
10. TRAFFIC AND PARKING ANALYSES

Gorrill Palmer prepared the attached Traffic and Parking Analysis and has forecasted trip generation for the proposed garage and evaluated the operation of the entrances and exits onto St. John Street.

The ground level of the parking garage and surface lot will accommodate parking needs associated with the businesses at 222 St. John Street after construction. MMC is arranging for other nearby accommodations during construction. Provision of snow ban parking in the garage will be further discussed between MMC and the City of Portland.

The MMC Transportation Demand Management (TDM) Plan is discussed in the approved IDP (IDP page 74). Within the TDM, there are several parking and other strategies to manage the growth of staff parking demand. The current TDM is attached to this Section.

MMC has developed proposed shuttle routes once the staff parking garage is complete. Figures showing the inbound and outbound shuttle routes are attached to this Section.

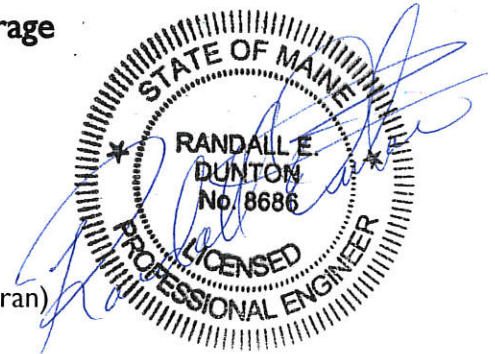
At the request of the City and based on traffic routing options, MMC analyzed a potential connection from the staff parking garage to the Fore River Parkway. A feasibility analysis was prepared and is attached to this Section.

10.1 Attachments

- Traffic Evaluation
- Transportation Demand Management Plan
- MMC Staff Parking Garage Shuttle Route Figures (Inbound & Outbound)
- Feasibility Analysis | Connecting the St. John Garage to Fore River Parkway

Traffic Evaluation
Maine Medical Center – St. John Street Garage
Portland, Maine
JN 2866.01

Date: June 19, 2018
Subject: Traffic Evaluation
St. John Street Garage – Portland, Maine
To: Alexander Green (MMC), Dave Senus (Woodard & Curran)
From: Randy Dunton / Emily Tynes, Gorrill Palmer



Introduction

Gorrill Palmer (GP) has prepared this traffic evaluation for the proposed 222 St. John Street garage to be located off St. John Street in Portland, Maine. This project is Phase 2 of 3 phases. The first phase of an East Tower overbuild and Visitor Garage overbuild are currently under construction. Phase 3 includes an expansion to the hospital to be located off Congress Street and will require a MaineDOT Traffic Movement Permit (administered by the City), as well as a more extensive and wide ranging traffic impact study that incorporate the findings of this evaluation. The garage is proposed to provide approximately 2,400 parking spaces, with an adjacent surface lot containing approximately 52 parking spaces. It should be noted that of the 2,452 spaces, 150 spaces will be allocated to tenants of 222 St. John Street, who operate during typical business hours (approximately 8:00 AM to 5:00 PM), and not on the offset shifts like the majority of Maine Medical Center employees. Also included in the garage on the first deck are 50 spaces reserved for the Eagles. GP has forecast trip generation for the proposed garage and evaluated the operation of the adjacent roadway network. The following is a summary of the methodology and results of the evaluation.

Trip Generation

The proposed garage and adjacent surface lot are anticipated to accommodate the following:

- Gilman Garage: 1,274 spaces
- Sportsman Lot: 60 spaces
- 222 St. John Street Lot: 283 spaces
- Gateway Garage: 100 spaces
- Classic Lot: 97 spaces
- 321 Brackett Street Lot: 9 spaces



- Reserved Eagles 50 spaces
- MMC Employee On-Street Parking: 200 spaces (estimated)

Total Parking Spaces = 2,073

The 200 on-street parking spaces are an approximate number of spaces intended to include vehicles that may currently park on neighborhood streets. The 50 parking spaces reserved for the Eagles are not expected to occur on a regular and frequent basis, or coincide with the peaks of MMC. However, to be conservative, for the purposes of completing this evaluation, they have been considered as MMC employee spaces with the same traffic patterns.

The Institutional Development Plan (IDP) identifies a current total of 2,027 employee parking spaces both on and off campus. The existing employee spaces that are not included in the garage spaces identified above are located in the 7 Bramhall Street lot (26 spaces). This lot is proposed to remain where it is because it serves specific programs at that location.

A parking demand analysis was conducted as part of the Transportation Plan in the IDP to determine parking needs based on supply and demand, and trip reduction efforts outlined in the TDM Plan. The analysis revealed an existing employee parking shortage of 150 to 200 spaces, with the MMC parking system typically operating at or above capacity during weekday daytime hours (IDP page 65). Approximately 500 to 600 additional employee parking spaces are required to meet projected demand based on expected staff growth. The proposed project was identified to address the shortage.

Existing Parking Area Traffic Volumes

Traffic counts were completed at the existing Gilman Garage access as follows:

- Accurate Counts - November 2, 2017 from 5:00AM to 9:00PM (16 hours) – The counts indicate that the peak hours of traffic entering and exiting the garage occurred from 6:45AM to 7:45AM with 448 trip ends, and 6:00PM to 7:00PM with 326 trip ends.
- GP – January 18, 2018 from 6:30AM to 8:00AM and 5:45PM to 7:15PM - The times were chosen based on the peak hours determined in the November 2, 2017 counts. The counts completed by GP confirmed the original findings from the November 2, 2017 counts.

Traffic counts were also completed at the existing 222 St. John Street surface parking as follows:

- GP - January 18, 2018 from 6:15AM to 7:45AM and from 3:30PM to 5:00PM
- GP - January 23, 2018 from 5:45PM to 7:15PM



The 222 St. John Street parking lot peak hours occurred from 6:15AM to 7:15AM and 3:30PM to 4:30PM. The entering and exiting traffic for each 15 minute period at the 222 St. John Street is shown on the attached “St. John Street Parking Garage Trip Generation” table.

The Gilman Employee Parking Garage and 222 St. John Street surface lot represent approximately 85% of the MMC employee spaces anticipated to be accommodated by the proposed St. John Street garage. As such, it is anticipated that when combined they will represent the majority of the traffic patterns that can be expected at the new garage. To represent the traffic patterns of the remaining 15% of the satellite lots as well as the on-street parking spaces, the traffic patterns were assumed to be similar to the 222 St. John Street satellite lot. The trip generation for each 15 minute period for each satellite parking area has been estimated based on the trip generation at the 222 St. John Street parking lot and is shown on the attached “St. John Street Parking Garage Trip Generation” table.

Proposed Parking Garage Trip Generation

Since the employees that currently park in the Gilman garage will be shifted to the new garage, they will have to take a shuttle in the future rather than have direct access to the hospital as they do currently. Because of this shift, we would expect those employees to arrive approximately 15 minutes earlier than they typically would and that they would end up leaving the new garage approximately 15 minutes later. Therefore, the counted volumes for the Gilman Garage were adjusted by 15 minutes to estimate the traffic that would be experienced when the spaces are relocated to 222 St. John Street. The adjusted Gilman Garage volumes are shown on the attached “St. John Street Parking Garage Trip Generation” table.

The total trip generation for the proposed St. John Street garage is based on adding the existing or estimated trip generation of each 15 minute period for each parking location to identify the overall AM & PM peak hours. Then, a ratio of the proposed number of parking spaces (2,452) to the existing combined number of parking spaces to forecast the trip generation for the proposed garage.

Based on the combined volumes for the parking areas and the proportional increase in number of parking spaces, the AM peak hour of the proposed garage is estimated to occur from 6:00AM to 7:00AM with **1,097** trip ends, and the PM peak hour of the garage is estimated to occur 4:15PM to 5:15PM with **571** trip ends. A trip end is a trip into or out of the site, thus a round trip is equal to two trip ends. The AM peak hour of the garage is estimated to occur significantly outside of the adjacent street (St. John Street) peak hours for the AM condition which occurs from 7:30AM to 8:30AM and closer to the PM peak hour of the adjacent street which occurs from 4:00PM to 5:00PM. It should be noted that the Traffic Impact Study for Phase 3 will take a broader look at the overall adjacent roadway network peak hours versus the peak hours of the garage.



Trip Distribution and Assignment

The garage is proposed to be accessed directly via a full movement driveway directly onto St. John Street as well as indirectly via the Margarita's driveway. During peak hours of the garage, the garage will be set up such that the ground level and first deck will be accessed via the Margarita's driveway and decks 2-8 will be accessed directly via the St. John Street access. All of the 222 St. John Street employees, the 50 Eagles spaces, and some of the MMC Campus employees will use the ground level and first deck parking spaces with decks 2 – 8 used by MMC Campus employees only. All employee shuttles throughout the day (enter and exit) will access the garage via the Margarita's access. Unused shuttles during non-peak times of the day are expected to be parked on the ground level.

The trip distribution (enter vs. exit) for the proposed St. John Street garage has been based on the counts completed at the existing 222 St. John Street surface lot and the Gilman Garage. Based on the counts, the following trip distribution is anticipated for the proposed 222 St. John Street garage:

- AM Peak Hour: 98% entering, 2% exiting
- PM Peak Hour: 14% entering, 86% exiting

The regional trip assignment has been based on the VHB travelshed completed for the IDP. For localized assignment, it is based on GP's review of the area as well as numerous discussions with the City of Portland staff and traffic consultant. The trip assignment is shown on the attached Figure 4.

Please note that the existing turning movement counts indicate that some traffic uses the existing Union Station access from Congress Street to the site. For the purposes of this assessment, to be conservative, it has been assumed that this cut-through will not be available and that traffic has been reassigned to the adjacent street. The attached Figure 6 shows the estimated MMC traffic using the Margarita's driveway, and Figure 7 shows the reassignment of the cut-through traffic (not including MMC traffic).

Shuttle Trip Generation / Assignment

As discussed above, MMC will be upgrading their current shuttle service to accommodate the new garage. In addition to employee traffic, shuttles will be used to transport employees between the parking garage and the hospital. There are proposed to be 13 shuttles during the peak hours, each with an approximate 15 minute headway. Based on this information, one shuttle can make approximately four trips to and from the proposed garage during a one hour period. With 13 shuttles, approximately 52 round (52 enter and 52 exit) trips are anticipated at the site during the peak hour. As identified previously, all entering and exiting shuttles will use the Margarita's



access. These 104 trips have been added to the employee trips. To be conservative, it has been assumed that the shuttles will turn right into the Margarita's access and left out of the Margarita's access.

2022 Predevelopment Volumes

GP completed turning movement counts at the intersection of St. John Street with the Margarita's Driveway on May 17, 18, and 19, 2017 from 6:00AM to 8:00AM, 7:45AM to 9:00AM, 5:00PM to 8:00PM, and 3:00PM to 5:00PM. Those volumes were used as the base raw volumes for St. John Street and for Margaritas during the forecast garage peak hours of 6:00AM to 7:00AM and 4:15PM to 5:15PM.

Additional turning movement counts were completed by Accurate Counts at the following intersections from 6:00AM to 9:00AM and 2:00PM to 8:00 PM on the specified dates:

- St John Street / Valley Street: November 8, 2017
- Valley Street / Commercial Street: November 2, 2017
- Congress Street / St. John Street: November 2, 2017

Turning movement counts were also completed by Gorrill Palmer at the following intersections:

- St. John Street / D Street: May 30, 2018, 6:00AM – 9:00AM and 3:00PM – 6:00PM
- Congress Street / Valley Street: December 13, 2016, 7:00AM – 9:00AM and 3:00PM – 6:00PM

The results of all counts are shown on the attached Figure 2.

Seasonal Adjustment

Traffic volumes that are not collected during peak summer months are typically seasonally adjusted to estimate traffic volumes that may be experienced during the peak summer months. Since the traffic counts were not collected during the peak summer months, the raw volumes shown on Figure 2 have been seasonally adjusted based on the weekly group mean factors published by MaineDOT. The following summarizes the adjustment at each intersection:

- Valley Street / Commercial Street: 7.0%
- St. John Street / Valley Street: 8.1%
- D Street / St. John Street: 1.2%
- Margaritas / St. John Street: 2.3%
- Congress Street / St. John Street: 7.0%
- Valley Street / Congress Street: 12.8%



Annual Growth

In addition to the seasonal adjustment, the adjacent roadway volumes were also increased by an annual growth rate to forecast the traffic that may be experienced during the build out year of the project. An annual growth rate of 0.5% per year (approved by the City and consistent with other studies in the area) has been applied to the seasonally adjusted volumes to yield the 2022 Predevelopment traffic volumes shown on the attached Figure 3. It should be noted that the employee growth rate in the IDP is forecast to be approximately 0.63% per year, which is very similar to the growth rate approved by the City for overall on-street traffic and used on other studies in the area.

2022 Postdevelopment Volumes

The 2022 Predevelopment traffic volumes shown on Figure 3 were combined with the employee and shuttle trip assignments shown on Figures 4 and 5. Then, the traffic volumes on the Existing Employee Garage Trip Assignment on Figure 6, the Existing MMC 222 St. John Street Traffic on Figure 7, and the Existing Cut-Through Traffic on Figure 8 were subtracted from the combined trip assignment to yield the 2022 Postdevelopment traffic volumes shown on Figure 9.

Signal Warrant

A signal warrant was completed for the proposed garage access using the Manual on Uniform Traffic Control Devices (MUTCD) Signal Warrant 3, Peak Hour (attached). The warrant was completed using the 2022 Postdevelopment traffic volumes on Figure 9. Based on the warrant, a signal for the garage access opposite D Street is not warranted during the AM peak hour and is marginal during the PM peak hour. During the AM peak hour, the majority of the garage traffic is entering (98%), and very little (2%) is exiting, which does not meet the warrant. During the PM peak hour of the garage, if the traffic volumes on the adjacent street increase by approximately 150 vehicles, a signal would be warranted at the intersection. It should be noted that this evaluation assumes that the shuttles turn left out of the Margarita's access. If the shuttles are shifted to turn right out of the Margarita's access then turn left onto D Street, the traffic volumes on the adjacent street would need to increase by approximately 100 vehicles for a signal to be warranted at the garage access during the PM peak hour. Additionally, a signal would improve pedestrian connectivity in the vicinity of the garage and improve the safety of pedestrian crossings on St. John Street. It is our recommendation that a signal be installed at the garage access opposite D Street.

Capacity Analysis

Based on discussions with the City, the study area intersections for this evaluation include the following. Please note that Phase 3, the MMC Congress Street expansion, will require a Traffic



Movement Permit (TMP) and full traffic impact study which will include not only these intersections, but others as well.

- Valley / Congress (Signalized)
- Congress / St. John (Signalized)
- Margaritas / St. John (Unsignalized)
- D Street / Garage / St. John (Signalized)
- Valley / St. John (Signalized)
- Commercial / Valley (Signalized)

Capacity analysis was completed for the study area intersections using Synchro/SimTraffic computer analysis software. Levels of service are similar to the academic ranking system where an 'A' is good with little control delay and an 'F' represents poor traffic conditions. If the level of service falls below a 'D', an evaluation should be made to determine if mitigation is warranted. The following tables summarize the relationship between level of service and control delay per vehicle for unsignalized and signalized intersections.

Level of Service Criteria for Unsignalized Intersections

Level of Service	Control Delay per Vehicle (sec)
A	Less than 10.0
B	10.1 to 15.0
C	15.1 to 25.0
D	25.1 to 35.0
E	35.1 to 50.0
F	Greater than 50.0

Level of Service Criteria for Signalized Intersections

Level of Service	Control Delay per Vehicle (sec)
A	Less than 10.0
B	10.1 to 20.0
C	20.1 to 35.0
D	35.1 to 55.0
E	55.1 to 80.0
F	Greater than 80.0

The capacity analysis was completed for the proposed St. John Street garage access as shown on the concept plan submitted with the overall application. This includes signalization of the St. John Street / garage access with associated restriping of St. John Street and restriping of the Margaritas exit for separate left and right lanes. This also assumes that the shuttles will turn left out of the Margaritas exit. The St. John Street southbound approach was reviewed for two separate



scenarios, one as shown on the site plan, and one that included a southbound right turn lane which is shown in the table in (). The results are based on the average of five SimTraffic runs. The following table summarizes the results of the capacity analysis. Detailed results are attached.

Level of Service Summary

Approach	Level of Service	
	2022 AM Garage Peak Hour	2022 PM Garage Peak Hour
Valley / Congress (S)		
Congress EB	A	A
Congress WB	C	B
Valley NB	B	C
Overall	B	B
Congress / St. John (S)		
Congress EB	C	C
Congress WB	C	C
St. John NB	B	C
St. John SB	C	C
Overall	C	C
Margaritas / St. John (U)		
Margaritas EB	F	C
St. John NB	C	A
St. John SB	A	A
D St / Garage / St. John (S)		
Garage EB / (with St. John SB Right)	C (B)	A (A)
D WB / (with St. John SB Right)	A (A)	A (A)
St. John NB / (with St. John SB Right)	B (A)	A (A)
St. John SB / (with St. John SB Right)	A (A)	B (B)
Overall / (with St. John SB Right)	A (A)	A (A)
Valley / St. John (S)		
St. John EB	A	B
St. John WB	B	C
Valley NB	A	B
Valley SB	A	B
Overall	A	B
Commercial / Valley (S)		
Fore River Pkwy EB	A	B
Commercial WB	B	C
Valley SB	A	B
Overall	A	B

(U) = Unsignalized, (S) = Signalized



As shown in the table, the study area intersections are forecast to operate at acceptable levels of service during the AM and PM peak hours of the garage. The garage access on St. John Street is forecast to operate at very good levels of service during the AM and PM peak hours of the garage. The Margarita's driveway on St. John Street is forecast to operate at a low level of service during the AM peak hour of the garage, due to the high volume of southbound traffic on St. John Street. It should be noted that if the shuttles turn right out of the Margarita's exit, the level of service is forecast to increase to a 'C' during the AM peak hour of the garage. Additional shuttle traffic is not forecast to significantly impact the St. John Street southbound approach at the garage access.

The construction of a right turn lane on St. John Street southbound at the proposed garage access opposite D Street is forecast to improve the level of service of the St. John Street northbound approach and the garage eastbound approach from a 'B' to an 'A' and a 'C' to a 'B', respectively, during the AM peak hour of the garage. The southbound right turn lane was included in initial intersection designs, but was removed per the request of the City of Portland to improve pedestrian accommodations.

Queue Analysis

For this evaluation, GP completed a queue analysis for key movements at the two accesses to the garage using the same Synchro/SimTraffic computer analysis software as that used to complete the capacity analysis. Queue analysis involves comparing the 95th percentile queue lengths, rounded up to the nearest five feet, to the available storage lengths. The results are based on the average of five SimTraffic runs. Please note that similar to the Capacity Analysis, the Queue Analysis evaluated two scenarios for the southbound St. John Street approach; with and without a right turn lane for traffic turning into the garage. The following table summarizes the results of the queue analysis for the key movements. Detailed results are attached.

Queue Analysis Summary

Approach	Available Storage Length (ft)	95 th Percentile Queue Lengths (ft)	
		AM Garage Peak Hour	PM Garage Peak Hour
Garage Access / St. John St.			
Garage Exit EB LT	120 (to garage)	45	125
Garage Exit EB R	120 (to garage)	25	75
D St WB LR		35	45
St. John NB L	100	115	30
St. John NB TR		40	90
St. John SB L	75	60	45
St. John SB TR		225	180
St. John SB T		120	180
St. John SB R	150	150	75



Approach	Available Storage Length (ft)	95 th Percentile Queue Lengths (ft)	
		AM Garage Peak Hour	PM Garage Peak Hour
Margaritas / St. John St.			
Exit EB L		110	115
Exit EB R	150	15	60
St. John NB LT		135	65
St. John SB TR		25	10

NB = Northbound, SB = Southbound, EB = Eastbound, WB = Westbound
 L=Left, T=Through, R=Right

As shown in the table, the proposed storage lengths are forecast to accommodate the anticipated 95th percentile queue lengths, with the exception of the St. John Street northbound left turn lane into the garage during the AM peak hour of the garage. The 95th percentile queue length is forecast to exceed the available storage length by approximately 15 feet, which is less than one vehicle, assuming a vehicle and the associated space between vehicles is 25 feet.

Additionally, if the shuttles turn right out of the Margarita's exit then left onto D Street, the queue lengths of the garage access are forecast to be improved. It is anticipated that the St. John Street southbound left turn lane would need to be increased from 75 feet to 100 feet to accommodate the additional shuttle traffic.

The addition of the St. John Street southbound right turn lane into the garage access opposite D Street is forecast to improve the queue lengths during the AM but is not forecast to significantly impact the queue lengths during the PM peak hour. The right turn lane was removed from the intersection per the request of the City to improve pedestrian accommodations.

Pedestrian Accommodations

Currently the nearest crosswalks across St. John Street are located at the intersection with C Street approximately 600 feet to the north and at the METRO station approximately 600 feet to the south. To better accommodate employees who wish to walk between the garage and work, or for pedestrians in the neighborhood, the proposed off-site mitigation along St. John Street includes a crosswalk across St. John Street on the northerly side of the garage access, as shown on the attached plan from Woodard & Curran. This crosswalk is proposed to include new ADA ramps and have pedestrian signal heads and push buttons so that they can cross with the traffic signal. In addition, MMC is reviewing available crosswalks & sidewalks, as well as street lighting between the garage and the hospital to ensure pedestrians have a designated route. See full site plan application for additional crosswalk & sidewalk locations as well as lighting upgrades.



Bicycle Accommodations

The City has recently restriped St. John Street along the site frontage to include a northbound and southbound bicycle lane. Consistent with the City's desire to provide a bicycle lane through this corridor, MMC is proposing to maintain a bicycle lane as well in each direction on St. John Street. See full Site Plan application submittal for a striping plan along the site frontage.

