



## **Syracuse Metropolitan Transportation Council**

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**TO:** Gary Butterfield, Mayor, Village of North Syracuse  
**FROM:** Michael Alexander  
**DATE:** December 18, 2018  
**RE:** Final Church Street Municipal Lot Assessment Technical Memorandum (Dated: 12/11/18 - Route 11/Church Street intersection)  
**CC:** Megan Costa, SOCPA  
John Reichert, NYSDOT  
Dave Cooper, OCDOT

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The Syracuse Metropolitan Transportation Council (SMTC) has agreed to assist municipalities within our Metropolitan Planning Area (MPA) with transportation-related elements of their planning processes under a “Comprehensive Plan Assistance Block” as requested by the Syracuse-Onondaga County Planning Agency (SOCPA).

The Village of North Syracuse (Village) requested that the SMTC study traffic impacts on the Route 11/Church Street intersection based on the following changes and improvements:

- consolidate several parking lots into a municipal lot
- reduce and alter Route 11 driveway access
- promote primary driveway access at Church Street
- maintain full access at Route 11/Church Street intersection, and
- extend Church Street as a right-out only at South Bay Road.

SOCPA agreed to have SMTC advance this assessment under the assistance block for the 2018-2019 program year. The SMTC presented this technical memorandum to the Policy Committee as an informational item on December 11, 2018.

### ***Village of North Syracuse Municipal Parking Lot***

Several privately-owned parking lots exist around and behind buildings located along the east side of the 100 and 200 blocks of Route 11. The Village’s engineer, CHA Companies, developed a concept plan that consolidates the lots as a municipal lot and improves access management. The concept plan reduces the number of driveways on Route 11 from four to two and enhances driveway access on Church Street.

To assist their planning process, the Village requested that the SMTC conduct a brief technical assessment as an update to the 2016 Church Street Access Study (Access Study), which was prepared by SMTC on behalf of the Village. This technical assessment identifies traffic impacts on the Route 11/Church Street intersection based on information obtained from the (2016)

Access Study, the municipal lot concept plan, and the grant proposal to extend Church Street as a right-out only at South Bay Road.

### **2016 Access Study**

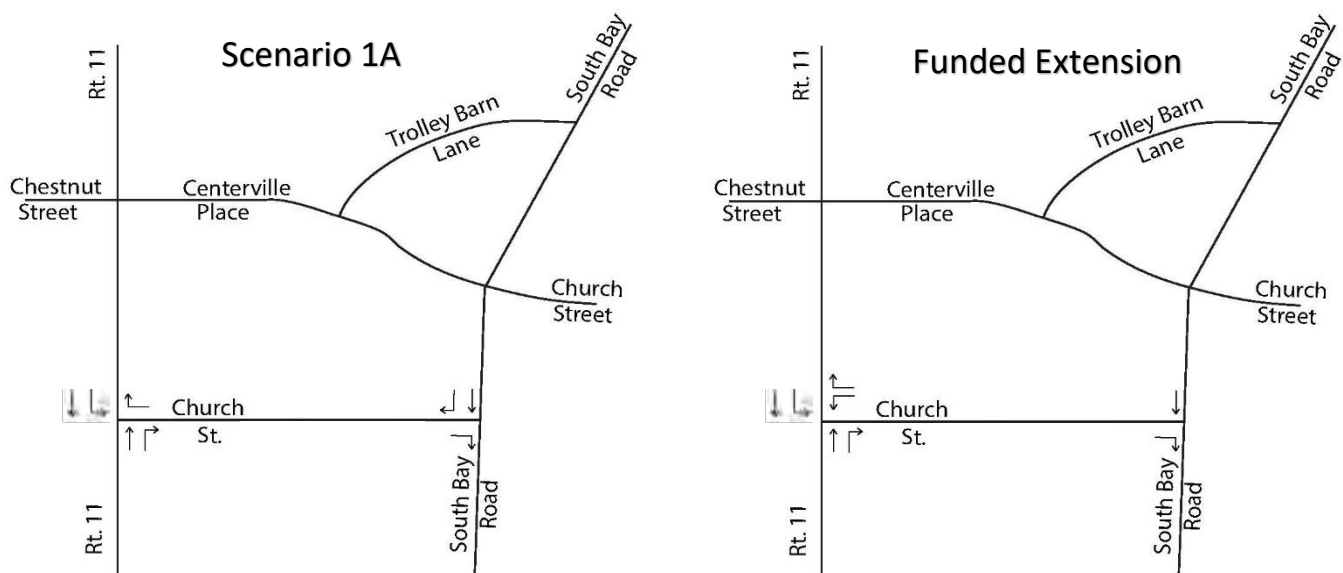
Currently, the 100 block of Church Street is as a dead-end road with residences and several residential to commercial conversions. The Village envisions this area redeveloping as an extension of its central business district and wishes to promote this transition by providing a second point of access at South Bay Road. To help advance this vision, the Village and the SMTC identified Church Street extension alternatives, determined feasibility, and summarized findings in the 2016 Access Study.

The 2016 Access Study analyzed impacts on surrounding area intersections based on existing and forecasted (20-year) traffic growth estimates. The forecasted traffic included anticipated traffic growth from the envisioned redevelopment of Church Street as a mixed-use district as well as a small amount of background growth. Based on the Access Study's findings, the Village identified Scenario 1A as their preferred alternative. Scenario 1A restricts westbound lefts at Route 11/Church Street and connects Church Street to South Bay Road as a right-in, right-out only (RIRO).

### **2018 Grant Proposal to Extend Church Street**

In 2018, the Village obtained a grant from Assemblyman Stirpe to extend Church Street as a right-out (RO) only to South Bay Road while maintaining full access at Route 11/Church Street. The grant proposal sought to extend Church Street as a RO only due to public concern that a southbound right from South Bay Road would promote cut-through traffic. The Access Study, however, found that Scenario 1A would likely abate cut-through traffic by prohibiting westbound lefts onto Route 11. Figure 1 shows different turning movements for Scenario 1A and the funded extension of Church Street.

**Figure 1 – Scenario 1A Movements - vs - Funded Extension Movements**



In addition to soliciting the grant funds to extend Church Street as a RO only, the Village currently seeks to establish a municipal lot and improve access management along Route 11. Establishing a municipal lot and improving access management will further promote the Village's long-term vision for redevelopment within the area.

### ***Municipal Lot Concept Plan Coordination Meetings***

On April 12, 2018, the SMTC met with Village representatives and parking lot property owners, including the North Syracuse Central School District, to determine which properties to include and which driveways to consider for closure. Involving representatives from the Main Street School was important because providing municipal lot access to school employees and parents - for student drop offs - could drastically increase the number of vehicles entering and exiting the Route 11/Church Street intersection during the morning and evening peak hours.

Based on the questions discussed at the April 12 meeting, the Village agreed to have its engineer develop concept plans for a municipal lot. CHA companies developed two concept plans and presented them at a second meeting held on June 18, 2018. During the second meeting, the Village and the property owners agreed to advance Concept Site Plan #1. In addition, the representatives from the Main Street School decided to only allow emergency access to the municipal lot. If desired, the School's eight buses could access the lot from their adjacent staging area, but no access would be provided for staff/parent parking.

The existing site plan and the municipal lot concept plan are provided in Attachment A. The existing lots currently provide 83 off-street parking spaces and are serviced by four driveways along Route 11 and two driveways along Church Street. The municipal lot concept plan increases the number of off-street spaces to 94, consolidates the Church Street driveways into one, eliminates two driveways along Route 11, and changes one of the Route 11 driveways into an entrance – it currently operates as an exit only.

### ***Data Collection***

On June 6, 2018, SMTC staff conducted fieldwork along Route 11 to observe the number of vehicles that enter and exit from four business driveways and two school driveways. Staff documented the number of entering and exiting vehicles and their direction of travel during the morning (8:00 a.m. to 9:00 a.m.) and evening (4:00 p.m. to 5:00 p.m.) peak hour.

Since observations were conducted prior to the end of the school year, staff also noted traffic at the school from 2:00 p.m. to 4:00 p.m. to document the number of vehicles that enter and exit during the period when parents arrive to pick-up their children and staff leave for the day. School-related driveway counts were collected in the event that the municipal lot was to also service the Main Street School.

The SMTC also used existing and forecasted turning movement data from the Access Study to conduct the assessment.

### ***Route 11/Church Street Intersection Scenarios***

This assessment analyzed traffic impacts at the Route 11/Church Street intersection for the following intersection scenarios:

#### Plus Municipal Lot Traffic

- Existing conditions
- Future No-build conditions

#### Future Build Traffic plus Municipal Lot Traffic

- RO only at Route 11; RI-RO at South Bay Road
- L/R lane at Route 11; RI-RO at South Bay Road
- L lane, R lane at Route 11; RO only at South Bay Road
- L/R lane at Route 11; RO only at South Bay Road

#### Half of Future Build Traffic plus Municipal Lot Traffic

- L/R lane at Route 11; RO at South Bay Road.

### ***Assessment Methodology***

The SMTC redistributed driveway counts and included them in existing and future turning movements at the Route 11/Church Street intersection.

#### *Driveway Trip Redistribution*

As shown in Attachment B, SMTC documented the number of vehicles entering and exiting four business driveways and two school driveways and noted the direction of travel during the morning and evening peak hours. This allowed planners to calculate the percent of vehicles along Route 11 that come from the north and turn left into the parking lots and what percent come from the south and turn right into the lots. Likewise, planners calculated the percent of vehicles that turned right and left from the lots as they exited during each peak hour.

Staff redistributed these turning movements to the Route 11/Church Street intersection. Applying all of the turning movements to the intersection assumes a worst-case scenario where the driveway on Church Street becomes the primary access point for the municipal lot. However, it is unlikely that all vehicles will turn at the intersection because two driveways will remain on Route 11.

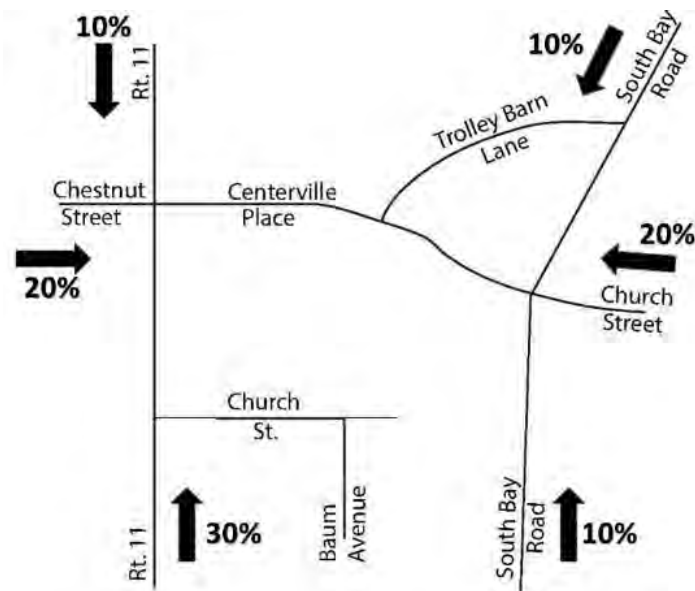
#### *Trip Redistribution for half of Forecasted Traffic Growth*

The SMTC wanted to assess if the Route 11/Church Street intersection would experience satisfactory levels of service if only half of the forecasted traffic growth from the future redevelopment of Church Street as a mixed-use district was realized. As shown in Attachment C, the SMTC reduced and redistributed the forecasted growth by half and included the municipal lot trips.

### Scenario Trip Redistribution Assignments for Assessment

Since the Access Study assumed that westbound lefts at Route 11/Church Street were prohibited, the SMTC had to redistribute 30 percent of the westbound right turns as westbound left turns for scenarios allowing full access at Route 11. As shown in Figure 2, the percentage is consistent with the distribution assumptions identified in the Access Study, which suggested that 30 percent of traffic comes from the southwest.

**Figure 2 – Church Street Traffic Distribution Assumptions**



Also, as previously mentioned, any scenario that includes Church Street as a RO only onto South Bay Road will need to redistribute southbound right turns from South Bay Road as southbound left turns from Route 11 onto Church Street (since the Access Study had assumed RIRO access at South Bay Road/Church Street).

Attachment D shows the final calculations for the Route 11/Church Street intersection for each scenario.

### Assessment

The SMTC entered the final trip assignments for each scenario into Synchro 10 software to determine level of service at the Route 11/Church Street intersection for the AM and PM peak hours. A copy of the summary reports is provided in Attachment E. Table 1 shows the LOS and delay for the Church Street westbound approach and the Route 11 southbound left-turn movement for each evaluation scenario.

