Appendix A

Site Plan

LEGEND

	Ex. Light Pole
	Ex. Utility Pole
	Ex. Traffic Pole
	Ex. Guy Wire
E	Ex. Electric Manhole
E	Ex. Electric Meter
E	Ex. Electric Box
T	Ex. Telephone Manhole
T	Ex. Telephone Box
TR	Ex. Traffic Box
A	Ex. A.C. Unit
	Ex. Sign
	Ex. Bollard
M	Ex. Mailbox
C	Ex. Cable Box
	Ex. Fire Hydrant
	Ex. Water Valve
W	Ex. Water Meter
	Ex. Water Manhole
G	Ex. Gas Box
G	Ex. Gas Meter
GS	Ex. Gas Service
	Ex. Gas Valve
	Ex. Clean Out
Ex. San. MH	Ex. Sanitary Sewer Manhole
Ex. Stm. MH	Ex. Storm Sewer Manhole
Ex. C.B.	Ex. Catch Basin
	Ex. Double Gutter Inlet
	Ex. Single Gutter Inlet
OU	Ex. Overhead Utility Lines
UU	Ex. Underground Utility Lines
UE	Ex. Underground Electric
UT	Ex. Underground Telephone

EXISTING UNDERGROUND UTILITIES REPRESENTED ON THIS DRAWING ARE APPROXIMATE LOCATION ONLY BASED ON FIELD OBSERVATIONS AND AVAILABLE RECORDS OBTAINED BY ABERCROMBIE & ASSOCIATES INC. IN MAY 2022. CONTACT THE LOCAL UTILITY PROTECTION SERVICES AND AGENCIES PRIOR TO ANY EXCAVATION, CONSTRUCTION OR DESIGN.

ELEVATION DATUM SHOWN IS RELATIVE TO NAVD 88 BASED ON VRS GPS OBSERVATIONS.



VICINITY MAP

BLUE ASH ROAD

COOPER ROAD

KENWOOD ROAD

MYRTLE AVENUE

LAUREL AVENUE

ZONING DOWNTOWN DISTRICT (DT)

ZONING DOWNTOWN DISTRICT (DT) RETAIL STRIP CENTER

ZONING DOWNTOWN DISTRICT (DT) BANK USE

ZONING RESIDENTIAL HIGH DENSITY (R-3)

SINGLE FAMILY RESIDENCE

RETAIL

VACANT

Auditors Parcel 612-0050-0342 City of Blue Ash D.B. 4286, Pg. 1307

Auditors Parcel 612-0120-0018 Southwest Ohio Regional Transit Authority O.R. 9308, Pg. 674

Auditors Parcel 612-0050-0520 City of Blue Ash D.B. 4293, Pg. 1345

Auditors Parcel 612-0050-0513 City of Blue Ash D.B. 4377, Pg. 298

Auditors Parcel 612-0050-0505 City of Blue Ash D.B. 4293, Pg. 1345

Auditors Parcel 612-0050-0506 City of Blue Ash D.B. 4301, Pg. 875

Auditors Parcel 612-0050-0507 City Of Blue Ash D.B. 4301, Pg. 875

Auditors Parcel 612-0050-0498 City of Blue Ash D.B. 4275, Pg. 648

Auditors Parcel 612-0050-0515 Toebben, LTD D.B. 4394, Pg. 672

Auditors Parcel 612-0050-0352 Toebben, LTD D.B. 4394, Pg. 672

Auditors Parcel 612-0050-0514 Toebben, LTD D.B. 4394, Pg. 672

Prop. Apartment Building

Prop. Parking Garage Entrance

Prop. Parking Garage (Level 1)

Prop. Parking Garage

Prop. Access Drive

Service Drive

Drop Off / Delivery Area

Right-Out/Only

Right-In/Only

Right-In/ Right Out Only

Trash/Loading Area

Prop. Outdoor Area & Pool Deck

Prop. Pool

Prop. Retail Building

Prop. Office Building

Overlapping/Upper Floor Line; Typ.

New Parallel Parking

New Striping

New Striping; Extend SB Left Turn, Remove Left Turn Into Site

Ex. Railroad Tracks

Ex. Dumpster Enclosure

Ex. 12" Conc. Waterline

Ex. Asphalt Pavement

Ex. Conc. Walk

Ex. Depressed Curb

Ex. Single White Line

Ex. Double Yellow Line

Ex. Cross Walk

N 16°35'32" E 649.89'

N 68°03'00" W 195.79'

N 68°02'35" W 190.72'

S 87°29'47" E 155.64'

S 87°10'00" E 115.42'

N 75°30'00" E 26.00'

S 5°00'28" W 103.78'

S 5°02'40" W 121.44'

S 2°30'00" W 515.13'

S 2°27'53" W 8.00'

Delta=24°35'46" R=136.00' L=58.38' Chd.=57.94' N 80°21'02" W

Delta=84°53'00" R=25.00' L=37.04' Chd.=33.74' S 44°54'10" W

TOTAL 271,293 Sq. Ft. 6.2280 Acres

GRAPHIC SCALE

40 0 20 40 80 160

(IN FEET)

1 inch = 40 ft.

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Parcels Included In This Development

Owner:9617 Kenwood Road Development LLC
612-0050-0341
612-0050-0342
612-0050-0343
612-0050-0345
612-0050-0346
612-0050-0348
612-0050-0349
612-0050-0489

Owner: City Of Blue Ash
612-0050-0546

OWNER/DEVELOPER:
CIRCLE DEVELOPMENT
10988 DEERFIELD ROAD
BLUE ASH, OHIO 45242

Date 6-9-22
Drawn By J.C.
Checked By C.A.
Scale 1" = 40'

REVISIONS

DWG PRLM\JC-CONCEPT

Sheet Title CONCEPT PLAN

Project Title SECTION-15, TOWN-4, E.RANGE-1 SYCAMORE TOWNSHIP, CITY OF BLUE ASH HAMILTON COUNTY, OHIO

Abercrombie & Associates, Inc.
Civil Engineering + Surveying
8111 Cincinnati Road, Suite 200
Cincinnati, Ohio 45242
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www.abercrombie-associates.com

Job No. 20-0027

1 / 1

Appendix B

Memorandum of Understanding

SHA Engineering, LLC

6221 Thornberry Court, Mason, OH 45040
Phone: (513)236-7909
E-Mail: JAdhami@shaengg.com

March 14, 2022

Memorandum of Understanding

Consultant: SHA Engineering, LLC
6221 Thornberry Court
Mason, OH 45040

Submitted to
Gordon M. Perry, P.E.
Public Works Director
City of Blue Ash
4343 Cooper Road
Blue Ash, OH 45242-5699

Re: Traffic Impact Study – Mixed Use Development, Blue Ash, Ohio

Background

The site for the proposed development is in City of Blue Ash, Ohio. The development is proposed at the northeast quadrant of the intersection of Kenwood Road and Cooper Road. The new development will include retail, apartments, and offices. Multilevel parking garages will be built as part of the development. It is anticipated the new development will include the following.

- 65,000 SFT of retail that will include specialty retail shops, fast casual restaurants, sit down restaurants
- 35,000 SFT Office space and amenities
- 250 residential units.

Study Area

The study area for the Traffic Impact Study is based on the preliminary development details provided by the development team and discussion in the virtual meeting with City of Blue Ash held on March 07, 2022. The following intersections are included in study area. The existing intersection locations are shown in Exhibit 1.

- Cooper Rd. at Blue Ash Rd. (***This is also location of proposed access drive for the site***)
- Kenwood Rd. at Cooper Rd.
- Coopper Rd. at Monroe Ave.
- Kenwood Rd. at SR 126 EB Ramps
- Kenwood Rd. SR 126 WB Ramps
- Kenwood Rd. at Laurel Ave.
- Kenwood Rd. at Malsbury Rd.
- Reed Hartman Rd. at Malsbury Rd.

6221 Thornberry Court, Mason, OH 45040
Phone: (513)236-7909
E-Mail: JAdhami@shaengg.com

- Proposed Access Drive on Kenwood Road
- Proposed Access on Cooper Road (pick-up/drop-off area)
- Proposed Access on Cooper Road for delivery trucks

Scope of Work

The following tasks are included in the scope of work for completion of Traffic Impact Study.

a. Traffic Data Collection

Intersection Turning Movement Counts will be completed at the intersections included in the study area. The directional counts at proposed access locations on Cooper Road and Kenwood Road will be recorded. The traffic data will be completed on an average weekday during AM and PM Peak Periods (6:00 AM to 10:00 AM, and 2:00 PM to 7:00 PM). The AM and PM Peak Hours will be established by analyzing traffic data.

b. **Trip generation and Distribution** – The new trips for the proposed development will be estimated using the 11^{1h} edition of ITE Trip Generation Manual. The new trips will be distributed for each land use included in the proposed development. The estimated trips will be divided in groups as identified below.

- Residential
- Office
- Restaurants/Café
- Retail

The estimated new trips will be adjusted for the Pass-by/diverted and internal trips.

Table 1 and Appendix includes the summary of estimated trips. Please note the trips included in the table will be adjusted for the internal trips. Copies of AM and PM Internal Trips estimated using NCHRP 684 is also included in the Exhibit 2.

The estimated new trips for each group will be distributed on the adjacent roadway network. The existing traffic patterns and nature of development within the influence area for each group will be used for estimating trip distribution of each group.

The estimated new trips will be combined with existing traffic volume to generate Build scenarios. The following scenarios will be analyzed:

- AM and PM Peak hour No-Build, Opening Year
- AM and PM Peak hour Build, Opening Year
- AM and PM Peak Hour No- Build, Future Year
- AM and PM Peak Hour Build, Future Year

The Build scenario may include alternatives with modifications at intersection(s) within the study area.

c. Forecast traffic – The forecast year will be 10 years beyond opening day for the development. The regional background annual traffic growth factor will be established based on the feedback received from City of Blue Ash and review of historical traffic data.

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Phone: (513)236-7909
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d. Analysis

Following analysis will be completed for the scenarios identified in item c above.

Capacity Analysis – Capacity analysis for each intersection identified above will be completed using Highway Capacity Software (Version 7) or SYNCHRO software for the signalized and un-signalized intersection. The analysis for the signalized intersection will be completed to balance the delays for the critical approaches. The unsignalized intersection will identify delays for the stop-controlled approaches and left turns on the main street. ***Capacity Analysis will be completed using traffic signal timing data to be provided by city for each signalized intersection within the study area***.

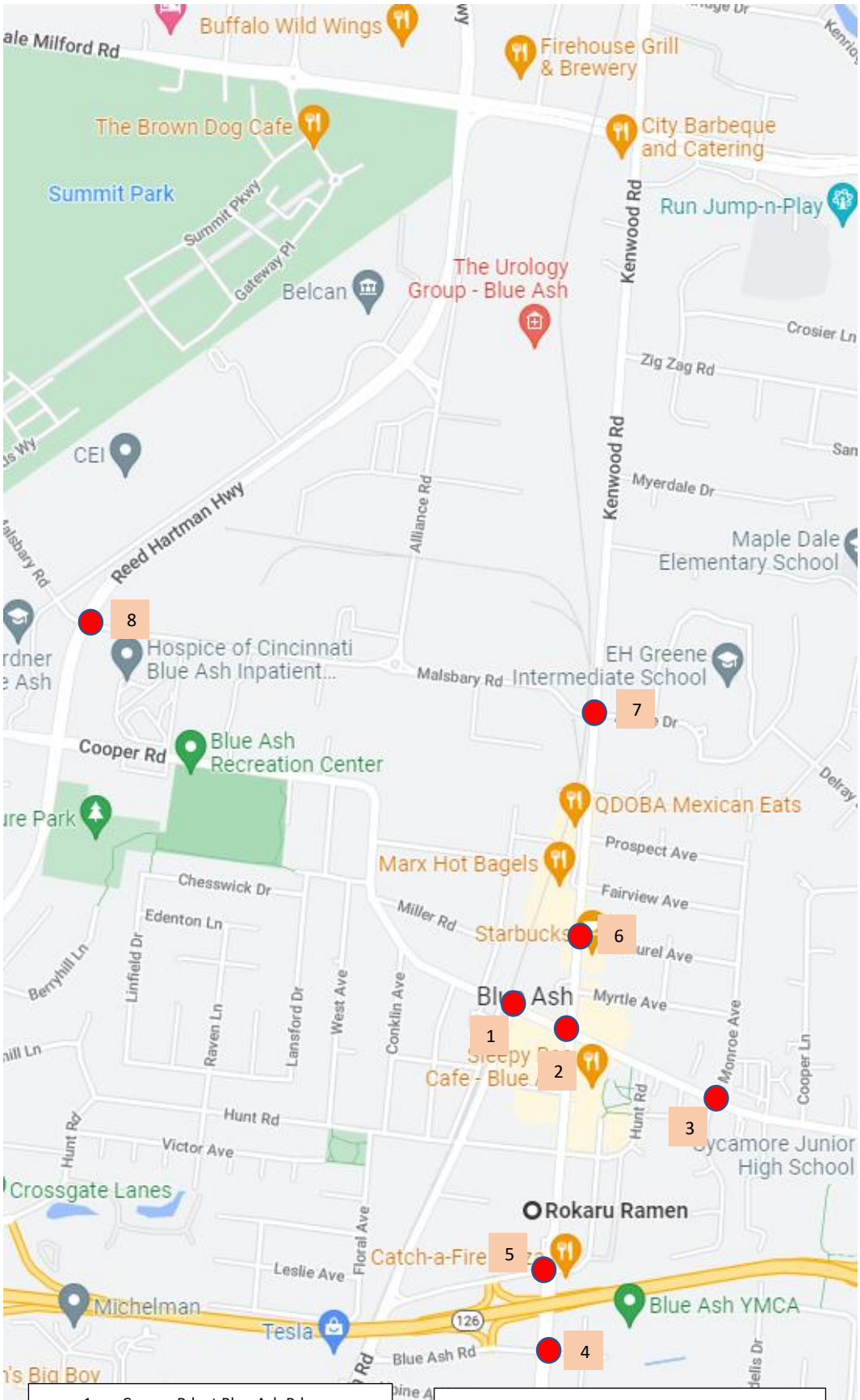
Turn Lane Warrants – The turn lane warrants will be completed to determine the need for exclusive left and right turns lanes at each access location identified in the study. The turn lane warrants will be completed using the procedure identified in ODOT Location and Design Manual, volume 1.

Storage Lengths/95th Percentile Queues – the HCS/SYNCHRO analysis will be used to summarized 95th percentile queue lengths for the turning lengths at the proposed access locations.

Traffic impact study report – Prepare a Traffic Impact Study (TIS) technical report describing the traffic engineering analysis, conclusions, and recommendations. The report will follow the recommendations and summary tables as per the recommendations included is ODOT OATS manual.

e. **Schematic Plan –** A schematic plan showing the proposed improvements will be developed for the study area. The schematic plan will indicate number of lanes and pavement markings.

Exhibit 1



1. Cooper Rd. at Blue Ash Rd.
2. Kenwood Rd. at Cooper Rd.
3. Coopper Rd. at Monroe Ave.
4. Kenwood Rd. at SR 126 EB Ramps
5. Kenwood Rd. SR 126 WB Ramps
6. Kenwood Rd. at Laurel Ave.

7. Kenwood Rd. at Malsbury Rd.
8. Reed Hartman Rd. at Malsbury Rd.

Exhibit 2

Blue Development, City of Blue Ash, Ohio

3/12/2022
SHA Engineering LLC

TABLE 1: Estimated Trips

Parcel ID	Land Use	Units	Total	Weekday			AM Peak Hour			PM Peak Hour		
				Ent.	Exit	Tot.	Ent.	Exit	Tot.	Ent.	Exit	Tot.
GROUP 1												
GS-1, GS-2, GS-3, GS-4, CR-1, CR-2, CR-3, CR-4, CR-5. CR-6. FB-1	*821 - Shopping Plaza (No Super Market)*	GFA (SFT)	40,000	1350	1350	2,700	43	26	69	102	106	208
		Pass-by Trips								41	41	82
	New Trips			1350	1350	2700	43	26	69	102	106	208
	Pass-by Trips									41	41	82
	Net- New Trips			1350	1350	2700	43	26	69	61	65	126
GROUP 2												
FB-2, FB-3, FB-4, FB-5, FB-6, EN 1, EN-2	*931 - Fine Dining Restaurant*	GFA (SFT)	5000	210	210	420	4	0	4	26	13	39
		Pass-by Trips								8	8	16
	931 - Fine Dining Restaurant	GFA (SFT)	5000	210	210	420	4	0	4	26	13	39
		Pass-by Trips								8	8	16
	930 - Fast Casual Restaurant	GFA (SFT)	2,000	97	97	194				14	11	25
		Pass-by Trips										
	930 - Fast Casual Restaurant	GFA (SFT)	2,000	97	97	194				14	11	25
		Pass-by Trips										
	936 - Coffee/Donut Shop without Drive-Through Window	GFA (SFT)	1,000				47	46	93	21	11	32
	975 - Drinking Place	GFA (SFT)	5,000							38	19	57
	975 - Drinking Place	GFA (SFT)	5,000							38	19	57
	New Trips			614	614	1228	8	0	8	80	48	128
	Pass-by Trips			0	0	0	0	0	0	16	16	32
	Net- New Trips			614	614	1228	8	0	8	64	32	96

Blue Development, City of Blue Ash, Ohio

3/12/2022
SHA Engineering LLC

TABLE 1: Estimated Trips

Parcel ID	Land Use	Units	Total	Weekday			AM Peak Hour			PM Peak Hour		
				Ent.	Exit	Tot.	Ent.	Exit	Tot.	Ent.	Exit	Tot.
GROUP 3												
OF-1, OF-2, OF-3, OF-4, OF-5	*720 - Medical and Dental*	GFA (SFT)	35,000	698	698	1396	86	23	109	42	97	139
	New Trips			698	698	1396	86	23	109	42	97	139
	Pass-by Trips			0	0	0	0	0	0	0	0	0
	Net- New Trips			698	698	1396	86	23	109	42	97	139
GROUP 3												
	230 - Low-Rise Residential with Ground-Floor Commercial	DW	250	430	430	860	25	87	110	64	26	90
	New Trips			430	430	860	25	87	110	64	26	90
	Pass-by Trips			0	0	0	0	0	0	0	0	0
	Net- New Trips			430	430	860	25	87	110	64	26	90
TOTALS ENTIRE DEVELOPMENT												
	New Trips			3092	3092	6184	162	136	296	231	220	451
	Pass-by Trips			0	0	0	0	0	0	57	57	114
	Net- New Trips			**3092**	**3092**	**6184**	**162**	**136**	**296**	**174**	**163**	**337**

Project Name:	Blue Ash Mixed Use Development
Analysis Period:	**AM Street Peak Hour**

Table 7-A: Conversion of Vehicle-Trip Ends to Person-Trip Ends

Land Use	Table 7-A (D): Entering Trips			Table 7-A (O): Exiting Trips		
	Veh. Occ.	Vehicle-Trips	Person-Trips*	Veh. Occ.	Vehicle-Trips	Person-Trips*
Office	1.00	86	86	1.00	23	23
Retail	1.00	43	43	1.00	26	26
Restaurant	1.00	4	4	1.00	4	4
Cinema/Entertainment	1.00	0	0	1.00	0	0
Residential	1.00	25	25	1.00	87	87
Hotel	1.00	0	0	1.00	0	0

Table 8-A (O): Internal Person-Trip Origin-Destination Matrix (Computed at Origin)

Origin (From)	Destination (To)					
	Office	Retail	Restaurant	Cinema/Entertainment	Residential	Hotel
Office		6	14	0	0	0
Retail	8		3	0	4	0
Restaurant	1	1		0	0	0
Cinema/Entertainment	0	0	0		0	0
Residential	2	1	17	0		0
Hotel	0	0	0	0	0	

Table 8-A (D): Internal Person-Trip Origin-Destination Matrix (Computed at Destination)

Origin (From)	Destination (To)					
	Office	Retail	Restaurant	Cinema/Entertainment	Residential	Hotel
Office		14	1	0	0	0
Retail	3		2	0	1	0
Restaurant	12	3		0	1	0
Cinema/Entertainment	0	0	0		0	0
Residential	3	7	1	0		0
Hotel	3	2	0	0	0	

Table 9-A (D): Internal and External Trips Summary (Entering Trips)

Destination Land Use	Person-Trip Estimates			External Trips by Mode*		
	Internal	External	Total	Vehicles[1]	Transit[2]	Non-Motorized[2]
Office	6	80	86	80	0	0
Retail	8	35	43	35	0	0
Restaurant	4	0	4	0	0	0
Cinema/Entertainment	0	0	0	0	0	0
Residential	1	24	25	24	0	0
Hotel	0	0	0	0	0	0
All Other Land Uses[3]	0	0	0	0	0	0

Table 9-A (O): Internal and External Trips Summary (Exiting Trips)

Origin Land Use	Person-Trip Estimates			External Trips by Mode*		
	Internal	External	Total	Vehicles[1]	Transit[2]	Non-Motorized[2]
Office	7	16	23	16	0	0
Retail	6	20	26	20	0	0
Restaurant	2	2	4	2	0	0
Cinema/Entertainment	0	0	0	0	0	0
Residential	4	83	87	83	0	0
Hotel	0	0	0	0	0	0
All Other Land Uses[3]	0	0	0	0	0	0

[1]Vehicle-trips computed using the mode split and vehicle occupancy values provided in Table 2-A

[2]Person-Trips

[3]Total estimate for all other land uses at mixed-use development site is not subject to internal trip capture computations in this estimator

*Indicates computation that has been rounded to the nearest whole number.

Project Name:	0
Analysis Period:	**PM Street Peak Hour**

Table 7-P: Conversion of Vehicle-Trip Ends to Person-Trip Ends

Land Use	Table 7-P (D): Entering Trips			Table 7-P (O): Exiting Trips		
	Veh. Occ.	Vehicle-Trips	Person-Trips*	Veh. Occ.	Vehicle-Trips	Person-Trips*
Office	1.00	42	42	1.00	97	97
Retail	1.00	102	102	1.00	106	106
Restaurant	1.00	80	80	1.00	48	48
Cinema/Entertainment	1.00	0	0	1.00	0	0
Residential	1.00	64	64	1.00	26	26
Hotel	1.00	0	0	1.00	0	0

Table 8-P (O): Internal Person-Trip Origin-Destination Matrix (Computed at Origin)

Origin (From)	Destination (To)					
	Office	Retail	Restaurant	Cinema/Entertainment	Residential	Hotel
Office		19	4	0	2	0
Retail	2		31	4	28	5
Restaurant	1	20		4	9	3
Cinema/Entertainment	0	0	0		0	0
Residential	1	11	5	0		1
Hotel	0	0	0	0	0	

Table 8-P (D): Internal Person-Trip Origin-Destination Matrix (Computed at Destination)

Origin (From)	Destination (To)					
	Office	Retail	Restaurant	Cinema/Entertainment	Residential	Hotel
Office		8	2	0	3	0
Retail	13		23	0	29	0
Restaurant	13	51		0	10	0
Cinema/Entertainment	3	4	2		3	0
Residential	24	10	11	0		0
Hotel	0	2	4	0	0	

Table 9-P (D): Internal and External Trips Summary (Entering Trips)

Destination Land Use	Person-Trip Estimates			External Trips by Mode*		
	Internal	External	Total	Vehicles[1]	Transit[2]	Non-Motorized[2]
Office	4	38	42	38	0	0
Retail	38	64	102	64	0	0
Restaurant	30	50	80	50	0	0
Cinema/Entertainment	0	0	0	0	0	0
Residential	39	25	64	25	0	0
Hotel	0	0	0	0	0	0
All Other Land Uses[3]	0	0	0	0	0	0

Table 9-P (O): Internal and External Trips Summary (Exiting Trips)

Origin Land Use	Person-Trip Estimates			External Trips by Mode*		
	Internal	External	Total	Vehicles[1]	Transit[2]	Non-Motorized[2]
Office	12	85	97	85	0	0
Retail	53	53	106	53	0	0
Restaurant	30	18	48	18	0	0
Cinema/Entertainment	0	0	0	0	0	0
Residential	16	10	26	10	0	0
Hotel	0	0	0	0	0	0
All Other Land Uses[3]	0	0	0	0	0	0

[1]Vehicle-trips computed using the mode split and vehicle occupancy values provided in Table 2-P

[2]Person-Trips

[3]Total estimate for all other land uses at mixed-use development site is not subject to internal trip capture computations in this estimator

*Indicates computation that has been rounded to the nearest whole number.

Shopping Plaza (40-150k) - Supermarket - No (821)

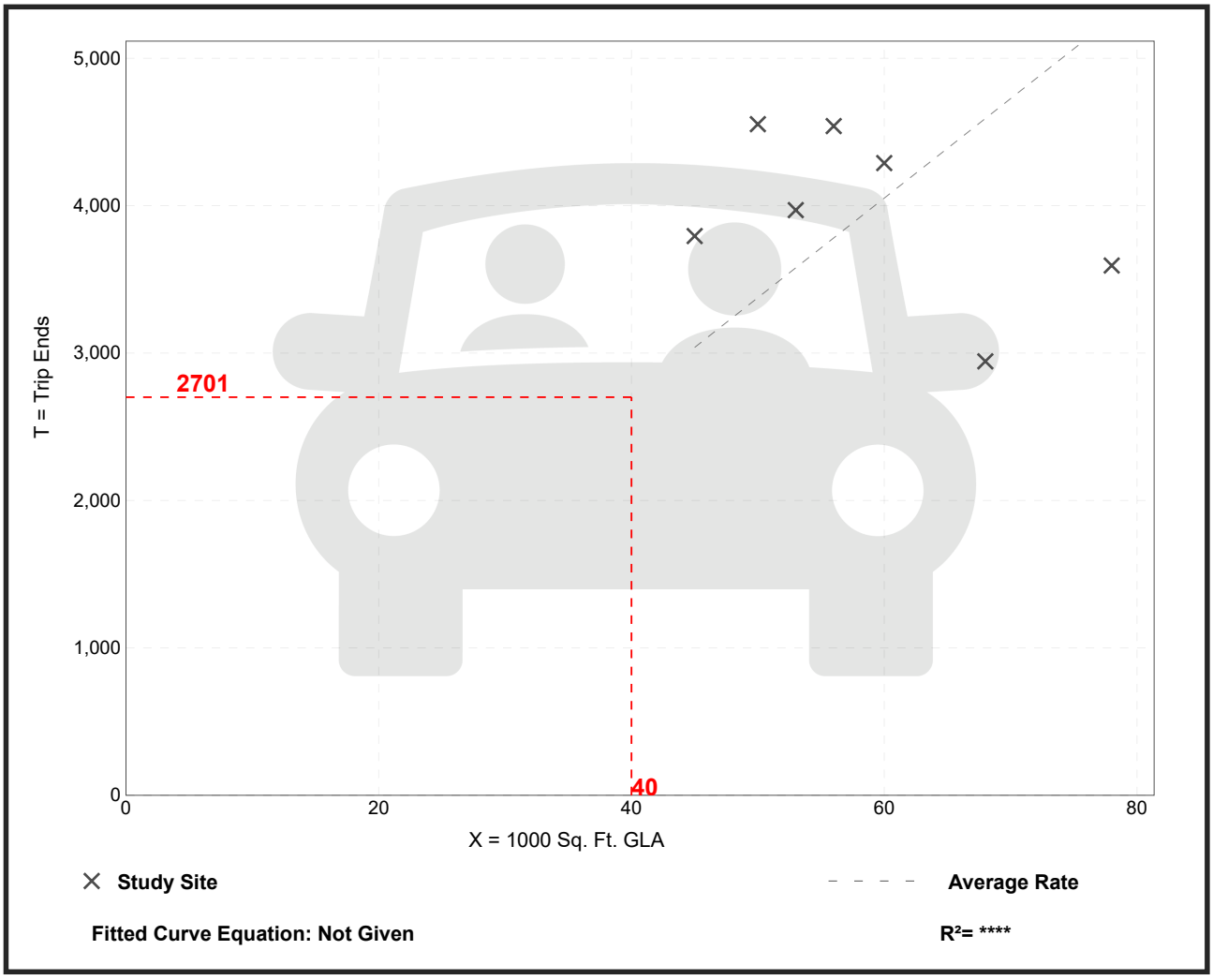
Vehicle Trip Ends vs: **1000 Sq. Ft. GLA**
On a: **Weekday**

Setting/Location: **General Urban/Suburban**
Number of Studies: 7
Avg. 1000 Sq. Ft. GLA: 59
Directional Distribution: 50% entering, 50% exiting

Vehicle Trip Generation per 1000 Sq. Ft. GLA

Average Rate	Range of Rates	Standard Deviation
67.52	43.29 - 91.06	19.25

Data Plot and Equation



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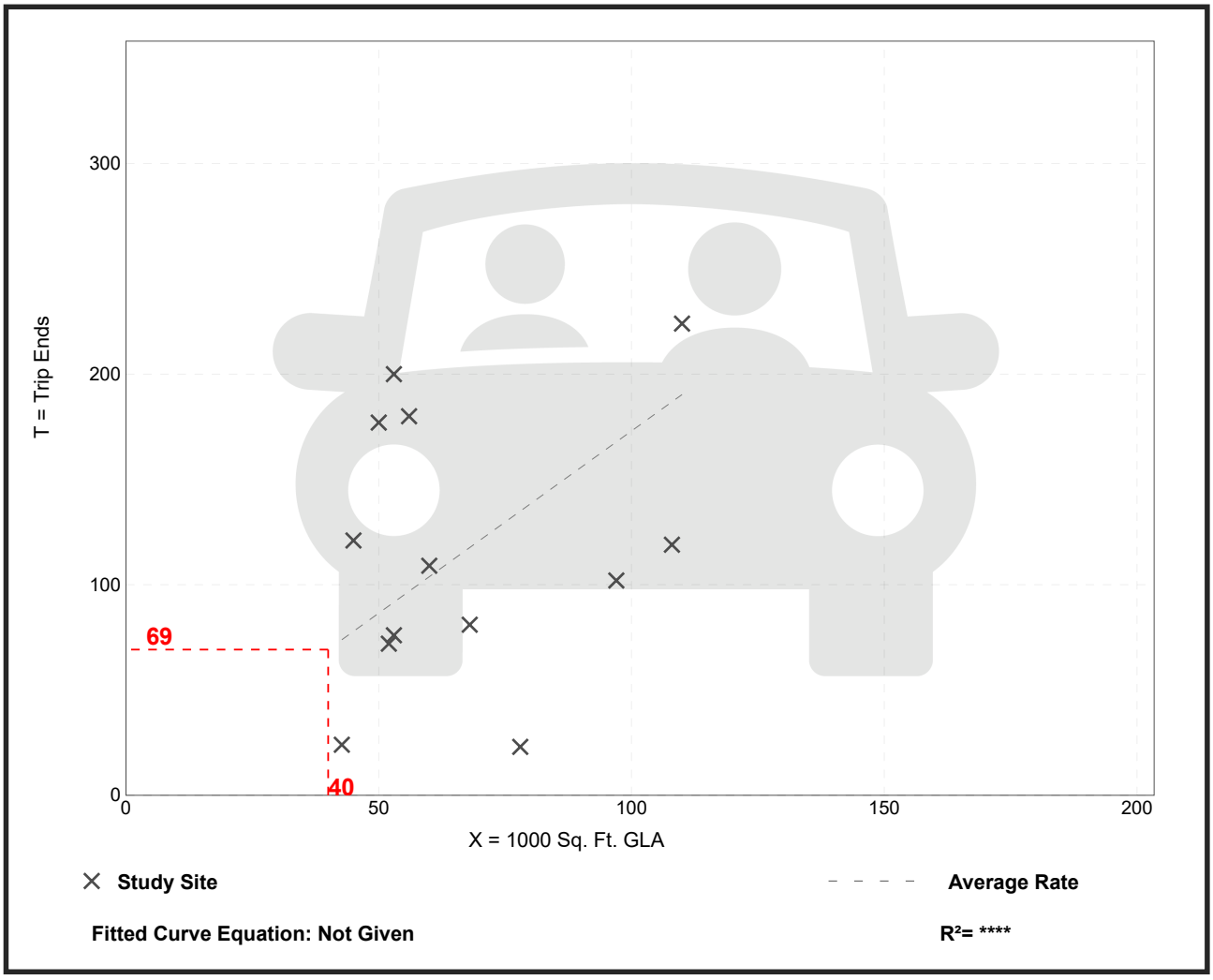
Shopping Plaza (40-150k) - Supermarket - No (821)

Vehicle Trip Ends vs: **1000 Sq. Ft. GLA**
On a: **Weekday,**
Peak Hour of Adjacent Street Traffic,
One Hour Between 7 and 9 a.m.
Setting/Location: **General Urban/Suburban**
Number of Studies: 13
Avg. 1000 Sq. Ft. GLA: 67
Directional Distribution: 62% entering, 38% exiting

Vehicle Trip Generation per 1000 Sq. Ft. GLA

Average Rate	Range of Rates	Standard Deviation
1.73	0.29 - 3.77	1.06

Data Plot and Equation



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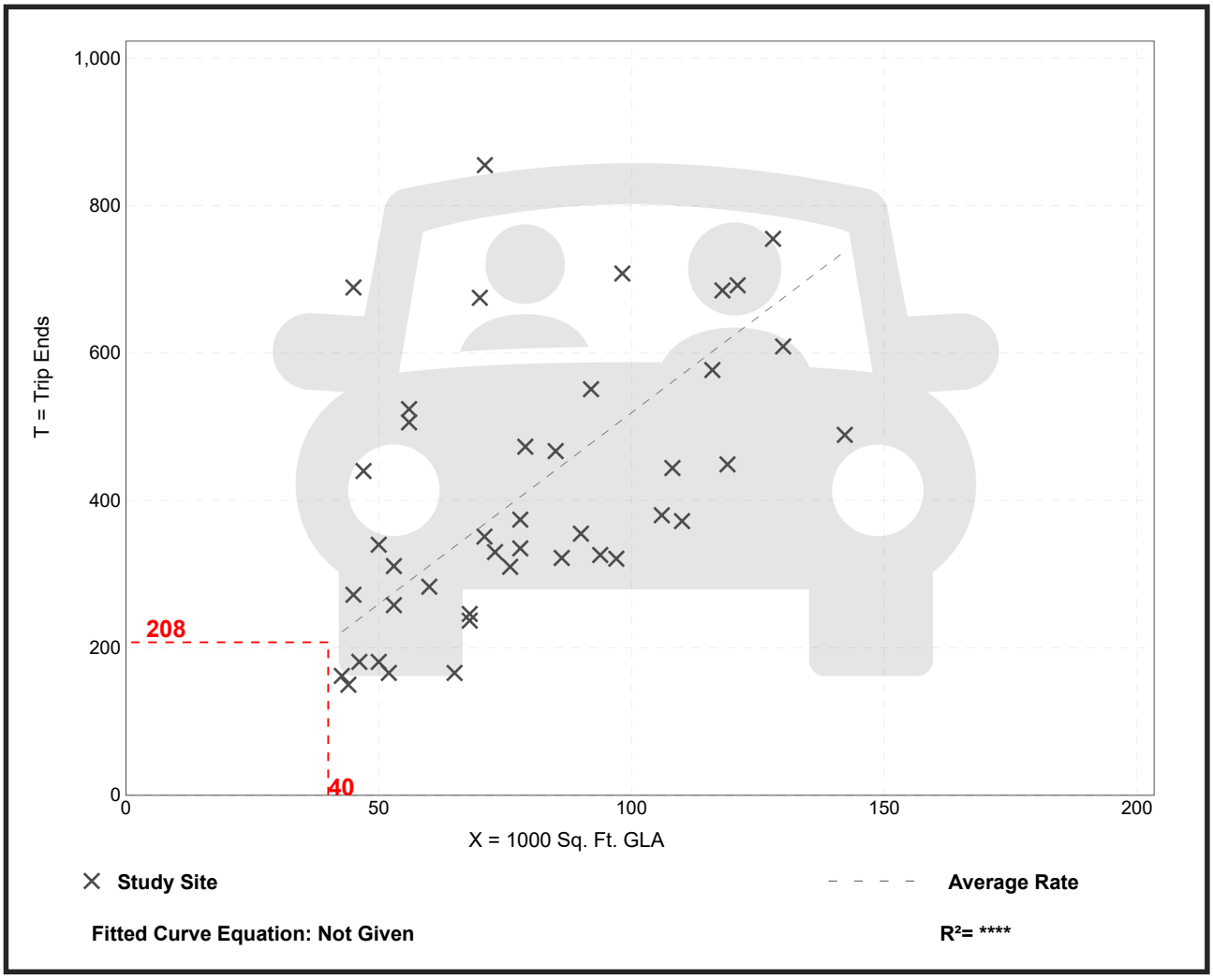
Shopping Plaza (40-150k) - Supermarket - No (821)

Vehicle Trip Ends vs: **1000 Sq. Ft. GLA**
On a: **Weekday,**
Peak Hour of Adjacent Street Traffic,
One Hour Between 4 and 6 p.m.
Setting/Location: **General Urban/Suburban**
Number of Studies: 42
Avg. 1000 Sq. Ft. GLA: 79
Directional Distribution: 49% entering, 51% exiting

Vehicle Trip Generation per 1000 Sq. Ft. GLA

Average Rate	Range of Rates	Standard Deviation
5.19	2.55 - 15.31	2.28

Data Plot and Equation



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Fine Dining Restaurant
(931)

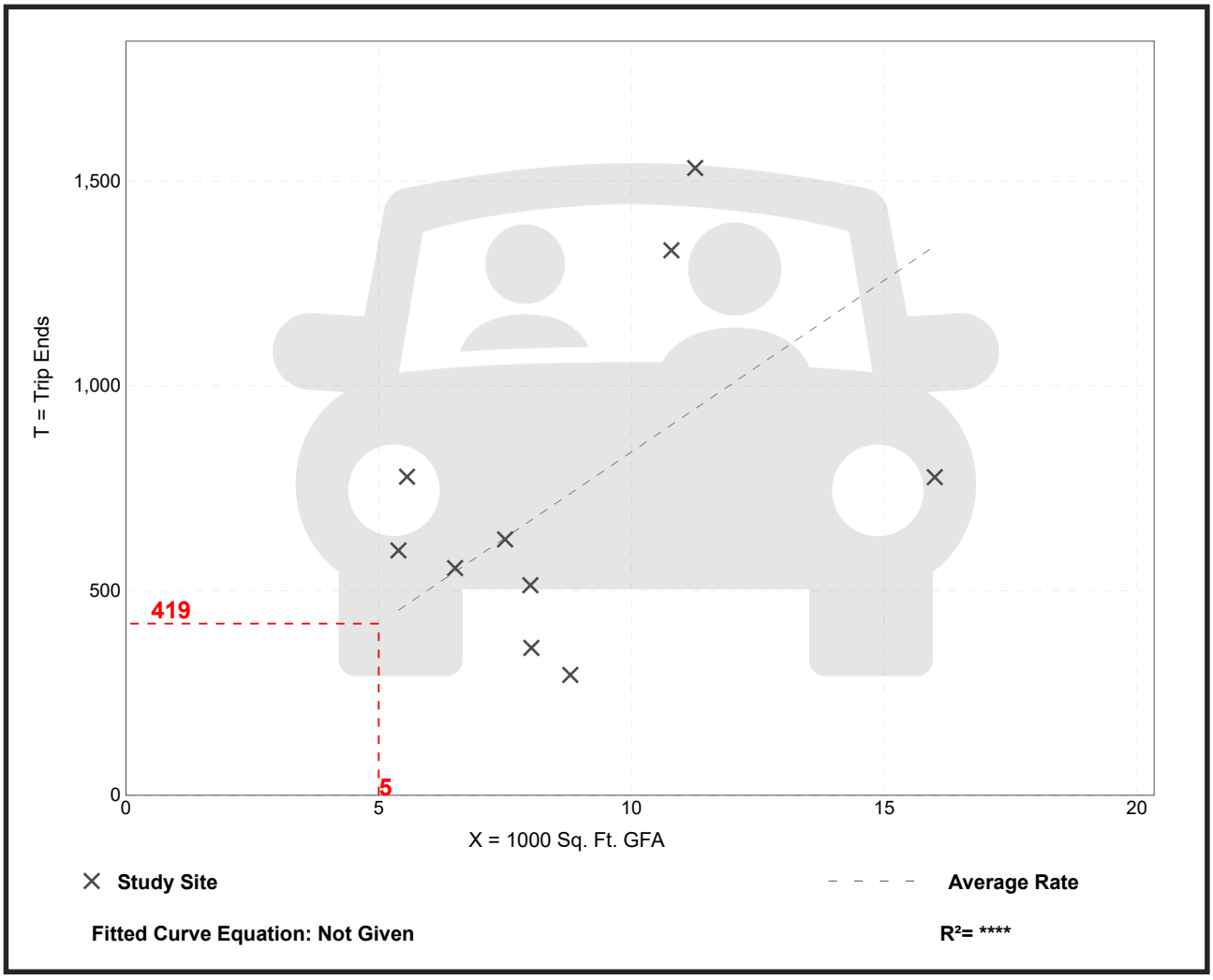
Vehicle Trip Ends vs: **1000 Sq. Ft. GFA**
On a: **Weekday**

Setting/Location: **General Urban/Suburban**
Number of Studies: 10
Avg. 1000 Sq. Ft. GFA: 9
Directional Distribution: 50% entering, 50% exiting

Vehicle Trip Generation per 1000 Sq. Ft. GFA

Average Rate	Range of Rates	Standard Deviation
83.84	33.45 - 139.93	40.01

Data Plot and Equation



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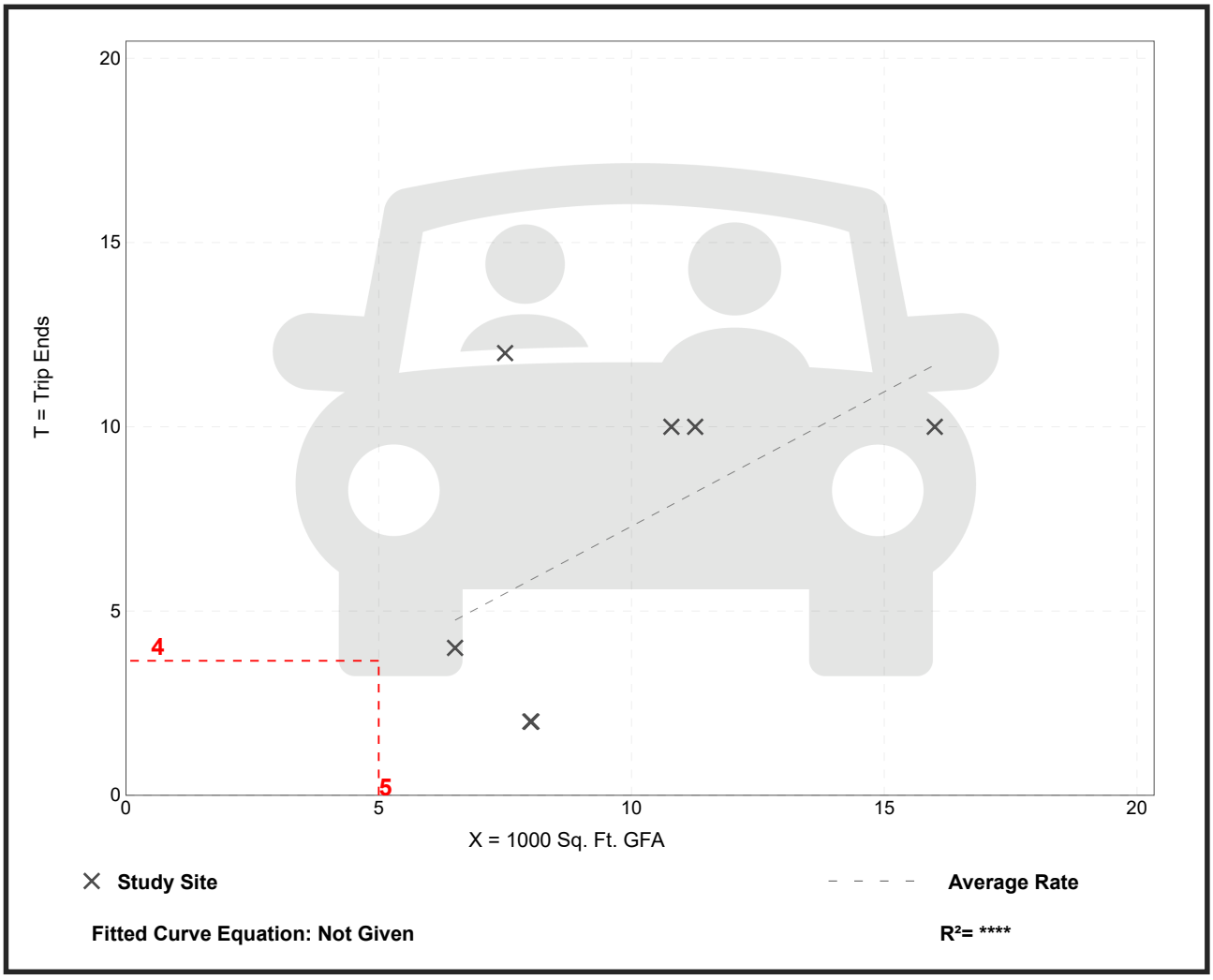
Fine Dining Restaurant
(931)

Vehicle Trip Ends vs: **1000 Sq. Ft. GFA**
On a: **Weekday,**
Peak Hour of Adjacent Street Traffic,
One Hour Between 7 and 9 a.m.
Setting/Location: **General Urban/Suburban**
Number of Studies: 7
Avg. 1000 Sq. Ft. GFA: 10
Directional Distribution: Not Available

Vehicle Trip Generation per 1000 Sq. Ft. GFA

Average Rate	Range of Rates	Standard Deviation
0.73	0.25 - 1.60	0.42

Data Plot and Equation



Trip Gen Manual, 11th Edition ● Institute of Transportation Engineers

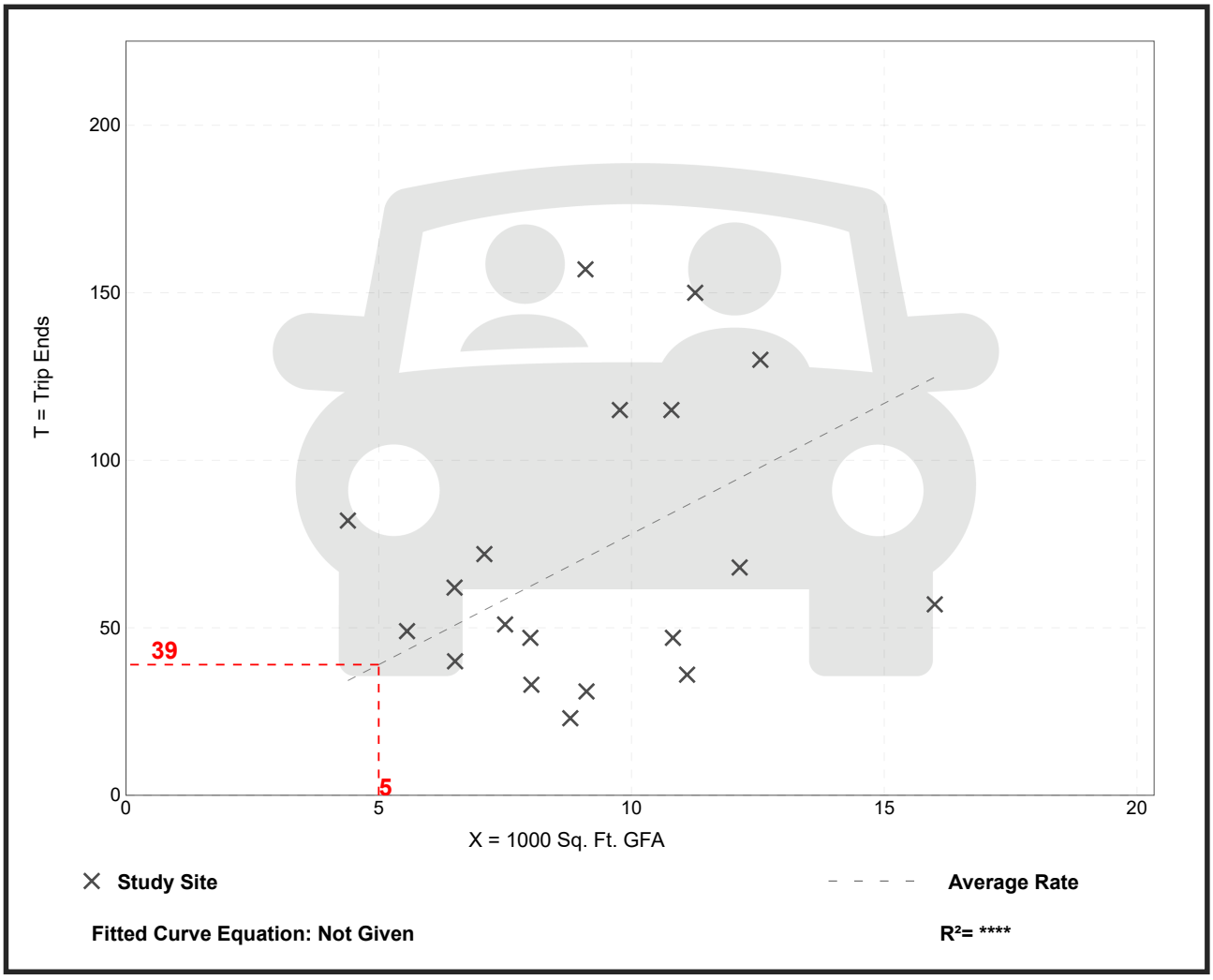
Fine Dining Restaurant
(931)

Vehicle Trip Ends vs: **1000 Sq. Ft. GFA**
On a: **Weekday,**
Peak Hour of Adjacent Street Traffic,
One Hour Between 4 and 6 p.m.
Setting/Location: **General Urban/Suburban**
Number of Studies: 19
Avg. 1000 Sq. Ft. GFA: 9
Directional Distribution: 67% entering, 33% exiting

Vehicle Trip Generation per 1000 Sq. Ft. GFA

Average Rate	Range of Rates	Standard Deviation
7.80	2.62 - 18.68	4.49

Data Plot and Equation



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Fast Casual Restaurant
(930)

Vehicle Trip Ends vs: **1000 Sq. Ft. GFA**
On a: **Weekday**

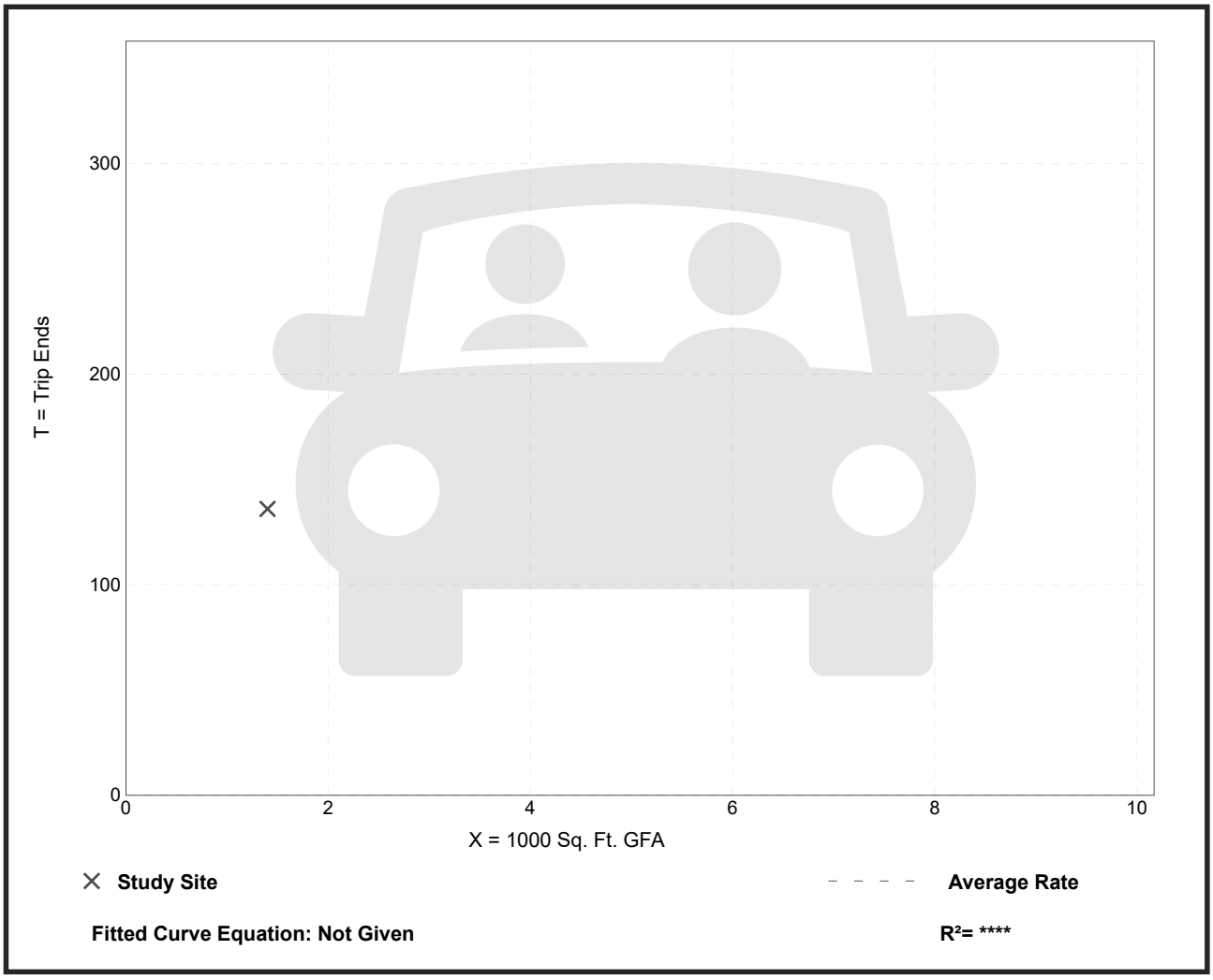
Setting/Location: **General Urban/Suburban**
Number of Studies: 1
Avg. 1000 Sq. Ft. GFA: 1
Directional Distribution: 50% entering, 50% exiting