Conclusions

The following is a summary of the conclusions:

1. The proposed parking garage is the second phase of a three phase process. This evaluation will be incorporated into the larger more extensive traffic impact study to be submitted during phase three of the MMC expansion.
2. The proposed parking garage will accommodate six existing MMC parking areas as well as 200 on-street parking spaces (assumed) in the general neighborhood around the hospital and 50 parking spaces for the Eagles. This accounts for approximately 2,073 parking spaces. The proposed parking garage is planned to provide approximately 2,400 parking spaces in the garage and 52 parking spaces in a surface lot adjacent to the garage.
3. This project aligns with the parking demand information in the IDP.
4. The peak hours of the proposed St. John Street garage are forecast to be 6:00AM to 7:00AM and 4:15PM to 5:15PM. The peak hours of the garage are estimated to occur outside of the adjacent street (St. John Street) peak hours, which occur from 7:30AM to 8:30AM and 4:00PM to 5:00PM.
5. The employee trip generation for the proposed garage is forecast to be **1,097 AM** and **571 PM** peak hour trip ends, based on the parking demand of 2,452 spaces.
6. MMC is expected to expand their existing shuttle service to 13 shuttles during the peak hours, with a reduced level during non-peak hours. This would add approximately 104 (52 enter and 52 exit) trip ends to the Margaritas access. To be conservative, it has been assumed that the shuttles will turn right into the Margaritas access and left out of the Margaritas access.
7. Based on the MUTCD Signal Warrant 3, Peak Hour, a signal is marginal at the proposed garage access opposite D Street on St. John Street based on the 2022 Postdevelopment PM peak hour of the garage traffic volumes. If the adjacent street traffic increases by 150 vehicles during the PM peak hour of the garage, then a signal would be warranted at the



intersection. It should be noted that if the shuttles turn right out of Margaritas (instead of left) the adjacent street would need to increase by 100 vehicles to warrant a signal. A traffic signal would improve pedestrian connectivity and safety. A traffic signal at the garage access is recommended.

8. Based on the results of the capacity analysis, the study area intersections are forecast to operate at overall acceptable levels of service during both the AM and PM peak hours of the garage. The results indicate that addition of a southbound right turn lane on St. John Street at the garage access opposite D Street will slightly improve the operation of the northbound and eastbound approaches during the AM peak hour of the garage, but overall will not have a significant impact on the intersection. It should be noted that if the shuttles are directed to turn right out of the Margarita's access, the level of service of the Margarita's access is forecast to improve from an 'F' to a 'C'.
9. Based on the results of the queue analysis, the queues at the two accesses to the garage are forecast to be accommodated by the available storage lengths, with the exception of the St. John Street northbound left turn lane into the garage, which is forecast to exceed the storage length by less than one vehicle. The results indicate that addition of a southbound right turn lane on St. John Street at the garage access opposite D Street may improve the queue lengths of the southbound approach during the AM peak hour of the garage, but will not significantly impact the queue lengths during the PM peak hour of the garage. It should be noted that if the shuttles turn right out of the Margarita's access then left onto D Street, the queue lengths for the Margarita's access are forecast to improve. The St. John Street southbound left turn lane is anticipated to need to be increased from 75 feet to 100 feet to accommodate the additional shuttle traffic.
10. The proposed off-site mitigation includes signalization of the garage access onto St. John Street and striping the exit from Margaritas as separate left and right movements.

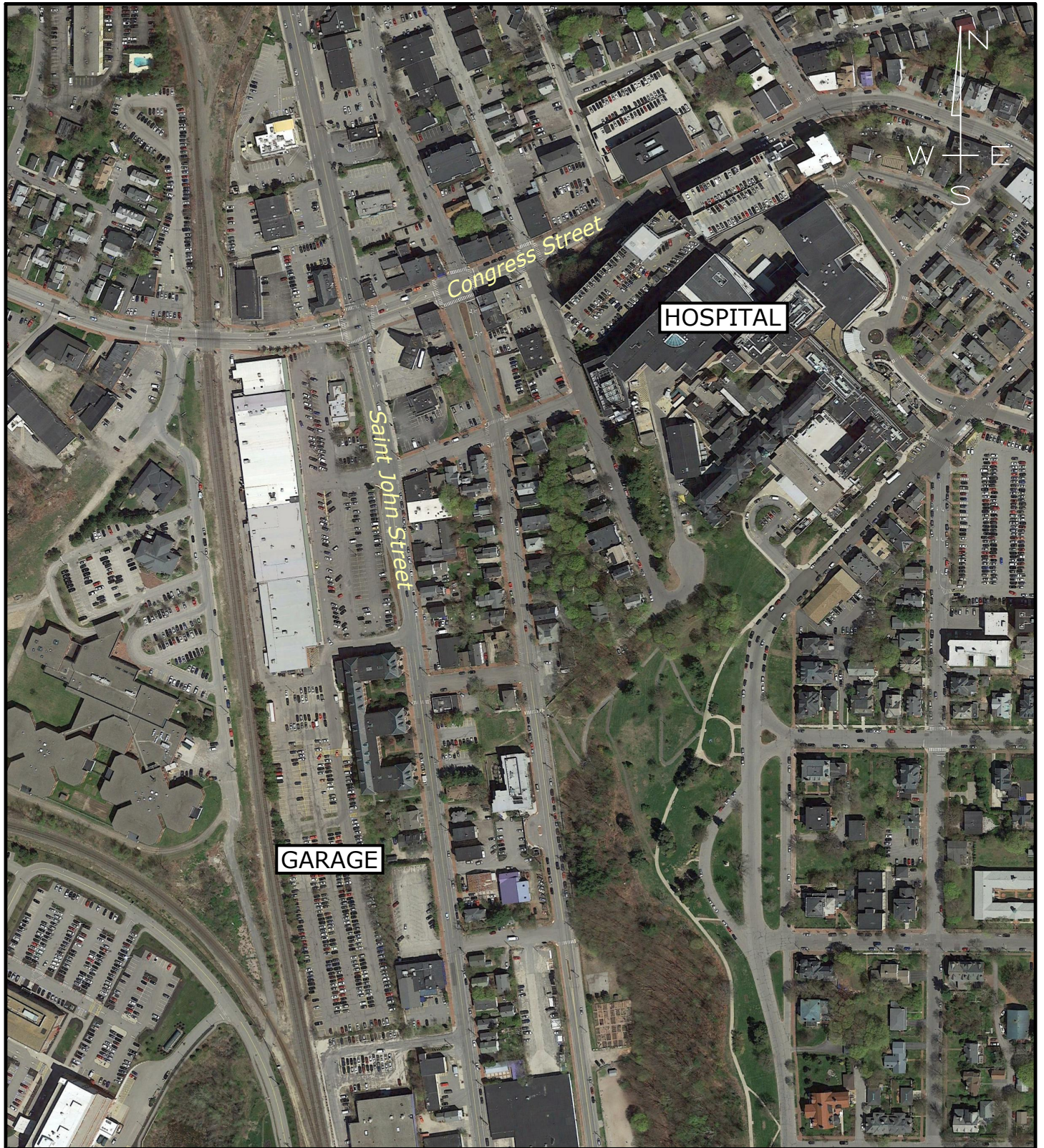
A crosswalk across St. John Street is proposed on the northerly side of the St. John Street / D Street intersection. This will include ADA accommodations for the crossing as well pedestrian signal heads and push buttons.

To accommodate bicyclists, the currently proposed off-site mitigation plan is maintaining a bicycle lane in both the northbound and southbound directions.

11. Based on this evaluation, it is our opinion that with the proposed mitigation identified herein, the proposed garage traffic can be accommodated on the adjacent roadway network.

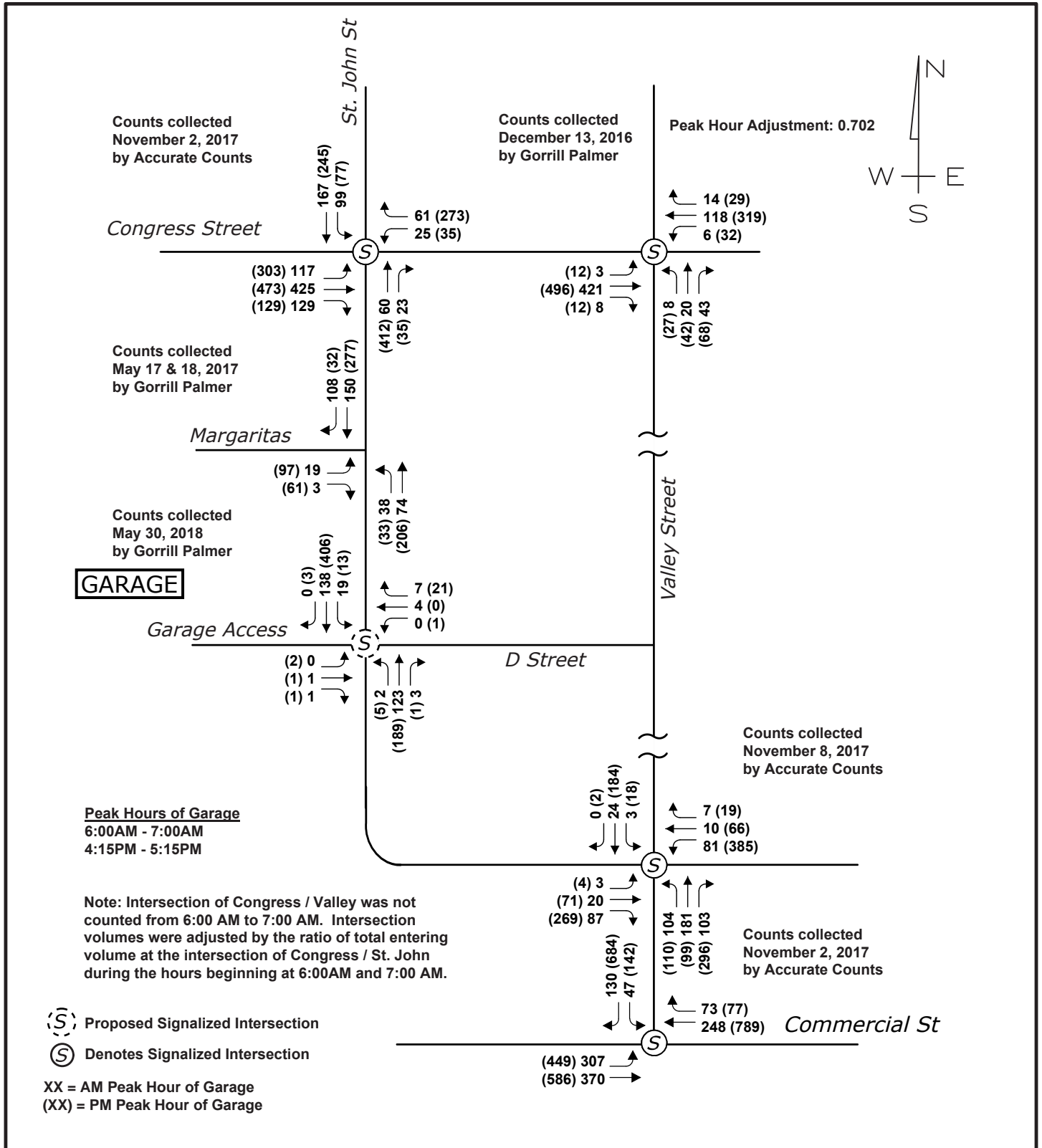
Location Map

Figure No. **1**

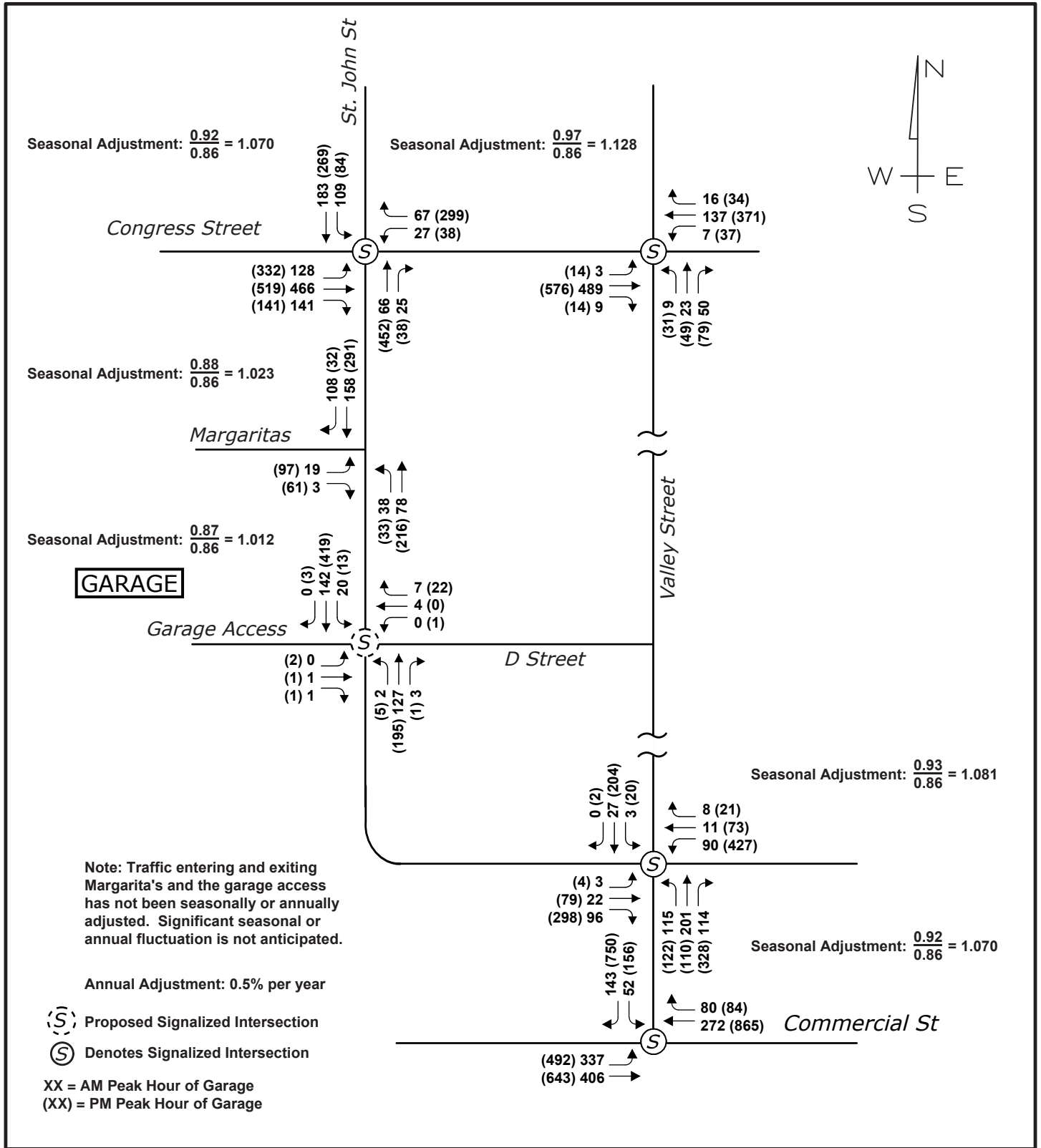


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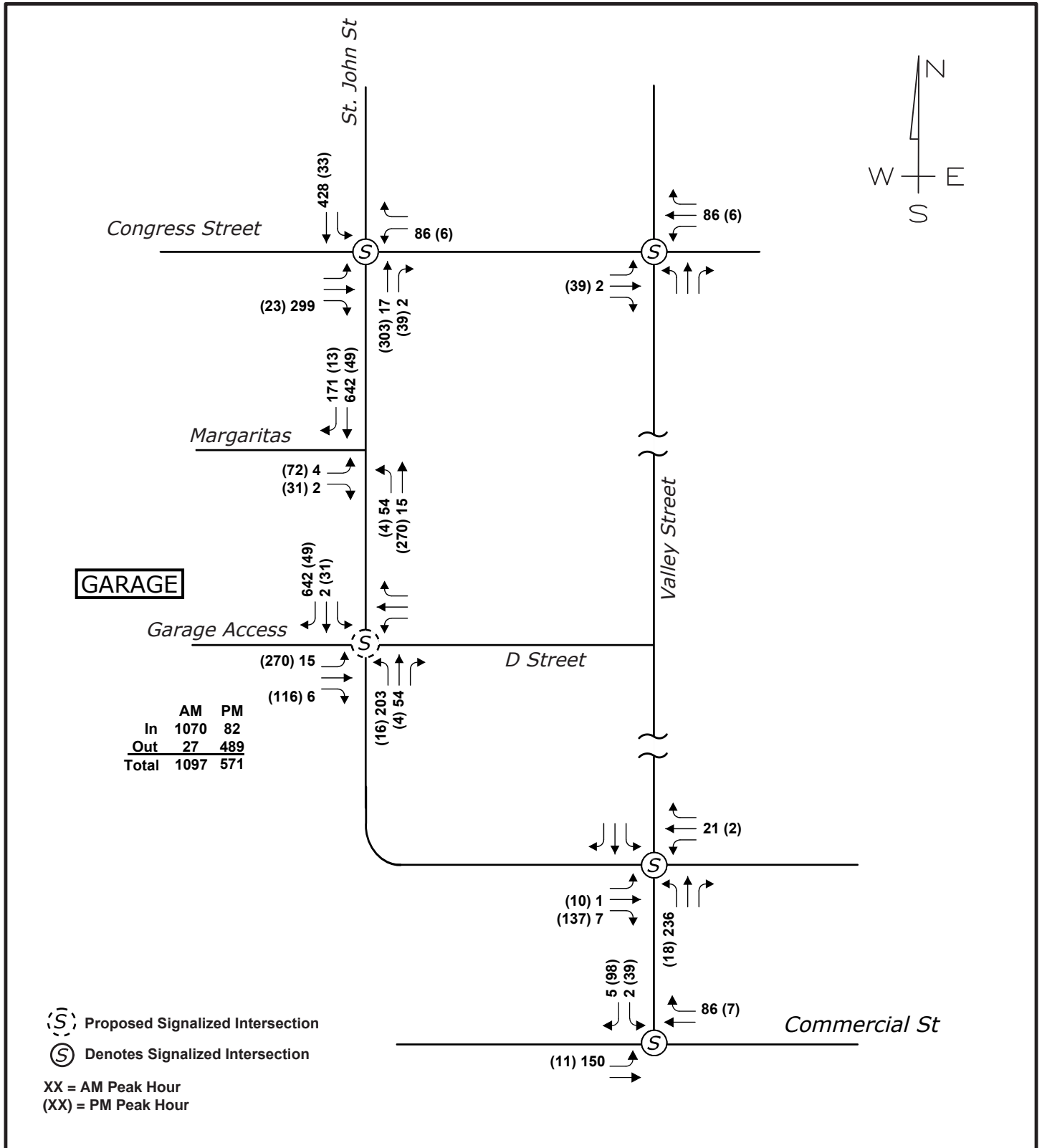


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Trip Assignment

Figure No.

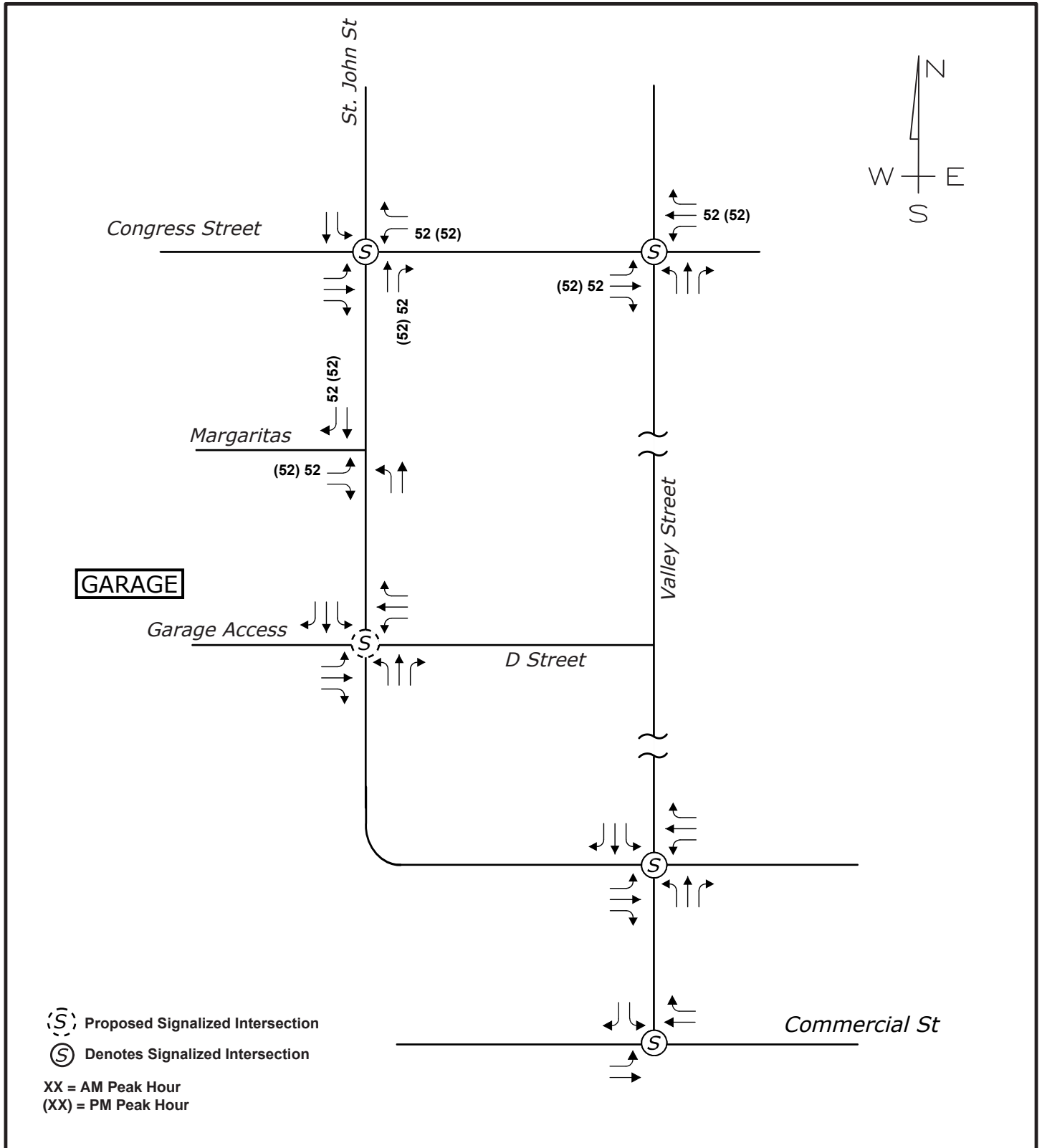
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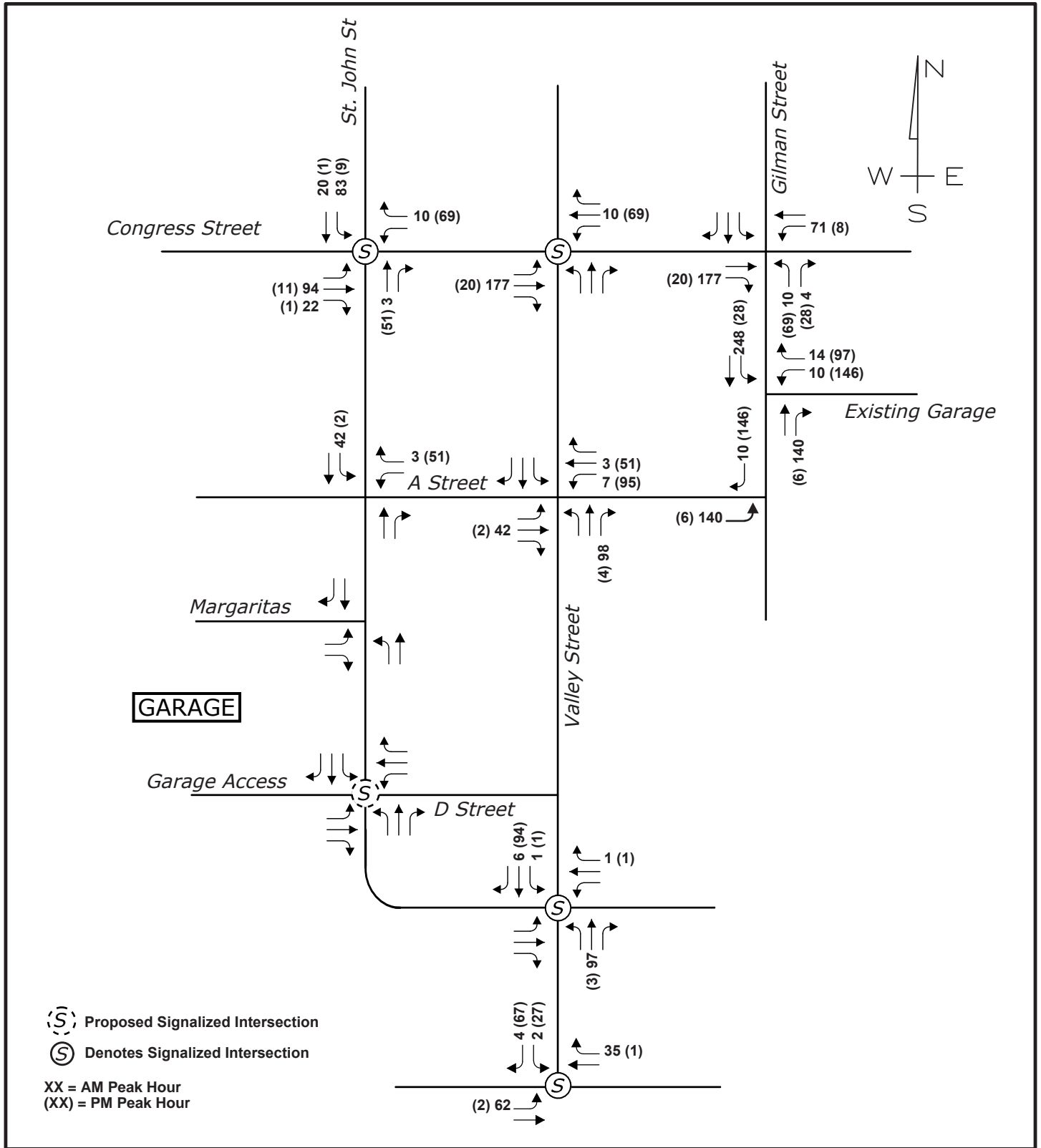
Shuttle Assignment



