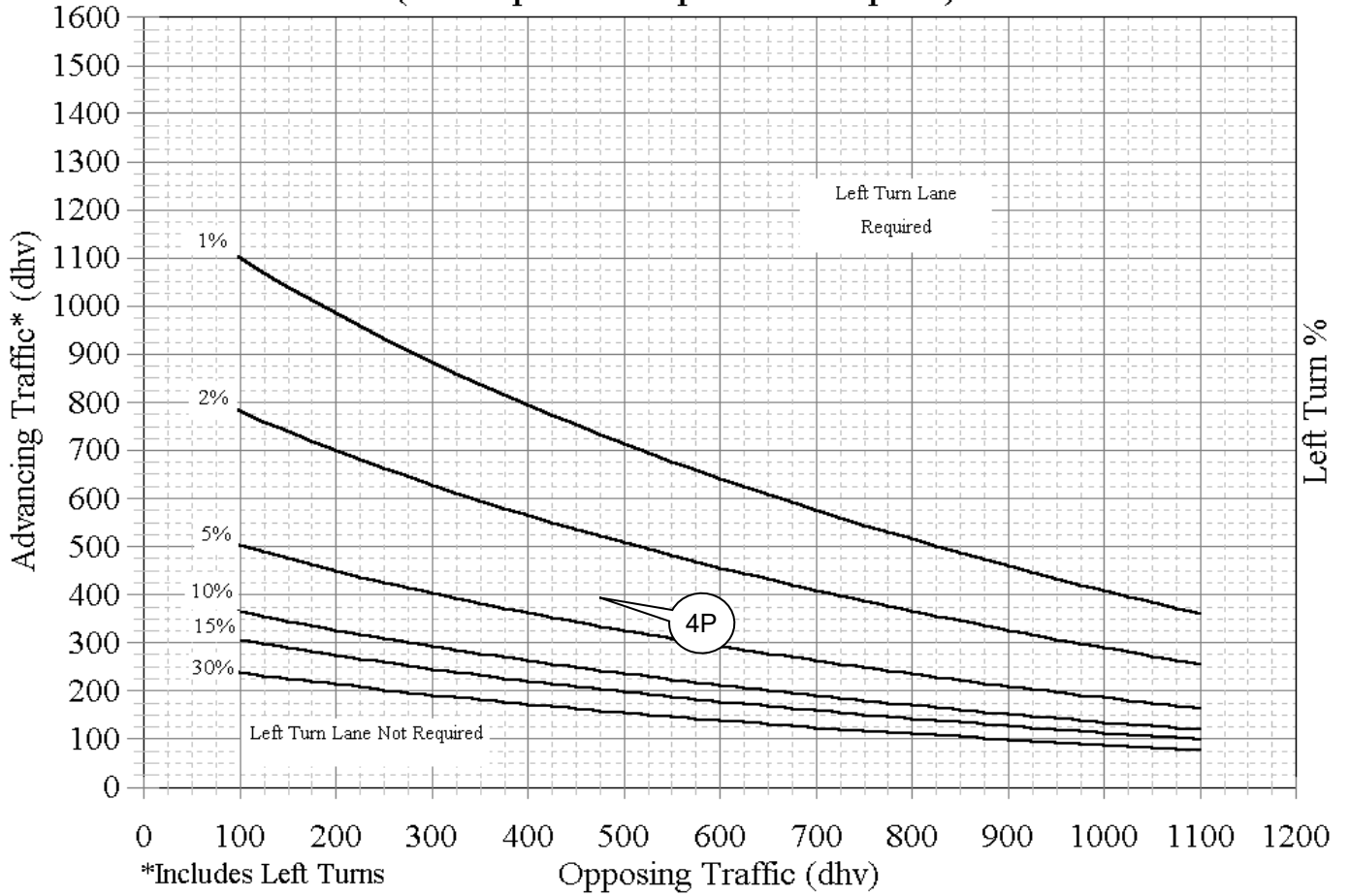
= \leq 40 mph or 70 kph Posted Speed



WARRANT SUMMARY

ID	INTERSECTION [MOVEMENT] - VOLUME SET	AM PEAK (A)	PM PEAK (P)	RESULT
1	Prop. Site Access & SR 752 [EB RT] - 2023 'BUILD'	(324,13)	(404,42)	NOT MET
2	Prop. Site Access & SR 752 [EB RT] - 2033 'BUILD'	(409,13)	(502,42)	NOT MET

2-Lane Highway Left Turn Lane Warrant (>40 mph or 70 kph Posted Speed)



WARRANT SUMMARY

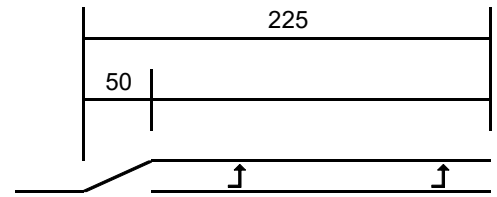
ID	INTERSECTION [MOVEMENT] - VOLUME SET	AM PEAK (A)	PM PEAK (P)	RESULT
4	Prop. Site Access & SR 752 [WB LT] - 2033 70 UNIT 'BUILD'		(478,386 / 3.6%)	NOT MET

(1) PROP. SITE ACCESS & SR 752 - WB LT - 2023 'BUILD'

Critical Analysis Period: PM PEAK

Type = Unsignalized Through Road
Speed = 50 MPH
Cycle Length = 60 seconds
Turning Volume = 34 VPH
of Turning Lanes = 1
Advancing Volume = 327 VPH
Turning % (>10% HIGH) 10.4% HIGH
Design Condition = B or C
Vehicles per Cycle = 0.6
Storage Length (Calc) = 50 feet

Design Condition (Rev)= B
Storage Length (Adj) = NA
Deceleration/Div. Taper = 225 feet
Turn Lane Length = 225 feet



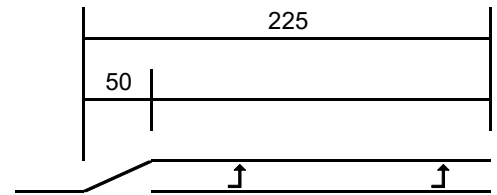
Calculations based on 401-7E in ODOT L&D Manual. All dimensions are in feet.