**Table 1: Level of Service Results**

		Existing conditions traffic	Existing conditions traffic plus municipal lot traffic	Future 'no-build'	Future 'no-build' plus municipal lot traffic	Future development plus municipal lot traffic				Half future development traffic plus municipal lot traffic
S. Bay Rd. connection:		None	None	None	None	RIRO		RO only		RO only
AM Peak Hour										
Church Street (WB)	Left/right shared turn lane	C (17)	C (17)	C (18)	C (19)	---	F (71)	---	F (122)	E (47)
	Left turn lane	---	---	---	---	---	---	F (115)	---	---
	Right turn lane	---	---	---	---	C (19)	---	C (16)	---	---
Route 11 (SB)	Left turn lane	A (9)	A (9)	A (9)	A (9)	A (10)	A (10)	A (10)	A (10)	A (9)
PM Peak Hour										
Church Street (WB)	Left/right shared turn lane	C (20)	C (21)	C (22)	C (23)	---	F (118)	---	F (181)	F (77)
	Left turn lane	---	---	---	---	---	---	F (144)	---	---
	Right turn lane	---	---	---	---	C (25)	---	C (20)	---	---
Route 11 (SB)	Left turn lane	A (9)	A (9)	A (9)	A (9)	B (10)	B (10)	B (10)	B (10)	A (10)

**Notes:**

- Existing conditions year is 2014 (based on year of traffic counts)
- Future-build is year 2034 with a 0.3% per year background traffic growth rate over 20 years (6% total increase) as identified in the 2016 Church Street Access Study
- RIRO = right-in/right-out access; RO only = right-out only access
- --- indicates that the lane configuration/movement does not exist under this alternative
- WB = Westbound; SB = Southbound

**Existing and Future No-build Conditions**

Currently, the single, shared left-turn/right-turn lane from Church Street westbound at Route 11 operates well, at LOS C. Existing and future no-build scenarios assume that Church Street remains a dead end. The southbound left-turn movement from Route 11 onto Church Street operates very well, at LOS A. With the closure of driveways on Route 11 and consolidation of parking lots into a municipal lot with access only to Church Street, the movements at the Route 11/Church Street intersection are expected to continue operating at the current levels of service. Additionally, these levels of service are also expected to continue under the future No-Build traffic volumes with the formation of the municipal parking lot.

*Future Build Conditions (includes estimated mixed-use district traffic)*

The SMTC accessed four access alternatives<sup>1</sup> that include municipal lot traffic plus the estimated future traffic from the redevelopment of Church Street as a mixed-use district. Under all of these scenarios, the southbound left-turn from Route 11 to Church Street is expected to operate very well (LOS A), but the operation of the westbound approaches varies. The additional development on Church Street, as envisioned in the 2012 Village Center Master Plan and as described in the 2016 Access Study, generates a significant amount of additional traffic to the area (i.e., 128 in and 116 out during the AM; 142 in and 131 out during the PM).

Under the alternative with a left-turn restriction from westbound Church Street (i.e. Church Street westbound becomes a right-turn only) and a RIRO connection at Church Street/South Bay Road (i.e., Scenario 1A from the 2016 study), the Church Street right-turn is expected to operate at LOS C. However, in the short-term, the Village seeks to extend Church Street with RO only access at South Bay Road, and will continue to allow full access at Route 11/Church Street. Left- and right-turn movements from Church Street onto Route 11 would continue to be made from a single, shared lane on westbound Church Street. Capacity analysis results indicate that, under this configuration, the westbound Church Street approach at Route 11 would operate at LOS F with average delay in excess of two minutes.

In an attempt to mitigate the significant delay on the Church Street westbound approach, SMTC analyzed an alternative with dedicated left-turn and right-turn lanes on Church Street at Route 11. This configuration would greatly reduce delay for the right-turns, but the left-turns are still expected to experience average delay of nearly two minutes. Additionally, the width of Church Street is only 30 feet at this location, which would result in 10-foot wide lanes. The tight radius of the northbound right-turn movement and southbound left-turn movements would likely require wider lanes with deeper set-backs for the stop bar. Given that the Grotto restaurant is built to the corner, there would likely be sight distance issues with a setback stop bar, and little opportunity to expand lane widths. Therefore, this alternative was not considered feasible.

The SMTC also analyzed a scenario with a RIRO connection at Church Street/South Bay Road (as originally envisioned in the 2016 study), but with a single, shared lane for making left- and right-turn movements from westbound Church Street at Route 11. Allowing the southbound right turn from South Bay Road to Church Street reduces the overall amount of traffic at the Route 11/Church Street intersection, which thereby reduces the delay for vehicles trying to turn from Church Street onto Route 11. Under this alternative, the westbound Church Street approach (shared left/right) operates at LOS F, but with average delay of 71 seconds – much less than the two minutes of delay for previous alternatives.

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<sup>1</sup> All findings are based on excluding traffic from staff or parents dropping off children at the Main Street School. Should the school ever decide to open access from their lot to the municipal lot, the resulting delay at the Route 11/Church Street intersection under any of the scenarios discussed here could increase exponentially.

The SMTC analyzed one additional scenario that included half of the forecasted traffic growth associated with the future redevelopment of Church Street as a mixed-use district – a “Half of Future Build” scenario (plus municipal parking lot). A single, shared left/right-turn lane on westbound Church Street and a RO only connection at South Bay Road were included in this scenario. Under this scenario, level of service in the morning is expected to improve to LOS E, but continues to operate at LOS F in the evening. However, the average delay in the evening is relatively short, compared to other alternatives, at 77 seconds. As with all other scenarios, traffic on Route 11 is expected to continue flowing with very good levels of service.

### **Conclusions**

The assessment assumes a ‘worst-case scenario’ that involves all municipal lot traffic using the Church Street driveway. However, it is unlikely that all traffic will enter and exit at this location. Also, as indicated in the Access Study, it is unlikely that all of the traffic generated by the envisioned mixed-use development will occur for future build scenarios.

After adding the additional traffic from the municipal lot, the Route 11/Church Street intersection experiences acceptable levels of delay under the Existing and Future No-build conditions. Furthermore, this intersection is expected to continue operating well with the addition of the traffic associated with both the municipal lot and the mixed-use redevelopment of Church Street under the scenario with a right-turn only from Church Street onto Route 11 and a RIRO at South Bay Road (i.e., Scenario 1A from the Access Study).

However, in the short-term, the Village seeks to extend Church Street as a RO only at South Bay Road and will continue to allow full access at Route 11. Our analysis of various alternatives shows that left-turns from Church Street onto Route 11 will experience significant delay and operate at LOS F with the additional traffic.

The full-build future scenarios indicate delay of two-to-three minutes on westbound Church Street at Route 11. Relatively long delays on a side street at an unsignalized intersection on a major roadway are not an uncommon occurrence. In this case, the State’s arterial (Route 11) continues to operate very well and the delay is confined to the side-street approach. Therefore, if the state (or the county, who owns South Bay Road) does not object, the decision may ultimately rest with what the Village, local residents, and business owners are willing to accept for delay at Church Street, which is a Village-owned street.

The analysis showed that prohibiting westbound left turns from Church Street and allowing southbound right-turns from South Bay Road will reduce delay at the Route 11/Church Street intersection. The analysis also showed that with half of the traffic associated with the redevelopment of Church Street, the Route 11/Church Street intersection will operate at a borderline LOS E/F; therefore, the Village could consider incorporating access modifications to Church Street in the future when this scale of development is reached. This would require monitoring traffic as new development occurs along Church Street. Future coordination with the state and/or county may also be necessary.



# Attachment A

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Existing Site Plan

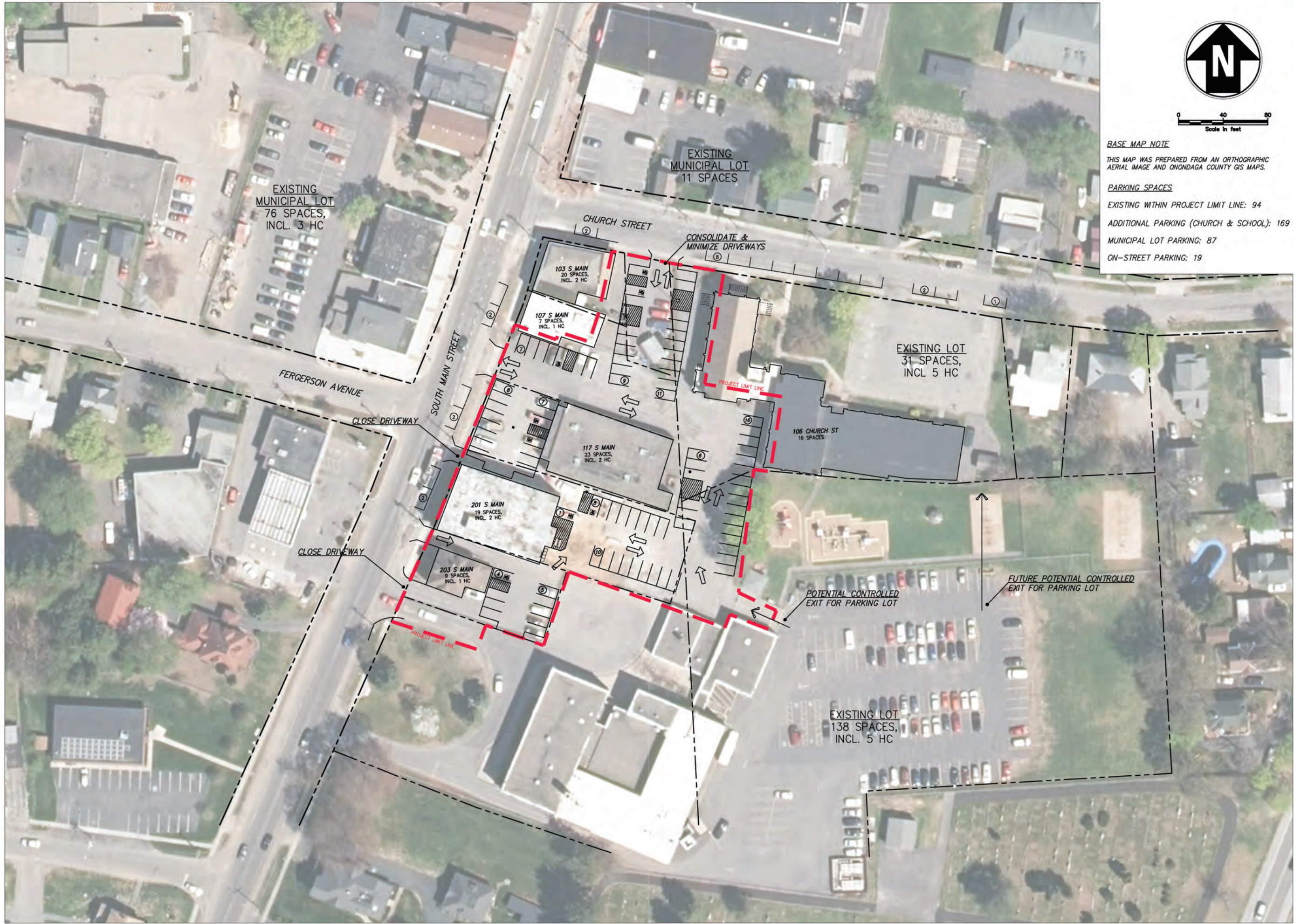
Municipal Lot Concept Plan







File: W:\PROJECTS\SNY\22016\DATA\OTHER\1042 - 2018 CHURCH ST MUNICIPAL PARKING LOT\22016-1042\_C-101.DWG  
Saved: 6/1/2018 9:52:29 AM Plotted: 6/1/2018 10:21:43 AM Current User: Franco, Amy LastSavedBy: 2473



**BASE MAP NOTE**  
THIS MAP WAS PREPARED FROM AN ORTHOGRAPHIC AERIAL IMAGE AND ONONDAGA COUNTY GIS MAPS.

**PARKING SPACES**  
EXISTING WITHIN PROJECT LIMIT LINE: 94  
ADDITIONAL PARKING (CHURCH & SCHOOL): 169  
MUNICIPAL LOT PARKING: 87  
ON-STREET PARKING: 19



IF IT IS DETERMINED THAT A LOT OR PORTION OF A LOT IS NOT SUITABLE FOR THE PROPOSED DEVELOPMENT, THE VILLAGE OF NORTH SYRACUSE MAY, AT ITS DISCRETION, REVOKE THE PERMIT TO DEVELOP THE LOT OR PORTION OF THE LOT. THE VILLAGE OF NORTH SYRACUSE MAY, AT ITS DISCRETION, REVOKE THE PERMIT TO DEVELOP THE LOT OR PORTION OF THE LOT. THE VILLAGE OF NORTH SYRACUSE MAY, AT ITS DISCRETION, REVOKE THE PERMIT TO DEVELOP THE LOT OR PORTION OF THE LOT.

