GHA GEWALT HAMILTON ASSOCIATES, INC.
CONSULTING ENGINEERS
625 Forest Edge Drive, Vernon Hills, IL 60061
TEL 847.478.9700 ■ FAX 847.478.9701
www.gha-engineers.com

Traffic Operations Study

To: **Matt Schumacher**
CAGE Civil Engineering

From: Antonio Maravillas, E.I.T.
Transportation Engineer

Bill Grieve, P.E., PTOE
Senior Transportation Engineer

Date: January 9, 2020

Subject: ***Field Middle School***
2055 Landwehr Road - Northbrook, IL

Part I. Project Context and Summary Statement

Gewalt Hamilton Associates, Inc. (GHA) has conducted a Traffic Operations Study for the recently repositioned and reconstructed south access drive on Landwehr Road for Field Middle School in Northbrook, Illinois. Formerly, a left-turn storage lane was provided for the previous access drive along Landwehr Road. Prior to the 2019-2020 school year, the access drive was reconstructed further south on Landwehr Road where there is not currently a dedicated left-turn lane.

The following summarizes our findings and provides various recommendations for your consideration. *Exhibits* and *Appendices* referenced are centrally located at the end of this document.

Part II. Background Information

Site Location Map and Roadway Inventory

Exhibit 1 provides a location map of the site, and ***Appendix A*** provides a photo inventory of the site vicinity. The existing traffic operations in the site area are illustrated on ***Exhibit 2***. Pertinent comments to the adjacent roadways include:

<u>Landwehr Road (County Route W80)</u>

- Landwehr Road is a north-south route that is under the jurisdiction of the Cook County Department of Transportation and Highways (CCDOTH) and is classified as a Major Collector.
- It provides a two-lane cross section (one through lane in each direction) with sidewalks along both sides of the roadway.
- At its signalized intersection with Techny Road, separate left-turn lanes are provided on both approaches. A pedestrian crosswalk is striped and signed on the northbound approach with 'No Turn on Red' signage posted. Pedestrian countdown signals are also provided on both approaches.
- South of Techny Road, a three-lane cross section is present with a dedicated left-turn lane for the former school entrance point. It returns to a two-lane cross section immediately north of the relocated entrance.

Landwehr Road School Access

- Two access points are provided for the school along Landwehr Road with the northern drive serving as exit only and the southern drive serving as enter only. 'Do Not Enter' signage is posted at the northern drive with exiting traffic have stop control.
- At the northern drive, separate left and right-turn lanes are provided.
- Crosswalks are striped at both access points.

Techny Road (County Route A76)

- Techny Road is an east-west route that is also under the jurisdiction of CCDOTH and is classified as a Major Collector.
- It provides a two-lane cross section (one through lane in each direction) with sidewalks along both sides of the roadway west of Landwehr Road. East of Landwehr Road, a sidewalk is provided along the northern side of the roadway.
- At its signalized intersection with Landwehr Road, separate left-turn lanes are provided on both approaches. Pedestrian crosswalks are signed with 'No Turn on Red' signage posted on both approaches. Pedestrian countdown signals are also provided on both approaches and a crosswalk is striped on the westbound approach.

Techny Road School Access

- Two access points are provided for the school along Techny Road. The western drive provides one inbound and one outbound lane while the eastern drive provides two outbound lanes. 'Do Not Enter' signage is posted at the eastern drive with exiting traffic having stop control.

Existing Traffic

Peak period traffic turning movement counts were conducted by GHA on Tuesday, November 19, 2019 from 7:00 to 9:00 AM and 2:30 to 6:00 PM at the Landwehr Road and Techny Road intersection, as well as at all four school access driveways. The observed weekday morning peak hour occurred from 7:30-8:30 AM, which coincided with the school's morning drop-off period. The observed weekday evening peak hour for the school occurred from 3:30-4:30 PM, coinciding with the schools 3:30 dismissal. The observed weekday evening street peak hour occurred from 5:00-6:00 PM on Landwehr Road and Techny Road. Summaries of the existing traffic counts can be found in ***Appendix B***.

Exhibit 3 summarizes the existing weekday morning and evening peak period traffic and pedestrian volumes. ***Exhibit 3*** also provides the AADT, or 24-hour volume, along Landwehr Road and Techny Road, as published by the Illinois Department of Transportation (IDOT) on their website www.gettingaroundillinois.com.

Crash Analysis

Observing the most recent available crash history can determine if any roadway improvements are needed to improve safety along the surrounding roadways. Crash data from 2014-2018 was obtained from the IDOT Bureau of Data Collection for Landwehr Road and Techny Road in the site vicinity. ***Appendix C*** summarizes the 5-year (2014-2018) crash history at the Landwehr Road intersection with Techny Road. As can be seen, 22 crashes occurred during the 5-year study period, of which 16 (73%) were rear ends.

Only two (2) crashes occurred on Techny Road north of the school while zero (0) crashes occurred on Landwehr Road west of the school during the 5-year study period. The only crash pattern that occurred in the site area were the rear end collisions at the intersection of Landwehr Road and Techny Road, which is typical for a signalized intersection. Thus, no roadway improvements are necessary based on crash history.

Part III. Traffic Evaluation

Turn Lane Analysis

With the recent relocation of the Landwehr Road Access drive, there is no dedicated left-turn lane into the school on Landwehr Road. This study examined whether a left-turn storage lane should be considered for the new access driveway.

The Illinois Department of Transportation's *Bureau of Design and Environment Manual* was used to determine the need for auxiliary lanes. A left-turn lane is warranted at any unsignalized intersection that satisfies the criterion depicted in Figure 36-3.G for two-lane highways with a speed limit of 40 mph or less. The chart is included on ***Exhibit 4 – Part A***. Based on the existing traffic volumes, an auxiliary left-turn lane is warranted on southbound Landwehr Road at the south access drive (see ***Exhibit 4 – Part B***).

Discussion Point. The left-turn volumes along Landwehr Road at the south school access drive account for a low percentage of total southbound traffic (3% during the morning peak hour and 1% during the evening school peak hour). Based on the low left-turn volumes, posted speed limit, and lack of recent crash history, it is recommended that a southbound left-turn lane not be initially constructed at the new access drive, but that traffic conditions should be monitored to determine if providing a southbound left turn lane would improve operational safety.

Intersection Capacity Analyses

Intersection capacity analyses were conducted using the Highway Capacity Software (HCS) and results are shown in ***Exhibit 5***. The analysis parameters are listed in Part A, as published in the Transportation Research Board's (TRB) *Highway Capacity Manual – 6th Edition*, 2016 (HCM). At signalized intersections, Level of Service (LOS) "reports" traffic operations using the letter designations "A" (best) through "F" (worst). LOS reports operations based on the average control delay per vehicle in seconds.

LOS C is often referred to as the intersection "design" guideline and LOS D is usually considered as providing the lower threshold of "acceptable" operations. LOS E and F are usually considered "unacceptable". At unsignalized intersections, the HCS measurement is approach delay in seconds.

Capacity analyses were conducted at the Landwehr Road and Techny Road intersection, as well as at all four school access drives. The results are summarized in ***Exhibit 5***. The HCS summary printouts are provided in ***Appendix D***.

Key Finding. The capacity analyses results indicate that all movements at every intersection tested currently operate at or better than the acceptable LOS D. The intersection of Landwehr Road and Techny Road operates at overall LOS C during all three peak periods.

Key Finding. The capacity analyses results indicate that northbound queues at the Landwehr Road and Techny Road intersection exceed 500 feet during the morning peak hour. Field observations showed back-ups as far as the southern school access drive.

Part IV. Conclusions and Recommendations

A traffic analysis was performed for Field Middle School in Northbrook, Illinois. The capacity analysis results indicate that traffic along Landwehr Road and Techny Road operate at acceptable levels of service during the morning and both evening peak hours. The following provides recommendations to any roadway improvements for your consideration:

- Along Landwehr Road, a southbound left-turn lane is warranted at the south access drive based on IDOT's criteria. Field observations also showed vehicles frequently bypassing on the shoulder when another vehicle was waiting to turn left. However, as previously discussed, it is not recommended that a left-turn lane be constructed. Instead, due to the low left turn volumes, turning restriction signage should be posted at the drive for the morning hours when northbound traffic is heaviest, and back-ups occur from the Techny Road signal.
- 'Do Not Pass On Shoulder' signage should be posted for southbound traffic at the new access drive.
- Yellow diagonal crosshatch markings should be striped on the former turn lane along Landwehr Road.

Part V. Technical Addendum

The following Appendices were previously referenced. They provide technical support for our observations, findings and recommendations discussed in the text.

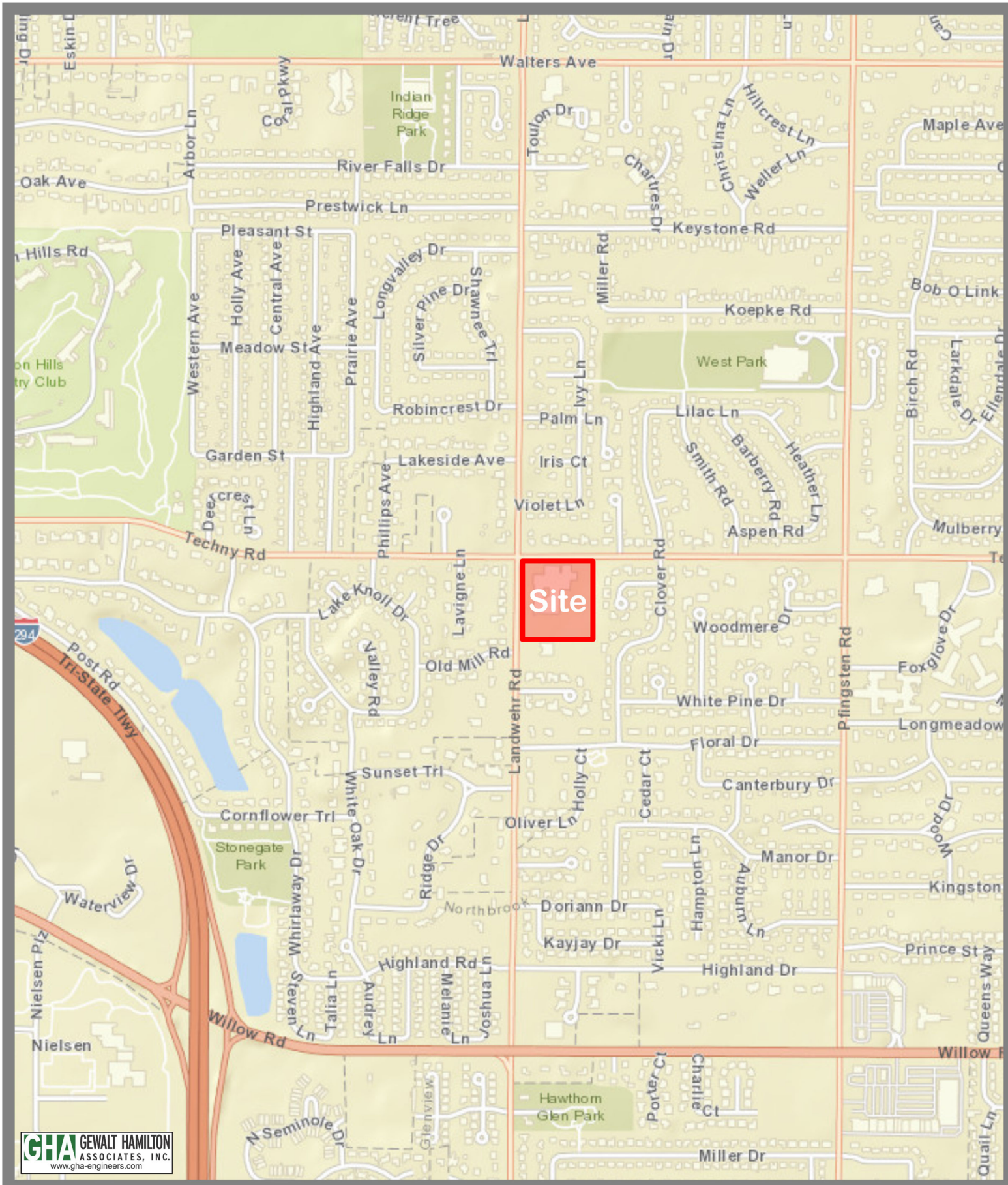
Exhibits

1. Site Location Map
2. Existing Traffic Operations
3. Existing Traffic and Pedestrians
4. Turn Lane Requirements
5. Intersection Capacity Analyses

Appendices

A. Photo Inventory
B. Traffic Count Summary Sheets
C. Crash Summary
D. Capacity Analysis Worksheets

EXHIBITS



GHA GEWALT HAMILTON ASSOCIATES, INC.
www.gha-engineers.com

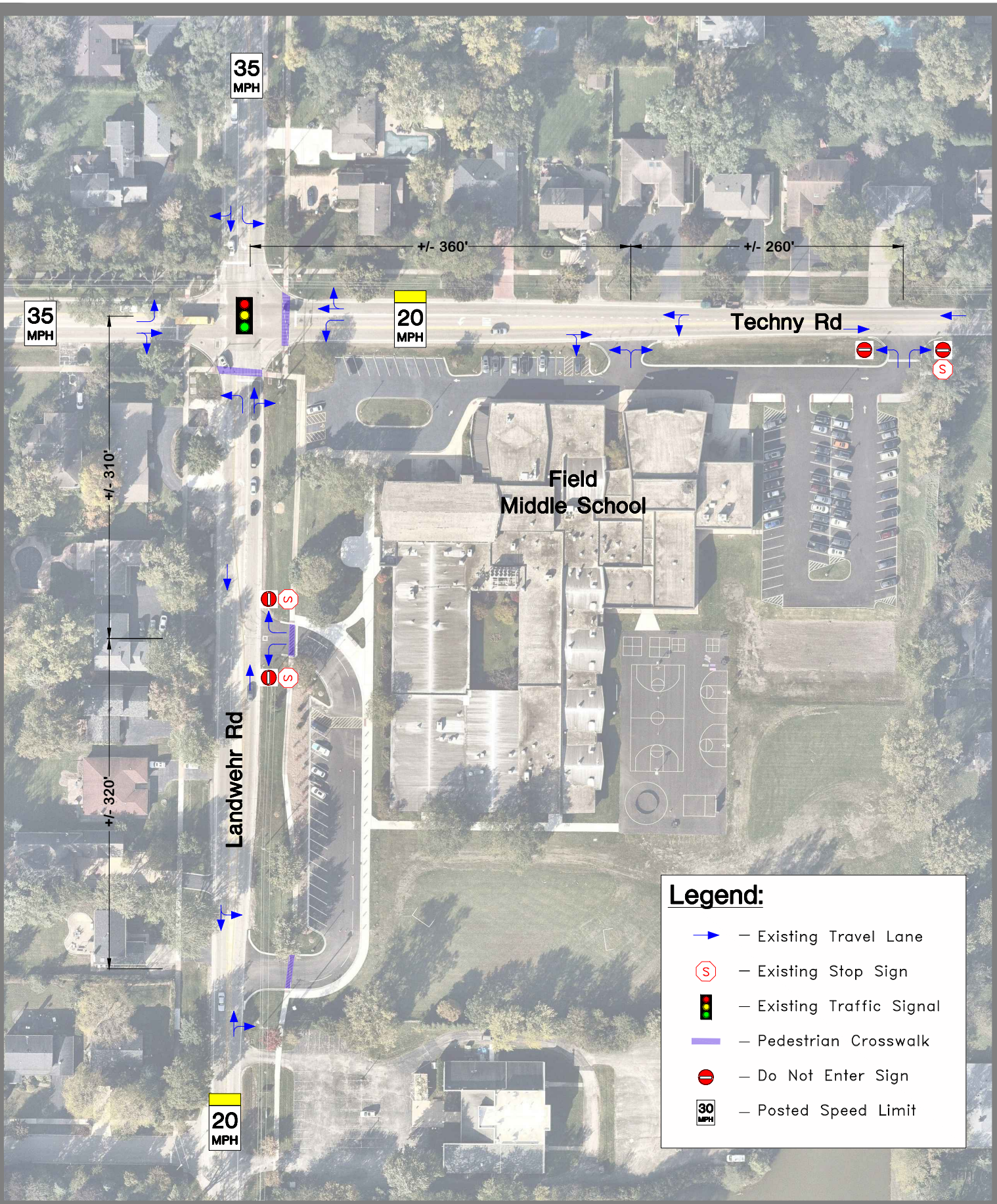
N

1 inch = 1,000 Feet

Exhibit 1 - Location Map

Field Middle School
2055 Landwehr Road, Northbrook, IL

Map Center: 87.85884°W 42.11457°N

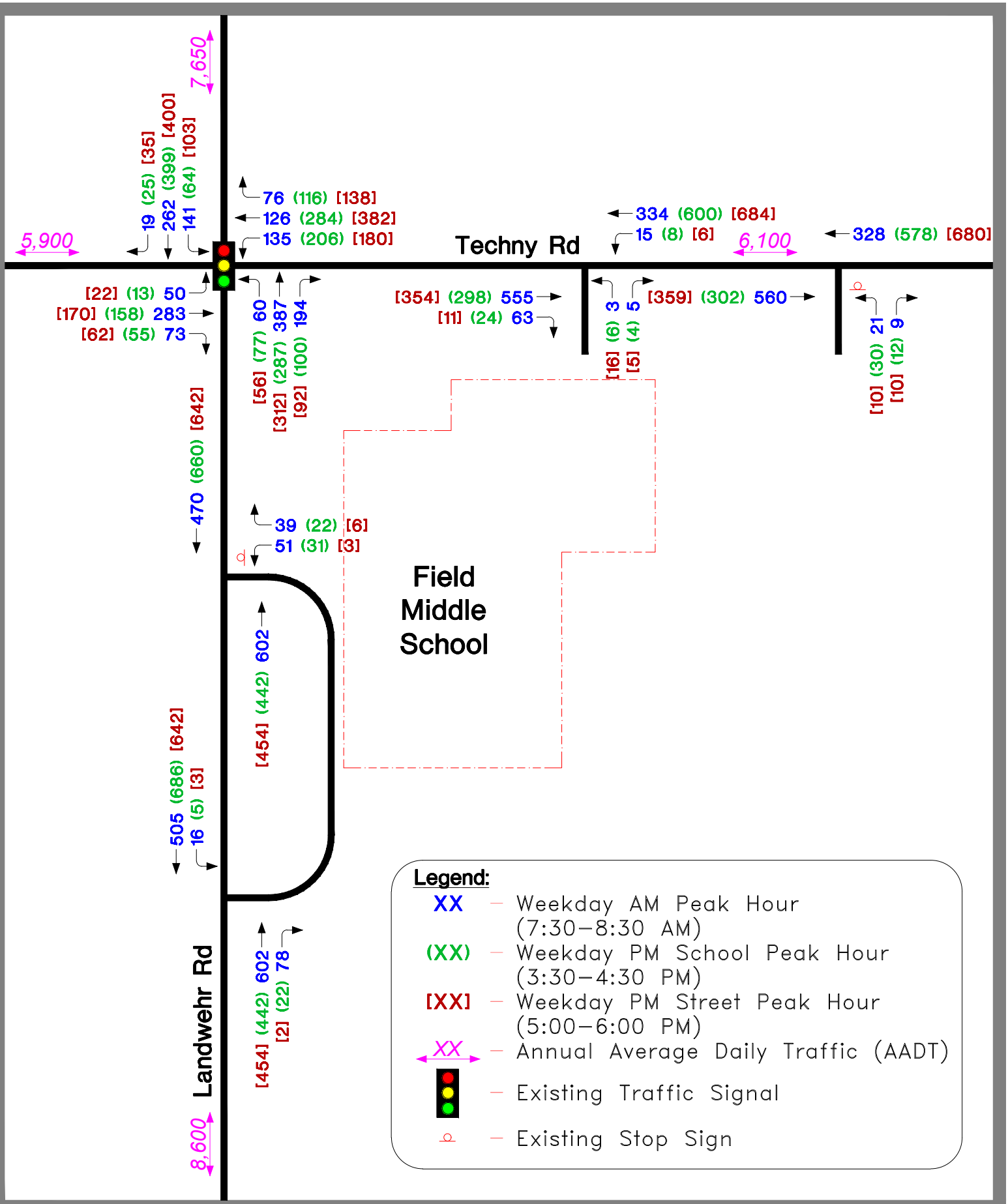


GHA GEWALT HAMILTON ASSOCIATES, INC.

