

GROSSE POINTE WAR MEMORIAL (GPWM) PARKING AND TRAFFIC STUDY REPORT, GROSSE POINTE FARMS, MI



**Prepared for: Grosse Pointe War Memorial Association
32 Lake Shore Drive
Grosse Pointe Farms, MI 48236**

**Prepared by: Tapan K. Datta, Ph.D., P.E.
Wayne State University
Transportation Research Group
5050 Anthony Wayne Drive, EDC #0504
Detroit, MI 48202**

Date: June 8, 2017

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TABLE OF CONTENTS

	<u>Page</u>
I. INTRODUCTION AND BACKGROUND	1
II. STUDY OBJECTIVES.....	1
III. DATA COLLECTION	2
IV. PARKING GENERATION ANALYSIS	14
V. PROPOSED PARKING LOT.....	15
VI. LEVEL OF SERVICE ANALYSIS	17
VII. CONCLUSIONS AND RECOMMENDATIONS	18
APPENDIX I – EXCERPTS FROM THE PARKING GENERATION MANUAL	20
APPENDIX II – EXCERPTS FROM THE CODE OF ORDINANCES-CITY OF GROSSE POINTE FARMS	26

LIST OF FIGURES

	<u>Page</u>
Figure 1. Existing Parking Layout Plan at the Project Site.....	3
Figure 2. Lake Shore Drive Existing Condition Diagram	4
Figure 3. Parking Occupancy Data on April 8, 2017.....	6
Figure 4. Diagram Showing Total Parking Occupancy on April 8, 2017.....	7
Figure 5. Parking Occupancy Data on May 14, 2017.....	8
Figure 6. Turning Traffic Volume Data at the Driveways.....	10
Figure 7. Traffic Volume Data on Lake Shore Drive	12
Figure 8. Diagram Showing Total Parking Occupancy on May 14, 2017.....	13
Figure 9. Proposed Parking Access Plan	16

LIST OF TABLES

	<u>Page</u>
Table 1. Uninterrupted Flow Level of Service for Peak Hour on May 14, 2017 (4-Lane Lake Shore Drive)	17
Table 2. Uninterrupted Flow Level of Service for Peak Hour on May 14, 2017 (2-Lane Lake Shore Drive)	17

I. INTRODUCTION AND BACKGROUND

The Grosse Pointe War Memorial campus is located south of Lake Shore Drive in Grosse Pointe Farms, Michigan. It occupies an outstanding piece of property that is very well maintained and supports a wide range of recreational and community services. The current parking facility, that the overwhelming majority is owned and maintained by the War Memorial, is located just north of the War Memorial building and serves as parking facilities for the Grosse Pointe Memorial Church and the Grosse Pointe Club. There are several driveways from Lake Shore Drive that serve as access to the War Memorial facility, the Church, and the Club. While they seem to be arranged at random, current users know exactly when and which driveway to use to access at any one of the events being held at these facilities. It becomes a little bit confusing to a newcomer to the complex who may not know where to access the property and where to park.

Lake Shore Drive is an east-west arterial that runs through Grosse Pointe Farms, Michigan. The corridor of Lake Shore Drive is located between Fisher Road and Marter Road with a total length of 5.62 miles. It is 40 feet wide and consists of four travel lanes with two lanes in each direction. A 10-foot wide sidewalk is located on both sides of the drive from Fisher Road to Edgemere Road.

II. STUDY OBJECTIVES

Instead of the existing auditorium that holds approximately 450 seats, the War Memorial is planning to implement a single screen movie theater in the existing facility that will provide seating for 165 guests. Therefore, the impact on parking and access to the property will be less than the existing condition. Operation of the new facility will continue to be performed by the War Memorial management team. The residents of the City voiced their concern about the traffic and parking issues. The War Memorial management decided to carefully study the access and parking issues and to present the study results to the City and the residents to assure mitigation of traffic circulation and parking issues.

The specific objectives of this study are:

1. Prepare existing condition diagram, as necessary, to present the traffic and parking-related issues.
2. Perform parking utilization and access-related studies on April 8, 2017 and on Mother's Day (May 14, 2017).
3. Analyze the parking and access data to identify any issues and concerns related to the use of the War Memorial facility.
4. Prepare a report to present the study conclusions and recommendations, if any.

III. DATA COLLECTION

As a part of the initiation of the study, all available resources and background materials were reviewed and the owner's concerns were carefully considered to develop a comprehensive study plan.

A meeting was convened on March 27, 2017 with a select group of City residents and the Grosse Pointe Farms City Administration to discuss various ideas and concerns. The meeting was quite lively and many issues (real and perceived) were discussed that provided the framework for the study.

The data collection effort started with a comprehensive reconnaissance survey in the vicinity of the facility, which included noting the roadway geometry and the existing parking stalls. The dimensions of the existing buildings in the study area and the parking aisles, as well as the stalls, were noted. These data provided the background for the preparation of the existing plans and layouts that were used in the study.

Existing condition diagrams were prepared and shown in Figures 1 and 2 using the field survey data and numerous photographs, which were taken on Mother's Day for the traffic and parking study. **The parking lot has been divided into three areas: X, Y and Z, and the total number of existing parking spaces is 294.** Currently, vehicles can access in and out of the War Memorial campus and the Grosse Pointe Memorial Church through four driveways.

Parking zone	Number of spaces
A	27
B	17
C	17
D	16
E	19
F	20
G	20
H	20
I	20
J	17
K	15
L	17
M	13
N	6
O	22
P	11
Q	5
R	8
S	4

Total Number of Spaces in Area X = 82
 Total Number of Spaces in Area Y = 111
 Total Number of Spaces in Area Z = 101
 Total Existing Parking Capacity = 294

WAYNE STATE UNIVERSITY
 TRANSPORTATION RESEARCH GROUP
 5050 ANTHONY WAYNE DRIVE, ROOM NO. 0594-08
 DETROIT, MICHIGAN, 48202