Vehicle Trip Generation per 1000 Sq. Ft. GFA

Average Rate	Range of Rates	Standard Deviation
97.14	97.14 - 97.14	*

Data Plot and Equation

Caution – Small Sample Size



Fitted Curve Equation: Not Given

R^2= **

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Fast Casual Restaurant
(930)

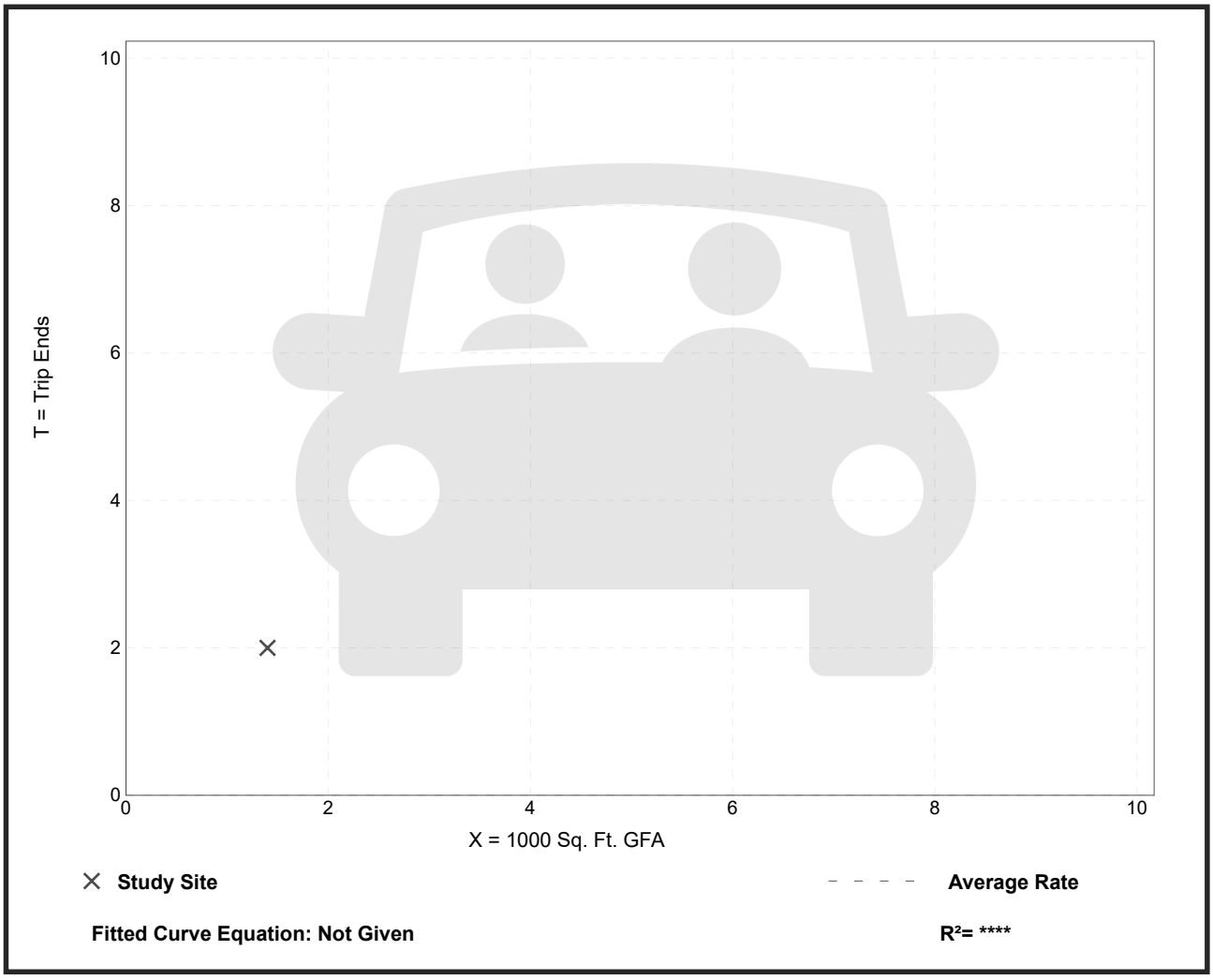
Vehicle Trip Ends vs: **1000 Sq. Ft. GFA**
On a: **Weekday,**
Peak Hour of Adjacent Street Traffic,
One Hour Between 7 and 9 a.m.
Setting/Location: **General Urban/Suburban**
Number of Studies: 1
Avg. 1000 Sq. Ft. GFA: 1
Directional Distribution: 50% entering, 50% exiting

Vehicle Trip Generation per 1000 Sq. Ft. GFA

Average Rate	Range of Rates	Standard Deviation
1.43	1.43 - 1.43	*

Data Plot and Equation

Caution – Small Sample Size



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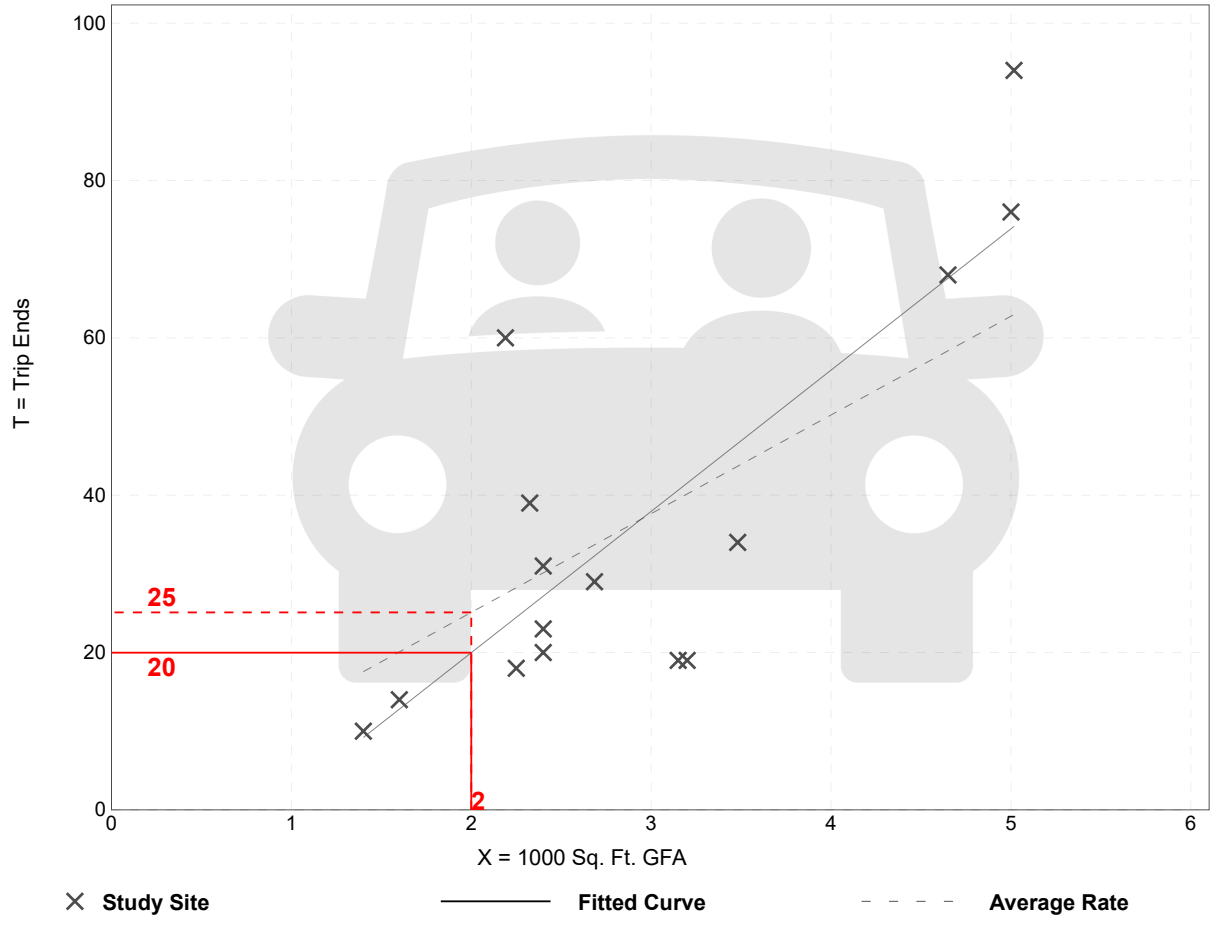
Fast Casual Restaurant
(930)

Vehicle Trip Ends vs: **1000 Sq. Ft. GFA**
On a: **Weekday,**
Peak Hour of Adjacent Street Traffic,
One Hour Between 4 and 6 p.m.
Setting/Location: **General Urban/Suburban**
Number of Studies: 15
Avg. 1000 Sq. Ft. GFA: 3
Directional Distribution: 55% entering, 45% exiting

Vehicle Trip Generation per 1000 Sq. Ft. GFA

Average Rate	Range of Rates	Standard Deviation
12.55	5.94 - 27.40	5.52

Data Plot and Equation



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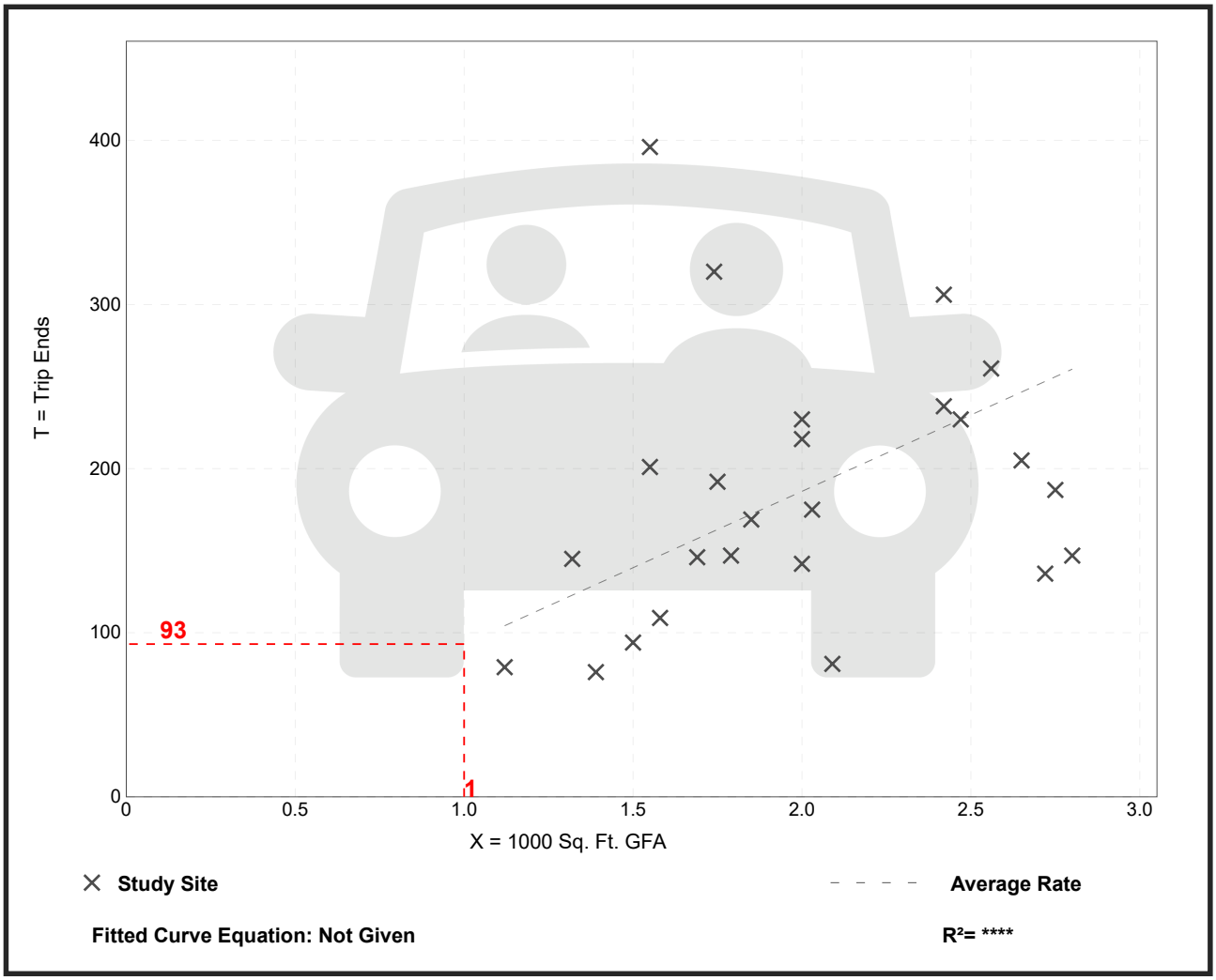
Coffee/Donut Shop without Drive-Through Window
(936)

Vehicle Trip Ends vs: **1000 Sq. Ft. GFA**
On a: **Weekday,**
Peak Hour of Adjacent Street Traffic,
One Hour Between 7 and 9 a.m.
Setting/Location: **General Urban/Suburban**
Number of Studies: 25
Avg. 1000 Sq. Ft. GFA: 2
Directional Distribution: 51% entering, 49% exiting

Vehicle Trip Generation per 1000 Sq. Ft. GFA

Average Rate	Range of Rates	Standard Deviation
93.08	38.76 - 255.48	42.71

Data Plot and Equation



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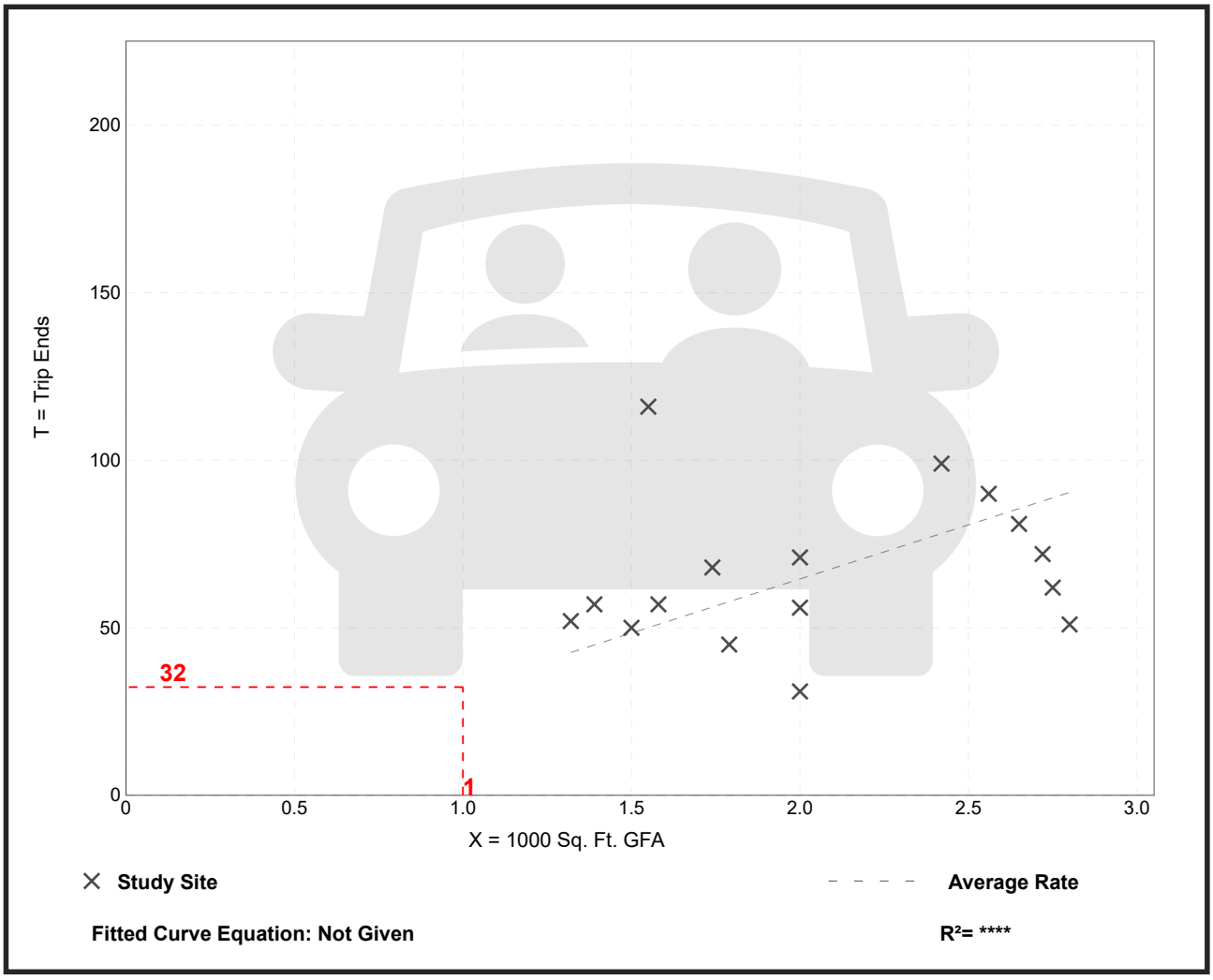
Coffee/Donut Shop without Drive-Through Window
(936)

Vehicle Trip Ends vs: **1000 Sq. Ft. GFA**
On a: **Weekday,**
Peak Hour of Adjacent Street Traffic,
One Hour Between 4 and 6 p.m.
Setting/Location: **General Urban/Suburban**
Number of Studies: 16
Avg. 1000 Sq. Ft. GFA: 2
Directional Distribution: 50% entering, 50% exiting

Vehicle Trip Generation per 1000 Sq. Ft. GFA

Average Rate	Range of Rates	Standard Deviation
32.29	15.50 - 74.84	12.64

Data Plot and Equation



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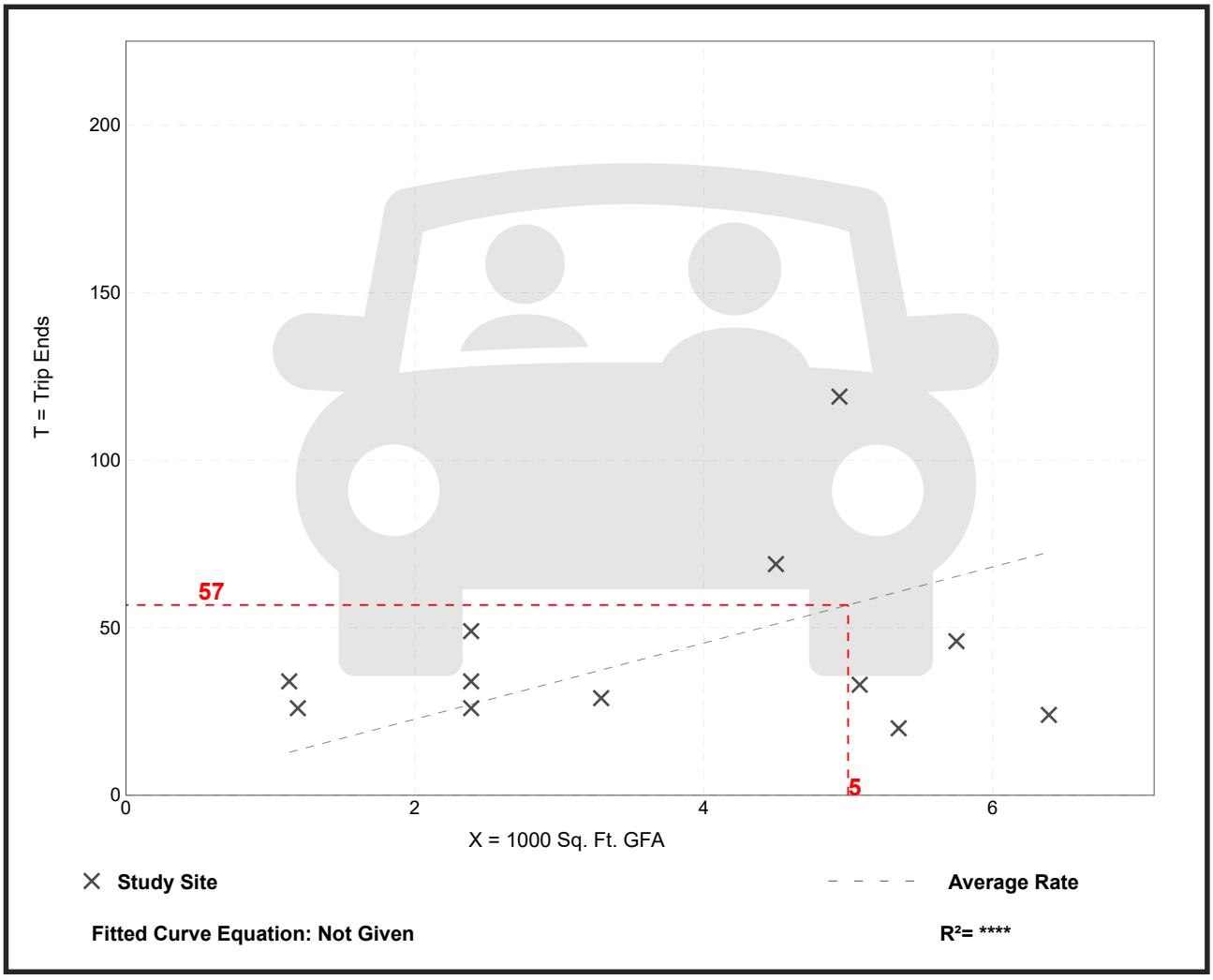
Drinking Place
(975)

Vehicle Trip Ends vs: **1000 Sq. Ft. GFA**
On a: **Weekday,**
Peak Hour of Adjacent Street Traffic,
One Hour Between 4 and 6 p.m.
Setting/Location: **General Urban/Suburban**
Number of Studies: 12
Avg. 1000 Sq. Ft. GFA: 4
Directional Distribution: 66% entering, 34% exiting

Vehicle Trip Generation per 1000 Sq. Ft. GFA

Average Rate	Range of Rates	Standard Deviation
11.36	3.74 - 30.09	7.81

Data Plot and Equation



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Medical-Dental Office Building - Stand-Alone
(720)

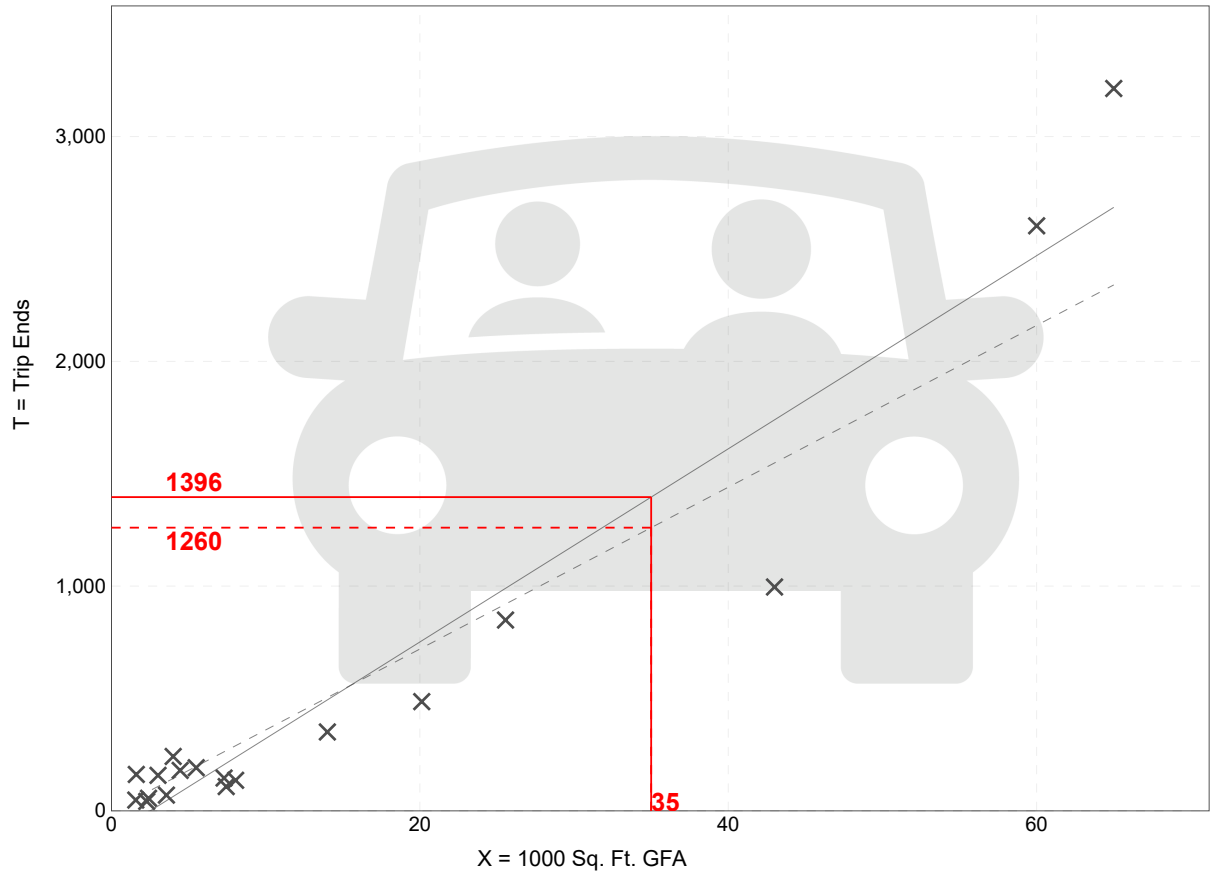
Vehicle Trip Ends vs: **1000 Sq. Ft. GFA**
On a: **Weekday**

Setting/Location: **General Urban/Suburban**
Number of Studies: 18
Avg. 1000 Sq. Ft. GFA: 15
Directional Distribution: 50% entering, 50% exiting

Vehicle Trip Generation per 1000 Sq. Ft. GFA

Average Rate	Range of Rates	Standard Deviation
36.00	14.52 - 100.75	13.38

Data Plot and Equation



Fitted Curve Equation: T = 42.97(X) - 108.01

R^2= 0.92

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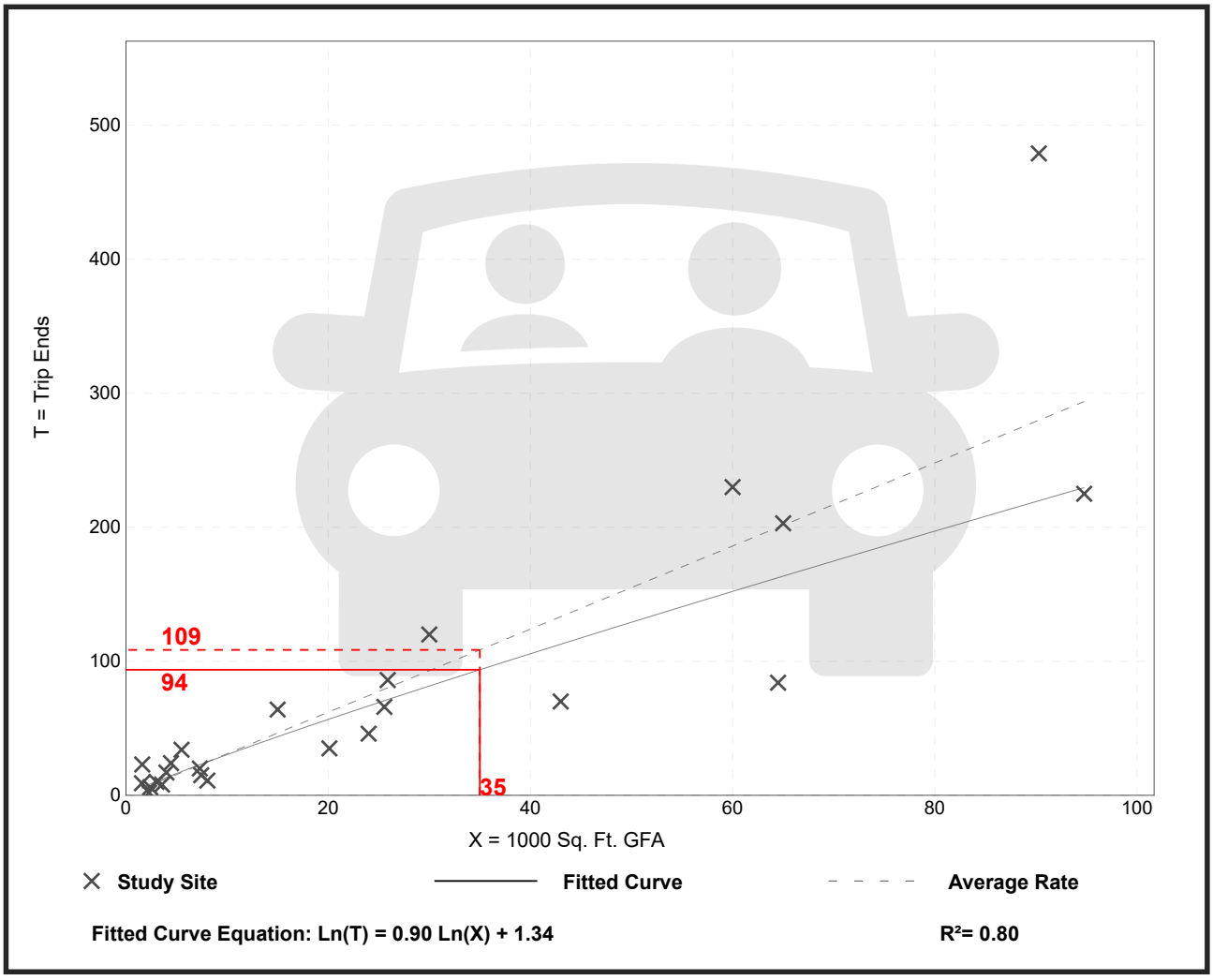
Medical-Dental Office Building - Stand-Alone
(720)

Vehicle Trip Ends vs: **1000 Sq. Ft. GFA**
On a: **Weekday,**
Peak Hour of Adjacent Street Traffic,
One Hour Between 7 and 9 a.m.
Setting/Location: **General Urban/Suburban**
Number of Studies: 24
Avg. 1000 Sq. Ft. GFA: 25
Directional Distribution: 79% entering, 21% exiting

Vehicle Trip Generation per 1000 Sq. Ft. GFA

Average Rate	Range of Rates	Standard Deviation
3.10	0.87 - 14.30	1.49

Data Plot and Equation



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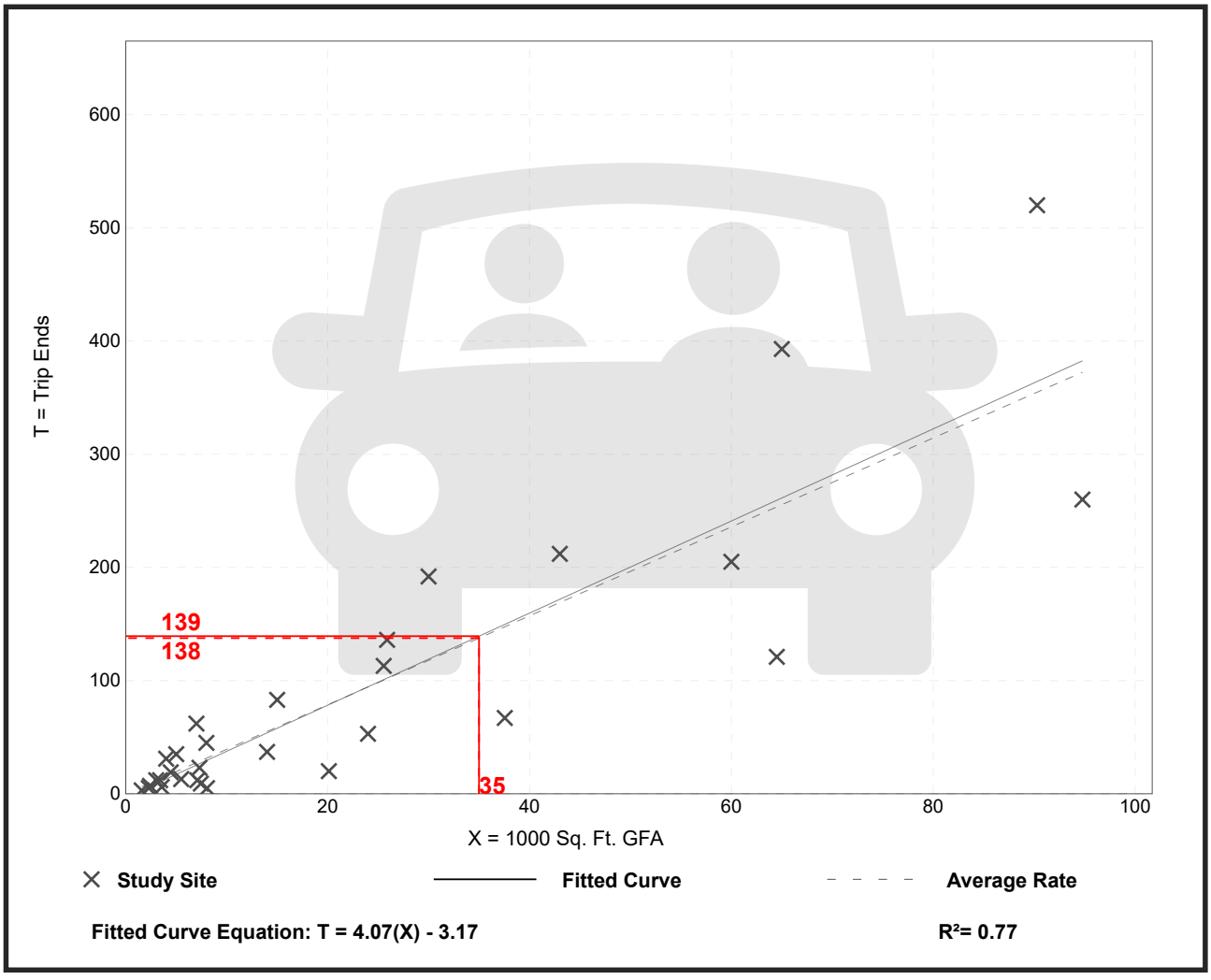
Medical-Dental Office Building - Stand-Alone
(720)

Vehicle Trip Ends vs: **1000 Sq. Ft. GFA**
On a: **Weekday,**
Peak Hour of Adjacent Street Traffic,
One Hour Between 4 and 6 p.m.
Setting/Location: **General Urban/Suburban**
Number of Studies: 30
Avg. 1000 Sq. Ft. GFA: 23
Directional Distribution: 30% entering, 70% exiting

Vehicle Trip Generation per 1000 Sq. Ft. GFA

Average Rate	Range of Rates	Standard Deviation
3.93	0.62 - 8.86	1.86

Data Plot and Equation



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Low-Rise Residential with Ground-Floor Commercial
GFA (1-25k) (230)

Vehicle Trip Ends vs: **Dwelling Units**
On a: **Weekday**

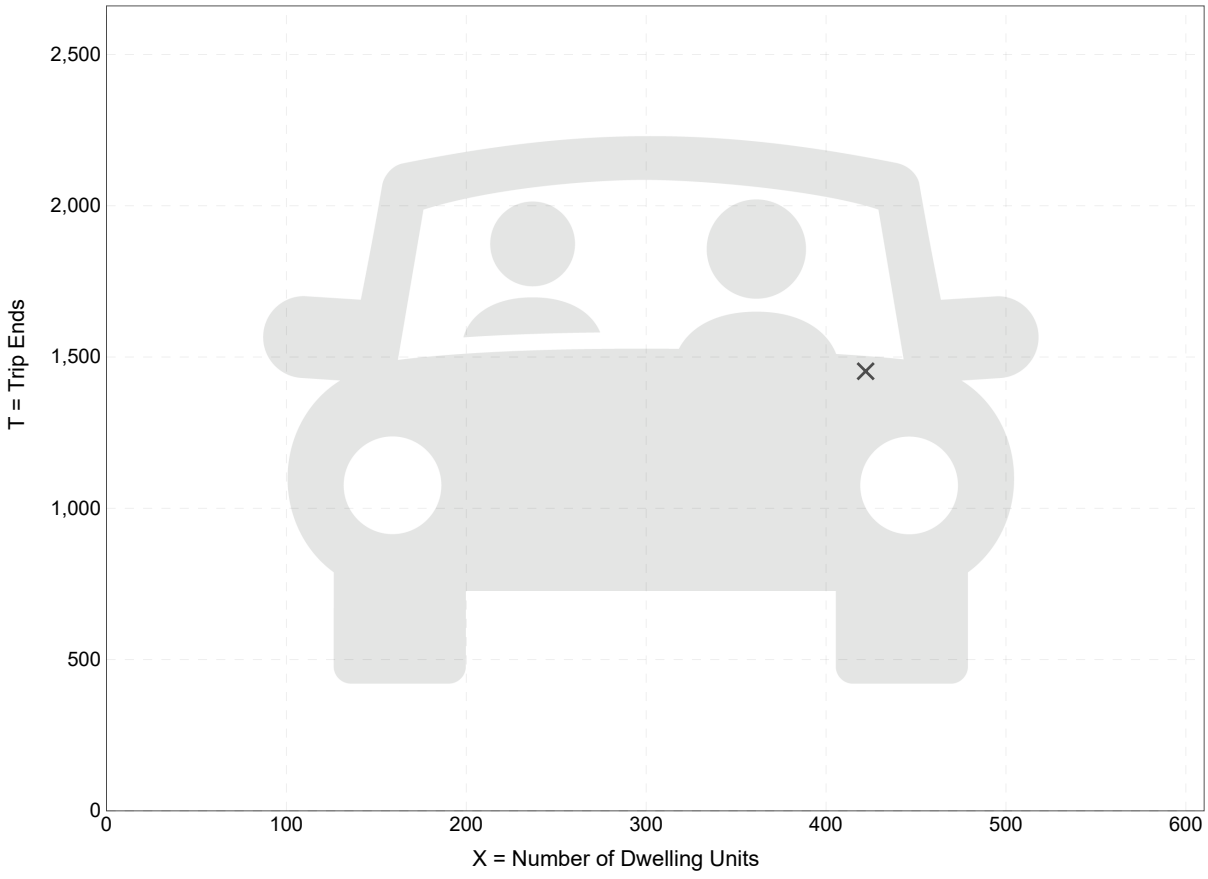
Setting/Location: **General Urban/Suburban**
Number of Studies: 1
Avg. Num. of Dwelling Units: 422
Directional Distribution: 50% entering, 50% exiting

Vehicle Trip Generation per Dwelling Unit

Average Rate	Range of Rates	Standard Deviation
3.44	3.44 - 3.44	*

Data Plot and Equation

Caution – Small Sample Size



Fitted Curve Equation: Not Given

R^2= **

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Low-Rise Residential with Ground-Floor Commercial
GFA (1-25k) (230)

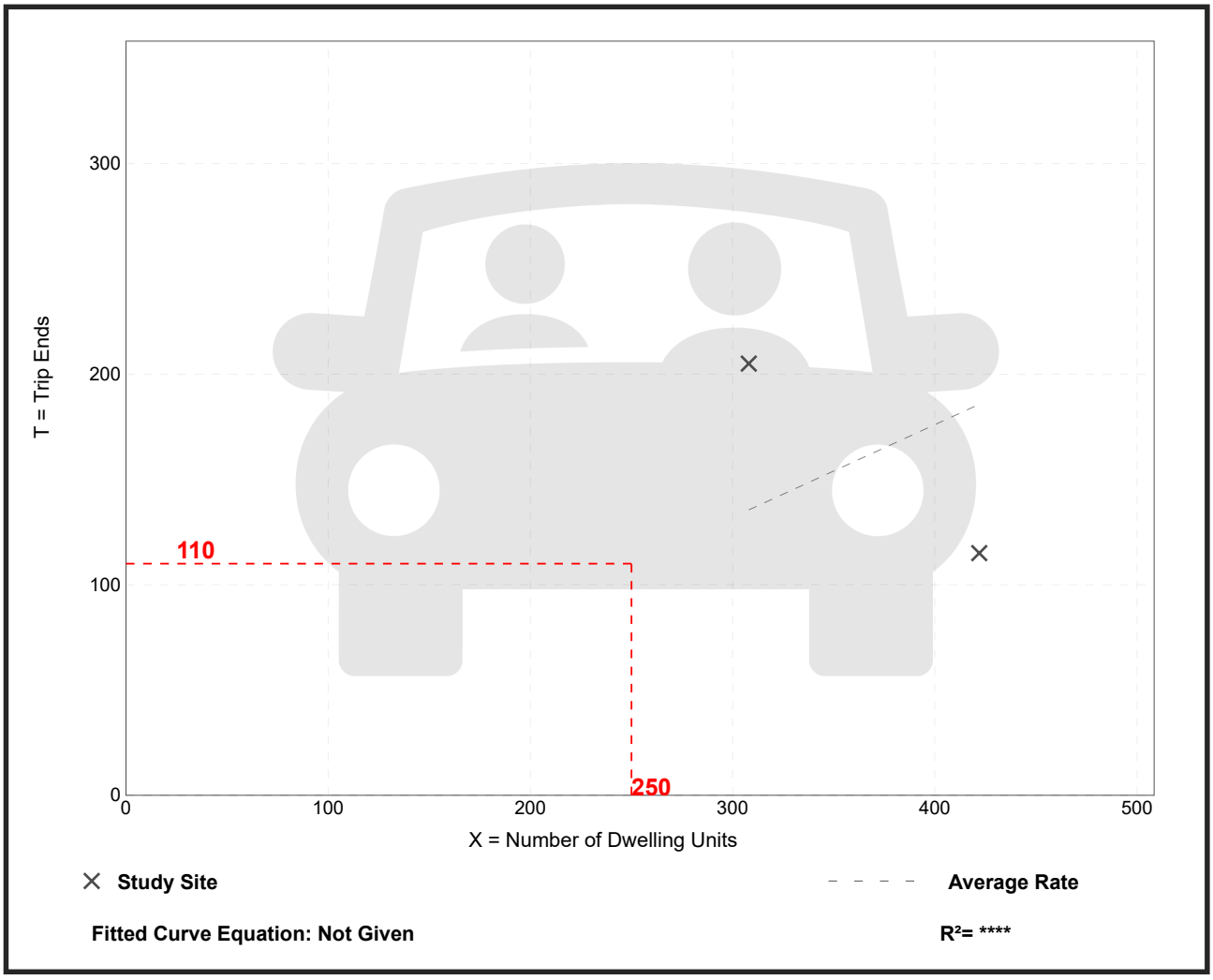
Vehicle Trip Ends vs: **Dwelling Units**
On a: **Weekday,**
Peak Hour of Adjacent Street Traffic,
One Hour Between 7 and 9 a.m.
Setting/Location: **General Urban/Suburban**
Number of Studies: 2
Avg. Num. of Dwelling Units: 365
Directional Distribution: 23% entering, 77% exiting

Vehicle Trip Generation per Dwelling Unit

Average Rate	Range of Rates	Standard Deviation
0.44	0.27 - 0.67	*

Data Plot and Equation

Caution – Small Sample Size



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Low-Rise Residential with Ground-Floor Commercial
GFA (1-25k) (230)

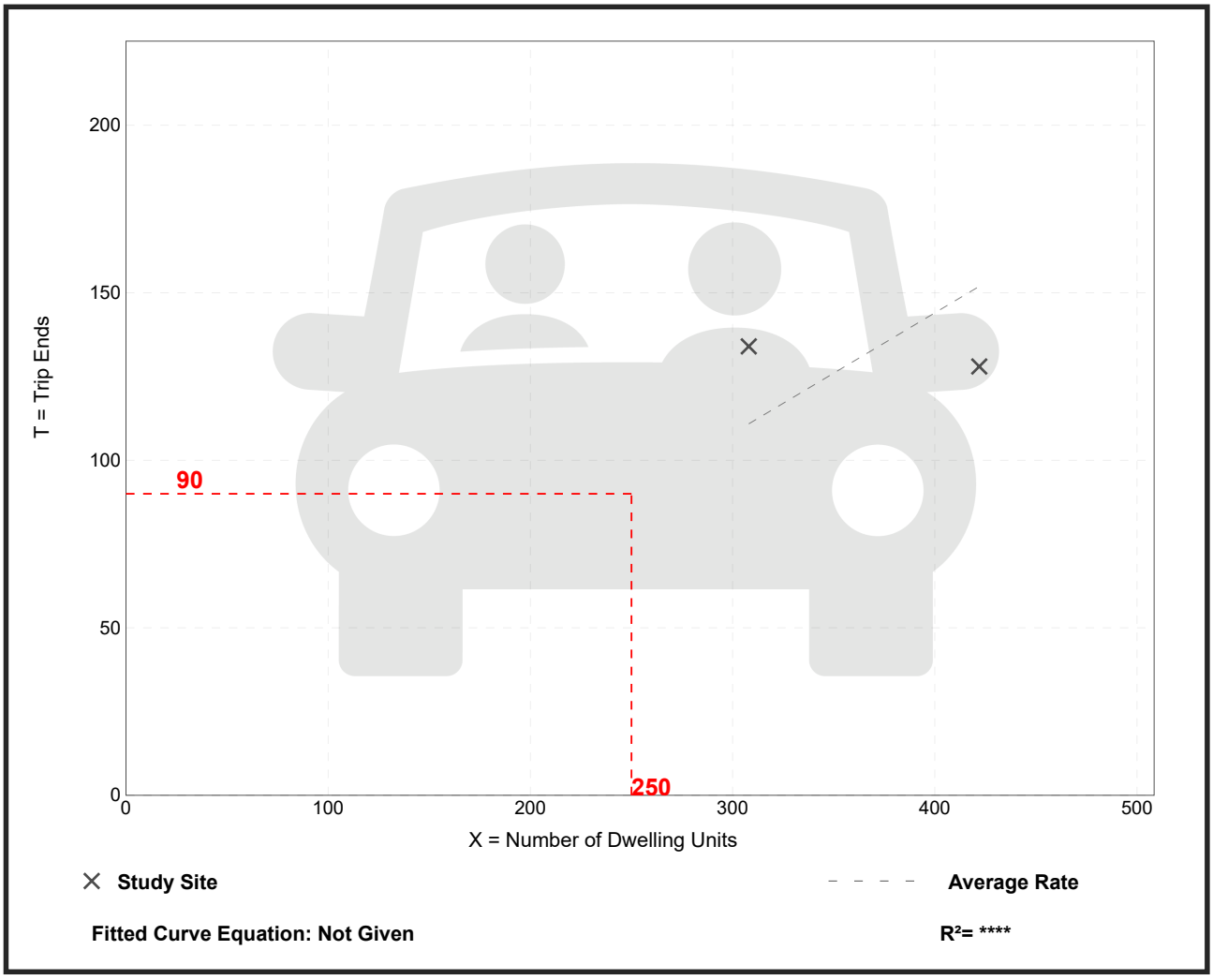
Vehicle Trip Ends vs: **Dwelling Units**
On a: **Weekday,**
Peak Hour of Adjacent Street Traffic,
One Hour Between 4 and 6 p.m.
Setting/Location: **General Urban/Suburban**
Number of Studies: 2
Avg. Num. of Dwelling Units: 365
Directional Distribution: 71% entering, 29% exiting

Vehicle Trip Generation per Dwelling Unit

Average Rate	Range of Rates	Standard Deviation
0.36	0.30 - 0.44	*

Data Plot and Equation

Caution – Small Sample Size



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Appendix C

Traffic Data and Traffic Scenarios

Peak Hour Turning Movement Counts
Kenwood Road at SR 126 EB Ramps/YMCA

Start Time	SR 126 EB Ramps Eastbound				YMCA Drive Westbound				Kenwood Road Northbound				Kenwood Road Southbound				
	Left	Thru	Right		Left	Thru	Right		Left	Thru	Right		Left	Thru	Right		
AM PEAK HOUR TURNING MOVEMENT VOLUMES																	
2022 Existing Traffic																	
7:30 - 8:30 AM	190	21	241		9	17	17		66	383	16		30	378	128		
2025 No Build Traffic (Growth Rate 1.0%/year, Compounded)																	
7:30 - 8:30 AM	196	22	248		9	18	18		68	395	16		31	389	132		
2035 No Build Traffic (Growth Rate 1.0%/year, Compounded)																	
7:30 - 8:30 AM	216	24	274		10	19	19		75	436	18		34	430	146		
Estimated New Trips - Entering																	
7:30 - 8:30 AM										51				0			
Estimated New Trips - Exiting																	
7:30 - 8:30 AM														48			
Pass-by Trips																	
7:30 - 8:30 AM																	
2025 - Build Traffic																	
7:30 - 8:30 AM	196	22	248		9	18	18		68	446	16		31	437	132		
2035 - Build Traffic																	
7:30 - 8:30 AM	216	24	274		10	19	19		75	487	18		34	478	146		
PM PEAK HOUR TURNING MOVEMENT VOLUMES																	
2022 Existing Traffic																	
4:30 - 5:30 PM	151	18	229		16	6	23		83	888	17		24	574	162		
2025 No Build Traffic (Growth Rate 1.0%/year, Compounded)																	
4:30 - 5:30 PM	156	19	236		16	6	24		86	915	18		25	591	167		
2035 No Build Traffic (Growth Rate 1.0%/year, Compounded)																	
4:30 - 5:30 PM	172	20	261		18	7	26		94	1011	19		27	653	184		
Estimated New Trips - Entering																	
4:30 - 5:30 PM										76				0			
Estimated New Trips - Exiting																	
4:30 - 5:30 PM														64			
Pass-by Trips																	
4:30 - 5:30 PM																	
2025 - Build Traffic																	
4:30 - 5:30 PM	156	19	236		16	6	24		86	991	18		25	655	167		
2035 - Build Traffic																	
4:30 - 5:30 PM	172	20	261		18	7	26		94	1087	19		27	717	184		

Peak Hour Turning Movement Counts
Kenwood Road at Blue Ash Road (SR 126 WB Ramps)/Towne Square Avenue

Start Time	Blue Ash Road Eastbound				Towne Square Avenue Westbound				Kenwood Road Northbound				Kenwood Road Southbound			
	Left	Thru	Right		Left	Thru	Right		Left	Thru	Right		Left	Thru	Right	
AM PEAK HOUR TURNING MOVEMENT VOLUMES																
2022 Existing Traffic																
7:30 - 8:30 AM	155	43	144		46	12	3		79	482	28		1	359	33	
2025 No Build Traffic (Growth Rate 1.0%/year, Compounded)																
7:30 - 8:30 AM	160	44	148		47	12	3		81	497	29		1	370	34	
2035 No Build Traffic (Growth Rate 1.0%/year, Compounded)																
7:30 - 8:30 AM	176	49	164		52	14	3		90	549	32		1	409	38	
Estimated New Trips - Entering																
7:30 - 8:30 AM									8	43						
Estimated New Trips - Exiting																
7:30 - 8:30 AM			16											32		
Pass-by Trips																
7:30 - 8:30 AM																
2025 - Build Traffic																
7:30 - 8:30 AM	160	44	164		47	12	3		89	540	29		1	402	34	
2035 - Build Traffic																
7:30 - 8:30 AM	176	49	180		52	14	3		98	592	32		1	441	38	
PM PEAK HOUR TURNING MOVEMENT VOLUMES																
2022 Existing Traffic																
4:30 - 5:30 PM	88	36	103		54	28	11		330	642	70		4	609	221	
2025 No Build Traffic (Growth Rate 1.0%/year, Compounded)																
4:30 - 5:30 PM	91	37	106		56	29	11		340	661	72		4	627	228	
2035 No Build Traffic (Growth Rate 1.0%/year, Compounded)																
4:30 - 5:30 PM	100	41	117		61	32	13		376	731	80		5	693	252	
Estimated New Trips - Entering																
4:30 - 5:30 PM									13	63						
Estimated New Trips - Exiting																
4:30 - 5:30 PM			21											43		
Pass-by Trips																
4:30 - 5:30 PM																
2025 - Build Traffic																
4:30 - 5:30 PM	91	37	127		56	29	11		353	724	72		4	670	228	
2035 - Build Traffic																
4:30 - 5:30 PM	100	41	138		61	32	13		389	794	80		5	736	252	

Peak Hour Turning Movement Counts
Kenwood Road at Cooper Road

Start Time	Cooper Road Eastbound				Cooper Road Westbound				Kenwood Road Northbound				Kenwood Road Southbound			
	Left	Thru	Right		Left	Thru	Right		Left	Thru	Right		Left	Thru	Right	
AM PEAK HOUR TURNING MOVEMENT VOLUMES																
2022 Existing Traffic																
7:30 - 8:30 AM	140	90	38		60	116	125		80	428	60		88	330	75	
2025 No Build Traffic (Growth Rate 1.0%/year, Compounded)																
7:30 - 8:30 AM	144	93	39		62	120	129		82	441	62		91	340	77	
2035 No Build Traffic (Growth Rate 1.0%/year, Compounded)																
7:30 - 8:30 AM	159	102	43		68	132	142		91	487	68		100	376	85	
Estimated New Trips - Entering																
7:30 - 8:30 AM						9	9		17	26					9	
Estimated New Trips - Exiting																
7:30 - 8:30 AM	16	8	8										8	24		
Pass-by Trips																
7:30 - 8:30 AM																
2025 - Build Traffic																
7:30 - 8:30 AM	160	101	47		62	129	138		99	467	62		99	364	86	
2035 - Build Traffic																
7:30 - 8:30 AM	175	110	51		68	141	151		108	513	68		108	400	94	
PM PEAK HOUR TURNING MOVEMENT VOLUMES																
2022 Existing Traffic																
4:30 - 5:30 PM	131	213	93		133	196	114		89	464	133		131	478	143	
2025 No Build Traffic (Growth Rate 1.0%/year, Compounded)																
4:30 - 5:30 PM	135	219	96		137	202	117		92	478	137		135	492	147	
2035 No Build Traffic (Growth Rate 1.0%/year, Compounded)																
4:30 - 5:30 PM	149	242	106		151	223	130		101	528	151		149	544	163	
Estimated New Trips - Entering																
4:30 - 5:30 PM						13	13		25	38					13	
Estimated New Trips - Exiting																
4:30 - 5:30 PM	21	11	11										11	32		
Pass-by Trips																
4:30 - 5:30 PM																
2025 - Build Traffic																
4:30 - 5:30 PM	156	230	107		137	215	130		117	516	137		146	524	160	
2035 - Build Traffic																
4:30 - 5:30 PM	170	253	117		151	236	143		126	566	151		160	576	176	