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Existing Garage Employee Trip Assignment

Figure No. **6**



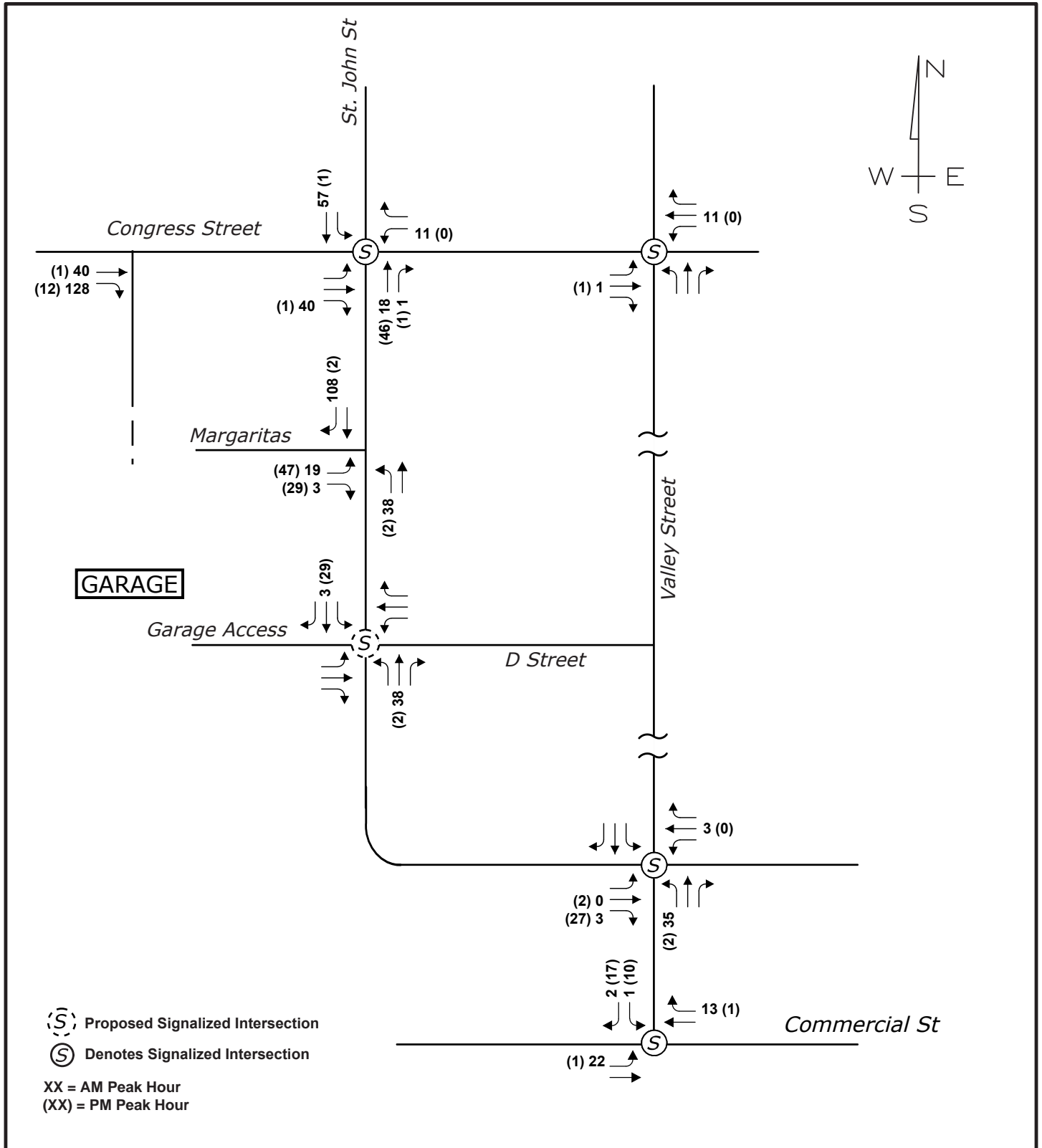
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222 St. John Existing MMC Traffic

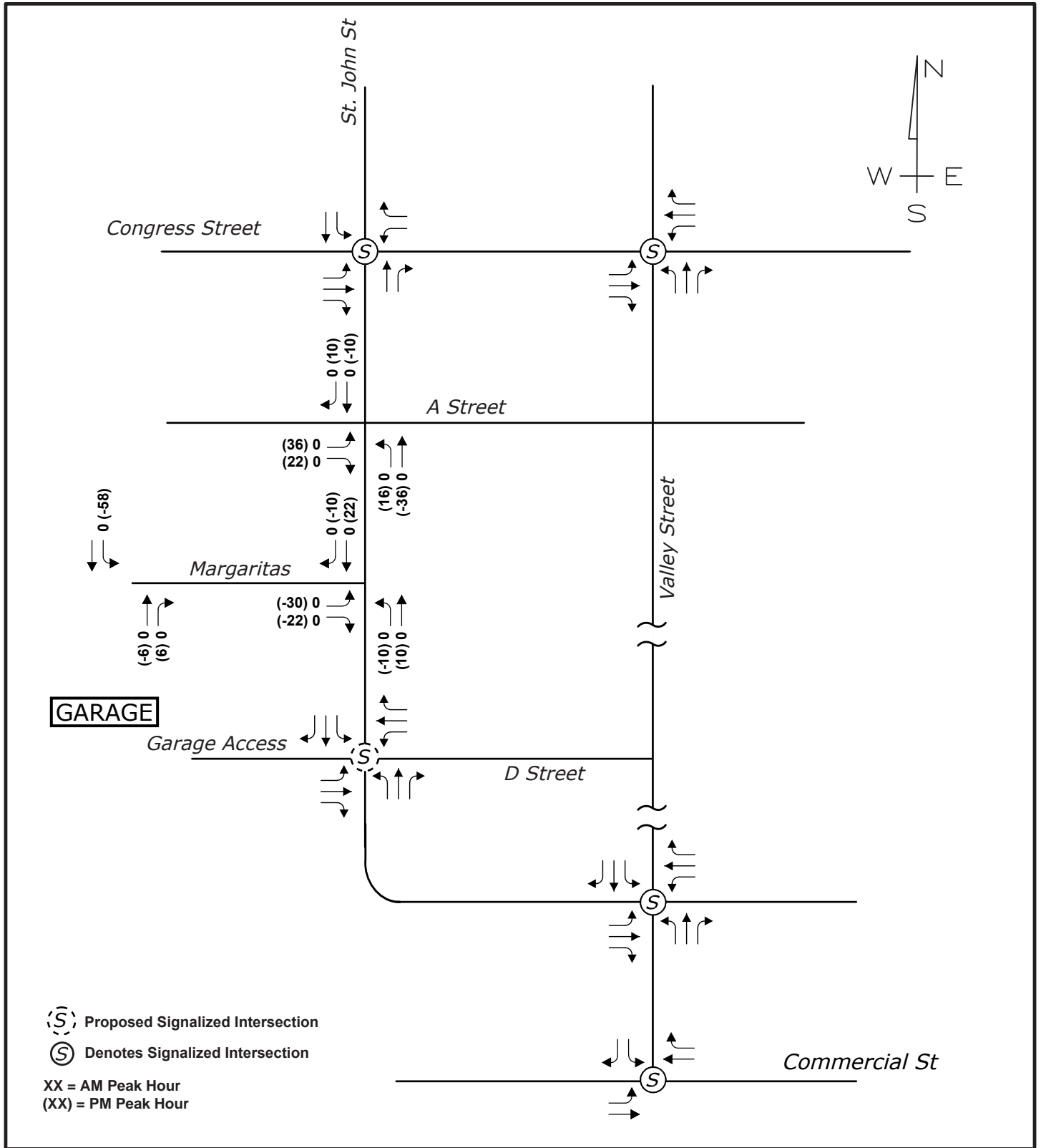
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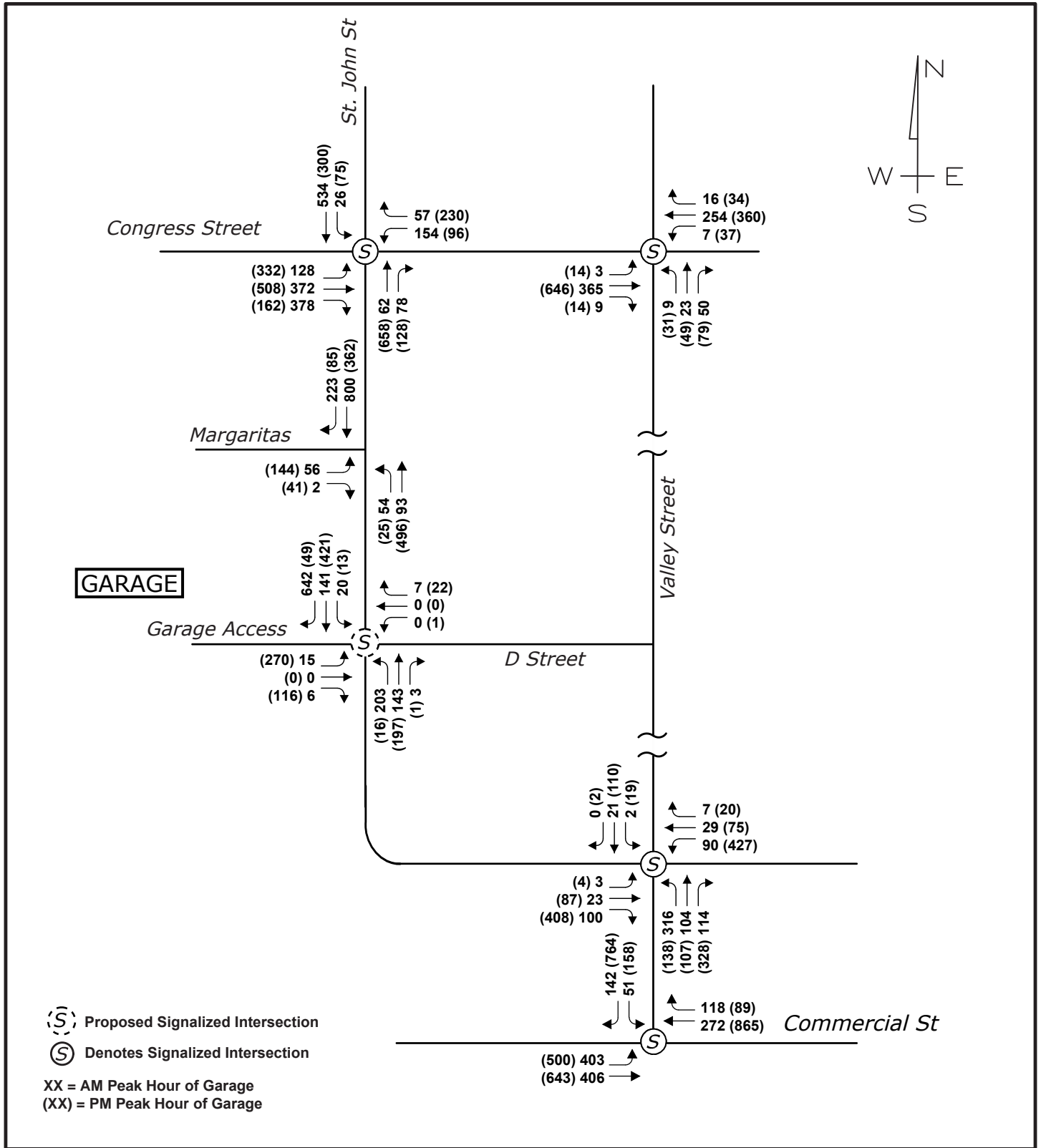


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St. John Street Parking Garage Trip Generation

June 6, 2018

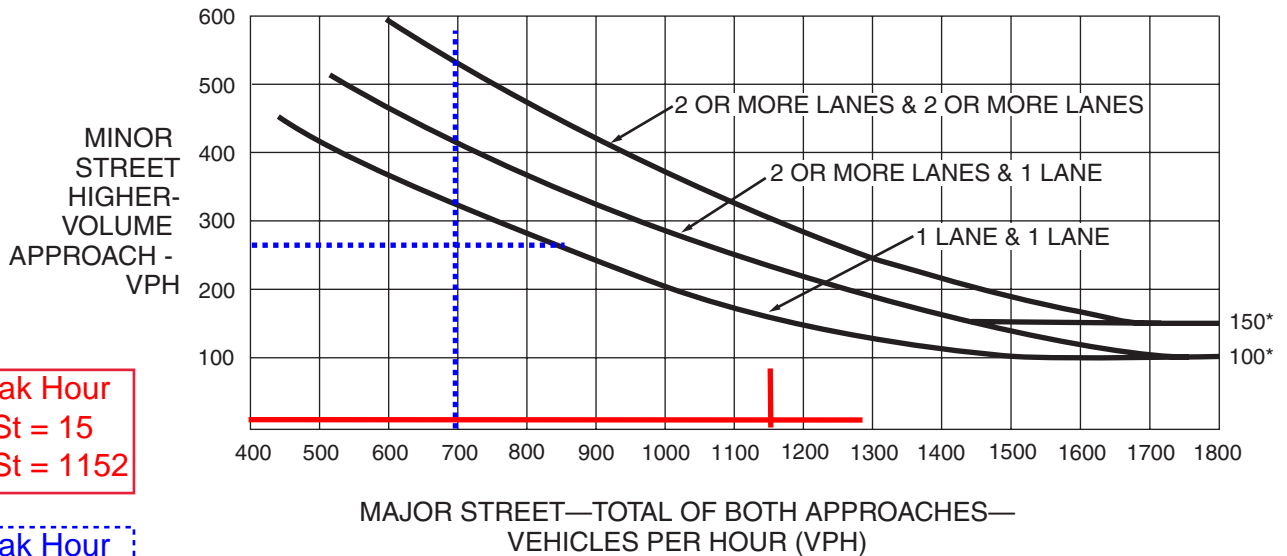
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Parking Area Count Date Number of Spaces	St. John St Lot 1/18/2018 283 Spaces		Sportsman Lot Estimated 60 Spaces		Gateway Garage Estimated 100 Spaces		Classic Lot Estimated 97 Spaces		321 Brackett Lot Estimated 9 Spaces		On-Street Spaces Estimated 100 Spaces		Gilman Garage -Shifted 11/2/2017 1274 Spaces		All Parking Areas 1923 Spaces			Existing Parking Hourly Volumes Total Spaces: 1923			Proposed Parking Hourly Volumes Total Spaces: 2452		
	Entering	Exiting	Entering	Exiting	Entering	Exiting	Entering	Exiting	Entering	Exiting	Entering	Exiting	Entering	Exiting	Total	Hourly Vol.	%In	%Out	Hourly Vol.	Entering	Exiting		
6:00 AM	23	0	5	0	8	0	8	0	1	0	8	0	89	1	142	1	143	860	98%	2%	1097	1070	27
6:15 AM	45	0	10	0	16	0	15	0	1	0	16	0	113	8	216	8	224	838	97%	3%	1069	1036	33
6:30 AM	85	1	18	0	30	0	29	0	3	0	30	0	118	6	313	7	320	791	95%	5%	1009	955	54
6:45 AM	51	1	11	0	18	0	17	0	2	0	18	0	51	4	168	5	173	637	83%	17%	812	673	139
7:00 AM	26	0	6	0	9	0	9	0	1	0	9	0	55	6	115	6	121	578	69%	31%	737	510	227
7:15 AM	41	0	9	0	14	0	14	0	1	0	14	0	60	24	153	24	177	551	59%	41%	703	412	291
7:30 AM	12	7	3	1	4	2	4	2	0	0	4	2	65	60	92	74	166	436	44%	56%	556	246	310
7:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	40	74	40	74	114						
8:00 AM	2	2	0	0	1	1	1	1	0	0	1	1	33	51	38	56	94						
8:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	23	39	23	39	62						
3:15 PM	1	8	0	2	0	3	0	3	0	0	0	3	12	38	13	57	70	357	12%	88%	455	56	399
3:30 PM	2	27	0	6	1	10	1	9	0	1	1	10	9	36	14	99	113	411	11%	89%	524	60	464
3:45 PM	1	15	0	3	0	5	0	5	0	0	0	5	6	60	7	93	100	399	13%	87%	509	64	445
4:00 PM	1	12	0	3	0	4	0	4	0	0	0	4	9	37	10	64	74	407	15%	85%	519	77	442
4:15 PM	3	22	1	5	1	8	1	8	0	1	1	8	9	56	16	108	124	448	14%	86%	571	82	489
4:30 PM	2	14	0	3	1	5	1	5	0	0	1	5	12	52	17	84	101	427	15%	85%	544	82	462
4:45 PM	6	9	1	2	2	3	2	3	0	0	2	3	4	71	17	91	108	410	17%	83%	523	88	435
5:00 PM	2	18	0	4	1	6	1	6	0	1	1	6	9	60	14	101	115	384	21%	79%	490	101	389
5:15 PM	3	12	1	3	1	4	1	4	0	0	1	4	9	60	16	87	103	351	33%	67%	448	147	301
5:30 PM	5	5	1	1	2	2	2	2	0	0	2	2	10	50	22	62	84	375	47%	53%	478	227	251
5:45 PM	2	5	0	1	1	2	1	2	0	0	1	2	22	43	27	55	82	381	54%	46%	486	264	222
6:00 PM	0	4	0	1	0	1	0	1	0	0	0	1	50	24	50	32	82	354	56%	44%	451	251	200
6:15 PM	1	1	0	0	0	0	0	0	0	0	0	0	78	47	79	48	127	308	50%	50%	393	197	197
6:30 PM	1	7	0	1	0	2	0	2	0	0	0	2	50	25	51	39	90						
6:45 PM	2	4	0	1	1	1	1	1	0	0	1	1	12	30	17	38	55						
7:00 PM	0	2	0	0	0	1	0	1	0	0	0	1	7	24	7	29	36						

Indicates peak hour volumes

Proposed Garage Access Signal Warrant
2022 Postdevelopment DHV

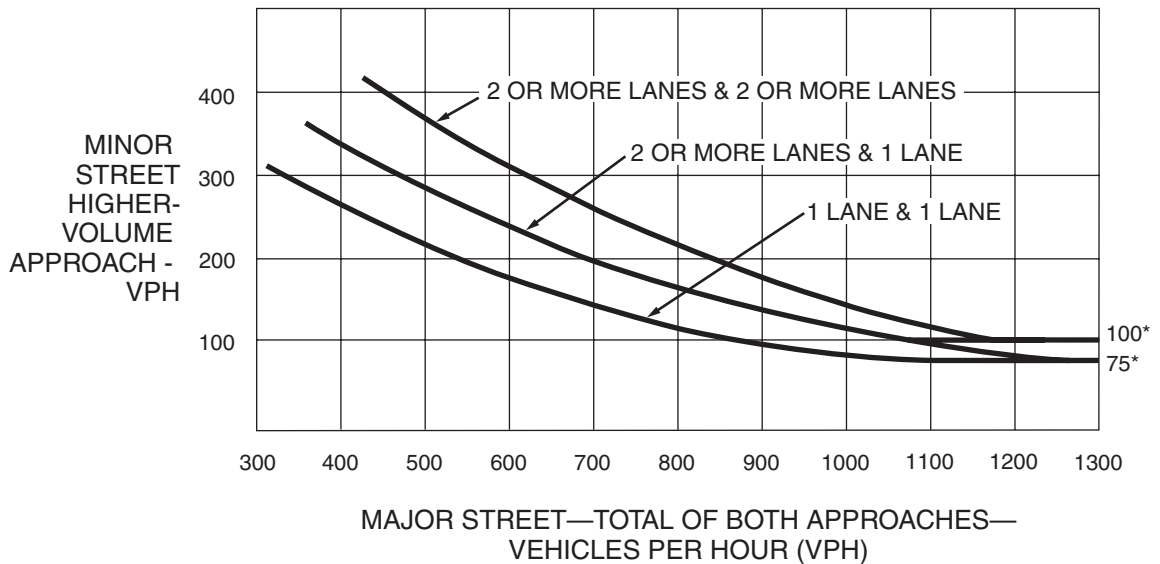
Figure 4C-3. Warrant 3, Peak Hour



*Note: 150 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 100 vph applies as the lower threshold volume for a minor-street approach with one lane.