VILLAGE OF NORTH SYRACUSE  
CHURCH STREET MUNICIPAL PARKING LOT

No.	Submital / Revision	App'd By	Date

CONCEPTUAL SITE PLAN #1		
Designed By: ACC	Drawn By: ACC	Checked By: WTE
Issue Date: 04/26/18	Project No: 22016-1042	Scale: AS SHOWN

Drawing No.:  
**C-101**



# Attachment B

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## Route 11 Driveway Enter/Exit Counts and Trip Redistribution

Figure X: Observed Traffic Counts

AM (PM) on 6/6/18  
Church Street Access Study

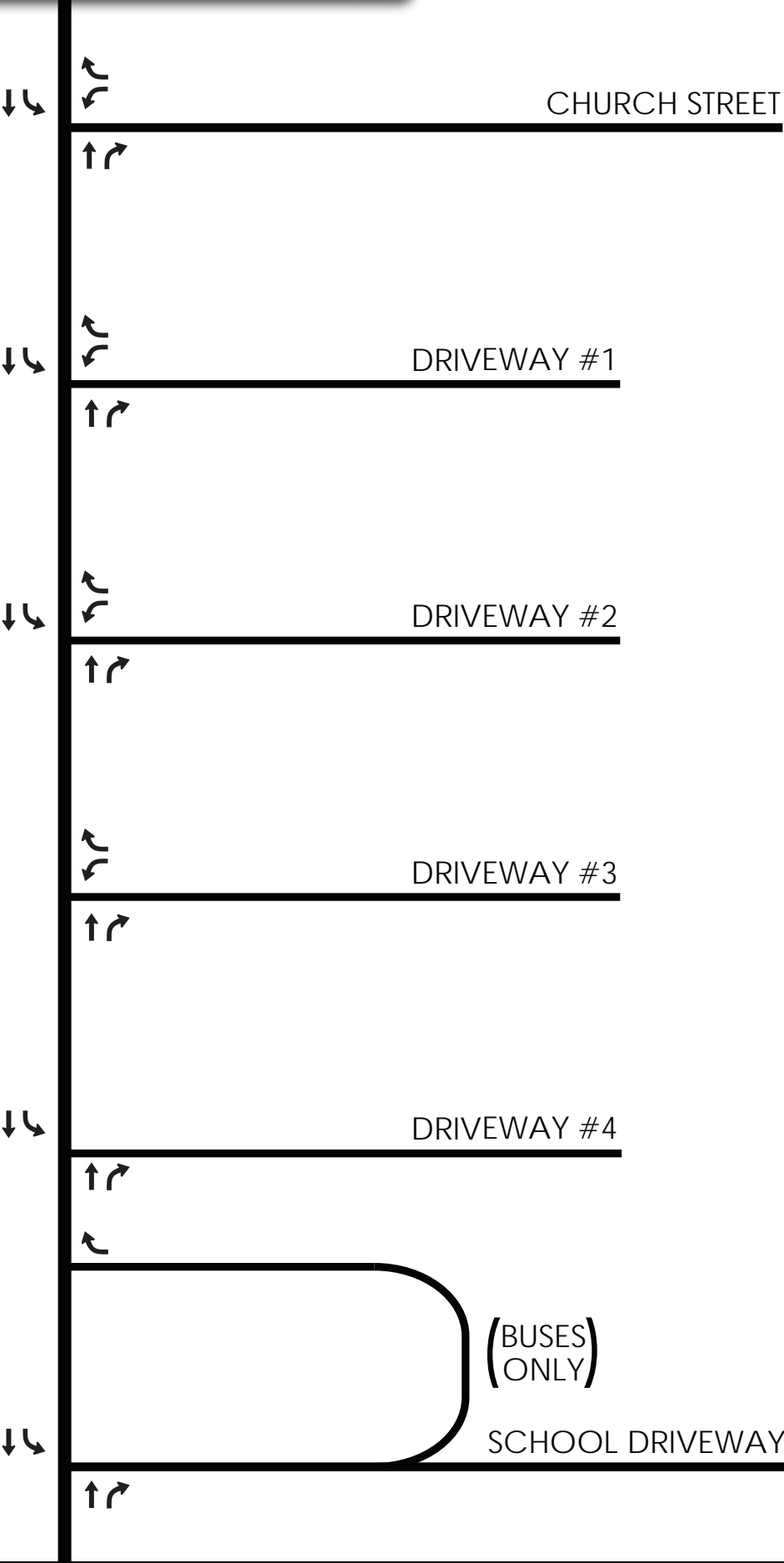


Figure 1: Observed Enter/Exit Driveway Counts

Peak Hour AM (PM) on 6/6/18  
Church Street Access Study

Peak Hours were observed from 8:00 - 9:00 AM and 4:00 - 5:00 PM, respectively. Percentages of entering and exiting vehicles were calculated for Driveways 1-4; the school driveway (buses only) percentages were calculated separately.

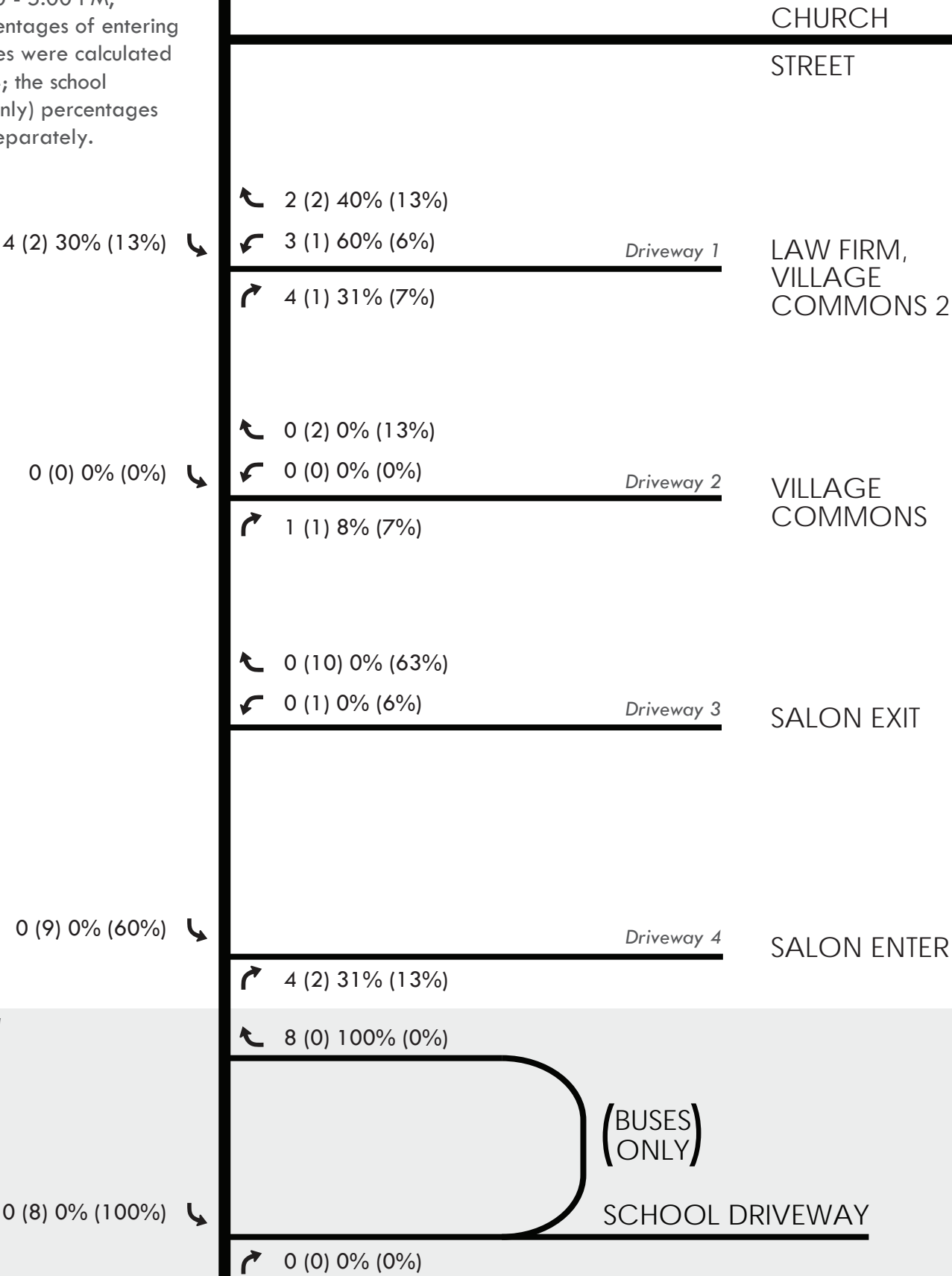
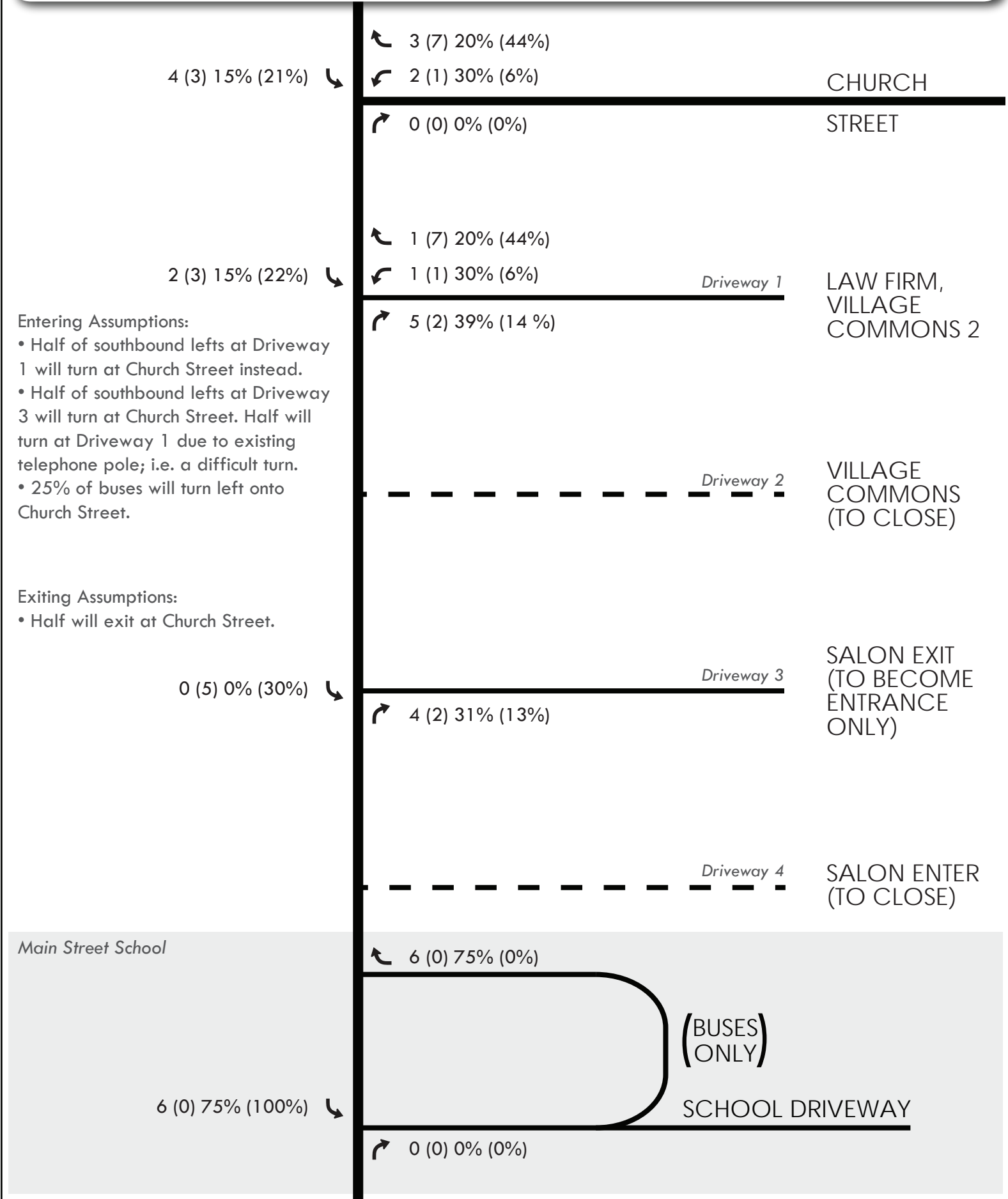


Figure 2: Municipal Lot Concept Plan - Assumed Traffic Redistribution Assignments

Peak Hour AM (PM)  
Church Street Access Study



### Figure 3: "Worst-Case Assignment Scenario"

Peak Hour AM (PM)  
Church Street Access Study

Scenario Assumption:

All driveway traffic enters and/or exits  
at Church Street.

12 (11) 30% (73%) ↘

↶ 10 (14) 40% (88%)

↷ 3 (2) 60% (12%)

↶ 9 (4) 70% (27%)

CHURCH

STREET



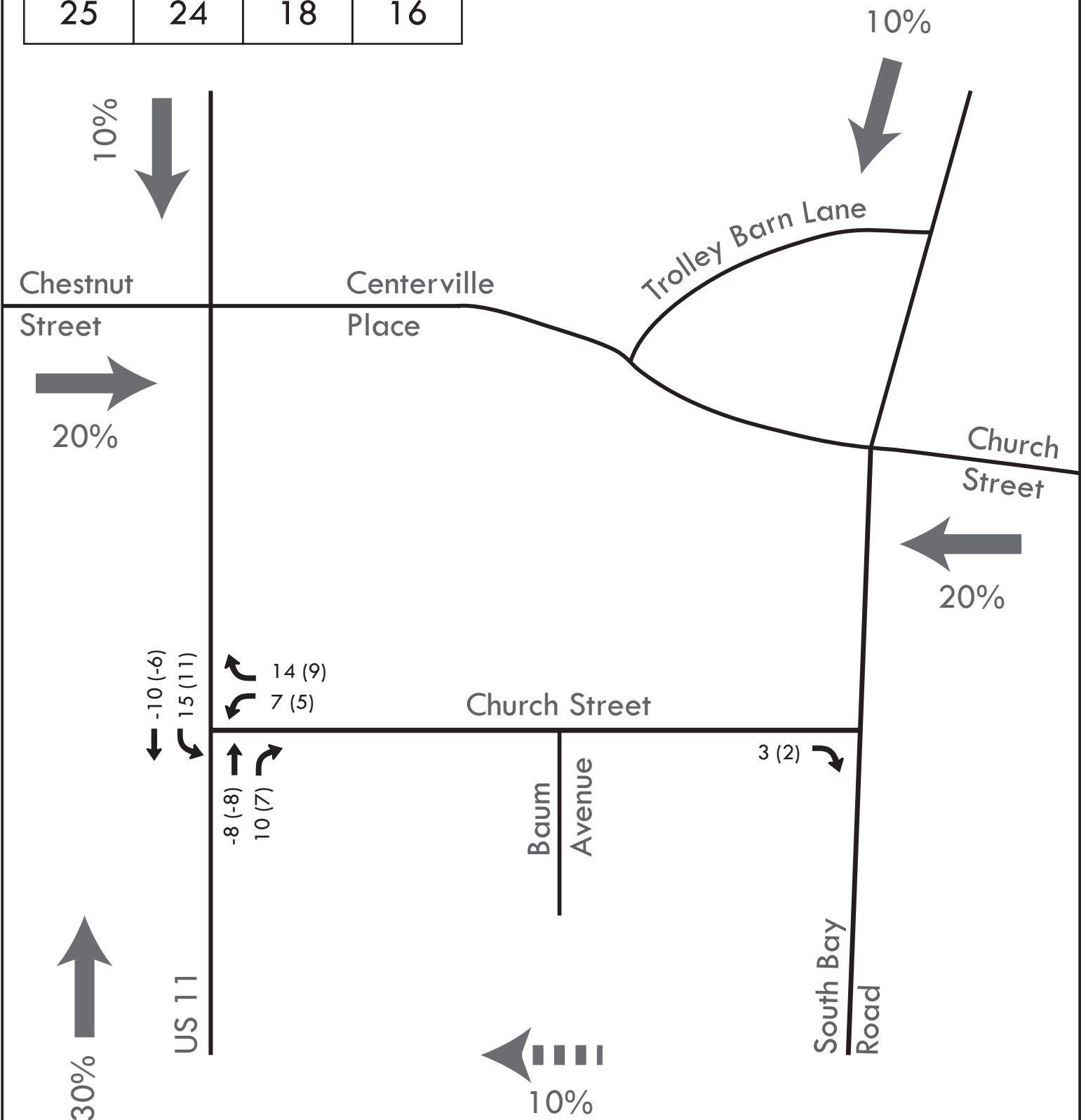
# Attachment C

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**Half of Forecasted Traffic Growth (from future  
mixed-use development) Trip Assignments**