Peak Hour Turning Movement Counts
Kenwood Road at Malsbury Road/Aldine Drive

Start Time	Malsbury Road Eastbound				Aldine Drive Westbound				Kenwood Road Northbound				Kenwood Road Southbound			
	Left	Thru	Right		Left	Thru	Right		Left	Thru	Right		Left	Thru	Right	
AM PEAK HOUR TURNING MOVEMENT VOLUMES																
2022 Existing Traffic																
7:30 - 8:30 AM	15	22	25		71	31	103		108	465	71		120	403	108	
2025 No Build Traffic (Growth Rate 1.0%/year, Compounded)																
7:30 - 8:30 AM	15	23	26		73	32	106		111	479	73		124	415	111	
2035 No Build Traffic (Growth Rate 1.0%/year, Compounded)																
7:30 - 8:30 AM	17	25	28		81	35	117		123	529	81		137	459	123	
Estimated New Trips - Entering																
7:30 - 8:30 AM			17											44		
Estimated New Trips - Exiting																
7:30 - 8:30 AM									16	41						
Pass-by Trips																
7:30 - 8:30 AM																
2025 - Build Traffic																
7:30 - 8:30 AM	15	23	43		73	32	106		127	520	73		124	459	111	
2035 - Build Traffic																
7:30 - 8:30 AM	17	25	45		81	35	117		139	570	81		137	503	123	
PM PEAK HOUR TURNING MOVEMENT VOLUMES																
2022 Existing Traffic																
4:30 - 5:30 PM	83	4	123		14	2	25		29	662	17		27	593	28	
2025 No Build Traffic (Growth Rate 1.0%/year, Compounded)																
4:30 - 5:30 PM	86	4	127		14	2	26		30	682	18		28	611	29	
2035 No Build Traffic (Growth Rate 1.0%/year, Compounded)																
4:30 - 5:30 PM	94	5	140		16	2	28		33	753	19		31	675	32	
Estimated New Trips - Entering																
4:30 - 5:30 PM			25											64		
Estimated New Trips - Exiting																
4:30 - 5:30 PM									20	54						
Pass-by Trips																
4:30 - 5:30 PM																
2025 - Build Traffic																
4:30 - 5:30 PM	86	4	152		14	2	26		50	736	18		28	675	29	
2035 - Build Traffic																
4:30 - 5:30 PM	94	5	165		16	2	28		53	807	19		31	739	32	

Peak Hour Turning Movement Counts
Kenwood Road at Laurel Avenue

Start Time	Proposed Access Drive Eastbound				Laurel Avenue Westbound				Kenwood Road Northbound				Kenwood Road Southbound				
	Left	Thru	Right		Left	Thru	Right		Left	Thru	Right		Left	Thru	Right		
AM PEAK HOUR TURNING MOVEMENT VOLUMES																	
2022 Existing Traffic																	
7:30 - 8:30 AM					17		33			647	7		29	461			
2025 No Build Traffic (Growth Rate 1.0%/year, Compounded)																	
7:30 - 8:30 AM	0	0	0		18	0	34		0	667	7		30	475	0		
2035 No Build Traffic (Growth Rate 1.0%/year, Compounded)																	
7:30 - 8:30 AM	0	0	0		19	0	38		0	736	8		33	525	0		
Estimated New Trips - Entering																	
7:30 - 8:30 AM						9			35					9	52		
Estimated New Trips - Exiting																	
7:30 - 8:30 AM	41	8	32							16							
Pass-by Trips																	
7:30 - 8:30 AM																	
2025 - Build Traffic																	
7:30 - 8:30 AM	41	8	32		18	9	34		35	683	7		30	484	52		
2035 - Build Traffic																	
7:30 - 8:30 AM	41	8	32		19	9	38		35	752	8		33	534	52		
PM PEAK HOUR TURNING MOVEMENT VOLUMES																	
2022 Existing Traffic																	
4:30 - 5:30 PM					11		10			716	8		11	762			
2025 No Build Traffic (Growth Rate 1.0%/year, Compounded)																	
4:30 - 5:30 PM	0	0	0		11	0	10		0	738	8		11	785	0		
2035 No Build Traffic (Growth Rate 1.0%/year, Compounded)																	
4:30 - 5:30 PM	0	0	0		13	0	11		0	815	9		13	867	0		
Estimated New Trips - Entering																	
4:30 - 5:30 PM						13			51					13	76		
Estimated New Trips - Exiting																	
4:30 - 5:30 PM	53	11	43							21							
Pass-by Trips																	
4:30 - 5:30 PM	16		12						16	-16				-12	12		
2025 - Build Traffic																	
4:30 - 5:30 PM	69	11	55		11	13	10		67	743	8		11	786	88		
2035 - Build Traffic																	
4:30 - 5:30 PM	69	11	55		13	13	11		67	820	9		13	868	88		

Peak Hour Turning Movement Counts
Cooper Road at Monroe Avenue/Wynnecrest Drive

Start Time	Cooper Road Eastbound				Cooper Road Westbound				Wynnecrest Drive Northbound				Monroe Avenue Southbound			
	Left	Thru	Right		Left	Thru	Right		Left	Thru	Right		Left	Thru	Right	
AM PEAK HOUR TURNING MOVEMENT VOLUMES																
2022 Existing Traffic																
7:30 - 8:30 AM	8	234	2		5	318	13		10	1	8		13	2	15	
2025 No Build Traffic (Growth Rate 1.0%/year, Compounded)																
7:30 - 8:30 AM	8	241	2		5	328	13		10	1	8		13	2	15	
2035 No Build Traffic (Growth Rate 1.0%/year, Compounded)																
7:30 - 8:30 AM	9	266	2		6	362	15		11	1	9		15	2	17	
Estimated New Trips - Entering																
7:30 - 8:30 AM						18	9									
Estimated New Trips - Exiting																
7:30 - 8:30 AM		16											8			
Pass-by Trips																
7:30 - 8:30 AM																
2025 - Build Traffic																
7:30 - 8:30 AM	8	257	2		5	346	22		10	1	8		21	2	15	
2035 - Build Traffic																
7:30 - 8:30 AM	9	282	2		6	380	24		11	1	9		23	2	17	
PM PEAK HOUR TURNING MOVEMENT VOLUMES																
2022 Existing Traffic																
4:30 - 5:30 PM	23	488	12		3	348	15		5	0	2		15	0	33	
2025 No Build Traffic (Growth Rate 1.0%/year, Compounded)																
4:30 - 5:30 PM	24	503	12		3	359	15		5	0	2		15	0	34	
2035 No Build Traffic (Growth Rate 1.0%/year, Compounded)																
4:30 - 5:30 PM	26	555	14		3	396	17		6	0	2		17	0	38	
Estimated New Trips - Entering																
4:30 - 5:30 PM						26	13									
Estimated New Trips - Exiting																
4:30 - 5:30 PM		22											11			
Pass-by Trips																
4:30 - 5:30 PM																
2025 - Build Traffic																
4:30 - 5:30 PM	24	525	12		3	385	28		5	0	2		26	0	34	
2035 - Build Traffic																
4:30 - 5:30 PM	26	577	14		3	422	30		6	0	2		28	0	38	

Peak Hour Turning Movement Counts
Cooper Road at Blue Ash Road/Access Drive

Start Time	Cooper Road Eastbound				Cooper Road Westbound				Blue Ash Road Northbound				Access Drive Southbound			
	Left	Thru	Right		Left	Thru	Right		Left	Thru	Right		Left	Thru	Right	
AM PEAK HOUR TURNING MOVEMENT VOLUMES																
2022 Existing Traffic																
7:30 - 8:30 AM	0	164	46		46	223	0		62	0	108		0	0	0	
2025 No Build Traffic (Growth Rate 1.0%/year, Compounded)																
7:30 - 8:30 AM	0	169	47		47	230	0		64	0	111		0	0	0	
2035 No Build Traffic (Growth Rate 1.0%/year, Compounded)																
7:30 - 8:30 AM	0	187	52		52	254	0		71	0	123		0	0	0	
Estimated New Trips - Entering																
7:30 - 8:30 AM	35						35			8						
Estimated New Trips - Exiting																
7:30 - 8:30 AM													32	16	33	
Pass-by Trips																
7:30 - 8:30 AM																
2025 - Build Traffic																
7:30 - 8:30 AM	35	169	47		47	230	35		64	8	111		32	16	33	
2035 - Build Traffic																
7:30 - 8:30 AM	35	187	52		52	254	35		71	8	123		32	16	33	
PM PEAK HOUR TURNING MOVEMENT VOLUMES																
2022 Existing Traffic																
4:30 - 5:30 PM	0	332	138		116	304	0		50	0	113		0	0	0	
2025 No Build Traffic (Growth Rate 1.0%/year, Compounded)																
4:30 - 5:30 PM	0	342	142		120	313	0		52	0	116		0	0	0	
2035 No Build Traffic (Growth Rate 1.0%/year, Compounded)																
4:30 - 5:30 PM	0	378	157		132	346	0		57	0	129		0	0	0	
Estimated New Trips - Entering																
4:30 - 5:30 PM	50						51			13						
Estimated New Trips - Exiting																
4:30 - 5:30 PM													43	21	43	
Pass-by Trips																
4:30 - 5:30 PM	4	-4				-8	8						4		8	
2025 - Build Traffic																
4:30 - 5:30 PM	54	338	142		120	305	59		52	13	116		47	21	51	
2035 - Build Traffic																
4:30 - 5:30 PM	54	374	157		132	338	59		57	13	129		47	21	51	

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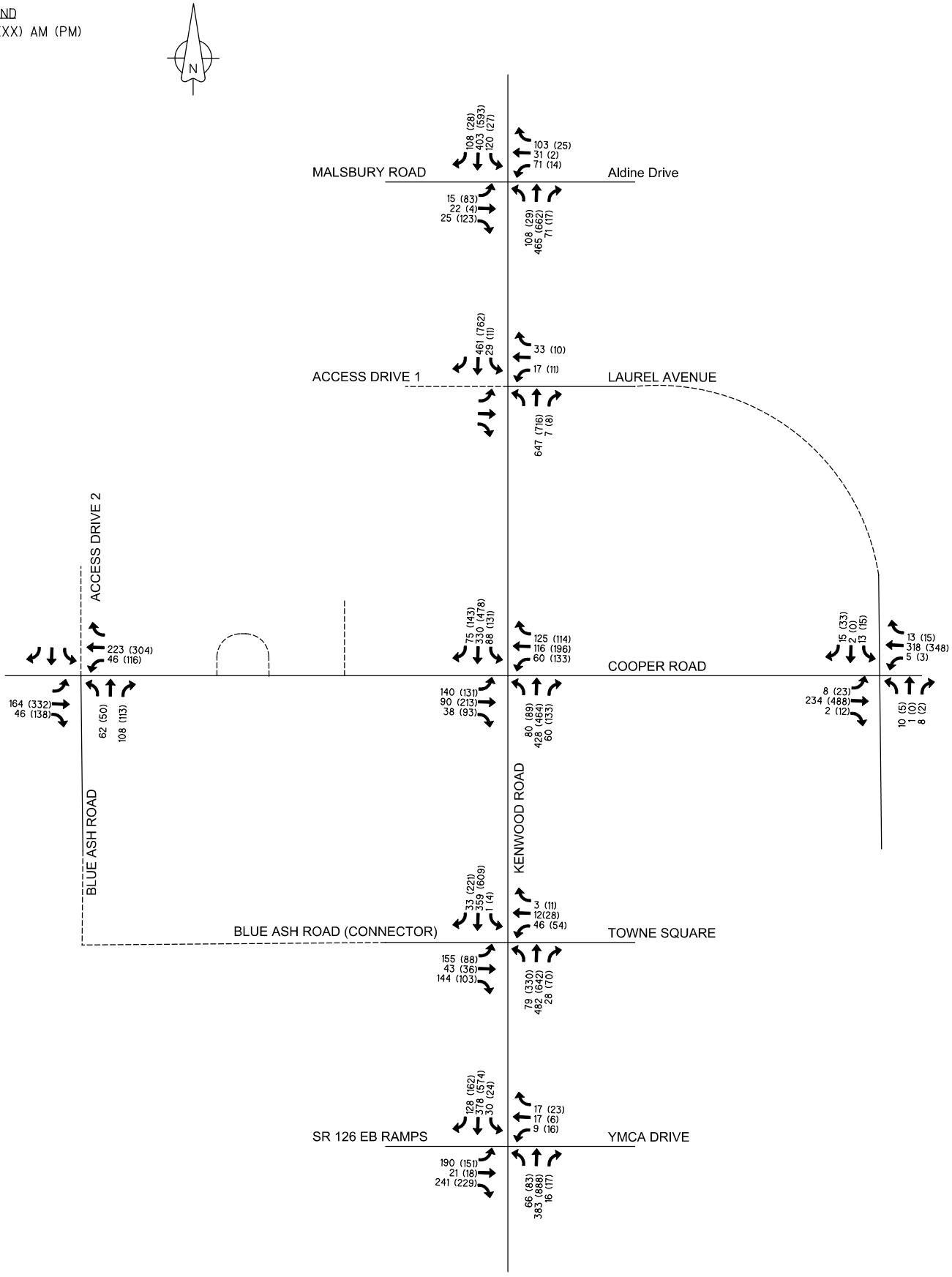
BLUE ASH, HAMILTON COUNTY, OHIO

EXISTING 2022 TRAFFIC

Project No:	Checked: JAA
Date: 04-14-2022	Ref: JAA

Sheet: EXHIBIT 1

LEGEND
XXX (XXX) AM (PM)



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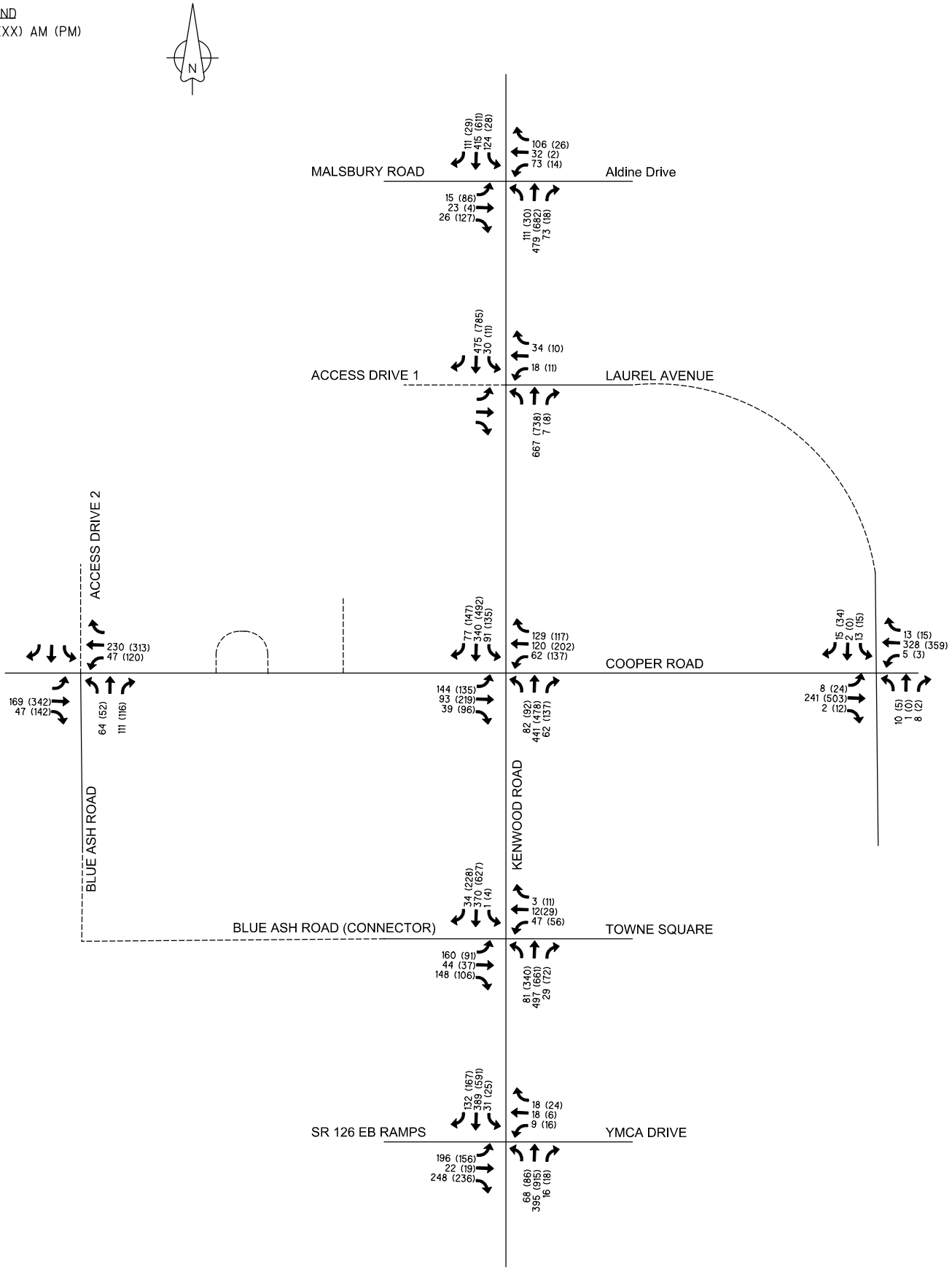
BLUE ASH, HAMILTON COUNTY, OHIO

2025 NO BUILD TRAFFIC

Project No:	Checked: JAA
Date: 04-14-2022	Ref: JAA

Sheet: EXHIBIT 2

LEGEND
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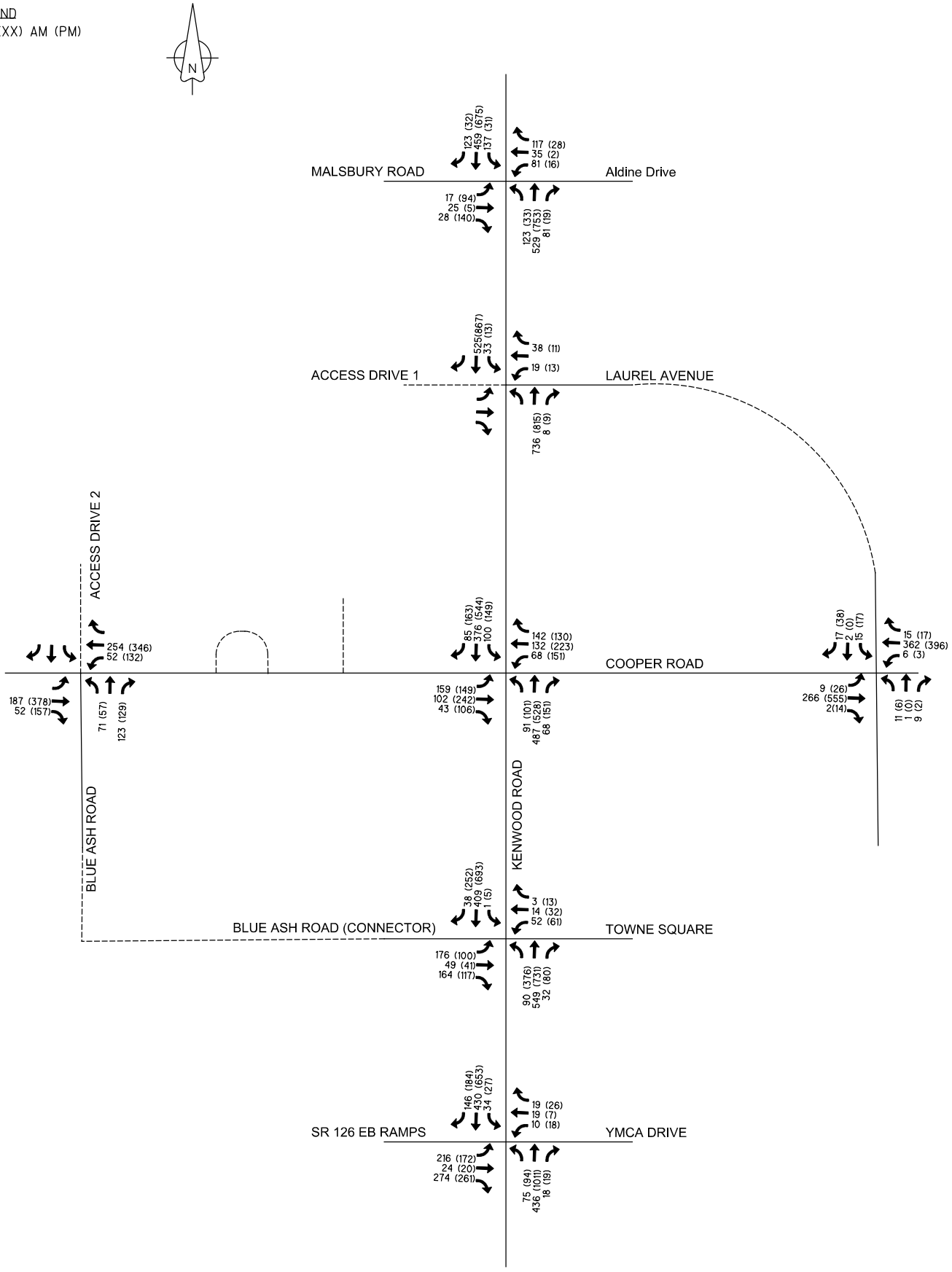
BLUE ASH, HAMILTON COUNTY, OHIO

2035 NO BUILD TRAFFIC

Project No:	Checked: JAA
Date: 04-14-2022	Ref: JAA

Sheet: EXHIBIT 3

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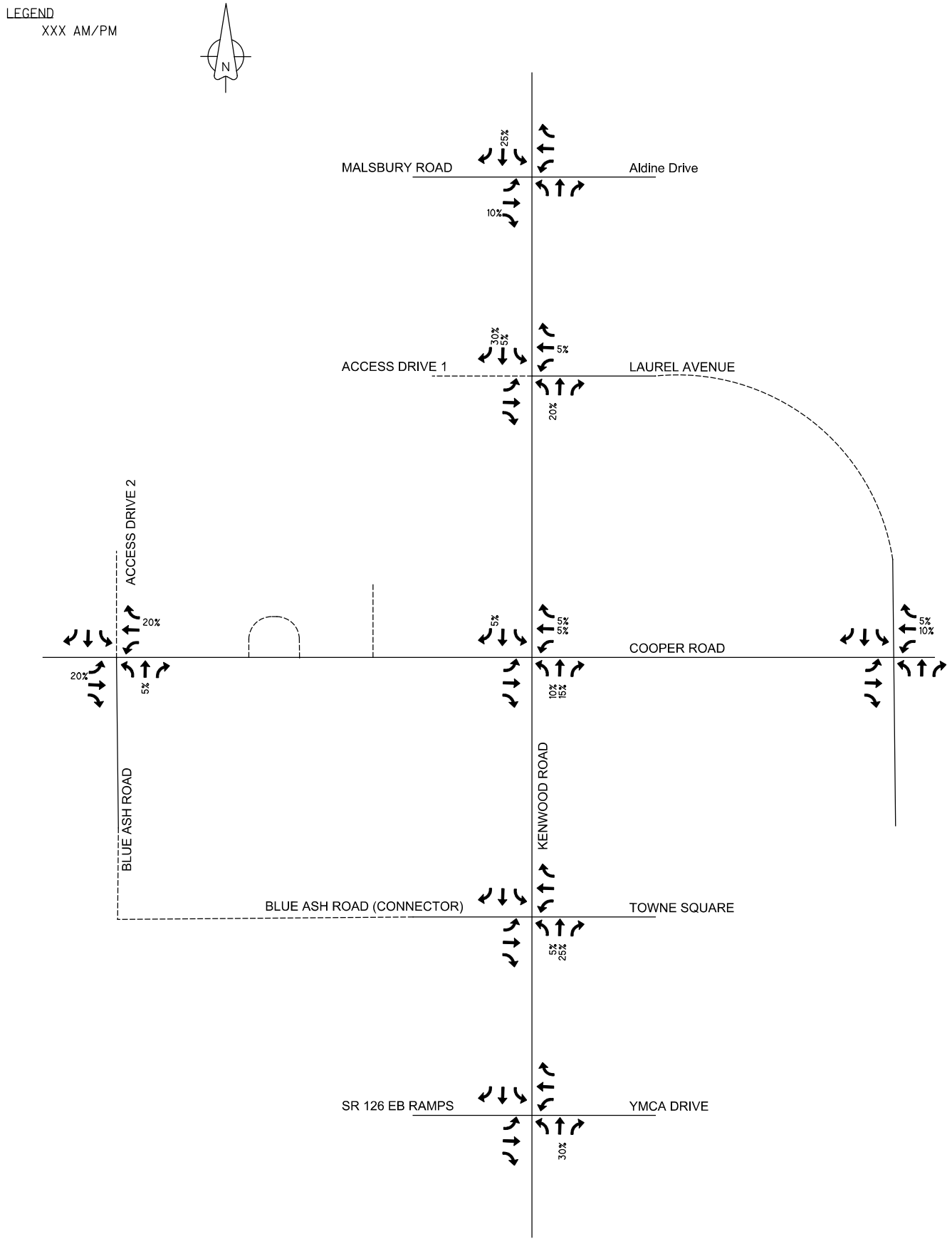
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BLUE ASH, HAMILTON COUNTY, OHIO

TRIP DISTRIBUTION PERCENT - ENTERING TRAFFIC

Project No:	Checked: JAA
Date: 04-14-2022	Ref: JAA

Sheet: EXHIBIT 4



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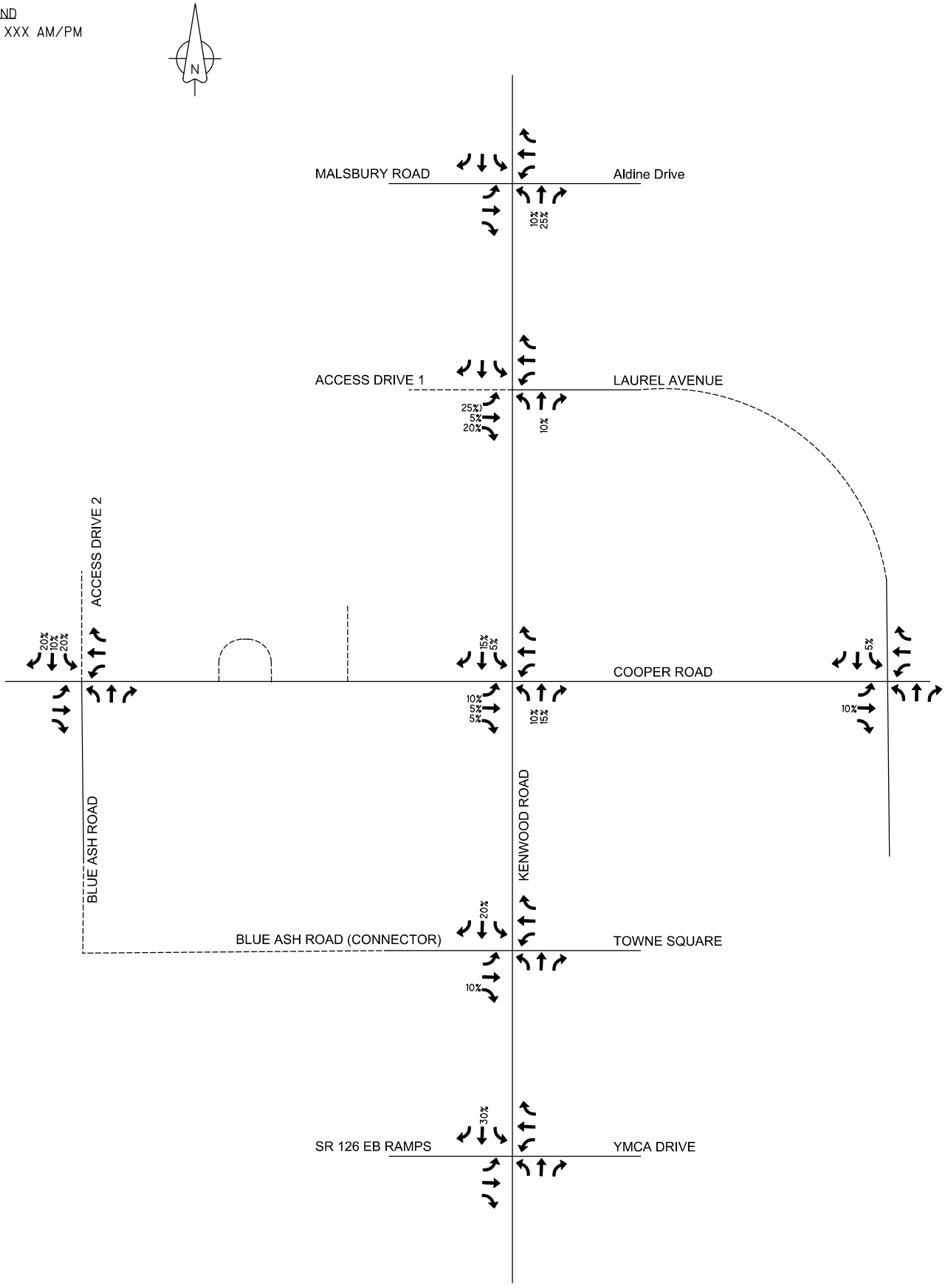
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TRIP DISTRIBUTION - PERCENT - EXITING TRAFFIC

Project No:	Checked: JAA
Date: 04-14-2022	Ref: JAA

Sheet: EXHIBIT 5

LEGEND
XXX AM/PM



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BLUE ASH, OHIO
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BLUE ASH, HAMILTON COUNTY, OHIO

ESTIMATED NEW TRIPS - ENTERING

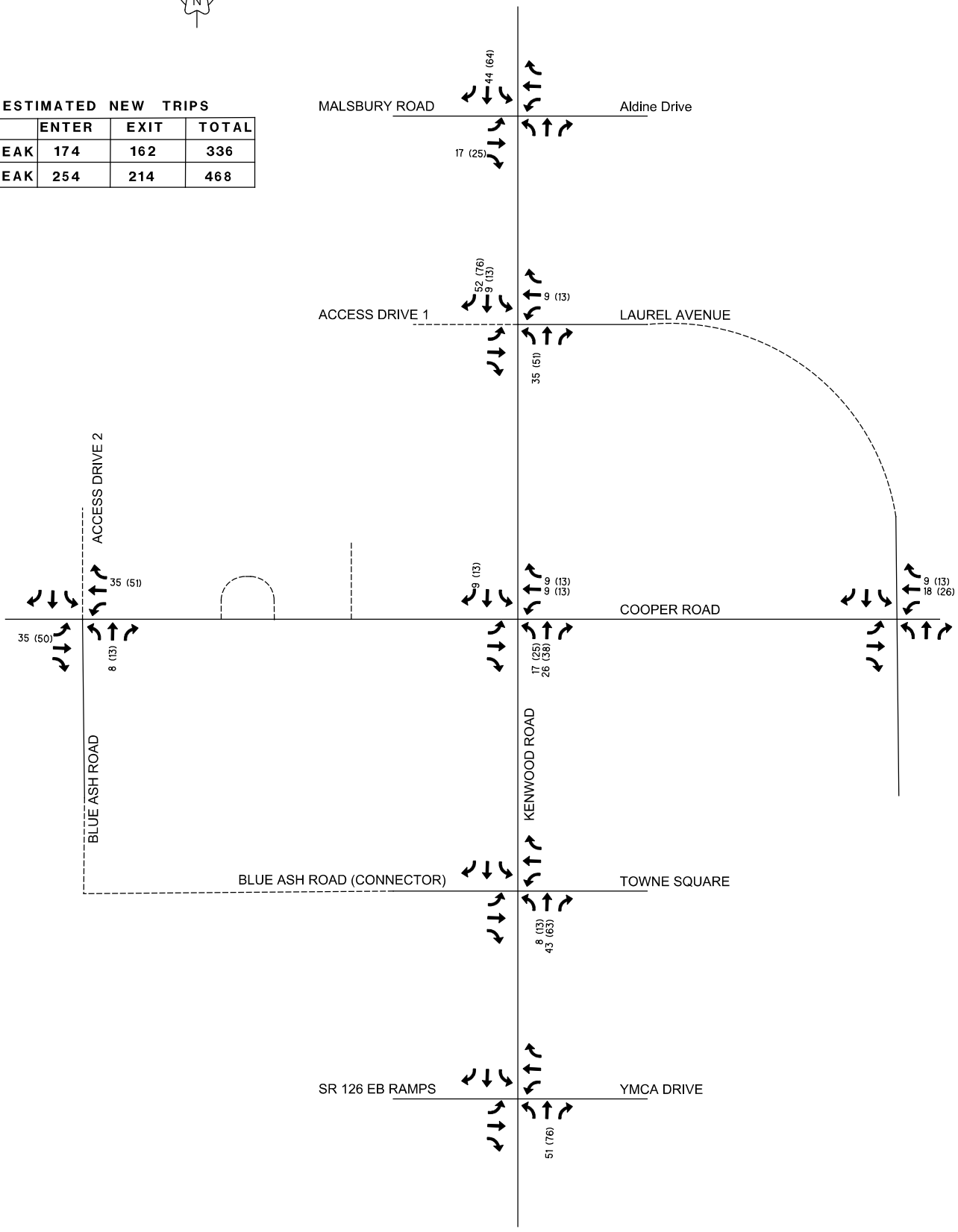
Project No:	Checked: JAA
Date: 04-14-2022	Ref: JAA

Sheet: EXHIBIT 6

LEGEND
XXX (XXX) AM (PM)

ESTIMATED NEW TRIPS

	ENTER	EXIT	TOTAL
AM PEAK	174	162	336
PM PEAK	254	214	468



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ESTIMATED NEW TRIPS - EXITING

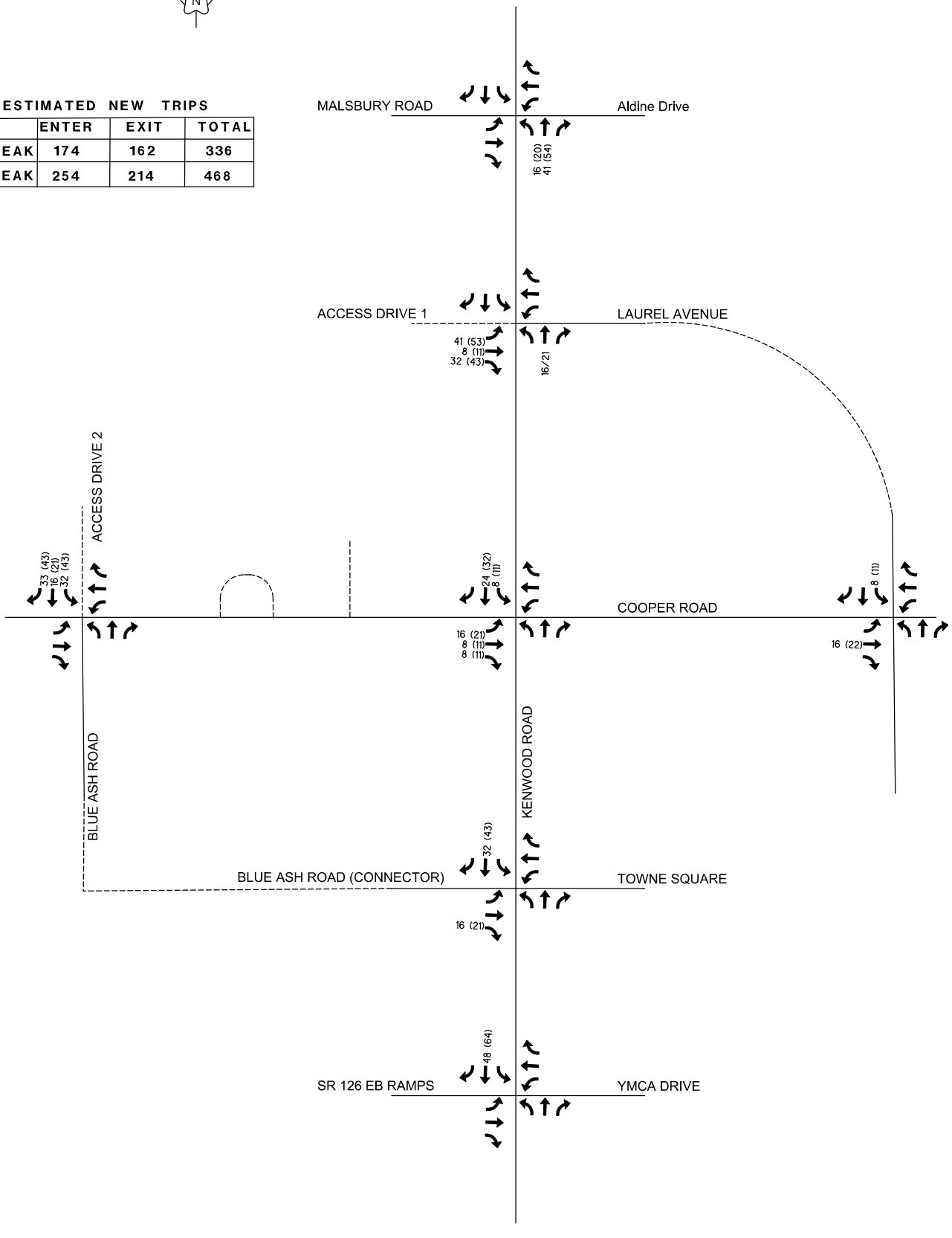
Project No:	Checked: JAA
Date: 04-14-2022	Ref: JAA

Sheet: EXHIBIT 7

LEGEND
XXX AM/PM

ESTIMATED NEW TRIPS

	ENTER	EXIT	TOTAL
AM PEAK	174	162	336
PM PEAK	254	214	468



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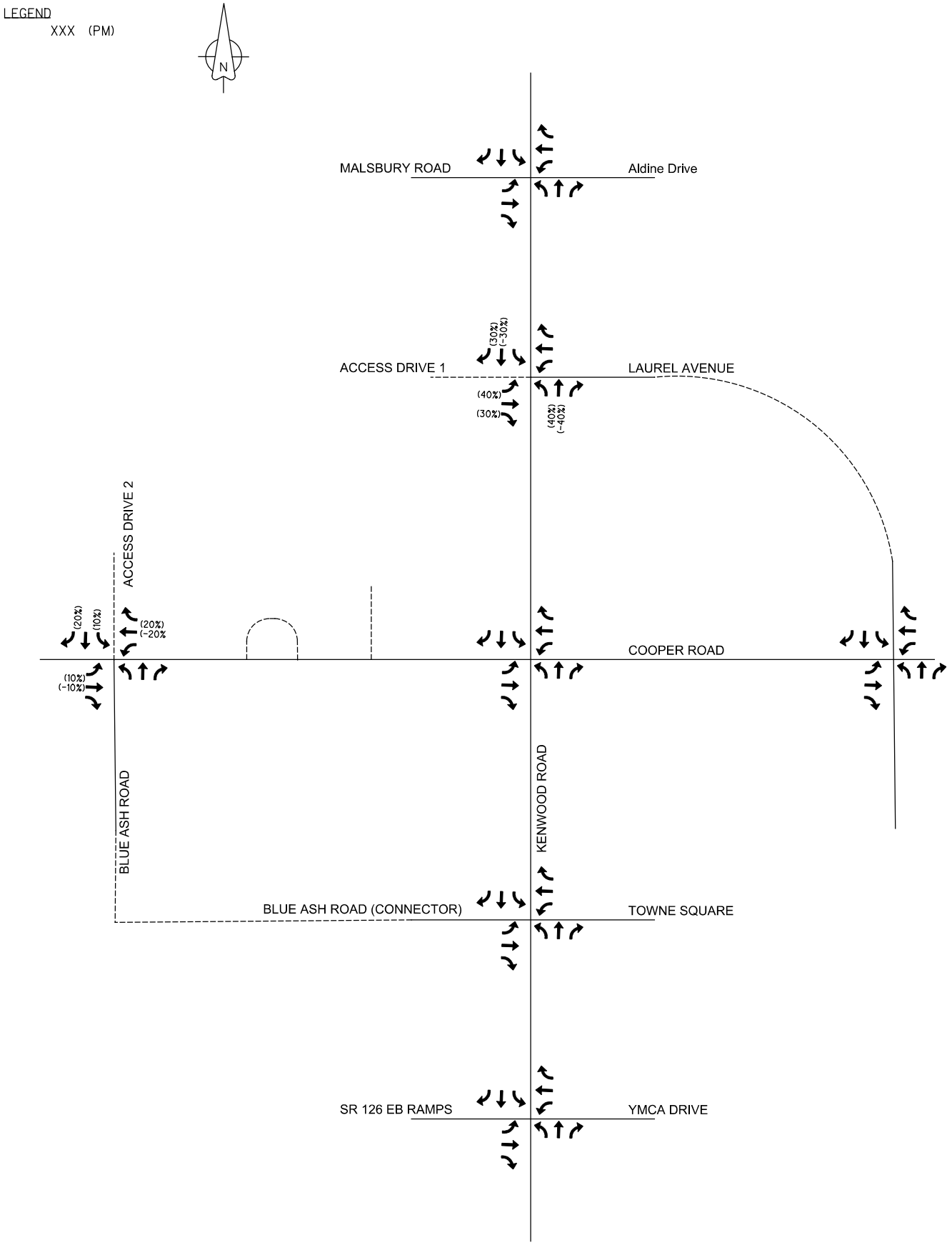
BLUE ASH, OHIO
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TRAFFIC IMPACT STUDY

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PASS-BY TRIPS (PERCENT)

Project No:	Checked: JAA
Date: 04-14-2022	Ref: JAA

Sheet: EXHIBIT 8



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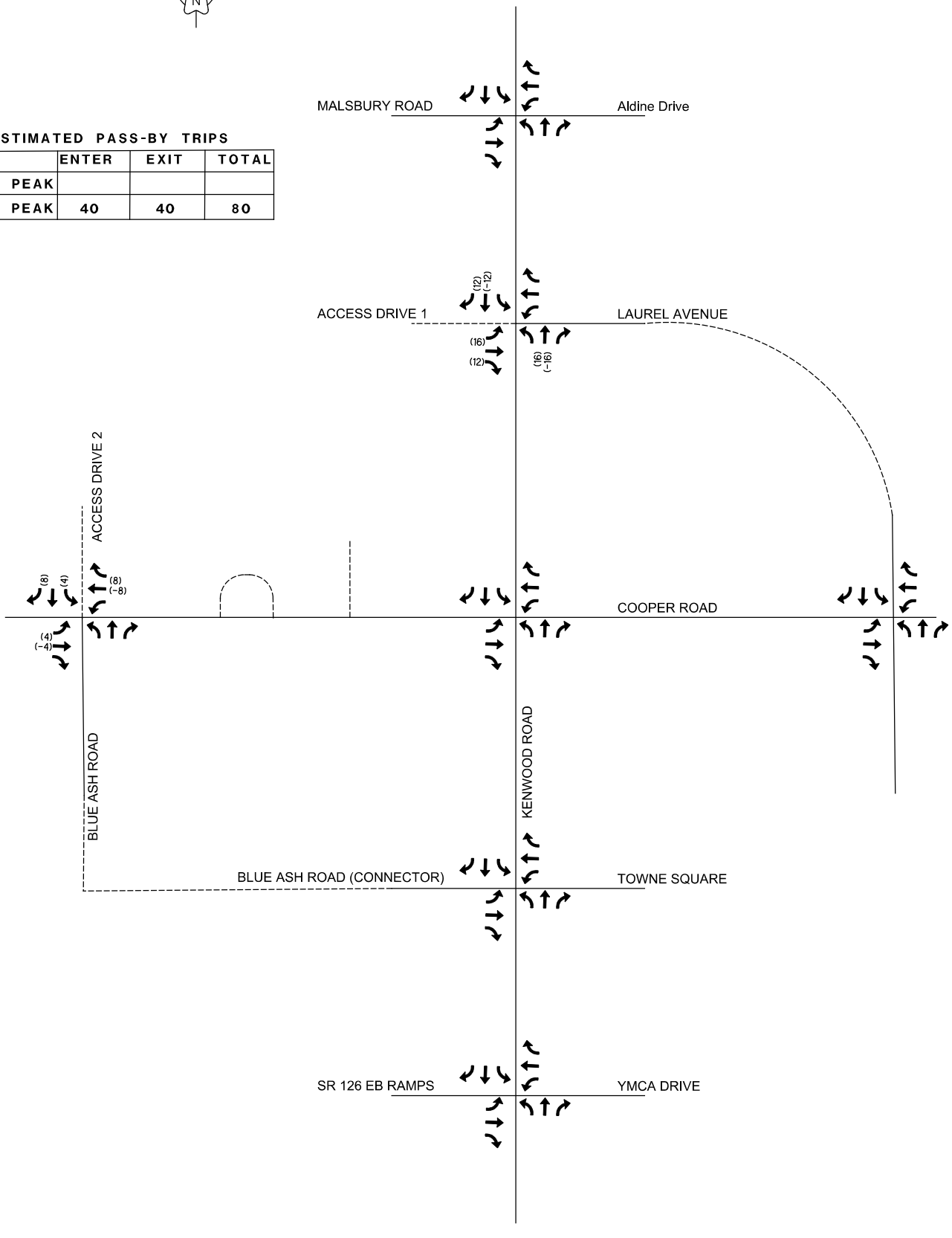
ESTIMATED PASS-BY TRIPS

Project No:	Checked: JAA
Date: 04-14-2022	Ref: JAA
Sheet: EXHIBIT 9	

LEGEND
XXX (PM)

ESTIMATED PASS-BY TRIPS

	ENTER	EXIT	TOTAL
AM PEAK			
PM PEAK	40	40	80



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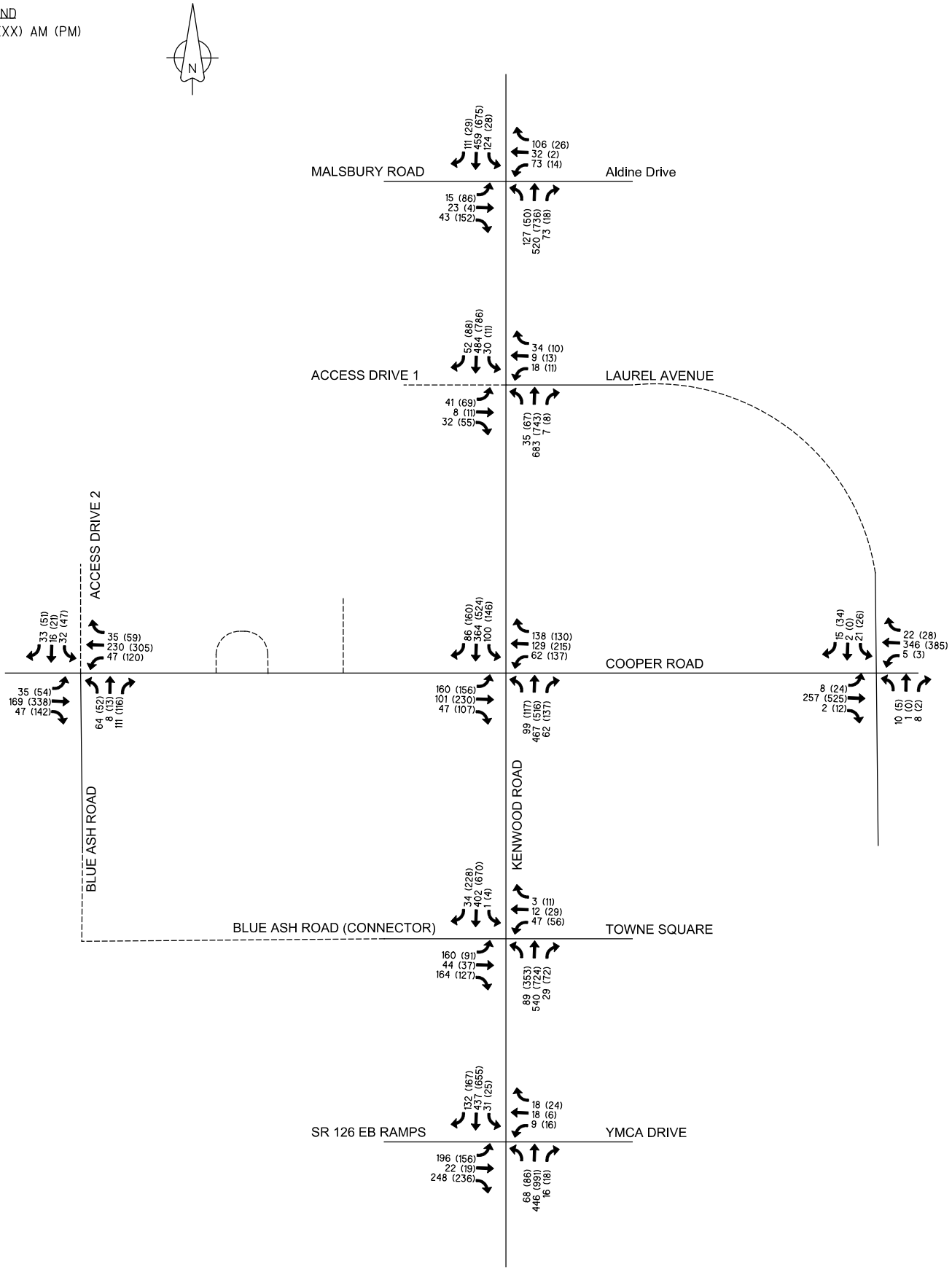
BLUE ASH, OHIO
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TRAFFIC IMPACT STUDY

BLUE ASH, HAMILTON COUNTY, OHIO

2025 BUILD TRAFFIC

Project No:	Checked: JAA
Date: 04-14-2022	Ref: JAA
Sheet: EXHIBIT10	

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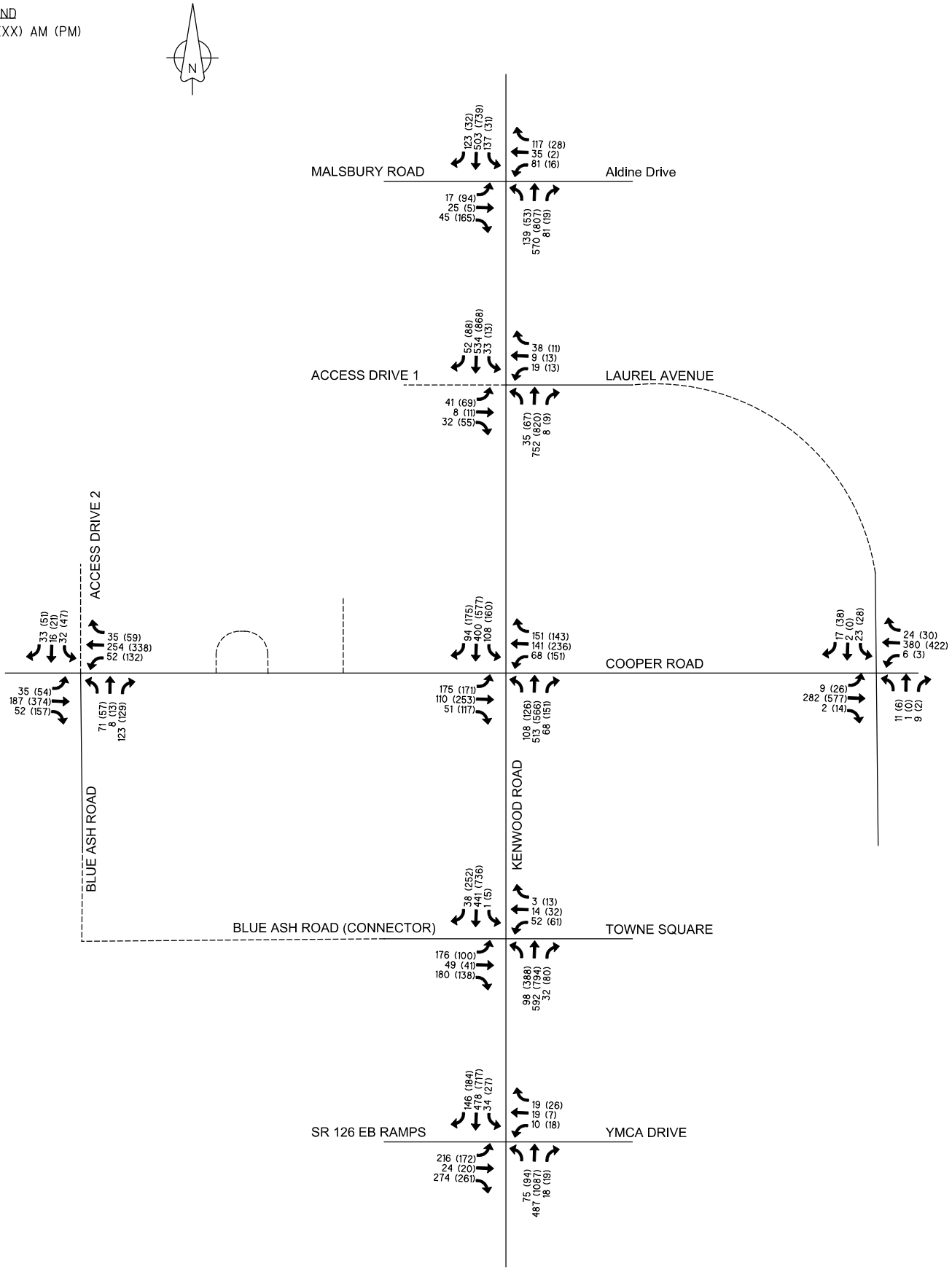
BLUE ASH, HAMILTON COUNTY, OHIO

2035 BUILD TRAFFIC

Project No:	Checked: JAA
Date: 04-14-2022	Ref: JAA

Sheet: EXHIBIT 11

LEGEND
XXX (XXX) AM (PM)



Appendix D

Trip Generation Summary

Blue Development, City of Blue Ash, Ohio

4/7/2022
SHA Engineering LLC

TABLE 1: Estimated Trips - Group 1

Parcel ID	Land Use	Units	Total	Weekday			AM Peak Hour			PM Peak Hour		
				Ent.	Exit	Tot.	Ent.	Exit	Tot.	Ent.	Exit	Tot.
GROUP 1												
GS-1, GS-2, GS-3, GS-4, CR-1, CR-2, CR-3, CR-4, CR-5. CR-6. FB-1	*821 - Shopping Plaza (No Super Market)*	GFA (SFT)	40,000	1350	1350	2,700	43	26	69	102	106	208
		Internal Trips					9	5	14	25	37	62
		Pass-by Trips								24	24	48
	New Trips - Group 1			1350	1350	2700	43	26	69	102	106	208
	Internal Trips - Group 1						9	5	14	25	37	62
	Estimated Trips adjusted for Internal Trips			1350	1350	2700	34	21	55	77	69	146
	Pass-by Trips (Group 1)									24	24	48
	Net- New Trips			1350	1350	2700	34	21	55	53	45	98

Blue Development, City of Blue Ash, Ohio

4/7/2022
SHA Engineering LLC

TABLE 2: Estimated Trips - Group 2

Parcel ID	Land Use	Units	Total	Weekday			AM Peak Hour			PM Peak Hour		
				Ent.	Exit	Tot.	Ent.	Exit	Tot.	Ent.	Exit	Tot.
GROUP 2												
FB-2, FB-3, FB-4, FB-5, FB-6, EN-1, EN-2	*931 - Fine Dining Restaurant*	GFA (SFT)	5000	210	210	420	2	2	4	26	13	39
		Internal Trips							0	2	1	3
		Pass-by Trips								8	8	16
	931 - Fine Dining Restaurant	GFA (SFT)	5000	210	210	420	2	2	4	26	13	39
		Internal Trips					0	0	0	2	1	3
		Pass-by Trips								8	8	16
	930 - Fast Casual Restaurant	GFA (SFT)	2,000	97	97	194	1	1	2	11	9	20
		Internal Trips					0	0	0	0	1	1
		Pass-by Trips										
	930 - Fast Casual Restaurant	GFA (SFT)	2,000	97	97	194	1	1	2	11	9	20
		Internal Trips								0	1	1
		Pass-by Trips										
	936 - Coffee/Donut Shop without Drive-Through Window	GFA (SFT)	1,000				47	46	93	16	16	32
		Internal Trips					3	2	5	1	1	2
	975 - Drinking Place	GFA (SFT)	5,000							37	19	56
		Internal Trips					0	0	0	3	2	5
	975 - Drinking Place	GFA (SFT)	5,000							37	19	56
		Internal Trips					0	0	0	3	2	5
	New Trips			614	614	1228	53	52	105	164	98	262
	Internal Trips						3	2	5	11	9	20
	Estimated Trips adjusted for Internal Trips			614	614	1228	50	50	100	153	89	242
	Pass-by Trips			0	0	0	0	0	0	16	16	32
	Net- New Trips			614	614	1228	50	50	100	137	73	210

Blue Development, City of Blue Ash, Ohio

4/7/2022
SHA Engineering LLC

TABLE 3: Estimated Trips - Group 3

Parcel ID	Land Use	Units	Total	Weekday			AM Peak Hour			PM Peak Hour		
				Ent.	Exit	Tot.	Ent.	Exit	Tot.	Ent.	Exit	Tot.
GROUP 3												
OF-1, OF-2, OF-3, OF-4, OF-5	*720 - Medical and Dental*	GFA (SFT)	35,000	698	698	1396	74	20	94	42	97	139
		Internal Trips					8	10	18	3	11	14
	New Trips			698	698	1396	74	20	94	42	97	139
	Internal Trips						8	10	18	3	11	14
	Estimated Trips adjusted for Internal Trips			698	698	1396	66	10	76	39	86	125
	Pass-by Trips			0	0	0	0	0	0	0	0	0
	Net- New Trips			698	698	1396	66	10	76	39	86	125

Blue Development, City of Blue Ash, Ohio

4/7/2022
SHA Engineering LLC

TABLE 4: Estimated Trips - Group 4

Parcel ID	Land Use	Units	Total	Weekday			AM Peak Hour			PM Peak Hour		
				Ent.	Exit	Tot.	Ent.	Exit	Tot.	Ent.	Exit	Tot.
GROUP 4												
	230 - Low-Rise Residential with Ground-Floor Commercial	DW	250	430	430	860	25	85	110	64	26	90
		Internal Trips					1	4	5	33	15	48
	New Trips			430	430	860	25	85	110	64	26	90
	Internal Trips						1	4	5	39	16	55
	Estimated Trips adjusted for Internal Trips			430	430	860	24	81	105	25	10	35
	Pass-by Trips			0	0	0	0	0	0	0	0	0
	Net- New Trips			430	430	860	24	81	105	25	10	35

Blue Development, City of Blue Ash, Ohio

4/7/2022
SHA Engineering LLC

TOTALS ENTIRE DEVELOPMENT

Parcel ID	Land Use	Units	Total	Weekday			AM Peak Hour			PM Peak Hour		
				Ent.	Exit	Tot.	Ent.	Exit	Tot.	Ent.	Exit	Tot.
	New Trips			3092	3092	6184	195	183	378	372	327	699
	Internal Trips						21	21	42	78	73	151
	Estimated Trips adjusted for Internal Trips			3092	3092	6184	174	162	336	294	254	548
	Pass-by Trips			0	0	0	0	0	0	40	40	80
	Net- New Trips			**3092**	**3092**	**6184**	**174**	**162**	**336**	**254**	**214**	**468**

Scenario - 1

Scenario Name: **AM PEAK**

User Group:

Dev. phase: 1

No. of Years to Project Traffic : 0

Analyst Note: Blue Ash Mixed Use Development

Warning: The time periods among the land uses do not appear to match.