TITLE
 EXISTING PARKING LAYOUT PLAN
 AT THE
 PROJECT SITE

DRAWN	SAROU NAPIT	CHECKED	TAPAN DATTA
DESIGNED		APPROVED	TAPAN DATTA
DATE	03/23/2017		

SHEET 01 OF 09

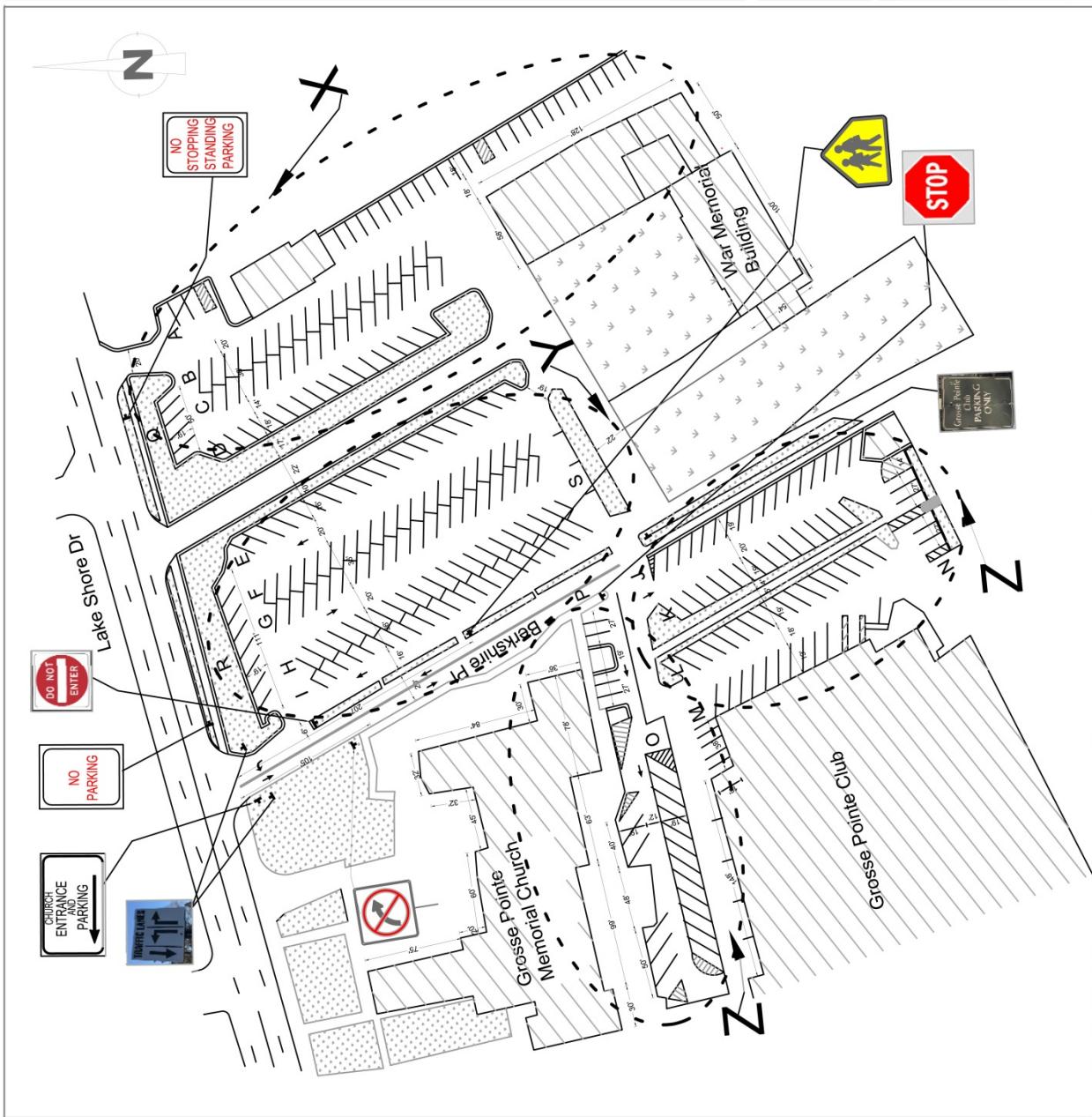


Figure 1. Existing Parking Layout Plan at the Project Site

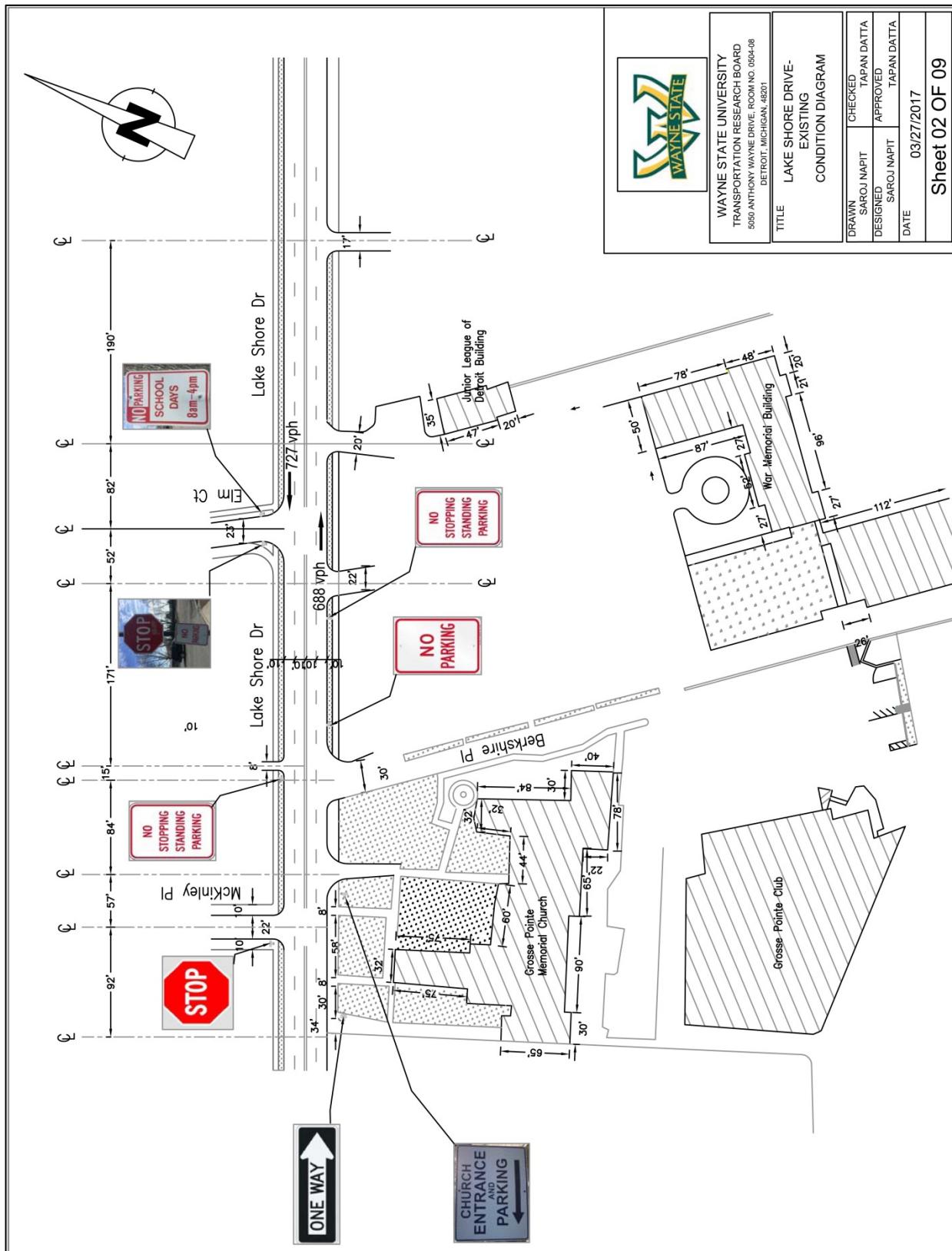
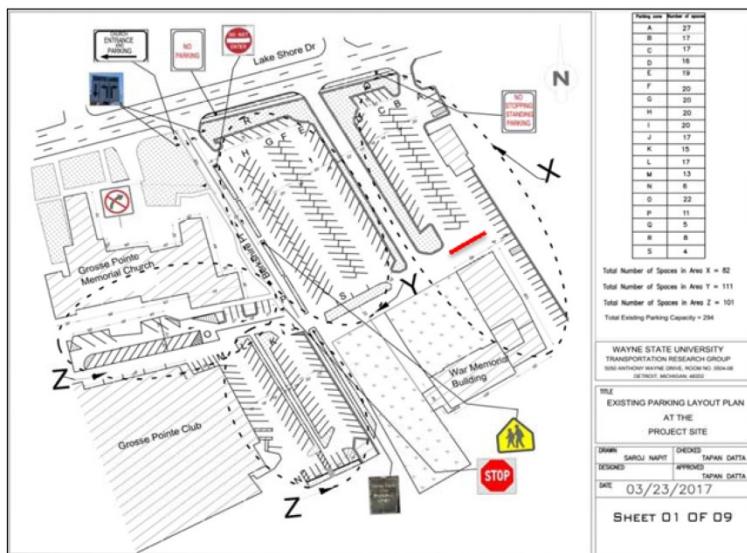


Figure 2. Lake Shore Drive Existing Condition Diagram

Figure 3 shows the summary of the parking data as observed on April 8, 2017. The data was collected in every 15-minute intervals between 1:00 PM and 3:30 PM. The day was selected as suggested by the management due to a special event. The collected data matched the expected patrons, which was about 500. The maximum parking occupancy for a particular 15-minute interval was 223 out of 294 parking spaces. During the data collection period, it was observed that there were some intervals during that time period when the entire parking lot of the War Memorial building was filled, but many parking spaces of the Grosse Pointe Memorial Church were still vacant.