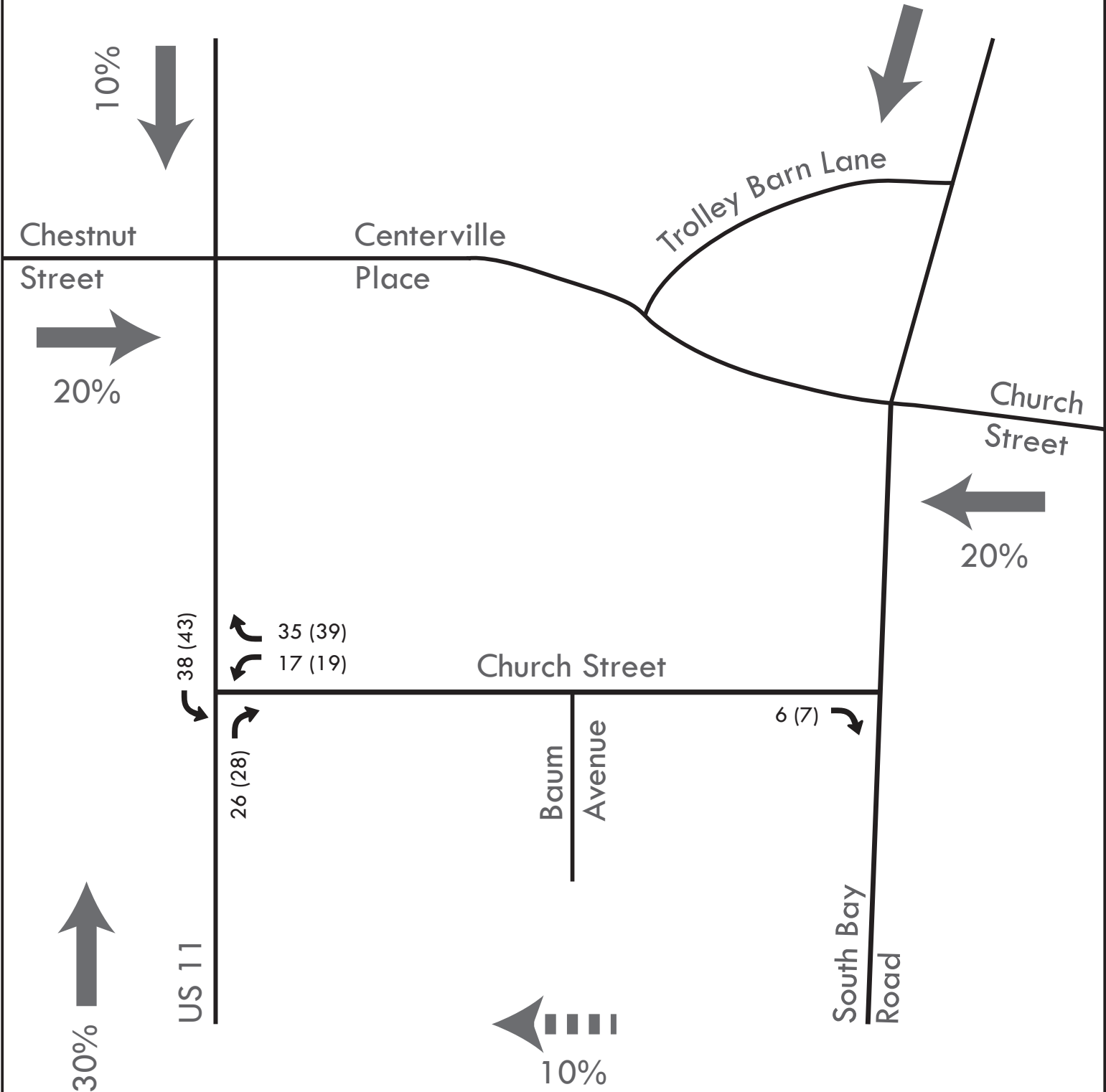
# Assignment of Pass-By Trips with Half of Economic Development Traffic

AM		PM	
In	Out	In	Out
25	24	18	16



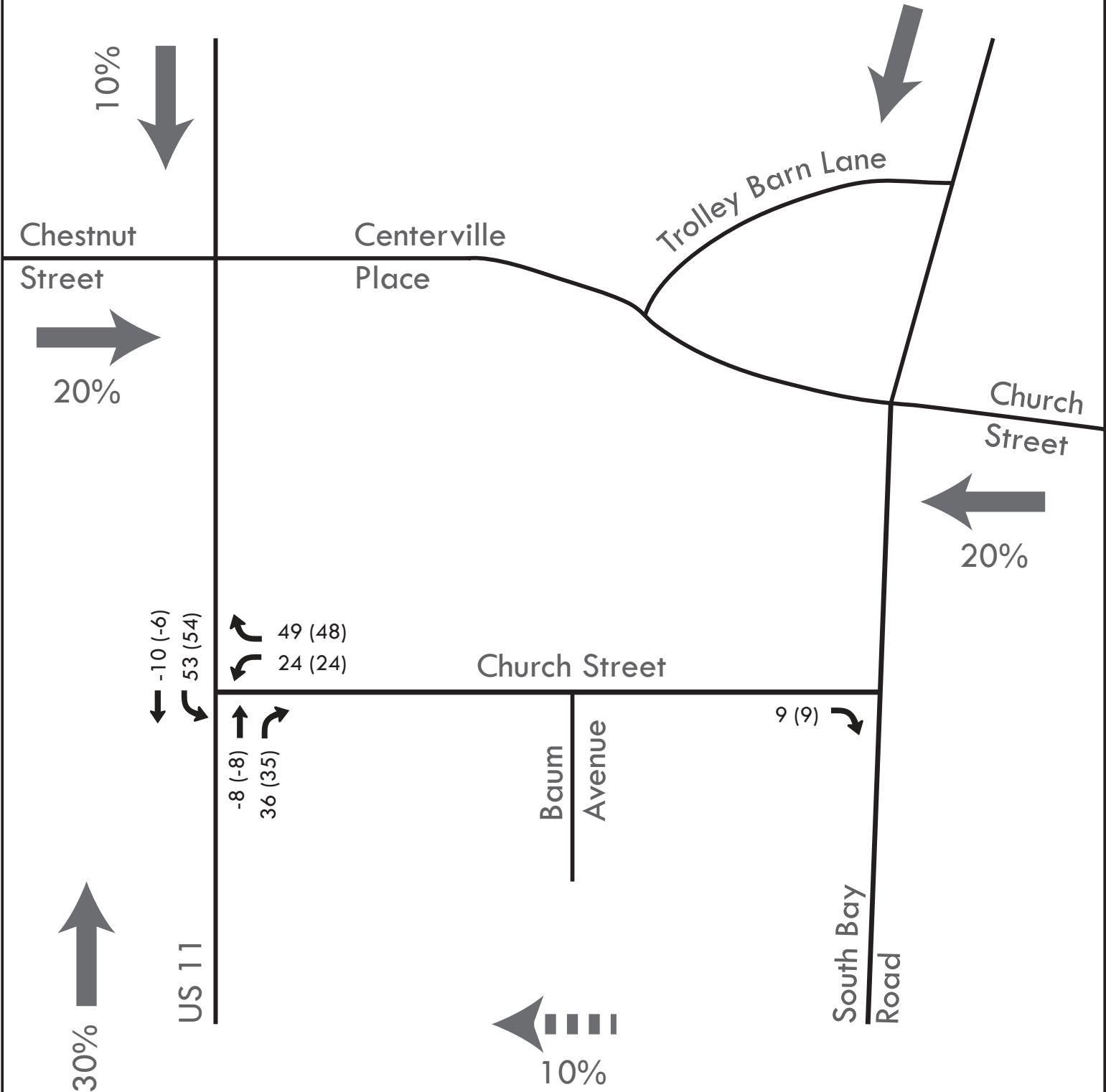
# Assignment of New Trips with Half of Economic Development Traffic