N

Not to Scale

Exhibit 2
Existing Traffic Operations

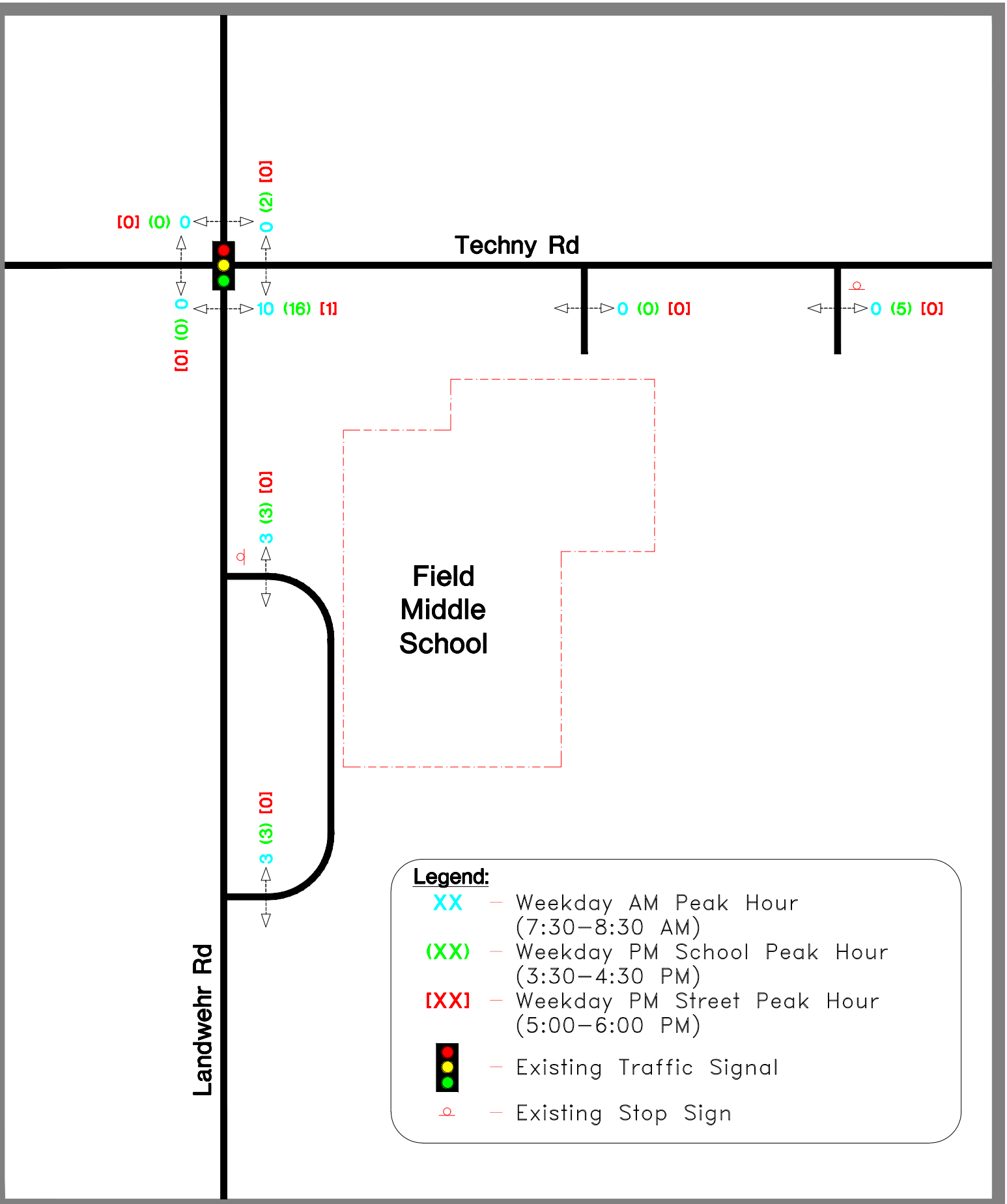


GHA GEWALT HAMILTON ASSOCIATES, INC.

Not to Scale

Exhibit 3A
Existing Traffic

Sources: 1) GHA November, 2019 2) IDOT 2018 AADT



GEWALT HAMILTON ASSOCIATES, INC.

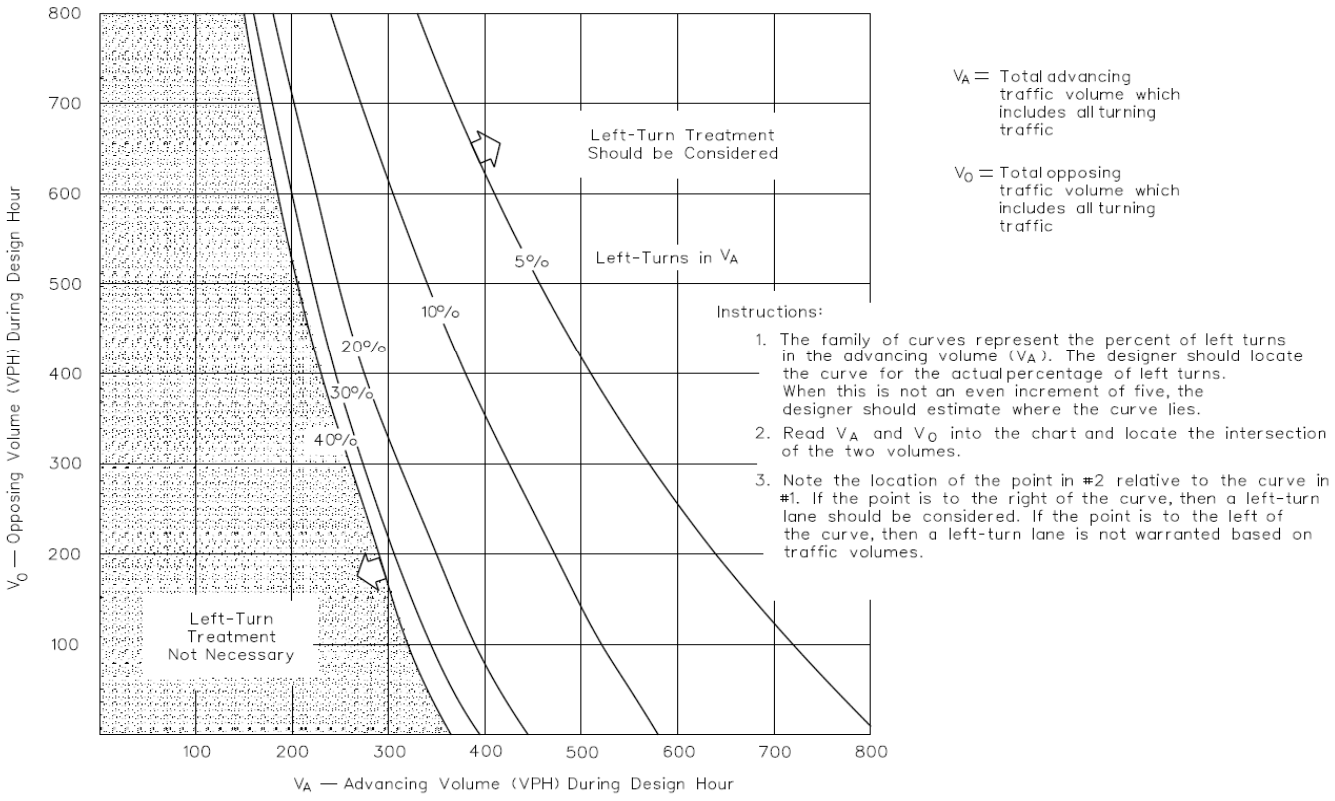
N

Not to Scale

Exhibit 3B
Existing Pedestrians
Source: GHA November, 2019

Exhibit 4
Turn Lane Requirements
Field Middle School - Northbrook, Illinois

Part A. Parameters - Minimum Volume Required for Warranting Exclusive Left-Turn Lane
(Source: IDOT Bureau of Design and Environment Manual)



Part B. Results

	Left-Turn Lane Warrant				
1. Landwehr Rd at School Access	**NB Approach Total**	**SB Approach Total**	**SB Left Turns**		**Satisfied?**
A. Weekday Morning Peak Hour					
Existing Traffic (See *Exhibit 3*)	680	521	16	3%	**YES**
B. Weekday Evening Peak Hour					
Existing Traffic (See Exhibit 3)	464	691	5	1%	**YES**

GEWALT HAMILTON ASSOCIATES, INC.

Exhibit 5
Intersection Capacity and Queue Analyses
Field Middle School - Northbrook, IL

Part A. Parameters - Type of Traffic Control *(Source: Highway Capacity Manual 6th Edition)*

I. Traffic Signals

LOS	Delay (sec / veh)	Description
A	<10	All signal phases clear waiting vehicles without delay
B	>10 and < 20	Minimal delay experienced on select signal phases
C	>20 and < 35	Some delay experienced on several phases; often used as design criteria
D	>35 and < 55	Usually considered as the acceptable delay standard
E	>55 and < 80	Very long delays experienced during the peak hours
F	>80	Unacceptable delays experienced throughout the peak hours

II. Stop Sign

LOS	Delay (sec / veh)
A	< 10
B	>10 and < 15
C	>15 and < 25
D	>25 and < 35
E	>35 and < 50
F	>50

Part B. Results

	Roadway Conditions	LOS Per Movement By Approach (> = Shared Lane, - = Non Critical or not Allowed Movement)												Intersection / Approach	
		Eastbound			Westbound			Northbound			Southbound			Delay	
		LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT	(sec / veh)	LOS
1. Landwehr Rd at Techny Rd	**Signalized**	Eastbound			Westbound			Northbound			Southbound			**Intersection Delay**	
A. Weekday Morning Peak Hour															
Existing Traffic (See Exhibit 3)	• Current	C	D	<	C	C	<	B	D	<	C	B	<	31.0	C
	• 95th Queue Length (ft)	41	351	-	107	188	-	38	539	-	88	205	-	-	-
B. Weekday Evening School Peak Hour															
Existing Traffic (See Exhibit 3)	• Current	C	C	<	B	C	<	B	C	<	B	C	<	20.7	C
	• 95th Queue Length (ft)	7	139	-	98	235	-	33	216	-	28	245	-	-	-
C. Weekday Evening Street Peak Hour															
Existing Traffic (See Exhibit 3)	• Current	C	C	<	B	C	<	B	C	<	B	C	<	24.1	C
	• 95th Queue Length (ft)	13	162	-	95	349	-	32	280	-	56	294	-	-	-
2. Landwehr Rd at North School Access	**TWSC - WB Stop**	Eastbound			Westbound			Northbound			Southbound			**WB Approach Delay**	
A. Weekday Morning Peak Hour															
Existing Traffic (See Exhibit 3)	• Current				D		B		A	-	-	A		22.7	C
	• 95th Queue Length (ft)				28		8		0	-	-	0		-	-
B. Weekday Evening School Peak Hour															
Existing Traffic (See Exhibit 3)	• Current				D		B		A	-	-	A		19.9	C
	• 95th Queue Length (ft)				15		3		0	-	-	0		-	-
C. Weekday Evening Street Peak Hour															
Existing Traffic (See Exhibit 3)	• Current				C		B		A	-	-	A		15.0	C
	• 95th Queue Length (ft)				0		0		0	-	-	0		-	-
3. Landwehr Rd at South School Access	**TWSC - WB Stop**	Eastbound			Westbound			Northbound			Southbound			**SB Approach Delay**	
A. Weekday Morning Peak Hour															
Existing Traffic (See Exhibit 3)	• Current				-		-		A	<	>	A		0.6	A
	• 95th Queue Length (ft)				-		-		0	-	-	3		-	-
B. Weekday Evening School Peak Hour															
Existing Traffic (See Exhibit 3)	• Current				-		-		A	<	>	A		0.1	A
	• 95th Queue Length (ft)				-		-		0	-	-	0		-	-
C. Weekday Evening Street Peak Hour															
Existing Traffic (See Exhibit 3)	• Current				-		-		A	<	>	A		0.1	A
	• 95th Queue Length (ft)				-		-		0	-	-	0		-	-

GEWALT HAMILTON ASSOCIATES, INC.

Part B. Results

Roadway Conditions	LOS Per Movement By Approach (> = Shared Lane; - = Non Critical or not Allowed Movement)												Intersection / Approach	
	Eastbound			Westbound			Northbound			Southbound			Delay	
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT	(sec / veh)	LOS
4. Techny Rd at West School Access	**TWSC - NB Stop**	Eastbound			Westbound			Northbound			Southbound		**NB Approach Delay**	
A. Weekday Morning Peak Hour														
Existing Traffic (See Exhibit 3)	• Current	A	<	>	A		C	<					15.2	C
	• 95th Queue Length (ft)	0	-	-	3		3	-					-	-
B. Weekday Evening School Peak Hour														
Existing Traffic (See Exhibit 3)	• Current	A	<	>	A		B	<					14.8	B
	• 95th Queue Length (ft)	0	-	-	0		3	-					-	-
C. Weekday Evening Street Peak Hour														
Existing Traffic (See Exhibit 3)	• Current	A	<	>	A		C	<					18.8	C
	• 95th Queue Length (ft)	0	-	-	0		5	-					-	-
5. Techny Rd at East School Access	**TWSC - NB Stop**	Eastbound			Westbound			Northbound			Southbound		**NB Approach Delay**	
A. Weekday Morning Peak Hour														
Existing Traffic (See Exhibit 3)	• Current	A	-	-	A		C	B					16.6	C
	• 95th Queue Length (ft)	0	-	-	0		8	3					-	-
B. Weekday Evening School Peak Hour														
Existing Traffic (See Exhibit 3)	• Current	A	-	-	A		C	B					16.1	C
	• 95th Queue Length (ft)	0	-	-	0		10	3					-	-
C. Weekday Evening Street Peak Hour														
Existing Traffic (See Exhibit 3)	• Current	A	-	-	A		C	B					15.6	C
	• 95th Queue Length (ft)	0	-	-	0		3	0					-	-

APPENDIX A
Photo Inventory

Northbound Landwehr Rd
(Techny Rd intersection)

Southbound Landwehr Rd
(Techny Rd intersection)

Eastbound Techny Rd
(Landwehr Rd intersection)

Westbound Techny Rd
(Landwehr Rd intersection)

GEWALT HAMILTON ASSOCIATES, INC.

Northbound Landwehr Rd
(South school access drive intersection)

Southbound Landwehr Rd
(North school access drive intersection)

Northbound Landwehr Rd
(between school access drives)

Southbound Landwehr Rd
(between school access drives)

North school access drive
(from Landwehr Rd, facing East)

South school access drive
(from Landwehr Rd, facing East)

School access drive
(off Landwehr Rd, facing North)

North school access drive
(at Landwehr Rd, facing West)

Eastbound Techny Rd
(West school access drive intersection)

Westbound Techny Rd
(East school access drive intersection)

Eastbound Techny Rd
(between school access drives)

Westbound Techny Rd
(between school access drives)

APPENDIX B

Traffic Count Summary Sheets

Gewalt Hamilton Associates Inc.
625 Forest Edge Drive

Vernon Hills, Illinois, United States 60061
(847) 478-9700 poster@gha-engineers.com

Count Name: Techny Rd @ Landwehr Rd
Site Code:
Start Date: 11/19/2019

Turning Movement Data

Start Time	Landwehr Southbound						Techny Westbound						Landwehr Northbound						Techny Eastbound						Int. Total
	Right	Thru	Left	U-Turn	Peds	App. Total	Right	Thru	Left	U-Turn	Peds	App. Total	Right	Thru	Left	U-Turn	Peds	App. Total	Right	Thru	Left	U-Turn	Peds	App. Total	
7:00 AM	2	50	21	0	0	73	14	15	28	0	0	57	24	49	3	0	0	76	7	46	0	0	0	53	259
7:15 AM	6	65	25	0	0	96	14	20	38	0	0	72	50	55	4	0	0	109	11	79	3	0	0	93	370
7:30 AM	5	76	55	0	0	136	15	29	31	0	0	75	50	67	5	0	0	122	18	86	15	0	0	119	452
7:45 AM	5	61	40	0	0	106	29	26	34	0	0	89	53	112	10	0	3	175	24	74	18	0	0	116	486
Hourly Total	18	252	141	0	0	411	72	90	131	0	0	293	177	283	22	0	3	482	60	285	36	0	0	381	1567
8:00 AM	5	62	23	0	0	90	21	40	34	0	0	95	46	111	29	0	3	186	15	60	12	0	0	87	458
8:15 AM	4	63	23	0	0	90	11	31	36	0	0	78	45	97	16	0	4	158	16	57	5	0	0	78	404
8:30 AM	6	55	14	0	0	75	16	41	42	0	0	99	29	80	9	0	1	118	12	62	4	0	0	78	370
8:45 AM	2	59	12	0	0	73	12	32	37	0	2	81	39	115	4	0	0	158	11	45	7	0	0	63	375
Hourly Total	17	239	72	0	0	328	60	144	149	0	2	353	159	403	58	0	8	620	54	224	28	0	0	306	1607
*** BREAK ***	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2:30 PM	3	63	13	0	0	79	18	50	24	0	0	92	8	54	5	0	0	67	7	38	3	0	0	48	286
2:45 PM	2	51	18	0	0	71	18	52	15	0	0	85	26	68	18	0	0	112	8	30	1	0	0	39	307
Hourly Total	5	114	31	0	0	150	36	102	39	0	0	177	34	122	23	0	0	179	15	68	4	0	0	87	593
3:00 PM	5	75	10	0	0	90	24	48	26	0	0	98	13	62	14	0	0	89	4	36	8	0	0	48	325
3:15 PM	7	67	24	0	0	98	32	67	36	0	0	135	19	57	7	0	0	83	15	36	8	0	0	59	375
3:30 PM	8	94	9	0	0	111	37	73	46	0	0	156	31	77	30	0	12	138	7	44	5	0	0	56	461
3:45 PM	7	92	22	0	0	121	32	65	54	0	1	151	27	66	16	0	0	109	6	28	3	0	0	37	418
Hourly Total	27	328	65	0	0	420	125	253	162	0	1	540	90	262	67	0	12	419	32	144	24	0	0	200	1579
4:00 PM	4	94	18	0	0	116	27	64	54	0	1	145	20	65	13	0	4	98	24	40	2	0	0	66	425
4:15 PM	6	119	15	0	0	140	20	82	52	0	0	154	22	79	18	0	0	119	18	40	3	0	0	61	474
4:30 PM	11	81	19	0	0	111	18	69	49	0	0	136	33	75	11	0	0	119	15	35	5	0	0	55	421
4:45 PM	4	106	24	0	0	134	27	68	68	0	0	163	20	64	9	0	0	93	14	41	7	0	0	62	452
Hourly Total	25	400	76	0	0	501	92	283	223	0	1	598	95	283	51	0	4	429	71	156	17	0	0	244	1772
5:00 PM	10	103	24	0	0	137	28	79	40	0	0	147	28	80	11	0	0	119	14	51	3	0	0	68	471
5:15 PM	9	95	26	0	0	130	36	96	48	0	0	180	22	80	13	0	0	115	10	42	8	0	0	60	485
5:30 PM	8	110	29	0	0	147	27	118	38	0	0	183	21	74	17	0	0	112	18	44	6	0	0	68	510
5:45 PM	8	92	24	0	0	124	47	89	54	0	0	190	21	78	15	0	1	114	20	32	5	0	0	57	485
Hourly Total	35	400	103	0	0	538	138	382	180	0	0	700	92	312	56	0	1	460	62	169	22	0	0	253	1951
Grand Total	127	1733	488	0	0	2348	523	1254	884	0	4	2661	647	1665	277	0	28	2589	294	1046	131	0	0	1471	9069
Approach %	5.4	73.8	20.8	0.0	-	-	19.7	47.1	33.2	0.0	-	-	25.0	64.3	10.7	0.0	-	-	20.0	71.1	8.9	0.0	-	-	-
Total %	1.4	19.1	5.4	0.0	-	25.9	5.8	13.8	9.7	0.0	-	29.3	7.1	18.4	3.1	0.0	-	28.5	3.2	11.5	1.4	0.0	-	16.2	-
Lights	121	1682	471	0	-	2274	507	1227	868	0	-	2602	627	1621	269	0	-	2517	289	1018	128	0	-	1435	8828
% Lights	95.3	97.1	96.5	-	-	96.8	96.9	97.8	98.2	-	-	97.8	96.9	97.4	97.1	-	-	97.2	98.3	97.3	97.7	-	-	97.6	97.3
Mediums	6	37	15	0	-	58	12	22	14	0	-	48	17	38	8	0	-	63	4	24	3	0	-	31	200
% Mediums	4.7	2.1	3.1	-	-	2.5	2.3	1.8	1.6	-	-	1.8	2.6	2.3	2.9	-	-	2.4	1.4	2.3	2.3	-	-	2.1	2.2
Articulated Trucks	0	14	2	0	-	16	4	5	2	0	-	11	3	6	0	0	-	9	1	4	0	0	-	5	41
% Articulated Trucks	0.0	0.8	0.4	-	-	0.7	0.8	0.4	0.2	-	-	0.4	0.5	0.4	0.0	-	-	0.3	0.3	0.4	0.0	-	-	0.3	0.5

Bicycles on Crosswalk	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-
% Bicycles on Crosswalk	-	-	-	-	-	-	-	-	-	-	0.0	-	-	-	-	-	0.0	-	-	-	-	-	-	-	-
Pedestrians	-	-	-	-	0	-	-	-	-	-	4	-	-	-	-	-	28	-	-	-	-	-	0	-	-
% Pedestrians	-	-	-	-	-	-	-	-	-	-	100.0	-	-	-	-	-	100.0	-	-	-	-	-	-	-	-