Figure 4 represents the parking data for April 8, 2017 in the form of a diagram. From the diagram it is evident that between 2:15 PM and 2:45 PM the parking spaces in Area ‘X’ were completely filled, while it was nearly filled in Area ‘Y’. Also, during the same time period, there were vacant spaces in Area ‘Z’.

Figure 5 shows a summary table for parking occupancy on Mother’s Day (May 14, 2017) from 9:00 AM to 5:30 PM. Parking data were collected in every 15-minute intervals. Due to various special events on that day, the total expected patrons were about 1,000 in the War Memorial building, Grosse Pointe Memorial Church, and Grosse Pointe Club. Also, there was a Mother’s Day brunch from 10:30 AM to 3:00 PM and a ‘Beauty and the Beast’ performance starting at 2:00 PM. In addition to this, the Grosse Pointe Memorial Church services were scheduled at 9:00 AM, 11:00 AM, and 5:00 PM and the Grosse Pointe Club had a brunch at 11:00 AM. Therefore, it was a suitable day for data collection due to the various special events in the facility. According to Figure 5, the maximum parking occupancy on that day was 289, out of the 294 total available parking spaces. Also, observation showed that there were many intervals when all the parking spaces of the War Memorial building were filled up and the Parking Authority allowed vehicles to be parked on the driveways, while at the same time, there were vacant parking spaces at the Grosse Pointe Memorial Church.



Date:	4/8/2017
Weather	Clear

Total Parking Occupancy Data

Start Time (Duration 15 Minutes)	Vehicles Parked at Lot X	Vehicles Parked at Lot Y	Vehicles Parked at Lot Z	Vehicle Parking Allowed by Parking Authority (highlighted in red in plan)	Total Occupancy for each 15-min. Interval
1:00 PM	76	10	19	0	105
1:15 PM	76	10	14	0	100
1:30 PM	75	52	23	0	150
1:45 PM	79	101	27	0	207
2:00 PM	80	108	30	0	218
2:15 PM	82	110	29	0	221
2:30 PM	82	110	30	1	223
2:45 PM	82	110	29	2	223
3:00 PM	81	108	29	0	218
3:15 PM	82	107	28	1	218
3:30 PM	82	107	27	1	217

Maximum Occupancy for a particular 15-minute interval = 223

Total Existing Parking Capacity = 294

Figure 3. Parking Occupancy Data on April 8, 2017

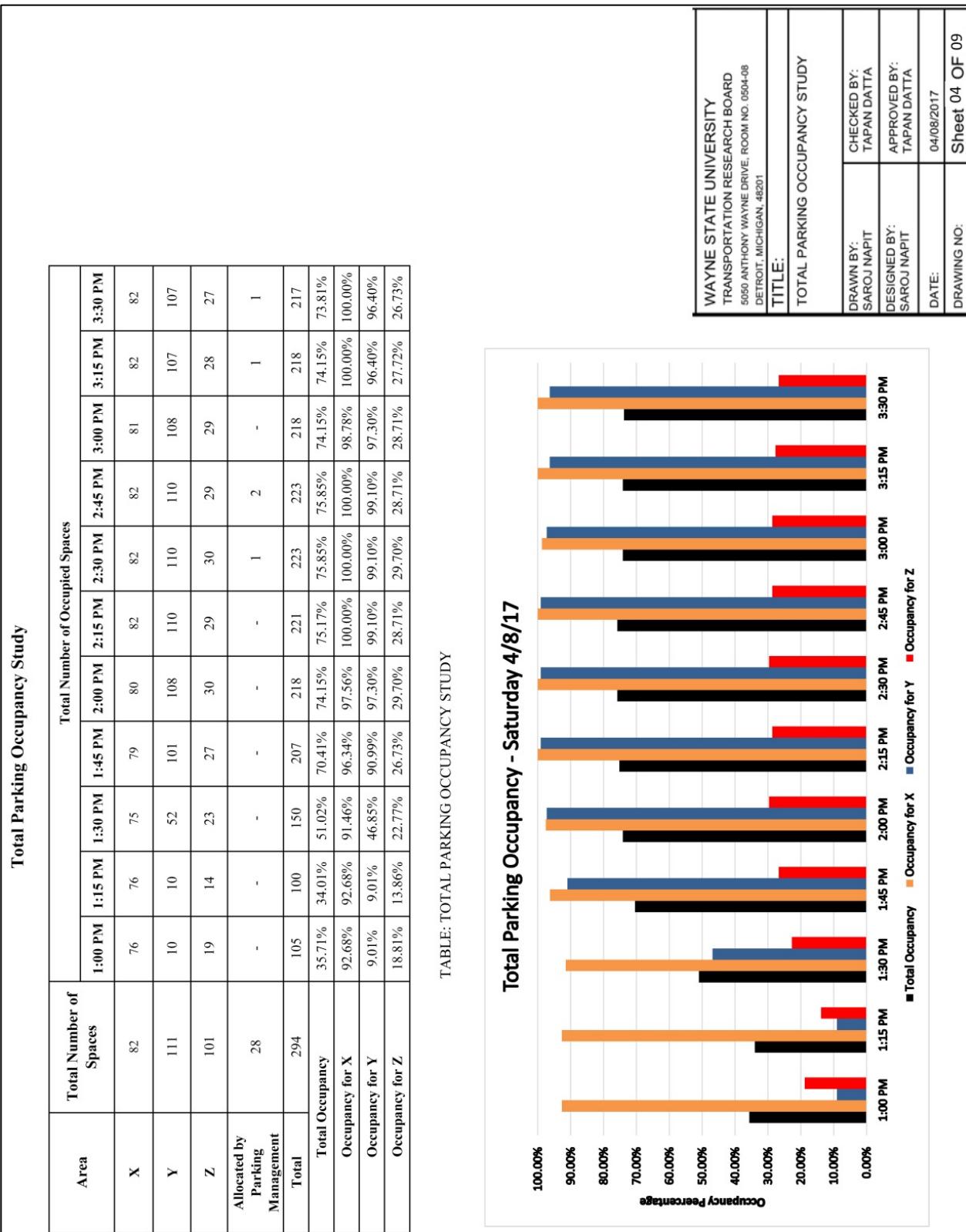
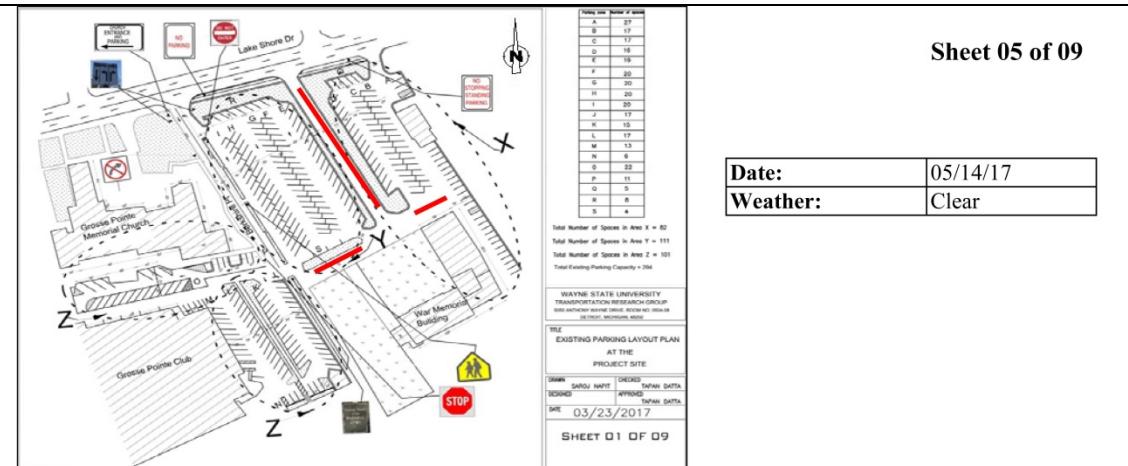


