February 21, 2025

Mr. Wardell Wilcox
Bayer Becker
6900 Tylersville Road
Mason, Ohio 45040

Dear Mr. Wilcox:

The Department of Transportation and Engineering (DOTE) has completed the review of the Traffic Impact Study for the Hyde Park Square Development (TIS).

A TIS was submitted to DOTE on February 5, 2025 that recommended changes to improve traffic operation on Edwards Rd between Observatory Ave and Erie Ave. The recommended changes did have a significant impact on on-street parking along this segment of Edwards Rd. The study recommended changes to improve traffic conditions on Edwards Rd with today's conditions, without consideration for the development as well with the proposed development. DOTE agreed with and approved the methodology and assumptions in the report but requested additional information before making an opinion on the recommendations of the study.

Specifically, DOTE requested travel time in both directions of Edwards Rd and queue lengths on Edwards Rd at both Erie Ave and Observatory Ave intersections, with four scenarios:

- Scenario 1 – Existing conditions
- Scenario 2 – Existing traffic with recommended 2024 improvements (No development considered)
- Scenario 3 – Existing operations with development generated traffic added
- Scenario 4 – Proposed Recommendations with development generated traffic

Scenario 1 shows better travel times and queues better or the same as Scenario 2. DOTE does not recommend or approve the implementation of Scenario 2.

When comparing Scenario 1 v Scenario 3 v Scenario 4, there is not a significant difference in the travel times or queue lengths between the Scenario's. This can be attributed to signal timing changes to optimize each Scenario.

DOTE pulled existing crash data for this section of Edwards Rd for the 4-year period of 2021-2024. There were 22 crashes during this period, which is slightly higher than would be expected. However, only one of the crashes resulted in serious injury, the remainder were minor, property damage only type crashes. Scenario 4 could reduce crashes by creating turn lanes, thus reducing rear-end collisions.

After review of the TIS, DOTE concludes the proposed development will have minimal impact to the existing travel conditions on Edwards Rd and Scenario 3 would sufficiently support the development. However, there are potential benefits to implementing Scenario 4, mainly a reduction in crashes but at the expense of on-street parking. The parking loss could be offset

by the proposed garage. DOTE would not be opposed to implementing the recommended Scenario 4. If the developer would like to pursue Scenario 4, they can work with the Hyde Park Community Council and the directly affected properties and businesses as well as DOTE and City of Cincinnati Parking Services.

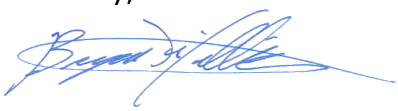
The TIS states the drive access to the site from Edwards Rd will be moved to the southern property line of the development. This change must be incorporated into the plan.

The TIS discusses existing traffic concerns related to the dismissal process of Hyde Park School, which occurs between roughly 1:45p and 2:15p each school day. DOTE is working separately with Cincinnati Public Schools on ways to potentially alleviate some of the issues associated with afternoon dismissal.

It should be noted that any comments, requirements or other issues associated with the development that occur during the site review or permitting phase of the project will supersede the comments associated with the TIS review.

DOTE staff are prepared to meet with you to discuss this review and provide further insight into comments and the concerns. Should you have any questions or want to schedule a follow-up meeting, please contact Bryan Williams at bryan.williams@cincinnati-oh.gov or 352-4506. We appreciate your cooperation in this matter.

Sincerely,



Bryan Williams, P.E.
Division Manager

TRAFFIC IMPACT STUDY
FOR
HYDE PARK SQUARE DEVELOPMENT

HYDE PARK COMMUNITY
CINCINNATI, OHIO

FEBRUARY 2025

PREPARED FOR:

PLK COMMUNITIES
5905 EAST GALBRAITH ROAD, SUITE 4100
CINCINNATI, OHIO 45236

PREPARED BY:

BAYER BECKER
6900 TYLERSVILLE ROAD
MASON, OHIO 45040
PHONE: (513) 336-6600
FAX: (513) 336-9365

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EXECUTIVE SUMMARY

The proposed Hyde Park Square development is located on the east side of Edwards Road (SR 561), south side of Erie Avenue, and west side of Michigan Avenue in the Hyde Park Community, City of Cincinnati, Ohio. The proposed Hyde Park Square development will include a mix of commercial/retail and residential land uses and will consist of the following land uses and densities:

Hyde Park Square Development

Land Use	Density
Multifamily Housing (Apartments and Townhomes)	182 Dwelling Units (DU)
Hotel	90 Rooms (RM)
Retail Stores	10,600 Square Feet (SF)
Fast Casual Restaurant	5,300 Square Feet (SF)
Fine Dining Restaurant	3,000 Square Feet (SF)
Brewery Tap Room	6,000 Square Feet (SF)
Total Development	**24,900 SF/182 DU/90 RM**

The roadways that will provide access to the proposed site development are Edwards Road (SR 561), Observatory Avenue, Erie Avenue, and Michigan Avenue. Direct access to the proposed Hyde Park Square development will utilize the following locations:

- Edwards Road (SR 561) and Site Access 1, approximately 230 feet south of Erie Avenue (stop bar to centerline), near the south property line.
- Michigan Avenue and Site Access 2, approximately 150 feet south of Erie Avenue (stop bar to centerline).

Bayer Becker corresponded with representatives of the Cincinnati Department of Transportation and Engineering (DOTE) to establish the parameters of the Study. As such, the following key existing and proposed intersections define the study area of this report:

- Edwards Road (SR 561) and Erie Avenue – Existing.
- Edwards Road (SR 561) and Observatory Avenue – Existing.
- Michigan Avenue and Erie Avenue – Existing.
- Edwards Road (SR 561) and Site Access 1 – Proposed.
- Michigan Avenue and Site Access 2 – Proposed.

The traffic control that currently operates at the key existing intersections are as follows:

- Edwards Road (SR 561) and Erie Avenue - Signalized.
- Edwards Road (SR 561) and Observatory Avenue - Signalized.
- Erie Avenue and Michigan Avenue - Signalized.

The site is surrounded by residential, commercial, recreational, civic and educational land uses. There are no other known significant developments or improvements planned within the immediate study area.

Based on the current traffic operation issues discussed in this report, the roadway improvements recommended to accommodate the ***2024 Existing Traffic*** (excluding site traffic) are as follows:

Edwards Road Corridor

1. Restripe the southbound pavement on Edwards Road (SR 561), between Erie Avenue and Observatory Avenue, with a lane line to allow the curb lane to function as a lane of travel during the restricted parking periods.
2. Restrict on-street parking on the west side of Edwards Road (SR 561) during the 12:00 PM – 6:00 PM peak hour period, between Erie Avenue and the Hyde Park Elementary School driveway.
3. Install “No Parking or Stopping 12 PM – 6 PM Mon thru Fri Except During After School Dismissal” pole mounted signs on the west side of Edwards Road (SR 561), within the restricted area.
4. Police enforcement should be required to maintain safe traffic operations on Edwards Road (SR 561) at the Hyde Park Elementary School driveway, during the standard time allotment for the schools PM period.
5. An adult crossing guard should be considered at the Edwards Road (SR 561) and Erie Avenue intersection during the AM and PM school peak periods if student safety concerns arise.

Based on the analysis contained in this report, the roadway improvements recommended to accommodate the ***2027 Build Traffic Projections*** (including site traffic) are as follows:

Edwards Road (SR 561) and Erie Avenue Intersection

1. Restripe Edwards Road (SR 561) and Erie Avenue intersection to provide the following:
    - One (1) northbound left turn lane a total of 100 feet in length, including 50 feet of diverging taper.

- One (1) northbound shared through and right turn lane.
- Adjust striping on the north side of the intersection for proper geometric alignment.
- Modify traffic signal to provide appropriate timing and phasing.

Edwards Road (SR 561) and Site Access 1 Intersection

1. Construct a new full operational site access driveway on the east side of Edwards Road (SR 561), approximately 230 feet south of Erie Avenue (stop bar to centerline), for access to the proposed Hyde Park Square development.
2. Provide one (1) eastbound lane for entering traffic.
3. Provide one (1) westbound lane for exiting traffic.
4. Install a "Do Not Block Driveway" pole mounted sign on Edwards Road (SR 561) at the site driveway.

Michigan Avenue and Site Access 2 Intersection

1. Construct a new full operational site driveway on the west side of Michigan Avenue, approximately 150 feet south of Erie Avenue (stop bar to centerline), for access to the proposed Hyde Park Square development.
2. Provide one (1) westbound lane for entering traffic.
3. Provide one (1) eastbound lane for exiting traffic.

General

1. Restripe Edwards Road (SR 561), along the site frontage, to provide:
   - One (1) lane of travel in the northbound direction.
   - Two (2) lanes of travel in the southbound direction.
   - A center two-way left turn lane (TWLTL) approximately 330 feet (stop bar to US Bank entering driveway) to provide left turn storage for the driveways on both sides of Edwards Road (SR 561)
2. Remove all on-street parking on east side of Edwards Road (SR 561), along site frontage.
3. Install "No Stopping or Parking Anytime" pole mounted signs on the east side of Edwards Road (SR 561), within the restricted area.
4. Modify traffic signal timing and phasing at the Edwards Road (SR 561) and Erie Avenue, and Michigan Avenue and Erie Avenue intersections, as necessary.

Based upon engineering judgment and the analysis contained in this report, the proposed Hyde Park Square development upon construction of the recommended improvements will not significantly impact operations on the adjacent roadway network.

INTRODUCTION

The purpose of this study is to determine the traffic impacts of the proposed Hyde Park Square development, in the Hyde Park Community, Cincinnati, Ohio, and to satisfy the Cincinnati Department of Transportation and Engineering (DOTE) requirements for traffic impact studies.

This study describes the existing roadway network, identifies peak traffic conditions, forecasts and distributes future traffic volumes, and determines the impact of the proposed development on the adjacent road network. Conclusions related to the impact of the increased traffic on the roadway system are identified and recommendations for mitigating any possible traffic impacts are provided.

The proposed Hyde Park Square development is located on the east side of Edwards Road (SR 561), south side of Erie Avenue, and west side of Michigan Avenue in the Hyde Park Community. A vicinity map is provided in Figure 1 below.

Figure 1
Vicinity Map

Bayer Becker corresponded with DOTE to establish the scope of the study. As such, the following key existing and proposed intersections define the study area of this report:

- Edwards Road (SR 561) and Erie Avenue - Existing.
- Edwards Road (SR 561) and Observatory Avenue - Existing.
- Michigan Avenue and Erie Avenue - Existing.
- Edwards Road (SR 561) and Site Access 1 - Proposed.
- Michigan Avenue and Site Access 2 - Proposed.

The full build out of the proposed Hyde Park Square development is anticipated by the year 2027. Therefore, the analysis year of the study is ***2027 Build Traffic Projections***. At full build out, the proposed Hyde Park Square development will consist of the following land uses and densities:

Hyde Park Square Development

Land Use	Density
Multifamily Housing (Apartments and Townhomes)	182 Dwelling Units (DU)
Hotel	90 Rooms (RM)
Retail Stores	10,600 Square Feet (SF)
Fast Casual Restaurant	5,300 Square Feet (SF)
Fine Dining Restaurant	3,000 Square Feet (SF)
Brewery Tap Room	6,000 Square Feet (SF)
Total Development	**24,900 SF/182 DU/90 RM**

The technical material and data contained in this document was prepared by Bayer Becker under the supervision and direction of a Professional Engineer licensed to practice in the State of Ohio, using the following resources in the development of the analysis:

1. Site reconnaissance, field counts and observations by Bayer Becker.
2. Communications with representatives of the Cincinnati Department of Transportation and Engineers (DOTE).
3. Communications with representatives of the PLK Communities (PLK).
4. Concept Site Plan for the proposed Hyde Park Square development provided by PLK.

5. Peak hour turning movement traffic counts, performed by Bayer Becker, on Wednesday, November 6, 2024, and Tuesday, December 3, 2024, from 7:00 AM to 9:00 AM and from 4:00 PM to 6:00 PM peak hours at the following intersections:
    a. Edwards Road (SR 561) and Erie Avenue.
    b. Edwards Road (SR 561) and Observatory Avenue.
    c. Erie Avenue and Michigan Avenue.
6. Institute of Transportation Engineer's (ITE) *Trip Generation Manual 11th, Edition.*
7. *Highway Capacity Manual (HCM), 6th Edition*.
8. *Highway Capacity Software 2024 (HCS2024, Version 8.3*).
9. *SYNCHRO plus SimTraffic 12, Version 12.2, build 3, revision 12 (12.2.3.12*).
10. The *2013 Official Thoroughfare System,* for the City of Cincinnati.
11. Reference to the *Title XIV Zoning Code of the City of Cincinnati*, Ordained 2004.

The primary objective of this traffic impact study is to determine the traffic impacts of the proposed development, to determine what off-site improvements are required to mitigate the developments' impact, and to satisfy DOTE requirements for traffic impact studies.

The ***2024 Existing Traffic*** and ***2027 Build Traffic Projections*** are the years analyzed as part of the study.

PROPOSED SITE DEVELOPMENT

The proposed Hyde Park Square development is located on the east side of Edwards Road (SR 561), south side of Erie Avenue, and west side of Michigan Avenue in the Hyde Park Community, City of Cincinnati, Ohio.

According to the City of Cincinnati, Ohio *Zoning Map*, the multiple properties are currently zoned Commercial Neighborhood - Pedestrian - Business (CN-P-B) and Office Limited - Business (OL-B). The properties have been consolidated under the Planned Development (PD) zone. The proposed zone change would allow for a mixed-use development consisting of residential (residential apartments and townhouses), retail (including restaurants and entertainment), and hotel land uses.

At full build out, the proposed Hyde Park Square development will consist of the following land uses and densities:

Hyde Park Square Development

Land Use	Density
Multifamily Housing (Apartments and Townhomes)	182 Dwelling Units (DU)
Hotel	90 Rooms (RM)
Retail Stores	10,600 Square Feet (SF)
Fast Casual Restaurant	5,300 Square Feet (SF)
Fine Dining Restaurant	3,000 Square Feet (SF)
Brewery Tap Room	6,000 Square Feet (SF)
Total Development	**24,900 SF/182 DU/90 RM**

Direct access to the proposed Hyde Park Square development will utilize the following locations:

- Edwards Road (SR 561) and Site Access 1, Full Movement.
- Michigan Avenue and Site Access 2, Full Movement.

The Concept Plan for the proposed Hyde Park Square development is provided in Figure 2.

LEGEND

- EXISTING CONCRETE/WALK (TO REMAIN)
- PROPOSED CONCRETE DRIVE APRON (PER DOTE ACC NO. 22855)
- PROPOSED VEHICULAR/PEDESTRIAN PLAZA OVER STRUCTURED PARKING
- PROPOSED GREEN SPACE (SEE ARCH PLANS)
- PROPOSED BUILDING OVER STRUCTURED PARKING (SEE ARCH PLANS)
- BUILDING RENOVATION (SEE ARCH PLANS)
- EXISTING BUILDING TO REMAIN
- PROJECT BOUNDARY

Basis of Bearing: State Plane NAD83 (2011)

0 20 30

SCALE: 1" = 20'

Edwards Road (PUBLIC)

Erie Avenue (PUBLIC)

EXISTING MIXED-USE BUILDING WITH GROUND FLOOR RETAIL

SEE ARCH PLANS FOR BUILDING RENOVATION PLANS

EXISTING LOBBY

EXIST MU BLDG RETAIL

EXISTING MIXED-USE BUILDING WITH GROUND FLOOR RETAIL

EXISTING LOBBY

0' BUILDING SETBACK

EXISTING BUILDING TO REMAIN

Ex. 1 Story Brick Building

HOTEL RESTAURANT

EV 02 001

HOTEL LOBBY

EXISTING BUILDING TO REMAIN

Ex. 3 Story Brick Building

EXISTING BUILDING TO REMAIN

Ex. 3 Story Brick Building

RETAIL

TWO LEVELS OF STRUCTURED PARKING BLOW PLAZA DECK

ENTRANCE TO PROP UNDERGROUND PARKING GARAGE (SEE PARKING GARAGE PLANS FOR DETAILS)

RETAIL

RESIDENTIAL LOBBY

LOBBY

SERVICE

LOB

EL 03 001

UP

DOWN

GARAGE RAMP

UTILITY

UTILITY

EXISTING BUILDING TO REMAIN

Ex. 1 Story Block Building

Ex. 1 Story Block Garage

Area Under Construction No Access

Ex. Steel Plate

Ex. Chainlink Construction Fence

Ex. Curb Cut

Ex. Speed Bump

Ex. Planter

Ex. Bench

Ex. Grates

Ex. Conc Walk

Ex. Conc Ramp

Ex. Fountain

Ex. Conc. Wall

Ex. Bench (Typical)

Ex. Fire Escape

Ex. Wood Deck

Ex. Brick Stairs

Ex. B/C

Ex. Conc. Wall

Ex. Conc. Window Well (Typ.)

5' MIN

10' MIN

679.43 sq ft

1 T-1 0.00

52 T-12 0.00

Item	Revision Description	Date	Drwn	Chk

HYDE PARK SQUARE

SITE LAYOUT PLAN

bayer becker
www.bayerbecker.com
1404 Race Street Suite 204
Cincinnati, OH 45202 - 513.834.6151

Drawing: 23-0083 CD
Drawn by: AFG
Checked By:
Issue Date: 11-01-24

Figure 2
Site Plan

AREA CONDITIONS

Study Area

The proposed site development is located on Edwards Road (SR 561), Erie Avenue, and Michigan Avenue. The following key existing and proposed intersections define the study area of this report:

- Edwards Road (SR 561) and Erie Avenue - Existing.
- Edwards Road (SR 561) and Observatory Avenue - Existing.
- Michigan Avenue and Erie Avenue - Existing.
- Edwards Road (SR 561) and Site Access 1 - Proposed.
- Michigan Avenue and Site Access 2 - Proposed.

Within the study area, according to the *2013 Official Thoroughfare System Report* for the City of Cincinnati, **Edwards Road (SR 561)** is a north-south, basic four (4) lane Principal Arterial street; operating on the west border of the proposed Hyde Park Square development, with a posted speed limit of 35 mph. One (1) lane of travel and one (1) lane of on-street parking are provided in each of the northbound and southbound directions, with turn lanes provided at critical intersections with Erie Avenue and Observatory Avenue.

Erie Avenue is an east-west, four (4) lane Minor Arterial street; to the north of the Hyde Park Square development, with a posted speed limit of 25 mph along the site frontage. The historic Hyde Park Square boulevard and neighborhood shopping district is located on Erie Avenue, also along the site frontage. Two (2) lanes of travel and angled on-street parking are provided in each of the eastbound and westbound directions, with turn lanes provided at the critical Edwards Road (SR 561) intersection.

Michigan Avenue is a north-south, two (2) lane Local street on the east side of the proposed Hyde Park Square development, with a posted speed limit of 25 mph along the site frontage. One (1) lane of travel and one (1) lane of on-street parking are provided in each of the northbound and southbound directions.

Observatory Avenue is an east-west two (2) lane Principal Arterial street, operating to the south of the proposed Hyde Park Square development with a posted speed limit of 30 MPH. One (1) lane of travel and one (1) lane of on-street parking are provided in each of the eastbound and westbound directions, with turn lanes provided at critical intersections with Edwards Road (SR 561).

It should be noted that a restrictive 20 mph school zone sign is installed on Edwards Road (SR 561) and Observatory Avenue, in the vicinity of the Hyde Park Elementary School.

Study Area Land Use

The proposed Hyde Park Square development is generally surrounded by residential, commercial, institutional, recreational and educational land uses.

There are no other known developments or improvements planned within the study area.

Site Accessibility

The roadways that will provide access to the proposed site development are Edwards Road (SR 561), Observatory Avenue, Erie Avenue, and Michigan Avenue. Direct access to the proposed Hyde Park Square development will utilize the following locations:

- Edwards Road (SR 561) and Site Access 1, approximately 230 feet south of Erie Avenue (stop bar to centerline).
- Michigan Avenue and Site Access 2, approximately 150 feet south of Erie Avenue (stop bar to centerline).

To determine the weekday AM and PM peak hour traffic volumes for the key intersections, Bayer Becker performed the peak hour turning movement traffic counts, on Wednesday, November 6, 2024, and Tuesday, December 3, 2024, from 7:00 AM to 9:00 AM and from 4:00 PM to 6:00 PM at the following intersections:

- Edwards Road (SR 561) and Erie Avenue.
- Edwards Road (SR 561) and Observatory Avenue.
- Erie Avenue and Michigan Avenue.

The 1-hour peak for the AM and PM peak hour periods were established as:

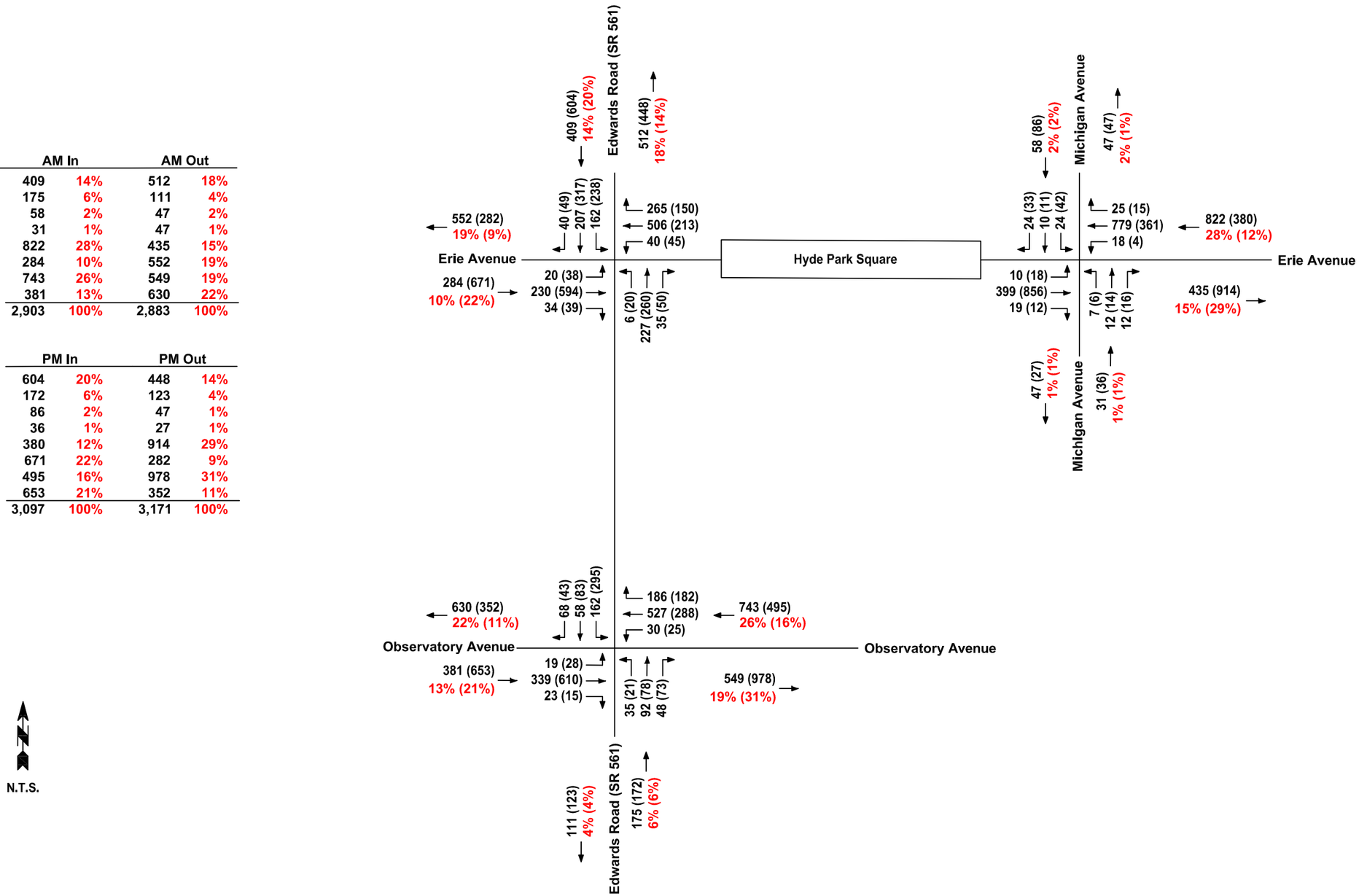
- AM Peak Hour - 7:30 – 8:30 AM.
- PM Peak Hour - 4:00 and 4:30 – 5:00 and 5:30 PM.

The 2024 Existing AM and PM peak-hour volumes are presented in Figure 3. The actual 2024 existing traffic volumes are provided in Appendix A.

External Station
Existing Traffic and Percentage Distribution

	AM In		AM Out	
To/From North on Edwards Road (SR 561)	409	14%	512	18%
To/From South on Edwards Road (SR 561)	175	6%	111	4%
To/From North on Michigan Avenue	58	2%	47	2%
To/From South on Michigan Avenue	31	1%	47	1%
To/From East on Erie Avenue	822	28%	435	15%
To/From West on Erle Avenue	284	10%	552	19%
To/From East on Observatory Avenue	743	26%	549	19%
To/From West on Observatory Avenue	381	13%	630	22%
	2,903	100%	2,883	100%

	PM In		PM Out	
To/From North on Edwards Road (SR 561)	604	20%	448	14%
To/From South on Edwards Road (SR 561)	172	6%	123	4%
To/From North on Michigan Avenue	86	2%	47	1%
To/From South on Michigan Avenue	36	1%	27	1%
To/From East on Erie Avenue	380	12%	914	29%
To/From West on Erle Avenue	671	22%	282	9%
To/From East on Observatory Avenue	495	16%	978	31%
To/From West on Observatory Avenue	653	21%	352	11%
	3,097	100%	3,171	100%



N.T.S.

Figure 3

Hyde Park Square Development
City of Cincinnati, Hamilton County, Ohio

2024 Existing Traffic & Percentage Distributions

xx/xx% - AM Peak Hour
(xx)/(xx%) - PM Peak Hour

bayer becker
www.bayerbecker.com
6900 Tylersville Road, Suite A
Mason, OH 45040 - 513.336.6600

PROJECTED TRAFFIC

Site Traffic

The Institute of Transportation Engineer's (ITE) *Trip Generation Manual*, *11th Edition*, based on the peak hour of adjacent street traffic, when available, or peak of generator, is the nationally accepted data source used by the traffic engineering industry to estimate the future trips for the land uses of a proposed development. The trips generated by the proposed Hyde Park Square development were calculated using the *Trip Generation Manual,* based on the peak hour of adjacent street traffic.

The proposed Hyde Park Square development, with its mix of commercial, retail, and residential land uses, has the potential for interaction amongst these uses within the site. As defined in the ITE *Trip Generation Handbook*, *3rd Edition*, "a multi-use development is typically a single real estate project that consists of two or more ITE land use classifications between which trips can be made without using the off-site road system."

Therefore, the procedure for estimating multi-use trip generation (internal capture), presented in the Transportation Research Board (TRB) *National Cooperative Highway Research Program (NCHRP) Report 684*, *"Enhancing Internal Trip Capture Estimation for Mixed-Use Developments"*, was used to estimate the internal trips, or the reduction rate that can be applied to the trip generation estimates for individual land uses to account for trips internal to the site. Once the trips internal to the site are established, the trips external to the site that are added to the adjacent road network are developed by subtracting the internal trips from the site generated trips of each land use category.

The trips generated by the proposed Hyde Park Square development, during the weekday AM and PM peak hour (of adjacent street traffic), are shown in Table 1.

The trips generated by each land use during the weekday AM and PM peak hour (of adjacent street traffic) are presented in Table 1, on page 14.

Table 1
Trip Generation*

Hyde Park Square Development	ITE Code*	Size	Unit	AM Peak Hour			PM Peak Hour		
				Enter	Exit	Total	Enter	Exit	Total
Multi-Family Housing (Mid Rise) 4-10 Fls	221	182	DU's	16	52	68	43	28	71
Internal Capture				0	-3	-3	-17	-11	-28
External Trips**				16	49	65	26	17	43
Hotel	310	90	RM's	21	17	38	20	19	39
Internal Capture				0	-2	-2	-8	-6	-14
External Trips**				21	15	36	12	13	25
Strip Retail Center <40k	822	10,600	SF	18	12	30	41	40	81
Internal Capture				-3	-2	-5	-26	-24	-50
External Trips**				15	10	25	15	16	31
Fast Casual Restaurant	930	5,300	SF	4	4	8	43	36	79
Internal Capture				-3	-1	-4	-11	-17	-28
External Trips**				1	3	4	32	19	51
Fine Dining Restaurant	931	3,000	SF	1	1	2	15	8	23
Internal Capture				0	0	0	-3	-4	-7
External Trips**				1	1	2	12	4	16
Pass-By Reduction @ 44% PM				0	0	0	-5	-2	-7
Final Trips**				1	1	2	7	2	9
Brewery Tap Room	971	6,000	SF	4	0	4	35	24	59
Internal Capture				-2	0	-2	-9	-12	-21
External Trips**				2	0	2	26	12	38
Total Site Generated Trips				64	86	150	197	155	352
Total Internal Capture				-8	-8	-16	-74	-74	-148
Total External Trips				**56**	**78**	**134**	**123**	**81**	**204**
Total Pass-By Reductions				0	0	0	-5	-2	-7
Total External/Final Trips				**56**	**78**	**134**	**118**	**79**	**197**

* Excerpts from Institute of Transportation Engineers (ITE) -*Trip Generation Manual*, 11th Edition.
** NCHRP Internal Capture calculations. See Appendix B.

Trip Distribution

The external trips generated by the proposed Hyde Park Square development were distributed to the adjacent roadway network, by directional distribution, based on existing traffic volumes, existing traffic patterns, and experience related to land use patterns in the area. Considering these factors, the regional percentage of trips that enter and exit the proposed Hyde Park Square development site, during the AM and PM peak hours, are presented in Table 2, on page 15.

Table 2
Existing Regional Traffic and Percentage Distribution

Hyde Park Square Development External Traffic Station Orientation To/From	AM Peak Hour				PM Peak Hour			
	Entering		Exiting		Entering		Exiting	
	Volume	Percentage	Volume	Percentage	Volume	Percentage	Volume	Percentage
North on Edwards Road (SR 561)	409	14%	512	18%	604	20%	448	14%
South on Edwards Road (SR 561)	175	6%	111	4%	172	6%	123	4%
North on Michigan Avenue	58	2%	47	2%	86	2%	47	1%
South on Michigan Avenue	31	1%	47	1%	36	1%	27	1%
East on Erie Avenue	822	28%	435	15%	380	12%	914	29%
West on Erie Avenue	284	10%	552	19%	671	22%	282	9%
East on Observatory Avenue	743	26%	549	19%	495	16%	978	31%
West on Observatory Avenue	381	13%	630	22%	653	21%	352	11%
Total	2,903	100%	2,883	100%	3,097	100%	3,171	100%

Trip distribution percentages for the proposed Hyde Park Square development are presented in Figure 3, along with the existing traffic volumes.

External Site Trips

The external site trips generated by the proposed Hyde Park Square development were assigned to the adjacent road network based on the trip distribution percentages contained in Table 2. The ***External Site Trips*** for the proposed Hyde Park Square development are presented in Figure 4 and the supportive data used to establish the external site trips are provided as Appendix B.

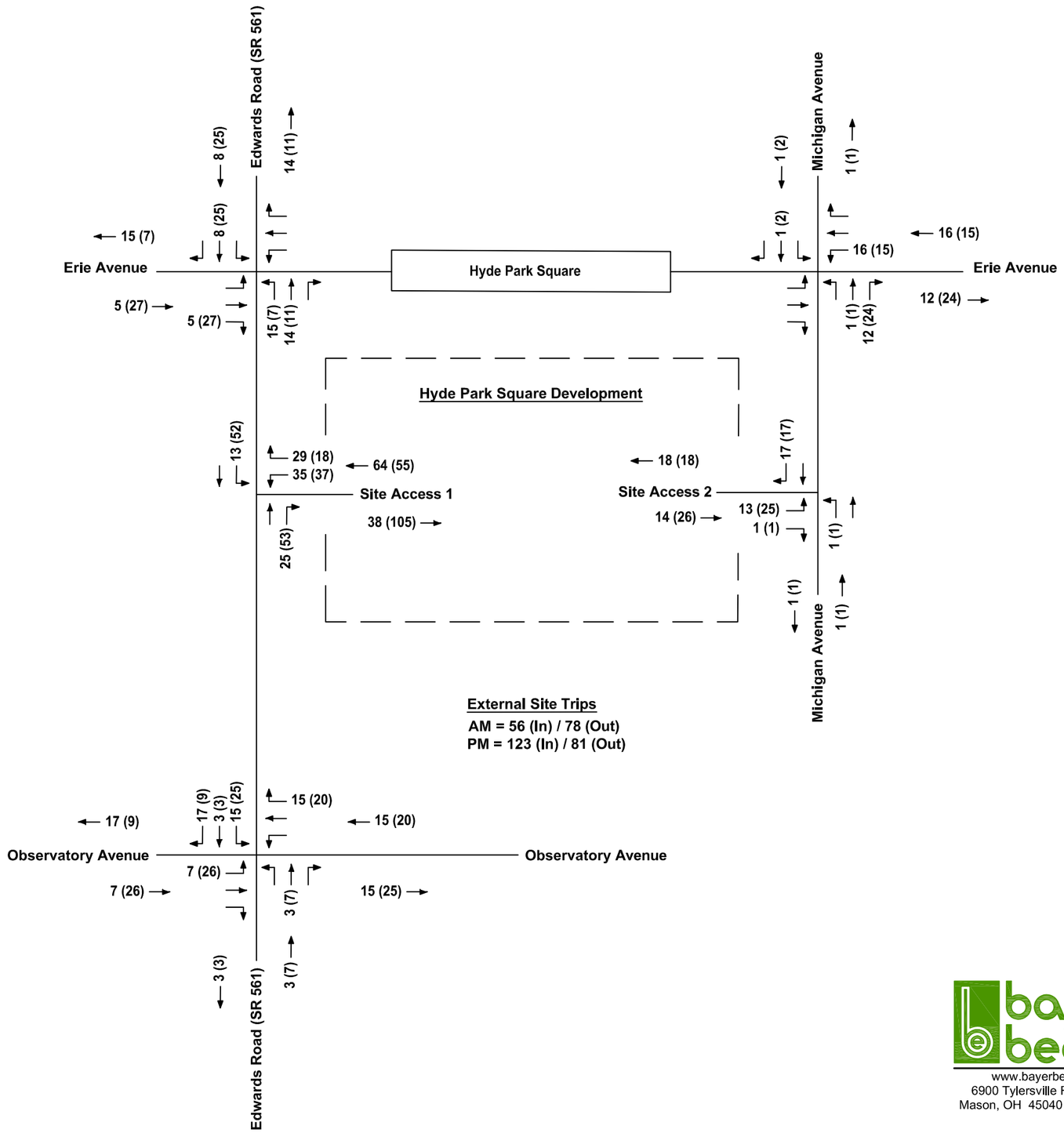
Pass-By Trips

Pass-by trips attracted from the existing adjacent road volumes of Edwards Road (SR 561), Erie Avenue, and Observatory Avenue by the proposed development project, were established along the site frontage. The ***Pass-By Trips*** for the proposed Hyde Park Square development are provided in Figure 5.