Figure 4C-4. Warrant 3, Peak Hour (70% Factor)

(COMMUNITY LESS THAN 10,000 POPULATION OR ABOVE 40 MPH ON MAJOR STREET)



*Note: 100 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 75 vph applies as the lower threshold volume for a minor-street approach with one lane.

Baseline

06/18/2018

Summary of All Intervals

Run Number	1	2	3	4	5	Avg
Start Time	6:57	6:57	6:57	6:57	6:57	6:57
End Time	8:00	8:00	8:00	8:00	8:00	8:00
Total Time (min)	63	63	63	63	63	63
Time Recorded (min)	60	60	60	60	60	60
# of Intervals	2	2	2	2	2	2
# of Recorded Intervals	1	1	1	1	1	1
Vehs Entered	3258	3246	3256	3237	3232	3246
Vehs Exited	3251	3243	3251	3218	3225	3238
Starting Vehs	85	98	72	76	67	77
Ending Vehs	92	101	77	95	74	84
Denied Entry Before	1	0	1	0	0	0
Denied Entry After	2	0	1	0	0	0
Travel Distance (mi)	1590	1598	1587	1563	1569	1581
Travel Time (hr)	86.8	93.3	89.1	85.5	87.3	88.4
Total Delay (hr)	26.0	32.2	28.5	25.9	27.4	28.0
Total Stops	3347	3578	3478	3291	3443	3428
Fuel Used (gal)	62.0	64.3	62.5	61.5	62.0	62.4

Interval #0 Information Seeding

Start Time	6:57
End Time	7:00
Total Time (min)	3
Volumes adjusted by Growth Factors.	
No data recorded this interval.	

Interval #1 Information Recording

Start Time	7:00
End Time	8:00
Total Time (min)	60
Volumes adjusted by Growth Factors.	

Run Number	1	2	3	4	5	Avg
Vehs Entered	3258	3246	3256	3237	3232	3246
Vehs Exited	3251	3243	3251	3218	3225	3238
Starting Vehs	85	98	72	76	67	77
Ending Vehs	92	101	77	95	74	84
Denied Entry Before	1	0	1	0	0	0
Denied Entry After	2	0	1	0	0	0
Travel Distance (mi)	1590	1598	1587	1563	1569	1581
Travel Time (hr)	86.8	93.3	89.1	85.5	87.3	88.4
Total Delay (hr)	26.0	32.2	28.5	25.9	27.4	28.0
Total Stops	3347	3578	3478	3291	3443	3428
Fuel Used (gal)	62.0	64.3	62.5	61.5	62.0	62.4

Baseline**1: St. John Street & Margaritas Performance by approach**

Approach	EB	NB	SB	All
Denied Del/Veh (s)	0.3	0.0	0.0	0.0
Total Del/Veh (s)	58.0	15.7	4.7	8.5
Denied Entry Before	0	0	0	0
Denied Entry After	0	0	0	0

3: St. John Street & Garage Access/D St Performance by approach

Approach	EB	WB	NB	SB	All
Denied Del/Veh (s)	1.2	0.1	0.0	0.0	0.0
Total Del/Veh (s)	20.6	7.0	10.9	9.3	9.9
Denied Entry Before	0	0	0	0	0
Denied Entry After	0	0	0	0	0

5: Valley & St. John Street Performance by approach

Approach	EB	WB	NB	SB	All
Denied Del/Veh (s)	0.0	2.9	0.0	3.0	0.5
Total Del/Veh (s)	6.4	10.1	6.6	5.2	7.0
Denied Entry Before	0	0	0	0	0
Denied Entry After	0	0	0	0	0

7: St. John Street & Congress Street Performance by approach

Approach	EB	WB	NB	SB	All
Denied Del/Veh (s)	0.8	1.0	0.0	0.2	0.6
Total Del/Veh (s)	21.7	34.4	10.9	24.9	23.7
Denied Entry Before	0	0	0	0	0
Denied Entry After	0	0	0	0	0

13: Fore River Pkwy & Valley Performance by approach

Approach	EB	WB	SB	All
Denied Del/Veh (s)	1.6	1.2	0.0	1.3
Total Del/Veh (s)	6.8	11.4	6.7	8.0
Denied Entry Before	0	0	0	0
Denied Entry After	0	0	0	0

16: Congress Street & Valley Performance by approach

Approach	EB	WB	NB	All
Denied Del/Veh (s)	0.0	0.2	0.1	0.1
Total Del/Veh (s)	4.3	23.2	13.1	11.3
Denied Entry Before	0	0	0	0
Denied Entry After	0	0	0	0

Total Network Performance

Denied Del/Veh (s)	1.0
Total Del/Veh (s)	29.3
Denied Entry Before	0
Denied Entry After	0

Baseline

06/18/2018

Intersection: 1: St. John Street & Margaritas

Movement	EB	EB	NB	SB
Directions Served	L	R	LT	TR
Maximum Queue (ft)	132	23	155	40
Average Queue (ft)	48	2	56	5
95th Queue (ft)	107	14	131	24
Link Distance (ft)	228		678	670
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)		150		
Storage Blk Time (%)	2			
Queuing Penalty (veh)	0			

Intersection: 3: St. John Street & Garage Access/D St

Movement	EB	EB	WB	NB	NB	SB	SB
Directions Served	LT	R	LTR	L	TR	L	TR
Maximum Queue (ft)	53	31	35	121	81	99	280
Average Queue (ft)	14	5	9	67	6	14	122
95th Queue (ft)	43	23	32	113	38	56	225
Link Distance (ft)	470		195		1603		678
Upstream Blk Time (%)							
Queuing Penalty (veh)							
Storage Bay Dist (ft)		120		100		75	
Storage Blk Time (%)				2			11
Queuing Penalty (veh)				3			2

Intersection: 5: Valley & St. John Street

Movement	EB	EB	WB	WB	NB	NB	SB	SB
Directions Served	LT	R	L	TR	L	TR	LT	TR
Maximum Queue (ft)	50	65	85	55	155	94	29	33
Average Queue (ft)	14	32	38	15	65	22	3	7
95th Queue (ft)	41	57	68	43	128	63	17	27
Link Distance (ft)	1603			536	264	264	594	
Upstream Blk Time (%)								
Queuing Penalty (veh)								
Storage Bay Dist (ft)		110	335					265
Storage Blk Time (%)								
Queuing Penalty (veh)								

Baseline

Intersection: 7: St. John Street & Congress Street

Movement	EB	EB	EB	WB	WB	NB	NB	SB	SB
Directions Served	L	T	R	L	R	T	TR	L	T
Maximum Queue (ft)	136	338	302	104	209	51	78	51	348
Average Queue (ft)	58	166	136	89	94	14	22	20	197
95th Queue (ft)	117	276	242	118	217	39	54	49	312
Link Distance (ft)	1620	1620			188	670		1418	1418
Upstream Blk Time (%)					8				
Queuing Penalty (veh)					22				
Storage Bay Dist (ft)			290	80			175		
Storage Blk Time (%)		1	0	33	0				
Queuing Penalty (veh)		2	0	19	0				

Intersection: 13: Fore River Pkwy & Valley

Movement	EB	EB	EB	EB	WB	WB	WB	SB	SB	SB
Directions Served	L	L	T	T	T	T	R	L	R	R
Maximum Queue (ft)	135	121	79	79	138	93	90	71	54	64
Average Queue (ft)	75	53	36	32	74	27	33	27	25	24
95th Queue (ft)	121	94	70	67	119	68	67	60	48	49
Link Distance (ft)			724	724	662	662		264	264	264
Upstream Blk Time (%)										
Queuing Penalty (veh)										
Storage Bay Dist (ft)	430	430					415			
Storage Blk Time (%)										
Queuing Penalty (veh)										

Intersection: 16: Congress Street & Valley

Movement	EB	EB	WB	WB	NB	NB
Directions Served	L	TR	L	TR	LT	R
Maximum Queue (ft)	19	159	26	243	69	58
Average Queue (ft)	1	54	3	105	22	24
95th Queue (ft)	7	124	17	207	56	52
Link Distance (ft)		188	839	839	494	494
Upstream Blk Time (%)		0				
Queuing Penalty (veh)		0				
Storage Bay Dist (ft)	50					
Storage Blk Time (%)		8				
Queuing Penalty (veh)		0				

Network Summary

Network wide Queuing Penalty: 49

Baseline

Intersection: 3: St. John Street & Garage Access/D St

Phase	2	4	5	6	8
Movement(s) Served	NBTL	EBTL	NBL	SBTL	WBTL
Maximum Green (s)	45.0	5.0	6.5	34.0	5.0
Minimum Green (s)	5.0	5.0	5.0	5.0	5.0
Recall	None	None	None	None	None
Avg. Green (s)	60.8	5.3	6.1	25.3	5.3
g/C Ratio	-0.01	-0.01	-0.01	-0.01	-0.01
Cycles Skipped (%)	48	83	31	9	83
Cycles @ Minimum (%)	0	17	13	0	17
Cycles Maxed Out (%)	24	17	40	38	17
Cycles with Peds (%)	0	0	0	0	0

Controller Summary

Average Cycle Length (s): NA
 Number of Complete Cycles : 0

Intersection: 5: Valley & St. John Street

Phase	2	3	4	6	8
Movement(s) Served	NBTL	WBL	EBTL	SBTL	WBT
Maximum Green (s)	19.0	8.0	18.0	19.0	31.0
Minimum Green (s)	5.0	5.0	5.0	5.0	5.0
Recall	None	None	None	None	None
Avg. Green (s)	11.7	6.7	7.1	11.7	9.5
g/C Ratio	-0.01	-0.01	-0.01	-0.01	-0.01
Cycles Skipped (%)	18	62	57	18	33
Cycles @ Minimum (%)	4	0	9	4	6
Cycles Maxed Out (%)	14	10	0	14	0
Cycles with Peds (%)	0	0	0	0	0

Controller Summary

Average Cycle Length (s): NA
 Number of Complete Cycles : 0

Baseline

Intersection: 7: St. John Street & Congress Street

Phase	1	2	3	4	5	6	7	8
Movement(s) Served	EBL	WBL	SBL	NBT	WBL	EBTL	EBL	SBT
Maximum Green (s)	12.5	15.5	3.7	25.5	5.5	22.5	4.5	26.0
Minimum Green (s)	8.0	8.0	3.0	8.0	5.0	8.0	1.0	5.0
Recall	None	C-Min	None	None	None	C-Min	None	None
Avg. Green (s)	10.1	25.3	8.5	26.4	5.8	28.6	0.0	31.2
g/C Ratio	-0.01	NA	-0.01	-0.01	-0.01	NA	-0.01	NA
Cycles Skipped (%)	26	0	55	5	14	0	100	0
Cycles @ Minimum (%)	34	0	0	0	23	0	0	0
Cycles Maxed Out (%)	8	100	36	35	50	100	0	36
Cycles with Peds (%)	0	0	0	0	0	0	0	0

Controller Summary

Average Cycle Length (s): NA
 Number of Complete Cycles : 0

Intersection: 13: Fore River Pkwy & Valley

Phase	4	6	7	8
Movement(s) Served	EBT	SBL	EBL	WBT
Maximum Green (s)	37.0	13.0	17.0	15.0
Minimum Green (s)	5.0	5.0	5.0	5.0
Recall	None	None	None	None
Avg. Green (s)	27.3	8.2	11.5	9.8
g/C Ratio	-0.01	-0.01	-0.01	-0.01
Cycles Skipped (%)	20	34	12	23
Cycles @ Minimum (%)	0	10	0	0
Cycles Maxed Out (%)	16	8	17	10
Cycles with Peds (%)	0	0	0	0

Controller Summary

Average Cycle Length (s): NA
 Number of Complete Cycles : 0

Summary of All Intervals

Run Number	1	2	3	4	5	Avg
Start Time	6:57	6:57	6:57	6:57	6:57	6:57
End Time	8:00	8:00	8:00	8:00	8:00	8:00
Total Time (min)	63	63	63	63	63	63
Time Recorded (min)	60	60	60	60	60	60
# of Intervals	2	2	2	2	2	2
# of Recorded Intervals	1	1	1	1	1	1
Vehs Entered	3295	3227	3296	3238	3235	3258
Vehs Exited	3287	3227	3285	3237	3225	3254
Starting Vehs	86	96	71	86	67	76
Ending Vehs	94	96	82	87	77	84
Denied Entry Before	1	0	1	0	0	0
Denied Entry After	2	1	0	0	0	0
Travel Distance (mi)	1625	1606	1622	1604	1586	1609
Travel Time (hr)	89.3	94.9	88.7	88.4	87.4	89.7
Total Delay (hr)	27.0	33.4	26.7	27.1	26.9	28.2
Total Stops	3427	3546	3513	3388	3353	3447
Fuel Used (gal)	63.6	64.7	63.6	63.7	62.4	63.6

Interval #0 Information Seeding

Start Time	6:57
End Time	7:00
Total Time (min)	3
Volumes adjusted by Growth Factors.	
No data recorded this interval.	

Interval #1 Information Recording

Start Time	7:00
End Time	8:00
Total Time (min)	60
Volumes adjusted by Growth Factors.	

Run Number	1	2	3	4	5	Avg
Vehs Entered	3295	3227	3296	3238	3235	3258
Vehs Exited	3287	3227	3285	3237	3225	3254
Starting Vehs	86	96	71	86	67	76
Ending Vehs	94	96	82	87	77	84
Denied Entry Before	1	0	1	0	0	0
Denied Entry After	2	1	0	0	0	0
Travel Distance (mi)	1625	1606	1622	1604	1586	1609
Travel Time (hr)	89.3	94.9	88.7	88.4	87.4	89.7
Total Delay (hr)	27.0	33.4	26.7	27.1	26.9	28.2
Total Stops	3427	3546	3513	3388	3353	3447
Fuel Used (gal)	63.6	64.7	63.6	63.7	62.4	63.6

1: St. John Street & Margaritas Performance by approach

Approach	EB	NB	SB	All
Denied Del/Veh (s)	0.4	0.0	0.0	0.0
Total Del/Veh (s)	73.4	21.1	4.7	9.7
Denied Entry Before	0	0	0	0
Denied Entry After	0	0	0	0

3: St. John Street & Garage Access/D St Performance by approach

Approach	EB	WB	NB	SB	All
Denied Del/Veh (s)	1.1	0.1	0.0	0.0	0.0
Total Del/Veh (s)	18.0	5.8	8.8	7.1	7.8
Denied Entry Before	0	0	0	0	0
Denied Entry After	0	0	0	0	0

5: Valley & St. John Street Performance by approach

Approach	EB	WB	NB	SB	All
Denied Del/Veh (s)	0.0	2.9	0.0	2.7	0.5
Total Del/Veh (s)	5.5	9.4	6.5	5.0	6.7
Denied Entry Before	0	0	0	0	0
Denied Entry After	0	0	0	0	0

7: St. John Street & Congress Street Performance by approach

Approach	EB	WB	NB	SB	All
Denied Del/Veh (s)	0.8	0.6	0.0	0.2	0.5
Total Del/Veh (s)	21.8	34.9	11.8	25.0	24.0
Denied Entry Before	0	0	0	0	0
Denied Entry After	0	0	0	0	0

13: Fore River Pkwy & Valley Performance by approach

Approach	EB	WB	SB	All
Denied Del/Veh (s)	1.6	1.1	0.0	1.3
Total Del/Veh (s)	7.1	11.3	7.4	8.3
Denied Entry Before	0	0	0	0
Denied Entry After	0	0	0	0

16: Congress Street & Valley Performance by approach

Approach	EB	WB	NB	All
Denied Del/Veh (s)	0.0	0.2	0.1	0.1
Total Del/Veh (s)	4.3	25.7	14.0	12.2
Denied Entry Before	0	0	0	0
Denied Entry After	0	0	0	0

Total Network Performance

Denied Del/Veh (s)	1.0
Total Del/Veh (s)	29.5
Denied Entry Before	0
Denied Entry After	0

Baseline

Intersection: 1: St. John Street & Margaritas

Movement	EB	EB	NB	SB
Directions Served	L	R	LT	TR
Maximum Queue (ft)	149	28	182	44
Average Queue (ft)	53	3	65	5
95th Queue (ft)	126	17	151	26
Link Distance (ft)	228		678	670
Upstream Blk Time (%)	0			
Queuing Penalty (veh)	0			
Storage Bay Dist (ft)		150		
Storage Blk Time (%)	3			
Queuing Penalty (veh)	0			

Intersection: 3: St. John Street & Garage Access/D St

Movement	EB	EB	WB	NB	NB	SB	SB	SB
Directions Served	LT	R	LTR	L	TR	L	T	R
Maximum Queue (ft)	48	22	35	118	85	30	213	168
Average Queue (ft)	12	3	10	61	8	7	37	87
95th Queue (ft)	37	15	33	105	42	27	117	149
Link Distance (ft)	459		195		1603		678	
Upstream Blk Time (%)								
Queuing Penalty (veh)								
Storage Bay Dist (ft)		120		100		75		150
Storage Blk Time (%)				1			0	1
Queuing Penalty (veh)				2			2	1

Intersection: 5: Valley & St. John Street

Movement	EB	EB	WB	WB	NB	NB	SB	SB
Directions Served	LT	R	L	TR	L	TR	LT	TR
Maximum Queue (ft)	46	70	92	56	161	91	32	29
Average Queue (ft)	12	34	38	16	72	21	3	6
95th Queue (ft)	37	61	73	44	137	59	17	25
Link Distance (ft)	1603			536	264	264	594	
Upstream Blk Time (%)								
Queuing Penalty (veh)								
Storage Bay Dist (ft)		110	335					265
Storage Blk Time (%)								
Queuing Penalty (veh)								

Baseline

Intersection: 7: St. John Street & Congress Street

Movement	EB	EB	EB	WB	WB	NB	NB	SB	SB
Directions Served	L	T	R	L	R	T	TR	L	T
Maximum Queue (ft)	179	338	310	104	210	46	76	97	356
Average Queue (ft)	60	165	132	89	97	13	24	21	199
95th Queue (ft)	124	276	241	119	222	36	57	64	323
Link Distance (ft)	1767	1767			188	670		1418	1418
Upstream Blk Time (%)					10				
Queuing Penalty (veh)					25				
Storage Bay Dist (ft)			290	80			175		
Storage Blk Time (%)		1	0	33	0				
Queuing Penalty (veh)		3	0	19	0				

Intersection: 13: Fore River Pkwy & Valley

Movement	EB	EB	EB	EB	WB	WB	WB	SB	SB	SB
Directions Served	L	L	T	T	T	T	R	L	R	R
Maximum Queue (ft)	150	120	98	69	174	104	70	72	53	78
Average Queue (ft)	78	53	37	31	79	29	32	28	25	26
95th Queue (ft)	128	93	79	64	137	79	60	59	46	54
Link Distance (ft)			724	724	662	662		264	264	264
Upstream Blk Time (%)										
Queuing Penalty (veh)										
Storage Bay Dist (ft)	430	430					415			
Storage Blk Time (%)										
Queuing Penalty (veh)										

Intersection: 16: Congress Street & Valley

Movement	EB	EB	WB	WB	NB	NB
Directions Served	L	TR	L	TR	LT	R
Maximum Queue (ft)	24	167	26	267	72	66
Average Queue (ft)	1	52	3	117	22	23
95th Queue (ft)	12	129	17	237	56	55
Link Distance (ft)		188	839	839	494	494
Upstream Blk Time (%)		0				
Queuing Penalty (veh)		0				
Storage Bay Dist (ft)	50					
Storage Blk Time (%)		9				
Queuing Penalty (veh)		0				

Network Summary

Network wide Queuing Penalty: 54

Baseline

Intersection: 3: St. John Street & Garage Access/D St

Phase	2	4	5	6	8
Movement(s) Served	NBTL	EBTL	NBL	SBTL	WBTL
Maximum Green (s)	45.0	5.0	6.5	34.0	5.0
Minimum Green (s)	5.0	5.0	5.0	5.0	5.0
Recall	None	None	None	None	None
Avg. Green (s)	39.8	5.2	6.2	19.3	5.2
g/C Ratio	-0.01	-0.01	-0.01	-0.01	-0.01
Cycles Skipped (%)	38	84	43	10	84
Cycles @ Minimum (%)	0	16	13	2	16
Cycles Maxed Out (%)	19	16	33	18	16
Cycles with Peds (%)	0	0	0	0	0

Controller Summary

Average Cycle Length (s): NA
 Number of Complete Cycles : 0

Intersection: 5: Valley & St. John Street

Phase	2	3	4	6	8
Movement(s) Served	NBTL	WBL	EBTL	SBTL	WBT
Maximum Green (s)	19.0	8.0	18.0	19.0	31.0
Minimum Green (s)	5.0	5.0	5.0	5.0	5.0
Recall	None	None	None	None	None
Avg. Green (s)	11.5	6.8	7.2	11.5	9.6
g/C Ratio	-0.01	-0.01	-0.01	-0.01	-0.01
Cycles Skipped (%)	17	64	57	17	35
Cycles @ Minimum (%)	4	0	9	4	5
Cycles Maxed Out (%)	11	10	0	11	0
Cycles with Peds (%)	0	0	0	0	0

Controller Summary

Average Cycle Length (s): NA
 Number of Complete Cycles : 0

Baseline

Intersection: 7: St. John Street & Congress Street

Phase	1	2	3	4	5	6	7	8
Movement(s) Served	EBL	WBL	SBL	NBT	WBL	EBTL	EBL	SBT
Maximum Green (s)	12.5	15.5	3.7	25.5	5.5	22.5	4.5	26.0
Minimum Green (s)	8.0	8.0	3.0	8.0	5.0	8.0	1.0	5.0
Recall	None	C-Min	None	None	None	C-Min	None	None
Avg. Green (s)	10.0	24.9	9.4	27.0	5.8	28.9	0.0	31.4
g/C Ratio	-0.01	NA	-0.01	-0.01	-0.01	NA	-0.01	NA
Cycles Skipped (%)	24	0	55	7	18	0	100	0
Cycles @ Minimum (%)	36	0	0	0	20	0	0	0
Cycles Maxed Out (%)	10	100	36	35	55	100	0	39
Cycles with Peds (%)	0	0	0	0	0	0	0	0

Controller Summary

Average Cycle Length (s): NA
 Number of Complete Cycles : 0

Intersection: 13: Fore River Pkwy & Valley

Phase	4	6	7	8
Movement(s) Served	EBT	SBL	EBL	WBT
Maximum Green (s)	37.0	13.0	17.0	15.0
Minimum Green (s)	5.0	5.0	5.0	5.0
Recall	None	None	None	None
Avg. Green (s)	27.0	7.8	11.4	10.0
g/C Ratio	-0.01	-0.01	-0.01	-0.01
Cycles Skipped (%)	19	33	13	22
Cycles @ Minimum (%)	0	12	0	0
Cycles Maxed Out (%)	15	7	17	11
Cycles with Peds (%)	0	0	0	0

Controller Summary

Average Cycle Length (s): NA
 Number of Complete Cycles : 0

Baseline

06/18/2018

Summary of All Intervals

Run Number	1	2	3	4	5	Avg
Start Time	6:57	6:57	6:57	6:57	6:57	6:57
End Time	8:00	8:00	8:00	8:00	8:00	8:00
Total Time (min)	63	63	63	63	63	63
Time Recorded (min)	60	60	60	60	60	60
# of Intervals	2	2	2	2	2	2
# of Recorded Intervals	1	1	1	1	1	1
Vehs Entered	5487	5508	5577	5489	5534	5520
Vehs Exited	5460	5467	5548	5471	5496	5489
Starting Vehs	143	118	134	151	123	132
Ending Vehs	170	159	163	169	161	162
Denied Entry Before	2	4	2	0	1	0
Denied Entry After	4	5	1	2	1	2
Travel Distance (mi)	2802	2784	2836	2826	2811	2812
Travel Time (hr)	160.3	159.6	165.1	163.9	161.7	162.1
Total Delay (hr)	56.4	56.3	59.7	59.2	57.3	57.8
Total Stops	6743	6836	7014	6970	6851	6880
Fuel Used (gal)	109.9	110.4	111.8	110.9	110.8	110.8

Interval #0 Information Seeding

Start Time	6:57
End Time	7:00
Total Time (min)	3
Volumes adjusted by Growth Factors.	
No data recorded this interval.	