Figure 4. Diagram Showing Total Parking Occupancy on April 8, 2017



Sheet 05 of 09

Date:	05/14/17
Weather:	Clear

Total Parking Occupancy Data

Start Time (Duration 15 Minutes)	Vehicles Parked at Lot X	Vehicles Parked at Lot Y	Vehicles Parked at Lot Z	Vehicle Parking Allowed by Parking Authority (highlighted in red in plan)	Total Occupancy for each 15-min. Interval
9:00 AM	22	79	56	-	157
9:15 AM	22	68	57	-	147
9:30 AM	24	77	65	-	166
9:45 AM	23	75	68	-	166
10:00 AM	24	88	63	-	175
10:15 AM	24	48	51	-	123
10:30 AM	26	41	47	-	114
10:45 AM	27	53	54	-	134
11:00 AM	29	67	63	-	159
11:15 AM	27	61	62	-	150
11:30 AM	30	83	61	-	174
11:45 AM	28	87	59	-	174
12:00 PM	32	90	58	-	180
12:15 PM	30	73	47	-	150
12:30 PM	28	53	38	-	119
12:45 PM	28	52	36	-	116
1:00 PM	32	47	35	-	114
1:15 PM	33	50	33	-	116
1:30 PM	42	59	41	-	142
1:45 PM	78	106	47	-	231
2:00 PM	80	111	65	28	284
2:15 PM	82	110	66	28	286
2:30 PM	82	111	68	28	289
2:45 PM	80	111	70	25	286
3:00 PM	79	111	69	25	284
3:15 PM	79	111	70	25	285
3:30 PM	81	105	70	24	280
3:45 PM	74	102	70	26	272
4:00 PM	72	103	70	24	269
4:15 PM	70	102	54	24	250
4:30 PM	69	98	53	24	244
4:45 PM	62	61	34	18	175
5:00 PM	28	27	34	-	89
5:15 PM	21	13	22	-	56

Maximum Total Occupancy for a particular 15-minute interval = 289
Total Existing Parking Capacity = 294

Figure 5. Parking Occupancy Data on May 14, 2017

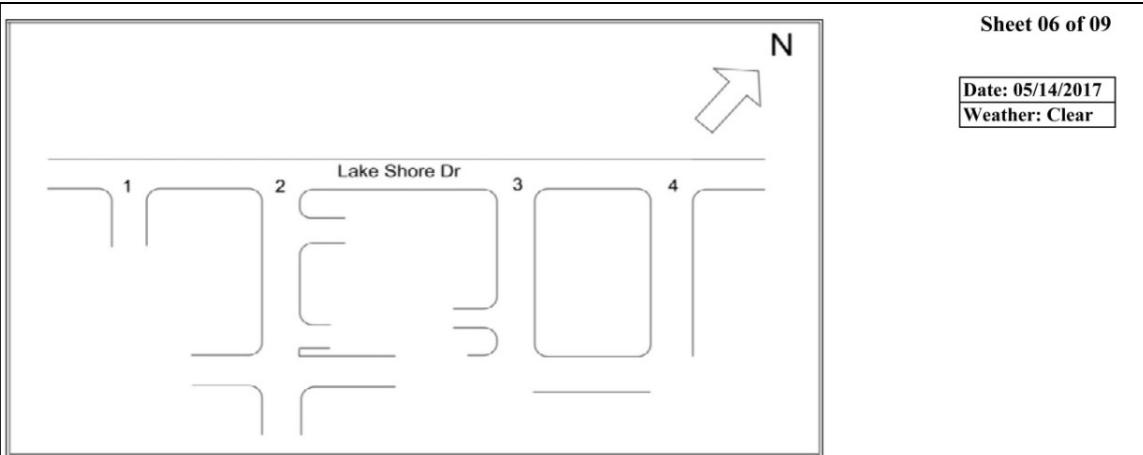
Figure 6 represents the turning traffic volume counts at the driveways in every 15-minute intervals from 9:00 AM to 5:30 PM on May 14, 2017. Data were collected at all of the four driveways through which the facility can be accessed. It can be noted that the total number of entering vehicles were 575 and the total number of exiting vehicles were 679 from 9:00 AM to 5:30 PM.

Figure 7 represents the traffic volume count on Lake Shore Drive for both directions. Data were collected on May 14, 2017 in every 15-minute intervals between 9:00 AM and 5:30 PM. From Figure 7 it can be seen that the peak hour volume data was between 1:15 PM and 2:15 PM. The peak hour volume for eastbound traffic was 688 with a Peak Hour Factor (PHF) of 0.68. Likewise, for westbound traffic the peak hour volume was 727 with a PHF of 0.84. These data were used for the existing capacity analysis.

Figure 8 represents the parking occupancy data on May 14, 2017 in the form of a diagram. From the diagram, it can be noted that during most of the time intervals, parking occupancy at Areas ‘X’ and ‘Y’ were completely full; however, there were many vacant parking spaces in Area ‘Z’ during the same period.

N

Date: 05/14/2017
Weather: Clear



Turning Traffic Volume At the Driveways

Time Interval	Driveway No.	Vehicles Entered	Total Vehicles Entered every 15-Min. Interval	Vehicles Exited	Total Vehicles Exited every 15-Min. Interval
9:00 AM-9:15 AM	1	1	13	N/A	3
	2	7		2	
	3	5		1	
	4	0		0	
9:15 AM-9:30 AM	1	1	3	N/A	1
	2	2		1	
	3	0		0	
	4	0		0	
9:30 AM-9:45 AM	1	1	11	N/A	4
	2	6		2	
	3	4		0	
	4	0		2	
9:45 AM-10:00 AM	1	0	9	N/A	3
	2	7		2	
	3	2		0	
	4	0		1	
10:00 AM-10:15 AM	1	1	11	N/A	69
	2	5		65	
	3	5		3	
	4	0		1	
10:15 AM-10:30 AM	1	2	41	N/A	32
	2	9		29	
	3	30		3	
	4	0		0	
10:30 AM-10:45 AM	1	1	7	N/A	3
	2	5		3	
	3	1		0	
	4	0		0	
10:45 AM-11:00 AM	1	10	48	N/A	11
	2	22		11	
	3	16		0	
	4	0		0	
11:00 AM-11:15 AM	1	9	22	N/A	26
	2	8		24	
	3	5		1	
	4	0		1	
11:15 AM-11:30 AM	1	6	26	N/A	5
	2	7		5	
	3	12		0	
	4	1		0	
11:30 AM-11:45 AM	1	4	15	N/A	4
	2	4		4	
	3	7		0	
	4	0		0	
11:45 AM-12:00 PM	1	2	18	N/A	8
	2	6		3	
	3	10		2	
	4	0		3	
12:00 PM-12:15 PM	1	5	15	N/A	36
	2	8		33	
	3	2		2	
	4	0		1	
12:15 PM-12:30 PM	1	7	14	N/A	21
	2	6		17	
	3	1		3	
	4	0		1	