VEHICLE TRIPS BEFORE REDUCTION

Land Use & Data Source	Location	IV	Size	Time Period	Method Rate/Equation	Entry Split%	Exit Split%	Total
821 - Shopping Plaza (40-150k) - Supermarket -	General Urban/Suburban	1000 Sq. Ft. GLA	40	Weekday, Peak Hour of Adjacent Street Traffic,	Average	43	26	69
Data Source: Trip Generation Manual, 11th Ed					1.73	62%	38%	
931 - Fine Dining Restaurant	General Urban/Suburban	1000 Sq. Ft. GFA	5	Weekday, Peak Hour of Adjacent Street Traffic,	Average	2	2	4
Data Source: Trip Generation Manual, 11th Ed					0.73	50%	50%	
931(1) - Fine Dining Restaurant	General Urban/Suburban	1000 Sq. Ft. GFA	5	Weekday, Peak Hour of Adjacent Street Traffic,	Average	2	2	4
Data Source: Trip Generation Manual, 11th Ed					0.73	50%	50%	
930 - Fast Casual Restaurant	General Urban/Suburban	1000 Sq. Ft. GFA	2	Weekday, Peak Hour of Adjacent Street Traffic,	Average	1	1	2
Data Source: Trip Generation Manual, 11th Ed					1.43	50%	50%	
930(1) - Fast Casual Restaurant	General Urban/Suburban	1000 Sq. Ft. GFA	2	Weekday, Peak Hour of Adjacent Street	Average	1	1	2
Data Source: Trip Generation Manual, 11th Ed					1.43	50%	50%	
936 - Coffee/Donut Shop without Drive-Through	General Urban/Suburban	1000 Sq. Ft. GFA	1	Weekday, Peak Hour of Adjacent Street Traffic,	Average	47	46	93
Data Source: Trip Generation Manual, 11th Ed					93.08	51%	49%	
975 - Drinking Place	General Urban/Suburban	1000 Sq. Ft. GFA	0	Weekday, Peak Hour of Adjacent Street Traffic,	Average	0	0	0
Data Source: Trip Generation Manual, 11th Ed					11.36	66%	34%	
975(1) - Drinking Place	General Urban/Suburban	1000 Sq. Ft. GFA	0	Weekday, Peak Hour of Adjacent Street Traffic,	Average	0	0	0
Data Source: Trip Generation Manual, 11th Ed					11.36	66%	34%	
720 - Medical-Dental Office Building - Stand-	General Urban/Suburban	1000 Sq. Ft. GFA	35	Weekday, Peak Hour of Adjacent Street Traffic,	Best Fit (LOG)	74	20	94
Data Source: Trip Generation Manual, 11th Ed					Ln(T) =0.90Ln(X) + 1.34	79%	21%	
230 - Low-Rise Residential with Ground-Floor	General Urban/Suburban	Dwelling Units	250	Weekday, Peak Hour of Adjacent Street Traffic,	Average	25	85	110
Data Source: Trip Generation Manual, 11th Ed					0.44	23%	77%	

INTERNAL PERSON TRIPS:

821 - Shopping Plaza (40-150k)-Supermarket - No

Internal Person Trips From	Entry	Exit	Total
931 - Fine Dining Restaurant	0	0	0
931(1) - Fine Dining Restaurant	0	0	0
930 - Fast Casual Restaurant	0	0	0
930(1) - Fast Casual Restaurant	0	0	0
936 - Coffee/Donut Shop without Drive-Through Window	0	0	1
975 - Drinking Place	0	0	0
975(1) - Drinking Place	0	0	0
720 - Medical-Dental Office Building-Stand-Alone	8	4	12
230 - Low-Rise Residential with Ground-Floor Commercial-GFA (1-25k)	1	1	1
Total Internal Person Trips	**9**	**5**	**14**

PASS-BY VEHICLE TRIP REDUCTION

Land Use	External Vehicle Trips		Pass-by Vehicle Trip %		Pass-by Vehicle Trips	
	Entry	Exit	Entry (%)	Exit (%)	Entry	Exit
821 - Shopping Plaza (40-150k) - Supermarket - No	34	21	0.00%	0.00%	0	0
931 - Fine Dining Restaurant	2	2	0.00%	0.00%	0	0
931(1) - Fine Dining Restaurant	2	2	0.00%	0.00%	0	0
930 - Fast Casual Restaurant	1	1	0.00%	0.00%	0	0
930(1) - Fast Casual Restaurant	1	1	0.00%	0.00%	0	0
936 - Coffee/Donut Shop without Drive-Through Window	44	44	0.00%	0.00%	0	0
975 - Drinking Place	0	0	0.00%	0.00%	0	0
975(1) - Drinking Place	0	0	0.00%	0.00%	0	0
720 - Medical-Dental Office Building - Stand-Alone	66	10	0.00%	0.00%	0	0
230 - Low-Rise Residential with Ground-Floor Commercial - GFA (1-25k)	24	81	0.00%	0.00%	0	0

Scenario - 2

Scenario Name: **PM Peak**

User Group:

Dev. phase: Blue Ash Mixed Use Development

No. of Years to Project Traffic : 0

Analyst Note:

Warning:

VEHICLE TRIPS BEFORE REDUCTION

Land Use & Data Source	Location	IV	Size	Time Period	Method / Rate/Equation	Entry / Split%	Exit / Split%	Total
821 - Shopping Plaza (40-150k) - Supermarket -	General Urban/Suburban	1000 Sq. Ft. GLA	40	Weekday, Peak Hour of Adjacent Street Traffic,	Average	102	106	208
Data Source: Trip Generation Manual, 11th Ed					5.19	49%	51%	
931 - Fine Dining Restaurant	General Urban/Suburban	1000 Sq. Ft. GFA	5	Weekday, Peak Hour of Adjacent Street Traffic,	Average	26	13	39
Data Source: Trip Generation Manual, 11th Ed					7.80	67%	33%	
931(1) - Fine Dining Restaurant	General Urban/Suburban	1000 Sq. Ft. GFA	5	Weekday, Peak Hour of Adjacent Street Traffic,	Average	26	13	39
Data Source: Trip Generation Manual, 11th Ed					7.80	67%	33%	
930 - Fast Casual Restaurant	General Urban/Suburban	1000 Sq. Ft. GFA	2	Weekday, Peak Hour of Adjacent Street Traffic,	Best Fit (LIN)	11	9	20
Data Source: Trip Generation Manual, 11th Ed					T = 17.96(X) - 15.94	55%	45%	
930(1) - Fast Casual Restaurant	General Urban/Suburban	1000 Sq. Ft. GFA	2	Weekday, Peak Hour of Adjacent Street	Best Fit (LIN)	11	9	20
Data Source: Trip Generation Manual, 11th Ed					T = 17.96(X) - 15.94	55%	45%	
936 - Coffee/Donut Shop without Drive-Through	General Urban/Suburban	1000 Sq. Ft. GFA	1	Weekday, Peak Hour of Adjacent Street Traffic,	Average	16	16	32
Data Source: Trip Generation Manual, 11th Ed					32.29	50%	50%	
975 - Drinking Place	General Urban/Suburban	1000 Sq. Ft. GFA	5	Weekday, Peak Hour of Adjacent Street Traffic,	Average	37	19	56
Data Source: Trip Generation Manual, 11th Ed					11.36	66%	34%	
975(1) - Drinking Place	General Urban/Suburban	1000 Sq. Ft. GFA	5	Weekday, Peak Hour of Adjacent Street Traffic,	Average	37	19	56
Data Source: Trip Generation Manual, 11th Ed					11.36	66%	34%	
720 - Medical-Dental Office Building - Stand-	General Urban/Suburban	1000 Sq. Ft. GFA	35	Weekday, Peak Hour of Adjacent Street Traffic,	Best Fit (LIN)	42	97	139
Data Source: Trip Generation Manual, 11th Ed					T = 4.07(X) - 3.17	30%	70%	
230 - Low-Rise Residential with Ground-Floor	General Urban/Suburban	Dwelling Units	250	Weekday, Peak Hour of Adjacent Street Traffic,	Average	64	26	90
Data Source: Trip Generation Manual, 11th Ed					0.36	71%	29%	

INTERNAL PERSON TRIPS:

821 - Shopping Plaza (40-150k)-Supermarket - No

Internal Person Trips From	Entry	Exit	Total
931 - Fine Dining Restaurant	1	1	2
931(1) - Fine Dining Restaurant	1	1	2
930 - Fast Casual Restaurant	1	0	1
930(1) - Fast Casual Restaurant	1	0	1
936 - Coffee/Donut Shop without Drive-Through Window	1	1	2
975 - Drinking Place	1	2	3
975(1) - Drinking Place	1	2	3
720 - Medical-Dental Office Building-Stand-Alone	8	2	10
230 - Low-Rise Residential with Ground-Floor Commercial-GFA (1-25k)	10	28	38
Total Internal Person Trips	**25**	**37**	**62**

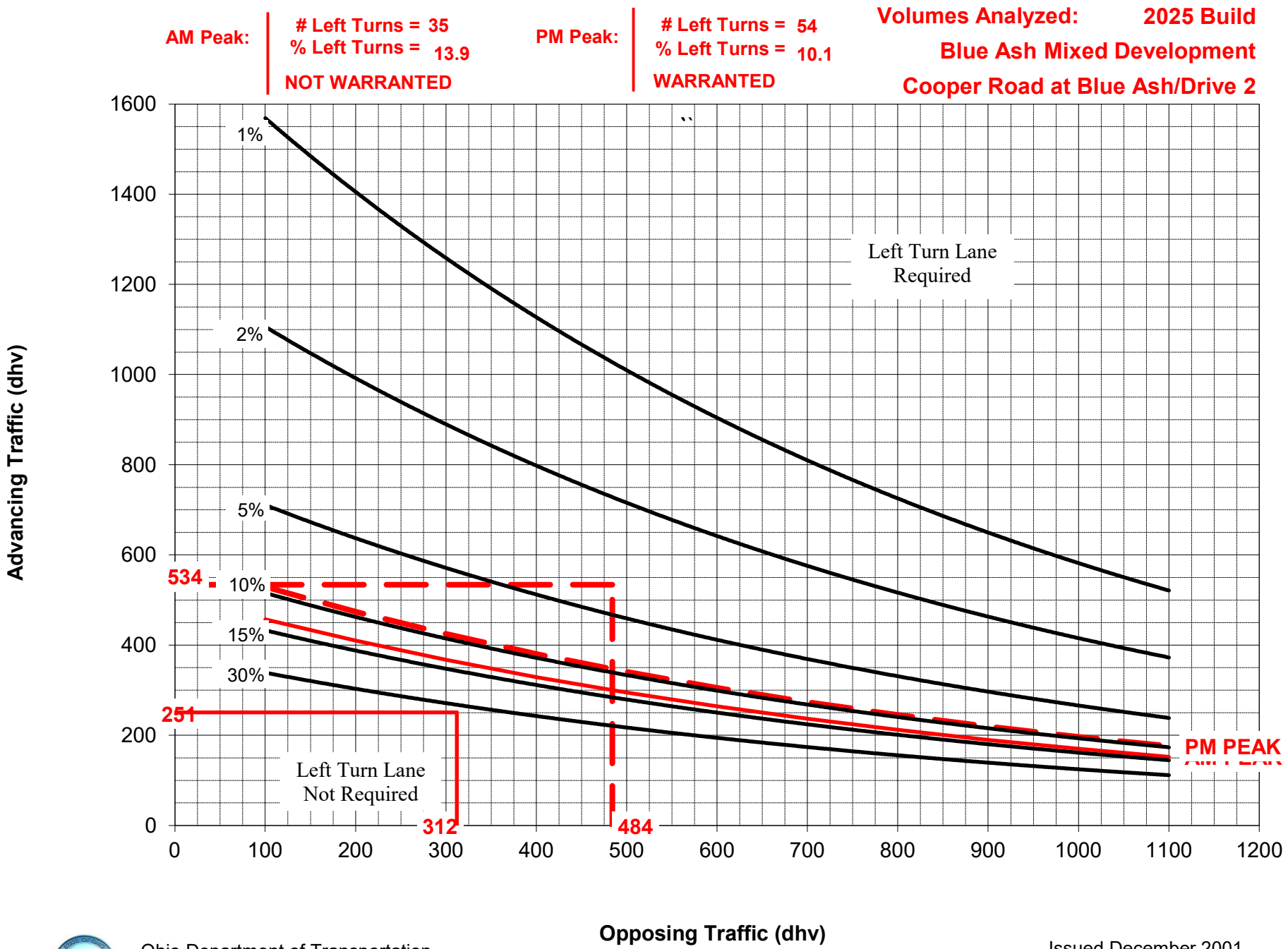
PASS-BY VEHICLE TRIP REDUCTION

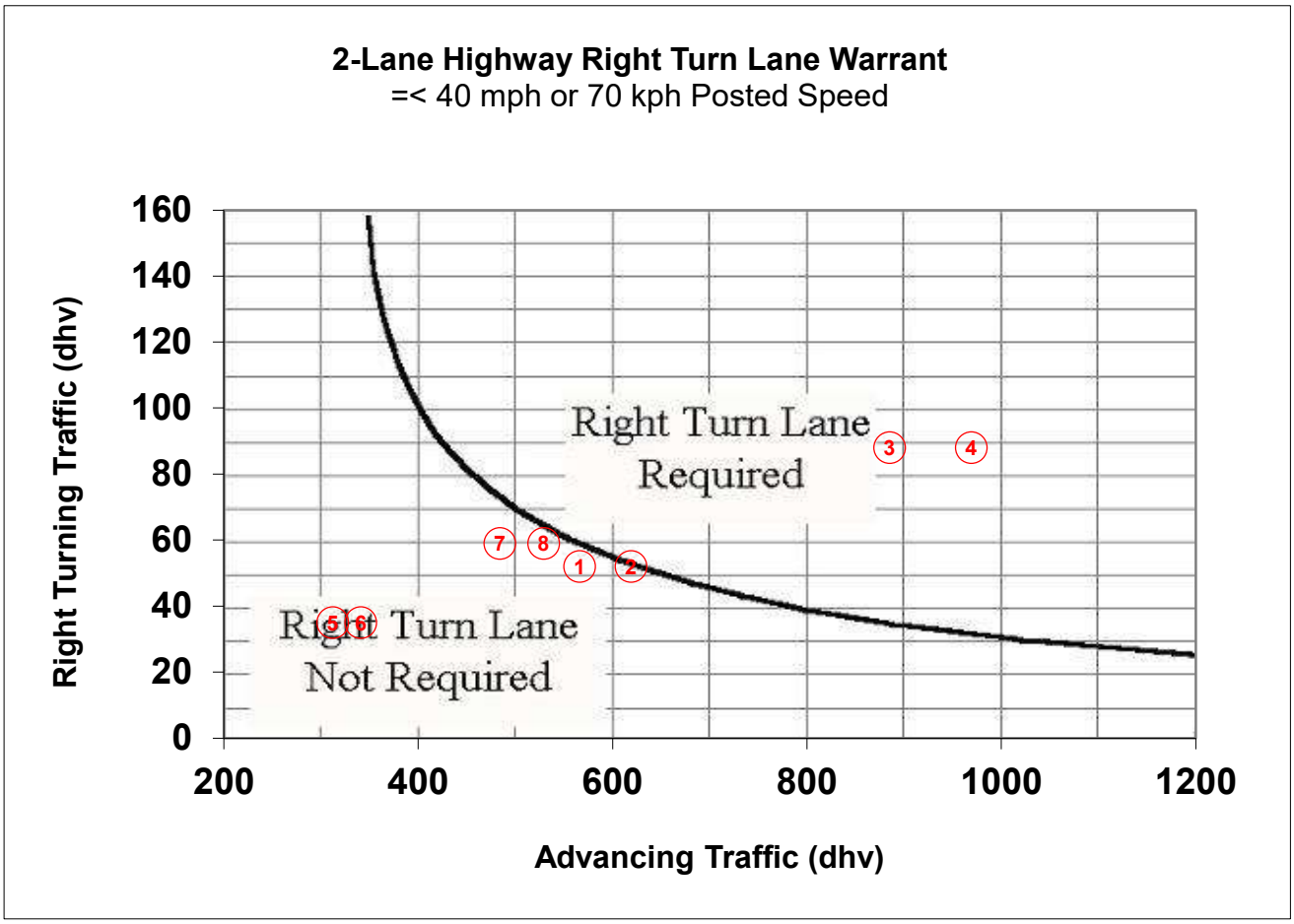
Land Use	External Vehicle Trips		Pass-by Vehicle Trip %		Pass-by Vehicle Trips	
	Entry	Exit	Entry (%)	Exit (%)	Entry	Exit
821 - Shopping Plaza (40-150k) - Supermarket - No	77	69	34.00%	34.00%	26	23
931 - Fine Dining Restaurant	24	12	44.00%	44.00%	11	5
931(1) - Fine Dining Restaurant	24	12	44.00%	44.00%	11	5
930 - Fast Casual Restaurant	11	8	0.00%	0.00%	0	0
930(1) - Fast Casual Restaurant	11	8	0.00%	0.00%	0	0
936 - Coffee/Donut Shop without Drive-Through Window	15	15	0.00%	0.00%	0	0
975 - Drinking Place	34	17	0.00%	0.00%	0	0
975(1) - Drinking Place	34	17	0.00%	0.00%	0	0
720 - Medical-Dental Office Building - Stand-Alone	39	86	0.00%	0.00%	0	0
230 - Low-Rise Residential with Ground-Floor Commercial - GFA (1-25k)	31	11	0.00%	0.00%	0	0

Appendix E

Turn Lane Warrants

2-Lane Highway Left Turn Lane Warrant (<=40MPH)





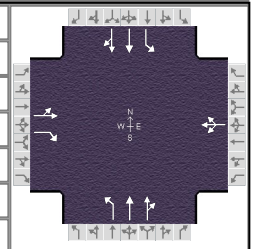
REQ	Intersection	Advancing Traffic Volume	Right Turning Traffic	Result
1	SB Right Turn - Kewood at Drive 1 - AM 2025 Build	566	52	NO
2	SB Right Turn - Kewood at Drive 1 - AM 2035 Build	619	52	NO
3	SB Right Turn - Kewood at Drive 1 - PM 2025 Build	885	88	YES
4	SB Right Turn - Kewood at Drive 1 - PM 2035 Build	969	88	YES
5	WB Right Turn - Blue Ash at Drive 2 - AM 2025 Build	312	35	NO
6	WB Right Turn - Blue Ash at Drive 2 - AM 2035 Build	341	35	NO
7	WB Right Turn - Blue Ash at Drive 2 - PM 2025 Build	484	59	NO
8	WB Right Turn - Blue Ash at Drive 2 - PM 2035 Build	529	59	NO
9				
10				
11				
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Appendix F

Capacity Analysis

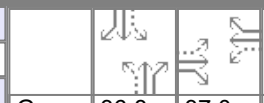
HCS7 Signalized Intersection Results Summary

General Information				Intersection Information	
Agency	SHA			Duration, h	0.250
Analyst	JA	Analysis Date	May 4, 2022	Area Type	Other
Jurisdiction	City of Blue Ash	Time Period	AM Peak	PHF	0.92
Urban Street	Kenwood Road	Analysis Year	2025 No Build	Analysis Period	1> 7:00
Intersection	Kenwood at SR 126 EB/…	File Name	1-1-AM-2025-No-Build-Kenwood-SR126EB.xus		
Project Description	Blue Ash Mixed Use Development				

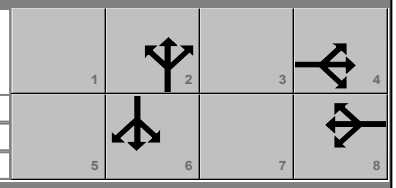


Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	196	24	248	9	18	18	68	395	16	31	389	132

Signal Information			
Cycle, s	85.0	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	Yes	Simult. Gap E/W	On
Force Mode	Fixed	Simult. Gap N/S	On



Green	36.8	37.0	0.0	0.0	0.0	0.0	
Yellow	3.6	3.6	0.0	0.0	0.0	0.0	
Red	2.0	2.0	0.0	0.0	0.0	0.0	



Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase		4		8		2		6
Case Number		7.0		8.0		6.0		6.0
Phase Duration, s		42.6		42.6		42.4		42.4
Change Period, ($Y+R_c$), s		5.6		5.6		5.6		5.6
Max Allow Headway (*MAH*), s		3.2		3.2		3.2		3.2
Queue Clearance Time (g_s), s		11.7		3.4		16.4		11.0
Green Extension Time (g_e), s		1.1		1.2		2.3		2.4
Phase Call Probability		1.00		1.00		1.00		1.00
Max Out Probability		0.00		0.00		0.01		0.00

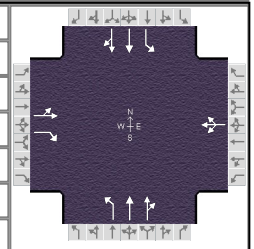
Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	7	4	14	3	8	18	5	2	12	1	6	16
Adjusted Flow Rate (*v*), veh/h		239	270		49		74	224	222	34	294	272
Adjusted Saturation Flow Rate (*s*), veh/h/ln		1435	1610		1692		858	1900	1874	958	1900	1736
Queue Service Time (g_s), s		8.2	9.7		0.0		5.4	6.5	6.5	2.0	8.8	9.0
Cycle Queue Clearance Time (g_c), s		9.5	9.7		1.4		14.4	6.5	6.5	8.5	8.8	9.0
Green Ratio (*g/C*)		0.44	0.44		0.44		0.43	0.43	0.43	0.43	0.43	0.43
Capacity (*c*), veh/h		705	701		787		366	823	811	426	823	751
Volume-to-Capacity Ratio (*X*)		0.339	0.385		0.062		0.202	0.273	0.274	0.079	0.357	0.363
Back of Queue (*Q*), ft/ln (95 th percentile)		132.4	149.7		23.3		46.9	118.2	117.1	19.1	161.5	150.2
Back of Queue (*Q*), veh/ln (95 th percentile)		5.3	6.0		0.9		1.9	4.7	4.7	0.8	6.5	6.0
Queue Storage Ratio (*RQ*) (95 th percentile)		0.44	0.50		0.06		0.31	0.24	0.23	0.15	0.25	0.23
Uniform Delay (d_1), s/veh		16.2	16.3		13.9		21.0	15.5	15.5	18.2	16.2	16.2
Incremental Delay (d_2), s/veh		0.1	0.1		0.0		0.1	0.1	0.1	0.0	0.1	0.1
Initial Queue Delay (d_3), s/veh		0.0	0.0		0.0		0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (*d*), s/veh		16.3	16.4		13.9		21.1	15.6	15.6	18.3	16.3	16.3
Level of Service (LOS)		B	B		B		C	B	B	B	B	B
Approach Delay, s/veh / LOS	16.4	B		13.9	B		16.4	B		16.4	B	
Intersection Delay, s/veh / LOS	16.3						B					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	2.26	B	2.26	B	1.68	B	1.90	B
Bicycle LOS Score / LOS	1.33	A	0.57	A	0.92	A	0.98	A

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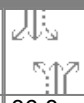
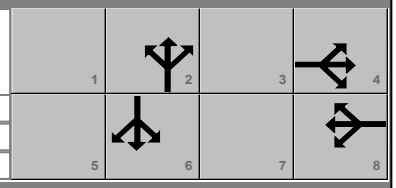
HCS7 Signalized Intersection Results Summary

General Information				Intersection Information	
Agency	SHA			Duration, h	0.250
Analyst	JA	Analysis Date	May 4, 2022	Area Type	Other
Jurisdiction	City of Blue Ash	Time Period	AM Peak	PHF	0.92
Urban Street	Kenwood Road	Analysis Year	2035 No Build	Analysis Period	1> 7:00
Intersection	Kenwood at SR 126 EB/…	File Name	1-2-AM-2035-No-Build-Kenwood-SR126EB.xus		
Project Description	Blue Ash Mixed Use Development				



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	216	24	274	10	19	19	75	436	18	34	430	146

Signal Information			
Cycle, s	85.0	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	Yes	Simult. Gap E/W	On
Force Mode	Fixed	Simult. Gap N/S	On

												
Green	36.8	37.0	0.0	0.0	0.0	0.0						
Yellow	3.6	3.6	0.0	0.0	0.0	0.0						
Red	2.0	2.0	0.0	0.0	0.0	0.0						

Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase		4		8		2		6
Case Number		7.0		8.0		6.0		6.0
Phase Duration, s		42.6		42.6		42.4		42.4
Change Period, ($Y+R_c$), s		5.6		5.6		5.6		5.6
Max Allow Headway (*MAH*), s		3.2		3.2		3.2		3.2
Queue Clearance Time (g_s), s		12.9		3.5		18.6		12.1
Green Extension Time (g_e), s		1.3		1.3		2.6		2.7
Phase Call Probability		1.00		1.00		1.00		1.00
Max Out Probability		0.00		0.00		0.02		0.00

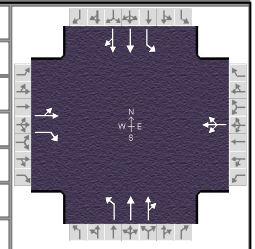
Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	7	4	14	3	8	18	5	2	12	1	6	16
Adjusted Flow Rate (*v*), veh/h		261	298		52		82	248	245	37	326	301
Adjusted Saturation Flow Rate (*s*), veh/h/ln		1426	1610		1693		812	1900	1873	918	1900	1735
Queue Service Time (g_s), s		9.3	10.9		0.0		6.5	7.2	7.3	2.3	10.0	10.1
Cycle Queue Clearance Time (g_c), s		10.7	10.9		1.5		16.6	7.2	7.3	9.6	10.0	10.1
Green Ratio (*g/C*)		0.44	0.44		0.44		0.43	0.43	0.43	0.43	0.43	0.43
Capacity (*c*), veh/h		701	701		788		340	823	811	404	823	751
Volume-to-Capacity Ratio (*X*)		0.372	0.425		0.066		0.240	0.302	0.303	0.092	0.396	0.400
Back of Queue (*Q*), ft/ln (95 th percentile)		147.8	169.2		24.9		53.9	132.6	131.2	21.5	182.7	169.2
Back of Queue (*Q*), veh/ln (95 th percentile)		5.9	6.8		1.0		2.2	5.3	5.2	0.9	7.3	6.8
Queue Storage Ratio (*RQ*) (95 th percentile)		0.49	0.56		0.06		0.36	0.27	0.26	0.17	0.28	0.26
Uniform Delay (d_1), s/veh		16.6	16.6		14.0		22.2	15.7	15.7	18.9	16.5	16.5
Incremental Delay (d_2), s/veh		0.1	0.2		0.0		0.1	0.1	0.1	0.0	0.1	0.1
Initial Queue Delay (d_3), s/veh		0.0	0.0		0.0		0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (*d*), s/veh		16.7	16.8		14.0		22.4	15.8	15.8	18.9	16.6	16.7
Level of Service (LOS)		B	B		B		C	B	B	B	B	B
Approach Delay, s/veh / LOS	16.7	B		14.0	B		16.7	B		16.8	B	
Intersection Delay, s/veh / LOS	16.7						B					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	2.26	B	2.26	B	1.68	B	1.90	B
Bicycle LOS Score / LOS	1.41	A	0.57	A	0.96	A	1.03	A

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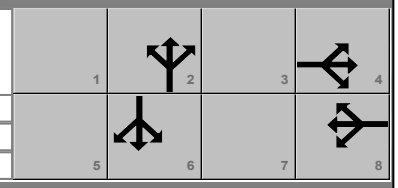
HCS7 Signalized Intersection Results Summary

General Information				Intersection Information	
Agency	SHA			Duration, h	0.250
Analyst	JA	Analysis Date	May 4, 2022	Area Type	Other
Jurisdiction	City of Blue Ash	Time Period	AM Peak	PHF	0.92
Urban Street	Kenwood Road	Analysis Year	2025- Build	Analysis Period	1> 7:00
Intersection	Kenwood at SR 126 EB/…	File Name	1-3-AM-2025-Build-Kenwood-SR126EB.xus		
Project Description	Blue Ash Mixed Use Development				



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	196	22	248	9	18	18	68	446	16	31	437	132

Signal Information					EB		WB				NB				SB			
Cycle, s	85.0	Reference Phase	2															
Offset, s	0	Reference Point	End	Green	37.0	36.8	0.0	0.0	0.0	0.0								
Uncoordinated	Yes	Simult. Gap E/W	On	Yellow	3.6	3.6	0.0	0.0	0.0	0.0								
Force Mode	Fixed	Simult. Gap N/S	On	Red	2.0	2.0	0.0	0.0	0.0	0.0								



Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase		4		8		2		6
Case Number		7.0		8.0		6.0		6.0
Phase Duration, s		42.4		42.4		42.6		42.6
Change Period, ($Y+R_c$), s		5.6		5.6		5.6		5.6
Max Allow Headway (*MAH*), s		3.2		3.2		3.2		3.2
Queue Clearance Time (g_s), s		11.7		3.4		17.6		11.9
Green Extension Time (g_e), s		1.1		1.2		2.6		2.7
Phase Call Probability		1.00		1.00		1.00		1.00
Max Out Probability		0.00		0.00		0.01		0.00

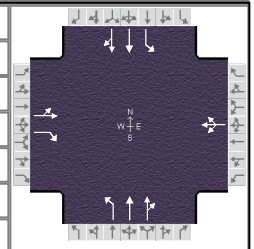
Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	7	4	14	3	8	18	5	2	12	1	6	16
Adjusted Flow Rate (*v*), veh/h		237	270		49		74	252	250	34	320	298
Adjusted Saturation Flow Rate (*s*), veh/h/ln		1431	1610		1692		818	1900	1876	910	1900	1748
Queue Service Time (g_s), s		8.1	9.7		0.0		5.8	7.3	7.4	2.1	9.7	9.9
Cycle Queue Clearance Time (g_c), s		9.5	9.7		1.4		15.6	7.3	7.4	9.5	9.7	9.9
Green Ratio (*g/C*)		0.43	0.43		0.43		0.44	0.44	0.44	0.44	0.44	0.44
Capacity (*c*), veh/h		700	697		784		346	827	817	402	827	761
Volume-to-Capacity Ratio (*X*)		0.338	0.387		0.062		0.214	0.305	0.306	0.084	0.387	0.392
Back of Queue (*Q*), ft/ln (95 th percentile)		131.8	150.7		23.4		47.9	134.5	133.2	19.5	178.2	166.2
Back of Queue (*Q*), veh/ln (95 th percentile)		5.3	6.0		0.9		1.9	5.4	5.3	0.8	7.1	6.6
Queue Storage Ratio (*RQ*) (95 th percentile)		0.44	0.50		0.06		0.32	0.27	0.27	0.15	0.28	0.26
Uniform Delay (d_1), s/veh		16.3	16.4		14.1		21.7	15.6	15.6	18.7	16.3	16.3
Incremental Delay (d_2), s/veh		0.1	0.1		0.0		0.1	0.1	0.1	0.0	0.1	0.1
Initial Queue Delay (d_3), s/veh		0.0	0.0		0.0		0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (*d*), s/veh		16.4	16.5		14.1		21.8	15.7	15.7	18.8	16.4	16.5
Level of Service (LOS)		B	B		B		C	B	B	B	B	B
Approach Delay, s/veh / LOS	16.5	B		14.1	B		16.5	B		16.6	B	
Intersection Delay, s/veh / LOS	16.4						B					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	2.26	B	2.26	B	1.68	B	1.90	B
Bicycle LOS Score / LOS	1.32	A	0.57	A	0.96	A	1.03	A

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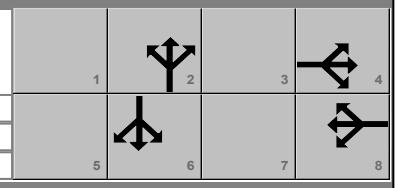
HCS7 Signalized Intersection Results Summary

General Information				Intersection Information	
Agency	SHA			Duration, h	0.250
Analyst	JA	Analysis Date	May 4, 2022	Area Type	Other
Jurisdiction	City of Blue Ash	Time Period	AM Peak	PHF	0.92
Urban Street	Kenwood Road	Analysis Year	2035- Build	Analysis Period	1> 7:00
Intersection	Kenwood at SR 126 EB/…	File Name	1-4-AM-2035-Build-Kenwood-SR126EB.xus		
Project Description	Blue Ash Mixed Use Development				



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	216	24	274	10	19	19	75	487	18	34	478	146

Signal Information												
Cycle, s	85.0	Reference Phase	2									
Offset, s	0	Reference Point	End									
Uncoordinated	Yes	Simult. Gap E/W	On	Green	37.0	36.8	0.0	0.0	0.0	0.0		
Force Mode	Fixed	Simult. Gap N/S	On	Yellow	3.6	3.6	0.0	0.0	0.0	0.0		
				Red	2.0	2.0	0.0	0.0	0.0	0.0		



Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase		4		8		2		6
Case Number		7.0		8.0		6.0		6.0
Phase Duration, s		42.4		42.4		42.6		42.6
Change Period, ($Y+R_c$), s		5.6		5.6		5.6		5.6
Max Allow Headway (*MAH*), s		3.2		3.2		3.2		3.2
Queue Clearance Time (g_s), s		12.9		3.5		20.0		13.0
Green Extension Time (g_e), s		1.3		1.3		2.9		3.0
Phase Call Probability		1.00		1.00		1.00		1.00
Max Out Probability		0.00		0.00		0.04		0.01

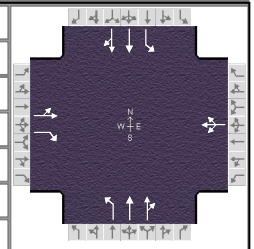
Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	7	4	14	3	8	18	5	2	12	1	6	16
Adjusted Flow Rate (*v*), veh/h		261	298		52		82	276	273	37	352	326
Adjusted Saturation Flow Rate (*s*), veh/h/ln		1426	1610		1693		773	1900	1876	872	1900	1747
Queue Service Time (g_s), s		9.3	10.9		0.0		7.0	8.2	8.2	2.5	10.9	11.0
Cycle Queue Clearance Time (g_c), s		10.8	10.9		1.5		18.0	8.2	8.2	10.7	10.9	11.0
Green Ratio (*g/C*)		0.43	0.43		0.43		0.44	0.44	0.44	0.44	0.44	0.44
Capacity (*c*), veh/h		698	697		784		321	827	817	380	827	760
Volume-to-Capacity Ratio (*X*)		0.374	0.427		0.067		0.254	0.334	0.334	0.097	0.426	0.429
Back of Queue (*Q*), ft/ln (95 th percentile)		148.5	170		25		55.1	149.2	147.7	21.9	197.4	185.6
Back of Queue (*Q*), veh/ln (95 th percentile)		5.9	6.8		1.0		2.2	6.0	5.9	0.9	7.9	7.4
Queue Storage Ratio (*RQ*) (95 th percentile)		0.37	0.57		0.06		0.37	0.30	0.30	0.17	0.31	0.29
Uniform Delay (d_1), s/veh		16.7	16.8		14.1		22.9	15.9	15.9	19.4	16.6	16.7
Incremental Delay (d_2), s/veh		0.1	0.2		0.0		0.2	0.1	0.1	0.0	0.1	0.1
Initial Queue Delay (d_3), s/veh		0.0	0.0		0.0		0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (*d*), s/veh		16.9	16.9		14.1		23.1	15.9	16.0	19.4	16.8	16.8
Level of Service (LOS)		B	B		B		C	B	B	B	B	B
Approach Delay, s/veh / LOS	16.9	B		14.1	B		16.9	B		16.9	B	
Intersection Delay, s/veh / LOS	16.8						B					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	2.26	B	2.26	B	1.68	B	1.90	B
Bicycle LOS Score / LOS	1.41	A	0.57	A	1.01	A	1.08	A

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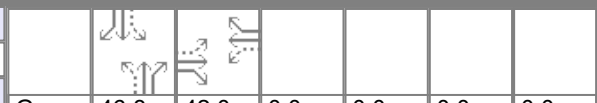
HCS7 Signalized Intersection Results Summary

General Information				Intersection Information	
Agency	SHA			Duration, h	0.250
Analyst	JA	Analysis Date	May 4, 2022	Area Type	Other
Jurisdiction	City of Blue Ash	Time Period	PM Peak	PHF	0.92
Urban Street	Kenwood Road	Analysis Year	2025 No Build	Analysis Period	1> 7:00
Intersection	Kenwood at SR 126 EB/…	File Name	1-5-PM-2025-No-Build-Kenwood-SR126EB.xus		
Project Description	Blue Ash Mixed Use Development				

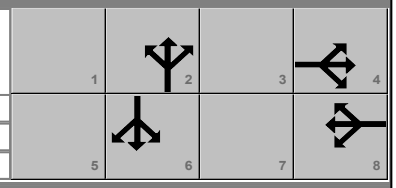


Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	156	19	236	16	6	24	86	915	18	25	591	167

Signal Information			
Cycle, s	100.0	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	Yes	Simult. Gap E/W	On
Force Mode	Fixed	Simult. Gap N/S	On



Green	46.8	42.0	0.0	0.0	0.0	0.0						
Yellow	3.6	3.6	0.0	0.0	0.0	0.0						
Red	2.0	2.0	0.0	0.0	0.0	0.0						



Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase		4		8		2		6
Case Number		7.0		8.0		6.0		6.0
Phase Duration, s		47.6		47.6		52.4		52.4
Change Period, ($Y+R_c$), s		5.6		5.6		5.6		5.6
Max Allow Headway (*MAH*), s		3.2		3.2		3.2		3.2
Queue Clearance Time (g_s), s		13.0		3.7		28.5		25.1
Green Extension Time (g_e), s		1.0		1.0		4.7		4.9
Phase Call Probability		1.00		1.00		1.00		1.00
Max Out Probability		0.00		0.00		0.14		0.09

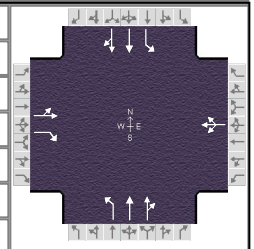
Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	7	4	14	3	8	18	5	2	12	1	6	16
Adjusted Flow Rate (*v*), veh/h		190	257		50		93	509	505	27	428	396
Adjusted Saturation Flow Rate (*s*), veh/h/ln		1442	1610		1596		675	1900	1887	565	1900	1755
Queue Service Time (g_s), s		7.0	11.0		0.0		11.0	19.5	19.5	3.7	15.5	15.5
Cycle Queue Clearance Time (g_c), s		8.7	11.0		1.7		26.5	19.5	19.5	23.1	15.5	15.5
Green Ratio (*g/C*)		0.42	0.42		0.42		0.47	0.47	0.47	0.47	0.47	0.47
Capacity (*c*), veh/h		674	676		719		283	889	883	226	889	821
Volume-to-Capacity Ratio (*X*)		0.282	0.379		0.070		0.330	0.572	0.572	0.120	0.481	0.482
Back of Queue (*Q*), ft/ln (95 th percentile)		128.6	179.4		30.3		78.9	323.7	321.9	22.2	266.4	250.4
Back of Queue (*Q*), veh/ln (95 th percentile)		5.1	7.2		1.2		3.2	12.9	12.9	0.9	10.7	10.0
Queue Storage Ratio (*RQ*) (95 th percentile)		0.43	0.60		0.08		0.53	0.65	0.64	0.17	0.41	0.39
Uniform Delay (d_1), s/veh		19.3	20.0		17.3		27.4	19.3	19.3	27.7	18.3	18.3
Incremental Delay (d_2), s/veh		0.1	0.1		0.0		0.3	0.6	0.6	0.1	0.2	0.2
Initial Queue Delay (d_3), s/veh		0.0	0.0		0.0		0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (*d*), s/veh		19.4	20.1		17.3		27.6	19.9	19.9	27.8	18.4	18.4
Level of Service (LOS)		B	C		B		C	B	B	C	B	B
Approach Delay, s/veh / LOS	19.8	B		17.3	B		20.6	C		18.7	B	
Intersection Delay, s/veh / LOS	19.7						B					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	2.27	B	2.27	B	1.68	B	1.90	B
Bicycle LOS Score / LOS	1.22	A	0.57	A	1.40	A	1.19	A

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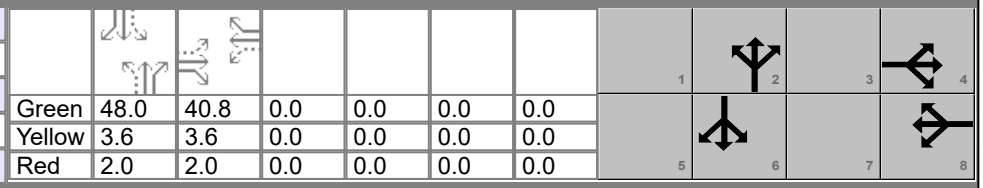
HCS7 Signalized Intersection Results Summary

General Information				Intersection Information	
Agency	SHA			Duration, h	0.250
Analyst	JA	Analysis Date	May 4, 2022	Area Type	Other
Jurisdiction	City of Blue Ash	Time Period	PM Peak	PHF	0.92
Urban Street	Kenwood Road	Analysis Year	2035 No Build	Analysis Period	1> 7:00
Intersection	Kenwood at SR 126 EB/…	File Name	1-6-PM-2035-No-Build-Kenwood-SR126EB.xus		
Project Description	Blue Ash Mixed Use Development				



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	172	20	261	18	7	26	94	1011	19	27	653	184

Signal Information			
Cycle, s	100.0	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	Yes	Simult. Gap E/W	On
Force Mode	Fixed	Simult. Gap N/S	On



Green	48.0	40.8	0.0	0.0	0.0	0.0						
Yellow	3.6	3.6	0.0	0.0	0.0	0.0						
Red	2.0	2.0	0.0	0.0	0.0	0.0						

Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase		4		8		2		6
Case Number		7.0		8.0		6.0		6.0
Phase Duration, s		46.4		46.4		53.6		53.6
Change Period, ($Y+R_c$), s		5.6		5.6		5.6		5.6
Max Allow Headway (*MAH*), s		3.3		3.3		3.3		3.3
Queue Clearance Time (g_s), s		14.7		3.9		32.8		28.3
Green Extension Time (g_e), s		1.1		1.1		5.2		5.6
Phase Call Probability		1.00		1.00		1.00		1.00
Max Out Probability		0.00		0.00		0.28		0.17

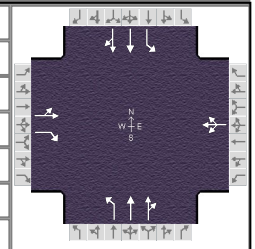
Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	7	4	14	3	8	18	5	2	12	1	6	16
Adjusted Flow Rate (*v*), veh/h		209	284		55		102	562	558	29	473	437
Adjusted Saturation Flow Rate (*s*), veh/h/ln		1437	1610		1601		623	1900	1887	511	1900	1755
Queue Service Time (g_s), s		8.0	12.7		0.0		13.6	21.8	21.8	4.5	17.2	17.2
Cycle Queue Clearance Time (g_c), s		10.0	12.7		1.9		30.8	21.8	21.8	26.3	17.2	17.2
Green Ratio (*g/C*)		0.41	0.41		0.41		0.48	0.48	0.48	0.48	0.48	0.48
Capacity (*c*), veh/h		654	657		702		264	912	906	206	912	843
Volume-to-Capacity Ratio (*X*)		0.319	0.432		0.079		0.388	0.616	0.616	0.143	0.518	0.519
Back of Queue (*Q*), ft/ln (95 th percentile)		146.9	203.5		34.5		89.8	356.5	354.6	24.7	289.8	272.1
Back of Queue (*Q*), veh/ln (95 th percentile)		5.9	8.1		1.4		3.6	14.3	14.2	1.0	11.6	10.9
Queue Storage Ratio (*RQ*) (95 th percentile)		0.49	0.68		0.09		0.60	0.71	0.71	0.19	0.45	0.42
Uniform Delay (d_1), s/veh		20.5	21.3		18.1		28.7	19.2	19.2	28.9	18.0	18.0
Incremental Delay (d_2), s/veh		0.1	0.2		0.0		0.3	0.9	0.9	0.1	0.2	0.3
Initial Queue Delay (d_3), s/veh		0.0	0.0		0.0		0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (*d*), s/veh		20.6	21.4		18.1		29.0	20.1	20.1	29.0	18.2	18.3
Level of Service (LOS)		C	C		B		C	C	C	C	B	B
Approach Delay, s/veh / LOS	21.1	C		18.1	B		20.9	C		18.6	B	
Intersection Delay, s/veh / LOS	20.1						C					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	2.27	B	2.27	B	1.68	B	1.90	B
Bicycle LOS Score / LOS	1.30	A	0.58	A	1.50	A	1.26	A

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HCS7 Signalized Intersection Results Summary

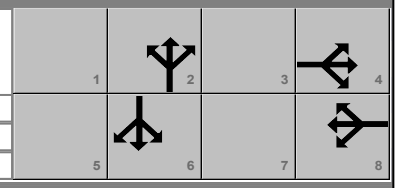
General Information				Intersection Information	
Agency	SHA			Duration, h	0.250
Analyst	JA	Analysis Date	May 4, 2022	Area Type	Other
Jurisdiction	City of Blue Ash	Time Period	PM Peak	PHF	0.92
Urban Street	Kenwood Road	Analysis Year	2025 Build	Analysis Period	1> 7:00
Intersection	Kenwood at SR 126 EB/…	File Name	1-7-PM-2025-Build-Kenwood-SR126EB.xus		
Project Description	Blue Ash Mixed Use Development				



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	156	19	236	16	6	24	86	991	18	25	655	167

Signal Information			
Cycle, s	100.0	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	Yes	Simult. Gap E/W	On
Force Mode	Fixed	Simult. Gap N/S	On

Green	48.0	40.8	0.0	0.0	0.0	0.0	
Yellow	3.6	3.6	0.0	0.0	0.0	0.0	
Red	2.0	2.0	0.0	0.0	0.0	0.0	



Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase		4		8		2		6
Case Number		7.0		8.0		6.0		6.0
Phase Duration, s		46.4		46.4		53.6		53.6
Change Period, ($Y+R_c$), s		5.6		5.6		5.6		5.6
Max Allow Headway (*MAH*), s		3.2		3.2		3.2		3.2
Queue Clearance Time (g_s), s		13.2		3.8		30.7		27.2
Green Extension Time (g_e), s		1.0		1.0		5.2		5.4
Phase Call Probability		1.00		1.00		1.00		1.00
Max Out Probability		0.00		0.00		0.20		0.14