Final Site Trips

Final site trips of the proposed Hyde Park Square development, to be assigned to the study area key intersections, were determined by subtracting the pass-by trips from the external site trips. The ***Final Site Trips*** for the proposed Hyde Park Square development are presented in Figure 6.

External Station - External Site Trip Validation	AM In	AM Out	PM In	PM Out
To/From North on Edwards Road (SR 561)	8	14	25	11
To/From South on Edwards Road (SR 561)	3	3	7	3
To/From North on Michigan Avenue	1	1	2	1
To/From South on Michigan Avenue	1	1	1	1
To/From East on Erie Avenue	16	12	15	24
To/From West on Erie Avenue	5	15	27	7
To/From East on Observatory Avenue	15	15	20	25
To/From West on Observatory Avenue	7	17	26	9
	56	78	123	81



N.T.S.

Figure 4

Hyde Park Square Development
City of Cincinnati, Hamilton County, Ohio

External Site Trips

xx - AM Peak Hour
(xx) - PM Peak Hour

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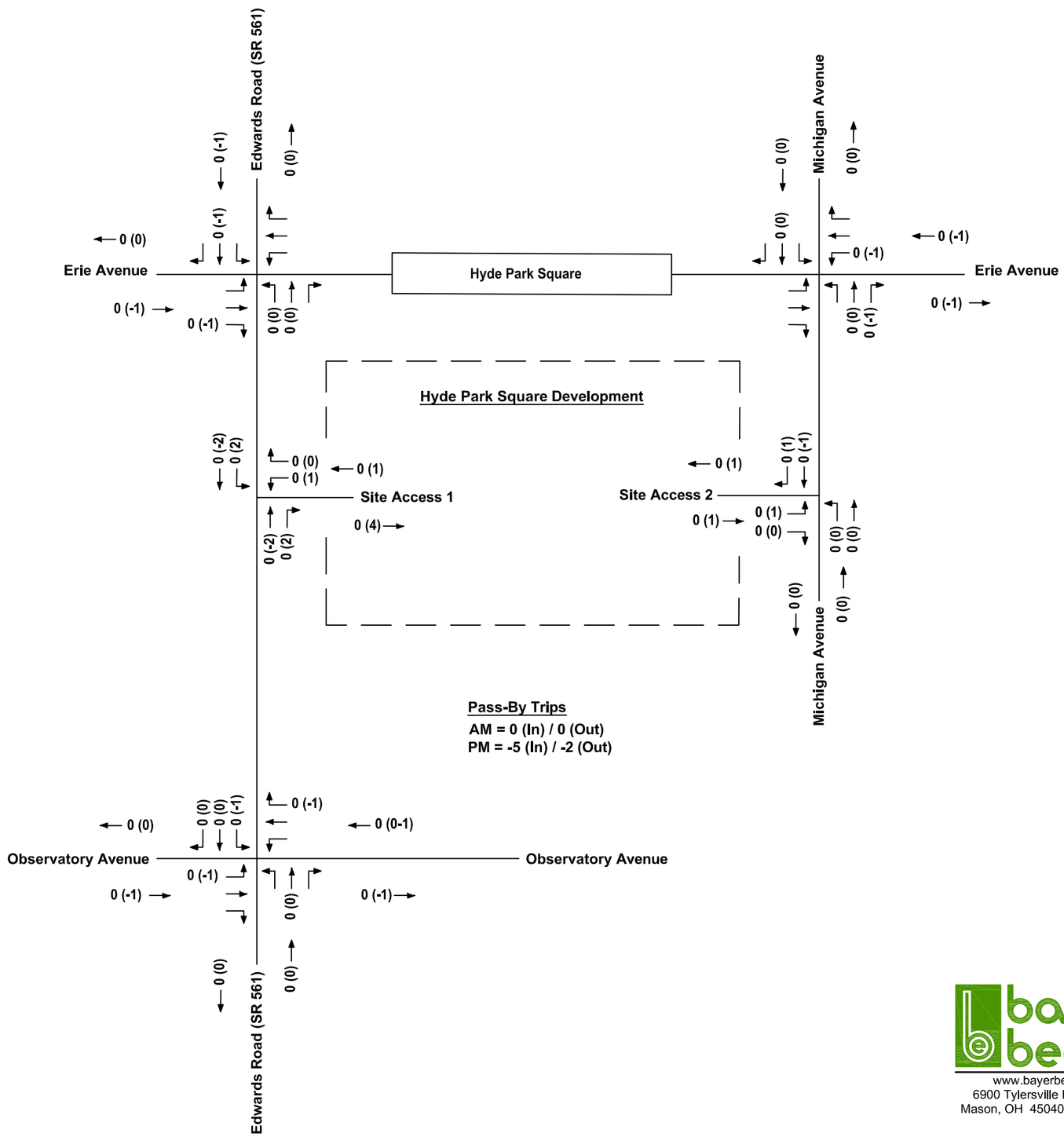
6900 Tylersville Road, Suite A
Mason, OH 45040 - 513.336.6600

External Station - Pass-By Trip Validation	AM In	AM Out	PM In	PM Out
To/From North on Edwards Road (SR 561)	0	0	-1	0
To/From South on Edwards Road (SR 561)	0	0	0	0
To/From North on Michigan Avenue	0	0	0	0
To/From South on Michigan Avenue	0	0	0	0
To/From East on Erie Avenue	0	0	-1	-1
To/From West on Erie Avenue	0	0	-1	0
To/From East on Observatory Avenue	0	0	-1	-1
To/From West on Observatory Avenue	0	0	-1	0
	0	0	-5	-2



N.T.S.

Figure 5

Hyde Park Square Development
City of Cincinnati, Hamilton County, Ohio

Pass-By Trip Reductions

xx - AM Peak Hour
(xx) - PM Peak Hour

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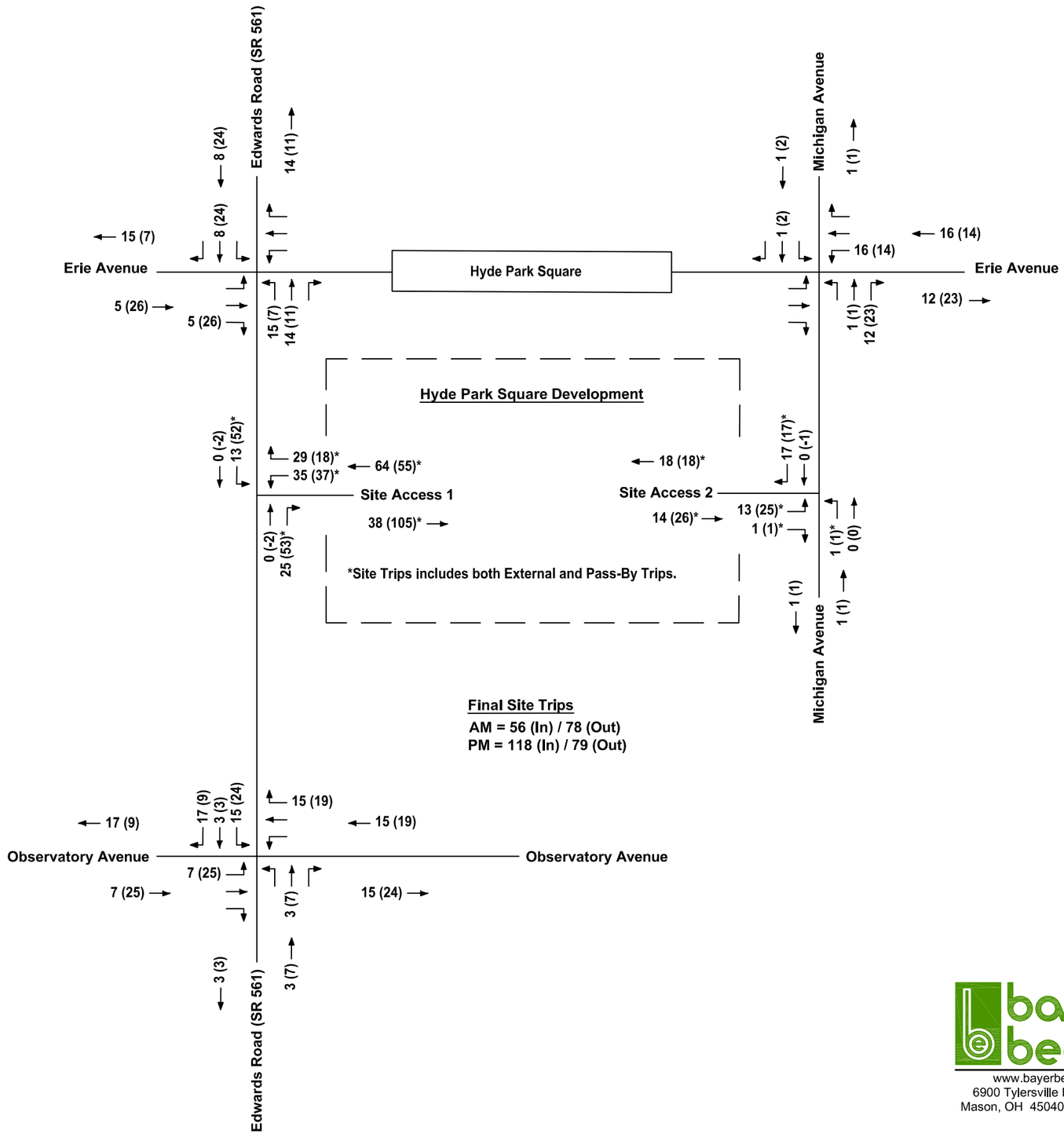
6900 Tylersville Road, Suite A
Mason, OH 45040 - 513.336.6600

External Station - Final Site Trip Validation	AM In	AM Out	PM In	PM Out
To/From North on Edwards Road (SR 561)	8	14	24	11
To/From South on Edwards Road (SR 561)	3	3	7	3
To/From North on Michigan Avenue	1	1	2	1
To/From South on Michigan Avenue	1	1	1	1
To/From East on Erie Avenue	16	12	14	23
To/From West on Erie Avenue	5	15	26	7
To/From East on Observatory Avenue	15	15	19	24
To/From West on Observatory Avenue	7	17	25	9
	56	78	118	79



N.T.S.

Figure 6

Hyde Park Square Development
City of Cincinnati, Hamilton County, Ohio

Final Site Trips

xx - AM Peak Hour
(xx) - PM Peak Hour

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Build Traffic Projections

The 2027 Build Traffic Projections were obtained by adding the 2024 Existing Traffic Volumes (see Figure 3) together with the Final Site Trips (see Figure 6). The ***2027 Build Traffic Projections*** are presented in Figure 7.

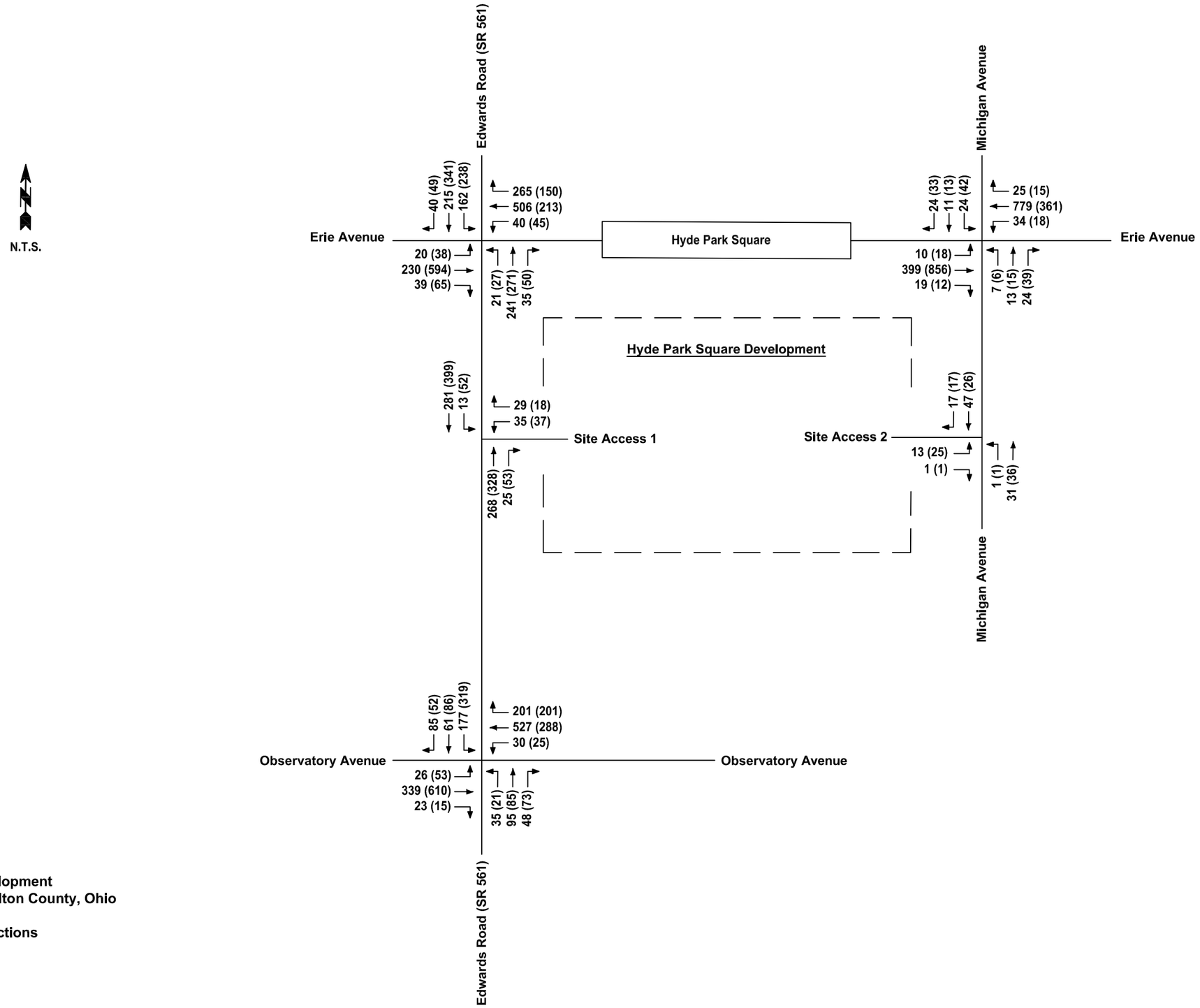

Figure 7

Hyde Park Square Development
City of Cincinnati, Hamilton County, Ohio

2027 Build Traffic Projections

xx - AM Peak Hour
(xx) - PM Peak Hour

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TRAFFIC ANALYSIS

Site Access

The roadways that will provide access to the proposed site development are Edwards Road (SR 561), Observatory Avenue, Erie Avenue, and Michigan Avenue. Direct access to the proposed Hyde Park Square development will utilize the following locations:

- Edwards Road (SR 561) and Site Access 1, approximately 230 feet south of Erie Avenue (stop bar to centerline).
- Michigan Avenue and Site Access 2, approximately 150 feet south of Erie Avenue (stop bar to centerline).

Turn Lane Warrant Analysis

The need for left and right-turn lanes at the key unsignalized site access intersections was not considered after conducting a preliminary capacity analysis of the existing traffic operations at the Edwards Road (SR 561) and Erie Avenue, and Erie Avenue and Michigan Avenue intersections. As a result of the preliminary analysis and discussions with DOTE, the scope of services for the traffic analysis was expanded to include the following design alternatives for the Edwards Road (SR 561) Corridor and intersection with Erie Avenue:

Alternative 1 – Peak Hour On-Street Parking Restrictions

- Restripe pavement on Edwards Road (SR 561), between Erie Avenue and Observatory Avenue, and restrict the AM and PM peak hour on-street parking, by peak hour direction, to permit two (2) lanes of travel northbound (AM peak) and two (2) lanes of travel southbound (PM peak).
  - 380 Feet or approximately 19 parking spaces, at 20 feet/space, would be lost on the west side of Edwards Road (SR 561), during the restricted period.
  - 415 Feet or approximately 21 parking spaces, at 20 feet/space, would be lost on the east side of Edwards Road (SR 561), during the restricted period.
- Restripe pavement at the Edwards Avenue (SR 561) and Erie Avenue intersection, to provide the following:
  - One (1) shared northbound through/left turn lane.
  - One (1) northbound right turn lane.
  - One (1) southbound left turn lane.
  - One (1) southbound through/right turn lane.

Alternative 2 – Dedicated Northbound Left Turn Lane

- Restripe pavement on Edwards Road (SR 561), between Erie Avenue and Observatory Avenue, and restrict the PM peak hour on-street parking to permit two (2) southbound lanes of travel.
  - 380 Feet or approximately 19 parking spaces, at 20 feet/space, would be lost on the west side of Edwards Road (SR 561), during the restricted period.
- Restripe pavement and modify traffic signal phasing and timing at the Edwards Avenue (SR 561) and Erie Avenue intersection, to provide the following:
  - One (1) exclusive northbound left turn lane.
  - One (1) northbound through/right turn lane.
  - Two (2) southbound lanes.
- A dedicated southbound left turn lane will be provided on Edwards Avenue (SR 561), at the Site Access 1 intersection.
- On-street parking on the east side of Edwards Road (SR 561) will be removed, as necessary, for geometric alignment.
  - Restripe northbound Edwards Road (SR 561) to provide approximately 205 feet of shift taper.
  - 415 Feet or approximately 21 parking spaces, at 20 feet/space, all would be permanently removed on the east side of Edwards Road (SR 561).

Alternative 3 – Dedicated Northbound Left/Through/Right Turn Lanes

- Restripe pavement and modify traffic signal phasing and timing at the Edwards Avenue (SR 561) and Erie Avenue intersection, to provide the following:
  - One (1) exclusive northbound left turn lane.
  - One (1) northbound through lane.
  - One (1) northbound through/right turn lane.
  - One (1) southbound lane.
  - 253 feet or approximately 13 parking spaces, at 20 feet/space, would be permanently removed on the west side of Edwards Road (SR 561) and 217 feet or approximately 11 parking spaces would be permanently removed on the east side of Edwards Road (SR 561), between Erie Avenue and Site Access 1.
- A dedicated southbound left turn lane will be provided on Edwards Avenue (SR 561), at the Site Access 1 intersection.

- Restripe pavement on Edwards Road (SR 561), between the Hyde Park Elementary School driveway and Observatory Avenue, and restrict the PM peak hour on-street parking to permit two (2) southbound lanes of travel.
    - 125 Feet or approximately 6 spaces, at 20 feet/space, would be lost on the west side of Edwards Road (SR 561), during the restricted period.

A geometric layout of the 3 alternatives, including the existing geometry, is graphically presented in Figure 8.

Of note, the on-street parking spaces were field measured on both sides of Edwards Avenue (SR 561), between Erie Avenue and Observatory Avenue. The distances identified in Figure 8 excludes all driveways, fire hydrants, and areas currently signed “No Parking Anytime”.

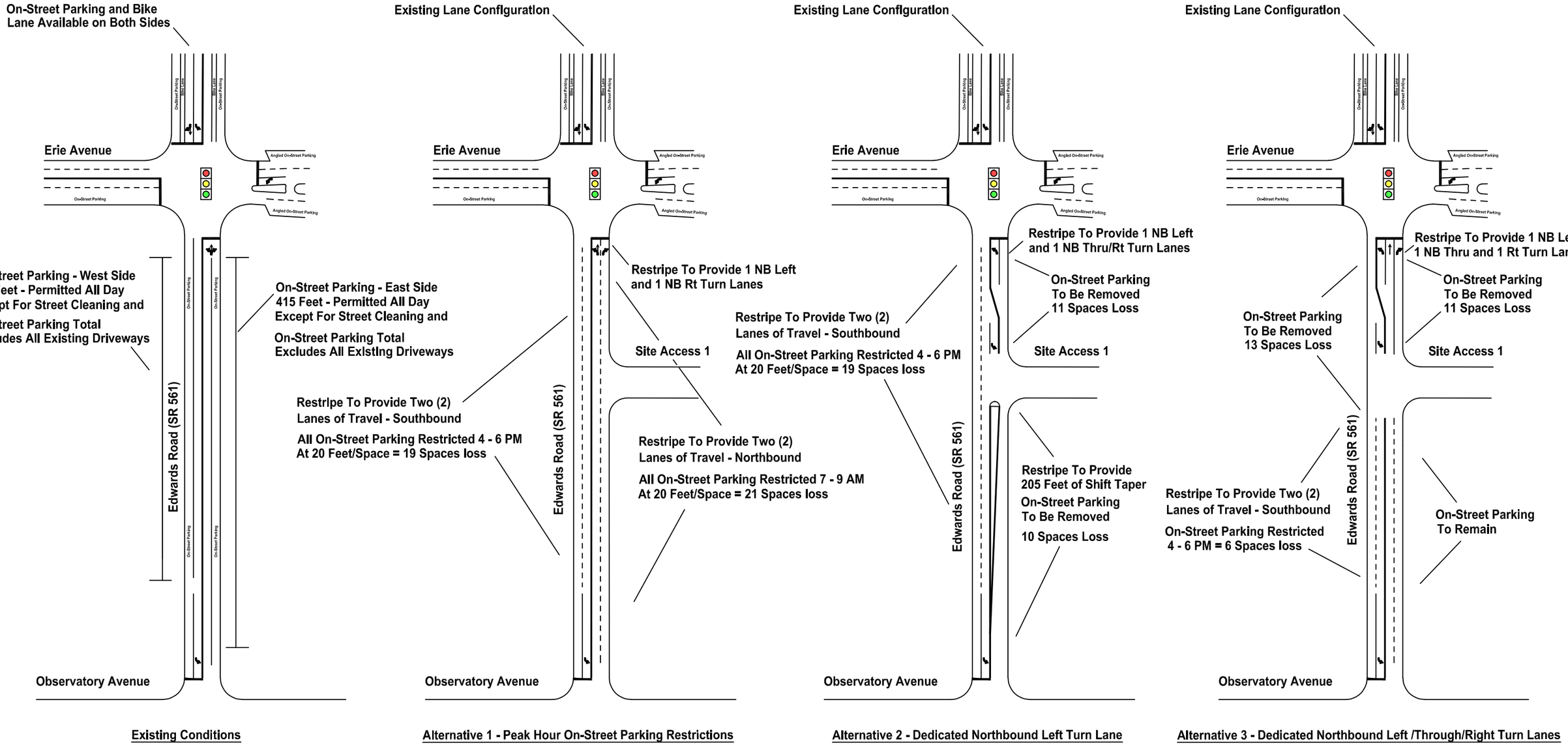

Figure 8

Hyde Park Square Development
Cincinnati, Hamilton County, Ohio

Existing Geometry and Alternative Geometric Layouts

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Capacity and Level of Service

Level of service (LOS), as defined in the *Highway Capacity Manual (HCM), 7th Edition*, is "a quality measure describing operational conditions within a traffic stream, generally in terms of such service measures as speed and travel time, freedom to maneuver, traffic interruptions, and comfort and convenience." LOS is a function of the control delay per vehicle, and it is the standard used to evaluate traffic flow at an intersection. The goal for the operation of roadways is to maintain the best level of service possible with an overall intersection LOS of D as an acceptable minimum. The criteria used by *HCM* are provided in Table 3.

Table 3
Level of Service Criteria for Signalized and Unsignalized Intersections

Signalized Intersection

Level of Service	Delay Range (sec/veh)	Expected Delay
A	<10	Extremely Favorable Progression
B	>10 and < 20	Good Progression
C	>20 and < 35	Fair Progression
D	>35 and < 55	Unfavorable Progression
E	>55 and < 80	Poor Progression
F	>80 or v/c > 1	Excessive Traffic Delay

Unsignalized Intersection

Level of Service	Delay Range (sec/veh)	Expected Delay
A	<10	Little or No Delay
B	>10 and < 15	Short Traffic Delay
C	>15 and < 25	Average Traffic Delay
D	>25 and < 35	Long Traffic Delay
E	>35 and < 50	Very long Traffic Delay
F	>50 or v/c >1	Excessive Traffic Delay

A capacity analysis of the study area intersections was performed for the ***2024 Existing Traffic Volumes*** and ***2027 Build Traffic Projections,*** using the Highway Capacity Software 2024 (HCS2024) and the results are provided in Table 4, on pages 26 and 27.

Table 4
Levels of Service Results

Hyde Park Square Development		2024 Existing Traffic		2027 Build Traffic Projections – Alt 1		2027 Build Traffic Projections – Alt 2		2027 Build Traffic Projections – Alt 3	
		LOS (Delay, Sec.)							
		AM	PM	AM	PM	AM	PM	AM	PM
Edwards Road (SR 561) and Erie Avenue									
EB	LT	B (15.3)	B (18.9)	B (10.0)	B (18.3)	B (14.6)	B (19.3)	B (14.6)	B (19.3)
	TR	B (15.4)	B (19.8)	B (10.1)	B (19.2)	B (14.7)	C (20.4)	B (14.7)	C (20.4)
	Approach	**B (15.4)**	**B (19.3)**	**B (10.1)**	**B (18.7)**	**B (14.7)**	**B (19.8)**	**B (14.7)**	**B (19.8)**
WB	L	B (17.1)	C (23.9)	B (11.3)	C (23.4)	B (16.4)	C (24.6)	B (16.4)	C (24.6)
	T	C (20.9)	B (15.8)	B (13.1)	B (15.0)	B (19.7)	B (15.8)	B (19.7)	B (15.8)
	R	C (21.5)	B (16.1)	B (13.3)	B (15.3)	C (20.2)	B (16.1)	C (20.2)	B (16.1)
	Approach	**C (21.0)**	**B (16.8)**	**B (13.1)**	**B (16.1)**	**B (19.8)**	**B (16.9)**	**B (19.8)**	**B (16.9)**
NB	LTR	B (13.9)	B (15.0)	N/A	N/A	N/A	N/A	N/A	N/A
	LT	N/A	N/A	C (20.6)	B (15.1)	N/A	N/A	N/A	N/A
	L	N/A	N/A	N/A	N/A	B (15.9)	B (16.9)	B (15.9)	B (16.9)
	TR	N/A	N/A	N/A	N/A	C (31.5)	C (33.5)	N/A	N/A
	T	N/A	N/A	N/A	N/A	N/A	N/A	C (28.3)	C (28.3)
	R	N/A	N/A	B (16.4)	B (12.1)	N/A	N/A	C (21.0)	C (20.6)
	Approach	**B (13.9)**	**B (15.0)**	**C (20.1)**	**B (14.7)**	**C (30.4)**	**C (32.2)**	**C (26.5)**	**C (26.3)**
SB	L	C (20.3)	C (28.2)	C (31.3)	C (27.1)	C (21.2)	C (28.7)	C (20.1)	C (24.5)
	TR	B (13.8)	B (15.9)	C (21.0)	B (17.3)	C (29.9)	D (46.0)	C (29.9)	D (46.0)
	Approach	**B (16.4)**	**C (20.7)**	**C (25.0)**	**C (21.1)**	**C (26.5)**	**D (39.5)**	**C (26.1)**	**D (37.8)**
Overall Intersection		**B (18.0)**	**B (18.5)**	**B (16.5)**	**B (18.2)**	**C (22.2)**	**C (27.2)**	**C (21.5)**	**C (25.8)**
Edwards Road (SR 561) and Observatory Avenue									
EB	L	D (37.1)	C (29.7)	D (40.5)	C (34.2)	Same LOS Results as Alternative 1		Same LOS Results as Alternative 1	
	TR	B (15.7)	D (48.3)	B (15.7)	D (48.3)				
	Approach	**B (16.7)**	**D (47.5)**	**B (17.3)**	**D (47.2)**				
WB	L	B (18.4)	D (39.2)	B (18.4)	D (39.2)				
	TR	D (43.1)	C (28.0)	D (48.1)	C (30.1)				
	Approach	**D (42.1)**	**C (28.6)**	**D (46.9)**	**C (30.6)**				
NB	LT	C (22.1)	C (21.4)	C (22.2)	C (21.5)				
	R	C (20.6)	C (21.3)	C (20.6)	C (21.3)				
	Approach	**C (21.7)**	**C (21.4)**	**C (21.8)**	**C (21.5)**				
SB	L	B (17.4)	B (15.9)	B (17.8)	B (16.6)				
	TR	B (13.6)	B (10.4)	B (14.0)	B (10.5)				
	Approach	**B (15.7)**	**B (14.2)**	**B (16.1)**	**B (14.8)**				
Overall Intersection		**C (29.0)**	**C (31.5)**	**C (31.2)**	**C (31.9)**				
Erie Avenue and Michigan Avenue									
EB	LT	A (9.5)	B (12.2)	A (9.5)	B (12.2)	Same LOS Results as Alternative 1		Same LOS Results as Alternative 1	
	TR	A (9.6)	B (12.6)	A (9.6)	B (12.6)				
	Approach	**A (9.5)**	**B (12.4)**	**A (9.5)**	**B (12.4)**				
WB	LT	B (11.7)	A (9.2)	B (11.9)	A (9.3)				
	TR	B (12.1)	A (9.3)	B (12.3)	A (9.5)				
	Approach	**B (11.9)**	**A (9.3)**	**B (12.1)**	**A (9.4)**				
NB	LTR	B (17.0)	B (17.0)	B (17.2)	B (17.5)				
	Approach	**B (17.0)**	**B (17.0)**	**B (17.2)**	**B (17.5)**				
SB	LTR	B (17.5)	B (18.0)	B (17.5)	B (18.1)				
	Approach	**B (17.5)**	**B (18.0)**	**B (17.5)**	**B (18.1)**				
Overall Intersection		**B (11.5)**	**B (12.0)**	**B (11.7)**	**B (12.1)**				

Table 4
Levels of Service Results *(Continued)*

Hyde Park Square Development		2024 Existing Traffic		2027 Build Traffic Projections – Alt 1		2027 Build Traffic Projections – Alt 2		2027 Build Traffic Projections – Alt 3	
		LOS (Delay, Sec.)							
		AM	PM	AM	PM	AM	PM	AM	PM
Edwards Road (SR 561) and Site Access 1									
WB	LR	N/A	N/A	B (11.6)	B (15.0)	B (12.0)	C (15.3)	B (12.8)	C (18.7)
	Approach	**N/A**	**N/A**	**B (11.6)**	**B (15.0)**	**B (12.0)**	**C (15.3)**	**B (12.8)**	**C (18.7)**
SB	LT	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	L	N/A	N/A	A (8.0)	A (8.3)	A (8.0)	A (8.3)	A (8.0)	A (8.3)
	T	N/A	N/A	A (0.1)	A (0.4)	-	-	-	-
	Approach	**N/A**	**N/A**	**A (0.4)**	**A (1.3)**	**A (0.4)**	**A (1.0)**	**A (0.4)**	**A (1.0)**
Michigan Avenue and Site Access 2									
EB	LR	N/A	N/A	A (9.0)	A (9.0)	Same LOS Results as Alternative 1		Same LOS Results as Alternative 1	
	Approach	**N/A**	**N/A**	**A (9.0)**	**A (9.0)**				
NB	L	N/A	N/A	A (7.4)	A (7.3)				
	T	N/A	N/A	A (0.0)	A (0.0)				
	Approach	**N/A**	**N/A**	**A (0.2)**	**A (0.2)**				

For the complete HCS capacity analysis, see Appendix C.

Based on the level of service analysis completed and summarized in Table 4, the intersection capacity analysis results for the ***2027 Build Traffic Projections*** are expected to operate satisfactory, for all intersections and all alternatives. Therefore, either alternative can be installed and expected to operate satisfactorily with the proposed Hyde Park Square development.

Turn Lane Storage Length Calculations

Considering that the capacity analysis results did not identify any one alternative (1, 2, or 3) as better than the others, the back of queue storage lane lengths were calculated, along with the capacity analysis, to determine the alternative that provides the best operations for the proposed Hyde Park Square development and the motoring public, on the Edwards Road (SR 561) corridor.

The distance between the Edwards Road (SR 561) and Erie Avenue and Edwards Road (SR 561) and Site Access 1 intersections is approximately 230 feet (stop bar to centerline). The southbound left turn movement at the Edwards Road (SR 561) and Site Access 1 intersection was identified as a concern by DOTE. Currently, no dedicated northbound left turn lane is available at the Edwards Road (SR 561) and Erie Avenue intersection; however, a southbound left turn lane is provided. Therefore, a northbound left turn lane can be provided, at the Edwards Road (SR 561) and Erie Avenue intersection, and geometric alignment maintain, without any road widening required.

The back of queue lengths for the northbound left turn lane, at the Edwards Road (SR 561) and Erie Avenue, and the southbound left turn lane, at the Edwards Road (SR 561) and Site Access 1 intersections, for the 3 alternatives are presented as follows in Table 5.

Table 5
Back of Queue Lane Length Results

		2027 Build Traffic Projections Alternative 1	2027 Build Traffic Projections Alternative 2	2027 Build Traffic Projections Alternative 3
		Back of Queue Lane Length*		
Edwards Avenue (SR 561) and Erie Avenue				
NB	LT	167 Feet	N/A	N/A
	L	N/A	14 Feet	14 Feet
	TR	N/A	255 Feet	N/A
	T	N/A	N/A	206 Feet
	R	22 Feet	N/A	32 Feet
Edwards Avenue (SR 561) and Site Access 1				
SB	LT	128 Feet	N/A	N/A
	L	N/A	128 Feet	128 Feet

*Greater distance AM Peak vs PM Peak.

Based on the back of queue results, all alternatives provide sufficient distance for storage of left turn vehicles between the Edwards Road (SR 561) and Erie Avenue and Edwards Road (SR 561) and Site Access 1 intersections, with a back-to-back left turn lane distance of 192 feet (including 50 feet of diverging taper). The northbound back-of-queue (LT/TR/T), at the Erie Avenue intersection, is acceptable for all alternatives, except Alternative 2. Alternative 2's back of queue extends about 25 feet (255' minus 230') past the centerline of Site Access 1.

To prevent Site Access 1 from being blocked, a "Do Not Block Driveway" pole mounted sign should be installed at the site driveway.

The back of queue lane length results is available in Appendix C, along with the capacity results.

Traffic Safety

The Hyde Park Elementary School is in the northwest corner of the Edwards Road (SR 561) and Observatory Avenue intersection. Access to the school's parking lot and for parent drop-off and pick-up of students, is located on Edwards Road (SR 561), approximately 470 feet south of stop bar at Erie Avenue.

Currently, a restrictive 20 mph school zone sign is installed on Edwards Road (SR 561) and Observatory Avenue. Crosswalks, with pedestrian push buttons, are installed at the key intersections of Edwards Road (SR 561) and Erie Avenue, Edwards Road (SR 561) and Observatory Avenue, and Erie Avenue and Michigan Avenue. Additionally, manual crossing assistance (an adult crossing guard) is provided at the Edwards Road (SR 561) and Observatory Avenue intersection, during the AM start and PM end of each school day, to assist safe access for students and parents who walk to the elementary school.