Figure 6. Turning Traffic Volume Data at the Driveways

12:30 PM-12:45 PM	1	5	12	N/A
	2	7		13
	3	0		2
	4	0		0
12:45 PM-1:00 PM	1	1	9	N/A
	2	6		20
	3	2		1
	4	0		0
1:00 PM-1:15 PM	1	3	23	N/A
	2	12		18
	3	8		5
	4	0		1
1:15 PM-1:30 PM	1	1	43	N/A
	2	21		16
	3	21		0
	4	0		5
1:30 PM-1:45 PM	1	3	86	N/A
	2	29		12
	3	53		1
	4	1		2
1:45 PM-2:00 PM	1	1	64	N/A
	2	9		11
	3	53		3
	4	1		0
2:00 PM-2:15 PM	1	2	11	N/A
	2	3		2
	3	5		0
	4	1		4
2:15 PM-2:30 PM	1	1	10	N/A
	2	2		8
	3	7		1
	4	0		1
2:30 PM-2:45 PM	1	1	6	N/A
	2	3		5
	3	2		4
	4	0		3
2:45 PM-3:00 PM	1	0	9	N/A
	2	2		2
	3	7		1
	4	0		2
3:00 PM-3:15 PM	1	0	6	N/A
	2	3		7
	3	3		3
	4	0		3
3:15 PM-3:30 PM	1	2	7	N/A
	2	0		9
	3	5		0
	4	0		2
3:30 PM-3:45 PM	1	0	1	N/A
	2	0		11
	3	1		0
	4	0		5
3:45 PM-4:00 PM	1	1	6	N/A
	2	0		9
	3	5		1
	4	0		3
4:00 PM-4:15 PM	1	0	5	N/A
	2	3		6
	3	2		1
	4	0		8
4:15 PM-4:30 PM	1	3	3	N/A
	2	0		14
	3	0		0
	4	0		2
4:30 PM-4:45 PM	1	3	9	N/A
	2	4		10
	3	2		2
	4	0		5
4:45 PM-5:00 PM	1	4	10	N/A
	2	4		78
	3	2		9
	4	0		43
5:00 PM-5:15 PM	1	0	2	N/A
	2	2		35
	3	0		23
	4	0		8
5:15 PM-5:30 PM	1	0	0	N/A
	2	0		4
	3	0		2
	4	0		7

Total Number of Vehicles Entered = 575
Total Number of Vehicles Existed = 679

Figure 6. Turning Traffic Volume Data at the Driveways (Continued)

Date: 05/14/2017

Weather: Clear

Lake Shore Dr



727 vph ←

688 vph →

Traffic Volume - Lake Shore Drive

Time Interval	Vehicles travelling EB Lake Shore Drive	Vehicles travelling WB Lake Shore Drive	Total Vehicles Travelling EB and WB Lake Shore Drive
9:00 AM-9:15 AM	62	43	105
9:15 AM-9:30 AM	47	61	108
9:30 AM-9:45 AM	64	94	158
9:45 AM-10:00 AM	79	78	157
10:00 AM-10:15 AM	110	85	195
10:15 AM-10:30 AM	75	112	187
10:30 AM-10:45 AM	93	101	194
10:45 AM-11:00 AM	114	177	291
11:00 AM-11:15 AM	109	170	279
11:15 AM-11:30 AM	72	103	175
11:30 AM-11:45 AM	99	157	256
11:45 AM-12:00 PM	124	147	271
12:00 PM-12:15 PM	89	108	197
12:15 PM-12:30 PM	218	158	376
12:30 PM-12:45 PM	144	147	291
12:45 PM-1:00 PM	147	156	303
1:00 PM-1:15 PM	148	163	311
1:15 PM-1:30 PM	141	197	338
1:30 PM-1:45 PM	167	205	372
1:45 PM-2:00 PM	126	109	235
2:00 PM-2:15 PM	254	216	470
2:15 PM-2:30 PM	98	108	206
2:30 PM-2:45 PM	112	128	240
2:45 PM-3:00 PM	119	118	237
3:00 PM-3:15 PM	115	111	226
3:15 PM-3:30 PM	128	140	268
3:30 PM-3:45 PM	140	130	270
3:45 PM-4:00 PM	106	109	215
4:00 PM-4:15 PM	139	113	252
4:15 PM-4:30 PM	130	149	279
4:30 PM-4:45 PM	146	128	274
4:45 PM-5:00 PM	261	182	443
5:00 PM-5:15 PM	195	144	339
5:15 PM-5:30 PM	86	72	158

Total Number of Vehicles travelling Eastbound on Lake Shore Drive between 9AM and 6PM = 4,257

Total Number of Vehicles travelling Westbound on Lake Shore Drive between 9AM and 6PM = 4,419

Total Number of Vehicles travelling Eastbound and Westbound on Lake Shore Drive between 9AM and 6PM = 8,676

Figure 7. Traffic Volume Data on Lake Shore Drive

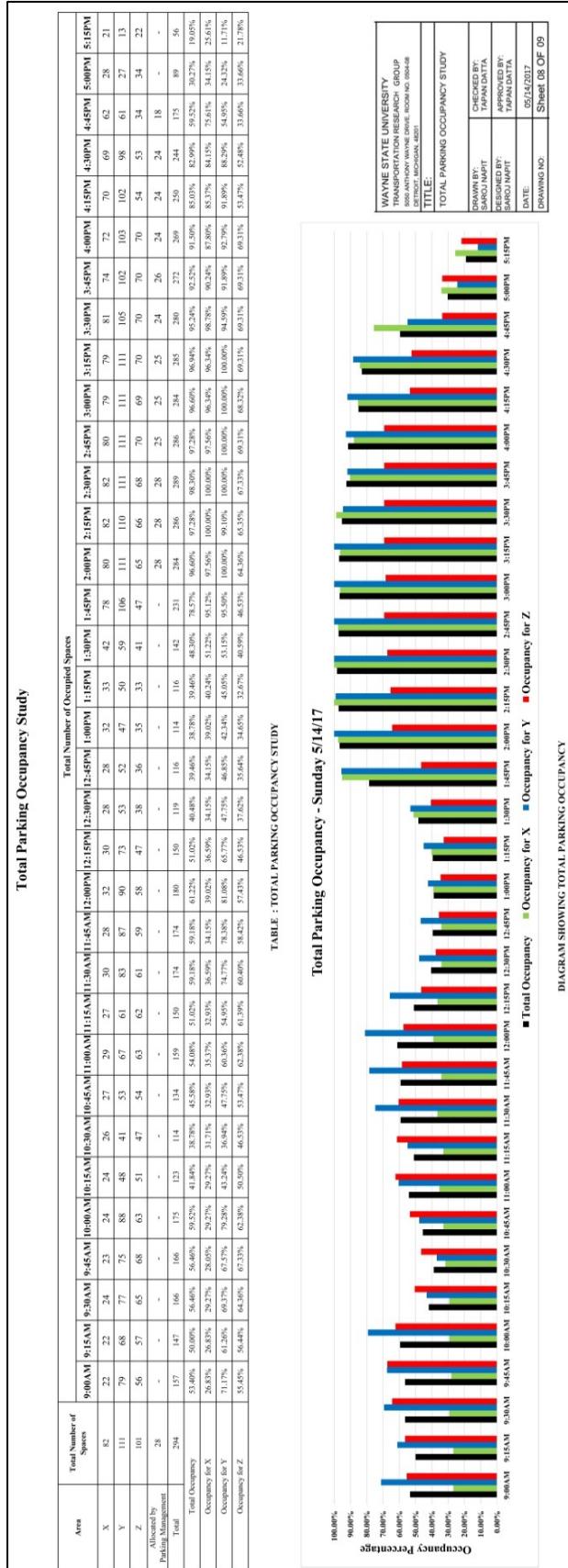


Figure 8. Diagram Showing Total Parking Occupancy on May 14, 2017

IV. PARKING GENERATION ANALYSIS

The parking space requirement estimate was performed with various methods, which includes the Parking Generation Manual (published by the Institute of Transportation Engineers), past ticket sale estimation, as well as similar site experiences.