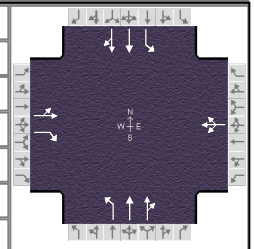
Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	7	4	14	3	8	18	5	2	12	1	6	16
Adjusted Flow Rate (*v*), veh/h		190	257		50		93	550	547	27	463	431
Adjusted Saturation Flow Rate (*s*), veh/h/ln		1442	1610		1598		633	1900	1888	522	1900	1766
Queue Service Time (g_s), s		7.2	11.2		0.0		11.9	21.2	21.2	4.0	16.8	16.8
Cycle Queue Clearance Time (g_c), s		8.9	11.2		1.8		28.7	21.2	21.2	25.2	16.8	16.8
Green Ratio (*g/C*)		0.41	0.41		0.41		0.48	0.48	0.48	0.48	0.48	0.48
Capacity (*c*), veh/h		657	657		700		270	912	906	212	912	848
Volume-to-Capacity Ratio (*X*)		0.290	0.390		0.071		0.347	0.603	0.603	0.128	0.508	0.508
Back of Queue (*Q*), ft/ln (95 th percentile)		131.7	183.9		31.1		79.8	347.2	345.5	22.5	282.8	266.8
Back of Queue (*Q*), veh/ln (95 th percentile)		5.3	7.4		1.2		3.2	13.9	13.8	0.9	11.3	10.7
Queue Storage Ratio (*RQ*) (95 th percentile)		0.44	0.61		0.08		0.53	0.69	0.69	0.17	0.44	0.41
Uniform Delay (d_1), s/veh		20.1	20.8		18.0		27.7	19.0	19.0	28.3	17.9	17.9
Incremental Delay (d_2), s/veh		0.1	0.1		0.0		0.3	0.8	0.8	0.1	0.2	0.2
Initial Queue Delay (d_3), s/veh		0.0	0.0		0.0		0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (*d*), s/veh		20.2	21.0		18.1		28.0	19.8	19.8	28.4	18.1	18.1
Level of Service (LOS)		C	C		B		C	B	B	C	B	B
Approach Delay, s/veh / LOS	20.7	C		18.1	B		20.5	C		18.4	B	
Intersection Delay, s/veh / LOS	19.7						B					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	2.27	B	2.27	B	1.68	B	1.90	B
Bicycle LOS Score / LOS	1.22	A	0.57	A	1.47	A	1.25	A

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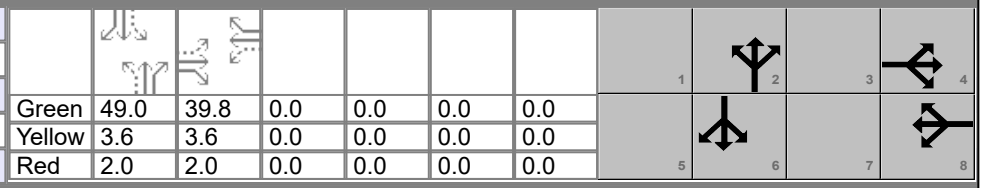
HCS7 Signalized Intersection Results Summary

General Information				Intersection Information	
Agency	SHA			Duration, h	0.250
Analyst	JA	Analysis Date	May 4, 2022	Area Type	Other
Jurisdiction	City of Blue Ash	Time Period	PM Peak	PHF	0.92
Urban Street	Kenwood Road	Analysis Year	2035 Build	Analysis Period	1> 7:00
Intersection	Kenwood at SR 126 EB/…	File Name	1-8-PM-2035-Build-Kenwood-SR126EB.xus		
Project Description	Blue Ash Mixed Use Development				



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	172	20	261	18	7	26	94	1087	19	27	717	184

Signal Information			
Cycle, s	100.0	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	Yes	Simult. Gap E/W	On
Force Mode	Fixed	Simult. Gap N/S	On



Green	49.0	39.8	0.0	0.0	0.0	0.0						
Yellow	3.6	3.6	0.0	0.0	0.0	0.0						
Red	2.0	2.0	0.0	0.0	0.0	0.0						

Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase		4		8		2		6
Case Number		7.0		8.0		6.0		6.0
Phase Duration, s		45.4		45.4		54.6		54.6
Change Period, ($Y+R_c$), s		5.6		5.6		5.6		5.6
Max Allow Headway (*MAH*), s		3.3		3.3		3.3		3.3
Queue Clearance Time (g_s), s		14.9		4.0		35.4		30.7
Green Extension Time (g_e), s		1.1		1.1		5.5		6.1
Phase Call Probability		1.00		1.00		1.00		1.00
Max Out Probability		0.00		0.00		0.38		0.25

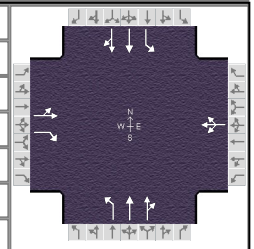
Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	7	4	14	3	8	18	5	2	12	1	6	16
Adjusted Flow Rate (*v*), veh/h		209	284		55		102	603	599	29	508	472
Adjusted Saturation Flow Rate (*s*), veh/h/ln		1437	1610		1602		584	1900	1888	473	1900	1765
Queue Service Time (g_s), s		8.2	12.9		0.0		14.8	23.7	23.7	4.9	18.6	18.6
Cycle Queue Clearance Time (g_c), s		10.2	12.9		2.0		33.4	23.7	23.7	28.7	18.6	18.6
Green Ratio (*g/C*)		0.40	0.40		0.40		0.49	0.49	0.49	0.49	0.49	0.49
Capacity (*c*), veh/h		640	641		686		249	931	925	192	931	865
Volume-to-Capacity Ratio (*X*)		0.326	0.443		0.081		0.410	0.648	0.648	0.153	0.545	0.545
Back of Queue (*Q*), ft/ln (95 th percentile)		150.1	206.8		35.3		91.5	381.7	380.5	25.2	308.1	290.4
Back of Queue (*Q*), veh/ln (95 th percentile)		6.0	8.3		1.4		3.7	15.3	15.2	1.0	12.3	11.6
Queue Storage Ratio (*RQ*) (95 th percentile)		0.50	0.69		0.09		0.61	0.76	0.76	0.19	0.48	0.45
Uniform Delay (d_1), s/veh		21.2	22.0		18.7		29.4	19.0	19.1	29.8	17.7	17.7
Incremental Delay (d_2), s/veh		0.1	0.2		0.0		0.4	1.2	1.2	0.1	0.4	0.4
Initial Queue Delay (d_3), s/veh		0.0	0.0		0.0		0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (*d*), s/veh		21.3	22.2		18.7		29.8	20.3	20.3	29.9	18.1	18.2
Level of Service (LOS)		C	C		B		C	C	C	C	B	B
Approach Delay, s/veh / LOS	21.8	C		18.7	B		21.0	C		18.5	B	
Intersection Delay, s/veh / LOS	20.2						C					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	2.27	B	2.27	B	1.68	B	1.90	B
Bicycle LOS Score / LOS	1.30	A	0.58	A	1.56	B	1.32	A

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HCS7 Signalized Intersection Results Summary

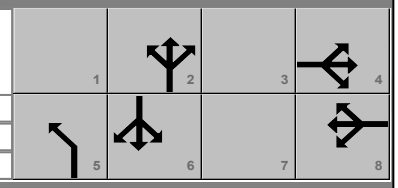
General Information				Intersection Information	
Agency	SHA			Duration, h	0.250
Analyst	JA	Analysis Date	May 4, 2022	Area Type	CBD
Jurisdiction	City of Blue Ash	Time Period	AM Peak	PHF	0.92
Urban Street	Kenwood Road	Analysis Year	2025 No Build	Analysis Period	1> 7:00
Intersection	Kenwood at SR 126 WB…	File Name	2-1-AM-2025-No-Build-Kenwood-SR126WB.xus		
Project Description	Blue Ash Mixed Use Development				



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	160	44	148	47	12	3	81	497	29	1	370	34

Signal Information			
Cycle, s	85.0	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	Yes	Simult. Gap E/W	On
Force Mode	Fixed	Simult. Gap N/S	On

Green	7.0	31.0	30.8	0.0	0.0	0.0						
Yellow	3.0	3.6	3.6	0.0	0.0	0.0						
Red	2.0	2.0	2.0	0.0	0.0	0.0						



Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase		4		8	5	2		6
Case Number		7.0		8.0	1.0	4.0		6.3
Phase Duration, s		36.4		36.4	12.0	48.6		36.6
Change Period, ($Y+R_c$), s		5.6		5.6	5.0	5.6		5.6
Max Allow Headway (*MAH*), s		3.2		3.2	3.1	3.1		3.1
Queue Clearance Time (g_s), s		12.5		4.7	4.6	10.5		10.1
Green Extension Time (g_e), s		0.8		0.9	0.0	1.9		1.8
Phase Call Probability		1.00		1.00	1.00	1.00		1.00
Max Out Probability		0.00		0.00	1.00	0.00		0.00

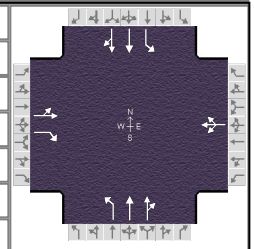
Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	7	4	14	3	8	18	5	2	12	1	6	16
Adjusted Flow Rate (*v*), veh/h		222	161		67		88	288	284	1	222	217
Adjusted Saturation Flow Rate (*s*), veh/h/ln		1357	1449		1331		1629	1710	1676	768	1710	1659
Queue Service Time (g_s), s		7.8	6.8		0.0		2.6	8.5	8.5	0.1	8.1	8.1
Cycle Queue Clearance Time (g_c), s		10.5	6.8		2.7		2.6	8.5	8.5	0.1	8.1	8.1
Green Ratio (*g/C*)		0.36	0.36		0.36		0.47	0.51	0.51	0.36	0.36	0.36
Capacity (*c*), veh/h		567	525		557		452	865	848	365	624	605
Volume-to-Capacity Ratio (*X*)		0.391	0.306		0.121		0.195	0.333	0.334	0.003	0.356	0.359
Back of Queue (*Q*), ft/ln (95 th percentile)		141.7	97.7		38.2		39.6	134.6	132.4	0.6	137.2	134.6
Back of Queue (*Q*), veh/ln (95 th percentile)		5.7	3.9		1.5		1.6	5.4	5.3	0.0	5.5	5.4
Queue Storage Ratio (*RQ*) (95 th percentile)		0.47	0.33		0.10		0.13	0.21	0.21	0.00	0.21	0.21
Uniform Delay (d_1), s/veh		20.6	19.4		18.1		13.3	12.5	12.5	17.2	19.7	19.7
Incremental Delay (d_2), s/veh		0.2	0.1		0.0		0.1	0.1	0.1	0.0	0.1	0.1
Initial Queue Delay (d_3), s/veh		0.0	0.0		0.0		0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (*d*), s/veh		20.7	19.6		18.1		13.3	12.6	12.6	17.2	19.8	19.9
Level of Service (LOS)		C	B		B		B	B	B	B	B	B
Approach Delay, s/veh / LOS	20.2	C		18.1	B		12.7	B		19.8	B	
Intersection Delay, s/veh / LOS	16.8						B					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	2.27	B	2.27	B	1.67	B	1.91	B
Bicycle LOS Score / LOS	1.12	A	0.60	A	1.03	A	0.85	A

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HCS7 Signalized Intersection Results Summary

General Information				Intersection Information	
Agency	SHA			Duration, h	0.250
Analyst	JA	Analysis Date	May 4, 2022	Area Type	CBD
Jurisdiction	City of Blue Ash	Time Period	AM Peak	PHF	0.92
Urban Street	Kenwood Road	Analysis Year	2035 No Build	Analysis Period	1> 7:00
Intersection	Kenwood at SR 126 WB…	File Name	2-2-AM-2035-No-Build-Kenwood-SR126WB.xus		
Project Description	Blue Ash Mixed Use Development				



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	176	49	164	52	14	3	90	549	32	1	409	38

Signal Information			
Cycle, s	85.0	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	Yes	Simult. Gap E/W	On
Force Mode	Fixed	Simult. Gap N/S	On

							1	2	3	4
Green	7.0	31.0	30.8	0.0	0.0	0.0	5	6	7	8
Yellow	3.0	3.6	3.6	0.0	0.0	0.0				
Red	2.0	2.0	2.0	0.0	0.0	0.0				

Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase		4		8	5	2		6
Case Number		7.0		8.0	1.0	4.0		6.3
Phase Duration, s		36.4		36.4	12.0	48.6		36.6
Change Period, ($Y+R_c$), s		5.6		5.6	5.0	5.6		5.6
Max Allow Headway (*MAH*), s		3.2		3.2	3.1	3.1		3.1
Queue Clearance Time (g_s), s		13.9		5.1	4.9	11.6		11.1
Green Extension Time (g_e), s		0.9		1.0	0.0	2.1		2.1
Phase Call Probability		1.00		1.00	1.00	1.00		1.00
Max Out Probability		0.00		0.00	1.00	0.00		0.00

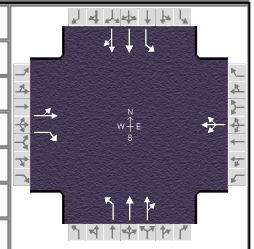
Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	7	4	14	3	8	18	5	2	12	1	6	16
Adjusted Flow Rate (*v*), veh/h		245	178		75		98	319	313	1	246	240
Adjusted Saturation Flow Rate (*s*), veh/h/ln		1353	1449		1329		1629	1710	1676	727	1710	1659
Queue Service Time (g_s), s		8.8	7.6		0.0		2.9	9.6	9.6	0.1	9.1	9.1
Cycle Queue Clearance Time (g_c), s		11.9	7.6		3.1		2.9	9.6	9.6	0.1	9.1	9.1
Green Ratio (*g/C*)		0.36	0.36		0.36		0.47	0.51	0.51	0.36	0.36	0.36
Capacity (*c*), veh/h		566	525		556		433	865	848	350	624	605
Volume-to-Capacity Ratio (*X*)		0.432	0.339		0.135		0.226	0.368	0.369	0.003	0.394	0.397
Back of Queue (*Q*), ft/ln (95 th percentile)		159.4	110.1		42.8		44.3	151.9	149.3	0.6	154.4	151.3
Back of Queue (*Q*), veh/ln (95 th percentile)		6.4	4.4		1.7		1.8	6.1	6.0	0.0	6.2	6.1
Queue Storage Ratio (*RQ*) (95 th percentile)		0.53	0.37		0.11		0.15	0.24	0.23	0.00	0.24	0.23
Uniform Delay (d_1), s/veh		21.0	19.7		18.2		13.5	12.8	12.8	17.2	20.0	20.1
Incremental Delay (d_2), s/veh		0.2	0.1		0.0		0.1	0.1	0.1	0.0	0.2	0.2
Initial Queue Delay (d_3), s/veh		0.0	0.0		0.0		0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (*d*), s/veh		21.2	19.8		18.2		13.6	12.8	12.9	17.2	20.2	20.2
Level of Service (LOS)		C	B		B		B	B	B	B	C	C
Approach Delay, s/veh / LOS	20.7	C		18.2	B		13.0	B		20.2	C	
Intersection Delay, s/veh / LOS	17.1						B					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	2.27	B	2.27	B	1.67	B	1.91	B
Bicycle LOS Score / LOS	1.19	A	0.61	A	1.09	A	0.89	A

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HCS7 Signalized Intersection Results Summary

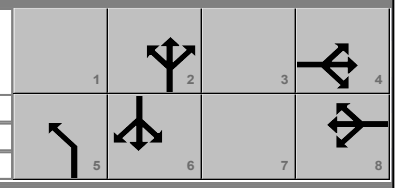
General Information				Intersection Information	
Agency	SHA			Duration, h	0.250
Analyst	JA	Analysis Date	May 4, 2022	Area Type	CBD
Jurisdiction	City of Blue Ash	Time Period	AM Peak	PHF	0.92
Urban Street	Kenwood Road	Analysis Year	2025 Build	Analysis Period	1> 7:00
Intersection	Kenwood at SR 126 WB…	File Name	2-3-AM-2025-Build-Kenwood-SR126WB.xus		
Project Description	Blue Ash Mixed Use Development				



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	160	44	164	47	12	3	89	540	29	1	402	34

Signal Information			
Cycle, s	85.0	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	Yes	Simult. Gap E/W	On
Force Mode	Fixed	Simult. Gap N/S	On

Green	7.0	31.0	30.8	0.0	0.0	0.0						
Yellow	3.0	3.6	3.6	0.0	0.0	0.0						
Red	2.0	2.0	2.0	0.0	0.0	0.0						



Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase		4		8	5	2		6
Case Number		7.0		8.0	1.0	4.0		6.3
Phase Duration, s		36.4		36.4	12.0	48.6		36.6
Change Period, ($Y+R_c$), s		5.6		5.6	5.0	5.6		5.6
Max Allow Headway (*MAH*), s		3.2		3.2	3.1	3.1		3.1
Queue Clearance Time (g_s), s		12.5		4.7	4.8	11.4		10.9
Green Extension Time (g_e), s		0.9		0.9	0.0	2.0		2.0
Phase Call Probability		1.00		1.00	1.00	1.00		1.00
Max Out Probability		0.00		0.00	1.00	0.00		0.00

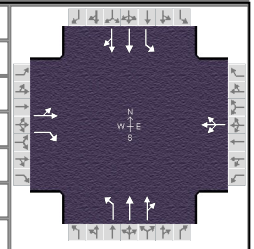
Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	7	4	14	3	8	18	5	2	12	1	6	16
Adjusted Flow Rate (*v*), veh/h		222	178		67		97	312	307	1	239	235
Adjusted Saturation Flow Rate (*s*), veh/h/ln		1357	1449		1331		1629	1710	1679	736	1710	1663
Queue Service Time (g_s), s		7.8	7.6		0.0		2.8	9.4	9.4	0.1	8.8	8.9
Cycle Queue Clearance Time (g_c), s		10.5	7.6		2.7		2.8	9.4	9.4	0.1	8.8	8.9
Green Ratio (*g/C*)		0.36	0.36		0.36		0.47	0.51	0.51	0.36	0.36	0.36
Capacity (*c*), veh/h		567	525		557		438	865	849	353	624	606
Volume-to-Capacity Ratio (*X*)		0.391	0.339		0.121		0.221	0.360	0.361	0.003	0.384	0.387
Back of Queue (*Q*), ft/ln (95 th percentile)		141.7	110.1		38.2		43.8	147.9	146	0.6	149.9	147.1
Back of Queue (*Q*), veh/ln (95 th percentile)		5.7	4.4		1.5		1.8	5.9	5.8	0.0	6.0	5.9
Queue Storage Ratio (*RQ*) (95 th percentile)		0.47	0.37		0.10		0.15	0.23	0.23	0.00	0.23	0.23
Uniform Delay (d_1), s/veh		20.6	19.7		18.1		13.4	12.7	12.7	17.2	19.9	20.0
Incremental Delay (d_2), s/veh		0.2	0.1		0.0		0.1	0.1	0.1	0.0	0.1	0.2
Initial Queue Delay (d_3), s/veh		0.0	0.0		0.0		0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (*d*), s/veh		20.7	19.8		18.1		13.5	12.8	12.8	17.2	20.1	20.1
Level of Service (LOS)		C	B		B		B	B	B	B	C	C
Approach Delay, s/veh / LOS	20.3	C		18.1	B		12.9	B		20.1	C	
Intersection Delay, s/veh / LOS	17.0						B					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	2.27	B	2.27	B	1.67	B	1.91	B
Bicycle LOS Score / LOS	1.15	A	0.60	A	1.08	A	0.88	A

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HCS7 Signalized Intersection Results Summary

General Information				Intersection Information	
Agency	SHA			Duration, h	0.250
Analyst	JA	Analysis Date	May 4, 2022	Area Type	CBD
Jurisdiction	City of Blue Ash	Time Period	AM Peak	PHF	0.92
Urban Street	Kenwood Road	Analysis Year	2035 Build	Analysis Period	1> 7:00
Intersection	Kenwood at SR 126 WB…	File Name	2-4-AM-2035-Build-Kenwood-SR126WB.xus		
Project Description	Blue Ash Mixed Use Development				

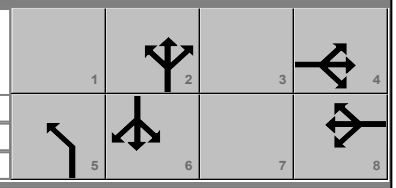


Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	176	49	180	52	14	3	98	592	32	1	441	38

Signal Information			
Cycle, s	85.0	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	Yes	Simult. Gap E/W	On
Force Mode	Fixed	Simult. Gap N/S	On



Green	7.0	31.0	30.8	0.0	0.0	0.0						
Yellow	3.0	3.6	3.6	0.0	0.0	0.0						
Red	2.0	2.0	2.0	0.0	0.0	0.0						



Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase		4		8	5	2		6
Case Number		7.0		8.0	1.0	4.0		6.3
Phase Duration, s		36.4		36.4	12.0	48.6		36.6
Change Period, ($Y+R_c$), s		5.6		5.6	5.0	5.6		5.6
Max Allow Headway (*MAH*), s		3.2		3.2	3.1	3.1		3.1
Queue Clearance Time (g_s), s		13.9		5.1	5.1	12.5		11.9
Green Extension Time (g_e), s		1.0		1.0	0.0	2.3		2.2
Phase Call Probability		1.00		1.00	1.00	1.00		1.00
Max Out Probability		0.00		0.00	1.00	0.00		0.01

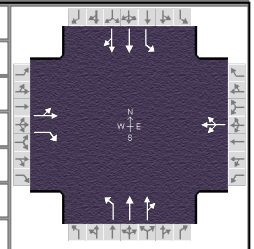
Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	7	4	14	3	8	18	5	2	12	1	6	16
Adjusted Flow Rate (*v*), veh/h		245	196		75		107	342	336	1	263	257
Adjusted Saturation Flow Rate (*s*), veh/h/ln		1353	1449		1329		1629	1710	1679	696	1710	1662
Queue Service Time (g_s), s		8.8	8.5		0.0		3.1	10.5	10.5	0.1	9.8	9.9
Cycle Queue Clearance Time (g_c), s		11.9	8.5		3.1		3.1	10.5	10.5	0.1	9.8	9.9
Green Ratio (*g/C*)		0.36	0.36		0.36		0.47	0.51	0.51	0.36	0.36	0.36
Capacity (*c*), veh/h		566	525		556		419	865	849	339	624	606
Volume-to-Capacity Ratio (*X*)		0.432	0.373		0.135		0.254	0.395	0.396	0.003	0.422	0.425
Back of Queue (*Q*), ft/ln (95 th percentile)		159.4	122.6		42.8		48.6	166.2	163.4	0.6	167.5	164.1
Back of Queue (*Q*), veh/ln (95 th percentile)		6.4	4.9		1.7		1.9	6.6	6.5	0.0	6.7	6.6
Queue Storage Ratio (*RQ*) (95 th percentile)		0.53	0.41		0.11		0.16	0.26	0.25	0.00	0.26	0.25
Uniform Delay (d_1), s/veh		21.0	20.0		18.2		13.7	13.0	13.0	17.2	20.3	20.3
Incremental Delay (d_2), s/veh		0.2	0.2		0.0		0.1	0.1	0.1	0.0	0.2	0.2
Initial Queue Delay (d_3), s/veh		0.0	0.0		0.0		0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (*d*), s/veh		21.2	20.1		18.2		13.8	13.1	13.1	17.2	20.4	20.5
Level of Service (LOS)		C	C		B		B	B	B	B	C	C
Approach Delay, s/veh / LOS	20.8	C		18.2	B		13.2	B		20.5	C	
Intersection Delay, s/veh / LOS	17.3						B					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	2.27	B	2.27	B	1.67	B	1.91	B
Bicycle LOS Score / LOS	1.21	A	0.61	A	1.14	A	0.92	A

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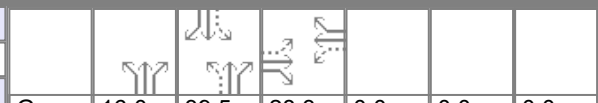
HCS7 Signalized Intersection Results Summary

General Information				Intersection Information	
Agency	SHA			Duration, h	0.250
Analyst	JA	Analysis Date	May 4, 2022	Area Type	CBD
Jurisdiction	City of Blue Ash	Time Period	PM Peak	PHF	0.92
Urban Street	Kenwood Road	Analysis Year	2025 No Build	Analysis Period	1> 7:00
Intersection	Kenwood at SR 126 WB…	File Name	2-5-PM-2025-No-Build-Kenwood-SR126WB.xus		
Project Description	Blue Ash Mixed Use Development				

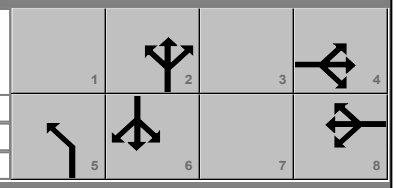


Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	91	37	106	56	29	11	340	661	72	4	627	228

Signal Information			
Cycle, s	100.0	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	Yes	Simult. Gap E/W	On
Force Mode	Fixed	Simult. Gap N/S	On



Green	16.0	39.5	28.3	0.0	0.0	0.0
Yellow	3.0	3.6	3.6	0.0	0.0	0.0
Red	2.0	2.0	2.0	0.0	0.0	0.0



Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase		4		8	5	2		6
Case Number		7.0		8.0	1.0	4.0		6.3
Phase Duration, s		33.9		33.9	21.0	66.1		45.1
Change Period, ($Y+R_c$), s		5.6		5.6	5.0	5.6		5.6
Max Allow Headway (*MAH*), s		3.2		3.2	3.1	3.1		3.1
Queue Clearance Time (g_s), s		10.0		7.4	14.5	14.3		26.1
Green Extension Time (g_e), s		0.6		0.7	0.1	3.8		3.4
Phase Call Probability		1.00		1.00	1.00	1.00		1.00
Max Out Probability		0.00		0.00	1.00	0.01		0.16

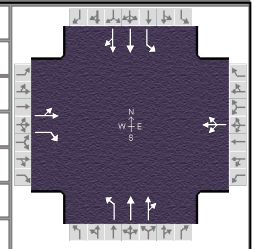
Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	7	4	14	3	8	18	5	2	12	1	6	16
Adjusted Flow Rate (*v*), veh/h		139	115		104		370	405	392	4	487	442
Adjusted Saturation Flow Rate (*s*), veh/h/ln		1362	1449		1404		1629	1710	1651	623	1710	1553
Queue Service Time (g_s), s		2.5	6.2		0.0		12.5	12.3	12.3	0.4	24.1	24.1
Cycle Queue Clearance Time (g_c), s		8.0	6.2		5.4		12.5	12.3	12.3	0.4	24.1	24.1
Green Ratio (*g/C*)		0.28	0.28		0.28		0.57	0.60	0.60	0.39	0.39	0.39
Capacity (*c*), veh/h		447	410		454		417	1035	999	318	675	614
Volume-to-Capacity Ratio (*X*)		0.311	0.281		0.230		0.886	0.392	0.392	0.014	0.721	0.721
Back of Queue (*Q*), ft/ln (95 th percentile)		117.7	95.2		85.5		262.4	189.5	183.2	2.7	377.9	350.9
Back of Queue (*Q*), veh/ln (95 th percentile)		4.7	3.8		3.4		10.5	7.6	7.3	0.1	15.1	14.0
Queue Storage Ratio (*RQ*) (95 th percentile)		0.39	0.32		0.21		0.87	0.29	0.28	0.02	0.59	0.54
Uniform Delay (d_1), s/veh		28.5	27.9		27.6		18.5	10.2	10.2	18.4	25.6	25.6
Incremental Delay (d_2), s/veh		0.1	0.1		0.1		19.2	0.1	0.1	0.0	3.3	3.6
Initial Queue Delay (d_3), s/veh		0.0	0.0		0.0		0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (*d*), s/veh		28.6	28.1		27.7		37.7	10.3	10.3	18.4	28.9	29.2
Level of Service (LOS)		C	C		C		D	B	B	B	C	C
Approach Delay, s/veh / LOS	28.4	C		27.7	C		19.0	B		29.0	C	
Intersection Delay, s/veh / LOS	24.1						C					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	2.29	B	2.29	B	1.65	B	1.91	B
Bicycle LOS Score / LOS	0.91	A	0.66	A	1.45	A	1.26	A

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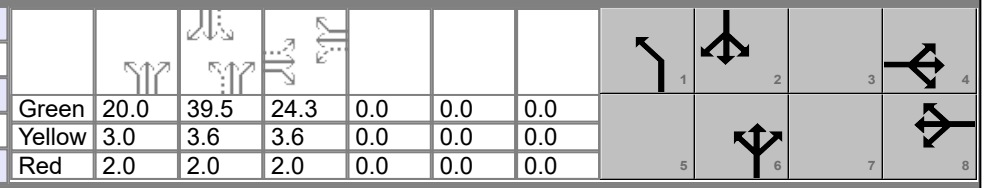
HCS7 Signalized Intersection Results Summary

General Information				Intersection Information	
Agency	SHA			Duration, h	0.250
Analyst	JA	Analysis Date	May 4, 2022	Area Type	CBD
Jurisdiction	City of Blue Ash	Time Period	PM Peak	PHF	0.92
Urban Street	Kenwood Road	Analysis Year	2035 No Build	Analysis Period	1> 7:00
Intersection	Kenwood at SR 126 WB…	File Name	2-6-PM-2035-No-Build-Kenwood-SR126WB.xus		
Project Description	Blue Ash Mixed Use Development				



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	100	41	117	61	32	13	376	731	80	5	693	252

Signal Information			
Cycle, s	100.0	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	Yes	Simult. Gap E/W	On
Force Mode	Fixed	Simult. Gap N/S	On



Green	20.0	39.5	24.3	0.0	0.0	0.0						
Yellow	3.0	3.6	3.6	0.0	0.0	0.0						
Red	2.0	2.0	2.0	0.0	0.0	0.0						

Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase		4		8	1	6		2
Case Number		7.0		8.0	1.0	4.0		6.3
Phase Duration, s		29.9		29.9	25.0	70.1		45.1
Change Period, (*Y+R c*), s		5.6		5.6	5.0	5.6		5.6
Max Allow Headway (*MAH*), s		3.2		3.2	3.1	3.1		3.1
Queue Clearance Time (*g s*), s		11.5		8.4	18.1	14.6		29.8
Green Extension Time (*g e*), s		0.7		0.7	0.2	4.4		3.4
Phase Call Probability		1.00		1.00	1.00	1.00		1.00
Max Out Probability		0.00		0.00	1.00	0.01		0.37

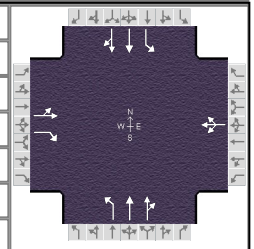
Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	7	4	14	3	8	18	1	6	16	5	2	12
Adjusted Flow Rate (*v*), veh/h		153	127		115		409	449	433	5	538	489
Adjusted Saturation Flow Rate (*s*), veh/h/ln		1360	1449		1408		1629	1710	1650	576	1710	1553
Queue Service Time (*g s*), s		3.0	7.3		0.0		16.1	12.6	12.6	0.6	27.8	27.8
Cycle Queue Clearance Time (*g c*), s		9.5	7.3		6.4		16.1	12.6	12.6	0.6	27.8	27.8
Green Ratio (*g/C*)		0.24	0.24		0.24		0.61	0.64	0.64	0.39	0.39	0.39
Capacity (*c*), veh/h		392	352		399		456	1103	1064	299	675	614
Volume-to-Capacity Ratio (*X*)		0.391	0.361		0.289		0.895	0.407	0.407	0.018	0.797	0.797
Back of Queue (*Q*), ft/ln (95 th percentile)		140.1	113.4		101.5		317.1	186.3	179.9	3.4	439.3	408.7
Back of Queue (*Q*), veh/ln (95 th percentile)		5.6	4.5		4.1		12.7	7.5	7.2	0.1	17.6	16.3
Queue Storage Ratio (*RQ*) (95 th percentile)		0.47	0.38		0.25		1.06	0.29	0.28	0.03	0.68	0.63
Uniform Delay (*d 1*), s/veh		32.2	31.4		31.0		22.7	8.5	8.5	18.5	26.7	26.7
Incremental Delay (*d 2*), s/veh		0.2	0.2		0.1		19.3	0.1	0.1	0.0	6.1	6.7
Initial Queue Delay (*d 3*), s/veh		0.0	0.0		0.0		0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (*d*), s/veh		32.4	31.6		31.2		42.0	8.6	8.6	18.5	32.8	33.4
Level of Service (LOS)		C	C		C		D	A	A	B	C	C
Approach Delay, s/veh / LOS	32.0	C		31.2	C		19.2	B		33.0	C	
Intersection Delay, s/veh / LOS	26.3						C					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	2.29	B	2.29	B	1.65	B	1.91	B
Bicycle LOS Score / LOS	0.95	A	0.68	A	1.55	B	1.34	A

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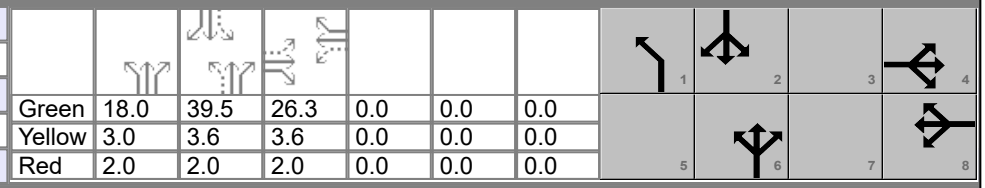
HCS7 Signalized Intersection Results Summary

General Information				Intersection Information	
Agency	SHA			Duration, h	0.250
Analyst	JA	Analysis Date	May 4, 2022	Area Type	CBD
Jurisdiction	City of Blue Ash	Time Period	PM Peak	PHF	0.92
Urban Street	Kenwood Road	Analysis Year	2025 Build	Analysis Period	1> 7:00
Intersection	Kenwood at SR 126 WB…	File Name	2-7-PM-2025-Build-Kenwood-SR126WB.xus		
Project Description	Blue Ash Mixed Use Development				



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	91	37	127	56	29	11	353	724	72	4	670	228

Signal Information			
Cycle, s	100.0	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	Yes	Simult. Gap E/W	On
Force Mode	Fixed	Simult. Gap N/S	On



Green	18.0	39.5	26.3	0.0	0.0	0.0						
Yellow	3.0	3.6	3.6	0.0	0.0	0.0						
Red	2.0	2.0	2.0	0.0	0.0	0.0						

Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase		4		8	1	6		2
Case Number		7.0		8.0	1.0	4.0		6.3
Phase Duration, s		31.9		31.9	23.0	68.1		45.1
Change Period, ($Y+R_c$), s		5.6		5.6	5.0	5.6		5.6
Max Allow Headway (*MAH*), s		3.2		3.2	3.1	3.1		3.1
Queue Clearance Time (g_s), s		10.2		7.6	15.7	15.0		27.7
Green Extension Time (g_e), s		0.7		0.7	0.2	4.2		3.5
Phase Call Probability		1.00		1.00	1.00	1.00		1.00
Max Out Probability		0.00		0.00	1.00	0.01		0.25

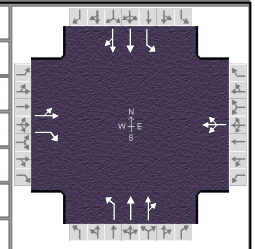
Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	7	4	14	3	8	18	1	6	16	5	2	12
Adjusted Flow Rate (*v*), veh/h		139	138		104		384	440	426	4	510	466
Adjusted Saturation Flow Rate (*s*), veh/h/ln		1363	1449		1406		1629	1710	1655	585	1710	1561
Queue Service Time (g_s), s		2.6	7.8		0.0		13.7	13.0	13.0	0.5	25.7	25.7
Cycle Queue Clearance Time (g_c), s		8.2	7.8		5.6		13.7	13.0	13.0	0.5	25.7	25.7
Green Ratio (*g/C*)		0.26	0.26		0.26		0.59	0.62	0.62	0.39	0.39	0.39
Capacity (*c*), veh/h		420	381		427		438	1069	1035	303	675	616
Volume-to-Capacity Ratio (*X*)		0.331	0.362		0.245		0.877	0.411	0.411	0.014	0.756	0.756
Back of Queue (*Q*), ft/ln (95 th percentile)		121.6	120.1		88.4		274.4	194.7	189.9	2.7	404.7	377.2
Back of Queue (*Q*), veh/ln (95 th percentile)		4.9	4.8		3.5		11.0	7.8	7.6	0.1	16.2	15.1
Queue Storage Ratio (*RQ*) (95 th percentile)		0.41	0.40		0.22		0.91	0.30	0.29	0.02	0.63	0.59
Uniform Delay (d_1), s/veh		30.1	30.0		29.1		20.1	9.5	9.5	18.4	26.1	26.1
Incremental Delay (d_2), s/veh		0.2	0.2		0.1		17.3	0.1	0.1	0.0	4.4	4.8
Initial Queue Delay (d_3), s/veh		0.0	0.0		0.0		0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (*d*), s/veh		30.3	30.2		29.3		37.4	9.6	9.6	18.4	30.4	30.8
Level of Service (LOS)		C	C		C		D	A	A	B	C	C
Approach Delay, s/veh / LOS	30.3	C		29.3	C		18.1	B		30.6	C	
Intersection Delay, s/veh / LOS	24.5						C					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	2.29	B	2.29	B	1.65	B	1.91	B
Bicycle LOS Score / LOS	0.94	A	0.66	A	1.52	B	1.30	A

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HCS7 Signalized Intersection Results Summary

General Information				Intersection Information	
Agency	SHA			Duration, h	0.250
Analyst	JA	Analysis Date	May 4, 2022	Area Type	CBD
Jurisdiction	City of Blue Ash	Time Period	PM Peak	PHF	0.92
Urban Street	Kenwood Road	Analysis Year	2035 Build	Analysis Period	1> 7:00
Intersection	Kenwood at SR 126 WB…	File Name	2-8-PM-2035-Build-Kenwood-SR126WB.xus		
Project Description	Blue Ash Mixed Use Development				



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	100	41	138	61	32	13	389	794	80	5	736	252

Signal Information			
Cycle, s	100.0	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	Yes	Simult. Gap E/W	On
Force Mode	Fixed	Simult. Gap N/S	On

Green	20.0	40.5	23.3	0.0	0.0	0.0	1	2	3	4		
Yellow	3.0	3.6	3.6	0.0	0.0	0.0	5	6	7	8		
Red	2.0	2.0	2.0	0.0	0.0	0.0						

Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase		4		8	1	6		2
Case Number		7.0		8.0	1.0	4.0		6.3
Phase Duration, s		28.9		28.9	25.0	71.1		46.1
Change Period, (*Y+R c*), s		5.6		5.6	5.0	5.6		5.6
Max Allow Headway (*MAH*), s		3.2		3.2	3.1	3.1		3.1
Queue Clearance Time (*g s*), s		11.6		8.5	19.6	15.6		31.1
Green Extension Time (*g e*), s		0.7		0.7	0.1	4.8		3.6
Phase Call Probability		1.00		1.00	1.00	1.00		1.00
Max Out Probability		0.00		0.00	1.00	0.02		0.43

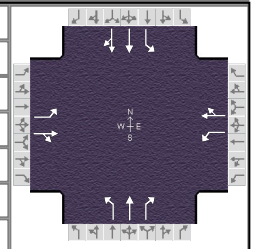
Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	7	4	14	3	8	18	1	6	16	5	2	12
Adjusted Flow Rate (*v*), veh/h		153	150		115		423	483	467	5	561	513
Adjusted Saturation Flow Rate (*s*), veh/h/ln		1360	1449		1409		1629	1710	1655	540	1710	1560
Queue Service Time (*g s*), s		3.1	8.9		0.0		17.6	13.6	13.6	0.6	29.1	29.1
Cycle Queue Clearance Time (*g c*), s		9.6	8.9		6.5		17.6	13.6	13.6	0.6	29.1	29.1
Green Ratio (*g/C*)		0.23	0.23		0.23		0.62	0.65	0.65	0.40	0.40	0.40
Capacity (*c*), veh/h		379	338		385		452	1120	1084	291	693	632
Volume-to-Capacity Ratio (*X*)		0.405	0.444		0.299		0.935	0.431	0.431	0.019	0.811	0.811
Back of Queue (*Q*), ft/ln (95 th percentile)		142.2	138.3		103.2		472.7	196.1	191.2	3.3	458	427.9
Back of Queue (*Q*), veh/ln (95 th percentile)		5.7	5.5		4.1		18.9	7.8	7.6	0.1	18.3	17.1
Queue Storage Ratio (*RQ*) (95 th percentile)		0.47	0.46		0.26		1.58	0.30	0.30	0.03	0.71	0.66
Uniform Delay (*d 1*), s/veh		33.0	32.8		31.8		24.4	8.3	8.3	17.9	26.4	26.4
Incremental Delay (*d 2*), s/veh		0.3	0.3		0.2		26.4	0.1	0.1	0.0	6.7	7.4
Initial Queue Delay (*d 3*), s/veh		0.0	0.0		0.0		0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (*d*), s/veh		33.3	33.2		32.0		50.8	8.4	8.4	17.9	33.1	33.7
Level of Service (LOS)		C	C		C		D	A	A	B	C	C
Approach Delay, s/veh / LOS	33.2	C		32.0	C		21.5	C		33.3	C	
Intersection Delay, s/veh / LOS	27.6						C					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	2.29	B	2.29	B	1.64	B	1.91	B
Bicycle LOS Score / LOS	0.99	A	0.68	A	1.62	B	1.38	A

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HCS7 Signalized Intersection Results Summary

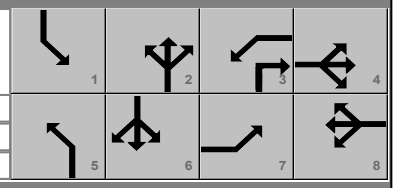
General Information				Intersection Information	
Agency	SHA			Duration, h	0.250
Analyst	JA	Analysis Date	May 4, 2022	Area Type	Other
Jurisdiction	City of Blue Ash	Time Period	AM Peak	PHF	0.92
Urban Street	Kenwood Road	Analysis Year	2025 No Build	Analysis Period	1> 7:00
Intersection	Kenwood at Cooper Road	File Name	3-1-AM-2025-No-Build-Kenwood-Cooper.xus		
Project Description	Blue Ash Mixed Use Development				



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	144	93	39	62	120	129	82	441	62	91	340	77

Signal Information			
Cycle, s	85.0	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	Yes	Simult. Gap E/W	On
Force Mode	Fixed	Simult. Gap N/S	On

Green	9.0	26.0	9.0	2.0	19.8	0.0	
Yellow	3.0	3.6	3.0	0.0	3.6	0.0	
Red	2.0	2.0	0.0	0.0	2.0	0.0	



Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase	7	4	3	8	5	2	1	6
Case Number	1.1	4.0	1.1	4.0	1.1	3.0	1.1	4.0
Phase Duration, s	14.0	27.4	12.0	25.4	14.0	31.6	14.0	31.6
Change Period, ($Y+R_c$), s	5.0	5.6	3.0	5.6	5.0	5.6	5.0	5.6
Max Allow Headway (*MAH*), s	3.1	3.2	3.1	3.2	3.1	3.1	3.1	3.1
Queue Clearance Time (g_s), s	7.3	7.5	4.2	14.0	4.6	21.9	4.9	10.4
Green Extension Time (g_e), s	0.0	0.7	0.0	0.5	0.0	1.0	0.0	1.8
Phase Call Probability	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Max Out Probability	1.00	0.00	0.07	0.18	0.17	0.70	0.27	0.01

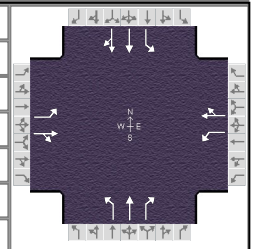
Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	7	4	14	3	8	18	5	2	12	1	6	16
Adjusted Flow Rate (*v*), veh/h	157	143		67	271		89	479	67	99	232	221
Adjusted Saturation Flow Rate (*s*), veh/h/ln	1810	1804		1810	1738		1810	1900	1610	1810	1900	1779
Queue Service Time (g_s), s	5.3	5.5		2.2	12.0		2.6	19.9	2.2	2.9	8.2	8.4
Cycle Queue Clearance Time (g_c), s	5.3	5.5		2.2	12.0		2.6	19.9	2.2	2.9	8.2	8.4
Green Ratio (*g/C*)	0.34	0.26		0.34	0.23		0.41	0.31	0.41	0.41	0.31	0.31
Capacity (*c*), veh/h	379	463		490	405		451	581	663	321	581	544
Volume-to-Capacity Ratio (*X*)	0.413	0.310		0.138	0.669		0.197	0.825	0.102	0.308	0.399	0.407
Back of Queue (*Q*), ft/ln (95 th percentile)	97.1	102.3		39.5	223.4		45.8	377.8	34.2	51.4	159	152
Back of Queue (*Q*), veh/ln (95 th percentile)	3.9	4.1		1.6	8.9		1.8	15.1	1.4	2.1	6.4	6.1
Queue Storage Ratio (*RQ*) (95 th percentile)	0.72	0.21		0.18	0.18		0.32	0.38	0.07	0.34	0.28	0.27
Uniform Delay (d_1), s/veh	21.3	25.5		19.5	29.6		16.2	27.4	15.3	18.7	23.3	23.4
Incremental Delay (d_2), s/veh	0.3	0.1		0.0	3.4		0.1	8.9	0.0	0.2	0.2	0.2
Initial Queue Delay (d_3), s/veh	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (*d*), s/veh	21.6	25.7		19.5	33.0		16.2	36.3	15.4	18.9	23.5	23.6
Level of Service (LOS)	C	C		B	C		B	D	B	B	C	C
Approach Delay, s/veh / LOS	23.5	C		30.3	C		31.2	C		22.7	C	
Intersection Delay, s/veh / LOS	27.2						C					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	2.28	B	2.12	B	1.92	B	1.92	B
Bicycle LOS Score / LOS	0.98	A	1.05	A	1.54	B	0.94	A

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HCS7 Signalized Intersection Results Summary

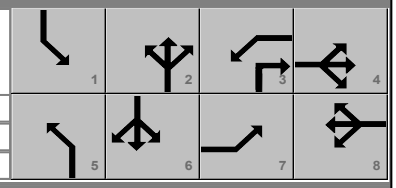
General Information				Intersection Information	
Agency	SHA			Duration, h	0.250
Analyst	JA	Analysis Date	May 4, 2022	Area Type	Other
Jurisdiction	City of Blue Ash	Time Period	AM Peak	PHF	0.92
Urban Street	Kenwood Road	Analysis Year	2035 No Build	Analysis Period	1> 7:00
Intersection	Kenwood at Cooper Road	File Name	3-2-AM-2035-No-Build-Kenwood-Cooper.xus		
Project Description	Blue Ash Mixed Use Development				



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	159	102	43	68	132	142	91	487	68	100	376	85

Signal Information			
Cycle, s	85.0	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	Yes	Simult. Gap E/W	On
Force Mode	Fixed	Simult. Gap N/S	On

Green	9.0	27.0	9.0	2.0	18.8	0.0
Yellow	3.0	3.6	3.0	0.0	3.6	0.0
Red	2.0	2.0	0.0	0.0	2.0	0.0



Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase	7	4	3	8	5	2	1	6
Case Number	1.1	4.0	1.1	4.0	1.1	3.0	1.1	4.0
Phase Duration, s	14.0	26.4	12.0	24.4	14.0	32.6	14.0	32.6
Change Period, ($Y+R_c$), s	5.0	5.6	3.0	5.6	5.0	5.6	5.0	5.6
Max Allow Headway (*MAH*), s	3.1	3.2	3.1	3.2	3.1	3.1	3.1	3.1
Queue Clearance Time (g_s), s	8.0	8.1	4.4	15.7	4.8	24.4	5.1	11.2
Green Extension Time (g_e), s	0.0	0.7	0.0	0.4	0.0	0.8	0.1	2.1
Phase Call Probability	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Max Out Probability	1.00	0.01	0.12	1.00	0.25	1.00	0.38	0.02

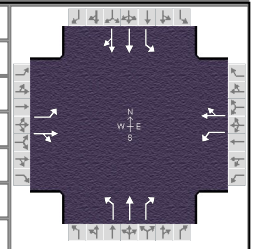
Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	7	4	14	3	8	18	5	2	12	1	6	16
Adjusted Flow Rate (*v*), veh/h	173	158		74	298		99	529	74	109	257	244
Adjusted Saturation Flow Rate (*s*), veh/h/ln	1810	1804		1810	1738		1810	1900	1610	1810	1900	1779
Queue Service Time (g_s), s	6.0	6.1		2.4	13.7		2.8	22.4	2.4	3.1	9.1	9.2
Cycle Queue Clearance Time (g_c), s	6.0	6.1		2.4	13.7		2.8	22.4	2.4	3.1	9.1	9.2
Green Ratio (*g/C*)	0.33	0.24		0.33	0.22		0.42	0.32	0.42	0.42	0.32	0.32
Capacity (*c*), veh/h	342	441		462	384		445	604	682	303	604	565
Volume-to-Capacity Ratio (*X*)	0.505	0.357		0.160	0.775		0.222	0.877	0.108	0.358	0.426	0.432
Back of Queue (*Q*), ft/ln (95 th percentile)	111.4	115.5		44.4	264.4		49.7	434.4	36.8	55.5	175.1	166.8
Back of Queue (*Q*), veh/ln (95 th percentile)	4.5	4.6		1.8	10.6		2.0	17.4	1.5	2.2	7.0	6.7
Queue Storage Ratio (*RQ*) (95 th percentile)	0.82	0.24		0.20	0.21		0.34	0.43	0.07	0.37	0.31	0.30
Uniform Delay (d_1), s/veh	22.6	26.6		20.3	31.1		15.8	27.4	14.8	19.0	22.9	22.9
Incremental Delay (d_2), s/veh	0.5	0.2		0.1	8.7		0.1	13.3	0.0	0.3	0.2	0.2
Initial Queue Delay (d_3), s/veh	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (*d*), s/veh	23.1	26.7		20.4	39.8		15.9	40.7	14.8	19.3	23.1	23.1
Level of Service (LOS)	C	C		C	D		B	D	B	B	C	C
Approach Delay, s/veh / LOS	24.8	C		35.9	D		34.5	C		22.4	C	
Intersection Delay, s/veh / LOS	29.5						C					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	2.29	B	2.12	B	1.92	B	1.92	B
Bicycle LOS Score / LOS	1.03	A	1.10	A	1.65	B	0.99	A

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HCS7 Signalized Intersection Results Summary

General Information				Intersection Information	
Agency	SHA			Duration, h	0.250
Analyst	JA	Analysis Date	May 4, 2022	Area Type	Other
Jurisdiction	City of Blue Ash	Time Period	AM Peak	PHF	0.92
Urban Street	Kenwood Road	Analysis Year	2025 Build	Analysis Period	1> 7:00
Intersection	Kenwood at Cooper Road	File Name	3-3-AM-2025-Build-Kenwood-Cooper.xus		
Project Description	Blue Ash Mixed Use Development				

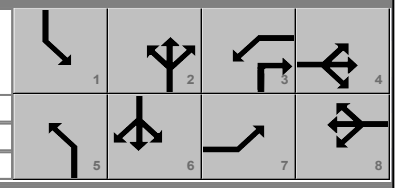


Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	160	101	47	62	129	138	99	467	62	99	364	86

Signal Information			
Cycle, s	85.0	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	Yes	Simult. Gap E/W	On
Force Mode	Fixed	Simult. Gap N/S	On



Green	9.0	26.5	9.0	2.0	19.3	0.0
Yellow	3.0	3.6	3.0	0.0	3.6	0.0
Red	2.0	2.0	0.0	0.0	2.0	0.0



Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase	7	4	3	8	5	2	1	6
Case Number	1.1	4.0	1.1	4.0	1.1	3.0	1.1	4.0
Phase Duration, s	14.0	26.9	12.0	24.9	14.0	32.1	14.0	32.1
Change Period, ($Y+R_c$), s	5.0	5.6	3.0	5.6	5.0	5.6	5.0	5.6
Max Allow Headway (*MAH*), s	3.1	3.2	3.1	3.2	3.1	3.1	3.1	3.1
Queue Clearance Time (g_s), s	8.0	8.3	4.2	15.2	5.1	23.3	5.1	11.1
Green Extension Time (g_e), s	0.0	0.7	0.0	0.4	0.1	0.9	0.1	2.0
Phase Call Probability	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Max Out Probability	1.00	0.01	0.08	0.55	0.38	0.97	0.38	0.02

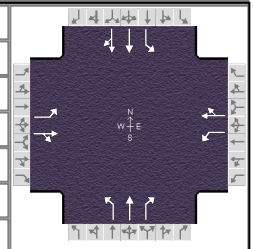
Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	7	4	14	3	8	18	5	2	12	1	6	16
Adjusted Flow Rate (*v*), veh/h	174	161		67	290		108	508	67	108	251	238
Adjusted Saturation Flow Rate (*s*), veh/h/ln	1810	1797		1810	1738		1810	1900	1610	1810	1900	1775
Queue Service Time (g_s), s	6.0	6.3		2.2	13.2		3.1	21.3	2.2	3.1	8.9	9.1
Cycle Queue Clearance Time (g_c), s	6.0	6.3		2.2	13.2		3.1	21.3	2.2	3.1	8.9	9.1
Green Ratio (*g/C*)	0.33	0.25		0.33	0.23		0.42	0.31	0.42	0.42	0.31	0.31
Capacity (*c*), veh/h	356	450		467	395		444	592	672	310	592	553
Volume-to-Capacity Ratio (*X*)	0.488	0.357		0.144	0.735		0.243	0.857	0.100	0.347	0.424	0.431
Back of Queue (*Q*), ft/ln (95 th percentile)	110.6	117		39.9	249		55.2	410	33.8	55.6	171.9	164
Back of Queue (*Q*), veh/ln (95 th percentile)	4.4	4.7		1.6	10.0		2.2	16.4	1.4	2.2	6.9	6.6
Queue Storage Ratio (*RQ*) (95 th percentile)	0.82	0.24		0.18	0.20		0.38	0.41	0.07	0.37	0.31	0.29
Uniform Delay (d_1), s/veh	22.1	26.2		19.9	30.5		16.1	27.5	15.0	19.0	23.2	23.3
Incremental Delay (d_2), s/veh	0.4	0.2		0.1	6.2		0.1	11.4	0.0	0.2	0.2	0.2
Initial Queue Delay (d_3), s/veh	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (*d*), s/veh	22.5	26.4		19.9	36.7		16.2	38.9	15.1	19.2	23.4	23.4
Level of Service (LOS)	C	C		B	D		B	D	B	B	C	C
Approach Delay, s/veh / LOS	24.4	C		33.5	C		32.9	C		22.7	C	
Intersection Delay, s/veh / LOS	28.5						C					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	2.28	B	2.12	B	1.92	B	1.92	B
Bicycle LOS Score / LOS	1.04	A	1.08	A	1.61	B	0.98	A