Gewalt Hamilton Associates Inc.
625 Forest Edge Drive

Vernon Hills, Illinois, United States 60061
(847) 478-9700 poster@gha-engineers.com

Count Name: Techny Rd @ Landwehr Rd
Site Code:
Start Date: 11/19/2019

Turning Movement Peak Hour Data (7:30 AM)

Start Time	Landwehr Southbound						Techny Westbound						Landwehr Northbound						Techny Eastbound						Int. Total
	Right	Thru	Left	U-Turn	Peds	App. Total	Right	Thru	Left	U-Turn	Peds	App. Total	Right	Thru	Left	U-Turn	Peds	App. Total	Right	Thru	Left	U-Turn	Peds	App. Total	
7:30 AM	5	76	55	0	0	136	15	29	31	0	0	75	50	67	5	0	0	122	18	86	15	0	0	119	452
7:45 AM	5	61	40	0	0	106	29	26	34	0	0	89	53	112	10	0	3	175	24	74	18	0	0	116	486
8:00 AM	5	62	23	0	0	90	21	40	34	0	0	95	46	111	29	0	3	186	15	60	12	0	0	87	458
8:15 AM	4	63	23	0	0	90	11	31	36	0	0	78	45	97	16	0	4	158	16	57	5	0	0	78	404
Total	19	262	141	0	0	422	76	126	135	0	0	337	194	387	60	0	10	641	73	277	50	0	0	400	1800
Approach %	4.5	62.1	33.4	0.0	-	-	22.6	37.4	40.1	0.0	-	-	30.3	60.4	9.4	0.0	-	-	18.3	69.3	12.5	0.0	-	-	-
Total %	1.1	14.6	7.8	0.0	-	23.4	4.2	7.0	7.5	0.0	-	18.7	10.8	21.5	3.3	0.0	-	35.6	4.1	15.4	2.8	0.0	-	22.2	-
PHF	0.950	0.862	0.641	0.000	-	0.776	0.655	0.788	0.938	0.000	-	0.887	0.915	0.864	0.517	0.000	-	0.862	0.760	0.805	0.694	0.000	-	0.840	0.926
Lights	17	252	138	0	-	407	70	122	135	0	-	327	189	377	57	0	-	623	70	268	49	0	-	387	1744
% Lights	89.5	96.2	97.9	-	-	96.4	92.1	96.8	100.0	-	-	97.0	97.4	97.4	95.0	-	-	97.2	95.9	96.8	98.0	-	-	96.8	96.9
Mediums	2	7	3	0	-	12	4	3	0	0	-	7	4	9	3	0	-	16	2	8	1	0	-	11	46
% Mediums	10.5	2.7	2.1	-	-	2.8	5.3	2.4	0.0	-	-	2.1	2.1	2.3	5.0	-	-	2.5	2.7	2.9	2.0	-	-	2.8	2.6
Articulated Trucks	0	3	0	0	-	3	2	1	0	0	-	3	1	1	0	0	-	2	1	1	0	0	-	2	10
% Articulated Trucks	0.0	1.1	0.0	-	-	0.7	2.6	0.8	0.0	-	-	0.9	0.5	0.3	0.0	-	-	0.3	1.4	0.4	0.0	-	-	0.5	0.6
Bicycles on Crosswalk	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-
% Bicycles on Crosswalk	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0	-	-	-	-	-	-	-	-
Pedestrians	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	10	-	-	-	-	-	0	-	-
% Pedestrians	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	100.0	-	-	-	-	-	-	-	-

Gewalt Hamilton Associates Inc.
625 Forest Edge Drive

Vernon Hills, Illinois, United States 60061
(847) 478-9700 poster@gha-engineers.com

Count Name: Techny Rd @ Landwehr Rd
Site Code:
Start Date: 11/19/2019

Turning Movement Peak Hour Data (5:00 PM)

Start Time	Landwehr Southbound						Techny Westbound						Landwehr Northbound						Techny Eastbound						Int. Total
	Right	Thru	Left	U-Turn	Peds	App. Total	Right	Thru	Left	U-Turn	Peds	App. Total	Right	Thru	Left	U-Turn	Peds	App. Total	Right	Thru	Left	U-Turn	Peds	App. Total	
5:00 PM	10	103	24	0	0	137	28	79	40	0	0	147	28	80	11	0	0	119	14	51	3	0	0	68	471
5:15 PM	9	95	26	0	0	130	36	96	48	0	0	180	22	80	13	0	0	115	10	42	8	0	0	60	485
5:30 PM	8	110	29	0	0	147	27	118	38	0	0	183	21	74	17	0	0	112	18	44	6	0	0	68	510
5:45 PM	8	92	24	0	0	124	47	89	54	0	0	190	21	78	15	0	1	114	20	32	5	0	0	57	485
Total	35	400	103	0	0	538	138	382	180	0	0	700	92	312	56	0	1	460	62	169	22	0	0	253	1951
Approach %	6.5	74.3	19.1	0.0	-	-	19.7	54.6	25.7	0.0	-	-	20.0	67.8	12.2	0.0	-	-	24.5	66.8	8.7	0.0	-	-	-
Total %	1.8	20.5	5.3	0.0	-	27.6	7.1	19.6	9.2	0.0	-	35.9	4.7	16.0	2.9	0.0	-	23.6	3.2	8.7	1.1	0.0	-	13.0	-
PHF	0.875	0.909	0.888	0.000	-	0.915	0.734	0.809	0.833	0.000	-	0.921	0.821	0.975	0.824	0.000	-	0.966	0.775	0.828	0.688	0.000	-	0.930	0.956
Lights	35	390	98	0	-	523	136	379	180	0	-	695	91	307	56	0	-	454	62	167	22	0	-	251	1923
% Lights	100.0	97.5	95.1	-	-	97.2	98.6	99.2	100.0	-	-	99.3	98.9	98.4	100.0	-	-	98.7	100.0	98.8	100.0	-	-	99.2	98.6
Mediums	0	5	4	0	-	9	1	3	0	0	-	4	1	5	0	0	-	6	0	2	0	0	-	2	21
% Mediums	0.0	1.3	3.9	-	-	1.7	0.7	0.8	0.0	-	-	0.6	1.1	1.6	0.0	-	-	1.3	0.0	1.2	0.0	-	-	0.8	1.1
Articulated Trucks	0	5	1	0	-	6	1	0	0	0	-	1	0	0	0	0	-	0	0	0	0	0	-	0	7
% Articulated Trucks	0.0	1.3	1.0	-	-	1.1	0.7	0.0	0.0	-	-	0.1	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.4
Bicycles on Crosswalk	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-
% Bicycles on Crosswalk	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0	-	-	-	-	-	-	-	-
Pedestrians	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	1	-	-	-	-	-	0	-	-
% Pedestrians	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	100.0	-	-	-	-	-	-	-	-

Gewalt Hamilton Associates Inc.
625 Forest Edge Drive

Vernon Hills, Illinois, United States 60061
(847) 478-9700 poster@gha-engineers.com

Count Name: Landwehr Rd @ North school drive
Site Code:
Start Date: 11/19/2019

Turning Movement Data

Start Time	Landwehr Southbound					North School Dr Westbound					Landwehr Northbound					Int. Total
	Thru	Left	U-Turn	Peds	App. Total	Right	Left	U-Turn	Peds	App. Total	Right	Thru	U-Turn	Peds	App. Total	
7:00 AM	82	0	0	0	82	0	0	0	0	0	0	78	0	0	78	160
7:15 AM	116	0	0	0	116	1	0	0	0	1	0	113	0	0	113	230
7:30 AM	123	0	0	0	123	0	1	0	0	1	0	126	0	0	126	250
7:45 AM	118	0	0	0	118	8	2	0	0	10	0	159	0	0	159	287
Hourly Total	439	0	0	0	439	9	3	0	0	12	0	476	0	0	476	927
8:00 AM	113	0	0	0	113	14	20	0	0	34	0	176	0	0	176	323
8:15 AM	110	0	0	0	110	17	28	0	3	45	0	135	0	0	135	290
8:30 AM	112	0	0	0	112	4	5	0	0	9	0	114	0	0	114	235
8:45 AM	106	0	0	0	106	1	3	0	2	4	0	154	0	0	154	264
Hourly Total	441	0	0	0	441	36	56	0	5	92	0	579	0	0	579	1112
*** BREAK ***	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2:30 PM	96	0	0	0	96	0	0	0	0	0	0	68	0	0	68	164
2:45 PM	72	0	0	0	72	0	0	0	0	0	0	111	1	0	112	184
Hourly Total	168	0	0	0	168	0	0	0	0	0	0	179	1	0	180	348
3:00 PM	106	0	0	0	106	0	1	0	0	1	0	89	0	0	89	196
3:15 PM	118	0	0	0	118	0	1	0	1	1	0	84	0	0	84	203
3:30 PM	147	0	0	0	147	19	29	0	2	48	0	120	0	0	120	315
3:45 PM	151	0	0	0	151	1	2	0	0	3	0	107	0	0	107	261
Hourly Total	522	0	0	0	522	20	33	0	3	53	0	400	0	0	400	975
4:00 PM	174	0	0	0	174	1	0	0	1	1	0	99	0	0	99	274
4:15 PM	188	0	0	0	188	1	0	0	0	1	0	117	0	0	117	306
4:30 PM	141	0	0	0	141	4	1	0	0	5	0	119	0	0	119	265
4:45 PM	183	0	0	0	183	7	9	0	0	16	0	84	0	0	84	283
Hourly Total	686	0	0	0	686	13	10	0	1	23	0	419	0	0	419	1128
5:00 PM	154	0	0	0	154	3	2	0	0	5	0	112	0	0	112	271
5:15 PM	152	0	0	0	152	1	0	0	0	1	0	117	0	0	117	270
5:30 PM	166	0	0	0	166	0	0	0	0	0	0	111	0	0	111	277
5:45 PM	169	0	0	0	169	2	1	0	0	3	0	112	0	0	112	284
Hourly Total	641	0	0	0	641	6	3	0	0	9	0	452	0	0	452	1102
Grand Total	2897	0	0	0	2897	84	105	0	9	189	0	2505	1	0	2506	5592
Approach %	100.0	0.0	0.0	-	-	44.4	55.6	0.0	-	-	0.0	100.0	0.0	-	-	-
Total %	51.8	0.0	0.0	-	51.8	1.5	1.9	0.0	-	3.4	0.0	44.8	0.0	-	44.8	-
Lights	2825	0	0	-	2825	80	105	0	-	185	0	2436	1	-	2437	5447
% Lights	97.5	-	-	-	97.5	95.2	100.0	-	-	97.9	-	97.2	100.0	-	97.2	97.4
Mediums	57	0	0	-	57	4	0	0	-	4	0	60	0	-	60	121
% Mediums	2.0	-	-	-	2.0	4.8	0.0	-	-	2.1	-	2.4	0.0	-	2.4	2.2
Articulated Trucks	15	0	0	-	15	0	0	0	-	0	0	9	0	-	9	24
% Articulated Trucks	0.5	-	-	-	0.5	0.0	0.0	-	-	0.0	-	0.4	0.0	-	0.4	0.4
Bicycles on Crosswalk	-	-	-	0	-	-	-	-	0	-	-	-	-	0	-	-

% Bicycles on Crosswalk	-	-	-	-	-	-	-	-	0.0	-	-	-	-	-	-	-	-
Pedestrians	-	-	-	0	-	-	-	-	9	-	-	-	-	0	-	-	
% Pedestrians	-	-	-	-	-	-	-	-	100.0	-	-	-	-	-	-	-	

Gewalt Hamilton Associates Inc.
625 Forest Edge Drive

Vernon Hills, Illinois, United States 60061
(847) 478-9700 poster@gha-engineers.com

Count Name: Landwehr Rd @ North school drive
Site Code:
Start Date: 11/19/2019

Turning Movement Peak Hour Data (7:30 AM)

Start Time	Landwehr Southbound					North School Dr Westbound					Landwehr Northbound					
	Thru	Left	U-Turn	Peds	App. Total	Right	Left	U-Turn	Peds	App. Total	Right	Thru	U-Turn	Peds	App. Total	Int. Total
7:30 AM	123	0	0	0	123	0	1	0	0	1	0	126	0	0	126	250
7:45 AM	118	0	0	0	118	8	2	0	0	10	0	159	0	0	159	287
8:00 AM	113	0	0	0	113	14	20	0	0	34	0	176	0	0	176	323
8:15 AM	110	0	0	0	110	17	28	0	3	45	0	135	0	0	135	290
Total	464	0	0	0	464	39	51	0	3	90	0	596	0	0	596	1150
Approach %	100.0	0.0	0.0	-	-	43.3	56.7	0.0	-	-	0.0	100.0	0.0	-	-	-
Total %	40.3	0.0	0.0	-	40.3	3.4	4.4	0.0	-	7.8	0.0	51.8	0.0	-	51.8	-
PHF	0.943	0.000	0.000	-	0.943	0.574	0.455	0.000	-	0.500	0.000	0.847	0.000	-	0.847	0.890
Lights	453	0	0	-	453	39	51	0	-	90	0	577	0	-	577	1120
% Lights	97.6	-	-	-	97.6	100.0	100.0	-	-	100.0	-	96.8	-	-	96.8	97.4
Mediums	8	0	0	-	8	0	0	0	-	0	0	17	0	-	17	25
% Mediums	1.7	-	-	-	1.7	0.0	0.0	-	-	0.0	-	2.9	-	-	2.9	2.2
Articulated Trucks	3	0	0	-	3	0	0	0	-	0	0	2	0	-	2	5
% Articulated Trucks	0.6	-	-	-	0.6	0.0	0.0	-	-	0.0	-	0.3	-	-	0.3	0.4
Bicycles on Crosswalk	-	-	-	0	-	-	-	-	0	-	-	-	-	0	-	-
% Bicycles on Crosswalk	-	-	-	-	-	-	-	-	0.0	-	-	-	-	-	-	-
Pedestrians	-	-	-	0	-	-	-	-	3	-	-	-	-	0	-	-
% Pedestrians	-	-	-	-	-	-	-	-	100.0	-	-	-	-	-	-	-

Gewalt Hamilton Associates Inc.
625 Forest Edge Drive

Vernon Hills, Illinois, United States 60061
(847) 478-9700 poster@gha-engineers.com

Count Name: Landwehr Rd @ North school drive
Site Code:
Start Date: 11/19/2019

Turning Movement Peak Hour Data (3:30 PM)

Start Time	Landwehr Southbound					North School Dr Westbound					Landwehr Northbound					
	Thru	Left	U-Turn	Peds	App. Total	Right	Left	U-Turn	Peds	App. Total	Right	Thru	U-Turn	Peds	App. Total	Int. Total
3:30 PM	147	0	0	0	147	19	29	0	2	48	0	120	0	0	120	315
3:45 PM	151	0	0	0	151	1	2	0	0	3	0	107	0	0	107	261
4:00 PM	174	0	0	0	174	1	0	0	1	1	0	99	0	0	99	274
4:15 PM	188	0	0	0	188	1	0	0	0	1	0	117	0	0	117	306
Total	660	0	0	0	660	22	31	0	3	53	0	443	0	0	443	1156
Approach %	100.0	0.0	0.0	-	-	41.5	58.5	0.0	-	-	0.0	100.0	0.0	-	-	-
Total %	57.1	0.0	0.0	-	57.1	1.9	2.7	0.0	-	4.6	0.0	38.3	0.0	-	38.3	-
PHF	0.878	0.000	0.000	-	0.878	0.289	0.267	0.000	-	0.276	0.000	0.923	0.000	-	0.923	0.917
Lights	639	0	0	-	639	21	31	0	-	52	0	431	0	-	431	1122
% Lights	96.8	-	-	-	96.8	95.5	100.0	-	-	98.1	-	97.3	-	-	97.3	97.1
Mediums	17	0	0	-	17	1	0	0	-	1	0	11	0	-	11	29
% Mediums	2.6	-	-	-	2.6	4.5	0.0	-	-	1.9	-	2.5	-	-	2.5	2.5
Articulated Trucks	4	0	0	-	4	0	0	0	-	0	0	1	0	-	1	5
% Articulated Trucks	0.6	-	-	-	0.6	0.0	0.0	-	-	0.0	-	0.2	-	-	0.2	0.4
Bicycles on Crosswalk	-	-	-	0	-	-	-	-	0	-	-	-	-	0	-	-
% Bicycles on Crosswalk	-	-	-	-	-	-	-	-	0.0	-	-	-	-	-	-	-
Pedestrians	-	-	-	0	-	-	-	-	3	-	-	-	-	0	-	-
% Pedestrians	-	-	-	-	-	-	-	-	100.0	-	-	-	-	-	-	-

Gewalt Hamilton Associates Inc.
625 Forest Edge Drive

Vernon Hills, Illinois, United States 60061
(847) 478-9700 poster@gha-engineers.com

Count Name: Landwehr Rd @ South school drive
Site Code:
Start Date: 11/19/2019

Turning Movement Data

Start Time	Landwehr Southbound					South School Dr Westbound					Landwehr Northbound					Int. Total
	Thru	Left	U-Turn	Peds	App. Total	Right	Left	U-Turn	Peds	App. Total	Right	Thru	U-Turn	Peds	App. Total	
7:00 AM	88	0	0	0	88	0	0	0	0	0	0	79	0	0	79	167
7:15 AM	117	0	0	0	117	0	0	0	0	0	1	115	0	0	116	233
7:30 AM	122	1	0	0	123	0	0	0	0	0	2	133	0	0	135	258
7:45 AM	119	1	0	0	120	0	0	0	0	0	10	154	0	0	164	284
Hourly Total	446	2	0	0	448	0	0	0	0	0	13	481	0	0	494	942
8:00 AM	125	5	0	0	130	0	0	0	2	0	34	174	0	0	208	338
8:15 AM	132	9	0	0	141	0	0	0	1	0	32	140	0	0	172	313
8:30 AM	120	3	0	0	123	0	0	0	2	0	6	119	0	0	125	248
8:45 AM	108	1	0	0	109	0	0	0	0	0	2	144	0	0	146	255
Hourly Total	485	18	0	0	503	0	0	0	5	0	74	577	0	0	651	1154
*** BREAK ***	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2:30 PM	98	0	0	0	98	0	0	0	0	0	0	68	0	0	68	166
2:45 PM	69	3	0	0	72	0	0	0	0	0	7	114	0	0	121	193
Hourly Total	167	3	0	0	170	0	0	0	0	0	7	182	0	0	189	359
3:00 PM	102	6	0	0	108	0	0	0	0	0	8	89	0	0	97	205
3:15 PM	115	4	0	0	119	0	0	0	0	0	4	83	0	0	87	206
3:30 PM	172	2	0	0	174	0	0	0	2	0	16	120	0	0	136	310
3:45 PM	155	0	0	0	155	0	0	0	1	0	2	108	0	0	110	265
Hourly Total	544	12	0	0	556	0	0	0	3	0	30	400	0	0	430	986
4:00 PM	174	1	0	0	175	0	0	0	0	0	3	100	0	0	103	278
4:15 PM	184	2	0	0	186	0	0	0	0	0	1	117	0	0	118	304
4:30 PM	140	4	0	0	144	0	0	0	0	0	9	121	0	0	130	274
4:45 PM	198	1	0	0	199	0	0	0	0	0	4	84	0	0	88	287
Hourly Total	696	8	0	0	704	0	0	0	0	0	17	422	0	0	439	1143
5:00 PM	160	1	0	0	161	0	0	0	0	0	1	111	0	0	112	273
5:15 PM	157	1	0	0	158	0	0	0	0	0	1	117	0	0	118	276
5:30 PM	164	0	0	0	164	0	0	0	0	0	0	109	0	0	109	273
5:45 PM	162	1	0	0	163	0	0	0	0	0	0	113	0	0	113	276
Hourly Total	643	3	0	0	646	0	0	0	0	0	2	450	0	0	452	1098
Grand Total	2981	46	0	0	3027	0	0	0	8	0	143	2512	0	0	2655	5682
Approach %	98.5	1.5	0.0	-	-	0.0	0.0	0.0	-	-	5.4	94.6	0.0	-	-	-
Total %	52.5	0.8	0.0	-	53.3	0.0	0.0	0.0	-	0.0	2.5	44.2	0.0	-	46.7	-
Lights	2912	45	0	-	2957	0	0	0	-	0	140	2443	0	-	2583	5540
% Lights	97.7	97.8	-	-	97.7	-	-	-	-	-	97.9	97.3	-	-	97.3	97.5
Mediums	53	1	0	-	54	0	0	0	-	0	3	59	0	-	62	116
% Mediums	1.8	2.2	-	-	1.8	-	-	-	-	-	2.1	2.3	-	-	2.3	2.0
Articulated Trucks	16	0	0	-	16	0	0	0	-	0	0	10	0	-	10	26
% Articulated Trucks	0.5	0.0	-	-	0.5	-	-	-	-	-	0.0	0.4	-	-	0.4	0.5
Bicycles on Crosswalk	-	-	-	0	-	-	-	-	0	-	-	-	-	0	-	-