Field observations were conducted during the AM and PM school peak periods and the observations revealed that student drop-offs occur with no major impact to traffic operations on the Edwards Road (SR 561) corridor, during the AM drop-off period. However, during the PM student pick-up period, traffic gridlock was observed. Arriving parents use the permitted on-street parking spaces on the west side of Edwards Road (SR 561), between Erie Avenue and Observatory Avenue, to park then walk to the school to pick up their school child. Since the southbound Edwards Road (SR 561) parking lane is occupied, parents staying in their vehicles use the southbound travel lane for staging while waiting for access to the parking lot/school, which impedes the southbound flow of traffic on Edwards Road (SR 561).

Also, access to the parking garage at 3427 Edwards Road (SR 561), on the west side and just north of the Hyde Park Elementary School, was blocked by waiting parents, which prevented access for all traffic; more importantly, northbound traffic, to the garage. Lastly, the northbound traffic operations were further compromised when on-street parking occurred on the east side of Edwards Road (SR 561), where permitted, between Erie Avenue and the Hyde Park Elementary School driveway. The congestion related to the PM student pick-up lasted about 45 minutes.

Based on observations, police enforcement at the Edwards Road (SR 561) and Hyde Park Elementary School intersection should be considered to maintain safe operations of traffic on Edwards Road (SR 561), during the school's end of day PM peak. Additionally, the PM peak hour parking restriction described in Alternative 1 and 2 should be installed, which will allow parents to park in the curb lane and maintain one (1) southbound through lane for motorists.

Site Access and Parking Needs

Direct access to the proposed Hyde Park Square development will utilize the following locations:

- Edwards Road (SR 561) and Site Access 1, approximately 230 feet south of Erie Avenue (stop bar to centerline).
- Michigan Avenue and Site Access 2, approximately 150 feet south of Erie Avenue (stop bar to centerline).

The site circulation provided in the proposed development is adequate for the assumed land uses.

IMPROVEMENT ANALYSIS

Status of Improvements Previously Recommended

There are no other known developments or improvements planned within the study area.

Improvements to Accommodate Base Traffic

Based on the current traffic operation issues discussed in this report, the roadway improvements recommended to accommodate the ***2024 Existing Traffic*** (excluding site traffic) are as follows:

Edwards Road Corridor

1. Restripe the southbound pavement on Edwards Road (SR 561), between Erie Avenue and Observatory Avenue, with a lane line to allow the curb lane to function as a lane of travel during the restricted parking periods.
2. Restrict on-street parking on the west side of Edwards Road (SR 561) during the 12:00 PM – 6:00 PM peak hour period, between Erie Avenue and the Hyde Park Elementary School driveway.
3. Install "No Parking or Stopping 12 PM – 6 PM Mon thru Fri Except During After School Dismissal" pole mounted signs on the west side of Edwards Road (SR 561), within the restricted area.
4. Police enforcement should be required to maintain safe traffic operations on Edwards Road (SR 561) at the Hyde Park Elementary School driveway, during the standard time allotment for the schools PM period.
5. An adult crossing guard should be considered at the Edwards Road (SR 561) and Erie Avenue intersection during the AM and PM school peak periods if student safety concerns arise.

Based on the analysis contained in this report, the roadway improvements recommended to accommodate the ***2027 Build Traffic Projections*** (including site traffic) are as follows:

Edwards Road (SR 561) and Erie Avenue Intersection

1. Restripe Edwards Road (SR 561) and Erie Avenue intersection to provide the following:
   - One (1) northbound left turn lane a total of 100 feet in length, including 50 feet of diverging taper.
   - One (1) northbound shared through and right turn lane.
   - Adjust striping on the north side of the intersection for proper geometric alignment.
   - Modify traffic signal to provide appropriate timing and phasing.

Edwards Road (SR 561) and Site Access 1 Intersection

1. Construct a new full operational site access driveway on the east side of Edwards Road (SR 561), approximately 230 feet south of Erie Avenue (stop bar to centerline), for access to the proposed Hyde Park Square development.
2. Provide one (1) eastbound lane for entering traffic.
3. Provide one (1) westbound lane for exiting traffic.
4. Install a "Do Not Block Driveway" pole mounted sign on Edwards Road (SR 561) at the site driveway.

Michigan Avenue and Site Access 2 Intersection

1. Construct a new full operational site driveway on the west side of Michigan Avenue, approximately 150 feet south of Erie Avenue (stop bar to centerline), for access to the proposed Hyde Park Square development.
2. Provide one (1) westbound lane for entering traffic.
3. Provide one (1) eastbound lane for exiting traffic.

General

1. Restripe Edwards Road (SR 561), along the site frontage, to provide:
   - One (1) lane of travel in the northbound direction.
   - Two (2) lanes of travel in the southbound direction.
   - A center two-way left turn lane (TWLTL) approximately 330 feet (stop bar to US Bank entering driveway) to provide left turn storage for the driveways on both sides of Edwards Road (SR 561)
2. Remove all on-street parking on east side of Edwards Road (SR 561), along site frontage.
3. Install "No Stopping or Parking Anytime" pole mounted signs on the east side of Edwards Road (SR 561), within the restricted area.
4. Modify traffic signal timing and phasing at the Edwards Road (SR 561) and Erie Avenue, and Michigan Avenue and Erie Avenue intersections, as necessary.

A geometric layout of the recommended improvements presented in Figure 9, on page 33.

Based upon engineering judgment and the analysis contained in this report, the proposed Hyde Park Square development upon construction of the recommended improvements will not significantly impact operations on the adjacent roadway network.

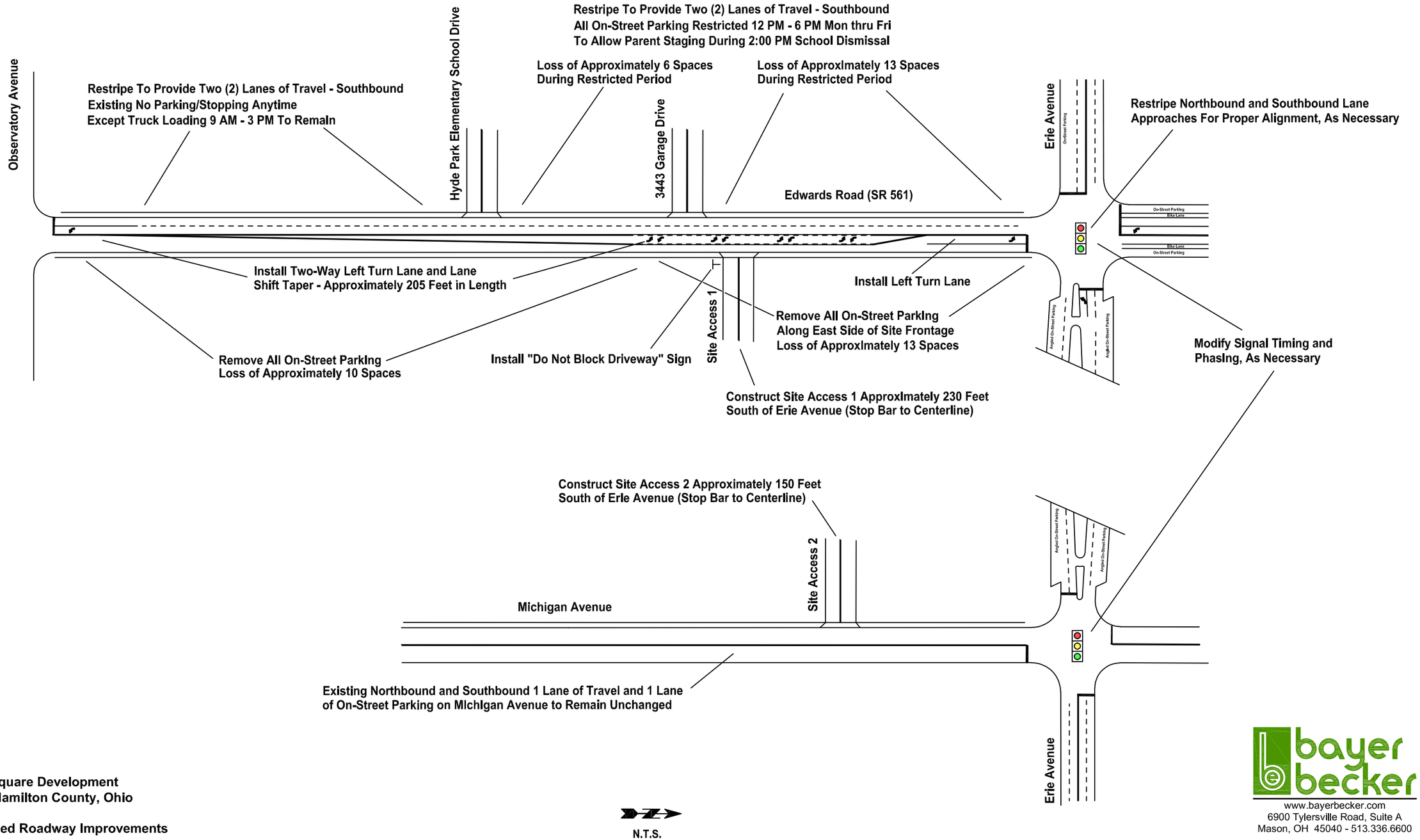

Figure 9

Hyde Park Square Development
Cincinnati, Hamilton County, Ohio

Recommended Roadway Improvements

bayer becker
www.bayerbecker.com
6900 Tylersville Road, Suite A
Mason, OH 45040 - 513.336.6600

While developing the recommended improvements for the proposed Hyde Park Square development, the prior described student pick-up traffic operations and congestion were shared with DOTE. Considering that the Hyde Park Elementary traffic congestion is a pre-existing condition and permanent on-street parking lanes were recently installed on both sides of Edwards Road (SR 561), between Erie Avenue and Observatory Avenue, DOTE requested an additional analysis, using SYNCHRO plus SimTraffic 12 computer software program, comparing the travel times and back of queue results for the following scenarios:

- Scenario 1 - 2024 Existing Traffic with 2024 Existing Geometry.
- Scenario 2 - 2024 Existing Traffic with 2024 Recommended Improvements.
- Scenario 3 - 2027 Projected Traffic with 2024 Existing Geometry.
- Scenario 4 - 2027 Projected Traffic with 2024 and 2027 Recommended Improvements.

Of note, one (1) travel lane, in both the northbound and southbound directions, was coded in the SYNCHRO files on Edwards Road (SR 561) at the key intersections of Erie Avenue, Observatory Avenue, and Site Access 1 for all analyses based on existing geometry (1 travel lane and 1 lane of permanent on-street parking).

The travel times and back of queue length results for the four (4) scenarios are presented in Table 6 as follows and on page 35.

Table 6
Travel Times and Back of Queue Lane Length Results

	Scenario 1 - 2024 Existing Traffic with 2024 Existing Geometry		Scenario 2 - 2024 Existing Traffic with 2024 Improvements		Scenario 3 - 2027 Projected Traffic with 2024 Existing Geometry		Scenario 4 - 2027 Projected Traffic with 2024/2027 Improvements	
	Travel Times (seconds)							
	AM	PM	AM	PM	AM	PM	AM	PM
Edwards Avenue (SR 561) - Northbound								
Observatory Avenue	24.0	23.9	24.8	35.7	44.9	27.6	32.7	37.4
Site Access 1	N/A	N/A	N/A	N/A	10.8	9.2	10.8	9.7
Erie Avenue	38.2	41.3	42.5	39.2	22.6	27.2	27.7	29.4
Total	**62.2**	**65.2**	**67.3**	**74.9**	**78.3**	**64.0**	**71.3**	**76.5**
Edwards Avenue (SR 561) - Southbound								
Observatory Avenue	20.6	45.3	21.9	66.8	23.2	53.0	35.8	30.9
Site Access 1	N/A	N/A	N/A	N/A	9.3	10.7	9.1	8.8
Erie Avenue	29.8	29.8	29.3	34.9	28.5	23.0	25.8	23.9
Total	**50.4**	**75.1**	**51.2**	**101.7**	**61.0**	**86.7**	**70.8**	**63.7**

*Better result Scenario 1 vs Scenario 2 and Scenario 3 vs Scenario 4.

As shown in Table 6 above, the 2024 existing traffic travel times on Edwards Avenue (SR 561) are better in both the northbound and southbound directions, for both the AM and PM peak periods,

based on Scenario 1. However, the results are not as decisive for the 2027 projected traffic. During the AM peak period in the northbound direction, Scenario 4 is better, while Scenario 3 is better in the PM peak period. Similarly, during the AM peak period in the southbound direction, Scenario 3 is better, while Scenario 4 is better in the PM peak period.

Table 6 (Continued)
Travel Times and Back of Queue Lane Length Results

		Scenario 1 - 2024 Existing Traffic with 2024 Existing Geometry		Scenario 2 - 2024 Existing Traffic with 2024 Improvements		Scenario 3 - 2027 Projected Traffic with 2024 Existing Geometry		Scenario 4 - 2027 Projected Traffic with 2024/2027 Improvements	
		Back of Queue Lane Length							
		AM	PM	AM	PM	AM	PM	AM	PM
Edwards Avenue (SR 561) and Erie Avenue									
EB	LT	220 Feet	282 Feet	185 Feet	259 Feet	229 Feet	244 Feet	236 Feet	284 Feet
	TR	176 Feet	225 Feet	136 Feet	188 Feet	169 Feet	200 Feet	177 Feet	244 Feet
WB	L	64 Feet	62 Feet	76 Feet	67 Feet	62 Feet	68 Feet	72 Feet	77 Feet
	T	168 Feet	94 Feet	153 Feet	121 Feet	168 Feet	79 Feet	187 Feet	125 Feet
	TR	194 Feet	95 Feet	199 Feet	177 Feet	200 Feet	117 Feet	224 Feet	152 Feet
NB	LTR	161 Feet	249 Feet	165 Feet	293 Feet	173 Feet	218 Feet	N/A	N/A
	L	N/A	N/A	N/A	N/A	N/A	N/A	46 Feet	46 Feet
	TR	N/A	N/A	N/A	N/A	N/A	N/A	169 Feet	213 Feet
SB	L	109 Feet	119 Feet	114 Feet	118 Feet	115 Feet	117 Feet	124 Feet	122 Feet
	TR	210 Feet	347 Feet	230 Feet	340 Feet	238 Feet	344 Feet	303 Feet	335 Feet
Edwards Avenue (SR 561) and Observatory Avenue									
EB	L	60 Feet	324 Feet	96 Feet	141 Feet	95 Feet	313 Feet	264 Feet	124 Feet
	TR	238 Feet	270 Feet	183 Feet	304 Feet	213 Feet	273 Feet	295 Feet	295 Feet
WB	L	333 Feet	158 Feet	278 Feet	83 Feet	332 Feet	213 Feet	334 Feet	87 Feet
	TR	301 Feet	310 Feet	292 Feet	268 Feet	310 Feet	314 Feet	292 Feet	267 Feet
NB	LT	110 Feet	95 Feet	118 Feet	129 Feet	182 Feet	94 Feet	130 Feet	119 Feet
	R	75 Feet	93 Feet	76 Feet	93 Feet	76 Feet	76 Feet	49 Feet	92 Feet
SB	L	118 Feet	131 Feet	109 Feet	218 Feet	126 Feet	144 Feet	152 Feet	216 Feet
	TR	102 Feet	104 Feet	101 Feet	118 Feet	150 Feet	236 Feet	135 Feet	121 Feet
Erie Avenue and Michigan Avenue									
EB	LT	80 Feet	108 Feet	77 Feet	189 Feet	84 Feet	128 Feet	96 Feet	228 Feet
	TR	81 Feet	123 Feet	85 Feet	186 Feet	89 Feet	134 Feet	104 Feet	231 Feet
WB	LT	201 Feet	128 Feet	195 Feet	118 Feet	203 Feet	119 Feet	209 Feet	118 Feet
	TR	171 Feet	112 Feet	186 Feet	108 Feet	196 Feet	105 Feet	230 Feet	103 Feet
NB	LTR	40 Feet	40 Feet	45 Feet	53 Feet	57 Feet	67 Feet	60 Feet	73 Feet
SB	LTR	96 Feet	93 Feet	92 Feet	97 Feet	74 Feet	76 Feet	68 Feet	91 Feet
Edwards Avenue (SR 561) and Site Access 1									
WB	LR	N/A	N/A	N/A	N/A	59 Feet	61 Feet	65 Feet	78 Feet
NB	TR	N/A	N/A	N/A	N/A	N/A	19 Feet	N/A	N/A
SB	LT	N/A	N/A	N/A	N/A	29 Feet	101 Feet	N/A	N/A
	L	N/A	N/A	N/A	N/A	N/A	N/A	21 Feet	58 Feet

*Better result Scenario 1 vs Scenario 2 and Scenario 3 vs Scenario 4.

Table 6 (Continued) above provides an abundance of information, yet the northbound approach at Edwards Avenue (SR 561) and Erie Avenue intersection and the southbound approach at the

Edwards Avenue (SR 561) and Observatory Avenue intersection are the specific results of importance in understanding which scenario provides the best results along the proposed Hyde Park Square development frontage.

In general, the back of queue lane length results on Edwards Avenue (SR 561), are better in both the northbound and southbound directions, for both the AM and PM peak periods, based on Scenario 1. Like travel time, the back of queue lane length results for the 2027 projected traffic are mixed. The northbound and southbound through/right approach, at the Erie Avenue intersection, and the southbound through/right approach, at the Observatory Avenue intersections results are better in Scenario 4, for both the AM and PM peak periods, while the southbound left is better in Scenario 3 at the Observatory Avenue intersection, for both the AM and PM peak periods.

Lastly, the back of queue lane length results for the southbound left turn versus the southbound left/through approach on Edwards Avenue (SR 561) at the Site Access 1 intersection is better in Scenario 4, for both the AM and PM peak periods.

Considering the results of the travel time and back of queue lane length analysis, Scenario 1 is the better option for existing 2024 traffic, excluding the after school pick-up operations of the Hyde Park Elementary School. Understanding the current after-school pick-up operations, the recommended improvements outlined in this section of the report are still considered valid.

Also considering the results of the travel time and back of queue lane length analysis, Scenario 4 is the better option for the 2027 projected traffic. While the travel time results were evenly mixed, overall, the improvements outlined in this section of the report are strengthened by the back of queue lane length results and an understanding of the current after-school pick-up operations.

The SimTraffic travel times and back of queue lane length results are available in Appendix D.

FINDINGS

Site Accessibility

The roadways that will provide access to the proposed site development are Edwards Road (SR 561) and Michigan Avenue. Direct access to the proposed Hyde Park Square development will utilize the following locations:

- Edwards Road (SR 561) and Site Access 1, approximately 230 feet south of Erie Avenue (stop bar to centerline).
- Michigan Avenue and Site Access 2, approximately 150 feet south of Erie Avenue (stop bar to centerline).

Traffic Impacts

At full build out, the proposed Hyde Park Square development will consist of the following land uses and densities:

Hyde Park Square Development

Land Use	Density
Multifamily Housing (Apartments and Townhomes)	182 Dwelling Units (DU)
Hotel	90 Rooms (RM)
Retail Stores	10,600 Square Feet (SF)
Fast Casual Restaurant	5,300 Square Feet (SF)
Fine Dining Restaurant	3,000 Square Feet (SF)
Brewery Tap Room	6,000 Square Feet (SF)
Total Development	**24,900 SF/182 DU/90 RM**

Bayer Becker corresponded with representatives of the Cincinnati Department of Transportation and Engineering (DOTE) to establish the parameters of the study. As such, the following existing and proposed key intersections define the study area of this report:

- Edwards Road (SR 561) and Erie Avenue.
- Edwards Road (SR 561) and Observatory Avenue.
- Erie Avenue and Michigan Avenue.
- Edwards Road (SR 561) and Site Access 1, Full Movement.
- Michigan Avenue and Site Access 2, Full Movement.

Need for Improvements

Based on the current traffic operation issues discussed in this report, the roadway improvements recommended to accommodate the ***2024 Existing Traffic*** (excluding site traffic) are as follows:

Edwards Road Corridor

1. Restripe the southbound pavement on Edwards Road (SR 561), between Erie Avenue and Observatory Avenue, with a lane line to allow the curb lane to function as a lane of travel during the restricted parking periods.
2. Restrict on-street parking on the west side of Edwards Road (SR 561) during the 12:00 PM – 6:00 PM peak hour period, between Erie Avenue and the Hyde Park Elementary School driveway.
3. Install "No Parking or Stopping 12 PM – 6 PM Mon thru Fri Except During After School Dismissal" pole mounted signs on the west side of Edwards Road (SR 561), within the restricted area.
4. Police enforcement should be required to maintain safe traffic operations on Edwards Road (SR 561) at the Hyde Park Elementary School driveway, during the standard time allotment for the schools PM period.
5. An adult crossing guard should be considered at the Edwards Road (SR 561) and Erie Avenue intersection during the AM and PM school peak periods if student safety concerns arise.

Based on the analysis contained in this report, the roadway improvements recommended to accommodate the ***2027 Build Traffic Projections*** (including site traffic) are as follows:

Edwards Road (SR 561) and Erie Avenue Intersection

1. Restripe Edwards Road (SR 561) and Erie Avenue intersection to provide the following:
   - One (1) northbound left turn lane a total of 100 feet in length, including 50 feet of diverging taper.
   - One (1) northbound shared through and right turn lane.
   - Adjust striping on the north side of the intersection for proper geometric alignment.
   - Modify traffic signal to provide appropriate timing and phasing.

Edwards Road (SR 561) and Site Access 1 Intersection

1. Construct a new full operational site access driveway on the east side of Edwards Road (SR 561), approximately 230 feet south of Erie Avenue (stop bar to centerline), for access to the proposed Hyde Park Square development.

2. Provide one (1) eastbound lane for entering traffic.
3. Provide one (1) westbound lane for exiting traffic.
4. Install a "Do Not Block Driveway" pole mounted sign on Edwards Road (SR 561) at the site driveway.

Michigan Avenue and Site Access 2 Intersection

1. Construct a new full operational site driveway on the west side of Michigan Avenue, approximately 150 feet south of Erie Avenue (stop bar to centerline), for access to the proposed Hyde Park Square development.
2. Provide one (1) westbound lane for entering traffic.
3. Provide one (1) eastbound lane for exiting traffic.

General

1. Restripe Edwards Road (SR 561), along the site frontage, to provide:
   - One (1) lane of travel in the northbound direction.
   - Two (2) lanes of travel in the southbound direction.
   - A center two-way left turn lane (TWLTL) approximately 330 feet (stop bar to US Bank entering driveway) to provide left turn storage for the driveways on both sides of Edwards Road (SR 561)
2. Remove all on-street parking on east side of Edwards Road (SR 561), along site frontage.
3. Install "No Stopping or Parking Anytime" pole mounted signs on the east side of Edwards Road (SR 561), within the restricted area.
4. Modify traffic signal timing and phasing at the Edwards Road (SR 561) and Erie Avenue, and Michigan Avenue and Erie Avenue intersections as necessary.

Compliance with Applicable Codes

All roadway improvements shall be constructed in accordance with Cincinnati Department of Transportation and Engineering (DOTE) requirements, as appropriate and applicable. Based upon engineering judgment and the analysis contained in this report, the proposed Hyde Park Square development, upon construction of the recommended improvements, will not significantly impact operations on the adjacent roadway network.

RECOMMENDATIONS

Site Access

The roadways that will provide access to the proposed site development are Edwards Road (SR 561) and Michigan Avenue. Direct access to the proposed Hyde Park Square development will utilize the following locations:

- Edwards Road (SR 561) and Site Access 1, approximately 230 feet south of Erie Avenue (stop bar to centerline).
- Michigan Avenue and Site Access 2, approximately 150 feet south of Erie Avenue (stop bar to centerline).

Roadway Improvements

Based on the current traffic operation issues discussed in this report, the roadway improvements recommended to accommodate the ***2024 Existing Traffic*** (excluding site traffic) are as follows:

Edwards Road Corridor

1. Restripe the southbound pavement on Edwards Road (SR 561), between Erie Avenue and Observatory Avenue, with a lane line to allow the curb lane to function as a lane of travel during the restricted parking periods.
2. Restrict on-street parking on the west side of Edwards Road (SR 561) during the 12:00 PM – 6:00 PM peak hour period, between Erie Avenue and the Hyde Park Elementary School driveway.
3. Install “No Parking or Stopping 12 PM – 6 PM Mon thru Fri Except During After School Dismissal” pole mounted signs on the west side of Edwards Road (SR 561), within the restricted area.
4. Police enforcement should be required to maintain safe traffic operations on Edwards Road (SR 561) at the Hyde Park Elementary School driveway, during the standard time allotment for the schools PM period.
5. An adult crossing guard should be considered at the Edwards Road (SR 561) and Erie Avenue intersection during the AM and PM school peak periods if student safety concerns arise.

Based on the analysis contained in this report, the roadway improvements recommended to accommodate the ***2027 Build Traffic Projections*** (including site traffic) are as follows:

Edwards Road (SR 561) and Erie Avenue Intersection

1. Restripe Edwards Road (SR 561) and Erie Avenue intersection to provide the following:
   - One (1) northbound left turn lane a total of 100 feet in length, including 50 feet of diverging taper.
   - One (1) northbound shared through and right turn lane.
   - Adjust striping on the north side of the intersection for proper geometric alignment.
   - Modify traffic signal to provide appropriate timing and phasing.

Edwards Road (SR 561) and Site Access 1 Intersection

1. Construct a new full operational site access driveway on the east side of Edwards Road (SR 561), approximately 230 feet south of Erie Avenue (stop bar to centerline), for access to the proposed Hyde Park Square development.
2. Provide one (1) eastbound lane for entering traffic.
3. Provide one (1) westbound lane for exiting traffic.
4. Install a “Do Not Block Driveway” pole mounted sign on Edwards Road (SR 561) at the site driveway.

Michigan Avenue and Site Access 2 Intersection

1. Construct a new full operational site driveway on the west side of Michigan Avenue, approximately 150 feet south of Erie Avenue (stop bar to centerline), for access to the proposed Hyde Park Square development.
2. Provide one (1) westbound lane for entering traffic.
3. Provide one (1) eastbound lane for exiting traffic.

General

1. Restripe Edwards Road (SR 561), along the site frontage, to provide:
   - One (1) lane of travel in the northbound direction.
   - Two (2) lanes of travel in the southbound direction.
   - A center two-way left turn lane (TWLTL) approximately 330 feet (stop bar to US Bank entering driveway) to provide left turn storage for the driveways on both sides of Edwards Road (SR 561)

2. Remove all on-street parking on east side of Edwards Road (SR 561), along site frontage.
3. Install “No Stopping or Parking Anytime” pole mounted signs on the east side of Edwards Road (SR 561), within the restricted area.
4. Modify traffic signal timing and phasing at the Edwards Road (SR 561) and Erie Avenue, and Michigan Avenue and Erie Avenue intersections, as necessary.

The recommended improvements are presented in Figure 9, on page 33.

Based upon engineering judgment and the analysis contained in this report, the proposed Hyde Park Square development upon construction of the recommended improvements will not significantly impact operations on the adjacent roadway network.

APPENDIX A

2024 EXISTING TRAFFIC COUNTS

Bayer Becker
6900 Tylersville Road
Suite A
Mason, Ohio, United States 45040
513-336-6600 wardellwilcox@bayerbecker.com

Count Name: Erie and Edwards
Site Code: 23-0083
Start Date: 11/06/2024

Turning Movement Peak Hour Data (7:30 AM)

Start Time	Edwards Road (SR 561) Southbound					Erie Avenue Westbound					Edwards Road (SR 561) Northbound					Erie Avenue Eastbound					
	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Int. Total
7:30 AM	8	52	43	0	103	62	163	16	3	244	8	42	2	0	52	21	60	6	0	87	486
7:45 AM	9	51	51	0	111	60	119	8	1	188	8	75	2	0	85	3	74	5	0	82	466
8:00 AM	10	57	24	0	91	67	112	8	0	187	12	54	0	0	66	4	45	4	0	53	397
8:15 AM	13	47	44	0	104	76	112	8	3	199	7	56	2	0	65	6	51	5	0	62	430
Total	40	207	162	0	409	265	506	40	7	818	35	227	6	0	268	34	230	20	0	284	1779
Approach %	9.8	50.6	39.6	0.0	-	32.4	61.9	4.9	0.9	-	13.1	84.7	2.2	0.0	-	12.0	81.0	7.0	0.0	-	-
Total %	2.2	11.6	9.1	0.0	23.0	14.9	28.4	2.2	0.4	46.0	2.0	12.8	0.3	0.0	15.1	1.9	12.9	1.1	0.0	16.0	-
PHF	0.769	0.908	0.794	0.000	0.921	0.872	0.776	0.625	0.583	0.838	0.729	0.757	0.750	0.000	0.788	0.405	0.777	0.833	0.000	0.816	0.915
All Vehicles (no classification)	40	207	162	0	409	265	506	40	7	818	35	227	6	0	268	34	230	20	0	284	1779
% All Vehicles (no classification)	100.0	100.0	100.0	-	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	-	100.0	100.0	100.0	100.0	-	100.0	100.0

Bayer Becker
6900 Tylersville Road
Suite A
Mason, Ohio, United States 45040
513-336-6600 wardellwilcox@bayerbecker.com

Count Name: Erie and Edwards
Site Code: 23-0083
Start Date: 11/06/2024

Turning Movement Peak Hour Data (4:00 PM)

Start Time	Edwards Road (SR 561) Southbound					Erie Avenue Westbound					Edwards Road (SR 561) Northbound					Erie Avenue Eastbound					
	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Int. Total
4:00 PM	13	77	47	0	137	41	72	10	0	123	8	71	8	0	87	15	128	8	0	151	498
4:15 PM	15	73	57	0	145	42	47	16	0	105	9	68	9	0	86	11	172	9	0	192	528
4:30 PM	13	78	66	0	157	38	52	11	0	101	16	62	1	0	79	6	158	8	0	172	509
4:45 PM	8	89	68	0	165	29	42	8	0	79	17	59	2	0	78	7	136	13	0	156	478
Total	49	317	238	0	604	150	213	45	0	408	50	260	20	0	330	39	594	38	0	671	2013
Approach %	8.1	52.5	39.4	0.0	-	36.8	52.2	11.0	0.0	-	15.2	78.8	6.1	0.0	-	5.8	88.5	5.7	0.0	-	-
Total %	2.4	15.7	11.8	0.0	30.0	7.5	10.6	2.2	0.0	20.3	2.5	12.9	1.0	0.0	16.4	1.9	29.5	1.9	0.0	33.3	-
PHF	0.817	0.890	0.875	0.000	0.915	0.893	0.740	0.703	0.000	0.829	0.735	0.915	0.556	0.000	0.948	0.650	0.863	0.731	0.000	0.874	0.953
All Vehicles (no classification)	49	317	238	0	604	150	213	45	0	408	50	260	20	0	330	39	594	38	0	671	2013
% All Vehicles (no classification)	100.0	100.0	100.0	-	100.0	100.0	100.0	100.0	-	100.0	100.0	100.0	100.0	-	100.0	100.0	100.0	100.0	-	100.0	100.0

Bayer Becker
6900 Tylersville Road
Suite A
Mason, Ohio, United States 45040
513-336-6600 wardellwilcox@bayerbecker.com

Count Name: Edwards and Observatory
Site Code: 23-0083
Start Date: 12/03/2024

Turning Movement Peak Hour Data (7:30 AM)

Start Time	Edwards Road (SR 561) Southbound					Observatory Avenue Westbound					Edwards Road (SR 561) Northbound					Observatory Avenue Eastbound					
	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Int. Total
7:30 AM	40	11	54	0	105	24	127	3	0	154	8	20	5	0	33	5	77	6	0	88	380
7:45 AM	20	18	31	0	69	45	132	9	0	186	5	27	8	0	40	4	101	5	0	110	405
8:00 AM	2	17	36	0	55	62	133	10	0	205	19	25	9	0	53	10	93	4	0	107	420
8:15 AM	6	12	41	0	59	55	135	8	0	198	16	20	13	0	49	4	68	4	0	76	382
Total	68	58	162	0	288	186	527	30	0	743	48	92	35	0	175	23	339	19	0	381	1587
Approach %	23.6	20.1	56.3	0.0	-	25.0	70.9	4.0	0.0	-	27.4	52.6	20.0	0.0	-	6.0	89.0	5.0	0.0	-	-
Total %	4.3	3.7	10.2	0.0	18.1	11.7	33.2	1.9	0.0	46.8	3.0	5.8	2.2	0.0	11.0	1.4	21.4	1.2	0.0	24.0	-
PHF	0.425	0.806	0.750	0.000	0.686	0.750	0.976	0.750	0.000	0.906	0.632	0.852	0.673	0.000	0.825	0.575	0.839	0.792	0.000	0.866	0.945
All Vehicles (no classification)	68	58	162	0	288	186	527	30	0	743	48	92	35	0	175	23	339	19	0	381	1587
% All Vehicles (no classification)	100.0	100.0	100.0	-	100.0	100.0	100.0	100.0	-	100.0	100.0	100.0	100.0	-	100.0	100.0	100.0	100.0	-	100.0	100.0

Bayer Becker
6900 Tylersville Road
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Mason, Ohio, United States 45040
513-336-6600 wardellwilcox@bayerbecker.com

Count Name: Edwards and Observatory
Site Code: 23-0083
Start Date: 12/03/2024

Turning Movement Peak Hour Data (4:00 PM)

Start Time	Edwards Road (SR 561) Southbound					Observatory Avenue Westbound					Edwards Road (SR 561) Northbound					Observatory Avenue Eastbound					
	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Int. Total
4:00 PM	19	21	75	0	115	42	83	8	0	133	18	20	9	0	47	5	138	9	0	152	447
4:15 PM	6	20	78	0	104	48	68	6	0	122	19	20	4	0	43	6	158	10	0	174	443
4:30 PM	9	22	74	0	105	48	62	3	0	113	18	21	5	0	44	3	154	5	0	162	424
4:45 PM	9	20	68	0	97	44	75	8	0	127	18	17	3	0	38	1	160	4	0	165	427
Total	43	83	295	0	421	182	288	25	0	495	73	78	21	0	172	15	610	28	0	653	1741
Approach %	10.2	19.7	70.1	0.0	-	36.8	58.2	5.1	0.0	-	42.4	45.3	12.2	0.0	-	2.3	93.4	4.3	0.0	-	-
Total %	2.5	4.8	16.9	0.0	24.2	10.5	16.5	1.4	0.0	28.4	4.2	4.5	1.2	0.0	9.9	0.9	35.0	1.6	0.0	37.5	-
PHF	0.566	0.943	0.946	0.000	0.915	0.948	0.867	0.781	0.000	0.930	0.961	0.929	0.583	0.000	0.915	0.625	0.953	0.700	0.000	0.938	0.974
All Vehicles (no classification)	43	83	295	0	421	182	288	25	0	495	73	78	21	0	172	15	610	28	0	653	1741
% All Vehicles (no classification)	100.0	100.0	100.0	-	100.0	100.0	100.0	100.0	-	100.0	100.0	100.0	100.0	-	100.0	100.0	100.0	100.0	-	100.0	100.0

Bayer Becker
6900 Tylersville Road
Suite A
Mason, Ohio, United States 45040
513-336-6600 wardellwilcox@bayerbecker.com

Count Name: Erie and Michigan
Site Code: 23-0083
Start Date: 11/06/2024

Turning Movement Peak Hour Data (7:30 AM)

Start Time	Michigan Avenue Southbound					Erie Avenue Westbound					Michigan Avenue Northbound					Erie Avenue Eastbound					
	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Int. Total
7:30 AM	6	4	2	0	12	5	222	8	0	235	6	11	3	0	20	5	109	5	0	119	386
7:45 AM	3	3	6	0	12	5	180	1	0	186	3	1	4	0	8	5	121	3	0	129	335
8:00 AM	10	0	6	0	16	8	180	6	0	194	1	0	0	0	1	5	71	1	0	77	288
8:15 AM	5	3	10	0	18	7	197	3	0	207	2	0	0	0	2	4	98	1	0	103	330
Total	24	10	24	0	58	25	779	18	0	822	12	12	7	0	31	19	399	10	0	428	1339
Approach %	41.4	17.2	41.4	0.0	-	3.0	94.8	2.2	0.0	-	38.7	38.7	22.6	0.0	-	4.4	93.2	2.3	0.0	-	-
Total %	1.8	0.7	1.8	0.0	4.3	1.9	58.2	1.3	0.0	61.4	0.9	0.9	0.5	0.0	2.3	1.4	29.8	0.7	0.0	32.0	-
PHF	0.600	0.625	0.600	0.000	0.806	0.781	0.877	0.563	0.000	0.874	0.500	0.273	0.438	0.000	0.388	0.950	0.824	0.500	0.000	0.829	0.867
All Vehicles (no classification)	24	10	24	0	58	25	779	18	0	822	12	12	7	0	31	19	399	10	0	428	1339
% All Vehicles (no classification)	100.0	100.0	100.0	-	100.0	100.0	100.0	100.0	-	100.0	100.0	100.0	100.0	-	100.0	100.0	100.0	100.0	-	100.0	100.0

Bayer Becker
6900 Tylersville Road
Suite A
Mason, Ohio, United States 45040
513-336-6600 wardellwilcox@bayerbecker.com

Count Name: Erie and Michigan
Site Code: 23-0083
Start Date: 11/06/2024

Turning Movement Peak Hour Data (4:30 PM)

Start Time	Michigan Avenue Southbound					Erie Avenue Westbound					Michigan Avenue Northbound					Erie Avenue Eastbound					
	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Int. Total
4:30 PM	10	4	12	0	26	4	82	0	0	86	2	1	1	0	4	5	219	2	0	226	342
4:45 PM	4	2	15	0	21	6	70	1	0	77	6	6	0	0	12	1	220	1	0	222	332
5:00 PM	10	3	11	0	24	4	102	2	0	108	5	6	3	0	14	3	201	7	0	211	357
5:15 PM	9	2	4	0	15	1	107	1	0	109	3	1	2	0	6	3	216	8	0	227	357
Total	33	11	42	0	86	15	361	4	0	380	16	14	6	0	36	12	856	18	0	886	1388
Approach %	38.4	12.8	48.8	0.0	-	3.9	95.0	1.1	0.0	-	44.4	38.9	16.7	0.0	-	1.4	96.6	2.0	0.0	-	-
Total %	2.4	0.8	3.0	0.0	6.2	1.1	26.0	0.3	0.0	27.4	1.2	1.0	0.4	0.0	2.6	0.9	61.7	1.3	0.0	63.8	-
PHF	0.825	0.688	0.700	0.000	0.827	0.625	0.843	0.500	0.000	0.872	0.667	0.583	0.500	0.000	0.643	0.600	0.973	0.563	0.000	0.976	0.972
All Vehicles (no classification)	33	11	42	0	86	15	361	4	0	380	16	14	6	0	36	12	856	18	0	886	1388
% All Vehicles (no classification)	100.0	100.0	100.0	-	100.0	100.0	100.0	100.0	-	100.0	100.0	100.0	100.0	-	100.0	100.0	100.0	100.0	-	100.0	100.0

APPENDIX B

TRIP GENERATION EXCEPTS
&
NCHRP INTERNAL CAPTURE CALCULATIONS

Land Use: 221
Multifamily Housing (Mid-Rise)

Description

Mid-rise multifamily housing includes apartments and condominiums located in a building that has between four and 10 floors of living space. Access to individual dwelling units is through an outside building entrance, a lobby, elevator, and a set of hallways.