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HCS7 Signalized Intersection Results Summary

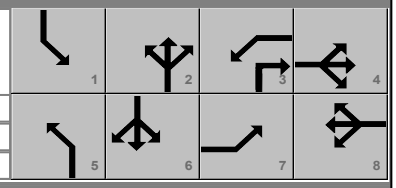
General Information				Intersection Information	
Agency	SHA			Duration, h	0.250
Analyst	JA	Analysis Date	May 4, 2022	Area Type	Other
Jurisdiction	City of Blue Ash	Time Period	AM Peak	PHF	0.92
Urban Street	Kenwood Road	Analysis Year	2035 Build	Analysis Period	1> 7:00
Intersection	Kenwood at Cooper Road	File Name	3-4-AM-2035-Build-Kenwood-Cooper.xus		
Project Description	Blue Ash Mixed Use Development				



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	175	110	51	68	141	151	108	513	68	108	400	94

Signal Information			
Cycle, s	85.0	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	Yes	Simult. Gap E/W	On
Force Mode	Fixed	Simult. Gap N/S	On

Green	9.0	27.0	9.0	2.0	18.8	0.0	
Yellow	3.0	3.6	3.0	0.0	3.6	0.0	
Red	2.0	2.0	0.0	0.0	2.0	0.0	



Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase	7	4	3	8	5	2	1	6
Case Number	1.1	4.0	1.1	4.0	1.1	3.0	1.1	4.0
Phase Duration, s	14.0	26.4	12.0	24.4	14.0	32.6	14.0	32.6
Change Period, ($Y+R_c$), s	5.0	5.6	3.0	5.6	5.0	5.6	5.0	5.6
Max Allow Headway (*MAH*), s	3.1	3.2	3.1	3.2	3.1	3.1	3.1	3.1
Queue Clearance Time (g_s), s	8.7	8.9	4.4	16.8	5.4	26.1	5.4	12.0
Green Extension Time (g_e), s	0.0	0.8	0.0	0.3	0.1	0.4	0.1	2.2
Phase Call Probability	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Max Out Probability	1.00	0.02	0.12	1.00	0.55	1.00	0.55	0.03

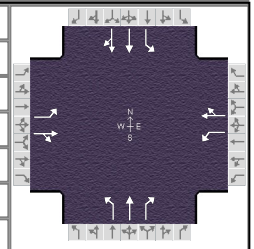
Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	7	4	14	3	8	18	5	2	12	1	6	16
Adjusted Flow Rate (*v*), veh/h	190	175		74	317		117	558	74	117	276	261
Adjusted Saturation Flow Rate (*s*), veh/h/ln	1810	1798		1810	1738		1810	1900	1610	1810	1900	1775
Queue Service Time (g_s), s	6.7	6.9		2.4	14.8		3.4	24.1	2.4	3.4	9.8	10.0
Cycle Queue Clearance Time (g_c), s	6.7	6.9		2.4	14.8		3.4	24.1	2.4	3.4	9.8	10.0
Green Ratio (*g/C*)	0.33	0.24		0.33	0.22		0.42	0.32	0.42	0.42	0.32	0.32
Capacity (*c*), veh/h	327	440		448	384		432	604	682	286	604	564
Volume-to-Capacity Ratio (*X*)	0.581	0.398		0.165	0.826		0.272	0.924	0.108	0.411	0.457	0.463
Back of Queue (*Q*), ft/ln (95 th percentile)	128.6	129.8		44.4	294		59.8	490.1	36.8	60.4	189.9	180.4
Back of Queue (*Q*), veh/ln (95 th percentile)	5.1	5.2		1.8	11.8		2.4	19.6	1.5	2.4	7.6	7.2
Queue Storage Ratio (*RQ*) (95 th percentile)	0.95	0.26		0.20	0.24		0.41	0.49	0.07	0.40	0.34	0.32
Uniform Delay (d_1), s/veh	23.1	26.9		20.4	31.5		16.1	28.0	14.8	19.4	23.1	23.2
Incremental Delay (d_2), s/veh	1.7	0.2		0.1	12.9		0.1	19.8	0.0	0.4	0.2	0.2
Initial Queue Delay (d_3), s/veh	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (*d*), s/veh	24.8	27.1		20.4	44.5		16.2	47.8	14.8	19.7	23.4	23.4
Level of Service (LOS)	C	C		C	D		B	D	B	B	C	C
Approach Delay, s/veh / LOS	25.9	C		39.9	D		39.6	D		22.7	C	
Intersection Delay, s/veh / LOS	32.2						C					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	2.29	B	2.12	B	1.92	B	1.92	B
Bicycle LOS Score / LOS	1.09	A	1.13	A	1.72	B	1.03	A

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HCS7 Signalized Intersection Results Summary

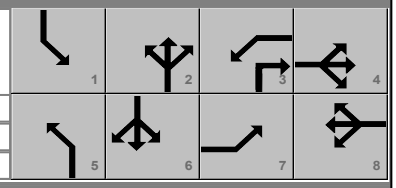
General Information				Intersection Information	
Agency	SHA			Duration, h	0.250
Analyst	JA	Analysis Date	May 4, 2022	Area Type	Other
Jurisdiction	City of Blue Ash	Time Period	PM Peak	PHF	0.92
Urban Street	Kenwood Road	Analysis Year	2025 No Build	Analysis Period	1> 7:00
Intersection	Kenwood at Cooper Road	File Name	3-5-PM-2025-No-Build-Kenwood-Cooper.xus		
Project Description	Blue Ash Mixed Use Development				



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	135	219	96	137	202	117	92	478	137	135	492	147

Signal Information			
Cycle, s	100.0	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	Yes	Simult. Gap E/W	On
Force Mode	Fixed	Simult. Gap N/S	On

Green	9.0	32.8	9.0	2.0	28.0	0.0	
Yellow	3.0	3.6	3.0	0.0	3.6	0.0	
Red	2.0	2.0	0.0	0.0	2.0	0.0	



Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase	7	4	3	8	5	2	1	6
Case Number	1.1	4.0	1.1	4.0	1.1	3.0	1.1	4.0
Phase Duration, s	14.0	35.6	12.0	33.6	14.0	38.4	14.0	38.4
Change Period, ($Y+R_c$), s	5.0	5.6	3.0	5.6	5.0	5.6	5.0	5.6
Max Allow Headway (*MAH*), s	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1
Queue Clearance Time (g_s), s	7.6	18.4	7.6	19.4	5.4	27.3	7.1	17.9
Green Extension Time (g_e), s	0.0	1.1	0.0	1.1	0.0	1.8	0.0	2.7
Phase Call Probability	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Max Out Probability	1.00	0.05	1.00	0.08	0.53	0.56	1.00	0.06

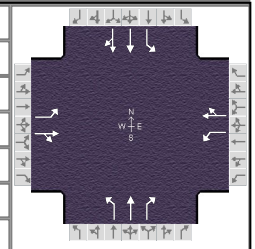
Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	7	4	14	3	8	18	5	2	12	1	6	16
Adjusted Flow Rate (*v*), veh/h	147	342		149	347		100	520	149	147	360	334
Adjusted Saturation Flow Rate (*s*), veh/h/ln	1810	1801		1810	1782		1810	1900	1610	1810	1900	1749
Queue Service Time (g_s), s	5.6	16.4		5.6	17.4		3.4	25.3	5.9	5.1	15.7	15.9
Cycle Queue Clearance Time (g_c), s	5.6	16.4		5.6	17.4		3.4	25.3	5.9	5.1	15.7	15.9
Green Ratio (*g/C*)	0.37	0.30		0.37	0.28		0.42	0.33	0.42	0.42	0.33	0.33
Capacity (*c*), veh/h	346	540		357	499		349	623	673	284	623	574
Volume-to-Capacity Ratio (*X*)	0.424	0.634		0.417	0.695		0.287	0.834	0.221	0.516	0.578	0.582
Back of Queue (*Q*), ft/ln (95 th percentile)	104.4	289.8		106.1	307.9		62.7	463.5	96.6	96.2	286.2	270
Back of Queue (*Q*), veh/ln (95 th percentile)	4.2	11.6		4.2	12.3		2.5	18.5	3.9	3.8	11.4	10.8
Queue Storage Ratio (*RQ*) (95 th percentile)	0.77	0.59		0.48	0.25		0.43	0.46	0.19	0.64	0.51	0.48
Uniform Delay (d_1), s/veh	23.4	30.3		23.2	32.2		19.8	31.1	18.7	22.9	27.9	27.9
Incremental Delay (d_2), s/veh	0.3	1.9		0.3	3.5		0.2	9.0	0.1	0.7	0.9	1.0
Initial Queue Delay (d_3), s/veh	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (*d*), s/veh	23.7	32.1		23.5	35.7		19.9	40.1	18.7	23.6	28.8	28.9
Level of Service (LOS)	C	C		C	D		B	D	B	C	C	C
Approach Delay, s/veh / LOS	29.6	C		32.0	C		33.3	C		27.9	C	
Intersection Delay, s/veh / LOS	30.6						C					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	2.29	B	2.12	B	1.92	B	1.92	B
Bicycle LOS Score / LOS	1.29	A	1.31	A	1.76	B	1.18	A

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HCS7 Signalized Intersection Results Summary

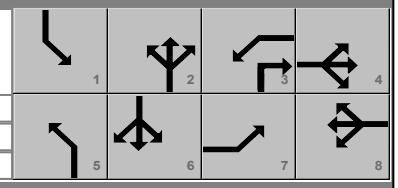
General Information				Intersection Information	
Agency	SHA			Duration, h	0.250
Analyst	JA	Analysis Date	May 4, 2022	Area Type	Other
Jurisdiction	City of Blue Ash	Time Period	PM Peak	PHF	0.92
Urban Street	Kenwood Road	Analysis Year	2035 No Build	Analysis Period	1> 7:00
Intersection	Kenwood at Cooper Road	File Name	3-6-PM-2035-No-Build-Kenwood-Cooper.xus		
Project Description	Blue Ash Mixed Use Development				



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	149	242	106	151	223	130	101	528	151	149	544	163

Signal Information			
Cycle, s	100.0	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	Yes	Simult. Gap E/W	On
Force Mode	Fixed	Simult. Gap N/S	On

Green	9.0	33.8	9.0	2.0	27.0	0.0
Yellow	3.0	3.6	3.0	0.0	3.6	0.0
Red	2.0	2.0	0.0	0.0	2.0	0.0



Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase	7	4	3	8	5	2	1	6
Case Number	1.1	4.0	1.1	4.0	1.1	3.0	1.1	4.0
Phase Duration, s	14.0	34.6	12.0	32.6	14.0	39.4	14.0	39.4
Change Period, (*Y+R c*), s	5.0	5.6	3.0	5.6	5.0	5.6	5.0	5.6
Max Allow Headway (*MAH*), s	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1
Queue Clearance Time (*g s*), s	8.3	20.9	8.4	22.0	5.7	30.7	7.6	19.7
Green Extension Time (*g e*), s	0.0	1.0	0.0	0.9	0.0	1.3	0.0	3.0
Phase Call Probability	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Max Out Probability	1.00	0.28	1.00	0.46	0.79	0.99	1.00	0.10

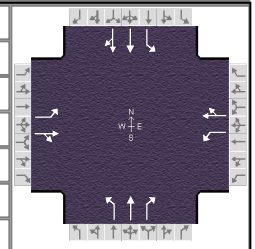
Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	7	4	14	3	8	18	5	2	12	1	6	16
Adjusted Flow Rate (*v*), veh/h	162	378		164	384		110	574	164	162	399	369
Adjusted Saturation Flow Rate (*s*), veh/h/ln	1810	1801		1810	1782		1810	1900	1610	1810	1900	1749
Queue Service Time (*g s*), s	6.3	18.9		6.4	20.0		3.7	28.7	6.5	5.6	17.6	17.7
Cycle Queue Clearance Time (*g c*), s	6.3	18.9		6.4	20.0		3.7	28.7	6.5	5.6	17.6	17.7
Green Ratio (*g/C*)	0.36	0.29		0.36	0.27		0.43	0.34	0.43	0.43	0.34	0.34
Capacity (*c*), veh/h	306	522		318	481		335	642	689	262	642	591
Volume-to-Capacity Ratio (*X*)	0.530	0.724		0.516	0.798		0.328	0.894	0.238	0.619	0.622	0.624
Back of Queue (*Q*), ft/ln (95 th percentile)	120.4	334.9		121.4	364.5		67.8	539	105.4	184.6	315.4	296.8
Back of Queue (*Q*), veh/ln (95 th percentile)	4.8	13.4		4.9	14.6		2.7	21.6	4.2	7.4	12.6	11.9
Queue Storage Ratio (*RQ*) (95 th percentile)	0.89	0.68		0.55	0.29		0.47	0.54	0.21	1.23	0.56	0.53
Uniform Delay (*d 1*), s/veh	24.9	31.9		24.6	34.0		19.7	31.4	18.2	23.4	27.7	27.8
Incremental Delay (*d 2*), s/veh	0.9	4.3		0.7	8.5		0.2	14.5	0.1	3.3	1.4	1.5
Initial Queue Delay (*d 3*), s/veh	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (*d*), s/veh	25.8	36.2		25.3	42.4		19.9	45.9	18.3	26.7	29.1	29.3
Level of Service (LOS)	C	D		C	D		B	D	B	C	C	C
Approach Delay, s/veh / LOS	33.1	C		37.3	D		37.2	D		28.8	C	
Intersection Delay, s/veh / LOS	33.7						C					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	2.29	B	2.12	B	1.92	B	1.92	B
Bicycle LOS Score / LOS	1.38	A	1.39	A	1.89	B	1.26	A

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HCS7 Signalized Intersection Results Summary

General Information				Intersection Information	
Agency	SHA			Duration, h	0.250
Analyst	JA	Analysis Date	May 4, 2022	Area Type	Other
Jurisdiction	City of Blue Ash	Time Period	PM Peak	PHF	0.92
Urban Street	Kenwood Road	Analysis Year	2025 Build	Analysis Period	1> 7:00
Intersection	Kenwood at Cooper Road	File Name	3-7-PM-2025-Build-Kenwood-Cooper.xus		
Project Description	Blue Ash Mixed Use Development				

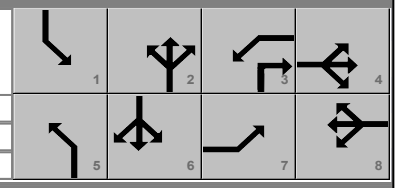


Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	156	230	107	137	215	130	117	516	137	146	524	160

Signal Information			
Cycle, s	100.0	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	Yes	Simult. Gap E/W	On
Force Mode	Fixed	Simult. Gap N/S	On



Green	9.0	33.8	9.0	2.0	27.0	0.0						
Yellow	3.0	3.6	3.0	0.0	3.6	0.0						
Red	2.0	2.0	0.0	0.0	2.0	0.0						



Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase	7	4	3	8	5	2	1	6
Case Number	1.1	4.0	1.1	4.0	1.1	3.0	1.1	4.0
Phase Duration, s	14.0	34.6	12.0	32.6	14.0	39.4	14.0	39.4
Change Period, (*Y+R c*), s	5.0	5.6	3.0	5.6	5.0	5.6	5.0	5.6
Max Allow Headway (*MAH*), s	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1
Queue Clearance Time (*g s*), s	8.6	20.2	7.7	21.5	6.3	29.7	7.5	19.0
Green Extension Time (*g e*), s	0.0	1.1	0.0	0.9	0.0	1.6	0.0	2.9
Phase Call Probability	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Max Out Probability	1.00	0.20	1.00	0.36	1.00	0.80	1.00	0.07

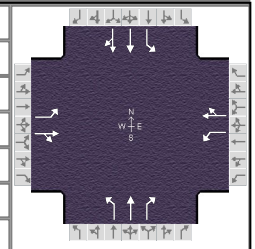
Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	7	4	14	3	8	18	5	2	12	1	6	16
Adjusted Flow Rate (*v*), veh/h	170	366		149	375		127	561	149	159	387	357
Adjusted Saturation Flow Rate (*s*), veh/h/ln	1810	1797		1810	1779		1810	1900	1610	1810	1900	1747
Queue Service Time (*g s*), s	6.6	18.2		5.7	19.5		4.3	27.7	5.8	5.5	16.9	17.0
Cycle Queue Clearance Time (*g c*), s	6.6	18.2		5.7	19.5		4.3	27.7	5.8	5.5	16.9	17.0
Green Ratio (*g/C*)	0.36	0.29		0.36	0.27		0.43	0.34	0.43	0.43	0.34	0.34
Capacity (*c*), veh/h	312	521		326	480		343	642	689	270	642	590
Volume-to-Capacity Ratio (*X*)	0.544	0.703		0.457	0.781		0.371	0.873	0.216	0.588	0.602	0.605
Back of Queue (*Q*), ft/ln (95 th percentile)	127.5	321.6		108.4	352.5		79.4	513.9	94.5	176.9	303.7	285.7
Back of Queue (*Q*), veh/ln (95 th percentile)	5.1	12.9		4.3	14.1		3.2	20.6	3.8	7.1	12.1	11.4
Queue Storage Ratio (*RQ*) (95 th percentile)	0.94	0.65		0.49	0.28		0.55	0.51	0.19	1.18	0.54	0.51
Uniform Delay (*d 1*), s/veh	24.9	31.7		24.2	33.8		19.8	31.1	18.0	23.2	27.5	27.5
Incremental Delay (*d 2*), s/veh	1.1	3.6		0.4	7.4		0.2	12.2	0.1	2.3	1.1	1.3
Initial Queue Delay (*d 3*), s/veh	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (*d*), s/veh	26.0	35.3		24.6	41.2		20.0	43.3	18.1	25.5	28.6	28.8
Level of Service (LOS)	C	D		C	D		C	D	B	C	C	C
Approach Delay, s/veh / LOS	32.3	C		36.5	D		35.3	D		28.1	C	
Intersection Delay, s/veh / LOS	32.6						C					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	2.29	B	2.12	B	1.92	B	1.92	B
Bicycle LOS Score / LOS	1.37	A	1.35	A	1.87	B	1.23	A

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HCS7 Signalized Intersection Results Summary

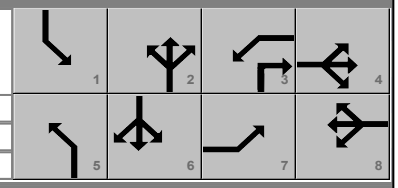
General Information				Intersection Information	
Agency	SHA			Duration, h	0.250
Analyst	JA	Analysis Date	May 4, 2022	Area Type	Other
Jurisdiction	City of Blue Ash	Time Period	PM Peak	PHF	0.92
Urban Street	Kenwood Road	Analysis Year	2035 Build	Analysis Period	1> 7:00
Intersection	Kenwood at Cooper Rpad	File Name	3-8-PM-2035-Build-Kenwood-Cooper.xus		
Project Description	Blue Ash Mixed Use Development				



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	170	253	117	151	236	143	126	566	151	160	576	176

Signal Information			
Cycle, s	100.0	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	Yes	Simult. Gap E/W	On
Force Mode	Fixed	Simult. Gap N/S	On

Green	9.0	34.3	9.0	2.0	26.5	0.0						
Yellow	3.0	3.6	3.0	0.0	3.6	0.0						
Red	2.0	2.0	0.0	0.0	2.0	0.0						



Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase	7	4	3	8	5	2	1	6
Case Number	1.1	4.0	1.1	4.0	1.1	3.0	1.1	4.0
Phase Duration, s	14.0	34.1	12.0	32.1	14.0	39.9	14.0	39.9
Change Period, (*Y+R c*), s	5.0	5.6	3.0	5.6	5.0	5.6	5.0	5.6
Max Allow Headway (*MAH*), s	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1
Queue Clearance Time (*g s*), s	9.3	22.6	8.4	24.1	6.6	33.5	8.0	21.0
Green Extension Time (*g e*), s	0.0	0.8	0.0	0.6	0.0	0.5	0.0	3.1
Phase Call Probability	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Max Out Probability	1.00	0.74	1.00	1.00	1.00	1.00	1.00	0.14

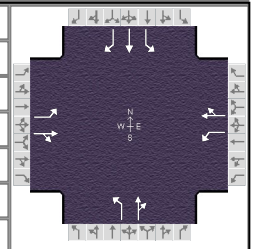
Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	7	4	14	3	8	18	5	2	12	1	6	16
Adjusted Flow Rate (*v*), veh/h	185	402		164	412		137	615	164	174	425	392
Adjusted Saturation Flow Rate (*s*), veh/h/ln	1810	1798		1810	1779		1810	1900	1610	1810	1900	1747
Queue Service Time (*g s*), s	7.3	20.6		6.4	22.1		4.6	31.5	6.4	6.0	19.0	19.0
Cycle Queue Clearance Time (*g c*), s	7.3	20.6		6.4	22.1		4.6	31.5	6.4	6.0	19.0	19.0
Green Ratio (*g/C*)	0.36	0.28		0.36	0.26		0.43	0.34	0.43	0.43	0.34	0.34
Capacity (*c*), veh/h	278	512		294	471		325	652	697	242	652	599
Volume-to-Capacity Ratio (*X*)	0.665	0.785		0.559	0.874		0.421	0.944	0.235	0.719	0.653	0.654
Back of Queue (*Q*), ft/ln (95 th percentile)	153.3	370.8		125.4	421.7		85.4	618.3	104.2	210.6	336.7	315.7
Back of Queue (*Q*), veh/ln (95 th percentile)	6.1	14.8		5.0	16.9		3.4	24.7	4.2	8.4	13.5	12.6
Queue Storage Ratio (*RQ*) (95 th percentile)	1.14	0.76		0.57	0.34		0.59	0.62	0.21	1.40	0.60	0.56
Uniform Delay (*d 1*), s/veh	26.2	32.9		25.4	35.2		20.2	31.9	17.9	23.6	27.8	27.8
Incremental Delay (*d 2*), s/veh	4.8	7.2		1.5	15.9		0.3	22.2	0.1	8.6	1.9	2.0
Initial Queue Delay (*d 3*), s/veh	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (*d*), s/veh	30.9	40.1		26.9	51.0		20.5	54.1	18.0	32.3	29.7	29.9
Level of Service (LOS)	C	D		C	D		C	D	B	C	C	C
Approach Delay, s/veh / LOS	37.2	D		44.1	D		42.6	D		30.2	C	
Intersection Delay, s/veh / LOS	37.9						D					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	2.29	B	2.12	B	1.92	B	1.92	B
Bicycle LOS Score / LOS	1.46	A	1.44	A	2.00	B	1.31	A

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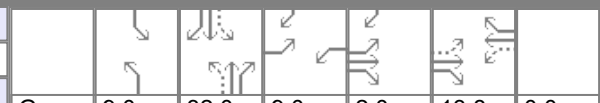
HCS7 Signalized Intersection Results Summary

General Information				Intersection Information	
Agency	SHA			Duration, h	0.250
Analyst	JA	Analysis Date	May 4, 2022	Area Type	Other
Jurisdiction	City of Blue Ash	Time Period	AM Peak	PHF	0.92
Urban Street	Kenwood Road	Analysis Year	2025 No Build	Analysis Period	1> 7:00
Intersection	Kenwood at Malsbury	File Name	4-1-AM-2025-No-Build-Kenwood-Malsbury.xus		
Project Description	Blue Ash Mixed Use Development				

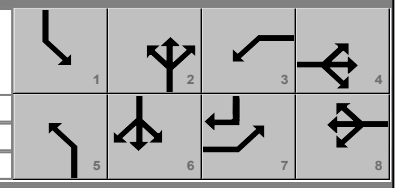


Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	15	23	26	73	32	106	111	479	73	124	415	111

Signal Information			
Cycle, s	85.0	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	Yes	Simult. Gap E/W	On
Force Mode	Fixed	Simult. Gap N/S	On



Green	9.0	32.0	9.0	2.0	13.8	0.0	
Yellow	3.0	3.6	3.0	0.0	3.6	0.0	
Red	2.0	2.0	0.0	0.0	2.0	0.0	



Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase	7	4	3	8	5	2	1	6
Case Number	1.1	4.0	1.1	4.0	1.1	4.0	1.1	3.0
Phase Duration, s	14.0	21.4	12.0	19.4	14.0	37.6	14.0	37.6
Change Period, ($Y+R_c$), s	5.0	5.6	3.0	5.6	5.0	5.6	5.0	5.6
Max Allow Headway (*MAH*), s	3.1	3.3	3.1	3.3	3.1	3.1	3.1	3.1
Queue Clearance Time (g_s), s	2.6	4.2	4.9	9.0	5.1	34.0	5.5	18.5
Green Extension Time (g_e), s	0.0	0.3	0.0	0.2	0.1	0.0	0.1	2.2
Phase Call Probability	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Max Out Probability	0.00	0.00	0.23	0.24	0.40	1.00	0.67	0.05

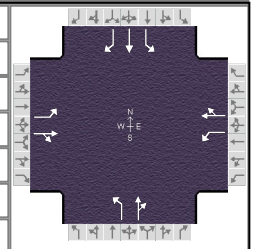
Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	7	4	14	3	8	18	5	2	12	1	6	16
Adjusted Flow Rate (*v*), veh/h	16	53		79	150		121	600		135	451	121
Adjusted Saturation Flow Rate (*s*), veh/h/ln	1810	1734		1810	1669		1810	1856		1810	1900	1610
Queue Service Time (g_s), s	0.6	2.2		2.9	7.0		3.1	25.3		3.5	16.5	3.6
Cycle Queue Clearance Time (g_c), s	0.6	2.2		2.9	7.0		3.1	25.3		3.5	16.5	3.6
Green Ratio (*g/C*)	0.27	0.19		0.27	0.16		0.48	0.38		0.48	0.38	0.48
Capacity (*c*), veh/h	376	322		464	271		428	699		276	715	777
Volume-to-Capacity Ratio (*X*)	0.043	0.165		0.171	0.553		0.282	0.859		0.488	0.631	0.155
Back of Queue (*Q*), ft/ln (95 th percentile)	10.5	40.2		53	128.7		53.3	449.1		61	288	53.7
Back of Queue (*Q*), veh/ln (95 th percentile)	0.4	1.6		2.1	5.1		2.1	18.0		2.4	11.5	2.1
Queue Storage Ratio (*RQ*) (95 th percentile)	0.08	0.20		0.30	0.21		0.44	0.45		0.41	0.51	0.63
Uniform Delay (d_1), s/veh	23.3	29.1		23.8	32.8		14.5	24.4		18.3	21.7	12.3
Incremental Delay (d_2), s/veh	0.0	0.1		0.1	1.5		0.1	10.0		0.5	1.4	0.0
Initial Queue Delay (d_3), s/veh	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Control Delay (*d*), s/veh	23.3	29.1		23.9	34.2		14.6	34.4		18.8	23.0	12.3
Level of Service (LOS)	C	C		C	C		B	C		B	C	B
Approach Delay, s/veh / LOS	27.8	C		30.7	C		31.1	C		20.4	C	
Intersection Delay, s/veh / LOS	26.5						C					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	1.93	B	2.12	B	1.91	B	1.91	B
Bicycle LOS Score / LOS	0.60	A	0.87	A	1.68	B	1.65	B

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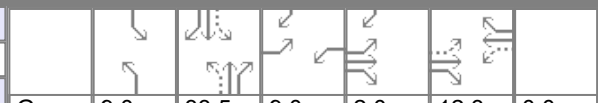
HCS7 Signalized Intersection Results Summary

General Information				Intersection Information	
Agency	SHA			Duration, h	0.250
Analyst	JA	Analysis Date	May 4, 2022	Area Type	Other
Jurisdiction	City of Blue Ash	Time Period	AM Peak	PHF	0.92
Urban Street	Kenwood Road	Analysis Year	2035 No Build	Analysis Period	1> 7:00
Intersection	Kenwood at Malsbury	File Name	4-2-AM-2035-No-Build-Kenwood-Malsbury.xus		
Project Description	Blue Ash Mixed Use Development				

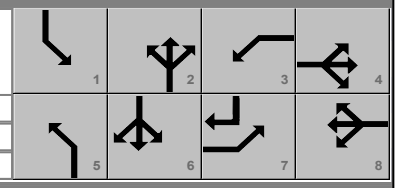


Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	17	25	28	81	35	117	123	529	81	137	459	123

Signal Information			
Cycle, s	85.0	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	Yes	Simult. Gap E/W	On
Force Mode	Fixed	Simult. Gap N/S	On



Green	9.0	33.5	9.0	2.0	12.3	0.0
Yellow	3.0	3.6	3.0	0.0	3.6	0.0
Red	2.0	2.0	0.0	0.0	2.0	0.0



Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase	7	4	3	8	5	2	1	6
Case Number	1.1	4.0	1.1	4.0	1.1	4.0	1.1	3.0
Phase Duration, s	14.0	19.9	12.0	17.9	14.0	39.1	14.0	39.1
Change Period, ($Y+R_c$), s	5.0	5.6	3.0	5.6	5.0	5.6	5.0	5.6
Max Allow Headway (*MAH*), s	3.1	3.3	3.1	3.3	3.1	3.1	3.1	3.1
Queue Clearance Time (g_s), s	2.7	4.4	5.3	10.0	5.4	35.5	5.8	20.3
Green Extension Time (g_e), s	0.0	0.3	0.0	0.1	0.1	0.0	0.1	2.5
Phase Call Probability	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Max Out Probability	0.00	0.02	0.42	1.00	0.56	1.00	0.93	0.08

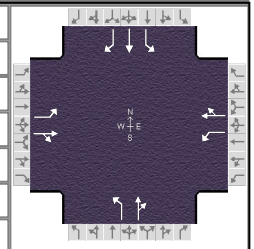
Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	7	4	14	3	8	18	5	2	12	1	6	16
Adjusted Flow Rate (*v*), veh/h	18	58		88	165		134	663		149	499	134
Adjusted Saturation Flow Rate (*s*), veh/h/ln	1810	1735		1810	1669		1810	1856		1810	1900	1610
Queue Service Time (g_s), s	0.7	2.4		3.3	8.0		3.4	28.6		3.8	18.3	3.8
Cycle Queue Clearance Time (g_c), s	0.7	2.4		3.3	8.0		3.4	28.6		3.8	18.3	3.8
Green Ratio (*g/C*)	0.25	0.17		0.25	0.14		0.50	0.39		0.50	0.39	0.50
Capacity (*c*), veh/h	339	292		435	241		418	731		276	749	805
Volume-to-Capacity Ratio (*X*)	0.054	0.197		0.202	0.684		0.320	0.907		0.539	0.666	0.166
Back of Queue (*Q*), ft/ln (95 th percentile)	12.3	44.8		60.9	160.6		56.8	519.5		66.9	314.3	57.3
Back of Queue (*Q*), veh/ln (95 th percentile)	0.5	1.8		2.4	6.4		2.3	20.8		2.7	12.6	2.3
Queue Storage Ratio (*RQ*) (95 th percentile)	0.09	0.22		0.35	0.27		0.47	0.52		0.45	0.56	0.67
Uniform Delay (d_1), s/veh	24.5	30.4		25.1	34.5		14.3	24.3		18.2	21.2	11.6
Incremental Delay (d_2), s/veh	0.0	0.1		0.1	6.5		0.2	14.7		1.2	1.8	0.0
Initial Queue Delay (d_3), s/veh	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Control Delay (*d*), s/veh	24.5	30.5		25.2	41.0		14.5	38.9		19.3	23.0	11.6
Level of Service (LOS)	C	C		C	D		B	D		B	C	B
Approach Delay, s/veh / LOS	29.1	C		35.5	D		34.8	C		20.3	C	
Intersection Delay, s/veh / LOS	28.8						C					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	1.93	B	2.13	B	1.91	B	1.91	B
Bicycle LOS Score / LOS	0.61	A	0.91	A	1.80	B	1.78	B

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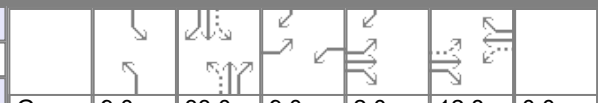
HCS7 Signalized Intersection Results Summary

General Information				Intersection Information	
Agency	SHA			Duration, h	0.250
Analyst	JA	Analysis Date	May 4, 2022	Area Type	Other
Jurisdiction	City of Blue Ash	Time Period	AM Peak	PHF	0.92
Urban Street	Kenwood Road	Analysis Year	2025 Build	Analysis Period	1> 7:00
Intersection	Kenwood at Malsbury	File Name	4-3-AM-2025-Build-Kenwood-Malsbury.xus		
Project Description	Blue Ash Mixed Use Development				

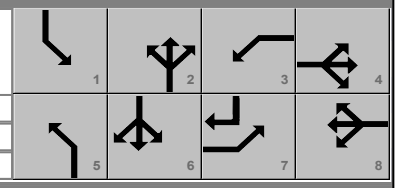


Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	15	23	43	73	32	106	127	520	73	124	459	111

Signal Information			
Cycle, s	85.0	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	Yes	Simult. Gap E/W	On
Force Mode	Fixed	Simult. Gap N/S	On



Green	9.0	33.0	9.0	2.0	12.8	0.0						
Yellow	3.0	3.6	3.0	0.0	3.6	0.0						
Red	2.0	2.0	0.0	0.0	2.0	0.0						



Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase	7	4	3	8	5	2	1	6
Case Number	1.1	4.0	1.1	4.0	1.1	4.0	1.1	3.0
Phase Duration, s	14.0	20.4	12.0	18.4	14.0	38.6	14.0	38.6
Change Period, ($Y+R_c$), s	5.0	5.6	3.0	5.6	5.0	5.6	5.0	5.6
Max Allow Headway (*MAH*), s	3.1	3.3	3.1	3.3	3.1	3.1	3.1	3.1
Queue Clearance Time (g_s), s	2.6	5.1	4.9	9.1	5.6	35.0	5.5	20.5
Green Extension Time (g_e), s	0.0	0.3	0.0	0.2	0.1	0.0	0.1	2.4
Phase Call Probability	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Max Out Probability	0.00	0.02	0.24	0.70	0.68	1.00	0.61	0.09

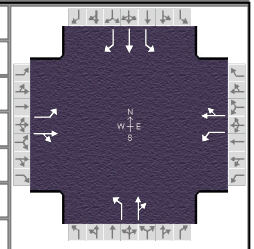
Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	7	4	14	3	8	18	5	2	12	1	6	16
Adjusted Flow Rate (*v*), veh/h	16	72		79	150		138	645		135	499	121
Adjusted Saturation Flow Rate (*s*), veh/h/ln	1810	1701		1810	1669		1810	1859		1810	1900	1610
Queue Service Time (g_s), s	0.6	3.1		2.9	7.1		3.6	27.6		3.5	18.5	3.5
Cycle Queue Clearance Time (g_c), s	0.6	3.1		2.9	7.1		3.6	27.6		3.5	18.5	3.5
Green Ratio (*g/C*)	0.26	0.17		0.26	0.15		0.49	0.39		0.49	0.39	0.49
Capacity (*c*), veh/h	360	296		430	251		410	722		276	738	796
Volume-to-Capacity Ratio (*X*)	0.045	0.242		0.184	0.597		0.336	0.893		0.488	0.676	0.152
Back of Queue (*Q*), ft/ln (95 th percentile)	10.7	55.9		54.1	134.3		59.9	497.6		59.2	318.6	52.1
Back of Queue (*Q*), veh/ln (95 th percentile)	0.4	2.2		2.2	5.4		2.4	19.9		2.4	12.7	2.1
Queue Storage Ratio (*RQ*) (95 th percentile)	0.08	0.28		0.31	0.22		0.50	0.50		0.39	0.57	0.61
Uniform Delay (d_1), s/veh	24.0	30.3		24.6	33.7		14.7	24.3		18.2	21.6	11.8
Incremental Delay (d_2), s/veh	0.0	0.2		0.1	2.7		0.2	13.2		0.5	2.0	0.0
Initial Queue Delay (d_3), s/veh	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Control Delay (*d*), s/veh	24.0	30.4		24.7	36.4		14.9	37.5		18.7	23.6	11.8
Level of Service (LOS)	C	C		C	D		B	D		B	C	B
Approach Delay, s/veh / LOS	29.2	C		32.3	C		33.5	C		20.8	C	
Intersection Delay, s/veh / LOS	28.0						C					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	1.93	B	2.13	B	1.91	B	1.91	B
Bicycle LOS Score / LOS	0.63	A	0.87	A	1.78	B	1.73	B

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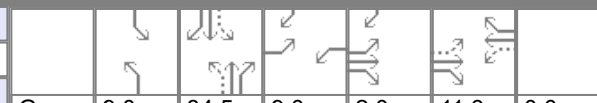
HCS7 Signalized Intersection Results Summary

General Information				Intersection Information	
Agency	SHA			Duration, h	0.250
Analyst	JA	Analysis Date	May 4, 2022	Area Type	Other
Jurisdiction	City of Blue Ash	Time Period	AM Peak	PHF	0.92
Urban Street	Kenwood Road	Analysis Year	2035 Build	Analysis Period	1> 7:00
Intersection	Kenwood at Malsbury	File Name	4-4-AM-2035-Build-Kenwood-Malsbury.xus		
Project Description	Blue Ash Mixed Use Development				

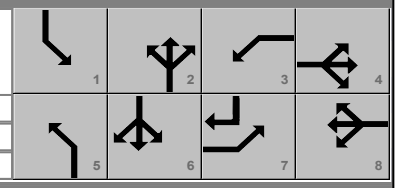


Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	17	25	45	81	35	117	139	570	81	137	503	123

Signal Information			
Cycle, s	85.0	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	Yes	Simult. Gap E/W	On
Force Mode	Fixed	Simult. Gap N/S	On



Green	9.0	34.5	9.0	2.0	11.3	0.0
Yellow	3.0	3.6	3.0	0.0	3.6	0.0
Red	2.0	2.0	0.0	0.0	2.0	0.0



Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase	7	4	3	8	5	2	1	6
Case Number	1.1	4.0	1.1	4.0	1.1	4.0	1.1	3.0
Phase Duration, s	14.0	18.9	12.0	16.9	14.0	40.1	14.0	40.1
Change Period, ($Y+R_c$), s	5.0	5.6	3.0	5.6	5.0	5.6	5.0	5.6
Max Allow Headway (*MAH*), s	3.1	3.3	3.1	3.3	3.1	3.1	3.1	3.1
Queue Clearance Time (g_s), s	2.7	5.4	5.3	10.1	5.8	36.5	5.7	22.4
Green Extension Time (g_e), s	0.0	0.3	0.0	0.1	0.1	0.0	0.1	2.7
Phase Call Probability	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Max Out Probability	0.00	0.10	0.45	1.00	0.90	1.00	0.84	0.13

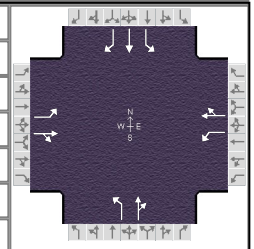
Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	7	4	14	3	8	18	5	2	12	1	6	16
Adjusted Flow Rate (*v*), veh/h	18	76		88	165		151	708		149	547	134
Adjusted Saturation Flow Rate (*s*), veh/h/ln	1810	1703		1810	1669		1810	1858		1810	1900	1610
Queue Service Time (g_s), s	0.7	3.4		3.3	8.1		3.8	31.1		3.7	20.4	3.8
Cycle Queue Clearance Time (g_c), s	0.7	3.4		3.3	8.1		3.8	31.1		3.7	20.4	3.8
Green Ratio (*g/C*)	0.24	0.16		0.24	0.13		0.51	0.41		0.51	0.41	0.51
Capacity (*c*), veh/h	323	266		402	222		401	754		276	771	824
Volume-to-Capacity Ratio (*X*)	0.057	0.286		0.219	0.745		0.377	0.938		0.539	0.709	0.162
Back of Queue (*Q*), ft/ln (95 th percentile)	12.5	61		62.1	175		63	577.6		64.8	345.6	55.5
Back of Queue (*Q*), veh/ln (95 th percentile)	0.5	2.4		2.5	7.0		2.5	23.1		2.6	13.8	2.2
Queue Storage Ratio (*RQ*) (95 th percentile)	0.09	0.31		0.36	0.29		0.53	0.58		0.43	0.62	0.65
Uniform Delay (d_1), s/veh	25.3	31.7		26.0	35.5		14.6	24.2		18.0	21.1	11.0
Incremental Delay (d_2), s/veh	0.0	0.2		0.1	11.4		0.2	19.0		1.2	2.6	0.0
Initial Queue Delay (d_3), s/veh	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Control Delay (*d*), s/veh	25.3	31.9		26.1	46.9		14.8	43.3		19.2	23.7	11.1
Level of Service (LOS)	C	C		C	D		B	D		B	C	B
Approach Delay, s/veh / LOS	30.6	C		39.6	D		38.3	D		20.8	C	
Intersection Delay, s/veh / LOS	31.0						C					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	1.93	B	2.13	B	1.91	B	1.91	B
Bicycle LOS Score / LOS	0.64	A	0.91	A	1.90	B	1.86	B

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HCS7 Signalized Intersection Results Summary

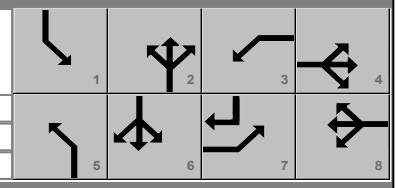
General Information				Intersection Information	
Agency	SHA			Duration, h	0.250
Analyst	JA	Analysis Date	May 4, 2022	Area Type	Other
Jurisdiction	City of Blue Ash	Time Period	PM Peak	PHF	0.92
Urban Street	Kenwood Road	Analysis Year	2025 No Build	Analysis Period	1> 7:00
Intersection	Kenwood at Malsbury	File Name	4-5-PM-2025-No-Build-Kenwood-Malsbury.xus		
Project Description	Blue Ash Mixed Use Development				



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	86	4	127	14	2	26	30	682	18	28	611	29

Signal Information			
Cycle, s	100.0	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	Yes	Simult. Gap E/W	On
Force Mode	Fixed	Simult. Gap N/S	On

Green	9.0	45.3	9.0	2.0	15.5	0.0						
Yellow	3.0	3.6	3.0	0.0	3.6	0.0						
Red	2.0	2.0	0.0	0.0	2.0	0.0						



Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase	7	4	3	8	5	2	1	6
Case Number	1.1	4.0	1.1	4.0	1.1	4.0	1.1	3.0
Phase Duration, s	14.0	23.1	12.0	21.1	14.0	50.9	14.0	50.9
Change Period, ($Y+R_c$), s	5.0	5.6	3.0	5.6	5.0	5.6	5.0	5.6
Max Allow Headway (*MAH*), s	3.1	3.4	3.1	3.4	3.1	3.0	3.1	3.0
Queue Clearance Time (g_s), s	6.1	10.0	2.6	3.6	2.8	47.3	2.8	31.4
Green Extension Time (g_e), s	0.0	0.2	0.0	0.3	0.0	0.0	0.0	3.0
Phase Call Probability	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Max Out Probability	1.00	0.12	0.00	0.00	0.00	1.00	0.00	0.10

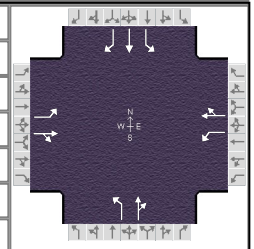
Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	7	4	14	3	8	18	5	2	12	1	6	16
Adjusted Flow Rate (*v*), veh/h	93	142		15	30		33	761		30	664	32
Adjusted Saturation Flow Rate (*s*), veh/h/ln	1810	1618		1810	1628		1810	1891		1810	1900	1610
Queue Service Time (g_s), s	4.1	8.0		0.6	1.6		0.8	36.8		0.8	29.4	0.9
Cycle Queue Clearance Time (g_c), s	4.1	8.0		0.6	1.6		0.8	36.8		0.8	29.4	0.9
Green Ratio (*g/C*)	0.24	0.17		0.24	0.16		0.54	0.45		0.54	0.45	0.54
Capacity (*c*), veh/h	429	283		330	252		344	857		235	861	874
Volume-to-Capacity Ratio (*X*)	0.218	0.503		0.046	0.121		0.095	0.888		0.130	0.772	0.036
Back of Queue (*Q*), ft/ln (95 th percentile)	79.5	141.1		12.4	28.6		14.5	622.6		31.1	481	13.9
Back of Queue (*Q*), veh/ln (95 th percentile)	3.2	5.6		0.5	1.1		0.6	24.9		1.2	19.2	0.6
Queue Storage Ratio (*RQ*) (95 th percentile)	0.57	0.71		0.07	0.05		0.12	0.62		0.21	0.86	0.16
Uniform Delay (d_1), s/veh	30.1	37.3		29.1	36.4		15.8	25.0		20.9	23.0	10.7
Incremental Delay (d_2), s/veh	0.1	0.5		0.0	0.1		0.0	10.9		0.1	3.9	0.0
Initial Queue Delay (d_3), s/veh	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Control Delay (*d*), s/veh	30.2	37.9		29.1	36.5		15.8	35.9		21.0	26.9	10.7
Level of Service (LOS)	C	D		C	D		B	D		C	C	B
Approach Delay, s/veh / LOS	34.8	C		34.0	C		35.1	D		26.0	C	
Intersection Delay, s/veh / LOS	31.4						C					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	1.94	B	2.13	B	1.91	B	1.91	B
Bicycle LOS Score / LOS	0.88	A	0.56	A	1.80	B	1.69	B

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HCS7 Signalized Intersection Results Summary

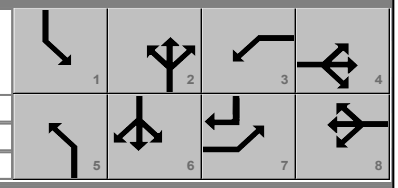
General Information				Intersection Information	
Agency	SHA			Duration, h	0.250
Analyst	JA	Analysis Date	May 4, 2022	Area Type	Other
Jurisdiction	City of Blue Ash	Time Period	PM Peak	PHF	0.92
Urban Street	Kenwood Road	Analysis Year	2035 No Build	Analysis Period	1> 7:00
Intersection	Kenwood at Malsbury	File Name	4-6-PM-2035-No-Build-Kenwood-Malsbury.xus		
Project Description	Blue Ash Mixed Use Development				



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	94	5	140	16	2	28	33	753	19	31	675	32

Signal Information			
Cycle, s	100.0	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	Yes	Simult. Gap E/W	On
Force Mode	Fixed	Simult. Gap N/S	On

Green	9.0	48.3	9.0	2.0	12.5	0.0						
Yellow	3.0	3.6	3.0	0.0	3.6	0.0						
Red	2.0	2.0	0.0	0.0	2.0	0.0						



Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase	7	4	3	8	5	2	1	6
Case Number	1.1	4.0	1.1	4.0	1.1	4.0	1.1	3.0
Phase Duration, s	14.0	20.1	12.0	18.1	14.0	53.9	14.0	53.9
Change Period, ($Y+R_c$), s	5.0	5.6	3.0	5.6	5.0	5.6	5.0	5.6
Max Allow Headway (*MAH*), s	3.1	3.4	3.1	3.4	3.1	3.0	3.1	3.0
Queue Clearance Time (g_s), s	6.7	11.2	2.8	3.8	2.9	50.3	2.8	34.5
Green Extension Time (g_e), s	0.0	0.1	0.0	0.2	0.0	0.0	0.0	3.4
Phase Call Probability	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Max Out Probability	1.00	1.00	0.00	0.01	0.00	1.00	0.00	0.14

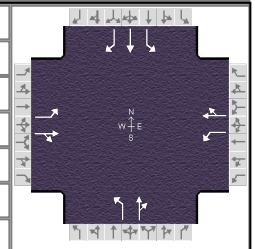
Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	7	4	14	3	8	18	5	2	12	1	6	16
Adjusted Flow Rate (*v*), veh/h	102	158		17	33		36	839		34	734	35
Adjusted Saturation Flow Rate (*s*), veh/h/ln	1810	1619		1810	1627		1810	1892		1810	1900	1610
Queue Service Time (g_s), s	4.7	9.2		0.8	1.8		0.9	41.2		0.8	32.5	0.9
Cycle Queue Clearance Time (g_c), s	4.7	9.2		0.8	1.8		0.9	41.2		0.8	32.5	0.9
Green Ratio (*g/C*)	0.22	0.14		0.22	0.13		0.57	0.48		0.57	0.48	0.57
Capacity (*c*), veh/h	385	235		276	203		336	914		235	918	923
Volume-to-Capacity Ratio (*X*)	0.266	0.671		0.063	0.160		0.107	0.918		0.143	0.799	0.038
Back of Queue (*Q*), ft/ln (95 th percentile)	91.6	179.8		14.9	32.1		14.6	696		34.5	522.5	14
Back of Queue (*Q*), veh/ln (95 th percentile)	3.7	7.2		0.6	1.3		0.6	27.8		1.4	20.9	0.6
Queue Storage Ratio (*RQ*) (95 th percentile)	0.65	0.90		0.08	0.05		0.12	0.70		0.23	0.93	0.16
Uniform Delay (d_1), s/veh	32.7	40.5		31.5	39.1		15.6	24.0		21.0	21.8	9.3
Incremental Delay (d_2), s/veh	0.1	6.0		0.0	0.1		0.1	13.7		0.1	4.7	0.0
Initial Queue Delay (d_3), s/veh	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Control Delay (*d*), s/veh	32.8	46.5		31.6	39.2		15.6	37.7		21.1	26.5	9.3
Level of Service (LOS)	C	D		C	D		B	D		C	C	A
Approach Delay, s/veh / LOS	41.1	D		36.5	D		36.8	D		25.5	C	
Intersection Delay, s/veh / LOS	32.8						C					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	1.94	B	2.13	B	1.90	B	1.90	B
Bicycle LOS Score / LOS	0.92	A	0.57	A	1.93	B	1.81	B

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HCS7 Signalized Intersection Results Summary

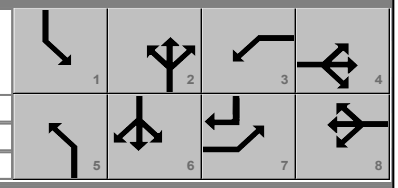
General Information				Intersection Information	
Agency	SHA			Duration, h	0.250
Analyst	JA	Analysis Date	May 4, 2022	Area Type	Other
Jurisdiction	City of Blue Ash	Time Period	PM Peak	PHF	0.92
Urban Street	Kenwood Road	Analysis Year	2025 Build	Analysis Period	1> 7:00
Intersection	Kenwood at Malsbury	File Name	4-7-PM-2025-Build-Kenwood-Malsbury.xus		
Project Description	Blue Ash Mixed Use Development				



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	86	4	152	14	2	26	50	736	18	28	675	29

Signal Information			
Cycle, s	100.0	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	Yes	Simult. Gap E/W	On
Force Mode	Fixed	Simult. Gap N/S	On

Green	9.0	46.8	9.0	2.0	14.0	0.0
Yellow	3.0	3.6	3.0	0.0	3.6	0.0
Red	2.0	2.0	0.0	0.0	2.0	0.0



Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase	7	4	3	8	5	2	1	6
Case Number	1.1	4.0	1.1	4.0	1.1	4.0	1.1	3.0
Phase Duration, s	14.0	21.6	12.0	19.6	14.0	52.4	14.0	52.4
Change Period, ($Y+R_c$), s	5.0	5.6	3.0	5.6	5.0	5.6	5.0	5.6
Max Allow Headway (*MAH*), s	3.1	3.4	3.1	3.4	3.1	3.0	3.1	3.0
Queue Clearance Time (g_s), s	6.2	11.8	2.7	3.6	3.4	48.8	2.8	35.5
Green Extension Time (g_e), s	0.0	0.1	0.0	0.3	0.0	0.0	0.0	3.1
Phase Call Probability	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Max Out Probability	1.00	1.00	0.00	0.00	0.02	1.00	0.00	0.21