The planning estimate, based on the Parking Generation Manual (see Appendix I), can be estimated as follows:

Using the ITE Parking Generation Manual for the Saturday Peak period parking demand
(ITE Land Use: 444, page no. 107)

$$P = 0.21X - 33$$

$$\text{With } R^2 = 0.72$$

Where: P = Parked Vehicles

X = Number of Seats

$$P = 0.21(165) - 33$$

$$P = 1.65$$

Using the ITE Parking Generation Manual for the Sunday Peak period parking demand
(ITE Land Use: 444, page no. 108)

Peak Period = 4:00 to 5:00 PM

Average Peak Period Parking Demand = 0.11 vehicles per seat = 0.11 * 165 = 19

According to the Code of Ordinances–City of Grosse Pointe Farms, the required parking for a theater is one parking space for each three-seat spaces in the main assembly (see Appendix II). Therefore, the number of parking spaces required for a 165-seat single-screen movie theater is 55.

V. PROPOSED PARKING LOT

A total of 294 of the existing parking spaces will be replaced in the proposed parking plan of the facility. The study proposes to provide a total of 383 parking spaces (see Figure 9). The proposed typical dimension of a parking stall is 20 feet by 8.5 feet for 90-degree orientation with a 24-foot wide 2-way aisle. The aisle and rows of parking are proposed to keep parallel to the long dimension of the facility and parking on both sides of an aisle. The entire existing parking layout is modified, which includes the removal of the existing 50-foot driveway and islands. In addition, parking spaces will be added by clearing islands on the north side of the parking lot. A sidewalk is cut off at about 170 feet from the main driveway and a zebra crosswalk is proposed to be installed for pedestrian movement. This adjustment will add 13 extra parking spaces. It is obvious that accessible spaces are required when parking facilities are added or altered. This proposed modification is aimed to provide accessible parking spaces that are required for each parking facility where the public is expected to park. This change is not necessary for the proposed Patriot Cinema.

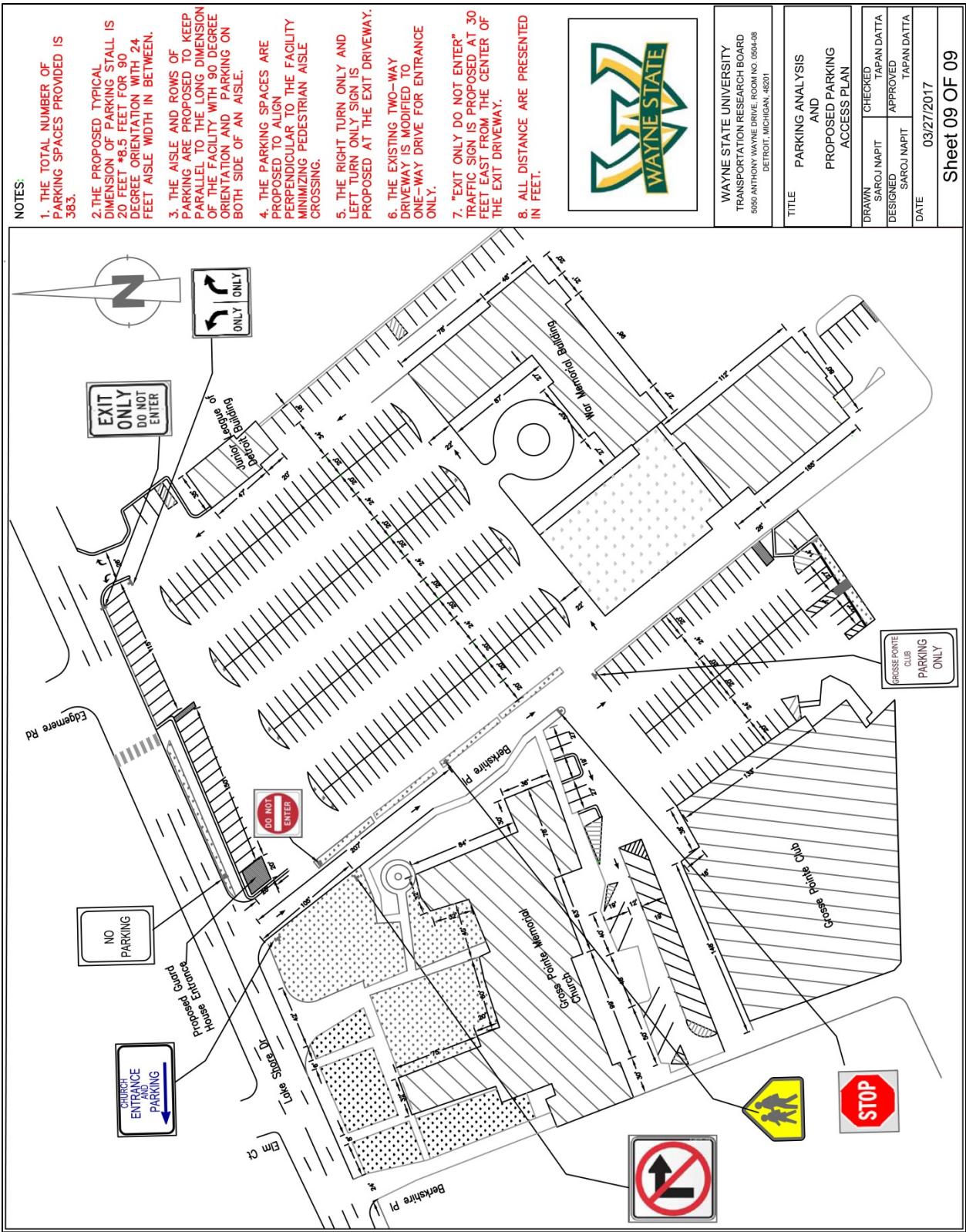


Figure 9. Proposed Parking Access Plan

VI. LEVEL OF SERVICE ANALYSIS

A delay and level of service (LOS) analysis was performed on Lake Shore Drive using the Highway Capacity Software (HCS). The operational analysis in the study covers peak periods from 1:15 PM to 2:15 PM on May 14, 2017. The LOS analysis is done for both 4-lane and 2-lane roadway segments based on the traffic count data on Lake Shore Drive for both eastbound and westbound directions collected on May 14, 2017. As a result of the data collection, one of the major observations is that through traffic volumes are higher in the westbound direction compared to the eastbound direction, although at peak hour the PHF for eastbound is 0.68 and westbound is 0.84. The LOS analysis results for the existing Lake Shore Drive roadway condition are presented in Table 1. The number of rear-end left-turn crashes on Lake Shore Drive will reduce considerably if the roadway cross section is modified into a 3-lane road with one lane running in each direction with a center left-turn lane. Table 2 shows the level of service for Lake Shore Drive for a 2-lane segment road, one lane running in each direction. Also, the HCS file can be accessed through the following link:

<https://docs.wayne.edu/5934a4a5b4883/>

**Table 1. Uninterrupted Flow Level of Service for Peak Hour on May 14, 2017
(4-Lane Lake Shore Drive)**

Directional Movement	Existing Condition	
	Density	LOS
Eastbound	11.2 pc/mi/ln	B
Westbound	9.6 pc/mi/ln	A

**Table 2. Uninterrupted Flow Level of Service for Peak Hour on May 14, 2017
(2-Lane Lake Shore Drive)**

Directional Movement	Percent Free Flow Speed	LOS
Eastbound	70.7	D
Westbound	76	C

The above noted analysis establishes that no off-site road improvement is necessary due to the implementation of the Patriot Cinema in the existing War Memorial facility.