Interval #1 Information Recording

Start Time	7:00
End Time	8:00
Total Time (min)	60
Volumes adjusted by Growth Factors.	

Run Number	1	2	3	4	5	Avg
Vehs Entered	5487	5508	5577	5489	5534	5520
Vehs Exited	5460	5467	5548	5471	5496	5489
Starting Vehs	143	118	134	151	123	132
Ending Vehs	170	159	163	169	161	162
Denied Entry Before	2	4	2	0	1	0
Denied Entry After	4	5	1	2	1	2
Travel Distance (mi)	2802	2784	2836	2826	2811	2812
Travel Time (hr)	160.3	159.6	165.1	163.9	161.7	162.1
Total Delay (hr)	56.4	56.3	59.7	59.2	57.3	57.8
Total Stops	6743	6836	7014	6970	6851	6880
Fuel Used (gal)	109.9	110.4	111.8	110.9	110.8	110.8

Baseline**1: St. John Street & Margaritas Performance by approach**

Approach	EB	NB	SB	All
Denied Del/Veh (s)	1.1	0.0	0.0	0.2
Total Del/Veh (s)	15.8	2.1	2.2	4.3
Denied Entry Before	0	0	0	0
Denied Entry After	0	0	0	0

3: St. John Street & Garage Access/D St Performance by approach

Approach	EB	WB	NB	SB	All
Denied Del/Veh (s)	1.5	0.1	0.0	0.1	0.6
Total Del/Veh (s)	10.0	3.6	8.8	10.3	9.8
Denied Entry Before	0	0	0	0	0
Denied Entry After	0	0	0	0	0

5: Valley & St. John Street Performance by approach

Approach	EB	WB	NB	SB	All
Denied Del/Veh (s)	0.0	3.0	0.0	2.9	1.1
Total Del/Veh (s)	13.0	20.1	13.5	16.9	15.5
Denied Entry Before	0	0	0	0	0
Denied Entry After	0	1	0	0	1

7: St. John Street & Congress Street Performance by approach

Approach	EB	WB	NB	SB	All
Denied Del/Veh (s)	0.4	0.0	0.3	0.2	0.3
Total Del/Veh (s)	33.4	23.2	22.5	22.1	26.9
Denied Entry Before	0	0	0	0	0
Denied Entry After	0	0	0	0	0

13: Fore River Pkwy & Valley Performance by approach

Approach	EB	WB	SB	All
Denied Del/Veh (s)	1.1	0.5	0.0	0.6
Total Del/Veh (s)	19.4	27.0	13.2	20.0
Denied Entry Before	0	0	0	0
Denied Entry After	1	0	0	1

16: Congress Street & Valley Performance by approach

Approach	EB	WB	NB	All
Denied Del/Veh (s)	0.0	0.3	0.2	0.1
Total Del/Veh (s)	7.4	18.3	24.7	13.1
Denied Entry Before	0	0	0	0
Denied Entry After	0	0	0	0

Total Network Performance

Denied Del/Veh (s)	1.0
Total Del/Veh (s)	35.9
Denied Entry Before	0
Denied Entry After	2

Baseline

06/18/2018

Intersection: 1: St. John Street & Margaritas

Movement	EB	EB	NB	SB
Directions Served	L	R	LT	TR
Maximum Queue (ft)	141	77	101	19
Average Queue (ft)	61	27	16	1
95th Queue (ft)	111	57	65	9
Link Distance (ft)	601		678	670
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)		120		
Storage Blk Time (%)	1	0		
Queuing Penalty (veh)	0	0		

Intersection: 3: St. John Street & Garage Access/D St

Movement	EB	EB	WB	NB	NB	SB	SB
Directions Served	LT	R	LTR	L	TR	L	TR
Maximum Queue (ft)	153	92	50	37	107	85	214
Average Queue (ft)	77	38	14	9	42	11	107
95th Queue (ft)	125	71	41	29	89	45	178
Link Distance (ft)	470		195		1603		678
Upstream Blk Time (%)							
Queuing Penalty (veh)							
Storage Bay Dist (ft)		150		100		75	
Storage Blk Time (%)	0				0		12
Queuing Penalty (veh)	0				0		2

Intersection: 5: Valley & St. John Street

Movement	EB	EB	WB	WB	NB	NB	SB	SB
Directions Served	LT	R	L	TR	L	TR	LT	TR
Maximum Queue (ft)	217	135	291	129	129	220	72	81
Average Queue (ft)	61	96	164	26	58	103	24	35
95th Queue (ft)	149	142	254	86	108	191	60	69
Link Distance (ft)	1603			536	264	264	594	
Upstream Blk Time (%)								
Queuing Penalty (veh)								
Storage Bay Dist (ft)		110	335					265
Storage Blk Time (%)	0	4	0					
Queuing Penalty (veh)	0	4	0					

Baseline

06/18/2018

Intersection: 7: St. John Street & Congress Street

Movement	EB	EB	EB	WB	WB	NB	NB	SB	SB
Directions Served	L	T	R	L	R	T	TR	L	T
Maximum Queue (ft)	342	595	315	105	201	286	200	116	193
Average Queue (ft)	161	291	128	75	117	147	134	51	99
95th Queue (ft)	276	504	331	124	193	240	206	98	168
Link Distance (ft)	1783	1783			188	670		1418	1418
Upstream Blk Time (%)					1				
Queuing Penalty (veh)					5				
Storage Bay Dist (ft)			290	80			175		
Storage Blk Time (%)		13	0	10	15	2	2		
Queuing Penalty (veh)		22	0	23	14	11	6		

Intersection: 13: Fore River Pkwy & Valley

Movement	EB	EB	EB	EB	WB	WB	WB	SB	SB	SB
Directions Served	L	L	T	T	T	T	R	L	R	R
Maximum Queue (ft)	300	342	200	180	369	331	65	154	146	167
Average Queue (ft)	98	184	69	63	227	182	27	70	91	97
95th Queue (ft)	238	310	160	142	323	277	56	122	135	149
Link Distance (ft)			1329	1329	662	662		264	264	264
Upstream Blk Time (%)										
Queuing Penalty (veh)										
Storage Bay Dist (ft)	430	430					415			
Storage Blk Time (%)	0	1	0							
Queuing Penalty (veh)	0	2	1							

Intersection: 16: Congress Street & Valley

Movement	EB	EB	WB	WB	NB	NB
Directions Served	L	TR	L	TR	LT	R
Maximum Queue (ft)	64	206	68	273	123	81
Average Queue (ft)	8	126	20	129	57	34
95th Queue (ft)	36	210	53	228	109	63
Link Distance (ft)		188	839	839	494	494
Upstream Blk Time (%)		1				
Queuing Penalty (veh)		6				
Storage Bay Dist (ft)	50					
Storage Blk Time (%)	0	21				
Queuing Penalty (veh)	0	3				

Network Summary

Network wide Queuing Penalty: 100

Baseline

Intersection: 3: St. John Street & Garage Access/D St

Phase	2	4	5	6	8
Movement(s) Served	NBTL	EBTL	NBL	SBTL	WBTL
Maximum Green (s)	31.0	19.0	5.5	21.0	19.0
Minimum Green (s)	5.0	5.0	5.0	5.0	5.0
Recall	None	None	None	None	None
Avg. Green (s)	14.4	10.8	6.5	13.6	10.8
g/C Ratio	-0.01	-0.01	-0.01	-0.01	-0.01
Cycles Skipped (%)	7	12	93	8	12
Cycles @ Minimum (%)	2	3	0	2	3
Cycles Maxed Out (%)	2	10	6	20	10
Cycles with Peds (%)	0	0	0	0	0

Controller Summary

Average Cycle Length (s): NA
 Number of Complete Cycles : 0

Intersection: 5: Valley & St. John Street

Phase	2	3	4	6	8
Movement(s) Served	NBTL	WBL	EBTL	SBTL	WBT
Maximum Green (s)	18.0	19.0	18.0	18.0	42.0
Minimum Green (s)	5.0	5.0	5.0	5.0	5.0
Recall	None	None	None	None	None
Avg. Green (s)	14.1	16.5	13.2	14.1	34.7
g/C Ratio	-0.01	-0.01	-0.01	-0.01	-0.01
Cycles Skipped (%)	9	3	9	9	6
Cycles @ Minimum (%)	0	0	2	0	0
Cycles Maxed Out (%)	35	55	29	35	22
Cycles with Peds (%)	0	0	0	0	0

Controller Summary

Average Cycle Length (s): NA
 Number of Complete Cycles : 0

Baseline

06/18/2018

Intersection: 7: St. John Street & Congress Street

Phase	1	2	3	4	5	6	7	8
Movement(s) Served	EBL	WBL	SBL	NBT	WBL	EBTL	EBL	SBT
Maximum Green (s)	11.5	15.5	3.7	26.5	4.5	22.5	4.5	27.0
Minimum Green (s)	8.0	8.0	3.0	8.0	4.5	8.0	1.0	5.0
Recall	None	C-Min	None	None	None	C-Min	None	None
Avg. Green (s)	12.7	16.1	4.1	26.5	4.6	26.1	4.8	34.9
g/C Ratio	-0.01	NA	-0.01	NA	-0.01	NA	-0.01	NA
Cycles Skipped (%)	2	0	16	0	20	0	93	0
Cycles @ Minimum (%)	4	2	0	0	80	0	0	0
Cycles Maxed Out (%)	78	100	80	66	80	100	7	66
Cycles with Peds (%)	0	0	0	0	0	0	0	0

Controller Summary

Average Cycle Length (s): NA
 Number of Complete Cycles : 0

Intersection: 13: Fore River Pkwy & Valley

Phase	4	6	7	8
Movement(s) Served	EBT	SBL	EBL	WBT
Maximum Green (s)	44.0	16.0	18.0	21.0
Minimum Green (s)	5.0	5.0	5.0	5.0
Recall	None	None	None	None
Avg. Green (s)	43.3	15.3	17.2	21.1
g/C Ratio	NA	NA	NA	NA
Cycles Skipped (%)	0	0	0	0
Cycles @ Minimum (%)	0	0	0	0
Cycles Maxed Out (%)	71	79	75	92
Cycles with Peds (%)	0	0	0	0

Controller Summary

Average Cycle Length (s): NA
 Number of Complete Cycles : 0

Summary of All Intervals

Run Number	1	2	3	4	5	Avg
Start Time	6:57	6:57	6:57	6:57	6:57	6:57
End Time	8:00	8:00	8:00	8:00	8:00	8:00
Total Time (min)	63	63	63	63	63	63
Time Recorded (min)	60	60	60	60	60	60
# of Intervals	2	2	2	2	2	2
# of Recorded Intervals	1	1	1	1	1	1
Vehs Entered	5567	5589	5637	5499	5533	5568
Vehs Exited	5530	5554	5609	5471	5484	5529
Starting Vehs	132	139	140	149	115	134
Ending Vehs	169	174	168	177	164	170
Denied Entry Before	2	1	1	1	0	0
Denied Entry After	1	1	0	2	1	0
Travel Distance (mi)	2854	2850	2884	2806	2803	2840
Travel Time (hr)	179.1	162.4	168.7	163.6	160.0	166.8
Total Delay (hr)	73.0	56.3	61.5	59.7	56.0	61.3
Total Stops	7525	6739	7126	6949	6707	7008
Fuel Used (gal)	116.0	111.9	113.5	110.6	109.7	112.4

Interval #0 Information Seeding

Start Time	6:57
End Time	7:00
Total Time (min)	3
Volumes adjusted by Growth Factors.	
No data recorded this interval.	

Interval #1 Information Recording

Start Time	7:00
End Time	8:00
Total Time (min)	60
Volumes adjusted by Growth Factors.	

Run Number	1	2	3	4	5	Avg
Vehs Entered	5567	5589	5637	5499	5533	5568
Vehs Exited	5530	5554	5609	5471	5484	5529
Starting Vehs	132	139	140	149	115	134
Ending Vehs	169	174	168	177	164	170
Denied Entry Before	2	1	1	1	0	0
Denied Entry After	1	1	0	2	1	0
Travel Distance (mi)	2854	2850	2884	2806	2803	2840
Travel Time (hr)	179.1	162.4	168.7	163.6	160.0	166.8
Total Delay (hr)	73.0	56.3	61.5	59.7	56.0	61.3
Total Stops	7525	6739	7126	6949	6707	7008
Fuel Used (gal)	116.0	111.9	113.5	110.6	109.7	112.4

1: St. John Street & Margaritas Performance by approach

Approach	EB	NB	SB	All
Denied Del/Veh (s)	1.1	0.0	0.0	0.2
Total Del/Veh (s)	17.1	2.4	2.2	4.6
Denied Entry Before	0	0	0	0
Denied Entry After	0	0	0	0

3: St. John Street & Garage Access/D St Performance by approach

Approach	EB	WB	NB	SB	All
Denied Del/Veh (s)	1.5	0.1	0.0	0.2	0.6
Total Del/Veh (s)	9.3	3.6	8.8	10.1	9.4
Denied Entry Before	0	0	0	0	0
Denied Entry After	0	0	0	0	0

5: Valley & St. John Street Performance by approach

Approach	EB	WB	NB	SB	All
Denied Del/Veh (s)	0.0	3.0	0.0	2.9	1.1
Total Del/Veh (s)	14.0	25.4	15.5	17.4	18.1
Denied Entry Before	0	0	0	0	0
Denied Entry After	0	0	0	0	0

7: St. John Street & Congress Street Performance by approach

Approach	EB	WB	NB	SB	All
Denied Del/Veh (s)	0.4	0.0	0.3	0.2	0.3
Total Del/Veh (s)	31.1	23.2	22.8	23.3	26.2
Denied Entry Before	0	0	0	0	0
Denied Entry After	0	0	0	0	0

13: Fore River Pkwy & Valley Performance by approach

Approach	EB	WB	SB	All
Denied Del/Veh (s)	1.1	0.5	0.0	0.6
Total Del/Veh (s)	27.0	25.7	12.9	22.3
Denied Entry Before	0	0	0	0
Denied Entry After	0	0	0	0

16: Congress Street & Valley Performance by approach

Approach	EB	WB	NB	All
Denied Del/Veh (s)	0.0	0.3	0.1	0.1
Total Del/Veh (s)	7.5	18.5	24.6	13.2
Denied Entry Before	0	0	0	0
Denied Entry After	0	0	0	0

Total Network Performance

Denied Del/Veh (s)	1.0
Total Del/Veh (s)	37.8
Denied Entry Before	0
Denied Entry After	0

Baseline

Intersection: 1: St. John Street & Margaritas

Movement	EB	EB	NB	SB
Directions Served	L	R	LT	TR
Maximum Queue (ft)	158	83	122	11
Average Queue (ft)	64	25	19	0
95th Queue (ft)	118	58	84	6
Link Distance (ft)	601		678	670
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)		120		
Storage Blk Time (%)	2	0		
Queuing Penalty (veh)	1	0		

Intersection: 3: St. John Street & Garage Access/D St

Movement	EB	EB	WB	NB	NB	SB	SB	SB
Directions Served	LT	R	LTR	L	TR	L	T	R
Maximum Queue (ft)	161	124	39	33	143	58	225	145
Average Queue (ft)	73	30	12	9	47	11	104	21
95th Queue (ft)	127	72	37	29	101	45	178	71
Link Distance (ft)	483		195		1604		678	
Upstream Blk Time (%)								
Queuing Penalty (veh)								
Storage Bay Dist (ft)		150		100		75		150
Storage Blk Time (%)	0	0			1		11	0
Queuing Penalty (veh)	0	0			0		7	0

Intersection: 5: Valley & St. John Street

Movement	EB	EB	WB	WB	NB	NB	SB	SB
Directions Served	LT	R	L	TR	L	TR	LT	TR
Maximum Queue (ft)	234	135	338	338	149	217	74	88
Average Queue (ft)	58	97	182	48	63	111	25	40
95th Queue (ft)	141	147	304	231	121	207	58	74
Link Distance (ft)	1604			536	264	264	594	
Upstream Blk Time (%)				0		0		
Queuing Penalty (veh)				0		0		
Storage Bay Dist (ft)		110	335					265
Storage Blk Time (%)	0	6	3					
Queuing Penalty (veh)	1	5	3					

Baseline

Intersection: 7: St. John Street & Congress Street

Movement	EB	EB	EB	WB	WB	NB	NB	SB	SB
Directions Served	L	T	R	L	R	T	TR	L	T
Maximum Queue (ft)	353	515	315	105	205	314	200	134	233
Average Queue (ft)	166	271	107	76	112	150	136	50	100
95th Queue (ft)	299	461	290	126	196	240	204	103	177
Link Distance (ft)	1767	1767			188	670		1418	1418
Upstream Blk Time (%)					2				
Queuing Penalty (veh)					7				
Storage Bay Dist (ft)			290	80			175		
Storage Blk Time (%)		9	0	12	14	2	1		
Queuing Penalty (veh)		15	0	27	13	11	4		

Intersection: 13: Fore River Pkwy & Valley

Movement	EB	EB	EB	EB	WB	WB	WB	SB	SB	SB
Directions Served	L	L	T	T	T	T	R	L	R	R
Maximum Queue (ft)	316	342	310	287	326	308	78	141	162	191
Average Queue (ft)	164	228	127	99	214	174	25	73	91	99
95th Queue (ft)	402	435	405	307	297	265	59	124	141	156
Link Distance (ft)			1329	1329	662	662		264	264	264
Upstream Blk Time (%)										
Queuing Penalty (veh)										
Storage Bay Dist (ft)	430	430					415			
Storage Blk Time (%)	1	6	0			0				
Queuing Penalty (veh)	3	18	2			0				

Intersection: 16: Congress Street & Valley

Movement	EB	EB	WB	WB	NB	NB
Directions Served	L	TR	L	TR	LT	R
Maximum Queue (ft)	44	206	83	299	150	71
Average Queue (ft)	6	122	22	132	59	34
95th Queue (ft)	26	218	59	242	113	57
Link Distance (ft)		188	839	839	494	494
Upstream Blk Time (%)		1				
Queuing Penalty (veh)		7				
Storage Bay Dist (ft)	50					
Storage Blk Time (%)		21				
Queuing Penalty (veh)		3				

Network Summary

Network wide Queuing Penalty: 129

Baseline

Intersection: 3: St. John Street & Garage Access/D St

Phase	2	4	5	6	8
Movement(s) Served	NBTL	EBTL	NBL	SBTL	WBTL
Maximum Green (s)	31.0	19.0	5.5	21.0	19.0
Minimum Green (s)	5.0	5.0	5.0	5.0	5.0
Recall	None	None	None	None	None
Avg. Green (s)	13.8	11.2	6.0	13.1	11.2
g/C Ratio	-0.01	-0.01	-0.01	-0.01	-0.01
Cycles Skipped (%)	8	12	93	9	12
Cycles @ Minimum (%)	3	4	0	2	4
Cycles Maxed Out (%)	2	14	5	15	14
Cycles with Peds (%)	0	0	0	0	0

Controller Summary

Average Cycle Length (s): NA
 Number of Complete Cycles : 0

Intersection: 5: Valley & St. John Street

Phase	2	3	4	6	8
Movement(s) Served	NBTL	WBL	EBTL	SBTL	WBT
Maximum Green (s)	18.0	19.0	18.0	18.0	42.0
Minimum Green (s)	5.0	5.0	5.0	5.0	5.0
Recall	None	None	None	None	None
Avg. Green (s)	14.4	16.9	13.7	14.4	34.3
g/C Ratio	-0.01	-0.01	-0.01	-0.01	-0.01
Cycles Skipped (%)	3	3	10	3	3
Cycles @ Minimum (%)	0	0	0	0	0
Cycles Maxed Out (%)	43	60	35	43	25
Cycles with Peds (%)	0	0	0	0	0

Controller Summary

Average Cycle Length (s): NA
 Number of Complete Cycles : 0

Baseline

Intersection: 7: St. John Street & Congress Street

Phase	1	2	3	4	5	6	7	8
Movement(s) Served	EBL	WBL	SBL	NBT	WBL	EBTL	EBL	SBT
Maximum Green (s)	11.5	15.5	3.7	26.5	4.5	22.5	4.5	27.0
Minimum Green (s)	8.0	8.0	3.0	8.0	4.5	8.0	1.0	5.0
Recall	None	C-Min	None	None	None	C-Min	None	None
Avg. Green (s)	12.4	16.3	4.0	26.4	4.6	25.8	5.4	34.9
g/C Ratio	-0.01	NA	-0.01	NA	-0.01	NA	-0.01	NA
Cycles Skipped (%)	2	0	14	0	18	0	93	0
Cycles @ Minimum (%)	4	0	0	0	82	0	0	0
Cycles Maxed Out (%)	76	100	84	70	80	100	7	70
Cycles with Peds (%)	0	0	0	0	0	0	0	0

Controller Summary

Average Cycle Length (s): NA
 Number of Complete Cycles : 0

Intersection: 13: Fore River Pkwy & Valley

Phase	4	6	7	8
Movement(s) Served	EBT	SBL	EBL	WBT
Maximum Green (s)	44.0	16.0	18.0	21.0
Minimum Green (s)	5.0	5.0	5.0	5.0
Recall	None	None	None	None
Avg. Green (s)	43.0	15.4	17.3	21.0
g/C Ratio	NA	NA	NA	NA
Cycles Skipped (%)	0	0	0	0
Cycles @ Minimum (%)	0	0	0	0
Cycles Maxed Out (%)	73	83	81	92
Cycles with Peds (%)	0	0	0	0

Controller Summary

Average Cycle Length (s): NA
 Number of Complete Cycles : 0



Get on Board!