% Bicycles on Crosswalk	-	-	-	-	-	-	-	-	0.0	-	-	-	-	-	-	-	-
Pedestrians	-	-	-	0	-	-	-	-	8	-	-	-	-	0	-	-	
% Pedestrians	-	-	-	-	-	-	-	-	100.0	-	-	-	-	-	-	-	

Gewalt Hamilton Associates Inc.
625 Forest Edge Drive

Vernon Hills, Illinois, United States 60061
(847) 478-9700 poster@gha-engineers.com

Count Name: Landwehr Rd @ South school drive
Site Code:
Start Date: 11/19/2019

Turning Movement Peak Hour Data (7:30 AM)

Start Time	Landwehr Southbound					South School Dr Westbound					Landwehr Northbound					
	Thru	Left	U-Turn	Peds	App. Total	Right	Left	U-Turn	Peds	App. Total	Right	Thru	U-Turn	Peds	App. Total	Int. Total
7:30 AM	122	1	0	0	123	0	0	0	0	0	2	133	0	0	135	258
7:45 AM	119	1	0	0	120	0	0	0	0	0	10	154	0	0	164	284
8:00 AM	125	5	0	0	130	0	0	0	2	0	34	174	0	0	208	338
8:15 AM	132	9	0	0	141	0	0	0	1	0	32	140	0	0	172	313
Total	498	16	0	0	514	0	0	0	3	0	78	601	0	0	679	1193
Approach %	96.9	3.1	0.0	-	-	0.0	0.0	0.0	-	-	11.5	88.5	0.0	-	-	-
Total %	41.7	1.3	0.0	-	43.1	0.0	0.0	0.0	-	0.0	6.5	50.4	0.0	-	56.9	-
PHF	0.943	0.444	0.000	-	0.911	0.000	0.000	0.000	-	0.000	0.574	0.864	0.000	-	0.816	0.882
Lights	486	16	0	-	502	0	0	0	-	0	78	582	0	-	660	1162
% Lights	97.6	100.0	-	-	97.7	-	-	-	-	-	100.0	96.8	-	-	97.2	97.4
Mediums	9	0	0	-	9	0	0	0	-	0	0	17	0	-	17	26
% Mediums	1.8	0.0	-	-	1.8	-	-	-	-	-	0.0	2.8	-	-	2.5	2.2
Articulated Trucks	3	0	0	-	3	0	0	0	-	0	0	2	0	-	2	5
% Articulated Trucks	0.6	0.0	-	-	0.6	-	-	-	-	-	0.0	0.3	-	-	0.3	0.4
Bicycles on Crosswalk	-	-	-	0	-	-	-	-	0	-	-	-	-	0	-	-
% Bicycles on Crosswalk	-	-	-	-	-	-	-	-	0.0	-	-	-	-	-	-	-
Pedestrians	-	-	-	0	-	-	-	-	3	-	-	-	-	0	-	-
% Pedestrians	-	-	-	-	-	-	-	-	100.0	-	-	-	-	-	-	-

Gewalt Hamilton Associates Inc.
625 Forest Edge Drive

Vernon Hills, Illinois, United States 60061
(847) 478-9700 poster@gha-engineers.com

Count Name: Landwehr Rd @ South school drive
Site Code:
Start Date: 11/19/2019

Turning Movement Peak Hour Data (3:30 PM)

Start Time	Landwehr Southbound					South School Dr Westbound					Landwehr Northbound					
	Thru	Left	U-Turn	Peds	App. Total	Right	Left	U-Turn	Peds	App. Total	Right	Thru	U-Turn	Peds	App. Total	Int. Total
3:30 PM	172	2	0	0	174	0	0	0	2	0	16	120	0	0	136	310
3:45 PM	155	0	0	0	155	0	0	0	1	0	2	108	0	0	110	265
4:00 PM	174	1	0	0	175	0	0	0	0	0	3	100	0	0	103	278
4:15 PM	184	2	0	0	186	0	0	0	0	0	1	117	0	0	118	304
Total	685	5	0	0	690	0	0	0	3	0	22	445	0	0	467	1157
Approach %	99.3	0.7	0.0	-	-	0.0	0.0	0.0	-	-	4.7	95.3	0.0	-	-	-
Total %	59.2	0.4	0.0	-	59.6	0.0	0.0	0.0	-	0.0	1.9	38.5	0.0	-	40.4	-
PHF	0.931	0.625	0.000	-	0.927	0.000	0.000	0.000	-	0.000	0.344	0.927	0.000	-	0.858	0.933
Lights	663	5	0	-	668	0	0	0	-	0	21	432	0	-	453	1121
% Lights	96.8	100.0	-	-	96.8	-	-	-	-	-	95.5	97.1	-	-	97.0	96.9
Mediums	17	0	0	-	17	0	0	0	-	0	1	11	0	-	12	29
% Mediums	2.5	0.0	-	-	2.5	-	-	-	-	-	4.5	2.5	-	-	2.6	2.5
Articulated Trucks	5	0	0	-	5	0	0	0	-	0	0	2	0	-	2	7
% Articulated Trucks	0.7	0.0	-	-	0.7	-	-	-	-	-	0.0	0.4	-	-	0.4	0.6
Bicycles on Crosswalk	-	-	-	0	-	-	-	-	0	-	-	-	-	0	-	-
% Bicycles on Crosswalk	-	-	-	-	-	-	-	-	0.0	-	-	-	-	-	-	-
Pedestrians	-	-	-	0	-	-	-	-	3	-	-	-	-	0	-	-
% Pedestrians	-	-	-	-	-	-	-	-	100.0	-	-	-	-	-	-	-

Gewalt Hamilton Associates Inc.
625 Forest Edge Drive

Vernon Hills, Illinois, United States 60061
(847) 478-9700 poster@gha-engineers.com

Count Name: Techny Rd @ West school drive
Site Code:
Start Date: 11/19/2019

Turning Movement Data

Start Time	Techny Westbound					West School Dr Northbound					Techny Eastbound					Int. Total
	Thru	Left	U-Turn	Peds	App. Total	Right	Left	U-Turn	Peds	App. Total	Right	Thru	U-Turn	Peds	App. Total	
7:00 AM	57	1	0	0	58	0	0	0	0	0	2	87	0	0	89	147
7:15 AM	77	5	0	0	82	1	1	0	0	2	8	142	0	0	150	234
7:30 AM	71	3	0	0	74	1	0	0	0	1	22	173	0	0	195	270
7:45 AM	93	4	0	0	97	1	1	0	0	2	21	148	0	0	169	268
Hourly Total	298	13	0	0	311	3	2	0	0	5	53	550	0	0	603	919
8:00 AM	90	4	0	0	94	0	1	0	0	1	6	122	0	0	128	223
8:15 AM	72	4	0	0	76	3	1	0	0	4	14	111	0	0	125	205
8:30 AM	100	0	0	0	100	0	0	0	0	0	3	103	0	0	106	206
8:45 AM	74	1	0	0	75	0	0	0	0	0	3	92	0	0	95	170
Hourly Total	336	9	0	0	345	3	2	0	0	5	26	428	0	0	454	804
*** BREAK ***	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2:30 PM	93	0	0	0	93	1	1	0	0	2	1	58	0	0	59	154
2:45 PM	81	0	0	0	81	0	0	0	0	0	3	72	0	0	75	156
Hourly Total	174	0	0	0	174	1	1	0	0	2	4	130	0	0	134	310
3:00 PM	102	3	0	0	105	0	0	0	0	0	1	60	0	0	61	166
3:15 PM	137	3	0	0	140	1	0	0	0	1	11	70	0	0	81	222
3:30 PM	156	2	0	0	158	0	5	0	0	5	10	75	0	0	85	248
3:45 PM	143	3	0	0	146	1	1	0	0	2	7	72	0	0	79	227
Hourly Total	538	11	0	0	549	2	6	0	0	8	29	277	0	0	306	863
4:00 PM	144	2	0	0	146	2	0	0	0	2	4	75	0	0	79	227
4:15 PM	153	1	0	0	154	1	0	0	0	1	3	76	0	0	79	234
4:30 PM	141	1	0	0	142	0	2	0	0	2	7	76	0	0	83	227
4:45 PM	159	3	0	0	162	5	9	0	0	14	4	86	0	0	90	266
Hourly Total	597	7	0	0	604	8	11	0	0	19	18	313	0	0	331	954
5:00 PM	135	1	0	0	136	0	0	0	0	0	6	99	0	0	105	241
5:15 PM	177	2	0	0	179	2	3	0	0	5	3	89	0	0	92	276
5:30 PM	180	1	0	0	181	0	1	0	0	1	0	94	0	0	94	276
5:45 PM	179	2	0	0	181	3	12	0	0	15	2	74	0	0	76	272
Hourly Total	671	6	0	0	677	5	16	0	0	21	11	356	0	0	367	1065
Grand Total	2614	46	0	0	2660	22	38	0	0	60	141	2054	0	0	2195	4915
Approach %	98.3	1.7	0.0	-	-	36.7	63.3	0.0	-	-	6.4	93.6	0.0	-	-	-
Total %	53.2	0.9	0.0	-	54.1	0.4	0.8	0.0	-	1.2	2.9	41.8	0.0	-	44.7	-
Lights	2556	43	0	-	2599	22	38	0	-	60	125	2003	0	-	2128	4787
% Lights	97.8	93.5	-	-	97.7	100.0	100.0	-	-	100.0	88.7	97.5	-	-	96.9	97.4
Mediums	45	3	0	-	48	0	0	0	-	0	16	44	0	-	60	108
% Mediums	1.7	6.5	-	-	1.8	0.0	0.0	-	-	0.0	11.3	2.1	-	-	2.7	2.2
Articulated Trucks	13	0	0	-	13	0	0	0	-	0	0	7	0	-	7	20
% Articulated Trucks	0.5	0.0	-	-	0.5	0.0	0.0	-	-	0.0	0.0	0.3	-	-	0.3	0.4
Bicycles on Crosswalk	-	-	-	0	-	-	-	-	0	-	-	-	-	0	-	-

% Bicycles on Crosswalk	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Pedestrians	-	-	-	0	-	-	-	-	0	-	-	-	-	0	-	-	-
% Pedestrians	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Gewalt Hamilton Associates Inc.
625 Forest Edge Drive

Vernon Hills, Illinois, United States 60061
(847) 478-9700 poster@gha-engineers.com

Count Name: Techny Rd @ West school drive
Site Code:
Start Date: 11/19/2019

Turning Movement Peak Hour Data (7:15 AM)

Start Time	Techny Westbound					West School Dr Northbound					Techny Eastbound					
	Thru	Left	U-Turn	Peds	App. Total	Right	Left	U-Turn	Peds	App. Total	Right	Thru	U-Turn	Peds	App. Total	Int. Total
7:15 AM	77	5	0	0	82	1	1	0	0	2	8	142	0	0	150	234
7:30 AM	71	3	0	0	74	1	0	0	0	1	22	173	0	0	195	270
7:45 AM	93	4	0	0	97	1	1	0	0	2	21	148	0	0	169	268
8:00 AM	90	4	0	0	94	0	1	0	0	1	6	122	0	0	128	223
Total	331	16	0	0	347	3	3	0	0	6	57	585	0	0	642	995
Approach %	95.4	4.6	0.0	-	-	50.0	50.0	0.0	-	-	8.9	91.1	0.0	-	-	-
Total %	33.3	1.6	0.0	-	34.9	0.3	0.3	0.0	-	0.6	5.7	58.8	0.0	-	64.5	-
PHF	0.890	0.800	0.000	-	0.894	0.750	0.750	0.000	-	0.750	0.648	0.845	0.000	-	0.823	0.921
Lights	320	16	0	-	336	3	3	0	-	6	56	571	0	-	627	969
% Lights	96.7	100.0	-	-	96.8	100.0	100.0	-	-	100.0	98.2	97.6	-	-	97.7	97.4
Mediums	7	0	0	-	7	0	0	0	-	0	1	12	0	-	13	20
% Mediums	2.1	0.0	-	-	2.0	0.0	0.0	-	-	0.0	1.8	2.1	-	-	2.0	2.0
Articulated Trucks	4	0	0	-	4	0	0	0	-	0	0	2	0	-	2	6
% Articulated Trucks	1.2	0.0	-	-	1.2	0.0	0.0	-	-	0.0	0.0	0.3	-	-	0.3	0.6
Bicycles on Crosswalk	-	-	-	0	-	-	-	-	0	-	-	-	-	0	-	-
% Bicycles on Crosswalk	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Pedestrians	-	-	-	0	-	-	-	-	0	-	-	-	-	0	-	-
% Pedestrians	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Gewalt Hamilton Associates Inc.
625 Forest Edge Drive

Vernon Hills, Illinois, United States 60061
(847) 478-9700 poster@gha-engineers.com

Count Name: Techny Rd @ West school drive
Site Code:
Start Date: 11/19/2019

Turning Movement Peak Hour Data (5:00 PM)

Start Time	Techny Westbound					West School Dr Northbound					Techny Eastbound					
	Thru	Left	U-Turn	Peds	App. Total	Right	Left	U-Turn	Peds	App. Total	Right	Thru	U-Turn	Peds	App. Total	Int. Total
5:00 PM	135	1	0	0	136	0	0	0	0	0	6	99	0	0	105	241
5:15 PM	177	2	0	0	179	2	3	0	0	5	3	89	0	0	92	276
5:30 PM	180	1	0	0	181	0	1	0	0	1	0	94	0	0	94	276
5:45 PM	179	2	0	0	181	3	12	0	0	15	2	74	0	0	76	272
Total	671	6	0	0	677	5	16	0	0	21	11	356	0	0	367	1065
Approach %	99.1	0.9	0.0	-	-	23.8	76.2	0.0	-	-	3.0	97.0	0.0	-	-	-
Total %	63.0	0.6	0.0	-	63.6	0.5	1.5	0.0	-	2.0	1.0	33.4	0.0	-	34.5	-
PHF	0.932	0.750	0.000	-	0.935	0.417	0.333	0.000	-	0.350	0.458	0.899	0.000	-	0.874	0.965
Lights	663	6	0	-	669	5	16	0	-	21	11	348	0	-	359	1049
% Lights	98.8	100.0	-	-	98.8	100.0	100.0	-	-	100.0	100.0	97.8	-	-	97.8	98.5
Mediums	5	0	0	-	5	0	0	0	-	0	0	7	0	-	7	12
% Mediums	0.7	0.0	-	-	0.7	0.0	0.0	-	-	0.0	0.0	2.0	-	-	1.9	1.1
Articulated Trucks	3	0	0	-	3	0	0	0	-	0	0	1	0	-	1	4
% Articulated Trucks	0.4	0.0	-	-	0.4	0.0	0.0	-	-	0.0	0.0	0.3	-	-	0.3	0.4
Bicycles on Crosswalk	-	-	-	0	-	-	-	-	0	-	-	-	-	0	-	-
% Bicycles on Crosswalk	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Pedestrians	-	-	-	0	-	-	-	-	0	-	-	-	-	0	-	-
% Pedestrians	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Gewalt Hamilton Associates Inc.
625 Forest Edge Drive

Vernon Hills, Illinois, United States 60061
(847) 478-9700 poster@gha-engineers.com

Count Name: 1) Techny Road @ Techny Rd @ East school drive
Site Code:
Start Date: 11/19/2019

Turning Movement Data

Start Time	Techny Westbound					East School Dr Northbound					Techny Eastbound					Int. Total
	Thru	Left	U-Turn	Peds	App. Total	Right	Left	U-Turn	Peds	App. Total	Right	Thru	U-Turn	Peds	App. Total	
7:00 AM	55	1	0	0	56	0	0	0	0	0	0	87	0	0	87	143
7:15 AM	76	0	0	0	76	3	3	0	0	6	0	144	0	0	144	226
7:30 AM	62	0	0	0	62	3	12	0	0	15	0	176	0	0	176	253
7:45 AM	91	0	0	0	91	2	7	0	0	9	0	148	0	0	148	248
Hourly Total	284	1	0	0	285	8	22	0	0	30	0	555	0	0	555	870
8:00 AM	94	0	0	0	94	2	0	0	0	2	0	122	0	0	122	218
8:15 AM	76	1	0	0	77	2	2	0	0	4	1	114	0	0	115	196
8:30 AM	98	0	0	0	98	2	3	0	0	5	0	104	0	0	104	207
8:45 AM	74	0	0	0	74	1	1	0	0	2	0	92	0	0	92	168
Hourly Total	342	1	0	0	343	7	6	0	0	13	1	432	0	0	433	789
*** BREAK ***	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2:30 PM	96	0	0	0	96	0	0	0	0	0	0	58	0	0	58	154
2:45 PM	77	0	0	0	77	1	2	0	0	3	1	69	0	0	70	150
Hourly Total	173	0	0	0	173	1	2	0	0	3	1	127	0	0	128	304
3:00 PM	103	0	0	0	103	1	1	0	0	2	0	58	0	0	58	163
3:15 PM	138	0	0	0	138	0	4	0	0	4	1	69	0	0	70	212
3:30 PM	146	0	0	0	146	7	14	0	0	21	0	75	0	0	75	242
3:45 PM	132	0	0	0	132	5	12	0	2	17	0	73	0	0	73	222
Hourly Total	519	0	0	0	519	13	31	0	2	44	1	275	0	0	276	839
4:00 PM	147	0	0	0	147	0	3	0	3	3	0	75	0	0	75	225
4:15 PM	153	0	0	0	153	0	1	0	0	1	0	79	0	0	79	233
4:30 PM	143	0	0	0	143	1	3	0	0	4	1	75	0	0	76	223
4:45 PM	155	0	0	0	155	2	5	0	0	7	1	87	0	0	88	250
Hourly Total	598	0	0	0	598	3	12	0	3	15	2	316	0	0	318	931
5:00 PM	141	0	0	0	141	1	2	0	0	3	1	96	0	0	97	241
5:15 PM	183	0	0	0	183	1	2	0	0	3	0	90	0	0	90	276
5:30 PM	181	0	0	0	181	2	1	0	0	3	0	94	0	0	94	278
5:45 PM	171	0	0	0	171	6	5	0	0	11	0	79	0	0	79	261
Hourly Total	676	0	0	0	676	10	10	0	0	20	1	359	0	0	360	1056
Grand Total	2592	2	0	0	2594	42	83	0	5	125	6	2064	0	0	2070	4789
Approach %	99.9	0.1	0.0	-	-	33.6	66.4	0.0	-	-	0.3	99.7	0.0	-	-	-
Total %	54.1	0.0	0.0	-	54.2	0.9	1.7	0.0	-	2.6	0.1	43.1	0.0	-	43.2	-
Lights	2543	2	0	-	2545	30	77	0	-	107	6	2011	0	-	2017	4669
% Lights	98.1	100.0	-	-	98.1	71.4	92.8	-	-	85.6	100.0	97.4	-	-	97.4	97.5
Mediums	43	0	0	-	43	12	6	0	-	18	0	43	0	-	43	104
% Mediums	1.7	0.0	-	-	1.7	28.6	7.2	-	-	14.4	0.0	2.1	-	-	2.1	2.2
Articulated Trucks	6	0	0	-	6	0	0	0	-	0	0	10	0	-	10	16
% Articulated Trucks	0.2	0.0	-	-	0.2	0.0	0.0	-	-	0.0	0.0	0.5	-	-	0.5	0.3
Bicycles on Crosswalk	-	-	-	0	-	-	-	-	0	-	-	-	-	0	-	-

% Bicycles on Crosswalk	-	-	-	-	-	-	-	-	0.0	-	-	-	-	-	-	-	-
Pedestrians	-	-	-	0	-	-	-	-	5	-	-	-	-	0	-	-	-
% Pedestrians	-	-	-	-	-	-	-	-	100.0	-	-	-	-	-	-	-	-

Gewalt Hamilton Associates Inc.
625 Forest Edge Drive

Vernon Hills, Illinois, United States 60061
(847) 478-9700 poster@gha-engineers.com

Count Name: 1) Techny Road @ Techny Rd @ East school drive
Site Code:
Start Date: 11/19/2019

Turning Movement Peak Hour Data (7:15 AM)