AM		PM	
In	Out	In	Out
64	58	71	65

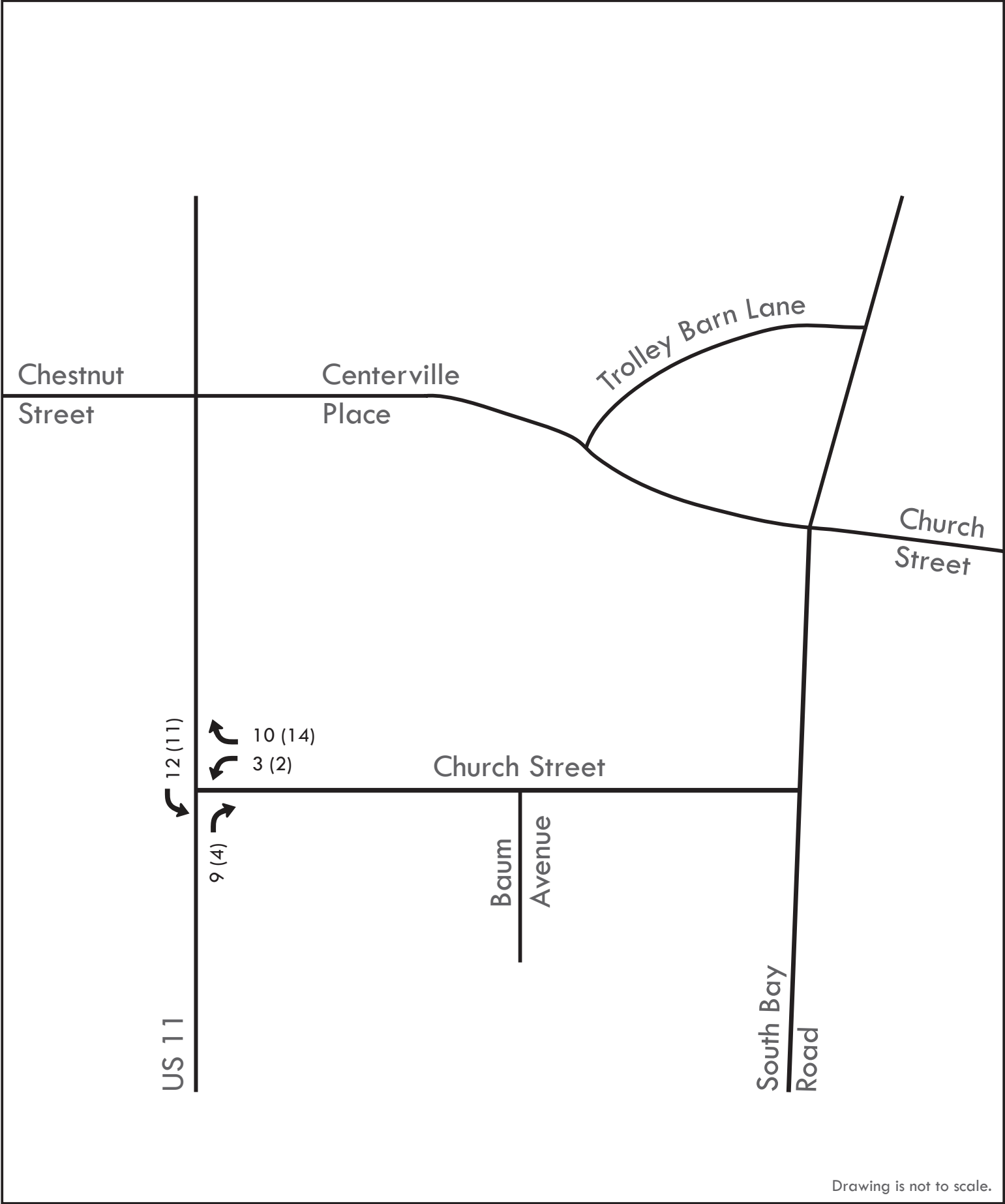


# Assignment of Pass-By Trips Plus New Trips with Half of Economic Development Traffic

AM		PM	
In	Out	In	Out
89	82	89	81

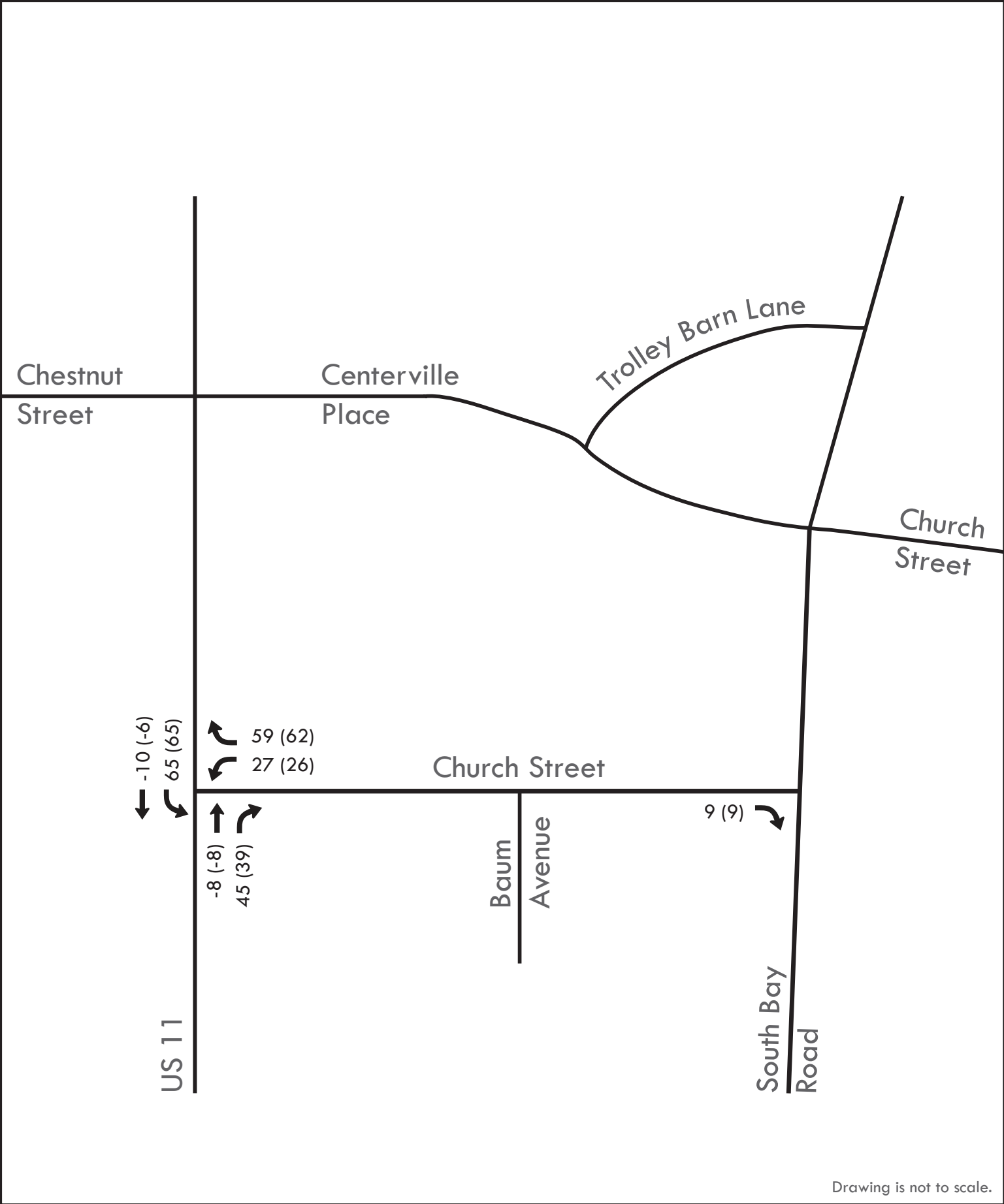


“Worst-case” Municipal Lot Traffic Scenario

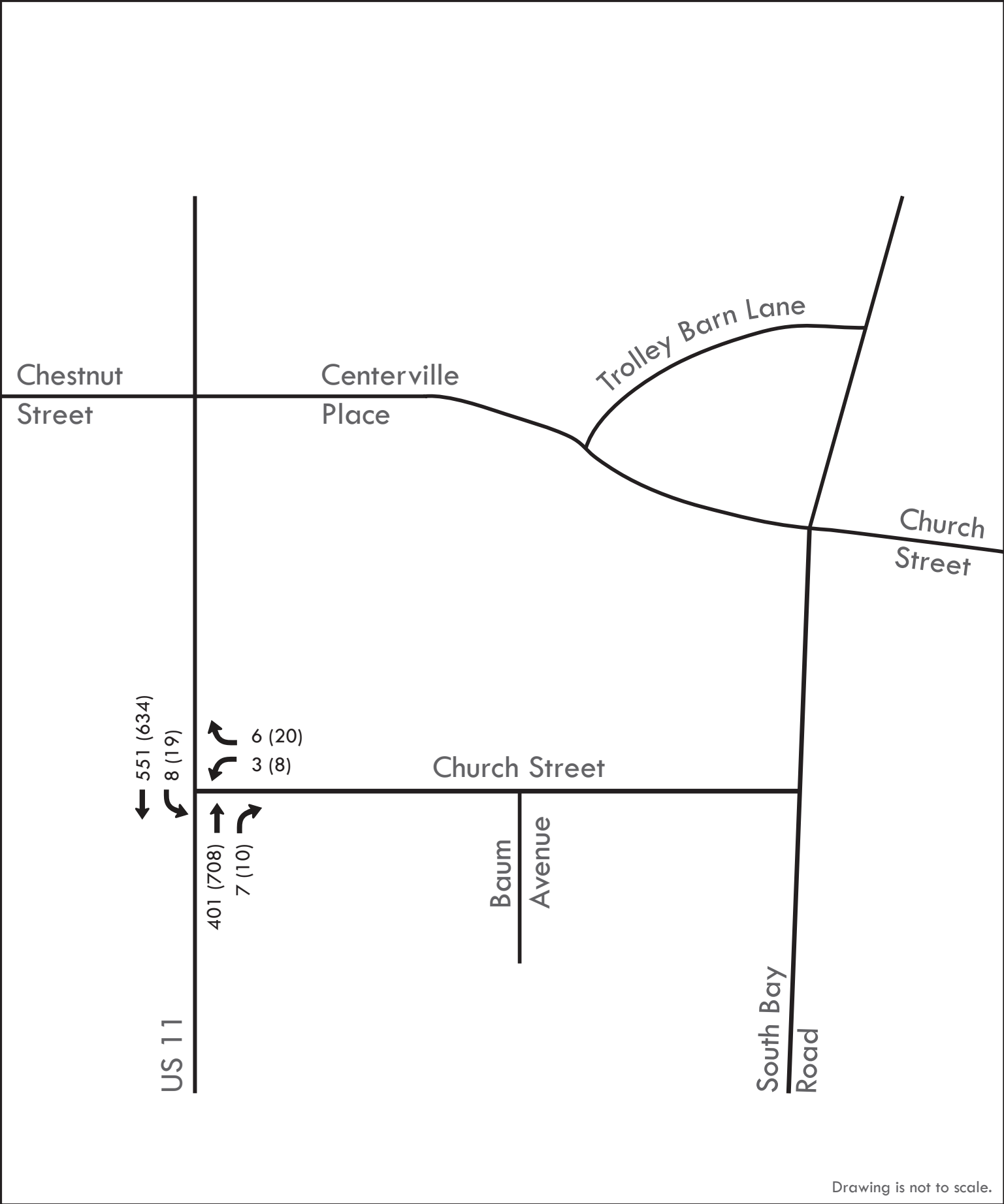


Drawing is not to scale.

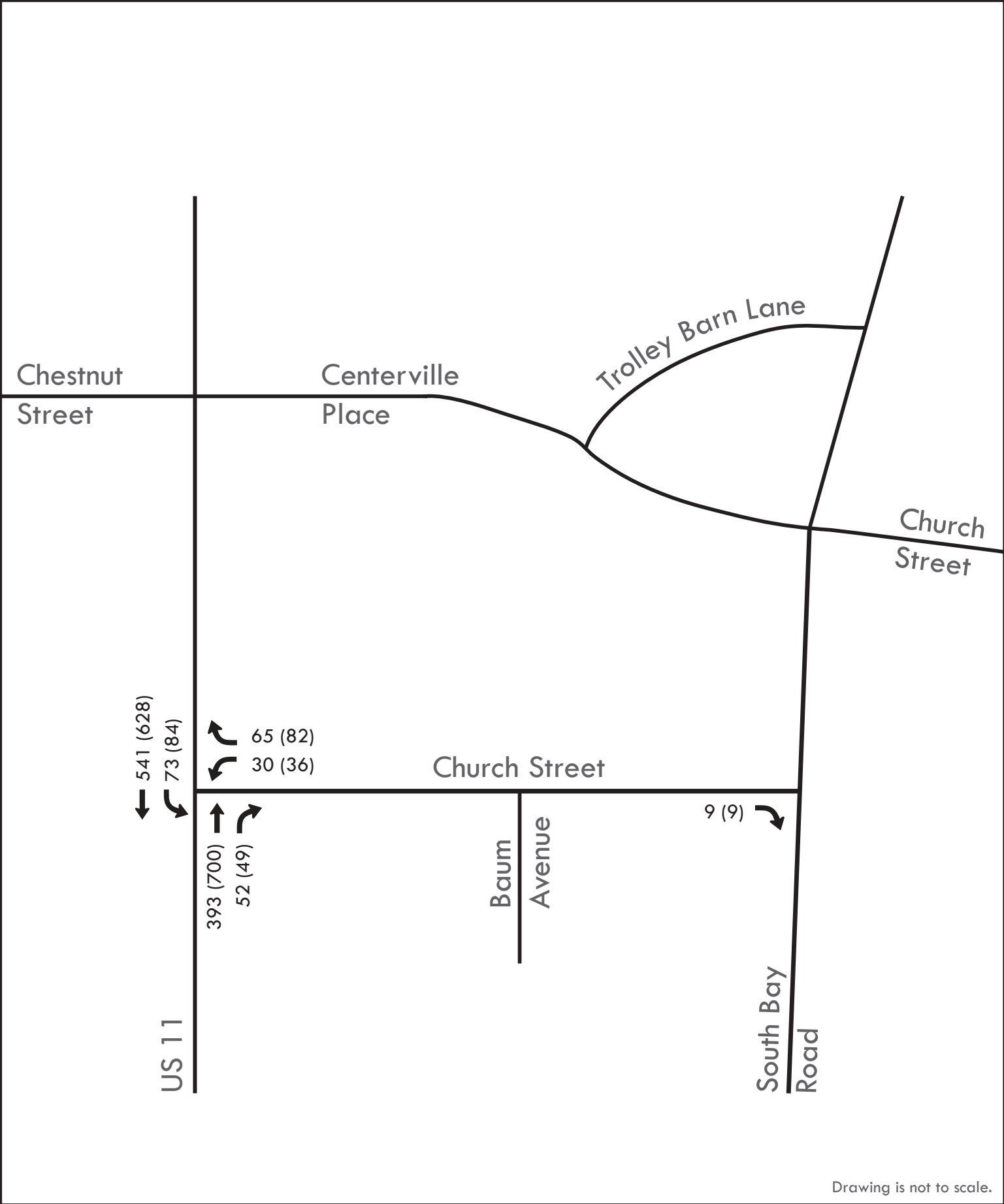
Assignment of Pass-By Trips with Half of Economic Development Traffic and Municipal Lot



2034 No-Build Scenario Volumes (From 2016 Access Study)



Assignment of Pass-By Trips Plus New Trips with Half of Economic Development Traffic and Municipal Lot Plus 2034 No-Build Scenario