VII. CONCLUSIONS AND RECOMMENDATIONS

Based on the study, the following conclusions are drawn:

1. Existing condition diagrams were prepared after site inspection and measurement of the various buildings, parking stalls, driveways and other features.
2. Parking occupancy data were collected at every 15-minute intervals on April 8, 2017 from 1:00 PM to 3:30 PM and on Mother's Day (May 14, 2017) from 9:00 AM to 5:30 PM.
3. A diagram showing the percentage of parking occupancy at all sections of the parking lots was prepared for the data collected on April 8, 2017 and on May 14, 2017.
4. It was observed during data collection that many parking spaces for the Grosse Pointe Memorial Church were vacant during the peak parking occupancy time period for the War Memorial building.
5. Traffic turning movement counts were collected at the driveways on May 14, 2017 from 9:00 AM to 5:30 PM. Also, traffic volume counts were taken for the same time period for both directions.
6. A parking generation analysis was performed for a 165-seat single screen movie theater using the ITE Parking Generation (4th Edition) Manual and from the Code of Ordinances-City of Grosse Pointe Farms. Parking spaces required for the development were considered according to the zoning ordinance, which is 55.
7. A proposed parking layout plan was prepared with a total of 383 parking spaces, which should be adequate for the future parking demand for the facility.
8. A delay and level of service analysis was performed on Lake Shore Drive using HCS for both the eastbound and westbound directions and the operation analysis in the study covers peak periods from 1:15 PM to 2:15 PM and it notes a desirable LOS for both directions.

9. While Mother's Day is one of the busiest events, there were only 2 or 3 vehicles that utilized on-street parking on the south side of Lake Shore Drive.

Based on the study, the following recommendations are drawn:

1. Based on the studies performed, it is clear that the addition of the movie theater will not add any significant parking load. In fact, proper planning and scheduling will reduce parking issues.
2. Parking spaces are adequate to handle special events along with the planned movie theater.
3. In the future, the parking lot may be converted to 90°-angle parking with 2-way aisles. This is, however, not an essential condition for the implementation of the proposed movie theater.

APPENDIX I – EXCERPTS FROM THE PARKING GENERATION MANUAL

(Source: An Informational Report of the Institute of Transportation Engineers,
Parking Generation, 4th Edition, 2010)

Land Use: 444

Movie Theater with Matinee

Description

Traditional movie theaters consist of audience seating, less than 10 screens, a lobby and a refreshment stand. These sites show movies on weekday afternoons and evenings as well as on weekends. Multiplex movie theater (Land Use 445) is a related use.

Database Description

- Parking supply ratio: 0.27 spaces per theater seat (one study site).

Parking demand data were provided for seven sites on a Saturday. One of these sites included continuous counts during a multi-hour period between 1:00 and 9:00 p.m. At this site, the peak hour for parking demand was between 8:00 and 9:00 p.m. However, the other six Saturday study sites provided only single-hour observations of parking demand, with four reporting only mid-afternoon counts between 2:00 and 4:00 p.m. The overall peak parking demand for the afternoon data were substantially lower than that observed for evenings. It is anticipated that inclusion of additional evening parking demand data could raise the overall measured Saturday parking demand rate.

For the four study sites with Sunday parking data, all observations were during the mid-afternoon. It is expected that inclusion of additional evening parking demand data could influence the overall measured Sunday parking demand rate.

Additional Data

- Theater parking studies published by ITE indicate that as the number of screens increases, the parking demand per seat decreases.¹
- The following table exhibits the recommended time-of-day distribution for parking demand at movie theaters based on information provided in the *Shared Parking report*.²

Hour Beginning	Typical Time-of-Day Factors (Percent of Peak Period)	Post-Christmas Time-of-Day Factors (Percent of Peak Period)
12:00 p.m.	20	35
1:00 p.m.	45	60
2:00 p.m.	55	75
3:00 p.m.	55	80
4:00 p.m.	55	80
5:00 p.m.	60	80
6:00 p.m.	60	70
7:00 p.m.	80	80
8:00 p.m.	100	100
9:00 p.m.	100	100
10:00 p.m.	80	85
11:00 p.m.	65	70
12:00 a.m.	40	55

- Information on ticket sales for this land use provided an indication of how activity varies at movie theaters from day to day during the course of the year. The tables below provide a summary of movie theater ticket sales for North American theaters between 1997 and 2002. The data in the tables

¹ Institute of Transportation Engineers. *Transportation Planning Handbook*, 3rd Edition. Washington, DC: ITE, 2008. Chapter 18, page 829.

² Urban Land Institute. *Shared Parking*. Second Edition, Washington, DC: ULI, 2005. Chapter 4, page 58.

Land Use: 444 Movie Theater with Matinee

below represent averages of approximately five years of data for each day of the year (helping to balance parking demand variations caused by movie premieres and other events). Note that these data pertain to all movie theaters, including larger multiplex theaters. The percentages shown are the ratio of the specific day compared to the highest average ticket sales day of the year. Holidays are shown separately and December was broken into two halves (before Christmas holiday break and the 2 weeks during Christmas break). The top ticket sales of the year occur on the following days: 1) the day after Thanksgiving, 2) Saturdays during Christmas break, 3) the day after Christmas and 4) Saturdays in July.

**Variation in North American Ticket Sales at Movie Theaters
Day of Week and Month Comparisons to the Peak Day of the Year (1997–2002)²**

	Monday (%)	Tuesday (%)	Wednesday (%)	Thursday (%)	Friday (%)	Saturday (%)	Sunday (%)
January	22	18	14	19	52	71	41
February	16	11	10	19	48	59	34
March	13	14	13	13	49	67	42
April	13	13	12	12	45	58	37
May	26	15	18	14	51	71	54
June	26	26	29	28	65	82	65
July	39	36	38	36	77	92	76
August	27	29	26	25	61	75	62
September	15	10	8	8	35	51	32
October	11	11	9	9	42	62	38
November	13	14	19	21	63	78	48
December Pre-Holiday	15	15	16	17	48	67	45
December Holiday	61	68	69	71	78	100	80

<i>Holidays³</i>		(%)
New Years Day		81
Martin Luther King Jr. Day		40
Presidents Day		37
Memorial Day		62
Fourth of July		66
Labor Day		37
Veteran's Day		29
Thanksgiving		57
Friday After Thanksgiving		100
Christmas		76
Day after Christmas		93