Start Time	Techny Westbound					East School Dr Northbound					Techny Eastbound					
	Thru	Left	U-Turn	Peds	App. Total	Right	Left	U-Turn	Peds	App. Total	Right	Thru	U-Turn	Peds	App. Total	Int. Total
7:15 AM	76	0	0	0	76	3	3	0	0	6	0	144	0	0	144	226
7:30 AM	62	0	0	0	62	3	12	0	0	15	0	176	0	0	176	253
7:45 AM	91	0	0	0	91	2	7	0	0	9	0	148	0	0	148	248
8:00 AM	94	0	0	0	94	2	0	0	0	2	0	122	0	0	122	218
Total	323	0	0	0	323	10	22	0	0	32	0	590	0	0	590	945
Approach %	100.0	0.0	0.0	-	-	31.3	68.8	0.0	-	-	0.0	100.0	0.0	-	-	-
Total %	34.2	0.0	0.0	-	34.2	1.1	2.3	0.0	-	3.4	0.0	62.4	0.0	-	62.4	-
PHF	0.859	0.000	0.000	-	0.859	0.833	0.458	0.000	-	0.533	0.000	0.838	0.000	-	0.838	0.934
Lights	314	0	0	-	314	9	22	0	-	31	0	575	0	-	575	920
% Lights	97.2	-	-	-	97.2	90.0	100.0	-	-	96.9	-	97.5	-	-	97.5	97.4
Mediums	7	0	0	-	7	1	0	0	-	1	0	12	0	-	12	20
% Mediums	2.2	-	-	-	2.2	10.0	0.0	-	-	3.1	-	2.0	-	-	2.0	2.1
Articulated Trucks	2	0	0	-	2	0	0	0	-	0	0	3	0	-	3	5
% Articulated Trucks	0.6	-	-	-	0.6	0.0	0.0	-	-	0.0	-	0.5	-	-	0.5	0.5
Bicycles on Crosswalk	-	-	-	0	-	-	-	-	0	-	-	-	-	0	-	-
% Bicycles on Crosswalk	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Pedestrians	-	-	-	0	-	-	-	-	0	-	-	-	-	0	-	-
% Pedestrians	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Gewalt Hamilton Associates Inc.
625 Forest Edge Drive

Vernon Hills, Illinois, United States 60061
(847) 478-9700 poster@gha-engineers.com

Count Name: 1) Techny Road @ Techny Rd @ East school drive
Site Code:
Start Date: 11/19/2019

Turning Movement Peak Hour Data (5:00 PM)

Start Time	Techny Westbound					East School Dr Northbound					Techny Eastbound					
	Thru	Left	U-Turn	Peds	App. Total	Right	Left	U-Turn	Peds	App. Total	Right	Thru	U-Turn	Peds	App. Total	Int. Total
5:00 PM	141	0	0	0	141	1	2	0	0	3	1	96	0	0	97	241
5:15 PM	183	0	0	0	183	1	2	0	0	3	0	90	0	0	90	276
5:30 PM	181	0	0	0	181	2	1	0	0	3	0	94	0	0	94	278
5:45 PM	171	0	0	0	171	6	5	0	0	11	0	79	0	0	79	261
Total	676	0	0	0	676	10	10	0	0	20	1	359	0	0	360	1056
Approach %	100.0	0.0	0.0	-	-	50.0	50.0	0.0	-	-	0.3	99.7	0.0	-	-	-
Total %	64.0	0.0	0.0	-	64.0	0.9	0.9	0.0	-	1.9	0.1	34.0	0.0	-	34.1	-
PHF	0.923	0.000	0.000	-	0.923	0.417	0.500	0.000	-	0.455	0.250	0.935	0.000	-	0.928	0.950
Lights	672	0	0	-	672	9	10	0	-	19	1	351	0	-	352	1043
% Lights	99.4	-	-	-	99.4	90.0	100.0	-	-	95.0	100.0	97.8	-	-	97.8	98.8
Mediums	4	0	0	-	4	1	0	0	-	1	0	7	0	-	7	12
% Mediums	0.6	-	-	-	0.6	10.0	0.0	-	-	5.0	0.0	1.9	-	-	1.9	1.1
Articulated Trucks	0	0	0	-	0	0	0	0	-	0	0	1	0	-	1	1
% Articulated Trucks	0.0	-	-	-	0.0	0.0	0.0	-	-	0.0	0.0	0.3	-	-	0.3	0.1
Bicycles on Crosswalk	-	-	-	0	-	-	-	-	0	-	-	-	-	0	-	-
% Bicycles on Crosswalk	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Pedestrians	-	-	-	0	-	-	-	-	0	-	-	-	-	0	-	-
% Pedestrians	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

APPENDIX C
Crash Summary

Appendix C
Crash Data Summary
Landwehr Road at Techny Road, Northbrook, IL

Type of Crash	2014		2015		2016		2017		2018	
	No.	%	No.	%	No.	%	No.	%	No.	%
Angle	1	17%	-	-	-	-	1	20%	1	14%
Turning	1	17%	-	-	-	-	1	20%	-	-
Rear End	4	66%	1	100%	3	100%	2	40%	6	86%
Sideswipe Same Direction	-	-	-	-	-	-	1	20%	-	-
Pavement Conditions										
Snowy or Icy Conditions	-	-	-	-	-	-	-	-	2	29%
Wet Conditions	-	-	-	-	1	33%	-	-	1	14%
Dry Conditions	6	100%	1	100%	2	67%	5	100%	4	57%
Light Conditions										
Dawn or Dusk Conditions	-	-	-	-	-	-	-	-	2	29%
Night Conditions	2	33%	-	-	-	-	-	-	2	29%
Day Conditions	4	67%	1	100%	3	100%	5	100%	3	42%
Crash Severity										
Fatal	-	-	-	-	-	-	-	-	-	-
Injury										
-A (Incapacitating)	-	-	-	-	-	-	-	-	-	-
-B (Non-incapacitating	-	-	-	-	-	-	-	-	2	29%
-C (Reported/Not evident)	4	67%	-	-	1	33%	2	40%	1	14%
Property Damage Only	2	33%	1	100%	2	67%	3	60%	4	57%
Total Crashes	6		1		3		5		7	

5-Year Crash Summary	2014-2018	
	No.	%
Total Crashes	22	
Type of Crash		
-Angle	3	14%
-Turning	2	9%
-Rear End	16	73%
-Sideswipe Same Direction	1	4%
Pavement Condition		
-Dry	18	82%
-Wet/Snow/Ice	4	18%
Light Condition		
-Daylight	16	73%
-Dark	6	27%
Crash Severity		
-Fatal	0	0%
-Injury	10	45%
-PDO	12	55%

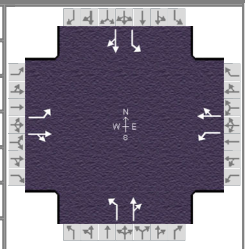
GHA GEWALT HAMILTON ASSOCIATES, INC.

APPENDIX D

Capacity Analysis Worksheets

HCS7 Signalized Intersection Input Data

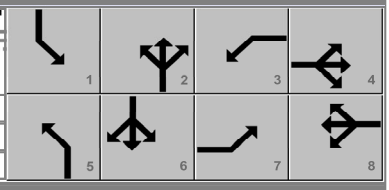
General Information				Intersection Information	
Agency	GHA			Duration, h	0.250
Analyst	TM	Analysis Date	12/12/2019	Area Type	Other
Jurisdiction	CCDOTH	Time Period	7:30-8:30 AM	PHF	0.93
Urban Street	Landwehr Road	Analysis Year	2019	Analysis Period	1> 7:30
Intersection	Landwehr at Techny	File Name	AM Landwehr at Techny.xus		
Project Description	AM Peak				



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	50	283	73	135	126	76	60	387	194	141	262	19

Signal Information			
Cycle, s	96.4	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	Yes	Simult. Gap E/W	On
Force Mode	Fixed	Simult. Gap N/S	On

Green	3.4	3.3		38.3	3.2	0.8	24.9					
Yellow	3.5	0.0		4.0	3.5	3.5	4.0					
Red	0.0	0.0		2.0	0.0	0.0	2.0					



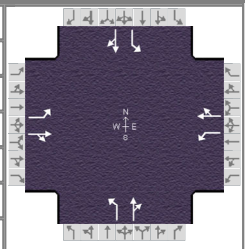
Traffic Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	50	283	73	135	126	76	60	387	194	141	262	19
Initial Queue (Q_b), veh/h	0	0	0	0	0	0	0	0	0	0	0	0
Base Saturation Flow Rate (s_o), veh/h	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Parking (N_m), man/h		None			None			None			None	
Heavy Vehicles (P_{HV}), %	0	2		0	4		0	1		0	2	
Ped / Bike / RTOR, /h	0	0	0	0	0	0	10	0	0	0	0	0
Buses (N_b), buses/h	0	0	0	0	0	0	0	0	0	0	0	0
Arrival Type (*AT*)	3	3	3	3	3	3	3	3	3	3	3	3
Upstream Filtering (*I*)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lane Width (*W*), ft	12.0	12.0		12.0	12.0		12.0	12.0		12.0	12.0	
Turn Bay Length, ft	160	0		190	0		130	0		160	0	
Grade (*Pg*), %		0			0			0			0	
Speed Limit, mi/h	30	30	30	30	30	30	30	30	30	30	30	30

Phase Information	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Maximum Green (G_{max}) or Phase Split, s	15.0	45.0	15.0	45.0	15.0	45.0	15.0	45.0
Yellow Change Interval (*Y*), s	3.5	4.0	3.5	4.0	3.5	4.0	3.5	4.0
Red Clearance Interval (R_c), s	0.0	2.0	0.0	2.0	0.0	2.0	0.0	2.0
Minimum Green (G_{min}), s	3	8	3	8	3	8	3	8
Start-Up Lost Time (*lt*), s	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Extension of Effective Green (*e*), s	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Passage (*PT*), s	3.0	4.0	3.0	4.0	3.0	4.0	3.0	4.0
Recall Mode	Off	Min	Off	Min	Off	Min	Off	Min
Dual Entry	No	Yes	No	Yes	No	Yes	No	Yes
Walk (*Walk*), s		7.0		7.0		7.0		7.0
Pedestrian Clearance Time (*PC*), s		14.0		14.0		14.0		14.0

Multimodal Information	EB			WB			NB			SB		
85th % Speed / Rest in Walk / Corner Radius	0	No	25	0	No	25	0	No	25	0	No	25
Walkway / Crosswalk Width / Length, ft	9.0	12	0	9.0	12	0	9.0	12	0	9.0	12	0
Street Width / Island / Curb	0	0	No	0	0	No	0	0	No	0	0	No
Width Outside / Bike Lane / Shoulder, ft	12	5.0	2.0	12	5.0	2.0	12	5.0	2.0	12	5.0	2.0
Pedestrian Signal / Occupied Parking	No	0.50		No	0.50		No	0.50		No	0.50	

HCS7 Signalized Intersection Results Summary

General Information				Intersection Information	
Agency	GHA			Duration, h	0.250
Analyst	TM	Analysis Date	12/12/2019	Area Type	Other
Jurisdiction	CCDOTH	Time Period	7:30-8:30 AM	PHF	0.93
Urban Street	Landwehr Road	Analysis Year	2019	Analysis Period	1> 7:30
Intersection	Landwehr at Techny	File Name	AM Landwehr at Techny.xus		
Project Description	AM Peak				



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	50	283	73	135	126	76	60	387	194	141	262	19

Signal Information			
Cycle, s	96.4	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	Yes	Simult. Gap E/W	On
Force Mode	Fixed	Simult. Gap N/S	On

Green	3.4	3.3	38.3	3.2	0.8	24.9	1	2	3	4		
Yellow	3.5	0.0	4.0	3.5	3.5	4.0	5	6	7	8		
Red	0.0	0.0	2.0	0.0	0.0	2.0						

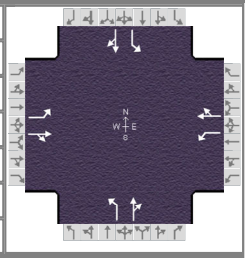
Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase	7	4	3	8	5	2	1	6
Case Number	1.1	4.0	1.1	4.0	1.1	4.0	1.1	4.0
Phase Duration, s	6.7	30.9	11.0	35.3	6.9	44.3	10.2	47.6
Change Period, ($Y+R_c$), s	3.5	6.0	3.5	6.0	3.5	6.0	3.5	6.0
Max Allow Headway (*MAH*), s	4.1	5.1	4.1	5.1	4.1	5.1	4.1	5.1
Queue Clearance Time (g_s), s	4.1	21.3	7.4	11.7	4.0	33.8	6.5	12.7
Green Extension Time (g_e), s	0.1	3.6	0.2	3.8	0.1	4.4	0.3	6.8
Phase Call Probability	0.76	1.00	0.98	1.00	0.82	1.00	0.98	1.00
Max Out Probability	0.00	0.02	0.06	0.00	0.00	0.46	0.03	0.03

Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	7	4	14	3	8	18	5	2	12	1	6	16
Adjusted Flow Rate (*v*), veh/h	54	383		145	217		65	625		152	302	
Adjusted Saturation Flow Rate (*s*), veh/h/ln	1810	1804		1810	1724		1810	1770		1810	1848	
Queue Service Time (g_s), s	2.1	19.3		5.4	9.7		2.0	31.8		4.5	10.7	
Cycle Queue Clearance Time (g_c), s	2.1	19.3		5.4	9.7		2.0	31.8		4.5	10.7	
Green Ratio (*g/C*)	0.29	0.26		0.36	0.30		0.43	0.40		0.49	0.43	
Capacity (*c*), veh/h	351	467		276	523		467	703		255	797	
Volume-to-Capacity Ratio (*X*)	0.153	0.820		0.527	0.415		0.138	0.889		0.593	0.379	
Back of Queue (*Q*), ft/ln (95 th percentile)	40.9	351.4		107.2	187.5		37.8	538.6		87.9	205	
Back of Queue (*Q*), veh/ln (95 th percentile)	1.6	13.8		4.3	7.3		1.5	21.4		3.5	8.1	
Queue Storage Ratio (*RQ*) (95 th percentile)	0.26	0.00		0.56	0.00		0.29	0.00		0.55	0.00	
Uniform Delay (d_1), s/veh	25.3	33.7		24.4	26.8		16.6	27.1		21.1	18.7	
Incremental Delay (d_2), s/veh	0.2	5.1		1.6	0.7		0.1	11.2		2.2	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	25.5	38.8		26.0	27.6		16.8	38.3		23.3	19.1	
Level of Service (LOS)	C	D		C	C		B	D		C	B	
Approach Delay, s/veh / LOS	37.1	D		26.9	C		36.3	D		20.5	C	
Intersection Delay, s/veh / LOS	31.0						C					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	1.93	B	1.92	B	1.91	B	1.91	B
Bicycle LOS Score / LOS	1.21	A	1.09	A	1.62	B	1.24	A

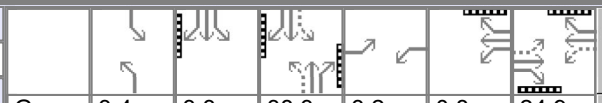
HCS7 Signalized Intersection Intermediate Values

General Information				Intersection Information	
Agency	GHA			Duration, h	0.250
Analyst	TM	Analysis Date	12/12/2019	Area Type	Other
Jurisdiction	CCDOTH	Time Period	7:30-8:30 AM	PHF	0.93
Urban Street	Landwehr Road	Analysis Year	2019	Analysis Period	1> 7:30
Intersection	Landwehr at Techny	File Name	AM Landwehr at Techny.xus		
Project Description	AM Peak				

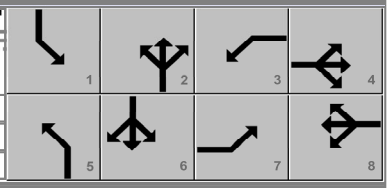


Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	50	283	73	135	126	76	60	387	194	141	262	19

Signal Information			
Cycle, s	96.4	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	Yes	Simult. Gap E/W	On
Force Mode	Fixed	Simult. Gap N/S	On



Green	3.4	3.3	38.3	3.2	0.8	24.9
Yellow	3.5	0.0	4.0	3.5	3.5	4.0
Red	0.0	0.0	2.0	0.0	0.0	2.0



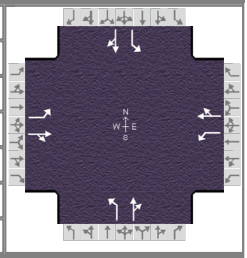
Saturation Flow / Delay	L	T	R	L	T	R	L	T	R	L	T	R
Lane Width Adjustment Factor (f_w)	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
Heavy Vehicles and Grade Factor (f_{HVg})	1.000	0.984	1.000	1.000	0.969	1.000	1.000	0.992	1.000	1.000	0.984	1.000
Parking Activity Adjustment Factor (f_p)	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
Bus Blockage Adjustment Factor (f_{bb})	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
Area Type Adjustment Factor (f_a)	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
Lane Utilization Adjustment Factor (f_{LU})	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
Left-Turn Adjustment Factor (f_{LT})	0.952	0.000		0.952	0.000		0.952	0.000		0.952	0.000	
Right-Turn Adjustment Factor (f_{RT})		0.964	0.964		0.937	0.937		0.939	0.939		0.988	0.988
Left-Turn Pedestrian Adjustment Factor (f_{Lpb})	1.000			1.000			1.000			1.000		
Right-Turn Ped-Bike Adjustment Factor (f_{Rpb})			1.000			1.000			0.987			1.000
Work Zone Adjustment Factor (f_{wz})	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
DDI Factor (f_{DDI})	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
Movement Saturation Flow Rate (s), veh/h	1810	1434	370	1810	1075	649	1810	1179	591	1810	1723	125
Proportion of Vehicles Arriving on Green (P)	0.03	0.26	0.26	0.08	0.30	0.30	0.04	0.40	0.40	0.07	0.43	0.43
Incremental Delay Factor (k)	0.11	0.15		0.11	0.15		0.11	0.33		0.11	0.15	

Signal Timing / Movement Groups	EBL	EBT/R	WBL	WBT/R	NBL	NBT/R	SBL	SBT/R
Lost Time (t_L)	3.5	6.0	3.5	6.0	3.5	6.0	3.5	6.0
Green Ratio (g/C)	0.29	0.26	0.36	0.30	0.43	0.40	0.49	0.43
Permitted Saturation Flow Rate (s_p), veh/h/ln	1182	0	1016	0	1094	0	813	0
Shared Saturation Flow Rate (s_{sh}), veh/h/ln								
Permitted Effective Green Time (g_p), s	25.0	0.0	27.0	0.0	38.3	0.0	40.2	0.0
Permitted Service Time (g_u), s	17.7	0.0	5.7	0.0	29.0	0.0	6.5	0.0
Permitted Queue Service Time (g_{ps}), s	0.3		3.5		0.6		6.5	
Time to First Blockage (g_f), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Queue Service Time Before Blockage (g_{fs}), s								
Protected Right Saturation Flow (s_R), veh/h/ln								
Protected Right Effective Green Time (g_R), s								

Multimodal	EB		WB		NB		SB	
Pedestrian F_w / F_v	1.198	0.000	1.198	0.000	1.198	0.000	1.198	0.000
Pedestrian F_s / F_{delay}	0.000	0.131	0.000	0.126	0.000	0.115	0.000	0.110
Pedestrian M_{corner} / M_{cw}								
Bicycle c_b / d_b	517.09	26.51	606.72	23.40	793.77	17.54	862.49	15.60
Bicycle F_w / F_v	-3.64	0.72	-3.64	0.60	-3.64	1.14	-3.64	0.75

HCS7 Signalized Intersection Results Graphical Summary

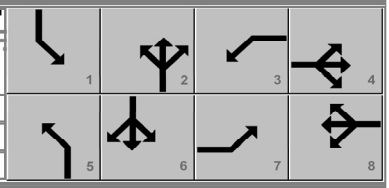
General Information				Intersection Information	
Agency	GHA			Duration, h	0.250
Analyst	TM	Analysis Date	12/12/2019	Area Type	Other
Jurisdiction	CCDOTH	Time Period	7:30-8:30 AM	PHF	0.93
Urban Street	Landwehr Road	Analysis Year	2019	Analysis Period	1> 7:30
Intersection	Landwehr at Techny	File Name	AM Landwehr at Techny.xus		
Project Description	AM Peak				