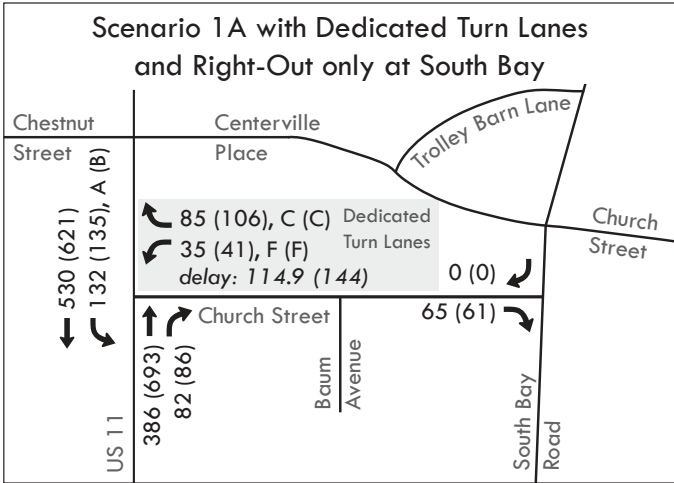
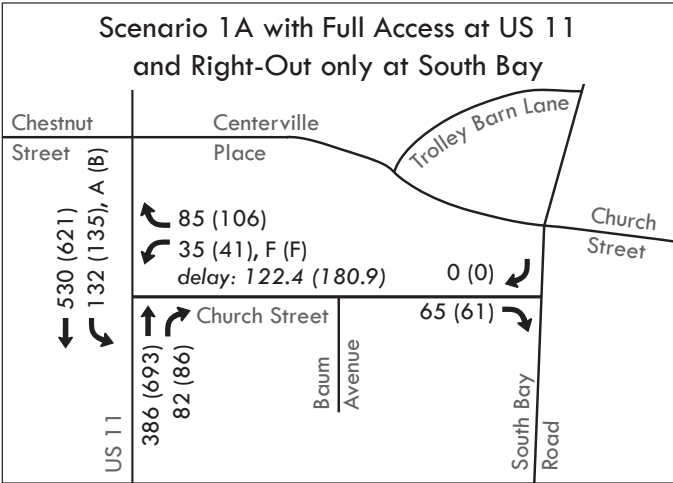
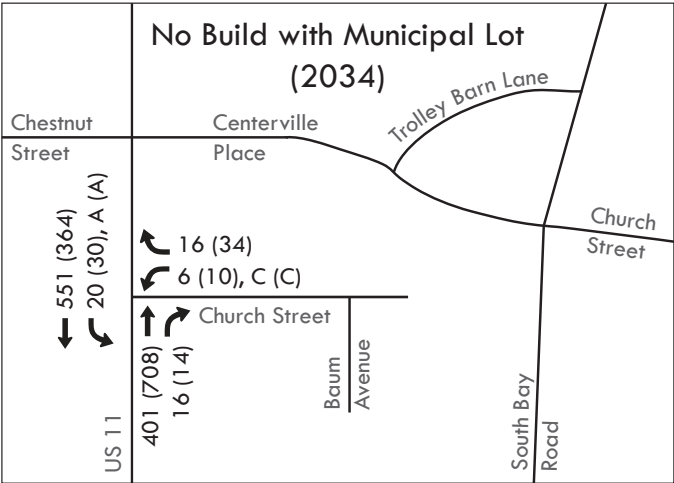
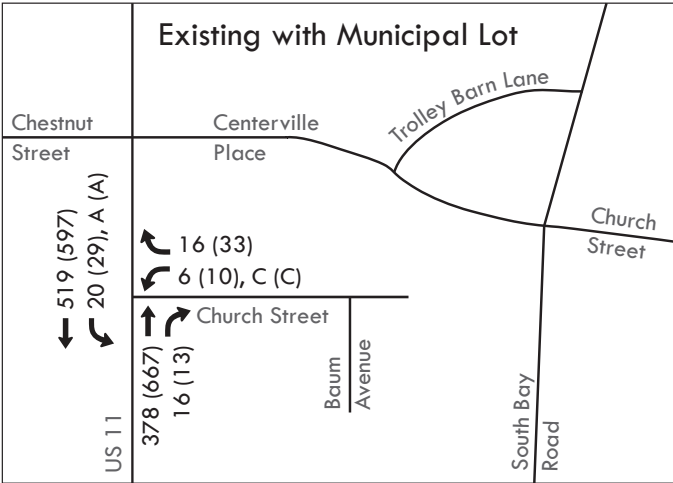
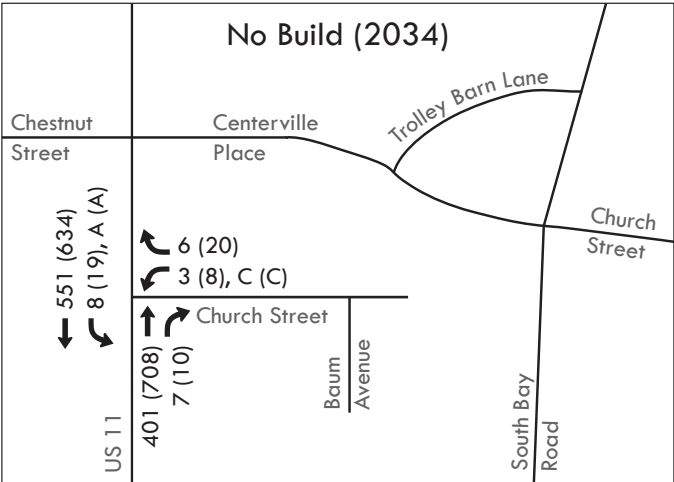
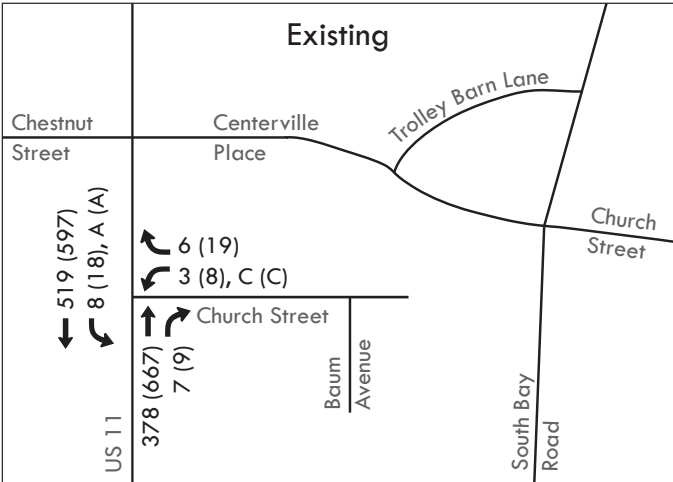


# Attachment D

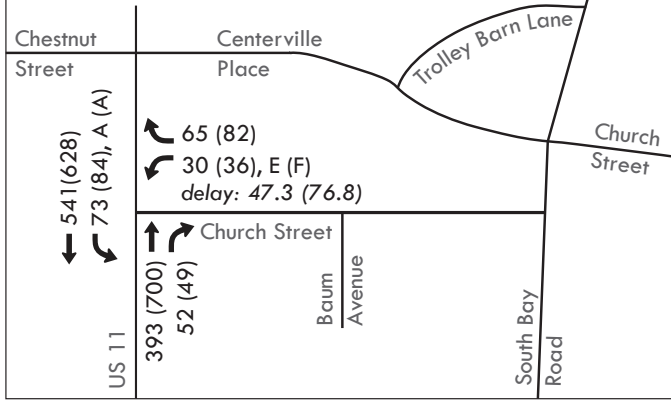
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## Scenario Trip Distribution and Assignments

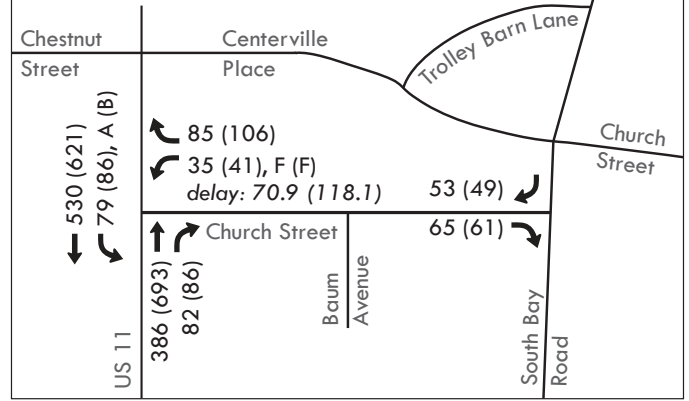
Final Trip Assignment Results



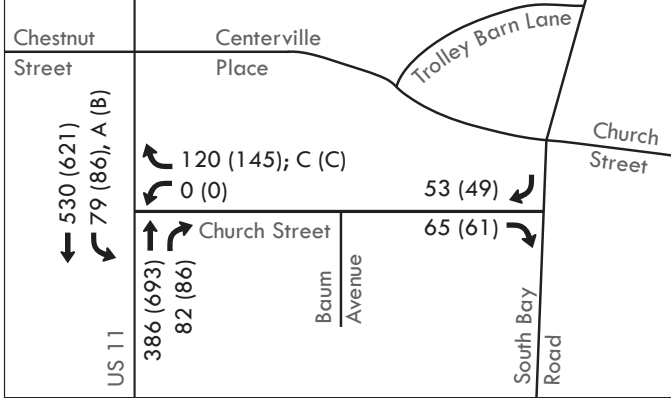
### Scenario 1A with Half Economic Development Traffic and Municipal Lot



### Scenario 1A with Full Access at US 11 and Right-In, Right-Out only at South Bay



### Scenario 1A - WB Right-Out only at US 11 and Right-In, Right-Out only at South Bay







# Attachment E

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## Scenario Synchro Summary Reports





Existing (2014) Traffic – 11/Church  
WB Left/Right allowed at Rt 11, no connection to S. Bay Rd.

AM Peak Hour  
HCM 2010 TWSC

Intersection						
Int Delay, s/veh	0.3					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	3	6	378	7	8	519
Future Vol, veh/h	3	6	378	7	8	519
Conflicting Peds, #/hr	2	5	0	12	12	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	95	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	56	56	68	68	78	78
Heavy Vehicles, %	0	0	7	0	0	6
Mvmt Flow	5	11	556	10	10	665
Major/Minor	Minor1	Major1		Major2		
Conflicting Flow All	1260	578	0	0	578	0
Stage 1	573	-	-	-	-	-
Stage 2	687	-	-	-	-	-
Critical Hdwy	6.4	6.2	-	-	4.1	-
Critical Hdwy Stg 1	5.4	-	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-	-
Follow-up Hdwy	3.5	3.3	-	-	2.2	-
Pot Cap-1 Maneuver	190	519	-	-	1006	-
Stage 1	568	-	-	-	-	-
Stage 2	503	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	186	512	-	-	997	-
Mov Cap-2 Maneuver	186	-	-	-	-	-
Stage 1	557	-	-	-	-	-
Stage 2	502	-	-	-	-	-
Approach	WB	NB		SB		
HCM Control Delay, s	16.7	0		0.1		
HCM LOS	C					
Minor Lane/Major Mvmt		NBT	NBRWBLn1	SBL	SBT	
Capacity (veh/h)		-	-	323	997	-
HCM Lane V/C Ratio		-	-	0.05	0.01	-
HCM Control Delay (s)		-	-	16.7	8.6	-
HCM Lane LOS		-	-	C	A	-
HCM 95th %tile Q(veh)		-	-	0.2	0	-





Existing (2014) Traffic – 11/Church  
WB Left/Right allowed at Rt 11, no connection to S. Bay Rd.

PM Peak Hour  
HCM 2010 TWSC

Intersection						
Int Delay, s/veh	0.7					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	8	19	667	9	18	597
Future Vol, veh/h	8	19	667	9	18	597
Conflicting Peds, #/hr	10	0	0	4	4	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	95	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	68	68	95	95	92	92
Heavy Vehicles, %	0	5	1	11	0	1
Mvmt Flow	12	28	702	9	20	649
Major/Minor	Minor1	Major1		Major2		
Conflicting Flow All	1410	711	0	0	715	0
Stage 1	711	-	-	-	-	-
Stage 2	699	-	-	-	-	-
Critical Hdwy	6.4	6.25	-	-	4.1	-
Critical Hdwy Stg 1	5.4	-	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-	-
Follow-up Hdwy	3.5	3.345	-	-	2.2	-
Pot Cap-1 Maneuver	154	428	-	-	895	-
Stage 1	490	-	-	-	-	-
Stage 2	497	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	149	427	-	-	892	-
Mov Cap-2 Maneuver	149	-	-	-	-	-
Stage 1	478	-	-	-	-	-
Stage 2	493	-	-	-	-	-
Approach	WB	NB		SB		
HCM Control Delay, s	20.3	0		0.3		
HCM LOS	C					
Minor Lane/Major Mvmt		NBT	NBRWBLn1	SBL	SBT	
Capacity (veh/h)		-	-	275	892	-
HCM Lane V/C Ratio		-	-	0.144	0.022	-
HCM Control Delay (s)		-	-	20.3	9.1	-
HCM Lane LOS		-	-	C	A	-
HCM 95th %tile Q(veh)		-	-	0.5	0.1	-





No Build (2034) Traffic (est. 6% growth) – 11/Church  
WB Left/Right allowed at Rt 11, no connection to S. Bay Rd.

AM Peak Hour  
HCM 2010 TWSC

Intersection						
Int Delay, s/veh	0.3					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	3	6	401	7	8	551
Future Vol, veh/h	3	6	401	7	8	551
Conflicting Peds, #/hr	2	5	0	12	12	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	95	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	56	56	68	68	78	78
Heavy Vehicles, %	0	0	7	0	0	6
Mvmt Flow	5	11	590	10	10	706
Major/Minor	Minor1	Major1		Major2		
Conflicting Flow All	1335	612	0	0	612	0
Stage 1	607	-	-	-	-	-
Stage 2	728	-	-	-	-	-
Critical Hdwy	6.4	6.2	-	-	4.1	-
Critical Hdwy Stg 1	5.4	-	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-	-
Follow-up Hdwy	3.5	3.3	-	-	2.2	-
Pot Cap-1 Maneuver	171	497	-	-	977	-
Stage 1	548	-	-	-	-	-
Stage 2	482	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	167	490	-	-	968	-
Mov Cap-2 Maneuver	167	-	-	-	-	-
Stage 1	538	-	-	-	-	-
Stage 2	481	-	-	-	-	-
Approach	WB	NB		SB		
HCM Control Delay, s	17.8	0		0.1		
HCM LOS	C					
Minor Lane/Major Mvmt	NBT	NBRWBLn1	SBL	SBT		
Capacity (veh/h)	-	-	298	968	-	
HCM Lane V/C Ratio	-	-	0.054	0.011	-	
HCM Control Delay (s)	-	-	17.8	8.8	-	
HCM Lane LOS	-	-	C	A	-	
HCM 95th %tile Q(veh)	-	-	0.2	0	-	

No Build (2034) Traffic (est. 6% growth) – 11/Church  
WB Left/Right allowed at Rt 11, no connection to S. Bay Rd.