Multifamily housing (low-rise) (Land Use 220), multifamily housing (high-rise) (Land Use 222), off-campus student apartment (mid-rise) (Land Use 226), and mid-rise residential with ground-floor commercial (Land Use 231) are related land uses.

Land Use Subcategory

Data are presented for two subcategories for this land use: (1) not close to rail transit and (2) close to rail transit. A site is considered close to rail transit if the walking distance between the residential site entrance and the closest rail transit station entrance is ½ mile or less.

Additional Data

For the six sites for which both the number of residents and the number of occupied dwelling units were available, there were an average of 2.5 residents per occupied dwelling unit.

For the five sites for which the numbers of both total dwelling units and occupied dwelling units were available, an average of 96 percent of the total dwelling units were occupied.

The technical appendices provide supporting information on time-of-day distributions for this land use. The appendices can be accessed through either the ITETripGen web app or the trip generation resource page on the ITE website (https://www.ite.org/technical-resources/topics/trip-and-parking-generation/).

It is expected that the number of bedrooms and number of residents are likely correlated to the trips generated by a residential site. To assist in future analysis, trip generation studies of all multifamily housing should attempt to obtain information on occupancy rate and on the mix of residential unit sizes (i.e., number of units by number of bedrooms at the site complex).

The sites were surveyed in the 1990s, the 2000s, the 2010s, and the 2020s in Alberta (CAN), California, District of Columbia, Florida, Georgia, Illinois, Maryland, Massachusetts, Minnesota, Montana, New Jersey, New York, Ontario (CAN), Oregon, Utah, and Virginia.

Source Numbers

168, 188, 204, 305, 306, 321, 818, 857, 862, 866, 901, 904, 910, 949, 951, 959, 963, 964, 966, 967, 969, 970, 1004, 1014, 1022, 1023, 1025, 1031, 1032, 1035, 1047, 1056, 1057, 1058, 1071, 1076

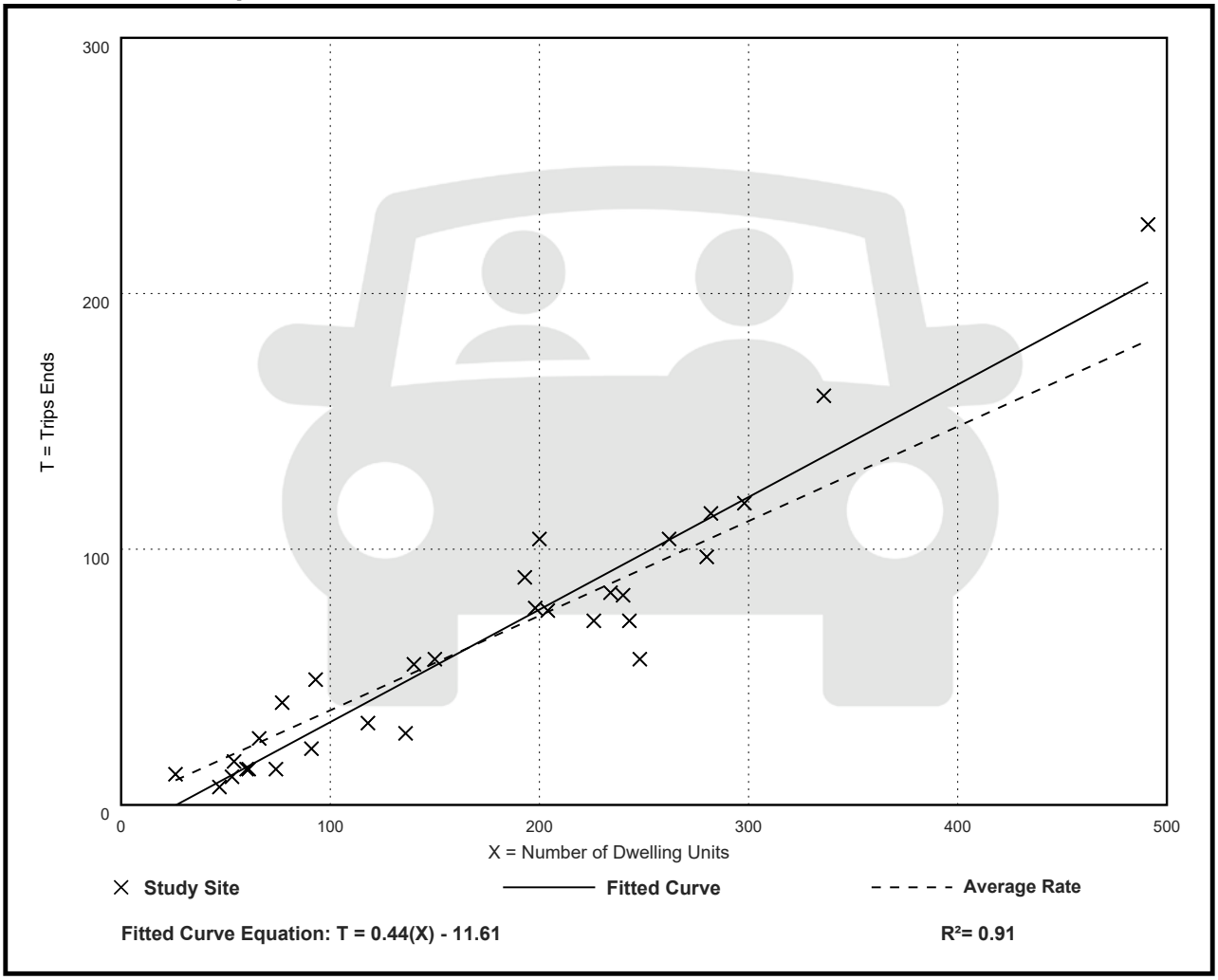
Multifamily Housing (Mid-Rise)
Not Close to Rail Transit (221)

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: 30
Avg. Num. of Dwelling Units: 173
Directional Distribution: 23% entering, 77% exiting

Vehicle Trip Generation per Dwelling Unit

Average Rate	Range of Rates	Standard Deviation
0.37	0.15 - 0.53	0.09

Data Plot and Equation



Fitted Curve Equation: T = 0.44(X) - 11.61

R^2= 0.91

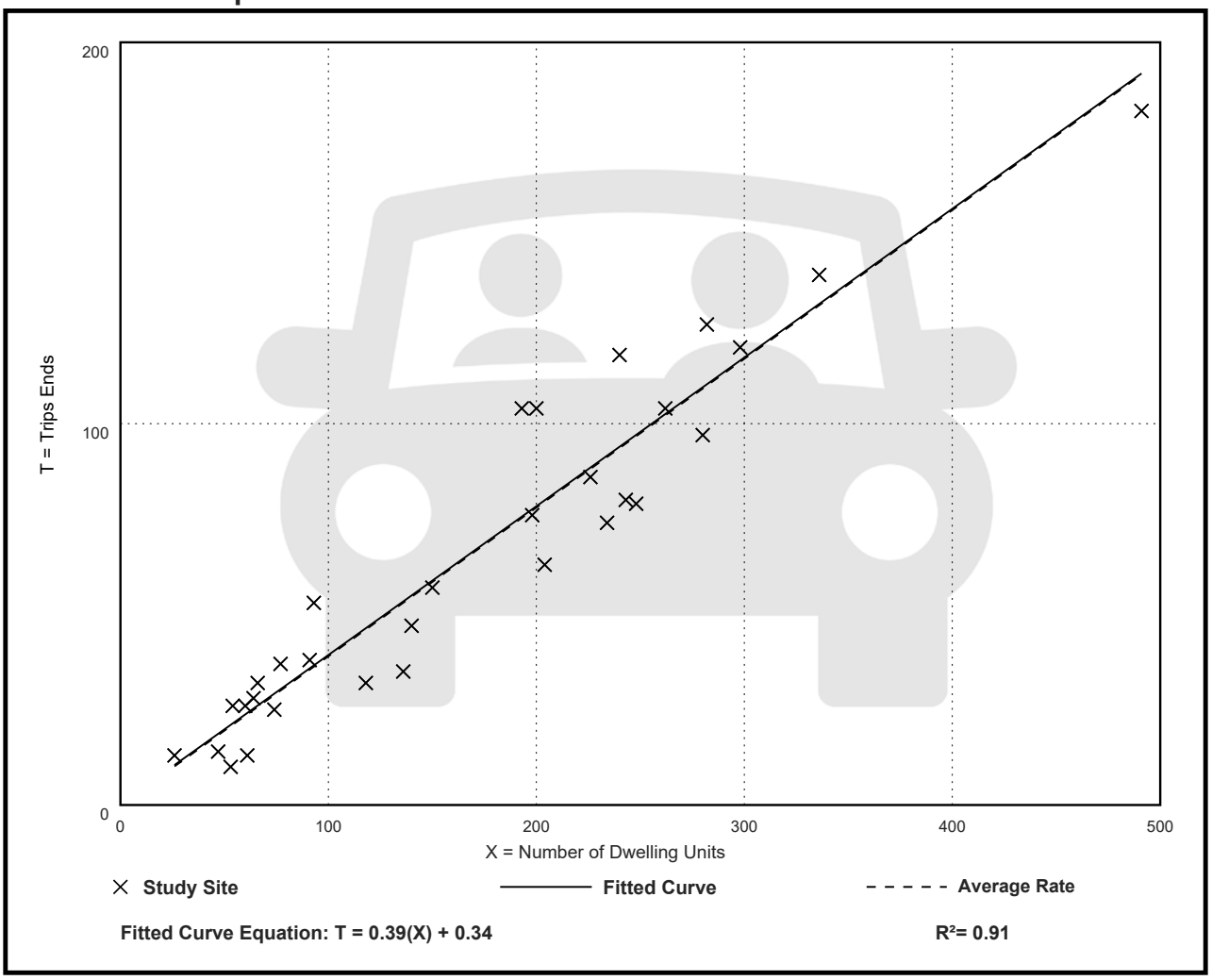
Multifamily Housing (Mid-Rise)
Not Close to Rail Transit (221)

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: 31
Avg. Num. of Dwelling Units: 169
Directional Distribution: 61% entering, 39% exiting

Vehicle Trip Generation per Dwelling Unit

Average Rate	Range of Rates	Standard Deviation
0.39	0.19 - 0.57	0.08

Data Plot and Equation



Land Use: 310
Hotel

Description

A hotel is a place of lodging that provides sleeping accommodations and supporting facilities such as a full-service restaurant, cocktail lounge, meeting rooms, banquet room, and convention facilities. A hotel typically provides a swimming pool or another recreational facility such as a fitness room. All suites hotel (Land Use 311), business hotel (Land Use 312), motel (Land Use 320), and resort hotel (Land Use 330) are related uses.

Additional Data

Twenty-five studies provided information on occupancy rates at the time the studies were conducted. The average occupancy rate for these studies was approximately 82 percent.

Some properties in this land use provide guest transportation services (e.g., airport shuttle, limousine service, golf course shuttle service) which may have an impact on the overall trip generation rates.

The technical appendices provide supporting information on time-of-day distributions for this land use. The appendices can be accessed through either the ITETripGen web app or the trip generation resource page on the ITE website (https://www.ite.org/technical-resources/topics/trip-and-parking-generation/).

The sites were surveyed in the 1980s, the 1990s, the 2000s, and the 2010s in California, District of Columbia, Florida, Georgia, Indiana, Minnesota, New York, Ontario (CAN), Pennsylvania, South Dakota, Texas, Vermont, Virginia, and Washington.

For all lodging uses, it is important to collect data on occupied rooms as well as total rooms in order to accurately predict trip generation characteristics for the site.

Trip generation at a hotel may be related to the presence of supporting facilities such as convention facilities, restaurants, meeting/banquet space, and retail facilities. Future data submissions should specify the presence of these amenities. Reporting the level of activity at the supporting facilities such as full, empty, partially active, number of people attending a meeting/banquet during observation may also be useful in further analysis of this land use.

Source Numbers

170, 260, 262, 277, 280, 301, 306, 357, 422, 507, 577, 728, 867, 872, 925, 951, 1009, 1021, 1026, 1046

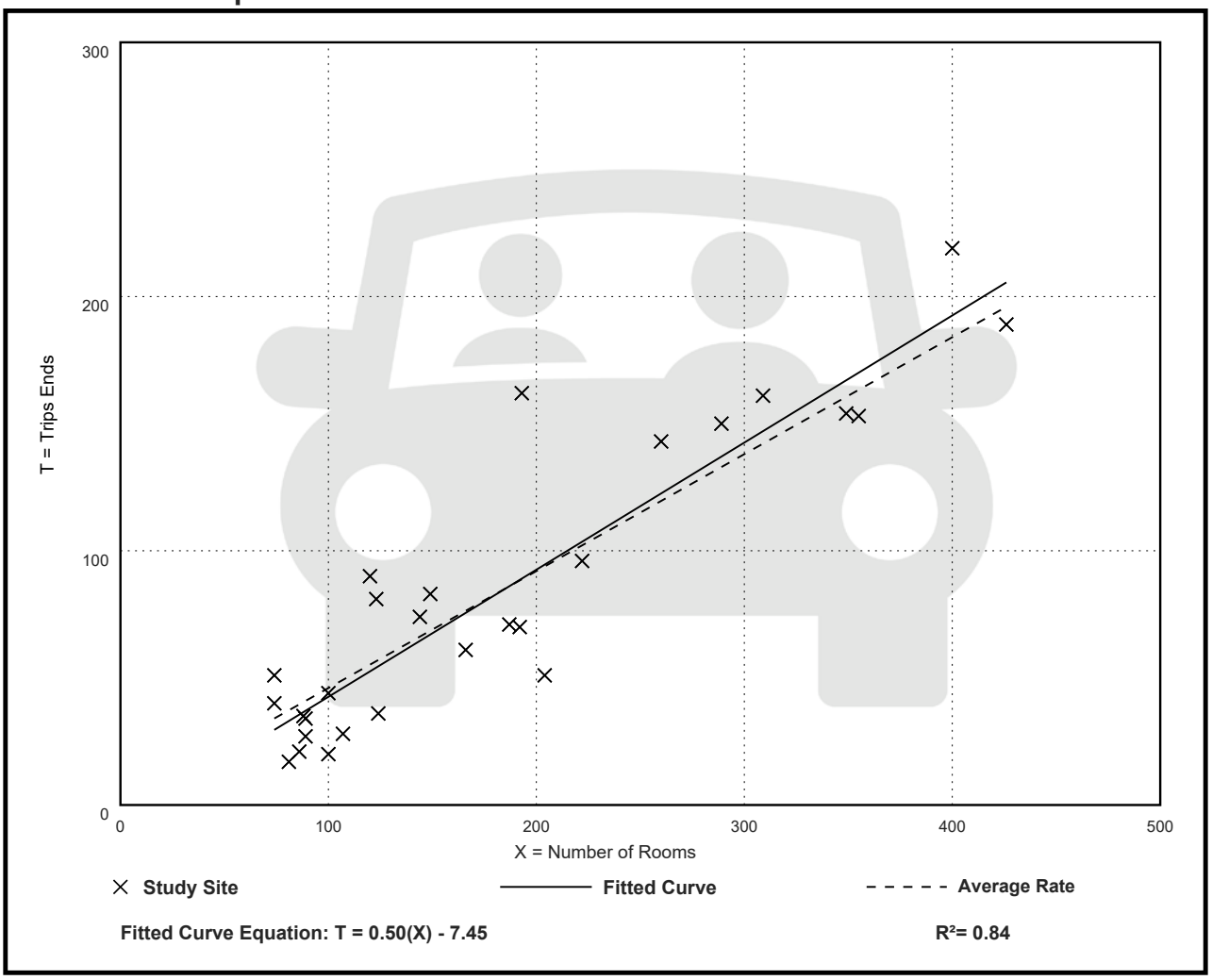
Hotel
(310)

Vehicle Trip Ends vs: Rooms
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: 28
Avg. Num. of Rooms: 182
Directional Distribution: 56% entering, 44% exiting

Vehicle Trip Generation per Room

Average Rate	Range of Rates	Standard Deviation
0.46	0.20 - 0.84	0.14

Data Plot and Equation



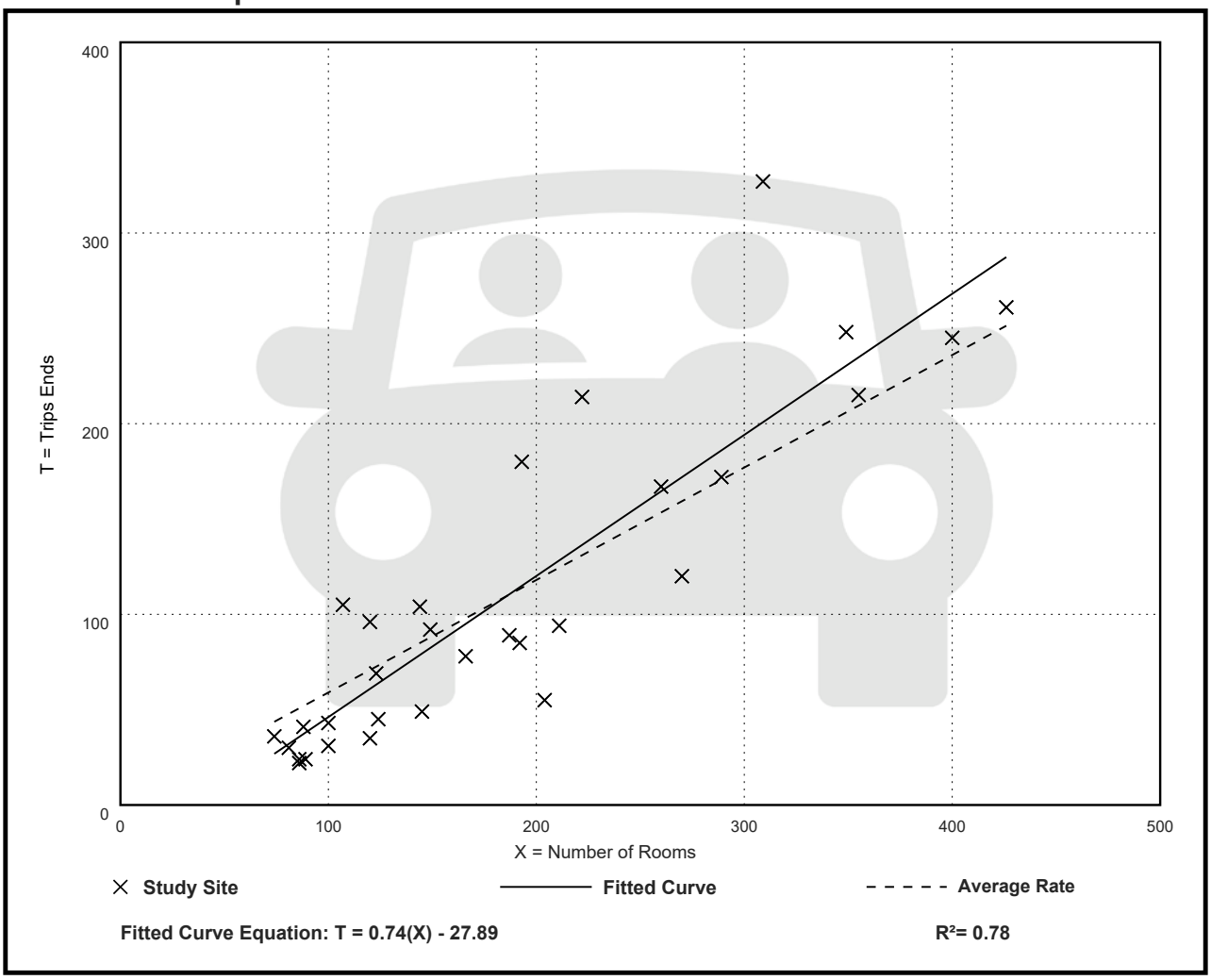
Hotel
(310)

Vehicle Trip Ends vs: Rooms
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: 31
Avg. Num. of Rooms: 186
Directional Distribution: 51% entering, 49% exiting

Vehicle Trip Generation per Room

Average Rate	Range of Rates	Standard Deviation
0.59	0.26 - 1.06	0.22

Data Plot and Equation



Land Use: 822
Strip Retail Plaza (<40k)

Description

A strip retail plaza is an integrated group of commercial establishments that is planned, developed, owned, and managed as a unit. Each study site in this land use has less than 40,000 square feet of gross leasable area (GLA). Because a strip retail plaza is open-air, the GLA is the same as the gross floor area of the building.

The 40,000 square feet GFA threshold between strip retail plaza and shopping plaza (Land Use 821) was selected based on an examination of the overall shopping center/plaza database. No shopping plaza with a supermarket as its anchor is smaller than 40,000 square feet GLA.

Shopping center (>150k) (Land use 820), shopping plaza (40-150k) (Land Use 821), and factory outlet center (Land Use 823) are related uses.

Additional Data

The technical appendices provide supporting information on time-of-day distributions for this land use. The appendices can be accessed through either the ITETripGen web app or the trip generation resource page on the ITE website (https://www.ite.org/technical-resources/topics/trip-and-parking-generation/).

The sites were surveyed in the 1980s, the 1990s, the 2000s, and the 2010s in Alberta (CAN), California, Delaware, Florida, New Jersey, Ontario (CAN), South Dakota, Vermont, Washington, and Wisconsin.

Source Numbers

304, 358, 423, 428, 437, 507, 715, 728, 936, 960, 961, 974, 1009

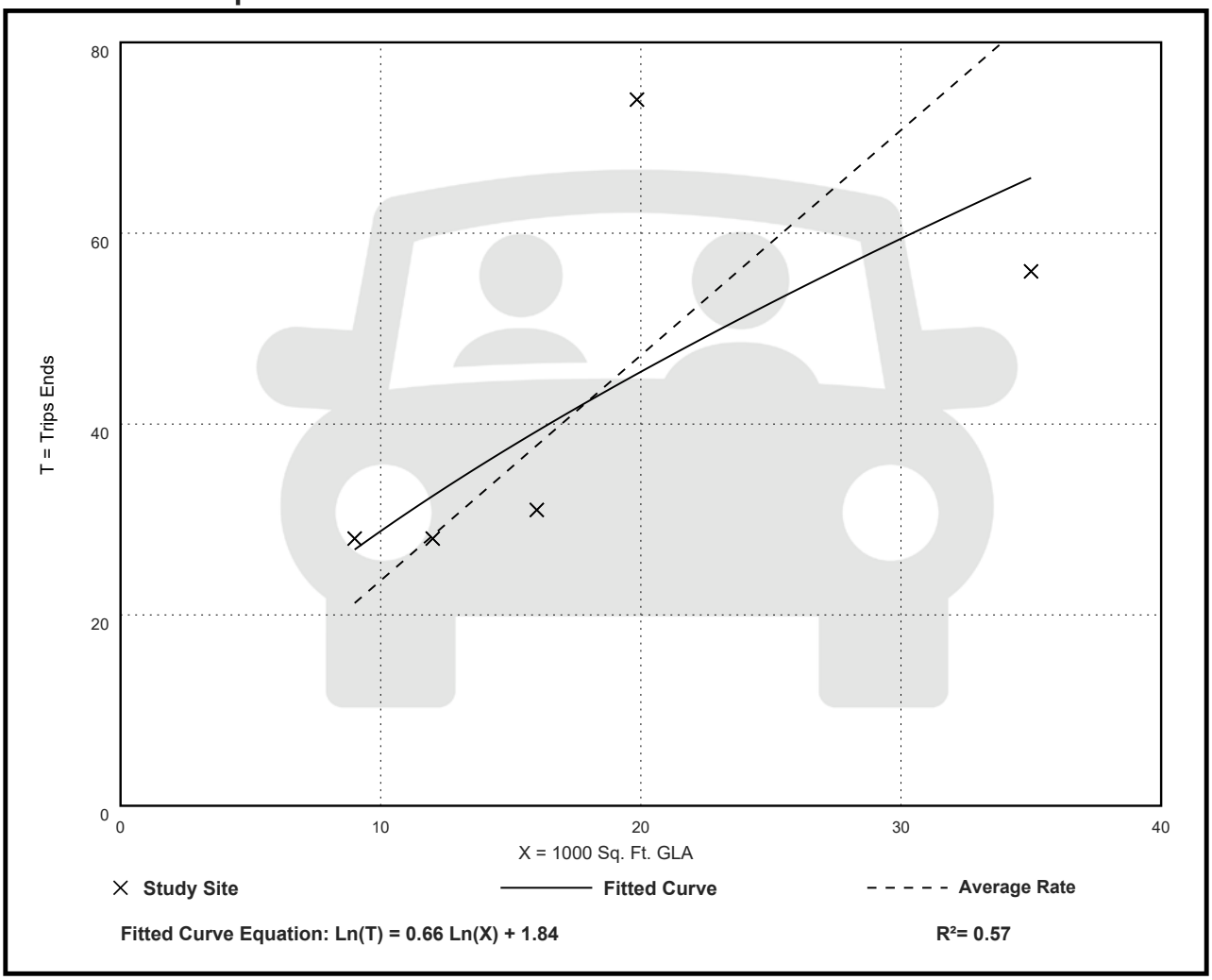
Strip Retail Plaza (<40k)
(822)

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: 5
Avg. 1000 Sq. Ft. GLA: 18
Directional Distribution: 60% entering, 40% exiting

Vehicle Trip Generation per 1000 Sq. Ft. GLA

Average Rate	Range of Rates	Standard Deviation
2.36	1.60 - 3.73	0.94

Data Plot and Equation



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

R^2= 0.57

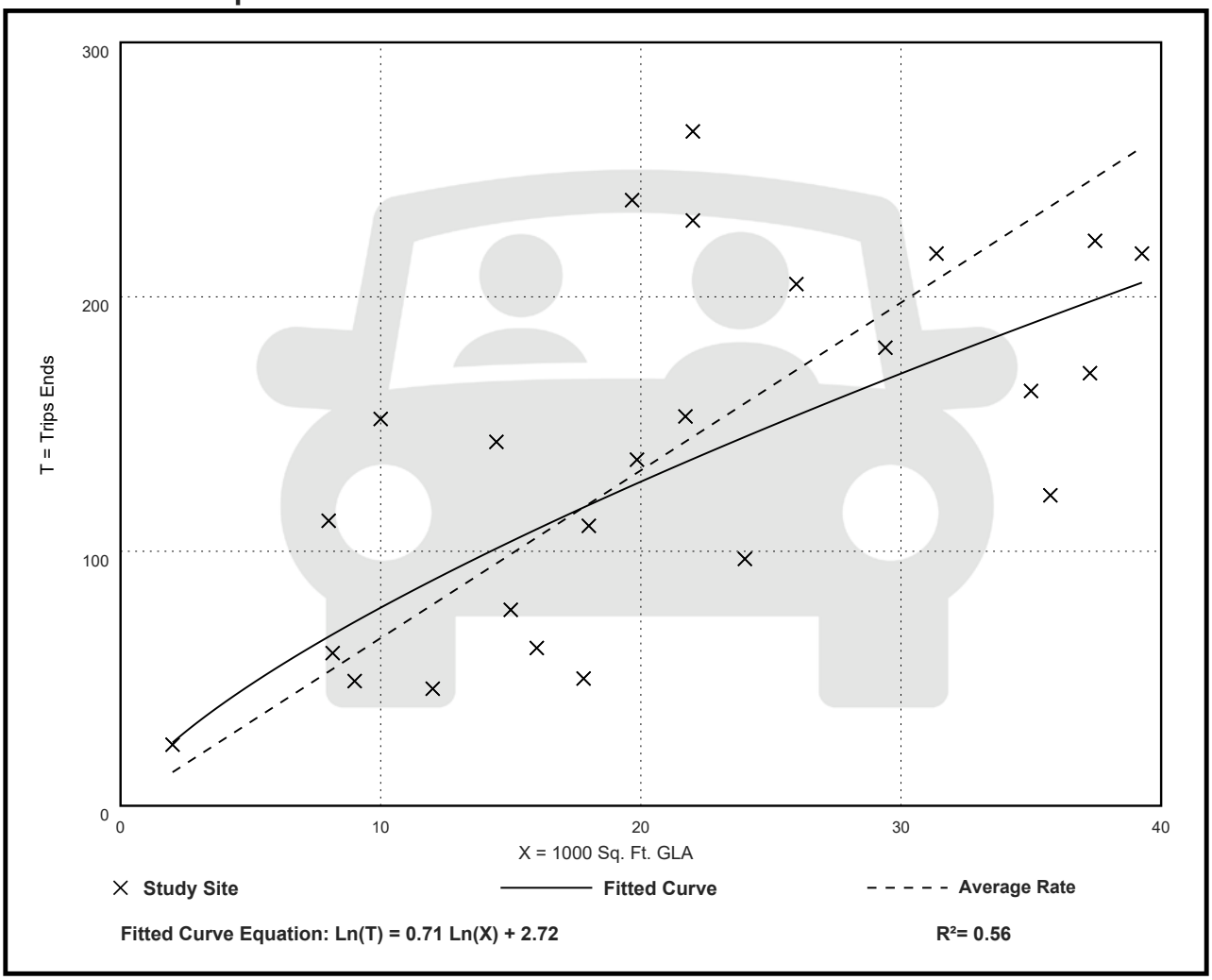
Strip Retail Plaza (<40k)
(822)

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: 25
Avg. 1000 Sq. Ft. GLA: 21
Directional Distribution: 50% entering, 50% exiting

Vehicle Trip Generation per 1000 Sq. Ft. GLA

Average Rate	Range of Rates	Standard Deviation
6.59	2.81 - 15.20	2.94

Data Plot and Equation



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

R^2= 0.56

Land Use: 930
Fast Casual Restaurant

Description

A fast casual restaurant is a sit-down restaurant with no (or very limited) wait staff or table service. A customer typically orders off a menu board, pays for food before the food is prepared, and seats themselves. The menu generally contains higher-quality, made-to-order food items with fewer frozen or processed ingredients than at a fast-food restaurant. Most patrons eat their meal within the restaurant, but a significant proportion of the restaurant sales can be carry-out orders. A fast casual restaurant typically serves lunch and dinner; some serve breakfast. A typical duration of stay for an eat-in customer is 40 minutes or less. Fine dining restaurant (Land Use 931), high-turnover (sit-down) restaurant (Land Use 932), and fast-food restaurant without drive-through window (Land Use 933) are related uses.

Additional Data

The fast casual restaurant study sites included in this land use did not have a drive-through window.

The technical appendices provide supporting information on time-of-day distributions for this land use. The appendices can be accessed through either the ITETripGen web app or the trip generation resource page on the ITE website (https://www.ite.org/technical-resources/topics/trip-and-parking-generation/).

The sites were surveyed in the 2010s in Minnesota, South Carolina, Washington, and Wisconsin.