Maine Medical Center

Transportation Demand Management Program
Friday June 22nd, 2018



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Introduction

Purpose

The purpose of Maine Medical Center's Transportation Demand Management program, Get on Board, is to reduce the amount of single-occupancy vehicles by enabling and promoting alternative modes of transportation to and from MMC's Bramhall Campus for MMC employees.

Maine Medical Center

Maine Medical Center is a complete health care resource for the people of greater Portland, the entire state of Maine, and northern New England.

Incorporated in 1868, Maine Medical Center is the state's largest medical center, licensed for 637 beds and employing more than 8,000 people – with approximately 2,000 of those employees residing in the City of Portland. Maine Medical Center's unique role as both a community hospital and a referral center requires an unparalleled depth and breadth of services, including the state's only medical school, through a partnership with Tufts University School of Medicine, and a world-class biomedical research center, the Maine Medical Center Research Institute.

Our care model includes the state's largest multispecialty medical group, Maine Medical Partners. Maine Medical Partners provides a wide range of primary, specialty, and subspecialty care delivered through a network of more than 40 locations throughout greater Portland and the southern Maine region.

Maine Medical Center is the flagship hospital of MaineHealth, a 12-member health system touching central, southern, and western Maine and eastern New Hampshire. The collaboration of MaineHealth's members allows greater availability to community health improvement programs, access to clinical trials and research, and shared electronic medical records.

The strength of the health system, anchored by Maine Medical Center, enables its members to invest in shared programs and services that improve the quality of care while reducing costs whenever possible. As a nonprofit institution, Maine Medical Center has provided more than \$200 million annually in community benefits, delivering care to those who need it, regardless of their ability to pay.

MISSION, VISION AND VALUES

Maine Medical Center is dedicated to maintaining and improving the health of the communities it serves by:

- Caring for its community
- Educating tomorrow's caregivers
- Researching new ways to provide care

It proudly carries its unique responsibility as Maine's leader in patient care, education and research. MMC is dedicated to the traditions and ideals of not-for-profit healthcare. It provides care to all who seek it.

MMC's efforts to execute its Mission are aimed at achieving a simple, yet powerful Vision: "Working together so our communities are the healthiest in America."

MMC is guided by a set of Values, helping to meet and exceed the expectations of those it is privileged to serve. MMC's Values:

- Patient-Centered
- Integrity
- Ownership
- Excellence
- Respect
- Innovation

MMC Facility Planning

Maine Medical Center recently announced a project that will expand and modernize much of its patient care facilities. Over the next five years Maine Medical Center plans to spend \$512 million on the construction, renovation and expansion of inpatient and outpatient facilities and services. The majority of this investment will occur at MMC's main Bramhall campus.

Every aspect of this project is designed around the needs of patients. The project will optimize current bed capacity at, Maine Medical Center, the state's largest hospital and calls for increasing the number of single rooms available to patients as well as replacing surgical and treatment areas with ones that adhere to 21st century standards. In addition, patient rooms will be universal meaning that each rooms can meet the needs of patients at any point during their stay whether they require critical care or acute care services. About \$50 million of the total project cost will be invested in outpatient facilities through the hospital's multi-specialty medical group organization - Maine Medical Partners.

The project also involves the replacement of the largest parking garage on campus, a 1,200-space structure used by employees that sits along Congress Street. The need to replace that garage creates an opportunity to reorient the hospital's main entrance to Congress Street, one of the city's main thoroughfares. The hospital's current main entrance faces Bramhall Street in the city's largely residential West End.

The project is organized into three separate site plan descriptions:

- Site Plan #1:
 - Two floor addition to the East Tower housing 64 private universal rooms.
 - Relocation of the helipad which is currently on the employee garage to the top of the East Tower. Patients arriving via the helipad will have a direct vertical connection via elevator to MMC's Emergency Department and trauma services on the first floor of the East Tower.
 - Three floor addition to the visitor garage on Congress St.
- Site Plan #2:
 - New employee parking garage on St John St that will include over 2,400 parking spaces. The location of the new garage is roughly a quarter mile from the main campus and employees will be encouraged to walk during nice weather.

- Site Plan #3:
 - Removal of the current employee parking garage on Congress St.
 - Construction of a new hospital tower with 64 private universal rooms, 19 procedure rooms, and space for an additional 32 private universal rooms. This building will also include a new hospital entrance and drop-off area with direct connection to the visitor garage.

The project is expected to be completed in the Fall of 2022.

Commitment to TDM

MMC has a long-standing history of promoting health outside of and within its organization. The medical center developed a Transportation Demand Management (TDM) program in 2008, becoming one of the first in Maine to publish such a plan.

In 2008, MMC became one of the first in Maine to develop an independent TDM program.

Known as "Get on Board!," the program supports alternative commuting options such as carpool, mass transit, bicycling, and walking. MMC also engages in an extensive campaign to educate employees about the benefits of alternative modes of transportation and the Get on Board! program. Total enrollment in Get on Board continues to increase year after year.

Over the years, MMC has added elements to strengthen the program's offerings. In 2015, for example, MMC installed additional bicycle parking in its South Parking Lot to enhance cycling access to the main areas of the campus.

The following Plan documents MMC's current TDM efforts, planned program enhancements, as well as new TDM programs. The Plan is intended to serve as a living document. Monitoring reports will be submitted annually to the City's Planning Department.

While MMC encourages sustainable commuting practices across its organization, this TDM Plan applies to MMC's main campus in the west end of Portland, ME, where the majority of MMC's staff is located. Presently, the main campus has approximately 4,400 employed individuals on any given week day. Maine Medical Center employs more than 8,000 people throughout Southern Maine, roughly 6,000 of MMC employees work at the Bramhall Campus.

Contributors to this Plan

MMC would like to thank the City of Portland, the West End, Western Promenade, Libbytown, St John Valley, and Parkside neighborhoods, and Vanasse Hangen Brustlin, Inc. (VHB) for contributing to this Transportation Demand Management Plan.

MMC engaged VHB to assist in the creation of this plan. VHB is a national consulting firm specializing in transportation engineering and a leader in the development and management of Transportation Demand Management plans.

Context

Land Use

CURRENT

MMC's Bramhall campus is located at a high point in the west end of the Portland peninsula that is renowned for the Western Promenade—an 18-acre park and national historic landmark designed by the Olmsted Brothers, among others. The campus abuts the Western Promenade in a dense urban setting that serves, in many ways, as a transitional zone between areas with diverse character, land uses, and demographics.

The campus, which serves the entire state of Maine as well as eastern New Hampshire, is located within less than a mile's distance of I-295, which links Portland to destinations across New England. To the north, the campus fronts on Congress St —Portland's main thoroughfare that extends along the spine of the peninsula to Portland's downtown and beyond. The MMC campus is located at the western gateway into the City.

FUTURE

The area surrounding MMC is identified in the City's Comprehensive Plan as an area with transformational potential. MMC's TDM plan aligns with this future vision. As part of the project, MMC will add a new entrance to Congress Street and envisions providing active ground floor uses in new buildings. This change will heighten the level of pedestrian activity on Congress Street, and serve to promote the corridor.

Parking

CURRENT SUPPLY

MMC offers its patients, visitors, physicians, and employees several options for parking. MMC currently controls approximately 2,877 total off-street parking spaces either via ownership or through leases with others that specifically serve the Bramhall Campus. Of the 2,877 spaces, 850 spaces are available for public use by patients and visitors, and 2,027 parking spaces are subscribed to staff and physicians.

TABLE 1 Existing Parking Spaces

		Patient / Visitor	Employee	Total at Facility	Ownership
ON-CAMPUS	Employee Garage	0	1,274	1,274	Owned
850 patient / visitor	Patient / Visitor Garage	480	0	480	Owned
1,538 employee spaces	South Lot	370	0	370	Owned
	887 Congress (Forest St Garage)*	0	178	178	Owned
	7 Bramhall St	0	26	26	Leased
	905 Congress St (Sportsman Lot)	0	60	60	Leased
OFF-CAMPUS	222 St John St (First Atlantic Lot)	0	283	283	Leased
489 employee spaces	181 High St (Gateway Garage)	0	100	100	Leased
	993 Congress St (Classic Lot)	0	97	97	Owned
	321 Brackett St	0	9	9	Leased
TOTAL PARKING SPACES		850 Patient / Visitor	2,027 Employee	2,877 Total	

* The Forest St Garage has an additional 222 spaces that are dedicated to medical office staff and patients.

CURRENT DEMAND

MMC has continued to witness intensifying demands on the existing parking supply due to increased patient volumes and higher acuity patients with longer lengths of stay. Under current conditions, MMC’s staff parking system typically operates at capacity during the weekday daytime hours. When off-site, remote staff parking facilities reach capacity, staff is directed to park on-campus in the Congress Visitor Garage. Some staff members independently choose to park nearby utilizing neighborhood on-street parking, although this is discouraged by MMC.

Patients, visitors, and staff at MMC often comment on the lack of adequate and predictable parking. MMC parking facilities do not have integrated technologies to accurately report parking utilization. Therefore, current demand was estimated using a combination of observed data and comparisons to facilities similar to MMC’s Bramhall Campus.

Observations:

On behalf of MMC, VHB conducted on-site parking usage observations in January and March 2017. These months were ideal for parking observations because of the poor weather resulting in increased parking utilization. VHB collected parking count data during peak hours, which included late afternoon, evening, and overnight occupancy and turnover. Parking observations were completed during weekdays when MMC typically sees its biggest parking challenges – Tuesday – Friday. Historically, the highest patient volumes at MMC are on Thursdays and Fridays according to the MMC team responsible for managing parking. High patient volumes coincide with higher volumes of staff. The counts indicate that the parking system typically operates at or above capacity during weekday daytime hours. During the observations, it was difficult for VHB to differentiate staff from patients and visitors. Therefore, a total demand estimate is provided.

The observed data reveals that parking demand at the Bramhall campus among patients, visitors, physicians, and staff total roughly 3,122. MMC parking facilities have capacity of 2,877. The observed

parking demand is almost 110% of supply. The observed parking demand is 4.4% below the expected parking demand (3,264) for a suburban hospital of MMC’s size, according to Institute of Transportation Engineers (ITE) parking demand projections. The difference equates to a shortage of 142 parking spaces.

In addition to VHB’s observations, the MMC staff responsible for managing parking has estimated the employee parking deficit to be between 200 and 300 spaces.

Comparison to Peer Group:

VHB compared MMC’s parking ratio per licensed bed to other hospitals in New England and nationally. MMC’s 850 patient/visitor parking spaces equate to 1.33 parking spaces per bed which is low compared to peers. The midpoint patient and visitor parking space/licensed bed ratio among MMC peers is 1.87. It is important to note that based on a review of peer institutions, MMC would need to increase its patient/visitor allocation by 344 spaces, or 40%, to achieve a similar beds-to-spaces ratio as its peers. MMC’s 2,027 staff parking spaces equate to 3.18 parking spaces per bed which is also low when compared to other peer institutions. The midpoint employee parking space/licensed bed ratio among MMC peers is 4.38. MMC has 637 licensed beds.

When compared to peers, MMC has a shortage of 341 patient and visitor parking spaces and 763 staff parking spaces.

$$\begin{aligned}
 & \text{MMC Licensed Beds (637) * Comparison Group Patient \& Visitor Parking Space per Bed (1.87)} \\
 & \quad = \text{Peer Equivalent Patient \& Visitor Parking Spaces (1,191)} \\
 & \quad - \text{MMC Patient \& Visitor Parking Space (850)} \\
 & \quad = \text{Patient \& Visitor Parking Space Deficit at MMC (341)}
 \end{aligned}$$

$$\begin{aligned}
 & \text{MMC Licensed Beds (637) * Peer Group Staff Parking Spaces per Bed (4.38)} \\
 & \quad = \text{Peer Group Equivalent Staff Parking Spaces (2,790)} \\
 & \quad - \text{MMC Staff Parking Spaces (2,027) = Staff Parking Space Deficit at MMC (763)}
 \end{aligned}$$

Current Demand:

MMC used the observed and peer group data to determine the estimated parking demand.

Based on data available, the estimated MMC parking demand exceeds patient and visitor supply by approximately 25 parking spaces and exceeds employee parking supply by approximately 220 parking spaces. MMC’s total parking deficit is estimated to be 800 parking spaces in 2017. Therefore, the estimated parking demand in 2017 is:

2017 Estimated Parking Demand
- 875 for patient and visitor parking (875 = Current Patient Visitor Parking Supply + 25)
- 2,250 for employees (2,250 = 2,247 + roundup = Current Employee Parking Supply + 220)
- 3,125 total estimated parking demand

The parking demand for MMC’s Bramhall campus approximately 3,125 parking spaces.

MMC feels that the appropriate metric to measure parking utilization is parking demand per Bramhall campus employee. This metric is ideal because the number of employees will change over time. Other

metrics such as parking space per bed or parking space per square foot would not accurately account for all factors impacting parking demand on campus. This metric allows for changes in both factors – the number of employees and parking demand. In addition, this metric focuses on MMC employees who are the target population of this transportation demand management plan.

MMC's Bramhall campus has roughly 6,000 employees as of 2017. Therefore the current employee parking demand per Bramhall campus employee is 0.375.

$$\frac{\text{Estimated Employee Parking Demand (2,250)}}{\text{MMC Bramhall Employees (6,000)}} = \text{Employee Parking per Bramhall Employee (0.375)}$$

FUTURE

Looking towards the future, MMC will undertake a project to modernize its Bramhall campus. The project is detailed above and is anticipated to increase patient/visitor and employee parking demand. This demand will be offset by TDM methods described later in this document, along with expansions in its campus parking capacity.

Data Collection

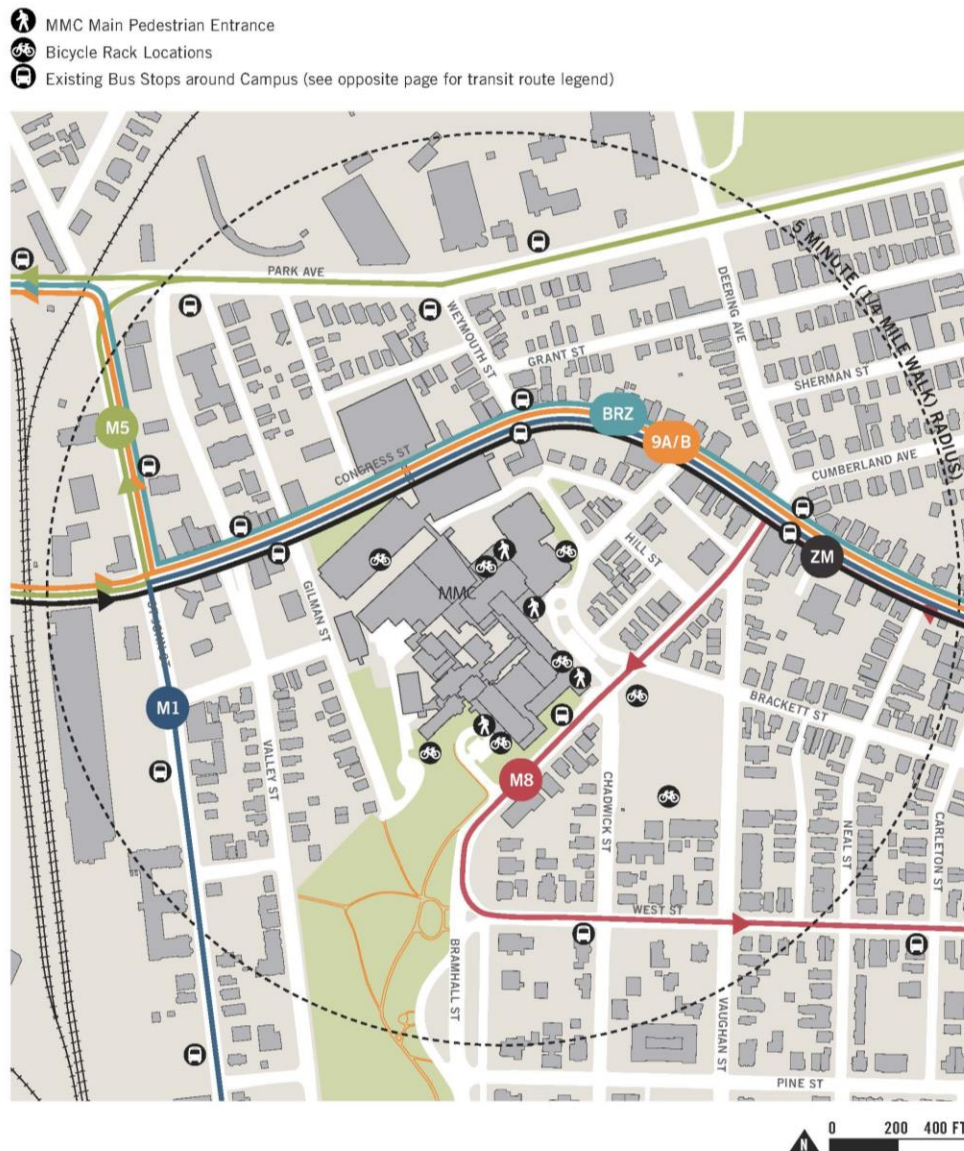
Currently, MMC has a limited transportation mode data collection system. MMC recognizes the need for an improved system. MMC employs a large number of individuals and tracking their commute behaviors will require a system that relies on automatic data collection wherever possible. MMC is exploring options to improve data collection such as a card reading system, similar to EZ-PASS, in new parking buildings.

Transit

MMC's main campus is located in a section of the City that is served by the Greater Portland Transit system (METRO), which has multiple routes that stop within walking distance of the Medical Center. The campus is also served by the ZOOM turnpike Express route operated by ShuttleBus-ZOOM.

The METRO routes accessible from the Bramhall Campus have varying service spans with buses generally arriving every 30 to 60 minutes. They provide connections to the nearby Portland Transportation Center (PTC) and the Downtown Hub, which are served by additional METRO and regional bus lines. The PTC also serves as the local connection to Amtrak's Downeaster service that runs along the coast between Boston and Brunswick. The closest bus shelter to the hospital is along Bramhall Street, between the Dana Health Education Center and the South Entrance. This stop is served by METRO Route #8, which provides connections to other parts of the peninsula. There are two other nearby bus stops on the corners of Congress St and Gilman St and Congress St and Weymouth St. These bus stops are served by routes #9, #1, METRO's express service BREEZ, and the ZOOM turnpike express. For the most up to date METRO stops and routes, go to www.gpmetrobus.com.

FIGURE 1 Map of Existing Transit Routes and Stops



Bicycle and Pedestrian Infrastructure

MMC understands that all campus users walk at some point to arrive at their MMC destination. To enhance pedestrian accessibility, MMC maintains its network of campus pathways and public sidewalks adjacent to campus. Similar to other medical centers of its size, MMC provides elevated, covered, and temperature-controlled walkways between its parking garages and key campus circulation corridors.

The bike facility network surrounding MMC's campus is fragmented and lacks bicycle infrastructure as illustrated in figure 6 below. In addition, the hilly nature of the Western Promenade impacts bicycling and walking in this area.

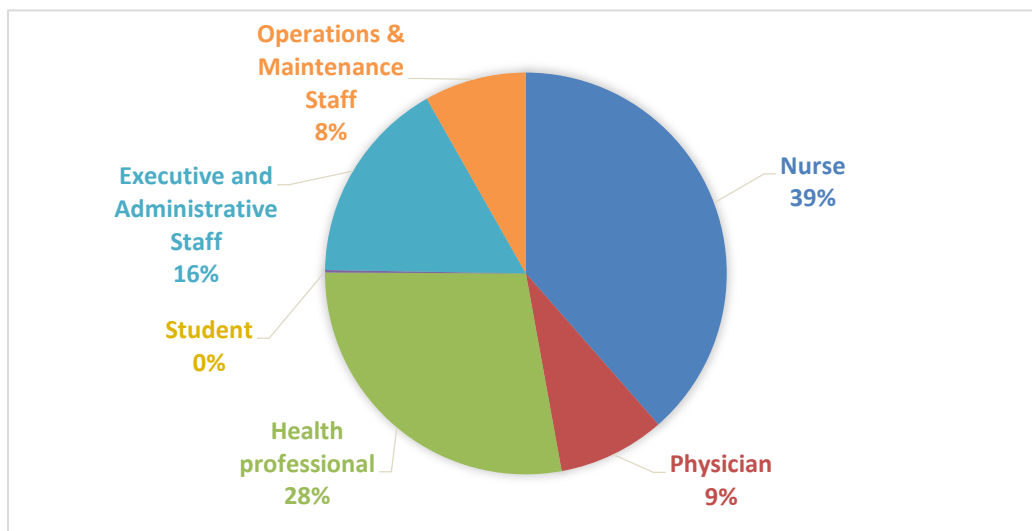
Current Travel Behavior

As part of its efforts to monitor and enhance the Get on Board program, MMC recently conducted a survey of its employees to understand how they commute, any barriers to using alternative transportation, and their interest in other TDM initiatives. The Medical Center also analyzed employee residence data using geospatial analysis tools to better understand employee commuting patterns. The findings from the survey and analysis are summarized below.