(2) PROP. SITE ACCESS & SR 752 - WB LT - 2033 'BUILD'

Critical Analysis Period: PM PEAK

Type = Unsignalized Through Road
Speed = 50 MPH
Cycle Length = 60 seconds
Turning Volume = 34 VPH
of Turning Lanes = 1
Advancing Volume = 406 VPH
Turning % (>10% HIGH) 8.4% LOW
Design Condition = B
Vehicles per Cycle = 0.6
Storage Length (Calc) = 50 feet

Storage Length (Adj) = NA
Deceleration/Div. Taper = 225 feet
Turn Lane Length = 225 feet



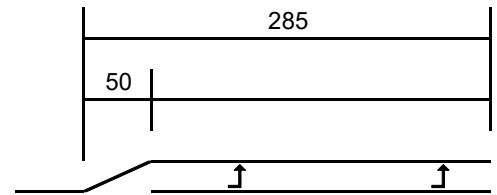
Calculations based on 401-7E in ODOT L&D Manual. All dimensions are in feet.

(3) PROP. SITE ACCESS & SR 752 - WB LT - 2023 'BUILD'

Critical Analysis Period: PM PEAK

Type = Unsignalized Through Road
Speed = 55 MPH
Cycle Length = 60 seconds
Turning Volume = 34 VPH
of Turning Lanes = 1
Advancing Volume = 327 VPH
Turning % (>10% HIGH) 10.4% HIGH
Design Condition = B or C
Vehicles per Cycle = 0.6
Storage Length (Calc) = 50 feet

Design Condition (Rev)= B
Storage Length (Adj) = NA
Deceleration/Div. Taper = 285 feet
Turn Lane Length = 285 feet



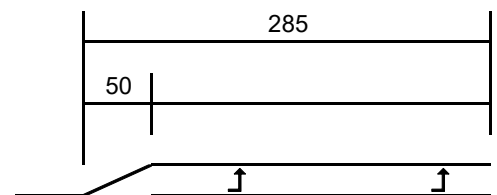
Calculations based on 401-7E in ODOT L&D Manual. All dimensions are in feet.

(4) PROP. SITE ACCESS & SR 752 - WB LT - 2033 'BUILD'

Critical Analysis Period: PM PEAK

Type = Unsignalized Through Road
Speed = 55 MPH
Cycle Length = 60 seconds
Turning Volume = 34 VPH
of Turning Lanes = 1
Advancing Volume = 406 VPH
Turning % (>10% HIGH) 8.4% LOW
Design Condition = B
Vehicles per Cycle = 0.6
Storage Length (Calc) = 50 feet

Storage Length (Adj) = NA
Deceleration/Div. Taper = 285 feet
Turn Lane Length = 285 feet



Calculations based on 401-7E in ODOT L&D Manual. All dimensions are in feet.

**THE DISTILLERY
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PREPARED BY: SMART SERVICES

6/2022

APPENDIX

LEFT TURN LANE CALCULATIONS

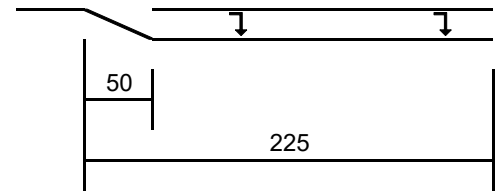
(2) PROP. SITE ACCESS & SR 752 - EB RT - 2033 'BUILD'

Critical Analysis Period: PM Peak

Type = Unsignalized Through Road
Speed = 50 MPH
Cycle Length = 60 seconds
Turning Volume = 42 VPH
of Turning Lanes = 1
Advancing Volume = 502 VPH
Turning % (>10% HIGH) 8.4% LOW
Design Condition = B
Vehicles per Cycle = 0.70
Storage Length (Calc) = 50 feet

Storage Length (Adj) = NA
Deceleration/Div. Taper = 225 feet
Turn Lane Length = 225 feet

Calculations based on 401-7E in ODOT L&D Manual. All dimensions are in feet.



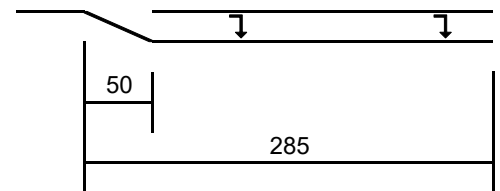
(4) PROP. SITE ACCESS & SR 752 - EB RT - 2033 'BUILD'

Critical Analysis Period: PM Peak

Type = Unsignalized Through Road
Speed = 55 MPH
Cycle Length = 60 seconds
Turning Volume = 42 VPH
of Turning Lanes = 1
Advancing Volume = 502 VPH
Turning % (>10% HIGH) 8.4% LOW
Design Condition = B
Vehicles per Cycle = 0.70
Storage Length (Calc) = 50 feet

Storage Length (Adj) = NA
Deceleration/Div. Taper = 285 feet
Turn Lane Length = 285 feet

Calculations based on 401-7E in ODOT L&D Manual. All dimensions are in feet.



**THE DISTILLERY
TRAFFIC ACCESS STUDY**

PREPARED BY:  SMART SERVICES

6/2022

APPENDIX

RIGHT TURN LANE CALCULATIONS