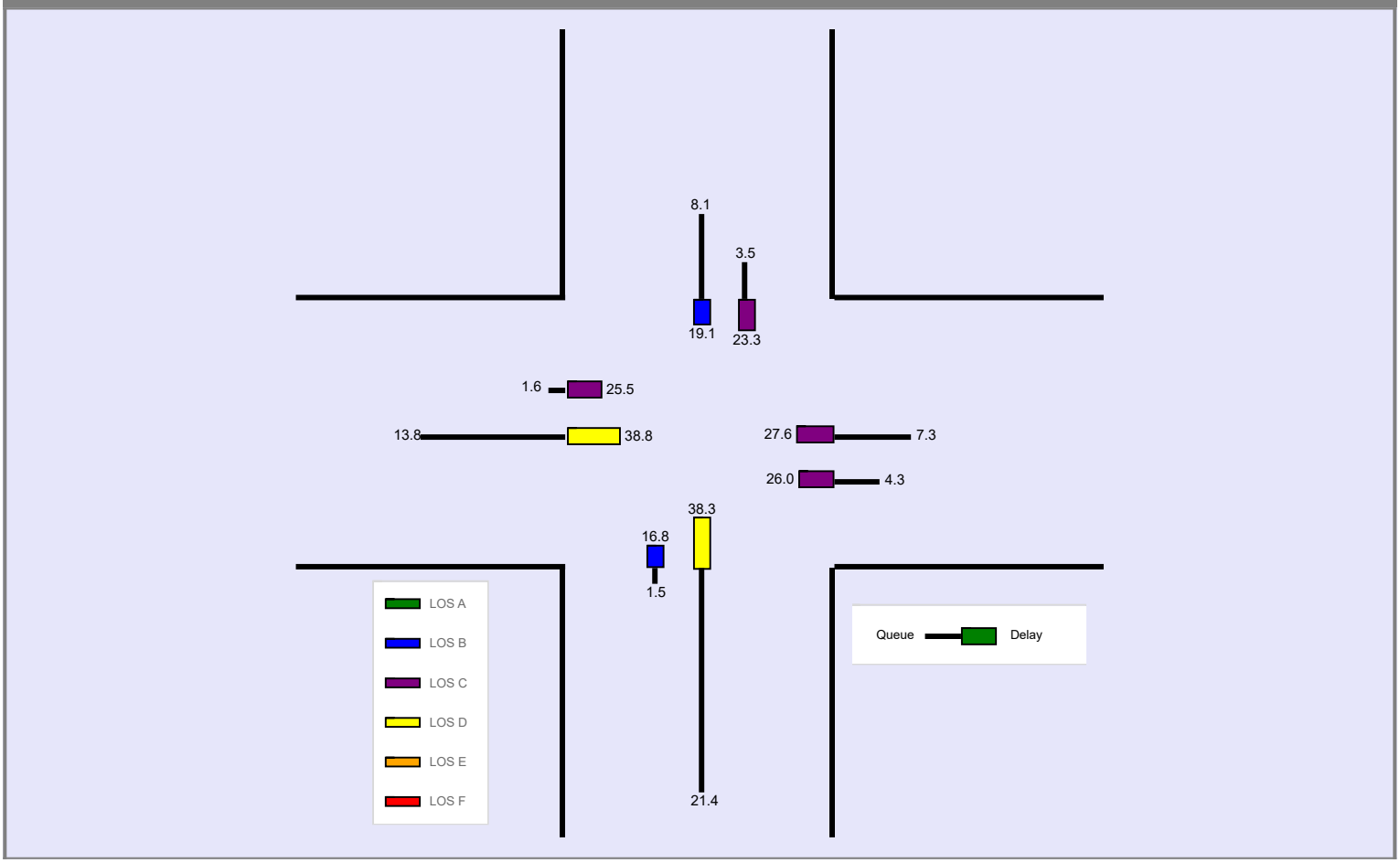
Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	50	283	73	135	126	76	60	387	194	141	262	19

Signal Information			
Cycle, s	96.4	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	Yes	Simult. Gap E/W	On
Force Mode	Fixed	Simult. Gap N/S	On

Green	3.4	3.3	38.3	3.2	0.8	24.9	
Yellow	3.5	0.0	4.0	3.5	3.5	4.0	
Red	0.0	0.0	2.0	0.0	0.0	2.0	



Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Back of Queue (*Q*), ft/ln (95 th percentile)	40.9	351.4		107.2	187.5		37.8	538.6		87.9	205	
Back of Queue (*Q*), veh/ln (95 th percentile)	1.6	13.8		4.3	7.3		1.5	21.4		3.5	8.1	
Queue Storage Ratio (*RQ*) (95 th percentile)	0.26	0.00		0.56	0.00		0.29	0.00		0.55	0.00	
Control Delay (*d*), s/veh	25.5	38.8		26.0	27.6		16.8	38.3		23.3	19.1	
Level of Service (LOS)	C	D		C	C		B	D		C	B	
Approach Delay, s/veh / LOS	37.1	D		26.9	C		36.3	D		20.5	C	
Intersection Delay, s/veh / LOS	31.0						C					



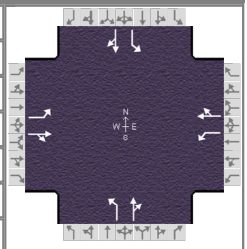
--- Messages ---

No errors or warnings exist.

--- Comments ---

HCS7 Signalized Intersection Input Data

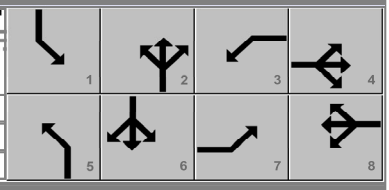
General Information				Intersection Information	
Agency	GHA			Duration, h	0.250
Analyst	TM	Analysis Date	12/12/2019	Area Type	Other
Jurisdiction	CCDOTH	Time Period	3:30-4:30 PM	PHF	0.96
Urban Street	Landwehr Road	Analysis Year	2019	Analysis Period	1> 3:30
Intersection	Landwehr at Techny	File Name	PM School Landwehr at Techny.xus		
Project Description	PM School Peak				



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	13	158	55	206	284	116	77	287	100	64	399	25

Signal Information			
Cycle, s	64.7	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	Yes	Simult. Gap E/W	On
Force Mode	Fixed	Simult. Gap N/S	On

Green	2.6	0.5	21.3	0.7	3.7	13.5						
Yellow	3.5	0.0	4.0	3.5	3.5	4.0						
Red	0.0	0.0	2.0	0.0	0.0	2.0						



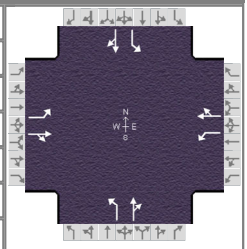
Traffic Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	13	158	55	206	284	116	77	287	100	64	399	25
Initial Queue (Q_b), veh/h	0	0	0	0	0	0	0	0	0	0	0	0
Base Saturation Flow Rate (s_o), veh/h	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Parking (N_m), man/h		None			None			None			None	
Heavy Vehicles (P_{HV}), %	0	0		0	1		0	0		1	2	
Ped / Bike / RTOR, /h	0	0	0	2	0	0	16	0	0	0	0	0
Buses (N_b), buses/h	0	0	0	0	0	0	0	0	0	0	0	0
Arrival Type (*AT*)	3	3	3	3	3	3	3	3	3	3	3	3
Upstream Filtering (*I*)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lane Width (*W*), ft	12.0	12.0		12.0	12.0		12.0	12.0		12.0	12.0	
Turn Bay Length, ft	160	0		190	0		130	0		160	0	
Grade (*Pg*), %		0			0			0			0	
Speed Limit, mi/h	30	30	30	30	30	30	30	30	30	30	30	30

Phase Information	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Maximum Green (G_{max}) or Phase Split, s	15.0	45.0	15.0	45.0	15.0	45.0	15.0	45.0
Yellow Change Interval (*Y*), s	3.5	4.0	3.5	4.0	3.5	4.0	3.5	4.0
Red Clearance Interval (R_c), s	0.0	2.0	0.0	2.0	0.0	2.0	0.0	2.0
Minimum Green (G_{min}), s	3	8	3	8	3	8	3	8
Start-Up Lost Time (*lt*), s	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Extension of Effective Green (*e*), s	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Passage (*PT*), s	3.0	4.0	3.0	4.0	3.0	4.0	3.0	4.0
Recall Mode	Off	Min	Off	Min	Off	Min	Off	Min
Dual Entry	No	Yes	No	Yes	No	Yes	No	Yes
Walk (*Walk*), s		7.0		7.0		7.0		7.0
Pedestrian Clearance Time (*PC*), s		14.0		14.0		14.0		14.0

Multimodal Information	EB			WB			NB			SB		
85th % Speed / Rest in Walk / Corner Radius	0	No	25	0	No	25	0	No	25	0	No	25
Walkway / Crosswalk Width / Length, ft	9.0	12	0	9.0	12	0	9.0	12	0	9.0	12	0
Street Width / Island / Curb	0	0	No	0	0	No	0	0	No	0	0	No
Width Outside / Bike Lane / Shoulder, ft	12	5.0	2.0	12	5.0	2.0	12	5.0	2.0	12	5.0	2.0
Pedestrian Signal / Occupied Parking	No	0.50		No	0.50		No	0.50		No	0.50	

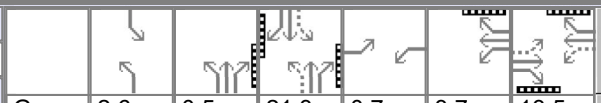
HCS7 Signalized Intersection Results Summary

General Information				Intersection Information	
Agency	GHA			Duration, h	0.250
Analyst	TM	Analysis Date	12/12/2019	Area Type	Other
Jurisdiction	CCDOTH	Time Period	3:30-4:30 PM	PHF	0.96
Urban Street	Landwehr Road	Analysis Year	2019	Analysis Period	1> 3:30
Intersection	Landwehr at Techny	File Name	PM School Landwehr at Techny.xus		
Project Description	PM School Peak				

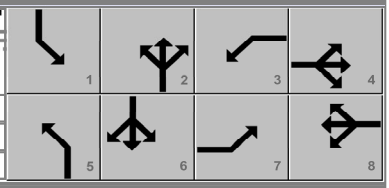


Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	13	158	55	206	284	116	77	287	100	64	399	25

Signal Information			
Cycle, s	64.7	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	Yes	Simult. Gap E/W	On
Force Mode	Fixed	Simult. Gap N/S	On



Green	2.6	0.5	21.3	0.7	3.7	13.5
Yellow	3.5	0.0	4.0	3.5	3.5	4.0
Red	0.0	0.0	2.0	0.0	0.0	2.0



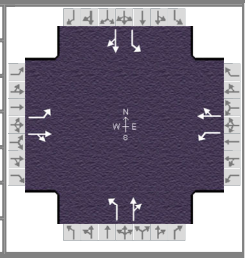
Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase	7	4	3	8	5	2	1	6
Case Number	1.1	4.0	1.1	4.0	1.1	4.0	1.1	4.0
Phase Duration, s	4.2	19.5	11.3	26.7	6.6	27.8	6.1	27.3
Change Period, ($Y+R_c$), s	3.5	6.0	3.5	6.0	3.5	6.0	3.5	6.0
Max Allow Headway (*MAH*), s	4.1	5.1	4.1	5.1	4.1	5.1	4.1	5.1
Queue Clearance Time (g_s), s	2.4	9.1	7.6	15.4	3.9	14.4	3.6	15.6
Green Extension Time (g_e), s	0.0	4.2	0.4	4.1	0.1	5.6	0.1	5.6
Phase Call Probability	0.22	1.00	0.98	1.00	0.76	1.00	0.70	1.00
Max Out Probability	0.00	0.00	0.11	0.01	0.00	0.02	0.00	0.03

Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	7	4	14	3	8	18	5	2	12	1	6	16
Adjusted Flow Rate (*v*), veh/h	14	222		215	417		80	403		67	442	
Adjusted Saturation Flow Rate (*s*), veh/h/ln	1810	1816		1810	1790		1810	1803		1795	1851	
Queue Service Time (g_s), s	0.4	7.1		5.6	13.4		1.9	12.4		1.6	13.6	
Cycle Queue Clearance Time (g_c), s	0.4	7.1		5.6	13.4		1.9	12.4		1.6	13.6	
Green Ratio (*g/C*)	0.22	0.21		0.36	0.32		0.38	0.34		0.37	0.33	
Capacity (*c*), veh/h	211	379		447	572		312	607		297	609	
Volume-to-Capacity Ratio (*X*)	0.064	0.586		0.480	0.728		0.257	0.664		0.224	0.725	
Back of Queue (*Q*), ft/ln (95 th percentile)	7.2	138.7		98.4	235		33	216.4		27.9	245	
Back of Queue (*Q*), veh/ln (95 th percentile)	0.3	5.5		3.9	9.3		1.3	8.7		1.1	9.6	
Queue Storage Ratio (*RQ*) (95 th percentile)	0.04	0.00		0.52	0.00		0.25	0.00		0.17	0.00	
Uniform Delay (d_1), s/veh	20.4	23.1		15.8	19.5		14.7	18.4		15.0	19.1	
Incremental Delay (d_2), s/veh	0.1	2.0		0.8	2.5		0.4	1.8		0.4	2.3	
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	20.6	25.2		16.6	22.1		15.1	20.1		15.3	21.5	
Level of Service (LOS)	C	C		B	C		B	C		B	C	
Approach Delay, s/veh / LOS	24.9	C		20.2	C		19.3	B		20.7	C	
Intersection Delay, s/veh / LOS	20.7						C					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	1.92	B	1.91	B	1.90	B	1.90	B
Bicycle LOS Score / LOS	0.88	A	1.53	B	1.29	A	1.33	A

HCS7 Signalized Intersection Intermediate Values

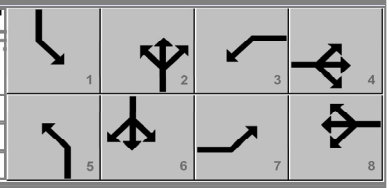
General Information				Intersection Information	
Agency	GHA			Duration, h	0.250
Analyst	TM	Analysis Date	12/12/2019	Area Type	Other
Jurisdiction	CCDOTH	Time Period	3:30-4:30 PM	PHF	0.96
Urban Street	Landwehr Road	Analysis Year	2019	Analysis Period	1> 3:30
Intersection	Landwehr at Techny	File Name	PM School Landwehr at Techny.xus		
Project Description	PM School Peak				



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	13	158	55	206	284	116	77	287	100	64	399	25

Signal Information			
Cycle, s	64.7	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	Yes	Simult. Gap E/W	On
Force Mode	Fixed	Simult. Gap N/S	On

Green	2.6	0.5	21.3	0.7	3.7	13.5
Yellow	3.5	0.0	4.0	3.5	3.5	4.0
Red	0.0	0.0	2.0	0.0	0.0	2.0



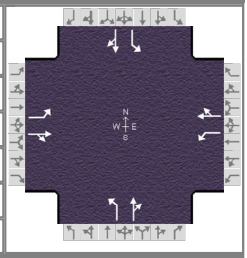
Saturation Flow / Delay	L	T	R	L	T	R	L	T	R	L	T	R
Lane Width Adjustment Factor (f_w)	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
Heavy Vehicles and Grade Factor (f_{HVg})	1.000	1.000	1.000	1.000	0.992	1.000	1.000	1.000	1.000	0.992	0.984	1.000
Parking Activity Adjustment Factor (f_p)	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
Bus Blockage Adjustment Factor (f_{bb})	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
Area Type Adjustment Factor (f_a)	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
Lane Utilization Adjustment Factor (f_{LU})	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
Left-Turn Adjustment Factor (f_{LT})	0.952	0.000		0.952	0.000		0.952	0.000		0.952	0.000	
Right-Turn Adjustment Factor (f_{RT})		0.956	0.956		0.949	0.949		0.949	0.949		0.989	0.989
Left-Turn Pedestrian Adjustment Factor (f_{Lpb})	0.998			1.000			1.000			0.991		
Right-Turn Ped-Bike Adjustment Factor (f_{Rpb})			1.000			0.997			0.976			1.000
Work Zone Adjustment Factor (f_{wz})	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
DDI Factor (f_{DDI})	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
Movement Saturation Flow Rate (s), veh/h	1810	1347	469	1810	1271	519	1810	1337	466	1795	1742	109
Proportion of Vehicles Arriving on Green (P)	0.01	0.21	0.21	0.12	0.32	0.32	0.05	0.34	0.34	0.04	0.33	0.33
Incremental Delay Factor (k)	0.11	0.15		0.11	0.15		0.11	0.15		0.11	0.15	

Signal Timing / Movement Groups	EBL	EBT/R	WBL	WBT/R	NBL	NBT/R	SBL	SBT/R
Lost Time (t_L)	3.5	6.0	3.5	6.0	3.5	6.0	3.5	6.0
Green Ratio (g/C)	0.22	0.21	0.36	0.32	0.38	0.34	0.37	0.33
Permitted Saturation Flow Rate (s_p), veh/h/ln	985	0	1177	0	963	0	990	0
Shared Saturation Flow Rate (s_{sh}), veh/h/ln								
Permitted Effective Green Time (g_p), s	13.5	0.0	15.5	0.0	21.3	0.0	21.3	0.0
Permitted Service Time (g_u), s	5.4	0.0	6.4	0.0	7.7	0.0	7.5	0.0
Permitted Queue Service Time (g_{ps}), s	0.1		2.0		1.2		1.0	
Time to First Blockage (g_f), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Queue Service Time Before Blockage (g_{fs}), s								
Protected Right Saturation Flow (s_R), veh/h/ln								
Protected Right Effective Green Time (g_R), s								

Multimodal	EB		WB		NB		SB	
Pedestrian F_w / F_v	1.198	0.000	1.198	0.000	1.198	0.000	1.198	0.000
Pedestrian F_s / F_{delay}	0.000	0.121	0.000	0.109	0.000	0.106	0.000	0.107
Pedestrian M_{corner} / M_{cw}								
Bicycle c_b / d_b	416.96	20.26	639.10	14.97	673.32	14.23	658.15	14.56
Bicycle F_w / F_v	-3.64	0.39	-3.64	1.04	-3.64	0.80	-3.64	0.84

HCS7 Signalized Intersection Results Graphical Summary

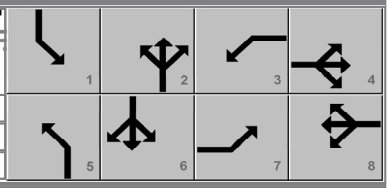
General Information				Intersection Information	
Agency	GHA			Duration, h	0.250
Analyst	TM	Analysis Date	12/12/2019	Area Type	Other
Jurisdiction	CCDOTH	Time Period	3:30-4:30 PM	PHF	0.96
Urban Street	Landwehr Road	Analysis Year	2019	Analysis Period	1> 3:30
Intersection	Landwehr at Techny	File Name	PM School Landwehr at Techny.xus		
Project Description	PM School Peak				



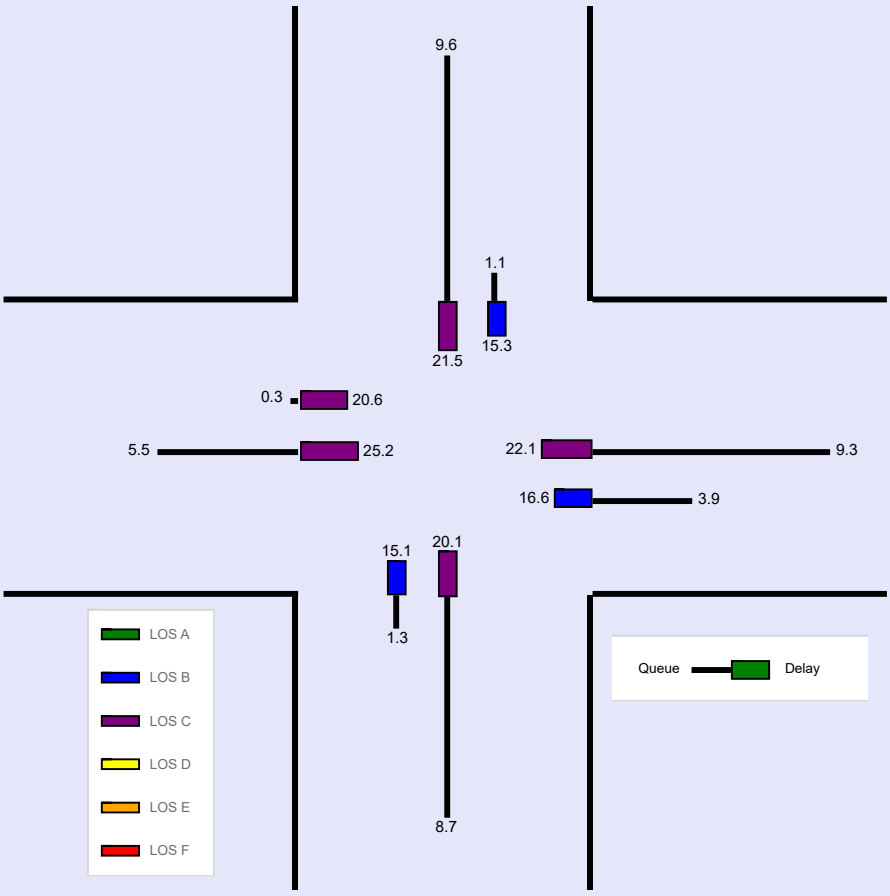
Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	13	158	55	206	284	116	77	287	100	64	399	25

Signal Information			
Cycle, s	64.7	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	Yes	Simult. Gap E/W	On
Force Mode	Fixed	Simult. Gap N/S	On

Green	2.6	0.5	21.3	0.7	3.7	13.5	
Yellow	3.5	0.0	4.0	3.5	3.5	4.0	
Red	0.0	0.0	2.0	0.0	0.0	2.0	



Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Back of Queue (*Q*), ft/ln (95 th percentile)	7.2	138.7		98.4	235		33	216.4		27.9	245	
Back of Queue (*Q*), veh/ln (95 th percentile)	0.3	5.5		3.9	9.3		1.3	8.7		1.1	9.6	
Queue Storage Ratio (*RQ*) (95 th percentile)	0.04	0.00		0.52	0.00		0.25	0.00		0.17	0.00	
Control Delay (*d*), s/veh	20.6	25.2		16.6	22.1		15.1	20.1		15.3	21.5	
Level of Service (LOS)	C	C		B	C		B	C		B	C	
Approach Delay, s/veh / LOS	24.9	C		20.2	C		19.3	B		20.7	C	
Intersection Delay, s/veh / LOS	20.7						C					



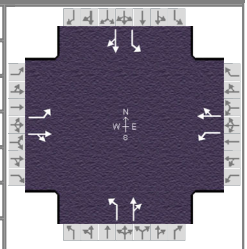
--- Messages ---

No errors or warnings exist.