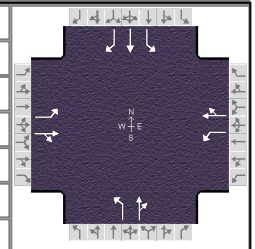
Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	7	4	14	3	8	18	5	2	12	1	6	16
Adjusted Flow Rate (*v*), veh/h	93	170		15	30		54	820		30	734	32
Adjusted Saturation Flow Rate (*s*), veh/h/ln	1810	1616		1810	1628		1810	1892		1810	1900	1610
Queue Service Time (g_s), s	4.2	9.8		0.7	1.6		1.4	40.7		0.8	33.5	0.9
Cycle Queue Clearance Time (g_c), s	4.2	9.8		0.7	1.6		1.4	40.7		0.8	33.5	0.9
Green Ratio (*g/C*)	0.23	0.16		0.23	0.14		0.56	0.47		0.56	0.47	0.56
Capacity (*c*), veh/h	408	259		286	228		318	885		235	889	898
Volume-to-Capacity Ratio (*X*)	0.229	0.656		0.053	0.134		0.171	0.926		0.130	0.825	0.035
Back of Queue (*Q*), ft/ln (95 th percentile)	81.4	187.8		12.7	29.3		23.4	700.3		31.1	546.7	13.3
Back of Queue (*Q*), veh/ln (95 th percentile)	3.3	7.5		0.5	1.2		0.9	28.0		1.2	21.9	0.5
Queue Storage Ratio (*RQ*) (95 th percentile)	0.58	0.94		0.07	0.05		0.20	0.70		0.21	0.98	0.16
Uniform Delay (d_1), s/veh	31.3	39.4		30.4	37.7		16.9	25.0		20.9	23.1	10.0
Incremental Delay (d_2), s/veh	0.1	4.7		0.0	0.1		0.1	15.1		0.1	6.0	0.0
Initial Queue Delay (d_3), s/veh	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Control Delay (*d*), s/veh	31.4	44.1		30.4	37.8		17.0	40.0		21.0	29.1	10.0
Level of Service (LOS)	C	D		C	D		B	D		C	C	A
Approach Delay, s/veh / LOS	39.6	D		35.3	D		38.6	D		28.0	C	
Intersection Delay, s/veh / LOS	34.4						C					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	1.94	B	2.13	B	1.90	B	1.90	B
Bicycle LOS Score / LOS	0.92	A	0.56	A	1.93	B	1.80	B

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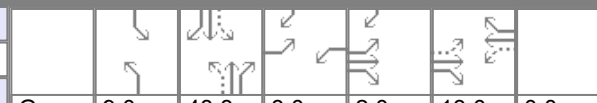
HCS7 Signalized Intersection Results Summary

General Information				Intersection Information	
Agency	SHA			Duration, h	0.250
Analyst	JA	Analysis Date	May 4, 2022	Area Type	Other
Jurisdiction	City of Blue Ash	Time Period	PM Peak	PHF	0.92
Urban Street	Kenwood Road	Analysis Year	2035 Build	Analysis Period	1> 7:00
Intersection	Kenwood at Malsbury	File Name	4-8-PM-2035-Build-Kenwood-Malsbury.xus		
Project Description	Blue Ash Mixed Use Development				

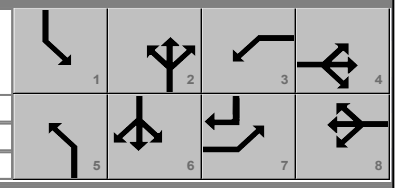


Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	94	5	165	16	2	28	53	807	19	31	739	32

Signal Information			
Cycle, s	100.0	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	Yes	Simult. Gap E/W	On
Force Mode	Fixed	Simult. Gap N/S	On



Green	9.0	48.8	8.0	2.0	13.0	0.0
Yellow	3.0	3.6	3.0	0.0	3.6	0.0
Red	2.0	2.0	0.0	0.0	2.0	0.0



Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase	7	4	3	8	5	2	1	6
Case Number	1.1	4.0	1.1	4.0	1.1	4.0	1.1	3.0
Phase Duration, s	13.0	20.6	11.0	18.6	14.0	54.4	14.0	54.4
Change Period, ($Y+R_c$), s	5.0	5.6	3.0	5.6	5.0	5.6	5.0	5.6
Max Allow Headway (*MAH*), s	3.1	3.4	3.1	3.4	3.1	3.0	3.1	3.0
Queue Clearance Time (g_s), s	6.7	13.0	2.8	3.8	3.4	50.8	2.8	39.5
Green Extension Time (g_e), s	0.0	0.0	0.0	0.3	0.0	0.0	0.0	0.2
Phase Call Probability	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Max Out Probability	1.00	1.00	0.01	0.01	0.02	1.00	0.00	1.00

Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	7	4	14	3	8	18	5	2	12	1	6	16
Adjusted Flow Rate (*v*), veh/h	102	185		17	33		58	898		34	803	35
Adjusted Saturation Flow Rate (*s*), veh/h/ln	1810	1617		1810	1627		1810	1892		1810	1900	1610
Queue Service Time (g_s), s	4.7	11.0		0.8	1.8		1.4	46.2		0.8	37.5	1.0
Cycle Queue Clearance Time (g_c), s	4.7	11.0		0.8	1.8		1.4	46.2		0.8	37.5	1.0
Green Ratio (*g/C*)	0.21	0.15		0.21	0.13		0.58	0.49		0.58	0.49	0.57
Capacity (*c*), veh/h	374	243		242	211		299	923		235	927	915
Volume-to-Capacity Ratio (*X*)	0.273	0.762		0.072	0.154		0.193	0.972		0.143	0.866	0.038
Back of Queue (*Q*), ft/ln (95 th percentile)	92.3	219.7		15	31.8		23.4	825.7		16.1	613	14.3
Back of Queue (*Q*), veh/ln (95 th percentile)	3.7	8.8		0.6	1.3		0.9	33.0		0.6	24.5	0.6
Queue Storage Ratio (*RQ*) (95 th percentile)	0.66	1.10		0.09	0.05		0.20	0.83		0.11	1.09	0.17
Uniform Delay (d_1), s/veh	33.1	40.8		32.1	38.6		17.7	24.9		21.0	22.7	9.5
Incremental Delay (d_2), s/veh	0.1	12.0		0.0	0.1		0.1	22.9		0.1	8.3	0.0
Initial Queue Delay (d_3), s/veh	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Control Delay (*d*), s/veh	33.2	52.8		32.2	38.7		17.8	47.8		21.1	31.0	9.5
Level of Service (LOS)	C	D		C	D		B	D		C	C	A
Approach Delay, s/veh / LOS	45.8	D		36.5	D		46.0	D		29.8	C	
Intersection Delay, s/veh / LOS	39.2						D					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	1.94	B	2.13	B	1.90	B	1.90	B
Bicycle LOS Score / LOS	0.96	A	0.57	A	2.06	B	1.93	B

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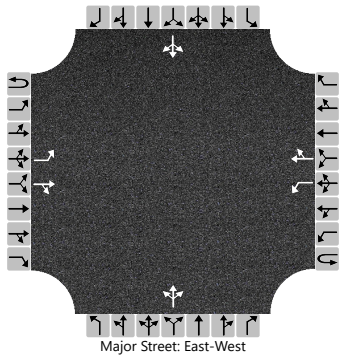
General Information

Analyst	JA
Agency/Co.	SHA Engineering
Date Performed	5/5/2022
Analysis Year	2025
Time Analyzed	AM Peak -No Build
Intersection Orientation	East-West
Project Description	Mixed use Development

Site Information

Intersection	Cooper at Monroe
Jurisdiction	City of Blue Ash
East/West Street	Cooper Road
North/South Street	Monroe/Wynnecrest
Peak Hour Factor	0.92
Analysis Time Period (hrs)	0.25

Lanes



Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority	1U	1	2	3	4U	4	5	6		7	8	9		10	11	12
Number of Lanes	0	1	1	0	0	1	1	0		0	1	0		0	1	0
Configuration		L		TR		L		TR			LTR				LTR	
Volume (veh/h)		8	241	2		5	328	13		10	1	8		13	2	15
Percent Heavy Vehicles (%)		3				3				3	3	3		3	3	3
Proportion Time Blocked																
Percent Grade (%)										0				0		
Right Turn Channelized																
Median Type | Storage		Undivided														

Critical and Follow-up Headways

Base Critical Headway (sec)		4.1				4.1				7.1	6.5	6.2		7.1	6.5	6.2
Critical Headway (sec)		4.13				4.13				7.13	6.53	6.23		7.13	6.53	6.23
Base Follow-Up Headway (sec)		2.2				2.2				3.5	4.0	3.3		3.5	4.0	3.3
Follow-Up Headway (sec)		2.23				2.23				3.53	4.03	3.33		3.53	4.03	3.33

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)		9				5					21				33	
Capacity, c (veh/h)		1182				1294					465				478	
v/c Ratio		0.01				0.00					0.04				0.07	
95% Queue Length, Q_{95} (veh)		0.0				0.0					0.1				0.2	
Control Delay (s/veh)		8.1				7.8					13.1				13.1	
Level of Service (LOS)		A				A					B				B	
Approach Delay (s/veh)	0.3				0.1				13.1				13.1			
Approach LOS									B				B			

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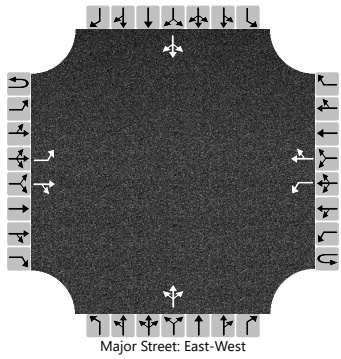
General Information

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Agency/Co.	SHA Engineering
Date Performed	5/5/2022
Analysis Year	2035
Time Analyzed	AM Peak -No Build
Intersection Orientation	East-West
Project Description	Mixed use Development

Site Information

Intersection	Cooper at Monroe
Jurisdiction	City of Blue Ash
East/West Street	Cooper Road
North/South Street	Monroe/Wynnecrest
Peak Hour Factor	0.92
Analysis Time Period (hrs)	0.25

Lanes



Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority	1U	1	2	3	4U	4	5	6		7	8	9		10	11	12
Number of Lanes	0	1	1	0	0	1	1	0		0	1	0		0	1	0
Configuration		L		TR		L		TR			LTR				LTR	
Volume (veh/h)		9	266	2		6	362	15		11	1	9		15	2	17
Percent Heavy Vehicles (%)		3				3				3	3	3		3	3	3
Proportion Time Blocked																
Percent Grade (%)										0				0		
Right Turn Channelized																
Median Type | Storage		Undivided														

Critical and Follow-up Headways

Base Critical Headway (sec)		4.1				4.1				7.1	6.5	6.2		7.1	6.5	6.2
Critical Headway (sec)		4.13				4.13				7.13	6.53	6.23		7.13	6.53	6.23
Base Follow-Up Headway (sec)		2.2				2.2				3.5	4.0	3.3		3.5	4.0	3.3
Follow-Up Headway (sec)		2.23				2.23				3.53	4.03	3.33		3.53	4.03	3.33

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)		10				7					23				37	
Capacity, c (veh/h)		1144				1265					425				437	
v/c Ratio		0.01				0.01					0.05				0.08	
95% Queue Length, Q_{95} (veh)		0.0				0.0					0.2				0.3	
Control Delay (s/veh)		8.2				7.9					13.9				14.0	
Level of Service (LOS)		A				A					B				B	
Approach Delay (s/veh)	0.3				0.1				13.9				14.0			
Approach LOS									B				B			

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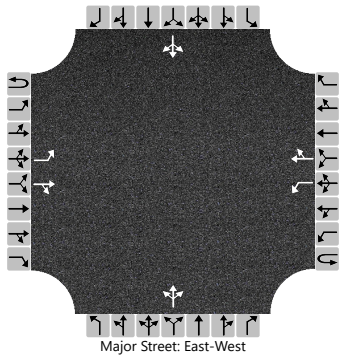
General Information

Analyst	JA
Agency/Co.	SHA Engineering
Date Performed	5/5/2022
Analysis Year	2025
Time Analyzed	AM Peak -Build
Intersection Orientation	East-West
Project Description	Mixed use Development

Site Information

Intersection	Cooper at Monroe
Jurisdiction	City of Blue Ash
East/West Street	Cooper Road
North/South Street	Monroe/Wynnecrest
Peak Hour Factor	0.92
Analysis Time Period (hrs)	0.25

Lanes



Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority	1U	1	2	3	4U	4	5	6		7	8	9		10	11	12
Number of Lanes	0	1	1	0	0	1	1	0		0	1	0		0	1	0
Configuration		L		TR		L		TR			LTR				LTR	
Volume (veh/h)		8	257	2		5	346	22		10	1	8		21	2	15
Percent Heavy Vehicles (%)		3				3				3	3	3		3	3	3
Proportion Time Blocked																
Percent Grade (%)										0				0		
Right Turn Channelized																
Median Type | Storage			Undivided													

Critical and Follow-up Headways

Base Critical Headway (sec)		4.1				4.1				7.1	6.5	6.2		7.1	6.5	6.2
Critical Headway (sec)		4.13				4.13				7.13	6.53	6.23		7.13	6.53	6.23
Base Follow-Up Headway (sec)		2.2				2.2				3.5	4.0	3.3		3.5	4.0	3.3
Follow-Up Headway (sec)		2.23				2.23				3.53	4.03	3.33		3.53	4.03	3.33

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)		9				5					21				41	
Capacity, c (veh/h)		1153				1275					440				425	
v/c Ratio		0.01				0.00					0.05				0.10	
95% Queue Length, Q_{95} (veh)		0.0				0.0					0.1				0.3	
Control Delay (s/veh)		8.1				7.8					13.6				14.4	
Level of Service (LOS)		A				A					B				B	
Approach Delay (s/veh)		0.2				0.1				13.6				14.4		
Approach LOS										B				B		

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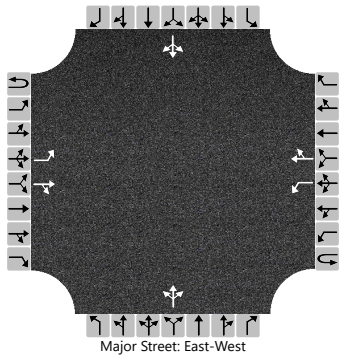
General Information

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Agency/Co.	SHA Engineering
Date Performed	5/5/2022
Analysis Year	2035
Time Analyzed	AM Peak -Build
Intersection Orientation	East-West
Project Description	Mixed use Development

Site Information

Intersection	Cooper at Monroe
Jurisdiction	City of Blue Ash
East/West Street	Cooper Road
North/South Street	Monroe/Wynnecrest
Peak Hour Factor	0.92
Analysis Time Period (hrs)	0.25

Lanes



Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority	1U	1	2	3	4U	4	5	6		7	8	9		10	11	12
Number of Lanes	0	1	1	0	0	1	1	0		0	1	0		0	1	0
Configuration		L		TR		L		TR			LTR				LTR	
Volume (veh/h)		9	282	2		6	380	24		11	1	9		23	2	17
Percent Heavy Vehicles (%)		3				3				3	3	3		3	3	3
Proportion Time Blocked																
Percent Grade (%)										0				0		
Right Turn Channelized																
Median Type | Storage		Undivided														

Critical and Follow-up Headways

Base Critical Headway (sec)		4.1				4.1				7.1	6.5	6.2		7.1	6.5	6.2
Critical Headway (sec)		4.13				4.13				7.13	6.53	6.23		7.13	6.53	6.23
Base Follow-Up Headway (sec)		2.2				2.2				3.5	4.0	3.3		3.5	4.0	3.3
Follow-Up Headway (sec)		2.23				2.23				3.53	4.03	3.33		3.53	4.03	3.33

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)		10				7					23				46	
Capacity, c (veh/h)		1115				1246					402				388	
v/c Ratio		0.01				0.01					0.06				0.12	
95% Queue Length, Q_{95} (veh)		0.0				0.0					0.2				0.4	
Control Delay (s/veh)		8.3				7.9					14.5				15.5	
Level of Service (LOS)		A				A					B				C	
Approach Delay (s/veh)	0.3				0.1				14.5				15.5			
Approach LOS									B				C			

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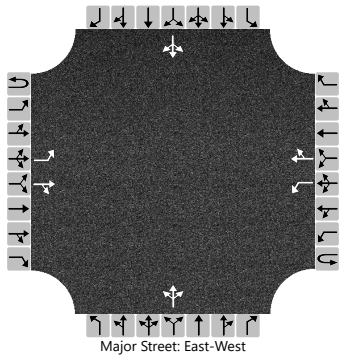
General Information

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Agency/Co.	SHA Engineering
Date Performed	5/5/2022
Analysis Year	2025
Time Analyzed	PM Peak -No Build
Intersection Orientation	East-West
Project Description	Mixed use Development

Site Information

Intersection	Cooper at Monroe
Jurisdiction	City of Blue Ash
East/West Street	Cooper Road
North/South Street	Monroe/Wynnecrest
Peak Hour Factor	0.92
Analysis Time Period (hrs)	0.25

Lanes



Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority	1U	1	2	3	4U	4	5	6		7	8	9		10	11	12
Number of Lanes	0	1	1	0	0	1	1	0		0	1	0		0	1	0
Configuration		L		TR		L		TR			LTR				LTR	
Volume (veh/h)		24	503	12		3	359	15		6	0	2		17	2	38
Percent Heavy Vehicles (%)		3				3				3	3	3		3	3	3
Proportion Time Blocked																
Percent Grade (%)										0				0		
Right Turn Channelized																
Median Type | Storage		Undivided														

Critical and Follow-up Headways

Base Critical Headway (sec)		4.1				4.1				7.1	6.5	6.2		7.1	6.5	6.2
Critical Headway (sec)		4.13				4.13				7.13	6.53	6.23		7.13	6.53	6.23
Base Follow-Up Headway (sec)		2.2				2.2				3.5	4.0	3.3		3.5	4.0	3.3
Follow-Up Headway (sec)		2.23				2.23				3.53	4.03	3.33		3.53	4.03	3.33

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)		26				3					9				62	
Capacity, c (veh/h)		1147				1006					228				387	
v/c Ratio		0.02				0.00					0.04				0.16	
95% Queue Length, Q_{95} (veh)		0.1				0.0					0.1				0.6	
Control Delay (s/veh)		8.2				8.6					21.4				16.1	
Level of Service (LOS)		A				A					C				C	
Approach Delay (s/veh)	0.4				0.1				21.4				16.1			
Approach LOS									C				C			

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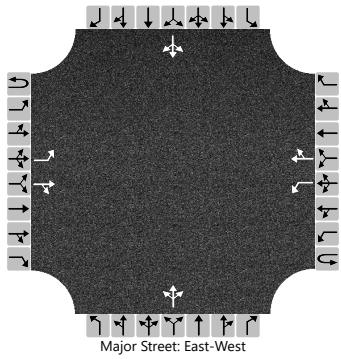
General Information

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Agency/Co.	SHA Engineering
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Analysis Year	2035
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Intersection Orientation	East-West
Project Description	Mixed use Development

Site Information

Intersection	Cooper at Monroe
Jurisdiction	City of Blue Ash
East/West Street	Cooper Road
North/South Street	Monroe/Wynnecrest
Peak Hour Factor	0.92
Analysis Time Period (hrs)	0.25

Lanes



Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority	1U	1	2	3	4U	4	5	6		7	8	9		10	11	12
Number of Lanes	0	1	1	0	0	1	1	0		0	1	0		0	1	0
Configuration		L		TR		L		TR			LTR				LTR	
Volume (veh/h)		26	555	14		3	396	17		6	0	2		17	0	38
Percent Heavy Vehicles (%)		3				3				3	3	3		3	3	3
Proportion Time Blocked																
Percent Grade (%)										0				0		
Right Turn Channelized																
Median Type | Storage		Undivided														

Critical and Follow-up Headways

Base Critical Headway (sec)		4.1				4.1				7.1	6.5	6.2		7.1	6.5	6.2
Critical Headway (sec)		4.13				4.13				7.13	6.53	6.23		7.13	6.53	6.23
Base Follow-Up Headway (sec)		2.2				2.2				3.5	4.0	3.3		3.5	4.0	3.3
Follow-Up Headway (sec)		2.23				2.23				3.53	4.03	3.33		3.53	4.03	3.33

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)		28				3					9				60	
Capacity, c (veh/h)		1106				957					196				352	
v/c Ratio		0.03				0.00					0.04				0.17	
95% Queue Length, Q_{95} (veh)		0.1				0.0					0.1				0.6	
Control Delay (s/veh)		8.3				8.8					24.2				17.3	
Level of Service (LOS)		A				A					C				C	
Approach Delay (s/veh)	0.4				0.1				24.2				17.3			
Approach LOS									C				C			

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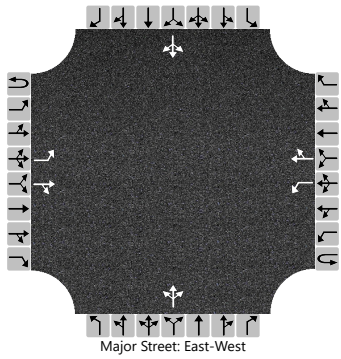
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Site Information

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Jurisdiction	City of Blue Ash
East/West Street	Cooper Road
North/South Street	Monroe/Wynnecrest
Peak Hour Factor	0.92
Analysis Time Period (hrs)	0.25

Lanes



Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority	1U	1	2	3	4U	4	5	6		7	8	9		10	11	12
Number of Lanes	0	1	1	0	0	1	1	0		0	1	0		0	1	0
Configuration		L		TR		L		TR			LTR				LTR	
Volume (veh/h)		24	525	12		3	385	28		5	0	2		26	0	34
Percent Heavy Vehicles (%)		3				3				3	3	3		3	3	3
Proportion Time Blocked																
Percent Grade (%)										0				0		
Right Turn Channelized																
Median Type | Storage		Undivided														

Critical and Follow-up Headways

Base Critical Headway (sec)		4.1				4.1				7.1	6.5	6.2		7.1	6.5	6.2
Critical Headway (sec)		4.13				4.13				7.13	6.53	6.23		7.13	6.53	6.23
Base Follow-Up Headway (sec)		2.2				2.2				3.5	4.0	3.3		3.5	4.0	3.3
Follow-Up Headway (sec)		2.23				2.23				3.53	4.03	3.33		3.53	4.03	3.33

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)		26				3					8				65	
Capacity, c (veh/h)		1106				986					218				316	
v/c Ratio		0.02				0.00					0.03				0.21	
95% Queue Length, Q_{95} (veh)		0.1				0.0					0.1				0.8	
Control Delay (s/veh)		8.3				8.7					22.1				19.3	
Level of Service (LOS)		A				A					C				C	
Approach Delay (s/veh)	0.4				0.1				22.1				19.3			
Approach LOS									C				C			

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HCS7 Two-Way Stop-Control Report

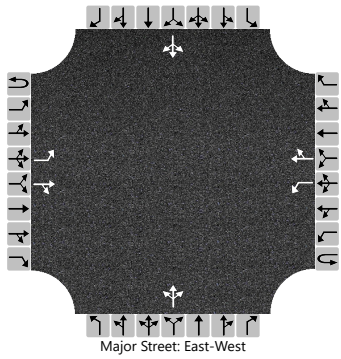
General Information

Analyst	JA
Agency/Co.	SHA Engineering
Date Performed	5/5/2022
Analysis Year	2035
Time Analyzed	PM Peak - Build
Intersection Orientation	East-West
Project Description	Mixed use Development

Site Information

Intersection	Cooper at Monroe
Jurisdiction	City of Blue Ash
East/West Street	Cooper Road
North/South Street	Monroe/Wynnecrest
Peak Hour Factor	0.92
Analysis Time Period (hrs)	0.25

Lanes



Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority	1U	1	2	3	4U	4	5	6		7	8	9		10	11	12
Number of Lanes	0	1	1	0	0	1	1	0		0	1	0		0	1	0
Configuration		L		TR		L		TR			LTR				LTR	
Volume (veh/h)		26	577	14		3	422	30		6	0	2		28	0	38
Percent Heavy Vehicles (%)		3				3				3	3	3		3	3	3
Proportion Time Blocked																
Percent Grade (%)										0				0		
Right Turn Channelized																
Median Type | Storage			Undivided													

Critical and Follow-up Headways

Base Critical Headway (sec)		4.1				4.1				7.1	6.5	6.2		7.1	6.5	6.2
Critical Headway (sec)		4.13				4.13				7.13	6.53	6.23		7.13	6.53	6.23
Base Follow-Up Headway (sec)		2.2				2.2				3.5	4.0	3.3		3.5	4.0	3.3
Follow-Up Headway (sec)		2.23				2.23				3.53	4.03	3.33		3.53	4.03	3.33

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)		28				3					9				72	
Capacity, c (veh/h)		1067				937					179				280	
v/c Ratio		0.03				0.00					0.05				0.26	
95% Queue Length, Q_{95} (veh)		0.1				0.0					0.2				1.0	
Control Delay (s/veh)		8.5				8.9					26.2				22.3	
Level of Service (LOS)		A				A					D				C	
Approach Delay (s/veh)		0.4				0.1				26.2				22.3		
Approach LOS										D				C		

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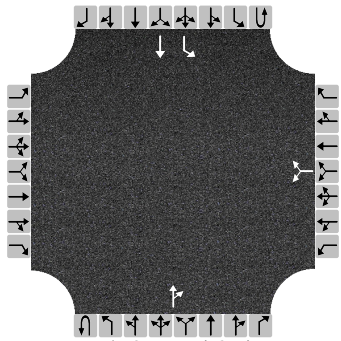
General Information

Analyst	JA
Agency/Co.	SHA Engineering
Date Performed	5/5/2022
Analysis Year	2025
Time Analyzed	AM Peak - No Build
Intersection Orientation	North-South
Project Description	Mixed use Development

Site Information

Intersection	Kenwood at Laurel
Jurisdiction	City of Blue Ash
East/West Street	Laurel
North/South Street	Kenwood Road
Peak Hour Factor	0.92
Analysis Time Period (hrs)	0.25

Lanes



Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority		10	11	12		7	8	9	1U	1	2	3	4U	4	5	6
Number of Lanes		0	0	0		0	1	0	0	0	1	0	0	1	1	0
Configuration							LR					TR		L	T	
Volume (veh/h)						18		34			667	7		30	475	
Percent Heavy Vehicles (%)						3		3						3		
Proportion Time Blocked																
Percent Grade (%)						0										
Right Turn Channelized																
Median Type | Storage		Undivided														

Critical and Follow-up Headways

Base Critical Headway (sec)						7.1		6.2						4.1		
Critical Headway (sec)						6.43		6.23						4.13		
Base Follow-Up Headway (sec)						3.5		3.3						2.2		
Follow-Up Headway (sec)						3.53		3.33						2.23		

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)							57							33		
Capacity, c (veh/h)							277							868		
v/c Ratio							0.20							0.04		
95% Queue Length, Q_{95} (veh)							0.7							0.1		
Control Delay (s/veh)							21.3							9.3		
Level of Service (LOS)							C							A		
Approach Delay (s/veh)						21.3								0.6		
Approach LOS						C										

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HCS7 Two-Way Stop-Control Report

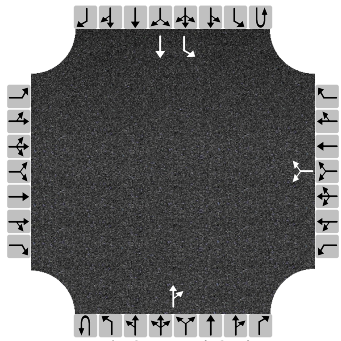
General Information

Analyst	JA
Agency/Co.	SHA Engineering
Date Performed	5/5/2022
Analysis Year	2035
Time Analyzed	AM Peak - No Build
Intersection Orientation	North-South
Project Description	Mixed use Development

Site Information

Intersection	Kenwood at Laurel
Jurisdiction	City of Blue Ash
East/West Street	Laurel
North/South Street	Kenwood Road
Peak Hour Factor	0.92
Analysis Time Period (hrs)	0.25

Lanes



Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority		10	11	12		7	8	9	1U	1	2	3	4U	4	5	6
Number of Lanes		0	0	0		0	1	0	0	0	1	0	0	1	1	0
Configuration							LR					TR		L	T	
Volume (veh/h)						19		38			736	8		33	525	
Percent Heavy Vehicles (%)						3		3						3		
Proportion Time Blocked																
Percent Grade (%)						0										
Right Turn Channelized																
Median Type | Storage		Undivided														

Critical and Follow-up Headways

Base Critical Headway (sec)						7.1		6.2						4.1		
Critical Headway (sec)						6.43		6.23						4.13		
Base Follow-Up Headway (sec)						3.5		3.3						2.2		
Follow-Up Headway (sec)						3.53		3.33						2.23		

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)							62							36		
Capacity, c (veh/h)							240							812		
v/c Ratio							0.26							0.04		
95% Queue Length, Q_{95} (veh)							1.0							0.1		
Control Delay (s/veh)							25.2							9.6		
Level of Service (LOS)							D							A		
Approach Delay (s/veh)						25.2								0.6		
Approach LOS						D										

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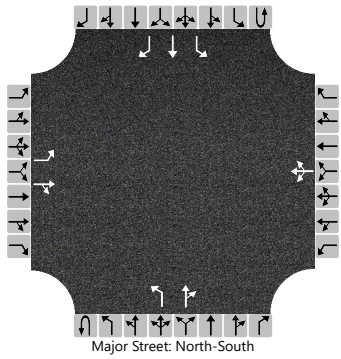
General Information

Analyst	JA
Agency/Co.	SHA Engineering
Date Performed	5/5/2022
Analysis Year	2025
Time Analyzed	AM Peak - Build
Intersection Orientation	North-South
Project Description	Mixed use Development

Site Information

Intersection	Kenwood at Laurel
Jurisdiction	City of Blue Ash
East/West Street	Laurel
North/South Street	Kenwood Road
Peak Hour Factor	0.92
Analysis Time Period (hrs)	0.25

Lanes


Major Street: North-South

Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority		10	11	12		7	8	9	1U	1	2	3	4U	4	5	6
Number of Lanes		1	1	0		0	1	0	0	1	1	0	0	1	1	1
Configuration		L		TR			LTR			L		TR		L	T	R
Volume (veh/h)		41	8	32		18	9	34		35	683	7		30	484	52
Percent Heavy Vehicles (%)		3	3	3		3	3	3		3				3		
Proportion Time Blocked																
Percent Grade (%)		0				0										
Right Turn Channelized														No		
Median Type | Storage		Undivided														

Critical and Follow-up Headways

Base Critical Headway (sec)		7.1	6.5	6.2		7.1	6.5	6.2		4.1				4.1		
Critical Headway (sec)		7.13	6.53	6.23		7.13	6.53	6.23		4.13				4.13		
Base Follow-Up Headway (sec)		3.5	4.0	3.3		3.5	4.0	3.3		2.2				2.2		
Follow-Up Headway (sec)		3.53	4.03	3.33		3.53	4.03	3.33		2.23				2.23		

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)		45		43			66			38				33		
Capacity, c (veh/h)		89		329			168			987				855		
v/c Ratio		0.50		0.13			0.39			0.04				0.04		
95% Queue Length, Q_{95} (veh)		2.2		0.5			1.7			0.1				0.1		
Control Delay (s/veh)		80.8		17.6			39.7			8.8				9.4		
Level of Service (LOS)		F		C			E			A				A		
Approach Delay (s/veh)		49.6				39.7				0.4				0.5		
Approach LOS		E				E										

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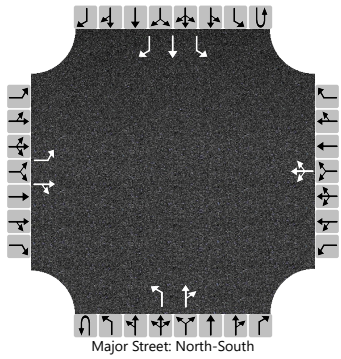
General Information

Analyst	JA
Agency/Co.	SHA Engineering
Date Performed	5/5/2022
Analysis Year	2035
Time Analyzed	AM Peak - Build
Intersection Orientation	North-South
Project Description	Mixed use Development

Site Information

Intersection	Kenwood at Laurel
Jurisdiction	City of Blue Ash
East/West Street	Laurel
North/South Street	Kenwood Road
Peak Hour Factor	0.92
Analysis Time Period (hrs)	0.25

Lanes



Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority		10	11	12		7	8	9	1U	1	2	3	4U	4	5	6
Number of Lanes		1	1	0		0	1	0	0	1	1	0	0	1	1	1
Configuration		L		TR			LTR			L		TR		L	T	R
Volume (veh/h)		41	8	32		19	9	38		35	752	8		33	534	52
Percent Heavy Vehicles (%)		3	3	3		3	3	3		3				3		
Proportion Time Blocked																
Percent Grade (%)		0				0										
Right Turn Channelized														No		
Median Type | Storage		Undivided														

Critical and Follow-up Headways

Base Critical Headway (sec)		7.1	6.5	6.2		7.1	6.5	6.2		4.1				4.1		
Critical Headway (sec)		7.13	6.53	6.23		7.13	6.53	6.23		4.13				4.13		
Base Follow-Up Headway (sec)		3.5	4.0	3.3		3.5	4.0	3.3		2.2				2.2		
Follow-Up Headway (sec)		3.53	4.03	3.33		3.53	4.03	3.33		2.23				2.23		

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)		45		43			72			38				36		
Capacity, c (veh/h)		68		286			141			942				800		
v/c Ratio		0.66		0.15			0.51			0.04				0.04		
95% Queue Length, Q_{95} (veh)		2.9		0.5			2.4			0.1				0.1		
Control Delay (s/veh)		127.7		19.9			54.7			9.0				9.7		
Level of Service (LOS)		F		C			F			A				A		
Approach Delay (s/veh)		74.4				54.7				0.4				0.5		
Approach LOS		F				F										

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HCS7 Two-Way Stop-Control Report

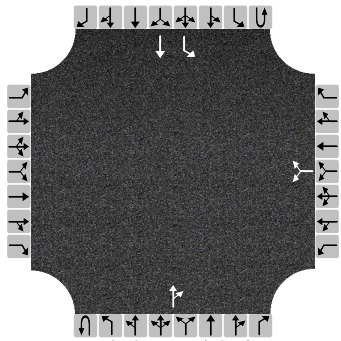
General Information

Analyst	JA
Agency/Co.	SHA Engineering
Date Performed	5/5/2022
Analysis Year	2025
Time Analyzed	PM Peak - No Build
Intersection Orientation	North-South
Project Description	Mixed use Development

Site Information

Intersection	Kenwood at Laurel
Jurisdiction	City of Blue Ash
East/West Street	Laurel
North/South Street	Kenwood Road
Peak Hour Factor	0.92
Analysis Time Period (hrs)	0.25

Lanes


Major Street: North-South

Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority		10	11	12		7	8	9	1U	1	2	3	4U	4	5	6
Number of Lanes		0	0	0		0	1	0	0	0	1	0	0	1	1	0
Configuration							LR					TR		L	T	
Volume (veh/h)						11		10			738	8		11	785	
Percent Heavy Vehicles (%)						3		3						3		
Proportion Time Blocked																
Percent Grade (%)						0										
Right Turn Channelized																
Median Type | Storage		Undivided														

Critical and Follow-up Headways

Base Critical Headway (sec)						7.1		6.2						4.1		
Critical Headway (sec)						6.43		6.23						4.13		
Base Follow-Up Headway (sec)						3.5		3.3						2.2		
Follow-Up Headway (sec)						3.53		3.33						2.23		

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)							23							12		
Capacity, c (veh/h)							156							811		
v/c Ratio							0.15							0.01		
95% Queue Length, Q_{95} (veh)							0.5							0.0		
Control Delay (s/veh)							32.0							9.5		
Level of Service (LOS)							D							A		
Approach Delay (s/veh)						32.0								0.1		
Approach LOS						D										

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HCS7 Two-Way Stop-Control Report

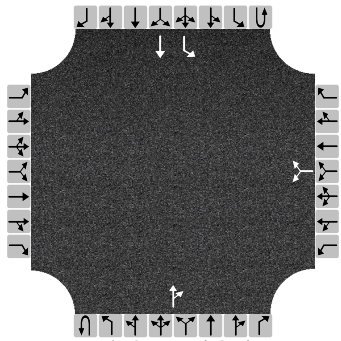
General Information

Analyst	JA
Agency/Co.	SHA Engineering
Date Performed	5/5/2022
Analysis Year	2035
Time Analyzed	PM Peak - No Build
Intersection Orientation	North-South
Project Description	Mixed use Development

Site Information

Intersection	Kenwood at Laurel
Jurisdiction	City of Blue Ash
East/West Street	Laurel
North/South Street	Kenwood Road
Peak Hour Factor	0.92
Analysis Time Period (hrs)	0.25

Lanes



Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority		10	11	12		7	8	9	1U	1	2	3	4U	4	5	6
Number of Lanes		0	0	0		0	1	0	0	0	1	0	0	1	1	0
Configuration							LR					TR		L	T	
Volume (veh/h)						13		11			815	9		13	867	
Percent Heavy Vehicles (%)						3		3						3		
Proportion Time Blocked																
Percent Grade (%)						0										
Right Turn Channelized																
Median Type | Storage						Undivided										

Critical and Follow-up Headways

Base Critical Headway (sec)						7.1		6.2						4.1		
Critical Headway (sec)						6.43		6.23						4.13		
Base Follow-Up Headway (sec)						3.5		3.3						2.2		
Follow-Up Headway (sec)						3.53		3.33						2.23		

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)							26							14		
Capacity, c (veh/h)							121							754		
v/c Ratio							0.22							0.02		
95% Queue Length, Q_{95} (veh)							0.8							0.1		
Control Delay (s/veh)							42.7							9.9		
Level of Service (LOS)							E							A		
Approach Delay (s/veh)						42.7								0.1		
Approach LOS						E										

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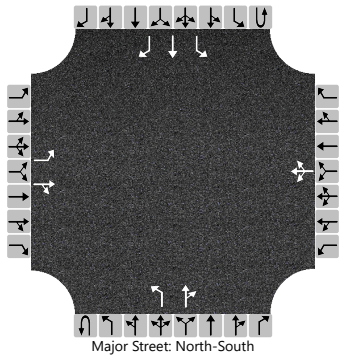
General Information

Analyst	JA
Agency/Co.	SHA Engineering
Date Performed	5/5/2022
Analysis Year	2025
Time Analyzed	PM Peak - Build
Intersection Orientation	North-South
Project Description	Mixed use Development

Site Information

Intersection	Kenwood at Laurel
Jurisdiction	City of Blue Ash
East/West Street	Laurel
North/South Street	Kenwood Road
Peak Hour Factor	0.92
Analysis Time Period (hrs)	0.25

Lanes


Major Street: North-South

Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority		10	11	12		7	8	9	1U	1	2	3	4U	4	5	6
Number of Lanes		1	1	0		0	1	0	0	1	1	0	0	1	1	1
Configuration		L		TR			LTR			L		TR		L	T	R
Volume (veh/h)		69	11	55		11	13	10		67	743	8		11	786	88
Percent Heavy Vehicles (%)		3	3	3		3	3	3		3				3		
Proportion Time Blocked																
Percent Grade (%)		0				0										
Right Turn Channelized														No		
Median Type | Storage		Undivided														

Critical and Follow-up Headways

Base Critical Headway (sec)		7.1	6.5	6.2		7.1	6.5	6.2		4.1				4.1		
Critical Headway (sec)		7.13	6.53	6.23		7.13	6.53	6.23		4.13				4.13		
Base Follow-Up Headway (sec)		3.5	4.0	3.3		3.5	4.0	3.3		2.2				2.2		
Follow-Up Headway (sec)		3.53	4.03	3.33		3.53	4.03	3.33		2.23				2.23		

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)		75		72			37			73				12		
Capacity, c (veh/h)		41		206			58			719				807		
v/c Ratio		1.83		0.35			0.63			0.10				0.01		
95% Queue Length, Q_{95} (veh)		7.8		1.5			2.6			0.3				0.0		
Control Delay (s/veh)		605.1		31.5			139.9			10.6				9.5		
Level of Service (LOS)		F		D			F			B				A		
Approach Delay (s/veh)		324.6				139.9				0.9				0.1		
Approach LOS		F				F										

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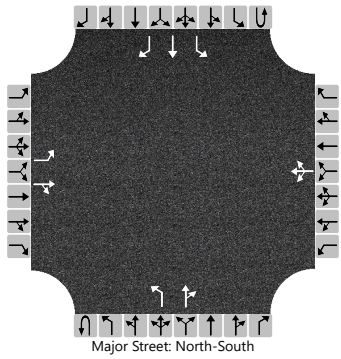
General Information

Analyst	JA
Agency/Co.	SHA Engineering
Date Performed	5/5/2022
Analysis Year	2035
Time Analyzed	PM Peak - Build
Intersection Orientation	North-South
Project Description	Mixed use Development

Site Information

Intersection	Kenwood at Laurel
Jurisdiction	City of Blue Ash
East/West Street	Laurel
North/South Street	Kenwood Road
Peak Hour Factor	0.92
Analysis Time Period (hrs)	0.25

Lanes



Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority		10	11	12		7	8	9	1U	1	2	3	4U	4	5	6
Number of Lanes		1	1	0		0	1	0	0	1	1	0	0	1	1	1
Configuration		L		TR			LTR			L		TR		L	T	R
Volume (veh/h)		69	11	55		13	13	11		67	820	9		13	868	88
Percent Heavy Vehicles (%)		3	3	3		3	3	3		3				3		
Proportion Time Blocked																
Percent Grade (%)		0				0										
Right Turn Channelized														No		
Median Type | Storage		Undivided														

Critical and Follow-up Headways

Base Critical Headway (sec)		7.1	6.5	6.2		7.1	6.5	6.2		4.1				4.1		
Critical Headway (sec)		7.13	6.53	6.23		7.13	6.53	6.23		4.13				4.13		
Base Follow-Up Headway (sec)		3.5	4.0	3.3		3.5	4.0	3.3		2.2				2.2		
Follow-Up Headway (sec)		3.53	4.03	3.33		3.53	4.03	3.33		2.23				2.23		

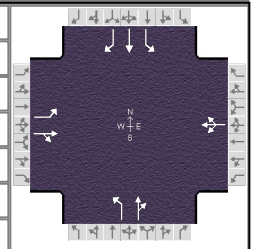
Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)		75		72			40			73				14		
Capacity, c (veh/h)		28		169			41			665				750		
v/c Ratio		2.68		0.42			0.98			0.11				0.02		
95% Queue Length, Q_{95} (veh)		9.0		1.9			3.8			0.4				0.1		
Control Delay (s/veh)		1056.1		41.2			282.6			11.1				9.9		
Level of Service (LOS)		F		E			F			B				A		
Approach Delay (s/veh)		559.9				282.6				0.8				0.1		
Approach LOS		F				F										

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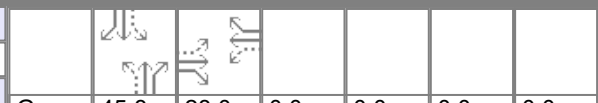
HCS7 Signalized Intersection Results Summary

General Information				Intersection Information	
Agency	SHA			Duration, h	0.250
Analyst	JA	Analysis Date	May 4, 2022	Area Type	Other
Jurisdiction	City of Blue Ash	Time Period	AM Peak	PHF	0.92
Urban Street	Kenwood Road	Analysis Year	2035 Build	Analysis Period	1> 7:00
Intersection	Kenwood at Laurel	File Name	6-4A-AM-2035-Build-Kenwood-Laurel.xus		
Project Description	Blue Ash Mixed Use Development				

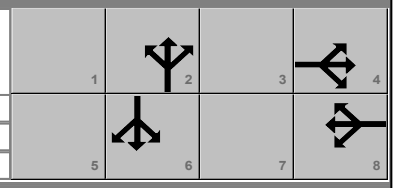


Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	41	8	32	19	9	38	35	752	8	33	534	52

Signal Information			
Cycle, s	85.0	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	Yes	Simult. Gap E/W	On
Force Mode	Fixed	Simult. Gap N/S	On



Green	45.8	28.0	0.0	0.0	0.0	0.0						
Yellow	3.6	3.6	0.0	0.0	0.0	0.0						
Red	2.0	2.0	0.0	0.0	0.0	0.0						



Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase		4		8		2		6
Case Number		6.0		8.0		6.0		5.0
Phase Duration, s		33.6		33.6		51.4		51.4
Change Period, ($Y+R_c$), s		5.6		5.6		5.6		5.6
Max Allow Headway (*MAH*), s		3.2		3.2		3.1		3.1
Queue Clearance Time (g_s), s		6.5		4.5		32.3		36.2
Green Extension Time (g_e), s		0.3		0.3		3.4		3.0
Phase Call Probability		1.00		1.00		1.00		1.00
Max Out Probability		0.00		0.00		0.14		0.29

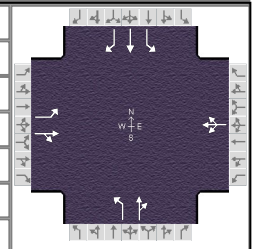
Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	7	4	14	3	8	18	5	2	12	1	6	16
Adjusted Flow Rate (*v*), veh/h	45	43			72		38	826		36	580	57
Adjusted Saturation Flow Rate (*s*), veh/h/ln	1375	1661			1596		847	1896		674	1900	1610
Queue Service Time (g_s), s	2.0	1.5			0.0		2.7	30.3		3.9	17.2	1.4
Cycle Queue Clearance Time (g_c), s	4.5	1.5			2.5		19.9	30.3		34.2	17.2	1.4
Green Ratio (*g/C*)	0.33	0.33			0.33		0.54	0.54		0.54	0.54	0.54
Capacity (*c*), veh/h	498	547			580		369	1022		208	1024	868
Volume-to-Capacity Ratio (*X*)	0.090	0.079			0.124		0.103	0.808		0.173	0.567	0.065
Back of Queue (*Q*), ft/ln (95 th percentile)	28	25.7			43.1		22.7	463		28	271.3	20.6
Back of Queue (*Q*), veh/ln (95 th percentile)	1.1	1.0			1.7		0.9	18.5		1.1	10.9	0.8
Queue Storage Ratio (*RQ*) (95 th percentile)	0.19	0.09			0.11		0.15	0.93		0.22	0.42	0.14
Uniform Delay (d_1), s/veh	21.5	19.6			19.9		19.6	16.0		30.0	13.0	9.4
Incremental Delay (d_2), s/veh	0.0	0.0			0.0		0.0	4.6		0.1	0.5	0.0
Initial Queue Delay (d_3), s/veh	0.0	0.0			0.0		0.0	0.0		0.0	0.0	0.0
Control Delay (*d*), s/veh	21.5	19.6			20.0		19.7	20.6		30.1	13.5	9.4
Level of Service (LOS)	C	B			B		B	C		C	B	A
Approach Delay, s/veh / LOS	20.6	C		20.0	B		20.5	C		14.0	B	
Intersection Delay, s/veh / LOS	17.9						B					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	1.92	B	2.11	B	1.66	B	1.89	B
Bicycle LOS Score / LOS	0.63	A	0.61	A	1.91	B	1.60	B

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HCS7 Signalized Intersection Results Summary

General Information				Intersection Information	
Agency	SHA			Duration, h	0.250
Analyst	JA	Analysis Date	May 4, 2022	Area Type	Other
Jurisdiction	City of Blue Ash	Time Period	PM Peak	PHF	0.92
Urban Street	Kenwood Road	Analysis Year	2035 Build	Analysis Period	1> 7:00
Intersection	Kenwood at Laurel	File Name	6-8A-PM-2035-Build-Kenwood-Laurel.xus		
Project Description	Blue Ash Mixed Use Development				

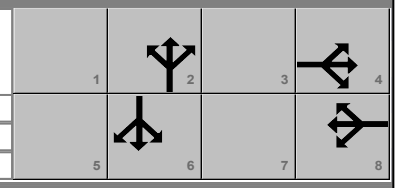


Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	69	11	55	11	13	10	67	743	8	11	786	88

Signal Information			
Cycle, s	100.0	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	Yes	Simult. Gap E/W	On
Force Mode	Fixed	Simult. Gap N/S	On



Green	54.8	34.0	0.0	0.0	0.0	0.0						
Yellow	3.6	3.6	0.0	0.0	0.0	0.0						
Red	2.0	2.0	0.0	0.0	0.0	0.0						



Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase		4		8		2		6
Case Number		6.0		8.0		6.0		5.0
Phase Duration, s		39.6		39.6		60.4		60.4
Change Period, ($Y+R_c$), s		5.6		5.6		5.6		5.6
Max Allow Headway (*MAH*), s		3.2		3.2		3.2		3.2
Queue Clearance Time (g_s), s		7.2		3.4		49.2		38.9
Green Extension Time (g_e), s		0.3		0.3		2.7		4.6
Phase Call Probability		1.00		1.00		1.00		1.00
Max Out Probability		0.00		0.00		0.72		0.18

Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	7	4	14	3	8	18	5	2	12	1	6	16
Adjusted Flow Rate (*v*), veh/h	75	72			37		73	816		12	854	96
Adjusted Saturation Flow Rate (*s*), veh/h/ln	1408	1652			1628		656	1896		680	1900	1610
Queue Service Time (g_s), s	3.8	3.0			0.0		10.3	34.2		1.4	36.9	2.9
Cycle Queue Clearance Time (g_c), s	5.2	3.0			1.4		47.2	34.2		35.6	36.9	2.9
Green Ratio (*g/C*)	0.34	0.34			0.34		0.55	0.55		0.55	0.55	0.55
Capacity (*c*), veh/h	531	562			601		189	1039		212	1041	882
Volume-to-Capacity Ratio (*X*)	0.141	0.128			0.061		0.385	0.785		0.056	0.821	0.108
Back of Queue (*Q*), ft/ln (95 th percentile)	55.9	51.6			26		73.8	521.1		10.5	566.6	43.4
Back of Queue (*Q*), veh/ln (95 th percentile)	2.2	2.1			1.0		3.0	20.8		0.4	22.7	1.7
Queue Storage Ratio (*RQ*) (95 th percentile)	0.37	0.17			0.06		0.49	1.04		0.08	0.88	0.29
Uniform Delay (d_1), s/veh	24.0	22.8			22.2		37.9	17.9		32.1	18.6	10.9
Incremental Delay (d_2), s/veh	0.0	0.0			0.0		0.5	3.7		0.0	5.0	0.0
Initial Queue Delay (d_3), s/veh	0.0	0.0			0.0		0.0	0.0		0.0	0.0	0.0
Control Delay (*d*), s/veh	24.0	22.8			22.3		38.4	21.6		32.1	23.5	10.9
Level of Service (LOS)	C	C			C		D	C		C	C	B
Approach Delay, s/veh / LOS	23.4	C		22.3	C		23.0	C		22.4	C	
Intersection Delay, s/veh / LOS	22.7						C					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	1.92	B	2.11	B	1.67	B	1.89	B
Bicycle LOS Score / LOS	0.73	A	0.55	A	1.95	B	2.07	B

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HCS7 Two-Way Stop-Control Report

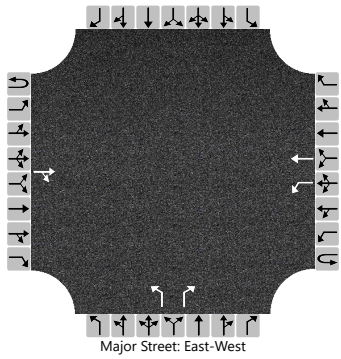
General Information

Analyst	JA
Agency/Co.	SHA Engineering
Date Performed	5/5/2022
Analysis Year	2025
Time Analyzed	AM Peak - No Build
Intersection Orientation	East-West
Project Description	Mixed use Development

Site Information

Intersection	Cooper at Blue Ash
Jurisdiction	City of Blue Ash
East/West Street	Cooper Road
North/South Street	Blue Ash Road
Peak Hour Factor	0.92
Analysis Time Period (hrs)	0.25

Lanes



Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority	1U	1	2	3	4U	4	5	6		7	8	9		10	11	12
Number of Lanes	0	0	1	0	0	1	1	0		1	0	1		0	0	0
Configuration				TR		L	T			L		R				
Volume (veh/h)			169	47		47	230			64		111				
Percent Heavy Vehicles (%)						3				3		3				
Proportion Time Blocked																
Percent Grade (%)										0						
Right Turn Channelized										No						
Median Type | Storage						Undivided										

Critical and Follow-up Headways

Base Critical Headway (sec)						4.1				7.1		6.2				
Critical Headway (sec)						4.13				6.43		6.23				
Base Follow-Up Headway (sec)						2.2				3.5		3.3				
Follow-Up Headway (sec)						2.23				3.53		3.33				

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)						51				70		121				
Capacity, c (veh/h)						1327				468		829				
v/c Ratio						0.04				0.15		0.15				
95% Queue Length, Q_{95} (veh)						0.1				0.5		0.5				
Control Delay (s/veh)						7.8				14.0		10.1				
Level of Service (LOS)						A				B		B				
Approach Delay (s/veh)						1.3				11.5						
Approach LOS										B						

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HCS7 Two-Way Stop-Control Report

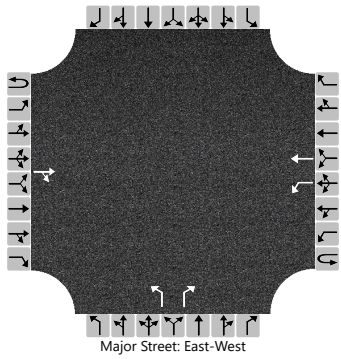
General Information

Analyst	JA
Agency/Co.	SHA Engineering
Date Performed	5/5/2022
Analysis Year	2035
Time Analyzed	AM Peak - No Build
Intersection Orientation	East-West
Project Description	Mixed use Development

Site Information

Intersection	Cooper at Blue Ash
Jurisdiction	City of Blue Ash
East/West Street	Cooper Road
North/South Street	Blue Ash Road
Peak Hour Factor	0.92
Analysis Time Period (hrs)	0.25

Lanes



Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority	1U	1	2	3	4U	4	5	6		7	8	9		10	11	12
Number of Lanes	0	0	1	0	0	1	1	0		1	0	1		0	0	0
Configuration				TR		L	T			L		R				
Volume (veh/h)			187	52		52	254			71		123				
Percent Heavy Vehicles (%)						3				3		3				
Proportion Time Blocked																
Percent Grade (%)										0						
Right Turn Channelized										No						
Median Type | Storage						Undivided										