Source Numbers

861, 869, 939, 959, 962, 1048

Fast Casual Restaurant
(930)

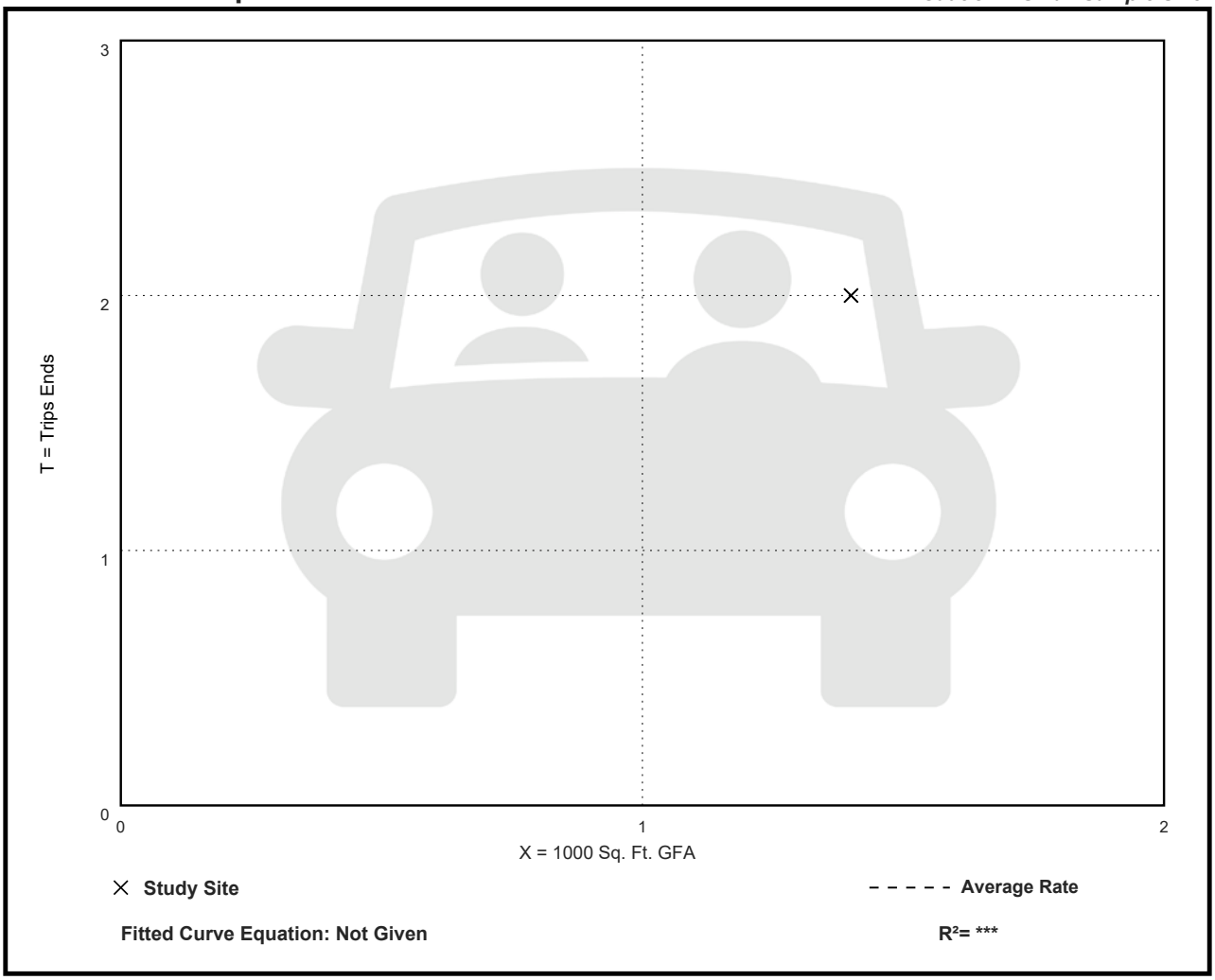
Vehicle Trip Ends vs: 1000 Sq. Ft. GFA
On a: Weekday,
Peak Hour of Adjacent Street Traffic,
One Hour Between 7 and 9 a.m.
Setting/Location: General Urban/Suburban
Number of Studies: 1
Avg. 1000 Sq. Ft. GFA: 1
Directional Distribution: 50% entering, 50% exiting

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



Fitted Curve Equation: Not Given

R^2= ***

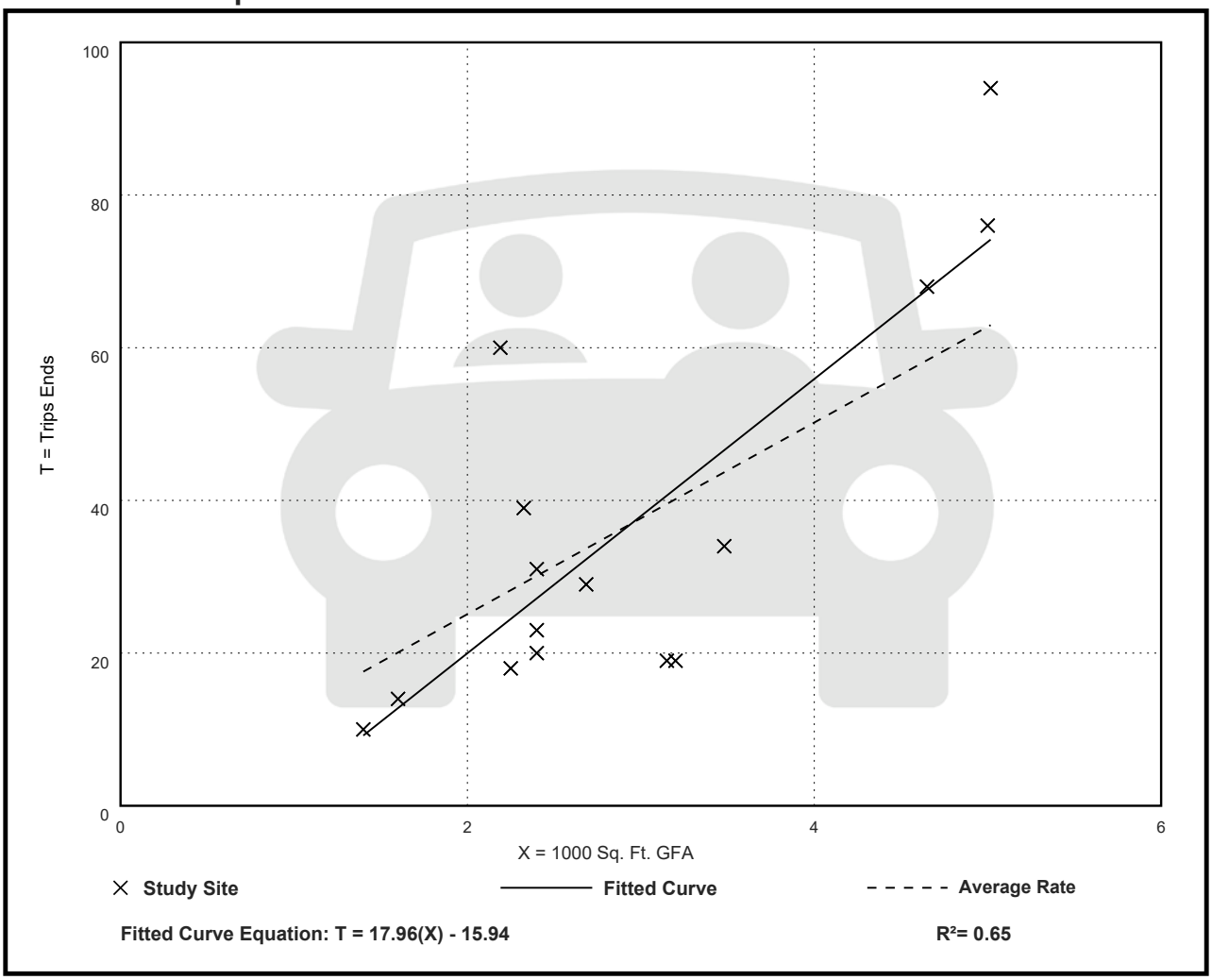
Fast Casual Restaurant
(930)

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



Fitted Curve Equation: T = 17.96(X) - 15.94

R^2= 0.65

Land Use: 931
Fine Dining Restaurant

Description

A fine dining restaurant is a full-service eating establishment with a typical duration of stay of at least 1 hour. A fine dining restaurant generally does not serve breakfast; some do not serve lunch; all serve dinner. This type of restaurant often requests and sometimes requires a reservation and is generally not part of a chain. A patron commonly waits to be seated, is served by wait staff, orders from a menu and pays after the meal. Some of the study sites have lounge or bar facilities (serving alcoholic beverages), but meal service is the primary draw to the restaurant. Fast casual restaurant (Land Use 930) and high-turnover (sit-down) restaurant (Land Use 932) are related uses.

Additional Data

If the fine dining restaurant has outdoor seating, its area is not included in the overall gross floor area. For a restaurant that has significant outdoor seating, the number of seats may be more reliable than GFA as an independent variable on which to establish a trip generation rate.

The sites were surveyed in the 1980s, the 1990s, and the 2010s in Alberta (CAN), California, Colorado, Florida, Indiana, Kentucky, New Jersey, and Utah.

Source Numbers

126, 260, 291, 301, 338, 339, 368, 437, 440, 976, 1053

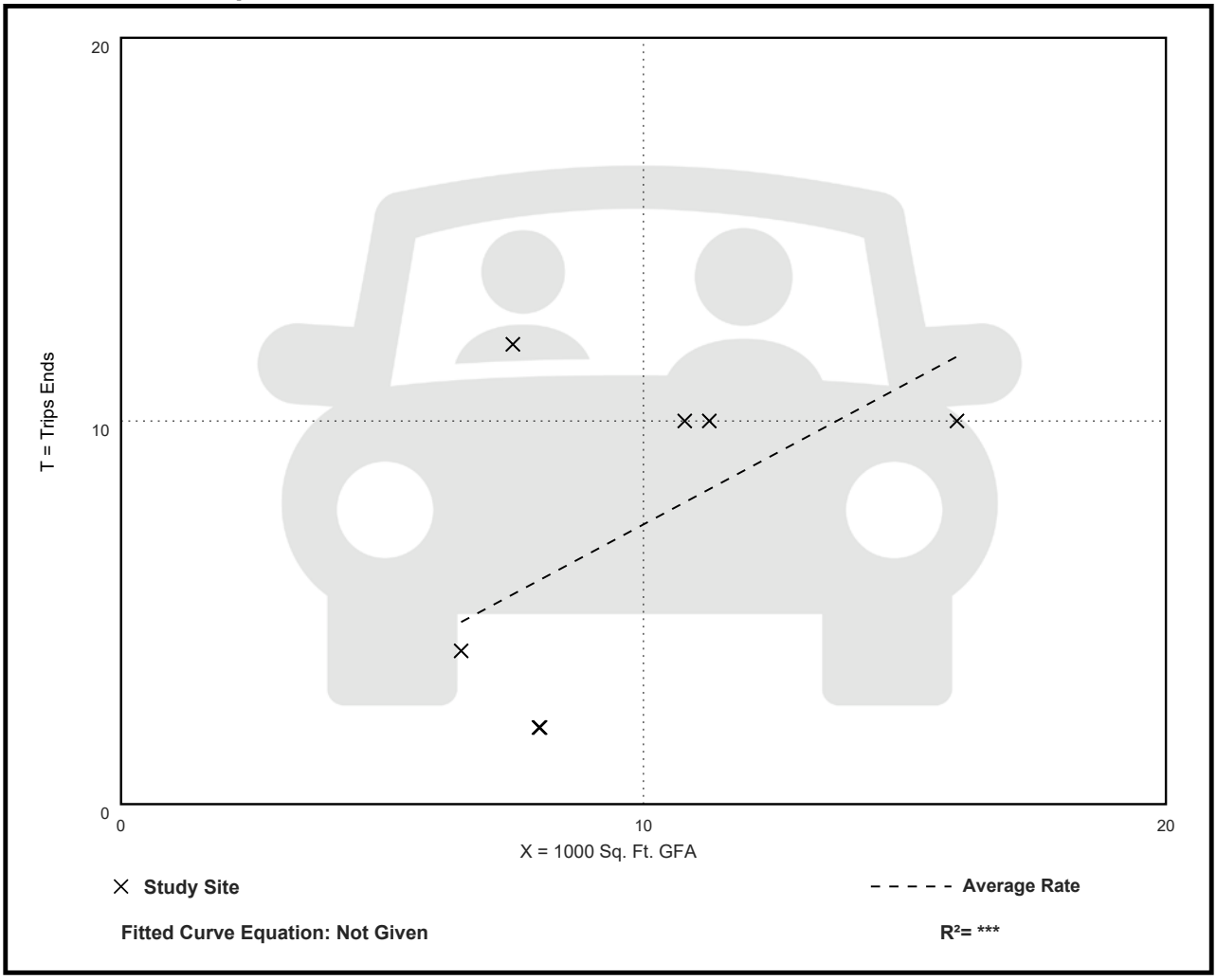
Fine Dining Restaurant
(931)

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



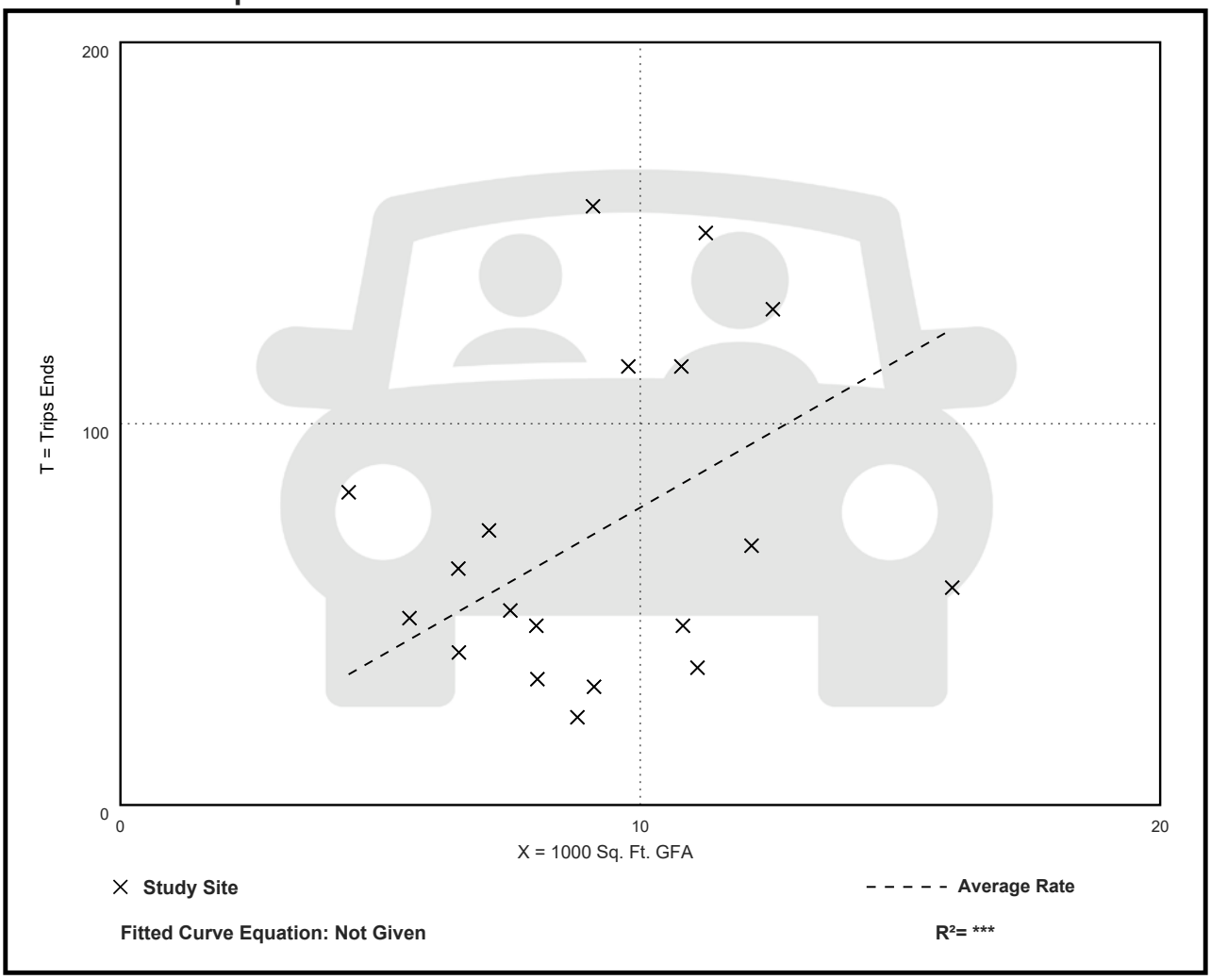
Fine Dining Restaurant
(931)

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



Land Use: 971
Brewery Tap Room

Description

A brewery tap room is a designated area found in conjunction with a brewery in which customers can try samples of a brewery's products. These rooms are typically located on-site and can be used as a way to sell beer or related products directly to the customer. Depending on its size, a tap room can also be used to house social gatherings. A brewery tap room may also be used to facilitate complimentary tours of the brewery.

Additional Data

For the purposes of this land use, the independent variable "1,000 sq. foot gross floor area" refers to the square footage of the building that houses the tap room.

The technical appendices provide supporting information on time-of-day distributions for this land use. The appendices can be accessed through either the ITETripGen web app or the trip generation resource page on the ITE website (https://www.ite.org/technical-resources/topics/trip-and-parking-generation/).

The sites were surveyed in the 2010s in Florida and Minnesota.

Source Numbers

1047, 1053

Brewery Tap Room
(971)

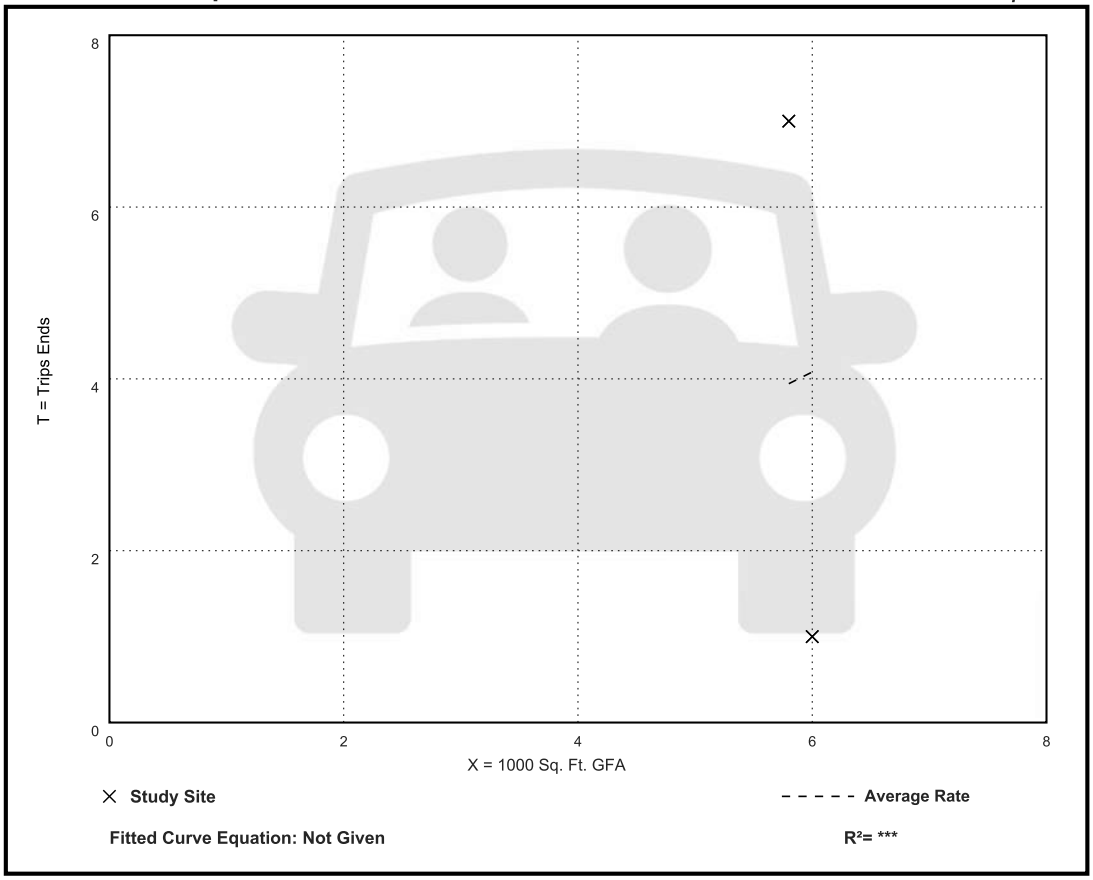
Vehicle Trip Ends vs: 1000 Sq. Ft. GFA
On a: Weekday,
Peak Hour of Adjacent Street Traffic,
One Hour Between 7 and 9 a.m.
Setting/Location: General Urban/Suburban
Number of Studies: 2
Avg. 1000 Sq. Ft. GFA: 6
Directional Distribution: 88% entering, 12% exiting

Vehicle Trip Generation per 1000 Sq. Ft. GFA

Average Rate	Range of Rates	Standard Deviation
0.68	0.17 - 1.21	***

Data Plot and Equation

Caution – Small Sample Size



Fitted Curve Equation: Not Given

R^2= *

Brewery Tap Room
(971)

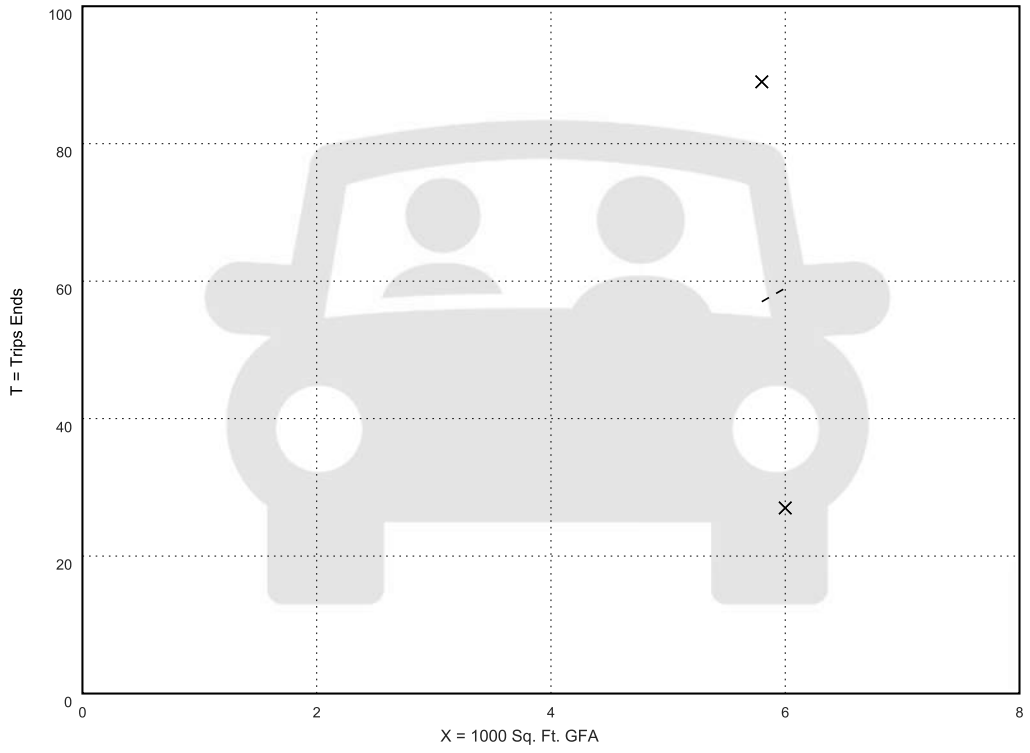
Vehicle Trip Ends vs: 1000 Sq. Ft. GFA
On a: Weekday,
Peak Hour of Adjacent Street Traffic,
One Hour Between 4 and 6 p.m.
Setting/Location: General Urban/Suburban
Number of Studies: 2
Avg. 1000 Sq. Ft. GFA: 6
Directional Distribution: 59% entering, 41% exiting

Vehicle Trip Generation per 1000 Sq. Ft. GFA

Average Rate	Range of Rates	Standard Deviation
9.83	4.50 - 15.34	***

Data Plot and Equation

Caution – Small Sample Size



Fitted Curve Equation: Not Given

R^2= *

NCHRP 684 Internal Trip Capture Estimation Tool			
Project Name:	Hyde Park Square Development	**Organization:**	Bayer Becker
Project Location:	Cincinnati, Ohio	**Performed By:**	WLW
Scenario Description:	Full Build	**Date:**	11/20/24
Analysis Year:	2027	**Checked By:**	EMR
Analysis Period:	**AM Street Peak Hour**	**Date:**	

Table 1-A: Base Vehicle-Trip Generation Estimates (Single-Use Site Estimate)

Land Use	Development Data (*For Information Only*)			Estimated Vehicle-Trips[3]		
	ITE LUCs[1]	Quantity	Units	Total	Entering	Exiting
Office				0		
Retail	822	10,600	SF	30	18	12
Restaurant	930/931/971	14,300	SF	14	9	5
Cinema/Entertainment				0	0	0
Residential	221	182	DU	68	16	52
Hotel	310	90	RM	38	21	17
All Other Land Uses[2]				0	0	0
				150	64	86

Table 2-A: Mode Split and Vehicle Occupancy Estimates

Land Use	Entering Trips			Exiting Trips		
	Veh. Occ.[4]	% Transit	% Non-Motorized	Veh. Occ.[4]	% Transit	% Non-Motorized
Office	1.00	0%	0%	1.00	0%	0%
Retail	1.00	0%	0%	1.00	0%	0%
Restaurant						
Cinema/Entertainment						
Residential	1.00	0%	0%	1.00	0%	0%
Hotel						
All Other Land Uses[2]						

Table 3-A: Average Land Use Interchange Distances (Feet Walking Distance)

Origin (From)	Destination (To)					
	Office	Retail	Restaurant	Cinema/Entertainment	Residential	Hotel
Office						
Retail						
Restaurant						
Cinema/Entertainment						
Residential						
Hotel						

Table 4-A: Internal Person-Trip Origin-Destination Matrix*

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

Table 5-A: Computations Summary

	Total	Entering	Exiting
All Person-Trips	150	64	86
Internal Capture Percentage	11%	13%	9%
External Vehicle-Trips[5]	134	56	78
External Transit-Trips[6]	0	0	0
External Non-Motorized Trips[6]	0	0	0

Table 6-A: Internal Trip Capture Percentages by Land Use

Land Use	Entering Trips	Exiting Trips
Office	N/A	N/A
Retail	17%	17%
Restaurant	56%	20%
Cinema/Entertainment	N/A	N/A
Residential	0%	6%
Hotel	0%	12%

[1]Land Use Codes (LUCs) from *Trip Generation Manual*, published by the Institute of Transportation Engineers.

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

[3]Enter trips assuming no transit or non-motorized trips (as assumed in ITE *Trip Generation Manual*).

[4]Enter vehicle occupancy assumed in Table 1-A vehicle trips. If vehicle occupancy changes for proposed mixed-use project, manual adjustments must be made to Tables 5-A, 9-A (O and D). Enter transit, non-motorized percentages that will result with proposed mixed-use project complete.

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

[6]Person-Trips

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

Estimation Tool Developed by the Texas A&M Transportation Institute - Version 2013.1

Project Name:	Hyde Park Square 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	0	0	1.00	0	0
Retail	1.00	18	18	1.00	12	12
Restaurant	1.00	9	9	1.00	5	5
Cinema/Entertainment	1.00	0	0	1.00	0	0
Residential	1.00	16	16	1.00	52	52
Hotel	1.00	21	21	1.00	17	17

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		0	0	0	0	0
Retail	3		2	0	2	0
Restaurant	2	1		0	0	0
Cinema/Entertainment	0	0	0		0	0
Residential	1	1	10	0		0
Hotel	13	2	2	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		6	2	0	0	0
Retail	0		5	0	0	0
Restaurant	0	1		0	1	1
Cinema/Entertainment	0	0	0		0	0
Residential	0	3	2	0		0
Hotel	0	1	1	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	0	0	0	0	0	0
Retail	3	15	18	15	0	0
Restaurant	5	4	9	4	0	0
Cinema/Entertainment	0	0	0	0	0	0
Residential	0	16	16	16	0	0
Hotel	0	21	21	21	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	0	0	0	0	0	0
Retail	2	10	12	10	0	0
Restaurant	1	4	5	4	0	0
Cinema/Entertainment	0	0	0	0	0	0
Residential	3	49	52	49	0	0
Hotel	2	15	17	15	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.

NCHRP 684 Internal Trip Capture Estimation Tool			
Project Name:	Hyde Park Square Development	**Organization:**	Bayer Becker
Project Location:	Cincinnati, Ohio	**Performed By:**	WLW
Scenario Description:	Full Build	**Date:**	11/20/24
Analysis Year:	2027	**Checked By:**	EMR
Analysis Period:	**PM Street Peak Hour**	**Date:**	

Table 1-P: Base Vehicle-Trip Generation Estimates (Single-Use Site Estimate)

Land Use	Development Data (*For Information Only*)			Estimated Vehicle-Trips[3]		
	ITE LUCs[1]	Quantity	Units	Total	Entering	Exiting
Office				0		
Retail	822	10,600	SF	81	41	40
Restaurant	930/931/971	14,300	SF	161	93	68
Cinema/Entertainment				0	0	0
Residential	221	182	DU	71	43	28
Hotel	310	90	RM	39	20	19
All Other Land Uses[2]				0	0	0
				352	197	155

Table 2-P: Mode Split and Vehicle Occupancy Estimates

Land Use	Entering Trips			Exiting Trips		
	Veh. Occ.[4]	% Transit	% Non-Motorized	Veh. Occ.[4]	% Transit	% Non-Motorized
Office						
Retail						
Restaurant						
Cinema/Entertainment						
Residential						
Hotel						
All Other Land Uses[2]						

Table 3-P: Average Land Use Interchange Distances (Feet Walking Distance)

Origin (From)	Destination (To)					
	Office	Retail	Restaurant	Cinema/Entertainment	Residential	Hotel
Office						
Retail						
Restaurant						
Cinema/Entertainment						
Residential						
Hotel						

Table 4-P: Internal Person-Trip Origin-Destination Matrix*

Origin (From)	Destination (To)					
	Office	Retail	Restaurant	Cinema/Entertainment	Residential	Hotel
Office		0	0	0	0	0
Retail	0		12	0	10	2
Restaurant	0	21		0	7	5
Cinema/Entertainment	0	0	0		0	0
Residential	0	4	6	0		1
Hotel	0	1	5	0	0	

Table 5-P: Computations Summary

	Total	Entering	Exiting
All Person-Trips	352	197	155
Internal Capture Percentage	42%	38%	48%
External Vehicle-Trips[5]	204	123	81
External Transit-Trips[6]	0	0	0
External Non-Motorized Trips[6]	0	0	0

Table 6-P: Internal Trip Capture Percentages by Land Use

Land Use	Entering Trips	Exiting Trips
Office	N/A	N/A
Retail	63%	60%
Restaurant	25%	49%
Cinema/Entertainment	N/A	N/A
Residential	40%	39%
Hotel	40%	32%

[1]Land Use Codes (LUCs) from *Trip Generation Manual*, published by the Institute of Transportation Engineers.

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

[3]Enter trips assuming no transit or non-motorized trips (as assumed in ITE *Trip Generation Manual*).

[4]Enter vehicle occupancy assumed in Table 1-P vehicle trips. If vehicle occupancy changes for proposed mixed-use project, manual adjustments must be made to Tables 5-P, 9-P (O and D). Enter transit, non-motorized percentages that will result with proposed mixed-use project complete.

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

[6]Person-Trips

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

Estimation Tool Developed by the Texas A&M Transportation Institute - Version 2013.1

Project Name:	Hyde Park Square Development
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	0	0	1.00	0	0
Retail	1.00	41	41	1.00	40	40
Restaurant	1.00	93	93	1.00	68	68
Cinema/Entertainment	1.00	0	0	1.00	0	0
Residential	1.00	43	43	1.00	28	28
Hotel	1.00	20	20	1.00	19	19

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		0	0	0	0	0
Retail	1		12	2	10	2
Restaurant	2	28		5	12	5
Cinema/Entertainment	0	0	0		0	0
Residential	1	12	6	0		1
Hotel	0	3	13	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		3	2	0	2	0
Retail	0		27	0	20	3
Restaurant	0	21		0	7	14
Cinema/Entertainment	0	2	3		2	0
Residential	0	4	13	0		2
Hotel	0	1	5	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	0	0	0	0	0	0
Retail	26	15	41	15	0	0
Restaurant	23	70	93	70	0	0
Cinema/Entertainment	0	0	0	0	0	0
Residential	17	26	43	26	0	0
Hotel	8	12	20	12	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	0	0	0	0	0	0
Retail	24	16	40	16	0	0
Restaurant	33	35	68	35	0	0
Cinema/Entertainment	0	0	0	0	0	0
Residential	11	17	28	17	0	0
Hotel	6	13	19	13	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.