Commuting Survey

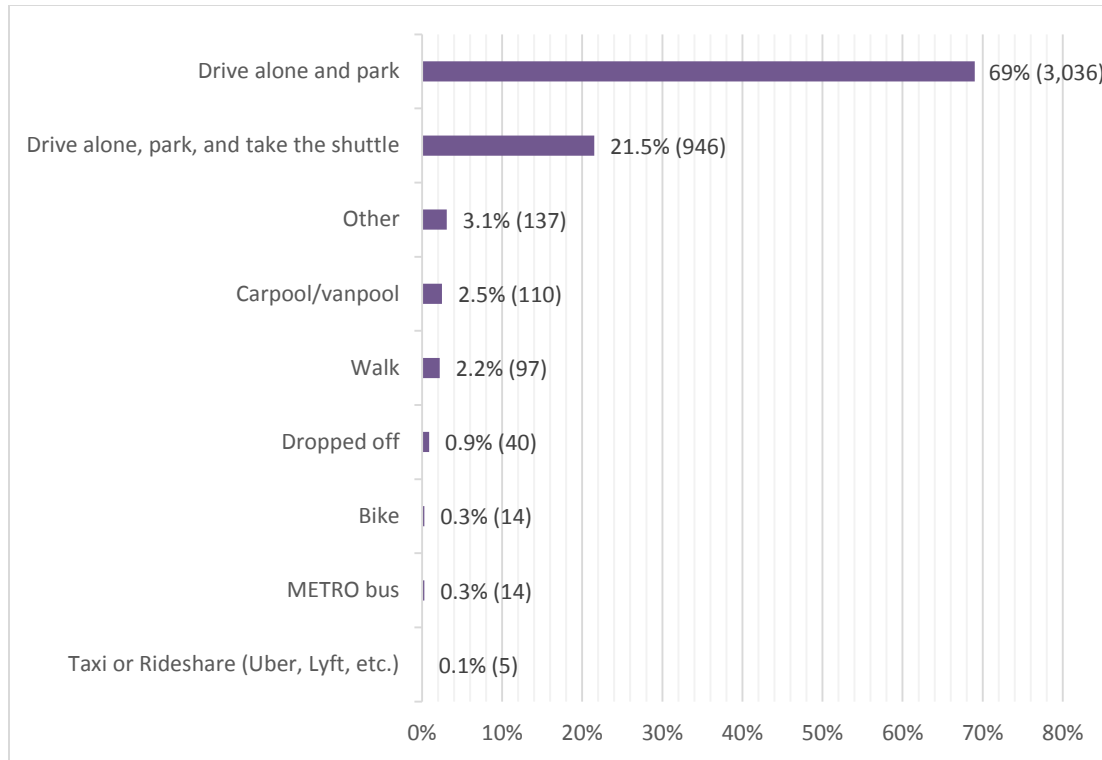
Approximately 1,600 MMC employees participated in the voluntary survey, administered in February 2017 – nearly a 40% response rate. Approximately 81% of the respondents work at the Bramhall campus. The respondents included a diverse spectrum of employees including operations and maintenance staff, students, executive and administrative staff, health professionals, nurses, and physicians. Figure 2 illustrates the various roles held by the survey participants.

FIGURE 2 Survey Respondents by Hospital Affiliation



The survey found that the majority of employees drive to campus. Among alternative modes, carpooling was the most used mode of travel, followed closely by walking. Figure 3 illustrates the commuting modes of MMC employees.

FIGURE 3 Estimated Employee Travel Mode To and From MMC on an Average Workday
(4,400 estimated employees on campus per average weekday)



The survey also revealed that among Get on Board enrollees who participate in the program, carpooling benefits were the most used benefits, followed by biking benefits and transit benefits.

As the Get on Board program evolves, MMC intends to administer a commuting survey once every two years to track travel trends and to gauge the effectiveness of specific initiatives. The information collected will enable MMC to develop informed, data-based enhancements to Get on Board, providing a greater prospect for program success.

Geospatial Analysis

MMC analyzed the residence locations of its employees to understand employee commuting patterns. The analysis showed that approximately 27% of employees live within a 3-mile radius and approximately 73% of employees live beyond a three mile radius of MMC (See, Figures 4 and 5). Three miles is generally considered a reasonable biking distance by industry standards.

FIGURE 4 MMC Bramhall Campus Employees, Distance to Work by Type of Employee

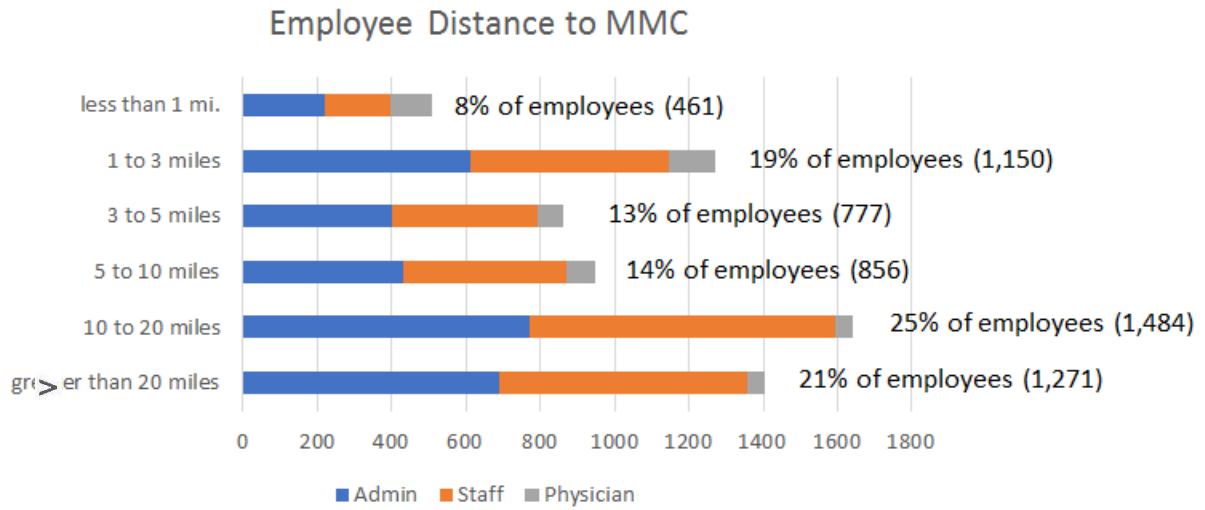
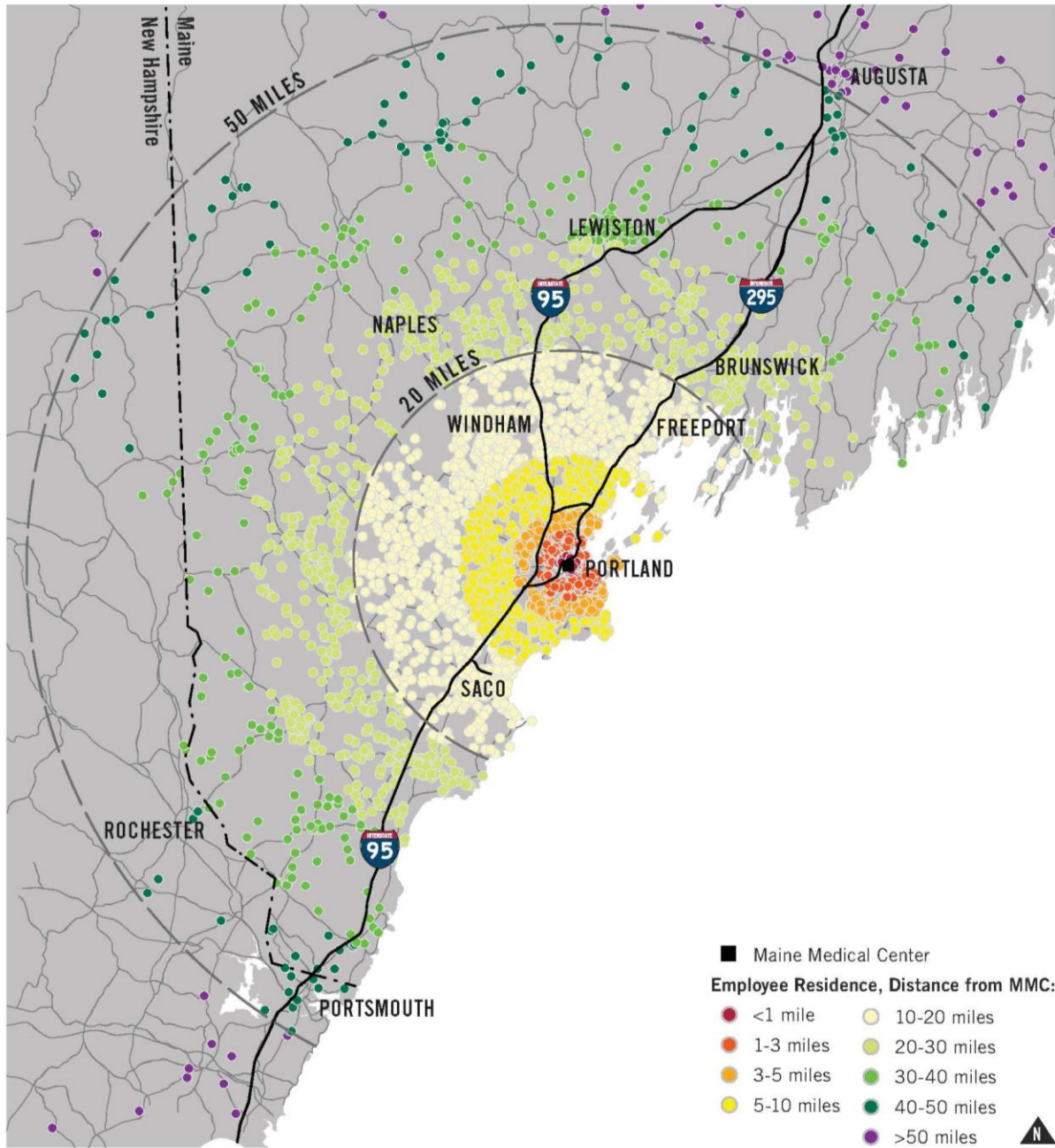


FIGURE 5 Map of MMC Bramhall Campus Employee Residences Illustrating Distance to Work and Travelsheds



Program Goals

The goal of the program is to reduce employee use of single-occupancy vehicles as they commute to work at MMC’s Bramhall Campus. At this time, MMC has determined the best way to measure a reduction in employee single-occupancy vehicles is to monitor employee parking demand per employee.

$$\text{Employee Parking Demand Per Employee} = \frac{\text{Estimated Employee Parking Demand}}{\text{Bramhall Campus Employees}}$$

As the program grows and evolves with time, new goals and metrics may be identified.

VHB conducted a study to determine the existing parking demand for employees (refer to the Context section of this document). VHB’s observations and peer group comparison will serve as the baseline for future reduction targets.

Peak parking demand at the Bramhall campus is 4.4% below the expected parking demand for a suburban hospital of MMC's size.

The Get on Board program aims to reduce single-occupancy vehicles on MMC’s Bramhall campus through effective TDM measures. These measures include a parking “cash out” program, discounted transit fares, premium parking for carpoolers, and bicycle parking and facilities, among others. Additional details about the program elements are described in the next section. MMC believes the program has had a positive impact on employee travel behavior and has contributed to reduced parking demand over the years.

Based on a review of federal census data, employee travel origin and destination information, existing employee travel mode split, and transportation survey results, MMC believes it can further reduce the portion of employees driving alone to work, thus reducing trip making and resultant parking demands. An initial estimate is that an additional 65 individuals who currently drive to MMC could be shifted into alternative modes of accessing the campus over 5 years. This represents an additional 2% reduction from the ITE parking demand projections.

In consultation with the City, MMC has established the following aggressive short-term, mid-term, and long-term trip reduction goals. These targets are applied to the 2017 baseline identified in the Context section of this document.

	2017 Baseline	Short-Term (0-2 years)	Mid-Term (2-5 years)	Long-Term (5+ years)
Targeted Reduction		2%	4%	5%
Employee Parking Demand Per Employee	0.375	0.367	0.360	0.356

MMC hopes these targets will be achieved through the strategies outlined below. It will endeavor to reduce the number beyond the target identified above through further enhancements or program expansions in the coming years. MMC will continue to monitor parking demand and needs at the Bramhall campus, and re-evaluate its program goals after the initial five year period as needed.

Parking and TDM Strategies

Current Get on Board Program Elements

Get on Board is advanced through a range of incentives and the provision of services to support alternative modes. The individual program elements are described below.

Biking

The MMC campus is located in close proximity to existing and planned routes in the City of Portland's growing bicycle network as shown in Figure 6. MMC offers a variety of bike facilities to make bicycle commuters feel welcome and safe. In 2008, MMC installed five strategically-located bike racks and ten bike lockers on its main campus. Three new bicycle racks were added in the vicinity of the Bramhall entrance and in the South Lot in 2016, bringing total storage capacity to 193 bicycles across campus. Bicycle commuters also have access to additional on-site facilities such as showers and lockers.

Beyond on-campus facilities, MMC is an advocate of the City of Portland's Bikeway Network Plan, which will provide bicycle infrastructure on streets adjacent to campus to connect bicyclists with existing and shared use paths.

The City of Portland's latest Comprehensive Plan proposes transforming the streets surrounding MMC into "neighborhood byways." This type of improvement would serve to encourage walking and biking for employees who live within a reasonable distance of the hospital. MMC also supports ongoing collaboration with the City of Portland, local and regional transit agencies, and neighborhood and advocacy organizations to explore opportunities to improve pedestrian, bicycle, and transit infrastructure and networks serving the Bramhall Campus. The City of Portland has plans to expand the bike lanes illustrated in Figure 6 and add a Neighborhood byway.

FIGURE 6 - Portland Bikeway and Pedestrian Network (Source: City of Portland)



Mass Transit

Under Get on Board (GOB), employees can purchase discounted bus tickets and Shuttle-Bus Zoom tickets conveniently on campus. This is a clear demonstration of MMC’s commitment to making the TDM Plan work for its employees and for the City of Portland. Table 2 lists the Greater Portland METRO Bus and Shuttle-Bus Zoom discounts provided through “Get on Board!”

TABLE 2 MMC Transit Discounts

	Regular Price	MMC Sale Price	% Discount
METRO	\$13.50	\$8.00	40%
S. Portland	\$13.50	\$8.00	40%
Zoom 10 Ride	\$39.00	\$29.60	25%
Zoom Monthly	\$100.00	\$84.50	15%
Zoom Quarterly	\$260.00	\$197.50	25%

The *Portland Peninsula Transit Study*¹ established several strategies for improving the utilization of transit in Portland. These strategies involved expanding the transit service to development areas, creating more direct connections, and increasing service frequency to compete with drive-alone commute times. The *Portland Transportation Hub Link Feasibility Study*² also proposed a route alignment along Congress Street

¹ Portland Transit Committee. *Portland Peninsula Transit Study* (2009), Retrieved from: <https://www.portlandmaine.gov/DocumentCenter/Home/View/3383> .

² Portland Area Comprehensive Transportation System (PACTS). *Portland “Hub Link” Feasibility Study* (2015), Retrieved from: <http://www.portlandmaine.gov/DocumentCenter/View/14793> .

that would increase transit frequency near the hospital. These improvements, if implemented, would highly benefit MMC's campus population in light of the distance that most employees reside from MMC and the fluctuating nature of employees' schedules.

Carpool

Carpooling is the most popular component of the Get on Board program. Over half of program participants at the main campus take advantage of this benefit. Currently, employees participating in a carpool are given access to preferred parking in an area of the Employee Garage that connects directly to the Main Lobby on the ground floor of the hospital. MMC is planning to relocate its employee parking garage to St John St. Appropriate incentives that encourage participation in the carpool program have not been fully identified. However, until other incentives are identified, carpool participants will have preferred parking in the St John St employee garage.

Parking Cash Out

Presently, MMC operates a "parking cash out" program that offers employees monetary payments in lieu of a parking space. Program participants submit a form every three months that certifies their use of alternative transportation during the week to commute to work. Upon receipt of a certification, MMC issues the employee a payment equal to the cost of parking at MMC's employee garage.

MMC Shuttles

MMC operates employee shuttle services between the Bramhall campus and off-site parking locations Mondays-Fridays, 6:00 am to 11:00 pm. The shuttles include:

- MMC and off-site parking lots at 222 St. John Street and 993 Congress Street (Monday – Friday, 6:00 AM to 11:00 PM)
- MMC Bramhall campus and the 110 Free Street Office Building (Monday-Friday, 6:00 AM to 4:00 PM, every 20 minutes)
- MMC Bramhall and Brighton Medical Center (335 Brighton Avenue) (Monday-Friday, 6:00 AM to 4:00 PM)

MMC also provides shuttle service for contractors from the parking lot at 993 Congress Street to the hospital. The shuttles provide a predictable alternative to employees commuting between the three sites and serves to reduce vehicular traffic in and around MMC.

Scooters and Motorcycles

The campus provides a designated parking space for scooters and motorcycles on the first floor of the employee parking garage.



UCar

MMC currently dedicates a space in its Congress Street parking garage for a carshare vehicle, as part of the city-wide carshare program called U Car Share. The program allows members to borrow a car by the hour, providing employees who bike, walk, or ride transit to work with

additional mobility for off-site meetings. Between mid-March and October of 2016, the UCar program had 96 reservations for a total of 4,105 miles.

TDM and GoMAINE website

The current employee GOB portal is linked to the GoMAINE Commuter Connections website, which is an alternative commuting program operated by MaineDOT. GoMAINE provides commuters with additional commuting resources and benefits that supplement those provided by MMC. These benefits include a carpool ride-matching program and a rewards program for participants.

Pay for Parking

MMC charges its employees no less than \$3 per paycheck to utilize MMC parking. MMC employees are paid bi-weekly. Therefore, the annual employee parking cost is \$78.

$$\$3 \text{ per paycheck} \times 26 \text{ pay periods} = \$78$$

Skiing



In the winter months, some employees chose to leverage their wintertime hobbies to get to work.

Enhanced Get on Board Program Elements

Program enhancements are anticipated to occur within 1-3 years.

Walking

As part of the modernization of Bramhall, MMC will orient entrances to public streets and provide active ground floor uses where possible to encourage pedestrian activity.

Biking

MMC will continue to offer bike storage, bike repair tools, and on-site shower and locker facilities to commuters who choose to bicycle to work.

MMC will also continue its parking cash out program to incentivize current bicyclists. To support “interested but cautious” bicyclists, MMC will seek out local bicycling support organizations to host educational safety seminars and/or adult bicycling skills classes at least once per year on the Bramhall Campus. MMC will also promote rewards programs, such as GO MAINE and Bicycle Benefits, to further motivate increased bicycle commuting.

MMC understands that Portland Bike Share, a non-profit organization with a goal to establish a bike share system in the City of Portland, plans to launch a bike share pilot in 2018. MMC will support this effort in the future.

MMC also recognizes the importance of safe and accessible infrastructure to active transportation. The presence of infrastructure can provide the sense of security that cautious bicyclists seek to spur a change in travel behavior. Additionally, as active modes become more widespread throughout the City of Portland, the visibility of walkers and bicyclists in the community can encourage greater participation among MMC employees. MMC supports the City of Portland in its work to improve public rights-of-way and promote active transportation modes.

The City of Portland has proposed a bike lane on Congress St and a proposed Neighborhood Byway on Bramhall St. Both of these proposed improvements are immediately adjacent to MMC’s Bramhall campus.



Carpooling/Vanpooling

Given the success of its carpooling program, MMC will continue to provide carpoolers with premium parking in the new employee parking garage. Similar to bicyclists, pedestrians, and transit riders, carpoolers will also continue to be eligible for parking “cash out” benefits. To facilitate the formation of carpools and vanpools, MMC will promote GOMAINE’s carpool matching program to facilitate carpool matching.

MMC Shuttle

Once the new employee parking garage is constructed, MMC will redesign its shuttle route system to serve employees parking at the new site. The new parking garage will consolidate previously dispersed parking options for MMC employees. MMC anticipates the new route will reduce traffic congestion into and around the campus area.

UCar

Working with UHaul and the City's Parking Department, MMC will continue to monitor the use of the UCar vehicle presently located in its Congress Street parking garage. In the event an additional car is warranted, MMC will work with its partners in finding a suitable location on the main campus for the storage and use of the additional UCar.

Enhanced Transit Subsidies

To further incentivize transit use, MMC will fully cover the cost of METRO bus tickets for employees who elect to use METRO as their primary mode of transit to the campus. If METRO ticket costs change, MMC will address program participation rates and work with METRO to find the best solution to support employees who wish to ride METRO. The type and amount of subsidy will depend upon ongoing discussions with METRO to enhance partnerships (see below).

Employees who use the METRO can apply for 100% reimbursement of METRO ticket costs. This project is administered on a reimbursement basis in order to minimize abuse of this benefit.

New Program Elements

In addition to enhancements to the initiatives described above, MMC intends to initiate complementary elements to ensure the program's continued success. The strategies are prioritized based on their implementation timeframe.

Short-Term (1-5 years)

The following actions MMC will pursue immediately (some are already underway) with the intention that all programs are fully operational within the 3-year time horizon.

Get on Board! Coordinator

MMC will hire a designated resource who will work to reduce employee single-occupancy vehicles on the Bramhall campus through the implementation, facilitation, and continuing sustainability of Get on Board. The coordinator will track the progress of the TDM program, oversee operations, and identify future opportunities to reduce single-occupancy vehicles on MMC's Bramhall campus by employees. The Coordinator will also be responsible for monitoring the progress of programs, data collection, and TDM program updates as required.



Way 2 GO MAINE

In October 2017, MMC participated in GOMAINE's Way 2 GO MAINE program for the first time. Way 2 GO MAINE is a 3-week business to business commuter challenge where employees log commute trips and earn prizes. In the first year participating, MMC ranked 2nd for large companies participating with 1,094 trips logged.

MMC will participate in the Way 2 GO MAINE B2B challenge in the future.

Improving Data Collection Capabilities

MMC will improve its data collection capabilities as described below.

Guaranteed Ride Home (GRH) Program

MMC will implement a Guaranteed Ride Home program to ensure that employees who regularly commute using alternative modes will have transportation in emergency situations.