PM Peak Hour  
HCM 2010 TWSC

Intersection						
Int Delay, s/veh	0.7					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	8	20	708	10	19	634
Future Vol, veh/h	8	20	708	10	19	634
Conflicting Peds, #/hr	10	0	0	4	4	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	95	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	68	68	95	95	92	92
Heavy Vehicles, %	0	5	1	11	0	1
Mvmt Flow	12	29	745	11	21	689
Major/Minor	Minor1	Major1	Major2			
Conflicting Flow All	1496	755	0	0	760	0
Stage 1	755	-	-	-	-	-
Stage 2	741	-	-	-	-	-
Critical Hdwy	6.4	6.25	-	-	4.1	-
Critical Hdwy Stg 1	5.4	-	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-	-
Follow-up Hdwy	3.5	3.345	-	-	2.2	-
Pot Cap-1 Maneuver	137	404	-	-	861	-
Stage 1	468	-	-	-	-	-
Stage 2	475	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	132	403	-	-	858	-
Mov Cap-2 Maneuver	132	-	-	-	-	-
Stage 1	455	-	-	-	-	-
Stage 2	471	-	-	-	-	-
Approach	WB	NB	SB			
HCM Control Delay, s	21.9	0	0.3			
HCM LOS	C					
Minor Lane/Major Mvmt	NBT	NBRWBLn1	SBL	SBT		
Capacity (veh/h)	-	-	254	858	-	
HCM Lane V/C Ratio	-	-	0.162	0.024	-	
HCM Control Delay (s)	-	-	21.9	9.3	-	
HCM Lane LOS	-	-	C	A	-	
HCM 95th %tile Q(veh)	-	-	0.6	0.1	-	







Existing (2014) Traffic w/Municipal Lot – 11/Church  
WB Left/Right at Rt 11, no connection to S. Bay Rd.

AM Peak Hour  
HCM 2010 TWSC

Intersection						
Int Delay, s/veh	0.7					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	6	16	378	16	20	519
Future Vol, veh/h	6	16	378	16	20	519
Conflicting Peds, #/hr	2	5	0	12	12	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	95	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	56	56	68	68	78	78
Heavy Vehicles, %	0	0	7	0	0	6
Mvmt Flow	11	29	556	24	26	665
Major/Minor	Minor1	Major1		Major2		
Conflicting Flow All	1299	585	0	0	592	0
Stage 1	580	-	-	-	-	-
Stage 2	719	-	-	-	-	-
Critical Hdwy	6.4	6.2	-	-	4.1	-
Critical Hdwy Stg 1	5.4	-	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-	-
Follow-up Hdwy	3.5	3.3	-	-	2.2	-
Pot Cap-1 Maneuver	180	515	-	-	994	-
Stage 1	564	-	-	-	-	-
Stage 2	486	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	173	508	-	-	985	-
Mov Cap-2 Maneuver	173	-	-	-	-	-
Stage 1	544	-	-	-	-	-
Stage 2	485	-	-	-	-	-
Approach	WB	NB		SB		
HCM Control Delay, s	17.3	0		0.3		
HCM LOS	C					
Minor Lane/Major Mvmt	NBT	NBRWBLn1		SBL	SBT	
Capacity (veh/h)	-	-	332	985	-	
HCM Lane V/C Ratio	-	-	0.118	0.026	-	
HCM Control Delay (s)	-	-	17.3	8.8	-	
HCM Lane LOS	-	-	C	A	-	
HCM 95th %tile Q(veh)	-	-	0.4	0.1	-	





Existing (2014) Traffic w/Municipal Lot – 11/Church  
WB Left/Right at Rt 11, no connection to S. Bay Rd.

PM Peak Hour  
HCM 2010 TWSC

Intersection						
Int Delay, s/veh	1.1					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	10	33	667	13	29	597
Future Vol, veh/h	10	33	667	13	29	597
Conflicting Peds, #/hr	10	0	0	4	4	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	95	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	68	68	95	95	92	92
Heavy Vehicles, %	0	5	1	11	0	1
Mvmt Flow	15	49	702	14	32	649
Major/Minor	Minor1	Major1	Major2			
Conflicting Flow All	1436	713	0	0	720	0
Stage 1	713	-	-	-	-	-
Stage 2	723	-	-	-	-	-
Critical Hdwy	6.4	6.25	-	-	4.1	-
Critical Hdwy Stg 1	5.4	-	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-	-
Follow-up Hdwy	3.5	3.345	-	-	2.2	-
Pot Cap-1 Maneuver	149	427	-	-	891	-
Stage 1	489	-	-	-	-	-
Stage 2	484	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	142	426	-	-	888	-
Mov Cap-2 Maneuver	142	-	-	-	-	-
Stage 1	470	-	-	-	-	-
Stage 2	480	-	-	-	-	-
Approach	WB	NB	SB			
HCM Control Delay, s	20.8	0	0.4			
HCM LOS	C					
Minor Lane/Major Mvmt	NBT	NBRWBLn1	SBL	SBT		
Capacity (veh/h)	-	-	291	888	-	
HCM Lane V/C Ratio	-	-	0.217	0.035	-	
HCM Control Delay (s)	-	-	20.8	9.2	-	
HCM Lane LOS	-	-	C	A	-	
HCM 95th %tile Q(veh)	-	-	0.8	0.1	-	





No Build (2034) Traffic (est. 6% growth) w/Municipal Lot – 11/Church  
WB Left/Right at Rt 11, right-in, right out at S. Bay Rd.

AM Peak Hour  
HCM 2010 TWSC

Intersection						
Int Delay, s/veh	0.7					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	6	16	401	16	20	551
Future Vol, veh/h	6	16	401	16	20	551
Conflicting Peds, #/hr	2	5	0	12	12	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	95	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	56	56	68	68	78	78
Heavy Vehicles, %	0	0	7	0	0	6
Mvmt Flow	11	29	590	24	26	706
Major/Minor	Minor1	Major1	Major2			
Conflicting Flow All	1374	619	0	0	626	0
Stage 1	614	-	-	-	-	-
Stage 2	760	-	-	-	-	-
Critical Hdwy	6.4	6.2	-	-	4.1	-
Critical Hdwy Stg 1	5.4	-	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-	-
Follow-up Hdwy	3.5	3.3	-	-	2.2	-
Pot Cap-1 Maneuver	162	492	-	-	965	-
Stage 1	544	-	-	-	-	-
Stage 2	465	-	-	-	-	-
Platoon blocked, %			-	-	-	-
Mov Cap-1 Maneuver	156	485	-	-	956	-
Mov Cap-2 Maneuver	156	-	-	-	-	-
Stage 1	524	-	-	-	-	-
Stage 2	464	-	-	-	-	-
Approach	WB	NB	SB			
HCM Control Delay, s	18.4	0	0.3			
HCM LOS	C					
Minor Lane/Major Mvmt	NBT	NBRWBLn1	SBL	SBT		
Capacity (veh/h)	-	-	308	956	-	
HCM Lane V/C Ratio	-	-	0.128	0.027	-	
HCM Control Delay (s)	-	-	18.4	8.9	-	
HCM Lane LOS	-	-	C	A	-	
HCM 95th %tile Q(veh)	-	-	0.4	0.1	-	





No Build (2034) Traffic (est. 6% growth) w/Municipal Lot – 11/Church  
WB Left/Right at Rt 11, right-in, right out at S. Bay Rd.

PM Peak Hour  
HCM 2010 TWSC

Intersection						
Int Delay, s/veh	1.1					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	10	34	708	14	30	634
Future Vol, veh/h	10	34	708	14	30	634
Conflicting Peds, #/hr	10	0	0	4	4	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	95	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	68	68	95	95	92	92
Heavy Vehicles, %	0	5	1	11	0	1
Mvmt Flow	15	50	745	15	33	689
Major/Minor	Minor1	Major1	Major2			
Conflicting Flow All	1522	757	0	0	764	0
Stage 1	757	-	-	-	-	-
Stage 2	765	-	-	-	-	-
Critical Hdwy	6.4	6.25	-	-	4.1	-
Critical Hdwy Stg 1	5.4	-	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-	-
Follow-up Hdwy	3.5	3.345	-	-	2.2	-
Pot Cap-1 Maneuver	132	403	-	-	858	-
Stage 1	467	-	-	-	-	-
Stage 2	463	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	125	402	-	-	855	-
Mov Cap-2 Maneuver	125	-	-	-	-	-
Stage 1	447	-	-	-	-	-
Stage 2	459	-	-	-	-	-
Approach	WB	NB	SB			
HCM Control Delay, s	22.7	0	0.4			
HCM LOS	C					
Minor Lane/Major Mvmt	NBT	NBRWBLn1	SBL	SBT		
Capacity (veh/h)	-	-	267	855	-	
HCM Lane V/C Ratio	-	-	0.242	0.038	-	
HCM Control Delay (s)	-	-	22.7	9.4	-	
HCM Lane LOS	-	-	C	A	-	
HCM 95th %tile Q(veh)	-	-	0.9	0.1	-	





Scenario 1A with full access at 11; Right-out only at S. Bay Rd. - w/Muni Lot  
WB Left/Right at Rt 11; right-out only S. Bay Rd.

AM Peak Hour  
HCM 2010 TWSC






Intersection						
Int Delay, s/veh	15.9					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	35	85	386	82	132	530
Future Vol, veh/h	35	85	386	82	132	530
Conflicting Peds, #/hr	2	5	0	12	12	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	0	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	56	56	68	68	78	78
Heavy Vehicles, %	0	0	7	0	0	6
Mvmt Flow	63	152	568	121	169	679
Major/Minor	Minor1	Major1		Major2		
Conflicting Flow All	1660	646	0	0	701	0
Stage 1	641	-	-	-	-	-
Stage 2	1019	-	-	-	-	-
Critical Hdwy	6.4	6.2	-	-	4.1	-
Critical Hdwy Stg 1	5.4	-	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-	-
Follow-up Hdwy	3.5	3.3	-	-	2.2	-
Pot Cap-1 Maneuver	108	475	-	-	905	-
Stage 1	528	-	-	-	-	-
Stage 2	351	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	87	469	-	-	897	-
Mov Cap-2 Maneuver	87	-	-	-	-	-
Stage 1	425	-	-	-	-	-
Stage 2	350	-	-	-	-	-
Approach	WB	NB		SB		
HCM Control Delay, s	122.4	0		2		
HCM LOS	F					
Minor Lane/Major Mvmt	NBT	NBRWBLn1	SBL	SBT		
Capacity (veh/h)	-	-	206	897	-	
HCM Lane V/C Ratio	-	-	1.04	0.189	-	
HCM Control Delay (s)	-	-	122.4	9.9	-	
HCM Lane LOS	-	-	F	A	-	
HCM 95th %tile Q(veh)	-	-	9.5	0.7	-	

Scenario 1A with full access at 11; Right-out only at S. Bay Rd. w/Muni Lot  
WB Left/Right at Rt 11; right-out only S. Bay Rd.






PM Peak Hour  
HCM 2010 TWSC

Intersection						
Int Delay, s/veh	21.9					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	41	106	693	86	135	621
Future Vol, veh/h	41	106	693	86	135	621
Conflicting Peds, #/hr	10	0	0	4	4	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	0	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	68	68	95	95	92	92
Heavy Vehicles, %	0	5	1	11	0	1
Mvmt Flow	60	156	729	91	147	675
Major/Minor	Minor1	Major1		Major2		
Conflicting Flow All	1758	779	0	0	824	0
Stage 1	779	-	-	-	-	-
Stage 2	979	-	-	-	-	-
Critical Hdwy	6.4	6.25	-	-	4.1	-
Critical Hdwy Stg 1	5.4	-	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-	-
Follow-up Hdwy	3.5	3.345	-	-	2.2	-
Pot Cap-1 Maneuver	94	391	-	-	815	-
Stage 1	456	-	-	-	-	-
Stage 2	367	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	76	390	-	-	813	-
Mov Cap-2 Maneuver	76	-	-	-	-	-
Stage 1	373	-	-	-	-	-
Stage 2	364	-	-	-	-	-
Approach	WB	NB		SB		
HCM Control Delay, s	180.9	0		1.9		
HCM LOS	F					
Minor Lane/Major Mvmt	NBT	NBRWBLn1	SBL	SBT		
Capacity (veh/h)	-	-	181	813	-	
HCM Lane V/C Ratio	-	-	1.194	0.18	-	
HCM Control Delay (s)	-	-	180.9	10.4	-	
HCM Lane LOS	-	-	F	B	-	
HCM 95th %tile Q(veh)	-	-	11.5	0.7	-	

Scenario 1A with Dedicated c lanes; Right-out only at S. Bay Rd. as shown in the AM Peak Hour  
Dedicated WB left lane and WB right lane at Rt 11; right-out only at S. Bay Rd. as shown in the PM Peak Hour  
HCM 2010 TWSC