Study Sites/Years

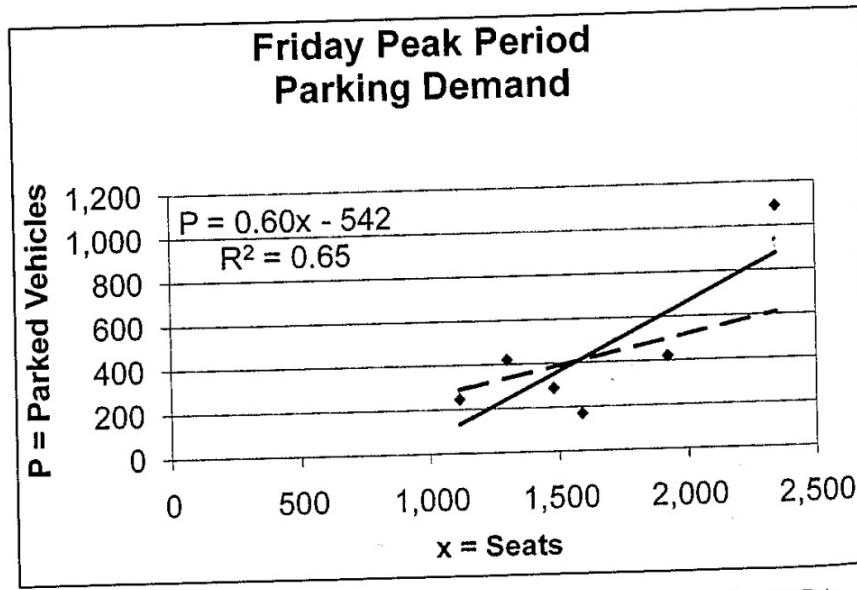
Brooklyn Center, MN (1978); Edina, MN (1978); Hopkins, MN (1978); Robbinsdale, MN (1978); Skokie, IL (1981); Dewitt, NY (1984); Hayward, CA (1984); Plymouth, PA (1997)

³ SOURCE: DKS Associates and www.the-numbers.com

Land Use: 444 Movie Theater with Matinee

**Average Peak Period Parking Demand vs. Seats
On a: Friday**

Statistic	Peak Period Demand
Peak Period	8:00–10:00 p.m.
Number of Study Sites	6
Average Size of Study Sites	1,600 seats
Average Peak Period Parking Demand	0.26 vehicles per seat
Standard Deviation	0.12
Coefficient of Variation	49%
Range	0.11–0.46 vehicles per seat
85th Percentile	0.36 vehicles per seat
33rd Percentile	0.21 vehicles per seat



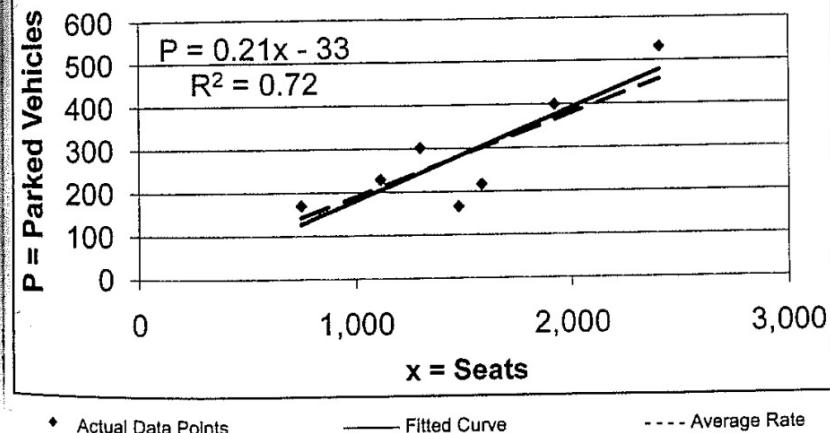
Land Use: 444 Movie Theater with Matinee

**Average Peak Period Parking Demand vs. Seats
On a Saturday**

Statistic	Peak Period Demand
Peak Period	Varies*
Number of Study Sites	7
Average Size of Study Sites	1,500 seats
Average Peak Period Parking Demand	0.19 vehicles per seat*
Standard Deviation	0.05
Coefficient of Variation	25%
Range	0.11–0.23 vehicles per seat
85th Percentile	0.23 vehicles per seat
33rd Percentile	0.20 vehicles per seat

*Caution—refer to "Database Description" section for discussion on limitations of Saturday data.

**Saturday Peak Period
Parking Demand**

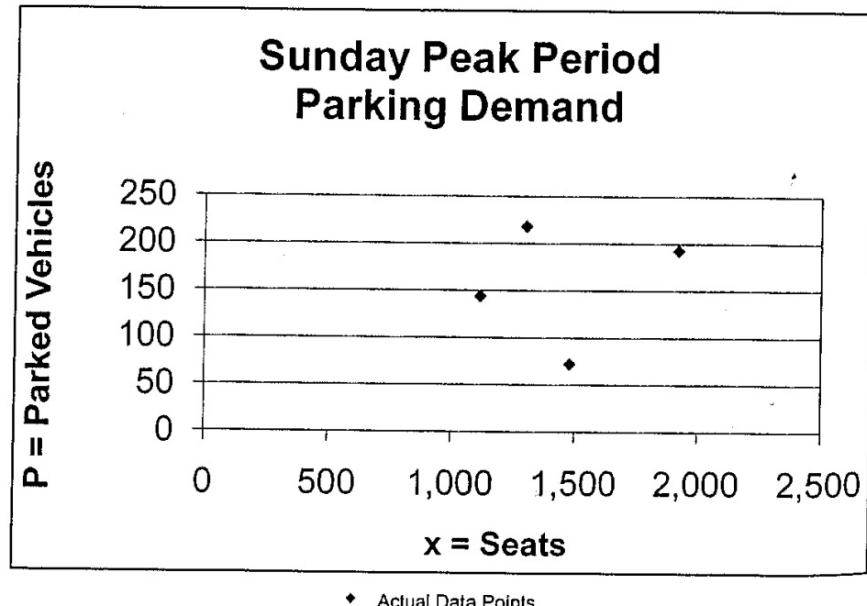


Land Use: 444 Movie Theater with Matinee

Average Peak Period Parking Demand vs. Seats
On a: Sunday

Statistic	Peak Period Demand
Peak Period	4:00–5:00 p.m. (only time period with data)
Number of Study Sites	4
Average Size of Study Sites	1,450 seats
Average Peak Period Parking Demand	0.11 vehicles per seat*
Standard Deviation	0.05
Coefficient of Variation	45%
Range	0.09–0.15 vehicles per seat
85th Percentile	0.15 vehicles per seat
33rd Percentile	0.10 vehicles per seat

* Caution—refer to "Database Description" section for discussion on limitations of Sunday data.



APPENDIX II – EXCERPTS FROM THE CODE OF ORDINANCES-
CITY OF GROSSE POINTE FARMS

A diagram of the foregoing requirements is on file in the office of the City's Building Department.

- * 9*. The amount of required off-street parking spaces for new uses or buildings, additions thereto and additions to existing buildings as specified above shall be determined in accordance with the following table, and the amount of space, so required, shall be stated in the application for a building permit and such space shall be reserved for such use:

	USE	REQUIRED PARKING
A.	RESIDENTIAL One-Family Residential Multiple-Family Residential	Two (2) parking spaces for each dwelling unit.
B.	Hospitals	Two and two-tenths (2.20) parking spaces for each one (1) bed.
C.	Auditoriums, theaters, churches, senior high schools, and community centers and other uses with Auditoriums and/or gymnasiums	One (1) parking space for each three (3) seat spaces in the main assembly area of four (4) parking spaces for each one hundred (100) square feet of usable floor area in a main assembly area without permanent seating.
D.	Schools Elementary and Junior High Schools	One (1) parking space per employee.
E.	Libraries, community buildings (without a main assembly area), and private clubs.	One (1) parking space for each one hundred (100) square feet of usable floor area.
F.	Establishments for the sale and consumption on the premises of alcoholic beverages, food or refreshments	One (1) parking space for each one hundred (100) square feet of usable square feet of usable floor are or one (1) parking space for each two (2) persons allowed within the maximum occupancy load as established by local, county, or state fire, building or health codes, whichever is greater.
G.	Banks	One (1) parking space for each one

* Sec. 1504, Par. 9 Am., Sept. 5, 1988, Ord. No. 293
Sec. 1504, Par. 9 Am., Oct. 23, 1995, Ord. No. 337