--- Comments ---

HCS7 Signalized Intersection Input Data

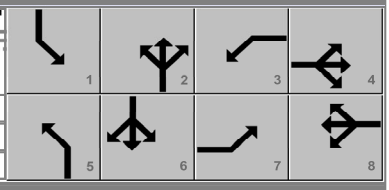
General Information				Intersection Information	
Agency	GHA			Duration, h	0.250
Analyst	TM	Analysis Date	12/12/2019	Area Type	Other
Jurisdiction	CCDOTH	Time Period	5:00-6:00 PM	PHF	0.96
Urban Street	Landwehr Road	Analysis Year	2019	Analysis Period	1> 5:00
Intersection	Landwehr at Techny	File Name	PM Street Landwehr at Techny.xus		
Project Description	PM Street Peak				



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	22	170	62	180	382	138	56	312	92	103	400	35

Signal Information			
Cycle, s	76.5	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	Yes	Simult. Gap E/W	On
Force Mode	Fixed	Simult. Gap N/S	On

Green	2.7	2.0		23.7	1.2	2.8	21.7					
Yellow	3.5	0.0		4.0	3.5	3.5	4.0					
Red	0.0	0.0		2.0	0.0	0.0	2.0					



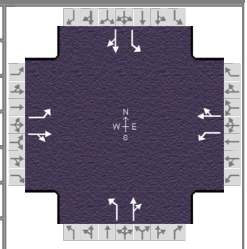
Traffic Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	22	170	62	180	382	138	56	312	92	103	400	35
Initial Queue (Q_b), veh/h	0	0	0	0	0	0	0	0	0	0	0	0
Base Saturation Flow Rate (s_o), veh/h	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Parking (N_m), man/h		None			None			None			None	
Heavy Vehicles (P_{HV}), %	0	0		0	1		0	0		1	2	
Ped / Bike / RTOR, /h	0	0	0	0	0	0	1	0	0	0	0	0
Buses (N_b), buses/h	0	0	0	0	0	0	0	0	0	0	0	0
Arrival Type (*AT*)	3	3	3	3	3	3	3	3	3	3	3	3
Upstream Filtering (*I*)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lane Width (*W*), ft	12.0	12.0		12.0	12.0		12.0	12.0		12.0	12.0	
Turn Bay Length, ft	160	0		190	0		130	0		160	0	
Grade (*Pg*), %		0			0			0			0	
Speed Limit, mi/h	30	30	30	30	30	30	30	30	30	30	30	30

Phase Information	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Maximum Green (G_{max}) or Phase Split, s	15.0	45.0	15.0	45.0	15.0	45.0	15.0	45.0
Yellow Change Interval (*Y*), s	3.5	4.0	3.5	4.0	3.5	4.0	3.5	4.0
Red Clearance Interval (R_c), s	0.0	2.0	0.0	2.0	0.0	2.0	0.0	2.0
Minimum Green (G_{min}), s	3	8	3	8	3	8	3	8
Start-Up Lost Time (*lt*), s	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Extension of Effective Green (*e*), s	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Passage (*PT*), s	3.0	4.0	3.0	4.0	3.0	4.0	3.0	4.0
Recall Mode	Off	Min	Off	Min	Off	Min	Off	Min
Dual Entry	No	Yes	No	Yes	No	Yes	No	Yes
Walk (*Walk*), s		7.0		7.0		7.0		7.0
Pedestrian Clearance Time (*PC*), s		14.0		14.0		14.0		14.0

Multimodal Information	EB			WB			NB			SB		
85th % Speed / Rest in Walk / Corner Radius	0	No	25	0	No	25	0	No	25	0	No	25
Walkway / Crosswalk Width / Length, ft	9.0	12	0	9.0	12	0	9.0	12	0	9.0	12	0
Street Width / Island / Curb	0	0	No	0	0	No	0	0	No	0	0	No
Width Outside / Bike Lane / Shoulder, ft	12	5.0	2.0	12	5.0	2.0	12	5.0	2.0	12	5.0	2.0
Pedestrian Signal / Occupied Parking	No	0.50		No	0.50		No	0.50		No	0.50	

HCS7 Signalized Intersection Results Summary

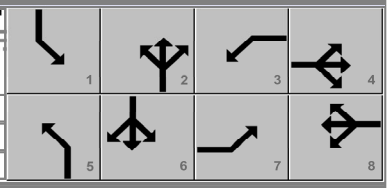
General Information				Intersection Information	
Agency	GHA			Duration, h	0.250
Analyst	TM	Analysis Date	12/12/2019	Area Type	Other
Jurisdiction	CCDOTH	Time Period	5:00-6:00 PM	PHF	0.96
Urban Street	Landwehr Road	Analysis Year	2019	Analysis Period	1> 5:00
Intersection	Landwehr at Techny	File Name	PM Street Landwehr at Techny.xus		
Project Description	PM Street Peak				



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	22	170	62	180	382	138	56	312	92	103	400	35

Signal Information			
Cycle, s	76.5	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	Yes	Simult. Gap E/W	On
Force Mode	Fixed	Simult. Gap N/S	On

Green	2.7	2.0	23.7	1.2	2.8	21.7
Yellow	3.5	0.0	4.0	3.5	3.5	4.0
Red	0.0	0.0	2.0	0.0	0.0	2.0



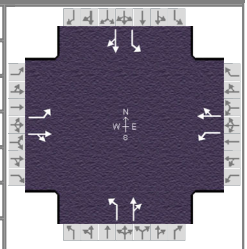
Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase	7	4	3	8	5	2	1	6
Case Number	1.1	4.0	1.1	4.0	1.1	4.0	1.1	4.0
Phase Duration, s	4.7	27.7	11.0	34.0	6.2	29.7	8.2	31.7
Change Period, ($Y+R_c$), s	3.5	6.0	3.5	6.0	3.5	6.0	3.5	6.0
Max Allow Headway (*MAH*), s	4.1	5.1	4.1	5.1	4.1	5.1	4.1	5.1
Queue Clearance Time (g_s), s	2.7	10.5	7.3	23.0	3.7	17.9	5.0	18.6
Green Extension Time (g_e), s	0.0	5.4	0.3	4.9	0.1	5.7	0.2	5.7
Phase Call Probability	0.39	1.00	0.98	1.00	0.71	1.00	0.90	1.00
Max Out Probability	0.00	0.01	0.07	0.06	0.00	0.04	0.00	0.05

Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	7	4	14	3	8	18	5	2	12	1	6	16
Adjusted Flow Rate (*v*), veh/h	23	242		188	542		58	421		107	453	
Adjusted Saturation Flow Rate (*s*), veh/h/ln	1810	1813		1810	1799		1810	1824		1795	1844	
Queue Service Time (g_s), s	0.7	8.5		5.3	21.0		1.7	15.9		3.0	16.6	
Cycle Queue Clearance Time (g_c), s	0.7	8.5		5.3	21.0		1.7	15.9		3.0	16.6	
Green Ratio (*g/C*)	0.30	0.28		0.41	0.37		0.35	0.31		0.38	0.34	
Capacity (*c*), veh/h	180	513		472	658		247	565		305	620	
Volume-to-Capacity Ratio (*X*)	0.127	0.471		0.397	0.823		0.236	0.745		0.352	0.731	
Back of Queue (*Q*), ft/ln (95 th percentile)	13.3	161.7		94.6	349.3		31.5	280.3		56.2	294.1	
Back of Queue (*Q*), veh/ln (95 th percentile)	0.5	6.5		3.8	13.9		1.3	11.2		2.2	11.6	
Queue Storage Ratio (*RQ*) (95 th percentile)	0.08	0.00		0.50	0.00		0.24	0.00		0.35	0.00	
Uniform Delay (d_1), s/veh	21.0	22.8		15.9	22.1		18.9	23.8		17.7	22.4	
Incremental Delay (d_2), s/veh	0.3	1.0		0.5	4.0		0.5	2.8		0.7	2.4	
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	21.3	23.7		16.4	26.0		19.4	26.6		18.4	24.8	
Level of Service (LOS)	C	C		B	C		B	C		B	C	
Approach Delay, s/veh / LOS	23.5	C		23.6	C		25.7	C		23.6	C	
Intersection Delay, s/veh / LOS	24.1						C					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	1.92	B	1.91	B	1.91	B	1.91	B
Bicycle LOS Score / LOS	0.92	A	1.69	B	1.28	A	1.41	A

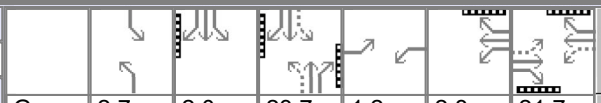
HCS7 Signalized Intersection Intermediate Values

General Information				Intersection Information	
Agency	GHA			Duration, h	0.250
Analyst	TM	Analysis Date	12/12/2019	Area Type	Other
Jurisdiction	CCDOTH	Time Period	5:00-6:00 PM	PHF	0.96
Urban Street	Landwehr Road	Analysis Year	2019	Analysis Period	1> 5:00
Intersection	Landwehr at Techny	File Name	PM Street Landwehr at Techny.xus		
Project Description	PM Street Peak				

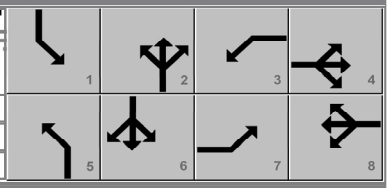


Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	22	170	62	180	382	138	56	312	92	103	400	35

Signal Information			
Cycle, s	76.5	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	Yes	Simult. Gap E/W	On
Force Mode	Fixed	Simult. Gap N/S	On



Green	2.7	2.0	23.7	1.2	2.8	21.7
Yellow	3.5	0.0	4.0	3.5	3.5	4.0
Red	0.0	0.0	2.0	0.0	0.0	2.0



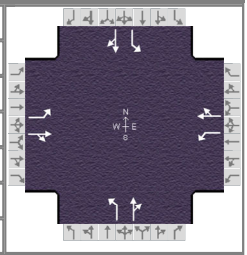
Saturation Flow / Delay	L	T	R	L	T	R	L	T	R	L	T	R
Lane Width Adjustment Factor (f_w)	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
Heavy Vehicles and Grade Factor (f_{HVg})	1.000	1.000	1.000	1.000	0.992	1.000	1.000	1.000	1.000	0.992	0.984	1.000
Parking Activity Adjustment Factor (f_p)	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
Bus Blockage Adjustment Factor (f_{bb})	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
Area Type Adjustment Factor (f_a)	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
Lane Utilization Adjustment Factor (f_{LU})	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
Left-Turn Adjustment Factor (f_{LT})	0.952	0.000		0.952	0.000		0.952	0.000		0.952	0.000	
Right-Turn Adjustment Factor (f_{RT})		0.954	0.954		0.954	0.954		0.960	0.960		0.986	0.986
Left-Turn Pedestrian Adjustment Factor (f_{Lpb})	1.000			1.000			1.000			1.000		
Right-Turn Ped-Bike Adjustment Factor (f_{Rpb})			1.000			1.000			0.998			1.000
Work Zone Adjustment Factor (f_{wz})	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
DDI Factor (f_{DDI})	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
Movement Saturation Flow Rate (s), veh/h	1810	1328	484	1810	1322	477	1810	1409	415	1795	1695	148
Proportion of Vehicles Arriving on Green (P)	0.02	0.28	0.28	0.10	0.37	0.37	0.04	0.31	0.31	0.06	0.34	0.34
Incremental Delay Factor (k)	0.11	0.15		0.11	0.16		0.11	0.15		0.11	0.15	

Signal Timing / Movement Groups	EBL	EBT/R	WBL	WBT/R	NBL	NBT/R	SBL	SBT/R
Lost Time (t_L)	3.5	6.0	3.5	6.0	3.5	6.0	3.5	6.0
Green Ratio (g/C)	0.30	0.28	0.41	0.37	0.35	0.31	0.38	0.34
Permitted Saturation Flow Rate (s_p), veh/h/ln	878	0	1156	0	953	0	974	0
Shared Saturation Flow Rate (s_{sh}), veh/h/ln								
Permitted Effective Green Time (g_p), s	21.7	0.0	23.7	0.0	23.8	0.0	24.3	0.0
Permitted Service Time (g_u), s	5.1	0.0	13.3	0.0	7.2	0.0	7.9	0.0
Permitted Queue Service Time (g_{ps}), s	0.4		2.0		1.1		2.0	
Time to First Blockage (g_f), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Queue Service Time Before Blockage (g_{fs}), s								
Protected Right Saturation Flow (s_R), veh/h/ln								
Protected Right Effective Green Time (g_R), s								

Multimodal	EB		WB		NB		SB	
Pedestrian F_w / F_v	1.198	0.000	1.198	0.000	1.198	0.000	1.198	0.000
Pedestrian F_s / F_{delay}	0.000	0.119	0.000	0.110	0.000	0.116	0.000	0.113
Pedestrian M_{corner} / M_{cw}								
Bicycle c_b / d_b	565.86	19.68	731.12	15.41	619.03	18.25	671.82	16.88
Bicycle F_w / F_v	-3.64	0.44	-3.64	1.20	-3.64	0.79	-3.64	0.92

HCS7 Signalized Intersection Results Graphical Summary

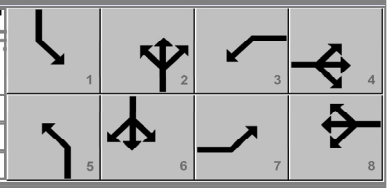
General Information				Intersection Information	
Agency	GHA			Duration, h	0.250
Analyst	TM	Analysis Date	12/12/2019	Area Type	Other
Jurisdiction	CCDOTH	Time Period	5:00-6:00 PM	PHF	0.96
Urban Street	Landwehr Road	Analysis Year	2019	Analysis Period	1> 5:00
Intersection	Landwehr at Techny	File Name	PM Street Landwehr at Techny.xus		
Project Description	PM Street Peak				



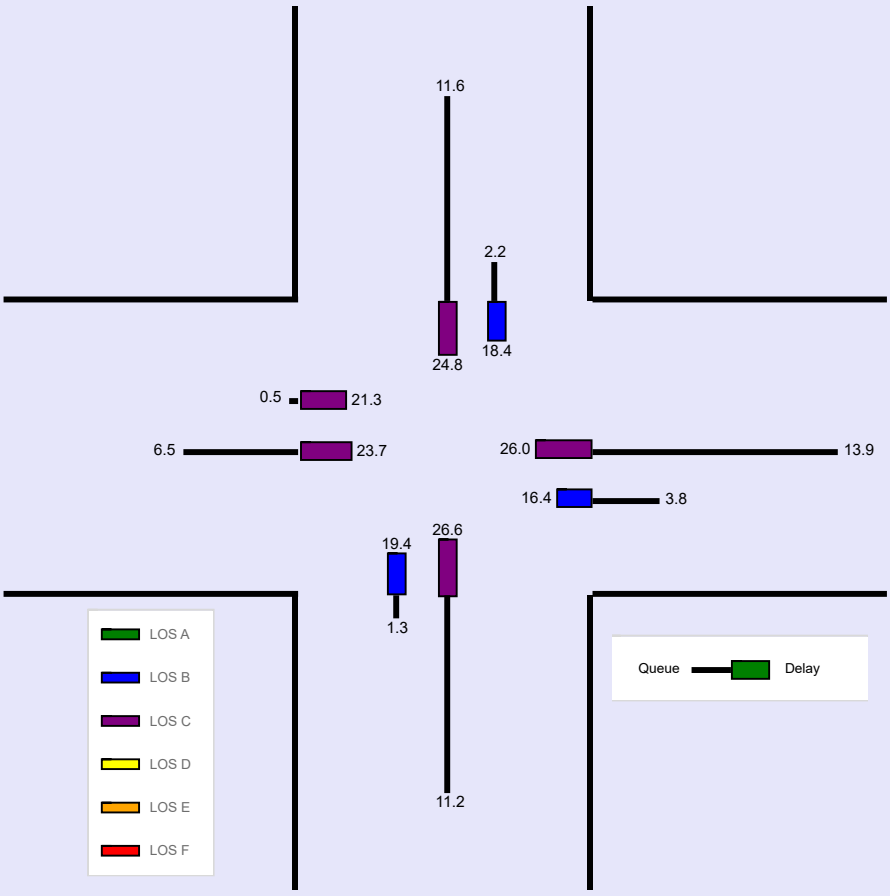
Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	22	170	62	180	382	138	56	312	92	103	400	35

Signal Information			
Cycle, s	76.5	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	Yes	Simult. Gap E/W	On
Force Mode	Fixed	Simult. Gap N/S	On

Green	2.7	2.0		23.7	1.2		2.8	21.7				
Yellow	3.5	0.0		4.0	3.5		3.5	4.0				
Red	0.0	0.0		2.0	0.0		0.0	2.0				



Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Back of Queue (*Q*), ft/ln (95 th percentile)	13.3	161.7		94.6	349.3		31.5	280.3		56.2	294.1	
Back of Queue (*Q*), veh/ln (95 th percentile)	0.5	6.5		3.8	13.9		1.3	11.2		2.2	11.6	
Queue Storage Ratio (*RQ*) (95 th percentile)	0.08	0.00		0.50	0.00		0.24	0.00		0.35	0.00	
Control Delay (*d*), s/veh	21.3	23.7		16.4	26.0		19.4	26.6		18.4	24.8	
Level of Service (LOS)	C	C		B	C		B	C		B	C	
Approach Delay, s/veh / LOS	23.5	C		23.6	C		25.7	C		23.6	C	
Intersection Delay, s/veh / LOS	24.1						C					



--- Messages ---

No errors or warnings exist.