APPENDIX C

HCS INTERSECTION LOS CAPACITY ANALYSIS CALCULATIONS

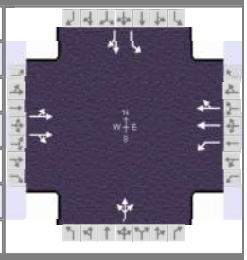
&

BACK OF QUEUE LANE LENGTH RESULTS

2024 EXISTING CONDITIONS
AM AND PM PEAK HOUR

HCS Signalized Intersection Results Summary

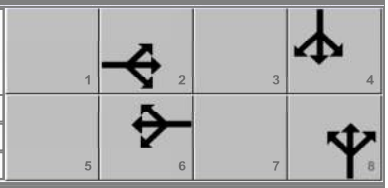
General Information				Intersection Information	
Agency	Bayer Becker			Duration, h	0.250
Analyst	WLW	Analysis Date	10/30/2024	Area Type	Other
Jurisdiction	City of Cincinnati	Time Period	AM Peak	PHF	0.92
Urban Street	Erie Avenue	Analysis Year	2024	Analysis Period	1> 7:00
Intersection	Edwards Road (SR 561)	File Name	Erie & Edwards - 2024 Build AM.xus		
Project Description	Existing Conditions				



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	20	230	34	40	506	265	6	227	35	162	207	40

Signal Information			
Cycle, s	70.0	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	No	Simult. Gap E/W	On
Force Mode	Fixed	Simult. Gap N/S	On

Green	27.0	31.0	0.0	0.0	0.0	0.0	
Yellow	3.4	3.0	0.0	0.0	0.0	0.0	
Red	2.6	3.0	0.0	0.0	0.0	0.0	



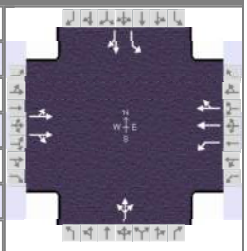
Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase		2		6		8		4
Case Number		8.0		6.0		8.0		6.0
Phase Duration, s		33.0		33.0		37.0		37.0
Change Period, (*Y+R c*), s		6.0		6.0		6.0		6.0
Max Allow Headway (*MAH*), s		0.0		0.0		3.2		3.2
Queue Clearance Time (*g s*), s						9.3		18.0
Green Extension Time (*g e*), s		0.0		0.0		1.5		1.4
Phase Call Probability						1.00		1.00
Max Out Probability						0.00		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	5	2	12	1	6	16	3	8	18	7	4	14
Adjusted Flow Rate (*v*), veh/h	155		153	43	444	394		291		176	268	
Adjusted Saturation Flow Rate (*s*), veh/h/ln	1525		1657	1110	1900	1679		1849		1112	1846	
Queue Service Time (*g s*), s	0.3		4.4	1.9	13.1	13.2		0.0		8.7	6.6	
Cycle Queue Clearance Time (*g c*), s	13.5		4.4	6.3	13.1	13.2		7.3		16.0	6.6	
Green Ratio (*g/C*)	0.39		0.39	0.39	0.39	0.39		0.44		0.44	0.44	
Capacity (*c*), veh/h	647		639	461	733	648		871		480	818	
Volume-to-Capacity Ratio (*X*)	0.240		0.240	0.094	0.606	0.608		0.334		0.367	0.328	
Back of Queue (*Q*), ft/ln (95 th percentile)	74		74	23	246	227		131		105	120	
Back of Queue (*Q*), veh/ln (95 th percentile)	3.0		3.0	0.9	9.9	9.1		5.2		4.2	4.8	
Queue Storage Ratio (*RQ*) (95 th percentile)	0.00		0.00	0.57	0.00	0.00		0.00		1.40	0.00	
Uniform Delay (*d 1*), s/veh	14.4		14.6	16.7	17.2	17.3		12.9		18.2	12.7	
Incremental Delay (*d 2*), s/veh	0.9		0.9	0.4	3.7	4.2		1.0		2.2	1.1	
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	15.3		15.4	17.1	20.9	21.5		13.9		20.3	13.8	
Level of Service (LOS)	B		B	B	C	C		B		C	B	
Approach Delay, s/veh / LOS	15.4	B		21.0	C		13.9	B		16.4	B	
Intersection Delay, s/veh / LOS	18.0						B					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	1.68	B	1.90	B	2.25	B	2.08	B
Bicycle LOS Score / LOS	0.74	A	1.21	A	0.97	A	1.22	A

HCS Signalized Intersection Results Summary

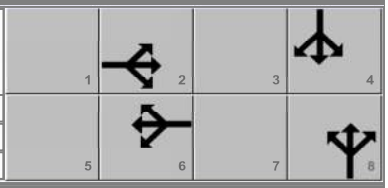
General Information				Intersection Information	
Agency	Bayer Becker			Duration, h	0.250
Analyst	WLW	Analysis Date	10/30/2024	Area Type	Other
Jurisdiction	City of Cincinnati	Time Period	PM Peak	PHF	0.92
Urban Street	Erie Avenue	Analysis Year	2024	Analysis Period	1> 7:00
Intersection	Edwards Road (SR 561)	File Name	Erie & Edwards - 2024 Ex PM.xus		
Project Description	Existing Conditions				



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	38	594	39	45	213	150	20	260	50	238	317	49

Signal Information			
Cycle, s	70.0	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	No	Simult. Gap E/W	On
Force Mode	Fixed	Simult. Gap N/S	On

Green	27.0	31.0	0.0	0.0	0.0	0.0	
Yellow	3.4	3.0	0.0	0.0	0.0	0.0	
Red	2.6	3.0	0.0	0.0	0.0	0.0	



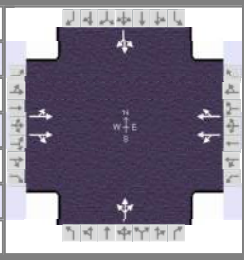
Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase		2		6		8		4
Case Number		8.0		6.0		8.0		6.0
Phase Duration, s		33.0		33.0		37.0		37.0
Change Period, (*Y+R c*), s		6.0		6.0		6.0		6.0
Max Allow Headway (*MAH*), s		0.0		0.0		3.3		3.3
Queue Clearance Time (*g s*), s						11.4		27.0
Green Extension Time (*g e*), s		0.0		0.0		2.3		1.2
Phase Call Probability						1.00		1.00
Max Out Probability						0.01		0.81

Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	5	2	12	1	6	16	3	8	18	7	4	14
Adjusted Flow Rate (*v*), veh/h	378		352	49	207	188		359		259	398	
Adjusted Saturation Flow Rate (*s*), veh/h/ln	1798		1692	766	1900	1643		1807		1060	1855	
Queue Service Time (*g s*), s	0.0		11.3	3.7	5.3	5.5		0.0		15.6	10.6	
Cycle Queue Clearance Time (*g c*), s	10.7		11.3	15.0	5.3	5.5		9.4		25.0	10.6	
Green Ratio (*g/C*)	0.39		0.39	0.39	0.39	0.39		0.44		0.44	0.44	
Capacity (*c*), veh/h	751		653	275	733	634		855		430	822	
Volume-to-Capacity Ratio (*X*)	0.503		0.539	0.178	0.282	0.296		0.420		0.601	0.484	
Back of Queue (*Q*), ft/ln (95 th percentile)	205		199	33	101	94		170		191	195	
Back of Queue (*Q*), veh/ln (95 th percentile)	8.2		8.0	1.3	4.0	3.7		6.8		7.7	7.8	
Queue Storage Ratio (*RQ*) (95 th percentile)	0.00		0.00	0.82	0.00	0.00		0.00		2.55	0.00	
Uniform Delay (*d 1*), s/veh	16.5		16.7	22.5	14.8	14.9		13.5		22.1	13.8	
Incremental Delay (*d 2*), s/veh	2.4		3.2	1.4	1.0	1.2		1.5		6.1	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	
Control Delay (*d*), s/veh	18.9		19.8	23.9	15.8	16.1		15.0		28.2	15.9	
Level of Service (LOS)	B		B	C	B	B		B		C	B	
Approach Delay, s/veh / LOS	19.3	B		16.8	B		15.0	B		20.7	C	
Intersection Delay, s/veh / LOS	18.5						B					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	1.68	B	1.90	B	2.25	B	2.08	B
Bicycle LOS Score / LOS	1.09	A	0.85	A	1.08	A	1.57	B

HCS Signalized Intersection Results Summary

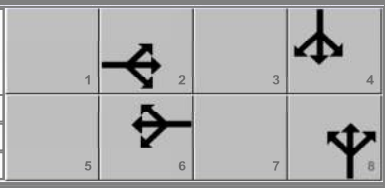
General Information				Intersection Information	
Agency	Bayer Becker			Duration, h	0.250
Analyst	WLW	Analysis Date	10/30/2024	Area Type	Other
Jurisdiction	City of Cincinnati	Time Period	AM Peak	PHF	0.92
Urban Street	Erie Avenue	Analysis Year	2024	Analysis Period	1> 7:00
Intersection	Michigan Avenue	File Name	Erie & Michigan - 2024 Build AM.xus		
Project Description	Existing Conditions				



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	10	399	19	18	779	25	7	12	12	24	10	24

Signal Information			
Cycle, s	70.0	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	No	Simult. Gap E/W	On
Force Mode	Fixed	Simult. Gap N/S	On

Green	37.0	22.0	0.0	0.0	0.0	0.0
Yellow	3.0	3.0	0.0	0.0	0.0	0.0
Red	2.0	3.0	0.0	0.0	0.0	0.0



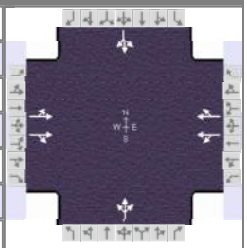
Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase		2		6		8		4
Case Number		8.0		8.0		8.0		8.0
Phase Duration, s		42.0		42.0		28.0		28.0
Change Period, ($Y+R_c$), s		5.0		5.0		6.0		6.0
Max Allow Headway (*MAH*), s		0.0		0.0		3.2		3.2
Queue Clearance Time (g_s), s						2.9		3.8
Green Extension Time (g_e), s		0.0		0.0		0.1		0.1
Phase Call Probability						1.00		1.00
Max Out Probability						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	5	2	12	1	6	16	3	8	18	7	4	14
Adjusted Flow Rate (*v*), veh/h	243		222	467		426		34			63	
Adjusted Saturation Flow Rate (*s*), veh/h/ln	1848		1701	1869		1709		1687			1585	
Queue Service Time (g_s), s	0.0		5.0	0.0		11.0		0.0			0.0	
Cycle Queue Clearance Time (g_c), s	4.8		5.0	10.8		11.0		0.9			1.8	
Green Ratio (*g/C*)	0.53		0.53	0.53		0.53		0.31			0.31	
Capacity (*c*), veh/h	1031		899	1041		904		593			571	
Volume-to-Capacity Ratio (*X*)	0.236		0.247	0.449		0.472		0.057			0.110	
Back of Queue (*Q*), ft/ln (95 th percentile)	82		77	187		174		17			33	
Back of Queue (*Q*), veh/ln (95 th percentile)	3.3		3.1	7.5		7.0		0.7			1.3	
Queue Storage Ratio (*RQ*) (95 th percentile)	0.00		0.00	0.00		0.00		0.00			0.00	
Uniform Delay (d_1), s/veh	8.9		8.9	10.3		10.4		16.8			17.1	
Incremental Delay (d_2), s/veh	0.5		0.7	1.4		1.8		0.2			0.4	
Initial Queue Delay (d_3), s/veh	0.0		0.0	0.0		0.0		0.0			0.0	
Control Delay (*d*), s/veh	9.5		9.6	11.7		12.1		17.0			17.5	
Level of Service (LOS)	A		A	B		B		B			B	
Approach Delay, s/veh / LOS	9.5	A		11.9	B		17.0	B		17.5	B	
Intersection Delay, s/veh / LOS	11.5						B					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	1.65	B	1.65	B	2.10	B	2.10	B
Bicycle LOS Score / LOS	0.87	A	1.22	A	0.54	A	0.59	A

HCS Signalized Intersection Results Summary

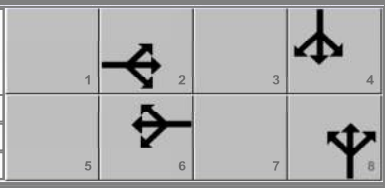
General Information				Intersection Information	
Agency	Bayer Becker			Duration, h	0.250
Analyst	WLW	Analysis Date	10/30/2024	Area Type	Other
Jurisdiction	City of Cincinnati	Time Period	PM Peak	PHF	0.92
Urban Street	Erie Avenue	Analysis Year	2024	Analysis Period	1> 7:00
Intersection	Michigan Avenue	File Name	Erie & Michigan - 2024 Build PM.xus		
Project Description	Existing Conditions				



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	18	856	12	4	361	15	6	14	16	42	11	33

Signal Information			
Cycle, s	70.0	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	No	Simult. Gap E/W	On
Force Mode	Fixed	Simult. Gap N/S	On

Green	37.0	22.0	0.0	0.0	0.0	0.0
Yellow	3.0	3.0	0.0	0.0	0.0	0.0
Red	2.0	3.0	0.0	0.0	0.0	0.0



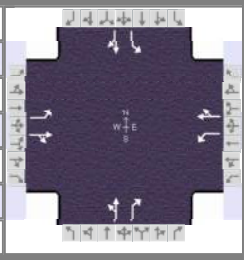
Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase		2		6		8		4
Case Number		8.0		8.0		8.0		8.0
Phase Duration, s		42.0		42.0		28.0		28.0
Change Period, ($Y+R_c$), s		5.0		5.0		6.0		6.0
Max Allow Headway (*MAH*), s		0.0		0.0		3.2		3.2
Queue Clearance Time (g_s), s						3.1		4.8
Green Extension Time (g_e), s		0.0		0.0		0.2		0.2
Phase Call Probability						1.00		1.00
Max Out Probability						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	5	2	12	1	6	16	3	8	18	7	4	14
Adjusted Flow Rate (*v*), veh/h	503		461	217		196		39			93	
Adjusted Saturation Flow Rate (*s*), veh/h/ln	1873		1720	1885		1704		1700			1551	
Queue Service Time (g_s), s	0.0		12.1	0.0		4.3		0.0			0.7	
Cycle Queue Clearance Time (g_c), s	11.9		12.1	4.3		4.3		1.1			2.8	
Green Ratio (*g/C*)	0.53		0.53	0.53		0.53		0.31			0.31	
Capacity (*c*), veh/h	1044		909	1049		900		594			564	
Volume-to-Capacity Ratio (*X*)	0.482		0.506	0.207		0.218		0.066			0.166	
Back of Queue (*Q*), ft/ln (95 th percentile)	203		193	72		67		20			50	
Back of Queue (*Q*), veh/ln (95 th percentile)	8.1		7.7	2.9		2.7		0.8			2.0	
Queue Storage Ratio (*RQ*) (95 th percentile)	0.00		0.00	0.00		0.00		0.00			0.00	
Uniform Delay (d_1), s/veh	10.6		10.6	8.8		8.8		16.8			17.4	
Incremental Delay (d_2), s/veh	1.6		2.0	0.4		0.6		0.2			0.6	
Initial Queue Delay (d_3), s/veh	0.0		0.0	0.0		0.0		0.0			0.0	
Control Delay (*d*), s/veh	12.2		12.6	9.2		9.3		17.0			18.0	
Level of Service (LOS)	B		B	A		A		B			B	
Approach Delay, s/veh / LOS	12.4	B		9.3	A		17.0	B		18.0	B	
Intersection Delay, s/veh / LOS	12.0						B					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	1.65	B	1.65	B	2.10	B	2.10	B
Bicycle LOS Score / LOS	1.28	A	0.83	A	0.55	A	0.64	A

HCS Signalized Intersection Results Summary

General Information				Intersection Information	
Agency	Bayer Becker			Duration, h	0.250
Analyst	WLW	Analysis Date	Dec 10, 2024	Area Type	Other
Jurisdiction	City of Cincinnati	Time Period	AM Peak	PHF	0.92
Urban Street	Edwards Road (SR 561)	Analysis Year	2024	Analysis Period	1> 7:00
Intersection	Observatory Avenue	File Name	Edwards & Observatory - 2024 Ex AM.xus		
Project Description	Existing Conditions				



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	19	339	23	30	527	186	35	92	48	162	58	68

Signal Information			
Cycle, s	70.0	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	No	Simult. Gap E/W	On
Force Mode	Fixed	Simult. Gap N/S	On

							1	2	3	4
Green	31.0	6.0	18.0	0.0	0.0	0.0	5	6	7	8
Yellow	3.2	3.0	3.2	0.0	0.0	0.0				
Red	1.8	2.0	1.8	0.0	0.0	0.0				

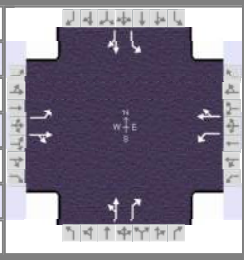
Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase		2		6		8	7	4
Case Number		6.0		6.0		7.3	1.0	4.0
Phase Duration, s		36.0		36.0		23.0	11.0	34.0
Change Period, ($Y+R_c$), s		5.0		5.0		5.0	5.0	5.0
Max Allow Headway (*MAH*), s		0.0		0.0		3.2	3.1	3.2
Queue Clearance Time (g_s), s						6.1	6.7	5.5
Green Extension Time (g_e), s		0.0		0.0		0.5	0.0	0.6
Phase Call Probability						1.00	1.00	1.00
Max Out Probability						0.00	1.00	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	5	2	12	1	6	16	3	8	18	7	4	14
Adjusted Flow Rate (*v*), veh/h	21	393		33	775			138	52	176	137	
Adjusted Saturation Flow Rate (*s*), veh/h/ln	707	1879		1006	1815			1735	1610	1810	1732	
Queue Service Time (g_s), s	1.9	10.3		1.7	29.1			0.0	1.7	4.7	3.5	
Cycle Queue Clearance Time (g_c), s	31.0	10.3		12.0	29.1			4.1	1.7	4.7	3.5	
Green Ratio (*g/C*)	0.44	0.44		0.44	0.44			0.26	0.26	0.37	0.41	
Capacity (*c*), veh/h	122	832		400	804			512	414	520	717	
Volume-to-Capacity Ratio (*X*)	0.169	0.473		0.082	0.964			0.270	0.126	0.339	0.191	
Back of Queue (*Q*), ft/ln (95 th percentile)	20	196		18	568			86	31	91	61	
Back of Queue (*Q*), veh/ln (95 th percentile)	0.8	7.8		0.7	22.7			3.4	1.2	3.6	2.4	
Queue Storage Ratio (*RQ*) (95 th percentile)	0.14	0.00		0.20	0.00			0.00	0.42	0.91	0.00	
Uniform Delay (d_1), s/veh	34.1	13.7		18.0	19.0			20.8	20.0	15.6	13.0	
Incremental Delay (d_2), s/veh	3.0	1.9		0.4	24.2			1.3	0.6	1.8	0.6	
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	37.1	15.7		18.4	43.1			22.1	20.6	17.4	13.6	
Level of Service (LOS)	D	B		B	D			C	C	B	B	
Approach Delay, s/veh / LOS	16.7	B		42.1	D		21.7	C		15.7	B	
Intersection Delay, s/veh / LOS	29.0						C					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	1.89	B	1.89	B	1.92	B	1.90	B
Bicycle LOS Score / LOS	1.17	A	1.82	B	0.80	A	1.00	A

HCS Signalized Intersection Results Summary

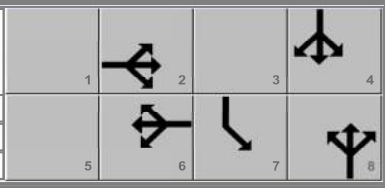
General Information				Intersection Information	
Agency	Bayer Becker			Duration, h	0.250
Analyst	WLW	Analysis Date	Dec 10, 2024	Area Type	Other
Jurisdiction	City of Cincinnati	Time Period	PM Peak	PHF	0.92
Urban Street	Edwards Road (SR 561)	Analysis Year	2024	Analysis Period	1> 7:00
Intersection	Observatory Avenue	File Name	Edwards & Observatory - 2024 Ex PM.xus		
Project Description	Existing Conditions				



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	28	610	15	25	288	182	21	78	73	295	83	43

Signal Information			
Cycle, s	70.0	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	No	Simult. Gap E/W	On
Force Mode	Fixed	Simult. Gap N/S	On

Green	26.0	11.0	18.0	0.0	0.0	0.0
Yellow	3.2	3.0	3.2	0.0	0.0	0.0
Red	1.8	2.0	1.8	0.0	0.0	0.0



Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase		2		6		8	7	4
Case Number		6.0		6.0		7.3	1.0	4.0
Phase Duration, s		31.0		31.0		23.0	16.0	39.0
Change Period, ($Y+R_c$), s		5.0		5.0		5.0	5.0	5.0
Max Allow Headway (*MAH*), s		0.0		0.0		3.2	3.1	3.2
Queue Clearance Time (g_s), s						5.1	10.4	5.0
Green Extension Time (g_e), s		0.0		0.0		0.5	0.0	0.6
Phase Call Probability						1.00	1.00	1.00
Max Out Probability						0.00	1.00	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	5	2	12	1	6	16	3	8	18	7	4	14
Adjusted Flow Rate (*v*), veh/h	30	679		27	511			108	79	321	137	
Adjusted Saturation Flow Rate (*s*), veh/h/ln	903	1892		773	1776			1786	1610	1810	1790	
Queue Service Time (g_s), s	2.2	24.7		1.3	17.8			0.0	2.7	8.4	3.0	
Cycle Queue Clearance Time (g_c), s	19.9	24.7		26.0	17.8			3.1	2.7	8.4	3.0	
Green Ratio (*g/C*)	0.37	0.37		0.37	0.37			0.26	0.26	0.44	0.49	
Capacity (*c*), veh/h	209	703		118	660			521	414	671	869	
Volume-to-Capacity Ratio (*X*)	0.146	0.967		0.231	0.774			0.206	0.192	0.478	0.158	
Back of Queue (*Q*), ft/ln (95 th percentile)	24	537		27	324			65	49	155	50	
Back of Queue (*Q*), veh/ln (95 th percentile)	1.0	21.5		1.1	13.0			2.6	1.9	6.2	2.0	
Queue Storage Ratio (*RQ*) (95 th percentile)	0.17	0.00		0.30	0.00			0.00	0.65	1.55	0.00	
Uniform Delay (d_1), s/veh	28.2	21.6		34.6	19.4			20.5	20.3	13.5	10.0	
Incremental Delay (d_2), s/veh	1.5	26.7		4.5	8.6			0.9	1.0	2.4	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	
Control Delay (*d*), s/veh	29.7	48.3		39.2	28.0			21.4	21.3	15.9	10.4	
Level of Service (LOS)	C	D		D	C			C	C	B	B	
Approach Delay, s/veh / LOS	47.5	D		28.6	C		21.4	C		14.2	B	
Intersection Delay, s/veh / LOS	31.5						C					

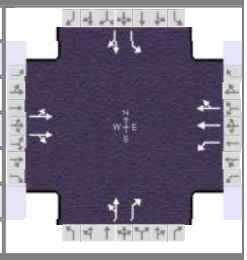
Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	1.90	B	1.90	B	1.92	B	1.89	B
Bicycle LOS Score / LOS	1.66	B	1.38	A	0.80	A	1.24	A

2027 BUILD CONDITIONS
AM AND PM PEAK HOUR

ALTERNATIVE 1

HCS Signalized Intersection Results Summary

General Information				Intersection Information	
Agency	Bayer Becker			Duration, h	0.250
Analyst	WLW	Analysis Date	10/30/2024	Area Type	Other
Jurisdiction	City of Cincinnati	Time Period	AM Peak	PHF	0.92
Urban Street	Erie Avenue	Analysis Year	2027	Analysis Period	1> 7:00
Intersection	Edwards Road (SR 561)	File Name	Erie & Edwards - 2027 B AM-Alt 1.xus		
Project Description	Future Traffic, Modified Geometry - Alt 1				



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	20	230	39	40	506	265	21	241	35	162	215	40

Signal Information			
Cycle, s	70.0	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	No	Simult. Gap E/W	On
Force Mode	Fixed	Simult. Gap N/S	On

							1	2	3	4
							5	6	7	8
Green	35.0	23.0	0.0	0.0	0.0	0.0				
Yellow	3.4	3.0	0.0	0.0	0.0	0.0				
Red	2.6	3.0	0.0	0.0	0.0	0.0				

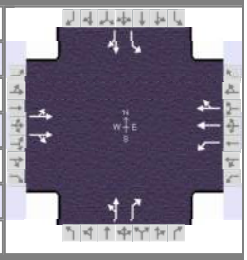
Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase		2		6		8		4
Case Number		8.0		6.0		7.0		6.0
Phase Duration, s		41.0		41.0		29.0		29.0
Change Period, (*Y+R c*), s		6.0		6.0		6.0		6.0
Max Allow Headway (*MAH*), s		0.0		0.0		3.2		3.2
Queue Clearance Time (*g s*), s						10.3		20.4
Green Extension Time (*g e*), s		0.0		0.0		1.5		0.6
Phase Call Probability						1.00		1.00
Max Out Probability						0.02		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	5	2	12	1	6	16	3	8	18	7	4	14
Adjusted Flow Rate (*v*), veh/h	161		153	43	444	394		285	38	176	277	
Adjusted Saturation Flow Rate (*s*), veh/h/ln	1648		1647	1104	1900	1679		1852	1610	1135	1848	
Queue Service Time (*g s*), s	0.0		3.6	1.6	10.7	10.7		0.0	1.1	10.2	8.3	
Cycle Queue Clearance Time (*g c*), s	3.2		3.6	5.2	10.7	10.7		8.3	1.1	18.4	8.3	
Green Ratio (*g/C*)	0.50		0.50	0.50	0.50	0.50		0.33	0.33	0.33	0.33	
Capacity (*c*), veh/h	882		824	598	950	839		664	529	341	607	
Volume-to-Capacity Ratio (*X*)	0.182		0.186	0.073	0.468	0.469		0.429	0.072	0.516	0.457	
Back of Queue (*Q*), ft/ln (95 th percentile)	57		55	17	191	172		167	19	138	165	
Back of Queue (*Q*), veh/ln (95 th percentile)	2.3		2.2	0.7	7.7	6.9		6.7	0.8	5.5	6.6	
Queue Storage Ratio (*RQ*) (95 th percentile)	0.00		0.00	0.43	0.00	0.00		0.00	0.00	1.84	0.00	
Uniform Delay (*d 1*), s/veh	9.6		9.6	11.1	11.4	11.4		18.6	16.2	25.8	18.6	
Incremental Delay (*d 2*), s/veh	0.5		0.5	0.2	1.7	1.9		2.0	0.3	5.5	2.5	
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	
Control Delay (*d*), s/veh	10.0		10.1	11.3	13.1	13.3		20.6	16.4	31.3	21.0	
Level of Service (LOS)	B		B	B	B	B		C	B	C	C	
Approach Delay, s/veh / LOS	10.1	B		13.1	B		20.1	C		25.0	C	
Intersection Delay, s/veh / LOS	16.5						B					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	1.88	B	1.88	B	2.27	B	2.10	B
Bicycle LOS Score / LOS	0.75	A	1.21	A	1.02	A	1.24	A

HCS Signalized Intersection Results Summary

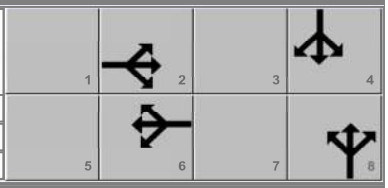
General Information				Intersection Information	
Agency	Bayer Becker			Duration, h	0.250
Analyst	WLW	Analysis Date	10/30/2024	Area Type	Other
Jurisdiction	City of Cincinnati	Time Period	PM Peak	PHF	0.92
Urban Street	Erie Avenue	Analysis Year	2027	Analysis Period	1> 7:00
Intersection	Edwards Road (SR 561)	File Name	Erie & Edwards - 2027 B PM-Alt 1.xus		
Project Description	Future Traffic, Ex. Geometry - Alt 1				



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	38	594	65	45	213	150	27	271	50	238	341	49

Signal Information			
Cycle, s	70.0	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	No	Simult. Gap E/W	On
Force Mode	Fixed	Simult. Gap N/S	On

Green	28.0	30.0	0.0	0.0	0.0	0.0	
Yellow	3.4	3.0	0.0	0.0	0.0	0.0	
Red	2.6	3.0	0.0	0.0	0.0	0.0	



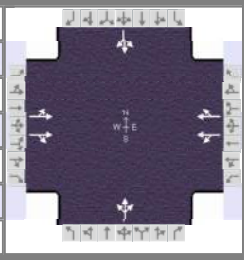
Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase		2		6		8		4
Case Number		8.0		6.0		7.0		6.0
Phase Duration, s		34.0		34.0		36.0		36.0
Change Period, (*Y+R c*), s		6.0		6.0		6.0		6.0
Max Allow Headway (*MAH*), s		0.0		0.0		3.3		3.3
Queue Clearance Time (*g s*), s						10.2		25.0
Green Extension Time (*g e*), s		0.0		0.0		2.4		1.4
Phase Call Probability						1.00		1.00
Max Out Probability						0.01		0.61

Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	5	2	12	1	6	16	3	8	18	7	4	14
Adjusted Flow Rate (*v*), veh/h	395		363	49	207	188		324	54	259	424	
Adjusted Saturation Flow Rate (*s*), veh/h/ln	1803		1670	747	1900	1643		1823	1610	1102	1858	
Queue Service Time (*g s*), s	0.0		11.6	3.8	5.1	5.4		0.0	1.4	14.8	11.8	
Cycle Queue Clearance Time (*g c*), s	11.0		11.6	15.4	5.1	5.4		8.2	1.4	23.0	11.8	
Green Ratio (*g/C*)	0.40		0.40	0.40	0.40	0.40		0.43	0.43	0.43	0.43	
Capacity (*c*), veh/h	778		668	277	760	657		838	690	446	796	
Volume-to-Capacity Ratio (*X*)	0.508		0.543	0.176	0.272	0.286		0.387	0.079	0.580	0.532	
Back of Queue (*Q*), ft/ln (95 th percentile)	209		201	33	98	90		155	22	187	215	
Back of Queue (*Q*), veh/ln (95 th percentile)	8.3		8.0	1.3	3.9	3.6		6.2	0.9	7.5	8.6	
Queue Storage Ratio (*RQ*) (95 th percentile)	0.00		0.00	0.81	0.00	0.00		0.00	0.00	2.49	0.00	
Uniform Delay (*d 1*), s/veh	15.9		16.1	22.0	14.1	14.2		13.8	11.8	21.7	14.8	
Incremental Delay (*d 2*), s/veh	2.4		3.1	1.4	0.9	1.1		1.3	0.2	5.4	2.5	
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	
Control Delay (*d*), s/veh	18.3		19.2	23.4	15.0	15.3		15.1	12.1	27.1	17.3	
Level of Service (LOS)	B		B	C	B	B		B	B	C	B	
Approach Delay, s/veh / LOS	18.7	B		16.1	B		14.7	B		21.1	C	
Intersection Delay, s/veh / LOS	18.2						B					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	1.90	B	1.90	B	2.25	B	2.09	B
Bicycle LOS Score / LOS	1.11	A	0.85	A	1.11	A	1.61	B

HCS Signalized Intersection Results Summary

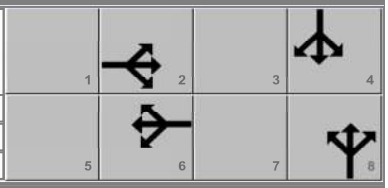
General Information				Intersection Information	
Agency	Bayer Becker			Duration, h	0.250
Analyst	WLW	Analysis Date	10/30/2024	Area Type	Other
Jurisdiction	City of Cincinnati	Time Period	AM Peak	PHF	0.92
Urban Street	Erie Avenue	Analysis Year	2027	Analysis Period	1> 7:00
Intersection	Michigan Avenue	File Name	Erie & Michigan - 2027 B AM-Alt 1-3.xus		
Project Description	Future Traffic, Ex. Geometry				



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	10	399	19	34	779	25	7	13	24	24	11	24

Signal Information			
Cycle, s	70.0	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	No	Simult. Gap E/W	On
Force Mode	Fixed	Simult. Gap N/S	On

Green	37.0	22.0	0.0	0.0	0.0	0.0
Yellow	3.0	3.0	0.0	0.0	0.0	0.0
Red	2.0	3.0	0.0	0.0	0.0	0.0



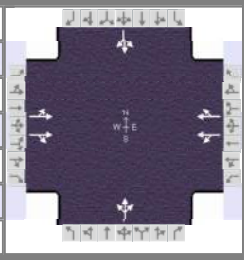
Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase		2		6		8		4
Case Number		8.0		8.0		8.0		8.0
Phase Duration, s		42.0		42.0		28.0		28.0
Change Period, ($Y+R_c$), s		5.0		5.0		6.0		6.0
Max Allow Headway (*MAH*), s		0.0		0.0		3.2		3.2
Queue Clearance Time (g_s), s						3.4		3.8
Green Extension Time (g_e), s		0.0		0.0		0.2		0.2
Phase Call Probability						1.00		1.00
Max Out Probability						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	5	2	12	1	6	16	3	8	18	7	4	14
Adjusted Flow Rate (*v*), veh/h	243		222	471		440		48			64	
Adjusted Saturation Flow Rate (*s*), veh/h/ln	1848		1701	1823		1710		1679			1582	
Queue Service Time (g_s), s	0.0		5.0	0.0		11.4		0.0			0.0	
Cycle Queue Clearance Time (g_c), s	4.8		5.0	10.9		11.4		1.4			1.8	
Green Ratio (*g/C*)	0.53		0.53	0.53		0.53		0.31			0.31	
Capacity (*c*), veh/h	1031		899	1019		904		587			570	
Volume-to-Capacity Ratio (*X*)	0.236		0.247	0.462		0.487		0.081			0.113	
Back of Queue (*Q*), ft/ln (95 th percentile)	82		77	189		182		25			33	
Back of Queue (*Q*), veh/ln (95 th percentile)	3.3		3.1	7.6		7.3		1.0			1.3	
Queue Storage Ratio (*RQ*) (95 th percentile)	0.00		0.00	0.00		0.00		0.00			0.00	
Uniform Delay (d_1), s/veh	8.9		8.9	10.3		10.5		16.9			17.1	
Incremental Delay (d_2), s/veh	0.5		0.7	1.5		1.9		0.3			0.4	
Initial Queue Delay (d_3), s/veh	0.0		0.0	0.0		0.0		0.0			0.0	
Control Delay (*d*), s/veh	9.5		9.6	11.9		12.3		17.2			17.5	
Level of Service (LOS)	A		A	B		B		B			B	
Approach Delay, s/veh / LOS	9.5	A		12.1	B		17.2	B		17.5	B	
Intersection Delay, s/veh / LOS	11.7						B					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	1.65	B	1.65	B	2.10	B	2.10	B
Bicycle LOS Score / LOS	0.87	A	1.24	A	0.57	A	0.59	A

HCS Signalized Intersection Results Summary

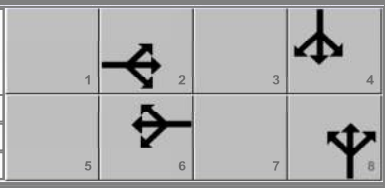
General Information				Intersection Information	
Agency	Bayer Becker			Duration, h	0.250
Analyst	WLW	Analysis Date	10/30/2024	Area Type	Other
Jurisdiction	City of Cincinnati	Time Period	PM Peak	PHF	0.92
Urban Street	Erie Avenue	Analysis Year	2027	Analysis Period	1> 7:00
Intersection	Michigan Avenue	File Name	Erie & Michigan - 2027 B PM-Alt 1-3.xus		
Project Description	Future Traffic, Ex. Geometry				



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	18	856	12	18	361	15	6	15	39	42	13	33

Signal Information			
Cycle, s	70.0	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	No	Simult. Gap E/W	On
Force Mode	Fixed	Simult. Gap N/S	On

Green	37.0	22.0	0.0	0.0	0.0	0.0
Yellow	3.0	3.0	0.0	0.0	0.0	0.0
Red	2.0	3.0	0.0	0.0	0.0	0.0