Critical and Follow-up Headways

Base Critical Headway (sec)						4.1				7.1		6.2				
Critical Headway (sec)						4.13				6.43		6.23				
Base Follow-Up Headway (sec)						2.2				3.5		3.3				
Follow-Up Headway (sec)						2.23				3.53		3.33				

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)						57				77		134				
Capacity, c (veh/h)						1299				430		805				
v/c Ratio						0.04				0.18		0.17				
95% Queue Length, Q_{95} (veh)						0.1				0.6		0.6				
Control Delay (s/veh)						7.9				15.2		10.4				
Level of Service (LOS)						A				C		B				
Approach Delay (s/veh)						1.3				12.1						
Approach LOS										B						

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HCS7 Two-Way Stop-Control Report

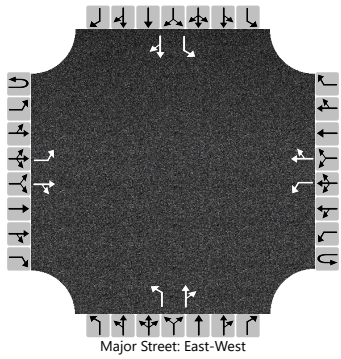
General Information

Analyst	JA
Agency/Co.	SHA Engineering
Date Performed	5/5/2022
Analysis Year	2025
Time Analyzed	AM Peak - Build
Intersection Orientation	East-West
Project Description	Mixed use Development

Site Information

Intersection	Cooper at Blue Ash
Jurisdiction	City of Blue Ash
East/West Street	Cooper Road
North/South Street	Blue Ash Road
Peak Hour Factor	0.92
Analysis Time Period (hrs)	0.25

Lanes



Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority	1U	1	2	3	4U	4	5	6		7	8	9		10	11	12
Number of Lanes	0	1	1	0	0	1	1	0		1	1	0		1	1	0
Configuration		L		TR		L		TR		L		TR		L		TR
Volume (veh/h)		35	169	47		47	230	35		64	8	111		32	16	33
Percent Heavy Vehicles (%)		3				3				3	3	3		3	3	3
Proportion Time Blocked																
Percent Grade (%)										0				0		
Right Turn Channelized																
Median Type | Storage		Undivided														

Critical and Follow-up Headways

Base Critical Headway (sec)		4.1				4.1				7.1	6.5	6.2		7.1	6.5	6.2
Critical Headway (sec)		4.13				4.13				7.13	6.53	6.23		7.13	6.53	6.23
Base Follow-Up Headway (sec)		2.2				2.2				3.5	4.0	3.3		3.5	4.0	3.3
Follow-Up Headway (sec)		2.23				2.23				3.53	4.03	3.33		3.53	4.03	3.33

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)		38				51				70		129		35		53
Capacity, c (veh/h)		1268				1327				315		758		271		549
v/c Ratio		0.03				0.04				0.22		0.17		0.13		0.10
95% Queue Length, Q_{95} (veh)		0.1				0.1				0.8		0.6		0.4		0.3
Control Delay (s/veh)		7.9				7.8				19.7		10.7		20.2		12.3
Level of Service (LOS)		A				A				C		B		C		B
Approach Delay (s/veh)	1.1				1.2				13.8				15.4			
Approach LOS									B				C			

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HCS7 Two-Way Stop-Control Report

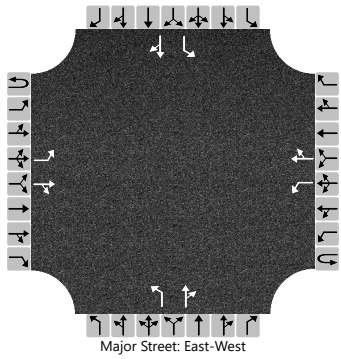
General Information

Analyst	JA
Agency/Co.	SHA Engineering
Date Performed	5/5/2022
Analysis Year	2035
Time Analyzed	AM Peak - Build
Intersection Orientation	East-West
Project Description	Mixed use Development

Site Information

Intersection	Cooper at Blue Ash
Jurisdiction	City of Blue Ash
East/West Street	Cooper Road
North/South Street	Blue Ash Road
Peak Hour Factor	0.92
Analysis Time Period (hrs)	0.25

Lanes



Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority	1U	1	2	3	4U	4	5	6		7	8	9		10	11	12
Number of Lanes	0	1	1	0	0	1	1	0		1	1	0		1	1	0
Configuration		L		TR		L		TR		L		TR		L		TR
Volume (veh/h)		35	187	52		52	254	35		71	8	123		32	16	33
Percent Heavy Vehicles (%)		3				3				3	3	3		3	3	3
Proportion Time Blocked																
Percent Grade (%)										0				0		
Right Turn Channelized																
Median Type | Storage		Undivided														

Critical and Follow-up Headways

Base Critical Headway (sec)		4.1				4.1				7.1	6.5	6.2		7.1	6.5	6.2
Critical Headway (sec)		4.13				4.13				7.13	6.53	6.23		7.13	6.53	6.23
Base Follow-Up Headway (sec)		2.2				2.2				3.5	4.0	3.3		3.5	4.0	3.3
Follow-Up Headway (sec)		2.23				2.23				3.53	4.03	3.33		3.53	4.03	3.33

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)		38				57				77		142		35		53
Capacity, c (veh/h)		1240				1299				284		737		238		516
v/c Ratio		0.03				0.04				0.27		0.19		0.15		0.10
95% Queue Length, Q_{95} (veh)		0.1				0.1				1.1		0.7		0.5		0.3
Control Delay (s/veh)		8.0				7.9				22.3		11.0		22.7		12.8
Level of Service (LOS)		A				A				C		B		C		B
Approach Delay (s/veh)	1.0				1.2				15.0				16.7			
Approach LOS									C				C			

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HCS7 Two-Way Stop-Control Report

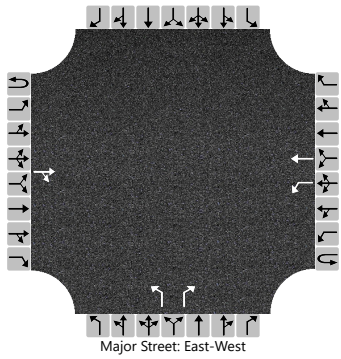
General Information

Analyst	JA
Agency/Co.	SHA Engineering
Date Performed	5/5/2022
Analysis Year	2025
Time Analyzed	PM Peak - No Build
Intersection Orientation	East-West
Project Description	Mixed use Development

Site Information

Intersection	Cooper at Blue Ash
Jurisdiction	City of Blue Ash
East/West Street	Cooper Road
North/South Street	Blue Ash Road
Peak Hour Factor	0.92
Analysis Time Period (hrs)	0.25

Lanes



Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority	1U	1	2	3	4U	4	5	6		7	8	9		10	11	12
Number of Lanes	0	0	1	0	0	1	1	0		1	0	1		0	0	0
Configuration				TR		L	T			L		R				
Volume (veh/h)			342	142		120	313			52		116				
Percent Heavy Vehicles (%)						3				3		3				
Proportion Time Blocked																
Percent Grade (%)										0						
Right Turn Channelized										No						
Median Type | Storage						Undivided										

Critical and Follow-up Headways

Base Critical Headway (sec)						4.1				7.1		6.2				
Critical Headway (sec)						4.13				6.43		6.23				
Base Follow-Up Headway (sec)						2.2				3.5		3.3				
Follow-Up Headway (sec)						2.23				3.53		3.33				

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)						130				57		126				
Capacity, c (veh/h)						1036				219		608				
v/c Ratio						0.13				0.26		0.21				
95% Queue Length, Q_{95} (veh)						0.4				1.0		0.8				
Control Delay (s/veh)						9.0				27.1		12.5				
Level of Service (LOS)						A				D		B				
Approach Delay (s/veh)						2.5				17.0						
Approach LOS										C						

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HCS7 Two-Way Stop-Control Report

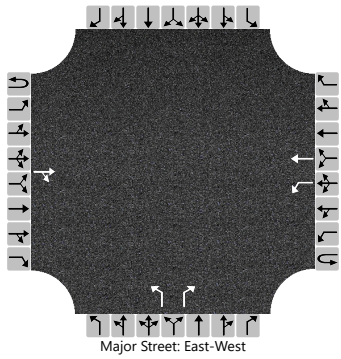
General Information

Analyst	JA
Agency/Co.	SHA Engineering
Date Performed	5/5/2022
Analysis Year	2035
Time Analyzed	PM Peak - No Build
Intersection Orientation	East-West
Project Description	Mixed use Development

Site Information

Intersection	Cooper at Blue Ash
Jurisdiction	City of Blue Ash
East/West Street	Cooper Road
North/South Street	Blue Ash Road
Peak Hour Factor	0.92
Analysis Time Period (hrs)	0.25

Lanes



Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority	1U	1	2	3	4U	4	5	6		7	8	9		10	11	12
Number of Lanes	0	0	1	0	0	1	1	0		1	0	1		0	0	0
Configuration				TR		L	T			L		R				
Volume (veh/h)			378	157		132	346			57		129				
Percent Heavy Vehicles (%)						3				3		3				
Proportion Time Blocked																
Percent Grade (%)										0						
Right Turn Channelized										No						
Median Type | Storage						Undivided										

Critical and Follow-up Headways

Base Critical Headway (sec)						4.1				7.1		6.2				
Critical Headway (sec)						4.13				6.43		6.23				
Base Follow-Up Headway (sec)						2.2				3.5		3.3				
Follow-Up Headway (sec)						2.23				3.53		3.33				

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)						143				62		140				
Capacity, c (veh/h)						988				184		572				
v/c Ratio						0.15				0.34		0.25				
95% Queue Length, Q_{95} (veh)						0.5				1.4		1.0				
Control Delay (s/veh)						9.3				34.2		13.3				
Level of Service (LOS)						A				D		B				
Approach Delay (s/veh)						2.6				19.7						
Approach LOS										C						

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HCS7 Two-Way Stop-Control Report

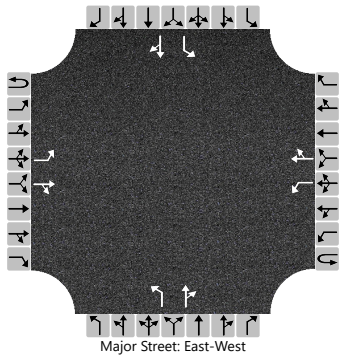
General Information

Analyst	JA
Agency/Co.	SHA Engineering
Date Performed	5/5/2022
Analysis Year	2025
Time Analyzed	PM Peak - Build
Intersection Orientation	East-West
Project Description	Mixed use Development

Site Information

Intersection	Cooper at Blue Ash
Jurisdiction	City of Blue Ash
East/West Street	Cooper Road
North/South Street	Blue Ash Road
Peak Hour Factor	0.92
Analysis Time Period (hrs)	0.25

Lanes



Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority	1U	1	2	3	4U	4	5	6		7	8	9		10	11	12
Number of Lanes	0	1	1	0	0	1	1	0		1	1	0		1	1	0
Configuration		L		TR		L		TR		L		TR		L		TR
Volume (veh/h)		54	338	142		120	305	59		52	13	116		47	21	51
Percent Heavy Vehicles (%)		3				3				3	3	3		3	3	3
Proportion Time Blocked																
Percent Grade (%)										0				0		
Right Turn Channelized																
Median Type | Storage		Undivided														

Critical and Follow-up Headways

Base Critical Headway (sec)		4.1				4.1				7.1	6.5	6.2		7.1	6.5	6.2
Critical Headway (sec)		4.13				4.13				7.13	6.53	6.23		7.13	6.53	6.23
Base Follow-Up Headway (sec)		2.2				2.2				3.5	4.0	3.3		3.5	4.0	3.3
Follow-Up Headway (sec)		2.23				2.23				3.53	4.03	3.33		3.53	4.03	3.33

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)		59				130				57		140		51		78
Capacity, c (veh/h)		1157				1040				109		466		95		320
v/c Ratio		0.05				0.13				0.52		0.30		0.54		0.24
95% Queue Length, Q_{95} (veh)		0.2				0.4				2.4		1.3		2.4		0.9
Control Delay (s/veh)		8.3				9.0				69.6		16.0		80.9		19.9
Level of Service (LOS)		A				A				F		C		F		C
Approach Delay (s/veh)	0.8				2.2				31.4				44.0			
Approach LOS									D				E			

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HCS7 Two-Way Stop-Control Report

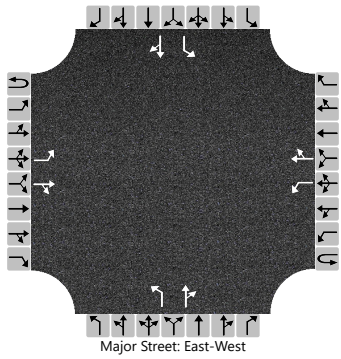
General Information

Analyst	JA
Agency/Co.	SHA Engineering
Date Performed	5/5/2022
Analysis Year	2035
Time Analyzed	PM Peak - Build
Intersection Orientation	East-West
Project Description	Mixed use Development

Site Information

Intersection	Cooper at Blue Ash
Jurisdiction	City of Blue Ash
East/West Street	Cooper Road
North/South Street	Blue Ash Road
Peak Hour Factor	0.92
Analysis Time Period (hrs)	0.25

Lanes



Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority	1U	1	2	3	4U	4	5	6		7	8	9		10	11	12
Number of Lanes	0	1	1	0	0	1	1	0		1	1	0		1	1	0
Configuration		L		TR		L		TR		L		TR		L		TR
Volume (veh/h)		54	374	157		132	338	59		57	13	129		47	21	51
Percent Heavy Vehicles (%)		3				3				3	3	3		3	3	3
Proportion Time Blocked																
Percent Grade (%)										0				0		
Right Turn Channelized																
Median Type | Storage		Undivided														

Critical and Follow-up Headways

Base Critical Headway (sec)		4.1				4.1				7.1	6.5	6.2		7.1	6.5	6.2
Critical Headway (sec)		4.13				4.13				7.13	6.53	6.23		7.13	6.53	6.23
Base Follow-Up Headway (sec)		2.2				2.2				3.5	4.0	3.3		3.5	4.0	3.3
Follow-Up Headway (sec)		2.23				2.23				3.53	4.03	3.33		3.53	4.03	3.33

Delay, Queue Length, and Level of Service

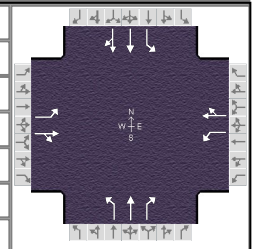
Flow Rate, v (veh/h)		59				143				62		154		51		78
Capacity, c (veh/h)		1123				991				87		433		72		278
v/c Ratio		0.05				0.14				0.71		0.36		0.71		0.28
95% Queue Length, Q_{95} (veh)		0.2				0.5				3.5		1.6		3.2		1.1
Control Delay (s/veh)		8.4				9.2				114.4		17.9		130.3		23.0
Level of Service (LOS)		A				A				F		C		F		C
Approach Delay (s/veh)	0.8				2.3				45.5				65.4			
Approach LOS									E				F			

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Capacity Analysis
Additional Scenarios

HCS7 Signalized Intersection Results Summary

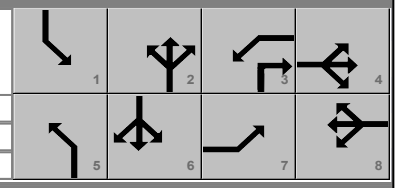
General Information				Intersection Information	
Agency	SHA			Duration, h	0.250
Analyst	JA	Analysis Date	May 4, 2022	Area Type	Other
Jurisdiction	City of Blue Ash	Time Period	PM Peak	PHF	0.92
Urban Street	Kenwood Road	Analysis Year	2035 Build - Alt 1	Analysis Period	1> 7:00
Intersection	Kenwood at Cooper Rpad	File Name	3-8A1-PM-2035-Build-Kenwood-Cooper.xus		
Project Description	Blue Ash Mixed Use Development				



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	170	253	117	151	236	143	126	566	151	160	576	176

Signal Information			
Cycle, s	100.0	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	Yes	Simult. Gap E/W	On
Force Mode	Fixed	Simult. Gap N/S	On

Green	9.0	34.3	9.0	2.0	26.5	0.0						
Yellow	3.0	3.6	3.0	0.0	3.6	0.0						
Red	2.0	2.0	0.0	0.0	2.0	0.0						



Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase	7	4	3	8	5	2	1	6
Case Number	1.1	4.0	1.1	4.0	1.1	3.0	1.1	4.0
Phase Duration, s	14.0	34.1	12.0	32.1	14.0	39.9	14.0	39.9
Change Period, ($Y+R_c$), s	5.0	5.6	3.0	5.6	5.0	5.6	5.0	5.6
Max Allow Headway (*MAH*), s	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1
Queue Clearance Time (g_s), s	9.3	22.6	8.4	24.1	6.6	33.5	8.0	24.7
Green Extension Time (g_e), s	0.0	0.8	0.0	0.6	0.0	0.5	0.0	2.8
Phase Call Probability	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Max Out Probability	1.00	0.74	1.00	1.00	1.00	1.00	1.00	0.28

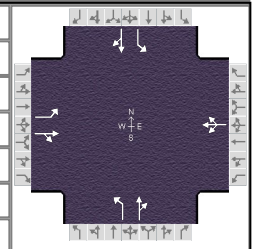
Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	7	4	14	3	8	18	5	2	12	1	6	16
Adjusted Flow Rate (*v*), veh/h	185	402		164	412		137	615	164	174	486	331
Adjusted Saturation Flow Rate (*s*), veh/h/ln	1810	1798		1810	1779		1810	1900	1610	1810	1900	1291
Queue Service Time (g_s), s	7.3	20.6		6.4	22.1		4.6	31.5	6.4	6.0	22.6	22.7
Cycle Queue Clearance Time (g_c), s	7.3	20.6		6.4	22.1		4.6	31.5	6.4	6.0	22.6	22.7
Green Ratio (*g/C*)	0.36	0.28		0.36	0.26		0.43	0.34	0.43	0.43	0.34	0.34
Capacity (*c*), veh/h	278	512		294	471		300	652	697	242	652	443
Volume-to-Capacity Ratio (*X*)	0.665	0.785		0.559	0.874		0.456	0.944	0.235	0.719	0.746	0.748
Back of Queue (*Q*), ft/ln (95 th percentile)	153.3	370.8		125.4	421.7		85.6	618.3	104.2	210.6	400.2	300
Back of Queue (*Q*), veh/ln (95 th percentile)	6.1	14.8		5.0	16.9		3.4	24.7	4.2	8.4	16.0	12.0
Queue Storage Ratio (*RQ*) (95 th percentile)	1.14	0.76		0.57	0.34		0.59	0.62	0.21	1.40	0.71	0.54
Uniform Delay (d_1), s/veh	26.2	32.9		25.4	35.2		21.2	31.9	17.9	23.6	29.0	29.0
Incremental Delay (d_2), s/veh	4.8	7.2		1.5	15.9		0.4	22.2	0.1	8.6	4.2	6.1
Initial Queue Delay (d_3), s/veh	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (*d*), s/veh	30.9	40.1		26.9	51.0		21.6	54.1	18.0	32.3	33.2	35.2
Level of Service (LOS)	C	D		C	D		C	D	B	C	C	D
Approach Delay, s/veh / LOS	37.2	D		44.1	D		42.8	D		33.7	C	
Intersection Delay, s/veh / LOS	39.0						D					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	2.29	B	2.12	B	1.92	B	1.92	B
Bicycle LOS Score / LOS	1.46	A	1.44	A	2.00	B	1.31	A

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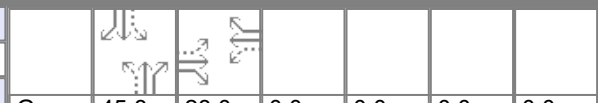
HCS7 Signalized Intersection Results Summary

General Information				Intersection Information	
Agency	SHA			Duration, h	0.250
Analyst	JA	Analysis Date	May 4, 2022	Area Type	Other
Jurisdiction	City of Blue Ash	Time Period	AM Peak	PHF	0.92
Urban Street	Kenwood Road	Analysis Year	2035 Build	Analysis Period	1> 7:00
Intersection	Kenwood at Laurel	File Name	6-4A-AM-2035-Build-Kenwood-Laurel.xus		
Project Description	Blue Ash Mixed Use Development				



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	41	8	32	19	9	38	35	752	8	33	534	52

Signal Information			
Cycle, s	85.0	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	Yes	Simult. Gap E/W	On
Force Mode	Fixed	Simult. Gap N/S	On



Green	45.8	28.0	0.0	0.0	0.0	0.0	1	2	3	4		
Yellow	3.6	3.6	0.0	0.0	0.0	0.0						
Red	2.0	2.0	0.0	0.0	0.0	0.0	5	6	7	8		

Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase		4		8		2		6
Case Number		6.0		8.0		6.0		6.0
Phase Duration, s		33.6		33.6		51.4		51.4
Change Period, ($Y+R_c$), s		5.6		5.6		5.6		5.6
Max Allow Headway (*MAH*), s		3.2		3.2		3.1		3.1
Queue Clearance Time (g_s), s		6.5		4.5		47.8		47.8
Green Extension Time (g_e), s		0.3		0.3		0.0		0.0
Phase Call Probability		1.00		1.00		1.00		1.00
Max Out Probability		0.00		0.00		1.00		1.00

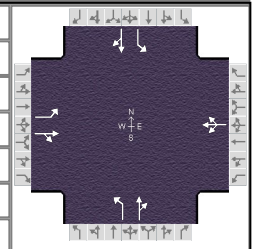
Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	7	4	14	3	8	18	5	2	12	1	6	16
Adjusted Flow Rate (*v*), veh/h	45	43			72		38	826		36	637	
Adjusted Saturation Flow Rate (*s*), veh/h/ln	1375	1661			1596		804	1896		674	1870	
Queue Service Time (g_s), s	2.0	1.5			0.0		0.0	30.3		3.9	20.2	
Cycle Queue Clearance Time (g_c), s	4.5	1.5			2.5		45.8	30.3		34.2	20.2	
Green Ratio (*g/C*)	0.33	0.33			0.33		0.54	0.54		0.54	0.54	
Capacity (*c*), veh/h	498	547			580		85	1022		208	1008	
Volume-to-Capacity Ratio (*X*)	0.090	0.079			0.124		0.449	0.808		0.173	0.632	
Back of Queue (*Q*), ft/ln (95 th percentile)	28	25.7			43.1		36.5	463		28	308.8	
Back of Queue (*Q*), veh/ln (95 th percentile)	1.1	1.0			1.7		1.5	18.5		1.1	12.4	
Queue Storage Ratio (*RQ*) (95 th percentile)	0.19	0.09			0.11		0.24	0.93		0.22	0.48	
Uniform Delay (d_1), s/veh	21.5	19.6			19.9		42.5	16.0		30.0	13.7	
Incremental Delay (d_2), s/veh	0.0	0.0			0.0		1.4	4.6		0.1	1.0	
Initial Queue Delay (d_3), s/veh	0.0	0.0			0.0		0.0	0.0		0.0	0.0	
Control Delay (*d*), s/veh	21.5	19.6			20.0		43.9	20.6		30.1	14.7	
Level of Service (LOS)	C	B			B		D	C		C	B	
Approach Delay, s/veh / LOS	20.6	C		20.0	B		21.6	C		15.5	B	
Intersection Delay, s/veh / LOS	19.1						B					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	1.92	B	1.92	B	1.66	B	1.89	B
Bicycle LOS Score / LOS	0.63	A	0.61	A	1.91	B	1.60	B

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HCS7 Signalized Intersection Results Summary

General Information				Intersection Information	
Agency	SHA			Duration, h	0.250
Analyst	JA	Analysis Date	May 4, 2022	Area Type	Other
Jurisdiction	City of Blue Ash	Time Period	PM Peak	PHF	0.92
Urban Street	Kenwood Road	Analysis Year	2035 Build - Alt 1	Analysis Period	1> 7:00
Intersection	Kenwood at Laurel	File Name	6-8A-PM-2035-Build-Kenwood-Laurel.xus		
Project Description	Blue Ash Mixed Use Development				



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	69	11	55	13	13	11	67	820	9	13	868	88

Signal Information			
Cycle, s	100.0	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	Yes	Simult. Gap E/W	On
Force Mode	Fixed	Simult. Gap N/S	On

							1	2	3	4
Green	7.0	58.8	19.0	0.0	0.0	0.0	5	6	7	8
Yellow	4.0	3.6	3.6	0.0	0.0	0.0				
Red	0.0	2.0	2.0	0.0	0.0	0.0				

Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase		4		8	5	2		6
Case Number		6.0		8.0	1.0	4.0		6.3
Phase Duration, s		24.6		24.6	11.0	75.4		64.4
Change Period, ($Y+R_c$), s		5.6		5.6	4.0	5.6		5.6
Max Allow Headway (*MAH*), s		3.2		3.2	3.1	3.1		3.1
Queue Clearance Time (g_s), s		10.4		5.7	3.4	29.3		53.6
Green Extension Time (g_e), s		0.2		0.3	0.0	5.8		2.8
Phase Call Probability		1.00		1.00	1.00	1.00		1.00
Max Out Probability		0.00		0.00	0.46	0.02		0.77

Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	7	4	14	3	8	18	5	2	12	1	6	16
Adjusted Flow Rate (*v*), veh/h	75	72			40		73	901		14	1039	
Adjusted Saturation Flow Rate (*s*), veh/h/ln	1406	1652			1625		1810	1896		628	1869	
Queue Service Time (g_s), s	4.8	3.7			0.0		1.4	27.3		1.3	51.6	
Cycle Queue Clearance Time (g_c), s	8.4	3.7			3.7		1.4	27.3		17.7	51.6	
Green Ratio (*g/C*)	0.19	0.19			0.19		0.68	0.70		0.59	0.59	
Capacity (*c*), veh/h	287	314			357		238	1324		339	1099	
Volume-to-Capacity Ratio (*X*)	0.261	0.229			0.113		0.305	0.681		0.042	0.946	
Back of Queue (*Q*), ft/ln (95 th percentile)	73.4	65.9			36.1		45.2	364.6		8.5	808.2	
Back of Queue (*Q*), veh/ln (95 th percentile)	2.9	2.6			1.4		1.8	14.6		0.3	32.3	
Queue Storage Ratio (*RQ*) (95 th percentile)	0.49	0.22			0.09		0.30	0.73		0.07	1.26	
Uniform Delay (d_1), s/veh	37.9	34.3			33.6		21.9	8.7		16.9	19.1	
Incremental Delay (d_2), s/veh	0.2	0.1			0.1		0.3	1.2		0.0	15.6	
Initial Queue Delay (d_3), s/veh	0.0	0.0			0.0		0.0	0.0		0.0	0.0	
Control Delay (*d*), s/veh	38.0	34.4			33.6		22.2	9.9		17.0	34.7	
Level of Service (LOS)	D	C			C		C	A		B	C	
Approach Delay, s/veh / LOS	36.3	D		33.6	C		10.8	B		34.5	C	
Intersection Delay, s/veh / LOS	24.2						C					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	1.94	B	1.94	B	1.63	B	1.88	B
Bicycle LOS Score / LOS	0.73	A	0.55	A	2.09	B	2.23	B

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Appendix G
Traffic Signal Warrant

Signal Warrants Analysis

File Name:	Warrants.xsw
Analyst:	JA
Agency:	SHA Engineering
Date Performed:	6/2/2022
Time Analyzed:	Weekday
Jurisdiction:	Blue Ash
Analysis Year:	2022
Project Description:	Mixed Use Develop,ent
Units:	U.S. Customary

General

Major Street Direction: North-South	Population <10,000: No
Starting Time Interval: 6	Coordinated Signal System: Yes
Median Type: Undivided	Crashes Per Year: 0
Major Street Speed (mi/h): 25	Adequate Trials of Crash Experience Alternatives: No
Nearest Signal (ft): 750	

School Crossing and Roadway Network

Number of Students in Highest Hour: 0	Two or More Major Routes: No
Number of Adequate Gaps in Period: 0	Weekend Count: No
Number of Minutes in Period: 0	5-year Growth Factor (%): 0

Railroad Crossing

Grade Crossing Approach: None	Rail Traffic (trains/day): 4
Highest Volume Hour with Trains: Unknown	High Occupancy Buses (%): 0
Distance to Stop Line (ft): -	Tractor-Trailer Trucks (%): 10

Geometry and Traffic

	Eastbound			Westbound			Northbound			Southbound		
	L	T	R	L	T	R	L	T	R	L	T	R
No. Lanes	1	1	0	0	1	0	1	1	0	1	1	0
Lane Usage	L	TR			LTR		L	TR		L	TR	

Traffic Volumes (veh/h)

	Eastbound			Westbound			Northbound			Southbound		
	L	T	R	L	T	R	L	T	R	L	T	R
Hour												
06 - 07	0	21	0	8	0	19	0	226	3	11	118	0
07 - 08	0	43	0	13	0	26	0	573	7	28	383	0
08 - 09	0	71	0	23	0	36	0	532	12	30	431	0
09 - 10	0	90	0	18	0	35	0	532	12	30	431	0
10 - 11	0	87	0	14	0	18	0	441	13	12	351	0
11 - 12	0	114	0	17	0	11	0	516	6	15	516	0
12 - 13	0	131	0	14	0	22	0	640	14	24	615	0
13 - 14	0	143	0	17	0	21	0	578	10	14	576	0
14 - 15	0	117	0	12	0	14	0	573	6	17	564	0
15 - 16	0	116	0	11	0	15	0	692	11	17	637	0
16 - 17	0	98	0	10	0	10	0	650	9	10	677	0
17 - 18	0	118	0	7	0	12	0	648	4	12	767	0

Pedestrian Volumes and Gaps (Per Hour)

	Eastbound		Westbound		Northbound		Southbound	
	Gaps	Volume	Gaps	Volume	Gaps	Volume	Gaps	Volume
Hour								
06 - 07	0	0	0	0	0	0	0	0
07 - 08	0	0	0	0	0	0	0	0
08 - 09	0	0	0	0	0	0	0	0
09 - 10	0	0	0	0	0	0	0	0
10 - 11	0	0	0	0	0	0	0	0
11 - 12	0	0	0	0	0	0	0	0
12 - 13	0	0	0	0	0	0	0	0
13 - 14	0	0	0	0	0	0	0	0
14 - 15	0	0	0	0	0	0	0	0
15 - 16	0	0	0	0	0	0	0	0
16 - 17	0	0	0	0	0	0	0	0
17 - 18	0	0	0	0	0	0	0	0

Delay

Hour	Eastbound secs/veh	Eastbound veh-hrs	Westbound secs/veh	Westbound veh-hrs	Northbound secs/veh	Northbound veh-hrs	Southbound secs/veh	Southbound veh-hrs
06 - 07	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
07 - 08	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
08 - 09	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
09 - 10	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
10 - 11	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
11 - 12	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
12 - 13	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
13 - 14	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
14 - 15	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
15 - 16	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
16 - 17	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
17 - 18	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Summary

Hour	Major Volume	Minor Volume	Total Volume	1A 100%	1A 80%	1B 100%	1B 80%	2 100%	3A 100%	3B 80%	4A 100%	4B 80%
06 - 07	358	27	406	No	No	No	No	No	No	No	No	No
07 - 08	991	43	1073	No	No	No	No	No	No	No	No	No
08 - 09	1005	71	1135	No	No	No	No	No	No	No	No	No
09 - 10	1005	90	1148	No	No	No	Yes	No	No	No	No	No
10 - 11	817	87	936	No	No	No	Yes	No	No	No	No	No
11 - 12	1053	114	1195	No	No	Yes	Yes	No	No	No	No	No
12 - 13	1293	131	1460	No	No	Yes	Yes	Yes	No	No	No	No
13 - 14	1178	143	1359	No	No	Yes	Yes	Yes	No	No	No	No
14 - 15	1160	117	1303	No	No	Yes	Yes	No	No	No	No	No
15 - 16	1357	116	1499	No	No	Yes	Yes	Yes	No	No	No	No
16 - 17	1346	98	1464	No	No	No	Yes	No	No	No	No	No
17 - 18	1431	118	1568	No	No	Yes	Yes	Yes	No	No	No	No
Total	12994	1155	14546	0	0	6	9	4	0	0	0	0

Results

Warrant 1: Eight-Hour Vehicular Volume [ ]
- A. Minimum Vehicular Volumes [ ]
- B. Interruption of Continuous Traffic [ ]
- 80% Vehicular --and-- Interruption Volumes [ ]

Warrant 2: Four-Hour Vehicular Volume [X]
- Four-Hour Vehicular Volumes [X]

Warrant 3: Peak Hour [ ]
- A. Peak-Hour Conditions [ ]
- B. Peak-Hour Vehicular Volume Hours Met [ ]

Warrant 4: Pedestrian Volume [ ]
- A. Four Hour Volumes [ ]
- B. One-Hour Volumes [ ]

Warrant 5: School Crossing [ ]
- Gaps Same Period [ ]
- Student Volumes [ ]
- Nearest Traffic Control Signal [X]

Warrant 6: Coordinated Signal System [X]
- Degree of Platooning [X]

Warrant 7: Crash Experience [ ]
- A. Adequate Trials of Alternatives [ ]
- B. Reported Crashes [ ]
- C. 80% Volumes for Warrants 1A, 1B --or-- 4 [X]

Warrant 8: Roadway Network [ ]
- A. Weekday Volume [ ]
- B. Weekend Volume [ ]

Warrant 9: Grade Crossing [ ]
   A. Grade Crossing within 140 ft --and-- [ ]
   B. Peak-Hour Vehicular Volumes [ ]

This text report was created in HCS™ Signal Warrants Version 7.9.5 on 6/2/2022 5:58:00 PM

Estimated Exitng Volume on Drive 1 (For Signal Warrants)					
TOTAL EXITING VOLUME AT ACCESS DRIVE 1 (LAUREL)					TOTAL
	821	930	720	230	TOTAL
Time					
12:00 - 1:00 AM	0	0	0	1	2
1:00 - 2:00 AM	0	0	0	1	1
2:00 - 3:00 AM	0	0	0	0	0
3:00 - 4:00 AM	0	0	0	0	1
4:00 - 5:00 AM	0	0	2	1	3
5:00 - 6:00 AM	0	0	2	2	4
6:00 - 7:00 AM	5	0	2	14	21
7:00 - 8:00 AM	12	0	4	27	43
8:00 - 9:00 AM	22	5	21	24	71
9:00 - 10:00 AM	34	9	32	14	90
10:00 - 11:00 AM	44	0	35	8	87
11:00 - 12:00 PM	50	14	36	14	114
12:00 - 1:00 PM	58	32	29	12	131
1:00 - 2:00 PM	56	50	27	11	143
2:00 - 3:00 PM	49	23	35	11	117
3:00 - 4:00 PM	49	23	35	9	116
4:00 - 5:00 PM	49	9	35	9	102
5:00 - 6:00 PM	54	23	29	11	116
6:00 - 7:00 PM	58	14	13	14	98
7:00 - 8:00 PM	53	50	7	8	118
8:00 - 9:00 PM	47	45	4	7	104
9:00 - 10:00 PM	35	9	2	9	55
10:00 - 11:00 PM	0	5	1	4	9
11:00 - 12:00 AM	0	0	1	3	4

Hourly Distribution of Entering and Exiting Vehicle Trips by Land Use

Source: ITE *Trip Generation Manual* , 11th Edition

				2700			***Volume carried for approach volumes on Drive 1 for Warrants***	
Land Use Code	821			821 - Trips				
Land Use	Shopping Plaza (40-150k)							
Subcategory	Supermarket - No							
Setting	General Urban/Suburban							
Time Period	Weekday							
# Data Sites	6						Trip Exiting at Drive 1	
	% of 16-Hour Vehicle Trips							
Time	Total	Entering	Exiting	Total	Entering	Exiting	Exiting	
12:00 - 1:00 AM	--	--	--					
1:00 - 2:00 AM	--	--	--					
2:00 - 3:00 AM	--	--	--					
3:00 - 4:00 AM	--	--	--					
4:00 - 5:00 AM	--	--	--					
5:00 - 6:00 AM	--	--	--					
6:00 - 7:00 AM	0.8%	--	--	22	11	11	5	
7:00 - 8:00 AM	1.8%	--	--	47	24	24	12	
8:00 - 9:00 AM	3.3%	--	--	88	44	44	22	
9:00 - 10:00 AM	5.1%	--	--	137	69	69	34	
10:00 - 11:00 AM	6.5%	--	--	176	88	88	44	
11:00 - 12:00 PM	7.4%	--	--	200	100	100	50	
12:00 - 1:00 PM	8.6%	--	--	232	116	116	58	
1:00 - 2:00 PM	8.3%	--	--	224	112	112	56	
2:00 - 3:00 PM	7.2%	--	--	195	97	97	49	
3:00 - 4:00 PM	7.2%	--	--	195	97	97	49	
4:00 - 5:00 PM	7.3%	--	--	196	98	98	49	
5:00 - 6:00 PM	8.0%	--	--	215	108	108	54	
6:00 - 7:00 PM	8.5%	--	--	230	115	115	58	
7:00 - 8:00 PM	7.9%	--	--	214	107	107	53	
8:00 - 9:00 PM	7.0%	--	--	190	95	95	47	
9:00 - 10:00 PM	5.2%	--	--	140	70	70	35	
10:00 - 11:00 PM	--	--	--					
11:00 - 12:00 AM	--	--	--					

Hourly Distribution of Entering and Exiting Vehicle Trips by Land Use

Source: ITE *Trip Generation Manual* , 11th Edition

					1228		***Volume carried for approach volumes on Drive 1 for Warrants***	
				614				
Land Use Code	930			720 - Trips				
Land Use	Fast Casual Restaurant							
Setting	General Urban/Suburban							
Time Period	Weekday							
# Data Sites	1							
	% of 24-Hour Vehicle Trips						Trip Exiting at Drive 1	
Time	Total	Entering	Exiting	Total	Entering	Exiting	Exiting	
12:00 - 1:00 AM	0.0%	0.0%	0.0%	0	0	0	0	
1:00 - 2:00 AM	0.0%	0.0%	0.0%	0	0	0	0	
2:00 - 3:00 AM	0.0%	0.0%	0.0%	0	0	0	0	
3:00 - 4:00 AM	0.0%	0.0%	0.0%	0	0	0	0	
4:00 - 5:00 AM	0.0%	0.0%	0.0%	0	0	0	0	
5:00 - 6:00 AM	0.0%	0.0%	0.0%	0	0	0	0	
6:00 - 7:00 AM	0.0%	0.0%	0.0%	0	0	0	0	
7:00 - 8:00 AM	0.0%	0.0%	0.0%	0	0	0	0	
8:00 - 9:00 AM	1.5%	1.5%	1.5%	18	9	9	5	
9:00 - 10:00 AM	2.9%	2.9%	2.9%	36	18	18	9	
10:00 - 11:00 AM	0.7%	1.5%	0.0%	9	9	0	0	
11:00 - 12:00 PM	5.9%	7.4%	4.4%	72	45	27	14	
12:00 - 1:00 PM	14.7%	19.1%	10.3%	181	117	63	32	
1:00 - 2:00 PM	14.7%	13.2%	16.2%	181	81	99	50	
2:00 - 3:00 PM	6.6%	5.9%	7.4%	81	36	45	23	
3:00 - 4:00 PM	4.4%	1.5%	7.4%	54	9	45	23	
4:00 - 5:00 PM	2.9%	2.9%	2.9%	36	18	18	9	
5:00 - 6:00 PM	7.4%	7.4%	7.4%	90	45	45	23	
6:00 - 7:00 PM	9.6%	14.7%	4.4%	117	90	27	14	
7:00 - 8:00 PM	12.5%	8.8%	16.2%	154	54	99	50	
8:00 - 9:00 PM	14.0%	13.2%	14.7%	172	81	90	45	
9:00 - 10:00 PM	1.5%	0.0%	2.9%	18	0	18	9	
10:00 - 11:00 PM	0.7%	0.0%	1.5%	9	0	9	5	
11:00 - 12:00 AM	0.0%	0.0%	0.0%	0	0	0	0	

Hourly Distribution of Entering and Exiting Vehicle Trips by Land Use

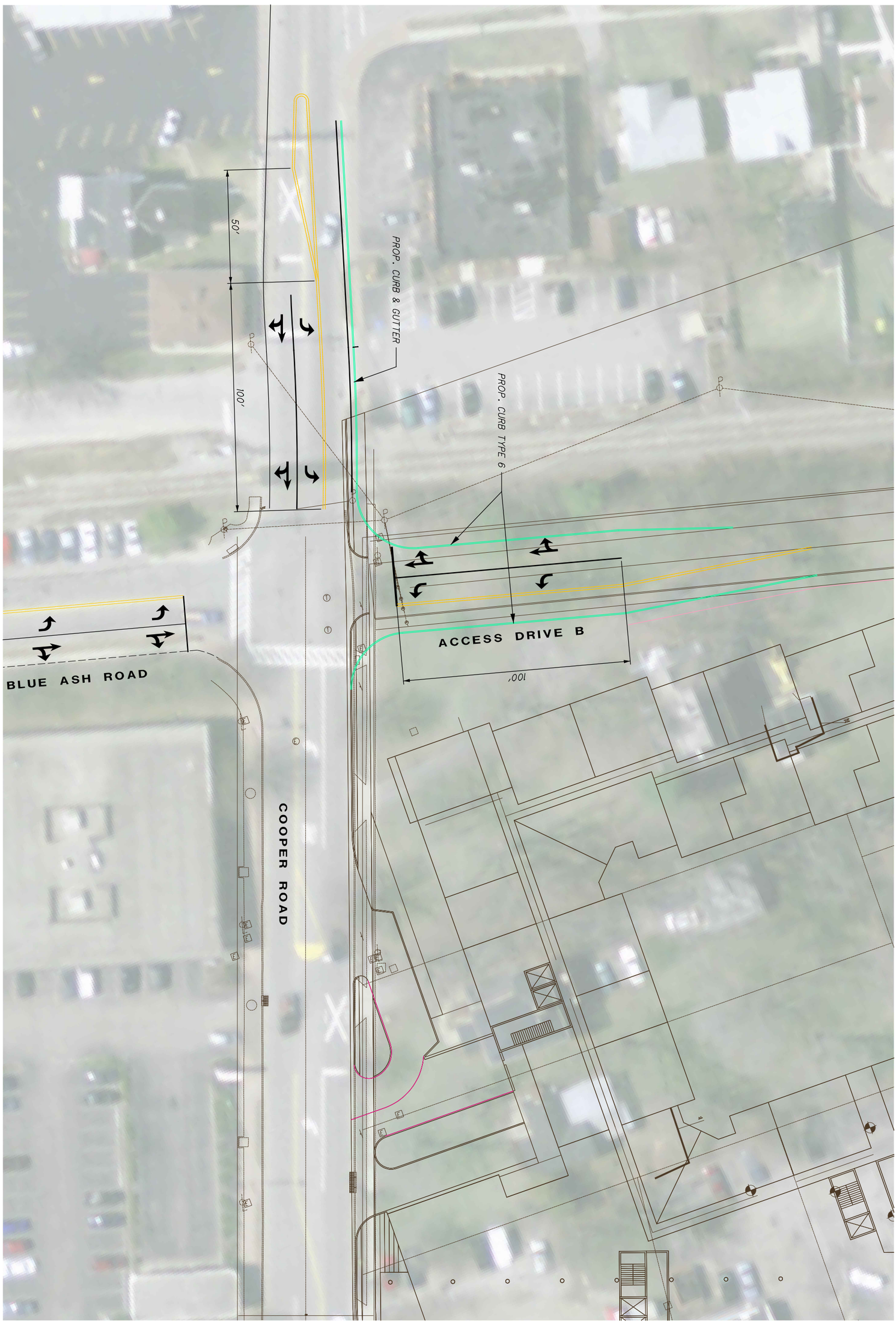
Source: ITE *Trip Generation Manual* , 11th Edition

					1396		***Volume carried for approach volumes on Drive 1 for Warrants***
				698			
Land Use Code	720			720 - Trips			
Land Use	Medical-Dental Office Building						
	Stand-Alone						
Setting	General Urban/Suburban						
Time Period	Weekday						
# Data Sites	15						Trip Exiting at Drive 1
	% of 24-Hour Vehicle Trips						
Time	Total	Entering	Exiting	Total	Entering	Exiting	Exiting
12:00 - 1:00 AM	0.0%	0.0%	0.0%	0	0	0	0
1:00 - 2:00 AM	0.0%	0.0%	0.0%	0	0	0	0
2:00 - 3:00 AM	0.0%	0.0%	0.0%	0	0	0	0
3:00 - 4:00 AM	0.2%	0.3%	0.1%	3	2	1	0
4:00 - 5:00 AM	0.9%	1.4%	0.5%	13	9	3	2
5:00 - 6:00 AM	0.6%	0.7%	0.5%	8	5	3	2
6:00 - 7:00 AM	1.2%	1.9%	0.5%	17	13	4	2
7:00 - 8:00 AM	3.9%	6.8%	1.0%	55	47	7	4
8:00 - 9:00 AM	9.0%	12.2%	5.9%	126	85	41	21
9:00 - 10:00 AM	10.3%	11.4%	9.1%	143	79	64	32
10:00 - 11:00 AM	10.3%	10.6%	10.0%	143	74	69	35
11:00 - 12:00 PM	9.0%	7.7%	10.4%	126	54	73	36
12:00 - 1:00 PM	7.5%	6.8%	8.2%	105	47	58	29
1:00 - 2:00 PM	9.0%	10.4%	7.6%	126	72	53	27
2:00 - 3:00 PM	9.7%	9.6%	9.9%	136	67	69	35
3:00 - 4:00 PM	9.6%	9.0%	10.1%	133	63	71	35
4:00 - 5:00 PM	8.0%	5.8%	10.1%	111	41	71	35
5:00 - 6:00 PM	5.6%	2.8%	8.3%	78	20	58	29
6:00 - 7:00 PM	2.4%	1.2%	3.6%	34	8	25	13
7:00 - 8:00 PM	1.5%	1.1%	1.9%	21	8	13	7
8:00 - 9:00 PM	0.7%	0.2%	1.2%	9	1	8	4
9:00 - 10:00 PM	0.3%	0.1%	0.6%	4	1	4	2
10:00 - 11:00 PM	0.1%	0.1%	0.2%	2	1	1	1
11:00 - 12:00 AM	0.1%	0.0%	0.2%	2	0	2	1

Hourly Distribution of Entering and Exiting Vehicle Trips by Land Use								
Source: ITE *Trip Generation Manual* , 11th Edition				860			***Volume carried for approach volumes on Drive 1 for Warrants***	
				430				
Land Use Code	230			230 - Trips				
Land Use	Low-Rise Residential with Ground-Floor Commercial							
Subcategory	GFA (1-25k)							
Setting	General Urban/Suburban							
Time Period	Weekday							
# Data Sites	1						Trip Exiting at Drive 1	
	% of 24-Hour Vehicle Trips							
Time	Total	Entering	Exiting	Total	Entering	Exiting	Exiting	
12:00 - 1:00 AM	0.7%	0.7%	0.7%	6	3	3	1	
1:00 - 2:00 AM	0.1%	0.0%	0.3%	1	0	1	1	
2:00 - 3:00 AM	0.1%	0.3%	0.0%	1	1	0	0	
3:00 - 4:00 AM	0.2%	0.3%	0.1%	2	1	1	0	
4:00 - 5:00 AM	0.5%	0.3%	0.7%	4	1	3	1	
5:00 - 6:00 AM	0.8%	0.7%	1.0%	7	3	4	2	
6:00 - 7:00 AM	4.0%	1.4%	6.5%	34	6	28	14	
7:00 - 8:00 AM	7.7%	2.6%	12.6%	66	11	54	27	
8:00 - 9:00 AM	6.8%	2.2%	11.3%	59	10	48	24	
9:00 - 10:00 AM	5.4%	4.0%	6.7%	46	17	29	14	
10:00 - 11:00 AM	3.9%	4.0%	3.7%	33	17	16	8	
11:00 - 12:00 PM	6.2%	6.0%	6.4%	53	26	27	14	
12:00 - 1:00 PM	5.9%	6.1%	5.7%	51	26	25	12	
1:00 - 2:00 PM	4.1%	3.2%	4.9%	35	14	21	11	
2:00 - 3:00 PM	5.2%	5.3%	5.2%	45	23	22	11	
3:00 - 4:00 PM	4.9%	5.4%	4.3%	42	23	19	9	
4:00 - 5:00 PM	5.8%	7.5%	4.1%	50	32	18	9	
5:00 - 6:00 PM	8.8%	12.7%	5.0%	76	55	22	11	
6:00 - 7:00 PM	9.4%	12.4%	6.5%	81	53	28	14	
7:00 - 8:00 PM	6.8%	9.8%	3.9%	59	42	17	8	
8:00 - 9:00 PM	4.5%	5.7%	3.3%	38	25	14	7	
9:00 - 10:00 PM	4.7%	5.3%	4.1%	40	23	18	9	
10:00 - 11:00 PM	2.1%	2.4%	1.8%	18	10	8	4	
11:00 - 12:00 AM	1.4%	1.5%	1.4%	12	7	6	3	

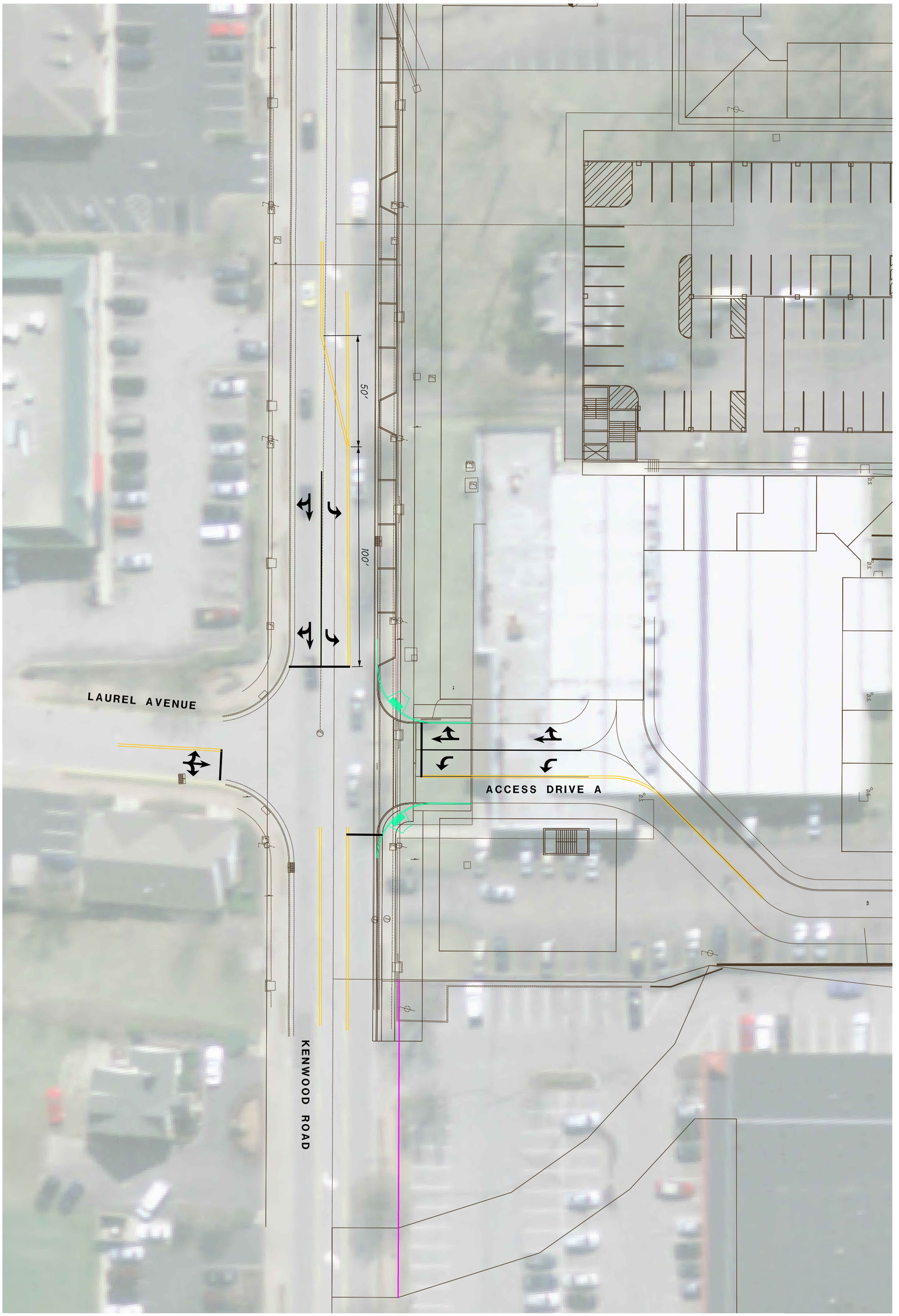
Appendix H
Schematic

C:\Projectdata\22020_BLUE-ASH\Design\Roadway\Sheets\22020_GP001.dgn Sheet 6/3/2022 9:14:41 AM jadha



2 / 1	BLUE DEVELOPMENT	SCHEMATIC PLAN ACCESS DRIVE ON COOPER ROAD	CALCULATED JAJA CHECKED XXX	0 20 10 40 HORIZONTAL SCALE IN FEET

C:\Projectdata\22020_BLUE-ASH\Design\Roadway\Sheets\22020_GP002.dgn Sheet 6/3/2022 9:14:47 AM jadha



2/2	BLUE DEVELOPMENT	SCHEMATIC PLAN ACCESS ON KENWOOD ROAD	CALCULATED JA CHECKED JA	0 10 20 40 HORIZONTAL SCALE IN FEET