Pay for Parking

MMC will evaluate employee parking fees in the mid-term. In evaluating future price, MMC will consider the prevailing market price for parking in the surrounding area at the time of implementation, as well as best practices in setting affordable parking prices in the region.

Long-Term Actions (5+ years)

MMC recognizes that the following program elements require partnerships with outside partners and agencies and, as such, will take longer to achieve. MMC has already laid the groundwork for all of these elements and will continue to pursue them in the coming years.

Regional Connections Partnership

Through its TDM Coordinator, MMC will seek to form partnerships with other major employers in the city, including the City itself, to foster a holistic approach to travel management. The partnerships would enable the exchange of TDM-related information and experiences between institutions, and it would foster a community that is focused on promoting alternative transportation in the City of Portland. Such collaborations would afford the opportunity to think regionally and help guide both employer provided or sponsored benefits as well as critical external resources such as METRO transit, sidewalks, and bicycle infrastructure. Opportunities to improve existing transit infrastructure would be a focus of any regional connections partnership.

Supporting Mass Transit Commutes

MMC intends to explore a partnership with the METRO to identify strategies for increasing MMC ridership, such as service updates and/or pricing agreements. Service updates could include changes in existing routes, new routes, or alternative route schedules. The formation of a partnership could be mutually beneficial, by providing METRO with feedback for increasing ridership while maximizing the usefulness of the transit system for MMC employees. As MMC formalizes its ties to other local institutions through a regional partnership, its collaboration with METRO could also extend to other employers.

Education and Marketing Strategies

MMC has a number of approaches to raise awareness about the benefits of alternative transportation and opportunities for participating in the Get on Board program. These strategies are integrated into various aspects of the organization's engagement with employees to reinforce the importance of TDM.

Sharing TDM Program Information

Information about the Get on Board program is available to all MMC employees via the MMC intranet. MMC's intranet is a place where employees routinely go for information. The Get on Board page provides information about all of MMC's TDM programs as well as links to the GOMAINE.org webpage.

MMC will develop and deliver information about the Get on Board program using communications best practices that are refined throughout the program's lifespan. Communication methods that are effective will be further refined while elements that are less effective will be reevaluated. Some examples of communication methods include:

- Introducing the program to new employees at orientation: MMC has shared information about the Get on Board program with new employees during orientation but will evaluate whether this is an effective way to educate new employees about the program. There are many factors to consider when providing information to new employees. The biggest factor to consider is the large amount of information shared during orientation.
- Social Media: MMC will use social media as an effective tool to communicate with employees about the Get on Board program.
- Get on Board Kiosks: To supplement information available on the Get on Board intranet site, MMC will designate locations to communicate information to employees in real time. One location under consideration is near shuttle stops.

MMC will commit to reorganizing information on its intranet site within the first six months following the hiring of the TDM Coordinator.

Get on Board Fair/Seminars

MMC will explore offering educational sessions about the importance of TDM and specific TDM methods such as walking, biking, or riding the bus. Educational sessions will rely on the expertise of local organizations specializing in alternative modes of transportation.

Get on Board Blitz

October is National Rideshare month and the same month of GOMAINE's Way 2 GOMAINE business to business challenge. In the future, MMC will explore ways to increase marketing of the Get on Board program during the month of October, potentially leveraging social media and internal communications vehicles, such as electronic newsletters.

Comprehensive Data and Goal Monitoring

MMC understands from its prior experience with TDM initiatives that achieving change is an iterative process that involves tracking the effectiveness of its programming and making mid-term adjustments if necessary to improve program effectiveness. MMC will collect and analyze data on a regular basis to monitor progress towards its TDM targets. The data would be collected through a range of instruments and will be used to make annual comparisons and to identify trends, and areas for growth. MMC will submit monitoring reports that include a summary of the data monitoring results, comparisons of the data to trip reduction targets, and adjustments to programs as needed.

Parking Utilization Data

MMC is exploring options to improve data collection in the new employee parking garage. The most likely option utilizes Easy-Pass technology to automatically collect information about the vehicles parking in the garage.

In addition, MMC plans to install a parking guidance system in the new employee garage, as well as a controlled-access parking system in the visitor parking garages. Together, these systems will allow MMC to monitor occupancy in each garage and to collect data regarding who uses the parking facilities and the temporal fluctuations in parking demand across various periods of time. These systems will provide quantifiable information to assist in determining future utilization of MMC's parking facilities.

MMC will utilize this parking usage data to assess its parking arrangement twice every year.

MMC has received feedback on numerous occasions about inappropriate use of its parking garages. MMC hopes to reduce the misuse of its garages in the future by implementing these monitoring and controlling systems.

Employee Survey

MMC conducted an employee travel survey in 2017 to understand employee commuter preferences, and intends to administer the survey once every two years going forward. The survey is administered electronically using a survey platform and will produce data that MMC (or a third party) can use to identify changes and progress from one period to the next. The survey will seek information about the following topics to gauge the effectiveness of initiatives:

- TDM program participation rates
- Individual program effectiveness
- Barriers to TDM use
- Changes in commuting preferences
- Marketing effectiveness

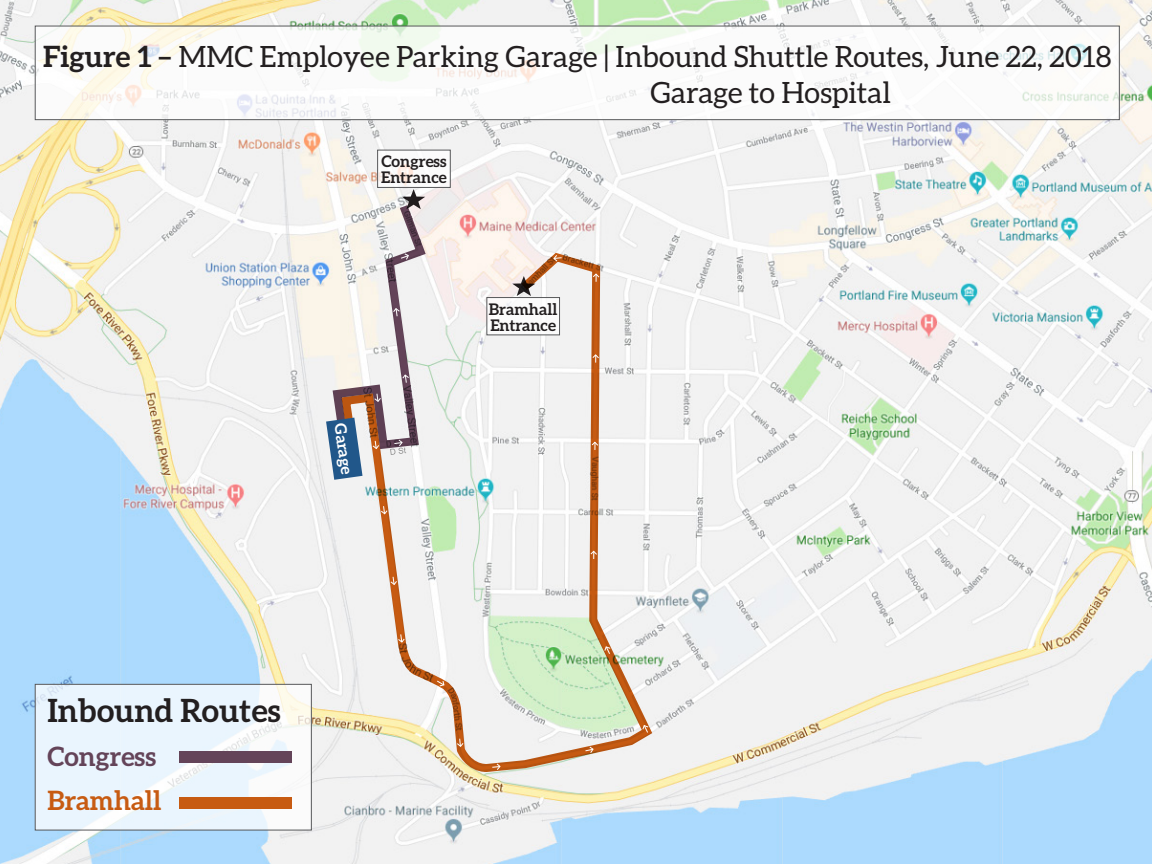
Reporting Frequency

MMC will submit annual monitoring reports that will include a summary of progress toward targets established in the TDM Plan.

Conclusion

The purpose of Maine Medical Center's Transportation Demand Management program, Get on Board, is to reduce the amount of employee single-occupancy vehicles at MMC's Bramhall Campus by enabling and promoting alternative modes of transportation to and from MMC's Bramhall Campus for MMC employees. The program has aggressive short- and long-term goals. Success of this program partially relies on a cultural shift away from personal vehicles. Maine Medical Center is committed to implementing the programs outlined in this report and supporting the transition away from single occupancy vehicles.

Figure 1 - MMC Employee Parking Garage | Inbound Shuttle Routes, June 22, 2018
Garage to Hospital



Inbound Routes

- Congress** [Dark Purple Line]
- Bramhall** [Orange Line]

Figure 2 - MMC Employee Parking Garage | Outbound Shuttle Routes, June 22, 2018
Hospital to Garage



Outbound Routes

- Congress** 
- Bramhall** 



Feasibility Analysis

Connecting the St John Garage to Fore River Parkway

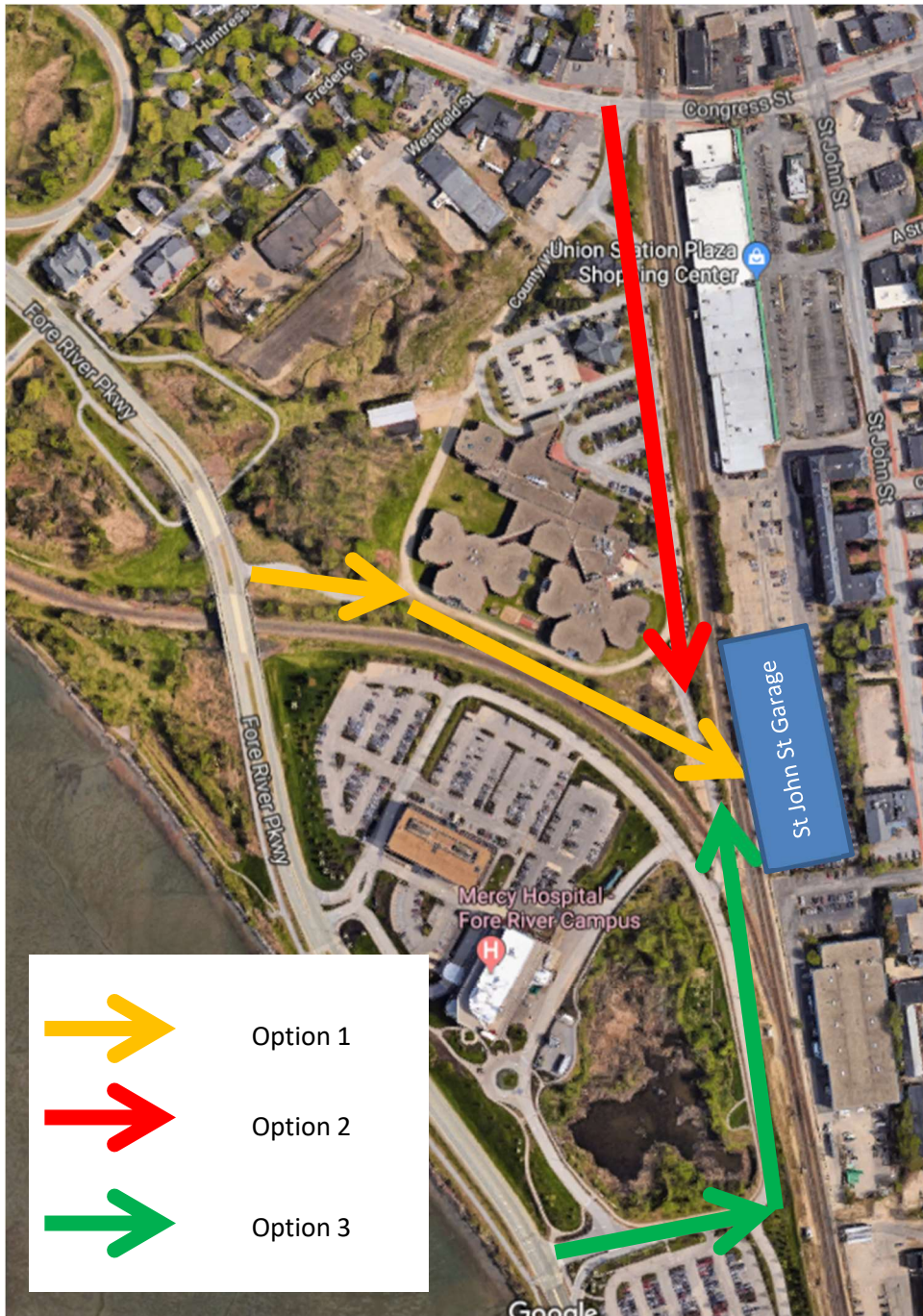
June 22, 2018

Executive Summary

Maine Medical Center is proposing to locate a 2,450 space parking garage on St John St near 222 St John St – the old railroad administration building. The primary access point to the proposed garage is on St John St near the intersection of St John St and D St. A secondary access point to the proposed garage is on St John St at the north end of the building located at 222 St John St.

The purpose of this document is to explore future access possibilities to the proposed St John garage from Fore River Parkway. This document analyzes the feasibility of such an access route and the pros and cons of access options identified by the City of Portland.

The options identified by the City of Portland are illustrated in the image below.



Source: Good Earth; City Of Portland

As described in detail below, none of the options are feasible within the anticipated construction schedule proposed by MMC in its Site Plan application. Of the options considered, option 3 is most worthy of additional consideration. This option uses an existing signalized intersection at Mercy Hospital and requires a ramp tall enough to safely clear three railways and a ramp long enough to provide a slope that is safe for regular vehicular traffic. This option would require significant time and cost to realize as well as easement agreements between private landowners and the railroad and wetland mitigation.

Objectives:

The objectives of a connection between the St John garage and the Fore River Pkwy include:

1. Utilize existing infrastructure, easements, and rights of way to the extent possible.
2. Decrease vehicular traffic on Congress St.
3. Increase utilization of Fore River Pkwy.

Assumptions:

Assumptions made in this analysis include:

1. A rail crossing is required.
2. Surface rail crossings are a safety concern and should be avoided.
3. Surface rail crossings temporarily interfere with non-rail traffic and should be avoided.
4. The slope of proposed ramps will be within industry standards for safe vehicular travel.
5. Any access option will meet applicable City of Portland technical standards.

Key Factors:

Key factors considered in this analysis include:

1. Existing and required easements.
2. Length of time required for all stakeholders to align around proposed design of access route. Stakeholders include rail operator, property owners and abutters, neighborhood associations, City of Portland and MMC.
3. Cost of ramps and infrastructure.
4. Minimum clearance over the rail is 23'-0" resulting in a bridge deck level of approximately 27'-0" above adjacent grade.

Option Summary

The following table summarizes the pros and cons of each access option. A significant cost and time to implement is assumed with each option. Costs would include the roadway and ramps associated with the rail crossing. Time for stakeholders to agree and approve a design is anticipated to be at least twenty months. Figures highlighting each option are attached to this summary.

	Pros	Cons
<p>Option 1: Access behind the Jail</p>	<ul style="list-style-type: none"> • Short bridge – two rail crossing • Increases Fore River Pkwy traffic • Decreases Congress St traffic • Potential for a through street using right of way adjacent to 222 St John. 	<ul style="list-style-type: none"> • The narrowest point of the proposed roadway is between the jail facility and the rail right of way. There is inadequate space to allow for two lanes of traffic, property setbacks, utilities, drainage and pedestrian pathways. • Railroad bed is approximately 7’ lower than existing grade alongside jail, access road would require long retaining wall system • Proximity to jail; disturbance to inmates. • Curb cut on Fore River Pkwy is between two bridges and cannot be widened. • The proposed location on Fore River Pkwy is currently unsignalized.
<p>Option 2: County Way</p>	<ul style="list-style-type: none"> • Short bridge – two rail crossing • Ogdensburg Street / County Way are existing public roads 	<ul style="list-style-type: none"> • Does not decrease traffic on Congress St or increase traffic on Fore River Pkwy • County Way and Congress St is an unsignalized intersection. Signalizing this intersection is complicated due to the proximity to the rail crossing. • Individuals seeking entrance to I-295 would have a circuitous route given the one-way on Congress St. • There is potential for garage traffic to interfere with jail traffic. This concern is exacerbated in the case of an emergency at the jail.
<p>Option 3: Mercy Circle Drive</p>	<ul style="list-style-type: none"> • Stakeholder interest at this time. • Achieves stated objectives. 	<ul style="list-style-type: none"> • May significantly impact Mercy’s development capabilities and require filling a wetland area

Option 1: Access Behind the Jail

Constructing a bridge crossing that spans two-railroad tracks and a new roadway alongside and south of the jail provides access from the Fore River Parkway to the garage at a new intersection between two existing bridges on the parkway. While this option provides direct, fully segregated access for garage traffic between the parkway and the garage, there is insufficient room between the jail building and the spur track right-of-way (approximately 40' from building to right-of-way, estimated). The space is too narrow to accommodate a two-lane roadway, walkway, drainage, and infrastructure such as a retaining wall, while still providing a reasonable buffer from the jail building. Other complicating factors in this option include the limited room / limited sight lines at the proposed intersection location on Fore River Parkway, as this intersection would be located between two width-limited bridge structures. This option would require purchase of land or easements from various property owners and negotiating a railroad bridge crossing with the railway.

This option is not feasible due to the limited width of land between the railroad and the jail.

Option 2: County Way

Constructing a bridge crossing that spans two-railroad tracks and reconstructing two roadway sections alongside and east / north of the jail (Ogdensburg Street to County Way) provides access from Congress Street to the garage. This option relies on sharing municipal roadways that are currently fully dedicated to serving the needs of the Cumberland County jail; analysis would be needed on whether additional traffic has adverse impacts on the jail operations and emergency response vehicles. This option does not decrease traffic on Congress St or increase traffic on Fore River Pkwy. County Way and Congress St is an unsignalized intersection; signalizing this intersection is complicated due to the proximity of the intersection to the rail crossing. Individuals seeking entrance to I-295 would have a circuitous route given the one-way on Congress St. Traffic that leaves the garage over the railroad tracks would need to cross those same tracks at an existing at-grade crossing on Congress Street. This option would require negotiating a railroad bridge crossing from the railway and coordination with the County jail, including possible easements.

This option does not meet two of the objectives of decreasing vehicular traffic on Congress Street while increasing utilization of the Fore River Parkway and is therefore not considered to be a viable option for further consideration.

Option 3: Mercy Circle Drive

Constructing a long bridge across three-railroad tracks and the Mercy hospital roadway provides access from the Fore River Parkway to the garage by way of the existing Mercy Hospital roadway system. This option maximizes the use of existing, built infrastructure on the Mercy Hospital campus, including the existing signalized intersection on the Fore River Parkway. The ramp system that provides access between the Mercy Hospital roadway and the garage bridge would likely require filling of wetland areas and impacts to the previously developed Mercy Hospital Master Plan submitted to the City prior to the Fore River Campus construction. This option would require purchase of land or easements from various property owners, including Mercy Hospital, and negotiating a railroad bridge crossing with the railway.

Of the three options explored, this option is most feasible and meets the objectives of utilizing existing infrastructure, easements, and rights of way to the extent possible; decreasing vehicular traffic on Congress Street; and increasing utilization of the Fore River Parkway; however, this option has impacts to the Mercy Campus which require approvals outside of the control of MMC.



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REV	DESCRIPTION	DATE

DESIGNED BY: BCM
 DRAWN BY: BCM
 CHECKED BY: DAS
 ALTERNATE PROGRAM

ACCESS BEHIND JAIL

MAINE MEDICAL CENTER
 22 BRANHALL STREET
 PORTLAND, ME 04102
 MM ST. JOHN STREET
 EMPLOYEE PARKING GARAGE
 JOB NO.: 0231158.00
 DATE: JUNE 2018
 SCALE: 1" = 60'
 SHEET: 1 OF 3

NOT FOR CONSTRUCTION

OPT. 1



A
B
C
D

A
B
C
D

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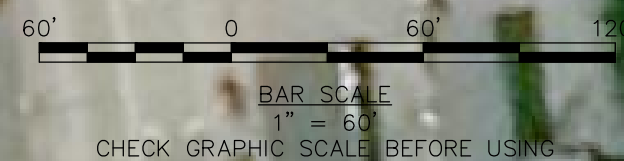
DESIGNED BY: BCM
DRAWN BY: ALBERTE FROBERG

COUNTY WAY

MAINE MEDICAL CENTER
22 BRANHALL STREET
PORTLAND, ME 04102

MM ST. JOHN STREET
EMPLOYEE PARKING GARAGE

JOB NO.: 0231158.00
DATE: JUN E 2018
SCALE: 1" = 60'
SHEET: 2 OF 3



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OPT. 2

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UTILIZE EXISTING SIGNALIZED INTERSECTION

FORE RIVER PARKWAY

UTILIZE EXISTING ROADWAY

WETLAND FILL/ IMPACTS TO MERCY MASTER PLAN

350'± RAMP @ 8% SLOPE

RAMP

LONG BRIDGE WITH 23' CLEAR (CROSSES 3 TRACKS & ROAD)

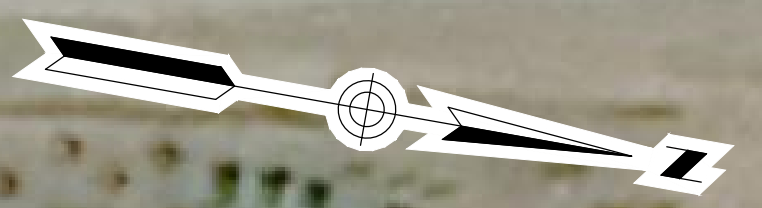
NEW INTERSECTION

2 RAILROAD TRACKS

MMC EMPLOYEE GARAGE

MERCY CIRCLE DRIVE

RAILROAD TRACK



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DRAWN BY: ALBERTE FROSTING

MERCY CIRCLE DRIVE

MAINE MEDICAL CENTER
22 BRANHALL STREET
PORTLAND, ME 04102

MM ST. JOHN STREET
EMPLOYEE PARKING GARAGE

JOB NO.: 0231158.00
DATE: JUNE 2018
SCALE: 1" = 60'
SHEET: 3 OF 3

OPT. 3

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