Intersection						
Int Delay, s/veh	6.5					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	35	85	386	82	132	530
Future Vol, veh/h	35	85	386	82	132	530
Conflicting Peds, #/hr	2	5	0	12	12	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	0	-	-	0	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	56	56	68	68	78	78
Heavy Vehicles, %	0	0	7	0	0	6
Mvmt Flow	63	152	568	121	169	679
Major/Minor	Minor1	Major1	Major2			
Conflicting Flow All	1660	646	0	0	701	0
Stage 1	641	-	-	-	-	-
Stage 2	1019	-	-	-	-	-
Critical Hdwy	6.4	6.2	-	-	4.1	-
Critical Hdwy Stg 1	5.4	-	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-	-
Follow-up Hdwy	3.5	3.3	-	-	2.2	-
Pot Cap-1 Maneuver	108	475	-	-	905	-
Stage 1	528	-	-	-	-	-
Stage 2	351	-	-	-	-	-
Platoon blocked, %			-	-	-	-
Mov Cap-1 Maneuver	87	469	-	-	897	-
Mov Cap-2 Maneuver	87	-	-	-	-	-
Stage 1	425	-	-	-	-	-
Stage 2	350	-	-	-	-	-
Approach	WB	NB	SB			
HCM Control Delay, s	45.1	0	2			
HCM LOS	E					
Minor Lane/Major Mvmt	NBT	NBR	WBLn1	WBLn2	SBL	SBT
Capacity (veh/h)	-	-	87	469	897	-
HCM Lane V/C Ratio	-	-	0.718	0.324	0.189	-
HCM Control Delay (s)	-	-	114.9	16.3	9.9	-
HCM Lane LOS	-	-	F	C	A	-
HCM 95th %tile Q(veh)	-	-	3.5	1.4	0.7	-

Scenario 1A w/dedicated turn lanes; Right-out only at S. Bay Rd. w/Muni Lot PM Peak Hour  
Dedicated WB left lane and WB right lane at Rt 11; right-out only at S. Bay Rd. HCM 2010 TWSC

Intersection						
Int Delay, s/veh	7.2					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	41	106	693	86	135	621
Future Vol, veh/h	41	106	693	86	135	621
Conflicting Peds, #/hr	10	0	0	4	4	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	0	-	-	0	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	68	68	95	95	92	92
Heavy Vehicles, %	0	5	1	11	0	1
Mvmt Flow	60	156	729	91	147	675
Major/Minor	Minor1	Major1	Major2			
Conflicting Flow All	1758	779	0	0	824	0
Stage 1	779	-	-	-	-	-
Stage 2	979	-	-	-	-	-
Critical Hdwy	6.4	6.25	-	-	4.1	-
Critical Hdwy Stg 1	5.4	-	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-	-
Follow-up Hdwy	3.5	3.345	-	-	2.2	-
Pot Cap-1 Maneuver	94	391	-	-	815	-
Stage 1	456	-	-	-	-	-
Stage 2	367	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	76	390	-	-	813	-
Mov Cap-2 Maneuver	76	-	-	-	-	-
Stage 1	373	-	-	-	-	-
Stage 2	364	-	-	-	-	-
Approach	WB	NB	SB			
HCM Control Delay, s	54.7	0	1.9			
HCM LOS	F					
Minor Lane/Major Mvmt	NBT	NBRWBLn1WBLn2	SBL	SBT		
Capacity (veh/h)	-	- 76 390	813	-		
HCM Lane V/C Ratio	-	- 0.793 0.4	0.18	-		
HCM Control Delay (s)	-	- 144 20.2	10.4	-		
HCM Lane LOS	-	- F C	B	-		
HCM 95th %tile Q(veh)	-	- 3.9 1.9	0.7	-		







Scenario 1A w/ 1/2 ED Traffic, Full access at 11; Right-out only at S. Bay Rd. } as c AM Peak Hour  
 WB Left/Right at Rt 11; right-out only at S. Bay Rd. HCM 2010 TWSC

Intersection						
Int Delay, s/veh	5.5					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	W		T		T	T
Traffic Vol, veh/h	30	65	393	52	73	541
Future Vol, veh/h	30	65	393	52	73	541
Conflicting Peds, #/hr	2	5	0	12	12	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	0	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	56	56	68	68	78	78
Heavy Vehicles, %	0	0	7	0	0	6
Mvmt Flow	54	116	578	76	94	694
Major/Minor	Minor1	Major1		Major2		
Conflicting Flow All	1512	633	0	0	666	0
Stage 1	628	-	-	-	-	-
Stage 2	884	-	-	-	-	-
Critical Hdwy	6.4	6.2	-	-	4.1	-
Critical Hdwy Stg 1	5.4	-	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-	-
Follow-up Hdwy	3.5	3.3	-	-	2.2	-
Pot Cap-1 Maneuver	134	483	-	-	933	-
Stage 1	536	-	-	-	-	-
Stage 2	407	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	119	477	-	-	924	-
Mov Cap-2 Maneuver	119	-	-	-	-	-
Stage 1	477	-	-	-	-	-
Stage 2	406	-	-	-	-	-
Approach	WB	NB		SB		
HCM Control Delay, s	47.3	0		1.1		
HCM LOS	E					
Minor Lane/Major Mvmt	NBT	NBRWBLn1	SBL	SBT		
Capacity (veh/h)	-	-	245	924	-	
HCM Lane V/C Ratio	-	-	0.692	0.101	-	
HCM Control Delay (s)	-	-	47.3	9.3	-	
HCM Lane LOS	-	-	E	A	-	
HCM 95th %tile Q(veh)	-	-	4.6	0.3	-	





Scenario 1A w/½ ED Traffic, Full access at 11; Right-out only at S. Bay w/Muni Lot PM Peak Hour  
WB Left/Right at Rt 11; right-out only at S. Bay Rd.

HCM 2010 TWSC





Intersection						
Int Delay, s/veh	8.2					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	36	82	700	49	84	628
Future Vol, veh/h	36	82	700	49	84	628
Conflicting Peds, #/hr	10	0	0	4	4	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	0	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	68	68	95	95	92	92
Heavy Vehicles, %	0	5	1	11	0	1
Mvmt Flow	53	121	737	52	91	683
Major/Minor	Minor1	Major1	Major2			
Conflicting Flow All	1642	767	0	0	793	0
Stage 1	767	-	-	-	-	-
Stage 2	875	-	-	-	-	-
Critical Hdwy	6.4	6.25	-	-	4.1	-
Critical Hdwy Stg 1	5.4	-	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-	-
Follow-up Hdwy	3.5	3.345	-	-	2.2	-
Pot Cap-1 Maneuver	111	397	-	-	837	-
Stage 1	462	-	-	-	-	-
Stage 2	411	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	98	396	-	-	834	-
Mov Cap-2 Maneuver	98	-	-	-	-	-
Stage 1	410	-	-	-	-	-
Stage 2	408	-	-	-	-	-
Approach	WB	NB	SB			
HCM Control Delay, s	76.8	0	1.2			
HCM LOS	F					
Minor Lane/Major Mvmt	NBT	NBRWBLn1	SBL	SBT		
Capacity (veh/h)	-	-	205	834	-	
HCM Lane V/C Ratio	-	-	0.846	0.109	-	
HCM Control Delay (s)	-	-	76.8	9.8	-	
HCM Lane LOS	-	-	F	A	-	
HCM 95th %tile Q(veh)	-	-	6.3	0.4	-	

Scenario 1A with full access at 11; Right-in, right out at S. Bay Road w/Muni Lot AM Peak Hour  
WB Left/Right at Rt 11; right-in, right-out at S. Bay Rd.

HCM 2010 TWSC





Intersection						
Int Delay, s/veh	9.6					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	35	85	386	82	79	530
Future Vol, veh/h	35	85	386	82	79	530
Conflicting Peds, #/hr	2	5	0	12	12	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	0	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	56	56	68	68	78	78
Heavy Vehicles, %	0	0	7	0	0	6
Mvmt Flow	63	152	568	121	101	679
Major/Minor	Minor1	Major1		Major2		
Conflicting Flow All	1524	646	0	0	701	0
Stage 1	641	-	-	-	-	-
Stage 2	883	-	-	-	-	-
Critical Hdwy	6.4	6.2	-	-	4.1	-
Critical Hdwy Stg 1	5.4	-	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-	-
Follow-up Hdwy	3.5	3.3	-	-	2.2	-
Pot Cap-1 Maneuver	131	475	-	-	905	-
Stage 1	528	-	-	-	-	-
Stage 2	408	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	115	469	-	-	897	-
Mov Cap-2 Maneuver	115	-	-	-	-	-
Stage 1	464	-	-	-	-	-
Stage 2	407	-	-	-	-	-
Approach	WB	NB		SB		
HCM Control Delay, s	70.9	0		1.2		
HCM LOS	F					
Minor Lane/Major Mvmt	NBT	NBRWBLn1	SBL	SBT		
Capacity (veh/h)	-	-	247	897	-	
HCM Lane V/C Ratio	-	-	0.868	0.113	-	
HCM Control Delay (s)	-	-	70.9	9.5	-	
HCM Lane LOS	-	-	F	A	-	
HCM 95th %tile Q(veh)	-	-	7.2	0.4	-	

Scenario 1A with full access at 11; Right-in, right out at S. Bay Road w/Muni Lot PM Peak Hour  
 WB Left/Right at Rt 11; right-in, right-out at S. Bay Rd. HCM 2010 TWSC

Intersection						
Int Delay, s/veh	14.7					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	41	106	693	86	86	621
Future Vol, veh/h	41	106	693	86	86	621
Conflicting Peds, #/hr	10	0	0	4	4	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	0	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	68	68	95	95	92	92
Heavy Vehicles, %	0	5	1	11	0	1
Mvmt Flow	60	156	729	91	93	675
Major/Minor	Minor1	Major1		Major2		
Conflicting Flow All	1650	779	0	0	824	0
Stage 1	779	-	-	-	-	-
Stage 2	871	-	-	-	-	-
Critical Hdwy	6.4	6.25	-	-	4.1	-
Critical Hdwy Stg 1	5.4	-	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-	-
Follow-up Hdwy	3.5	3.345	-	-	2.2	-
Pot Cap-1 Maneuver	110	391	-	-	815	-
Stage 1	456	-	-	-	-	-
Stage 2	413	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	96	390	-	-	813	-
Mov Cap-2 Maneuver	96	-	-	-	-	-
Stage 1	403	-	-	-	-	-
Stage 2	410	-	-	-	-	-
Approach	WB	NB		SB		
HCM Control Delay, s	118.1	0		1.2		
HCM LOS	F					
Minor Lane/Major Mvmt	NBT	NBRWBLn1		SBL	SBT	
Capacity (veh/h)	-	-	210	813	-	
HCM Lane V/C Ratio	-	-	1.029	0.115	-	
HCM Control Delay (s)	-	-	118.1	10	-	
HCM Lane LOS	-	-	F	B	-	
HCM 95th %tile Q(veh)	-	-	9.4	0.4	-	





Scenario 1A with Municipal Lot – 11/Church  
WB right only at Rt 11; right-in, right-out at S. Bay Rd.

AM Peak Hour  
HCM 2010 TWSC

Intersection						
Int Delay, s/veh	3					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	0	120	386	82	79	530
Future Vol, veh/h	0	120	386	82	79	530
Conflicting Peds, #/hr	2	5	0	12	12	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	0	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	56	56	68	68	78	78
Heavy Vehicles, %	0	0	7	0	0	6
Mvmt Flow	0	214	568	121	101	679
Major/Minor	Minor1	Major1		Major2		
Conflicting Flow All	1524	646	0	0	701	0
Stage 1	641	-	-	-	-	-
Stage 2	883	-	-	-	-	-
Critical Hdwy	6.4	6.2	-	-	4.1	-
Critical Hdwy Stg 1	5.4	-	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-	-
Follow-up Hdwy	3.5	3.3	-	-	2.2	-
Pot Cap-1 Maneuver	131	475	-	-	905	-
Stage 1	528	-	-	-	-	-
Stage 2	408	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	115	469	-	-	897	-
Mov Cap-2 Maneuver	115	-	-	-	-	-
Stage 1	464	-	-	-	-	-
Stage 2	407	-	-	-	-	-
Approach	WB	NB		SB		
HCM Control Delay, s	19	0		1.2		
HCM LOS	C					
Minor Lane/Major Mvmt	NBT	NBRWBLn1	SBL	SBT		
Capacity (veh/h)	-	-	469	897	-	
HCM Lane V/C Ratio	-	-	0.457	0.113	-	
HCM Control Delay (s)	-	-	19	9.5	-	
HCM Lane LOS	-	-	C	A	-	
HCM 95th %tile Q(veh)	-	-	2.4	0.4	-	

Scenario 1A with Municipal Lot – 11/Church  
WB right only at Rt 11; right-in, right-out at S. Bay Rd.

PM Peak Hour  
HCM 2010 TWSC

Intersection						
Int Delay, s/veh	3.4					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	0	145	693	86	86	621
Future Vol, veh/h	0	145	693	86	86	621
Conflicting Peds, #/hr	10	0	0	4	4	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	0	-	-	0	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	68	68	95	95	92	92
Heavy Vehicles, %	0	5	1	11	0	1
Mvmt Flow	0	213	729	91	93	675
Major/Minor	Minor1	Major1		Major2		
Conflicting Flow All	-	779	0	0	824	0
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	6.25	-	-	4.1	-
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	3.345	-	-	2.2	-
Pot Cap-1 Maneuver	0	391	-	-	815	-
Stage 1	0	-	-	-	-	-
Stage 2	0	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	-	390	-	-	813	-
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Approach	WB	NB		SB		
HCM Control Delay, s	24.8	0		1.2		
HCM LOS	C					
Minor Lane/Major Mvmt	NBT	NBRWBLn1		SBL	SBT	
Capacity (veh/h)	-	-	390	813	-	
HCM Lane V/C Ratio	-	-	0.547	0.115	-	
HCM Control Delay (s)	-	-	24.8	10	-	
HCM Lane LOS	-	-	C	B	-	
HCM 95th %tile Q(veh)	-	-	3.2	0.4	-	