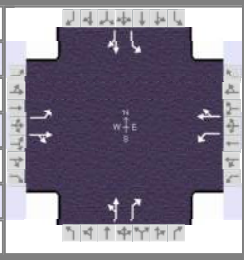
Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase		2		6		8		4
Case Number		8.0		8.0		8.0		8.0
Phase Duration, s		42.0		42.0		28.0		28.0
Change Period, ($Y+R_c$), s		5.0		5.0		6.0		6.0
Max Allow Headway (*MAH*), s		0.0		0.0		3.2		3.2
Queue Clearance Time (g_s), s						3.9		4.8
Green Extension Time (g_e), s		0.0		0.0		0.3		0.3
Phase Call Probability						1.00		1.00
Max Out Probability						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	5	2	12	1	6	16	3	8	18	7	4	14
Adjusted Flow Rate (*v*), veh/h	503		461	219		209		65			96	
Adjusted Saturation Flow Rate (*s*), veh/h/ln	1873		1720	1733		1705		1676			1541	
Queue Service Time (g_s), s	0.0		12.1	0.0		4.6		0.0			0.6	
Cycle Queue Clearance Time (g_c), s	11.9		12.1	4.3		4.6		1.9			2.8	
Green Ratio (*g/C*)	0.53		0.53	0.53		0.53		0.31			0.31	
Capacity (*c*), veh/h	1044		909	972		901		583			560	
Volume-to-Capacity Ratio (*X*)	0.482		0.506	0.225		0.232		0.112			0.171	
Back of Queue (*Q*), ft/ln (95 th percentile)	203		193	74		72		34			51	
Back of Queue (*Q*), veh/ln (95 th percentile)	8.1		7.7	3.0		2.9		1.4			2.0	
Queue Storage Ratio (*RQ*) (95 th percentile)	0.00		0.00	0.00		0.00		0.00			0.00	
Uniform Delay (d_1), s/veh	10.6		10.6	8.8		8.9		17.1			17.4	
Incremental Delay (d_2), s/veh	1.6		2.0	0.5		0.6		0.4			0.7	
Initial Queue Delay (d_3), s/veh	0.0		0.0	0.0		0.0		0.0			0.0	
Control Delay (*d*), s/veh	12.2		12.6	9.3		9.5		17.5			18.1	
Level of Service (LOS)	B		B	A		A		B			B	
Approach Delay, s/veh / LOS	12.4	B		9.4	A		17.5	B		18.1	B	
Intersection Delay, s/veh / LOS	12.1						B					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	1.65	B	1.65	B	2.10	B	2.10	B
Bicycle LOS Score / LOS	1.28	A	0.84	A	0.60	A	0.65	A

HCS Signalized Intersection Results Summary

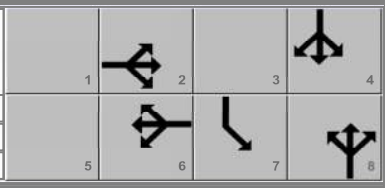
General Information				Intersection Information	
Agency	Bayer Becker			Duration, h	0.250
Analyst	WLW	Analysis Date	Dec 10, 2024	Area Type	Other
Jurisdiction	City of Cincinnati	Time Period	AM Peak	PHF	0.92
Urban Street	Edwards Road (SR 561)	Analysis Year	2027	Analysis Period	1> 7:00
Intersection	Observatory Avenue	File Name	Edwards & Observatory - 2027 B AM-Alt 1-3.xus		
Project Description	Future Traffic, Ex Geometry - Alternatives 1 - 3				



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	26	339	23	30	527	201	35	95	48	177	61	85

Signal Information			
Cycle, s	70.0	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	No	Simult. Gap E/W	On
Force Mode	Fixed	Simult. Gap N/S	On

Green	31.0	6.0	18.0	0.0	0.0	0.0
Yellow	3.2	3.0	3.2	0.0	0.0	0.0
Red	1.8	2.0	1.8	0.0	0.0	0.0



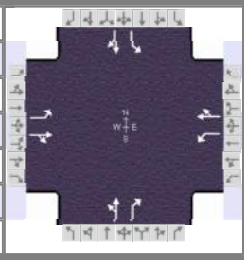
Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase		2		6		8	7	4
Case Number		6.0		6.0		7.3	1.0	4.0
Phase Duration, s		36.0		36.0		23.0	11.0	34.0
Change Period, ($Y+R_c$), s		5.0		5.0		5.0	5.0	5.0
Max Allow Headway (*MAH*), s		0.0		0.0		3.2	3.1	3.2
Queue Clearance Time (g_s), s						6.2	7.2	6.2
Green Extension Time (g_e), s		0.0		0.0		0.6	0.0	0.7
Phase Call Probability						1.00	1.00	1.00
Max Out Probability						0.00	1.00	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	5	2	12	1	6	16	3	8	18	7	4	14
Adjusted Flow Rate (*v*), veh/h	28	393		33	791			141	52	192	159	
Adjusted Saturation Flow Rate (*s*), veh/h/ln	696	1879		1006	1810			1732	1610	1810	1720	
Queue Service Time (g_s), s	0.7	10.3		1.7	30.3			0.0	1.7	5.2	4.2	
Cycle Queue Clearance Time (g_c), s	31.0	10.3		12.0	30.3			4.2	1.7	5.2	4.2	
Green Ratio (*g/C*)	0.44	0.44		0.44	0.44			0.26	0.26	0.37	0.41	
Capacity (*c*), veh/h	110	832		400	802			511	414	517	712	
Volume-to-Capacity Ratio (*X*)	0.257	0.473		0.082	0.987			0.277	0.126	0.372	0.223	
Back of Queue (*Q*), ft/ln (95 th percentile)	29	196		18	612			88	31	101	72	
Back of Queue (*Q*), veh/ln (95 th percentile)	1.1	7.8		0.7	24.5			3.5	1.2	4.0	2.9	
Queue Storage Ratio (*RQ*) (95 th percentile)	0.20	0.00		0.20	0.00			0.00	0.42	1.01	0.00	
Uniform Delay (d_1), s/veh	34.9	13.7		18.0	19.3			20.9	20.0	15.8	13.2	
Incremental Delay (d_2), s/veh	5.6	1.9		0.4	28.8			1.3	0.6	2.0	0.7	
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	40.5	15.7		18.4	48.1			22.2	20.6	17.8	14.0	
Level of Service (LOS)	D	B		B	D			C	C	B	B	
Approach Delay, s/veh / LOS	17.3	B		46.9	D		21.8	C		16.1	B	
Intersection Delay, s/veh / LOS	31.2						C					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	1.89	B	1.89	B	1.92	B	1.90	B
Bicycle LOS Score / LOS	1.18	A	1.85	B	0.81	A	1.07	A

HCS Signalized Intersection Results Summary

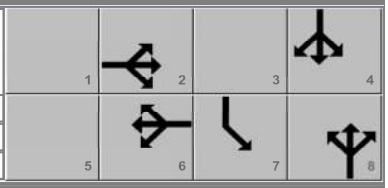
General Information				Intersection Information	
Agency	Bayer Becker			Duration, h	0.250
Analyst	WLW	Analysis Date	Dec 10, 2024	Area Type	Other
Jurisdiction	City of Cincinnati	Time Period	PM Peak	PHF	0.92
Urban Street	Edwards Road (SR 561)	Analysis Year	2027	Analysis Period	1> 7:00
Intersection	Observatory Avenue	File Name	Edwards & Observatory - 2027 B PM-Alt 1-3.xus		
Project Description	Future Traffic, Ex. Geometry - Alternatives 1 - 3				



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	53	610	15	25	288	201	21	85	73	319	86	52

Signal Information			
Cycle, s	70.0	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	No	Simult. Gap E/W	On
Force Mode	Fixed	Simult. Gap N/S	On

Green	26.0	11.0	18.0	0.0	0.0	0.0
Yellow	3.2	3.0	3.2	0.0	0.0	0.0
Red	1.8	2.0	1.8	0.0	0.0	0.0



Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase		2		6		8	7	4
Case Number		6.0		6.0		7.3	1.0	4.0
Phase Duration, s		31.0		31.0		23.0	16.0	39.0
Change Period, (*Y+R c*), s		5.0		5.0		5.0	5.0	5.0
Max Allow Headway (*MAH*), s		0.0		0.0		3.2	3.1	3.2
Queue Clearance Time (*g s*), s						5.4	11.2	5.3
Green Extension Time (*g e*), s		0.0		0.0		0.6	0.0	0.7
Phase Call Probability						1.00	1.00	1.00
Max Out Probability						0.00	1.00	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	5	2	12	1	6	16	3	8	18	7	4	14
Adjusted Flow Rate (*v*), veh/h	58	679		27	532			115	79	347	150	
Adjusted Saturation Flow Rate (*s*), veh/h/ln	886	1892		773	1769			1793	1610	1810	1779	
Queue Service Time (*g s*), s	4.4	24.7		1.3	18.9			0.0	2.7	9.2	3.3	
Cycle Queue Clearance Time (*g c*), s	23.3	24.7		26.0	18.9			3.4	2.7	9.2	3.3	
Green Ratio (*g/C*)	0.37	0.37		0.37	0.37			0.26	0.26	0.44	0.49	
Capacity (*c*), veh/h	193	703		118	657			523	414	664	864	
Volume-to-Capacity Ratio (*X*)	0.299	0.967		0.231	0.809			0.220	0.192	0.522	0.174	
Back of Queue (*Q*), ft/ln (95 th percentile)	50	537		27	347			70	49	172	55	
Back of Queue (*Q*), veh/ln (95 th percentile)	2.0	21.5		1.1	13.9			2.8	1.9	6.9	2.2	
Queue Storage Ratio (*RQ*) (95 th percentile)	0.34	0.00		0.30	0.00			0.00	0.65	1.72	0.00	
Uniform Delay (*d 1*), s/veh	30.2	21.6		34.6	19.8			20.6	20.3	13.7	10.1	
Incremental Delay (*d 2*), s/veh	3.9	26.7		4.5	10.3			1.0	1.0	2.9	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	
Control Delay (*d*), s/veh	34.2	48.3		39.2	30.1			21.5	21.3	16.6	10.5	
Level of Service (LOS)	C	D		D	C			C	C	B	B	
Approach Delay, s/veh / LOS	47.2	D		30.6	C		21.5	C		14.8	B	
Intersection Delay, s/veh / LOS	31.9						C					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	1.90	B	1.90	B	1.92	B	1.89	B
Bicycle LOS Score / LOS	1.70	B	1.41	A	0.81	A	1.31	A

HCS Two-Way Stop-Control Report

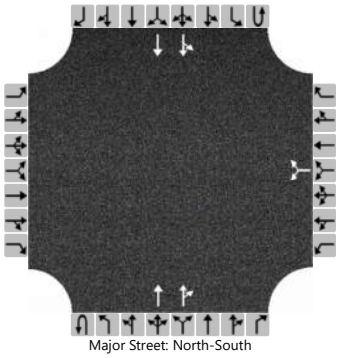
General Information

Analyst	WLW
Agency/Co.	Bayer Becker
Date Performed	12/12/2024
Analysis Year	2027
Time Analyzed	AM Peak
Intersection Orientation	North-South
Project Description	2027 Build Traffic Projections - Alternative 1

Site Information

Intersection	Edwards Avenue and Site Access 1
Jurisdiction	City of Cincinnati
East/West Street	Site Access 1
North/South Street	Edwards Avenue
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	2	0	0	0	2	0
Configuration							LR				T	TR		LT	T	
Volume (veh/h)						35		29			268	25		13	281	
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)						7.5		6.9						4.1		
Critical Headway (sec)						6.86		6.96						4.16		
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)							70							14		
Capacity, c (veh/h)							617							1231		
v/c Ratio							0.11							0.01		
95% Queue Length, Q_{95} (veh)							0.4							0.0		
95% Queue Length, Q_{95} (ft)							10.2							0.0		
Control Delay (s/veh)							11.6							8.0	0.1	
Level of Service (LOS)							B							A	A	
Approach Delay (s/veh)						11.6								0.4		
Approach LOS						B								A		

HCS Two-Way Stop-Control Report

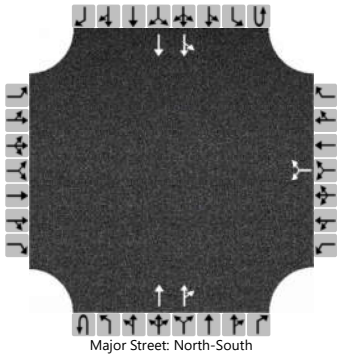
General Information

Analyst	WLW
Agency/Co.	Bayer Becker
Date Performed	12/12/2024
Analysis Year	2027
Time Analyzed	PM Peak
Intersection Orientation	North-South
Project Description	2027 Build Traffic Projections - Alternative 1

Site Information

Intersection	Edwards Avenue and Site Access 1
Jurisdiction	City of Cincinnati
East/West Street	Site Access 1
North/South Street	Edwards Avenue
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	2	0	0	0	2	0
Configuration							LR				T	TR		LT	T	
Volume (veh/h)						37		18			328	53		52	399	
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)						7.5		6.9						4.1		
Critical Headway (sec)						6.86		6.96						4.16		
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)							60							57		
Capacity, c (veh/h)							421							1134		
v/c Ratio							0.14							0.05		
95% Queue Length, Q_{95} (veh)							0.5							0.2		
95% Queue Length, Q_{95} (ft)							12.8							5.1		
Control Delay (s/veh)							15.0							8.3	0.4	
Level of Service (LOS)							B							A	A	
Approach Delay (s/veh)						15.0								1.3		
Approach LOS						B								A		

HCS Two-Way Stop-Control Report

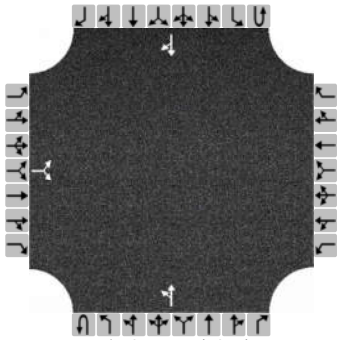
General Information

Analyst	WLW
Agency/Co.	Bayer Becker
Date Performed	12/12/2024
Analysis Year	2027
Time Analyzed	AM Peak
Intersection Orientation	North-South
Project Description	2027 Build Traffic Projections - Alternative 1 - 3

Site Information

Intersection	Michigan Avenue and Site Access 2
Jurisdiction	City of Cincinnati
East/West Street	Site Access 2
North/South Street	Michigan Avenue
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	1	0		0	0	0	0	0	1	0	0	0	1	0
Configuration			LR							LT						TR
Volume (veh/h)		13		1						1	31				47	17
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)			15							1						
Capacity, c (veh/h)			907							1525						
v/c Ratio			0.02							0.00						
95% Queue Length, Q_{95} (veh)			0.1							0.0						
95% Queue Length, Q_{95} (ft)			2.6							0.0						
Control Delay (s/veh)			9.0							7.4	0.0					
Level of Service (LOS)			A							A	A					
Approach Delay (s/veh)		9.0								0.2						
Approach LOS		A								A						

HCS Two-Way Stop-Control Report

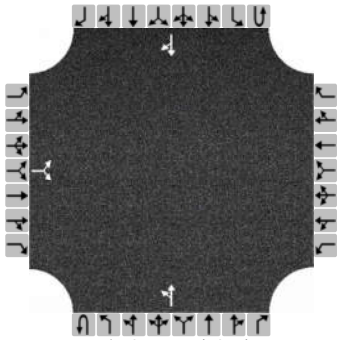
General Information

Analyst	WLW
Agency/Co.	Bayer Becker
Date Performed	12/12/2024
Analysis Year	2027
Time Analyzed	PM Peak
Intersection Orientation	North-South
Project Description	2027 Build Traffic Projections - Alternative 1 - 3

Site Information

Intersection	Michigan Avenue and Site Access 2
Jurisdiction	City of Cincinnati
East/West Street	Site Access 2
North/South Street	Michigan Avenue
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	1	0		0	0	0	0	0	1	0	0	0	1	0
Configuration			LR							LT						TR
Volume (veh/h)		25		1						1	36				26	17
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						

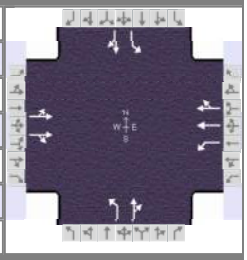
Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)			28							1						
Capacity, c (veh/h)			925							1554						
v/c Ratio			0.03							0.00						
95% Queue Length, Q_{95} (veh)			0.1							0.0						
95% Queue Length, Q_{95} (ft)			2.6							0.0						
Control Delay (s/veh)			9.0							7.3	0.0					
Level of Service (LOS)			A							A	A					
Approach Delay (s/veh)		9.0								0.2						
Approach LOS		A								A						

ALTERNATIVE 2

HCS Signalized Intersection Results Summary

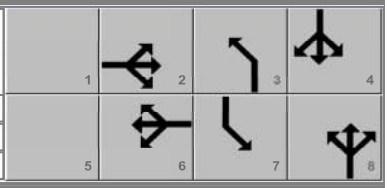
General Information				Intersection Information	
Agency	Bayer Becker			Duration, h	0.250
Analyst	WLW	Analysis Date	10/30/2024	Area Type	Other
Jurisdiction	City of Cincinnati	Time Period	AM Peak	PHF	0.92
Urban Street	Erie Avenue	Analysis Year	2027	Analysis Period	1> 7:00
Intersection	Edwards Road (SR 561)	File Name	Erie & Edwards - 2027 B AM-Alt 2.xus		
Project Description	Future Traffic, Modified Geometry - Alt 2				



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	20	230	39	40	506	265	21	241	35	162	215	40

Signal Information			
Cycle, s	70.0	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	No	Simult. Gap E/W	On
Force Mode	Fixed	Simult. Gap N/S	On

Green	28.0	8.0	17.0	0.0	0.0	0.0
Yellow	3.4	3.0	3.0	0.0	0.0	0.0
Red	2.6	2.0	3.0	0.0	0.0	0.0



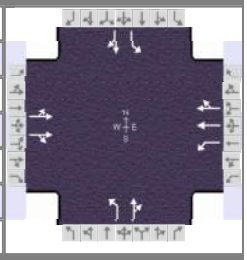
Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase		2		6	3	8	7	4
Case Number		8.0		6.0	1.1	4.0	1.1	4.0
Phase Duration, s		34.0		34.0	13.0	23.0	13.0	23.0
Change Period, ($Y+R_c$), s		6.0		6.0	5.0	6.0	5.0	6.0
Max Allow Headway (*MAH*), s		0.0		0.0	3.1	3.1	3.1	3.1
Queue Clearance Time (g_s), s					2.6	12.2	6.9	11.4
Green Extension Time (g_e), s		0.0		0.0	0.0	0.6	0.0	0.7
Phase Call Probability					1.00	1.00	1.00	1.00
Max Out Probability					0.01	0.38	1.00	0.24

Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	5	2	12	1	6	16	3	8	18	7	4	14
Adjusted Flow Rate (*v*), veh/h	159		155	43	444	394	23	300		176	277	
Adjusted Saturation Flow Rate (*s*), veh/h/ln	1568		1648	1104	1900	1679	1810	1858		1810	1848	
Queue Service Time (g_s), s	0.2		4.4	1.9	12.8	12.9	0.6	10.2		4.9	9.4	
Cycle Queue Clearance Time (g_c), s	13.1		4.4	6.3	12.8	12.9	0.6	10.2		4.9	9.4	
Green Ratio (*g/C*)	0.40		0.40	0.40	0.40	0.40	0.36	0.24		0.36	0.24	
Capacity (*c*), veh/h	686		659	476	760	672	400	451		385	449	
Volume-to-Capacity Ratio (*X*)	0.232		0.235	0.091	0.585	0.586	0.057	0.665		0.458	0.618	
Back of Queue (*Q*), ft/ln (95 th percentile)	74		72	22	239	220	11	220		101	202	
Back of Queue (*Q*), veh/ln (95 th percentile)	2.9		2.9	0.9	9.6	8.8	0.4	8.8		4.0	8.1	
Queue Storage Ratio (*RQ*) (95 th percentile)	0.00		0.00	0.55	0.00	0.00	0.00	0.00		1.34	0.00	
Uniform Delay (d_1), s/veh	13.8		13.9	16.0	16.4	16.5	15.6	23.9		17.3	23.6	
Incremental Delay (d_2), s/veh	0.8		0.8	0.4	3.3	3.7	0.3	7.5		3.9	6.3	
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	14.6		14.7	16.4	19.7	20.2	15.9	31.5		21.2	29.9	
Level of Service (LOS)	B		B	B	B	C	B	C		C	C	
Approach Delay, s/veh / LOS	14.7	B		19.8	B		30.4	C		26.5	C	
Intersection Delay, s/veh / LOS	22.2						C					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	1.90	B	1.90	B	2.28	B	2.11	B
Bicycle LOS Score / LOS	0.75	A	1.21	A	1.02	A	1.24	A

HCS Signalized Intersection Results Summary

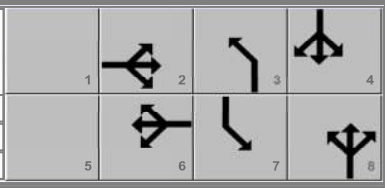
General Information				Intersection Information	
Agency	Bayer Becker			Duration, h	0.250
Analyst	WLW	Analysis Date	10/30/2024	Area Type	Other
Jurisdiction	City of Cincinnati	Time Period	PM Peak	PHF	0.92
Urban Street	Erie Avenue	Analysis Year	2027	Analysis Period	1> 7:00
Intersection	Edwards Road (SR 561)	File Name	Erie & Edwards - 2027 B PM-Alt 2.xus		
Project Description	Future Traffic, Modified Geometry - Alt 2				



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	38	594	65	45	213	150	27	271	50	238	341	49

Signal Information			
Cycle, s	70.0	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	No	Simult. Gap E/W	On
Force Mode	Fixed	Simult. Gap N/S	On

Green	27.0	8.0	18.0	0.0	0.0	0.0
Yellow	3.4	3.0	3.0	0.0	0.0	0.0
Red	2.6	2.0	3.0	0.0	0.0	0.0



Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase		2		6	3	8	7	4
Case Number		8.0		6.0	1.1	4.0	1.1	4.0
Phase Duration, s		33.0		33.0	13.0	24.0	13.0	24.0
Change Period, ($Y+R_c$), s		6.0		6.0	5.0	6.0	5.0	6.0
Max Allow Headway (*MAH*), s		0.0		0.0	3.1	3.1	3.1	3.1
Queue Clearance Time (g_s), s					2.7	14.1	9.3	17.4
Green Extension Time (g_e), s		0.0		0.0	0.0	0.8	0.0	0.2
Phase Call Probability					1.00	1.00	1.00	1.00
Max Out Probability					0.02	0.70	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	5	2	12	1	6	16	3	8	18	7	4	14
Adjusted Flow Rate (*v*), veh/h	395		363	49	207	188	29	349		259	424	
Adjusted Saturation Flow Rate (*s*), veh/h/ln	1802		1670	747	1900	1643	1810	1848		1810	1858	
Queue Service Time (g_s), s	0.6		11.9	3.9	5.3	5.5	0.7	12.1		7.3	15.4	
Cycle Queue Clearance Time (g_c), s	11.4		11.9	15.8	5.3	5.5	0.7	12.1		7.3	15.4	
Green Ratio (*g/C*)	0.39		0.39	0.39	0.39	0.39	0.37	0.26		0.37	0.26	
Capacity (*c*), veh/h	752		644	264	733	634	318	475		368	478	
Volume-to-Capacity Ratio (*X*)	0.525		0.563	0.186	0.282	0.296	0.092	0.734		0.703	0.887	
Back of Queue (*Q*), ft/ln (95 th percentile)	215		207	34	101	94	14	255		172	348	
Back of Queue (*Q*), veh/ln (95 th percentile)	8.6		8.3	1.3	4.0	3.7	0.6	10.2		6.9	13.9	
Queue Storage Ratio (*RQ*) (95 th percentile)	0.00		0.00	0.84	0.00	0.00	0.00	0.00		2.30	0.00	
Uniform Delay (d_1), s/veh	16.7		16.9	23.1	14.8	14.9	16.3	23.8		18.0	25.0	
Incremental Delay (d_2), s/veh	2.6		3.5	1.5	1.0	1.2	0.6	9.7		10.7	21.0	
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	19.3		20.4	24.6	15.8	16.1	16.9	33.5		28.7	46.0	
Level of Service (LOS)	B		C	C	B	B	B	C		C	D	
Approach Delay, s/veh / LOS	19.8	B		16.9	B		32.2	C		39.5	D	
Intersection Delay, s/veh / LOS	27.2						C					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	1.90	B	1.90	B	2.28	B	2.11	B
Bicycle LOS Score / LOS	1.11	A	0.85	A	1.11	A	1.61	B

HCS Two-Way Stop-Control Report

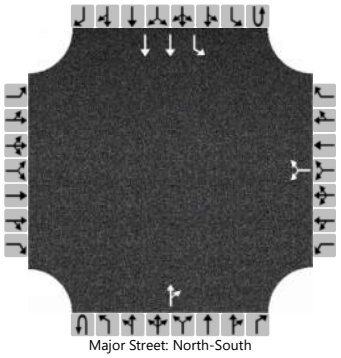
General Information

Analyst	WLW
Agency/Co.	Bayer Becker
Date Performed	12/12/2024
Analysis Year	2027
Time Analyzed	AM Peak
Intersection Orientation	North-South
Project Description	2027 Build Traffic Projections - Alternative 2

Site Information

Intersection	Edwards Avenue and Site Access 1
Jurisdiction	City of Cincinnati
East/West Street	Site Access 1
North/South Street	Edwards Avenue
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	2	0
Configuration							LR					TR		L	T	
Volume (veh/h)						35		29			268	25		13	281	
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)						7.5		6.2						4.1		
Critical Headway (sec)						6.86		6.26						4.16		
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)							70							14		
Capacity, c (veh/h)							585							1231		
v/c Ratio							0.12							0.01		
95% Queue Length, Q_{95} (veh)							0.4							0.0		
95% Queue Length, Q_{95} (ft)							10.2							0.0		
Control Delay (s/veh)							12.0							8.0		
Level of Service (LOS)							B							A		
Approach Delay (s/veh)						12.0								0.4		
Approach LOS						B								A		

HCS Two-Way Stop-Control Report

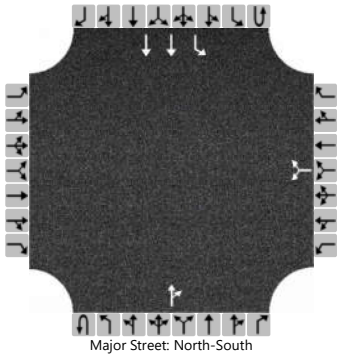
General Information

Analyst	WLW
Agency/Co.	Bayer Becker
Date Performed	12/12/2024
Analysis Year	2027
Time Analyzed	PM Peak
Intersection Orientation	North-South
Project Description	2027 Build Traffic Projections - Alternative 2

Site Information

Intersection	Edwards Avenue and Site Access 1
Jurisdiction	City of Cincinnati
East/West Street	Site Access 1
North/South Street	Edwards Avenue
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	2	0
Configuration							LR					TR		L	T	
Volume (veh/h)						37		18			328	53		52	399	
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)						7.5		6.2						4.1		
Critical Headway (sec)						6.86		6.26						4.16		
Base Follow-Up Headway (sec)						3.5		3.3						2.2		
Follow-Up Headway (sec)						3.53		3.33						2.23		

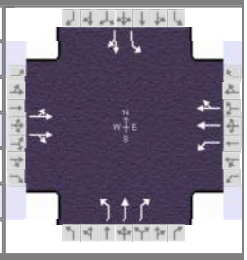
Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)							60							57		
Capacity, c (veh/h)							409							1134		
v/c Ratio							0.15							0.05		
95% Queue Length, Q_{95} (veh)							0.5							0.2		
95% Queue Length, Q_{95} (ft)							12.8							5.1		
Control Delay (s/veh)							15.3							8.3		
Level of Service (LOS)							C							A		
Approach Delay (s/veh)						15.3								1.0		
Approach LOS						C								A		

ALTERNATIVE 3

HCS Signalized Intersection Results Summary

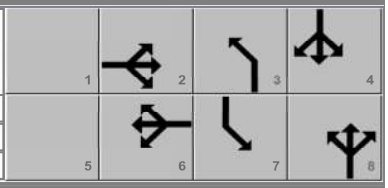
General Information				Intersection Information	
Agency	Bayer Becker			Duration, h	0.250
Analyst	WLW	Analysis Date	10/30/2024	Area Type	Other
Jurisdiction	City of Cincinnati	Time Period	AM Peak	PHF	0.92
Urban Street	Erie Avenue	Analysis Year	2027	Analysis Period	1> 7:00
Intersection	Edwards Road (SR 561)	File Name	Erie & Edwards - 2027 B AM-Alt 3.xus		
Project Description	Future Traffic, Modified Geometry - Alt 3				



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	20	230	39	40	506	265	21	241	35	162	215	40

Signal Information			
Cycle, s	70.0	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	No	Simult. Gap E/W	On
Force Mode	Fixed	Simult. Gap N/S	On

Green	28.0	8.0	17.0	0.0	0.0	0.0	
Yellow	3.4	3.0	3.0	0.0	0.0	0.0	
Red	2.6	2.0	3.0	0.0	0.0	0.0	



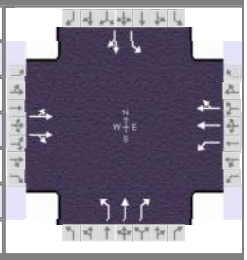
Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase		2		6	3	8	7	4
Case Number		8.0		6.0	1.1	3.0	1.1	4.0
Phase Duration, s		34.0		34.0	13.0	23.0	13.0	23.0
Change Period, ($Y+R_c$), s		6.0		6.0	5.0	6.0	5.0	6.0
Max Allow Headway (*MAH*), s		0.0		0.0	3.1	3.1	3.1	3.1
Queue Clearance Time (g_s), s					2.6	10.5	6.9	11.4
Green Extension Time (g_e), s		0.0		0.0	0.0	0.7	0.0	0.7
Phase Call Probability					1.00	1.00	1.00	1.00
Max Out Probability					0.01	0.15	1.00	0.24

Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	5	2	12	1	6	16	3	8	18	7	4	14
Adjusted Flow Rate (*v*), veh/h	159		155	43	444	394	23	262	38	176	277	
Adjusted Saturation Flow Rate (*s*), veh/h/ln	1568		1648	1104	1900	1679	1810	1900	1610	1810	1848	
Queue Service Time (g_s), s	0.2		4.4	1.9	12.8	12.9	0.6	8.5	1.3	4.9	9.4	
Cycle Queue Clearance Time (g_c), s	13.1		4.4	6.3	12.8	12.9	0.6	8.5	1.3	4.9	9.4	
Green Ratio (*g/C*)	0.40		0.40	0.40	0.40	0.40	0.36	0.24	0.24	0.36	0.24	
Capacity (*c*), veh/h	686		659	476	760	672	400	461	391	415	449	
Volume-to-Capacity Ratio (*X*)	0.232		0.235	0.091	0.585	0.586	0.057	0.568	0.097	0.424	0.618	
Back of Queue (*Q*), ft/ln (95 th percentile)	74		72	22	239	220	11	187	23	98	202	
Back of Queue (*Q*), veh/ln (95 th percentile)	2.9		2.9	0.9	9.6	8.8	0.4	7.5	0.9	3.9	8.1	
Queue Storage Ratio (*RQ*) (95 th percentile)	0.00		0.00	0.55	0.00	0.00	0.22	0.00	0.46	1.31	0.00	
Uniform Delay (d_1), s/veh	13.8		13.9	16.0	16.4	16.5	15.6	23.3	20.5	17.0	23.6	
Incremental Delay (d_2), s/veh	0.8		0.8	0.4	3.3	3.7	0.3	5.0	0.5	3.1	6.3	
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	14.6		14.7	16.4	19.7	20.2	15.9	28.3	21.0	20.1	29.9	
Level of Service (LOS)	B		B	B	B	C	B	C	C	C	C	
Approach Delay, s/veh / LOS	14.7	B		19.8	B		26.5	C		26.1	C	
Intersection Delay, s/veh / LOS	21.5						C					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	2.09	B	1.90	B	2.28	B	2.11	B
Bicycle LOS Score / LOS	0.75	A	1.21	A	1.02	A	1.24	A

HCS Signalized Intersection Results Summary

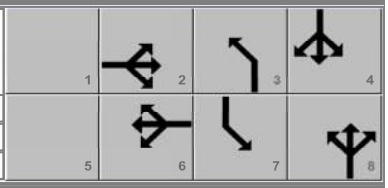
General Information				Intersection Information	
Agency	Bayer Becker			Duration, h	0.250
Analyst	WLW	Analysis Date	10/30/2024	Area Type	Other
Jurisdiction	City of Cincinnati	Time Period	PM Peak	PHF	0.92
Urban Street	Erie Avenue	Analysis Year	2027	Analysis Period	1> 7:00
Intersection	Edwards Road (SR 561)	File Name	Erie & Edwards - 2027 B PM-Alt 3.xus		
Project Description	Future Traffic, Modified Geometry - Alt 3				



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	38	594	65	45	213	150	27	271	50	238	341	49

Signal Information			
Cycle, s	70.0	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	No	Simult. Gap E/W	On
Force Mode	Fixed	Simult. Gap N/S	On

Green	27.0	8.0	18.0	0.0	0.0	0.0
Yellow	3.4	3.0	3.0	0.0	0.0	0.0
Red	2.6	2.0	3.0	0.0	0.0	0.0



Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase		2		6	3	8	7	4
Case Number		8.0		6.0	1.1	3.0	1.1	4.0
Phase Duration, s		33.0		33.0	13.0	24.0	13.0	24.0
Change Period, ($Y+R_c$), s		6.0		6.0	5.0	6.0	5.0	6.0
Max Allow Headway (*MAH*), s		0.0		0.0	3.1	3.1	3.1	3.1
Queue Clearance Time (g_s), s					2.7	11.5	9.3	17.4
Green Extension Time (g_e), s		0.0		0.0	0.0	1.0	0.0	0.2
Phase Call Probability					1.00	1.00	1.00	1.00
Max Out Probability					0.02	0.23	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	5	2	12	1	6	16	3	8	18	7	4	14
Adjusted Flow Rate (*v*), veh/h	395		363	49	207	188	29	295	54	259	424	
Adjusted Saturation Flow Rate (*s*), veh/h/ln	1802		1670	747	1900	1643	1810	1900	1610	1810	1858	
Queue Service Time (g_s), s	0.6		11.9	3.9	5.3	5.5	0.7	9.5	1.8	7.3	15.4	
Cycle Queue Clearance Time (g_c), s	11.4		11.9	15.8	5.3	5.5	0.7	9.5	1.8	7.3	15.4	
Green Ratio (*g/C*)	0.39		0.39	0.39	0.39	0.39	0.37	0.26	0.26	0.37	0.26	
Capacity (*c*), veh/h	752		644	264	733	634	318	489	414	411	478	
Volume-to-Capacity Ratio (*X*)	0.525		0.563	0.186	0.282	0.296	0.092	0.603	0.131	0.629	0.887	
Back of Queue (*Q*), ft/ln (95 th percentile)	215		207	34	101	94	14	206	32	160	348	
Back of Queue (*Q*), veh/ln (95 th percentile)	8.6		8.3	1.3	4.0	3.7	0.6	8.2	1.3	6.4	13.9	
Queue Storage Ratio (*RQ*) (95 th percentile)	0.00		0.00	0.84	0.00	0.00	0.29	0.00	0.64	2.13	0.00	
Uniform Delay (d_1), s/veh	16.7		16.9	23.1	14.8	14.9	16.3	22.9	20.0	17.4	25.0	
Incremental Delay (d_2), s/veh	2.6		3.5	1.5	1.0	1.2	0.6	5.4	0.7	7.1	21.0	
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	19.3		20.4	24.6	15.8	16.1	16.9	28.3	20.6	24.5	46.0	
Level of Service (LOS)	B		C	C	B	B	B	C	C	C	D	
Approach Delay, s/veh / LOS	19.8	B		16.9	B		26.3	C		37.8	D	
Intersection Delay, s/veh / LOS	25.8						C					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	2.09	B	1.90	B	2.28	B	2.11	B
Bicycle LOS Score / LOS	1.11	A	0.85	A	1.11	A	1.61	B

HCS Two-Way Stop-Control Report

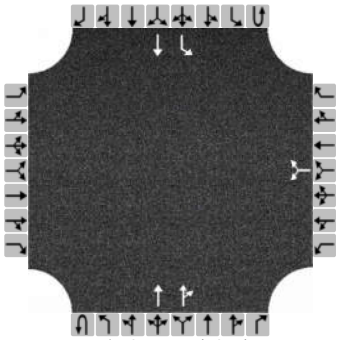
General Information

Analyst	WLW
Agency/Co.	Bayer Becker
Date Performed	12/12/2024
Analysis Year	2027
Time Analyzed	PM Peak
Intersection Orientation	North-South
Project Description	2027 Build Traffic Projections - Alternative 3

Site Information

Intersection	Edwards Avenue and Site Access 1
Jurisdiction	City of Cincinnati
East/West Street	Site Access 1
North/South Street	Edwards Avenue
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	2	0	0	1	1	0
Configuration							LR				T	TR		L	T	
Volume (veh/h)						37		18			328	53	0	52	399	
Percent Heavy Vehicles (%)						3		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)						7.5		6.9						4.1		
Critical Headway (sec)						6.86		6.96						4.16		
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)							60							57		
Capacity, c (veh/h)							323							1134		
v/c Ratio							0.19							0.05		
95% Queue Length, Q_{95} (veh)							0.7							0.2		
95% Queue Length, Q_{95} (ft)							17.9							5.1		
Control Delay (s/veh)							18.7							8.3		
Level of Service (LOS)							C							A		
Approach Delay (s/veh)						18.7								1.0		
Approach LOS						C								A		

HCS Two-Way Stop-Control Report

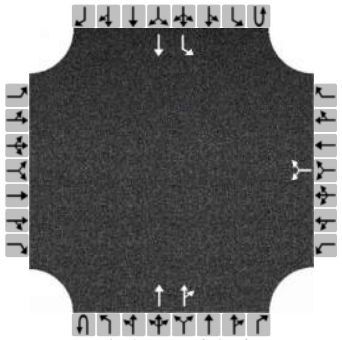
General Information

Analyst	WLW
Agency/Co.	Bayer Becker
Date Performed	12/12/2024
Analysis Year	2027
Time Analyzed	PM Peak
Intersection Orientation	North-South
Project Description	2027 Build Traffic Projections - Alternative 3

Site Information

Intersection	Edwards Avenue and Site Access 1
Jurisdiction	City of Cincinnati
East/West Street	Site Access 1
North/South Street	Edwards Avenue
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	2	0	0	1	1	0
Configuration							LR				T	TR		L	T	
Volume (veh/h)						37		18			328	53	0	52	399	
Percent Heavy Vehicles (%)						3		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)						7.5		6.9						4.1		
Critical Headway (sec)						6.86		6.96						4.16		
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)							60							57		
Capacity, c (veh/h)							323							1134		
v/c Ratio							0.19							0.05		
95% Queue Length, Q_{95} (veh)							0.7							0.2		
95% Queue Length, Q_{95} (ft)							17.9							5.1		
Control Delay (s/veh)							18.7							8.3		
Level of Service (LOS)							C							A		
Approach Delay (s/veh)						18.7								1.0		
Approach LOS						C								A		

APPENDIX D

SIMTRAFFIC TRAVEL TIME
&
BACK OF QUEUE LANE LENGTH RESULTS

SCENARIO 1

Arterial Level of Service: NB Edwards Road (SR 561)

Cross Street	Node	Delay (s/veh)	Travel time (s)	Dist (mi)	Arterial Speed
Observatory Avenue	4	17.9	24.0	0.1	10
Erie Avenue	1	24.7	38.2	0.1	14
Total		42.6	62.2	0.2	12

Arterial Level of Service: SB Edwards Road (SR 561)

Cross Street	Node	Delay (s/veh)	Travel time (s)	Dist (mi)	Arterial Speed
Erie Avenue	1	14.5	20.6	0.1	11
Observatory Avenue	4	14.7	29.8	0.1	18
Total		29.2	50.4	0.2	15

Summary of All Intervals

Start Time	6:50
End Time	8:00
Total Time (min)	70
Time Recorded (min)	60
# of Intervals	2
# of Recorded Intervals	1
Vehs Entered	3046
Vehs Exited	3064
Starting Vehs	65
Ending Vehs	47
Travel Distance (mi)	533
Travel Time (hr)	128.2
Total Delay (hr)	107.4
Total Stops	2690
Fuel Used (gal)	49.9

Interval #0 Information Seeding

Start Time	6:50
End Time	7:00
Total Time (min)	10

Volumes adjusted by Growth Factors,80%ile Adjustment.