--- Comments ---

HCS7 Two-Way Stop-Control Report

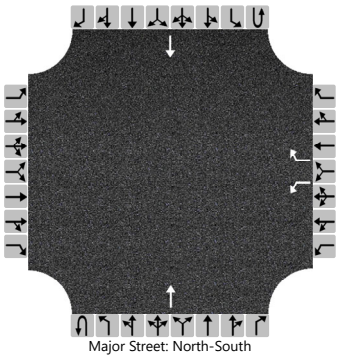
General Information

Analyst	TM
Agency/Co.	GHA
Date Performed	12/12/2019
Analysis Year	2019
Time Analyzed	7:30-8:30 AM
Intersection Orientation	North-South
Project Description	Existing AM

Site Information

Intersection	Landwehr at N School
Jurisdiction	CCDOTH
East/West Street	North School Access
North/South Street	Landwehr Road
Peak Hour Factor	0.89
Analysis Time Period (hrs)	0.25

Lanes



Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority		10	11	12		7	8	9	1U	1	2	3	4U	4	5	6
Number of Lanes		0	0	0		1	0	1	0	0	1	0	0	0	1	0
Configuration						L		R			T				T	
Volume (veh/h)						51		39			602				470	
Percent Heavy Vehicles (%)						0		0								
Proportion Time Blocked																
Percent Grade (%)						0										
Right Turn Channelized						No										
Median Type | Storage		Undivided														

Critical and Follow-up Headways

Base Critical Headway (sec)						7.1		6.2								
Critical Headway (sec)						6.40		6.20								
Base Follow-Up Headway (sec)						3.5		3.3								
Follow-Up Headway (sec)						3.50		3.30								

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)						57		44								
Capacity, c (veh/h)						204		454								
v/c Ratio						0.28		0.10								
95% Queue Length, Q_{95} (veh)						1.1		0.3								
Control Delay (s/veh)						29.5		13.8								
Level of Service (LOS)						D		B								
Approach Delay (s/veh)						22.7										
Approach LOS						C										

Pedestrian Level of Service				
Flow (ped/hr)		3	0	0
Two-Stage Crossing		No		
Pedestrian Platooning		No		
Conflicting Vehicular Flow (veh/h)				
Average Delay (s)		0.4		
Level of Service (LOS)		A		

HCS7 Two-Way Stop-Control Report

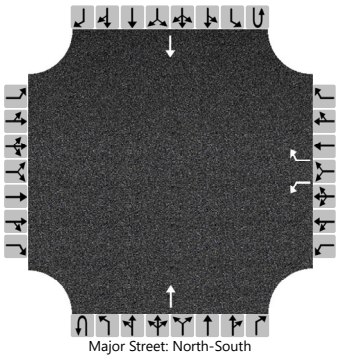
General Information

Analyst	TM
Agency/Co.	GHA
Date Performed	12/12/2019
Analysis Year	2019
Time Analyzed	3:30-4:30 PM
Intersection Orientation	North-South
Project Description	Existing PM School

Site Information

Intersection	Landwehr at N School
Jurisdiction	CCDOTH
East/West Street	North School Access
North/South Street	Landwehr Road
Peak Hour Factor	0.92
Analysis Time Period (hrs)	0.25

Lanes


Major Street: North-South

Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority		10	11	12		7	8	9	1U	1	2	3	4U	4	5	6
Number of Lanes		0	0	0		1	0	1	0	0	1	0	0	0	1	0
Configuration						L		R			T				T	
Volume (veh/h)						31		22			442				660	
Percent Heavy Vehicles (%)						0		0								
Proportion Time Blocked																
Percent Grade (%)						0										
Right Turn Channelized						No										
Median Type | Storage		Undivided														

Critical and Follow-up Headways

Base Critical Headway (sec)						7.1		6.2								
Critical Headway (sec)						6.40		6.20								
Base Follow-Up Headway (sec)						3.5		3.3								
Follow-Up Headway (sec)						3.50		3.30								

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)						34		24								
Capacity, c (veh/h)						206		586								
v/c Ratio						0.16		0.04								
95% Queue Length, Q_{95} (veh)						0.6		0.1								
Control Delay (s/veh)						25.9		11.4								
Level of Service (LOS)						D		B								
Approach Delay (s/veh)						19.9										
Approach LOS						C										

Pedestrian Level of Service				
Flow (ped/hr)		3	0	0
Two-Stage Crossing		No		
Pedestrian Platooning		No		
Conflicting Vehicular Flow (veh/h)				
Average Delay (s)		0.2		
Level of Service (LOS)		A		

HCS7 Two-Way Stop-Control Report

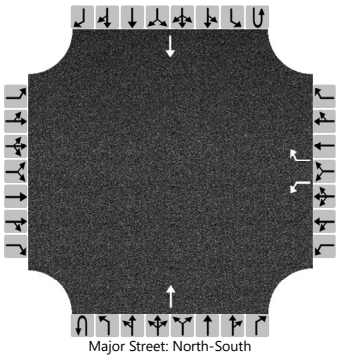
General Information

Analyst	TM
Agency/Co.	GHA
Date Performed	12/12/2019
Analysis Year	2019
Time Analyzed	5:00-6:00 PM
Intersection Orientation	North-South
Project Description	Existing PM School

Site Information

Intersection	Landwehr at N School
Jurisdiction	CCDOTH
East/West Street	North School Access
North/South Street	Landwehr Road
Peak Hour Factor	0.92
Analysis Time Period (hrs)	0.25

Lanes


Major Street: North-South

Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority		10	11	12		7	8	9	1U	1	2	3	4U	4	5	6
Number of Lanes		0	0	0		1	0	1	0	0	1	0	0	0	1	0
Configuration						L		R			T				T	
Volume (veh/h)						3		6			454				642	
Percent Heavy Vehicles (%)						0		0								
Proportion Time Blocked																
Percent Grade (%)						0										
Right Turn Channelized						No										
Median Type | Storage		Undivided														

Critical and Follow-up Headways

Base Critical Headway (sec)						7.1		6.2								
Critical Headway (sec)						6.40		6.20								
Base Follow-Up Headway (sec)						3.5		3.3								
Follow-Up Headway (sec)						3.50		3.30								

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)						3		7								
Capacity, c (veh/h)						209		580								
v/c Ratio						0.02		0.01								
95% Queue Length, Q_{95} (veh)						0.0		0.0								
Control Delay (s/veh)						22.5		11.3								
Level of Service (LOS)						C		B								
Approach Delay (s/veh)						15.0										
Approach LOS						C										

HCS7 Two-Way Stop-Control Report

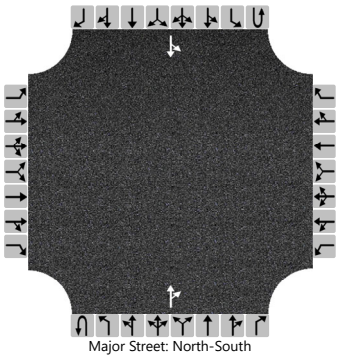
General Information

Analyst	TM
Agency/Co.	GHA
Date Performed	12/12/2019
Analysis Year	2019
Time Analyzed	7:30-8:30 AM
Intersection Orientation	North-South
Project Description	Existing AM

Site Information

Intersection	Landwehr at S School
Jurisdiction	CCDOTH
East/West Street	South School Access
North/South Street	Landwehr Road
Peak Hour Factor	0.88
Analysis Time Period (hrs)	0.25

Lanes



Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority		10	11	12		7	8	9	1U	1	2	3	4U	4	5	6
Number of Lanes		0	0	0		0	0	0	0	0	1	0	0	0	1	0
Configuration												TR		LT		
Volume (veh/h)											602	78		16	505	
Percent Heavy Vehicles (%)														0		
Proportion Time Blocked																
Percent Grade (%)																
Right Turn Channelized																
Median Type | Storage	Undivided															

Critical and Follow-up Headways

Base Critical Headway (sec)														4.1		
Critical Headway (sec)														4.10		
Base Follow-Up Headway (sec)														2.2		
Follow-Up Headway (sec)														2.20		

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)														18		
Capacity, c (veh/h)														852		
v/c Ratio														0.02		
95% Queue Length, Q_{95} (veh)														0.1		
Control Delay (s/veh)														9.3		
Level of Service (LOS)														A		
Approach Delay (s/veh)													0.6			
Approach LOS																

HCS7 Two-Way Stop-Control Report

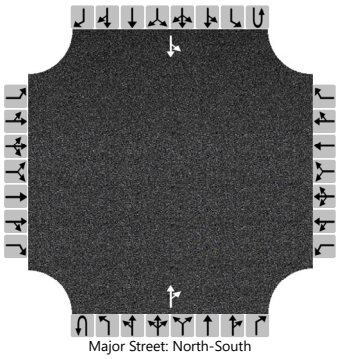
General Information

Analyst	TM
Agency/Co.	GHA
Date Performed	12/12/2019
Analysis Year	2019
Time Analyzed	3:30-4:30 PM
Intersection Orientation	North-South
Project Description	Existing PM School

Site Information

Intersection	Landwehr at S School
Jurisdiction	CCDOTH
East/West Street	South School Access
North/South Street	Landwehr Road
Peak Hour Factor	0.93
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	0	0	0	0	1	0	0	0	1	0
Configuration												TR		LT		
Volume (veh/h)											442	22		5	686	
Percent Heavy Vehicles (%)														0		
Proportion Time Blocked																
Percent Grade (%)																
Right Turn Channelized																
Median Type | Storage	Undivided															

Critical and Follow-up Headways

Base Critical Headway (sec)														4.1		
Critical Headway (sec)														4.10		
Base Follow-Up Headway (sec)														2.2		
Follow-Up Headway (sec)														2.20		

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)														5		
Capacity, c (veh/h)														1076		
v/c Ratio														0.00		
95% Queue Length, Q_{95} (veh)														0.0		
Control Delay (s/veh)														8.4		
Level of Service (LOS)														A		
Approach Delay (s/veh)													0.1			
Approach LOS																

HCS7 Two-Way Stop-Control Report

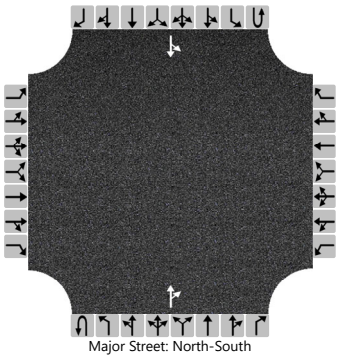
General Information

Analyst	TM
Agency/Co.	GHA
Date Performed	12/12/2019
Analysis Year	2019
Time Analyzed	5:00-6:00 PM
Intersection Orientation	North-South
Project Description	Existing PM School

Site Information

Intersection	Landwehr at S School
Jurisdiction	CCDOTH
East/West Street	South School Access
North/South Street	Landwehr Road
Peak Hour Factor	0.93
Analysis Time Period (hrs)	0.25

Lanes



Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority		10	11	12		7	8	9	1U	1	2	3	4U	4	5	6
Number of Lanes		0	0	0		0	0	0	0	0	1	0	0	0	1	0
Configuration												TR		LT		
Volume (veh/h)											454	2		3	642	
Percent Heavy Vehicles (%)														0		
Proportion Time Blocked																
Percent Grade (%)																
Right Turn Channelized																
Median Type | Storage	Undivided															

Critical and Follow-up Headways

Base Critical Headway (sec)														4.1		
Critical Headway (sec)														4.10		
Base Follow-Up Headway (sec)														2.2		
Follow-Up Headway (sec)														2.20		

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)														3		
Capacity, c (veh/h)														1083		
v/c Ratio														0.00		
95% Queue Length, Q_{95} (veh)														0.0		
Control Delay (s/veh)														8.3		
Level of Service (LOS)														A		
Approach Delay (s/veh)													0.1			
Approach LOS																

HCS7 Two-Way Stop-Control Report

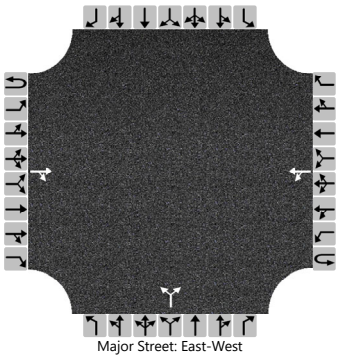
General Information

Analyst	TM
Agency/Co.	GHA
Date Performed	12/12/2019
Analysis Year	2019
Time Analyzed	7:30-8:30 AM
Intersection Orientation	East-West
Project Description	Existing AM

Site Information

Intersection	Techny at W School
Jurisdiction	CCDOTH
East/West Street	Techny Road
North/South Street	West School Access
Peak Hour Factor	0.92
Analysis Time Period (hrs)	0.25

Lanes



Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority	1U	1	2	3	4U	4	5	6		7	8	9		10	11	12
Number of Lanes	0	0	1	0	0	0	1	0		0	1	0		0	0	0
Configuration				TR		LT					LR					
Volume (veh/h)			555	63		15	334			3		5				
Percent Heavy Vehicles (%)						0				0		0				
Proportion Time Blocked																
Percent Grade (%)										0						
Right Turn Channelized																
Median Type | Storage						Undivided										

Critical and Follow-up Headways

Base Critical Headway (sec)						4.1				7.1		6.2				
Critical Headway (sec)						4.10				6.40		6.20				
Base Follow-Up Headway (sec)						2.2				3.5		3.3				
Follow-Up Headway (sec)						2.20				3.50		3.30				

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)						16					9					
Capacity, c (veh/h)						928					360					
v/c Ratio						0.02					0.02					
95% Queue Length, Q_{95} (veh)						0.1					0.1					
Control Delay (s/veh)						8.9					15.2					
Level of Service (LOS)						A					C					
Approach Delay (s/veh)						0.6				15.2						
Approach LOS										C						

HCS7 Two-Way Stop-Control Report

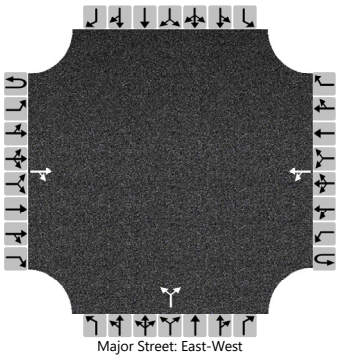
General Information

Analyst	TM
Agency/Co.	GHA
Date Performed	12/12/2019
Analysis Year	2019
Time Analyzed	3:30-4:30 PM
Intersection Orientation	East-West
Project Description	Existing PM School

Site Information

Intersection	Techny at W School
Jurisdiction	CCDOTH
East/West Street	Techny Road
North/South Street	West School Access
Peak Hour Factor	0.97
Analysis Time Period (hrs)	0.25

Lanes



Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority	1U	1	2	3	4U	4	5	6		7	8	9		10	11	12
Number of Lanes	0	0	1	0	0	0	1	0		0	1	0		0	0	0
Configuration				TR		LT					LR					
Volume (veh/h)			298	24		8	600			6		4				
Percent Heavy Vehicles (%)						0				0		0				
Proportion Time Blocked																
Percent Grade (%)										0						
Right Turn Channelized																
Median Type | Storage						Undivided										

Critical and Follow-up Headways

Base Critical Headway (sec)						4.1				7.1		6.2				
Critical Headway (sec)						4.10				6.40		6.20				
Base Follow-Up Headway (sec)						2.2				3.5		3.3				
Follow-Up Headway (sec)						2.20				3.50		3.30				

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)						8					10					
Capacity, c (veh/h)						1239					378					
v/c Ratio						0.01					0.03					
95% Queue Length, Q_{95} (veh)						0.0					0.1					
Control Delay (s/veh)						7.9					14.8					
Level of Service (LOS)						A					B					
Approach Delay (s/veh)						0.2				14.8						
Approach LOS										B						

HCS7 Two-Way Stop-Control Report

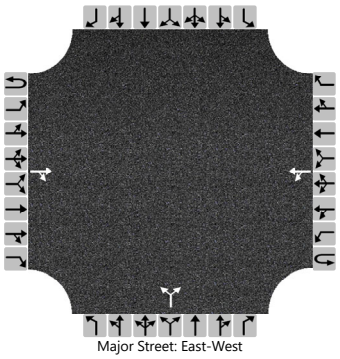
General Information

Analyst	TM
Agency/Co.	GHA
Date Performed	12/12/2019
Analysis Year	2019
Time Analyzed	5:00-6:00 PM
Intersection Orientation	East-West
Project Description	Existing PM Street

Site Information

Intersection	Techny at W School
Jurisdiction	CCDOTH
East/West Street	Techny Road
North/South Street	West School Access
Peak Hour Factor	0.97
Analysis Time Period (hrs)	0.25

Lanes


Major Street: East-West

Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority	1U	1	2	3	4U	4	5	6		7	8	9		10	11	12
Number of Lanes	0	0	1	0	0	0	1	0		0	1	0		0	0	0
Configuration				TR		LT					LR					
Volume (veh/h)			354	11		6	684			16		5				
Percent Heavy Vehicles (%)						0				0		0				
Proportion Time Blocked																
Percent Grade (%)										0						
Right Turn Channelized																
Median Type | Storage																

Critical and Follow-up Headways

Base Critical Headway (sec)						4.1				7.1		6.2				
Critical Headway (sec)						4.10				6.40		6.20				
Base Follow-Up Headway (sec)						2.2				3.5		3.3				
Follow-Up Headway (sec)						2.20				3.50		3.30				

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)						6					22					
Capacity, c (veh/h)						1193					282					
v/c Ratio						0.01					0.08					
95% Queue Length, Q_{95} (veh)						0.0					0.2					
Control Delay (s/veh)						8.0					18.8					
Level of Service (LOS)						A					C					
Approach Delay (s/veh)						0.1				18.8						
Approach LOS										C						

HCS7 Two-Way Stop-Control Report

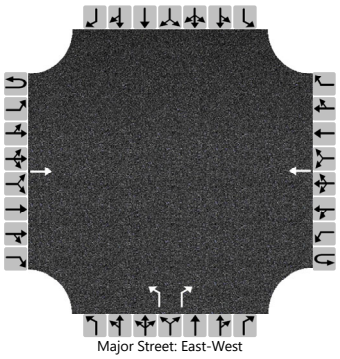
General Information

Analyst	TM
Agency/Co.	GHA
Date Performed	12/12/2019
Analysis Year	2019
Time Analyzed	7:30-8:30 AM
Intersection Orientation	East-West
Project Description	Existing AM

Site Information

Intersection	Techny at E School
Jurisdiction	CCDOTH
East/West Street	Techny Road
North/South Street	East School Access
Peak Hour Factor	0.93
Analysis Time Period (hrs)	0.25

Lanes



Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority	1U	1	2	3	4U	4	5	6		7	8	9		10	11	12
Number of Lanes	0	0	1	0	0	0	1	0		1	0	1		0	0	0
Configuration			T				T			L		R				
Volume (veh/h)			560				328			21		9				
Percent Heavy Vehicles (%)										0		0				
Proportion Time Blocked																
Percent Grade (%)										0						
Right Turn Channelized										No						
Median Type | Storage	Undivided															

Critical and Follow-up Headways

Base Critical Headway (sec)										7.1		6.2				
Critical Headway (sec)										6.40		6.20				
Base Follow-Up Headway (sec)										3.5		3.3				
Follow-Up Headway (sec)										3.50		3.30				

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)										23		10				
Capacity, c (veh/h)										289		503				
v/c Ratio										0.08		0.02				
95% Queue Length, Q_{95} (veh)										0.3		0.1				
Control Delay (s/veh)										18.5		12.3				
Level of Service (LOS)										C		B				
Approach Delay (s/veh)										16.6						
Approach LOS										C						

HCS7 Two-Way Stop-Control Report

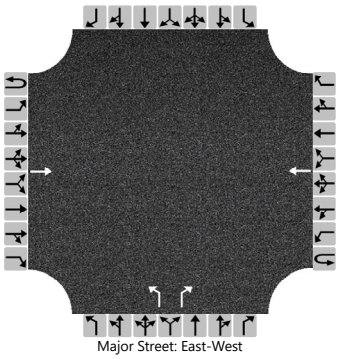
General Information

Analyst	TM
Agency/Co.	GHA
Date Performed	12/12/2019
Analysis Year	2019
Time Analyzed	3:30-4:30 PM
Intersection Orientation	East-West
Project Description	Existing PM School

Site Information

Intersection	Techny at E School
Jurisdiction	CCDOTH
East/West Street	Techny Road
North/South Street	East School Access
Peak Hour Factor	0.95
Analysis Time Period (hrs)	0.25

Lanes


Major Street: East-West

Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority	1U	1	2	3	4U	4	5	6		7	8	9		10	11	12
Number of Lanes	0	0	1	0	0	0	1	0		1	0	1		0	0	0
Configuration			T				T			L		R				
Volume (veh/h)			302				578			30		12				
Percent Heavy Vehicles (%)										0		0				
Proportion Time Blocked																
Percent Grade (%)										0						
Right Turn Channelized										No						
Median Type | Storage	Undivided															

Critical and Follow-up Headways

Base Critical Headway (sec)										7.1		6.2				
Critical Headway (sec)										6.40		6.20				
Base Follow-Up Headway (sec)										3.5		3.3				
Follow-Up Headway (sec)										3.50		3.30				

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)										32		13				
Capacity, c (veh/h)										297		719				
v/c Ratio										0.11		0.02				
95% Queue Length, Q_{95} (veh)										0.4		0.1				
Control Delay (s/veh)										18.6		10.1				
Level of Service (LOS)										C		B				
Approach Delay (s/veh)										16.1						
Approach LOS										C						

Pedestrian Level of Service				
Flow (ped/hr)	0	0	5	
Two-Stage Crossing			No	
Pedestrian Platooning			No	
Conflicting Vehicular Flow (veh/h)				
Average Delay (s)			0.2	
Level of Service (LOS)			A	

HCS7 Two-Way Stop-Control Report

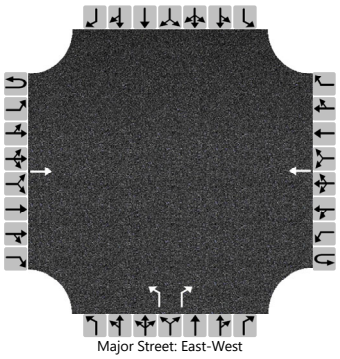
General Information

Analyst	TM
Agency/Co.	GHA
Date Performed	12/12/2019
Analysis Year	2019
Time Analyzed	5:00-6:00 PM
Intersection Orientation	East-West
Project Description	Existing PM Street

Site Information

Intersection	Techny at E School
Jurisdiction	CCDOTH
East/West Street	Techny Road
North/South Street	East School Access
Peak Hour Factor	0.95
Analysis Time Period (hrs)	0.25

Lanes



Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority	1U	1	2	3	4U	4	5	6		7	8	9		10	11	12
Number of Lanes	0	0	1	0	0	0	1	0		1	0	1		0	0	0
Configuration			T				T			L		R				
Volume (veh/h)			359				680			10		10				
Percent Heavy Vehicles (%)										0		0				
Proportion Time Blocked																
Percent Grade (%)										0						
Right Turn Channelized										No						
Median Type | Storage	Undivided															

Critical and Follow-up Headways

Base Critical Headway (sec)										7.1		6.2				
Critical Headway (sec)										6.40		6.20				
Base Follow-Up Headway (sec)										3.5		3.3				
Follow-Up Headway (sec)										3.50		3.30				

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)										11		11				
Capacity, c (veh/h)										239		673				
v/c Ratio										0.04		0.02				
95% Queue Length, Q_{95} (veh)										0.1		0.0				
Control Delay (s/veh)										20.8		10.4				
Level of Service (LOS)										C		B				
Approach Delay (s/veh)										15.6						
Approach LOS										C						