No data recorded this interval.

Interval #1 Information Recording

Start Time	7:00
End Time	8:00
Total Time (min)	60

Volumes adjusted by Growth Factors,80%ile Adjustment.

Vehs Entered	3046
Vehs Exited	3064
Starting Vehs	65
Ending Vehs	47
Travel Distance (mi)	533
Travel Time (hr)	128.2
Total Delay (hr)	107.4
Total Stops	2690
Fuel Used (gal)	49.9

Intersection: 1: Edwards Road (SR 561) & Erie Avenue

Movement	EB	EB	WB	WB	WB	NB	SB	SB
Directions Served	LT	TR	L	T	TR	LTR	L	TR
Maximum Queue (ft)	225	190	64	178	198	237	100	271
Average Queue (ft)	122	83	26	115	139	88	70	115
95th Queue (ft)	220	176	64	168	194	161	109	210
Link Distance (ft)	280	280		410	410	690		260
Upstream Blk Time (%)								0
Queuing Penalty (veh)								0
Storage Bay Dist (ft)			40				75	
Storage Blk Time (%)			5	47			14	13
Queuing Penalty (veh)			14	21			37	22

Intersection: 4: Edwards Road (SR 561) & Observatory Avenue

Movement	EB	EB	WB	WB	NB	NB	SB	SB
Directions Served	L	TR	L	TR	LT	R	L	TR
Maximum Queue (ft)	71	238	273	314	120	96	125	138
Average Queue (ft)	29	107	254	277	64	43	70	44
95th Queue (ft)	60	193	333	301	110	75	118	102
Link Distance (ft)	238	238	251	251	301	301		690
Upstream Blk Time (%)		0	46	92				
Queuing Penalty (veh)		0	0	0				
Storage Bay Dist (ft)							100	
Storage Blk Time (%)							3	1
Queuing Penalty (veh)							5	3

Intersection: 5: Michigan Avenue & Erie Avenue

Movement	EB	EB	WB	WB	NB	SB
Directions Served	LT	TR	LT	TR	LTR	LTR
Maximum Queue (ft)	110	94	236	228	50	138
Average Queue (ft)	51	54	125	106	14	42
95th Queue (ft)	80	81	201	171	40	96
Link Distance (ft)	410	410	221	221	446	224
Upstream Blk Time (%)			0	0		
Queuing Penalty (veh)			0	0		
Storage Bay Dist (ft)						
Storage Blk Time (%)						
Queuing Penalty (veh)						

Network Summary

Network wide Queuing Penalty: 101

Arterial Level of Service: NB Edwards Road (SR 561)

Cross Street	Node	Delay (s/veh)	Travel time (s)	Dist (mi)	Arterial Speed
Observatory Avenue	4	17.8	23.9	0.1	10
Erie Avenue	1	29.9	41.3	0.1	13
Total		47.7	65.2	0.2	12

Arterial Level of Service: SB Edwards Road (SR 561)

Cross Street	Node	Delay (s/veh)	Travel time (s)	Dist (mi)	Arterial Speed
Erie Avenue	1	27.6	45.3	0.1	6
Observatory Avenue	4	15.2	29.8	0.1	18
Total		42.8	75.1	0.2	12

Summary of All Intervals

Start Time	3:50
End Time	5:00
Total Time (min)	70
Time Recorded (min)	60
# of Intervals	2
# of Recorded Intervals	1
Vehs Entered	3266
Vehs Exited	3248
Starting Vehs	62
Ending Vehs	80
Travel Distance (mi)	576
Travel Time (hr)	68.5
Total Delay (hr)	46.3
Total Stops	3204
Fuel Used (gal)	38.2

Interval #0 Information Seeding

Start Time	3:50
End Time	4:00
Total Time (min)	10

Volumes adjusted by Growth Factors,80%ile Adjustment.

No data recorded this interval.

Interval #1 Information Recording

Start Time	4:00
End Time	5:00
Total Time (min)	60

Volumes adjusted by Growth Factors,80%ile Adjustment.

Vehs Entered	3266
Vehs Exited	3248
Starting Vehs	62
Ending Vehs	80
Travel Distance (mi)	576
Travel Time (hr)	68.5
Total Delay (hr)	46.3
Total Stops	3204
Fuel Used (gal)	38.2

Intersection: 1: Edwards Road (SR 561) & Erie Avenue

Movement	EB	EB	WB	WB	WB	NB	SB	SB
Directions Served	LT	TR	L	T	TR	LTR	L	TR
Maximum Queue (ft)	294	243	64	111	111	308	100	282
Average Queue (ft)	191	127	32	47	58	150	92	218
95th Queue (ft)	282	225	62	94	95	249	119	347
Link Distance (ft)	279	279		410	410	690		266
Upstream Blk Time (%)	1							19
Queuing Penalty (veh)	0							0
Storage Bay Dist (ft)			40				75	
Storage Blk Time (%)			9	14			40	26
Queuing Penalty (veh)			10	7			154	65

Intersection: 4: Edwards Road (SR 561) & Observatory Avenue

Movement	EB	EB	WB	WB	NB	NB	SB	SB
Directions Served	L	TR	L	TR	LT	R	L	TR
Maximum Queue (ft)	253	277	262	267	120	136	123	177
Average Queue (ft)	217	257	53	222	49	42	83	46
95th Queue (ft)	324	270	158	310	95	93	131	104
Link Distance (ft)	238	238	251	251	301	301		690
Upstream Blk Time (%)	29	82	0	13				
Queuing Penalty (veh)	0	0	0	0				
Storage Bay Dist (ft)							100	
Storage Blk Time (%)							10	0
Queuing Penalty (veh)							14	1

Intersection: 5: Michigan Avenue & Erie Avenue

Movement	EB	EB	WB	WB	NB	SB
Directions Served	LT	TR	LT	TR	LTR	LTR
Maximum Queue (ft)	133	179	153	165	52	162
Average Queue (ft)	65	74	73	56	22	41
95th Queue (ft)	108	123	128	112	52	93
Link Distance (ft)	410	410	221	221	446	224
Upstream Blk Time (%)						
Queuing Penalty (veh)						
Storage Bay Dist (ft)						
Storage Blk Time (%)						
Queuing Penalty (veh)						

Network Summary

Network wide Queuing Penalty: 251

SCENARIO 2

Arterial Level of Service: NB Edwards Road (SR 561)

Cross Street	Node	Delay (s/veh)	Travel time (s)	Dist (mi)	Arterial Speed
Observatory Avenue	4	18.8	24.8	0.1	9
Erie Avenue	1	28.6	42.5	0.1	12
Total		47.3	67.3	0.2	11

Arterial Level of Service: SB Edwards Road (SR 561)

Cross Street	Node	Delay (s/veh)	Travel time (s)	Dist (mi)	Arterial Speed
Erie Avenue	1	15.7	21.9	0.1	10
Observatory Avenue	4	14.0	29.3	0.1	18
Total		29.7	51.2	0.2	15

Summary of All Intervals

Start Time	6:50
End Time	8:00
Total Time (min)	70
Time Recorded (min)	60
# of Intervals	2
# of Recorded Intervals	1
Vehs Entered	3011
Vehs Exited	3025
Starting Vehs	55
Ending Vehs	41
Travel Distance (mi)	530
Travel Time (hr)	127.9
Total Delay (hr)	107.4
Total Stops	2618
Fuel Used (gal)	49.6

Interval #0 Information Seeding

Start Time	6:50
End Time	7:00
Total Time (min)	10

Volumes adjusted by Growth Factors,80%ile Adjustment.

No data recorded this interval.

Interval #1 Information Recording

Start Time	7:00
End Time	8:00
Total Time (min)	60

Volumes adjusted by Growth Factors,80%ile Adjustment.

Vehs Entered	3011
Vehs Exited	3025
Starting Vehs	55
Ending Vehs	41
Travel Distance (mi)	530
Travel Time (hr)	127.9
Total Delay (hr)	107.4
Total Stops	2618
Fuel Used (gal)	49.6

Intersection: 1: Edwards Road (SR 561) & Erie Avenue

Movement	EB	EB	WB	WB	WB	NB	SB	SB
Directions Served	LT	TR	L	T	TR	LTR	L	TR
Maximum Queue (ft)	216	160	64	160	220	244	100	282
Average Queue (ft)	111	65	29	100	122	93	73	119
95th Queue (ft)	185	136	76	153	199	165	114	230
Link Distance (ft)	273	273		410	410	690		266
Upstream Blk Time (%)								1
Queuing Penalty (veh)								0
Storage Bay Dist (ft)			40				75	
Storage Blk Time (%)			2	42			13	14
Queuing Penalty (veh)			6	19			34	25

Intersection: 4: Edwards Road (SR 561) & Observatory Avenue

Movement	EB	EB	WB	WB	NB	NB	SB	SB
Directions Served	L	TR	L	TR	LT	R	L	TR
Maximum Queue (ft)	115	253	273	314	138	96	138	164
Average Queue (ft)	39	114	260	273	63	34	67	47
95th Queue (ft)	96	183	278	292	118	76	109	101
Link Distance (ft)	238	238	251	251	301	301	690	690
Upstream Blk Time (%)		0	49	90				
Queuing Penalty (veh)		0	0	0				
Storage Bay Dist (ft)								
Storage Blk Time (%)								
Queuing Penalty (veh)								

Intersection: 5: Michigan Avenue & Erie Avenue

Movement	EB	EB	WB	WB	NB	SB
Directions Served	LT	TR	LT	TR	LTR	LTR
Maximum Queue (ft)	72	93	236	236	50	138
Average Queue (ft)	48	46	122	115	18	39
95th Queue (ft)	77	85	195	186	45	92
Link Distance (ft)	410	410	221	221	446	224
Upstream Blk Time (%)			1	1		
Queuing Penalty (veh)			0	0		
Storage Bay Dist (ft)						
Storage Blk Time (%)						
Queuing Penalty (veh)						

Network Summary

Network wide Queuing Penalty: 84

Arterial Level of Service: NB Edwards Road (SR 561)

Cross Street	Node	Delay (s/veh)	Travel time (s)	Dist (mi)	Arterial Speed
Observatory Avenue	4	29.6	35.7	0.1	6
Erie Avenue	1	26.9	39.2	0.1	13
Total		56.6	74.9	0.2	10

Arterial Level of Service: SB Edwards Road (SR 561)

Cross Street	Node	Delay (s/veh)	Travel time (s)	Dist (mi)	Arterial Speed
Erie Avenue	1	33.1	66.8	0.1	6
Observatory Avenue	4	20.3	34.9	0.1	15
Total		53.3	101.7	0.2	10

Summary of All Intervals

Start Time	3:50
End Time	5:00
Total Time (min)	70
Time Recorded (min)	60
# of Intervals	2
# of Recorded Intervals	1
Vehs Entered	3269
Vehs Exited	3246
Starting Vehs	65
Ending Vehs	88
Travel Distance (mi)	576
Travel Time (hr)	61.3
Total Delay (hr)	39.2
Total Stops	3326
Fuel Used (gal)	36.5

Interval #0 Information Seeding

Start Time	3:50
End Time	4:00
Total Time (min)	10

Volumes adjusted by Growth Factors,80%ile Adjustment.

No data recorded this interval.

Interval #1 Information Recording

Start Time	4:00
End Time	5:00
Total Time (min)	60

Volumes adjusted by Growth Factors,80%ile Adjustment.

Vehs Entered	3269
Vehs Exited	3246
Starting Vehs	65
Ending Vehs	88
Travel Distance (mi)	576
Travel Time (hr)	61.3
Total Delay (hr)	39.2
Total Stops	3326
Fuel Used (gal)	36.5

Intersection: 1: Edwards Road (SR 561) & Erie Avenue

Movement	EB	EB	WB	WB	WB	NB	SB	SB
Directions Served	LT	TR	L	T	TR	LTR	L	TR
Maximum Queue (ft)	288	210	64	155	238	392	100	330
Average Queue (ft)	179	108	42	63	86	149	96	245
95th Queue (ft)	259	188	67	121	177	293	118	340
Link Distance (ft)	273	273		410	410	690		266
Upstream Blk Time (%)	1							33
Queuing Penalty (veh)	0							0
Storage Bay Dist (ft)			40				75	
Storage Blk Time (%)			9	17			44	29
Queuing Penalty (veh)			10	9			171	72

Intersection: 4: Edwards Road (SR 561) & Observatory Avenue

Movement	EB	EB	WB	WB	NB	NB	SB	SB
Directions Served	L	TR	L	TR	LT	R	L	TR
Maximum Queue (ft)	253	277	191	276	160	110	250	136
Average Queue (ft)	42	235	25	172	67	42	130	60
95th Queue (ft)	141	304	83	268	129	93	218	118
Link Distance (ft)	238	238	251	251	301	301	690	690
Upstream Blk Time (%)	2	21		2				
Queuing Penalty (veh)	0	0		0				
Storage Bay Dist (ft)								
Storage Blk Time (%)								
Queuing Penalty (veh)								

Intersection: 5: Michigan Avenue & Erie Avenue

Movement	EB	EB	WB	WB	NB	SB
Directions Served	LT	TR	LT	TR	LTR	LTR
Maximum Queue (ft)	230	205	138	122	72	114
Average Queue (ft)	104	110	63	50	19	53
95th Queue (ft)	189	186	118	108	53	97
Link Distance (ft)	410	410	221	221	446	224
Upstream Blk Time (%)						
Queuing Penalty (veh)						
Storage Bay Dist (ft)						
Storage Blk Time (%)						
Queuing Penalty (veh)						

Network Summary

Network wide Queuing Penalty: 262

SCENARIO 3

Arterial Level of Service: NB Edwards Road (SR 561)

Cross Street	Node	Delay (s/veh)	Travel time (s)	Dist (mi)	Arterial Speed
Observatory Avenue	4	38.7	44.9	0.1	5
Site Access 1	12	3.1	10.8	0.1	28
Erie Avenue	1	16.4	22.6	0.1	10
Total		58.1	78.3	0.2	10

Arterial Level of Service: SB Edwards Road (SR 561)

Cross Street	Node	Delay (s/veh)	Travel time (s)	Dist (mi)	Arterial Speed
Erie Avenue	1	16.9	23.2	0.1	10
Site Access 1	12	2.4	9.3	0.1	24
Observatory Avenue	4	20.3	28.5	0.1	10
Total		39.6	61.0	0.2	12

Summary of All Intervals

Start Time	6:50
End Time	8:00
Total Time (min)	70
Time Recorded (min)	60
# of Intervals	2
# of Recorded Intervals	1
Vehs Entered	3380
Vehs Exited	3413
Starting Vehs	75
Ending Vehs	42
Travel Distance (mi)	581
Travel Time (hr)	57.4
Total Delay (hr)	34.6
Total Stops	3160
Fuel Used (gal)	35.9

Interval #0 Information Seeding

Start Time	6:50
End Time	7:00
Total Time (min)	10

Volumes adjusted by Growth Factors,80%ile Adjustment.

No data recorded this interval.

Interval #1 Information Recording

Start Time	7:00
End Time	8:00
Total Time (min)	60

Volumes adjusted by Growth Factors,80%ile Adjustment.

Vehs Entered	3380
Vehs Exited	3413
Starting Vehs	75
Ending Vehs	42
Travel Distance (mi)	581
Travel Time (hr)	57.4
Total Delay (hr)	34.6
Total Stops	3160
Fuel Used (gal)	35.9

Intersection: 1: Edwards Road (SR 561) & Erie Avenue

Movement	EB	EB	WB	WB	WB	NB	SB	SB
Directions Served	LT	TR	L	T	TR	LTR	L	TR
Maximum Queue (ft)	246	192	64	178	217	206	100	280
Average Queue (ft)	134	78	23	114	138	102	71	130
95th Queue (ft)	229	169	62	168	200	173	115	238
Link Distance (ft)	279	279		410	410	263		266
Upstream Blk Time (%)								0
Queuing Penalty (veh)								0
Storage Bay Dist (ft)			40				75	
Storage Blk Time (%)			4	44			13	17
Queuing Penalty (veh)			9	20			36	30

Intersection: 4: Edwards Road (SR 561) & Observatory Avenue

Movement	EB	EB	WB	WB	NB	NB	SB	SB
Directions Served	L	TR	L	TR	LT	R	L	TR
Maximum Queue (ft)	137	245	266	314	300	118	124	196
Average Queue (ft)	34	119	137	269	97	32	77	77
95th Queue (ft)	95	213	332	310	182	76	126	150
Link Distance (ft)	238	238	251	251	301	301		372
Upstream Blk Time (%)		0	7	47	0			
Queuing Penalty (veh)		0	0	0	0			
Storage Bay Dist (ft)							100	
Storage Blk Time (%)							6	2
Queuing Penalty (veh)							10	3

Intersection: 5: Michigan Avenue & Erie Avenue

Movement	EB	EB	WB	WB	NB	SB
Directions Served	LT	TR	LT	TR	LTR	LTR
Maximum Queue (ft)	94	91	236	211	71	112
Average Queue (ft)	47	53	134	123	24	39
95th Queue (ft)	84	89	203	196	57	74
Link Distance (ft)	410	410	221	221	446	224
Upstream Blk Time (%)			1	0		
Queuing Penalty (veh)			0	0		
Storage Bay Dist (ft)						
Storage Blk Time (%)						
Queuing Penalty (veh)						

Intersection: 12: Edwards Road (SR 561) & Site Access 1

Movement	WB	SB
Directions Served	LR	LT
Maximum Queue (ft)	78	31
Average Queue (ft)	35	7
95th Queue (ft)	59	29
Link Distance (ft)	180	263
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Network Summary

Network wide Queuing Penalty: 109

Arterial Level of Service: NB Edwards Road (SR 561)

Cross Street	Node	Delay (s/veh)	Travel time (s)	Dist (mi)	Arterial Speed
Observatory Avenue	4	21.5	27.6	0.1	8
Site Access 1	12	2.3	9.2	0.1	33
Erie Avenue	1	21.0	27.2	0.1	8
Total		44.7	64.0	0.2	12

Arterial Level of Service: SB Edwards Road (SR 561)

Cross Street	Node	Delay (s/veh)	Travel time (s)	Dist (mi)	Arterial Speed
Erie Avenue	1	30.5	53.0	0.1	6
Site Access 1	12	3.9	10.7	0.1	21
Observatory Avenue	4	14.8	23.0	0.1	13
Total		49.2	86.7	0.2	11

Summary of All Intervals

Start Time	3:50
End Time	5:00
Total Time (min)	70
Time Recorded (min)	60
# of Intervals	2
# of Recorded Intervals	1
Vehs Entered	3483
Vehs Exited	3488
Starting Vehs	73
Ending Vehs	68
Travel Distance (mi)	614
Travel Time (hr)	118.8
Total Delay (hr)	95.0
Total Stops	3546
Fuel Used (gal)	51.4

Interval #0 Information Seeding

Start Time	3:50
End Time	4:00
Total Time (min)	10

Volumes adjusted by Growth Factors,80%ile Adjustment.

No data recorded this interval.

Interval #1 Information Recording

Start Time	4:00
End Time	5:00
Total Time (min)	60

Volumes adjusted by Growth Factors,80%ile Adjustment.

Vehs Entered	3483
Vehs Exited	3488
Starting Vehs	73
Ending Vehs	68
Travel Distance (mi)	614
Travel Time (hr)	118.8
Total Delay (hr)	95.0
Total Stops	3546
Fuel Used (gal)	51.4

Intersection: 1: Edwards Road (SR 561) & Erie Avenue

Movement	EB	EB	WB	WB	WB	NB	SB	SB
Directions Served	LT	TR	L	T	TR	LTR	L	TR
Maximum Queue (ft)	258	235	64	97	179	273	100	330
Average Queue (ft)	183	118	35	47	60	134	92	252
95th Queue (ft)	244	200	68	79	117	218	117	344
Link Distance (ft)	279	279		410	410	264		266
Upstream Blk Time (%)						0		32
Queuing Penalty (veh)						1		0
Storage Bay Dist (ft)			40				75	
Storage Blk Time (%)			13	13			39	31
Queuing Penalty (veh)			15	6			162	78

Intersection: 4: Edwards Road (SR 561) & Observatory Avenue

Movement	EB	EB	WB	WB	NB	NB	SB	SB
Directions Served	L	TR	L	TR	LT	R	L	TR
Maximum Queue (ft)	292	290	266	288	98	95	124	321
Average Queue (ft)	241	258	75	214	55	39	108	119
95th Queue (ft)	313	273	213	314	94	76	144	236
Link Distance (ft)	238	238	251	251	301	301		371
Upstream Blk Time (%)	49	88	1	14				
Queuing Penalty (veh)	0	0	0	0				
Storage Bay Dist (ft)							100	
Storage Blk Time (%)							21	2
Queuing Penalty (veh)							31	5

Intersection: 5: Michigan Avenue & Erie Avenue

Movement	EB	EB	WB	WB	NB	SB
Directions Served	LT	TR	LT	TR	LTR	LTR
Maximum Queue (ft)	141	137	122	164	74	74
Average Queue (ft)	74	84	65	53	30	41
95th Queue (ft)	128	134	119	105	67	76
Link Distance (ft)	410	410	221	221	446	224
Upstream Blk Time (%)						
Queuing Penalty (veh)						
Storage Bay Dist (ft)						
Storage Blk Time (%)						
Queuing Penalty (veh)						

Intersection: 12: Edwards Road (SR 561) & Site Access 1

Movement	WB	NB	SB
Directions Served	LR	TR	LT
Maximum Queue (ft)	73	53	174
Average Queue (ft)	34	2	31
95th Queue (ft)	61	19	101
Link Distance (ft)	274	371	264
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (ft)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Network Summary

Network wide Queuing Penalty: 299

SCENARIO 4

Arterial Level of Service: NB Edwards Road (SR 561)

Cross Street	Node	Delay (s/veh)	Travel time (s)	Dist (mi)	Arterial Speed
Observatory Avenue	4	26.5	32.7	0.1	7
Site Access 1	12	2.8	10.8	0.1	28
Erie Avenue	1	21.5	27.7	0.1	8
Total		50.8	71.3	0.2	11

Arterial Level of Service: SB Edwards Road (SR 561)

Cross Street	Node	Delay (s/veh)	Travel time (s)	Dist (mi)	Arterial Speed
Erie Avenue	1	27.3	35.8	0.1	7
Site Access 1	12	2.3	9.1	0.1	25
Observatory Avenue	4	17.9	25.8	0.1	12
Total		47.5	70.8	0.2	11

Summary of All Intervals

Start Time	6:50
End Time	8:00
Total Time (min)	70
Time Recorded (min)	60
# of Intervals	2
# of Recorded Intervals	1
Vehs Entered	3320
Vehs Exited	3324
Starting Vehs	79
Ending Vehs	75
Travel Distance (mi)	569
Travel Time (hr)	113.8
Total Delay (hr)	91.5
Total Stops	3235
Fuel Used (gal)	48.5

Interval #0 Information Seeding

Start Time	6:50
End Time	7:00
Total Time (min)	10

Volumes adjusted by Growth Factors,80%ile Adjustment.
No data recorded this interval.

Interval #1 Information Recording

Start Time	7:00
End Time	8:00
Total Time (min)	60

Volumes adjusted by Growth Factors,80%ile Adjustment.

Vehs Entered	3320
Vehs Exited	3324
Starting Vehs	79
Ending Vehs	75
Travel Distance (mi)	569
Travel Time (hr)	113.8
Total Delay (hr)	91.5
Total Stops	3235
Fuel Used (gal)	48.5

Intersection: 1: Edwards Road (SR 561) & Erie Avenue

Movement	EB	EB	WB	WB	WB	NB	NB	SB	SB
Directions Served	LT	TR	L	T	TR	L	TR	L	TR
Maximum Queue (ft)	244	185	64	198	245	74	200	100	301
Average Queue (ft)	121	76	34	127	146	16	100	79	173
95th Queue (ft)	236	177	72	187	224	46	169	124	303
Link Distance (ft)	273	273		409	409		262		266
Upstream Blk Time (%)									8
Queuing Penalty (veh)									0
Storage Bay Dist (ft)			40			50		75	
Storage Blk Time (%)			4	43		1	35	16	28
Queuing Penalty (veh)			11	20		2	9	45	48

Intersection: 4: Edwards Road (SR 561) & Observatory Avenue

Movement	EB	EB	WB	WB	NB	NB	SB	SB
Directions Served	L	TR	L	TR	LT	R	L	TR
Maximum Queue (ft)	253	290	279	303	140	53	183	203
Average Queue (ft)	196	171	246	274	75	23	100	78
95th Queue (ft)	264	295	334	292	130	49	152	135
Link Distance (ft)	238	238	251	251	301	301	370	370
Upstream Blk Time (%)	21	17	47	87				
Queuing Penalty (veh)	0	0	0	0				
Storage Bay Dist (ft)								
Storage Blk Time (%)								
Queuing Penalty (veh)								

Intersection: 5: Michigan Avenue & Erie Avenue

Movement	EB	EB	WB	WB	NB	SB
Directions Served	LT	TR	LT	TR	LTR	LTR
Maximum Queue (ft)	132	175	236	236	74	94
Average Queue (ft)	55	55	140	144	31	34
95th Queue (ft)	96	104	209	230	60	68
Link Distance (ft)	409	409	221	221	446	224
Upstream Blk Time (%)			0	1		
Queuing Penalty (veh)			0	0		
Storage Bay Dist (ft)						
Storage Blk Time (%)						
Queuing Penalty (veh)						

Intersection: 12: Edwards Road (SR 561) & Site Access 1

Movement	WB	SB
Directions Served	LR	L
Maximum Queue (ft)	78	31
Average Queue (ft)	34	4
95th Queue (ft)	65	21
Link Distance (ft)	143	
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		100
Storage Blk Time (%)		
Queuing Penalty (veh)		

Network Summary

Network wide Queuing Penalty: 134

Arterial Level of Service: NB Edwards Road (SR 561)

Cross Street	Node	Delay (s/veh)	Travel time (s)	Dist (mi)	Arterial Speed
Observatory Avenue	4	31.1	37.4	0.1	6
Site Access 1	12	2.6	9.7	0.1	31
Erie Avenue	1	23.4	29.4	0.1	8
Total		57.1	76.5	0.2	10

Arterial Level of Service: SB Edwards Road (SR 561)

Cross Street	Node	Delay (s/veh)	Travel time (s)	Dist (mi)	Arterial Speed
Erie Avenue	1	22.9	30.9	0.1	8
Site Access 1	12	2.0	8.8	0.1	25
Observatory Avenue	4	15.9	23.9	0.1	12
Total		40.8	63.7	0.2	12

Summary of All Intervals

Start Time	3:50
End Time	5:00
Total Time (min)	70
Time Recorded (min)	60
# of Intervals	2
# of Recorded Intervals	1
Vehs Entered	3608
Vehs Exited	3623
Starting Vehs	79
Ending Vehs	64
Travel Distance (mi)	629
Travel Time (hr)	61.2
Total Delay (hr)	36.7
Total Stops	3834
Fuel Used (gal)	38.8

Interval #0 Information Seeding

Start Time	3:50
End Time	4:00
Total Time (min)	10

Volumes adjusted by Growth Factors,80%ile Adjustment.

No data recorded this interval.

Interval #1 Information Recording

Start Time	4:00
End Time	5:00
Total Time (min)	60

Volumes adjusted by Growth Factors,80%ile Adjustment.

Vehs Entered	3608
Vehs Exited	3623
Starting Vehs	79
Ending Vehs	64
Travel Distance (mi)	629
Travel Time (hr)	61.2
Total Delay (hr)	36.7
Total Stops	3834
Fuel Used (gal)	38.8

Intersection: 1: Edwards Road (SR 561) & Erie Avenue

Movement	EB	EB	WB	WB	WB	NB	NB	SB	SB
Directions Served	LT	TR	L	T	TR	L	TR	L	TR
Maximum Queue (ft)	288	286	64	135	176	74	248	100	282
Average Queue (ft)	208	146	49	75	90	18	136	88	222
95th Queue (ft)	284	244	77	125	152	46	213	122	335
Link Distance (ft)	273	273		409	409		264		266
Upstream Blk Time (%)	2	0					0		11
Queuing Penalty (veh)	0	0					0		0
Storage Bay Dist (ft)			40			50		75	
Storage Blk Time (%)			27	20			40	23	28
Queuing Penalty (veh)			30	10			12	94	70

Intersection: 4: Edwards Road (SR 561) & Observatory Avenue

Movement	EB	EB	WB	WB	NB	NB	SB	SB
Directions Served	L	TR	L	TR	LT	R	L	TR
Maximum Queue (ft)	162	272	112	267	134	113	226	162
Average Queue (ft)	54	222	39	176	62	48	140	61
95th Queue (ft)	124	295	87	267	119	92	216	121
Link Distance (ft)	238	238	251	251	301	301	370	370
Upstream Blk Time (%)		13		5				
Queuing Penalty (veh)		0		0				
Storage Bay Dist (ft)								
Storage Blk Time (%)								
Queuing Penalty (veh)								

Intersection: 5: Michigan Avenue & Erie Avenue

Movement	EB	EB	WB	WB	NB	SB
Directions Served	LT	TR	LT	TR	LTR	LTR
Maximum Queue (ft)	240	269	163	118	118	98
Average Queue (ft)	127	133	70	63	33	50
95th Queue (ft)	228	231	118	103	73	91
Link Distance (ft)	409	409	221	221	446	224
Upstream Blk Time (%)						
Queuing Penalty (veh)						
Storage Bay Dist (ft)						
Storage Blk Time (%)						
Queuing Penalty (veh)						

Intersection: 12: Edwards Road (SR 561) & Site Access 1

Movement	WB	SB
Directions Served	LR	L
Maximum Queue (ft)	119	73
Average Queue (ft)	36	23
95th Queue (ft)	78	58
Link Distance (ft)	240	
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		100
Storage Blk Time (%)		
Queuing Penalty (veh)		

Network Summary

Network wide Queuing Penalty: 217